Planning Board
AGENDA

Thursday, March 5, 2026 - 6:00 PM

Regular Meeting
Agawam Senior Center
954 Main Street
Agawam, MA 01001

A. Planning Board

1) 6:00PM PUBLIC HEARING-DEFINITIVE PLAN-Old River Street, 27 Walnut Stret, & 17 High Street-Calabrese Construction, LLC

2) 6:10PM-PUBLIC HEARING-ZONE CHANGE-515 &533 Mill Street-Dikan & Ashlaban

3) Site Plan-769 Silver Street-Agawam Energy Center, LLC

4) FORM A-544 Mill Street-RLS Realty Holdings

5) APPROVAL OF MINUTES-February 5, 2026 and February 19, 2026

6) Correspondences

TOWN OF AGAWAM
PLANNING BOARD
APPROVAL UNDER THE SUBDIVISION
CONTROL LAW IS REQUIRED

_____ _____
DATE

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

I CERTIFY THAT THIS PLAN WAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

_____
PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

Definitive Subdivision Plans

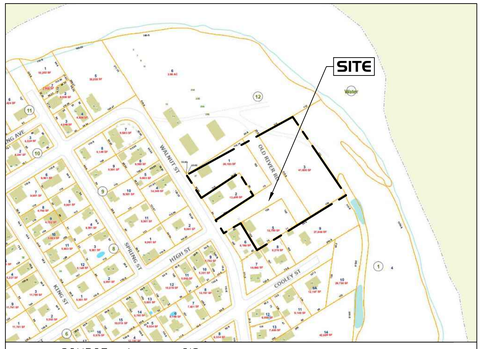
High Street

Old River Street, 27 Walnut Street & 17 High Street
Parcel IDs: J17-1-3, J17-1-1 & J17-1-5
Agawam, Masschusetts 01001

AS PREPARED FOR

Calabrese Construction, LLC
c/o Mr. Charles Calabrese

7 Brewster Road
West Springfield, Massachusetts



SOURCE: Agawam GIS

NORTH

January 30, 2026

DRAWING INDEX

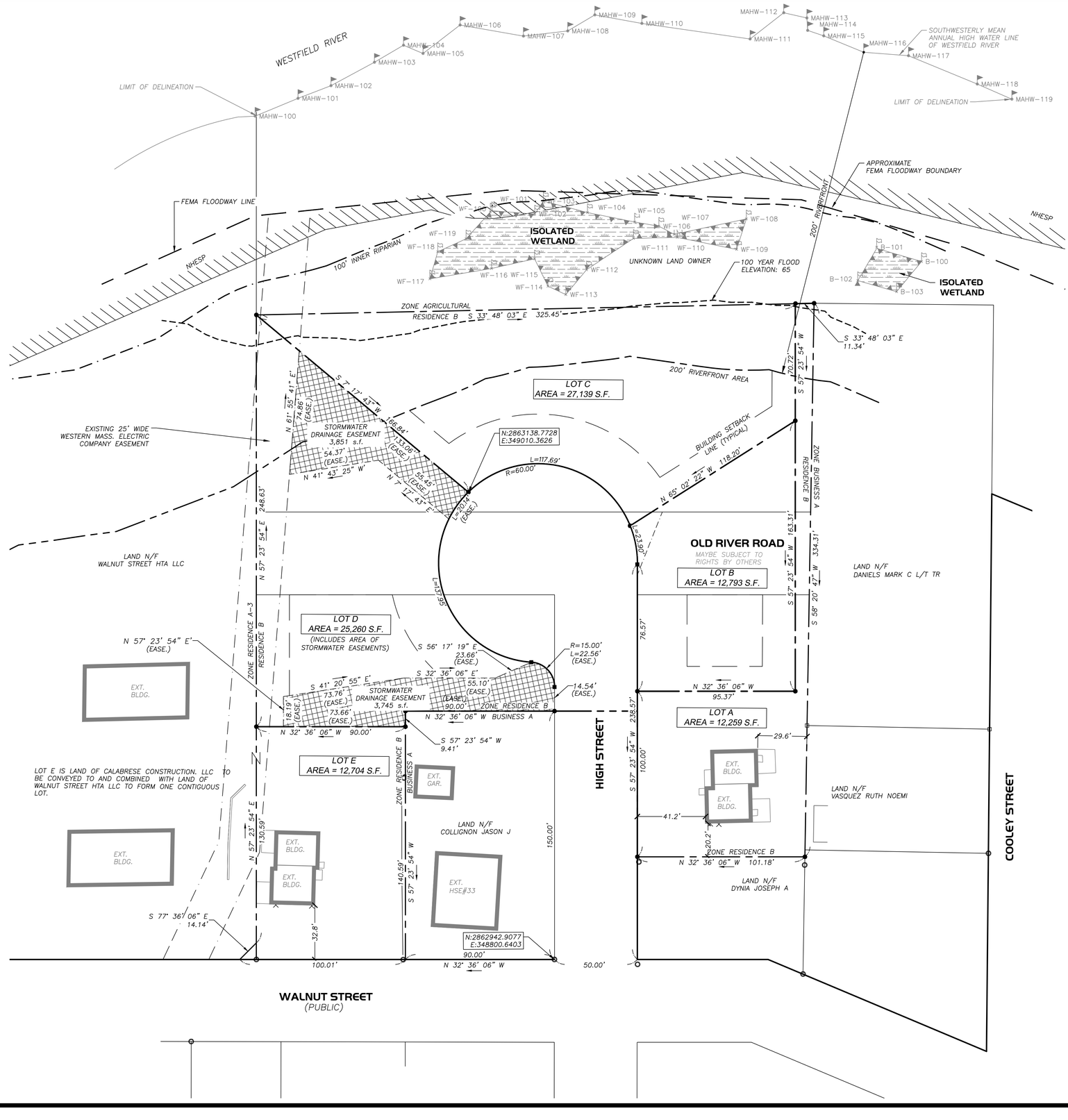
SHEET NO.	SHEET NAME	ISSUE DATE	REVISION DATE
T-1	TITLE SHEET	1/30/26	
P-1	DEFINITIVE SUBDIVISION PLAN	1/30/26	
EX-1	EXISTING CONDITIONS PLAN	1/30/26	
C-1	NOTES, SYMBOL & LINE LEGEND, AND ABBREVIATIONS	1/30/26	
C-2	CONSTRUCTION NOTES	1/30/26	
C-3	GRADING, EROSION & SEDIMENTATION CONTROL PLAN	1/30/26	
C-4	PLAN & PROFILE - HIGH STREET - STA -0+50 to STA 3+50	1/30/26	
C-5	SUBSURFACE INFILTRATION BASIN	1/30/26	
D-1	DETAILS	1/30/26	
D-2	DETAILS	1/30/26	
D-3	DETAILS	1/30/26	
D-4	DETAILS	1/30/26	
D-5	DETAILS	1/30/26	

BY

R LEVESQUE ASSOCIATES INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA · 01085
ph 413.568.0985 · fax 413.568.0986
www.rlaland.com

RLA Project Number: 220627

PERMITTING



NOTES

1. THE RECORD OWNER OF THE SUBJECT PARCEL CALABRESE CONSTRUCTION, LLC. SEE HAMPDEN COUNTY REGISTRY OF DEEDS BOOK DEED BOOK 22388 PAGE 42 – 47, BOOK 22935 PAGE 347.
2. THE PROPERTY LINES SHOWN HEREON ARE BASED UPON ON A GROUND SURVEY PERFORMED BY R.LEVESQUE ASSOCIATES INC.
3. THIS PLAN HAS BEEN PREPARED FOR DEFINITIVE SUBDIVISION AND SHALL BE USED FOR THE CONVEYANCE OF LAND.
4. THE SUBJECT PROPERTIES SHOWN HEREON MAY BE SUBJECT TO RIGHTS AND EASEMENTS AS CONTAINED IN THE VARIOUS DEEDS OF RECORD DESCRIBING SAID PROPERTIES. THE LOCATION AND EXTENT OF ANY SUCH RIGHTS AND EASEMENTS IS NOT THE SUBJECT OF THIS PLAN.
5. WETLANDS AND M.A.H.W. DELINEATED BY R.LEVESQUE ASSOCIATES INC JULY 17, 2025.
6. THE EXISTING TOPOGRAPHIC INFORMATION SHOWN IS BASED UPON NOAA LIDAR TOPOGRAPHIC DIGITAL AND R. LEVESQUE ASSOCIATES FIELD SURVEY ON MARCH 2025
7. ADJACENT PROPERTY LINES AND ABUTTERS SHOWN HEREON ARE REFERENCED FROM THE TOWN OF WEST SPRINGFIELD GIS MAPPING.
8. SUBJECT PARCELS ARE ZONED RESIDENCE B ACCORDING TO ZONING MAP AMENDMENT.
9. A PORTION OF SUBJECT PARCEL IS LOCATED WITHIN A SPECIAL FLOOD ZONE AREA ACCORDING TO FLOOD INSURANCE RATE MAP NUMBER 25013C0382E – EFFECTIVE DATE: 7/16/2013. ELEV: 65.0
10. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM (NHESP) JURISDICTION.
11. OFFSITE WETLAND RESOURCE HAVE BEEN SHOWN TO ACCURATELY DEPICT BUFFER ZONE AND RIVERFRONT AREA ON THE SUBJECT PROPERTIES. THE DETERMINATION OF OFFSITE RESOURCE AREAS ARE NOT THE SUBJECT OF THIS FILING.
12. LOTS TO BE SERVICED BY PUBLIC WATER AND PUBLIC SEWER

TOWN OF AGAWAM PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

I HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDINGS OF SAID NOTICE.

_____ DATE
CITY CLERK

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

SYMBOL & LINE LEGEND

- IRON PIPE FOUND
- CONCRETE BOUND FOUND
- IRON PIPE TO BE SET
- CONCRETE BOUND TO BE SET
- BUILDING SETBACK LINE
- EDGE OF WETLAND

Owner
Calabrese Construction, LLC

Definitive Subdivision Plan
HIGH STREET EXTENSION
Agawam, MA

Surveyed and Mapped for
Calabrese Construction, LLC
7 Brewster Road
West Springfield, Massachusetts

January 30, 2026 Scale: 1"=30'

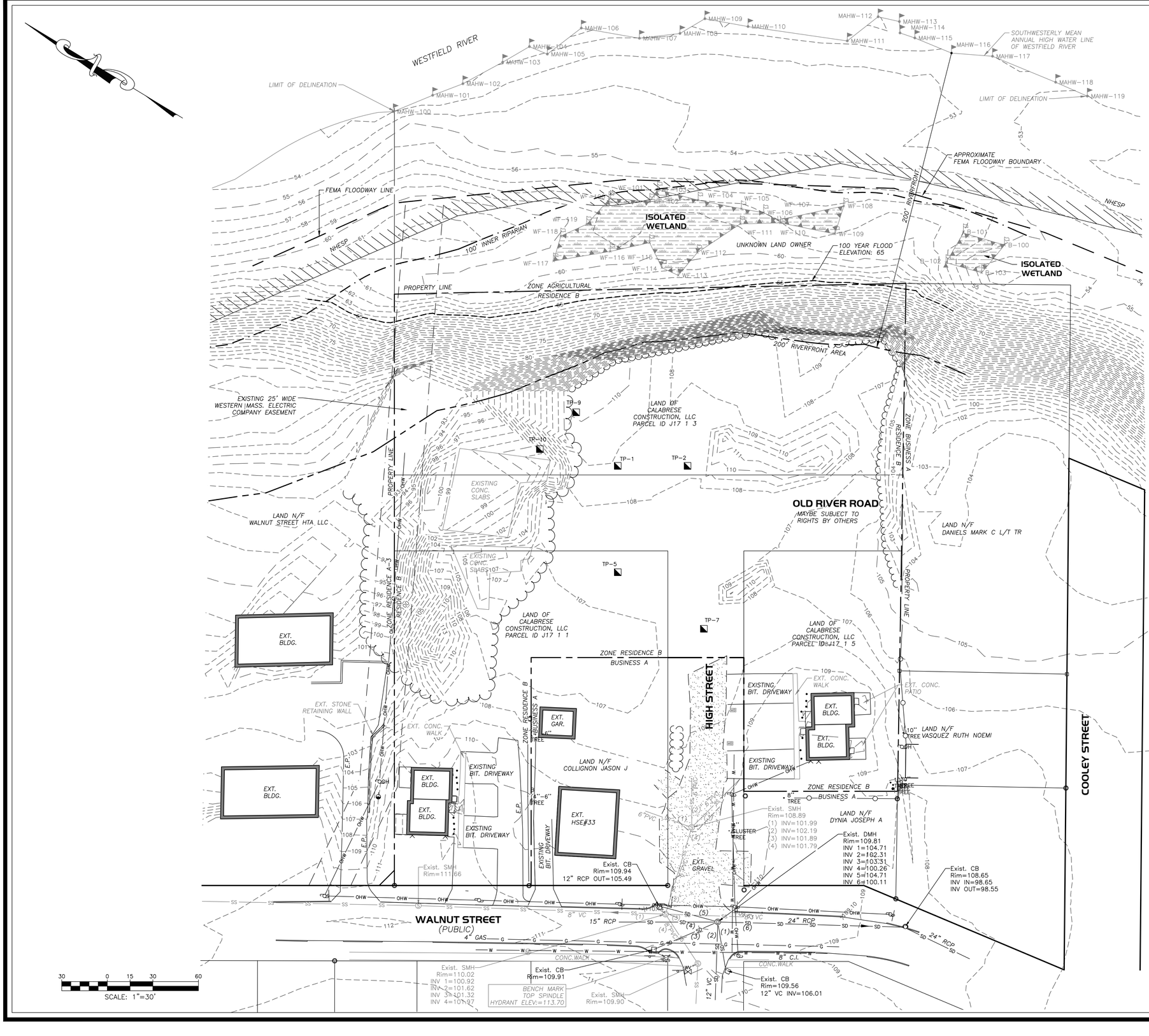
Prepared by

R LEVESQUE ASSOCIATES INC
ph: 413.568.0985 fax: 413.568.0986
40 School Street · P.O. Box 640
Westfield, MA 01086
rlaland.com

30 0 15 30 60
SCALE: 1"=30'

RLA Project Number: 220627

P-1



TOWN OF AGAWAM
PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

I HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDINGS OF SAID NOTICE.

_____ _____
CITY CLERK DATE

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

_____
PROFESSIONAL LAND SURVEYOR

EXISTING SITE CONDITIONS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE:	January 30, 2026
REVISIONS:	**DATE:**
DRAFTED BY:	T.A. & F.C.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
EX-1	

PERMITTING

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

SYMBOL & LINE LEGEND

- IRON PIPE FOUND
- IRON PIPE TO BE SET
- CONCRETE BOUND FOUND
- CONCRETE BOUND TO BE SET
- COMPUTED POINT
- EXISTING SIGN
- EXISTING MAILBOX
- EXISTING MONITORING WELL
- EXISTING LIGHT POLE
- UTILITY POLE
- GUY ANCHOR
- EXISTING ELECTRIC MANHOLE
- EXISTING TELEPHONE MANHOLE
- EXISTING CABLE TV BOX
- EXISTING WELL LOCATION
- EXISTING WATER VALVE
- EXISTING WATER SHUT-OFF
- EXISTING HYDRANT
- PROPOSED WATER VALVE
- PROPOSED HYDRANT
- EXISTING GAS VALVE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED MANHOLE
- SOIL BORING LOCATION
- TEST PIT LOCATION
- PERC TEST LOCATION
- WETLAND FLAG LOCATION
- M.A.H.W. FLAG LOCATION
- EXISTING STONE WALL
- TREE LINE
- × 102.4 EXISTING SPOT GRADE
- 219 EXISTING CONTOUR
- × 94.7 PROPOSED SPOT GRADE
- 214 PROPOSED CONTOUR
- EDGE OF WETLAND
- FENCE LINE
- GUARDRAIL
- OHW OHW EXISTING OVERHEAD WIRES
- UEL UEL EXISTING UNDERGROUND ELECTRIC
- TEL TEL EXISTING TELEPHONE LINE
- G G EXISTING GAS LINE
- W W EXISTING WATER LINE
- SD SD EXISTING STORM DRAIN
- SS SS EXISTING SANITARY SEWER
- LOW LOW LIMIT OF WORK LINE
- SF SF SF SILT FENCE LINE

ABBREVIATIONS

A.F.F.	–	ABOVE FINISHED FLOOR
A.F.S.	–	ABOVE FINISHED SLAB
APPROX.	–	APPROXIMATE
A.T.F.	–	ABOVE TOP OF FOUNDATION
BLDG.	–	BUILDING
BLK.	–	BLOCK
BOT.	–	BOTTOM
B.O.W.	–	BOTTOM OF WALL
BRG.	–	BEARING
CB.	–	CATCH BASIN
CL	–	CENTERLINE
C.I.	–	CAST IRON
CLR.	–	CLEAR
CONC.	–	CONCRETE
CONT.	–	CONTINUOUS
CONTR.	–	CONTRACTOR
DBL.	–	DOUBLE
DET.	–	DETAIL
D.I.	–	DUCTILE IRON
DIA.	–	DIAMETER
DIM.	–	DIMENSION
DT'L.	–	DETAIL
DWG.	–	DRAWING
EA.	–	EACH
ELEC.	–	ELECTRIC
ELEV.	–	ELEVATION
EXIST.	–	EXISTING
EXT.	–	EXTERIOR
FFE	–	FINISH FLOOR ELEVATION
FIN.	–	FINISH
FLR.	–	FLOOR
FOUND.	–	FOUNDATION
FT.	–	FOOT OR FEET
INSTL.	–	INSTALLED
LT.	–	LIGHT
MAX.	–	MAXIMUM
M.A.H.W.	–	MEAN ANNUAL HIGH WATER
MH.	–	MANHOLE
MIN.	–	MINIMUM
MISC.	–	MISCELLANEOUS
N.T.S.	–	NOT TO SCALE
O.A.	–	OVERALL
O.C.	–	ON CENTER
PCB	–	PROPOSED CATCH BASIN
PDMH	–	PROPOSED DRAIN MANHOLE
PFES	–	PROP. FLARED END SECTION
POCS	–	PROP. OUTLET CONTROL STRUCT.
PROP.	–	PROPOSED
PSMH	–	PROP. SANITARY SEWER MANHOLE
PWQU	–	PROP. WATER QUALITY UNIT
P.S.I.	–	POUNDS PER SQUARE INCH
REINF.	–	REINFORCING
R.H.	–	RIGHT HAND
SHT.	–	SHEET
SPEC.	–	SPECIAL OR SPECIFICATIONS
SQ.	–	SQUARE
ST.	–	STEEL
STA.	–	STATION
T.O.F.	–	TOP OF FOUNDATION
T.O.W.	–	TOP OF WALL
T.S.	–	TOP OF STEEL
TYP.	–	TYPICAL
W/	–	WITH
WTR.	–	WATER
W.W.M.	–	WELDED WIRE MESH

TOWN OF AGAWAM
PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ _____
DATE

I HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDINGS OF SAID NOTICE.

_____ _____
CITY CLERK DATE

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

_____
PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

EROSION & SEDIMENT CONTROL NOTES

MANAGEMENT STRATEGIES

1. CONSTRUCTION TRAFFIC SHALL BE LIMITED TO THE CONSTRUCTION ENTRANCE.
2. CONSTRUCTION SEQUENCE SHALL BE PHASED TO AVOID LEAVING LARGE AREAS EXPOSED FOR LONG PERIODS OF TIME.
3. TEMPORARY SEED AND MULCH SHALL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING.
4. SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED CONTINUOUSLY, ESPECIALLY FOLLOWING STORM EVENTS TO LOCATE FAILING CONTROL MEASURES AND CONDUCT ROUTINE MAINTENANCE OPERATIONS.
5. THE CONSTRUCTION SUPERINTENDENT SHALL INFORM ALL ON-SITE WORKERS OF THE SEDIMENTATION CONTROL PROGRAM.

VEGETATIVE CONTROL PRACTICES

1. TOPSOIL STOCKPILING: TOPSOIL SHALL BE STRIPPED FROM AREAS TO BE DISTURBED AND STOCKPILED FOR LATER USE. STOCKPILE LOCATION SHALL BE APPROVED BY THE OWNER AND ENGINEER AND BE WITHIN LIMIT OF WORK.
2. TEMPORARY SEEDING: THE TEMPORARY SEDIMENT BASIN, TOPSOIL STOCKPILE AND ROUGH GRADED AREAS SHALL BE SEEDED WITH WINTER RYE AT A RATE OF 30 LBS. PER ACRE ANY SOILS THAT ARE LEFT EXPOSED AND UNDISTURBED FOR MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED.

A. SITE PREPARATION
- COMPLETE ALL ROUGH GRADING ACTIVITIES
- REMOVE ALL ROCKS AND DEBRIS LARGER THAN 3" IN DIAMETER FROM AREAS TO BE TEMPORARILY SEEDED. -EVENLY APPLY LIME TO ACHIEVE A PH VALUE OF 6.0.
- EVENLY APPLY 14 LBS. OF 5-10-10 ANALYSIS FERTILIZER TO A DEPTH OF 4" USING SUITABLE EQUIPMENT.
- SEEDBED IS TO BE LEFT IN FIRM AND SMOOTH CONDITION.
- THE LAST TILLAGE OPERATION SHALL BE PERFORMED ACROSS THE SLOPE.

B. ESTABLISHMENT
- EVENLY APPLY SEED IN ACCORDANCE WITH THE SPECIES AND RATE INDICATED ABOVE BY MEANS OF BROADCASTING OR HYDROSEEDING.
- UNLESS HYDROSEEDED, COVER SEED WITH 1/4" TO 1/2" OF TOPSOIL
- APPLY MULCH OR EROSION CONTROL BLANKET IMMEDIATELY FOLLOWING SEEDING.
- VERIFY SEEDING DATES WITH ENGINEER/LANDSCAPE ARCHITECT. IF ENGINEER/LANDSCAPE ARCHITECT DETERMINES THAT SEED CANNOT BE APPLIED DUE TO CLIMATE, TOPSOIL SHALL NOT BE SPREAD AND MULCHING SHALL BE APPLIED TO THE EXPOSED SURFACE TO STABILIZE SOILS UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
- PERMANENT SEEDING SHALL BE APPLIED BETWEEN APRIL 15 AND SEPTEMBER 30. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS OUTSIDE THIS TIME FRAME, UPON APPROVAL BY THE ENGINEER/LANDSCAPE ARCHITECT.

C. MAINTENANCE
- ALL SEEDED/MULCHED AREAS SHALL BE INSPECTED REGULARLY TO SEE THAT A GOOD STAND IS MAINTAINED. AREAS SHALL BE REPAIRED AS NECESSARY.

NONSTRUCTURAL CONTROL PRACTICES

1. SCARIFICATION: EXPOSED SLOPES EXCEEDING 4:1 SHALL BE SCARIFIED AT RIGHT ANGLES TO THE SLOPE. PROVIDE PERIODIC UPGRADING OF SERRATIONS DURING EXPOSED PERIOD UNTIL VEGETATION IS ESTABLISHED. PROVIDE VEGETATIVE COVER AS SOON AS POSSIBLE.
2. STRAW MULCH: STRAW MULCH SHALL BE APPLIED IN CONJUNCTION WITH TEMPORARY/PERMANENT SEEDING AND TO GRADED AREAS WHICH REMAIN EXPOSED OUTSIDE OF RECOMMENDED SEEDING DATES. MULCH SHALL BE APPLIED AT 90 LBS. PER 1000 S.F. CONTRACTOR SHALL PERIODICALLY INSPECT AND REAPPLY AS NECESSARY, PARTICULARLY FOLLOWING SIGNIFICANT STORM EVENTS.
3. TOPSOIL: DISTURBED AREAS SHALL BE TOPSOILED PRIOR TO SEED APPLICATION. APPLICATION STANDARDS:
- REMOVE ALL ROCKS AND DEBRIS OVER 1"-1 1/2" IN DIAMETER.
- SCARIFY SURFACE PRIOR TO SEED APPLICATION.
- APPLY 6" DEPTH OF TOPSOIL.
4. SILT FENCE: SILT FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF THE SITE, AT CULVERT OUTLET LOCATIONS, OR AS INDICATED ON THE DRAWINGS. SILT FENCE SHALL BE INSPECTED AND REPAIRED ROUTINELY, ESPECIALLY FOLLOWING STORM EVENTS UNTIL THE SITE HAS BEEN STABILIZED (COVER > 70%) BY VEGETATION.

STRUCTURAL CONTROL PRACTICES

1. RIP-RAP OUTLET PROTECTION: RIP-RAP SHALL BE PROVIDED AT ALL PIPE OUTLETS. MATERIAL SHALL BE HARD, DURABLE FIELD OR QUARRY STONE WHICH IS ANGULAR AND RESISTS BREAKING DOWN WHEN EXPOSED TO WATER OR WEATHERING.
2. CONSTRUCTION ENTRANCE: CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DRAWINGS.
3. DUST CONTROL: A WATER TRUCK SHOULD BE LOCATED ON-SITE FOR DUST CONTROL WHILE WORK IS PROCEEDING. MAINTENANCE SEDIMENTATION CONTROL MEASURES SHALL BE CHECKED WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL EVENT. THE FOLLOWING ITEMS SHALL BE CHECKED IN PARTICULAR:

A. RIP-RAP OUTLET PROTECTION SHALL BE CHECKED REGULARLY FOR SEDIMENT ACCUMULATION. IF SIGNIFICANT AMOUNTS OF SEDIMENT ACCUMULATE, RIP-RAP SHALL BE REMOVED AND REPLACED.
B. SILT FENCING SHALL BE INSPECTED REGULARLY FOR UNDERMINING AND DETERIORATION. REMOVE SEDIMENT FROM BEHIND FENCE WHEN IT BECOMES 6 INCHES DEEP.
C. SEEDED/MULCHED AREAS SHALL BE INSPECTED REGULARLY TO SEE THAT A GOOD STAND IS MAINTAINED. AREAS SHALL BE REPAIRED AS NECESSARY.

SILT FENCE INSTALLATION NOTES

1. THIS SEDIMENT BARRIER UTILIZES MIRAFI ENVIROFENCE (100X) OR EQUAL. IT IS DESIGNED FOR SITUATIONS IN WHICH ONLY SHEET OR OVERLAND FLOWS ARE EXPECTED.
2. THE HEIGHT OF THE BARRIER SHALL NOT EXCEED 36 INCHES (HIGHER BARRIERS MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE). IDEALLY THE FILTER FENCE SHALL BE PLACED 10 FEET AWAY FROM THE TOE OF SLOPE.
3. WHEN JOINTS ARE NECESSARY, FILTER FABRICS SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT STAKES WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED. SEE MANUFACTURER'S RECOMMENDATION.
4. STAKES SHALL BE SPACED A MAXIMUM OF 10 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES). IN APPLICATIONS WHERE HEAVY FLOWS ARE EXPECTED SUCH AS IN-STREAM INSTALLATIONS STAKE SPACING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS AND/OR THE ENGINEERS RECOMMENDATIONS.
5. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF STAKES AND UPSLOPE FROM THE BARRIER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
6. THE PRE ASSEMBLED SILT FENCE SYSTEM SHALL BE UNROLLED, POSITION THE STAKES ON THE DOWNHILL SIDE OF THE TRENCH AND HAMMER THE STAKES AT LEAST 12 INCHES INTO THE GROUND.
7. THE BOTTOM SIX (6) INCHES OF THE FABRIC SHALL BE LAID INTO THE TRENCH TO PREVENT UNDERMINING BY STORM WATER RUNOFF.
8. BACKFILL THE TRENCH OVER THE FILTER FABRIC AND COMPACT SUFFICIENTLY TO PREVENT THE RUNOFF FROM ERODING THE BACKFILL.
9. THE FABRIC SHALL NOT EXTEND MORE THAT 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES OR SUPPORTS OTHER THAN THE STANDARD STAKES.
10. INSTALLED SILT FENCE BARRIERS SHALL BE MAINTAINED ON A REGULAR SCHEDULE WHICH MAY BE PRESCRIBED BY THE LOCAL, STATE OF FEDERAL REGULATORY AUTHORITY; BUT, AT MINIMUM SHALL BE CHECKED WEEKLY AS WELL AS AFTER EACH STORM EVENT. MAINTENANCE SHALL CONSIST OF AN INSPECTION OF THE ENTIRE LENGTH OF THE BARRIER TO DETERMINE IF IT IS FUNCTIONING AS INTENDED. ALL BREAKS, DETACHED FABRIC, SLUMPED FABRIC, CLOGGED FABRIC, AND UNDERMINED AREAS SHALL BE FIXED THE DAY THAT THEY ARE DISCOVERED.
11. WHEN A MAXIMUM OF SIX (6) INCHES OF SEDIMENT HAS ACCUMULATED BEHIND THE SILT FENCE THIS SEDIMENT SHALL BE REMOVED AND THE FENCE SHALL BE INSPECTED FOR TEARS, CLOGGING OF BREAKS. ALL DEFICIENCIES SHALL BE CORRECTED IMMEDIATELY EITHER BY REPAIR OF REPLACEMENT OF THE SILT FENCE BARRIER AND/OR STAKES AS NEEDED.
12. SILT FENCE BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN CLEANED OF SILT AND PERMANENTLY STABILIZED.

HAY BALE INSTALLATION & MAINTENANCE (AS REQ'D)

1. HAY BALES SHALL BE PLACED IN A SINGLE ROW, LENGTHWISE ON THE CONTOUR, WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER.
2. ALL BALES SHALL BE EITHER WIRE BOUND OR STRING TIES. BALES SHALL BE INSTALLED SO THAT BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES TO PREVENT DETERIORATION OF THE BINDINGS.
3. THE BARRIER SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED THE WIDTH OF A BALE AND THE LENGTH OF THE PROPOSED BARRIER TO A MINIMUM DEPTH OF FOUR (4) INCHES AND A MAXIMUM DEPTH OF SIX (6) INCHES. AFTER THE BALES ARE STAKED AND CHINKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AGAINST THE BARRIER. BACKFILL SOIL SHALL CONFORM TO THE GROUND LEVEL ON THE DOWNHILL SIDE AND SHALL BE BUILT UP TO FOUR (4) INCHES AGAINST THE UPHILL SIDE OF THE BARRIER.
4. EACH BALE SHALL BE SECURELY ANCHORED BY AT LEAST TWO (2) STAKES OR REBARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. STAKES OR REBARS SHALL BE DRIVEN DEEP ENOUGH INTO THE GROUND TO SECURELY ANCHOR THE BALES.
5. THE GAPS BETWEEN BALES SHALL BE CHINKED (FILLED BY WEDGING) WITH STRAW TO PREVENT WATER FROM ESCAPING BETWEEN THE BALES. (LOOSE STRAW SCATTERED OVER THE AREA IMMEDIATELY UPHILL FROM A STRAW BALE BARRIER TENDS TO INCREASE BARRIER EFFICIENCY.)
6. HAY BALES GENERALLY DETERIORATE IN 2-6 MONTHS AND THUS NEED REPLACEMENT.
7. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
8. BALE BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

SITE PREP

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATION, INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES SPECIFICATIONS AND SHALL BE APPROVED BY SUCH.
2. CONTRACTOR SHALL ERECT AND MAINTAIN SAFETY BARRICADES AND POST PROPER NOTICES PRIOR TO THE COMMENCEMENT OF WORK.
3. CONTRACTOR SHALL PROTECT EXISTING SITE IMPROVEMENTS, APPURTENANCES, AND LANDSCAPING TO REMAIN.
4. CONTRACTOR SHALL MAINTAIN EXISTING UTILITIES TO REMAIN IN SERVICE AND PROTECT THEM FROM DAMAGE DURING DEMOLITION OPERATIONS.
5. DO NOT DAMAGE EXISTING UTILITIES TO REMAIN WITHIN PROJECT AREA. ALL DAMAGE TO EXISTING UTILITIES TO REMAIN SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE UTILITY OWNER.
6. THERE SHALL BE NO BURNING OF DEMOLISHED MATERIAL ALLOWED ON SITE.
7. CONTRACTOR SHALL COORDINATE WITH OWNER FOR ANY ITEMS TO BE TURNED OVER TO OWNER.
8. DEMOLISH AND REMOVE ALL PAVEMENT, SLABS, FOOTINGS, SUBSURFACE ELEMENTS, MISCELLANEOUS DEBRIS, ETC. WITHIN PROPERTY LINES UNLESS NOTED OTHERWISE.
9. CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST SO THAT DUST DOES NOT CREATE A NUISANCE ON ADJACENT ROADS OR PROPERTIES. SITE CONTRACTOR SHALL BE RESPONSIBLE FOR STREET SWEEPING AND CATCH BASIN CLEANING AFTER EACH PHASE OF CONSTRUCTION AND AS NEED IS DETERMINED BY THE ENGINEER.
10. CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY ABANDONED SUBSURFACE SOIL ABSORPTION SYSTEM (SAS) AND MISCELLANEOUS DEBRIS.
11. NO ACTIVITY OTHER THAN NORMAL MAINTENANCE SHALL OCCUR OUTSIDE OF LIMIT OF WORK LINES AS SHOWN ON PLAN WITHOUT THE APPROVAL OF THE ENGINEER.
12. THE CONTRACTOR SHALL NOTIFY DIG SAFE @ 1-888-344-7233 PRIOR TO COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITY.

LANDSCAPE NOTES

1. THE CONTRACTOR SHALL VERIFY FINAL SELECTION OF PLANT MATERIALS WITH THE LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.
2. NO PLANT MATERIAL WILL BE ACCEPTED WHICH DISPLAYS MAJOR IRREGULARITIES OR DAMAGE. THE OWNER/LANDSCAPE ARCHITECT RETAINS THE RIGHT TO REJECT ANY PLANT MATERIAL DEEMED UNFIT.
3. WARRANTEE: FOR A PERIOD OF TWO GROWING SEASONS FROM THE DATE THAT THE WORK UNDER THIS CONTRACT IS CERTIFIED AS SUBSTANTIALLY COMPLETE, THE CONTRACTOR SHALL: 1) WARRANTEE ALL PLANTS AND SEEDED AREAS UNDER THIS CONTRACT; 2)REMOVE AND REPLACE DURING THIS GUARANTEE PERIOD PLANTS WHICH DIE OR ARE IN POOR CONDITION AS DETERMINED BY THE OWNER; 3) REPLANT WITH STOCK OF SAME SIZE AND QUALITY AS ORIGINALLY SPECIFIED; 4) GUY AND MAINTAIN AS SPECIFIED HEREIN AT NO ADDITIONAL COST TO THE OWNER.
4. ALL NEW LAWN AREAS SHALL RECEIVE A MINIMUM OF 4 INCHES TOPSOIL OF THE PROPER pH AND ORGANIC CONTENT SUITABLE FOR THE HEALTHY GROWTH OF LAWNS. THESE AREAS SHALL BE SEEDED WITH A FINE BLADE LAWN GRASS SEED OR SODDED. ADDITIONAL OFF-SITE TOPSOIL MAY BE REQUIRED.
5. ALL AREAS TO BE MULCHED SHALL RECEIVE 4 INCHES MINIMUM 100% SHREDDED BARK MULCH WITHIN 48 HOURS OF PLANTING UNLESS OTHERWISE NOTED IN PLANTING DETAILS.
6. ALL TREE AND SHRUB PITS SHALL BE AT LEAST 2 FEET WIDER AND 1 FOOT DEEPER THAN THE TREE OR SHRUB ROOT BALL TO BE PLANTED IN IT. BACKFILL SHALL BE HIGH QUALITY LOAM OF THE PROPER pH AND ORGANIC CONTENT SUITABLE FOR THE HEALTHY GROWTH OF PLANT MATERIALS.
7. ALL PLANTS SHALL BE NURSERY GROWN AND CONFORM TO THE LATEST EDITION OF "ANSI Z60.1, AMERICAN STANDARD FOR NURSERY STOCK".
8. EACH PLANT TO BE FREE FROM DISEASE, INSECT INFESTATION, MECHANICAL INJURIES, AND IN ALL RESPECTS BE SUITABLE FOR FIELD PLANTING.
9. EACH PLANT TO BE IN THE TOP OF ITS SIZE CLASS AFTER SHEARING AND PRUNING.
10. ADJACENT TO THE TOP OF ANY WALLS OVER 36" A FENCE OR WALL SHALL BE CONSTRUCTED PER PLAN THAT MEETS LOCAL BUILDING CODE AND ALL OTHER APPLICABLE STATE AND FEDERAL LAWS.
11. SEE DETAIL SHEETS FOR ADDITIONAL DETAILS & SPECIFICATIONS.
12. SHOULD GC OR ANY SUBCONTRACTOR ENCOUNTER A DISCREPANCE/CONFLICT IN THE PLAN AN THE ACTUAL LOCATION OF A SITE FEATURE, THE CONTRACTOR SHALL CONTACT THE LANDSCAPE ARCHITECT/ENGINEER AND OWNER IMMEDIATELY.
13. ALL AREAS DISTURBED DURING CONSTRUCTION NOT DESIGNATED TO RECEIVE OTHER TREATMENT SHALL BE LOAMED TO A MINIMUM DEPTH OF 4" AND SEEDED IN ACCORDANCE WITH THE FOLLOWING:
    A. INCORPORATE GROUND LIMESTONE INTO ALL AREAS TO BE SEEDED AT A RATE OF 50 LBS/1,000 S.F.
    B. APPLY 10-6-4 FERTILIZER TO ALL AREAS TO BE SEEDED AT A RATE OF 2 LBS/1,000 S.F.
    C. THOROUGHLY INCORPORATE LIME AND FERTILIZER INTO SEED BED TO DEPTH OF 3" BY DISCING OR OTHER APPROVED METHOD.
    D. SEED WITH THE FOLLOWING MIXTURE, APPLIED AT A RATE OF 10 LBS/1,000 S.F. SEED MIX:

NAME OF SEED	% BY WEIGHT IN MIXTURE	MIN. % PURITY	MIN. GERMINATION
POS PRETENSES "BARON" BARON BLUEGRASS	50	90	75
FESTUCA RUBRA "PENNLAWN" PENNLAWN FESCUE	25	95	85
LOLIUM PERENNE "PENNFINE" PENNFINE	25	98	95

    E. MULCH ALL SEEDED AREAS WITH STRAW AT A RATE OF 5 LBS/1,000 S.F.UNLESS HYDROSEEDING WAS USED.
    F. ALL SLOPES OF 3:1 OR GREATER AFTER BEING LOAMED, SEEDED AND MULCHED IN ACCORDANCE WITH THE ABOVE SHALL SECURED WITH EROSION CONTROL BLANKETS (NO. AMERICAN GREEN S150 OR EQUAL). OVERLAP ALL NETTING JOINTS A MINIMUM OF 6" AND SECURE WITH DOUBLE ROW OF STAPLES.

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

NOTES, SYMBOL & LINE LEGEND AND ABBREVIATIONS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 49576
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:
Chuck Calabrese
Calabrese Construction, LLC
7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**
DRAFTED BY: T.A. & F.C.	

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
C-1	-

PERMITTING

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

GENERAL CONSTRUCTION NOTES

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR OR HIS AUTHORIZED REPRESENTATIVE SHALL CONVENE A PRE-CONSTRUCTION CONFERENCE BETWEEN THE CITY/TOWN REPRESENTATIVES, CONSULTING ENGINEER/LANDSCAPE ARCHITECT, UTILITY COMPANY REPRESENTATIVES, AND ANY OTHER AFFECTED PARTIES.

2. THE OWNER, R LEVESQUE ASSOCIATES, INC., AND/OR THEIR REPRESENTATIVES, IN PREPARING THESE PLANS HAVE ATTEMPTED TO LOCATE ALL EXISTING UTILITIES IN THE PROJECT AREA. HOWEVER, THERE MAY BE UTILITIES THAT WERE NOT OR COULD NOT BE LOCATED. UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE IN APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL CALL ALL APPROPRIATE UTILITY COMPANIES FOR LOCATIONS OF THEIR UTILITIES AT LEAST 48 HOURS BEFORE COMMENCING EXCAVATION. IN THE EVENT THAT A UTILITY IS SITUATED SUCH THAT CONSTRUCTION CANNOT PROCEED AS SHOWN ON THE PLANS, THE PROJECT ENGINEER/LANDSCAPE ARCHITECT AND OWNER SHALL BE NOTIFIED IMMEDIATELY.

3. THE SITE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH OCCUR DUE TO HIS FAILURE TO LOCATE AND PRESERVE ANY AND ALL UTILITIES.

4. ALL FILL WORK REQUIRED TO BRING THE PROPOSED ROADWAY UP TO SUB-GRADE LEVEL SHALL CONFORM TO MHD SPECIFICATIONS SECTION 150.

5. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.

6. ALL WORK IN THE CITY/TOWN RIGHT-OF-WAY AND EASEMENTS SHALL BE IN ACCORDANCE WITH THE CITY/TOWN SPECIFICATIONS AND MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.

7. THE CONTRACTOR SHALL GIVE THE CITY/TOWN A MINIMUM OF 48 HOURS NOTICE BEFORE BEGINNING EACH PHASE OF CONSTRUCTION.

8. CONTRACTOR IS RESPONSIBLE FOR REPAIRS OF DAMAGE TO ANY EXISTING IMPROVEMENTS DURING CONSTRUCTION, SUCH AS, BUT NOT LIMITED TO, DRAINAGE, UTILITIES, PAVEMENT, STRIPING, CURB, ETC. REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS.

9. ALL WORK SHALL BE PERFORMED IN CONFORMANCE WITH THE CONDITIONS OF APPROVAL OUTLINED IN ALL STATE AND LOCAL PERMITS. COPIES OF THE CONDITIONS ARE INCLUDED WITHIN THE PROJECTS TECHNICAL SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THIS INFORMATION PRIOR TO CONSTRUCTION AND CONFORMING TO THE CONDITIONS AS REQUIRED DURING CONSTRUCTION.

10. THE CONTRACTOR SHALL MAINTAIN THE JOB CLEAR OF TRASH AND DEBRIS. THE WORK AREAS ARE TO BE PICKED UP AT THE END OF EACH WORK DAY.

11. ANY TEMPORARY FACILITIES FOR THE STORAGE OR PROTECTION OF TOOLS, EQUIPMENT OR MATERIALS SHALL CONFORM TO LOCAL REGULATIONS AND SHALL BE THE GENERAL CONTRACTORS RESPONSIBILITY. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. SAFETY, CARE OF ADJACENT PROPERTIES DURING CONSTRUCTION, AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS REGARDING SAFETY SHALL BE THE GENERAL CONTRACTORS RESPONSIBILITY.

12. THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL CONDITIONS PRIOR TO SUBMITTING HIS PROPOSAL. NO EXTRAS DUE TO UNFAMILIARITY WITH THE EXISTING SITE OR WORKING CONDITIONS WILL BE ALLOWED.

13. CONTRACTOR SHALL BE REQUIRED TO PERFORM FINAL CLEANUP CONSISTING OF CLEANING THE PROPOSED DRAINAGE AND SEWER SYSTEMS OF ALL DEBRIS PRIOR TO THE ACCEPTANCE BY THE OWNER. ADDITIONALLY, THE PROPOSED ROADWAY SHALL BE CLEANED AND SWEPT BY THE CONTRACTOR PRIOR TO ACCEPTANCE.

14. ALL EXCAVATION SHALL COMPLY WITH OSHA'S LATEST STANDARDS. ALL REQUIREMENTS OF OSHA'S EXCAVATION STANDARDS SHALL BE PROVIDED BY THE CONTRACTOR INCLUDING, BUT NOT LIMITED TO, THE PROVISION FOR A COMPETENT PERSON ON SITE MANAGER AND ANY REQUIRED DOCUMENTATION THAT MAY REQUIRE CERTIFICATION BY A PROFESSIONAL ENGINEER. THE OWNER, THROUGH ITS ENGINEER, SHALL EXPRESSLY NOT PROVIDE ANY OF THE ABOVE REQUIREMENTS DESIGNATED BY OSHA'S EXCAVATION STANDARD.

15. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE COST OF LAYING OUT ALL ITEMS OF THE WORK BASED ON CERTAIN HORIZONTAL CONTROL AND BENCHMARK SUPPLIED BY THE SURVEYOR OF RECORD. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.

16. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, PERMITS AND APPURTENANCES NECESSARY TO PROVIDE A COMPLETE PROJECT AS INDICATED ON THE PLANS AND IN THESE SPECIFICATIONS.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR A THOROUGH SITE EXAMINATION IN ORDER TO PREPARE SITE FOR CONSTRUCTION.

18. ANY AND ALL DEMOLISHED TREES, STRUCTURES AND OTHER RUBBLE MATERIAL PERTAINING TO THIS PROJECT SHALL BE DISPOSED OF BY THE CONTRACTOR OFF-SITE AT HIS EXPENSE IN ACCORDANCE WITH ALL OF THE CITY/TOWN ORDINANCES AND ALL APPLICABLE STATE AND FEDERAL ENVIRONMENTAL REGULATIONS.

19. ALL PAVEMENT DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS.

20. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING OR COVERING WITH STEEL PLATES.

21. ALL MATERIALS AND METHODS ARE TO COMPLY WITH THE CITY/TOWN DPW STANDARDS OR MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT) (WHERE APPLICABLE), UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

22. PERMITS WILL BE REQUIRED BY CONTRACTOR WHEN WORKING WITHIN OR OCCUPYING PUBLIC WAY. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED WORK PERMITS AND MAINTAINING A COPY OF ALL PERMITS IN A THREE RING BINDER OR PROJECT BOOK AND ON-SITE AT ALL TIMES.

23. BACKFILL WILL BE PLACED IN SUCCESSIVE LAYERS NOT MORE THAN TWELVE INCHES IN THICKNESS AND SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY DETERMINED BY STANDARD PROCTOR TEST (ASTM 698) FOR ALL APPLICABLE TYPES OF BACKFILL MATERIAL. NO FROZEN MATERIAL SHALL BE USED AS BACKFILL. IF, IN THE OPINION OF THE ENGINEER OR THE DPW, THE EXCAVATED MATERIAL IS UNSUITABLE, THE ENTIRE MATERIAL FOR BACKFILLING SHALL CONSIST OF APPROVED GRAVEL OR APPROVED BORROW, AS DIRECTED. AFTER THOROUGH TAMPING AROUND AND BENEATH THE UTILITY, A SIX-INCH LAYER OF BACKFILL WILL BE THOROUGHLY COMPACTED AS FOLLOWS: IF DRY, SHALL BE MOISTENED AND THEN COMPACTED WITH MECHANICAL TAMPERS OR BY HAND TAMPERS HAVING A TAMPING FACE NOT EXCEEDING 25 SQUARE INCHES IN AREA. THE FINAL TWELVE INCHES OF FILLING WILL, IN ALL CASES, CONSIST OF APPROVED GRAVEL THOROUGHLY TAMPED.

24. CONTRACTOR SHALL PROVIDE FIELD COMPACTION VERIFICATION UTILIZING ASTM D5195-02, STANDARD TEST METHOD FOR DENSITY OF SOIL & ROCK IN-PLACE AT DEPTHS BELOW THE SURFACE BY NUCLEAR METHODS.

25. CONTRACTOR SHALL PROVIDE FIELD COMPACTION RESULTS TO ENGINEER WITHIN 24-HOURS PRIOR TO PLACEMENT OF INFRASTRUCTURE OR BITUMINOUS BINDER.

26. ALL FILL TO BRING PROPOSED ROADWAY UP TO THE SUB-GRADE LEVEL SHALL EXTEND PAST THE EDGE OF THE RIGHT-OF-WAY AT A 2:1 SLOPE. THIS IS TO PROVIDE ADEQUATE SUPPORT FOR THE RIGHT-OF-WAY.

LAYOUT NOTES

1. ALL CONSTRUCTION IN CITY/TOWN RIGHT-OF-WAYS AND/OR EASEMENTS SHALL BE IN ACCORDANCE WITH THE CITY/TOWN STANDARD SPECIFICATIONS.

2. IN THE EVENT OF DISCREPANCIES BETWEEN LOCAL SPECIFICATIONS AND SITE SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL GOVERN.

3. SITE CONTRACTOR SHALL PROTECT ALL BENCHMARKS AND PROPERTY MONUMENTATION AND SHALL REPLACE OR REPAIR, AT HIS OWN EXPENSE, BENCHMARKS AND MONUMENTATION DISTURBED DURING CONSTRUCTION.

4. ALL STRIPING, PAVEMENT MARKINGS, AND TRAFFIC SIGNAGE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, UNLESS OTHERWISE NOTED ON THE PLANS.

5. ALL WORK SHALL COMPLY WITH FEDERAL, STATE AND LOCAL CODES AND ORDINANCES INCLUDING BUT NOT LIMITED TO: AASHTO, OSHA, EPA, DEP, MASSDOT , ETC. THE GENERAL CONTRACTOR SHALL APPLY FOR ALL PERMITS AND SHALL PAY ALL PERMIT RELATED FEES. ALL NECESSARY PERMITS SHALL BE OBTAINED PRIOR TO THE START OF WORK.

6. ALL DIMENSIONS AND CONDITIONS SHOWN ON THE DRAWINGS ARE TO BE VERIFIED BY THE CONTRACTOR. IF FIELD CONDITIONS VARY SIGNIFICANTLY ENOUGH TO REQUIRE A CHANGE TO THE CONTRACT DOCUMENTS, THE PROJECT PROPONENT AND ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

7. THE SITE/GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL CONTACT THE OWNER AND ENGINEER SHOULD HE FIND ANY CONFLICT OR INCONSISTENCY BETWEEN THE WORK SHOWN ON THE DRAWINGS AND NORMAL ACCEPTED CONSTRUCTION PRACTICES, OR HE SHALL ASSUME RESPONSIBILITY FOR ALL CORRECTIONS.

8. ANY CORRECTIONS REQUIRED FOR REVISIONS TO THE CONTRACT DRAWINGS INITIATED BY THE GENERAL CONTRACTOR OR SUBCONTRACTORS WITHOUT PRIOR APPROVAL OF THE OWNER AND OR THE ENGINEER SHALL BE ACCOMPLISHED AT THE CONTRACTORS RISK.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL & LEGAL DISPOSAL OF ALL MATERIAL NECESSARY TO PREPARE THE SITE FOR THE NEW CONSTRUCTION AS SHOWN ON THE SITE DRAWINGS.

10. REPAIR DAMAGED CITY/TOWN ROADS AND CURBS IN ACCORDANCE WITH MASSDOT AND/OR THE CITY/TOWN REGULATIONS.

11. CONTRACTOR SHALL SAWCUT PAVEMENT EDGE WHERE PAVEMENT TO REMAIN IS ADJACENT TO PAVEMENT TO BE REMOVED.

12. CONTRACTOR SHALL PREPARE SITE AS NECESSARY FOR CONSTRUCTION SHOWN ON THE PLANS.

EARTHWORK NOTES

1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

2. ALL CUT OR FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED.

3. STORM PIPE SHALL BE AS NOTED ON PLANS.

4. EXISTING DRAINAGE STRUCTURES TO BE INSPECTED AND REPAIRED AS NEEDED, AND EXISTING PIPES TO BE CLEANED OUT TO REMOVE ALL SILT AND DEBRIS.

5. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.

6. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.

7. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.

8. ALL STORM PIPE ENTERING STRUCTURES SHALL BE SEALED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT.

9. ALL STORM SEWER MANHOLES FRAMES AND GRATES ARE TO BE SET EQUAL TO FINISH GRADES, AND SHALL HAVE TRAFFIC BEARING RING & COVERS (H20).

10. CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.

11. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.

12. ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 4 INCHES OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3H:1V OR STEEPER. CONTRACTOR SHALL GRASS DISTURBED AREAS IN ACCORDANCE WITH THE SPECIFICATIONS UNTIL A HEALTHY STAND OF GRASS IS OBTAINED.

13. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.

14. IF CONTRACTOR RELOCATES OR SETS NEW BENCHMARKS, THE VERTICAL ELEVATIONS OF THE BENCHMARKS SHALL BE SET WITHIN A TOLERANCE OF 0.010 FT.

15. CONTRACTOR SHALL LEAVE GRADE BEHIND CURB IN ALL PLANTER AREAS A MINIMUM OF 4" LOW FOR THE PLACEMENT OF SUITABLE TOPSOIL OR PLANTING MIX.

SITE UTILITY NOTES

GENERAL:

1. ALL FILL MATERIAL IS TO BE IN PLACE, AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.

2. TOPS OF EXISTING MANHOLES SHALL BE SET EQUAL TO FINISH GRADE. IN GRASSED LANDSCAPED AREAS WITH WATER TIGHT LIDS.

3. ALL CONCRETE FOR ENCASEMENTS SHALL HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH AT 3000 P.S.I.

4. DRAWINGS DO NOT PURPORT TO SHOW ALL EXISTING UTILITIES.

5. EXISTING UTILITIES SHALL BE VERIFIED IN FIELD PRIOR TO INSTALLATION OF ANY NEW LINES.

6. SITE/GENERAL CONTRACTOR IS RESPONSIBLE FOR COMPLYING TO THE SPECIFICATIONS OF THE LOCAL AUTHORITIES AT THE CITY WITH REGARD TO MATERIALS AND INSTALLATION OF THE WATER AND SEWER LINES.

7. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

8. CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.

9. CONTRACTOR SHALL COORDINATE INSPECTION OF UTILITY LINES WITH APPROPRIATE AUTHORITIES PRIOR TO BACKFILLING TRENCHES.

10. CONTRACTOR SHALL COMPLY WITH THE LATEST OSHA STANDARDS OR DIRECTIVES OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND MAINTENANCE OF ALL SUPPORT SYSTEMS, SLOPING, BENCHING, AND OTHER MEANS OF PROTECTION.

11. CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES WITH LOCAL COMPANIES TO AVOID CONFLICTS AND TO ASSURE THAT PROPER DEPTHS ARE ACHIEVED. CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITY COMPANIES FOR EXACT LOCATION AND SCHEDULING OF CONNECTIONS TO THEIR FACILITIES.

12. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. DUE TO THE LACK OF AVAILABLE DOCUMENTATION. ALL UTILITIES, INCLUDING CURB BOXES, MAY NOT BE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL CALL THE "DIG SAFE CENTER" TO HAVE ALL UTILITIES MARKED ON THE GROUND PRIOR TO THE START OF CONSTRUCTION

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH OCCUR DUE TO HIS FAILURE TO LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

14. DO NOT INTERRUPT EXISTING UTILITIES WITHOUT AUTHORIZATION FROM THE OWNER, OWNERS OF ADJACENT PROPERTIES, AND THE CORRESPONDING UTILITY OWNER. CONTRACTOR SHALL ARRANGE TO SHUT OFF UTILITIES, AS REQUIRED, WITH THE UTILITY OWNERS.

15. COORDINATE UTILITY TERMINATION WITH UTILITY OWNERS.

SEWER:

1. SANITARY SEWER MAINS AND LATERALS SHALL BE PVC PIPE CONFORMING TO ASTM D 3034-SDR35. THE MINIMUM SIZE FOR SEWER MAINS SHAL BE 8"; SEWER LATERALS SHALL BE 4" MIN.

2. ALL SANITARY SEWERS, SEWER FORCE MAINS, AND SEWER LATERALS SHALL BE INSTALLED IN FIRST-CLASS BEDDING AND IN ACCORDANCE WITH THE DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS. SEWERS SHALL BE INSTALLED TO THE LINE AND GRADE INDICATED ON THE PLANS.

3. ONLY PRECAST CONCRETE MANHOLES OF A DESIGN APPROVED BY THE TOWN ENGINEER SHALL BE INSTALLED ON A SANITARY SEWER MAIN.

4. NO GROUNDWATER OR SURFACE WATER SHALL BE DISCHARGED INTO THE SANITARY SEWER.

5. WHERE ROCK IS ENCOUNTERED, IT SHALL BE REMOVED TO A DEPTH OF ONE FOOT BELOW THE FLOWLINE OF THE SEWER AND THE PIPE LAID IN A PROPERLY COMPACTED GRANULAR MATERIAL APPROVED BY THE TOWN ENGINEER.

6. ONLY GRANULAR MATERIAL APPROVED BY THE TOWN ENGINEER SHALL BE USED AS BACKFILL IN ANY TRENCH EXCAVATION.

WATER:

1. CONTRACTOR SHALL CONTACT THE CITY/TOWN WATER DEPARTMENT FOR SPECIFICATIONS AND MAKE OF VALVES, VALVE BOXES, FIRE HYDRANTS AND ALL OTHER WATER LINE APPURTENANCES.

2. WATER LINE TESTING AND STERILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH LOCAL DPW SPECIFICATIONS AND WATER DISTRIBUTION SYSTEM. CONTRACTOR SHALL COORDINATE TESTING WITH THE CITY WATER DEPARTMENT.

3. ALL WATER MAIN SHALL BE DUCTILE IRON (D.I.), CLASS 52, AWWA C-151 (ANSI A21.40). D.I. PIPE SHALL BE DOUBLE CEMENT LINED WITH A SEAL COAT CONFORMING TO AWWA C-104 (ANSI A-21.4).

4. JOINTS FOR D.I. PIPE SHALL BE PUSH-ON OR OTHERWISE APPROVED, AWWA C151(ANSI A-21.51) WITH GASKETS CONFORMING TO AWWA C-111 (ANSI A-21.11) MAXIMUM LENGTH OF PIPE TO BE 20 L.F.

5. ALL FITTINGS SHALL BE DUCTILE IRON CLASS 53 WITH PRESSURE RATING OF 350 PSI AND MECHANICAL JOINTS CONFORMING TO AWWA C-151 (ANSI A21.51).

6. RETAINER GLANDS: RETAINER GLANDS SHALL BE DESIGNED TO IMPART MULTIPLE WEDGING ACTION AGAINST THE PIPE, INCREASE ITS RESISTANCE AS THE PRESSURE INCREASES. GLANDS SHALL BE MANUFACTURED OF DUCTILE IRON CONFORMING TO ASTM A536-80. RESTRAINING DEVICES SHALL BE DUCTILE IRON HEAT-TREATED TO A MINIMUM HARNESS OF 370 BHN. TWIST-OFF NUTS SHALL BE USED TO INSURE PROPER ACTUATING OF THE RETAINER GLAND. DIMENSIONS OF THE GLAND SHALL BE SUCH THAT IT CAN BE USED WITH THE STANDARD MECHANICAL JOINT BELL AND TEE-HEADED BOLTS CONFORMING TO ANSI/AWWA A21.1 AND ANSI/WWA 153/A21.5. THE RETAINER GLAND SHALL HAVE A WORKING PRESSURE OF 250 PSI WITH A MINIMUM SAFETY FACTOR OF 2:1 AND SHALL BE CERTIFIED BY THE MANUFACTURER TO BE COMPATIBLE WITH THE PIPE CLASS AND PIPE MANUFACTURER FOR ALL SIZES PROVIDED ON THE JOB. THE RETAINER GLAND SHALL BE MEGA-LUG AS MANUFACTURED EBAA IRON, INC., OR APPROVED EQUAL.

7. ALL WATER MAINS, UNLESS OTHERWISE NOTED, SHALL BE INSTALLED WITH A MINIMUM FIVE FEET OF COVER. WHEN CROSSING ABOVE OR BELOW WATER PIPELINES, A MINIMUM VERTICAL SEPARATION OF SIX INCHES SHALL BE PROVIDED. WHEN CROSSING SANITARY SEWERS, A MINIMUM OF 18" SHALL BE PROVIDED.

TOWN OF AGAWAM PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

_____

_____

_____

_____

_____

I HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDINGS OF SAID NOTICE.

_____ _____

CITY CLERK DATE

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

_____

PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

SITE UTILITY NOTES (CONTINUED)

8. THE INSTALLED WATER MAIN SHALL BE PRESSURE TESTED, FLUSHED AND DISINFECTED BY CONTRACTOR IN ACCORDANCE WITH AWWA C-600 AND AWWA C-651 OR PER CITY/TOWN WATER DEPARTMENT STANDARDS.

9. DUCTILE IRON PIPES SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C-600.

10. ALL MECHANICAL JOINTS ARE TO BE RESTRAINED. FITTINGS SHALL BE RESTRAINED BY MECHANICAL JOINT RESTRAINTS. THE PIPE CONNECTED TO THE FITTING SHALL BE RESTRAINED PER THE MANUFACTURER'S SCHEDULE.

11. THE CONTRACTOR SHALL MARK THE LOCATION OF THE PROPOSED WATER MAIN AT LEAST 48 HOURS PRIOR TO EXCAVATING. EXCAVATION SHALL NOT PROCEED WITHOUT AUTHORIZATION BY THE ENGINEER.

12. ALL WATER MAINS, HYDRANT BRANCHES, AND SERVICES SHALL HAVE UTILITY WARNING TAPE. THE TAPE SHALL BE BURIED APPROXIMATELY 2 FEET BELOW FINISHED GRADE.

13. BACKFILL SHALL BE COMPACTED TO 95 PERCENT OF THE STANDARD PROCTOR DENSITY AS DETERMINED BY ASTM D698. COMPACTION EQUIPMENT USED MUST BE SPECIFICALLY DESIGNED FOR COMPACTION. TAMPING WITH THE BACK OF THE BACK HOE BUCKET IS UNACCEPTABLE COMPACTION.

14. ALL WATER SERVICES SHALL BE 1" DIA. COPPER TUBING TYPE K, SOFT TEMPER CONFORMING TO ASTM B88 UNLESS OTHERWISE NOTED.

15. DEPRESS WATER MAIN UNDER EXISTING SERVICES AND HYDRANT BRANCHES TO MAINTAIN 5'-0" OF COVER.

16. ALL WATER MAINS SHALL BE LAID PER THE PLANS TO MAINTAIN THE MAXIMUM SEPARATION FROM EXISTING OR PROPOSED SANITARY SEWER. DISTANCE SHALL BE MEASURED EDGE TO EDGE.

17. IDENTIFY EACH PIPE LENGTH & FITTING CLEARLY WITH MANUFACTURE'S NAME & TRADEMARK. NOMINAL PIPE SIZE & MATERIAL DESIGNATION.

18. ALL WATER MAINS & SERVICE PIPES SHALL BE LAID IN A TRENCH SEPARATE FROM ANY OTHER UTILITY (GAS, ELECTRIC, TELEPHONE, ETC.) SHALL BE A MINIMUM NO LESS THAN FIVE (5) FEET FROM ANOTHER UTILITY.

19. ALL MATERIAL SHALL BE IN ACCORDANCE WITH CITY/TOWN WATER DEPARTMENT "RULES & REGULATIONS". ALL WORK TO BE PERFORMED IN ACCORDANCE WITH CITY/TOWN WATER DEPARTMENT "SPECIFICATIONS". CITY/TOWN WATER DEPARTMENT STANDARDS SHALL TAKE PRECEDENCE OVER ANY REQUIREMENTS LISTED ABOVE.

PERMITTING

RLA

R LEVESQUE ASSOCIATES INC

Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants

ph: 413.568.0985 fax: 413.568.0986

40 School Street
Westfield, MA 01085

rlaland.com

CONSTRUCTION NOTES

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 49576
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**

DRAFTED BY: T.A. & F.C.

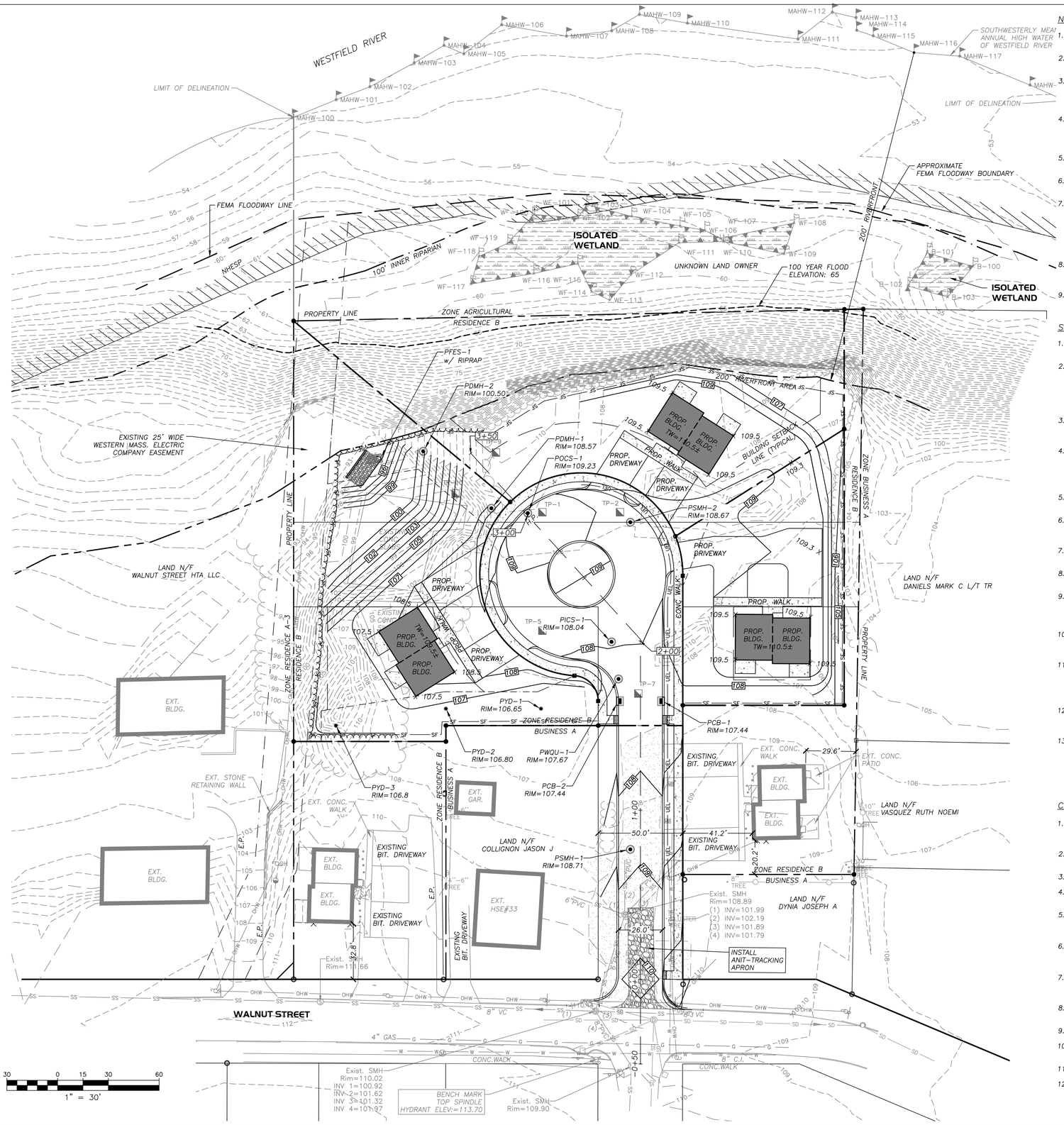
UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
C-2	-

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg



BENCHMARK

TOP OF HYDRANT SPINDLE (SEE BELOW)

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

TOWN OF AGAWAM
PLANNING BOARD
APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

NOTES

1. THE RECORD OWNER OF THE SUBJECT PARCELS ARE CHARLES R. CALABRESE SEE HAMPDEN COUNTY REGISTRY OF DEEDS BOOK 2727 PAGE 258.
2. PROPERTY LINES SHOWN HEREON WERE DERIVED FROM PLAN BOOK 231 PAGE 47, PLAN BOOK 334 PAGE 8 AND PLAN BOOK 30 PAGE 4.
3. THE SUBJECT PROPERTIES SHOWN HEREON MAY BE SUBJECT TO RIGHTS AND EASEMENTS AS CONTAINED IN THE VARIOUS DEEDS OF RECORD DESCRIBING SAID PROPERTIES. THE LOCATION AND EXTENT OF ANY SUCH RIGHTS AND EASEMENTS IS NOT THE SUBJECT OF THIS PLAN.
4. PARTIAL WETLAND AND M.A.H.W. BOUNDARIES DELINEATED BY R. LEVESQUE ASSOCIATES, INC. (KATE BEDNAZ PWS# 1906) IN SEPTEMBER 2014. OFFSITE WETLANDS ARE NOT THE SUBJECT OF THIS FILING AND HAVE BEEN SHOWN TO DEPICT THE LIMITS OF BUFFER ZONE.
5. ADJACENT PROPERTY LINES AND ABUTTERS SHOWN HEREON ARE REFERENCED FROM THE ASSESSOR DATA.
6. SUBJECT PARCELS ARE ZONED AGRICULTURAL ACCORDING TO THE AGAWAM GIS ZONING MAP.
7. THE UNDERGROUND UTILITIES SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND AVAILABLE RECORD DATA. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN HERE ARE IN THE EXACT LOCATION INDICATED. ALTHOUGH THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.
8. THE SUBJECT PARCELS DO NOT CONTAIN BORDERING LAND SUBJECT TO FLOODING ACCORDING TO FLOOD INSURANCE RATE MAP NUMBER 25013C0384E EFFECTIVE DATE: JULY 16, 2013.
9. THE SUBJECT PROPERTY IS NOT LOCATED WITHIN NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM (NHESP) JURISDICTION (2008 NHESP ATLAS).

SHORT-TERM EROSION CONTROL MAINTENANCE

1. THE CONTRACTOR OR SUBCONTRACTOR WILL BE RESPONSIBLE FOR IMPLEMENTING EACH CONTROL SHOWN ON THE SEDIMENTATION AND EROSION CONTROL PLAN.
2. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL MEASURES WILL BE INSTALLED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFF-SITE SEDIMENTATION IF DEEMED NECESSARY BY ON-SITE INSPECTION.
3. EFFECTIVE EROSION CONTROL MEASURES SHALL BE INITIATED PRIOR TO THE COMMENCEMENT OF CLEARING, GRADING, EXCAVATION, OR OTHER OPERATIONS THAT WILL DISTURB THE NATURAL PROTECTION.
4. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES OF PRECIPITATION DURING ANY 24-HOUR PERIOD, AND THE INSPECTION SHALL BE DOCUMENTED IN WRITING. DAMAGED OR INEFFECTIVE DEVICES SHALL BE REPAIRED OR REPLACED, AS NECESSARY.
5. THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO AVOID EXCESS EROSION OF THE SITE DUE TO THE CONSTRUCTION OF THIS PROJECT.
6. SILT SHALL BE REMOVED FROM BEHIND BARRIERS IF GREATER THAN 6-INCHES DEEP OR AS NEEDED. SEDIMENT THAT IS COLLECTED IN STRUCTURES SHALL BE DISPOSED OF PROPERLY AND COVERED IF STORED ON-SITE.
7. DAMAGED OR DETERIORATED ITEMS WILL BE REPAIRED IMMEDIATELY AFTER IDENTIFICATION.
8. ALL DITCHES SHALL BE STABILIZED AS SOON AS IS PRACTICABLE TO MINIMIZE EROSION.
9. THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL DEVICES IN A GOOD, WORKING STATE OF REPAIR UNTIL THEIR USE IS NO LONGER WARRANTED. AT THAT TIME, THE EROSION CONTROL DEVICES SHALL BE REMOVED AND DISPOSED OF SO AS TO CAUSE NO OFF-SITE SILTATION.
10. INSPECT AND MAINTAIN CONSTRUCTION ENTRANCE STONE SUCH THAT SEDIMENT DOES NOT TRACK ONTO THE STREET. ANY SEDIMENT TRACKED ONTO THE STREET SHALL BE CLEANED DAILY.
11. AFTER CATCH BASINS HAVE BEEN CONSTRUCTED AND THE SITE HAS BEEN PAVED, THE CONTRACTOR SHALL PROTECT THE INLETS BY CONSTRUCTING INLET PROTECTION AS SHOWN ON THE PLANS. INLET PROTECTION TO REMAIN IN PLACE AND MAINTAINED UNTIL DISTURBED AREAS HAVE BEEN STABILIZED, LOAMED AND SEEDED.
12. EROSION CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL ALL DISTURBED EARTH HAS BEEN SUBSTANTIALLY STABILIZED. AFTER REMOVAL OF MEASURES, DISTURBED AREAS SHALL BE REGRADED AND STABILIZED AS NECESSARY.
13. THIS PLAN IS PROVIDED AS A BASIS FOR THE INITIAL SEDIMENTATION AND EROSION CONTROL MEASURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO UPDATE AND EXPAND THIS PLAN AS SITE CONDITIONS DICTATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PREVENT THE OCCURRENCE OF SILTATION TO WETLAND RESOURCE AREAS AND THE MOVEMENT OF SEDIMENT BEYOND THE SITE BOUNDARIES.

CONSTRUCTION SEQUENCE

1. CONTACT THE TOWN OF AGAWAM AT LEAST FORTY-EIGHT HOURS PRIOR TO COMMENCEMENT OF ANY DEMOLITION, CONSTRUCTION, OR EARTHWORK ACTIVITY ON THIS PROJECT.
2. CONSTRUCT ANTI-TRACKING PAD AT ENTRANCE AND INSTALL ANY REQUIRED INLET PROTECTION AS DEPICTED ON THE PLAN.
3. INSTALL SILT FENCE AS SHOWN ON THE PLANS.
4. UPON COMPLETION OF EROSION CONTROL MEASURES, CLEARING AND GRUBBING AND EARTHWORK MAY COMMENCE.
5. CLEAR AND GRUB SITE. STOCKPILE ANY CHIPPING OR TOPSOIL MATERIAL TO REMAIN ON SITE FOR LONGER THAN 14 DAYS AND INSTALL SILT FENCE AROUND THE PERIMETER OF THE STOCKPILE.
6. COMMENCE EARTHWORK BY EXCAVATING FOR THE CUT/FILL SLOPES AS SHOWN ON THE PLANS. STABILIZE/SEED ANY SLOPES THAT HAVE ACHIEVED FINAL GRADE.
7. INSTALL UTILITIES AS SHOWN ON PLANS INCLUDING WATER SERVICE, SEWER SERVICE, GAS SERVICE, ELECTRICAL SERVICE AND STORMWATER MANAGEMENT SYSTEM.
8. GRADE THE ALIGNMENT OF THE ROADWAY TO ACCEPT PAVEMENT SECTION MATERIALS.
9. INSTALL PAVEMENT AS SPECIFIED ON THE PLANS.
10. UPON INSTALLATION OF PAVEMENT SURFACE, INSTALL INLET PROTECTION AS REQUIRED ON ANY NEW INLET STRUCTURES.
11. FINAL GRADING AND STABILIZATION OF ANY REMAINING EXPOSED AREAS.
12. AT THE DIRECTION OF THE TOWN, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED.

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

GRADING, EROSION & SEDIMENTATION CONTROL PLAN

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 49376
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**
DRAFTED BY: T.A. & F.C.	

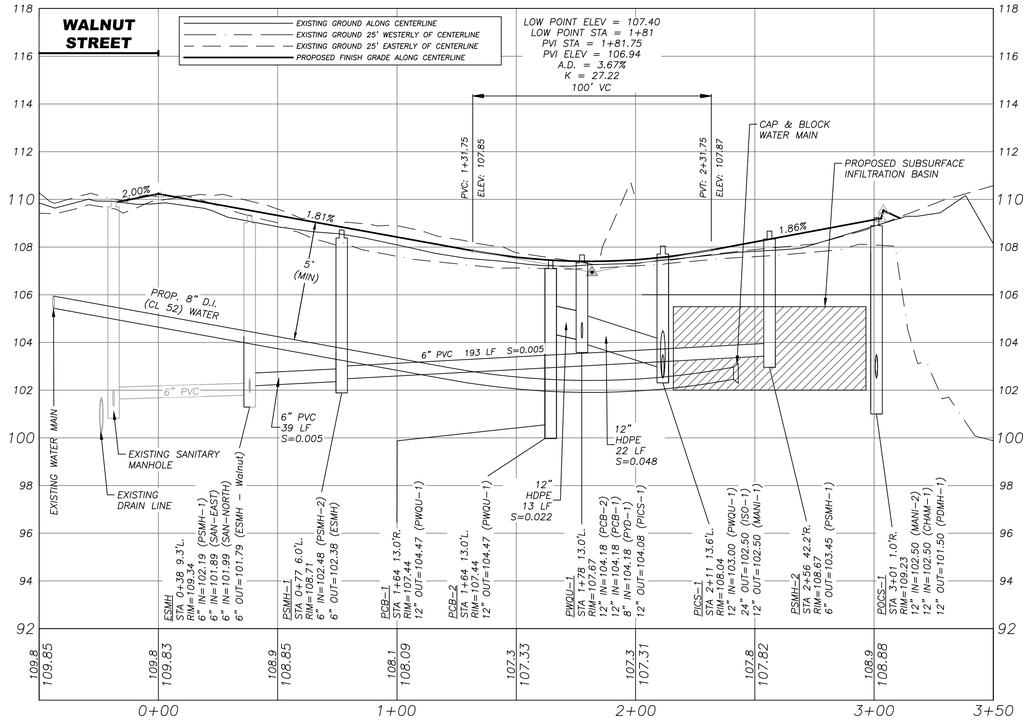
UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

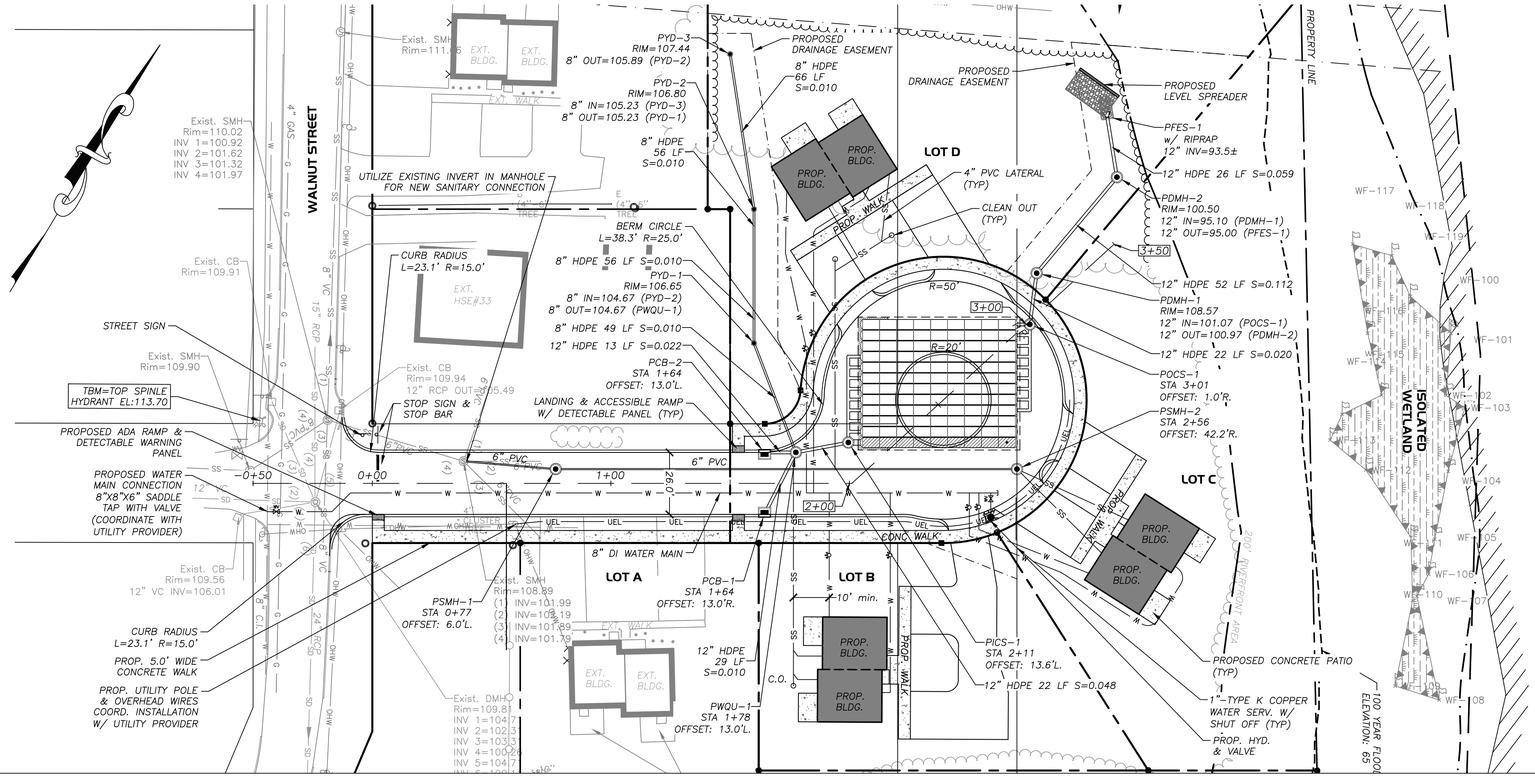
DRAWING#	REV.
C-3	-

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg



HIGH STREET · PROFILE ALONG CENTERLINE OF ROADWAY

HORIZONTAL 1" = 30'
VERTICAL 1" = 3'



S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

TOWN OF AGAWAM
PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

_____

_____

_____

_____

_____

_____

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

_____
PROFESSIONAL LAND SURVEYOR

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

NOTES

1. *THE RECORD OWNER OF THE SUBJECT PARCELS ARE CHARLES R. CALABRESE SEE HAMPDEN COUNTY REGISTRY OF DEEDS BOOK 2727 PAGE 258.*
2. *PROPERTY LINES SHOWN HEREON WERE DERIVED FROM PLAN BOOK 231 PAGE 47, PLAN BOOK 334 PAGE 8 AND PLAN BOOK 30 PAGE 4.*
3. *THE SUBJECT PROPERTIES SHOWN HEREON MAY BE SUBJECT TO RIGHTS AND EASEMENTS AS CONTAINED IN THE VARIOUS DEEDS OF RECORD DESCRIBING SAID PROPERTIES. THE LOCATION AND EXTENT OF ANY SUCH RIGHTS AND EASEMENTS IS NOT THE SUBJECT OF THIS PLAN.*
4. *PARTIAL WETLAND AND M.A.H.W. BOUNDARIES DELINEATED BY R. LEVESQUE ASSOCIATES, INC. (KATE BEDNAZ PWS# 1906) IN SEPTEMBER 2014. OFFSITE WETLANDS ARE NOT THE SUBJECT OF THIS FILING AND HAVE BEEN SHOWN TO DEPICT THE LIMITS OF BUFFER ZONE.*
5. *ADJACENT PROPERTY LINES AND ABUTTERS SHOWN HEREON ARE REFERENCED FROM THE ASSESSOR DATA.*
6. *SUBJECT PARCELS ARE ZONED AGRICULTURAL ACCORDING TO THE AGAWAM GIS ZONING MAP.*
7. *THE UNDERGROUND UTILITIES SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND AVAILABLE RECORD DATA. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN HERE ARE IN THE EXACT LOCATION INDICATED. ALTHOUGH THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.*
8. *THE SUBJECT PARCELS DO NOT CONTAIN BORDERING LAND SUBJECT TO FLOODING ACCORDING TO FLOOD INSURANCE RATE MAP NUMBER 25013C0384E EFFECTIVE DATE: JULY 16, 2013.*
9. *THE SUBJECT PROPERTY IS NOT LOCATED WITHIN NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM (NHESP) JURISDICTION (2008 NHESP ATLAS).*

CONSTRUCTION NOTES

1. *UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON SURFACE FEATURES AS LOCATED BY SURVEY AND AVAILABLE RECORD DATA AND ARE APPROXIMATE. ACTUAL FIELD LOCATIONS SHOULD BE VERIFIED WITH THE APPROPRIATE UTILITY COMPANY AND/OR MUNICIPAL DEPARTMENT PRIOR TO CONSTRUCTION.*
2. *CONTRACTOR TO NOTIFY DIG SAFE A MINIMUM OF 72 HOURS PRIOR TO START OF CONSTRUCTION ACCORDING TO MA GENERAL LAWS.*
3. *APPROVED PLANS TO BE ON SITE AT ALL TIMES.*
4. *CHANGES TO THIS PLAN MAY OCCUR AS UNFORESEEN CONDITIONS ARISE. ALL CHANGES TO BE APPROVED BY DESIGN ENGINEER, FIELD INSPECTOR AND CITY/TOWN ENGINEER.*
5. *CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND SAFETY OF TRAFFIC ON THE PUBLIC AND PRIVATE WAYS AFFECTED BY THE CONSTRUCTION OF THIS PROJECT.*
6. *CONTRACTOR SHALL PROTECT ALL SLOPES, VEGETATION, PAVING, WALKS, AND IMPROVEMENTS OUTSIDE THE AREAS TO BE AFFECTED BY THE CONSTRUCTION OF THIS PROJECT.*
7. *TREES, BRUSH AND STUMPS REMOVED BY CLEARING AND GRUBBING OPERATIONS SHALL BE TRANSPORTED OFF THE PROJECT SITE TO AN APPROVED DISPOSAL LOCATION.*
8. *CALCIUM CHLORIDE/WATER FOR DUST CONTROL TO BE AVAILABLE AT ALL TIMES.*
9. *ALL CONSTRUCTION METHODS TO CONFORM TO TOWN PLANNING BOARD REGULATIONS AND DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS.*
10. *TOWN DEPARTMENT OF PUBLIC WORKS APPROVAL IS NOT TO BE CONSTRUED AS AN ALL INCLUSIVE APPROVAL AS OTHER APPROVALS MAY BE NECESSARY, I.E. TOWN ENGINEER, CONSERVATION, FIRE DEPARTMENT, WATER DEPARTMENT, ETC.*
11. *ALL CATCH BASINS TO HAVE 48" SEALED SUMPS AND HOODS.*
12. *EROSION CONTROL MEASURES TO BE IN PLACE PRIOR TO START OF CONSTRUCTION.*
13. *WATER SERVICE TO HAVE A MINIMUM OF 60" OF COVER.*
14. *ALL WATER LINE CONNECTIONS SHALL HAVE MECHANICAL JOINTS.*
15. *SANITARY SEWER CONNECTION TO HAVE A MINIMUM OF 48" OF COVER. CLEAN-OUT SHALL BE REQUIRED EVERY 100 FEET AND AT ALL BENDS.*

STREET NOTES

1. *THE LENGTH OF THE PROPOSED STREET IS APPROXIMATELY 303 FEET THROUGH THE CENTER OF THE CUL-DE-SACE.*
2. *PROPOSED STREET IS CLASSIFIED AS A "PLACE" ACCORDING TO AGAWAM SUBDIVISION REGULATIONS.*
3. *THE ESTIMATED AVERAGE DAILY TRAFFIC (ADT) OF THE PROPOSED STREET IS 40 VEHICLES PER DAY.*

BENCHMARK

TOP OF HYDRANT SPINDLE LOCATED ON SOUTHERLY SIDE OF WOODSIDE DRIVE APPROXIMATELY 75 FEET EASTERLY OF INTERSECTION WITH SAMUEL STREET.
ELEVATION = 125.10 (NAVD88)

30 0 15 30 60
1" = 30'

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

PLAN & PROFILE
HIGH STREET
STA -0+50 to STA 3+25

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 49376
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

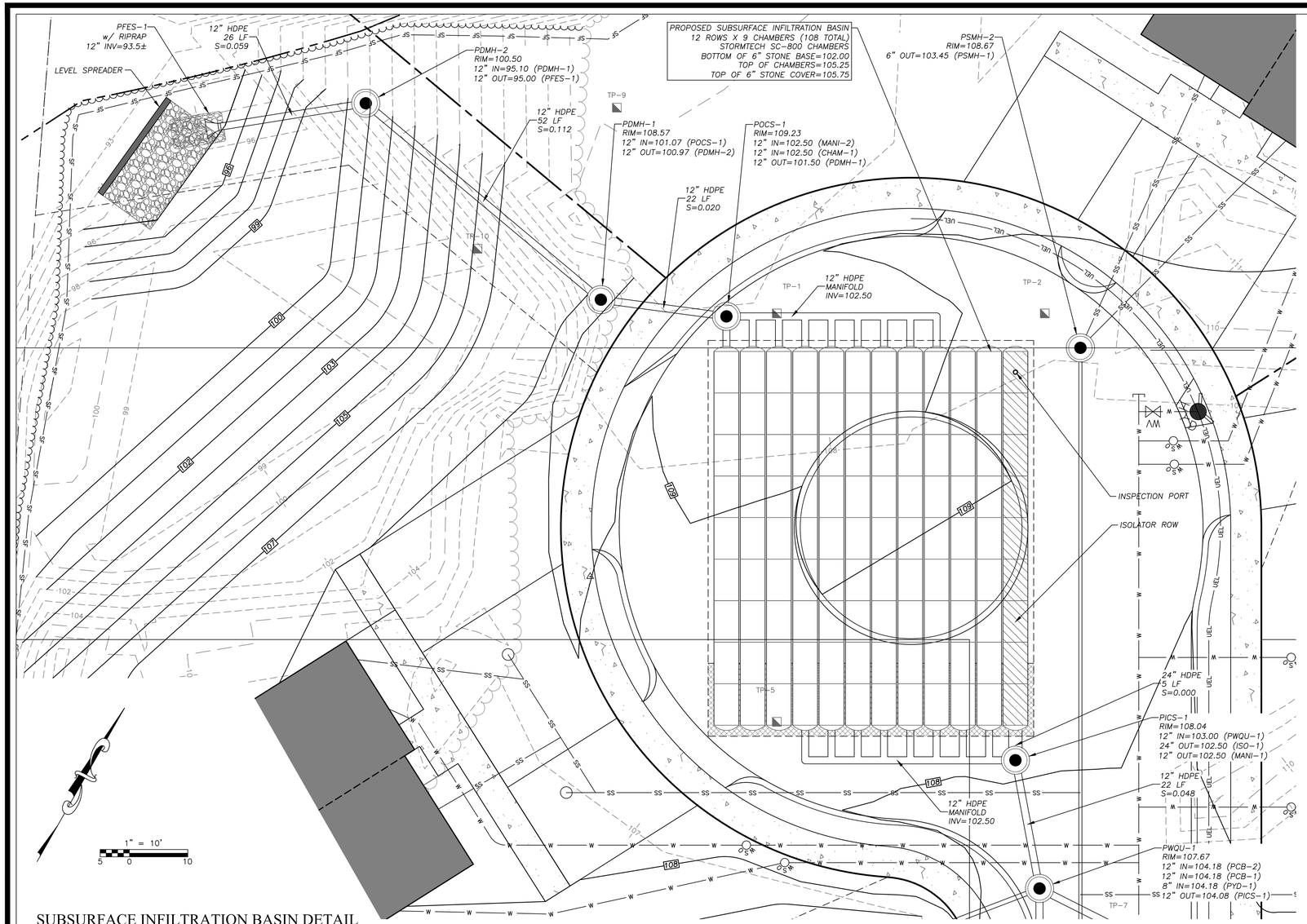
ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**
DRAFTED BY: T.A. & F.C.	

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

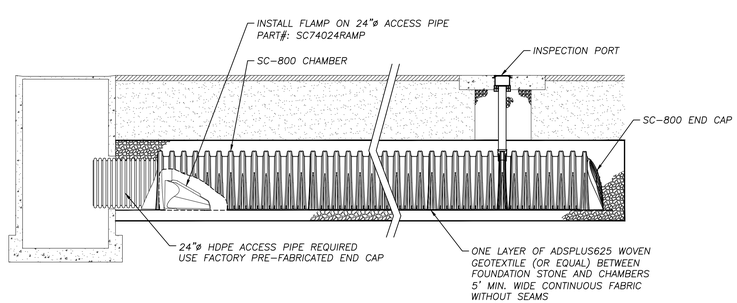
RLA PROJ. NUMBER: 220627

DRAWING#	REV.
C-4	



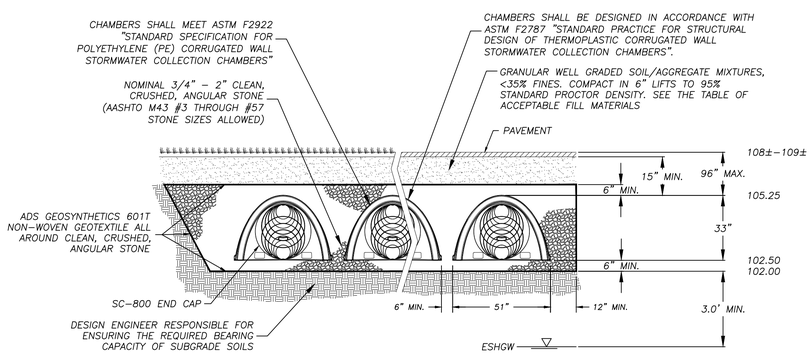
SUBSURFACE INFILTRATION BASIN DETAIL

1" = 10'



STORMTECH SC-800 ISOLATOR ROW DETAIL

NO SCALE



STORMTECH SC-800 CROSS-SECTION

NO SCALE

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

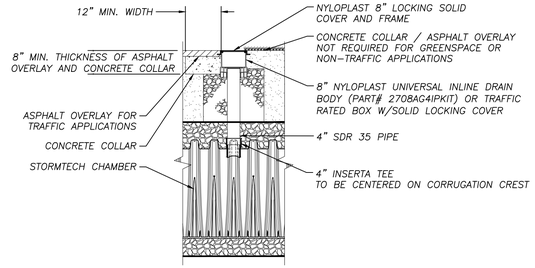
COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

TOWN OF AGAWAM PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

DATE

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.



STORMTECH SC-800 INSPECTION PORT DETAIL

NO SCALE

CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-800 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN POLYPROPYLENE OR POLYETHYLENE RESINS TESTED USING ASTM STANDARDS.
3. CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCE.
6. ONLY CHAMBERS THAT ARE APPROVED BY THE ENGINEER WILL BE ALLOWED. THE CONTRACTOR SHALL SUBMIT (3 SETS) OF THE FOLLOWING TO THE ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION BY A REGISTERED STRUCTURAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET. THE 50-YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2922 MUST BE USED AS A PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
7. CHAMBERS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
8. ALL DESIGN SPECIFICATIONS FOR CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST DESIGN MANUAL.
9. THE INSTALLATION OF CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS.

PERMITTING

RLA

R LEVESQUE ASSOCIATES INC

Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants

ph: 413.568.0985 fax: 413.568.0986

40 School Street
Westfield, MA 01085

rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 43576
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**

DRAFTED BY: T.A. & F.C.

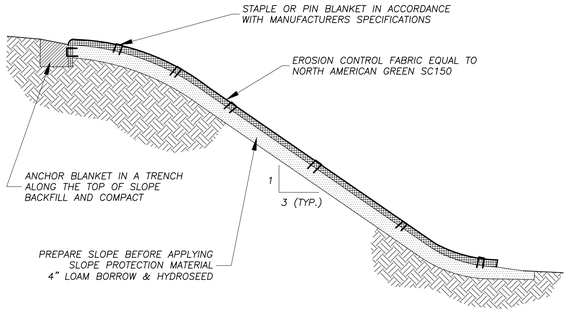
UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

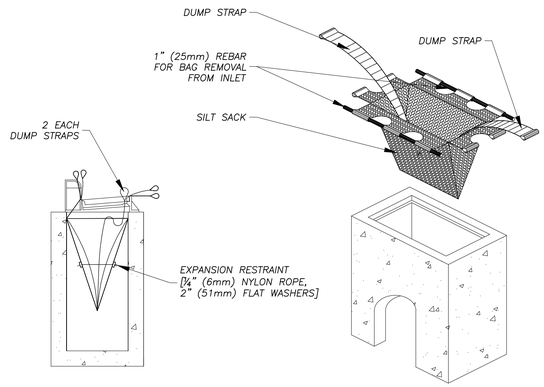
DRAWING#	REV.
C-5	-

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg



SLOPE PROTECTION MATERIAL INSTALLATION (AS REQ'D)

NO SCALE



INLET PROTECTION - SEDIMENT FILTER SACK

NO SCALE

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

TOWN OF AGAWAM PLANNING BOARD

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

_____

_____

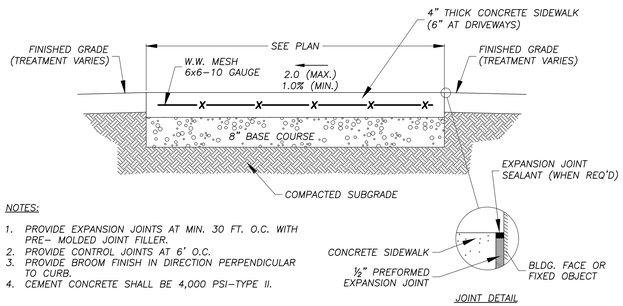
_____

_____

_____

_____

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

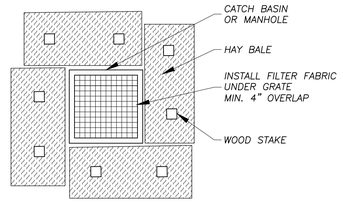


NOTES:

1. PROVIDE EXPANSION JOINTS AT MIN. 30 FT. O.C. WITH PRE– MOLDED JOINT FILLER.
2. PROVIDE CONTROL JOINTS AT 6' O.C.
3. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.
4. CEMENT CONCRETE SHALL BE 4,000 PSI–TYPE II.

REINFORCED CONCRETE SIDEWALK SECTION

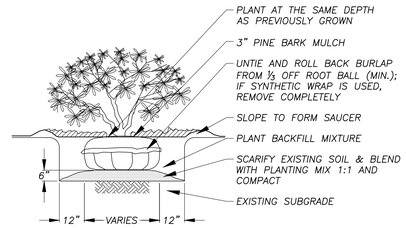
NO SCALE



NOTE
INSTALL BARRIER AT EACH CATCH BASIN AND DRAINAGE BASIN. CATCH BASINS IN PAVEMENT AREAS ARE TO RECEIVE ONLY THE FILTER FABRIC TREATMENT.

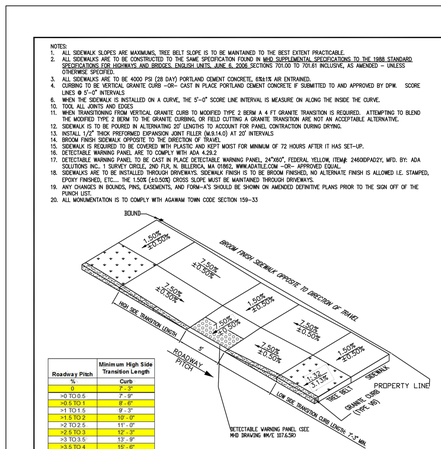
INLET PROTECTION - HAY BALES

NO SCALE



SHRUB PLANTING DETAIL

NO SCALE



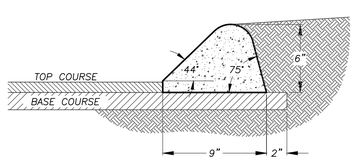
Roadway Pitch %	Minimum High Side Transition Length Curb
0	7'-0"
>0 TO 0.5	7'-6"
>0.5 TO 1	8'-6"
>1 TO 1.5	9'-6"
>1.5 TO 2	10'-6"
>2 TO 2.5	11'-6"
>2.5 TO 3	12'-3"
>3 TO 3.5	13'-6"
>3.5 TO 4	15'-6"
>4	17'-6"

- THE ABOVE LENGTHS ARE CALCULATED USING THE 7.0ft PANEL SLOPE.
- USE OF SHALLOWER GRADES WILL REQUIRE LONGER HIGH SIDE AND LOW SIDE TRANSITION LENGTHS.
- CHECK WITH THE TOWN ENGINEER BEFORE USING ANY GRADES BESIDES THOSE LISTED IN THE TABLE ABOVE.

SIDEWALK CURB CUT

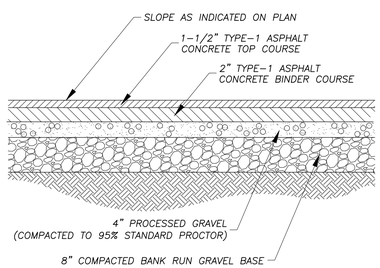
N.T.S.

DRAWN BY: JGD	PROJECT	SHT. NAME	SHT. NO.
DATE: 05/27/08	TOWN OF AGAWAM CONSTRUCTION STANDARDS	SIDEWALK CURB CUT W/ DETECTABLE WARNING PANEL	H–7
DWG. NO.: 1			
APPROVED BY: MCC			



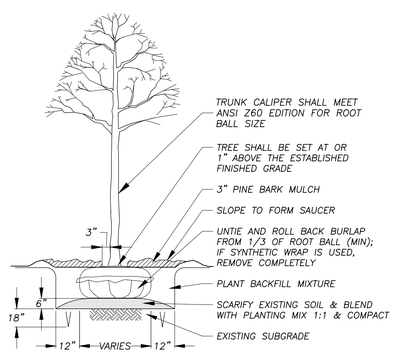
BITUMINOUS CONCRETE BERM (TYPE-2)

NO SCALE



BITUMINOUS CONCRETE PAVING DETAIL

NO SCALE



TREE PLANTING DETAIL

NO SCALE

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 54376
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026

REVISIONS:	DATE:

DRAFTED BY: T.A. & F.C.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
D-1	-

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

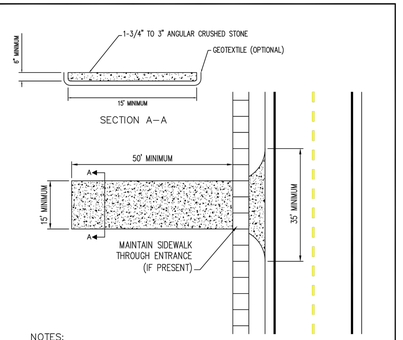
I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS

PROFESSIONAL LAND SURVEYOR

TOWN OF AGAWAM
PLANNING BOARD
APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

DATE

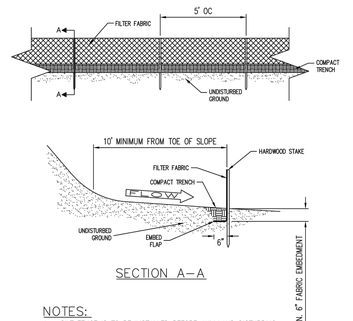
I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.



NOTES:
1. EACH SITE ENTRANCE IS TO HAVE A TEMPORARY CONSTRUCTION ENTRANCE.
2. STONE IS TO BE 1-3/4" TO 3" ANGULAR CRUSHED STONE.
3. ANY SEDIMENT TRACKED INTO THE ROADWAY NEEDS TO BE CLEANED IMMEDIATELY.
4. ADDITIONAL STONE IS TO BE ADDED TO THE PAD AS NEEDED TO MAINTAIN THE ORIGINAL DEPTH.
5. ANY SIDEWALK DAMAGED DURING CONSTRUCTION MUST BE REPLACED AT THE CONTRACTORS/DEVELOPERS EXPENSE.
6. SIDEWALK MUST REMAIN PASSABLE, IF THE SIDEWALK BECOMES UNSAFE OR IMPASSABLE, A TEMPORARY SIDEWALK/ SIDEWALK DETOUR MUST BE PROVIDED.

TEMPORARY CONSTRUCTION ENTRANCE
N.T.S

DRAWN BY: JGD DATE: 03/05/07 REV: 01/19/10 DWG. NO.: 1 APPROVED BY: MCC	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME TEMPORARY CONSTRUCTION ENTRANCE	SHT. NO. ES-1



NOTES:
1. SILT FENCE IS TO BE INSTALLED BEFORE ANY LAND DISTURBING ACTIVATES START AT THE CONSTRUCTION SITE –OR– AS DIRECTED IN THE SITE'S EROSION AND SEDIMENTATION PLAN.
2. INSPECT SILT FENCE ON WEEKLY BASIS AND AFTER EACH RAIN ANY DETERIORATED/DAMAGED SILT FENCE MUST BE REPLACED IMMEDIATELY.
3. REMOVE SILT FROM FENCE AS NEEDED –OR– WHEN THE SILT HAS ACCUMULATED TO HALF THE ORIGINAL HEIGHT OF THE FENCE.
4. WHEN JOINING TWO SECTIONS OF FENCE, ROLL THE END STAKES TOGETHER SUCH THAT THERE IS NO GAP IN THE FENCE, OVERLAPPING FENCE SECTIONS IS NOT AN ACCEPTABLE ALTERNATIVE

SILT FENCE
N.T.S

DRAWN BY: JGD DATE: 3/8/2007 DWG. NO.: 1 APPROVED BY: MCC	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME SILT FENCE	SHT. NO. ES-2

MINIMUM THICKNESS FOR PAVEMENT

TYPE OF STREET	HOT MIX ASPHALT			GRAVEL BASE & GRAVEL SUB-BASE	
	SURFACE COURSE (INCHES)	BINDER COURSE (INCHES)	BASE (INCHES)	BASE (INCHES) DENSE GRADED CRUSHED STONE (M .01.7)	SUB-BASE (INCHES) (M 1.03.0 TYPE B, 3" MAX.)
PLACE	1.5"	3.0"	NA	4.0"	8.0"
LANE	1.5"	3.0"	NA	4.0"	8.0"
SUBCOLLECTOR	1.5"	2.0"	3.0"	4.0"	8.0"
COLLECTOR	1.5"	2.0"	4.0"	4.0"	10.0"

NOTE: THE THICKNESSES ABOVE DO NOT APPLY TO INDUSTRIAL PARK ROADS

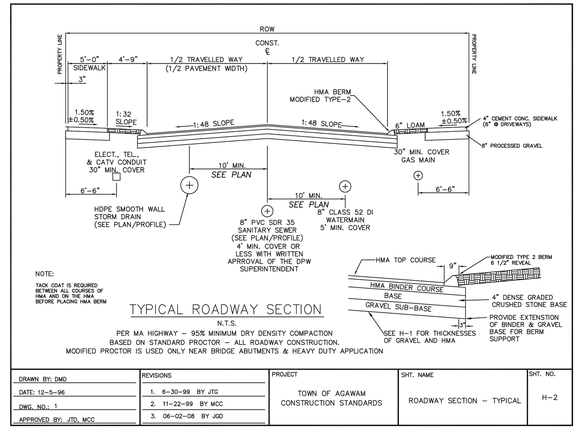
1. THE MATERIAL TO BE USED FOR THE GRAVEL BASE (THE 4" OF MATERIAL DIRECTLY UNDER THE BINDER COURSE OF PAVING) IS TO BE DENSE GRADED CRUSHED STONE (NOT PROCESSED GRAVEL OR OTHER NATURAL STONE PRODUCT.) MHD SPECIFICATION M2.01.7, WHICH MUST BE MET, STATES THAT COARSE AGGREGATE (#4 SIEVE AND LARGER) MUST BE CRUSHER RUN.
2. THE LINE, GRADE AND COMPACTION OF THE GRAVEL SUB-BASE (THE 8" LAYER OF GRAVEL BORROW DIRECTLY UNDER THE DENSE GRADED CRUSHED STONE) MUST BE APPROVED BY ENGINEERING BEFORE THE 4" LAYER OF DENSE GRADED CRUSHED STONE IS PLACED. IT IS IMPORTANT THAT ENOUGH TIME IS ALLOWED IN THE CONSTRUCTION SCHEDULE SO THAT FIELD DENSITY TESTS CAN BE MADE (AT DEVELOPER'S EXPENSE).
3. GRAVEL SAMPLES FOR THE SUB-BASE AND BASE WILL BE TAKEN BY THE ENGINEERING DIVISION FOR TESTING. THE SAMPLE MUST MEET ITS RESPECTIVE MHD SPECIFICATION AND BE APPROVED BY THE TOWN ENGINEER BEFORE ANY OF THE GRAVEL CAN BE SPREAD ON-SITE. THE TOWN ENGINEER OR THEIR AGENT ARE SOLELY RESPONSIBLE FOR CHAIN OF CUSTODY OF ALL SAMPLES; ANY TESTING PERFORMED OUTSIDE OF THE TOWN CHAIN OF CUSTODY WILL NOT BE ACCEPTED.
4. FIELD DENSITY TESTING IS TO BE MADE ON BOTH THE GRAVEL SUB-BASE AND GRAVEL BASE SEPARATELY. THE GRAVEL SUB-BASE IS TO BE TESTED BEFORE THE GRAVEL BASE WILL BE ALLOWED TO BE PLACED.
5. WHEN THE GRAVEL FOR THE SUB-BASE AND BASE IS SPREAD OUT, IT IS TO BE SPREAD INTO THE SITE STARTING AT THE SITE'S ENTRANCE AND WORKING INWARDS.
6. THE BINDER COURSE OF PAVING CANNOT BE LAID UNTIL THE ENGINEERING DIVISION HAS APPROVED THE GRADE FOR THE ROADWAY AND THE COMPACTION OF THE GRAVEL BASE.
7. PRIOR TO INSTALLING THE CURB, THE DEVELOPER SHALL HAVE THE LINES OF THE PROPOSED CURBING LAID OUT WITH RED PAINT OR OTHER MARKING AND THEN NOTIFY ENGINEERING THAT MARKING IS READY FOR INSPECTION. AFTER INSPECTION, ENGINEERING WILL NOTIFY THE DEVELOPER THAT CURBING IS EITHER READY FOR LAYING OR CORRECTIONS MUST BE MADE TO THE MARKINGS. IN THE LATTER CASE, THE DEVELOPER MUST MAKE THE CORRECTIONS PRIOR TO APPROVAL AND INSTALLATION. TACK COAT IS REQUIRED BEFORE PLACMENT OF HMA BERMS.
8. PRIOR TO LAYING THE TOP COURSE OF PAVEMENT, AND AFTER THE CURB IS INSTALLED, THE PAVEMENT MUST BE FLOODED SO THAT ENGINEERING CAN OBSERVE AND SURVEY THE GRADES OF BINDER COURSE TO DETECT ANY DISCREPANCIES IN GRADE. THIS INFORMATION MUST BE FURNISHED TO THE PAVING SUBCONTRACTOR BY THE DEVELOPER SO THAT ANY NECESSARY SHIMMING OF THE PAVEMENT CAN BE MADE. ENGINEERING WILL CHECK SHIMS.
9. AS NOTED IN THE SUBDIVISION REGULATIONS AND STANDARD PERFORMANCE AGREEMENTS, THE PRESENCE OF AN INSPECTOR WILL NOT RELIEVE THE DEVELOPER OF HIS OBLIGATIONS TO PROVIDE A SATISFACTORY INSTALLATION OF ALL FACILITIES WHICH ARE A PART OF THE SUBDIVISION.
10. TACK COAT WILL BE REQUIRED TO BE APPLIED AT A RATE OF 1/20 GAL/SY WHENEVER PLACING HMA OVER EXISTING PAVEMENT, OTHERWISE THE TACK COAT SHALL BE AS SPECIFIED IN SECTION 460.62 OF THE MHD STANDARD SPECIFICATIONS.

STREET DESIGN STANDARDS

TYPE OF STREET	RIGHT OF WAY WIDTH (FEET)	PAVEMENT WIDTH (FEET)
PLACE	50	26
LANE	50	30
SUBCOLLECTOR	60	36
COLLECTOR	66	40

REVISED 05/2008

DRAWN BY:DMD REV. BY: JTG, JGD DATE: 1/23/98 REV.: 01/19/10 DWG. NO.: 1 APPROVED BY:JTD, MCC	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME STREET STANDARDS	SHT. NO. H-1

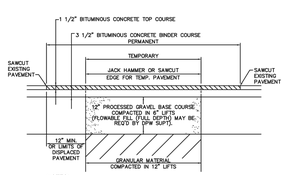


NOTE:
TACK COAT IS REQUIRED BETWEEN ALL COURSES OF HMA AND ON THE HMA BEFORE PLACING HMA BERM

TYPICAL ROADWAY SECTION
N.T.S.

PER MA HIGHWAY – 95% MINIMUM DRY DENSITY COMPACTION
BASED ON STANDARD PROCTOR – ALL ROADWAY CONSTRUCTION.
MODIFIED PROCTOR IS USED ONLY NEAR BRIDGE ABUTMENTS & HEAVY DUTY APPLICATION

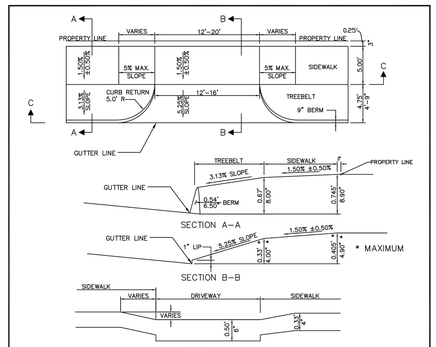
DRAWN BY: DMD DATE: 12-5-96 DWG. NO.: 1 APPROVED BY: JTD, MCC	REVISIONS 1. 6-30-99 BY JTG 2. 11-22-99 BY MCC 3. 06-02-08 BY JGD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME ROADWAY SECTION – TYPICAL	SHT. NO. H-2



NOTES:
1. TEMPORARY PAVEMENT OVER TRENCHES IN STREET TO REMAIN FOR A MINIMUM OF 60 DAYS. TEMPORARY PAVEMENT 3" BINDER COURSE IN ONE LIFT – COLD PATCH KNOWN AS "DPW" MAYBE USED WHEN TYPE I-1 IS UNAVAILABLE.
2. REMOVE TEMPORARY PAVEMENT AND REPLACE WITH PERMANENT PAVEMENT
3. PAVEMENT THICKNESS TO BE 5" MINIMUM, OR GREATER TO MATCH EXISTING CONDITIONS.
4. WHERE PAVEMENT IS CUT 2'-0" OR LESS FROM EDGE OF ROAD, REPAVING TO EXTEND TO EDGE OF ROAD.
5. EDGE OF EXISTING PAVEMENT SHALL BE TREATED WITH A TACK COAT PRIOR TO PLACEMENT OF THE PERMANENT PATCH.
6. EXCEPT AS OTHERWISE DIRECTED BY THE D.P.W. SUPT., THE EDGE OF PAVEMENT ADJACENT TO PATCH SHALL BE HEATED WITH INFRARED EQUIPMENT TO SEAL THE JOINTS.

PERMANENT PAVEMENT REPLACEMENT DETAIL
N.T.S.

DRAWN BY: DMD DATE: 12-5-96 REV.: 3-15-98 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME PERMANENT PAVEMENT REPLACEMENT DETAIL	SHT. NO. H-3



NOTES:
1. CONCRETE SIDEWALK IS TO RUN CONTINUOUSLY THROUGH DRIVEWAYS
2. CONCRETE USED SHALL BE 4000 PSI WITH A MAX. AGGREGATE SIZE OF 3/4" AND SHALL CONTAIN 5-7% ENTRAINED AIR.
3. CONCRETE DEPTH DEPTH SHALL BE A MINIMUM OF 4" WITH A MINIMUM DEPTH OF 6" @ DRIVEWAYS
4. SIDEWALKS SHOULD BE INSTALLED PRIOR TO THE APPLICATION FOR A BUILDING PERMIT UNLESS THE BUILDER REQUESTS IN WRITING THAT THE SIDEWALKS BE DELAYED AND GUARANTEES THAT THE SIDEWALK WILL CONFORM TO THE STANDARD DRIVEWAY DETAIL.
5. ALL DRIVEWAYS REQUIRE A DPW DRIVEWAY PERMIT
6. ALL SLOPES ARE MAXIMUM, DRIVEWAYS ARE TO BE DESIGNED SUCH THAT WATER WILL NOT FLOW INTO DRIVEWAY FROM THE ROADWAY
7. DRIVEWAY SHALL BE PLACED SO THAT STREET INFRASTRUCTURE, SUCH AS: FIRE HYDRANTS, UTILITY POLES AND CATCH BASINS, ARE LOCATED NO CLOSER THAN 5FT TO THE POINT WHERE THE DRIVEWAY'S CURB RETURN MEETS WITH THE STREET'S CURB LINE.

STANDARD RESIDENTIAL DRIVEWAY
N.T.S.

DRAWN BY:DMD REV. BY: JTG, JGD DATE:12-5-96 REV.: 10-18-10 DWG. NO.: 1 APPROVED BY: MCC	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME STANDARD RESIDENTIAL DRIVEWAY	SHT. NO. H-6

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 54376
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026

REVISIONS:	DATE:

DRAFTED BY: T.A. & F.C.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
D-2	

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

PLANNING BOARD

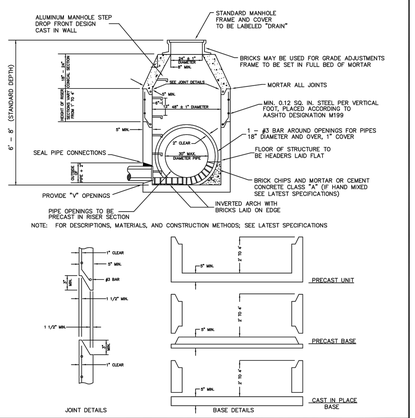
APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

DATE

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

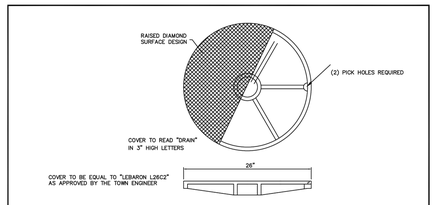
PRECAST CONCRETE DRAIN MANHOLE

N.T.S.
202.4.0

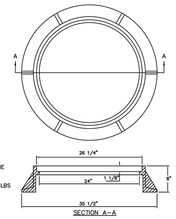


NOTE: FOR DESCRIPTIONS, MATERIALS, AND CONSTRUCTION METHODS; SEE LATEST SPECIFICATIONS

DRAWN BY: MCC DATE:12-30-98 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME PRECAST DRAIN MANHOLE	SHT. NO. D-1

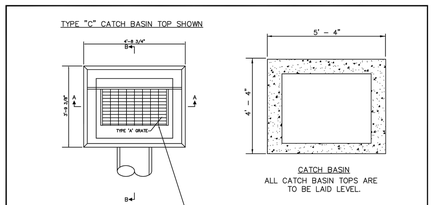


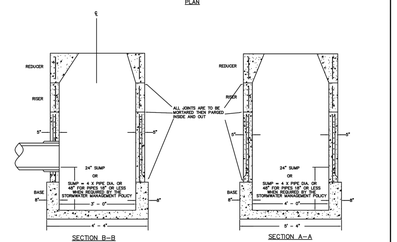
24" MANHOLE COVER
N.T.S.
202.8.1



24" MANHOLE FRAME
N.T.S.
202.11

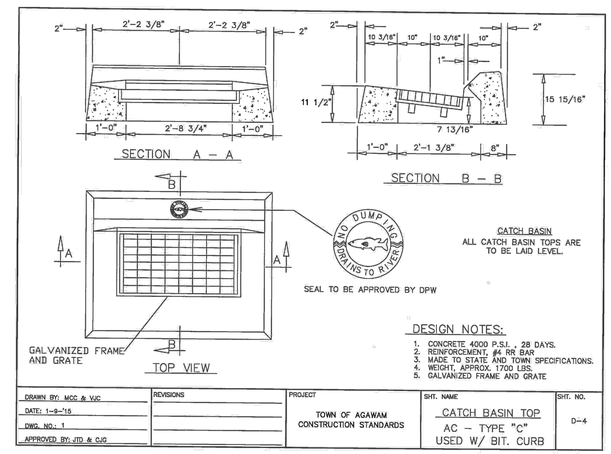
DRAWN BY:MCC/JTG DATE: 1-10-99/7-23-01 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME DRAIN MANHOLE FRAME AND COVER	SHT. NO. D-2





PRECAST CATCH BASIN
"TYPE C"
N.T.S.

DRAWN BY:DMD REV. BY: JTG/MCC DATE: 12-5-96 REV.: 9/6/02 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME CATCH BASIN	SHT. NO. D-3

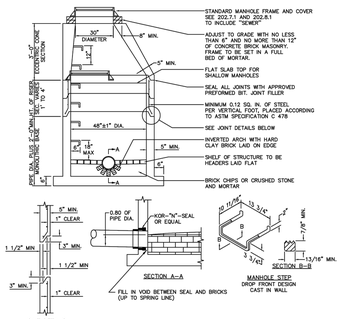


DESIGN NOTES:
1. CONCRETE 4000 P.S.I. , 28 DAYS.
2. REINFORCEMENT, #4 RR BAR
3. MADE TO STATE AND TOWN SPECIFICATIONS.
4. WEIGHT, APPROX. 1700 LBS.
5. GALVANIZED FRAME AND GRATE

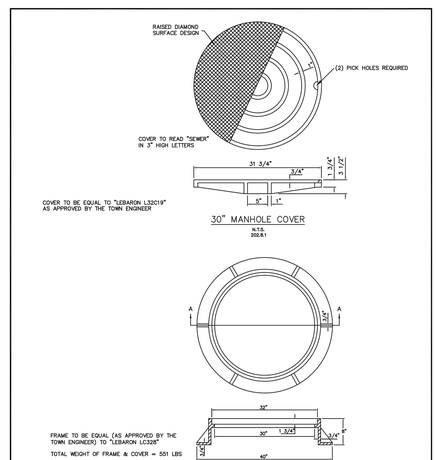
DRAWN BY: MCC & VJC DATE: 1-8-15 DWG. NO.: 1 APPROVED BY: JTD & CJC	REVISIONS	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME CATCH BASIN TOP AC – TYPE "C" USED W/ BIT. CURB	SHT. NO. D-4

STANDARD SANITARY SEWER MANHOLE

N.T.S.
202.6.1



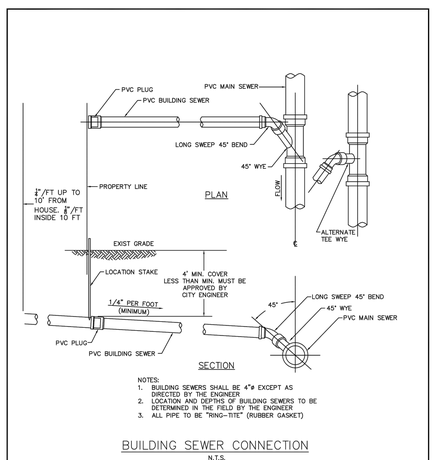
DRAWN BY: DMD REV. BY: JTG DATE: 12-5-96 REV: 6-30-99 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME MANHOLE – SANITARY SEWER	SHT. NO. S-1



30" MANHOLE COVER
N.T.S.
202.8.1

30" MANHOLE FRAME
TYPE 'C'
N.T.S.
202.7.1

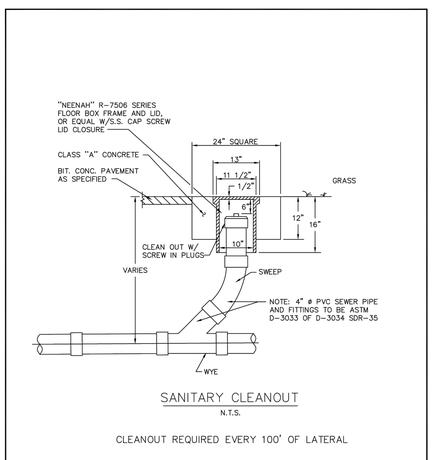
DRAWN BY: DMD/JTG DATE:12-5-96/7-23-01 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME SANITARY SEWER MANHOLE FRAME AND COVER	SHT. NO. S-3



NOTES:
1. BUILDING SEWERS SHALL BE 4"ø EXCEPT AS DIRECTED BY THE ENGINEER
2. LOCATION AND DEPTHS OF BUILDING SEWERS TO BE DETERMINED IN THE FIELD BY THE ENGINEER
3. ALL PIPE TO BE "RING-TITE" (RUBBER GASKET)

BUILDING SEWER CONNECTION
N.T.S.

DRAWN BY: DMD/MCC DATE: 12-5-96 REV.: 8/1/03 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME BUILDING SEWER CONNECTION	SHT. NO. S-4



SANITARY CLEANOUT
N.T.S.

CLEANOUT REQUIRED EVERY 100' OF LATERAL

DRAWN BY: DMD DATE: 12-5-96 DWG. NO.: 1 APPROVED BY: JTD	PROJECT TOWN OF AGAWAM CONSTRUCTION STANDARDS	SHT. NAME SANITARY CLEANOUT	SHT. NO. S-5

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. CRAVO
CIVIL
No. 49376
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026	
REVISIONS:	**DATE:**

DRAFTED BY: T.A. & F.C.

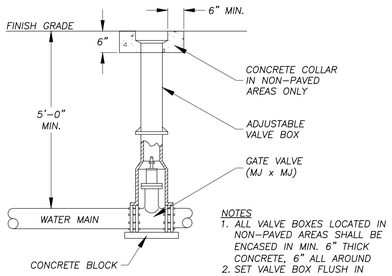
UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
D-3	

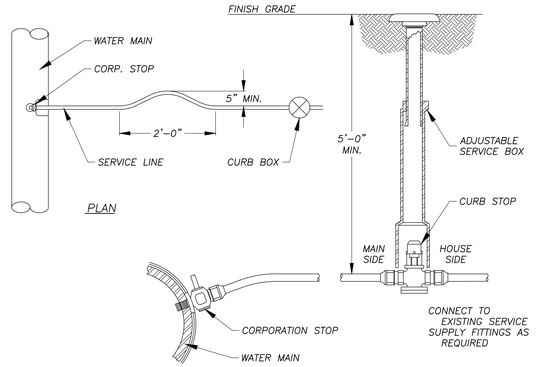
S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg



NOTES
1. ALL VALVE BOXES LOCATED IN NON-PAVED AREAS SHALL BE ENCASED IN MIN. 6" THICK CONCRETE, 6" ALL AROUND
2. SET VALVE BOX FLUSH IN PAVED AREAS

TYPICAL BURIED VALVE

NO SCALE



PLAN

SECTION

TYPICAL WATER SERVICE CONNECTION

NO SCALE

PIPE RESTRAINT SCHEDULE FOR GROUND BURIED PRESSURE PIPES									
LENGTH OF RESTRAINT REQD (FEET)								DESIGN FORCE ON RESTRAINT REQ'D (KIPS) ①	
PIPE \ DEFLECT. ANGLE	2½°	3¾°	45°	56¼°	67½°	78¾°	90° OR TEE	45°	90° OR TEE
6"	3	6	11	16	23	29	37	2.0	5.0
8"	4	8	15	22	31	41	50	3	9.0
10"	5	11	18	28	38	49	61	4.0	14.0
12"	6	13	22	33	45	59	73	6.0	20.0

① THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE + WATER HAMMER). FOR OTHER TEST PRESSURES, ALL VALUES TO BE INCREASED OR DECREASED PROPORTIONALLY

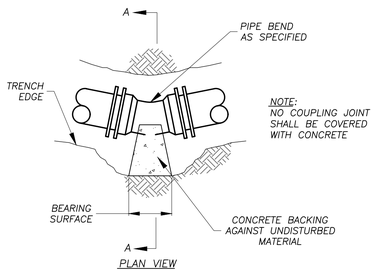
② IN EACH DIRECTION FROM POINT OF DEFLECTION EXCEPT FOR TEE AT WHICH ONLY THE BRANCH IN THE DIRECTION OF THE TEE STEM.

③ IF TIE RODS ARE USED, USE 4 RODS MINIMUM AND ADD ⅛" TO BAR DIA AS CORROSION ALLOWANCE.

MINIMUM AREA OF BEARING FACE OF CONCRETE THRUST BLOCKS IN SQUARE FEET			
	SOIL BEARING		
PIPE SIZE (INCHES)	1,000 LBS./ SQ. FT.	2,000 LBS./ SQ. FT.	4,000 LBS./ SQ. FT.
DEAD END, TEE OR HYDRANT			
6	11	6	3
8	20	10	5
12	34	17	9
1/4 BEND – 90°			
6	16	8	4
8	28	14	7
12	56	28	14
1/8 BEND – 45°			
6	9	4	2
8	14	7	4
12	32	16	8
1/16 BEND – 22 1/2° OR LESS			
6	4	2	1
8	8	4	2
12	15	8	4

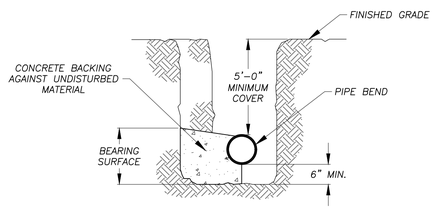
NOTES: THRUST BLOCKS

1. FIGURES BASED ON 300 PSI OPERATING PLUS SURGE PRESSURE
2. CONCRETE SHALL NOT BE DUMPED OVER THE FITTING. THE BLOCK MUST BE FORMED
3. RETAINING RODS OR RESTRAINED JOINT PIPE AS APPROVED BY THE ENGINEER MAY BE USED IN PLACE OF THRUST BLOCKS
4. PLACE 15 LB ROOF FELT BETWEEN PIPE AND CONCRETE
5. CONCRETE SHALL NOT COVER PIPE JOINTS
6. ALL BENDS, TEES, HYDRANTS AND DEAD ENDS SHALL BE BRACED WITH CONCRETE THRUST BLOCKS OR SUITABLE RESTRAINING DEVICES
7. BEARING AREA IS AREA OF CONCRETE IN CONTACT WITH WALL OF TRENCH = H x L
8. HEIGHT (H) AND LENGTH (L) AS REQUIRED TO OBTAIN AREA IN TABLE. LENGTH TO BE 2 TIMES HEIGHT
9. ESTIMATED SOIL BEARING LOAD IS 2000 LBS

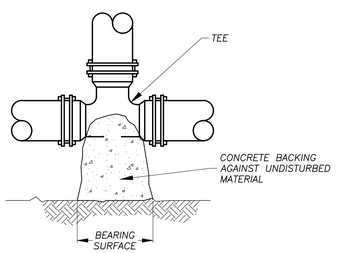


NOTE:
NO COUPLING JOINT SHALL BE COVERED WITH CONCRETE

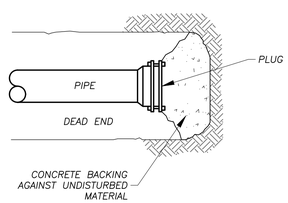
PLAN VIEW



SECTION A – A



PLAN VIEW



PLAN VIEW

WATER MAIN · HORIZONTAL THRUST BLOCK DETAILS

NO SCALE

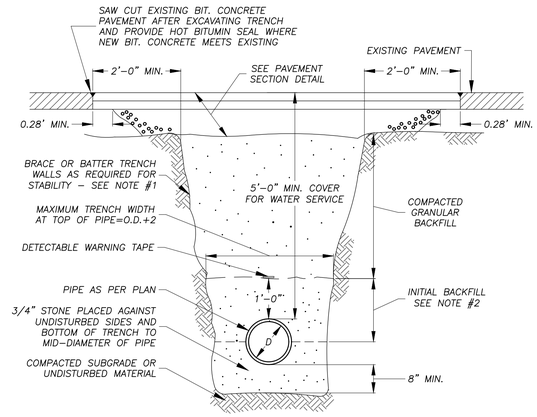
I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

TOWN OF AGAWAM
PLANNING BOARD
APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

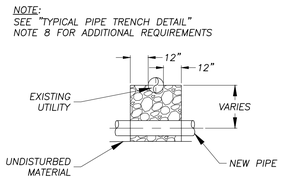


TRENCH NOTES

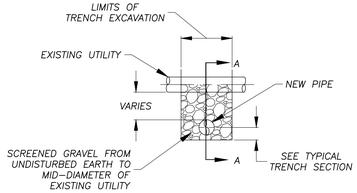
1. SHEETING, WHEN REQUIRED TO BE CUT OFF AT LEAST 5 FT. BELOW STREET AND A MINIMUM OF 1 FT. ABOVE TOP OF PIPE. WOOD SHEETING DRIVEN BELOW MID-DIAMETER OF THE PIPE SHALL BE LEFT IN PLACE. STEEL SHEETING DRIVEN BELOW MID-DIAMETER MAY BE WITHDRAWN IF APPROVED IN WRITING BY THE ENGINEER. FOR P.V.C. PIPE, ALL SHEETING DRIVEN BELOW MID-DIAMETER SHALL BE LEFT IN PLACE.
2. SELECTED COMMON FILL, HAND PLACED, FROM MID-DIAMETER OF PIPE TO 12" ABOVE, TOP OF PIPE.
3. TRENCHES LOCATED ON THE ROAD SHOULDER SHALL BE TREATED THE SAME AS STREET EXCEPT FOR PAVING.
4. PROVIDE AT LEAST ONE IMPERVIOUS DAM IN GRAVEL BEDDING BETWEEN EACH MANHOLE WHERE DIRECTED, OR EVERY 300 FT., WHICHEVER IS LESS.
5. COMPACT ALL BACKFILL MATERIAL WITH VIBRATORY PLATE EQUIPMENT (MINIMUM TWO PASSES) TO A MINIMUM DENSITY OF 95 PERCENT OF THE STANDARD PROCTOR DENSITY AS DETERMINED BY ASTM D698.
6. PLACE BACKFILL MATERIALS IN MAXIMUM ONE FOOT LIFTS.

PIPE TRENCH DETAIL (STANDARD)

NO SCALE



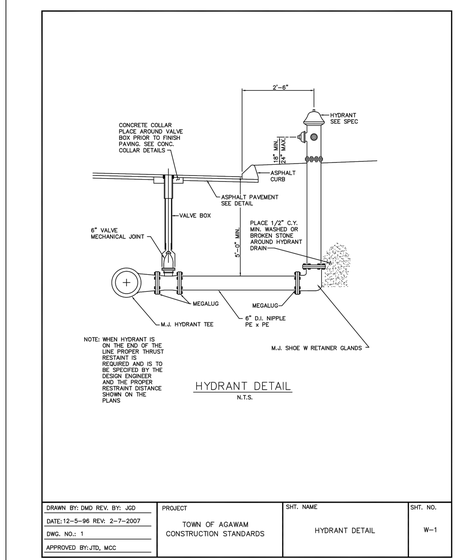
SECTION "A–A"



TYPICAL SECTION

UTILITY CROSSING DETAIL

NO SCALE



HYDRANT DETAIL
N.T.S.

DRAWN BY: DMD REV. BY: JGD	PROJECT	SHT. NAME	SHT. NO.
DATE:12-5-96 REV: 2-7-2007	TOWN OF AGAWAM CONSTRUCTION STANDARDS	HYDRANT DETAIL	W-1
DWG. NO.: 1			
APPROVED BY:JTD, MCC			

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

FILIPE J. CRAVO CIVIL No. 52076 REGISTERED PROFESSIONAL ENGINEER 1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026

REVISIONS:	DATE:

DRAFTED BY: T.A. & F.C.

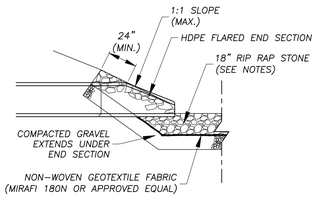
UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

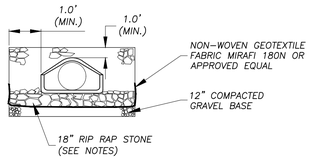
RLA PROJ. NUMBER: 220627

DRAWING#	REV.
D-4	

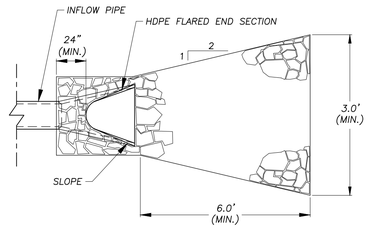
S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg



SIDE SECTION



FRONT SECTION



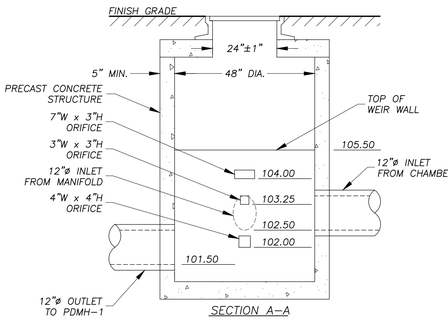
PLAN VIEW

NOTES

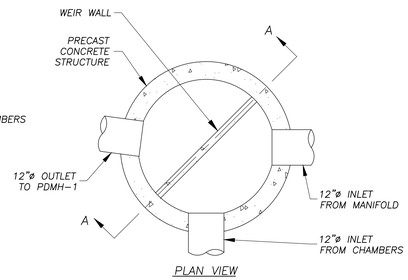
1. FLARED END SECTION PIPE JOINT SHALL BE SIMILAR TO THE MAIN RUN OF PIPE JOINTS
2. STONE RIPRAP SHALL NOT BE LESS THAN 50 POUNDS NOR MORE THAN 125 POUNDS AND AT LEAST 75% OF THE VOLUME SHALL BE AT LEAST 75 POUNDS

STANDARD RIP RAP PIPE OUTLET

NO SCALE



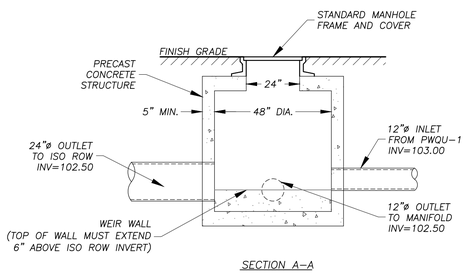
SECTION A-A



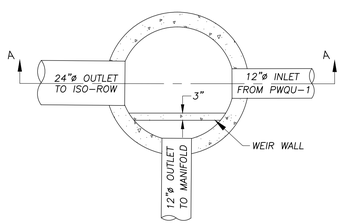
PLAN VIEW

OUTLET CONTROL STRUCTURE (POCS-1)

NO SCALE



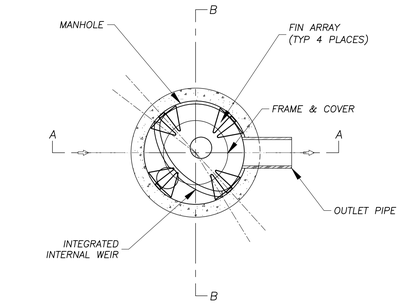
SECTION A-A



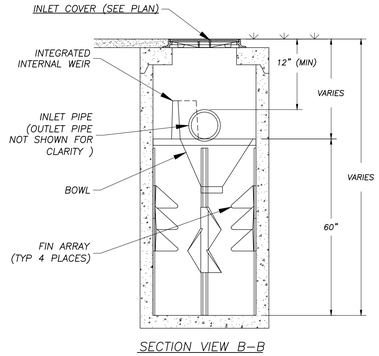
PLAN VIEW

INLET CONTROL STRUCTURE (PICS-4)

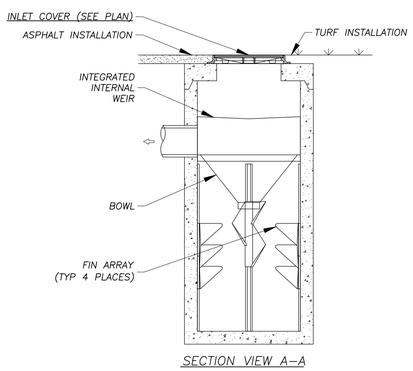
NO SCALE



PLAN VIEW



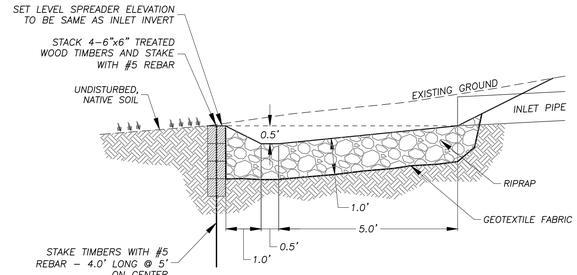
SECTION VIEW B-B



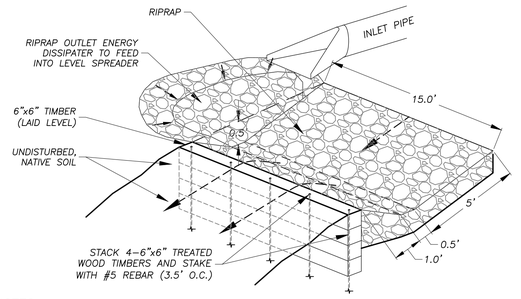
SECTION VIEW A-A

WATER QUALITY UNIT
BARRACUDA MAX S4 (PWQU-1)

NO SCALE



LEVEL SPREADER CROSS-SECTION

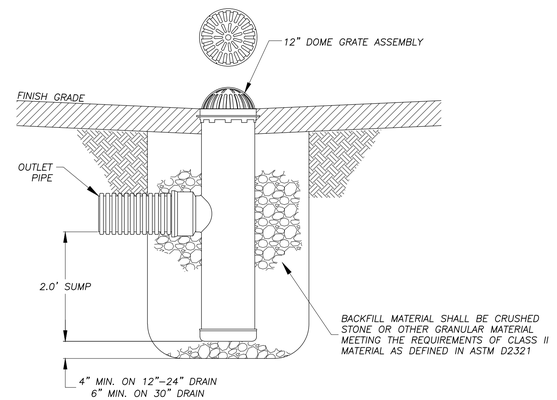


NOTES

1.) LEVEL SPREADER SHALL BE INSTALLED WITH A LEVEL INSTRUMENT. CONSTRUCT LEVEL UP TO 0% GRADE TO ENSURE UNIFORM SHEET FLOW. LEVEL SPREADER SHALL BE CONSTRUCTED ON UNDISTURBED SOIL.
2.) CONSTRUCTION OF LEVEL SPREADER SHALL BE FROM UPHILL SIDE ONLY. LEVEL LIP AND AREA BELOW SPREADER SHALL BE AT EXISTING GRADES AND UNDISTURBED BY EARTHWORK OR EQUIPMENT.
3.) CONSTRUCT SPREADER WITH LIP AT EXISTING GRADE AS SPECIFIED.
4.) DOWNGRADIENT RECEIVING AREA MUST BE NATURALLY WELL VEGETATED.

LEVEL SPREADER DETAIL

NO SCALE



ADS NYLOPLAST YARD DRAIN BASIN

NO SCALE

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTRY OF DEEDS.

PROFESSIONAL LAND SURVEYOR

I, _____, CLERK OF THE TOWN OF AGAWAM HEREBY CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE AGAWAM PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECEIVED DURING TWENTY DAYS AFTER SUCH RECEIPT AND RECORDED OF SAID NOTICE.

TOWN OF AGAWAM
PLANNING BOARD
APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED

_____ DATE

_____

_____

_____

_____

_____

_____

PERMITTING

RLA
R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

DETAILS

0 Old River Street
Agawam, Massachusetts
Map J17 Parcel I-3

COMMONWEALTH OF MASSACHUSETTS
FILIPE J. GRAVO
CIVIL
No. 61576
REGISTERED PROFESSIONAL ENGINEER
1/30/26

PREPARED FOR:

Chuck Calabrese
Calabrese Construction, LLC

7 Brewster Road
West Springfield, MA.

ISSUANCE DATE: January 30, 2026

REVISIONS:	DATE:

DRAFTED BY: T.A. & F.C.

UNAUTHORIZED ALTERATION OF
THIS DOCUMENT IS A VIOLATION
OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 220627

DRAWING#	REV.
D-5	-

S:\Projects\2022\220627 - Calabrese - 0 Old River St, Agawam, MA\05 Civil 3D\220627 - Defin.dwg

Definitive Subdivision Application

Under the Town of Agawam Subdivision of Land Section 159-7 Definitive plan

Proposed Residential Subdivision

Project Location:

Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)

Submitted To:

Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

Applicant & Property Owner:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

RLA Project File No. 220627

January 30, 2026

R LEVESQUE ASSOCIATES, INC.

A LAND PLANNING SERVICES COMPANY

40 School Street, Westfield, MA 01085

p 413.568.0985 · f 413.568.0986 · www.rlaland.com

TABLE OF CONTENTS

SECTIONS

1. COVER LETTER
2. ADMINISTRATIVE DOCUMENTS
   - 2.1 NOTICE TO THE TOWN CLERK
   - 2.2 FORM C – APPLICATION FOR APPROVAL OF DEFINITIVE PLAN
   - 2.3 WAIVER REQUEST LETTER
   - 2.4 STATEMENT OF INTEREST
3. REQUIRED STUDIES
4. FIGURES
   - 4.1 LOCATION MAP
   - 4.2 USGS TOPOGRAPHIC MAP
   - 4.3 FEMA FLOODPLAIN MAP
   - 4.4 NRCS SOIL MAP
   - 4.5 NHESP PRIORITY HABITAT OF RARE SPECIES
5. DEED REFERENCES

LIST OF APPENDICES

APPENDICES

APPENDIX A: SITE PLAN SET

APPENDIX B: STORMWATER DRAINAGE REPORT

I. COVER LETTER

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

January 30, 2026

Violet Baldwin, Chairperson
Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

RE: Definitive Subdivision Application
Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)
RLA Project File No. 220627

Dear Chairperson Baldwin and Board Members:

On behalf of the applicant and property owner, Calabrese Construction, LLC c/o Mr. Charles Calabrese, please find the requisite number of copies of a Definitive Subdivision application and supporting documentation. The applicant proposes the construction of a residential subdivision to be located at the above-referenced properties.

Included within this submission package is the requisite filing fee. As required, a copy of this application submission has been transmitted electronically via email to the Town of Agawam Planning Department.

We are requesting to be placed on the Planning Board's next available agenda. Should you have any questions or comments regarding this submission, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio

Nina Fazio
Permitting Coordinator

2. ADMINISTRATIVE DOCUMENTS

2.1 NOTICE TO THE TOWN CLERK

2.2 FORM C – APPLICATION FOR APPROVAL OF DEFINITIVE PLAN

2.3 WAIVER REQUEST LETTER

2.4 STATEMENT OF INTEREST

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

January 30, 2026

Town of Agawam Town Clerk
36 Main Street
Agawam, Massachusetts 01001

RE: Notice to Town Clerk
Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)
RLA Project File No. 220627

To Whom It May Concern:

I hereby provide notice that a copy of the above-referenced Definitive Subdivision Application and supporting documentation has been filed with the Town Clerk, via hand delivery by R Levesque Associates, Inc. This notice is pursuant to Section 159-7 – Definitive Plan Submission under the Rules & Regulations for the Subdivision of Land for the Town of Agawam, Massachusetts

Should you have any questions or comments regarding this notification, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio

Nina Fazio
Permitting Coordinator

TOWN OF AGAWAM

36 Main Street Agawam, Massachusetts
Tel. 413-786-0400

FORM C
APPLICATION FOR APPROVAL OF DEFINITIVE PLAN

File one completed form with the Planning Board and a copy with the Town Clerk in accordance with the requirements of Section III-B.

Agawam January 29 2026

To the Planning Board:

The undersigned herewith submits the accompanying Definitive Plan of property located in the Town of Agawam for approval as a subdivision under the requirements of the Subdivision Control Law and the Rules and Regulations Governing the Subdivision of Land of the Planning Board in the Town of Agawam.

1. Name of Applicant: Calabrese Construction, LLC c/o Charles Calabrese
   Address: 7 Brewster Road, West Springfield, MA 01089

2. Name of Engineer or Surveyor: R Levesque Associates, Inc.
   Address: 40 School Street, Westfield, MA 01085

3. Deed of property recorded in Hampden County Registry
   Book 22388 / 22935 Page 46 / 347

4. Location and Description of Property: Please see Environmental Study

5. A list of the documents included in this application shall accompany notice to the Town Clerk.

   a. Notarized Statement of Interest in the land;
   b. Environmental Study;
   c. Plans and specifications;
   d. Statement of time-development;
   e. Plan of sequence of development;
   f. Town-development relationship study;
   g. Reports of test borings, etc.; and
   h. Certified copy of Deed.

Your attention is directed to Section III, B. 8 of the Subdivision Rules and Regulations requiring the posting of a bond or recording of a covenant BEFORE approval can be given.

Signature of Owner _____
Address: 7 Brewster Road, West Springfield, MA 01089

Agawam Planning Board

STATEMENT OF INTEREST

Date 01/29/2026

The petitioner hereby certifies that he is the owner of all lands contained within the description of the subject petition. Agawam Planning Board Case No._____.

Charles Calabrese
(Name)

7 Brewster Road, West Springfield, MA 01089
(Address)

(Signature)

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN ss Date 1-22-2026

There personally appeared before me, on the above date, Charles Calabrese to me known to be the person described in and who executed the foregoing document.

Feb 1, 2030
My commission expires

Notary Public

Guilherme Costa
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
February 1, 2030

4-59-8/74-150

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

January 30, 2026

Violet Baldwin, Chairperson
Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

RE: Waiver Request Letter
Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)
RLA Project File No. 220627

Dear Chairperson Baldwin and Board Members:

On behalf of the applicant, Calabrese Construction, LLC c/o Mr. Charles Calabrese, R Levesque Associates, Inc. is submitting this waiver request letter. The following text is taken directly from the Town of Agawam Bylaws Chapter 159 Subdivision of Land and is presented below in *italic text*, followed by a waiver request presented below in **boldface text**.

1. *Section 159-23(A) Sidewalks, tree belts and pedestrian and bicycle paths – There shall be cement concrete sidewalks constructed on both sides of each street in the subdivision. The width of the sidewalks shall be as specified under the Design Standards for the various classes of streets. The construction must conform to the Town of Agawam Department of Public Works Specifications for Construction of Cement Concrete Sidewalks, April 1989. All materials and construction methods shall be as specified in the Department of Public Works Specifications.*

   Waiver Request: The applicant respectfully requests a waiver from the requirement to provide sidewalks on both sides of the roadway. Sidewalks are proposed along one side of the roadway and partially within the cul-de-sac; however, sidewalks are not proposed along the northern side of High Street abutting land of Mr. Collignon. This area is currently utilized by the owner for access to their property, and the installation of sidewalks would disrupt this access and would place sidewalk infrastructure immediately adjacent to property not owned by the applicant. Given the limited length of roadway involved and the proposed sidewalk coverage elsewhere, the applicant believes this waiver is considered reasonable and appropriate.

2. *Section 159-8(D) Intersections - The intersection of places and lanes with other streets shall have a property line radius of 15 feet and a curbline radius of 25 feet. The intersections of all other*

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

streets shall have a property line radius of 25 feet and a curb radius of 35 feet. The Planning Board reserves the right to increase these radii wherever it may deem necessary for public safety. Maximum grade allowed within 100 feet of an intersection, measured from the outer gutter line, is 2.5%.

Waiver Request: The applicant respectfully requests a waiver from the requirement to provide a curbline radius of 25'. The proposed curbline radius is 15' due to the location of an existing utility pole.

3. *Section 159-20(A) Sanitary Sewers - Sanitary sewer mains and laterals shall be polyvinyl chloride pipe conforming to ASTM D 3034-SDR 35. The minimum size for sewer mains shall be eight inches while the minimum size of sewer laterals shall be four inches.*

   Waiver Request: The applicant respectfully requests a waiver from the requirement to provide an 8" sanitary sewer main. The existing main is 6", therefore the proposed sewer main is 6".

4. *Section 159-21(A). Drainage - Storm drains shall be reinforced concrete pipe conforming to ASTM C-76, Class 3 minimum, polyvinyl chloride pipe conforming to ASTM D3034, SDR35 or polyvinyl chloride ASTM F-794. Bedding for various types of storm drains shall be as approved by the Engineer.*

   Waiver Request: The applicant respectfully requests a waiver from the requirement to provide concrete pipe. The applicant proposes HDPE, which is industry standard.

Should you have any questions or comments regarding this information, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio

Nina Fazio
Permitting Coordinator

3. REQUIRED STUDIES

REQUIRED STUDIES

For

DEFINITIVE SUBDIVISION APPLICATION
OLD RIVER ROAD, 27 WALTNUT STREET & 17 HIGH STREET
AGAWAM, MASSACHUSETTS 01001
(PARCEL IDS: J17-1-3, J17-1-1 & J17-1-5)

INTRODUCTION

On behalf of the applicant and property owner, Calabrese Construction, LLC c/o Mr. Charles Calabrese, R Levesque Associates, Inc. is providing these studies as required for the submission of a definitive subdivision application. The applicant proposes the construction of residential subdivision to be located at the above-referenced properties. The applicant received Preliminary Subdivision Approval on November 6, 2025.

PROPERTY DESCRIPTION

The subject properties are located east of Walnut Street and consist of approximately 1.9 ± acres as shown on the associated site plan prepared by R Levesque Associates, Inc. Said properties are owned by Calabrese Construction, LLC and are recorded in the Hampden County Registry of Deeds in Book 22388, Page 42 (27 Walnut Street & 0 River Road) and Book 22935, Page 347 (17 High Street).

EXISTING CONDITIONS & SURROUNDING LAND USES

The subject properties consist of cleared and forested land, with residential structures located at 27 Walnut Street and 17 High Street. In general, the topography of the subject properties vary, generally sloping from the west along Walnut Street to the east towards the Westfield River. Please refer to the USGS Topographic Map included within this application packet under Section 4.

The subject properties were rezoned to the Residence B (RB) zoning district by the Town of Agawam City Council in 2025. The surrounding land uses consist primarily of residential uses.

STATEMENT OF TIME-DEVELOPMENT

The following statement of time and development is based on anticipated start of Spring 2026 and is contingent upon the timeline of local approvals, labor, and construction costs (subject to change).

1. **Endorsement and Mobilization (Spring 2026)**

- Planning Board endorses definitive plan
- Applicant records plan and secure performance guarantee or covenant
- Pre-construction meeting
- Contractor bidding and utility coordination.

2. **Site Preparation and Erosion Control (Spring 2026 - Summer 2026)**

- Clearing and grubbing
- Install erosion and sediment controls
- Establish construction access
- Perform rough earthwork and initial roadway cut/fill.

3. **Drainage Installation and Rough Grading (Spring 2026 - Fall 2026)**

- Install catch basins and subsurface storm piping
- Construct stormwater management features
- Complete rough roadway grading.

4. **Utility Trenching and Installation (Fall 2026)**

- Install water, sewer, gas, electric, and communications utilities
- Coordinate with utility companies for service laterals and perform required testing.

5. **Temporary Roadway Base and Winter Preparations (Fall 2026 – Winter 2026)**

- Fine grade roadway base
- Install temporary binder course if weather allows
- Stabilize site for winter with erosion controls and stockpile protection.

6. **Administrative Activities During Winter Slowdown (Winter 2026)**

- Submit building permit applications for released lots

7. Roadway Completion and Lot Service Tie-ins (Spring 2027 – Summer 2027)

- Complete roadway base or binder course
- Connect utility service laterals
- Construct driveways and foundations for homes.

8. Curbing, Sidewalks, Lighting, and Landscaping (Spring 2027 – Fall 2027)

- Install curbs, sidewalks, and street lighting
- Complete right-of-way landscaping
- Install final stormwater elements.

9. Infrastructure Close-out and Punch List Work (Fall 2027 – Winter 2027)

- Address punch list items from inspections
- Install monuments and street signs

10. Final Paving and As-Built Preparation (Spring 2028 – Summer 2028)

- Apply final roadway wearing course
- Complete any remaining utility tie-ins
- Prepare and submit as-built drawings.

11. Final Inspections and Acceptance Package (Spring 2028 - Summer 2028)

- Conduct final subdivision inspection and address remaining punch list items
- Assemble acceptance package with as-builts and maintenance bond.

12. Petition for Street Acceptance and Town Approval (Spring 2028 - Summer 2028)

- Submit petition and documentation for street acceptance
- Request bond release

13. Recordation, Final Bond Release, and Project Closeout (Summer 2028)

- Record street acceptance documents at Registry of Deeds

- Release remaining performance bond and close out permits.

ENVIRONMENTAL STUDY

Examination of GIS information from the Massachusetts Natural Heritage Atlas revealed that the subject properties are not located within Natural Heritage and Endangered Species Program jurisdiction.

According to the Web Soil Survey Map, the soil types mapped on the subject properties consist of Merrimac fine sandy loam, 3 to 8 percent slopes (254B). Please refer to the attached NRCS Soil Map included within this application packet under Section 4.

- The Merrimac series consists of very deep, somewhat excessively drained soils formed in outwash. They are nearly level through very steep soils on outwash terraces and plains and other glaciofluvial landforms. Slope ranges from 0 through 35 percent.

Please refer to the Figures within Section 5 of this application packet for greater detail regarding the environmental considerations.

WETLAND RESOURCE AREAS

The wetland resource areas were flagged in the field by R Levesque Associates, Inc. in July 2025. A Positive 2A Determination of Applicability was issued by the Town of Agawam Conservation Commission in August 2025.

The definition of each applicable resource area is presented below in italic text, followed by a description of the resource area presented below in boldface text.

Isolated Vegetated Wetlands (IVW)

Isolated vegetated wetlands are not subject to jurisdiction under the Massachusetts Wetlands Protection Act 310 CMR 10.00. Additionally, the Town of Agawam does not have a local wetlands bylaw that provides independent regulatory authority over isolated wetlands; therefore, these areas are not regulated at the local level either.

Two (2) Isolated Vegetated Wetlands (IVW) are located off-site to the east of Old River Road. The boundary of the IVWs have been flagged in the field with sequentially numbered pink flagging and are shown on the accompanying filing plan labeled "WF-100" through "WF-119" and "B-100" through "B-103".

Bank

In 310 CMR 10.54(2) it states, "*A Bank is the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent flood plain, or, in the absence of these, it occurs between a water body and an upland.*"

The western upper limit of bank of the Westfield River has been marked in the field with sequentially numbered blue flagging labeled "MAHW-100" through "MAHW-119".

Riverfront Area

Riverfront Area (RFA) as defined in 310 CMR 10.58(3) "*…is the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away. The riverfront area may include or overlap other resource areas or their buffer zone. The riverfront area does not have a buffer zone.*"

Riverfront Area is associated with the Westfield River and has been shown to extend 200' from the delineated MAHW. The 100' Inner Riparian has been shown as well. The total Riverfront Area on site is 2,085 ± SF.

Land Under Water Bodies and Waterways (LUWW)

As defined in 310 CMR 10.56(2) "Land Under Water Bodies and Waterways is the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock."

LUWW is associated with the Westfield River, a perennial stream located off-site. The mean annual low flow, or bottom of bank, has not been delineated therefore LUWW is not shown or defined.

Bordering Land Subject to Flooding (BLSF)

As stated in 310 CMR 10.57(2)(a), *"Bordering Land Subject to Flooding is an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds, or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland."* .

An eastern portion of the subject property is located within the 100-year flood zone according to Flood Insurance Rate Map Number 25013C0382E effective date July 16, 2013. The 100-year flood zone elevation is shown at 65 feet (NAVD '88) according to said mapping.

PROPOSED DEVELOPMENT IMPACTS

The proposed project represents a relatively minor development in comparison to the surrounding neighborhood and is not expected to negatively impact pedestrian or vehicular traffic in the surrounding area, nor will it adversely affect solid waste management or air and water quality. The lots will be connected to public utilities where feasible, with all services coordinated in accordance with the requirements of the appropriate utility providers. Construction activities are not anticipated to disturb any historic, architectural, or archaeological resources on the site.

The project will not affect outdoor recreational opportunities, as the land in question is currently privately owned and will remain so following division of the land. Furthermore, the proposed development aligns with the Town of Agawam's Zoning Bylaw and Community Development Plan by contributing to the local housing stock within an area that is predominantly zoned and used for residential purposes.

TOWN-DEVELOPMENT RELATIONSHIP STUDY

(a) The impact on utilities and services which will be required to service the development.

The proposed subdivision will create a de minimis increase in demand on municipal utilities and public services. Each lot will be served by extensions of existing water, sewer, and utility infrastructure located along the frontage roadway, designed to meet municipal standards and verified through engineering review. The additional service connections represent a minimal incremental load well within the capacity of the existing systems, with no anticipated adverse impact on pressure, flow, or treatment capacity. Solid waste collection, snow removal, and emergency services can be readily accommodated within the town's existing operations, as the project's small scale will not materially affect municipal budgets or staffing levels.

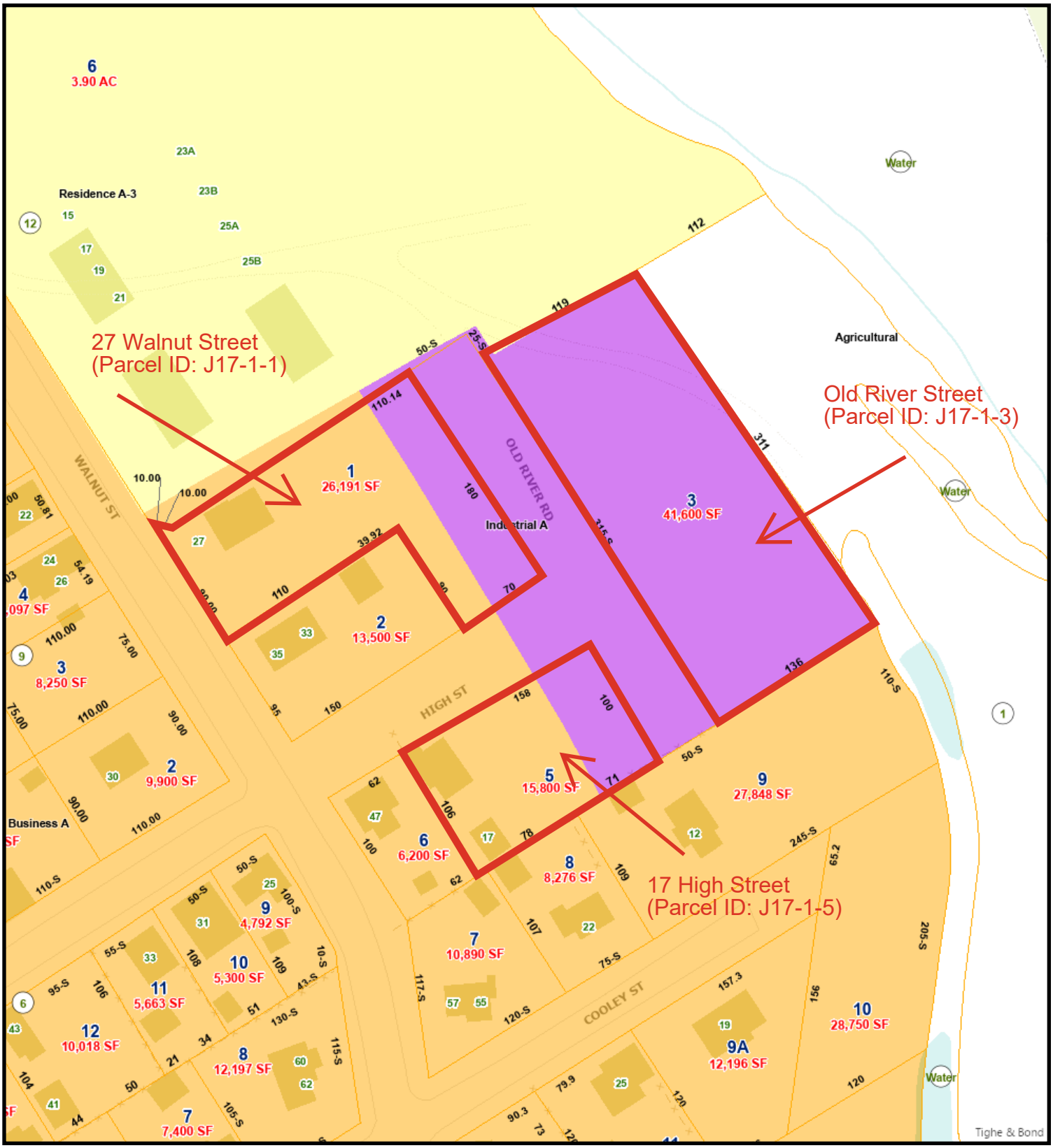
(b) The tentative sale price of houses, type of housing and square footage of finished living space per unit.

The tentative sale price of the proposed dwelling units will be established at market rates at the time of sale. The housing type will be consistent with residential uses permitted within the underlying zoning district. Final floor plans and square footage of finished living space will be determined during the building design phase and submitted to the Building Department as part of the building permit process. Copies of these materials can be provided to the Planning Board for review as they become available.

[END OF REQUIRED STUDIES]

4. FIGURES

4.1 LOCATION MAP
4.2 USGS TOPOGRAPHIC MAP
4.3 FEMA FLOODPLAIN MAP
4.4 NRCS SOIL MAP
4.5 NHESP PRIORITY HABITAT OF RARE SPECIES



Locus Map (Current Zoning)

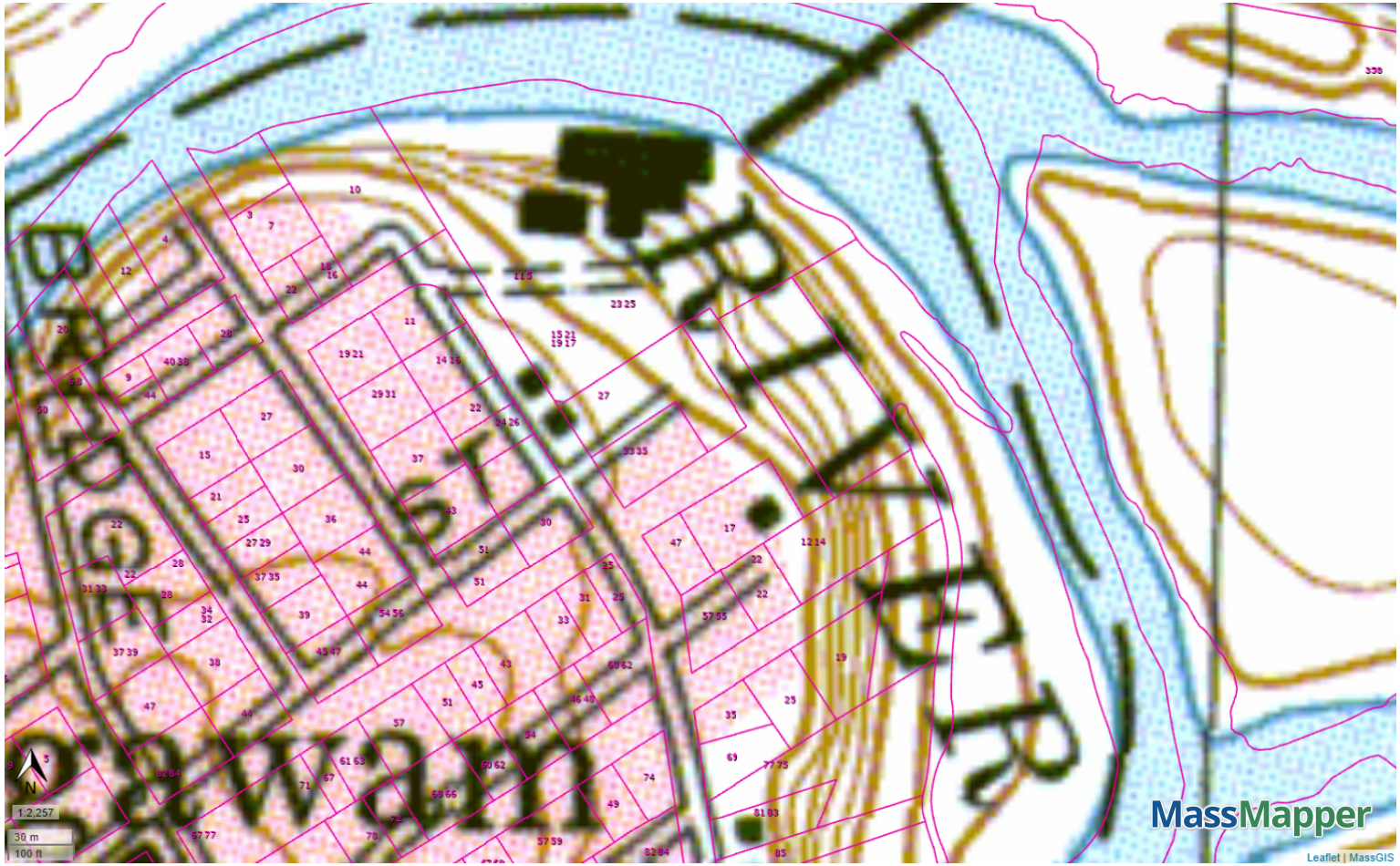
1/8/2025 4:32:43 PM

Scale: 1"=100'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

USGS Topographic Map



Property Tax Parcels
USGS Topographic Maps

National Flood Hazard Layer FIRMette

FEMA

72°38'17"W 42°6'9"N



72°37'39"W 42°5'43"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/21/2025 at 8:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Soil Map—Hampden County, Massachusetts, Central Part
(GISDATA_L3_TAXPAR_POLY_ASSESSPolygon)



Map Scale: 1:1,140 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 18, Aug 27, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

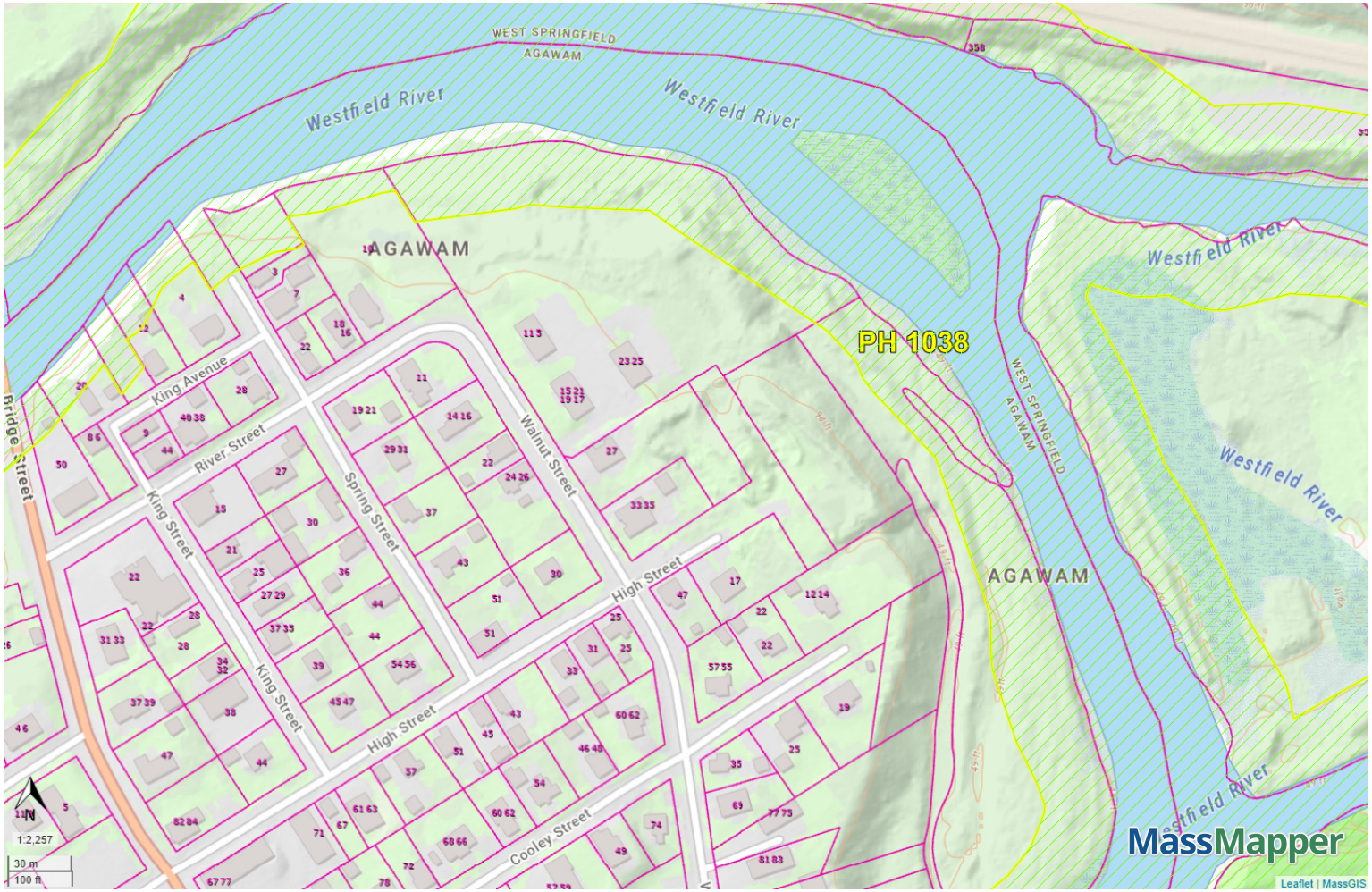
Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	1.9	100.0%
Totals for Area of Interest		**1.9**	**100.0%**

NHESP



NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

Property Tax Parcels

5. DEED REFERENCES

(SOURCE: HAMPDEN COUNTY REGISTRY OF DEEDS)

Bk 22388 Pg46 #59514
10-03-2018 @ 01:56p

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 10-03-2018 @ 01:56pm
Ctl#: 208 Doc#: 59514
Fee: $456.00 Cons: $100,000.00

QUITCLAIM DEED

KNOW ALL PERSONS BY THESE PRESENTS, that, 27 GROUP, LLC, a Massachusetts Limited Liability Company with an address of 167 Coyote Circle, Feeding Hills, Hampden County, Massachusetts

for consideration paid and in full consideration of ONE HUNDRED THOUSAND AND 00/100 DOLLARS ($100,000.00);

grants to **CALABRESE CONSTRUCTION, LLC,** a Massachusetts Limited Liability Company with an address of 7 Brewster Road, West Springfield, Massachusetts

with **QUITCLAIM COVENANTS**

Certain real estate situated in Agawam, being more particularly bounded and described as follows:

Beginning at a point on the easterly side of Walnut Street, about ninety (90) feet northerly from High Street, and running thence

EASTERLY	about one hundred (100) feet; thence
NORTHERLY	about ninety (90) feet; thence
WESTERLY	about one hundred (100) feet to said Walnut Street, and thence
SOUTHERLY	on said Walnut Street, about ninety (90) feet to the point of the beginning.

Being Lot #3 (three) on a plan of lots of the Agawam Canal Company, recorded in Hampden County Registry of Deeds in Book 365, Page (H). Subject to all restrictions, liens and encumbrances of record, if any are in force and applicable.

The sale is in the ordinary course of business of 27 GROUP, LLC.

BEING the same premises conveyed to the grantor herein by deed of Edward J. Mutti dated September 14, 2012, and recorded in the Hampden County Registry of Deeds in Book 19486, Page 591. See also Book 19486, Page 589 and Book 16786, Page 4.

Property Address: 27 Walnut Street, Agawam, MA 01001

WITNESS my hand and seal this 6th day of September, 2018.

27 GROUP, LLC

Edward J. Mutti, manager

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN, ss.

On this 6th day of September, 2018, before me, the undersigned notary public, personally appeared Edward J. Mutti as manager of 27 GROUP, LLC, proved to me through satisfactory evidence of identification, which was ☐ photographic identification with signature issued by a federal or state governmental agency, ☒ personal knowledge of the undersigned, ☐ oath or affirmation of a credible witness, to be the person whose name is signed on the preceding or attached document, and who swore, subscribed and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief and that he signed the document voluntarily for its stated purpose on behalf of 27 GROUP, LLC, and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief.

Gina M. Barry, Notary Public

GINA M. BARRY
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
September 17, 2021

My Commission Expires: 9/17/2021

KELLY CAVANAUGH-KELLY
HAMPDEN COUNTY REGISTRY OF DEEDS

Bk 22388 Pg42 #59513
10-03-2018 @ 01:56p

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 10-03-2018 @ 01:56pm
Ctl#: 207 Doc#: 59513
Fee: $177.84 Cons: $39,000.00

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that 17 GROUP, LLC, a Massachusetts Limited Liability Company with an address of 167 Coyote Circle, Feeding Hills, Hampden County, Massachusetts and Edward H. Mutti, of Agawam, Hampden County, Massachusetts

for consideration paid and in full consideration of THIRTY-NINE THOUSAND AND 00/100 DOLLARS ($39,000.00);

grants to **CALABRESE CONSTRUCTION, LLC,** a Massachusetts Limited Liability Company with an address of 7 Brewster Road, West Springfield, Massachusetts

with **QUITCLAIM COVENANTS**

Locus: 0 High Street and 0 Old River, Agawam MA

Parcel 1: 0 High Street
Certain real estate situated in Agawam, being known and designated as "Parcel B" as shown on a plan entitled "Property Plan for Helen E. Geoffrion Agawam, Massachusetts" dated April 1985 and recorded in Hampden County Registry of Deeds in Book of Plans 224, Page 18, said lot being more particularly bounded and described as follows:

SOUTHERLY	by High Street, seventy (70) feet;
EASTERLY	by River Street, one hundred eighty (180.00) feet;
NORTHERLY	by land now or formerly of Worthy Paper Company, one hundred ten and 14/100 (110.14) feet;
WESTERLY	by land now or formerly of one Jacobsen, ninety and 01/100 (90.01) feet;
NORTHERLY	by land now or formerly of Helen E. Geoffrion, thirty-nine and 92/100 (39.92) feet; and

WESTERLY by land now or formerly of Helen E. Geoffrion, ninety (90) feet to the point of beginning.

BEING the same premises conveyed to 17 Group LLC by deed of Edward J. Mutti dated September 14, 2012, and recorded in the Hampden County Registry of Deeds in Book 19486, Page 596. See also Book 16786, Page 9.

Parcel 2: 0 Old River:
A certain parcel of land situated in Agawam in said County of Hampden, bounded and described as follows:

Bounded Northerly by land now or formerly of Worthy Paper Company and the Westfield River; Easterly by said River; Southerly by land now or formerly of Justus R. Cooley; and Westerly by River Street; containing approximately one and 88/100 (1.88) acres.

The sale is in the ordinary course of business of 17 GROUP, LLC.

The grantors herein release all rights of homestead in the conveyed premises and certify that no one else has acquired such rights.

BEING Parcel 2 as conveyed to 17 Group LLC by deed of Edward J. Mutti dated September 14, 2012, and recorded in the Hampden County Registry of Deeds in Book 19486, Page 598. See also 16786, Page 2.

Edward H. Mutti joins in signing this deed to release his life estate interest on both properties.

-Signature page(s) to follow-

WITNESS my hand and seal this 6th day of September, 2018.

17 GROUP, LLC

Edward J. Mutti, manager

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN, ss.

On this 6th day of September, 2018, before me, the undersigned notary public, personally appeared Edward J. Mutti as manager of 17 GROUP, LLC, proved to me through satisfactory evidence of identification, which was ☐ photographic identification with signature issued by a federal or state governmental agency, ☒ personal knowledge of the undersigned, ☐ oath or affirmation of a credible witness, to be the person whose name is signed on the preceding or attached document, and who swore, subscribed and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief and that he signed the document voluntarily for its stated purpose on behalf of 17 GROUP, LLC, and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief.

Gina M. Barry, Notary Public

GINA M. BARRY
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
September 17, 2021

My Commission Expires: 9/17/2021

WITNESS my hand and seal this 6th day of September, 2018.

Edward H. Mutti, by Edward J. Mutti,
his attorney in fact

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN, ss.

On this 6th day of September, 2018, before me, the undersigned notary public, personally appeared Edward J. Mutti, who proved to me through satisfactory evidence of identification, being personal knowledge, to be the person who executed the foregoing instrument on behalf of Edward H. Mutti and acknowledged to me that he signed it voluntarily and as the free act and deed of Edward H. Mutti, his principal

as his free act and deed

Gina M. Barry, Notary Public

My Commission Expires: 9/17/2021

GINA M. BARRY
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
September 17, 2021

KELLY CAVANAUGH-KELLY
HAMPDEN COUNTY REGISTRY OF DEEDS

Bk 22935 Pg347 #64532
11-01-2019 @ 03:38p

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 11-01-2019 @ 03:38pm
Ctl#: 515 Doc#: 64532
Fee: $478.80 Cons: $105,000.00

WARRANTY DEED

KNOW ALL PERSONS BY THESE PRESENTS, that 17 GROUP, LLC, a Massachusetts Limited Liability Company with an address of 167 Coyote Circle, Feeding Hills, Hampden County, Massachusetts

for consideration paid and in full consideration of ONE HUNDRED FIVE THOUSAND AND 00/100 DOLLARS ($105,000.00);

grants to **CALABRESE CONSTRUCTION, LLC,** a Massachusetts Limited Liability Company with an address of 7 Brewster Road, West Springfield, Massachusetts

with **QUITCLAIM COVENANTS**

Certain real estate situated in Agawam, being more particularly bounded and described as follows:

A certain lot of land with the buildings thereon lying on the Southerly side of High Street in said Agawam being part of Lot Number Nine (9) and all of lot Number Ten (10) on a Plan of the Agawam Canal Company, recorded in the Registry of Deeds for Hampden County in Book 365 in the fore part of said Book before the paging and marked "I", said lot being described more fully as follows, to wit:

Beginning at an iron pin on the Southerly side of High Street sixty-two (62) feet Easterly of the Southeasterly corner of Walnut Street and High Street and running thence Easterly by High Street one hundred fifty-eight (158) feet to an iron pin on the Westerly side of River Street; thence running by River Street in a Southerly direction one hundred (100) feet to an iron pin; thence running Westerly and parallel with the Southerly line of High Street one hundred fifty-eight (158) feet to an iron pin; thence running Northerly and parallel with the Westerly line of River Street one hundred (100) feet to the place of beginning.

BEING a portion of the premises conveyed to 17 Group LLC by deed of Edward J. Mutti dated September 14, 2012, and recorded in the Hampden County Registry of Deeds in Book 19486, Page 598. See also Book 16786, Page 2. Edward H. Mutti, having reserved a life estate, died on September 14, 2019.

The sale is in the ordinary course of business of 17 GROUP, LLC.

Locus: 17 High Street, Agawam MA

WITNESS my hand and seal this 31st day of October, 2019.

17 GROUP, LLC

Edward J. Mutti, manager

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN, ss.

On this 31st day of October, 2019, before me, the undersigned notary public, personally appeared Edward J. Mutti as manager of 17 GROUP, LLC, proved to me through satisfactory evidence of identification, which was ☒ photographic identification with signature issued by a federal or state governmental agency, ☐ personal knowledge of the undersigned, ☐ oath or affirmation of a credible witness, to be the person whose name is signed on the preceding or attached document, and who swore, subscribed and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief and that he signed the document voluntarily for its stated purpose on behalf of 17 GROUP, LLC, and affirmed to me that the contents of the document are truthful and accurate to the best of his knowledge and belief.

Gina M. Barry, Notary Public

GINA M. BARRY
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
September 17, 2021

My Commission Expires: 9/17/2021

CHERYL A. COAKLEY-RIVERA, ESQ.
HAMPDEN COUNTY REGISTRY OF DEEDS

APPENDIX A: SITE PLAN SET

SITE PLAN SET ENTITLED “PROPOSED RESIDENTIAL SUBDIVISION”

PREPARED FOR CALABRESE CONSTRUCTION, LLC

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED JANUARY 30, 2026

APPENDIX B: STORMWATER REPORT

STORMWATER DRAINAGE REPORT

PREPARED FOR CALABRESE CONSTRUCTION, LLC

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED JANUARY 30, 2026

Stormwater Drainage Report

Proposed Residential Subdivision

Project Location:
Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)

Submitted To:
Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

Applicant & Property Owner:
Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089



RLA Project File No. 220627
January 30, 2026

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

TABLE OF CONTENTS

SECTION PAGE NO.

I. INTRODUCTION 1-1

2. SITE DESCRIPTION 2-1

2.1 Predevelopment Conditions 2-1
2.2 Resource Areas 2-1
2.2.1 Floodplain 2-1
2.2.2 Natural Heritage and Endangered Species Program 2-1
2.2.3 Aquifer Protection District 2-2
2.3 Soils 2-2
2.4 Post Development Conditions 2-3

3. STORMWATER MANAGEMENT SYSTEM 3-1

3.1 Drainage Calculations 3-1
3.1.1 Design Points 3-2
3.1.2 Pre-Development Hydrology 3-2
3.1.3 Post-Development Hydrology 3-2
3.1.4 Peak Discharge Rates 3-3
3.2 Hydraulic Analysis 3-3
3.3 MassDEP Stormwater Management Standards 3-3
3.4 Stormwater Best Management Practices 3-6
3.4.1 Deep Sump Catch Basins 3-6
3.4.2 Proprietary Sedimentation Devices 3-6
3.4.3 Subsurface Detention Basin 3-7
3.5 Protection of Stormwater Best Management Practices during Construction 3-7
3.6 Inspection and Maintenance of Stormwater Best Management Practices 3-7
3.7 Illicit Discharge Compliance Statement 3-7
3.8 Low-Impact Development Alternatives Analysis Narrative 3-7

4. CONCLUSION 4-1

List of Tables

Table Page No.

Table 2.4: Hydrologic Soil Group Classification 2-2
Table 3.1: Design Rainfall Data 3-1
Table 3.1.4 Pre- and Post-Development Peak Discharge Rates 3-3

List of Figures

Figure

Figure 1: Site Locus – USGS Map
Figure 2: FEMA Flood Map
Figure 3: NHESP Map
Figure 4: Pre-Development Watershed Plan
Figure 5: Post-Development Watershed Plan
Figure 6: Inlet Area Plan

Appendices

APPENDIX A: CHECKLIST FOR STORMWATER REPORT
APPENDIX B: SOILS INFORMATION
APPENDIX C: PRE- AND POST- DEVELOPMENT HYDROLOGIC ANALYSIS (2, 10, & 100 YEAR STORM EVENTS)
APPENDIX D: HYDRAULIC ANALYSIS
APPENDIX E: MASSDEP CALCULATIONS
APPENDIX F: CONSTRUCTION PERIOD EROSION CONTROL PLAN
APPENDIX G: LONG-TERM OPERATION AND MAINTENANCE PLAN
APPENDIX H: ILLICIT DISCHARGE COMPLIANCE STATEMENT
APPENDIX I: LOW IMPACT DEVELOPMENT CONSIDERATIONS

I. INTRODUCTION

The project applicant, Calabrese Construction, LLC, is proposing to construct a three (3) lot residential subdivision on approximately 13.1 acres of land located at the terminus of High Street in Agawam, Massachusetts. The project site consists of three parcels located at Old River Street, 27 Walnut Street & 17 High Street and identified as parcels J17-1-3, J17-1-1 & J17-1-5 in the Agawam assessor's office. For the purposes of this report, reference to the project "site" shall comprise all of the properties under common ownership and included in the proposed subdivision. The site where the proposed subdivision is proposed includes properties which are currently developed with residential dwellings. Additionally, the site includes a large portion of property that has been historically disturbed and cleared of mature vegetation. The site is accessed off an undeveloped portion of High Street and is bisected by the Old River Road right-of-way. Currently, there are no stormwater management best management practices located within the project site or High Street right-of-way. Under existing conditions, stormwater runoff generally flows overland toward various design points and ultimately being tributary to the Westfield River offsite to the northeast. A new stormwater management system is being proposed as part of the new residential subdivision.

The proposed project involves the following:

- Construction of approximately 300 feet of roadway from the intersection with Walnut Street to the terminus of the cul-de-sac;
- Construction of three (3) new multi-family residential homes;
- Installation of underground water, sanitary sewer, electric, gas and communication utility services;
- Construction of a stormwater management system including deep sump hooded catch basins, underground infrastructure, proprietary sedimentation device, and subsurface detention basin.

The new drainage infrastructure has been designed utilizing the Agawam Stormwater Management Ordinance Chapter 176, the Town of Agawam Subdivision Rules and Regulations, as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

2. SITE DESCRIPTION

2.1 Predevelopment Conditions

The properties proposed for development are located at Old River Street, 27 Walnut Street, and 17 High Street and are identified by the Town of Agawam Assessor's Office as Parcels J17-1-3, J17-1-1, and J17-1-5. For the purposes of this report, the "site" is defined as all parcels under common ownership included within the limits of the proposed subdivision. The site includes parcels that are currently developed with residential dwellings, as well as a significant portion of land that has been historically disturbed and cleared of mature vegetation. Site access is provided from an undeveloped segment of High Street, and the site is bisected by the Old River Road right-of-way. The project area comprises approximately 13.1 acres and is zoned Residence B. Abutting land uses consist of residentially developed properties to the north and south, Walnut Street to the west, and the Westfield River to the east. The site location is depicted on Figure 1 – USGS Map.

Site topography generally slopes easterly toward Walnut Street or ultimately drains toward the Westfield River. A relatively flat, cleared area is located at the terminus of the High Street right-of-way and will accommodate the majority of the proposed site improvements. A steeply sloping area is present along the northwestern portion of the site, with the top of slope generally coincident with the existing tree line and descending toward the Westfield River. Topography along both the northerly and southerly property boundaries similarly grades downward from Walnut Street toward the river. Pre-development drainage sub-catchment areas are illustrated on Figure 4 – Pre-Development Conditions..

2.2 Resource Areas

Portions of the project site are located within jurisdictional riverfront area associated with the Westfield River to the North. None of the site improvements required to build the proposed subdivision are located within the 200-foot riverfront jurisdictional area.

2.2.1 Floodplain

R. Levesque Associates, Inc. performed due diligence research on the property in regard to FEMA flood zone mapping. According to Flood Insurance Rate Map Number 25013C0382E, effective date 7/16/2013, a portion of the property is shown to be within a special flood zone area "Zone AE" (100-Year storm event) polygon with base flood elevation 65; see Figure 2 – Flood Rate Insurance Map. None of the proposed site improvements required to build the proposed subdivision are located within the floodplain.

2.2.2 Natural Heritage and Endangered Species Program

R. Levesque Associates, Inc. performed due diligence research on the property in regard to Natural Heritage and Endangered Species Program (NHESP) areas. The parcel is not located

within an area delineated by NHESP as priority habitat of endangered species; see Figure 3 – NHESP Map.

2.2.3 Aquifer Protection District

R. Levesque Associates, Inc. performed due diligence research on the property in regard to an Aquifer Protection District. The property is not located within an area delineated as a Zone II Wellhead Protection Area, see Figure 3 – NHESP & Zone II Map.

2.3 Soils

R. Levesque Associates, Inc. researched the soils located on site with information readily available by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Based on a review of the USDA Soil Survey of Hampden County, Massachusetts, Central Part, the site is comprised of the following soil types:

Table 2.4: Hydrologic Soil Group Classification

Soil Description	Map Unit Symbol	Hydrologic Soil Group
Merrimac Fine Sandy Loam	254B	A

A series of test pits were conducted by Ryan Nelson, P.E. (SE #14394), to verify existing site soil conditions and evaluate the feasibility of incorporating infiltration-based stormwater management practices. A total of six test pits were excavated across the site within proposed development and stormwater management areas. The subsurface conditions observed in all test pits consisted of varying depths of varied fill material overlying native soils. The fill material varied significantly across the site and ranged from loamy sand with no visible debris to fill containing mixed construction materials, including asphalt, brick, concrete, and varied soils. Native soils were encountered only in test pits excavated along the western portion of the site (Test Pits 5 and 7), where the fill material transitioned to native silt loam exhibiting a dense, plasticky consistence.

Estimated seasonal high groundwater was not observed within the fill material; however, groundwater was observed at the interface between the fill material and the underlying native soils. Estimated seasonal high groundwater elevations were observed at approximately 130 inches below grade in Test Pit 5 and 100 inches below grade in Test Pit 7, coinciding with the top of the native silt loam layer. This perched groundwater condition at the fill/native interface further limits the suitability of the site for infiltration-based stormwater practices.

The native silt loam soils encountered in the field do not corroborate the NRCS Soil Survey mapping, which identifies the site as Hydrologic Soil Group A sandy loam. As documented in the Massachusetts Stormwater Management Handbook and supported by the Rawls Rate soil classification charts, silt loam soils are typically classified as Hydrologic Soil Group C, reflecting low infiltration capacity and poor suitability for groundwater recharge. The dense structure and plasticky nature of the native silt loam observed on site are consistent with these classifications.

Based on the presence of varied fill material, the underlying very poorly drained native silt loam, and the observed groundwater conditions at the fill/native interface, the site soils are not suitable to support infiltration-based best management practices. Therefore, compliance with Massachusetts Stormwater Management Standard 3 will be achieved to the maximum extent practicable through non-infiltrating stormwater management measures, consistent with the limitations imposed by verified on-site soil conditions.

2.4 Post Development Conditions

The proposed project consists of the construction of a five (5) lot residential subdivision located on the westerly side of Walnut Street, with access provided via an extension of High Street. The proposed roadway will establish the previously undeveloped portion of High Street and will extend approximately 300 feet from the Walnut Street intersection to the end of the proposed cul-de-sac. The subdivision will include the installation of underground sanitary sewer, water, electric, gas, and communication utilities. A comprehensive stormwater management system has been designed in accordance with the Agawam Stormwater Management Ordinance and the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

Post-development stormwater runoff generated from the proposed roadway, residential building roof areas, driveways, and adjacent landscaped areas will be collected through a network of yard drains and deep-sump hooded catch basins. Runoff captured by these inlet structures will be conveyed via an underground storm drainage system to a proprietary water quality unit providing pretreatment prior to discharge to a subsurface detention basin. The subsurface detention basin has been designed with an outlet control structure to provide peak flow attenuation for the 2-, 10-, and 100-year, 24-hour storm events. Discharge from the outlet control structure will be conveyed to a level spreader to promote non-erosive sheet flow and avoid concentrated point discharges.

The proposed stormwater management system has been designed to meet applicable peak flow attenuation, water quality, and recharge requirements. Due to field-verified subsurface soil conditions, including varied fill overlying native silt loam soils with limited infiltration capacity, groundwater recharge is provided to the maximum extent practicable in accordance with Massachusetts Stormwater Management Standard 3. Water quality treatment is achieved through

a treatment train approach consisting of deep-sump hooded catch basins, a proprietary sedimentation device, and subsurface detention prior to discharge. Overall, the proposed post-development conditions will maintain existing drainage patterns, reduce post-development peak discharge rates, and improve stormwater runoff quality relative to existing conditions. Post-development drainage areas are shown on Figure 5 – Post-Development Watershed Plan.

3. STORMWATER MANAGEMENT SYSTEM

R. Levesque Associates, Inc. has prepared the following drainage system calculations for the proposed project site. These calculations were performed to document compliance with the guidelines set forth by the Agawam Stormwater Management Ordinance Chapter 176, the Town of Agawam Subdivision Rules and Regulations, as well as the Massachusetts Department of Environmental Protection Stormwater Management Handbook (MassDEP Handbook). A detailed hydrologic analysis of the system was completed in order to evaluate the performance of the stormwater management system components. The proposed stormwater management system will collect runoff from on-site impervious areas and utilize stormwater best management practices to provide water quality treatment and peak discharge rate attenuation. See Appendix C - Pre- and Post-Development Hydrologic Analysis for supplemental information.

3.1 Drainage Calculations

R. Levesque Associates, Inc. utilized the HydroCAD software program, Version 10.0, developed by HydroCAD Software Solutions LLC, in order to model and analyze site hydrology. The HydroCAD software is based upon the Soil Conservation Service (SCS) "Technical Release 20 – Urban Hydrology for Small Watersheds" and "Technical Release 55 – Urban Hydrology for small Watersheds" which are generally accepted industry standard methodologies. The analysis was conducted in order to establish the peak discharge rates and estimated run-off volume from the project site. This was accomplished to properly evaluate pre- and post-development conditions during various storm events. Contributing drainage areas were identified and soils, surface cover, watershed slope, and flow paths were evaluated to develop the necessary HydroCAD model input parameters. Pre-development time of concentration (Tc) values were calculated based on existing site conditions. The minimum recommended time of concentration of six minutes was used in the hydrologic calculations.

Drainage calculations were performed for the Pre- and Post-Development conditions for the 24-hour, 2, 10, and 100-year Type III storm events. The total rainfall for each of the storm events was based upon data readily available by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14-point precipitation frequency estimates. Total rainfall values used in the hydrologic modeling for each event are shown in the following table:

Table 3.1: Design Rainfall Data		
2-year, 24-hour storm	10-year, 24-hour storm	100-year, 24-hour storm
3.19 inches	5.16 inches	8.28 inches

3.1.1 Design Points

In order to compare the difference between pre- and post-development peak flows, existing and proposed watersheds were delineated. Multiple design points (DP) were established with flow paths representing the longest time of concentration of run-off in each tributary watershed. For this analysis, the design points were determined as follows:

- DP-1: Offsite to Northeast; This design point represents the destination for stormwater runoff from the project area which flows off site in a northeasterly direction;
- DP-2: Offsite to South; This design point represents the destination for stormwater runoff from the project area which flows in a southerly direction;
- DP-3: Walnut Street; This design point represents the destination for stormwater runoff from the project area which flows in a westerly direction toward the Walnut Street drainage infrastructure;
- DP-4: Offsite to Northwest; This design point represents the destination for stormwater runoff from the project area which flows in a northwesterly direction;

3.1.2 Pre-Development Hydrology

The project area under existing conditions was analyzed as six sub-catchment areas discharging to the design points as described above. The sub-catchments were delineated based on existing site topography and property lines. For further watershed detail please see Figure 4 titled "Pre-Development Watershed Plan". Peak discharge rates for the design point are depicted in Table 3.1.4 below.

3.1.3 Post-Development Hydrology

The project area under proposed conditions was analyzed as seven sub-catchment areas discharging to the same design points as in pre-development conditions. For further watershed detail please see Figure 5 titled "Post-Development Watershed Plan". Peak discharge rates for the design point are depicted in Table 3.1.4 below.

3.1.4 Peak Discharge Rates

The table below summarizes the Pre- and Post-Development peak discharge rates for each Design Point:

Table 3.1.4 Pre- and Post-Development Peak Discharge Rates						
	2-year storm (cfs)		10-year storm (cfs)		100-year storm (cfs)	
	Pre-	Post-	Pre-	Post-	Pre-	Post-
Design Point 1	0.6	0.5	1.0	0.9	2.4	2.4
Design Point 2	0.1	0.1	0.1	0.1	0.7	0.4
Design Point 3	0.0	0.0	0.1	0.1	0.2	0.2
Design Point 4	0.1	0.1	0.1	0.1	0.2	0.2

As depicted in the table, the post-development peak discharge rates do not increase over pre-development peak discharge rates for each of the storm events presented. This is accomplished by providing on site attenuation through the proposed subsurface detention basin.

3.2 Hydraulic Analysis

R. Levesque Associates, Inc. utilized the Hydraflow Storm Sewer Extension for AutoCAD Civil 3D 2022 software program developed by Autodesk, Inc., in order to analyze the hydraulic capacity of the proposed underground infrastructure. The analysis was conducted in order to verify that the proposed conveyance piping has sufficient capacity to convey up to and including the 24-hour, 100-year storm event. The data from the analysis was used to properly size the conveyance piping such that there is no surcharge of stormwater above the rim elevations within the paved areas. As part of the input parameter required for the hydraulic analysis, the tributary inlet areas were delineated based on topography and any additional connected discharges. Additionally, the characteristic land use coverages and flow paths were identified. Please refer to Appendix D for the hydraulic analysis of the proposed stormwater management system.

3.3 MassDEP Stormwater Management Standards

R. Levesque Associates, Inc. has designed the proposed stormwater management system to be in compliance with the MassDEP Stormwater Management Standards. Chapter 1, Volume 3 of the

MassDEP Handbook outlines specific calculations, and other information, which must be submitted with each report to document compliance. The following summary highlights elements of the proposed project and how they apply to each standard.

- *Standard #1 - No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

  The proposed project provides water quality treatment to the guidelines of the MassDEP Handbook. Therefore, no new untreated stormwater is discharged.

- *Standard #2 – Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

  The proposed stormwater management system has been designed such that the post-development peak discharge rates are less than the pre-development discharge rates for the 2-year, 10-year, and 100-year 24-hour storms. See Appendix C for the Hydrologic Analysis.

- *Standard #3 - Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater BMPs, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook.*

  Based on field-verified soil evaluations demonstrating variable depths of varied fill overlying native Hydrologic Soil Group C silt loam with observed perched seasonal high groundwater at the fill/native soil interface, infiltration-based recharge practices are not feasible; therefore, groundwater recharge is addressed to the maximum extent practicable in accordance with the Massachusetts Stormwater Management Handbook.

- *Standard #4 – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of TSS. It is presumed that this standard is met when:*

  a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

  b. Structural stormwater BMPs practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

  c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook

The treatment train utilizes deep-sump hooded catch basins, a proprietary sedimentation device and a subsurface detention basin to meet water quality standards. See Appendix E for the Water Quality and Total Suspended Solids Removal Calculations.

- *Standard #5 - For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by MassDEP to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

  This standard is not applicable.

- *Standard #6 – Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater BMPs determined by MassDEP to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

  This standard is not applicable.

- *Standard #7 – A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural BMPs requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

This standard is not applicable.

- *Standard #8 – A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention) shall be developed and implemented.*

  A Construction Period Erosion Control Plan has been provided in Appendix F.

- *Standard #9 – A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

  A Long-term Operation & Maintenance Plan has been provided in Appendix G.

- *Standard #10 - All illicit discharges to the stormwater management system are prohibited.*

  An illicit discharge statement will be provided prior to discharge of stormwater to post-construction BMPs. See Appendix H for a copy of the Illicit Discharge Statement.

3.4 Stormwater Best Management Practices

The proposed stormwater management system was designed utilizing stormwater best management practices (BMP) as set forth by the MassDEP Handbook. The BMPs utilized as part of the stormwater management system include deep-sump hooded catch basins, a proprietary sedimentation device, and a subsurface detention basin. All of the BMPs were designed to meet the requirements of the MassDEP Handbook and will provide water quality treatment and peak rate attenuation in order to mitigate the impacts of the proposed site improvements. See Appendix E – MassDEP Calculations for the calculations required to document compliance. The following section provides a description of the best management practices (BMPs) being utilized on site.

3.4.1 Deep Sump Catch Basins

Deep-sump catch basins equipped with oil/gas hoods are being utilized as structural pretreatment devices within the proposed stormwater management system. The catch basins will be constructed with a 4′-0″ deep sumps to function as a settling chamber and allow for adequate storage of collected sediments. Catch basins are typically first in the line of water quality treatment.

3.4.2 Proprietary Sedimentation Devices

The stormwater management system is utilizing a proprietary treatment device for the pretreatment of stormwater runoff in order to ensure that the required water quality treatment is being performed prior to discharge to the downgradient BMP.

3.4.3 Subsurface Detention Basin

Subsurface Detention Basins are well suited to provide groundwater attenuation from watershed areas such as those associated with this project. The subsurface detention basin consists of underground stormwater chambers embedded in stone. Stormwater discharge is conveyed to the subsurface detention basin via up-gradient drainage infrastructure. The subsurface detention basin has been designed with an outlet control structure such that the post-development discharge rates are less than or equal to pre-development rates.

3.5 Protection of Stormwater Best Management Practices during Construction

Protection of the stormwater best management practices during construction will ensure the proper functioning of the stormwater management system and provide protection to the undisturbed areas until the site has been stabilized. Certain specific erosion and sedimentation controls and good practices to be performed by the site contractor have been documented in a Construction Period Erosion Control Plan. See Appendix F – Construction Period Erosion Control Plan.

3.6 Inspection and Maintenance of Stormwater Best Management Practices

Frequent maintenance of the stormwater best management practices is essential to ensuring that the stormwater management system will function properly long-term. The MassDEP provides guidelines for the regular inspection and maintenance of the proposed stormwater best management practices. A Long-Term Stormwater Operation and Maintenance Plan has been prepared which dictates the inspection frequency and maintenance operations for each BMP. See Appendix G – Long-Term Operation and Maintenance Plan.

3.7 Illicit Discharge Compliance Statement

RLA has prepared an Illicit Discharge Compliance Statement to document compliance with the Massachusetts Department of Environmental Protection Stormwater Management Handbook, see Appendix H.

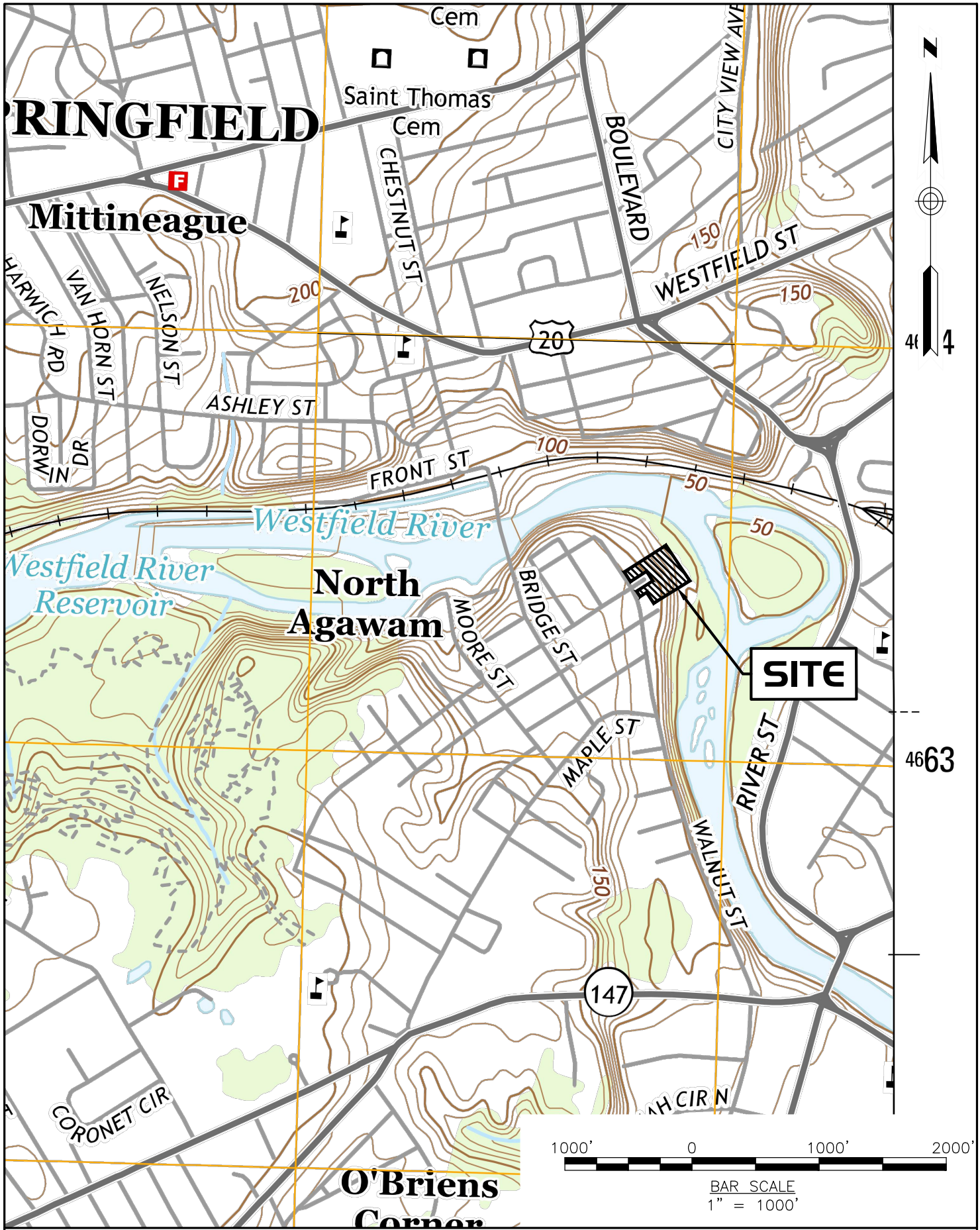
3.8 Low-Impact Development Alternatives Analysis Narrative

RLA has prepared a Low-Impact Development Alternatives Analysis Narrative as part of the Stormwater Drainage Report, see Appendix I.

4. CONCLUSION

The proposed stormwater management system has been designed to mitigate the impacts of the proposed site improvements by providing effective control of stormwater runoff water quality and water quantity. The proposed site improvements, including the stormwater management system, utilize best management practices approved by the Massachusetts Department of Environmental Protection Stormwater Management Handbook. These best management practices have been incorporated to provide water quality treatment and peak discharge rate attenuation for the post-development conditions. Groundwater recharge is addressed to the maximum extent practicable based on field-verified soil evaluations demonstrating site conditions that are not suitable for infiltration-based practices. Implementation of stormwater best management practices such as deep-sump hooded catch basins, a proprietary sedimentation device, and a subsurface detention basin provides a stormwater drainage design that is in conformance with the criteria set forth in the Agawam Stormwater Management Ordinance (Chapter 176), the Town of Agawam Subdivision Rules and Regulations, and the Massachusetts Department of Environmental Protection Stormwater Management Handbook.

Figure 1: Site Locus – USGS Map



R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

SITE LOCUS
USGS MAP

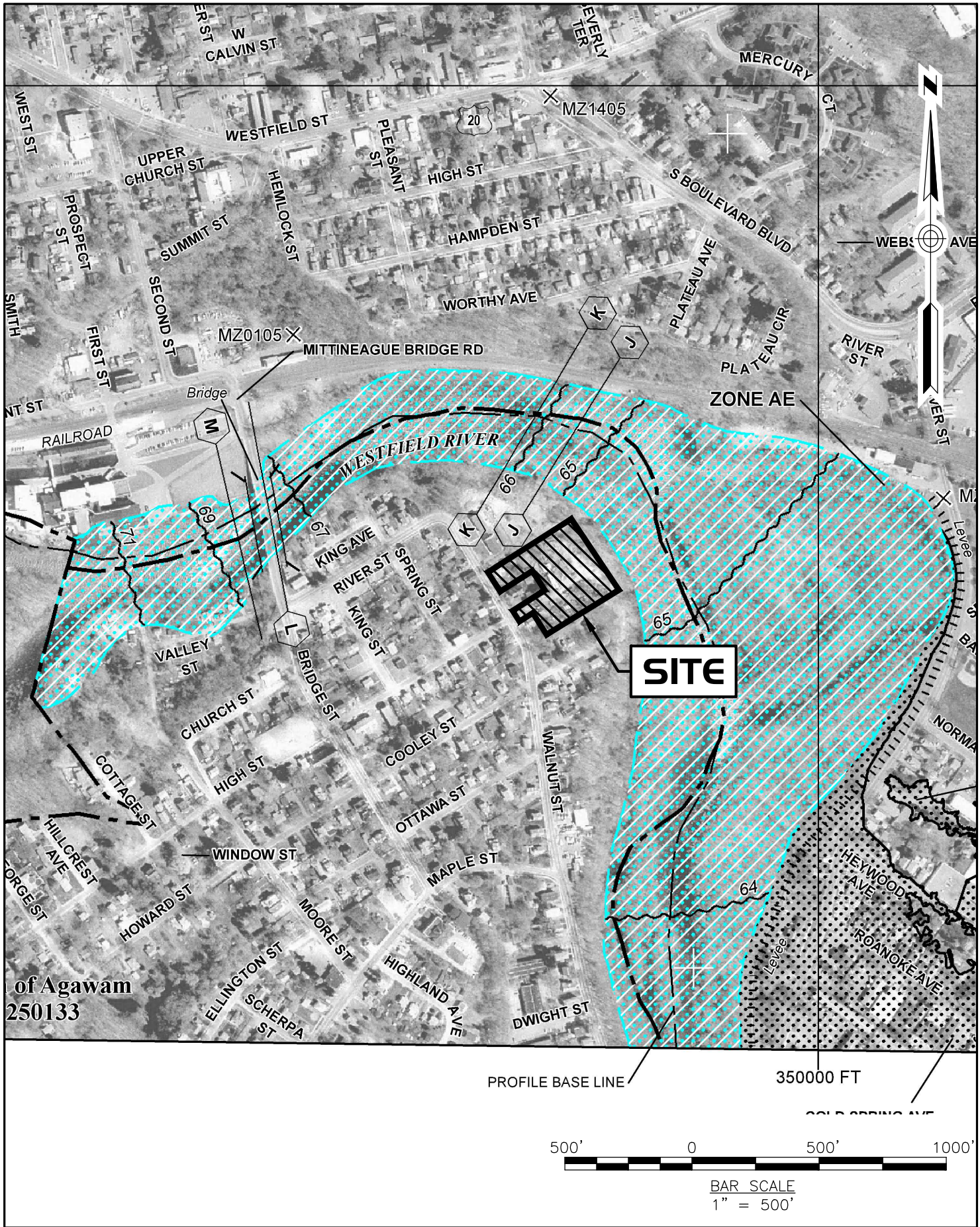
Proposed Residential Subdivision
27 Walnut Street and Old River Street
Agawam, Massachusetts

Calabrese Construction, LLC
7 Brewster Road
West Springfield, Massachusetts

JOB NO: 220627
DATE: 1/29/26
SCALE: AS NOTED

FIG-1

Figure 2: FEMA Flood Map



R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

FLOOD RATE INSURANCE MAP

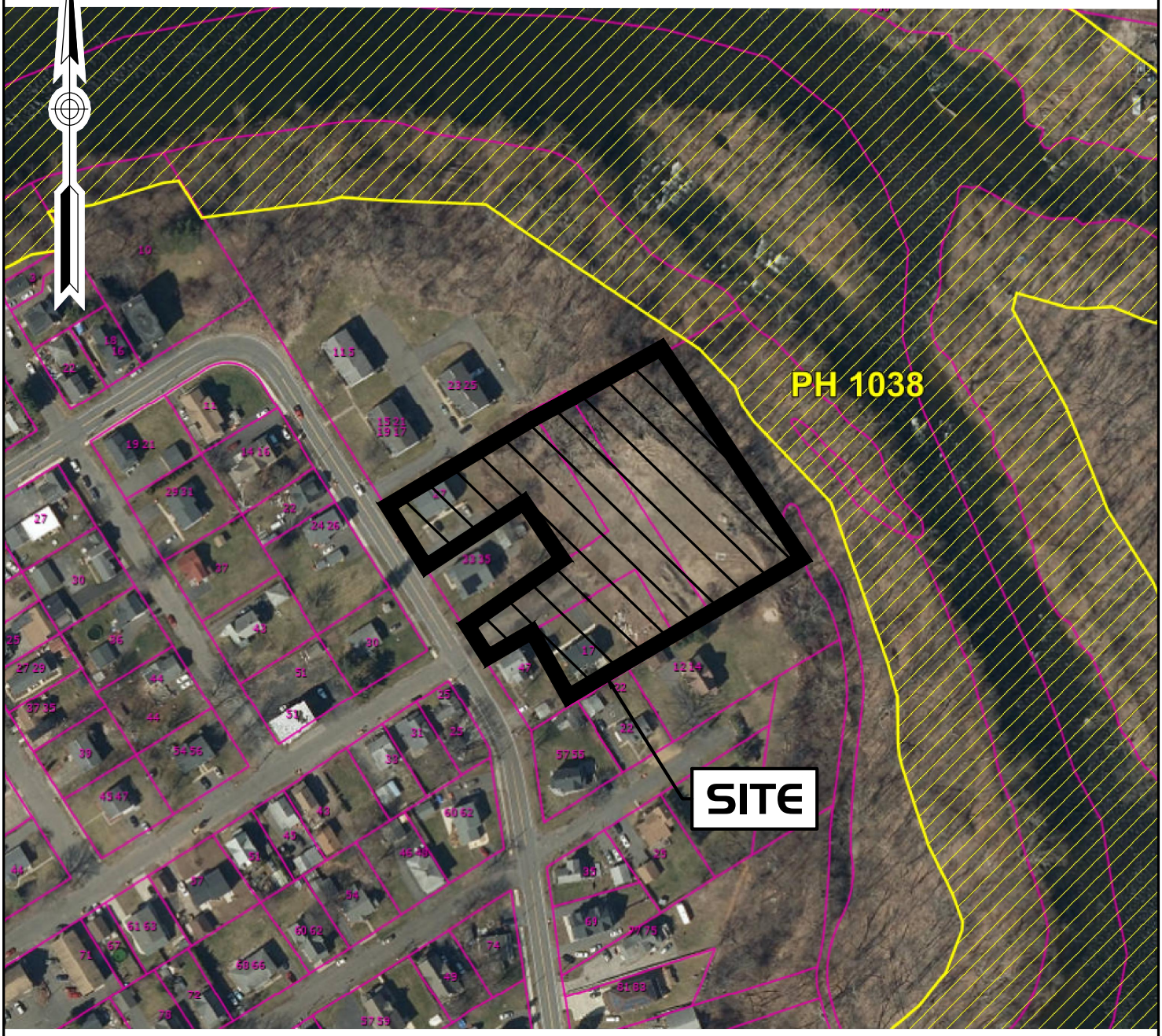
Proposed Residential Subdivision
27 Walnut Street and Old River Street
Agawam, Massachusetts

Calabrese Construction, LLC
7 Brewster Road
West Springfield, Massachusetts

JOB NO: 220627
DATE: 1/29/26
SCALE: AS NOTED

FIG-2

Figure 3: NHESP Map



1000' 0 1000' 2000'

BAR SCALE
1" = 1000'

R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

NHESP Area Map

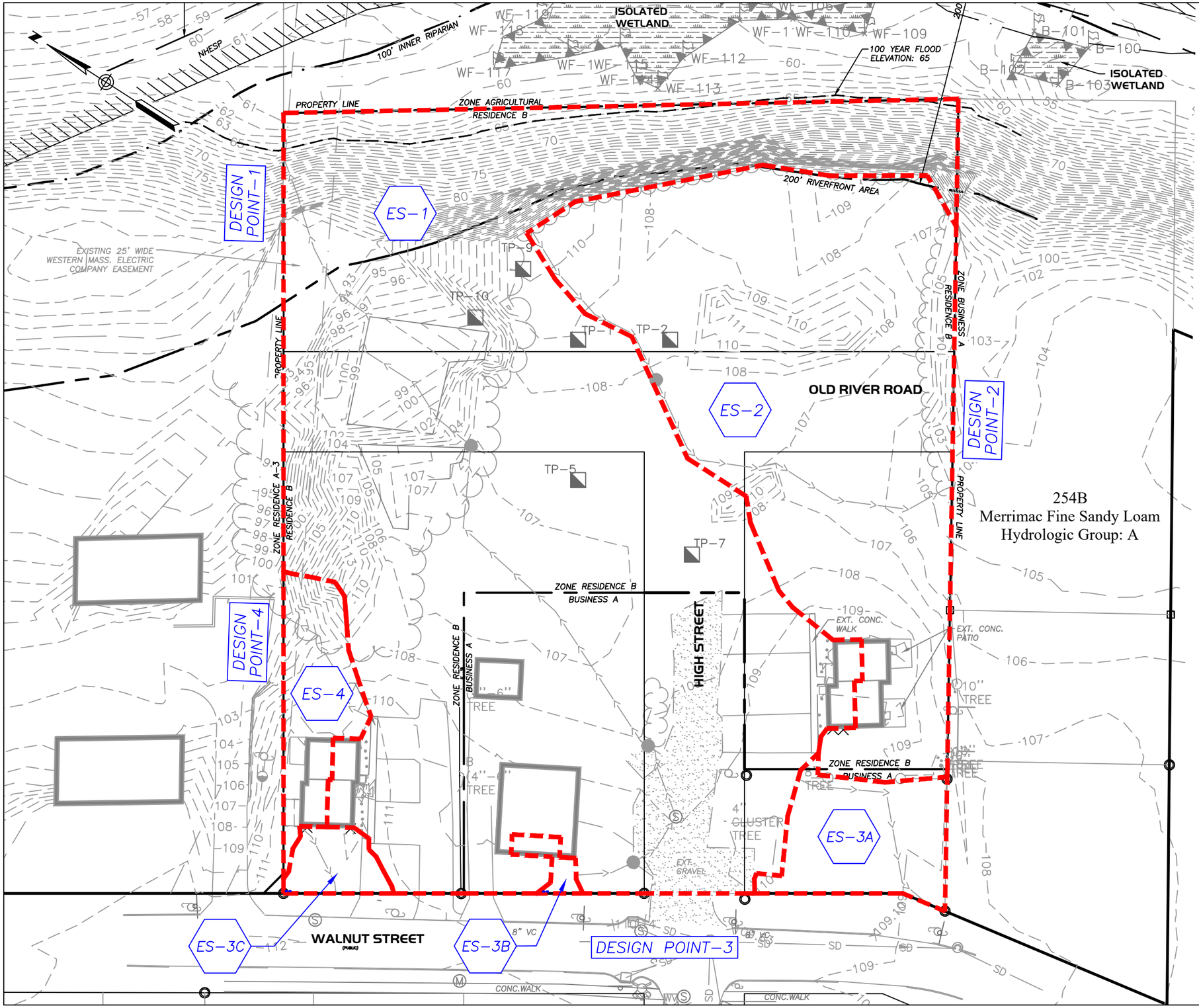
Proposed Residential Subdivision
27 Walnut Street and Old River Street
Agawam, Massachusetts

Calabrese Construction, LLC
7 Brewster Road
West Springfield, Massachusetts

JOB NO: 220627
DATE: 1/29/26
SCALE: AS NOTED

FIG-3

Figure 4: Pre-Development Watershed Plan



LEGEND

- TIME OF CONC. FLOW PATH
- ES-1 — SUBCATCHMENT NAME
- SUB WATERSHED
- SOIL BOUNDARY

1" = 50'
25 0 50

R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

Pre-Development Watershed Plan

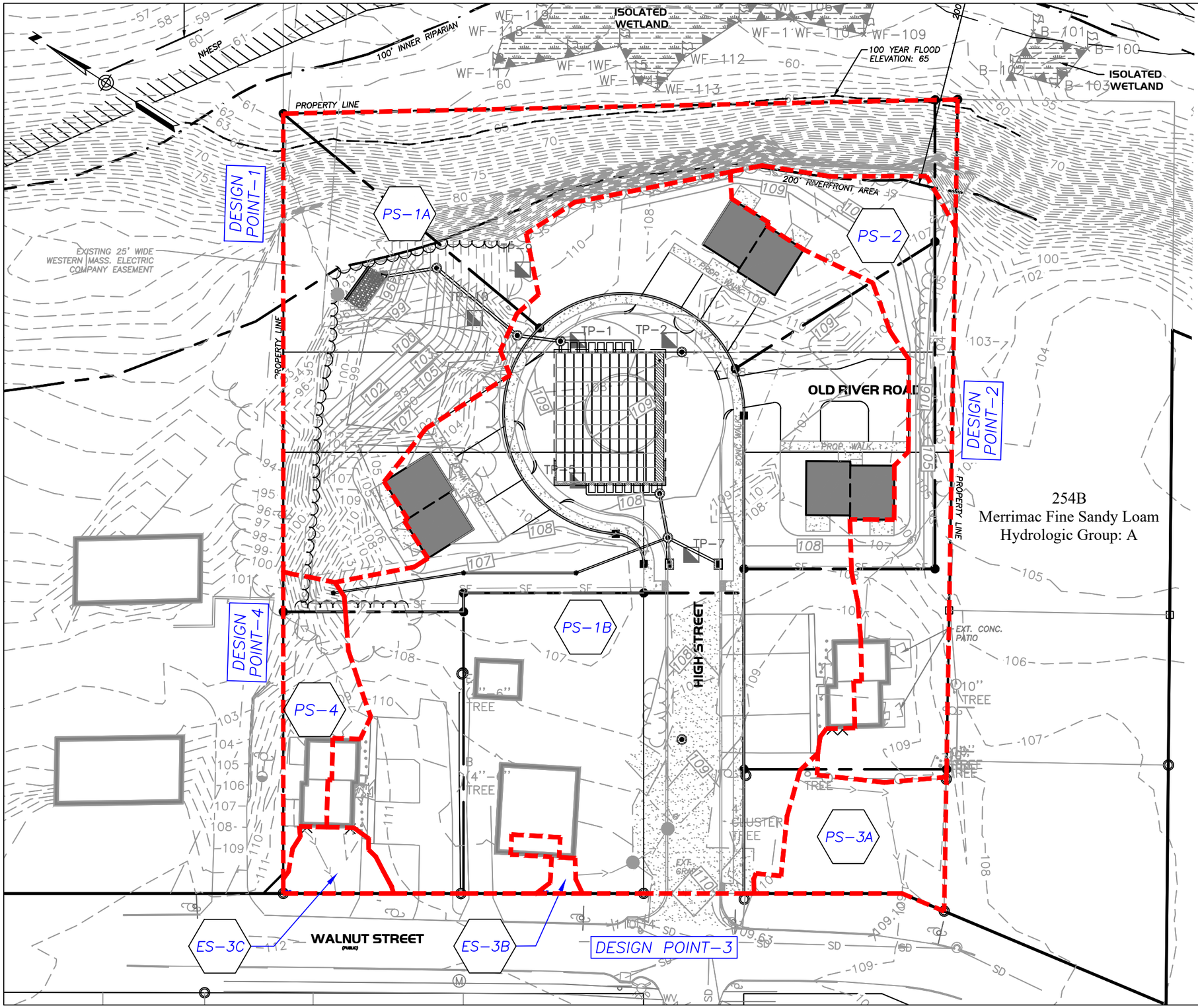
Proposed Residential Subdivision
Old River Road
Agawam, Massachusetts

Calabrese Construction, LLC
7 Brewster Road
West Springfield, MA 01089

JOB NO.: 220627
DATE: 1/30/26
SCALE: As Noted

FIG-4

Figure 5: Post-Development Watershed Plan



LEGEND

- TIME OF CONC. FLOW PATH
- ES-1 — SUBCATCHMENT NAME
- SUB WATERSHED
- SOIL BOUNDARY

1" = 50'

25 0 50

R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

Post-Development Watershed Plan

Proposed Residential Subdivision
Old River Road
Agawam, Massachusetts

C.D.C. Realty, Inc.
7 Brewster Road
West Springfield, MA 01089

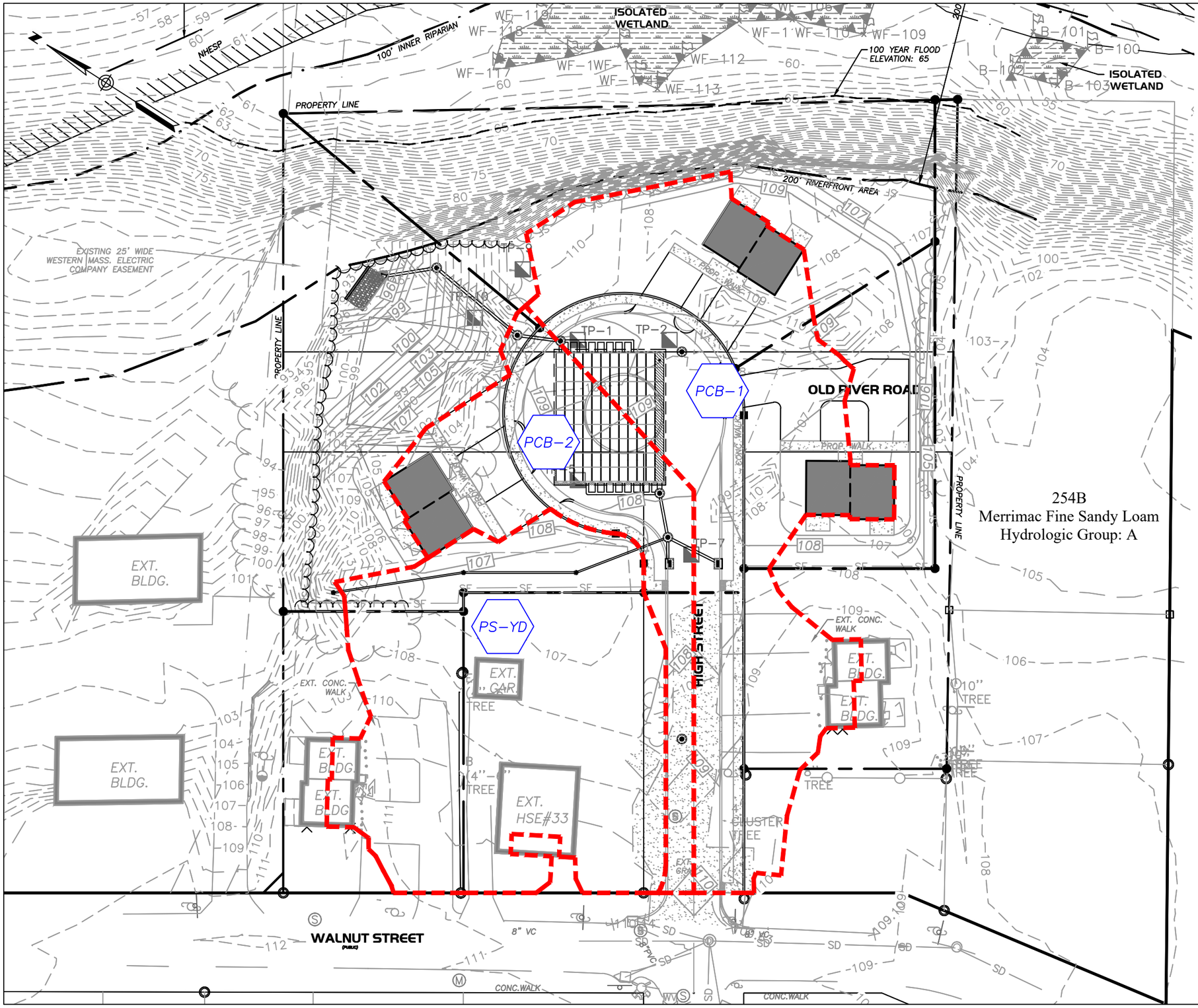
JOB NO.: 220627

DATE: 1/30/26

SCALE: As Noted

FIG-5

Figure 6: Inlet Area Plan



LEGEND

- TIME OF CONC. FLOW PATH
- ES-1 — SUBCATCHMENT NAME
- SUB WATERSHED
- SOIL BOUNDARY

1" = 50'
25 0 50

R LEVESQUE ASSOCIATES, INC
A Land Planning Services Company
40 School Street · P.O. Box 640 · Westfield, MA 01086
ph: 413.568.0985 fax: 413.568.0986 rlaland.com

Inlet Area Plan

Proposed Residential Subdivision
Old River Road
Agawam, Massachusetts

C.D.C. Realty, Inc.
7 Brewster Road
West Springfield, MA 01089

JOB NO.: 220627
DATE: 1/30/26
SCALE: As Noted

FIG-6

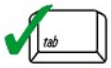
Appendix A: Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

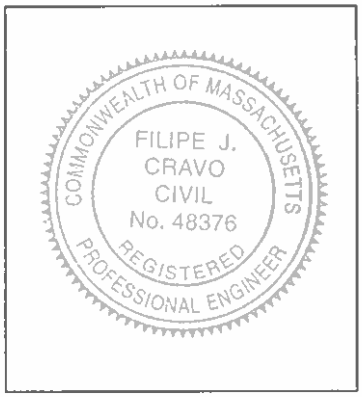
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



1/30/26

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Proprietary Sedimentation Device, Subsurface Infiltration Basin

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

☐ Limited Project

☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.

☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area

☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff

☐ Bike Path and/or Foot Path

☐ Redevelopment Project

☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Appendix B: Soils Information

- NRCS Custom Soil Resource Report

- Test pit information

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hampden County, Massachusetts, Central Part

Walnut Street



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Hampden County, Massachusetts, Central Part.....14
254B—Merrimac fine sandy loam, 3 to 8 percent slopes.....14
References.....16

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



Map Scale: 1:1,120 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 19, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	2.6	100.0%
Totals for Area of Interest		**2.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hampden County, Massachusetts, Central Part

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

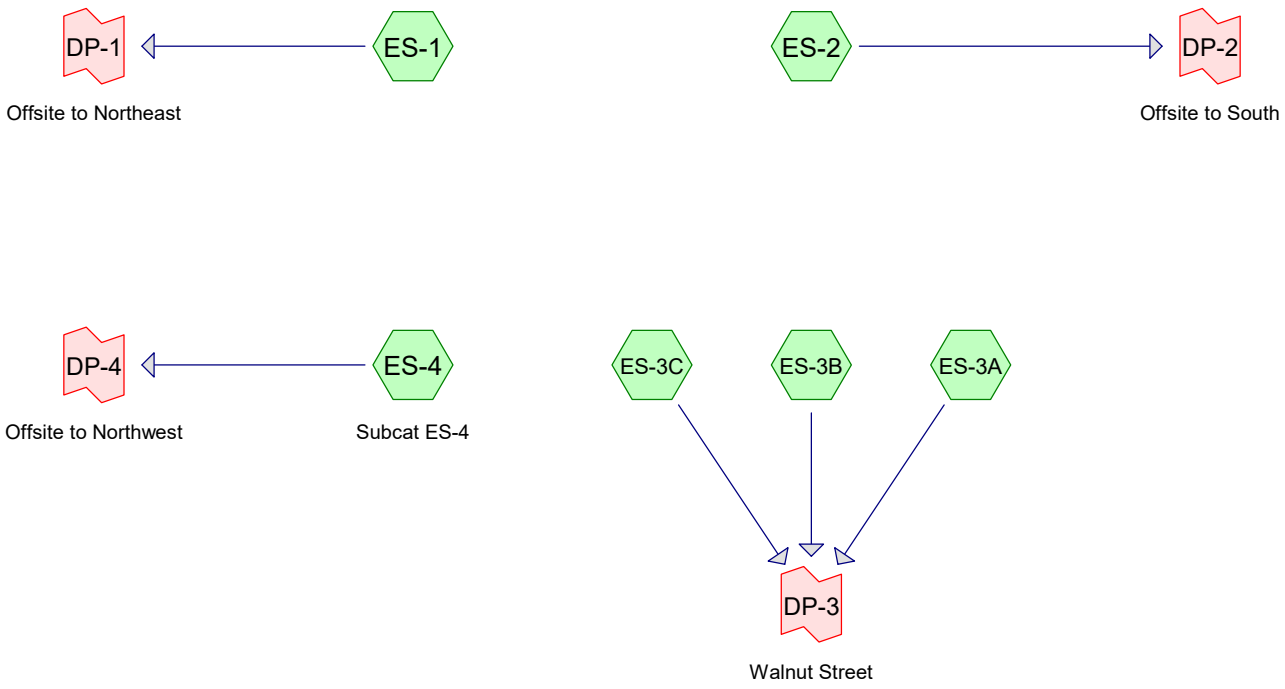
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C: Pre- and Post- Development Hydrologic Analysis (2, 10, & 100 Year Storm Events)



Subcat Reach Pond Link

Routing Diagram for 220627 - PRE
Prepared by R Levesque Associates
HydroCAD® 10.20-8a s/n 13073 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.19	2
2	10-Year	Type III 24-hr		Default	24.00	1	5.16	2
3	100-Year	Type III 24-hr		Default	24.00	1	8.28	2

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=84,098 sf 11.89% Impervious Runoff Depth=0.35"
Flow Length=469' Tc=10.0 min CN=WQ Runoff=0.6 cfs 2,465 cf

Subcatchment ES-2: Runoff Area=36,222 sf 2.65% Impervious Runoff Depth=0.08"
Flow Length=281' Tc=14.6 min CN=WQ Runoff=0.1 cfs 237 cf

Subcatchment ES-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=0.44"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.0 cfs 176 cf

Subcatchment ES-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 60 cf

Subcatchment ES-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=0.01"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 1 cf

Subcatchment ES-4: Subcat ES-4 Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=0.61"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.1 cfs 201 cf

Link DP-1: Offsite to Northeast Inflow=0.6 cfs 2,465 cf
Primary=0.6 cfs 2,465 cf

Link DP-2: Offsite to South Inflow=0.1 cfs 237 cf
Primary=0.1 cfs 237 cf

Link DP-3: Walnut Street Inflow=0.0 cfs 236 cf
Primary=0.0 cfs 236 cf

Link DP-4: Offsite to Northwest Inflow=0.1 cfs 201 cf
Primary=0.1 cfs 201 cf

Total Runoff Area = 131,039 sf Runoff Volume = 3,139 cf Average Runoff Depth = 0.29"
90.29% Pervious = 118,309 sf 9.71% Impervious = 12,730 sf

Summary for Subcatchment ES-1:

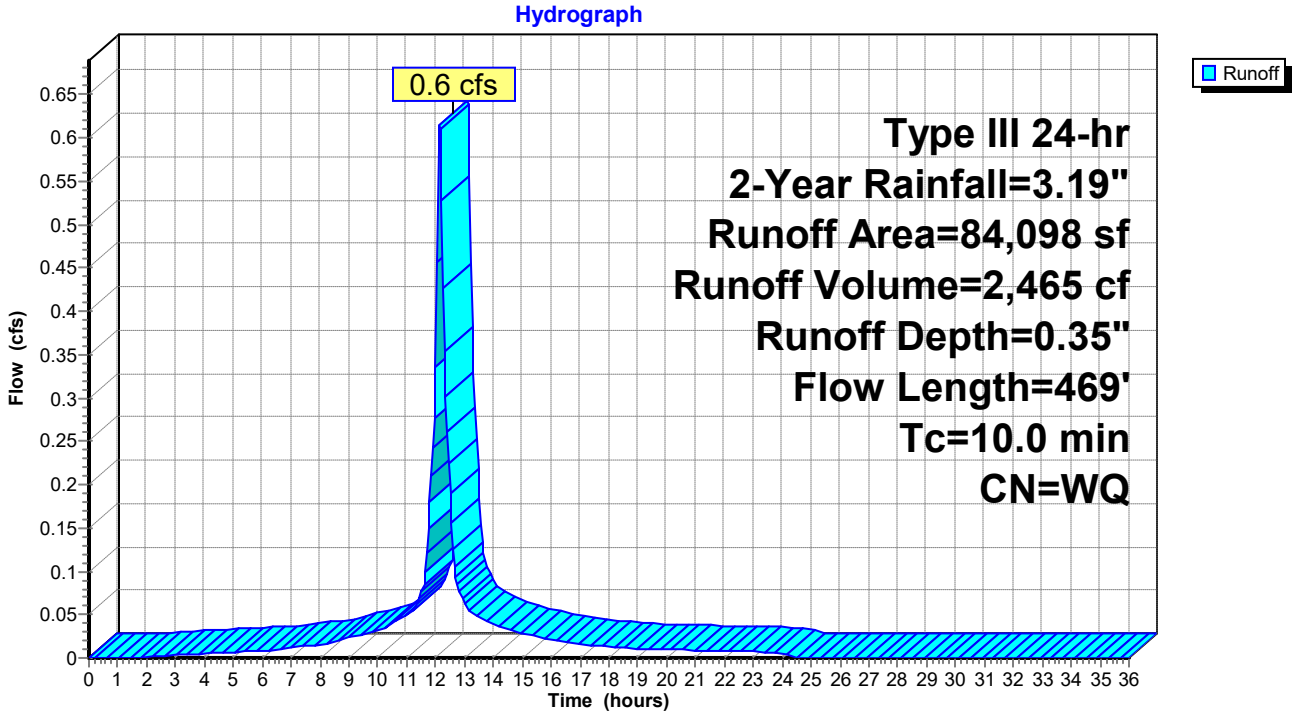
Runoff = 0.6 cfs @ 12.14 hrs, Volume= 2,465 cf, Depth= 0.35"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
39,863	39	>75% Grass cover, Good, HSG A
6,325	98	Paved parking, HSG A
3,674	98	Roofs, HSG A
34,236	30	Woods, Good, HSG A
84,098		Weighted Average
74,099	35	88.11% Pervious Area
9,999	98	11.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.8	71	0.0289	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
2.5	185	0.0059	1.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	184	0.2065	2.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	469	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

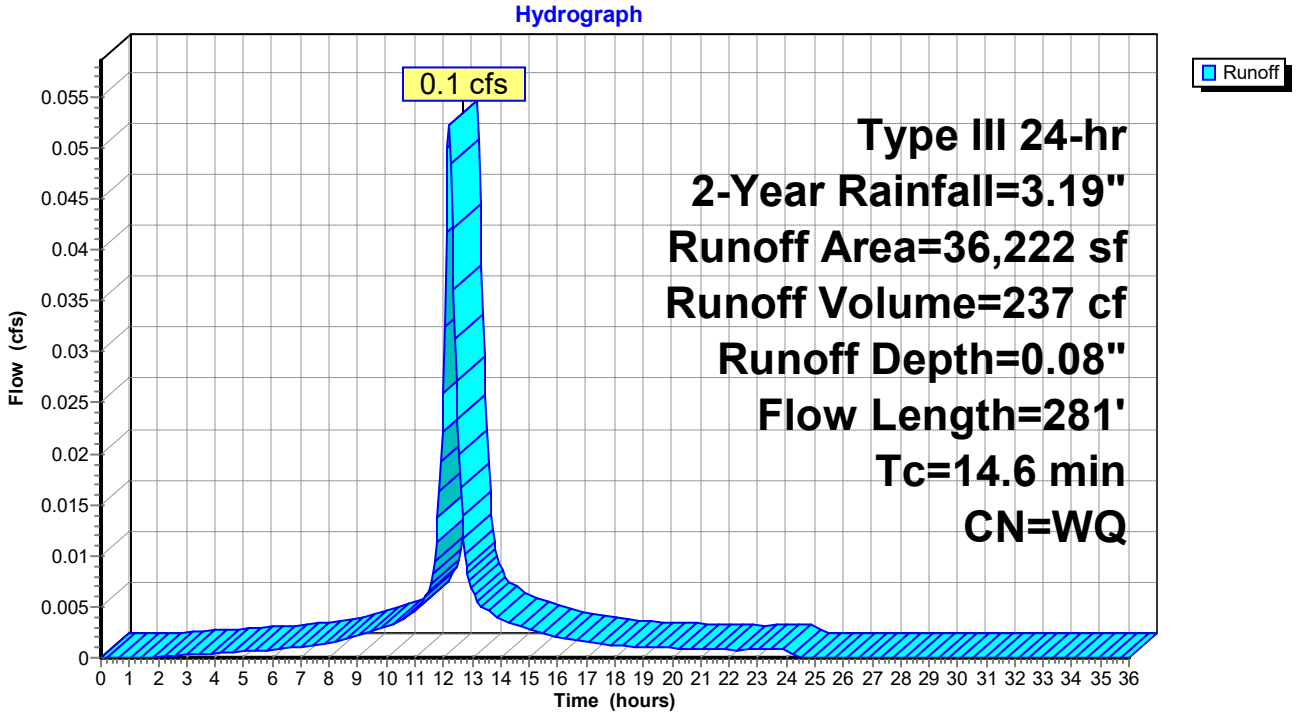
Runoff = 0.1 cfs @ 12.19 hrs, Volume= 237 cf, Depth= 0.08"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
33,745	39	>75% Grass cover, Good, HSG A
325	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,519	30	Woods, Good, HSG A
36,222		Weighted Average
35,263	39	97.35% Pervious Area
959	98	2.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0260	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	181	0.0215	2.36		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
14.6	281	Total			

Subcatchment ES-2:



Summary for Subcatchment ES-3A:

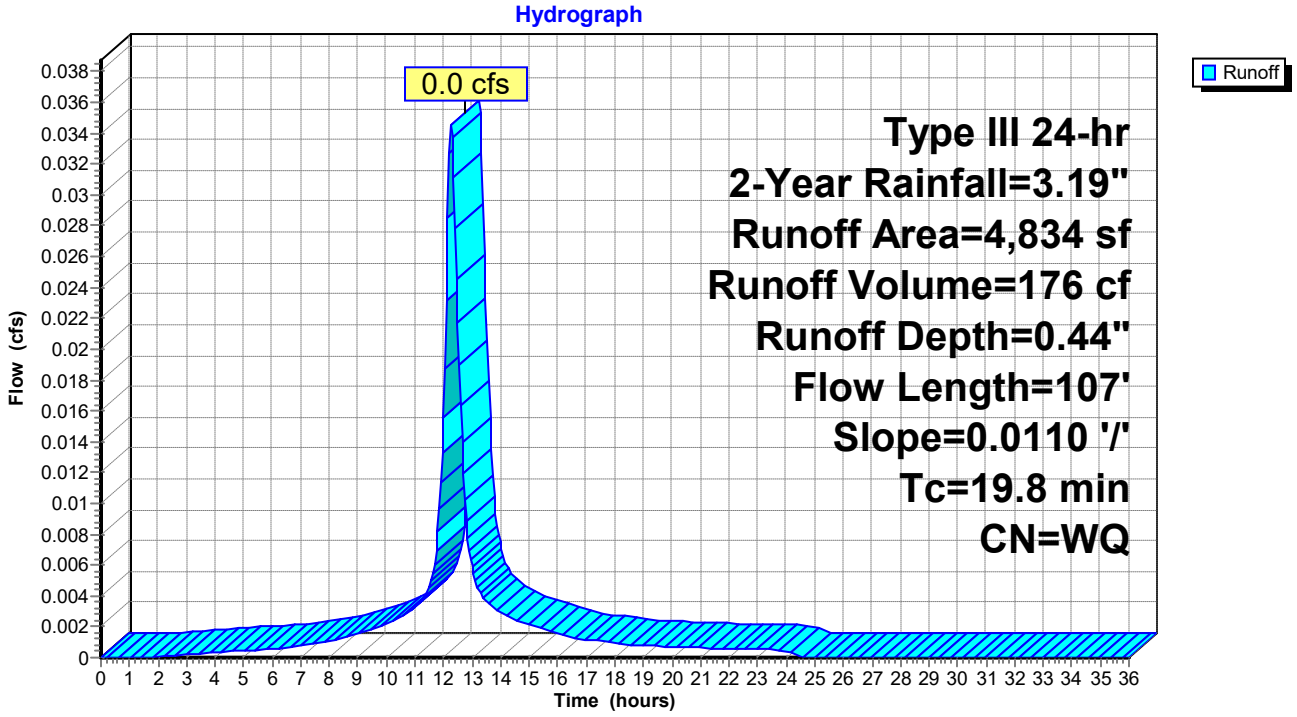
Runoff = 0.0 cfs @ 12.26 hrs, Volume= 176 cf, Depth= 0.44"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3A:



Summary for Subcatchment ES-3B:

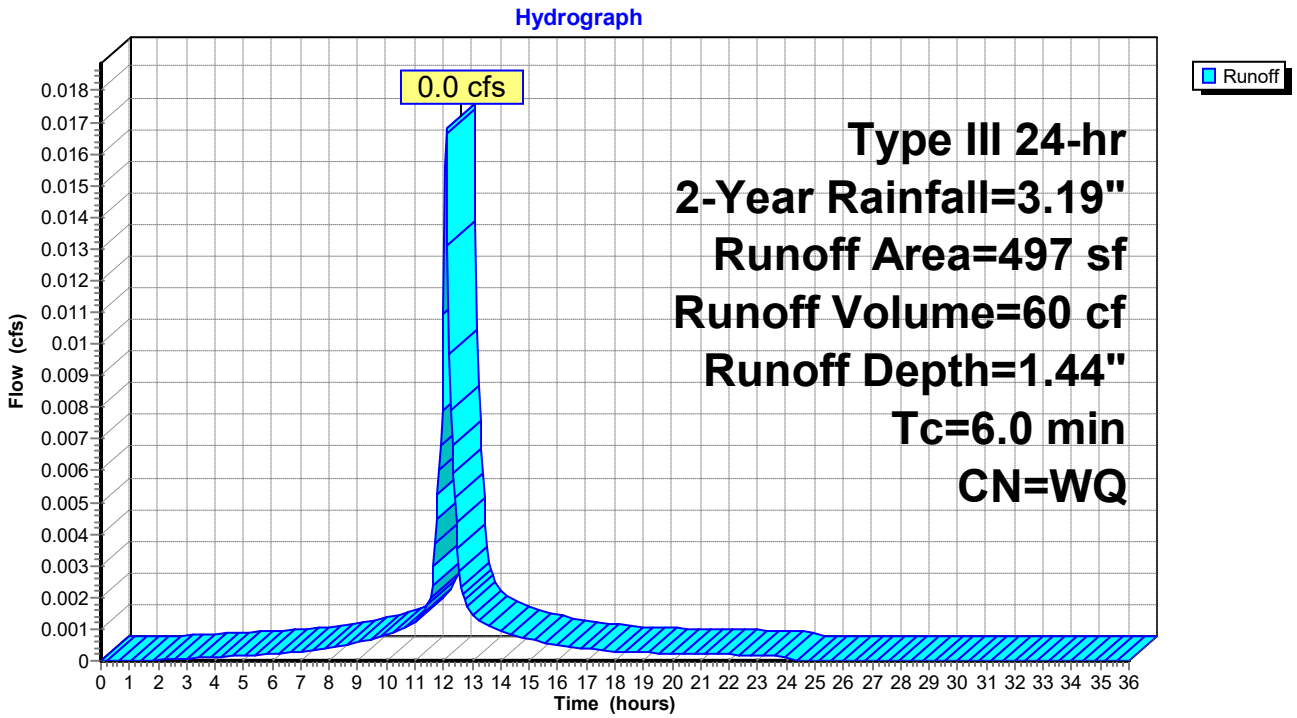
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 60 cf, Depth= 1.44"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ES-3B:



Summary for Subcatchment ES-3C:

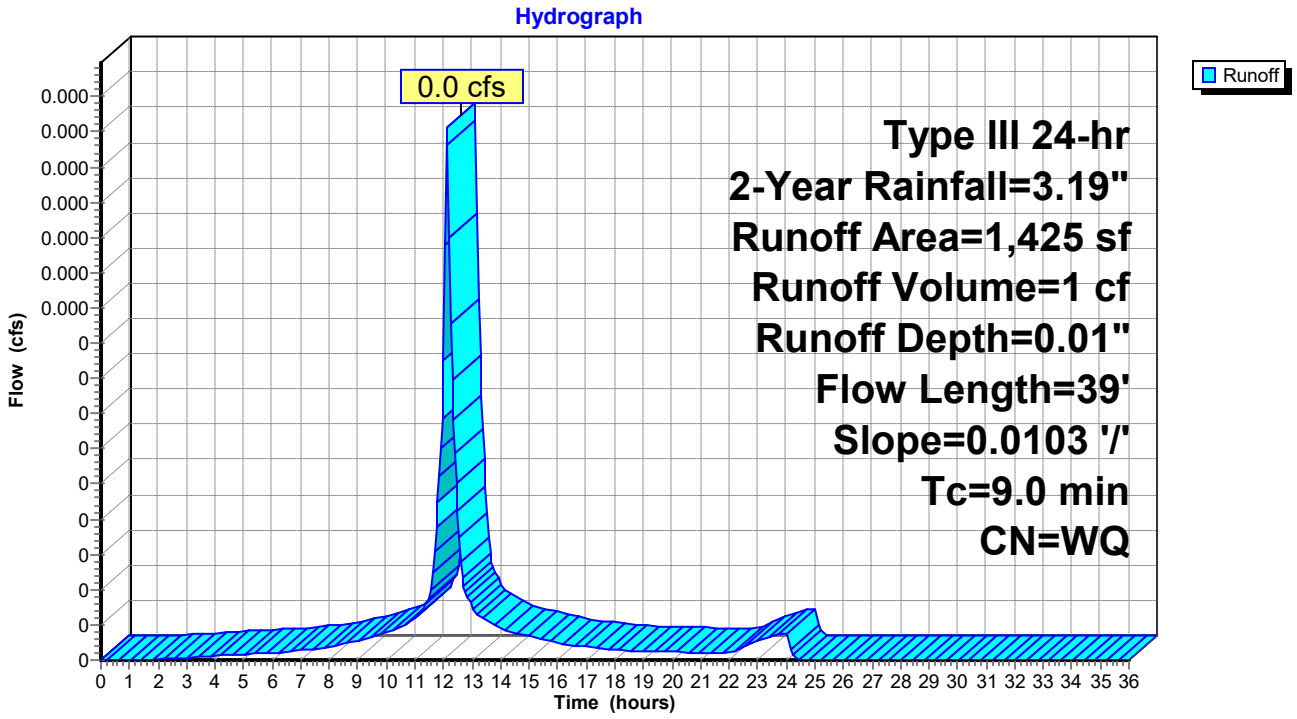
Runoff = 0.0 cfs @ 12.12 hrs, Volume= 1 cf, Depth= 0.01"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3C:



Summary for Subcatchment ES-4: Subcat ES-4

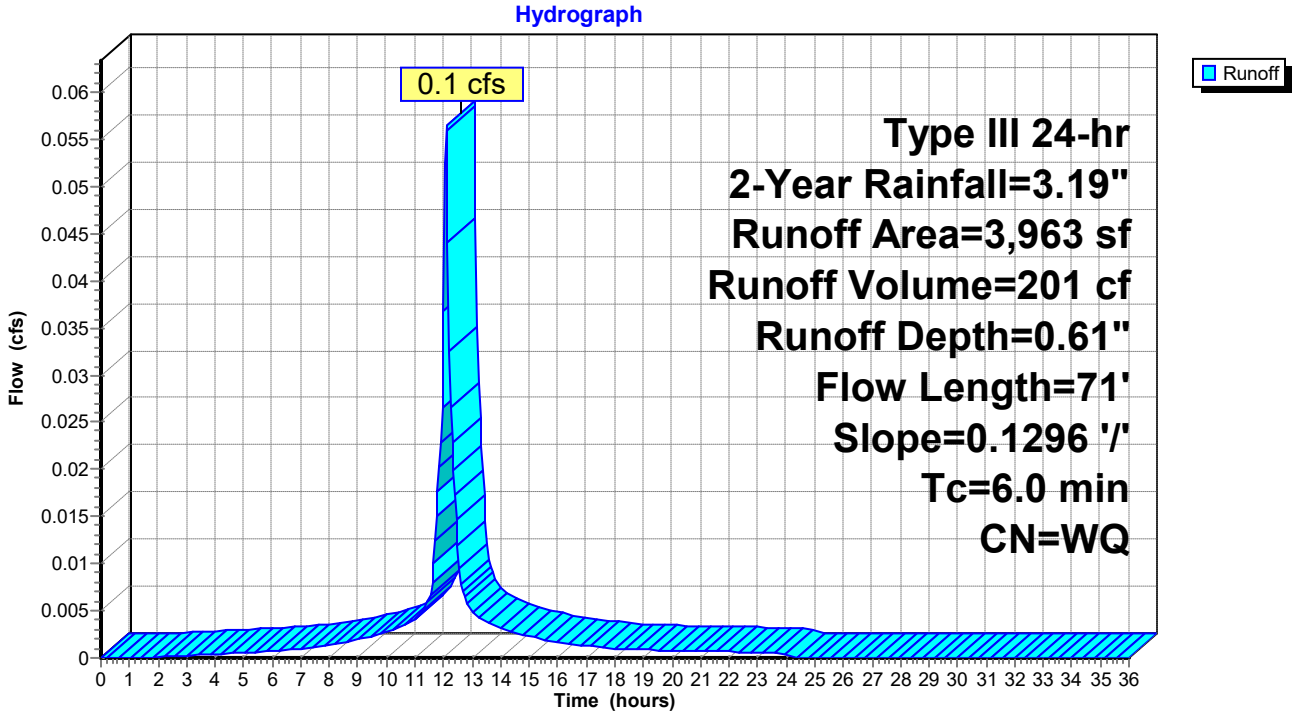
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 201 cf, Depth= 0.61"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
2,344	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
804	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment ES-4: Subcat ES-4

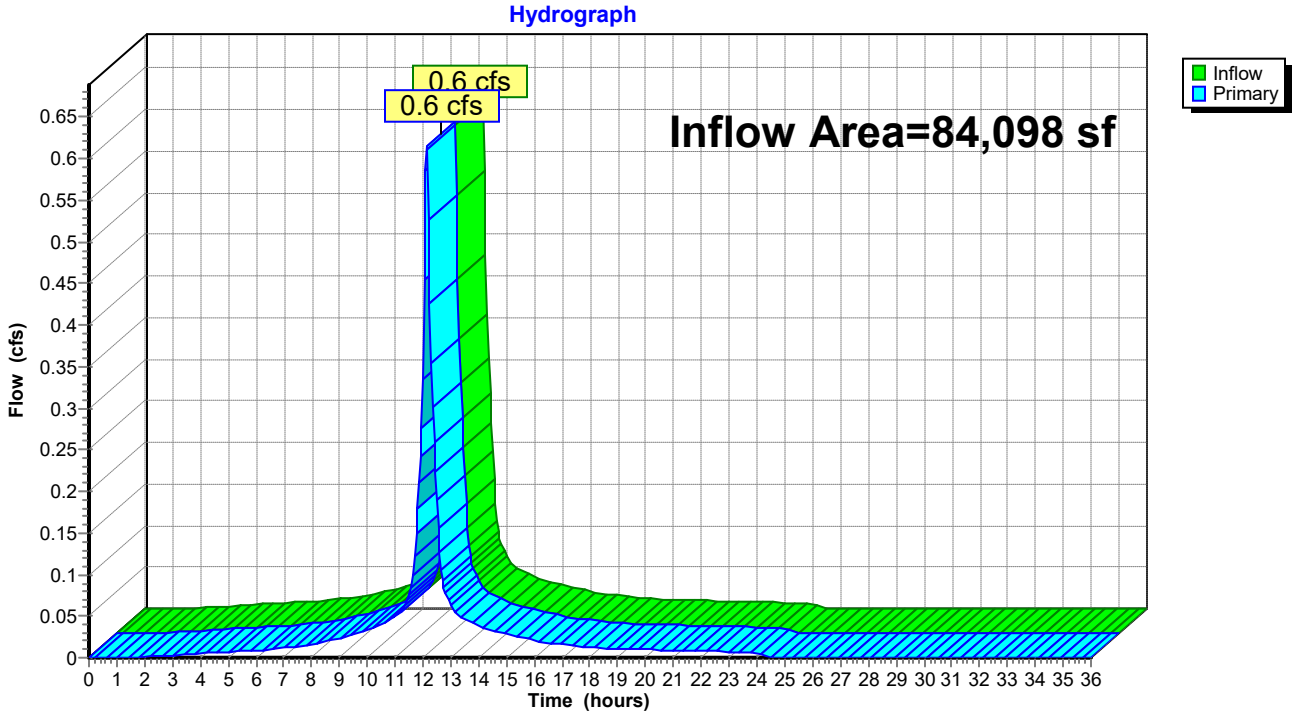


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 84,098 sf, 11.89% Impervious, Inflow Depth = 0.35" for 2-Year event
Inflow = 0.6 cfs @ 12.14 hrs, Volume= 2,465 cf
Primary = 0.6 cfs @ 12.14 hrs, Volume= 2,465 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

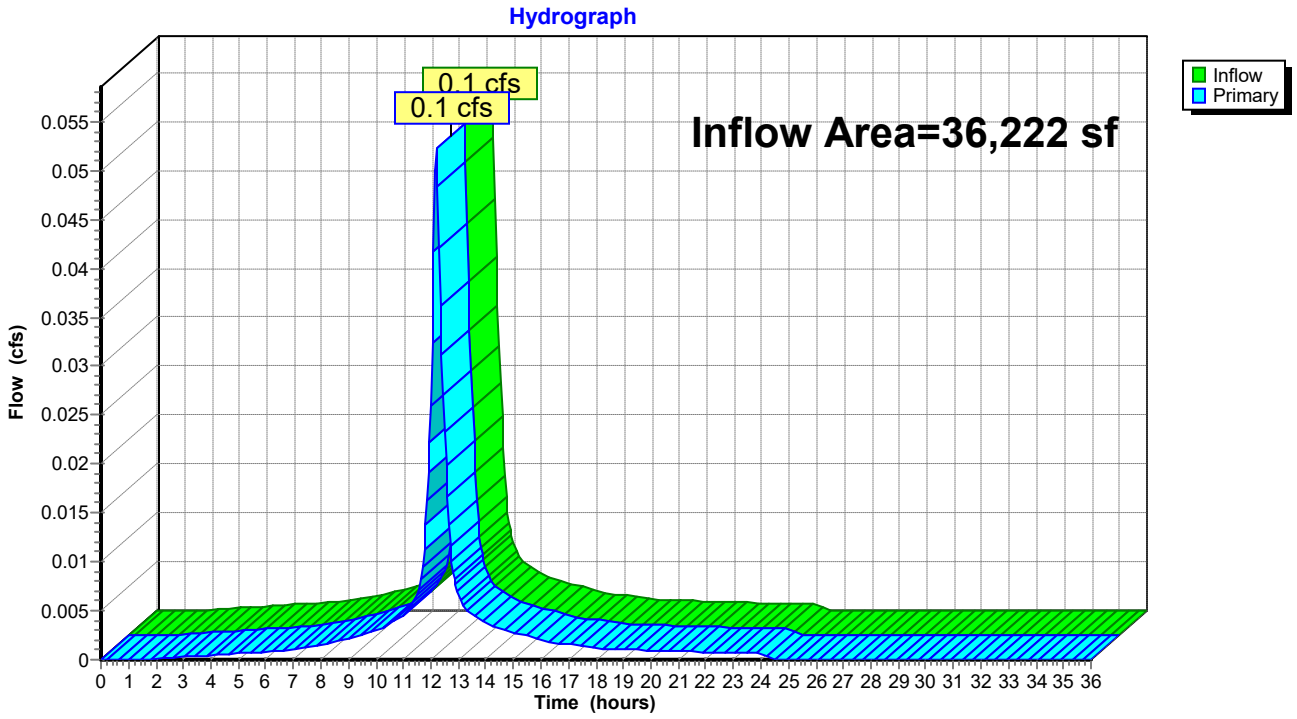


Summary for Link DP-2: Offsite to South

Inflow Area = 36,222 sf, 2.65% Impervious, Inflow Depth = 0.08" for 2-Year event
Inflow = 0.1 cfs @ 12.19 hrs, Volume= 237 cf
Primary = 0.1 cfs @ 12.19 hrs, Volume= 237 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

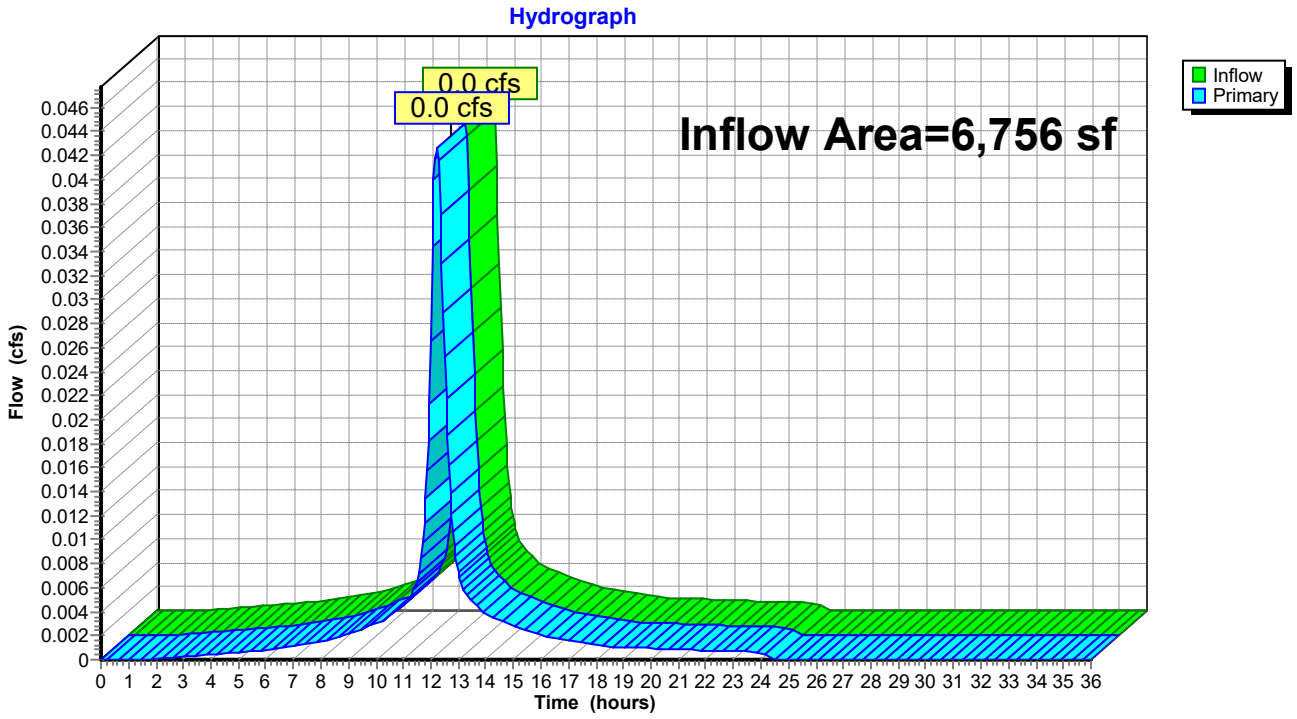


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 0.42" for 2-Year event
Inflow = 0.0 cfs @ 12.22 hrs, Volume= 236 cf
Primary = 0.0 cfs @ 12.22 hrs, Volume= 236 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

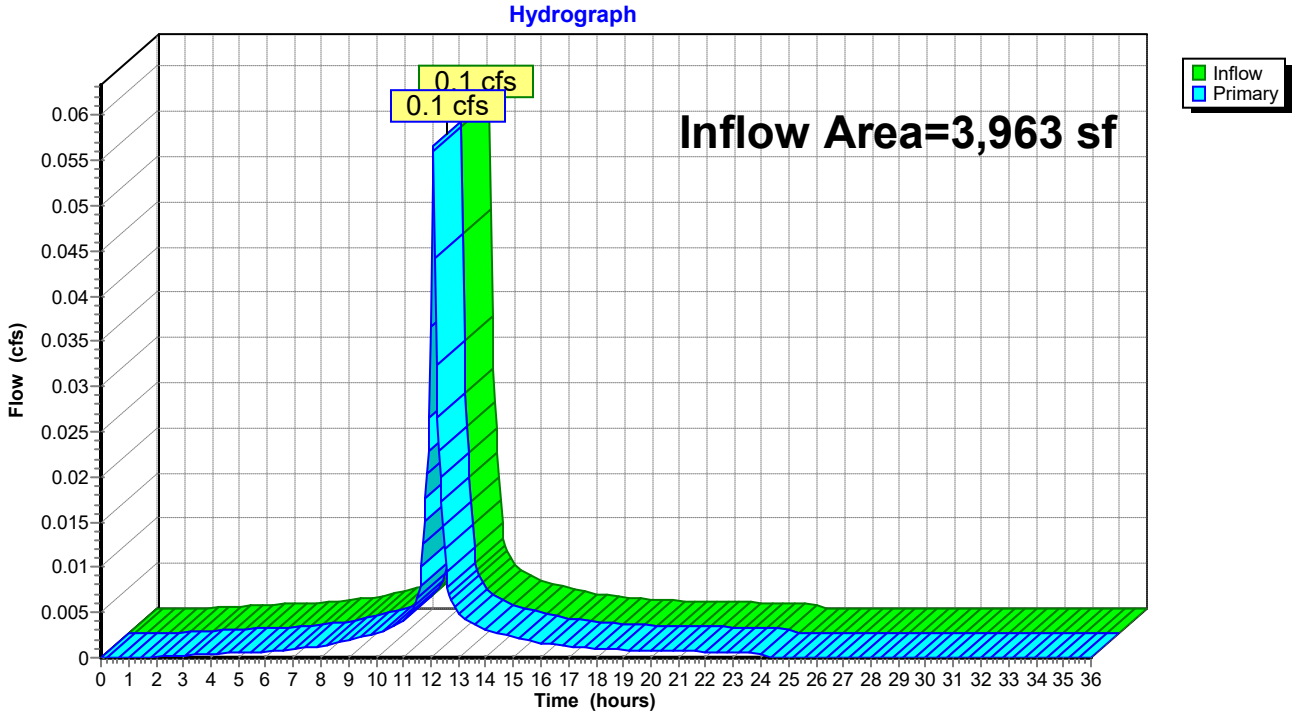


Summary for Link DP-4: Offsite to Northwest

Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 0.61" for 2-Year event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 201 cf
Primary = 0.1 cfs @ 12.09 hrs, Volume= 201 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=84,098 sf 11.89% Impervious Runoff Depth=0.70"
Flow Length=469' Tc=10.0 min CN=WQ Runoff=1.0 cfs 4,907 cf

Subcatchment ES-2: Runoff Area=36,222 sf 2.65% Impervious Runoff Depth=0.35"
Flow Length=281' Tc=14.6 min CN=WQ Runoff=0.1 cfs 1,052 cf

Subcatchment ES-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=0.92"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.1 cfs 372 cf

Subcatchment ES-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=2.52"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 104 cf

Subcatchment ES-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=0.24"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 29 cf

Subcatchment ES-4: Subcat ES-4 Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=1.15"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.1 cfs 381 cf

Link DP-1: Offsite to Northeast Inflow=1.0 cfs 4,907 cf
Primary=1.0 cfs 4,907 cf

Link DP-2: Offsite to South Inflow=0.1 cfs 1,052 cf
Primary=0.1 cfs 1,052 cf

Link DP-3: Walnut Street Inflow=0.1 cfs 505 cf
Primary=0.1 cfs 505 cf

Link DP-4: Offsite to Northwest Inflow=0.1 cfs 381 cf
Primary=0.1 cfs 381 cf

Total Runoff Area = 131,039 sf Runoff Volume = 6,845 cf Average Runoff Depth = 0.63"
90.29% Pervious = 118,309 sf 9.71% Impervious = 12,730 sf

Summary for Subcatchment ES-1:

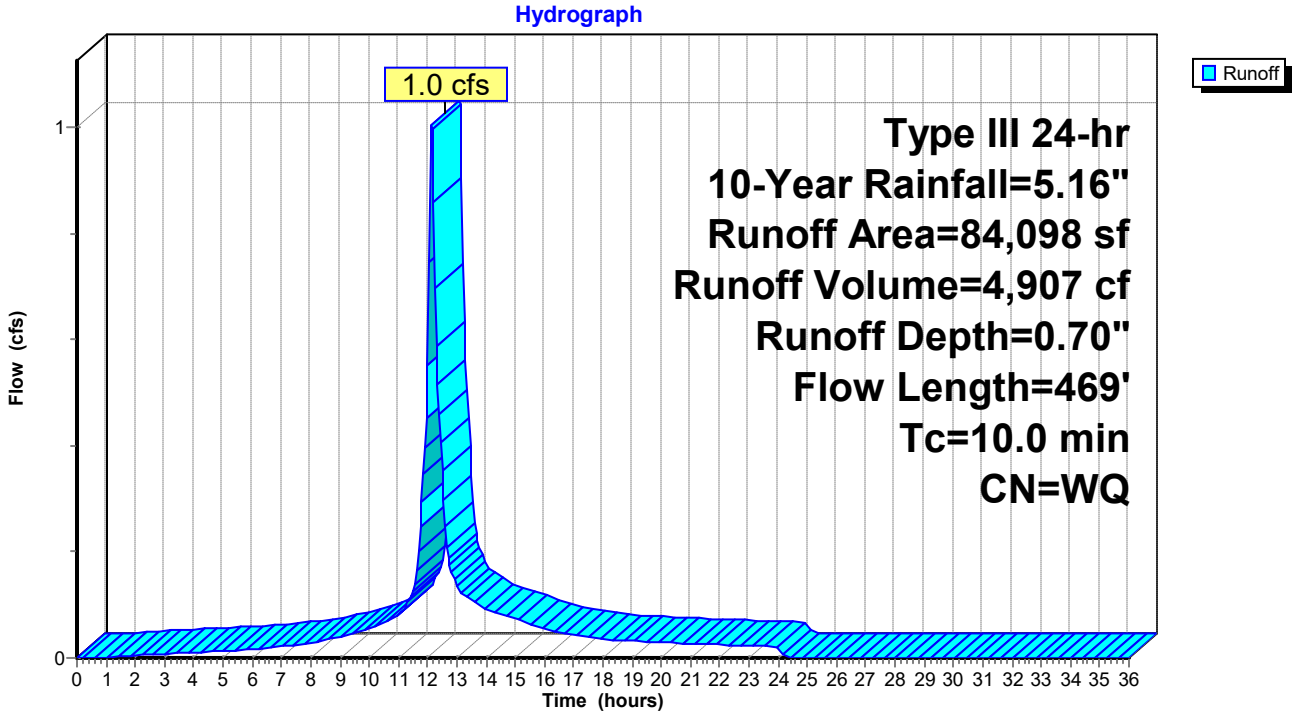
Runoff = 1.0 cfs @ 12.14 hrs, Volume= 4,907 cf, Depth= 0.70"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
39,863	39	>75% Grass cover, Good, HSG A
6,325	98	Paved parking, HSG A
3,674	98	Roofs, HSG A
34,236	30	Woods, Good, HSG A
84,098		Weighted Average
74,099	35	88.11% Pervious Area
9,999	98	11.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.8	71	0.0289	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
2.5	185	0.0059	1.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	184	0.2065	2.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	469	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

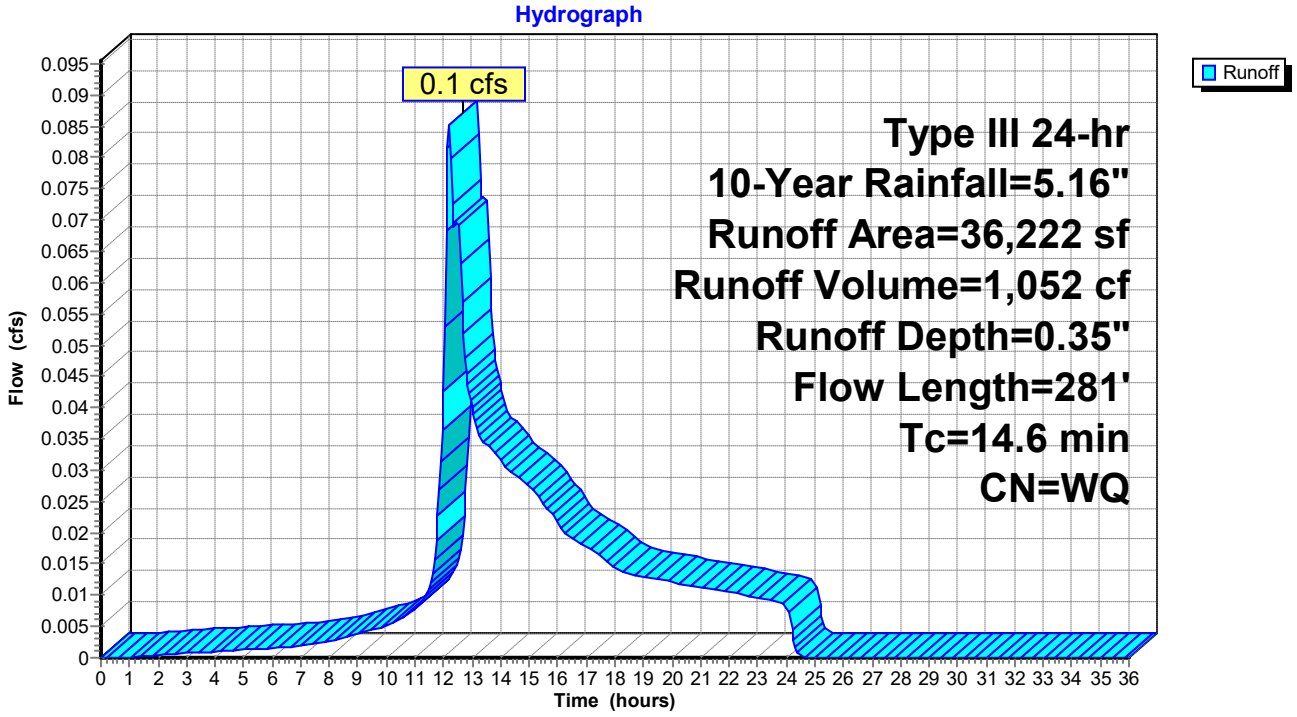
Runoff = 0.1 cfs @ 12.20 hrs, Volume= 1,052 cf, Depth= 0.35"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
33,745	39	>75% Grass cover, Good, HSG A
325	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,519	30	Woods, Good, HSG A
36,222		Weighted Average
35,263	39	97.35% Pervious Area
959	98	2.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0260	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	181	0.0215	2.36		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
14.6	281	Total			

Subcatchment ES-2:



Summary for Subcatchment ES-3A:

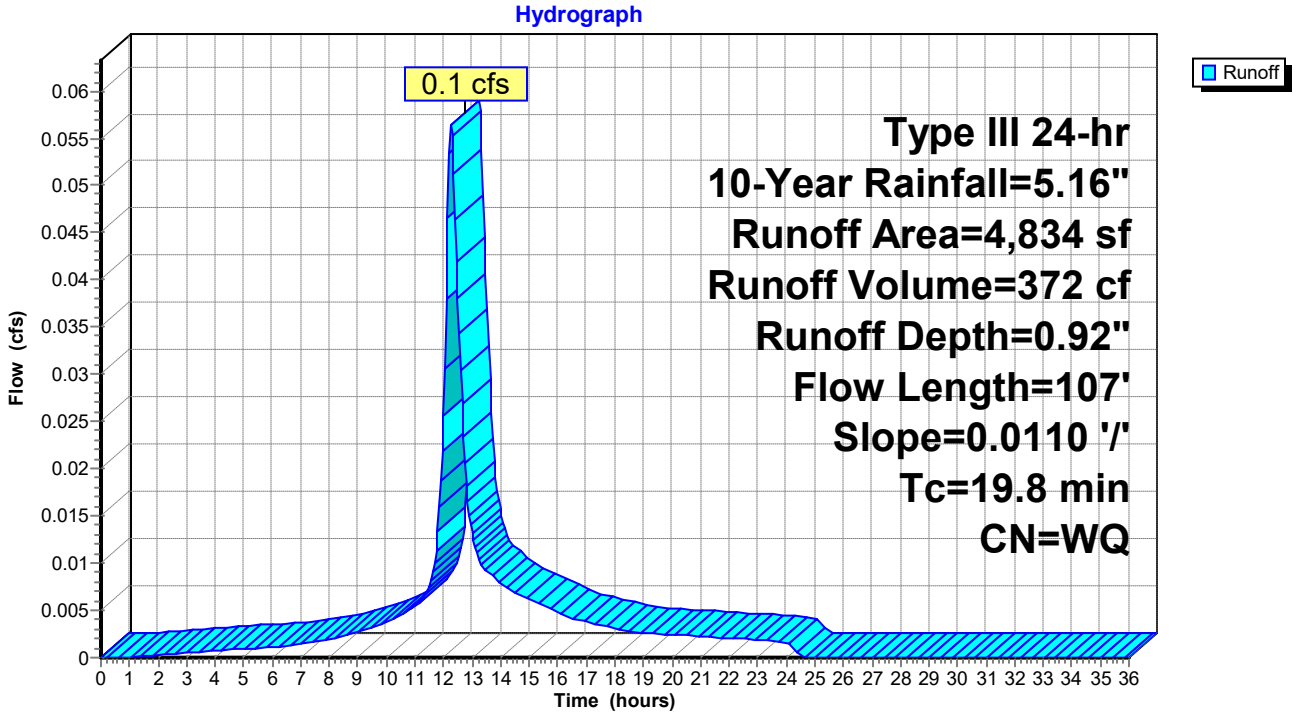
Runoff = 0.1 cfs @ 12.26 hrs, Volume= 372 cf, Depth= 0.92"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3A:



Summary for Subcatchment ES-3B:

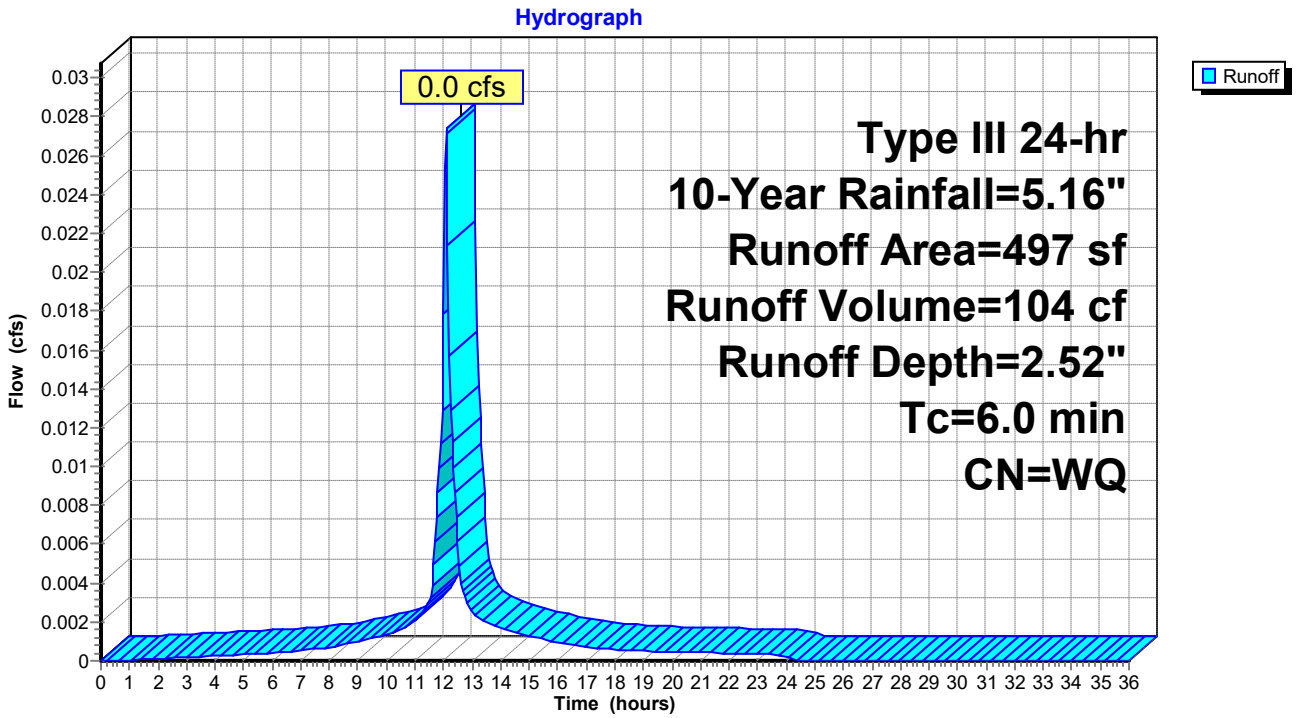
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 104 cf, Depth= 2.52"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ES-3B:



Summary for Subcatchment ES-3C:

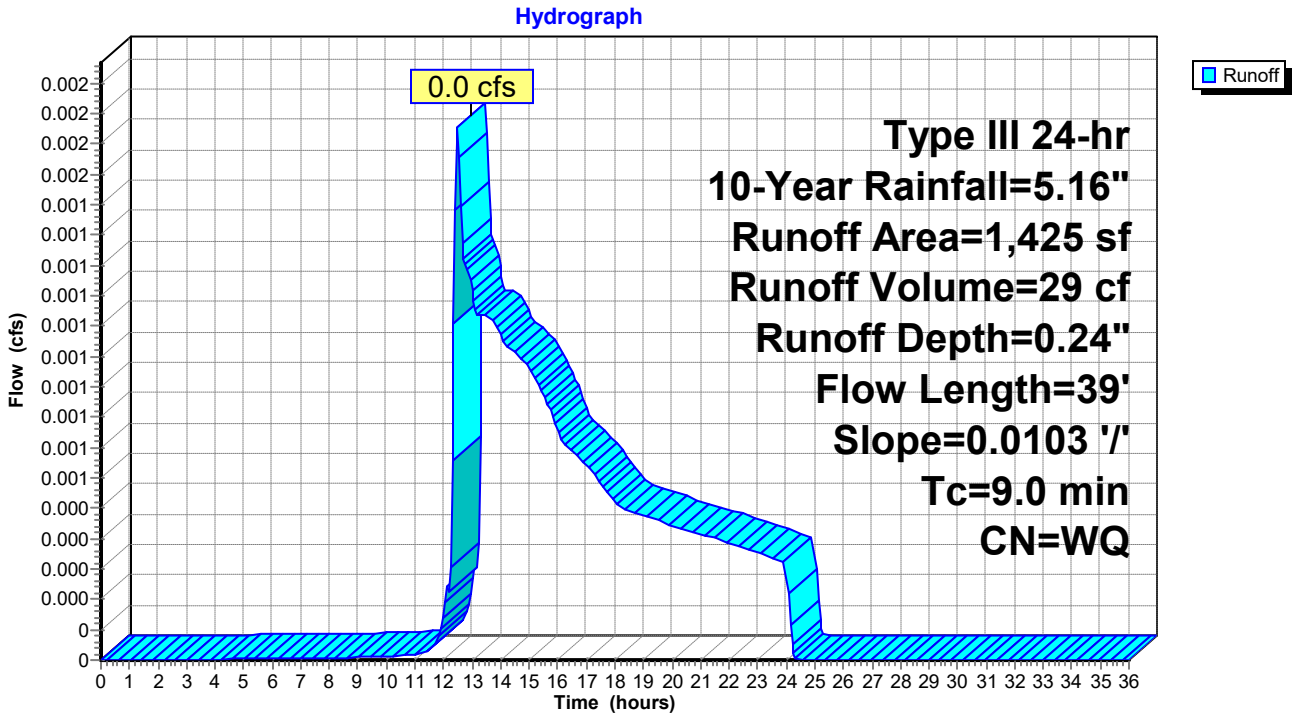
Runoff = 0.0 cfs @ 12.49 hrs, Volume= 29 cf, Depth= 0.24"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3C:



Summary for Subcatchment ES-4: Subcat ES-4

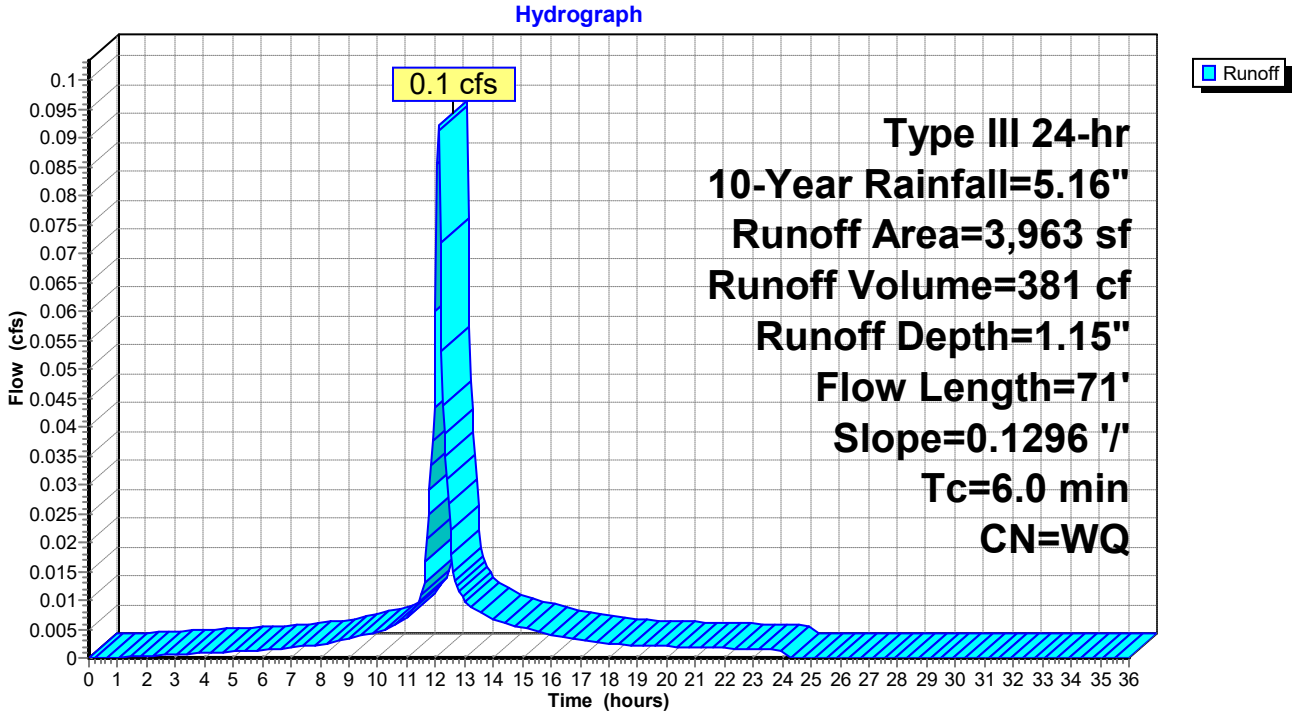
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 381 cf, Depth= 1.15"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
2,344	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
804	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment ES-4: Subcat ES-4

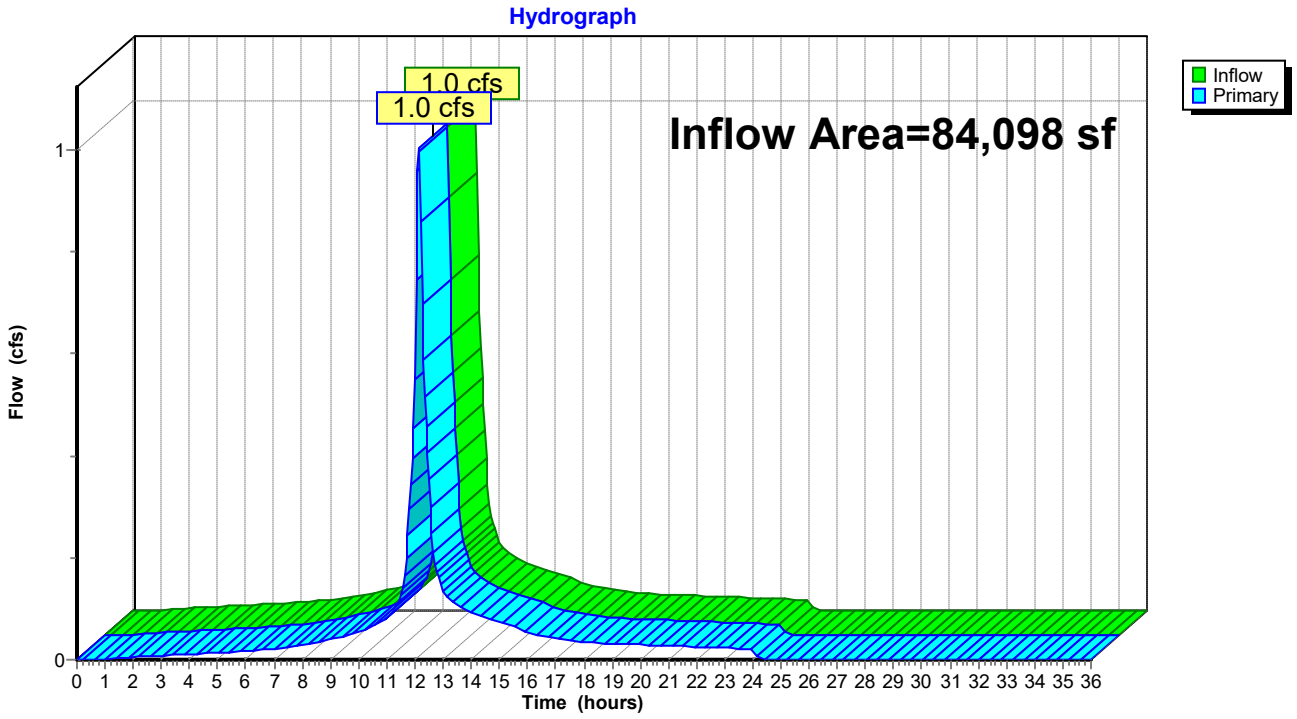


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 84,098 sf, 11.89% Impervious, Inflow Depth = 0.70" for 10-Year event
Inflow = 1.0 cfs @ 12.14 hrs, Volume= 4,907 cf
Primary = 1.0 cfs @ 12.14 hrs, Volume= 4,907 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

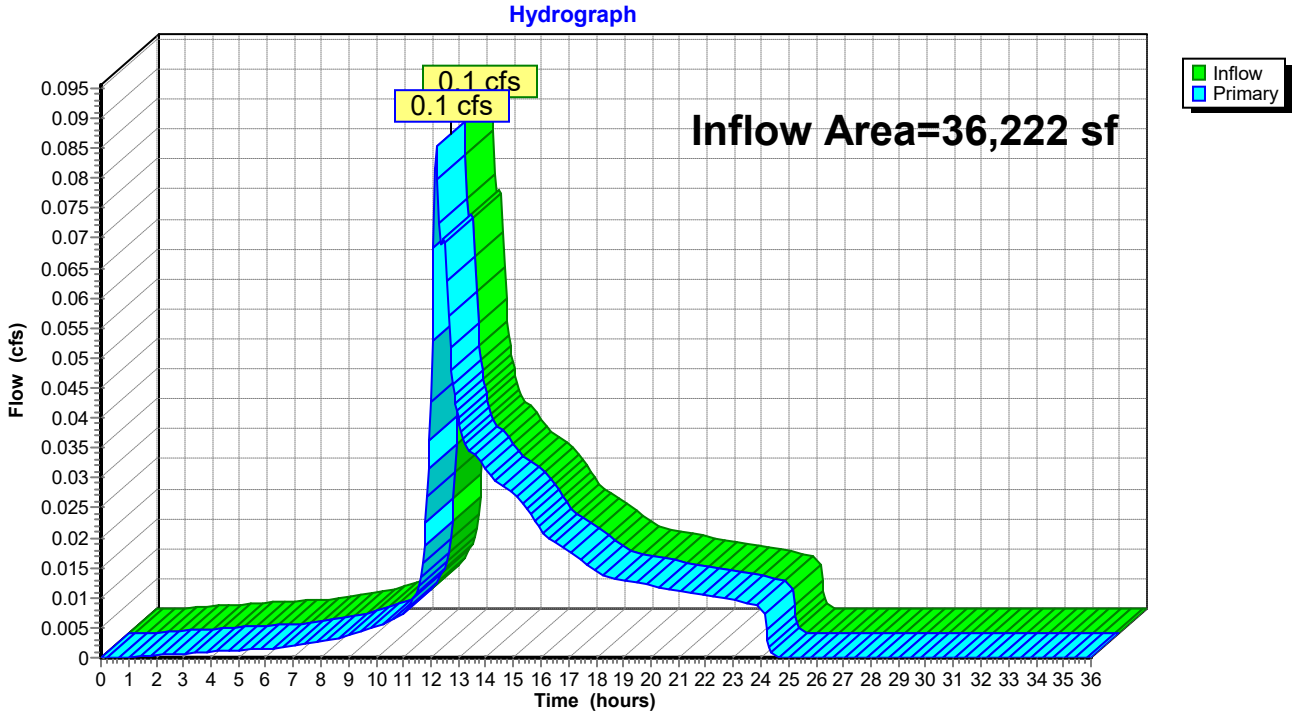


Summary for Link DP-2: Offsite to South

Inflow Area = 36,222 sf, 2.65% Impervious, Inflow Depth = 0.35" for 10-Year event
Inflow = 0.1 cfs @ 12.20 hrs, Volume= 1,052 cf
Primary = 0.1 cfs @ 12.20 hrs, Volume= 1,052 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

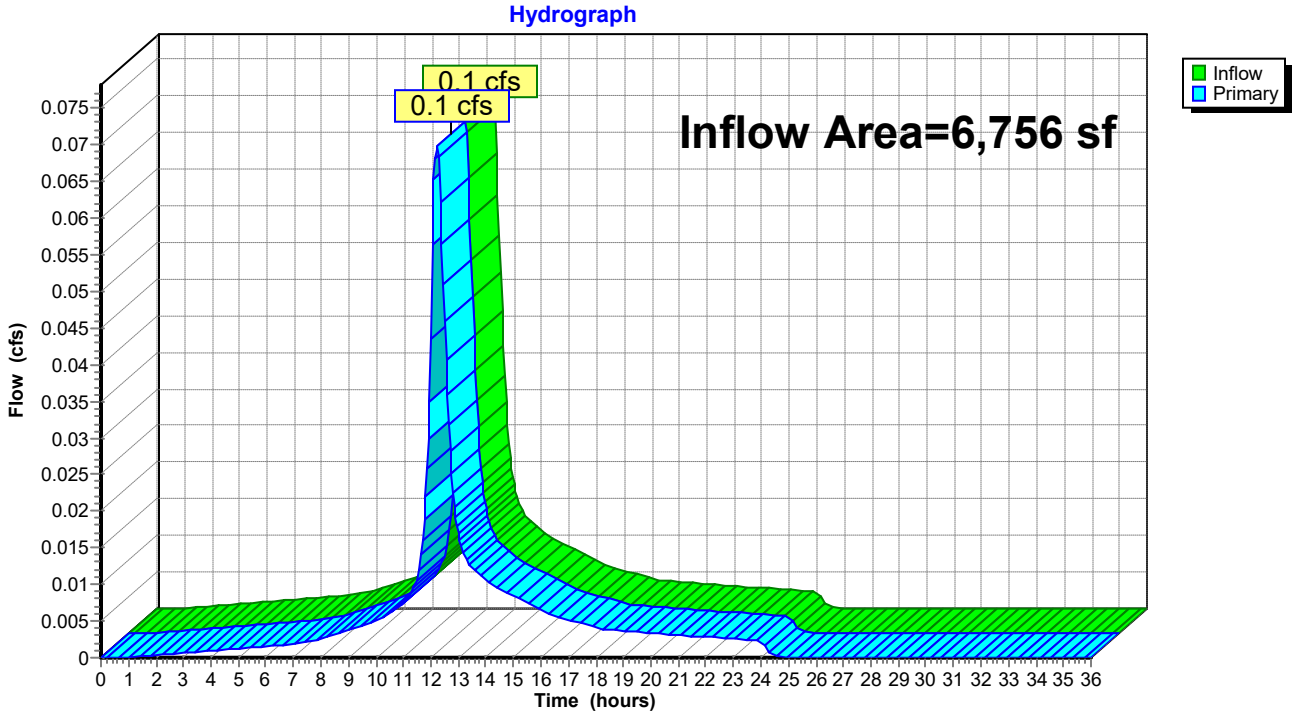


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 0.90" for 10-Year event
Inflow = 0.1 cfs @ 12.23 hrs, Volume= 505 cf
Primary = 0.1 cfs @ 12.23 hrs, Volume= 505 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

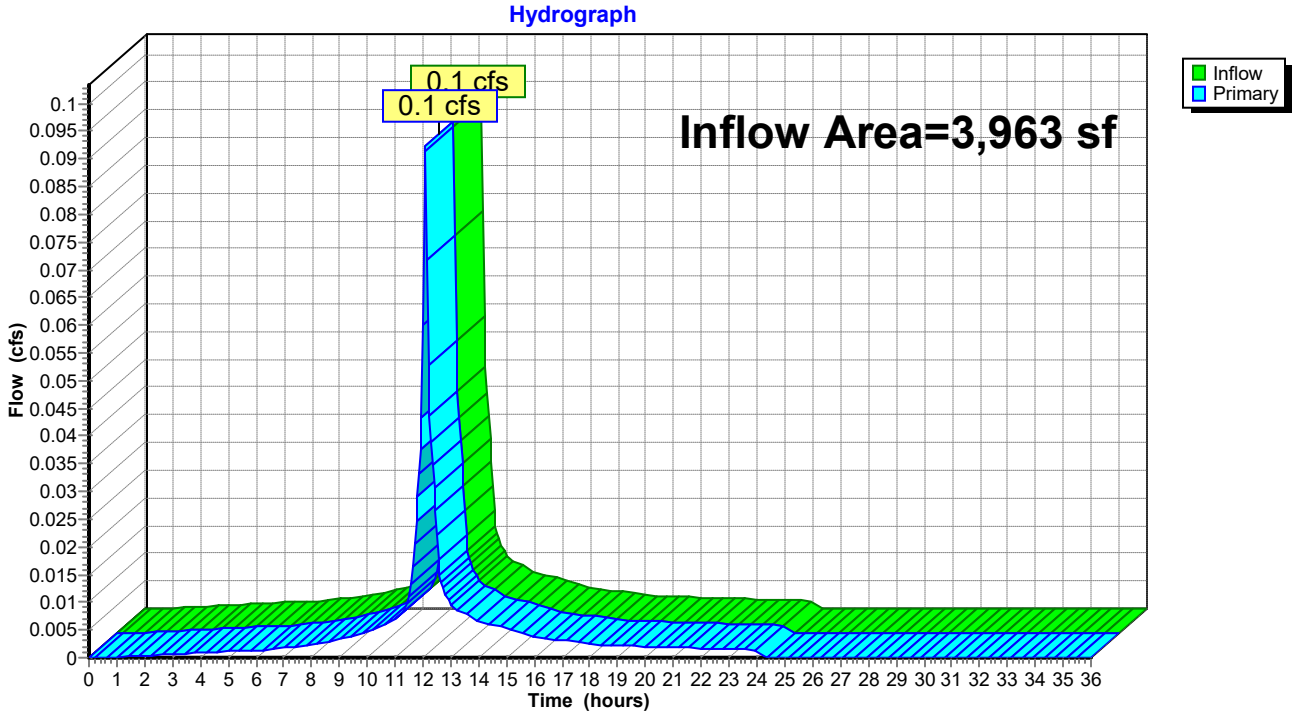


Summary for Link DP-4: Offsite to Northwest

Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 1.15" for 10-Year event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 381 cf
Primary = 0.1 cfs @ 12.09 hrs, Volume= 381 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment ES-1: Runoff Area=84,098 sf 11.89% Impervious Runoff Depth=1.76"
Flow Length=469' Tc=10.0 min CN=WQ Runoff=2.4 cfs 12,322 cf

Subcatchment ES-2: Runoff Area=36,222 sf 2.65% Impervious Runoff Depth=1.42"
Flow Length=281' Tc=14.6 min CN=WQ Runoff=0.7 cfs 4,293 cf

Subcatchment ES-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=2.27"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.2 cfs 915 cf

Subcatchment ES-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 190 cf

Subcatchment ES-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=1.29"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 153 cf

Subcatchment ES-4: Subcat ES-4 Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=2.51"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.2 cfs 828 cf

Link DP-1: Offsite to Northeast Inflow=2.4 cfs 12,322 cf
Primary=2.4 cfs 12,322 cf

Link DP-2: Offsite to South Inflow=0.7 cfs 4,293 cf
Primary=0.7 cfs 4,293 cf

Link DP-3: Walnut Street Inflow=0.2 cfs 1,258 cf
Primary=0.2 cfs 1,258 cf

Link DP-4: Offsite to Northwest Inflow=0.2 cfs 828 cf
Primary=0.2 cfs 828 cf

Total Runoff Area = 131,039 sf Runoff Volume = 18,701 cf Average Runoff Depth = 1.71"
90.29% Pervious = 118,309 sf 9.71% Impervious = 12,730 sf

Summary for Subcatchment ES-1:

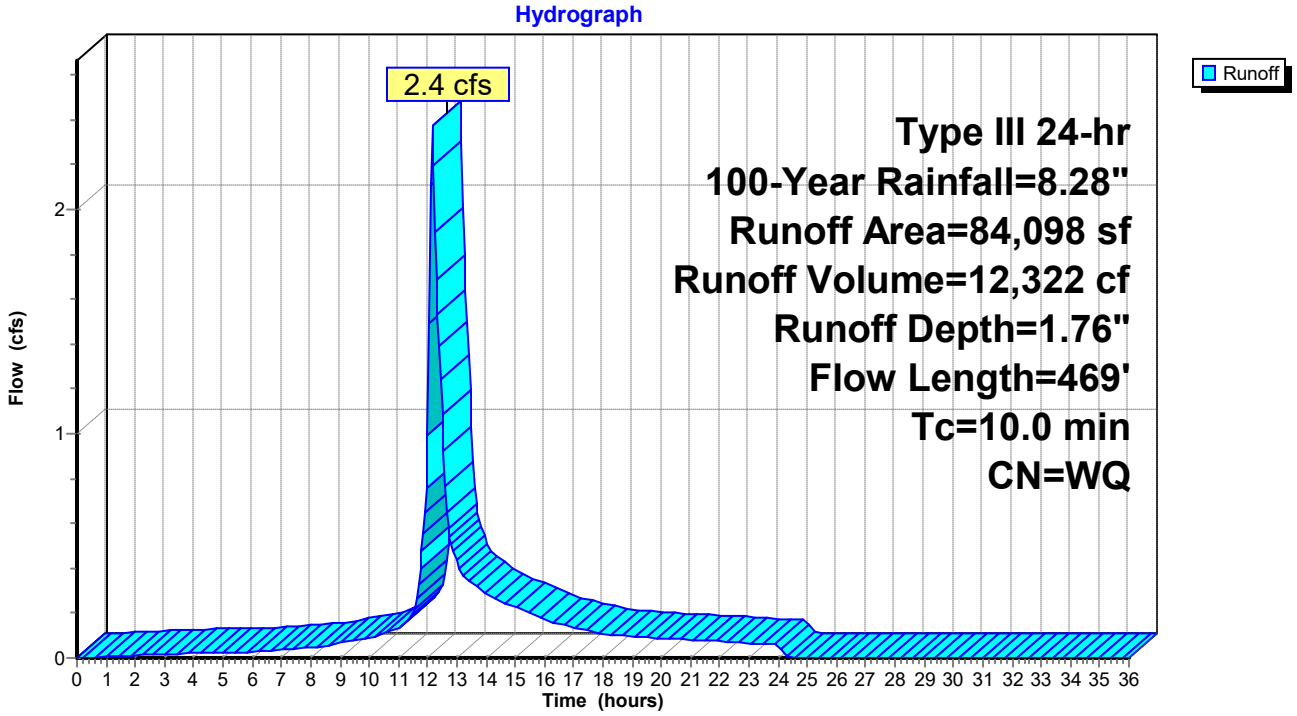
Runoff = 2.4 cfs @ 12.15 hrs, Volume= 12,322 cf, Depth= 1.76"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
39,863	39	>75% Grass cover, Good, HSG A
6,325	98	Paved parking, HSG A
3,674	98	Roofs, HSG A
34,236	30	Woods, Good, HSG A
84,098		Weighted Average
74,099	35	88.11% Pervious Area
9,999	98	11.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.8	71	0.0289	1.44		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
2.5	185	0.0059	1.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.3	184	0.2065	2.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	469	Total			

Subcatchment ES-1:



Summary for Subcatchment ES-2:

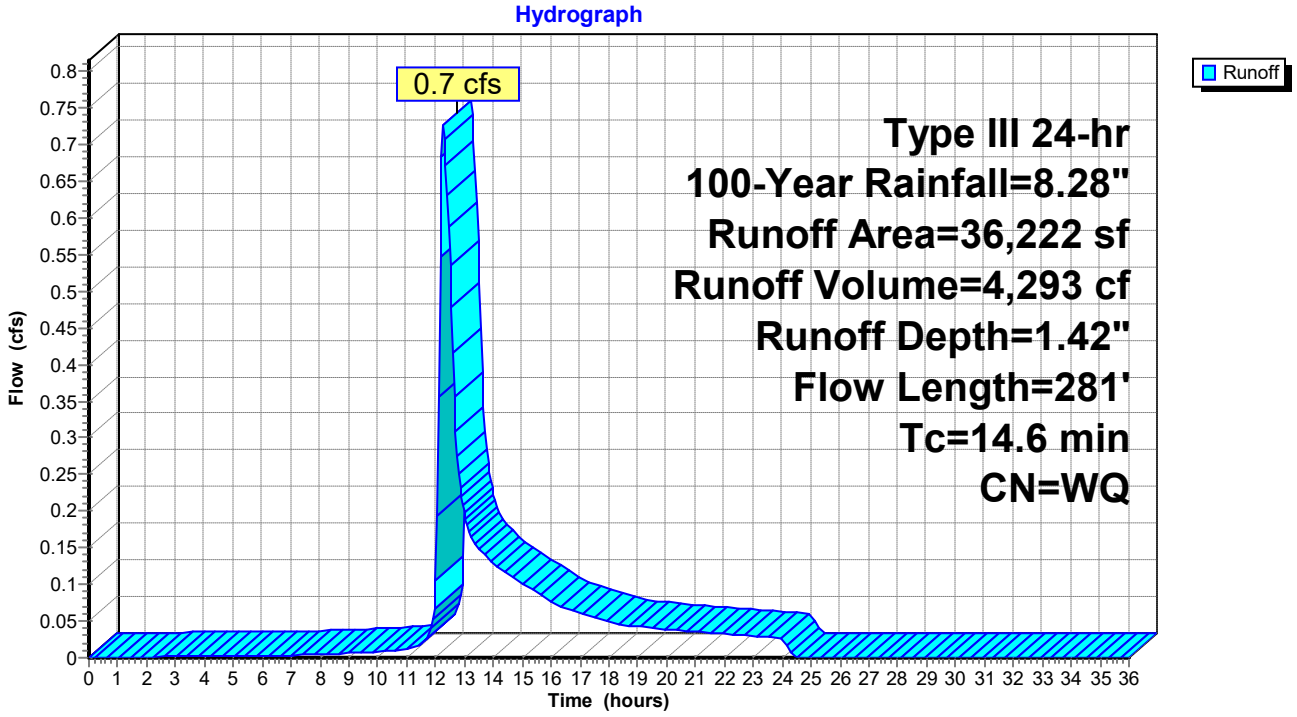
Runoff = 0.7 cfs @ 12.26 hrs, Volume= 4,293 cf, Depth= 1.42"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
33,745	39	>75% Grass cover, Good, HSG A
325	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,519	30	Woods, Good, HSG A
36,222		Weighted Average
35,263	39	97.35% Pervious Area
959	98	2.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0260	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	181	0.0215	2.36		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
14.6	281	Total			

Subcatchment ES-2:



Summary for Subcatchment ES-3A:

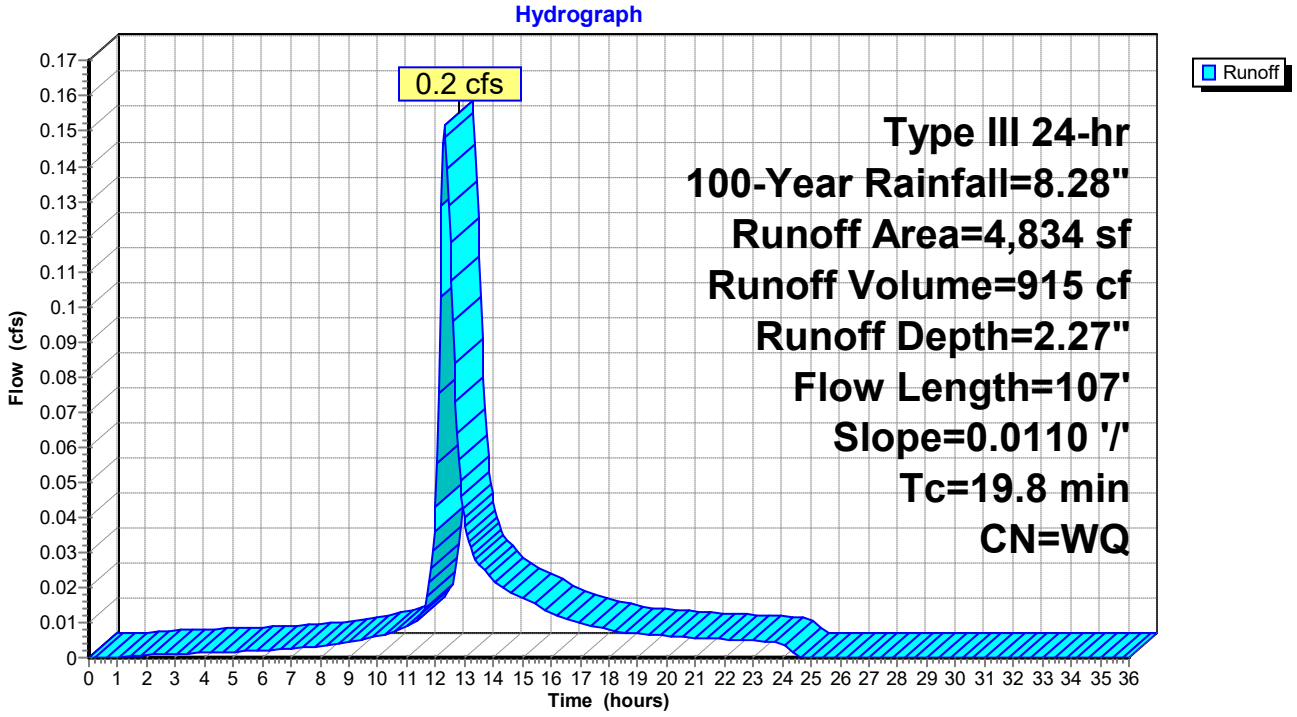
Runoff = 0.2 cfs @ 12.31 hrs, Volume= 915 cf, Depth= 2.27"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3A:



Summary for Subcatchment ES-3B:

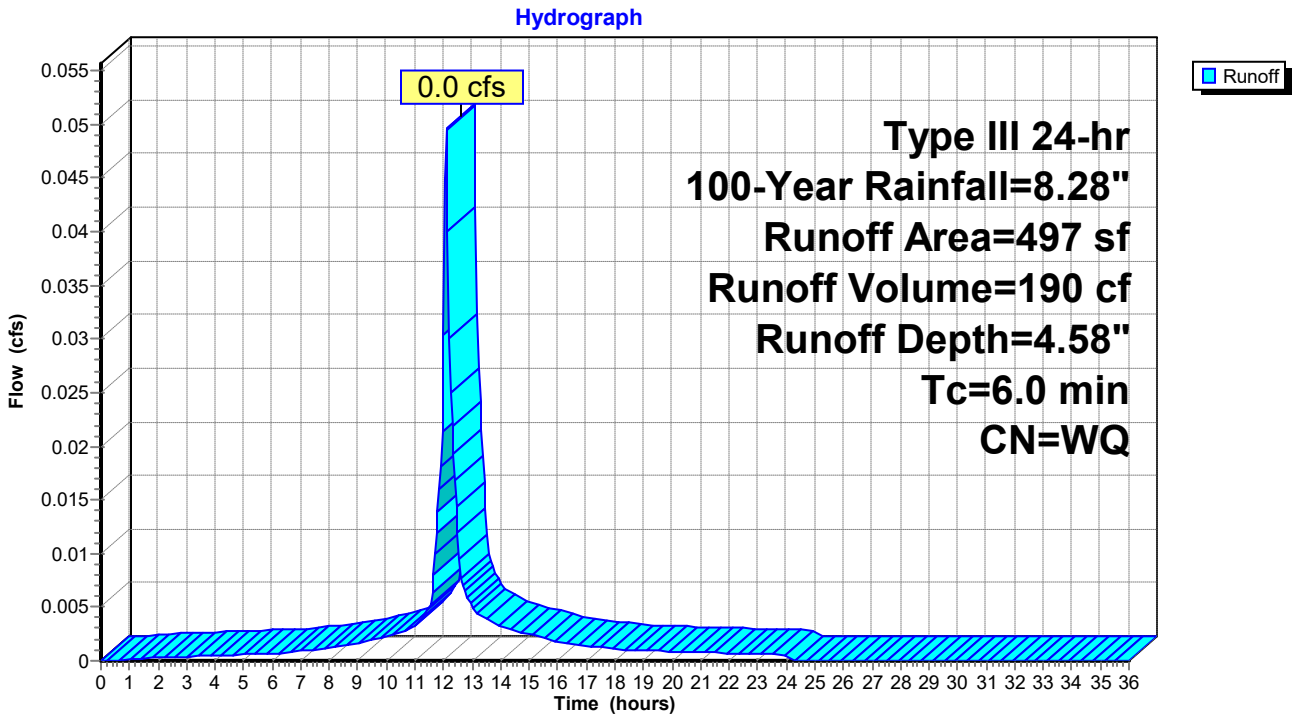
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 190 cf, Depth= 4.58"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ES-3B:



Summary for Subcatchment ES-3C:

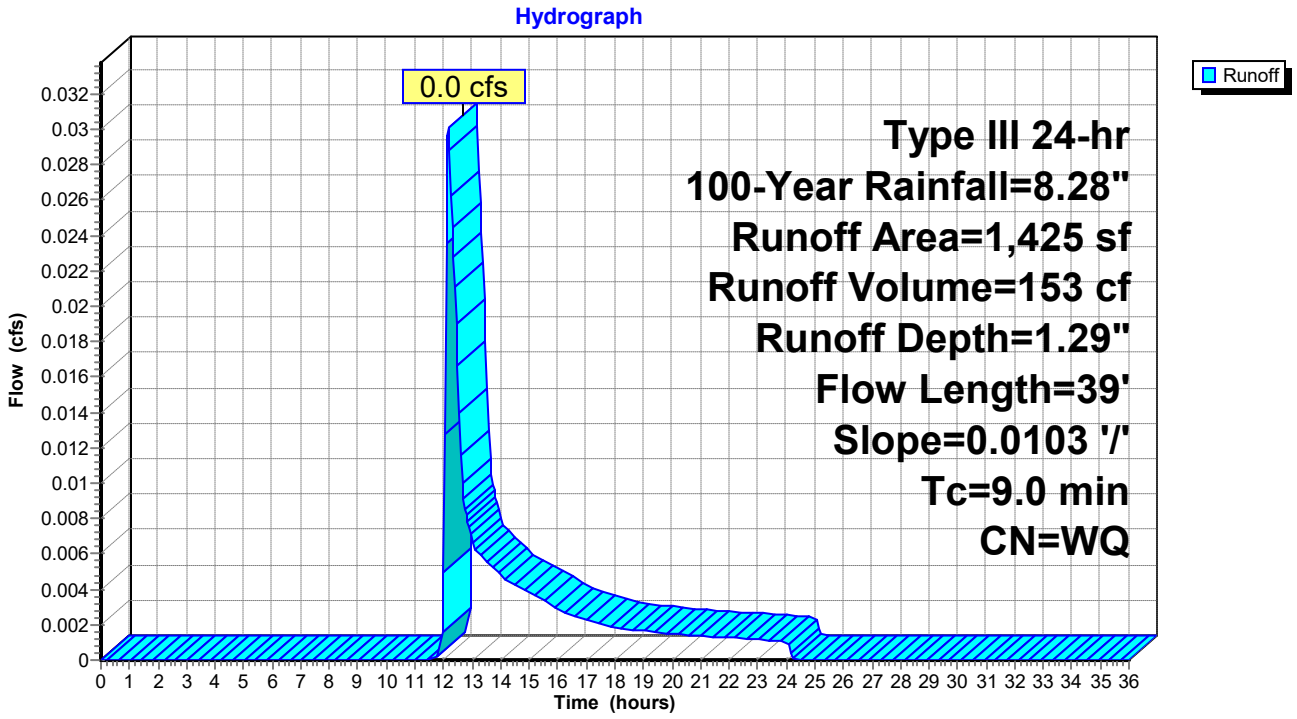
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 153 cf, Depth= 1.29"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment ES-3C:



Summary for Subcatchment ES-4: Subcat ES-4

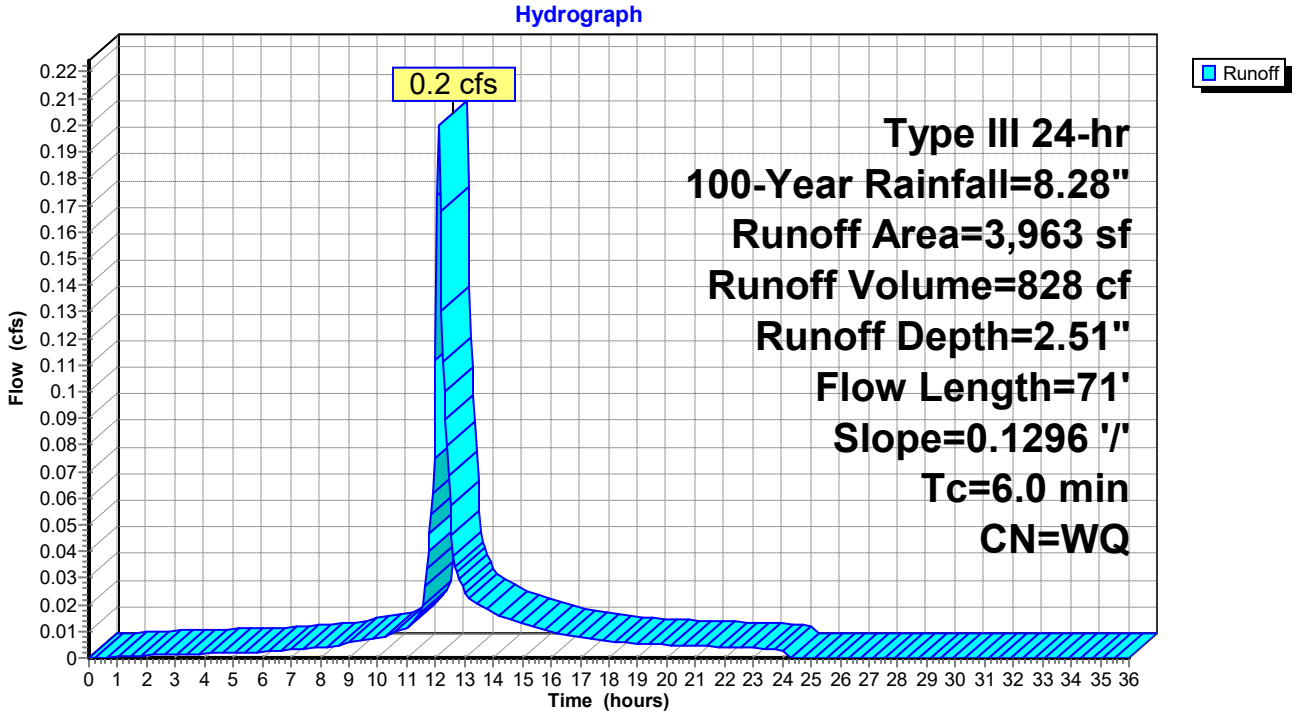
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 828 cf, Depth= 2.51"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
2,344	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
804	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment ES-4: Subcat ES-4

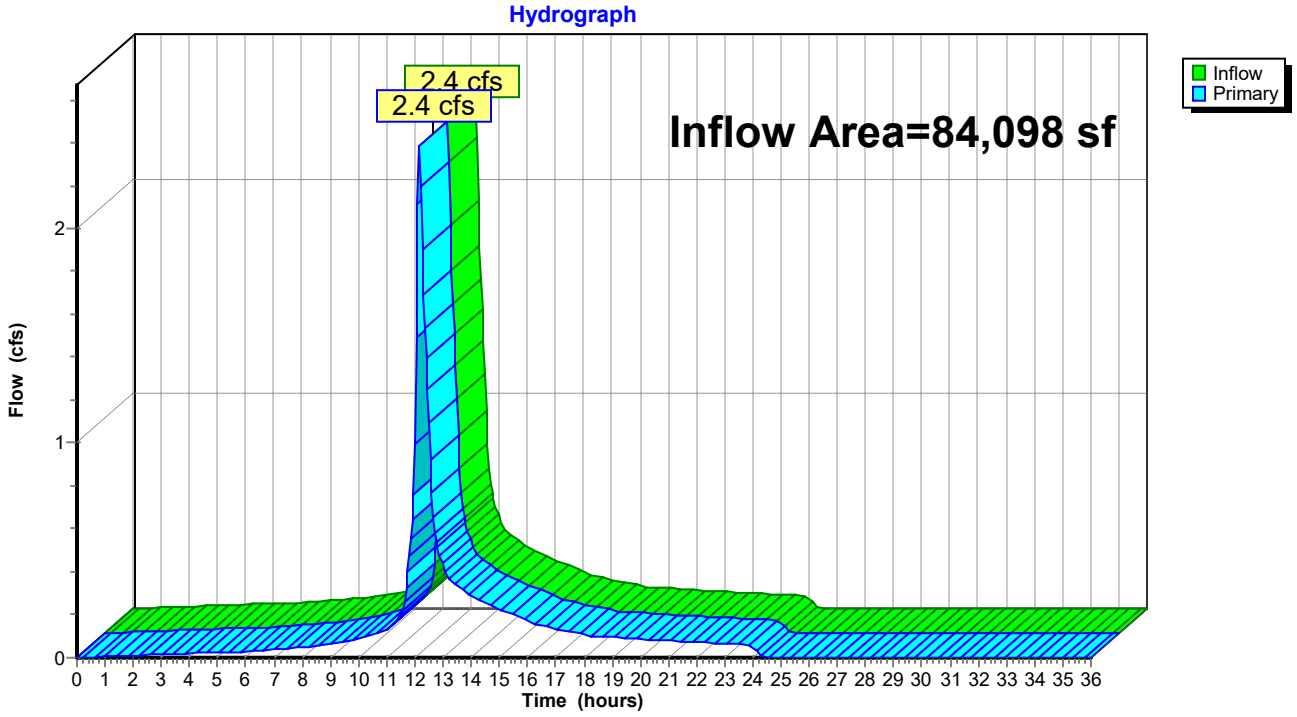


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 84,098 sf, 11.89% Impervious, Inflow Depth = 1.76" for 100-Year event
Inflow = 2.4 cfs @ 12.15 hrs, Volume= 12,322 cf
Primary = 2.4 cfs @ 12.15 hrs, Volume= 12,322 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

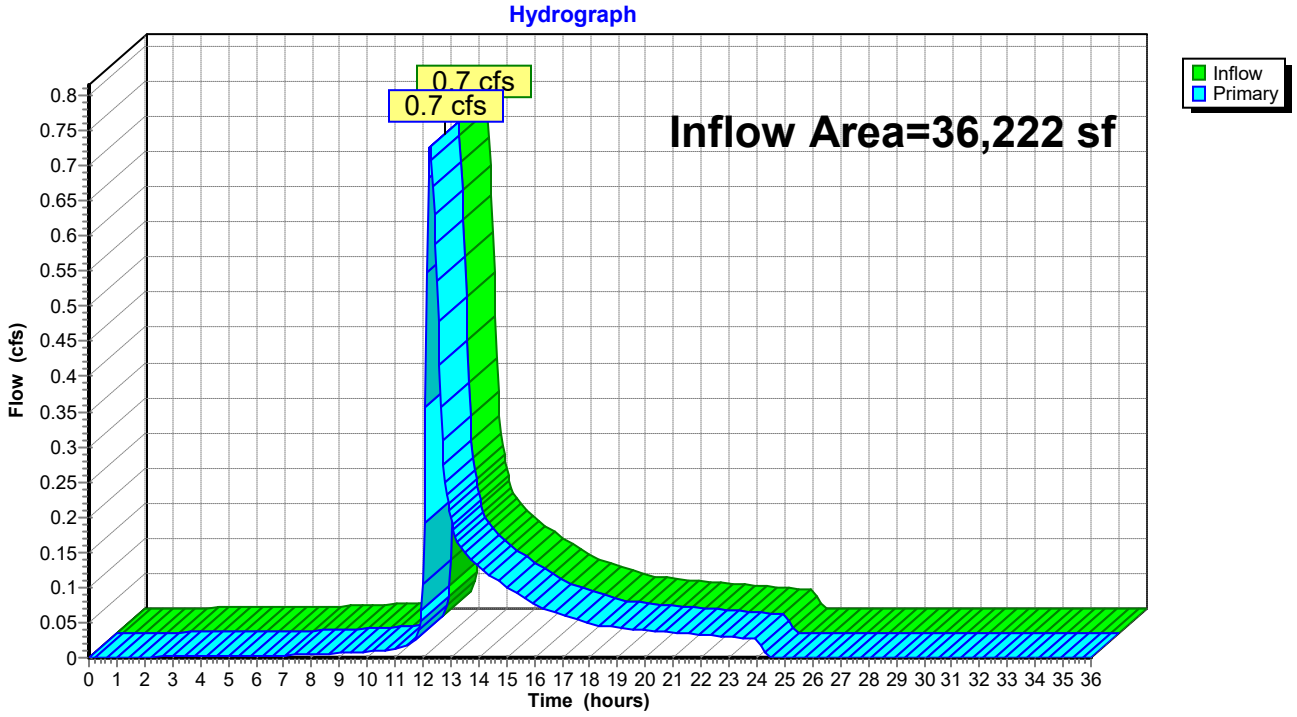


Summary for Link DP-2: Offsite to South

Inflow Area = 36,222 sf, 2.65% Impervious, Inflow Depth = 1.42" for 100-Year event
Inflow = 0.7 cfs @ 12.26 hrs, Volume= 4,293 cf
Primary = 0.7 cfs @ 12.26 hrs, Volume= 4,293 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

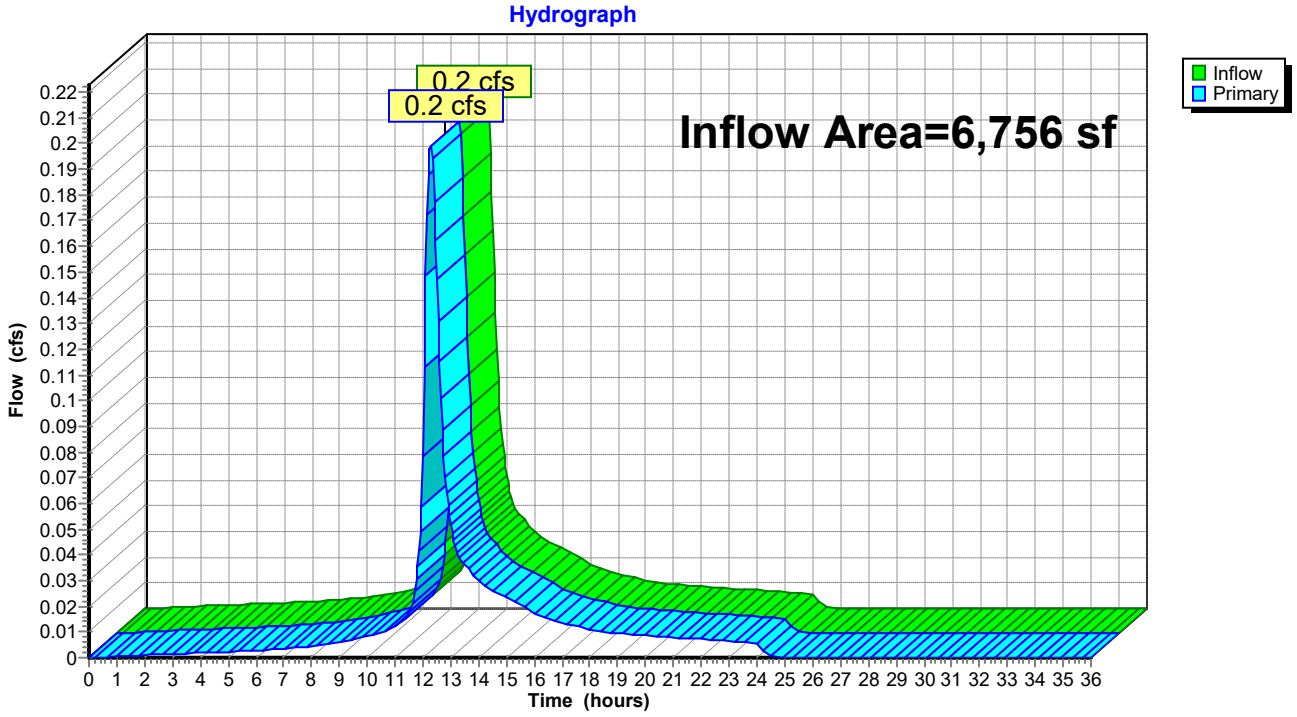


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 2.23" for 100-Year event
Inflow = 0.2 cfs @ 12.28 hrs, Volume= 1,258 cf
Primary = 0.2 cfs @ 12.28 hrs, Volume= 1,258 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

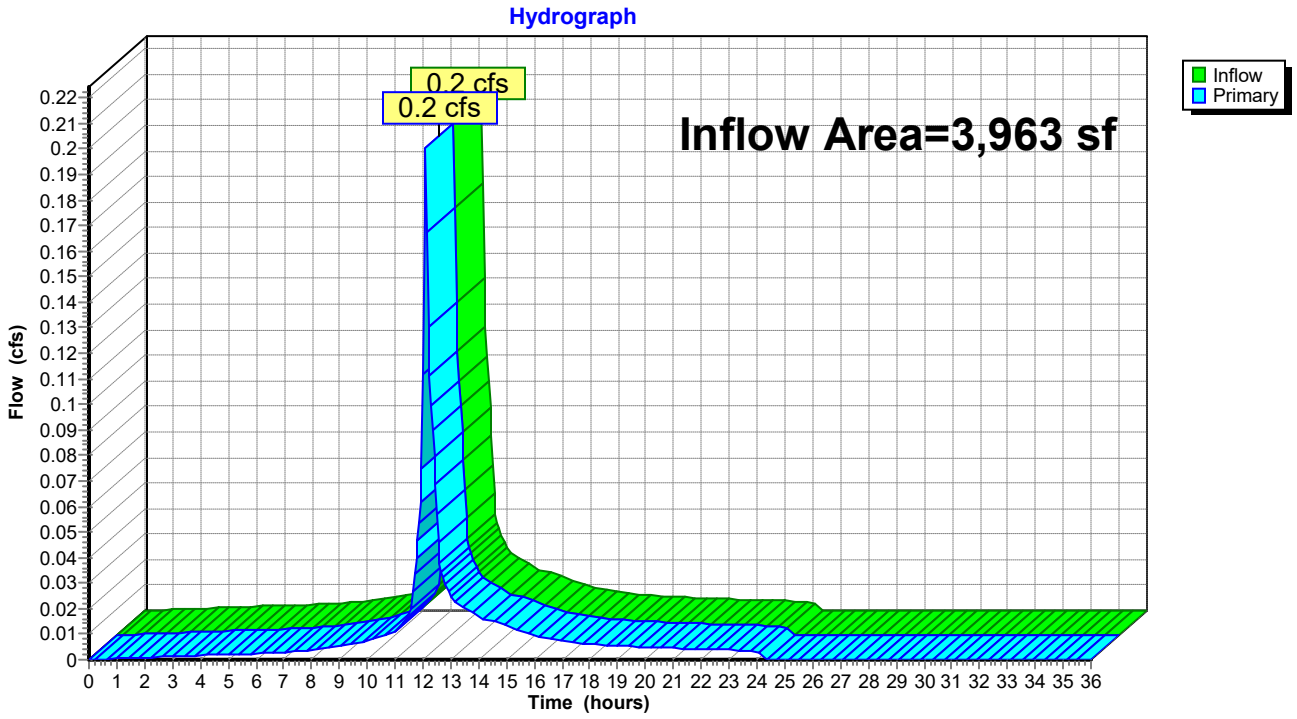


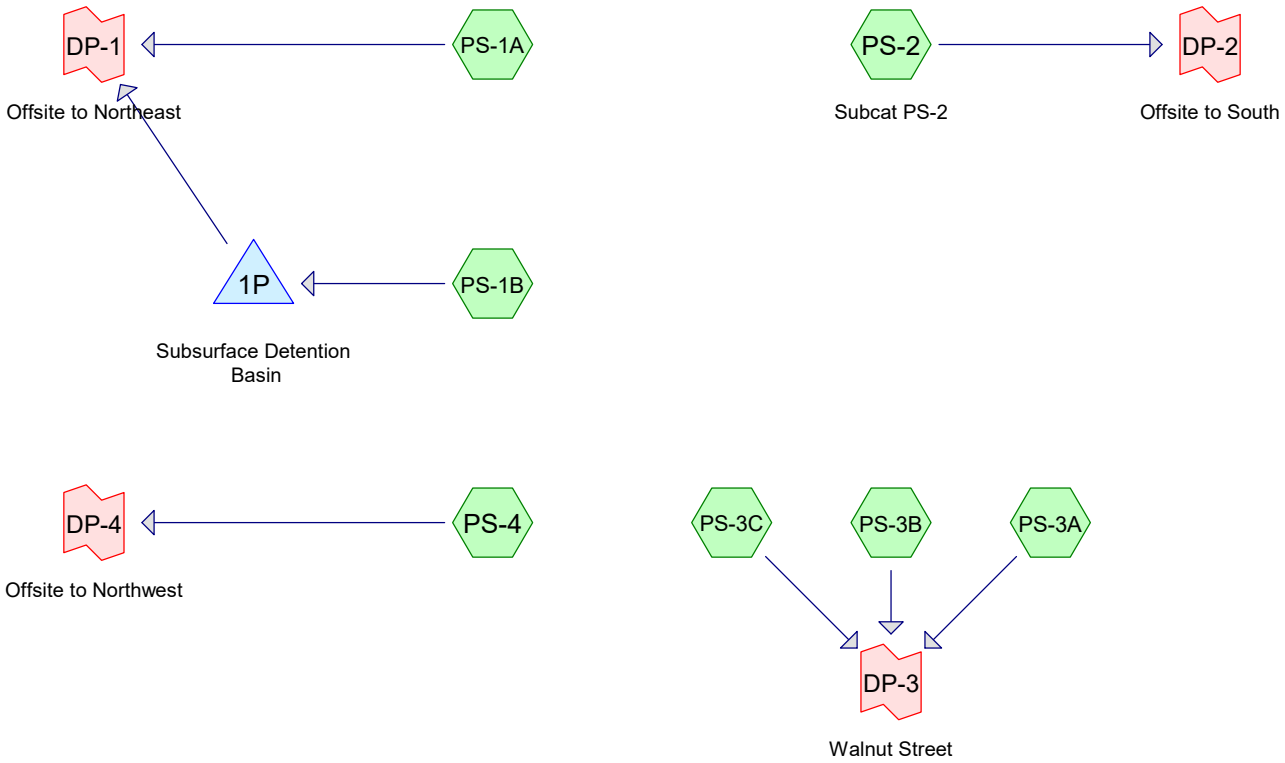
Summary for Link DP-4: Offsite to Northwest

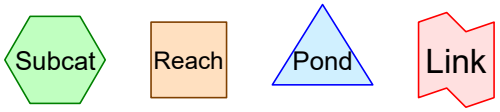
Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 2.51" for 100-Year event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 828 cf
Primary = 0.2 cfs @ 12.10 hrs, Volume= 828 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest







Routing Diagram for 220627 - POST
Prepared by R Levesque Associates
HydroCAD® 10.20-8a s/n 13073 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.19	2
2	10-Year	Type III 24-hr		Default	24.00	1	5.16	2
3	100-Year	Type III 24-hr		Default	24.00	1	8.28	2

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=31,504 sf 0.61% Impervious Runoff Depth=0.02"
Flow Length=174' Tc=10.8 min CN=WQ Runoff=0.0 cfs 48 cf

Subcatchment PS-1B: Runoff Area=74,573 sf 48.17% Impervious Runoff Depth=1.42"
Flow Length=217' Tc=6.7 min CN=WQ Runoff=2.5 cfs 8,855 cf

Subcatchment PS-2: Subcat PS-2 Runoff Area=14,243 sf 9.63% Impervious Runoff Depth=0.29"
Flow Length=92' Slope=0.0440 '/' Tc=10.1 min CN=WQ Runoff=0.1 cfs 338 cf

Subcatchment PS-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=0.44"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.0 cfs 176 cf

Subcatchment PS-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 60 cf

Subcatchment PS-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=0.01"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 1 cf

Subcatchment PS-4: Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=0.61"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.1 cfs 201 cf

Pond 1P: Subsurface Detention Basin Peak Elev=103.16' Storage=2,860 cf Inflow=2.5 cfs 8,855 cf
Outflow=0.5 cfs 8,855 cf

Link DP-1: Offsite to Northeast Inflow=0.5 cfs 8,902 cf
Primary=0.5 cfs 8,902 cf

Link DP-2: Offsite to South Inflow=0.1 cfs 338 cf
Primary=0.1 cfs 338 cf

Link DP-3: Walnut Street Inflow=0.0 cfs 236 cf
Primary=0.0 cfs 236 cf

Link DP-4: Offsite to Northwest Inflow=0.1 cfs 201 cf
Primary=0.1 cfs 201 cf

Total Runoff Area = 131,039 sf Runoff Volume = 9,677 cf Average Runoff Depth = 0.89"
70.04% Pervious = 91,779 sf 29.96% Impervious = 39,260 sf

Summary for Subcatchment PS-1A:

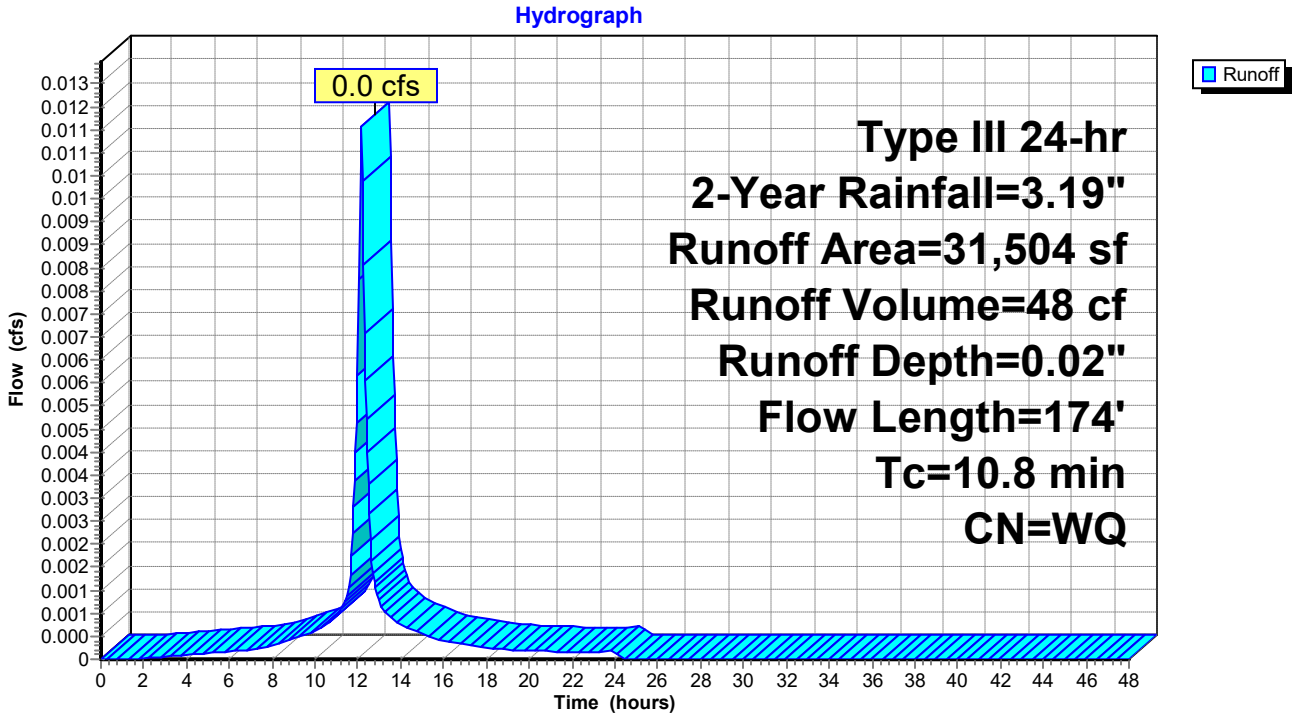
Runoff = 0.0 cfs @ 12.15 hrs, Volume= 48 cf, Depth= 0.02"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
10,927	39	>75% Grass cover, Good, HSG A
192	98	Paved parking, HSG A
20,385	30	Woods, Good, HSG A
31,504		Weighted Average
31,312	33	99.39% Pervious Area
192	98	0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1500	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	36	0.0278	0.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	38	0.6053	3.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.8	174	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

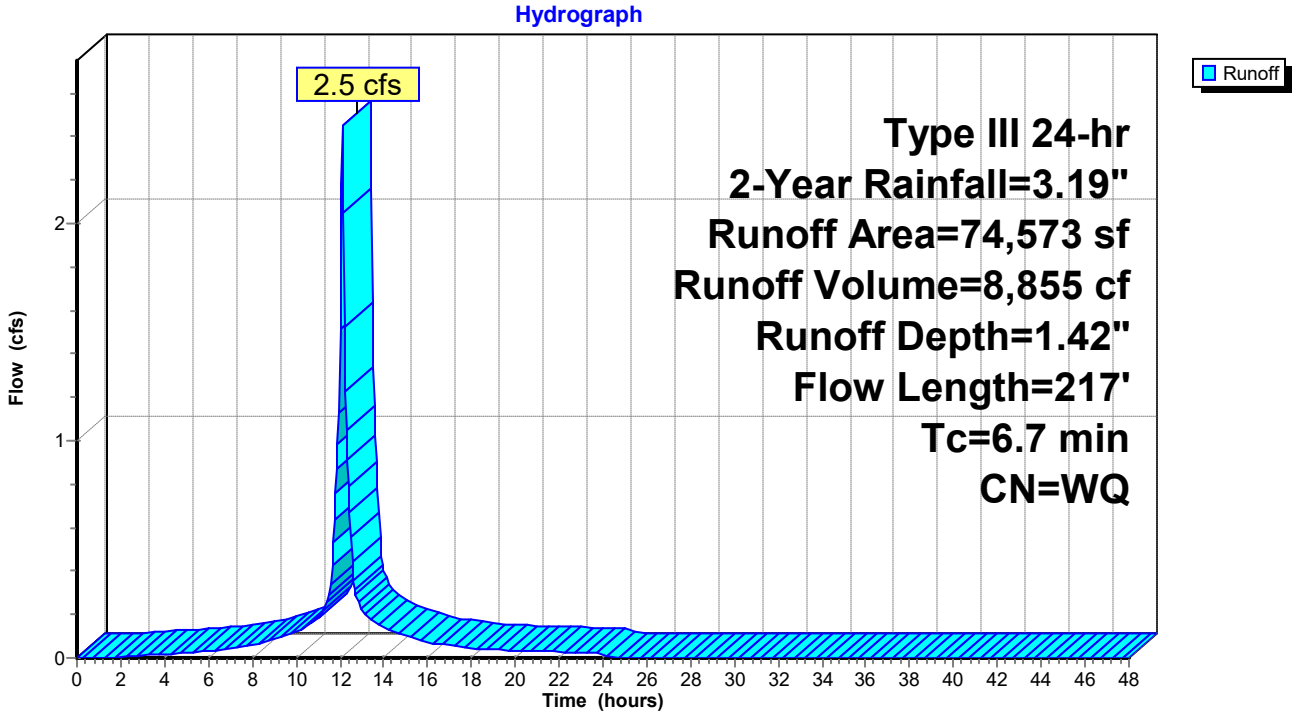
Runoff = 2.5 cfs @ 12.10 hrs, Volume= 8,855 cf, Depth= 1.42"
Routed to Pond 1P : Subsurface Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
37,767	39	>75% Grass cover, Good, HSG A
28,686	98	Paved parking, HSG A
7,238	98	Roofs, HSG A
882	30	Woods, Good, HSG A
74,573		Weighted Average
38,649	39	51.83% Pervious Area
35,924	98	48.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.4	25	0.0260	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
0.8	132	0.0181	2.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	31	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	217	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2: Subcat PS-2

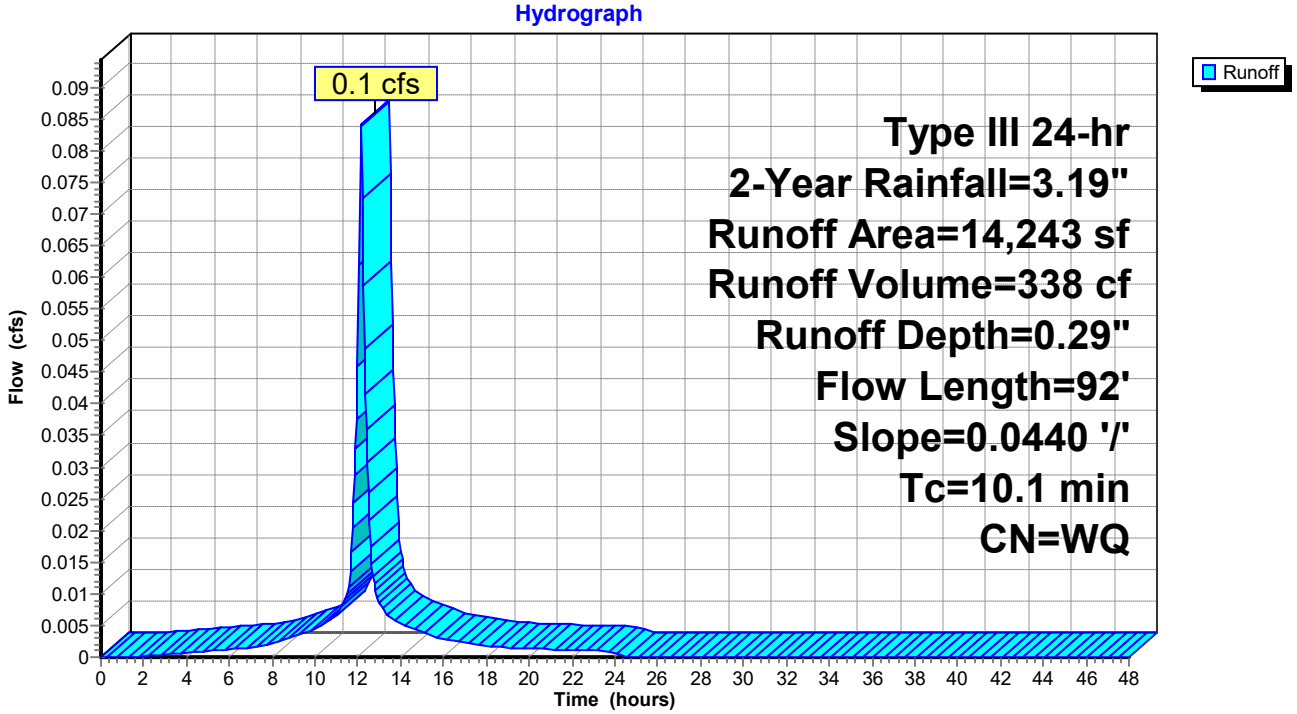
Runoff = 0.1 cfs @ 12.14 hrs, Volume= 338 cf, Depth= 0.29"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
11,589	39	>75% Grass cover, Good, HSG A
738	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,282	30	Woods, Good, HSG A
14,243		Weighted Average
12,871	38	90.37% Pervious Area
1,372	98	9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	92	0.0440	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-2: Subcat PS-2



Summary for Subcatchment PS-3A:

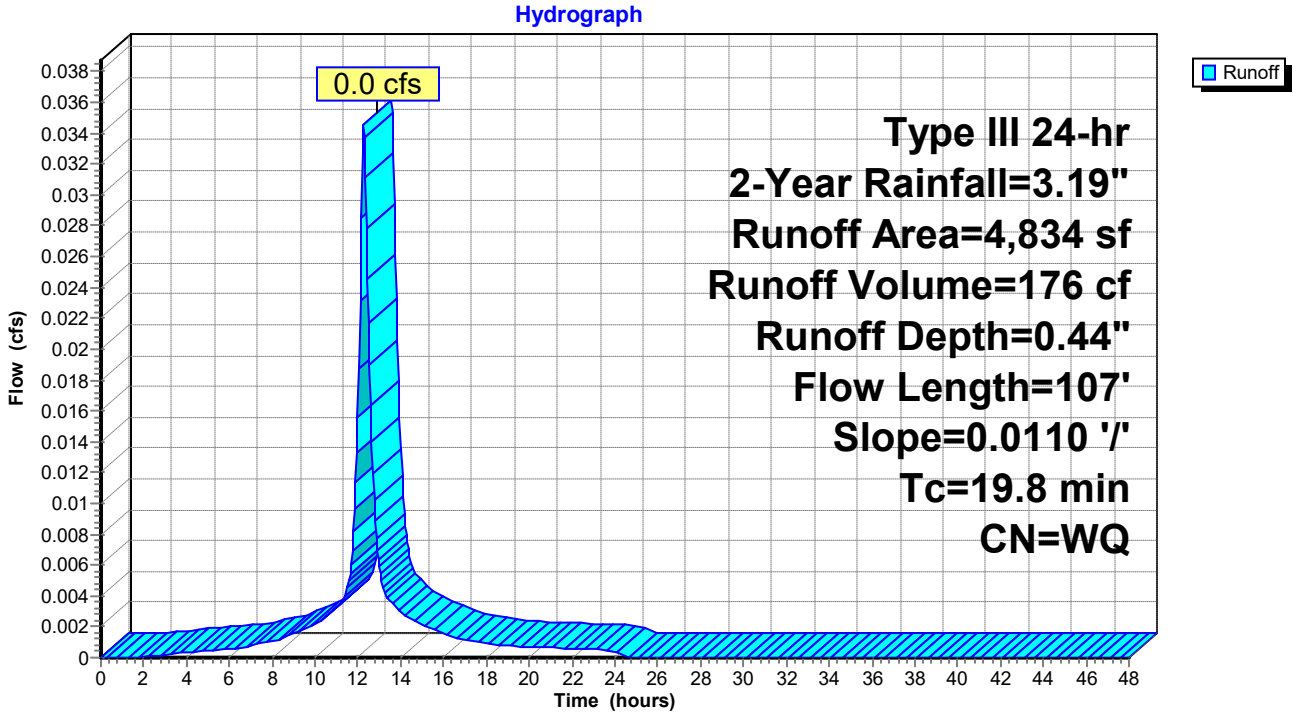
Runoff = 0.0 cfs @ 12.26 hrs, Volume= 176 cf, Depth= 0.44"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3A:



Summary for Subcatchment PS-3B:

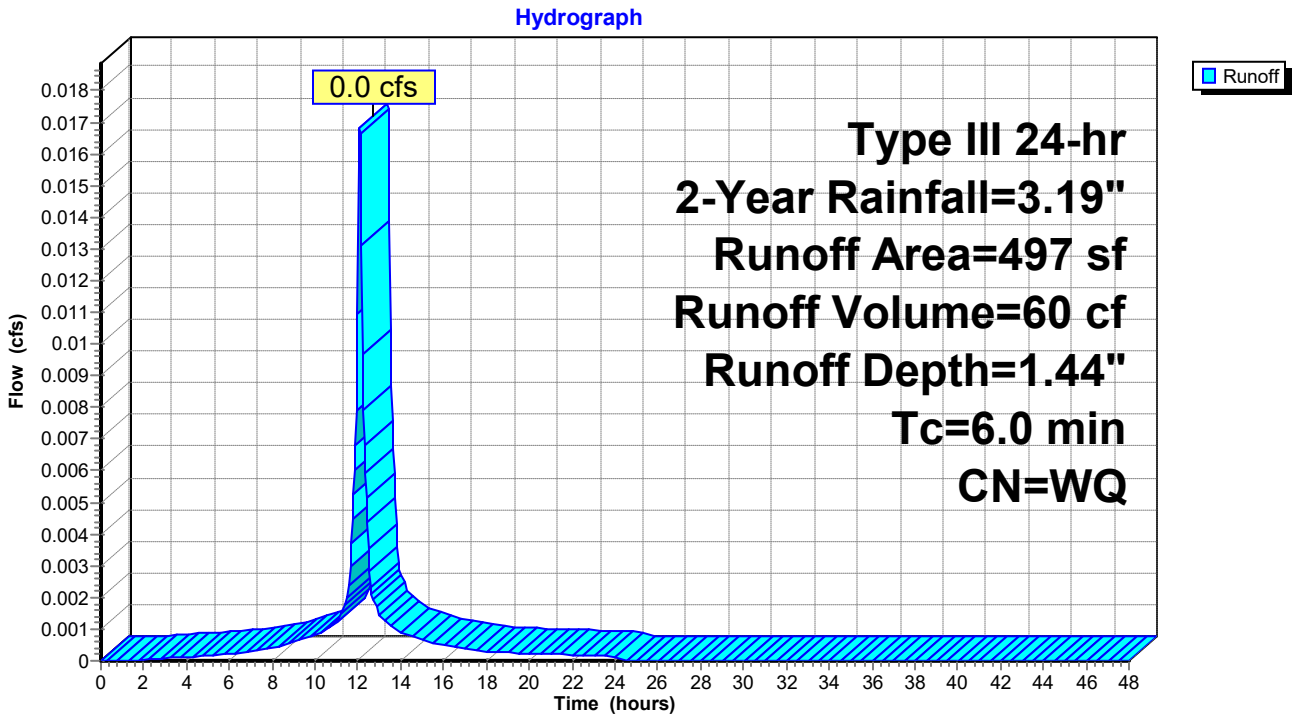
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 60 cf, Depth= 1.44"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PS-3B:



Summary for Subcatchment PS-3C:

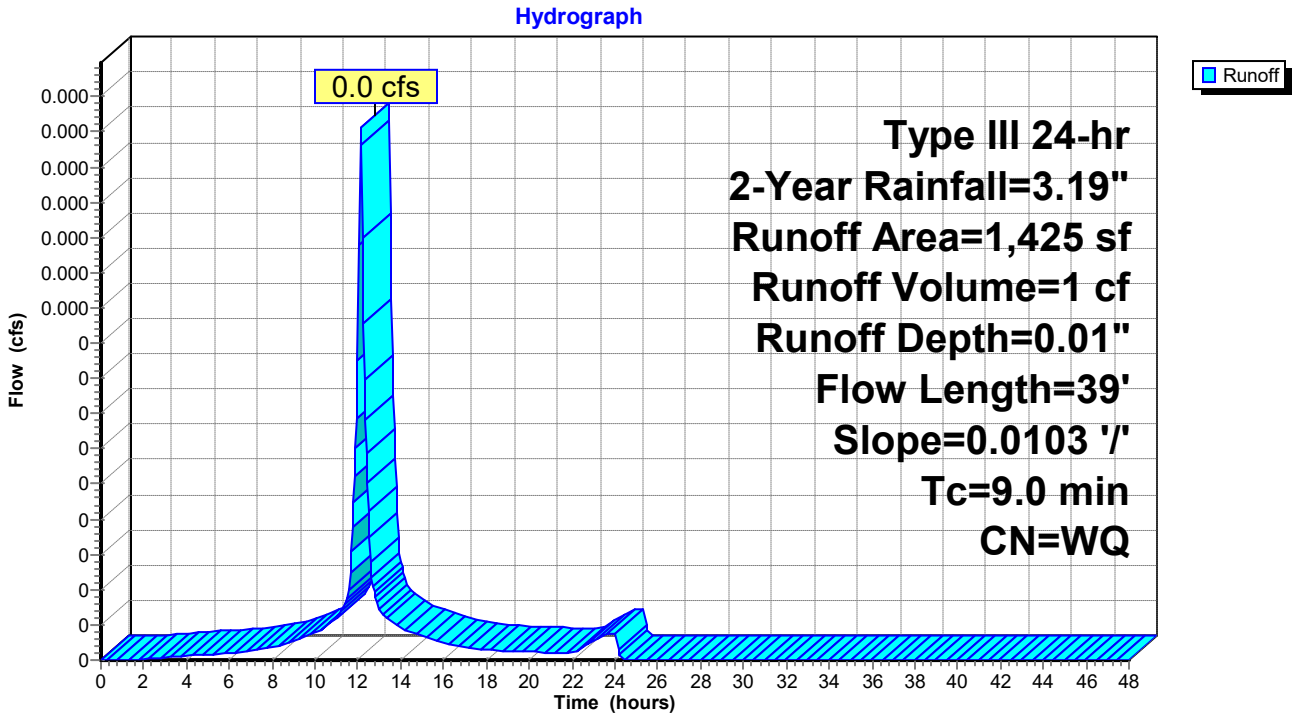
Runoff = 0.0 cfs @ 12.12 hrs, Volume= 1 cf, Depth= 0.01"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3C:



Summary for Subcatchment PS-4:

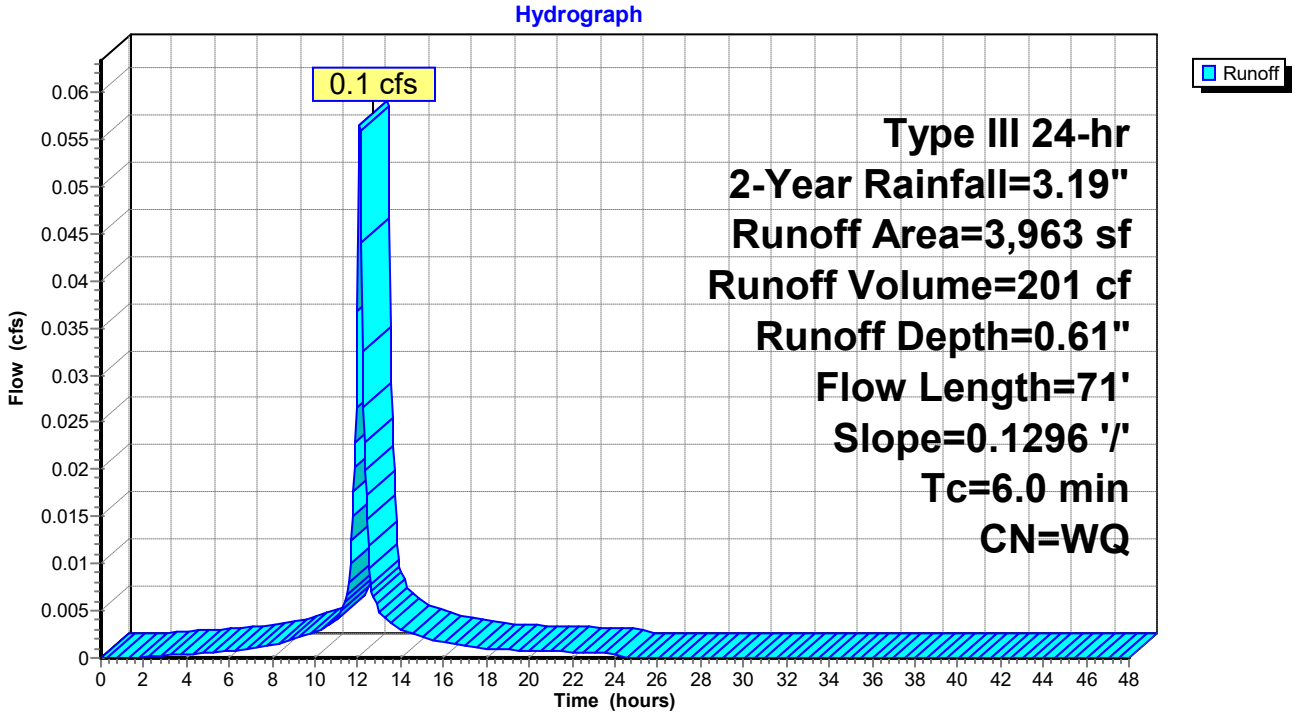
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 201 cf, Depth= 0.61"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.19"

Area (sf)	CN	Description
2,563	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
585	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment PS-4:



Summary for Pond 1P: Subsurface Detention Basin

Inflow Area = 74,573 sf, 48.17% Impervious, Inflow Depth = 1.42" for 2-Year event
Inflow = 2.5 cfs @ 12.10 hrs, Volume= 8,855 cf
Outflow = 0.5 cfs @ 12.51 hrs, Volume= 8,855 cf, Atten= 78%, Lag= 24.9 min
Primary = 0.5 cfs @ 12.51 hrs, Volume= 8,855 cf
Routed to Link DP-1 : Offsite to Northeast

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 103.16' @ 12.51 hrs Surf.Area= 3,781 sf Storage= 2,860 cf

Plug-Flow detention time= 64.9 min calculated for 8,845 cf (100% of inflow)
Center-of-Mass det. time= 65.3 min (822.4 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	3,453 cf	**55.75'W x 67.82'L x 3.75'H Field A** 14,178 cf Overall - 5,546 cf Embedded = 8,632 cf x 40.0% Voids
#2A	102.50'	5,546 cf	**ADS_StormTech SC-800 +Cap** x 108 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 108 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		8,999 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" Round Culvert** L= 98.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 102.00' / 93.00' S= 0.0918 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	102.00'	**4.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	103.25'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	104.00'	**7.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	105.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.5 cfs @ 12.51 hrs HW=103.16' (Free Discharge)
└**1=Culvert** (Passes 0.5 cfs of 3.8 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.5 cfs @ 4.78 fps)
├**3=Orifice/Grate** (Controls 0.0 cfs)
├**4=Orifice/Grate** (Controls 0.0 cfs)
└**5=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Subsurface Detention Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-800 +Cap (ADS StormTech® SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

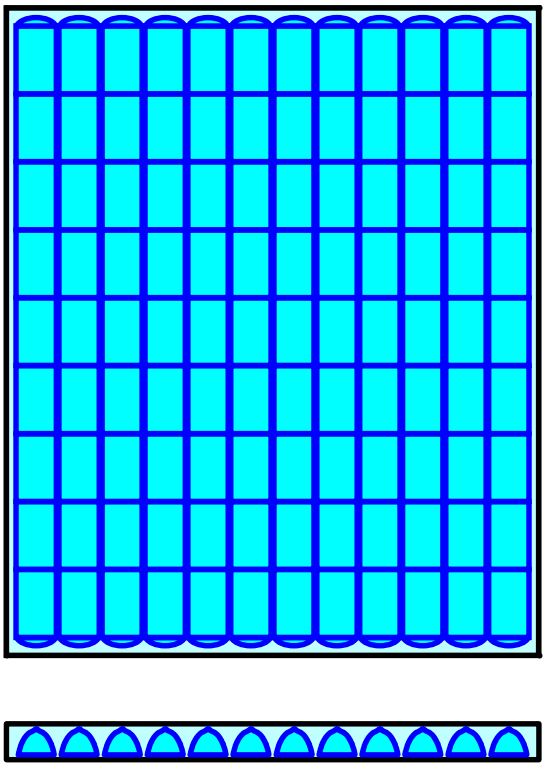
9 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 65.82' Row Length +12.0" End Stone x 2 = 67.82' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

108 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 5,546.0 cf Chamber Storage

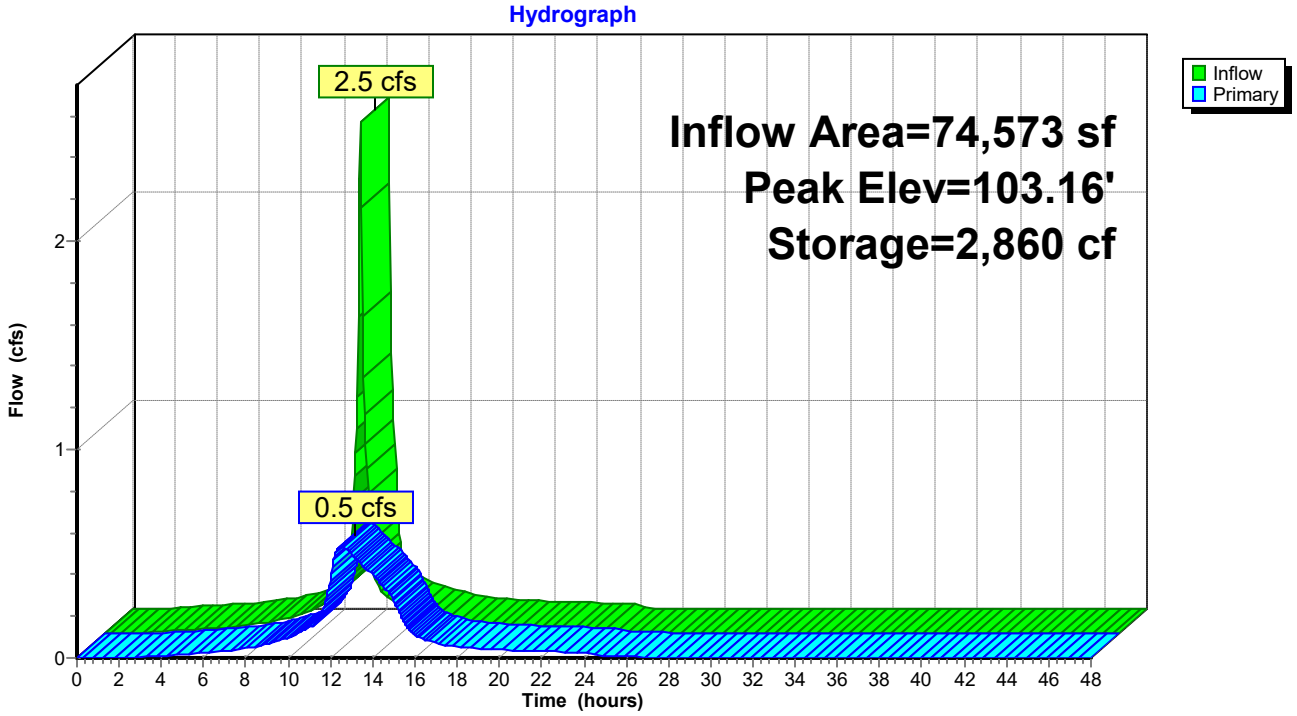
14,177.9 cf Field - 5,546.0 cf Chambers = 8,631.9 cf Stone x 40.0% Voids = 3,452.8 cf Stone Storage

Chamber Storage + Stone Storage = 8,998.8 cf = 0.207 af
Overall Storage Efficiency = 63.5%
Overall System Size = 67.82' x 55.75' x 3.75'

108 Chambers
525.1 cy Field
319.7 cy Stone



Pond 1P: Subsurface Detention Basin

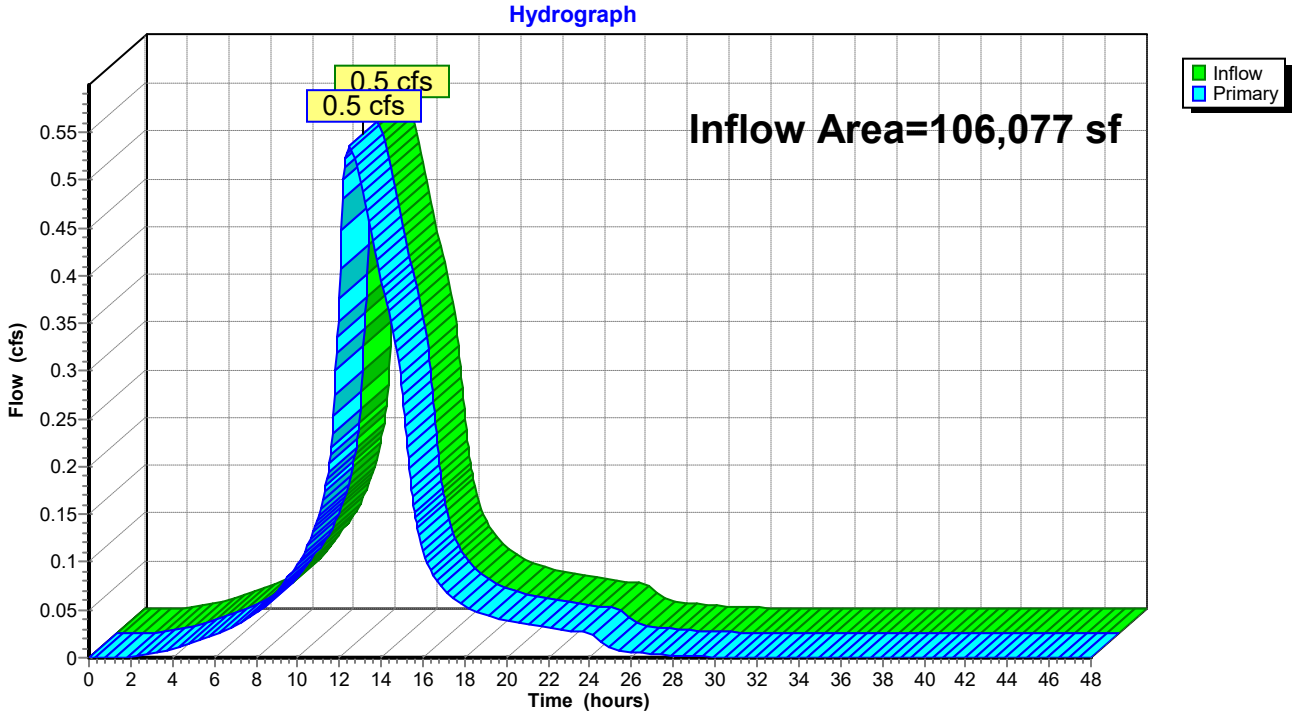


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 106,077 sf, 34.05% Impervious, Inflow Depth = 1.01" for 2-Year event
Inflow = 0.5 cfs @ 12.49 hrs, Volume= 8,902 cf
Primary = 0.5 cfs @ 12.49 hrs, Volume= 8,902 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

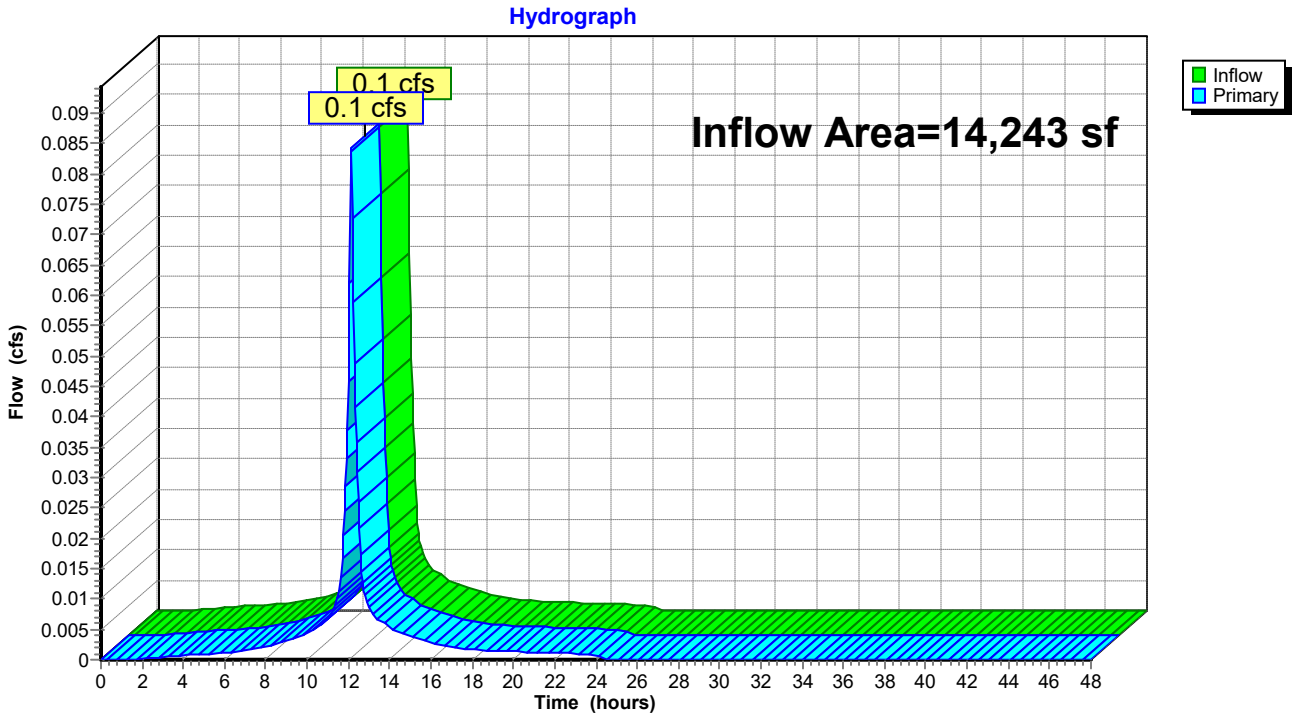


Summary for Link DP-2: Offsite to South

Inflow Area = 14,243 sf, 9.63% Impervious, Inflow Depth = 0.29" for 2-Year event
Inflow = 0.1 cfs @ 12.14 hrs, Volume= 338 cf
Primary = 0.1 cfs @ 12.14 hrs, Volume= 338 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

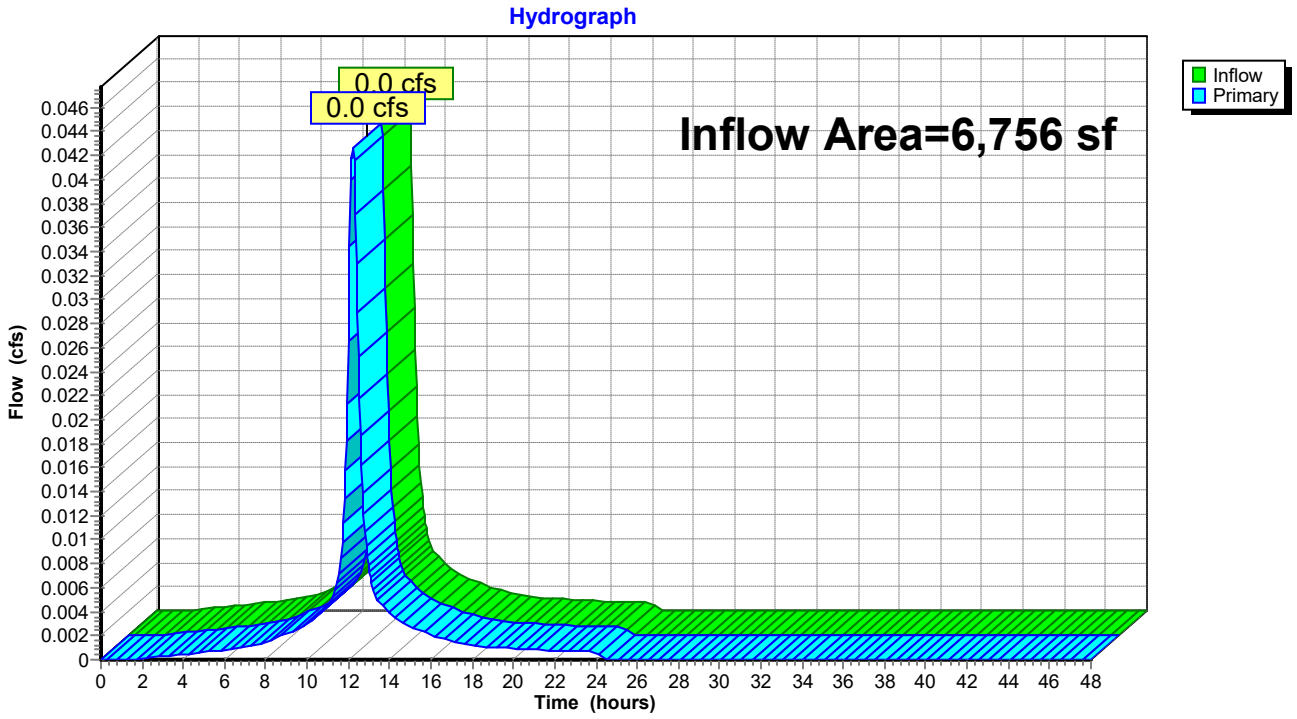


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 0.42" for 2-Year event
Inflow = 0.0 cfs @ 12.22 hrs, Volume= 236 cf
Primary = 0.0 cfs @ 12.22 hrs, Volume= 236 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

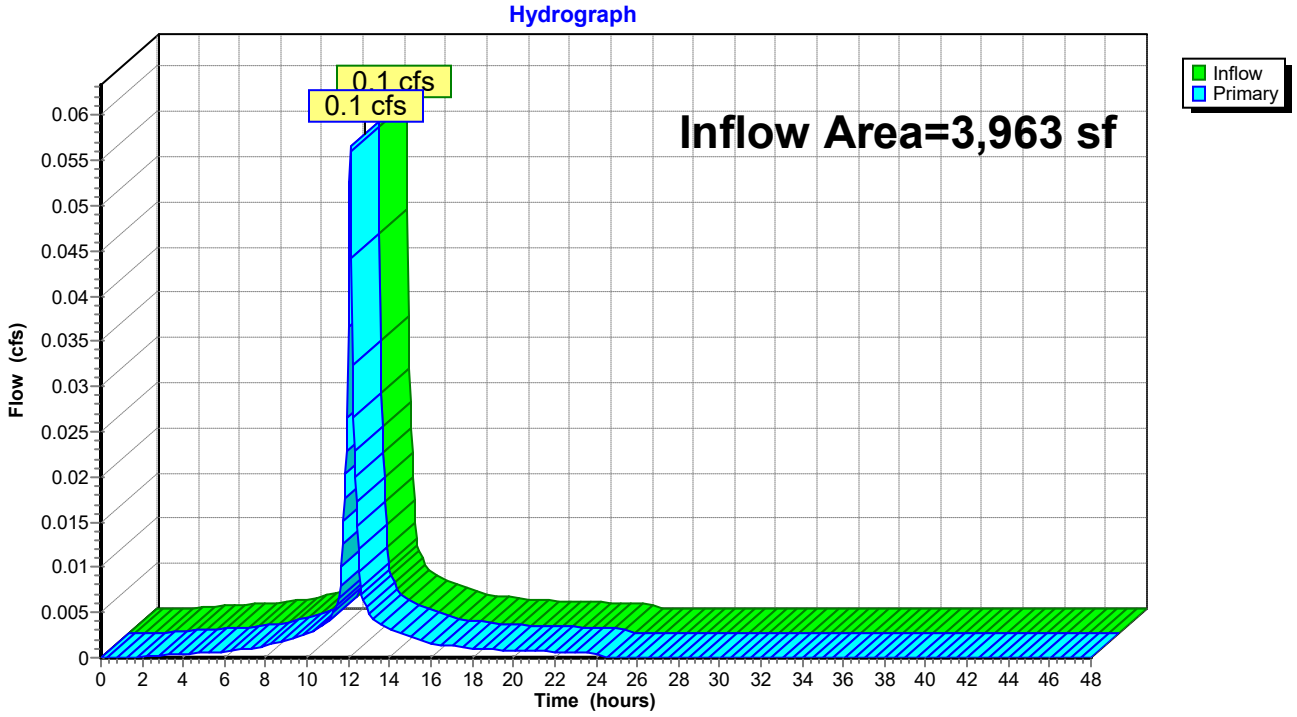


Summary for Link DP-4: Offsite to Northwest

Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 0.61" for 2-Year event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 201 cf
Primary = 0.1 cfs @ 12.09 hrs, Volume= 201 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=31,504 sf 0.61% Impervious Runoff Depth=0.12"
Flow Length=174' Tc=10.8 min CN=WQ Runoff=0.0 cfs 309 cf

Subcatchment PS-1B: Runoff Area=74,573 sf 48.17% Impervious Runoff Depth=2.49"
Flow Length=217' Tc=6.7 min CN=WQ Runoff=4.0 cfs 15,474 cf

Subcatchment PS-2: Subcat PS-2 Runoff Area=14,243 sf 9.63% Impervious Runoff Depth=0.67"
Flow Length=92' Slope=0.0440 '/' Tc=10.1 min CN=WQ Runoff=0.1 cfs 790 cf

Subcatchment PS-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=0.92"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.1 cfs 372 cf

Subcatchment PS-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=2.52"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 104 cf

Subcatchment PS-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=0.24"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 29 cf

Subcatchment PS-4: Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=1.17"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.1 cfs 385 cf

Pond 1P: Subsurface Detention Basin Peak Elev=103.83' Storage=4,895 cf Inflow=4.0 cfs 15,474 cf
Outflow=0.9 cfs 15,474 cf

Link DP-1: Offsite to Northeast Inflow=0.9 cfs 15,782 cf
Primary=0.9 cfs 15,782 cf

Link DP-2: Offsite to South Inflow=0.1 cfs 790 cf
Primary=0.1 cfs 790 cf

Link DP-3: Walnut Street Inflow=0.1 cfs 505 cf
Primary=0.1 cfs 505 cf

Link DP-4: Offsite to Northwest Inflow=0.1 cfs 385 cf
Primary=0.1 cfs 385 cf

Total Runoff Area = 131,039 sf Runoff Volume = 17,462 cf Average Runoff Depth = 1.60"
70.04% Pervious = 91,779 sf 29.96% Impervious = 39,260 sf

Summary for Subcatchment PS-1A:

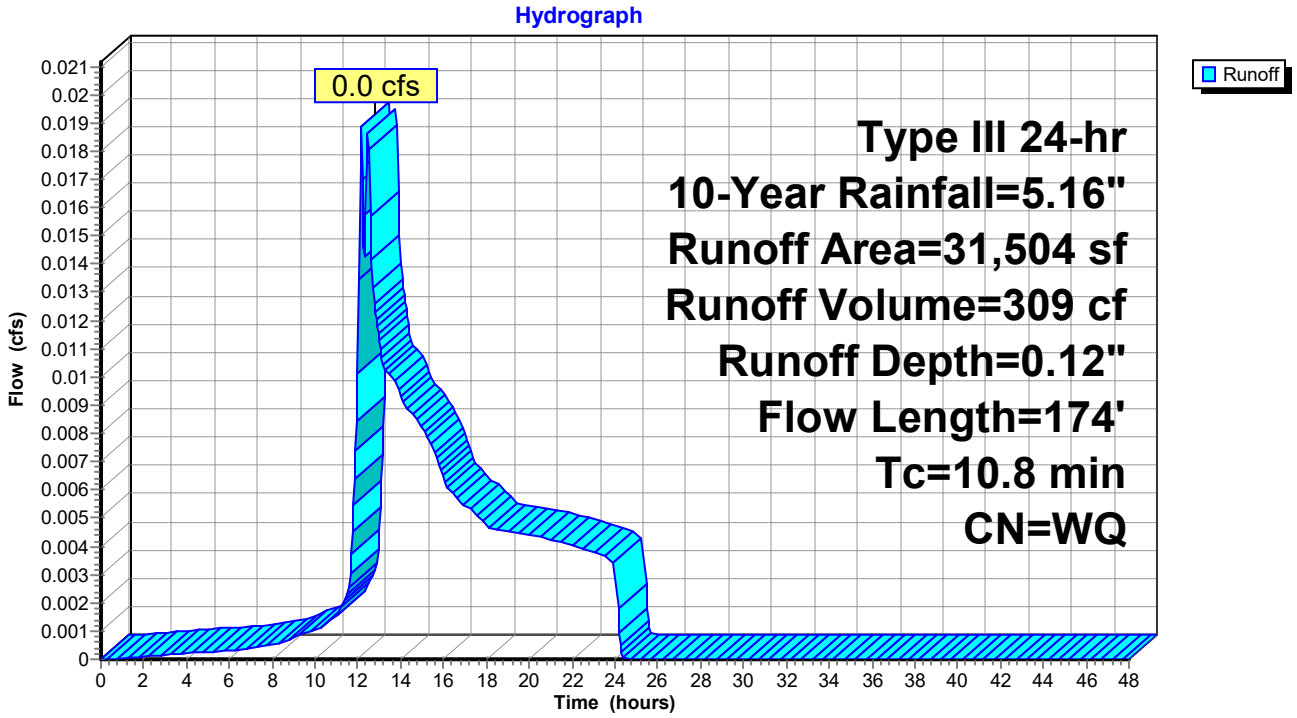
Runoff = 0.0 cfs @ 12.15 hrs, Volume= 309 cf, Depth= 0.12"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
10,927	39	>75% Grass cover, Good, HSG A
192	98	Paved parking, HSG A
20,385	30	Woods, Good, HSG A
31,504		Weighted Average
31,312	33	99.39% Pervious Area
192	98	0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1500	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	36	0.0278	0.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	38	0.6053	3.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.8	174	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

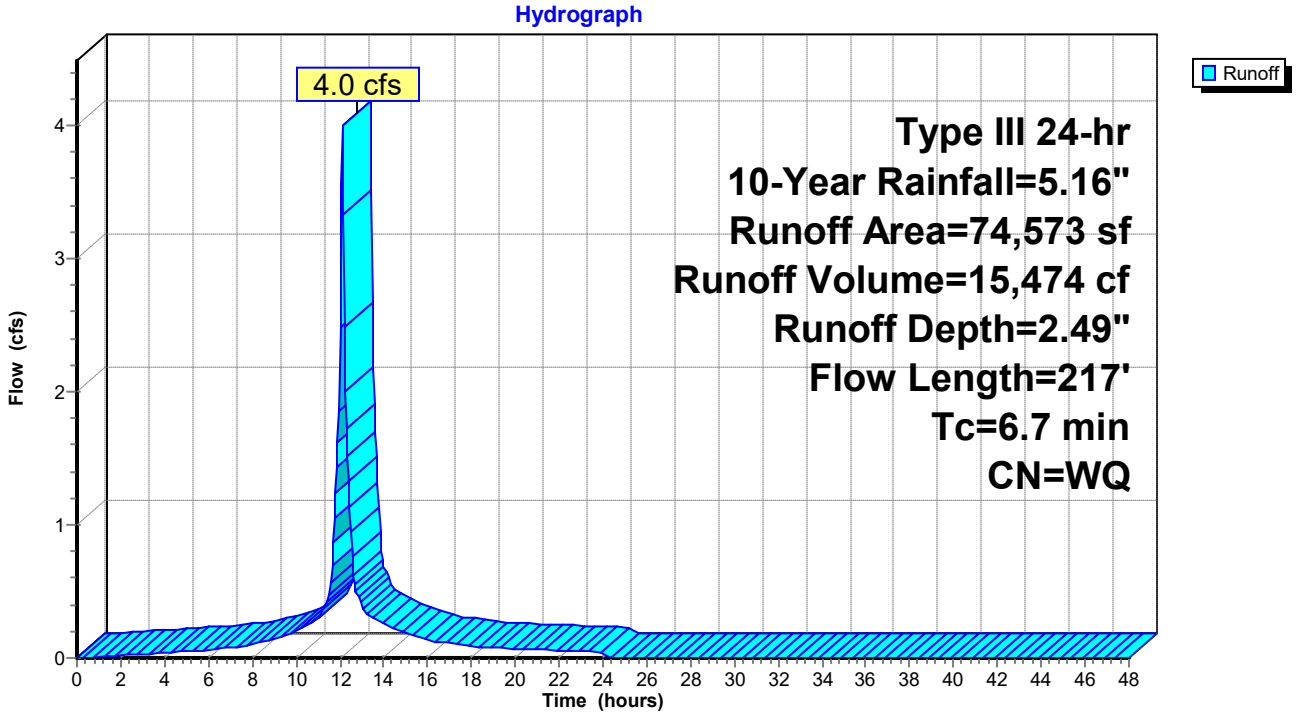
Runoff = 4.0 cfs @ 12.10 hrs, Volume= 15,474 cf, Depth= 2.49"
Routed to Pond 1P : Subsurface Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
37,767	39	>75% Grass cover, Good, HSG A
28,686	98	Paved parking, HSG A
7,238	98	Roofs, HSG A
882	30	Woods, Good, HSG A
74,573		Weighted Average
38,649	39	51.83% Pervious Area
35,924	98	48.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.4	25	0.0260	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
0.8	132	0.0181	2.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	31	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	217	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2: Subcat PS-2

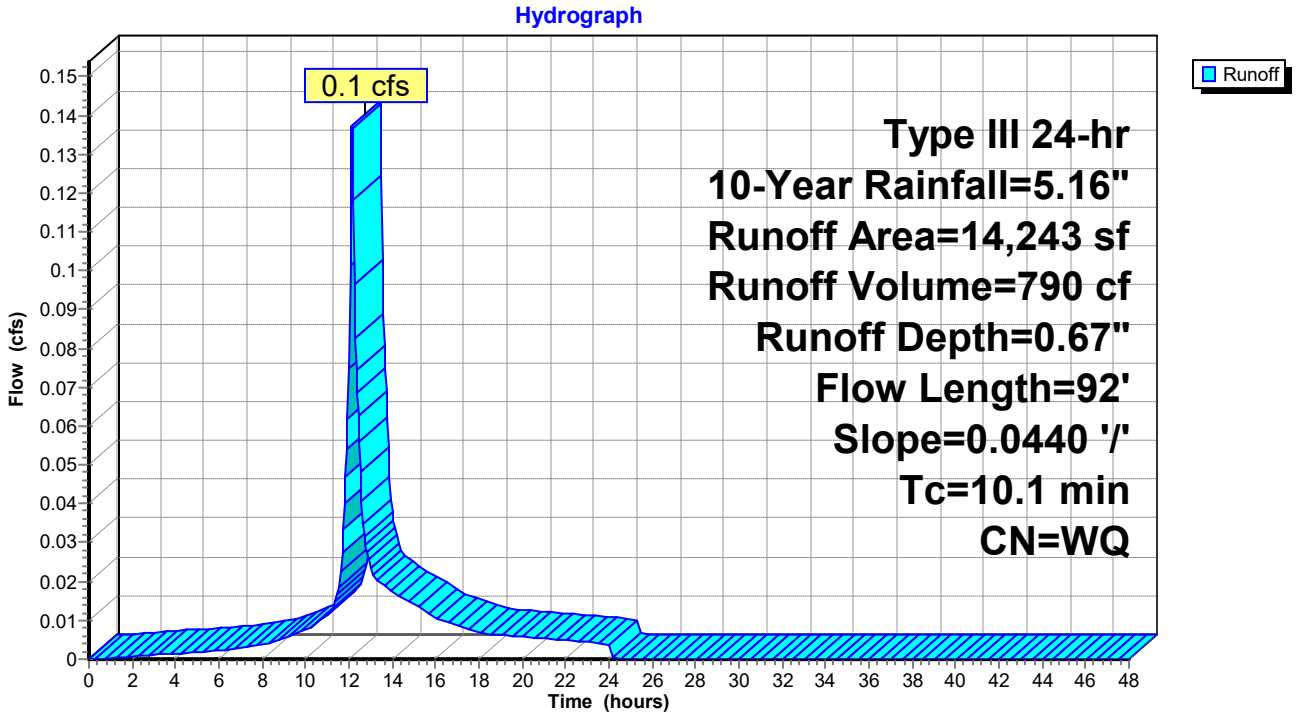
Runoff = 0.1 cfs @ 12.14 hrs, Volume= 790 cf, Depth= 0.67"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
11,589	39	>75% Grass cover, Good, HSG A
738	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,282	30	Woods, Good, HSG A
14,243		Weighted Average
12,871	38	90.37% Pervious Area
1,372	98	9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	92	0.0440	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-2: Subcat PS-2



Summary for Subcatchment PS-3A:

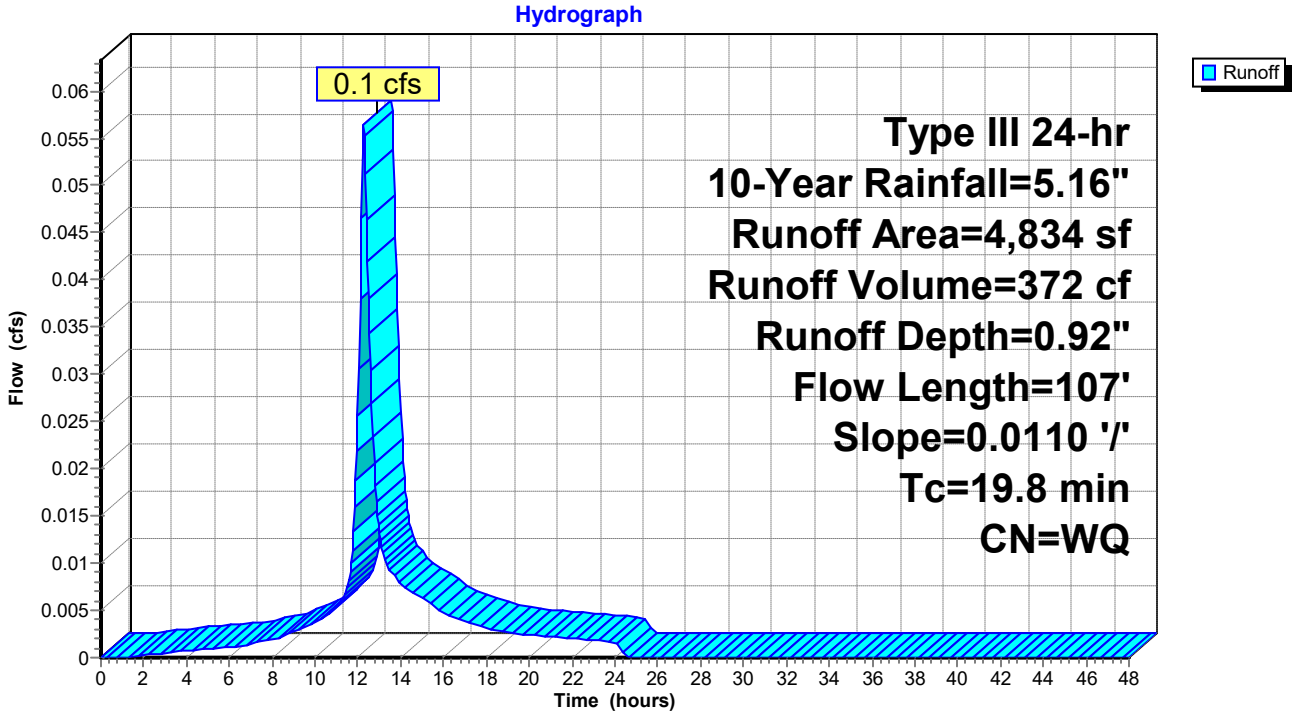
Runoff = 0.1 cfs @ 12.26 hrs, Volume= 372 cf, Depth= 0.92"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3A:



Summary for Subcatchment PS-3B:

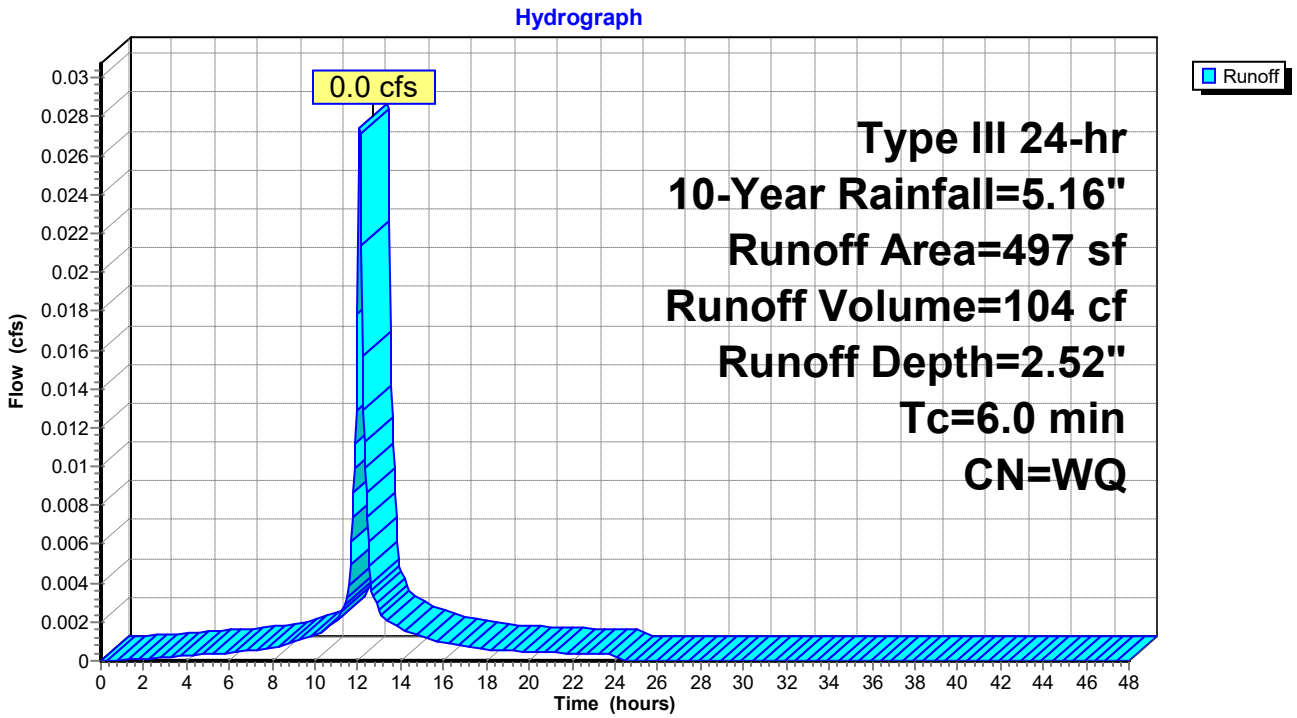
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 104 cf, Depth= 2.52"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PS-3B:



Summary for Subcatchment PS-3C:

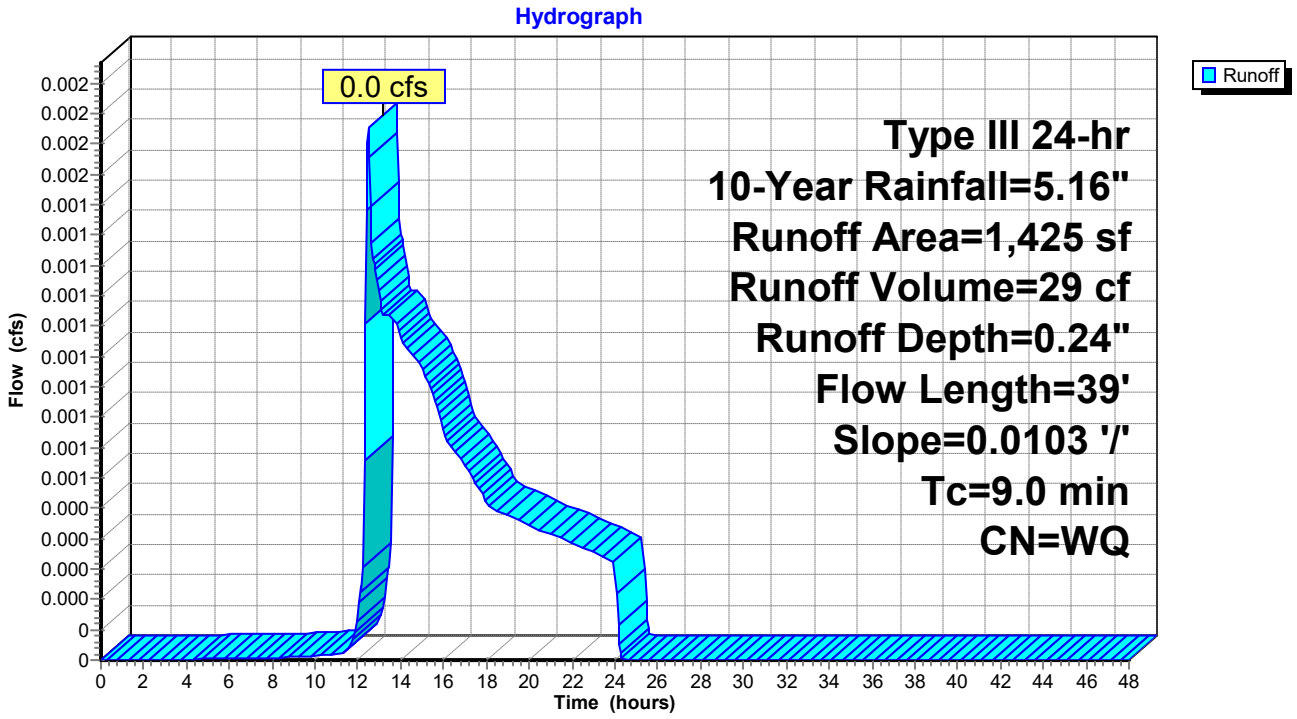
Runoff = 0.0 cfs @ 12.49 hrs, Volume= 29 cf, Depth= 0.24"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3C:



Summary for Subcatchment PS-4:

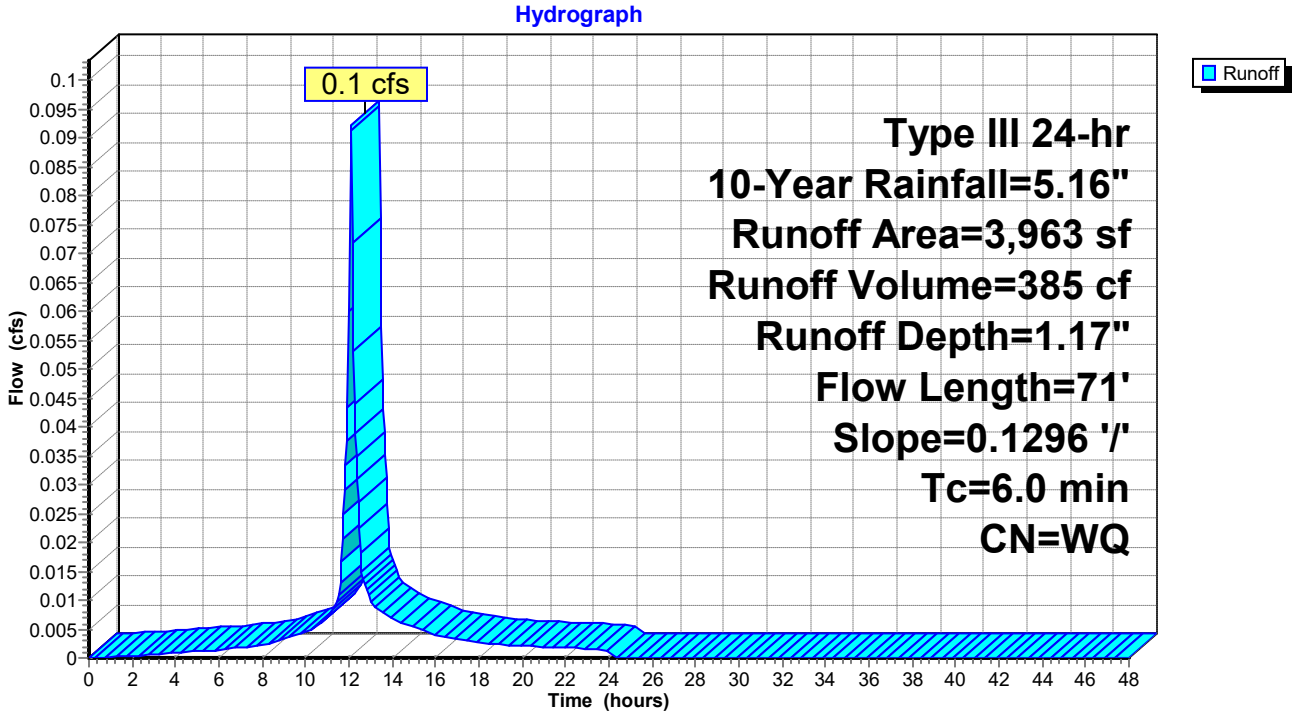
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 385 cf, Depth= 1.17"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.16"

Area (sf)	CN	Description
2,563	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
585	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment PS-4:



Summary for Pond 1P: Subsurface Detention Basin

Inflow Area = 74,573 sf, 48.17% Impervious, Inflow Depth = 2.49" for 10-Year event
Inflow = 4.0 cfs @ 12.10 hrs, Volume= 15,474 cf
Outflow = 0.9 cfs @ 12.51 hrs, Volume= 15,474 cf, Atten= 78%, Lag= 25.1 min
Primary = 0.9 cfs @ 12.51 hrs, Volume= 15,474 cf
Routed to Link DP-1 : Offsite to Northeast

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 103.83' @ 12.51 hrs Surf.Area= 3,781 sf Storage= 4,895 cf

Plug-Flow detention time= 70.3 min calculated for 15,457 cf (100% of inflow)
Center-of-Mass det. time= 70.6 min (830.8 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	3,453 cf	**55.75'W x 67.82'L x 3.75'H Field A** 14,178 cf Overall - 5,546 cf Embedded = 8,632 cf x 40.0% Voids
#2A	102.50'	5,546 cf	**ADS_StormTech SC-800 +Cap** x 108 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 108 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		8,999 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" Round Culvert** L= 98.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 102.00' / 93.00' S= 0.0918 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	102.00'	**4.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	103.25'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	104.00'	**7.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	105.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.9 cfs @ 12.51 hrs HW=103.83' (Free Discharge)
└**1=Culvert** (Passes 0.9 cfs of 5.5 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.7 cfs @ 6.21 fps)
├**3=Orifice/Grate** (Orifice Controls 0.2 cfs @ 3.24 fps)
├**4=Orifice/Grate** (Controls 0.0 cfs)
└**5=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Subsurface Detention Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-800 +Cap (ADS StormTech® SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

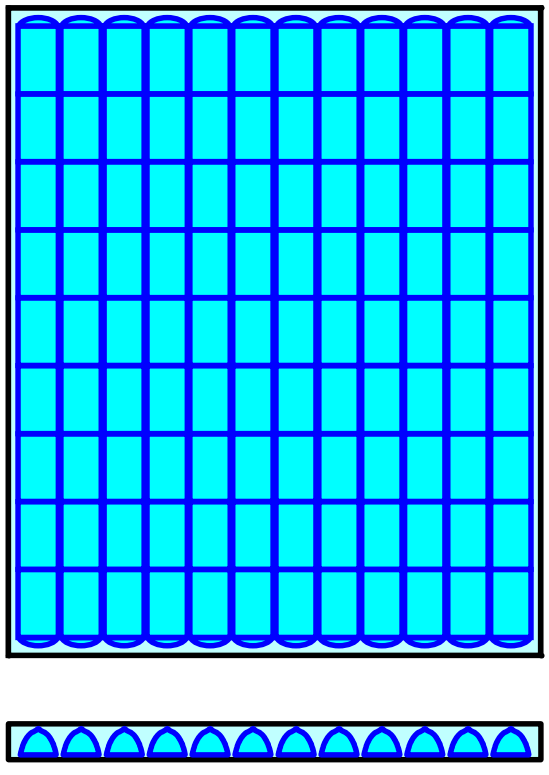
9 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 65.82' Row Length +12.0" End Stone x 2 = 67.82' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

108 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 5,546.0 cf Chamber Storage

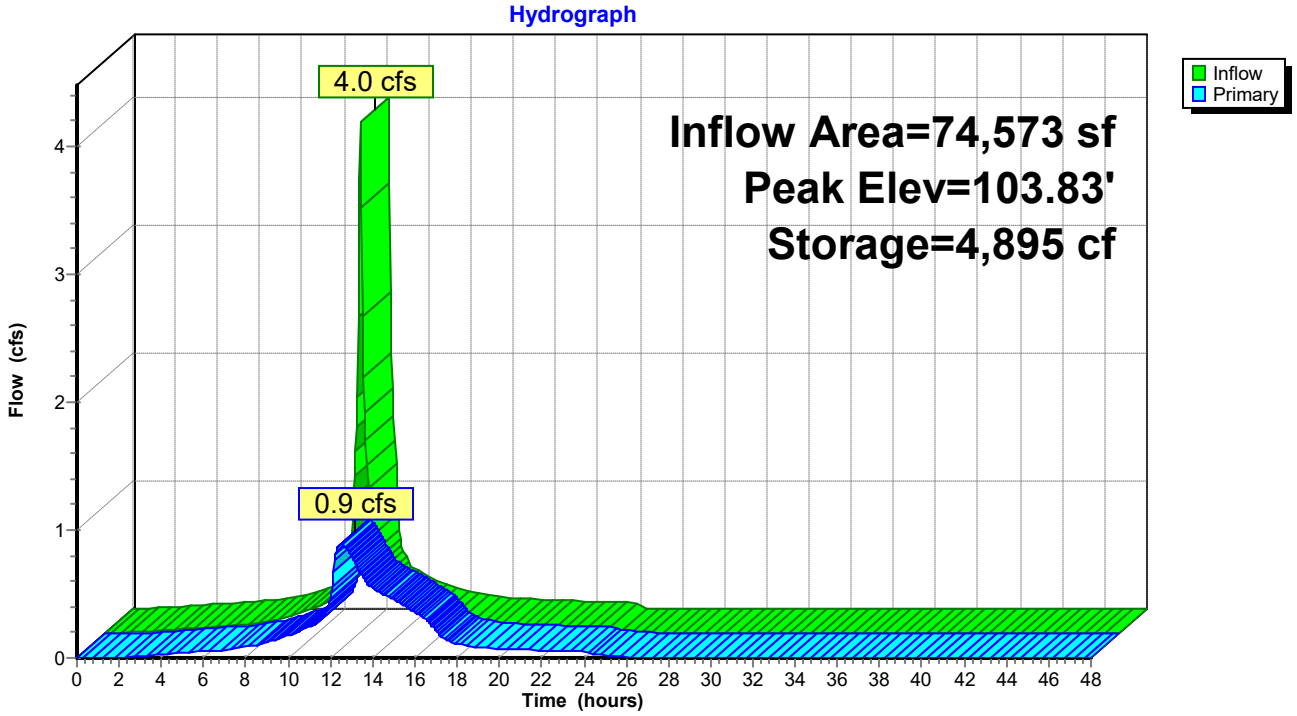
14,177.9 cf Field - 5,546.0 cf Chambers = 8,631.9 cf Stone x 40.0% Voids = 3,452.8 cf Stone Storage

Chamber Storage + Stone Storage = 8,998.8 cf = 0.207 af
Overall Storage Efficiency = 63.5%
Overall System Size = 67.82' x 55.75' x 3.75'

108 Chambers
525.1 cy Field
319.7 cy Stone



Pond 1P: Subsurface Detention Basin

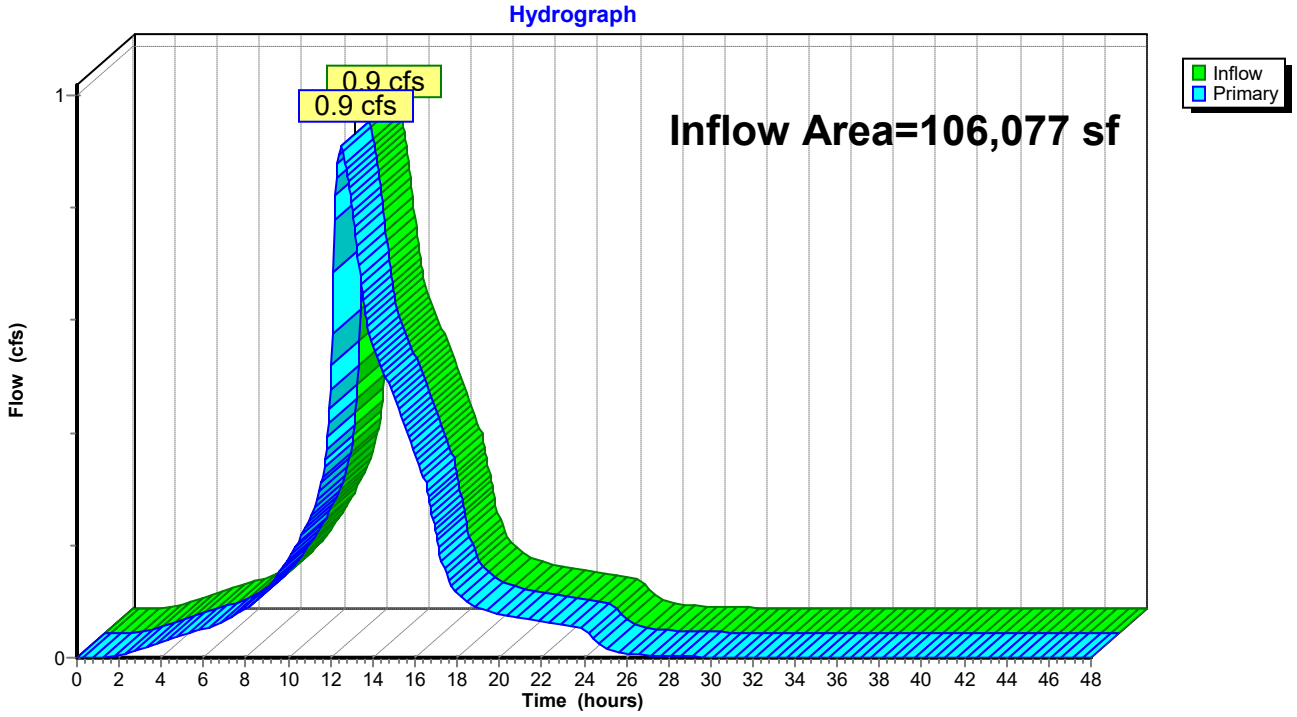


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 106,077 sf, 34.05% Impervious, Inflow Depth = 1.79" for 10-Year event
Inflow = 0.9 cfs @ 12.51 hrs, Volume= 15,782 cf
Primary = 0.9 cfs @ 12.51 hrs, Volume= 15,782 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

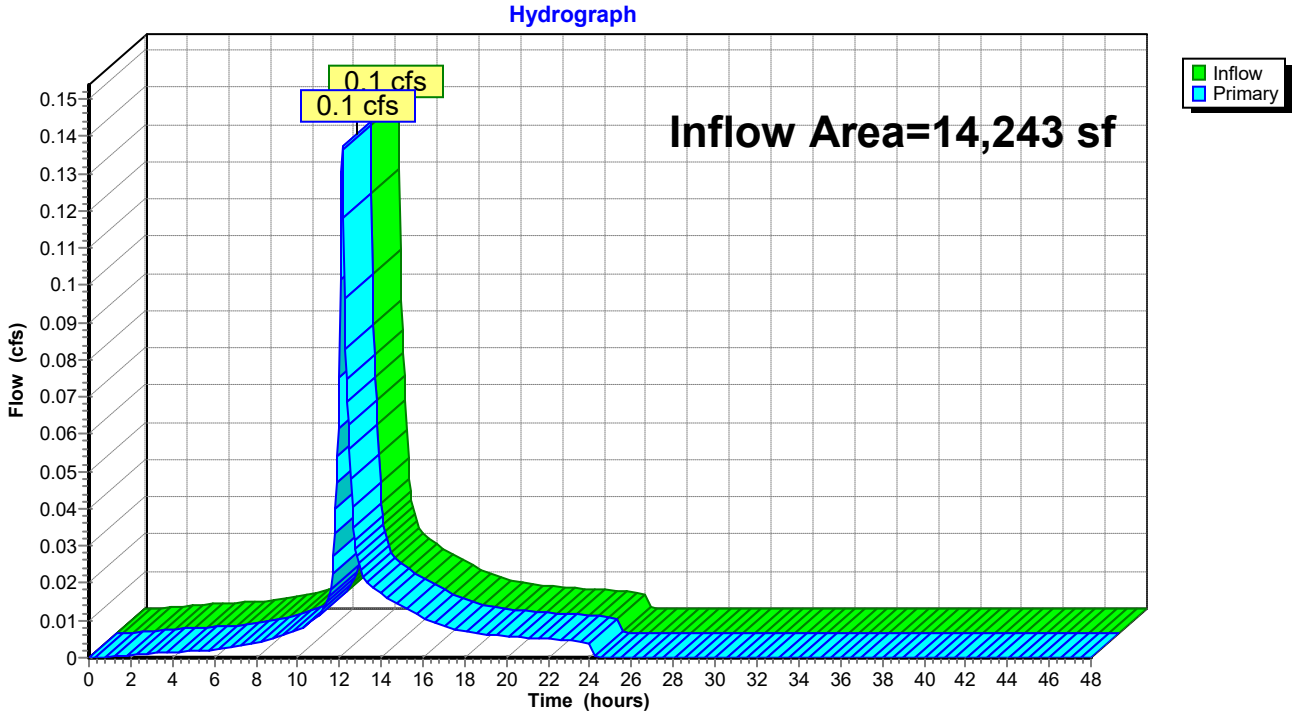


Summary for Link DP-2: Offsite to South

Inflow Area = 14,243 sf, 9.63% Impervious, Inflow Depth = 0.67" for 10-Year event
Inflow = 0.1 cfs @ 12.14 hrs, Volume= 790 cf
Primary = 0.1 cfs @ 12.14 hrs, Volume= 790 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

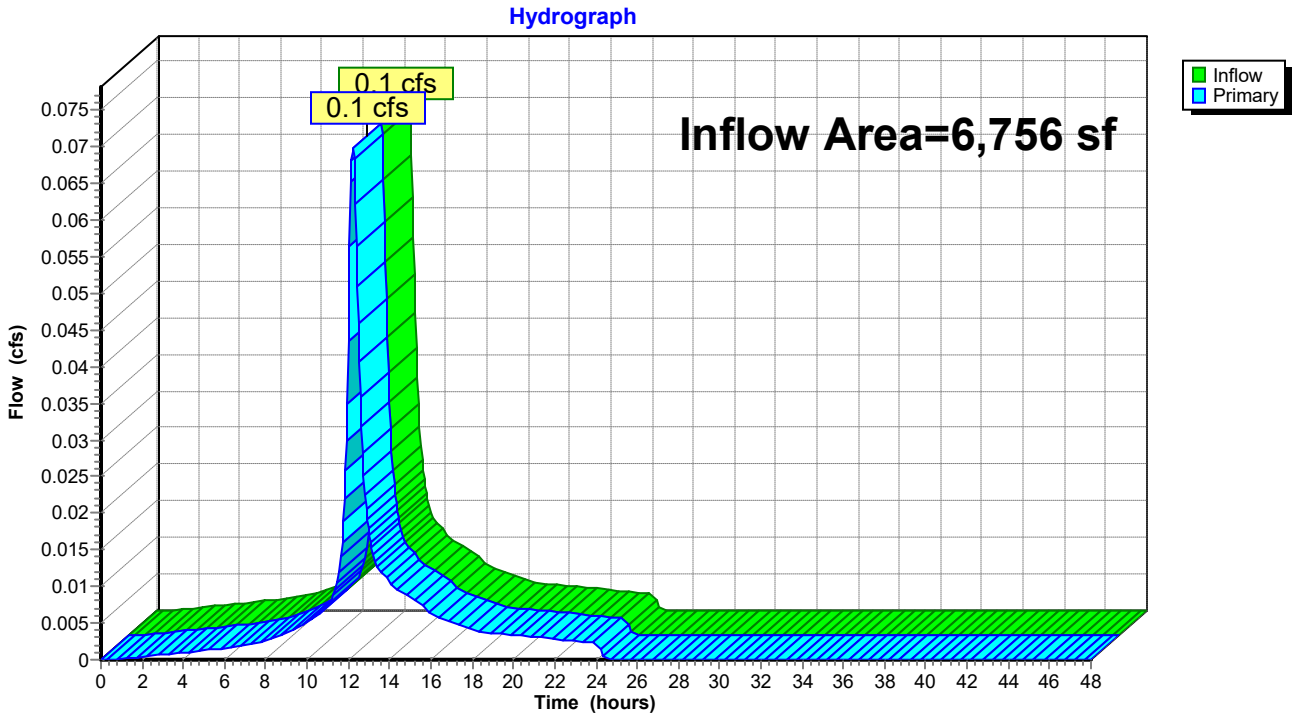


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 0.90" for 10-Year event
Inflow = 0.1 cfs @ 12.23 hrs, Volume= 505 cf
Primary = 0.1 cfs @ 12.23 hrs, Volume= 505 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

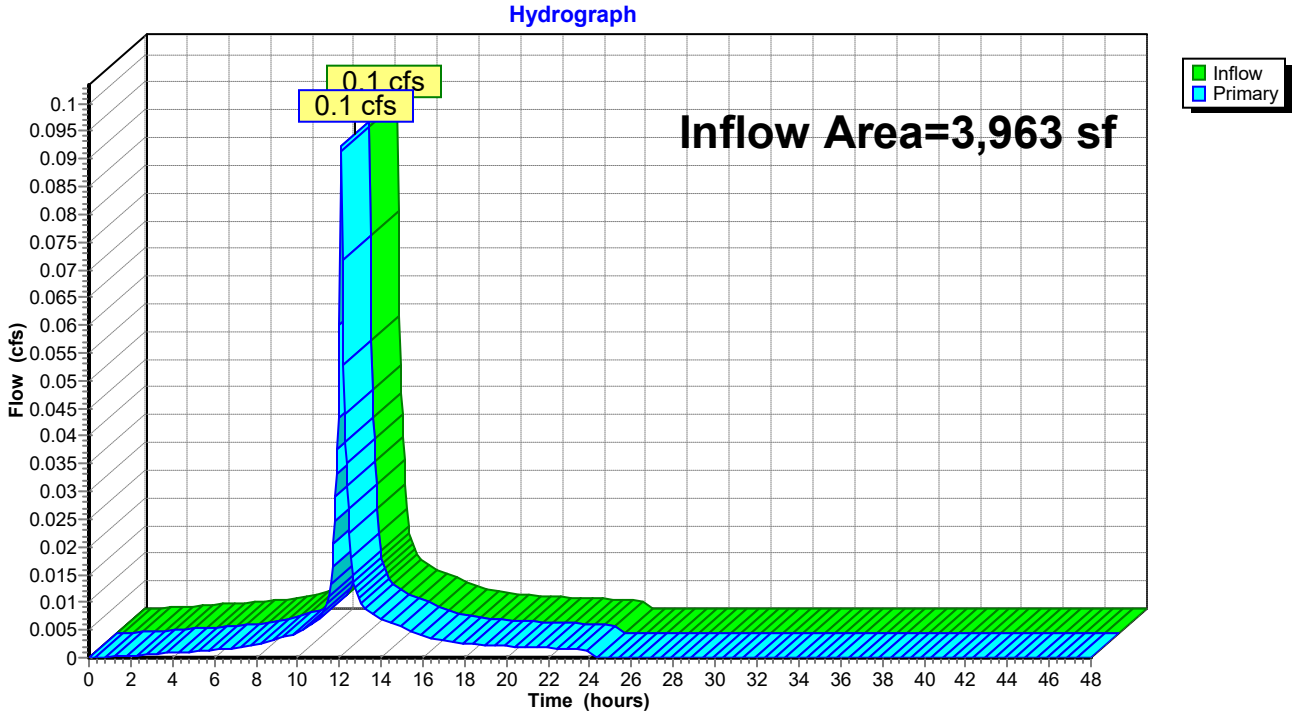


Summary for Link DP-4: Offsite to Northwest

Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 1.17" for 10-Year event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 385 cf
Primary = 0.1 cfs @ 12.09 hrs, Volume= 385 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PS-1A: Runoff Area=31,504 sf 0.61% Impervious Runoff Depth=0.81"
Flow Length=174' Tc=10.8 min CN=WQ Runoff=0.3 cfs 2,114 cf

Subcatchment PS-1B: Runoff Area=74,573 sf 48.17% Impervious Runoff Depth=4.53"
Flow Length=217' Tc=6.7 min CN=WQ Runoff=7.2 cfs 28,122 cf

Subcatchment PS-2: Subcat PS-2 Runoff Area=14,243 sf 9.63% Impervious Runoff Depth=1.86"
Flow Length=92' Slope=0.0440 '/' Tc=10.1 min CN=WQ Runoff=0.4 cfs 2,204 cf

Subcatchment PS-3A: Runoff Area=4,834 sf 14.73% Impervious Runoff Depth=2.27"
Flow Length=107' Slope=0.0110 '/' Tc=19.8 min CN=WQ Runoff=0.2 cfs 915 cf

Subcatchment PS-3B: Runoff Area=497 sf 48.79% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=WQ Runoff=0.0 cfs 190 cf

Subcatchment PS-3C: Runoff Area=1,425 sf 0.17% Impervious Runoff Depth=1.29"
Flow Length=39' Slope=0.0103 '/' Tc=9.0 min CN=WQ Runoff=0.0 cfs 153 cf

Subcatchment PS-4: Runoff Area=3,963 sf 20.57% Impervious Runoff Depth=2.55"
Flow Length=71' Slope=0.1296 '/' Tc=6.0 min CN=WQ Runoff=0.2 cfs 842 cf

Pond 1P: Subsurface Detention Basin Peak Elev=105.38' Storage=8,440 cf Inflow=7.2 cfs 28,122 cf
Outflow=2.2 cfs 28,122 cf

Link DP-1: Offsite to Northeast Inflow=2.4 cfs 30,236 cf
Primary=2.4 cfs 30,236 cf

Link DP-2: Offsite to South Inflow=0.4 cfs 2,204 cf
Primary=0.4 cfs 2,204 cf

Link DP-3: Walnut Street Inflow=0.2 cfs 1,258 cf
Primary=0.2 cfs 1,258 cf

Link DP-4: Offsite to Northwest Inflow=0.2 cfs 842 cf
Primary=0.2 cfs 842 cf

Total Runoff Area = 131,039 sf Runoff Volume = 34,540 cf Average Runoff Depth = 3.16"
70.04% Pervious = 91,779 sf 29.96% Impervious = 39,260 sf

Summary for Subcatchment PS-1A:

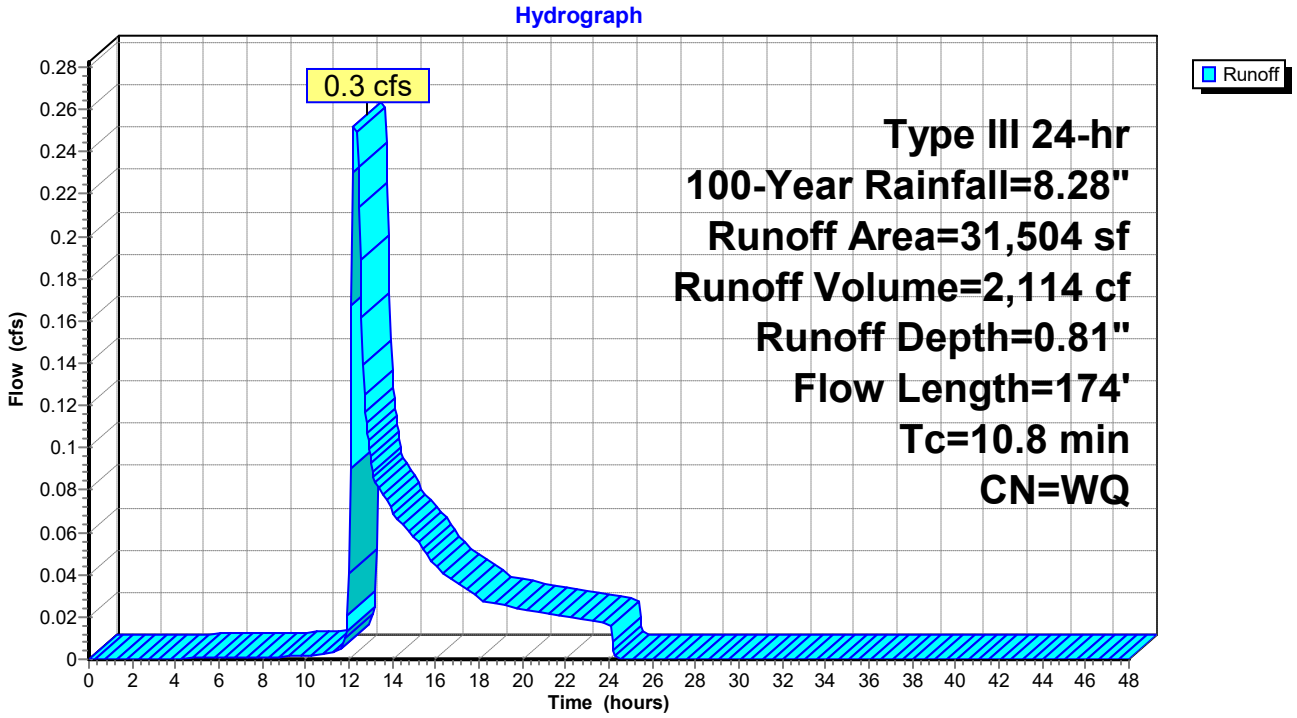
Runoff = 0.3 cfs @ 12.20 hrs, Volume= 2,114 cf, Depth= 0.81"
Routed to Link DP-1 : Offsite to Northeast

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
10,927	39	>75% Grass cover, Good, HSG A
192	98	Paved parking, HSG A
20,385	30	Woods, Good, HSG A
31,504		Weighted Average
31,312	33	99.39% Pervious Area
192	98	0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	100	0.1500	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	36	0.0278	0.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	38	0.6053	3.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.8	174	Total			

Subcatchment PS-1A:



Summary for Subcatchment PS-1B:

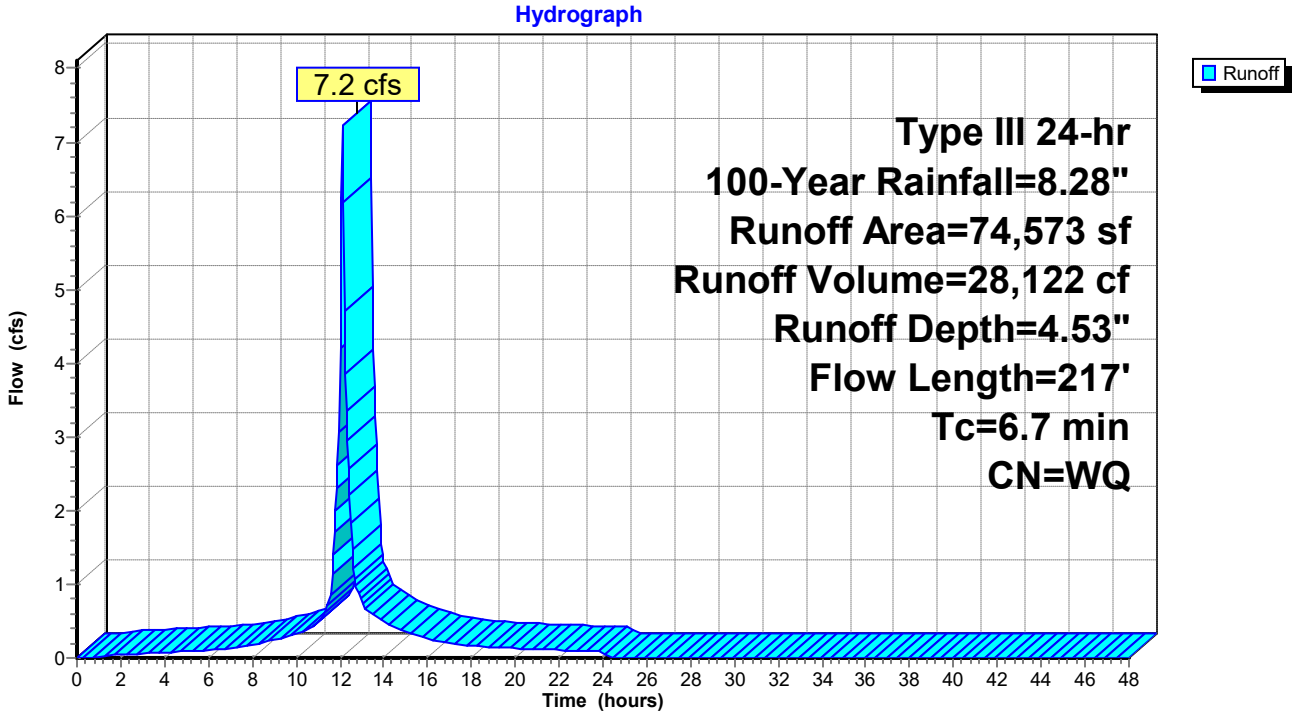
Runoff = 7.2 cfs @ 12.10 hrs, Volume= 28,122 cf, Depth= 4.53"
Routed to Pond 1P : Subsurface Detention Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
37,767	39	>75% Grass cover, Good, HSG A
28,686	98	Paved parking, HSG A
7,238	98	Roofs, HSG A
882	30	Woods, Good, HSG A
74,573		Weighted Average
38,649	39	51.83% Pervious Area
35,924	98	48.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	29	0.0207	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.4	25	0.0260	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
0.8	132	0.0181	2.73		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	31	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
6.7	217	Total			

Subcatchment PS-1B:



Summary for Subcatchment PS-2: Subcat PS-2

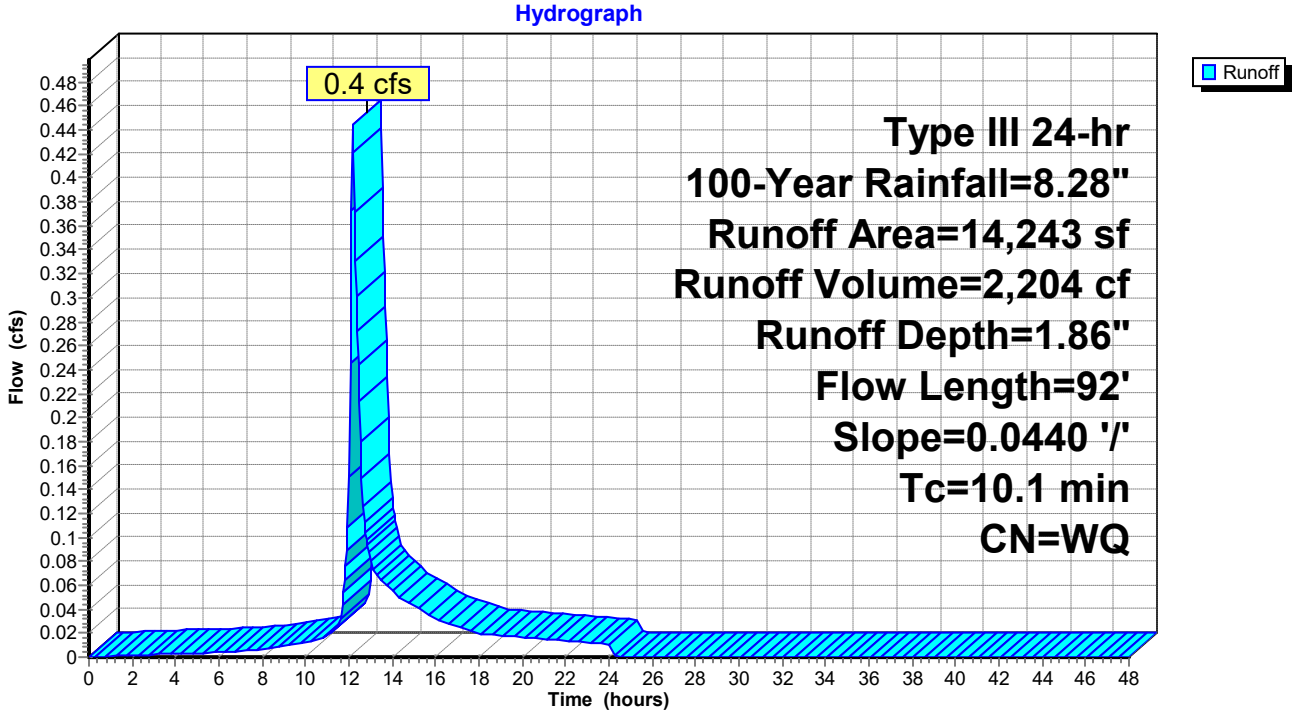
Runoff = 0.4 cfs @ 12.16 hrs, Volume= 2,204 cf, Depth= 1.86"
Routed to Link DP-2 : Offsite to South

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
11,589	39	>75% Grass cover, Good, HSG A
738	98	Paved parking, HSG A
634	98	Roofs, HSG A
1,282	30	Woods, Good, HSG A
14,243		Weighted Average
12,871	38	90.37% Pervious Area
1,372	98	9.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	92	0.0440	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-2: Subcat PS-2



Summary for Subcatchment PS-3A:

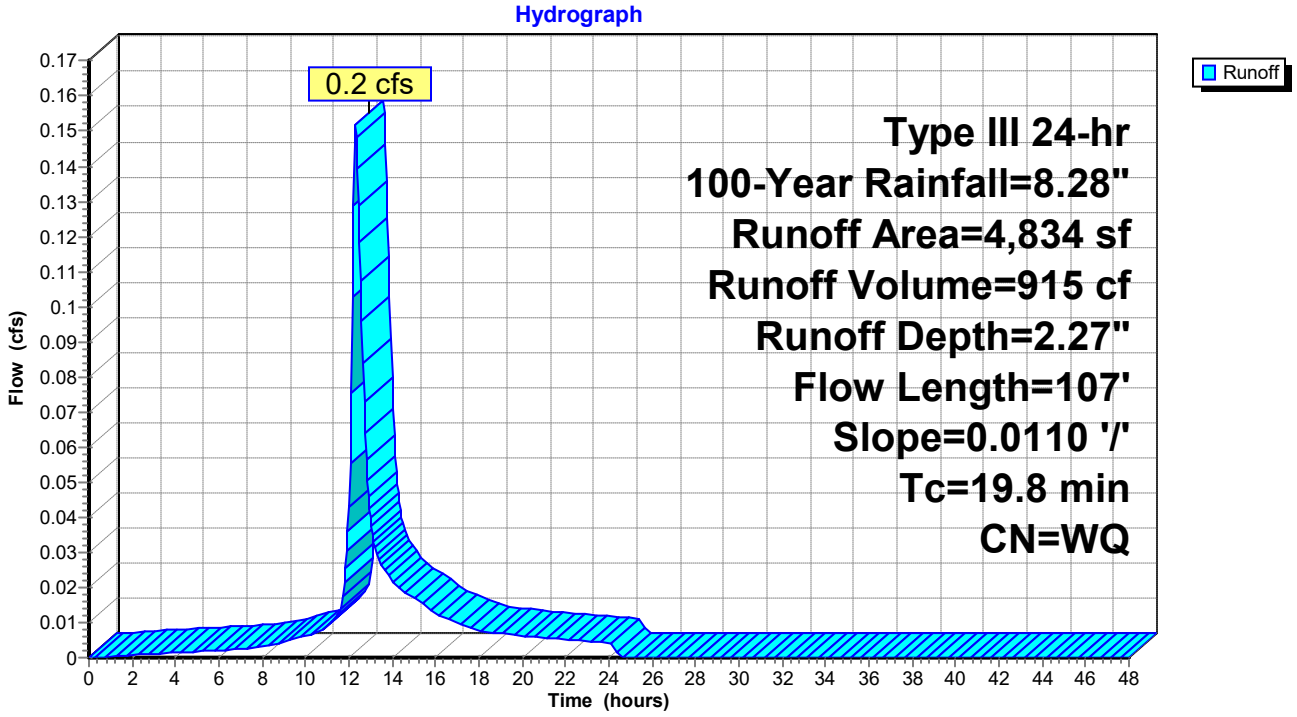
Runoff = 0.2 cfs @ 12.31 hrs, Volume= 915 cf, Depth= 2.27"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
4,122	39	>75% Grass cover, Good, HSG A
149	98	Paved parking, HSG A
562	98	Roofs, HSG A
4,834		Weighted Average
4,122	39	85.27% Pervious Area
712	98	14.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.8	107	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3A:



Summary for Subcatchment PS-3B:

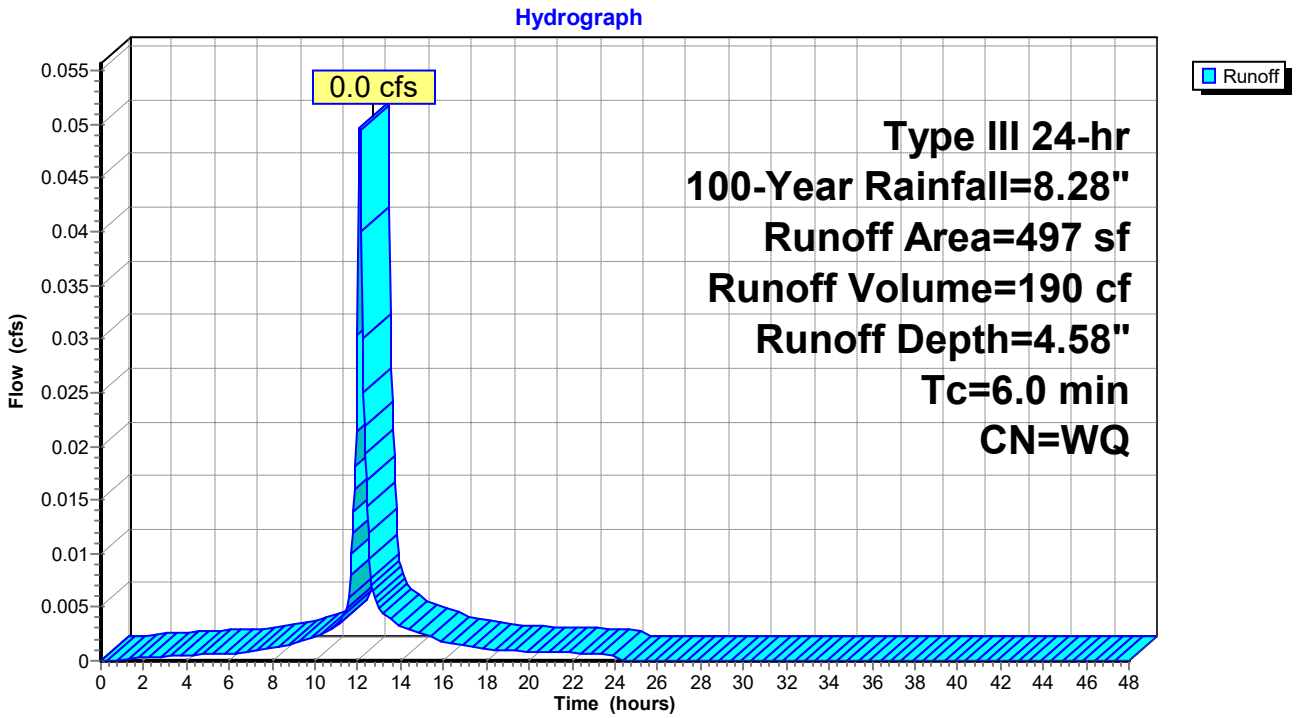
Runoff = 0.0 cfs @ 12.09 hrs, Volume= 190 cf, Depth= 4.58"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
255	39	>75% Grass cover, Good, HSG A
242	98	Roofs, HSG A
497		Weighted Average
255	39	51.21% Pervious Area
242	98	48.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PS-3B:



Summary for Subcatchment PS-3C:

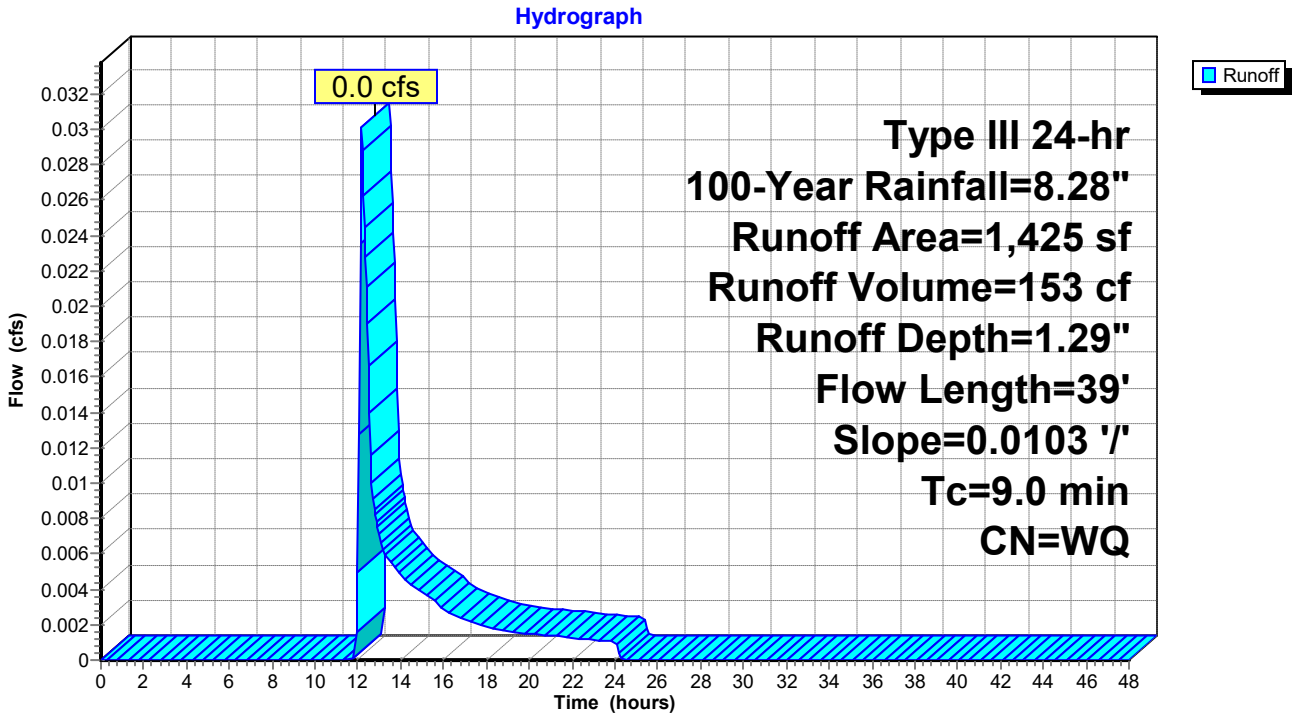
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 153 cf, Depth= 1.29"
Routed to Link DP-3 : Walnut Street

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
1,422	39	>75% Grass cover, Good, HSG A
2	98	Paved parking, HSG A
1,425		Weighted Average
1,422	39	99.83% Pervious Area
2	98	0.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	39	0.0103	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"

Subcatchment PS-3C:



Summary for Subcatchment PS-4:

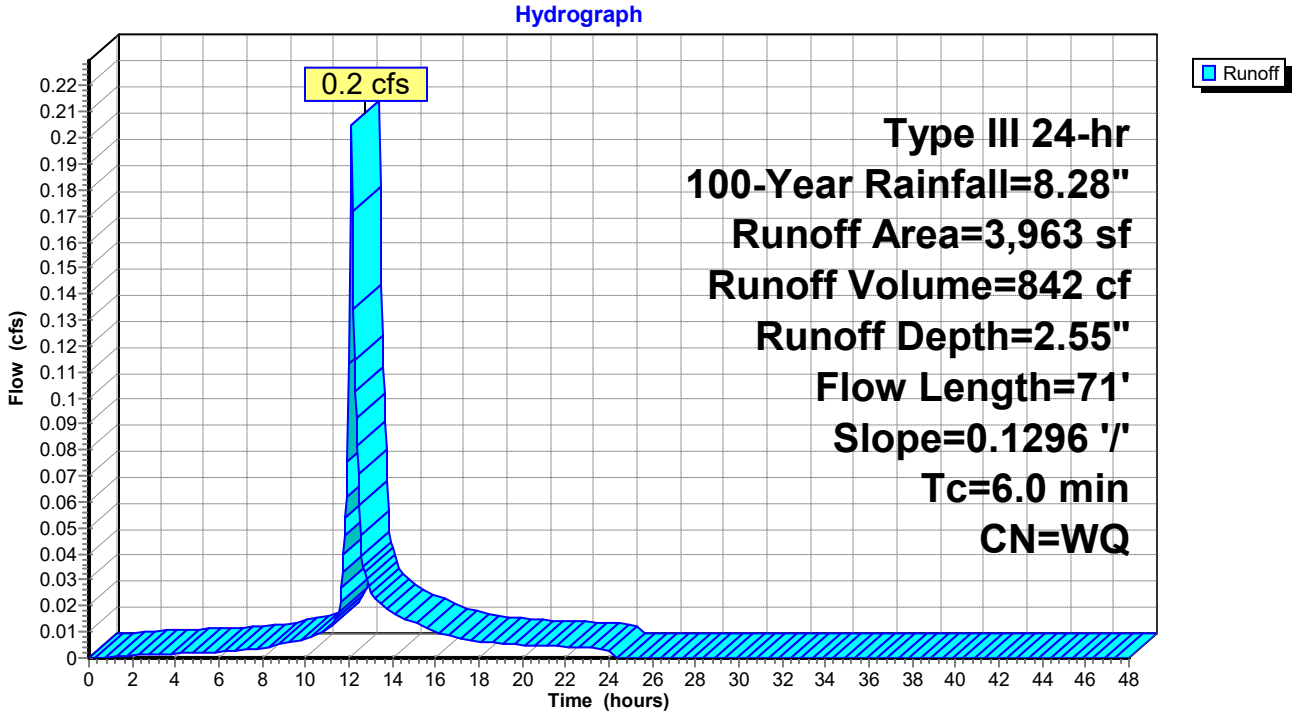
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 842 cf, Depth= 2.55"
Routed to Link DP-4 : Offsite to Northwest

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
2,563	39	>75% Grass cover, Good, HSG A
211	98	Paved parking, HSG A
604	98	Roofs, HSG A
585	30	Woods, Good, HSG A
3,963		Weighted Average
3,148	37	79.43% Pervious Area
815	98	20.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	71	0.1296	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
5.3	71	Total, Increased to minimum Tc = 6.0 min			

Subcatchment PS-4:



Summary for Pond 1P: Subsurface Detention Basin

Inflow Area = 74,573 sf, 48.17% Impervious, Inflow Depth = 4.53" for 100-Year event
Inflow = 7.2 cfs @ 12.10 hrs, Volume= 28,122 cf
Outflow = 2.2 cfs @ 12.46 hrs, Volume= 28,122 cf, Atten= 70%, Lag= 21.4 min
Primary = 2.2 cfs @ 12.46 hrs, Volume= 28,122 cf
Routed to Link DP-1 : Offsite to Northeast

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 105.38' @ 12.46 hrs Surf.Area= 3,781 sf Storage= 8,440 cf

Plug-Flow detention time= 69.7 min calculated for 28,122 cf (100% of inflow)
Center-of-Mass det. time= 69.2 min (834.8 - 765.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	102.00'	3,453 cf	**55.75'W x 67.82'L x 3.75'H Field A** 14,178 cf Overall - 5,546 cf Embedded = 8,632 cf x 40.0% Voids
#2A	102.50'	5,546 cf	**ADS_StormTech SC-800 +Cap** x 108 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 108 Chambers in 12 Rows Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf
		8,999 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" Round Culvert** L= 98.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 102.00' / 93.00' S= 0.0918 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	102.00'	**4.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	103.25'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	104.00'	**7.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	105.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.2 cfs @ 12.46 hrs HW=105.38' (Free Discharge)
└**1=Culvert** (Passes 2.2 cfs of 8.0 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 1.0 cfs @ 8.63 fps)
├**3=Orifice/Grate** (Orifice Controls 0.4 cfs @ 6.81 fps)
├**4=Orifice/Grate** (Orifice Controls 0.8 cfs @ 5.39 fps)
└**5=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Subsurface Detention Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-800 +Cap (ADS StormTech® SC-800 with cap volume)
Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf
Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap
Cap Storage= 3.4 cf x 2 x 12 rows = 82.1 cf

51.0" Wide + 3.0" Spacing = 54.0" C-C Row Spacing

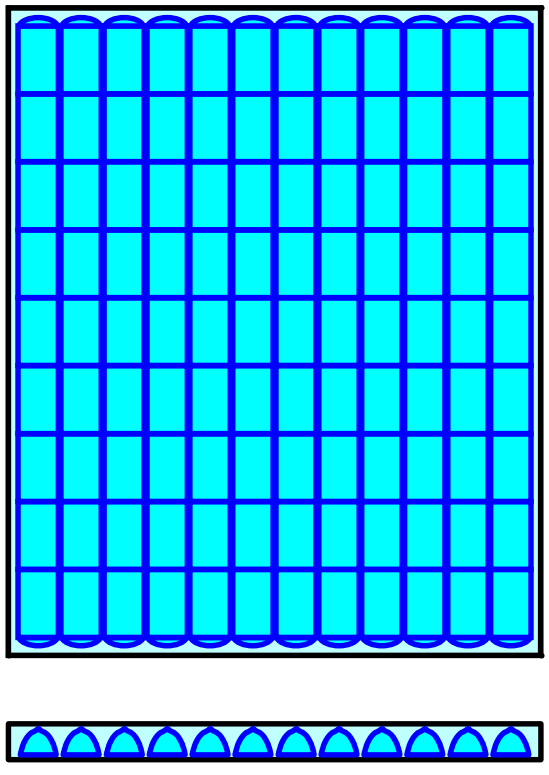
9 Chambers/Row x 7.12' Long +0.88' Cap Length x 2 = 65.82' Row Length +12.0" End Stone x 2 = 67.82' Base Length
12 Rows x 51.0" Wide + 3.0" Spacing x 11 + 12.0" Side Stone x 2 = 55.75' Base Width
6.0" Stone Base + 33.0" Chamber Height + 6.0" Stone Cover = 3.75' Field Height

108 Chambers x 50.6 cf + 3.4 cf Cap Volume x 2 x 12 Rows = 5,546.0 cf Chamber Storage

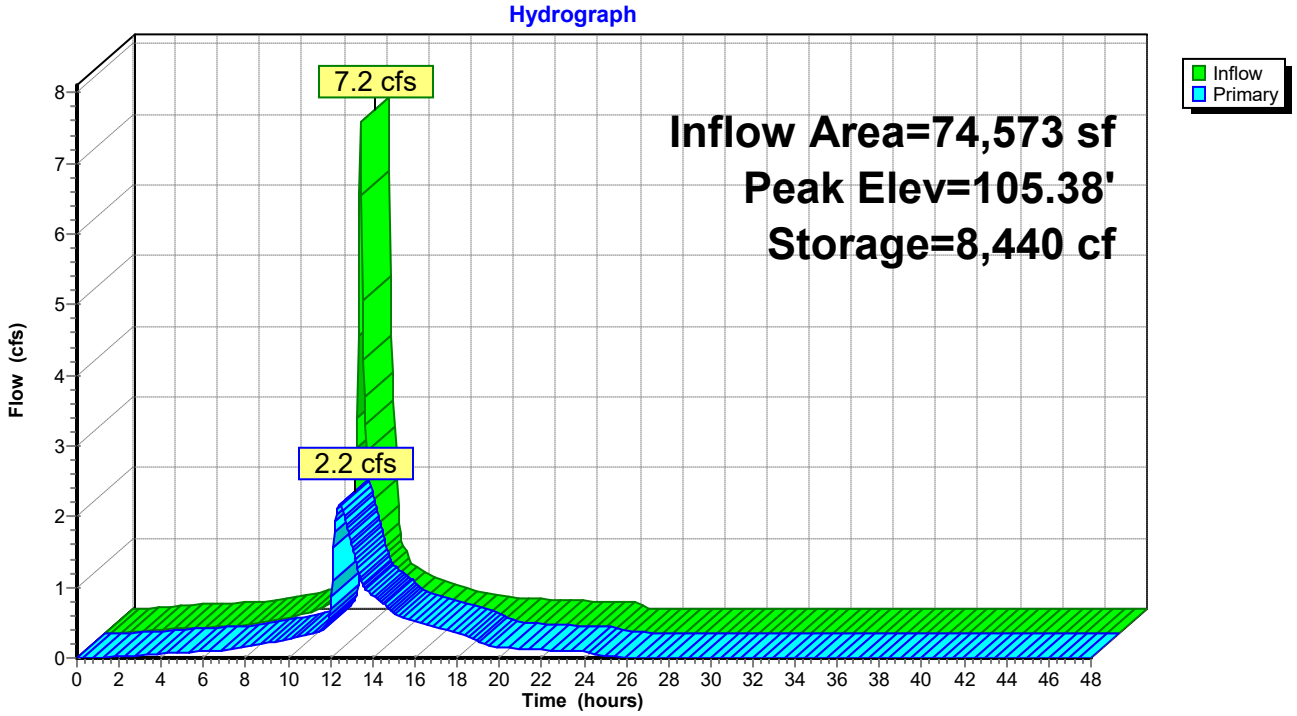
14,177.9 cf Field - 5,546.0 cf Chambers = 8,631.9 cf Stone x 40.0% Voids = 3,452.8 cf Stone Storage

Chamber Storage + Stone Storage = 8,998.8 cf = 0.207 af
Overall Storage Efficiency = 63.5%
Overall System Size = 67.82' x 55.75' x 3.75'

108 Chambers
525.1 cy Field
319.7 cy Stone



Pond 1P: Subsurface Detention Basin

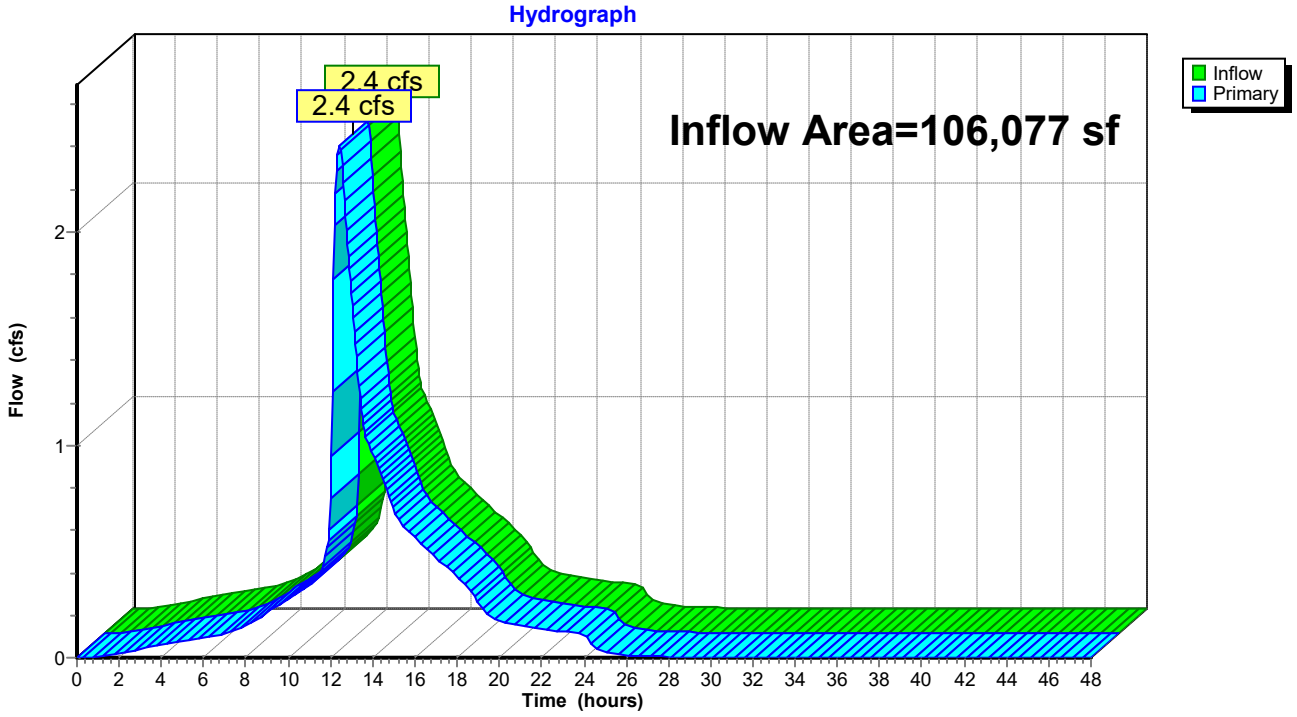


Summary for Link DP-1: Offsite to Northeast

Inflow Area = 106,077 sf, 34.05% Impervious, Inflow Depth = 3.42" for 100-Year event
Inflow = 2.4 cfs @ 12.43 hrs, Volume= 30,236 cf
Primary = 2.4 cfs @ 12.43 hrs, Volume= 30,236 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-1: Offsite to Northeast

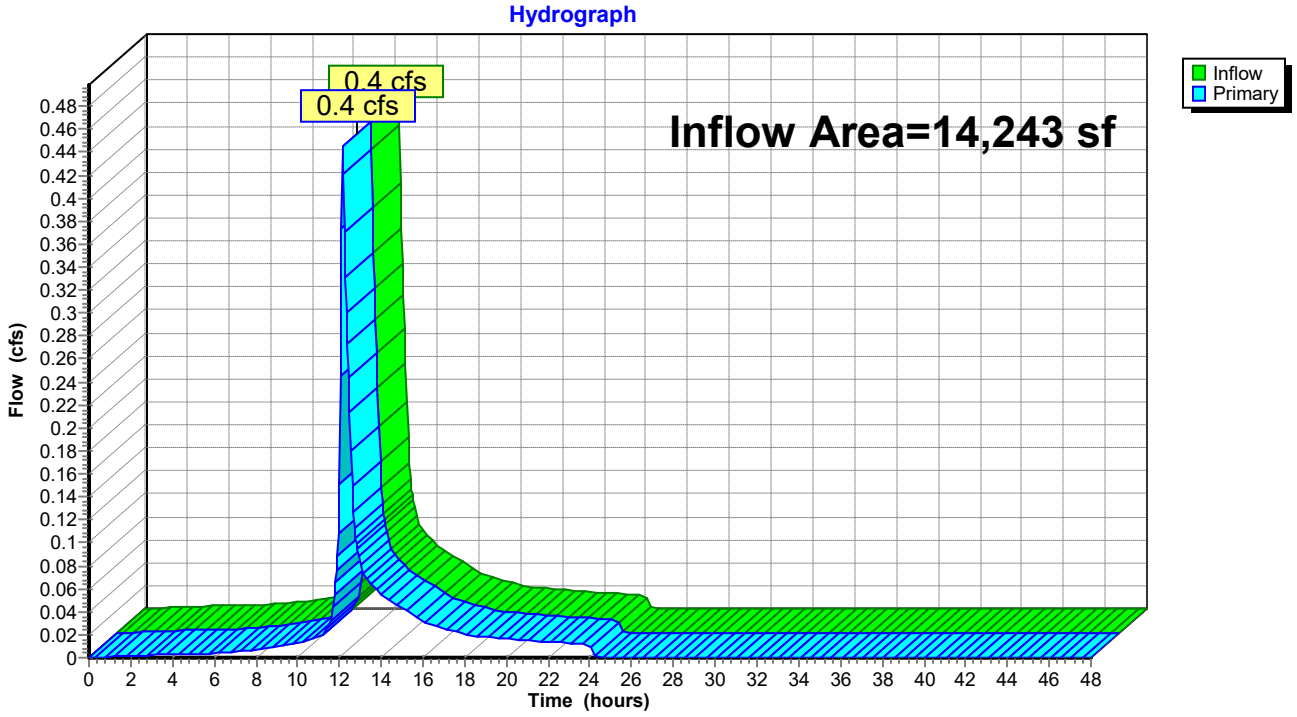


Summary for Link DP-2: Offsite to South

Inflow Area = 14,243 sf, 9.63% Impervious, Inflow Depth = 1.86" for 100-Year event
Inflow = 0.4 cfs @ 12.16 hrs, Volume= 2,204 cf
Primary = 0.4 cfs @ 12.16 hrs, Volume= 2,204 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-2: Offsite to South

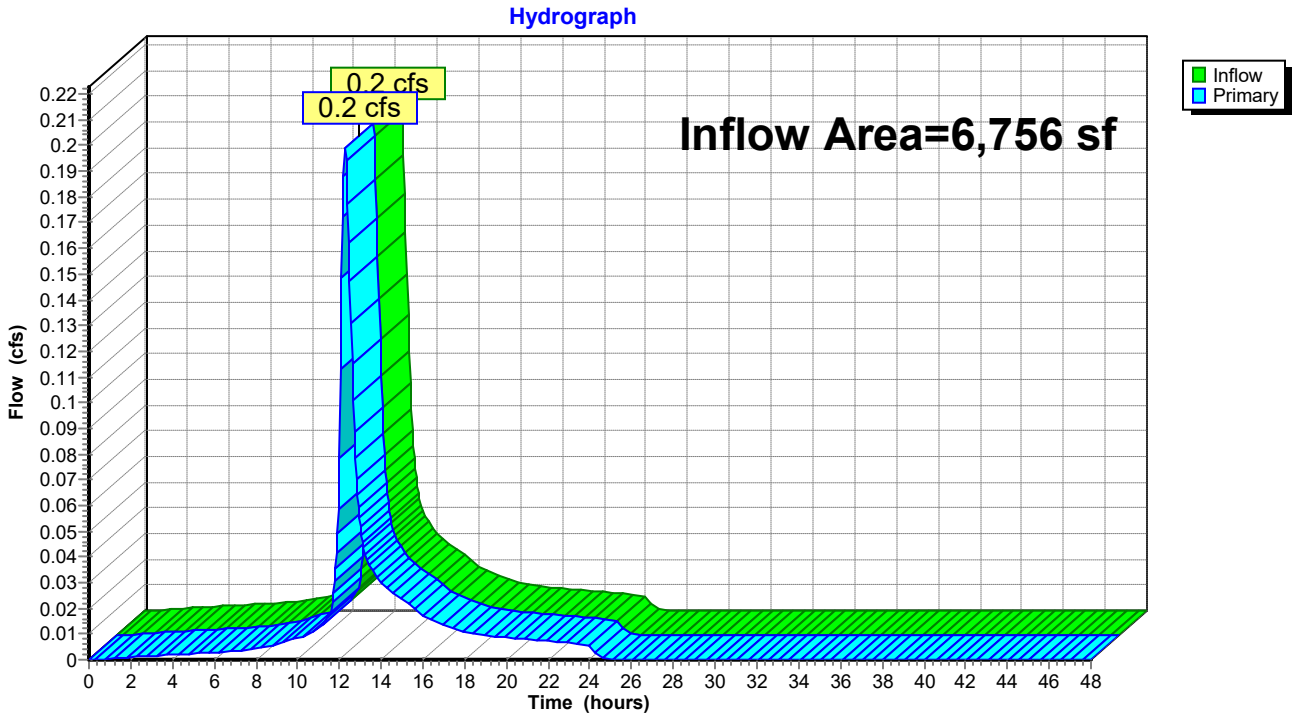


Summary for Link DP-3: Walnut Street

Inflow Area = 6,756 sf, 14.16% Impervious, Inflow Depth = 2.23" for 100-Year event
Inflow = 0.2 cfs @ 12.28 hrs, Volume= 1,258 cf
Primary = 0.2 cfs @ 12.28 hrs, Volume= 1,258 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-3: Walnut Street

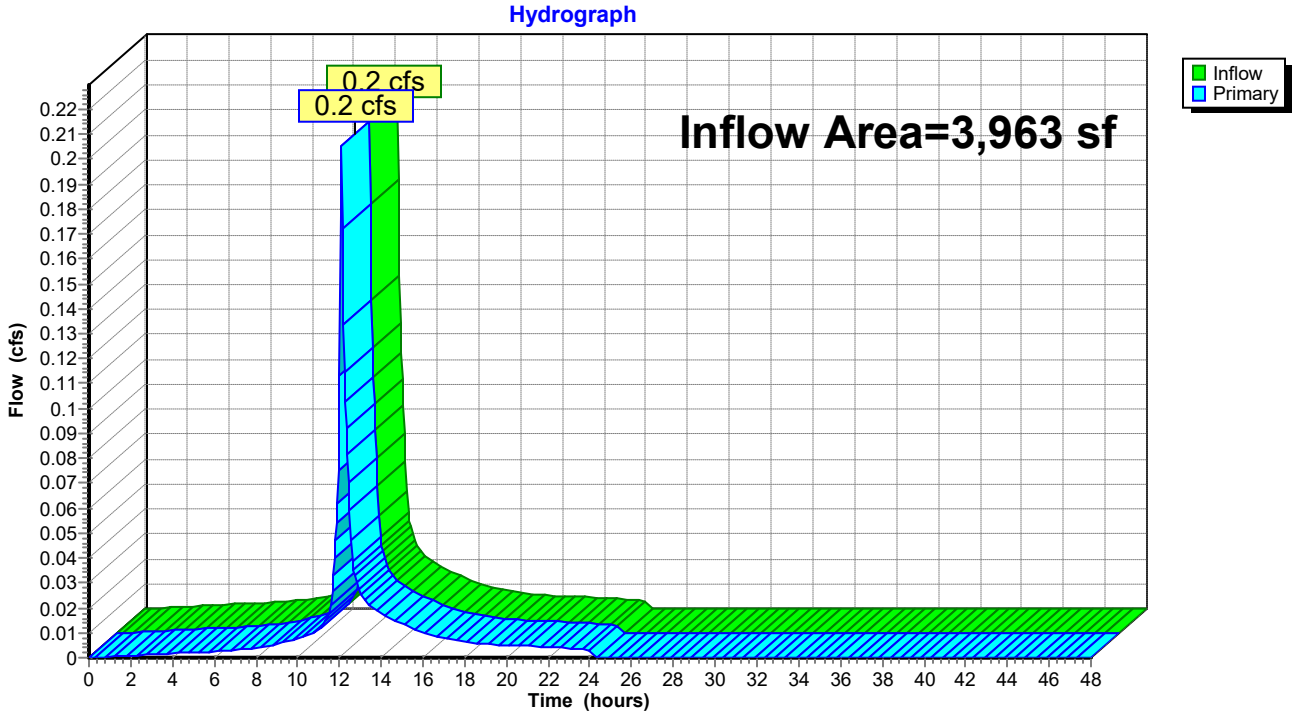


Summary for Link DP-4: Offsite to Northwest

Inflow Area = 3,963 sf, 20.57% Impervious, Inflow Depth = 2.55" for 100-Year event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 842 cf
Primary = 0.2 cfs @ 12.10 hrs, Volume= 842 cf, Atten= 0%, Lag= 0.0 min

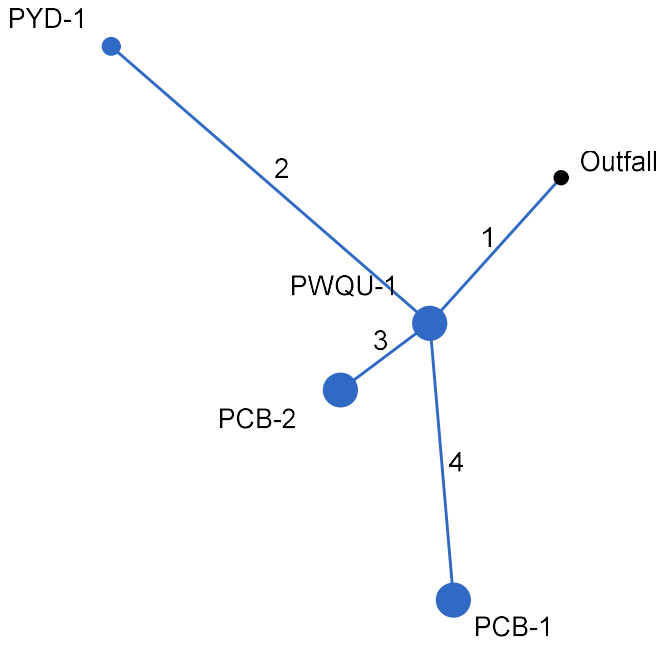
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-4: Offsite to Northwest



Appendix D: Hydraulic Analysis

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



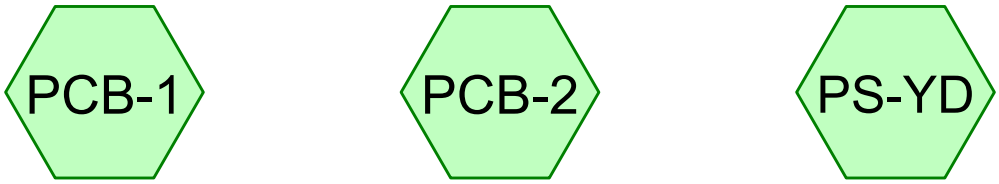
Project File: PR-STORM.stm	Number of lines: 4	Date: 1/27/2026

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	22.362	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	7.00	7.82	8.95	12	4.83	103.00	104.08	103.99	105.05	108.04	107.67	P-D-PIPE-(2)
2	1	49.061	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	1.60	1.21	4.58	8	1.00	104.18	104.67	105.05	105.92	107.67	106.65	P-D-PIPE-(19)
3	1	13.127	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.00	5.29	3.39	12	2.21	104.18	104.47	105.05	105.07	107.67	107.47	P-D-PIPE-(1)
4	1	29.126	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	3.40	3.55	4.90	12	1.00	104.18	104.47	105.05	105.26	107.67	107.44	P-D-PIPE-(4)

Project File: PR-STORM.stm | Number of lines: 4 | Run Date: 1/27/2026

NOTES:Known Qs only ; c = cir e = ellip b = box



Subcat Reach Pond Link

Routing Diagram for 220627 - INLET
Prepared by R Levesque Associates
HydroCAD® 10.20-8a s/n 13073 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100-Year	Type III 24-hr		Default	24.00	1	8.28	2

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PCB-1: Runoff Area=29,959 sf 56.64% Impervious Runoff Depth=5.10"
Tc=6.0 min CN=WQ Runoff=3.4 cfs 12,735 cf

Subcatchment PCB-2: Runoff Area=12,952 sf 84.26% Impervious Runoff Depth=6.97"
Tc=6.0 min CN=WQ Runoff=2.0 cfs 7,518 cf

Subcatchment PS-YD: Runoff Area=26,516 sf 26.49% Impervious Runoff Depth=3.04"
Flow Length=153' Tc=8.3 min CN=WQ Runoff=1.6 cfs 6,712 cf

Total Runoff Area = 69,427 sf Runoff Volume = 26,966 cf Average Runoff Depth = 4.66"
49.72% Pervious = 34,520 sf 50.28% Impervious = 34,908 sf

Summary for Subcatchment PCB-1:

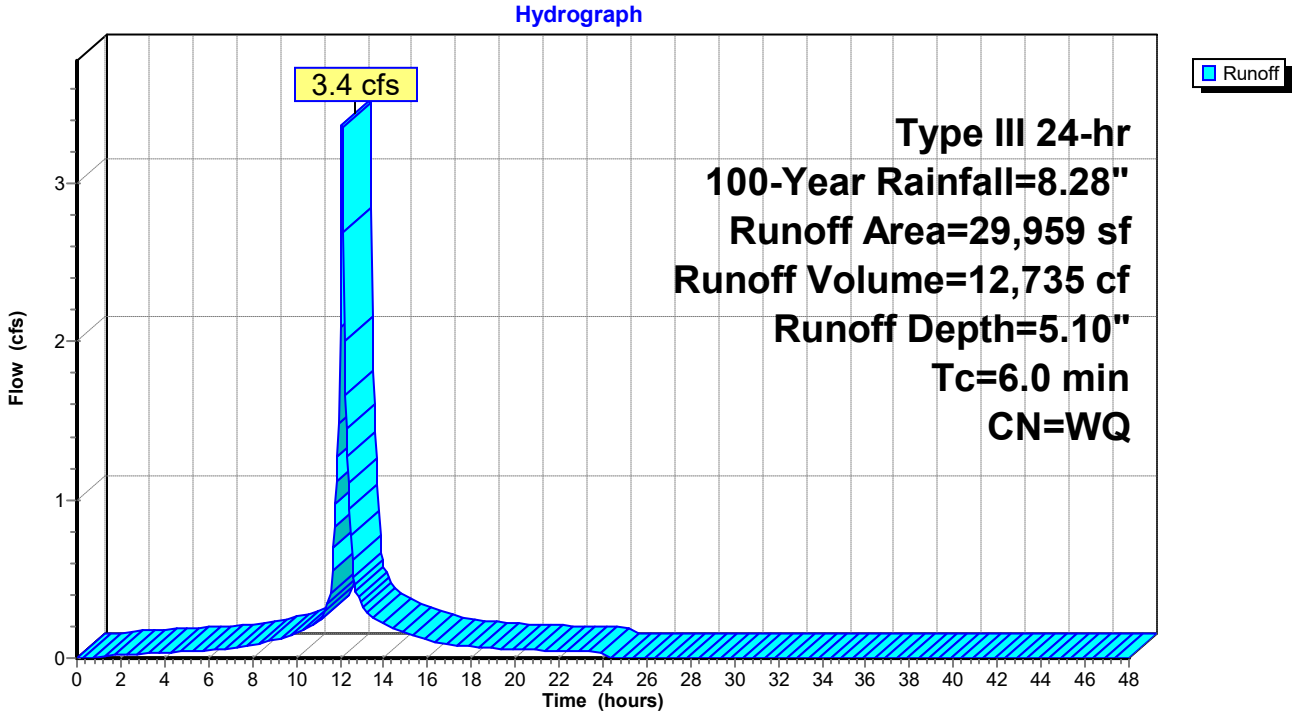
Runoff = 3.4 cfs @ 12.09 hrs, Volume= 12,735 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
12,748	39	>75% Grass cover, Good, HSG A
13,598	98	Paved parking, HSG A
3,371	98	Roofs, HSG A
241	30	Woods, Good, HSG A
29,959		Weighted Average
12,989	39	43.36% Pervious Area
16,970	98	56.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PCB-1:



Summary for Subcatchment PCB-2:

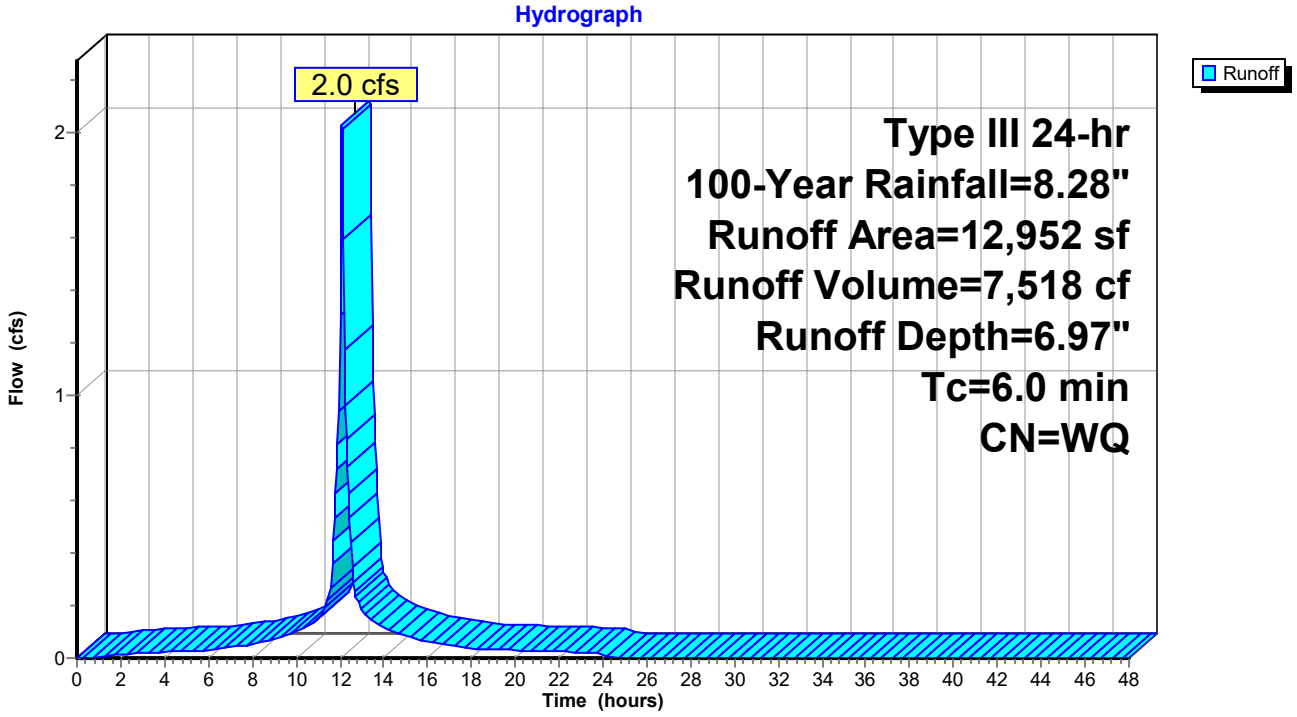
Runoff = 2.0 cfs @ 12.09 hrs, Volume= 7,518 cf, Depth= 6.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
1,872	39	>75% Grass cover, Good, HSG A
9,726	98	Paved parking, HSG A
1,188	98	Roofs, HSG A
166	30	Woods, Good, HSG A
12,952		Weighted Average
2,038	38	15.74% Pervious Area
10,914	98	84.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PCB-2:



Summary for Subcatchment PS-YD:

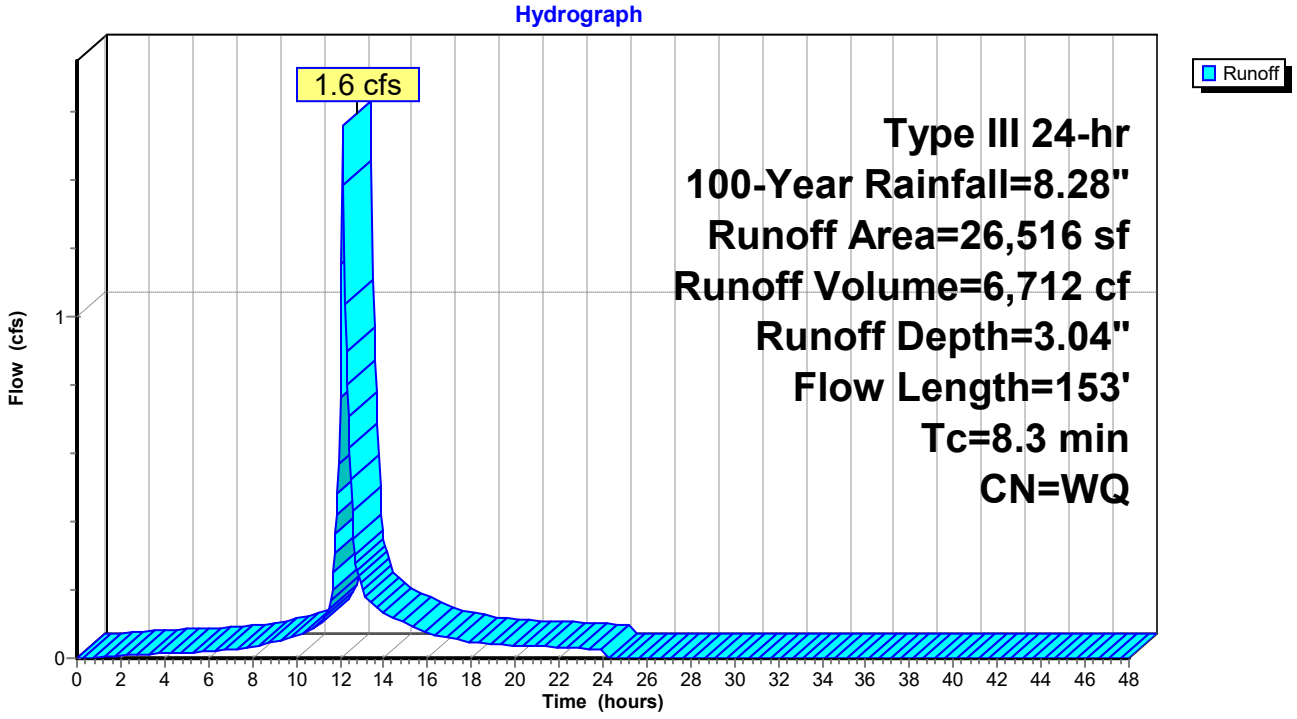
Runoff = 1.6 cfs @ 12.12 hrs, Volume= 6,712 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.28"

Area (sf)	CN	Description
18,470	39	>75% Grass cover, Good, HSG A
4,345	98	Paved parking, HSG A
2,679	98	Roofs, HSG A
1,022	30	Woods, Good, HSG A
26,516		Weighted Average
19,493	39	73.51% Pervious Area
7,024	98	26.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	57	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.8	96	0.0156	2.01		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.3	153	Total			

Subcatchment PS-YD:



Appendix E: MassDEP Calculations

- Impervious Area Calculations
- Water Quality Flow Rate Calculation – PWQU-1
- Water Quality Conversion Table
- TSS Removal Worksheet
- Barracuda Max Info Sheet

Standard 3: Recharge Calculations

Impervious Area Calculations

Existing Total Impervious Area

Sub-Catchment	Roof (sf)	Other Impervious (sf)	Sum (sf)
ES-1	3674	6325	9,999
ES-2	634	325	959
ES-3A	562	149	711
ES-3B	242	0	242
ES-3C	0	2	2
ES-4	604	211	815
			12,728

Proposed Total Impervious Area

Sub-Catchment	Roof (sf)	Other Impervious (sf)	Sum (sf)	
PS-1A	0	192	192	
PS-1B	7238	28686	35924	Tributary to Basin
PS-2	634	738	1372	
PS-3A	562	149	711	
PS-3B	242	0	242	
PS-3C	0	2	2	
PS-4	604	211	815	
			39,258	

Summary Table

Total Existing Impervious Area	12,728	SF
Total Proposed Impervious Area	39,258	SF
Total New Impervious Area	26,530	SF
Total Impervious Area Tributary to Basin	35,924	SF

Standard 4: Water Quality - PWQU-I

Water Quality Volume Conversion to Flow Rate

Note: Required water quality volume based on 0.5-inch of runoff

$Q = (qu)\ (A)\ (WQV)$

where: Q = peak flow rate associated with first 0.5-inch of runoff (c.f.s.)

qu = unit peak discharge (csm/in) - value taken from table based on t_c

A = impervious surface drainage area (sq. mi.)

WQV = water quality volume in watershed inches

Proposed Water Quality Unit (PWQU-1)

t_c =	0.100	hrs	
qu =	752	csm/in	(from table)
A =	0.00129	sq. mi.*	
WQV =	0.5	inch **	

$Q_{0.5}$ = 0.48 c.f.s

The Baracuda Max Model S4 provides treatment of flows up to 1.52 c.f.s.

* Only inlcudes impervious area tributary to PWQU-1

** Water quality depth shall equal 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4-inches/hour or greater; 1/2-inch for discharges near to to other areas

Figure 2: For First ½-inch of Runoff, Table of qu values for Ia/P Curve = 0.0.058, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)
0.01	821
0.03	821
0.05	813
0.067	794
0.083	773
0.1	752
0.116	733
0.133	713
0.15	694
0.167	677
0.183	662
0.2	646
0.217	632
0.233	619
0.25	606
0.3	572
0.333	552
0.35	542
0.4	516
0.416	508
0.5	472
0.583	443
0.6	437
0.667	417
0.7	408
0.8	383
0.9	361
1	342
1.1	325
1.2	311
1.3	297
1.4	285
1.5	274
1.6	264
1.7	254
1.8	246
1.9	238
2	230
2.1	223
2.2	217
2.3	211
2.4	205
2.5	200
2.6	194
2.7	190
2.8	185
2.9	181
3	176
3.1	173
3.2	169
3.3	165
3.4	162
3.5	158
3.6	155
3.7	152
3.8	149
3.9	147
4	144
4.1	141
4.2	139
4.3	136
4.4	134
4.5	132
4.6	130
4.7	128
4.8	126
4.9	124
5	122
5.1	120
5.2	118
5.3	116
5.4	115
5.5	113
5.6	112
5.7	110
5.8	109
5.9	107
6	106
6.1	104
6.2	103
6.3	102
6.4	100
6.5	99
6.6	98
6.7	97
6.8	96
6.9	94
7	93
7.1	92
7.2	91
7.3	90
7.4	89
7.5	88
7.6	87
7.7	86
7.8	85
7.9	84
8	84
8.1	83
8.2	82
8.3	81
8.4	80
8.5	79
8.6	79
8.7	78
8.8	77
8.9	76
9	76
9.1	75
9.2	74
9.3	74
9.4	73
9.5	72
9.6	72
9.7	71
9.8	70
9.9	70
10	69

TSS Removal Form - Surface Infiltration Basin

Total TSS Removal

BMP	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep-Sump Hooded Catch Basins	0.25	1.00	0.25	0.75
Propietary Sdimentation Device	0.80	0.75	0.60	0.15

Total TSS Removal = 85%

Barracuda® Max

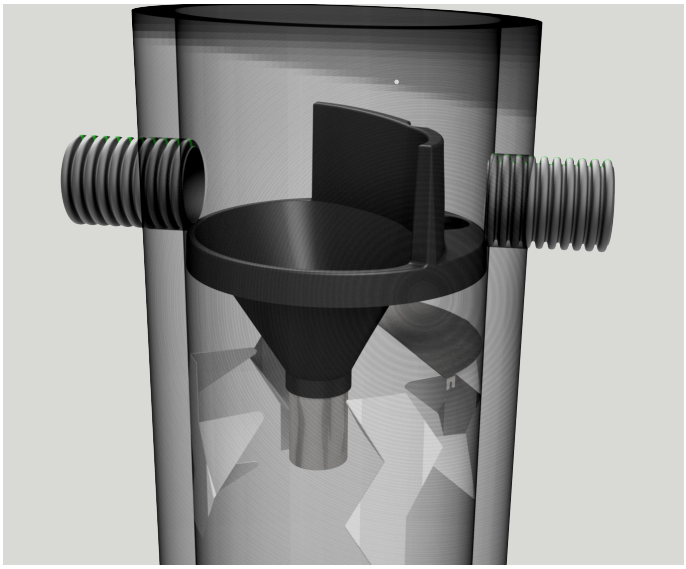
The Barracuda Max is market-changing stormwater quality technology. This high-performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda Max is also an outstanding value that offers multiple pipe configurations, and quick installation. The “Max” version of the Barracuda is built on the base platform of the original ADS Barracuda with improved removal efficiencies and installation components.

Features

- Single manhole design
- No elevation loss between the inlet and outlet
- Variable inlet/outlet angle configurations (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent pending “teeth” mitigate turbulence in the sump area to prevent resuspension of captured contaminants
- Available with grated drop inlet configuration
- Available with trash and/or oil capture add-ons

Benefits

- Internal components are in stock for quick delivery
- The S3, S4, S6, and S8 can be installed in a standard 36” (900 mm), 48” (1200 m), 72” (1800 m), and 96” (2400 m) precast manhole, respectively
- The S3 & S4 can be provided factory installed within a 36” (900 mm) and 48” (1200 mm) ADS HP manhole and delivered to the jobsite
- The Barracuda Max “teeth” and deflector plate apparatus are fabricated and designed for quick and easy field assembly
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry





ADS™

Barrucuda Specification

Materials and Design

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 36” (900 mm) and 48” (1200 mm) HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

Performance

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.
- The Barracuda Max unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS using a media mix with d_{50}=75 micron and 200 mg/L influent concentration.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol.
- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly, which includes the “teeth”.

Barracuda Max Model	Manhole Diameter	OK-110 (80% removal)	Pretreatment for Infiltration[1]
S3	36” (900 mm)	0.86 CFS (24.1 L/s)	1.65 CFS (46.7 L/s)
S4	48” (1200 mm)	1.52 CFS (43.0 L/s)	2.94 CFS (83.3 L/s)
S6	72” (1800 mm)	3.42 CFS (96.8 L/s)	6.62 CFS (187.5 L/s)
S8	96” (2400 mm)	6.08 CFS (172.2 L/s)	11.76 CFS (333.0 L/s)

* Peak bypass flows are dependent on final design

[1] 50% removal of OK-110.

Installation

Installation of the stormwater treatment unit(s) shall be performed per manufacturer’s installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at 800-821-6710 or by logging on to www.adspipe.com.

ADS “Terms and Conditions of Sale” are available on the website, www.ads-pipe.com . The ADS logo, Barracuda logo, and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
© 2022 Advanced Drainage Systems, Inc. 4/22 CS

Appendix F: Construction Period Erosion Control Plan

Construction Period Erosion Control Plan

Proposed Residential Subdivision

Project Location:

Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)

Submitted To:

Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

Applicant & Property Owner:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

RLA Project File No. 220627

January 30, 2026

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

The project shall implement a construction period erosion control plan. The following provides descriptions and guidelines to ensure that the areas surrounding the project site will be protected from excessive sedimentation and runoff during construction.

1.1 Construction Period Pollution Prevention And Erosion Control Measures

1.1.1 Preconstruction Notifications And Meetings

Prior to the start of construction, the contractor shall call together a pre-construction meeting including a representative from the Town, the design engineer, contractor, and any pertinent persons that should be in attendance. These requirements shall be the responsibility of the Contractor to arrange, attend, and document.

1.1.2 Sediment Barrier And Work Limit

Before installation of the sediment barriers, the location shall be staked in the field for review and approval by the owner or their representative. To facilitate sediment barrier installation, woody vegetation may then be removed and any required trench may be cut by machine, provided all other ground cover is left intact. No excavation, grading, filling, or removal of vegetative ground cover shall begin until sediment barriers have been installed as shown on the plans and have been inspected by the owner or their representative.

1.1.3 Silt Fence

The bottom of the fence shall be trenched into the ground a minimum of 6" and back-filled with compacted soil. Where trenching is not feasible, silt fence skirt shall be covered with compacted soil or crushed stone. The top of the fabric shall be stretched as tightly as is practical, with intermediate stakes added to correct excessive sags. Stakes shall be driven at least 12" into the ground. Splices between sections shall be made by rolling end stakes together one complete turn and driving into the ground together.

1.1.4 Straw Bales

Straw bales may be used as temporary and moveable control measures, temporary check dams, or as reinforcement for silt fence in areas of concentrated runoff or high fills. Bales shall be tightly butted and staked 12" into the ground. Where used without silt fence in front, the bales shall be trenched 4" into the ground, back-filled with compacted soil, and the spaces between bales shall be chinked with loose hay.

1.1.5 Filter Sock (Filtrexx Or Equivalent)

In areas of expected sheet flow, filter sock may be placed directly on the ground without trenching or stakes. In areas of expected concentrated flow, mulch or crushed stone shall be placed along the up-slope face to control and filter underflow. Additional layers of Filter Sock may be required for adequate freeboard. The filter sock shall be staked at 10 feet on-center or in cases where they cannot be staked, utilize heavy concrete blocks to hold in place.

1.1.6 Temporary Sedimentation Basins

Temporary sediment basins may be excavations or bermed stormwater detention structures (depending on grading) that will retain runoff for a sufficient period of time to allow suspended soil particles to settle out prior to discharge. These temporary basins will be located based on construction needs as determined by the contractor and outlet devices will be designed to control velocity and sediment. Points of discharge from sediment basins will be stabilized to minimize erosion. If the temporary basin is to be located within an area of future infiltration as part of the stormwater management system, the excavation for the temporary sedimentation basin shall be limited to one foot above final grade of the infiltration structure.

1.1.7 Stocking Additional Materials

A stock of additional erosion control materials shall be available on the site for emergency repairs and temporary measures. Stock shall be replenished when decreased to 50% of the numbers below. Stock shall include:

Straw Bales – 10 (kept dry) with 20 oak stakes

Or

Silt Fence – 30 Linear feet.

Or

Filter Sock – 4 – 8 foot sections (kept dry)

Washed Stone – One (1) cubic yard, ¾" to 2" diameter

1.1.8 Trench Protection

Open trenches shall be protected from accumulation of surface water or groundwater that could result in erosion of the trench and discharge of sediment. Where feasible, spoil shall be stockpiled on the up-slope side of the trench to prevent entrance of surface runoff. Backfill shall be crowned to allow for settlement and to avoid concentration of runoff on top of the trench.

1.1.9 Site Stabilization – Temporary

Where a portion of the site will not be subject to construction activity for over 14 days, measures shall be taken to provide temporary stabilization of that inactive portion of the site, within 14 days of the cessation of construction activity. Stabilization measures may include seeding for temporary cover, mulching, or other measures to protect exposed soil from erosion and prevent sediment movement.

1.1.10 Site Stabilization – Permanent

Within 14 days of completion of loaming and finish grading on any portion of the site, that area shall be seeded or planted for permanent cover (season permitting) in accordance with USDA NRCS guidelines or equivalent.

1.1.11 Roadway Sweeping

The entrance to the site and affected portions of the access drive or paved project areas shall be swept as needed to control sediment runoff into storm drains or waterways and to control blowing dust.

1.2 Short-Term Erosion Control Maintenance

The following provides short-term erosion control maintenance guidelines and requirements.

1. The contractor or subcontractor will be responsible for implementing each control shown on the sedimentation and erosion control plan.
2. All erosion and sediment control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control measures will be installed during construction in order to control erosion and/or off-site sedimentation if deemed necessary by on-site inspection.
3. Effective erosion control measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operations that will disturb the natural protection.
4. All sediment and erosion control devices shall be inspected at least once every seven (7) calendar days and after any storm event greater than 0.5 inches of precipitation during any 24-hour period, and the inspection shall be documented in writing. Damaged or ineffective devices shall be repaired or replaced, as necessary.
5. The contractor shall take all reasonable precautions to avoid excess erosion of the site due to the construction of this project.
6. Silt shall be removed from behind barriers if greater than 6-inches deep or as needed. Sediment that is collected in structures shall be disposed of properly and covered if stored on-site
7. Damaged or deteriorated items will be repaired immediately after identification.
8. All ditches shall be stabilized as soon as is practicable to minimize erosion.
9. The contractor shall maintain all erosion control devices in a good, working state of repair. Upon complete stabilization of any tributary areas, the erosion control devices shall be removed and disposed of so as to cause no off-site siltation.
10. Inspect and maintain construction entrance stone such that sediment does not track onto the street. Any sediment tracked onto the street shall be swept daily.
11. After catch basins have been constructed, the contractor shall protect the inlets by constructing inlet protection as shown on the plans.
12. Once the site has been paved, all catch basin inlets shall receive a silt sack type protection.
13. Erosion control measures shall remain in place until all disturbed earth has been substantially stabilized. After removal of structures, disturbed areas shall be regraded and stabilized as necessary.

Appendix G: Long-Term Operation and Maintenance Plan

- Long-Term Operation & Maintenance Plan Narrative
- Barracuda Max Maintenance Guide
- StormTech Isolator Row Manual
- Isolator Row Sell Sheet
- StormTech SC-800 Sell Sheet
- O&M Checklist

Long-Term Operation & Maintenance Plan

Proposed Residential Subdivision

Project Location:

Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)

Submitted To:

Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

Applicant & Property Owner:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

RLA Project File No. 220627

January 30, 2026

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

I. Long-Term Stormwater Maintenance Program:

This Long-Term Operation and Maintenance Plan (O&M) identifies inspection and maintenance requirements for the proposed stormwater management system. The O&M references guidelines set forth by the Stormwater Management Handbook developed by the Massachusetts Department of Environmental Protection.

Owner/Responsible Party*:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

_____
Signature of Authorized Representative

*The party listed shall be responsible for implementation and record keeping of the requirements listed in this operation and maintenance plan. Upon sale of property or any other transition of ownership, the responsible party shall be reinstated as the new owner or any other group created as determined by the owner.

2. Inspection and Maintenance Program:

Regular inspection and routine maintenance are necessary to ensure that the stormwater management system continues to control and treat runoff. The following lists the inspection schedule and maintenance procedures for the proposed stormwater Best Management Practices:

BMP	Inspection Schedule	Maintenance Schedule	Maintenance Procedures
Bituminous Concrete Pavement	Four times per year	Twice per year	• Roadway to be swept in March or April following snow melt and again in late November or early December to remove fallen leaves and debris.
Deep-Sump Catch Basins	Four times per year	Four times per year	• Remove sediment once deposits reach one half the depth from the bottom sump to the lowest invert.
Stormwater Piping	Once per year	Once per year	• Inspect pipe entrances in catch basins and manholes and remove any blockages.
Water Quality Unit*	As specified by the manufacturer	As specified by the manufacturer	• Clean the unit using the method specified by the manufacturer. Vactor trucks are typically used to clean these units.
Subsurface Detention Basin	Twice per year	Twice Per year	• Verify that the inlet structure has no accumulation of sediment.
Isolator Row(s)**	Every 6 months for the first year. Once per year thereafter	3 inches of accumulated sediment	• Measure accumulated sediment depth. Once sediment reaches 3 inches, maintenance cleaning should be performed.
Flared End Section	Four times per year	As Needed	• Remove any debris or vegetation around the flared end section such that flow out of the structure is not impeded.
Roof Leaders	Once per year	Once per year	• Inspect downspout connections at grade and remove any blockages. • Open and inspect cleanout locations and remove any blockages.
Level Spreader	Every six months during the first year. Annually thereafter.	As Needed	• Remove sediment from the toe of slope and/or riprap voids. • Repair gullies and reseed bare spots immediately.

*See attached Device Operation and Maintenance Guides

**See attached Maintenance Guide

See the attached Long-Term O&M Inspection Checklist for record keeping purposes.

3. Additional Long-Term Operation and Maintenance Items

The following is a list of additional operation and maintenance items to be implemented by the owner/governing group to maintain the features proposed in this project.

A. Proper storage, use, and disposal of hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc. shall be required. Information should be provided on chemicals of concern, proper use, and disposal options. Recycling programs for used motor oil, antifreeze, and other products should be developed.

B. Vehicle Washing. This management measure involves educating the owner on the water quality impacts of the outdoor washing of vehicles and how to avoid allowing polluted runoff to enter the storm drain system. Outdoor vehicle washing has the potential to result in high loads of nutrients, metals, and hydrocarbons which is conveyed by the detergent-rich water into storm drains.

C. Recycling, spill prevention and response plans, and proper material storage and disposal of potentially hazardous materials shall be implemented. It will be the responsibility of the owner to contain and legally remove any materials that are spilled onsite. The use of dry floor cleaners and absorbent materials and limiting the use of water to clean pavement is encouraged. Care should be taken to avoid accidental disposal of hazardous materials.

D. Provisions for storing trash and waste products shall be implemented. The waste materials shall be collected by the owner and all materials shall be properly disposed of.

E. Requirements for routine inspections and maintenance of stormwater best management practices. Routine inspections shall be performed to ensure the correct functioning of stormwater best management practices. See the specific maintenance criteria for detail regarding inspections and maintenance frequency.

F. Requirements for Storage and Use of Fertilizers, Herbicides, and Pesticides. Fertilizers, pesticides, herbicides, lawn care chemicals, or other leachable materials shall be used in accordance with the Lawn Care Regulations of the Massachusetts Pesticide Board, 33 CMR 10.03 (30,31), as amended, with manufacturer's label instructions and all other necessary precautions to minimize adverse impacts on surface and groundwater. The storage of any such materials shall be within structure designed to prevent the escape of contaminated runoff or leachate.

G. Provisions for prevention of illicit discharges to the stormwater management system shall be implemented. Any illicit discharges to the stormwater management system shall be prohibited. It will be the owner's responsibility to ensure compliance with the legal disposal of all materials and containment/cleanup of any illicit discharges.

H. Training for staff or personnel involved with implementation of the Long-Term Pollution Prevention Plan shall be required. The owner/governing group will be responsible for the implementation of the measures set forth in the Long-Term Pollution Prevention Plan. Documentation that personnel and owners involved with the implementation of the Long-Term Pollution Prevention Plan have been trained to conduct such tasks shall be documented.

4. Winter and Snow Conditions

The following is a list of additional operation and maintenance items to be implemented by the owner during winter and snow conditions.

A. Snowfall shall be stored on the grassed areas surrounding the pavement areas, excluding any areas utilized for stormwater management practices. As needed, any snow that cannot be stored on site shall be trucked off site and disposed of properly.

B. Winter road salt and/or sand use and storage restrictions shall be implemented based on any restrictions issued for the project. Sodium chloride for ice control shall be used at the minimum salt to sand ratio which is consistent with the Massachusetts Department of Environmental Protections guidelines. Sodium chloride, calcium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads/drives shall not be stored on site.

5. Public Safety Features

The proposed site design utilizes the following features which have been incorporated to ensure the safety of the public:

A. Control and collection of stormwater runoff through positive drainage and curbing directing it towards the drainage inlets;

B. Heavy-duty stormwater drain manhole covers and catch basin grates have been designed to withstand H20 loading;

C. Reduction of peak discharge rates from the site in the post-development condition as compared to the pre-developed conditions;

D. Development and implementation of an Operations & Maintenance Plan to ensure the stormwater management system continues to function as designed.

6. Estimated Cost of Maintenance

The following budget was prepared as an estimate of inspection and maintenance costs for the stormwater management system. The budget is an estimate only as the costs may vary depending on the level of sediment accumulation and frequency of maintenance tasks required.

BMP Inspections	Number of Occurrences	Maintenance Cost	Number of Structures	Sum
Water Quality Unit	2/year	$200	1	$400
Catch Basin	4/year	$50	2	$400
Isolator Row	2/year	$100	1	$200
Subsurface Detention Basin	2/year	$100	1	$200
Level Spreader	2/year	$100	1	$200
Total Estimated Annual Cost of Inspections				$1,400

BMP Maintenance	Number of Occurrences	Maintenance Cost	Number of Structures	Sum
Water Quality Unit	2/year	$1,000	1	$2,000
Catch Basin	4/year	$100	2	$800
Isolator Row	2/year	$100	1	$200
Subsurface Detention Basin	2/year	$500	1	$1,000
Level Spreader	1/year	$1,000	1	$1,000
Total Estimated Annual Cost of Maintenance				$5,000

Barracuda® Max & Barracuda Maintenance Guide

One of Barracuda's advantages is the ease of maintenance. Like any system that collects pollutants, the Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and then on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

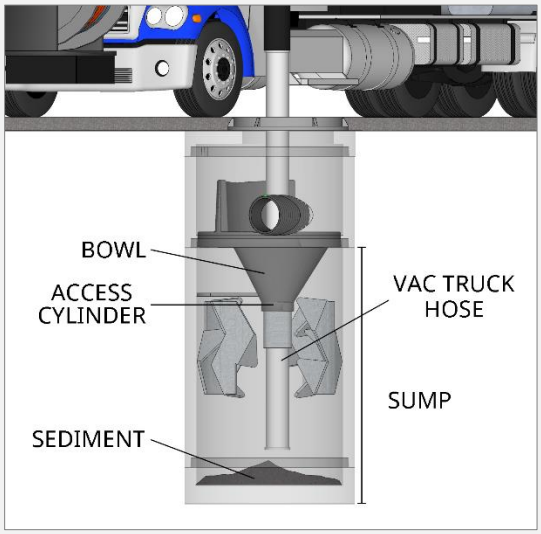
Barracuda Storage Capacities

Model	Manhole Diameter in. (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (20" depth) Yards^3 (meters^3)	NJDEP Sediment Capacity (50% of standard depth) Yards^3 (meters^3)
S3	36 (900)	264 (999)	212 (803)	0.44 (0.34)	0.22 (0.17)
S4	48 (1200)	665 (2517)	564 (2135)	0.78 (0.60)	0.39 (0.30)
S6	72 (1800)	1497 (5667)	1269 (4804)	1.75 (1.34)	0.88 (0.67)
S8	96 (2400)	4196 (15884)	3835 (14517)	3.10 (2.37)	1.55 (1.19)

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 8" (200 mm), 10" (250 mm), 15" (375 mm) or 20" (500 mm) diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
    a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
    b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
    c. Additional local regulations may apply to the maintenance procedure.

Figure 1



ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com
The ADS logo, Barracuda® and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
© 2022 Advanced Drainage Systems, Inc. MG1.01 08/22 CS

ADS® Barracuda® Concrete

Installation Guide

ADS Barracuda Max & Barracuda S4, S6, S8 Concrete Installation Guide

This installation guide is reference for installing the Barracuda Max S4, S6, S8 Water Quality Units into a precast concrete structure in the field.



(1) Deflector Plate



(1) Center Funnel Extender



(2) A/C Stainless Steel Tooth Set



(2) B/D Stainless Steel Tooth Set



(1) Barracuda Max Plastic Funnel

S4	 (4) Stainless Steel Funnel Mounting Flanges	 (1) Roll of Conseal®	 (16) Concrete Anchor ¼ x 2¼"
S6	 (4) Stainless Steel Funnel Mounting Flanges	 (3) Roll of Conseal®	 (16) Concrete Anchor ¼ x 2¼"
S8	 (8) Stainless Steel Funnel Mounting Flanges	 (4) Roll of Conseal®	 (22) Concrete Anchor ¼ x 2¼"

Please check that all components are on site. Below is a list of tools that may be required for installation.

- □ 1/4" Diameter Carbide Tipped Concrete Bit
- □ Standard Electrical or Battery Operated Drill
- □ Adjustable Wrench
- □ Marker for writing on the concrete wall
- □ Hammer Drill for Concrete (Fits the 1/4" Diameter Concrete Drill Bit)
- □ 7/16" Driver or deep socket for installation of provided ¼" Concrete Wedge Anchors
- □ Hammer
- □ Level
- □ Ladder that will extend to bottom of the structure
- □ Safety Glasses
- □ Hard Hat
- □ Protective Gloves
- □ Site Drawings
- □ ADS Design Layout

Installation Instructions (These directions assume the manhole base and riser have been assembled, but that the top slab/cone has not been set).

*Do not insert the inlet or outlet pipes until after the Barracuda Max internals have been installed. If pipes must be inserted in advance, the pipes should not protrude into the structure as they will interfere with installation of the bowl.

1. Install mounting flanges for the Barracuda Max plastic funnel. These flanges need to be installed at the same height, as indicated by model in Table 1. For example, the anchor holes for S4 flanges should be drilled 77" (1925 mm) from the sump floor. S4 and S6 models have four flanges and they need to be evenly spaced at 12, 3, 6, and 9 o'clock positions. S8 funnels require eight flanges that also need to be evenly spaced (i.e., forty-five degrees on a circle) around the inside of the manhole. This flange points are typically located in the third manhole section from the sump and also contain the pipe openings for the Barracuda Max unit. Use the same anchor procedure as you will when mounting the teeth (see step #4 below), using the ¼" (6.25 mm) concrete drill bit to drill 1¼" (31.25 mm) deep holes. Do not over drill the depth of the anchors. Lightly hammer the anchors in place and use locking nuts to firmly secure the flanges (Figure 1).
2. Next, mount the four sets of teeth vertically inside the manhole sump. Using the engineer's plans or the ADS layout, determine the correct orientation for the plastic funnel outlet hole in relation to the outlet pipe (Figures 2 and 5). The first set of teeth (marked as "A" on the teeth part) will be mounted under the center of the outlet hole from the Bowl. Mark that location with a plumb vertical line, this will serve as the "12 o' clock" landmark in the manhole (Figure 3). Repeat this process to mark lines at the 3, 6, and 9 o' clock positions for a total of four.
3. Each kit includes four sets of teeth. Two of these sets are stamped with the letters A and C. The other two sets are stamped B and D. The ADS shop drawing layout will label the teeth letters and all designs will be the A/B configuration (Figure 5). You will install each set of teeth in the correct location, with the indicated letter facing up (Figure 4). See Table 1 for the correct elevation for the top anchor location of each tooth set, measured from the sump floor for each Barracuda Max Unit. The teeth anchors are all at the same elevation. For example, for an S4 Barracuda the top anchor of an A or B indicated set of teeth will be 60" (1500 mm) off the sump floor. Mark the top anchor elevations on each of your four vertical lines (Figure 3), noting that A and B sets of teeth will be at the same height.



Figure 1



Figure 2



Figure 3

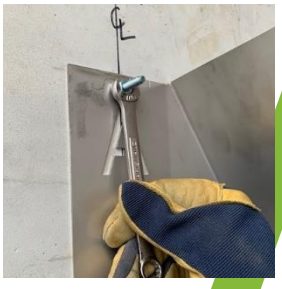
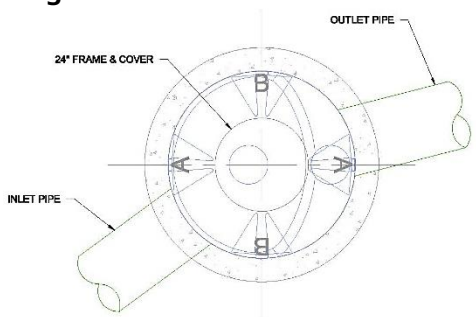


Figure 5

Figure 4



4. To fasten the sets of the teeth to the manhole, use the ¼" concrete drill bit and drill holes approximately 1¼" (31.25 mm) deep at your marked top anchor locations. Do not over drill into the concrete wall. Using a hammer, lightly tap the concrete anchors into the drilled holes (Figure 4). Hang the tooth set on the top anchor with the correct letter facing up and use a locking nut to loosely secure the tooth set to the wall (do not fully tighten the locking nut at this point). With the set of teeth hanging from the top anchor, line up and mark the bottom anchor location and drill the hole. Then hammer the bottom anchor in place and secure the teeth with a lock nut. Use an adjustable or socket wrench to tighten all the top and bottom locking nuts, except for the top nut on the outlet set of teeth (see step #5 below for the deflector plate installation, which will share the top anchor post), so that the teeth are firmly secured to the wall.

5. To attach the deflector plate to the concrete manhole you will use the exit tooth's top concrete anchor and share that linking point with the center tab of the deflector plate. Place the center tab of the deflector plate over the anchor bolt "post" on the outlet set of teeth and hand tighten the nut. Ideally, the plate will be held in place by this center point. Mark the location of the additional mounting tabs for the deflector plate while holding the plate relatively level. All deflector plate concrete anchors will be at the same elevation as the top tooth linking points and the anchors will be installed like the description in step #4. Once the two outer deflector plate linking points have been located, the installer can draw a vertical line and measure the exact location corresponding to the "high" teeth anchoring elevation. Once the deflector plate concrete anchors are installed tighten the nuts to complete the fastening of the deflector plate to the wall of the structure. See Figure 6 to show this more clearly.

6. Lower the plastic funnel into the structure (Figure 7), orienting the weir and outlet hole as depicted in the ADS layout (as identified in step 1). S6 and S8 units have eyebolts threaded holes on the top of the funnel to assist in lifting, and the eyebolts are provided in the equipment kit. If the eyebolts are misplaced, S6 units have ⅜" (9 mm) -16 threads and S8 units utilize ½" (12 mm) -13 threads. After the bowl is in place, install the center funnel extender through the hole and seat it until the tabs of the extender touch the bowl itself (Figure 8). This is a friction-based attachment and no fasteners are needed.

7. Next, you'll use Conseal to fill any gaps around the funnel. S6 and S8 units are provided with a metal funnel plug. This plug is placed in the funnel opening for worker safety and must be utilized ANYTIME SOMEONE ENTERS THE STRUCTURE. Unroll the Conseal and wedge it between the funnel and manhole to create a seal (Figure 9). Conseal should also be used to seal between the vertical edges of the weir wall and the manhole. The plastic funnel can expand with high temperature. Install the funnel during cooler parts of the day, or keep the funnel shaded until installation can mitigate fitment issues. Once the Conseal is installed, the internal component installation is complete. The funnel plug may be discarded (if applicable), and the top slab can be set. If the application calls for a grated inlet, orient the slab so the grate is above the inlet (large bowl) side of the plastic funnel.

For maintenance details, please refer to the Barracuda Max Maintenance Manual. If the application requires a trash rack or oil boom, reference the appropriate supplementary installation instructions.



Figure 6



Figure 7



Figure 8

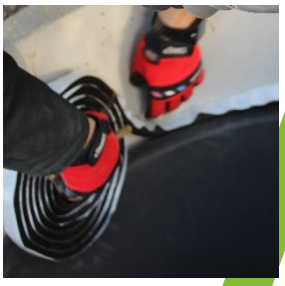


Figure 9

Table 1

	S4	S6	S8
Top Anchor Elevation from Sump Floor (A and B tooth indication)	60” (1270 mm)	68” (1475 mm)	90” (1880 mm)
Funnel Flange Anchor Elevation from Sump Floor	77” (1960 mm)	77” (1960 mm)	127” (3220 mm)

Note: Distances can be +/- 1-2 inches (25-50 mm) from these locations for the A, and B teeth, but flange elevations should be adhered to as much as possible and can only be lowered a maximum of 1 inch (25 mm) from these values listed above.
This guide is intended for field installations of Barracuda Max S4, S6, and S8 water quality units into precast manholes. For pre-casters installing internal components prior to job site delivery, contact ADS for possible modifications to component elevations.

ADS “Terms and Conditions of Sale” are available on the ADS website, www.ads-pipe.com
The ADS logo, Barracuda® and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
Conseal is a registered trademark of Concrete Sealants, Inc.
© 2021 Advanced Drainage Systems, Inc. IG1.08 7/21 CS

Isolator® Row Plus
O&M Manual



The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

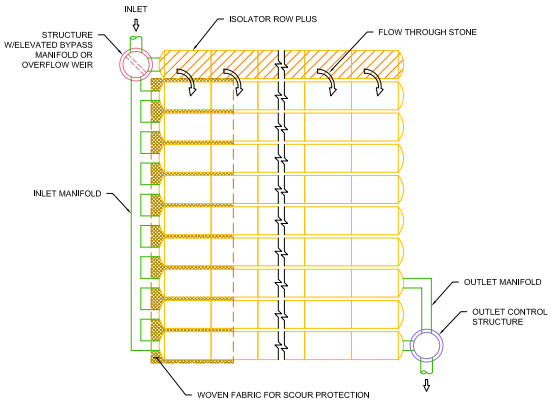
Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*



Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.



StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

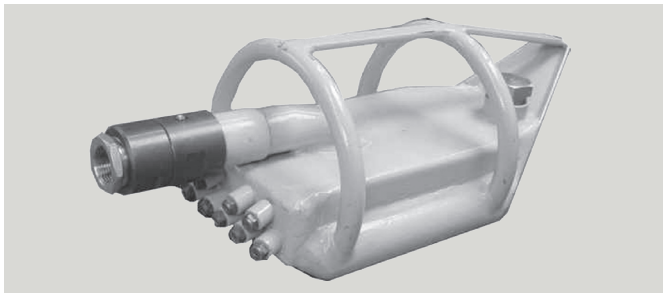
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

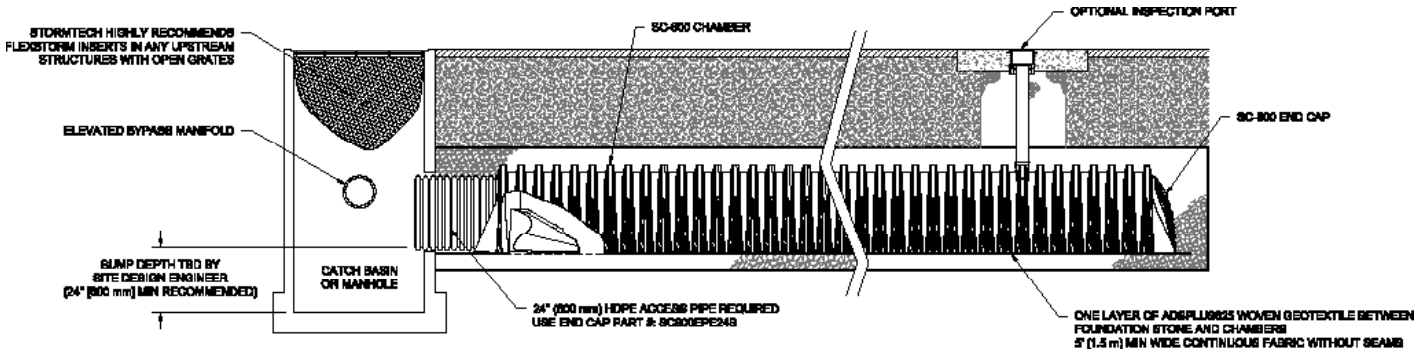
Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**







StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

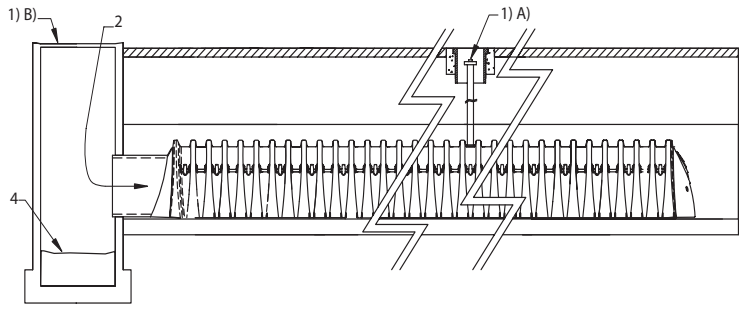
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

ADS "Terms and Conditions of Sale" are available on the ADS website, www.adspipe.com
The ADS logo, StormTech®, the Isolator® Row Plus and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
© 2025 Advanced Drainage Systems, Inc. #11081 5/25 CS

adspipe.com
800-821-6710

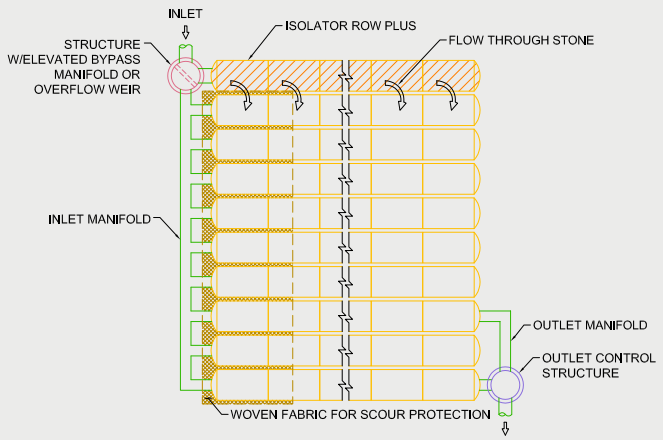
Isolator® Row Plus

The StormTech Isolator Row Plus is an enhancement to our proven water quality treatment system. This updated system is an NJCAT verified water quality treatment device that can be incorporated into any system layout.

Features

- Isolator Row Plus is now NJCAT verified. As a Manufactured Treatment Device it achieves over 80% TSS removal by filtration NJDEP Laboratory Protocol Assessment NJCAT Technology Verification.
- A patented Flamp™ (Flared End Ramp) provides a smooth transition from pipe invert to fabric bottom. The Flamp is attached to the inlet pipe inside the chamber end cap and improves chamber function over time by distributing sediment and debris that would otherwise collect at the inlet. It also serves to improve the fluid and solid flow back into the inlet pipe during maintenance and cleaning.
- Proprietary ADS Plus fabric maintains durability and sediment removal while allowing for higher water quality flow rates. A single layer of ADS Plus fabric is placed between the angular base stone and the Isolator Row Plus chambers.

Schematic of the StormTech Isolator Row Plus System



Technology Descriptions

The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume or a flow basis. An upstream manhole not only provides access to the Isolator Row Plus but includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with either an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the StormTech chamber system it is either infiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

Summary of Verified Claims[1]

Treatment Rate (gpm/ft²)	4.1
Underlying Geotextile Layers	1
NJDEP Test Sediment	D50=75um
Mean Particle Concentration (mg/L)	200
TSS Removal Efficiency	>80%

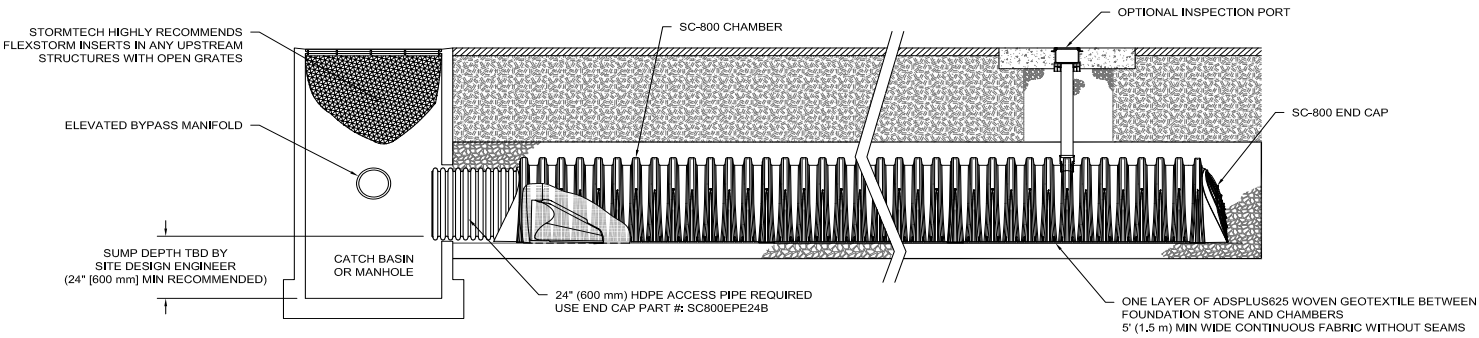
[1] Verification testing of the StormTech SC-740 Isolator Row PLUS in accordance with NJDEP Laboratory protocol to access total suspended solids removal by filtration manufactured treatment device, 2013



ADS StormTech™

adspipe.com
800-821-6710

StormTech Isolator Row Plus (not to scale)



Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By "isolating" sediment to just one row of the StormTech system, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout.

Maintenance is accomplished with the JetVac® process. The JetVac process utilizes a high-pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediment. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency.

StormTech Isolator Row Plus

Chamber Model	Chamber Storage	Chamber Footprint	Treatment Rate
SC-160LP	15.0 cf (0.42 m^3)	11.45 sf (1.06 m^2)	0.11 cfs (3.11 L/s)
SC-310	31.0 cf (0.88 m^3)	17.7 sf (1.64 m^2)	0.16 cfs (4.53 L/s)
DC-780	78.4 cf (2.22 m^3)	27.8 sf (2.58 m^2)	0.26 cfs (7.36 L/s)
SC-800	81.0 cf (2.29 m^3)	27.3 sf (2.54 m^2)	0.25 cfs (7.1 L/s)
MC-3500	175.0 cf (4.96 m^3)	42.9 sf (3.99 m^2)	0.40 cfs (11.32 L/s)
MC-4500	162.6 cf (4.60 m^3)	30.1 sf (2.80 m^2)	0.28 cfs (7.93 L/s)
MC-7200	267.3 cf (7.57 m^3)	50.0 sf (4.65 m^2)	0.45 cfs (12.74 L/s)

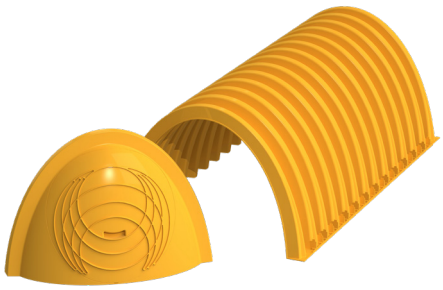
Installation

Installation of the stormwater treatment unit(s) shall be preformed per manufacture's installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems Inc. at (800) 821-6710 or by logging on to adspipe.com.

ADS "Terms and Conditions of Sale" are available on the ADS website, www.adspipe.com
The ADS logo, StormTech® and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
© 2025 Advanced Drainage Systems, Inc. #11085 5/25 CS

StormTech® SC-800 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
85.4” x 51” x 33”
2169 mm x 1295 mm x 838 mm

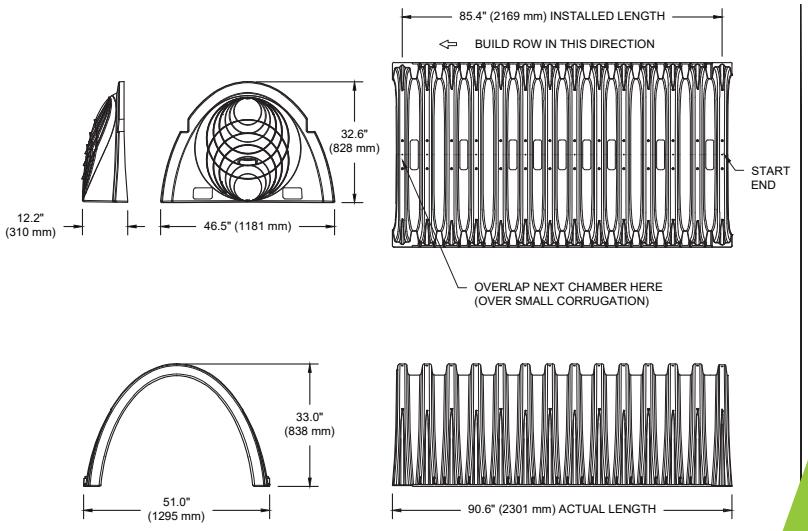
Chamber Storage
50.6 ft³ (1.43 m³)

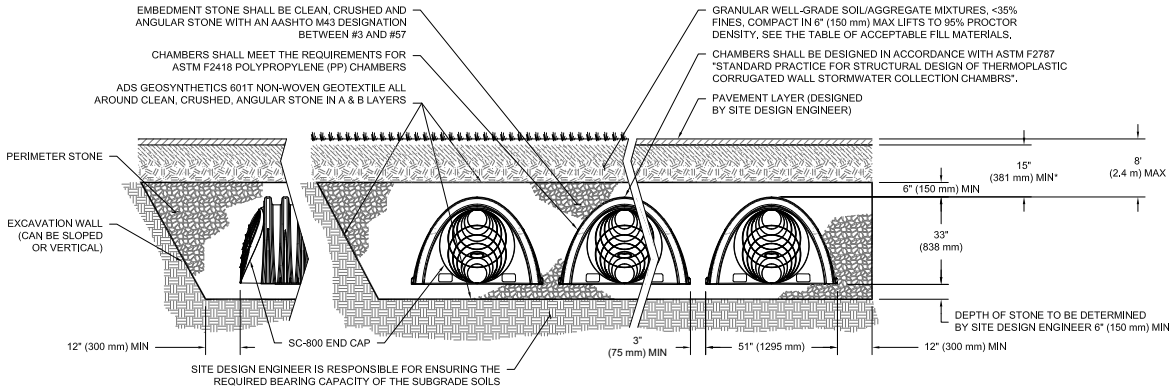
Min. Installed Storage*
78.4 ft³ (2.22 m³)

Weight
81.8 lbs (37.1 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

*Assumes 6” (150 mm) stone above and below chambers, 3” (75 mm) stone between chambers, and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 21" (533 mm).

ADS StormTech™

StormTech SC-800 Specifications

Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6” (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
45 (1143)	50.62 (1.433)	78.41 (2.22)
44 (1118)	50.62 (1.433)	77.34 (2.19)
43 (1092)	50.62 (1.433)	76.28 (2.16)
42 (1067)	50.62 (1.433)	75.21 (2.13)
41 (1041)	50.62 (1.433)	74.14 (2.10)
40 (1016)	50.62 (1.433)	73.07 (2.07)
39 (991)	50.62 (1.433)	72.01 (2.04)
38 (965)	50.55 (1.431)	70.89 (2.01)
37 (940)	50.35 (1.426)	69.71 (1.97)
36 (914)	50.07 (1.418)	68.47 (1.94)
35 (889)	49.56 (1.403)	67.10 (1.90)
34 (864)	48.82 (1.382)	65.59 (1.86)
33 (838)	47.93 (1.357)	63.98 (1.81)
32 (813)	46.91 (1.328)	62.31 (1.76)
31 (787)	45.79 (1.297)	60.57 (1.72)
30 (762)	44.58 (1.262)	58.77 (1.66)
29 (737)	43.28 (1.226)	56.93 (1.61)
28 (711)	41.91 (1.187)	55.04 (1.56)
27 (686)	40.47 (1.146)	53.10 (1.50)
26 (660)	38.96 (1.103)	51.13 (1.45)
25 (635)	37.40 (1.059)	49.13 (1.39)
24 (610)	35.78 (1.013)	47.09 (1.33)
23 (584)	34.10 (0.966)	45.02 (1.27)
22 (559)	32.38 (0.917)	42.91 (1.22)
21 (533)	30.61 (0.867)	40.79 (1.15)
20 (508)	28.80 (0.816)	38.63 (1.09)
19 (483)	26.95 (0.763)	36.45 (1.03)
18 (457)	25.06 (0.710)	34.25 (0.97)
17 (432)	23.13 (0.655)	32.02 (0.91)
16 (406)	21.17 (0.599)	29.78 (0.84)
15 (381)	19.17 (0.543)	27.51 (0.78)
14 (356)	17.14 (0.485)	25.23 (0.71)
13 (330)	15.09 (0.427)	22.93 (0.65)
12 (305)	13.00 (0.368)	20.61 (0.58)
11 (279)	10.89 (0.308)	18.28 (0.52)
10 (254)	8.76 (0.248)	15.93 (0.45)
9 (229)	6.60 (0.187)	13.57 (0.38)
8 (203)	4.42 (0.125)	11.19 (0.32)
7 (178)	2.22 (0.063)	8.81 (0.25)
6 (152)	0 (0)	6.41 (0.18)
5 (127)	0 (0)	5.34 (0.15)
4 (102)	0 (0)	4.27 (0.12)
3 (76)	0 (0)	3.20 (0.09)
2 (51)	0 (0)	2.14 (0.06)
1 (25)	0 (0)	1.07 (0.03)

Stone Cover

Stone Foundation

Note: Add 1.07 ft³ (0.03 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-800 Chamber	50.6 (1.43)	78.4 (2.22)	84.8 (2.4)	91.2 (2.58)

Note: Assumes 6” (150 mm) stone above chambers, 3” (75 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth		
	6”	12”	18”
SC-800	3.6 (2.6)	4.4 (3.2)	5.3 (3.8)
Metric Kilograms (m³)	**150 mm**	**300 mm**	**450 mm**
SC-800	3270 (2.0)	3990 (2.4)	4810 (2.9)

Note: Assumes 6” (150 mm) of stone above chambers and 3” (75 mm) stone between chambers.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6” (150 mm)	12” (300 mm)	18” (450 mm)
SC-800	5.3 (4.1)	5.9 (4.5)	6.5 (5.0)

Note: Assumes 3” (75 mm) of row separation and 15” (375 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

Working on a project?
Visit us at adspipe.com/stormtech and utilize the Design Tool

ADS StormTech™

adspipe.com
800-821-6710

ADS “Terms and Conditions of Sale” are available on the ADS website, www.adspipe.com
The ADS logo, StormTech® and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc.
© 2025 Advanced Drainage Systems, Inc. #11185 5/25 CS

Project: _____ Responsible Party: _____

Address: _____ Date: _____

BPM Name: _____ Page: 1 of 1

Operation & Maintenance Inspection Checklist

BMP Element:	Potential Problem:	Resolution:	Pass	Fail	Recommended Remediation
Deep-Sump Catch Basins	Sediment has accumulated to a depth greater than the original design depth for sediment storage, approximately 2-feet of sediment.	Remove the sediment and dispose of in accordance with local and state regulations.			
Stormwater Piping	Blockage of inlet/outlet pipes due to debris or sediment accumulation.	Remove any debris and sediment via proper means. Dispose of debris/sediment in accordance with local & state regulations			
Roof Leaders	Downspout connections have been damaged or disconnected.	Repair and reconnect downspout connections.			
	Roof leaders are surcharging at the downspout connections	Open and insepct at cleanout locations and remove any blockages.			
Proprietary Treatment Device	Sediment has accumulated to a depth greater that the original design depth for sediment storage.	Remove sediment and disposed of in accordance with local and state regulations.			
Subsurface Detention Basin	Accumulation of sediment at the inlet structure above maintenance level.	Remove the sediment and conduct proper maintenance to the up-gradient pretreatment devices.			
Isolator Row	Accumulation of sediment over 3-inches within the isolator row.	Remove the sediment and conduct the proper maintenance per the Isolator Row Operation and Maitenance Manual.			
Flared End Sections	Vegetation has started to grow within the riprap area.	Remove vegetation immediately.			
	Accumulation of sediment/debris at the culvert inlet.	Remove sediment or debris such that the culvert has free flow.			
	Erosion is occuring where riprap has been dislodged.	Remedy scoured area and replace riprap immediately.			
Level Spreader	Sediment has accumulated in riprap channel void space.	Remove the sediment and dispose of in accordance with local and state regulations and replace riprap.			
	Down-gradient gullies have formed due to sheet flow concentration.	Fill gullies with native backfill, No. 6 pea-stone, topsoil and errosion control blanket. Sod or re-seed with stabalized errosion control grass mix.			

_____ _____

Inspector's Signature Date

Appendix H: Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

The owners of the land/responsible party will be responsible for prohibiting illicit discharges to the stormwater management system during construction and during its life of operation. The stormwater management system is comprised of the components for conveying, treating, and infiltrating stormwater runoff on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. An illicit discharge shall constitute any connection or discharge to the stormwater management system including, but not limited to, wastewater discharges, discharge of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

Responsible Party*:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

*The party listed shall be responsible for implementation and record keeping of the requirements listed in this operation and maintenance plan. Upon sale of property or any other transition of ownership, the responsible party shall be reinstated as the new owner or any other group created as determined by the owner.

_____ _____

Signature of Responsible Party Representative Date

_____ _____

Signature of Responsible Party Representative** Date

**Required upon transfer of ownership

Appendix I: Low Impact Development Considerations

Low Impact Development Considerations

Proposed Residential Subdivision

Project Location:

Old River Street, 27 Walnut Street & 17 High Street
Agawam, Massachusetts 01001
(Parcel IDs: J17-1-3, J17-1-1 & J17-1-5)

Submitted To:

Town of Agawam Planning Board
1000 Suffield Street
Agawam, Massachusetts 01001

Applicant & Property Owner:

Calabrese Construction, LLC
c/o Mr. Charles Calabrese
7 Brewster Road
West Springfield, Massachusetts 01089

RLA Project File: 220627

January 30, 2026

R LEVESQUE ASSOCIATES, INC
A LAND PLANNING SERVICES COMPANY
40 School Street · Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

Introduction

Per the Massachusetts Stormwater Handbook, project proponents must consider environmentally sensitive site design and low impact development techniques to effectively manage stormwater. As a part of the proposed project, the proponent has considered a number of environmentally sensitive, low impact development techniques to prevent the generation of stormwater and non-point source pollution.

The following is a detailed description of the considerations for each low impact development measure. For ease of review, RLA has provided the consideration of each measure as detailed in the Massachusetts Stormwater Report Checklist.

Low Impact Development (Lid) Measures

1. Environmentally Sensitive Project Approach

   The proposed project has been designed to create three new building lots and the construction of three new multi-family homes on the northerly end of High Street and the paper street called Old River Street in Agawam, Massachusetts. The site is bordered to the north by the Westfield River and associated riverfront area. The proposed site improvements have been designed specifically to avoid jurisdictional area and therefor provide an environmentally sensitive approach to the site development.

2. No disturbance to any Wetland Resource Areas

   The project was designed in the least intrusive manner possible and almost entirely within previously developed areas. Riverfront area associated with the Westfield River is located on the property to the northeast. There is no work proposed within any wetland resource areas or, in this case, the respective 200-foot riverfront area.

3. Site Design Practices (e.g. clustered development, reduced frontage setbacks)

   The project will entail the creation of a three lot subdivision and will involve the reconstruction of a portion of High Street, a cul-de-sac, utility connections, and stormwater management system. The subdivision lots have been laid out in the most efficient manner possible, effectively utilizing the upland areas within the property and minimizing disturbance within the riverfront area. All proposed work is located outside of the 200-foot riverfront area.

4. Reduced Impervious Area (Redevelopment Only)

   The proposed project is not part of a redevelopment project.

5. Minimizing disturbance to existing trees and shrubs

   The goal of the project proponent is to maintain as much of the existing vegetative cover on-site as possible. The majority of the area being developed as part of the subdivision has been historically disturbed and lacks mature vegetation. Special care has been taken to avoid disturbance within the 200-foot riverfront area.

6. LID Site Design Credit Requested

No LID Site Design Credit is requested for the proposed project.

7. Use of "country drainage" versus curb and gutter conveyance and pipe

Country drainage systems are often times much less costly than closed drainage systems such as gutter conveyance and pipe. Alternatives to the proposed curb and gutter, catch basin, and underground infrastructure were considered. It was discovered that due to the site layout, the project proponent was unable to take advantage of country drainage systems. It was not feasible to convey the water to a pre-treatment and detention area that meets the DEP standards by country drainage methods.

8. Bioretention Cells (includes Rain Gardens)

Due to the site layout along with the proposed curb and gutter stormwater management system, a viable location to include a bioretention cell was not feasible.

9. Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

There are no wetland impacts proposed, therefore, a constructed wetland is not logical and would create additional regulated area.

10. Treebox Filter

Treebox filters were considered for the project, however, due to the nature of the project being a residential subdivision and the site layout, the extensive costs associated with such a method and the climatic conditions of the area, it is believed that such methods would be detrimental to the proposed project and would only provide a maintenance problem and a potential hazard for the owner.

11. Water Quality Swale

Due to the layout of the site, a water quality swale has not been included as part of the treatment train process for the stormwater management system.

12. Grass Channel

Due to the layout of the site, a grassed channel has not been included as part of the treatment train process for the stormwater management system.

13. Green Roof

Green roofs are not suitable or marketable for the proposed project.

14. Other

Please see the Stormwater Report for more information.

Request for Zoning Map Amendment

Under Town of Agawam Zoning Ordinance § 180-3 – Districts enumerated; Building Zone Map.

Proposed Residence A-2 (RA-2) Zoning District

Project Location:

515 Mill Street & 533 Mill Street
Agawam, Massachusetts 01001
(Assessor's Parcel IDs: H10-2-19 & H10-1-4)

Submitted To:

Town of Agawam City Council
36 Main Street
Agawam, Massachusetts 01001

Applicant(s) & Property Owner(s):

Of 515 Mill Street
Sergey Dikan
114 Birch Hill Road
Agawam, Massachusetts 01001

Of 533 Mill Street
Mikhail Ashlaban
533 Mill Street
Agawam, Massachusetts 01001

RLA Project File No. 250105
January 26, 2026

R LEVESQUE ASSOCIATES, INC.
A LAND PLANNING SERVICES COMPANY
40 School Street, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

TABLE OF CONTENTS

SECTION

1. PETITION LETTER
2. LOCUS MAP
3. DEED REFERENCES

LIST OF APPENDICES

APPENDICES

APPENDIX A: SITE PLAN

I. PETITION LETTER

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

January 26, 2026

Rosemary Sandlin, Council President
Town of Agawam City Council
36 Main Street
Agawam, Massachusetts 01001

RE: Request for Zoning Map Amendment – Proposed Residence A-2 (RA-2) Zoning District
515 Mill Street & 533 Mill Street
Agawam, Massachusetts 01001
(Assessor's Parcel IDs: H10-2-19 & H10-1-4)
RLA Project File No. 250105

Dear President Sandlin and Councilors:

On behalf of the applicants and property owners, Sergey Dikan and Mikhail Ashlaban, R Levesque Associates, Inc. is submitting this Request for Zoning Map Amendment for the above-referenced properties and right-of-way in Agawam, Massachusetts.

PROPERTY DESCRIPTION

The subject properties are located south of Mill Street and consist of approximately 6.6 ± acres. 515 Mill Street is owned by Sergey Dikan and is recorded in the Hampden County Registry of Deeds under Book 24346, Page 391. 533 Mill Street is owned by Mikhail Ashlaban and is recorded in the Hampden County Registry of Deeds under Book 20091, Page 539. Copies of the deed references are included within this petition packet under Section 3. According to the Town of Agawam online Assessor's database, the subject properties are split zoned, with the northern portions located within the Residence A-2 (RA-2) zoning district. The southern portion of 515 Mill Street is located within the Business B (BB) zoning district. The southern portion of 533 Mill Street is located within the Agricultural (AG) zoning district. A Locus Map depicting the location and current zoning is included within this petition packet under Section 2.

ZONING MAP AMENDMENT PETITION

The petitioners respectfully request that the Town of Agawam City Council grant the above-referenced Zoning Map Amendment under the Massachusetts General Laws Chapter 40A Section 5 to amend the Town of Agawam Building Zone Map to allow for the entirety of the subject properties and right-of-way to be rezoned to the Residence A-2 (RA-2) zoning district, as promulgated under Article III of the local zoning regulations.

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

STATEMENT OF PURPOSE

The proposed zoning amendment is intended to allow for residential development on the site, consistent with the character of surrounding uses. The proposed zoning map amendment to Residence A-2 (RA-2) would support the applicants' plan to divide the subject properties for residential use and improve / upgrade the existing right-of-way.

STATEMENT OF JUSTIFICATION

Facts to support a finding that the proposed Zoning Map Amendment will be desirable and without substantial detriment to the public good:

1. The applicant intends to rezone from a business-oriented zoning district to a residential-oriented zoning district to allow for future development and improvements at this site.
2. There is no significant impact to the neighborhood in requesting the proposed Zoning Map Amendment as similar residential areas currently exist within the general vicinity of the subject properties.
3. The subject properties are well suited for residential use and have ample space to utilize for construction.
4. The subject properties are located in a primarily residentially utilized neighborhood, and the proposed residential use of the site better aligns with the neighborhood than the existing allowable business uses.
5. The subject properties are already partially zoned Residence A-2 (RA-2) and are bound by other Residence A-2 (RA-2) zoned properties, therefore the proposed zoning map amendment does not constitute spot zoning.

CONCLUSION

Understanding the above, the proposed Zoning Map Amendment is not detrimental to the public good and does not substantially derogate from the intent of and purpose of the Town of Agawam Zoning Ordinance. Based on the foregoing, and all the supplemental information attached, the applicant respectfully requests that the Town of Agawam City Council grant the requested Zoning Map Amendment under the Town of Agawam Zoning Ordinance to Residence A-2 (RA-2).

R LEVESQUE ASSOCIATES, INC.
40 School Street, P.O. BOX 640, Westfield, MA 01085
p 413.568.0985 · f 413.568.0986 · www.rlaland.com

Applicants and Property Owners:

Mr. Sergey Dikan
515 Mill Street

Mr. Mikhail Ashlaban
533 Mill Street

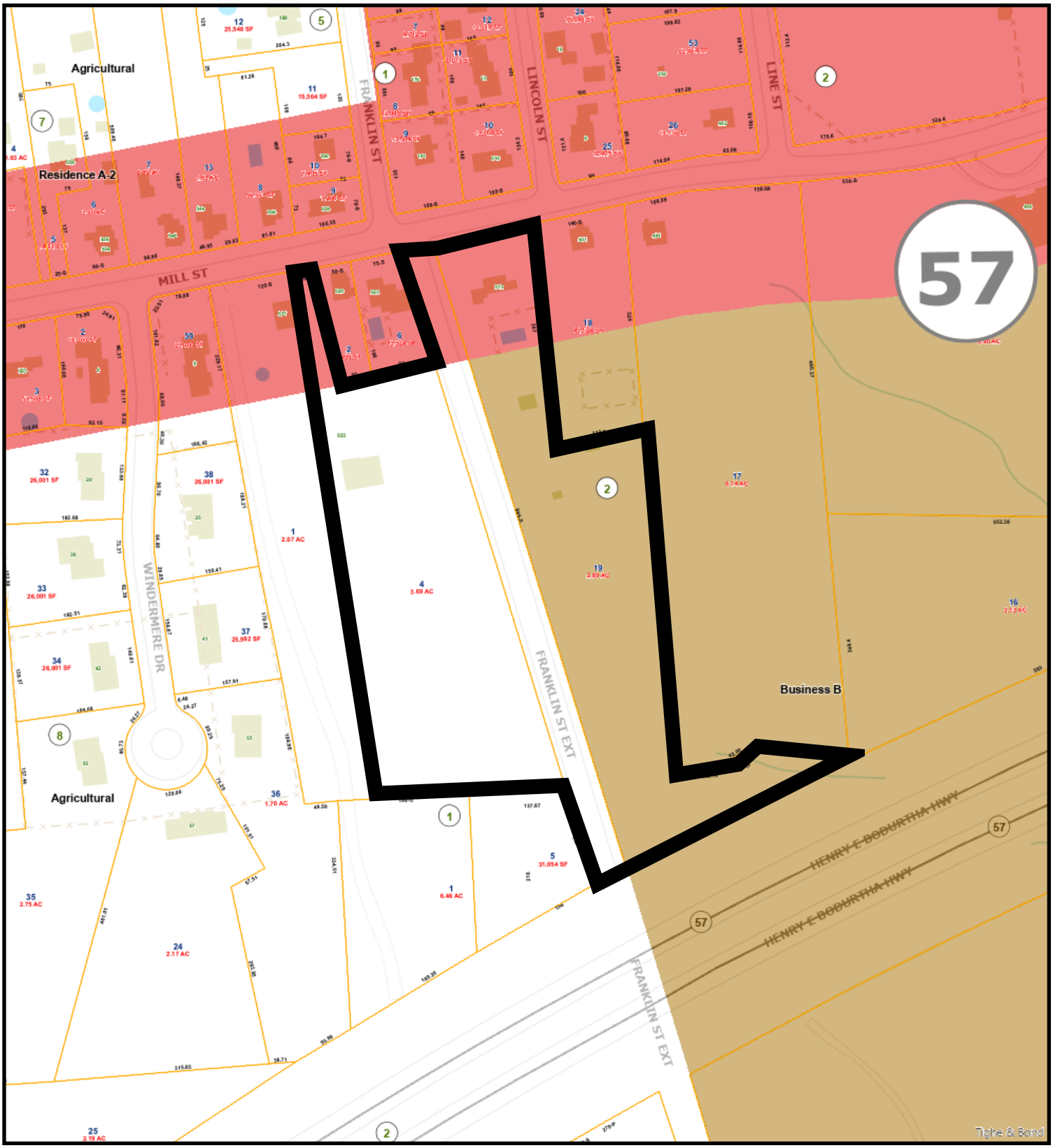
As required, a copy of this submission has been provided electronically via email to the Town of Agawam City Council and Planning Board. We are requesting to be placed on the City Council's next available agenda. Should you have any questions or comments regarding this submission, please do not hesitate to contact our office at your earliest convenience.

Sincerely,
R LEVESQUE ASSOCIATES, INC.

Nina Fazio
Permitting Coordinator

2. LOCUS MAP

(SOURCE: TOWN OF AGAWAM GIS)



Locus Map

1/28/2026 10:56:04 AM

Scale: 1"=200'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

3. DEED REFERENCES

(SOURCE: HAMPDEN COUNTY REGISTRY OF DEEDS)

Bk 24346 Pg391 #1366
01-07-2022 @ 02:46p

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 01-07-2022 @ 02:46pm
Ctl#: 300 Doc#: 1366
Fee: $1,071.60 Cons: $235,000.00

KNOW ALL PERSONS BY THESE PRESENTS

THAT I, Yegor Muravskiy, of 515 Mill Street, Feeding Hills, Massachusetts, individually,

For consideration of and in full consideration paid Two Hundred Thirty Five Thousand and 00/100 ($235,000.00) Dollars

GRANTS TO Sergey Dikan, of 114 Birch Hill Road, Agawam, Massachusetts,

with **WARRANTY COVENANTS**

The property described on Exhibit A which is attached hereto and made a part hereof.

BEING the same premises conveyed to Yegor Muravskiy herein by deed of Shirley G. Drenzek, dated December 23, 2017 and recorded in the Hampden County Registry of Deeds in Book 22008, Page 291.

As per M.G.L. Chapter 188, sect. 13, the Grantor, under oath and subject to the pains and penalties of perjury, does hereby depose, state and certify that: (i) I release all rights of Homestead in the subject realty, (ii) that no spouse, non-owner spouse, former spouse, or any other person resides in the home, and (iii) at the time of delivery of this deed, no spouse, former spouse, or any other person is entitled to claim the benefit of an existing estate of homestead.

(signature page to follow)

Property Address: 515 Mill Street, Feeding Hills, Massachusetts

This Deed is intended to take effect as a sealed instrument this 4 day of January, 2022.

Yegor Muravskiy

COMMONWEALTH OF MASSACHUSETTS

County of Hampden

On this 4 day of January, 2022, before me, the undersigned notary public, personally appeared Yegor Muravskiy and proved to me through satisfactory evidence of identification, which was Driver License to be the person whose name is signed on the preceding and acknowledged to me that they signed it voluntarily for its stated purpose and who swore, subscribed and affirmed to me that the contents of the document are truthful and accurate to the best of their knowledge and belief.

Jake S. Komar
NOTARY PUBLIC
Commonwealth of
Massachusetts
My Commission Expires
July 28, 2028

Jake Komar, Notary Public
My Commission Expires: July 28,2028

EXHIBIT "A"

Parcel II:

The land in Agawam, Hampden County, Massachusetts as shown on a Plan of Land entitled "Mill Street Extension, Agawam, Mass," dated June 1988 by Smith Associates Surveyors, Inc., and owned by Double "D" Realty, Inc., said Plan having been recorded in Hampden County Registry of Deed in Book od Plans 262, Page 129, said land being bounded and described as follows:

Beginning at the intersection of the westerly side-line of Franklin Street Extension with the northerly side-line of the Re-Location of Route 57, running thence

WESTERLY	along the northerly side-line of the Re-Location of Route 57, an arc distance of one hundred ninety-five and 69/100 (195.69) feet;
NORTHERLY	by land now or formerly of one Saralli, two hundred thirty-six and 36/100 (236.36) feet;
EASTERLY	by land now or formerly of one Saralli, one hundred thirty-seven and 77/100 (137.77) feet;
SOUTHERLY	along the westerly side-line of Franklin Street Extension to the point of beginning, one hundred fifty-five and 15/100 (155.15) feet.

Containing thirty-one thousand fifty-six (31,056) square feet or approximately 0.71 acres.

Together with all the right, title and interest of the Grantors herein, if any in and to the Franklin Street Extension as shown on the above-referenced plan, hereby specifically disclaiming any warranty or covenant of title as to said Franklin Street Extension, further representing that the land hereby conveyed lacks any right of access or frontage on a public way and by accepting this deed, the Grantees acknowledge that nay right of access to the land must be across their property adjacent to said land.

All subject to restrictions, easements, rights of way and other charges of record, if any.

PARCEL 1:

the land in Agawam, Hamden County, Massachusetts, bounded and described as follows:

Beginning at the North Eastern corner of Perkins Ave., and the South side of Mill St., and running thence Easterly on Mill Street about one hundred fifty (150) feet to a stone; thence Southerly on land now or formerly of one Voudren about three hundred thirty and 7/100 (330.07) feet; thence Easterly on last named land about one hundred thirty-two and 5/10 (132.5) feet; thence Southerly on land of Bruni, now or formerly, about five hundred sixteen and 80/100 (516.80) feet; thence Easterly on land of said Bruni about two hundred fifty-nine and 30/100 (259.30) feet; thence Southerly one hundred forty (140) feet to lot number 27 of Perkins' Little Farms continuing Westerly three hundred fifty (350) feet to Easterly side of Perkins Ave., thence Northerly one thousand forty one and 9/100 (1041.09) feet on the Easterly side of Perkins Ave., to the South side of Mills St., the place of the beginning, which includes lots numbers 10 to 26 (inclusive of Perkins' Little Farms).

Subject to restrictions and easements of record if any.

Bk 20091 Ps539 #71464
11-07-2013 @ 03:07p

FIDUCIARY'S D E E D

Property Address:
533 Mill Street
Feeding Hills, MA 01030

MASSACHUSETTS STATE EXCISE TAX
HAMPDEN COUNTY REGISTRY OF DEEDS
Date: 11-07-2013 @ 03:07pm
Ctl#: 251 Doc#: 71464
Fee: $843.60 Cons: $185,000.00

KNOW ALL MEN BY THESE PRESENTS, that I, **John A. Mercadante, individually, a married man** of 523 Mill Street, Feeding Hills, MA 01030 and **John A. Mercadante, as Personal Representative of the Estate of Gaetano L. Mercadante**, by License of the Probate Court. See Hampden County Probate Court, Docket No.: HD12P2321

FOR CONSIDERATION PAID AND IN FULL CONSIDERATION OF **One Hundred Eighty Five Thousand and 00/100 ($185,000.00) Dollars**

grant to **Mikhail Ashlaban and Tamara Ashlaban**, husband and wife, both of 5 Ogden Street, Chicopee, MA 01013, as tenants by the entirety

FOR THE PROPERTY DESCRIPTION SEE EXHIBIT A ATTACHED HERETO AND MADE A PART HEREOF.

BEING a portion of the same premises conveyed to the late John Saralli and Carmella E. Saralli by deed of Hugh D. Flynn dated December 18, 1946 and recorded in the Hampden County Registry of Deeds in Book 1849, Page 474.

Gaetano L. Mercadante died on October 17, 2012.

For Grantors title see Hampden County Probate Court Docket No. 182123.

Subject to the restriction that during the lifetime of John A. Mercadante, Grantee may only subdivide the property into two building lots by accessing the frontage from Mill Street.

The grantor agrees that there will not be any implied easement reserved on account of grantor's property at the rear of the property conveyed.

The grantor recognizes that the grantor's remaining property will be landlocked and the grantor covenants that he will not claim any easement of necessity or any other type of easement for ingress or egress to and from the landlocked property over, across, and upon the grantee's property. The grantor hereby waives the right to claim any type of easement.

This property is not homestead property or the principal residence of the grantor or any other person so entitled.

WITNESS my hand and seal this 31 day of October, 2013.

John A. Mercadante

John A. Mercadante,
Personal Representative of Estate of
Gaetano L. Mercadante

COMMONWEALTH OF MASSACHUSETTS

Hampden, ss. October 31, 2013

On this 31st day of October, 2013, then personally appeared the above-named **John A. Mercadante and John A. Mercadante, Personal Representative of Estate of Gaetano L. Mercadante** proved to me through satisfactory evidence of identification being (check whichever applies): ☐ driver's license or other state or federal governmental document bearing a photographic image, ☐ oath or affirmation of a credible witness known to me who knows the above signatory, or ☐ my own personal knowledge of the identity of the signatory, to be the persons whose names are signed on the preceding document, and acknowledged to me that he/she/they signed it voluntarily for its stated purpose.

DENNIS P. POWERS
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
November 30, [illegible]

Notary Public
My Commission Exp:

EXHIBIT "A"

The land in Agawam, Hampden County, Massachusetts bounded and described as follows:

First Parcel: Beginning at a stone bound at the northwest corner thereof and running thence southerly by land of N. G. King to a stone bound; thence southerly by land of W. E. Flower to a stone bound; thence southerly by land formerly of Sarah Flower to a stone bound; thence southerly by land of Aaron Hayes to a stone bound; thence southerly by land of heirs of John Taylor to a stake on an old ditch; thence along said ditch easterly by land of J. Diegel and L. Hatscher to a stone bound twelve (12) rods; thence northerly on a line of stone bounds by land of estate of J. Strong and F. M. West Box Company one hundred twenty-two (122) rods to a stone bound; thence westerly by land of Domenico Pisano and George Bourdo twelve (12) rods to the place of beginning.

Second Parcel: A certain tract of land bounded and described as follows:-

Beginning at the southeast corner thereof, at a stone bound; and running thence westerly by land of W. E. Flower, about six hundred thirty (630) feet to a stone bound; thence northerly by land of estate of Michelina Mercadante about three hundred seventy (370) feet to a stone bound; thence easterly by land of D. Pisano, L. Mercadante formerly, Alice St.John, and George Bourdo, about six hundred thirty (630) feet to a stone bound; thence southerly by land of grantees about three hundred seventy-eight (378) feet to stone bound at the place of beginning. Containing five acres of land, more or less. Said premises are subject to a right of way, as now used and located by adjoining land owners.

Third Parcel: A certain lot of land bounded and described as follows:-

Beginning at the northwest corner of the tract hereby conveyed at an iron pipe on the southerly side of Mill Street, and running thence easterly along Mill Street about one hundred twenty-three feet six inches (123' 6") to a stone bound; thence southerly in a straight line by land now or formerly of the F. M. West Box Company about eight hundred thirty (830) feet to a stone bound; thence westerly by land now or formerly of said Box Company and land now or formerly of Mercadante about two hundred three (203) feet; thence northerly by land now or formerly of Mercadante about seven hundred eighty-nine (789) feet to the place of beginning; containing three acres of land, more or less; excepting from the above described premises the following tract of land bounded and described as follows:-

Beginning at the northwest corner thereof at an iron pipe in the southerly side of Mill street distant forty-one feet three inches (41' 3") easterly from a stone bound at the northeast corner of land now or formerly of George Boudreau and running thence southerly in a straight line along other land of grantees one hundred seventy-five (175) feet to an iron pipe; thence easterly parallel with Mill Street fifty-two (52) feet to an iron pipe; thence northerly parallel with the westerly line above described one hundred seventy-five (175) feet and thence westerly by Mill street fifty-two (52) feet to the point of beginning.

Fourth Parcel: Beginning at a stone bound on the south side of Mill Street and running thence easterly along said Street forty-one (41) feet and three (3) inches to an iron pipe; thence southerly by land formerly of Guiseppe Pisano about seven hundred eighty-nine (789) feet to land formerly of Vincenzo Mercadante et al, thence westerly by said land formerly of Vincenzo Mercadante et al sixty-nine (69) feet to land now or formerly of George Bourdo at a stone monument; thence northerly by land now or formerly of said Bourdo about seven hundred eighty-nine (789) feet to the place of beginning. Containing one acre in area.

Excepting parcels conveyed by deed recorded as aforesaid in Book 3546, Page 427 and Book 2732, Page 129.

DONALD E. ASHE, REGISTER
HAMPDEN COUNTY REGISTRY OF DEEDS

APPENDIX A: SITE PLAN

SITE PLAN ENTITLED “PLAN FOR PROPOSED ZONE CHANGE”

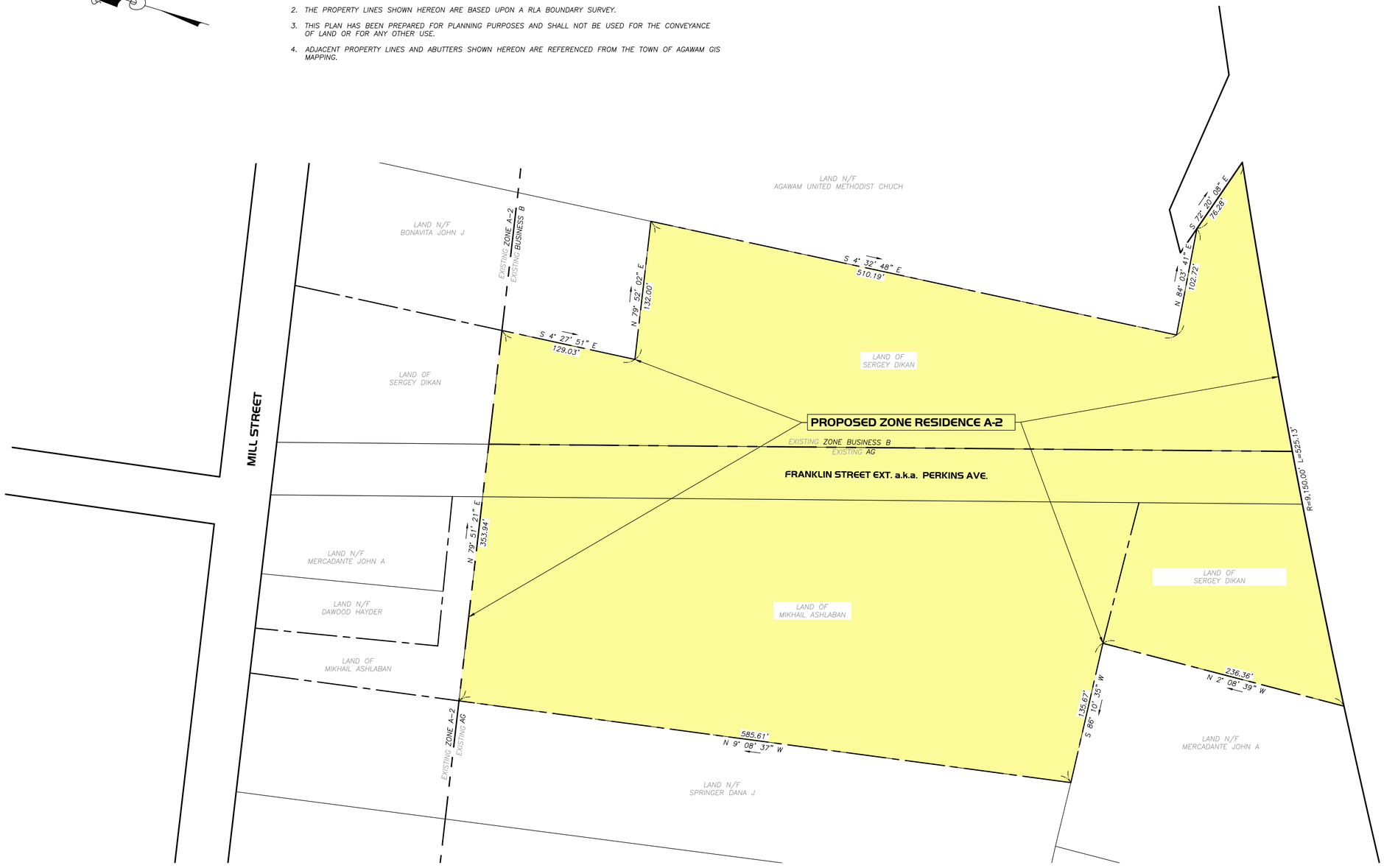
PREPARED FOR SERGEY DIKAN

PREPARED BY R LEVESQUE ASSOCIATES, INC.

DATED JANUARY 27, 2026

NOTES

1. THE RECORD OWNER OF THE SUBJECT PARCEL IS SERGEY DIKAN (515 MILL ST.) AND MIKHAIL & TAMARA ASHLABAN (533 MILL ST). SEE HAMPDEN COUNTY REGISTRY OF DEEDS BOOK 24346 PAGE 391 (515 MILL ST). DEEDS BOOK 20091 PAGE 539 (533 MILL ST.)
2. THE PROPERTY LINES SHOWN HEREON ARE BASED UPON A RLA BOUNDARY SURVEY.
3. THIS PLAN HAS BEEN PREPARED FOR PLANNING PURPOSES AND SHALL NOT BE USED FOR THE CONVEYANCE OF LAND OR FOR ANY OTHER USE.
4. ADJACENT PROPERTY LINES AND ABUTTERS SHOWN HEREON ARE REFERENCED FROM THE TOWN OF AGAWAM GIS MAPPING.



50 0 25 50 100
1" = 50'

PERMITTING

S:\Projects\2025\250105 - Dikan - 515 and 533 Mill St., Feeding Hills\05 Civil 3D\250105 - Zone Change RA2.dwg

RLA

R LEVESQUE ASSOCIATES INC
Landscape Architects
Civil Engineers · Land Surveyors
Environmental Consultants
ph: 413.568.0985 fax: 413.568.0986
40 School Street
Westfield, MA 01085
rlaland.com

PLAN FOR PROPOSED ZONE CHANGE

515 Mill Street and 533 Mill Street
Parcel ID: H10-2-19 and H10-I-04
Agawam, MA.

COMMONWEALTH OF MASSACHUSETTS
MARC E. SHUTE
No. 33610
PROFESSIONAL LAND SURVEYOR

PREPARED FOR:

Sergey Dikan
114 Birch Hill Road
Agawam, MA 01001

ISSUANCE DATE: January 27, 2026

REVISIONS:	DATE:

DRAFTED BY: T.A.

UNAUTHORIZED ALTERATION OF THIS DOCUMENT IS A VIOLATION OF MASSACHUSETTS STATE LAW

SCALE: As Noted

RLA PROJ. NUMBER: 250105

DRAWING#	REV.
Z-1	

Taryn Egerton

From: Derek Myers
Sent: Wednesday, February 11, 2026 2:49 PM
To: Taryn Egerton
Subject: RE: 769 Shoemaker Ln.

Yes. Lol sorry 769 Silver St.

From: Taryn Egerton <TEgerton@agawam.ma.us>
Sent: Wednesday, February 11, 2026 11:13 AM
To: Derek Myers <afdinsp@agawam.ma.us>
Subject: RE: 769 Shoemaker Ln.

Just to confirm – you mean 769 Silver Street (the BESS)?

Taryn Egerton
Planning Director & Conservation Agent
Planning Department

413.726.9737 | tegerton@agawam.ma.us

TOWN OF Agawam MASSACHUSETTS

Please be aware that applications approved by the Town of Agawam are considered public information. Unfortunately, email spammers often monitor municipal records and attempt to compromise communications by sending fraudulent emails, many of which appear to be invoices from the town to applicants.

To avoid confusion or potential scams, please note that the Planning Office including the Planning Board, Zoning Board of Appeals, and Conservation Commission requires all application fees to be submitted at the time of application.

If you receive an invoice after submitting your application, we recommend you to contact our office at 413-726-9737 to determine the authenticity of the invoice.

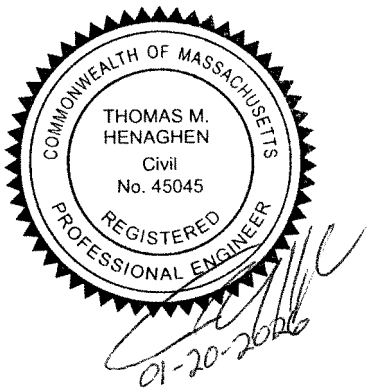
From: Derek Myers <afdinsp@agawam.ma.us>
Sent: Wednesday, February 11, 2026 9:58 AM
To: Taryn Egerton <TEgerton@agawam.ma.us>
Subject: 769 Shoemaker Ln.

Taryn,
We will need a Swept path analysis for the project at 769 Shoemaker Ln. Agawam, MA. I have attached documents with dimensions they should use.

STORMWATER MANAGEMENT REPORT
AGAWAM ENERGY CENTER
769 SILVER STREET
AGAWAM, MASSACHUSETTS

Prepared for

AGAWAM ENERGY CENTER, LLC
C/O Longroad Development Company, LLC
125 High Street
Boston, MA 02210



January 2026

4 Blanchard Road
P.O. Box 85A
Cumberland, ME 04021
Tel: 207.829.5016 sme-engineers.com

SME
SEVEE & MAHER ENGINEERS

TABLE OF CONTENTS

Section No.	Title	Page No.
1.0	**INTRODUCTION**	**1**
2.0	**PROJECT DESCRIPTION**	**1**
3.0	**SITE WATERSHED**	**4**
4.0	**STORMWATER MANAGEMENT STANDARDS**	**5**
4.1	Standard 1: No New Untreated Discharges	5
4.2	Standard 2: Peak Rate Attenuation	6
4.3	Standard 3: Recharge	8
4.4	Standard 4: Water Quality	8
4.5	Standard 5: Land Uses with Higher Potential Pollutant Loads	9
4.6	Standard 6: Critical Areas	9
4.7	Standard 7: Redevelopment and Other Projects Subject to the Standards only to the Maximum Extent Practicable	10
4.8	Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control	10
4.9	Standard 9: Operation and Maintenance Plan	10
4.10	Standard 10: Illicit Discharges	10
5.0	**CONCLUSION**	**11**

LIST OF ATTACHMENTS

ATTACHMENT A	NRCS SOIL SURVEY
ATTACHMENT B	STORMWATER DRAINAGE FIGURES
ATTACHMENT C	PRE-DEVELOPMENT HYDROCAD CALCULATIONS
ATTACHMENT D	POST-DEVELOPMENT HYDROCAD CALCULATIONS
ATTACHMENT E	TREATMENT VOLUME CALCULATIONS
ATTACHMENT F	LONG TERM POLLUTION PREVENTION PLAN
ATTACHMENT G	ILLICIT DISCHARGE STATEMENT

LIST OF FIGURES

Figure No.	Title	Page No.
1	SITE LOCATION MAP	3

STORMWATER MANAGEMENT REPORT
AGAWAM ENERGY CENTER
AGAWAM, MASSACHUSETTS

1.0 INTRODUCTION

This Stormwater Management Report was prepared by Sevee & Maher Engineers, Inc. (SME) to assess stormwater management for the construction of the proposed Agawam Energy Center project in Agawam, Massachusetts.

The Applicant proposes to develop an approximately 250-megawatt (MW), 4-megawatt hour (MWh), battery energy storage system (BESS) on the 17.2-acre site located at 769 Silver Street. The project will consist of battery containers, transformers, inverters, equipment pads, and associated infrastructure, including an interconnection substation. The proposed BESS site will be accessed from Silver Street. The battery containers will be surrounded by a combination of 18-foot-high solid wall, and 8-foot-high chain link and wood fencing that will act as physical, visual, and sound barriers as detailed in the attached plans. The BESS equipment will connect to the existing South Agawam Switching Station via the project's own substation and short transmission line.

The stormwater design is based on the water quality and quantity objectives identified in the stormwater management requirements pursuant to Chapter 175, §175-35 of the Code of the Town of Agawam and the Massachusetts Stormwater Management Standards.

The project will be located completely outside of all Areas Subject to Protection under M.G.L. c. 131, Section 40 listed in 310 CMR 10.02(1), as well as all buffer zones associated with Areas Subject to Protection. During construction, various Best Management Practices (BMPs) including erosion controls will be utilized to prevent impacts to adjacent resource areas and buffer zones.

2.0 PROJECT DESCRIPTION

The project property is an approximately 17-acre parcel on Silver Street in Agawam, Massachusetts. The property is zoned Industrial and is currently used for commercial/industrial purposes. The majority of the site being used for the project is currently developed with gravel and paved access roads, several buildings and other unvegetated gravel areas used or surface storage of equipment and materials. The Applicant plans to redevelop the site as an energy center with the addition of Battery Energy Storage Systems (BESS).

In accordance with the Chapter 175-35 Stormwater Management Plan, previously developed sites must meet the stormwater management standards to the maximum extent practicable. However, if it is not practicable to meet all the standards, the new system must be designed to improve existing conditions.

The addition of a open crushed stone surface over much of the site, additional plantings and vegetation at the site entrance and a vegetated buffer strip around the perimeter of the site and addition of stormwater detention pond, the proposed conditions will improve on existing conditions.

The site was identified for its gentle land slope, prior commercial/industrial use, as well as the commercial/industrial use of neighboring properties, as well as its proximity to the adjacent Eversource substation where it will make its electrical interconnection. The location of the project is shown in Figure 1, Site Location Map. More details on the project site are shown in the engineering drawing set submitted with this report.

As noted above, most of the site has been previously developed and disturbed for previous commercial use. Much of the site consists of uncontrolled, exposed gravel surfaces. To prepare the site, several of the existing buildings will be removed and the site will be graded to provide a uniform grade across the site. The proposed grading plan was prepared to generally maintain existing drainage patterns and avoid large cuts and fills.

The finished surface within the BESS yard will include a combination of compacted gravel access roads and a crushed "topping stone" surface. The topping stone used in the BESS yard and the proposed substation is a washed crushed stone used in the electrical grounding system for the facility for high electrical resistivity but also provides significant benefits in stormwater management. This crushed stone surface performs differently than most common construction practices. The stone which is washed to remove fines and contains large void ratios provides permeability plus storage.

Any disturbed areas or existing unvegetated areas on the perimeter of the site that are not required for roads, or the BESS units will be restored with loam and seed and native plantings.

The area at the front of the site, immediately off Silver Street, will include the Operations and Maintenance building and the associated entrance and parking area. The Operations and Maintenance building will utilize one of the existing buildings on site. This area will include driveway and parking improvements and landscaping improvements including a visual screening berm and plantings.

As noted above, the site will be graded to maintain existing drainage patterns. Most of the site will drain to the east towards the wetlands. In the proposed condition a detention pond will be added to provide additional treatment of stormwater and management of peak flows. The site drainage and stormwater management is discussed in more detail below.



0 1000 2000 4000

1 INCH = 2000 FEET

FIGURE 1
SITE LOCATION MAP
LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MASSACHUSETTS

SME
SEVEE & MAHER ENGINEERS

DWG: SITE LOCATION PLAN LMN: NONE CTB: SME-STD.CTB JOB#: 250579.01 REV: 12/17/2025

3.0 SITE WATERSHED

On-site soils were identified using the Natural Resources Conservation Service (NRCS) soil information for Hampden County, Massachusetts, Central Part. A copy of the custom Soil Resource Report is included in Attachment A of this report. The report includes a soil map for the project area. Soil mapping information is also included in the watershed plans.

The soil within the area of work consists of Merrimac fine sandy loam (254A, 254B, 254C and 254D) and Amostown fine sandy loam (258B). Soil classifications for 254A, 254B, 254C and 254D are Hydrological Soil Group (HSG) A and were modeled as HSG A for purposes of water quantity calculations. Soil Classification 258B is HSG C/D and was modeled as HSG D for purposes of water quantity calculations.

Existing Conditions

The ground surface on most of the property generally slopes towards the east in the direction of wetlands, with grades in the developed area ranging from less than 1 percent to 5 percent. The site is characterized by a low wetland area on the eastern side of the site, extending beyond the property line. The majority of the parcel is developed or previously disturbed except for the vegetated areas around the wetland areas which make up approximately 2 acres of the 17-acre site. Stormwater flows currently travel uncontrolled across the primarily unvegetated surface towards the wetlands.

Under existing conditions, stormwater runoff from most of the project area comes from Subcatchment 1 (SC-1). Stormwater generally flows from the higher areas to the wetlands, identified as Analysis Point (AP-1) for this report. The far eastern side of the site (east of the wetlands), still within the SC-1 drainage area, flows west towards the same AP-1 wetland area. This area on the east side of SC-1 is largely gravel and appears to be used for access and material storage.

There is a small drainage subarea at the front of the site that is modeled as Subcatchment 2 (SC-2), where flows from the existing driveway and parking area flows to Silver Street, which is identified as Analysis Point (AP-2) for this report.

There is a third small drainage area in the southwest corner of the site, that flows to the adjacent property to the south. The subarea is made of largely of existing buildings and driveways, with some lawn area. This is modeled as Subcatchment 3 (SC-3) and identified as Analysis Point (AP-3) at the property line.

Proposed Conditions

Under the proposed conditions, the overall site drainage patterns will be similar to existing conditions. The analysis points will be the same as those described in the existing conditions analysis to allow for easy comparison of pre- and post-development peak flows. The site will be graded to provide a more uniform slope, approximately 1 to 1.5% over most of the site but still following similar drainage patterns. Under proposed conditions, all stormwater from the BESS yard (SC-1A and SC-1B) will be routed to a proposed

stormwater detention pond located on the east side of the site between the developed area and the wetlands. The pond is designed with storage below the lowest outlet invert to provide space for storage of the "first flush" before any discharge from the pond. A vegetated drainage swale will be constructed along eastern edge of the BESS yard to intercept surface flow and direct it to the pond while providing additional opportunity for removal of sediment.

The eastern portion of the site that contains the proposed substation (SC-1C) will also maintain existing stormwater flow patterns with stormwater draining east to west towards the wetlands. The substation area will be graded to a consistent 1% slope. There is no stormwater treatment proposed in this area. The addition of the substation yard and its crushed stone topping represent an overall improvement in this area, compared to the existing gravel surface. The topping stone will minimize sediment load and provide infiltration and help filter stormwater, providing an improvement over existing conditions. This area is e, the surface has little to no sediment load and provides some initial storage stormwater in the voids, helping to reduce peak flows and filter stormwater. This area is also extremely flat and the addition of additional ponds or treatment structures that require gravity would require significant fill and additional disturbance of currently undisturbed areas and areas within 100 feet of the wetlands.

The drainage areas at the front of the site (SC-2 and SC-3) that flow to Silver Street and the adjacent parcels have changed slightly in size and shape but overall, there will be no net increase in peak flows to these areas and improvements to the type and quality of vegetated and landscaped areas.

Stormwater management plans identify the on-site drainage patterns before and after development (see Drawings D-100 and D-101). These drawings are included as Attachment B for reference.

4.0 STORMWATER MANAGEMENT STANDARDS

4.1 Standard 1: No New Untreated Discharges

The proposed project consists of new point source discharge locations associated with the proposed detention basin. The outlets from proposed stormwater basin will include two level spreaders to disperse stormwater flows from broad crested overflow weir, and three discharge pipes. Both the broad crested weir and the drainage pipe outlets will include rip rap protection to disperse stormwater at acceptable velocities and minimize erosive forces at the outfall. and erosive forces. Construction details of the level spreader, overflow structure and pipe inlets and outlets are included in the engineering plan set provided for the project.

All other areas not being directed to the pond will continue to flow overland, similar to existing conditions.

4.2 Standard 2: Peak Rate Attenuation

Stormwater peak flow rates were modeled for the 2, 10-, 25- and 100-year/24-hour storm events with Type III Soil Conservation Service rainfall distribution, using HydroCAD Version 10.20. HydroCAD is based on methodologies developed by the U.S. Department of Agriculture Soil Conservation Service (SCS), namely TR-55 and TR-20, to calculate runoff rates and volumes based on descriptions of land use, ground characteristics, and size, in combination with other hydraulic and hydrologic calculations.

Rainfall depths for each of storms identified above were obtained from NOAA Atlas 14 Volume 10 (Perica et al., 2015; Rev. 2019) and accessed via the NOAA Precipitation Frequency Data Server.

The time of concentration (Tc) for each subcatchment was calculated in HydroCAD using a combination of sheet flow and shallow concentrated flow. Sheet flow uses roughness coefficients (Manning's n) and watercourse slope to calculate travel time of stormwater runoff for each subcatchment. The site was modeled using a maximum 100 foot of sheet flow. The shallow concentrated flow method was used to determine the velocity factor along the flow path of the runoff and thereby derive a travel time. The time of concentration of each subcatchment is the combination of these travel times. A minimum time of concentration of 6 minutes was used for all subcatchments, for both existing and proposed conditions.

Site drainage from the proposed development will generally follow the pre-development flow patterns.

As discussed in Section 3 above, the site was divided into the following subcatchments and analysis points. The subcatchments are shown on the Figures included in Attachment B.

Existing Conditions
Analysis Point 1 (AP-1) – Wetlands on east side of the site.
Subcatchment (SC-1) - Represents most of the site, including area to the east and west of the wetland that represents AP-1. This includes some area beyond the property line that flows onto the site.

Analysis Point 2 (AP-2) – Area along Silver Street
Subcatchment 2 (SC-2) – This area is largely made of the "front yard" of the property, including driveways and parking areas.

Analysis Point 3 (AP-3) - Southwest corner of the property.
Subcatchment 3 (SC-3) – This area is made up largely of adjacent buildings and driveway.

Proposed Conditions
Analysis Point 1 (AP-1) – Wetlands on east side of the site.
SC-1A – Northern portion of the BESS yard and a portion of the main access.

SC-1B – Southern portion of the BESS yard and a portion of the Operations and Maintenance Building and entrance area.
SC-1C – The northern and eastern perimeter areas of the site, including the wetlands and the substation area.
SC-1D – A small area on the southeast corner.

Analysis Point 2 (AP-2) – Area along Silver Street
SC-2 – The front of the property including landscaped and parking areas that flow to Silver Street.

Analysis Point 3 (AP-3) - Southwest corner of the property.
SC-3 – Area on the southwest corner of the property that includes existing buildings and driveways and a small portion of the BESS yard.

A comparison of peak flows to the three analysis points is summarized in Table 1. As shown in Table 1, our model indicates that there will be no increase in peak flow rates to any of the three analysis points under the proposed conditions for the 2-year storm, 10-year storm, 25-year and 100-year storm. The proposed detention pond before AP-1 is adequately sized to handle the stormwater flows and control the discharge rate.

SC-2 contributing to AP-2 will remain largely the same in post-development conditions with updated landscaping and plantings between the project and Silver Street, resulting in a decrease in flows.

SC-3 will be decreased in size in the post-development condition, with more drainage directed to the east. As a result, AP-3 will see a decrease in flows and there will be no risk of an increase in flows to adjacent properties.

TABLE 1
STORMWATER QUANTITY SUMMARY

	2-Year Storm		10-Year Storm		25-Year Storm		100-year Storm	
	Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Analysis Point 1 (cfs)	12.23	8.88	29.9	20.73	42	31.34	61.32	49.43
Analysis Point 2 (cfs)	<1	<1	1.32	1.31	2.17	1.98	3.65	3.08
Analysis Point 3 (cfs)	4.94	2.69	8.76	5.19	11.14	6.78	14.77	9.21

Overall, the pre- and post- is a conservative estimate of the peak flows in the post-construction condition. The area of the BESS yard that will be finished with crushed "topping" stone was modeled as a compacted gravel surface with a Runoff Curve number of 96. Due to the rough surface and high void ratio of the stone surface will result in less runoff than a smooth compacted gravel surface.

Copies of the calculations for the pre-development runoff are in Attachment C and post-development runoff is provided in Appendix D.

4.3 Standard 3: Recharge

The soil within the area of work consists of Merrimac fine sandy loam (254A, 254B, 254C and 254D) and Amostown fine sandy loam (258B). Soil classifications for 254A, 254B, 254C and 254D are Hydrological Soil Group (HSG) A and were modeled as HSG A for purposes of water quantity calculations. Soil Classification 258B is HSG C/D and was modeled as HSG D for purposes of water quantity calculations.

For A-type soils, the Stormwater Management Guidelines require that a recharge device be provided with capacity equal to 0.60-inches the impervious area. To evaluate this re-development project we looked at each subarea to confirm if there was an increase in the impervious area, to calculate the recharge volume for new impervious area.

For SC-1, a large portion of the site in proposed conditions, including the BESS area and the substation yard, will be covered with a 6-inch layer of the crushed "topping stone", as part of the electrical grounding system. Although these areas are "stone" or "gravel" they do not behave the same as the compacted gravel surfaces that currently exist on the site and are proposed for the access roads at the site. The washed crushed stone mix overlaying 18-inches of gravel fill will provide improved permeability as well as storage in this stone, given its high void ratio. For this reason, this material was not considered impervious for the purposes of the recharge calculation. As a result, for SC-1 there is a net decrease in impervious area in the proposed conditions. In addition, the 6-inch layer of crushed stone with a void ratio of approximately 0.3, will provide 1.8 inches of initial storage in the stone. As a result, no recharge volume was calculated.

For SC-2 and SC-3 there was a reduction in impervious area in the proposed condition. As a result, no recharge volume was calculated.

4.4 Standard 4: Water Quality

The minimum required water quality treatment volume for the proposed development is one half inch of runoff times the impervious surface area. As discussed in 4.3 above, there is a net decrease in impervious area for the project when considering the characteristics of the topping stone. In addition, the topping stone also has the benefits of being a washed stone with little or no sediment load and also helps to trap sediment from other areas.

However, when determining a treatment volume for stormwater from SC-1A and SC-1B that will be flowing to the proposed detention based we included all paved and gravel areas, including the topping stone, to provide a conservative volume.

A calculation of the required treatment volume as well as a comparison of the treatment volume to the proposed volume provided below the lowest outlet from the pond is included in Attachment E. The storage below the lowest invert will provide additional opportunities for sediment removal and infiltration.

The topping stone, perimeter vegetated buffer strip and vegetated drainage swale will provide removal of sediment from stormwater flows along the path to the pond, providing pre-treatment.

The proposed detention basin and the vegetated swale along the east side of the BESS yard will provide an improvement in the quality of the stormwater runoff compared to the uncontrolled runoff from the large unvegetated gravel yard in the existing conditions.

Similar to the discussion in Section 4.3, no stormwater treatment was provided for SC-2 and SC-3 due to the net decrease in impervious surface in these areas.

As required by the Stormwater Management Standards, a Long-Term Pollution Prevention Plan is provided in Attachment F. In short, the plan identifies suitable practices for source control and pollution prevention measures.

4.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

The proposed facility is not considered a Land Use with Higher Potential Pollutant Loads. No exterior machinery, heavy equipment or fleet storage is proposed and projected daily vehicle traffic volumes are estimated to be very low. The precautions and procedures for maintenance of battery storage equipment will be outlined in the Operations and Maintenance Plan for the facility. Overall, the proposed site improvements will result in a more controlled environment with a lower sediment load. Therefore, Standard 5 does not apply to this project.

4.6 Standard 6: Critical Areas

The project is not located within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges are not located near or to any other critical area requiring the use of the specific source control and pollution prevention measures.

4.7 Standard 7: Redevelopment and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The site was historically used as a lumber and yard for storage of various materials. Most of the site is a combination of various impervious and unvegetated surfaces, including a paved entrance driveway and parking near Silver Street, compacted gravel driveways and storage yard and several buildings. The total impervious area under current conditions for the area analyzed, which includes some off-site areas is approximately 15 acres.

Under the proposed conditions, there will be additional plantings and landscaped areas at the entrance and on the perimeter of the site. Gravel access roads to provide access to equipment and substation will be more defined and existing unvegetated areas that are not proposed for development will be revegetated. Several existing buildings will be removed. The area around the battery storage units and within the substation yard will be finished with a washed crushed stone as part of the grounding system for the equipment. In addition, the nature of the rough surface and porosity of the stone will provide initial storage and improve infiltration of stormwater and initial treatment compared to the existing gravel surface. The total impervious area under proposed conditions (gravel roads, buildings, equipment foundations) not counting the topping stone is approximately 7 acres.

The change in surface materials and the addition of the detention basin, vegetated perimeter buffer strip and swale and increased landscaping in the proposed redevelopment will result in improved stormwater quality.

4.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control

In accordance with the Massachusetts Stormwater Management Standards and the NPDES General Permit, a SWPPP will be prepared prior to construction. The erosion control notes and details included in the engineering plan set submitted for the project will cover most of the SWPPP requirements. A copy of the SWPPP will be provided to the Town prior to construction.

4.9 Standard 9: Operation and Maintenance Plan

An Operations & Maintenance plan has been prepared for the project and submitted as part of the Site Plan Approval Application.

4.10 Standard 10: Illicit Discharges

The submitted Long-Term Stormwater Pollution Prevention Plan (Attachment F) specifies measures to prevent illicit discharges from entering the stormwater management system. Source control and response plans are also specified to prevent illicit discharges from being conveyed through the stormwater management system.

Consistent with the Massachusetts Stormwater Handbook, a signed Illicit Discharge Compliance Statement prior to discharging stormwater to the post-construction stormwater BMP's. A draft copy of the Illicit Discharge Statement is provided in Attachment G.

5.0 CONCLUSION

The stormwater management for the Agawam Energy Center was designed in accordance with Massachusetts Stormwater Standards and Town of Agawam requirements. Stormwater runoff will be controlled through the addition of stormwater detention pond and the stabilization of existing gravel areas with vegetative cover and a crushed stone surface and improved landscaping. As a result, we do not anticipate any adverse impacts anticipated on downstream drainage or abutting properties.

ATTACHMENT A

NRCS SOIL SURVEY

SME
SEVEE & MAHER
ENGINEERS

United States Department of Agriculture

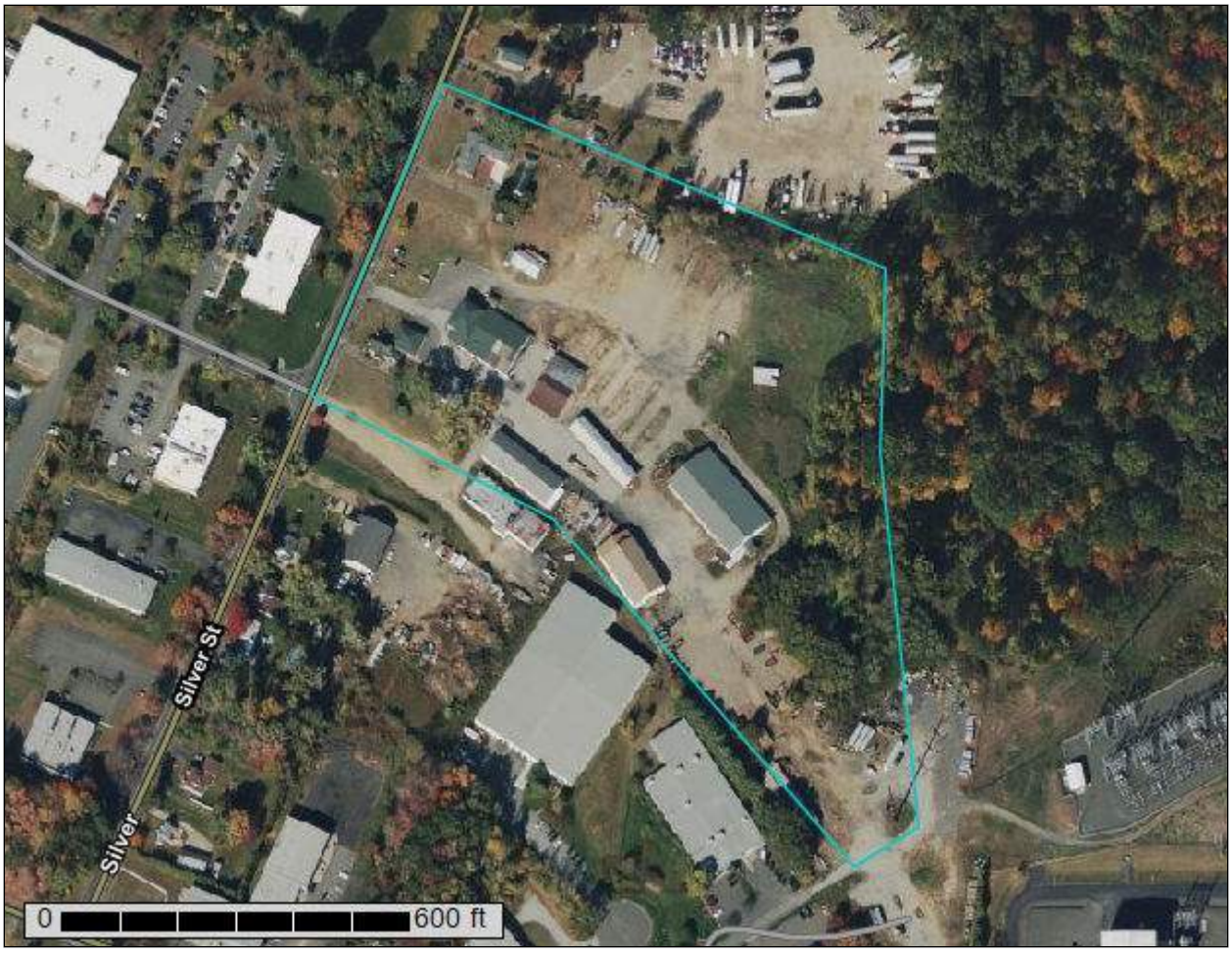
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hampden County, Massachusetts, Central Part

Silver Street



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Hampden County, Massachusetts, Central Part.....14
254A—Merrimac fine sandy loam, 0 to 3 percent slopes.....14
254B—Merrimac fine sandy loam, 3 to 8 percent slopes.....15
254C—Merrimac fine sandy loam, 8 to 15 percent slopes.....17
258B—Amostown fine sandy loam, 0 to 6 percent slopes.....19
References.....21

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,480 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 19, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	9.8	59.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	5.9	35.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	0.4	2.6%
258B	Amostown fine sandy loam, 0 to 6 percent slopes	0.4	2.2%
Totals for Area of Interest		**16.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hampden County, Massachusetts, Central Part

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

254C—Merrimac fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tyqt
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash plains, dunes, deltas, outwash terraces

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

258B—Amostown fine sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 99ms
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Amostown and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amostown

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable sandy glaciofluvial deposits over hard silty glaciolacustrine deposits

Typical profile

H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 32 inches: fine sandy loam
H3 - 32 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F145XY005MA - Moist Lake Plain
Hydric soil rating: No

Minor Components

Pollux

Percent of map unit: 10 percent
Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Enosburg

Percent of map unit: 10 percent
Landform: Terraces, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

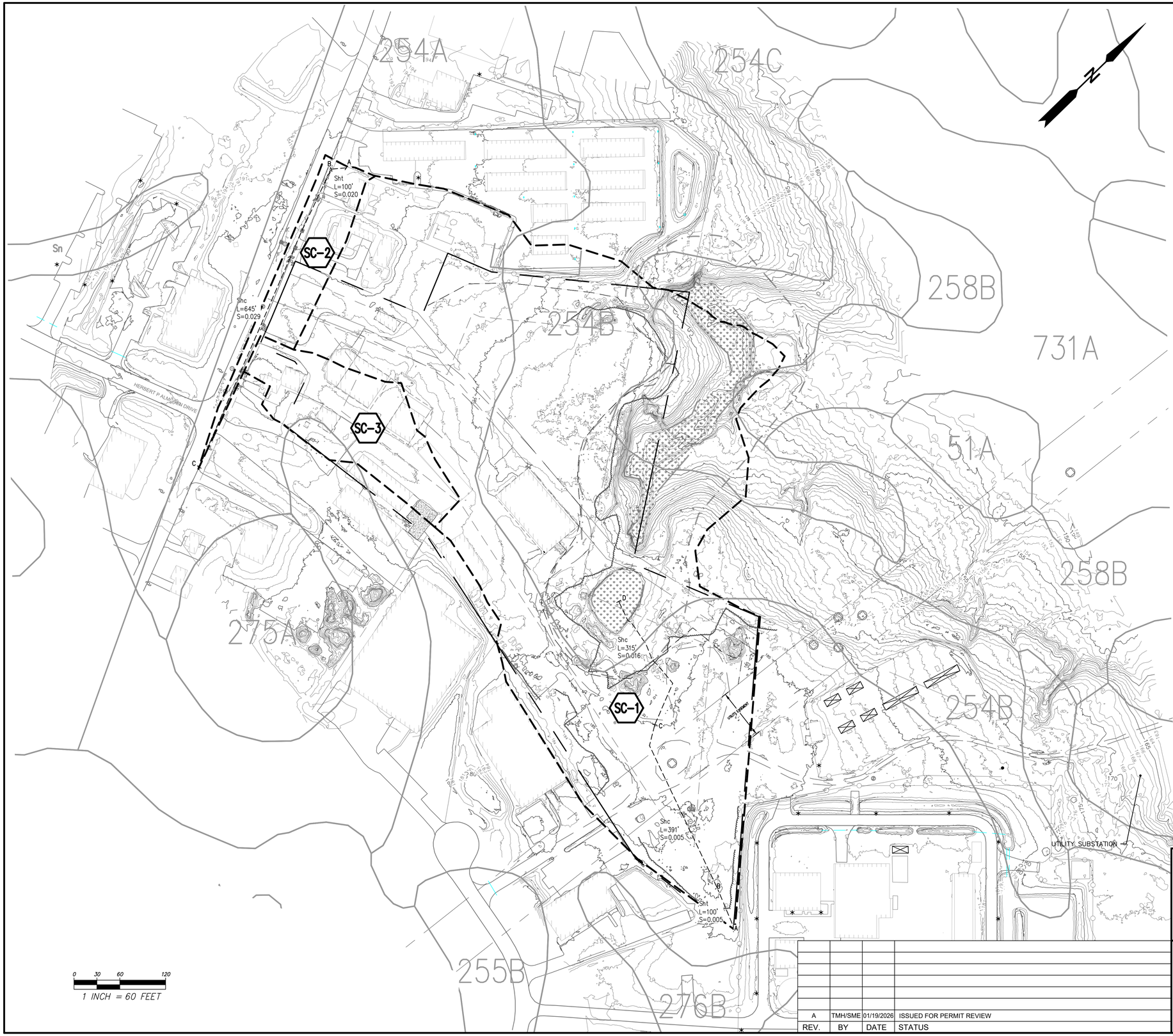
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ATTACHMENT B

STORMWATER DRAINAGE FIGURES

SME
SEVEE & MAHER
ENGINEERS



0 30 60 120

1 INCH = 60 FEET

LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- LIMIT OF WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FOOT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- EXISTING TREE LINE
- LIMIT OF WORK

NOTES

1. EXISTING CONDITIONS SURVEY CONDUCTED BY MILLSTONE LLC.

STORMWATER MANAGEMENT LEGEND

- SC-1 — SUBCATCHMENT DESIGNATION
- SUBCATCHMENT BOUNDARY
- A — B — C — TIME OF CONCENTRATION SEGMENT DESIGNATION / TIME OF CONCENTRATION PATH
- Sht L=50' S=0.005 — TIME OF CONCENTRATION TYPE, LENGTH AND SLOPE.
- Sht — SHEET FLOW
- Shc — SHALLOW CONCENTRATED FLOW
- Cf — CHANNEL FLOW
- DRAINAGE REACH
- R4 — REACH DESIGNATION (HYDROCAD)
- P3 — POND/STRUCTURE DESIGNATION (HYDROCAD)
- tc 1 — TIME OF CONCENTRATION WITH SUBCATCHMENT DESIGNATION
- SOIL TYPE BOUNDARY
- Sn — SOIL TYPE DESIGNATION

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW

LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MA

STORMWATER MANAGEMENT PLAN
PRE-DEVELOPMENT CONDITIONS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-200 REV A



0 30 60 120

1 INCH = 60 FEET

LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- LIMIT OF WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FOOT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- EXISTING TREE LINE
- LIMIT OF WORK

NOTES

1. EXISTING CONDITIONS SURVEY CONDUCTED BY MILLSTONE LLC.

STORMWATER MANAGEMENT LEGEND

- SC-1 — SUBCATCHMENT DESIGNATION
- SUBCATCHMENT BOUNDARY
- A — B — C — TIME OF CONCENTRATION SEGMENT DESIGNATION / TIME OF CONCENTRATION PATH
- Sht L=50' S=0.005 — TIME OF CONCENTRATION TYPE, LENGTH AND SLOPE.
- Sht — SHEET FLOW
- Shc — SHALLOW CONCENTRATED FLOW
- Cf — CHANNEL FLOW
- DRAINAGE REACH
- R4 — REACH DESIGNATION (HYDROCAD)
- P9 — POND/STRUCTURE DESIGNATION (HYDROCAD)
- tc 1 — TIME OF CONCENTRATION WITH SUBCATCHMENT DESIGNATION
- SOIL TYPE BOUNDARY
- Sn — SOIL TYPE DESIGNATION

REV.	BY	DATE	STATUS
A	TMH/SME	01-19-2026	ISSUED FOR PERMIT REVIEW

LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MA

STORMWATER MANAGEMENT PLAN
POST DEVELOPMENT CONDITIONS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

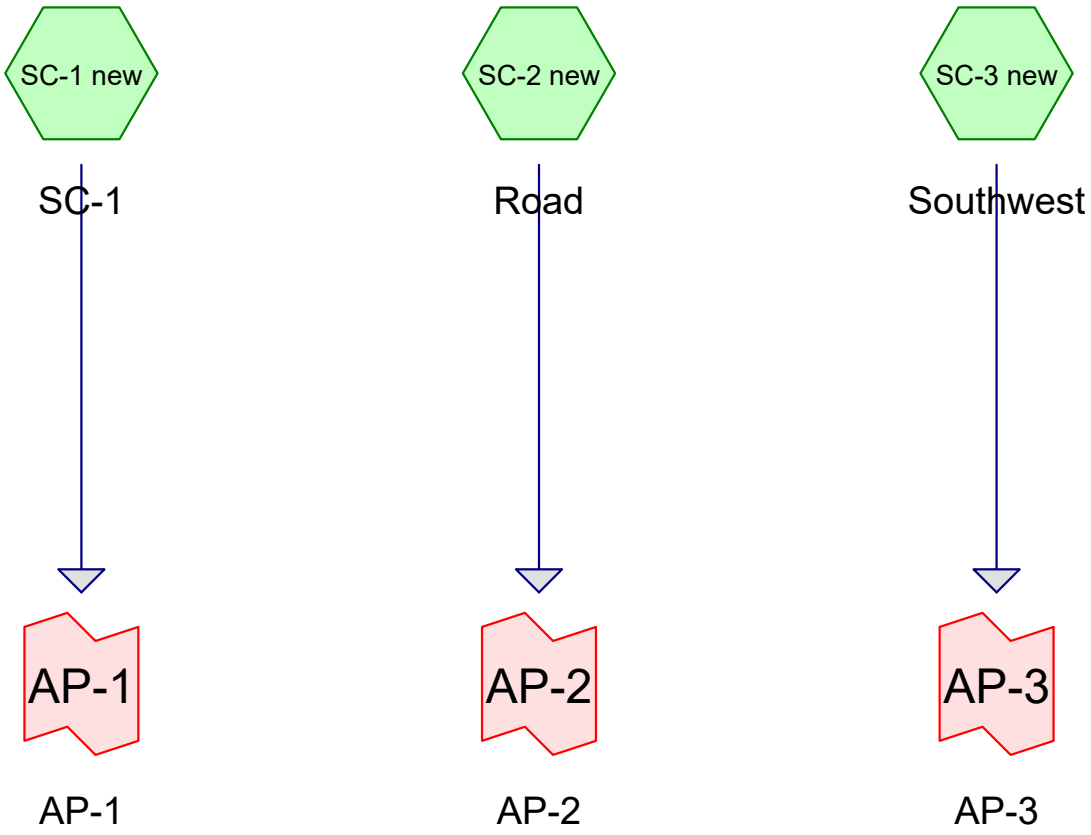
DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-200 REV A

ATTACHMENT C

PRE-DEVELOPMENT HYDROCAD CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS



Subcat Reach Pond Link

Routing Diagram for Pre-Conditions - TMH
Prepared by Sevee & Maher Engineers, Printed 12/23/2025
HydroCAD® 10.20-7a s/n 01260 © 2025 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.303	96	Gravel (SC-3 new)
12.188	96	Gravel surface, HSG A (SC-1 new)
2.779	39	Pasture/grassland/range, Good, HSG A (SC-1 new, SC-2 new, SC-3 new)
0.142	80	Pasture/grassland/range, Good, HSG D (SC-3 new)
1.383	98	Paved parking, HSG A (SC-1 new, SC-2 new, SC-3 new)
1.326	98	Roofs, HSG A (SC-1 new, SC-2 new, SC-3 new)
4.606	30	Woods, Good, HSG A (SC-1 new)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
22.282	HSG A	SC-1 new, SC-2 new, SC-3 new
0.000	HSG B	
0.000	HSG C	
0.142	HSG D	SC-3 new
0.303	Other	SC-3 new

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>1.00"
Flow Length=807' Tc=38.8 min CN=75 Runoff=12.23 cfs 1.640 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>0.36"
Flow Length=745' Tc=13.7 min CN=60 Runoff=0.26 cfs 0.034 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>2.15"
Tc=5.0 min CN=91 Runoff=4.94 cfs 0.335 af

Link AP-1: AP-1 Inflow=12.23 cfs 1.640 af
Primary=12.23 cfs 1.640 af

Link AP-2: AP-2 Inflow=0.26 cfs 0.034 af
Primary=0.26 cfs 0.034 af

Link AP-3: AP-3 Inflow=4.94 cfs 0.335 af
Primary=4.94 cfs 0.335 af

Summary for Subcatchment SC-1 new: SC-1

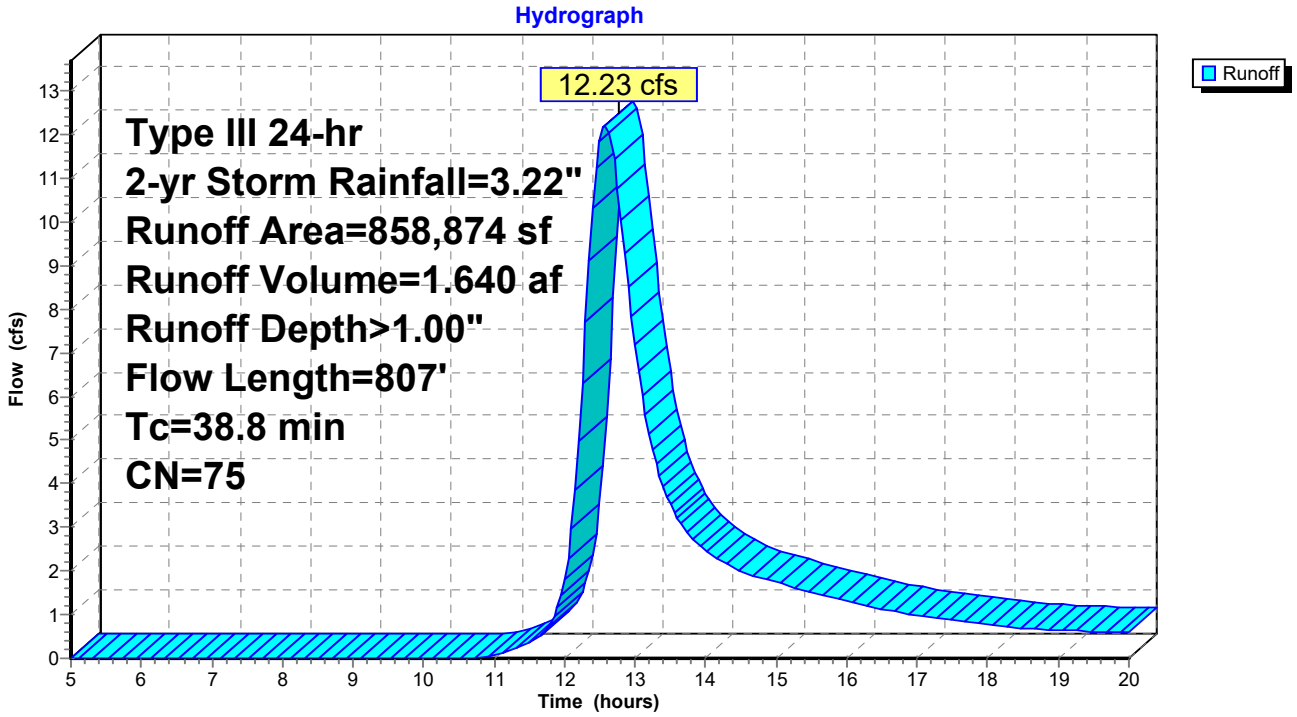
Runoff = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af, Depth> 1.00"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

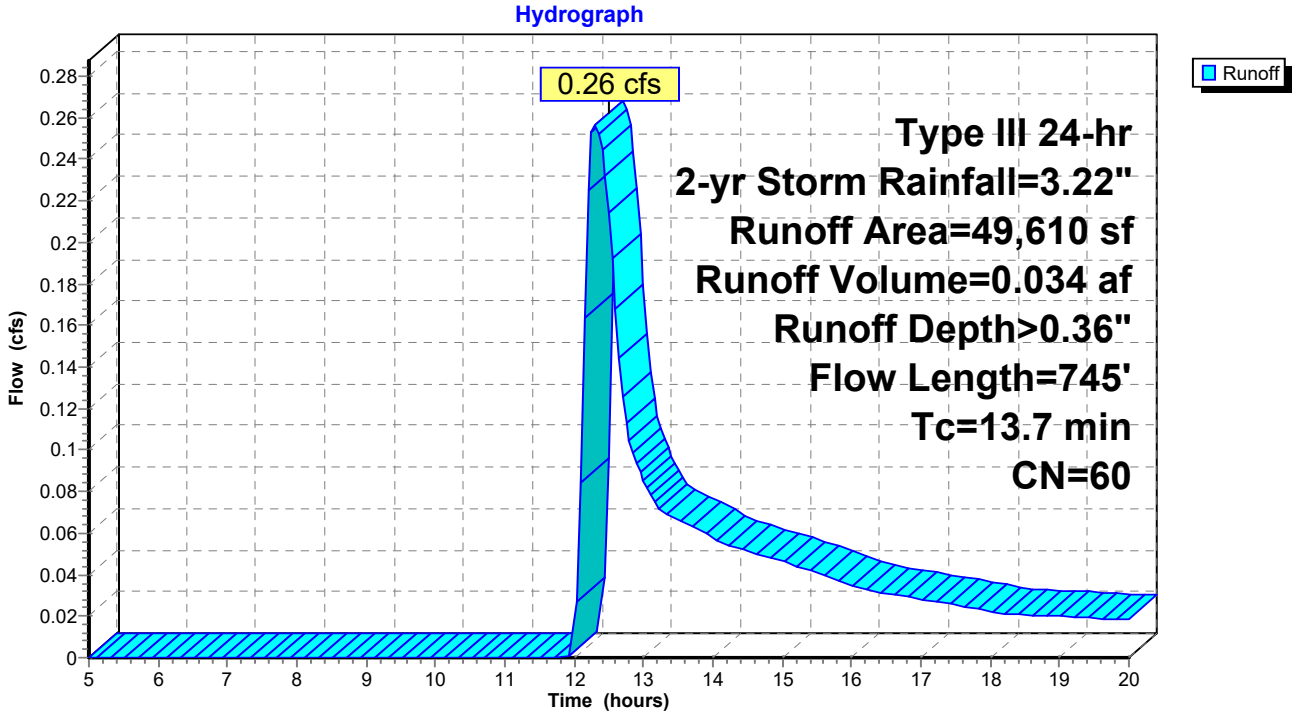
Runoff = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af, Depth> 0.36"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

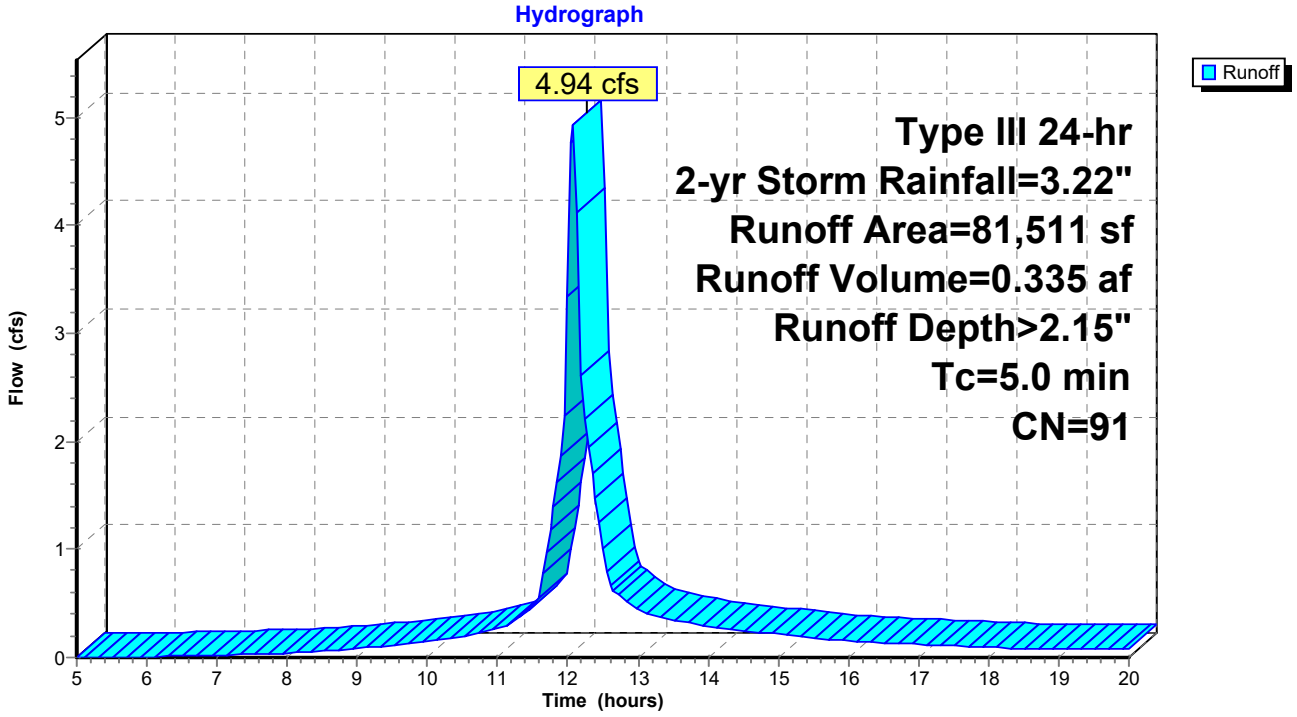
Runoff = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af, Depth> 2.15"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

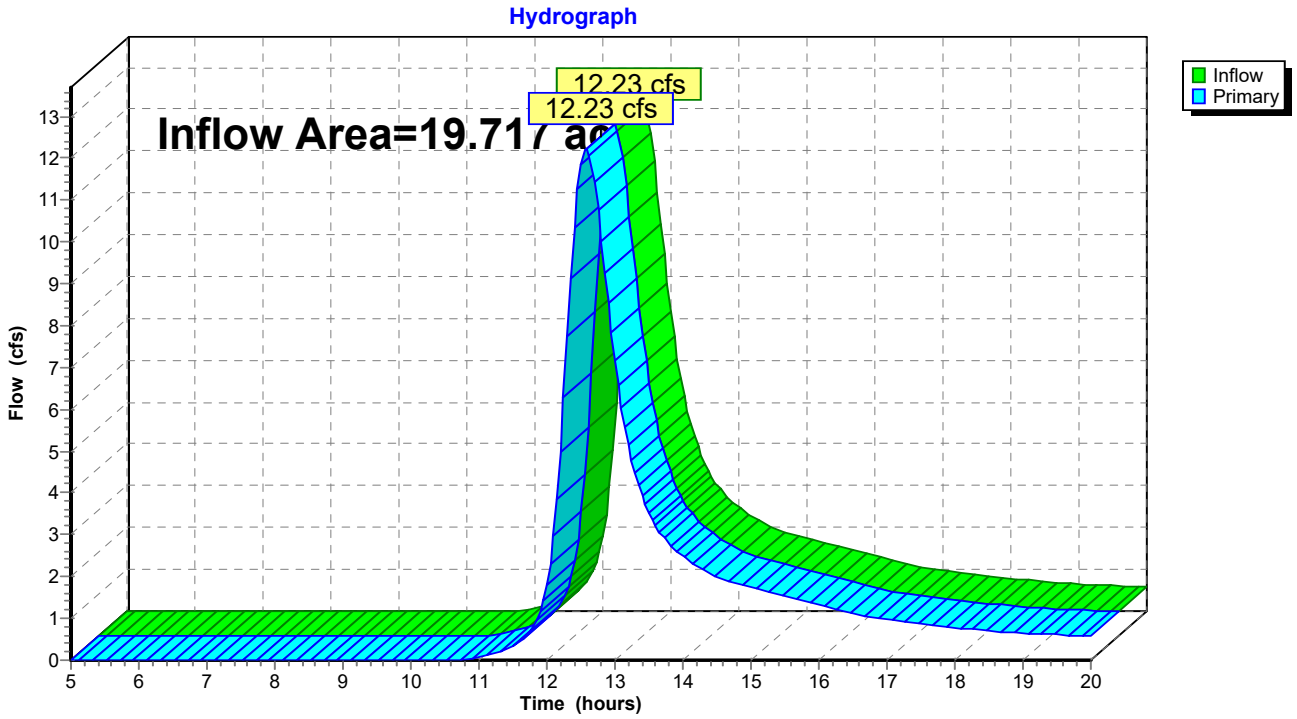


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 1.00" for 2-yr Storm event
Inflow = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af
Primary = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

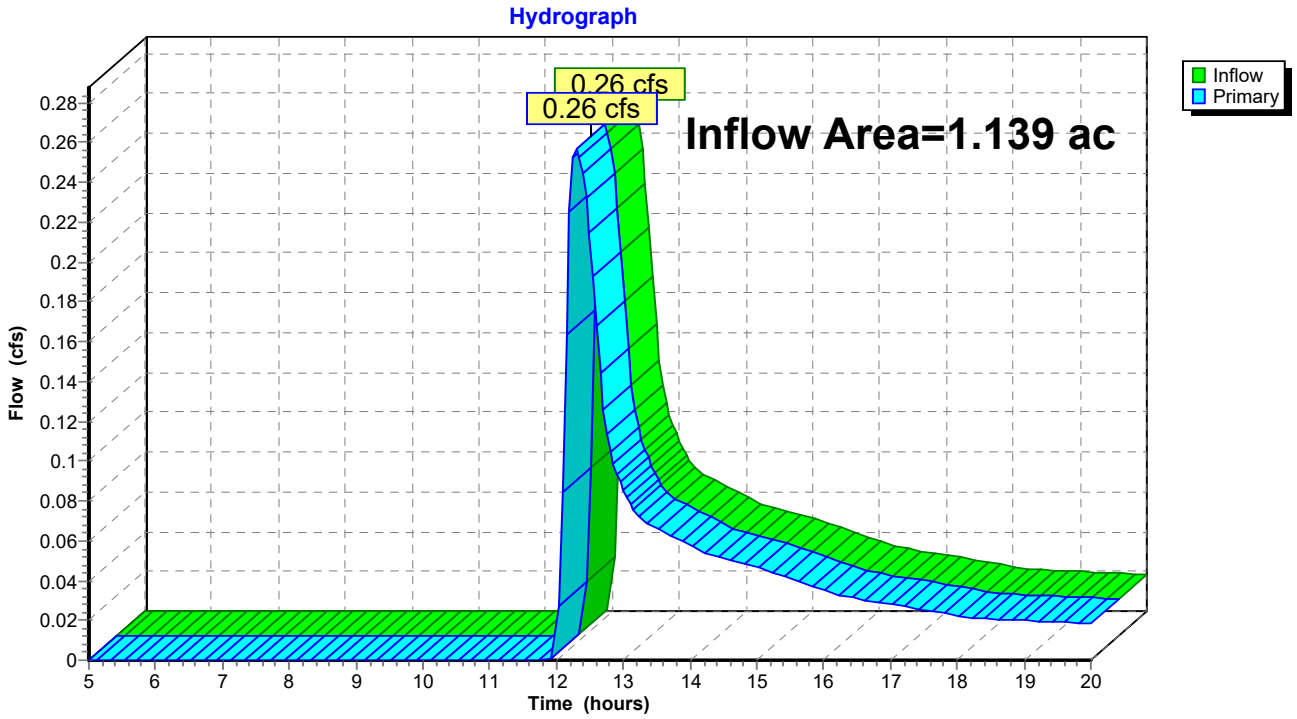


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 0.36" for 2-yr Storm event
Inflow = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af
Primary = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

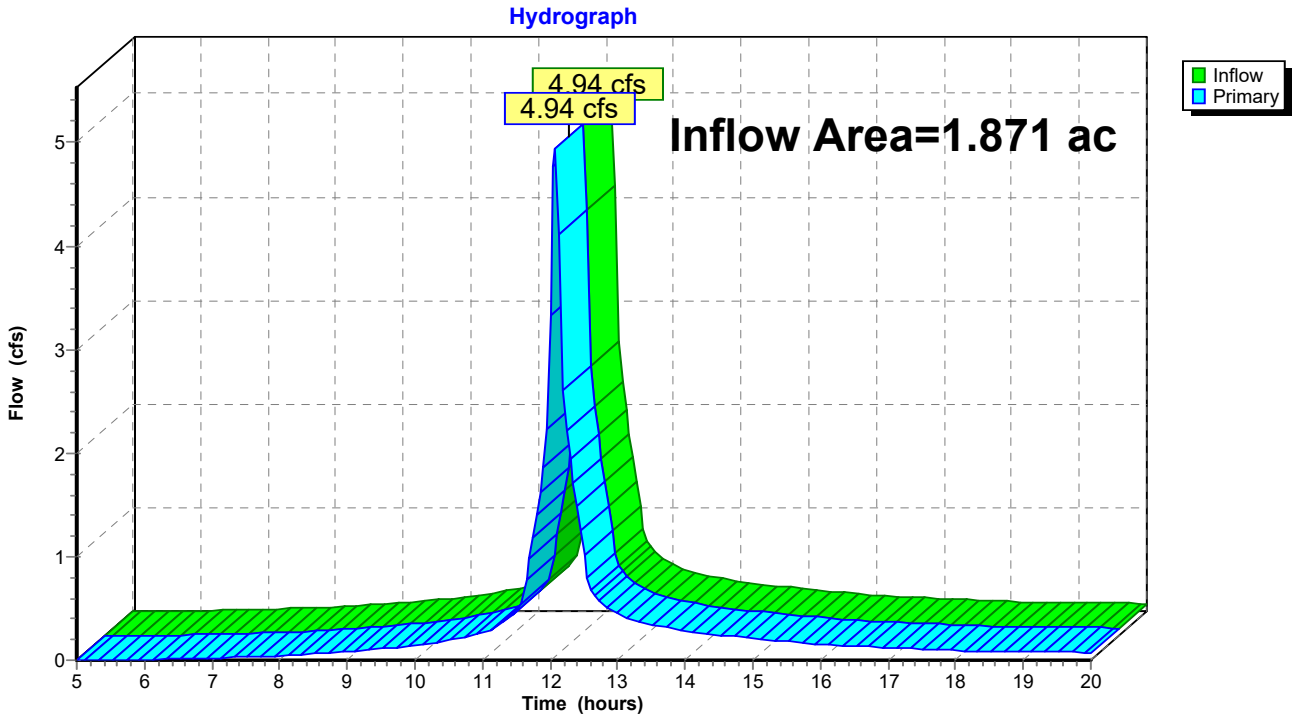


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 2.15" for 2-yr Storm event
Inflow = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af
Primary = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>2.38"
Flow Length=807' Tc=38.8 min CN=75 Runoff=29.90 cfs 3.914 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>1.27"
Flow Length=745' Tc=13.7 min CN=60 Runoff=1.32 cfs 0.120 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>3.93"
Tc=5.0 min CN=91 Runoff=8.76 cfs 0.613 af

Link AP-1: AP-1 Inflow=29.90 cfs 3.914 af
Primary=29.90 cfs 3.914 af

Link AP-2: AP-2 Inflow=1.32 cfs 0.120 af
Primary=1.32 cfs 0.120 af

Link AP-3: AP-3 Inflow=8.76 cfs 0.613 af
Primary=8.76 cfs 0.613 af

Summary for Subcatchment SC-1 new: SC-1

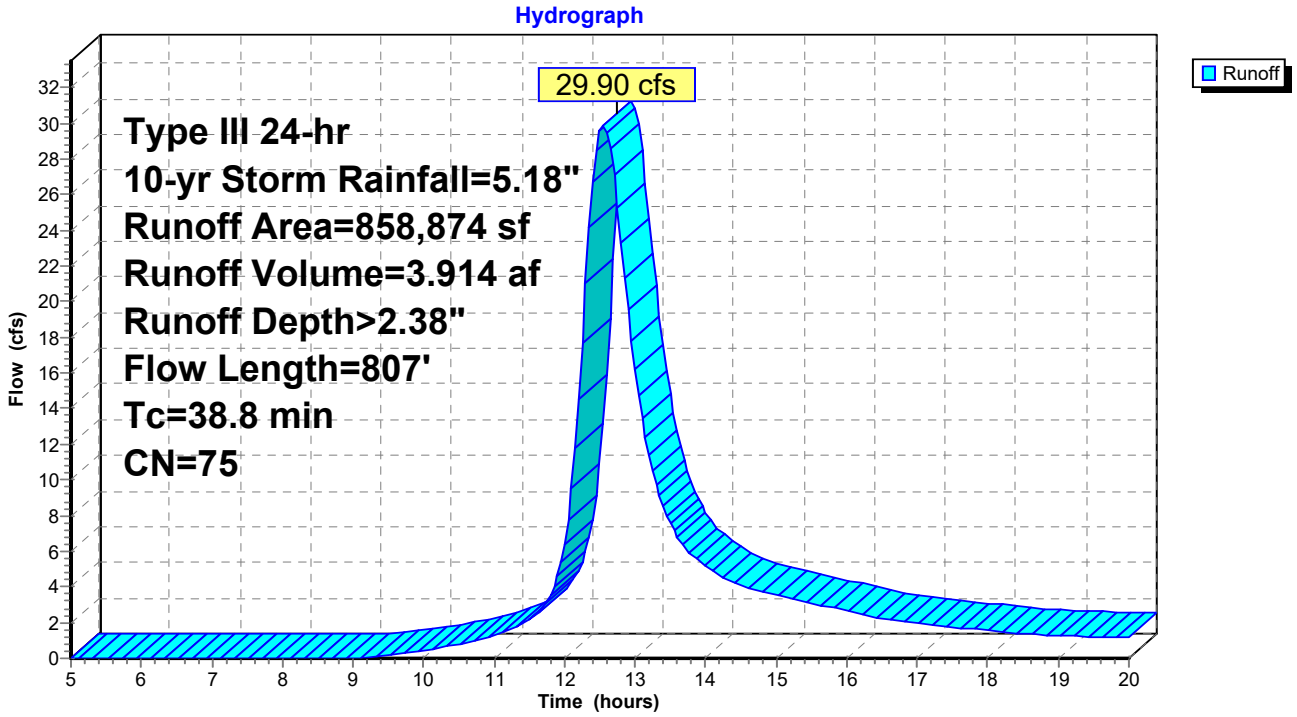
Runoff = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af, Depth> 2.38"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

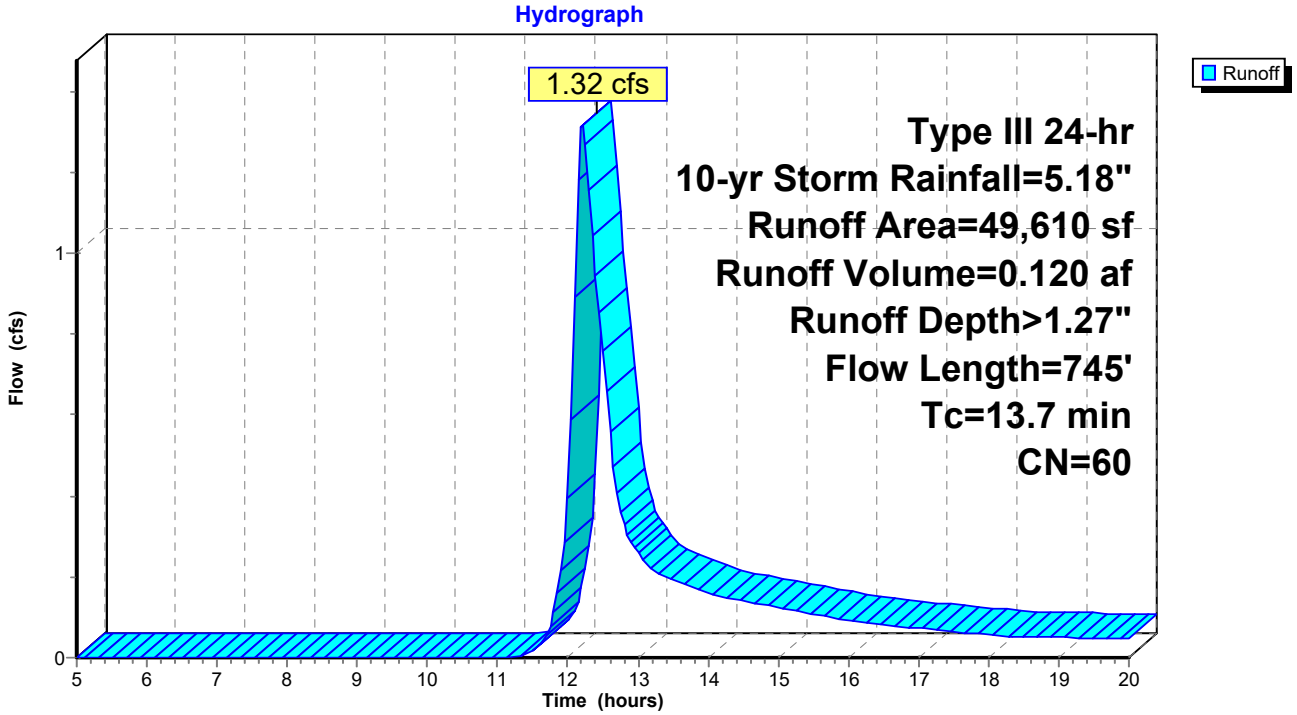
Runoff = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af, Depth> 1.27"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

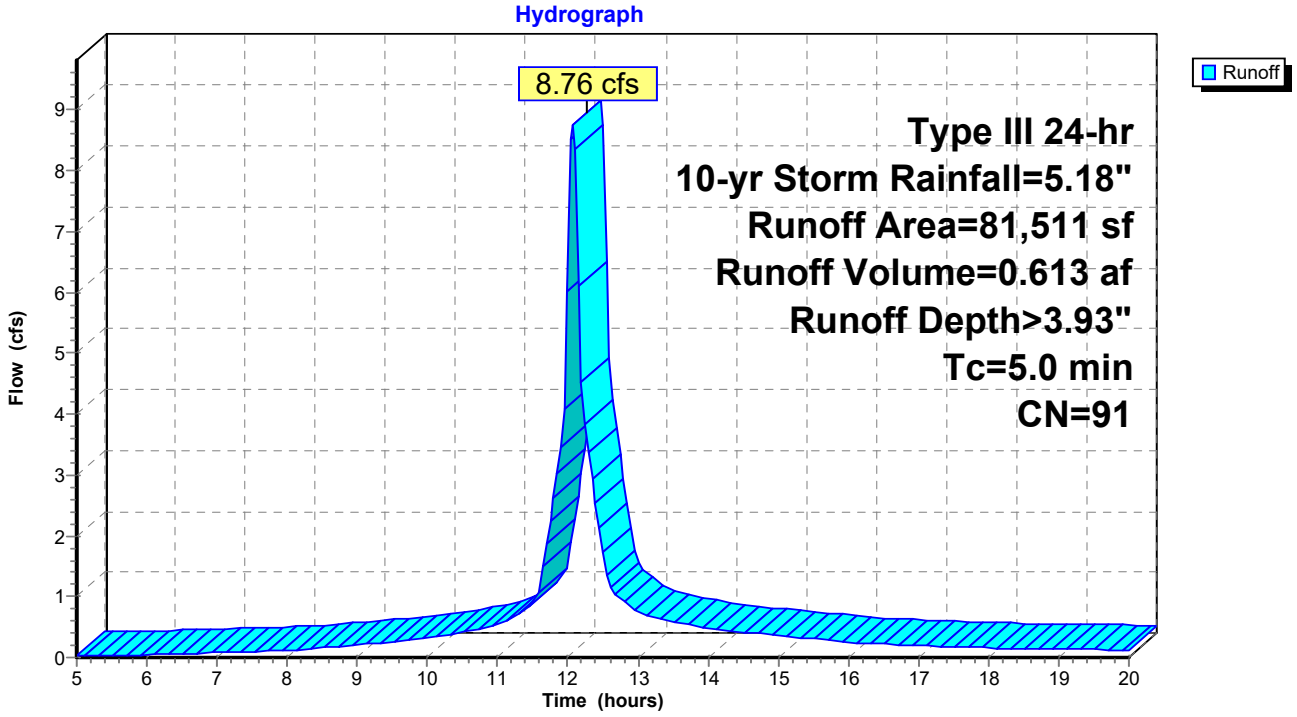
Runoff = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af, Depth> 3.93"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

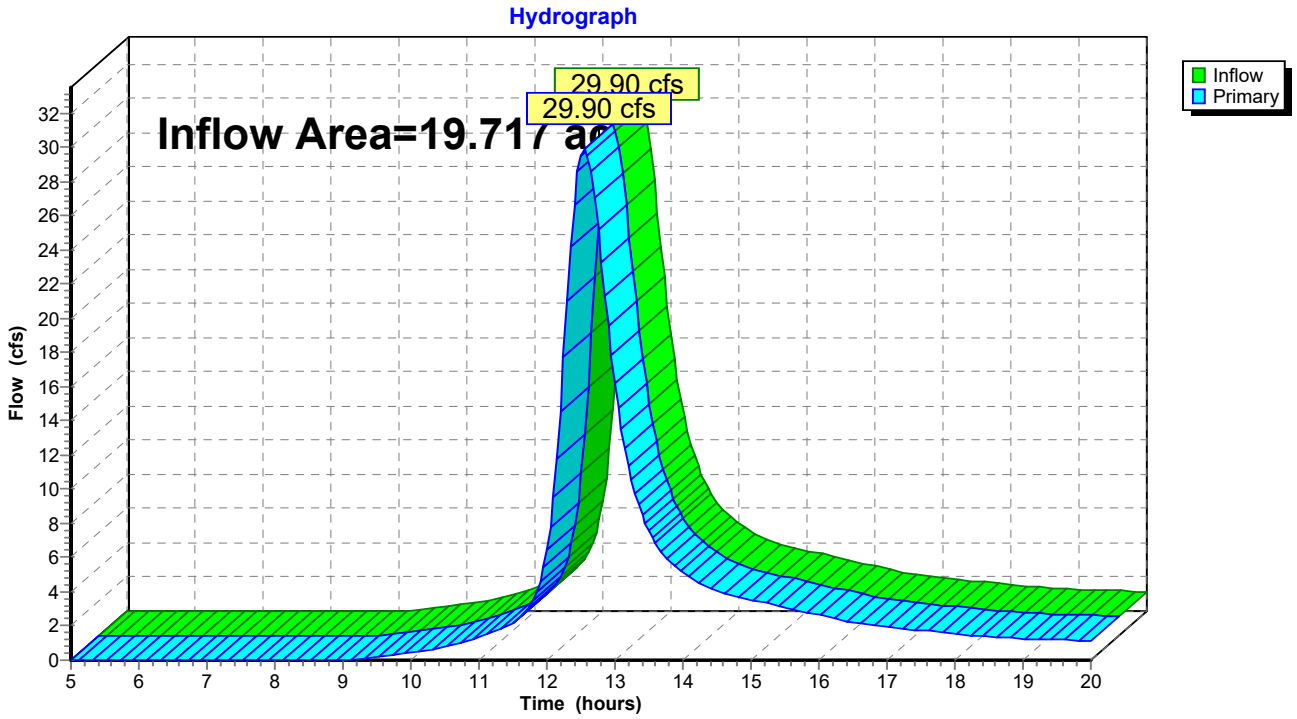


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 2.38" for 10-yr Storm event
Inflow = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af
Primary = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

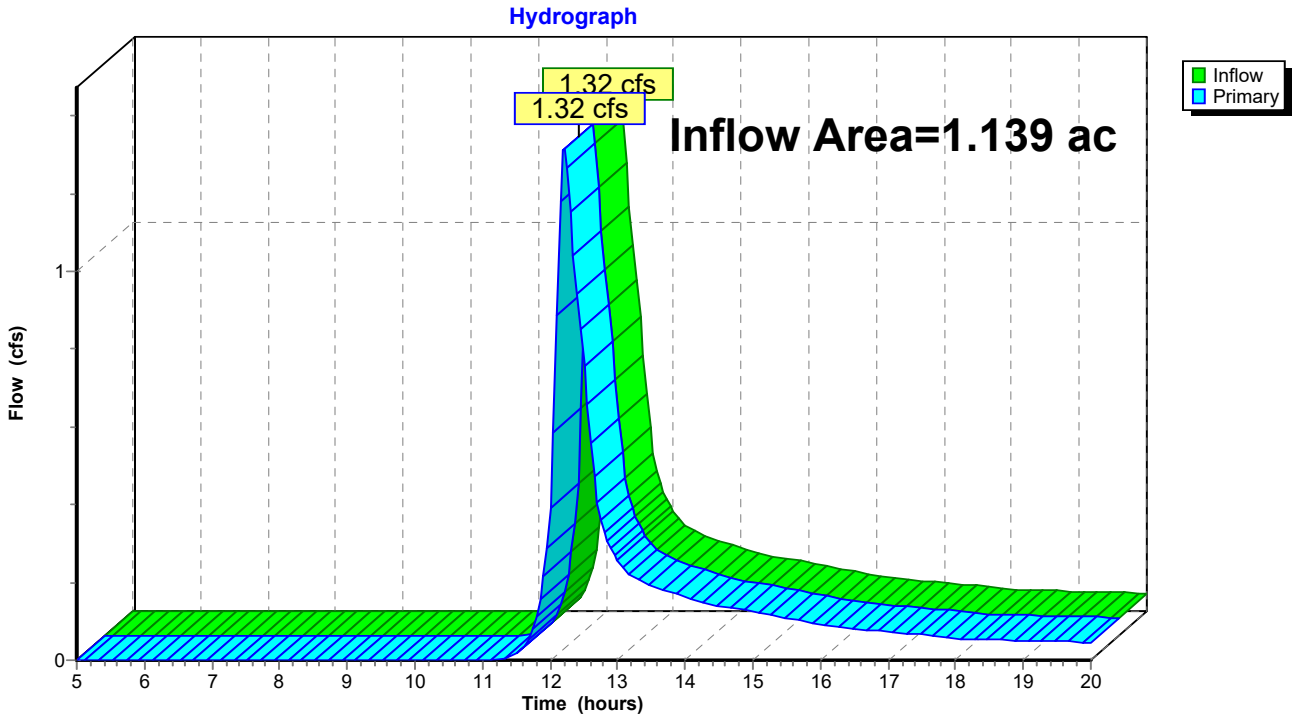


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 1.27" for 10-yr Storm event
Inflow = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af
Primary = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

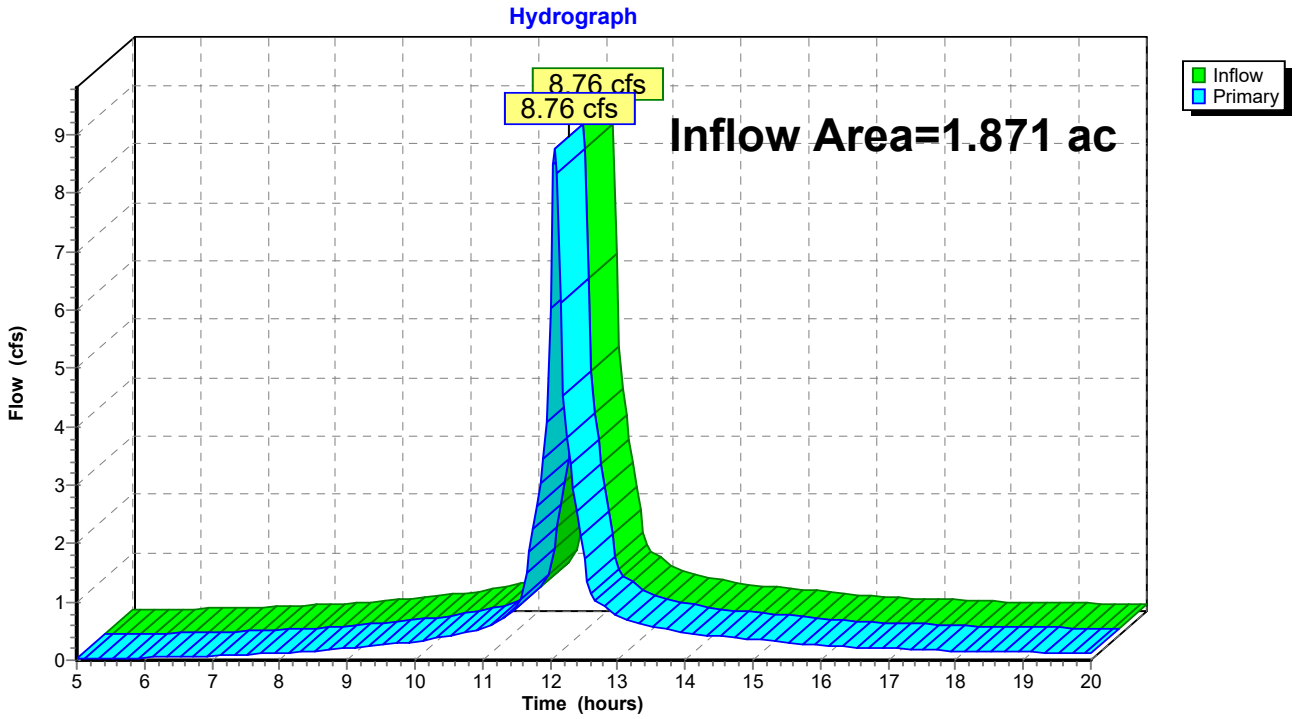


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 3.93" for 10-yr Storm event
Inflow = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af
Primary = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>3.35"
Flow Length=807' Tc=38.8 min CN=75 Runoff=42.00 cfs 5.511 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>2.00"
Flow Length=745' Tc=13.7 min CN=60 Runoff=2.17 cfs 0.190 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>5.06"
Tc=5.0 min CN=91 Runoff=11.14 cfs 0.790 af

Link AP-1: AP-1 Inflow=42.00 cfs 5.511 af
Primary=42.00 cfs 5.511 af

Link AP-2: AP-2 Inflow=2.17 cfs 0.190 af
Primary=2.17 cfs 0.190 af

Link AP-3: AP-3 Inflow=11.14 cfs 0.790 af
Primary=11.14 cfs 0.790 af

Summary for Subcatchment SC-1 new: SC-1

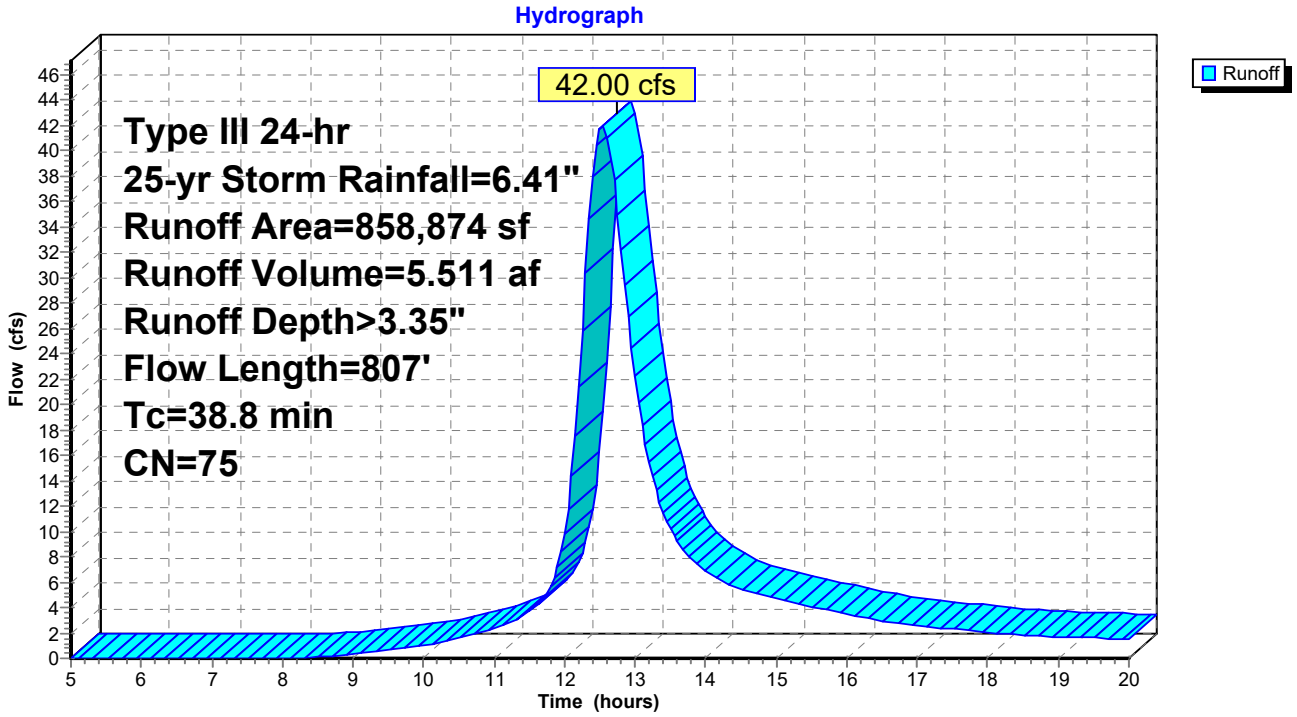
Runoff = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af, Depth> 3.35"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

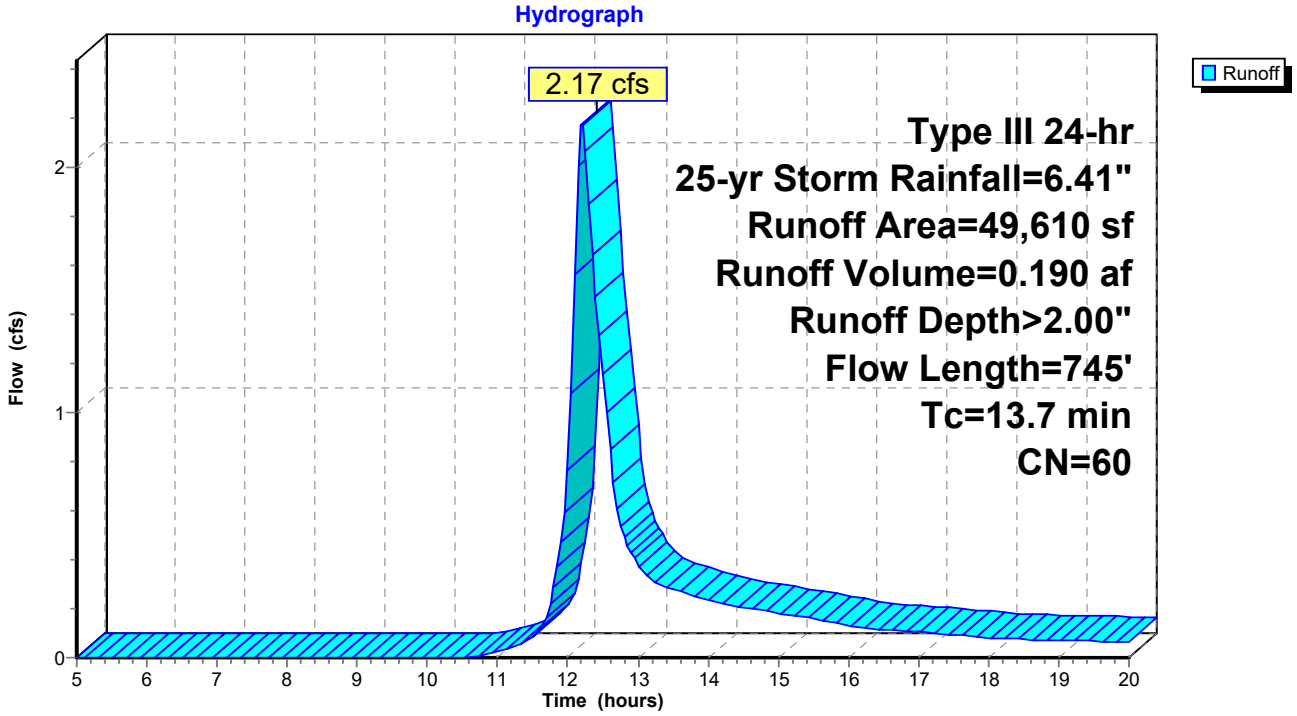
Runoff = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af, Depth> 2.00"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

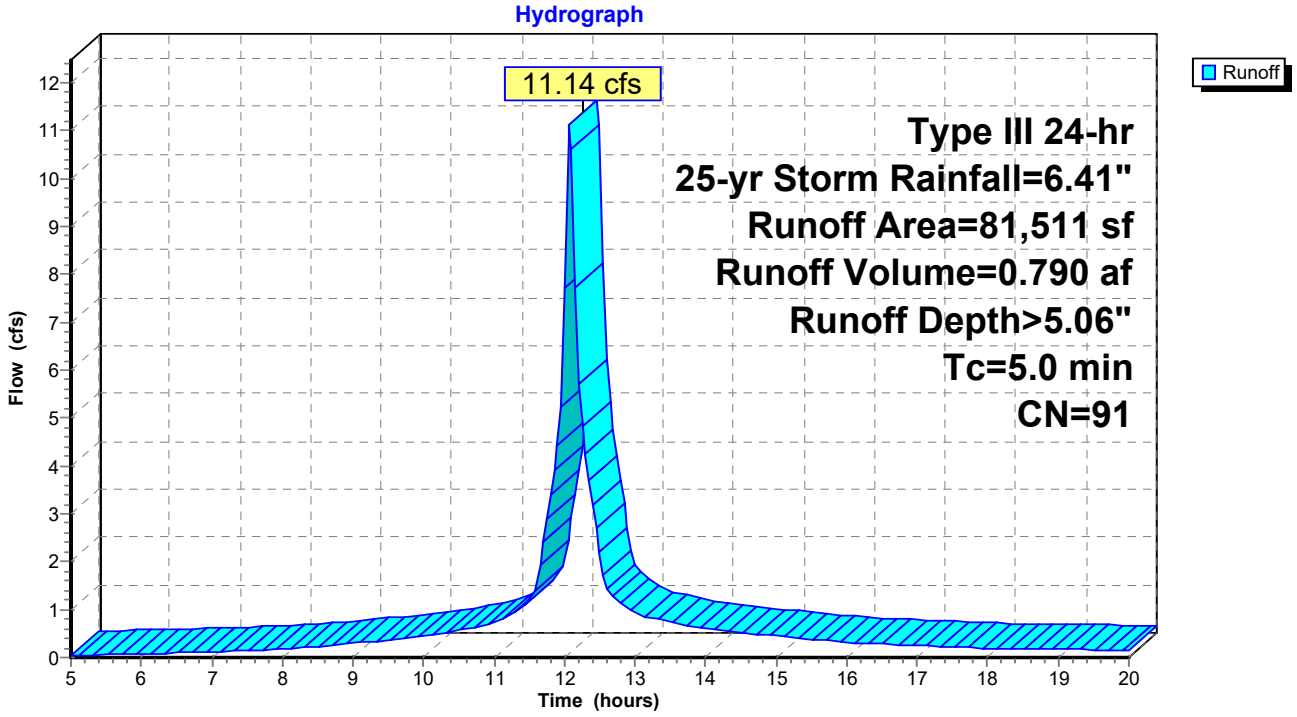
Runoff = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af, Depth> 5.06"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

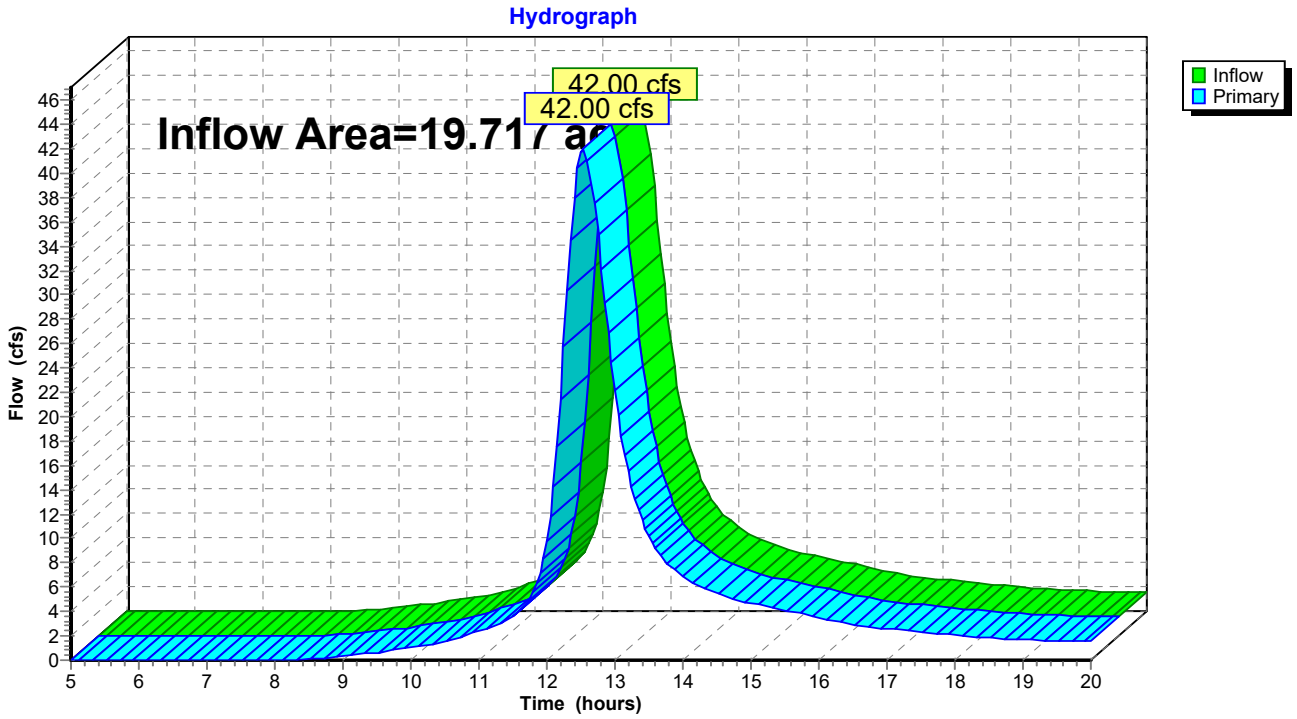


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 3.35" for 25-yr Storm event
Inflow = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af
Primary = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

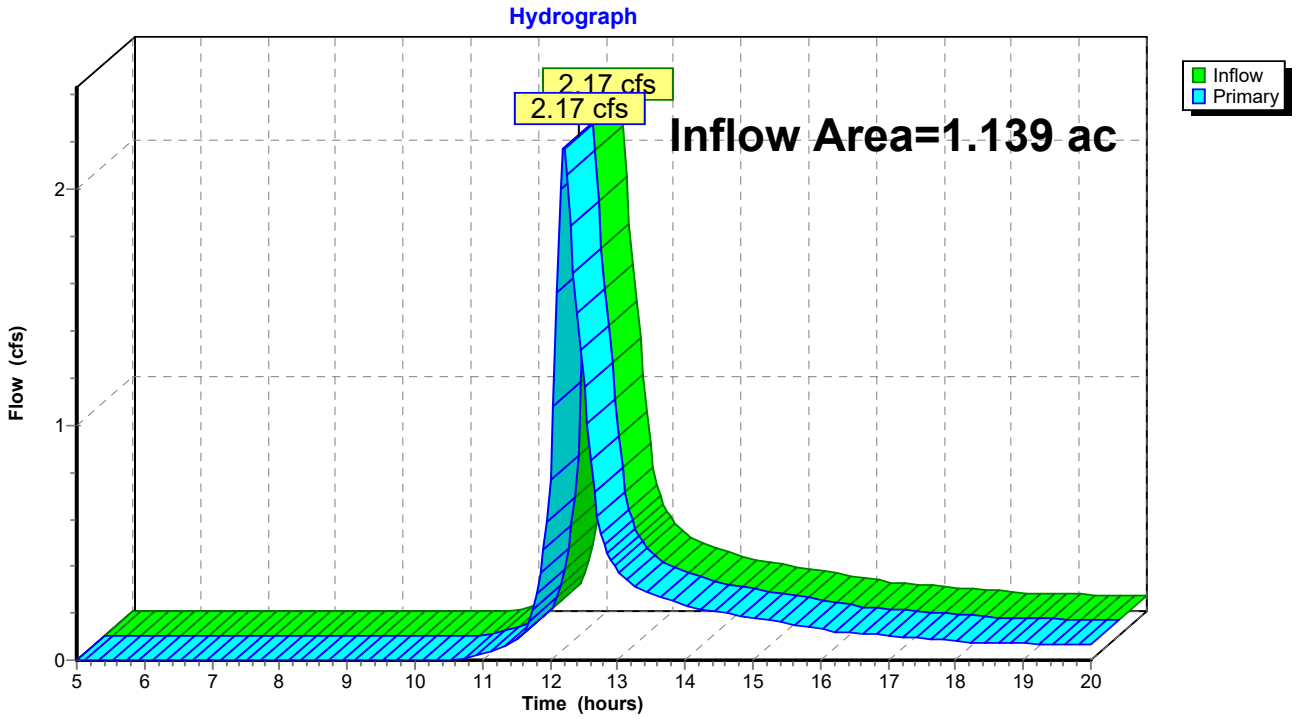


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 2.00" for 25-yr Storm event
Inflow = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af
Primary = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

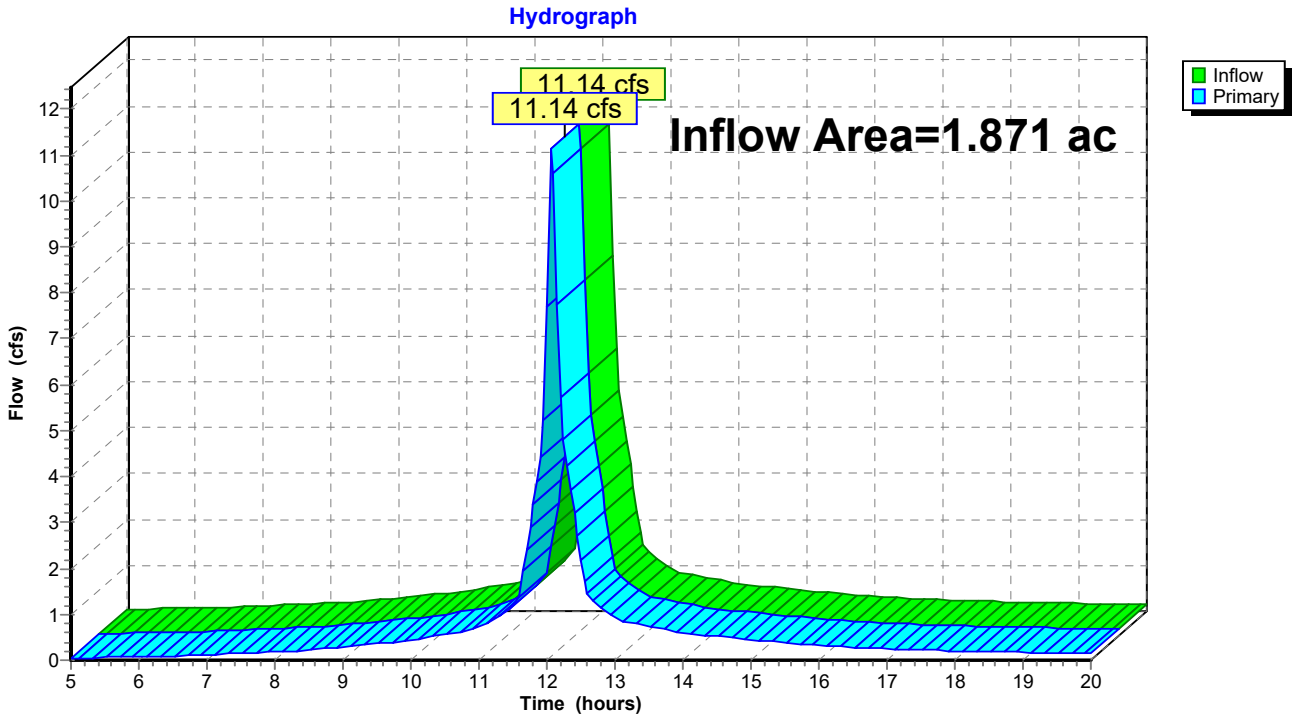


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 5.06" for 25-yr Storm event
Inflow = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af
Primary = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>4.94"
Flow Length=807' Tc=38.8 min CN=75 Runoff=61.32 cfs 8.118 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>3.28"
Flow Length=745' Tc=13.7 min CN=60 Runoff=3.65 cfs 0.312 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>6.82"
Tc=5.0 min CN=91 Runoff=14.77 cfs 1.063 af

Link AP-1: AP-1 Inflow=61.32 cfs 8.118 af
Primary=61.32 cfs 8.118 af

Link AP-2: AP-2 Inflow=3.65 cfs 0.312 af
Primary=3.65 cfs 0.312 af

Link AP-3: AP-3 Inflow=14.77 cfs 1.063 af
Primary=14.77 cfs 1.063 af

Summary for Subcatchment SC-1 new: SC-1

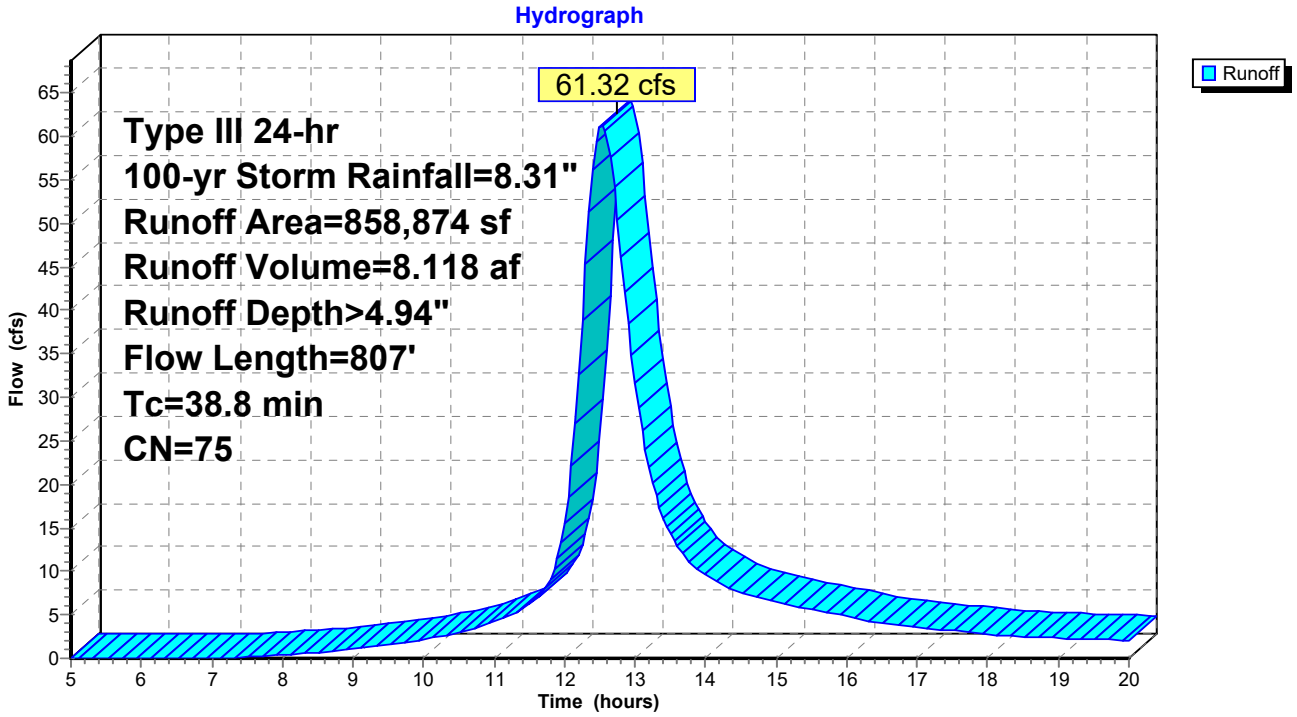
Runoff = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af, Depth> 4.94"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

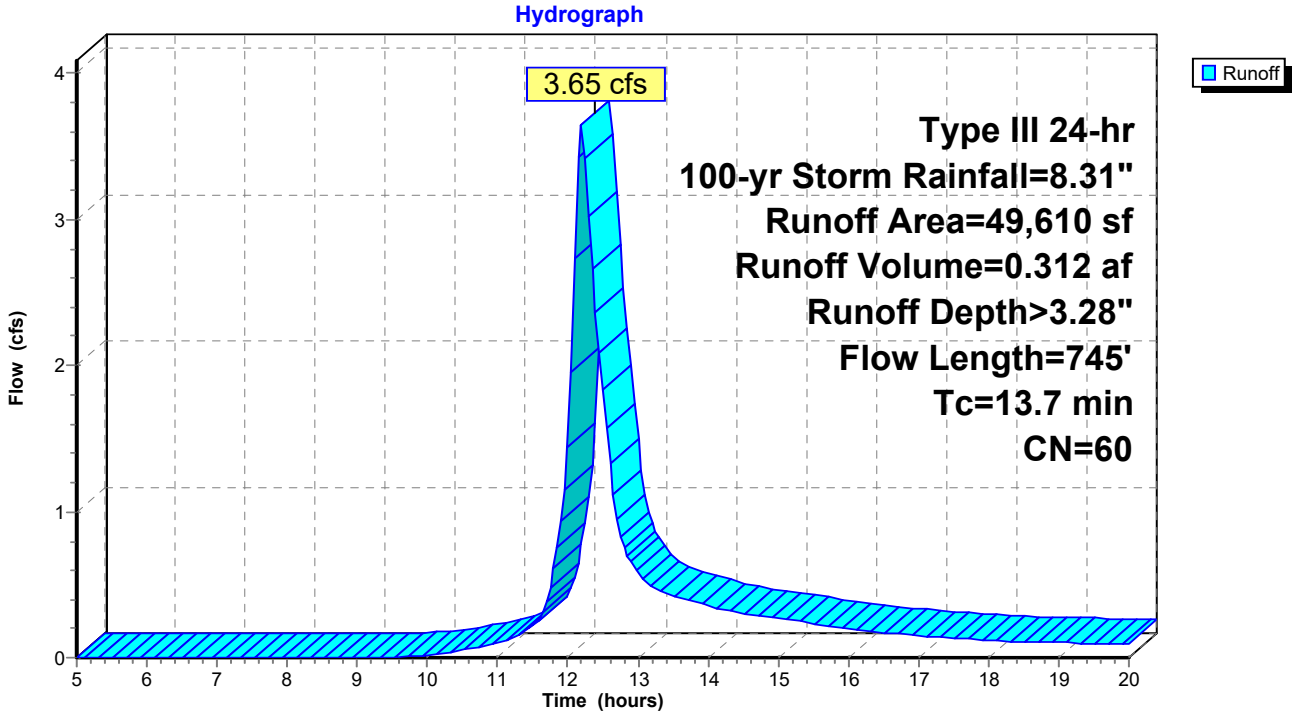
Runoff = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af, Depth> 3.28"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

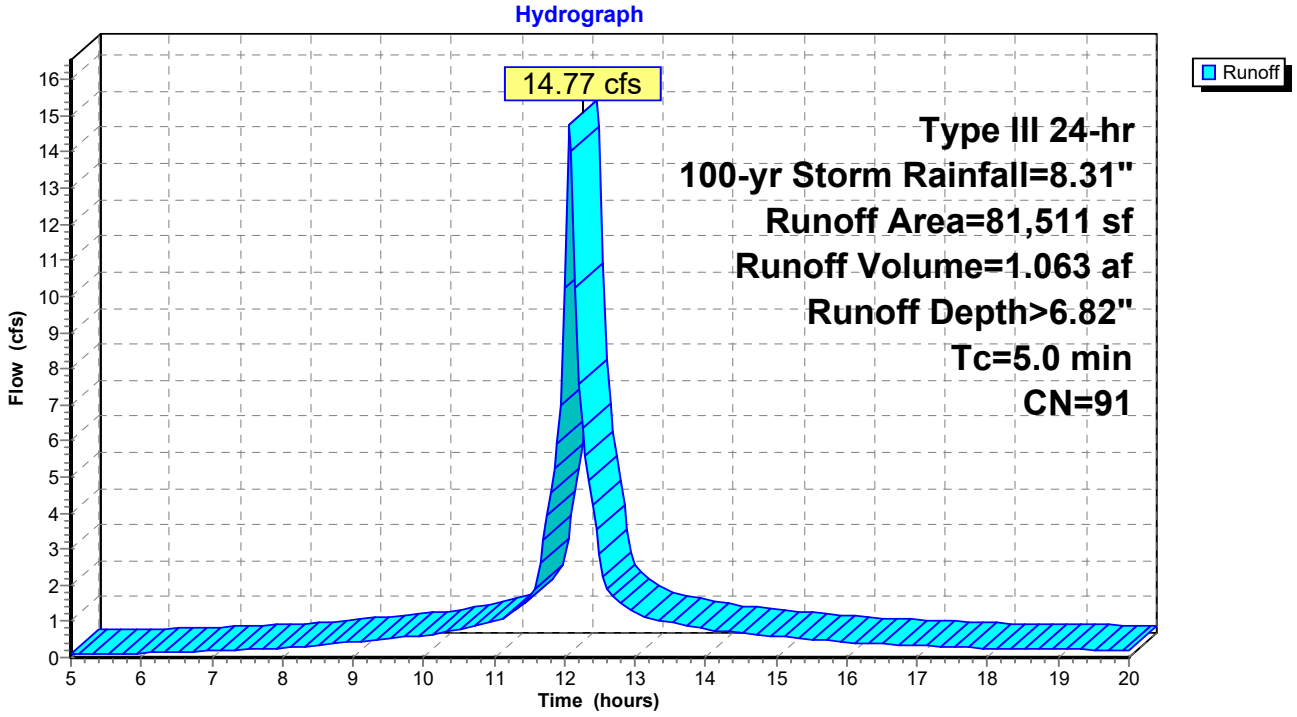
Runoff = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af, Depth> 6.82"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

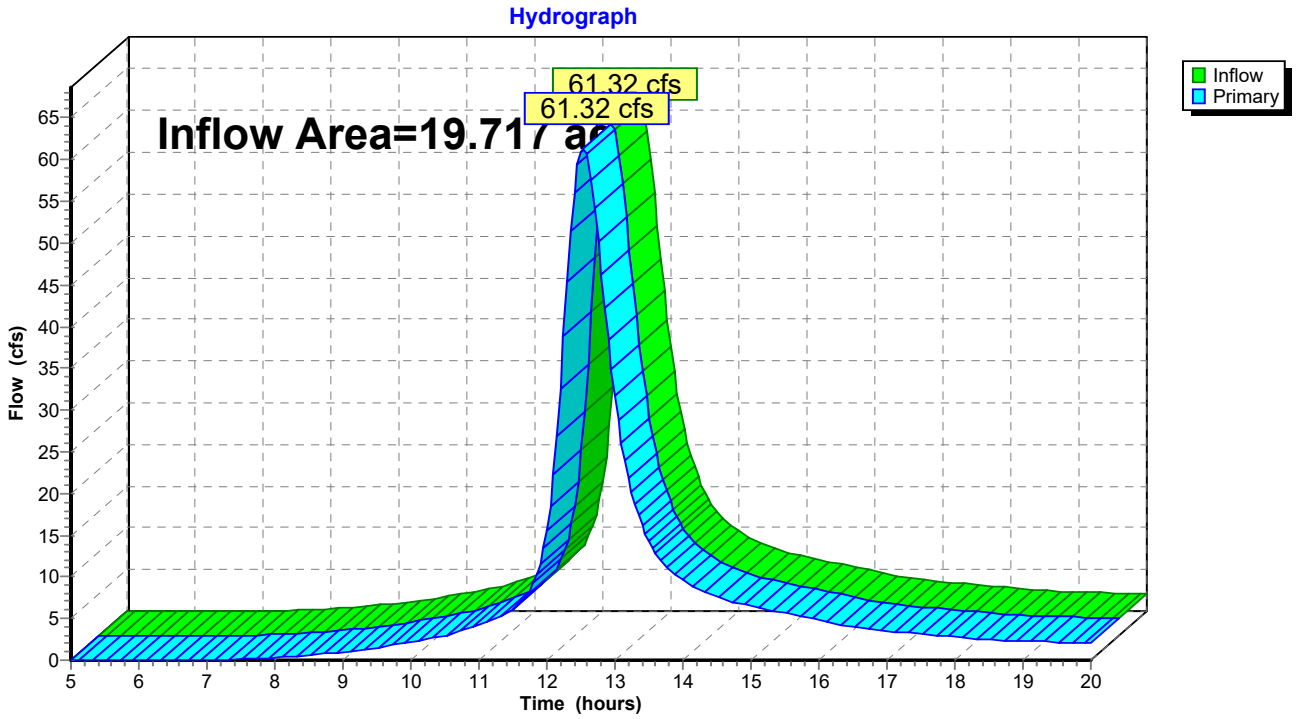


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 4.94" for 100-yr Storm event
Inflow = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af
Primary = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

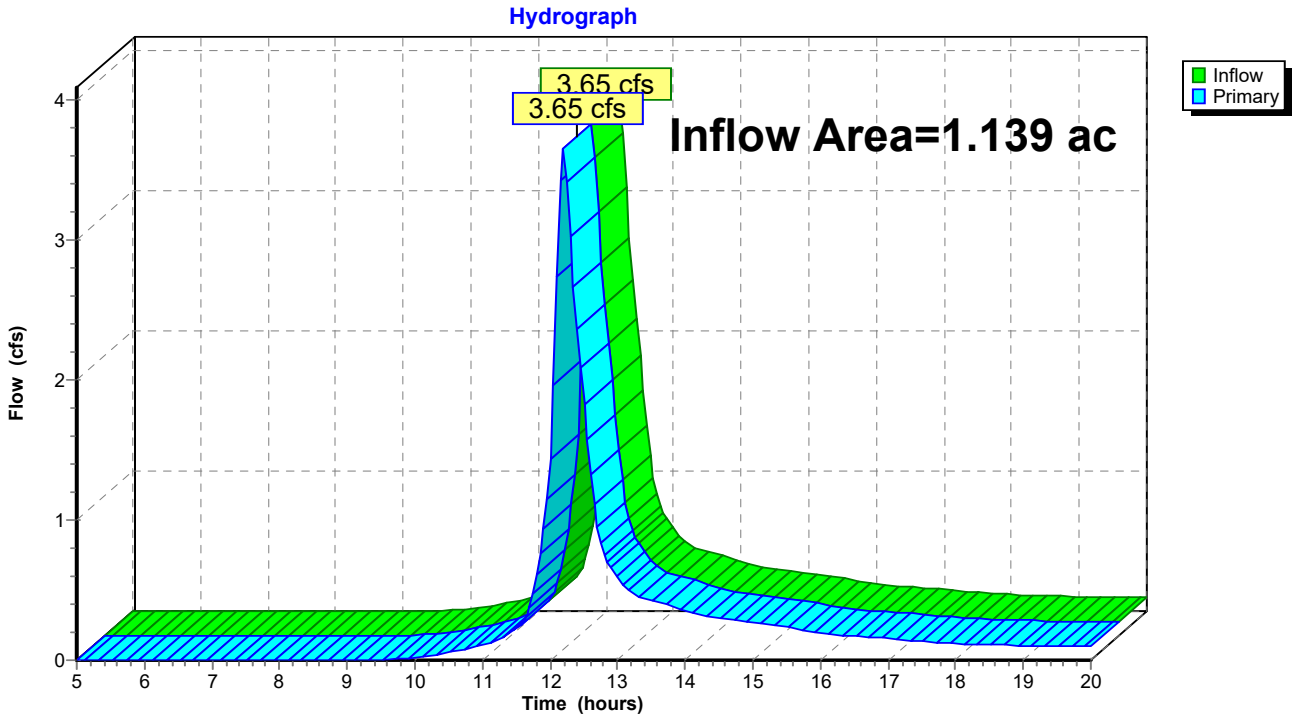


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 3.28" for 100-yr Storm event
Inflow = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af
Primary = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

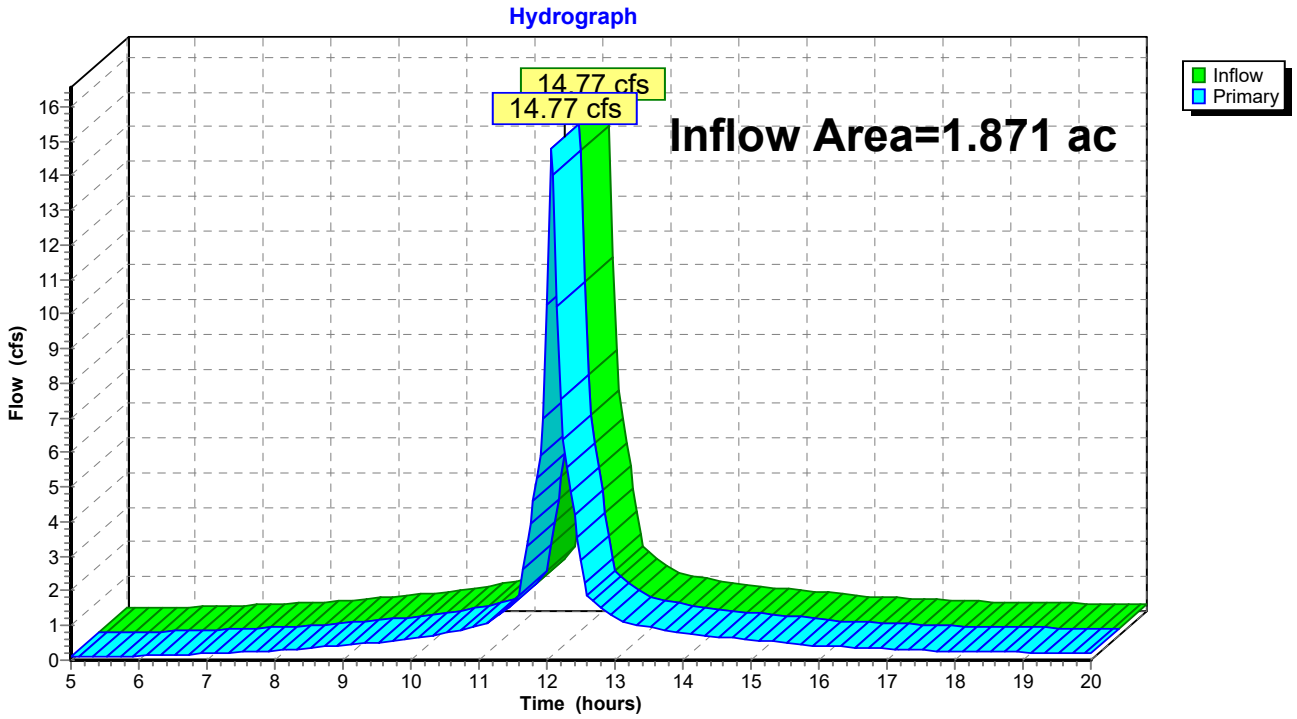


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 6.82" for 100-yr Storm event
Inflow = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af
Primary = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

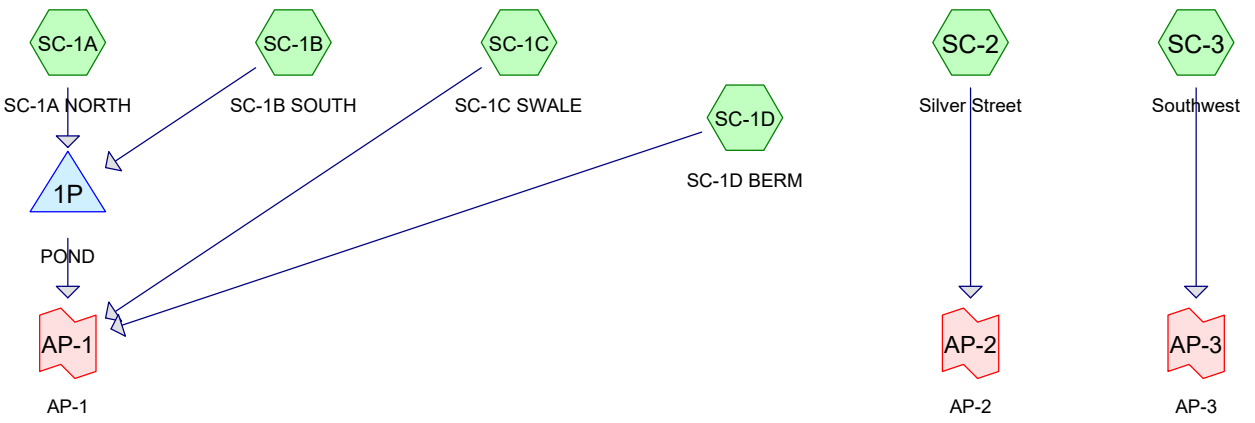
Link AP-3: AP-3



ATTACHMENT D

POST-DEVELOPMENT HYDROCAD CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS



Subcat Reach Pond Link

Routing Diagram for Post-Conditions - TMH
Prepared by Sevee & Maher Engineers, Printed 12/23/2025
HydroCAD® 10.20-7a s/n 01260 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr Storm	Type III 24-hr		Default	24.00	1	3.22	2
2	10-yr Storm	Type III 24-hr		Default	24.00	1	5.18	2
3	25-yr Storm	Type III 24-hr		Default	24.00	1	6.41	2
4	100-yr Storm	Type III 24-hr		Default	24.00	1	8.31	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.451	96	Gravel (SC-1A, SC-1B, SC-1C, SC-1D, SC-3)
7.696	39	Pasture/grassland/range, Good, HSG A (SC-1A, SC-1B, SC-1C, SC-1D, SC-2, SC-3)
0.510	98	Paved parking, HSG A (SC-1A, SC-1C, SC-2)
0.463	98	Roofs, HSG A (SC-1B, SC-1C, SC-2)
4.606	30	Woods, Good, HSG A (SC-1C)
22.726	**63**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	179.50	179.20	20.0	0.0150	0.012	0.0	15.0	0.0	
2	1P	180.00	179.80	20.0	0.0100	0.012	0.0	12.0	0.0	
3	1P	180.25	180.05	20.0	0.0100	0.012	0.0	12.0	0.0	

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=1.77"
Flow Length=779' Tc=22.4 min CN=85 Runoff=3.33 cfs 0.368 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=2.10"
Flow Length=901' Tc=23.4 min CN=89 Runoff=6.85 cfs 0.775 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=0.11"
Flow Length=896' Tc=30.9 min CN=49 Runoff=0.20 cfs 0.122 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=46 Runoff=0.00 cfs 0.003 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=0.70"
Flow Length=745' Tc=22.2 min CN=67 Runoff=0.41 cfs 0.054 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=1.85"
Tc=5.0 min CN=86 Runoff=2.69 cfs 0.184 af

Pond 1P: POND Peak Elev=181.05' Storage=8,847 cf Inflow=10.18 cfs 1.143 af
Outflow=8.87 cfs 1.075 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=8.88 cfs 1.200 af
Primary=8.88 cfs 1.200 af

Link AP-2: AP-2 Inflow=0.41 cfs 0.054 af
Primary=0.41 cfs 0.054 af

Link AP-3: AP-3 Inflow=2.69 cfs 0.184 af
Primary=2.69 cfs 0.184 af

Total Runoff Area = 22.726 ac Runoff Volume = 1.506 af Average Runoff Depth = 0.80"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

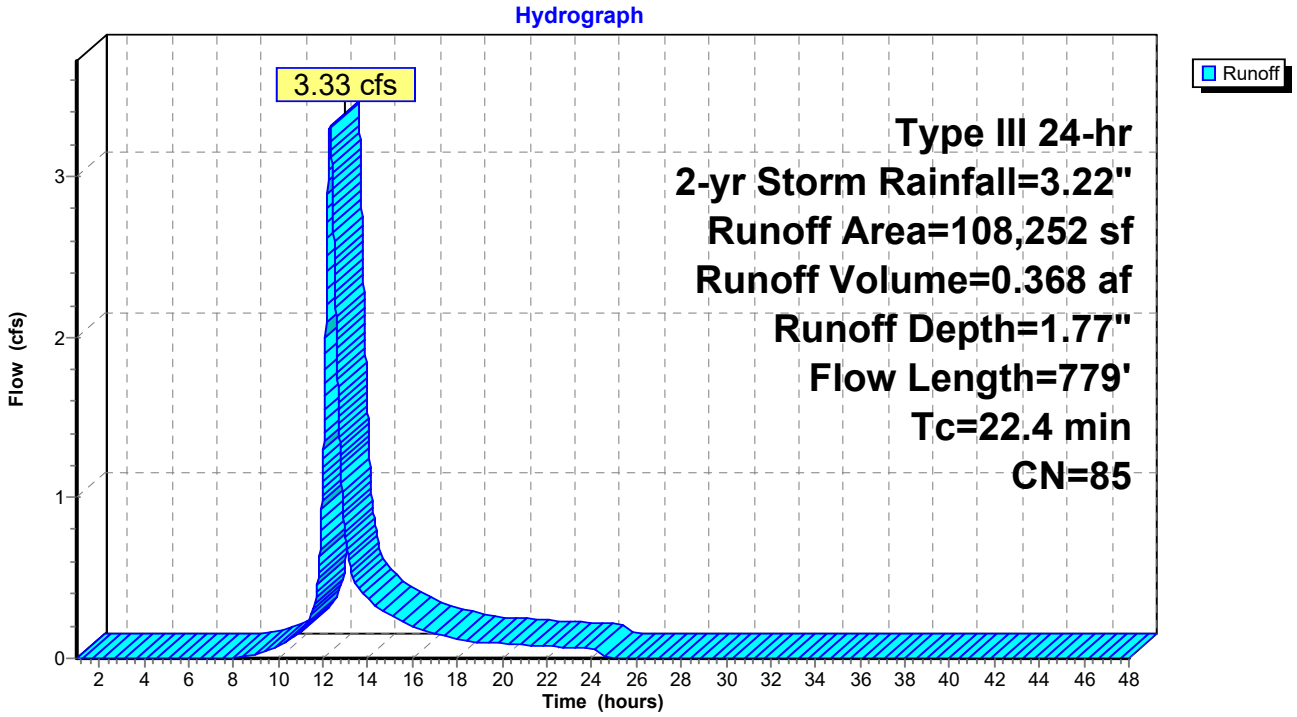
Runoff = 3.33 cfs @ 12.32 hrs, Volume= 0.368 af, Depth= 1.77"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

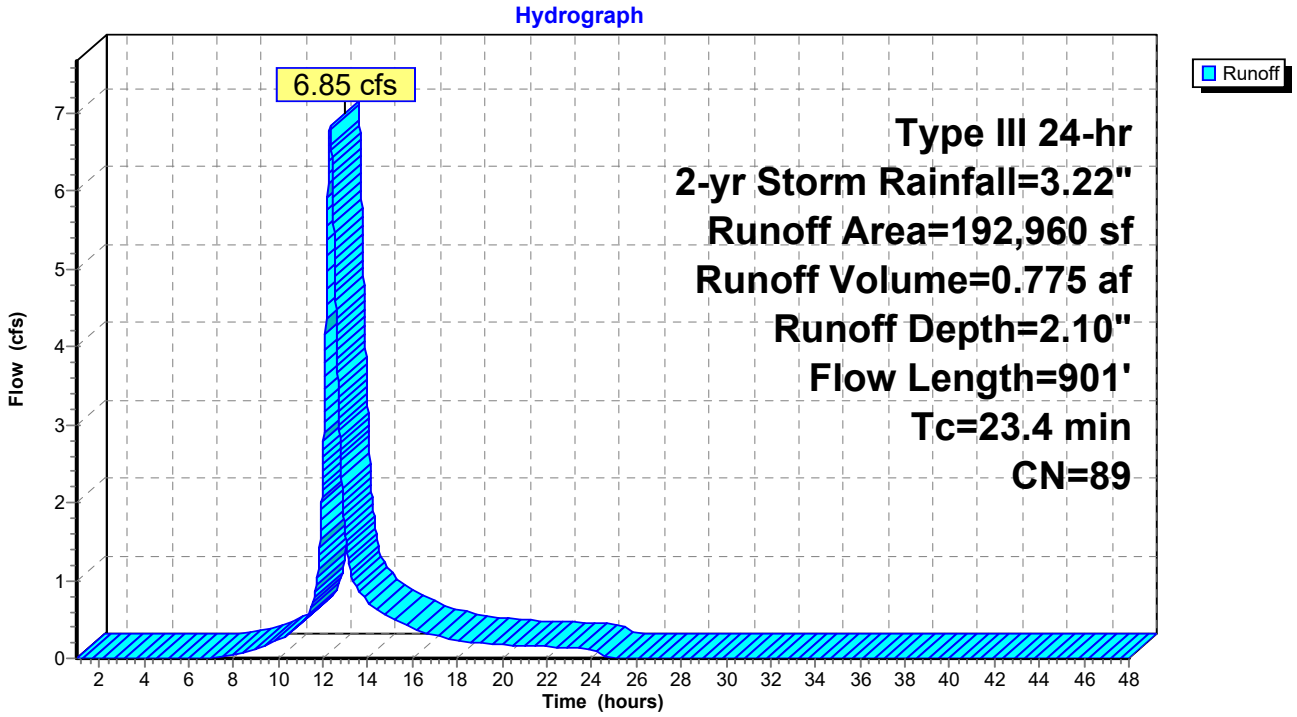
Runoff = 6.85 cfs @ 12.32 hrs, Volume= 0.775 af, Depth= 2.10"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

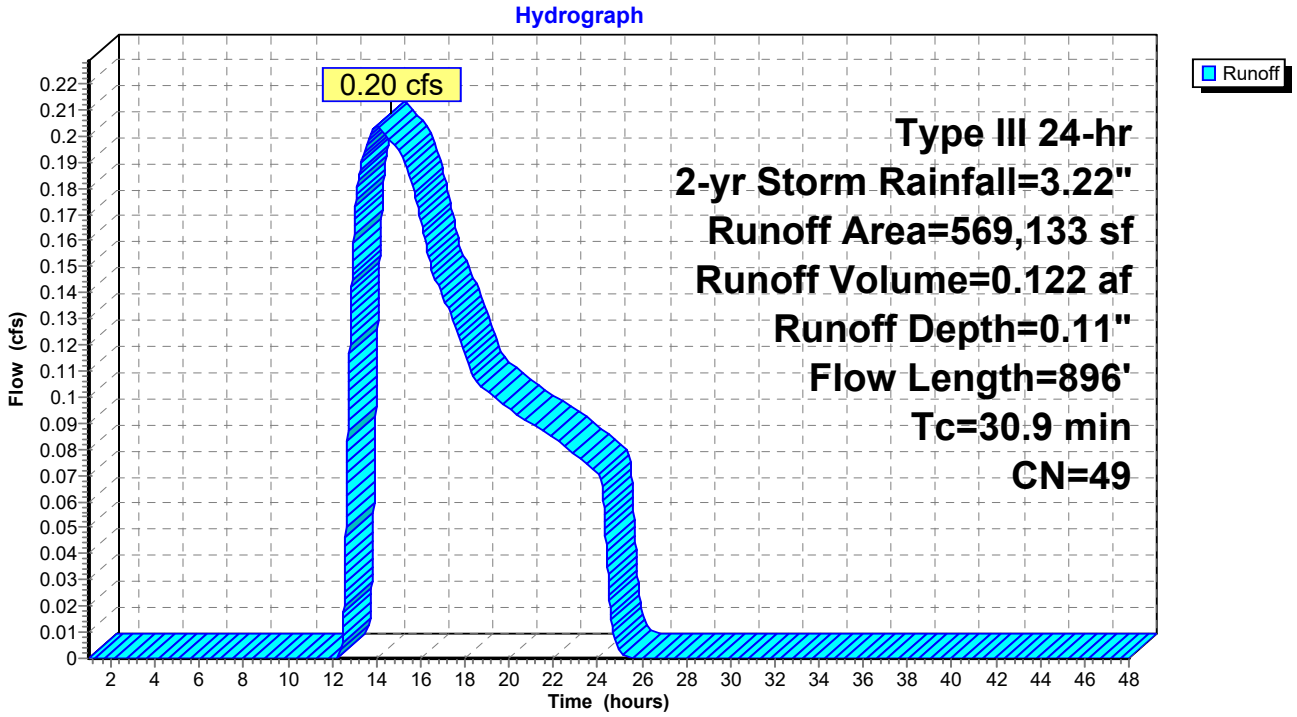
Runoff = 0.20 cfs @ 14.04 hrs, Volume= 0.122 af, Depth= 0.11"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

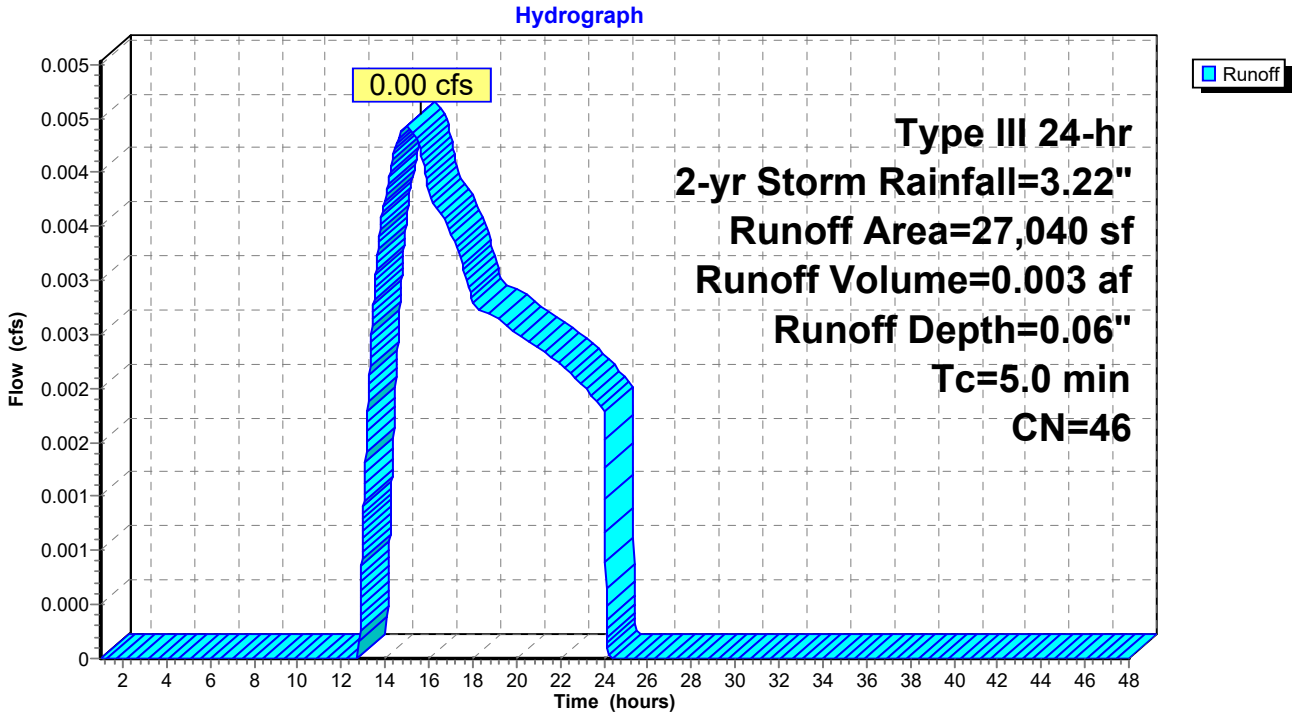
Runoff = 0.00 cfs @ 14.99 hrs, Volume= 0.003 af, Depth= 0.06"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

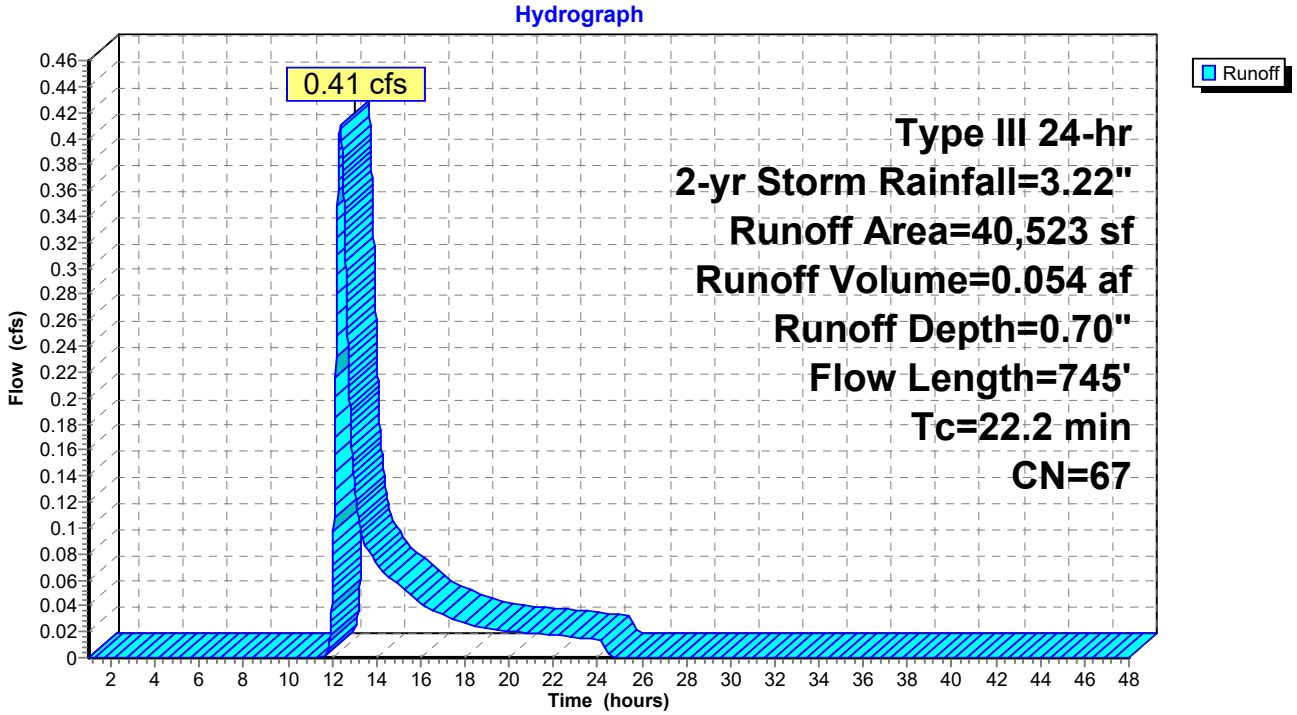
Runoff = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af, Depth= 0.70"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

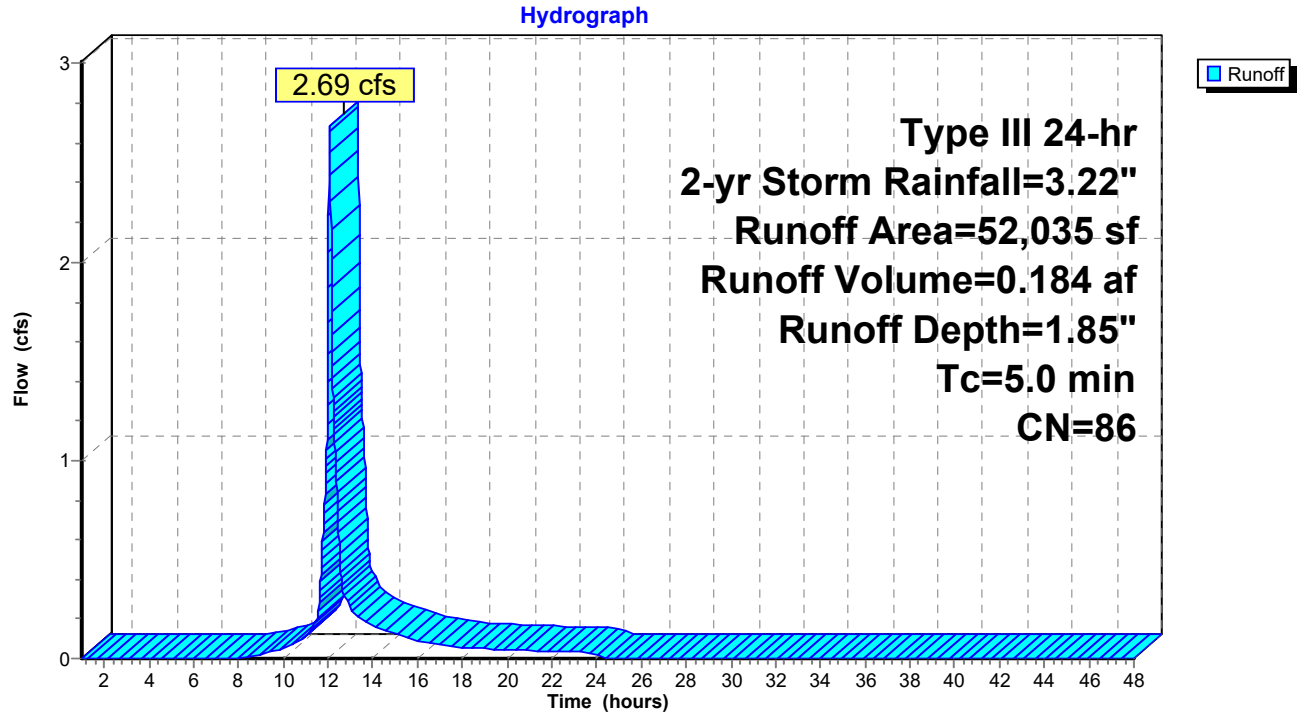
Runoff = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af, Depth= 1.85"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 1.98" for 2-yr Storm event
Inflow = 10.18 cfs @ 12.32 hrs, Volume= 1.143 af
Outflow = 8.87 cfs @ 12.44 hrs, Volume= 1.075 af, Atten= 13%, Lag= 7.5 min
Primary = 8.87 cfs @ 12.44 hrs, Volume= 1.075 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 181.05' @ 12.44 hrs Surf.Area= 4,851 sf Storage= 8,847 cf

Plug-Flow detention time= 71.5 min calculated for 1.075 af (94% of inflow)
Center-of-Mass det. time= 39.7 min (871.2 - 831.5)

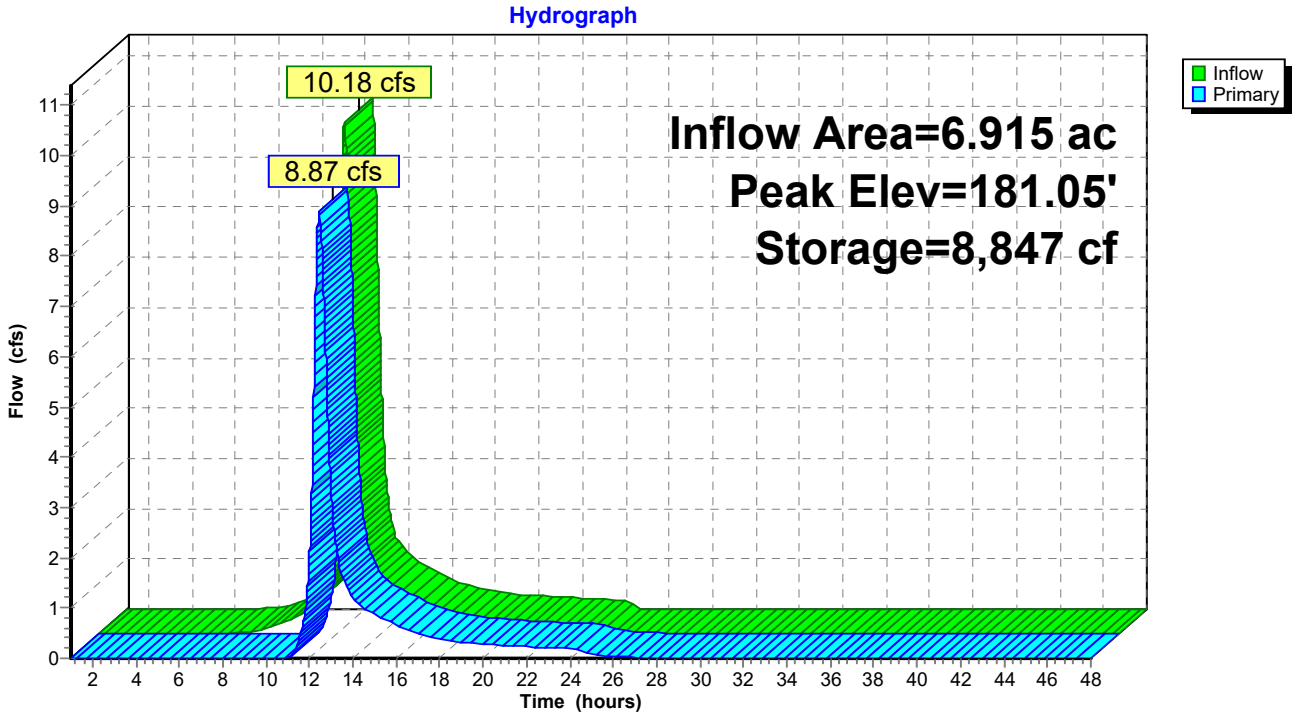
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=8.87 cfs @ 12.44 hrs HW=181.05' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Culvert** (Inlet Controls 4.48 cfs @ 3.65 fps)
- **3=Culvert** (Barrel Controls 2.61 cfs @ 3.94 fps)
- **4=Culvert** (Barrel Controls 1.78 cfs @ 3.62 fps)

Pond 1P: POND


Hydrograph
10.18 cfs
8.87 cfs
Inflow Area=6.915 ac
Peak Elev=181.05'
Storage=8,847 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

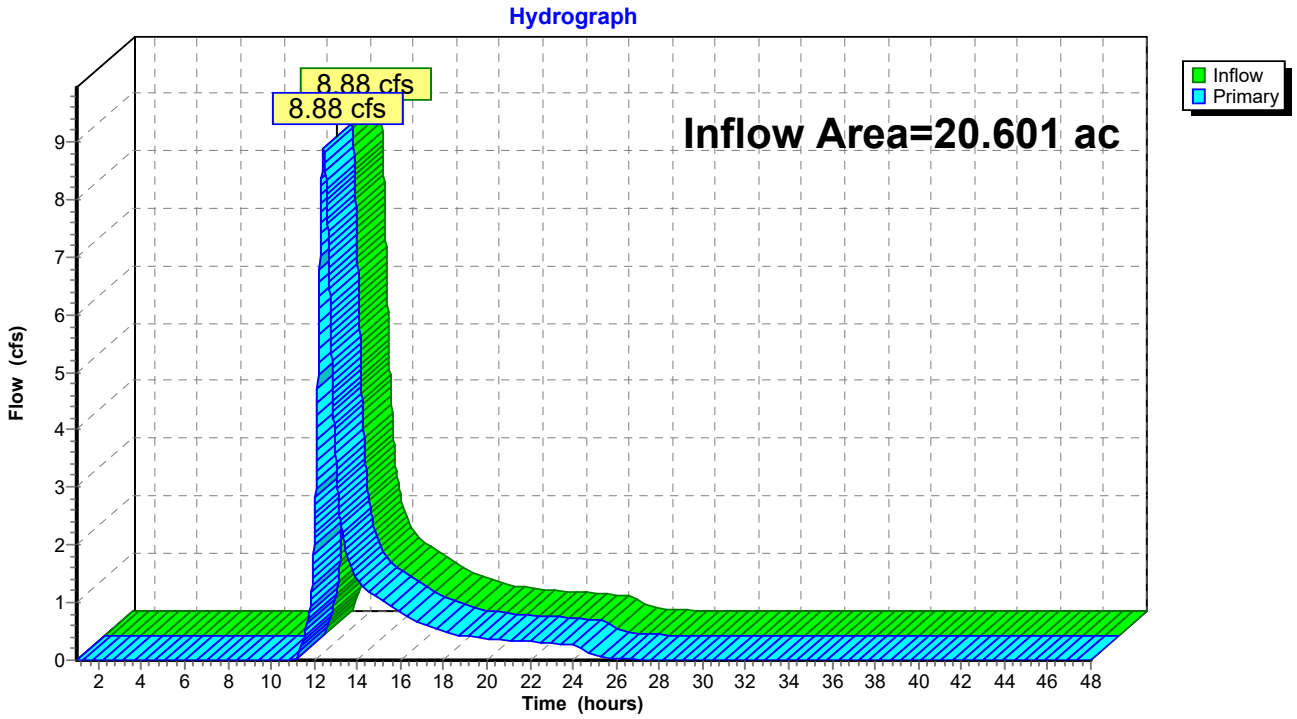
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 0.70" for 2-yr Storm event
Inflow = 8.88 cfs @ 12.44 hrs, Volume= 1.200 af
Primary = 8.88 cfs @ 12.44 hrs, Volume= 1.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

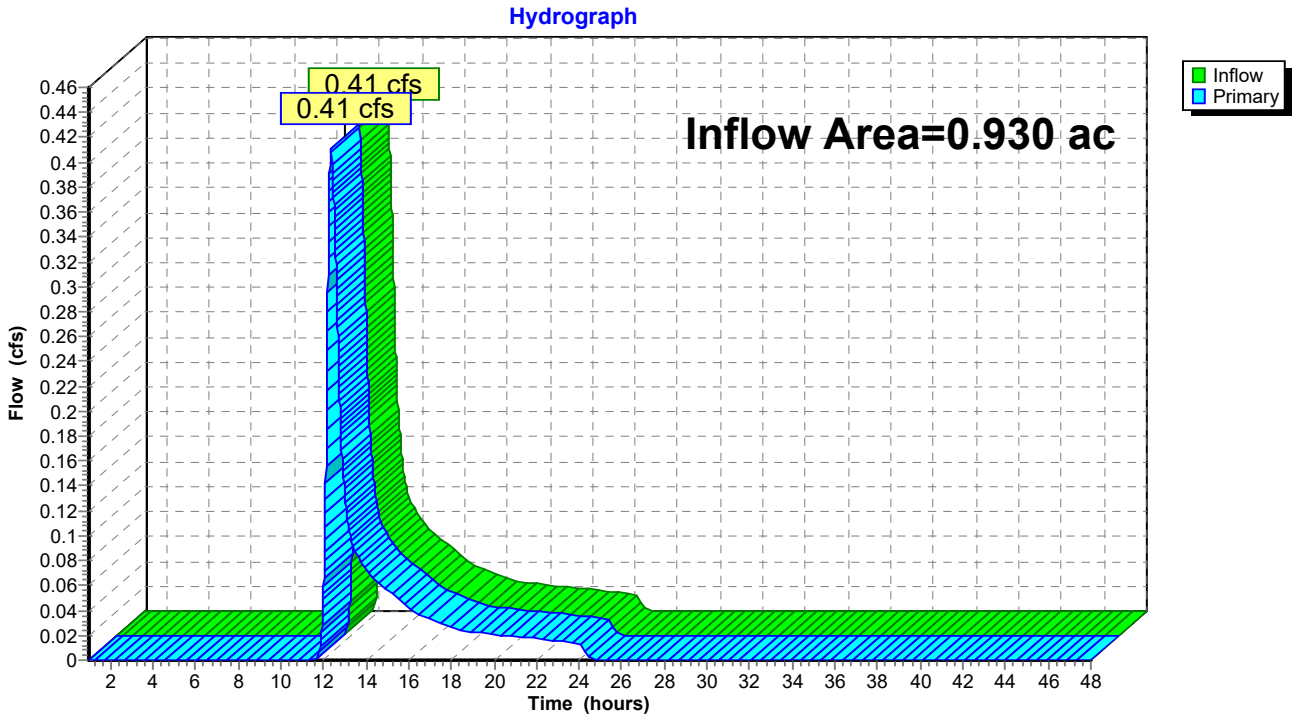


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 0.70" for 2-yr Storm event
Inflow = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af
Primary = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

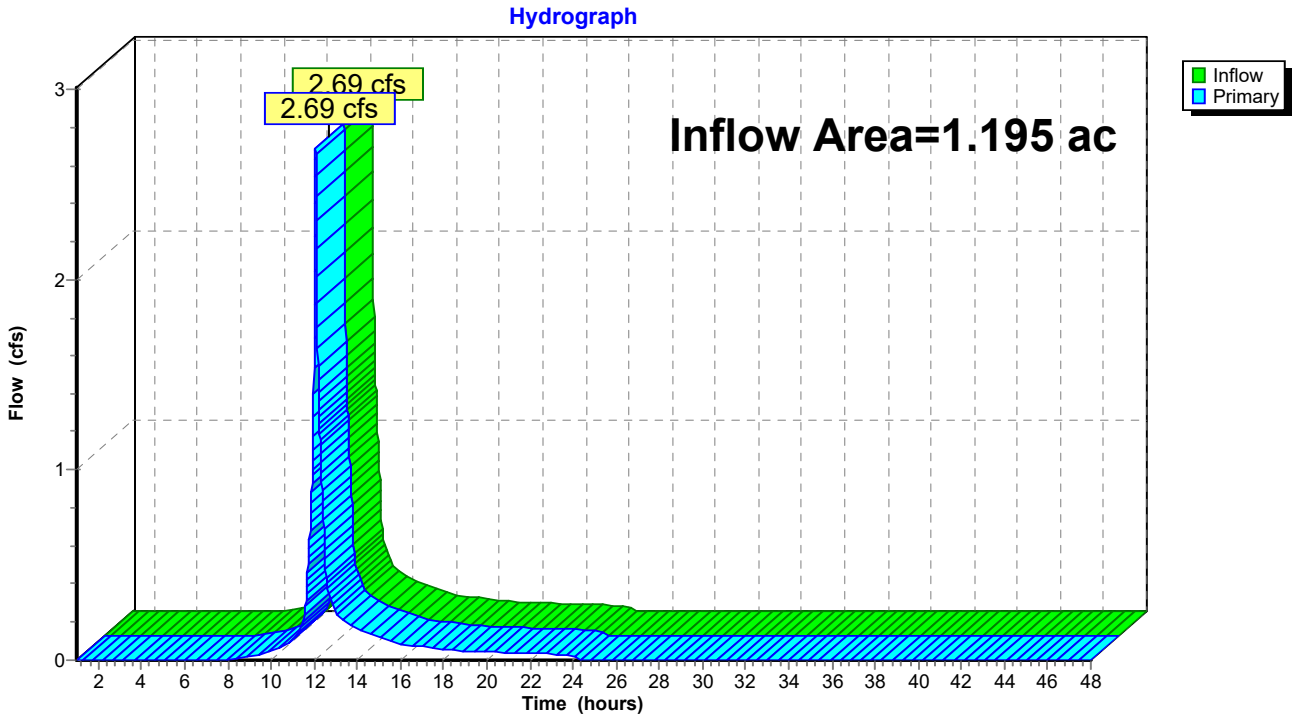


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 1.85" for 2-yr Storm event
Inflow = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af
Primary = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=3.53"
Flow Length=779' Tc=22.4 min CN=85 Runoff=6.57 cfs 0.732 af

SubcatchmentSC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=3.94"
Flow Length=901' Tc=23.4 min CN=89 Runoff=12.62 cfs 1.456 af

SubcatchmentSC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=0.71"
Flow Length=896' Tc=30.9 min CN=49 Runoff=4.11 cfs 0.774 af

SubcatchmentSC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=0.55"
Tc=5.0 min CN=46 Runoff=0.19 cfs 0.028 af

SubcatchmentSC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=1.93"
Flow Length=745' Tc=22.2 min CN=67 Runoff=1.31 cfs 0.150 af

SubcatchmentSC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=86 Runoff=5.19 cfs 0.362 af

Pond 1P: POND Peak Elev=181.81' Storage=13,066 cf Inflow=19.18 cfs 2.188 af
Outflow=17.07 cfs 2.121 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=20.73 cfs 2.923 af
Primary=20.73 cfs 2.923 af

Link AP-2: AP-2 Inflow=1.31 cfs 0.150 af
Primary=1.31 cfs 0.150 af

Link AP-3: AP-3 Inflow=5.19 cfs 0.362 af
Primary=5.19 cfs 0.362 af

Total Runoff Area = 22.726 ac Runoff Volume = 3.502 af Average Runoff Depth = 1.85"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

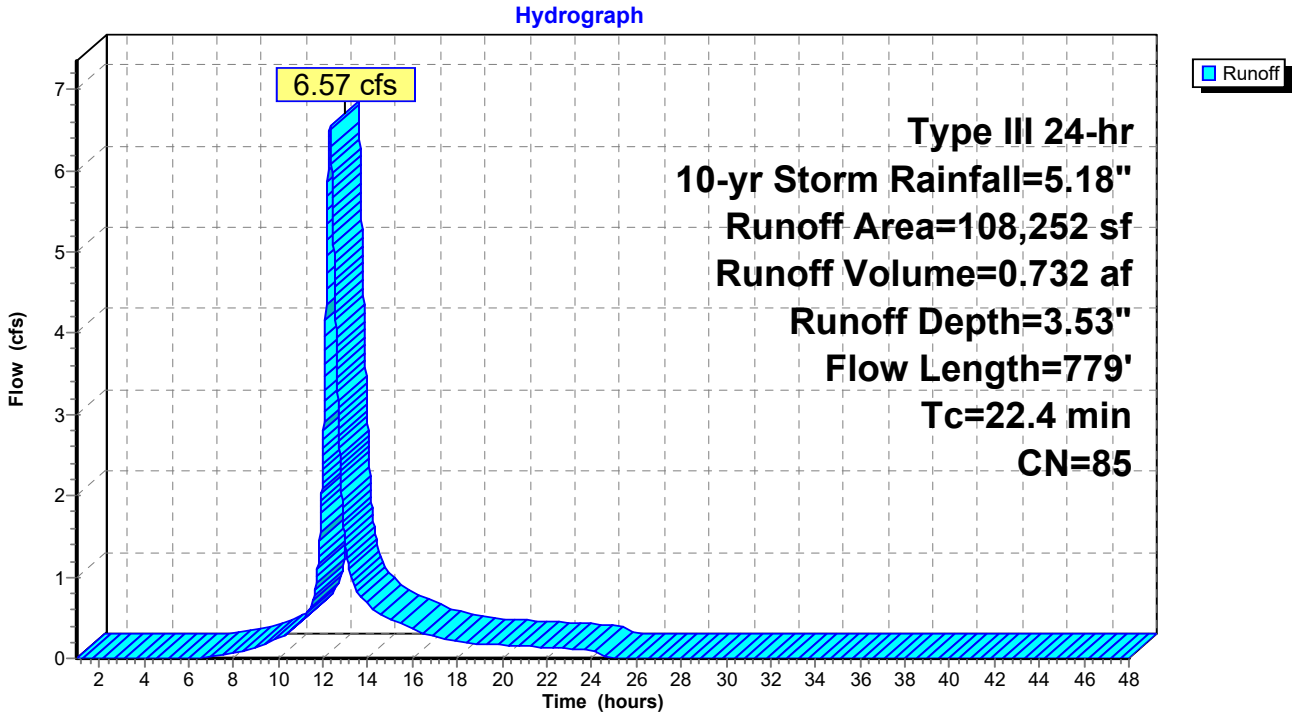
Runoff = 6.57 cfs @ 12.30 hrs, Volume= 0.732 af, Depth= 3.53"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

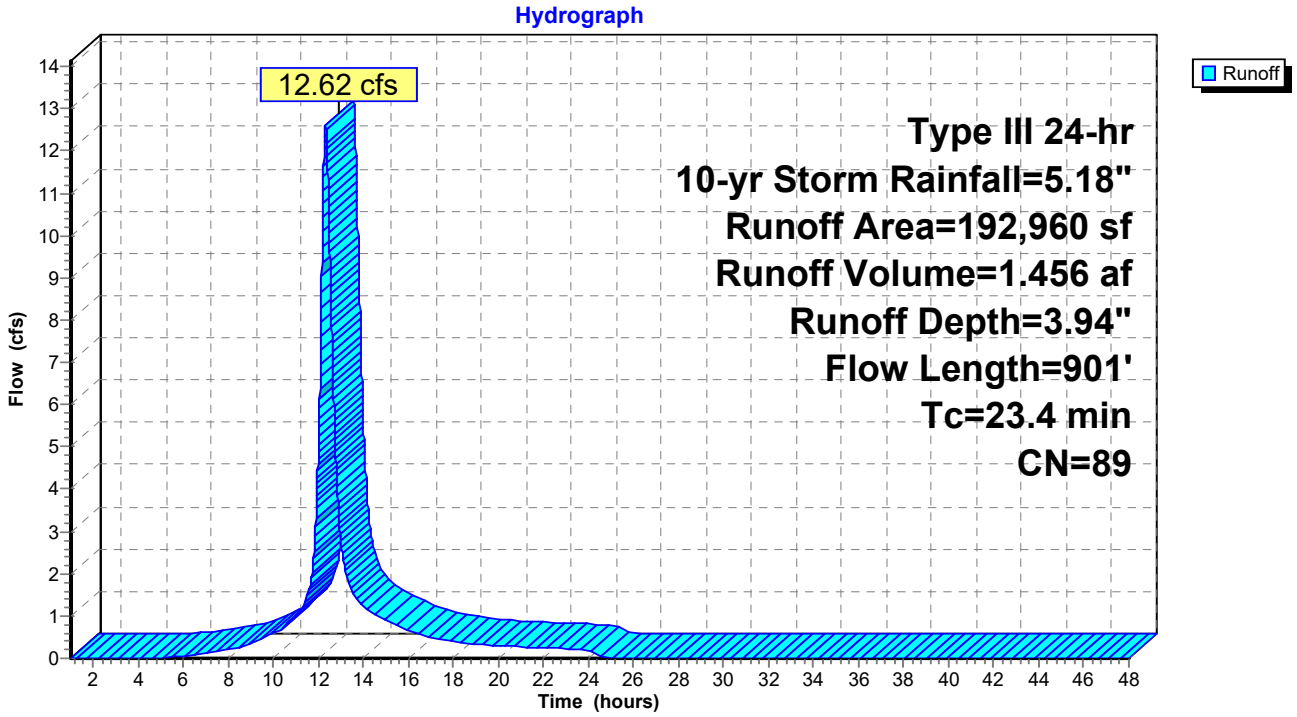
Runoff = 12.62 cfs @ 12.30 hrs, Volume= 1.456 af, Depth= 3.94"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

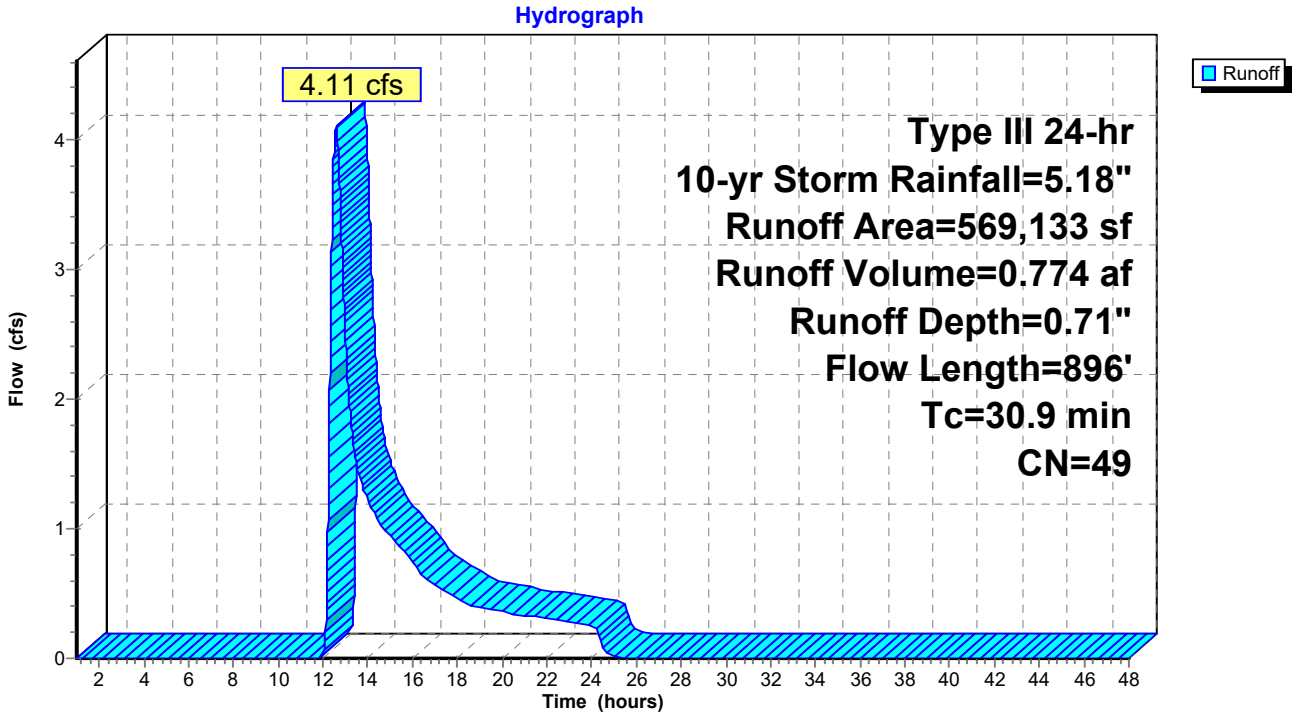
Runoff = 4.11 cfs @ 12.57 hrs, Volume= 0.774 af, Depth= 0.71"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

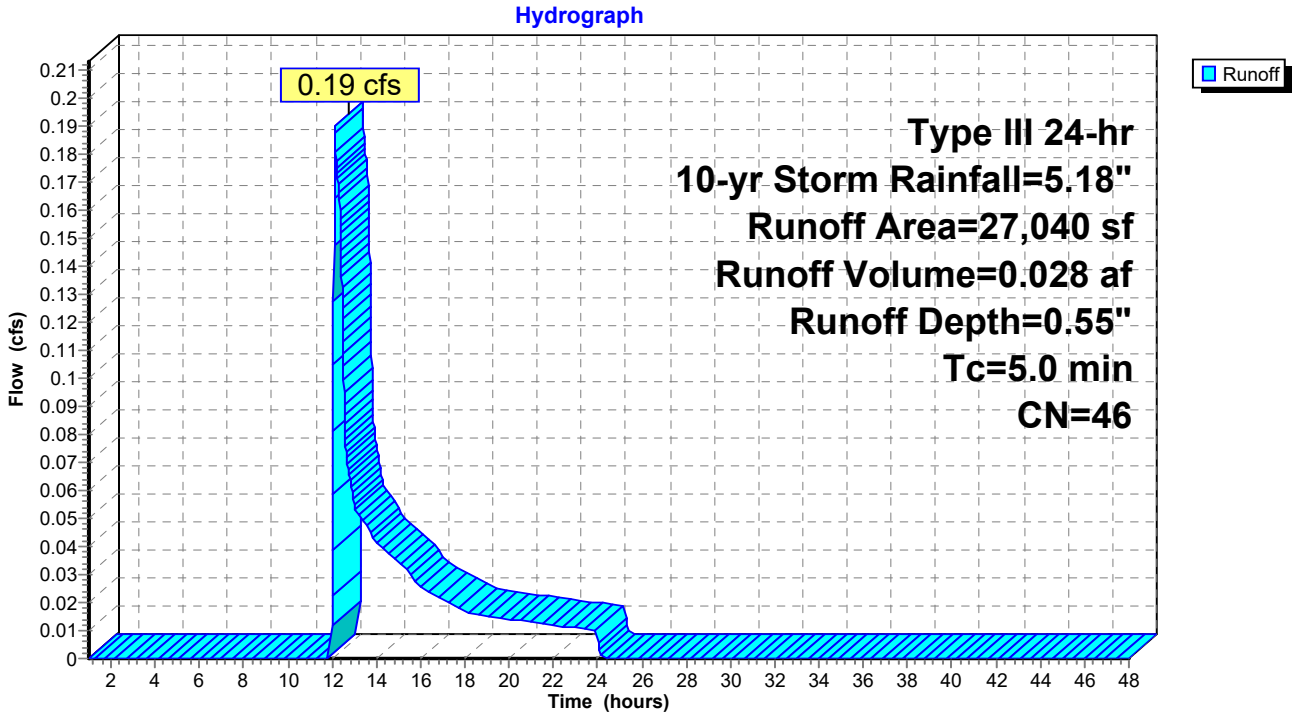
Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.028 af, Depth= 0.55"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

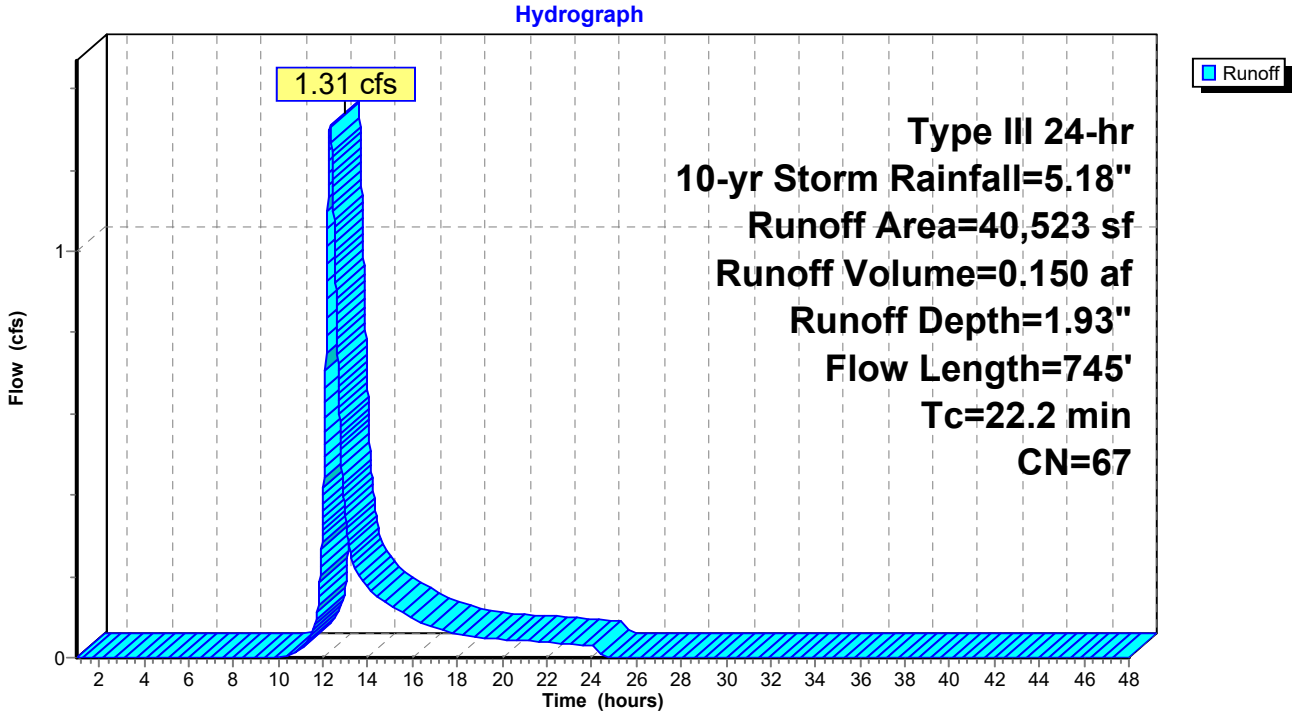
Runoff = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af, Depth= 1.93"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

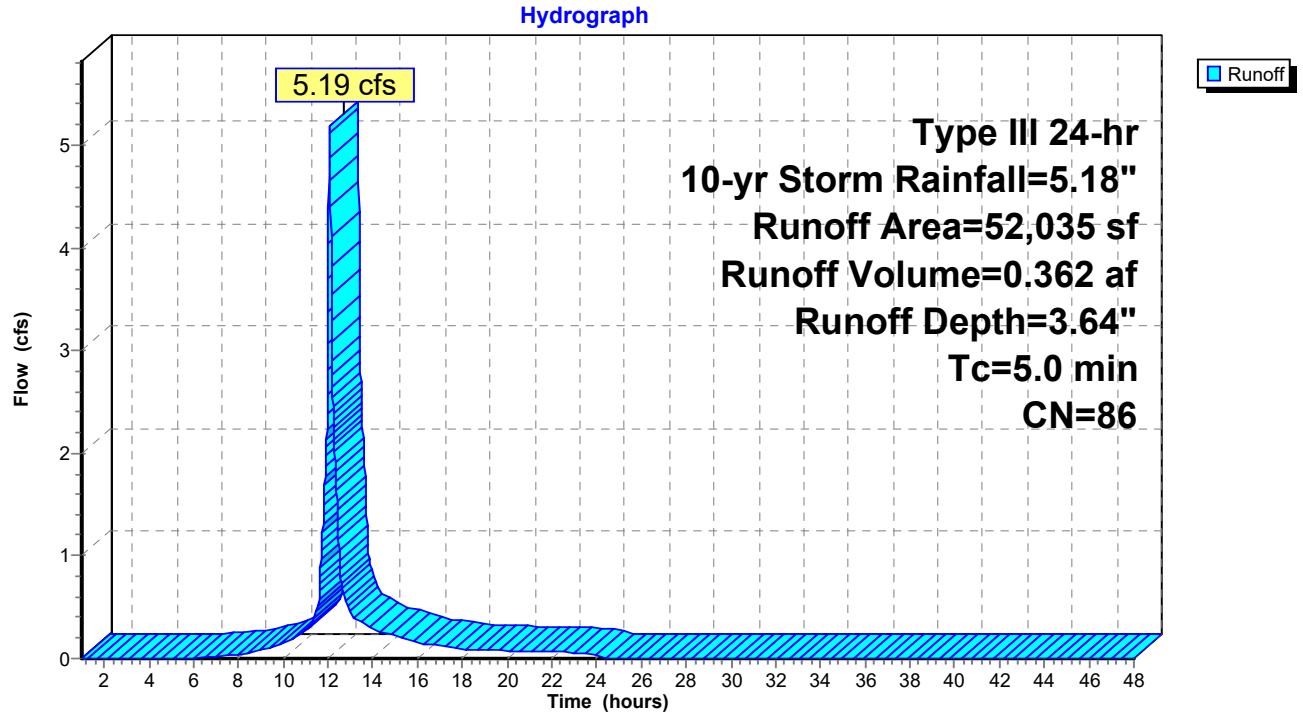
Runoff = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af, Depth= 3.64"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 3.80" for 10-yr Storm event
Inflow = 19.18 cfs @ 12.30 hrs, Volume= 2.188 af
Outflow = 17.07 cfs @ 12.42 hrs, Volume= 2.121 af, Atten= 11%, Lag= 7.0 min
Primary = 17.07 cfs @ 12.42 hrs, Volume= 2.121 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 181.81' @ 12.42 hrs Surf.Area= 6,227 sf Storage= 13,066 cf

Plug-Flow detention time= 48.3 min calculated for 2.120 af (97% of inflow)
Center-of-Mass det. time= 30.4 min (843.7 - 813.3)

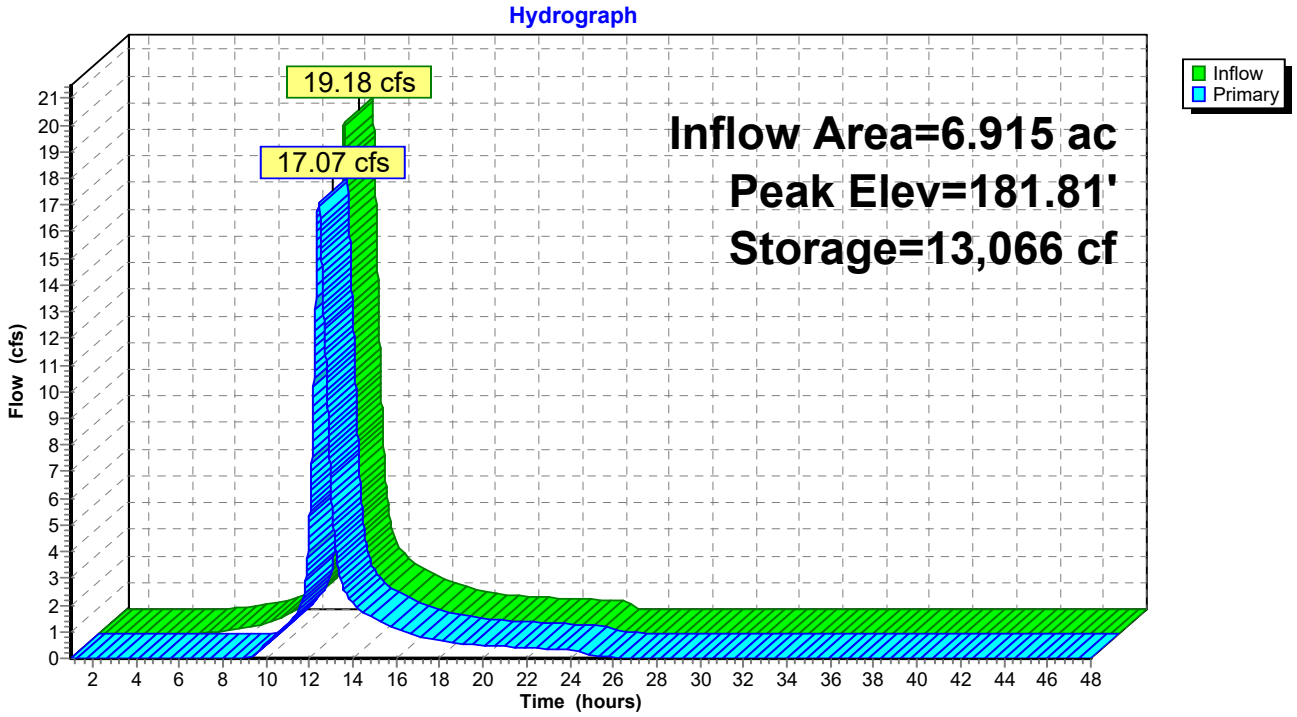
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=17.07 cfs @ 12.42 hrs HW=181.81' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 2.82 cfs @ 1.50 fps)
- **2=Culvert** (Inlet Controls 6.06 cfs @ 4.94 fps)
- **3=Culvert** (Inlet Controls 4.33 cfs @ 5.52 fps)
- **4=Culvert** (Barrel Controls 3.86 cfs @ 4.91 fps)

Pond 1P: POND


Hydrograph
19.18 cfs
17.07 cfs
Inflow Area=6.915 ac
Peak Elev=181.81'
Storage=13,066 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

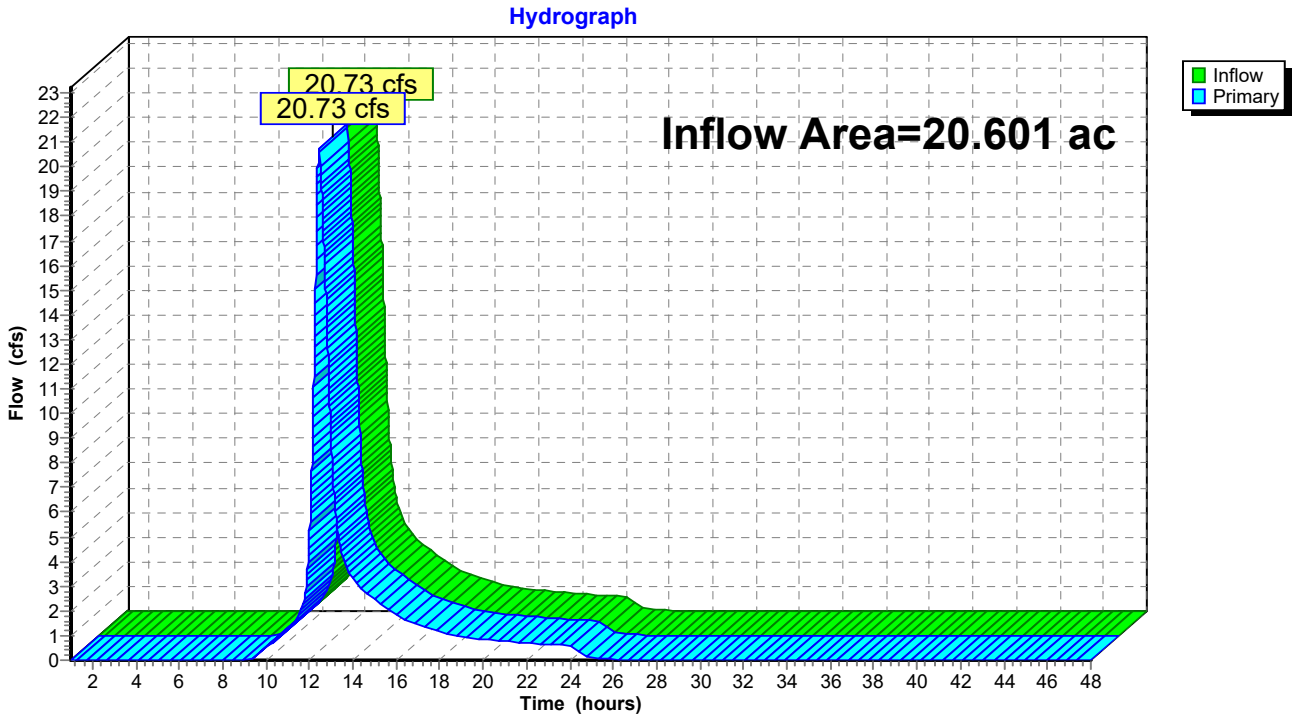
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 1.70" for 10-yr Storm event
Inflow = 20.73 cfs @ 12.44 hrs, Volume= 2.923 af
Primary = 20.73 cfs @ 12.44 hrs, Volume= 2.923 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

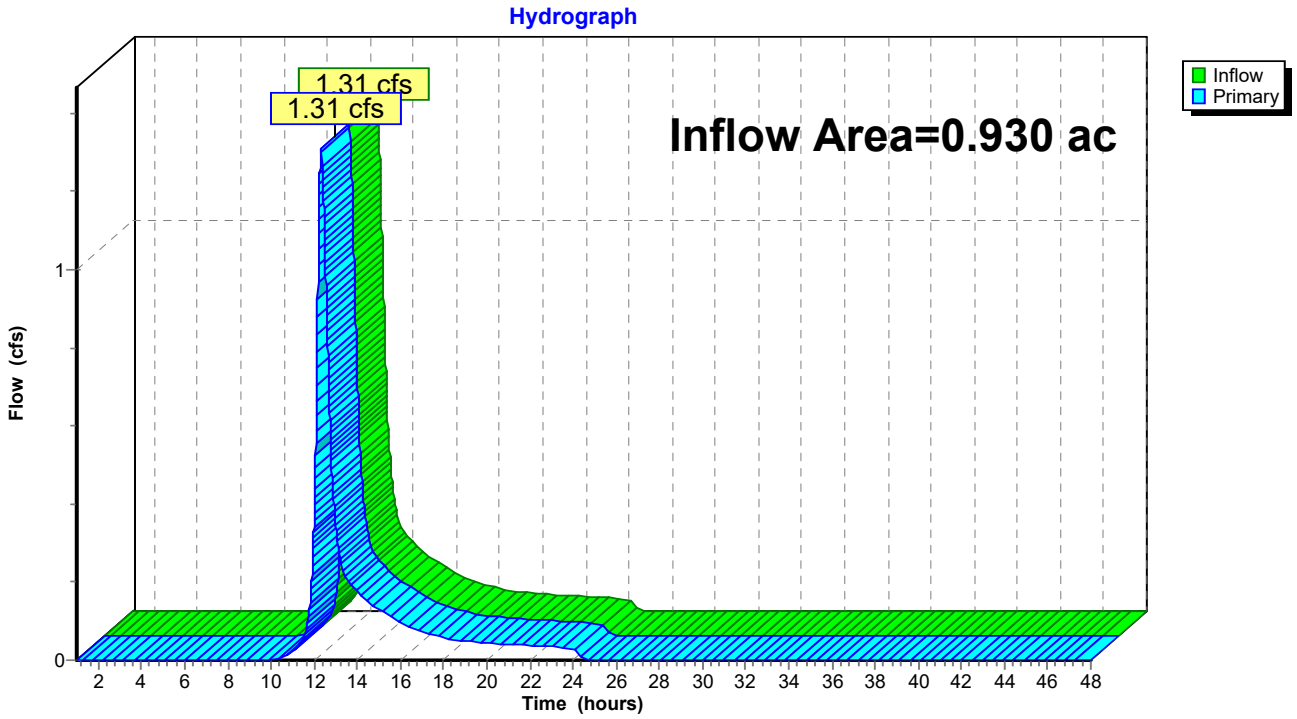


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 1.93" for 10-yr Storm event
Inflow = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af
Primary = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

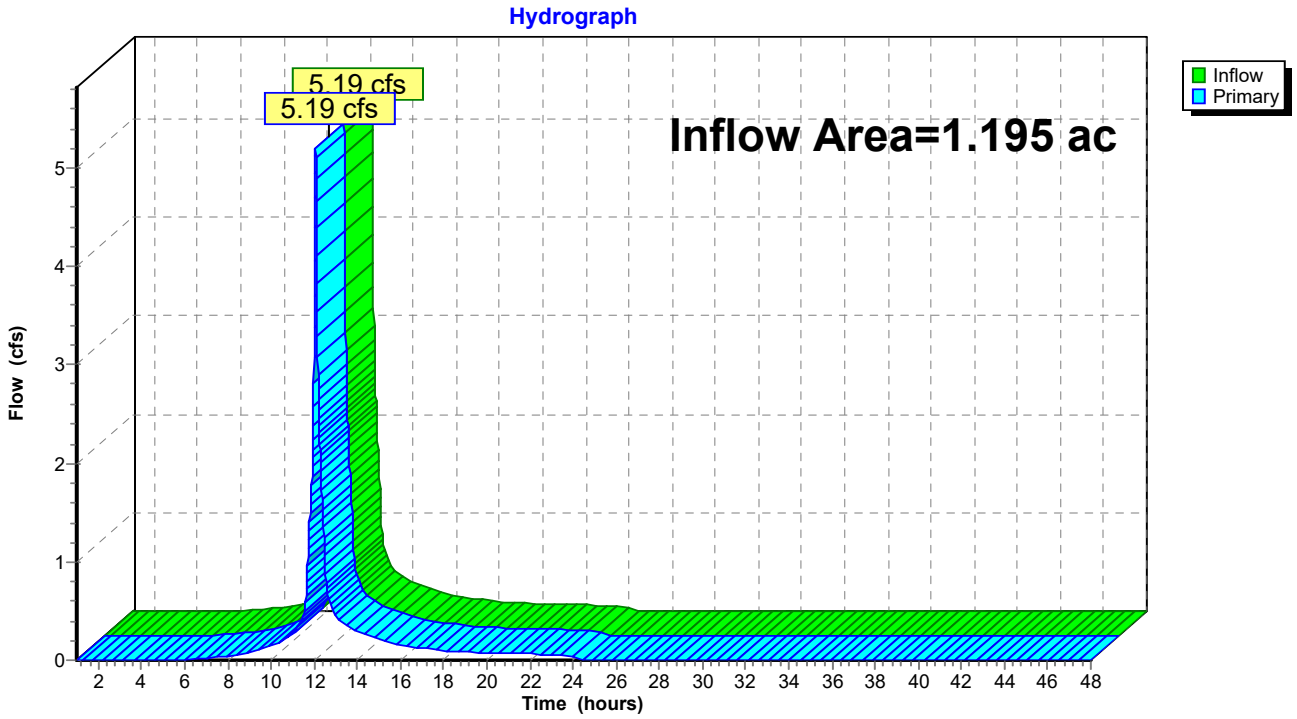


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 3.64" for 10-yr Storm event
Inflow = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af
Primary = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=4.69"
Flow Length=779' Tc=22.4 min CN=85 Runoff=8.63 cfs 0.971 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=5.13"
Flow Length=901' Tc=23.4 min CN=89 Runoff=16.23 cfs 1.895 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=1.27"
Flow Length=896' Tc=30.9 min CN=49 Runoff=8.86 cfs 1.384 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=1.04"
Tc=5.0 min CN=46 Runoff=0.56 cfs 0.054 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=2.84"
Flow Length=745' Tc=22.2 min CN=67 Runoff=1.98 cfs 0.220 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=4.80"
Tc=5.0 min CN=86 Runoff=6.78 cfs 0.478 af

Pond 1P: POND Peak Elev=182.08' Storage=14,833 cf Inflow=24.86 cfs 2.866 af
Outflow=22.90 cfs 2.799 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=31.34 cfs 4.237 af
Primary=31.34 cfs 4.237 af

Link AP-2: AP-2 Inflow=1.98 cfs 0.220 af
Primary=1.98 cfs 0.220 af

Link AP-3: AP-3 Inflow=6.78 cfs 0.478 af
Primary=6.78 cfs 0.478 af

Total Runoff Area = 22.726 ac Runoff Volume = 5.003 af Average Runoff Depth = 2.64"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

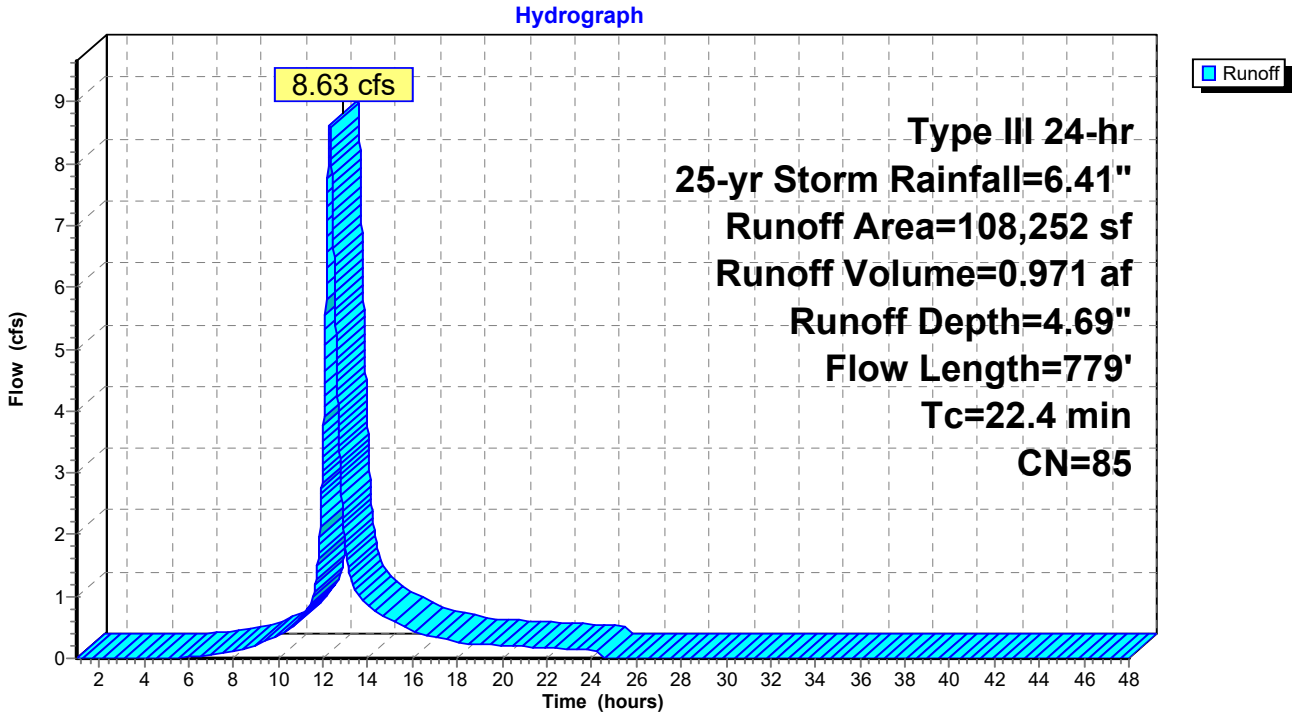
Runoff = 8.63 cfs @ 12.30 hrs, Volume= 0.971 af, Depth= 4.69"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

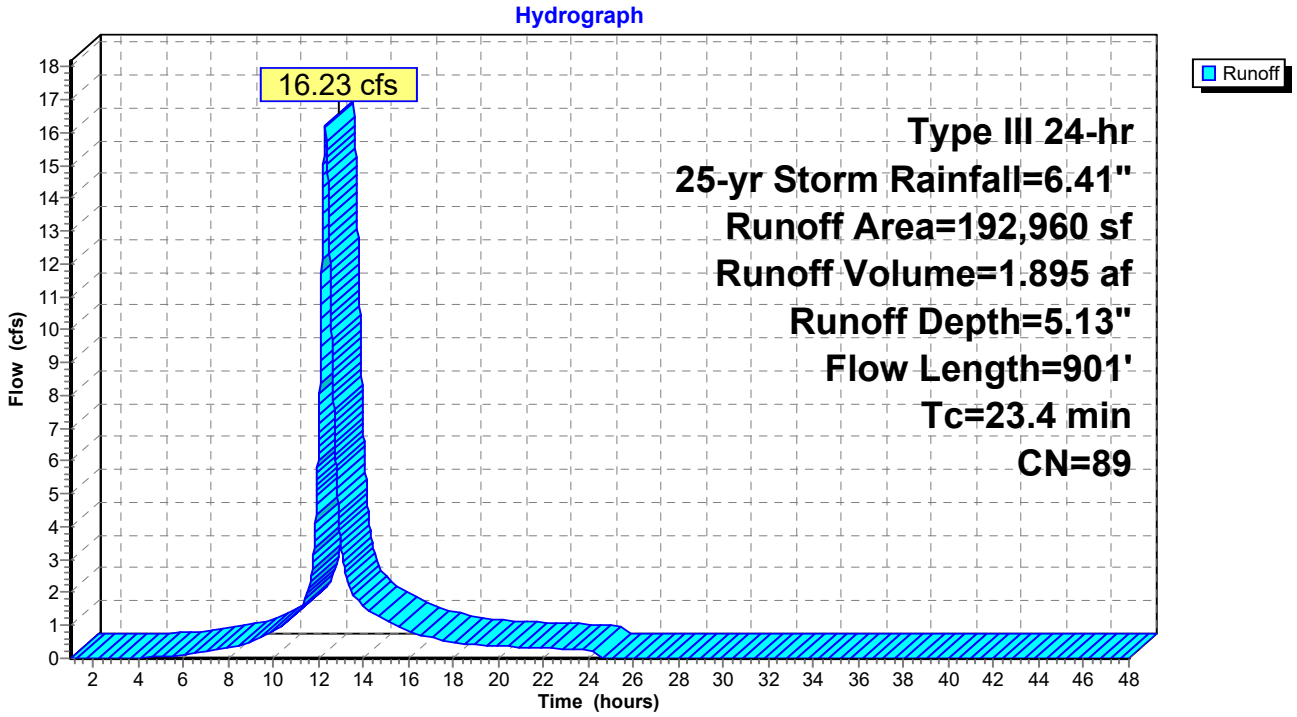
Runoff = 16.23 cfs @ 12.30 hrs, Volume= 1.895 af, Depth= 5.13"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

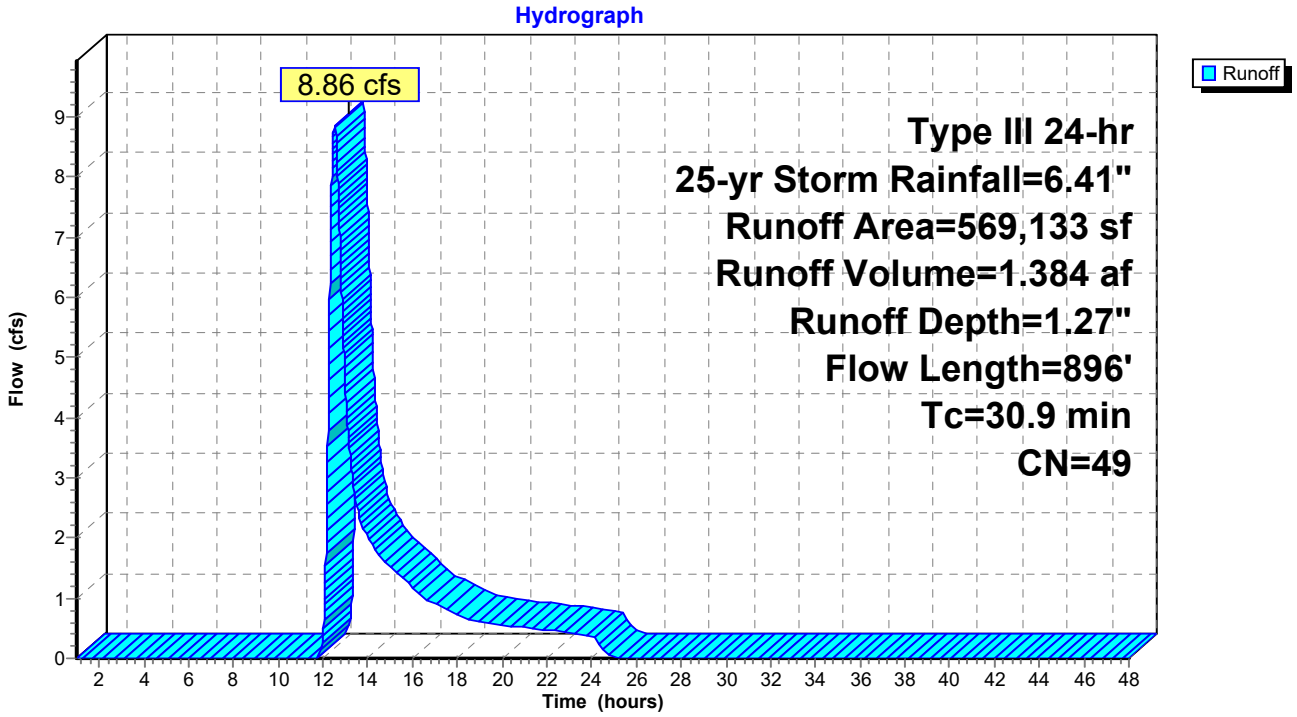
Runoff = 8.86 cfs @ 12.53 hrs, Volume= 1.384 af, Depth= 1.27"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

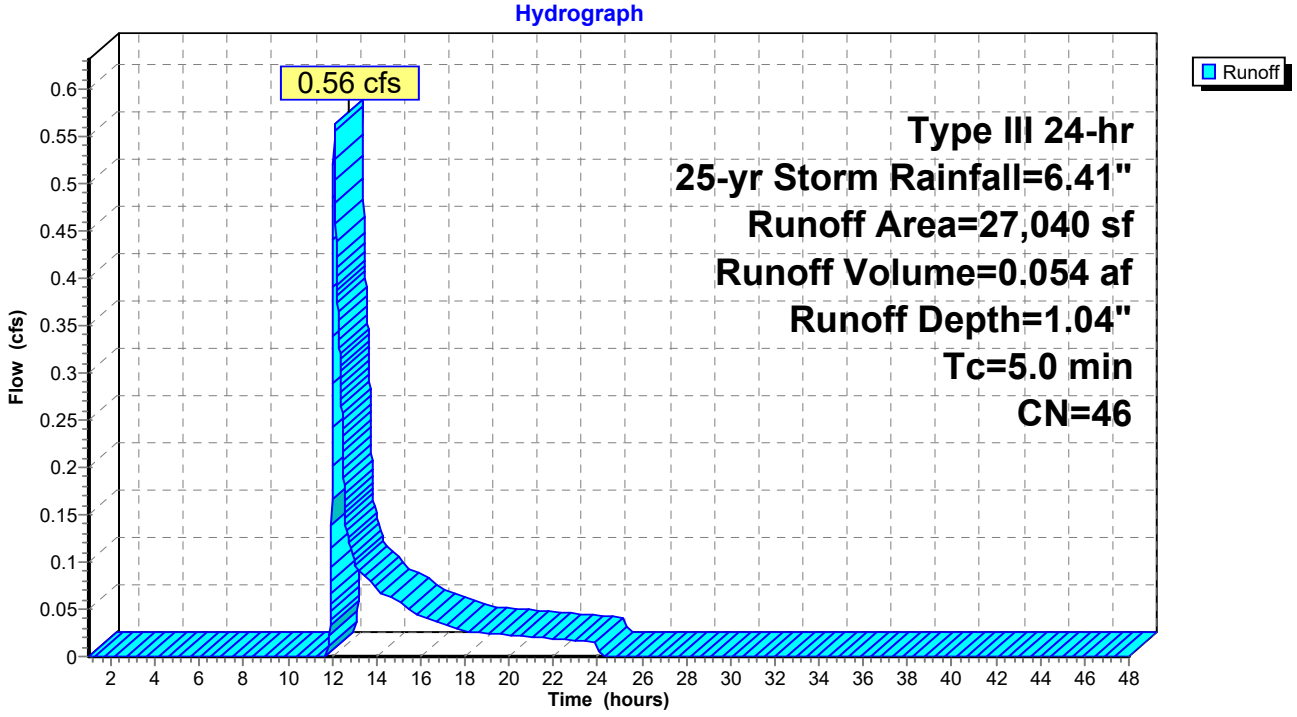
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.054 af, Depth= 1.04"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

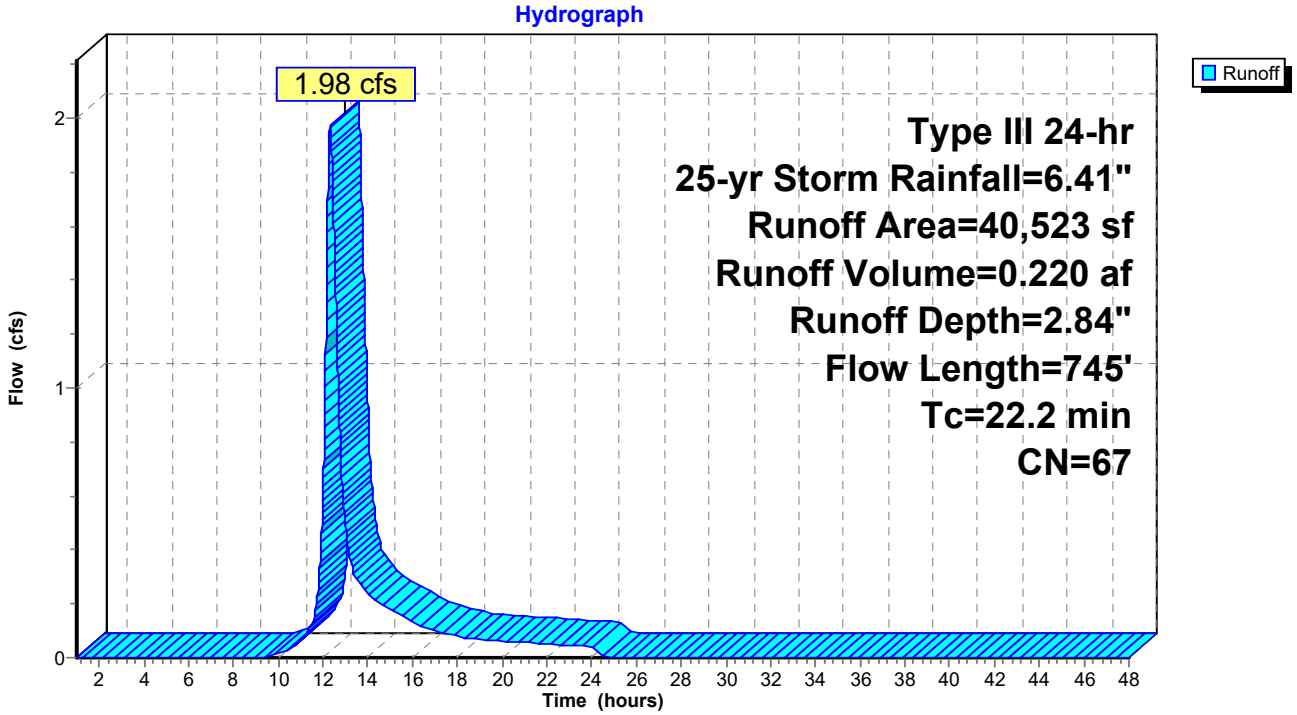
Runoff = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af, Depth= 2.84"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

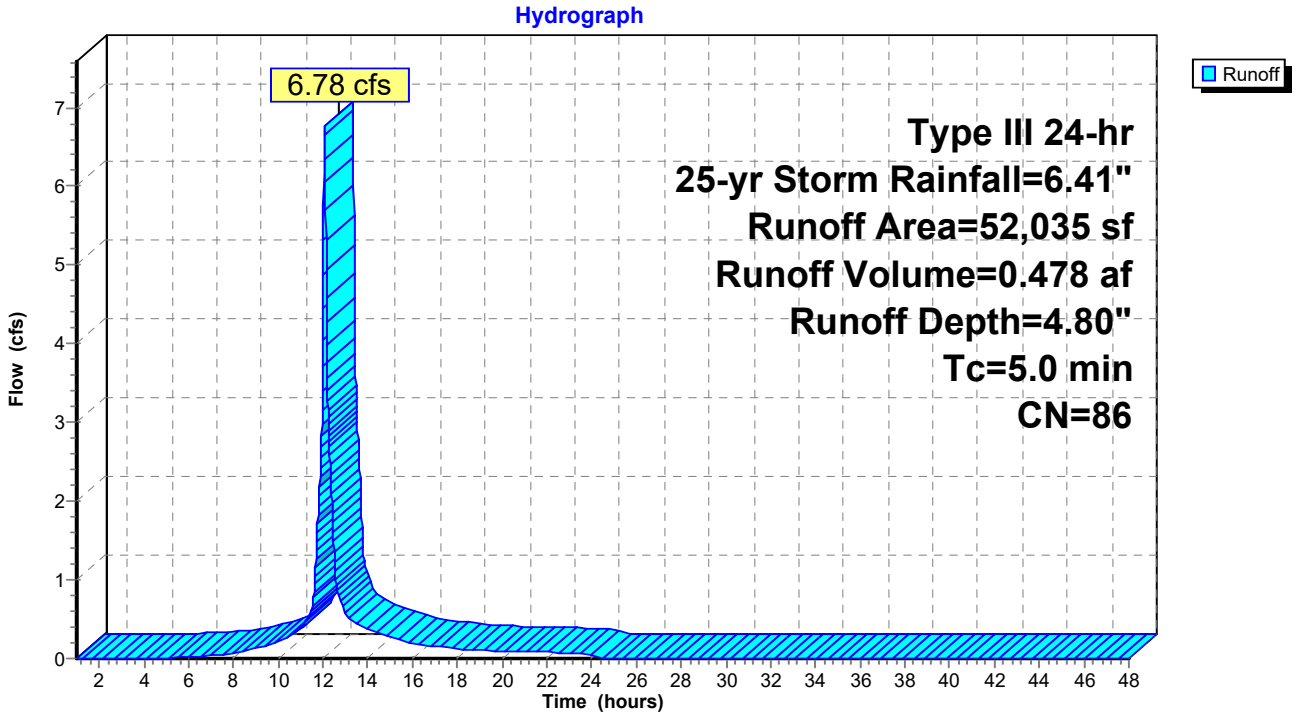
Runoff = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af, Depth= 4.80"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 4.97" for 25-yr Storm event
Inflow = 24.86 cfs @ 12.30 hrs, Volume= 2.866 af
Outflow = 22.90 cfs @ 12.40 hrs, Volume= 2.799 af, Atten= 8%, Lag= 5.7 min
Primary = 22.90 cfs @ 12.40 hrs, Volume= 2.799 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 182.08' @ 12.40 hrs Surf.Area= 6,751 sf Storage= 14,833 cf

Plug-Flow detention time= 41.4 min calculated for 2.799 af (98% of inflow)
Center-of-Mass det. time= 27.1 min (833.1 - 806.0)

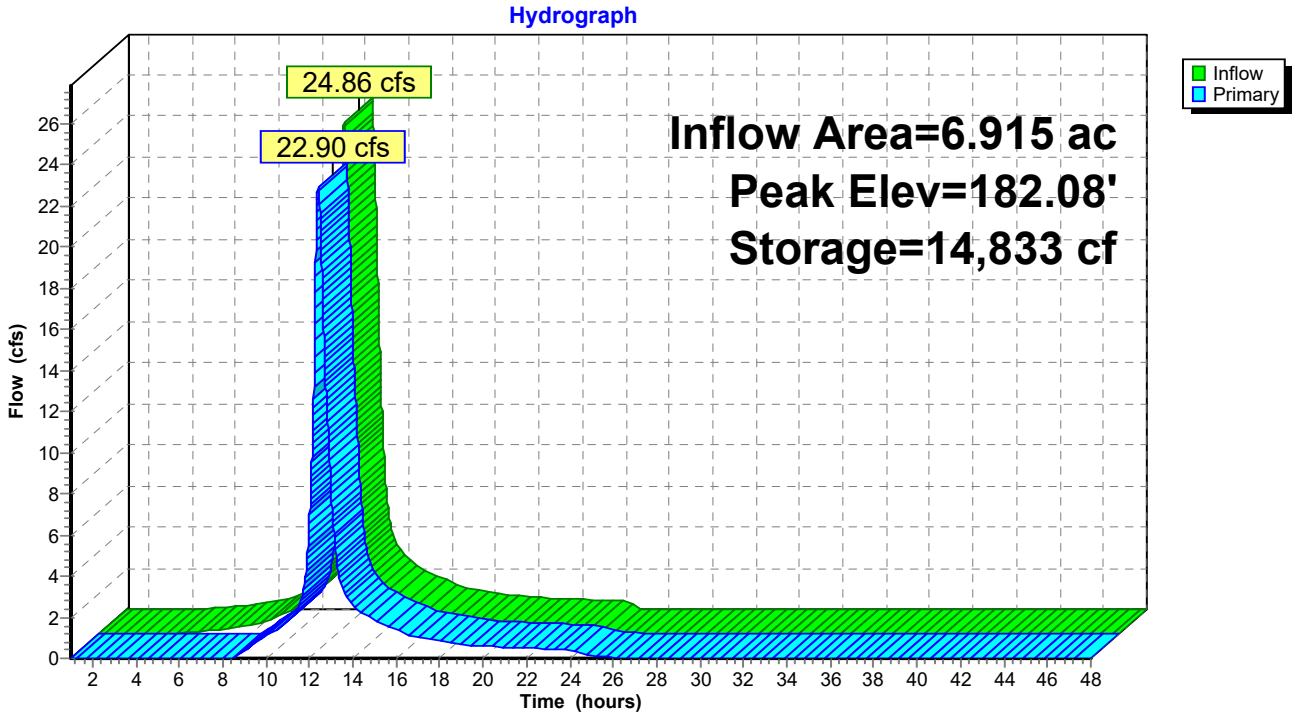
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=22.90 cfs @ 12.40 hrs HW=182.08' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 7.24 cfs @ 2.06 fps)
- **2=Culvert** (Inlet Controls 6.53 cfs @ 5.32 fps)
- **3=Culvert** (Inlet Controls 4.76 cfs @ 6.06 fps)
- **4=Culvert** (Inlet Controls 4.37 cfs @ 5.56 fps)

Pond 1P: POND


Hydrograph
24.86 cfs
22.90 cfs
Inflow Area=6.915 ac
Peak Elev=182.08'
Storage=14,833 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

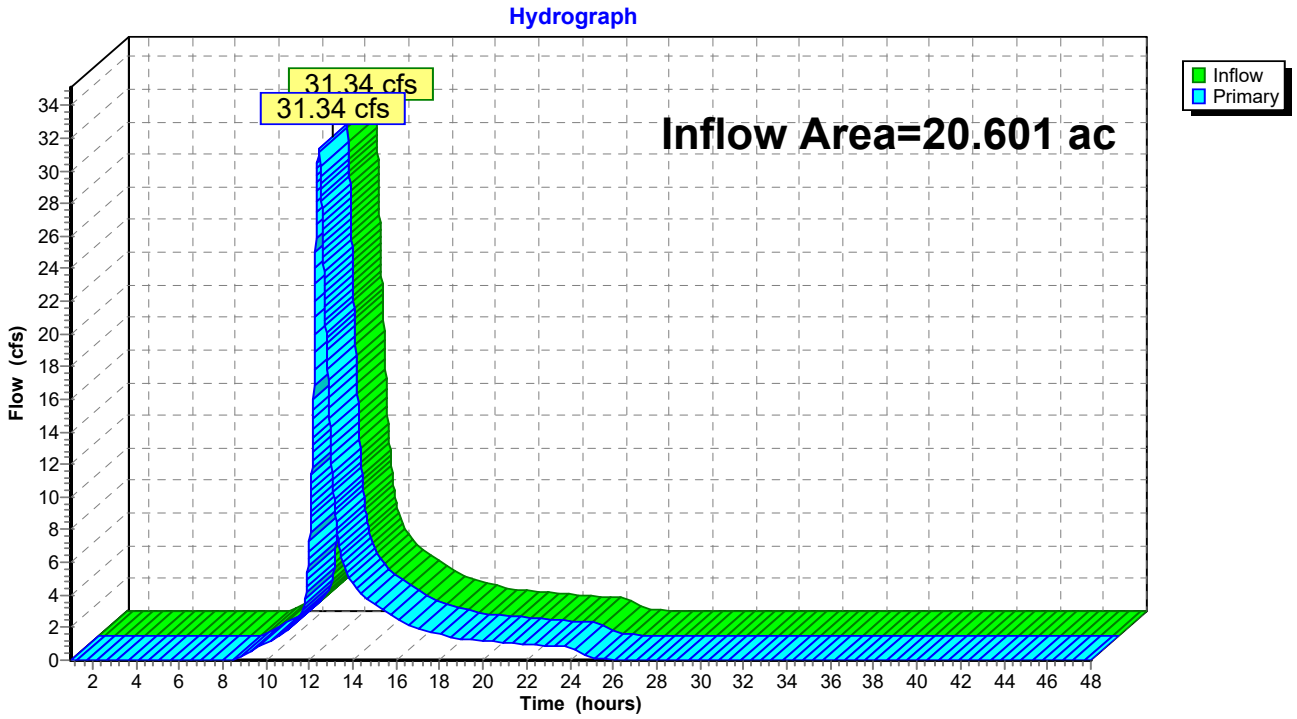
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 2.47" for 25-yr Storm event
Inflow = 31.34 cfs @ 12.42 hrs, Volume= 4.237 af
Primary = 31.34 cfs @ 12.42 hrs, Volume= 4.237 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

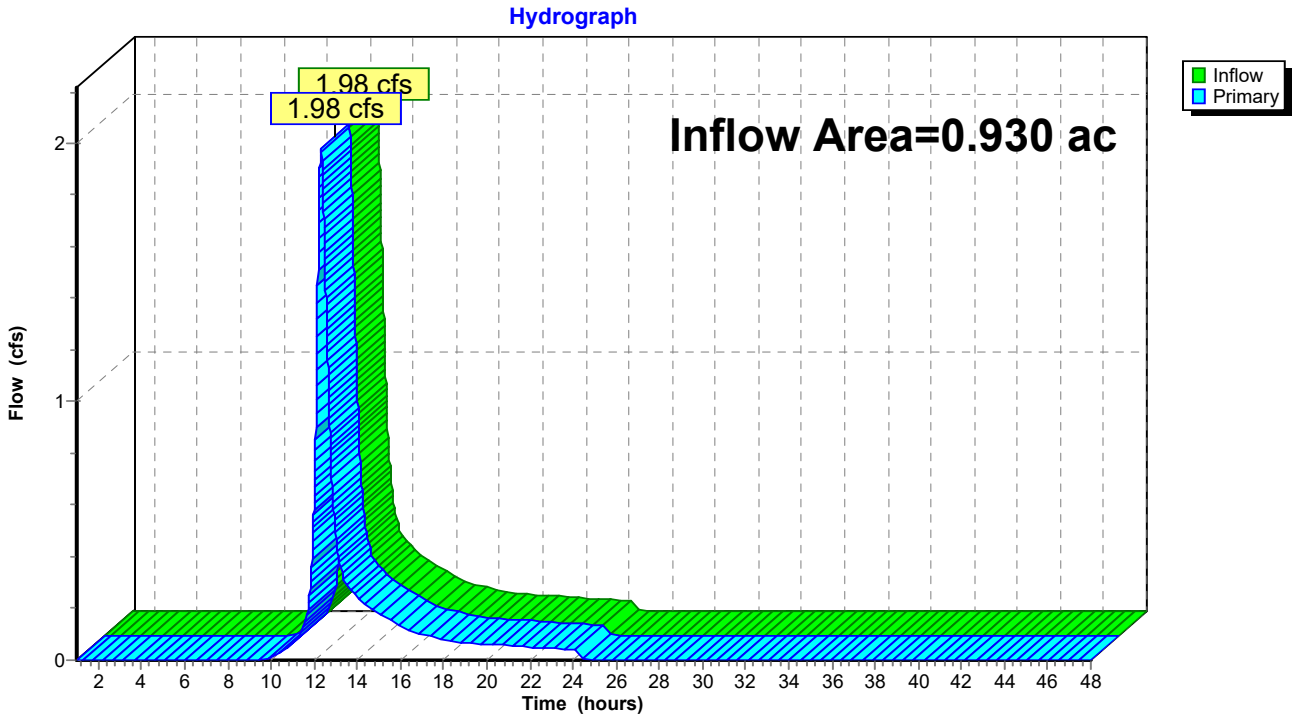


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 2.84" for 25-yr Storm event
Inflow = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af
Primary = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

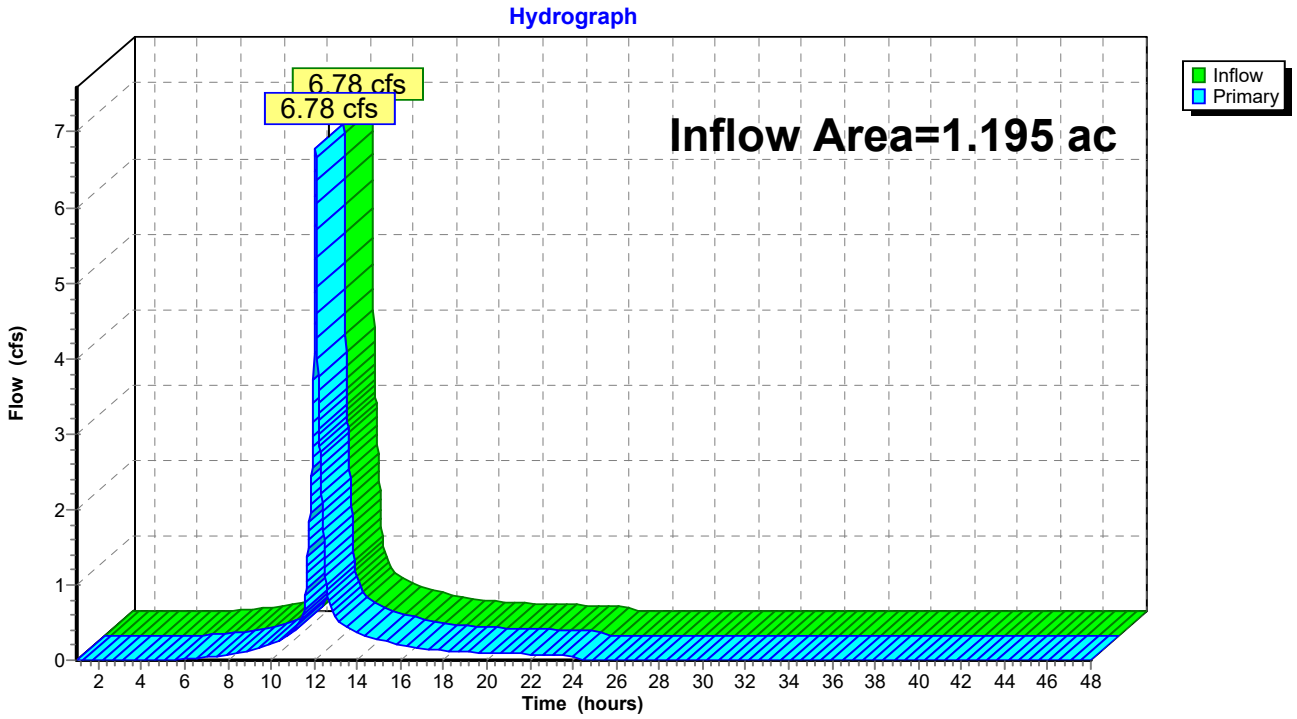


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 4.80" for 25-yr Storm event
Inflow = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af
Primary = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=6.51"
Flow Length=779' Tc=22.4 min CN=85 Runoff=11.81 cfs 1.349 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=6.99"
Flow Length=901' Tc=23.4 min CN=89 Runoff=21.75 cfs 2.581 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=2.33"
Flow Length=896' Tc=30.9 min CN=49 Runoff=18.22 cfs 2.539 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=2.01"
Tc=5.0 min CN=46 Runoff=1.33 cfs 0.104 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=4.38"
Flow Length=745' Tc=22.2 min CN=67 Runoff=3.08 cfs 0.340 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=6.63"
Tc=5.0 min CN=86 Runoff=9.21 cfs 0.660 af

Pond 1P: POND Peak Elev=182.43' Storage=17,294 cf Inflow=33.57 cfs 3.929 af
Outflow=31.46 cfs 3.862 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=49.43 cfs 6.505 af
Primary=49.43 cfs 6.505 af

Link AP-2: AP-2 Inflow=3.08 cfs 0.340 af
Primary=3.08 cfs 0.340 af

Link AP-3: AP-3 Inflow=9.21 cfs 0.660 af
Primary=9.21 cfs 0.660 af

Total Runoff Area = 22.726 ac Runoff Volume = 7.572 af Average Runoff Depth = 4.00"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

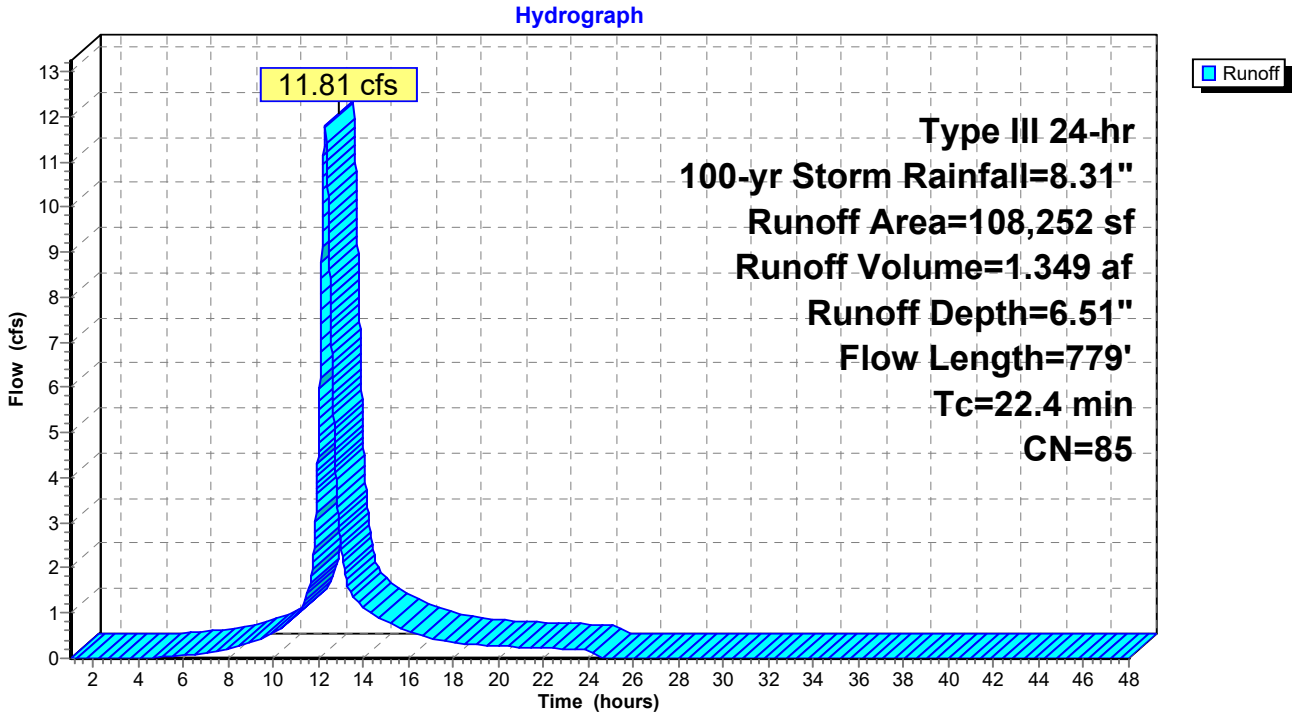
Runoff = 11.81 cfs @ 12.30 hrs, Volume= 1.349 af, Depth= 6.51"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

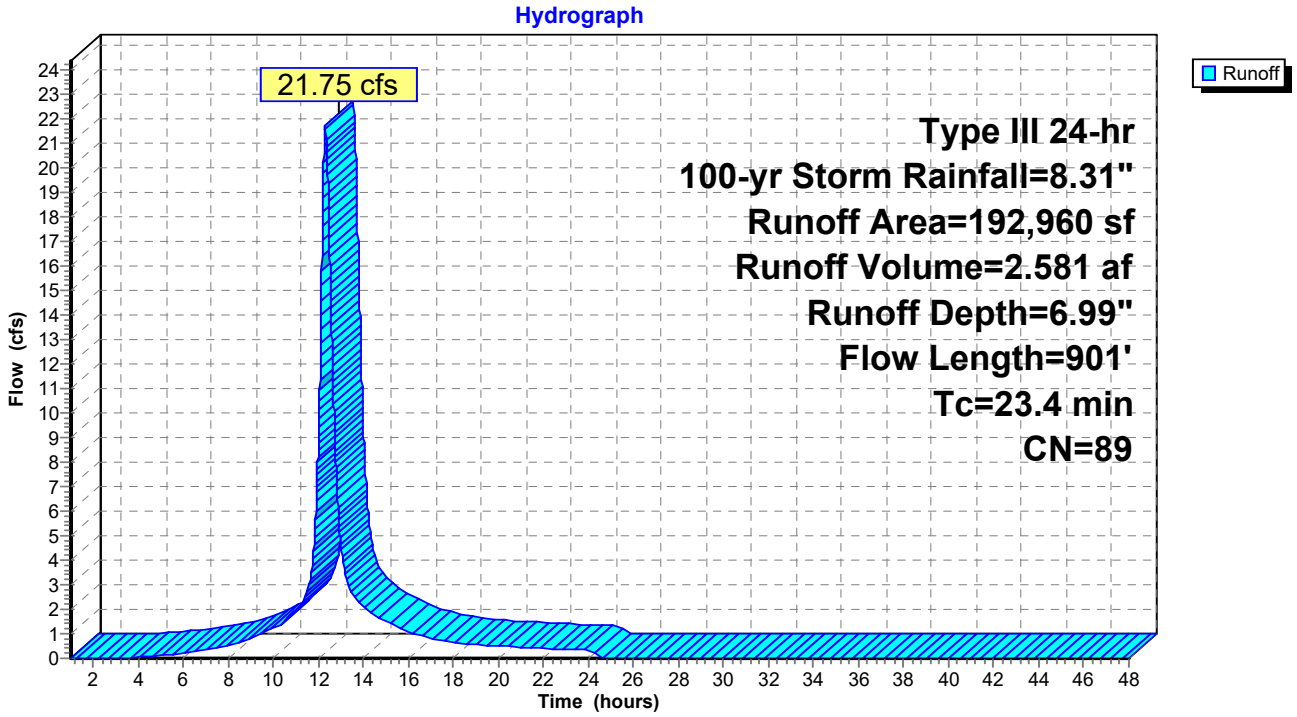
Runoff = 21.75 cfs @ 12.30 hrs, Volume= 2.581 af, Depth= 6.99"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

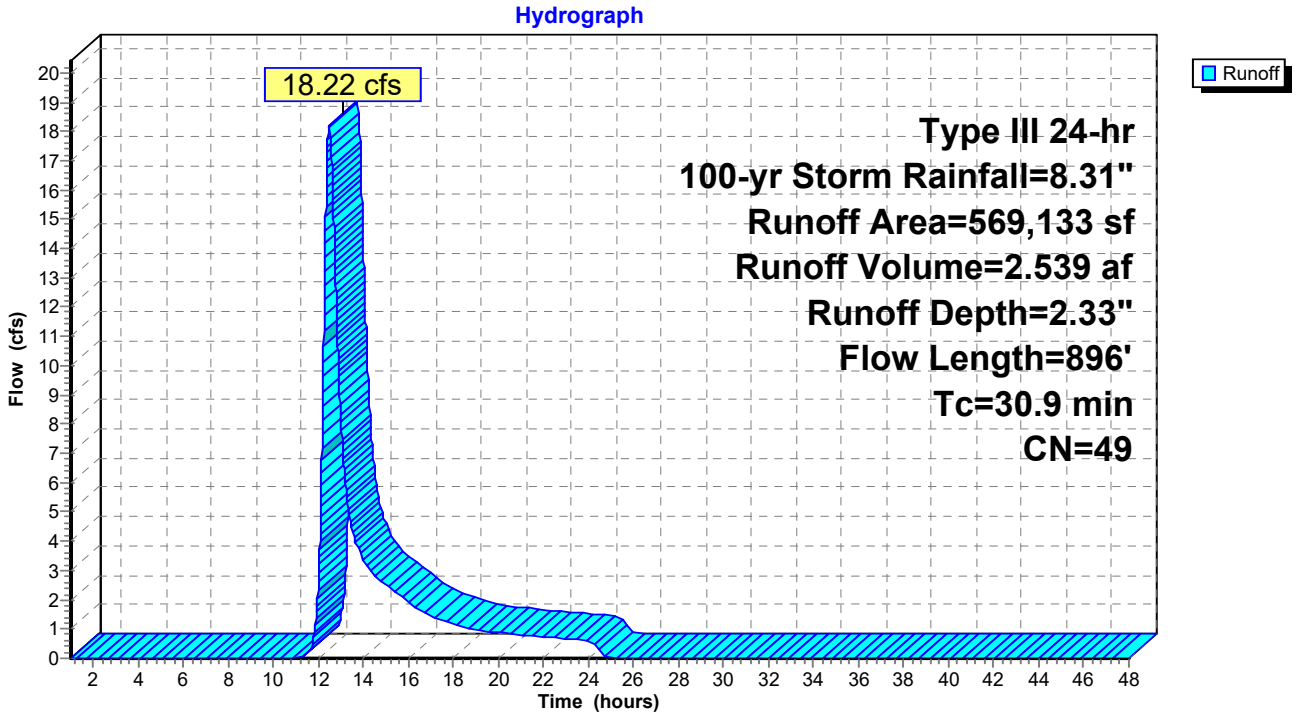
Runoff = 18.22 cfs @ 12.47 hrs, Volume= 2.539 af, Depth= 2.33"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

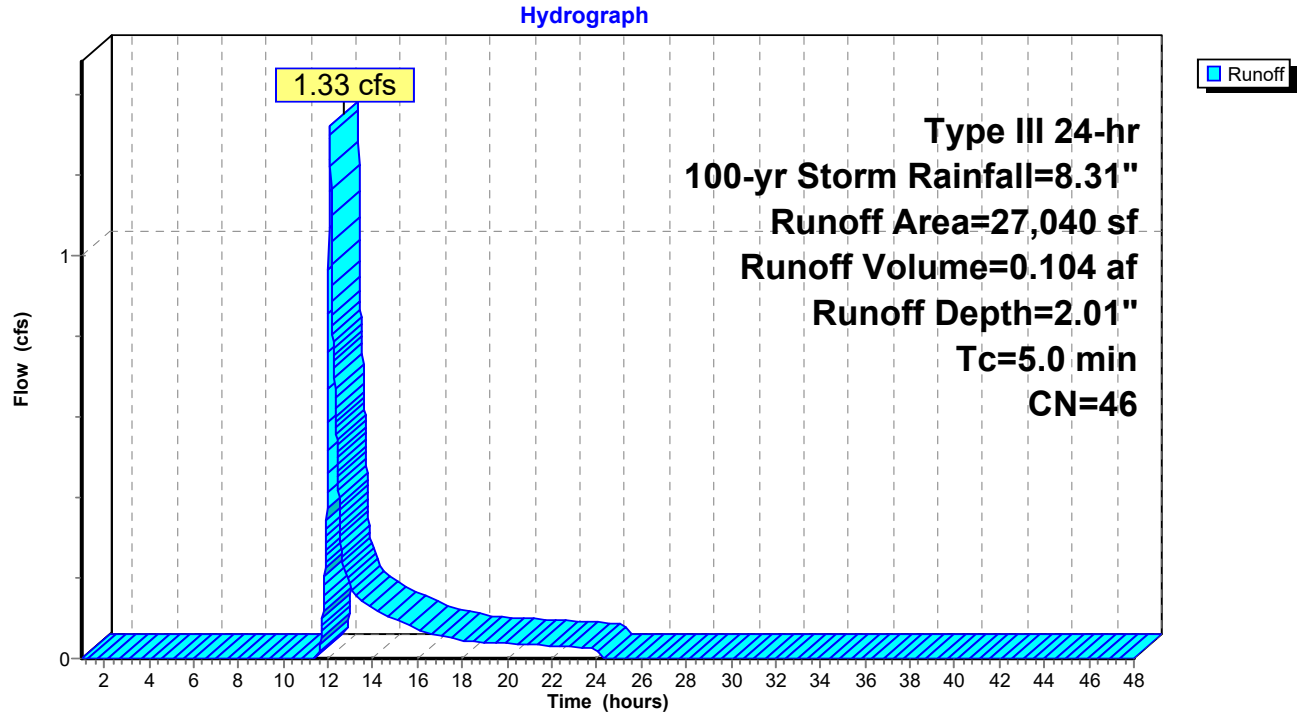
Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.104 af, Depth= 2.01"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

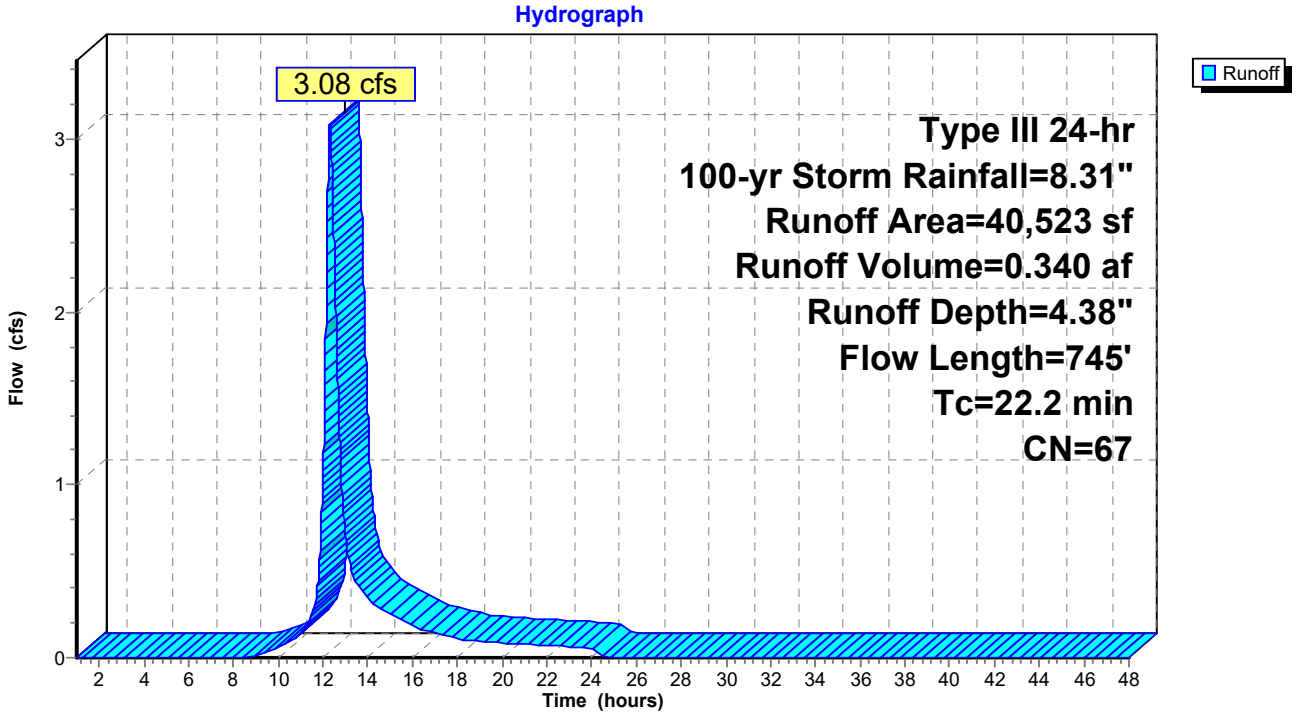
Runoff = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af, Depth= 4.38"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

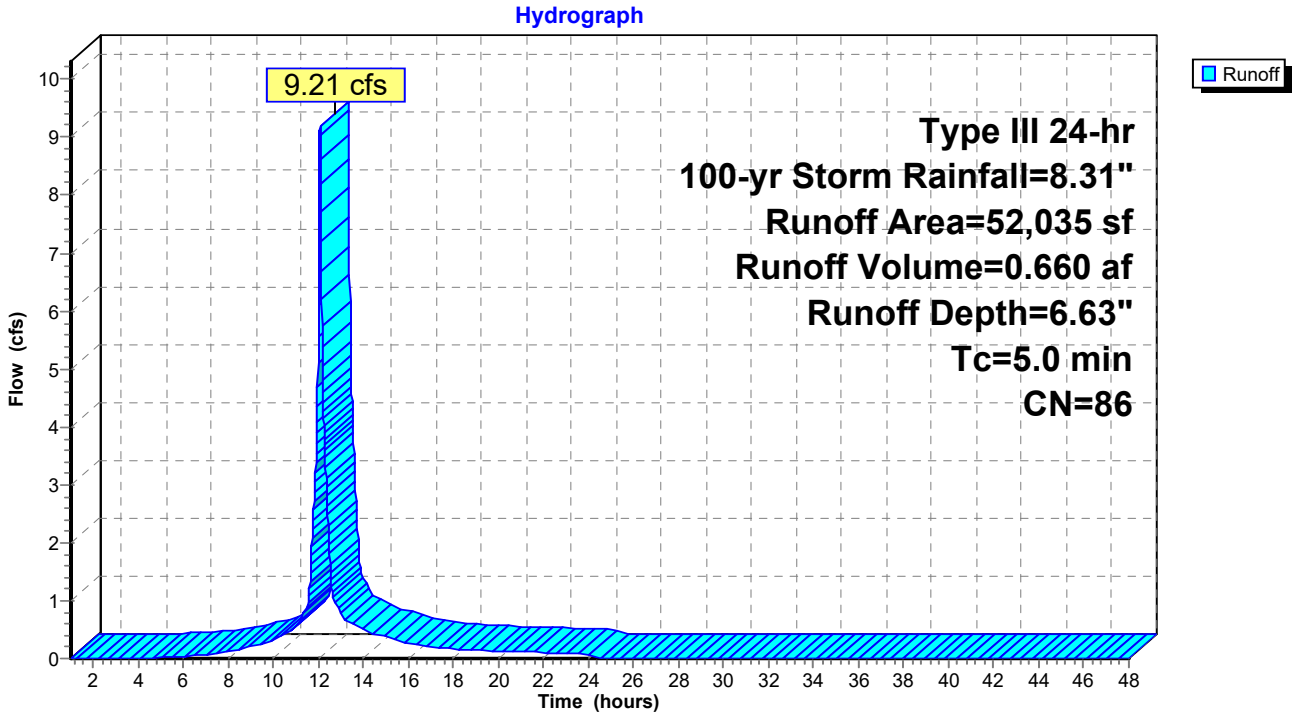
Runoff = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af, Depth= 6.63"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 6.82" for 100-yr Storm event
Inflow = 33.57 cfs @ 12.30 hrs, Volume= 3.929 af
Outflow = 31.46 cfs @ 12.38 hrs, Volume= 3.862 af, Atten= 6%, Lag= 5.0 min
Primary = 31.46 cfs @ 12.38 hrs, Volume= 3.862 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 182.43' @ 12.38 hrs Surf.Area= 7,428 sf Storage= 17,294 cf

Plug-Flow detention time= 34.2 min calculated for 3.861 af (98% of inflow)
Center-of-Mass det. time= 23.6 min (821.3 - 797.6)

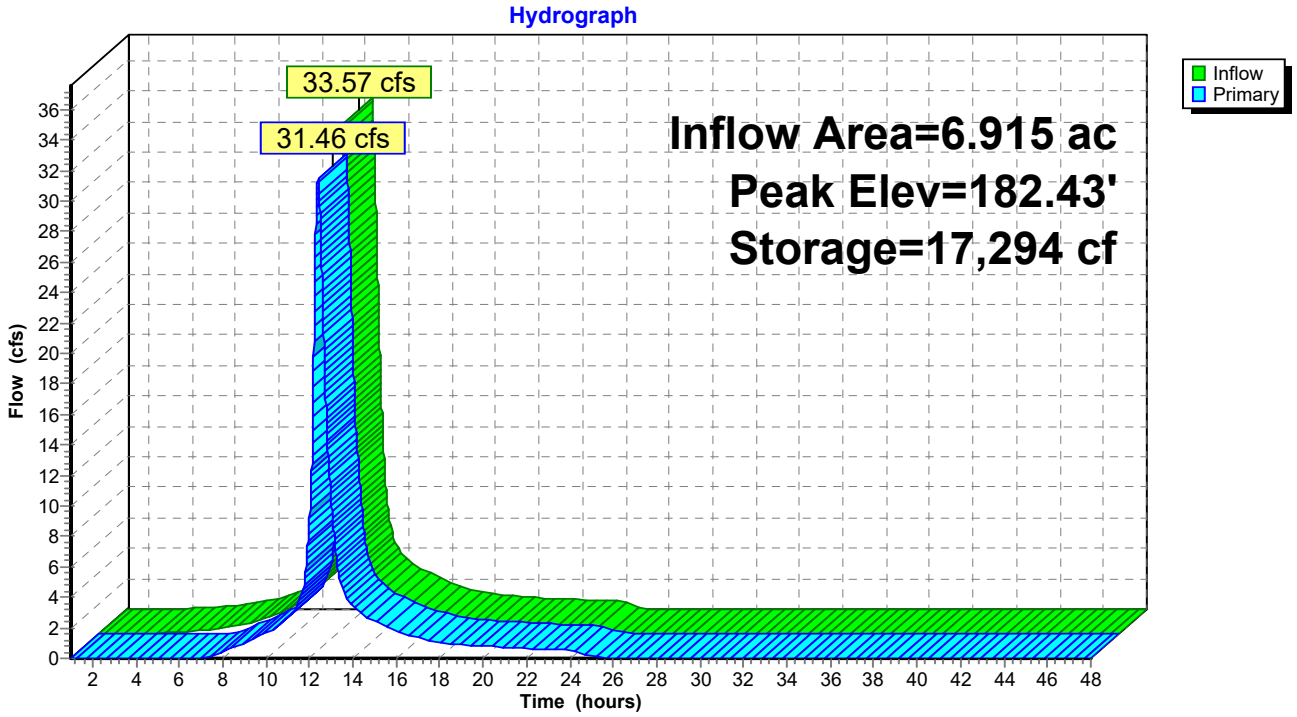
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=31.45 cfs @ 12.38 hrs HW=182.43' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 14.21 cfs @ 2.54 fps)
- **2=Culvert** (Inlet Controls 7.08 cfs @ 5.77 fps)
- **3=Culvert** (Inlet Controls 5.26 cfs @ 6.69 fps)
- **4=Culvert** (Inlet Controls 4.90 cfs @ 6.24 fps)

Pond 1P: POND


Hydrograph
33.57 cfs
31.46 cfs
Inflow Area=6.915 ac
Peak Elev=182.43'
Storage=17,294 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

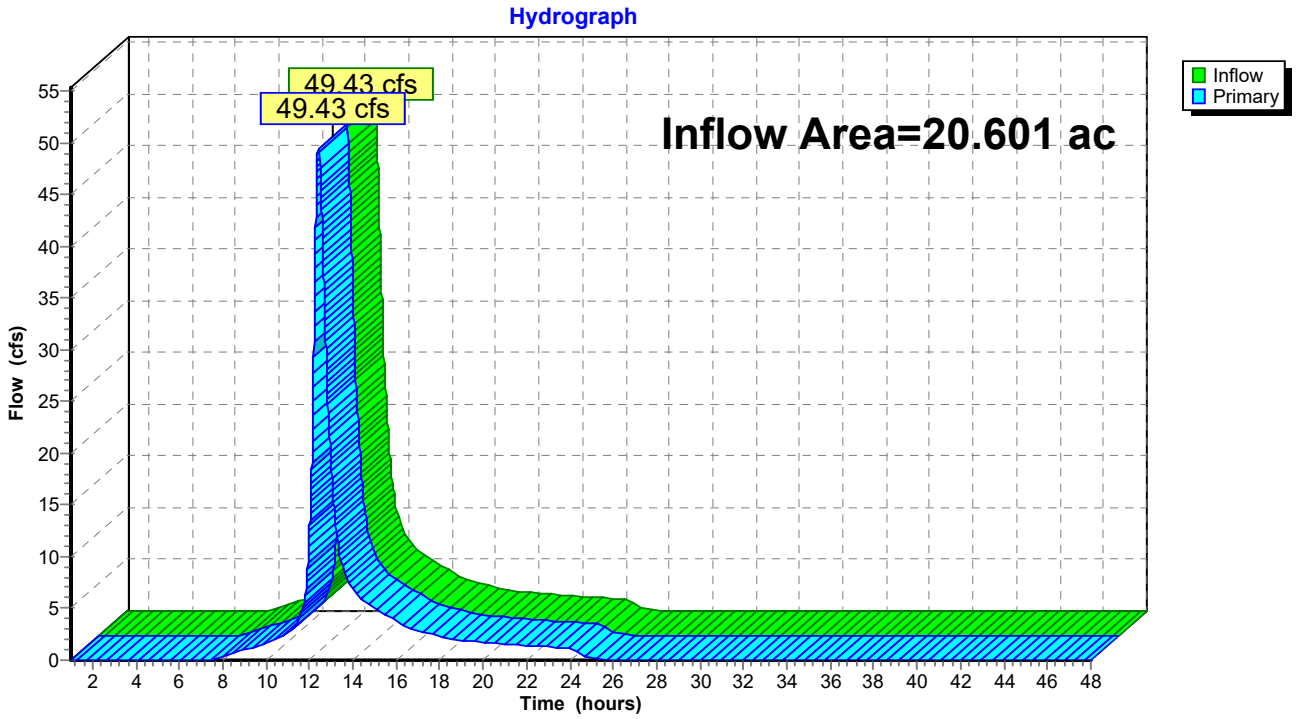
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 3.79" for 100-yr Storm event
Inflow = 49.43 cfs @ 12.41 hrs, Volume= 6.505 af
Primary = 49.43 cfs @ 12.41 hrs, Volume= 6.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

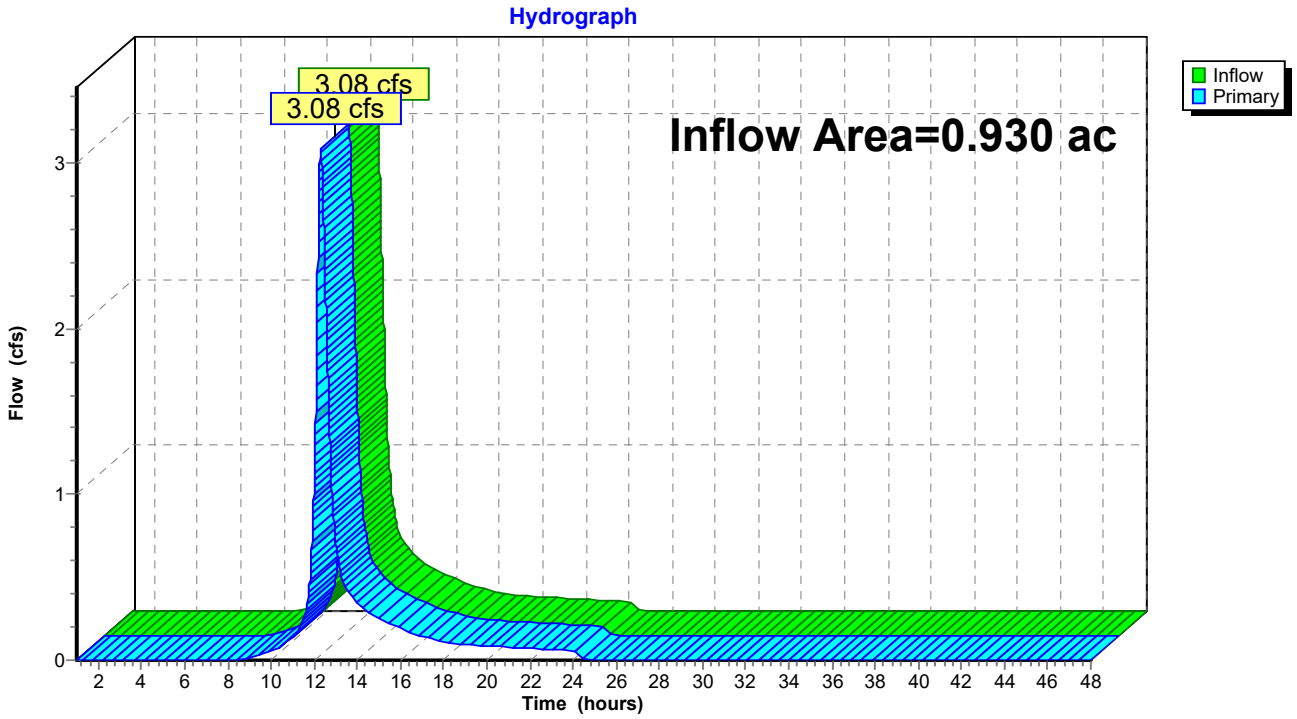


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 4.38" for 100-yr Storm event
Inflow = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af
Primary = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

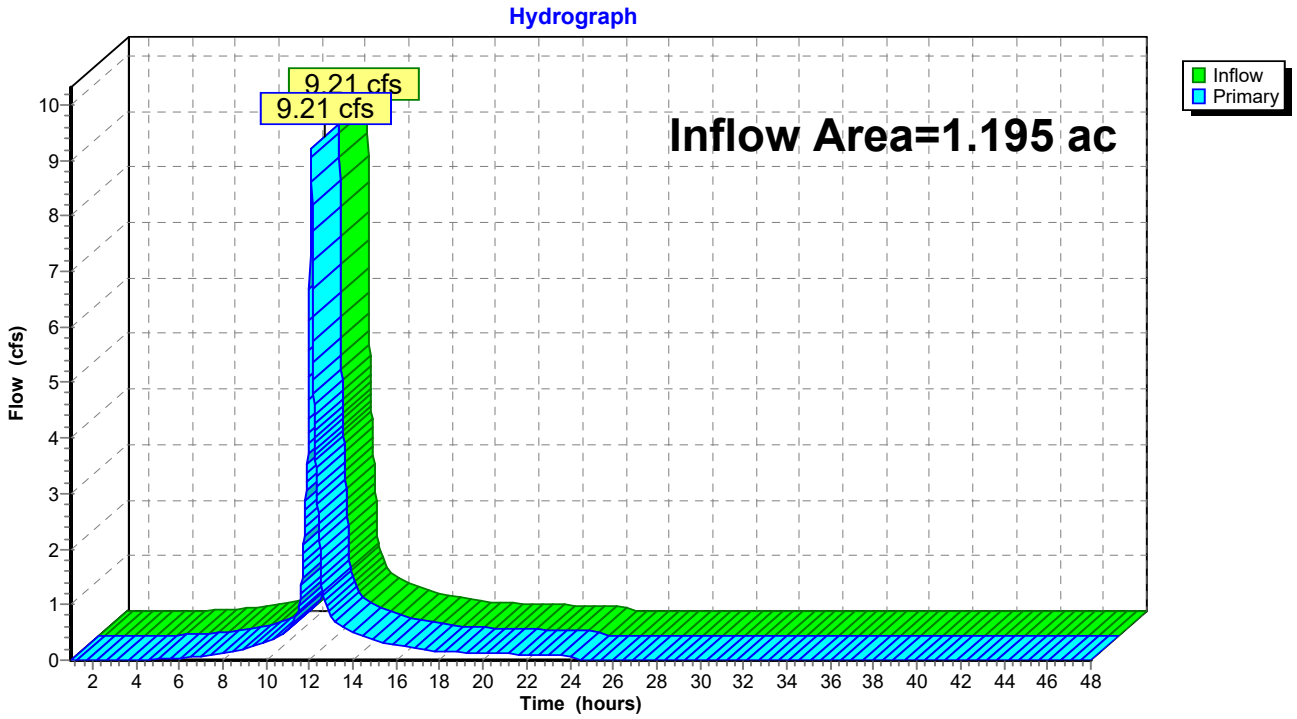


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 6.63" for 100-yr Storm event
Inflow = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af
Primary = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



ATTACHMENT E

TREATMENT VOLUME CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS

Agawam Energy Center

SC-1A and SC-1B Treatment Volume Calculation

Treatment Depth	0.5 inches
	0.04 feet

	Gravel/Pavement Area (SF)	Topping Stone (SF)	Treatment Area (SF)
North Area (SC1A-North)	84,355	75,336	12,816
	3,797		
South Area (SC1A-South)	160,517	108,520	51,997
		Treatment Area (SF)	64,813
		Treatment Volume (CF)	2,701

Summary of Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Required Volume: 2701 CF

Volume Provided: 2934 CF

ATTACHMENT F

LONG TERM POLLUTION PREVENTION PLAN

SME
SEVEE & MAHER
ENGINEERS

Long Term Pollution Prevention Plan

Standard #4 of the MassDEP Stormwater Management Handbook requires that a Long Term Pollution Prevention Plan (LTPPP) be prepared and incorporated into the long term operation and maintenance plan of the projects stormwater management system. The purpose of the LTPPP is to identify potential sources of pollution that may affect the quality of stormwater discharges and to describe suggested practices to reduce pollutants in stormwater discharges.

This document should be used in conjunction with the operation and maintenance plan for the facility.

Good housekeeping practices - The Property Owner is to keep the site in a neat and orderly condition so that pollutants are not conveyed to the storm drainage system and adjacent wetlands. Materials swept, blown or washed into the sites detention pond decreases the system's effectiveness and could eventually be conveyed into the adjacent wetland resource area. Some examples of good housekeeping practices are litter control and protected material storage areas. The Property Owner should assign responsibilities to personnel to keep the site in a neat and orderly condition at regular intervals.

Provisions for storing materials and waste products inside or under cover – A dedicated dumpster area should be provided if and when necessary. The trash and waste program should include regular pickup to avoid an overflowing dumpster condition. The water tight dumpster lid should be maintained closed when not actively loading or unloading. A trash disposal company, hired by the Property Owner(s), is to properly dispose the trash at a state approved disposal facility.

Requirements for routine inspections and maintenance of stormwater BMP's - Consistent with Standard 9 of the Massachusetts Stormwater Management Regulations, an Operation and Maintenance Plan has been prepared. The plan details routine inspection and maintenance along with associated record keeping forms.

Spill prevention and response plans – A spill containment and countermeasure plan (SPPC) will be prepared for the site. Beyond the measures for oil containing equipment, exterior spill hazards are to be minimized. Exterior spill hazards have the potential to enter the stormwater drainage system and are to be addressed as follows:

1) Spill hazards of pesticides, paints, and solvents shall be remediated using the

Manufacturers' recommended spill cleanup protocol

2) Vehicle fluid and fuel spills shall be remediated according to local and state regulations governing fuel spills. Spills are to be immediately cleaned up with absorbent materials and properly disposed.

3) The Property Owners shall have the following equipment and materials on hand to address a spill clean-up: brooms, dust-pans, mops, rags, gloves, trash bags, trash containers, and absorptive materials such as sand, sawdust, or kitty litter.

4) Spills of toxic or hazardous materials shall be reported to the Massachusetts Department of Environmental Protection at 1-888-304-1133.

Provisions for maintenance of lawns, garden, and other landscaped areas - It should be a general goal of the Property Owner to achieve a high quality of well-groomed and stable landscape that evolves throughout the changing seasons and overall condition of the property. All landscaped areas are to be maintained with dense vegetative growth or a layer of mulch so as to minimize sediment transport associated with erosion. Litter and waste are to be removed weekly from the landscaped areas and adjoining parking lots and disposed of in an appropriate receptacle.

Requirements for storage and use of fertilizer, herbicides, and pesticides - Fertilizers, herbicides, and pesticides will not to be stored on site. Chemical controls should be used as a last resort to organic and biological control methods.

Snow disposal and deicing chemicals – The parking lot and access road is designed to provide ample snow storage along the perimeter. If necessary, snow removal to an offsite location will occur to remain reasonable access and parking. No snow is to be moved to within 100 feet of a wetland resource area.

The use of de-icing agent such as salt or potassium chloride may be required to maintain a safe driving and walking surface. The de-icing agent for the walkways and building entrances may be kept on site within the building. De-icing agents are not to be stored outside.

ATTACHMENT G

ILLICIT DISCHARGE STATEMENT

SME
SEVEE & MAHER
ENGINEERS

ILLICIT DISCHARGE COMPLIANCE STATEMENT

I verify that no illicit discharges exist from the Agawam Energy Center. Through the implementation of a Long Term Pollution Prevention Plan and Operation and Maintenance Plan, measures are set forth to prevent illicit discharges from entering the stormwater management drainage system.

Signature	**Print Name**	**Date**
Title	**Company**	
Signature	**Print Name**	**Date**
Title	**Company**	

Note: This certification must be signed before stormwater is conveyed to the proposed stormwater drainage system in accordance with Standard 10 of the Massachusetts Stormwater Management Standards.



APPLICATION FOR SITE PLAN APPROVAL
769 SILVER STREET, AGAWAM, MA
AGAWAM ENERGY CENTER

January 29, 2026

Prepared For: Agawam Energy Center, LLC

Submitted To: Town of Agawam Planning Department

Prepared By: BSC Group, Inc.

BSC GROUP
BUILD | SUPPORT | CONNECT
180 Glastonbury Boulevard, Suite 305
Glastonbury, CT 06033

BSC GROUP
BUILD | SUPPORT | CONNECT

Engineers
Environmental Scientists
Software Developers
Landscape Architects
Planners
Surveyors

January 29, 2026

Taryn Egerton
Planning Director & Conservation Agent
Planning Department
Town of Agawam
Public Works and Municipal Annex
1000 Suffield Street
Agawam, MA 01001

Re: Application for Site Plan Approval
Agawam Energy Center
769 Silver Street
Agawam, MA 01001

Dear Ms. Egerton:

Agawam Energy Center, LLC (Applicant) proposes to develop an approximately 250 megawatt (MW), 4 megawatt hour (MWh), battery energy storage system (BESS) on the 17.2-acre site located at 769 Silver Street (Map G6, Block 2, Lot 6) (the Project). BSC Group is submitting this package on behalf of the Applicant which includes an Application for Site Plan Approval and related attachments to be filed with the Town of Agawam (the Town) Planning Board.

The Project will consist of battery containers, transformers, inverters, equipment pads, and associated infrastructure. The proposed BESS site will be accessed from Silver Street. The battery containers will be surrounded by an 18-foot-high solid wall and 8-foot-high chain link fence that will act as physical, visual, and sound barriers as detailed in the attached plans. The BESS equipment will connect to Eversource's existing South Agawam Switchyard via the Project's own substation and pole mounted interconnection equipment. This application package includes the following attachments:

- Attachment A – Application for Zoning Determination
- Attachment B – Form D – Application for Site Plan Approval
- Attachment C – Project Narrative
- Attachment D – Existing Conditions Photographs
- Attachment E – Fluence SmartStack Product Datasheet
- Attachment F – Plans and Renderings

- Attachment G – Sound Study
- Attachment H – Emergency Response Plan
- Attachment I – Decommissioning Plan
- Attachment J – Fire Safety Compliance Plan
- Attachment K – Emergency Operations Plan
- Attachment L – Stormwater Management Report
- Attachment M – Stormwater Permit Application
- Attachment N – Eversource Notification

If you have any questions or require additional information, please feel free to contact me at 617-896-4517 or via email at mkaplan@bscgroup.com.

Sincerely,



Melissa Kaplan, PWS
BSC Group
Licensing and Permitting Team Lead
Ecology Project Management Lead
Senior Associate

ATTACHMENT A – APPLICATION FOR ZONING DETERMINATION

The Commonwealth of Massachusetts

Town of Agawam

Inspection Services - Building Department

1000 Suffield Street, Agawam MA 01001 – (413) 821-0632

OFFICE ONLY
Date Filed:
RECEIVED BY BUILDING DEPARTMENT
DEC 05 2025
TOWN OF AGAWAM

Application for Zoning Determination

FILING INSTRUCTIONS: Deliver this form (no fee required) to Inspection Services.
For digital submissions, please confirm receipt. A *complete* application will be processed within 30 days.
The applicant must pick-up, or arrange for the receipt of, this processed form.

1) PROPERTY INFORMATION			
a. Street Address	769 Silver Street	**b. Zoning District**	Industrial B
c. Assessor's Map	G6	**d. Lot(s)**	2-6
e. Registry of Deeds Book	24427	**f. Page**	479
g. Overlay Districts	☑Historic Preservation ☐ Mixed-Use Business C		
h. Previous Special Permits, Site Plan Approvals, Findings or Variances Issued for this Site			
None per November 25, 2025 public records request #25-306.			
2) APPLICANT & OWNER INFORMATION			
a. Applicant Name	Agawam Energy Center, LLC c/o Michael Alvarez	**b. Applicant Phone**	415-792-6071
c. Applicant Email	Michael.Alvarez@longroadenergy.com		
d. Applicant Mailing Address	125 High Street, Suite 1705 Boston, MA 02110		
e. Applicant Relationship to Property	☐Owner ☐ Agent ☑Other:	Exclusive option to purchase the property	
f. Representative Name *(if any)*	Agawam Energy Center, LLC c/o Michael Alvarez	**g. Rep. Phone**	415-792-6071
h. Rep. Email	Michael.Alvarez@longroadenergy.com		
i. Owner Mailing Address	P.O. Box 777, Agawam, MA 01001		
j. Owner Name *(if different)*	Lucia Family Realty LLC	**k. Owner Phone**	413-519-3993
l. Owner Email	TLucia5964@gmail.com		
m.Owner Mailing Address	P.O. Box 777, Agawam, MA 01001		

3) PROJECT & SITE DETAILS
NOTE: Any omission of requested information may result in an INCOMPLETE determination

	Existing	***Proposed*** ☐ *No changes to building, site or lot*	-FOR BUILDING DEPT. REVIEW- REQUIRED / NCU
a. Lot Size	**749,014** SF	No Change SF	LOT SIZE ☐
b. Frontage	**199.5** FT	No Change FT	FRONTAGE ☐
c. Front Lot Line	**147** FT	No Change FT	FRONT SB ☐
d. Side Lot Line (Left/Right)	L: FT **4** R: 27 FT	L: 4 FT R: 132 FT	SIDE SB ☐
e. Rear Lot Line	450 FT	585 FT	REAR SB ☐
f. Building Height	Approx. 30 FT	No Change FT	BLDG HT ☐
g. Total BLDG/Res Area	Approx. 56,684 SF N/A SF	Approx. 19,342 SF No Change SF	AREA LIM ☐
h. BLDG Coverage (Footprint)	50,906 SF 6.8 % of lot	17,570 SF 2.4 % of lot	LOT COVER ☐
i. Impervious Coverage	284,146 SF 37.9 % of lot	378,338 SF 50.5 % of lot	IMPERVIOUS ☐
j. Parking/Loading Spaces	P: **18** L: **0**	P: **12** L: 0	PARKING ☐
k. Bicycle/EV Charge Spaces	B: **0** EV: **0**	B: **0** EV: 0	BIKE/EV ☐
l. Signs (Size & Type)	8 ft x 4 ft T: **Freestanding**	x N/A T: None	SIGNS ☐
m. Fence (Size & Type)	0 LIN FT T: **N/A**	2,350 LIN FT T: Chain Link	
n. Wetland Area	7,284 SF	7,284 SF	
o. Utility Services	☑ Town Water ☑ Town Sewer	☑ Town Water ☑ Town Sewer	NON-CONFORMING USE ☐

p. Current Use of Property	Former Lumber Yard (Lucia Lumber)
q. Proposed Use of Property	Battery Energy Storage System (BESS)

r. Project Description

The Applicant proposes to develop an approximately 250 megawatt (MW), 4 megawatt hour (MWh), battery energy storage system (BESS) on the 17.2 acre site located at 769 Silver Street. The project will consist of battery containers, transformers, inverters, equipment pads, and associated infrastructure. The proposed BESS site will be accessed from Silver Street. The battery containers will be surrounded by a 16 foot high solid wall and 8 foot high chain link fence that will act as physical, visual, and sound barriers as detailed in the attached plans. The BESS equipment will connect to the existing South Agawam Switching Station via the project's own substation and pole mounted interconnection equipment.

s. I have attached additional narrative, plans or supporting materials *(any oversize plans should also be included in an 8.5 x 11" format)*	☑ Yes ☐ No
t. Work is proposed in or within 100' of a wetland or 200' of a stream/river, or construction will occur within the Floodplain district. *If so, CONSERVATION COMMISSION review is required.*	☐ Yes ☑ No ☐ Unsure
u. The following projects shall be required to comply with the requirements of a STORM DRAIN PERMIT: **[1] Any alteration to sites on parcels of one acre or greater.** **[2] Any alteration to individual lots less than one acre, but which are contiguous or are deemed part of a common project which is one acre or greater.**	☑ Yes ☐ No ☐ Unsure
v. The project will affect at least one of the following; additional gross floor area by 2,000 square feet, any change of use, changes to parking and/ or curb cuts.	☑ Yes ☐ No

4) CERTIFICATION

This determination is based only on the information provided, which I represent as accurate. The issuance of a Zoning Determination does not relieve the Applicant of the responsibility to obtain other zoning or non-zoning permits, as may be required, and this determination is based on the zoning in effect at the issue date and grants no protection from any pending or future zoning changes. Additional information may be requested and required to properly process this form. Any non-zoning related comments provided are cursory in nature; Applicants should follow-up with appropriate Town Departments. ***Sec. 1-7 of the Town of Agawam's General Ordinances authorizes the denial of a license or permit where an outstanding debt or obligation to the Town exists.***

Signature	Michael U. Alvarez Michael U. Alvarez, COO	**Date**	12/4/2025

☑ Applicant ☐ Applicant's Representative

ZONING DETERMINATION - OFFICE USE ONLY

☐ Approved ☐ Denied: ☐ The proposed use is not permitted in the subject zoning district
☐ Only permissible with variance relief from the Zoning Board of Appeals

☒ Approved ***Pending additional approval:***

Per Zoning Ordinance Section(s)	Required Permit(s)	Approval Required	Permitting Authority
§ 180-169-(D&E)	☒ Building Permit(s)	☐ Special Permit(s)	☒ Planning Board
§ 180-13-(S.P.R)	☒ Electrical Permit(s)	☒ Site Plan Review	☐ Board of Appeals
	☐ Plumbing/Gas Permit(s)	☐ Variance	☐ City Council

Town Building Official		**Issue Date**	12/5/2025

This determination may be appealable to the Zoning Board of Appeals under the provisions of MGL Ch. 40A Sec. 8.
Revised 09/08/2022

ATTACHMENT B – FORM D – APPLICATION FOR SITE PLAN APPROVAL

TOWN OF AGAWAM, MASSACHUSETTS

FORM D

Application for Site Plan Approval

Please complete the following form and electronically submit with site plans, completed Zoning Determination and Storm Water Management Report to: siteplan@agawam.ma.us in addition to sending four (4) hard copies of the Site Plan and one (1) hard copy of the Storm Water Management Report and completed Zoning Determination to:

Agawam Planning Department

36 Main Street

Agawam, MA 01001

January 29, 2026

1. Name of Business: Agawam Energy Center, LLC

   Address: 125 High Street, Suite 1705, Boston, MA 02110

   Phone #: 207-210-1175 Email: Chad.Allen@longroadenergy.com

2. Name of Applicant/Owner: Applicant: Agawam Energy Center, LLC / Owner: Lucia Family Realty LLC

   Address: 125 High Street, Suite 1705, Boston, MA 02110 / P.O. Box 777, Agawam, MA 01001 Phone #: 207-210-1175

   Email: Chad.Allen@longroadenergy.com

3. Name of Engineer/Architect: Thomas Henaghen, PE

   Address: 4 Blanchard Road, P.O. Box 85A, Cumberland, ME 04021

   Phone #: 617-921-3703 Email: thomas.henaghen@sme-engineers.com

4. Please give a brief description of the proposed project: Please see the attached sheets which provide supplemental information regarding the project.

ATTACHMENT C – PROJECT NARRATIVE

Introduction

Agawam Energy Center, LLC (Applicant) proposes to develop an approximately 250 megawatt (MW), 4 megawatt hour (MWh), lithium-ion battery energy storage system (BESS) on the 17.2-acre site located at 769 Silver Street (Map G6, Block 2, Lot 6) in Agawam, Massachusetts (the Project). The Project site is located in the Industrial District B zoning district on the east side of Silver Street. The property is a former lumber yard with eight (8) existing buildings and a roadway network that were associated with the business. The subject property also contains two (2) existing easements. One (1) easement runs northwest by southeast across the Project site from Silver Street to the rear property line and provides accommodation for an underground water line. The other easement is located in the rear (southeast) portion of the property running northeast by southwest and provides accommodation for an existing transmission line. A wetland area containing an intermittent stream and a pond are also located along the eastern property boundary, more than 100 feet from the proposed Project footprint.

An Application for Zoning Determination was submitted to the Inspection Services - Building Department on December 5, 2025. According to the direction outlined in the Zoning Determination by the Inspector of Buildings dated December 5, 2025, an Application for Site Plan Approval is required to be submitted to the Planning Board in accordance with Sections 180-13 and 180-169 of the Zoning Ordinance of the Town of Agawam Code (Zoning Ordinance). The following narrative and documentation are hereby submitted to the Planning Board in accordance with Article I General Provisions, Section 180-13 Site Plans, and Article XXIII Battery Energy Storage Systems, Sections 180-167 General Requirements, 180-169 Permitting Requirements for Tier 2 and Tier 3 Battery Energy Storage Systems, and 180-170 Site Plan Application of the Zoning Ordinance, relating to Site Plan Review and BESSs.

This application package includes an Application for Site Plan Approval and related attachments. The application materials were submitted electronically to the following emails: TEgerton@agawam.ma.us, SitePlan@agawam.ma.us, and KDuquette@agawam.ma.us. Two (2) hard copies of the application materials and one (1) hard copy of the Stormwater Management Report have been delivered to the Planning Director & Conservation Agent as instructed.

Proposed Project

The Project's parcel is owned by Lucia Family Realty LLC, with whom the Applicant has an exclusive option to purchase the property. A BESS is an allowed use within the Industrial District B zoning district via Site Plan Review by the Planning Board as outlined in Sections 180-13, 180-169, and 180-170 of the Zoning Ordinance, as well as compliance with applicable provisions of the State Building Code, the State Electrical Code, the State Fire Code, and other applicable codes. Other provisions include those within Article XXIII of the Zoning Ordinance which pertains specifically to BESSs.

As currently designed, the proposed BESS has a capacity of approximately 250 MW and 4 MWh. Of the eight (8) existing buildings on the site, only the two (2) along the southwest property line will be fully retained and a third, the one closest to Silver Street, will have its rear section demolished while the front portion will be retained for office and administrative uses.

The BESS facility will occupy approximately 8 acres of the 17.2-acre Project site. The associated battery containers, transformers, and inverters will sit on concrete pads, driven piles, or grade beams that will be enclosed by a combination of an 18-foot-high, 433-foot-long, solid sound wall along Silver Street and the balance by an 8-foot-high chain link fence that will act as physical, visual, and sound barriers as detailed in the attached plans. The substation at the rear of the property will also be surrounded by an 8-foot-high chain link fence. The stormwater management area for the Project is in the northeast corner of the site, just outside the fence for the BESS area.

The Project is intended to charge during hours where electricity demand is low, such as the middle of the night, and discharge energy to the electrical grid during seasonal peak periods and monthly peak hours. The BESS facility will contain 54 lineups, with each lineup consisting of one medium voltage transformer (54 in total) and four (4) Fluence SmartStack BESSs (216 in total) (see Attachment E for details). Each SmartStack consists of batteries, a power conversion system (PCS), controls, and disconnects. The nominal voltage of the batteries is 1,500 volts direct current (Vdc). The SmartStack PCS converts direct current voltage to alternating current voltage (Vac). Each SmartStack PCS is connected to a medium voltage transformer that steps up voltage to 34.5 Kilovolt (kVac); the medium voltage transformers connect to the Project substation that interconnects to the grid at 115kVaC. Collection trenches with underground utilities ranging from a single circuit to as many as 12 circuits will carry power toward the Project's substation which will contain two (2) transformers, battery collection feeders, and other equipment. A 115-kVac overhead generator tie line will transfer power off-site to Eversource's South Agawam Switchyard located to the southeast, approximately 600 feet from the Project.

The Project is designed to offer world-class safety and environmentally responsible solutions by incorporating the latest technology and conducting close collaboration with Agawam's Fire Department and first responders regarding the design. The Project will use proven and stable lithium-iron-phosphate (LFP) technology, implement a design that incorporates energy storage specific safety certifications and standards, and will be monitored 24 hours a day, 7 days a week, and 365 days a year. By repurposing an idle industrial property and leveraging its proximity to an existing electrical switchyard, it avoids tree clearing and limits the need for new transmission infrastructure. The Project will provide enough energy to power over 285,000 residential homes, generate new long-term tax revenue for the Town, and reduce costs to electric ratepayers, among other items, all while requiring limited Town services.

The primary access to the Project site will be via a new curb cut and driveway off Silver Street close to the northern property boundary. Additional access will be provided through an existing driveway off Silver Street near the southern property boundary. The front of the Project site along Silver Street will consist of heavy landscaping, privacy fencing, and a screening mound between the two driveways, along with up to 12 parking spaces and an 80-foot by 80-foot first responder marshalling area. The landscape plantings at the front of the property will all be native with pollinator species proposed where possible, along with wood board fencing in two locations. Please see the Site Elements sheet in Attachment F for specific examples of vegetation and fencing.

There will also be an emergency access roadway to the south from Moylan Lane over the existing utility easement in that location. The roadways on the Project site itself will circle around the perimeter of the BESS equipment and transformers, as well as divide the equipment into two areas along another utility easement. A single roadway will lead to the rear of the Project site to the substation and connect to Moylan Lane. The roadways on the Project site will all be paved except for the locations within the fenced perimeter of the BESS equipment and substation access, where the roadways will be gravel. Four (4) locations with rolling gates will provide access to/from the BESS perimeter and there will also be two (2) gated access points for the Project's substation. The Natural Heritage & Endangered Species Program (NHESP) requirements for the Project include the fencing being installed to and into the ground to prevent wildlife or potential rare species from entering the site, and the gates will be constructed to prevent wildlife passage as well.

The Project Applicant is:

Agawam Energy Center, LLC
125 High Street, Suite 1705
Boston, MA 02110
Contact: Chad Allen
Phone: 207-210-1175
Email: chad.allen@longroadenergy.com

The Project Engineer authorized to represent the Applicant is:

Sevee & Maher Engineers, Inc.
4 Blanchard Road, P.O. Box 85A
Cumberland, ME 04021
Contact: Thomas Henaghen, PE
Phone: 617-921-3703
Email: thomas.henaghen@sme-engineers.com

Surrounding Area

The neighborhood around the Project site consists primarily of industrial, warehouse, and distribution type buildings and businesses, with a few single-family dwellings mixed in as well. To the north are two (2) single-family dwellings, a self-storage facility, and a slate roofing company. West, across Silver Street, is an Industrial District A zoning district with a variety of industrial businesses for engine control products, warehouses, noise control products, and horticultural growing mixes. To the south are four (4) single-family dwellings along Silver Street and a variety of other industrial businesses, such as a corrugated box company, a tool company, N.E.X.T. Fitness, and Berkshire Power, which includes a substation. To the east of the Project site are wooded parcels owned by Western Massachusetts Electric Company (Eversource Energy).

The area immediately surrounding the BESS site contains maintained lawn and filled/disturbed areas dominated by invasive species. Sensitive areas present on the parcel that are being avoided

and/or are having impacts minimized include trees, wetlands, streams, a pond, and NHESP Priority and Estimated Mapped Habitats of Rare Species. The outer edge of mapped NHESP Priority and Estimated Habitats of Rare Species is present along the northeastern section of the Project parcel. The proposed disturbed area (limit of work) for the Project avoids most of the NHESP area as the majority of the designated habitat is located off-site. The mapped NHESP areas on the Project site are mostly disturbed, and not high quality or suitable rare species habitat. Additionally, the Project does not infringe upon any of the wetlands or their 100-foot Buffer Zone on the subject property. BSC is currently working with NHESP and will comply with any Best Management Practices and protection plans as requested by NHESP.

There are no vernal pools, water supply watersheds, or aquifers on the Project site. One (1) field delineated open water pond on the subject property was confirmed by two (2) environmental consultants not to be a vernal pool. There were no indicators of vernal pool obligate of facultative species observed during the investigations. The pond also appears to hold water year-round based on multiple visits to the site, and contains the presence of duckweed and green frog tadpoles. As a result, the Project team was able to conclude the pond was not a vernal pool. The Applicant is currently in the process of obtaining a Request for Determination of Applicability (RDA) from the Conservation Commission to verify the wetland limits and confirm the Project does not require an Order of Conditions (OOC) under the Wetlands Protection Act.

There are no FEMA flood zones or floodplain areas present on or near the Project site, nor in the greater surrounding area.

Compliance with Zoning Ordinance

On behalf of the Applicant, the Project team has developed a set of plans (Attachment F) that are intended to meet requirements set forth in the Zoning Ordinance for the Industrial District B zoning district where the Project is located. Provisions of the Zoning Ordinance relative to the Project, followed by an analysis of the Project's compliance with the applicable provisions (in underlined font), are listed below. The outlined regulations represent an analysis applicable to Article I General Provisions, Section 180-13 Site Plans, and Article XXIII Battery Energy Storage Systems, Sections 180-167 General Requirements, 180-169 Permitting Requirements for Tier 2 and Tier 3 Battery Energy Storage Systems, and 180-170 Site Plan Application of the Zoning Ordinance.

Article I General Provisions

Section 180-13. Site Plans

A. Site plans prepared and approved in accordance with this section shall be required to assist the Inspector of Buildings in the review of certain applications for building permits and to assure compliance with all applicable requirements of this chapter.

   Acknowledged. An Application for Site Plan Approval and associated plans have been prepared in accordance with this section.

B. A site plan shall be required and shall be submitted in each of the following situations:

(1) Any proposed residential, business, industrial, institutional or other use of a new or renovated structure or of a parcel of land, or any change in any such use, structure or parcel, except for one-family detached dwellings and duplexes on separate lots; provided, however, that, upon application, the Inspector of Buildings may waive the site plan review and approval requirement for proposals involving a) a change in use only, b) construction or alteration of nonresidential structures not to exceed 2,000 square feet of additional gross floor area, or c) construction or alteration of structures that are accessory to a nonresidential structure. For the purposes of computing gross floor area, the Inspector of Buildings must aggregate all alterations or construction completed within the immediately preceding five years.
[Amended 9-5-2018 by TOR 2018-11]

Acknowledged. An Application for Site Plan Approval has been submitted for the proposed BESS.

(2) Any nonresidential use of a one-family dwelling.

Acknowledged. Not applicable.

(3) Any use requiring a special permit from the Board of Appeals. For this section, residences which are to be used solely for residential purposes are exempt.
[Amended 1-21-2003 by TOR-2002-8]

Acknowledged. Not applicable.

(4) Any major change in any condition or feature which is not in conformance with any feature of a previously approved site plan. Changes to parking and/or curb cuts will always necessitate site plan review.

Acknowledged. An Application for Site Plan Approval has been submitted for the proposed BESS.

C. Procedure.

(1) An applicant for site plan review under this section shall file an electronic copy of an application and a site plan, plus four hard copies of the site plan, and an electronic copy of the stormwater management plan, plus one hard copy of the stormwater plan and an electronic copy of the pre- and post-development stormwater calculations when applicable with the Building Department. The site plan shall be prepared by an engineer, architect or landscape architect unless otherwise specified by the Planning Board.
[Amended 10-7-2019 by Ord. No. TOR-2019-9]

Acknowledged. An electronic copy of the Site Plan Approval application, Site Plans, Stormwater Management Report, pre- and post-development stormwater calculations, and other associated materials have been submitted. Additionally, two (2) hard copies of the application materials and one (1) hard copy of the Stormwater Management Report have been submitted to Town staff as instructed by the Planning Director & Conservation Agent.

(2) The Inspector of Buildings shall, within five days of receipt, transmit to the Planning Board four copies of the application and site plan and an electronic copy of the stormwater management plan.
[Amended 12-6-2021 by Ord. No. TOR-2021-4]

Acknowledged.

(3) All site plans shall be prepared to scale on standard sheets of 24 inches by 36 inches to show with reasonable accuracy the following information, in addition to that required in § 180-4:

(a) A title block, containing the street address, applicant's name and address, date, scale and the name of the preparer of the plan.

The Site Plans (Attachment F, Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2) include a title block detailing the street address, applicant's name and address, date, scale, and name of the plan preparer on each sheet.

(b) A site layout at a scale of no smaller than one inch equals 50 feet.

The Site Plans (Attachment F, Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2) contain the proposed site layout at a scale of 1" = 40'.

(c) Topography of the site and adjacent lands.

Various plans in Attachment F (Existing Conditions and Demo Plan, Grading Plan – Sheet 1, and Grading Plan – Sheet 2) illustrate the topography of the Project site and adjacent lands.

(d) Provision for the handling of vehicular traffic flow. All curb cuts must be clearly defined with widths and radii noted on the plan. Radii shall meet Town standards. Parking lot and site traffic flow must be clearly noted with signs or other methods if it is to be maintained as one-way.

No new public roads are proposed for the Project. Within Attachment F, Site Layout Plan – Sheet 1 illustrates the 30-foot radius of the new proposed curb cut and paved access off Silver Street. Site Layout Plan – Sheet 2 displays the secondary emergency access via Moylan Lane. The existing curb cut and driveway off of Silver Street will remain. All roadways outside of the fenced-in BESS area will be paved and all

roadways within the BESS area will be gravel. All roadways on the site will accommodate two-way traffic.

(e) Parking areas and loading areas.

The 12 new parking spaces and first responder marshalling area for the Project are noted at the front of the Project site on Site Layout Plan – Sheet 1 in Attachment F.

(f) Drainage. The plan must be submitted to the Department of Public Works for input prior to Planning Board review.

The stormwater management area for the Project is shown on Site Layout Plan – Sheet 1 and Grading Plan – Sheet 1 in Attachment F. A Stormwater Management Report and associated watershed drainage figures is included in Attachment L which summarizes the stormwater runoff patterns of the pre- and post-development conditions for the Project.

(g) All public utilities (sewer, water, gas, electric).

The Project site has existing connections to public utilities that will be maintained to service the buildings that will be retained. The Utility Plan in Attachment F illustrates existing public utilities at the site. Additional electrical infrastructure will be installed at the site to service the BESS and substation.

(h) Landscaping. All landscaped areas are to be designated on the plan. These areas are to specify species type and size.

Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F provide a general sense of the proposed landscaping around the entire site. Dense landscaping will be provided at the front of the subject property along Silver Street. Additionally, a vegetated buffer strip will be provided around the north and east sides of the BESS between the BESS's perimeter gravel roadway and its perimeter fencing. Landscape Plan Enlargement – Sheet 3 in Attachment F portrays extensive details regarding the proposed landscaping at the front of the Project site which includes trees, shrubs, privacy fencing (wood board), and a screening mound. The landscape plantings at the front of the property will all be native with pollinator species proposed that are supportive of butterflies and other species. Please see the Site Elements sheet in Attachment F for specific examples of plantings, pollinator species, and fencing. The existing vegetation outside the proposed limit of work will remain.

(i) Sign location only.

Signage will comply with local, state, and federal regulations, as well as American National Standards Institute (ANSI) requirements as outlined in the Town of Agawam's BESS Ordinance. Signage will be placed in the required locations for safety and operational purposes. Please see the Lighting and Security Plan and Sign

Details sheets in Attachment F for signage details. High voltage warning signage will be placed on the chain link fence surrounding the BESS and the Project's substation. Site information and emergency contact signage will be placed at each gated entry to the BESS and Project's substation.

(j) Exterior lighting.

Lighting systems will comply with local, state, and federal regulations; will be limited to those locations required for safety and operational purposes; and will be reasonably shielded from abutting properties as necessary. Please see the Lighting and Security Plan in Attachment F for additional lighting details.

(k) Rendering or elevations, including all mechanical facility support items originating from or terminating on the building exterior, or both.

Attachment F contains renderings of the Project including BESS infrastructure and landscaping elements.

(l) The location and characteristics of any proposed screening, fencing or other buffers.

The submitted Site Plans (Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F) indicate the location of proposed screening, fencing, and buffers. A Site Elements sheet, also included in Attachment F, illustrates the type of solid and chain link fencing that will be used in the Project.

(m) The location of any wetlands, streams, drainage swales and areas subject to flooding.

The Existing Conditions and Demo Plan, Site Layout Plan – Sheet 1, and Site Layout Plan – Sheet 2 included in Attachment F illustrate the location of existing wetlands.

(n) Storm drain permit requirements pursuant to Chapter 175, §§ 175-22 to 175-30, inclusive, of the Code of the Town of Agawam, when applicable.
[Added 10-7-2019 by Ord. No. TOR-2019-9]

Acknowledged. The proposed Project application has been prepared to meet the requirements of Article IV Sanity Sewers, Storm Drains, and Connections, of the Town of Agawam Code (Sections 175-22 through 175-30).

Sanitary Sewer: No new buildings are proposed as part of the Project. There is an existing sewer service to one of the existing buildings to remain. That service will continue to be used. No new sewer connections are proposed and no significant increase in volume is proposed.

Storm Drains: A Stormwater Permit application (Attachment M), Stormwater Management Report (Attachment L), and a set of design drawings have been submitted with this application. No new discharges to the Town's closed drainage

system are proposed. Temporary and permanent BMPs are included in the submitted documents.

The Applicant will coordinate with the Department of Public Works throughout the process to provide necessary reporting and allow for inspections prior to and during construction in accordance with the Town requirements.

(o) Stormwater management plan requirements pursuant to Chapter 175, § 175-35 of the Code of the Town of Agawam, when applicable.
[Added 10-7-2019 by Ord. No. TOR-2019-9]

A Stormwater Management Report is included as Attachment L and is in accordance with Section 175-35 of the Code of the Town of Agawam.

(4) Within 21 days of receipt, the Planning Board shall hold a public meeting. The Planning Board shall within 35 days of receipt approve the site plan, approve it with modifications or return it for changes or additional information. When changes have been made or additional information provided, the above-specified time limits will apply. The Planning Board can in certain cases extend the review period if done so in writing and for good reason; however, the review period shall not exceed 90 days. A report containing the findings of the Board shall be submitted to the Inspector of Buildings for consideration in issuing a building permit.

Acknowledged.

(5) Any application for a building permit requiring site plan approval shall not be deemed complete until such site plan is submitted.

Acknowledged.

(6) Any decision pursuant to a site plan review shall be subject to the right of appeal to the Board of Appeals.

Acknowledged.

Article XXIII Battery Energy Storage Systems

Section 180-167. General Requirements

1. All permits required by state codes, including but not limited to building permit, an electrical permit, and a fire department permit shall be required for installation of all battery energy storage systems.

Acknowledged. All required permits will be obtained before the work associated with those permits commences.

2. All battery energy storage systems, all Dedicated Use Buildings, and all other buildings or structures that (a) contain or are otherwise associated with a battery energy storage system; and (b) are subject to the requirements of the State Building Code, shall be designed, erected, and installed in accordance with all applicable provisions of the State Building Code, the State Fire Code, and the State Electrical Code. All battery energy storage systems shall comply with the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time.

   Acknowledged. All buildings and structures associated with the BESS will be designed, erected, and installed in accordance with all applicable provisions of the State Building Code, the State Fire Code, and the State Electrical Code. The BESS will comply with the National Fire Protection Association (NFPA) Standard for the Installation of Stationary Energy Storage Systems.

3. Energy storage system capacities, including array capacity and separation, are limited to the thresholds contained in the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time.

   Acknowledged. The energy storage system capacities for the BESS will not exceed the thresholds contained in the NFPA Standard for the Installation of Stationary Energy Storage Systems.

4. Any battery energy storage system constructed in the Floodplain District as set forth in §180-68 shall require a special permit granted pursuant to §180-71.

   Acknowledged. The Project is not located within a Floodplain District.

5. Any application to construct a Tier 2 or Tier 3 battery energy storage system where the energy storage units are located within two hundred fifty (250) feet of a sensitive noise receptor may be required to include an acoustic study in order to ensure that any increase in sound complies with Massachusetts DEP requirements.

   Acknowledged. A Sound Study has been included in this application as Attachment G.

Section 180-169. Permitting Requirements for Tier 2 and Tier 3 Battery Energy Storage Systems

Tier 2 and Tier 3 Battery Energy Storage Systems are allowed by right in any Industrial zone subject to applicable provisions of the State Building Code, the State Electrical Code, the State Fire Code, and other applicable codes, and subject to site plan review as outlined in §180-13 of the Code of the Town of Agawam and such provisions of this Article as are applicable. Tier 2 Battery Energy Storage Systems are allowed by right in the Agricultural zone subject to applicable provisions of the State Building Code, the State Electrical Code, the State Fire Code, and other applicable codes, and subject to site plan review as outlined in §180-13 of the Code of the Town of Agawam and such provisions of this Article as are applicable. Tier 3 Battery Energy Storage Systems are allowed in the Agricultural zone subject to the issuance of a special permit as outlined in §180-11 of the Code of the Town of Agawam and subject to applicable provisions

of the State Building Code, the State Electrical Code, the State Fire Code, and other applicable codes, and subject to site plan review as outlined in §180-13 of the Code of the Town of Agawam and such provisions of this Article as are applicable. No Tier 2 or Tier 3 Battery Energy Storage System shall be constructed or installed in any Residential or Business zone, except for access or utility interconnection. Tier 1, Tier 2 and Tier 3 BESS shall comply with the applicable requirements set forth in this Article, as well as the Code of the Town of Agawam. The following requirements apply to all BESS subject to this Article, except where it is specifically noted to apply only to Tier 2 or Tier 3 BESS:

1. Utility Lines and Electrical Circuitry. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles.

   Acknowledged. All utility lines for the Project will be placed underground except for the 115kV generator tie line which will be located overhead and connect to the existing Eversource South Agawam Switchyard. Site Layout Plan – Sheet 2 displays the location of this generator tie line as well as the proposed locations for the support poles. Please note, the final configuration of the tie line and support poles may vary based upon final coordination with Eversource.

2. Signage. Signage shall comply with the requirements of Article XIII of Chapter 180 of the Code of the Town of Agawam and the following additional requirements; in the event of a conflict between the provisions of Article XIII and this Section, the requirements of this Section shall prevail.

   Acknowledged. Signage will comply with the requirements of Article XIII of Chapter 180.

   a. The signage shall be in compliance with ANSI requirements and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and twenty-four (24) hour emergency contact information, including reach-back phone number.

      Acknowledged. Signage will comply with ANSI requirements and provide the information stated above. Please see the Lighting and Security Plan and Sign Details sheets in Attachment F for signage details. High voltage warning signage will be placed on the chain link fence surrounding the BESS and the Project's substation. Site information and emergency contact signage will be placed at each gated entry to the BESS and Project's substation. Please find below two examples of typical signage that will be used in the Project.





b. As required by the state electrical code, disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

   Acknowledged. Signage will comply with these requirements and provide the information stated above. Please see the Lighting and Security Plan and Sign Details sheets in Attachment F for additional signage details. High voltage warning signage will be placed on the chain link fence surrounding the BESS and the Project's substation.

c. Signage compliant with ANSI requirements shall be provided on doors to rooms, entrances to BESS facilities, and on BESS outdoor containers.

   Acknowledged. Signage will comply with ANSI requirements and be provided in the locations stated above. Please see the Lighting and Security Plan and Sign Details sheets in Attachment F for additional signage details.

3. Lighting. Lighting systems shall be consistent with local, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties.

   Acknowledged. Lighting systems will comply with local, state, and federal regulations; will be limited to those locations required for safety and operational purposes; and will be reasonably shielded from abutting properties as necessary. Please see the Lighting and Security Plan in Attachment F for lighting details. Light fixtures will be installed at the gated entries of each service road, on the Project side of retained buildings, and within the Project's substation.

4. Vegetation and tree-cutting. Areas within ten (10) feet on each side of Battery Energy Storage Systems shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted provided

that they do not form a means of readily transmitting fire. Removal of trees should be minimized to the extent possible.

Acknowledged. Although there is minimal existing vegetation in the proposed location of the BESS, where necessary, areas within ten (10) feet on each side of BESSs will be cleared of any combustible vegetation and other combustible growth. Additionally, near the Project's on-site substation at the rear of the property, there may be a need to remove a few trees that might cause hazards for the facility, as well as some smaller trees/saplings, based upon earlier site visits to the property. There are also some aspen and cottonwoods in a few pockets along the eastern property line near the pond that will need to be removed as well. Combustible growth and tree removal is always an important issue for BESS facilities as vegetation can cause immediate potential hazards for these facilities, and potentially in the future as well as the vegetation grows upward and outward.

6. Setbacks. Tier 2 Battery Energy Storage Systems shall be set back a minimum of fifty (50) feet from all side, rear, and front lot lines; Tier 3 BESS shall be set back a minimum of one hundred (100) feet from side, rear, and front lot lines that abut or are across a street from residential zoning districts or existing single, two-family, or multi-family structures. The minimum setback areas shall include a buffer area at least fifteen (15) feet wide along all property lines. Access drives and parking are allowed in the setback areas, but shall not intrude into the required buffer areas except where necessary to provide access or egress to the property. In addition, a minimum of ten (10) feet must be maintained between BESS components and all buildings, stored combustible materials, hazardous materials, high-piled storage, personnel means of egress, and other exposure hazards not associated with electrical grid infrastructure.

   Acknowledged. As displayed on Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F, all components of the BESS are setback at least 100 feet from all lot lines. All other components to the Project, such as the substation, comply with the setback requirements of the Industrial District B zoning district. A buffer area has been provided around the perimeter of the BESS where feasible to work around access drives. All BESS components are at least 10 feet away from all buildings and the other items listed above.

7. Dimensional. Tier 2 and Tier 3 Battery Energy Storage Systems shall comply with the dimensional limitations for principal structures of the underlying zoning district as provided in Table of Dimension Regulations (See 180 Attachment 4, Appendix B to Chapter 180 of the Code of the Town of Agawam, unless otherwise provided in this Article).

   Acknowledged. As displayed on Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F, all components of the BESS are setback at least 100 feet from all lot lines. No new principal structures are being erected for the Project. As displayed on the Existing Conditions and Demo Plan in Attachment F, of the eight (8) existing buildings on the site, only the two (2) along the southwest property line will be fully retained and a

third, the one closest to Silver Street, will have its rear section demolished while the front portion will be retained for office and administrative uses.

8. Fencing Requirements. Battery Energy Storage Systems, including all mechanical equipment, shall be enclosed by a minimum eight (8) foot high fence with a self-locking gate to prevent unauthorized access unless housed in a dedicated-use building. Said fence may be placed within any minimum setback area. Security barriers, fences, landscaping and other enclosures must not inhibit required air flow to or exhaust from the BESS and components. The NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time, requires specialty safety systems to be provided based on the BESS chemistry and installed location.

   Acknowledged. The associated equipment for the BESS will be enclosed by an 18-foot-high, 433-foot-long, solid wall on its northwest side and an 8-foot-high chain link fence in all other locations. This wall and fencing will act as physical, visual, and sound barriers as detailed in Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F. Gates will be provided where access roads intersect the fencing or sound wall, for the both the BESS and Project's substation. There will also be a gate on the north side of the BESS near the stormwater management area. The NHESP requirements for the Project include the fencing being installed to and into the ground to prevent wildlife or potential rare species from entering the site, and the gates will be constructed to prevent wildlife passage as well.

9. Screening and Visibility. Battery Energy Storage Systems shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping or other screening methods that will harmonize with the character of the property and surrounding area. Such features may not inhibit required air flow to or exhaust from the BESS and components and must comply with the setbacks established in paragraph 6 above.

   Acknowledged. As displayed in Site Layout Plan – Sheet 1 and Site Layout Plan – Sheet 2 in Attachment F, the BESS will be enclosed by an 18-foot-high, 433-foot-long, solid sound wall on its northwest side and an 8-foot-high chain link fence on all other sides. The front of the property between Silver Street and the BESS will consist of heavy landscaping, privacy wood board fencing, and a screening mound between the two (2) access driveways. These items are displayed on Landscape Plan Enlargement – Sheet 3 in Attachment F. To the east of the BESS is an existing, sizeable, vegetated wetland area, that is not being disturbed as part of this Project, which will also act as a buffer. Additionally, as displayed in the Existing Conditions and Demo Plan in Attachment F, the two (2) large buildings along the southwest property line, both of which are approximately two (2) stories in height, will be fully retained. Each of these items will act as physical, visual, and sound barriers to properties adjacent to the BESS.

10. Batteries. Failed battery cells and modules shall not be stored on the site and shall be removed no later than thirty (30) days after deemed failed by the BESS operator or cell/module manufacturer. The operator shall notify the Agawam Fire Chief in advance if the type of battery or batteries used onsite is to be changed.

    Acknowledged.

11. Decommissioning Plan. The applicant for Tier 2 and Tier 3 BESS shall submit with its application a decommissioning plan for the BESS to be implemented upon abandonment and/or in conjunction with removal of the facility. The owner or operator of the BESS shall notify the Building Commissioner in writing at least twenty (20) days prior to when a BESS will be decommissioned. Decommissioning of an abandoned or discontinued BESS shall be completed within six (6) months after the facility ceases operation. The decommissioning plan shall include:

    a. A narrative description of the activities to be accomplished, including who will perform that activity and at what point in time, for complete physical removal of all battery energy storage system components, structures, equipment, security barriers, and transmission lines from the site;

       Acknowledged. Section 3.5 Equipment Removal Sequence on page 6 of the Decommissioning Plan (Attachment I) provides guidance on the typical removal process of all BESS components.

    b. Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations;

       Acknowledged. Section 3.7 Health, Safety & Environmental on page 7 of the Decommissioning Plan (Attachment I) speaks to the health and safety requirements in place regarding the appropriate handling of solid and hazardous waste.

    c. The anticipated life of the battery energy storage system;

       Acknowledged. Sections 3.1 on page 4 and 4.2.2 on page 13 of the Decommissioning Plan (Attachment I) discuss the anticipated life of the battery energy storage system.

    d. The estimated decommissioning costs and how said estimate was determined;

       Acknowledged. Section 4.0 Estimate of Probable Costs starting on page 8 of the Decommissioning Plan (Attachment I) discusses estimated decommissioning costs and how the estimates were determined.

    e. The method of ensuring that funds will be available for decommissioning and restoration;

Acknowledged. Sections 4.0 Estimate of Probable Costs starting on page 8 and 4.2 Scrap/Salvage Value on page 12 of the Decommissioning Plan (Attachment I) speak to the method of ensuring funds will be available for decommissioning and restoration.

f. The method by which the decommissioning cost will be kept current;

Acknowledged. Section 4.0 Estimate of Probable Costs starting on page 8 of the Decommissioning Plan (Attachment I) discusses the method by which the decommissioning cost will be kept current.

g. The manner in which the site will be restored, including a description of how any changes to the surrounding areas and other systems adjacent to the battery energy storage system, such as, but not limited to, structural elements, building penetrations, means of egress, and required fire detection suppression systems, will be protected during decommissioning and confirmed as being acceptable after the system is removed; and

Acknowledged. The manner in which the BESS site will be restored is discussed in Sections 3.6 Site Stabilization on page 7, 4.1.2 Site Work/Civil (Site Reclamation) on page 9, and 5.3 Schedule & Phasing on page 15 of the Decommissioning Plan (Attachment I).

h. A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.

Acknowledged. The procedures for removing intact BESSs with no major defects is discussed in Sections 3.5 Equipment Removal Sequence on page 6 and 4.1 Disassembly & Removal on page 9 of the Decommissioning Plan (Attachment I).

12. Decommissioning Bond. The owner and/or operator of a Tier 2 or Tier 3 BESS shall continuously maintain a bond or other surety acceptable to the Town, in a form approved by the Mayor, for the removal of the battery energy storage system, in an amount to be determined by the Town, for the period of the life of the facility. All costs of the financial security shall be borne by the applicant.

Acknowledged. A Decommissioning Bond will be posted per the requirements above prior to the issuance of a Building Permit.

13. Proof of Liability Insurance. The applicant for a Tier 2 or Tier 3 BESS or the property owner shall provide evidence of commercially liability insurance in an amount and type generally acceptable in the industry and approved by the Mayor prior to the issuance of a building permit, and shall continue such insurance in effect until such facility has been decommissioned, removed and the site restored in accordance with this Article.

Acknowledged. Liability insurance will be implemented per the requirements above prior to the issuance of a Building Permit for the Project.

Section 180-170 Site Plan Application

For Tier 2 and Tier 3 Battery Energy Storage Systems, the site plan application shall include the following information, in addition to that required by §180-13 of the Code of the Town of Agawam:

1. A one-line or three-line electrical diagram detailing the battery energy storage system layout, associated components, and electrical interconnection methods, with all state electrical code compliant disconnects and over current devices.

   Acknowledged. Please see the Power One-Line, 115kV Relay One-Line, 34.5KV Bus 1 Relay One-Line, 34.5KV Bus 2 Relay One-Line, Substation General Arrangement, Collection Power One-Line, and Collection General Arrangement sheets in Attachment F.

2. A preliminary equipment specification sheet that documents the proposed battery energy storage system components, inverters and associated electrical equipment that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.

   Acknowledged. A preliminary equipment specification sheet for the Fluence SmartStacks is provided as Attachment E.

3. Name, address, and contact information of proposed or potential system installer and the owner and/or operator of the battery energy storage system. Such information of the final system installer shall be submitted prior to the issuance of building permit.

   Acknowledged. This information will be submitted to the Town of Agawam prior to the issuance of a Building Permit.

4. Large-scale fire test data, evaluation information, and calculations and modeling data. For any of the following, UL fire test data must be made available to the Town for review: BESS systems with a capacity of greater than 50kWh - BESS systems with spacing between arrays of less than three (3) feet.

   Acknowledged. This information is still being generated and will not be fully completed until the first or second quarter of 2026. Once fully prepared, this information will be submitted to the Town of Agawam prior to the issuance of a Building Permit for the Project.

5. Commissioning Plan. The system installer or commissioning agent shall prepare a commissioning plan prior to the start of commissioning. Such plan shall be compliant with the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time, and document and verify that the system and its associated

controls and safety systems are in proper working condition per requirements set forth in applicable state codes. Where commissioning is required by the building code, battery energy storage system commissioning shall be conducted by a Massachusetts Licensed Professional Engineer after the installation is complete but prior to final inspection and approval. A corrective action plan shall be developed for any open or continuing issues that are allowed to be continued after commissioning. A report describing the results of the system commissioning and including the results of the initial acceptance testing required by applicable state codes shall be provided to Zoning Enforcement Officer prior to final inspection and approval and maintained at an approved on-site location.

Acknowledged. A Commissioning Plan and Operations and Maintenance Manual will be prepared prior to the start of commissioning, according to the latest version of the NFPA Standard of Station of Stationary Energy Storage (NFPA 855).

6. Fire Safety Compliance Plan. Such plan shall document and verify that the system and its associated controls and safety systems are in compliance with state codes, including documentation that BESS components comply with the safety standards set forth in §180-172.

   Acknowledged. The Agawam BESS Siting Assessment (Attachment J) speaks to the Project's compliance with fire safety measures. Fire and Risk Alliance, LLC performed the siting assessment for the proposed lithium-ion BESS proposed for the Project site. The document presents a summary of the proposed BESS, its inherent safety features, the applicable codes/standards/test methods that would be applied to the Project site, a discussion of BESS hazards, and typical emergency response considerations. The siting assessment provides general guidance based on typical BESS design characteristics and common siting practices for BESS installations. Modern lithium-ion BESSs, when designed, certified, and installed in accordance with UL 9540, UL 9540A, NFPA 855, and other applicable fire codes/standards, provide sufficient safety at the site level during deployment. Overall, the proposed SmartStack BESS installation at the Project site will have the necessary safety measures in place as confirmed by specialized testing and as documented in the prospective hazard mitigation analysis (HMA) and emergency response planning (ERP).

7. Operation and Maintenance Manual. Such plan shall describe continuing battery energy storage system maintenance and property upkeep, as well as design, construction, installation, testing and commissioning information and shall meet all requirements set forth state codes and the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time. Maintenance provisions will be driven by manufacturer requirements for the specific listed system.

   Acknowledged. A Commissioning Plan and Operations and Maintenance Manual will be prepared prior to the start of commissioning, according to the latest version of the NFPA Standard of Station of Stationary Energy Storage (NFPA 855).

8. Depending on the location of the BESS in relation to and its interaction with the electrical grid, interconnection will be completed per the State Electrical Code. System interconnections into utility grids shall be in accordance with the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time. An accessible disconnect is required per the State Electrical Code.

   Acknowledged. The Project's interconnection and disconnect will be compliant with the State Electrical Code, and its system interconnections will be in accordance with the NFPA Standard for the Installation of Stationary Energy Storage Systems. Please note the following NFPA Compliance Statement regarding the BESS Interconnection Design:

   The interconnection design for the BESS Project, including the associated interconnection substation and related electrical, protection, and control systems, will be designed in accordance with applicable NFPA codes and standards as adopted and enforced by the Authority Having Jurisdiction (AHJ). The design will address fire prevention, life safety, electrical safety, and emergency response considerations consistent with applicable NFPA requirements.

   The Project's design will be developed to align with NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, including provisions related to system separation distances, fire detection and suppression interfaces, emergency shutdown functions, signage, and coordination with emergency responders. Electrical equipment, grounding, bonding, working clearances, and overcurrent protection within the interconnection substation and associated facilities will be designed in accordance with NFPA 70, National Electrical Code (NEC), including applicable articles governing energy storage systems, power production sources, and medium- and high-voltage installations.

   Where applicable, fire detection, alarm, and signaling features associated with the BESS and interconnection facilities will be designed to align with NFPA 72. Fire protection considerations for substation equipment will be informed by NFPA 850 recommended practices for fire protection of electric generating plants and substations. The interconnection substation layout will provide appropriate access, egress, and working clearances to support safe operation and maintenance activities.

   NFPA compliance will be confirmed through detailed engineering, equipment listings and certifications where required, and construction-phase inspections. Final installation and energization will be subject to review and approval by the AHJ and local fire officials.

9. Prior to the issuance of the building permit, engineering documents must be signed and sealed by a Massachusetts Licensed Professional Engineer.

   Acknowledged.

10. Emergency Operations Plan. An Emergency Operations Plan compliant with the NFPA Standard for the Installation of Stationary Energy Storage Systems, as amended from time to time, is required. A copy of the approved Emergency Operations Plan shall be given to the system owner, the local fire department, and local fire code official. For so long as the BESS is operational, the operator shall provide the Fire Department, Police Department, Building Commissioner, and Mayor's office with contact information for personnel that can be reached twenty four (24) hours per day every day, and this contact information shall be updated by the operator whenever there is a change in the information. The operator shall also be required to have an official representative be present onsite not later than two hours after notification by the Fire Chief, Police Chief, or their designee. A permanent copy shall also be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders. The emergency operations plan shall include the following information:

    a. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

       Acknowledged. Section 8.9.3 on page 9 of the Emergency Preparedness and Response Plan (Attachment K) speaks to the isolation of equipment and systems under emergency conditions.

    b. Procedures for inspection and testing of associated alarms, interlocks, and controls, including time intervals for inspection and testing.

       Acknowledged. Section 8.6.3.9 on page 6 of the Emergency Preparedness and Response Plan (Attachment K) speaks to the various inspections and tests of the fire protection equipment that must be completed.

    c. Procedures to be followed in response to notifications from the Battery Energy Storage Management System, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

       Acknowledged. Section 8 Plan starting on page 4 of the Emergency Preparedness and Response Plan (Attachment K) discusses the procedures to be followed in response to notifications from the BESS Management System that could signify potentially dangerous conditions.

    d. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

Acknowledged. Sections 8.3, 8.4, 8.5, and 8.6 on pages 5 to 7 of the Emergency Preparedness and Response Plan (Attachment K) speak to the emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions.

e. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

   Acknowledged. Section 8.3 on page 5 of the Emergency Preparedness and Response Plan (Attachment K) speaks to the SDS binder.

f. Procedures for safe disposal of battery energy storage system equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged battery energy storage system equipment from the facility.

   Acknowledged. Sections 8.6 Fire on page 5, 8.9 Chemical Spill or Leak on page 9, 8.9.8 Tornado on page 10, 8.10 Earthquake on page 11, and 8.11 Wind Turbine Incident on page 11 of the Emergency Preparedness and Response Plan (Attachment K) speak to this item.

g. Other procedures as determined necessary by the Town to provide for the safety of occupants, neighboring properties, and emergency responders.

   Acknowledged. The Applicant is open to input from the Town regarding other elements that should be included in the Emergency Preparedness and Response Plan (Attachment K).

h. Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.

   Acknowledged. Section 8.6.5 on page 7 of the Emergency Preparedness and Response Plan (Attachment K) speaks to the emergency drill procedures.

ATTACHMENT D – EXISTING CONDITIONS PHOTOGRAPHS



Front of 769 Silver Street - Looking Southeast



North Side of 769 Silver Street - Looking Southeast



Field in Northeast Section of 769 Silver Street - Looking Northeast



Between Buildings at 769 Silver Street – Looking Southeast



Rear of 769 Silver Street – Looking Northwest

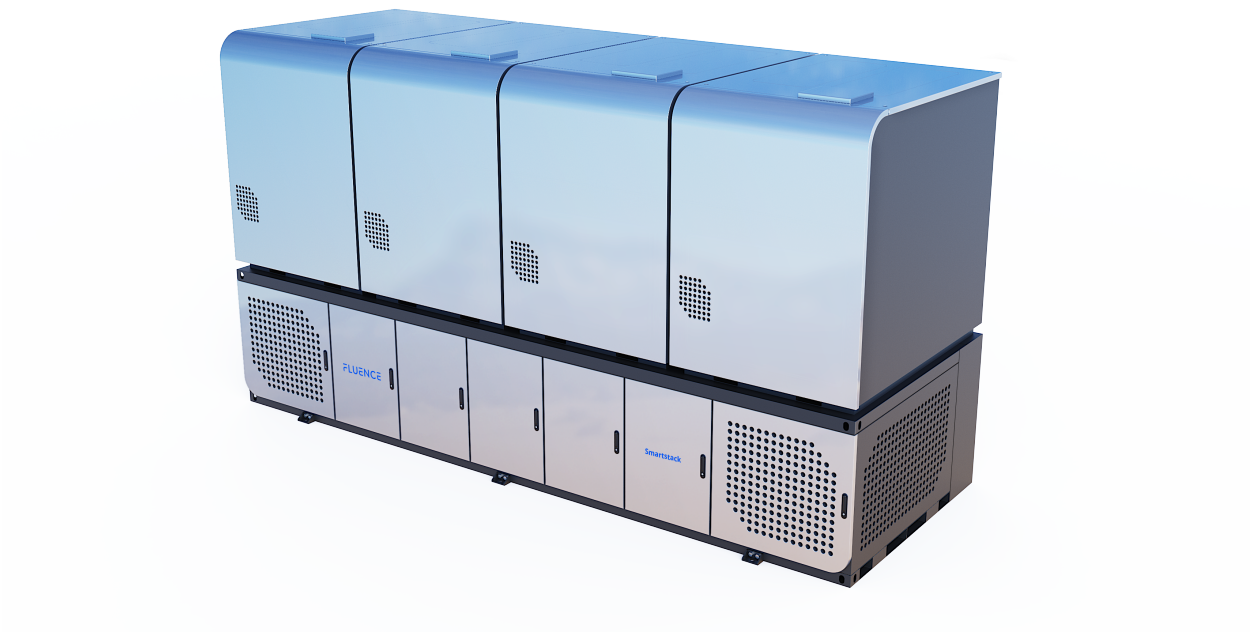


Rear of 769 Silver Street – Looking Southeast

ATTACHMENT E – FLUENCE SMARTSTACK PRODUCT DATASHEET

Smartstack™

- **Liquid-cooled 7.5 MWh BESS system - 2hr+ duration**



The Fluence Smartstack™ revolutionizes utility-scale energy storage by delivering embedded intelligence and unprecedented power density and in a revolutionary split architecture design. Our innovative approach makes intelligence, not hardware, the heart of innovation, creating the industry's first future-proof storage solution.

Maximum Power, Minimum Footprint

- Industry-leading energy density
- Optimized weight distribution
- Reduced land requirements
- Simplified site preparation

Embedded Intelligence

- Real-time performance optimization
- Predictive maintenance
- Complex event processing
- Continuous learning system

Maximize Investment

- Faster installation
- Streamlined permitting
- Up to 99% availability
- Turn system health from question into a certainty

Future-proof Design

- Upgrade without overhaul
- Easy capacity expansion
- Regular software updates
- Recyclability/End of life

Integrated Technology

- Fast Installation and Commissioning
- Standardized solution
- Standard power distribution block
- High energy density system
- Fast Stop circuit (F-Stop)
- Uninterruptible power supply (UPS)
- Battery thermal management system
- Interior climate-control HVAC unit
- NFPA 72 and EN 54 compliant fire alarm system
- Fire detection: certified SIL 2 fire detector
- Incipient gas detection: H_2 sensor
- Battery Pod vent exhaust system
- NFPA 68 and NFPA 69 compliant system
- NFPA 855 compliant system

System Configuration

Specification	Description
Cell	
Cell Chemistry	LFP
Cell Capacity (Ah)	314
Cell Rating C-rate	≤0.5
Pod	
Battery Strings per Pod	4.5
Modules per Pod	18
Pod Weight (including coolant)	~15,400 kg (33,952 lbs)
Pod Dimensions (L x D x H)	1,762 x 2,528 x 2,550 mm (5.78 x 8.3 x 8.4 ft.)
Smart Skid	
Nameplate Energy (kWh)	7,500
Number of Pods per Skid	4
Number of PCS per Skid (4hr/2hr)	5/9
Nominal AC Voltage	690 V AC, 3 phase
Maximum AC Output Current (A) (4hr/2hr)	2,092/3,765
Smart Skid Dimensions (L x D x H)	7,320 x 2,200 x 1,524 mm (24 x 7.22 x 5 ft.)
Smart Skid Weight	~11,000 kg (24,250 lbs) ±5%
Coolant Volume	~500 liters (132 gallons)
Battery coolant type	50/50 water/glycol
Auxiliary Power	
Peak Load Power Demand (kW)	~110
Supply mode	Internal (self-supply) and external provisions

Specification	Description
External supply mode	400 V AC, 3 phase
UPS Backup time	20 minutes to 2 hours
Mechanical Specification	
Seismicity	• Meets International Building Code (IBC) • Meets California Building Code (CBC) requirements per Seismic Design Category (SDC) D • Conforms to ASCE 7-16 standard • Compliant with IEEE693 High
Installation	• Compatible with bottom and top lifting
Enclosure sound pressure level at 1 m (Free Field)	• <70 dB(A) at 25 °C (77 °F)
Communication	
System BMS to Rack BMS	• Ethernet RJ45
OS Compatibility	• F.OS7 or later
Environment Specifications	
Operating Temperature Range (Ambient)	• -20 °C to +55 °C (-4 °F to +131 °F) • -30 °C to +55 °C (-22 °F to +131 °F) with cold weather kit • Derating after 50 °C (122 °F)
Wind Speed	• 240 km/h (149 mph)
Altitude	• Power de-rated over 2000 m (6562 ft) up to maximum of 4000 m (13123.3 ft) (1.5% for every 100 m)
Foundations	• Concrete Foundation • Static reference load 45 kN/m^2
Snow Load	• 130 kg/m2 (26.62 lbs/sq. ft)
IP Rating	• IP55
Chemical and Corrosion Resistance (ISO 12944-6)	• C3 Standard • C5 Optional

PCS

Specification	Description
AC Continuous Apparent Power	2 x 250 kVA
Nominal AC Voltage	690 V
Minimum DC Voltage	1164 V
Maximum DC Voltage	1500 V
Continuous AC Voltage Range	Nominal ±10%
Maximum Continuous AC Current	2 x 209 A
PF Range	0.9 (Lag)/0.9 (Lead)
Nominal AC Frequency	50/60 Hz
Cooling Method	Liquid cooled
Certification	• Safety: IEC 62477-1, UL1741, CSA C22.2No. 107.1 • EMC: FCC Part 15, IEC 61000-6-2, IEC 61000-6-4 • Grid codes as applicable

Approvals/Certifications/Tests

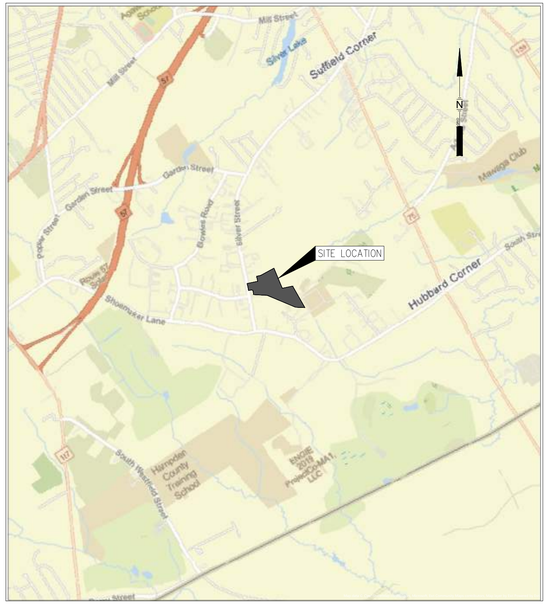
The Fluence Smartstack shall be certified to UL 9540 and tested as per IEC61439.2, and UL9540A at cell, module, and unit level.

© 2025 by Fluence Energy, LLC. All rights reserved.
Any reproduction, modification, or electronic transmission of this publication requires the prior written authorization of Fluence Energy, LLC. Trademarks, where noted, are registered trademarks of Fluence Energy, LLC, in the United States and other countries. All other product and company names are trademarks of their respective holders. The information, specifications, and illustrations provided in this document are accurate and reliable at the time of publication. Fluence continually reviews and modifies the content of this document where deemed necessary or practical. Fluence further reserves the right, in its discretion, to change the specifications and designs at any time, provided that such change complies with applicable laws, regulations, and good industry practice as of the date of such change. Fluence shall have no obligation to make the same or similar changes to products previously sold.

ATTACHMENT F – PLANS AND RENDERINGS

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

TITLE	DWG NO
COVER SHEET	AW1-C-000
EXISTING CONDITIONS PLAN	AW1-C-200
LAYOUT PLAN (SHEET 1 OF 2)	AW1-C-201-1
LAYOUT PLAN (SHEET 2 OF 2)	AW1-C-201-2
GRADING PLAN (SHEET 1 OF 2)	AW1-C-202-1
GRADING PLAN (SHEET 2 OF 2)	AW1-C-202-2
UTILITY PLAN	AW1-C-203
LIGHTING AND SECURITY PLAN	AW1-C-204
EROSION AND SEDIMENT CONTROL DETAILS	AW1-C-300
SITE DETAILS	AW1-C-301
SIGN DETAILS	AW1-C-302
CHAIN LINK FENCE DETAILS	AW1-C-303
POWER ONE-LINE	AW1-E-100
115 KV RELAY ONE-LINE	AW1-E-200
34.5 KV BUS 1 RELAY ONE-LINE	AW1-E-201
34.5 KV BUS 2 RELAY ONE-LINE	AW1-E-202
SUBSTATION GENERAL ARRANGEMENT	AW1-P-100
COLLECTION POWER ONE-LINE	AW1-U-100
COLLECTION GENERAL ARRANGEMENT	AW1-U-200
TRENCH DETAILS	AW1-U-600
TRENCHLESS INSTALLATION DETAILS	AW1-U-601



0 1000 2000 4000

1 INCH = 2000 FEET

SME
SEVEE & MAHER ENGINEERS

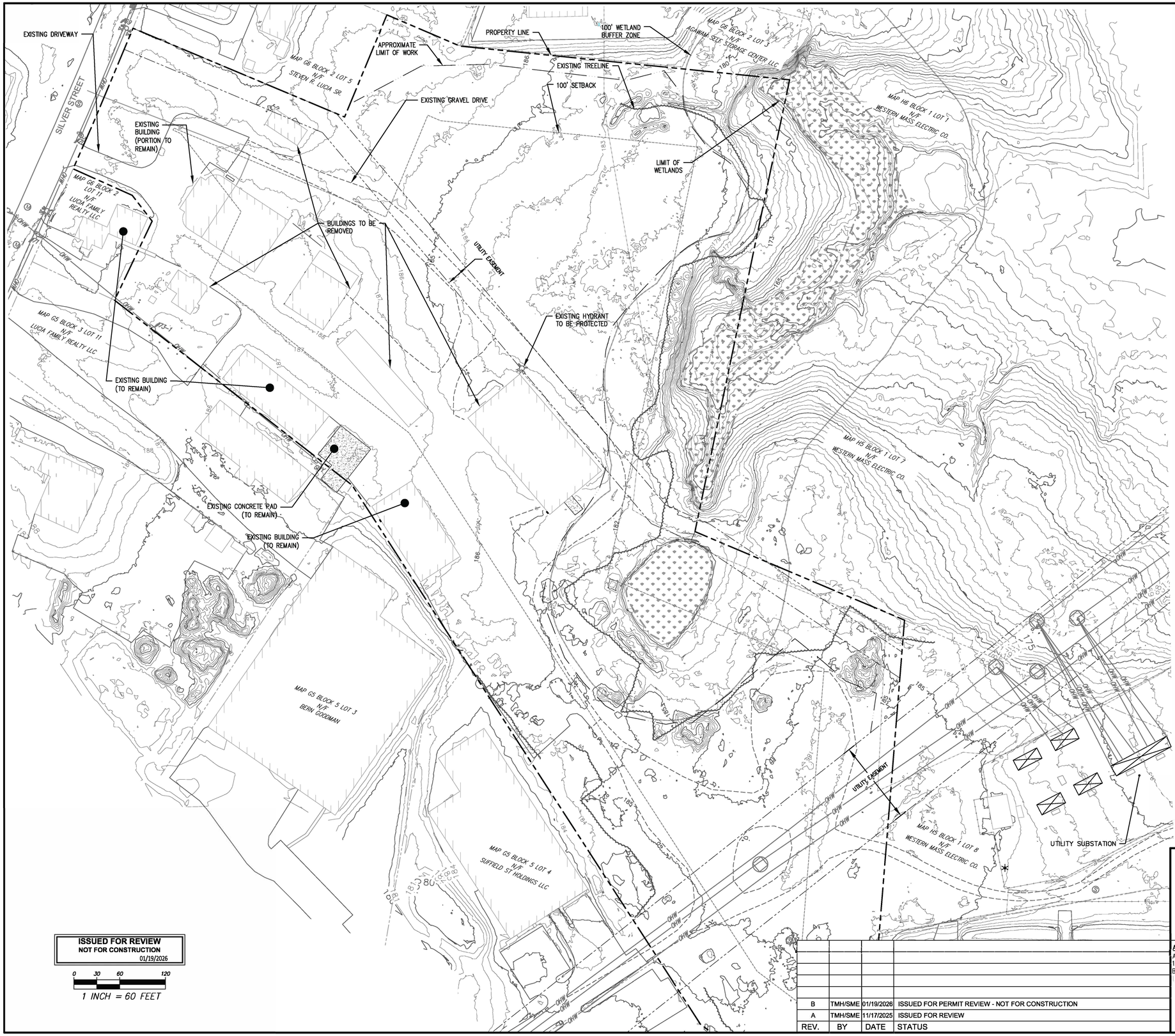
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • smemaine.com

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

APPLICANT:
AGAWAM ENERGY CENTER, LLC
C/O MICHAEL ALVAREZ
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

PROJECT: 250741
DATE: 01-19-2026
REVISION: B
DRAWING: AW1-C-000



LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- LIMIT OF WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FOOT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- EXISTING TREE LINE
- LIMIT OF WORK

NOTES

1. EXISTING CONDITIONS SURVEY CONDUCTED BY MILLSTONE LLC.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 30 60 120
1 INCH = 60 FEET

REV.	BY	DATE	STATUS
B	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
A	TMH/SME	11/17/2025	ISSUED FOR REVIEW

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
11-20-25

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

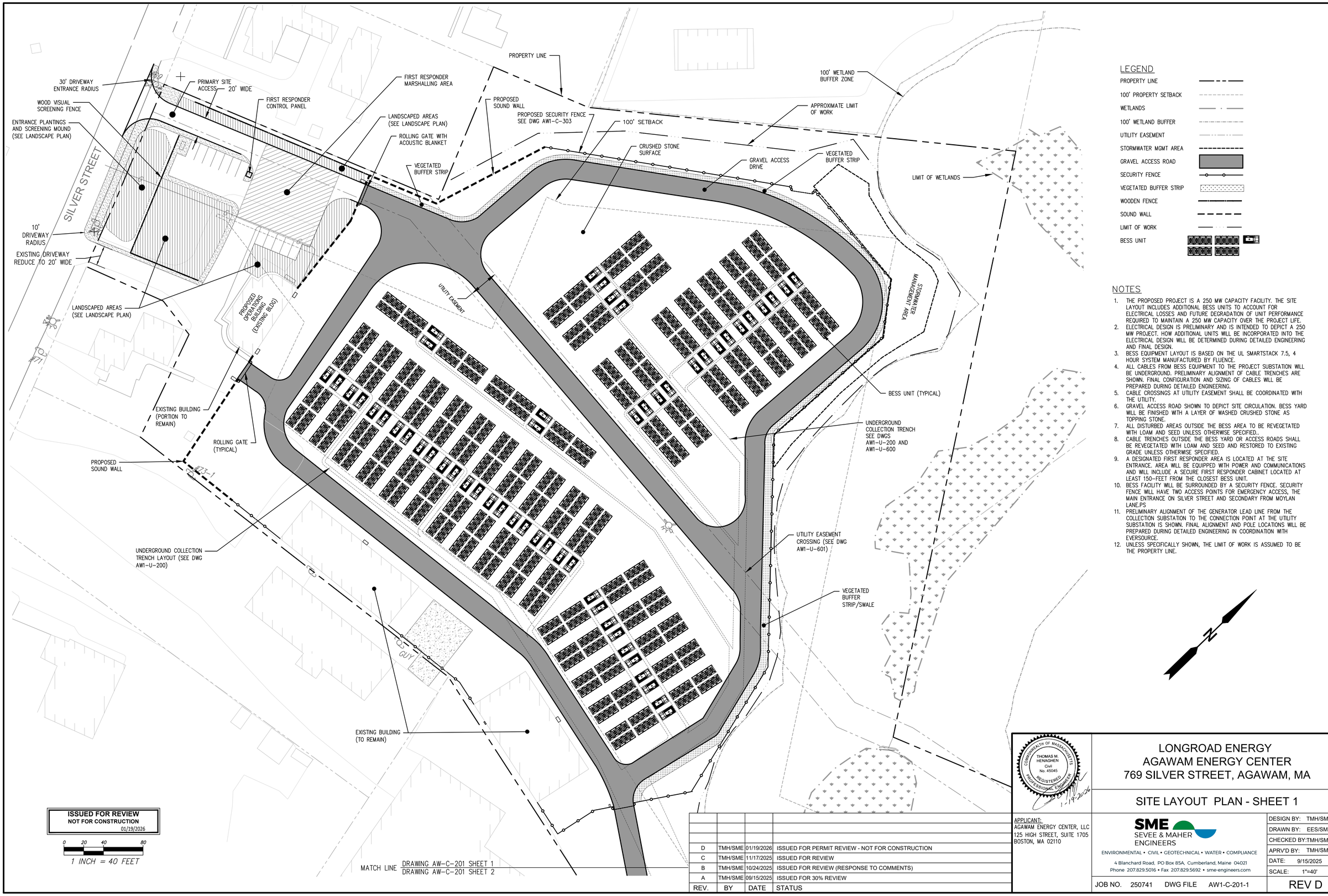
EXISTING CONDITIONS AND DEMO PLAN

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-200 REV B



LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- STORMWATER MGMT AREA
- GRAVEL ACCESS ROAD
- SECURITY FENCE
- VEGETATED BUFFER STRIP
- WOODEN FENCE
- SOUND WALL
- LIMIT OF WORK
- BESS UNIT

NOTES

1. THE PROPOSED PROJECT IS A 250 MW CAPACITY FACILITY. THE SITE LAYOUT INCLUDES ADDITIONAL BESS UNITS TO ACCOUNT FOR ELECTRICAL LOSSES AND FUTURE DEGRADATION OF UNIT PERFORMANCE REQUIRED TO MAINTAIN A 250 MW CAPACITY OVER THE PROJECT LIFE.
2. ELECTRICAL DESIGN IS PRELIMINARY AND IS INTENDED TO DEPICT A 250 MW PROJECT. HOW ADDITIONAL UNITS WILL BE INCORPORATED INTO THE ELECTRICAL DESIGN WILL BE DETERMINED DURING DETAILED ENGINEERING AND FINAL DESIGN.
3. BESS EQUIPMENT LAYOUT IS BASED ON THE UL SMARTSTACK 7.5, 4 HOUR SYSTEM MANUFACTURED BY FLUENCE.
4. ALL CABLES FROM BESS EQUIPMENT TO THE PROJECT SUBSTATION WILL BE UNDERGROUND. PRELIMINARY ALIGNMENT OF CABLE TRENCHES ARE SHOWN. FINAL CONFIGURATION AND SIZING OF CABLES WILL BE PREPARED DURING DETAILED ENGINEERING.
5. CABLE CROSSINGS AT UTILITY EASEMENT SHALL BE COORDINATED WITH THE UTILITY.
6. GRAVEL ACCESS ROAD SHOWN TO DEPICT SITE CIRCULATION. BESS YARD WILL BE FINISHED WITH A LAYER OF WASHED CRUSHED STONE AS TOPPING STONE.
7. ALL DISTURBED AREAS OUTSIDE THE BESS AREA TO BE REVEGETATED WITH LOAM AND SEED UNLESS OTHERWISE SPECIFIED..
8. CABLE TRENCHES OUTSIDE THE BESS YARD OR ACCESS ROADS SHALL BE REVEGETATED WITH LOAM AND SEED AND RESTORED TO EXISTING GRADE UNLESS OTHERWISE SPECIFIED.
9. A DESIGNATED FIRST RESPONDER AREA IS LOCATED AT THE SITE ENTRANCE. AREA WILL BE EQUIPPED WITH POWER AND COMMUNICATIONS AND WILL INCLUDE A SECURE FIRST RESPONDER CABINET LOCATED AT LEAST 150-FEET FROM THE CLOSEST BESS UNIT.
10. BESS FACILITY WILL BE SURROUNDED BY A SECURITY FENCE. SECURITY FENCE WILL HAVE TWO ACCESS POINTS FOR EMERGENCY ACCESS, THE MAIN ENTRANCE ON SILVER STREET AND SECONDARY FROM MOYLAN LANE.PS
11. PRELIMINARY ALIGNMENT OF THE GENERATOR LEAD LINE FROM THE COLLECTION SUBSTATION TO THE CONNECTION POINT AT THE UTILITY SUBSTATION IS SHOWN. FINAL ALIGNMENT AND POLE LOCATIONS WILL BE PREPARED DURING DETAILED ENGINEERING IN COORDINATION WITH EVERSOURCE.
12. UNLESS SPECIFICALLY SHOWN, THE LIMIT OF WORK IS ASSUMED TO BE THE PROPERTY LINE.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
D	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/2025	ISSUED FOR REVIEW
B	TMH/SME	10/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)
A	TMH/SME	09/15/2025	ISSUED FOR 30% REVIEW

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-26

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

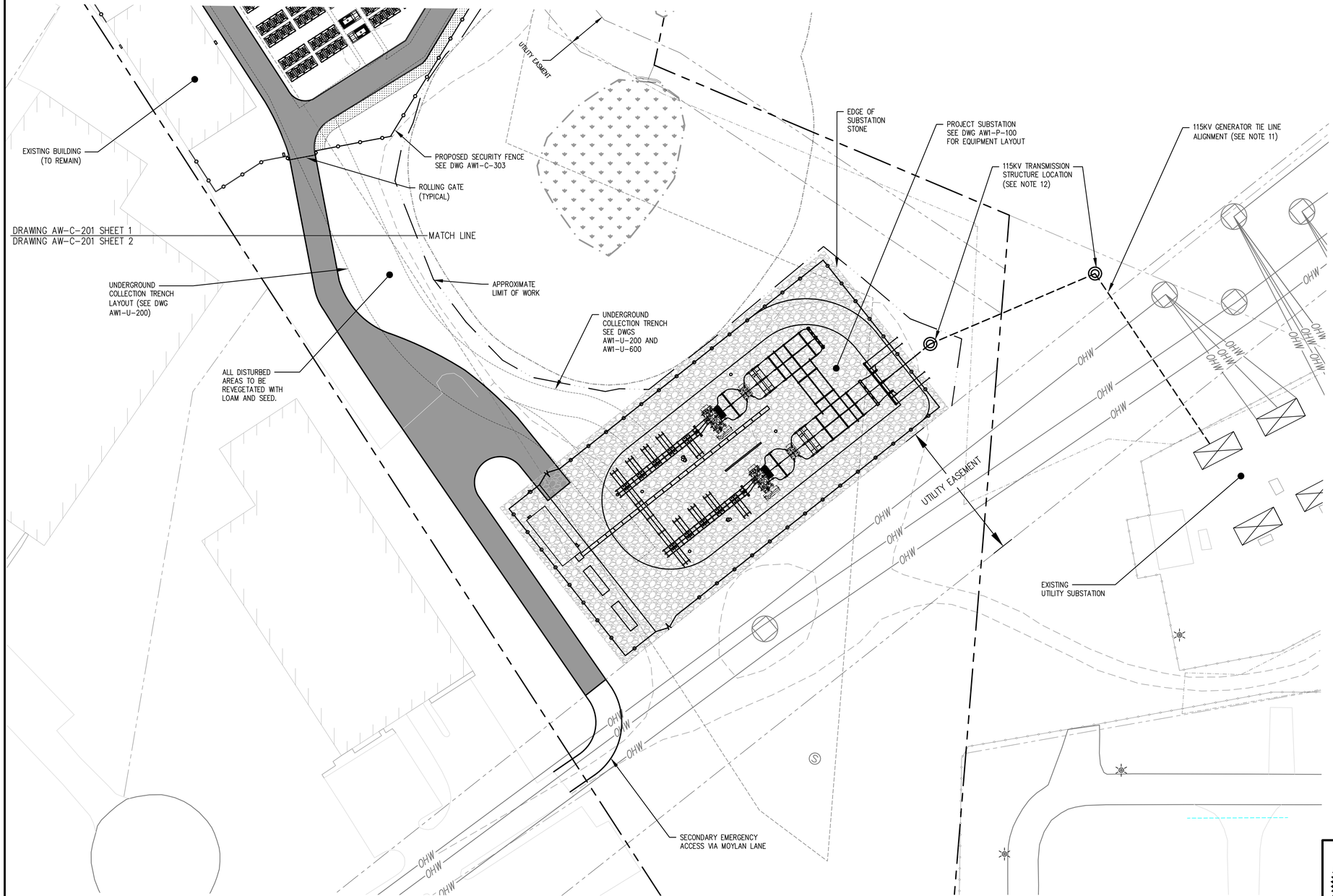
SITE LAYOUT PLAN - SHEET 1

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-201-1 REV D



LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- GRAVEL ACCESS ROAD
- VEGETATED BUFFER STRIP
- SECURITY FENCE
- SOUND WALL
- LIMIT OF WORK
- BESS UNIT

NOTES

1. THE PROPOSED PROJECT IS A 250 MW CAPACITY FACILITY. THE SITE LAYOUT INCLUDES ADDITIONAL BESS UNITS TO ACCOUNT FOR ELECTRICAL LOSSES AND FUTURE DEGRADATION OF UNIT PERFORMANCE REQUIRED TO MAINTAIN A 250 MW CAPACITY OVER THE PROJECT LIFE.
2. ELECTRICAL DESIGN IS PRELIMINARY AND IS INTENDED TO DEPICT A 250 MW PROJECT. HOW ADDITIONAL UNITS WILL BE INCORPORATED INTO THE ELECTRICAL DESIGN WILL BE DETERMINED DURING DETAILED ENGINEERING AND FINAL DESIGN.
3. BESS EQUIPMENT LAYOUT IS BASED ON THE UL SMARTSTACK 7.5, 4 HOUR SYSTEM MANUFACTURED BY FLUENCE.
4. ALL CABLES FROM BESS EQUIPMENT TO THE PROJECT SUBSTATION WILL BE UNDERGROUND. PRELIMINARY ALIGNMENT OF CABLE TRENCHES ARE SHOWN. FINAL CONFIGURATION AND SIZING OF CABLES WILL BE PREPARED DURING DETAILED ENGINEERING.
5. CABLE CROSSINGS AT UTILITY EASEMENT SHALL BE COORDINATED WITH THE UTILITY.
6. GRAVEL ACCESS ROAD SHOWN TO DEPICT SITE CIRCULATION. BESS YARD WILL BE FINISHED WITH A LAYER OF WASHED CRUSHED STONE AS TOPPING STONE.
7. ALL DISTURBED AREAS OUTSIDE THE BESS AREA TO BE REVEGETATED WITH LOAM AND SEED UNLESS OTHERWISE SPECIFIED..
8. CABLE TRENCHES OUTSIDE THE BESS YARD OR ACCESS ROADS SHALL BE REVEGETATED WITH LOAM AND SEED AND RESTORED TO EXISTING GRADE UNLESS OTHERWISE SPECIFIED.
9. A DESIGNATED FIRST RESPONDER AREA IS LOCATED AT THE SITE ENTRANCE. AREA WILL BE EQUIPPED WITH POWER AND COMMUNICATIONS AND WILL INCLUDE A SECURE FIRST RESPONDER CABINET LOCATED AT LEAST 150-FEET FROM THE CLOSEST BESS UNIT.
10. BESS FACILITY WILL BE SURROUNDED BY A SECURITY FENCE. SECURITY FENCE WILL HAVE TWO ACCESS POINTS FOR EMERGENCY ACCESS, THE MAIN ENTRANCE ON SILVER STREET AND SECONDARY FROM MOYLAN LANE.PS
11. PRELIMINARY ALIGNMENT OF THE GENERATOR LEAD LINE FROM THE COLLECTION SUBSTATION TO THE CONNECTION POINT AT THE UTILITY SUBSTATION IS SHOWN. FINAL ALIGNMENT MAY BE ADJUSTED BASED ON DETAILED ENGINEERING AND COORDINATION WITH EVERSOURCE.
12. THE ANTICIPATED CENTER POINT OF TRANSMISSION STRUCTURE ARE SHOWN. THE FINAL STRUCTURE LOCATION AND CONFIGURATION (HEIGHT, SIZE, TYPE) WILL BE DETERMINED BASED ON DETAILED ENGINEERING AND COORDINATION WITH EVERSOURCE.
13. UNLESS SPECIFICALLY SHOWN, THE LIMIT OF WORK IS ASSUMED TO BE THE PROPERTY LINE

N

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
D	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/2025	ISSUED FOR REVIEW
B	TMH/SME	10/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)
A	TMH/SME	09/15/2025	ISSUED FOR 30% REVIEW

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1/19/2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

SITE LAYOUT PLAN - SHEET 2

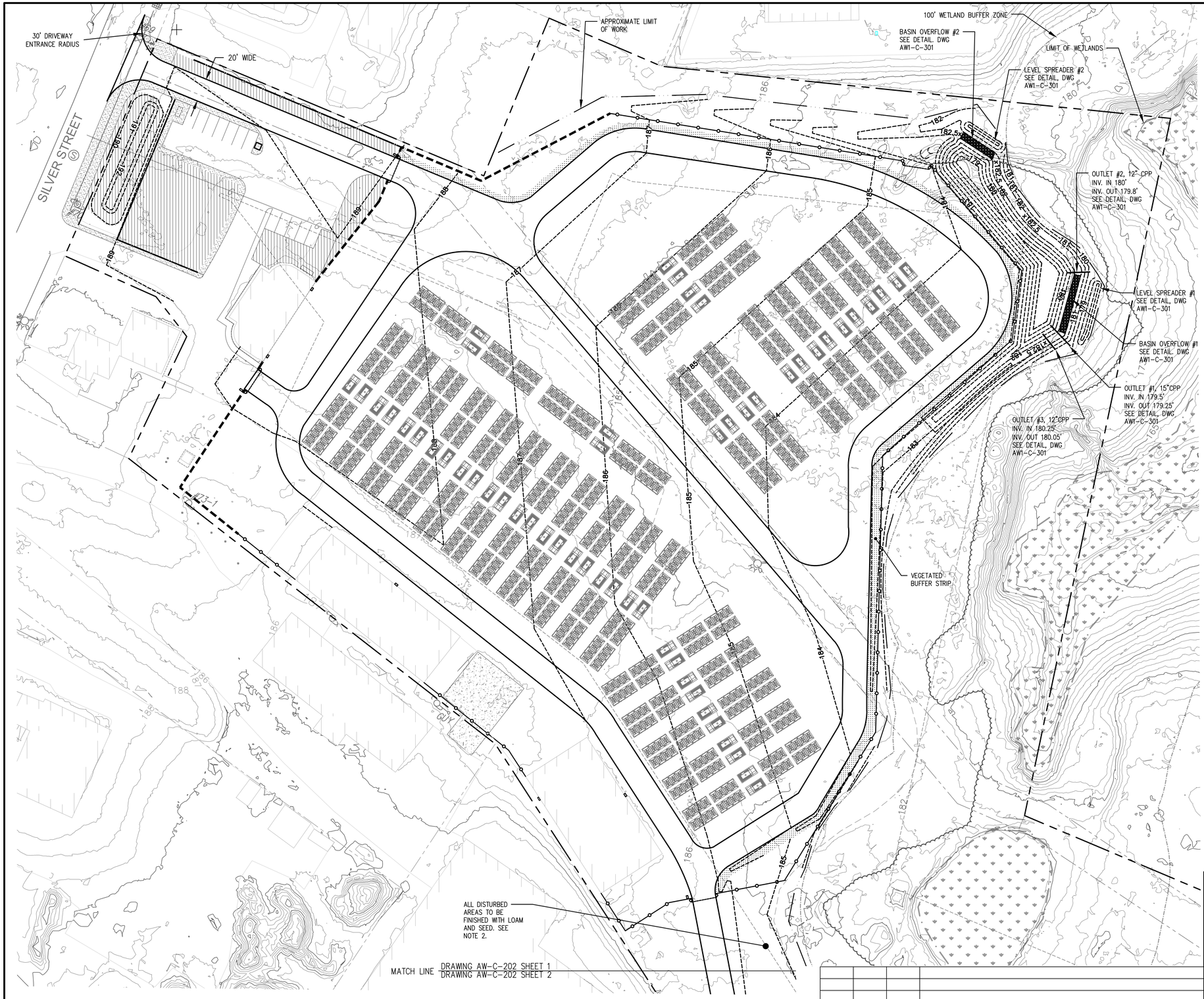
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-201-2

REV D



LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- PROPOSED CONTOURS — 185
- PROPOSED SPOT ELEV. x 186.5
- GRAVEL ACCESS ROAD
- VEGETATED BUFFER STRIP
- SECURITY FENCE
- SOUND WALL
- LIMIT OF WORK

NOTES:

1. ALL DISTURBED AREAS TO BE RESTORED AND REVEGETATED WITH LOAM AND SEED UNLESS SPECIFIED OTHERWISE.
2. ANY CABLE TRENCHES OUTSIDE OF BESS YARD AND ACCESS ROAD SHALL BE REVEGETATED WITH LOAM AND SEED AND RESTORED TO EXISTING GRADE.
3. EROSION CONTROLS SHALL BE INSTALLED AND MAINTAINED ALONG THE PERIMETER OF THE WORK AREA IN ACCORDANCE WITH THE EROSION CONTROL NOTES AND DETAILS.

N

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	11/17/2025	ISSUED FOR REVIEW
A	TMH/SME	09/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

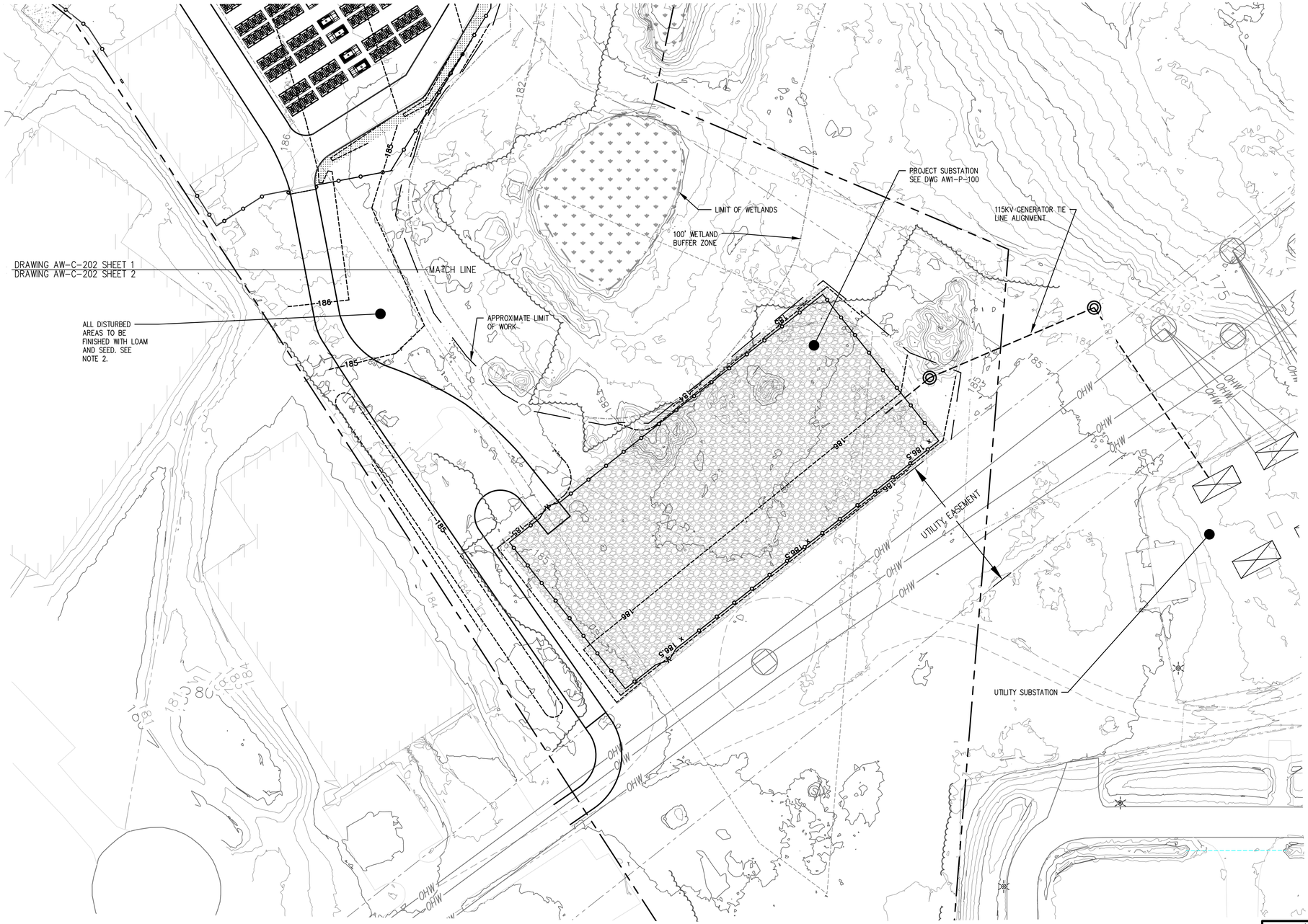
GRADING PLAN - SHEET 1

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-202-1 REV C



LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- PROPOSED CONTOURS — 185
- PROPOSED SPOT ELEV. — x 186.5
- GRAVEL ACCESS ROAD
- VEGETATED BUFFER STRIP
- SECURITY FENCE
- LIMIT OF WORK

N

NOTES:

1. ALL DISTURBED AREAS TO BE RESTORED AND REVEGETATED WITH LOAM AND SEED UNLESS SPECIFIED OTHERWISE.
2. ANY CABLE TRENCHES OUTSIDE OF BESS YARD AND ACCESS ROAD SHALL BE REVEGETATED WITH LOAM AND SEED AND RESTORED TO EXISTING GRADE.
3. EROSION CONTROLS SHALL BE INSTALLED AND MAINTAINED ALONG THE PERIMETER OF THE WORK AREA IN ACCORDANCE WITH THE EROSION CONTROL NOTES AND DETAILS.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	11/17/2025	ISSUED FOR REVIEW
A	TMH/SME	09/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

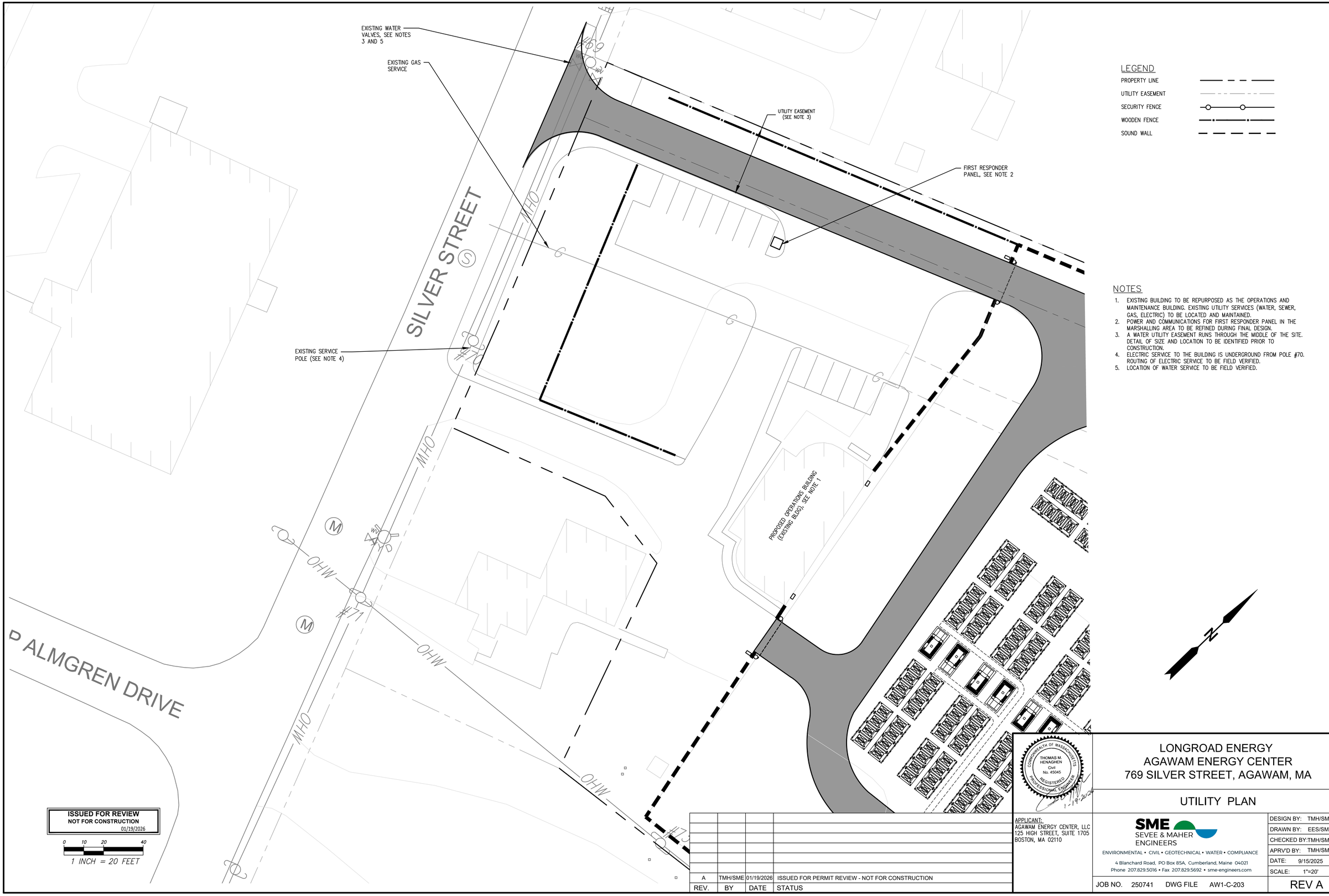
GRADING PLAN - SHEET 2

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-202-2 REV C



NOTES

1. EXISTING BUILDING TO BE REPURPOSED AS THE OPERATIONS AND MAINTENANCE BUILDING. EXISTING UTILITY SERVICES (WATER, SEWER, GAS, ELECTRIC) TO BE LOCATED AND MAINTAINED.
2. POWER AND COMMUNICATIONS FOR FIRST RESPONDER PANEL IN THE MARSHALLING AREA TO BE REFINED DURING FINAL DESIGN.
3. A WATER UTILITY EASEMENT RUNS THROUGH THE MIDDLE OF THE SITE. DETAIL OF SIZE AND LOCATION TO BE IDENTIFIED PRIOR TO CONSTRUCTION.
4. ELECTRIC SERVICE TO THE BUILDING IS UNDERGROUND FROM POLE #70. ROUTING OF ELECTRIC SERVICE TO BE FIELD VERIFIED.
5. LOCATION OF WATER SERVICE TO BE FIELD VERIFIED.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

UTILITY PLAN

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=20'

JOB NO. 250741 DWG FILE AW1-C-203 REV A

PROPERTY LINE

SILVER STREET

MAP G6 BLOCK 2 LOT 5
N/F
STEVEN R. LUCIA SR.

MAP G6 BLOCK 2 LOT 3
N/F
AGAWAM SELF STORAGE CENTER LLC

MAP H6 BLOCK 1 LOT 1
N/F
WESTERN MASS ELECTRIC CO.

MAP G6 BLOCK 2 LOT 11
N/F
LUCIA FAMILY REALTY LLC

MAP G5 BLOCK 3 LOT 11
N/F
LUCIA FAMILY REALTY LLC

MAP H5 BLOCK 1 LOT 7
N/F
WESTERN MASS ELECTRIC CO.

MAP G5 BLOCK 5 LOT 3
N/F
BERN GOODMAN

MAP G5 BLOCK 5 LOT 4
N/F
SUFFIELD ST HOLDINGS LLC

MAP H5 BLOCK 1 LOT 8
N/F
WESTERN MASS ELECTRIC CO.

UTILITY EASEMENT

UTILITY SUBSTATION

SL1 SL2 SL3 SL4 SL5 SL6 SL7 SL8 SL9 SL10

CH1 CH2 XL30

OHW UGT

LIGHTING NOTES:

1. ALL FLOOD LIGHTS IN THE SUBSTATION (YL-1, YL-2 AND YL-3) ARE TASK LIGHTS AND SHALL BE NORMALLY IN THE "OFF" POSITION.
2. LIGHTS CH1 AND CH2 ARE PROVIDED BY THE CONTROL ENCLOSURE VENDORS.
3. SECURITY LIGHTS (SL) SHALL BE POLE MOUNTED NEAR GATES OR BUILDING MOUNTED. ALL LIGHTS WILL BE FULLY SHIELDED/FULL CUTOFF LIGHTING.

CH1 = CONTROL HOUSE LIGHTING
YL1 = YARD LIGHTING (NORMALLY OFF)
SL1 = SECURITY LIGHTING

SIGNAGE NOTES:

1. REFER TO C-303 SIGN DETAILS.
2. HIGH VOLTAGE WARNING SIGNS SHALL BE PLACED ON EVERY GATE, AT LEAST 25' FROM ANY FENCE CORNER OR TERMINATION, AND EVERY 50' ELSEWHERE. SIGNS SHOULD BE MOUNTED AT APPROXIMATELY 5' ABOVE FINISH GRADE. SIGNS SHALL BE MOUNTED ON THE OUTSIDE WITH ANTI-THEFT FENCE BRACKETS.
3. SITE INFO/911 SIGNS SHALL BE LOCATED ON NEXT TO GATES TO THE SUBSTATION AND BESS YARDS.

(W) HIGH VOLTAGE WARNING SIGN: 20"x14" "WARNING HIGH VOLTAGE"

[A] SITE INFO/911 SIGN: 36"x24" WITH SITE ADDRESS AND EMERGENCY PHONE NUMBER

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 30 60 120
1 INCH = 60 FEET

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW-NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

LIGHTING AND SECURITY PLAN

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	01/16/2026
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-204 REV A

EROSION CONTROL NOTES:

A. GENERAL

1. All soil erosion and sediment control will be done in accordance with the Massachusetts Erosion and Sediment Control Guidelines for Urban Suburban Areas, latest edition.

2. The site Contractor (to be determined) will be responsible for the inspection and repair/replacement/maintenance of all erosion control measures, disturbed areas, material storage areas, and vehicle access points until all disturbed areas are stabilized.

3. Disturbed areas will be permanently stabilized within 7 days of final grading. Disturbed areas not to be worked upon within 14 days of disturbance will be temporarily stabilized within 7 days of the disturbance.

4. In all areas, removal of trees, bushes and other vegetation, as well as disturbance of topsoil will be kept to a minimum while allowing proper site operations.

5. Any suitable topsoil will be stripped and stockpiled for reuse as directed by the Owner. Topsoil will be stockpiled in a manner such that natural drainage is not obstructed and no off-site sediment damage will result. In any event, stockpiles will not be located within 100 feet of wetlands and will be at least 50 feet upgradient of the stockpile's perimeter silt fence. The sideslopes of the topsoil stockpile will not exceed 2:1. Silt fence will be installed around the perimeter of all topsoil stockpiles. Topsoil stockpiles will be surrounded with siltation fencing and will be temporarily seeded with Aroostook rye, annual or perennial ryegrass within 7 days of formation, or temporarily mulched.

6. Winter excavation and earthwork will be completed so as to minimize exposed areas while satisfactorily completing the project. Limit exposed areas to those areas in which work is to occur during the following 15 days and that can be mulched in one day. All areas will be considered denuded until the subbase gravel is installed in roadway areas or the areas of future loam and seed have been loamed, seeded, and mulched.

   Install any added measures necessary to control erosion/sedimentation. The particular measure used will be dependent upon site conditions, the size of the area to be protected, and weather conditions.

   To minimize areas without erosion control protection, continuation of earthwork operations on additional areas will not begin until the exposed soil surface on the area being worked has been stabilized.

B. TEMPORARY MEASURES

1. STABILIZED CONSTRUCTION ENTRANCE/EXIT

   A crushed stone stabilized construction entrance/exit will be placed at any point of vehicular access to the site, in accordance with the detail shown on this sheet.

2. SILT FENCE

   a. Silt fence will be installed prior to all construction activity, where soil disturbance may result in erosion. Silt fence will be erected at locations shown on the plans and/or downgradient of all construction activity.

   b. Silt fences will be removed when they have served their useful purpose, but not before the upgradient areas have been permanently stabilized.

   c. Silt fences will be inspected immediately after each rainfall and at least daily during prolonged rainfall. They will be inspected if there are any signs of erosion or sedimentation below them. Any required repairs will be made immediately. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind them, they will be replaced with a temporary crushed stone check dam.

   d. Sediment deposits will be removed after each storm event if significant build-up has occurred or if deposits exceed half the height of the barrier.

3. STONE CHECK DAMS

   Stone check dams will be installed in grass-lined swales and ditches during construction. Remove stone check dams when they have served their useful purpose, but not before upgradient areas have been permanently stabilized.

4. EROSION CONTROL MIX SEDIMENT BARRIER

   a. Where approved, erosion control mix sediment barriers may be used as a substitute for silt fence. See the details in this drawing set for specifications.

   b. Rock Filter Berms: To provide more filtering capacity or to act as a velocity check dam, a berm's center can be composed of clean crushed rock ranging in size from the french drain stone to riprap.

5. TEMPORARY SEEDING

   Stabilize disturbed areas that will not be brought to final grade and reduce problems associated with mud and dust production from exposed soil surface during construction with temporary vegetation.

6. TEMPORARY MULCHING

   Use temporary mulch in the following locations and/or circumstances:

   - In sensitive areas (within 100 feet of streams, wetlands and in lake watersheds) temporary mulch will be applied within 7 days of exposing spill or prior to any storm event.
   - Apply temporary mulch within 14 days of disturbance or prior to any storm event in all other areas.
   - Areas which have been temporarily or permanently seeded will be mulched immediately following seeding.
   - Areas which cannot be seeded within the growing season will be mulched for over-winter protection and the area will be seeded at the beginning of the growing season.
   - Mulch can be used in conjunction with tree, shrub, vine, and ground cover plantings.
   - Mulch anchoring will be used on slopes greater than 5 percent in late fall (past October 15), and over-winter (October 15 - April 15).

   The following materials may be used for temporary mulch:

   a. Hay or Straw material shall be air-dried, free of seeds and coarse material. Apply 2 bales/1,000 sf or 1.5 to 2 tons/acre to cover 90% of ground surface.

   b. Erosion Control Mix: It can be used as a stand-alone reinforcement:
      - on slopes 2 horizontal to 1 vertical or less;
      - on frozen ground or forested areas; and
      - at the edge of gravel parking areas and areas under construction.

   c. Erosion control mix alone is not suitable:
      - on slopes with groundwater seepage;
      - at low points with concentrated flows and in gullies;
      - at the bottom of steep perimeter slopes exceeding 100 feet in length;
      - below culvert outlet aprons; and around catch basins and closed storm systems.

   d. Chemical Mulches and Soil Binders: Wide ranges of synthetic spray-on materials are marketed to protect the soil surface. These are emulsions that are mixed with water and applied to the soil. They may be used alone, but most often are used to hold wood fiber, hydro-mulches or straw to the soil surface.

   e. Erosion Control Blankets and Mats: Mats are manufactured combinations of mulch and netting designed to retain soil moisture and modify soil temperature. During the growing season (April 15 to October 15) use mats indicated on drawings or North American Green (NAG) S75 (or mulch and netting) on:
      - the base of grassed waterways;
      - steep slopes (15 percent or greater); and
      - any disturbed soil within 100 feet of lakes, streams, or wetlands.

   During the late fall and winter (October 15 to April 15) use heavy grade mats indicated on drawings for all areas.

C. TEMPORARY DUST CONTROL

To prevent the blowing and movement of dust from exposed soil surfaces, and reduce the presence of dust, use water or calcium chloride to control dusting by preserving the moisture level in the road surface materials.

D. CONSTRUCTION DE-WATERING

1. Water from construction de-watering operations shall be cleaned of sediment before reaching wetlands, water bodies, streams or site boundaries. Utilize temporary sediment basins, erosion control soil filter berms backed by staked hay bales, A Dirt Bag 55" sediment filter bag by ACF Environmental, or other approved Best Management Practices (BMP's).

2. In sensitive areas near streams or ponds, discharge the water from the de-watering operation into a temporary sediment basin created by a surrounding filter berm of uncompacted erosion control mix immediately backed by staked hay bales (see the site details). Locate the temporary sediment basin at lease 100 feet from the nearest water body, such that the filtered water will flow through undisturbed vegetated soil areas prior to reaching the water body or property line.

E. PERMANENT MEASURES

1. Riprapped Aprons: All storm drain pipe outlets and the inlet and outlet of culverts will have riprap aprons to protect against scour and deterioration.

2. Topsoil, Seed, and Mulch: All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.) will be loamed, limed, fertilized, seeded, and mulched.

   Seeded Preparation: Use stockpiled materials spread to the depths shown on the plans, if available. Approved topsoil substitutes may be used. Grade the site as needed.

   a. Seeding will be completed by August 15 of each year. Late season seeding may be done between August 15 and October 15. Areas not seeded or which do not obtain satisfactory growth by October 15, will be seeded with Aroostook Rye or mulched. After November 1, or the first killing frost, disturbed areas will be seeded at double the specified application rates, mulched, and anchored.

   PERMANENT SEEDING SPECIFICATIONS OUTSIDE OF BESS YARD FOOTPRINT

Mixture:	Roadside (lbs/acre)	Lawn (lbs/acre)
Kentucky Bluegrass	20	55
White Clover	5	0
Creeping Red Fescue	20	55
Perennial Ryegrass	5	15

   b. Mulch in accordance with specifications for temporary mulching.

   c. If permanent vegetated stabilization cannot be established due to the season of the year, all exposed and disturbed areas not to undergo further disturbance are to have dormant seeding applied and be temporarily mulched to protect the site.

   d. Any fertilizer used on the site to be free of phosphorous.

3. Ditches and Channels: All ditches on-site will be lined with North American Green S75 erosion control mesh (or an approved equal) upon installation of loam and seed.

F. WINTER CONSTRUCTION AND STABILIZATION

1. Natural Resource Protection: During winter construction, a double-row of sediment barriers (i.e., silt fence backed with hay bales or erosion control mix) will be placed between any natural resource and the disturbed area. Projects crossing the natural resource will be protected a minimum distance of 100 feet on either side from the resource.

2. Sediment Barriers: During frozen conditions, sediment barriers may consist of erosion control mix berms or any other recognized sediment barriers as frozen soil prevents the proper installation of hay bales or silt fences.

3. Mulching:

   - All areas will be considered to be denuded until seeded and mulched. Hay and straw mulch will be applied at a rate of twice the normal accepted rate.
   - Mulch will not be spread on top of snow.
   - After each day of final grading, the area will be properly stabilized with anchored hay or straw or erosion control matting.
   - Between the dates of November 1 and April 15, all mulch will be anchored by either mulch netting, emulsion chemical, tracking or wood cellulose fiber.

5. Soil Stockpiling: Stockpiles of soil or subsoil will be mulched for over-winter protection with hay or straw at twice the normal rate or with a 4-inch layer of erosion control mix. This will be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpiles shall not be placed (even covered with mulch) within 100 feet from any natural resources. Sediment barriers should be installed downgradient of stockpiles. Stormwater shall be directed away from stockpiles.

6. Seeding: Dormant seeding may be placed prior to the placement of mulch or erosion control blankets. If dormant seeding is used for the site, all disturbed areas will receive 4 inches of loam and seed at an application rate of three times the rate for permanent seeding. All areas seeded during the winter will be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75 percent catch) will be revegetated by replacing loam, seed, and mulch.

   If dormant seeding is not used for the site, all disturbed areas will be revegetated in the spring.

7. Maintenance: Maintenance measures will be applied as needed during the entire construction season. After each rainfall, snow storm, or period of thawing and runoff, and at least once a week, the site Contractor will perform a visual inspection of all installed erosion control measures and perform repairs as needed to ensure their continuous function.

8. Identified repairs will be started no later than the end of the net work day and be completed within seven (7) calendar days.

   Following the temporary and/or final seeding and mulching, the Contractor will, in the spring, inspect and repair any damages and/or bare spots. An established vegetative cover means a minimum of 85 to 90 percent of areas vegetated with vigorous growth.

G. OVER-WINTER CONSTRUCTION EROSION CONTROL MEASURES

1. Stabilization of Disturbed Soil: By October 15, all disturbed soils on areas having a slope less than 15 percent will be seeded and mulched. If the Contractor fails to stabilize these soils by this date, then the Contractor shall stabilize the soil for late fall and winter, by using either temporary seeding or mulching.

2. Stabilization of Disturbed Slopes: All slopes to be vegetated will be completed by October 15. The Owner will consider any area having a grade greater than 15 percent (6.5H:1V) to be a slope. Slopes not vegetated by October 15 will receive one of the following actions to stabilize the slope for late fall and winter:

   a. Stabilize the soil with temporary vegetation and erosion control mesh.
   b. Stabilize the slope with erosion control mix.
   c. Stabilize the slope with stone riprap.
   d. Slopes steeper than 1.5:1 are prohibited.

3. Stabilization of Ditches and Channels: All stone-lined ditches and channels to be used to convey runoff through the winter will be constructed and stabilized by November 15. Grass-lined ditches and channels will be complete by September 15. Grass-lined ditches not stabilized by September 15 shall be lined with either sod or riprap.

H. MAINTENANCE PLAN

1. Routine Maintenance: Inspection will be performed as outlined in the project's Erosion Control Plan. Inspection will be by a qualified person during wet weather to ensure that the facility performs as intended. Inspection priorities will include checking erosion controls for accumulation of sediments.

I. Housekeeping

1. Spill prevention. Controls must be used to prevent pollutants from being discharged from materials on site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.

2. Groundwater protection. During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

3. Fugitive sediment and dust. Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control. If off-site tracking occurs roadways should be swept immediately and no loss once a week and prior to significant storm events.

4. Debris and other materials. Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

5. Trench or foundation de-watering. Trench de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the department.

6. Authorized Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

   (a) Discharges from firefighting activity;

   (b) Fire hydrant flushings;

   (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

   (d) Dust control runoff in accordance with permit conditions and section I3;

   (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

   (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

   (g) Uncontaminated air conditioning or compressor condensate;

   (h) Uncontaminated groundwater or spring water;

   (i) Foundation or footer drain-water where flows are not contaminated;

   (j) Uncontaminated excavation dewatering (see requirements in section I5);

   (k) Potable water sources including waterline flushings; and

   (l) Landscape irrigation.

7. Unauthorized non-stormwater discharges. The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non stormwater, other than those discharges in compliance with section I6. Specifically, the Department's approval does not authorize discharges of the following:

   (a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

   (b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

   (c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

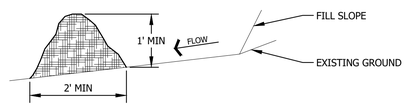
   (d) Toxic or hazardous substances from a spill or other release.

8. Additional requirements. Additional requirements may be applied on a site-specific basis.

J. CONSTRUCTION SEQUENCE

In general, the expected sequence of construction for each phase is provided below.

- Mobilization
- Install temporary erosion control measures
- Clearing and grubbing
- Site Grading
- Install gravel access road
- Install site utilities and BESS units
- Install fence
- Site stabilization, loam and seed, and landscaping
- Remove temporary erosion control measures



EROSION CONTROL MIX SEDIMENT BARRIER

NOTES:

1. EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR FLUME GRIT AND FRAGMENTED WOOD GENERATED FROM WATER-FLUME LOG HANDLING SYSTEMS. WOOD CHIPS, GROUND CONSTRUCTION DEBRIS, REPROCESSED WOOD PRODUCTS OR BARK CHIPS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX. EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH.

   THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
   A. ORGANIC MATERIAL: BETWEEN 20% - 100% (DRY WEIGHT BASIS)
   B. PARTICLE SIZE: BY WEIGHT, 100% PASSING 6" SCREEN, 70-85% PASSING 0.75" SCREEN
   C. THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
   D. LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
   E. SOLUBLE SALTS CONTENT SHALL BE LESS THAN 4.0 MMHOS/CM.
   F. PH: 5.0 - 8.0

2. ON SLOPES LESS THAN 5% OR AT THE BOTTOM OF SLOPES 2:1 OR LESS UP TO 20 FEET LONG, THE BARRIER MUST CONFORM TO THE ABOVE DIMENSIONS. ON THE LONGER OR STEEPER SLOPES, THE BARRIER SHOULD BE WIDER TO ACCOMMODATE THE ADDITIONAL FLOW.

3. THE BARRIER MUST BE PLACED ALONG A RELATIVELY LEVEL ELEVATION. IT MAY BE NECESSARY TO CUT TALL GRASSES OR WOODY VEGETATION TO AVOID CREATING VOIDS AND BRIDGES THAT WOULD ENABLE FINES TO WASH UNDER THE BARRIER THROUGH THE GRASS BLADES OR PLANT STEMS.

4. LOCATIONS WHERE OTHER BMP'S SHOULD BE USED:
   A. AT LOW POINTS OF CONCENTRATED FLOW
   B. BELOW CULVERT OUTLET APRONS
   C. WHERE A PREVIOUS STAND-ALONE EROSION CONTROL MIX APPLICATION HAS FAILED
   D. AT THE BOTTOM OF STEEP PERIMETER SLOPES THAT ARE MORE THAN 50 FEET FROM TOP TO BOTTOM (LARGE UPGRADIENT WATERSHED)
   E. AROUND CATCH BASINS AND CLOSED STORM DRAIN SYSTEMS

5. THE EROSION CONTROL MIX BARRIERS SHOULD BE INSPECTED REGULARLY AND AFTER EACH LARGE RAINFALL. REPAIR ALL DAMAGED SECTIONS OF BERM IMMEDIATELY BY REPLACING OR ADDING ADDITIONAL MATERIAL PLACED ON THE BERM TO THE DESIRED HEIGHT AND WIDTH.

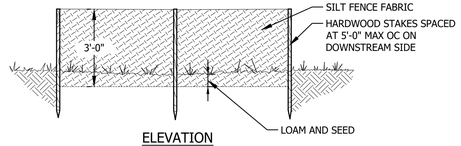
6. IT MAY BE NECESSARY TO REINFORCE THE BARRIER WITH SILT FENCE OR STONE CHECK DAMS IF THERE ARE SIGNS OF UNDERCUTTING OR THE IMPOUNDMENT OF LARGE VOLUMES OF WATER.

7. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.

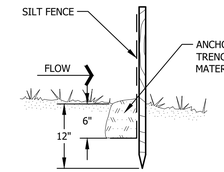
8. REPLACE SECTIONS OF BERM THAT DECOMPOSE, BECOME CLOGGED WITH SEDIMENT OR OTHERWISE BECOME INEFFECTIVE. THE BARRIER SHOULD BE RESHAPED AS NEEDED.

9. EROSION CONTROL MIX BARRIERS CAN BE LEFT IN PLACE AFTER CONSTRUCTION. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER BARRIER IS NO LONGER REQUIRED SHOULD BE SPREAD TO CONFORM TO THE EXISTING GRADE AND BE SEEDED AND MULCHED. WOODY VEGETATION CAN BE PLANTED INTO THE BARRIERS, OR THEY CAN BE OVER-SEEDED WITH LEGUMES. IF THE BARRIER NEEDS TO BE REMOVED, IT CAN BE SPREAD OUT INTO THE LANDSCAPE.

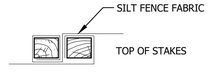
10. IF TEMPORARY BERMS ARE USED AS SILT BARRIERS, THEY ARE PROHIBITED AT THE BASE OF SLOPES STEEPER THAN 8% OR WHERE THERE IS FLOWING WATER WITHOUT THE SUPPORT OF ADDITIONAL MEASURES SUCH AS SILT FENCE.



ELEVATION



SECTION



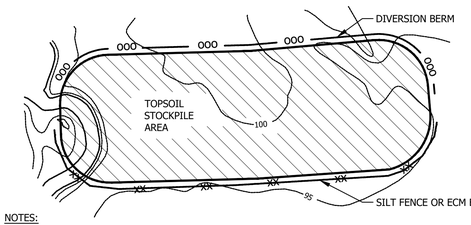
OVERLAP JOINTS

SILT FENCE

NOTE:
CONTRACTORS OPTION TO USE SEDIMENT BARRIER OR SILT FENCE FOR SLOPE PROTECTION.

SURFACE DRAINAGE SEDIMENT CONTROL

NTS

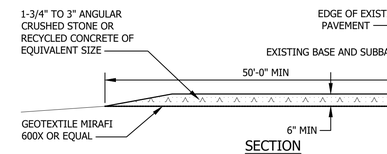


NOTES:

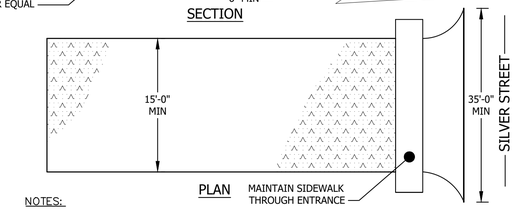
1. LOCATE SOIL STOCKPILES AS FAR FROM PROTECTED RESOURCES AS POSSIBLE (PONDS, RIVERS, STREAMS, BROOKS, & WETLANDS). LOCATE SOIL STOCKPILES AWAY FROM AREAS OF CONCENTRATED FLOW OR POTENTIAL FLOODING.
2. ERECT SEDIMENT BARRIER (SILT FENCE OR ECM BERM) DOWN SLOPE OF STOCKPILES.
3. STABILIZE STOCKPILES THAT WILL NOT BE WORKED FOR 14 OR MORE DAYS IN THE GROWING SEASON OR WILL REMAIN UNWORKED OR PARTIALLY UNWORKED OVER THE WINTER (NOVEMBER 1 TO APRIL 15) WITH TEMPORARY SEED, MULCH AND MULCH ANCHORING OR EROSION CONTROL BLANKET OR MESH AS SPECIFIED IN THE EROSION CONTROL PLAN. IN WINTER APPLY HAY MULCH AT THE RATE OF AT LEAST 150 LBS/1000 SF AND THICK ENOUGH THAT THE GROUND SURFACE IS NOT VISIBLE AND ANCHOR IF STOCKPILE HAS NOT BEEN PERMANENTLY STABILIZED USING ANOTHER METHOD (TARPS, PERMANENT SEED (< 90% VEGETATED), EROSION CONTROL BLANKET OR EROSION CONTROL MIX. EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR FLUME GRIT AND FRAGMENTED WOOD GENERATED FROM WATER-FLUME LOG HANDLING SYSTEMS. WOOD CHIPS, GROUND CONSTRUCTION DEBRIS, REPROCESSED WOOD PRODUCTS OR BARK CHIPS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX. EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
   A. ORGANIC MATERIAL: BETWEEN 20% - 100% (DRY WEIGHT BASIS)
   B. PARTICLE SIZE: BY WEIGHT, 100% PASSING 6" SCREEN, 70-85% PASSING 0.75" SCREEN.
   C. THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
   D. LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
   E. SOLUBLE SALTS CONTENT SHALL BE LESS THAN 4.0 MMHOS/CM.
   F. PH: 5.0 - 8.0.
4. IF SLOPE OF LAND IS GREATER THAN 5%, CONSTRUCT A DIVERSION BERM UPHILL OF THE STOCKPILE TO DIVERT FLOW.

SOIL STOCKPILE

NTS



SECTION



PLAN MAINTAIN SIDEWALK THROUGH ENTRANCE

NOTES:

1. MAINTAIN ENTRANCE IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. IF WASHING IS REQUIRED PREVENT SEDIMENT FROM ENTERING WATERWAYS, DITCHES OR STORM DRAINS.
2. REMOVE STABILIZED CONSTRUCTION ENTRANCE TO FINISH ROAD CONSTRUCTION AND PAVEMENT.

STABILIZED CONSTRUCTION ENTRANCE

NTS

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	11/17/25	ISSUED FOR REVIEW
A	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

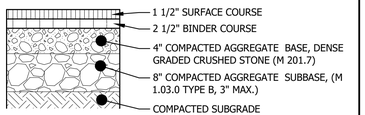
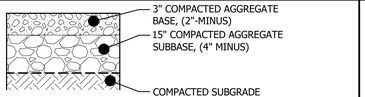
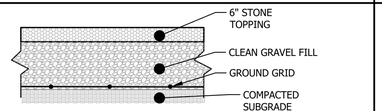
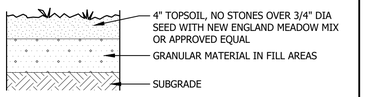
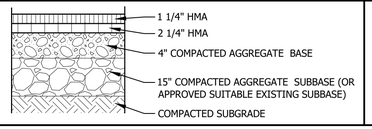
EROSION AND SEDIMENT CONTROL DETAILS

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	JJS/SME
DRAWN BY:	JJS/SME
DATE:	CLR/SME
CHECKED BY:	TMH/SME
LMN:	10/24/2025
CTB:	NONE

JOB NO. 250741.02 DWG FILE AW1-C-300 REV C

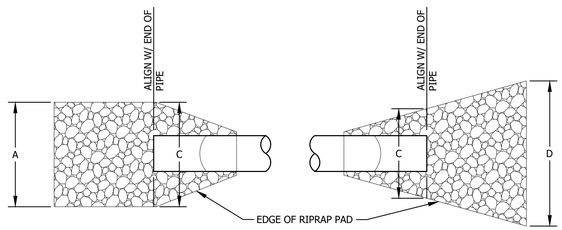
CONSTRUCTION	USE
	BITUMINOUS DRIVEWAY AND PARKING
	COMPACTED GRAVEL GRAVEL ACCESS ROADS
 1. TOPPING STONE SHALL BE CONSIST OF ANGULAR FRAGMENTS OF BROKEN SOUND ROCK, BLENDED TO PROVIDE A UNIFORM MIX MEETING TEH FOLLOWING GRADATION: 34% - 3/8" CRUSHED STONE 33% - 3/4" CRUSHED STONE 33% - 1-1/2" CRUSHED STONE 2. STONE SHALL BE WASHED AFTER BLENDING TO REMOVE FINES. 3. TOPPING SHALL BE 2,500 OHM-M OR HIGHER RESISTIVITY	TOPPING STONE BESS YARD AND SUBSTATION
	GRASS ALL DISTURBED AREAS
	BITUMINOUS SITE ENTRANCE, MARSHALLING AREA, PARKING AREA

NOTES:

1. COMPACT SUBGRADE AND EACH LAYER OF BORROW , SUBBASE MATERIAL, AND BASE MATERIAL TO MINIMUM 95% OF MATERIAL MAXIMUM DRY DENSITY PER ASTM D1557.

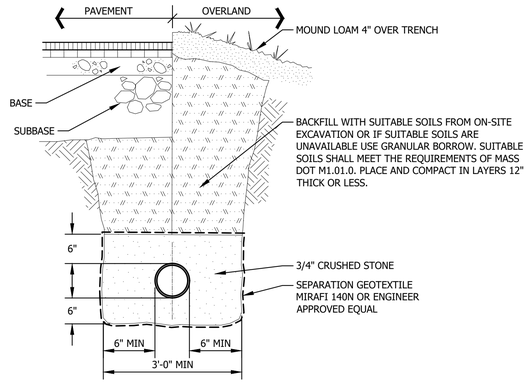
SCHEDULE OF SURFACE FINISHES

NTS



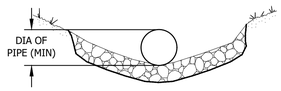
BASIN INLET/OUTLET DETAILS

NTS



TYPICAL CULVERT TRENCH SECTION

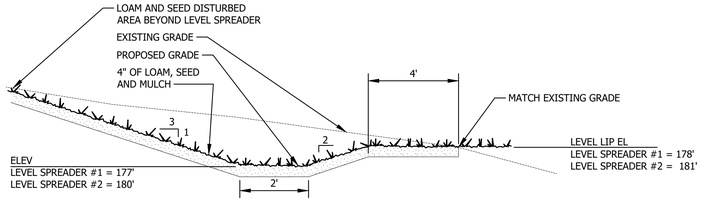
NTS



CROSS SECTION

RIPRAP PAD MUST BE INSTALLED WITHIN 48 HOURS OF INSTALLING NEW PIPE OR CULVERT.

PIPE	A	B	C	D	E	PAD DEPTH	D_{50}
≤12"	3 FT	2 FT	3 FT	4 FT	6 FT	10"	5"
15"	3.75 FT	2.5 FT	3.75 FT	5 FT	8 FT	16"	8"

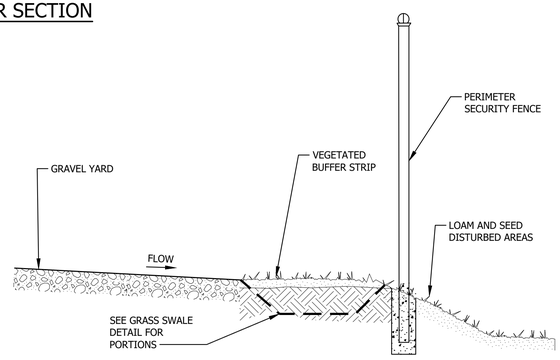


NOTES:

1. CONSTRUCT LEVEL LIP AND SPREADER ON ZERO PERCENT GRADE.
2. DO NOT CONSTRUCT LEVEL SPREADER ON FILL.
3. STORM RUNOFF CONVERTED TO SHEET FLOW SHALL OUTLET ONTO STABILIZED AREA. WATER SHALL NOT BE CHANNELIZED IMMEDIATELY BELOW POINT OF DISCHARGE.

LEVEL SPREADER SECTION

NTS

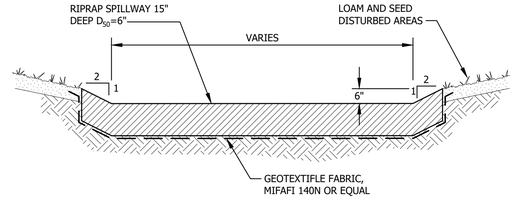


NOTES:

1. DETAIL REPRESENTS A TYPICAL LAYOUT FOR THE VEGETATED BUFFER STRIP. THE LOCATION OF THE FENCE WILL VARY. SEE LAYOUT PLAN. THE LOCATION OF DRAINAGE POINTS TO ALLOW STORMWATER TO FLOW ARE SHOWN ON THE GRADING PLAN.

VEGETATED BUFFER STRIP

NTS

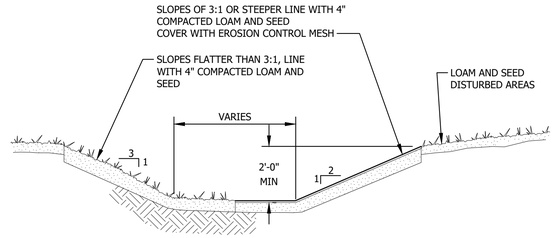


NOTES:

1. SUBGRADE PREPARATION: SHAPE THE SUBGRADE TO THE LINES AND GRADES AS SHOWN ON THE DRAWINGS AND AS SHOWN ON THE DETAILS. REMOVE ALL ORGANIC MATTER, DEBRIS AND SOIL THAT IS TOO WET TO SUPPORT RIPRAP. IF FILL IS REQUIRED PROVIDE SUITABLE SOIL FROM ON SITE OR COMMON BORROW (MDOT 703.18) COMPACTED TO A DENSITY APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED SOIL BUT NOT LESS THAN 92% (ASTM D1557).
2. GEOTEXTILE FABRIC: PLACE AND ANCHOR GEOTEXTILE (FILTER FABRIC) IMMEDIATELY AFTER SUBGRADE PREPARATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. STONE PLACEMENT: PLACE RIPRAP IMMEDIATELY AFTER PLACING GEOTEXTILE FABRIC. PLACE RIPRAP SO THAT IT PRODUCES A DENSE, WELL-GRADED MASS OF STONE WITH A MINIMUM OF VOIDS
4. MAINTENANCE: INSPECT RIPRAP FOLLOWING SIGNIFICANT RAINFALL EVENTS (3 INCHES OR MORE IN 24 HOURS) AND AFTER THE SPRING THAW. REPAIR DAMAGED AREAS IMMEDIATELY.
5. RIPRAP: SOUND DURABLE ROCK WHICH WILL NOT DISINTEGRATE BY EXPOSURE TO WATER OR WEATHER. EITHER FIELD STONE OR ROUGH, UNEVEN QUARRY STONE MAY BE USED. STONES SHALL BE ANGULAR AND AS NEARLY RECTANGULAR IN CROSS-SECTION AS PRACTICABLE. DO NOT USE ROUNDED BOULDERS OR COBBLES. USE A WELL GRADED MIXTURE OF STONE SIZES WITH 50 PERCENT OF THE MIXTURE BY WEIGHT BEING LARGER THAN THE D SIZE SPECIFIED AND 50 PERCENT SMALLER.

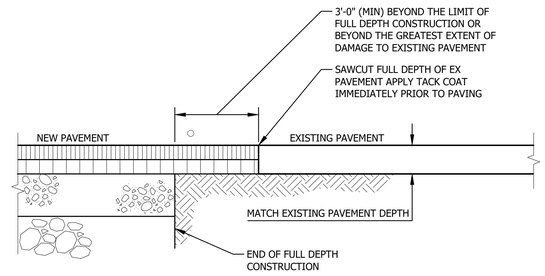
BASIN OVERFLOW SECTION

NTS



GRASS SWALE SECTION

NTS



PAVEMENT CUTTING AND MATCHING SECTION

NTS

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
B	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
A	TMH/SME	11/17/25	ISSUED FOR REVIEW

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

SITE DETAILS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

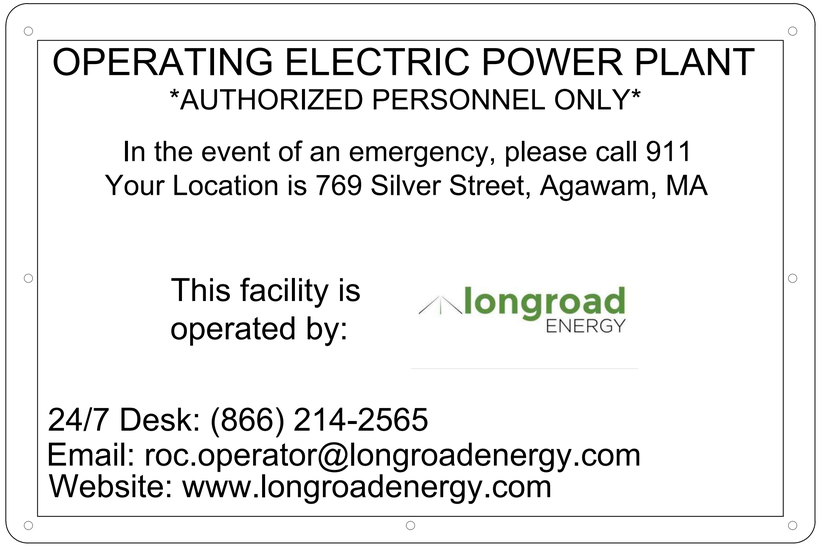
DESIGN BY:	JJS/SME
DRAWN BY:	JJS/SME
DATE:	CLR/SME
CHECKED BY:	TMH/SME
LMN:	09/15/2025
CTB:	NONE

JOB NO. 250741.02 DWG FILE AW1-C-301 REV B



HIGH VOLTAGE WARNING SIGN

SIGN NOTES:
1. SIGNS MUST BE NESC AND ANSI 8535-2011 COMPLIANT.
2. MINIMUM SAFE VIEWING DISTANCE IS 21 FEET PER ANSI Z535.2–2011 TABLE B1. RECOMMENDED SIGN SPACING 42–63 FEET APART.
3. SIGNS TO BE LOCATED 25 FEET FROM EACH CORNER OF FENCE, ON ALL GATES AND NO MORE THAN 50–FOOT SPACING ON THE REMAINING PORTIONS OF THE FENCE.
4. THE MOUNTING HEIGHT SHALL BE APPROXIMATELY 5 FEET ABOVE GROUND SURFACE.
5. SIGNS SHALL BE MOUNTED ON THE OUTSIDE OF THE FENCE WITH RUST RESISTANT TAMPERPROOF MOUNTS.
6. SIGN SHALL BE UTICOM SYSTEMS INC. PART# U1420W–G–U2650



SITE INFO/911 SIGN

SIGN NOTES:
1. SIGNS TO BE LOCATED ON ALL GATES.
2. THE MOUNTING HEIGHT SHALL BE APPROXIMATELY 5 FEET ABOVE GROUND SURFACE.
3. SIGNS SHALL BE MOUNTED ON THE OUTSIDE OF THE FENCE WITH RUST RESISTANT TAMPERPROOF MOUNTS.
4. SIGN SHALL BE 24”X36”

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

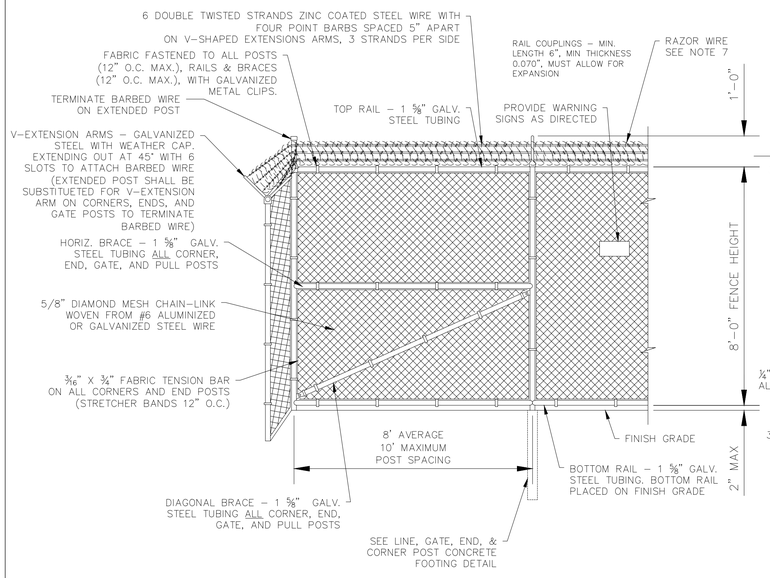
SIGN DETAILS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

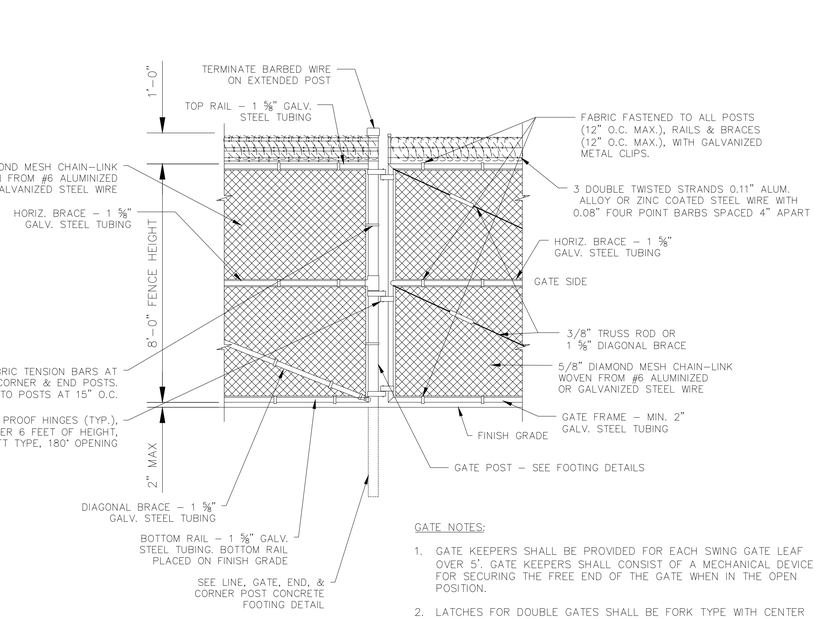
DESIGN BY:	JJS/SME
DRAWN BY:	JJS/SME
DATE:	CLR/SME
CHECKED BY:	TMH/SME
LMN:	09/15/2025
CTB:	NONE

JOB NO. 250741.02 DWG FILE AW1-C-302

REV A



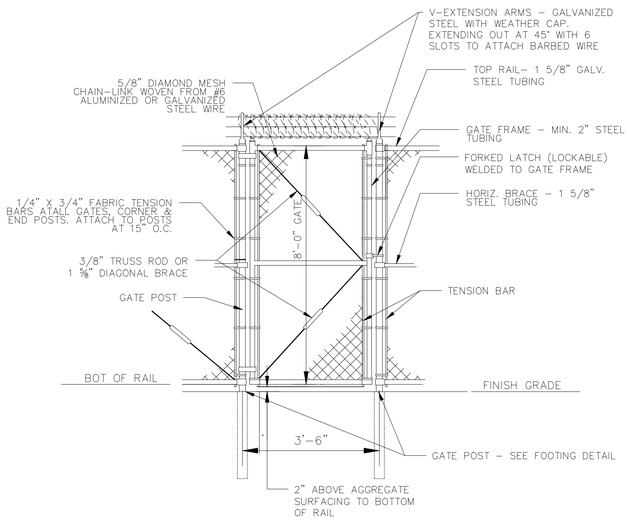
F1 MATERIAL AND STRUCTURAL DETAILS
N.T.S



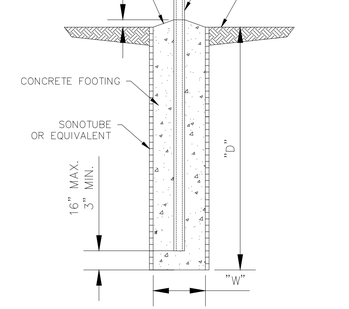
GATE NOTES:

1. GATE KEEPERS SHALL BE PROVIDED FOR EACH SWING GATE LEAF OVER 5'. GATE KEEPERS SHALL CONSIST OF A MECHANICAL DEVICE FOR SECURING THE FREE END OF THE GATE WHEN IN THE OPEN POSITION.
2. LATCHES FOR DOUBLE GATES SHALL BE FORK TYPE WITH CENTER DROP ROD OR PLUNGER BAR TYPE OF FULL GATE HEIGHT ARRANGED TO ENGAGE THE GATE STOP, OR A POSITIVE LOCKING GRAVITY DEVICE. LOCKING DEVICES SHALL BE CONSTRUCTED SO THE CENTER DROP ROD OR PLUNGER BAR CANNOT BE RAISED WHEN LOCKED.

F2 GATE FRAME DETAIL
N.T.S



F3 PERSONNEL GATE DETAIL
N.T.S



POST USE	LINE	GATE	CORNER	END
POST SIZE	3" STD.	4" STD.	4" STD.	4" STD.
"W"-MINIMUM FOOTING DIAMETER	1'-0"	2'-0"	1'-0"	1'-0"
"D"-MINIMUM FOOTING DEPTH	5'-6"	7'-0"	5'-6"	5'-6"

FOOTING NOTES:
1. UNLESS OTHERWISE INDICATED, FENCE POST SIZES ARE INDUSTRY STANDARD NOMINAL SIZES IN ACCORDANCE WITH ASTM F 1043, GALVANIZED STEEL PIPE.
2. BACKFILL SONOTUBE WITH MIN. 3,000 PSI CONCRETE.
3. ALL CONCRETE SHALL BE SINGLE POUR TO TOP OF GRAVEL.

F4 FENCE POST CONCRETE FOOTING DETAIL
N.T.S

F5 CENTER GATE STOP DETAIL
N.T.S

NOTES:

1. ALL ITEMS SHALL BE GALVANIZED AND ZINC COATED TO ASTM SPECIFICATIONS, INCLUDING ALL POSTS, RAILS, GATES, AND HARDWARE.
2. ALL POST AND FRAMES SHALL CONFORM ASTM 1043, A53 GRADE B, AND A123 AS APPLICABLE.
3. CHAIN LINK FABRIC SHALL BE TWISTED AND BARBED SELVAGE ON TOP, KNUCKLED SELVAGE AT THE BOTTOM. ZINC COATED PER ASTM A392 CLASS 1, OR ALUMINUM COATED PER ASTM A491.
4. FENCE FITTINGS, TIE WIRE, AND HOG WIRE SHALL BE PER ASTM F626 WITH 1.2 OZ/FT^2 ZINC.
5. BARBED WIRE SHALL BE ASTM A121 CLASS 1, WITH TWO TWISTED STRANDS OF 12.5 GAGE WIRE, WITH 4 POINT 14 GAGE BARBS SPACED 5" O.C.
6. TENSION WIRES:
   6.1. SHALL BE ZINC COATED ASTM A824 TYPE II CLASS 4
   6.2. STRETCHED TIGHT.
7. RAZOR WIRE SHALL BE GALVANIZED WITH STAINLESS STEEL BLADES. THE ROLL SHALL BE 18" DIAMETER WITH COIL CYLINDERS SPACED AT 4.5 O.C. THE ROLL SHALL BE SECURED TO ALL OF THE BARBED WIRES AT A MAXIMUM OF 4.5" SPACING.
8. GATE FENCE FABRIC SHALL BE MOUNTED INSIDE THE FRAME.
9. BOLTS AND HINGES SHALL BE OF A TAMPER-PROOF TYPE.
10. EXPOSED BOLTS AND NUTS SHALL BE SPOT WELDED.
11. CHAIN LINK FABRIC SHALL BE STRETCHED AND FASTENED TO END, CORNER, AND GATE POSTS WITH STRETCHER BARS AND STRETCHER BANDS.
12. BARBED WIRE SHALL BE INSTALLED ON EXTENSION ARMS. EACH WIRE SHALL BE PULLED TAUT. WIRE SHALL BE ATTACHED TO END, CORNER, & GATE POSTS WITH WIRE STRENCHER BANDS.
13. EXTENSION ARMS SHALL BE DESIGNED TO SECURELY ANCHOR SIX ROWS OF BARBED WIRE (THREE PER SIDE OF V-ARM) EQUALLY SPACED AND SUPPORT A VERTICAL LOAD OF 200 POUNDS AT THE OUTER END.
14. CORNER OR END POSTS SHALL BE INSTALLED AT ALL POINTS WHERE THE FENCE CHANGES DIRECTION OR AT A MAXIMUM SEPARATION OF 200'.
15. TOP OF CONCRETE FOOTINGS SHALL BE TROWELED TO A SLOPE TO PROVIDE A NEAT APPEARANCE AND TO SHED WATER.
16. FENCE TRANSITIONS SHALL BE AS FOLLOWS:
   16.1. TO NON-CONDUCTIVE FENCE: CHAIN LINK FENCE AND BARBED WIRE SHALL NOT BE CONNECTED TO NON-CONDUCTIVE FENCE AND BARBED WIRE.
   16.2. TO BUILDINGS/WALLS: GAP BETWEEN THE WALL & THE FENCE SHALL NOT EXCEED 2".
17. INSTALL RAZOR WIRE AROUND BARBED WIRE ON ALL EXTERIOR FENCING AND GATES.

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1/19/2026

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

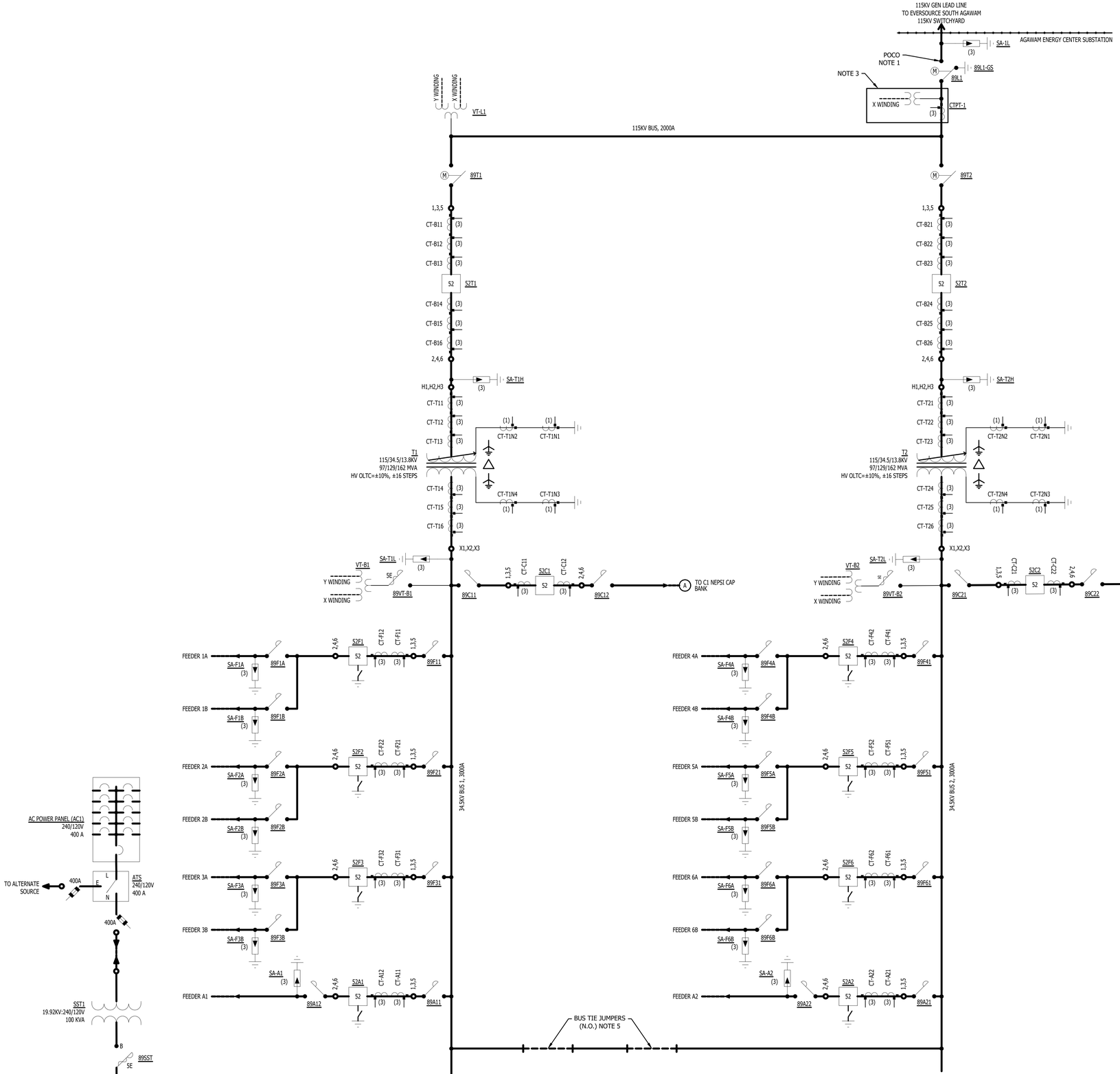
LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

CHAIN LINK FENCE DETAILS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	AJC/SME
APRV'D BY:	TMH/SME
DATE:	12/22/2025
SCALE:	N.T.S

JOB NO. 250741 DWG FILE AW1-C-303-1 REV A



NOTES:

1. POINT OF CHANGE OF OWNERSHIP (POCO) IS ASSUMED TO BE AT THE TERMINALS OF 89L1. SURGE ARRESTERS ARE OWNED BY LONGROAD.
2. CAPACITOR BANK DESIGN, INCLUDING PROTECTION ELEMENTS WITHIN THE CAPACITOR BANK, ARE IN THE NEPSI DESIGN SCOPE AND ONLY SHOWED HERE FOR ILLUSTRATIVE PURPOSES. FINAL DESIGN SHOULD BE BY NEPSI BASED ON CAPCAITOR SIZE AND CONFIGURATION AS DETERMINED DURING DETAILED DESIGN.
3. CT/PT COMBO UNIT IS PROVIDED FOR EVERSOURCE METERING NEEDS. EVERSOURCE MAY CHOOSE TO HAVE THIS METERING EQUIPMENT IN THEIR YARD. EQUIPMENT IS ASSUMED TO BE IN AGAWAM YARD DUE TO CONSTRAINTS ON THE EXISTING EVERSOURCE YARD AND THE CLOSE PROXIMITY, AS WELL AS CONSERVATIVENESS IN THE DETERMINING THE SUBSTATION FOOTPRINT.
4. DESIGN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED TO REPRESENT THE RESULTS OF DETAILED ENGINEERING DESIGN OR STUDIES. DESIGN IS TYPICAL BASED ON INDUSTRY STANDARDS AND BEST PRACTICES. MODIFICATIONS WILL LIKELY BE REQUIRED DURING DETAILED ENGINEERING.
5. JUMPERS ARE NORMALLY NOT IN PLACE, AND SHOULD ONLY BE ADDED WHEN BOTH BUSES ARE DE-ENERGIZED AND ONE TRANSFORMER SHOULD ALWAYS BE OUT OF SERVICE WHEN THE BUS JUMPERS ARE IN PLACE.

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

POWER ONE-LINE

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

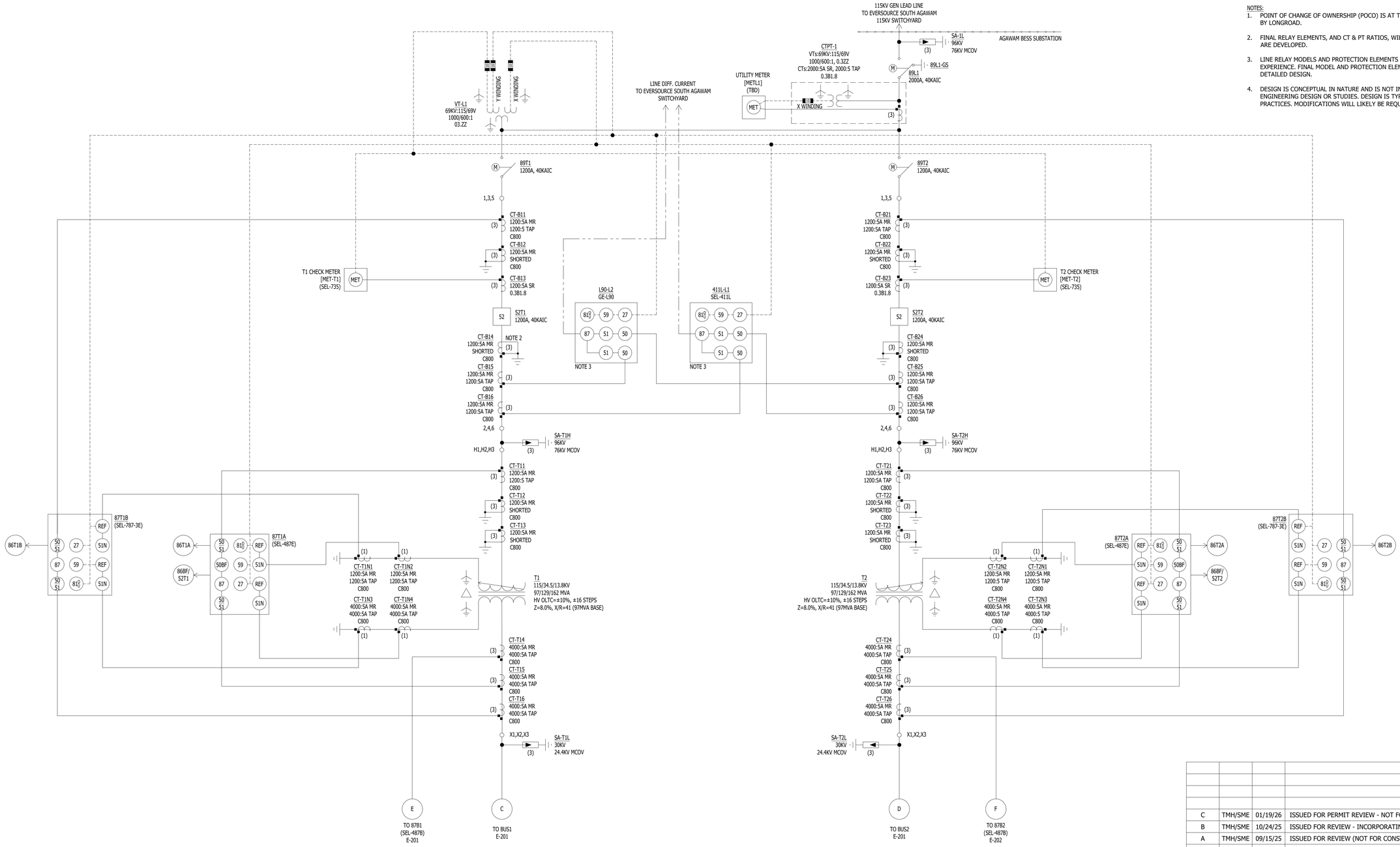
SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	WDG/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

JOB NO. 250741.02 DWG FILE AW1-E-100

REV C

NOTES:
1. POINT OF CHANGE OF OWNERSHIP (POCO) IS AT THE TERMINALS OF 89L1. SURGE ARRESTERS ARE OWNED BY LONGROAD.
2. FINAL RELAY ELEMENTS, AND CT & PT RATIOS, WILL BE DETERMINED WHEN RELAY PROTECTION SETTINGS ARE DEVELOPED.
3. LINE RELAY MODELS AND PROTECTION ELEMENTS ARE ASSUMED BASED ON PREVIOUS EVERSOURCE EXPERIENCE. FINAL MODEL AND PROTECTION ELEMENTS TO BE DICTATED BY EVERSOURCE DURING DETAILED DESIGN.
4. DESIGN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED TO REPRESENT THE RESULTS OF DETAILED ENGINEERING DESIGN OR STUDIES. DESIGN IS TYPICAL BASED ON INDUSTRY STANDARDS AND BEST PRACTICES. MODIFICATIONS WILL LIKELY BE REQUIRED DURING DETAILED ENGINEERING.



PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

115KV RELAY ONE-LINE

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

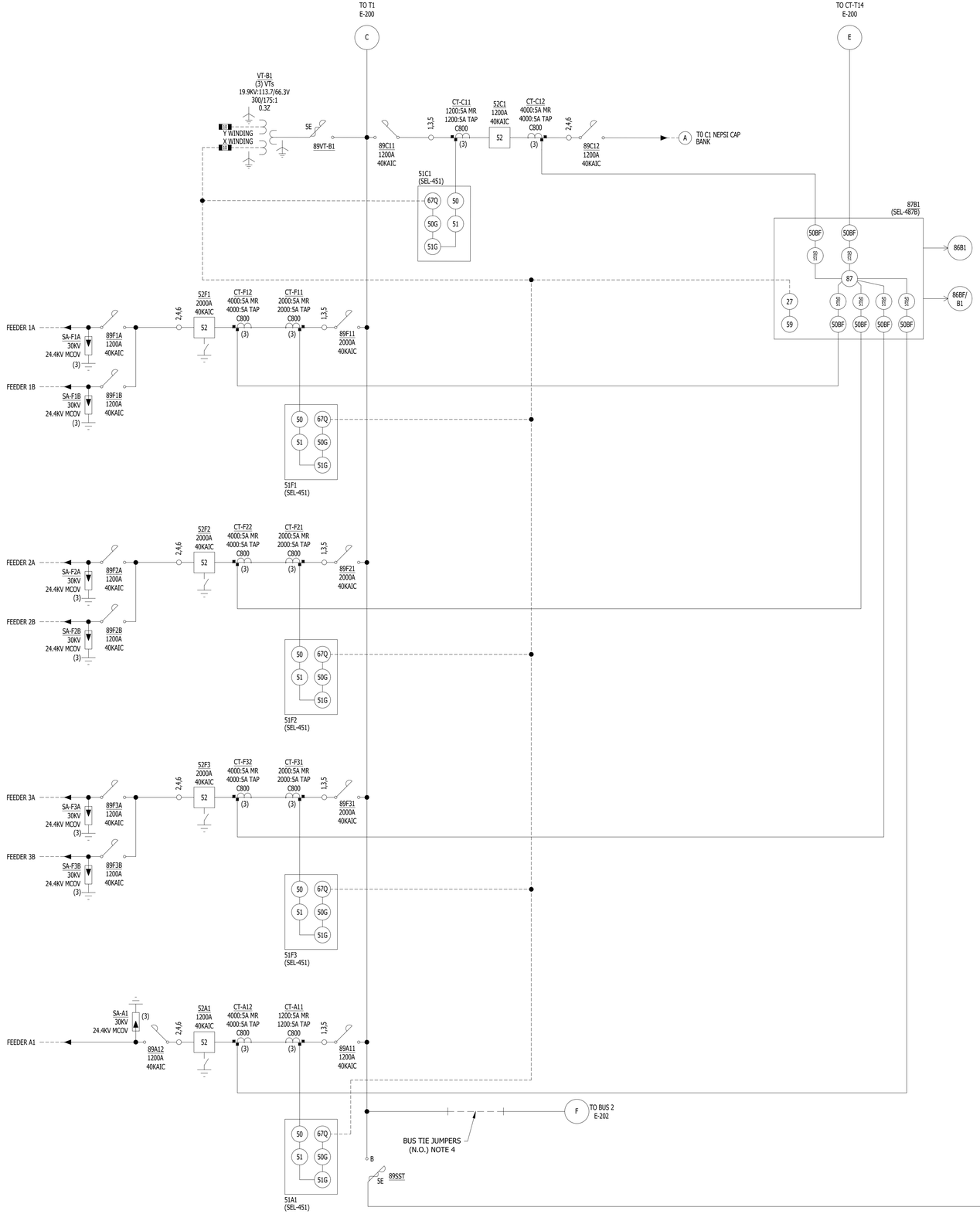
DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	WDG/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

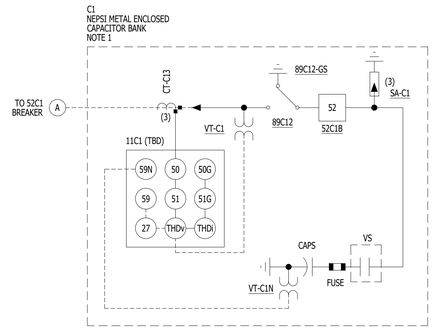
JOB NO. 250741.02 DWG FILE AW1-E-200

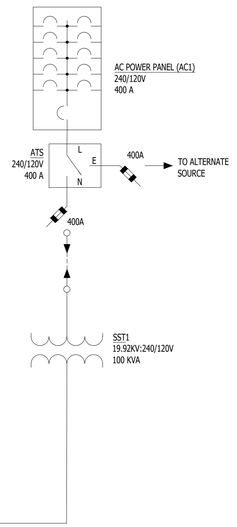
REV C

NOTES:

1. CAPACITOR BANK DESIGN, INCLUDING PROTECTION ELEMENTS WITHIN THE CAPACITOR BANK, ARE IN THE NEPSI DESIGN SCOPE AND ONLY SHOWED HERE FOR ILLUSTRATIVE PURPOSES. FINAL DESIGN SHOULD BE BY NEPSI BASED ON CAPCAITOR SIZE AND CONFIGURATION AS DETERMINED DURING DETAILED DESIGN.
2. FINAL RELAY ELEMENTS, AND CT & PT RATIOS, WILL BE DETERMINED WHEN RELAY PROTECTION SETTINGS ARE DEVELOPED.
3. DESIGN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED TO REPRESENT THE RESULTS OF DETAILED ENGINEERING DESIGN OR STUDIES. DESIGN IS TYPICAL BASED ON INDUSTRY STANDARDS AND BEST PRACTICES. MODIFICATIONS WILL LIKELY BE REQUIRED DURING DETAILED ENGINEERING.
4. JUMPERS ARE NORMALLY NOT IN PLACE, AND SHOULD ONLY BE ADDED WHEN BOTH BUSES ARE DE-ENERGIZED AND ONE TRANSFORMER SHOULD ALWAYS BE OUT OF SERVICE WHEN THE BUS JUMPERS ARE IN PLACE.







PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

34.5KV BUS 1 RELAY ONE-LINE

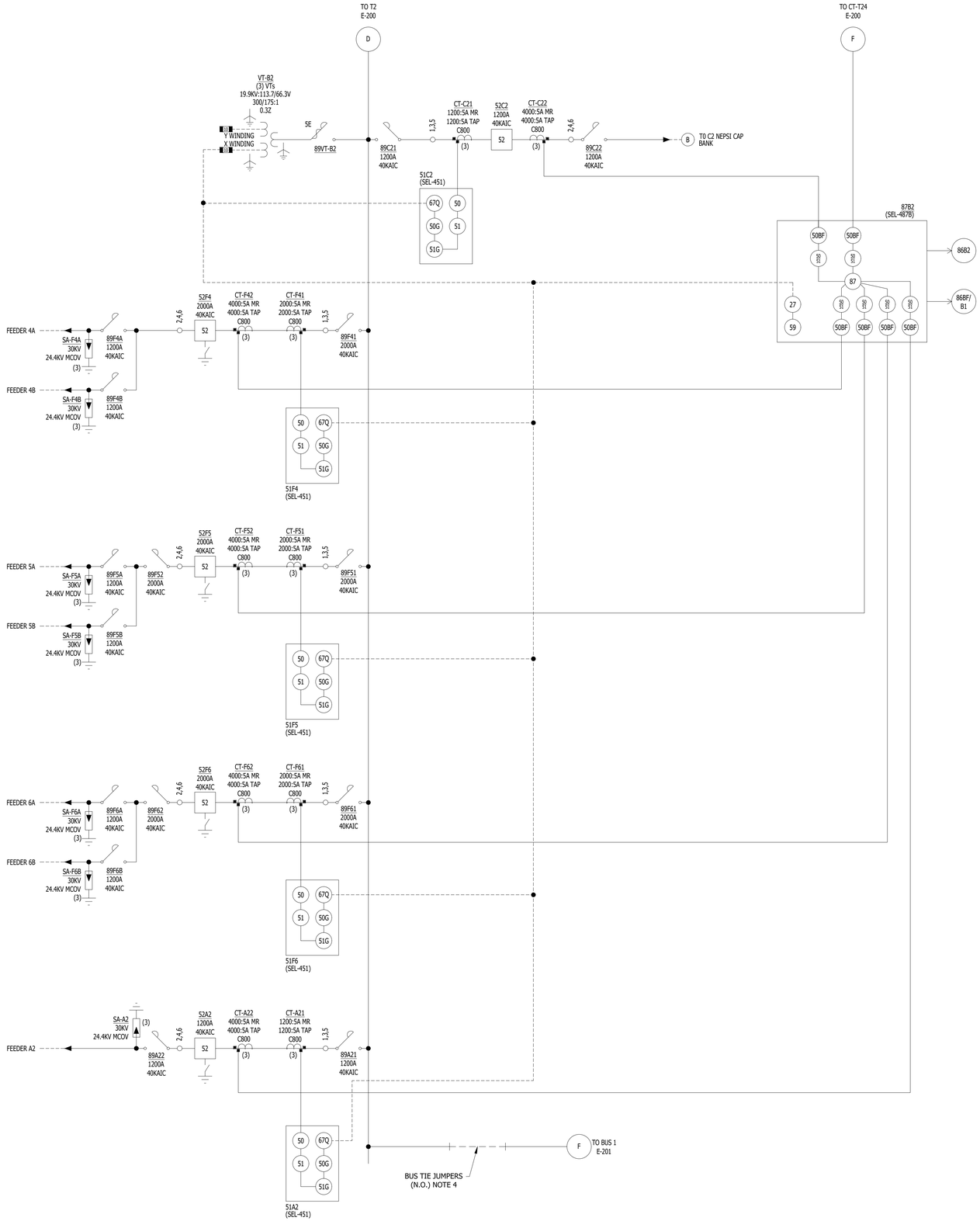
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

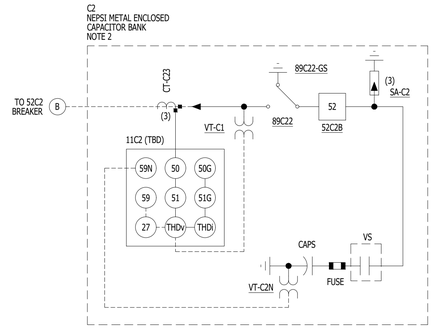
SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	WDG/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

JOB NO. 250741.02 DWG FILE AW1-E-201

REV C





NOTES:

1. CAPACITOR BANK DESIGN, INCLUDING PROTECTION ELEMENTS WITHIN THE CAPACITOR BANK, ARE IN THE NEPSI DESIGN SCOPE AND ONLY SHOWED HERE FOR ILLUSTRATIVE PURPOSES. FINAL DESIGN SHOULD BE BY NEPSI BASED ON CAPCAITOR SIZE AND CONFIGURATION AS DETERMINED DURING DETAILED DESIGN.
2. FINAL RELAY ELEMENTS, AND CT & PT RATIOS, WILL BE DETERMINED WHEN RELAY PROTECTION SETTINGS ARE DEVELOPED.
3. DESIGN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED TO REPRESENT THE RESULTS OF DETAILED ENGINEERING DESIGN OR STUDIES. DESIGN IS TYPICAL BASED ON INDUSTRY STANDARDS AND BEST PRACTICES. MODIFICATIONS WILL LIKELY BE REQUIRED DURING DETAILED ENGINEERING.
4. JUMPERS ARE NORMALLY NOT IN PLACE, AND SHOULD ONLY BE ADDED WHEN BOTH BUSES ARE DE-ENERGIZED AND ONE TRANSFORMER SHOULD ALWAYS BE OUT OF SERVICE WHEN THE BUS JUMPERS ARE IN PLACE.

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

34.5KV BUS 2 RELAY ONE-LINE

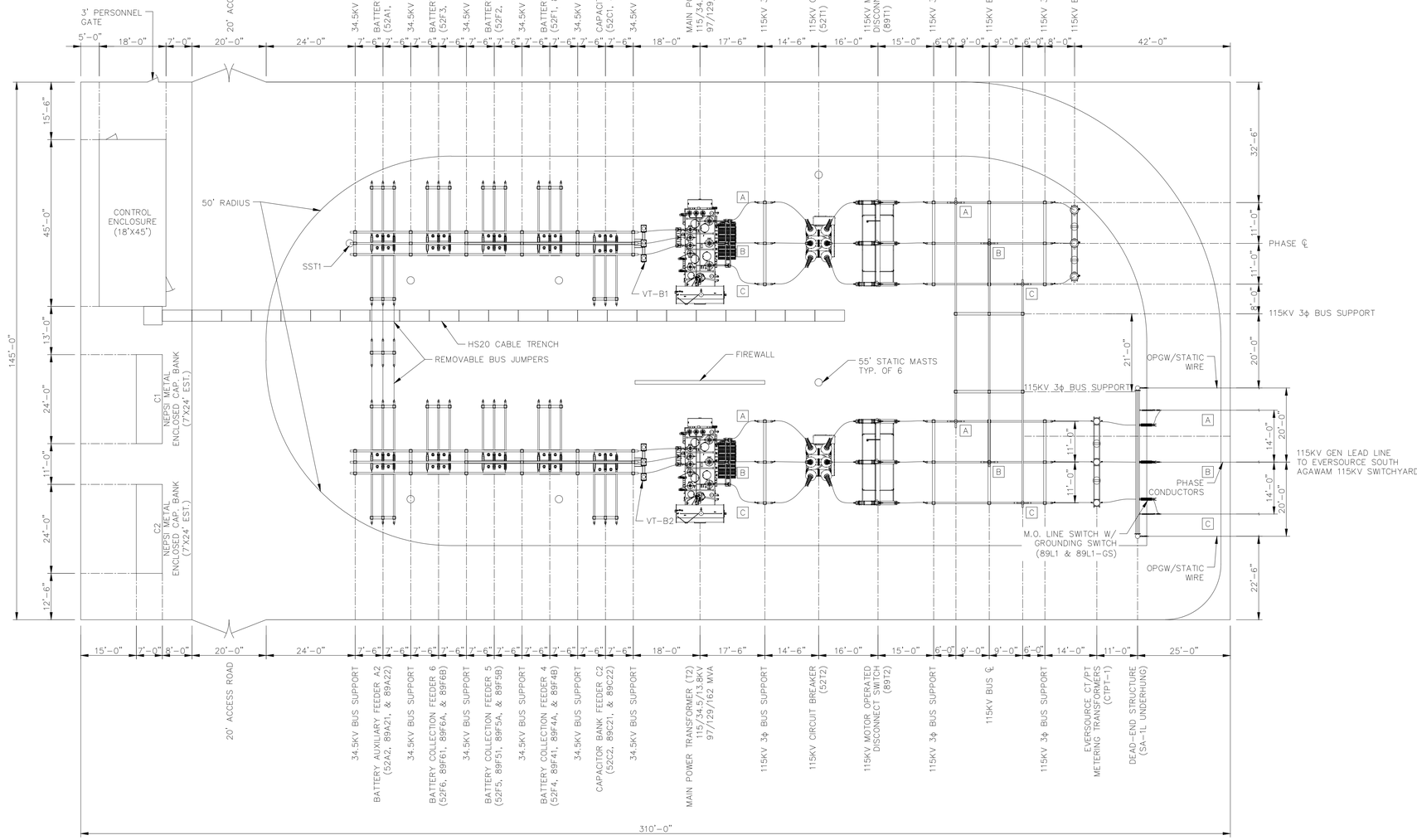
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	WDG/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

JOB NO. 250741.02 DWG FILE AW1-E-202

REV C



NOTES:

1. 34.5KV ELECTRICAL BUS & CONDUCTOR CLEARANCES FOR THIS INSTALLATION SHALL NOT BE LESS THAN THE FOLLOWING VALUES PER ANSI C37.30.1 & 1427:
   - PHASE - PHASE (℄ TO ℄) = 36"
   - PHASE - PHASE (METAL TO METAL) = 18"
   - PHASE - GROUND = 15"
2. 115KV ELECTRICAL BUS & CONDUCTOR CLEARANCES FOR THIS INSTALLATION SHALL NOT BE LESS THAN THE FOLLOWING VALUES PER ANSI C37.30.1 & 1427:
   - PHASE - PHASE (℄ TO ℄) = 84"
   - PHASE - PHASE (METAL TO METAL) = 53"
   - PHASE - GROUND = 42"
3. AN ACCEPTABLE INSIDE DIAMETER BEND FOR WIRE IS 10 TO 15 TIMES THE DIAMETER OF THE CONDUCTOR AND 5 TO 7 TIMES THE OUTSIDE DIAMETER OF THE TUBULAR BUS.
4. INSTALL DAMPING CONDUCTOR, 1272 AAC "NARCISSUS", IN ALL BUS SECTIONS OVER 20' AND TACK WELD TO THE BOTTOM OF THE BUS.
5. THE MINIMUM CLEARANCE ABOVE ANY PERMANENT SUPPORTING SURFACE FOR PERSONNEL TO THE LOWEST UNGROUNDED PART OF A HIGH VOLTAGE APPARATUS SHALL BE 8'-6" PER NESC RULE 124.
6. PER NESC TABLE 124-1, THE MINIMUM VERTICAL CLEARANCE TO LIVE PARTS IS AS FOLLOWS:
   - 115 KV = 11'-7"
   - 34.5 KV = 9'-6"
7. LIGHTNING MAST PLACEMENT, HEIGHT, AND QUANTITY IS PRELIMINARY. DETAILED DESIGN WILL DETERMINE FINAL MAST LOCATIONS TO PROVIDE COMPLETE COVERAGE. LIGHTING SHALL BE INSTALLED ON LIGHTNING MASTS TO PROVIDE ADEQUATE SUBSTATION ILLUMINATION PER APPLICABLE CODES.
8. ALL EQUIPMENT SHOWN IS PRELIMINARY AND FOR REPRESENTATION ONLY. DESIGN IS SUBJECT TO CHANGE AS VENDOR DRAWINGS ARE RECEIVED.
9. DESIGN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED TO REPRESENT THE RESULTS OF DETAILED ENGINEERING DESIGN OR STUDIES. DESIGN IS TYPICAL BASED ON INDUSTRY STANDARDS AND BEST PRACTICES. MODIFICATIONS WILL LIKELY BE REQUIRED DURING DETAILED ENGINEERING.

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

6' 0 6' 12' 18' 24' 30' 36'
SCALE: 1/16" = 1'-0"

REV.	BY	DATE	STATUS
D	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR 30% REVIEW (NOT FOR CONSTRUCTION)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

SUBSTATION GENERAL ARRANGEMENT

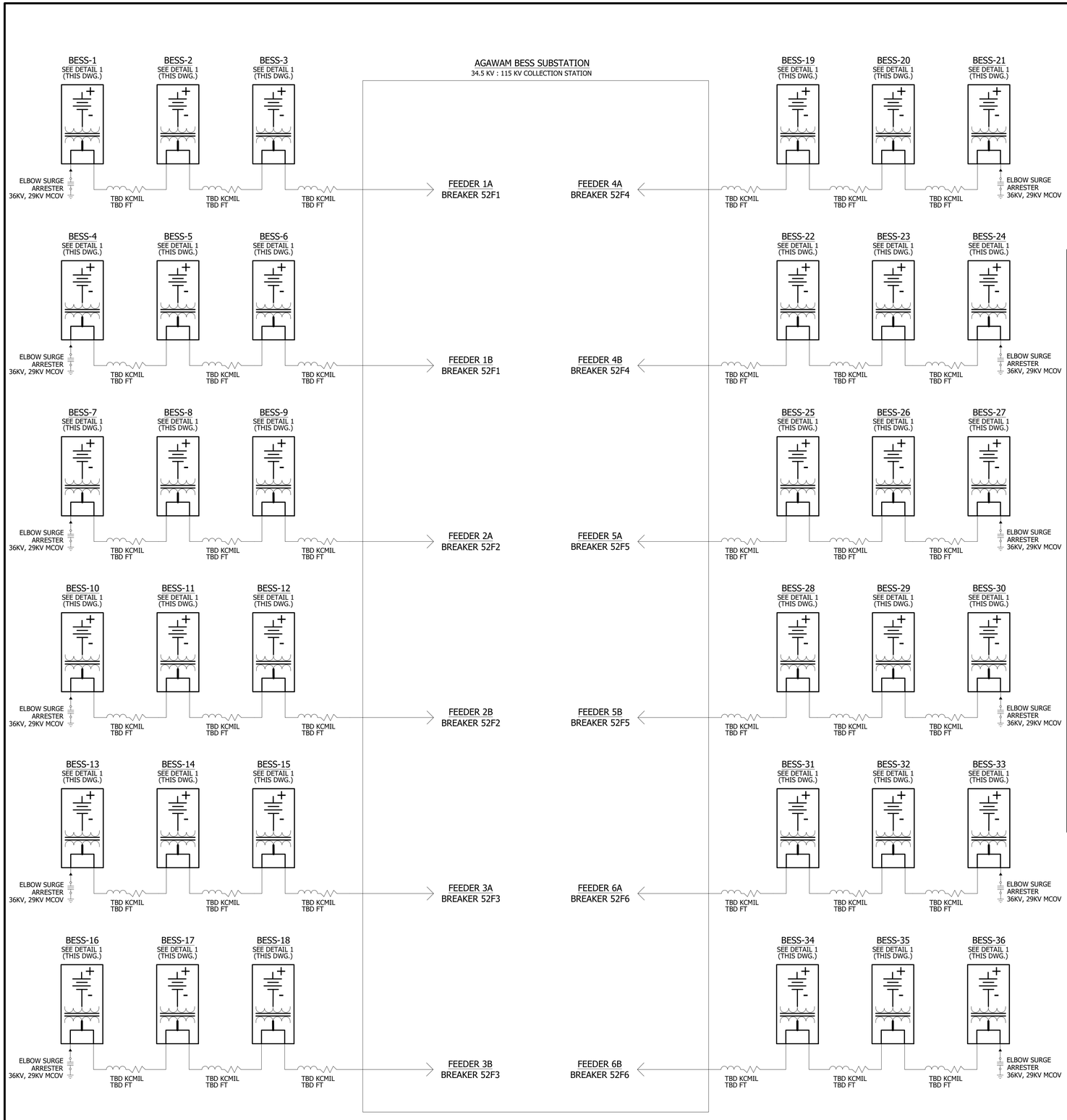
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	WDG/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	1/16" = 1'-0"

JOB NO. 250741.02 DWG FILE AW1-P-100

REV D

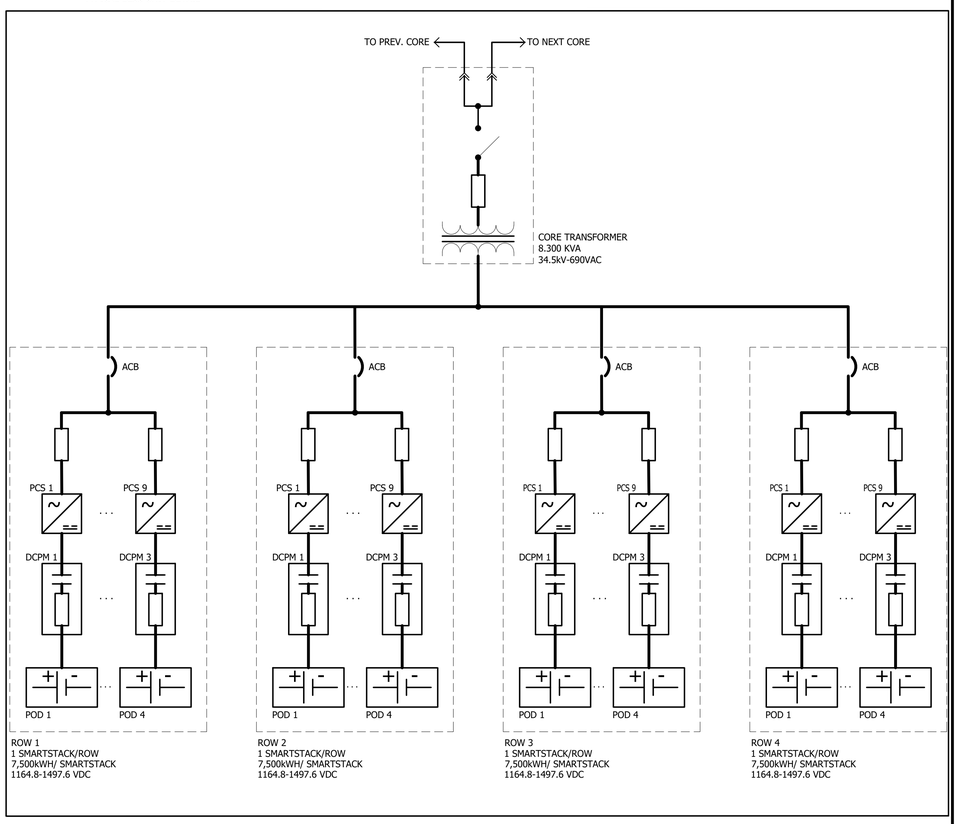


NOTES:
1. CABLE LENGTHS AND SIZES ARE TO BE DETERMINED DURING DETAILED ENGINEERING.
2. LAYOUT IS PRELIMINARY IN NATURE, REPRESENTING THE BUILD OUT REQUIRED TO PRODUCE THE PROPOSED PROJECT MEGAWATTS IN ITS INITIAL CONSTRUCTION. IT DOES NOT SHOW ADDITIONAL UNITS THAT MAY BE INCOPORATED IN TIME DUE TO DEGRADATION TO MAINTAIN PROJECT OUTPUT AND IS SUBJECT TO CHANGE.

LEGEND

- BESS UNIT, 30MWH 34.5KV/690V FLUENCE SMARTSTACK MODEL: SMS7.5
- SURGE ARRESTOR
- UNDERGROUND 35KV CABLE TBD KCMIL TBD FT

DETAIL 1
TYPICAL BESS UNIT DETAIL



ROW 1
1 SMARTSTACK/ROW
7,500kWH/ SMARTSTACK
1164.8-1497.6 VDC

ROW 2
1 SMARTSTACK/ROW
7,500kWH/ SMARTSTACK
1164.8-1497.6 VDC

ROW 3
1 SMARTSTACK/ROW
7,500kWH/ SMARTSTACK
1164.8-1497.6 VDC

ROW 4
1 SMARTSTACK/ROW
7,500kWH/ SMARTSTACK
1164.8-1497.6 VDC

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

COLLECTION POWER ONE-LINE

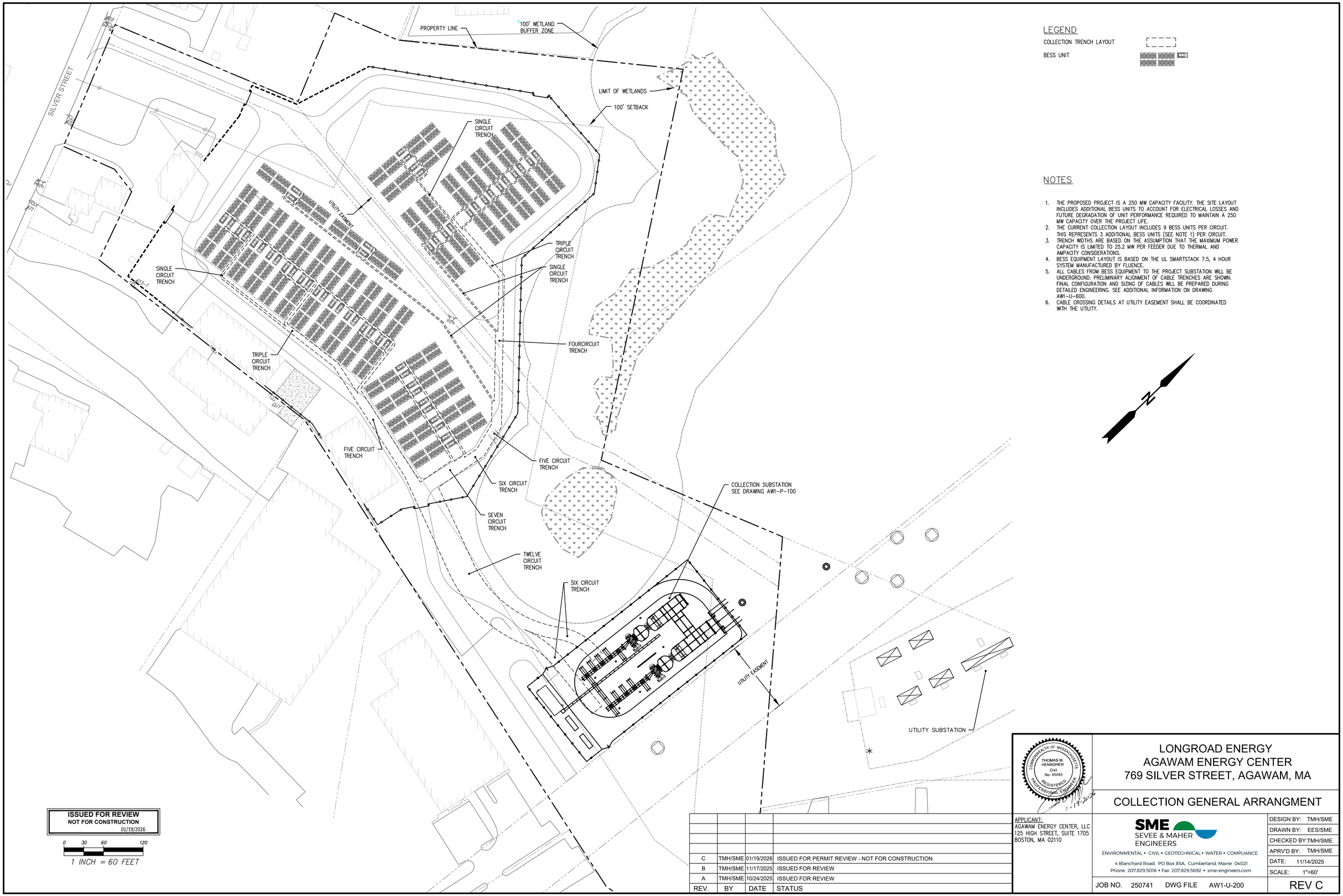
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	CLR/SME
DRAWN BY:	CLR/SME
CHECKED BY:	AJC/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

JOB NO. 250741.02 DWG FILE AW1-U-100

REV C



LEGEND

COLLECTION TRENCH LAYOUT

BESS UNIT

NOTES

1. THE PROPOSED PROJECT IS A 250 MW CAPACITY FACILITY. THE SITE LAYOUT INCLUDES ADDITIONAL BESS UNITS TO ACCOUNT FOR ELECTRICAL LOSSES AND FUTURE DEGRADATION OF UNIT PERFORMANCE REQUIRED TO MAINTAIN A 250 MW CAPACITY OVER THE PROJECT LIFE.
2. THE CURRENT COLLECTION LAYOUT INCLUDES 9 BESS UNITS PER CIRCUIT. THIS REPRESENTS 3 ADDITIONAL BESS UNITS (SEE NOTE 1) PER CIRCUIT.
3. TRENCH WIDTHS ARE BASED ON THE ASSUMPTION THAT THE MAXIMUM POWER CAPACITY IS LIMITED TO 25.2 MW PER FEEDER DUE TO THERMAL AND AMPACITY CONSIDERATIONS.
4. BESS EQUIPMENT LAYOUT IS BASED ON THE UL SMARTSTACK 7.5, 4 HOUR SYSTEM MANUFACTURED BY FLUENCE.
5. ALL CABLES FROM BESS EQUIPMENT TO THE PROJECT SUBSTATION WILL BE UNDERGROUND. PRELIMINARY ALIGNMENT OF CABLE TRENCHES ARE SHOWN. FINAL CONFIGURATION AND SIZING OF CABLES WILL BE PREPARED DURING DETAILED ENGINEERING. SEE ADDITIONAL INFORMATION ON DRAWING AW1-U-600.
6. CABLE CROSSING DETAILS AT UTILITY EASEMENT SHALL BE COORDINATED WITH THE UTILITY.

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
01/19/2026

0 30 60 120
1 INCH = 60 FEET

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	11/17/2025	ISSUED FOR REVIEW
A	TMH/SME	10/24/2025	ISSUED FOR REVIEW

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

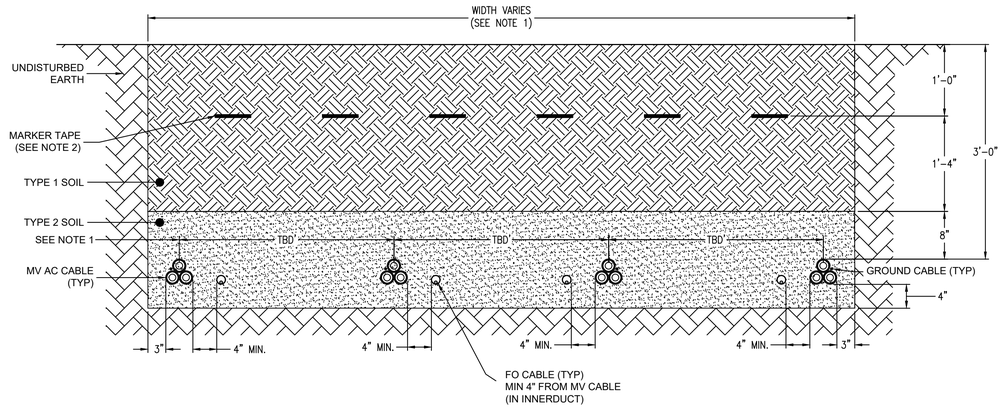
COLLECTION GENERAL ARRANGMENT

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-U-200 REV C



TYPICAL POWER CABLE TRENCH SPACING

SCALE: NTS
MVAC (3-1/C TRIPLEX)

NOTES:

1. THIS DRAWING IS DIAGRAMMATIC AND INTENDED TO SHOW THE TYPICAL BACKFILL AND MINIMUM SPACING BETWEEN CABLES WITHIN THE TRENCH. THE EXACT TYPE OR NUMBER OF CABLES WILL VARY BASED ON THE NUMBER OF CIRCUITS. SEE DRAWING AW1-U-200 FOR TRENCH LAYOUT.
2. INSTALL 6" WIDE RED DETECTABLE MARKER TAPE IN ALL TRENCHES EVERY 18" ACROSS EXCAVATED AREA.
3. BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 85% OF THE MAXIMUM DRY DENSITY. AT ROAD CROSSINGS, BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95%. FILL LIFT SHALL NOT EXCEED 9". SEE PROJECT GEOTECHNICAL REPORT FOR SITE SPECIFIC REQUIREMENTS.
4. CLEAN FILL REQUIREMENTS:
   - 8A. TYPE 1: NATIVE SOIL, SHALL BE USED FOR BACKFILL AS SHOWN IN SECTIONS CONTAINING PARTICLES NO LARGER THAN 3" IN DIAMETER.
   - 8B. TYPE 2: FILL SHALL BE CLEAN MATERIAL CONTAINING PARTICLES NO LARGER THAN 3/8" IN DIAMETER IN THE AREA 8" ABOVE AND 4" BELOW.
5. TREFOIL CABLE SHALL BE SECURED AT INTERVALS NOT EXCEEDING 3'.
6. TYPE 2 FILL MAY BE REPLACED WITH THERMAL BACKFILL TO REDUCE SPACING AND LIMIT TRENCH WIDTH.

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
C	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1/19/2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

TRENCH DETAILS

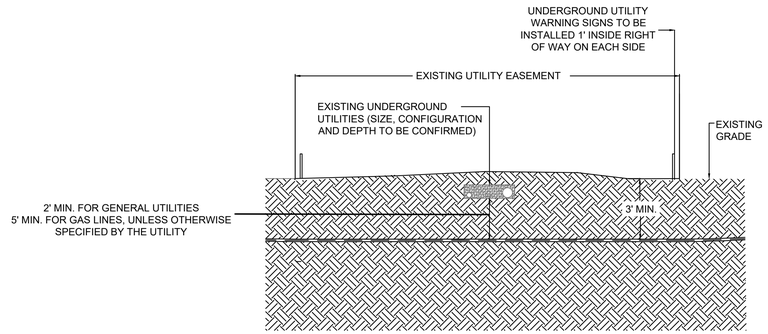
APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

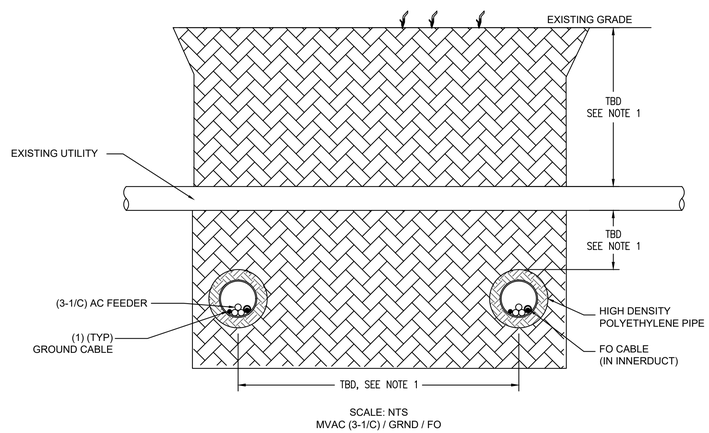
DESIGN BY:	JJS/SME
DRAWN BY:	JJS/SME
CHECKED BY:	CLR/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

JOB NO. 250741.02 DWG FILE AW1-U-600

REV C



THE MINIMUM VERTICAL CLEARANCE SHALL ACCOUNT FOR EXISTING FEATURES SUCH AS DITCHES, UNDERGROUND UTILITIES AND OTHER OBSTRUCTIONS, AND SHALL MEET ALL CLEARANCE REQUIREMENTS SET FORTH BY THE GOVERNING JURISDICTION. THE FULL CLEARANCE DEPTH MUST BE MAINTAINED THROUGHOUT THE ENTIRETY OF THE RIGHT OF WAY. THE LOCATION AND DEPTH OF EXISTING UTILITIES MUST BE DETERMINED PRIOR TO DRILLING.



SCALE: NTS
MVAC (3-1/C) / GRND / FO

TRENCHLESS SECTION - UTILITIES

NOTES:

1. THIS DRAWING IS DIAGRAMMATIC AND INTENDED TO SHOW THE TYPICAL ORIENTATION AND RELATION BETWEEN CONDUITS AND EXISTING UTILITIES WITHIN THE EASEMENT. FINAL DIMENSIONS TO BE DETERMINED DURING DETAILED DESIGN BASED ON REVIEW AND APPROVAL FROM THE UTILITY/EASEMENT HOLDER AND RECEIPT OF AS-BUILT INFORMATION ON EXISTING UTLITIES WITHIN THE EASEMENT.
2. THE EXACT TYPE OR NUMBER OF CABLES MAY VARY FROM WHAT IS SHOWN.
3. FOR UTILITY CROSSING LOCATIONS SEE DRAWING AW1-U-200.
4. BORE DEPTH TO BE MINIMUM AS SHOWN OR PURSUANT TO CROSSING AGREEMENTS.
5. CONSTRUCTION MEANS AND METHODS FOR UTILITY CROSSING TO BE DETERMINED DURING DETAILED DESIGN.

PRELIMINARY
NOT FOR CONSTRUCTION
01/19/2026

REV.	BY	DATE	STATUS
D	TMH/SME	01/19/26	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/25	ISSUED FOR REVIEW
B	TMH/SME	10/24/25	ISSUED FOR REVIEW - INCORPORATING CLIENT COMMENTS (NOT FOR CONSTRUCTION)
A	TMH/SME	09/15/25	ISSUED FOR REVIEW (NOT FOR CONSTRUCTION)

COMMONWEALTH OF MASSACHUSETTS
THOMAS M. HENAGHEN
Civil
No. 45045
REGISTERED PROFESSIONAL ENGINEER
1-19-2026

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

TRENCHLESS INSTALLATION DETAILS

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

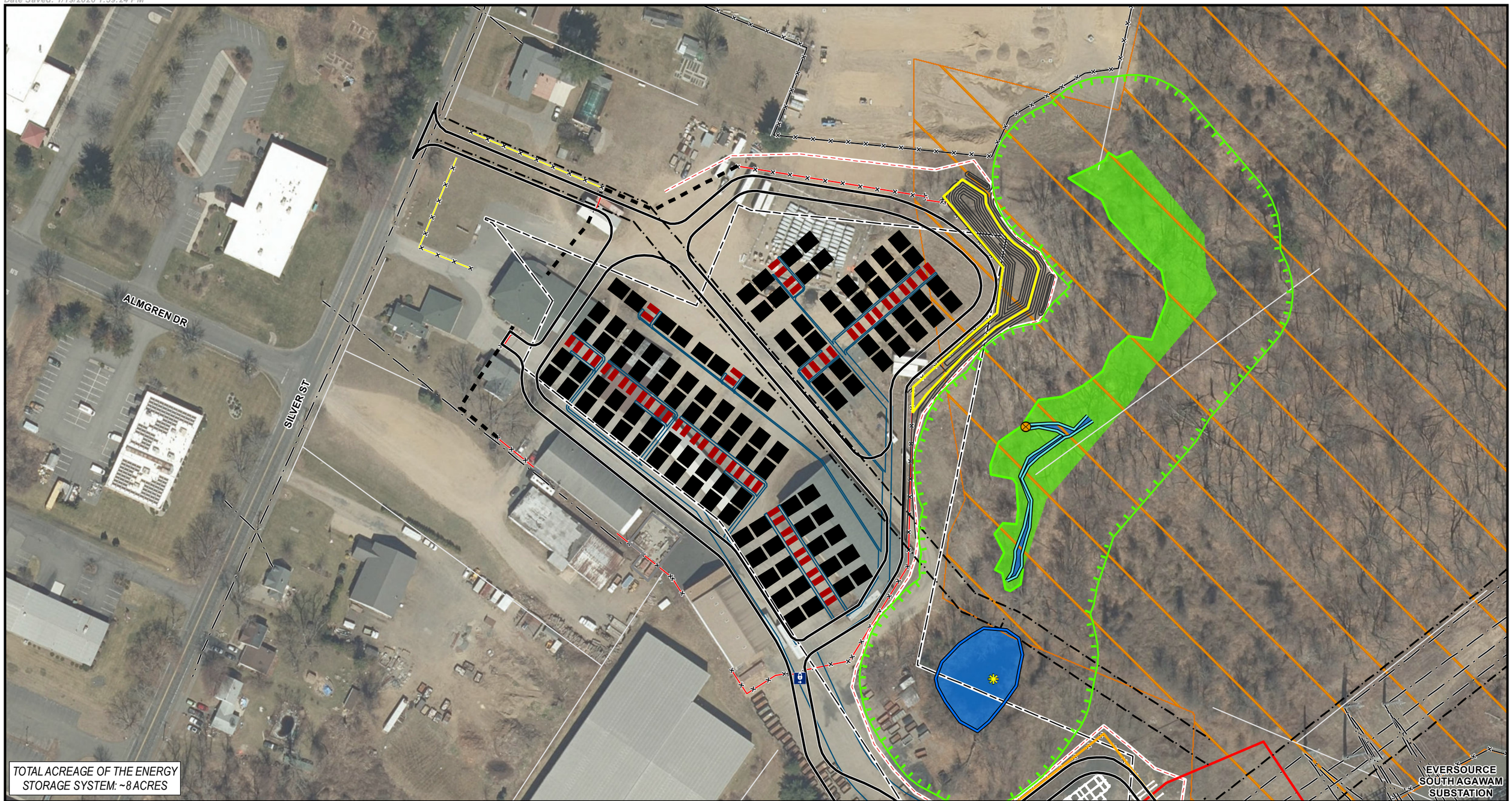
SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	JJS/SME
DRAWN BY:	JJS/SME
CHECKED BY:	CLR/SME
APRV'D BY:	TMH/SME
DATE:	09/15/2025
SCALE:	NONE

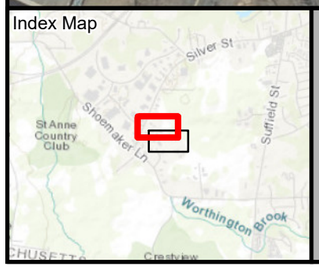
JOB NO. 250741.02 DWG FILE AW1-U-601

REV D

DRAFT



Index Map



Legend

- BESS Equipment
- Transformer
- Proposed Substation Perimeter
- Proposed Substation Infrastructure
- 115KV Generator Tie Line
- Stormwater Management Area
- Proposed Pavement
- Proposed Grading
- Underground Collection Trench
- Limit of Work
- Proposed Chain Link Fence
- Proposed Wood Privacy Fence
- Proposed Soundwall
- 100ft Setback
- Existing Easement
- Existing Overhead Line
- Existing Fence
- Existing Concrete
- Parcel Boundary
- Field Delineated Stream Bank
- Field Delineated Pond Bank
- Field Delineated Open Water*
- Field Delineated Wetland Boundary
- Field Delineated Wetland*
- 100ft Buffer to Wetlands & Streams
- Perennial Stream
- NHESP Priority & Estimated Habitats
- Potential Vernal Pools
- Culvert
- Gate

N

1 inch = 120 feet
0 60 120
Feet

Indicates Layers Set to Transparency

AGAWAM ENERGY CENTER

Site Plan

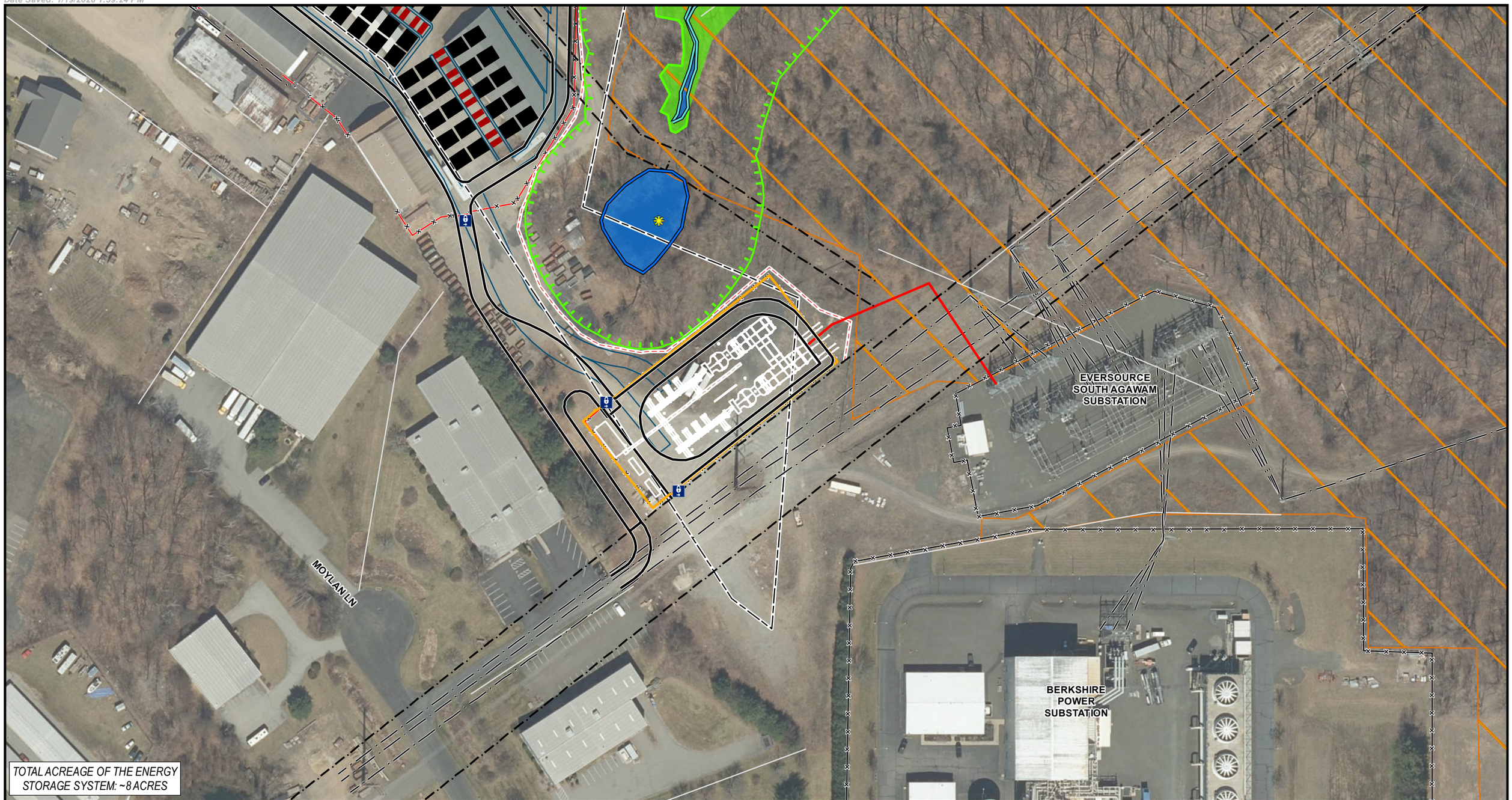
Agawam, MA
Page 1 of 2

MassGIS
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

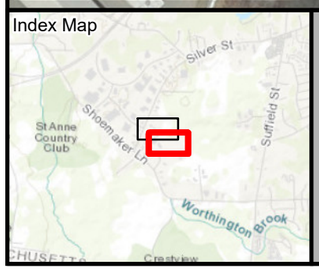
longroad ENERGY
BSC GROUP

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE.

DRAFT



Index Map



Legend

- BESS Equipment
- Transformer
- Proposed Substation Perimeter
- Proposed Substation Infrastructure
- 115KV Generator Tie Line
- Stormwater Management Area
- Proposed Pavement
- Proposed Grading
- Underground Collection Trench
- Limit of Work
- Proposed Chain Link Fence
- Proposed Wood Privacy Fence
- Proposed Soundwall
- 100ft Setback
- Existing Easement
- Existing Overhead Line
- Existing Fence
- Existing Concrete
- Parcel Boundary
- Field Delineated Stream Bank
- Field Delineated Pond Bank
- Field Delineated Open Water*
- Field Delineated Wetland Boundary
- Field Delineated Wetland*
- 100ft Buffer to Wetlands & Streams
- Perennial Stream
- NHESP Priority & Estimated Habitats
- Potential Vernal Pools
- Culvert
- Gate

N

1 inch = 120 feet
0 60 120
Feet

*Indicates Layers Set to Transparency

AGAWAM ENERGY CENTER

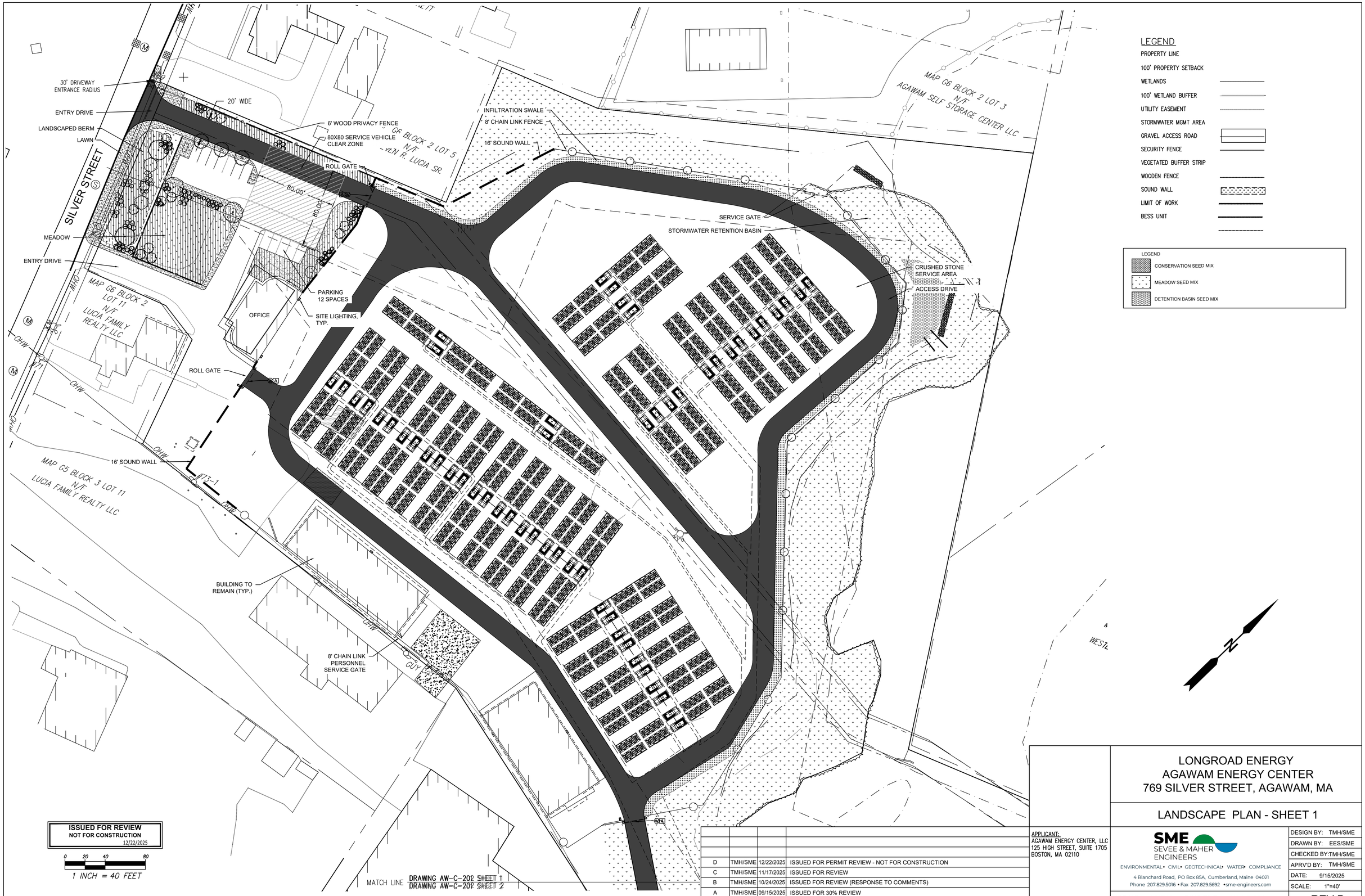
Site Plan

Agawam, MA
Page 2 of 2

MassGIS
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

longroad ENERGY
BSC GROUP

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE.



ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
12/22/2025

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
D	TMH/SME	12/22/2025	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/2025	ISSUED FOR REVIEW
B	TMH/SME	10/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)
A	TMH/SME	09/15/2025	ISSUED FOR 30% REVIEW

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

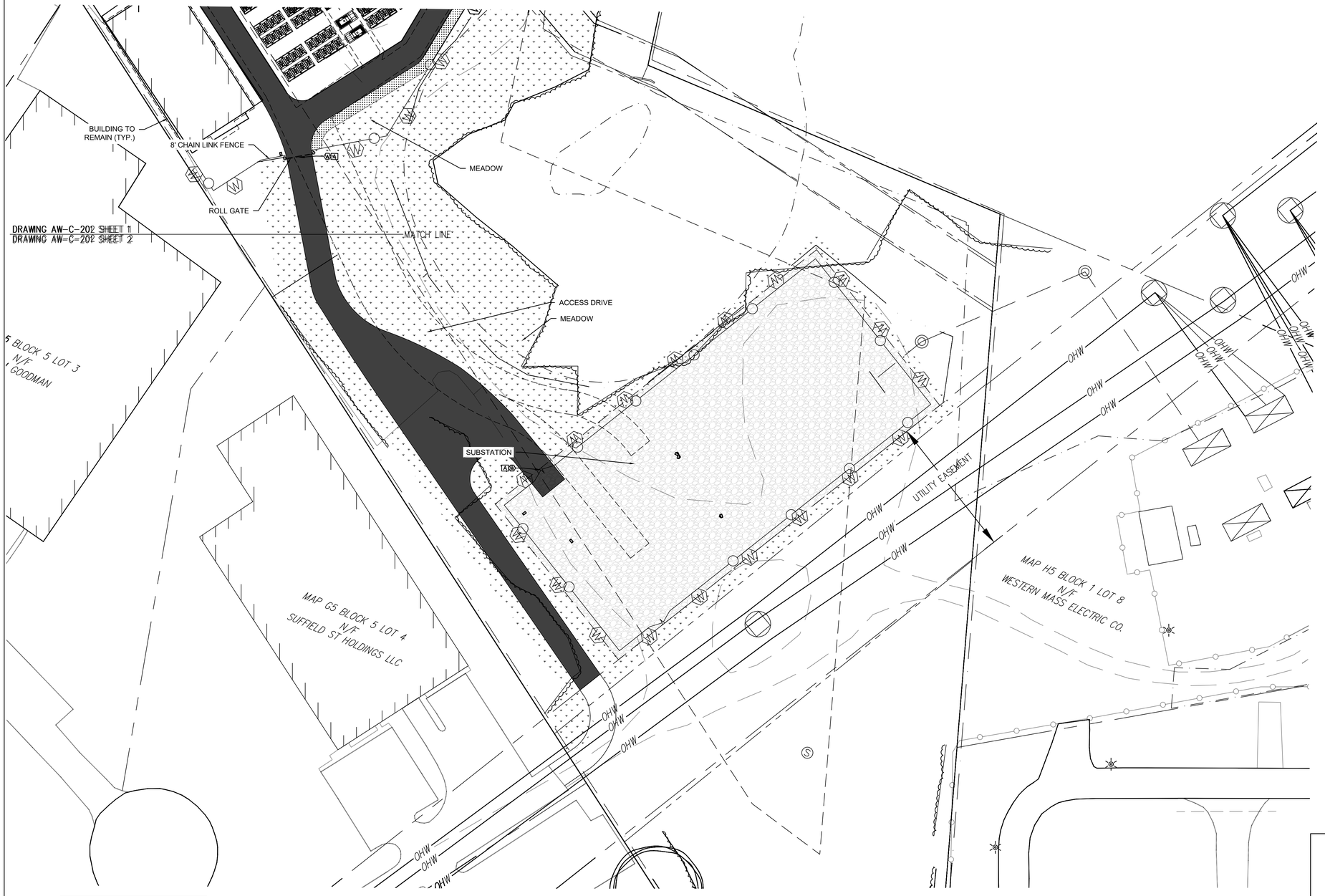
LANDSCAPE PLAN - SHEET 1

SME SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-201-1

REV D



LEGEND

PROPERTY LINE
100' PROPERTY SETBACK
WETLANDS
100' WETLAND BUFFER
UTILITY EASEMENT
GRAVEL ACCESS ROAD
VEGETATED BUFFER STRIP
SECURITY FENCE
SOUND WALL
LIMIT OF WORK
BESS UNIT

LEGEND

CONSERVATION SEED MIX
MEADOW SEED MIX
DETENTION BASIN SEED MIX

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
12/22/2025

0 20 40 80
1 INCH = 40 FEET

REV.	BY	DATE	STATUS
D	TMH/SME	12/22/2025	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/2025	ISSUED FOR REVIEW
B	TMH/SME	10/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)
A	TMH/SME	09/15/2025	ISSUED FOR 30% REVIEW

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

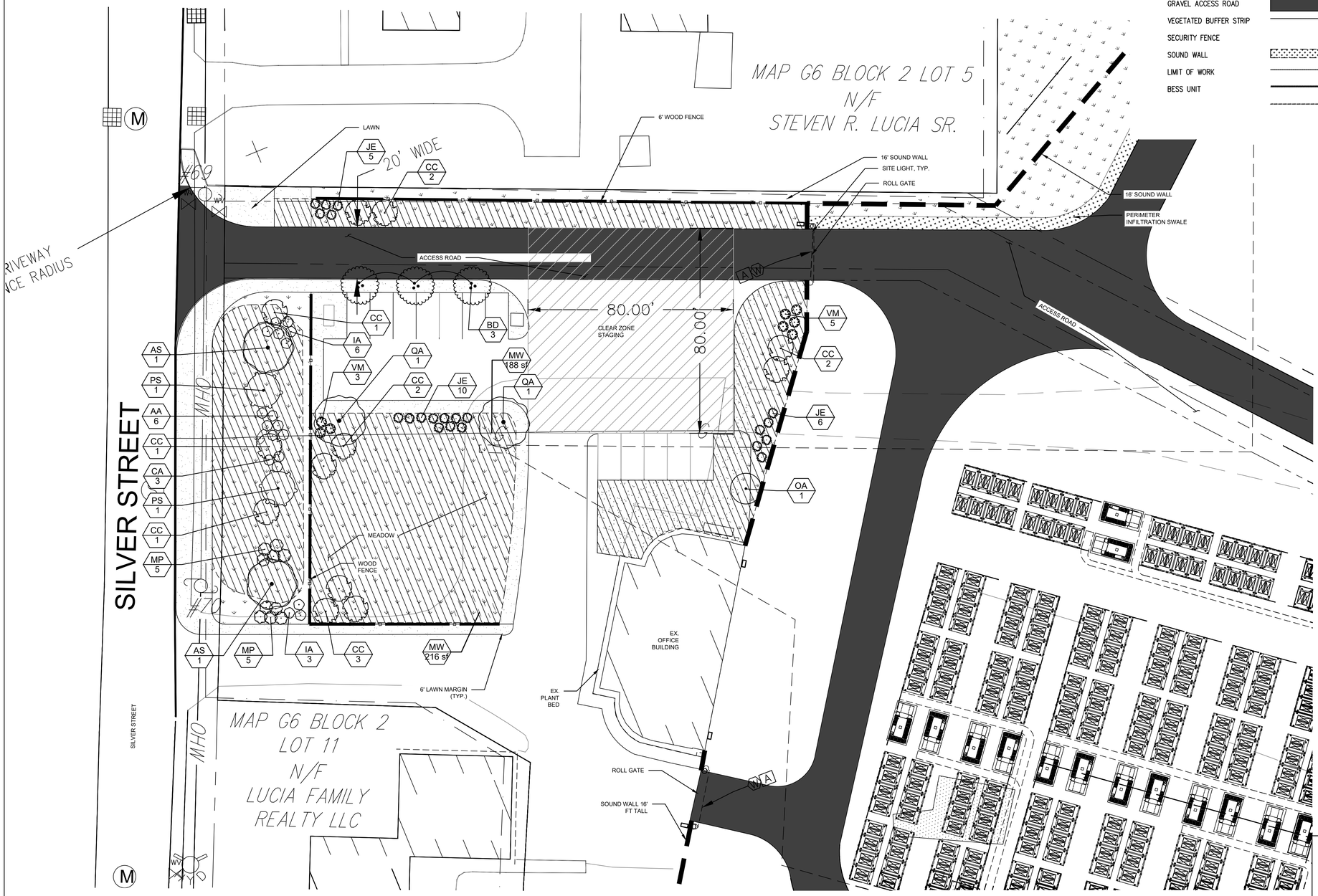
LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

LANDSCAPE PLAN - SHEET 2

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	9/15/2025
SCALE:	1"=40'

JOB NO. 250741 DWG FILE AW1-C-201-2



RIVEWAY
NCE RADIUS

ISSUED FOR REVIEW
NOT FOR CONSTRUCTION
12/22/2025

20 0 10 20
1 inch = 20 ft.

LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- GRAVEL ACCESS ROAD
- VEGETATED BUFFER STRIP
- SECURITY FENCE
- SOUND WALL
- LIMIT OF WORK
- BESS UNIT

NOTES

1. REFER TO UTILITY AND GRADING PLANS FOR UTILITY LOCATION AND FINAL GRADES. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE DRAWINGS. CONTACT LANDSCAPE ARCHITECT FOR DIRECTION ON HOW TO PROCEED.
2. REFER TO UTILITY AND GRADING PLANS AND REPORT CONFLICTS WITH PROPOSED PLANTINGS TO THE LANDSCAPE ARCHITECT.
3. CONTRACTOR SHALL COORDINATE PLANTING INSTALLATION WITH WORK BEING DONE BY OTHERS.
4. EXACT LOCATIONS OF PLANT MATERIALS TO BE APPROVED BY LANDSCAPE ARCHITECT IN THE FIELD PRIOR TO INSTALLATION. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ADJUST PLANTS TO EXACT LOCATION IN THE FIELD.
5. VERIFY PLANT COUNTS AND SQUARE FOOTAGES. QUANTITIES ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. IF QUANTITIES ON PLANT LIST DIFFER FROM GRAPHIC INDICATIONS, THEN GRAPHICS SHALL PREVAIL.
6. TREE SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO EXISTING.
7. TREES TO BE PLANTED A MINIMUM FOUR FEET FROM FACE OF BUILDINGS, OR PAVEMENT, EXCEPT AS APPROVED BY LANDSCAPE ARCHITECT.
8. PROVIDE MATCHING FORMS AND SIZES FOR PLANT MATERIALS WITHIN THE SAME SPECIES AND SIZE DESIGNATED ON THE DRAWINGS.
9. ALIGN AND EQUALLY SPACE IN ALL DIRECTIONS SHRUBS SO DESIGNATED PER THESE NOTES AND DRAWINGS.
10. FINISH GRADES OF SHRUB AREAS AND LAWNS SHALL BE 1 1/2–INCHES BELOW ADJACENT PAVING.
11. LANDSCAPE ARCHITECT TO REVIEW PLANT MATERIALS AT SOURCE OR BY PHOTOGRAPHS PRIOR TO DIGGING OR SHIPPING OF PLANT MATERIAL.
12. TOPSOIL STRIPPED FROM THE SITE AND PROPERLY STOCKPILED PRIOR TO APPLICATION MAY, UPON APPROVAL OF THE LANDSCAPE ARCHITECT, BE USED FOR PREPARATION OF LAWNS AND PLANTING BEDS. IT SHOULD BE FREE OF LARGE (ONE (1) INCH OR GREATER) COBBLES, ROOTS, OLD SOD, TRASH, WOOD OR OTHER CONTAMINANTS, AND BE OF A FRIABLE CONSISTENCY AND SUITABLE FOR PLANT GROWTH.
13. PROVIDE SOIL TEST REPORTS FOR ONSITE TOP SOIL TO BE REUSED AND FOR LOAM BORROW TO BE IMPORTED. SOIL TEST REPORT SHALL INCLUDE USDA TEXTURAL CLASSIFICATION, TEXTURAL SIEVE ANALYSIS, AS WELL AS NUTRIENT ANALYSIS, AND MICRO–NUTRIENTS.
14. DO NOT OVER COMPACT LOAM AREAS OR WORK SOIL IN A WET OR FROZEN STATE.
15. LOOSE OR CRACKED ROOTBALLS SHALL BE REJECTED.
16. THE CONTRACTOR IS RESPONSIBLE FOR FULLY MAINTAINING PLANTING (INCLUDING BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC.) OF THE PLANTING AREAS UNTIL THE WORK IS ACCEPTED IN TOTAL BY THE OWNER. PROVIDE A MINIMUM EQUIVALENT OF 1" OF RAIN PER WEEK DURING THE ESTABLISHMENT PERIOD.
17. THE CONTRACTOR SHALL COMPLETELY GUARANTEE PLANT MATERIAL FOR A PERIOD OF TWO (2) YEARS BEGINNING ON THE DATE OF TOTAL ACCEPTANCE. THE CONTRACTOR SHALL PROMPTLY MAKE REPLACEMENTS BEFORE OR AT THE END OF THE GUARANTEE PERIOD, AS DIRECTED BY THE OWNER.

N

PLANT SCHEDULE

CODE	QTY	BOTANICAL / COMMON NAME	CONT	CAL	HT
AS	2	ACER SACCHARUM / SUGAR MAPLE	B & B	2"CAL	
BD	3	BETULA DELTOIDES / GREY BIRCH	B & B		12'-14'
CC	12	CRATAEGUS CRUS-GALLI / COCKSPUR HAWTHORN	B & B	1"CAL	
OA	1	OXYDENDRUM ARBOREUM / SOURWOOD TREE	#10		4'-6'
PS	2	PRUNUS SEROTINA / BLACK CHERRY	#10	1.5"CAL	
QA	2	QUERCUS ALBA / WHITE OAK	B & B	2"CAL	
AA	6	ARONIA ARBUTIFOLIA / RED CHOKEBERRY	#3	24"-36"	
CA	3	CORYLUS AMERICANA / AMERICAN HAZELNUT	#3	24"-36"	
IA	9	ILEX VERTICILLATA / WINTERBERRY HOLLY	#3	24"-36"	
JE	21	JUNIPERUS VIRGINIANA 'GREY OWL' / GREY OWL JUNIPER	#3	18"-24"	
MP	10	MYRICA PENSYLVANICA / NORTHERN BAYBERRY	#3	24"-36"	
VM	8	VIBURNUM ACERIFOLIUM / MAPLELEAF VIBURNUM	#3	24"-36"	
MW	100 SF	ASCLEPIAS SYRIACA / COMMON MILKWEED	PLUG		
	TBD	BLACK BEAUTY TALL FESCUE MIX / ERNST SEEDS	SEED		

LEGEND

- CONSERVATION SEED MIX
- MEADOW SEED MIX
- DETENTION BASIN SEED MIX

REV.	BY	DATE	STATUS
D	TMH/SME	12/22/2025	ISSUED FOR PERMIT REVIEW - NOT FOR CONSTRUCTION
C	TMH/SME	11/17/2025	ISSUED FOR REVIEW
B	TMH/SME	10/24/2025	ISSUED FOR REVIEW (RESPONSE TO COMMENTS)
A	TMH/SME	09/15/2025	ISSUED FOR 30% REVIEW

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

LANDSCAPE PLAN ELARGEMENT - SHEET 3

BSC GROUP
BUILD | SUPPORT | CONNECT

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL• CIVIL• GEOTECHNICAL• WATER• COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 •sme-engineers.com

DESIGN BY:	CLB/TR
DRAWN BY:	TR/RNS
CHECKED BY:	CLB/RNS
APRV'D BY:	CLB
DATE:	1/19/2026
SCALE:	1"=20'

JOB NO. 250741 DWG FILE AW1-C-201-2

REV D

SOLID FENCING



Sound wall: Sound absorbing composite



Traditional cedar picket or board fence



Composite formal screening fence option

CHAIN LINK FENCE



PVC (vinyl) coated chain-link fence w/ vertical slats



Chain-link fence with privacy slats



Welded wire security fence



chain link standard 2“ for screening

Native low branching canopy trees selected for screening and pollinator habitat value



White Pine, Pinus strobus



Pin Oak, Quercus palustris



River Birch, Betula nigra

Native Understory flowering trees selected for screening and pollinator habitat value



Sourwood, Oxydendrum arboreum



Shad tree, Amelanchier canadensis



Dogwood, Cornus florida



Tupelo, Nyssa sylvatica



White Oak, Quercus alba



Sugar Maple, acer saccharum



Hornbeam, Carpinus carolineana



Hawthorn, Crataegus phaenopyrum



Black Cherry, Prunus serotina

Native shrubs and meadow options for screening and pollinator habitat value



NE Pollinator Meadow part sun



NE Native Pollinator Meadow low mix



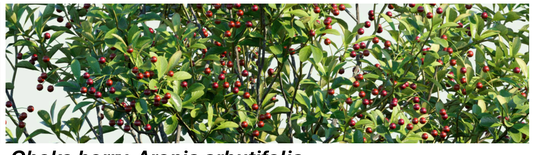
Hazelnut, Corylus americana



Red Cedar, Juniperus v.



Cranberrybush viburnum Viburnum acerifolium



Choke berry, Aronia arbutifolia

SITE ELEMENTS

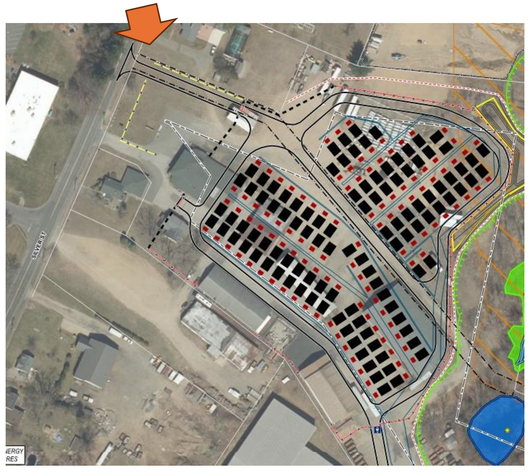
Existing Condition Photos



Proposed condition



Camera Location Plan



North Driveway near 777 Silver St.

Existing Condition Photos



Proposed condition



Camera Location aerial photo



South Driveway near 777 Silver St.

SITE ELEMENTS

Birds eye perspective site layout





Entry from Silver St. North



Entry from Silver St. South

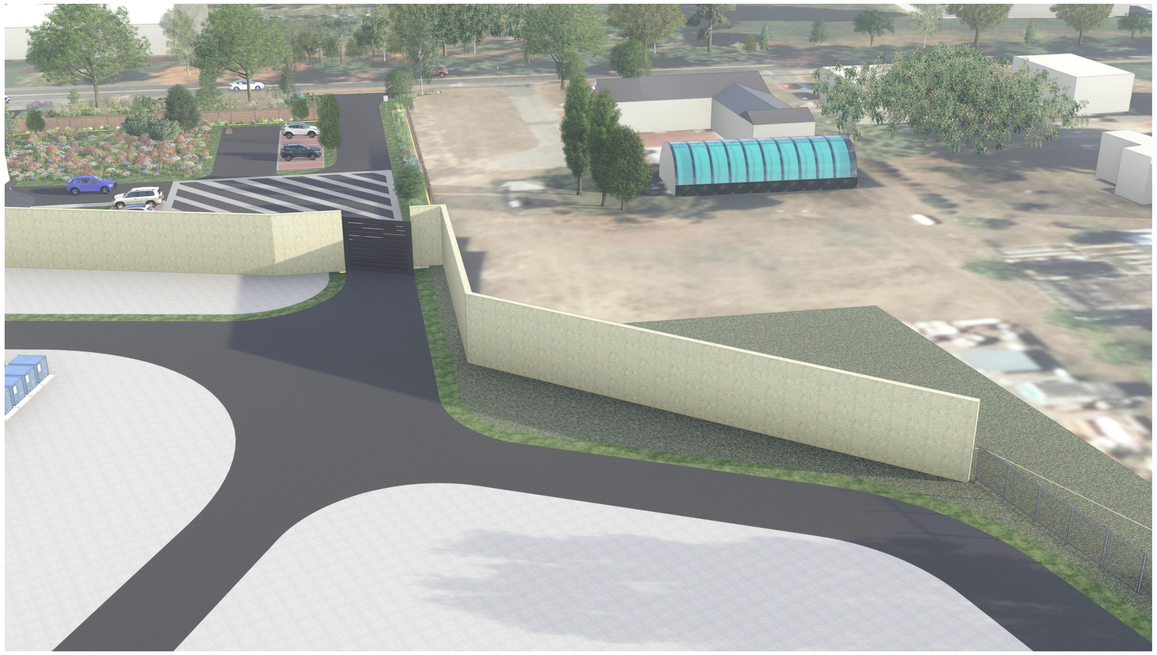


SITE ELEMENTS

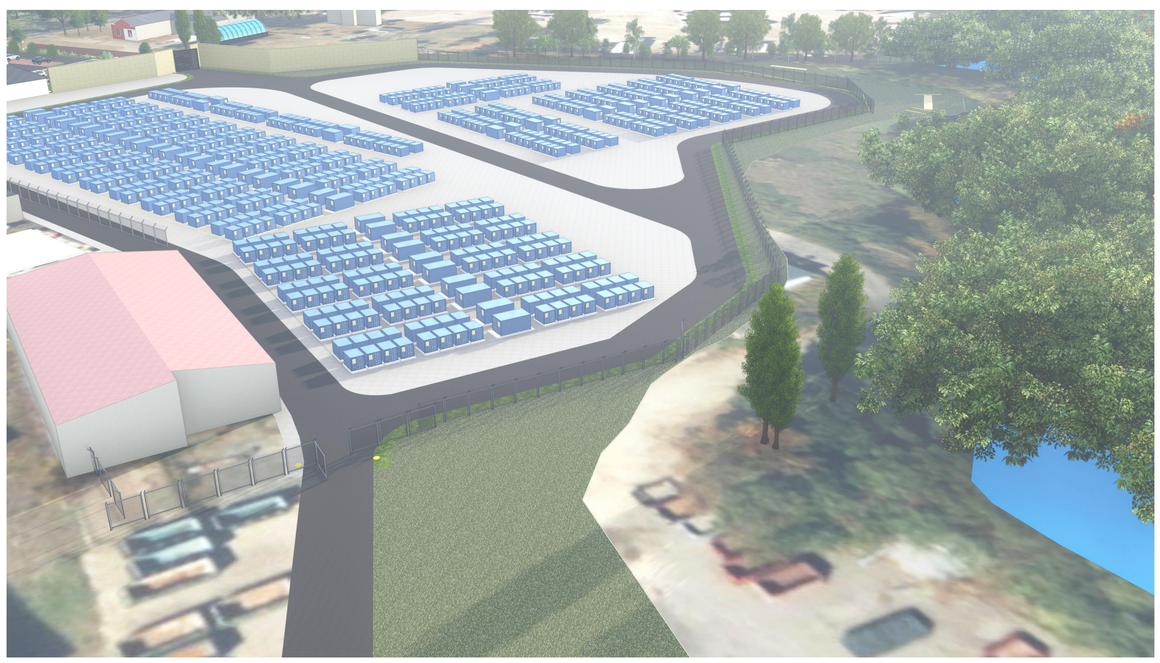
Birds eye along Silver St.



Birds eye toward Silver St. from inside the site



Birds eye from the power station toward the BESS



Front gardens Office parking & staging



SITE ELEMENTS

South Side warehouses



North Side Self Storage



East Side Power Substation



West side, Opposite Silver St. Light Industrial



SITE ELEMENTS

ATTACHMENT G – SOUND STUDY

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

January 20, 2026

Ms. Melissa Kaplan, PWS
Senior Associate
BSC Group, Inc.
655 Winding Brook Drive
Glastonbury, CT 06033

Re: Battery Energy Storage System (BESS), Agawam, MA – Sound Study ***Ref. 4983***

Dear Melissa:

Tech Environmental, Inc. (Tech) prepared this sound study for BSC Group, Inc. (BSC Group) for a proposed 250-megawatt (MW) battery energy storage system (BESS) (the "Project") at 769 Silver Street in Agawam, Massachusetts. Based on Project design drawings[1], Longroad Energy plans to install one hundred eight (108) BESS units which consist of two (2) Fluence Smartstacks and a transformer. The 108 BESS units are served by a substation that has two (2) 162 MVA transformers. For modeling purposes, Tech assumed daytime peak-power operation, with all equipment capable of operating during both daytime and nighttime hours. The objective of this study is to determine whether the Project complies with the Town of Agawam BESS ordinance, which requires adherence to the MassDEP Noise Policy.

Acoustic modeling evaluated sound propagation to eleven residential receptor locations surrounding the site. The analysis determined that an 18-foot-tall noise barrier along the northwest property boundary facing Silver Street is required to reduce sound levels at the nearest residences. With this mitigation, predicted worst-case sound levels range from 40 to 45 dBA at upper-story windows, demonstrating full compliance with the MassDEP Noise Policy.

1.0 THE DECIBEL SCALE FOR SOUND

All sounds originate with a source – a human voice, vehicles on a roadway, or an airplane overhead. The sound energy moves from the source to a person's ears as sound waves, which are minute variations of air pressure. The loudness of a sound depends on the sound pressure level, which has units of decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. On this scale, the quietest sound we can hear is 0 dB, while the loudest is 120 dB. Every 10-dB increase is perceived as a doubling of loudness. Most sounds we hear in our daily lives have sound pressure levels in the range of 30 dB to 90 dB.

Community noise studies and regulations use an A-weighting scale (dBA) when measuring sound pressure levels as this approximates the response of the human ear to sounds, we experience in everyday life. Typical sound levels associated with various activities and environments are presented in **Figure 1**. Here are examples of sound levels we all encounter. A quiet suburban area at night without any traffic typically has an average sound level of 40 to 45 dBA. The freight train you hear in the distance may be 50 dBA, and crickets and tree frogs in the summer sing a sound level of 55 dBA. Two people having a conversation

[1] Longroad Energy, Agawam BESS Preliminary Conceptual Drawing, Revision 12, Revised January 2, 2026.

in a normal tone of voice will hear each other speak at 65 dBA. Standing near a road, a car passing by can produce 75 dBA, and a truck passing by is louder at 80 dBA.

There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. The L_{10} metric, which is the sound level exceeded 10 percent of the time, represents the louder periods of time and is sometimes used to characterize highway traffic noise. The L_{eq}, or equivalent sound level, is the steady-state sound level over a period of time that has the same acoustic energy as the fluctuating sounds that actually occurred during that same period. It is commonly referred to as the average sound level. The L_{max}, or maximum sound level, represents the one second peak level experienced during a given time period. These are broadband sound pressure measurements, i.e., it includes sounds at all frequencies. Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines eleven octave bands from 16 to 16,000 Hz.

2.0 APPLICABLE NOISE REGULATIONS

The Town of Agawam has battery energy storage system (BESS) ordinance which discusses sound under part 5 of §180- 167 General Requirements, which states, *"Any application to construct a Tier 2 or Tier 3 battery energy storage system where the energy storage units are located within two hundred fifty (250) feet of a sensitive noise receptor may be required to include an acoustic study in order to ensure that any increase in sound complies with Massachusetts DEP requirements."* Since the project is a Tier 3 BESS (having an aggregate energy capacity greater than 50 MWh), an acoustic study was prepared in accordance with the Massachusetts Department of Environmental Protection (MassDEP) requirements.

The MassDEP regulates noise through 310 CMR 7.10, "Air Pollution Control". In these regulations, "air contaminant" is defined to include sound, and a condition of "air pollution" includes the presence of an air contaminant in such concentration and duration as to "cause a nuisance" or "unreasonably interfere with the comfortable enjoyment of life and property." Regulation 7.10 prohibits "unnecessary emissions" of noise. The MassDEP Noise Policy (Policy Statement 90-001, February 1, 1990) interprets a violation of this noise regulation to have occurred if the source causes either:

a) An increase in the broadband sound pressure level of more than 10 A-weighted decibels(dBA) above the ambient, or
b) A "pure tone" condition.

The ambient background level is defined as the background sound level that exceeds 90 percent of the time (L_{90}) level, as measured during equipment operating hours. A "pure tone" condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

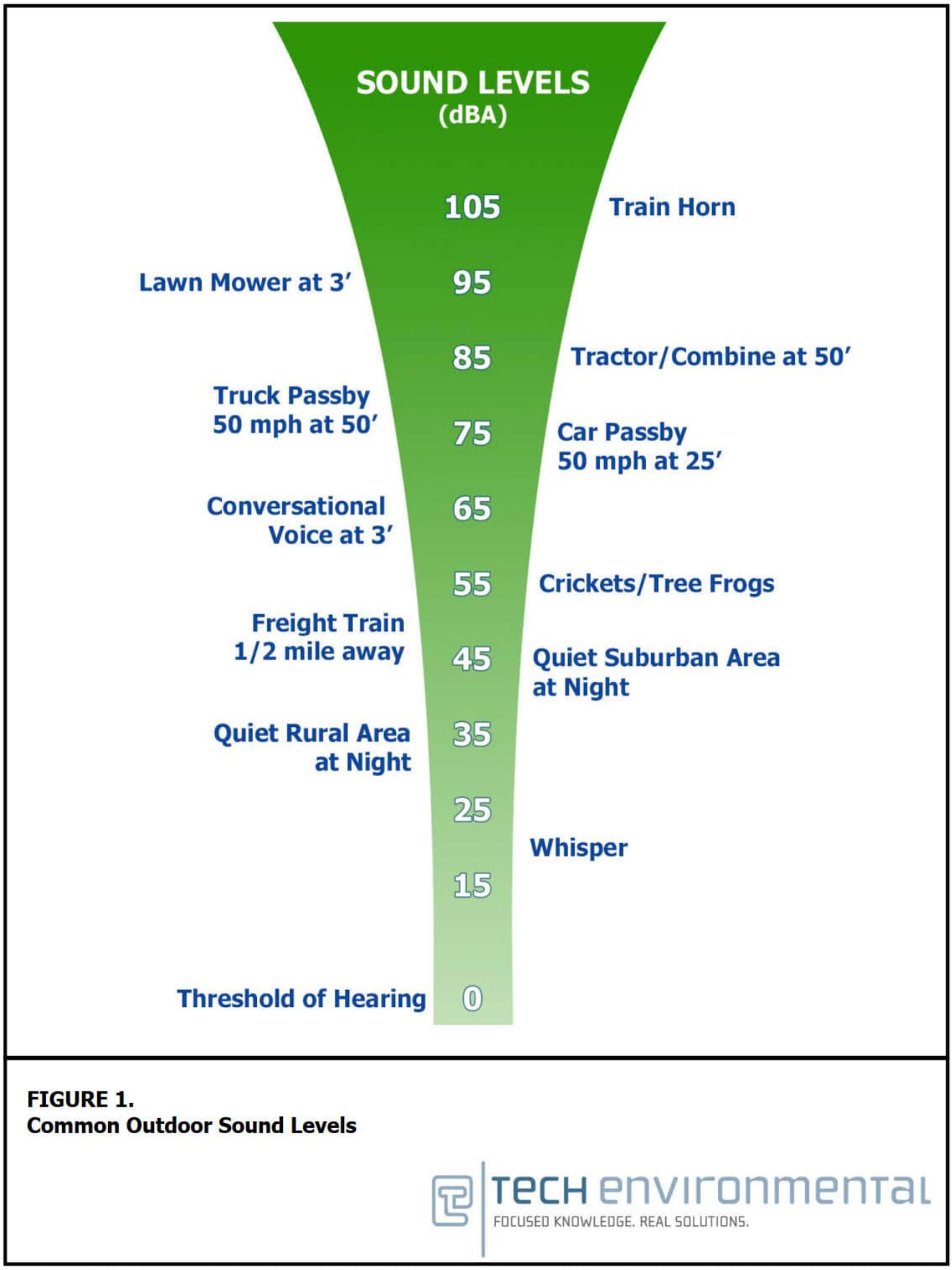


FIGURE 1.
Common Outdoor Sound Levels

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

3.0 PRE-CONSTRUCTION SOUND MONITORING

This section provides a summary of the pre-construction sound monitoring procedures and results.

3.1 Monitoring Procedures

Tech set up a sound monitoring station to collect sound measurements over an eight- (8) day period starting at 12:00 p.m. on Thursday, September 10, 2025, to 12:00 p.m. on Thursday, September 17, 2025, at 769 Silver Street, see **Figure 2.** The purpose of the monitoring was to establish the ambient sound levels for the Project site. Sound measurements were taken with a Larson Davis 831 real-time sound level analyzer. The analyzer was equipped with a 1/2" precision condenser microphone and has an operating range of 5 dB to 140 dB, and an overall frequency range of 3.5 to 20,000 Hz. The analyzer meets or exceeds all requirements set forth in the American National Standards Institute (ANSI) Standards for Type 1 for quality and accuracy. Prior to and immediately following the measurement session, the sound analyzer was calibrated (no level adjustment was required) with an ANSI Type 1 calibrator, which has an accuracy traceable to the National Institute of Standards and Technology (NIST). All instrumentation was laboratory calibrated per ANSI recommendations, see **Appendix A** for the calibration records. For the measurement session, the microphone was fitted with an environmental windscreen to minimize the effect of air movement and tripod-mounted at a height of five feet. The monitoring equipment was situated within a weatherproof case and installed at ground level. The sound monitoring was performed in conformance with the requirements of American National Standards Institute (ANSI) S12.18.[2] The sound analyzer was programmed to measure continuous real-time peak (L_{max}), average (L_{eq}), and background level (L_{90}), higher transient levels (L_{10}), and one-third octave band frequency measurements throughout the monitoring period. Weather data was retrieved from Iowa Environmental Mesonet ASOS-AWOS-METAR Data Download [3] for the Westfield-Barnes Regional Airport weather station (BAF), and weather conditions were generally favorable for ambient sound monitoring. The lowest average one-hour L_{90} sound level was used to establish ambient conditions.

3.2 Monitoring Results

The sound monitoring results are summarized in **Table 1**, **Figure 3**, and **Figure 4**. The dominant sound source at the Project site was traffic along local roads. The ambient (L_{90}) sound measurements that included high-frequency natural sounds, such as from insects, were removed and broadband L_{90} sound levels were recalculated.[4]

Table 1 and **Figure 3** present the hourly broadband L_{90} sound levels, which ranged from 28 to 48 dBA—typical of ambient conditions in a suburban environment. Average hourly sound levels were calculated for each of the 24 hours of the day and are shown in **Table 1** and **Figure 4**. Ambient sound levels were highest between 6:00 a.m. and 10:00 a.m., averaging 42 to 44 dBA, while the lowest average one-hour L_{90} level (35 dBA) occurred between 1:00 a.m. and 2:00 a.m. Based on this minimum hourly L_{90} level, the sound limit for the Project is 45 dBA (i.e., 35 dBA + 10 dBA).

[2] Acoustic Society of America, American National Standard S12.18-1994, "Procedures for Outdoor Measurement of Sound Pressure Level," reaffirmed 2009.
[3] https://mesonet.agron.iastate.edu/request/download.phtml?network=MA_ASOS
[4] Acoustical Society of America, American National Standard ANSI/ASA S3/SC1.100-2014 and ANSI/ASA S12.100 "Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas", 2014.



FIGURE 2.
Long-term Sound Meter Location
Agawam, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

TABLE 1

EXISTING SOUND LEVELS MEASURED AT 769 SILVER STREET, AGAWAM MA

Thursday September 10, 2025, to Thursday September 17, 2025

Hour Starting	Measured $L_{90\text{-}i}$ Broadband Hourly Sound Levels (dBA)								Average Sound Level (dBA)
	Fri. 3/7	Sat. 3/8	Sun. 3/9	Mon. 3/10	Tues. 3/11	Wed. 3/12	Thurs. 3/13	Fri. 3/14	
Midnight	--	41	37	32	29	36	34	41	35
1 a.m.	--	40	36	36	29	34	34	36	35*
2 a.m.	--	39	36	34	29	35	34	38	35
3 a.m.	--	38	40	34	28	39	39	38	37
4 a.m.	--	39	40	35	33	39	38	38	38
5 a.m.	--	40	41	34	34	41	40	40	38
6 a.m.	--	46	44	34	36	45	43	45	42
7 a.m.	--	46	45	37	36	48	42	47	44
8 a.m.	--	43	44	36	38	46	42	43	42
9 a.m.	--	46	43	37	41	44	44	44	43
10 a.m.	--	43	40	41	41	42	43	44	42
11 a.m.	--	44	41	39	38	41	44	44	42
Noon	48	47	43	36	39	43	44	--	42
1 p.m.	43	46	44	36	42	43	45	--	42
2 p.m.	41	46	43	36	40	43	45	--	42
3 p.m.	44	41	43	40	40	45	46	--	41
4 p.m.	40	40	43	39	38	41	45	--	41
5 p.m.	40	44	38	40	38	38	41	--	40
6 p.m.	41	40	41	33	37	38	42	--	39
7 p.m.	38	41	39	34	38	38	44	--	39
8 p.m.	39	40	35	32	40	37	43	--	38
9 p.m.	39	36	32	31	39	35	42	--	36
10 p.m.	38	37	34	30	38	35	42	--	36
11 p.m.	37	38	34	30	36	33	41	--	36

* Lowest average hourly sound level of 26 dBA was measured between 12:00 a.m. and 1:00 a.m.

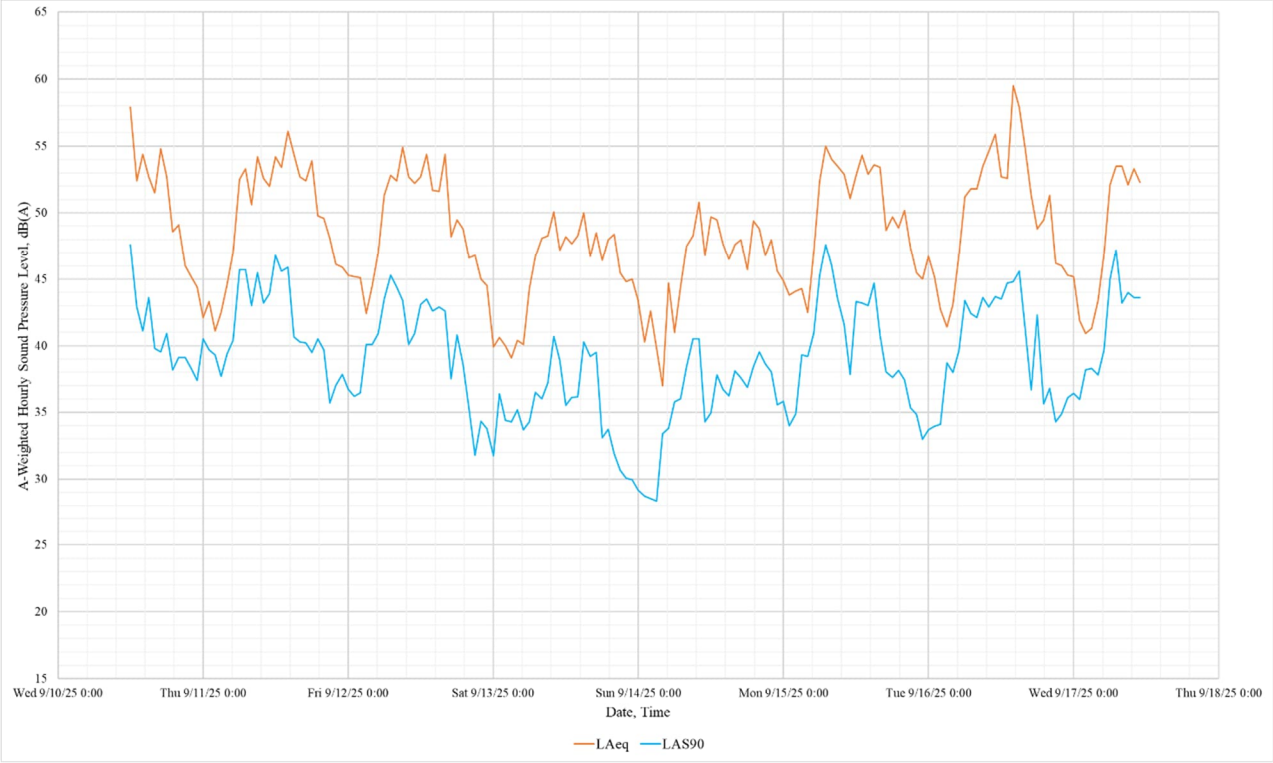


FIGURE 3. EXISTING SOUND LEVELS MEASURED AT 769 SILVER STREET

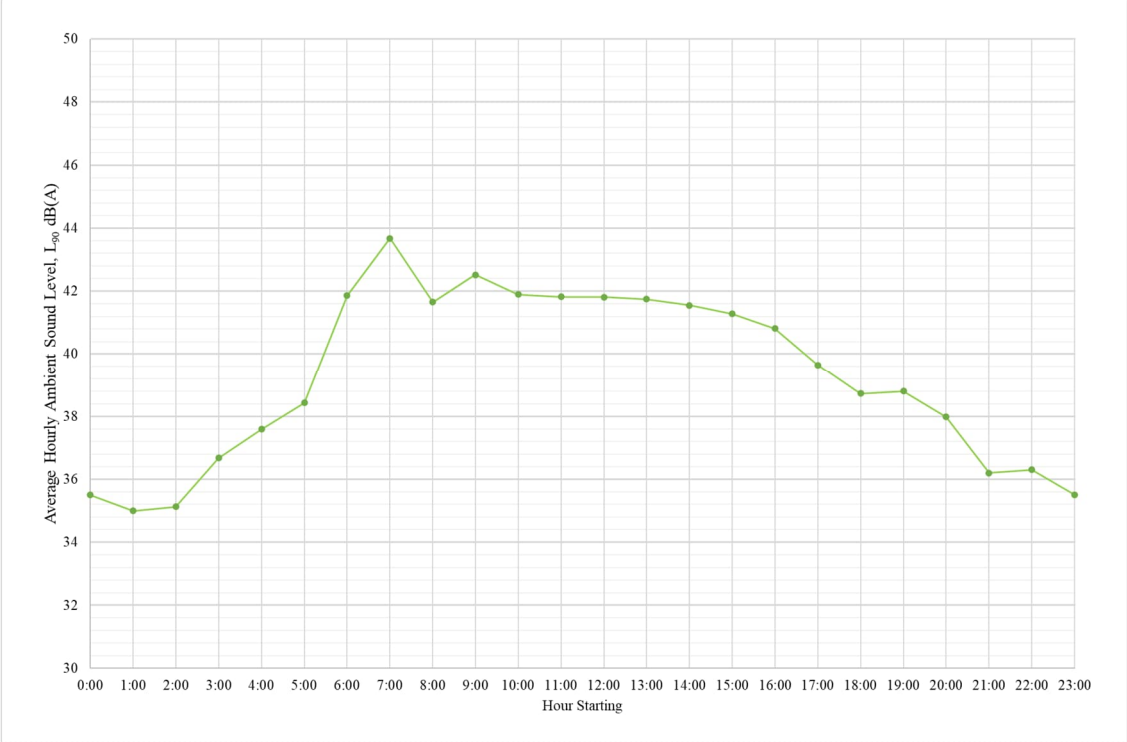


FIGURE 4. AVERAGE HOURLY AMBIENT SOUND LEVELS AT 769 SILVER STREET

4.0 ACOUSTIC MODELING APPROACH AND RESULTS

This section provides a summary of the acoustic modeling approach and results.

4.1 Acoustic Modeling Approach

The future sound levels from the Project, when it is producing maximum electrical power, were calculated with the Cadna/A acoustic model. Cadna/A is a three-dimensional model for sound propagation and attenuation based on International Standard ISO 9613-2 (2024)[5]. Atmospheric absorption, the process by which sound energy is absorbed by the air, was calculated using ANSI S1.26-1995.[6] On- and off-site topography was determined using MassGIS digital terrain and elevation data.[7] Ground absorption assumes mixed ground types (i.e., G = 0.5) for all areas. The model assumes the most-favorable sound propagation conditions, as occur under downwind conditions or during a ground-based temperature inversion on a clear night. Under these atmospheric conditions, sound travels further than if a person is upwind from a source and the atmosphere is well mixed, which would dampen the sound.

The battery energy storage system will include one hundred eight (108) BESS units which consist of two (2) Fluence Smartstacks and a transformer. The 108 BESS units are served by a substation that has two (2) 162 MVA transformers at the Project site. at the Project site. For the mitigation case, an 18-foot-tall noise barrier is used to reduce the propagation of sound from the Project to the nearest residential receptor on Silver Street. Sound level data for the BESS Unit vary by ambient temperature and power output of the units. This study used the worst case (highest sound level) for the project site under nighttime conditions: 35 degrees C (95 degrees F) and 100% power output. All equipment is understood to potentially run during any time of the day or night. Broadband and octave band sound source data used in the model was from the manufacturer's sound measurements and is summarized in **Table 2**.

TABLE 2

REFERENCE SOUND POWER LEVELS FOR ACOUSTIC MODELING (L_w, dB)

Equipment	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Total (dBA)
162 MVA Transformer	74	83	107	101	99	81	68	55	44	**98**
BESS Unit	50	69	71	79	82	86	84	79	71	**90**

The broadband and octave band sound data for the BESS Unit were determined from collected sound pressure levels by the manufacturer[8]. The broadband sound data was obtained from a JSHP transformer[9]. The octave band sound data for the transformers were estimated using the standardized National Electrical Manufactures Associations sound level rating (NEMA 87)[10]. All sound sources are represented in the acoustic model as area sources with heights equivalent to their unit dimensions.

[5] International Standard, ISO 9613-2, Acoustics – Attenuation of Sound During Propagation Outdoors, -- Part 2 General Method of Calculation, 2024.
[6] American National Standards Institute, ANSI S1.26-1995, "American National Standard Method for the Calculation of the Absorption of Sound by the Atmosphere," 1995.
[7] https://www.mass.gov/info-details/massgis-data-lidar-terrain-data
[8] Fluence, "Noise Design Report", September 4, 2025
[9] "JSHP FAT Report", Pages 61, 68-70
[10] Transformer dimensions: 13.3 ft wide, 15.4 ft long, 13.4 ft tall.

The equipment sound levels presented in **Table 2** represent the maximum sound levels to be emitted by equipment operating during daytime hours at peak power, although all system components are understood to potentially be operational during both daytime and nighttime hours. However, the operating condition of the equipment during non-peak hours will be less, and the sound levels emitted during non-peak hours will also be less. Thus, this analysis compares the predicted impacts of the Project's equipment at maximum load, to the lowest average one-hour ambient sound level, which is not likely to occur simultaneously, but is a conservative means of demonstrating compliance with the MassDEP Noise Policy.

4.2 Acoustic Modeling Results

Up to twenty-four (24) residential locations were analyzed in the model at both 5 feet and 15 feet above grade at each of the residential locations to represent the appropriate first and second story windows for each residence. For the purpose of this analysis, results are shown at the worst-case locations which are eleven (11) residential locations surrounding the Project site, at the second story window (15 feet). **Figure 5** shows the location of the BESS Units and the two(2) 162 MVA transformers at the Project site. **Figure 6** shows the modeling receptors included in the model representing the eleven (11) residential locations surrounding the Project site. Two (2) conditions were modeled:

1) The base condition represents the proposed site plan with no mitigation (i.e., noise barriers); and

2) A mitigated condition, installing sixteen (18) feet tall a noise barrier wall along the northwest edge of the property facing Silver Street which reduces the propagation of sound from the Project to the nearest residential receptors on Silver Street. The locations of the noise barrier walls are illustrated in **Figure 5**. All noise barrier walls are assumed to meet ISO 9613-2 requirements for a screening object: a) the surface density is at least 10 kg/m^2 (i.e., 2 lbs./sf), and b) the object has a closed surface without large cracks or gaps.

Both modeling analyses assume that all equipment will operate at maximum load during operation hours and compare the predicted sound levels to the measured lowest average one-hour ambient level at the project site (35 dBA), a condition unlikely to occur, and the presumed sound limit for the project of 45 dBA (i.e., 35 dBA +10 dBA).

4.2.1 No Mitigation Measures

The base condition, not employing any mitigation measures, does not show compliance with the MassDEP criteria of 45 dBA with impacts ranging from 37 dBA to 50 dBA at the second story windows. The predicted impacts at residencies further away are less. And those impacts warrant noise mitigation measures to demonstrate compliance at locations 6, 7 and 8. **Figure 7** illustrates the impacts of the Project, with no mitigation, with colored contours representing equivalent impacts. The predicted results for all modeling receptors with no mitigation are detailed in **Table 3** and **Table 4**.

4.2.2 Mitigation Measure – Barrier Wall Installation

The mitigated condition, installing a 18-foot-tall noise barrier wall along the northwest edge of the property facing Silver Street, reduces the propagation of sound from the Project towards receptor locations 6, 7, and 8. The predicted worst-case operational sound levels with those mitigation measures shows full compliance with the MassDEP criteria of 45 dBA with predicted worst-case operational sound levels of 40 to 45 dBA at the second story windows. This worst-case condition is unlikely to occur regularly. Thus, the Project with mitigation demonstrates compliance with the MassDEP Noise Policy. **Figure 8** illustrates the impacts of the Project, with mitigation, with colored contours representing equivalent impacts. Additionally, no pure tones as defined by MassDEP are predicted at any receptors. The predicted results for all modeling receptors with mitigation are detailed in **Table 5** and **Table 6**.

5.0 CONCLUSION

A sound study was conducted for the proposed energy storage system at 769 Silver Street in Agawam, Massachusetts, and the results were evaluated against the MassDEP Noise Policy. With the inclusion of an 18-foot-tall noise barrier along the northwest edge of the property to reduce sound propagation toward residential receptors 6, 7, and 8, predicted worst-case operational sound levels range from 40 to 45 dBA at second-story windows—fully compliant with the MassDEP 45 dBA criterion. This worst-case condition is unlikely to occur frequently. Therefore, the Project meets the requirements of the MassDEP Noise Policy.

Please call if you have any questions regarding this report.

Sincerely,

TECH ENVIRONMENTAL, INC.



Marc C. Wallace, QEP, INCE
Vice President

4983/Sound Study Report for Agawam BESS_1.20.2026

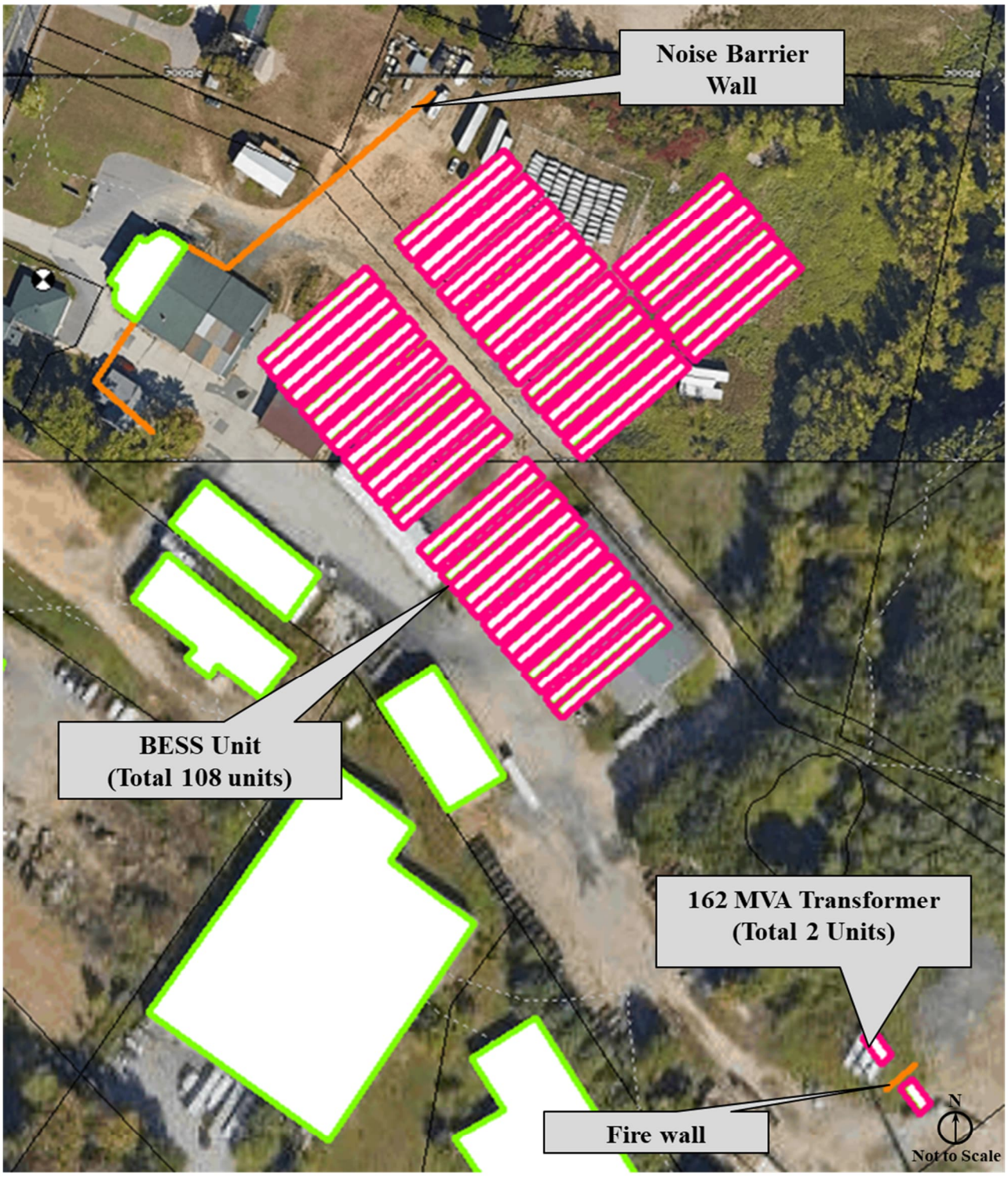


FIGURE 5.
Sound Source Locations
769 Silver Street, Agawam, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

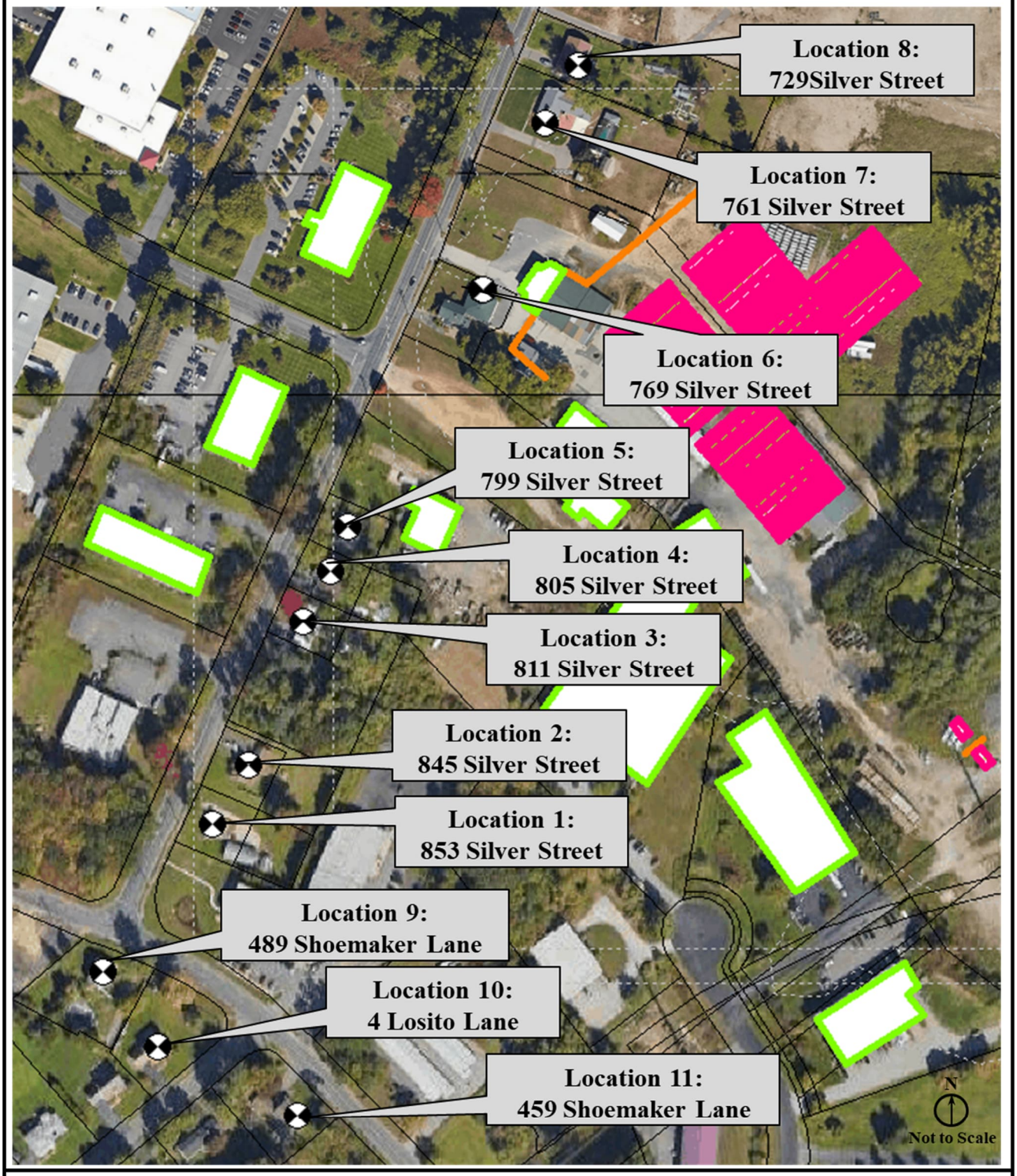


FIGURE 6.
Modeling Receptor Locations
769 Silver Street, Agawam, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

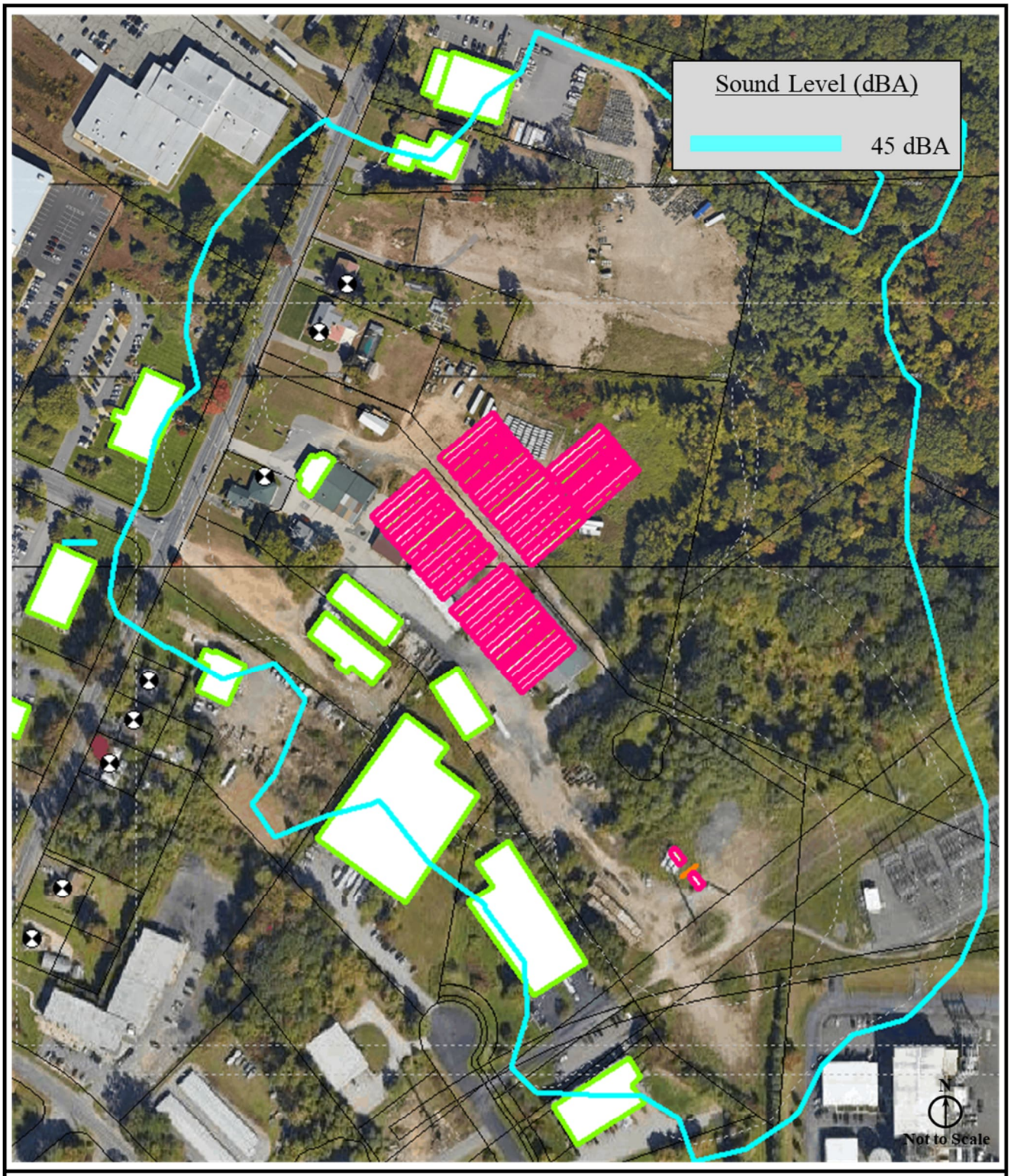


FIGURE 7.
Noise Contours of Modeling Results (5 ft): Unmitigated
769 Silver Street, Agawam, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

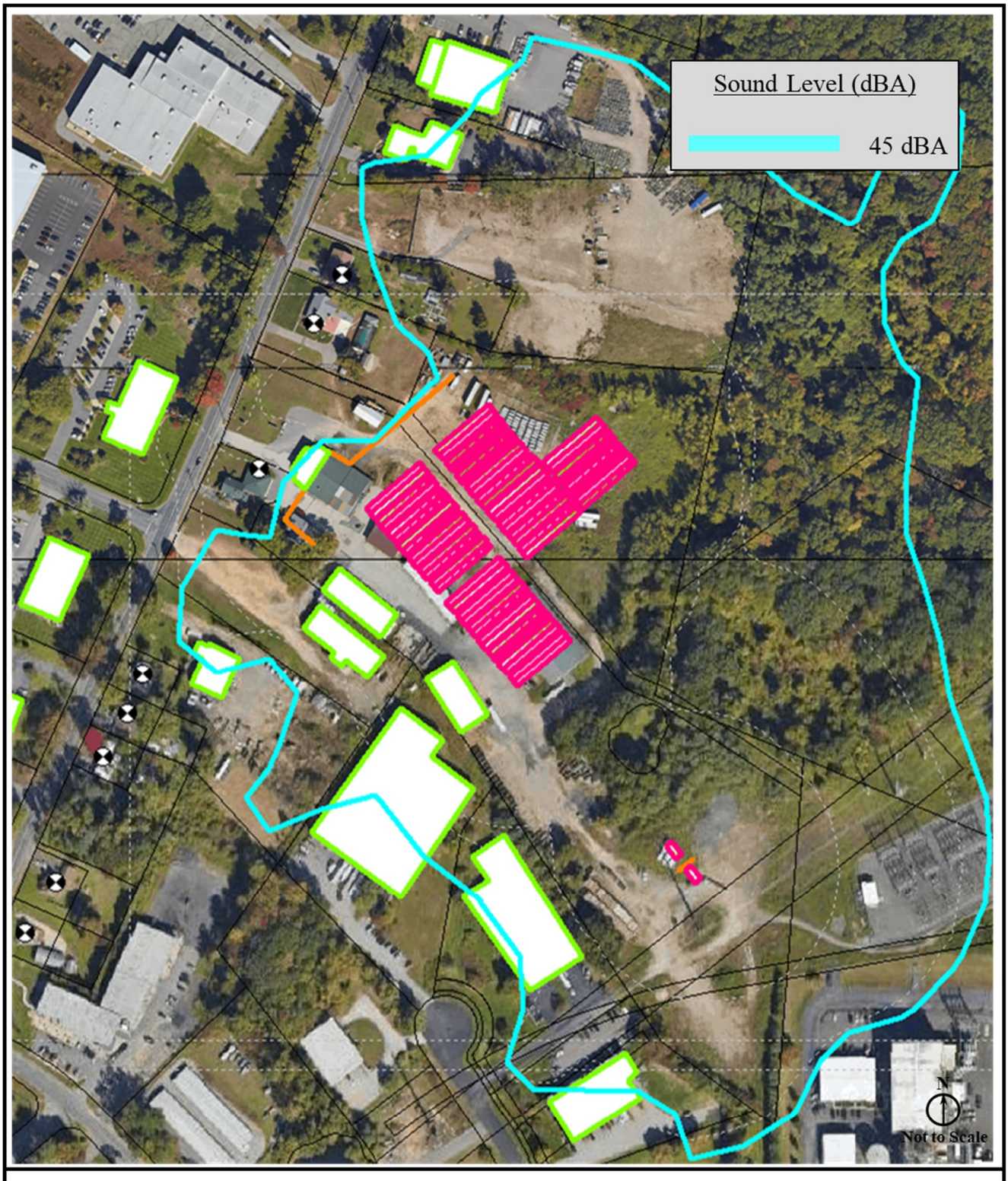


FIGURE 8.
Noise Contours of Modeling Results (5 ft): Mitigated
769 Silver Street, Agawam, MA

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

TABLE 3 - OCTAVE BAND RESULTS & PURE TONE ASSESSMENTS (dB)

Continuous Sound Level Impacts of Project with No Mitigation (i.e., Modeling Results)

Sensitive Receptor Location	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Total (dBA)
853 Silver St 2ndFlr	-24	3	28	30	35	37	35	21	-17	**40**
845 Silver St 2ndFlr	-23	3	28	30	35	36	34	22	-14	**40**
811 Silver St 2ndFlr	-22	3	29	30	35	35	34	23	-9	**39**
805 Silver St 2ndFlr	-23	2	28	30	34	33	35	23	-9	**39**
799 Silver St 2ndFlr	-23	4	28	31	36	40	41	31	4	**45**
769 Silver St 2ndFlr	-20	8	29	32	39	44	43	34	14	**48**
761 Silver St 2ndFlr	-21	8	29	33	40	47	46	36	16	**50**
729 Silver St 2ndFlr	-21	7	28	32	39	46	45	35	13	**49**
489 Shoemaker Lane 2ndFlr	-25	2	27	29	34	36	34	18	-28	**40**
4 Losito Lane 2ndFlr	-24	2	27	30	35	35	33	18	-29	**39**
459 Shoemaker Lane 2ndFlr	-23	1	29	30	35	32	31	15	-30	**37**

Table 4 – OCTAVE BAND RESULTS & PURE TONE ASSESSMENTS (dB)

Assumed Background Sound Level*

Average Measured L_{90} Hourly Sound Level	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Pure Tone?
1:00 am	47	49	43	37	34	31	26	26	14	**No**

* The average L_{90} sound level measured by the long-term meter at the quietest hour. Background sound levels at other times were higher. This is a conservative approach for demonstrating compliance with the pure tone restriction.

Estimated Total Continuous Sound Levels & Pure Tone Assessment with No Mitigation

Sensitive Receptor Location	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Total (dBA)
853 Silver St 2ndFlr	47	49	43	38	37	38	35	27	14	**42**
845 Silver St 2ndFlr	47	49	43	38	37	37	35	27	14	**41**
811 Silver St 2ndFlr	47	49	43	38	37	37	35	28	14	**41**
805 Silver St 2ndFlr	47	49	43	38	37	35	36	28	14	**41**
799 Silver St 2ndFlr	47	49	43	38	38	41	41	32	14	**45**
769 Silver St 2ndFlr	47	49	43	38	40	44	43	35	17	**48**
761 Silver St 2ndFlr	47	49	43	38	41	47	46	37	18	**50**
729 Silver St 2ndFlr	47	49	43	38	40	46	45	36	16	**50**
489 Shoemaker Lane 2ndFlr	47	49	43	37	37	37	35	26	14	**41**
4 Losito Lane 2ndFlr	47	49	43	38	37	37	34	26	14	**41**
459 Shoemaker Lane 2ndFlr	47	49	43	38	37	35	32	26	14	**40**

Table 5 – OCTAVE BAND RESULTS & PURE TONE ASSESSMENTS (dB)

Continuous Sound Level Impacts of Project with Mitigation (i.e., Modeling Results)

Sensitive Receptor Location	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Total (dBA)
853 Silver St 2ndFlr	-24	3	28	30	35	37	35	21	-17	**40**
845 Silver St 2ndFlr	-23	3	28	30	35	36	34	22	-15	**40**
811 Silver St 2ndFlr	-22	3	29	30	35	35	34	23	-9	**39**
805 Silver St 2ndFlr	-23	2	28	30	34	33	34	21	-10	**38**
799 Silver St 2ndFlr	-23	4	28	31	36	40	40	30	4	**44**
769 Silver St 2ndFlr	-22	7	27	31	37	41	39	29	9	**44**
761 Silver St 2ndFlr	-23	6	27	30	37	40	37	26	2	**43**
729 Silver St 2ndFlr	-23	5	26	30	37	40	39	27	3	**43**
489 Shoemaker Lane 2ndFlr	-25	2	27	29	34	36	34	19	-28	**40**
4 Losito Lane 2ndFlr	-24	2	27	30	35	35	33	18	-29	**39**
459 Shoemaker Lane 2ndFlr	-23	1	29	30	35	32	31	16	-30	**37**

Table 6 – OCTAVE BAND RESULTS & PURE TONE ASSESSMENTS (dB)

Assumed Background Sound Level*

Average Measured L_{90} Hourly Sound Level	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Pure Tone?
1:00 am	47	49	43	37	34	31	26	26	14	**No**

* The average L_{90} sound level measured by the long-term meter at the quietest hour. Background sound levels at other times were higher. This is a conservative approach for demonstrating compliance with the pure tone restriction.

Estimated Total Continuous Sound Levels & Pure Tone Assessment with Mitigation

Sensitive Receptor Location	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	Total (dBA)
853 Silver St 2ndFlr	47	49	43	38	37	38	35	27	14	**42**
845 Silver St 2ndFlr	47	49	43	38	37	37	35	27	14	**41**
811 Silver St 2ndFlr	47	49	43	38	37	37	35	27	14	**41**
805 Silver St 2ndFlr	47	49	43	38	37	35	34	27	14	**41**
799 Silver St 2ndFlr	47	49	43	38	38	41	40	31	14	**45**
769 Silver St 2ndFlr	47	49	43	38	39	41	39	31	15	**45**
761 Silver St 2ndFlr	47	49	43	38	39	40	38	29	14	**44**
729 Silver St 2ndFlr	47	49	43	38	38	41	39	30	14	**44**
489 Shoemaker Lane 2ndFlr	47	49	43	37	37	37	35	26	14	**41**
4 Losito Lane 2ndFlr	47	49	43	38	37	37	34	26	14	**41**
459 Shoemaker Lane 2ndFlr	47	49	43	38	37	35	32	26	14	**40**

APPENDIX A – CERTIFICATES OF CALIBRATION FOR EQUIPMENT

Calibration Certificate

Certificate Number 2025002223
Customer:
Tech Environmental

,

Model Number	831	***Procedure Number***	D0001.8378
Serial Number	0003143	***Technician***	Jacob Cannon
Test Results	**Pass**	***Calibration Date***	2025-02-11
Initial Condition	Inoperable	***Calibration Due***	
Description	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.403	***Temperature***	23.56 °C ± 0.25 °C
		Humidity	50.6 %RH ± 2.0 %RH
		Static Pressure	85.21 kPa ± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 029590 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2001 Class 1	ANSI S1.11 (R2009) Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

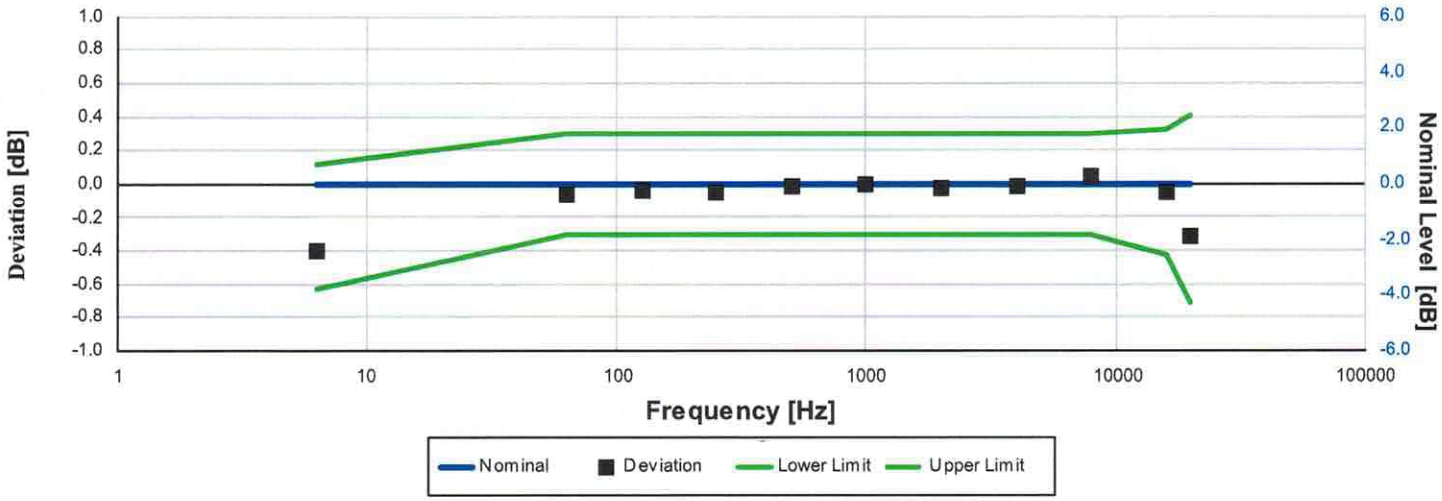
Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev S, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2024-05-07	2025-11-07	006943
SRS DS360 Ultra Low Distortion Generator	2024-09-03	2025-09-03	007167

Z-weight Filter Response

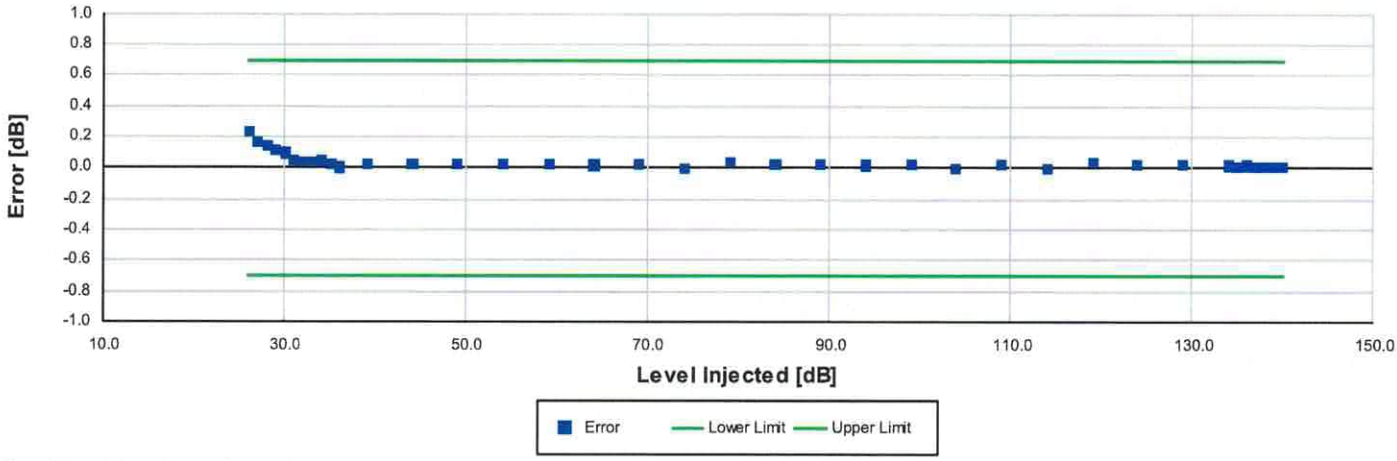


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.40	-0.40	-0.63	0.12	0.15	Pass
63.10	-0.06	-0.06	-0.30	0.30	0.15	Pass
125.89	-0.03	-0.03	-0.30	0.30	0.15	Pass
251.19	-0.06	-0.05	-0.30	0.30	0.15	Pass
501.19	-0.01	-0.01	-0.30	0.30	0.15	Pass
1,000.00	0.00	0.00	-0.30	0.30	0.15	Pass
1,995.26	-0.03	-0.03	-0.30	0.30	0.15	Pass
3,981.07	-0.01	-0.01	-0.30	0.30	0.15	Pass
7,943.28	0.04	0.04	-0.30	0.30	0.15	Pass
15,848.93	-0.05	-0.05	-0.42	0.32	0.15	Pass
19,952.62	-0.32	-0.32	-0.71	0.41	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



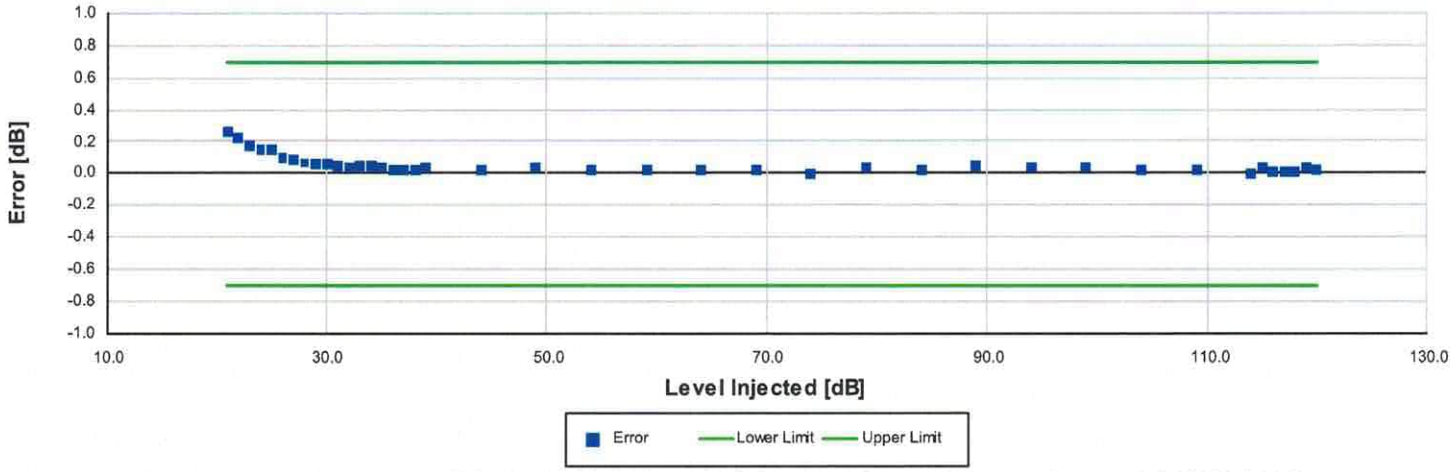
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
26.00	0.23	-0.70	0.70	0.16	Pass
27.00	0.17	-0.70	0.70	0.16	Pass
28.00	0.14	-0.70	0.70	0.16	Pass
29.00	0.11	-0.70	0.70	0.16	Pass
30.00	0.10	-0.70	0.70	0.16	Pass
31.00	0.05	-0.70	0.70	0.16	Pass
32.00	0.04	-0.70	0.70	0.16	Pass
33.00	0.04	-0.70	0.70	0.16	Pass
34.00	0.05	-0.70	0.70	0.16	Pass
35.00	0.03	-0.70	0.70	0.16	Pass
36.00	0.01	-0.70	0.70	0.16	Pass
39.00	0.02	-0.70	0.70	0.16	Pass
44.00	0.03	-0.70	0.70	0.16	Pass
49.00	0.03	-0.70	0.70	0.16	Pass
54.00	0.02	-0.70	0.70	0.16	Pass
59.00	0.03	-0.70	0.70	0.16	Pass
64.00	0.02	-0.70	0.70	0.16	Pass
69.00	0.03	-0.70	0.70	0.16	Pass
74.00	0.00	-0.70	0.70	0.16	Pass
79.00	0.04	-0.70	0.70	0.16	Pass
84.00	0.02	-0.70	0.70	0.16	Pass
89.00	0.03	-0.70	0.70	0.16	Pass
94.00	0.02	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.03	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.03	-0.70	0.70	0.15	Pass
124.00	0.02	-0.70	0.70	0.15	Pass
129.00	0.02	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass
139.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140.00	0.01	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
21.00	0.26	-0.70	0.70	0.16	Pass
22.00	0.22	-0.70	0.70	0.16	Pass
23.00	0.18	-0.70	0.70	0.16	Pass
24.00	0.15	-0.70	0.70	0.16	Pass
25.00	0.15	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.08	-0.70	0.70	0.16	Pass
28.00	0.07	-0.70	0.70	0.16	Pass
29.00	0.06	-0.70	0.70	0.16	Pass
30.00	0.06	-0.70	0.70	0.16	Pass
31.00	0.05	-0.70	0.70	0.16	Pass
32.00	0.04	-0.70	0.70	0.16	Pass
33.00	0.05	-0.70	0.70	0.16	Pass
34.00	0.05	-0.70	0.70	0.16	Pass
35.00	0.04	-0.70	0.70	0.16	Pass
36.00	0.03	-0.70	0.70	0.16	Pass
37.00	0.02	-0.70	0.70	0.16	Pass
38.00	0.02	-0.70	0.70	0.16	Pass
39.00	0.04	-0.70	0.70	0.16	Pass
44.00	0.03	-0.70	0.70	0.16	Pass
49.00	0.03	-0.70	0.70	0.16	Pass
54.00	0.03	-0.70	0.70	0.16	Pass
59.00	0.03	-0.70	0.70	0.16	Pass
64.00	0.02	-0.70	0.70	0.16	Pass
69.00	0.03	-0.70	0.70	0.16	Pass
74.00	0.00	-0.70	0.70	0.16	Pass
79.00	0.04	-0.70	0.70	0.16	Pass
84.00	0.02	-0.70	0.70	0.16	Pass
89.00	0.04	-0.70	0.70	0.16	Pass
94.00	0.04	-0.70	0.70	0.16	Pass
99.00	0.04	-0.70	0.70	0.16	Pass
104.00	0.02	-0.70	0.70	0.15	Pass
109.00	0.03	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.03	-0.70	0.70	0.15	Pass
116.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.04	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.97	134.51	136.51	0.15	Pass
		Positive Pulse	136.01	134.52	136.52	0.15	Pass
	30	Negative Pulse	135.07	134.51	136.51	0.15	Pass
		Positive Pulse	135.08	134.52	136.52	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.16 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.07	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.18 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	0.01	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.08	± 1.50	0.15 ‡	Pass
108.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	-0.17	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.99	93.89	94.09	0.15	Pass
0 dB Gain, Linearity	29.07	28.29	29.69	0.16	Pass
20 dB Gain	94.01	93.89	94.09	0.15	Pass
20 dB Gain, Linearity	24.11	23.29	24.69	0.16	Pass
OBA Low Range	93.99	93.89	94.09	0.15	Pass
OBA Normal Range	93.99	93.20	94.80	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	7.12	15.00	Pass
C-weight Noise Floor	12.44	17.30	Pass
Z-weight Noise Floor	21.18	24.50	Pass

-- End of measurement results--

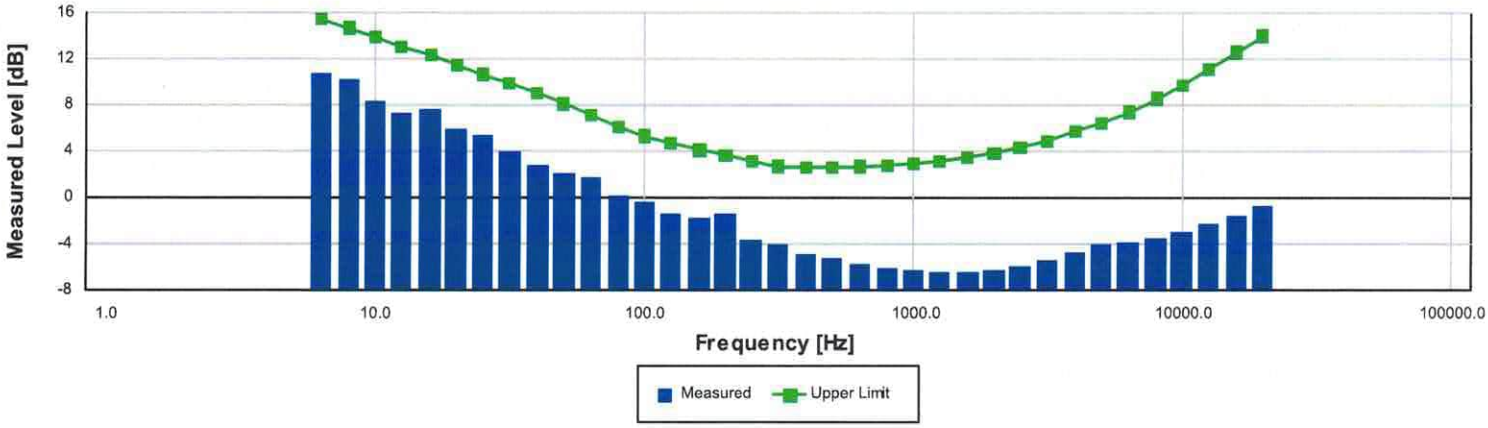
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.53	137.20	138.80	0.15	Pass
THD	-73.87		-60.00	0.01 ‡	Pass
THD+N	-66.26		-60.00	0.01 ‡	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



The SLM is set to low range and 20 dB gain.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.86	15.50	Pass
8.00	10.24	14.70	Pass
10.00	8.39	13.90	Pass
12.50	7.34	13.10	Pass
16.00	7.74	12.30	Pass
20.00	5.89	11.50	Pass
25.00	5.40	10.70	Pass
31.50	4.06	9.90	Pass
40.00	2.74	9.10	Pass
50.00	2.14	8.10	Pass
63.00	1.67	7.10	Pass
80.00	0.15	6.10	Pass
100.00	-0.42	5.30	Pass
125.00	-1.42	4.70	Pass
160.00	-1.69	4.10	Pass
200.00	-1.33	3.60	Pass
250.00	-3.58	3.10	Pass
315.00	-4.07	2.70	Pass
400.00	-4.91	2.60	Pass
500.00	-5.28	2.60	Pass
630.00	-5.74	2.70	Pass
800.00	-6.15	2.80	Pass
1,000.00	-6.29	3.00	Pass
1,250.00	-6.48	3.20	Pass
1,600.00	-6.42	3.50	Pass
2,000.00	-6.24	3.80	Pass
2,500.00	-5.86	4.30	Pass
3,150.00	-5.31	4.90	Pass
4,000.00	-4.66	5.70	Pass
5,000.00	-4.07	6.40	Pass
6,300.00	-3.76	7.40	Pass
8,000.00	-3.47	8.60	Pass
10,000.00	-3.01	9.80	Pass
12,500.00	-2.33	11.20	Pass
16,000.00	-1.56	12.60	Pass
20,000.00	-0.69	14.00	Pass

-- End of measurement results--

-- End of Report--

Signatory: Jacob Cannon

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED
CERT #3622.01

LARSON DAVIS
A PCB DIVISION

Calibration Certificate

Certificate Number 2025003296

Customer:
Tech Environmental Inc

,

Model Number	377B20	***Procedure Number***	D0001.8387		
Serial Number	LW134517	***Technician***	Abraham Ortega		
Test Results	**Pass**	***Calibration Date***	2025-02-28		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
Description	1/2 inch Microphone - Random Incidence - 0V	***Temperature***	22.3	°C	± 0.01 °C
		Humidity	40.8	%RH	± 0.5 %RH
		Static Pressure	101.53	kPa	± 0.03 kPa

Evaluation Method Tested electrically using an electrostatic actuator.

Compliance Standards Compliant to Manufacturer Specifications.

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

For microphone sensitivity measurements, simple acceptance criteria is used with an expanded uncertainty not to exceed 0.25 dB for microphone sensitivities above 1 mV/Pa and 0.65 dB for microphone sensitivities below 1 mV/Pa.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	2024-12-11	2025-12-11	001329
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-11	2025-07-11	006507
1/2 inch Microphone - Random Incidence - 200V	2024-11-12	2025-11-12	006511
1/2 inch Microphone - Random Incidence - 200V	2024-07-10	2025-07-10	006519
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-11	2025-07-11	006530
Larson Davis CAL250 Acoustic Calibrator	2025-01-16	2026-01-16	PCB0013615
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-26	2025-07-26	PCB0070355
Microphone Calibration System	2024-08-19	2025-08-19	PCB0089382
Larson Davis Model 2900 Real Time Analyzer	2024-10-29	2025-10-29	PCB0089383
1/2" Preamplifier	2024-08-29	2025-08-29	PCB0089384
1/2" Preamplifier	2024-07-11	2025-07-11	PCB0089385

Sensitivity

Measurement	Test Result [mV/Pa]	Lower limit [mV/Pa]	Upper limit [mV/Pa]	Expanded Uncertainty [mV/Pa]	Result
Open Circuit Sensitivity	52.2	43.2	58.2	1.2	Pass

-- End of measurement results--

Capacitance

Measurement	Test Result [pF]				
Capacitance	12.00				‡

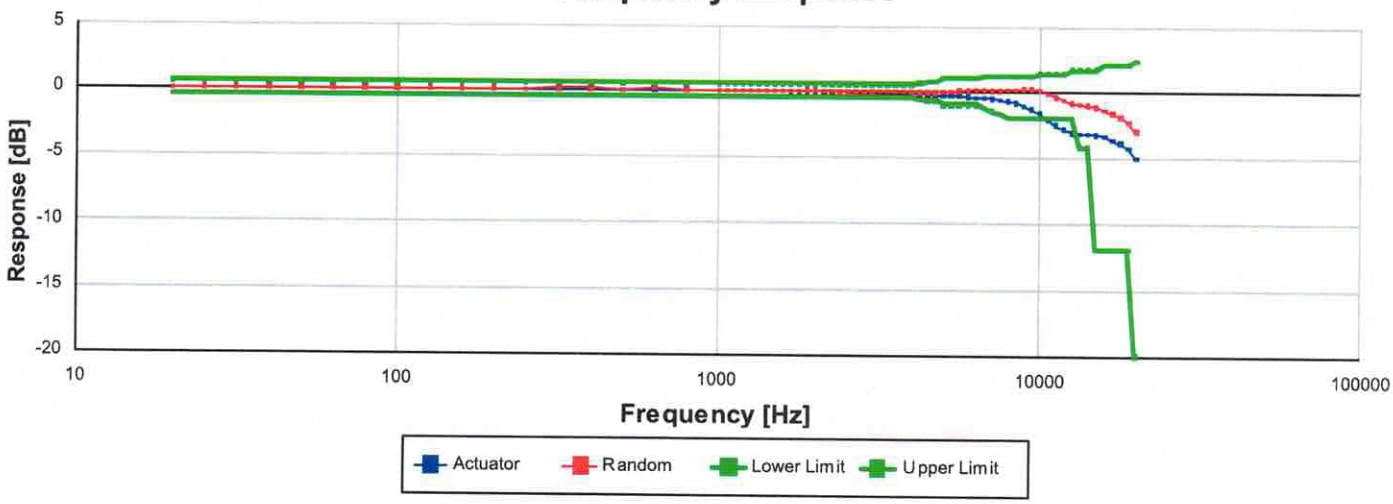
-- End of measurement results--

Lower Limiting Frequency

Measurement	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Result
-3 dB Frequency	1.70	1.00	2.40	Pass ‡

-- End of measurement results--

Frequency Response



Data is normalized for 0 dB @ 251.19 Hz.

Frequency [Hz]	Actuator [dB]	Random [dB]	Lower limit [dB]	Upper limit [dB]	Result
19.95	-0.01	-0.01	-0.50	0.50	Pass ‡
25.12	0.02	0.02	-0.50	0.50	Pass ‡
31.62	0.03	0.03	-0.50	0.50	Pass ‡
39.81	0.04	0.04	-0.50	0.50	Pass ‡
50.12	0.04	0.04	-0.50	0.50	Pass ‡
63.10	0.03	0.03	-0.50	0.50	Pass ‡
79.43	0.03	0.03	-0.50	0.50	Pass ‡
100.00	0.02	0.02	-0.50	0.50	Pass ‡
125.89	0.02	0.02	-0.50	0.50	Pass ‡
158.49	0.01	0.01	-0.50	0.50	Pass ‡
199.53	0.01	0.01	-0.50	0.50	Pass ‡
251.19	0.00	0.00	-0.50	0.50	Pass ‡
316.23	0.00	0.06	-0.50	0.50	Pass ‡
398.11	-0.01	0.05	-0.50	0.50	Pass ‡
501.19	-0.02	0.00	-0.50	0.50	Pass ‡
630.96	-0.02	0.12	-0.50	0.50	Pass ‡
794.33	-0.03	0.04	-0.50	0.50	Pass ‡
1,000.00	-0.04	-0.02	-0.50	0.50	Pass ‡
1,059.25	-0.04	-0.04	-0.50	0.50	Pass ‡
1,122.02	-0.04	-0.03	-0.50	0.50	Pass ‡
1,188.50	-0.05	-0.03	-0.50	0.50	Pass ‡
1,258.93	-0.05	-0.01	-0.50	0.50	Pass ‡
1,333.52	-0.05	0.00	-0.50	0.50	Pass ‡
1,412.54	-0.05	0.00	-0.50	0.50	Pass ‡
1,496.24	-0.06	-0.02	-0.50	0.50	Pass ‡
1,584.89	-0.06	-0.02	-0.50	0.50	Pass ‡
1,678.80	-0.07	-0.02	-0.50	0.50	Pass ‡
1,778.28	-0.07	-0.01	-0.50	0.50	Pass ‡
1,883.65	-0.07	0.01	-0.50	0.50	Pass ‡
1,995.26	-0.08	0.01	-0.50	0.50	Pass ‡
2,113.49	-0.08	0.00	-0.50	0.50	Pass ‡
2,238.72	-0.09	-0.04	-0.50	0.50	Pass ‡
2,371.37	-0.09	-0.07	-0.50	0.50	Pass ‡
2,511.89	-0.10	-0.10	-0.50	0.50	Pass ‡
2,660.73	-0.11	-0.10	-0.50	0.50	Pass ‡
2,818.38	-0.12	-0.09	-0.50	0.50	Pass ‡
2,985.38	-0.14	-0.07	-0.50	0.50	Pass ‡
3,162.28	-0.15	-0.05	-0.50	0.50	Pass ‡
3,349.65	-0.16	-0.03	-0.50	0.50	Pass ‡
3,548.13	-0.18	-0.05	-0.50	0.50	Pass ‡
3,758.37	-0.19	-0.06	-0.50	0.50	Pass ‡
3,981.07	-0.21	-0.08	-0.50	0.50	Pass ‡
4,216.97	-0.23	-0.09	-0.63	0.63	Pass ‡
4,466.84	-0.25	-0.08	-0.70	0.70	Pass ‡
4,731.51	-0.28	-0.07	-0.70	0.70	Pass ‡
5,011.87	-0.31	-0.05	-1.00	1.00	Pass ‡
5,308.84	-0.34	-0.02	-1.00	1.00	Pass ‡
5,623.41	-0.37	0.02	-1.00	1.00	Pass ‡
5,956.62	-0.42	0.05	-1.00	1.00	Pass ‡
6,309.57	-0.46	0.07	-1.00	1.00	Pass ‡
6,683.44	-0.51	0.08	-1.25	1.20	Pass ‡
7,079.46	-0.56	0.08	-1.50	1.20	Pass ‡
7,498.94	-0.65	0.06	-1.70	1.20	Pass ‡

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

2025-02-28T13:40:46

Frequency [Hz]	Actuator [dB]	Random [dB]	Lower limit [dB]	Upper limit [dB]	Result
7,943.28	-0.74	0.09	-2.00	1.20	Pass ‡
8,413.95	-0.86	0.15	-2.00	1.20	Pass ‡
8,912.51	-1.06	0.18	-2.00	1.20	Pass ‡
9,440.61	-1.34	0.17	-2.00	1.20	Pass ‡
10,000.00	-1.65	0.12	-2.00	1.38	Pass ‡
10,592.54	-2.17	-0.19	-2.00	1.38	Pass ‡
11,220.19	-2.53	-0.40	-2.00	1.38	Pass ‡
11,885.02	-2.83	-0.62	-2.00	1.38	Pass ‡
12,589.25	-3.10	-0.87	-2.00	1.68	Pass ‡
13,335.21	-3.17	-0.96	-4.20	1.68	Pass ‡
14,125.38	-3.19	-1.04	-4.20	1.68	Pass ‡
14,962.36	-3.23	-1.16	-11.90	1.68	Pass ‡
15,848.93	-3.36	-1.36	-11.90	2.08	Pass ‡
16,788.04	-3.61	-1.64	-11.90	2.08	Pass ‡
17,782.80	-3.87	-1.90	-11.90	2.08	Pass ‡
18,836.49	-4.27	-2.27	-11.90	2.08	Pass ‡
19,952.62	-5.03	-2.98	-100.00	2.38	Pass ‡

-- End of measurement results--

Signatory: *Abraham Ortega*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

Calibration Certificate

Certificate Number 2025003004
Customer:
Tech Environmental Inc

,

Model Number	PRM831	***Procedure Number***	D0001.8383
Serial Number	026008	***Technician***	Jacob Cannon
Test Results	**Pass**	***Calibration Date***	2025-02-25
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***	
Description	Larson Davis 1/2" Preamplifier for Model 831 Type 1	***Temperature***	23.07 °C ± 0.01 °C
		Humidity	52.2 %RH ± 0.5 %RH
		Static Pressure	86.12 kPa ± 0.03 kPa

Evaluation Method Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level. Tests are considered to pass when the measured value is within the acceptance limits, which are derived from industry standards.

Simple acceptance criteria is used with an expanded uncertainty not to exceed 0.20 dB for all measurements below 100 kHz and 0.50 dB for measurements above 100 kHz.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Standards Used

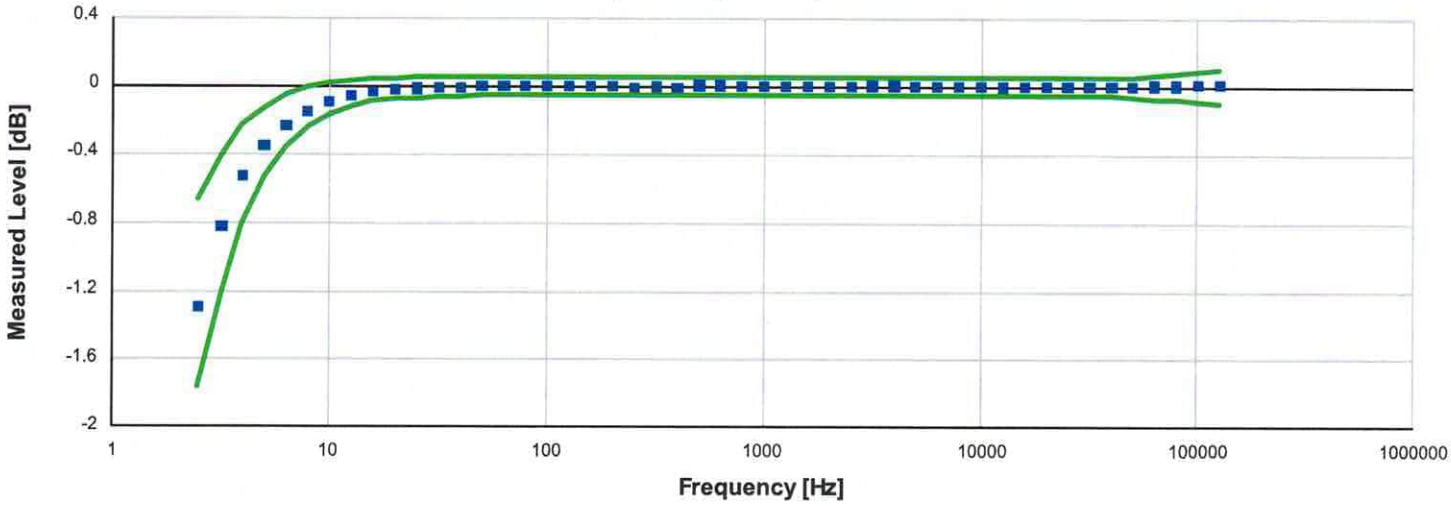
Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	2024-09-16	2025-09-16	001150
Hart Scientific 2626-S Humidity/Temperature Sensor	2024-05-07	2025-11-07	006943
SRS DS360 Ultra Low Distortion Generator	2024-03-26	2025-03-26	007635

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

Frequency Response



Frequency response electrically tested at 120.0 dB re 1 µV

Frequency [Hz]	Test Result [dB re 1 kHz]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2.50	-1.29	-1.76	-0.66	0.12	Pass
3.20	-0.82	-1.20	-0.40	0.12	Pass
4.00	-0.53	-0.81	-0.23	0.12	Pass
5.00	-0.35	-0.53	-0.13	0.10	Pass
6.30	-0.23	-0.36	-0.05	0.07	Pass
7.90	-0.15	-0.24	-0.01	0.07	Pass
10.00	-0.10	-0.17	0.03	0.07	Pass
12.60	-0.06	-0.13	0.04	0.04	Pass
15.80	-0.04	-0.09	0.04	0.04	Pass
20.00	-0.02	-0.08	0.05	0.04	Pass
25.10	-0.02	-0.07	0.05	0.04	Pass
31.60	-0.01	-0.07	0.05	0.04	Pass
39.80	-0.01	-0.06	0.05	0.04	Pass
50.10	0.00	-0.06	0.05	0.04	Pass
63.10	0.00	-0.05	0.05	0.04	Pass
79.40	0.00	-0.05	0.05	0.04	Pass
100.00	0.00	-0.05	0.05	0.04	Pass
125.90	0.00	-0.05	0.05	0.04	Pass
158.50	0.00	-0.05	0.05	0.04	Pass
199.50	0.00	-0.05	0.05	0.04	Pass
251.20	-0.01	-0.05	0.05	0.04	Pass
316.20	0.00	-0.05	0.05	0.04	Pass
398.10	-0.01	-0.05	0.05	0.04	Pass
501.20	0.01	-0.05	0.05	0.04	Pass
631.00	0.01	-0.05	0.05	0.04	Pass
794.30	0.01	-0.05	0.05	0.04	Pass
1,000.00	0.01	-0.05	0.05	0.04	Pass
1,258.90	0.00	-0.05	0.05	0.04	Pass
1,584.90	0.00	-0.05	0.05	0.04	Pass
1,995.30	0.00	-0.05	0.05	0.04	Pass
2,511.90	0.01	-0.05	0.05	0.04	Pass
3,162.30	0.01	-0.05	0.05	0.04	Pass

Frequency [Hz]	Test Result [dB re 1 kHz]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
3,981.10	0.01	-0.05	0.05	0.04	Pass
5,011.90	0.00	-0.05	0.05	0.04	Pass
6,309.60	0.00	-0.05	0.05	0.04	Pass
7,943.30	0.01	-0.05	0.05	0.04	Pass
10,000.00	0.01	-0.05	0.05	0.04	Pass
12,589.30	0.00	-0.05	0.05	0.04	Pass
15,848.90	0.00	-0.05	0.05	0.04	Pass
19,952.60	0.00	-0.05	0.05	0.04	Pass
25,118.90	0.00	-0.05	0.05	0.05	Pass
31,622.80	0.00	-0.05	0.05	0.05	Pass
39,810.70	0.00	-0.05	0.05	0.05	Pass
50,118.70	0.01	-0.06	0.06	0.09	Pass
63,095.70	0.01	-0.07	0.07	0.09	Pass
79,432.80	0.01	-0.08	0.08	0.09	Pass
100,000.00	0.01	-0.09	0.09	0.09	Pass
125,892.50	0.02	-0.10	0.10	0.45	Pass

Gain Measurement

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
Output Gain @ 1 kHz	-0.18	-0.45	-0.03	0.04	Pass

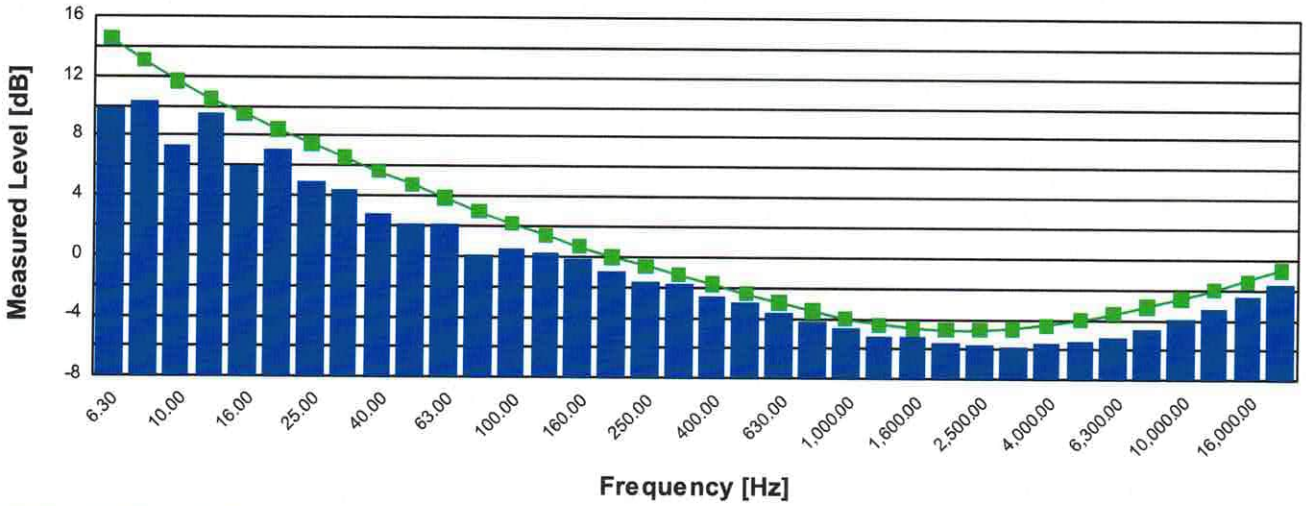
-- End of measurement results--

DC Bias Measurement

Measurement	Test Result [V]	Lower limit [V]	Upper limit [V]	Expanded Uncertainty [V]	Result
DC Voltage	17.73	15.50	19.50	0.04	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise



Frequency [Hz]	Test Result [dB re 1 µV]	Upper limit [dB re 1 µV]	Result
6.30	9.90	14.60	Pass
8.00	10.30	13.10	Pass
10.00	7.40	11.70	Pass
12.50	9.50	10.50	Pass
16.00	6.00	9.50	Pass
20.00	7.10	8.50	Pass
25.00	4.90	7.50	Pass
31.50	4.40	6.60	Pass
40.00	2.80	5.70	Pass
50.00	2.10	4.80	Pass
63.00	2.20	3.90	Pass
80.00	0.10	3.00	Pass
100.00	0.50	2.20	Pass
125.00	0.20	1.40	Pass
160.00	-0.10	0.70	Pass
200.00	-1.00	0.00	Pass
250.00	-1.70	-0.60	Pass
315.00	-1.80	-1.20	Pass
400.00	-2.60	-1.80	Pass
500.00	-3.00	-2.40	Pass
630.00	-3.70	-3.00	Pass
800.00	-4.20	-3.50	Pass
1,000.00	-4.60	-4.00	Pass
1,250.00	-5.10	-4.40	Pass
1,600.00	-5.20	-4.60	Pass
2,000.00	-5.60	-4.70	Pass
2,500.00	-5.70	-4.70	Pass
3,150.00	-5.80	-4.60	Pass
4,000.00	-5.60	-4.40	Pass
5,000.00	-5.40	-4.00	Pass
6,300.00	-5.10	-3.60	Pass
8,000.00	-4.60	-3.10	Pass
10,000.00	-3.90	-2.60	Pass
12,500.00	-3.20	-2.00	Pass
16,000.00	-2.50	-1.40	Pass
20,000.00	-1.70	-0.70	Pass

-- End of measurement results--

Self-generated Noise

Bandwidth	Test Result [µV]	Test Result [dB re 1 µV]	Upper limit [dB re 1 µV]	Result
A-weighted (1 Hz - 20 kHz)	2.32	7.30	8.00	Pass
Broadband (1 Hz - 20 kHz)	4.95	13.90	15.50	Pass

-- End of measurement results--

Signatory: *Jacob Cannon*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

Calibration Certificate

Certificate Number 2025001671

Customer:
Tech Environmental

,

Model Number	CAL200	***Procedure Number***	D0001.8386
Serial Number	10507	***Technician***	Scott Montgomery
Test Results	**Pass**	***Calibration Date***	2025-02-03
		Calibration Due	
Initial Condition	Adjusted	***Temperature***	24 °C ± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	30 %RH ± 3 %RH
		Static Pressure	101.3 kPa ± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	2024-06-20	2025-06-20	001021
Larson Davis Model 2900 Real Time Analyzer	2024-04-01	2025-04-01	001051
Microphone Calibration System	2024-02-22	2025-02-22	005446
1/2" Preamplifier	2024-08-15	2025-08-15	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-26	2025-07-26	006507
1/2 inch Microphone - Random Incidence - 200V	2024-11-12	2025-11-12	006511
Pressure Sensor	2024-02-28	2025-02-28	007825

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
94	101.3	94.00	93.80	94.20	0.14	Pass
114	101.2	114.00	113.80	114.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
94	101.3	1,000.01	993.00	1,007.00	0.20	Pass
114	101.2	1,000.00	993.00	1,007.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
94	101.3	0.38	0.00	2.00	0.25 ‡	Pass
114	101.2	0.34	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	107.9	-0.02	-0.25	0.25	0.04 ‡	Pass
101.3	101.3	0.00	-0.25	0.25	0.04 ‡	Pass
92.0	92.0	0.01	-0.25	0.25	0.04 ‡	Pass
83.0	83.0	-0.01	-0.25	0.25	0.04 ‡	Pass
74.0	74.1	-0.07	-0.25	0.25	0.04 ‡	Pass
65.0	65.1	-0.19	-0.25	0.25	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	107.9	0.00	-7.00	7.00	0.20 ‡	Pass
101.3	101.3	0.00	-7.00	7.00	0.20 ‡	Pass
92.0	92.0	0.00	-7.00	7.00	0.20 ‡	Pass
83.0	83.0	0.00	-7.00	7.00	0.20 ‡	Pass
74.0	74.1	0.00	-7.00	7.00	0.20 ‡	Pass
65.0	65.1	0.00	-7.00	7.00	0.20 ‡	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	107.9	0.35	0.00	2.00	0.25 ‡	Pass
101.3	101.3	0.34	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.33	0.00	2.00	0.25 ‡	Pass
83.0	83.0	0.33	0.00	2.00	0.25 ‡	Pass
74.0	74.1	0.33	0.00	2.00	0.25 ‡	Pass
65.0	65.1	0.33	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

Initial Assessment

Certificate Number 2025001669

Customer:
Tech Environmental

,

Model Number	CAL200	***Procedure Number***	D0001.8386
Serial Number	10507	***Technician***	Scott Montgomery
Test Results	**Pass**	***Calibration Date***	2025-02-03
Initial Condition	As Received	***Calibration Due***	
Description	Larson Davis CAL200 Acoustic Calibrator	***Temperature***	24 °C ± 0.3 °C
		Humidity	31 %RH ± 3 %RH
		Static Pressure	101.1 kPa ± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	2024-06-20	2025-06-20	001021
Larson Davis Model 2900 Real Time Analyzer	2024-04-01	2025-04-01	001051
Microphone Calibration System	2024-02-22	2025-02-22	005446
1/2" Preamplifier	2024-08-15	2025-08-15	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-26	2025-07-26	006507
1/2 inch Microphone - Random Incidence - 200V	2024-11-12	2025-11-12	006511
Pressure Sensor	2024-02-28	2025-02-28	007825

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
94	101.1	94.11	93.80	94.20	0.14	Pass
114	101.1	114.13	113.80	114.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
94	101.1	1,000.03	993.00	1,007.00	0.20	Pass
114	101.1	999.99	993.00	1,007.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
94	101.1	0.38	0.00	2.00	0.25 ‡	Pass
114	101.1	0.34	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	107.9	-0.02	-0.25	0.25	0.04 ‡	Pass
101.3	101.3	0.00	-0.25	0.25	0.04 ‡	Pass
92.0	92.0	0.01	-0.25	0.25	0.04 ‡	Pass
83.0	83.0	-0.01	-0.25	0.25	0.04 ‡	Pass
74.0	74.1	-0.07	-0.25	0.25	0.04 ‡	Pass
65.0	65.1	-0.19	-0.25	0.25	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	107.9	0.00	-7.00	7.00	0.20 ‡	Pass
101.3	101.3	0.00	-7.00	7.00	0.20 ‡	Pass
92.0	92.0	0.00	-7.00	7.00	0.20 ‡	Pass
83.0	83.0	0.00	-7.00	7.00	0.20 ‡	Pass
74.0	74.1	0.00	-7.00	7.00	0.20 ‡	Pass
65.0	65.1	0.00	-7.00	7.00	0.20 ‡	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 24 °C, 31 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	107.9	0.35	0.00	2.00	0.25 ‡	Pass
101.3	101.3	0.34	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.33	0.00	2.00	0.25 ‡	Pass
83.0	83.0	0.33	0.00	2.00	0.25 ‡	Pass
74.0	74.1	0.33	0.00	2.00	0.25 ‡	Pass
65.0	65.1	0.33	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo, UT 84601 United States
716-684-0001

ACCREDITED CERT #3622.01

LARSON DAVIS A PCB DIVISION

ATTACHMENT H – EMERGENCY RESPONSE PLAN

FIRE & RISK ALLIANCE

Agawam BESS ERP

Draft Emergency Response Plan RevA



Prepared for Longroad Energy

November 18, 2025

The distribution of this document to third parties is prohibited without written approval from Fire & Risk Alliance, LLC.

TABLE OF CONTENTS

1 GENERAL INFORMATION 4
1.1 Scope 4
1.2 Purpose 4
1.3 Site Owner 4
1.4 Location 4
1.5 Emergency Contact 4

2 SITE OVERVIEW 5
2.1 General Site Overview 5
2.2 Energy Storage System Site Overview 6

3 MITIGATION 7
3.1 Battery Cabinet Equipment Overview 7
3.2 Fire Protection Overview 7
3.2.1 Site Access 7
3.2.2 Fire Alarm and Detection System 8
3.2.3 First Responder Station 8
3.2.4 Fire Protection Water Supply 8
3.3 Explosion Control and Prevention System 9
3.4 Battery Management System 9
3.5 Emergency Stop 10

4 PREPAREDNESS 11
4.1 Chemical Hazards 11
4.1.1 Cell Vent Gas 11
4.1.2 Hydrogen 11
4.1.3 Carbon Monoxide 11
4.1.4 Transformer Dielectric Fluid 12
4.1.5 Refrigerant 12
4.2 Electrical Hazards 12
4.3 Thermal Runaway and Fire Hazards 13
4.4 Explosion Hazard 13
4.5 Recommended PPE 13
4.6 BESS Subject Matter Expert 13

5 RESPONSE 15
5.1 Tactics 15
5.1.1 Life Safety 15

5.1.2 Community Air Monitoring 16
5.1.3 Exclusion Zone 16
5.1.4 Alarms Monitoring 16
5.1.5 Isolation of Trouble Equipment 16
5.1.6 Condition Monitoring 16
5.1.7 Exposure Assessment 17
5.1.8 Exposure Protection 17
5.2 Incident Stabilization 17
5.2.1 Under Control 17

6 RECOVERY 18

7 REVISION SHEET 19

TABLE OF FIGURES

Figure 1 Site Overview 5
Figure 2 General Equipment Arrangement 6
Figure 3 Smartstack BESS Components 7
Figure 4 Municipal Fire Hydrant Locations 8
Figure 5 Explosion Prevention System 9
Figure 6 Explosion Control System 9
Figure 7 BESS E-Stop 10
Figure 8 General 100' Exclusion Zone 16

TABLE OF TABLES

Table 1 Emergency Services Contact Information 4
Table 2 BMS Functions 10
Table 3 Hydrogen Characteristics 11
Table 4 Carbon Monoxide Characteristics 12
Table 5 Refrigerant Characteristics 12

1 GENERAL INFORMATION

1.1 Scope

This document is an emergency response plan (ERP) for the Agawam battery energy storage system (BESS) facility. The ERP provides a facility overview, site design, type of equipment, safety features, suppression and detection information along with response recommendations for potential BESS facility failure scenarios.

1.2 Purpose

The purpose of this ERP is to provide information to BESS subject matter experts (SMEs) and fire department personnel about potential hazards at BESS facilities. This guidance outlines the size-up and response tactics necessary to ensure safety and mitigate risks during emergency operations.

1.3 Site Owner

Site Owner: Longroad Energy

Address and HQ Telephone: TBD

1.4 Location

Agawam, Hampden County, Massachusetts

1.5 Emergency Contact

The remote operations center (ROC) can be reached for any emergency that may occur at the Agawam BESS.

ROC Telephone: TBD

The Agawam Police Department dispatch can be reached for non-emergencies at 413.786.4767.

Table 1 Emergency Services Contact Information

Emergency Services Agency	Address
All Emergencies	*Call 911*
Agawam Fire Department – Station 2	1200 Springfield St, Feeding Hills, MA 01030
Agawam Police Department	681 Springfield St, Feeding Hills, MA 01030
Agawam Emergency Management	1000 Suffield St, Agawam, MA 01001
Mercy Medical Center	271 Carew St, Springfield, MA 01104

DRAFT

2 SITE OVERVIEW

2.1 General Site Overview

The BESS facility is located Agawam, Hampden County, Massachusetts, approximately one mile south of MA-57. The Agawam BESS facility is approximately 17 acres and is located in a suburban area zoned for industrial occupancies. The site is surrounded on the north, south, and west sides by industrial occupancies. To the east of the site is mostly undeveloped land. Project and utility substations, along with the Berkshire power station, sit to the southeast of the site.

The BESS facility includes the installation of Smartstack BESS manufactured by Fluence. The facility is normally unstaffed and is monitored by the ROC.

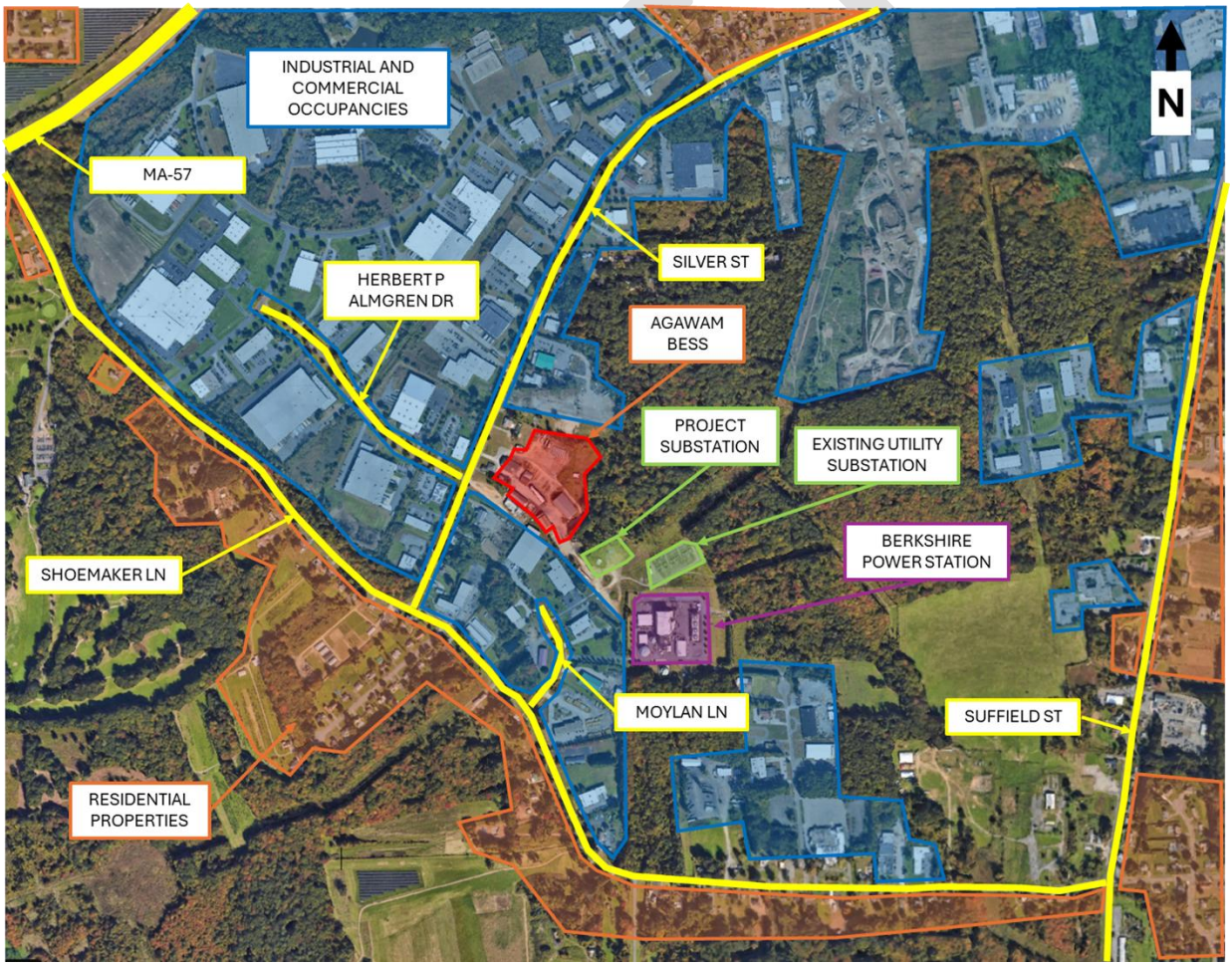


Figure 1 Site Overview

2.2 Energy Storage System Site Overview

The facility will contain 216 Smartstack BESS divided into 108 blocks. Each Smartstack BESS consists of four battery pods and a Smart Skid. Each block consists of two Smartstack BESS and a power conversion system (PCS). Each PCS consists of inverters, a medium voltage (MV) transformer, and disconnects. The highest DC voltage for the facility is 1500 VDC. The highest AC voltage for the facility is 34.5 kVAC. The voltage at the point of interconnection (POI) with the grid is 115 kV.

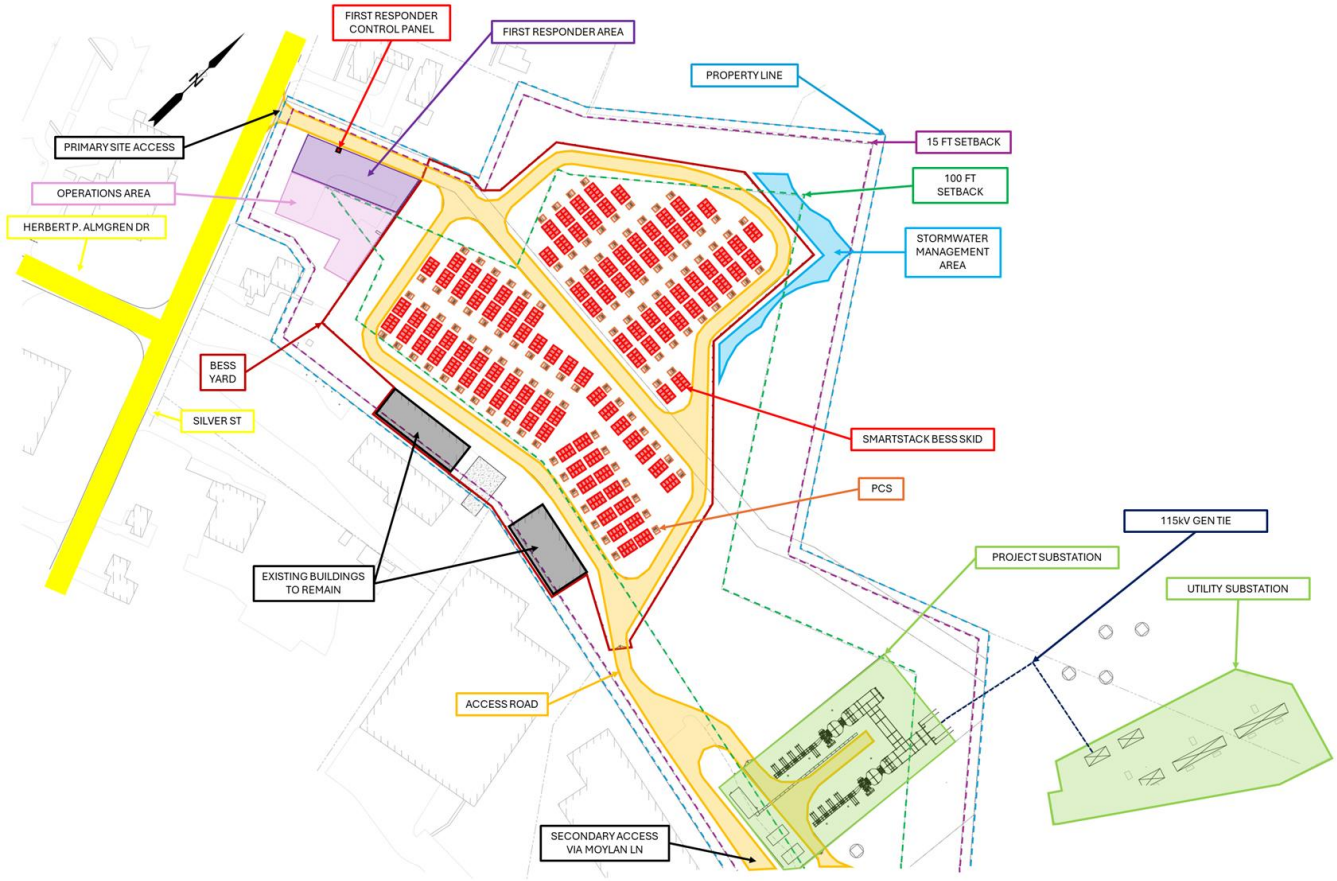


Figure 2 General Equipment Arrangement

3 MITIGATION

3.1 Battery Cabinet Equipment Overview

The smallest anatomy of a BESS is a cell. Cells are combined into modules which are combined into racks. Cabinets contain multiple racks and additional protection, monitoring and isolation features powered by on-site auxiliary power.

Each Smartstack BESS is IP55 rated and will contain 4 pods each containing 18 modules. Batteries are lithium iron phosphate (LFP) chemistry.



Figure 3 Smartstack BESS Components

3.2 Fire Protection Overview

3.2.1 Site Access

The main entrance to the site is located on Silver St. An additional entrance is located on Moylan Ln. Facility driving surfaces are provided and shown in Figure 2. A Knox Box will be installed if required by the fire department.

3.2.2 Fire Alarm and Detection System

Each Smartstack BESS is equipped with a smoke detector and a hydrogen detector. Each Smart Skid is equipped with three multi-detectors and a Fire Alarm Control Unit (FACU). Lastly, two horn/strobe units are located on the outside of each Smart Skid.

3.2.3 First Responder Station

The Master Fire Alarm Control Unit (MFACU) aggregates data collected by each Smartstack FACU. It is located in the first responder area outside the main facility gate, as shown in Figure 2. The MFACU is expected to contain equipment that allows first responders to see important information about the status and location of all site alarms.

3.2.4 Fire Protection Water Supply

There is no on-site fire protection water storage planned for the site. However, there are numerous municipal fire hydrants in close proximity to the site that can be used to supply fire protection water in the event that it becomes necessary.

This water should be used for exposure cooling only, not offensive firefighting of fires involving battery cabinets.

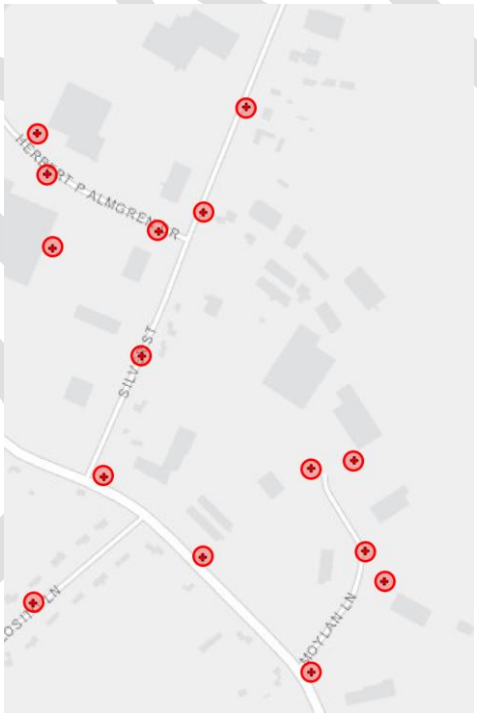


Figure 4 Municipal Fire Hydrant Locations

3.3 Explosion Control and Prevention System

Each pod of the Smartstack BESS will be equipped with a Combustible Concentration Reduction System (CCRS) to mitigate an overpressure event inside the cabinet. The CCRS, when activated, opens inlet and outlet louvers and starts the exhaust fan to lower gas concentration below flammable levels. The CCRS maintains the lower flammability limit (LFL) below 25%. If the CCRS fails, deflagration panels are provided for redundancy. There are two deflagration panels per pod, designed to activate when pressure exceeds their setpoint to prevent an explosion event within the pod.

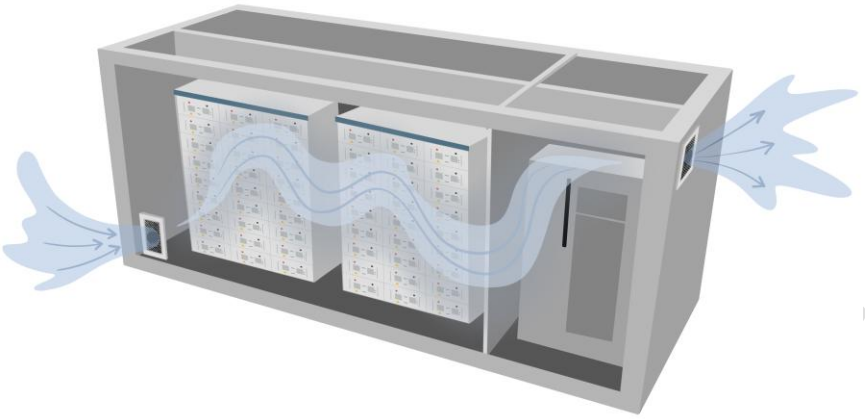


Figure 5 Explosion Prevention System

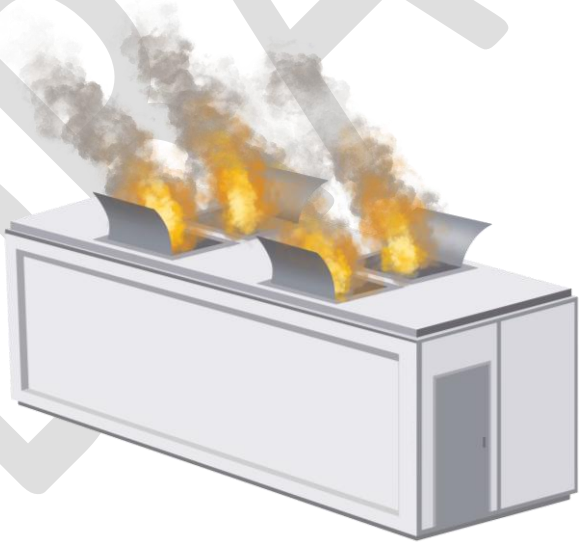


Figure 6 Explosion Control System

3.4 Battery Management System

The battery management system (BMS) monitors, protects, and manages the BESS, ensuring battery health parameters are maintained for efficient and continual operation.

Table 2 BMS Functions

Monitoring	The BMS continuously monitors key parameters such as voltage, current, temperature, and state of charge (SOC).
Protection	The BMS protects the battery from over-charging, over-discharging, over-current, over-temperature, and short circuits by isolating batteries that exceed predetermined operating parameters.
Balancing	The BMS helps to equalize the SOC across all cells.
Thermal Management	The BMS regulates the battery temperature by controlling heating or cooling systems, keeping the battery within the predetermined temperature range.
Power Control	The BMS regulates the power in and out of the batteries.
Communication	The BMS remotely communicates the status of monitored parameters and autonomously performed functions.

3.5 Emergency Stop

An emergency stop (E-stop) button is located on the front of each Smartstack. The operation of a BESS E-stop isolates the BESS from the PCS. Though isolated, the BESS batteries still maintain their SOC. Never approach a trouble BESS for manual activation of the E-stop.



Figure 7 BESS E-Stop

4 PREPAREDNESS

4.1 Chemical Hazards

4.1.1 Cell Vent Gas

During a failure event, battery cells produce toxic gases that have the potential to be harmful to site personnel and first responders. If the failure spreads to other BESS components, it can produce additional toxic gases similar to those released during the combustion of ordinary manufactured products. Although outdoor BESS cabinets are not occupiable, site personnel and first responders can still be exposed to these toxic gases while operating near a BESS during a failure or fire event. In the event of a gas release, these toxic gases are expected to be diluted by the entrainment of outside air. Fire department personnel should wear the appropriate personal protective equipment (PPE), as outlined in Section 4.5.

4.1.2 Hydrogen

When the temperature of a cell reaches the venting stage, the primary hazard is the production of hydrogen gas (H2). The gas is odorless, colorless, and requires internal sensors or external meters for detection. H2 is flammable and lighter than air.

Table 3 Hydrogen Characteristics

Appearance	Colorless Gas
Odor	Odorless
LFL	4%
UFL	76%
Auto Ignition	500°C/932°F
25% LFL	1% or 10,000 ppm
Vapor Density	0.069 (Air = 1)

4.1.3 Carbon Monoxide

Carbone monoxide (CO) is an odorless, colorless gas, and requires internal sensors or external meters for detection. CO is produced during incomplete combustion and/or cell failure.

Table 4 Carbon Monoxide Characteristics

Appearance	Colorless Gas
Odor	Odorless
LFL	12.5 %
UFL	74.2%
Auto Ignition	607°C (1125°F)
25% LFL	3.125% or 31,250 ppm
Vapor Density	0.97 (Air = 1)

4.1.4 Transformer Dielectric Fluid

Dielectric fluid is used to insulate and cool site transformers such as PCS transformers and auxiliary power transformers. During a transformer failure, arcing and sustained fire can lead to heat retention in the windings and metal cabinet of the transformer, making this a persistent fire.

4.1.5 Refrigerant

Refrigerant is commonly used within the BESS thermal management system. Refrigerants are nonflammable under normal operating conditions. However, refrigerants are pressurized and can become combustible when mixed with air at elevated temperatures and pressures. Refrigerants can also release toxic by-products as a result of heating and decomposition. In high concentrations, refrigerants can also become an asphyxiation hazard.

Table 5 Refrigerant Characteristics

Appearance	Colorless Liquid
Odor	Faintly Sweet

4.2 Electrical Hazards

Shielded electrical hazards at the BESS facility include battery cabinets, inverters and transformers. Outer covers around the equipment eliminate casual contact and locks prevent access to energized areas.

Unshielded electrical hazards at the facility include exposed bus within a substation or overhead electrical connections to the surrounding grid. OSHA regulations require a minimum standoff distance of 10 feet from equipment and power lines. The minimum clearance should be increased by 4 inches for every 10kV over 50kV.

BESS products contain batteries that are ALWAYS energized and present an electrical hazard even when disconnected from an electrical source. The operation of breakers or E-Stops will serve to isolate trouble equipment. However, the operation of these devices will not remove stranded energy. Class C electrical hazards constantly exist at BESS facilities.

NFPA 1971 structural firefighting ensemble is not rated for arc flash hazards. Maintain a 10-foot standoff distance from any open doors on BESS cabinets.

E-field detectors are commonly used to identify potential AC hazards. These devices do not have the ability to

detect DC voltage from battery cabinets. Do not use E-field detectors within a BESS facility.

4.3 Thermal Runaway and Fire Hazards

Thermal runaway occurs when an electrochemical battery cell's temperature increases at an accelerating rate in an uncontrollable fashion sufficient to result in damage to the cell. The thermal runaway progresses when the cell's generation of heat is at a higher rate than the heat it can dissipate.

During thermal runaway, flammable gas and heat is produced. Failure may spread to adjacent cells or modules, and the gas may ignite. Due to the high pressure at which these gases vent and the lack of a listed suppression agent, no attempt should be made to suppress this fire.

4.4 Explosion Hazard

The failure of a cell will begin with the venting stage; this is the pre-cursor to thermal runaway. Accumulation of flammable gases within a confined space, such as a BESS cabinet, can lead to an explosive atmosphere where the gas concentration falls within its upper and lower flammability limits. An explosion can occur when cell vent gases accumulate and contact a competent ignition source. While safety features are present to decrease the risk of an explosion, always assume that they are non-operational. Maintain an exclusion zone from the trouble equipment for the duration of the incident.

4.5 Recommended PPE

The recommended PPE is NFPA 1971 structural firefighting gear and the use of a self-contained breathing apparatus (SCBA) when exposed to respiratory hazards. All chemicals associated with the failure of BESS equipment and ancillary electrical components present dermal and respiratory hazards.

Note: The PPE recommendation is for emergency response operations and life safety. PPE recommendations for the post-fire removal of damaged modules will be defined by conditions found at the time of decommissioning. In addition, structural firefighting ensembles are not designed to provide protection from arc flash hazards.

4.6 BESS Subject Matter Expert

Typically, a BESS SME is a person or group familiar with the Smartstack BESS, the site layout and equipment, installation guides and manuals, the BMS architecture, passive and active protection systems, notification sequencing, and this ERP.

The BESS SME, equipment owner, and site operator play a critical role guiding fire department personnel responding to a BESS emergency by coordinating the following:

- Ensuring security of the site and limit access to only authorized personnel.
- Ensuring accountability of non-fire department personnel inside the facility.
- Ensuring authorized personnel have PPE that is appropriate to their assigned role/task.
- Reviewing and interpreting BMS data including SOC, state of health (SOH), temperature, and status of equipment.

- Locating and isolating trouble equipment.
- Ensuring an exclusion zone has been established around the trouble equipment.
- Expanding exclusion zone in the event additional battery cabinets sustain alarms or direct fire impingement.
- Evaluating the status of the explosion control and prevention system.
- Identifying the need for exposure protection.
- Leading post-incident operations.
- Administering decommissioning plan.

DRAFT

5 RESPONSE

5.1 Tactics

DO NOT FORCE ENTRY

Fire department personnel should not encroach within 100 feet of the facility fence line until the trouble battery cabinet has been identified.

Upon arrival, fire department incident command should contact the ROC to obtain preliminary information including the following:

- Accountability
  - ☐ Were any personnel present at the site?
  - ☐ If personnel are present, what is the status of their accountability?
- Location of Equipment in Alarm
  - ☐ What is the type and location of the trouble equipment in alarm?
- Alarm Type
  - ☐ What type of alarm has generated the initial response and have any other alarms been received that would suggest conditions are deteriorating?
- Equipment Status
  - ☐ Has trouble equipment been isolated autonomously or manually?
  - ☐ What is the SOC of the trouble equipment and facility?
- Explosion Control and Prevention Systems
  - ☐ What is the status of the explosion control and prevention system?

5.1.1 Life Safety

BESS facilities are normally not staffed and are observed and controlled remotely. However, facility personnel may be on-site periodically for inspection, testing and maintenance of equipment. Accountability shall be confirmed with the ROC.

Obvious line of sight rescues is the priority for responding fire department personnel. Fire department personnel shall not enter the facility for recovery operations.

Unescorted Rescue Considerations:

- Is there a confirmed victim location?
  - No confirmed location – No rescue advised
- How far is the victim from the electrical equipment?
  - Electrical contact – No rescue advised
- How far is the victim from the trouble battery cabinet?
  - Explosion hazard increases as distance to trouble battery cabinet doors decreases
  - Special consideration needed within 100 ft of battery cabinet doors

DRAFT

5.1.2 Community Air Monitoring

Establish air monitoring 100 feet downwind from the facility fence line to evaluate gas dispersion from failed equipment. Visually observe smoke plume to ensure it is not encroaching on exposure structures. If metering equipment detects abnormal levels, consider evacuating affected areas.

5.1.3 Exclusion Zone

Once the trouble equipment is identified, establish a 100-foot exclusion zone. Expand the exclusion zone if failure conditions spread to adjacent equipment.



Figure 8 General 100' Exclusion Zone

5.1.4 Alarms Monitoring

Monitor input alarms from the FACU and the BMS for the trouble equipment. Receipt of additional alarms can indicate deteriorating conditions within the trouble equipment. A review of the BMS can indicate the possible origin location and further impacted internal equipment.

5.1.5 Isolation of Trouble Equipment

Confirm trouble equipment has been autonomously isolated. If recommended by the BESS SME, remotely isolate adjacent equipment.

Fire Department personnel should never operate equipment or controls within the site. The BESS SME will coordinate all operational requests.

Never approach a trouble cabinet for manual activation of the E-Stop.

5.1.6 Condition Monitoring

From outside the exclusion zone, visually and audibly monitor the conditions of the trouble cabinet. Look for the presence of white gas, smoke, fire, and damage to the cabinet. Even if there are no visible or audible indications of failure, hazards to responding fire department personnel may still be present.

5.1.7 Exposure Assessment

Assess the adjacent equipment to determine if exposure protection is necessary. Evaluate the following:

- Are there any alarms in adjacent equipment?
  - Expand exclusion zone if adjacent equipment becomes involved.
- Based on thermal imaging camera readings, is there any increase in temperature on adjacent equipment?
  - If temperatures reach 50% of the average cell vent temperature as determined by UL9540A testing (TBD), see Section 5.1.8
- Is there any direct flame impingement on adjacent equipment?

5.1.8 Exposure Protection

Exposure protection should be considered if conditions warrant or if recommended by the BESS SME. While maintaining the exclusion zone, establish a continuous water supply. From outside the exclusion zone, using a rain down method, apply water in a fog pattern to cool the exposure equipment. Do not use a solid or straight stream to ensure fire department personnel safety and limit water intrusion into uninvolved equipment.

5.2 Incident Stabilization

5.2.1 Under Control

The incident may be considered under control when:

- Fire is contained to the equipment involved with no exposure concerns.
- No new alarms have been generated.
- The volume of fire or gas has decreased.

Once the incident has been placed under control, establish continuous fire-watch for the facility through decommissioning.

DRAFT

6 RECOVERY

Recovery focuses on equipment assessments for determining repair, replacement, or restoration as part of the facility owner/operator's recovery plan. Implementation of the recovery plan is the responsibility of the facility owner/operator and should be overseen by the BESS SME. Fire department involvement in the recovery plan is at the discretion of the BESS SME and the facility owner/operator.

Typical facility recovery plans can include:

- Facility fire watch
- Post-incident equipment assessment including:
  - Grid connectivity
  - BMS status
  - Fire alarm status
  - Fire suppression status
  - Explosion control status
- Lock out/Tag out
- Decommissioning
- Installation of new equipment
- Recommissioning

DRAFT

7 REVISION SHEET

Rev. No.	Date	Written By	Reviewed By	Approved By	Notes

DRAFT

Warning, this document is draft material.

Significant changes can occur after final review.

ATTACHMENT I – DECOMMISSIONING PLAN

DECOMISSIONING PLAN
AGAWAM ENERGY CENTER

Prepared for Longroad Energy

LONGROAD ENERGY
125 High Street
Boston, MA 02210

January 2026

4 Blanchard Road
P.O. Box 85A
Cumberland, Maine 04021

Tel: 207.829.5016 sme-engineers.com

SME
SEVEE & MAHER
ENGINEERS

TABLE OF CONTENTS

Section No.	Title	Page No.
1.0	**Executive Summary**	**1-1**
2.0	**Acronyms and Abbreviations**	**2-2**
3.0	**Narrative Description of Decommissioning Process**	**3-2**
3.1	Objectives	3-2
3.2	Scope & Boundaries	3-3
3.3	Pre-Decommissioning Planning	3-3
3.4	De-Energization & Isolation	3-4
3.5	Equipment Removal Sequence	3-4
3.6	Site Stabilization	3-5
3.7	Health, Safety & Environmental	3-5
3.8	Documentation & Records	3-5
4.0	**Estimate of Probable Costs**	**4-6**
4.1	Disassembly & Removal	4-7
4.1.1	Project Management	4-7
4.1.2	Site Work/Civil(Site Reclamation)	4-7
4.1.3	BESS and Transformer Foundations	4-8
4.1.4	BESS Units and Step Up Transformers	4-9
4.2	Scrap/Salvage Value	4-10
4.2.1	Presumed Scrap Value of BESS Equipment	4-10
4.2.2	Presumed Value of the Step Up Transformers	4-11
4.3	Decommissioning Summary	4-12
5.0	**Decommissioning Plan Administration**	**5-12**
5.1	Roles & Responsibilities	5-12
5.2	Compliance, Permitting & Reporting	5-13
5.3	Schedule & Phasing	5-13

LIST OF APPENDICES

APPENDIX A SITE PLAN

Agawam Energy Center (AEC) Decommissioning Plan
250 MW Battery Energy Storage System (BESS)

1.0 EXECUTIVE SUMMARY

Project Summary:
Capacity: 250 MW
Assets: 216 BESS units (containerized); 54 step-up transformers
Scope: Full retirement, removal, recycling/disposal, and site restoration

This Decommissioning Plan (the Plan) has been prepared based on the requirements in the Town of Agawam BESS ordinance (Article XXIII of the Code of the Town of Agawam). In accordance with the Ordinance, the Plan includes the following information.

a. A narrative description of the activities to be accomplished, including who will perform that activity and at what point in time, for complete physical removal of all battery energy storage system components, structures, equipment, security barriers, and transmission lines from the site;
b. Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations;
c. The anticipated life of the battery energy storage system;
d. The estimated decommissioning costs and how said estimate was determined;
e. The method of ensuring that funds will be available for decommissioning and restoration;
f. The method by which the decommissioning cost will be kept current;
g. A description of the manner in which the site will be restored, including how any changes to the surrounding areas and other systems adjacent to the battery energy storage system, such as, but not limited to, structural elements, building penetrations, means of egress, and required fire detection suppression systems, will be protected during decommissioning and confirmed as being acceptable after the system is removed; and
h. A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.

To present the information above the Plan is broken down into the following Sections.

- Section 2: Narrative Description of Decommissioning Process (items a, c, g and h)
- Section 3: Description of Disposal Methods (item b)
- Section 4: Estimate of Probable Costs (item d)
- Section 5: Decommissioning Plan Administration (items e and f)

The estimate of probable costs represents an opinion of probable cost (OPC), in today's dollars.

This decommissioning plan excludes the collection Substation which has potential value even after the Site ceases operation. As such, the substation and associated transmission lines to the interconnection substation are not included as part of the decommissioning and have not been included in the discussion or calculations herein.

2.0 ACRONYMS AND ABBREVIATIONS

AEC - Agawam Energy Center
BESS – Battery Energy Storage System
PCS – Power Conversion System
MV – Medium Voltage
LV – Low Voltage
SCADA – Supervisory Control and Data Acquisition
HVAC – Heating, Ventilation, and Air Conditioning
OPC – Opinion of Probable Cost
OEM – Original Equipment Manufacturer
LOTO – Lockout/Tagout
SOC – State of Charge
AHJ – Authority Having Jurisdiction
DC – Direct Current
UN – United Nations
DOT/IATA – U.S. Department of Transportation/International Air Transport Association
ISO – Independent System Operator
QA/QC – Quality Assurance/Quality Control
OSHA – Occupational Safety and Health Administration
ERP – Emergency Response Plan
NFPA – National Fire Protection Association
EPA/RCRA – U.S. Environmental Protection Agency/Resource Conservation and Recovery Act

3.0 NARRATIVE DESCRIPTION OF DECOMMISSIONING PROCESS

3.1 Objectives

In addition to meeting the requirements of the Town of Agawam requirements, the Plan has been prepared with the following objectives:

- Safely de-energize and remove all equipment associated with the BESS project.
- Maximize material recovery and recycling (battery materials, steel, copper, aluminum, electronics).
- Comply with all applicable environmental, health, and safety regulations.

- Restore and stabilize the site to protect human health and the environment.

The decommissioning plan will be implemented upon the end of operations or abandonment for 12 consecutive months. The anticipated life of the BESS system is assumed to be 25 years.

3.2 Scope & Boundaries

The overall AEC site can be broken down into three distinct areas: 1) the entrance area and Operations and Maintenance Building at the entrance off Silver Street; 2) the BESS facility located within the limits of the security fence and sound wall perimeter; and 3) the collection Substation located at the south end of the project site. A Site Plan is included in Appendix A. The scope of this decommissioning plan focuses on the BESS facility located within the security fence. The entrance area and Operations and Maintenance building pose no threat to human health or the environment and provide reuse value in their current condition. Similarly, the collection substation and overhead transmission lines connecting it to the adjacent utility substation may provide value to the utility or for future development of the parcel. Beyond proper disconnection of the BESS facility and securing of the substation fence, no demolition or removal of the collection substation is included in the Plan.

The decommissioning will include: BESS containers, battery modules/racks, Power Conversion System (PCS)/inverters, transformers, MV and LV cables, SCADA, HVAC, fire safety systems, foundations and pads (as required), access roads (as required), and ancillary equipment.

3.3 Pre-Decommissioning Planning

The Owner or party responsible for decommissioning shall undertake the following activities prior to decommissioning, as applicable:

- Permits & Notifications: Secure required decommissioning permits; notify utility/ISO, AHJ, fire department, environmental agencies, and landowner(s).
- Hazard Assessment: Perform HAZID/HAZOP specific to lithium-ion systems; review MSDS/SDS for all chemistries; identify PCB status for legacy equipment (if any).
- Site Condition Survey: Document equipment counts, oil volumes per transformer, battery chemistry, structural conditions, and access constraints.
- Contracting Strategy: Engage licensed electrical contractors, hazmat-trained battery handlers, recycling vendors certified and approved to handle specific materials (e.g. batteries, refrigerants etc), licensed disposal facilities and waste transporters.

- Emergency Preparedness: Confirm on-site fire equipment, spill kits are available and in good working order and that the facilities emergency response plan (ERP) are current for decommissioning activities.

3.4 De-Energization & Isolation

Decommissioning Contractor shall prepare an up-to-date de-energization plan based on the condition of the site at the time of decommissioning. At a minimum, the de-energization plan shall address plans and procedures for:

1. Outage Coordination: Coordination with utility; verify lockout/tagout (LOTO) plan, if applicable.
2. System Shutdown: Following OEM procedures for controlled shutdown of PCS/inverters and battery management system (BMS).
3. Electrical Isolation: Opening and LOTO of main breakers, DC disconnects, MV switchgear, and transformer secondary/primary; verify absence of voltage with calibrated meters.
4. Residual Energy Management: Discharging battery modules per OEM specs to safe state of charge (SOC), typically ≤ 5–10% prior to removal.
5. Ancillary Systems (HVAC, Controls, Fire Safety, etc.): Disabling systems per OEM guidance and Authority Having Jurisdiction (AHJ) after safe isolation.

3.5 Equipment Removal Sequence

BESS System Removal: The following is a typical removal process but should be reviewed and modified based on final equipment and configuration.

Step 1: Remove SCADA/communications equipment; archive data logs and configurations, if required.

Step 2: Remove battery modules/racks from each BESS unit (container). Package per UN 3480/3481 and DOT/IATA regulations, using fire-retardant crates or OEM packaging.

Step 3: Remove PCS/inverters, transformers, MV/LV gear.

Step 4: Extract cabling, busways, conduits; segregate copper/aluminum for recycling.

Step 5: Remove HVAC, fire safety systems (dispose per manufacturer/environmental regs).

Step-Up Transformer Removal: Transformers will be inspected and electrically tested for resale viability. Units will be drained to minimum oil transport levels per OEM instructions, disconnected and lifted intact onto transport trucks, and shipped to the designated buyer or refurbisher. Oil will be pumped into sealed totes and shipped with the transformer.

Concrete Slab Removal: After removal of BESS units and Step Up Transformers and related equipment, each reinforced concrete equipment slab will be broken using hydraulic breakers or excavator-mounted hammers. Reinforcing steel (rebar/mesh) will be separated and recycled. Once reinforcing steel is removed the concrete may be crushed on-site and used as fill or broken into pieces sized for transport and hauled to a concrete recycling facility.

3.6 Site Stabilization

Following removal of all above ground structures and equipment and below-ground structures and equipment to 24 inches below grade, the disturbed areas will be re-graded to be consistent with surrounding areas.

The access road from the main gate along the utility easement in the center of the site will be maintained from the main gate to the substation and the secondary access point to Moylan Lane. All other areas within the security fence of the BESS yard will be finished with a 4-inch layer of loam and seed, including fertilizer and mulch to promote re-vegetation.

3.7 Health, Safety & Environmental

Decommissioning contractor shall review and follow applicable health and safety requirements in place at the time the work is performed. A typical list of requirements is provided below.

- Standards & Compliance: OSHA 29 CFR (electrical safety, hazmat); NFPA 70E; NFPA 855 (ESS); EPA RCRA (hazardous waste); DOT hazmat shipping; local/state waste rules.
- Qualifications: Only trained, certified personnel handle battery modules and transformer oil.
- PPE: Arc-rated clothing, voltage-rated gloves, cut-resistant gloves, eye/face protection, respiratory protection as needed.
- Fire Risk Controls: Hot-work permits; thermal monitoring of removed modules; designated quarantine area for suspect modules (e.g. abnormal operation, visible damage, or indications of potential failure); Appropriate extinguishing media.
- Spill Prevention: Transformer oil handling plan; secondary containment; spill kits; immediate reporting and remediation per thresholds.

3.8 Documentation & Records

Decommissioning contractor shall maintain records for the tracking and disposal of materials removed from the site. All documentation shall be included in a final Decommissioning As-Built report including the following:

- Waste Manifests: Chain-of-custody for all hazardous and universal waste.
- Certificates: Recycling certificates; destruction certificates; non-PCB confirmation for transformer oil if applicable.

- Environmental Compliance: Permits, notifications, inspection logs, spill reports, air/noise/dust monitoring logs (if required).
- Photo documentation.
- Sign-offs from AHJ/landowner.

4.0 ESTIMATE OF PROBABLE COSTS

The costs of the decommissioning process have been broken down into two parts: 1) Disassembly & Removal and 2) Scrap/Salvage Value.

The Disassembly & Removal section has been divided into four general work items.

a. Project Management (contractor costs, general conditions, equipment, etc.)
b. BESS Units and Step up Transformers
c. BESS and Transformer Foundations
d. Site Work/Civil (site reclamation)

The Scrap/Salvage Value has been broken into two separate items.

a. Presumed scrap value of the BESS units
b. Presumed re-sale value of the Step-Up Transformers

This estimate is based on the site plans, information provided by Owner, and cost data obtained from Wage rates form the Massachusetts Department of Labor, Bureau of Labor Standards, and RS Means Construction Cost Index.

Quantities and unit prices for these individual work items are presented and discussed in the following paragraphs.

This estimate is based on the following assumptions:

- Facility includes 216 BESS “Smartskid” units.
- One step up transformer provided for every four (4) “Smartskids” for a total of 54 step up transformers.
- Each “Smartskid” contains 4 battery pods for a total of 864 battery pods.
- Demolition of 24-inch thick equipment foundations (or removal to 24-inches below grade).
- Batteries are lithium-ion;

- Step-up transformers have remaining useful life and are resold.
- Decommissioning will remove all materials and structures within 2-feet of the surface. All underground cable will be disconnected and abandoned in place.
- Transport distances: up to one-hour, one-way trip for concrete rubble and up to two-hour, one-way trip for battery and scrap recycling to recycle/refurbisher/waste facilities.
- Main access road through the center of the site will be maintained. All other surfaces will be covered with 4 inches of loam and seeded.
- All perimeter security fence and sound walls will remain in place
- Substation will remain in place.
- The three existing buildings will remain.

4.1 Disassembly & Removal

4.1.1 Project Management

1.0	Mobilization. Mobilization and demobilization of ancillary equipment and disassembly teams. (i.e. bull dozers, excavators, crane etc.) is estimated to approximately 1-2% of the decommissioning cost:	$ TBD	Prior to Building Permits
2.0	Project Oversight. Oversight of the decommissioning is estimated at:	$ TBD	Prior to Building Permits
3.0	Incidentals. A budget of approximately 5% of the decommissioning scope is recommended for project incidentals:	$ TBD	Prior to Building Permits
4.0	Contingency. A contingency of approximately 10% of the decommissioning scope is recommended to cover unknowns:	$ TBD	Prior to Building Permits
Total opinion of probable costs for **Project Management:**		**$ TBD**	**Prior To Building Permts**

4.1.2 Site Work/Civil(Site Reclamation)

1.0 Re-grading of BESS Site.

A. The decommissioning plan includes restoring the area of the BESS Sites. This assumes that all foundation areas will be brought up to grade and sloped to match adjacent grade and drain. The area will be rough graded and surface scarified to prepare it to receive loam and seed. This includes utilizing a portion of the crushed concrete from foundations as fill.

Approximate area: 249,220 SF

Cost per 1,000 square feet (MSF)	$ TBD Prior to Building Permits
Total estimate - regrading of the site:	$ TBD Prior to Building Permits

B. Following the preparation of the area in item A above the site will be finished with the placement of topsoil and other organic matter to support growth, including seed, and mulch.

Approximate disturbed area:	249,220 SY
Cost per square yard (SY)	$ TBD Prior to Building Permits
Total estimate - final loam and seed:	$ TBD Prior to Building Permits

The total opinion of probable costs for **Site Work/Civil:**	**$ TBD Prior to Building Permits**

4.1.3 BESS and Transformer Foundations

1.0 Removal of BESS and Transformer Foundations. Removal of the foundations is assumed to require a hydraulic excavator equipped with hydraulic ram (hoe-ram), an additional excavator with bucket for loading, and various dozers and loaders.

Demolition Cost per Unit:	$ TBD Prior to Building Permits		/unit
Number of Units:		54	units
Total estimate - foundation demolition:			$ TBD Prior to Building Permits

2.0 Transportation of rubble and disposal. Concrete demolition rubble generated for each BESS unit is estimated to be approximately 90 cubic yards (based on a removal depth of 2 feet below grade). It is assumed the reinforcing steel will be separated from the concrete debris and the remaining materials will be an inert material suitable for disposal at a demolition debris recycling material. It is also assumed that 50% of the concrete rubble (45*54=2430 CY) generated will not be transported offsite but will be used onsite to bring foundation sites back to grade. Costs to transport the remaining foundation rubble for disposal are based on an estimate of 15 CY per truck trip transported to a location within 1 hours (one-way).

Total estimated labor & equipment cost:	$ TBD Prior to Building Permits		/dump truck trip
Truck Trips Required (45CY X 54 Units/15CY)		162	trips
Total estimate for BESS foundation concrete costs for all 54 Units:			$ TBD Prior to Building Permits
Total estimated disposal cost:	$TBD Prior to Building Permits		/ton

Total estimate for concrete disposal at recycling facility:	$ TBD Prior to Building Permits
The total opinion of probable costs for removal of **BESS Foundations:**	**$ TBD Prior to Building Permits**

4.1.4 BESS Units and Step Up Transformers

1.0 Disconnection of Step Up tranformers. Disassembly costs for the Step Up transformers are based on the assumption that it will take a 4-man crew 8 hours to test and disconnect each of the 54 transformers.

Estimated labor rate: $TBD Prior to Building Permits /man-hour

Total estimate for BESS disassembly for all 54 Units:	$ TBD Prior to Building Permits

2.0 Disassembly of BESS Units. Disassembly costs for each smartskid with 4 battery pods broken down to separate components and battery modules will take an 8-man crew an estimated 24 hours.

Estimated labor rate: $TBD Prior to Building Permits /man-hour

Total estimate for BESS disassembly for all 216 Smartskid Units:	$ TBD Prior to Building Permits

3.0 Transportation of BESS battery modules. Cost to transport the BESS modules for disposal/recycling is limited by weight. This is assumes a single "Pod" is hauled per trip.

Total estimated labor & equipment cost: $ TBD Prior to Building Permits /transport trip

Total estimate for BESS transport for all 864 battery pods:	$TBD Prior to Building Permits

4.0 Transportation of broken down BESS module residuals (rack/enclosure) and smart skid to haul to recycle, disposal or reuse. Cost to transport the residual material from BESS modules (racks, enclosures, electronics etc) for disposal/recycling is limited by weight. This is assumes a max of 22 tons per trip resulting in 212 trips.

Total estimated labor & equipment cost: $ TBD Prior to Building Permits /transport trip

Total estimate for BESS transport for all broken down materials from 216 smartskid units:	$TBD Prior to Building Permits

5.0 Recycling/Disposal Cost for Lithium Ion Battery Materials. Cost for processing and recycling of Lithium Ion Battery modules at a licensed facility. Estimated at 14.5 tons per pod for 864 pods.

Total estimated disposal cost: $ TBD Prior to Building Permits /lb

Total disposal cost for 864 battery pods:	$TBD Prior to Building Permits

The total opinion of probable costs for removal of **BESS Units and Step Up Transformers:**	**$TBD Prior to Building Permits**

Disassembly & Removal Summary

The total opinion of probable costs for disassembly and removal including, Project Management, Site Work/Civil, BESS and Transformer Foundations and BESS Units and Transformers is:	**$TBD Prior to Building Permits**

4.2 Scrap/Salvage Value

For the purposes of this decommissioning plan, we have assumed that transformers will be sold for reuse and all other scrapable metal materials from the project decommissioning will be sold as scrap to a recycling yard in the Springfield, MA area. The presumed scrap / salvage values are based on the following conservative estimates:

4.2.1 Presumed Scrap Value of BESS Equipment

In estimating the scrap value of the BESS units, the following component weight estimates were used (all weights are in pounds). The material will vary between steel for enclosures and racks as well as the PCS and other electrical components. An average scrap value is used for the purposes of this estimate.

SmartSkid	4,979,000	lbs
Battery Pod (Enclosure)	2,592,000	lbs
Battery Pod (Racks/Misc)	1,728,000	lbs

Total estimated weight for each BESS: 9,299,000 lbs

Estimated recycling value for unprepared, mixed loads :	$TBD Prior to Building Permits/lb
Total estimated scrap value of non-battery components	$TBD Prior to Building Permits

Total opinion of **presumed scrap value for broken down non-battery BESS components:** **$TBD Prior to Building Permits**

4.2.2 Presumed Value of the Step Up Transformers

The cost of the step up transformers is approximately $500,000. Based on our research, typical transformers have a life expectancy of 50 years. Therefore, at 25 years a transformer could have a value of approximately 50% of its original cost. However, to be conservative, we have estimated the value of the internal transformers at 10% of the original transformer cost:

Estimated original cost for step up transformers:	$TBD Prior to Building Permits	each
Estimated value (10%)	$TBD Prior to Building Permits	each

Total opinion of **presumed value for all 54 external transformers:** $TBD Prior to Building Permits

Scrap/Salvage Value Summary

The total Opinion of probably scrap/salvage value from summing the items above: $TBD Prior to Building Permits

4.3 Decommissioning Summary

Disassembly & Removal

1.	Project Management	$TBD Prior to Building Permits
2.	Site Work/Civil (Site Reclamation)	$TBD Prior to Building Permit
3.	BESS and Transformer Foundations	$TBD Prior to Building Permits
4.	BESS Units and Step Up Tranformers	$TBD Prior to Building Permits
	Disassembly & Removal Total	**$**TBD Prior to Building Permits

Scrap/Salvage Value

1.	Presumed scrap value of BESS equipment.	$ TBD Prior to Building Permit
2.	Presumed value of the Step Up Transformers	$TBD Prior to Building Permits
	Scrap/Salvage Value Total	**$** TBD Prior to Building Permits

The net estimated opinion of probable cost for decommissioning is:	**$TBD Prior to Building Permits**

5.0 DECOMMISSIONING PLAN ADMINISTRATION

5.1 Roles & Responsibilities

- Owner/Developer: Approves plan, funds activities, oversees compliance and stakeholder engagement.
- Decommissioning Contractor: Executes plan, provides qualified crews, LOTO authority, HSE management, waste logistics.
- Battery Vendor/Recycling Partner: Provides packaging specs, transport guidance, recycling certificates.
- Environmental Consultant: Permitting, waste classification, spill response, stormwater/erosion compliance, monitoring.
- Utility/ISO Liaison: Outage coordination, interconnection termination requirements.
- AHJ/Fire Department: Safety oversight, hot-work approvals, ERP coordination.
- Transportation Vendor (Hazmat): DOT compliance, routing, manifests, incident reporting.

- QA/QC & Documentation Lead: Asset registry, photo logs, manifests, closeout package compilation.
- Transformer Resale Coordinator: Manages testing, certification, resale documentation, buyer coordination, and transport logistics.

5.2 Compliance, Permitting & Reporting

- Regulatory Framework: OSHA (electrical safety, hazmat handling), NFPA 70E, NFPA 855 for ESS, EPA/RCRA for hazardous/universal waste, DOT for lithium-ion transport, EPA Section 608 for refrigerants, and applicable state/local rules.
- Permits/Approvals: Decommissioning permit (if required), road use/oversize load permits, waste transporter permits, air/dust control plans, stormwater/erosion control.
- Recordkeeping: Waste manifests, certificates of recycling/disposal, spill logs, incident reports, daily JHAs, toolbox talks, LOTO logs, ERP drills.
- Stakeholder Notifications: Utility, AHJ, landowner(s), neighbors (if required), environmental agencies for any reportable events.
- Closeout Certification: Submission of complete documentation set; sign-off by Owner and AHJ.

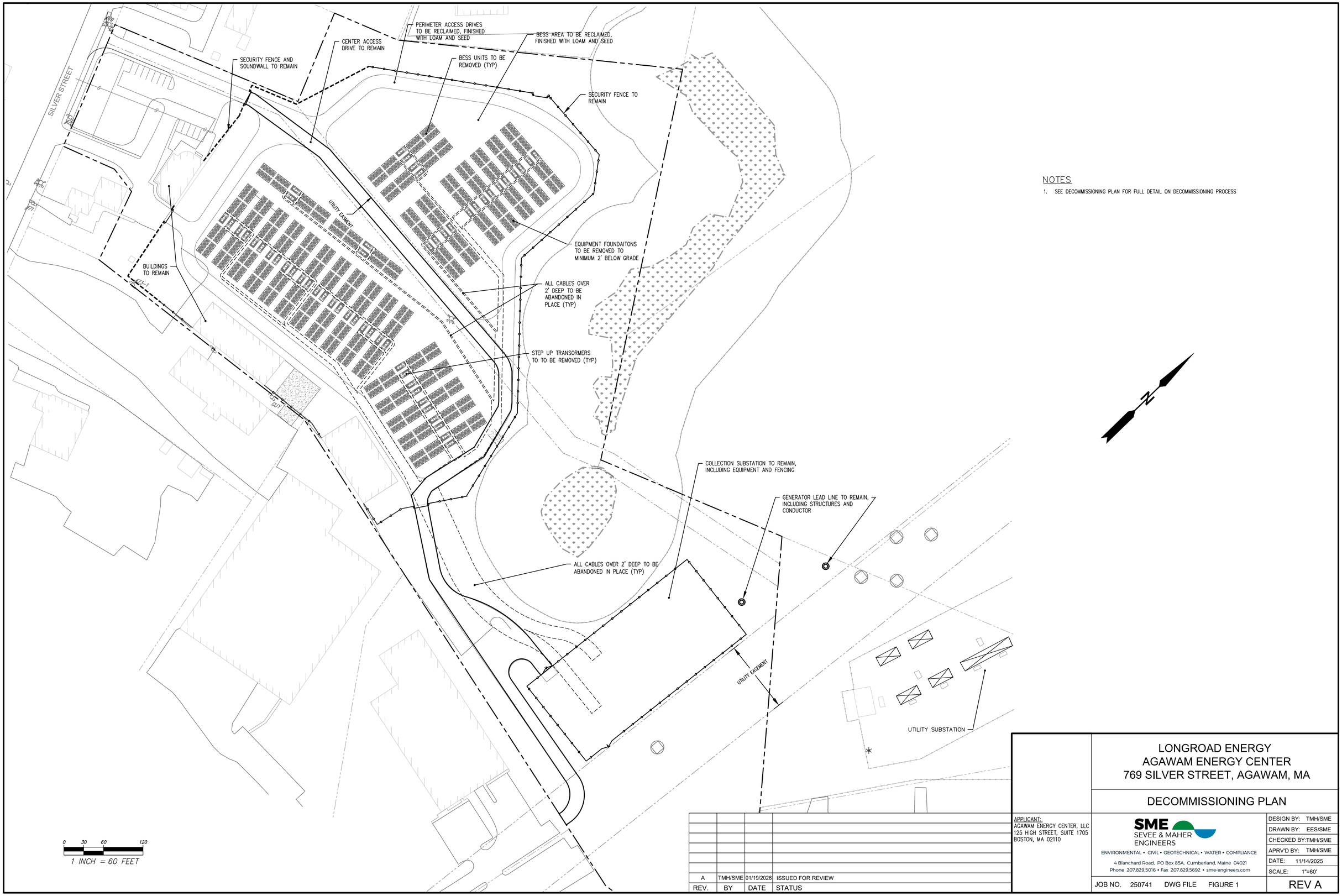
5.3 Schedule & Phasing

- Phase 1 (2–3 months): Permits, planning, mobilization, safety setup, de-energization.
- Phase 2 (6–9 months): Battery removal, packaging, transport, recycling; concurrent PCS/transformer removal for resale.
- Phase 3 (2–4 months): Civil removal (including slab demolition), site restoration, closeout.
- Total Duration: ~10–16 months (subject to vendor capacity and permit windows).

APPENDIX A

SITE PLANS

SME
SEVEE & MAHER
ENGINEERS



NOTES

1. SEE DECOMMISSIONING PLAN FOR FULL DETAIL ON DECOMMISSIONING PROCESS

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR REVIEW

APPLICANT:
AGAWAM ENERGY CENTER, LLC
125 HIGH STREET, SUITE 1705
BOSTON, MA 02110

LONGROAD ENERGY
AGAWAM ENERGY CENTER
769 SILVER STREET, AGAWAM, MA

DECOMMISSIONING PLAN

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE FIGURE 1 REV A

ATTACHMENT J – FIRE SAFETY COMPLIANCE PLAN

Agawam BESS Siting Assessment

Outdoor Ground Mounted Battery Energy Storage System

Agawam, Massachusetts



Prepared for
Longroad Energy
125 High Street
High Street Tower, Suite 1705
Boston, MA 02110

Prepared By
Fire & Risk Alliance, LLC
7620 Standish Place
Rockville, MD 20855

Rev0
November 18, 2025

The distribution of this document to third parties is prohibited without written approval from Fire & Risk Alliance, LLC.

Contents

1 Introduction 2
2 BESS Overview 2
3 UL 9540A Testing 4
3.1 Cell Level 4
3.2 Module Level 5
3.3 Unit Level 5
3.4 Applicability to Smartstack 6
4 Code Compliance and Emergency Planning 6
4.1 Agawam, Massachusetts – Hampden County Fire Code 6
4.2 Hazard Mitigation Analysis 6
4.3 BESS Emergency Response Plans and Training 7
5 Anticipated Hazards and Risk Considerations 8
5.1 Fire Hazards 8
5.2 Explosion Hazards 9
5.3 Smoke and Toxicity Hazards 9
5.4 Environmental Impact 10
6 Overview 10
7 Limitations 11
8 Revisions 11

Table of Figures

Figure 1 Smartstack Unit Arrangement 2
Figure 2 UL 9540A Test Levels 4

1 Introduction

Fire and Risk Alliance, LLC (FRA) performed a siting assessment for a proposed lithium-ion battery energy storage system (BESS) to be installed at the Agawam BESS Substation, located at Hampden County in Agawam, Massachusetts (Agawam BESS). This siting assessment includes a review of the proposed installation of Fluence Energy's Smartstack BESS 7.5, 4-hour system. This document presents a summary of the proposed BESS, its inherent safety features, the applicable codes/standards/test methods that would be applied to this site, a discussion of BESS hazards, and typical emergency response considerations. This siting assessment provides general guidance based on typical BESS design characteristics and common siting practices for BESS installations. It is intended as an informational resource during the planning and zoning stage and does not replace other site-specific engineering designs, analyses, or risk assessments that would be required for construction permitting.

2 BESS Overview

The proposed Smartstack installation is 7523-kilowatt hour (kWh) BESS that is populated with eighteen battery modules per pod with a lithium iron phosphate (LFP) cell chemistry. The Smartstack is a combination of one Smart Skid and four Pods installed together. Each pod contains eighteen battery modules, for a total of module count of seventy-two per Smartstack. The Smartstack is a fully integrated BESS consisting of battery modules, power electronics, control systems, a battery management system (BMS), a thermal management system (TMS), fire alarm system, explosion control, and ventilation. The Smartstack has a standardized, modular design that is not customizable or adjustable and is currently obtaining a UL 9540 factory listing. It is intended for each site installation to utilize factory-assembled/delivered Smartstack pods and Smart Skids. Each assembly is approximately 24.9 ft in length, 8.72 ft deep, 13.57 ft in height with a total weight of 155,646 pounds (Figure 1).



Figure 1 Smartstack Unit Arrangement

The lithium-ion batteries are housed inside an IP55 steel enclosure that provides protection against particle and water ingress and contact with the battery modules and power electronics. The Smartstack components are accessible through the doors. This modular, pod-style approach permits efficient maintenance/service of system components from outside the cabinets (i.e., battery modules, TMS, and power electronics), thus eliminating the need for personnel to enter an enclosure, structure, building or container to perform those activities. Since the BESS cabinets do not permit walk-in access, it is classified as a non-walk-in style (NWI) BESS; they are not defined as occupied buildings or structures. The Smartstack is designed with multiple integrated systems that work together to ensure safe operation and reduce the risk of fire and electrical hazards. These features are as follows:

- **Thermal Management System (TMS)** - Maintains optimal battery temperature through a closed-loop liquid cooling system, which automatically regulates heat buildup to prevent overheating and thermal runaway (TR).
- **Battery Management System (BMS)** - Continuously monitors voltage, current, temperature, and other critical parameters at the cell and module levels and autonomously responds to fault conditions by isolating problematic modules and activating the TMS to prevent escalation.
- **System Controller and Monitoring** - The Fluence control system allows for 24/7 monitoring of the Smartstack and critical parameters of the BESS.
- **Direct Current Protection Module (DCPM)** - The DCPM is intended to function as a means to disconnect each rack from the DC bus. The DCPM is in the Smart Skid.
- **Core Distribution, Protection and Monitoring Panel (CDPM)** - The CDPM is an outdoor electrical enclosure designed to protect the Smartstack by interrupting the flow of current when a fault occurs. The CDPM is in the Medium Voltage (MV) Skid.
- **Combustible Concentration Reduction System (CCRS)** - The CCRS, when activated, opens inlet and outlet louvers and starts the exhaust fan to lower gas concentration below flammable levels. A CCRS is contained within each pod on the Smartstack to maintain the lower flammability limit (LFL) below 25%. If the CCRS fails, deflagration panels are provided for redundancy. There are two deflagration panels per pod, designed to activate when pressure exceeds their setpoint to prevent an explosion event within the pod.
- **Master Fire Alarm Control Unit (MFACU)** - The MFACU aggregates data collected by each Smartstack Fire Alarm Control Unit (FACU) and communicates data to the customer, Fluence, and if a site fire alarm is triggered, transmits an alarm to the local emergency responders (if connected).
- **Fire Detection Systems** - Each Smartstack pod is equipped with a smoke detector/multi detector and a hydrogen detector. Each Smart Skid is equipped with three multi-detectors and a FACU. Lastly, two horn/strobe units are located on the outside of each Smart Skid.
- **Clearances Around Skids** - Limit the spread of heat and flames between modules and units, based on large-scale testing data.
- **Emergency Stop (E-Stop)** - Each Smart Skid is equipped with an E-Stop that can be initiated to stop power flow to and from the Smart Skid during an emergency.
- **Certifications and Listings** - All components are anticipated to be certified/listed per relevant product safety standards (e.g., UL 9540, UL 1973, UL 1642), ensuring the system

performance under abuse conditions is evaluated and validated for use in stationary energy storage applications.

3 UL 9540A Testing

All lithium-ion BESS deployed in the United States must be tested to UL 9540A, Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems (UL 9540A). UL 9540A details a test procedure to evaluate TR and fire propagation of a lithium-ion BESS at the cell, module, unit, and installation levels (Figure 2). Each of these procedures has exclusive test requirements and performance criteria. If acceptance criteria are satisfied at a given test level, further testing is not required. For example, cell and module level testing may be conducted, and if the module level test meets the model level performance criteria, unit and installation level tests are not required.

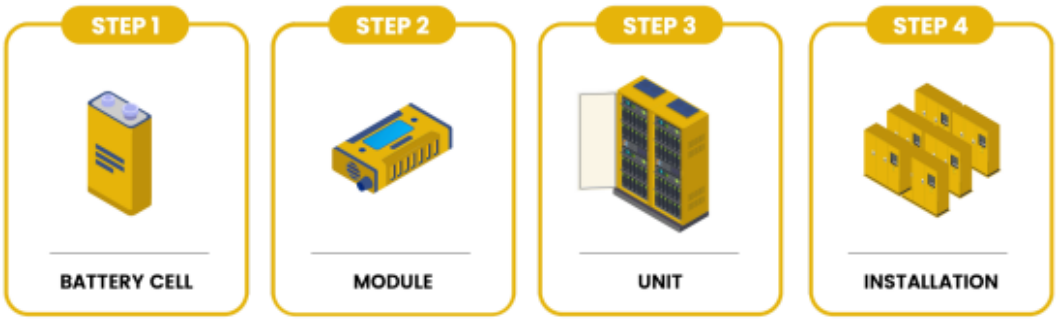


Figure 2 UL 9540A Test Levels

UL 9540A test results are used as a design basis for the fire and explosion protection systems/features required for a BESS installation. Notable test results include, but are not limited to, cell TR characteristics; cell TR gas composition; fire propagation potential from cell to cell, module to module, and unit to unit; products of combustion; heat release rate; smoke release rate; and performance of fire protection systems.

3.1 Cell Level

Cell level tests are conducted on individual battery cells that are stressed to induce TR. The first portion of the cell level test determines an effective means of forcing the cell into TR. The preferred method is to heat the cell with a flexible film heater applied to the exterior of the cell. The cell is then forced into TR using this method inside a pressure vessel to capture the vent gas. The gas composition is measured using Gas Chromatography (GC), and then the gas composition is used to determine various flammability parameters through standardized testing. Overall, cell level testing determines the venting and TR design temperature thresholds for the cells, as well as the amount and composition of flammable gases released during venting.

Key Results
Thermal Runaway Temperature
Venting Temperature
Vent Gas Composition
Vent Gas Volume
Lower Flammability Limit
Max. Explosion Pressure
Gas Burning Velocity
Performance Criteria
Thermal runaway not induced
Vent gas not flammable

UL 9540A (4th Edition) Section 7.7 specifies cell level test

acceptance criteria as follows:

1. TR cannot be induced in the cell; and
2. The cell vent gas does not present a flammability hazard when mixed with any volume of air, at both ambient and vent temperatures.

3.2 Module Level

Module level tests use the same method of inducing TR as the cell level test. The test is conducted under a smoke collection hood with the module placed on a noncombustible surface in the intended installed orientation. To induce TR propagation, one or multiple cells within the module are forced into TR to analyze if the module can contain TR to a limited number of cells. The gases generated from the module are collected in the hood and analyzed using oxygen consumption calorimetry, and smoke/gas sensors/analyzers to determine the gas composition and potential explosion hazard. Overall, module level testing evaluates if TR can propagate throughout the entire module, as well as determines the products of combustion released.

Key Results
Propagation External Venting/Flaming Heat Release Rate Smoke Release Rate Gas Composition Gas Volume Mass Loss
Performance Criteria
Thermal runaway is contained Vent gas not flammable

UL 9540A Section 8.4 specifies module level test acceptance criteria as follows:

1. TR is contained by module design; and
2. Cell vent gas is nonflammable as determined by the cell level test.

3.3 Unit Level

Unit level tests are conducted on a complete BESS unit to determine if a fire in one unit will spread to another unit or breach the walls of the adjacent BESS enclosure. The specific test configuration depends on the intended application as follows:

- Indoors or outdoors.
- Floor mounted, ground mounted, wall mounted or installed on a rooftop.
- Residential or non-residential.

Key Results
Propagation External Venting/Flaming Heat Release Rate Smoke Release Rate Gas Composition Gas Volume Surface Temperatures Heat Flux
Performance Criteria
Varies depending on the intended application/test configuration

In general, the test configuration involves the placement of initiating BESS a specified distance from target BESS units and walls. TR is induced in the initiating BESS unit using the same method as the cell/module tests. For a non-residential, outdoor, ground mounted BESS, such as the Smartstack, this test is typically conducted outdoors on a concrete pad. Unit level testing of non-residential, outdoor, ground mounted BESS (i.e., BESS units meant for outdoor installations only) can be used to demonstrate that TR/fire will not spread to adjacent units, surface temperatures and heat fluxes to adjacent walls/exposures will be limited, and explosion hazards are properly mitigated. Given

the installation will not be inside a building and unlike the cell/module tests, measurements of gas composition/products of combustion are not required

UL 9540A Section 9.8 specifies unit level test acceptance criteria as follows:

1. If flaming is observed outside the initiating BESS unit, separation distances to exposures shall be determined by greatest flame extension observed during the test.
2. Surface temperatures of the modules in the adjacent BESS unit do not exceed the temperature at which cell level gas venting occurs.
3. For BESS units intended for installation near exposures, surface temperatures of wall surfaces do not exceed 175ºF (97ºC) above ambient; and,
4. Explosion hazards are not observed.
5. Heat fluxes in the center of the accessible means of egress shall not exceed 1.3 kW/m^2.

3.4 Applicability to Smartstack

The Smartstack will be tested to the UL 9540A standard at the cell, module and unit levels. Notably, such testing would demonstrate whether or not TR could spread from module to module or unit to unit under test conditions.

4 Code Compliance and Emergency Planning

BESS are regulated by state and local codes as well as reference standards to ensure their safe installation and operation with proper emergency response planning. Notably, NFPA 855: *Standard for the Installation of Stationary Energy Storage Systems*, is a widely referenced standard with comprehensive requirements for the fire safety of BESS facilities.

4.1 Agawam, Massachusetts – Hampden County Fire Code

The regulatory authority having jurisdiction (AHJ) in Agawam, Massachusetts has adopted NFPA 1 (2021 Edition) with amendments, which incorporates NFPA 855 (2020 Edition). NFPA 855 includes requirements for separation distances, explosion control (NFPA 68/69), fire detection systems (NFPA 72), fire department access, electrical safety, security measures, signage, and the composition of a hazard mitigation analysis (HMA) for the proposed BESS. NFPA 855 also requires that BESS be listed in accordance with UL 9540 and evaluated using UL 9540A testing to determine fire and explosion behavior at the cell, module, and unit levels. As described in Section 3, these results inform critical design decisions, such as spatial separation, ventilation, and deflagration venting.

Together, these codes and standards (NFPA 1 and NFPA 855, as well as supporting codes like NFPA 68, 69, and 72) create a layered safety/compliance framework. Site developers and system integrators must work closely with AHJs to validate that installations meet the intent of these codes and standards through a combination of listings, testing, engineering analysis, and emergency planning documentation.

4.2 Hazard Mitigation Analysis

A HMA is a comprehensive technical assessment defined by NFPA 855 which identifies/evaluates potential hazards associated with a BESS installation. Furthermore, a HMA can demonstrate how

identified hazards have been—or can be—adequately mitigated through system design, site layout, operational controls, and emergency response planning.

Typically, a HMA is submitted to the AHJ as part of the overall permitting and plan review process as well as coordination with first responders. Based on the site layout, equipment placement, and utility details, it is anticipated that a HMA will be required for the proposed installation.

At a high level, a HMA typically includes the following elements:

- **Hazard Identification:** A review of the failure modes and risks associated with lithium-ion BESS technology, such as TR, fire propagation, gas generation, and deflagration. This often incorporates results from UL 9540A testing, including cell, module, and unit-level performance, to quantify the scale and timing of thermal events.
- **Mitigation Features:** A summary of safety systems integrated into the BESS product and installation, such as fire detection and suppression, explosion control measures (e.g., vents or sparkers), thermal management, and containment strategies. These features are cross-referenced with the hazard outcomes identified during testing (and modeling if utilized).
- **Code Compliance Review:** A verification that the BESS installation meets the requirements of governing codes and standards.
- **Site Layout and Spacing:** Evaluation of the proposed spatial arrangement of BESS units and their separation from structures, roadways, and exposures. This may involve prescriptive compliance or the use of performance-based alternatives supported by testing data.
- **Emergency Response Planning (ERP):** Identification of emergency shutdown procedures, response access routes, fire department interfaces, and public safety considerations. The HMA typically includes or references the ERP and may incorporate other content as needed or available from the BESS manufacturer.
- **Recommendations:** In cases where gaps exist between the product capabilities or site conditions and applicable safety criteria, the HMA will provide clear, actionable recommendations to reduce risk. This may include adding separation barriers, increasing spacing, or adding/enhancing detection and/or suppression systems.

The HMA is not a replacement for local plan reviews or code enforcement but serves to inform AHJs, emergency personnel, and stakeholders with technical justification for how fire, explosion, and toxic gas hazards will be managed. Furthermore, a HMA should provide confidence in the safety of the installation and supports effective coordination between developers, engineers, and first responders in Hampden County.

4.3 BESS Emergency Response Plans and Training

Emergency response planning is a critical component of any energy storage system installation. Per NFPA 855, authorized service personnel must be designated to respond to BESS fire emergencies. Accordingly, a site-specific ERP is typically required and should include procedures

for fire department coordination, incident response, shutdown protocols, and post-incident recovery. The ERP should also identify all major hazards, emergency access pathways, contact information, and locations of key safety equipment.

In addition, first responder training and orientation must be offered to ensure local emergency services are familiar with the ERP as it applies to the specific BESS installation. This includes access methods, hazard zones, and manufacturer-recommended response protocols.

For the specific product that has been selected (Smartstack), the ERP should reference any available product-level documentation, such as emergency response guides, design and installation manuals, and operations and maintenance manuals, which can assist with the development of the site-specific ERP and support safe and effective emergency response procedures.

5 Anticipated Hazards and Risk Considerations

BESS can experience TR at the cell level, which has the potential to propagate to modules/racks and produce a high heat release rate, flammable and toxic gases (e.g. H_2, CO, and HF), smoke, and – if gases accumulate – deflagration/overpressure risk. TR may be the result of internal defect(s), mechanical/thermal abuse, BMS/PCS failures, and/or external fires.

EPRI analysis of 81 recent incidents worldwide shows that only 11% of these failure events were attributed to cell/module defects, while the majority stemmed from system controls or balance of plant issues—demonstrating that the lithium-ion chemistry itself was not the primary risk contributor.[1] Globally, the grid-scale BESS failure rate declined by approximately 97% between 2018 and 2023, even as deployment increased.

5.1 Fire Hazards

As discussed, manufacturers mitigate fire risks through UL 9540A unit-level testing, which can demonstrate that TR would not propagate beyond a single module/unit. Such test data is referenced by the HMA as a basis for defining/designing separation distances, ventilation systems, and detection/suppression systems. Additionally, TMS and BMS systems are integrated into BESS to prevent cells from reaching TR triggering conditions. These design and testing protocols combine to create a system architecture where, in properly installed and commissioned facilities, fire spreading beyond the initiating unit is effectively prevented. Compared to large warehouse or chemical plant fires, which often burn uncontrolled and release significant heat and pollutants, fires involving BESS that are designed to modern codes, standards and safety features are rare, localized, and engineered to be contained within a single unit.

[1] Electric Power Research Institute, Pacific Northwest National Laboratory, and TWAICE. *Insights from EPRI's Battery Energy Storage Systems (BESS) Failure Incident Database: Analysis of Failure Root Cause*. May 2024. Electric Power Research Institute. Accessed 3 Aug. 2025. EPRI BESS Failure Incident Database. https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database.

5.2 Explosion Hazards

The risk of a BESS explosion arises when flammable off-gases produced by TR accumulate in the unit's enclosure and reach concentrations between the lower and upper flammability limits (LFL/UFL). If such conditions are coupled with ignition, deflagration or overpressure conditions may occur which may exceed the structural limits of the enclosure. Such risks also extend to potential cases in which oxygen is inadvertently introduced (e.g., opening the enclosure doors) and/or reignition occurs via hot surfaces or electrical arcing.

It is well established in fire science as well as reflected in NFPA and Society of Fire Protection Engineers (SFPE) guidance that when flammable gases accumulate within an enclosed volume, ignition can cause a rapid pressure rise, or overpressure, which may exceed the structural limits of the enclosure. This phenomenon is not unique to battery systems and applies broadly to any confined space containing a flammable atmosphere, from industrial process rooms to equipment housings. As discussed in the EPRI analysis, the APS 2019 Surprise, Arizona, BESS incident provides real-world validation: off-gas accumulation within a locked enclosure led to a deflagration and personal injury when first responders opened the door.

To address this hazard, current BESS designs incorporate code required explosion control systems to mitigate an overpressure event inside the cabinet. Specifically, the Smartstack mitigates the hazards of deflagration within the enclosure, with the CCRS. The CCRS, as described in Section 2, is designed to actuate inlet louvers, outlet louvers and an exhaust fan to maintain the LFL below 25% for combustible gases. If the CCRS were to fail, passive deflagration panels are located on the pods to relieve generated pressure and prevent an explosion. Therefore, the controls provided for the Smartstack effectively mitigate potential explosion hazards from TR as validated by UL 9540A and large-scale fire testing. Unlike other industrial occupancies or the APS 2019 Surprise incident, the Smartstack is not occupiable. Therefore, the risks to personnel are greatly reduced with an outdoor BESS installation.

5.3 Smoke and Toxicity Hazards

TR events have the potential to release smoke containing hazardous constituents such as hydrogen fluoride (HF), carbon monoxide (CO), volatile hydrocarbons, and particulates, which can present inhalation and environmental concerns in confined or poorly ventilated environments. The corrosive nature of HF may also pose risks to equipment and responders; however, these emissions are generally localized and, with proper ventilation, dissipate relatively quickly. Similarly, unlike other industrial occupancies or the APS 2019 Surprise incident, the Smartstack is not occupiable. Therefore, the risks to personnel are greatly reduced with an outdoor BESS installation where toxic gases are released into the ambient air (and do not accumulate within a confined, occupied space).

Emergency response plans outline PPE for responders, define standoff distances, and emergency procedures, aligning with American Clean Power public guidance.[2] While structural or industrial fires can produce widespread toxic smoke plumes affecting large communities, with

[2] American Clean Power Association. *First Responders Guide to Lithium-Ion Battery Energy Storage System Incidents.* July 1, 2023.

BESS deployed in smaller outdoor containers, the emissions are typically limited to the immediate site and dissipate quickly given the outdoor containers are comparatively small in size. Notably, fire events involving outdoor, non-occupiable BESS containers have not resulted in the detection of toxic gases outside of the BESS site's property line and should not pose a danger to the community or surrounding neighbors.

5.4 Environmental Impact

Potential environmental hazards from BESS fire events include contaminated fire-water runoff and particulate or metal deposition (e.g. Ni, Mn, Co, Li) in surrounding soil or water bodies. However, these impacts are typically localized and manageable when modern containment and remediation protocols are implemented. These strategies ensure that environmental impacts are contained and readily addressed. In contrast to large industrial incidents, with BESS deployed in smaller outdoor containers, the environmental impact from a BESS fire is limited given the outdoor containers are comparatively small in size. Notably, fire events involving outdoor, non-occupiable BESS containers have not resulted in the presence of toxic water and/or contaminated soil samples outside the BESS site's property line and should not pose a danger to the community or environment.

6 Overview

Modern lithium-ion BESS, when designed, certified, and installed in accordance with UL 9540, UL 9540A, NFPA 855, and other applicable fire codes/standards, provide sufficient safety at the site level during deployment. Unit level UL 9540A testing can be used to demonstrate that the Smartstack can contain TR events within a single unit, preventing propagation to adjacent equipment. Integrated thermal management, battery management, and explosion control systems, supplemented by site-level fire detection and clearance provisions, address the primary hazards of fire, explosion, toxic gas release, and environmental impact at the site level.

Incident data from the EPRI BESS Failure Incident Database and other public sources show that the majority of past failures have been associated with balance-of-plant or control issues rather than cell chemistry. Also, BESS incident rates have declined by approximately 97% between 2018 and 2023 despite rapid deployment growth.

When combined with appropriate siting, spacing, and permitting processes, including a site-specific HMA and ERP, these systems can be deployed in a manner that meets or exceeds current fire protection engineering best practices. Anticipated engagement with the AHJ as well as local emergency services during the design/planning phases will ensure that protective measures are understood and integrated into community response protocols.

Overall, the proposed Smartstack BESS installation at the Agawam, MA site will have the necessary safety measures in place as confirmed by specialized testing and as documented in the prospective HMA and ERP.

7 Limitations

At the request of Longroad Energy, FRA performed a site assessment for the proposed Agawam BESS installation in Hampden County, MA. The scope of services performed during this preliminary analysis may not adequately address the needs of other users of this report, and any re-use of this report or its conclusions presented herein are at the sole risk of the user. The opinions and comments formulated during this assessment are based on observations and information available at the time of the analysis, which has been provided to FRA by others. No guarantee or warranty as to future performance of any reviewed condition is expressed or implied. As the Agawam BESS site is still under development, this analysis assumed that the BESS and its associated equipment, as well as all fire protection systems, will be installed, commissioned, inspected, tested, and maintained as required by the manufacturer(s), NFPA 1, NFPA 855, and/or other applicable codes and standards throughout the lifetime of the BESS.

8 Revisions

Date	Revision	Reason for Issue	Developed By	Reviewed By	Approved By
11/18/2025	Rev0	Client Use	TS	KL	AFB

ATTACHMENT K – EMERGENCY OPERATIONS PLAN

Emergency Preparedness and Response Plan

Longroad Energy

Document #: COR-POL-E-001R3

Prepared by: C. Cote

Date Created: 10/03/2017

Revised by: Ryan Fonbuena

Last day revised: 6/16/2022

Contents

1 Approval Block: 2

2 Disclaimer 2

3 Revision History 2

4 Regulatory Requirement 2

5 Objective 3

6 Applicability/ Responsibility 3

7 Definitions 4

8 Plan 4

9 Appendix 14

1 Approval Block:

Authorized Person	Name (Printed):	Ryan Fonbuena
	Company Title:	VP, EHS
	Signature:	Ryan Fonbuena
	Date:	10/13/20

Changes to this procedure must be approved by the authorized officer and delegated manager.

2 Disclaimer

This document is Longroad Energy proprietary and confidential. It may not be distributed outside Longroad Energy without the written consent of the authorized officer named in section 1 of this document. Only approved plans will be used or circulated to execute directives. Plans in Draft mode may be used under the direction of the Authorized officer named in section 1.

3 Revision History

Revision #	Revision Date	Created / Revised By	Approved By	Section(s) Affected
1.1	10/03/2017	C Cote		All, new format
2.0	10/13/2020	R Fonbuena, EJ Martin	R Fonbuena	All
3.0	7/8/2022	R Fonbuena	R Fonbuena	All, Added 8.11, 8.13, new Appendixes A and B

4 Regulatory Requirement

Requirement	Description	–Cross Reference
OSHA 1910.38	Emergency Action Plans	1910.38(b)

5 Objective

The Objective of this Plan is to provide guidance and outline the course of action associated with preparedness and response to a variety of emergencies that may arise at Longroad Locations. This plan includes activities in offices, in the field, as well as working on wind, solar or battery energy storage sites or substations.

6 Applicability/ Responsibility

This plan applies to all locations and all persons conducting business for on behalf of Longroad Energy. The responsibilities of this are:

6.1 **EHS Department or Designee**

- 6.1.1 Ensure employees are trained annually on the Emergency Preparedness and Response Plan (EPRP) for their location.
- 6.1.2 Assist as needed in scheduling or hosting the annual emergency drill.
- 6.1.3 Annually review and as needed, revise this plan.

6.2 **Location Heads**

- 6.2.1 Ensure overall procedure implementation and coordination at their locations.
- 6.2.2 Ensure on location employees are contacted in the event of a serious injury, fire, chemical spill, or major emergency.
- 6.2.3 Determine when an evacuation should take place.
- 6.2.4 Account for every employee working at the location or in route to the location during an evacuation.
- 6.2.5 Ensure adequate emergency response/escape equipment is available at the location.

6.3 **Location EHS Coordinator**

- 6.3.1 Ensure the proper emergency and escape equipment to be used by personnel and visitors is in place and is in working condition.
- 6.3.2 If applicable to the emergency, determine if a reportable quantity of oil or hazardous waste has been spilled and contact the applicable regulatory agencies.
- 6.3.3 Determine if an emergency spill response team should be deployed.
- 6.3.4 Complete, and update annually, the location-specific information listed in **Appendices A and B**.
- 6.3.5 Ensure all inspections and associated recordkeeping are completed.
- 6.3.6 Ensure all drills and associated recordkeeping are completed.
- 6.3.7 Ensure all incidents and associated recordkeeping are completed.

6.4 **Employees**

- 6.4.1 Follow the emergency procedures listed in **Section 8**.
- 6.4.2 Notify the Location Head immediately of any possible emergency.
- 6.4.3 Control fuel and ignition sources, within limits or training and equipment.
- 6.4.4 Contact the appropriate response personnel in the event of an emergency (ambulance, fire department, police department, etc.).

7 Definitions

Term	Definition
Combustible Material	Material that will ignite with some effort when flame is applied or must be preheated in order to ignite
EPRP	Emergency Preparedness and Response Plan
EHS	Environmental, Health and Safety
Emergency Coordinator (EC)	The designated person who will be the in charge during an emergency.
Evacuation Meeting Point	A designated area where all employees will assemble during a location evacuation emergency.
Fire Detection System	An outside firm or a location monitoring system that detects and sends out a warning in the event of a fire.
Flammable Material	Material that will easily ignite in ambient temperatures with little contact with flame and no need to be preheated
Fuel/Ignition Sources	Any material, chemical, etc. that has the potential to increase the size, or possibly start, a fire (i.e.- boxes, pallets, rags, oil, fuel, paint, etc.).
Hazardous Materials	Any chemical meeting the hazardous criteria of being toxic, flammable, or corrosive defined by country regulations.
High Risk Incident (HRI)	Incidents that meet the following criteria: reportable to OSHA; hazardous material releases (liquid releases of ≥42 gallons to the environment, or ≥100 gallons into containment and solid releases which require immediate notification to regulatory agencies); fires which require response from emergency providers to protect the public; and as deemed required: near misses, equipment damage or failure, and security incidents.
Highly Combustible Materials	Any material or chemical that will readily catch fire (i.e.- fuel, oily rags, etc.).
Location	Longroad Energy owned, operated, or otherwise staffed location or facility.
Location Head	The person designated by Longroad Energy to have control of or be the highest ranked person at a Longroad Energy Location.
Location EHS Coordinator	The person designated at each location that is responsible to ensure that the EHS Program is properly administered at the location.
Reportable Quantity (RQ)	A designated quantity of a chemical that is reportable to a regulatory agency.
ROC	Remote Operations Center
Small Spill	A spill of less than 20L (5 gallons), which can be completely cleaned and contained using a Spill Kit.
WTG	Wind Turbine Generator

8 Plan

In accordance with the provisions of the Longroad Energy Corporate Policy and in support of the Company-wide emphasis on full environmental compliance and minimizing risks to employee health and safety, the Longroad Energy Location, has adopted this Emergency Preparedness and Emergency Response Plan.

8.1 **Location Description**

8.1.1 See Location Description in **Appendix A and B**.

8.2 **Availability of Copies of the Emergency Preparedness and Response Plan**

8.2.1 For all Longroad Energy Locations manned by Longroad Energy employees, a copy of the Emergency Preparedness and Response Plan will be available, in the office of the Location Head or EHS Coordinator, and/or in a common area so each employee has access to it.

8.2.2 If required, a copy of the plan will be sent to the local Fire Department and/or local Emergency Response Committee and any other emergency response agency that is expected to respond.

8.3 **Chemical Use & Storage**

8.3.1 The information about chemicals that may typically be expected to be found at this location can be found in the location SDS binder(s) located at _____

8.3.2 The storage locations of these materials can be found on the Location Map located in **Appendix B**. All containers will be marked or labeled to identify the contents of the container.

8.4 **Chemical/Hazardous Waste Storage**

8.4.1 Typical chemical wastes that are generated at this location are:

8.4.1.1 (***Enter a list of chemical wastes generated at specific locations***.)

8.4.1.2 Wastes may be accumulated in small quantities at the point of generation. If designated waste accumulation areas (or satellite storage areas) have been established, they can be found on the Location Map in **Appendix B**.

8.4.1.3 Oily waste liquids and solids are typically accumulated in 200 L (55-gallon) drums that are stored within a secondary containment.

8.4.1.4 Solar modules which have been classified as hazardous waste, are typically kept in sturdy boxes on pallets, or in large sturdy boxes capable of being moved with a forklift or pallet jack.

8.4.1.5 As these containers are filled, they are moved to the designated hazardous waste storage area as identified in the Location Map if they are not permanently kept there.

8.4.1.6 The chemical and hazardous waste storage areas are inspected regularly to prevent releases, explosions, and fires.

8.5 **Potential Emergencies**

8.5.1 The Location Head will be designated as the Emergency Coordinator unless otherwise specified in **Appendix A**. The Location Head will be notified immediately in the event of an emergency. If the emergency is within the capabilities of location personnel, the Emergency Coordinator will coordinate response activities. If the emergency is beyond the capabilities of location personnel, appropriate outside agencies and emergency responders will be notified. These agencies and their corresponding phone numbers are listed in **Appendix A.**

8.5.2 Emergency actions to be taken for various types of identified emergencies are detailed below.

8.6 **Fire**

8.6.1 Potential for Fire & Safe Operating Procedures

8.6.1.1 Potential ignition sources at this Longroad Energy location are:

Ignition source	Physical location	Hazard (Low, Med, High)

8.6.1.2 It is required that all fuel and ignition sources be removed from the location or reduced as much as practically possible.

8.6.1.3 Smoking is only allowed in designated areas as identified in **Appendix B**.

8.6.1.3.1 It is prohibited to introduce any unnecessary flammable materials/chemicals into the WTG towers or onto rooftop solar installations. Exceptions will only be made by the EHS Department or Location Head.

8.6.1.3.2 Combustible liquids such as oil must be stored in appropriate containers with caps (properly labeled) while being transferred by vehicles or between the top and bottom of turbines.

8.6.2 Control of Fuel Sources

8.6.2.1 All trash must be placed in designated containers.

8.6.2.2 Flammable liquids must be stored in approved containers and placed in flammable liquid storage cabinets when not in use.

8.6.2.3 Large accumulations of paper, cardboard, old pallets, excessive amounts of dried vegetation (in high hazard areas, near evacuation routes or meeting points) or other highly combustible materials should be kept to a minimum.

8.6.2.4 Areas around fire extinguishers, exits, and electrical panels must be kept clear for a three-foot space and unobstructed.

8.6.2.5 Combustible material should always be stored away from any ignition sources.

8.6.2.6 When transferring flammable liquids from one container to another, always ground and bond the containers to prevent static electricity build-up.

8.6.2.6.1 A catch basin shall be used where required to prevent spillage during transfers.

8.6.3 Control of Ignition Sources

8.6.3.1 Do not use equipment that has exposed wiring, cracked, or damaged switch plates.

8.6.3.2 Use only approved extension cords for temporary wiring.

8.6.3.3 Never use extension cords in place of permanent wiring.

8.6.3.4 Do not use cords that are damaged or frayed.

8.6.3.5 Do not load electrical circuits and circuit parts beyond their capacity.

8.6.3.6 Smoking, vaping and tobacco use is allowed in designated areas only and all butts must be disposed of in designated containers.

8.6.3.6.1 Smoking, vaping and tobacco use is NOT allowed in any building, substation or switchyard, vehicle, in or on WTGs (towers, nacelles or hubs), in solar arrays or on rooftops where solar arrays or equipment are located.

8.6.3.7 If smoke or smoldering is detected from plug powered equipment, disconnect the power supply and do not use the circuit until it has been inspected and the cause of the smoke or smoldering has been repaired.

8.6.3.8 When performing welding, cutting or open flame operations outside a designated weld area, a special hot work permit, reference the Longroad Hot Work policy for more information.

8.6.3.9 The following inspections of Fire Protection Equipment must be completed.

8.6.3.9.1 Automatic Sprinkler System requires annual inspections by a qualified person.

8.6.3.9.2 Emergency Lighting requires monthly inspections – verify that the emergency lighting will engage during an emergency situation.

8.6.3.9.3 Fire Detection Systems require annual inspections – verify that the detection systems will engage in the event of a real emergency. This inspection is usually completed by a detection company.

8.6.3.9.4 Fixed Extinguishing Systems require annual inspections. Ensure all systems are in complete working order.

8.6.3.9.5 Portable Fire Extinguishers in the Locations require monthly inspections– verify all extinguishers have the required charge, are in the correct locations and properly marked.

8.6.3.9.6 Portable Fire Extinguishers also require a periodic maintenance inspection by a qualified person, as well as periodic hydrostatic testing depending on the type of extinguisher.

8.6.4 Response to A Fire

8.6.4.1 Response to a Fire in the Location

8.6.4.1.1 The first person discovering a fire shall pull the nearest fire alarm and/or dial the location emergency number as listed in **Appendix A**. If the first responding employee has the appropriate fire extinguisher training, and the fire is incipient, the employee can try to extinguish the fire.

8.6.4.1.2 Evacuate the immediate area if unable to extinguish fire.

8.6.4.1.3 Notify the Location Head, who will direct the fire department to the proper location.

8.6.4.1.4 The Location Head and designated personnel will ensure the evacuation of personnel has been successfully completed and that all personnel are accounted for.

8.6.4.1.5 People should assemble at a designated Evacuation Meeting Location as described in **Appendix B.**

8.6.4.1.6 The Location Head will also ensure that equipment is shutdown as necessary.

8.6.4.1.7 The local fire department and the Location Head will determine when normal operations can be resumed.

8.6.4.2 Response to a Fire in an elevated work location

8.6.4.2.1 Reference the Tower Emergency and Rescue Procedure.

8.6.4.3 Response to a Fire at Substation / Transformer:

8.6.4.3.1 Call the location emergency number immediately. Fire department must be called immediately to contain these types of fires.

8.6.4.3.2 Do not try to extinguish the fire, evacuate to the nearest Evacuation Meeting Point at least 1000’ from the substation.

8.6.4.3.3 Report the fire the Longroad ROC.

8.6.4.4 Respond to fire which is out of control

8.6.4.4.1 Barricade access to the area(s) as practicable.

8.6.5 Emergency Drills

8.6.5.1 The location will conduct at least one annual emergency drill during operations. This also enables the local fire department to get a chance to become familiar with our location and be more prepared in the event of an actual emergency. Most emergency departments are more than willing to assist with drills. Conducting a drill involves the following steps:

8.6.5.1.1 Schedule the drill date and time. The Safety Drill Planning Checklist shall be used to document emergency drill planning.

8.6.5.1.2 Coordinate with the EHS Department, local emergency departments and if required, the fire detection company.

8.6.5.1.3 Conduct the drill.

8.6.5.1.4 Ensure the appropriate action and/or evacuation takes place.

8.6.5.1.5 Time the emergency actions.

8.6.5.1.6 Check the location for people who did not respond, areas where an alarm cannot be heard, or other potential problems.

8.6.5.1.7 Give employees and/or contractors the OK to come back inside.

8.6.5.1.8 Critique the drill with the local emergency department(s) if they are present.

8.6.5.1.9 Write up a brief report of how the drill went, send a copy to the EHS Director and keep it in your location EHS files. The Safety Drill Evaluation Form shall be used to document the drill.

8.7 **Emergency Evacuation**

8.7.1.1 Evacuation from the Location

8.7.1.1.1 A location evacuation map must be posted in commonly used locations inside the location. (lunchrooms, offices, bathrooms, etc.).

8.7.1.1.2 A designated On-Site Muster Point must be identified for each location. An Off-Site Muster Point must also be identified in case the primary Muster Point is affected by

the emergency (i.e.—substation fire, wind direction during a fire makes the original Evacuation Meeting Point unusable, active shooter or threat of violence, severe weather, etc.).

8.7.1.1.3 All location personnel must receive training of the location's emergency evacuation procedures within the first week of employment at the Site.

8.7.1.2 During an evacuation the designated Emergency Coordinator shall:

8.7.1.2.1 Keep exits marked, clear and accessible at all times.

8.7.1.2.2 Notify employees of any evacuation and then verify that all employees are safely at the Evacuation Meeting Point.

8.7.1.2.3 Comply with any instructions from any responding emergency department.

8.7.1.2.4 Consult with the emergency department / EHS as the situation permits and/or warrants.

8.7.1.2.5 Consult with the emergency department to determine the extent of any evacuation necessary.

8.7.1.2.6 Supervise any evacuation that is ordered.

8.7.1.2.7 Respond to direction from the emergency department / EHS and maintain communication with others.

8.7.1.2.8 Verify that isolated areas are checked for personnel.

8.7.1.2.9 Conduct head count to ensure everyone is accounted for. The designated Emergency Coordinator will notify the emergency department if any persons are thought to be on-site.

8.7.1.2.10 The local emergency department and the Emergency Coordinator will determine when normal operations can be resumed.

8.7.1.3 During a building evacuation Employees shall:

8.7.1.3.1 Evacuate the building from the nearest exit.

8.7.1.3.2 Report to the designated location Muster Point as listed in **Appendix B**.

8.8 **Medical Emergency**

8.8.1 Emergency Injury or Illness in the Location :

8.8.1.1 If emergency medical attention is required for an employee, call the local emergency medical services as listed in **Appendix A.**

8.8.1.2 Notify the Location Head and EHS Coordinator of the injury/illness.

8.8.1.3 An ambulance shall be used to transport the victim to the appropriate hospital emergency room unless delay in waiting would result in further damage to the employee's health.

8.8.1.4 The Location Head or injured employee's Manager shall fill out a Safety Incident Report Form if the employee is unable to do so.

8.8.1.5 All safety incident reports will be sent to the individuals designated on the form as the type of incident requires.

8.8.2 Emergency Injury or Illness in WTG:

8.8.2.1 Emergency plans shall be initiated to remove the employee from the tower or rooftop.

8.8.2.2 Call the location emergency number immediately to request external aid as required.

8.8.2.3 Depending on the injury/illness, if the employee requires immediate medical aid, apply 1st Aid/CPR to the employee, or use resources in the 1st aid kit if appropriate.

8.8.2.4 Use the tower rescue kit to lower the employee down the tower after applying immediate treatment.

8.8.2.5 Wait for emergency medical services to arrive once the injured person is safely on the ground unless transportation by location personnel is required.

8.8.3 Non-emergency Injury or Illness

8.8.3.1 If the employee needs attention by a doctor on a non-emergency basis, the Location Head will ask the employee if he/she wants to see a doctor.

8.8.3.2 The Location Head or EHS Coordinator will arrange transportation and designate someone to accompany the employee to the doctor.
8.8.3.3 Longroad Energy EHS Department must be notified immediately.
8.8.3.4 The Location Head shall fill a Safety Incident Report if the employee is unable.
8.8.3.5 All safety incident reports will be sent to the individuals designated on the form as the type of incident requires.

8.9 **Chemical Spill or Leak**

8.9.1 Response to a Chemical Spill
8.9.1.1 Refer to the Location SPCC plan.
8.9.1.2 The Location Head should be notified immediately.
8.9.1.3 Every effort will be made to prevent spills from entering waterways. Personnel working with chemicals or responding to a spill shall wear proper personal protective equipment, such as safety goggles, gloves, chemical apron, etc.
8.9.1.4 Only trained personnel in spill response shall respond to a chemical spill or leak. All others must notify the Location Head immediately.
8.9.1.5 For larger spills, additional assistance will be obtained from outside emergency responders or spill cleanup contractors. Spill response materials are kept at the location for small spills. The locations of these spill kits are identified on the Location Map in **Appendix B**.

8.9.2 The primary concerns for responding to chemical spill emergencies are:
8.9.2.1 Ensure the safety of all employees.
8.9.2.2 Notify appropriate emergency organizations to properly respond to the emergency. (i.e., fire department, ambulance, local/state environmental regulatory authority).
8.9.2.3 Get emergency assistance to anyone who has been exposed to the hazardous chemicals.
8.9.2.4 Prevent any spills from entering the sanitary and storm sewers.
8.9.2.5 Minimize location personnel exposure to the hazardous chemicals by only allowing qualified personnel to respond to the emergency.
8.9.2.6 Investigate to determine the cause, effect and damage, if any, and take steps to correct.
8.9.2.7 Arrange for timely cleanup of the chemical spill to minimize the potential of contaminating the environment or further contamination of the location.

8.9.3 ISWIM protocol
8.9.3.1 **Identify** the Spill – Identify the material spilling before you attempt to stop, isolate or minimize the spill.
8.9.3.2 **Stop** the Spill—Up-righting a container, closing a valve, or shutting down the equipment.
8.9.3.3 **Warn** others—to stay clear of the area.
8.9.3.4 **Isolate** the spill area—Keep personnel out of the area.
8.9.3.5 **Minimize** exposure and the spread of the spill. Place absorbent materials around the spill to contain its spread. Do not stand in the spilled material while doing this.

8.9.4 Response to a Chemical Spill in a WTG or solar installation
8.9.4.1 The Location Head shall be notified immediately.
8.9.4.2 Ensure spill absorbent material is available in each service truck and use it to contain the leak.
8.9.4.3 If the leak cannot be stopped by mechanical means, try to contain the leak as much as possible.
8.9.4.4 Notify Location Head immediately for guidance in clean-up procedures and regulatory notification.
8.9.4.5 Notify a cleaning company to clean the outside of the tower if the leak has migrated to the outside of the tower or the solar installation if it beyond the capabilities of LES personnel.
8.9.4.6 For spills into WTGs, contain the leak at the bottom of the tower with absorbent material, clay, etc. and put contaminated soil and absorbents in properly labeled containers.

8.9.5 Notifications

8.9.5.1.1 The Location Head must notify the Spill Release Team should a spill occur that is not controllable by the employees in the immediate area and requires the evacuation of the building. The notification shall include the following information:

8.9.5.1.1.1 Amount spilled/leaked,
8.9.5.1.1.2 Chemical(s) involved,
8.9.5.1.1.3 Time spill/leak occurred, and
8.9.5.1.1.4 Where spill/leak occurred.
8.9.5.1.1.5 If a spill impacted soil, water, etc.
8.9.5.1.1.6 Person responding to spill/leak.

8.9.5.1.2 Should the spill occur and evacuation is necessary, all employees shall immediately evacuate the building to the designated Evacuation Meeting Point.

8.9.6 Reportable Quantities

8.9.6.1 If a reportable quantity has been released, Longroad Energy will notify the appropriate regulatory agencies, as applicable:

- The National Response Center
- The State Emergency Response Commission
- The Local Emergency Planning Committee

8.9.7 Spills that reach the sewer system

8.9.7.1 The Location Head shall contact the applicable Sewer District. A detailed written statement describing the causes of the discharge and the measures being taken to prevent future occurrence must follow this notification.

8.9.8 Tornado

8.9.8.1 Tornadoes generally spawn from strong thunderstorms and the likelihood of them occurring is monitored via several weather services. As the weather should be reviewed as part of planning the day's work, pay close attention to any warnings, watches or storms that affect your location.

8.9.8.2 Never attempt to track a tornado on foot or in a vehicle.

8.9.8.3 Tornado Watch

8.9.8.3.1 Watches are issued by the Storm Prediction Center for counties where tornadoes may occur. The watch area is typically large, covering numerous counties or even states.

8.9.8.3.2 Tornadoes are possible in and near the watch area. Review and discuss your emergency plans and check supplies and your safe room if leaving the location is not possible or the best course of action.

8.9.8.3.3 Be ready to act quickly if a warning is issued or you suspect a tornado is approaching as acting early can help prevent injury.

8.9.8.3.4 Work that may endanger people in the event a tornado forms, i.e.- crane work, extensive repairs where people are exposed to the elements, should not be started.

8.9.8.3.5 Contact your manager to inform them of the hazard and if alternate plans should be made for staffing the location.

8.9.8.3.6 Contact the ROC to inform them of the weather and if alternate plans for staffing the location have been made.

8.9.8.4 Tornado Warning

8.9.8.4.1 Warnings are issued by your local forecast office. Warnings typically encompass a much smaller area (around the size of a city or small county) that may be impacted by a tornado identified by a forecaster on radar or by a trained spotter/law enforcement who is watching the storm.

8.9.8.4.2 A tornado has been sighted or indicated by weather radar and there is imminent danger to life and property.

8.9.8.4.3 Move to the tornado shelter if the location has one designated. If it does not, move to an interior room on the lowest floor of a sturdy building and avoid windows.

8.9.8.4.4 If in a vehicle, or outdoors, move to the closest substantial shelter and protect yourself from flying debris. The base level of a WTG, substation control house or under an overpass are examples if a tornado shelter or the interior room of a sturdy building is not accessible.

8.9.8.4.5 Do not leave from your shelter if the tornado is still in the area.

8.9.8.4.6 Once the tornado has cleared the area, carefully exit the shelter, being mindful of debris and potential damage to buildings, structures, blown debris and possible flooding.

8.9.8.4.7 Contact the ROC and provide a status update.

8.10 **Earthquake**

8.10.1 In the event of an earthquake the following should be done for employees inside of or near structures:

8.10.1.1 Take cover, such as under a sturdy piece of furniture, the inside corner of a room or in a close by doorway, to protect yourself from injury.

8.10.1.2 If there is overhead glass in the area, such as a solar canopy system, cover yourself from falling debris.

8.10.1.3 Take a look around for equipment that may fall or tip over in the area and stay clear.

8.10.1.4 Do not run from buildings during an earthquake. Most injuries occur outside from flying debris, falling objects or from downed high-voltage wires.

8.10.1.5 Extinguish open flames if possible.

8.10.1.6 If you are at a location that has an elevator, do not use it during an emergency.

8.10.1.7 DO NOT smoke or light a match/lighter.

8.10.1.8 Once the initial shock is over, calmly walk out of the building to the Evacuation Meeting Point. Do not reenter the building until the structure has been assessed to be safe.

8.10.1.9 Stay clear of flammable storage areas and tanks (i.e.- mounted propane tanks, heating oil tanks, etc.) until the area has been deemed safe.

8.10.1.10 In the event of an earthquake the following should be done for employees outside of and away from structures:

8.10.1.10.1 Stay in the open, away from structures, trees and overhead lines.

8.10.1.10.2 If there are overhead hazards in the area, cover yourself from falling debris.

8.10.1.10.3 DO NOT smoke or light a match/lighter.

8.10.1.10.4 Once the initial shock is over, calmly walk to the Evacuation Meeting Point. Do not enter buildings until the structure has been assessed to be safe.

When designating an Earthquake Shelter Location please consider the following:

- Safe areas include: doorways, under doorsills, or beside heavy upright beams
- Try to get under the nearest heavy table, desk, bench or machine.
- If you are unable to get under a sturdy object, move closely to an interior wall

8.11 **Wind Turbine Incidents**

8.11.1 Establishing a Temporary Clearance Area

8.11.1.1 When establishing a temporary clearance area in the event of a wind turbine incident (i.e., fire, runaway or debris separation), rope off or otherwise temporarily clear an area with a minimum radius of 500 meters (1,640 feet) measured from the base of the turbine.

8.11.1.2 The best judgment and common sense should always be employed when establishing a temporary clearance area. If a turbine incident is identified, but the situation

appears to be mitigated, the establishment of a temporary clearance area may not be required.

8.11.2 Fire

8.11.2.1 In case of fire in or near a turbine:

8.11.2.1.1 Push the emergency-stop button if it is physically safe to do so and it will not delay your exit from the turbine, disconnect the turbine at the main circuit breaker. Personnel outside the turbine should not approach the turbine to push the emergency-stop button.

8.11.2.1.2 If unable to access circuit breaker; contact the ROC to isolate tower.

8.11.2.1.3 Immediately exit the turbine, only using fire-fighting equipment to ensure a safe escape route from the wind turbine.

8.11.2.1.4 Establish a temporary clearance area and move upwind outside the clearance area, or seek shelter, if appropriate.

8.11.2.1.5 Notify the location office who can contact local emergency responders if assistance is required to extinguish the fire.

8.11.3 Turbine Runaway

8.11.3.1 In case of a runaway turbine:

8.11.3.1.1 Personnel outside the turbine should not approach the turbine.

8.11.3.1.2 Immediately exit the turbine, and establish a temporary clearance area, if appropriate.

8.11.3.1.3 Move upwind outside the 500 meter (1,640 feet) clearance area, or seek shelter, if appropriate.

8.11.3.1.4 Notify site office who can contact local emergency responders if assistance is required to address the situation.

8.11.4 Debris Separation

8.11.4.1 In case of debris separation:

8.11.4.1.1 Personnel outside the turbine should not approach the turbine.

8.11.4.1.2 Immediately exit the turbine, and establish a temporary clearance area, if appropriate.

8.11.4.1.3 Move upwind outside the clearance area, or seek shelter, if appropriate.

8.11.4.1.4 Notify site office who can contact local emergency responders if assistance is required to address the situation.

8.11.4.1.5 If debris separation is identified, but the situation appears to be mitigated, following the steps above may not be necessary. Best judgment and common sense should always be employed. Consult with the Location Head for guidance.

8.12 **Threats of violence**

8.12.1 <u>ALL THREATS OF VIOLENCE MUST BE TAKEN SERIOUSLY!!!</u>

8.12.2 The person receiving the call shall:

8.12.2.1 Notify the Location Head immediately.

8.12.2.2 Listen very carefully, assisted, if possible, by another person who will take careful notes to ensure getting the exact language of the message. Pay special attention to if the caller is a man or a woman, any distinguishing accents, and any background noises that might be heard (children, traffic, etc.).

8.12.2.3 See if another person can get the call traced, by contacting the police department, while the caller is kept on the phone.

8.12.2.4 Attempt to get the caller to repeat the message several times to elicit further information as to:

8.12.2.4.1 Who the caller is

8.12.2.4.2 Location of the calling party

8.12.2.4.3 What violent action is being planned
8.12.2.4.4 Where the action will take place
8.12.2.4.5 When it is scheduled to take place
8.12.2.4.6 Why Longroad Energy is being targeted with violence

8.12.3 The Location Head shall:

8.12.3.1 Evacuate the location immediately in the safest possible manner.

8.12.3.2 Contact the Police Department listed in **Appendix A**.

8.13 **Active Shooter**

8.13.1 The first course of action should always be to immediately evacuate the location to a safe area then contact law enforcement.

8.13.2 The phrase Run-Hide-Fight has been synonymous with Active Shooter training and means the following:

8.13.3 RUN: When an active shooter situation begins, all persons in the vicinity should run away from the area, find suitable shelter and call law enforcement.

8.13.3.1 Encourage others to leave with you.

8.13.3.2 Do not try to gather and take your personal belongings.

8.13.3.3 Prevent others from entering the area to the best of your abilities.

8.13.4 HIDE: If running is not an option, you should find a hiding spot that is hard to get to and large enough to quickly get out of if needed.

8.13.4.1 Hide quickly and quietly. If you can quietly secure the area you are hiding in, do so to delay a shooter from accessing the area.

8.13.4.2 Remember to turn off your phone or any other device that you might have which could alert the shooter to your location. Lights may need to be turned off as well.

8.13.4.3 Do not answer to any verbal calls from individuals until an all-clear has been given by law enforcement. Answering to verbal calls can alert a shooter to your location.

8.13.4.4 Do your best to stay calm, quiet and control your breathing.

8.13.5 FIGHT: If hiding is not an option or you are confronted by the shooter, this will be your last option.

8.13.5.1 Be aware of your surroundings. Know how to run from the area if an opportunity presents itself and what may present a hazard in the area you may be forced to fight in.

8.13.5.2 If you have to fight, use whatever improvised weapon you can; a fire extinguisher, chair, tools, laptop and other items may make the difference if you are forced to fight.

8.13.5.3 Commit to doing whatever is necessary to survive. There are few emergencies like an active shooter and your survival may depend on the actions you choose.

8.13.6 When law enforcement arrives, there will be actions you need to take:

8.13.6.1 Do not present yourself as a hostile person, they may not have all the information about the situation and may react with force if you appear to be a threat.

8.13.6.2 Keep your hands visible and empty.

8.13.6.3 Listen and comply with all commands given. If you are instructed to stop, get down, run or take any other action, do it, there may be a threat you don't see or know about they are trying to keep you safe from.

8.14 **Other Emergencies**

8.14.1 Power Outage

8.14.1.1 Employees should notify the Location Head if the outage is not immediately apparent.

8.14.1.2 The employees involved should take immediate steps to:

8.14.1.2.1 Ensure the safety of personnel.

8.14.1.2.2 Restore service.

8.14.1.2.3 Investigate to determine cause, effect, and damage, if any, and take steps to correct.

8.14.1.2.3.1 If required, call the local utility company. The location-specific utility company is listed in **Appendix A**.

8.14.1.3 Demonstrations or Civil Disturbances (Including Picketing)

8.14.1.3.1 Any employee seeing evidence of a demonstration within the immediate area of the location shall inform the Location Head

8.14.1.4 Media Requests

8.14.1.4.1 In the event of an EHS incident that gains media attention, **NO ONE** at any location shall have any contact with the media unless approved by their manager and External Affairs.

8.15 **Training**

8.15.1 All Longroad Energy field employees must be trained in the location's Emergency Preparedness and Emergency Action Plan and Fire Safety Plan.

8.15.2 Where applicable, designated Longroad Energy employees shall be trained on Oil Spill Prevention and the location-specific spill plans, and/or portable fire extinguishers.

8.15.3 Longroad Energy personnel involved with climbing and working in wind turbine must receive training in tower rescue and escape and how to prevent fires while working inside the towers.

8.16 **Auditing**

8.16.1 Longroad Energy Corporate Safety will review this procedure annually.

8.17 **References**

9 Appendix

9.1 **Appendix A: Emergency Contact Information**

SITE NAME

SITE ADDRESS

SITE LAT / LONG

SITE PHONE NUMBER

Emergency Contacts

IN AN EMERGENCY, DIAL 911

Local Non-Emergency Contact Number: (208)569-8546

Local Law Enforcement:	**Occupational Medical Clinic:**	**Regional Medical Center:**
LLE NAME	OMC NAME	RMC NAME
LLE ADDRESS	OMC ADDRESS	RMC ADDRESS
LLE PHONE NUMBER	OMC PHONE NUMBER	RMC PHONE NUMBER
Fire & Emergency Services:	**Helicopter Service:**	**Local Medical Center:**
FES NAME	HS NAME	LMC NAME
FES ADDRESS	HS ADDRESS	LMC ADDRESS
FES PHONE NUMBER	HS PHONE NUMBER	LMC PHONE NUMBER

When calling local emergency dispatcher remain calm, speak slowly and clearly. Include the following information in your communication:

- State the facility address or turbine coordinates;
- State the type of emergency (fire, medical, etc.);
- Stay on the telephone until the responding agency releases you, answer all questions; and
- Advise the dispatcher if you need to evacuate the turbine and temporarily clear the area around the turbine.

Critical Contact Information – Longroad Energy and Contractor

Longroad Energy Operations Manager:	**Longroad Energy Balance of Plant Technician:**	**Longroad Energy Remote Operations Center:**
NAME	NAME	24 hour contact
Cell:	Cell:	855-427-0180
EMAIL	EMAIL	roc.operator@longroadenergy.com

Contractor Site Manager:	**Contractor Office Coordinator:**	**Contractor Lead Technician:**
NAME	NAME	NAME
Cell:	Cell:	Cell:
EMAIL	EMAIL	EMAIL

Governing Federal Agencies

NERC REGION
Office:
Email:
NERC REGION Reliability Coordinator
Office:
Email:
NERC
Office: 404-446-9780
Email: esisac@nerc.com
FERC
Office: 202-586-8100
Fax: 202-586-8484
Email: doehqeoc@hq.doe.gov

Interconnection Entity

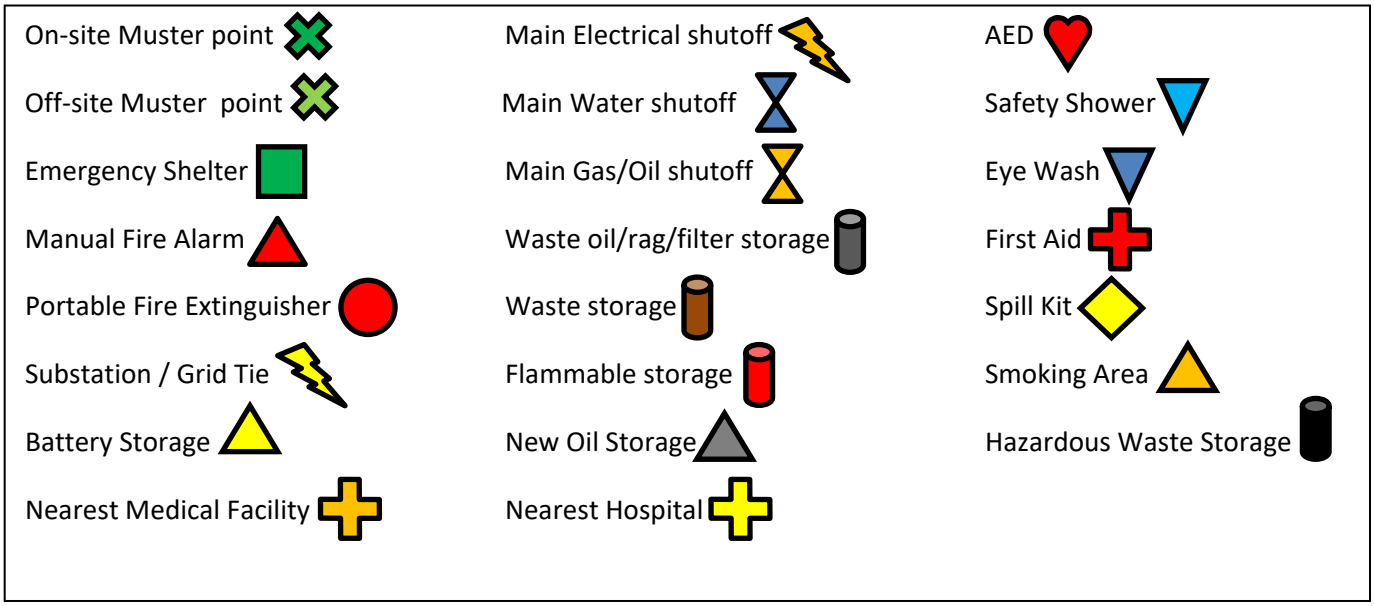
NAME
Office:
Email:

Specific Tower Siting

Tower ID			Elevation(msl)
1	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
2	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
3	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
4	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
5	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
6	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
7	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
8	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
9	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
10	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
11	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
12	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
13	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
14	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
15	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
16	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
17	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
18	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
19	N XX° XX. XXX’	W XX° XX. XXX’	XXXX
20	N XX° XX. XXX’	W XX° XX. XXX’	XXXX

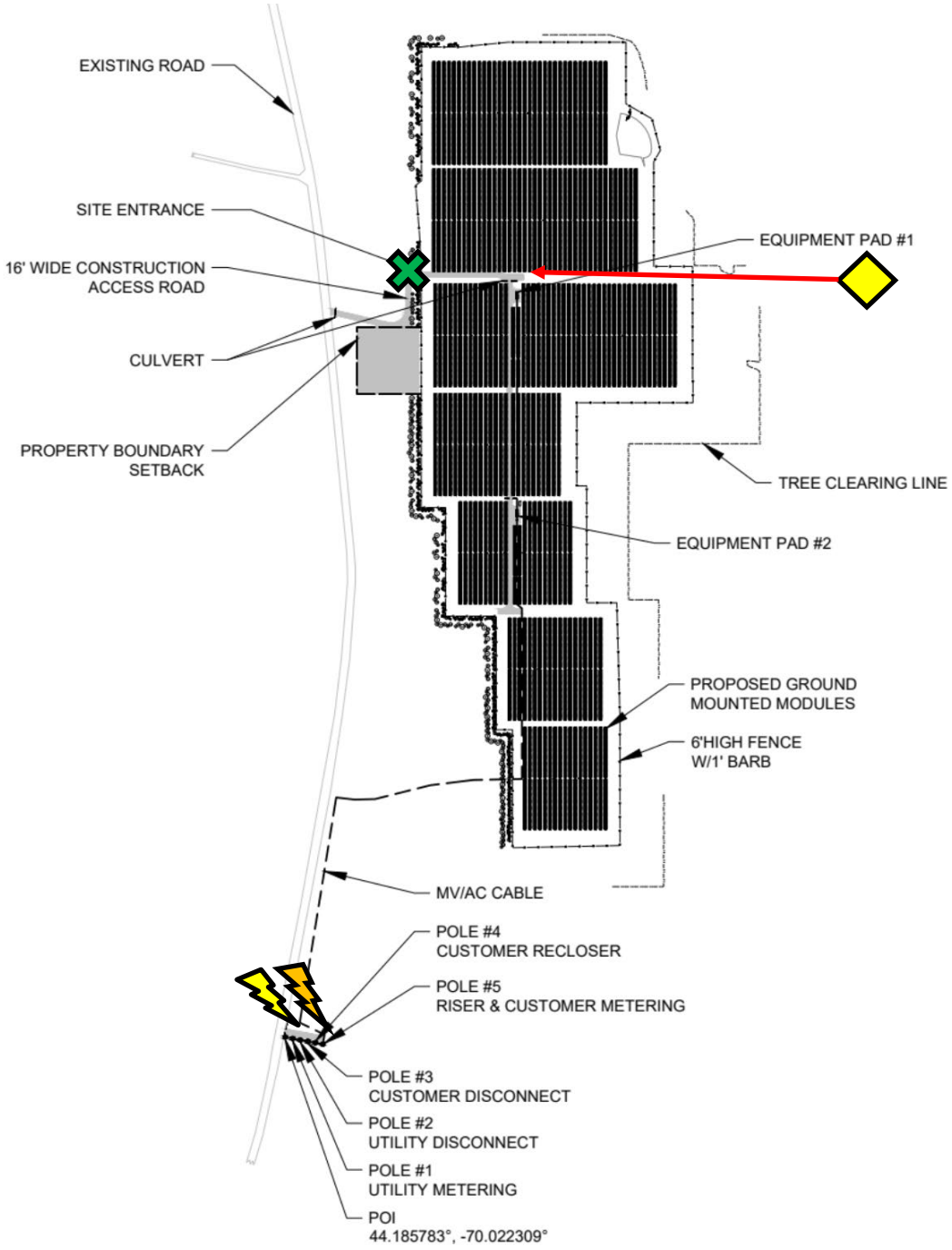
9.2 **Appendix B: Location Maps and Muster Point Information**

- ☐ **On-Site Muster Point**
- ☐ **Location #1:** DESCRIPTION
- ☐
- ☐ **(AS NEEDED) Location #2:** DESCRIPTION
- ☐
- ☐ **Off-Site Muster Point**
- ☐ **Location #1:** DESCRIPTION
- ☐
- ☐ **(AS NEEDED) Location #2:** DESCRIPTION



EXAMPLE MAP

Each Location shall have at least two maps: 1) that shows the full location and applicable legend items and 2) that shows the greater area where the Off-Site Muster point(s), Nearest Medical Facility and Nearest Hospital are located. Locations with staffed buildings shall have each floor of each building depicted on additional maps as needed.

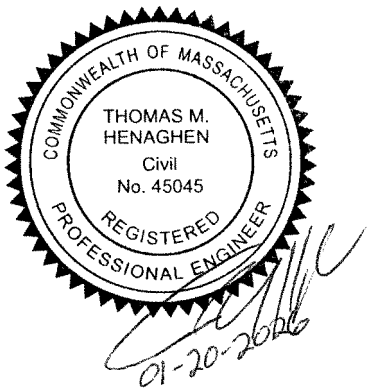


ATTACHMENT L – STORMWATER MANAGEMENT REPORT

STORMWATER MANAGEMENT REPORT
AGAWAM ENERGY CENTER
769 SILVER STREET
AGAWAM, MASSACHUSETTS

Prepared for

AGAWAM ENERGY CENTER, LLC
C/O Longroad Development Company, LLC
125 High Street
Boston, MA 02210



January 2026

4 Blanchard Road
P.O. Box 85A
Cumberland, ME 04021
Tel: 207.829.5016 sme-engineers.com

SME
SEVEE & MAHER
ENGINEERS

TABLE OF CONTENTS

Section No.	Title	Page No.
1.0	**INTRODUCTION**	**1**
2.0	**PROJECT DESCRIPTION**	**1**
3.0	**SITE WATERSHED**	**4**
4.0	**STORMWATER MANAGEMENT STANDARDS**	**5**
4.1	Standard 1: No New Untreated Discharges	5
4.2	Standard 2: Peak Rate Attenuation	6
4.3	Standard 3: Recharge	8
4.4	Standard 4: Water Quality	8
4.5	Standard 5: Land Uses with Higher Potential Pollutant Loads	9
4.6	Standard 6: Critical Areas	9
4.7	Standard 7: Redevelopment and Other Projects Subject to the Standards only to the Maximum Extent Practicable	10
4.8	Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control	10
4.9	Standard 9: Operation and Maintenance Plan	10
4.10	Standard 10: Illicit Discharges	10
5.0	**CONCLUSION**	**11**

LIST OF ATTACHMENTS

ATTACHMENT A	NRCS SOIL SURVEY
ATTACHMENT B	STORMWATER DRAINAGE FIGURES
ATTACHMENT C	PRE-DEVELOPMENT HYDROCAD CALCULATIONS
ATTACHMENT D	POST-DEVELOPMENT HYDROCAD CALCULATIONS
ATTACHMENT E	TREATMENT VOLUME CALCULATIONS
ATTACHMENT F	LONG TERM POLLUTION PREVENTION PLAN
ATTACHMENT G	ILLICIT DISCHARGE STATEMENT

LIST OF FIGURES

Figure No.	Title	Page No.
1	SITE LOCATION MAP	3

STORMWATER MANAGEMENT REPORT
AGAWAM ENERGY CENTER
AGAWAM, MASSACHUSETTS

1.0 INTRODUCTION

This Stormwater Management Report was prepared by Sevee & Maher Engineers, Inc. (SME) to assess stormwater management for the construction of the proposed Agawam Energy Center project in Agawam, Massachusetts.

The Applicant proposes to develop an approximately 250-megawatt (MW), 4-megawatt hour (MWh), battery energy storage system (BESS) on the 17.2-acre site located at 769 Silver Street. The project will consist of battery containers, transformers, inverters, equipment pads, and associated infrastructure, including an interconnection substation. The proposed BESS site will be accessed from Silver Street. The battery containers will be surrounded by a combination of 18-foot-high solid wall, and 8-foot-high chain link and wood fencing that will act as physical, visual, and sound barriers as detailed in the attached plans. The BESS equipment will connect to the existing South Agawam Switching Station via the project's own substation and short transmission line.

The stormwater design is based on the water quality and quantity objectives identified in the stormwater management requirements pursuant to Chapter 175, §175-35 of the Code of the Town of Agawam and the Massachusetts Stormwater Management Standards.

The project will be located completely outside of all Areas Subject to Protection under M.G.L. c. 131, Section 40 listed in 310 CMR 10.02(1), as well as all buffer zones associated with Areas Subject to Protection. During construction, various Best Management Practices (BMPs) including erosion controls will be utilized to prevent impacts to adjacent resource areas and buffer zones.

2.0 PROJECT DESCRIPTION

The project property is an approximately 17-acre parcel on Silver Street in Agawam, Massachusetts. The property is zoned Industrial and is currently used for commercial/industrial purposes. The majority of the site being used for the project is currently developed with gravel and paved access roads, several buildings and other unvegetated gravel areas used or surface storage of equipment and materials. The Applicant plans to redevelop the site as an energy center with the addition of Battery Energy Storage Systems (BESS).

In accordance with the Chapter 175-35 Stormwater Management Plan, previously developed sites must meet the stormwater management standards to the maximum extent practicable. However, if it is not practicable to meet all the standards, the new system must be designed to improve existing conditions.

The addition of a open crushed stone surface over much of the site, additional plantings and vegetation at the site entrance and a vegetated buffer strip around the perimeter of the site and addition of stormwater detention pond, the proposed conditions will improve on existing conditions.

The site was identified for its gentle land slope, prior commercial/industrial use, as well as the commercial/industrial use of neighboring properties, as well as its proximity to the adjacent Eversource substation where it will make its electrical interconnection. The location of the project is shown in Figure 1, Site Location Map. More details on the project site are shown in the engineering drawing set submitted with this report.

As noted above, most of the site has been previously developed and disturbed for previous commercial use. Much of the site consists of uncontrolled, exposed gravel surfaces. To prepare the site, several of the existing buildings will be removed and the site will be graded to provide a uniform grade across the site. The proposed grading plan was prepared to generally maintain existing drainage patterns and avoid large cuts and fills.

The finished surface within the BESS yard will include a combination of compacted gravel access roads and a crushed "topping stone" surface. The topping stone used in the BESS yard and the proposed substation is a washed crushed stone used in the electrical grounding system for the facility for high electrical resistivity but also provides significant benefits in stormwater management. This crushed stone surface performs differently than most common construction practices. The stone which is washed to remove fines and contains large void ratios provides permeability plus storage.

Any disturbed areas or existing unvegetated areas on the perimeter of the site that are not required for roads, or the BESS units will be restored with loam and seed and native plantings.

The area at the front of the site, immediately off Silver Street, will include the Operations and Maintenance building and the associated entrance and parking area. The Operations and Maintenance building will utilize one of the existing buildings on site. This area will include driveway and parking improvements and landscaping improvements including a visual screening berm and plantings.

As noted above, the site will be graded to maintain existing drainage patterns. Most of the site will drain to the east towards the wetlands. In the proposed condition a detention pond will be added to provide additional treatment of stormwater and management of peak flows. The site drainage and stormwater management is discussed in more detail below.



FIGURE 1
SITE LOCATION MAP
LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MASSACHUSETTS

SME
SEVEE & MAHER ENGINEERS

DWG: SITE LOCATION PLAN LMN: NONE CTB: SME-STD.CTB JOB#: 250579.01 REV: 12/17/2025

3.0 SITE WATERSHED

On-site soils were identified using the Natural Resources Conservation Service (NRCS) soil information for Hampden County, Massachusetts, Central Part. A copy of the custom Soil Resource Report is included in Attachment A of this report. The report includes a soil map for the project area. Soil mapping information is also included in the watershed plans.

The soil within the area of work consists of Merrimac fine sandy loam (254A, 254B, 254C and 254D) and Amostown fine sandy loam (258B). Soil classifications for 254A, 254B, 254C and 254D are Hydrological Soil Group (HSG) A and were modeled as HSG A for purposes of water quantity calculations. Soil Classification 258B is HSG C/D and was modeled as HSG D for purposes of water quantity calculations.

Existing Conditions

The ground surface on most of the property generally slopes towards the east in the direction of wetlands, with grades in the developed area ranging from less than 1 percent to 5 percent. The site is characterized by a low wetland area on the eastern side of the site, extending beyond the property line. The majority of the parcel is developed or previously disturbed except for the vegetated areas around the wetland areas which make up approximately 2 acres of the 17-acre site. Stormwater flows currently travel uncontrolled across the primarily unvegetated surface towards the wetlands.

Under existing conditions, stormwater runoff from most of the project area comes from Subcatchment 1 (SC-1). Stormwater generally flows from the higher areas to the wetlands, identified as Analysis Point (AP-1) for this report. The far eastern side of the site (east of the wetlands), still within the SC-1 drainage area, flows west towards the same AP-1 wetland area. This area on the east side of SC-1 is largely gravel and appears to be used for access and material storage.

There is a small drainage subarea at the front of the site that is modeled as Subcatchment 2 (SC-2), where flows from the existing driveway and parking area flows to Silver Street, which is identified as Analysis Point (AP-2) for this report.

There is a third small drainage area in the southwest corner of the site, that flows to the adjacent property to the south. The subarea is made of largely of existing buildings and driveways, with some lawn area. This is modeled as Subcatchment 3 (SC-3) and identified as Analysis Point (AP-3) at the property line.

Proposed Conditions

Under the proposed conditions, the overall site drainage patterns will be similar to existing conditions. The analysis points will be the same as those described in the existing conditions analysis to allow for easy comparison of pre- and post-development peak flows. The site will be graded to provide a more uniform slope, approximately 1 to 1.5% over most of the site but still following similar drainage patterns. Under proposed conditions, all stormwater from the BESS yard (SC-1A and SC-1B) will be routed to a proposed

stormwater detention pond located on the east side of the site between the developed area and the wetlands. The pond is designed with storage below the lowest outlet invert to provide space for storage of the "first flush" before any discharge from the pond. A vegetated drainage swale will be constructed along eastern edge of the BESS yard to intercept surface flow and direct it to the pond while providing additional opportunity for removal of sediment.

The eastern portion of the site that contains the proposed substation (SC-1C) will also maintain existing stormwater flow patterns with stormwater draining east to west towards the wetlands. The substation area will be graded to a consistent 1% slope. There is no stormwater treatment proposed in this area. The addition of the substation yard and its crushed stone topping represent an overall improvement in this area, compared to the existing gravel surface. The topping stone will minimize sediment load and provide infiltration and help filter stormwater, providing an improvement over existing conditions. This area is e, the surface has little to no sediment load and provides some initial storage stormwater in the voids, helping to reduce peak flows and filter stormwater. This area is also extremely flat and the addition of additional ponds or treatment structures that require gravity would require significant fill and additional disturbance of currently undisturbed areas and areas within 100 feet of the wetlands.

The drainage areas at the front of the site (SC-2 and SC-3) that flow to Silver Street and the adjacent parcels have changed slightly in size and shape but overall, there will be no net increase in peak flows to these areas and improvements to the type and quality of vegetated and landscaped areas.

Stormwater management plans identify the on-site drainage patterns before and after development (see Drawings D-100 and D-101). These drawings are included as Attachment B for reference.

4.0 STORMWATER MANAGEMENT STANDARDS

4.1 Standard 1: No New Untreated Discharges

The proposed project consists of new point source discharge locations associated with the proposed detention basin. The outlets from proposed stormwater basin will include two level spreaders to disperse stormwater flows from broad crested overflow weir, and three discharge pipes. Both the broad crested weir and the drainage pipe outlets will include rip rap protection to disperse stormwater at acceptable velocities and minimize erosive forces at the outfall. and erosive forces. Construction details of the level spreader, overflow structure and pipe inlets and outlets are included in the engineering plan set provided for the project.

All other areas not being directed to the pond will continue to flow overland, similar to existing conditions.

4.2 Standard 2: Peak Rate Attenuation

Stormwater peak flow rates were modeled for the 2, 10-, 25- and 100-year/24-hour storm events with Type III Soil Conservation Service rainfall distribution, using HydroCAD Version 10.20. HydroCAD is based on methodologies developed by the U.S. Department of Agriculture Soil Conservation Service (SCS), namely TR-55 and TR-20, to calculate runoff rates and volumes based on descriptions of land use, ground characteristics, and size, in combination with other hydraulic and hydrologic calculations.

Rainfall depths for each of storms identified above were obtained from NOAA Atlas 14 Volume 10 (Perica et al., 2015; Rev. 2019) and accessed via the NOAA Precipitation Frequency Data Server.

The time of concentration (Tc) for each subcatchment was calculated in HydroCAD using a combination of sheet flow and shallow concentrated flow. Sheet flow uses roughness coefficients (Manning's n) and watercourse slope to calculate travel time of stormwater runoff for each subcatchment. The site was modeled using a maximum 100 foot of sheet flow. The shallow concentrated flow method was used to determine the velocity factor along the flow path of the runoff and thereby derive a travel time. The time of concentration of each subcatchment is the combination of these travel times. A minimum time of concentration of 6 minutes was used for all subcatchments, for both existing and proposed conditions.

Site drainage from the proposed development will generally follow the pre-development flow patterns.

As discussed in Section 3 above, the site was divided into the following subcatchments and analysis points. The subcatchments are shown on the Figures included in Attachment B.

Existing Conditions
Analysis Point 1 (AP-1) – Wetlands on east side of the site.
Subcatchment (SC-1) - Represents most of the site, including area to the east and west of the wetland that represents AP-1. This includes some area beyond the property line that flows onto the site.

Analysis Point 2 (AP-2) – Area along Silver Street
Subcatchment 2 (SC-2) – This area is largely made of the "front yard" of the property, including driveways and parking areas.

Analysis Point 3 (AP-3) - Southwest corner of the property.
Subcatchment 3 (SC-3) – This area is made up largely of adjacent buildings and driveway.

Proposed Conditions
Analysis Point 1 (AP-1) – Wetlands on east side of the site.
SC-1A – Northern portion of the BESS yard and a portion of the main access.

SC-1B – Southern portion of the BESS yard and a portion of the Operations and Maintenance Building and entrance area.
SC-1C – The northern and eastern perimeter areas of the site, including the wetlands and the substation area.
SC-1D – A small area on the southeast corner.

Analysis Point 2 (AP-2) – Area along Silver Street
SC-2 – The front of the property including landscaped and parking areas that flow to Silver Street.

Analysis Point 3 (AP-3) - Southwest corner of the property.
SC-3 – Area on the southwest corner of the property that includes existing buildings and driveways and a small portion of the BESS yard.

A comparison of peak flows to the three analysis points is summarized in Table 1. As shown in Table 1, our model indicates that there will be no increase in peak flow rates to any of the three analysis points under the proposed conditions for the 2-year storm, 10-year storm, 25-year and 100-year storm. The proposed detention pond before AP-1 is adequately sized to handle the stormwater flows and control the discharge rate.

SC-2 contributing to AP-2 will remain largely the same in post-development conditions with updated landscaping and plantings between the project and Silver Street, resulting in a decrease in flows.

SC-3 will be decreased in size in the post-development condition, with more drainage directed to the east. As a result, AP-3 will see a decrease in flows and there will be no risk of an increase in flows to adjacent properties.

TABLE 1
STORMWATER QUANTITY SUMMARY

	2-Year Storm		10-Year Storm		25-Year Storm		100-year Storm	
	Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Analysis Point 1 (cfs)	12.23	8.88	29.9	20.73	42	31.34	61.32	49.43
Analysis Point 2 (cfs)	<1	<1	1.32	1.31	2.17	1.98	3.65	3.08
Analysis Point 3 (cfs)	4.94	2.69	8.76	5.19	11.14	6.78	14.77	9.21

Overall, the pre- and post- is a conservative estimate of the peak flows in the post-construction condition. The area of the BESS yard that will be finished with crushed "topping" stone was modeled as a compacted gravel surface with a Runoff Curve number of 96. Due to the rough surface and high void ratio of the stone surface will result in less runoff than a smooth compacted gravel surface.

Copies of the calculations for the pre-development runoff are in Attachment C and post-development runoff is provided in Appendix D.

4.3 Standard 3: Recharge

The soil within the area of work consists of Merrimac fine sandy loam (254A, 254B, 254C and 254D) and Amostown fine sandy loam (258B). Soil classifications for 254A, 254B, 254C and 254D are Hydrological Soil Group (HSG) A and were modeled as HSG A for purposes of water quantity calculations. Soil Classification 258B is HSG C/D and was modeled as HSG D for purposes of water quantity calculations.

For A-type soils, the Stormwater Management Guidelines require that a recharge device be provided with capacity equal to 0.60-inches the impervious area. To evaluate this re-development project we looked at each subarea to confirm if there was an increase in the impervious area, to calculate the recharge volume for new impervious area.

For SC-1, a large portion of the site in proposed conditions, including the BESS area and the substation yard, will be covered with a 6-inch layer of the crushed "topping stone", as part of the electrical grounding system. Although these areas are "stone" or "gravel" they do not behave the same as the compacted gravel surfaces that currently exist on the site and are proposed for the access roads at the site. The washed crushed stone mix overlaying 18-inches of gravel fill will provide improved permeability as well as storage in this stone, given its high void ratio. For this reason, this material was not considered impervious for the purposes of the recharge calculation. As a result, for SC-1 there is a net decrease in impervious area in the proposed conditions. In addition, the 6-inch layer of crushed stone with a void ratio of approximately 0.3, will provide 1.8 inches of initial storage in the stone. As a result, no recharge volume was calculated.

For SC-2 and SC-3 there was a reduction in impervious area in the proposed condition. As a result, no recharge volume was calculated.

4.4 Standard 4: Water Quality

The minimum required water quality treatment volume for the proposed development is one half inch of runoff times the impervious surface area. As discussed in 4.3 above, there is a net decrease in impervious area for the project when considering the characteristics of the topping stone. In addition, the topping stone also has the benefits of being a washed stone with little or no sediment load and also helps to trap sediment from other areas.

However, when determining a treatment volume for stormwater from SC-1A and SC-1B that will be flowing to the proposed detention based we included all paved and gravel areas, including the topping stone, to provide a conservative volume.

A calculation of the required treatment volume as well as a comparison of the treatment volume to the proposed volume provided below the lowest outlet from the pond is included in Attachment E. The storage below the lowest invert will provide additional opportunities for sediment removal and infiltration.

The topping stone, perimeter vegetated buffer strip and vegetated drainage swale will provide removal of sediment from stormwater flows along the path to the pond, providing pre-treatment.

The proposed detention basin and the vegetated swale along the east side of the BESS yard will provide an improvement in the quality of the stormwater runoff compared to the uncontrolled runoff from the large unvegetated gravel yard in the existing conditions.

Similar to the discussion in Section 4.3, no stormwater treatment was provided for SC-2 and SC-3 due to the net decrease in impervious surface in these areas.

As required by the Stormwater Management Standards, a Long-Term Pollution Prevention Plan is provided in Attachment F. In short, the plan identifies suitable practices for source control and pollution prevention measures.

4.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

The proposed facility is not considered a Land Use with Higher Potential Pollutant Loads. No exterior machinery, heavy equipment or fleet storage is proposed and projected daily vehicle traffic volumes are estimated to be very low. The precautions and procedures for maintenance of battery storage equipment will be outlined in the Operations and Maintenance Plan for the facility. Overall, the proposed site improvements will result in a more controlled environment with a lower sediment load. Therefore, Standard 5 does not apply to this project.

4.6 Standard 6: Critical Areas

The project is not located within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges are not located near or to any other critical area requiring the use of the specific source control and pollution prevention measures.

4.7 Standard 7: Redevelopment and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The site was historically used as a lumber and yard for storage of various materials. Most of the site is a combination of various impervious and unvegetated surfaces, including a paved entrance driveway and parking near Silver Street, compacted gravel driveways and storage yard and several buildings. The total impervious area under current conditions for the area analyzed, which includes some off-site areas is approximately 15 acres.

Under the proposed conditions, there will be additional plantings and landscaped areas at the entrance and on the perimeter of the site. Gravel access roads to provide access to equipment and substation will be more defined and existing unvegetated areas that are not proposed for development will be revegetated. Several existing buildings will be removed. The area around the battery storage units and within the substation yard will be finished with a washed crushed stone as part of the grounding system for the equipment. In addition, the nature of the rough surface and porosity of the stone will provide initial storage and improve infiltration of stormwater and initial treatment compared to the existing gravel surface. The total impervious area under proposed conditions (gravel roads, buildings, equipment foundations) not counting the topping stone is approximately 7 acres.

The change in surface materials and the addition of the detention basin, vegetated perimeter buffer strip and swale and increased landscaping in the proposed redevelopment will result in improved stormwater quality.

4.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control

In accordance with the Massachusetts Stormwater Management Standards and the NPDES General Permit, a SWPPP will be prepared prior to construction. The erosion control notes and details included in the engineering plan set submitted for the project will cover most of the SWPPP requirements. A copy of the SWPPP will be provided to the Town prior to construction.

4.9 Standard 9: Operation and Maintenance Plan

An Operations & Maintenance plan has been prepared for the project and submitted as part of the Site Plan Approval Application.

4.10 Standard 10: Illicit Discharges

The submitted Long-Term Stormwater Pollution Prevention Plan (Attachment F) specifies measures to prevent illicit discharges from entering the stormwater management system. Source control and response plans are also specified to prevent illicit discharges from being conveyed through the stormwater management system.

Consistent with the Massachusetts Stormwater Handbook, a signed Illicit Discharge Compliance Statement prior to discharging stormwater to the post-construction stormwater BMP's. A draft copy of the Illicit Discharge Statement is provided in Attachment G.

5.0 CONCLUSION

The stormwater management for the Agawam Energy Center was designed in accordance with Massachusetts Stormwater Standards and Town of Agawam requirements. Stormwater runoff will be controlled through the addition of stormwater detention pond and the stabilization of existing gravel areas with vegetative cover and a crushed stone surface and improved landscaping. As a result, we do not anticipate any adverse impacts anticipated on downstream drainage or abutting properties.

ATTACHMENT A

NRCS SOIL SURVEY

SME
SEVEE & MAHER
ENGINEERS

United States Department of Agriculture

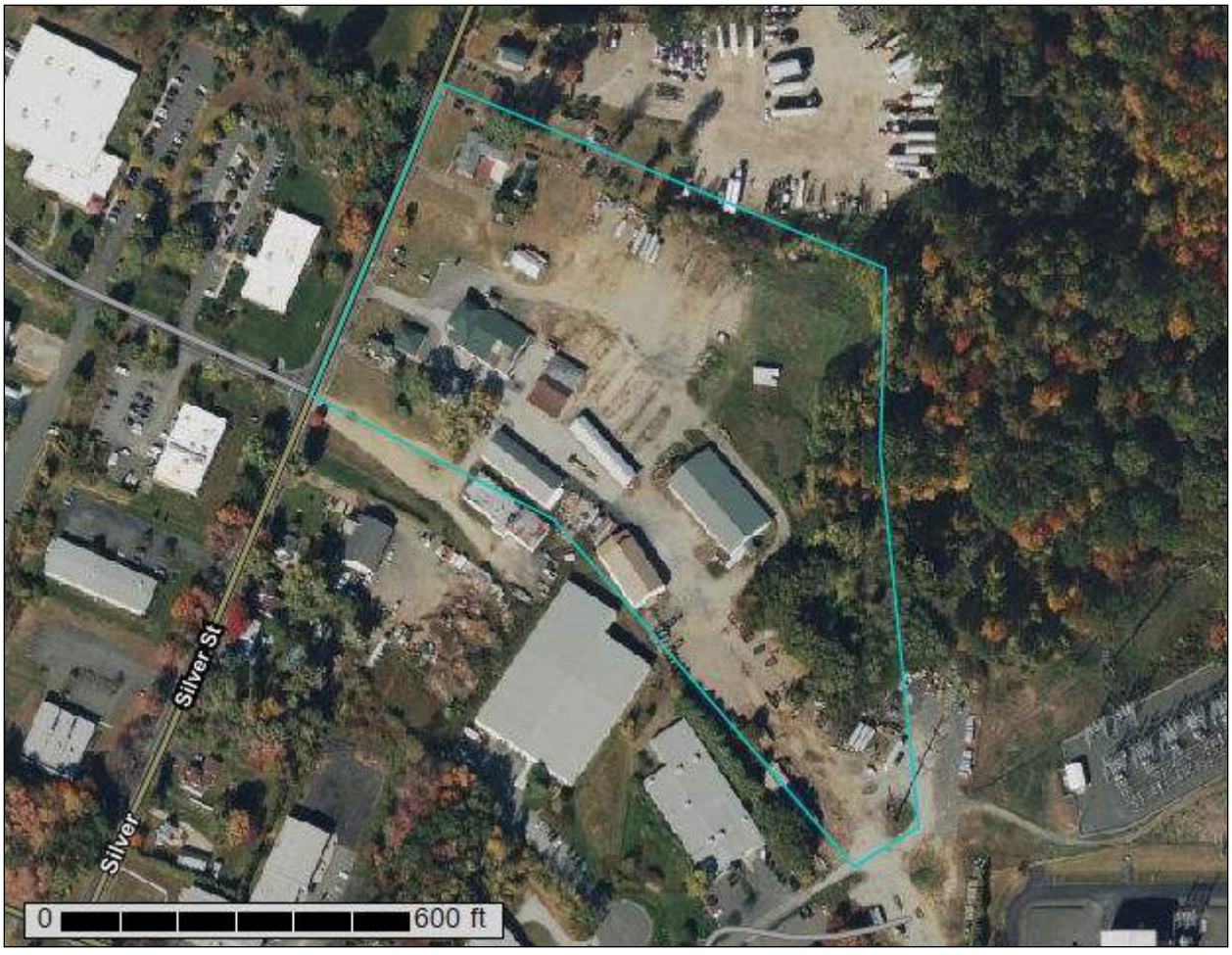
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hampden County, Massachusetts, Central Part

Silver Street



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Hampden County, Massachusetts, Central Part.....14
254A—Merrimac fine sandy loam, 0 to 3 percent slopes.....14
254B—Merrimac fine sandy loam, 3 to 8 percent slopes.....15
254C—Merrimac fine sandy loam, 8 to 15 percent slopes.....17
258B—Amostown fine sandy loam, 0 to 6 percent slopes.....19
References.....21

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,480 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hampden County, Massachusetts, Central Part
Survey Area Data: Version 19, Sep 5, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	9.8	59.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	5.9	35.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	0.4	2.6%
258B	Amostown fine sandy loam, 0 to 6 percent slopes	0.4	2.2%
Totals for Area of Interest		**16.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hampden County, Massachusetts, Central Part

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Walpole

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

254C—Merrimac fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tyqt
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash plains, dunes, deltas, outwash terraces

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

258B—Amostown fine sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 99ms
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Amostown and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amostown

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable sandy glaciofluvial deposits over hard silty glaciolacustrine deposits

Typical profile

H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 32 inches: fine sandy loam
H3 - 32 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F145XY005MA - Moist Lake Plain
Hydric soil rating: No

Minor Components

Pollux

Percent of map unit: 10 percent
Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Enosburg

Percent of map unit: 10 percent
Landform: Terraces, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

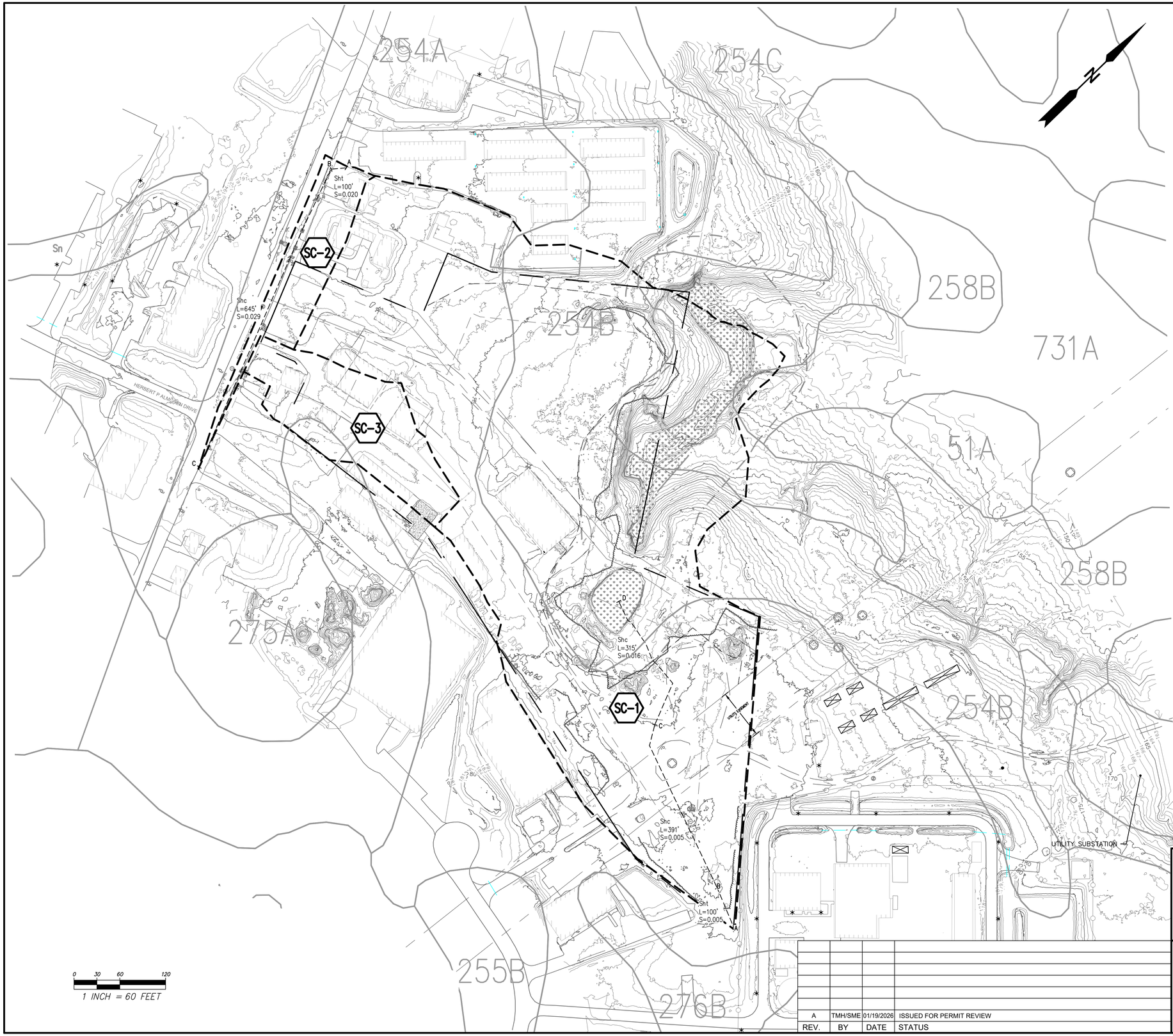
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ATTACHMENT B

STORMWATER DRAINAGE FIGURES

SME
SEVEE & MAHER
ENGINEERS



0 30 60 120

1 INCH = 60 FEET

LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- LIMIT OF WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FOOT CONTOUR (181)
- EXISTING 5-FT CONTOUR (180)
- EXISTING TREE LINE
- LIMIT OF WORK

NOTES

1. EXISTING CONDITIONS SURVEY CONDUCTED BY MILLSTONE LLC.

STORMWATER MANAGEMENT LEGEND

- SC-1 — SUBCATCHMENT DESIGNATION
- SUBCATCHMENT BOUNDARY
- A B C — TIME OF CONCENTRATION SEGMENT DESIGNATION / TIME OF CONCENTRATION PATH
- Sht L=50' S=0.005 — TIME OF CONCENTRATION TYPE, LENGTH AND SLOPE.
- Sht — SHEET FLOW
- Shc — SHALLOW CONCENTRATED FLOW
- Cf — CHANNEL FLOW
- DRAINAGE REACH
- R4 — REACH DESIGNATION (HYDROCAD)
- P3 — POND/STRUCTURE DESIGNATION (HYDROCAD)
- tc 1 — TIME OF CONCENTRATION WITH SUBCATCHMENT DESIGNATION
- SOIL TYPE BOUNDARY
- Sn — SOIL TYPE DESIGNATION

REV.	BY	DATE	STATUS
A	TMH/SME	01/19/2026	ISSUED FOR PERMIT REVIEW

LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MA

STORMWATER MANAGEMENT PLAN
PRE-DEVELOPMENT CONDITIONS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-200 REV A



0 30 60 120

1 INCH = 60 FEET

LEGEND

- PROPERTY LINE
- 100' PROPERTY SETBACK
- LIMIT OF WETLANDS
- 100' WETLAND BUFFER
- UTILITY EASEMENT
- EXISTING 1-FOOT CONTOUR — 181
- EXISTING 5-FT CONTOUR — 180
- EXISTING TREE LINE
- LIMIT OF WORK

NOTES

1. EXISTING CONDITIONS SURVEY CONDUCTED BY MILLSTONE LLC.

STORMWATER MANAGEMENT LEGEND

- SC-1 — SUBCATCHMENT DESIGNATION
- SUBCATCHMENT BOUNDARY
- A B C — TIME OF CONCENTRATION SEGMENT DESIGNATION / TIME OF CONCENTRATION PATH
- Sht L=50' S=0.005 — TIME OF CONCENTRATION TYPE, LENGTH AND SLOPE.
- Sht — SHEET FLOW
- Shc — SHALLOW CONCENTRATED FLOW
- Cf — CHANNEL FLOW
- DRAINAGE REACH
- R4 — REACH DESIGNATION (HYDROCAD)
- P9 — POND/STRUCTURE DESIGNATION (HYDROCAD)
- tc 1 — TIME OF CONCENTRATION WITH SUBCATCHMENT DESIGNATION
- SOIL TYPE BOUNDARY
- Sn — SOIL TYPE DESIGNATION

REV.	BY	DATE	STATUS
A	TMH/SME	01-19-2026	ISSUED FOR PERMIT REVIEW

LONGROAD ENERGY
AGAWAM ENERGY CENTER
AGAWAM, MA

STORMWATER MANAGEMENT PLAN
POST DEVELOPMENT CONDITIONS

SME
SEVEE & MAHER ENGINEERS
ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE
4 Blanchard Road, PO Box 85A, Cumberland, Maine 04021
Phone 207.829.5016 • Fax 207.829.5692 • sme-engineers.com

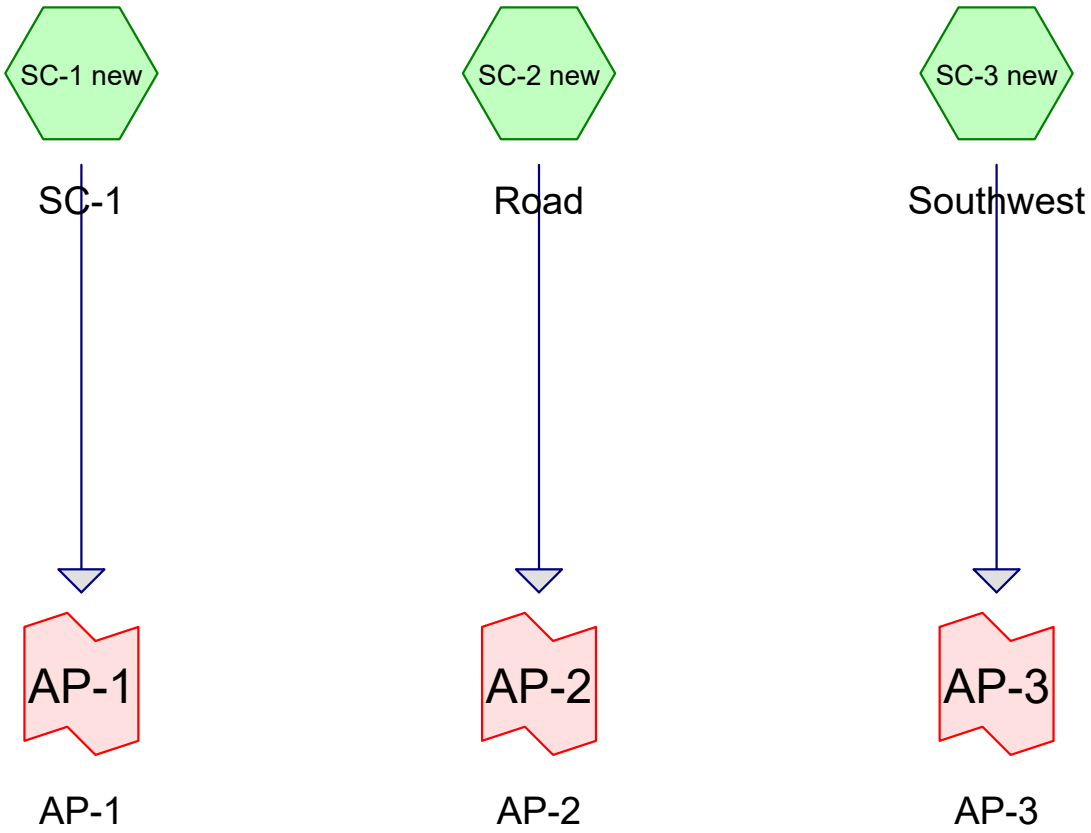
DESIGN BY:	TMH/SME
DRAWN BY:	EES/SME
CHECKED BY:	TMH/SME
APRV'D BY:	TMH/SME
DATE:	11/14/2025
SCALE:	1"=60'

JOB NO. 250741 DWG FILE AW1-C-200 REV A

ATTACHMENT C

PRE-DEVELOPMENT HYDROCAD CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS



Subcat Reach Pond Link

Routing Diagram for Pre-Conditions - TMH
Prepared by Sevee & Maher Engineers, Printed 12/23/2025
HydroCAD® 10.20-7a s/n 01260 © 2025 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.303	96	Gravel (SC-3 new)
12.188	96	Gravel surface, HSG A (SC-1 new)
2.779	39	Pasture/grassland/range, Good, HSG A (SC-1 new, SC-2 new, SC-3 new)
0.142	80	Pasture/grassland/range, Good, HSG D (SC-3 new)
1.383	98	Paved parking, HSG A (SC-1 new, SC-2 new, SC-3 new)
1.326	98	Roofs, HSG A (SC-1 new, SC-2 new, SC-3 new)
4.606	30	Woods, Good, HSG A (SC-1 new)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
22.282	HSG A	SC-1 new, SC-2 new, SC-3 new
0.000	HSG B	
0.000	HSG C	
0.142	HSG D	SC-3 new
0.303	Other	SC-3 new

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>1.00"
Flow Length=807' Tc=38.8 min CN=75 Runoff=12.23 cfs 1.640 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>0.36"
Flow Length=745' Tc=13.7 min CN=60 Runoff=0.26 cfs 0.034 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>2.15"
Tc=5.0 min CN=91 Runoff=4.94 cfs 0.335 af

Link AP-1: AP-1 Inflow=12.23 cfs 1.640 af
Primary=12.23 cfs 1.640 af

Link AP-2: AP-2 Inflow=0.26 cfs 0.034 af
Primary=0.26 cfs 0.034 af

Link AP-3: AP-3 Inflow=4.94 cfs 0.335 af
Primary=4.94 cfs 0.335 af

Summary for Subcatchment SC-1 new: SC-1

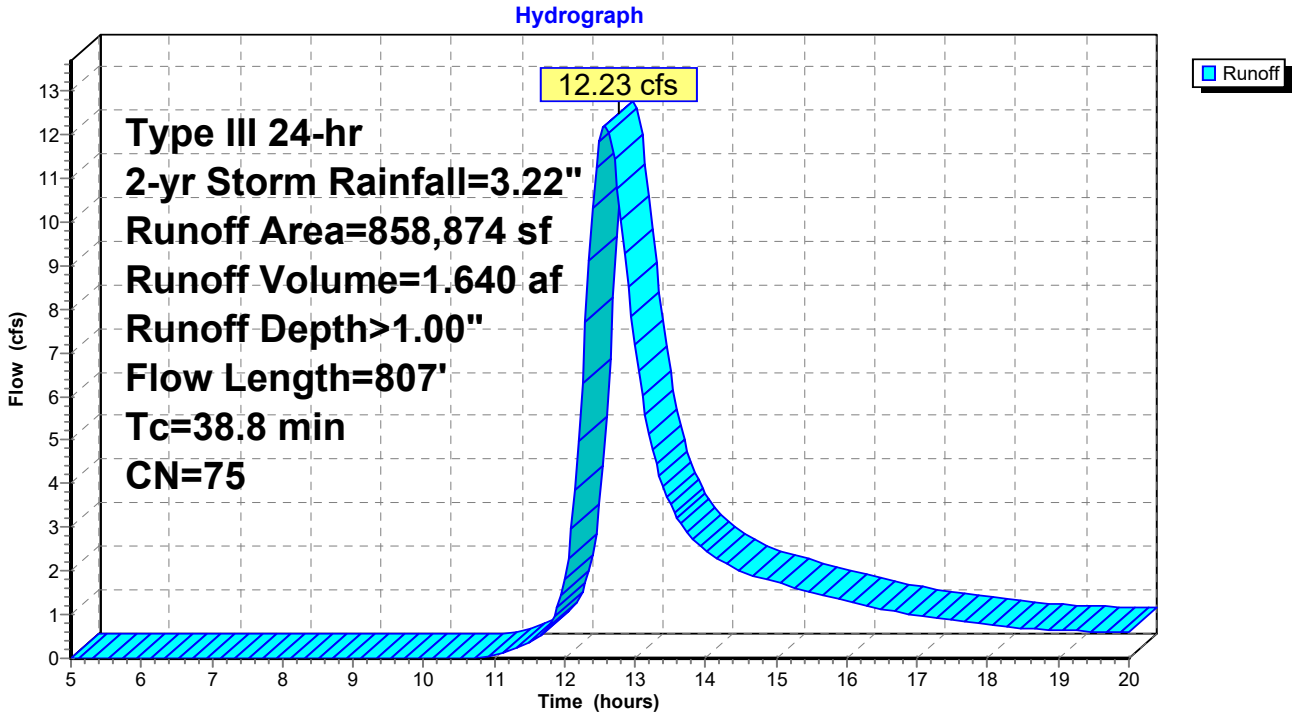
Runoff = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af, Depth> 1.00"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

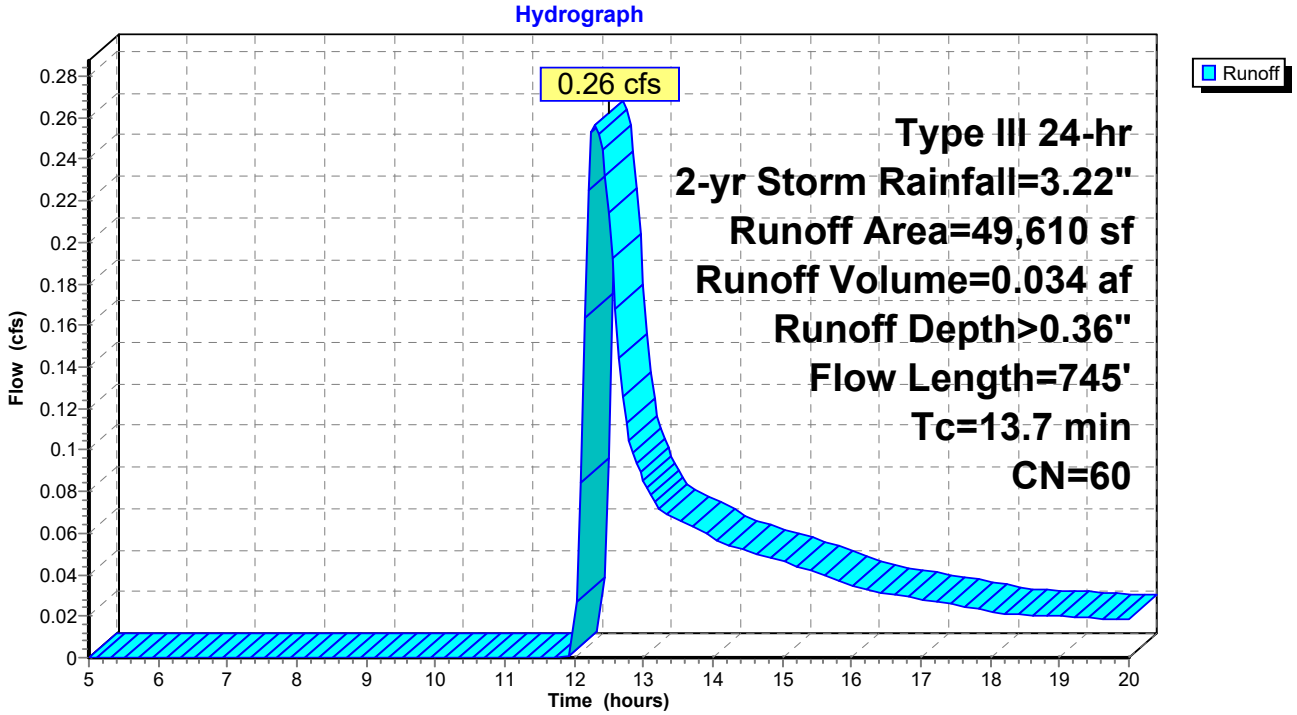
Runoff = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af, Depth> 0.36"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

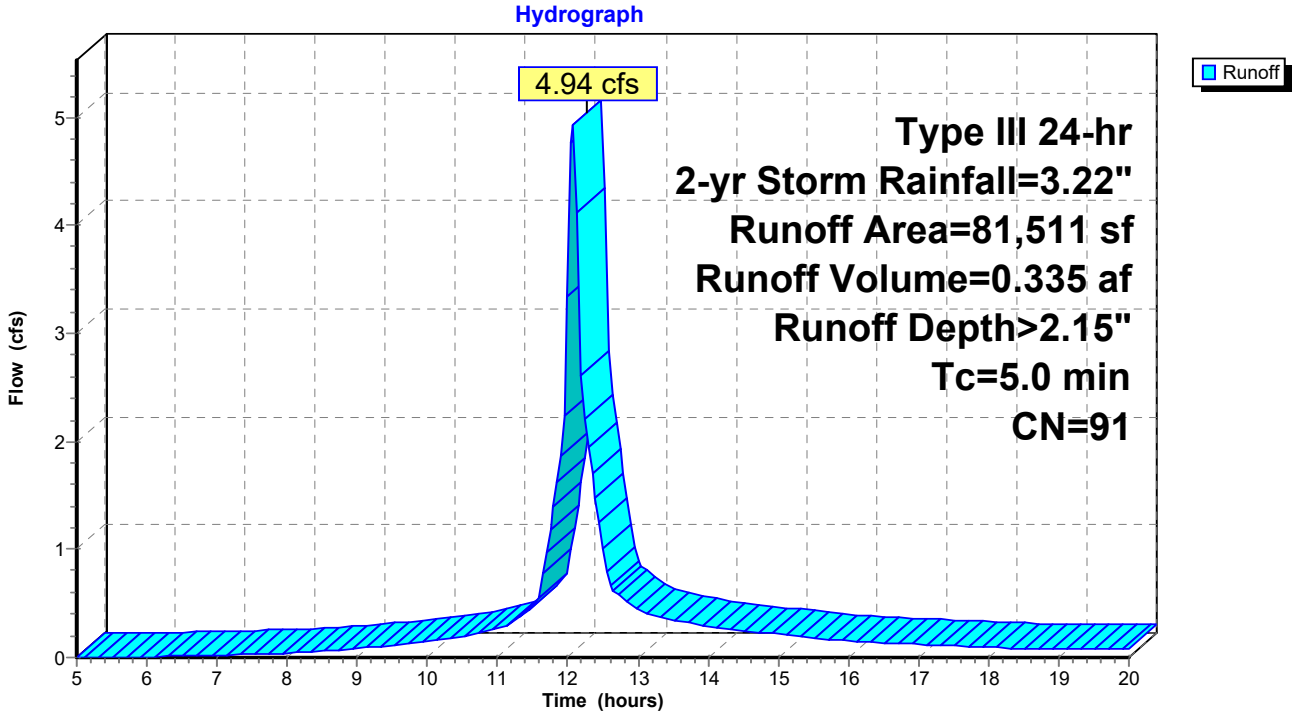
Runoff = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af, Depth> 2.15"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

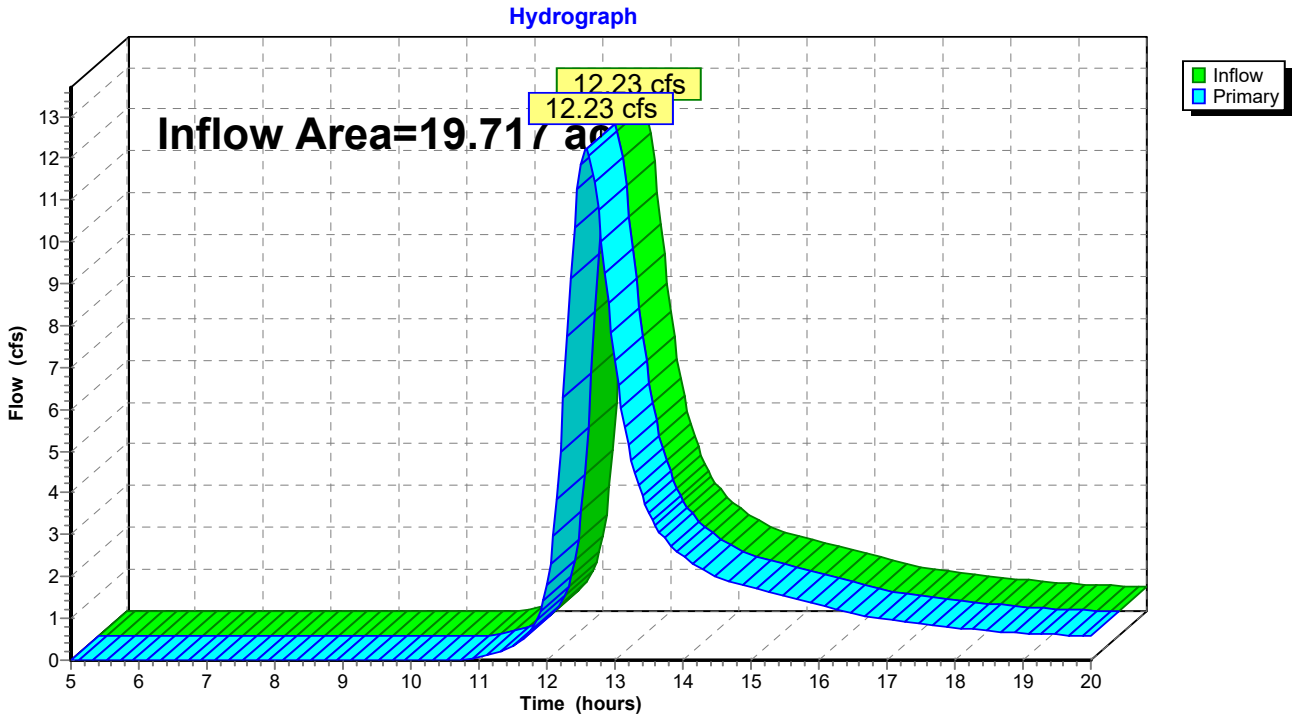


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 1.00" for 2-yr Storm event
Inflow = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af
Primary = 12.23 cfs @ 12.57 hrs, Volume= 1.640 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

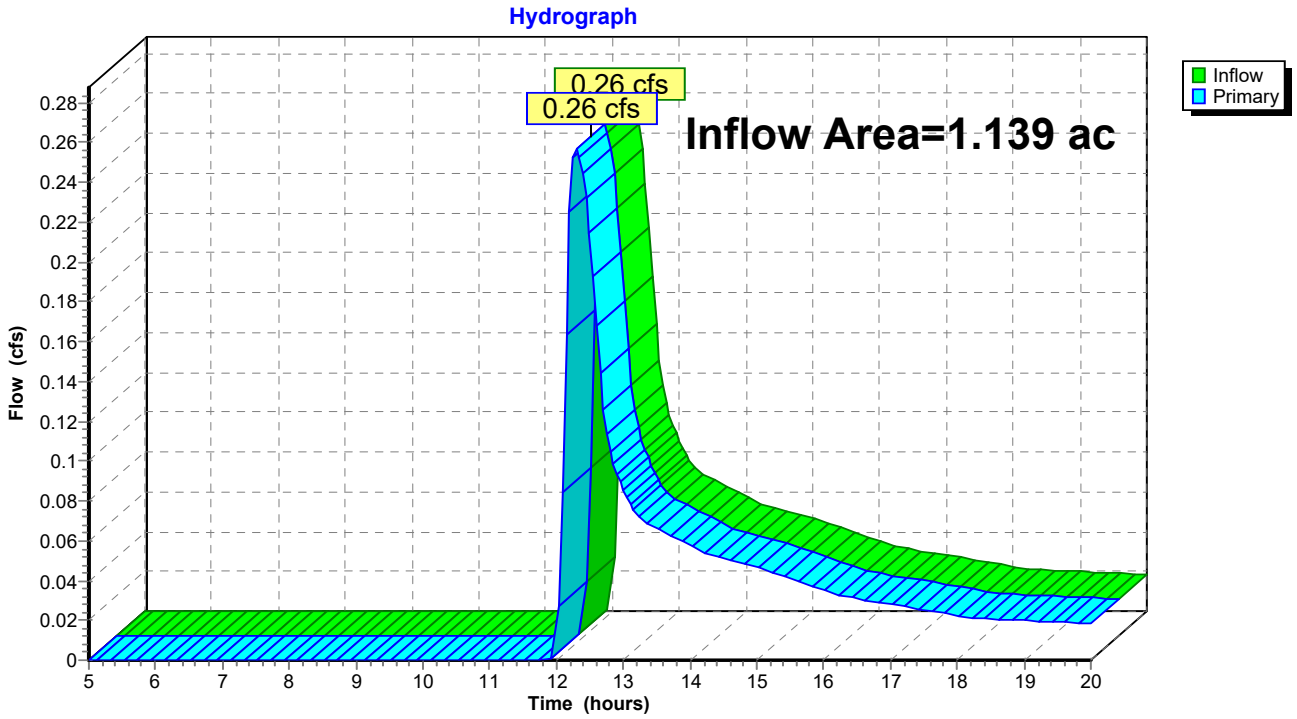


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 0.36" for 2-yr Storm event
Inflow = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af
Primary = 0.26 cfs @ 12.30 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

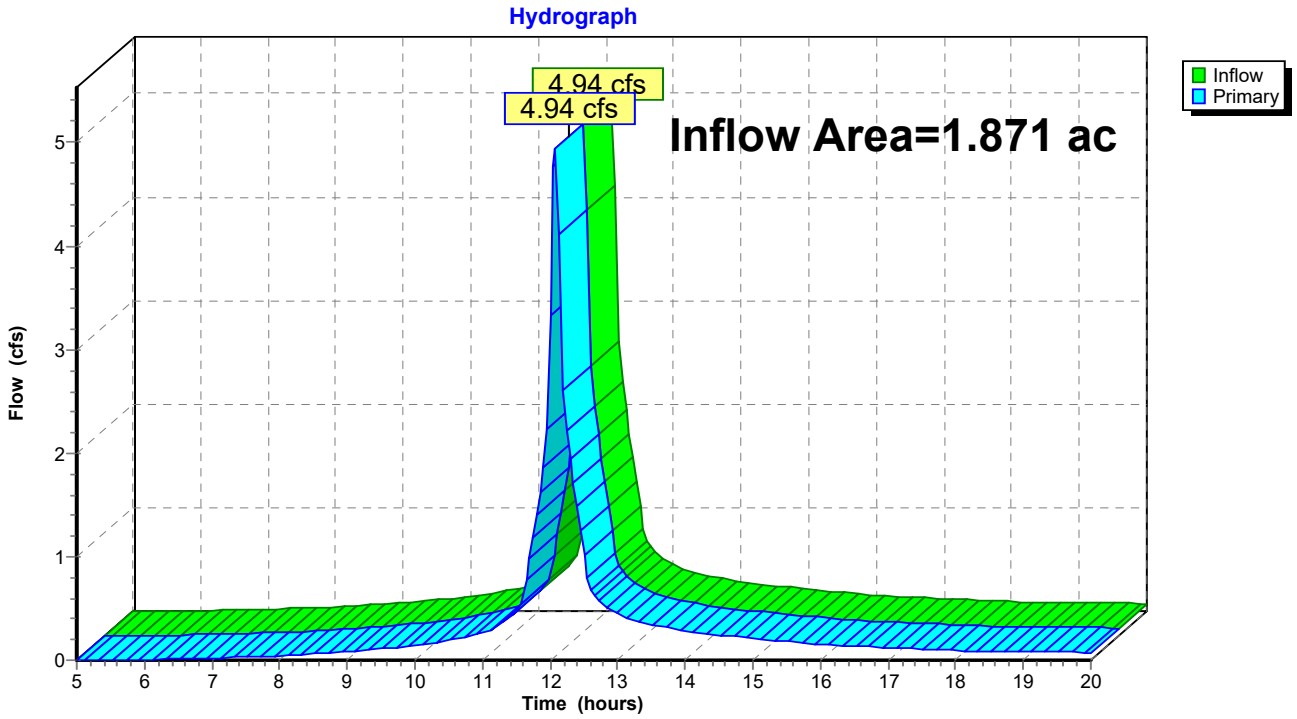


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 2.15" for 2-yr Storm event
Inflow = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af
Primary = 4.94 cfs @ 12.07 hrs, Volume= 0.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>2.38"
Flow Length=807' Tc=38.8 min CN=75 Runoff=29.90 cfs 3.914 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>1.27"
Flow Length=745' Tc=13.7 min CN=60 Runoff=1.32 cfs 0.120 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>3.93"
Tc=5.0 min CN=91 Runoff=8.76 cfs 0.613 af

Link AP-1: AP-1 Inflow=29.90 cfs 3.914 af
Primary=29.90 cfs 3.914 af

Link AP-2: AP-2 Inflow=1.32 cfs 0.120 af
Primary=1.32 cfs 0.120 af

Link AP-3: AP-3 Inflow=8.76 cfs 0.613 af
Primary=8.76 cfs 0.613 af

Summary for Subcatchment SC-1 new: SC-1

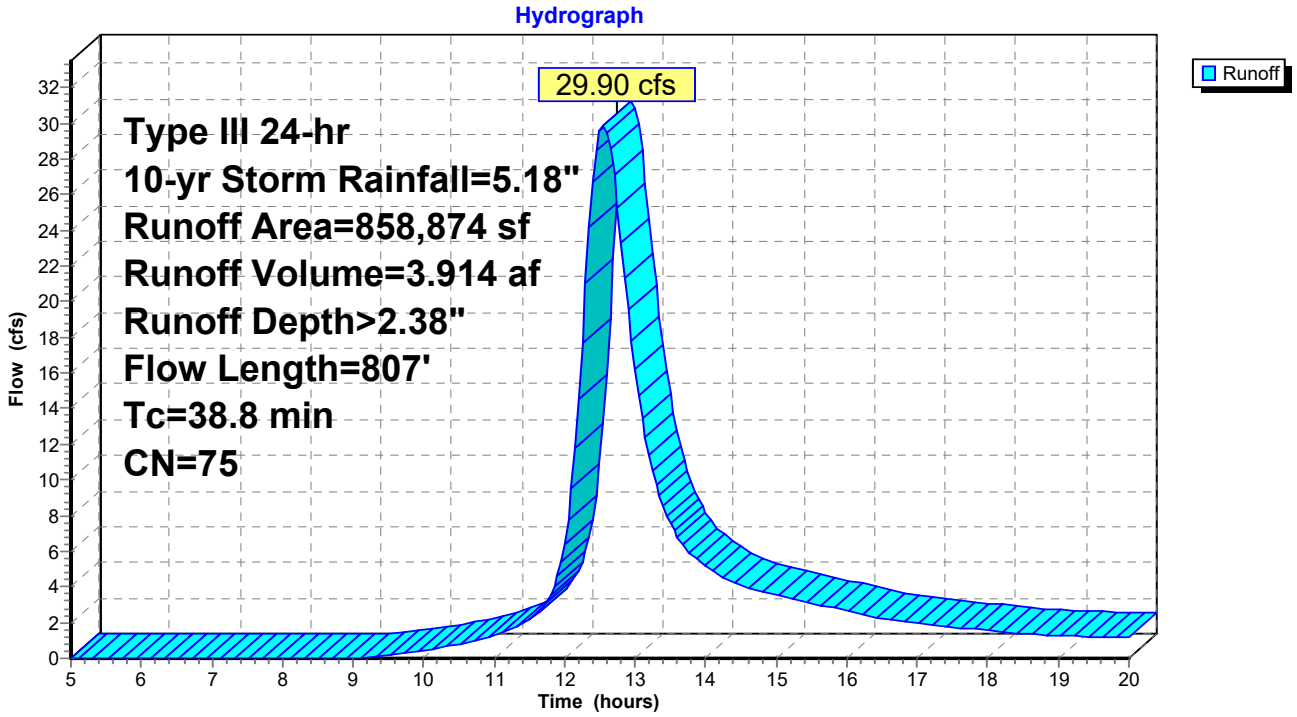
Runoff = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af, Depth> 2.38"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

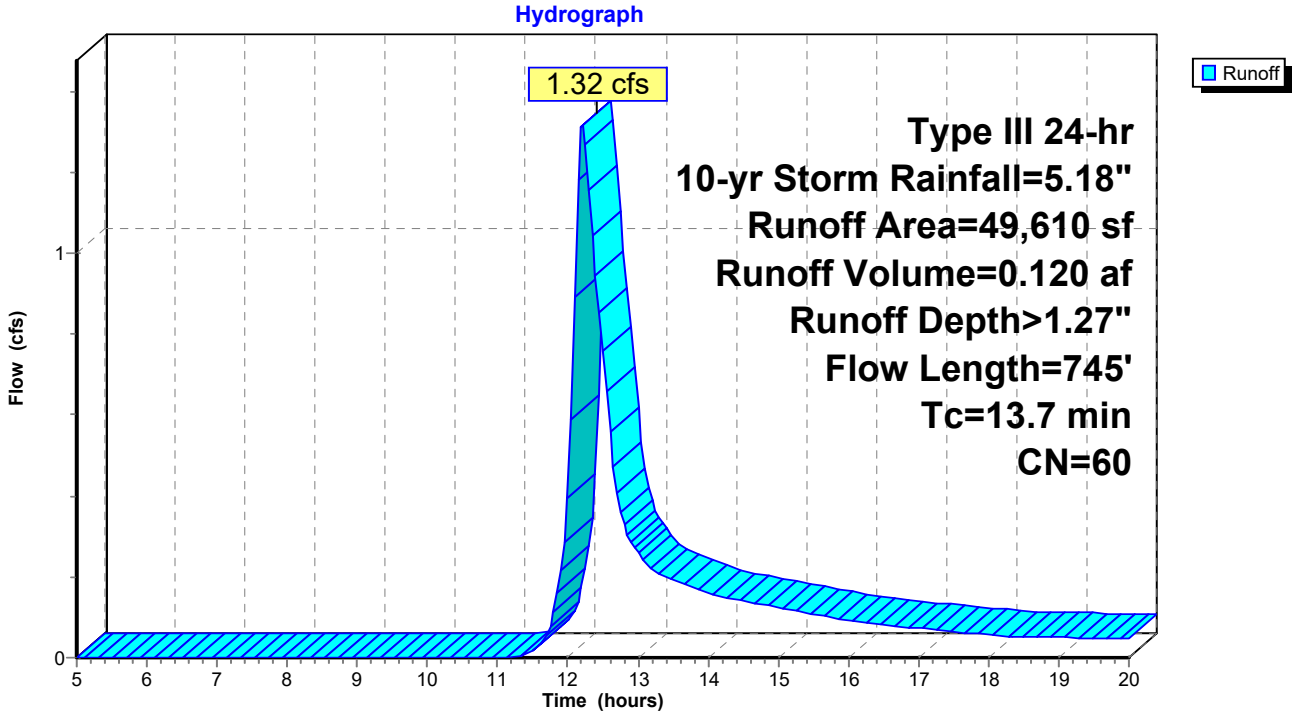
Runoff = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af, Depth> 1.27"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

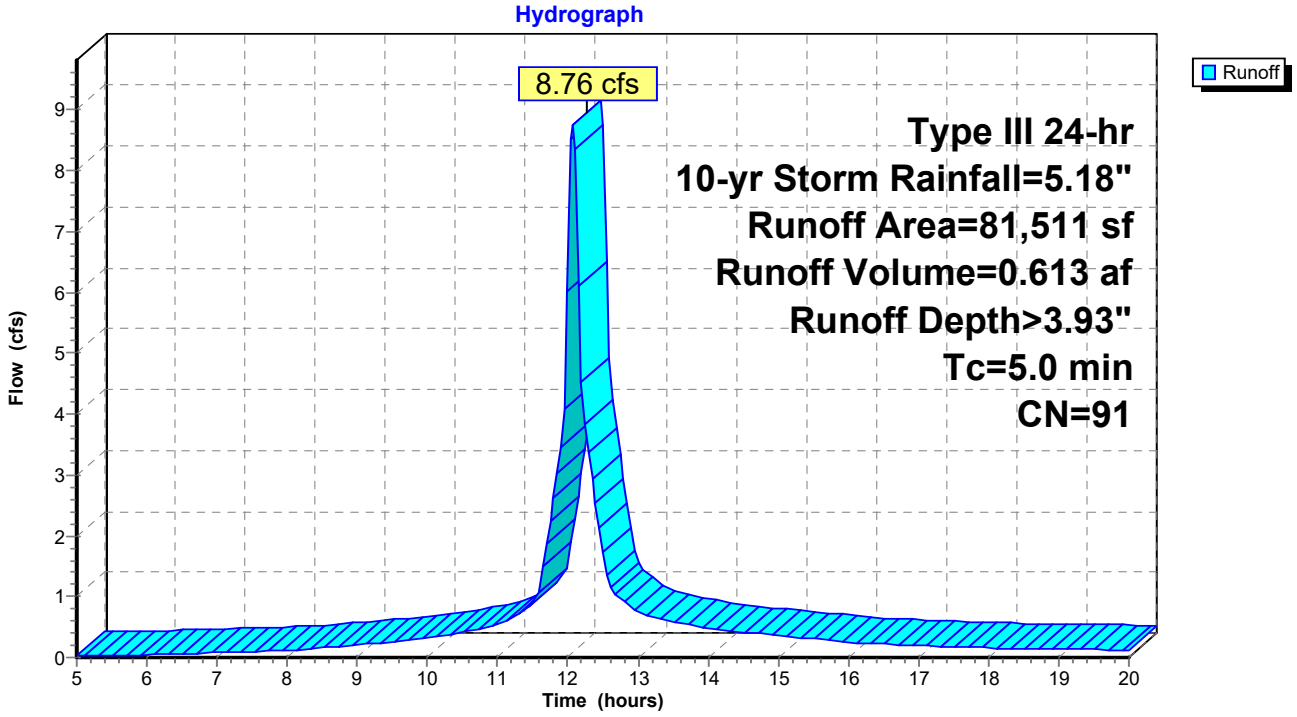
Runoff = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af, Depth> 3.93"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

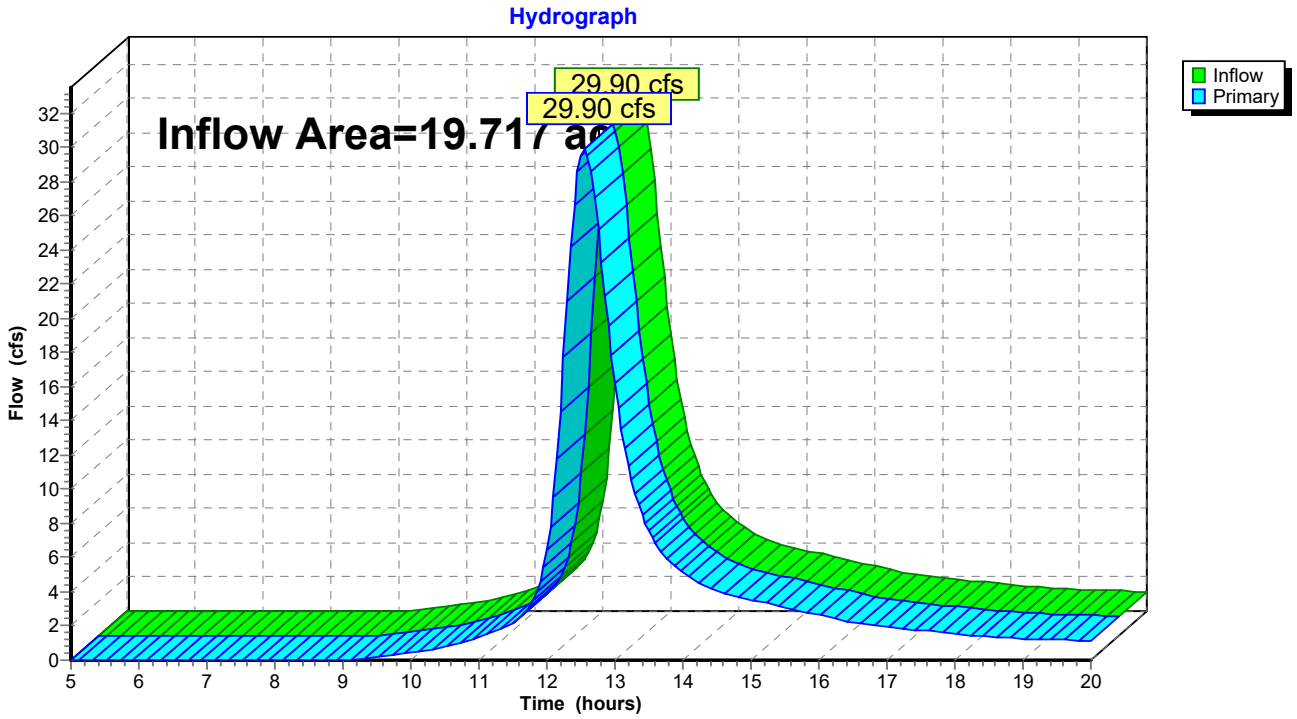


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 2.38" for 10-yr Storm event
Inflow = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af
Primary = 29.90 cfs @ 12.55 hrs, Volume= 3.914 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

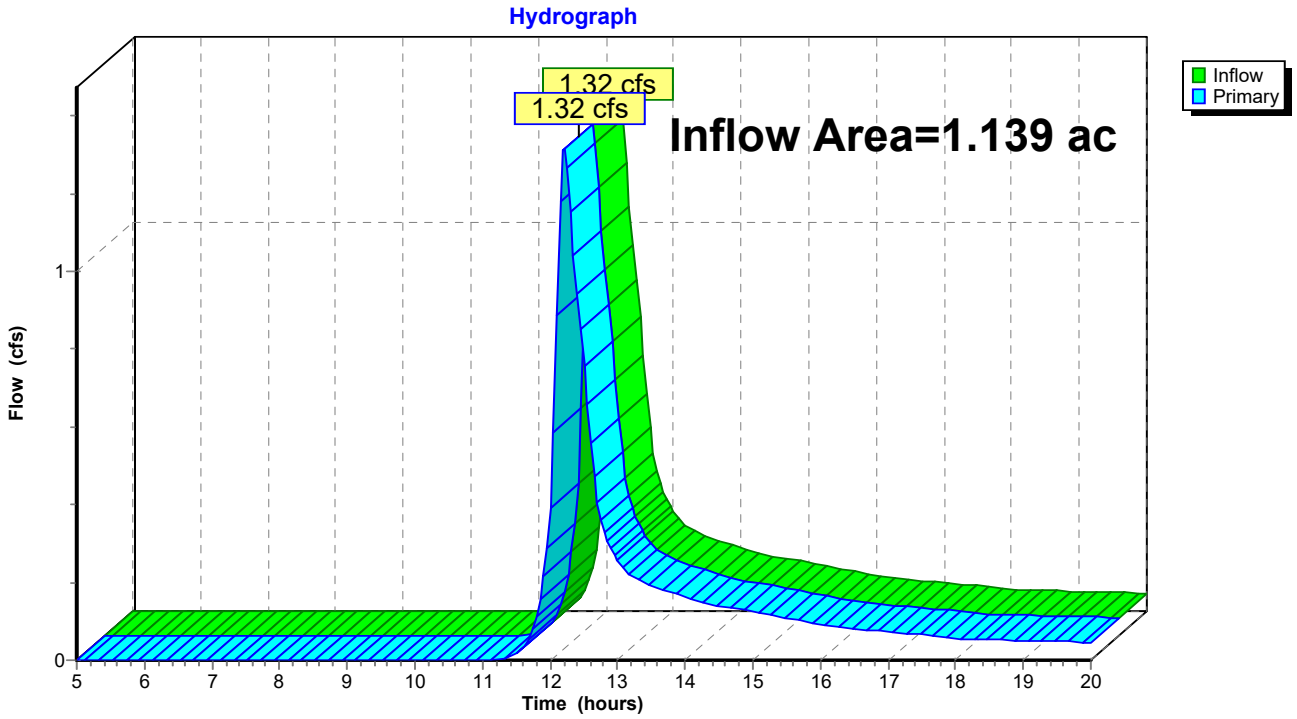


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 1.27" for 10-yr Storm event
Inflow = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af
Primary = 1.32 cfs @ 12.21 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

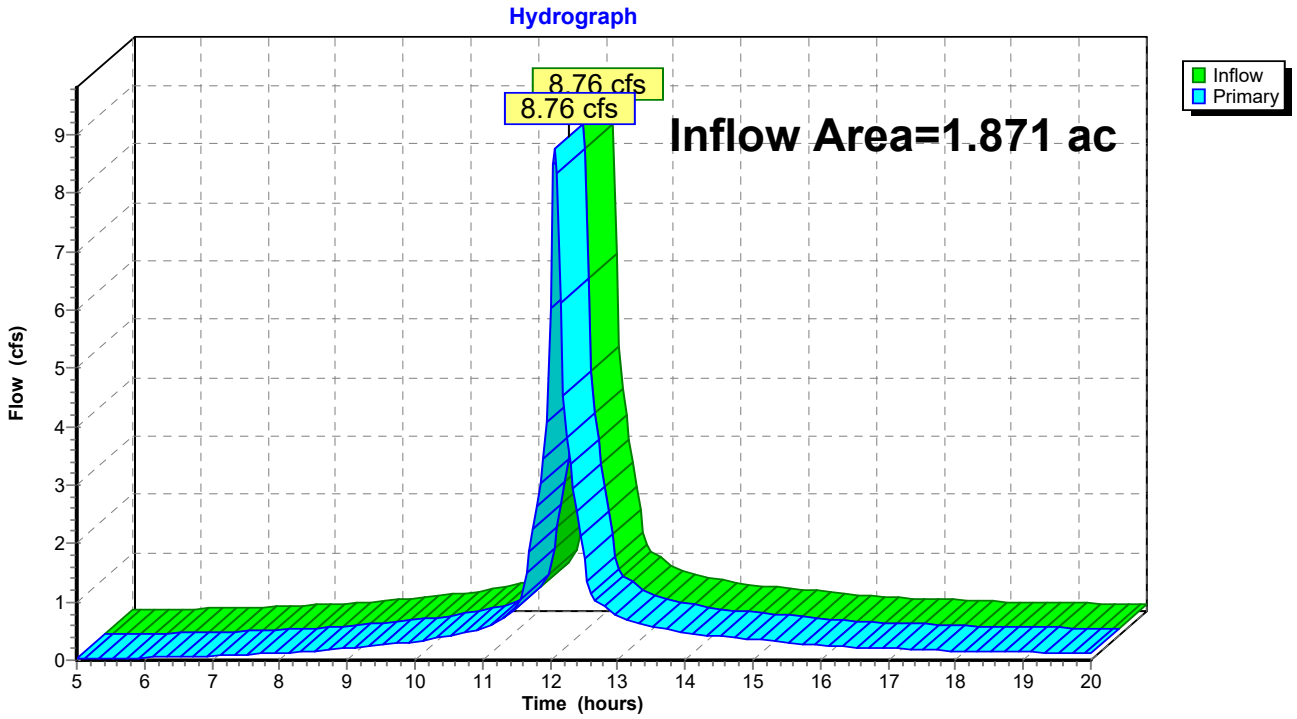


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 3.93" for 10-yr Storm event
Inflow = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af
Primary = 8.76 cfs @ 12.07 hrs, Volume= 0.613 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>3.35"
Flow Length=807' Tc=38.8 min CN=75 Runoff=42.00 cfs 5.511 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>2.00"
Flow Length=745' Tc=13.7 min CN=60 Runoff=2.17 cfs 0.190 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>5.06"
Tc=5.0 min CN=91 Runoff=11.14 cfs 0.790 af

Link AP-1: AP-1 Inflow=42.00 cfs 5.511 af
Primary=42.00 cfs 5.511 af

Link AP-2: AP-2 Inflow=2.17 cfs 0.190 af
Primary=2.17 cfs 0.190 af

Link AP-3: AP-3 Inflow=11.14 cfs 0.790 af
Primary=11.14 cfs 0.790 af

Summary for Subcatchment SC-1 new: SC-1

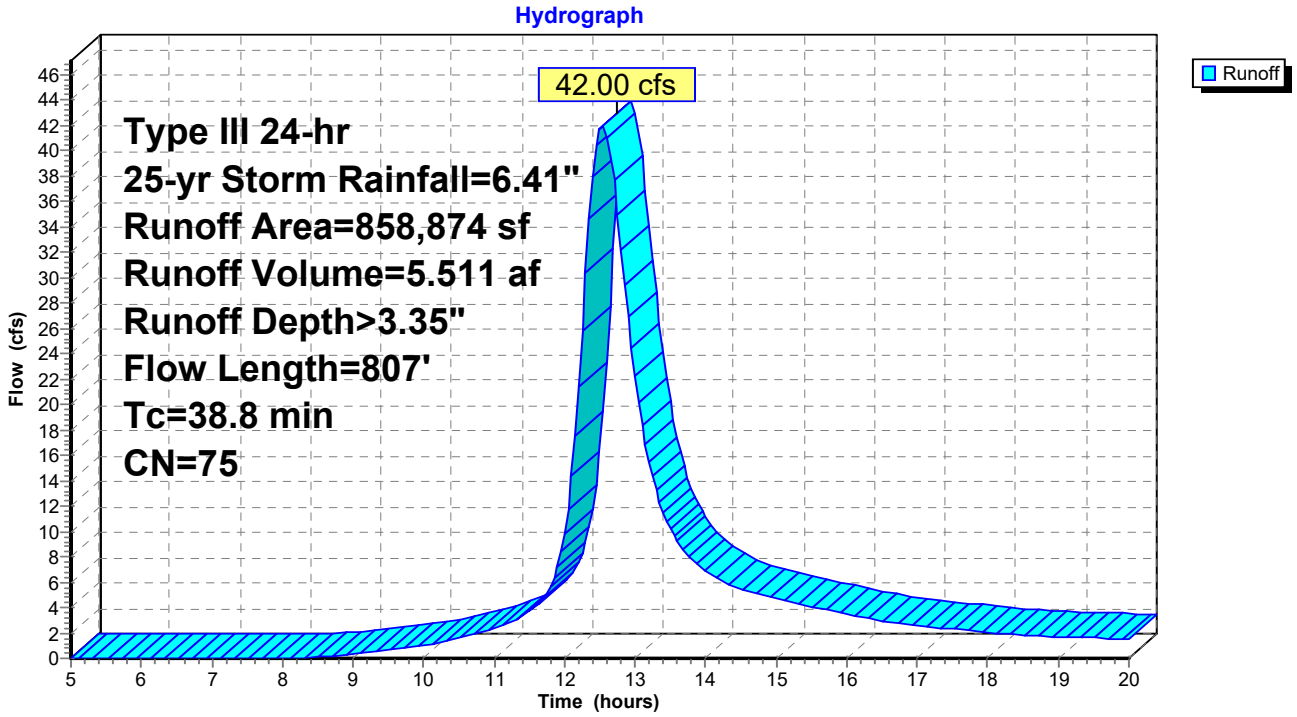
Runoff = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af, Depth> 3.35"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

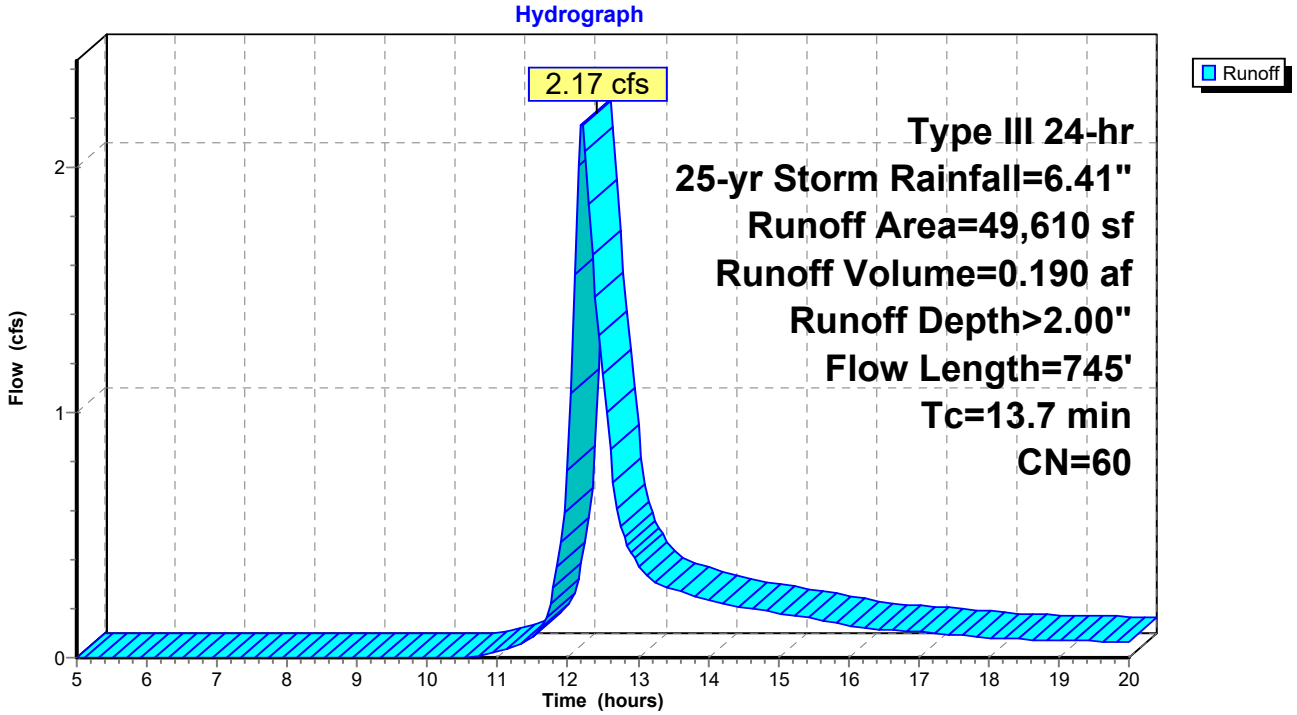
Runoff = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af, Depth> 2.00"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

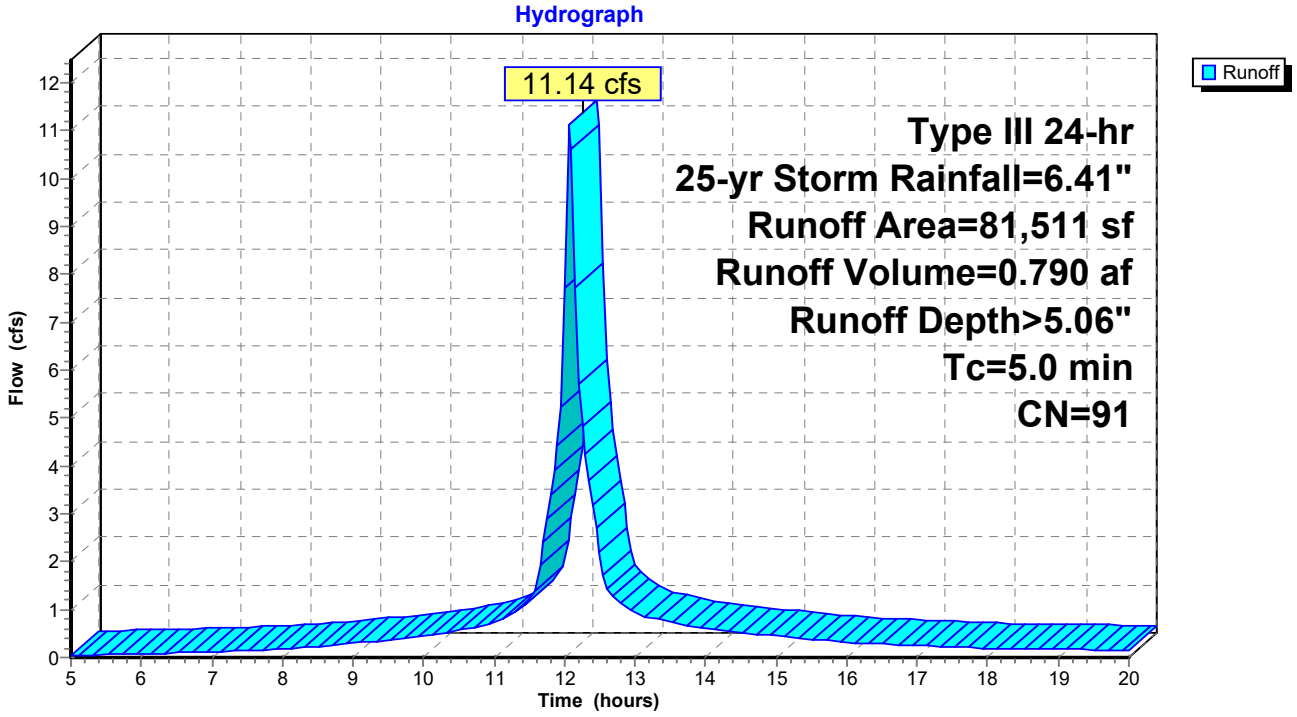
Runoff = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af, Depth> 5.06"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

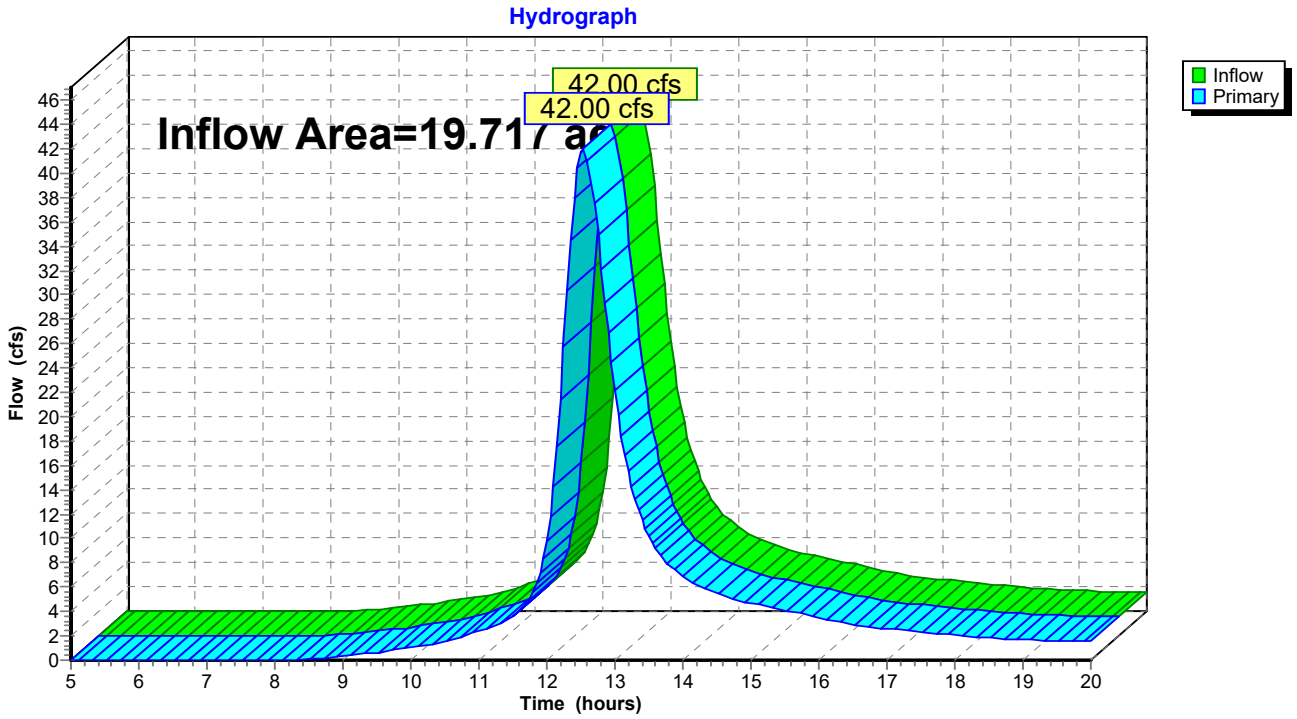


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 3.35" for 25-yr Storm event
Inflow = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af
Primary = 42.00 cfs @ 12.54 hrs, Volume= 5.511 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

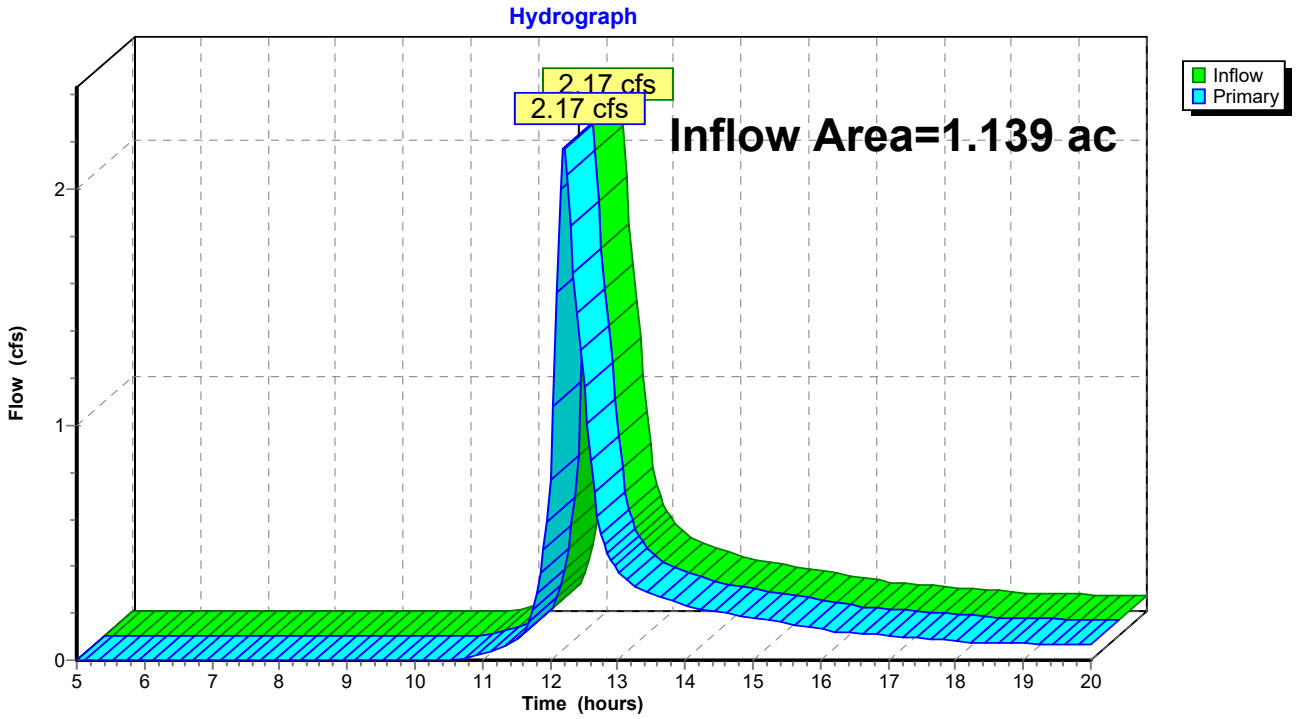


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 2.00" for 25-yr Storm event
Inflow = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af
Primary = 2.17 cfs @ 12.21 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

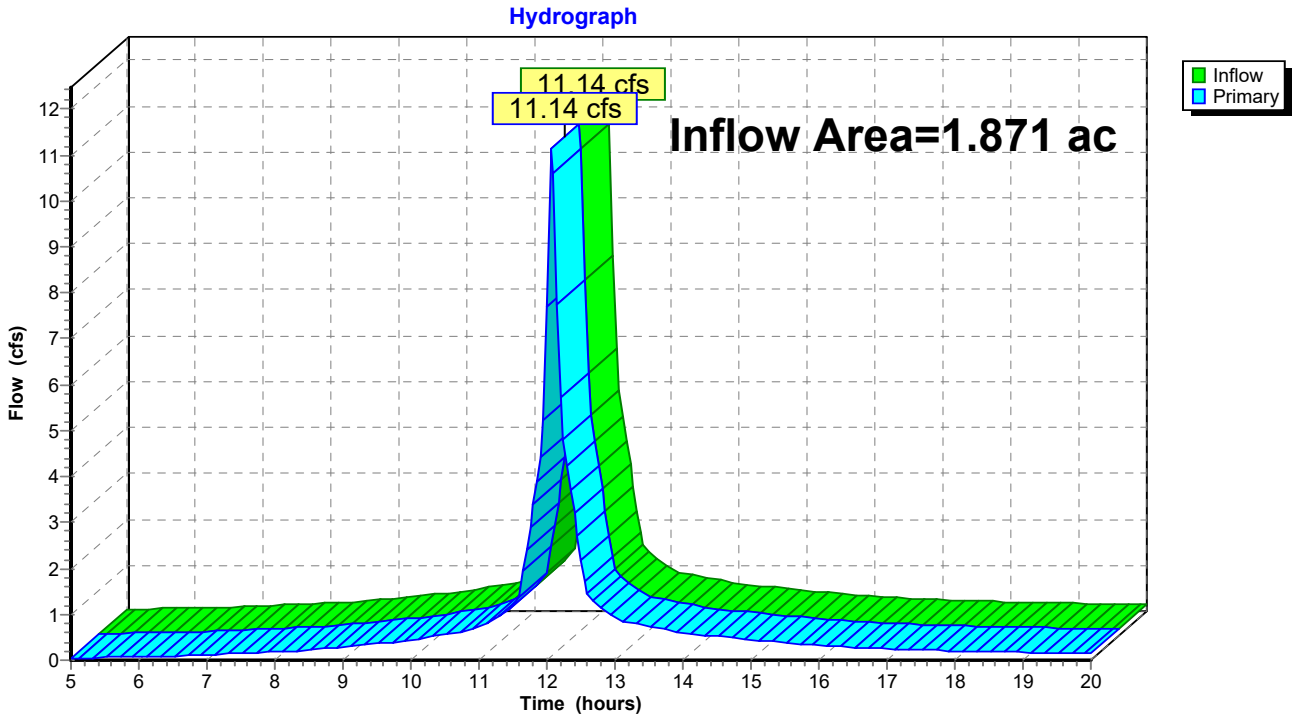


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 5.06" for 25-yr Storm event
Inflow = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af
Primary = 11.14 cfs @ 12.07 hrs, Volume= 0.790 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-3: AP-3



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1 new: SC-1 Runoff Area=858,874 sf 5.27% Impervious Runoff Depth>4.94"
Flow Length=807' Tc=38.8 min CN=75 Runoff=61.32 cfs 8.118 af

SubcatchmentSC-2 new: Road Runoff Area=49,610 sf 35.64% Impervious Runoff Depth>3.28"
Flow Length=745' Tc=13.7 min CN=60 Runoff=3.65 cfs 0.312 af

SubcatchmentSC-3 new: Southwest Runoff Area=81,511 sf 67.57% Impervious Runoff Depth>6.82"
Tc=5.0 min CN=91 Runoff=14.77 cfs 1.063 af

Link AP-1: AP-1 Inflow=61.32 cfs 8.118 af
Primary=61.32 cfs 8.118 af

Link AP-2: AP-2 Inflow=3.65 cfs 0.312 af
Primary=3.65 cfs 0.312 af

Link AP-3: AP-3 Inflow=14.77 cfs 1.063 af
Primary=14.77 cfs 1.063 af

Summary for Subcatchment SC-1 new: SC-1

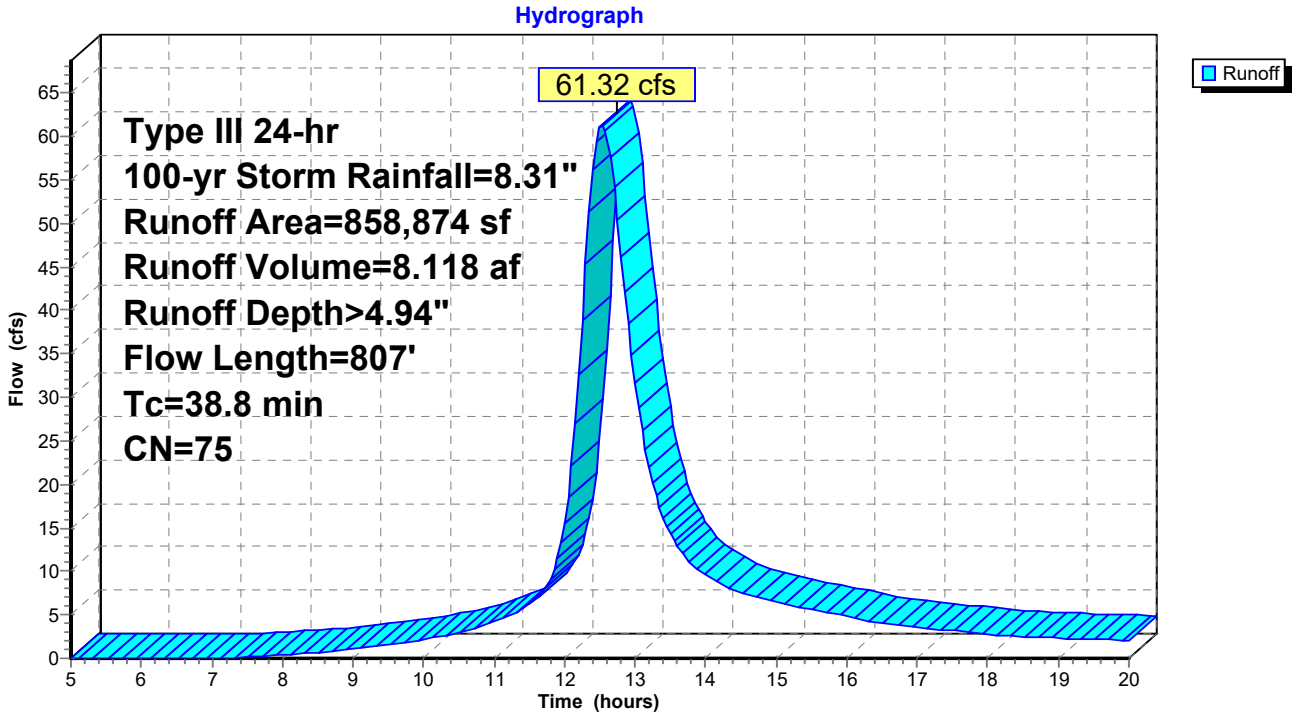
Runoff = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af, Depth> 4.94"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
82,076	39	Pasture/grassland/range, Good, HSG A
200,629	30	Woods, Good, HSG A
530,931	96	Gravel surface, HSG A
10,333	98	Paved parking, HSG A
34,905	98	Roofs, HSG A
858,874	75	Weighted Average
813,636		94.73% Pervious Area
45,238		5.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0050	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.22"
5.7	391	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.3	316	0.0160	0.63		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
38.8	807	Total			

Subcatchment SC-1 new: SC-1



Summary for Subcatchment SC-2 new: Road

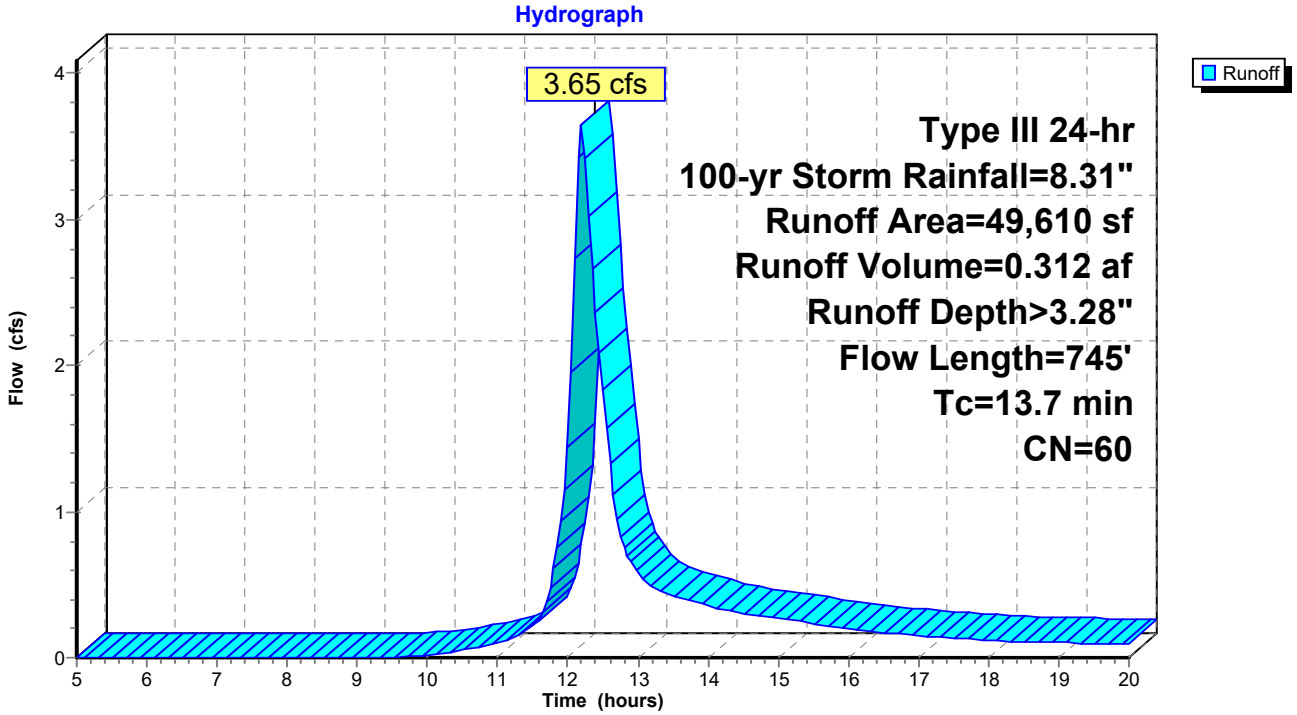
Runoff = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af, Depth> 3.28"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
14,423	98	Paved parking, HSG A
31,930	39	Pasture/grassland/range, Good, HSG A
3,257	98	Roofs, HSG A
49,610	60	Weighted Average
31,930		64.36% Pervious Area
17,680		35.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.9	645	0.0290	2.74		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.7	745	Total			

Subcatchment SC-2 new: Road



Summary for Subcatchment SC-3 new: Southwest

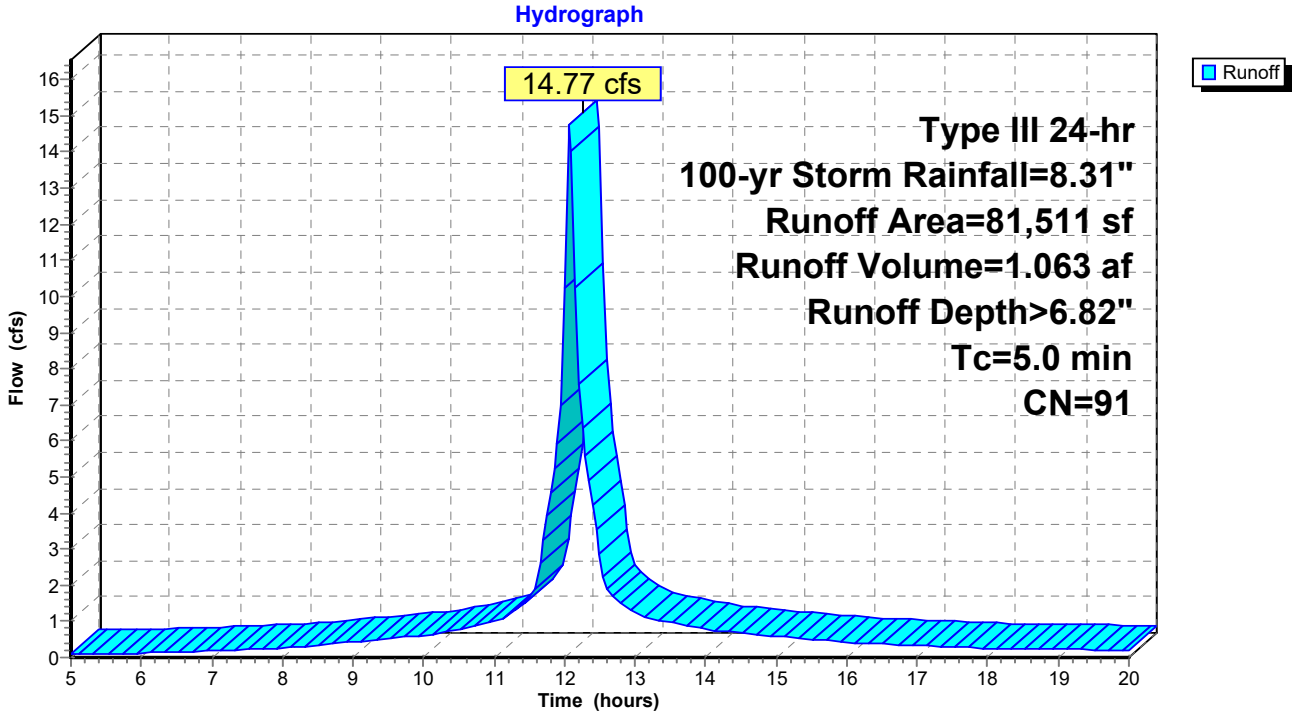
Runoff = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af, Depth> 6.82"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
	35,485	98	Paved parking, HSG A
	7,056	39	Pasture/grassland/range, Good, HSG A
	6,191	80	Pasture/grassland/range, Good, HSG D
	19,590	98	Roofs, HSG A
*	13,189	96	Gravel
	81,511	91	Weighted Average
	26,436		32.43% Pervious Area
	55,075		67.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3 new: Southwest

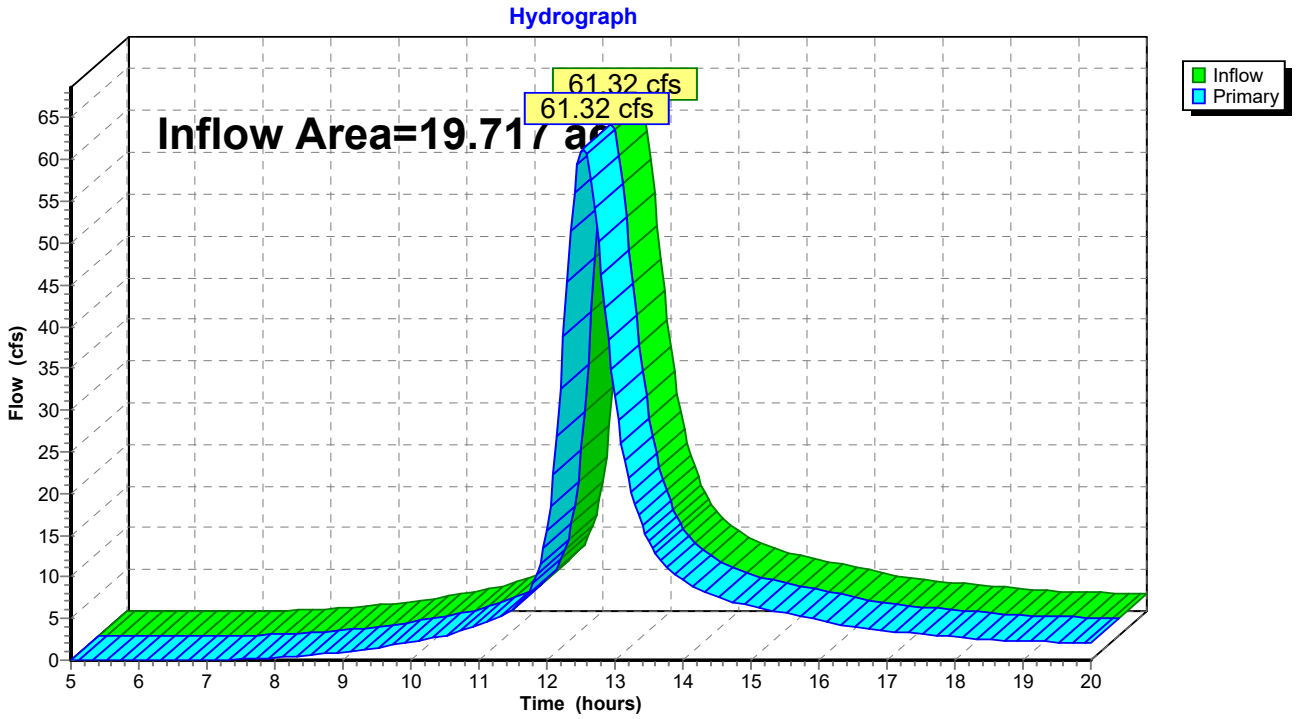


Summary for Link AP-1: AP-1

Inflow Area = 19.717 ac, 5.27% Impervious, Inflow Depth > 4.94" for 100-yr Storm event
Inflow = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af
Primary = 61.32 cfs @ 12.53 hrs, Volume= 8.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

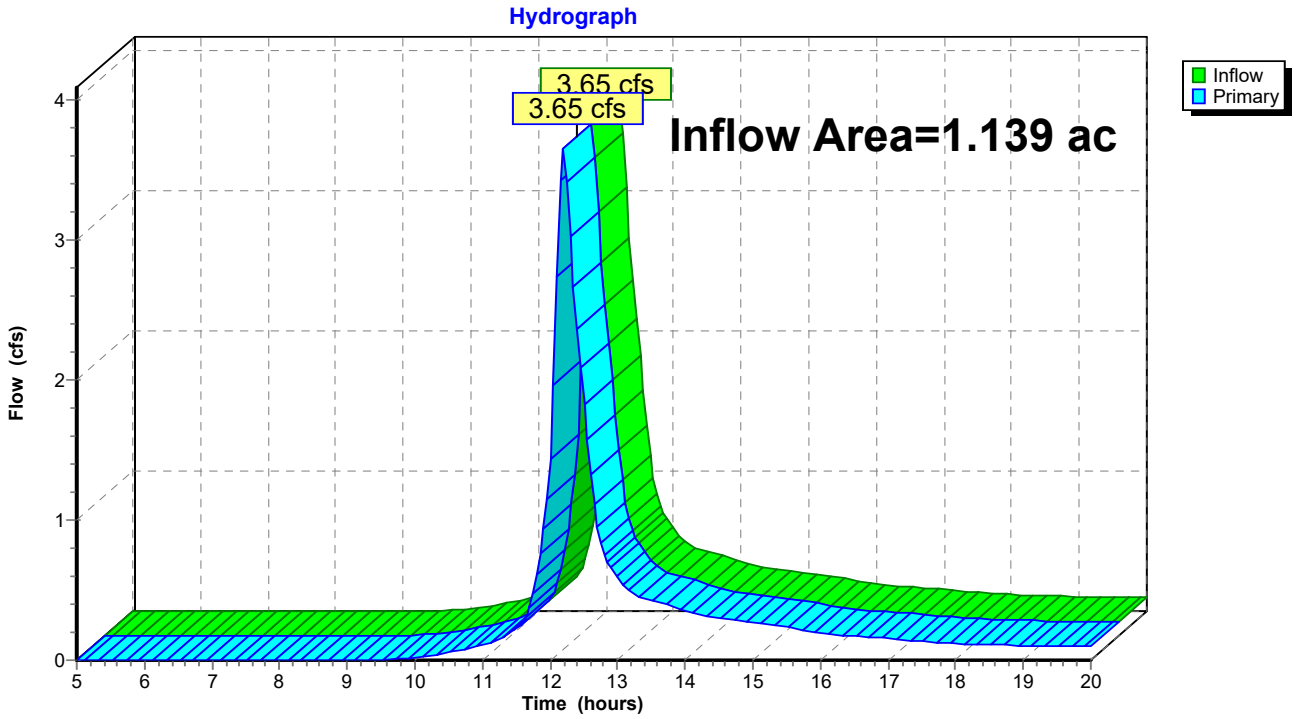


Summary for Link AP-2: AP-2

Inflow Area = 1.139 ac, 35.64% Impervious, Inflow Depth > 3.28" for 100-yr Storm event
Inflow = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af
Primary = 3.65 cfs @ 12.20 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

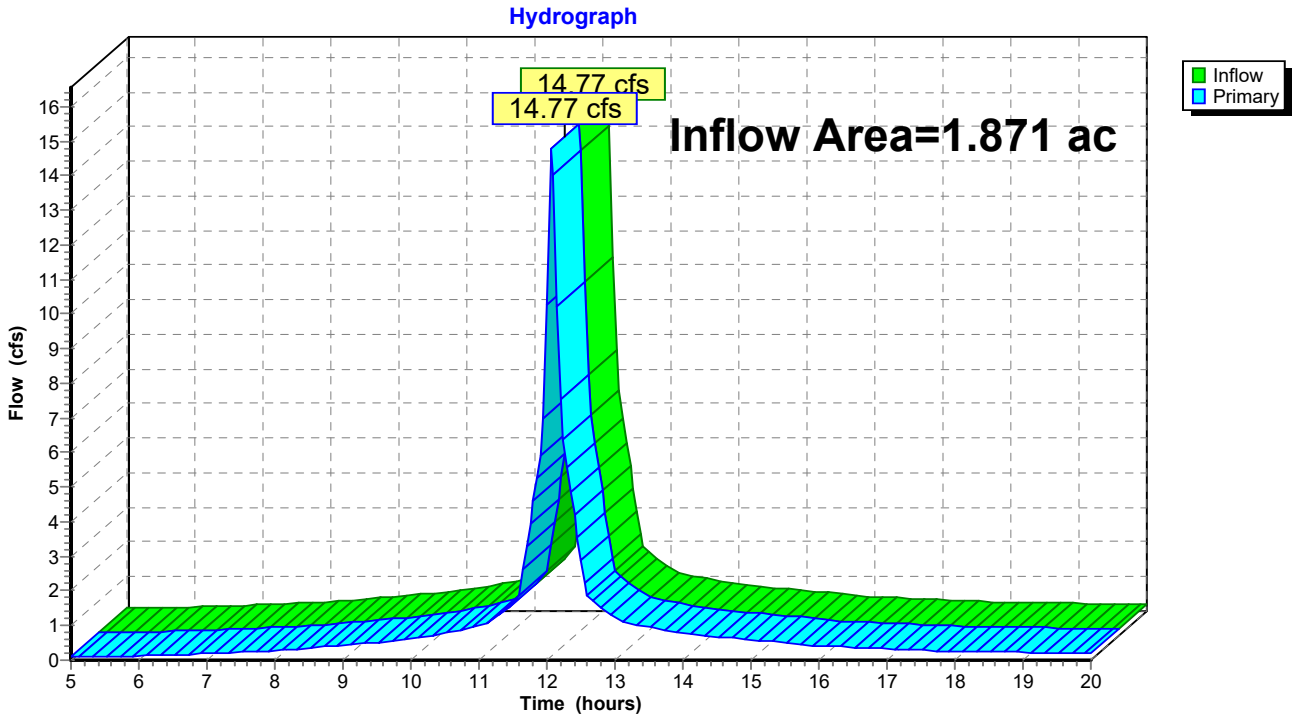


Summary for Link AP-3: AP-3

Inflow Area = 1.871 ac, 67.57% Impervious, Inflow Depth > 6.82" for 100-yr Storm event
Inflow = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af
Primary = 14.77 cfs @ 12.07 hrs, Volume= 1.063 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

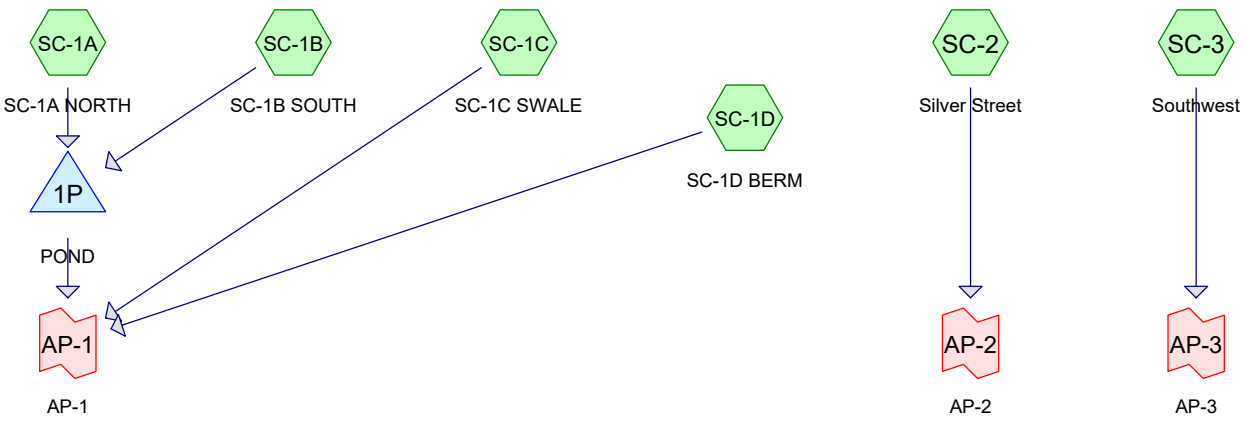
Link AP-3: AP-3



ATTACHMENT D

POST-DEVELOPMENT HYDROCAD CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS



Subcat Reach Pond Link

Routing Diagram for Post-Conditions - TMH
Prepared by Sevee & Maher Engineers, Printed 12/23/2025
HydroCAD® 10.20-7a s/n 01260 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr Storm	Type III 24-hr		Default	24.00	1	3.22	2
2	10-yr Storm	Type III 24-hr		Default	24.00	1	5.18	2
3	25-yr Storm	Type III 24-hr		Default	24.00	1	6.41	2
4	100-yr Storm	Type III 24-hr		Default	24.00	1	8.31	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.451	96	Gravel (SC-1A, SC-1B, SC-1C, SC-1D, SC-3)
7.696	39	Pasture/grassland/range, Good, HSG A (SC-1A, SC-1B, SC-1C, SC-1D, SC-2, SC-3)
0.510	98	Paved parking, HSG A (SC-1A, SC-1C, SC-2)
0.463	98	Roofs, HSG A (SC-1B, SC-1C, SC-2)
4.606	30	Woods, Good, HSG A (SC-1C)
22.726	**63**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	179.50	179.20	20.0	0.0150	0.012	0.0	15.0	0.0	
2	1P	180.00	179.80	20.0	0.0100	0.012	0.0	12.0	0.0	
3	1P	180.25	180.05	20.0	0.0100	0.012	0.0	12.0	0.0	

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=1.77"
Flow Length=779' Tc=22.4 min CN=85 Runoff=3.33 cfs 0.368 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=2.10"
Flow Length=901' Tc=23.4 min CN=89 Runoff=6.85 cfs 0.775 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=0.11"
Flow Length=896' Tc=30.9 min CN=49 Runoff=0.20 cfs 0.122 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=46 Runoff=0.00 cfs 0.003 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=0.70"
Flow Length=745' Tc=22.2 min CN=67 Runoff=0.41 cfs 0.054 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=1.85"
Tc=5.0 min CN=86 Runoff=2.69 cfs 0.184 af

Pond 1P: POND Peak Elev=181.05' Storage=8,847 cf Inflow=10.18 cfs 1.143 af
Outflow=8.87 cfs 1.075 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=8.88 cfs 1.200 af
Primary=8.88 cfs 1.200 af

Link AP-2: AP-2 Inflow=0.41 cfs 0.054 af
Primary=0.41 cfs 0.054 af

Link AP-3: AP-3 Inflow=2.69 cfs 0.184 af
Primary=2.69 cfs 0.184 af

Total Runoff Area = 22.726 ac Runoff Volume = 1.506 af Average Runoff Depth = 0.80"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

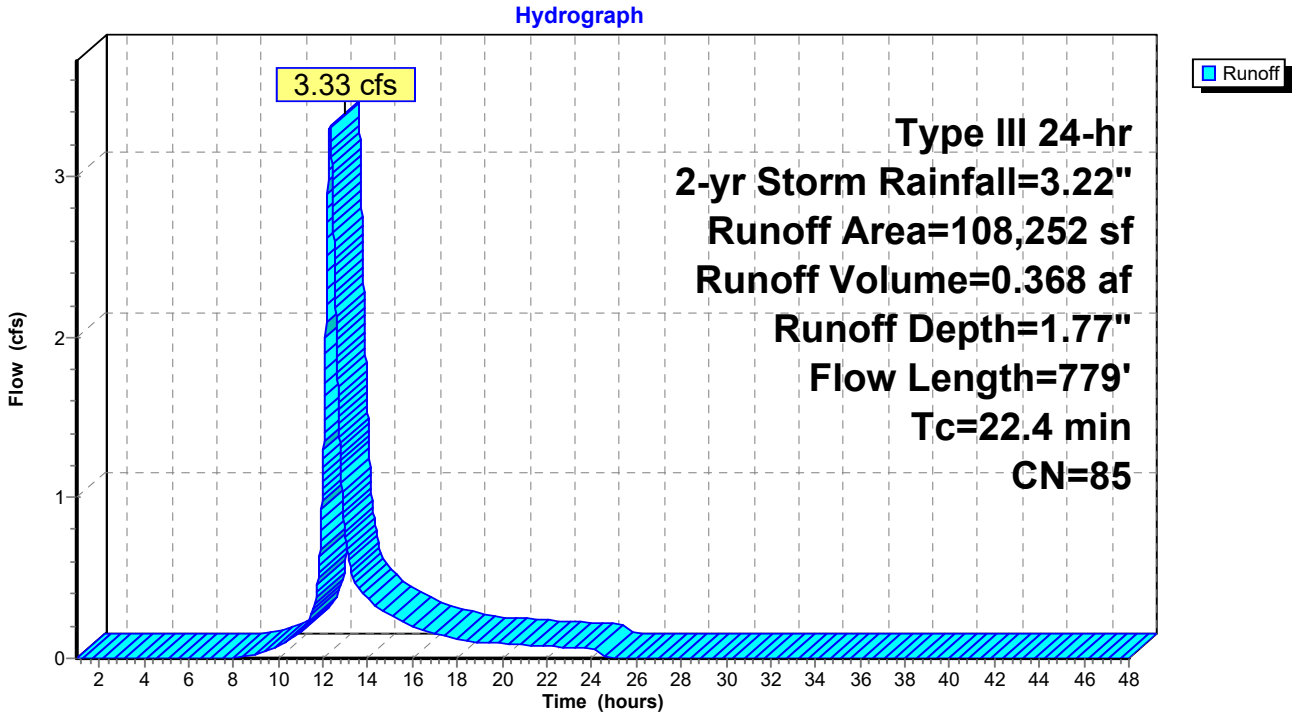
Runoff = 3.33 cfs @ 12.32 hrs, Volume= 0.368 af, Depth= 1.77"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

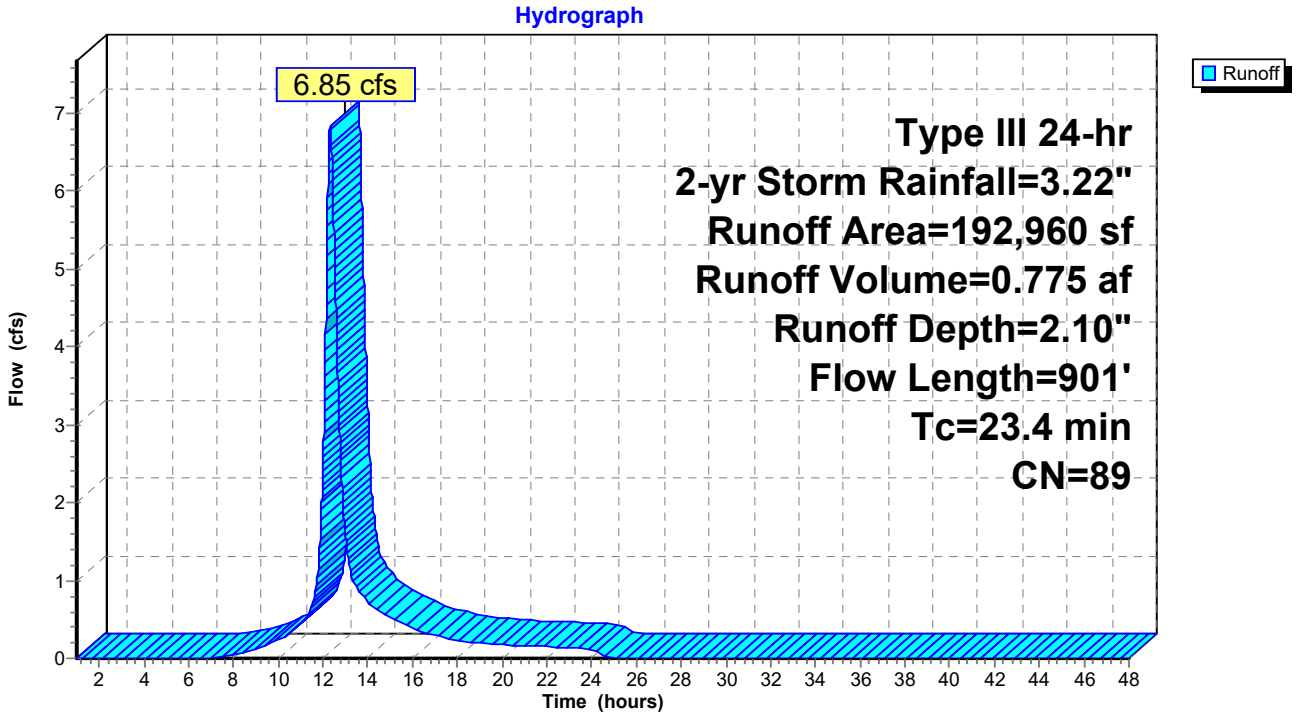
Runoff = 6.85 cfs @ 12.32 hrs, Volume= 0.775 af, Depth= 2.10"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

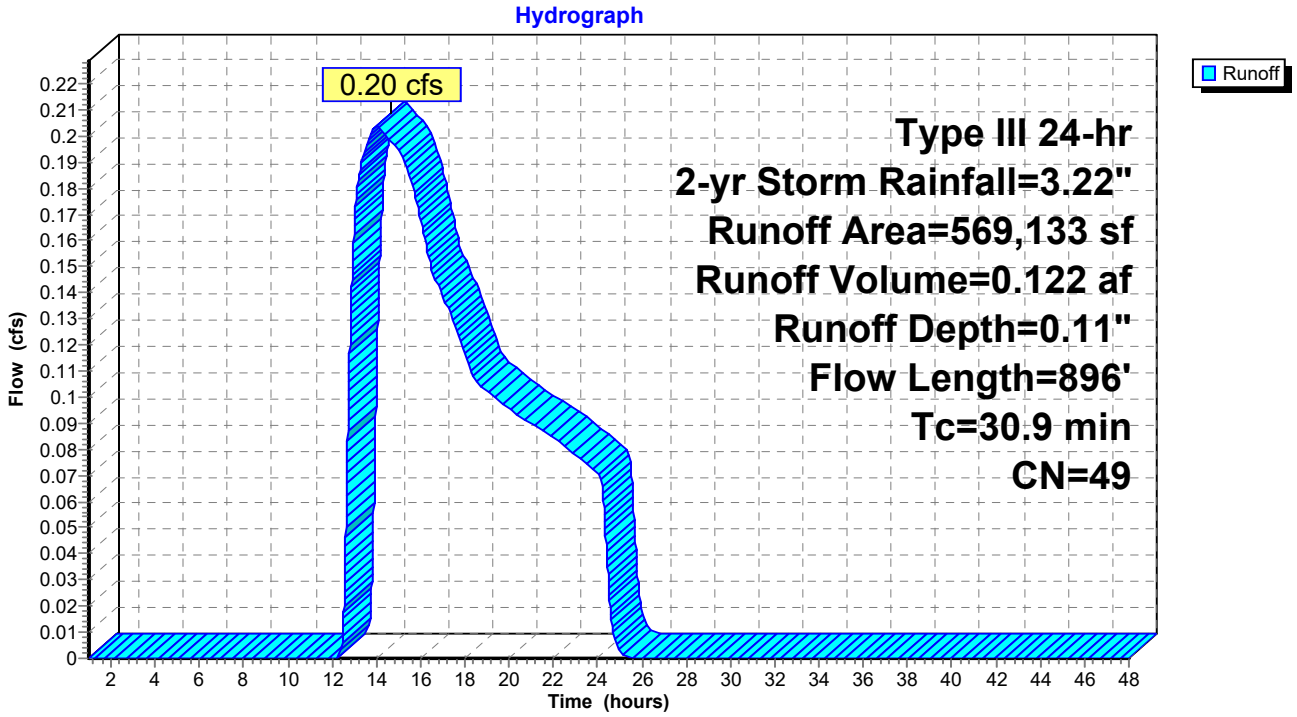
Runoff = 0.20 cfs @ 14.04 hrs, Volume= 0.122 af, Depth= 0.11"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

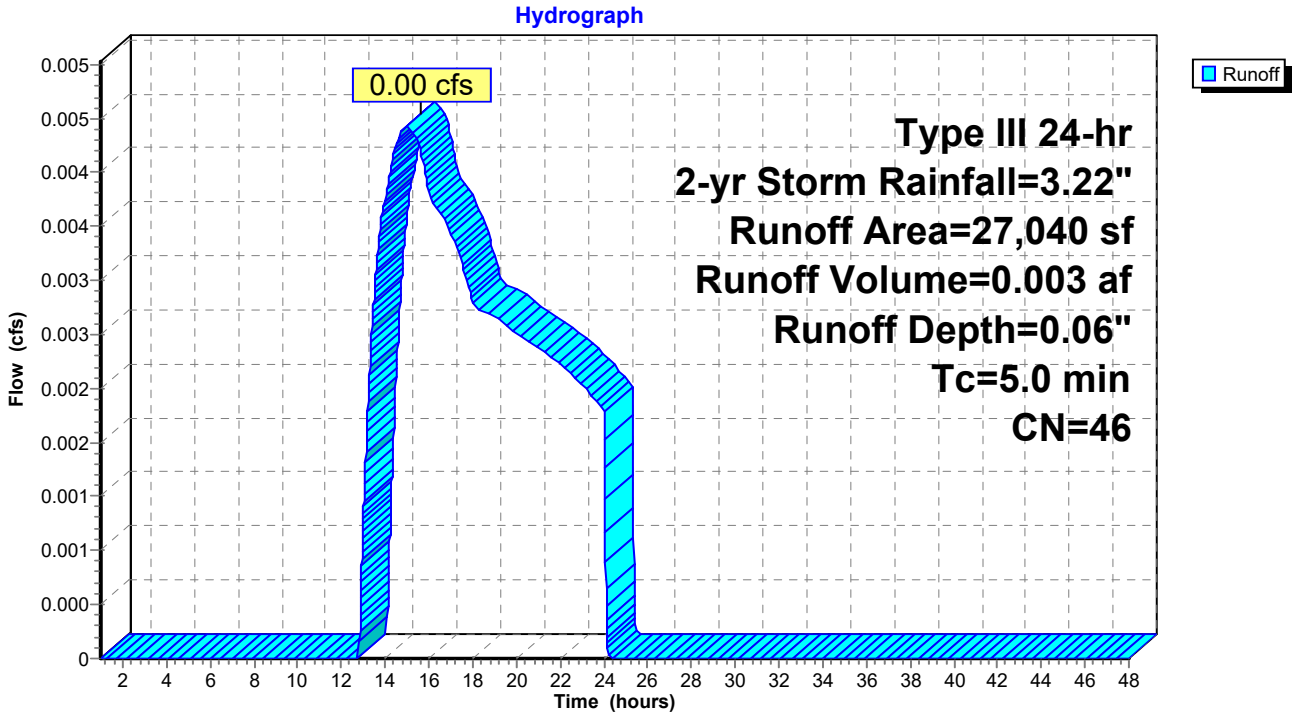
Runoff = 0.00 cfs @ 14.99 hrs, Volume= 0.003 af, Depth= 0.06"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

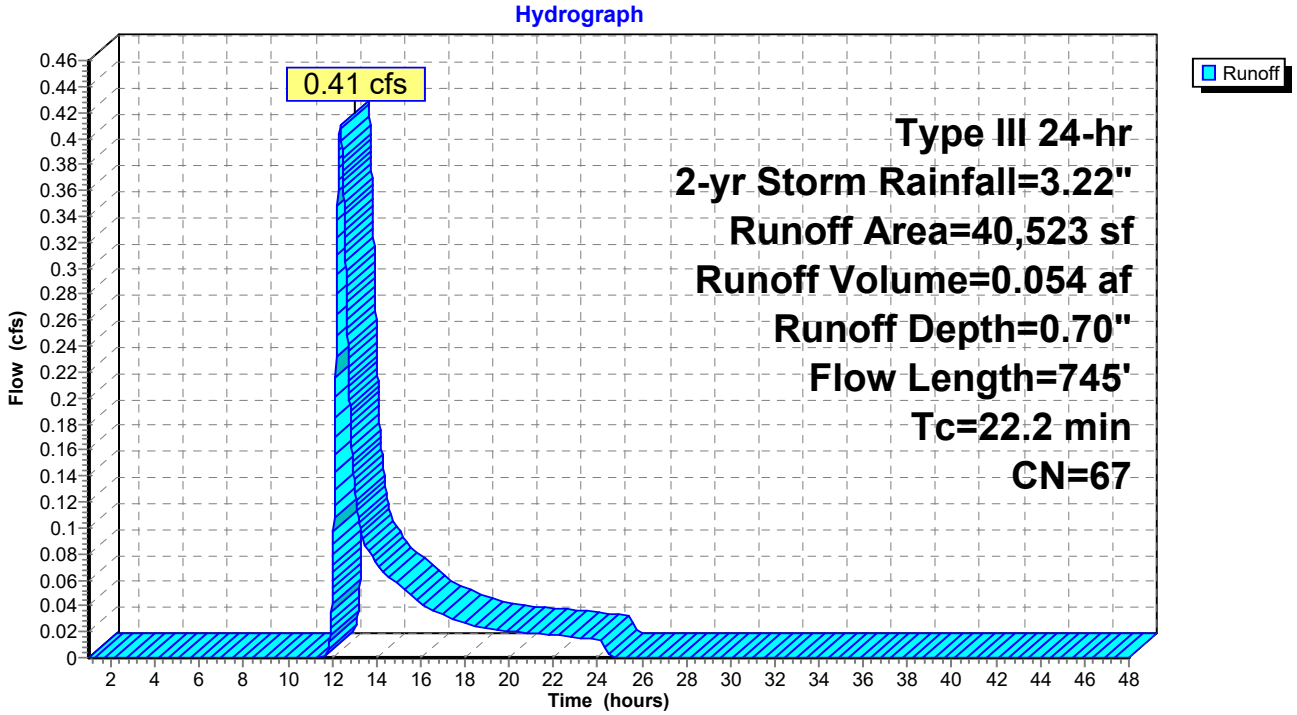
Runoff = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af, Depth= 0.70"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

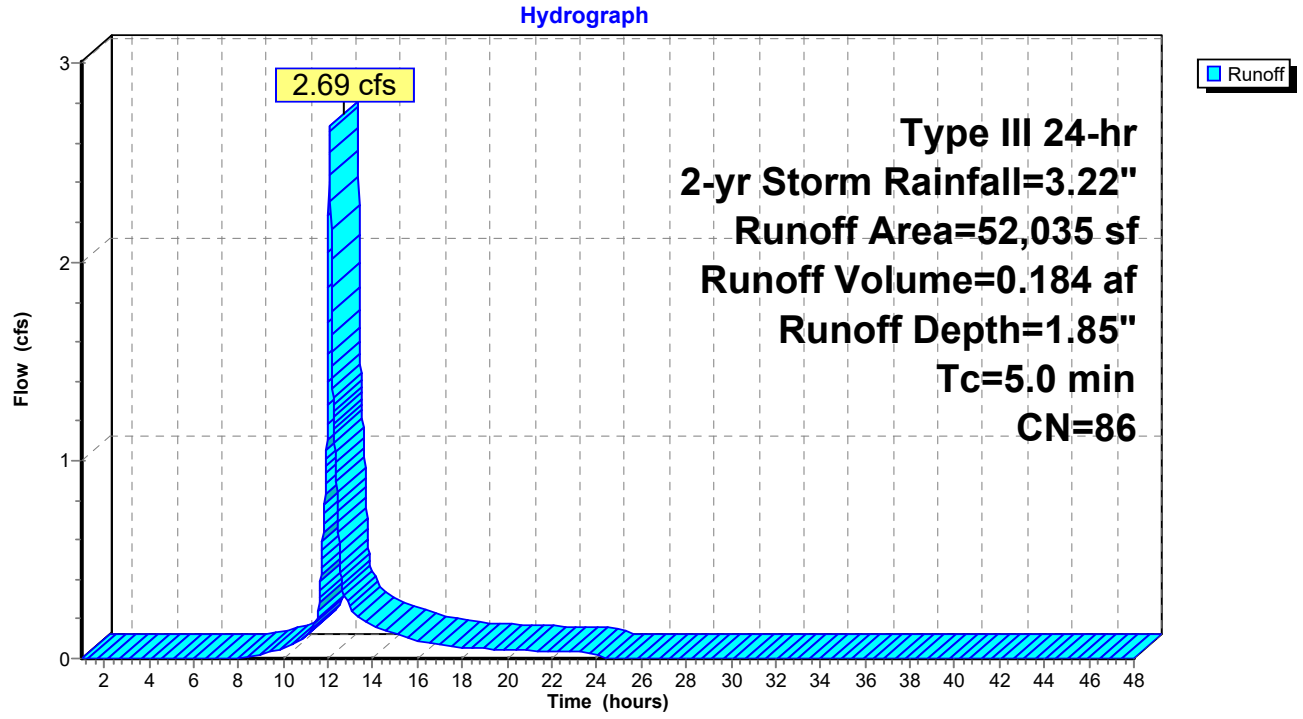
Runoff = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af, Depth= 1.85"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Storm Rainfall=3.22"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 1.98" for 2-yr Storm event
Inflow = 10.18 cfs @ 12.32 hrs, Volume= 1.143 af
Outflow = 8.87 cfs @ 12.44 hrs, Volume= 1.075 af, Atten= 13%, Lag= 7.5 min
Primary = 8.87 cfs @ 12.44 hrs, Volume= 1.075 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 181.05' @ 12.44 hrs Surf.Area= 4,851 sf Storage= 8,847 cf

Plug-Flow detention time= 71.5 min calculated for 1.075 af (94% of inflow)
Center-of-Mass det. time= 39.7 min (871.2 - 831.5)

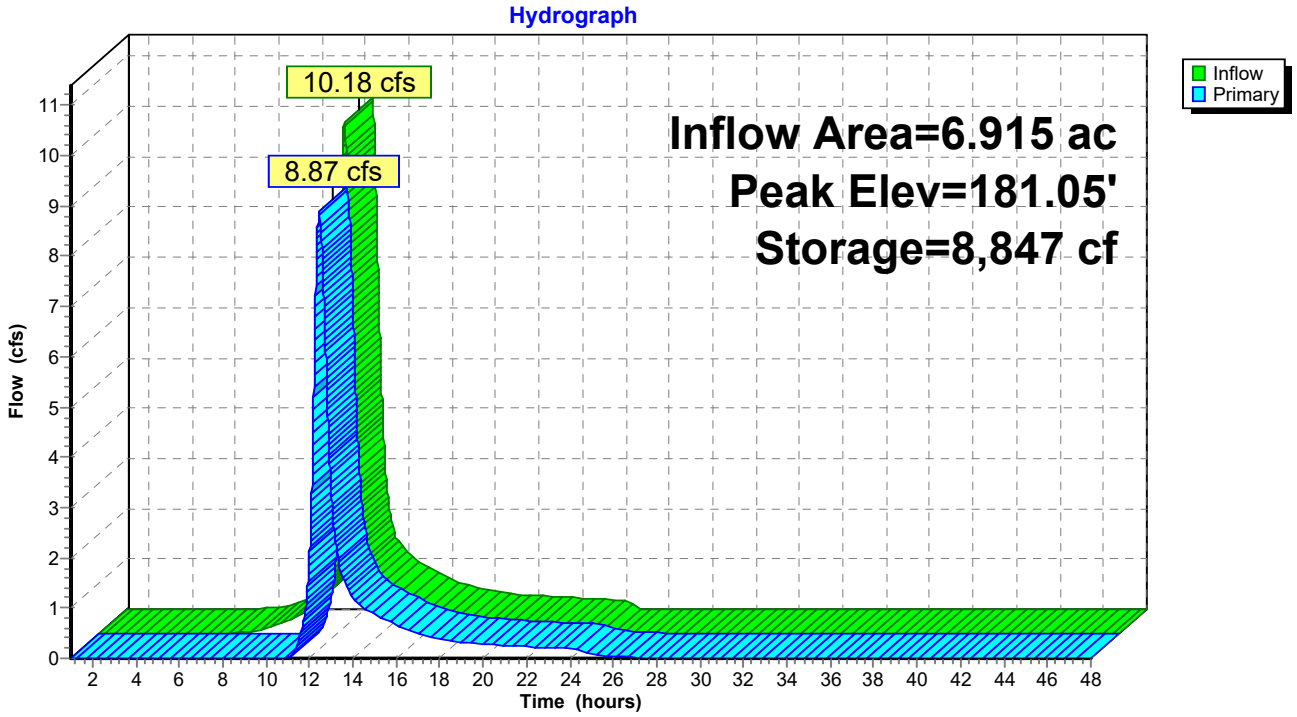
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=8.87 cfs @ 12.44 hrs HW=181.05' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Culvert** (Inlet Controls 4.48 cfs @ 3.65 fps)
- **3=Culvert** (Barrel Controls 2.61 cfs @ 3.94 fps)
- **4=Culvert** (Barrel Controls 1.78 cfs @ 3.62 fps)

Pond 1P: POND


Hydrograph
10.18 cfs
8.87 cfs
Inflow Area=6.915 ac
Peak Elev=181.05'
Storage=8,847 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

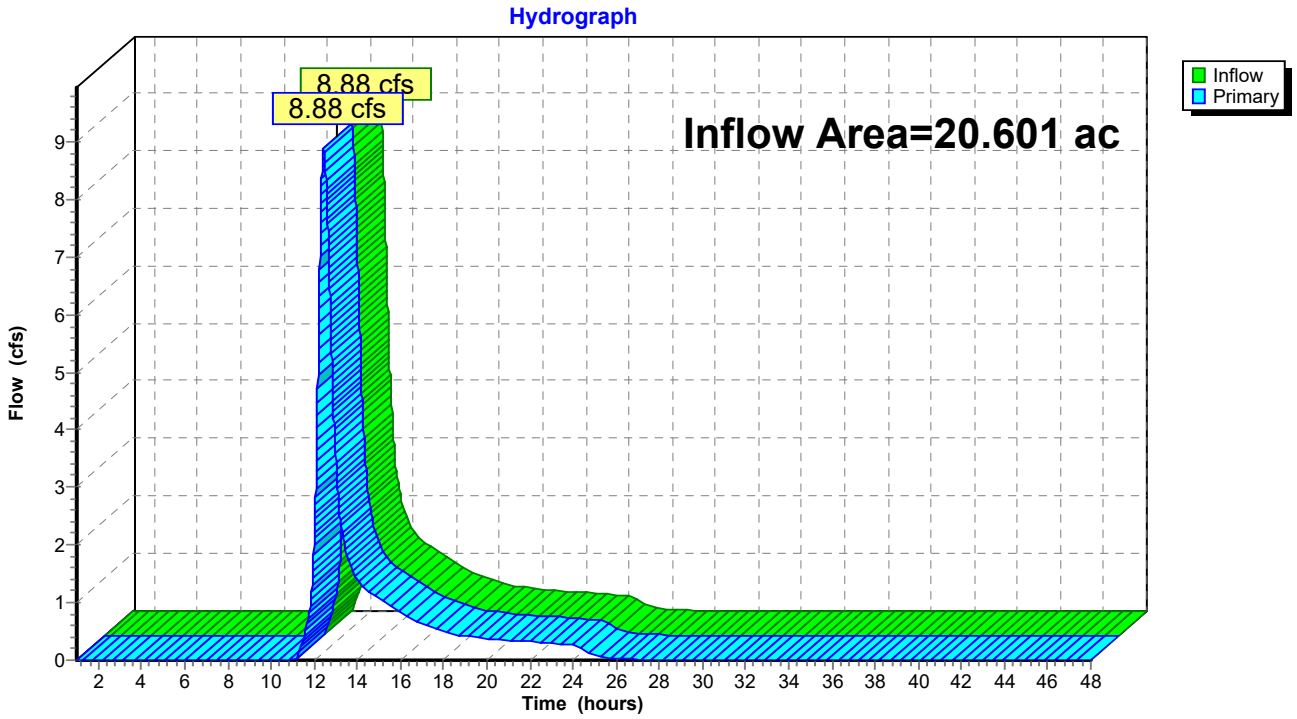
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 0.70" for 2-yr Storm event
Inflow = 8.88 cfs @ 12.44 hrs, Volume= 1.200 af
Primary = 8.88 cfs @ 12.44 hrs, Volume= 1.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

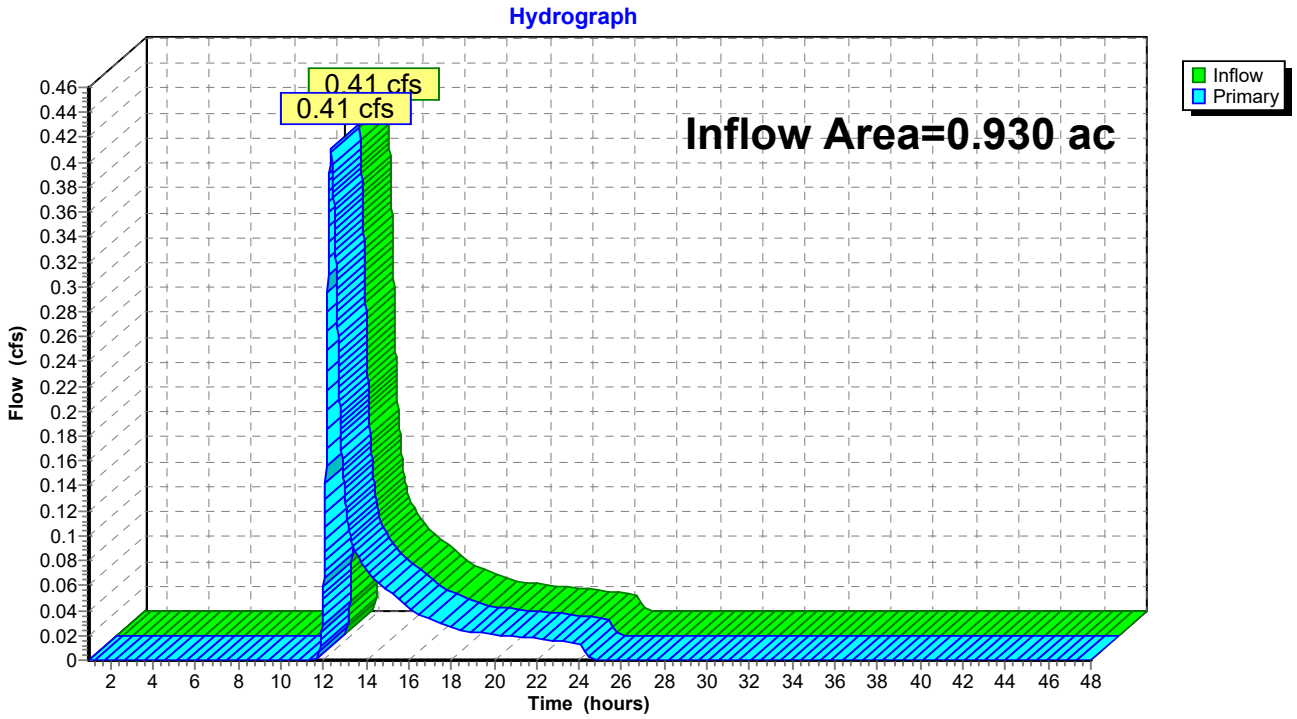


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 0.70" for 2-yr Storm event
Inflow = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af
Primary = 0.41 cfs @ 12.36 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

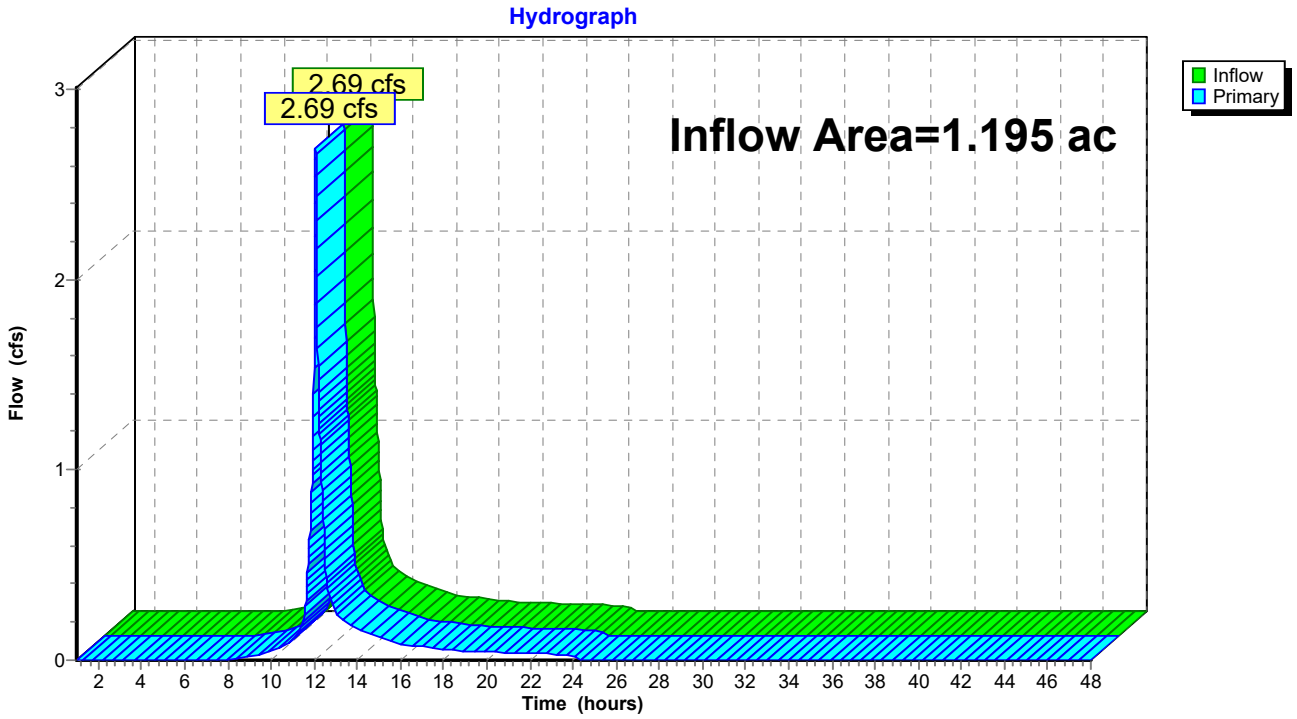


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 1.85" for 2-yr Storm event
Inflow = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af
Primary = 2.69 cfs @ 12.07 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentSC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=3.53"
Flow Length=779' Tc=22.4 min CN=85 Runoff=6.57 cfs 0.732 af

SubcatchmentSC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=3.94"
Flow Length=901' Tc=23.4 min CN=89 Runoff=12.62 cfs 1.456 af

SubcatchmentSC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=0.71"
Flow Length=896' Tc=30.9 min CN=49 Runoff=4.11 cfs 0.774 af

SubcatchmentSC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=0.55"
Tc=5.0 min CN=46 Runoff=0.19 cfs 0.028 af

SubcatchmentSC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=1.93"
Flow Length=745' Tc=22.2 min CN=67 Runoff=1.31 cfs 0.150 af

SubcatchmentSC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=3.64"
Tc=5.0 min CN=86 Runoff=5.19 cfs 0.362 af

Pond 1P: POND Peak Elev=181.81' Storage=13,066 cf Inflow=19.18 cfs 2.188 af
Outflow=17.07 cfs 2.121 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=20.73 cfs 2.923 af
Primary=20.73 cfs 2.923 af

Link AP-2: AP-2 Inflow=1.31 cfs 0.150 af
Primary=1.31 cfs 0.150 af

Link AP-3: AP-3 Inflow=5.19 cfs 0.362 af
Primary=5.19 cfs 0.362 af

Total Runoff Area = 22.726 ac Runoff Volume = 3.502 af Average Runoff Depth = 1.85"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

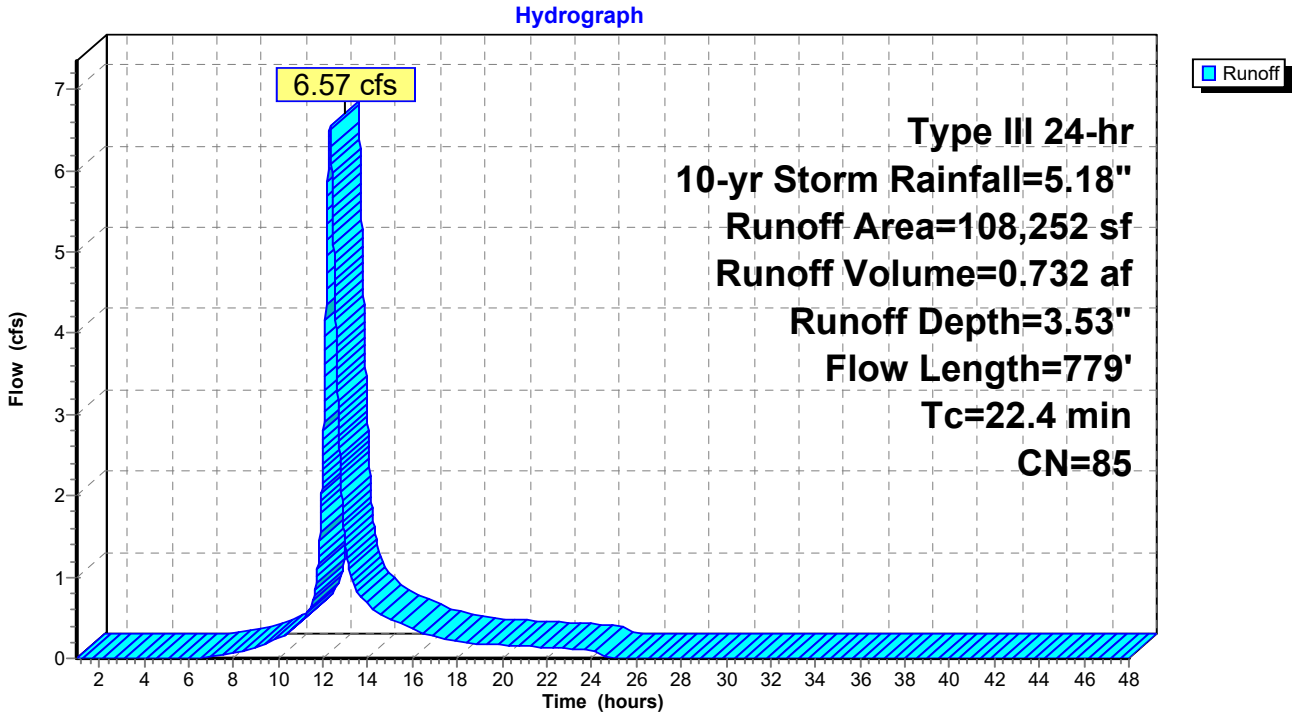
Runoff = 6.57 cfs @ 12.30 hrs, Volume= 0.732 af, Depth= 3.53"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

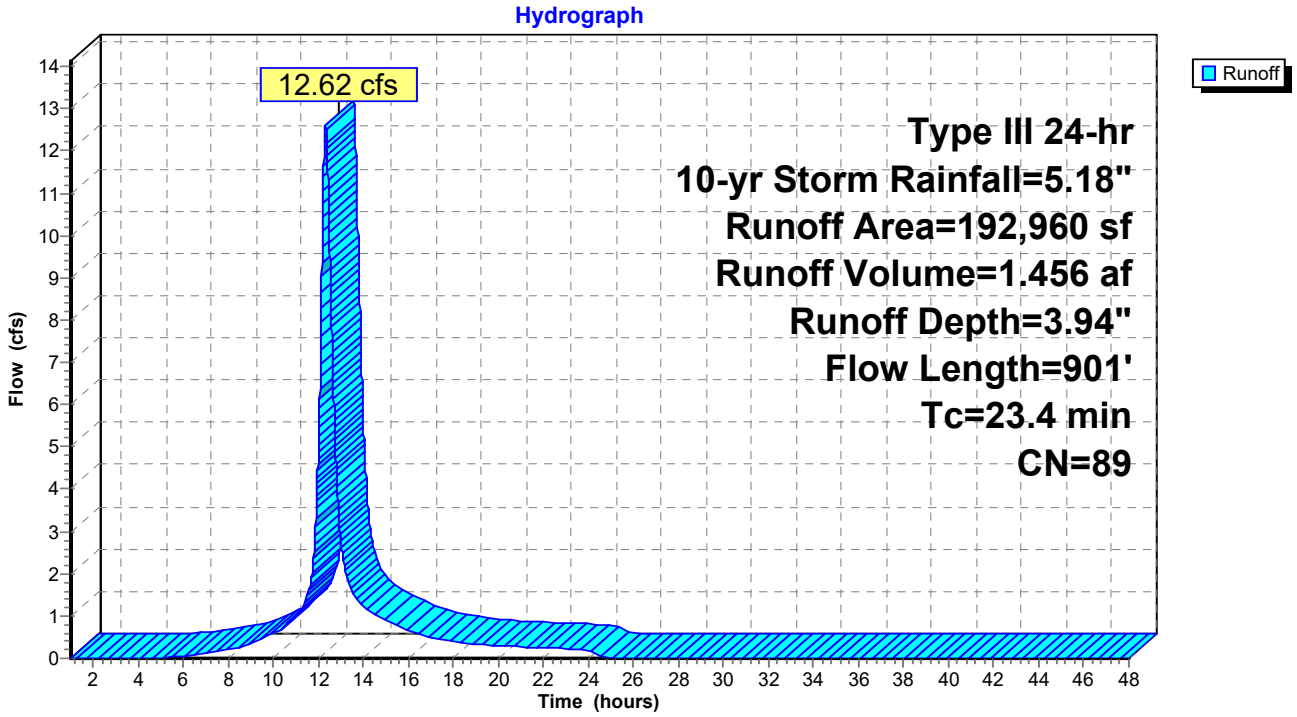
Runoff = 12.62 cfs @ 12.30 hrs, Volume= 1.456 af, Depth= 3.94"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

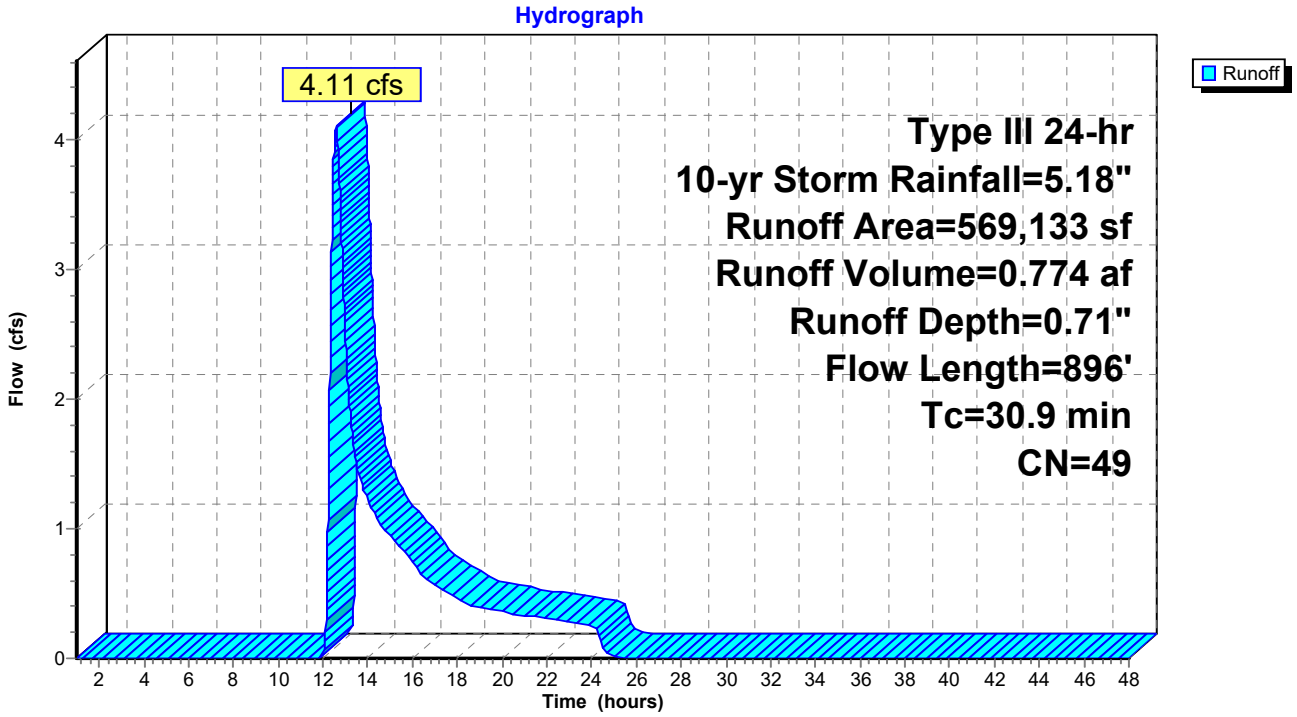
Runoff = 4.11 cfs @ 12.57 hrs, Volume= 0.774 af, Depth= 0.71"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

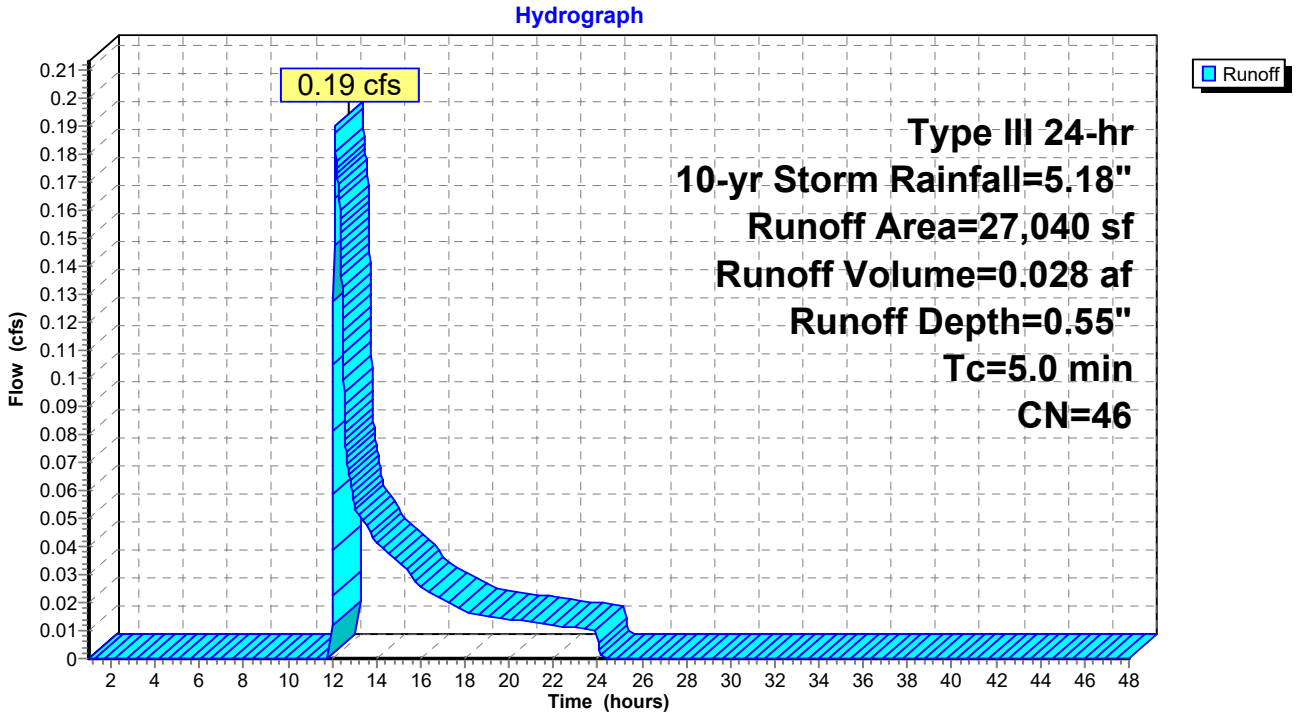
Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.028 af, Depth= 0.55"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

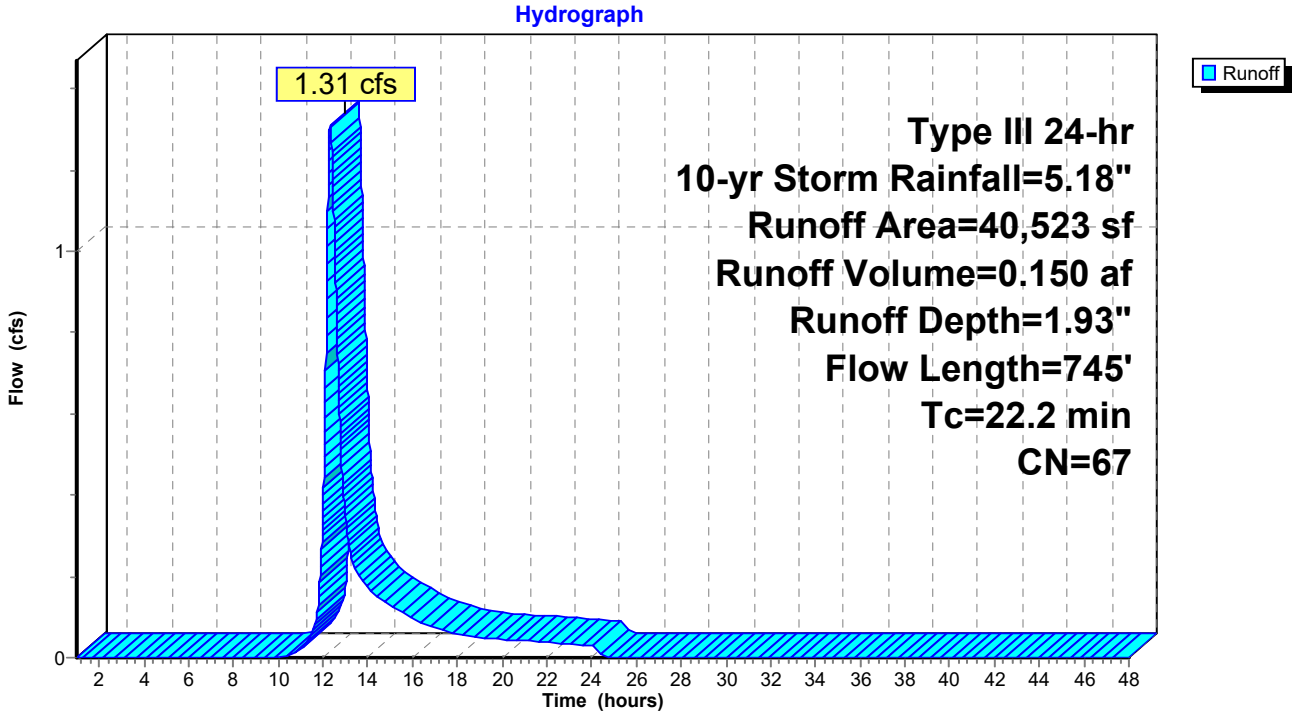
Runoff = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af, Depth= 1.93"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

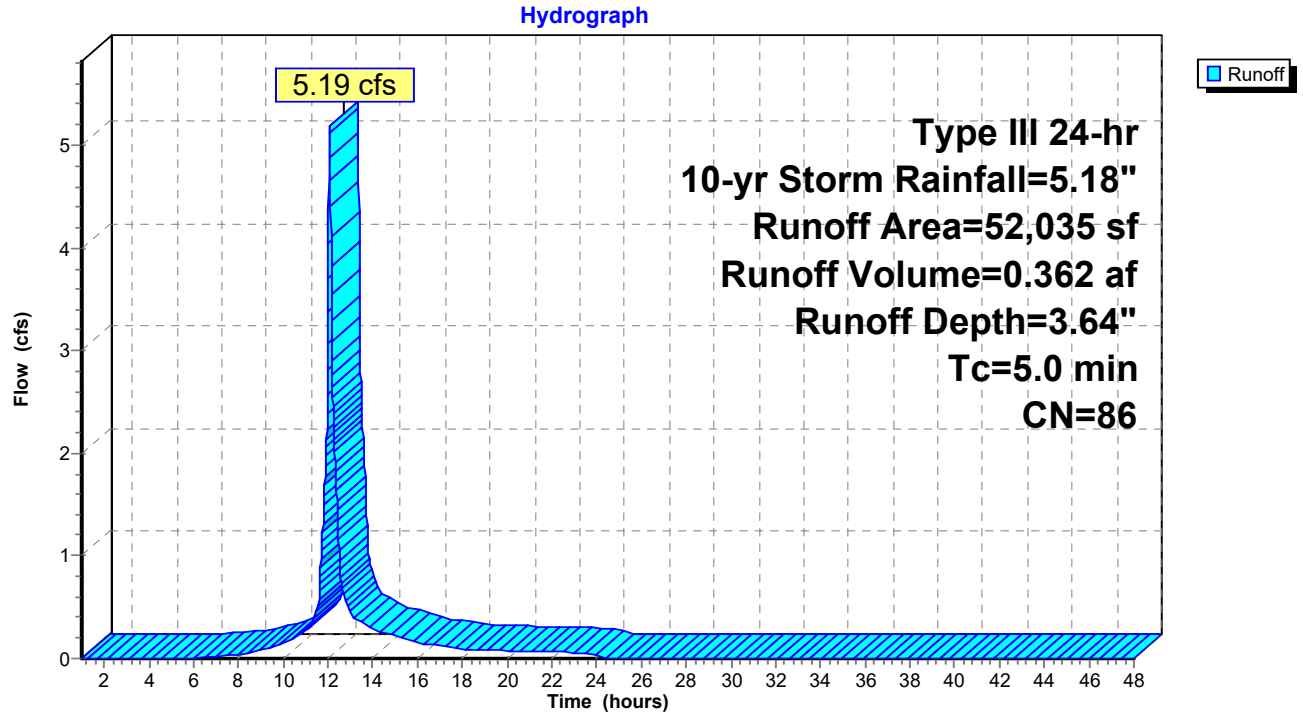
Runoff = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af, Depth= 3.64"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Storm Rainfall=5.18"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 3.80" for 10-yr Storm event
Inflow = 19.18 cfs @ 12.30 hrs, Volume= 2.188 af
Outflow = 17.07 cfs @ 12.42 hrs, Volume= 2.121 af, Atten= 11%, Lag= 7.0 min
Primary = 17.07 cfs @ 12.42 hrs, Volume= 2.121 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 181.81' @ 12.42 hrs Surf.Area= 6,227 sf Storage= 13,066 cf

Plug-Flow detention time= 48.3 min calculated for 2.120 af (97% of inflow)
Center-of-Mass det. time= 30.4 min (843.7 - 813.3)

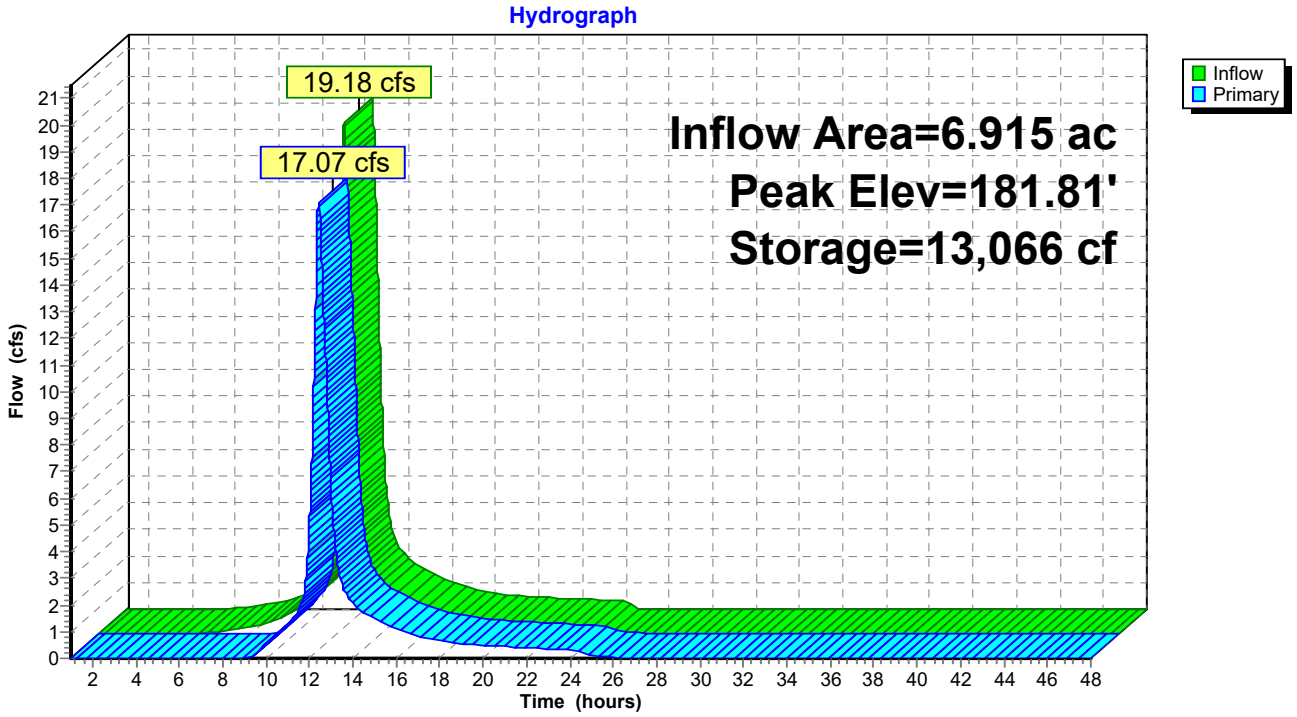
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=17.07 cfs @ 12.42 hrs HW=181.81' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 2.82 cfs @ 1.50 fps)
- **2=Culvert** (Inlet Controls 6.06 cfs @ 4.94 fps)
- **3=Culvert** (Inlet Controls 4.33 cfs @ 5.52 fps)
- **4=Culvert** (Barrel Controls 3.86 cfs @ 4.91 fps)

Pond 1P: POND


Hydrograph
19.18 cfs
17.07 cfs
Inflow Area=6.915 ac
Peak Elev=181.81'
Storage=13,066 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

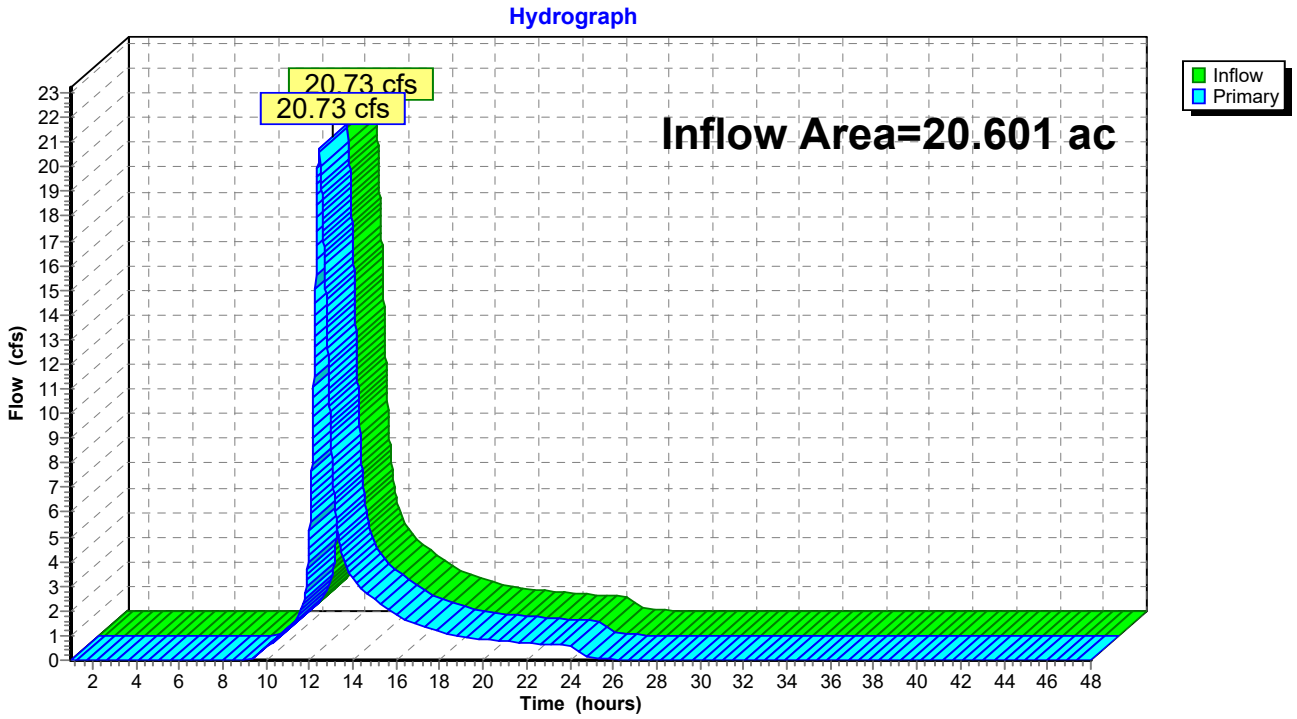
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 1.70" for 10-yr Storm event
Inflow = 20.73 cfs @ 12.44 hrs, Volume= 2.923 af
Primary = 20.73 cfs @ 12.44 hrs, Volume= 2.923 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

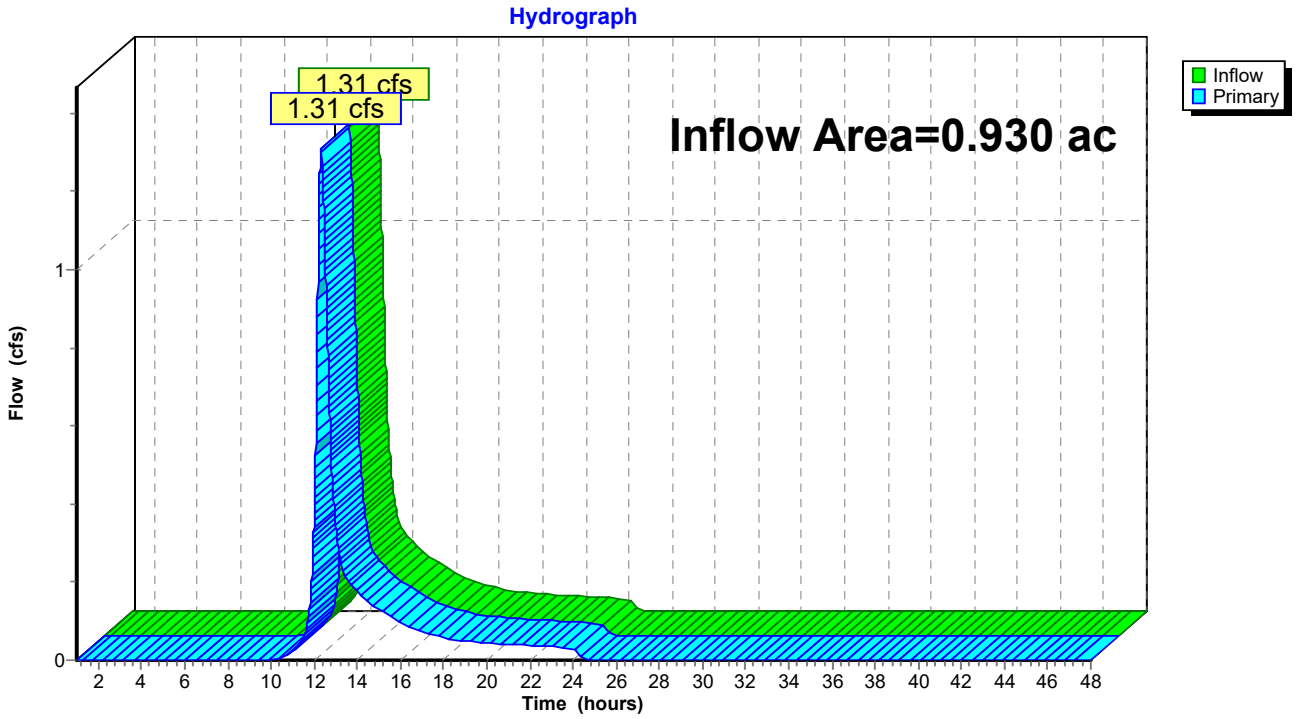


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 1.93" for 10-yr Storm event
Inflow = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af
Primary = 1.31 cfs @ 12.32 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

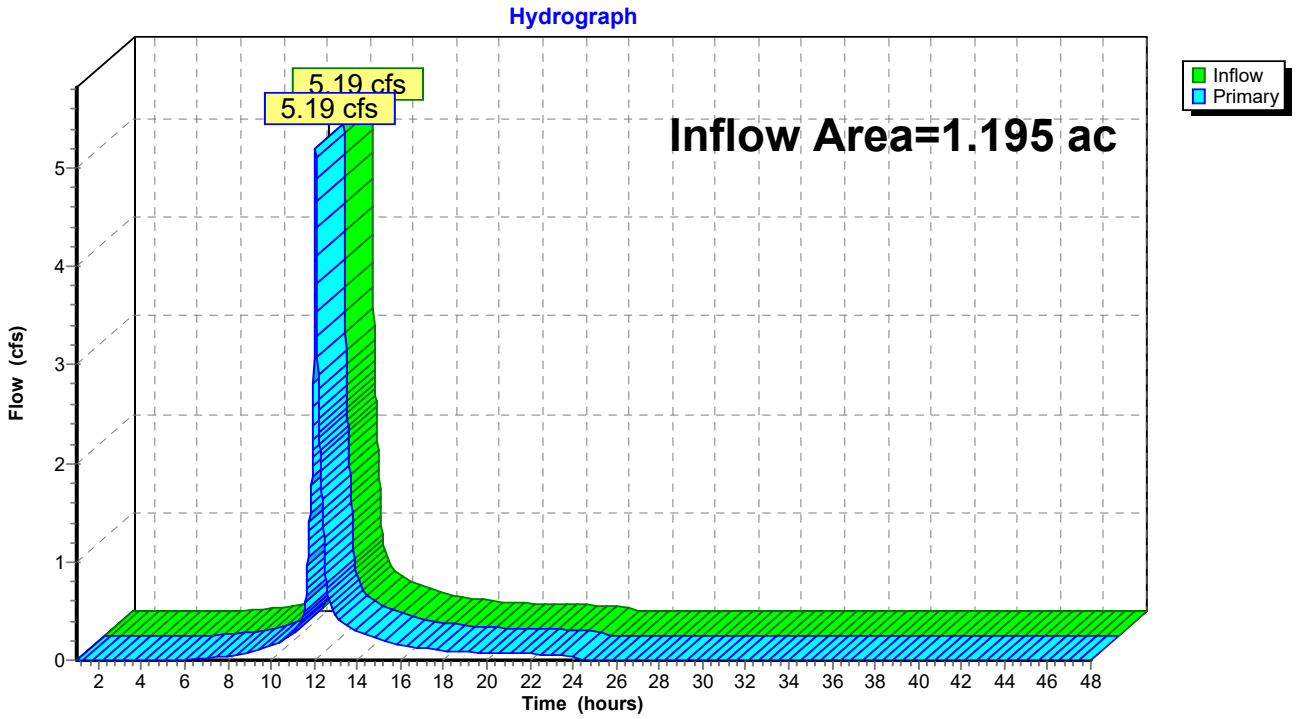


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 3.64" for 10-yr Storm event
Inflow = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af
Primary = 5.19 cfs @ 12.07 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=4.69"
Flow Length=779' Tc=22.4 min CN=85 Runoff=8.63 cfs 0.971 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=5.13"
Flow Length=901' Tc=23.4 min CN=89 Runoff=16.23 cfs 1.895 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=1.27"
Flow Length=896' Tc=30.9 min CN=49 Runoff=8.86 cfs 1.384 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=1.04"
Tc=5.0 min CN=46 Runoff=0.56 cfs 0.054 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=2.84"
Flow Length=745' Tc=22.2 min CN=67 Runoff=1.98 cfs 0.220 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=4.80"
Tc=5.0 min CN=86 Runoff=6.78 cfs 0.478 af

Pond 1P: POND Peak Elev=182.08' Storage=14,833 cf Inflow=24.86 cfs 2.866 af
Outflow=22.90 cfs 2.799 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=31.34 cfs 4.237 af
Primary=31.34 cfs 4.237 af

Link AP-2: AP-2 Inflow=1.98 cfs 0.220 af
Primary=1.98 cfs 0.220 af

Link AP-3: AP-3 Inflow=6.78 cfs 0.478 af
Primary=6.78 cfs 0.478 af

Total Runoff Area = 22.726 ac Runoff Volume = 5.003 af Average Runoff Depth = 2.64"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

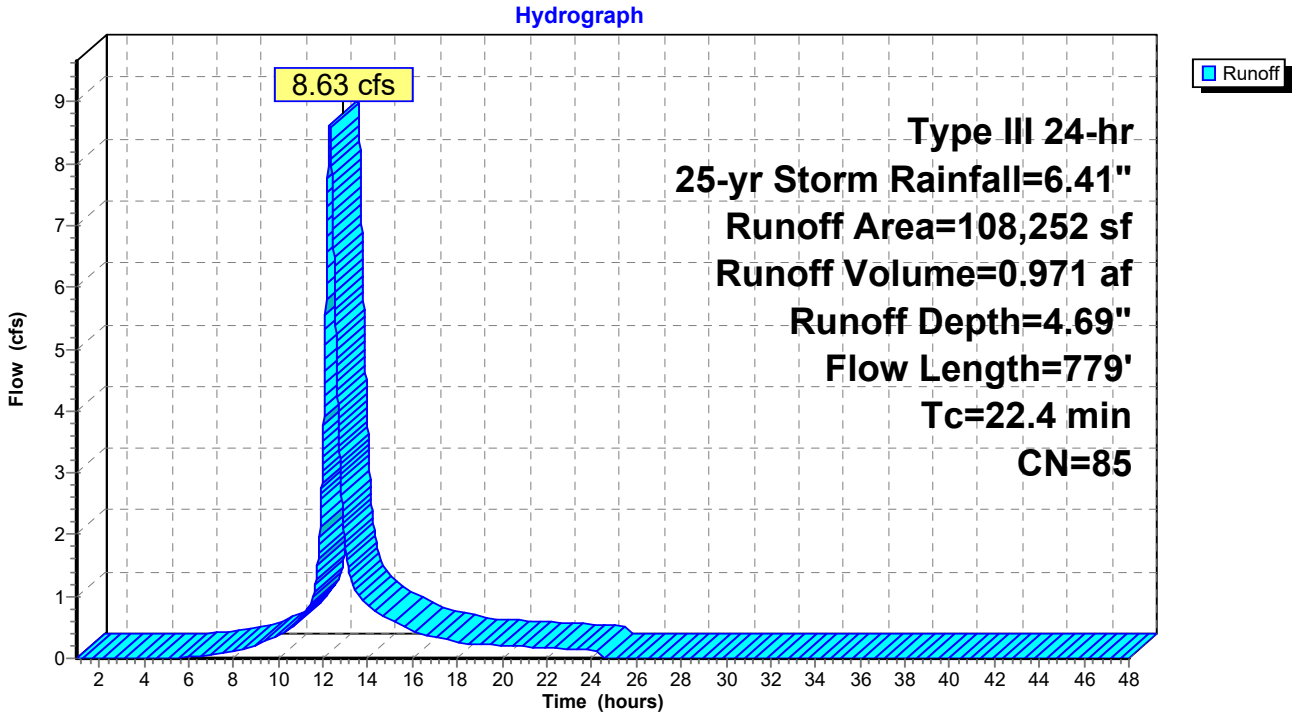
Runoff = 8.63 cfs @ 12.30 hrs, Volume= 0.971 af, Depth= 4.69"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

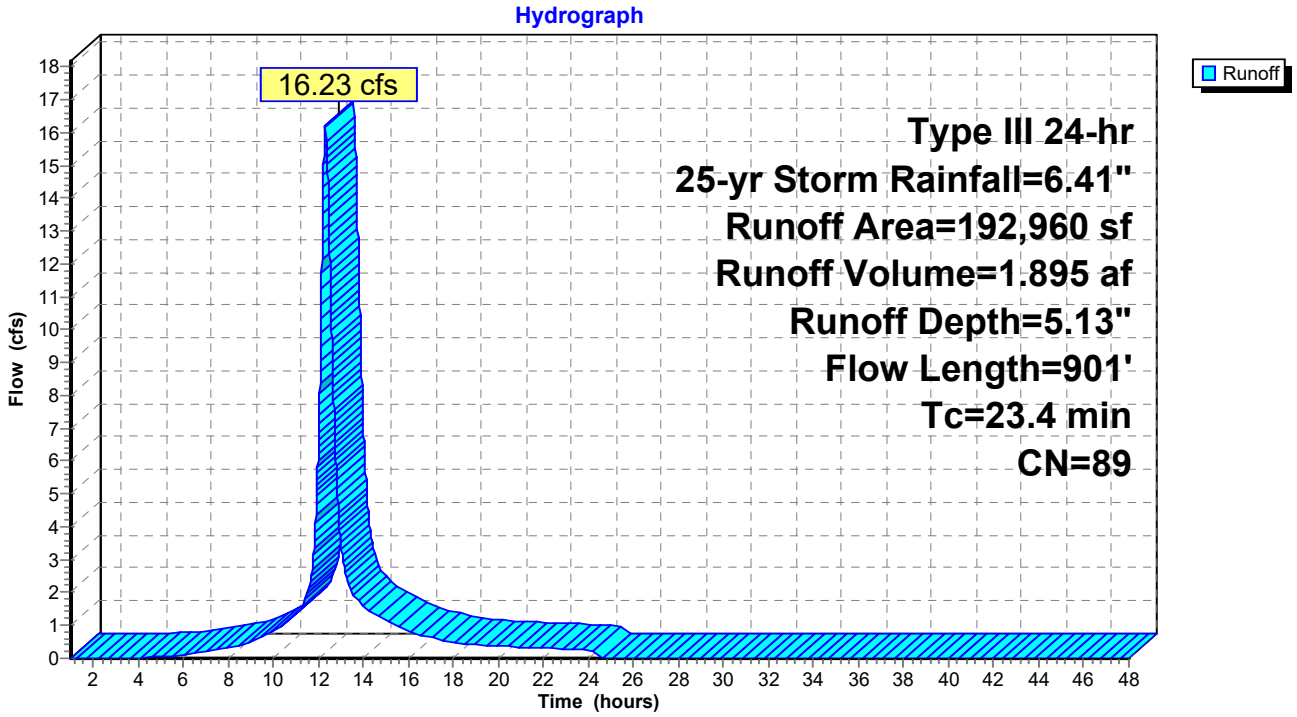
Runoff = 16.23 cfs @ 12.30 hrs, Volume= 1.895 af, Depth= 5.13"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

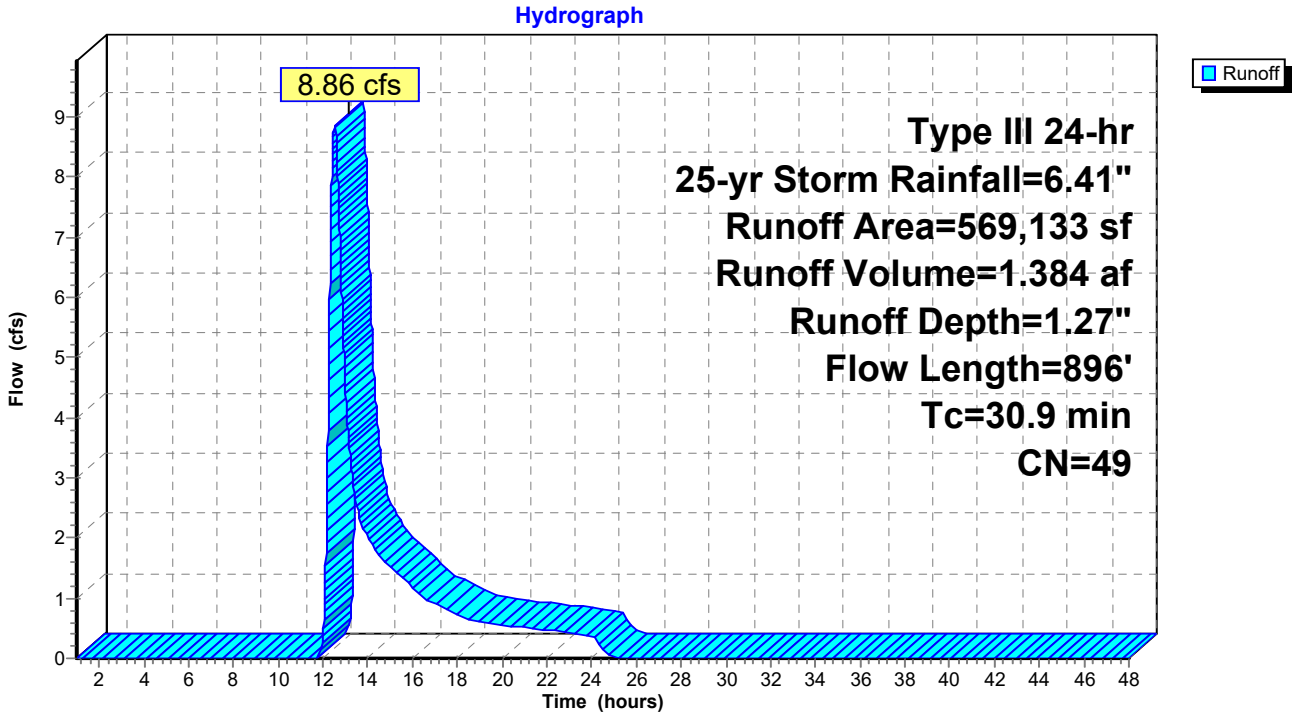
Runoff = 8.86 cfs @ 12.53 hrs, Volume= 1.384 af, Depth= 1.27"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

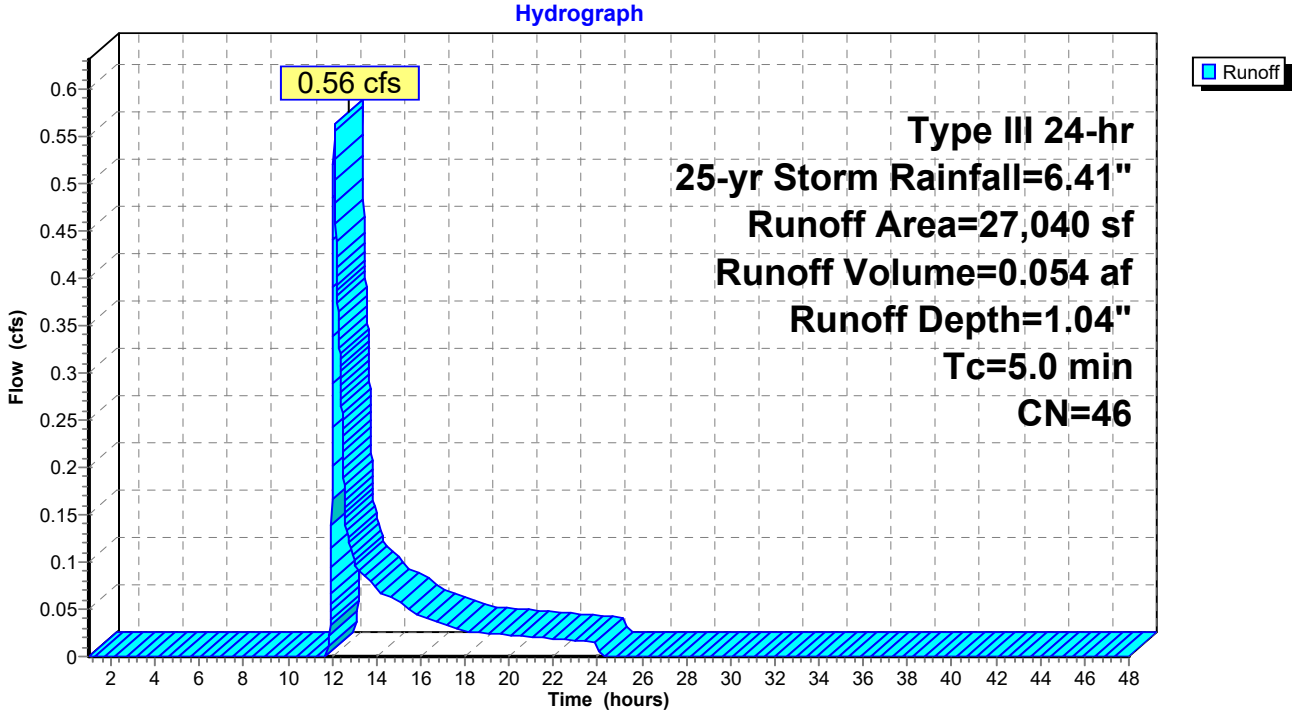
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.054 af, Depth= 1.04"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

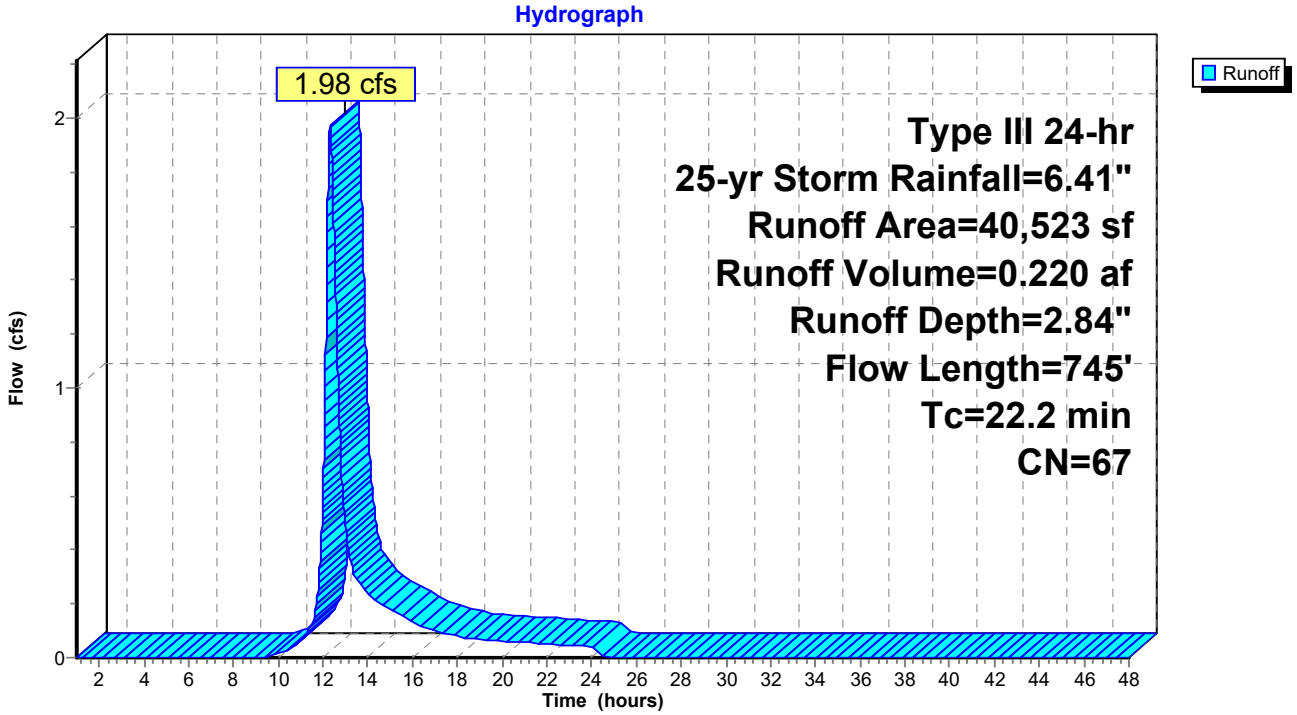
Runoff = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af, Depth= 2.84"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

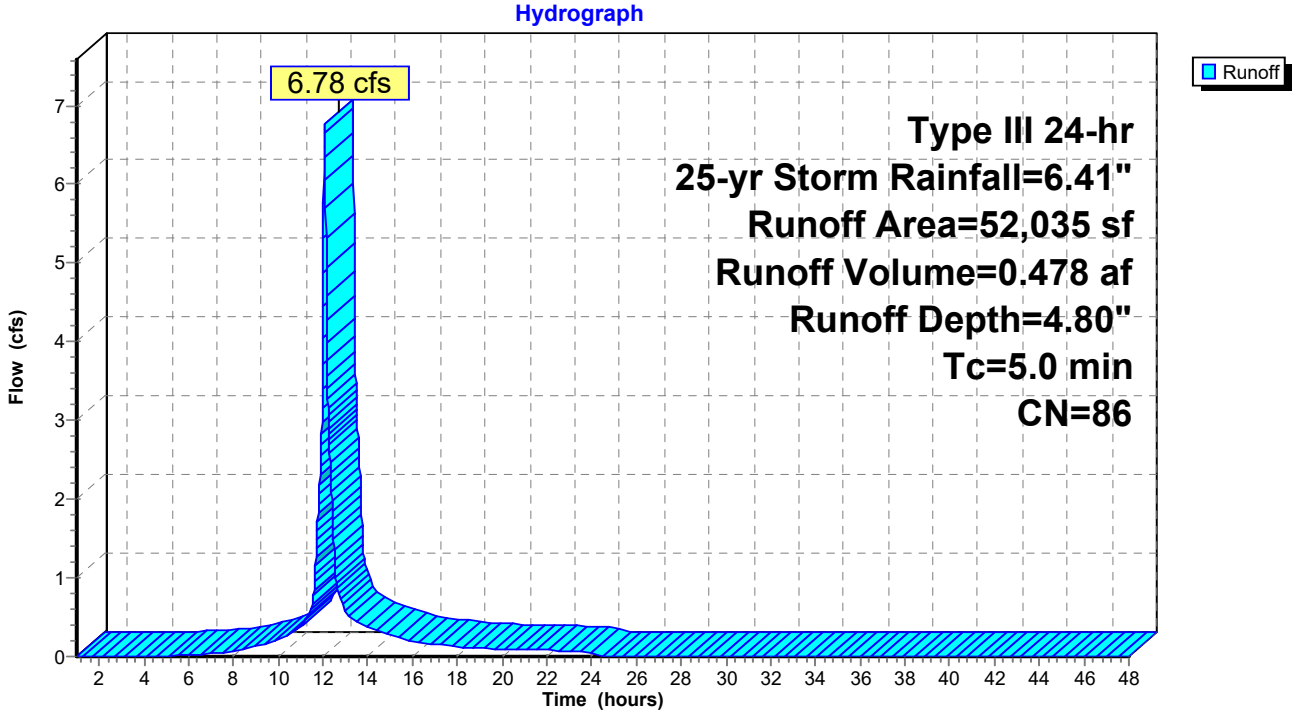
Runoff = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af, Depth= 4.80"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Storm Rainfall=6.41"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 4.97" for 25-yr Storm event
Inflow = 24.86 cfs @ 12.30 hrs, Volume= 2.866 af
Outflow = 22.90 cfs @ 12.40 hrs, Volume= 2.799 af, Atten= 8%, Lag= 5.7 min
Primary = 22.90 cfs @ 12.40 hrs, Volume= 2.799 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 182.08' @ 12.40 hrs Surf.Area= 6,751 sf Storage= 14,833 cf

Plug-Flow detention time= 41.4 min calculated for 2.799 af (98% of inflow)
Center-of-Mass det. time= 27.1 min (833.1 - 806.0)

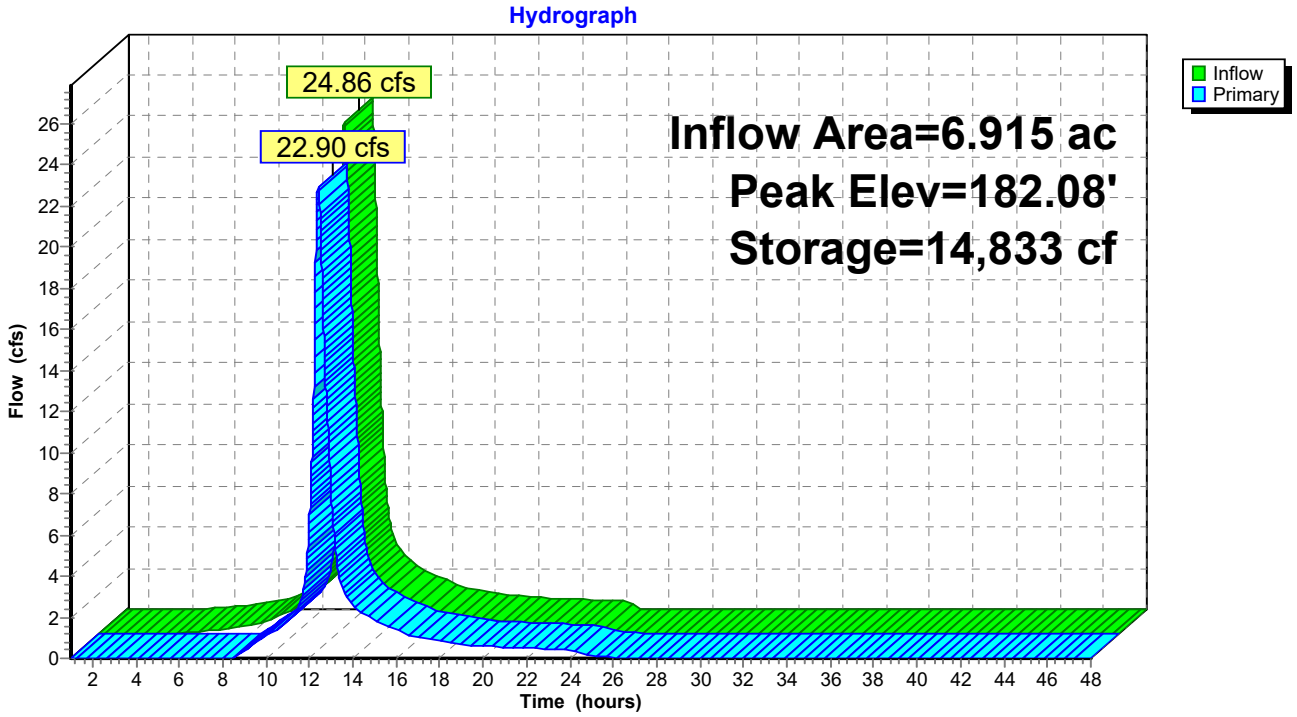
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=22.90 cfs @ 12.40 hrs HW=182.08' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 7.24 cfs @ 2.06 fps)
- **2=Culvert** (Inlet Controls 6.53 cfs @ 5.32 fps)
- **3=Culvert** (Inlet Controls 4.76 cfs @ 6.06 fps)
- **4=Culvert** (Inlet Controls 4.37 cfs @ 5.56 fps)

Pond 1P: POND


Hydrograph
24.86 cfs
22.90 cfs
Inflow Area=6.915 ac
Peak Elev=182.08'
Storage=14,833 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

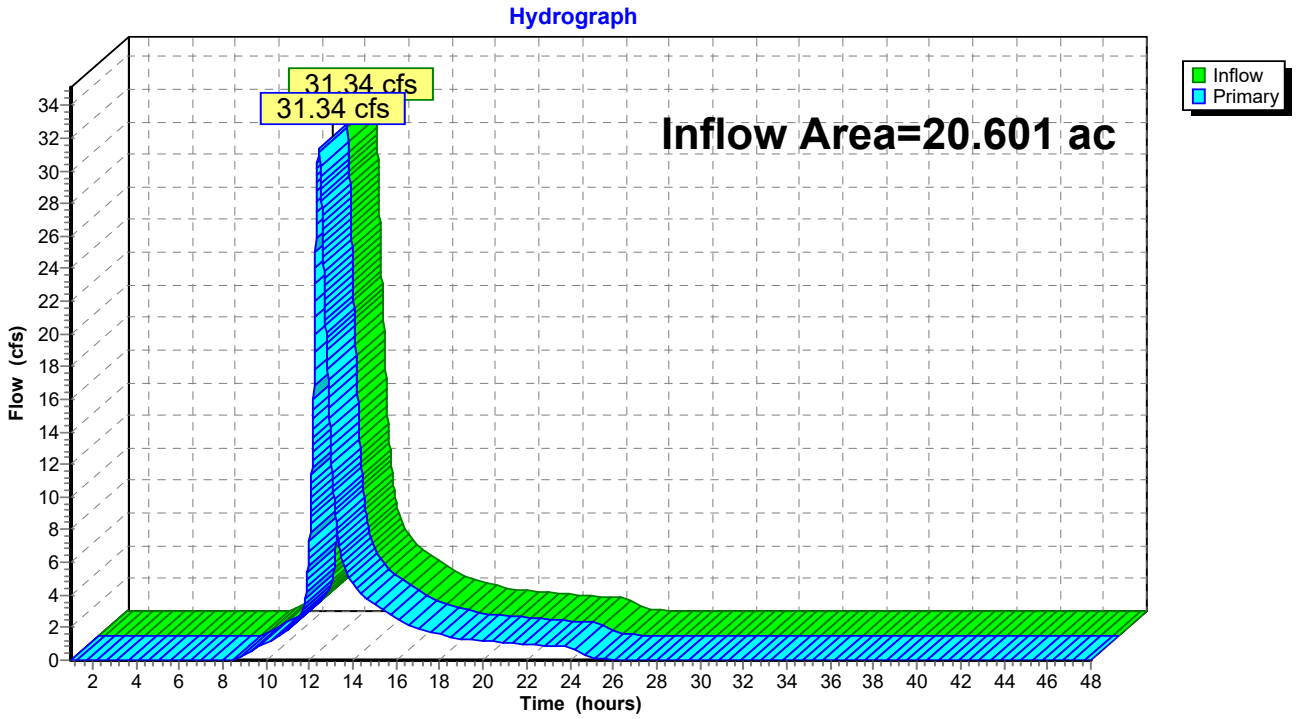
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 2.47" for 25-yr Storm event
Inflow = 31.34 cfs @ 12.42 hrs, Volume= 4.237 af
Primary = 31.34 cfs @ 12.42 hrs, Volume= 4.237 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

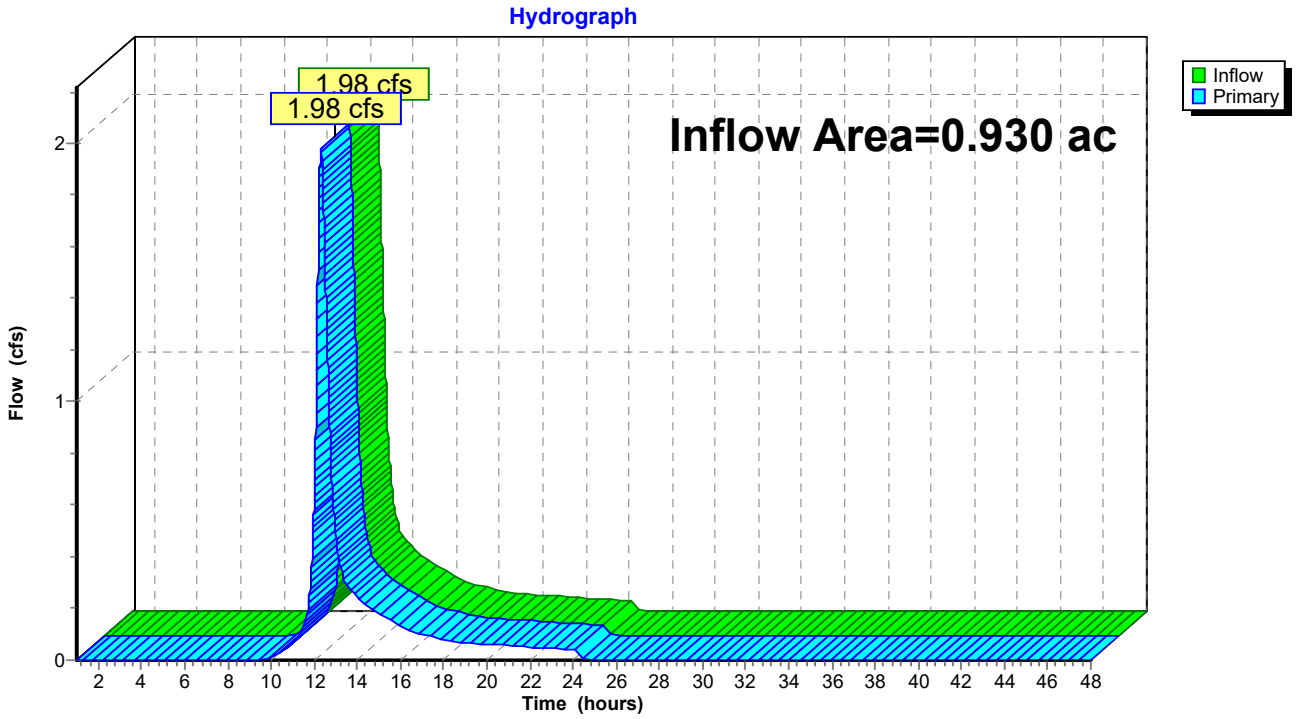


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 2.84" for 25-yr Storm event
Inflow = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af
Primary = 1.98 cfs @ 12.31 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

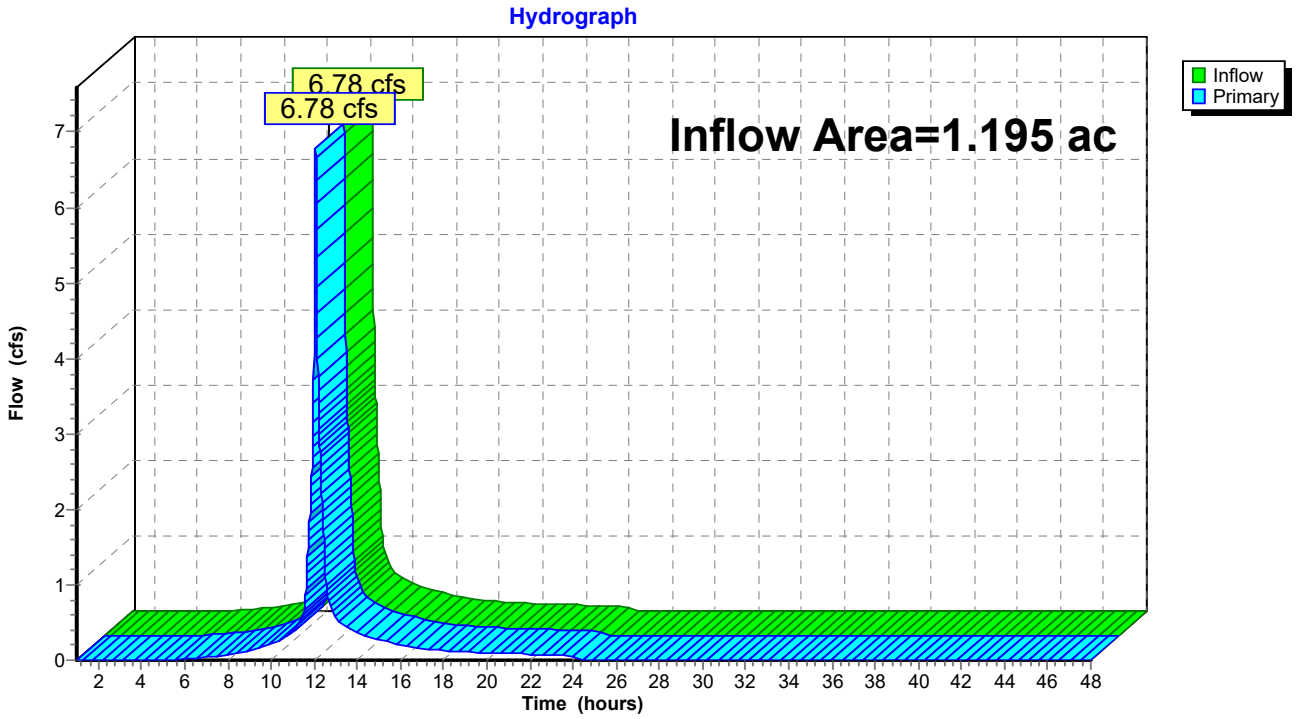


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 4.80" for 25-yr Storm event
Inflow = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af
Primary = 6.78 cfs @ 12.07 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SC-1A: SC-1A NORTH Runoff Area=108,252 sf 3.51% Impervious Runoff Depth=6.51"
Flow Length=779' Tc=22.4 min CN=85 Runoff=11.81 cfs 1.349 af

Subcatchment SC-1B: SC-1B SOUTH Runoff Area=192,960 sf 4.55% Impervious Runoff Depth=6.99"
Flow Length=901' Tc=23.4 min CN=89 Runoff=21.75 cfs 2.581 af

Subcatchment SC-1C: SC-1C SWALE Runoff Area=569,133 sf 1.87% Impervious Runoff Depth=2.33"
Flow Length=896' Tc=30.9 min CN=49 Runoff=18.22 cfs 2.539 af

Subcatchment SC-1D: SC-1D BERM Runoff Area=27,040 sf 0.00% Impervious Runoff Depth=2.01"
Tc=5.0 min CN=46 Runoff=1.33 cfs 0.104 af

Subcatchment SC-2: Silver Street Runoff Area=40,523 sf 47.20% Impervious Runoff Depth=4.38"
Flow Length=745' Tc=22.2 min CN=67 Runoff=3.08 cfs 0.340 af

Subcatchment SC-3: Southwest Runoff Area=52,035 sf 0.00% Impervious Runoff Depth=6.63"
Tc=5.0 min CN=86 Runoff=9.21 cfs 0.660 af

Pond 1P: POND Peak Elev=182.43' Storage=17,294 cf Inflow=33.57 cfs 3.929 af
Outflow=31.46 cfs 3.862 af

Pond 2P: Treatment Volume Peak Elev=0.00' Storage=0 cf

Link AP-1: AP-1 Inflow=49.43 cfs 6.505 af
Primary=49.43 cfs 6.505 af

Link AP-2: AP-2 Inflow=3.08 cfs 0.340 af
Primary=3.08 cfs 0.340 af

Link AP-3: AP-3 Inflow=9.21 cfs 0.660 af
Primary=9.21 cfs 0.660 af

Total Runoff Area = 22.726 ac Runoff Volume = 7.572 af Average Runoff Depth = 4.00"
95.72% Pervious = 21.753 ac 4.28% Impervious = 0.973 ac

Summary for Subcatchment SC-1A: SC-1A NORTH

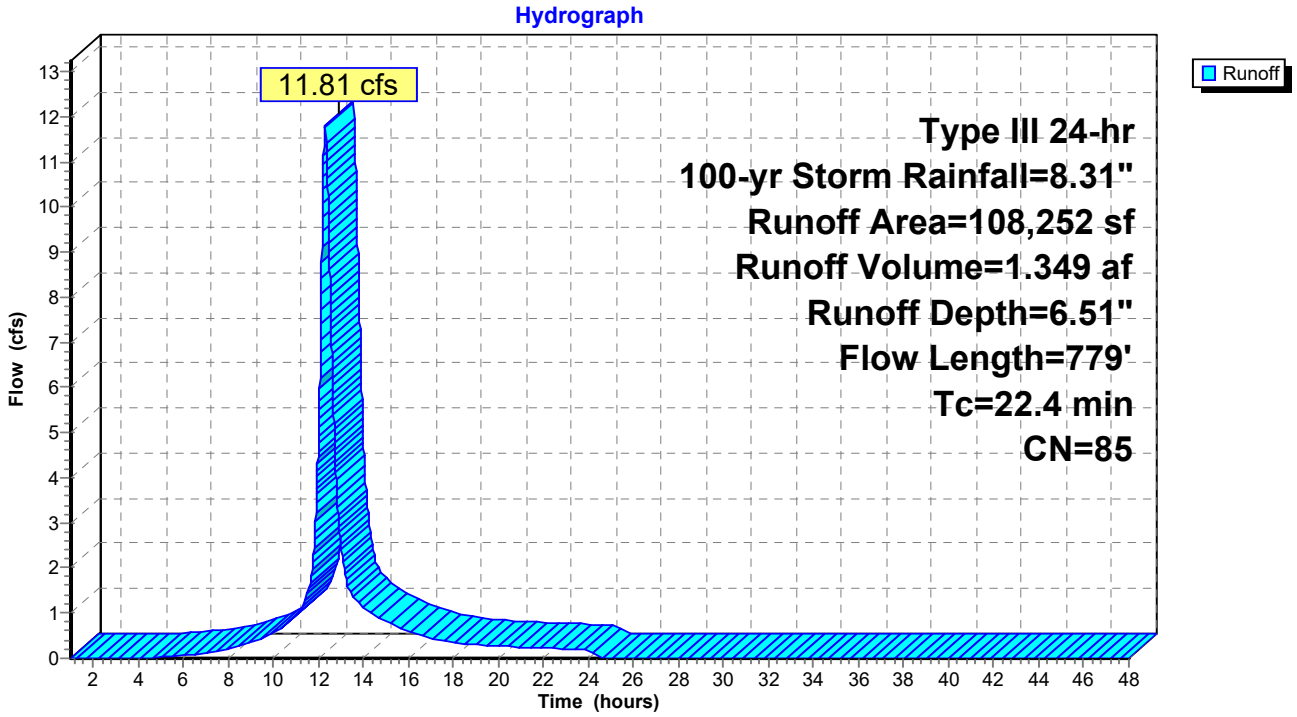
Runoff = 11.81 cfs @ 12.30 hrs, Volume= 1.349 af, Depth= 6.51"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	84,355	96	Gravel
	20,100	39	Pasture/grassland/range, Good, HSG A
	3,797	98	Paved parking, HSG A
	108,252	85	Weighted Average
	104,455		96.49% Pervious Area
	3,797		3.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
3.7	157	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.6	385	0.0120	1.76		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
2.2	137	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
22.4	779	Total			

Subcatchment SC-1A: SC-1A NORTH



Summary for Subcatchment SC-1B: SC-1B SOUTH

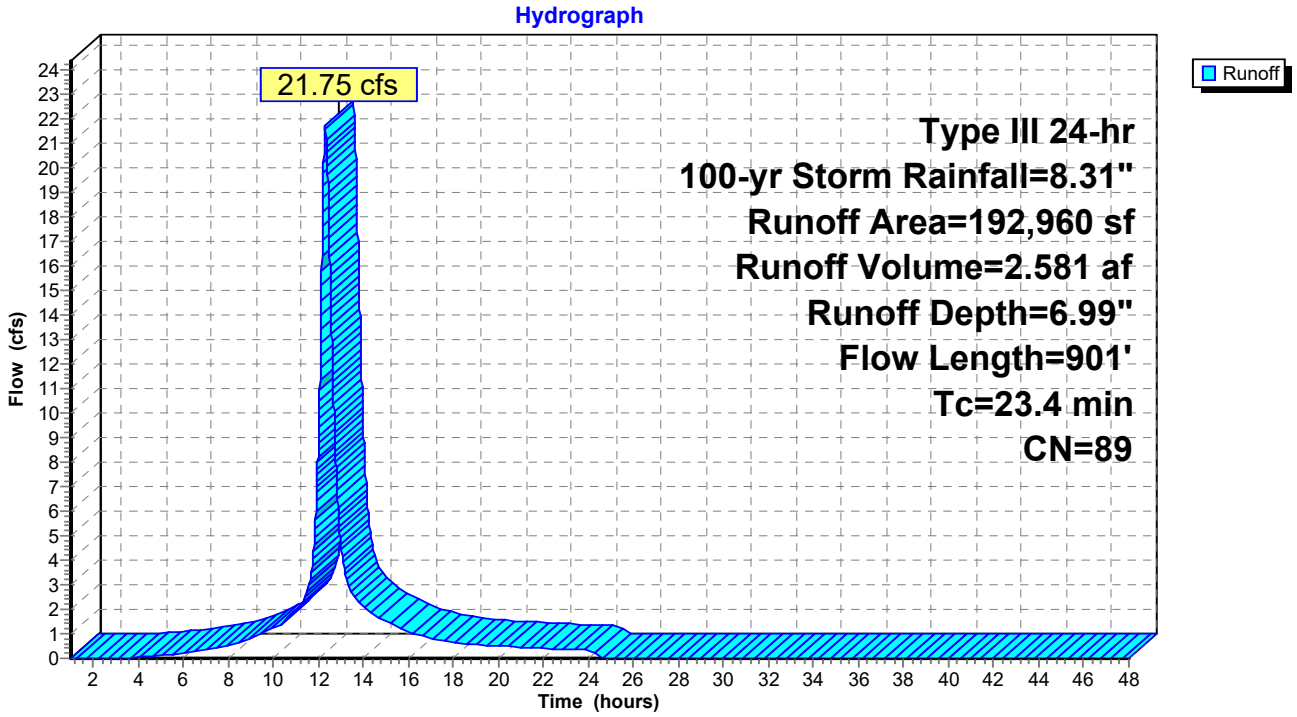
Runoff = 21.75 cfs @ 12.30 hrs, Volume= 2.581 af, Depth= 6.99"
Routed to Pond 1P : POND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	160,517	96	Gravel
	23,663	39	Pasture/grassland/range, Good, HSG A
	8,780	98	Roofs, HSG A
	192,960	89	Weighted Average
	184,180		95.45% Pervious Area
	8,780		4.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
0.8	88	0.0090	1.93		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.3	61	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.4	450	0.0110	1.69		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
4.0	202	0.0148	0.85		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
23.4	901	Total			

Subcatchment SC-1B: SC-1B SOUTH



Summary for Subcatchment SC-1C: SC-1C SWALE

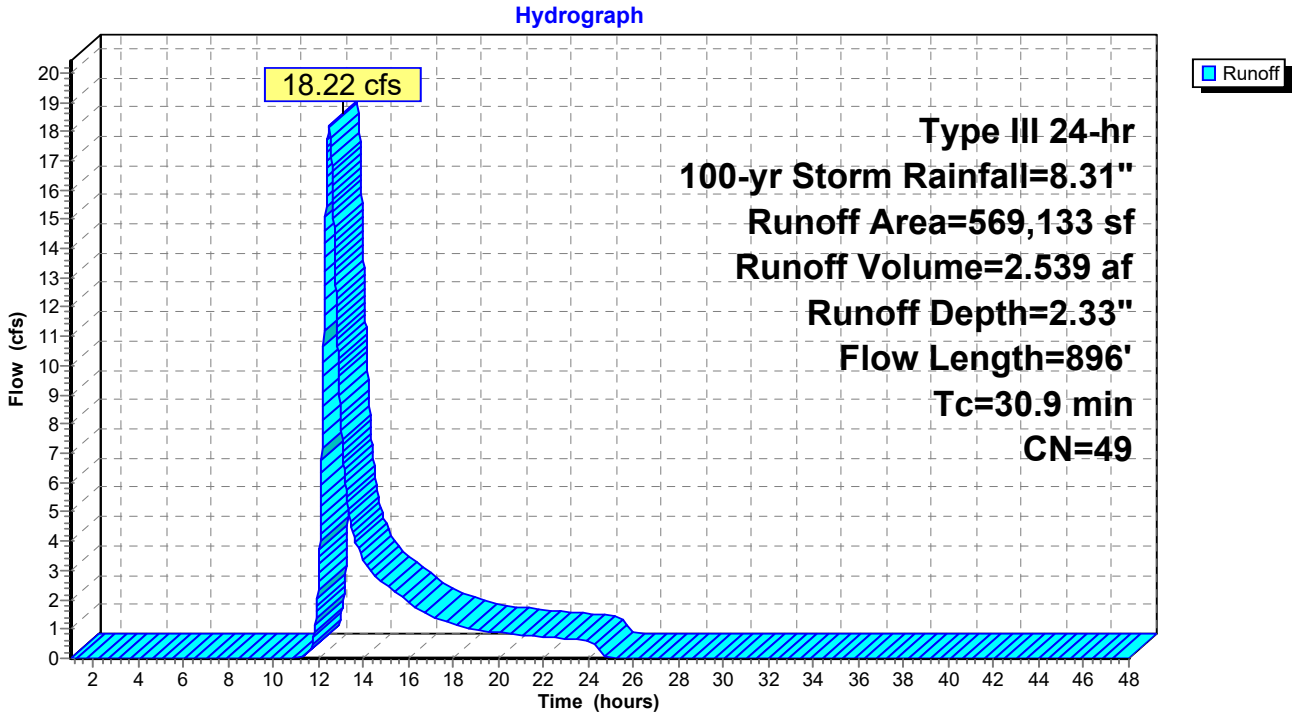
Runoff = 18.22 cfs @ 12.47 hrs, Volume= 2.539 af, Depth= 2.33"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
	237,073	39	Pasture/grassland/range, Good, HSG A
	200,629	30	Woods, Good, HSG A
	2,585	98	Paved parking, HSG A
*	120,760	96	Gravel
	8,086	98	Roofs, HSG A
	569,133	49	Weighted Average
	558,462		98.13% Pervious Area
	10,671		1.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	100	0.0050	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
6.9	474	0.0050	1.14		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
3.2	122	0.0080	0.63		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.8	200	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
30.9	896	Total			

Subcatchment SC-1C: SC-1C SWALE



Summary for Subcatchment SC-1D: SC-1D BERM

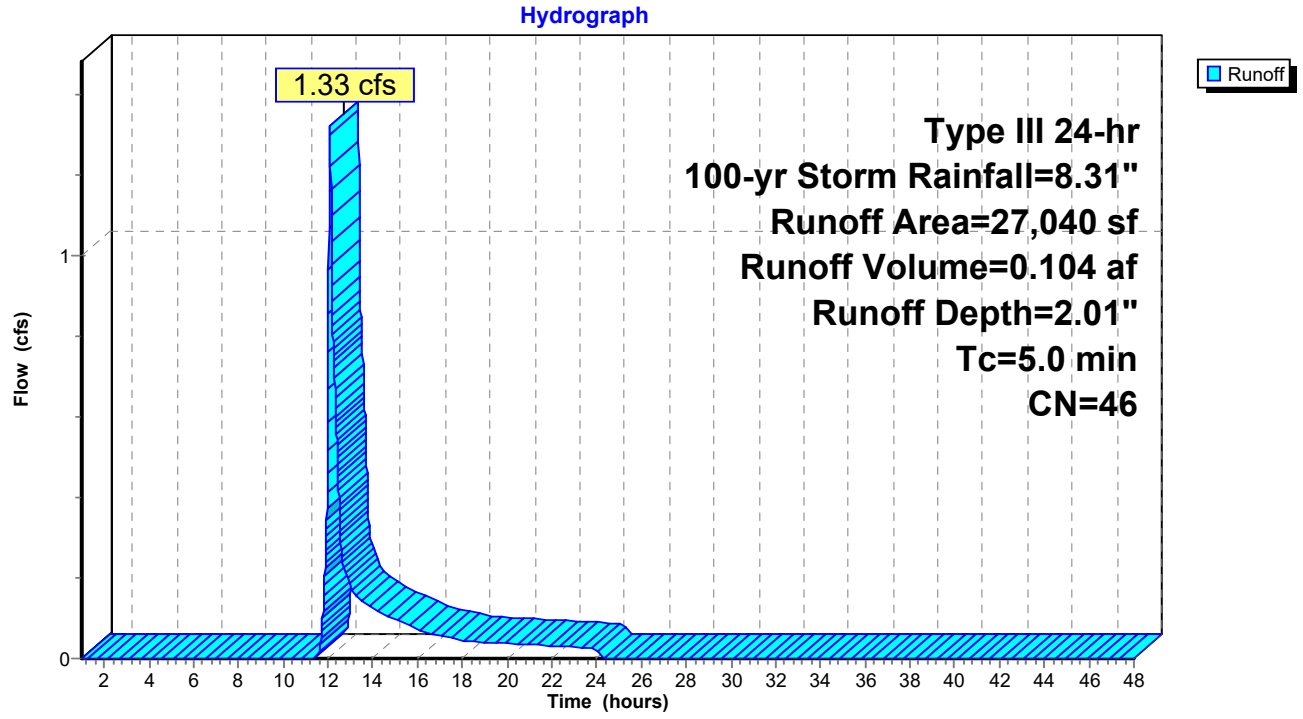
Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.104 af, Depth= 2.01"
Routed to Link AP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	3,240	96	Gravel
	23,800	39	Pasture/grassland/range, Good, HSG A
	27,040	46	Weighted Average
	27,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-1D: SC-1D BERM



Summary for Subcatchment SC-2: Silver Street

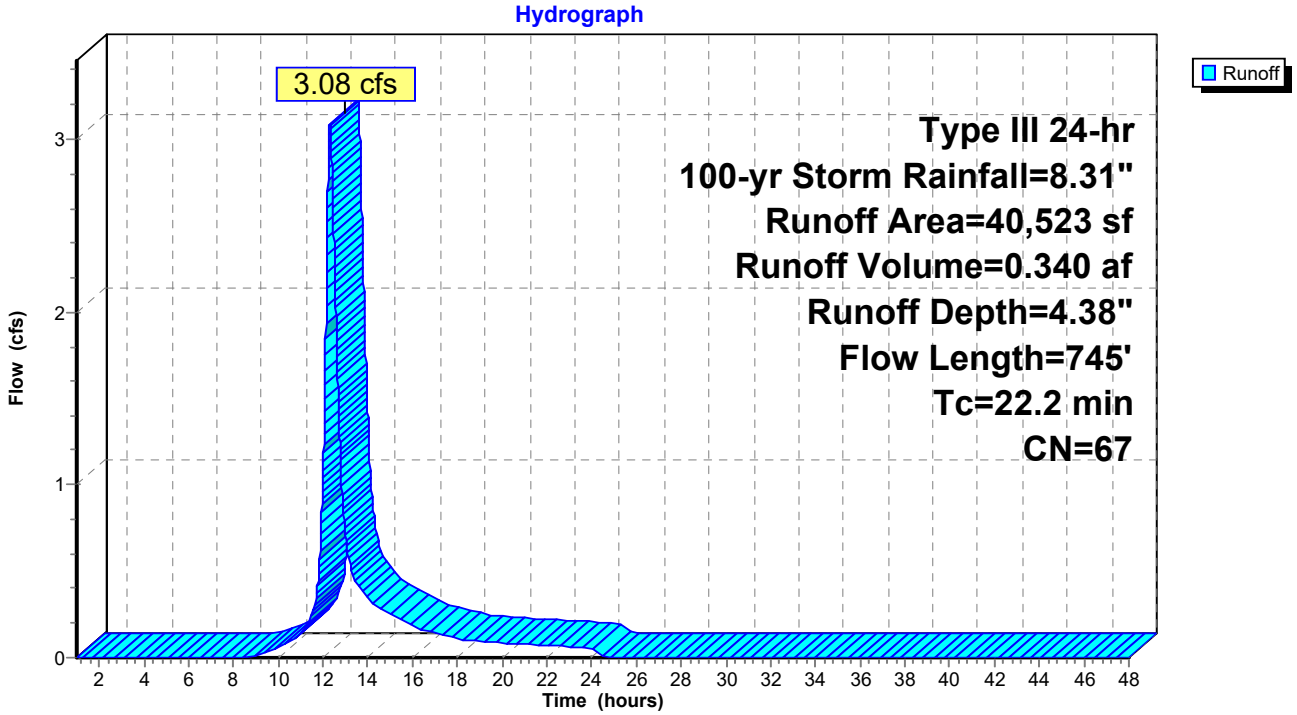
Runoff = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af, Depth= 4.38"
Routed to Link AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

Area (sf)	CN	Description
15,815	98	Paved parking, HSG A
21,395	39	Pasture/grassland/range, Good, HSG A
3,313	98	Roofs, HSG A
40,523	67	Weighted Average
21,395		52.80% Pervious Area
19,128		47.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.22"
12.4	645	0.0029	0.87		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
22.2	745	Total			

Subcatchment SC-2: Silver Street



Summary for Subcatchment SC-3: Southwest

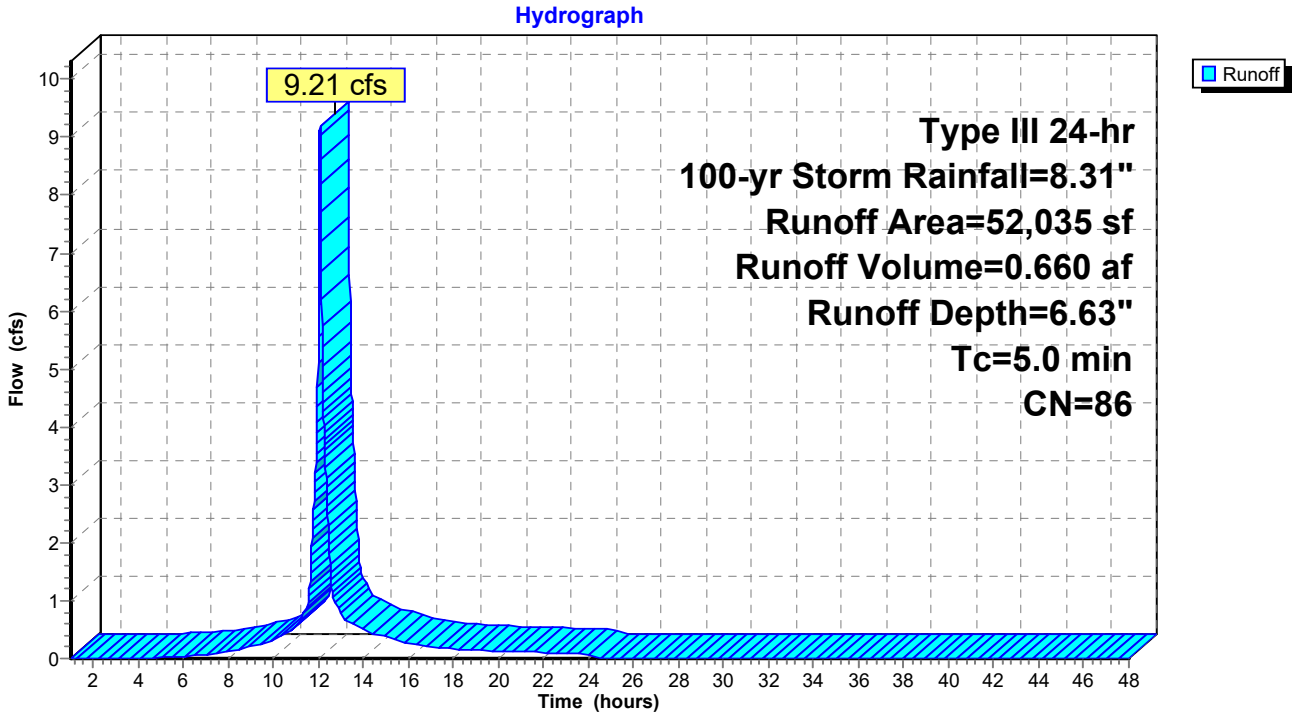
Runoff = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af, Depth= 6.63"
Routed to Link AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Storm Rainfall=8.31"

	Area (sf)	CN	Description
*	42,810	96	Gravel
	9,225	39	Pasture/grassland/range, Good, HSG A
	52,035	86	Weighted Average
	52,035		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment SC-3: Southwest



Summary for Pond 1P: POND

Inflow Area = 6.915 ac, 4.18% Impervious, Inflow Depth = 6.82" for 100-yr Storm event
Inflow = 33.57 cfs @ 12.30 hrs, Volume= 3.929 af
Outflow = 31.46 cfs @ 12.38 hrs, Volume= 3.862 af, Atten= 6%, Lag= 5.0 min
Primary = 31.46 cfs @ 12.38 hrs, Volume= 3.862 af
Routed to Link AP-1 : AP-1

Routing by Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 182.43' @ 12.38 hrs Surf.Area= 7,428 sf Storage= 17,294 cf

Plug-Flow detention time= 34.2 min calculated for 3.861 af (98% of inflow)
Center-of-Mass det. time= 23.6 min (821.3 - 797.6)

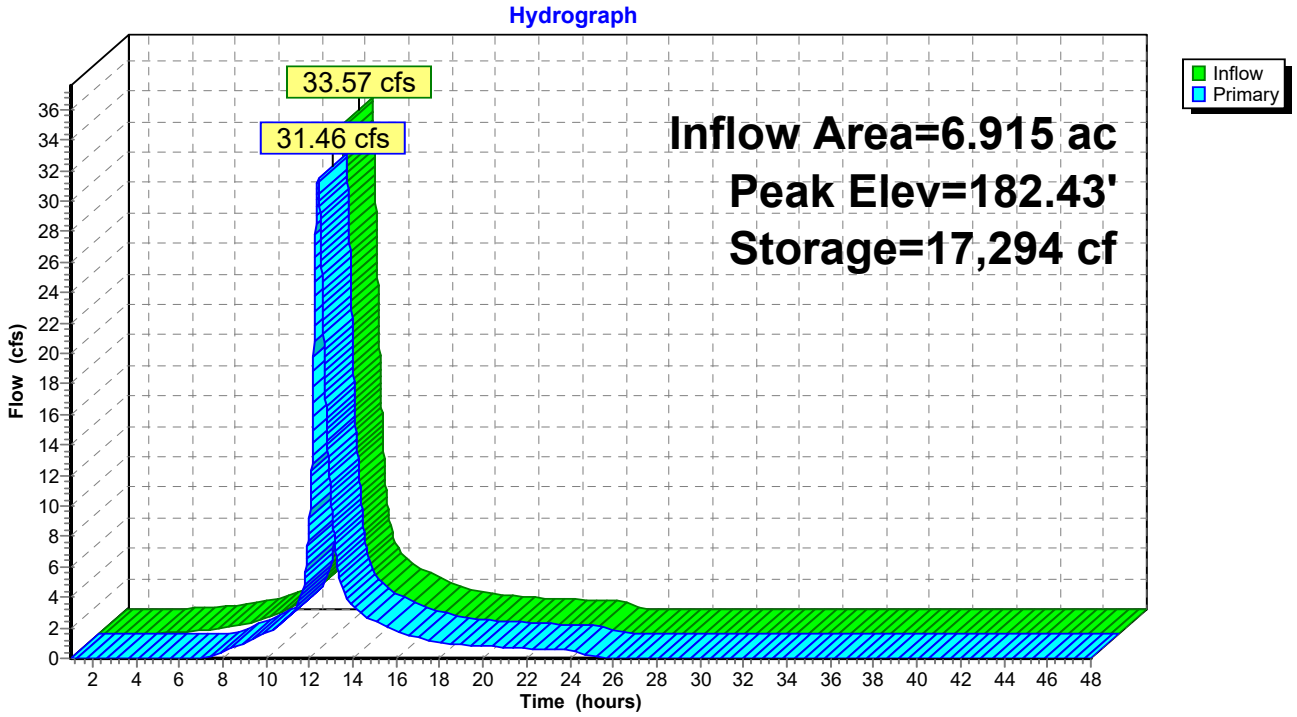
Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	17,805 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
180.00	3,473	2,846	4,509	3,497
181.00	4,769	4,104	8,613	4,812
182.00	6,591	5,655	14,268	6,654
182.50	7,565	3,536	17,805	7,639

Device	Routing	Invert	Outlet Devices
#1	Primary	181.50'	**6.0' long x 80.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	179.50'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.50' / 179.20' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#3	Primary	180.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 179.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Primary	180.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.25' / 180.05' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=31.45 cfs @ 12.38 hrs HW=182.43' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 14.21 cfs @ 2.54 fps)
- **2=Culvert** (Inlet Controls 7.08 cfs @ 5.77 fps)
- **3=Culvert** (Inlet Controls 5.26 cfs @ 6.69 fps)
- **4=Culvert** (Inlet Controls 4.90 cfs @ 6.24 fps)

Pond 1P: POND


Hydrograph
33.57 cfs
31.46 cfs
Inflow Area=6.915 ac
Peak Elev=182.43'
Storage=17,294 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2P: Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

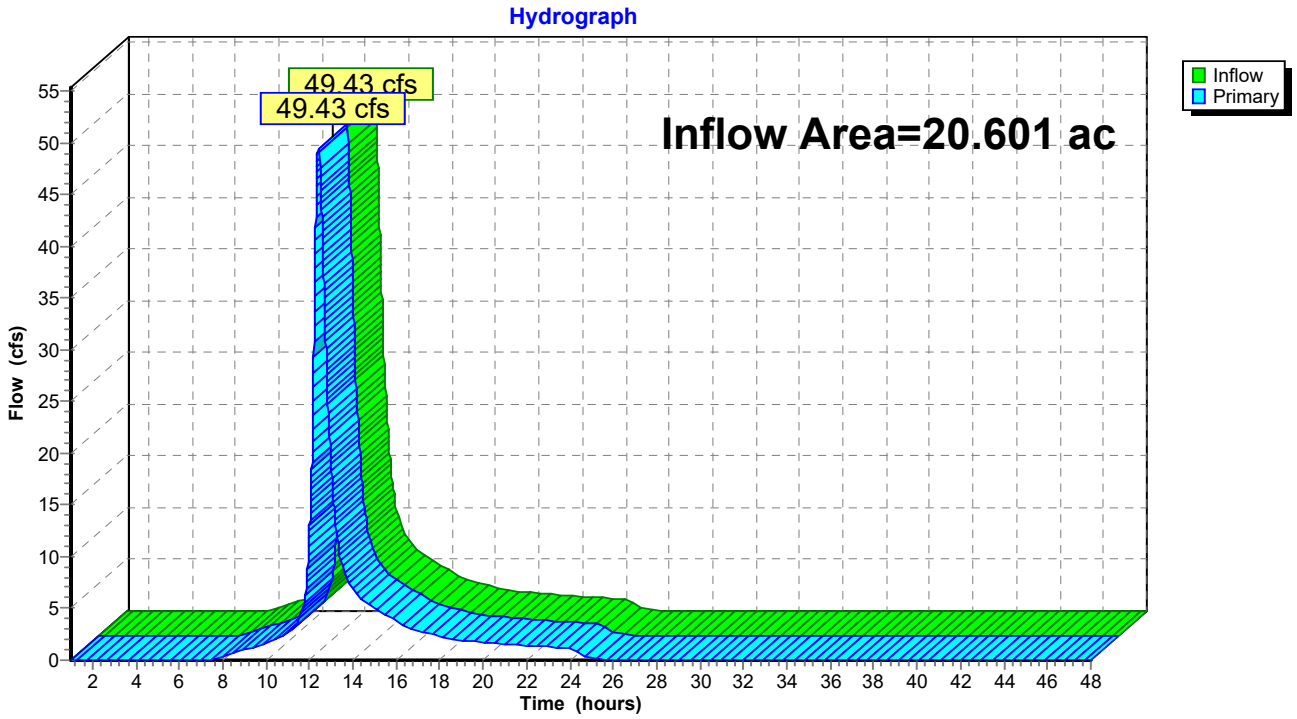
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Summary for Link AP-1: AP-1

Inflow Area = 20.601 ac, 2.59% Impervious, Inflow Depth = 3.79" for 100-yr Storm event
Inflow = 49.43 cfs @ 12.41 hrs, Volume= 6.505 af
Primary = 49.43 cfs @ 12.41 hrs, Volume= 6.505 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-1: AP-1

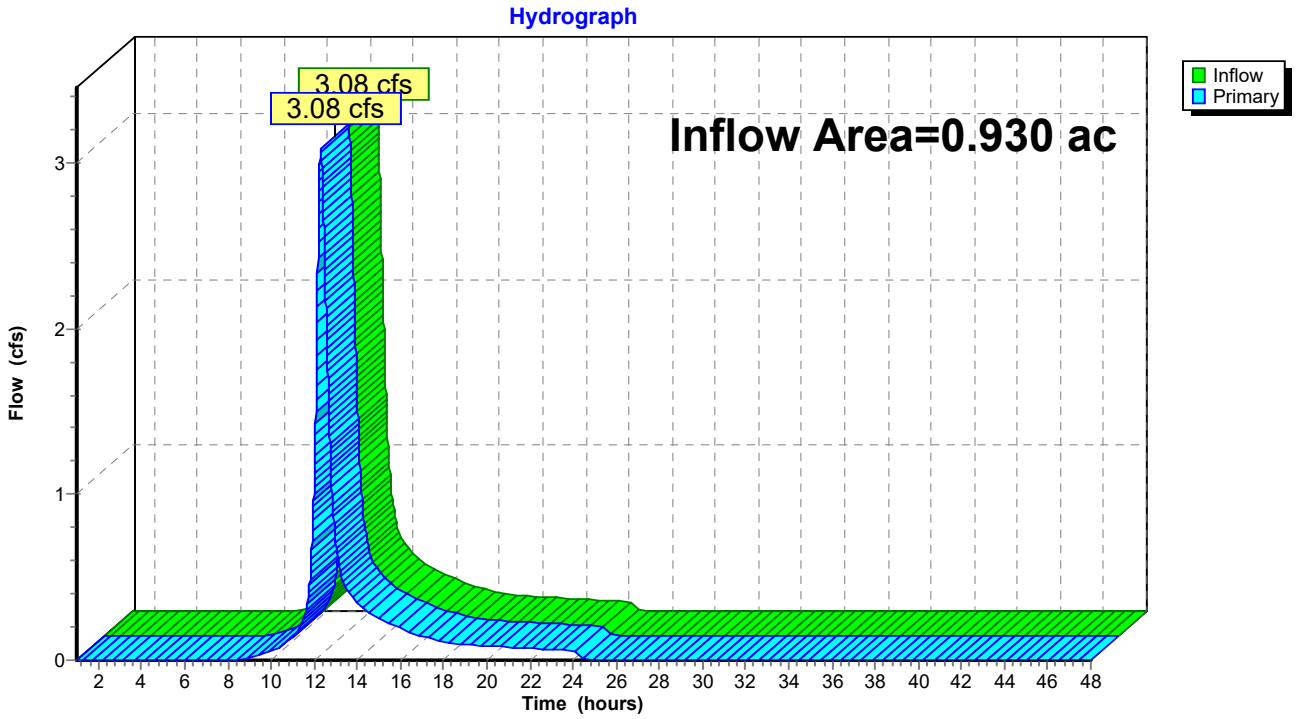


Summary for Link AP-2: AP-2

Inflow Area = 0.930 ac, 47.20% Impervious, Inflow Depth = 4.38" for 100-yr Storm event
Inflow = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af
Primary = 3.08 cfs @ 12.31 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-2: AP-2

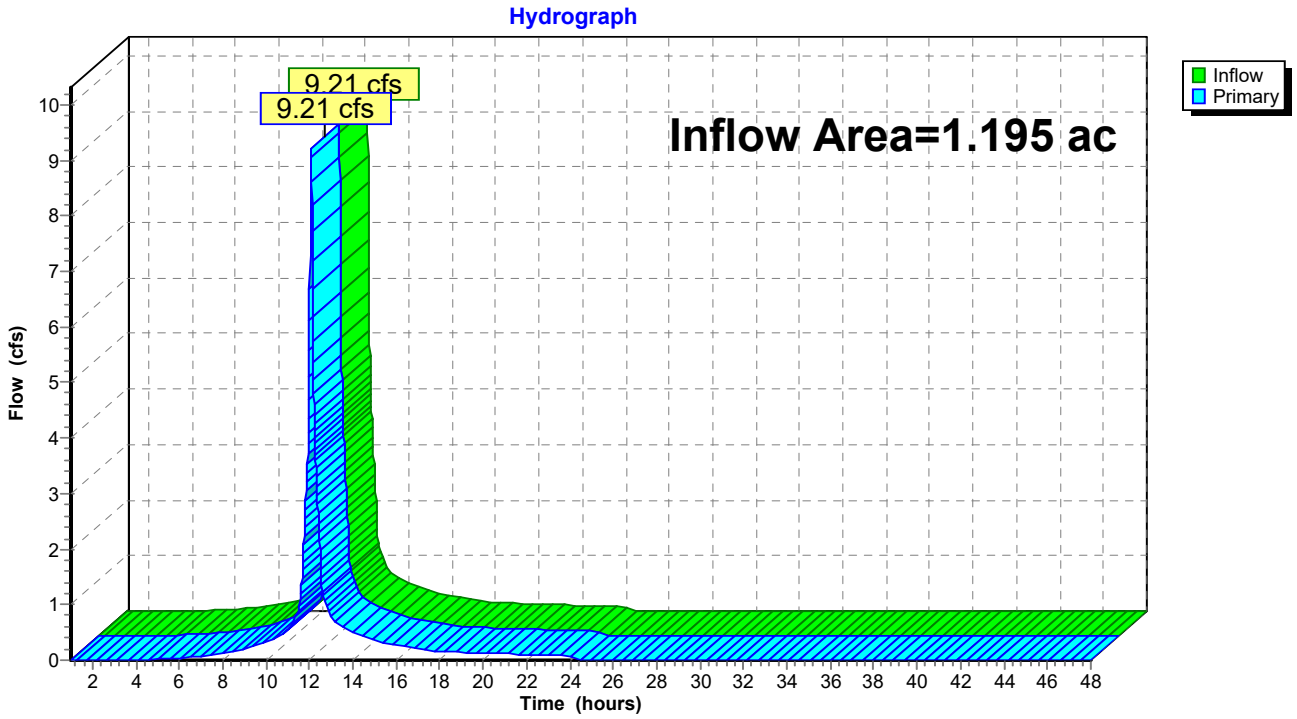


Summary for Link AP-3: AP-3

Inflow Area = 1.195 ac, 0.00% Impervious, Inflow Depth = 6.63" for 100-yr Storm event
Inflow = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af
Primary = 9.21 cfs @ 12.07 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Link AP-3: AP-3



ATTACHMENT E

TREATMENT VOLUME CALCULATIONS

SME
SEVEE & MAHER
ENGINEERS

Agawam Energy Center

SC-1A and SC-1B Treatment Volume Calculation

	Gravel/Pavement Area (SF)	Topping Stone (SF)	Treatment Area (SF)
North Area (SC1A-North)	84,355	75,336	12,816
	3,797		
South Area (SC1A-South)	160,517	108,520	51,997
		Treatment Area (SF)	64,813
		Treatment Volume (CF)	2,701

Treatment Depth	0.5	inches
	0.04	feet

Summary of Treatment Volume

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	2,943 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	1,129	0	0	1,129
179.00	2,262	1,663	1,663	2,271
179.33	2,658	811	2,474	2,671
179.50	2,858	469	2,943	2,874

Required Volume: 2701 CF

Volume Provided: 2934 CF

ATTACHMENT F

LONG TERM POLLUTION PREVENTION PLAN

SME
SEVEE & MAHER
ENGINEERS

Long Term Pollution Prevention Plan

Standard #4 of the MassDEP Stormwater Management Handbook requires that a Long Term Pollution Prevention Plan (LTPPP) be prepared and incorporated into the long term operation and maintenance plan of the projects stormwater management system. The purpose of the LTPPP is to identify potential sources of pollution that may affect the quality of stormwater discharges and to describe suggested practices to reduce pollutants in stormwater discharges.

This document should be used in conjunction with the operation and maintenance plan for the facility.

Good housekeeping practices - The Property Owner is to keep the site in a neat and orderly condition so that pollutants are not conveyed to the storm drainage system and adjacent wetlands. Materials swept, blown or washed into the sites detention pond decreases the system's effectiveness and could eventually be conveyed into the adjacent wetland resource area. Some examples of good housekeeping practices are litter control and protected material storage areas. The Property Owner should assign responsibilities to personnel to keep the site in a neat and orderly condition at regular intervals.

Provisions for storing materials and waste products inside or under cover – A dedicated dumpster area should be provided if and when necessary. The trash and waste program should include regular pickup to avoid an overflowing dumpster condition. The water tight dumpster lid should be maintained closed when not actively loading or unloading. A trash disposal company, hired by the Property Owner(s), is to properly dispose the trash at a state approved disposal facility.

Requirements for routine inspections and maintenance of stormwater BMP's - Consistent with Standard 9 of the Massachusetts Stormwater Management Regulations, an Operation and Maintenance Plan has been prepared. The plan details routine inspection and maintenance along with associated record keeping forms.

Spill prevention and response plans – A spill containment and countermeasure plan (SPPC) will be prepared for the site. Beyond the measures for oil containing equipment, exterior spill hazards are to be minimized. Exterior spill hazards have the potential to enter the stormwater drainage system and are to be addressed as follows:

1) Spill hazards of pesticides, paints, and solvents shall be remediated using the

Manufacturers' recommended spill cleanup protocol

2) Vehicle fluid and fuel spills shall be remediated according to local and state regulations governing fuel spills. Spills are to be immediately cleaned up with absorbent materials and properly disposed.

3) The Property Owners shall have the following equipment and materials on hand to address a spill clean-up: brooms, dust-pans, mops, rags, gloves, trash bags, trash containers, and absorptive materials such as sand, sawdust, or kitty litter.

4) Spills of toxic or hazardous materials shall be reported to the Massachusetts Department of Environmental Protection at 1-888-304-1133.

Provisions for maintenance of lawns, garden, and other landscaped areas - It should be a general goal of the Property Owner to achieve a high quality of well-groomed and stable landscape that evolves throughout the changing seasons and overall condition of the property. All landscaped areas are to be maintained with dense vegetative growth or a layer of mulch so as to minimize sediment transport associated with erosion. Litter and waste are to be removed weekly from the landscaped areas and adjoining parking lots and disposed of in an appropriate receptacle.

Requirements for storage and use of fertilizer, herbicides, and pesticides - Fertilizers, herbicides, and pesticides will not to be stored on site. Chemical controls should be used as a last resort to organic and biological control methods.

Snow disposal and deicing chemicals – The parking lot and access road is designed to provide ample snow storage along the perimeter. If necessary, snow removal to an offsite location will occur to remain reasonable access and parking. No snow is to be moved to within 100 feet of a wetland resource area.

The use of de-icing agent such as salt or potassium chloride may be required to maintain a safe driving and walking surface. The de-icing agent for the walkways and building entrances may be kept on site within the building. De-icing agents are not to be stored outside.

ATTACHMENT G

ILLICIT DISCHARGE STATEMENT

SME
SEVEE & MAHER
ENGINEERS

ILLICIT DISCHARGE COMPLIANCE STATEMENT

I verify that no illicit discharges exist from the Agawam Energy Center. Through the implementation of a Long Term Pollution Prevention Plan and Operation and Maintenance Plan, measures are set forth to prevent illicit discharges from entering the stormwater management drainage system.

Signature	**Print Name**	**Date**
Title	**Company**	
Signature	**Print Name**	**Date**
Title	**Company**	

Note: This certification must be signed before stormwater is conveyed to the proposed stormwater drainage system in accordance with Standard 10 of the Massachusetts Stormwater Management Standards.

ATTACHMENT M – STORMWATER PERMIT APPLICATION

Application Date: _____
Application Fee Paid: _____
Date Paid: _____
Inspection Fee Paid: _____
Date Paid: _____

Town of Agawam Department of Public Works
Stormwater Permit Application

Rev. November 2006

Return this application to:
Town of Agawam Department of Public Works
1000 Suffield Street
Agawam, MA 01001

Storm Drain Permit Application / Inspection Fees		
Area of Disturbance*	**Application Fees**	**Inspection Fees**
1 to 5 Acres	$200	$100
Over 5 Acres to 20 Acres	$700	$350
Over 20 Acres to 50 Acres	$1,500	$750
Over 50 Acres	$1,500 plus $25 per Acre over 50	$750 plus $10 per Acre over 50

*If the area of the parcel(s) and area of project disturbance differ such that the area of disturbance will be in a lower fee category, the applicant may submit a certified statement by the project designer, a P.E., of the project's area of disturbance.

1. Project / Site Information

769 Silver Street
Site Address

Agawam	Massachusetts	01001
City	State	Zip Code
G6 2 6	17.2 acres	~10.5 acres
Parcel ID	Parcel Size	Number of Acres to be Disturbed

Is there an existing larger project this site is now a part of? ☒No ☐Yes

If **yes**, name of larger project: _____

EXISTING SITE DESCRIPTION: (Example: 5 Acres of forest land, 2 Acre single family residence, 50 Acre Farm Land or Attach Project Narrative.)

The existing site consists of approximately 1.2 acres of commercial buildings,1 acre of pavement, 8 acres of gravel, 5 acres of grassed land, and 2 acres of forested land. The site is previously developed and has been in use as a lumber yard as well as material and equipment storage.

Storm Drain Permit #: SD_____

2. Builder / Contractor Information

Builder / Contractor Name		
TBD		
Address		
City	State	Zip Code
Contact / Last Name	First Name	Telephone (including area code)

3. Owner Information

Property Owner Name		
Agawam Energy Center, LLC c/o Longroad Development Company, LLC		
Address		
125 High Street, Suite 1705		
City	State	Zip Code
Boston	Massachusetts	02110
Contact / Last Name	First Name	Telephone (including area code)
Allen	Chad	

4. Project Description / Features

- ☐ Single Family/Multi Family Home
- ☐ Sub-division # of Lots: _____
- ☒ New Commercial / Industrial Site Plan
- ☒ Redevelopment Site Plan
- ☒ Re-grading or Land Disturbance
- ☐ Other _____

Proposed Project Site includes the following features:

- ☒ Proposed Impervious Area — Existing (ft^2) ~335,000 — Proposed (ft^2) ~373,000 ~140,000 (without topping stone)
- ☒ Detention Pond
- ☐ Sub-surface Detention / Infiltration
- ☐ Wetland Protection Act / Conservation Commission Jurisdiction
- ☐ River Act / Conservation Commission Jurisdiction

FINAL APPROVED PLAN / CONDITIONS OF PERMIT:

Storm Drain Permit #: SD_____

5. Stormwater Management Plan

The Stormwater Permit Application must include submission of a ***Stormwater Management Plan***. The purpose of the Stormwater Management Plan is to ensure that the runoff from a site has been treated for water quality and quantity impacts during the construction of the project and during the long term. This treatment includes, but is not limited to, erosion and sediment control to the extent practicable via structural and non-structural BMPs during construction and the establishment of structural BMPs for the long term controls.

See Agawam Stormwater Management Ordinance (Ch. 175-35) and the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas prepared by the Massachusetts DEP http://www.mass.gov/dep/water/esfull.pdf for additional information and guidance.

The following minimum information must be included within the Stormwater Management Plan.

Project Plan
- A plan identifying the project site area
- Plan must highlight the portion of the area to be disturbed

Short Term – Erosion and Sediment Control Measures
- Written description of proposed temporary BMPs
- A plan at an appropriate scale of those BMPs
- A description and schedule of maintenance of proposed BMPs
- Construction details
- Reporting requirements of erosion and sediment controls
- On-site hazardous materials handling and storage
- Dust control BMPs
- Off-site sedimentation measures
- Plan and procedures

Long Term - Stormwater Quality and Quantity Controls
- Written description of proposed permanent BMP's
- A plan at a scale of not less than 1"= 40' of those BMPs
- Construction details
- Computations in an acceptable format
- A description and schedule of long term maintenance of proposed BMPs
- Reporting requirements for maintenance and inspections as specified by the DPW

- A description of long term maintenance and inspection schedules shall be submitted for site development projects.

- Construction Certification Statement – A statement to be signed by the contractor and all relevant subcontractors shall be included, certifying that they have read and understand the construction phase requirements and agree to comply.

All components of the Stormwater Management Plan shall be prepared and stamped by a licensed Professional Engineer for all site plans, subdivisions and residential projects greater than 2 building lots.

6. Certification Statement

The owner or authorized representative and all contractors and subcontractors shall sign certification statements as part of the permit application and Stormwater Management Plan. In signing the plan, the authorized representative certifies that the information is true and assumes liability for the plan. In addition, the undersigned agrees:

1. To furnish any additional information relating to the installation of use of the storm drain for which this permit is sought as may be requested by the Superintendent.
2. To accept and abide by all the provisions of Section 175 inclusive of the Ordinances of the Town of Agawam and of all other pertinent ordinance or regulations that may be adopted in the future.
3. To operate and maintain any storm drain and detention facilities, as may be required as a condition of the storm drainage permit in efficient manner at all items, and at no expense to the Town.
4. To cooperate at all items with the Superintendent of Public Works and his representatives in their inspection of storm drains, and any maintenance thereof.
5. To notify the Superintendent of Public Works immediately in the event of any accident, negligence, or other occurrence that occasions discharge to the storm drain of any wastes or process waters not covered by this permit or allowed by Section 175 the Ordinance of the Town of Agawam.
6. To indemnify the Town from loss or damage that may directly or indirectly be occasioned by the installation of the storm drain and related facility or connection.

Owner Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

X	
Applicant's Signature	**Date**
X	
Owner's Signature	Date

Contractors and Subcontractors Certification:

I certify under penalty of law that I understand the terms and conditions of the Storm Drain Permit that authorizes storm water discharges associated with industrial activity from the construction site identified as part of this certification.

X	
Contractor's Signature	**Date**
X	
Subcontractor's Signature	Date

APPLICATION APPROVED AND PERMIT GRANTED	**PERMIT #: SD_____**
Signed	
Superintendent	**Date**

ATTACHMENT N – EVERSOURCE NOTIFICATION

Agawam Energy Center, LLC (QP1365) entered the ISO-NE Transitional Cluster Study on October 2, 2025. Below is a screenshot of the project in the public ISO-NE interconnection queue. A link to this queue is provided here.

ISO New England Study Request Database - Public

Active Projects as of 1/20/2026

FERC Jurisdictional Administered Transmission System

Cluster	QP	Updated	Type	Requested	Alternative Name	Unit	Fuel Type	Net MW	SumMW	WinMW	County	ST	OpDate	SyncDate	Interconnection Point	Serv	SIS	I39	TO Report	Dev	Zone
TCS	1090	10/17/2025	G	1/13/2021	Park City Offshore Wind CNR	WT	WND	0	838.2	838.2	NA	MA	12/31/2029	5/1/2029	Eversource (NSTAR) 345kV West Barnstable	CNR	No	No			SEMA
TCS	1116	10/17/2025	G	4/13/2021	SouthCoast Wind 1	WT	WND	1,200	1,200	1,200	NA	MA	12/31/2031	5/1/2030	Brayton Point making use of QP 837 to connect	CNR	Yes	Yes	ISO-NE	PD	RI
TCS	1123	10/17/2025	G	4/21/2021	Naugatuck Avenue Battery Storage CNR Only (see QP1089)	OT	BAT	0	205.32	205.32	New Haven	CT	5/31/2027	4/15/2027	devon 115kV substation	CNR	No	No		PD	SWCT
TCS	1148	10/17/2025	G	7/13/2021	Lite Brite Battery Storage	OT	BAT	305.62	305.62	305.62	Suffolk	MA	5/26/2028	4/30/2028	Electric Avenue 115 kV substation (bus number 110926), Zone MA_NST	CNR	Yes	Yes	ISO-NE		BOST
TCS	1171	10/17/2025	G	10/25/2021	Twin Energy Wind	WT	WND	18.3	20	20	Oxford	ME	9/21/2026	8/21/2026	Roxbury Substation	CNR	Yes	Yes	ISO-NE	PD	ME
TCS	1238	11/12/2025	G	3/22/2022	Battery Storage	OT	BAT	300	301.26	301.26	Norfolk	MA	4/28/2028	11/30/2027	West Medway 345kV station	CNR	No	No		PD	SEMA
TCS	1365	11/12/2025	G	3/9/2023	Battery Storage	OT	BAT	250	254.2	254.2	Hampden	MA	6/30/2029	1/29/2029	Connect to South Agawam 115 kV switchyard	CNR	No	No		PD	WMA
TCS	1412	11/12/2025	G	6/20/2023	Battery Storage	OT	BAT	168	169.84	169.84	Bristol	MA	9/30/2027	9/15/2027	Direct tap into the Pottersville Substation in Somerset, MA	CNR	No	No		PD	SEMA
TCS	1427	11/12/2025	G	7/21/2023	Solar	PV	SUN	180	183.32	183.32	York	ME	12/30/2029	12/1/2029	Lebanon, Maine Line 391 Buxton Sub (CMP) to Scobie Pond (Eversource). GPS coordinates of the POI: 43°22'51.59"N, 70°55'57.74"W. ** This new tap is located approximately 27.8 miles southwest of Buxton substation and approx. 39.9 miles northeast of the Scobie Pond substation.	CNR	No	No		PD	ME

Town of Agawam

Building Department

1000 Suffield Street, Agawam, Massachusetts 01001
Telephone - (413) 821-0632

February 4, 2026

To: Office of Planning and Community Development:

Re: Site Plan Review Comments for 769 Silver Street Agawam, MA 01001- BESS Project;

The Building Department has no zoning issues or concerns at this time for the proposed Site plan with the last revision date of January 19, 2026 for the above referenced address.

Respectfully,

Kevin Duquette

Kevin Duquette
Inspector of Buildings
Town of Agawam

AGAWAM POLICE DEPARTMENT

681 Springfield Street, Feeding Hills, MA 01030
Telephone (413)786-4767 | FAX (413)786-4821
Eric P. Gillis
Chief of Police

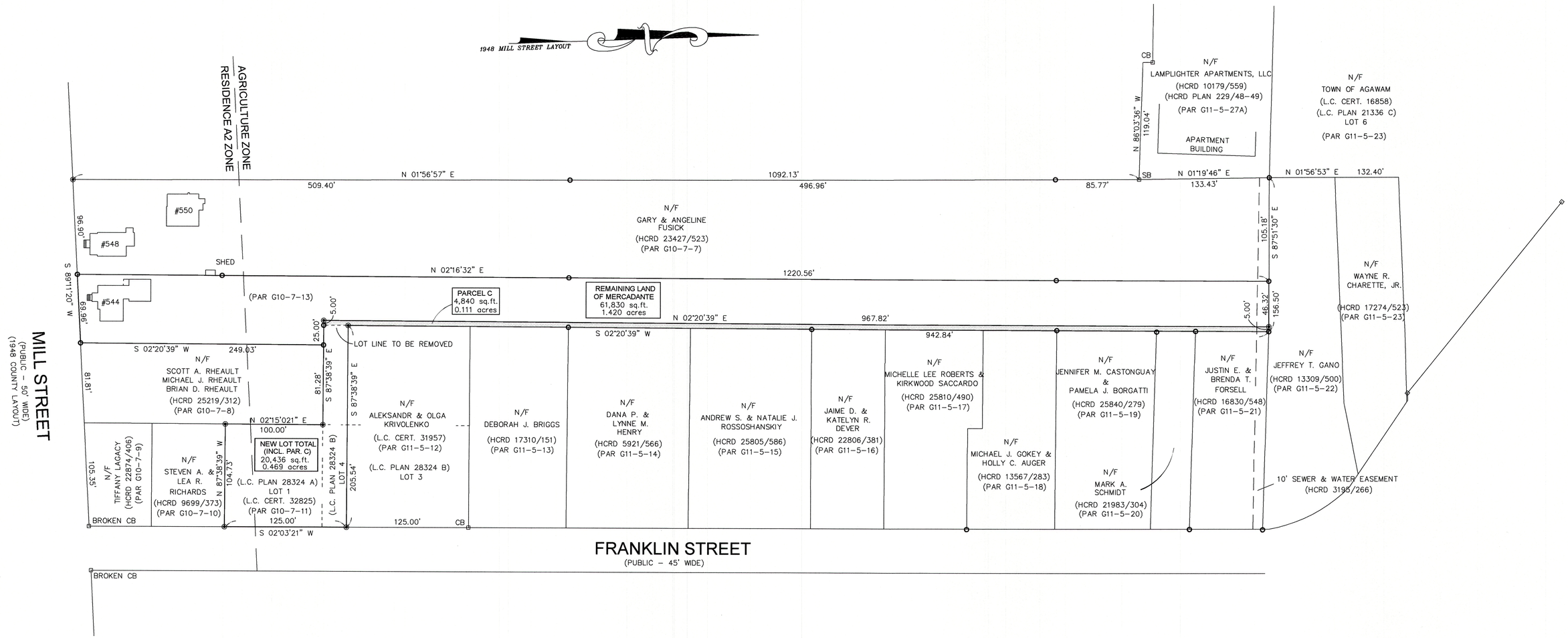
To: Planning Board

From: Sergeant Brian Machos- Safety Officer

Date: February 5, 2026

Re: 769 Silver Street

I have reviewed the previous site plans regarding this project, as well as attended the presentation before the planning board committee late last year. At this time, I do not have any public safety concerns related to the implementation of this project.



NOTES

1. FOR TITLE TO THE PREMISES SURVEYED AND DEPICTED HEREON, OWNED BY RLS REAL ESTATE HOLDINGS LLC, SEE DEED RECORDED IN HCRD BOOK 15971, PAGE 10. PARCELS 4–6 IN SAID DEED ARE CONTIGUOUS AND FRONT ON FRANKLIN STREET. SAID DEED IS ALSO KNOWN AS LAND COURT CERT. OF TITLE #32825. PARCELS 4 & 5 ARE REGISTERED LAND.
2. FOR TITLE TO THE PREMISES SHOWN HEREON OWNED BY DONNA JEAN MERCADANTE, SEE DEEDS RECORDED IN HCRD BOOK 6002, PAGE 539 AND BOOK 23337, PAGE 350. SAID PREMISES ARE ADDRESSED AT #544 MILL ST.
3. SEE PLANS RECORDED IN HCRD PLAN BOOK 196, PAGES 6 – 7 & PLAN BOOK 389, PAGE 25. SEE ALSO LAND COURT PLANS 28324 A & 28324 B.
4. THE PURPOSE OF THIS PLAN IS TO DIVIDE OFF A 5' WIDE STRIP OF LAND FROM THE *LAND OF* DONA JEAN MERCADANTE DENOTED HEREON AS PARCEL C. PARCEL C IS TO BE CONVEYED TO AND MADE AN INTEGRAL PART OF ADJOINING LAND OF RLS REALTY HOLDINGS LLC.
5. THE LOCUS PREMISES LIE IN THE AGRICULTURE ZONE.

LEGEND

o	IRON PIN OR PIPE FOUND
◉	REBAR IRON PIN TO BE SET
CB ⊡	CONCRETE BOUND FOUND
SB ⊡	NATIVE STONE BOUND FOUND
HCRD	HAMPDEN COUNTY REGISTRY OF DEEDS
G10–7–11	ASSESSOR'S PARCEL NUMBER (TYP)
- - - - - - - -	LOCUS PARCEL LINES TO BE REMOVED

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

DANIEL W. O'BRIEN P.L.S. #36388 — 2-10-2026 DATE

COMMONWEALTH OF MASSACHUSETTS
DANIEL W. O'BRIEN
No. 36388
REGISTERED
LAND SURVEYOR

PLANNING BOARD
AGAWAM, MASSACHUSETTS

APPROVAL UNDER THE SUBDIVISION CONTROL LAW NOT REQUIRED

DATE: _____

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PLAN OF LAND
FRANKLIN STREET
MILL STREET
AGAWAM, MASS.

OWNED BY

RLS REALTY HOLDINGS LLC &
161 CONCORD ROAD LONGMEADOW, MA 01106

DONA JEAN MERCADANTE
544 MILL STREET AGAWAM, MA 01030

SCALE: 1" = 50' DATE: FEBRUARY 10, 2026

SMITH ASSOCIATES
SURVEYORS, INC.
46B BALDWIN STREET EAST LONGMEADOW, MA 01028

TOWN OF AGAWAM, MASSACHUSETTS

FORM A

Application for Endorsement of Plan Not Believed to Require Approval

FILE ONE COMPLETED FORM WITH THE PLANNING BOARD AND ONE COPY WITH THE TOWN CLERK IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 11-B

2/6 2026

TO THE PLANNING BOARD:

The undersigned, believing that the accompanying plan of his property in the Town of Agawam does not constitute a subdivision within the meaning of the Subdivision Control Law, herewith submits said plan for a determination and endorsement that Planning Board approval under the Subdivision Control Law is not required.

1. Name of Applicant BEET COUGHLIN RLS Realty Holdings Antonette Coughlin
   Address 161 CONCORD ROAD, LONGMEADOW, MA
   Phone # 575-4934 Fax # _____ email BRETCOUGHC COMCAST.NET
2. Name of Surveyor DANIEL W. OBRIEN - SMITH ASSOC. SURVEYORS
   Address 46 B BALDWIN ST EAST LONGMEADOW, MA
   Phone # 413-525-8801 Fax # _____ email DANNOPLS@YAHOO.COM
3. Deed of Property Recorded in HAMPDEN COUNTY REGISTRY
   Book 23337 CERT NO. Page 350 MERCADANTE 32825 COUGHLIN
4. Location of Property 544 MILL ST + PARCEL ON FRANKLIN ST.
   G10-07-0011
5. Describe the proposal in this submission:
   DIVIDE A SMALL STRIP OF LAND FROM 544 MILL ST AND ADD TO THE FRANKLIN ST PROP TO BRING THE FRANKLIN ST. PROP INTO LOT SIZE CONFORMITY.

ATTACHMENTS - Two originals and three copies of plan by certified land surveyor. Filing Fee - $50.00 plus $20.00 per lot.

Signature of Owner Dona Mercadante Address 544 MILL ST
DONA MERCADANTE AGAWAM
Bret J. C.
BRET COUGHLIN 161 CONCORD RD
Antonette Coughlin LONGMEADOW
Antonette Coughlin
RLS Realty Holdings LLC

Town of Agawam

Building Department

1000 Suffield Street, Agawam, Massachusetts 01001
Telephone - (413) 821-0632

February 19, 2026

To: Office of Planning and Community Development:

Re: Form-A Review Comments for Franklin Street (G10-7-11) & 544 Mill Street Agawam, MA 01001;

The Building Department has no specific zoning issues or concerns at this time for the proposed Form A- ANR plan dated 2/10/2026 for the above referenced addresses.

Respectfully,

Kevin Duquette
Kevin Duquette
Inspector of Buildings
Town of Agawam

MEMBERS PRESENT:
Vi Baldwin-Chair
Frank DeStefano
Charles Elfman
Michael Cleavall

MEMBERS ABSENT:
Michael DiLullo

ALSO PRESENT:
Taryn Egerton
Stefanie Kesecker

Ms. Baldwin called the meeting to order at 6:00pm.

1. SITE PLAN-769 Silver Street-Agawam Energy Center, LLC

Chad Allen, Kevin Hutchinson, and Don Wardell with Longroad Energy, Adam Duchesneau and Melissa Kaplan with BSC Group, Tom Henaghen, with Sevee & Maher Engineers (SME), Ken Scanlon, with Fire & Risk Alliance, and Marc Wallace with Tech Environmental were present for this agenda item.
Mr. Duchesneau, BSC Group, stated the proposed Site Plan is for 769 Silver Street, which is a 17.2 acre parcel located in the Industrial B zoning district. The plan is for a Battery Energy Storage System (BESS), 250 megawatt, 4 megawatt hour facility, and permitting is required for a Tier 2 and Tier 3 BESS in the Town's zoning ordinance. He stated to date they have successfully developed 1,000 MW of storage projects, with an additional 10,000 MW of future projects in development.
Mr. Allen, Longroad Energy, stated they are a Boston based company that develops, owns, and operates renewal energy projects across the country. These projects include wind, solar, and battery energy storage systems. He stated they are heavily focused in the southwest, but also have a presence in the north east. He went on to say they have a number of projects equal and larger in size than this proposed BESS, which they have developed, managed, and operated.
Mr. Henaghen, Sevee & Maher Engineers, presented the site design. He stated the proposed project will be constructed in the area on the parcel that is already developed. The areas that are not used by the BESS we will revegetated and landscaped. The bottom portion of the property will be a substation that converts the energy and then connects to the adjacent Eversource substation. Mr. Elfman asked if the substation already exists, or if Eversource was building it. Mr. Henaghen stated it is an existing substation. He stated there are two driveways off Silver Street, one exists currently and one is proposed, and parking will be formalized for the operations building which will be located at the front of the site. He stated there are a number of buildings onsite, but 3 buildings will remain and the rest razed. There will be an emergency services area. There will be 4 entrance points with secure roller gates to access the site. At each gate there will signage with 911 information, which will list the site address on all the gates as well as the fencing to delineate high voltage area. All the access roads have been designed for maintenance and emergency services. A swept vehicle analysis was performed to ensure the largest Fire Department truck can access and move throughout the site. The Fire Department has

confirmed the design meets the swept path specifications. He went on to say all the BESS infrastructure will be connected through underground cables. The driveway and parking up front will be paved, once inside the site the access roads will be compacted gravel. There is also topping stone inside and its primary purpose is for an electrical grounding system, but also aids with stormwater management. There is an access road to the substation and a secondary emergency entrance near Moylan Lane. He stated there will be no work performed in the power easement or to the south. There will not be a lot of ground work and the current drainage patterns will be maintained. Current areas where vegetation has been disturbed will be restored. There will also be a landscaped mound near the entrance and visual noise screening with an 18ft. sound wall at the front of the site.

Mr. Henaghen stated they have received Engineering comments and are working to submit a formal written response, but most of the comments are related to pavement and stormwater. He stated this project will have less impervious area and less pollution than what exists today.

Ms. Baldwin asked if there would be a dumpster onsite. Mr. Henaghen stated yes there will be one adjacent to the operations buildings.

Mr. Elfman asked if the three buildings would remain as shown on the plan. Mr. Henaghen stated there are more than 3 buildings at present, but the 3 shown on the plan will remain, one for operations and maintenance and the other two buildings would exist for storage. Mr. Elfman asked about the stones on property versus grass. Mr. Henaghen stated any of the stone areas act to protect workers as a grounding item and a protective measure.

Mr. DeStefano asked if any poles were going to be installed. Mr. Henaghen stated everything will be underground down to the substation and the only pole would be placed for interconnection from the proposed substation to the Eversource substation. Mr. DeStefano asked how far the BESS would be from Silver Street. Mr. Henaghen stated well over 100 ft., which is the legal requirement. He went on to say there will be an 8ft chain link fence and an 18ft. sound wall.

Mr. Hutchinson, Longroad Energy stated the technology used to create the BESS is the same technology that creates electric vehicles. The cells are assembled in packs similar to the way batteries are stored in a remote. The BESS consists of battery cells and they are assembled into a module/pack, the battery container/chassis, which are outdoor/environmentally rated and house the batteries which are heated/cooled. They operate on direct current and are converted and connected to the grid so the energy can be used. On top of that there is a control system that monitors temperature, voltage current, and proper operation. If anything is operating out of the range they will automatically shut down and the BESS will also be monitored in a 24/7 operations center. Mr. Elfman asked if there were onsite controls. Mr. Hutchinson yes and also over the internet.

Mr. Scanlon, Fire & Risk Alliance stated there are a number of detection devices inside the containers, smoke detection, carbon monoxide detection, and gas detection. They are calibrated to detect hydrogen and are created to blow gases outside the containers to keep them at a safe level. There are panels on top of the BESS and the lids will pop off releasing any pressure. The containers have HVAC systems that are maintained at 70 degrees. There is an Emergency Response Plan developed for the Fire Department. They train the Fire Department and training is given yearly. Mr. Elfman asked about the containers and if they are sealed. Mr. Scanlon stated they are sealed and locked. Mr. DeStefano asked if there were any issues does someone need to test the air quality. Mr. Scanlon stated the first responders would be notified to clear the area with 15ft. clear around the ejection, so the ejection point cannot face a sidewalk or structure. Mr.

DeStefano asked about noise. Mr. Scanlon said Mr. Wallace would address this. Mr. Elfman asked about hydrogen release. Mr. Scanlon stated only if there was a failure would hydrogen be released.
Ms. Kaplan with BSC Group stated an RDA was submitted to the Conservation Commission and they are awaiting a peer review for wetland delineation. There will be native species and pollinators planted. She went over concept renderings of existing and proposed site plan improvements. She stated all that will be seen is the 18 ft. sound wall. There are no trees being cut down and they are also coordinating with Natural Heritage to develop a plan. She stated all the fencing will be snug to the ground to prevent any creatures from entering the area and the gates will have a sweep on them.
Mr. Wallace, Tech Environmental stated a sound study was done according to MASS DEP requirements of ambient conditions. The study was conducted over a 7 day period, every hour. He stated the lowest decibel was 35. He said the study was conducted for one and two-story homes. The design limit was set at 45 decibels. He stated a 433 ft. wide and 18 ft. tall sound wall was developed to mitigate the noise.
Mr. Elfman asked how noise complaints were addressed if mitigation didn't work. Mr. Wallace stated they would study any complaints and the sound wall has included more noise than the sound study detected, but adjustments could be made if necessary.
Mr. Cleavall asked if 45 decibels was the maximum allowable limit of noise, and could it fluctuate much higher. Mr. Wallace stated during the daytime the decibels are 5-7 higher than the nighttime so additional protection was built into the sound barrier. Mr. Wallace stated the sound study took into consideration the highest noise allowable and that was during peak daytime hours.
Ms. Baldwin asked when the project would commence. Ms. Kaplan stated the initial stage of the permitting process was underway. Ms. Baldwin asked when the construction work would start. Ms. Kaplan stated the projected date is early 2027 and the final project completed should occur in 2029.
Mr. DeStefano asked if there would be a lot of trucks and noise during the construction phase. Mr. Duchesneau stated grading and clearing would be happen first, with trenches and cabling and foundations being installed, during peak time he stated there would be 8-12 trucks daily. He stated this would avoid downtown Agawam.
Ms. Baldwin stated Engineering comments and Fire Department comments still have to be addressed and professionally satisfied before action could be taken on the Site Plan.
Ms. Kaplan requested the SITE PLAN for 769 Silver Street be continued to the March 5, 2026 meeting.

Motion was made by Mr. DeStefano and seconded by Mr. Elfman to continue the SITE PLAN-769 Silver Street-Agawam Energy Center, LLC to the March 5, 2026 meeting as requested.

VOTE 4-0-0

2. APPROVAL OF MINUTES-February 5, 2026

Motion was made by Mr. Cleavall and seconded by Mr. Elfman to table the February 5, 2026 minutes until the March 5, 2026 meeting.

VOTE 4-0-0

3. Correspondences

The Planning Board received a complaint from the new homeowner at 1410 Main Street, regarding the previously approved SITE PLAN for 1422 Main Street-Shields Hotel, regarding the concern for additional screening and his solar panels. His home is 15ft. away from the project.
The Planning Board discussed this and decided to send a letter to the developer to suggest adding additional screening for the homeowner at 1410 Main Street.

Motion was made by Mr. Elfman and seconded by Mr. Cleavall to adjourn the meeting.

VOTE 4-0-0

Meeting adjourned at 7:05pm.

DRAFT

Agawam Planning Board February 5, 2026

MEMBERS PRESENT:
Vi Baldwin-Chair
Michael DiLullo
Michael Cleavall

MEMBERS ABSENT:
Frank DeStefano
Charles Elfman

ALSO PRESENT:
Stefanie Kesecker

Ms. Baldwin called the meeting to order at 12:00pm.

1. FORM A-4-6 & 12-14 Church Street-Oriol

A portion of Parcel B is being conferred to Parcel A to meet the setback requirements.

The Planning Board received memos from the Engineering Department and Inspection Services and there were no concerns.

Motion was made by Mr. Cleavall and seconded by Mr. DiLullo to approve the Plan for 4-6 & 12-14 Church Street for Oriol under "Subdivision Control Law Not Required."

VOTE 3-0-0

2. APPROVAL OF MINUTES-January 30, 2026

Motion was made by Mr. DiLullo and seconded by Mr. Cleavall to approve the January 30, 2026 minutes as written.

VOTE 3-0-0

3. Correspondences

The Planning Board received a complaint from a homeowner whose property abuts 1422 Main Street concerning additional screening, for the previously approved Site Plan. The Planning Board will discuss this at the next Planning Board meeting under correspondences.

Motion was made by Mr. Cleavall and seconded by Mr. DiLullo to adjourn the meeting.

VOTE 3-0-0

Meeting adjourned at 12:10pm.

DRAFT