

MASHIE DRIVE SUBDIVISION

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

CONSTRUCTION NOTES

- THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK AND FOR ANY DAMAGES WHICH MAY OCCUR BY HIS FAILURE TO LOCATE OR PRESERVE THESE UNDERGROUND UTILITIES. IF DURING CONSTRUCTION OPERATIONS THE CONTRACTOR SHOULD ENCOUNTER UTILITIES OTHER THAN IN THOSE SHOWN ON THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER AND TAKE NECESSARY AND PROPER STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICE.
- THE CONTRACTOR SHALL DIG TEST PITS AS REQUIRED FOLLOWING NOTIFICATION AND MARKING OF ALL EXISTING UTILITIES BY MISS UTILITY TO VERIFY THE LOCATION AND DEPTH OF EXISTING UTILITIES. TEST HOLES TO BE PERFORMED AT LEAST 15 DAYS PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY TO THE OWNER AND ENGINEER. REDESIGN AND APPROVAL BY REVIEWING AGENCIES SHALL BE OBTAINED IF REQUIRED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE OWNER AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM ANY AUTHORITY ISSUING PERMITS.
- THE CONTRACTOR SHALL VISIT THE SITE AND SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.
- THE CONTRACTOR SHALL CLEAR THE SITE OF ALL TREES, PAVEMENT, UTILITIES, FOUNDATIONS, ETC. WITHIN THE LIMITS OF CONSTRUCTION UNLESS OTHERWISE SPECIFIED, AND SHALL BE RESPONSIBLE FOR CAUSING EXISTING UTILITIES TO BE DISCONNECTED PRIOR TO DEMOLITION AND CLEARING.
- THE DEVELOPER SHALL PROVIDE OVER-LOT GRADING TO PROVIDE POSITIVE DRAINAGE AND PRECLUDE PONDING OF WATER THROUGHOUT CONSTRUCTION.
- FINISHED GRADES SHOWN FOR FINISHED TOP OF CURB GRADES SHALL BE FIELD ADJUSTED AS REQUIRED TO CONFORM TO THE INTENT OF THE TYPICAL SECTION. A SMOOTH GRADE SHALL BE MAINTAINED TO THE FACE OF CURB TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF WATER ON THE PAVEMENT. THE EXISTING PAVEMENT SHALL BE RECAPPED AND/OR REMOVED AND REPLACED AS REQUIRED TO ACCOMPLISH THIS REQUIREMENT. CURB FORMS SHALL BE INSPECTED AND APPROVED FOR HORIZONTAL AND VERTICAL ALIGNMENT BY TOWN INSPECTORS PRIOR TO PLACING OF CONCRETE.
- ALL AREAS, ON OR OFF-SITE, WHICH ARE DISTURBED BY THIS CONSTRUCTION AND WHICH ARE NOT PAVED OR BUILT UPON, SHALL BE ADEQUATELY STABILIZED TO CONTROL EROSION AND SEDIMENTATION. THE MINIMUM ACCEPTABLE STABILIZATION SHALL CONSIST OF PERMANENT GRASS, SEED MIXTURE TO BE AS RECOMMENDED BY THE COUNTY AGENT. ALL SLOPES 3:1 AND GREATER SHALL BE SODDED AND PEGGED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE TOWN OF VIENNA.
- ALL OVER HEAD POLE LINES SHALL BE RELOCATED IF/AS REQUIRED BY THE OWNING UTILITY COMPANIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS AND COORDINATING ALL WORK REQUIRED FOR THE NECESSARY RELOCATIONS.
- PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL VERIFY FROM THE ARCHITECTURAL DRAWINGS ALL DIMENSION, DETAILS, AND TREATMENTS FOR THE PROPOSED BUILDINGS, WALKWAYS, AND OTHER PROPOSED CONSTRUCTION WHERE INDICATED ON THE PLANS.
- THE CONTRACTOR IS TO VERIFY INVERT, SIZE AND LOCATION OF BUILDING UTILITY CONNECTIONS WITH THE MECHANICAL PLANS PRIOR TO PLACEMENT OF UNDERGROUND UTILITIES.
- NO UNDERGROUND SOILS INVESTIGATION HAS BEEN PERFORMED BY WALTER L. PHILLIPS, INC. ALL SOILS INFORMATION PRESENTED AS PART OF THIS SITE PLAN IS TAKEN FROM FAIRFAX 2011 SOILS MAP.
- ALL PROPOSED SIDEWALK, CURB, CURB AND GUTTER, AND SIMILAR ITEMS ARE TO BE CONSTRUCTED WITH A MINIMUM 4" AGGREGATE BASE.
- EXISTING CONSTRUCTION SHALL BE REMOVED TO NEAREST JOINT. NEW CONSTRUCTION SHALL BE PROVIDED AS SHOWN AND ANY DAMAGED AREA SHALL BE REPAIRED TO MATCH CONDITIONS EXISTING PRIOR TO CONSTRUCTION.
- DAMAGE TO ANY EXISTING ENTRANCES, CURB AND GUTTER, PAVEMENT OR OTHER EXISTING STRUCTURES NOT PROPOSED TO BE DISTURBED WITH THIS DEVELOPMENT, WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE REPAIRED TO THE SATISFACTION OF THE TOWN OF VIENNA.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING A SMOOTH TRANSITION TO EXISTING CURB AND EXISTING PAVEMENT ELEVATIONS ADJUSTING FOR PROPOSED CAPPING. THE CONTRACTOR IS TO GRIND EXISTING PAVEMENT ADJACENT TO CURB PROPOSED TO REMAIN IN ORDER FOR PROPOSED CAPPING TO MEET EXISTING GUTTER OR BOTTOM OF CURB ELEVATIONS.
- CONTACT MISS UTILITY AT 800-257-7777 48 HOURS BEFORE ANY DIGGING.

- ALL PRIVATE BUILDING CONNECTIONS ARE TO BE INSTALLED IN ACCORDANCE WITH THE CURRENT PLUMBING CODE.
- SEE ARCHITECTURAL AND/OR LANDSCAPE DRAWINGS FOR DIMENSIONS AND DETAILS FOR ALL RETAINING WALLS. ALL ON-SITE RETAINING WALLS ARE SUBJECT TO A SEPARATE BUILDING PERMIT TO BE OBTAINED BY OWNER. THIS PLAN IS FOR APPROXIMATE LOCATION AND PROPOSED GRADING ONLY. GEOTECHNICAL AND STRUCTURAL DESIGN TO BE ACCOMPLISHED BY OTHERS.
- TOPS OF EXISTING STRUCTURES WHICH REMAIN IN USE ARE TO BE ADJUSTED IN ACCORDANCE WITH THE GRADING PLAN. ALL PROPOSED STRUCTURE TOP ELEVATIONS ARE TO BE VERIFIED BY THE CONTRACTOR WITH THE SITE GRADING PLANS. IN CASE OF CONFLICT, THE GRADING PLAN SHALL SUPERSEDE PROFILE ELEVATIONS. MINOR ADJUSTMENTS TO MEET FINISHED GRADE ELEVATIONS MAY BE REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTMENT CAPPING.
- THE DESIGN, CONSTRUCTION, FIELD PRACTICES AND METHODS SHALL CONFORM TO THE REQUIREMENTS SET FORTH BY THE GOVERNING AGENCY AND IT'S CURRENT ZONING ORDINANCE AND CONSTRUCTION STANDARDS MANUAL. FAILURE TO COMPLY WITH THE CODE, APPLICABLE MANUALS, PROVISIONS OF THE CONSTRUCTION AND ESCROW AGREEMENTS OR THE PERMITS SHALL BE DEEMED A VIOLATION.
- THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE OWNER/DEVELOPER OR HIS AGENT OF ANY LEGAL RESPONSIBILITIES WHICH MAY BE REQUIRED BY THE CODE OF VIRGINIA OR ANY ORDINANCE ENACTED BY THE GOVERNING AGENCY.
- CONSTRUCTION STAKEOUT SHALL BE UNDER THE DIRECT SUPERVISION OF A LICENSED LAND SURVEYOR IN THE COMMONWEALTH OF VIRGINIA.
- NO EVIDENCE OF GRAVES OR BURIAL SITES HAS BEEN FOUND ON THIS PROPERTY.
- WATER SYSTEMS BEING CONSTRUCTED IN THE TOWN SHALL BE DESIGNED AND BUILT TO THE LATEST FAIRFAX WATER CONSTRUCTION PRACTICE MANUAL AND CHAPTER 4 OF THE TOWN OF VIENNA PUBLIC INFRASTRUCTURE MANUAL.
- ALL EXISTING OVERHEAD UTILITIES SERVING THE PROPERTY WILL BE REMOVED OR PLACED UNDERGROUND. EXISTING OVERHEAD UTILITIES IN ELECTRIC AVENUE AND ON ADJACENT PROPERTIES WILL REMAIN.

TOWN OF VIENNA - NOTES

- NOTIFY THE TOWN OF VIENNA DEPARTMENT OF PUBLIC WORKS AT 703-255-6380 WHEN WORKS IS TO BE STARTED.
- ALL CONTRACTOR GENERATED DEBRIS MUST BE HAULED AWAY BY THE CONTRACTOR OR OWNER.
- ALL RUNOFF MUST SHEET FLOW ACROSS PROPERTY LINES UNLESS APPROVED OTHERWISE BY THE DIRECTOR OF PUBLIC WORKS.
- ALL PRIVATE STORM DRAINS (I.E. ROOF DRAINS, SUMP PUMPS ETC.) MUST DAYLIGHT AT A MINIMUM OF 10 FEET FROM A PROPERTY LINE.
- PRIOR TO THE REMOVAL OF ANY TOWN TREES (TREES WITHIN THE RIGHT OF WAY), THE APPLICANT OR THEIR REPRESENTATIVE SHALL CONTACT THE TOWN OF VIENNA ARBORIST AT 703-255-6360 TO COORDINATE HAVING THE TOWN ARBORIST ONSITE DURING ALL TOWN TREE REMOVAL.
- TREE PROTECTION FOR ANY TOWN TREE, AS SHOWN ON PLAN, MUST BE INSTALLED PRIOR TO ANY SITE WORK.
- THE OWNER IS RESPONSIBLE FOR ALL WORK AND COSTS ASSOCIATED WITH EXCAVATION, INSTALLATION, AND RESTORATION OF PUBLIC SPACE TO PERFORM A WATER/SEWER CONNECTION/ABANDONMENT. THE OWNER SHALL BE HELD RESPONSIBLE FOR ALL DAMAGES TO EXISTING STRUCTURES AND UTILITIES CAUSED BY CONSTRUCTION ACTIVITY.
- A SET OF SIGNED & SEALED AND VIENNA STAMPED PLANS SHALL BE KEPT AT ALL TIMES AT THE JOB SITE ON WHICH ALL CHANGES OR VARIATIONS IN THE WORK, INCLUDING ALL EXISTING UTILITIES, ARE TO BE RECORDED AND/OR CORRECTED DAILY.
- DEVELOPERS, CONTRACTORS AND/OR PLUMBERS MUST SUBMIT FINAL CONSTRUCTION AS-BUILT INFORMATION TO VIENNA FOR REVIEW AND APPROVAL. UPON COMPLETION OF INSTALLATION OF NEW SERVICES OR ABANDONMENT OF EXISTING SERVICES, WHEN THE FINAL AS-BUILT IS APPROVED ALL DEPOSITS WILL BE RETURNED TO THE APPLICANT.

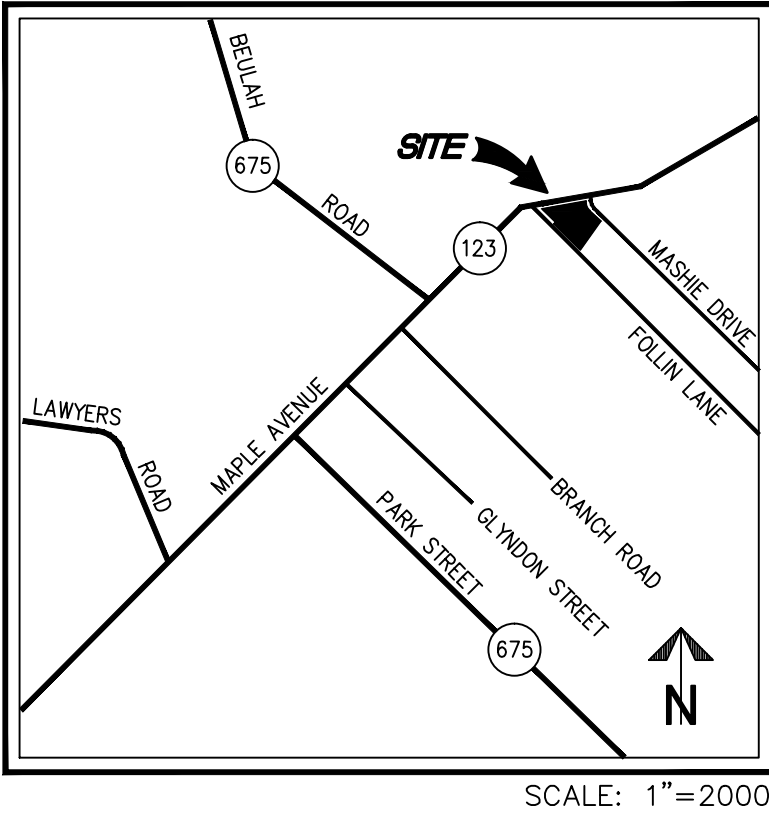
SURVEY NOTES

- THE PROPERTIES SHOWN HEREON ARE DESIGNATED BY FAIRFAX COUNTY, VIRGINIA, AS TAX MAP REFERENCE NUMBERS 0382-11-0077, 0382-11-0078, 0382-11-0079, AND 0382-11-080, AND ARE ZONED RS-16.
- THE PROPERTIES ARE AS FOLLOWS, ALL AMONG THE LAND RECORDS OF FAIRFAX COUNTY, VIRGINIA:
A) 0382-11-0077 - BEING LOT 77, SECTION 2, WESTBRIAR COUNTRY CLUB, NOW IN THE NAME OF MASHIE DRIVE LLC, AS RECORDED IN DEED BOOK 23341 AT PAGE 585
B) 0382-11-0078 - BEING LOT 78, SECTION 2, WESTBRIAR COUNTRY CLUB, NOW IN THE NAME OF MASHIE DRIVE LLC, AS RECORDED IN DEED BOOK 23430 AT PAGE 814
C) 0382-11-079 - BEING LOT 79, SECTION 2, WESTBRIAR COUNTRY CLUB, NOW IN THE NAME OF MASHIE DRIVE LLC, AS RECORDED IN DEED BOOK 24866 AT PAGE 246
D) 0382-11-080 - BEING PART OF LOT 80, SECTION 2, WESTBRIAR COUNTRY CLUB, NOW IN THE NAME OF ELSA Y. GUNESSEVER, DOGAN GUNESSEVER, WALTER O. GUNESSEVER, AND DENNIS G. GUNESSEVER, AS RECORDED IN DEED BOOK 22830 AT PAGE 457
- THIS PLAN AND THE SURVEY UPON WHICH IT IS BASED SHOWS ONLY THOSE IMPROVEMENTS THAT ARE OBSERVABLE AND CAN BE LOCATED USING NORMAL SURVEY METHODS. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, MISS UTILITY MARKINGS AND EXISTING RECORDS. THERE ARE NO GUARANTEES, EITHER EXPRESS OR IMPLIED, THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED, OR THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THE UNDERGROUND UTILITIES HAVE NOT BEEN PHYSICALLY LOCATED.
- TOTAL AREA OF THE PROPERTIES IS 117,042 SQUARE FEET OR 2.6869 ACRES.
- THIS PLAT IS BASED ON A FIELD SURVEY BY THIS FIRM COMPLETED ON SEPTEMBER 13, 2016.
- THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAP FOR FAIRFAX COUNTY, VIRGINIA, MAP NUMBER 51059C0145E, EFFECTIVE DATE SEPTEMBER 17, 2010, DESIGNATES THE PROPERTY AS BEING IN ZONE X, AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
- EASEMENTS, CONDITIONS, COVENANTS AND RESTRICTIONS, SHOWN AND/OR NOTED, TAKEN FROM THE TITLE REPORTS/COMMITMENTS AS FOLLOWS:
A) LOT 79 - RGS TITLE, LLC, FILE NUMBER 178325GNV, DATED JULY 6, 2016
B) LOT 80 - RGS TITLE, LLC, FILE NUMBER 178327GNV, DATED JULY 3, 2016
C) LOT 77 - CHICAGO TITLE INSURANCE COMPANY, COMMITMENT NUMBER 2013090287, DATED SEPTEMBER 9, 2013
D) LOT 78 - HBS TITLE ENTERPRISES, FILE NUMBER H13-13475, DATED JULY 4, 2013
- LOT 77 IS SUBJECT TO A VPSC EASEMENT RECORDED IN DEED BOOK S-13 AT PAGE 335 AND C&P TELEPHONE EASEMENTS RECORDED IN DEED BOOK E-8 AT PAGE 56, DEED BOOK U-8 AT PAGE 1, DEED BOOK 1340 AT PAGE 395, AND DEED BOOK 1563 AT PAGE 458, ALL AMONG THE LAND RECORDS OF FAIRFAX COUNTY, VIRGINIA.
- LOT 78 IS SUBJECT TO C&P TELEPHONE EASEMENTS RECORDED IN DEED BOOK L-8 AT PAGE 513, DEED BOOK 1340 AT PAGE 395, AND DEED BOOK 1563 AT PAGE 458, ALL AMONG THE LAND RECORDS OF FAIRFAX COUNTY, VIRGINIA.
- THE SITE SHOWN HEREON IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS COMPUTED FROM A FIELD RUN VERTICAL CONTROL SURVEY AND IS REFERENCED TO THE VIRGINIA COORDINATE SYSTEM OF 1983, [NAD 83(2011) (EPOCH:2010.0000)] AS COMPUTED FROM A FIELD RUN BOUNDARY AND HORIZONTAL CONTROL SURVEY THAT TIES THIS SUBDIVISION BOUNDARY AND THE BENCHMARK(S) SHOWN TO NOAA/NGS MONUMENT PID NUMBER DH7960; LOYB LOYOLA B COOP CORs ARP. THE COMBINED FACTOR APPLIED TO THE FIELD DISTANCES TO DERIVE THE REFERENCED COORDINATES IS 0.99994771. THE FOOT DEFINITION USED FOR CONVERSION OF THE MONUMENT COORDINATES AND IN THE PERFORMANCE OF THIS SURVEY IS THE U.S. SURVEY FOOT. CONTOUR INTERVAL IS TWO FEET.

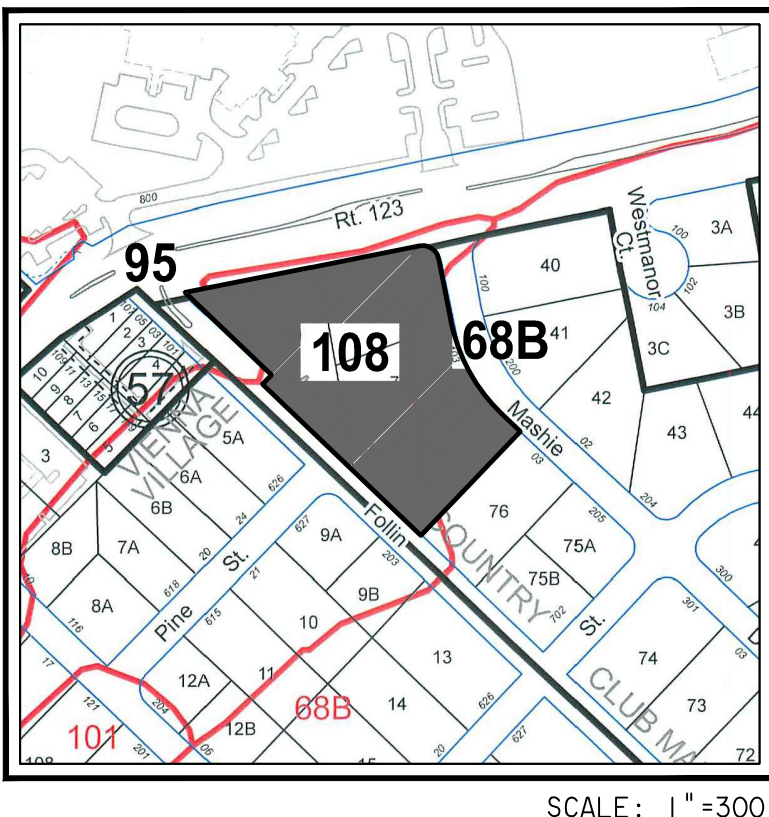
ZONING AND SITE TABULATIONS

| 1. SITE AREA | - | 117,042 SF / 2.687 ACRES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------|--|----------------|----------|----------|--------------|--|--|--------|---|-------|-----|---|-------|-----|---|-------|-------------|---|-----------|--|--|------------------------|-------------|--|--|-------|---|-------|-------------|---|----------|------|---|-------|--------|---|-----|--|--|-----|----------------------|---|-------------|--|--|-------|--|--|--|-----------------------|---|-----|--|--|------------------|
| 2. AREA OF STREET DEDICATION | - | 3,117 SF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. EXISTING USE | - | RESIDENTIAL SINGLE FAMILY DETACHED (4 LOTS) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. PROPOSED USE | - | RESIDENTIAL SINGLE FAMILY DETACHED (7 LOTS) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. ZONE | - | RS-16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>ORDINANCE DATA</th><th>REQUIRED</th><th>PROPOSED</th></tr><tr><td>6. LOT WIDTH</td><td></td><td></td></tr><tr><td>STREET</td><td>-</td><td>50 FT</td></tr><tr><td>BRL</td><td>-</td><td>60 FT</td></tr><tr><td>MID</td><td>-</td><td>90 FT</td></tr><tr><td>7. LOT AREA</td><td>-</td><td>16,000 SF</td></tr><tr><td></td><td></td><td>16,014 SF - 17, 578 SF</td></tr><tr><td>8. SETBACKS</td><td></td><td></td></tr><tr><td>FRONT</td><td>-</td><td>35 FT</td></tr><tr><td>SIDE/CORNER</td><td>-</td><td>15/25 FT</td></tr><tr><td>REAR</td><td>-</td><td>35 FT</td></tr><tr><td>9. FAR</td><td>-</td><td>N/A</td></tr><tr><td></td><td></td><td>N/A</td></tr><tr><td>10. MAX. BLDG HEIGHT</td><td>-</td><td>2.5 STORIES</td></tr><tr><td></td><td></td><td>35 FT</td></tr><tr><td></td><td></td><td>35' MAX (TBD AT TIME OF GRADING PLAN SUBMISSION)</td></tr><tr><td>11. MAX. LOT COVERAGE</td><td>-</td><td>25%</td></tr><tr><td></td><td></td><td>SEE SHEET C-0202</td></tr></table> | | | ORDINANCE DATA | REQUIRED | PROPOSED | 6. LOT WIDTH | | | STREET | - | 50 FT | BRL | - | 60 FT | MID | - | 90 FT | 7. LOT AREA | - | 16,000 SF | | | 16,014 SF - 17, 578 SF | 8. SETBACKS | | | FRONT | - | 35 FT | SIDE/CORNER | - | 15/25 FT | REAR | - | 35 FT | 9. FAR | - | N/A | | | N/A | 10. MAX. BLDG HEIGHT | - | 2.5 STORIES | | | 35 FT | | | 35' MAX (TBD AT TIME OF GRADING PLAN SUBMISSION) | 11. MAX. LOT COVERAGE | - | 25% | | | SEE SHEET C-0202 |
| ORDINANCE DATA | REQUIRED | PROPOSED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. LOT WIDTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| STREET | - | 50 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BRL | - | 60 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MID | - | 90 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. LOT AREA | - | 16,000 SF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 16,014 SF - 17, 578 SF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. SETBACKS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FRONT | - | 35 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SIDE/CORNER | - | 15/25 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| REAR | - | 35 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. FAR | - | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. MAX. BLDG HEIGHT | - | 2.5 STORIES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 35 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 35' MAX (TBD AT TIME OF GRADING PLAN SUBMISSION) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. MAX. LOT COVERAGE | - | 25% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | SEE SHEET C-0202 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

VICINITY MAP



SOILS MAP



SOILS DATA

| SOIL # 'S | SERIES NAME | HYDROLOGIC SOIL GROUP | PROBLEM CLASS | FOUNDATION SUPPORT | SUBSURFACE DRAINAGE | ERODABILITY |
|-----------|------------------------------|-----------------------|---------------|--------------------|---------------------|-------------|
| 68 | KINGSTOWNE-DANRIPPLE COMPLEX | D | IVB | MARGINAL | MARGINAL | MEDIAL |
| 95 | URBAN LAND | N/A | IVB | N/A | N/A | N/A |
| 108 | Wheaton-Sumerduck Complex | D | IVB | MARGINAL | POOR | MEDIAL |

FIRE FLOW INFORMATION

FIRE MARSHAL APPROVAL WILL BE OBTAINED PRIOR TO TOWN APPROVAL.

FILE #
FIRE MARSHAL APPROVAL
DATE

TOWN OF VIENNA
PLAN APPROVAL

Dept. of Planning and Zoning

_____ Date _____

Dept. of Public Works

_____ Date _____

SHEET INDEX

| | |
|--------|--|
| C-0101 | COVER SHEET |
| C-0201 | NOTES AND DETAILS |
| C-0202 | LOT AND BUILDING DATA |
| C-0301 | EXISTING CONDITIONS AND DEMOLITION PLAN |
| C-0302 | TREE INVENTORY |
| C-0401 | GEOMETRIC PLAN |
| C-0402 | LAYOUT PLAN |
| C-0403 | SWM AND BMP FACILITY LAYOUT PLAN |
| C-0501 | GRADING PLAN |
| C-0601 | EROSION AND SEDIMENT CONTROL PHASE 1 PLAN |
| C-0602 | EROSION AND SEDIMENT CONTROL PHASE 2 PLAN |
| C-0603 | EROSION AND SEDIMENT CONTROL NOTES AND DETAILS |
| C-0604 | EROSION AND SEDIMENT CONTROL DETAILS |
| C-0701 | SWM AND BMP COMPUTATIONS |
| C-0702 | BMP AND ADJUSTED CN COMPUTATIONS (VRRM SPREADSHEET) |
| C-0703 | BMP AND ADJUSTED CN COMPUTATIONS (VRRM SPREADSHEET) |
| C-0704 | RAIN GARDEN AND GRAVEL DETENTION COMPUTATION AND DETAILS |
| C-0705 | GRAVEL DETENTION COMPUTATIONS AND DETAILS |
| C-0706 | SWM AND BMP CONSTRUCTION AND MAINTENANCE RECOMMENDATIONS |
| C-0707 | OUTFALL ANALYSIS |
| C-0708 | HYDROGRAPHS |
| C-0709 | HYDROGRAPHS |
| C-0710 | HYDROGRAPHS |
| C-0711 | HYDROGRAPHS |
| C-0712 | HYDROGRAPHS |
| C-0713 | HYDROGRAPHS |
| C-0714 | HYDROGRAPHS |
| C-0715 | HYDROGRAPHS |
| C-0716 | HYDROGRAPHS |
| C-0801 | STORM SEWER PROFILES |
| C-0901 | SANITARY SEWER PLAN AND PROFILE |
| C-1101 | MASHIE DRIVE ROAD PROFILE |
| C-1201 | LANDSCAPE PLAN |
| C-1202 | LANDSCAPE NOTES AND DETAIL |
| C-1301 | FIRE MARSHAL PLAN |

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945

DATE: 13/11/17, 32/11/17, 4/18/17
SCALE: N/A

NO. DESCRIPTION DATE REVISION APPROVED BY DATE REVISION APPROVED BY

COVER SHEET

MASHIE DRIVE SUBDIVISION
PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA

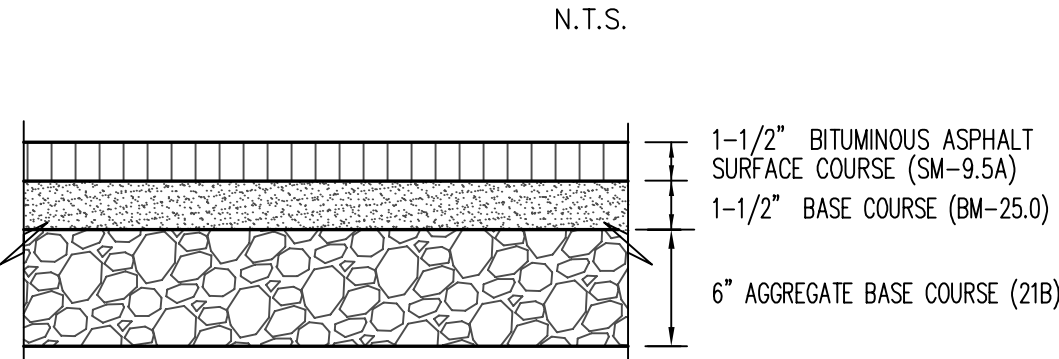
CHECKED: JS
DRAWN: SO

SHEET: C-0101

DEPARTMENT OF PUBLIC WORKS NOTES:

- 1) WATERLINES, ALL WATERLINE INSTALLATION SHALL SUBSCRIBE TO THE TOWN OF VIENNA'S CONSTRUCTION STANDARDS AND SPECIFICATIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- a. WATERLINES SHALL HAVE A MINIMUM COVER OF FOUR FEET (4'), UNLESS OTHERWISE SHOWN ON THE DRAWING, MEASURED FROM THE TOP OF THE PIPE TO THE FINISHED GROUND ELEVATION. IN NO EVENT SHALL THE DEFLECTION PER JOINT OF LENGTH EXCEED THE RECOMMENDED MAXIMUM DEFLECTION AS SET FORTH BY THE PIPE MANUFACTURER.
- b. FIRE HYDRANTS SHALL BE PLACED A MINIMUM OF EIGHTEEN INCHES (18") OR A MAXIMUM OF THIRTY-SIX INCHES (36") FROM THE FACE OF THE CURB, MEASURED FROM THE FACE OF THE CURB TO THE CENTER OF THE BARREL. AT A POINT ON THE HYDRANT IMMEDIATELY BELOW THE SWIVEL FLANGE. THE PUMPER NOZZLE SHALL BE EIGHTEEN INCHES (18") ABOVE THE CURB.
- c. FIRE HYDRANTS SHALL BE SO PLACED THAT THEY DO NOT FALL WITHIN THE SIDEWALK, UNLESS SO DIRECTED BY THE INSPECTOR FOR THE TOWN OF VIENNA.
- d. A SUITABLE SUMP MUST BE PROVIDED TO ALLOW DRAINING OF THE HYDRANT. FIRE HYDRANTS SHALL NOT TO BE PLACED IN FILL SECTIONS.
- e. HYDRANTS SHALL BE PLACED ON FIRM FOUNDATION TO SUPPORT THE UNDERBASE AND A CONCRETE BLOCK BRACE SHALL BE POURED AGAINST FIRM UNDISTURBED GROUND TO KEEP THE HYDRANT FROM BLOWING OFF.
- f. GRAVEL SHALL BE PLACED AROUND CIRCUMFERENCE OF THE HYDRANT BASE FOR A DISTANCE OF TWELVE INCHES (12") AND A HEIGHT OF EIGHTEEN INCHES (18") TO ASSURE POSITIVE DRAINAGE OF HYDRANT BARREL. GRAVEL SHALL BE CLEAN AND NOT LESS THAN THREE-FOURTHS INCH (3/4") SIZE.
- g. POLYETHYLENE ENCASEMENT SHALL BE PROVIDED AROUND ALL WATER LINES, ENCASEMENT SHALL BE SEAMLESS AND IN ACCORDANCE WITH ANSI/AWWA STANDARD CLOS CLASS C, AND SHALL BE INSTALLED IN ACCORDANCE WITH PROCEDURES DESCRIBED IN ANSI/AWWA STANDARD CLOS AROUND THE WATER MAIN, INCLUDING ALL PIPE, FITTINGS, VALVES, HYDRANTS AND BRANCH CONNECTIONS WHERE SHOWN ON THE PLANS. THERE SHALL BE TWO FEET OF OVERLAP BETWEEN THE CUT SECTIONS OF POLYETHYLENE. ALL OVERLAPPING SECTIONS SHALL BE COMPLETELY TAPED IN ORDER TO HOLD THEM IN POSITION DURING BACKFILLING. ALL HOLES, SITS, OR OPENINGS OF ANY SIZE SHALL BE REPAIRED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION SUCH THAT THE INTEGRITY OF THE POLYETHYLENE ENCASEMENT IS COMPLETELY RESTORED TO THE SATISFACTION OF THE TOWN. POLYETHYLENE ENCASEMENT WILL NOT BE REQUIRED FOR WATER MAIN INSTALLED INSIDE OF VAULT STRUCTURES.
- 2) SEWER LINES: ALL SEWER LINE INSTALLATION SHALL SUBSCRIBE TO THE TOWN OF VIENNA'S CONSTRUCTION STANDARDS AND SPECIFICATIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- a. PVC SEWER PIPE SHALL BE SCHEDULE 35 AND SHALL CONFORM TO THE A.S.T.M. DESIGNATION D3034.
- b. INFILTRATION TEST, THE INFILTRATION INTO THE COMPLETED SEWER SHALL NOT EXCEED A RATE OF TWO-HUNDRED (200) GALLONS PER INCH OF DIAMETER, PER MILE, PER DAY FOR EIGHT INCH (8") UP TO AND INCLUDING TWENTY-FOUR INCH (24") DIAMETER AND NOT MORE THAN FIVE-THOUSAND (5,000) GALLONS PER MILE, PER DAY FOR ALL SIZED OVER TWENTY-FOUR INCH (24") DIAMETER. FOR SHORT STRETCHES OF LESS THAN FIVE-HUNDRED FEET (500'), RATES UP TO FIFTY PERCENT (50%) MORE THAN THE ABOVE AMOUNTS WILL BE PERMITTED PROVIDED THAT THE TOTAL LEAKAGE IN THE COMPLETED CONTRACT DOES NOT EXCEED THE ABOVE LIMITS.
- c. TESTS FOR INFILTRATION SHALL BE MADE UNDER THE DIRECTION OF THE TOWN AND AT LOCATIONS SELECTED BY HIM. ALL LABOR, TEMPORARY EQUIPMENT, AND MATERIALS INCLUDING WEIRS NECESSARY FOR SUCH TESTS SHALL BE FURNISHED BY THE CONTRACTOR WITHOUT ADDITIONAL COMPENSATION. SUFFICIENT WEIR MEASUREMENTS SHALL BE MADE IN MANHOLES TO FURNISH THE NECESSARY INFORMATION. WHERE WEIR MEASUREMENTS ARE NOT MADE IN THE TOWN'S OPINION, OTHER METHODS OF MEASUREMENTS AS HE SHALL DETERMINE MAY BE ADOPTED. WHERE PRACTICABLE, SEWERS SHALL BE TESTED IN LENGTHS BETWEEN MANHOLES OF NOT MORE THAN FIFTEEN-HUNDRED FEET (1,500').
- d. SEWERS WILL NOT BE TESTED FOR INFILTRATION UNTIL AT LEAST TWO (2) WEEKS AFTER INSTALLATION AND PRIOR TO ANY SERVICE CONNECTIONS UNLESS OTHERWISE APPROVED BY THE TOWN. SEWERS WHICH FAIL TO MEET TESTS SHALL BE REPAIRED UNTIL NECESSARY REQUIREMENTS OF THIS SPECIFICATION, AS EVIDENCED BY SUBSEQUENT TESTS, ARE COMPLIED WITH.
- 3) STORMWATER LINES: ALL STORMWATER LINE INSTALLATION SHALL SUBSCRIBE TO THE TOWN OF VIENNA'S CONSTRUCTION STANDARDS AND SPECIFICATIONS.
- 4) THE OWNER MUST PHYSICALLY DISCONNECT EXISTING WATER, SEWER LATERALS THAT ARE TO BE ABANDONED AT THEIR CONNECTION TO THE PUBLIC MAIN.
- 5) THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF PROPOSED UTILITIES. A MINIMUM OF 18 INCHES VERTICAL AND FIVE FEET HORIZONTAL CLEARANCE SHALL BE MAINTAINED FROM ANY UTILITIES AND PUBLIC WATER AND SEWER MAINS.
- 6) ALL WATER AND SEWER FACILITIES SHALL BE INSTALLED BY A LICENSED CONTRACTOR IN THE STATE OF VIRGINIA.
- 7) ALL WATER AND SEWER CONSTRUCTION IS INSPECTED AND TESTED AS PER VIENNA STANDARDS PRIOR TO FINAL ACCEPTANCE BY THE TOWN.
- 8) THE VIENNA SEWER DEPARTMENT SHALL BE NOTIFIED AT A MINIMUM 48 HOURS (MONDAY THROUGH FRIDAY) PRIOR TO COMMENCING ANY WORK, TESTING, AND PRIOR TO MAKING ANY CONNECTIONS TO EXISTING SEWER LINES OR MANHOLES.
- 9) THERE SHALL BE NO UNMETERED CONNECTIONS TO THE TOWN'S WATER SYSTEM, INCLUDING CONNECTIONS BYPASSING METERS FOR TESTING ON-SITE PLUMBING OR FOR OBTAINING CONSTRUCTION WATER.
- 10) PRESSURE TESTING AGAINST VALVES WILL NOT BE ALLOWED.
- 11) A NOMINAL FOUR FEET OF COVER IS REQUIRED FOR ALL WATER MAINS AT FINAL GRADE.
- 12) THE USE OF A FIRE HYDRANT AS A WATER SOURCE IS PROHIBITED UNLESS A METER HAS BEEN OBTAINED FROM VIENNA FOR USE OF A SPECIFIC HYDRANT(S).
- 13) ABANDONMENTS OF EXISTING WATER AND SEWER CONNECTIONS ARE CLEARLY INDICATED ON THE PLANS WITH APPROPRIATE NOTES DESCRIBING HOW THE SERVICES ARE TO BE ABANDONED AT THE MAINS. INDIVIDUAL SERVICES MUST BE CUT AND THE REMAINING SERVICE LINE CRIMPED NOT LESS THAN 12" FROM THE MAIN AND NOT MORE THAN 3'. THE TOWN IS TO BE NOTIFIED 48 HOURS IN ADVANCE OF DISCONNECTION AND MAY INSPECT THE DISCONNECTION AT ITS CHOOSING SO AS TO PREVENT SLOW LEAKS, INCOMPLETELY TURN OFF CORPORATIONS AND OR FUTURE CONSTRUCTION ISSUES WITH TRENCHING THROUGH NONE CUT SERVICE LINES.
- 14) PER SECTION TOWN OF VIENNA CONSTRUCTION SPECIFICATIONS SECTION 1.B.10 : SUPPORTS SHALL BE CONSTRUCTED BEHIND ALL BENDS, TEES, CAPS, PLUGS AND HYDRANTS. THE USE OF SUPPORTS BEHIND FITTINGS REFERS TO FITTINGS IN THE VERTICAL PLANE AS WELL AS THOSE USED IN THE HORIZONTAL PLAN.* THEY SHALL BE DESIGNED TO CARRY THE LOAD THAT WILL REASONABLY BE REQUIRED OF THEM UNDER MAXIMUM HEAD AND A REASONABLE ALLOWANCE FOR WATER HAMMER."
- 15) POLYETHYLENE ENCASEMENT IS REQUIRED FOR ALL LINES IN VIENNA IN ACCORDANCE WITH ANSI/AWWA STANDARD C105 CLASS C, PER SECTION 1.B.14.B OF THE VIENNA STANDARD CONSTRUCTION SPECIFICATIONS.

TYPICAL ONSITE ASPHALT PAVEMENT SECTION

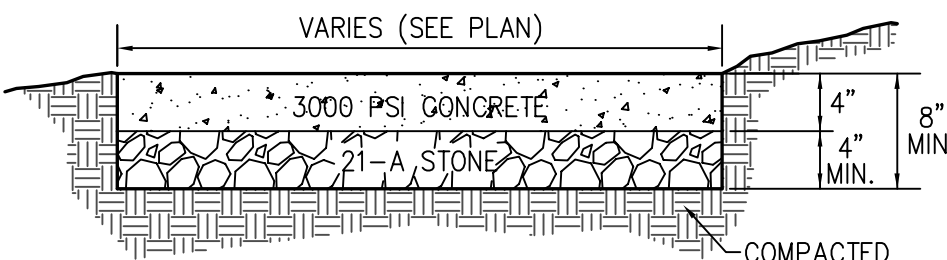


NOTES:

1. PAVEMENT SECTIONS PROVIDED ON THIS SHEET ARE BASED ON ASSUMED SOIL SUPPORT VALUES. ALL PAVEMENT SHALL BE CONSTRUCTED AS DIRECTED BY THE GEOTECHNICAL ENGINEER OF RECORD BASED ON ACTUAL FIELD SUBGRADE CONDITIONS.
2. ALL ON-SITE ASPHALT AND CONCRETE PAVEMENT IS PRIVATELY OWNED AND MAINTAINED.

SIDEWALK DETAIL

N.T.S.



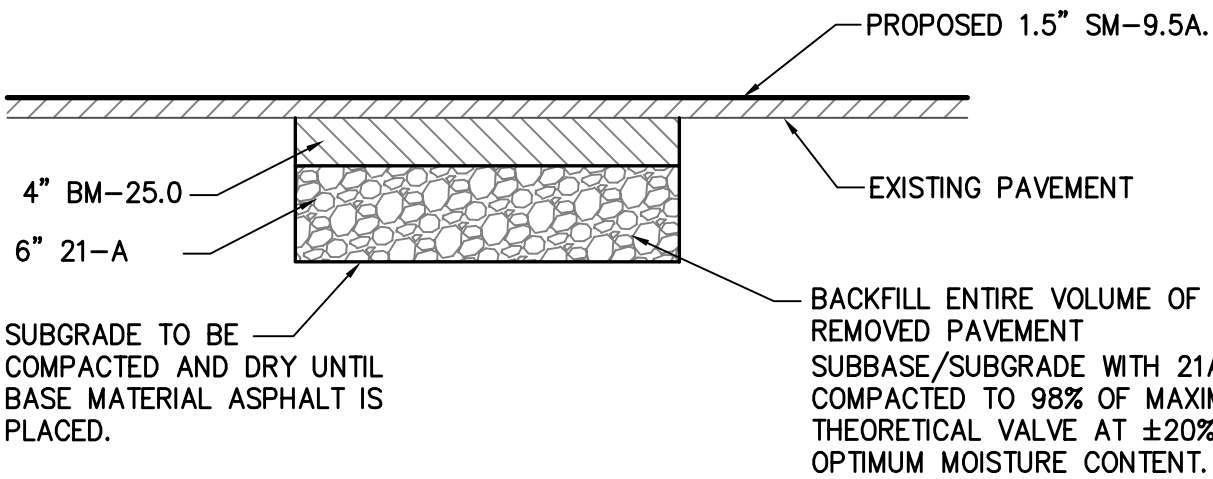
SUITABLE FOR GENERAL PEDESTRIAN USE. UNSUITABLE FOR BIKEWAYS ACCEPTABLE FOR TOWN MAINTENANCE.

SUBGRADE FOR ALL SIDEWALKS WITHIN VDOT R/W SHALL BE COMPACTED TO MINIMUM 95% DENSITY AT OPTIMUM MOISTURE TO FULL WIDTH OF R/W IN ACCORDANCE WITH AASHTO T99.

FOR SIDEWALKS WITHIN VDOT R/W, CONTRACTOR TO PROVIDE UD-3 IF REQUIRED BY GEOTECHNICAL TESTING RESULTS. GEOTECHNICAL TESTS RESULTS TO BE PROVIDED BY CONTRACTOR TO OWNER'S REPRESENTATIVE.

PAVEMENT PATCH DETAIL

N.T.S.

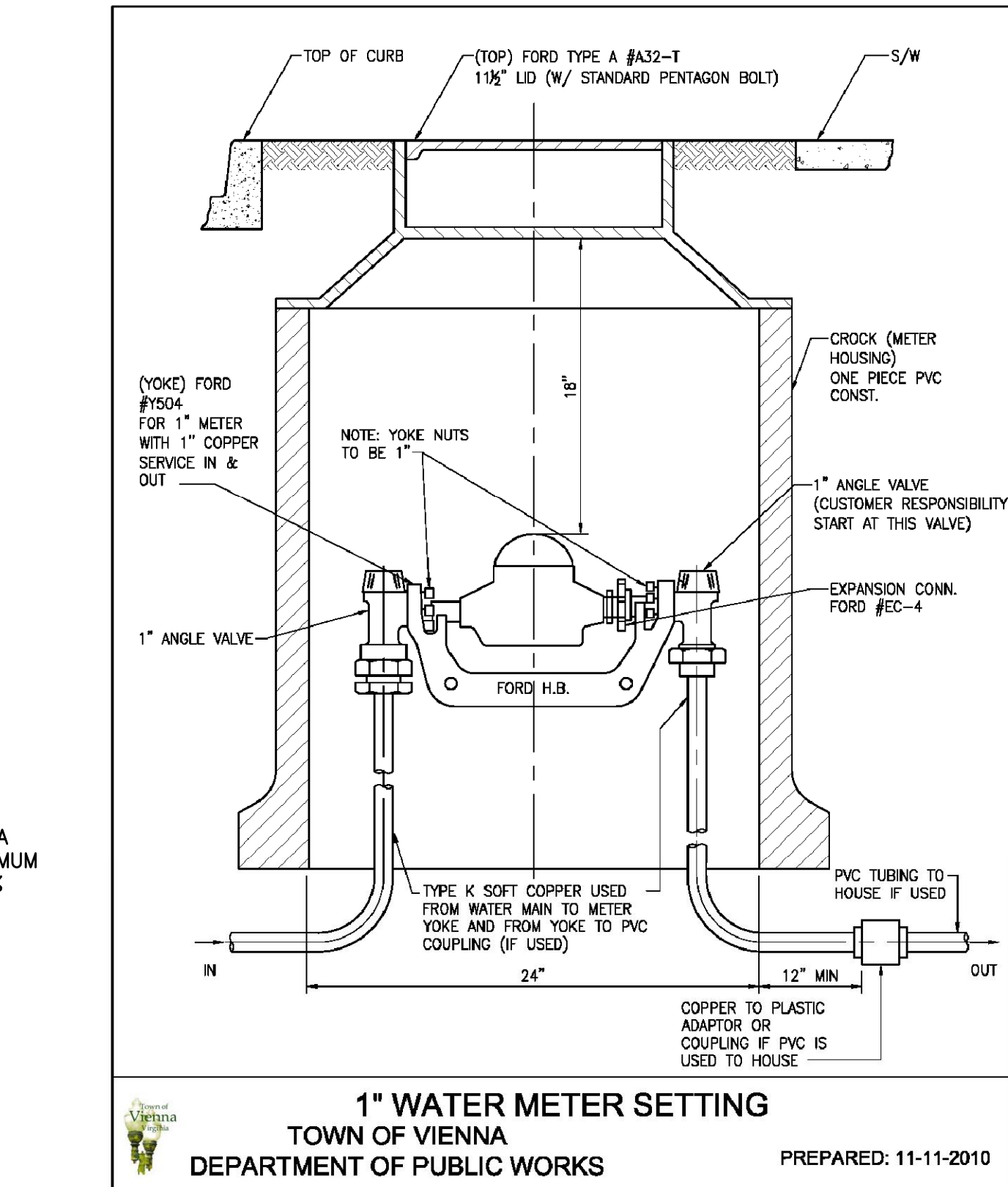
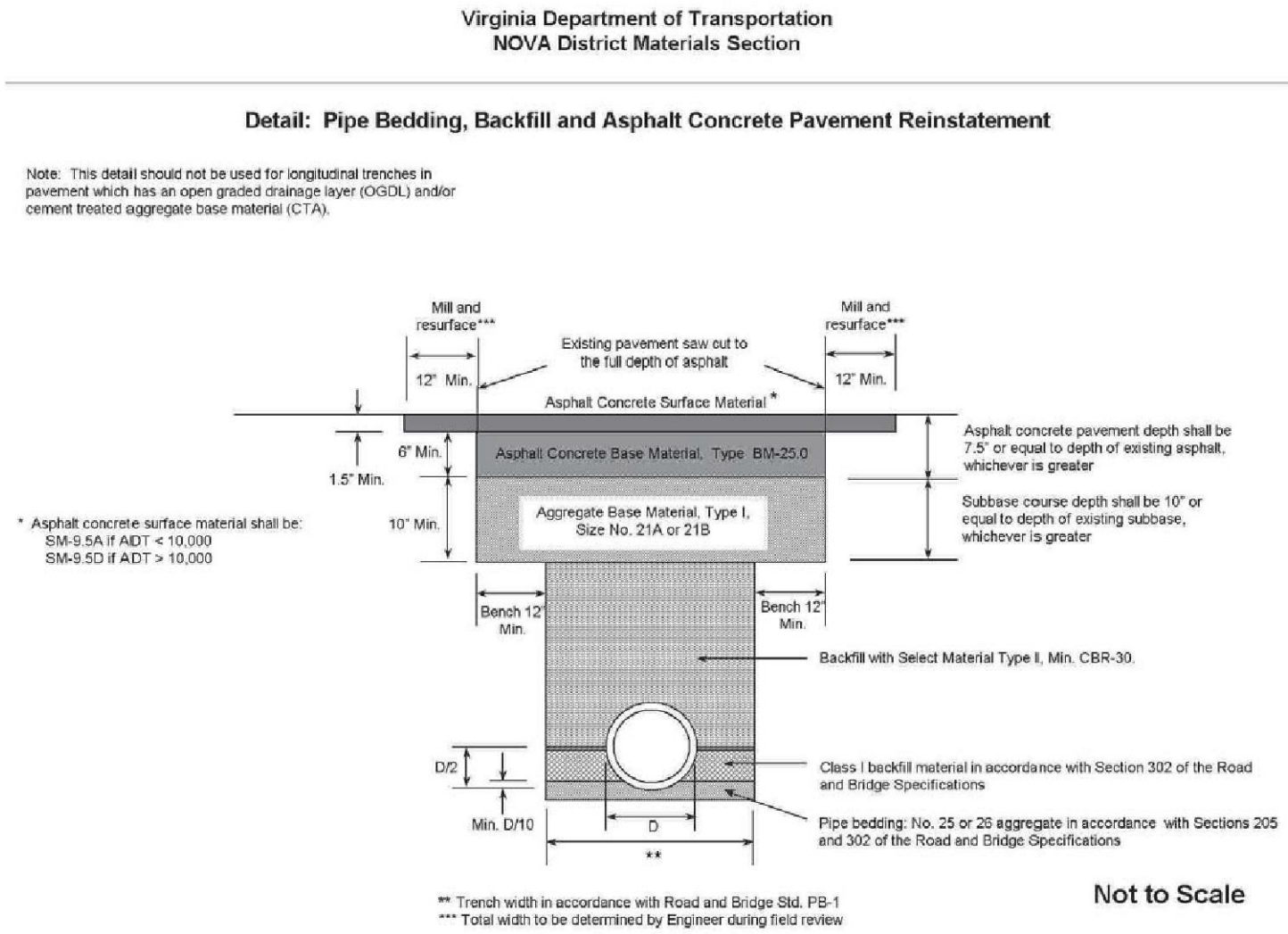


SUBGRADE TO BE COMPACTED AND DRY UNTIL BASE MATERIAL ASPHALT IS PLACED.

BACKFILL ENTIRE VOLUME OF REMOVED PAVEMENT SUBBASE/SUBGRADE WITH 21A COMPACTED TO 98% OF MAXIMUM THEORETICAL VALVE AT ±20% OPTIMUM MOISTURE CONTENT.

NOTE:

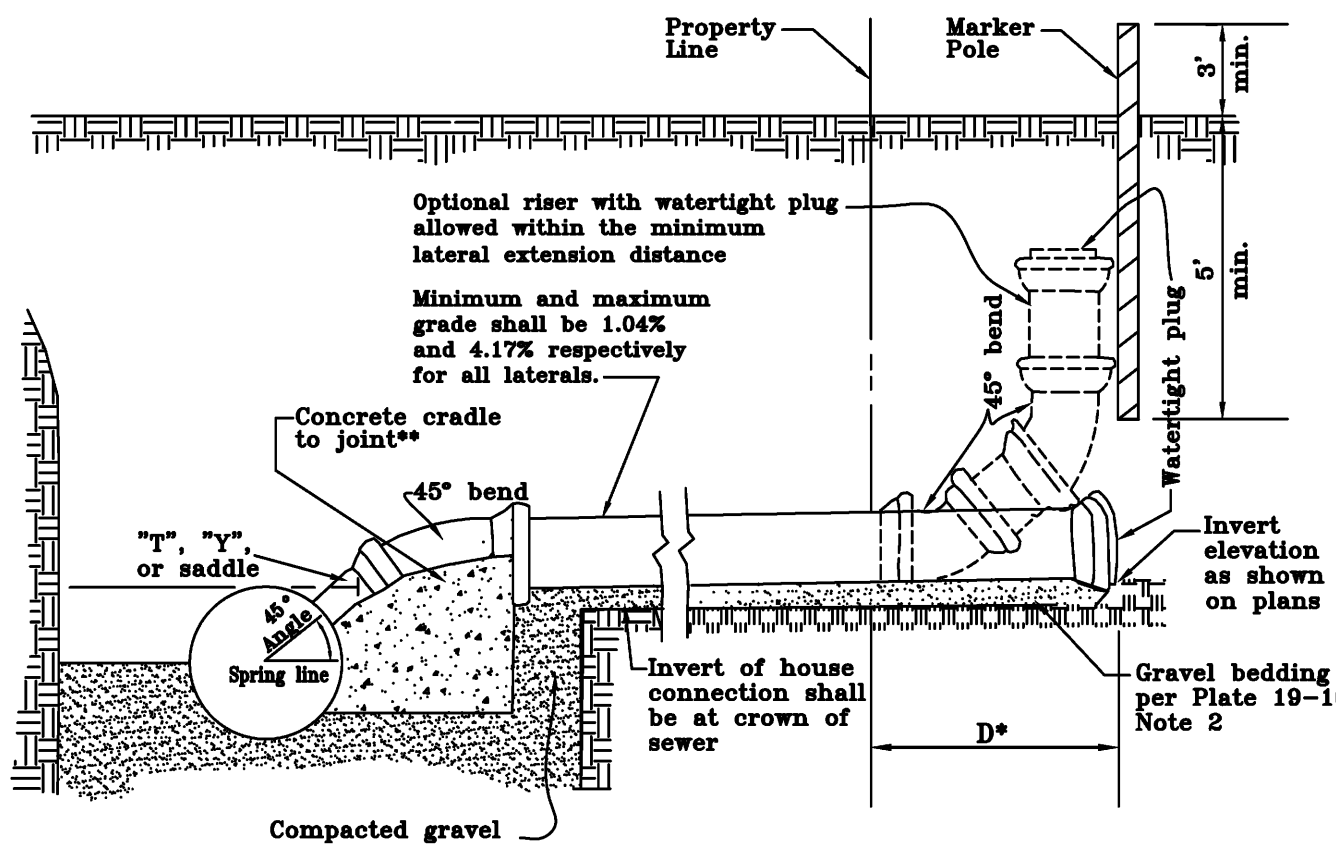
PAVEMENT PATCH DETAIL FOR USE IN AREAS WHERE EXISTING ISLANDS HAVE BEEN REMOVED, UTILITY CUTS, AROUND PERIMETER OF PROPOSED CURBING AND GUTTER AREAS OF PAVEMENT REPLACEMENT PER SEPARATELY PREPARED PAVEMENT MAINTENANCE PLAN.



SANITARY LATERAL DETAIL

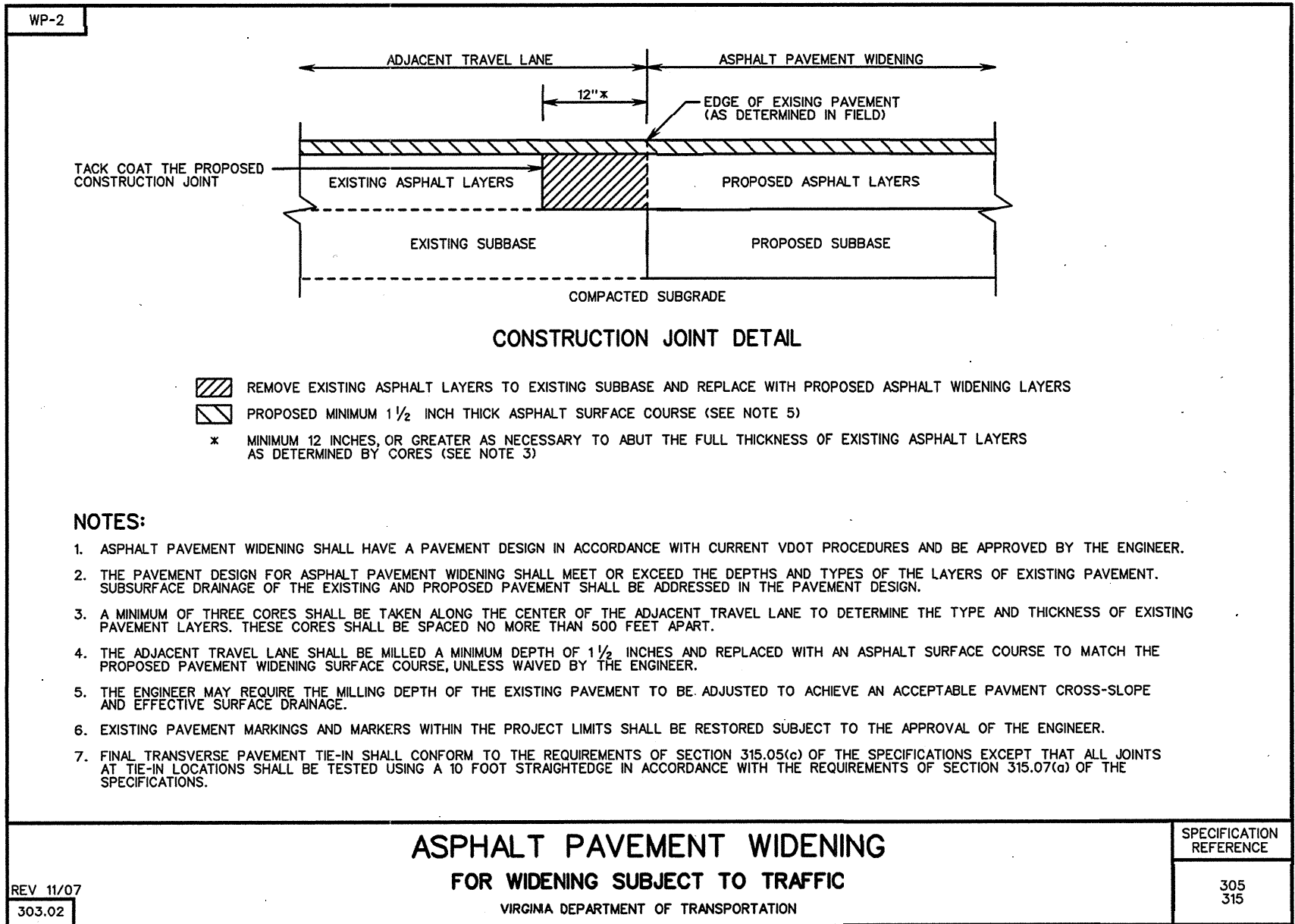
TO AVOID CONFLICTS WITH OTHER UNDERGROUND SERVICE UTILITIES, THE MINIMUM LATERAL EXTENSION DISTANCE (D)* SHALL BE:

| | |
|-------------------------|--|
| Single-Family Detached | 20 ft beyond the property line or within 5 ft of the minimum yard requirement, whichever distance is less. |
| Single-Family Townhouse | 5 ft beyond the property line or sanitary sewer easement, whichever distance is greater. |



NOTES:

1. Gravel bedding beyond the concrete cradle shall conform to Note 2 of Plate 19-10.
2. Lateral pipe material shall be as specified in Section 10-0103.8 or in the International Plumbing Code.
3. CI Saddles shall be as made by Richmond Foundry, Pioneer Foundry, or approved equal.
4. A long sweep, 90-degree bend may be used as an alternate to two 45-degree bends.

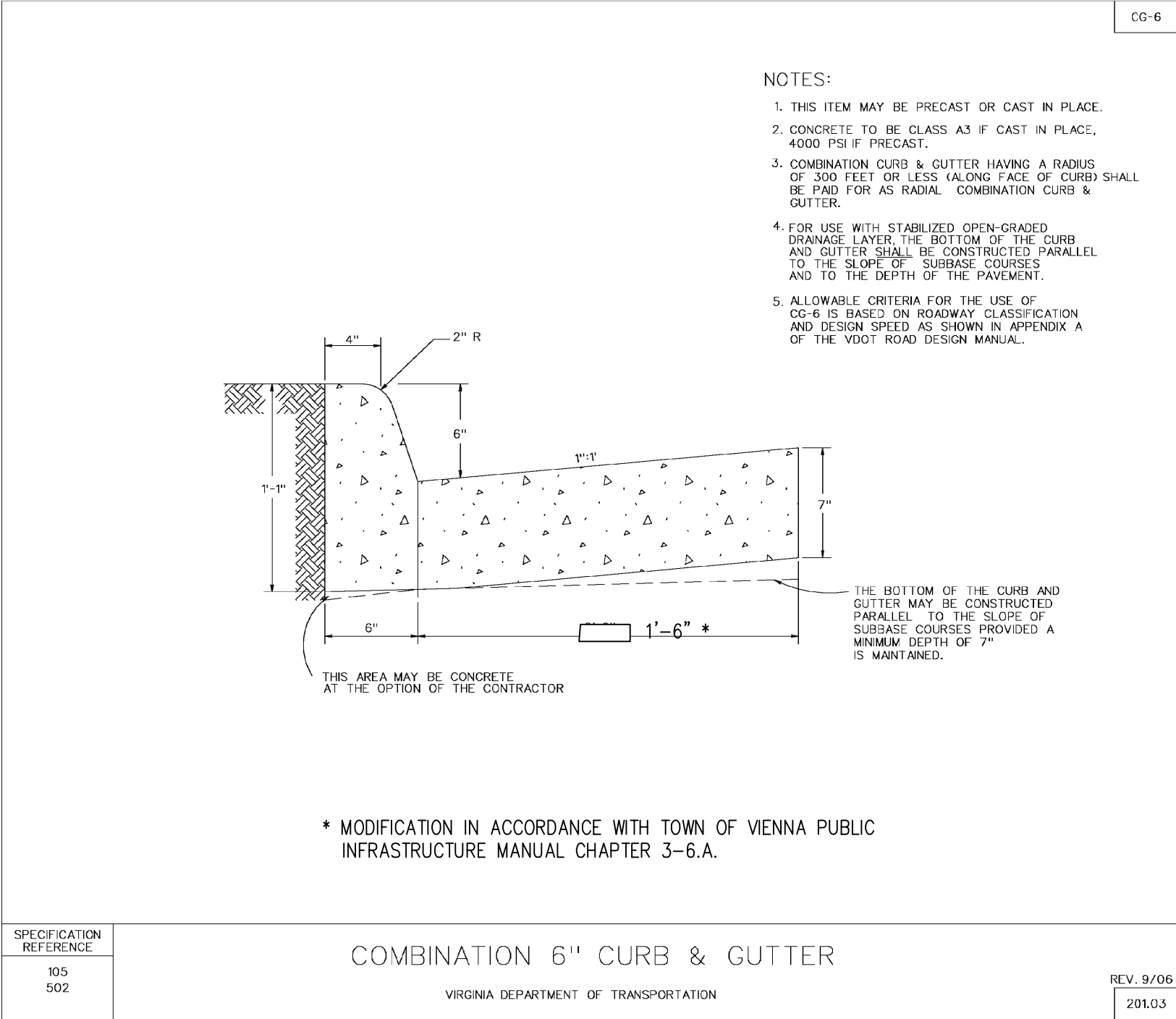


NOTES:

1. ASPHALT PAVEMENT WIDENING SHALL HAVE A PAVEMENT DESIGN IN ACCORDANCE WITH CURRENT VDOT PROCEDURES AND BE APPROVED BY THE ENGINEER.
2. THE PAVEMENT DESIGN FOR ASPHALT PAVEMENT WIDENING SHALL MEET OR EXCEED THE DEPTHS AND TYPES OF THE LAYERS OF EXISTING PAVEMENT. SUBSURFACE DRAINAGE OF THE EXISTING AND PROPOSED PAVEMENT SHALL BE ADDRESSED IN THE PAVEMENT DESIGN.
3. A MINIMUM OF THREE CORES SHALL BE TAKEN ALONG THE CENTER OF THE ADJACENT TRAVEL LANE TO DETERMINE THE TYPE AND THICKNESS OF EXISTING PAVEMENT LAYERS. THESE CORES SHALL BE SPACED NO MORE THAN 500 FEET APART.
4. THE ADJACENT TRAVEL LANE SHALL BE MILLED A MINIMUM DEPTH OF 1 1/2 INCHES AND REPLACED WITH AN ASPHALT SURFACE COURSE TO MATCH THE PROPOSED PAVEMENT WIDENING SURFACE COURSE UNLESS DIRECTED BY THE ENGINEER.
5. THE ENGINEER MAY REQUIRE THE MILLING DEPTH OF THE EXISTING PAVEMENT TO BE ADJUSTED TO ACHIEVE AN ACCEPTABLE PAVEMENT CROSS-SLOPE AND EFFECTIVE SURFACE DRAINAGE.
6. EXISTING PAVEMENT MARKINGS AND MARKERS WITHIN THE PROJECT LIMITS SHALL BE RESTORED SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. FINAL TRANSVERSE PAVEMENT TE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 35.05(a) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TE-IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 35.07(a) OF THE SPECIFICATIONS.

ASPHALT PAVEMENT WIDENING
FOR WIDENING SUBJECT TO TRAFFIC
VIRGINIA DEPARTMENT OF TRANSPORTATION

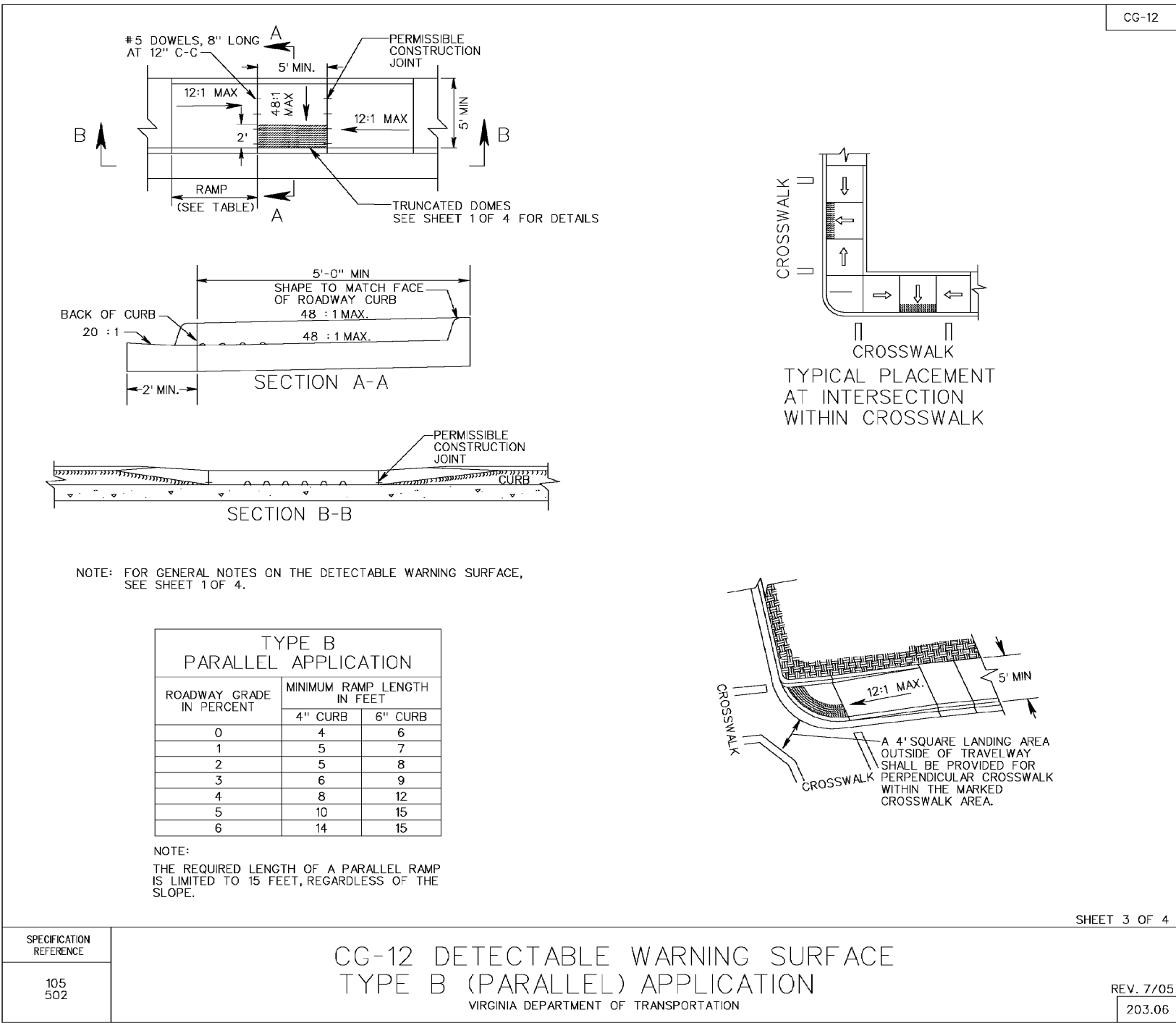
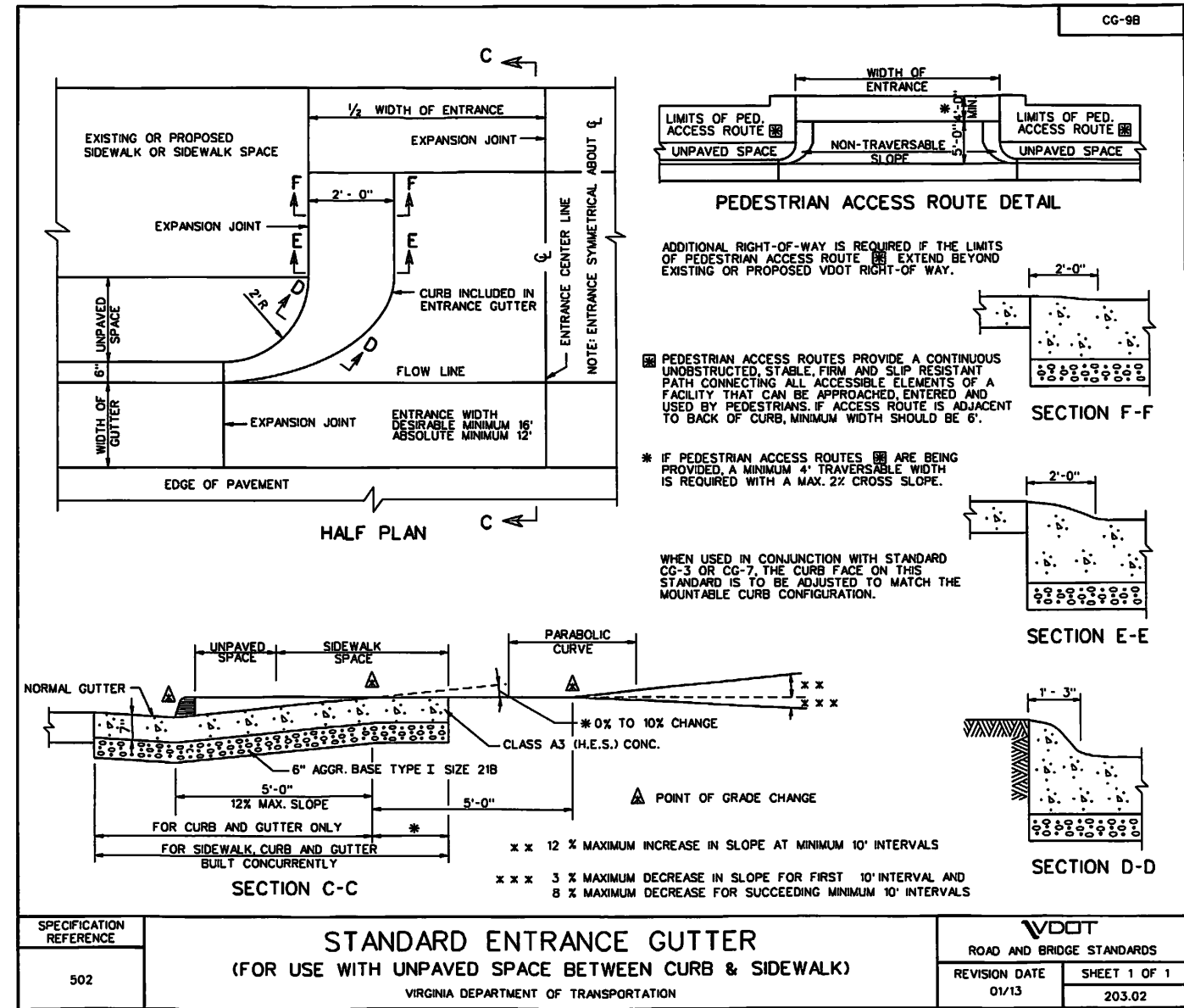
| |
|----------------------------|
| SPECIFICATION REFERENCE |
| 305 310 |



NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
2. CONCRETE TO BE CLASS AS IF CAST IN PLACE, 4000 PSI or PRECAST.
3. COMBINATION CURB & GUTTER HAVING A RADIUS OF 300 FEET OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS RADIUS, COMBINATION CURB & GUTTER.
4. FOR USE WITH STABILIZED OPEN-GRADED DRAINAGE LAYER, THE BOTTOM OF THE CURB AND GUTTER SHALL BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBBASE COURSES AND TO THE DEPTH OF THE WARDEN.
5. ALLOWABLE CRITERIA FOR THE USE OF CG-6 IS BASED ON ROADWAY CLASSIFICATION AND DESIGN SPEED AS SHOWN IN APPENDIX A OF THE VDOT ROAD DESIGN MANUAL.

* MODIFICATION IN ACCORDANCE WITH TOWN OF VIENNA PUBLIC INFRASTRUCTURE MANUAL CHAPTER 3-6.A.



TYPE B PARALLEL APPLICATION
ROADWAY GRADE IN PERCENT MINIMUM RAMP LENGTH IN FEET
4\"/>

NOTE:
ALL DETAILS PROVIDED ON THIS SHEET ARE CURRENT AT TIME OF PLAN PREPARATION. CONTRACTOR IS RESPONSIBLE FOR USING CURRENT DETAILS AT TIME OF CONSTRUCTION.

NOTES AND DETAILS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

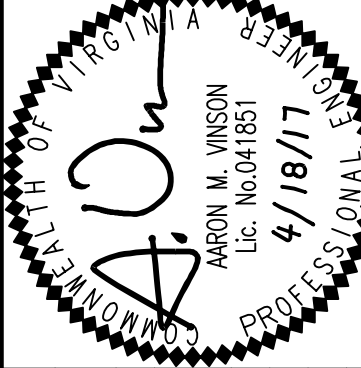
Engineers • Surveyors • Planners
Landscape Architects • Arborists

WALTER L. PHILLIPS

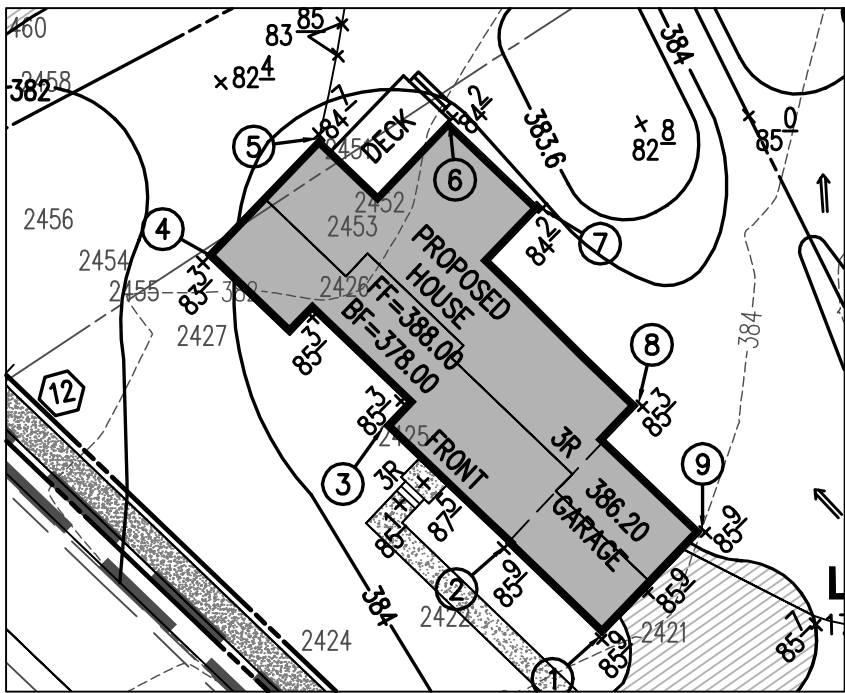
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

INCORPORATED ESTABLISHED 1945
DATE: 10/17/32/17, 4/18/17
SCALE: 1"=30'

CHECKED: JG
DRAWN: SO



| REVISION APPROVED BY | DATE | APPROVED | REVISION | DATE | BY |
|----------------------|------|----------|----------|------|----|
| DESCRIPTION | | | | | |
| NO. | | | | | |



LOT 1 LOT 1 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 385.90 | 383.79 | -2.11 |
| 2 | 385.90 | 383.12 | -2.78 |
| 3 | 385.30 | 382.75 | -2.55 |
| 4 | 384.30 | 381.64 | -2.66 |
| 5 | 384.70 | 381.82 | -2.88 |
| 6 | 384.10 | 382.08 | -2.02 |
| 7 | 384.00 | 382.56 | -1.44 |
| 8 | 385.30 | 383.39 | -1.91 |
| 9 | 385.90 | 383.97 | -1.93 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 17,556 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,389) | 22.1% (3,886) |
| HOUSE WITH PORCHES | | 2,467 |
| DRIVEWAYS | | 1,419 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 24 |
| REAR | 35 | 35.6 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 189 |
| @ FRONT BRL (35') | 60 | 177 |
| @ MIDPOINT | 90 | 170 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (878 SF) | 1% (175) |
| LOT SHAPE FACTOR (MAX.) | 25 | 17.55 |
| PERIMETER (FT) | 663 (MAX) | 555 |

BUILDING HEIGHT COMPUTATIONS

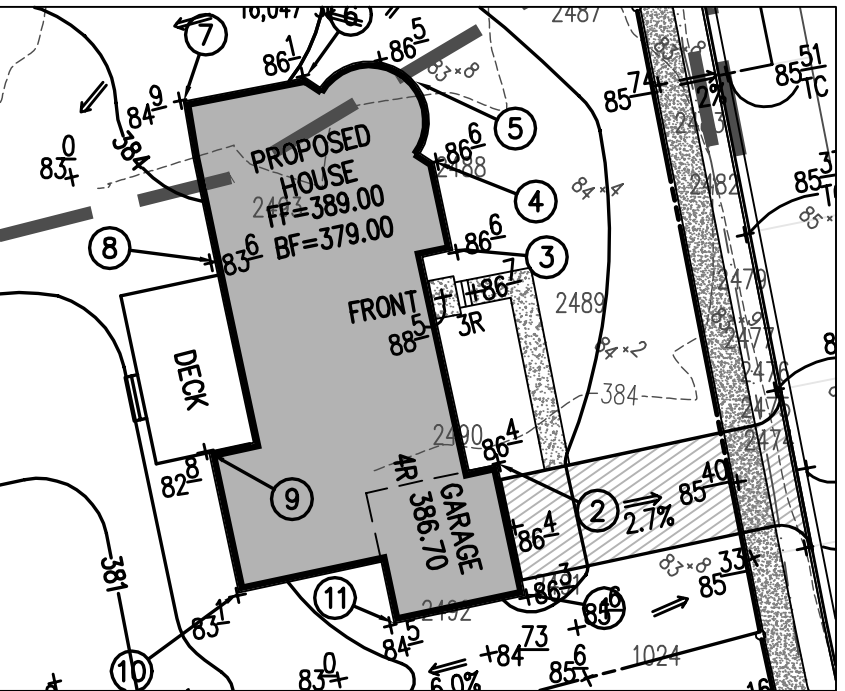
AVERAGE FRONT GRADE (AT GRADE) 385.35

FF ELEVATION 388.00
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 420.35

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 5 LOT 5 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 386.30 | 383.37 | -2.93 |
| 2 | 386.40 | 383.77 | -2.63 |
| 3 | 386.60 | 385.03 | -1.57 |
| 4 | 386.60 | 384.55 | -2.05 |
| 5 | 386.55 | 383.88 | -2.67 |
| 6 | 386.10 | 383.73 | -2.37 |
| 7 | 384.90 | 383.38 | -1.52 |
| 8 | 383.60 | 384.6 | 1.00 |
| 9 | 382.80 | 383.31 | 0.51 |
| 10 | 383.10 | 382.80 | -0.30 |
| 11 | 384.50 | 382.64 | -1.86 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,047 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,012) | 23.2% (3,729) |
| HOUSE WITH PORCHES | | 2,986 |
| DRIVEWAYS | | 743 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15/25 | 15.1/25.1 |
| REAR | 35 | 47 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 124 |
| @ FRONT BRL (35') | 60 | 127 |
| @ MIDPOINT | 90 | 129 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (802 SF) | 3% (425) |
| LOT SHAPE FACTOR (MAX.) | 25 | 15.58 |
| PERIMETER (FT) | 634 (MAX) | 500 |

BUILDING HEIGHT COMPUTATIONS

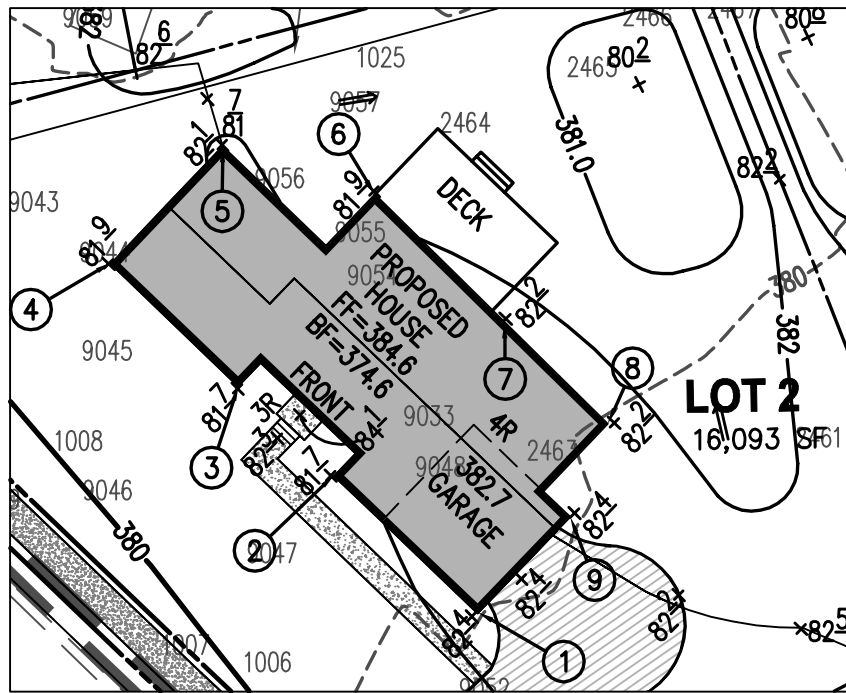
AVERAGE FRONT GRADE (AT GRADE) 386.49

FF ELEVATION 389.00
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 421.49

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 2 LOT 2 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 382.40 | 380.33 | -2.07 |
| 2 | 381.70 | 379.09 | -2.61 |
| 3 | 381.70 | 378.77 | -2.93 |
| 4 | 381.90 | 379.10 | -2.80 |
| 5 | 382.10 | 379.14 | -2.96 |
| 6 | 381.90 | 378.92 | -2.98 |
| 7 | 382.20 | 379.25 | -2.95 |
| 8 | 382.20 | 380.07 | -2.13 |
| 9 | 382.40 | 379.94 | -2.46 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,093 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,023) | 24.0% (3,862) |
| HOUSE WITH PORCHES | | 2,417 |
| DRIVEWAYS | | 1,445 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 15.1 |
| REAR | 35 | 35.1 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 153 |
| @ FRONT BRL (35') | 60 | 151 |
| @ MIDPOINT | 90 | 134 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (805 SF) | 2% (375) |
| LOT SHAPE FACTOR (MAX.) | 25 | 16.61 |
| PERIMETER (FT) | 634 (MAX) | 517 |

BUILDING HEIGHT COMPUTATIONS

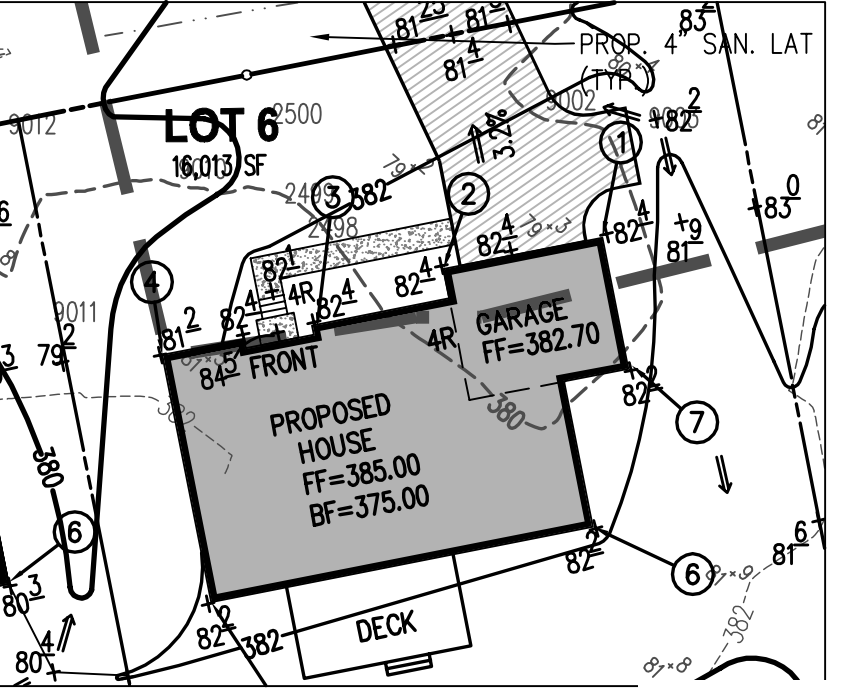
AVERAGE FRONT GRADE (AT GRADE) 381.93

FF ELEVATION 384.60
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 416.93

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 6 LOT 6 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 382.40 | 379.71 | -2.69 |
| 2 | 382.40 | 379.56 | -2.84 |
| 3 | 382.40 | 380.35 | -2.05 |
| 4 | 381.20 | 381.5 | 0.30 |
| 5 | 382.20 | 382.00 | -0.20 |
| 6 | 382.20 | 380.88 | -1.32 |
| 7 | 382.20 | 380.15 | -2.05 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,013 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,003) | 21.4% (3,431) |
| HOUSE WITH PORCHES | | 2,657 |
| DRIVEWAYS | | 774 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 15.1 |
| REAR | 35 | 65 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 111 |
| @ FRONT BRL (35') | 60 | 111 |
| @ MIDPOINT | 90 | 111 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (801 SF) | 2% (375) |
| LOT SHAPE FACTOR (MAX.) | 25 | 16.05 |
| PERIMETER (FT) | 634 (MAX) | 507 |

BUILDING HEIGHT COMPUTATIONS

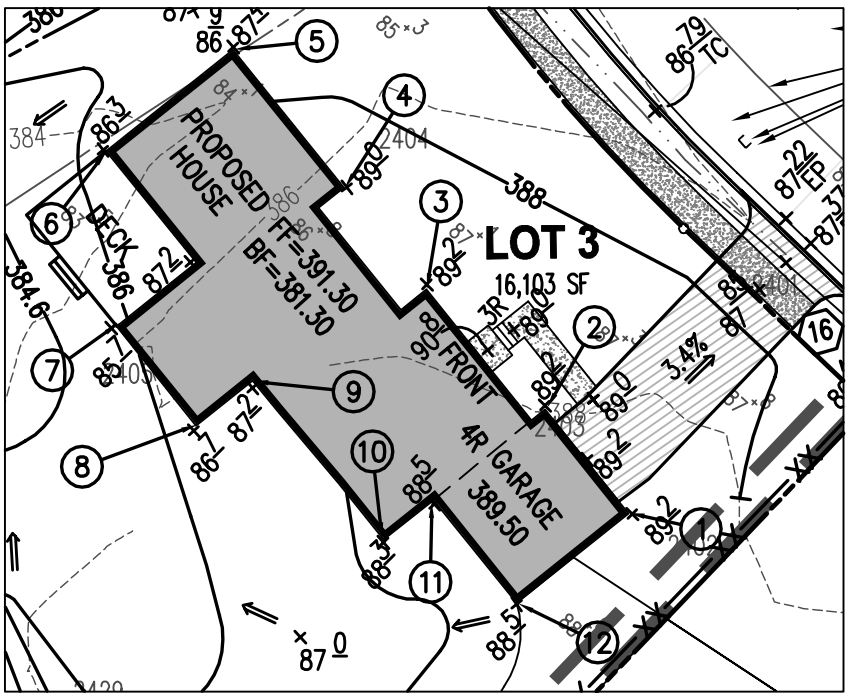
AVERAGE FRONT GRADE (AT GRADE) 382.10

FF ELEVATION 385.00
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 417.10

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 3 LOT 3 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 389.20 | 388.52 | -0.68 |
| 2 | 389.20 | 387.85 | -1.35 |
| 3 | 389.20 | 387.46 | -1.74 |
| 4 | 389.00 | 386.71 | -2.29 |
| 5 | 387.40 | 384.50 | -2.90 |
| 6 | 386.30 | 383.72 | -2.58 |
| 7 | 385.70 | 385.89 | 0.19 |
| 8 | 386.70 | 386.21 | -0.49 |
| 9 | 387.20 | 386.80 | -0.40 |
| 10 | 388.30 | 389.08 | 0.78 |
| 11 | 388.50 | 388.87 | 0.37 |
| 12 | 388.50 | 388.56 | 0.06 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,103 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,026) | 21.2% (3,417) |
| HOUSE WITH PORCHES | | 2,705 |
| DRIVEWAYS | | 712 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 15.1 |
| REAR | 35 | 35.1 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 115 |
| @ FRONT BRL (35') | 60 | 127 |
| @ MIDPOINT | 90 | 134 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (805 SF) | 2% (375) |
| LOT SHAPE FACTOR (MAX.) | 25 | 16.79 |
| PERIMETER (FT) | 635 (MAX) | 520 |

BUILDING HEIGHT COMPUTATIONS

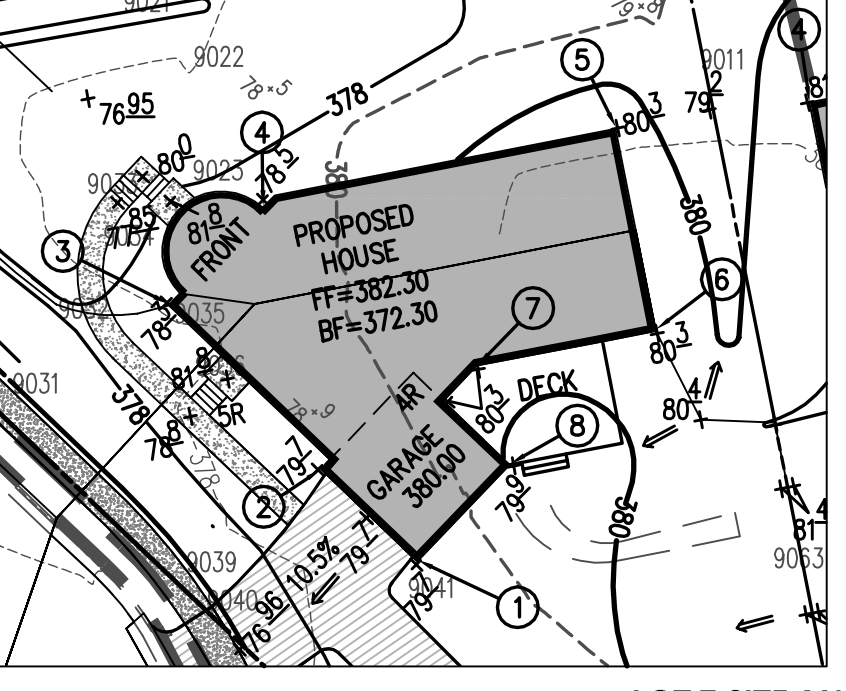
AVERAGE FRONT GRADE (AT GRADE) 389.15

FF ELEVATION 391.30
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 424.15

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 7 LOT 7 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 379.70 | 379.09 | -0.61 |
| 2 | 379.70 | 378.71 | -0.99 |
| 3 | 378.30 | 378.20 | -0.10 |
| 4 | 378.50 | 378.63 | 0.13 |
| 5 | 380.30 | 381.71 | 1.41 |
| 6 | 380.30 | 382.77 | 2.47 |
| 7 | 380.30 | 381.05 | 0.75 |
| 8 | 379.90 | 381.44 | 1.54 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,055 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,014) | 24.9% (4,005) |
| HOUSE WITH PORCHES | | 2,816 |
| DRIVEWAYS | | 1,189 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15/25 | 15.1/25.1 |
| REAR | 35 | 54 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 157 |
| @ FRONT BRL (35') | 60 | 133 |
| @ MIDPOINT | 90 | 104 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (803 SF) | 2% (275) |
| LOT SHAPE FACTOR (MAX.) | 25 | 18.57 |
| PERIMETER (FT) | 634 (MAX) | 546 |

BUILDING HEIGHT COMPUTATIONS

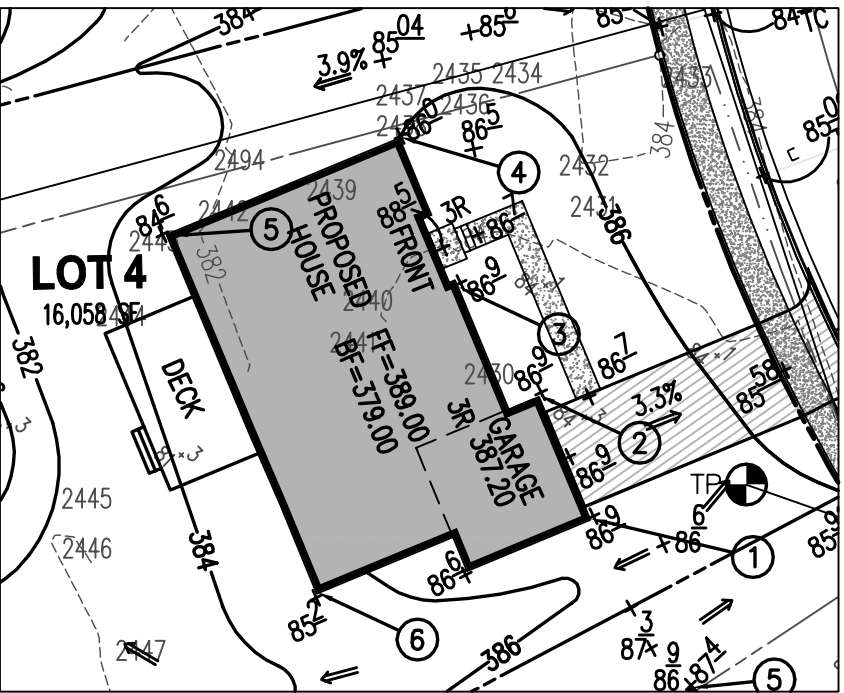
AVERAGE FRONT GRADE (AT GRADE) 379.03

FF ELEVATION 382.30
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 414.03

ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *



LOT 4 LOT 4 SITE ANALYSIS

| POINT | PROPOSED ELEVATION | EXISTING ELEVATION | DEVIATION |
|-------|--------------------|--------------------|-----------|
| 1 | 386.90 | 384.86 | -2.04 |
| 2 | 386.90 | 384.4 | -2.50 |
| 3 | 386.90 | 384.14 | -2.76 |
| 4 | 386.00 | 383.2 | -2.80 |
| 5 | 384.60 | 381.61 | -2.99 |
| 6 | 385.20 | 386.2 | 1.00 |

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,103 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,026) | 21.2% (3,417) |
| HOUSE WITH PORCHES | | 2,705 |
| DRIVEWAYS | | 712 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 15.1 |
| REAR | 35 | 35.1 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 115 |
| @ FRONT BRL (35') | 60 | 127 |
| @ MIDPOINT | 90 | 134 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (805 SF) | 2% (375) |
| LOT SHAPE FACTOR (MAX.) | 25 | 16.79 |
| PERIMETER (FT) | 635 (MAX) | 520 |

BUILDING HEIGHT COMPUTATIONS

AVERAGE FRONT GRADE (AT GRADE) 386.68

FF ELEVATION 389.00
ELEV. OF PEAK RIDGE (MAX. HEIGHT ELEVATION): 421.68

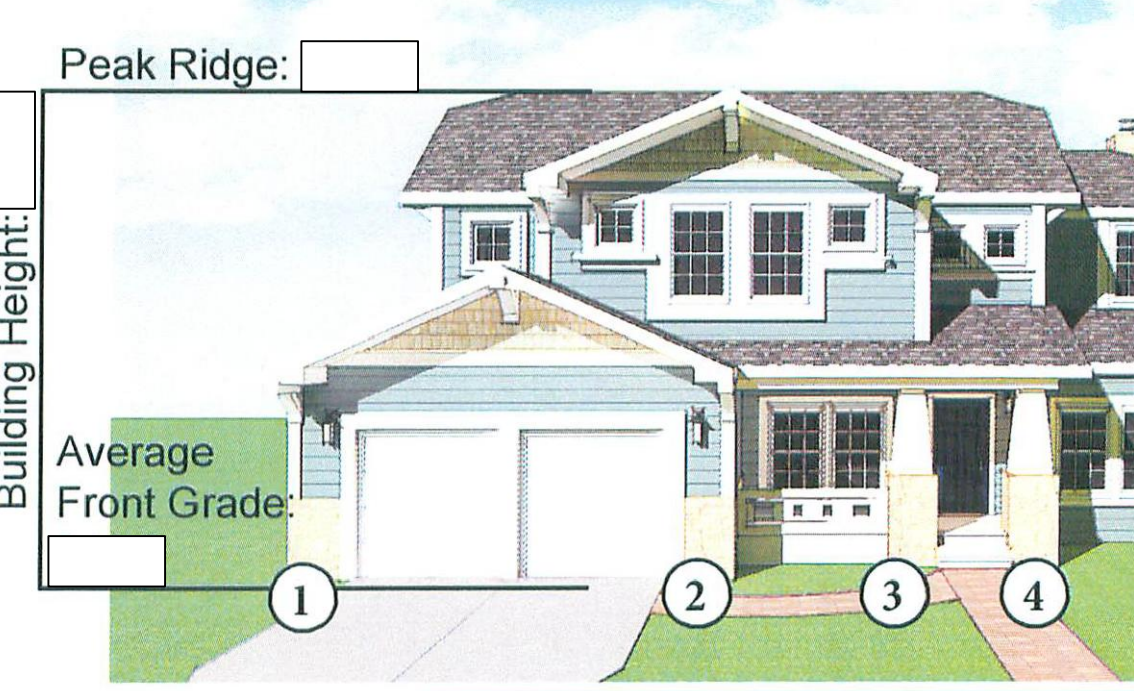
ACTUAL BUILDING HEIGHT (FEET) TBD *
(FROM FRONT AVERAGE GRADE)
(35' MAX. HEIGHT ALLOWED)

BUILDING INFORMATION BELOW PROVIDED BY ARCHITECT:

FINISHED FLOOR TO PEAK RIDGE= TBD *

LOT 4 SITE ANALYSIS

| DESCRIPTION | REQUIRED/ALLOWED | PROVIDED/EXISTING |
|---------------------------|------------------|-------------------|
| ZONE | RS-16 | RS-16 |
| LOT AREA (SF) | 16,000 | 16,058 |
| MAXIMUM LOT COVERAGE (SF) | 25% (4,015) | 20.6% (3,306) |
| HOUSE WITH PORCHES | | 2,549 |
| DRIVEWAYS | | 757 |
| SETBACK (FT) | | |
| FRONT (50' MIN. ROW) | 35 | 35.1 |
| SIDE | 15 | 15.1 |
| REAR | 35 | 65 |
| LOT WIDTH (FT) | 50/60/90 | |
| @ FRONT LOT LINE | 50 | 94 |
| @ FRONT BRL (35') | 60 | 102 |
| @ MIDPOINT | 90 | 110 |
| BUILDING HEIGHT (FT) | 35 | 34.9 |
| DECK COVERAGE | 5% (803 SF) | 2% (375) |
| LOT SHAPE FACTOR (MAX.) | 25 | 16.39 |
| PERIMETER (FT) | 634 (MAX) | 513 |

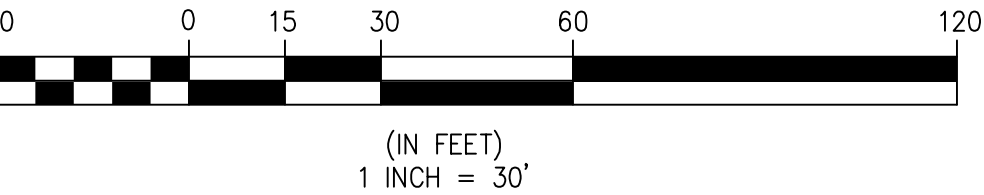


BUILDING HEIGHT DETAIL

* TBD TO BE DETERMINED BY AT TIME OF LOT GRADING PLAN SUBMISSION. FROM ELEVATION OF PEAK RIDGE TO AVERAGE FRONT GRADE SHALL NOT EXCEED 35'. BUILDING FOOTPRINTS SUBJECT TO CHANGE AT TIME OF SUBMISSION OF LOT GRADING PLANS FOR BUILDING PERMITS.

LEGEND

| | |
|--------|----------------------------|
| AC | ACRES |
| BOL | BOLLARD |
| CATV | CABLE TV BOX |
| CO | CLEANOUT |
| CONC | CONCRETE |
| DB, PG | DEED BOOK, PAGE |
| DHF | DRILL HOLE FOUND |
| DHS | DRILL HOLE SET |
| DRAIN | DRAINAGE |
| EB | ELECTRIC BOX |
| EM | ELECTRIC METER |
| EP | EDGE OF PAVEMENT |
| EPAD | ELECTRIC PAD |
| ESMT | EASEMENT |
| FC | FACE OF CURB |
| FDC | FIRE DEPARTMENT CONNECTION |
| FCAP | FILLER CAP |
| GM | GAS METER |
| GV | GAS VALVE |
| IPF | IRON PIN FOUND |
| IPS | IRON PIN SET |
| MB | US MAILBOX |
| MH | MANHOLE |
| MW | MONITORING WELL |
| PKF | PK NAIL FOUND |
| PKS | PK NAIL SET |
| PGB | POINT OF BEGINNING |
| PNTR | PLANTER |
| RD | ROOF DRAIN |
| SF | SQUARE FEET |
| SP | SIGN POST |
| SS | SANITARY SEWER MANHOLE |
| ST | STORM STRUCTURE |
| S/W | SIDEWALK |
| TB | TELEPHONE BOOTH |
| TCB | TRAFFIC CONTROL BOX |
| TP | TELEPHONE PEDESTAL |
| UTIL | UTILITY, UTILITIES |
| TSP | TRAFFIC SIGNAL POLE |
| WM | WATER METER |
| WSB | WATER SPRINKLER BOX |
| WSP | WATER STAND PIPE |
| WV | WATER VALVE |
| WD | DUMPSTER PAD |
| FD | FIRE HYDRANT |
| HP | HANDICAPPED PARKING SPACE |
| GL | GROUND LIGHT |
| LLP | LARGE LIGHT POLE (1 LITE) |
| LLP2 | LARGE LIGHT POLE (2 LITE) |
| LLP4 | LARGE LIGHT POLE (4 LITE) |
| SLP | SMALL LIGHT POLE |
| PM | PARKING METER |
| SP1 | SIGN (1 POLE) |
| SP2 | SIGN (2 POLE) |
| TPAD | TRANSFORMER PAD |
| UP | UTILITY POLE |
| ULP | UTILITY POLE WITH LIGHT |
| F | FENCE |
| GR | GUARD RAIL |
| GW | GUY WIRE |
| OW | OVERHEAD WIRES |
| SS | SANITARY SEWER LINE |
| ST | STORM SEWER LINE |
| E | UNDERGROUND ELECTRIC LINE |
| G | UNDERGROUND GAS LINE |
| T | UNDERGROUND TELEPHONE LINE |
| U | UNDERGROUND UTILITY LINE |
| W | WATER LINE |



SANITARY SEWER AS-BUILT

| | |
|-------------------------|--------|
| SMH 015 | |
| MANHOLE TOP = | 387.62 |
| 12" INV IN (EAST) = | 371.02 |
| 12" INV OUT (SMH 014) = | 370.88 |
| SMH 014 | |
| MANHOLE TOP = | 377.37 |
| 12" INV IN (SMH 015) = | 369.97 |
| 12" INV OUT (SMH 013) = | 369.72 |
| SMH 018 | |
| MANHOLE TOP = | 381.54 |
| 15" INV IN (S.EAST) = | 371.34 |
| 15" INV OUT (SMH 053) = | 371.24 |
| SMH 053 | |
| MANHOLE TOP = | 375.98 |
| 12" INV IN (S.WEST) = | 365.53 |
| 15" INV IN (SMH 018) = | 364.63 |
| 15" INV OUT (SMH 013) = | 364.58 |

STORM SEWER AS-BUILT

| | |
|------------------------------|--------|
| SD 822 | |
| YARD INLET TOP = | 384.18 |
| 18" RCP IN (EAST) = | 380.93 |
| 18" RCP OUT (SD 1287) = | 380.38 |
| SD 1287 | |
| YARD INLET TOP = | 379.46 |
| 18" RCP IN (SD 822) = | 376.81 |
| 18" RCP OUT (SD 1897) = | 376.71 |
| SD 2017 | |
| MANHOLE TOP = | 386.78 |
| 29" X45" RCP IN (S.EAST) = | 381.98 |
| 15" RCP IN (N.EAST) = | 381.33 |
| 15" RCP IN (S.WEST) = | 380.13 |
| 36" RCP OUT (SD 2011) = | 379.53 |
| SD 2011 | |
| MANHOLE TOP = | 380.98 |
| 18" RCP IN (S.WEST) = | 373.63 |
| 36" RCP IN (SD 2017) = | 373.59 |
| 29" X45" RCP OUT (SD 2008) = | 373.57 |
| SD 2008 | |
| MANHOLE TOP = | 378.39 |
| 29" X45" RCP IN (SD 2011) = | 372.94 |
| 34" X53" RCP OUT (SD 1897) = | 372.89 |

| | |
|------------------------------|--------|
| SD 1897 | |
| CURB GRATE TOP = | 377.35 |
| 18" RCP IN (SD 1287) = | 373.40 |
| 34" X53" RCP IN (SD 2008) = | 372.65 |
| 34" X53" RCP OUT (SD 1878) = | 372.55 |
| SD 1878 | |
| CURB INLET TOP = | 376.41 |
| 34" X53" RCP IN (SD 1897) = | 372.41 |
| 29" X45" RCP OUT (SD 1853) = | 372.16 |
| SD 1853 | |
| CURB INLET TOP = | 375.65 |
| 29" X45" RCP IN (SD 1878) = | 371.65 |
| 29" X45" RCP OUT (SD 1406) = | 371.60 |
| SD 1406 | |
| CURB INLET TOP = | 376.12 |
| 15" RCP OUT (SD 1406) = | 371.97 |
| SD 1406 | |
| CURB INLET TOP = | 375.22 |
| 15" RCP IN (SD 1405) = | 371.52 |
| 29" X45" RCP IN (SD 1853) = | 371.22 |
| 15" RCP IN (SD 1403) = | 371.22 |
| 36" RCP OUT (N.WEST) = | 371.07 |

CURVE TABLE

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHORD BEARING |
|-------|---------|---------|-----------|---------|---------|---------------|
| C1 | 25.00' | 39.27' | 90°00'00" | 25.00' | 35.36' | S56°10'01"E |
| C2 | 273.82' | 167.86' | 35°07'30" | 86.66' | 165.25' | S28°43'46"E |
| C3 | 273.82' | 18.61' | 3°53'40" | 9.31' | 18.61' | S13°06'51"E |
| C4 | 273.82' | 87.51' | 18°18'38" | 44.13' | 87.14' | S24°13'00"E |
| C5 | 273.82' | 61.74' | 12°55'12" | 31.00' | 61.61' | S39°49'55"E |

DEMOLITION LEGEND

| SYMBOL | DESCRIPTION |
|--------|-------------------------------------|
| | STRUCTURE TO BE DEMOLISHED |
| | HOUSE TO BE DEMOLISHED |
| | EXISTING SITE FEATURE TO BE REMOVED |

INVERT TABLE

| | | |
|---|---------|-------|
| 1 | 12" CMP | 377.9 |
| 2 | 12" CMP | 378.2 |
| 3 | 12" CMP | 382.3 |
| 4 | 12" CMP | 382.4 |
| 5 | 12" CMP | 383.8 |
| 6 | 12" CMP | 383.8 |
| 7 | 12" CMP | 386.2 |
| 8 | 12" CMP | 386.4 |

DEMOLITION NOTES

- ALL ITEMS WITHIN LIMITS OF DISTURBANCE ARE TO BE DEMOLISHED UNLESS OTHERWISE NOTED.
- DEMOLITION SHOWN ON THIS PLAN TO COINCIDE WITH EROSION AND SEDIMENT CONTROL PHASES 1 AND 2 (SHEETS C-0601 AND C-0602).
- SEE TREE PRESERVATION PLAN ON SHEET C-0301 FOR ADDITIONAL TREE REMOVAL INFORMATION.
- SEE CONSTRUCTION NOTES ON SHEET C-0201.
- CONTRACTOR TO MILL AND OVERLAY DAMAGED ASPHALT THAT IS CALLED OUT TO REMAIN, IF DAMAGED DURING CONSTRUCTION.
- ALL PAVEMENT TO BE REMOVED OR MILLED AS NECESSARY TO ADJUST GRADES AND INSTALL DRIVEWAYS, UNLESS OTHERWISE NOTED ON THIS PLAN.

EXISTING CONDITIONS AND DEMOLITION PLAN

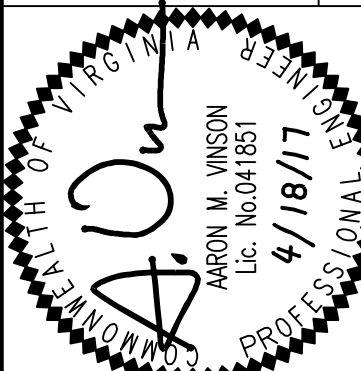
MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

WALTER L. PHILLIPS
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com



| NO. | DESCRIPTION | DATE | REVISION | APPROVED | DATE |
|-----|-------------|------|----------|----------|------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

CHECKED: JG
DRAWN: SO

DATE: 10/17/17, 3/2/17, 4/18/17

| TREE TAG NO. | TREE TYPE | CALIPER | | REMARKS | TREE TAG NO. | TREE TYPE | CALIPER | | REMARKS |
|--------------|-------------------|---------|------------|---------|--------------|-------------------|---------|---------------|---------|
| | | (INCH) | | | | | (INCH) | | |
| 1000 | RED MAPLE | 12 | | | 2452 | RED MAPLE | 10 | | |
| 1001 | BLACKGUM | 14 | | | 2453 | RED MAPLE | 19 | TWIN | |
| 1002 | RED MAPPLE | 16 | | | 2454 | TULIP POPLAR | 16 | | |
| 1003 | BLACKGUM | 6 | | | 2455 | TULIP POPLAR | 20 | | |
| 1004 | RED MAPLE | 14 | | | 2456 | TULIP POPLAR | 18 | | |
| 1005 | BLACKGUM | 6 | | | 2458 | WHITE OAK | 32 | | |
| 1006 | RED OAK | 18 | | | 2460 | MULBERRY | 8 | | |
| 1007 | RED OAK | 18 | | | 2461 | SILVER MAPLE | 21 | TRIPLE | |
| 1008 | RED MAPLE | 12 | | | 2463 | SILVER MAPLE | 36 | TRIPLE | |
| 1009 | TULIP POPLAR | 30 | | | 2464 | VIRGINIA CEDAR | 16 | | |
| 1010 | CHERRY | 8 | | | 2465 | BLACK WALNUT | 26 | | |
| 1011 | RED MAPLE | 21 | | | 2466 | AMERICAN HOLLY | 8 | | |
| 1012 | BLACKGUM | 15 | | | 2467 | TULIP POPLAR | 5 | | |
| 1013 | BLACKGUM | 8 | | | 2468 | MULBERRY | 6 | | |
| 1014 | CHERRY | 10 | | | 2474 | VIRGINIA CEDAR | 11 | | |
| 1015 | DEAD | 30 | | | 2475 | VIRGINIA CEDAR | 10 | DYING | |
| 1016 | RED MAPLE | 16 | | | 2476 | VIRGINIA CEDAR | 10 | | |
| 1017 | RED MAPLE | 16 | | | 2477 | VIRGINIA CEDAR | 10 | | |
| 1018 | RED MAPLE | 16 | | | 2479 | VIRGINIA CEDAR | 10 | | |
| 1019 | RED MAPLE | 16 | | | 2482 | VIRGINIA CEDAR | 12 | | |
| 1020 | RED MAPLE | 16 | | | 2483 | VIRGINIA CEDAR | 12 | | |
| 1021 | RED MAPLE | 16 | | | 2486 | VIRGINIA CEDAR | 10 | | |
| 1022 | RED MAPLE | 16 | | | 2486 | BLACK WALNUT | 12 | | |
| 1023 | RED MAPLE | 16 | | | 2487 | SAUCER MAGNOLIA | 10 | TRIPLE | |
| 1024 | RED MAPLE | 20 | | | 2488 | BRADFORD PEAR | 18 | | |
| 1025 | BLACKGUM | 6 | | | 2489 | JAPANESE MAPLE | 24 | MULTI-TRUNK | |
| 1026 | VIRGINIA CEDAR | 12 | | | 2490 | KOUSA DOGWOOD | 9 | | |
| 1027 | CHERRY | 14 | | | 2491 | JAPANESE MAPLE | 5 | | |
| 1028 | VIRGINIA CEDAR | 12 | | | 2492 | BRADFORD PEAR | 12 | SPLIT | |
| 1029 | BLUE SPRUCE | 4 | | | 2493 | FLOWERING DOGWOOD | 9 | | |
| 2344 | MAP | 8 | | | 2494 | FLOWRING DOGWOOD | 6 | | |
| 2401 | PIN OAK | 18 | | | 2495 | MULBERRY | 8 | | |
| 2402 | RED MAPLE | 42 | | | 2496 | DEAD | 18 | | |
| 2403 | AMERICAN HOLLY | 8 | | | 2498 | TREE OF HEAVEN | 8 | | |
| 2404 | RED MAPLE | 60 | | | 2499 | MULBERRY | 8 | | |
| 2405 | PIN OAK | 17 | | | 2500 | MULBERRY | 9 | | |
| 2406 | NORWAY SPRUCE | 21 | | | 9002 | RED MAPLE | 30 | | |
| 2407 | TULIP POPLAR | 28 | | | 9003 | DAWN REDWOOD | 32 | | |
| 2408 | TULIP POPLAR | 24 | | | 9007 | VIRGINIA CEDAR | 12 | | |
| 2409 | TULIP POPLAR | 10 | | | 9008 | VIRGINIA CEDAR | 10 | | |
| 2410 | TULIP POPLAR | 16 | | | 9009 | VIRGINIA CEDAR | 12 | | |
| 2411 | TULIP POPLAR | 21 | | | 9010 | CRABAPPLE SPECIES | 8 | | |
| 2412 | TULIP POPLAR | 24 | | | 9011 | NORWAY SPRUCE | 8 | | |
| 2413 | TULIP POPLAR | 12 | | | 9012 | WHITE PINE | 14 | | |
| 2414 | TULIP POPLAR | 14 | | | 9014 | JAPANESE MAPLE | 12 | | |
| 2415 | TULIP POPLAR | 22 | | | 9014 | WHITE PINE | 12 | | |
| 2416 | RED MAPLE | 18 | | | 9015 | WHITE PINE | 15 | | |
| 2417 | RED MAPLE | 21 | | | 9016 | WHITE PINE | 8 | | |
| 2418 | RED MAPLE | 9 | | | 9017 | WHITE PINE | 15 | | |
| 2419 | TULIP POPLAR | 24 | | | 9018 | WHITE PINE | 15 | | |
| 2420 | TULIP POPLAR | 22 | | | 9019 | WHITE PINE | 10 | | |
| 2421 | RED MAPLE | 14 | | | 9020 | WHITE PINE | 15 | TWIN | |
| 2422 | TULIP POPLAR | 20 | | | 9021 | RIVER BIRCH | 44 | MULTI-STEMMED | |
| 2423 | RED MAPLE | 9 | | | 9022 | JAPANESE MAPLE | 12 | | |
| 2424 | RED MAPLE | 15 | | | 9023 | JAPANESE MAPLE | 12 | TRIPLE | |
| 2425 | RED MAPLE | 20 | | | 9025 | AMERICAN ELM | 14 | TWIN | |
| 2426 | PIN OAK | 20 | | | 9026 | AMERICAN ELM | 12 | TWIN | |
| 2427 | TULIP POPLAR | 20 | | | 9027 | ASH (DYING) | 24 | | |
| 2429 | SERVICEBERRY | 8 | 10/12/ HT. | | 9031 | TREE OF HEAVEN | 22 | MULTI | |
| 2430 | AMERICAN HOLLY | 14 | | | 9032 | MULBERRY | 10 | | |
| 2431 | NORWAY MAPLE | 9 | | | 9033 | WHITE PINE | 12 | | |
| 2432 | AMERICAN HOLLY | 7 | TWIN | | 9034 | WHITE PINE | 12 | | |
| 2433 | NORWAY MAPLE | 34 | | | 9035 | WHITE PINE | 12 | | |
| 2434 | VIRGINIA CEDAR | 12 | | | 9036 | WHITE PINE | 9 | | |
| 2435 | VIRGINIA CEDAR | 10 | | | 9039 | ASH | 6 | | |
| 2436 | VIRGINIA CEDAR | 12 | | | 9040 | DEAD | 6 | DEAD | |
| 2437 | VIRGINIA CEDAR | 14 | | | 9041 | NORWAY SPRUCE | 11 | | |
| 2438 | VIRGINIA CEDAR | 9 | | | 9043 | CHERRY | 12 | | |
| 2439 | PIN OAK | 18 | | | 9044 | CHERRY | 16 | | |
| 2440 | FLOWERING DOGWOOD | 6 | TWIN | | 9045 | CHERRY | 12 | | |
| 2441 | AMERICAN HOLLY | 9 | | | 9046 | RED MAPLE | 6 | | |
| 2442 | SILVER MAPLE | 24 | TWIN | | 9047 | RED MAPLE | 12 | | |
| 2443 | AMERICAN HOLLY | 15 | | | 9048 | RED MAPLE | 13 | TWIN | |
| 2444 | RED MAPLE | 14 | | | 9052 | RED MAPLE | 32 | | |
| 2445 | RED OAK | 12 | | | 9053 | RED MAPLE | 21 | | |
| 2446 | RED OAK | 22 | | | 9054 | TULIP POPLAR | 15 | | |
| 2447 | DEAD (ASH) | 14 | | | 9055 | TULIP POPLAR | 10 | | |
| 2448 | MULBERRY | 11 | TWIN | | 9056 | RED MAPLE | 21 | | |
| 2451 | RED MAPLE | 26 | TWIN | | | | | | |



TREE INVENTORY

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

**TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA**



WALTER L. PHILLIPS

INCORPORATED

ENGINEERS • SURVEYORS • PLANNERS
 LANDSCAPE ARCHITECTS • ARBORISTS
 207 PARK AVENUE
 FALLS CHURCH, VIRGINIA 22046
 (703) 532-6163 Fax (703) 533-1301
 www.WLPHINC.com

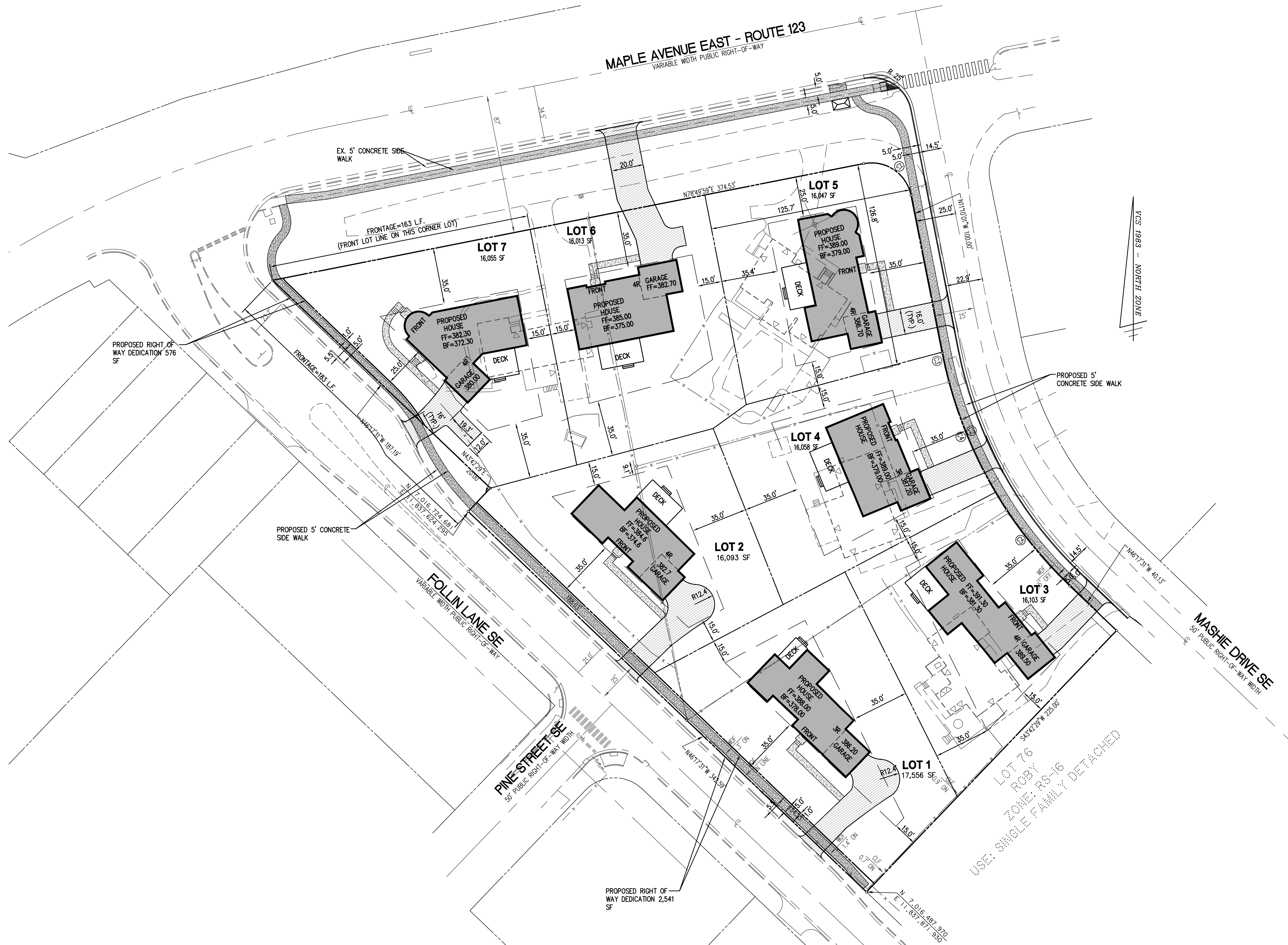
SCALE: 1" = 30'

DATE: 1/31/17, 3/2/17, 7/18/17

DRAWING: 50

CHECKED: JS

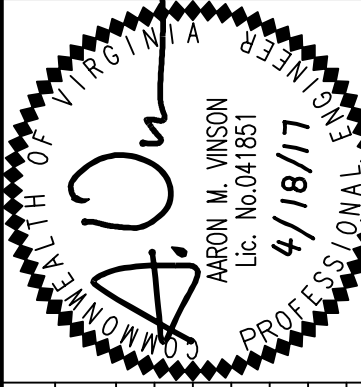
[illegible]



NOTE: ALL AREAS SHOWN ON PROPOSED LOTS AREAS ARE POST-DEDICATION

GEOMETRIC PLAN
MASHIE DRIVE SUBDIVISION
PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA

| NO. | DESCRIPTION | DATE | REV. | APPROVED BY | DATE |
|-----|-------------|------|------|-------------|------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



WALTER L. PHILLIPS
INCORPORATED
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ARBORISTS
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

CHECKED: JG
DRAWN: SO
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1"=30'



**TOWN OF VIRGINIA
FAIRFAX COUNTY, VIRGINIA**

[illegible]

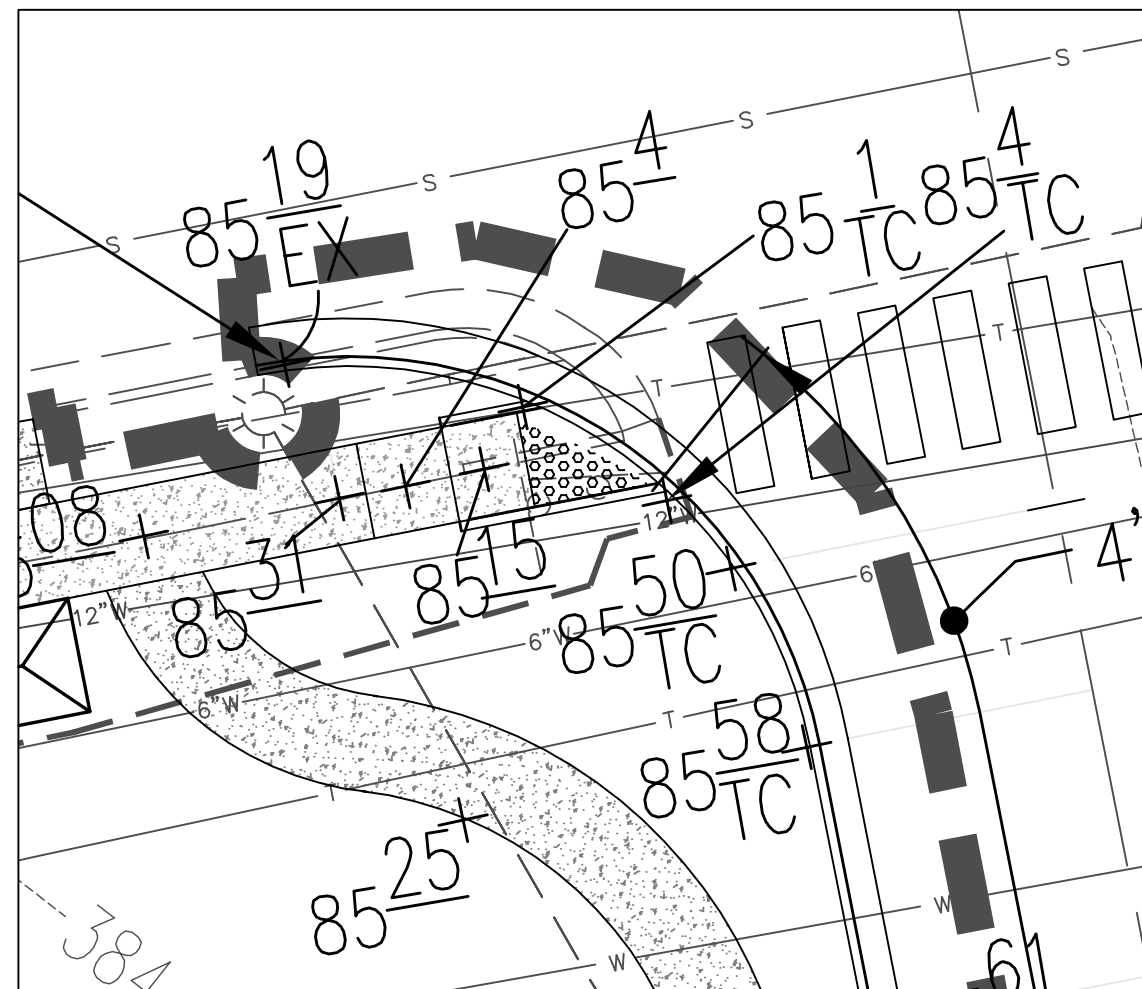
| | | |
|--|---------------|-----------------|
| | DRAWN: | CHECKED: |
|--|---------------|-----------------|

| PROPOSED | DESCRIPTION | EXISTING |
|----------|--------------------------------|----------|
| EP | EDGE OF PAVEMENT | EP |
| MH | MANHOLE | MH |
| WV | WATER VALVE | WV |
| WM | WATER METER | WM |
| GM | GAS METER | GM |
| TCB | TRAFFIC CONTROL BOX | TCB |
| LP | LIGHT POLE | LP |
| LP/S | LIGHT POLE WITH SIGNALS | LP/S |
| | CURB & GUTTER CG-2 | |
| | TRANSITION FROM CG-6 TO CG-6R | |
| | SANITARY SEWER | |
| | SANITARY LATERAL | |
| | CLEAN OUT | |
| | STORM SEWER | |
| | WATER MAIN | |
| | FIRE HYDRANT | |
| | PLUG | |
| | OVERHEAD WIRES | |
| | UTILITY POLE | |
| | UNDERGROUND ELECTRIC | |
| | TELEPHONE | |
| | GAS MAIN | |
| | ELECTRICAL | |
| | TRANSFORMER | |
| | HANDICAP RAMP (CG-12) | |
| | GUARDRAIL | |
| | FENCE | |
| | TRAFFIC FLOW | |
| | LIGHT | |
| | DOOR | |
| | TREES | |
| | LIMITS OF CLEARING AND GRADING | |
| | TEST PIT | |



PROPOSED CG-12B ON MAPLE AVE ENLARGEMENT VIEW

SCALE: 1"=10'



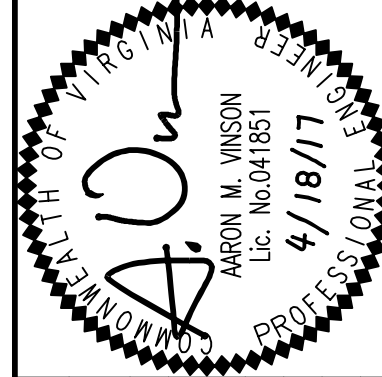
GRADING PLAN

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA



WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1"=30'

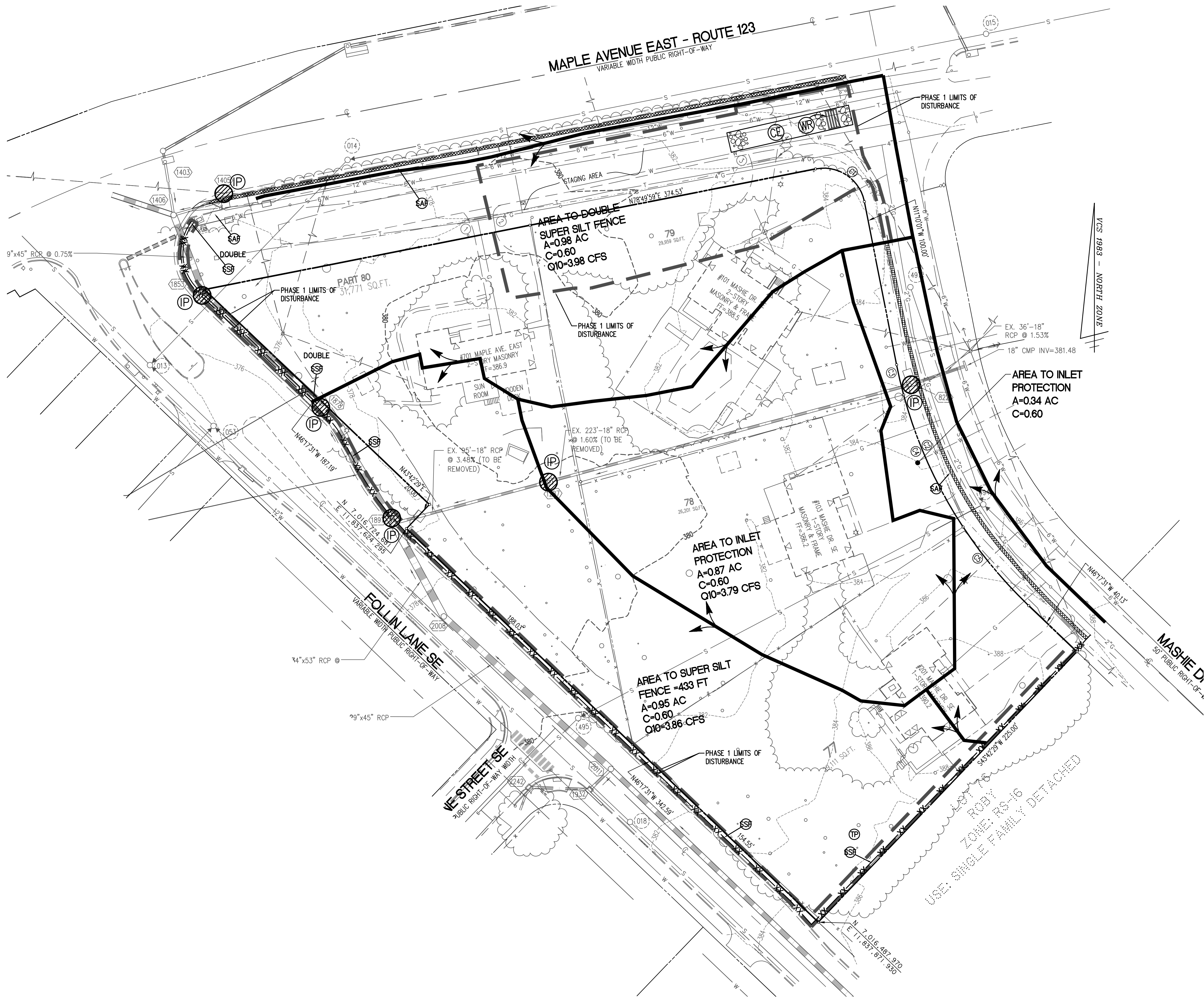
| NO. | DESCRIPTION | DATE | REV. | APPROVED BY |
|-----|-------------|------|------|-------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

CHECKED: JG
DRAWN: SO

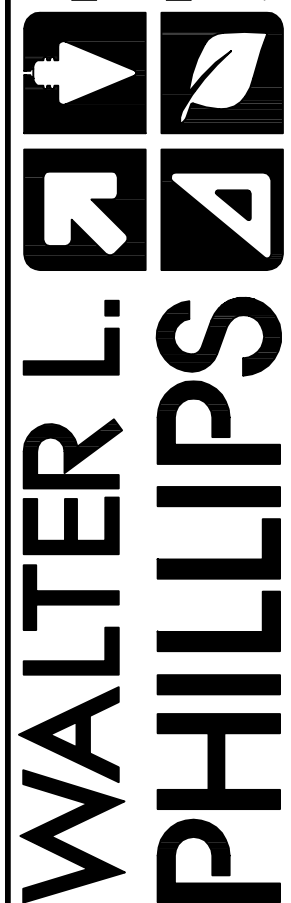
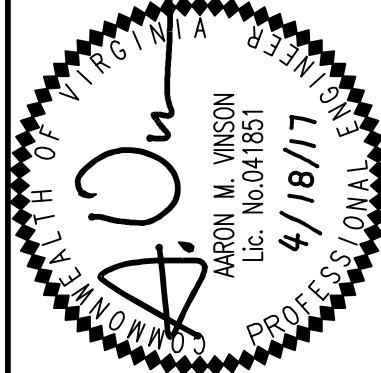
EROSION CONTROL LEGEND

| KEY | TITLE | SYMBOL |
|-----|---|--------|
| CE | TEMPORARY GRAVEL CONSTRUCTION ENTRANCE WITH WASH RACK | |
| SSF | DOUBLE SILT FENCE | |
| SSF | SUPER SILT FENCE | |
| TP | SSF | |
| IP | STORM DRAIN INLET PROTECTION | |
| SC | DRAINAGE DIVIDES (STORM SEWER COMPUTATIONS) | |
| SAF | SAFETY FENCE | |



EROSION AND SEDIMENT CONTROL PHASE 1 PLAN

MASHIE DRIVE SUBDIVISION
PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA



Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

| REVISION APPROVED BY | | DATE | | APPROVED | | DATE | |
|----------------------|-------------|------|----|----------|-------------|------|----|
| NO. | DESCRIPTION | REV. | BY | NO. | DESCRIPTION | REV. | BY |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

CHECKED: JG
DRAWN: SO
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1"=30'

EROSION CONTROL LEGEND

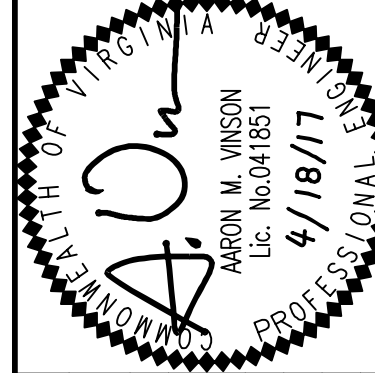
| KEY | TITLE | SYMBOL |
|--------|--|----------|
| SSF | DOUBLE SILT FENCE | XX XX |
| SSF | SUPER SILT FENCE | XX |
| TP SSF | SUPER SILT FENCE USED AS TREE PROTECTION | XX |
| IP | STORM DRAIN INLET PROTECTION | |
| SC | DRAINAGE DIVIDES (STORM SEWER COMPUTATIONS) | |
| SAF | SAFETY FENCE | |



EROSION AND SEDIMENT CONTROL PHASE 2 PLAN

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA



WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1" = 30'

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

CHECKED:
JG

DRAWN:
SO

EROSION – SILTATION CONTROL NARRATIVE

DESCRIPTION:

THE SCOPE OF THIS PROJECT IS TO SUBDIVIDE FOUR EXISTING SINGLE FAMILY DETACHED LOTS INTO SEVEN NEW SINGLE FAMILY DETACHED LOTS. THE FOUR EXISTING SINGLE FAMILY HOUSES AND A PORTION OF EXISTING SERVICE DRIVE ALONG MAPLE AVENUE WILL BE DEMOLISHED. THE PROPOSED SEVEN SINGLE FAMILY LOTS WILL HAVE INDIVIDUAL WATER QUALITY OR WATER QUANTITY FACILITIES ON EACH LOT, CONSISTING OF EITHER GRAVEL DETENTION OR BIO-RETENTION FACILITIES FOR WATER QUANTITY AND QUALITY CONTROL. CURB AND GUTTER WITH A FIVE FOOT CONCRETE SIDE WALK IS PROPOSED ALONG MASHE DRIVE. A FIVE FOOT CONCRETE SIDEWALK IS PROPOSED ALONG FOLLIN LANE SE. NO CHANGES TO DRAINAGE PATTERNS WILL OCCUR AS A RESULT OF THIS DEVELOPMENT, INCLUDING AREAS WITHIN THE EXISTING RIGHT-OF-WAYS. THE AMOUNT OF DISTURBED AREA IS 3.37 ACRES.

SOILS:

SEE SHEET C-0101. ALSO, SEE SHEET C-1501 FOR BORING LOCATIONS.

EXISTING SITE CONDITIONS:

THIS 2.69 ACRE IS SPLIT INTO FOUR SINGLE DETACHED DWELLINGS. THE SITE CONTAINS MATURE TREES AND SLOPES FROM MASHE DRIVE TO FOLLIN LANE SE. AT AN AVERAGE GRADE OF APPROXIMATELY 4% THE SITE DRAINS TO AN EXISTING STORM SEWER SYSTEM.

ADJACENT AREAS:

NORTH: THE SITE IS BORDERED BY MAPLE AVENUE EAST
SOUTHWEST: THE SITE IS BORDERED BY A SINGLE FAMILY DETACHED RESIDENTIAL PROPERTY
EAST: THE SITE IS BORDERED BY MASHE DRIVE
NORTHWEST: THE SITE IS BORDERED TO FOLLIN LANE S.E.

OFFSITE AREAS

THERE WILL BE NO PRIVATELY OWNED OFFSITE AREAS THAT WILL BE DISTURBED. THE EXISTING MAPLE AVE EAST SERVICE DRIVE WILL BE REMOVED.

CRITICAL SLOPE AREAS:

THERE ARE NO CRITICAL SLOPE AREAS LOCATED WITHIN THE WORK AREA.

EROSION CONTROL PROGRAM

TEMPORARY SEEDING AND MULCHING ARE TO BE APPLIED TO ANY AREA WITHIN THE SITE NOT CONTINUALLY WORKED FOR 7 DAYS AFTER CLEARING AND ROUGH GRADING. REVEGETATION SHOULD BE ACCOMPLISHED AS SOON AS POSSIBLE.

EROSION AND SEDIMENT CONTROL MEASURES AND PROGRAM

THE EROSION CONTROL DURING CONSTRUCTION SHALL BE ACCOMPLISHED IN PHASE I AND II PHASE. THE FIRST PHASE SHALL BE IN PLACE FROM THE BEGINNING OF LAND DISTURBANCE AND THROUGHOUT THE ENTIRE CLEARING AND LAND DISTURBING PROCESS. THE SECOND PHASE SHALL UTILIZE THE CONTROL MEASURES OF PHASE ONE AND WILL REMAIN IN PLACE UNTIL FINAL SITE STABILIZATION IS ACHIEVED.

PHASE I:

AS THE FIRST ITEM OF CONSTRUCTION, THE CONTRACTOR REQUESTS INSTALLING A CONSTRUCTION ENTRANCE (AS SHOWN ON THE PLAN). NEXT, THE CLEARING LIMITS AND PERIMETER CONTROLS SHOWN ON C-0601 ARE TO BE INSTALLED. THESE INCLUDE SAFETY FENCE, SUPER SILT AND DOUBLE SUPER SILT FENCE, AND INLET PROTECTION CONTROL. INSPECTION REQUESTS MUST BE MADE AT LEAST 48 HOURS IN ADVANCE. ONCE THE INSPECTOR HAS APPROVED INSTALLATION OF PHASE 1 MEASURES, PHASE 2 CONSTRUCTION PERMIT APPROVAL WILL BE AUTHORIZED

PHASE 2:

ALL PHASE 1 MEASURES ARE TO REMAIN IN PLACE AS LONG AS NECESSARY AND PRACTICAL THROUGHOUT THE DEVELOPMENT OF THE PROPERTY. SUPPLEMENTAL CONTROLS ARE TO BE PROVIDED AS SHOWN ON THE PHASE 2 EROSION CONTROL PLAN. THE PROPOSED RAIN GARDEN AREAS AND GRAVEL DETENTION FACILITIES SHOULD PROTECTED BY SUPER SILT FENCE. ALL CONTROLS ARE TO BE ADJUSTED AS REQUIRED BY SITE CONSTRUCTION PROGRESS OR AS DIRECTED BY THE INSPECTOR. CONTRACTOR SHALL MAINTAIN ADJACENT ROADWAYS IN A MUD AND DUST FREE CONDITION AT ALL TIMES.

CONTRACTOR SHALL PLACE ALL EXCAVATED TRENCH MATERIAL ON THE UPHILL SIDE OF THE TRENCH OPENING SO THAT SEDIMENT LADEN RUNOFF WILL BE CAPTURED IN EXCAVATED TRENCH SHOULD A RAIN EVENT OCCUR DURING CONSTRUCTION.

UPON FINAL SITE STABILIZATION, CONTROL MEASURES CAN BE REMOVED AS COORDINATED WITH THE INSPECTOR.

ALL BMP AND DETENTION MEASURES ARE TO BE MADE OPERATIONAL ONLY AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED. THE CONTRACTOR/DEVELOPER MAY REQUEST THAT THE ACTUAL FACILITIES BE INSTALLED IN CONJUNCTION WITH THE OVERLOT GRADING CONSTRUCTION PLANS.

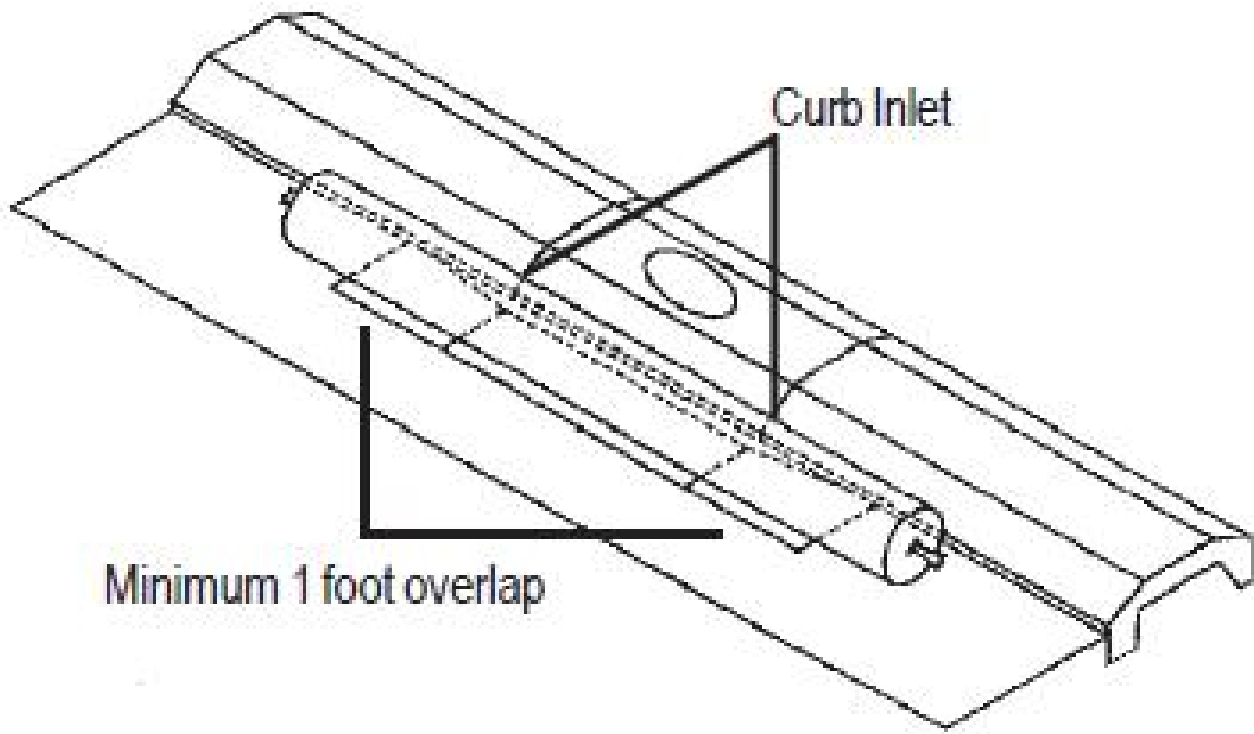
MAINTENANCE PROGRAM:

THE SITE SUPERINTENDENT, OR HIS/HER REPRESENTATIVE, SHALL MAKE A VISUAL INSPECTION OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREAS (I.E. SEEDED AND MULCHED AREAS) ON A DAILY BASIS, ESPECIALLY AFTER A HEAVY RAINFALL EVENT TO INSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING

ALL AREAS WITHIN THE CONSTRUCTION LIMITS WILL BE PERMANENTLY STABILIZED WITH EITHER BUILDING OR ASPHALT; SO NO VEGETATIVE STABILIZATION MEASURES WILL BE NECESSARY FOR THIS PLAN.

EROSION AND SEDIMENT CONTROL MEASURES:

- SEDIMENT AND EROSION CONTROL MEASURE ARE TO BE INSTALLED AT THE START OF GRADING.
- FOR ALL STANDARDS AND SPECIFICATIONS, REFER TO THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THE FAIRFAX COUNTY CHECKLIST.
- THERE WILL BE NO TOPSOIL STRIPPED, THEREFORE, A TOPSOIL STOCKPILE SHALL NOT BE UTILIZED WITH THIS PLAN.
- ALL AREAS DISTURBED BY CONSTRUCTION THAT ARE NOT TO BE CONSTRUCTED UPON SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISH GRADING BY SEEDING AND MULCHING PER STD. AND SPEC. NO. 3.31 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- BARE SOIL SURFACES NOT AT FINISH GRADE, WHICH WILL BE EXPOSED MORE THAN 7 DAYS, SHALL BE STABILIZED WITH TEMPORARY SEEDING AND MULCHING PER STD. AND SPEC. NO. 3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- ALL EXCESS OR UNSUITABLE MATERIALS THAT NEED TO BE HAULED OFF SITE MUST BE COORDINATED WITH THE SITE INSPECTORS AND THAT THE DESTINATION OF THE RECEIVING HAUL SITE MUST BE IDENTIFIED.



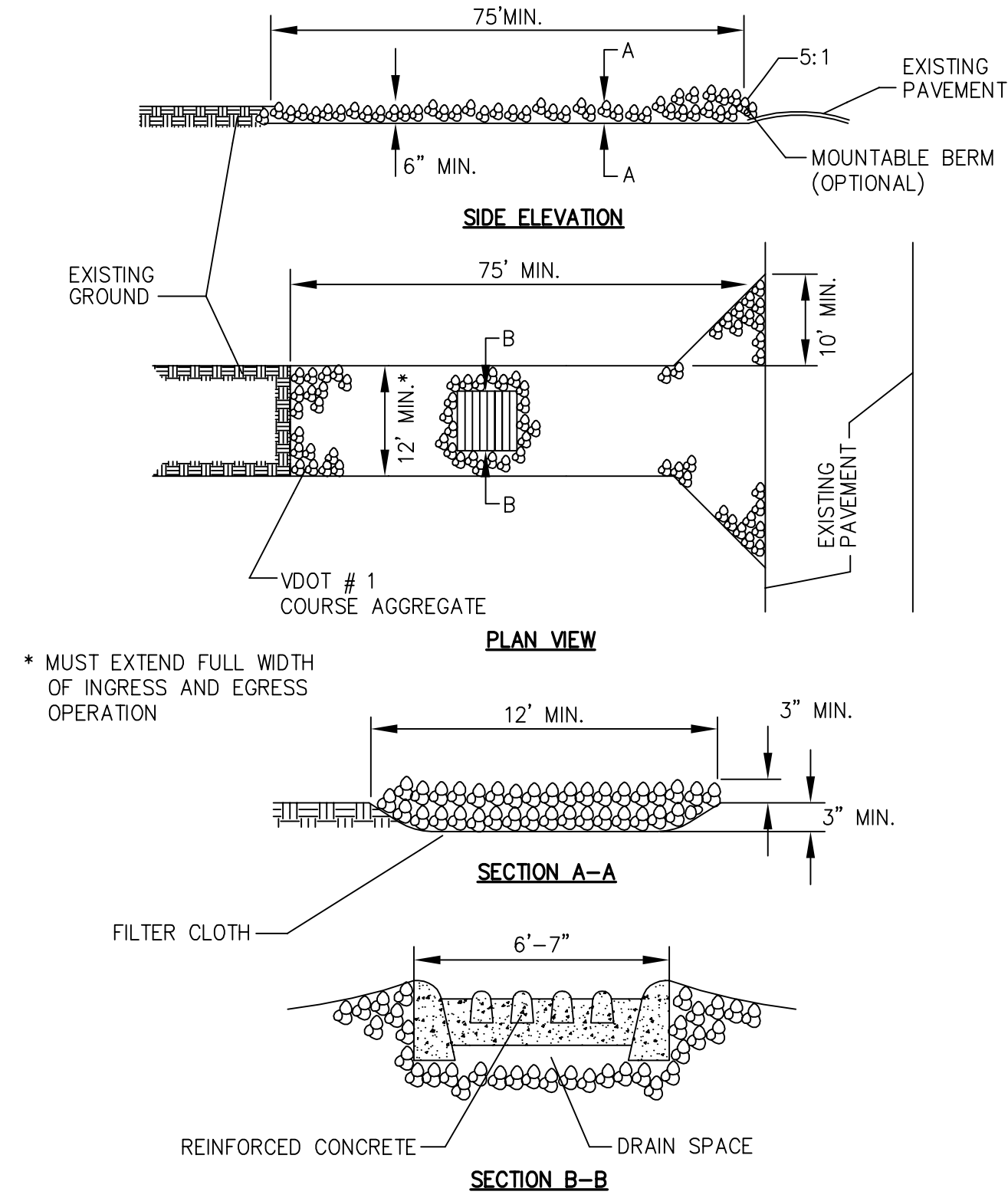
CONTRACTOR TO INSTALL GUTTER BUDY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

Gutter Buddy

Gutter Buddy ACF Environmental
2831 Cordwell Road
Richmond, VA 23234
(800) 223-9021, (804) 743-7779 Fax

CURB INLET PROTECTION IN RIGHT OF WAY


NOT TO SCALE



CONSTRUCTION ENTRANCE

NOT TO SCALE

VESCH STD. 3.02

|  Department of Conservation & Recreation <small>CONSERVING VIRGINIA'S SCENIC AND RECREATION RESOURCES</small> | | | | PLAN REVIEW MS CHECKLIST (For Local Program Review Only) | | |
|---|-----|---------------------|----|---|------------|--|
| | | | | Local Program: | | |
| Project Name and Description: | | | | | | |
| Reviewed By: | | | | Review Date: | | |
| File Number: | | Date Plan Approved: | | RLD Identified? | | |
| In accordance with the VESCH narrative checklist, the project narrative is: | | | | Adequate | Inadequate | |
| Does the plan address the maintenance responsibilities of the permittee? | | | | Yes | No | |
| MS | YES | NO | NA | MINIMUM STANDARD DESCRIPTION (4VAC50-30-40) | | |
| 1 | | X | | Have temporary and permanent stabilization been addressed? | | |
| | | X | | Are practices shown on the plan? | | |
| | | X | | Are limits of clearing and grading shown on the plan? | | |
| 2 | | X | | Sated specifications? | | |
| | | X | | Are soil stockpiles and borrow areas stabilized with sediment trapping measures? | | |
| 3 | | X | | Has establishment of permanent vegetation been addressed? | | |
| 4 | | | X | Are sediment trapping facilities to be constructed as a first step in land disturbing activity? | | |
| 5 | | | X | Has stabilization of earthen structures been addressed? | | |
| 6 | | | X | Are sediment traps and basins properly sized? | | |
| | | | X | Are detailed drawings in the plans? | | |
| | | | X | Are calculations included in the narrative or the plan? | | |
| 7 | | | X | Has design (i.e. with surface roughening, outlet protection) of cut and fill slopes been adequately addressed to minimize erosion? | | |
| 8 | | | X | Are paved flumes, channels, or slope drains required where necessary? | | |
| 9 | | X | | Has the potential for water seeps from slope faces been addressed with adequate drainage or other protection? | | |
| 10 | | X | | Is adequate inlet protection required on all storm sewer inlets prior to becoming operational? | | |
| 11 | | | X | Are channel lining and/or outlet protection required on stormwater conveyance channels? | | |
| 12 | | | X | Are in-stream construction measures required so that channel damage is minimized? | | |
| 13 | | | X | Are temporary stream crossings of non-erodible material required where applicable? | | |
| 14 | | | X | Is there evidence that all applicable federal, state, and local regulations pertaining to working in or crossing live watercourses have been addressed? | | |
| 15 | | | X | Has restabilization of areas subject to in-stream construction been adequately addressed? | | |
| 16 | | X | | Is stabilization and dewatering of utility trenches addressed? | | |
| 17 | | X | | Is the transport of soil and mud onto public roadways properly controlled (i.e. construction entrances, wash racks, daily cleaning of roadways, transport of sediment to a trapping facility)? | | |
| 18 | | X | | Has the removal of temporary control structures been addressed? | | |
| | | X | | Has maintenance of control structures been addressed? | | |
| 19 | | | X | Are properties and waterways downstream from development described and adequately protected from erosion and sediment deposition due to increases in stormwater runoff volume, velocity and peak flow rate? | | |
| | | | X | Are offsite, contributing areas accounted for? | | |
| | | | X | Are offsite, receiving areas and channels described and adequate? | | |
| | | | X | Are calculations included in the narrative or plan? | | |
| COMMENTS: (use back if additional space is needed) | | | | | | |

Rev. 09-14-04

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

MASHE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

WALTER L. PHILLIPS



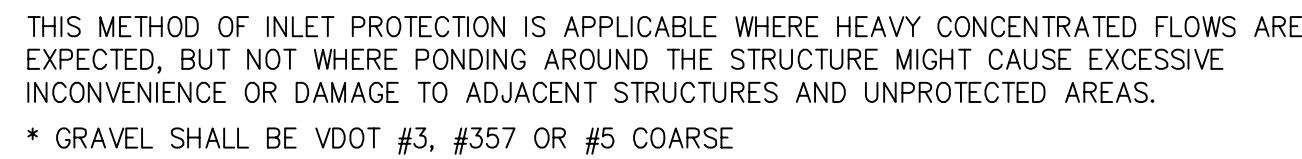
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

INCORPORATED
ESTABLISHED 1945
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1"=30'

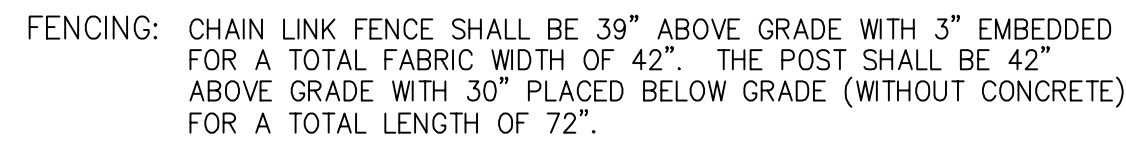
CHECKED: JG

DRAWN: SO

NOT TO SCALE
VESCH STD 3.07-2



NOT TO SCALE



- NOTES:
1. CHAIN LINK FENCES TO BE FASTENED SECURELY TO FENCE POST WITH WIRE TIES.
 2. FILTER CLOTH TO BE FASTENED SECURELY TO CHAIN LINK FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
 3. PHYSICAL PROPERTIES OF THE FILTER FABRIC SHALL CONFORM TO THE LATEST EDITION OF THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.
 4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAP BY 6".
 5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL SHALL BE REMOVED WHEN SEDIMENT BUILD-UP REACHES 50% OF THE HEIGHT OF THE SUPER SILT FENCE.

The diagram illustrates a 'SPECIAL APPLICATION' for a yard inlet. It shows two cross-sectional views of a curb and inlet structure. On the left, runoff water with sediment flows over the curb, with an overflow path indicated. A wire screen is installed in the inlet, and a 2" x 4" wood stud is shown supporting it. Sediment is shown accumulating behind the screen. On the right, the structure is shown without the screen, allowing filtered water to pass through the grate into the yard inlet, while overflow and runoff with sediment are directed away. Labels include: RUNOFF WATER WITH SEDIMENT, OVERFLOW, FILTERED WATER, YARD INLET, SEDIMENT, WIRE SCREEN, and 2" X 4" WOOD STUD.

YARD INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY
TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.

* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

MASHIE DRIVE SUBDIVISION

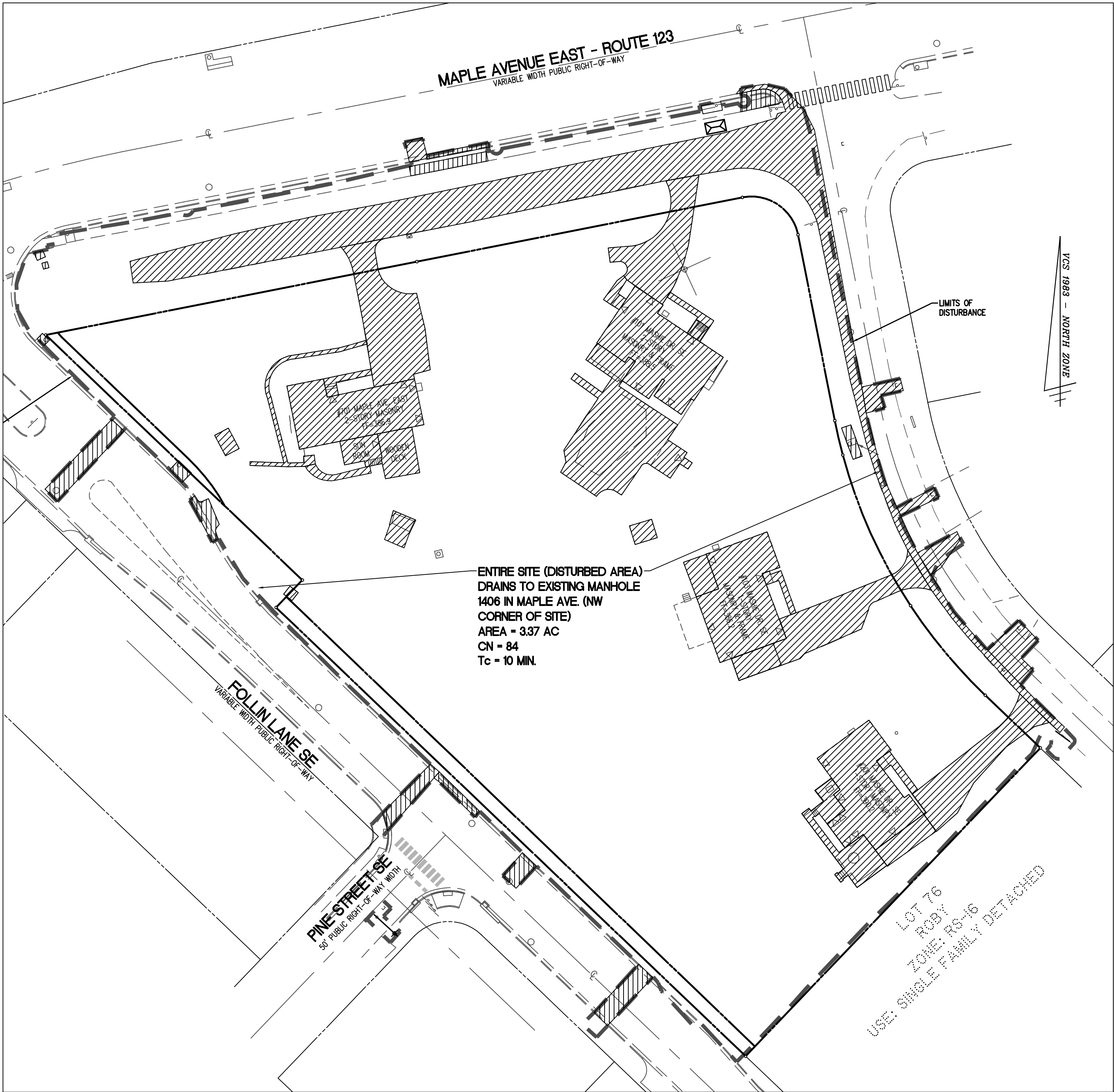
PROVIDENCE DISTRICT

TOWN OF VIENNIA

FAIRFAX COUNTY, VIRGINIA

| | | | | |
|---|---------------------------------|---|---|---|
|  | WALTER L. |  |  | Engineers • Surveyors • Planners Landscape Architects • Arborists 207 PARK AVENUE |
| | PHILLIPS |  |  | FALLS CHURCH, VIRGINIA 22046 (703) 532-6163 Fax (703) 533-1301 www.WLPINC.com |
| I N C O R P O R A T E D | | ESTABLISHED 1946 | | |
| SCALE: "1" = 30' | DATE: 1/31/17, 3/21/17, 4/18/17 | | DRAWN: | CHECKED: |

[illegible]



EXISTING IMPERVIOUS AREA

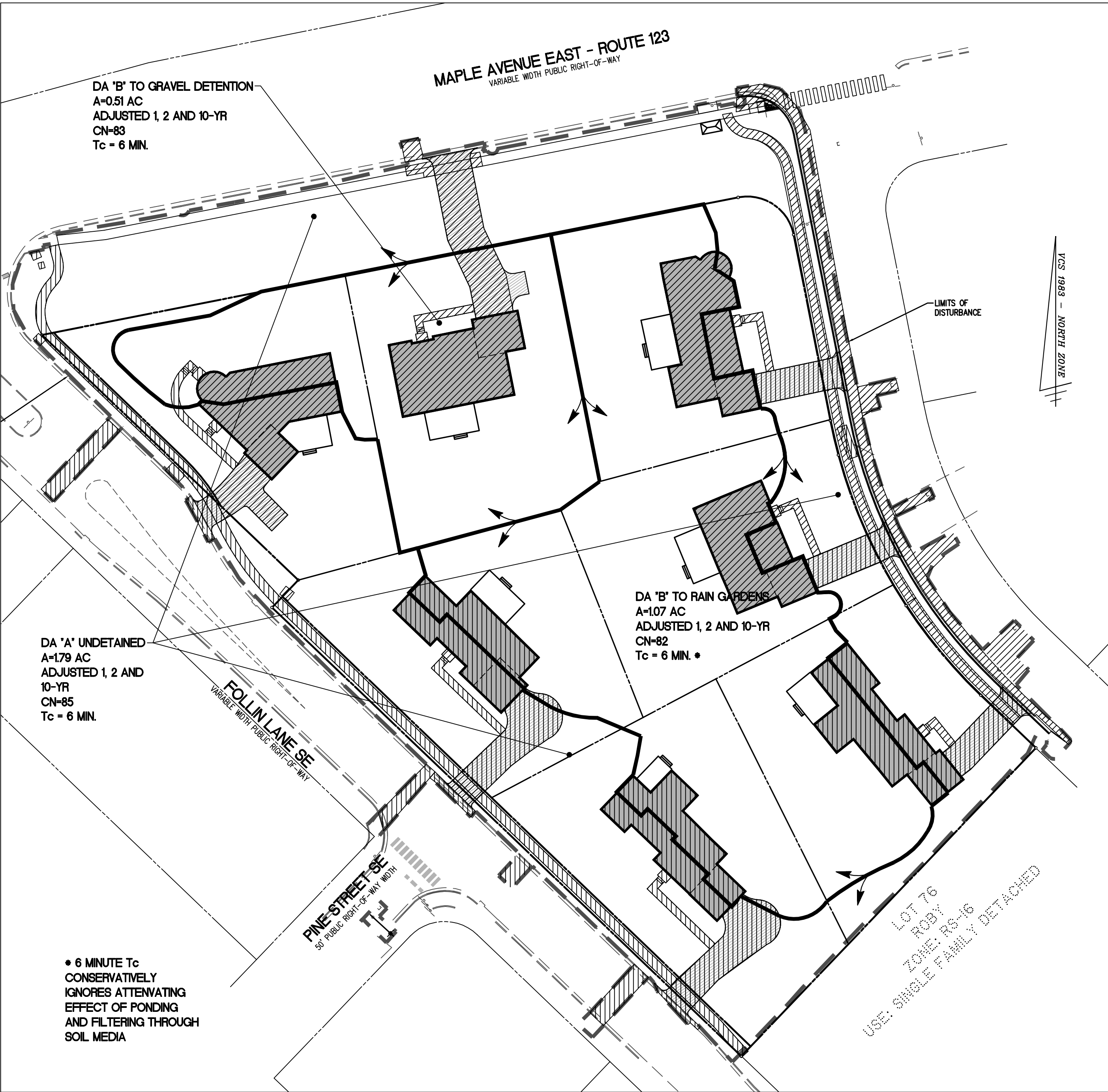
DISTURBED AREA = 3.37 AC
IMPERVIOUS AREA = 0.73 AC

SWM COMPUTATIONS

| DRAINAGE AREA | TOTAL AREA (AC) | IMPERVIOUS AREA (AC) | LANDSCAPED OR TURF (AC) | CN | 1-YR RUNOFF VOLUME ⁽¹⁾ (CF) |
|-----------------------|-----------------|----------------------|-------------------------|----|--|
| SITE (DISTURBED AREA) | 3.37 | 0.73 | 2.64 | 84 | 14,800 |

| DA IN VRRM SPREADSHEET | DRAINAGE AREA | TOTAL AREA (AC) | IMPERVIOUS AREA (AC) | LANDSCAPED OR TURF (AC) | ADJUSTED 1 & 2-YR CN ⁽²⁾ | 1-YR RUNOFF VOLUME ⁽¹⁾ (CF) | ADJUSTED 10-YR CN ⁽²⁾ |
|------------------------|--------------------------------|-----------------|----------------------|-------------------------|-------------------------------------|--|----------------------------------|
| DA "A" | UNDETAINED | 1.79 | 0.53 | 1.26 | 85 | | 85 |
| DA "B" | CONTROLLED BY RAIN GARDENS | 1.07 | 0.21 | 0.86 | | 14,971 | |
| DA "B" | CONTROLLED BY GRAVEL DETENTION | 0.51 | 0.11 | 0.40 | 82 | | 83 |
| SITE TOTALS | | 3.37 | 0.85 | 2.52 | | 14,766 | |

FOOTNOTES:
(1) PEAK FLOWS AND RUNOFF VOLUMES OBTAINED FROM HYDRAFLOW SOFTWARE.
(2) ADJUSTED CN OBTAINED FROM VRRM SPREADSHEET
(3) OUTFALL INCLUDES A STREAM SO ALLOWABLE Q1 IS $Q_{0.95} < (IF = .8)(Q_{REDEV} \times RV_{REDEV})/RV_{DEV}$. ALLOWABLE Q2 AND Q10 ARE PRE-DEVELOPMENT VALUES.



PROPOSED IMPERVIOUS AREA

DISTURBED AREA = 3.37 AC
IMPERVIOUS AREA = 0.85 AC

SWM AND BMP NARRATIVES

- THE 2014 STORMWATER REGULATIONS ARE APPLICABLE TO THIS PROJECT.
- THE CONCENTRATED RUNOFF FROM THE SITE WILL BE CONVEYED TO AN EXISTING STORM SEWER SYSTEM THAT CROSSES UNDER MAPLE AVENUE AND OUTLETS INTO A NATURAL STORMWATER CONVEYANCE SYSTEM (STREAM). THEREFORE, THE ALLOWABLE POST-DEVELOPMENT 1-YEAR PEAK RUNOFF RELEASE RATE FROM THE SITE TO SATISFY THE CHANNEL PROTECTION STORMWATER REQUIREMENT IS DETERMINED BY THE ENERGY BALANCE EQUATION FOUND IN THE DEQ REGULATIONS. REFER TO NOTE 3 IN THE TABLE TO THE LEFT FOR THIS ENERGY BALANCE EQUATION. THE DATA IN THIS TABLE TO THE LEFT SHOWS THE VALUES FOR THE EQUATION'S PARAMETERS AS WELL AS THE RESULTING ALLOWABLE Q AND ACTUAL POST-DEVELOPMENT Q FOR THE 1-YEAR STORM AFTER DETENTION. THE RUNOFF Q AND VOLUME VALUES WERE OBTAINED USING HYDRAFLOW SOFTWARE RATHER THAN BY HAND CALCULATIONS.
- THE FLOOD PROTECTION REQUIREMENT IS THAT THE POST-DEVELOPMENT PEAK FLOW RATES FOR THE SITE WILL BE LESS THAN PRE-DEVELOPMENT FOR THE TWO-YEAR AND THE TEN-YEAR 24-HOUR STORMS. AGAIN, THE TABLE TO THE LEFT SHOWS THE PREDEVELOPMENT AND ACTUAL POSTDEVELOPMENT (AFTER DETENTION) PEAK SITE RELEASE RATES FOR THE 2 AND 10-YEAR STORMS. THE STORMWATER DETENTION NECESSARY TO COMPLY WITH THESE REQUIREMENTS IS ACCOMPLISHED BY DETAINING STORMWATER IN THE GRAVEL AND SOIL MEDIA LAYERS AND SOMETIMES SURFACE PONDING OF THE FIVE PROPOSED BIORETENTION AREAS AND THE TWO PROPOSED GRAVEL DETENTION TRENCHES (ONE FACILITY PER LOT).
- THE SITE IS CURRENTLY DEVELOPED WITH FOUR SINGLE FAMILY HOMES WHICH WILL BE DEMOLISHED AND REPLACED WITH SEVEN NEW SINGLE FAMILY HOMES. THEREFORE, THIS IS A REDEVELOPMENT PROJECT. THE WATER QUALITY REQUIREMENT IS TO REDUCE THE PRE-DEVELOPMENT PHOSPHOROUS LOAD RELEASED FROM THE SITE BY THE AMOUNT DETERMINED BY THE VERSION 3.0 VRRM SPREADSHEET. SOME OF THE BMP REQUIREMENT (0.52 OF 0.81 POUNDS OF REQUIRED PHOSPHOROUS REMOVAL) WILL BE MET BY CONSTRUCTING FIVE BIORETENTION AREAS (RAIN GARDENS), THESE FACILITIES ARE BEING DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE 2013 VERSION OF THE VIRGINIA DEQ STORMWATER DESIGN SPECIFICATIONS. THE REMAINING 0.30 POUNDS OF PHOSPHOROUS PER YEAR REQUIRED TO BE REMOVED WILL BE ACHIEVED BY PURCHASING NUTRIENT OFFSET CREDITS. THESE CREDITS WILL BE PURCHASED PRIOR TO PLAN APPROVAL. PLEASE REFER TO COPIES OF THE SPREADSHEETS FOUND ON SHEETS C-0702 AND C-0703. EACH OF THE FIVE RAIN GARDENS REDUCE RUNOFF VOLUMES. TO DETERMINE THE RESULTING ADJUSTED CN, A SECOND VRRM SPREADSHEET WAS USED WITH EACH RAIN GARDEN CONSTITUTING A SEPARATE DRAINAGE AREA. DA A IS RAIN GARDEN 1, DA B IS RAIN GARDEN 2, ETC. IN THE DRAINAGE AREA CURVE NUMBER AND RUNOFF DEPTHS TABULATION ON SHEET C-0703, THESE ADJUSTED CN WERE USED FOR THE FIVE INFLOW HYDROGRAPHS FOR ROUTING EACH OF THE FIVE COMBINED RAIN GARDEN / DETENTION FACILITIES
- RUNOFF FLOW RATES, VOLUMES AND STORMWATER MANAGEMENT FACILITY ROUTINGS HAVE BEEN MODELED USING HYDROFLOW HYDROGRAPHS SOFTWARE. PRINT-OUTS OF THE HYDROGRAPHS AND DETENTION FACILITY DESIGN DATA CAN BE FOUND ON SUBSEQUENT SHEETS.

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17/17, 3/21/17, 4/18/17
SCALE: 1"=30'

| REVISION APPROVED BY | | | | DATE | |
|----------------------|-------------|------|---------|----------|--|
| NO. | DESCRIPTION | DATE | REV. BY | APPROVED | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SWM AND BMP COMPUTATIONS

MASHIE DRIVE SUBDIVISION
PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA

DRAINAGE AREA B

Drainage Area A Land Cover (acres)

CLEAR BMP AREAS

| | A Soils | B Soils | C Soils | D Soils | Totals | Land Cover Rv |
|---------------------------|---------|---------|---------|---------|--------|---------------|
| Forest/Open Space (acres) | | | | | 0.00 | 0.00 |
| Managed Turf (acres) | | | | 1.26 | 1.26 | 0.25 |
| Impervious Cover (acres) | | | | 0.32 | 0.32 | 0.95 |
| Total | | | | 1.58 | | |

Total Phosphorus Available for Removal in D.A. B (lb/yr)

Post Development Treatment Volume in D.A. B (ft³)

1.41

2,247

Stormwater Best Management Practices (RR = Runoff Reduction)

--Select from dropdown lists--

| Practice | Runoff Reduction Credit (%) | Managed Turf Credit Area (acres) | Impervious Cover Credit Area (acres) | Volume from Upstream Practice (ft³) | Runoff Reduction (ft³) | Remaining Runoff Volume (ft³) | Total BMP Treatment Volume (ft³) | Phosphorus Removal Efficiency (%) | Phosphorus Load from Upstream Practices (lb) | Untreated Phosphorus Load to Practice (lb) | Phosphorus Removed By Practice (lb) | Remaining Phosphorus Load (lb) | Downstream Practice to be Employed |
|---|-----------------------------------|--|--|---|---------------------------|-------------------------------------|--|---|---|---|---|--------------------------------------|---------------------------------------|
| 6. Bioretention (RR) | | | | | | | | | | | | | |
| 6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9) | 40 | 0.86 | 0.21 | 0 | 602 | 903 | 1,505 | 25 | 0.00 | 0.94 | 0.52 | 0.42 | |
| 6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9) | 80 | | | 0 | 0 | 0 | 0 | 50 | 0.00 | 0.00 | 0.00 | 0.00 | |

TOTAL IMPERVIOUS COVER TREATED (ac)0.21

TOTAL TURF AREA TREATED (ac)0.86

TOTAL RUNOFF REDUCTION IN D.A. B (ft³)602

TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. B (lb/yr)1.41

TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr)0.52

TOTAL PHOSPHORUS REMAINING AFTER APPLYING RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr)0.89

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

Site Results (Water Quality Compliance)

Area Checks

| | D.A. A | D.A. B | D.A. C | D.A. D | D.A. E | AREA CHECK |
|--------------------------------|--------|--------|--------|--------|--------|------------|
| FOREST/OPEN SPACE (ac) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | OK. |
| IMPERVIOUS COVER (ac) | 0.53 | 0.32 | 0.00 | 0.00 | 0.00 | OK. |
| IMPERVIOUS COVER TREATED (ac) | 0.00 | 0.21 | 0.00 | 0.00 | 0.00 | OK. |
| MANAGED TURF AREA (ac) | 1.26 | 1.26 | 0.00 | 0.00 | 0.00 | OK. |
| MANAGED TURF AREA TREATED (ac) | 0.00 | 0.86 | 0.00 | 0.00 | 0.00 | OK. |
| AREA CHECK | OK. | OK. | OK. | OK. | OK. | |

Site Treatment Volume (ft³)

5,218

Runoff Reduction Volume and TP By Drainage Area

| | D.A. A | D.A. B | D.A. C | D.A. D | D.A. E | TOTAL |
|--|--------|--------|--------|--------|--------|-------|
| RUNOFF REDUCTION VOLUME ACHIEVED (ft³) | 0 | 602 | 0 | 0 | 0 | 602 |
| TP LOAD AVAILABLE FOR REMOVAL (lb/yr) | 1.87 | 1.41 | 0.00 | 0.00 | 0.00 | 3.28 |
| TP LOAD REDUCTION ACHIEVED (lb/yr) | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 0.52 |
| TP LOAD REMAINING (lb/yr) | 1.87 | 0.89 | 0.00 | 0.00 | 0.00 | 2.76 |

NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)

| | 0.00 | 4.32 | 0.00 | 0.00 | 0.00 | 4.32 |
|--|------|------|------|------|------|------|
| | | | | | | |

Total Phosphorus

FINAL POST-DEVELOPMENT TP LOAD (lb/yr)3.28

TP LOAD REDUCTION REQUIRED (lb/yr)0.81

TP LOAD REDUCTION ACHIEVED (lb/yr)0.52

TP LOAD REMAINING (lb/yr):2.76

REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):0.30

NOTES:

1. REMAINING 0.30 POUNDS / YEAR WILL BE SATISFIED BY PURCHASING NUTRIENT OFFSET CREDITS.

2. REFER TO BMP NARRATIVE SHEET C–0701 FOR ADDITIONAL INFORMATION.

3. DRAINAGE AREA B SHOWN ABOVE IS THE TOTAL AREA DRAINING TO THE 5 BIORETENTION FACILITIES AND 2 GRAVEL DETENTION TRENCHES. EACH OF THESE 7 AREAS PROVIDE THE STORMWATER DETENTION NECESSARY FOR THIS PROJECT TO COMPLY WITH STORMWATER QUANTITY REGULATIONS. THIS 1.58 ACRE DETAINED DRAINAGE AREA IS SEPARATED FROM THE UNDETAINED DRAINAGE AREA (DRAINAGE A TAB IN THE VRRM SPREADSHEET) FOR STORMWATER MANAGEMENT COMPUTATION PURPOSES.

ores

Date:

January 27, 2017

To:

Mike Walker
Clydesdale Custom Homes, LLC

From:

Claire Wolanski
Credit Sales Coordinator
Resource Environmental Solutions

Subject:

Potomac Watershed– Nutrient Credit Availability

Project Reference:

Mashie Drive Project; 0.30 Credits Requested; HUC: 02070008

This letter is to confirm the availability of 0.30 authorized nutrient credits (“Nutrient Credits”) from one or more of Resource Environmental Solutions’ (“RES”) Potomac nutrient bank facilities for use by permit applicants within the Potomac watershed, including HUC 02070008, to compensate for nutrient loadings in excess of state or local regulations, as per Virginia Code § 62.1-44.15:35 and § 62.1-44.19:14 and Virginia Administrative Code 9 VAC 25-820-10 et seq. These Nutrient Credits are generated and managed under the terms of the Banking Instruments known as the Edgecliff Nutrient Reduction Implementation Plan (“NRIP”) or the Revised Holy Cross Abbey NRIP.

Please feel free to contact me if you have any questions.

Sincerely,

Claire Wolanski

Claire E. Wolanski
Resource Environmental Solutions
804-591-4060

10095 Red Run Blvd.
Suite 100
Odyssey Mills, MD
21117

412 N. 4th St.
Suite 300
Baton Rouge, LA
70802

701 E. Bay St.
Suite 205
Charleston, SC
29403

5000 Kentrose Blvd.
Suite 650
Houston, TX
77056

1200 Camella Blvd.
Suite 220
Lafayette, LA
70508

1377½ East Main St.
Suite 210
Oak Hill, WV
25901

23 Terminal Way
Suite 421
Pittsburgh, PA
15219

302 Jefferson St.
Suite 110
Raleigh, NC
27606

1521 W. Main
2nd Floor
Richmond, VA
23220

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS
IN CORPORATION
DATE: 1/31/17, 3/21/17, 4/18/17
SCALE: 1"=30'

ESTABLISHED 1945

APPROVED BY

NO. DESCRIPTION DATE REV. BY APPROVED DATE

PROVIDENCE DISTRICT

MASHIE DRIVE SUBDIVISION

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

Enter design storm rainfall depths (in):

Use NOAA Atlas 14 (<http://hdsc.nws.noaa.gov/hdsc/pfds/>)

[1] The curve numbers and runoff volumes computed in this spreadsheet for each drainage area are limited in their applicability for determining and demonstrating compliance with water quantity requirements. See VRRM User's Guide and Documentation for additional information.

[3] Adjusted CNs are based on runoff reduction volumes as calculated in D.A. tabs. An alternative CN adjustment calculation for Vegetated Roofs is included in BMP specification No. 5.

Curve numbers (CN, CNadj) and runoff depths ($RV_{Developed}$) are computed with and without reduction practices.

*See Notes above

**See Notes above*

1. DRAINAGE AREAS A AND B ABOVE COVER THE ENTIRE SITE AND ARE USED FOR PERFORMING THE STORMWATER MANAGEMENT COMPUTATIONS FOR THE ENTIRE PROJECT. DRAINAGE AREA B SHOWN ABOVE IS THE TOTAL AREA DRAINING TO THE 5 BIOTRETION FACILITIES AND 2 GRAVEL DETENTION TRENCHES. EACH OF THESE 7 AREAS PROVIDE THE STORMWATER DETENTION NECESSARY FOR THE PROJECT TO COMPLY WITH STORMWATER QUALITY REGULATIONS. THIS 1.58 ACRES DETAINED DRAINAGE AREA IS SEPARATED FROM THE UNDETAINED DRAINAGE AREA (DRAINAGE A TAB IN THE VRRM SPREADSHEET) FOR STORMWATER MANAGEMENT COMPUTATION PURPOSES. THE VRRM SPREADSHEET RESULTS SHOWN ABOVE SHOW THE ADJUSTED CURVE NUMBER FOR DRAINAGE B RESULTING FROM THE RUNOFF REDUCTION EFFECT OF THE BIOTRETION FACILITIES.
2. DRAINAGE AREAS A THROUGH E TO THE RIGHT ARE FOR EACH OF THE BIOTRETION FACILITIES WITH DA A CORRESPONDING WITH RG 1, DA B CORRESPONDING WITH RG 2, DA C CORRESPONDING WITH RG 3, DA D CORRESPONDING WITH RG 4, AND DA E CORRESPONDING WITH RG 5. THE ADJUSTED CURVE NUMBER FOR EACH OF THE FACILITIES SEPARATELY FOR THE PURPOSES OF DESIGNING AND PERFORMING DETENTION ROUTING FOR THE FACILITIES. THE RUNOFF REDUCTION PROVIDED BY THE BIOTRETION RESULTS IN A LOWER VOLUME OF RUNOFF THAT WILL BE DETAIED BY THE FACILITY.

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

Use NOAA Atlas 14 (<http://hdsc.nws.noaa.gov/hdsc/pfds/>)

[1] The curve numbers and runoff volumes computed in this spreadsheet for each drainage area are limited in their applicability for determining and demonstrating compliance with water quantity requirements. See VRRM User's Guide and Documentation for additional information.

[3] Adjusted CNs are based on runoff reduction volumes as calculated in D.A. tabs. An alternative CN adjustment calculation for Vegetated Roofs is included in BMP specification No. 5.

Curve numbers (CN, CNadj) and runoff depths ($RV_{Developed}$) are computed with and without reduction practices.

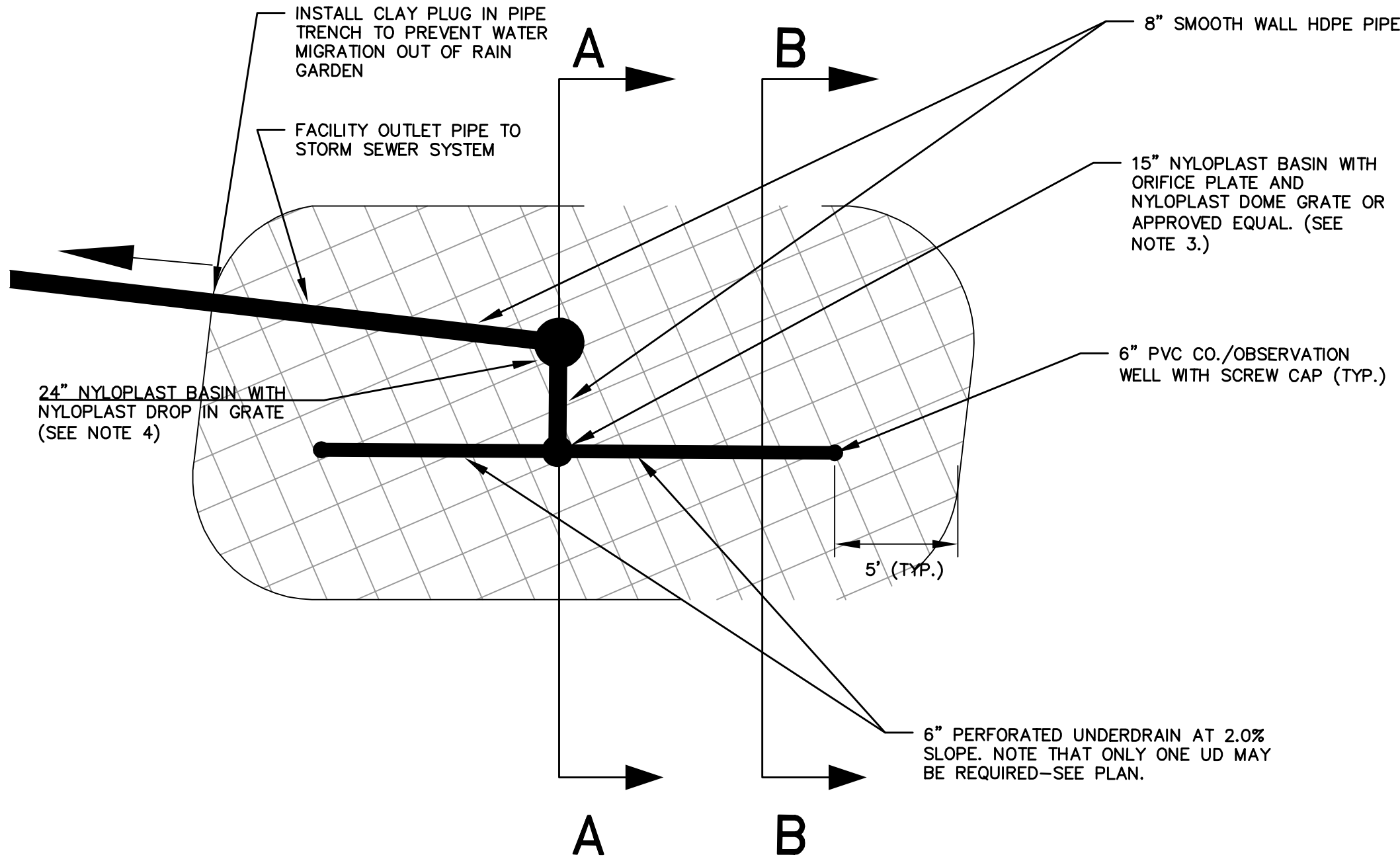
*See Notes above

*See Notes above

*See Notes above

*See Notes above

*See Notes above

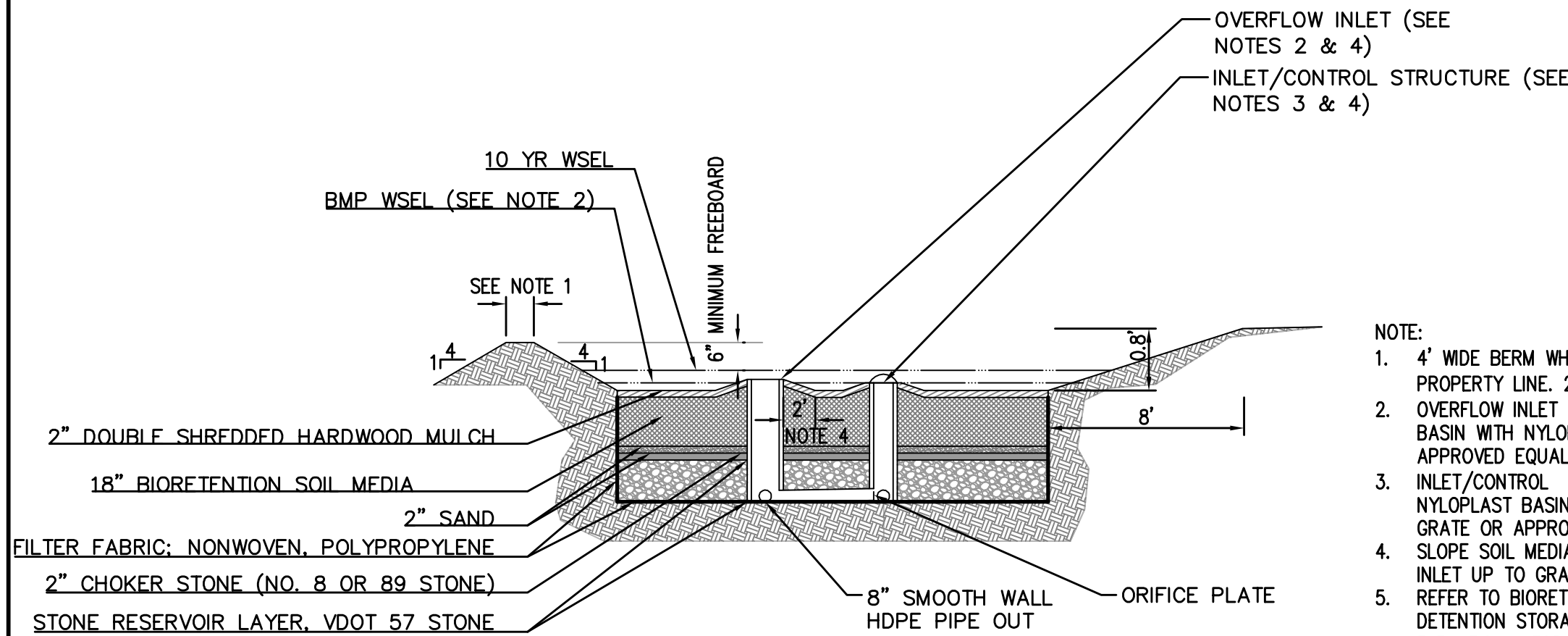


NOTES:

1. THIS PLAN VIEW DEPICTS RAIN GARDEN 4, HOWEVER, THE INFORMATION SHOWN IN THIS DETAIL APPLIES TO ALL SEVEN RAIN GARDENS AND GRAVEL DETENTION TRENCHES.
2. SEE BIORETENTION ELEVATION AND DETENTION STORAGE DATA TABLE AND GRAVEL DETENTION TRENCH DATA TABLE FOR ORIFICE DIAMETER AND ELEVATIONS FOR GRATES OF TWO NYLOPLAST BASINS.
3. 15" NYLOPLAST BASIN SERVES TO CONVEY STORM WATER DOWN TO THE GRAVEL LAYER WHICH IS NECESSARY FOR STORM WATER DETENTION PURPOSES SINCE HIGHER FLOW RATES CANNOT FILTER DOWN THROUGH THE SOIL MEDIA FAST ENOUGH. FOR THE RAIN GARDENS, THE BASIN'S GRATE IS SET AT THE BMP WATER SURFACE ELEVATION TO ENSURE THE WATER QUALITY VOLUME IS FILTERED THROUGH THE SOIL MEDIA. FOR THE GRAVEL DETENTION TRENCHES THE BASIN'S GRATE IS SET AT THE GROUND SURFACE. INSTALL ORIFICE PLATE ON 15" BASIN OUTLET PIPE TO RESTRICT/CONTROL STORMWATER RELEASE RATE FOR STORMWATER DETENTION PURPOSES. ORIFICE PLATE TO BE BENT TO SHAPE OF BASIN AND SEALED TO BASIN. SET INVERT OF 8" PIPE OUT OF 15" BASIN 0.1 FEET ABOVE INVERT OF 8" PIPE INTO 24" NYLOPLAST BASIN. SET INVERT(S) OF UNDERDRAIN(S) ENTERING 15" BASIN AT SAME INVERT AS 8" PIPE OUT OF 15" BASIN.
4. 24" NYLOPLAST BASIN SERVES AS OVERFLOW INLET FOR HIGH FLOWS. GRATE ELEVATION IS SET HIGH ENOUGH TO PROVIDE SUFFICIENT HEAD TO ALLOW 15" BASIN TO CAPTURE THE 10-YEAR FLOW TO ENSURE THAT THE GRAVEL LAYER FILLS UP FOR DETENTION PURPOSES BEFORE STORMWATWER POURS INTO 24" BASIN.
5. REFER TO FOLLOWING SHEET FOR SECTIONS A-A AND B-B FOR GRAVEL DETENTION TRENCH.
6. BIORETENTION SIZING CALCULATIONS TABLE THIS SHEET SHOWS ALL PARAMETERS NECESSARY TO SIZE THE FACILITIES IN ACCORDANCE WITH VIRGINIA DEQ SPECIFICATIONS. THE BIORETENTION ELEVATION AND STORAGE DATA TABLE PROVIDES THE ELEVATIONS FOR THE CONTRACTOR'S USE IN CONSTRUCTING THE FACILITIES AS WELL AS THE CALCULATIONS FOR STORMWATER DETENTION VOLUMES PROVIDED IN THE FACILITIES FOR USE IN THE DETENTION ROUTING ANALYSES FOR THE FACILITIES.

GRAVEL DETENTION TRENCH AND RAIN GARDEN TYPICAL DETAIL

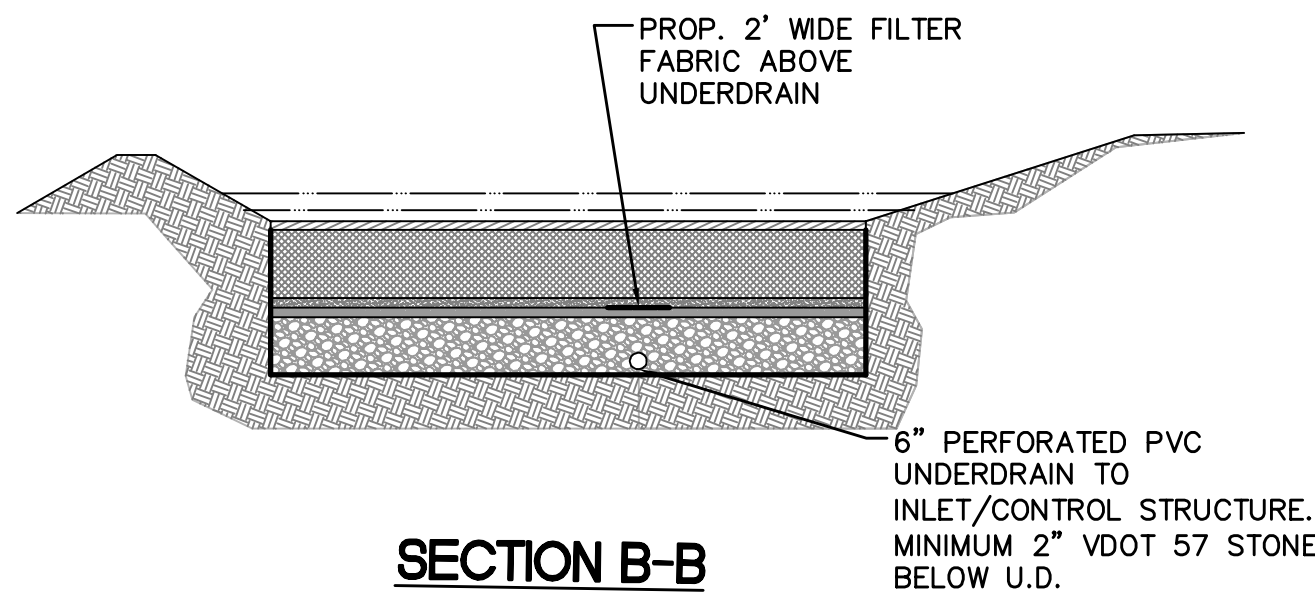
N.T.S.



SECTION A-A

NOTE:

1. 4' WIDE BERM WHERE CENTERED ON THE PROPERTY LINE. 2' WIDE BERM ELSEWHERE.
2. OVERFLOW INLET SHALL BE 24" NYLOPLAST BASIN WITH NYLOPLAST DROP IN GRATE OR APPROVED EQUAL.
3. INLET/CONTROL STRUCTURE SHALL BE 15" NYLOPLAST BASIN WITH NYLOPLAST DOME GRATE OR APPROVED EQUAL.
4. SLOPE SOIL MEDIA AND MULCH AROUND INLET UP TO GRATE.
5. REFER TO BIORETENTION ELEVATION AND DETENTION STORAGE DATA TABLE FOR ELEVATION INFORMATION. REFER TO LAYOUT PLAN FOR UNDERDRAIN ELEVATIONS.



SECTION B-B

CONSTRUCTION NOTES:

THE BIORETENTION (RAIN GARDENS) HAS BEEN DESIGNED IN ACCORDANCE WITH VIRGINIA DCR STORMWATER DESIGN SPECIFICATION No. 9, VERSION 2.0 DATED JAN. 1, 2013. THE CONTRACTOR SHALL CONSTRUCT THE RAIN GARDEN AND GRAVEL DETENTION TRENCH FACILITIES IN ACCORDANCE WITH THIS BIORETENTION SPECIFICATION. THE CONTRACTOR SHALL PROVIDE MATERIAL CERTIFICATIONS AND A SIGNED CERTIFICATION THAT THE FACILITIES WERE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND THE DCR SPECIFICATION REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR CONSTRUCTION SEQUENCE AND CONSTRUCTION INSPECTION RECOMMENDATIONS.

MAINTENANCE NOTES:

THE OWNER SHOULD BE AWARE THAT A MAINTENANCE AGREEMENT IS REQUIRED TO BE EXECUTED AND RECORDED IN LAND RECORDS BETWEEN THE OWNER AND THE LOCAL JURISDICTION. THE OWNER SHOULD MAKE HIMSELF FULLY AWARE OF ALL CONSTRUCTION, INSPECTION AND MAINTENANCE OBLIGATIONS CONTAINED IN THE AGREEMENT AND THE DCR SPECIFICATION REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR MAINTENANCE AND MAINTENANCE INSPECTION RECOMMENDATIONS.

SEE SHEET C-0403 FOR SWM AND BMP DRAINAGE AREA AND INFORMATION.

BIORETENTION SIZING CALCULATIONS
IN ACCORDANCE WITH DEQ SPECIFICATION NO. 9

Design Level 1 (55% Phosphorous removal rate)

Design Basis:

1. Design assumes no infiltration (Bioretention Filter)
2. Facility is designed for stormwater detention as well as water quality

Bioretention Design:

| Facility No. | Drainage Area | | | | | | 10-Yr Q Rational (cfs) | Treatment Vol. Tv =(1)(Rv)(A)/12 (CF) | Soil Media Depth (Ft) | Equivalent Subsurface Storage Depth ⁽²⁾ (Ft) | Surface Area (SF) | Surface Ponding Depth ⁽³⁾ = (Tv)/SA - ESSD (Ft) | Filter Mulch Surface Elevation (Ft) | BMP Water Surface Elev. ⁽⁴⁾ (Ft) | |
|--------------|-----------------|------|---------------|-------------------|------------|------|------------------------------|---|--------------------------|---|----------------------|--|--|--|--------|
| | Impervious Area | | Pervious Area | | Total Area | | | | | | | | | | |
| | (SF) | Rv | (SF) | Rv ⁽¹⁾ | (SF) | (Ac) | | | | | | | | | Rv |
| RG1 | 1,410 | 0.95 | 5,470 | 0.25 | 6,880 | 0.16 | 0.39 | 0.45 | 226 | 1.5 | 0.38 | 300 | 0.38 | 382.80 | 383.18 |
| RG2 | 1,281 | 0.95 | 6,274 | 0.25 | 7,555 | 0.17 | 0.37 | 0.47 | 232 | 1.5 | 0.38 | 300 | 0.40 | 380.20 | 380.60 |
| RG3 | 1,603 | 0.95 | 7,274 | 0.25 | 8,877 | 0.20 | 0.38 | 0.56 | 278 | 1.5 | 0.38 | 347 | 0.43 | 383.80 | 384.23 |
| RG4 | 2,158 | 0.95 | 10,091 | 0.25 | 12,249 | 0.28 | 0.37 | 0.77 | 381 | 1.5 | 0.38 | 447 | 0.48 | 380.80 | 381.28 |
| RG5 | 2,441 | 0.95 | 8,430 | 0.25 | 10,871 | 0.25 | 0.41 | 0.73 | 369 | 1.5 | 0.38 | 435 | 0.47 | 380.20 | 380.67 |
| TOTALS | 8,893 | 0.95 | 37,539 | | 46,432 | 1.07 | | | | 0.00 | 1,829 | | | | |
| | | | | | | | | | | | | | | | |

Footnotes:

- (1) Rv based on HSG in accordance with Va. runoff reduction method (turf values are .15, .2, .22, .25 for A, B, C, and D soils respectively)
- (2) Equivalent subsurface storage depth = media depth x 0.25 voids. Not counting gravel storage for this design. Gravel storage only counted for detention purposes.
- (3) Preferred maximum water quality ponding depth is 6" but up to 12" is allowed with appropriate plants.
- (4) Set 15" Nyloplast basin top elevation at BMP WSEL.

BIORETENTION ELEVATION AND DETENTION STORAGE DATA
IN ACCORDANCE WITH DEQ SPECIFICATION NO. 9

ELEVATION DATA

| Facility No. | Min. El. Top of Berm ⁽¹⁾ | 24" Nyloplast Basin Top Elev. ⁽²⁾ | Required Head For Q10 Into 15" Nyloplast (Ft) | 15" Nyloplast Basin Top Elev. ⁽²⁾ | 15" Nyloplast Basin Orifice Diameter (In) | Mulch Surface Elevation | Top of Gravel El. | Pipe & Orifice Invert Out of 15" Nyloplast Basin | Invert Out of 24" Nyloplast Basin | Facility Invert |
|--------------|-------------------------------------|--|---|--|---|-------------------------|-------------------|--|-----------------------------------|-----------------|
| RG1 | 383.48 | 383.29 | 0.11 | 383.18 | 2.0 | 382.80 | 380.80 | 379.17 | 377.32 | 379.00 |
| RG2 | 381.31 | 380.72 | 0.12 | 380.60 | 1.5 | 380.20 | 378.20 | 377.17 | 377.07 | 377.00 |
| RG3 | 384.78 | 384.36 | 0.13 | 384.23 | 1.7 | 383.80 | 381.80 | 377.87 | 377.77 | 379.00 |
| RG4 | 382.02 | 381.44 | 0.16 | 381.28 | 2.0 | 380.80 | 378.80 | 377.17 | 377.07 | 377.00 |
| RG5 | 381.44 | 380.83 | 0.16 | 380.67 | 1.8 | 380.20 | 378.20 | 377.17 | 377.07 | 377.00 |

DETENTION STORAGE DATA

| Surface Area (SF) | Depth of Gravel Above Underdrain Inv. | Gravel Det. Storage Vol. ⁽²⁾ (CF) | Det. Storage Vol. At Surface ⁽³⁾ (CF) | Det. Storage Vol. At BMP WSE ⁽⁴⁾ (CF) |
|-------------------|---------------------------------------|--|--|--|
| 300 | 1.63 | 195.6 | 308.1 | 421.18 |
| 300 | 1.03 | 123.6 | 236.1 | 355.72 |
| 347 | 3.93 | 545.5 | 675.6 | 823.93 |
| 447 | 1.63 | 291.4 | 459.1 | 672.51 |
| 435 | 1.03 | 179.2 | 342.3 | 548.09 |

Footnotes:

- (1) Berm elevation provides a 6" minimum freeboard above the 10-year water surface elevation determined by routing the facility.
- (2) Storage volume in #57 stone available for stormwater detention is depth of gravel x 0.40 void ratio.
- (3) Detention storage volume at surface elevation is sum of previous column and depth of media x 0.25 void ratio x area.
- (4) Detention storage volume at surface elevation is sum of previous column and BMP ponding depth x area.
- (5) 24" Nyloplast basin top grate elevation allows Q10 to be captured by 15" Nyloplast basin to minimize surface ponding depth.
- (6) 15" Nyloplast basin top grate elevation is set at BMP water surface elevation.

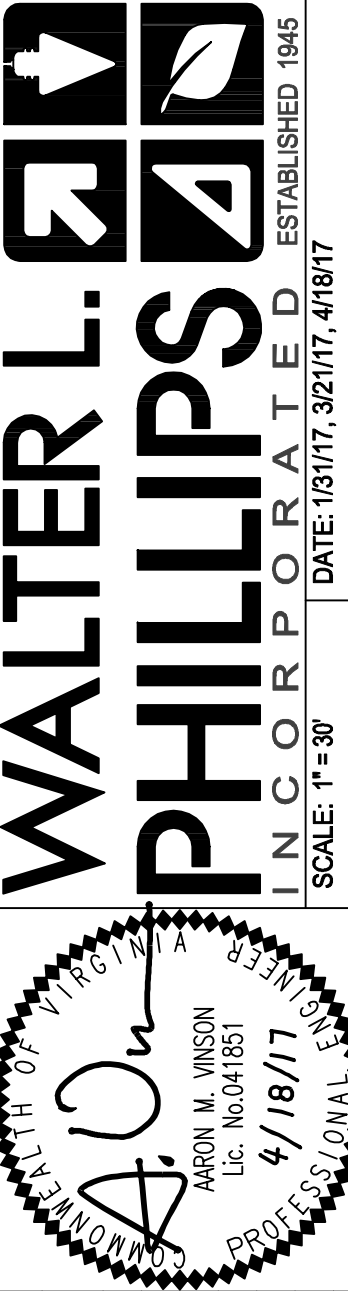
RAIN GARDEN AND GRAVEL DETENTION COMPUTATION AND DETAILS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

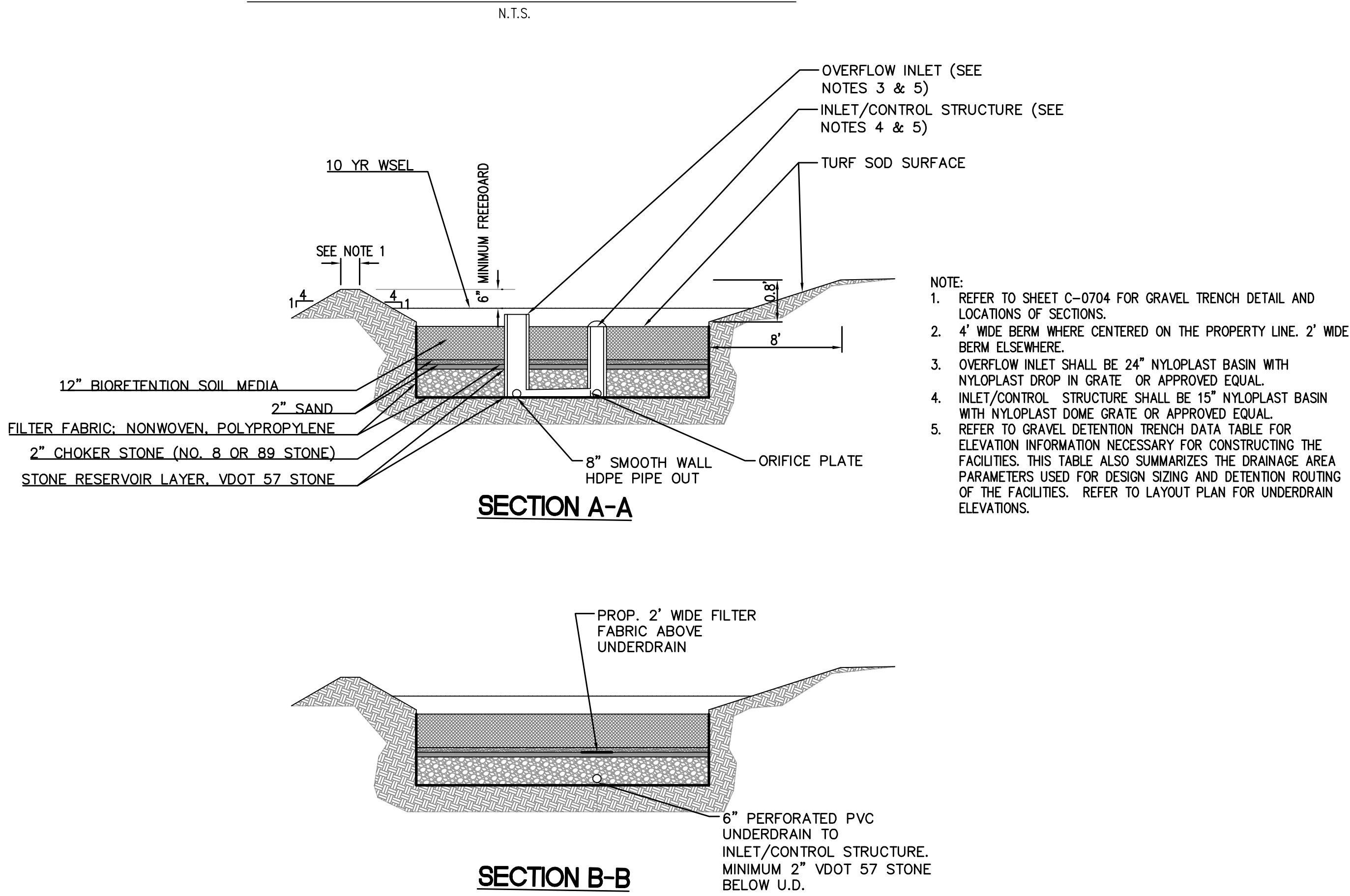
TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA



Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com
WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17, 3/21/17, 4/18/17
DRAWN: SO
CHECKED: JG

GRAVEL DETENTION TRENCH TYPICAL DETAIL



GRAVEL DETENTION TRENCH DATA

Design Basis:

1. Design assumes no infiltration. Facility is designed solely for stormwater detention purposes.

| Design and Construction Data: | | | | | | | | | | | | | | | | |
|-------------------------------|-----------------|-------|---------------|-------------------|------------|-------------------|---------------------------------------|---------------------------------|---------------------|-------------------|----------------------------|--|--|--|-------------------|-------------------------------|
| Detention Area No. | Drainage Area | | | | | | Minimum Berm Elevation ⁽²⁾ | 24" Nyloplast Basin Grate Elev. | 15" Nyloplast Basin | | Facility Surface Elevation | Pipe & Orifice Invert Out of 15" Nyloplast Basin | Depth of Gravel Above Underdrain Invert (Ft) | Equivalent Storage Depth ⁽¹⁾ (Ft) | Surface Area (SF) | Detention Storage Volume (CF) |
| | Impervious Area | | Pervious Area | | Total Area | | | | Grate Elev. | Orifice Dia. (In) | | | | | | |
| | (Ac) | CN | (Ac) | CN ⁽³⁾ | (Ac) | CN ⁽³⁾ | | | | | | | | | | |
| GD6 | 0.04 | 98 | 0.20 | 80 | 0.24 | 83 | 380.04 | 379.40 | 379.2 | 1.5 | 379.2 | 376.17 | 1.70 | 1.93 | 360 | 695 |
| GD7 | 0.07 | 98 | 0.20 | 80 | 0.27 | 85 | 377.78 | 377.15 | 376.95 | 1.8 | 376.95 | 373.17 | 2.45 | 2.23 | 356 | 794 |
| TOTALS | 0.11 | 98.00 | 0.40 | 80.00 | 0.51 | 84 | | | | | | | | | | |

Footnotes:

(1) Equivalent Storage depth = (1' surface ponding) + (depth of gravel above UD inv. x 0.40 void ratio) + (depth of media x 0.25 void ratio)

(2) Berm elevation set to provide 6" minimum freeboard above 10-year storm water surface determined from routing facility.

(3) CN based on HSG D soils.

(4) Set 15" Nyloplast grate elevation at surface elevation.

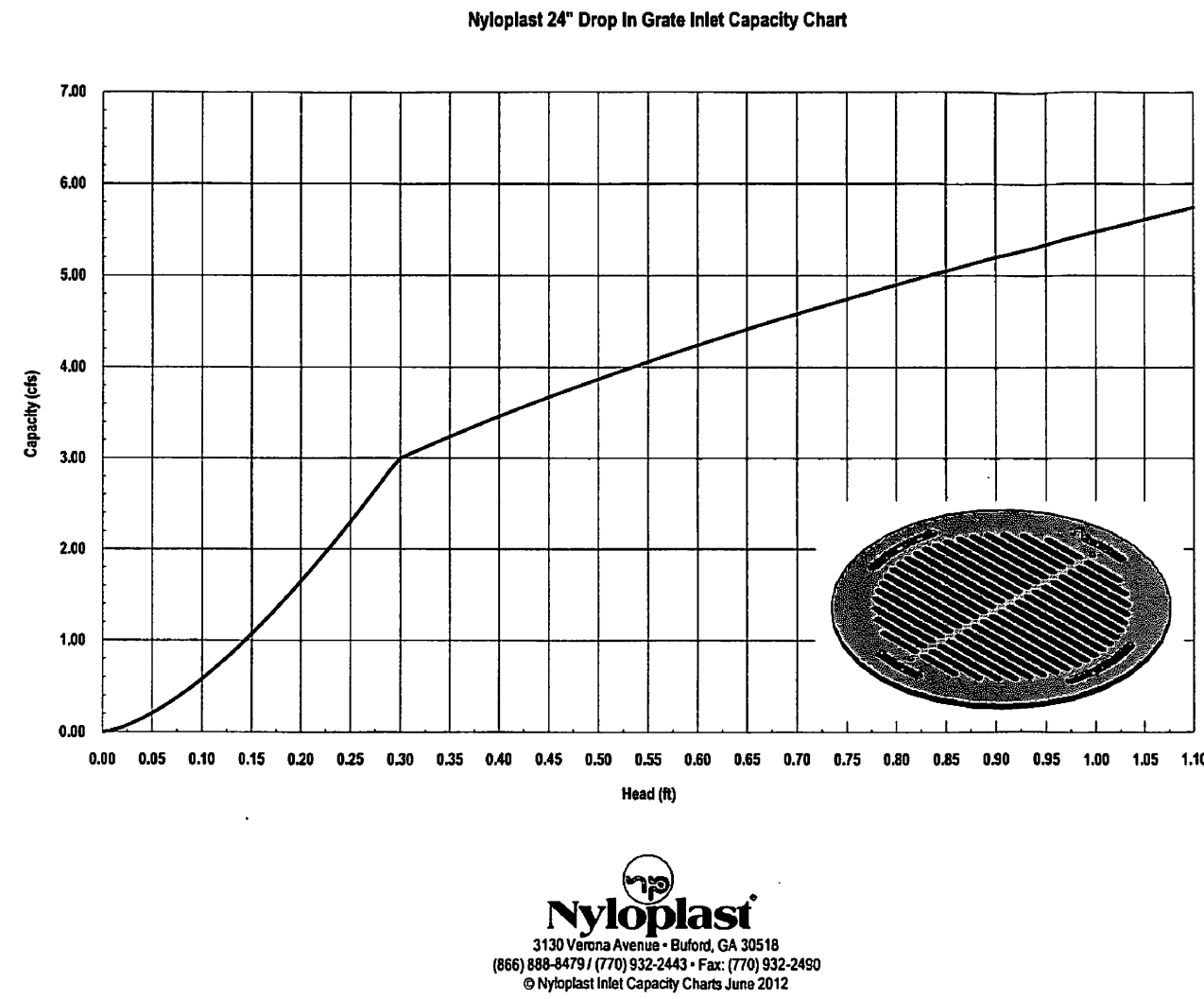
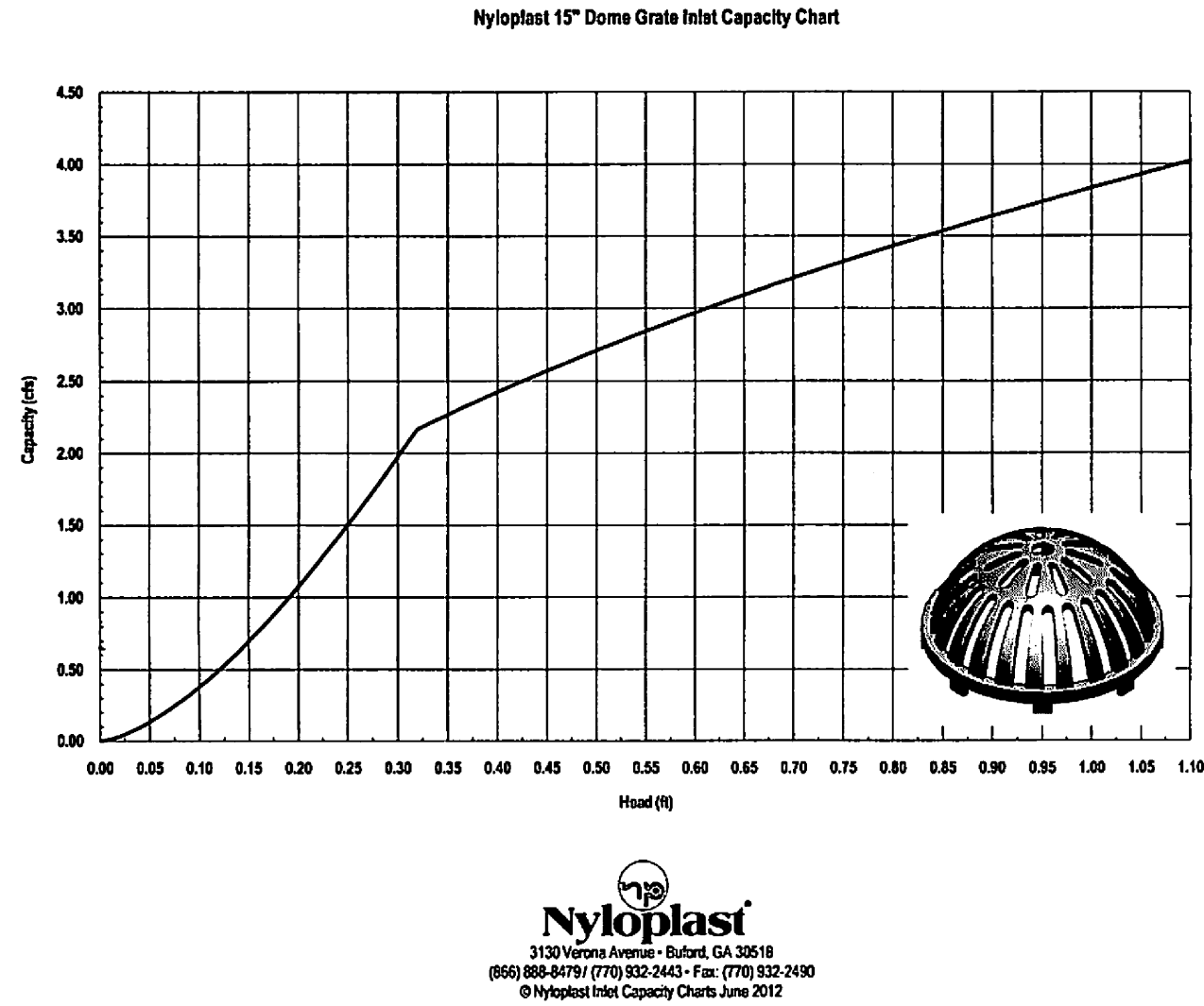
(5) Set invert of 8" pipes into and out of 24" Nyloplast basin 0.10' below invert of pipe out of 15" Nyloplast basin.

CONSTRUCTION NOTES:

THE BIORETENTION (RAIN GARDENS) HAS BEEN DESIGNED IN ACCORDANCE WITH VIRGINIA DCR STORMWATER DESIGN SPECIFICATION No. 9, VERSION 2.0 DATED JAN. 1, 2013. THE CONTRACTOR SHALL CONSTRUCT THE RAIN GARDEN AND GRAVEL DETENTION TRENCH FACILITIES IN ACCORDANCE WITH THIS BIORETENTION SPECIFICATION. THE CONTRACTOR SHALL PROVIDE MATERIAL CERTIFICATIONS AND A SIGNED CERTIFICATION THAT THE FACILITIES WERE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND THE DCR SPECIFICATION REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR CONSTRUCTION SEQUENCE AND CONSTRUCTION INSPECTION RECOMMENDATIONS.

MAINTENANCE NOTES:

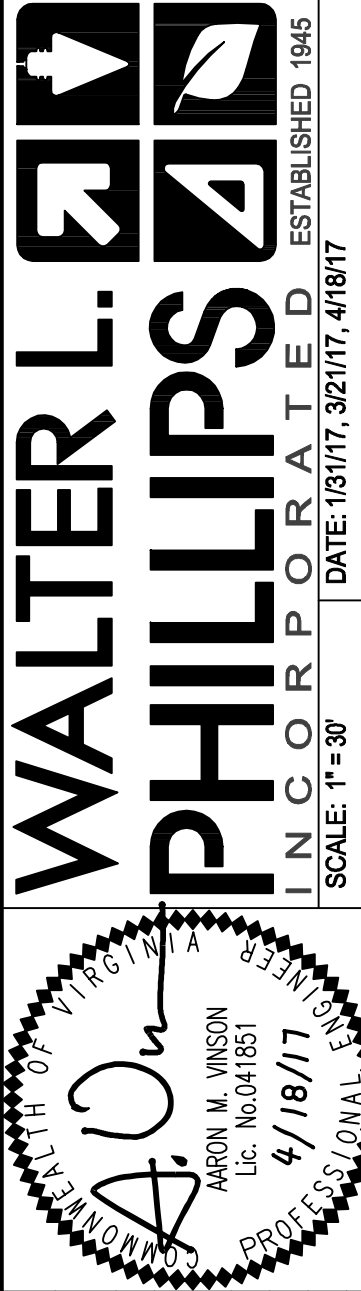
THE OWNER SHOULD BE AWARE THAT A MAINTENANCE AGREEMENT IS REQUIRED TO BE EXECUTED AND RECORDED IN LAND RECORDS BETWEEN THE OWNER AND THE LOCAL JURISDICTION. THE OWNER SHOULD MAKE HIMSELF FULLY AWARE OF ALL CONSTRUCTION, INSPECTION AND MAINTENANCE OBLIGATIONS CONTAINED IN THE AGREEMENT AND THE DCR SPECIFICATION REFERENCED ABOVE. REFER TO SHEET C-0705 FOR VIRGINIA DEQ/DCR MAINTENANCE AND MAINTENANCE INSPECTION RECOMMENDATIONS.



GRAVEL DETENTION COMPUTATIONS AND DETAILS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA



Engineers • Surveyors • Planners
Landscape Architects • Arborists
WALTER L. PHILLIPS
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com
INCORPORATED
ESTABLISHED 1945
DATE: 1/31/17, 3/21/17, 4/18/17
SCALE: 1" = 30'

CHECKED: JG
DRAWN: SO

SECTION 8: CONSTRUCTION

8.1. Construction Sequence

Construction Stage E&S Controls. Micro-bioretentation and small-scale bioretention areas should be fully protected by silt fence or construction fencing, particularly if they will rely on infiltration (i.e., have no underdrains). Ideally, bioretention should remain outside the limit of disturbance during construction to prevent soil compaction by heavy equipment. Bioretention basin locations may be used as small sediment traps or basins during construction. However, these must be accompanied by notes and graphic details on the ESC plan specifying that (1) the maximum excavation depth at the construction stage must be at least 1 foot above the post-construction maximum excavation, (2) the facility must contain an underdrain, and (3) the plan must also show the proper procedures for converting the temporary sediment control practice to a permanent bioretention facility, including dewatering, cleanout and stabilization.

8.2 Bioretention Installation

The following is a typical construction sequence to properly install a bioretention basin. The installation of a bioretention basin will include intermediate inspections at critical stages of construction with inspector sign-off that the particular elements of the bioretention are constructed according the approved plans and specifications. As an alternative, if allowed by the VSMP Authority, the contractor may rely on the engineer of record or other qualified individual

Version 2.0, January 1, 2013Page 37 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

to conduct the intermediate inspections and certifications of compliance. The construction sequence for micro-bioretentation is more simplified. These steps may be modified to reflect different bioretention applications or expected site conditions:

Step 1. Construction of the bioretention area may only begin after the entire contributing drainage area has been stabilized with vegetation. It may be necessary to block certain curb or other inlets while the bioretention area is being constructed. The proposed site should be checked for existing utilities prior to any excavation.

Step 2. The designer and the installer should have a preconstruction meeting, checking the boundaries of the contributing drainage area and the actual inlet elevations to ensure they conform to original design. Since other contractors may be responsible for constructing portions of the site, it is quite common to find subtle differences in site grading, drainage and paving elevations that can produce hydraulically important differences for the proposed bioretention area. The designer should clearly communicate, in writing, any project changes determined during the preconstruction meeting to the installer and the plan review/inspection authority.

Step 3. Temporary E&S controls are needed during construction of the bioretention area to divert stormwater away from the bioretention area until it is completed. Special protection measures such as erosion control fabrics may be needed to protect vulnerable side slopes from erosion during the construction process.

Step 4. Any pre-treatment cells should be excavated first and then sealed to trap sediments.

Step 5. Excavators or backhoes should work from the sides to excavate the bioretention area to its appropriate design depth and dimensions. Excavating equipment should have scoops with adequate reach so they do not have to sit inside the footprint of the bioretention area. Contractors should use a cell construction approach in larger bioretention basins, whereby the basin is split into 500 to 1,000 sq. ft. temporary cells with a 10-15 foot earth bridge in between, so that cells can be excavated from the side.

Step 6. It may be necessary to rip the bottom soils to a depth of 6 to 12 inches to promote greater infiltration.

Step 7. Place geotextile fabric on the sides of the bioretention area with a 6-inch overlap on the sides. If a stone storage layer will be used, place the appropriate depth of #57 stone on the bottom, install the perforated underdrain pipe, pack #57 stone to 3 inches above the underdrain pipe, and add approximately 3 inches of choker stone/pea gravel as a filter between the underdrain and the soil media layer. If no stone storage layer is used, start with 6 inches of #57 stone on the bottom, and proceed with the layering as described above.

Step 8. Obtain soil the media from a qualified vendor, and store it on an adjacent impervious area or plastic sheeting. After verifying that the media meets the specifications, apply the media in 12-inch lifts until the desired top elevation of the bioretention area is achieved. Wait a few days to check for settlement, and add additional media, as needed, to achieve the design elevation.

Version 2.0, January 1, 2013Page 38 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

Step 9. Prepare planting holes for any trees and shrubs, install the vegetation, and water accordingly. Install any temporary irrigation.

Step 10. Place the surface cover in both cells (mulch, river stone or turf), depending on the design. If coir or jute matting will be used in lieu of mulch, the matting will need to be installed prior to planting (**Step 9**), and holes or slits will have to be cut in the matting to install the plants.

Step 11. Install the plant materials as shown in the landscaping plan, and water them during weeks of no rain for the first two months.

8.3 Construction Inspection

Inspections during and immediately after construction are needed to ensure that all the elements of bioretention basins are built in accordance with these specifications. Use a detailed inspection checklist that requires sign-offs by qualified individuals at critical stages of construction and to ensure that the contractor's interpretation of the plan is consistent with the designer's intent. The following identifies the critical stages of construction where an intermediate inspection and sign-off by a qualified individual is recommended since the items can't be verified after construction is completed. A construction inspection checklist that includes certifications of inspection at critical stages is provided at the end of this specification.

The following represents items that are frequently overlooked during construction inspection but represent important elements for ensuring the success of the bioretention facility during the initial break-in period.

- Verify the proper coverage and depth of mulch, vegetation, or soil matting has been achieved following construction, both on the filter bed and the side-slopes.
- Inspect the pre-treatment forbays and filter strips to verify that they are properly installed, stabilized, and working effectively before opening the facility to runoff.
- Check that outfall protection/energy dissipation measures at concentrated inflow and outflow points are stable.

Upon final acceptance of the facility, log the practice's GPS coordinates and submit them for entry into the VSMP Authority's BMP maintenance tracking database.

SECTION 9: MAINTENANCE

9.1. Maintenance Agreements

The Virginia Stormwater Management regulations (4 VAC 50-60) specify the circumstances under which a maintenance agreement must be executed between the owner and the VSMP authority, and sets forth inspection requirements, compliance procedures if maintenance is neglected, notification of the local program upon transfer of ownership, and right-of-entry for local program personnel.

Version 2.0, January 1, 2013Page 39 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

- All bioretention practices must include a long term maintenance agreements consistent with the provisions of the VSMP regulations, and must include the recommended maintenance tasks and a copy of an annual inspection checklist.
- When micro-scale bioretention practices are applied on private residential lots, homeowners should be educated regarding their routine maintenance needs by being provided a simple document that explains their purpose and routine maintenance needs. .
- A deed restriction, drainage easement or other mechanism enforceable by the VSMP authority must be in place to help ensure that rain gardens and bioretention filters are maintained and not converted or disturbed, as well as to pass the knowledge along to any subsequent owners.
- The mechanism should, if possible, grant authority for the VSMP authority to access the property for inspection or corrective action.

9.2. First Year Maintenance Operations

Successful establishment of bioretention areas requires that the following tasks be undertaken in the first year following installation:

- **Initial inspections.** For the first 6 months following construction, the site should be inspected at least twice after storm events that exceed 1/2 inch of rainfall.
- **Spot Reseeding.** Inspectors should look for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover.
- **Fertilization.** One-time, spot fertilization may be needed for initial plantings.
- **Watering.** Watering is needed once a week during the first 2 months, and then as needed during first growing season (April-October), depending on rainfall.
- **Remove and replace dead plants.** Since up to 10% of the plant stock may die off in the first year, construction contracts should include a care and replacement warranty to ensure that vegetation is properly established and survives during the first growing season following construction. The typical thresholds below which replacement is required are 85% survival of plant material and 100% survival of trees.

9.3. Maintenance Inspections

- It is highly recommended that a spring maintenance inspection and cleanup be conducted at each bioretention area. The following is a list of some of the key maintenance problems to look for:
- Check to see if 75% to 90% cover (mulch plus vegetative cover) has been achieved in the bed, and measure the depth of the remaining mulch.
 - Check for sediment buildup at curb cuts, gravel diaphragms or pavement edges that prevents flow from getting into the bed, and check for other signs of bypassing.
 - Check for any winter- or salt-killed vegetation, and replace it with hardier species.
 - Note presence of accumulated sand, sediment and trash in the pre-treatment cell or filter beds, and remove it.
 - Inspect bioretention side slopes and grass filter strips for evidence of any rill or gully erosion, and repair it.
 - Check the bioretention bed for evidence of mulch flotation, excessive ponding, dead plants or concentrated flows, and take appropriate remedial action.

Version 2.0, January 1, 2013Page 40 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

- Check inflow points for clogging, and remove any sediment.
- Look for any bare soil or sediment sources in the contributing drainage area, and stabilize them immediately.
- Check for clogged or slow-draining soil media, a crust formed on the top layer, inappropriate soil media, or other causes of insufficient filtering time, and restore proper filtration characteristics.

Example maintenance inspection checklists for Bioretention areas can be accessed in Appendix C of Chapter 9 of the *Virginia Stormwater Management Handbook* (2010).

9.4. Routine and Non-Routine Maintenance Tasks

Maintenance of bioretention areas should be integrated into routine landscape maintenance tasks. If landscaping contractors will be expected to perform maintenance, their contracts should contain specifics on unique bioretention landscaping needs, such as maintaining elevation differences needed for ponding, proper mulching, sediment and trash removal, and limited use of fertilizers and pesticides. A customized maintenance schedule must be prepared for each bioretention facility, since the maintenance tasks will differ depending on the scale of bioretention, the landscaping template chosen, and the type of surface cover. A generalized summary of common maintenance tasks and their frequency is provided in **Table 9.8**.

- The most common non-routine maintenance problem involves standing water. If water remains on the surface for more than 48 hours after a storm, adjustments to the grading may be needed or underdrain repairs may be needed. The surface of the filter bed should also be checked for accumulated sediment or a fine crust that builds up after the first several storm events. There are several methods that can be used to rehabilitate the filter (try the easiest things first, as listed below):
- Open the underdrain observation well or cleanout and pour in water to verify that the underdrains are functioning and not clogged or otherwise in need of repair. The purpose of this check is to see if there is standing water all the way down through the soil. If there is standing water on top, but not in the underdrain, then there is a clogged soil layer. If the underdrain and stand pipe indicates standing water, then the underdrain must be clogged and will need to be snaked.
 - Remove accumulated sediment and till 2 to 3 inches of sand into the upper 8 to 12 inches of soil.
 - Install sand wicks from 3 inches below the surface to the underdrain layer. Sand wicks can be installed by excavating or augering (using a tree auger or similar tool) down to the gravel storage zone to create vertical columns which are then filled with a clean open-graded coarse sand material (coarse sand mix similar to the gradation used for the soil media). A sufficient number of wick drains of sufficient dimension should be installed to meet the design dewatering time for the facility.
 - Last resort - remove and replace some or all of the soil media.

Version 2.0, January 1, 2013Page 41 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

| Table 9.8. Suggested Annual Maintenance Activities for Bioretention | |
|---|-----------------------------|
| Maintenance Tasks | Frequency |
| • Mowing of grass filter strips and bioretention turf cover | At least 4 times a year |
| • Spot weeding, erosion repair, trash removal, and mulch raking | Twice during growing season |
| • Add reinforcement planting to maintain desired the vegetation density | As needed |
| • Remove invasive plants using recommended control methods | |
| • Stabilize the contributing drainage area to prevent erosion | |
| • Spring inspection and cleanup | Annually |
| • Supplement mulch to maintain a 3 inch layer | |
| • Prune trees and shrubs | |
| • Remove sediment in pre-treatment cells and inflow points | Once every 2 to 3 years |
| • Replace the mulch layer | Every 3 years |

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

Sample Construction Inspection Checklist for Bioretention Practices: The following checklist provides a basic outline of the anticipated items for the construction inspection of Bioretention Practices. This checklist does not necessarily distinguish between all the design variations and differences in construction between the family of practices: bioretention basins, micro-bioretentation (or raingardens), and urban bioretention. Similarly, the use of an infiltration sump below an underdrain, or an infiltration sump with an “upturned elbow”, and other variations between Level 1 and Level 2 bioretention may not be clearly identified in this checklist. Inspectors should review the plans carefully, and adjust these items and the timing of inspection verification as needed to ensure the intent of the design is met. Finally, users of this information may wish to incorporate these items into a VSMP Authority Construction Checklist format consistent with the format used for erosion and sediment control and BMP construction inspections.

Pre-Construction Meeting

- ☐ Pre-construction meeting with the contractor designated to install the bioretention practice has been conducted.
- ☐ Identify the tentative schedule for construction and verify the requirements and schedule for interim inspections and sign-off.
- ☐ Subsurface investigation and soils report supports the placement of an bioretention practice in the proposed location.
- ☐ Impervious cover has been constructed/installed and area is free of construction equipment, vehicles, material storage, etc.
- ☐ All pervious areas of the contributing drainage areas have been adequately stabilized with a thick layer of vegetation and erosion control measures have been removed.
- ☐ Area of bioretention practice has not been impacted during construction.
- ☐ Stormwater has been diverted around the area of the bioretention practice and perimeter erosion control measures to protect the facility during construction have been installed. .

Excavation

- ☐ Compare the bioretention surface and invert design elevations with the actual constructed elevations of the inflow and outlet inverts and adjust design elevations as needed.
- ☐ Area of bioretention excavation is marked and the size and location conforms to plan.
- ☐ If the excavation area has been used as a sediment trap: verify that the bottom elevation of the proposed stone reservoir is lower than the bottom elevation of the existing trap.
- ☐ For Level 2 bioretention, ensure the bottom of the excavation is scarified prior to placement of stone.
- ☐ Subgrade surface is free of rocks and roots, and large voids. Any voids should be refilled with the base aggregate to create a level surface for the placement of aggregates and underdrain (if required).

Version 2.0, January 1, 2013Page 43 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

- ☐ No groundwater seepage or standing water is present. Any standing water is dewatered to an acceptable dewatering device.
- ☐ Excavation of the bioretention practice has achieved proper grades and the required geometry and elevations without compacting the bottom of the excavation.
- ☐ **Certification of Excavation Inspection:** Inspector certifies the successful completion of the excavation steps listed above.

Filter Layer, Underdrain, and Stone Reservoir Placement

- ☐ All aggregates, including, as required, the filter layer (choker stone & sand), the stone reservoir layer or infiltration sump conform to specifications as certified by quarry.
- ☐ Underdrain size and perforations meet the specifications.
- ☐ For Level 2 installations: placement of filter layer and initial lift of stone reservoir layer aggregates with underdrain or infiltration sump, spread (not dumped) to avoid aggregate segregation; or
- ☐ Impermeable liner, when required, meets project specifications and is placed in accordance with manufacturers specifications.
- ☐ Sides of excavation covered with geotextile, when required, prior to placing stone reservoir aggregate; no tears or holes, or excessive wrinkles are present.
- ☐ Placement of underdrain, observation wells, and underdrain fittings (45 degree wyres, cap at the upstream end, etc.) are in accordance with the approved plans.
- ☐ Elevations of underdrain and outlet structure are in accordance with approved plans, or as adjusted to meet field conditions.
- ☐ Placement of remaining lift of stone reservoir layer as needed to achieve the required reservoir depth.
- ☐ **Certification of Filter Layer and Underdrain Placement Inspection:** Inspector certifies the successful completion of the filter layer and underdrain placement steps listed above.

Bioretention Soil Media Placement

- ☐ Soil media is certified by supplier or contractor as meeting the project specifications.
- ☐ Soil media is placed in 12-inch lifts to the design top elevation of the bioretention area. Elevation has been verified after settlement (2 to 4 days after initial placement).
- ☐ Side slopes of ponding area are feathered back at the required slope (no steeper than 3H:1V).
- ☐ **Certification of Soil Media Placement Inspection:** Inspector certifies the successful completion of the soil media steps listed above.

Version 2.0, January 1, 2013Page 44 of 61

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9BIORETENTION

Pretreatment and Plant Installation

- ☐ Placement of energy dissipators and pretreatment practices (forebays, gravel diaphragms, etc.) are installed in accordance with the approved plans.
- ☐ Riser, overflow weir, or other outflow structure is set to the proper elevation and functional; or.
- ☐ External bypass structure is built in accordance with the approved plans.
- ☐ Appropriate number and spacing of plants are installed in accordance with the approved plans.
- ☐ All erosion and sediment control practices have been removed.
- ☐ Follow-up inspection and as-built survey/certification has been scheduled.
- ☐ GPS coordinates have been documented for all bioretention practice installations on the parcel.

NOTES:
1. THIS SHEET PROVIDES SOME GENERAL RECOMMENDATIONS FROM THE VIRGINIA DEQ THAT SHOULD BE FOLLOWED FOR PROPER CONSTRUCTION AND CONSTRUCTION INSPECTION OF THE RAIN GARDENS AND GRAVEL DETENTION TRENCHES.
2. THIS SHEET ALSO PROVIDES SOME GENERAL RECOMMENDATIONS FOR MAINTENANCE AND MAINTENANCE INSPECTIONS OF THESE FACILITIES. NOTE THAT THE PROPERTY OWNER(S) ARE REQUIRED TO EXECUTE A STORMWATER MANAGEMENT FACILITY MAINTENANCE AGREEMENT WITH THE TOWN OF VIENNA WHICH CONTAINS FURTHER CONSTRUCTION, MAINTENANCE, AND INSPECTION REQUIREMENTS

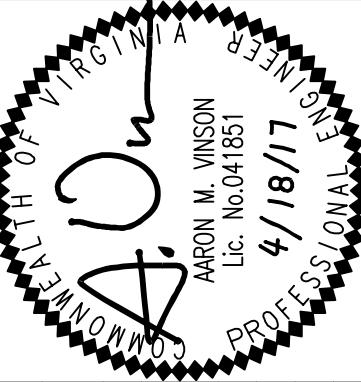
SWM AND BMP CONSTRUCTION AND MAINTENANCE RECOMMENDATIONS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA



WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17/32/17, 4/18/17
SCALE: 1"=30'

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

CHECKED: JG
DRAWN: SO

PRE-DEVELOPMENT SITE HYDROGRAPHS

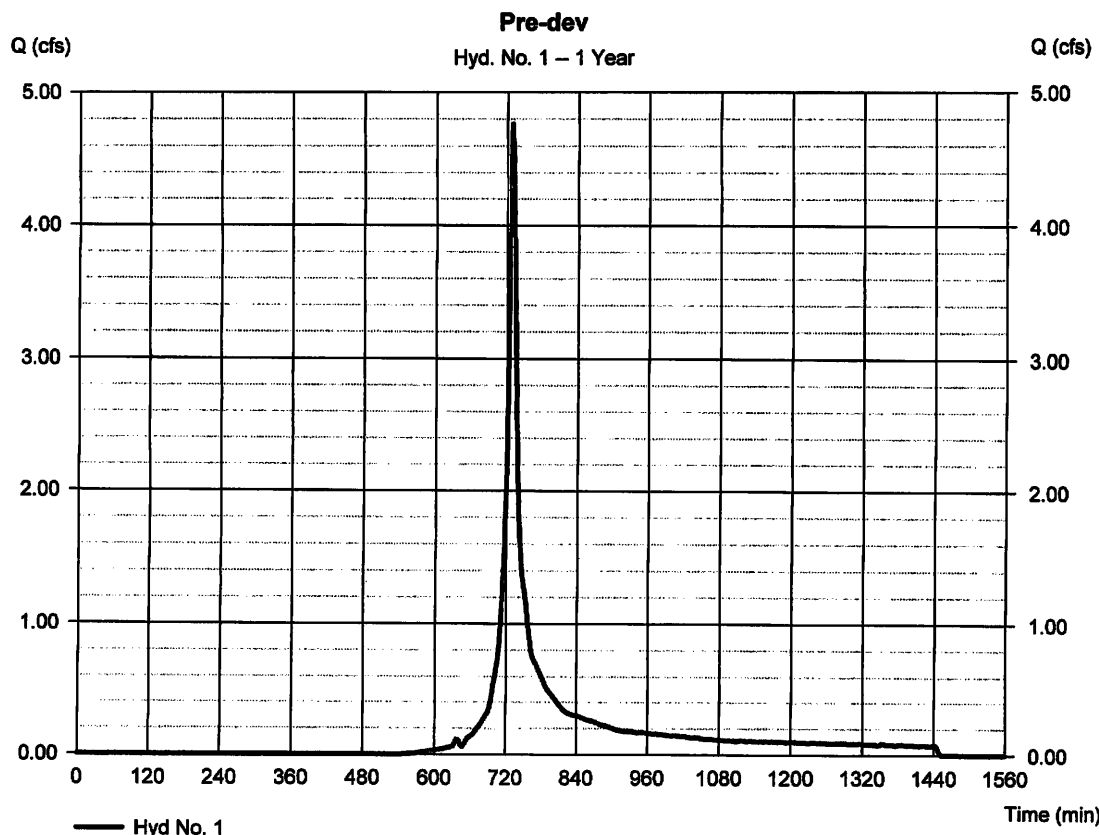
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 1

Pre-dev

| | | | |
|-----------------|---|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.764 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 729 min |
| Time interval | = 1 min | Hyd. volume | = 14,800 cuft |
| Drainage area | = 3.370 ac | Curve number | = 84 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.62 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



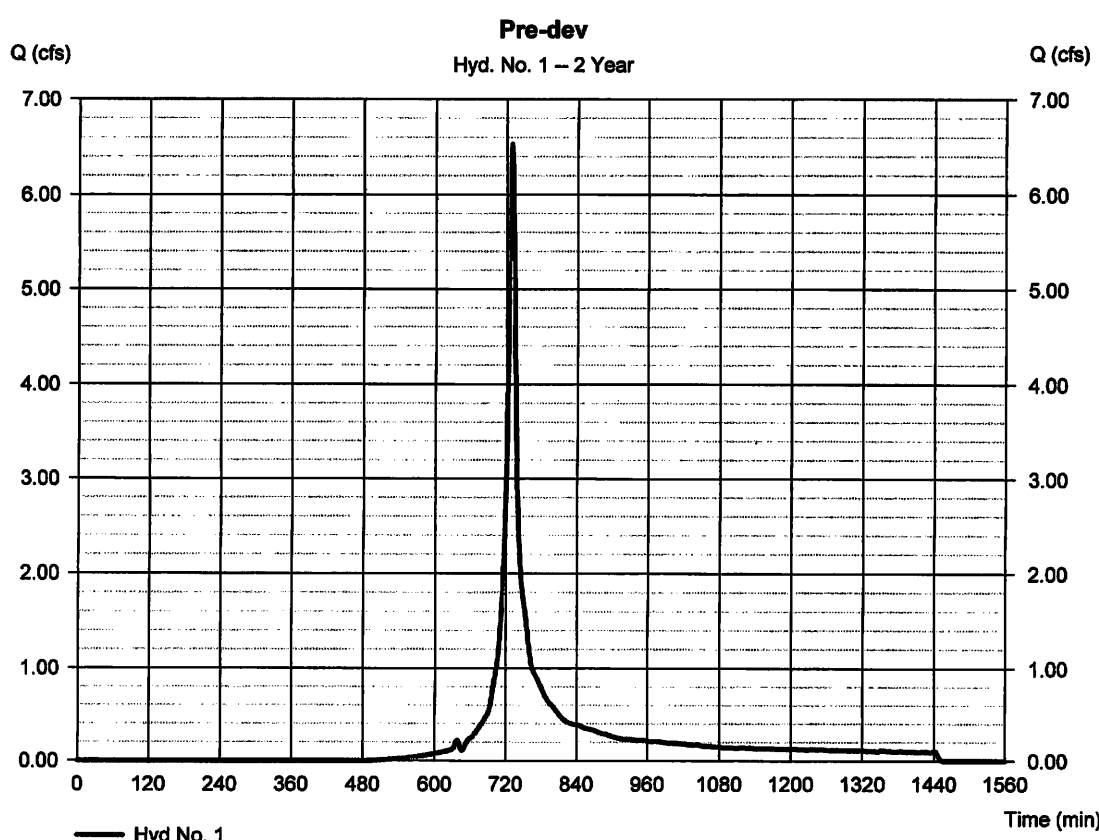
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 1

Pre-dev

| | | | |
|-----------------|---|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.529 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 729 min |
| Time interval | = 1 min | Hyd. volume | = 20,273 cuft |
| Drainage area | = 3.370 ac | Curve number | = 84 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 3.17 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



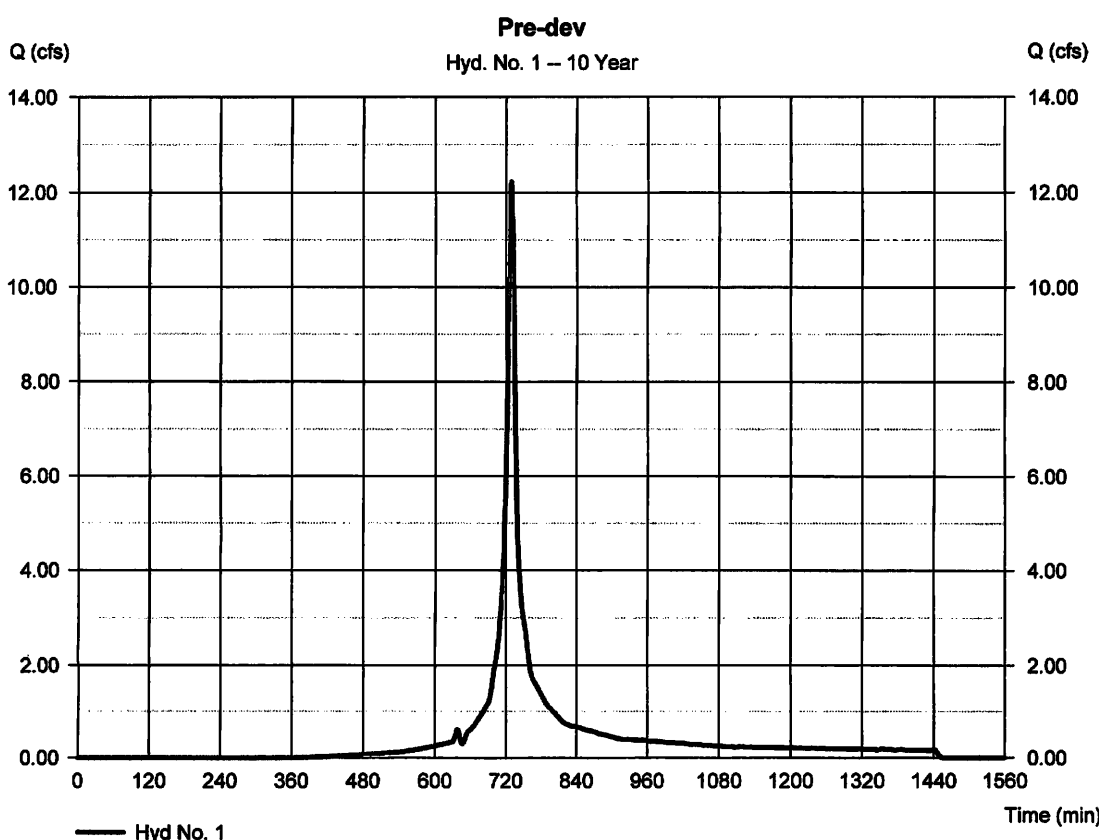
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 1

Pre-dev

| | | | |
|-----------------|---|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 12.23 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 729 min |
| Time interval | = 1 min | Hyd. volume | = 38,555 cuft |
| Drainage area | = 3.370 ac | Curve number | = 84 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 4.87 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



UNDETAINED POST-DEVELOPMENT SITE HYDROGRAPHS

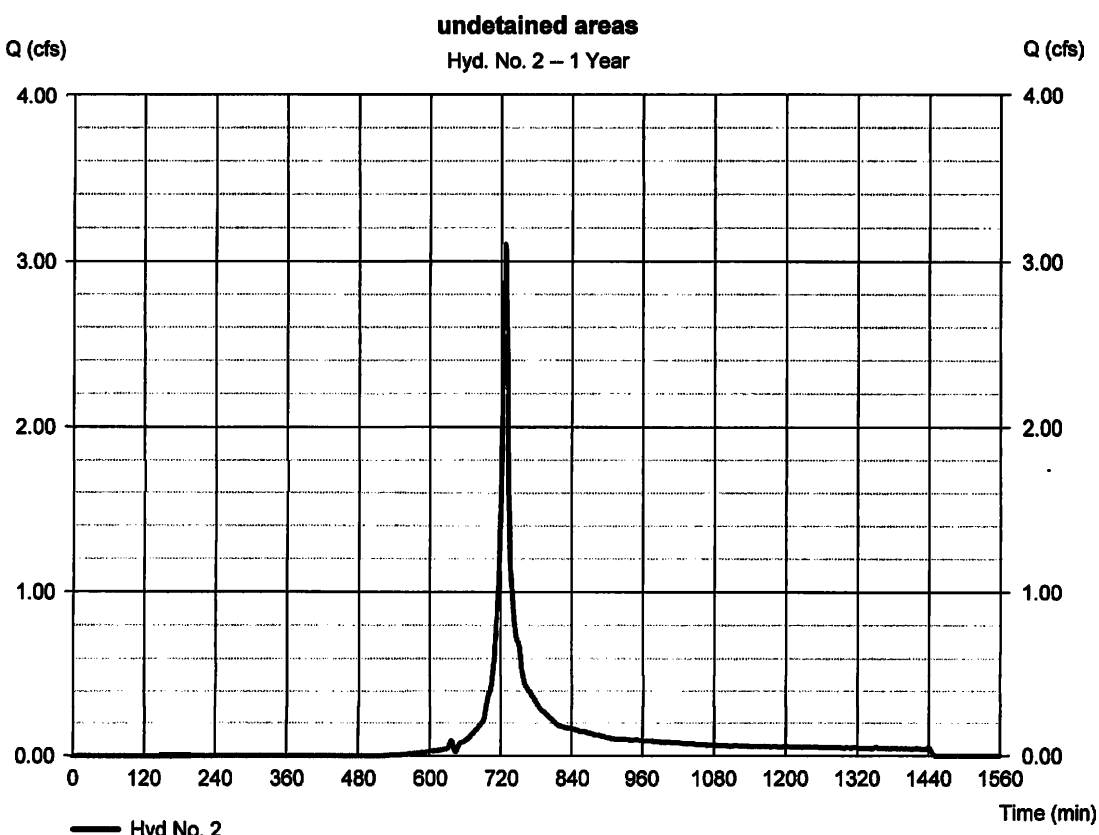
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 2

undetained areas

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.101 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 8,542 cuft |
| Drainage area | = 1.790 ac | Curve number | = 85 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 2.62 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



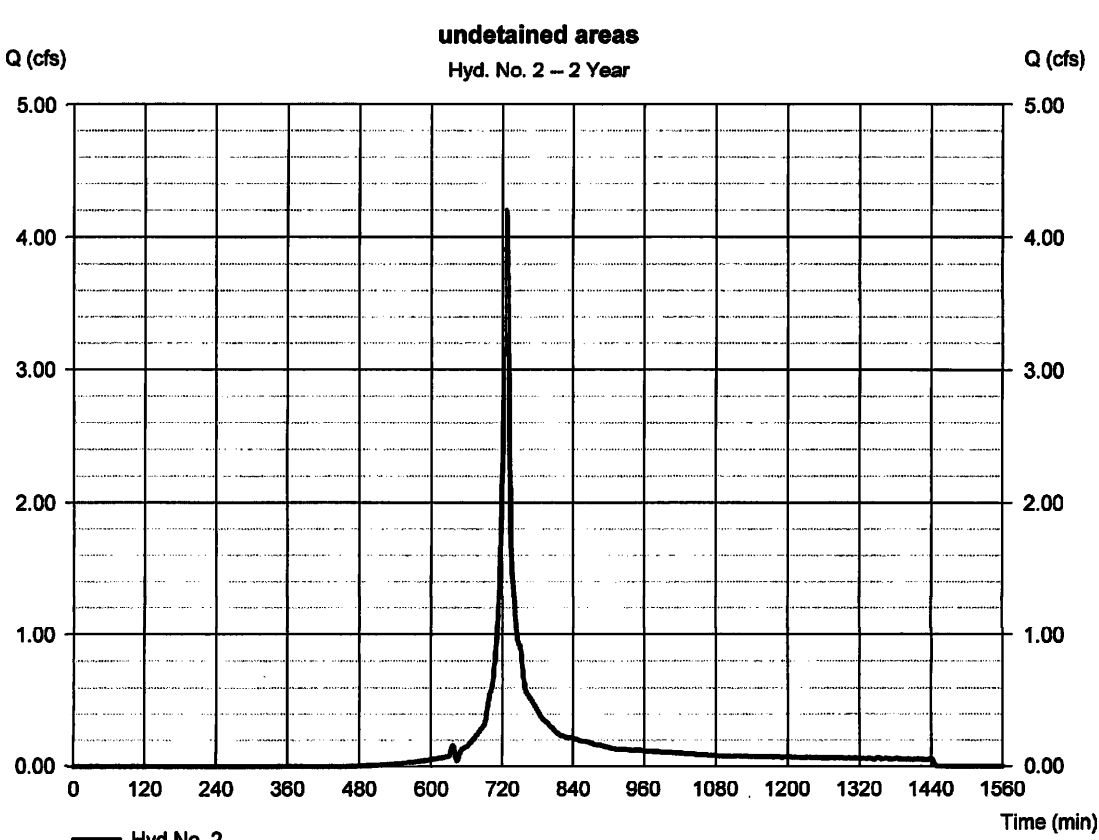
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 2

undetained areas

| | | | |
|-----------------|---|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.199 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 11,606 cuft |
| Drainage area | = 1.790 ac | Curve number | = 85 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 3.17 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



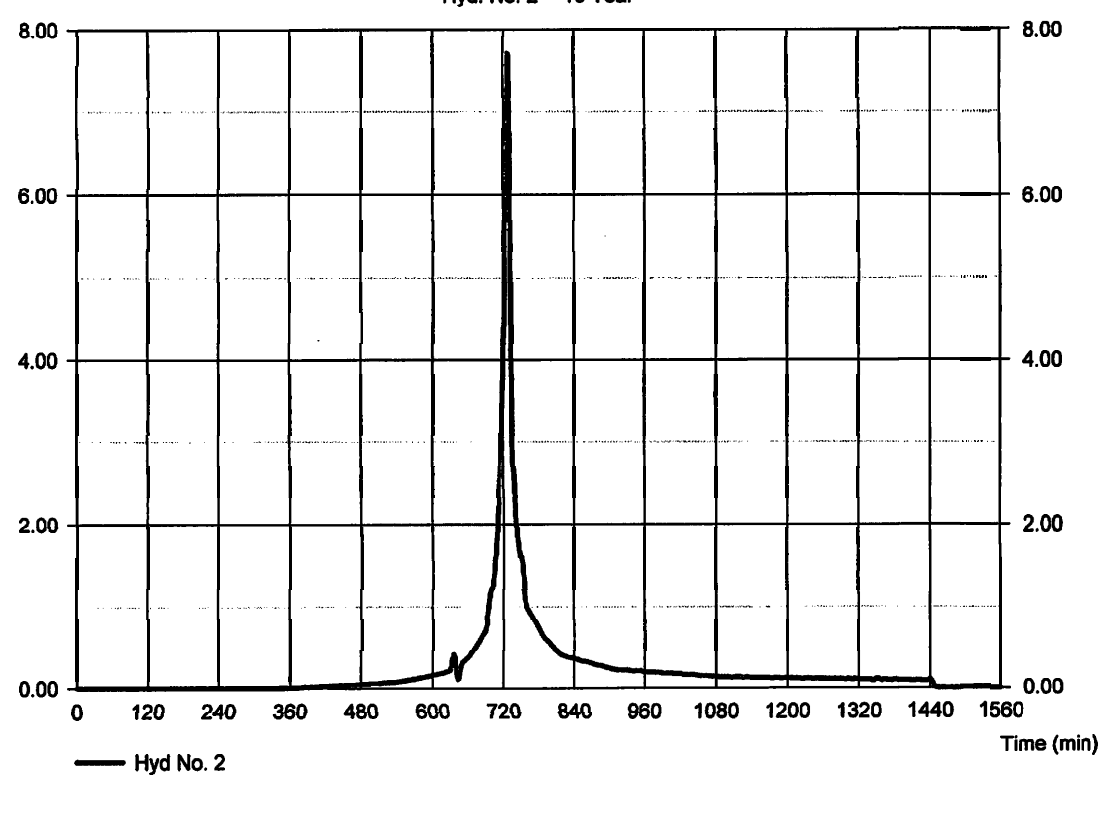
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 2

undetained areas

| | | | |
|-----------------|---|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.708 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 21,765 cuft |
| Drainage area | = 1.790 ac | Curve number | = 85 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 4.87 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



POST - DEVELOPMENT SITE 1-YEAR STORM HYDROGRAPHS FOR ALLOWABLE RELEASE RATE COMPUTATION

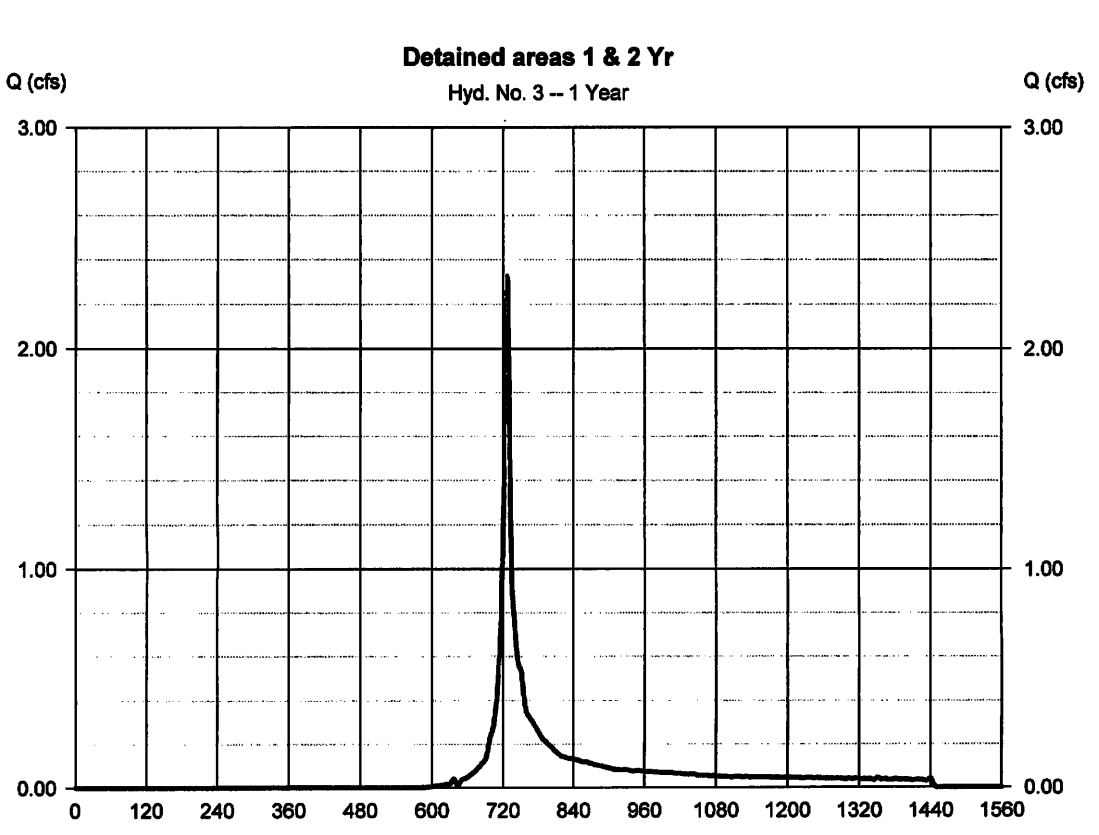
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 3

Detained areas 1 & 2 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.326 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 6,429 cuft |
| Drainage area | = 1.580 ac | Curve number | = 82 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 2.62 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



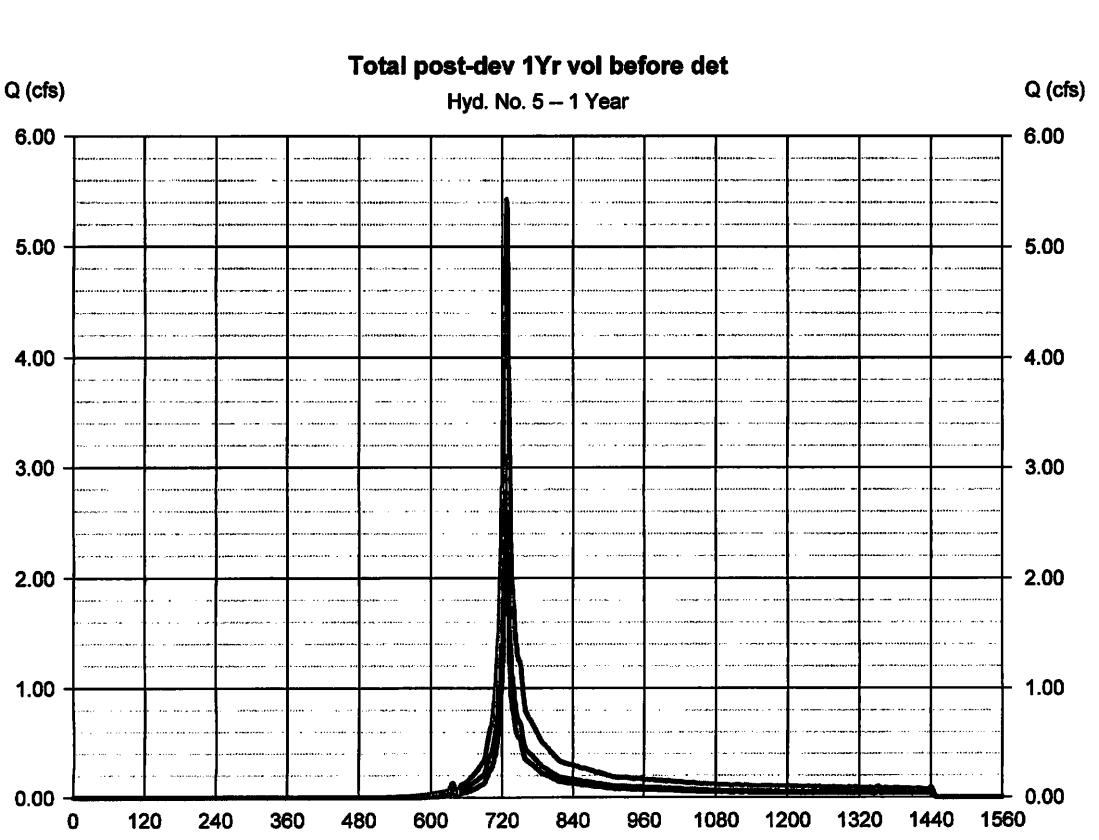
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.22
Wednesday, Jan 18, 2017

Hyd. No. 5

Total post-dev 1Yr vol before det

| | | | |
|-----------------|-----------|----------------------|---------------|
| Hydrograph type | = Combine | Peak discharge | = 5.427 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 14,971 cuft |
| Inflow hyds. | = 2, 3 | Contrib. drain. area | = 3.370 ac |



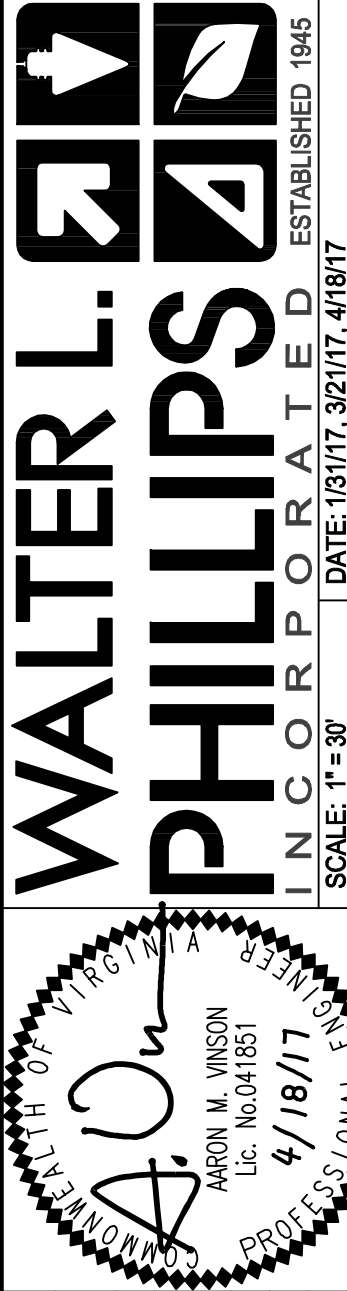
HYDROGRAPHS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA



WALTER L. PHILLIPS
INCORPORATED
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

DATE: 1/18/17, 3/21/17, 4/18/17

DRAWN: SO

CHECKED: JG

RAIN GARDEN 2 DATA AND HYDROGRAPHS

Hydrograph Report

8

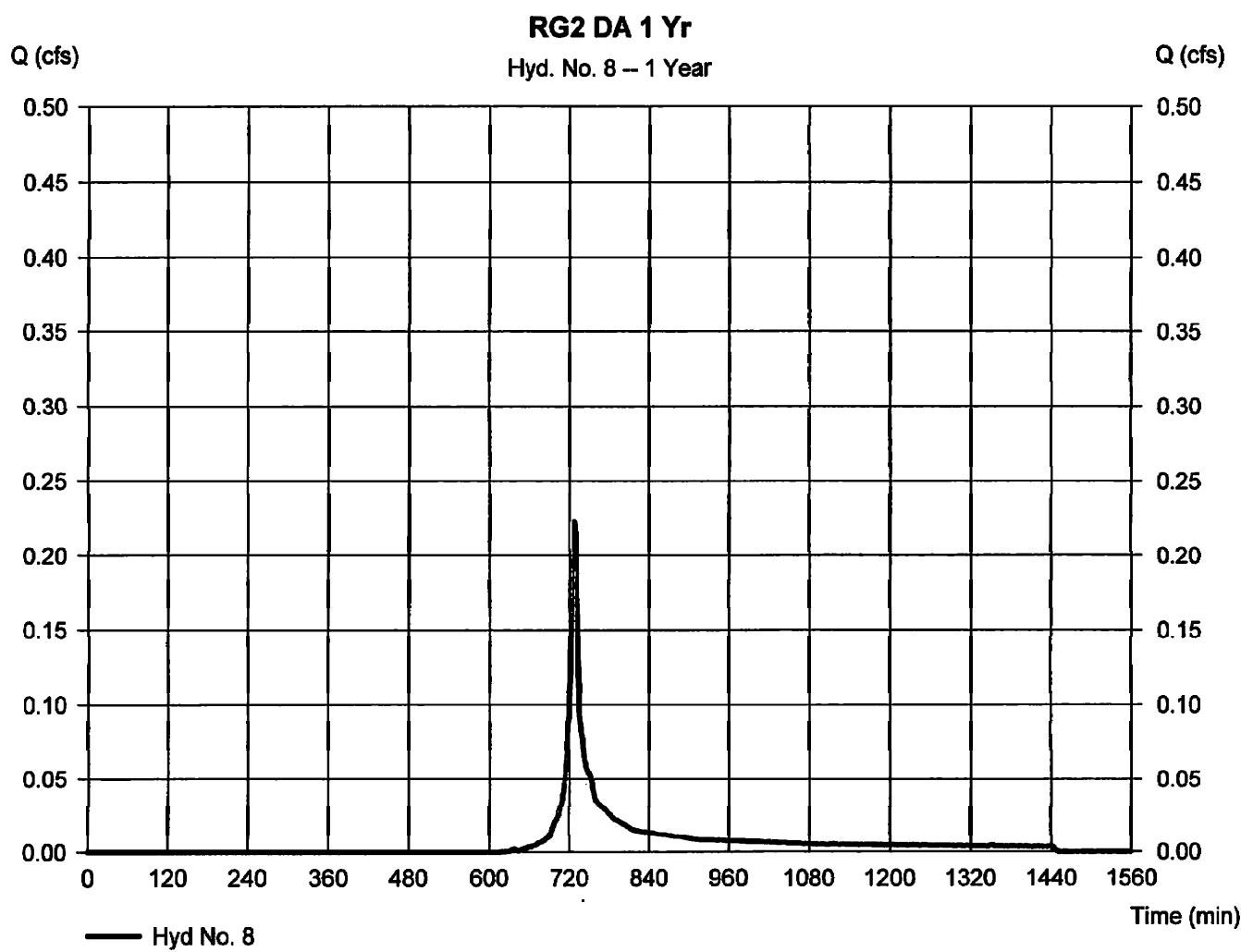
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 8

RG2 DA 1 Yr

| | | | | | |
|-----------------|---|---|--------------------|---|-----------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.222 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 727 min |
| Time interval | = | 1 min | Hyd. volume | = | 619 cuft |
| Drainage area | = | 0.170 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | USER | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 2.62 in | Distribution | = | Custom |
| Storm duration | = | NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = | 484 |



Hydrograph Report

22

Hydraflow Hydrographs by Intellisolve v9.22

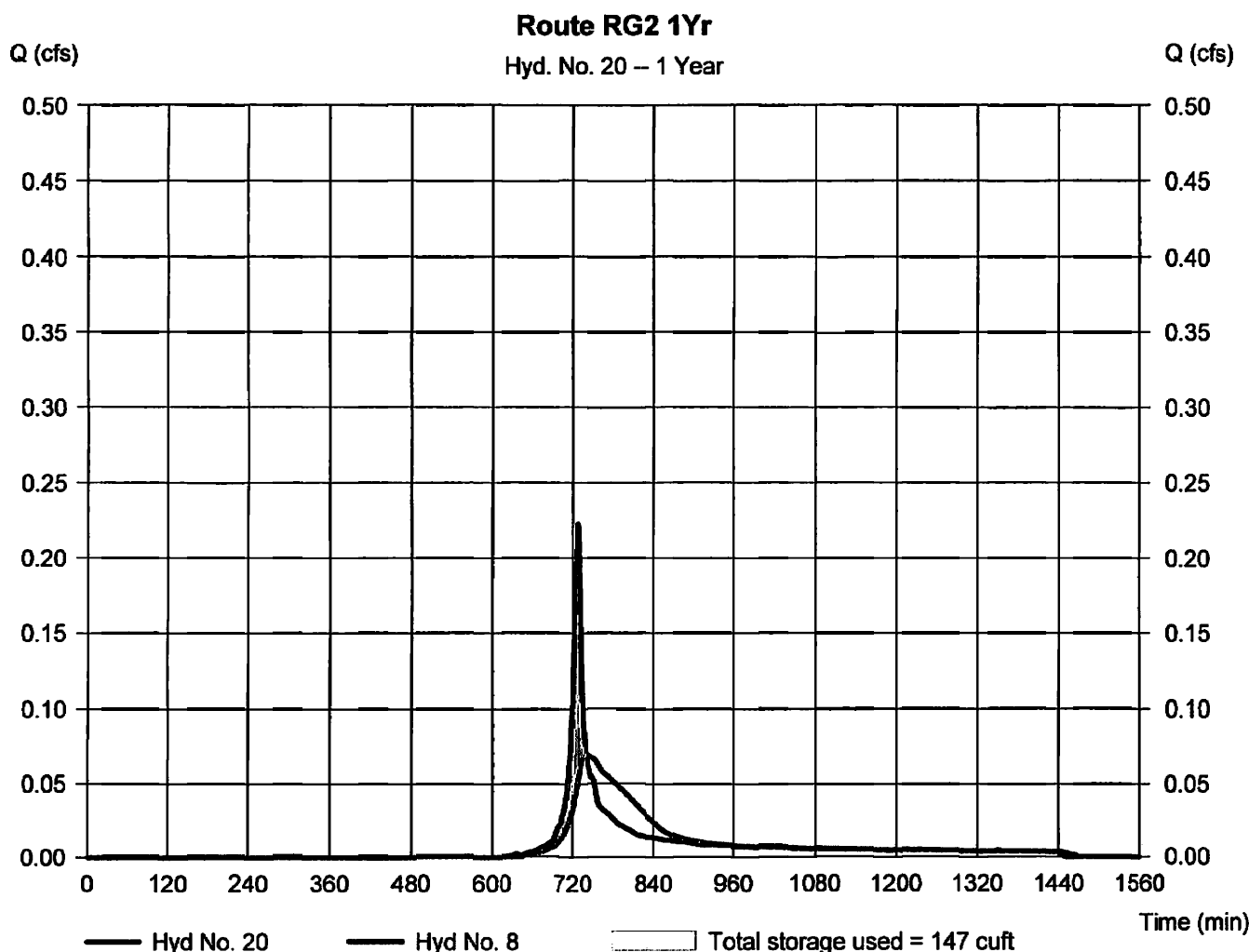
Wednesday, Jan 18, 2017

Hyd. No. 20

Route RG2 1Yr

| | | | | | |
|-----------------|---|-----------------|----------------|---|-----------|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.070 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 741 min |
| Time interval | = | 1 min | Hyd. volume | = | 618 cuft |
| Inflow hyd. No. | = | 8 - RG2 DA 1 Yr | Max. Elevation | = | 378.82 ft |
| Reservoir name | = | RG2 | Max. Storage | = | 147 cuft |

Storage Indication method used.



Hydrograph Report

54

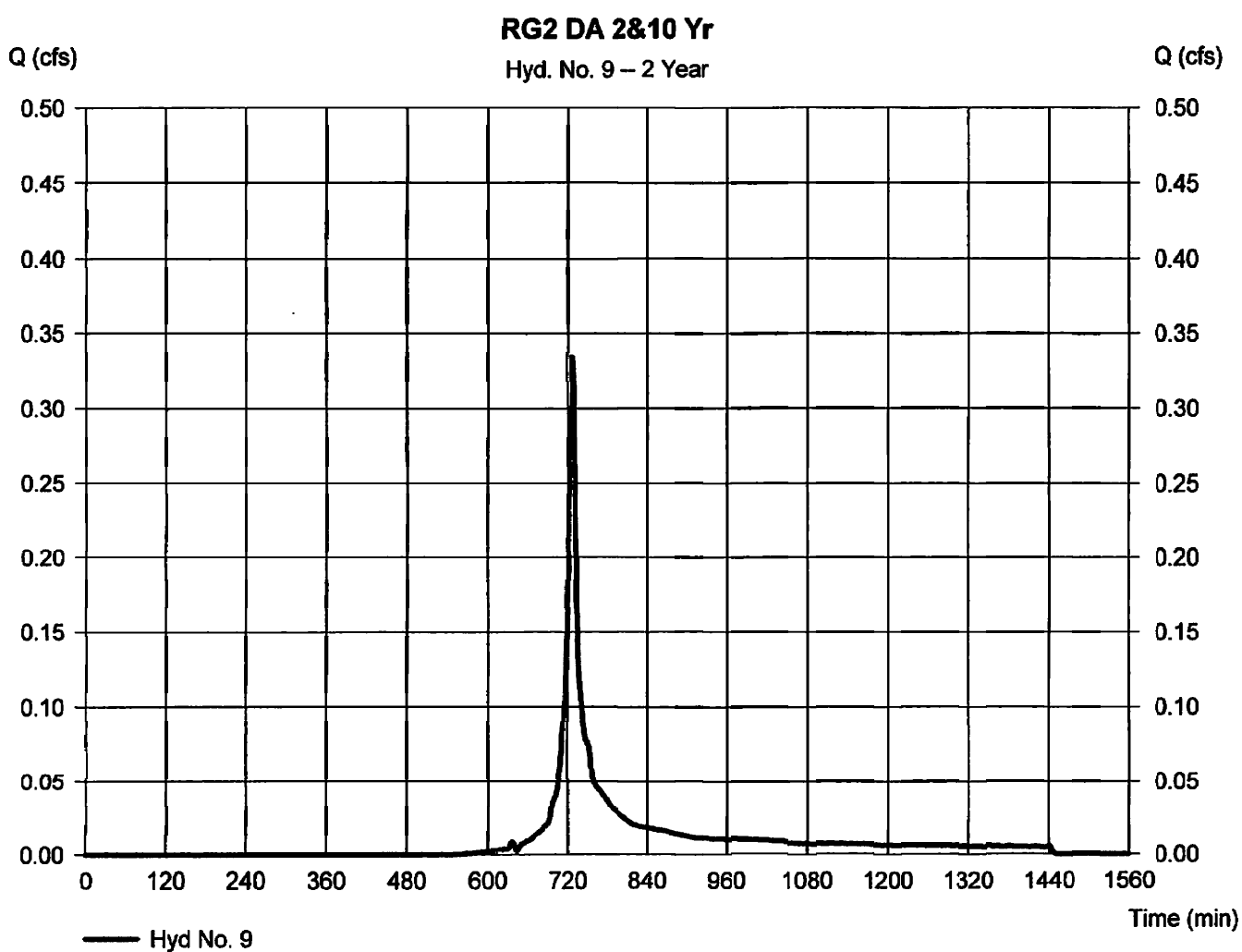
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 9

RG2 DA 2&10 Yr

| | | | | | |
|-----------------|---|---|--------------------|---|-----------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.334 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 727 min |
| Time interval | = | 1 min | Hyd. volume | = | 920 cuft |
| Drainage area | = | 0.170 ac | Curve number | = | 81 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | USER | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 3.17 in | Distribution | = | Custom |
| Storm duration | = | NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = | 484 |



Hydrograph Report

66

Hydraflow Hydrographs by Intellisolve v9.22

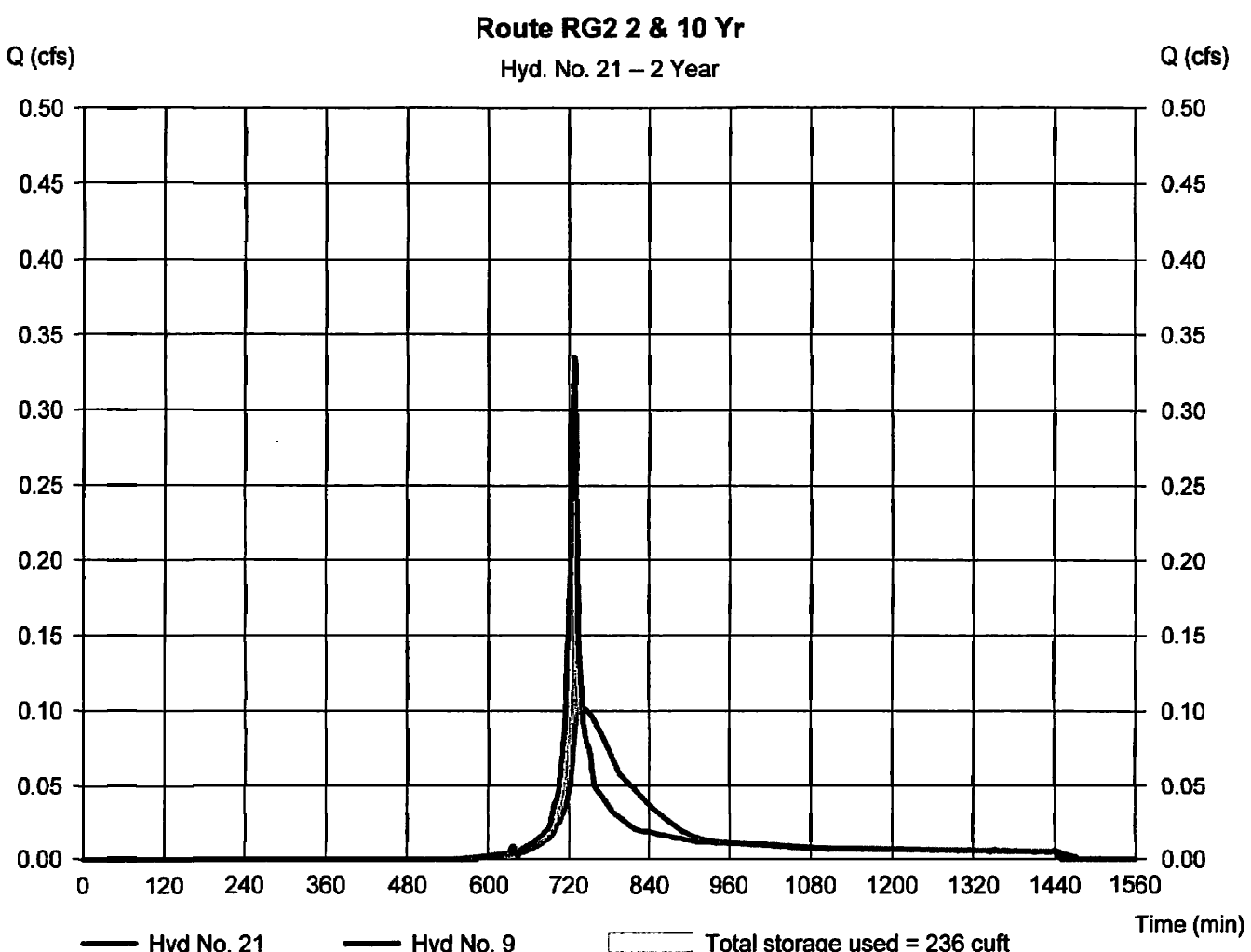
Wednesday, Jan 18, 2017

Hyd. No. 21

Route RG2 2 & 10 Yr

| | | | | | |
|-----------------|---|--------------------|----------------|---|-----------|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.102 cfs |
| Storm frequency | = | 2 yrs | Time to peak | = | 741 min |
| Time interval | = | 1 min | Hyd. volume | = | 919 cuft |
| Inflow hyd. No. | = | 9 - RG2 DA 2&10 Yr | Max. Elevation | = | 380.20 ft |
| Reservoir name | = | RG2 | Max. Storage | = | 236 cuft |

Storage Indication method used.



Hydrograph Report

87

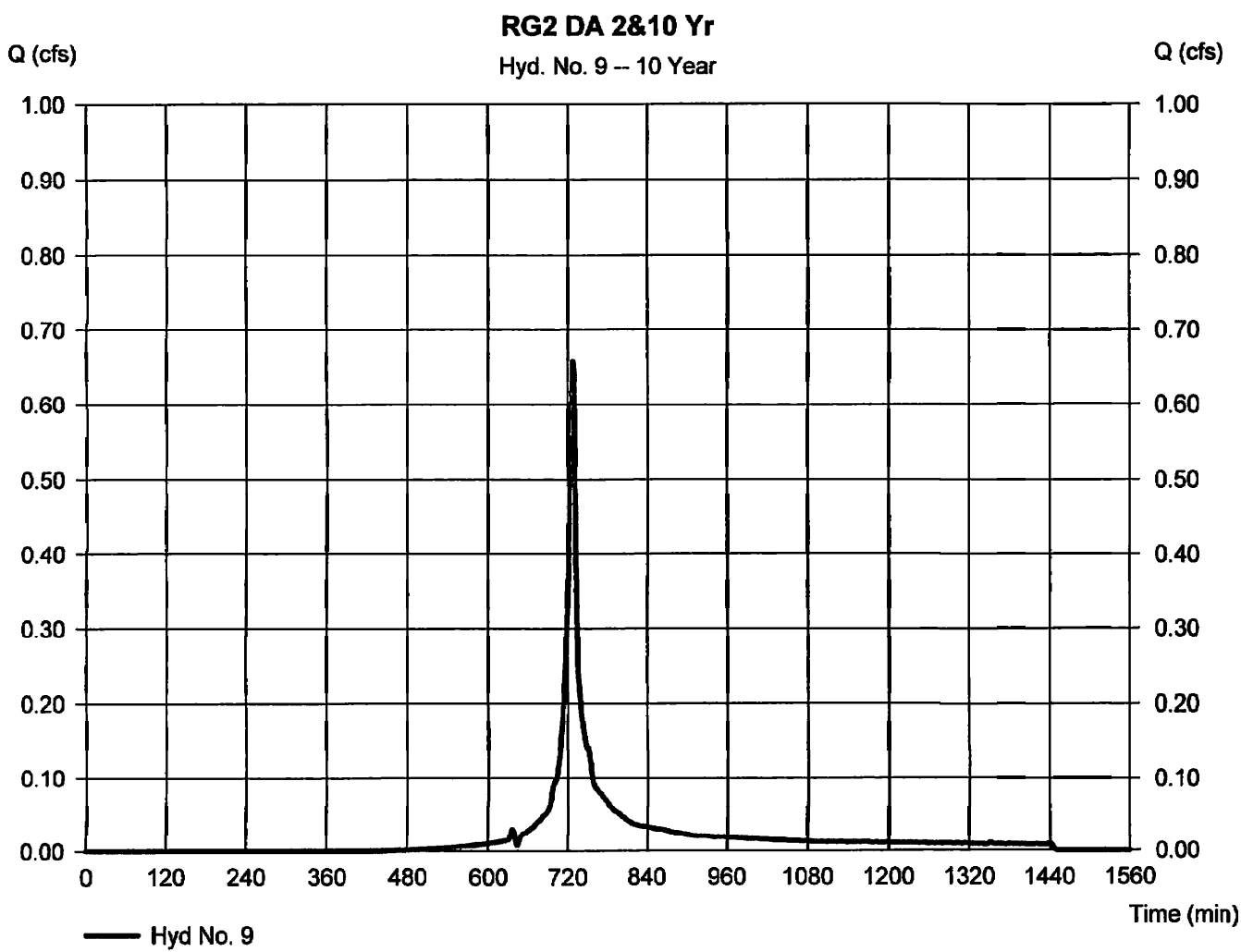
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 9

RG2 DA 2&10 Yr

| | | | | | |
|-----------------|---|---|--------------------|---|------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 0.657 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 727 min |
| Time interval | = | 1 min | Hyd. volume | = | 1,827 cuft |
| Drainage area | = | 0.170 ac | Curve number | = | 81 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | USER | Time of conc. (Tc) | = | 6.00 min |
| Total precip. | = | 4.87 in | Distribution | = | Custom |
| Storm duration | = | NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = | 484 |



Hydrograph Report

1

Hydraflow Hydrographs by Intellisolve v9.22

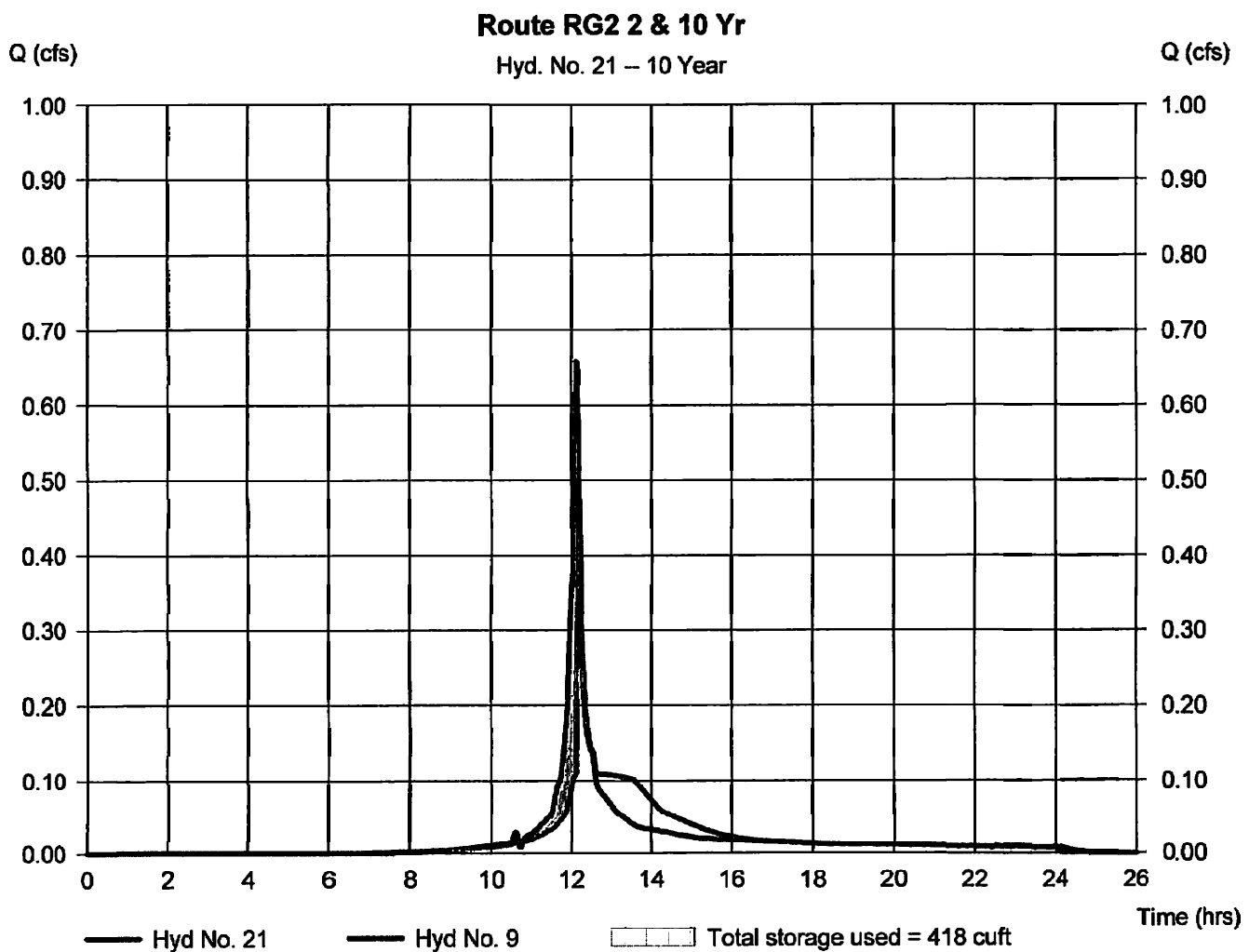
Wednesday, Jan 18, 2017

Hyd. No. 21

Route RG2 2 & 10 Yr

| | | | | | |
|-----------------|---|--------------------|----------------|---|------------|
| Hydrograph type | = | Reservoir | Peak discharge | = | 0.549 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 12.17 hrs |
| Time interval | = | 1 min | Hyd. volume | = | 1,826 cuft |
| Inflow hyd. No. | = | 9 - RG2 DA 2&10 Yr | Max. Elevation | = | 380.81 ft |
| Reservoir name | = | RG2 | Max. Storage | = | 418 cuft |

Storage Indication method used.



Pond Report

2

Hydraflow Hydrographs by Intellisolve v9.22

Thursday, Jan 19, 2017

Pond No. 3 - RG2

Pond Data

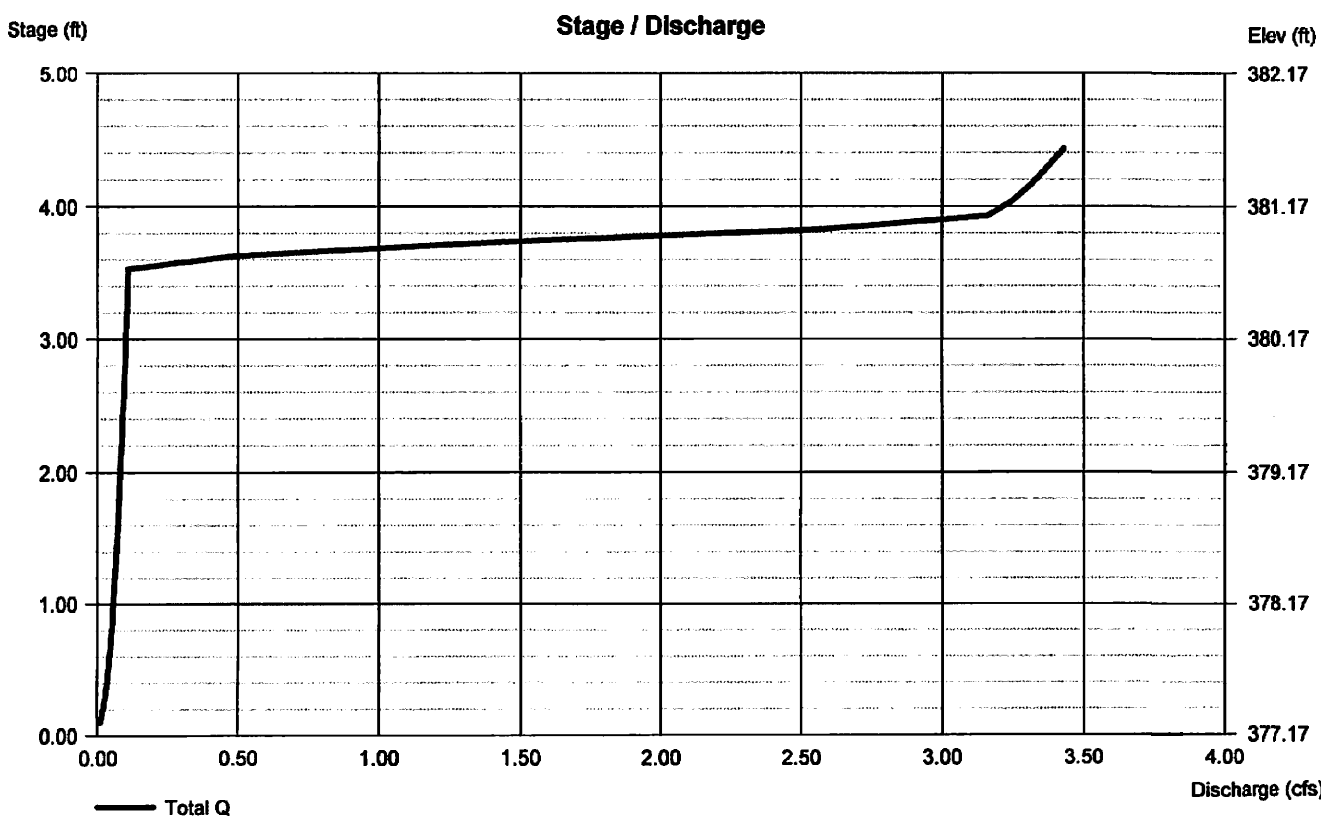
Pond storage is based on user-defined values.

| Stage / Storage Table | | | | |
|-----------------------|----------------|---------------------|----------------------|----------------------|
| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
| 0.00 | 377.17 | n/a | 0 | 0 |
| 1.03 | 378.20 | n/a | 124 | 124 |
| 3.03 | 380.20 | n/a | 113 | 236 |
| 3.43 | 380.80 | n/a | 120 | 356 |
| 4.43 | 381.60 | n/a | 300 | 656 |

| Culvert / Orifice Structures | | | | Weir Structures | | | | | |
|------------------------------|----------|--------|-----------|-----------------|----------------|------------------------|------|------|------|
| [A] | [B] | [C] | [Prf/Rsr] | [A] | [B] | [C] | [D] | | |
| Rise (in) | = 8.00 | 1.50 | 0.00 | 0.00 | Crest Len (ft) | = 6.28 | 0.00 | 0.00 | 0.00 |
| Span (in) | = 8.00 | 1.50 | 0.00 | 0.00 | Crest El. (ft) | = 380.72 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 | Weir Coeff. | = 2.70 | 3.33 | 3.33 | 3.33 |
| Invert El. (ft) | = 377.07 | 377.17 | 0.00 | 0.00 | Weir Type | = Riser | — | — | — |
| Length (ft) | = 19.00 | 0.00 | 0.00 | 0.00 | Multi-Stage | = Yes | No | No | No |
| Slope (%) | = 7.42 | 0.00 | 0.00 | n/a | | | | | |
| N-Value | = .011 | .013 | .013 | n/a | Exfil.(in/hr) | = 0.000 (by Weir area) | | | |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 | TW Elev. (ft) | = 0.00 | | | |
| Multi-Stage | = n/a | Yes | No | No | | | | | |

Note: Culvert/Orifice outflows are analyzed under rise (in) and outlet (sq) conditions. Weir risers checked for critical conditions (c) and submergence (s).

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (is).





RAIN GARDEN 4 DATA AND HYDROGRAPHS

Hydrograph Report

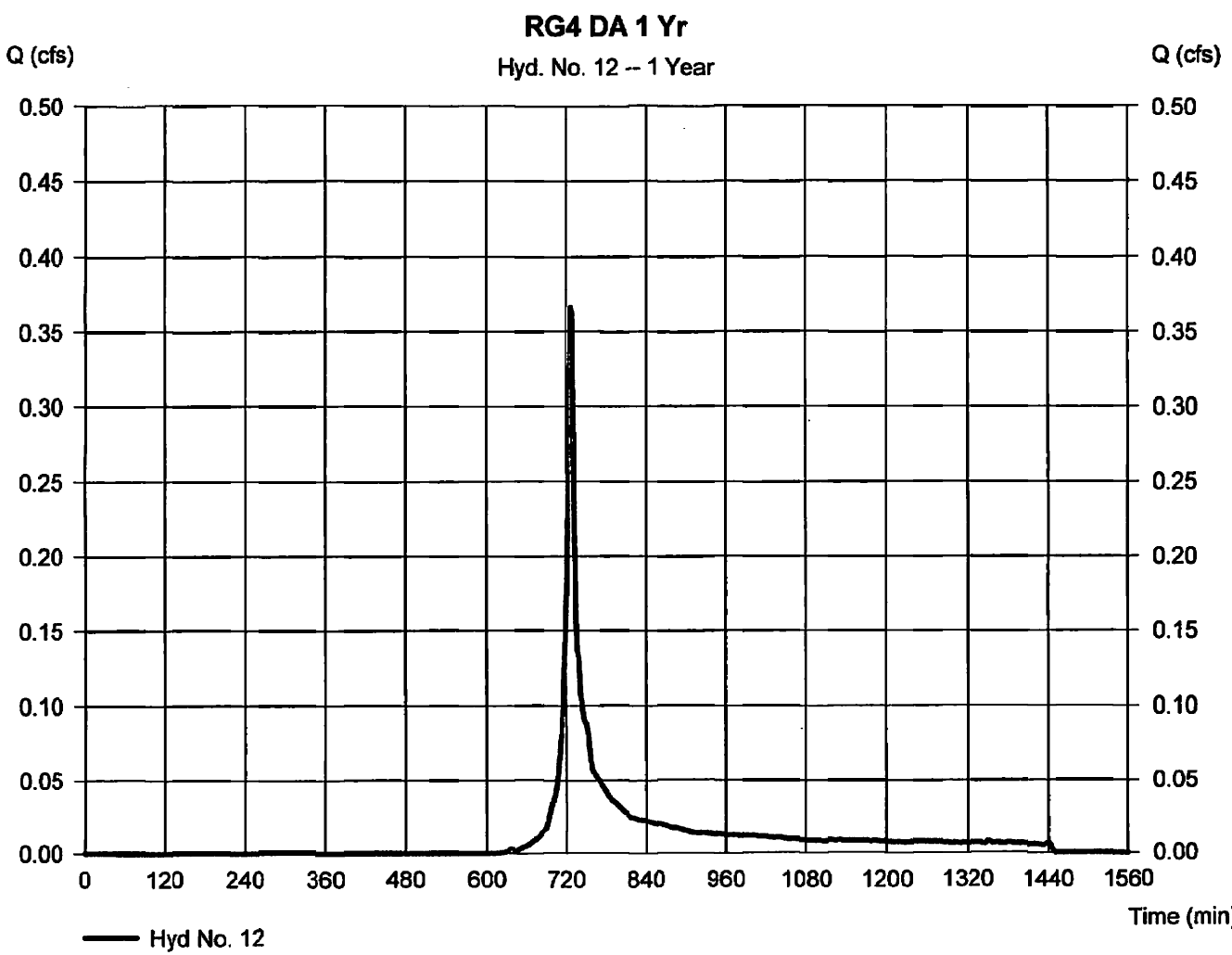
12

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 12

RG4 DA 1 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.366 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 1,020 cuft |
| Drainage area | = 0.280 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 2.82 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

30

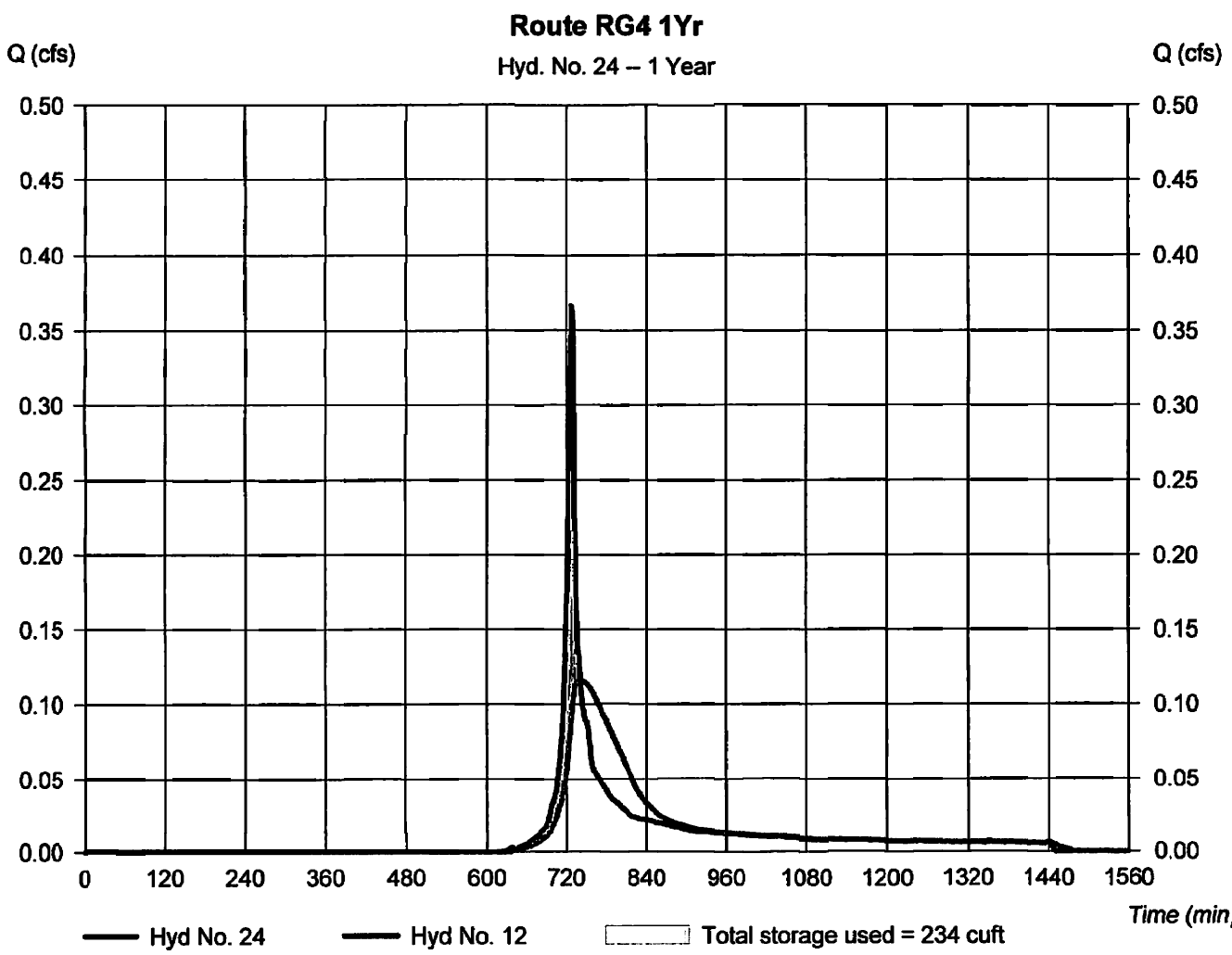
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 24

Route RG4 1Yr

| | | | |
|-----------------|--------------------|----------------|--------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.116 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 741 min |
| Time interval | = 1 min | Hyd. volume | = 1,019 cuft |
| Inflow hyd. No. | = 12 - RG4 DA 1 Yr | Max. Elevation | = 378.48 ft |
| Reservoir name | = RG4 | Max. Storage | = 234 cuft |

Storage Indication method used.



Hydrograph Report

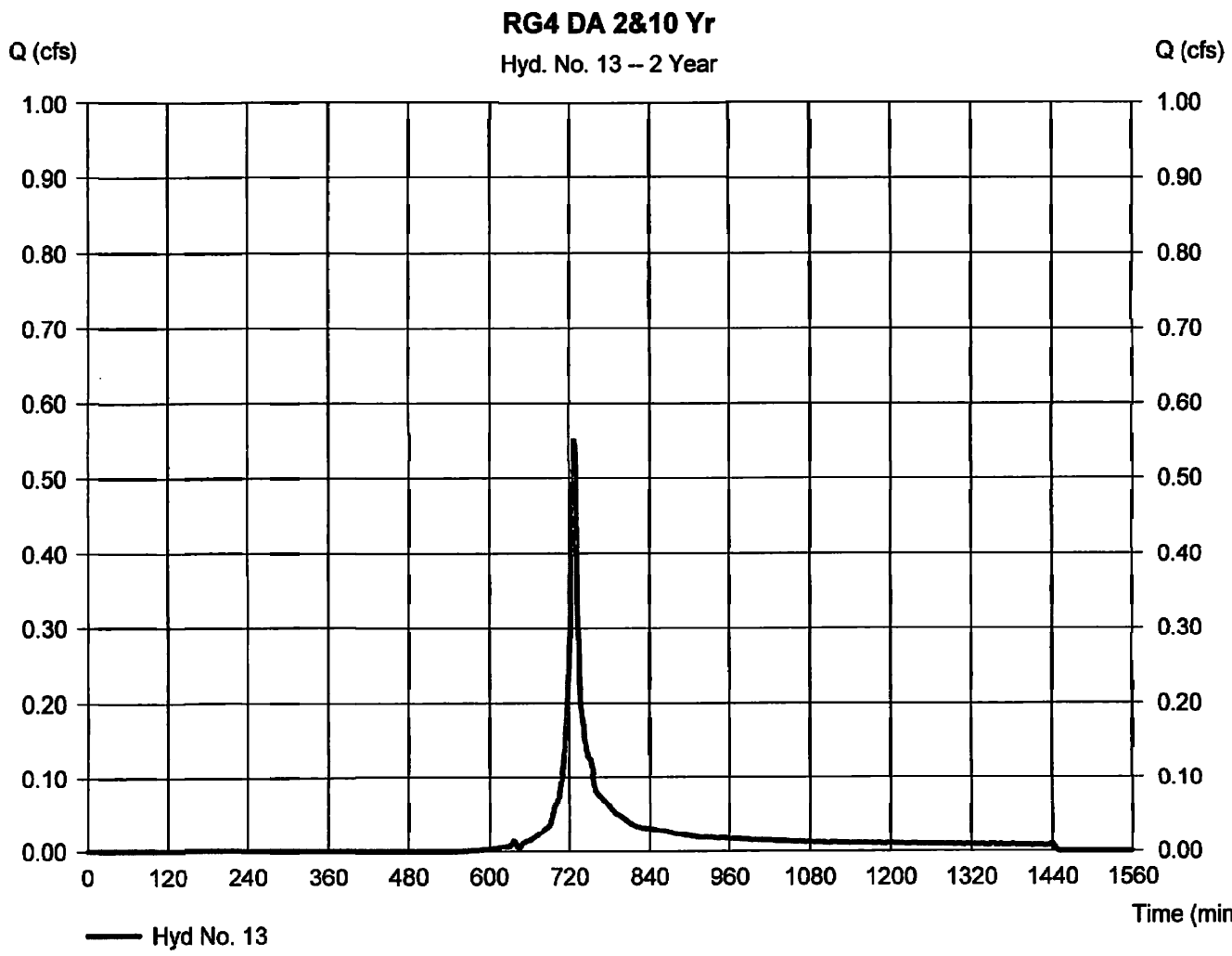
58

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 13

RG4 DA 2&10 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.550 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 1,515 cuft |
| Drainage area | = 0.280 ac | Curve number | = 81 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 3.17 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

70

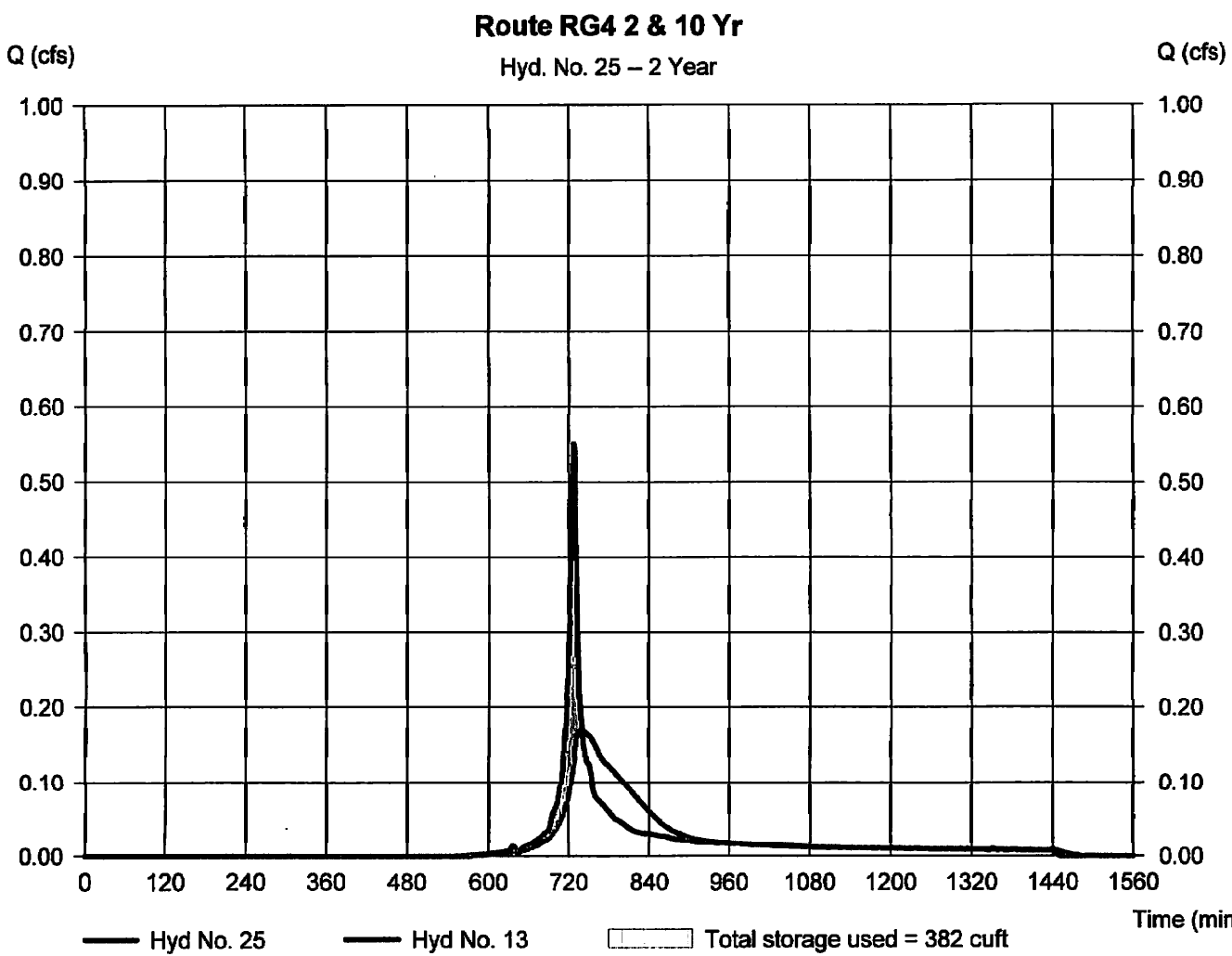
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 25

Route RG4 2 & 10 Yr

| | | | |
|-----------------|-----------------------|----------------|--------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.169 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 740 min |
| Time interval | = 1 min | Hyd. volume | = 1,514 cuft |
| Inflow hyd. No. | = 13 - RG4 DA 2&10 Yr | Max. Elevation | = 379.88 ft |
| Reservoir name | = RG4 | Max. Storage | = 382 cuft |

Storage Indication method used.



Hydrograph Report

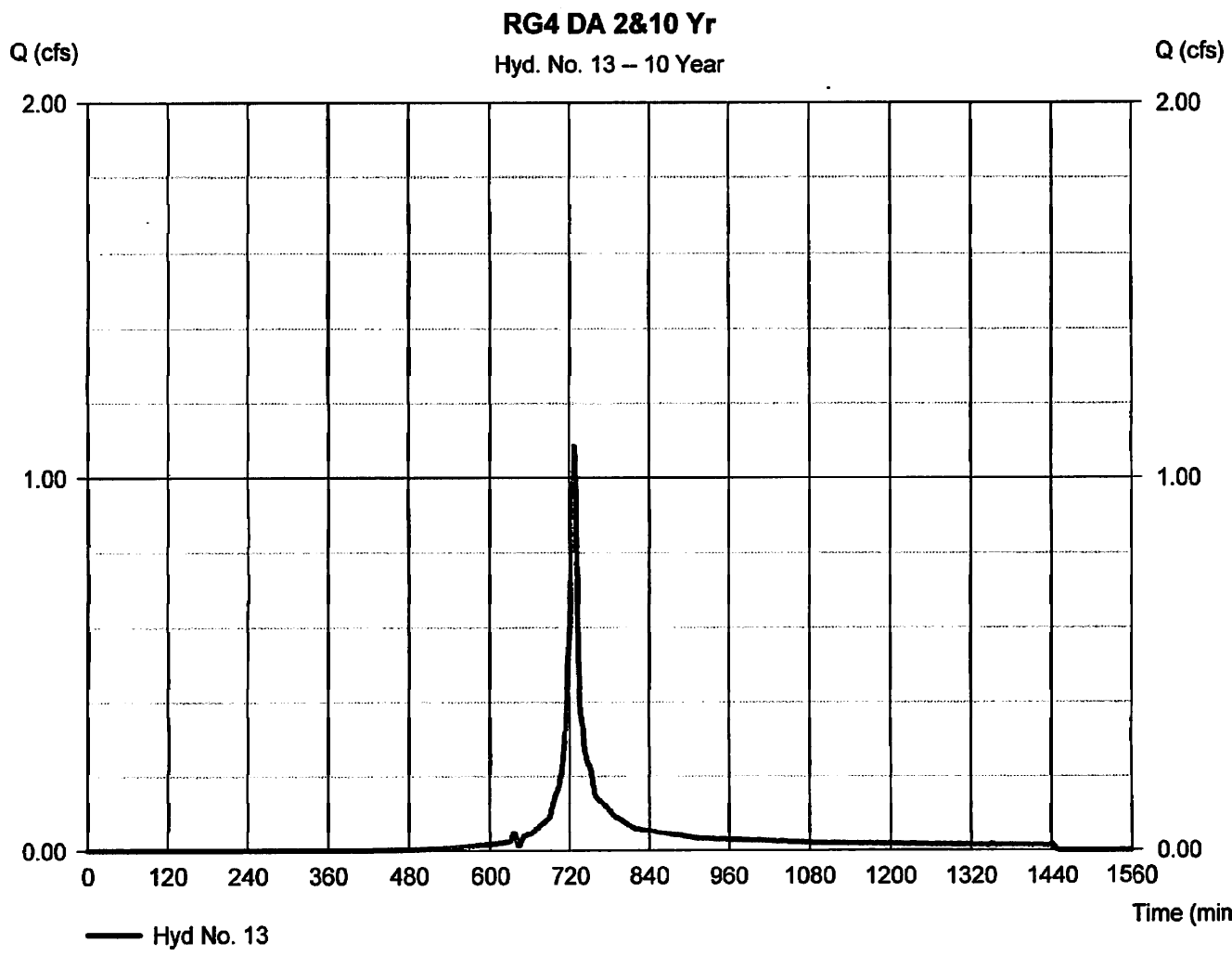
91

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 13

RG4 DA 2&10 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.083 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 3,009 cuft |
| Drainage area | = 0.280 ac | Curve number | = 81 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 4.87 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

1

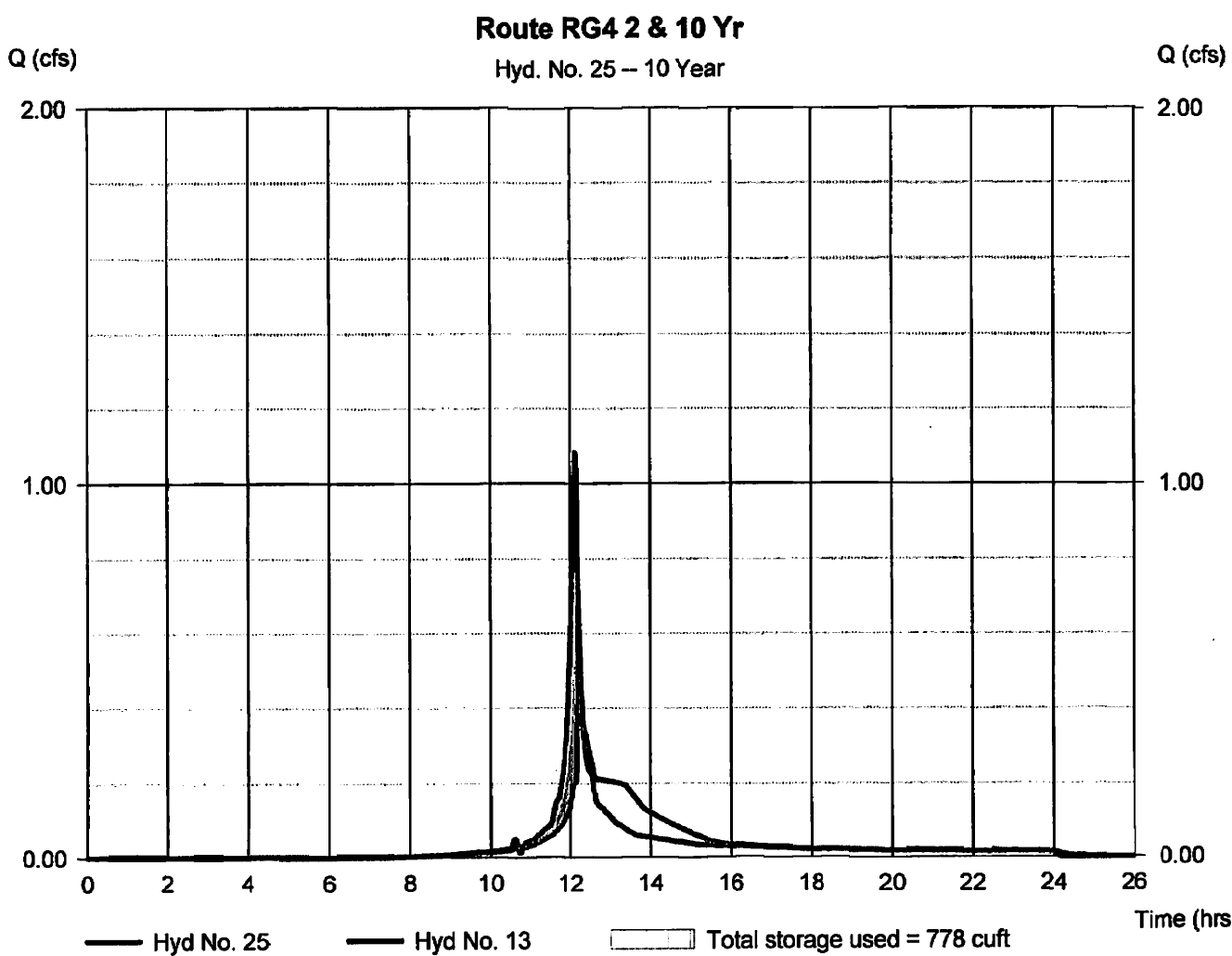
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 25

Route RG4 2 & 10 Yr

| | | | |
|-----------------|-----------------------|----------------|--------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.609 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 12.20 hrs |
| Time interval | = 1 min | Hyd. volume | = 3,008 cuft |
| Inflow hyd. No. | = 13 - RG4 DA 2&10 Yr | Max. Elevation | = 381.52 ft |
| Reservoir name | = RG4 | Max. Storage | = 778 cuft |

Storage Indication method used.



Pond Report

2

Hydraflow Hydrographs by Intellisolve v9.22 Thursday, Jan 19, 2017

Pond No. 5 - RG4

Pond Data

Pond storage is based on user-defined values.

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 377.17 | n/a | 0 | 0 |
| 1.63 | 378.80 | n/a | 291 | 291 |
| 3.63 | 380.80 | n/a | 108 | 458 |
| 4.11 | 381.28 | n/a | 213 | 673 |
| 5.11 | 382.28 | n/a | 447 | 1,120 |

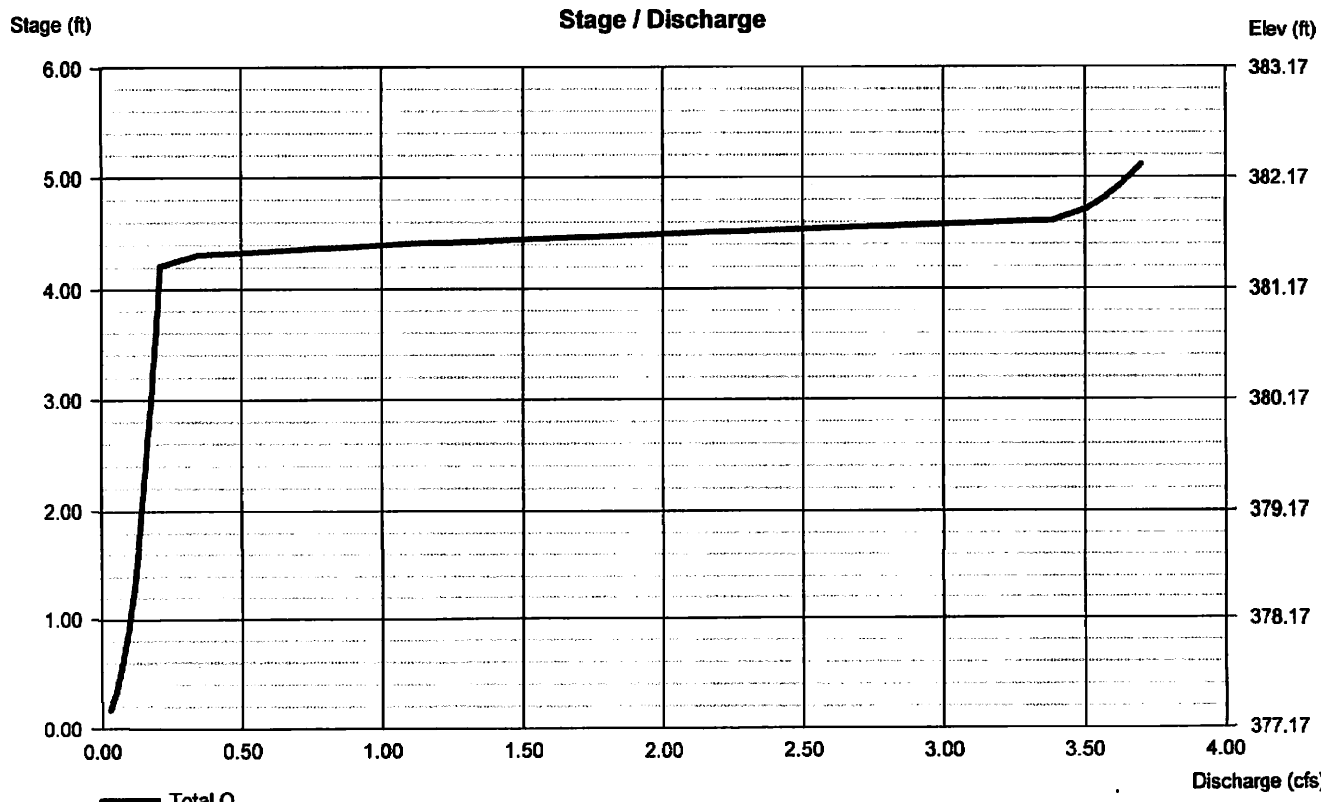
Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRs] |
|-----------------|----------|--------|------|---------|
| Rise (in) | = 8.00 | 2.00 | 0.00 | 0.00 |
| Span (in) | = 8.00 | 2.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 377.07 | 377.17 | 0.00 | 0.00 |
| Length (ft) | = 25.00 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 3.18 | 0.00 | 0.00 | n/a |
| N-Value | = .011 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | Yes | No | No |

Weir Structures

| | [A] | [B] | [C] | [D] |
|------------------|----------|---------------|------|------|
| Crest Len (ft) | = 6.28 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 381.44 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 2.70 | 3.33 | 3.33 | 3.33 |
| Weir Type | = Riser | — | — | — |
| Multi-Stage | = Yes | No | No | No |
| Exit El. (in/hr) | = 0.000 | (by Wet area) | | |
| TW Elev. (ft) | = 6.00 | | | |

Note: Culvert/Orifice outflows are analyzed under inlet (ci) and outlet (co) control. Weir risers checked for orifice conditions (ci) and submergence (o).



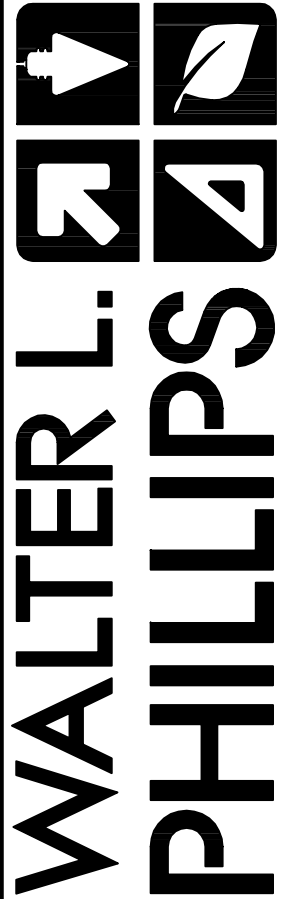
HYDROGRAPHS

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA



Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

DATE: 1/18/17, 3/21/17, 4/18/17

SCALE: 1"=30'

DRAWN: SO

CHECKED: JG

RAIN GARDEN 5 DATA AND HYDROGRAPHS

Hydrograph Report

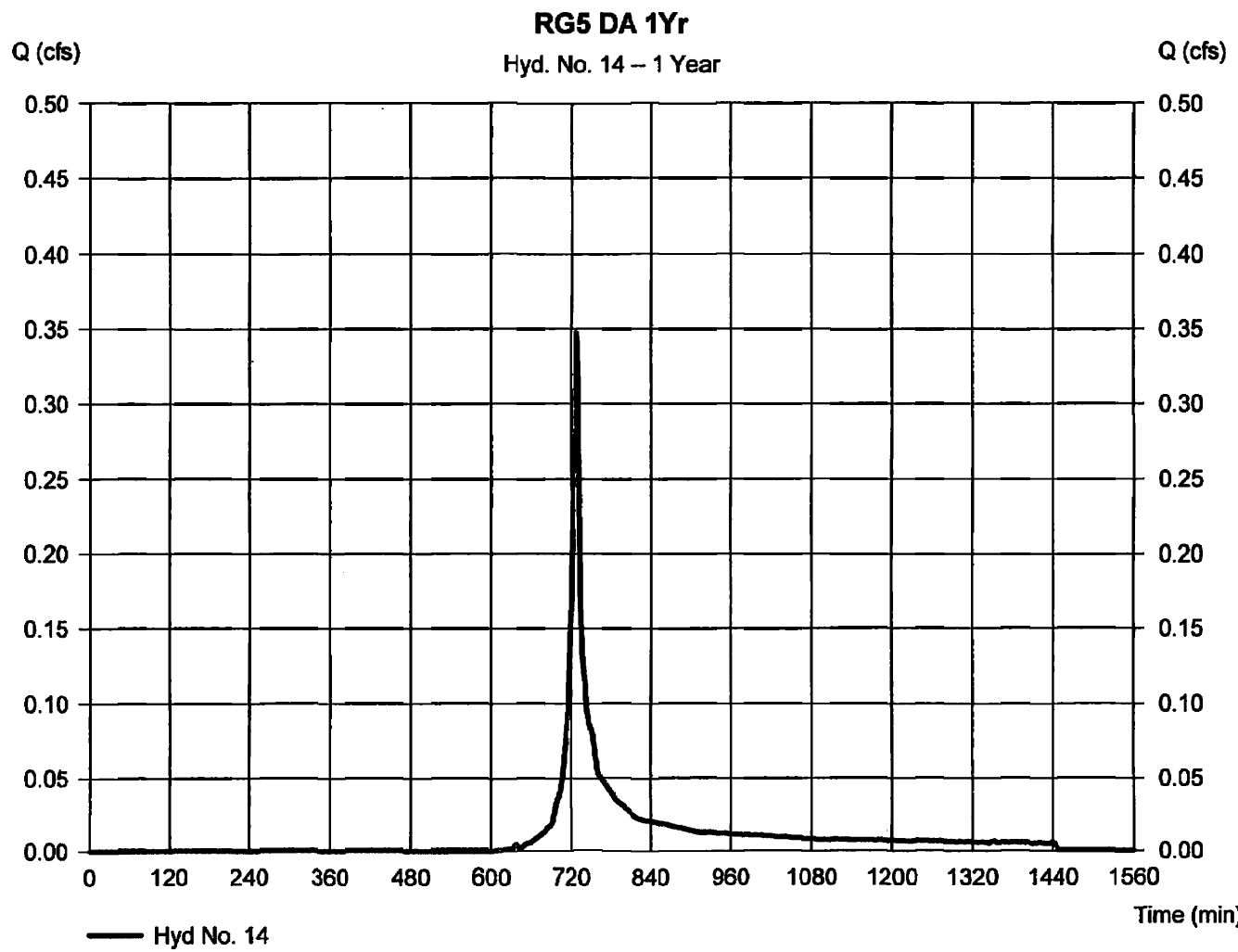
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 14

RG5 DA 1Yr

| | | | |
|-----------------|---|--------------------|-------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.347 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 963 cuft |
| Drainage area | = 0.250 ac | Curve number | = 81 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 2.62 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.22

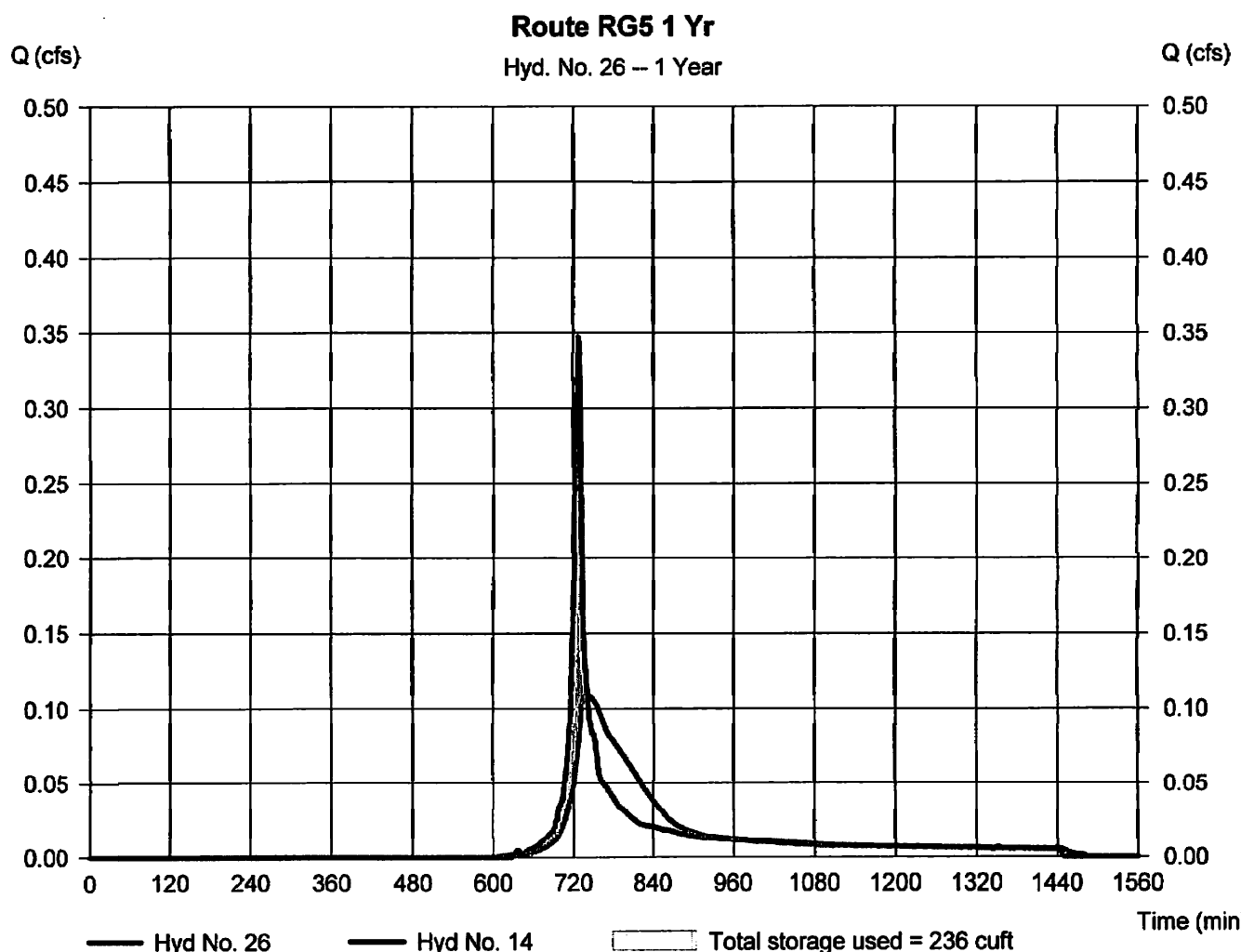
Wednesday, Jan 18, 2017

Hyd. No. 26

Route RG5 1 Yr

| | | | |
|-----------------|-------------------|----------------|-------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.109 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 741 min |
| Time interval | = 1 min | Hyd. volume | = 962 cuft |
| Inflow hyd. No. | = 14 - RG5 DA 1Yr | Max. Elevation | = 378.89 ft |
| Reservoir name | = RG5 | Max. Storage | = 236 cuft |

Storage Indication method used.



Hydrograph Report

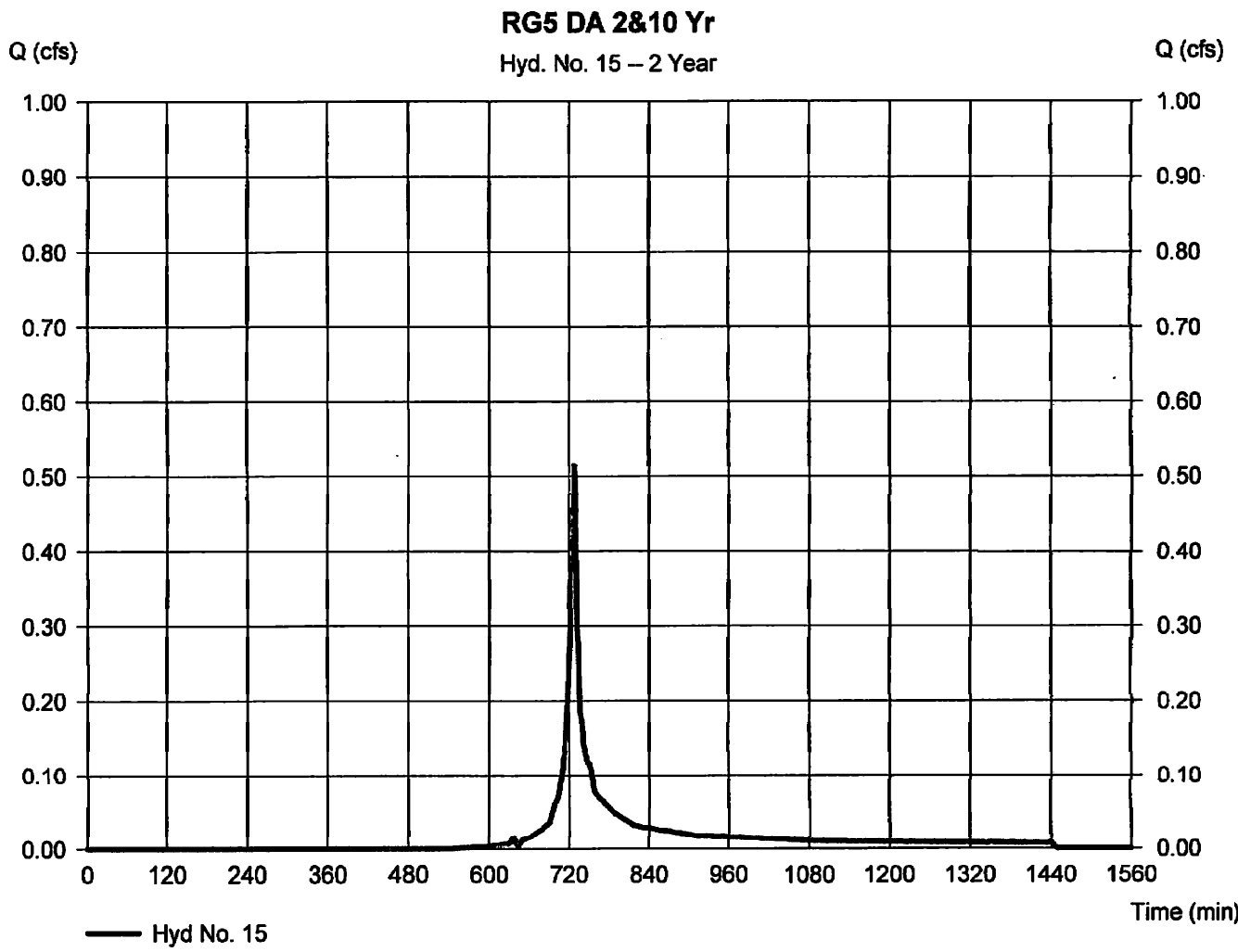
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 15

RG5 DA 2&10 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.514 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 1,417 cuft |
| Drainage area | = 0.250 ac | Curve number | = 82 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 3.17 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.22

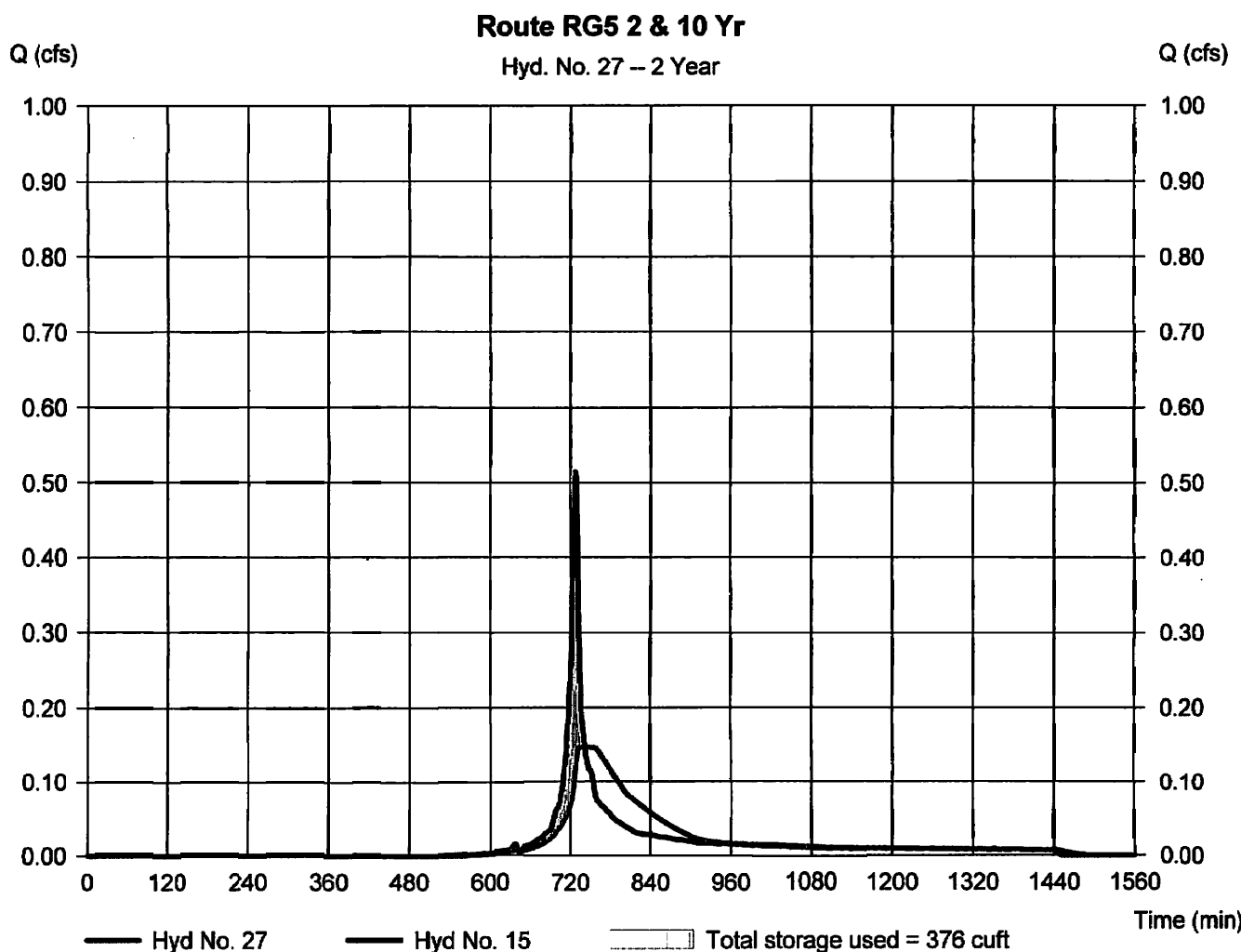
Wednesday, Jan 18, 2017

Hyd. No. 27

Route RG5 2 & 10 Yr

| | | | |
|-----------------|-----------------------|----------------|--------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.147 cfs |
| Storm frequency | = 2 yrs | Time to peak | = 741 min |
| Time interval | = 1 min | Hyd. volume | = 1,416 cuft |
| Inflow hyd. No. | = 15 - RG5 DA 2&10 Yr | Max. Elevation | = 380.28 ft |
| Reservoir name | = RG5 | Max. Storage | = 376 cuft |

Storage Indication method used.



Hydrograph Report

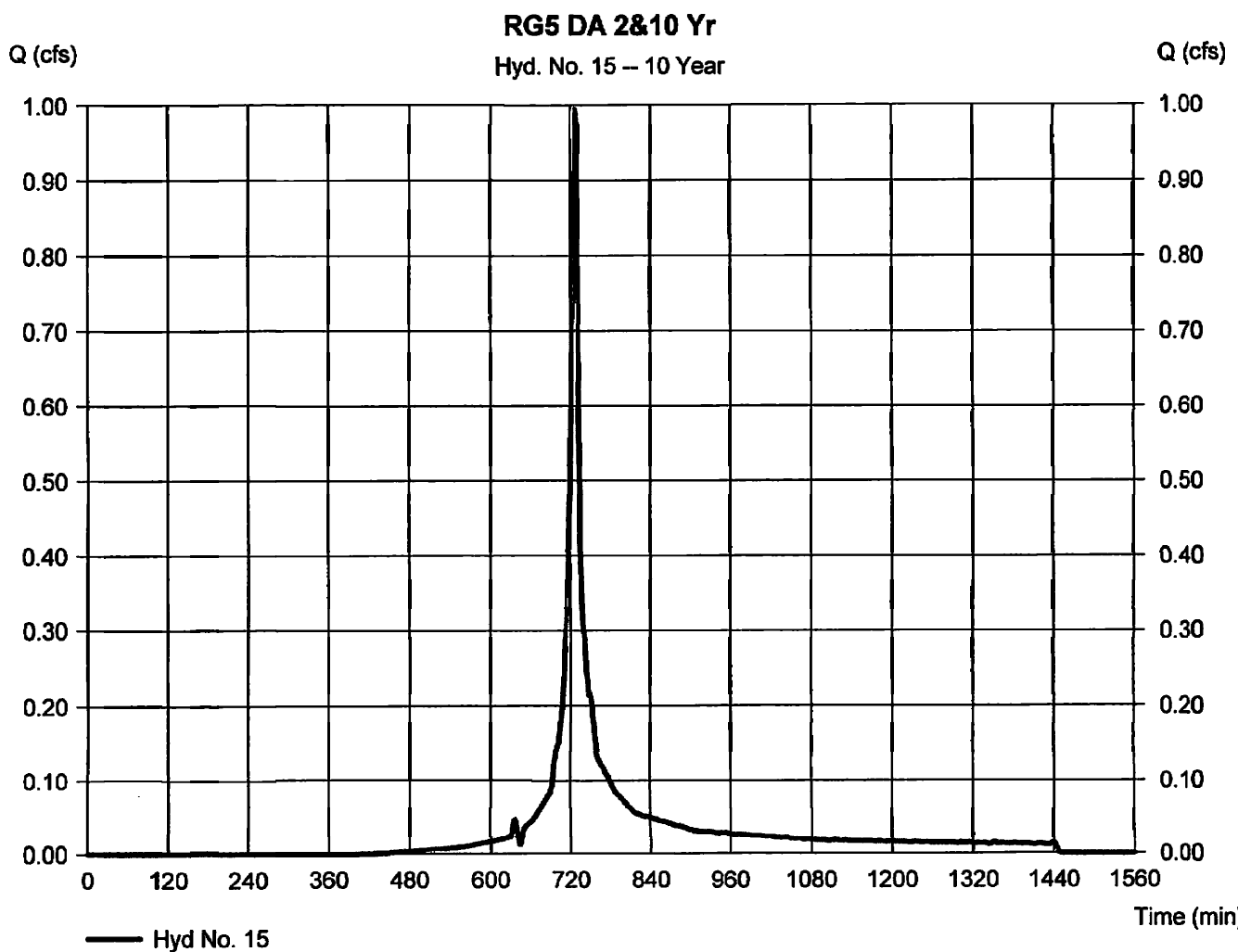
Hydraflow Hydrographs by Intellisolve v9.22

Wednesday, Jan 18, 2017

Hyd. No. 15

RG5 DA 2&10 Yr

| | | | |
|-----------------|---|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.995 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 727 min |
| Time interval | = 1 min | Hyd. volume | = 2,773 cuft |
| Drainage area | = 0.250 ac | Curve number | = 82 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min |
| Total precip. | = 4.87 in | Distribution | = Custom |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.22

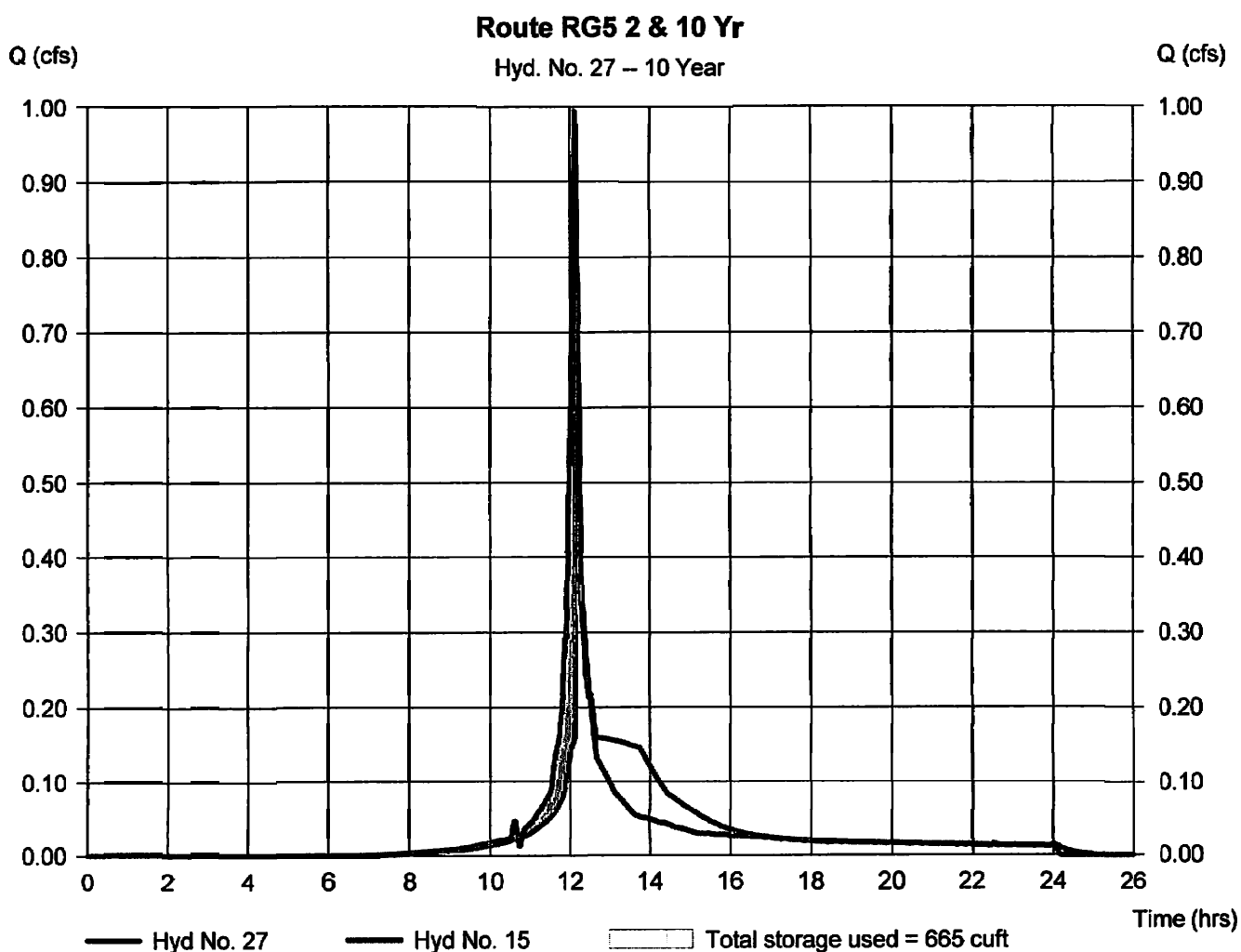
Wednesday, Jan 18, 2017

Hyd. No. 27

Route RG5 2 & 10 Yr

| | | | |
|-----------------|-----------------------|----------------|--------------|
| Hydrograph type | = Reservoir | Peak discharge | = 0.785 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 12.17 hrs |
| Time interval | = 1 min | Hyd. volume | = 2,772 cuft |
| Inflow hyd. No. | = 15 - RG5 DA 2&10 Yr | Max. Elevation | = 380.94 ft |
| Reservoir name | = RG5 | Max. Storage | = 665 cuft |

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intellisolve v9.22

Thursday, Jan 19, 2017

Pond No. 6 - RG5

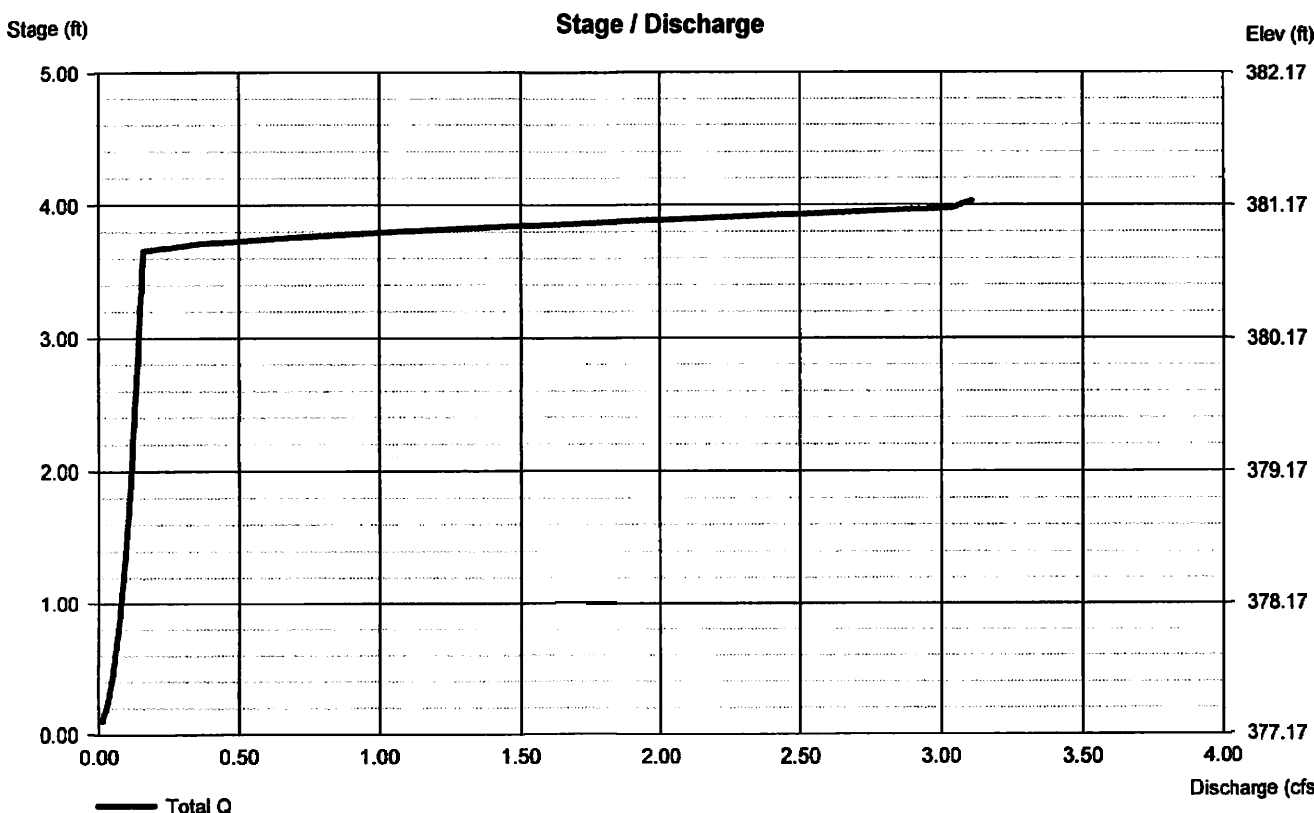
Pond Data

Pond storage is based on user-defined values.

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 377.17 | n/a | 0 | 0 |
| 1.03 | 378.20 | n/a | 179 | 179 |
| 3.03 | 380.20 | n/a | 163 | 342 |
| 3.50 | 380.67 | n/a | 206 | 548 |
| 4.03 | 381.20 | n/a | 229 | 777 |

| Culvert / Orifice Structures | | | | Weir Structures | | | |
|------------------------------|----------|--------|----------|-----------------|----------------|-----------------------|------|
| [A] | [B] | [C] | [Pr/Rsr] | [A] | [B] | [C] | [D] |
| Rise (in) | = 8.00 | 1.80 | 0.00 | 0.00 | Crest Len (ft) | = 6.28 | 0.00 |
| Span (in) | = 8.00 | 1.80 | 0.00 | 0.00 | Crest EL. (ft) | = 380.83 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 | Weir Coeff. | = 2.70 | 3.33 |
| Invert EL. (ft) | = 377.07 | 377.17 | 0.00 | 0.00 | Weir Type | = Riser | — |
| Length (ft) | = 48.00 | 0.00 | 0.00 | 0.00 | Multi-Stage | = Yes | No |
| Slope (%) | = 1.65 | 0.00 | 0.00 | n/a | | | |
| N-Value | = .011 | .013 | .013 | n/a | | | |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 | Exfil. (in/hr) | = 0.000 (by Wet area) | |
| Multi-Stage | = n/a | Yes | No | No | TW Elev. (ft) | = 0.00 | |

Note: Culvert/Orifice outflows are analyzed under inlet (ci) and outlet (oc) control. Weir risers checked for orifice conditions (ci) and submergence (si).



GRAVEL DETENTION 6 DATA AND HYDROGRAPHS

Hydrograph Report

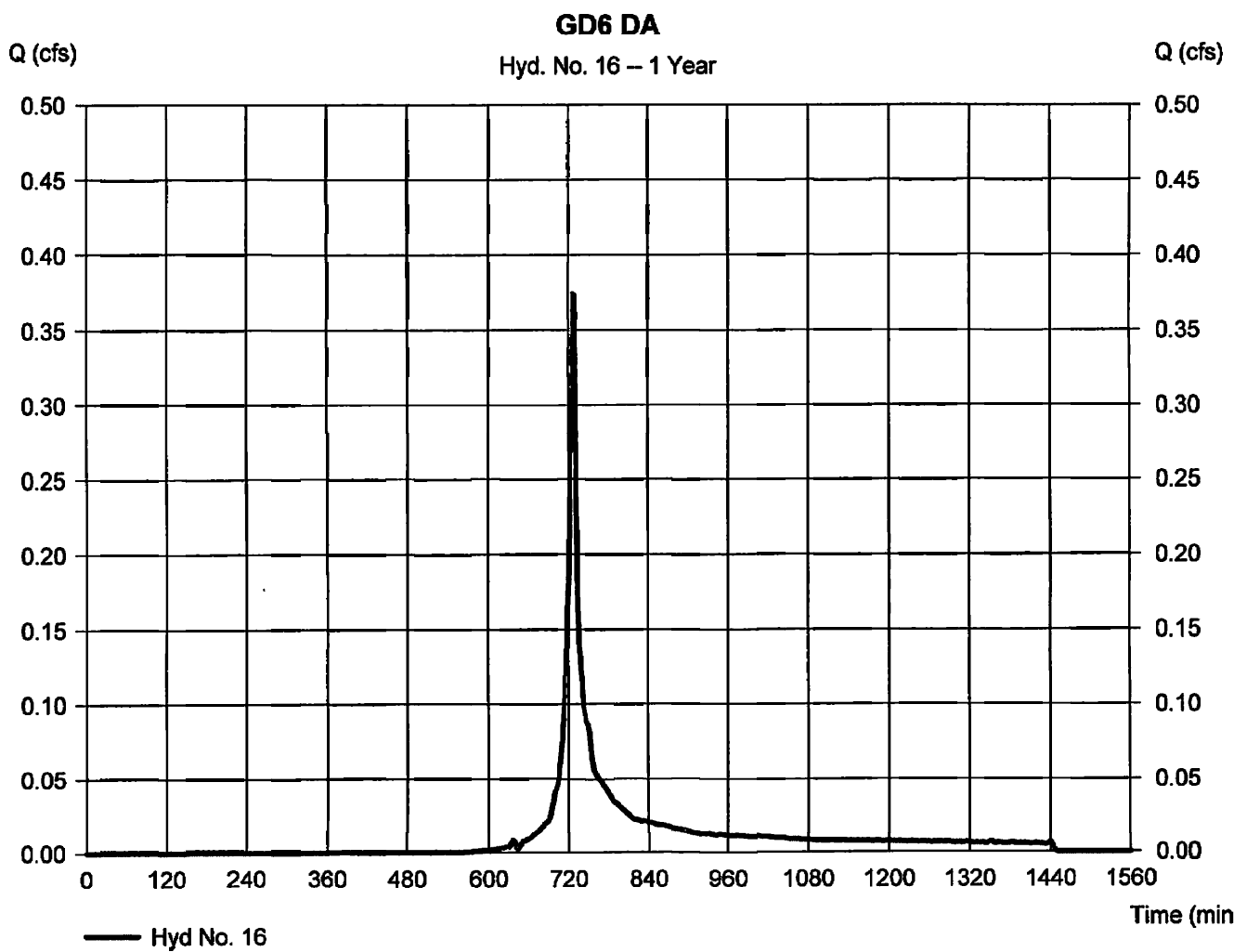
16

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 16

GD6 DA

Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Time interval = 1 min
Drainage area = 0.240 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 2.62 in
Storm duration = NOAA Type C Rainfall 1 Min interval.cds
Peak discharge = 0.374 cfs
Time to peak = 727 min
Hyd. volume = 1,031 cuft
Curve number = 83
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

1

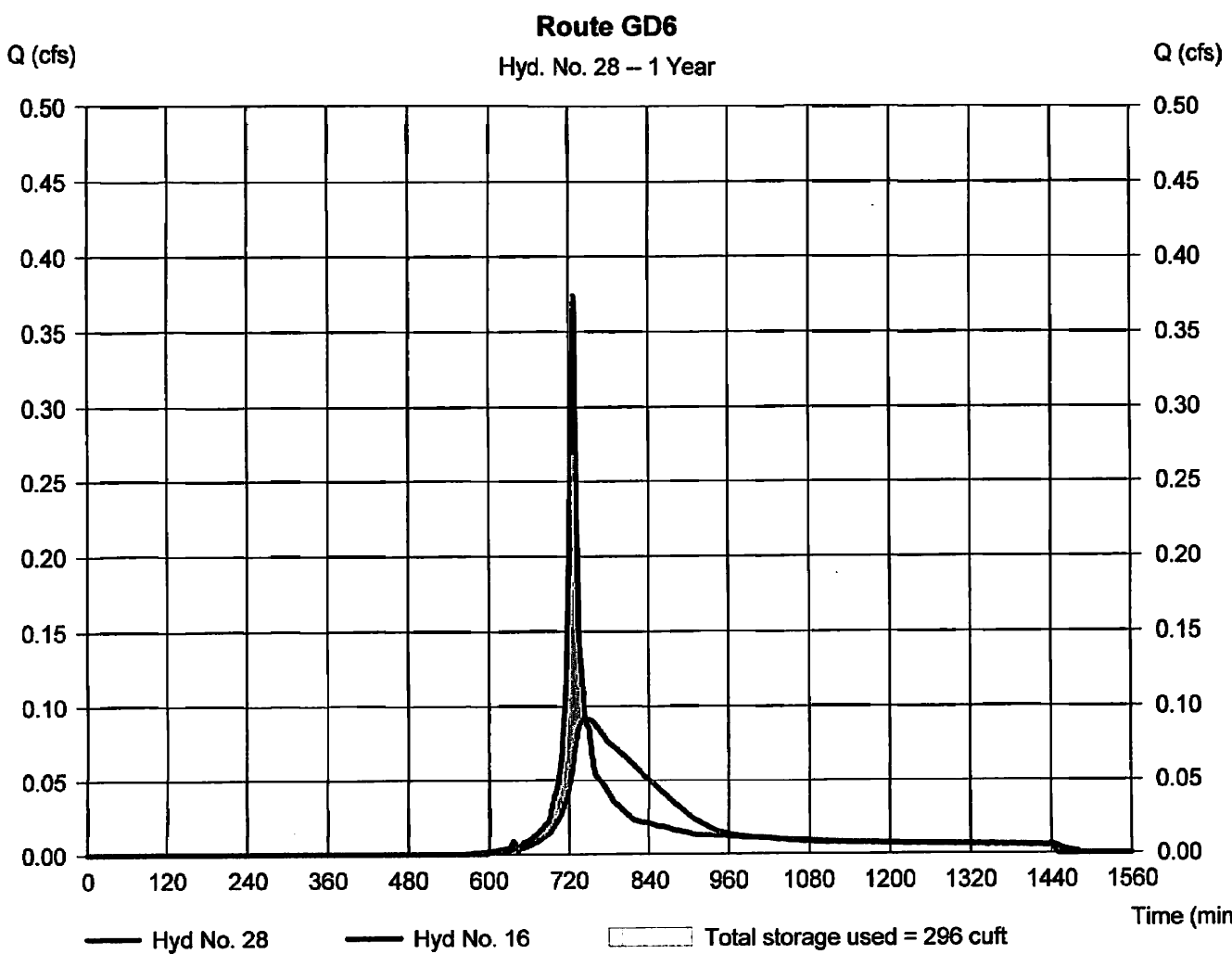
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 28

Route GD6

Hydrograph type = Reservoir
Storm frequency = 1 yrs
Time interval = 1 min
Inflow hyd. No. = 16 - GD6 DA
Reservoir name = GD6
Peak discharge = 0.091 cfs
Time to peak = 746 min
Hyd. volume = 1,029 cuft
Max. Elevation = 378.63 ft
Max. Storage = 296 cuft

Storage indication method used.



Hydrograph Report

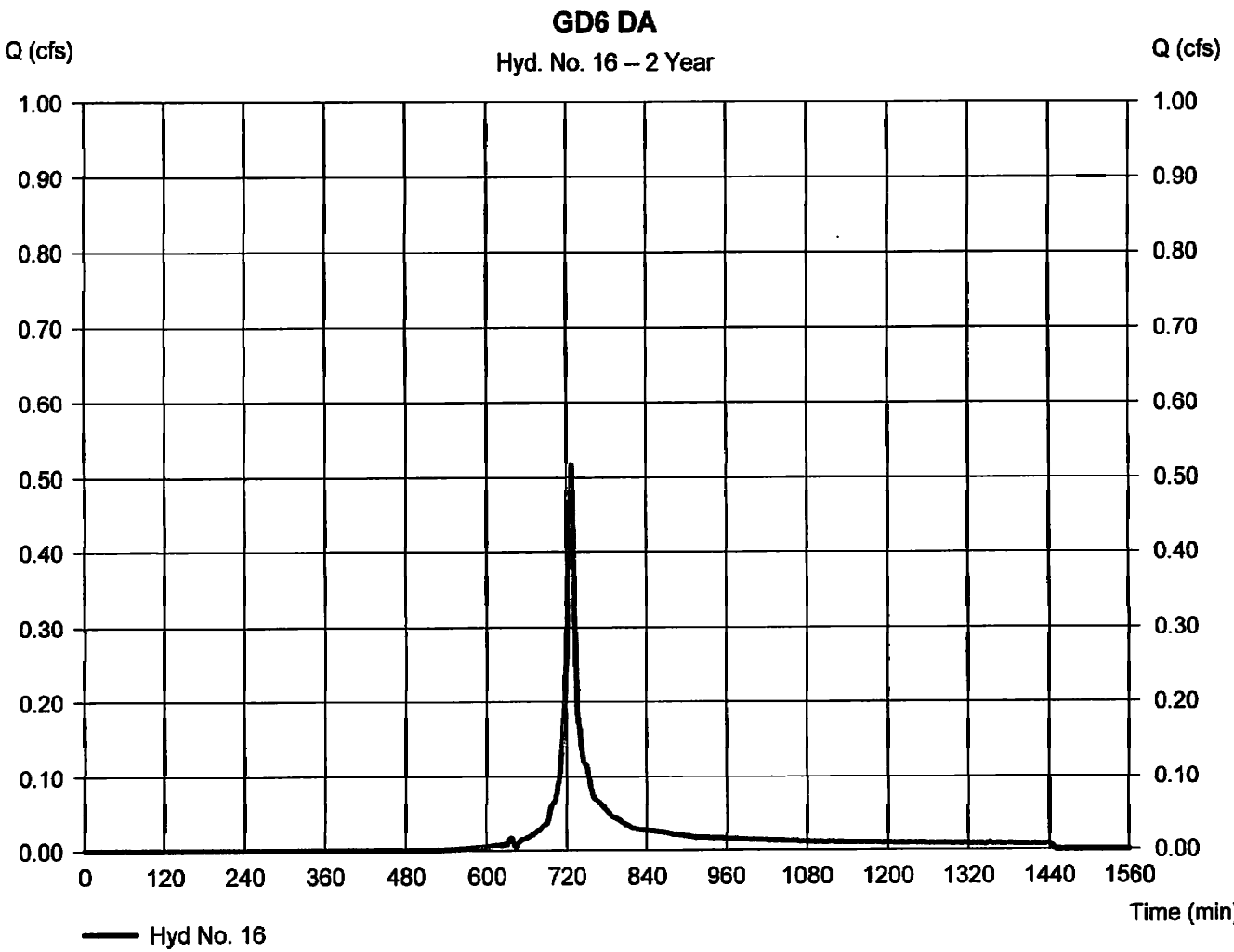
61

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 16

GD6 DA

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.240 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.17 in
Storm duration = NOAA Type C Rainfall 1 Min interval.cds
Peak discharge = 0.517 cfs
Time to peak = 727 min
Hyd. volume = 1,424 cuft
Curve number = 83
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

1

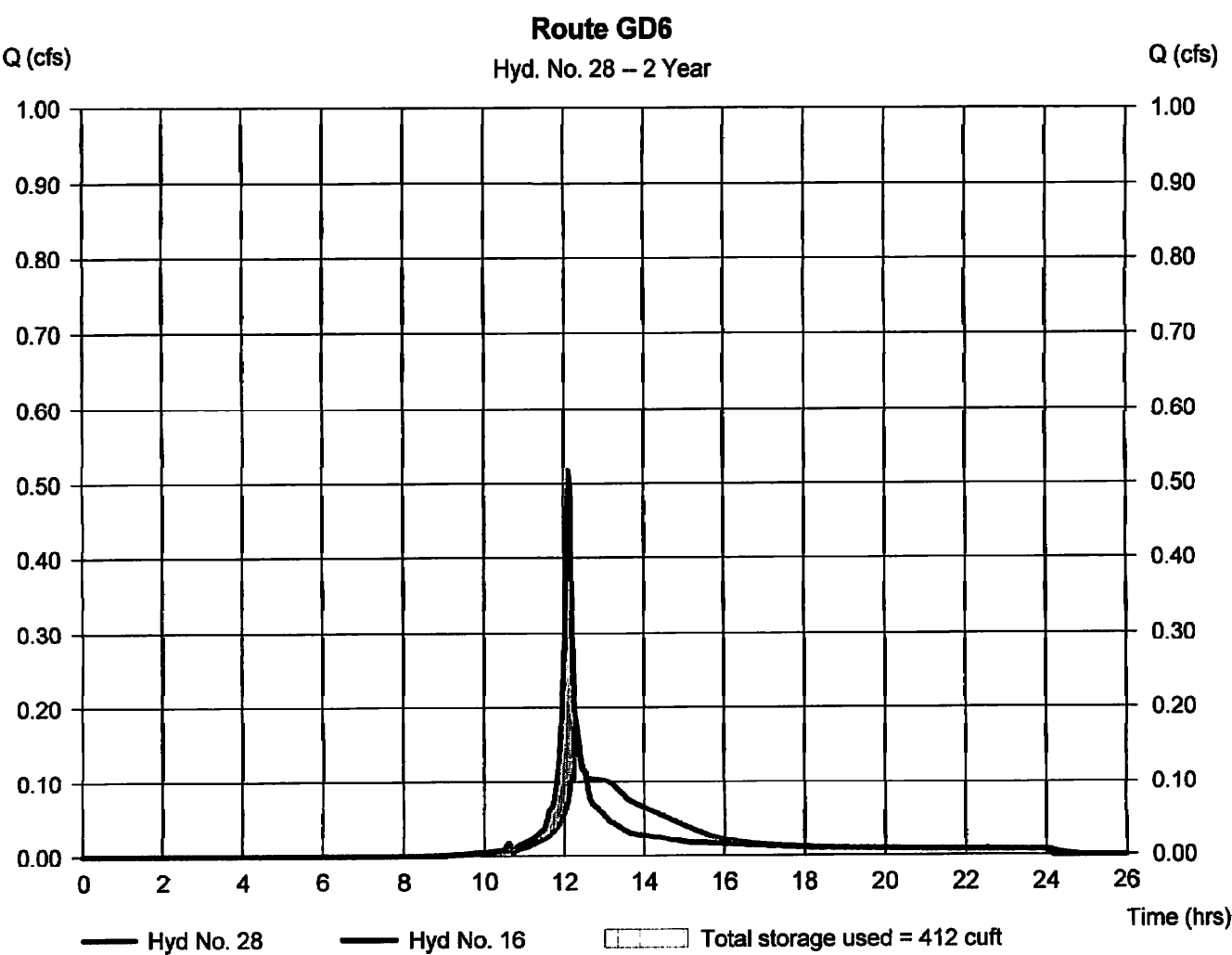
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 28

Route GD6

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyd. No. = 16 - GD6 DA
Reservoir name = GD6
Peak discharge = 0.183 cfs
Time to peak = 12.28 hrs
Hyd. volume = 1,422 cuft
Max. Elevation = 379.41 ft
Max. Storage = 412 cuft

Storage indication method used.



Hydrograph Report

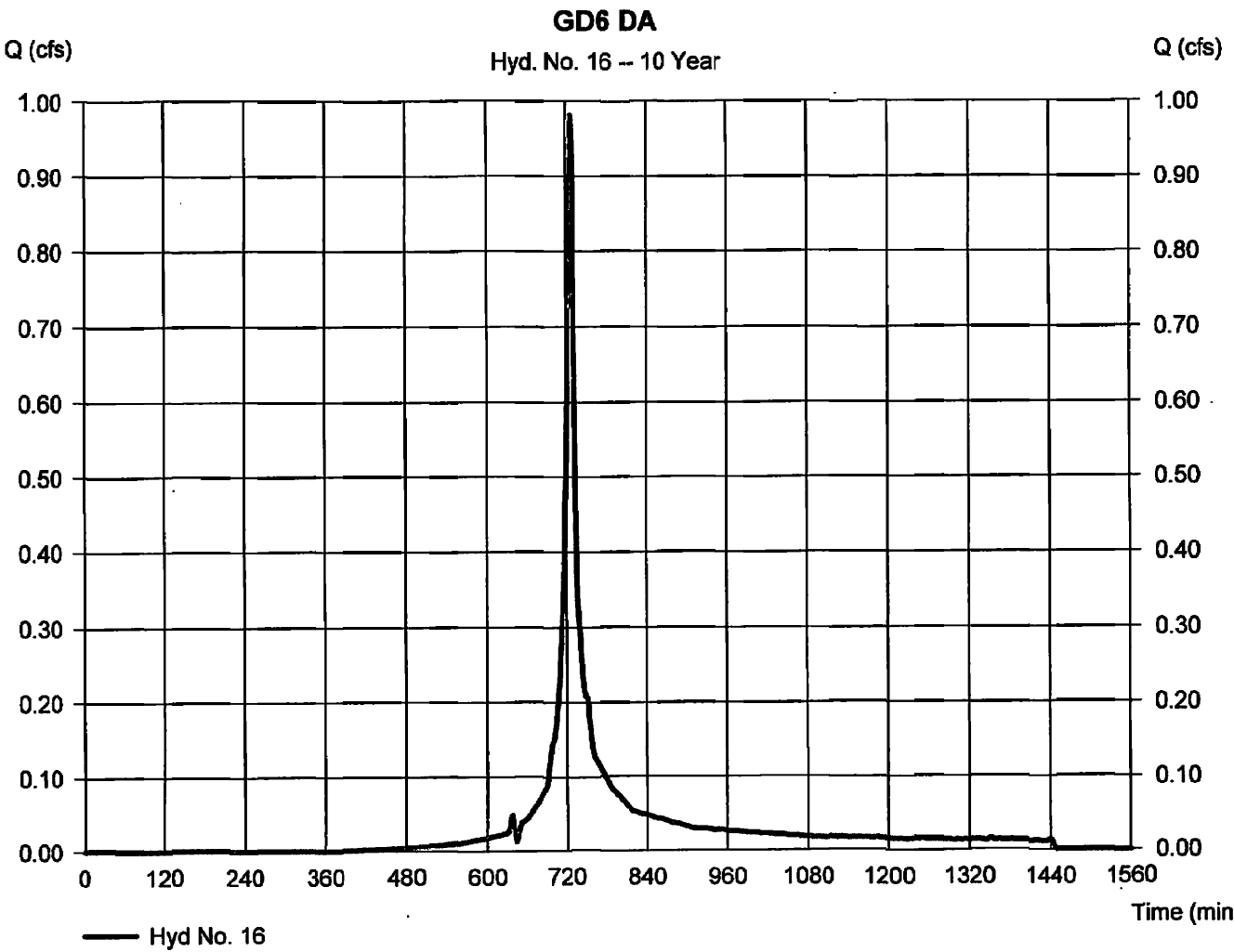
94

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 16

GD6 DA

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.240 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.87 in
Storm duration = NOAA Type C Rainfall 1 Min interval.cds
Peak discharge = 0.981 cfs
Time to peak = 727 min
Hyd. volume = 2,745 cuft
Curve number = 83
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.00 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

2

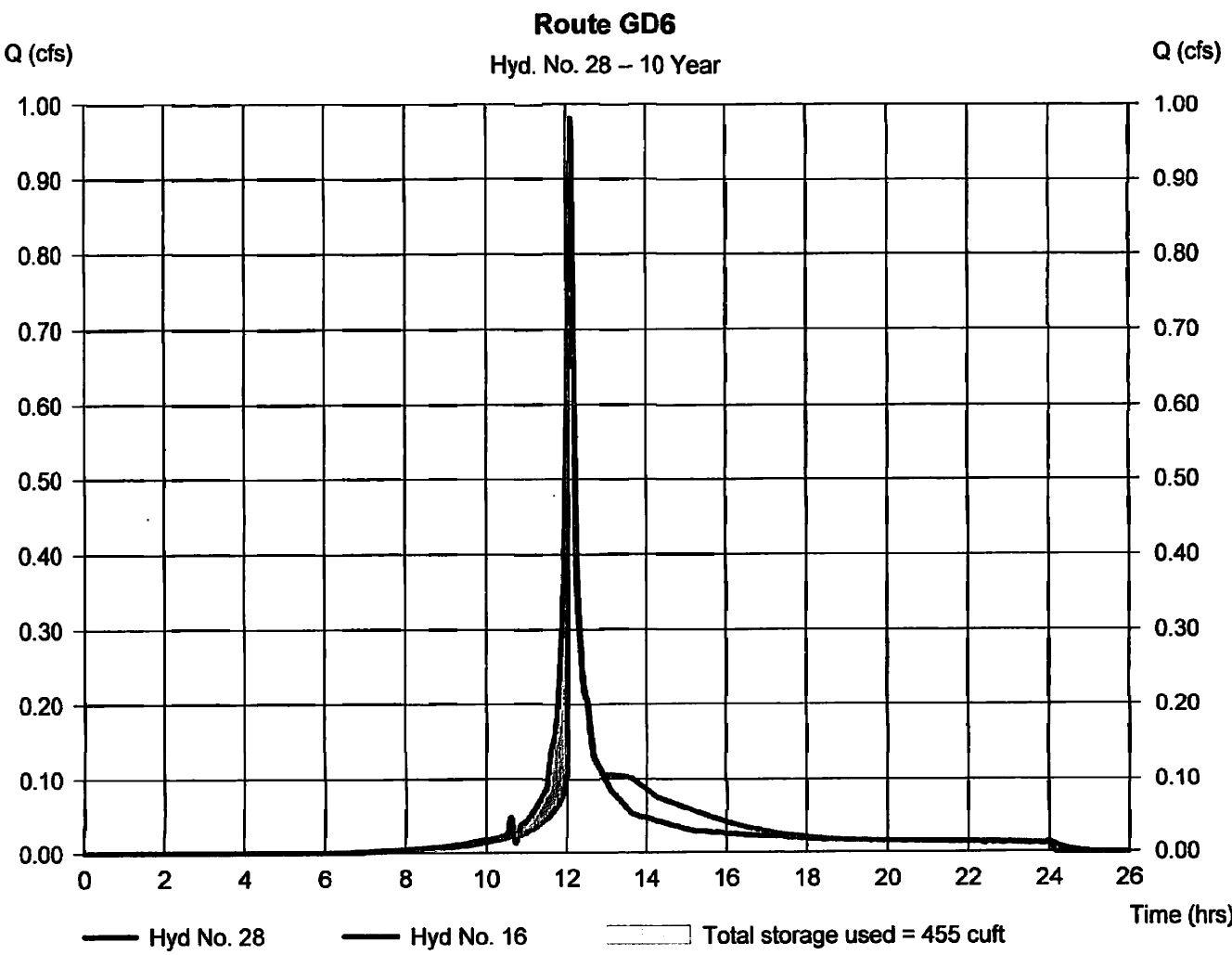
Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Hyd. No. 28

Route GD6

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyd. No. = 16 - GD6 DA
Reservoir name = GD6
Peak discharge = 0.970 cfs
Time to peak = 12.13 hrs
Hyd. volume = 2,745 cuft
Max. Elevation = 379.54 ft
Max. Storage = 455 cuft

Storage indication method used.



Pond Report

2

Hydraflow Hydrographs by Intellisolve v9.22 Wednesday, Jan 18, 2017

Pond No. 7 - GD6

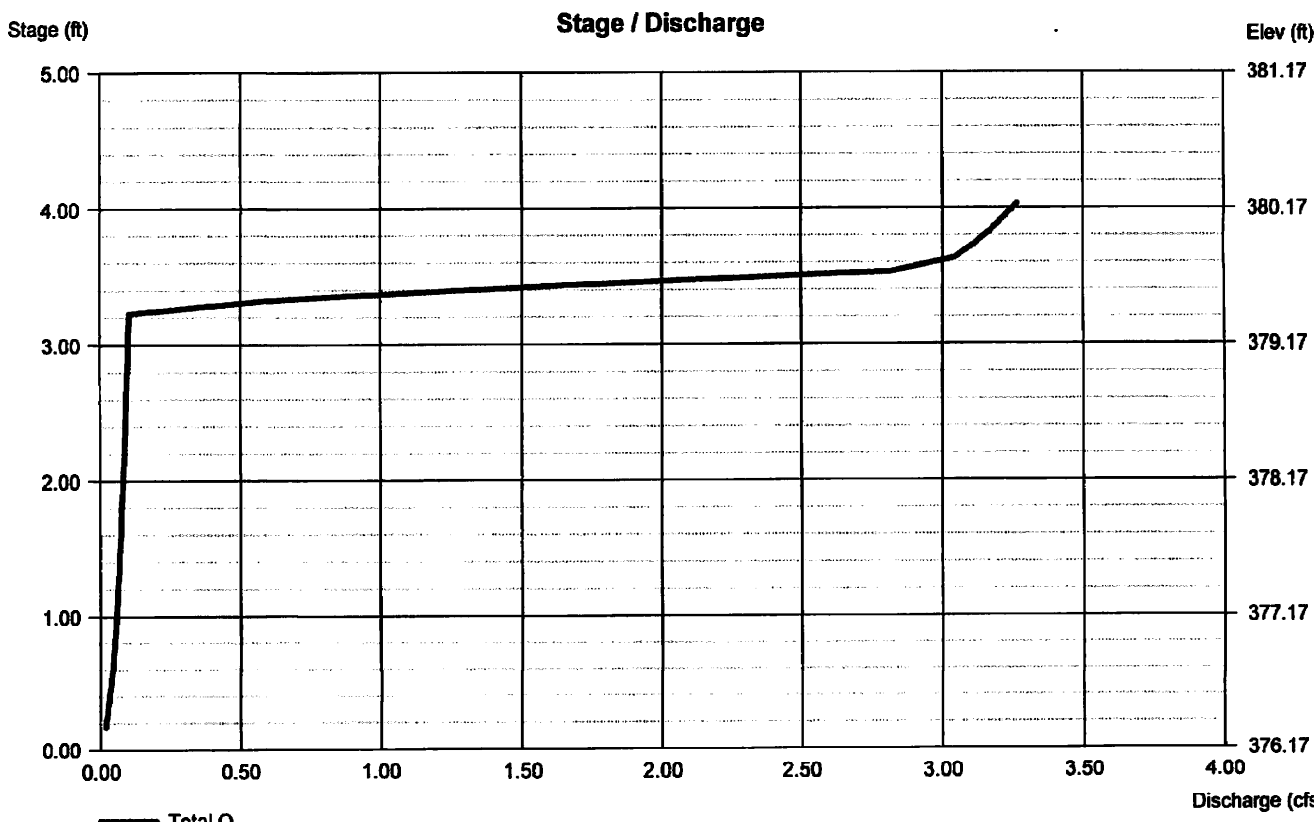
Pond Data

Pond storage is based on user-defined values.

| Stage / Storage Table | | | | |
|-----------------------|----------------|---------------------|----------------------|----------------------|
| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
| 0.00 | 376.17 | n/a | 0 | 0 |
| 1.70 | 377.87 | n/a | 245 | 245 |
| 3.03 | 378.20 | n/a | 90 | 335 |
| 4.03 | 380.20 | n/a | 360 | 695 |

| Culvert / Orifice Structures | | | | | Weir Structures | | | | |
|------------------------------|----------|--------|------|-----------|-----------------|-----------------------|------|------|------|
| | [A] | [B] | [C] | [Prf/Rsr] | | [A] | [B] | [C] | [D] |
| Rise (in) | = 8.00 | 1.50 | 0.00 | 0.00 | Crest Len (ft) | = 6.28 | 0.00 | 0.00 | 0.00 |
| Span (in) | = 8.00 | 1.50 | 0.00 | 0.00 | Crest EL. (ft) | = 379.40 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 | Weir Coeff. | = 2.70 | 3.33 | 3.33 | 3.33 |
| Invert EL. (ft) | = 376.07 | 376.17 | 0.00 | 0.00 | Weir Type | = Riser | - | - | - |
| Length (ft) | = 22.00 | 0.00 | 0.00 | 0.00 | Multi-Stage | = Yes | No | No | No |
| Slope (%) | = 1.86 | 0.00 | 0.00 | n/a | | | | | |
| N-Value | = .011 | .013 | .013 | n/a | | | | | |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 | Exfil.(in/hr) | = 0.000 (by Wet area) | | | |
| Multi-Stage | = n/a | Yes | No | No | TW Elev. (ft) | = 0.00 | | | |

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



HYDROGRAPHS

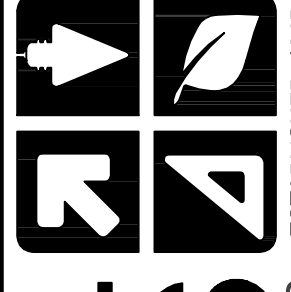
MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

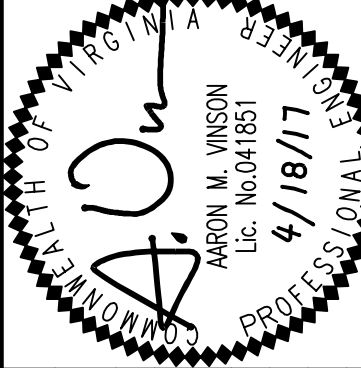
TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com



WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 1/18/17, 3/21/17, 4/18/17
SCALE: 1" = 30'



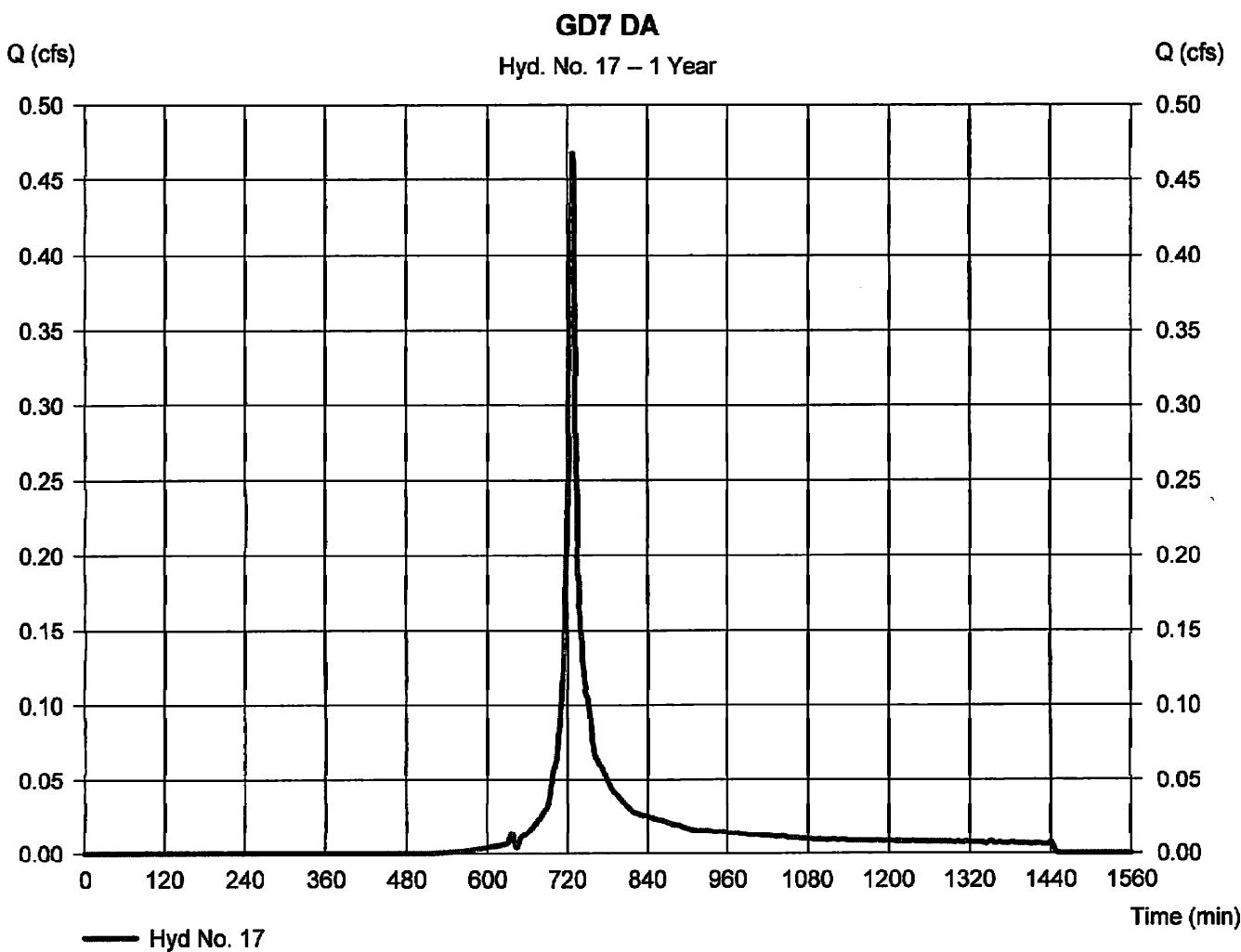
| NO. | REVISION APPROVED BY | | DATE | | DATE | |
|-----|----------------------|------|------|----------|------|------|
| | DESCRIPTION | REV. | BY | APPROVED | DATE | DATE |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

GRAVEL DETENTION 7 DATA AND HYDROGRAPHS

Hydrograph Report

17

| | | | | | | | |
|---|---|--------------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 17 | | | | | | | |
| GD7 DA | | | | | | | |
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.468 cfs | | | | |
| Storm frequency | = 1 yrs | Time to peak | = 727 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 1,288 cuft | | | | |
| Drainage area | = 0.270 ac | Curve number | = 85 | | | | |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft | | | | |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min | | | | |
| Total precip. | = 2.62 in | Distribution | = Custom | | | | |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 | | | | |

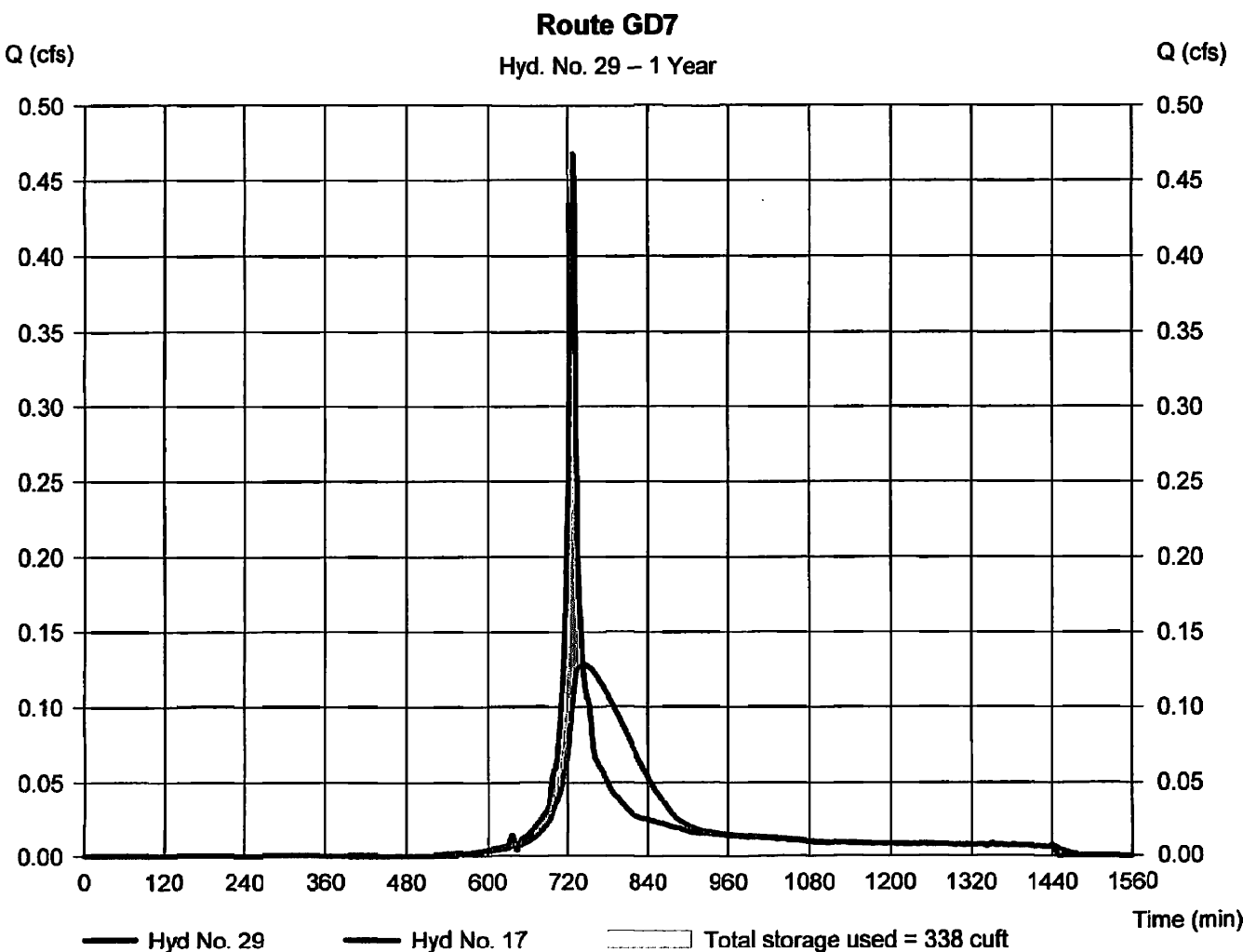


Hydrograph Report

40

| | | | | | | | |
|---|---------------|----------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 29 | | | | | | | |
| Route GD7 | | | | | | | |
| Hydrograph type | = Reservoir | Peak discharge | = 0.128 cfs | | | | |
| Storm frequency | = 1 yrs | Time to peak | = 742 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 1,287 cuft | | | | |
| Inflow hyd. No. | = 17 - GD7 DA | Max. Elevation | = 375.54 ft | | | | |
| Reservoir name | = GD7 | Max. Storage | = 338 cuft | | | | |

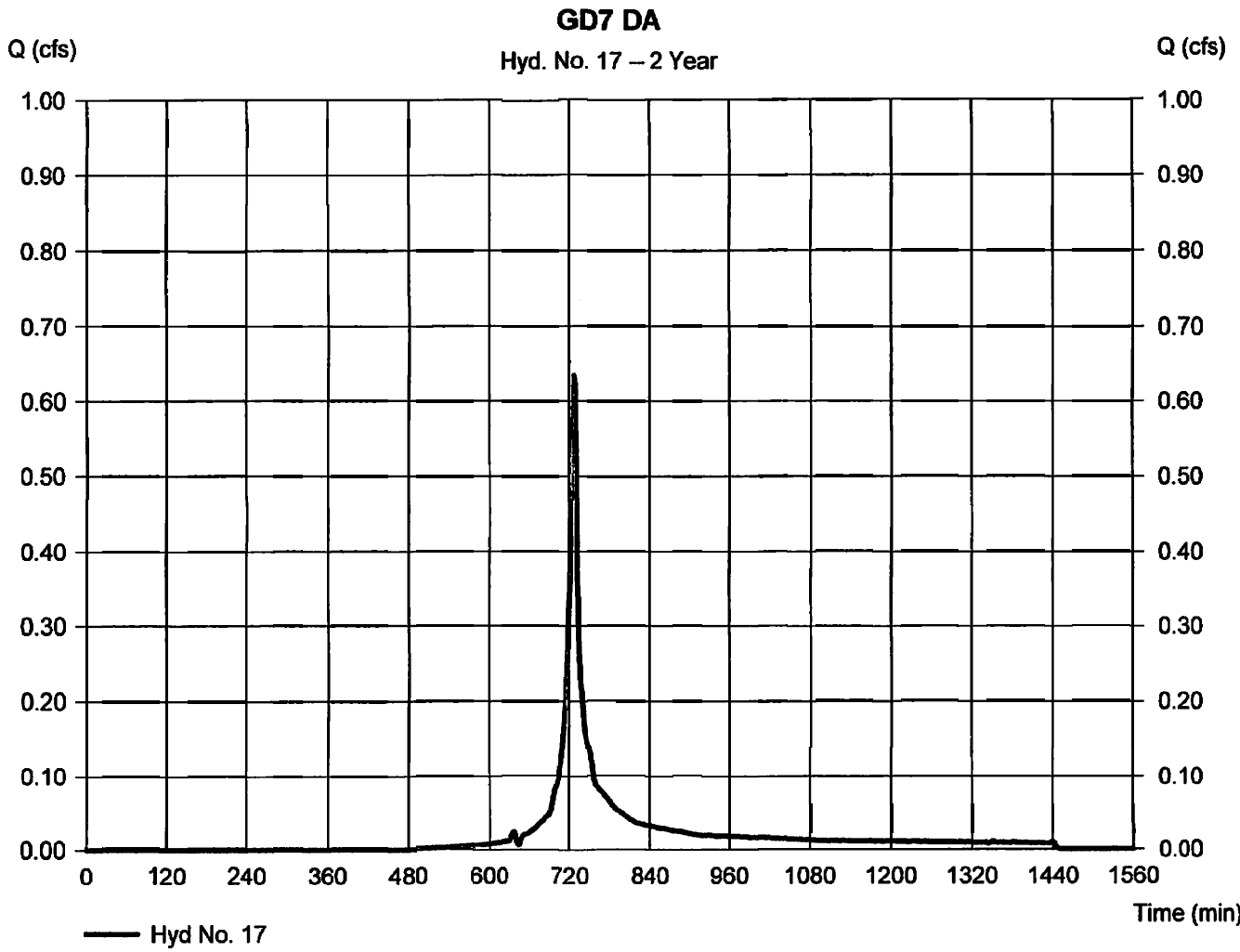
Storage Indication method used.



Hydrograph Report

62

| | | | | | | | |
|---|---|--------------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 17 | | | | | | | |
| GD7 DA | | | | | | | |
| Hydrograph type | = SCS Runoff | Peak discharge | = 0.633 cfs | | | | |
| Storm frequency | = 2 yrs | Time to peak | = 727 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 1,751 cuft | | | | |
| Drainage area | = 0.270 ac | Curve number | = 85 | | | | |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft | | | | |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min | | | | |
| Total precip. | = 3.17 in | Distribution | = Custom | | | | |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 | | | | |

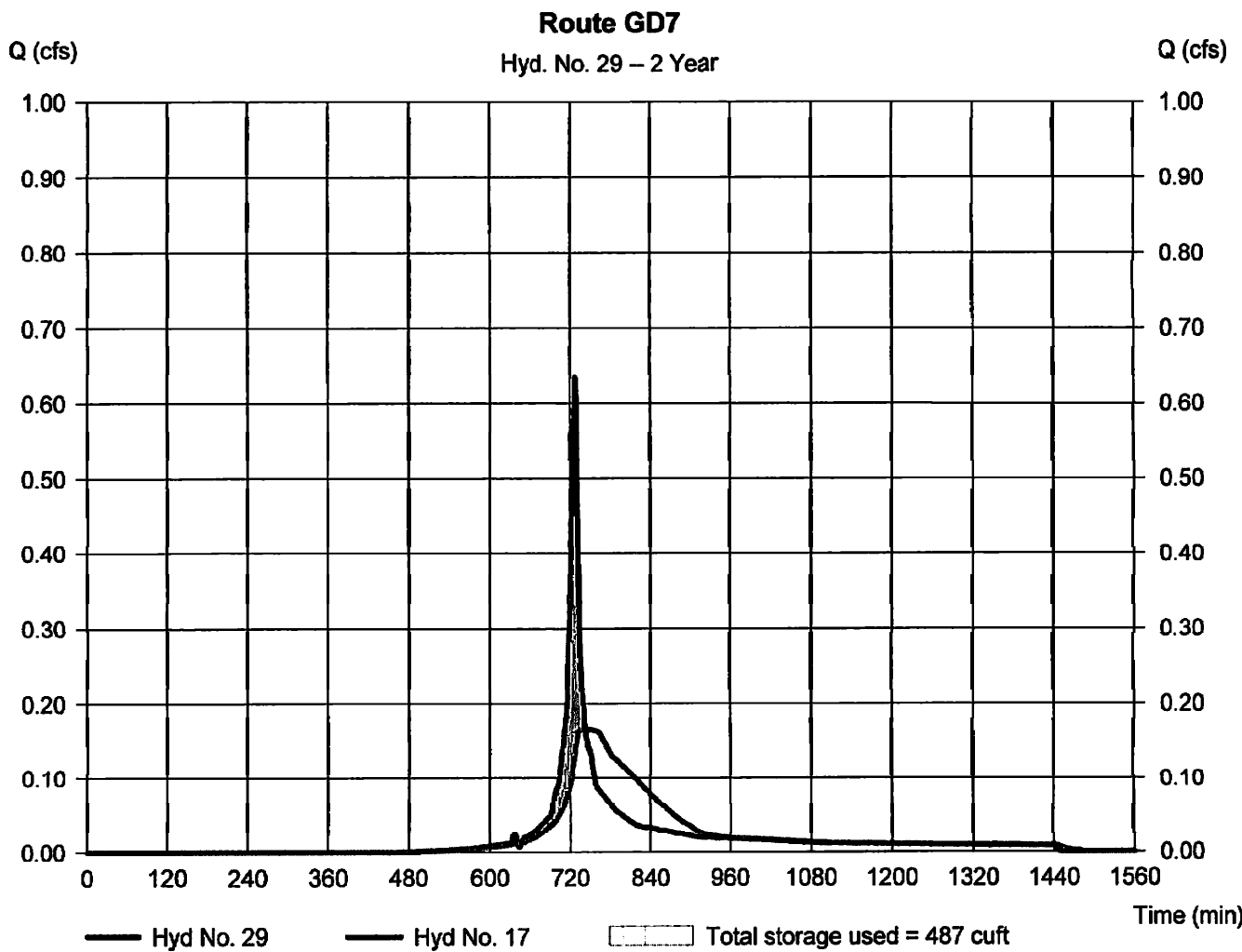


Hydrograph Report

74

| | | | | | | | |
|---|---------------|----------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 29 | | | | | | | |
| Route GD7 | | | | | | | |
| Hydrograph type | = Reservoir | Peak discharge | = 0.166 cfs | | | | |
| Storm frequency | = 2 yrs | Time to peak | = 743 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 1,750 cuft | | | | |
| Inflow hyd. No. | = 17 - GD7 DA | Max. Elevation | = 377.09 ft | | | | |
| Reservoir name | = GD7 | Max. Storage | = 487 cuft | | | | |

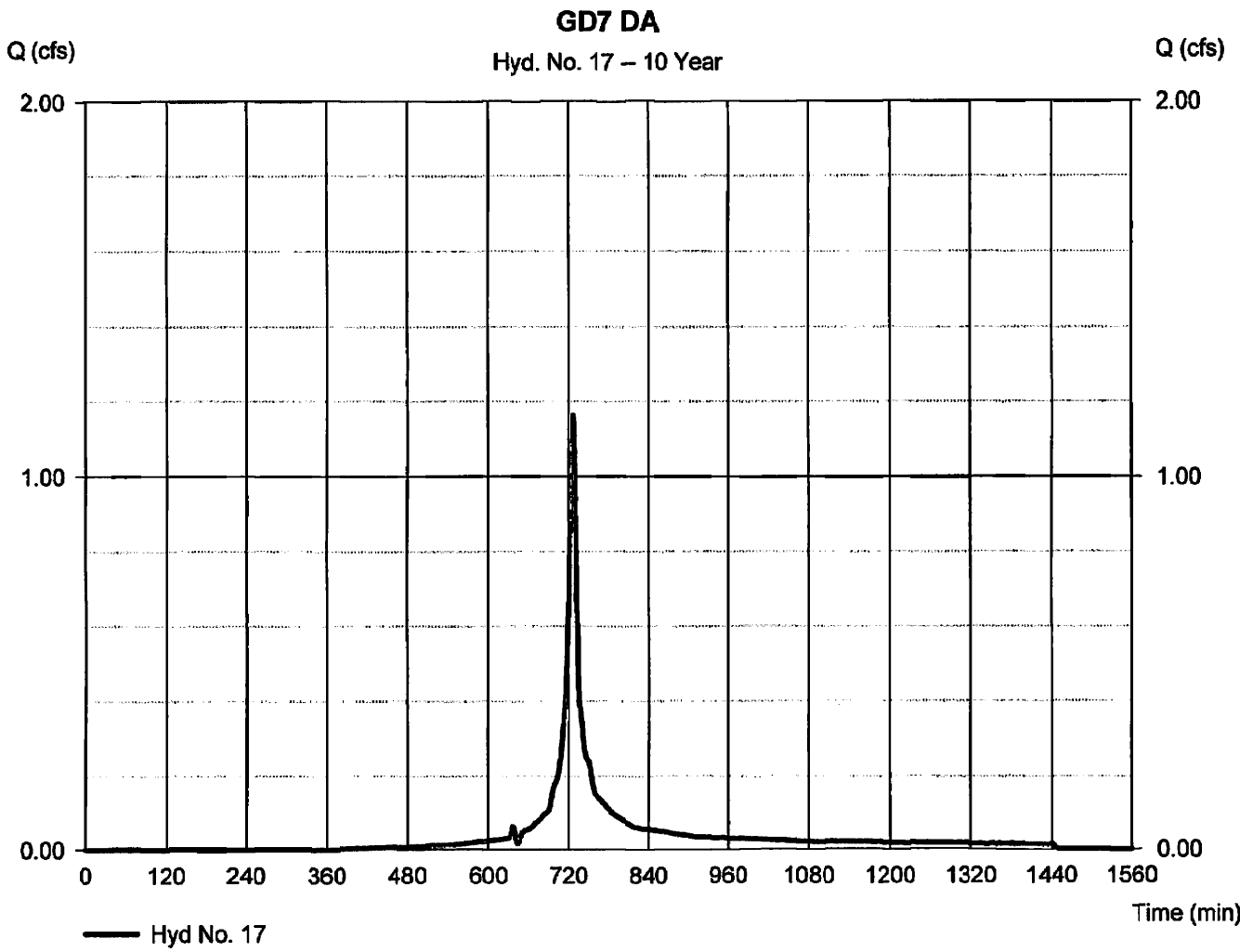
Storage Indication method used.



Hydrograph Report

95

| | | | | | | | |
|---|---|--------------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 17 | | | | | | | |
| GD7 DA | | | | | | | |
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.163 cfs | | | | |
| Storm frequency | = 10 yrs | Time to peak | = 727 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 3,283 cuft | | | | |
| Drainage area | = 0.270 ac | Curve number | = 85 | | | | |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft | | | | |
| Tc method | = USER | Time of conc. (Tc) | = 6.00 min | | | | |
| Total precip. | = 4.87 in | Distribution | = Custom | | | | |
| Storm duration | = NOAA Type C Rainfall 1 Min interval.cds | Shape factor | = 484 | | | | |

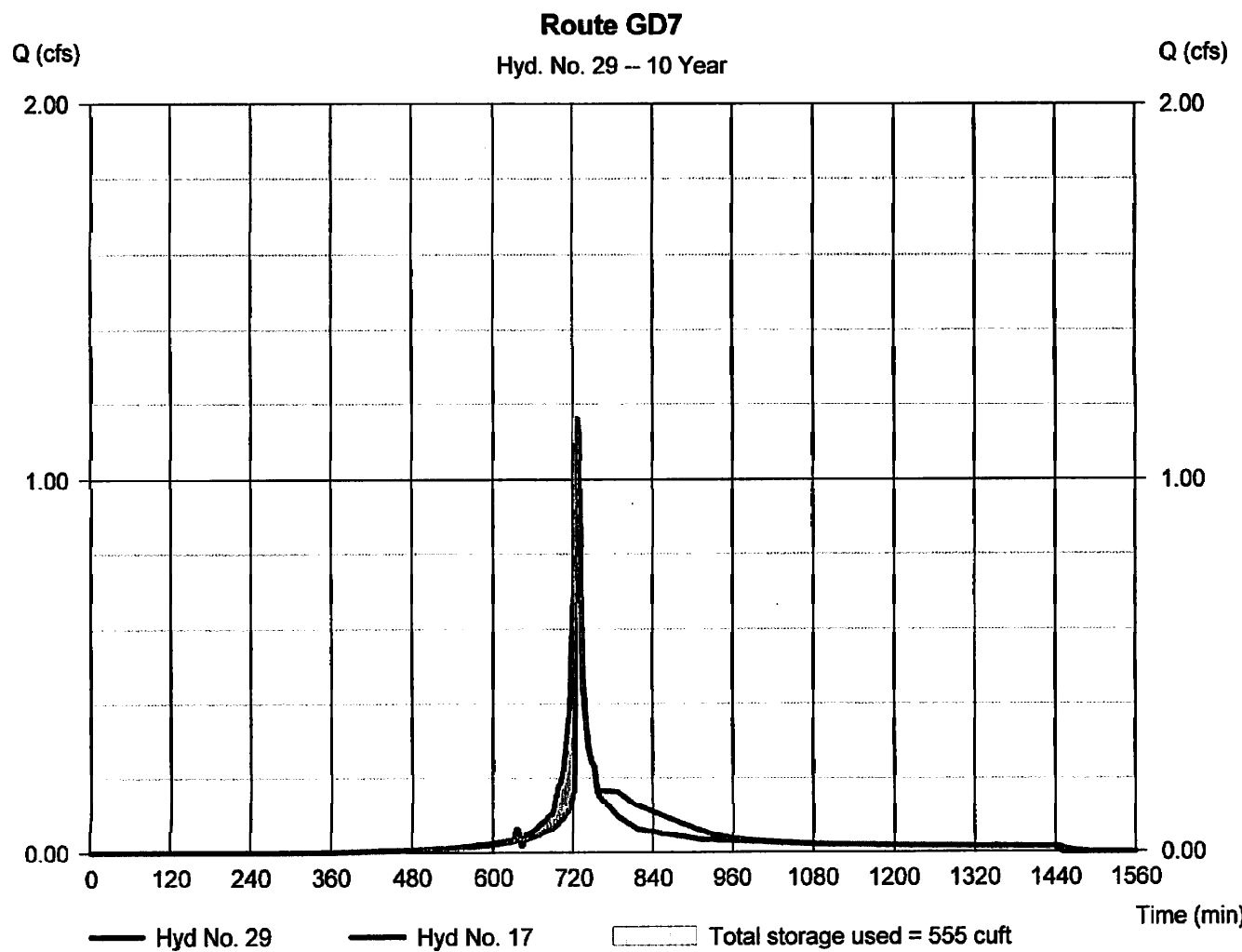


Hydrograph Report

107

| | | | | | | | |
|---|---------------|----------------|--------------|-------------------------|--|--|--|
| Hydraflow Hydrographs by Intellisolve v9.22 | | | | Wednesday, Jan 18, 2017 | | | |
| Hyd. No. 29 | | | | | | | |
| Route GD7 | | | | | | | |
| Hydrograph type | = Reservoir | Peak discharge | = 1.150 cfs | | | | |
| Storm frequency | = 10 yrs | Time to peak | = 727 min | | | | |
| Time interval | = 1 min | Hyd. volume | = 3,282 cuft | | | | |
| Inflow hyd. No. | = 17 - GD7 DA | Max. Elevation | = 377.28 ft | | | | |
| Reservoir name | = GD7 | Max. Storage | = 555 cuft | | | | |

Storage Indication method used.



Pond Report

2

Hydraflow Hydrographs by Intellisolve v9.22

Thursday, Jan 19, 2017

Pond No. 8 - GD7

Pond Data

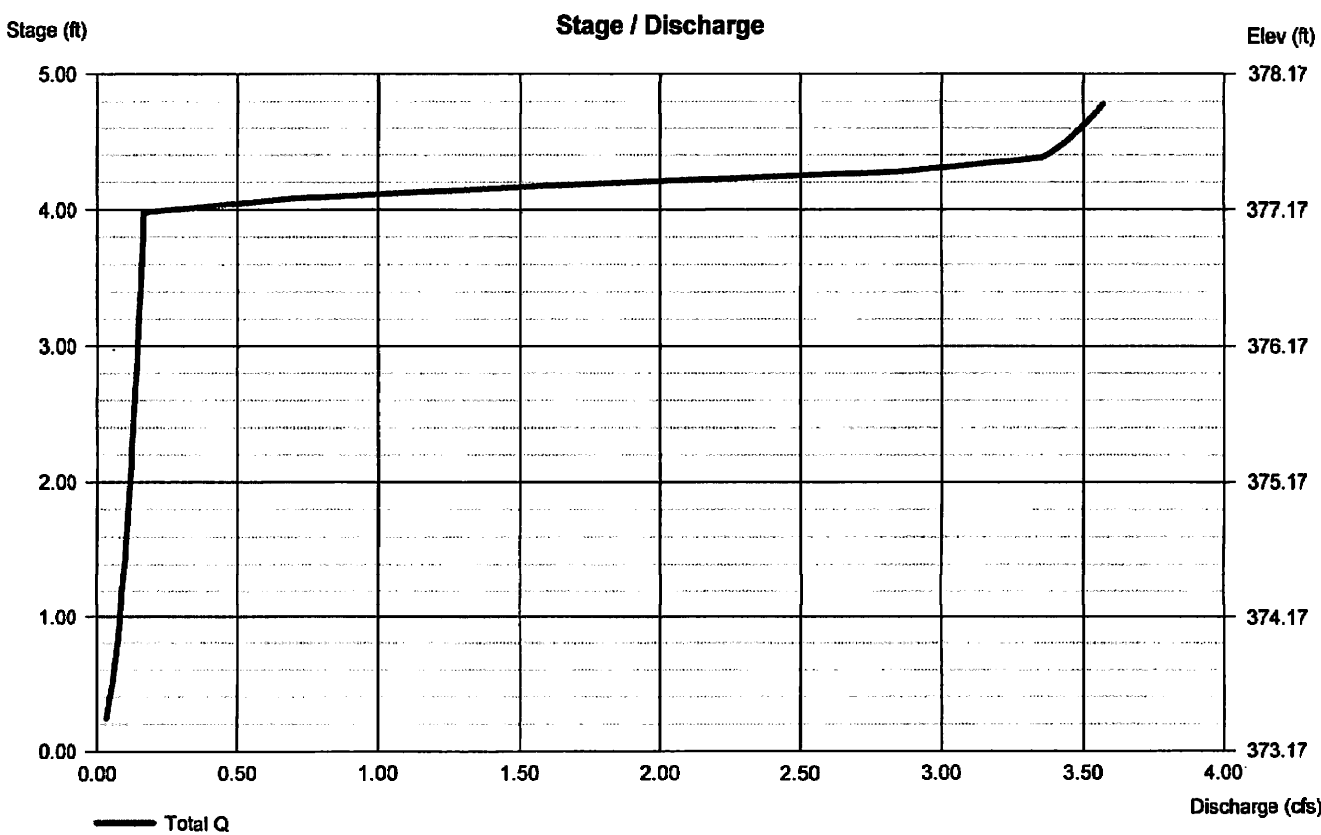
Pond storage is based on user-defined values.

| Stage / Storage Table | | | | |
|-----------------------|----------------|---------------------|----------------------|----------------------|
| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
| 0.00 | 373.17 | n/a | 0 | 0 |
| 2.45 | 375.02 | n/a | 349 | 349 |
| 3.78 | 376.95 | n/a | 89 | 438 |
| 4.78 | 377.95 | n/a | 356 | 794 |

| Culvert / Orifice Structures | | | | |
|------------------------------|----------|--------|------|---------|
| | [A] | [B] | [C] | [Pr/Rr] |
| Rise (in) | = 6.00 | 1.80 | 0.00 | 0.00 |
| Span (in) | = 6.00 | 1.80 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 373.07 | 373.17 | 0.00 | 0.00 |
| Length (ft) | = 30.00 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 1.00 | 0.00 | 0.00 | n/a |
| N-Value | = .011 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | Yes | No | No |

| Weir Structures | | | | |
|-----------------|-----------------------|------|------|------|
| | [A] | [B] | [C] | [D] |
| Crest Len (ft) | = 6.24 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 377.15 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 2.70 | 3.33 | 3.33 | 3.33 |
| Weir Type | = Riser | — | — | — |
| Multi-Stage | = Yes | No | No | No |
| Exfil.(in/hr) | = 0.000 (by Wet area) | | | |
| TW Elev. (ft) | = 0.00 | | | |

Note: Culvert/Orifice outflows are analyzed under inlet (ci) and outlet (co) control. Weir risers checked for orifice conditions (ci) and submergence (is).



HYDROGRAPHS

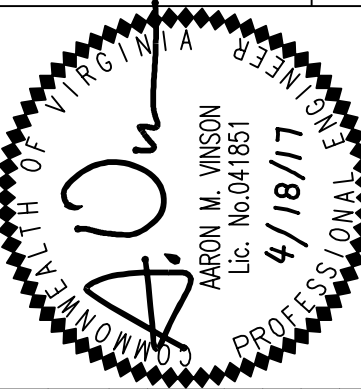
MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com



| NO. | REVISION APPROVED BY | | DATE | | DATE | | DATE | | DATE | |
|-----|----------------------|------|------|----------|------|------|------|----------|------|------|
| | DESCRIPTION | REV. | BY | APPROVED | DATE | REV. | BY | APPROVED | DATE | REV. |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

CHECKED: JG
DRAWN: SO

ONSITE AND OFFSITE STORM SEWER DESIGN COMPUTATIONS - 10 YEAR DESIGN STORM

| FROM POINT | TO POINT | AREA "A" ACRES | RUN OFF COEF C | CA | | INLET TIME MIN | RAIN FALL IN/HR | RUNOFF Q INCRE- MENT C.F.S. | RUNOFF Q10 C.F.S. | INVERT ELEV'S | | LENGTH FT. | SLOPE FT./FT. | MANNING'S 'n' | DIA. IN. | CAPA- CITY C.F.S. | VEL. F.P.S. | FLOW TIME SEC. | NORMAL DEPTH IN. |
|------------|----------|----------------------|-------------------------|----------------|------------------|----------------------|-----------------------|--------------------------------------|-------------------------|---------------|--------------|---------------|------------------|------------------|-------------|-------------------------|----------------|----------------------|------------------------|
| | | | | INCRE- MENT | ACCUM- ULATED | | | | | UPPER END | LOWER END | | | | | | | | |
| 12 | 2011 | - | - | - | - | - | - | 0.23 | 0.23 | 375.89 | 375.59 | 28 | 0.0107 | 0.013 | 12 | 3.67 | 2.62 | 10.70 | 2.03 |
| (2) 2011 | 2008 | 21.76 | 0.415 | 9.03 | 9.03 | 20.00 | 3.88 | 35.04 | 35.22 | 373.57 | 372.94 | 136 | 0.0046 | 0.013 | 36 (3) | 45.33 | 7.11 | 19.13 | 23.78 |
| | 2008 | 1897 | 0.00 | 0.00 | | | | 0.00 | 35.22 | 372.89 | 372.65 | 64 | 0.0038 | 0.013 | 42 (4) | 61.55 | 6.63 | 9.65 | 22.72 |
| Ex EW | 822 | 3.73 | 0.40 | 1.49 | 1.49 | 10.00 | 5.45 | 8.13 | 8.13 | 381.48 | 381.01 | 31 | 0.0152 | 0.013 | 18 | 12.88 | 7.75 | 4.00 | 10.33 |
| 16 | 15 | 0.37 | 0.50 | 0.19 | 0.19 | 5.00 | 6.77 | 1.25 | 1.25 | 386.40 | 383.85 | 88 | 0.0290 | 0.013 | 15 | 10.95 | 5.96 | 14.76 | 3.41 |
| 15 | 822 | 0.00 | 0.00 | 0.00 | 0.19 | 5.00 | 6.77 | 0.00 | 1.25 | 383.60 | 381.01 | 96 | 0.0270 | 0.013 | 15 | 10.56 | 5.81 | 16.51 | 3.48 |
| 822 | 10 | 0.47 | 0.50 | 0.24 | 1.91 | 10.00 | 5.45 | 1.28 | 10.32 | 380.58 | 376.28 | 138 | 0.0312 | 0.013 | 18 | 18.47 | 10.79 | 12.78 | 9.58 |
| 10 | 11 | | | | | | | 0.33 | 10.55 | 376.18 | 375.66 | 28 | 0.0186 | 0.013 | 24 | 30.74 | 8.91 | 3.14 | 9.67 |
| 11 | 1897 | 0.41 | 0.40 | 0.16 | 0.16 | 10.00 | 5.45 | 0.24 | 10.69 | 375.56 | 372.65 | 161 | 0.0181 | 0.013 | 24 | 30.33 | 8.85 | 18.19 | 9.81 |
| 1897 | 1878 | 1.37 | 0.40 | 0.55 | | 5.00 | 6.77 | 3.71 | 42.69 | 372.55 | 372.41 | 84 | 0.0017 | 0.013 | 42 (4) | 44.62 | 4.90 | 17.14 | 35.64 |
| 1878 | 14 | 0.24 | 0.58 | 0.14 | | 5.00 | 6.77 | 0.94 | 43.02 | 372.16 | 371.74 | 79 | 0.0053 | 0.013 | 36 (3) | 48.56 | 7.76 | 9.92 | 26.40 |
| 13 | 14 | 0.00 | 0.00 | 0.00 | | 5.00 | | 0.00 | 0.99 | 372.67 | 372.23 | 44 | 0.0100 | 0.013 | 12 | 3.54 | 3.89 | 11.31 | 4.32 |
| 14 | 1853 | 0.00 | 0.00 | 0.00 | | | | 0.00 | 43.53 | 371.74 | 371.65 | 18 | 0.0050 | 0.013 | 36 (3) | 47.09 | 7.59 | 2.37 | 27.22 |
| 1853 | 1406 | 0.18 | 0.67 | 0.12 | | 5.00 | 6.77 | 0.82 | 43.82 | 371.60 | 371.22 | 51 | 0.0075 | 0.013 | 36 (3) | 57.48 | 8.98 | 5.68 | 23.46 |

- (1) Q DETAINED BY ROUTING SWM FACILITIES USING RATIONAL METHOD.
(2) OFFSITE DRAINAGE AREA DATA OBTAINED FROM THE FOLIN LANE
(3) EQUIVALENT TO EX. 29"x45" PIPE ROAD IMPROVEMENT PLAN BY URBAN
(4) EQUIVALENT TO EX. 34"x53" PIPE BY ROAD IMPROVEMENT PLAN BY URBAN

ON SITE STORM SEWER DESIGN COMPUTATIONS (100 YEAR DESIGN STORM (SEE NOTE))

| FROM POINT | TO POINT | AREA "A" ACRES | RUN OFF COEF C | CA | | INLET TIME MIN | RAIN FALL IN/HR | RUNOFF Q INCRE- MENT C.F.S. | RUNOFF Q100 C.F.S. | INVERT ELEV'S | | LENGTH FT. | SLOPE FT./FT. | MANNING'S 'n' | DIA. IN. | CAPA- CITY C.F.S. | VEL. F.P.S. | FLOW TIME SEC. | NORMAL DEPTH IN. |
|------------|----------|----------------------|-------------------------|----------------|------------------|----------------------|-----------------------|--------------------------------------|--------------------------|---------------|--------------|---------------|------------------|------------------|-------------|-------------------------|----------------|----------------------|------------------------|
| | | | | INCRE- MENT | ACCUM- ULATED | | | | | UPPER END | LOWER END | | | | | | | | |
| (EX.)ES | 822 | 3.73 | 0.40 | 1.49 | 1.49 | 10.00 | 7.28 | 13.58 | 13.58 | 381.48 | 381.01 | 31 | 0.0152 | 0.013 | 18 | 12.88 | 8.32 | 3.73 | 15.66 |
| 16 | 15 | 0.37 | 0.50 | 0.19 | 0.19 | 5.00 | 9.10 | 2.10 | 2.10 | 386.40 | 383.85 | 88 | 0.0290 | 0.013 | 15 | 10.95 | 6.92 | 12.71 | 4.44 |
| 15 | 822 | 0.00 | 0.00 | 0.00 | 0.19 | 5.00 | 9.10 | 0.00 | 2.10 | 383.60 | 381.01 | 96 | 0.0270 | 0.013 | 15 | 10.56 | 6.75 | 14.23 | 4.52 |
| 822 | 10 | 0.47 | 0.50 | 0.24 | 1.91 | 10.00 | 7.28 | 2.14 | 17.40 | 380.58 | 376.28 | 138 | 0.0312 | 0.013 | 18 | 18.47 | 11.96 | 11.54 | 13.81 |
| 10 | 11 | 0.53 | 0.42 | 0.22 | 2.13 | 10.00 | 7.28 | 2.03 | 19.42 | 376.18 | 375.66 | 28 | 0.0186 | 0.013 | 24 | 30.74 | 10.40 | 2.69 | 13.79 |
| 11 | 1897 | 0.41 | 0.40 | 0.16 | 2.30 | 10.00 | 7.28 | 1.49 | 20.92 | 375.56 | 372.65 | 161 | 0.0181 | 0.013 | 24 | 30.33 | 10.46 | 15.40 | 14.60 |

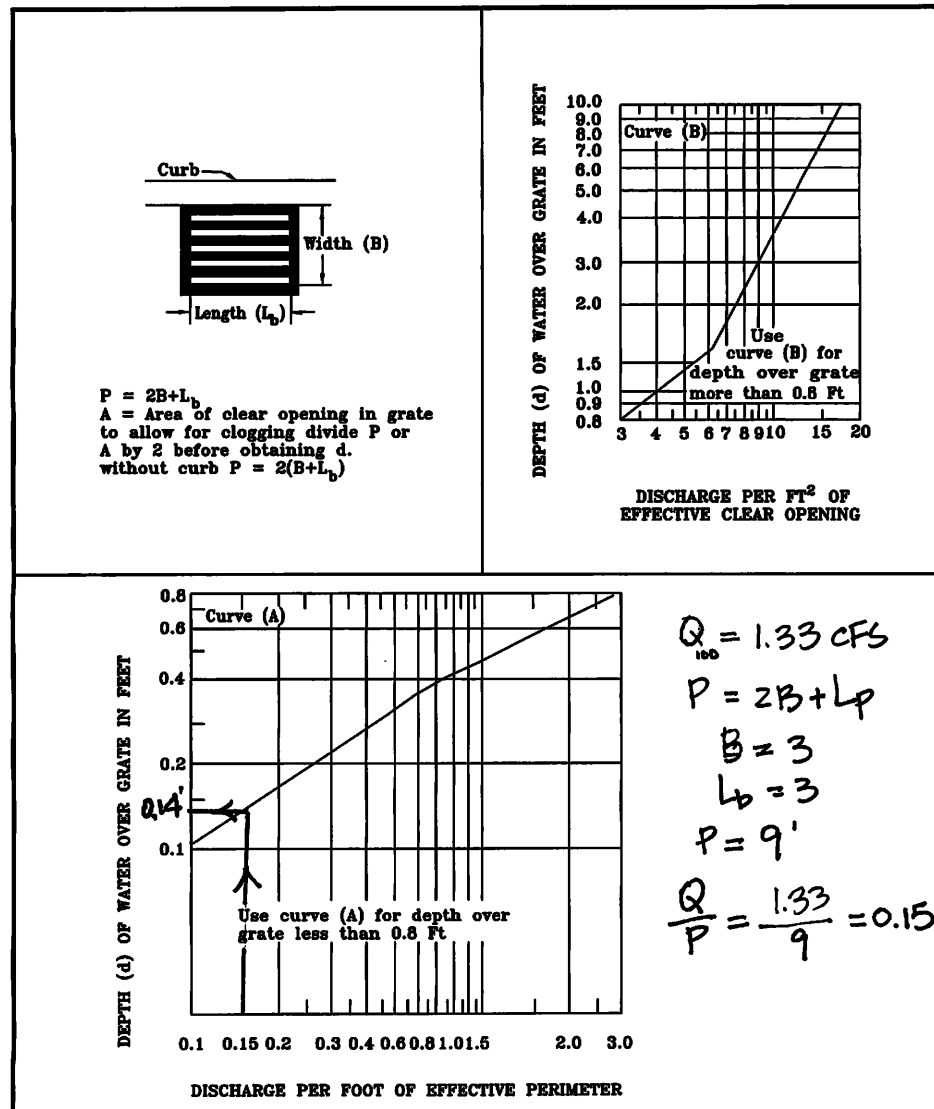
NOTE:
STORM SEWERS BETWEEN MASHE DRIVE AND FOLIN LANE ARE DESIGNED FOR 100 YEAR STORM TO HELP ADDRESS OVERLAND RELIEF, FLOW COMPUTATIONS CONSERVATIVELY IGNORE PEAK FLOW REDUCTION THAT WILL BE PROVIDED BY RAIN GARDENS AND GRAVEL DETENTION FACILITIES.

STORM STRUCTURE INLET DESIGN COMPUTATIONS

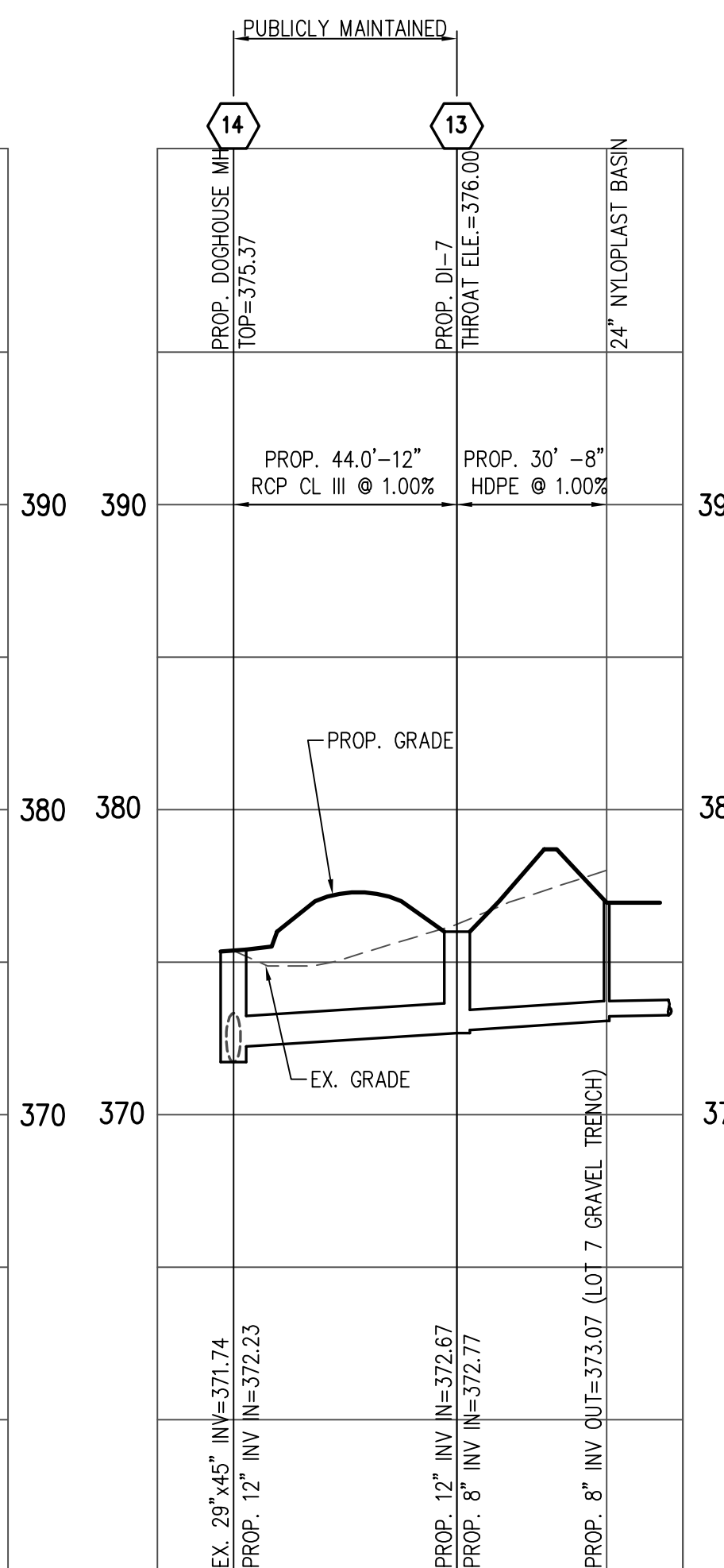
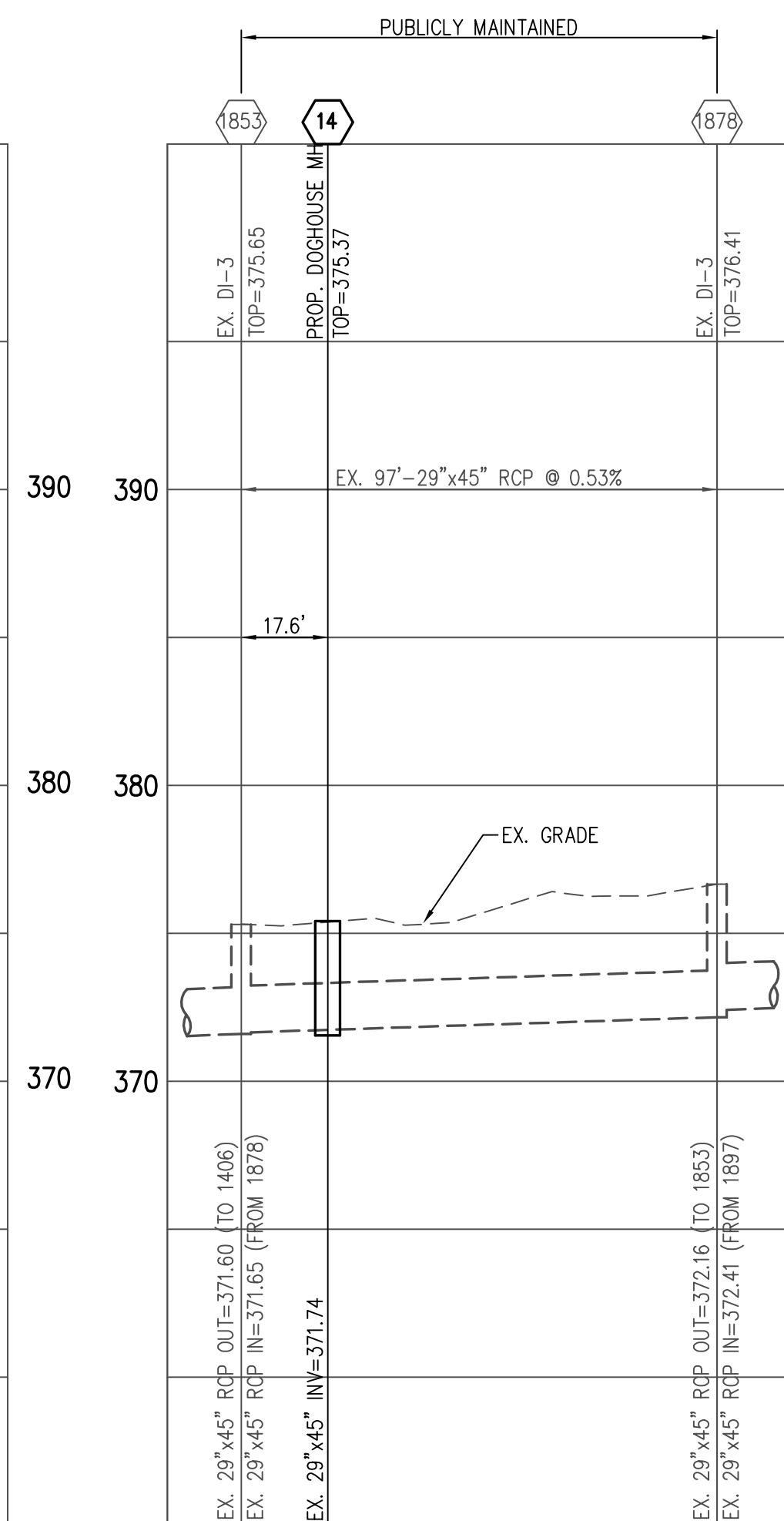
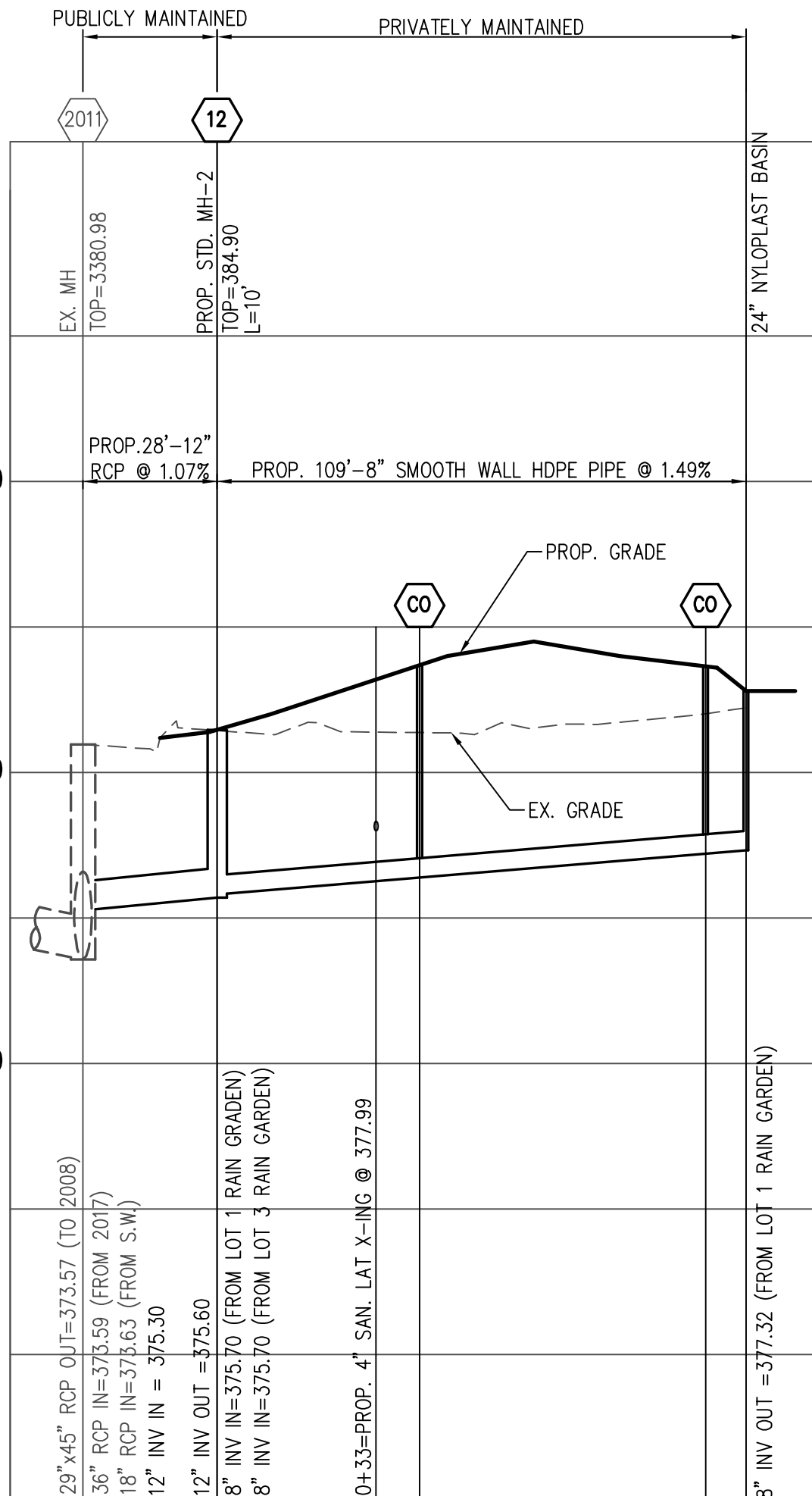
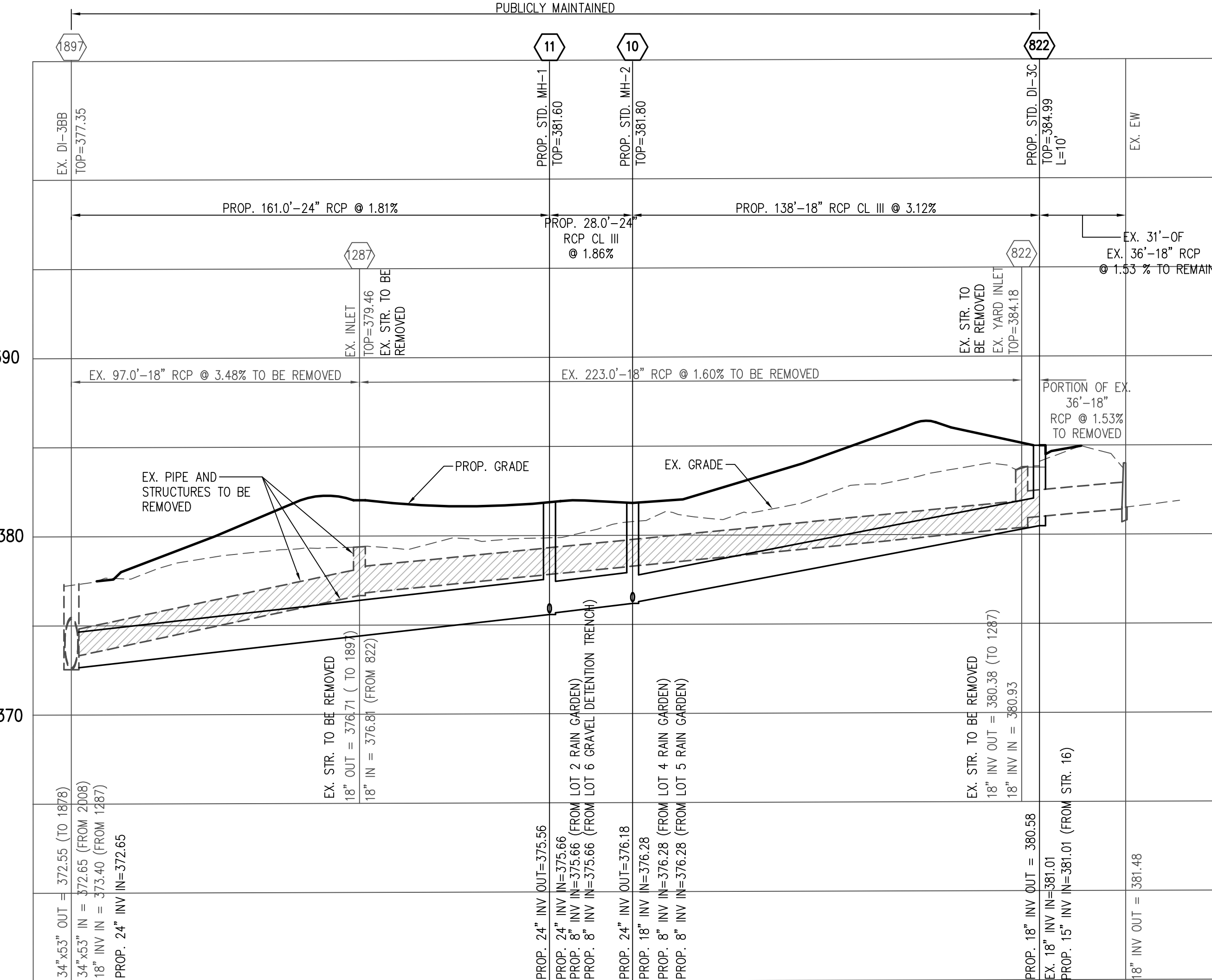
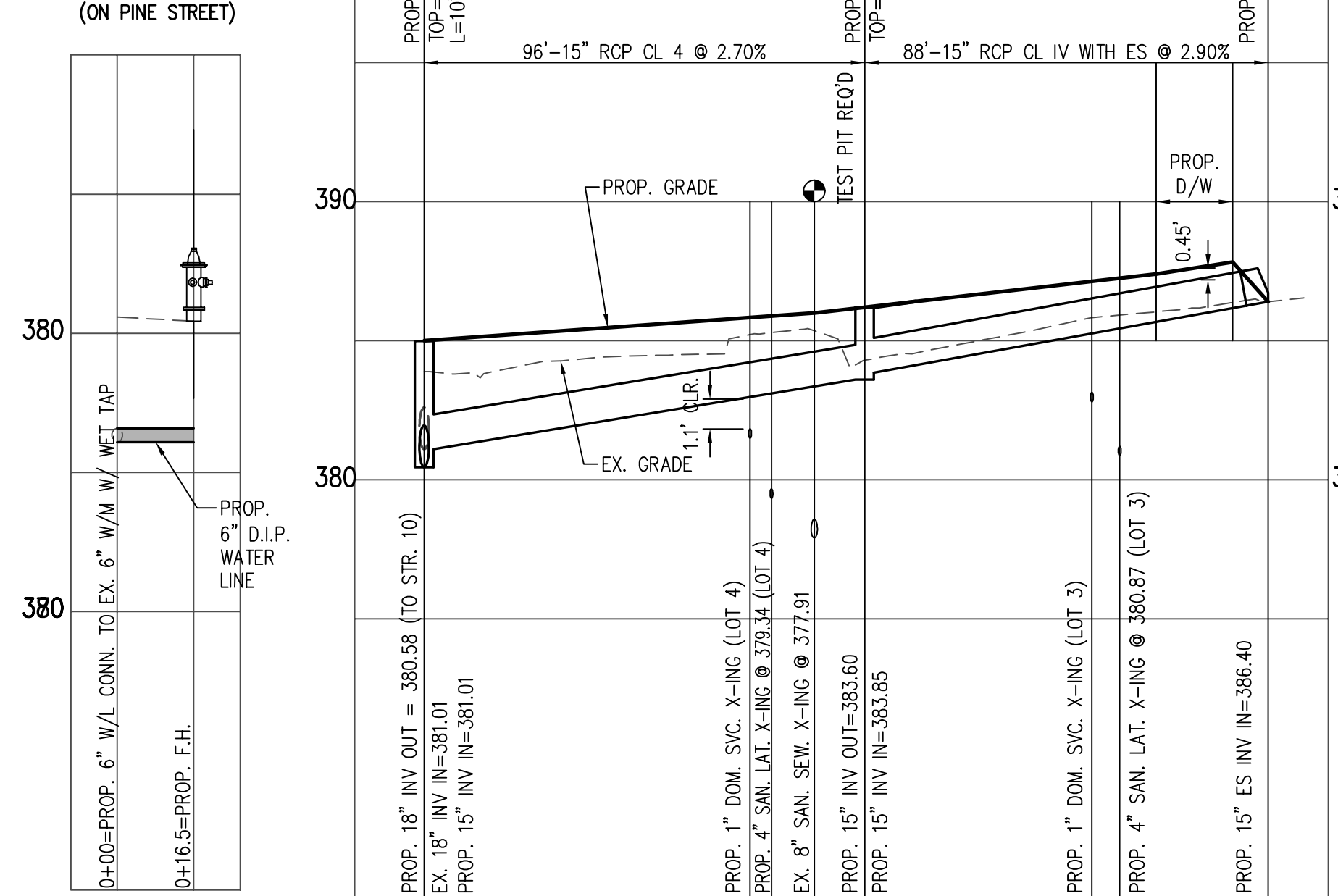
| INLET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SAG INLETS ONLY | | | |
|--------|-------|--------------|---------|---------------------|-----|------|------|-----------|---------------|--------------------------------|---------------------------|------------------------|------------------------------------|-------------|--------|------|------------|-------|----------------------------|-----------------------------------|-------------|---|--|--------------------------------------|------------------|----------------|----------------------------------|--------------------------------|-----------------|--------|-------|----------------------|
| NUMBER | TYPE | LENGTH (FT.) | STATION | DRAINAGE AREA (AC.) | C | CA | Σ CA | intensity | Q INCR. (CFS) | Q ₁ CARRYOVER (CFS) | Q ₂ GUTTERFLOW | S GUTTER SLOPE (FT/FT) | S _x CROSS SLOPE (FT/FT) | T. (SPREAD) | W (FT) | W/T | Sw (FT/FT) | Sw/Sx | E _o (App. 9C-8) | a = 12W(SW-SX) + LOCAL DEPRESSION | S = a/(12W) | S _{se} = S _x + S w/E _o (FT/FT) | COMPUTED LENGTH, L ₁ (FT) (App. 9C-17) | L ₁ SPECIFIED LENGTH (FT) | L/L ₁ | E (App. 9C-18) | Q ₁ INTERCEPTED (CFS) | Q ₂ CARRYOVER (CFS) | d (FT) | h (FT) | d/h | T. SPREAD @ SAG (FT) |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| 822 | DI-3C | 10 | 0+00 | 0.47 | 0.5 | 0.24 | 0.24 | 9.10 | 2.14 | 0.00 | 2.14 | 0.004 | 0.02 | 1.38 | 2.00 | 1.45 | 0.08 | 4.00 | - | - | - | - | - | 10 | - | - | 2.14 | 0.00 | 0.17 | 0.46 | 0.371 | 8.17 |

NOTE:
DUE TO OVERLAND RELIEF CONSIDERATIONS, THE INLET IS DESIGNED FOR A LARGER STORM EVENT THAN THE 100-YEAR STORM. THE 2.14 CFS FLOW RATE SELECTED CORRESPONDS TO THE FLOW WHERE WATER WOULD OVERTOP THE ROADWAY CROWN WITH THE 0.40% ROADWAY GRADE SOUTH OF THE INLET. THE EXCESS STORMWATER WOULD THEN FLOW TO THE CULVERT ON THE OTHER SIDE OF THE ROAD.

INLET COMPUTATION STRUCTURE 13



PROPOSED F.H. PROFILE



STORM SEWER PROFILES

MASHE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

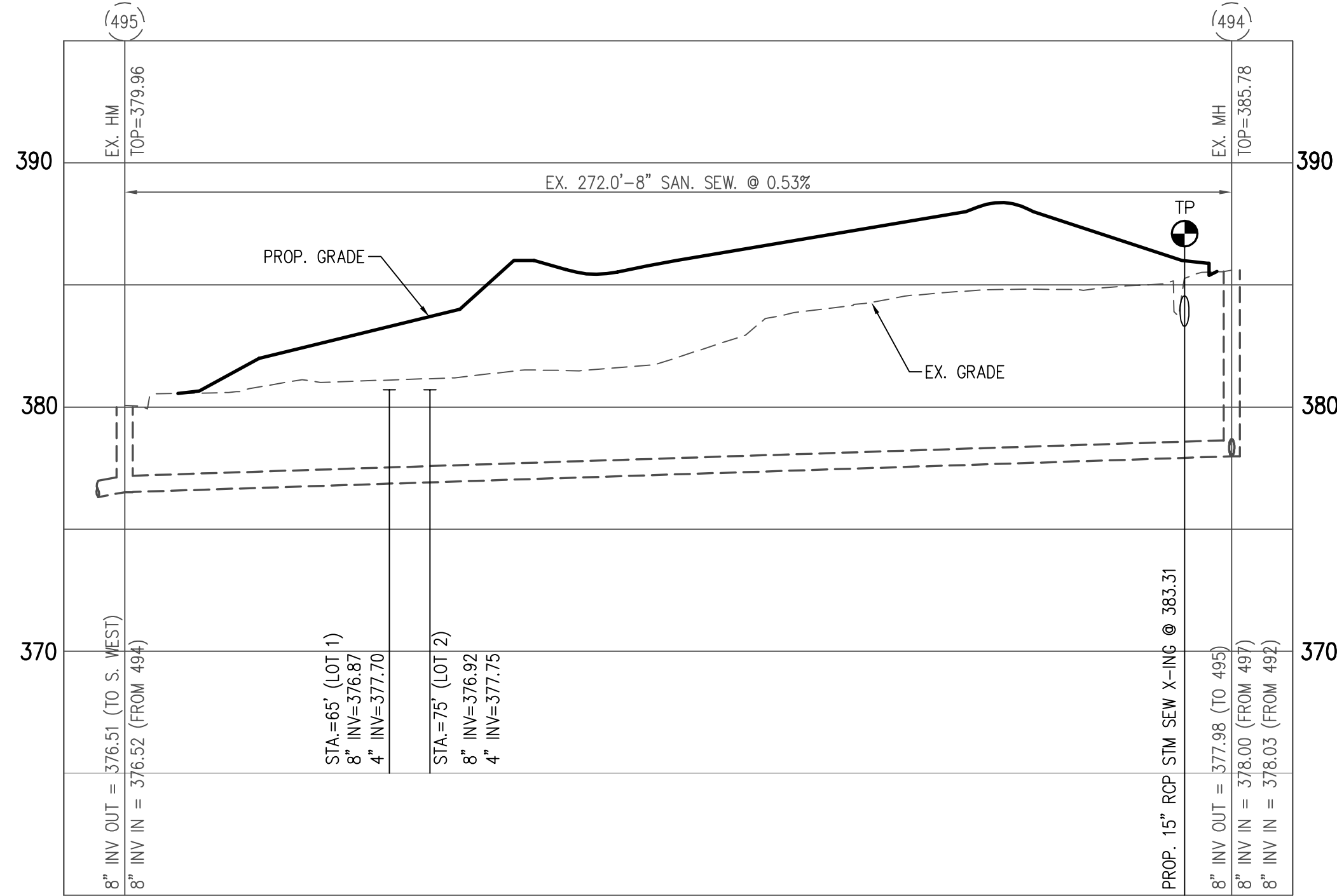
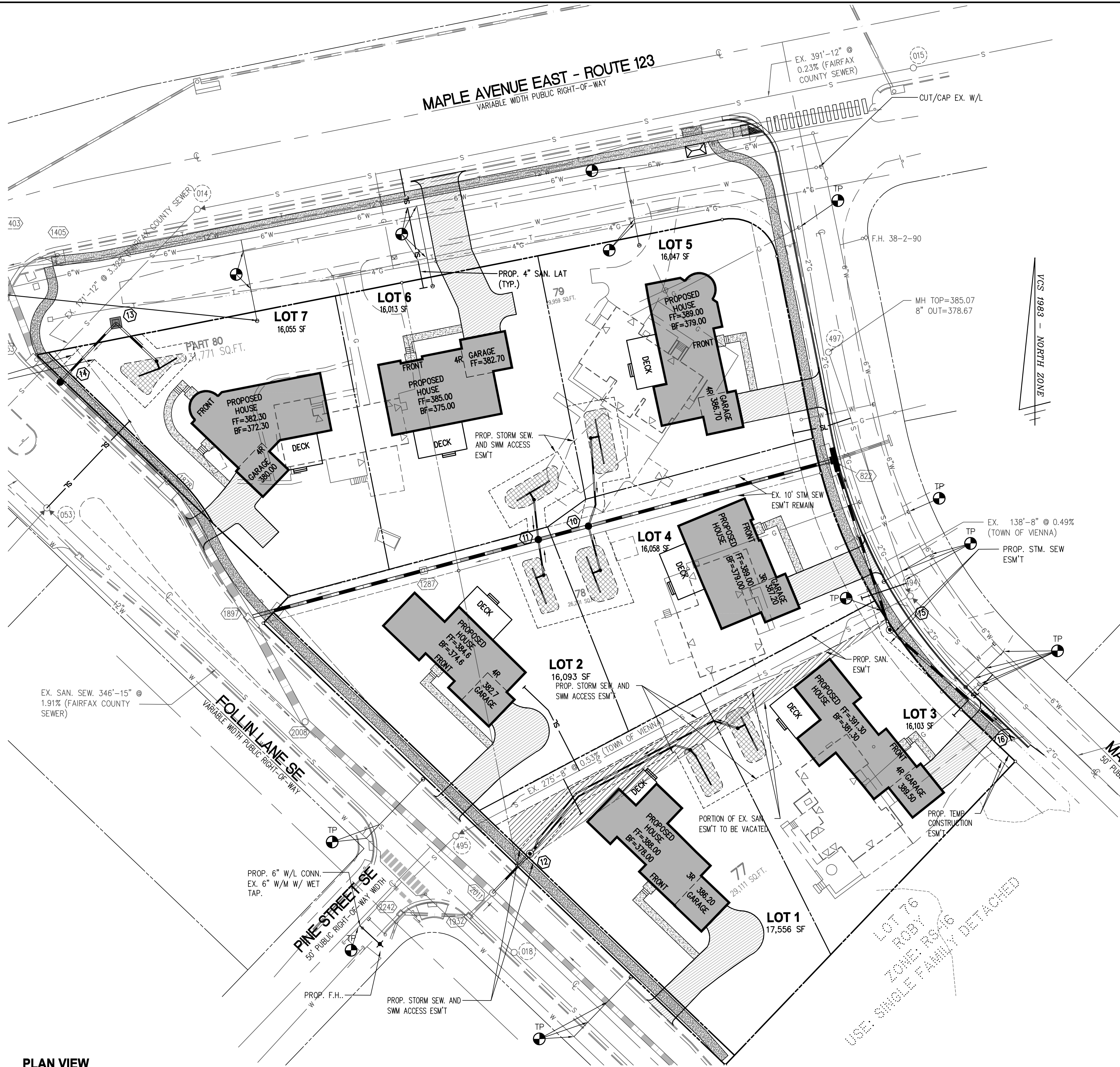
TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

Engineers • Surveyors • Planners
Landscape Architects • Arborists
WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 10/17/2017 3:21:17 4/18/17
SCALE: H:1"=30' V:1"=5'
CHECKED: JG
DRAWN: SO

| REVISION APPROVED BY | | DATE | |
|----------------------|-------------|------|----|
| NO. | DESCRIPTION | REV. | BY |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

PLAN VIEW



SANITARY LATERAL SCHEDULE

| LOT | FROM MH | TO MH | STA. | 8" MAIN INV. | 4" LAT. SIZE (IN) | 4" LAT. INV. @ MAIN | LAT. LENGTH TO C.O. | LAT. SLOPE | LAT. C.O. INV @ BLD | PROP BF ELEV | BF TO C.O | EJECTOR PUMP |
|-----|---------|-------|-------|--------------|-------------------|---------------------|---------------------|------------|---------------------|--------------|-----------|--------------|
| 1 | 494 | 495 | 00+65 | 376.87 | 4 | 377.70 | 11.00 | 2.08% | 377.92 | 380.00 | 2.08 | |
| 2 | 494 | 495 | 00+75 | 376.92 | 4 | 377.75 | 54.00 | 2.08% | 378.87 | 375.67 | -3.20 | NEEDED |
| 3 | 492 | 494 | 00+63 | 379.69 | 4 | 380.52 | 30.00 | 2.08% | 381.14 | 382.67 | 1.53 | NEEDED |
| 4 | 492 | 494 | 00+09 | 378.27 | 4 | 379.10 | 25.00 | 2.08% | 379.62 | 380.00 | 0.38 | NEEDED |
| 5 | 497 | 494 | 01+01 | 378.49 | 4 | 379.32 | 25.00 | 2.08% | 379.84 | 379.67 | -0.17 | NEEDED |
| 6 | 15 | 14 | 01+11 | 370.23 | 4 | 371.06 | 65.00 | 2.08% | 372.41 | 375.67 | 3.26 | |
| 7 | 53 | 53 | 00+0 | 364.58 | 4 | 364.58 | 64.00 | 2.08% | 365.91 | 372.67 | 6.76 | |

SANITARY SEWER AS-BUILT

| | |
|-------------------------|--------|
| SMH 015 | |
| MANHOLE TOP = | 387.62 |
| 12" INV IN (EAST) = | 371.02 |
| 12" INV OUT (SMH 014) = | 370.88 |
| SMH 014 | |
| MANHOLE TOP = | 377.37 |
| 12" INV IN (SMH 015) = | 369.97 |
| 12" INV OUT (SMH 013) = | 369.72 |
| SMH 018 | |
| MANHOLE TOP = | 381.54 |
| 15" INV IN (S. EAST) = | 371.34 |
| 15" INV OUT (SMH 053) = | 371.24 |
| SMH 053 | |
| MANHOLE TOP = | 375.98 |
| 12" INV IN (S. WEST) = | 365.53 |
| 15" INV IN (SMH 018) = | 364.63 |
| 15" INV OUT (SMH 013) = | 364.58 |

| | |
|-------------------------|--------|
| SMH 013 | |
| MANHOLE TOP = | 375.40 |
| 12" INV IN (SMH 014) = | 364.05 |
| 15" INV IN (SMH 053) = | 363.75 |
| 15" INV OUT (N. WEST) = | 363.55 |
| SMH 497 | |
| MANHOLE TOP = | 385.07 |
| 6" INV OUT (SMH 494) = | 378.67 |
| SMH 492 | |
| MANHOLE TOP = | 397.60 |
| 6" INV IN (N. EAST) = | 388.05 |
| 6" INV IN (S. EAST) = | 387.90 |
| 6" INV OUT (SMH 494) = | 387.88 |
| SMH 494 | |
| MANHOLE TOP = | 385.78 |
| 6" INV IN (SMH 492) = | 378.03 |
| 6" INV IN (SMH 497) = | 378.00 |
| 6" INV OUT (SMH 495) = | 377.98 |
| SMH 495 | |
| MANHOLE TOP = | 379.96 |
| 6" INV IN (SMH 494) = | 376.52 |
| 6" INV OUT (S. WEST) = | 376.51 |

PIPE SIZES FROM RECORD INFORMATION

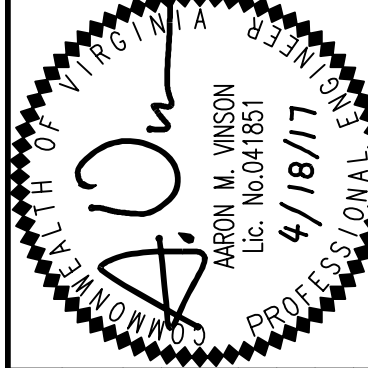
SANITARY SEWER PLAN AND PROFILE

MASHIE DRIVE SUBDIVISION

PROVIDENCE DISTRICT

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

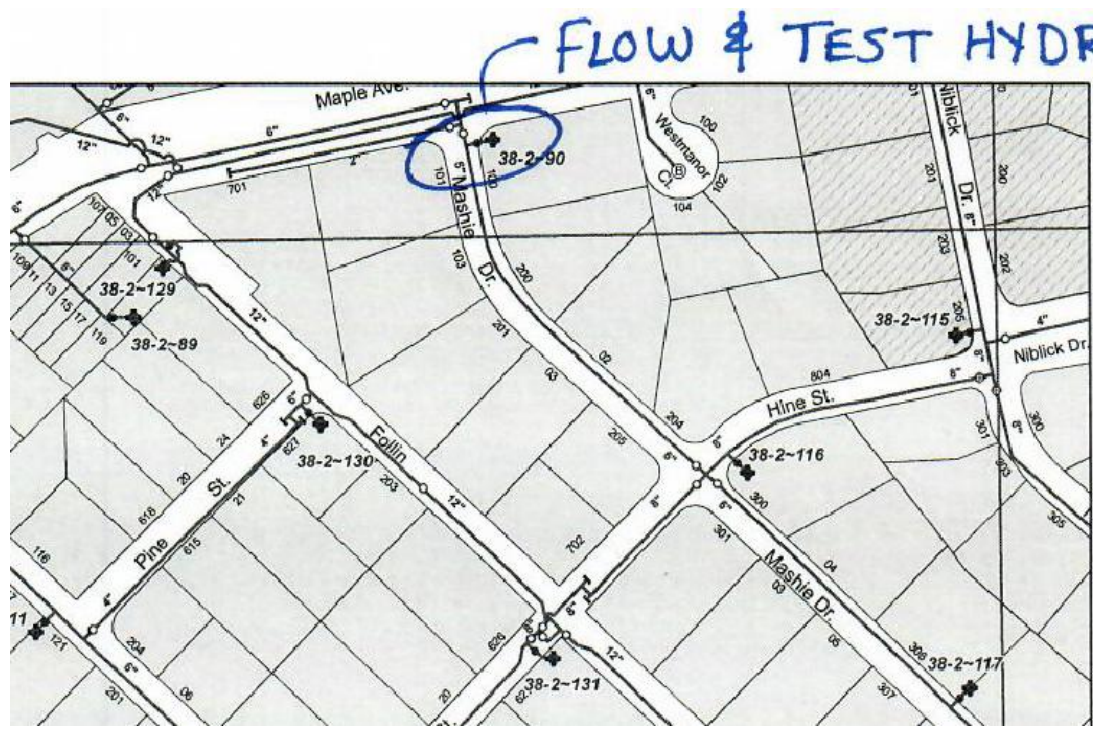


WALTER L. PHILLIPS
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

IN CORP. DATE: 10/17/17, 3/21/17, 4/18/17

DRAWN: SO

CHECKED: JG



FLOW TEST REPORTS

Location: 101 Mashie Drive Date: 3/9/17

Test Made by: G. STANBACK Time: 1:45 PM

Purpose of Test: _____

Consumption Rate During Test: _____

Flow Hydrants: 38-2-90 A₁ _____ A₂ _____ A₃ _____

Size Nozzle: 2.5

Pitot Reading: 35 Total gpm _____

gpm 1000

TEST HYDRANT: 38-2-90

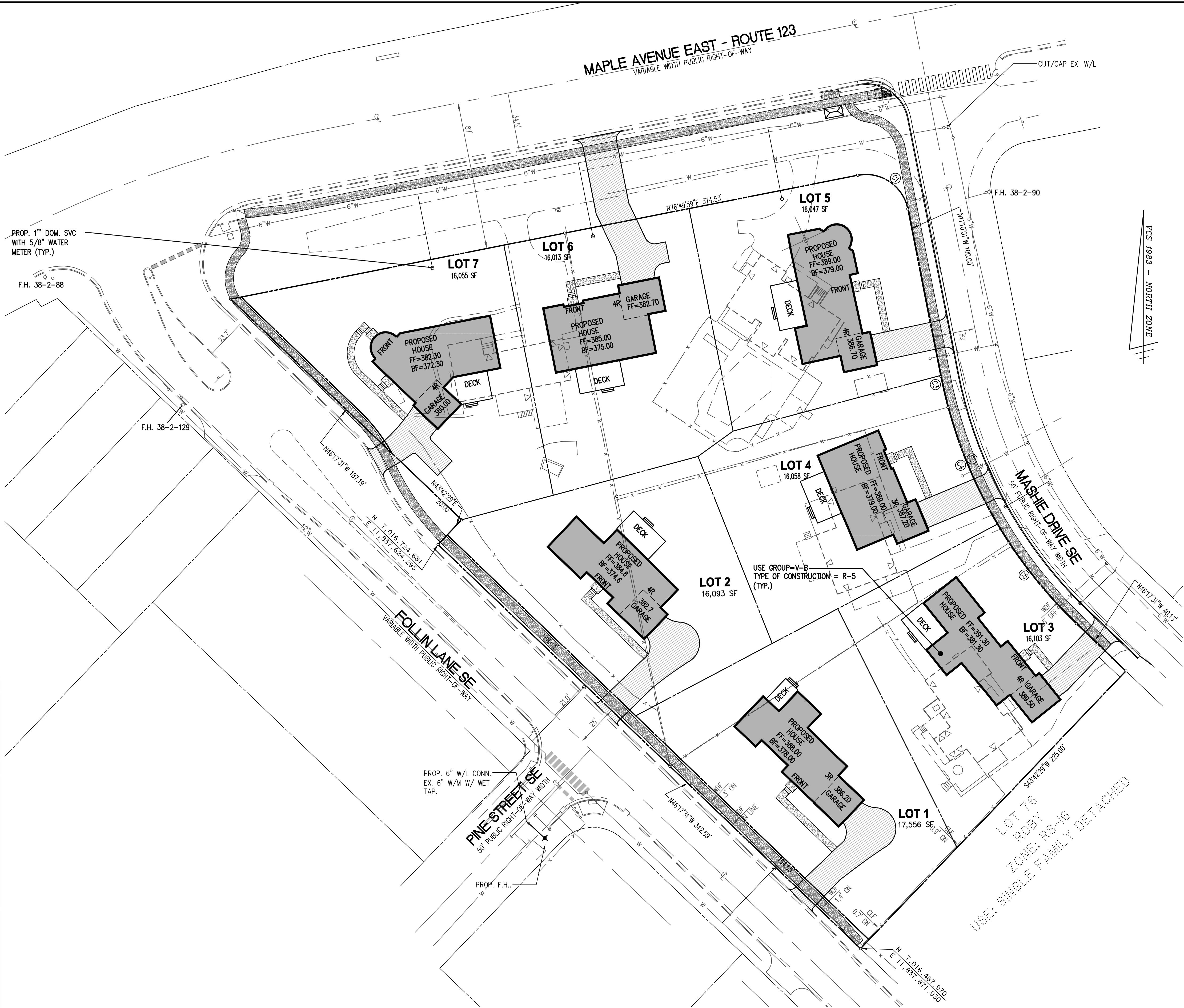
Static B 58 psi Residual B 42 psi

Projected Results: at 20 psi Residual _____ gpm; or at _____ psi Residual _____ gpm

Remarks: _____

Send results to: _____

| | | | |
|---|--|--|----------------------|
| Town of Vienna Department of Public Works | | Fire Flow Test | |
| FIRE HYDRANT | 38-2-90 | DATE: 3/9/2017 | TIME: 1:45 PM |
| ENGINEER | C. HORNER | DATE: 4/4/2017 | |
| AREA TYPE | Water Map 38-2-6 | PRESSURE ZONE | Vienna |
| A-1 FLOWING HYDRANT NUMBER: STATIC FLOW OUTLET | 38-2-90 psi 35 psi psi | INTERSECTION: N/A LOCATION: 101 Mashie Drive SE | RATE 993 GPM |
| A-2 FLOWING HYDRANT NUMBER: STATIC FLOW OUTLET | psi psi psi | INTERSECTION: LOCATION: | RATE 0 GPM |
| A-3 FLOWING HYDRANT NUMBER: STATIC FLOW OUTLET | psi psi psi | INTERSECTION: LOCATION: | RATE 0 GPM |
| A-4 FLOWING HYDRANT NUMBER: STATIC FLOW OUTLET | psi psi psi | INTERSECTION: LOCATION: | RATE 0 GPM |
| CALCULATIONS FOR RATE= (29.83)*(0.9)*(2.5) ² *(√FLOW) | | | |
| B-1 RESIDUAL FLOW H HYDRANT USED M METER USED HYDRANT OR METER NUMBER:(H OR M) STATIC RESIDUAL | psi psi psi H 38-2-90 58 psi 42 psi | LOCATION: 101 Mashie Drive SE | RATE: 1584 GPM@20psi |
| CALCULATIONS FOR RESIDUAL FLOW= (FLOW A1+A2+A3+A4)*((STATIC-20)/((STATIC-RESIDUAL)) ^{0.64} AT 20 psi | | | |
| DATE PAID: 2/28/2017 | | AMOUNT PAID: \$140 | |
| CALCULATED BY: C. HORNER | | CHECKED BY: D. DONAHUE | |
| REMARKS: Low HGL is 500 feet | | | |



NOTE: ALL AREAS SHOWN ON PROPOSED LOTS AREAS ARE POST-DEDICATION
ADDRESS TO BE PROVIDED BY THE TOWN OF VIENNA PRIOR TO FINAL RECORD PLAT APPROVAL.

FIRE MARSHAL PLAN
MASHIE DRIVE SUBDIVISION
PROVIDENCE DISTRICT
TOWN OF VIENNA
FAIRFAX COUNTY, VIRGINIA



WALTER L. PHILLIPS
Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

CHECKED: JG
DRAWN: SO
DATE: 4/18/17
SCALE: 1"=30'