PUBLIC WORKS NOTES:

1. All requirements relative to City Code and Public Works Design and Construction Standards shall be submitted and approved before release of site plans.
2. All required bonds, escrows, insurances, cash, etc., shall be submitted and approved before release of site plans.
3. Plan and profile shall be submitted (inked on mylar size 24" x 36") for all storm sewers and street projects in public right-of-ways or public easements and approved before release of site plans.
4. Contractor is responsible to notify all utility companies before construction begins.
5. All datum shall be based on USC and GS datum.
6. Bonds shall not be released until the receipt and approval by the City of as-built site plan, plans and profiles, etc.
7. All underground utilities and transformers shall be shown on site plan and confirmed per location on as-built plan.
8. The owner shall notify the Director of Public Works in Writing three days prior to the beginning of all street or storm sewer work shown on the site plan.
9. The installation of improvements as required in this article shall in no case serve to bind the city to accept such improvements for the maintenance, repair of operation thereof, but such acceptance, shall be subject to the existing regulations concerning the acceptance of each type of improvement.
10. No lane closures are permitted on West Broad Street before 9:30 AM and after 3:00 PM. Only one lane may be closed at a time. VDOT requirements for traffic control will govern.
11. Normal construction hours are 7:00 AM to 9:00 PM Monday, through Friday and 9:00 AM to 9:00 PM on weekends and holidays.
12. Permits are required for construction work located within the established City right-of-way.

SITE PLAN SHEET INDEX

C-0101 COVER SHEET
C-0201 NOTES AND ZONING TABULATIONS
C-0202 APPROVED SPECIAL EXCEPTION PLAN
C-0203 VOLUNTARY CONCESSIONS
C-0204 DETAILS
C-0205 DETAILS
C-0206 GRASS PAVE SPECIFICATIONS
C-0301 EXISTING CONDITIONS PLAN
C-0302 DEMOLITION PLAN
C-0303 PRELIMINARY SUBDIVISION PLAT
C-0401 LAYOUT PLAN
C-0402 FIRE MARSHAL, SIGNAGE & MARKING PLAN
C-0501 GRADING PLAN
C-0601 EROSION & SEDIMENT CONTROL PLAN - PHASE 1
C-0602 EROSION & SEDIMENT CONTROL PLAN - PHASE 2
C-0603 EROSION & SEDIMENT CONTROL NARRATIVES & DETAILS
C-0701 PROPOSED DRAINAGE DIVIDES
C-0702 RUNOFF REDUCTION COMPLIANCE SPREADSHEET
C-0703 RUNOFF REDUCTION COMPLIANCE SPREADSHEET
C-0704 HYDROGRAPHS & OUTFALL NARRATIVE
C-0705 BEST MANAGEMENT PRACTICES DETAILS
C-0706 BIORETENTION & INFILTRATION PRE-TREATMENT DETAILS
C-0707 INFILTRATION TEST REPORT
C-0901 UTILITY PROFILES
C-1201 TREE INVENTORY & PRESERVATION PLAN
C-1202 TREE INVENTORY
C-1203 TREE PRESERVATION NOTES & DETAILS
C-1204 LANDSCAPE PLAN
C-1205 PLANTING NOTES & DETAILS
A-004C ARCH SITE PLAN A
A-007C CARPORT PLAN/ELEVATION
A-009C SITE FEATURES
A-101C FIRST FLOOR PLAN (COMMON HOUSE)
A-102C SECOND FLOOR PLAN (COMMON HOUSE)
A-200C COMMON HOUSE ELEVATIONS
A-200T THE TINNER ELEVATIONS
A-200W THE WHITNEY ELEVATIONS

FIRE MARSHAL NOTES:

All requirements relative to City Fire Code and Virginia Building Code must be complied with.

1. Use group classification R-2 FOR COMMON HOUSE; HOMES GOVERNED BY IRC
2. Type of construction VB
3. Fire flow @ hydrant. Q20 = 2100 GPM HYDRANT #40-3-99

NOTE: NFPA-13D SPRINKLER PACKAGE PROPOSED

PUBLIC UTILITIES NOTES:

FAIRFAX WATER
WATER MAIN CONSTRUCTION NOTES

1. ALL WATER MAIN CONSTRUCTION, TESTING AND SAMPLING SHALL COMPLY WITH THE REQUIREMENTS AND SPECIFICATIONS OF FAIRFAX WATER'S CONSTRUCTION PRACTICE MANUAL AND THE REQUIREMENTS OF THE FAIRFAX COUNTY PUBLIC FACILITIES MANUAL. ALL WATER MAIN, FITTINGS AND APPURTENANCES SHALL COMPLY WITH FAIRFAX WATER'S "APPROVED PRODUCTS LIST". THE CONSTRUCTION PRACTICE MANUAL AND APPROVED PRODUCTS LIST MAY BE FOUND ON THE FW WEBSITE AT WWW.FAIRFAXWATER.ORG.
2. THE DEVELOPER SHALL REQUEST INSPECTION BY FAIRFAX WATER THREE DAYS PRIOR TO COMMENCING CONSTRUCTION OF THE WATER MAIN (PHONE NUMBER 703-289-6388 OR 6389).
3. NO WATER MAIN CONSTRUCTION IS PERMITTED OR VALVES OPERATED WITHOUT PRIOR NOTIFICATION OF FAIRFAX WATER (PHONE NUMBER 703-289-6388 OR 6389).
4. MAXIMUM WORKING PRESSURE SHALL BE 39 PSI.
5. THE DEVELOPER WILL BE RESPONSIBLE FOR ANY RELOCATION OR REMOVAL OF WATER MAINS AND APPURTENANCES DUE TO THE DEVELOPMENT OF THIS PROPERTY. SERVICE LINES WHICH WILL NO LONGER BE USED SHALL BE REMOVED AND DISCONNECTED AT THE WATER MAIN BY THE DEVELOPER, AND THE CORPORATION STOP SHUT-OFF AND CAPPED, OR REMOVED AND PLUGGED (WITH A TAPERED PLUG) AS DIRECTED BY THE FAIRFAX WATER INSPECTOR. THE DEVELOPER MAY ALSO BE REQUIRED TO USE ADDITIONAL PIPE RESTRAINT OR ALTERNATIVE CONSTRUCTION METHODS NOT SHOWN ON THE PLANS IF FIELD CONDITIONS WARRANT, AS DETERMINED BY THE FAIRFAX WATER INSPECTOR.
6. ALL NEW AND EXISTING VALVE BOXES MUST BE FULLY ADJUSTED TO CONFORM TO THE FINAL ASPHALT GRADE. NO PAVING ADJUSTERS WILL BE PERMITTED.
7. ALL NEW D.I.P. WATER MAIN SHALL BE WRAPPED WITH 4 MILLIMETER CROSS-LAMINATED POLYETHYLENE ENCASEMENT (SINGLE WRAPPED – LESS THAN 24", DOUBLE WRAPPED – 24" AND LARGER). THERE SHALL BE A 6 INCH ENVELOPE OF 21A SELECT FILL FOR ALL POLYETHYLENE WRAPPED WATER MAIN. SEE THE TRENCH DETAILS ON THE CURRENT VERSION OF FW STANDARD DETAILS. THESE DETAILS MAY BE FOUND ON THE FW WEBSITE AT WWW.FAIRFAXWATER.ORG.
8. WHEN CONNECTING TO AN EXISTING WATER MAIN, CONTRACTOR MUST EXCAVATE AND EXPOSE NEAREST VALVE IN THE PRESENCE OF A FAIRFAX WATER INSPECTOR IN ORDER TO DETERMINE THE CONDITION OF ITS RESTRAINT. IF FW INSPECTOR DEEMS IT NECESSARY, CONTRACTOR MUST RESTRAIN THE VALVE OR REPLACE THE RESTRAINT SYSTEM.
9. DURING WET TAP INSTALLATIONS THE CONTRACTOR SHALL SAVE AND TAG THE COUPON CLEARLY SHOWING THE DATE, LOCATION, DIAMETER AND PIPE MATERIAL. THE TAGGED COUPON SHALL BE GIVEN TO FAIRFAX WATER'S INSPECTOR FOR FURTHER PROCESSING. IF ANY PIPE IS TO BE ABANDONED, PRIOR TO CAPPING THE MAIN, A SMALL SECTION OF PIPE SHALL BE REMOVED, TAGGED AS DESCRIBED ABOVE AND GIVEN TO THE FAIRFAX WATER INSPECTOR.
10. FIRE LINES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER. FAIRFAX WATER'S OWNERSHIP AND MAINTENANCE RESPONSIBILITY INCLUDES AND STOPS AT THE BRANCH VALVE AT FAIRFAX WATER'S MAIN IN THE RIGHT-OF-WAY OR EASEMENT.
11. USE Q20 = 2100 GPM

PLANNING NOTES:

SPECIAL EXCEPTION:

A SPECIAL EXCEPTION FOR COTTAGE HOUSING DEVELOPMENT IN AN R-1A DISTRICT APPROVED BY CITY COUNCIL ON SEPTEMBER 11, 2017.

SEE VOLUNTARY CONCESSIONS ON SHEET C-0203.

ARBORIST NOTES:

RPI MAP INFORMATION:

RPC 52-102-032, 52-102-031, 52-102-030

Lot(s) 4, 4A, 5 **Block** LUCINDA GASKINS PARTITION

MISCELLANEOUS NOTES:

1. Upon satisfactory completion of the installation of required improvements, as shown on the approved site plan or a section thereof, the developer shall submit to the Department of Planning five copies of an as-built site plan certified by the engineer, architect and/or surveyor for approval for conformity with the approved site plan.
2. The As-Built Site Plan shall be submitted and approved prior to the issuance of the final Occupancy Permit.
3. Final approval by the Planning Commission of this site plan shall expire one year after the day of such approval if building permits have not been obtained for construction in accordance therewith, unless an extension is granted by the City.
4. In any development involving a condominium, cooperative, automatic owners' association or other form of ownership in which there is common area within the development, the documents pertaining to this form of ownership shall be approved by the City Attorney prior to issuance of any Occupancy Permit.
5. Any proposed changes or revisions during the execution of or subsequent to implementation of the approved site plan shall be subject to City review and approval.
6. The federal emergency management agency's flood insurance rate map for the City of Falls Church, Virginia, map number 5100540001c, revised date July 16, 2004, designates the property as being in zone x, "Areas determined to be outside the 0.2% annual chance floodplain."

WAIVERS:

1. LANDSCAPE WAIVERS:

NORTHERN PROPERTY LINE 48-1183.2.a
±232 LF 20' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.

SOUTHERN PROPERTY LINE 48-1183.2.a
±600 LF 10' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.

WESTERN PROPERTY LINE48-1183.2.a
±185 LF 10' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.

VARIANCE:

MISCELLANEOUS NOTES:

Easement(s):

1. VACATION EXISTING 10' SANITARY SEWER EASEMENT
2. PROPOSED 10' SANITARY SEWER EASEMENT

Subdvision(s) and Consolidation(s):

CONSOLIDATION OF PARCELS 52-102-032, 52-102-031, 52-102-030

Dedication(s):

N/A

Site Plan Approval:

APPROVALS

PLANNING COMMISSION FINAL APPROVAL:

SPECIAL USE PERMIT (Date(s) of Approval by BZA):

BOND(S) POSTED (Date(s) and Amount(s)):

FINAL STAFF APPROVAL:

Planning _____ Signature : | Date :
Public Works _____

SUBSEQUENT ACTIONS:

BUILDING PERMIT ISSUED (Date) : _____
AS-BUILT APPROVED (Date) : _____
COMMON AREA DOCUMENTS APPROVED (Date) : _____
LANDSCAPE ESCROW ACCEPTED (Date) : _____
CERTIFICATE OF OCCUPANCY (Date) : _____
OTHER :

Revisions Approved prior to Certificate of Occupancy:

Description	Date Approved

RAILROAD COTTAGES
NAME OF PROJECT

TBD
ADDRESS

RAILROAD, LLC C/O ROBERT YOUNG — 703-356-8800
OWNER — TELEPHONE #

800 W BROAD ST. #333 | FALLS CHURCH, VA 22046 | ATTN: ROBERT YOUNG
ADDRESS — FAX. #

APPLICATION FOR REVIEW AND APPROVAL BY

CITY OF FALLS CHURCH, VIRGINIA

Certification

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

Signature

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

Site Plan **MUNIS #** **C-0101**

CONSTRUCTION NOTES

CONTRACTOR AND DEVELOPER ARE ADVISED THAT ANY ELECTRONIC FILES ASSOCIATED WITH THE PREPARATION OF THESE PLANS WILL NOT BE RELEASED TO OTHERS FOR USE IN CONSTRUCTION STAKEOUT OR RELATED SERVICES.

1. 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.

2. 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 30 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 THIS INSTANCE OCCURS.

3. 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.

4. THE CONTRACTOR SHALL VISIT THE SITE AND SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.

5. THE CONTRACTOR SHALL CLEAR THE SITE OF ALL TREES, BUILDINGS, FOUNDATIONS, ETC. WITHIN THE LIMITS OF CONSTRUCTION UNLESS OTHERWISE SPECIFIED, AND SHALL BE RESPONSIBLE FOR CAUSING EXISTING UTILITIES TO BE DISCONNECTED.

6. THE DEVELOPER SHALL PROVIDE OVER-LOT GRADING TO PROVIDE POSITIVE DRAINAGE AND PRECLUDE PONDING OF WATER.

7. FINISHED GRADES SHOWN FOR FINISHED TOP OF CURB GRADES ON EXISTING ROADS SHALL BE FIELD ADJUSTED AS REQUIRED TO CONFORM TO THE INTENT OF THE TYPICAL SECTION USING THE EXISTING EDGE OF PAVEMENT AS THE CONTROL POINT. A SMOOTH GRADE SHALL BE MAINTAINED FROM THE CENTERLINE OF THE EXISTING RIGHT-OF-WAY TO THE FACE OF CURB TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF WATER ON THE ROADWAY. 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 CITY OF FALLS CHURCH INSPECTORS PRIOR TO PLACING OF CONCRETE. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR FINISHED GRADES ON TOP OF STRUCTURED PARKING DECK.

8. 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 CITY AGENT. ALL SLOPES 3:1 AND GREATER SHALL BE SODDED AND PEGGED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY CITY OF FALLS CHURCH.

9. EXISTING WELLS SHALL BE PERMANENTLY ABANDONED IN ACCORDANCE WITH VIRGINIA STATE WATER CONTROL BOARD REQUIREMENTS.

10. ALL OVER HEAD POLE LINES SHALL BE RELOCATED AS REQUIRED BY THE OWNING UTILITY COMPANIES AND AT THE DEVELOPERS EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS AND COORDINATING ALL WORK REQUIRED FOR THE NECESSARY RELOCATIONS.

11. SUBBASE MATERIAL SHOWN ON THE TYPICAL STREET SECTION SHALL CONFORM TO VDOT SPECIFICATIONS SECTION 209. PAVEMENT THICKNESS AS SHOWN ON THE PLAN ARE BASED ON AN ASSUMED SOIL SUPPORT VALUES (S.S.V.) OF 10 UNLESS OTHERWISE NOTED. A QUALIFIED SOILS TESTING FIRM SHALL BE ENGAGED BY THE CONTRACTOR TO DETERMINE THE ACTUAL S.S.V. IN ACCORDANCE WITH "A DESIGN GUIDE FOR SUBDIVISION PAVEMENTS IN VIRGINIA" BY N.K. VASWANI, OCTOBER 1973, VHRC 73-821 AS AMENDED. SOIL SUPPORT VALUES SHALL BE OBTAINED AT EACH CHANGE IN SUBGRADE SOILS AND AT A MAXIMUM SPACING OF 500 FEET WHERE SUBGRADE SOILS REMAIN CONSTANT. S.S.V. SHALL BE FURNISHED TO THE ENGINEER AND THE ENGINEER SHALL REVISE THE PAVEMENT DESIGN THICKNESS TO SHOW THE ACTUAL DEPTH OF PAVEMENT MATERIAL REQUIRED AND SHALL SUBMIT THE REVISION TO THE CITY OF FALLS CHURCH FOR REVIEW AND APPROVAL. THE CONTRACTOR IS ADVISED NOT TO BRING THE AREA SUBJECT TO THIS REVISION TO FINISHED GRADE UNTIL AFTER THE REVISED PAVEMENT SECTION IS APPROVED.

12. 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. ANY DISCREPANCIES SHALL IMMEDIATELY BE REPORTED TO DESIGN ENGINEER.

13. THE CONTRACTOR IS TO VERIFY INVERT, SIZE AND LOCATION OF BUILDING UTILITY CONNECTIONS WITH THE MECHANICAL PLANS PRIOR TO PLACEMENT OF UNDERGROUND UTILITIES.

14. NO UNDERGROUND SOILS INVESTIGATION HAS BEEN PERFORMED BY WALTER L. PHILLIPS, INC. ALL SOILS INFORMATION PRESENTED AS PART OF THIS SITE PLAN HAS BEEN PREPARED BY OTHERS AND IS INCLUDED AS REQUIRED FOR CITY OF FALLS SITE PLAN APPROVAL.

15. THE CONTRACTOR SHALL REMOVE EXISTING BUILDINGS, FENCES AND OTHER EXISTING PHYSICAL FEATURES AS REQUIRED.

16. ALL PROPOSED SIDEWALK, CG-6, CG-2 OR CG-6R IS TO BE CONSTRUCTED WITH A MINIMUM 4" AGGREGATE BASE.

17. 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.

18. 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 CITY OF FALLS CHURCH, THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND ANY ADJOINING OWNERS THAT MAY BE AFFECTED.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING A SMOOTH TRANSITION TO EXISTING CURB.

20. ALL PRIVATE BUILDING CONNECTIONS ARE TO BE INSTALLED IN ACCORDANCE WITH THE CURRENT PLUMBING CODE.

21. 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. RETAINING WALLS SHOWN ON THIS PLAN ARE FOR THE PURPOSES OF DEMONSTRATING THE PROPOSED TOP AND BOTTOM ELEVATIONS AND LOCATION OF THE WALLS ONLY. RETAINING WALLS ARE TO BE MAINTAINED BY THE PROPERTY OWNERS.

22. 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.

23. SEE LANDSCAPE PLAN FOR ALL ON-SITE SIDEWALK, PLANTING AND IRRIGATION DETAILS.

24. THE DESIGN, CONSTRUCTION, FIELD PRACTICES AND METHODS SHALL CONFORM TO THE REQUIREMENTS SET FORTH BY THE CITY OF FALLS CHURCH AND ITS 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.

25. 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.

26. A MINIMUM PERMISSIBLE GRADE OF 1.00% IS REQUIRED FOR PAVEMENT TO ASSURE POSITIVE DRAINAGE. IF THERE IS EXISTING PAVEMENT WHICH IS TO REMAIN DISTURBED DURING CONSTRUCTION AND IS LESS THAN 1.00%, THEN THE CONTRACTOR IS TO CHECK TO MAKE SURE THE SITE AREA WILL HAVE ADEQUATE DRAINAGE.

27. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE SURE THAT ANY EXISTING LANDSCAPING WHICH IS TO BE RELOCATED ON THE SITE WILL BE CAREFULLY STORED IN A DESIGNATED AREA BEFORE BEING REPLANTED. COORDINATION WITH THE OWNER FOR MUTUALLY AGREEABLE STORAGE LOCATIONS FOR LANDSCAPE MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF PLANT MATERIAL THAT DOES NOT SURVIVE STORAGE AND REPLANTING.

28. CONSTRUCTION STAKEOUT SHALL BE UNDER THE DIRECT SUPERVISION OF A LICENSED LAND SURVEYOR IN THE COMMONWEALTH OF VIRGINIA.

29. NO EVIDENCE OF GRAVES OR BURIAL SITES HAS BEEN FOUND ON THIS PROPERTY.

30. A WALL CHECK SURVEY WILL BE REQUIRED WHEN THE BUILDING RISES ABOVE GRADE DURING CONSTRUCTION.

31. THE PROPERTY OWNER(S) HEREBY JOIN IN THE SITE PLAN AND AGREE TO BE BOUND BY ALL PLAN REQUIREMENTS.

SIGNATURE

ROBERT A. YOUNG 4/12/17

NAME DATE

MANAGING MEMBER

TITLE

CITY OF FALLS CHURCH SEWER MAIN CONSTRUCTION NOTES

1. **Sewer main construction shall comply with the latest issues of the City of Falls Church Technical Specifications and Standard Details for Sewer Main Construction, DEQ/VDH Manual of Practice for Sewerage Systems, VDOT Road & Bridge Specifications & Standards, and Fairfax County Public Facility Manual (PFM).**

2. **Prior to commencing the sewer main construction, the Contractor shall verify of all the underground utilities (Power, Gas, Telephone, TV Cables, Water, Storm Sewer, within the project site. The contractor shall notify MISS UTILITY @ 811 Three (3) working days in advance. The Contractor shall be solely and entirely liable for any accident and/or damage caused by the construction of this project.**

3. **The Contractor shall notify the City of Falls Church, Department of Public Works, 703-248-5350, of any conflict with other existing utilities in the field at least (3) working days in advance, in order for the City to correct or adjust the design prior to installing the affected portion of sewer.**

4. **All sewer mains shall be PVC pipes SDR-35, unless otherwise approved by the City of Falls Church.**

5. **There is no sewer main less than eight (8) inches in diameter allowed to be permanently installed in the City of Falls Church Sewer System.**

6. **Sewer house service connection (lateral) and sewer tap to the main shall be privately owned and maintained. The City's responsibility stops at the sewer main, located in the street right-of-way or easement.**

7. **All construction must be done in compliance with The Occupational Safety and Health Act (OSHA) of 1970, and all rules and regulations thereto appurtenant.**

8. **The Contractor shall be responsible of any repair and restoration required prior to finish grading and surfacing of the streets and/or easements. Final acceptance will not be considered or granted until after the streets have been resurfaced or the easements finally graded to equal or better than the original condition.**

9. **Tapping into existing manholes for a sewer pipe 10" or less in diameter will be done by coring. Pipe sizes 12" diameter and larger may be connected to the manhole wall with a short length of pipe with a joint within two feet (2') of the inside face of the manhole wall.**

10. **The lateral connection to the main sewer shall be installed at two feet (2') minimum distance from any pipe joint (center to center). This shall also apply to the distance between 2 laterals.**

11. **Manhole frames subject to 115-20 highway loading shall be set in an approved non-shrink grout.**

12. **Sewer subject to vehicle traffic shall be installed with a minimum cover of 6 feet. Otherwise, it shall be protected from effects of traffic with HS-20 highway loading.**

ZONING TABULATION

EXISTING ZONE: R-1A

SITE AREA: 54,425 SF OR 1.2494 AC

PROPOSED SPECIAL EXCEPTION DEVELOPMENT FOR COTTAGE HOUSING IN ACCORDANCE WITH ZONING ORDINANCE SECTION 48-241(a):

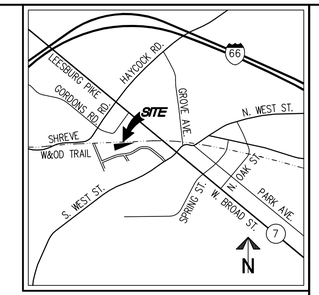
	REQUIRED	PROVIDED
MAX. BUILDING HT.	25 FT. 2 STORIES (2ND STORY TO BE MAXIMUM OF 1/2 FOOTPRINT OF 1ST FLOOR)	SEE BELOW FOR BUILDING HEIGHT PROVIDED 2 STORIES
MIN. YARD REQUIREMENTS:		
FRONT (RAILROAD AVENUE)	20 FT.	20.2 FT.
SIDE (WESTERN PROPERTY)	10 FT.	10.1 FT.
REAR (SOUTHERN PROPERTY)	20 FT.	20.7 FT.
DENSITY REQUIREMENTS:		
DWELLING UNITS	54,425 / 10,000 = 5.44 * 2 = 10.89 MAXIMUM 10 UNITS ALLOWED PROPOSED 10 UNITS PROVIDED	
COVERAGE:		

IMPERVIOUS AREAS

ITEM	EXISTING (SF)	PROPOSED (SF)	AREA TOWARDS IMPERVIOUS TOTAL WITH 25% CREDIT FOR PERMEABLE PAVEMENT WALKS/DRIVEWAYS (SF)
BUILDING(S)	0	14202	14202
DRIVEWAYS	1479	4218	3163.5
WALKS/MISC	0	664	498
TOTAL	**1479**	**19084**	**17863.5**

SITE AREA:	54,425 SF	
IMPERVIOUS AREA:	17,863.50 SF	
MAX IMPERVIOUS AREA ALLOWED:	35.00%	19,048 SF
TOTAL IMPERVIOUS AREA PROVIDED:	32.82%	17864 SF
MAX BUILDING COVERAGE ALLOWED:	30.00%	16,327 SF
TOTAL BUILDING COVERAGE PROVIDED:	26.09%	14202 SF

NOTE: MINIMUM 596 SF BUILDING TO BE TREATED WITH SOLAR OR GREEN ROOF TO OBTAIN 5% BONUS BUILDING COVERAGE ALLOWANCE ABOVE 25%. DEVELOPER INTENDS TO USE SOLAR PANELS FOR ENTIRE CARPORT ROOF - FINAL DESIGN TO BE DETERMINED DURING SITE PLAN



VICINITY MAP SCALE: 1"=2000'

PARKING TABULATION

PARKING REQUIRED:
1.25 SPACES PER UNIT
10 UNITS X 1.25 = 12.5
13 SPACES REQUIRED
13 SPACES PROVIDED

BUILDING HEIGHT

UNIT 1 - TINNER	
EXISTING	PROPOSED
352.60	353.00
352.71	353.00
350.98	351.50
350.98	351.80
351.81	352.32
LOWEST AVG. GRADE	351.81
MAX. BLDG. HT	376.81
FF	353.5
BLDG. HT FROM FF	20.94'
BLDG. HT. ELEVATION	374.44'
TOTAL BUILDING HEIGHT	22.63'

UNIT 2 - TINNER	
EXISTING	PROPOSED
352.40	352.80
352.80	353.00
350.95	351.50
350.99	351.50
351.78	352.20
LOWEST AVG. GRADE	351.78
MAX. BLDG. HT	376.78
FF	353.5
BLDG. HT FROM FF	20.94'
BLDG. HT. ELEVATION	374.44'
TOTAL BUILDING HEIGHT	22.66'

UNIT 3 - TINNER	
EXISTING	PROPOSED
347.34	347.50
346.63	346.50
346.92	346.90
347.34	347.30
347.05	347.05
LOWEST AVG. GRADE	347.05
MAX. BLDG. HT	372.05
FF	349.5
BLDG. HT FROM FF	20.94'
BLDG. HT. ELEVATION	370.44'
TOTAL BUILDING HEIGHT	23.39'

UNIT 4 - WHITNEY	
EXISTING	PROPOSED
348.23	348.70
347.81	348.00
347.49	347.50
347.58	348.00
347.77	348.05
LOWEST AVG. GRADE	347.77
MAX. BLDG. HT	372.77
FF	350
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	371.38'
TOTAL BUILDING HEIGHT	23.61'

UNIT 5 - WHITNEY	
EXISTING	PROPOSED
348.79	349.70
348.24	349.00
347.72	348.20
348.30	348.60
348.26	348.87
LOWEST AVG. GRADE	348.26
MAX. BLDG. HT	373.26
FF	351
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	372.38'
TOTAL BUILDING HEIGHT	24.12'

UNIT 6 - WHITNEY	
EXISTING	PROPOSED
350.72	350.72
349.50	350.00
348.60	349.00
349.41	349.90
349.55	349.90
LOWEST AVG. GRADE	349.55
MAX. BLDG. HT	374.55
FF	352
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	373.38'
TOTAL BUILDING HEIGHT	23.83'

UNIT 7 - WHITNEY	
EXISTING	PROPOSED
350.91	351.40
351.09	351.60
349.59	349.80
349.88	349.80
350.36	350.65
LOWEST AVG. GRADE	350.36
MAX. BLDG. HT	375.36
FF	352.5
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	373.88'
TOTAL BUILDING HEIGHT	23.52'

UNIT 8 - WHITNEY	
EXISTING	PROPOSED
350.59	351.30
350.93	351.40
348.31	349.80
348.22	349.80
349.51	350.57
LOWEST AVG. GRADE	349.51
MAX. BLDG. HT	374.51
FF	353
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	374.38'
TOTAL BUILDING HEIGHT	24.87'

UNIT 9 - WHITNEY	
EXISTING	PROPOSED
350.07	351.00
350.41	351.30
348.31	349.50
348.22	349.80
349.25	350.40
LOWEST AVG. GRADE	349.25
MAX. BLDG. HT	374.25
FF	352.8
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	374.18'
TOTAL BUILDING HEIGHT	24.93'

UNIT 10 - WHITNEY	
EXISTING	PROPOSED
349.00	351.00
349.85	351.00
347.84	349.50
347.96	350.00
348.66	350.37
LOWEST AVG. GRADE	348.66
MAX. BLDG. HT	373.66
FF	352.2
BLDG. HT FROM FF	21.38'
BLDG. HT. ELEVATION	373.58'
TOTAL BUILDING HEIGHT	24.92'

COMMON HOUSE	
EXISTING	PROPOSED
352.53	352.50
352.24	352.10
351.14	351.90
351.88	351.80
351.94	352.07
LOWEST AVG. GRADE	351.94
MAX. BLDG. HT	376.94
FF	353
BLDG. HT FROM FF	21.04'
BLDG. HT. ELEVATION	374.04'
TOTAL BUILDING HEIGHT	22.10'

WALTER L. PHILLIPS INCORPORATED
ESTABLISHED 1945
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Landscape Architects • Arborists
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DRAWN: AI
CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

SCALE: AS NOTED
DATE: 9/12/2017

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

NOTES AND ZONING TABULATIONS

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0201

RAILROAD COTTAGES

RPC #S 52-102-030, 52-102-031, 52-102-032

CITY OF FALLS CHURCH, VIRGINIA

CONCEPTUAL DEVELOPMENT PLAN

VICINITY MAP SCALE: 1"=2000'

NOTES:

1. THE PROPERTIES SHOWN HEREON ARE IDENTIFIED BY THE CITY OF FALLS CHURCH AS REAL PROPERTY CODE (RPC) NUMBERS: 52-102-030, 52-102-031, AND 52-102-032 AND ARE ZONED R-1A.
2. THE PROPERTIES SHOWN HEREON, CONSISTING OF LOTS 4 AND 5, LUCINDA GARDNER PARTITION AS RECORDED IN DEED BOOK 5-6 AT PAGE 221, ARE NOW IN THE NAME OF RAILROAD, LLC AS RECORDED IN INSTRUMENT NUMBER 201602000401600 AMONG THE LAND RECORDS OF ARLINGTON COUNTY, VIRGINIA.
3. THIS PLAT AND THE SURVEY UPON WHICH IT IS BASED SHOWS ONLY THOSE UNDERGROUND UTILITIES SHOWN HEREON AS MAY BE DISCLOSED BY THE FORMAL 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 ON SURVEYED OR ABANDONED, OR THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THE UNDERGROUND UTILITIES HAVE NOT BEEN PHYSICALLY LOCATED.
5. TOTAL AREA OF THE PROPERTY IS 54,425 SQUARE FEET OR 1.2494 ACRES.
6. THIS PLAT IS BASED ON A FIELD SURVEY BY THIS FIRM PERFORMED ON 6/23/2016.
7. THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAPS FOR THE CITY OF FALLS CHURCH, VIRGINIA, MAP NUMBER 5100540001C, REVISED JULY 16, 2004, DESIGNATES THE PROPERTY AS BEING IN ZONE X, "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."
8. EASEMENTS, CONDITIONS, COVENANTS AND RESTRICTIONS, SHOWN AND/OR NOTED HEREON, ARE BASED ON A TITLE REPORT BY EXAD TITLE, FILE M-160002, DATED BY DAVID TYSLIC DATED JUNE 21, 2016.
9. 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, ZONE 5(1501) (EPOCH 2010.0000) AS COMPUTED FROM A FIELD RUN BOUNDARY AND HORIZONTAL CONTROL SURVEY. THE BASIS OF BEARINGS IS THE MONUMENT LINE OF WOOD TRAIL AS SHOWN TO ANALYTICAL MONUMENT PID NUMBER DW7060 LYNN. LITTLE & COOP CORS ARP. THE COMBINED FACTOR APPLIED TO THE FIELD DISTANCES TO DERIVE THE REFERENCED COORDINATES IS 0.9999479. THE POINT DEFINITION USED FOR CONVERSION OF THE MONUMENT COORDINATES AND FOR THE PERFORMANCE OF THIS SURVEY IS THE U.S. SURVEY FOOT. CONTOUR INTERVAL IS TWO FEET.
10. THIS SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, JAMES A. WALTON, JR., L.S., FROM AN ACTUAL [ ] GROUND OR [ ] HYBRIDIZE SURVEY MADE UNDER MY SUPERVISION; THAT THE GEOGRAPHIC AND/OR ORIGINAL DATA WAS OBTAINED ON AUGUST 23, 2016; AND THAT THIS PLAT, MAP, OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.
11. THIS SURVEY WAS PERFORMED AT THE REQUEST OF THE YOUNG GROUP (SOO YOUNG).
12. THE PROPERTY IS SUBJECT TO AN AGREEMENT WITH VEPCO RECORDED IN DEED BOOK 1181 AT PAGE 309.
13. THERE ARE NO BUILDINGS ON THIS SITE. THERE WERE NO ADDRESSES POSTED. CITY OF FALLS CHURCH RECORDS SHOW LOT 5 AS HAVING AN ADDRESS OF 100A RAILROAD AVENUE.

ZONING TABULATION

EXISTING ZONE: R-1A
PROPOSED ZONE: R-1A
EXISTING SITE AREA: 54,425 SF OR 1.2494 ACRES

PROPOSED SPECIAL EXCEPTION DEVELOPMENT FOR COTTAGE HOUSING IN ACCORDANCE WITH ZONING ORDINANCE SECTION 48-241(J)

	REQUIRED	PROVIDED
MAX. BUILDING HT.	28 FT. / 2 STORIES	SEE BELOW FOR BUILDING HEIGHT PROVIDED
MIN. YARD REQUIREMENTS	1 1/2 STORIES	1 1/2 STORIES
FRONT (RAILROAD AVENUE)	20 FT.	±20 FT.
SIDE (WESTERN PROPERTY)	15 FT.	±56.1 FT.
REAR (SOUTHERN PROPERTY)	20 FT.	±20 FT.

DENSITY REQUIREMENTS

DWELLING UNITS: 54,425 / 10,000 = 5.44 * 2 = 10.89
MAXIMUM 10 UNITS ALLOWED
PROPOSED 10 UNITS PROVIDED

SPECIAL EXCEPTION

1. SPECIAL EXCEPTION REQUESTED FOR DEVELOPMENT OF COTTAGE HOUSING PER ZONING ORDINANCE SECTION 48-241(J).

WAIVERS REQUEST (FOR INFORMATION ONLY! TO BE REVIEWED AND APPROVED DURING SITE PLAN)

1. LANDSCAPE WAIVERS:

NORTHERN PROPERTY LINE 48-1183.2.e
±232 LF 30' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET P-0402.

SOUTHERN PROPERTY LINE 48-1183.2.e
±600 LF 50' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET P-0402.

WESTERN PROPERTY LINE48-1183.2.e
±185 LF 50' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET P-0402.

SEE SHEET P-0402 FOR MORE INFORMATION.

MODIFICATIONS REQUEST (FOR APPROVAL BY CITY COUNCIL DURING SPECIAL EXCEPTION)

PURSUANT TO SECTION 48-241(J):
REQUEST TO MODIFY REQUIREMENT SECTION 48-241(J)(14)a. TO ALLOW AN 8' WIDE DRIVE AISLE AND PARKING ALONG THE NORTHERN BUFFER ADJACENT TO RAILROAD AVENUE AS SHOWN ON THE CDP.

LANDSCAPE NOTES

1. THE PROPOSED LANDSCAPING AREAS WILL BE DESIGNED UTILIZING APPROPRIATE SPECIES, SOILS, AND IRRIGATION MEASURES TO MAXIMIZE THE OPPORTUNITY FOR HEALTHY PLANTINGS.
2. THE APPLICANT WILL WORK WITH THE CITY ARBORIST TO DESIGN A LANDSCAPE PLAN THAT INCLUDES NATIVE TREES, SHRUBS, PERENNIALS AND GRASSES.

PARKING TABULATION

PARKING REQUIRED:
1.25 SPACES PER UNIT
10 UNITS X 1.25 = 12.5
13 SPACES REQUIRED
13 SPACES PROVIDED

BUILDING HEIGHT CALCULATION

UNIT 1 - TENNER EXISTING	UNIT 1 - TENNER PROPOSED	UNIT 2 - TENNER EXISTING	UNIT 2 - TENNER PROPOSED	UNIT 3 - TENNER EXISTING	UNIT 3 - TENNER PROPOSED	UNIT 4 - WHITNEY EXISTING	UNIT 4 - WHITNEY PROPOSED	UNIT 5 - WHITNEY EXISTING	UNIT 5 - WHITNEY PROPOSED	COMMON HOUSE EXISTING	COMMON HOUSE PROPOSED
352.60	353.00	352.60	352.80	347.34	347.50	348.23	348.70	348.79	349.70	352.73	352.70
350.98	351.00	350.98	351.00	346.52	346.50	347.49	347.50	347.51	348.20	351.14	351.00
350.98	351.00	350.95	351.20	346.52	346.90	347.49	347.30	347.51	348.20	351.14	351.90
350.98	351.80	350.99	351.20	347.34	347.30	347.38	348.00	348.50	348.60	351.88	351.80
351.81	352.32	351.78	352.20	347.65	347.65	347.77	348.03	348.26	348.87	352.34	352.07
LOWEST AVG. GRADE: 351.81		LOWEST AVG. GRADE: 351.78		LOWEST AVG. GRADE: 347.65		LOWEST AVG. GRADE: 347.77		LOWEST AVG. GRADE: 348.26		LOWEST AVG. GRADE: 351.94	
MAX. BLDG. HT.: 376.81		MAX. BLDG. HT.: 376.78		MAX. BLDG. HT.: 372.65		MAX. BLDG. HT.: 372.77		MAX. BLDG. HT.: 373.26		MAX. BLDG. HT.: 376.94	
BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00	
BLDG. HT/ELEVATION: 374.44		BLDG. HT/ELEVATION: 374.44		BLDG. HT/ELEVATION: 370.44		BLDG. HT/ELEVATION: 371.18		BLDG. HT/ELEVATION: 372.18		BLDG. HT/ELEVATION: 374.68	
TOTAL BUILDING HEIGHT: 23.63'		TOTAL BUILDING HEIGHT: 22.66'		TOTAL BUILDING HEIGHT: 23.79'		TOTAL BUILDING HEIGHT: 23.41'		TOTAL BUILDING HEIGHT: 24.12'		TOTAL BUILDING HEIGHT: 22.75'	

UNIT 6 - WHITNEY EXISTING	UNIT 6 - WHITNEY PROPOSED	UNIT 7 - WHITNEY EXISTING	UNIT 7 - WHITNEY PROPOSED	UNIT 8 - WHITNEY EXISTING	UNIT 8 - WHITNEY PROPOSED	UNIT 9 - WHITNEY EXISTING	UNIT 9 - WHITNEY PROPOSED	UNIT 10 - WHITNEY EXISTING	UNIT 10 - WHITNEY PROPOSED
350.72	350.72	350.91	351.40	350.59	351.30	350.67	351.00	349.66	351.00
349.41	349.00	349.09	349.80	348.15	349.00	348.61	349.00	347.84	349.00
349.41	349.00	349.09	349.80	348.15	349.80	348.61	349.80	347.84	349.00
349.41	349.90	349.88	349.80	348.23	349.80	348.22	349.80	347.96	350.05
349.53	349.90	350.26	350.43	349.10	350.57	349.25	350.49	348.68	350.57
LOWEST AVG. GRADE: 349.53		LOWEST AVG. GRADE: 350.26		LOWEST AVG. GRADE: 349.10		LOWEST AVG. GRADE: 349.25		LOWEST AVG. GRADE: 348.68	
MAX. BLDG. HT.: 374.53		MAX. BLDG. HT.: 375.26		MAX. BLDG. HT.: 374.21		MAX. BLDG. HT.: 374.25		MAX. BLDG. HT.: 373.68	
BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00		BLDG. HT/FROM FF: 25.00	
BLDG. HT/ELEVATION: 373.58		BLDG. HT/ELEVATION: 373.88		BLDG. HT/ELEVATION: 374.18		BLDG. HT/ELEVATION: 374.18		BLDG. HT/ELEVATION: 373.68	
TOTAL BUILDING HEIGHT: 23.87'		TOTAL BUILDING HEIGHT: 23.22'		TOTAL BUILDING HEIGHT: 24.87'		TOTAL BUILDING HEIGHT: 24.59'		TOTAL BUILDING HEIGHT: 24.25'	

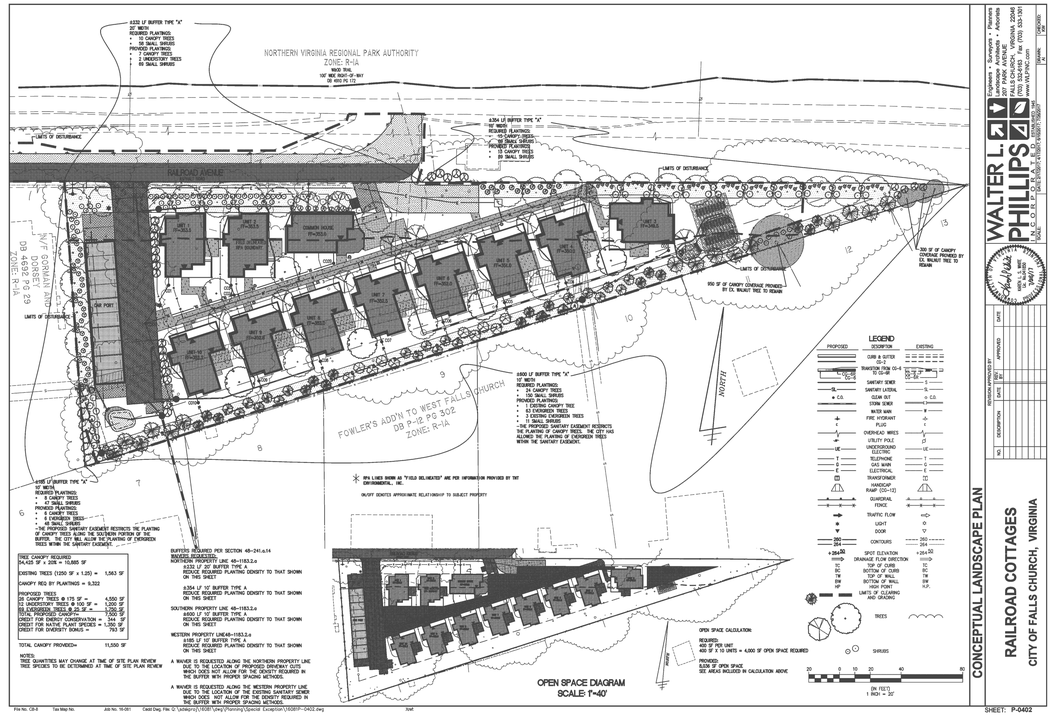
SHEET INDEX

P-0101 COVER SHEET
P-0201 EXISTING CONDITIONS
P-0401 CONCEPTUAL DEVELOPMENT PLAN
P-0402 CONCEPTUAL LANDSCAPE PLAN
P-0403 FIRE MARSHAL & OFFSITE RAILROAD AVENUE IMPROVEMENTS PLAN

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

COVER SHEET — RAILROAD COTTAGES, CITY OF FALLS CHURCH, VIRGINIA

SHEET: P-0101



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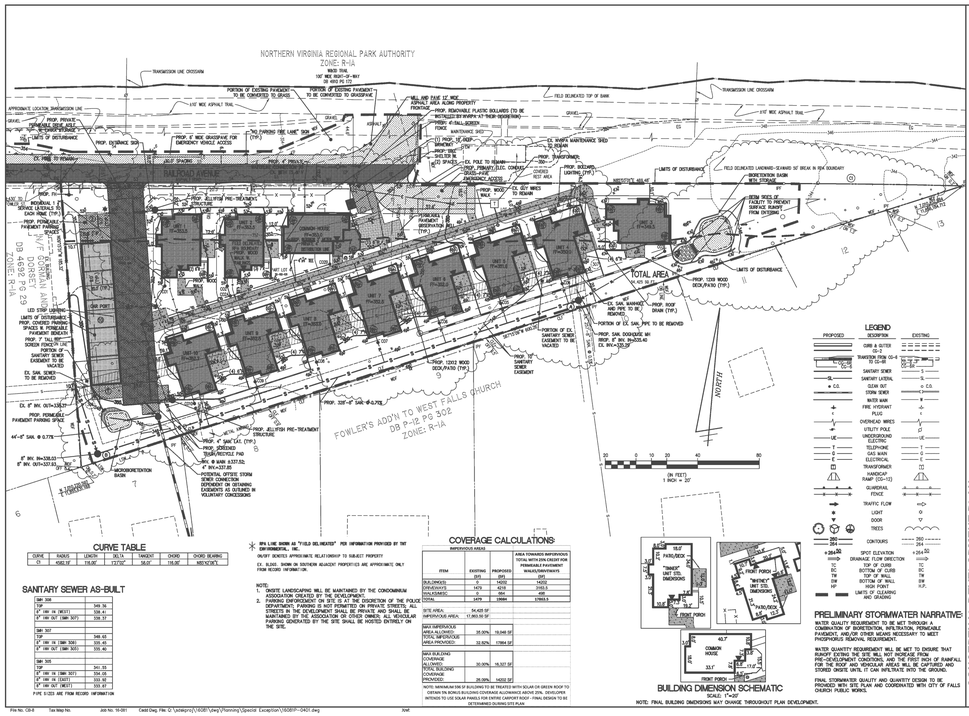
CONCEPTUAL LANDSCAPE PLAN — RAILROAD COTTAGES, CITY OF FALLS CHURCH, VIRGINIA

SHEET: P-0402



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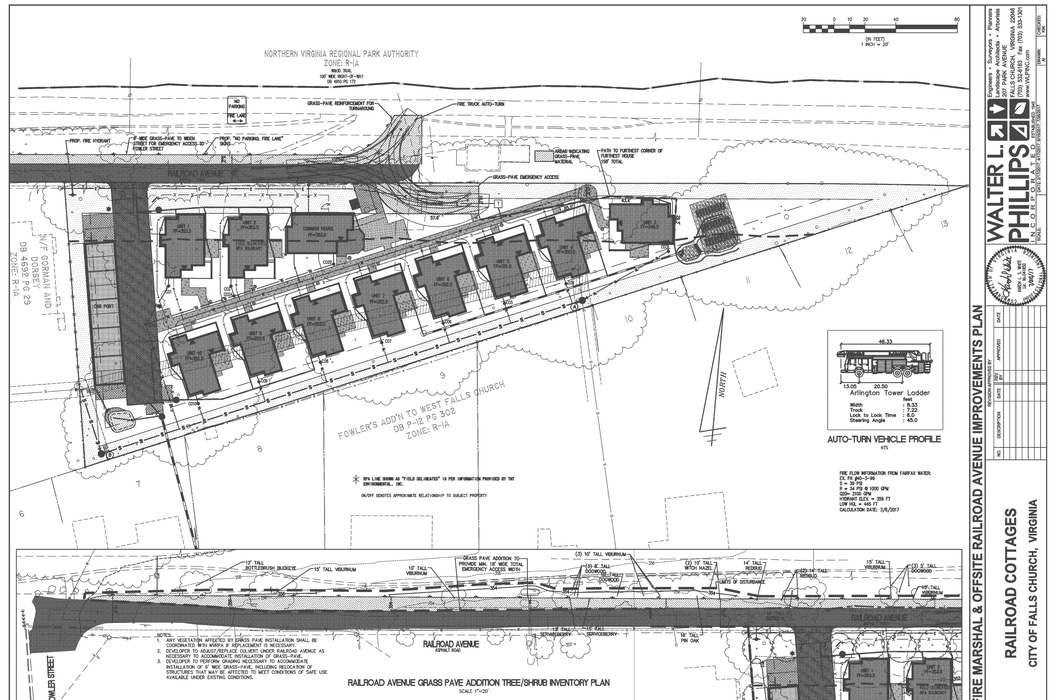
CONCEPTUAL DEVELOPMENT PLAN — RAILROAD COTTAGES, CITY OF FALLS CHURCH, VIRGINIA

SHEET: P-0401



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FIRE MARSHAL & OFFSITE RAILROAD AVENUE IMPROVEMENTS PLAN — RAILROAD COTTAGES, CITY OF FALLS CHURCH, VIRGINIA

SHEET: P-0403

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdsproj\16081\dwg\Engineering\Site Plan\16081C-0201.dwg Xref:

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

DRAWN: AJ — CHECKED: KW — SCALE: AS NOTED — DATE: 9/12/2017

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED

COMMONWEALTH OF VIRGINIA — KAREN L. S. WHITE, Lic. No.041850, 9/12/17, PROFESSIONAL ENGINEER

APPROVED SPECIAL EXCEPTION PLAN

RAILROAD COTTAGES — CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0202

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdsproj\16081\dwg\Engineering\Site Plan\16081C-0201.dwg Xref:

VOLUNTARY CONCESSIONS, COMMUNITY BENEFITS & TERMS AND CONDITIONS

RAILROAD COTTAGES

MUNIS 2017-0220

September 7, 2017

Pursuant to § 48-241 (c) of the Code of the City of Falls Church, Virginia (the "Code") and subject to the City of Falls Church (the "City") approving MUNIS 2017-0220 (the "Application") on the property identified as RPC #052-102-030, 031, and 032 (jointly the "Property"), Railroad, LLC (the "Owner") for itself, any contract purchaser, and its successors and assigns, hereby voluntarily agrees to the following conditions ("Voluntary Concessions"). The Owner acknowledges that through approval of this application (the "Special Exception"), it has been granted certain bonuses, including increased density, reduced yard setbacks, and other benefits in return for providing certain features, design elements, uses, services, or other amenities desired by the City as more particularly set forth below. In the event the Application is denied, these Voluntary Concessions will be null and void and of no further force and effect.

I. DEVELOPMENT SCOPE

A. Conceptual Development Plan. Development of the Property shall be in conformance with the plat set titled "Railroad Cottages Conceptual Development Plan" (the "CDP"), consisting of five sheets, prepared by Walter L. Phillips, Inc., dated July 26, 2017.

B. Development Scope. As depicted on the CDP, uses on the Property shall be limited to 10 cottage housing dwelling units (each a "Cottage" and jointly, the "Cottages"), plus a community clubhouse (the "Common House"), as well as a carport (the "Carport"), accessory parking, accessory structures such as, but not limited to, bicycle racks and trash collection area, as well as private outdoor recreation and open space areas. Uses may also include any uses permitted by special exception in the R-1A zoning district provided that approval of the requisite special exception shall have been obtained in accordance with the Code prior to establishment of such use.

C. Minor Modifications. The City Manager may approve minor deviations from conformance with these documents, as requested by the Owner, provided the deviations do not conflict with what is specifically agreed to in these Voluntary Concessions, are consistent with the purpose and intent of the City Council's approval of this Special Exception, and are either: (i) necessary to permit reasonable construction of the project; or (ii) as determined by the City Manager, improve the project's overall functioning or benefit to the City. The Owner may appeal an adverse decision by the City Manager to the City Council.

D. Age Restriction. Occupancy of the Cottages is intended for, and shall be restricted to, households with at least one full-time resident 55 years of age or older per Cottage in order to qualify as "housing for older persons" in accordance with the

State and Federal Fair Housing Acts and the Federal Housing for Older Persons Act of 1995 (Pub. L. 104–76, 109 Stat. 787, approved December 28, 1995), as amended, and as implemented by HUD regulations at 24 CFR part 100. Concurrently with the establishment of a condominium association ("COA") in accordance with Voluntary Concession II.A, the Owner shall submit for review and approval by the City a Declaration of Covenants ("Covenants") in conjunction with the preparation of Association Documents (as defined in Voluntary Concession II.A) which will meet the standards under the Act for housing for older persons, including requiring, in perpetuity, that qualification for occupancy of any dwelling unit on the Property shall be limited to households with at least one full-time resident who is age 55 or older, and that no resident under 18 years of age may reside on the Property. If title to any such dwelling unit shall become vested in any person under the age of 55 by reason of descent, distribution, foreclosure, purchase, or operation of law, the age restriction covenant shall not result in a forfeiture or reversion of title, but rather, such person thus taking title shall not be permitted to reside in such lot or dwelling unit until such person shall have attained the age of 55 or otherwise satisfies the requirements as set forth herein. Notwithstanding the aforementioned, a surviving spouse shall be allowed to occupy a dwelling unit consistent with the Federal Fair Housing Act and the Virginia Fair Housing Law, as may be amended.

E. Building Height. As depicted on Sheet P-0101 of the CDP, the maximum building height of the Cottages shall not exceed a height of 25 feet in height from average grade as defined by the Code. Minor reductions in height may be permitted pursuant Voluntary Concession I.C. Notwithstanding the foregoing, nothing shall preclude the Owner from constructing the Cottages or Common House to a lesser building height than that which is represented on the CDP, provided the configuration of the building footprints remain in conformance with that shown on the CDP.

F. Architectural Guidelines. The character of the architectural design and building materials for the Cottages and Common House shall conform to the character and quality of the architectural elevation document titled "Railroad Cottages Owner Options," prepared by Butz.Wilbern Ltd., and included by reference as Exhibit A (the "Design Guidelines"). Such architectural design shall include cementitious siding, vinyl, or similar exterior trim, as well as sprinklers and exterior strobe lights.

G. Outdoor Amenities For Residents. The Owner shall provide facilities designed to meet the on-site recreational needs of the future residents of the Property, and shall include outdoor furniture, lawn areas, and pedestrian-scaled lighting. Additional facilities may include, but shall not be limited to, walking paths, fitness stations, outdoor kitchen/grills, fire pits, specialty landscaping in excess of that otherwise required by the Code, and outdoor adult exercise areas.

H. Common House. As depicted on Sheet P-0402 of the CDP, the Owner shall provide a Common House. Any amenities contained within or appurtenant to the Common House will be owned and maintained by the Association established pursuant to Voluntary Concession II.A, and made available for all residents of the Cottages. Amenities in the Common House shall include, but shall not be limited to, the

following amenities: a multipurpose meeting room/studio, kitchen, accommodations for overnight guests of owners of the Cottages, , a computer/media room. The Common House shall be constructed and available for use by residents no later than approval of the 10th occupancy permit for the Cottages.

I. Universal Design. The Cottages shall employ universal design principles in accordance with any state, local or federal program governing such units. Specific elements shall be identified at the time of building plan submission.

J. Historic Commemoration. The Owner shall install a metal plaque on the Property, at or before the time of issuance of the 10th occupancy permit for the Cottages, not including the Common House, which shall be visible to the public along the Property's Railroad Avenue frontage. The language on the plaque shall commemorate the land ownership history of the Property, and shall be submitted to the City's Historical Commission for its review and comment, but not necessarily approval, prior to installation. The specific location of, and language on, the plaque shall be determined by the Owner, as approved by the Director of Planning, prior to approval of the site plan for the Property.

K. Water and Sewer. The Property shall be served by public central water supply and sanitary sewer systems. The Owner shall construct and install all water and sewer extensions to the Property and shall provide all connections necessary for development of the Property at no cost to the City or to the Fairfax County Water Authority (d/b/a "Fairfax Water"), and such extensions and connections shall be constructed and installed in accordance with City and Fairfax Water standards. The Owner shall acquire any offsite easements, if needed, to extend public water and/or sanitary sewer lines to the Property and shall dedicate such easements to the City and/or Fairfax Water, as necessary, at no cost to the City or to Fairfax Water. Any existing wells and septic systems on the Property shall be abandoned prior to approval of the site plan for the Property in accordance with Fairfax County Health Department standards and requirements then in effect.

L. Screening For Trash/Recycling Storage. As depicted on Sheet P-0401 of the CDP, the Owner shall provide a trash and recycling storage pad on the Property. To minimize negative visual impacts, the base of the storage pad will be constructed of permeable pavement materials and surrounded by a six-foot high wood and PVC lattice fence. All trash and/or recycling from all occupancy of the Project shall be kept and secured within the aforementioned fence.

M. Fire Marshal Coordination. The Owner has coordinated with the Fire Marshal regarding the site design and layout of the Property shown on the CDP. Notwithstanding such coordination, if it is determined during site plan review that elements of the CDP including, but not limited to, adjustments to streetscape and building locations, tree plantings, open space, courtyards, tree buffers, and tree preservation areas, require adjustment to allow for required emergency vehicle access or are necessary to respond to subsequent comments from the Fire Marshal,

the Owner shall be permitted to relocate, remove, or modify such conflicting elements provided any such modifications are made in consultation with, and subject to the approval of, the City Manager in accordance with Voluntary Concession I.C.

II. CONDOMINIUM ASSOCIATION

A. Condominium Association. All residential property owners in the Property shall be members of a condominium association (the "Association"), established to own and maintain common property and facilities and provide standards for the landscaping and use of privately-owned structures within the Property. Documents for the establishment of the Association (the "Association Documents"), including the Covenants, shall be submitted to the City Attorney for review and approval as being consistent with this Special Exception approval, with these Voluntary Concessions and any other applicable regulations concurrent with the submission of the site plan for the Property. The Association shall be established and the associated Association Documents recorded among the land records of Arlington County prior to issuance of the first residential occupancy permit for the Cottages. The declaration establishing the Association shall specify the conditions and obligations set forth in these Voluntary Concessions. Purchasers shall be advised in writing of these Voluntary Concessions prior to entering into a binding contract of sale.

B. General Responsibilities. In addition to any other responsibilities set forth elsewhere in these Voluntary Concessions and in § 48-1147 (Owner's Association) of the Code, the Association shall own and maintain all common areas on the Property, as well as provide for snow removal on common area sidewalks and driveways. The Association shall also be responsible for the maintenance of all common recreational facilities, landscaping maintenance, interior and exterior maintenance of the Common House, exterior maintenance of the cottages including, but not limited to, paint, caulking, roof, and chimney repairs, all storm drainage easements and stormwater management facilities not maintained by the City, all street lights or other exterior lighting internal to the Property, and all sidewalks and trails on the Property located outside of public right-of-way and not otherwise maintained by the City or the Northern Virginia Regional Park Authority ("NVRPA").

III. TRANSPORTATION

A. Bicycle Storage. Prior to the issuance of the first residential certificate of occupancy for the Cottages, the Owner shall install bicycle racks and one secure bicycle storage locker on the Property. Prior to approval of the site plan for the Property, the Owner shall provide the type, location, and number of bicycle racks to be provided to the City for approval. The bicycle racks shall be installed prior to the issuance of the first residential occupancy permit for the Cottages.

B. Railroad Avenue Improvements. As depicted on Sheet P-0401 of the CDP, and subject to City and NVRPA approval, the Owner shall facilitate emergency access for the Property and existing residents along Railroad Avenue by: (1) installing "grasspave" or reinforced porous treatment along the north side of Railroad Avenue between Fowler Street and the Property meeting the weight requirements for emergency apparatus and provides a continuous width of 18 feet; (2) installing "No Parking" signage along the north side of Railroad Avenue; (3) providing a one-time contribution of $50,000.00 to the City to be used to implement a Full Depth Reclamation asphalt rebuilding of Railroad Avenue from the Fairfax County line to the eastern terminus of Railroad Avenue; (4) replacing or modifying the culvert under Railroad Avenue, if necessary; (5) grading the area between the Washington & Old Dominion Railroad Trail (the "W&OD Trail") and the street, as applicable and necessary to accommodate a wider street and make the area safe for all road users and (6) indicate on the site plan an eight-foot-wide easement along the south side of Railroad Avenue along the Property's frontage and indicate the installation of grasspave or reinforced porous treatment within this easement, excepting those areas shown as permeable pavement. Said improvements shall be installed and available for use prior to the issuance of the first residential occupancy permit for the Cottages, or within 30 days after the City completes the Full Depth Reclamation asphalt rebuilding of Railroad Avenue, whichever comes later. Following installation of these improvements and acceptance by the City, the Owner shall not be responsible for maintenance of any off-site improvements not located on the Property.

C. Parking. As depicted on Sheets P-0101 and P-0401 of the CDP, the Owner shall provide a minimum of 13 parking spaces on the Property. All parking for the proposed Cottages and Common House shall occur on the Property and shall not interfere with the required fire apparatus turn-around as required by the Statewide Fire Prevention Code. The Owner shall inform purchasers of the Cottages and visitors to the property that parking in surrounding neighborhoods is discouraged. Notices to this effect shall be placed in a conspicuous location in the common house as well.

D. Parking Areas & Driveway. Parking and private driveway areas for the Property shall be provided as depicted on Sheet P-0401 of the CDP and in accordance with the parking requirements of Code. All parking and driveway areas, including those located within the Carport, shall be constructed of permeable pavement materials with dimensions consistent with Code standards, and shall be maintained by the Association established pursuant to Voluntary Concession II.A.

E. Pedestrian Facilities. Prior to the issuance of the first residential occupancy permit for the Cottages, the Owner shall construct an ADA-accessible variable width wooden walkway, with a minimum width of six feet, to facilitate pedestrian connectivity between the Cottages. The Owner shall be entitled to construct any number of additional private pedestrian connections internal to the Property in conformance with the Code. All private pedestrian connections shall be maintained by the Association, to be established pursuant to Voluntary Concession II.A.

F. Transportation Demand Management. The Owner will implement the transportation demand management ("TDM") program titled "Railroad Avenue Cottage Housing Transportation Demand and Parking Management Plan" and incorporated as Exhibit B to these Voluntary Concessions. The TDM program will conform to these Voluntary Concessions and will be finalized prior to approval of the site plan for the Property.

G. Electric Vehicle Charging Station. The Owner shall provide a minimum of one charging station for electric cars on the Property. The location of the charging station shall be determined in conjunction with the Department of Public Works prior to approval of the site plan for the Property.

H. Construction Parking & Staging Plan. Prior to issuance of any demolition and/or any building permits on the Property, the Owner shall prepare, and obtain the City Manager's approval of, a demolition and staging plan for the project. All demolition and construction of the project shall be done in conformance with the approved demolition and staging plan. Once a contractor has been selected for the project, and prior to issuance of any building permit for the project, the Owner will prepare a construction parking plan and a construction traffic and staging plan to be enforced by the Owner for the entire construction phase of the project, and to obtain the City Manager's approval of the plan as providing sufficient parking or other transportation services, so as to not have an adverse impact on traffic safety. The Owner acknowledges and agrees that violations of these plans during construction can result in a "Stop Work" order and other enforcement measures by the City, until such time as the Owner provides reasonable assurances that it will correct the violations.

IV. LANDSCAPING & ENVIRONMENTAL

A. Stormwater Management. Prior to approval of the site plan for the Property, the Owner shall demonstrate that development on the Property meets the water quantity and quality requirements, as well as the channel protection and flood protection requirements, pursuant to the latest edition of the Virginia Stormwater Management Handbook, or other such applicable state regulations, as may be currently in effect on the date of submission of the said site plan to the Department of Public Works. These requirements will be met through water quality treatment utilizing approved products found on the Virginia Stormwater BMP Clearinghouse website, which may include the purchase of off-site nutrient credits.

B. Landscape Plan. The Owner shall implement the landscape design as shown on Sheet P-0402 of the CDP (the "Conceptual Landscape Plan"), which illustrates the plantings and other features to be provided on the Property. The Conceptual Landscape Plan is conceptual in nature and the tree species, sizes, and planting locations may be modified by the Owner as part of final engineering and building design, provided such modifications: (a) provide a similar quality and quantity of

landscaping as that shown on the Conceptual Landscape Plan, and (b) otherwise are in conformance with the CDP.

1. Native Species. The Owner shall use principally native species or hardy drought tolerant adaptive plants throughout the Property as selected by the Owner from the City's list of approved plants, provided that the Owner reserves the right to modify as part of site plan approval, in consultation with and approval by the Urban Forestry Division ("UFD") of the Department of Public Works, the exact species to be used, such as where some plant materials are not available or have been deemed by UFD to no longer be appropriate. In the event a substitution of native plants is required to enable the Owner to meet LEED (or an equivalent rating system) criteria, as provided in Voluntary Concession IV.E, the City Manager or his designee may approve a substitute plant or procedure to meet the selected rating agency requirements if the substitute plant is hardy and has a similar growth habit to the original plant.

2. Plant Installation. Plant materials shall be at least the following sizes at installation:

a. Evergreen Trees: Eight to 10 feet in height at planting;

b. Canopy/Shade Trees: Minimum 2.5-inch caliper at planting; and

c. Shrubs: minimum spread of 14 to 24 inches at planting.

C. Fencing: The Owner shall install a four-foot high fence along the Property's Railroad Avenue frontages of Cottage Unit 1, Cottage Unit 2, and the Common House, as well as a seven-foot high solid wooden fence with an additional two feet of lattice, per Exhibit C, along the Property's entire western frontage adjacent to RPC #52-102-029 starting 20 feet back from front property line and a four-foot board-on-board wooden fence between 10 to 20 feet back from front property line along western frontage.

D. Lighting. In an effort to minimize nighttime light pollution from the Property, all on-site outdoor lighting provided on the Property shall be "dark sky"-compliant, utilize full cut-off fixtures, and be downward directed to the interior of the Property, such that neither the lamp itself nor the lamp image is visible outside the perimeter of the Property. The Owner may install bollard lighting on the Property. Nothing contained in this Voluntary Concession IV.D shall preclude the up-lighting, accent lighting, or backlighting of signage, entrance features, and related landscaping throughout the Property as permitted by applicable regulations of the Code.

E. EarthCraft Certification. Prior to approval of the site plan for the Property, the Owner will provide documentation to the City Manager certifying that the project has been designed in accordance with the EarthCraft House program certifying

that green building elements have been incorporated into the project and would be sufficient to achieve Earthcraft Gold certification.

1. Green Building Escrow. Prior to the issuance of the first residential certificate of occupancy for the Cottages, the Owner will provide the City with a $50,000.00 letter of credit which includes terms approved in advance by the City Manager sufficient to assure the City that the Owner will satisfy its obligations to achieve EarthCraft Gold certification. Such letter of credit will be returned to the Owner if the intended EarthCraft Gold certification is achieved within two years after the date of issuance of the first residential certificate of occupancy for the Cottages. If the project does not achieve the intended EarthCraft Gold certification within two years after the date of issuance of the first residential certificate of occupancy, the City will redeem the letter of credit, with such funds being used for environmental improvements in the City.

2. Equivalent Rating System. Where the Owner has provided evidence sufficient for the City Manager to find that an alternative green building program that is administered by an independent third party, other than the EarthCraft program, will ensure that equivalent environmental and energy efficiency will be achieved in the project, the City Manager may approve the use of such alternative program, subject to such conditions as may be reasonably necessary to ensure that the alternative program will achieve the goals of this Voluntary Concession IV.E.

F. Energy Conservation. The Owner will employ a variety of sustainability techniques across the Property including, but not limited to geothermal heating, ventilation, and air conditioning units, two-by-six exterior walls with a R-21 insulation, R-50 roof insulation, low thermal emissivity windows, Energy Star appliances, and programmable thermostats. The roof of the Carport shall incorporate photovoltaic arrays (solar panels) to capture energy for the purpose of either providing solar energy to the grid and/or for purposes exclusive to the project.

G. Off-Site Stormwater Improvements. As generally depicted on Sheet P-0401 of the CDP, the Owner shall install a stormwater conveyance system to carry stormwater runoff from Railroad Avenue and transport it across RPC #52-102-028, 52-102-029, and 52-102-019 (the "Adjacent Parcels") and the Property to an existing storm sewer pipe located on RPC #52-102-019. Such improvements shall be at no cost to the City or the owners of the Adjacent Parcels, and shall generally include the installation of two new storm inlets, the replacement of an existing storm inlet, and the installation of an underground storm pipe with a minimum diameter of 12 inches. Final inlet and pipe design for placement and sizes shall be determined at site plan in coordination with the City and owners of the Adjacent Parcels. This Voluntary Concession IV.G shall be specifically contingent upon the Owner's ability to acquire all necessary off-site easements, licenses, and/or permissions from the owners of the Adjacent Parcels. In the event, despite the Owner's good faith efforts, the Owner is unable to obtain such permissions from the owners of the

Adjacent Parcels within 90 days following approval of this Special Exception, then the obligation contained in this Voluntary Concession IV.G shall be deemed null and void.

V. AFFORDABLE HOUSING FUND CONTRIBUTION

Prior to issuance of the first residential certificate of occupancy of the Cottages, the Owner shall make a one-time contribution to the City's Affordable Housing Fund in the amount of $10,000.00. Said contribution shall be used solely for the maintenance of existing affordable housing and to develop additional affordable housing opportunities in the City.

VI. PARK AUTHORITY COORDINATION

A. Western Gateway Off-Site Improvement. Subject to City and NVRPA approval, the Owner shall install improvements to, and in the vicinity of, the existing maintenance shed and covered rest area located W&OD Trail on NVRPA Property. Said improvements may include installation of bicycle racks, landscaping, public art, benches, "City of Falls Church" gateway signage, and façade/architectural enhancements to the existing maintenance shed and covered rest area. The Owner shall work with NVRPA to determine the precise locations for, and extent of, said improvements, which shall be determined prior to approval of the site plan for the Property. In the event the aforementioned improvements are not authorized by NVRPA, the Owner shall make a one-time contribution to the City in the amount of $10,000.00 to be used at the City's discretion for park or streetscape enhancements. This contribution will be made prior to the issuance of the sixth (6th) occupancy permit by the City.

B. NVRPA Cooperation. Prior to final site plan approval for the Property, the Owner will work with NVRPA to address concerns related to the clearing and grading on the Property, as well as stormwater management, the health of any trees located on NVRPA property that have roots on the Property, access between the Property and the W&OD Trail, and the relocation or replacement of any trees and shrubs on NVRPA property which may be damaged or removed by construction of the Railroad Avenue improvements pursuant to Voluntary Concession III.B. The Owner shall apply for and receive all necessary right-of-entry permit(s) from the NVRPA, as well as temporary and permanent construction, stormwater, and maintenance agreements, as necessary, for all work conducted on the NVRPA property.

VII. MISCELLANEOUS

A. Non-Transferability. The Owner acknowledges that the Application, as granted, runs with the land and is not transferable to other land.

B. Period of Validity. The Owner acknowledges that this Special Exception will automatically expire without notice, 36 months after the date of approval unless the use has been established or an above-grade building permit has been issued and

construction has commenced and been diligently pursued, in accordance with § 48-90 (d) (6) of the Code.

C. Successors and Assigns. These Voluntary Concessions will bind and inure to the benefit of the Owner and its successors and assigns. Each reference to "Owner" in these Voluntary Concessions shall include within its meaning, and shall be binding upon, the Owner's successor(s) in interest and/or developer(s) of the site or any portion of the site.

D. Disclosure. The Owner shall provide a copy of these Voluntary Concessions to any future owner, heir, successor, and assign prior to transferring any interest in any part of the Property to such person, firm, corporation, or other entity.

E. Access for Commissioner of Revenue. The Owner agrees that the City's Commissioner of Revenue and/or his/her designated staff shall have access to the parking areas on the Property at all times for inspection of personal property tax vehicle window stickers.

F. Counterparts. These Voluntary Concessions may be executed in one or more counterparts, each of which when so executed and delivered shall be deemed an original document and all of which taken together shall constitute but one in the same instrument.

G. Timing. Notwithstanding the foregoing, upon demonstration that, despite diligent efforts or due to factors beyond the Owner's control, Voluntary Concession commitments have been delayed beyond the timeframes specified herein, the Director of Planning may agree to a later date for completion of such commitments if the Planning Director finds: (1) the Owner is diligently pursuing the commitments; (2) the commitments will be completed in reasonable amount of time; and (3) the City has been provided reasonable assurances that the commitments will be completed by the later date.

H. Terms & Conditions Incorporated In Resolution. The Owner voluntarily submits the foregoing Voluntary Concessions to the City Council to be incorporated by reference with the resolution approving the Application.

[SIGNATURE APPEARS ON FOLLOWING PAGE]

TITLE OWNER OF RPC #052-102-030, 031, and 032

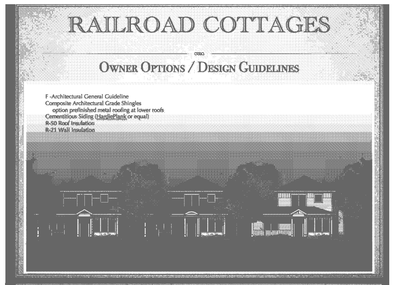
RAILROAD, LLC

By:
Name: Robert A. Young
Title: Managing Member

[SIGNATURES END]

EXHIBIT A

Design Guidelines



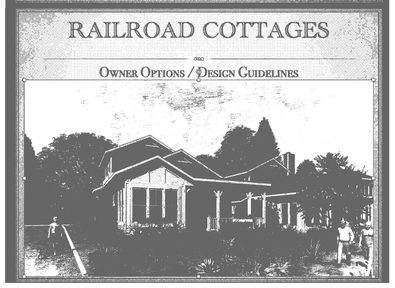


EXHIBIT B

Transportation Demand Management Program

Purpose

The City's Comprehensive Plan establishes a vision of providing a transportation network that offers choices in travel modes. The Plan also includes a strategy of meeting increased travel demand within, form, and through the City via non-automobile modes. To that end, the City expects redevelopment activity to use Transportation Demand Management (TDM) and Parking Management Techniques that provide a range of transportation options and reduce the reliance on automobiles.

Goals

This combined TDM and Parking Management Plan is designed to achieve the following goals:

1. Provide travel options that allow residents to "age in place", which means "the ability to live in one's own home and community safely, independently, and comfortable, regardless of age, income, or ability level"
2. Demonstrate that the number of parking spaces provide is consistent with City code and accommodates travel demand

Plan Flexibility

This combined TDM and Parking Management Plan recognizes that travel behavior may change over time. For that reason, this combined plan uses a strategy of adaptive management – monitoring performance and updating the strategies applied as necessary to achieve the stated goals. The success of this TDM and Parking Management Plan will be reviewed periodically and updated as needed to deliver on the goals listed above.

Plan

The table below summarizes the plan elements. The specific elements are described in more detail below the table. The table is broken into four categories:

1. Site Design, Infrastructure, and Options. These options will be provided when the project is opened for operation.
2. Promotion, Education, and Incentives. These options will be provided while the project is in operation.
3. Monitoring and Enforcement. These techniques will be used to measure performance of the implemented strategies, ensure compliance, and assess whether the strategies applied are meeting the goals of the plan.
4. Adaptive Management. These additional techniques will be used is the implemented strategies are not sufficient to meet the goals of the plan. Note that this list is not exhaustive. Other strategies as needed will be used to be the performance goals.

Table 1: TDM and Parking Management Plan Elements

Site Design, Infrastructure, and Options	• Bike cage provided • Shared bicycles provided
Promotion, Education, and Incentives	• Information kiosk in the community house with information on transit options, bike routes, and walking routes; as well as contact information for Commuter Connections • Information regarding local resources on community website • Parking spaces will not be sold with individual units. Parking hang tags will be issued by the condo board
Monitoring and Enforcement	• TDM Coordinator duties assigned to the association vice-president • Annual survey to assess transportation • Periodic check-in (3-4 years) with the City for updates on options and information

Cart provided for loading/unloading

A cart will be provided so that owners have a convenient way to transport items (groceries, suitcases, etc.) from cars to cottages.

Shared bicycles and bike cage provided

A secure bike cage holding four (4) shared bicycles will be provided when units are occupied to encourage their use as an alternative to automobiles.

Information kiosk in the community house with information on transit options, bike routes, and walking routes; as well as contact information for Commuter Connections

In addition to such information available in the common house, the same materials plus possible links to relevant resources will be available on the community's website.

Parking spaces will not be sold with individual units. Parking hang tags will be issued by the condo board and monitored by all residents.

TDM Coordinator duties assigned to the association vice president, as follows:

- Maintain cart, bicycles
- Maintain the information kiosk and website updates regarding transportation
- Be available to discuss local travel options with residents
- Monitor the usage of the plan and enforce rules where necessary

EXHIBIT C

Fencing for western frontage

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

SCALE: AS NOTED | DATE: 9/12/2017 | DRAWN: A.K. | CHECKED: L.W.

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

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

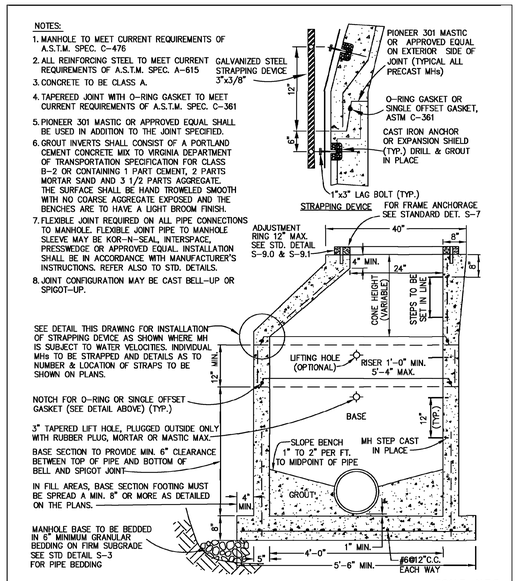
VOLUNTARY CONCESSIONS

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

NOTES:

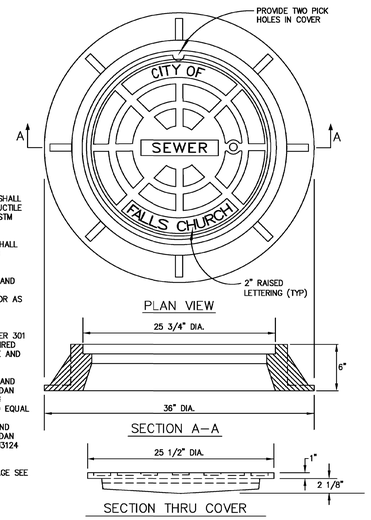
1. MANHOLE TO MEET CURRENT REQUIREMENTS OF A.S.T.M. SPEC. C-476
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF A.S.T.M. SPEC. A-615
3. CONCRETE TO BE CLASS A.
4. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF A.S.T.M. SPEC. C-361
5. PIONEER 301 MASTIC OR APPROVED EQUAL SHALL BE USED IN ADDITION TO THE JOINT SPECIFIED.
6. GROUT INVERTS SHALL CONSIST OF A PORTLAND CEMENT CONCRETE MIX TO VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIFICATION FOR CLASS B-2 OR CONTAINING 1 PART CEMENT, 2 PARTS MORTAR SAND AND 3 1/2 PARTS AGGREGATE. THE SURFACE SHALL BE HAND TROWELED SMOOTH WITH NO COARSE AGGREGATE EXPOSED AND THE BENCHES ARE TO HAVE A LIGHT BROOM FINISH.
7. FLEXIBLE JOINT REQUIRED ON ALL PIPE CONNECTIONS TO MANHOLE. FLEXIBLE JOINT PIPE TO MANHOLE SLEEVE MAY BE KOR-N-SEAL, INTERSPACE, PRESSWEDGE OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REFER ALSO TO STD. DETAILS.
8. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT-UP.



SCALE: N.T.S.

ISSUED: 6/12/14	STANDARD DETAIL TYPICAL 4' INNER DIAMETER PRECAST CONCRETE MANHOLE	DRAWING NO. S 1	
REVISION: 1.0			
REVISION: 6/12/14			
APPROVED: MAH			

CITY OF FALLS CHURCH VA PUBLIC FACILITIES MANUAL



NOTES:

1. FRAME AND COVER SHALL BE GRADE 65-45-12 DUCTILE IRON CONFORMING TO ASTM 536
2. FRAME AND COVER SHALL BE DESIGNED FOR H-20 LOADING
3. WATERTIGHT FRAME AND COVER REQUIRED IN THE 100-YEAR FLOODPLAIN OR AS DIRECTED BY THE CITY ENGINEER
4. RAM-NEK OR PIONEER 301 MASTIC OR EQUAL REQUIRED WITH WATERTIGHT FRAME AND COVER
5. WATERTIGHT FRAME AND COVER TO BE EAST JORDAN IRON WORKS PRODUCT # 00103304 OR APPROVED EQUAL
6. STANDARD FRAME AND COVER TO BE EAST JORDAN IRON WORKS PRODUCT #3124 OR APPROVED EQUAL
6. FOR FRAME ANCHORAGE SEE DETAIL S-7

SCALE: N.T.S.

ISSUED: 6/12/14	STANDARD DETAIL STANDARD MANHOLE FRAME & COVER	DRAWING NO. S 10.0	
REVISION: 1.0			
REVISION: 6/12/14			
APPROVED: MAH			

CITY OF FALLS CHURCH VA PUBLIC FACILITIES MANUAL

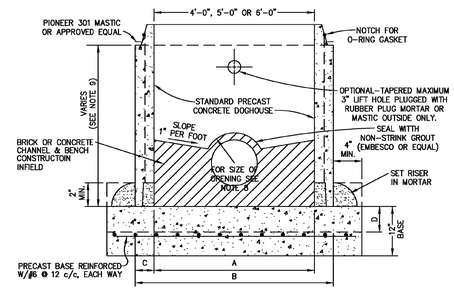
NOTE :

1. CONCRETE TO BE CLASS A.
2. ALL REINFORCING TO MEET REQUIREMENTS OF CURRENT A.S.T.M. SPEC. A-615
3. MANHOLE SECTIONS TO MEET REQUIREMENT OF CURRENT A.S.T.M. SPEC. C-478
4. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF A.S.T.M. SPEC. C-361.
5. DOGHOUSE OPENING MAY ONLY BE USED WHEN PLACING A NEW MANHOLE OVER AN EXISTING LINE; OTHERWISE, THE OPENING MUST BE CAST. SIZE, LOCATION & ANGLE OF ENTRY SHALL BE AS REQUIRED BY THE PLANS.
6. MANHOLE SECTION TO BE CASE IN THE BASE OF A MINIMUM OF 2".
7. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT-UP.
8. HOLES IN PRECASE UNITS ARE TO BE 4" MIN. TO 8" MAX. LARGER THAN THE OUTSIDE DIA. OF THE PROPOSED PIPE.
9. BASE SECTION TO PROVIDE MIN. 6" CLEARANCE BETWEEN TOP OF PIPE OPENING AND BOTTOM OF BELL AND SPIGOT JOINT.

CHART "A"

	MIN. DIMENSIONS		
MH	4'-0"	5'-0"	6'-0"
A	48"	60"	72"
B	58"	72"	86"
C	5"	6"	7"
D	6"	8"	10"

NOTE:
FOR DOGHOUSE BASE CONSTRUCTED OVER PVC PIPE, REMOVE EXISTING PVC PIPE BEYOND BASE DIMENSIONS AND BELL/PLAIN END INSERT SHORT LENGTHS OF PVC PIPE INTO STANDARD MANHOLE BASE WITH FLEXIBLE GASKET CONNECTORS



SCALE: N.T.S.

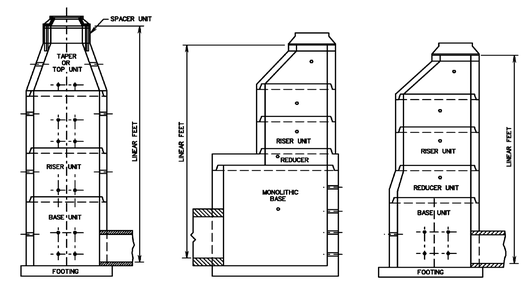
ISSUED: 6/12/14	STANDARD DETAIL PRECAST CONCRETE MANHOLE DOGHOUSE BASE	DRAWING NO. S 4	
REVISION: 1.0			
REVISION: 6/12/14			
APPROVED: MAH			

CITY OF FALLS CHURCH VA PUBLIC FACILITIES MANUAL

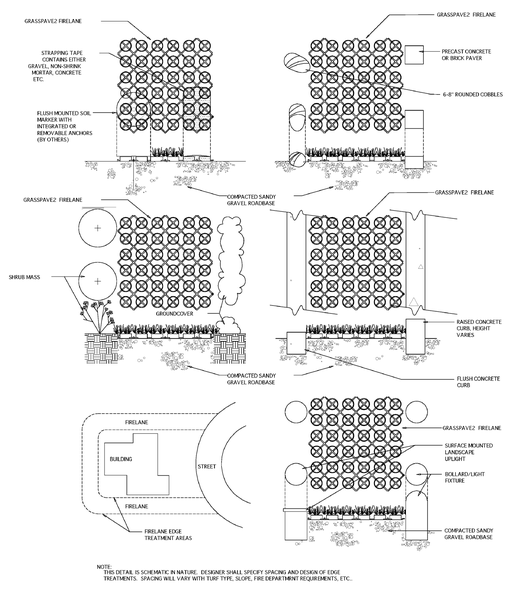
FOR SANITARY STRUCTURE 'A'

MH-2

FOR DETAILS OF ALL COMPONENT PARTS AND "GENERAL NOTES- PRECAST" SEE SHEETS 103.01-103.11



SPECIFICATION REFERENCE 105 302	PRECAST MANHOLE VIRGINIA DEPARTMENT OF TRANSPORTATION	VDOT ROAD AND BRIDGE STANDARDS REVISION DATE	SHEET 1 OF 1 106.07



NOTE:
THIS DETAIL IS SCHEMATIC IN NATURE. DESIGNER SHALL SPECIFY SPACING AND DESIGN OF EDGE TREATMENTS. SPACING WILL VARY WITH TURF TYPE, SLOPE, FIRE DEPARTMENT REQUIREMENTS, ETC.

Grasspave2 Firelane Detail

1
1OF1

NOT TO SCALE

Use this detail for delineating a Grasspave2 firelane

Invisible Structures, Inc.
GP2Firelane11.dwg

1600 Jackson Street, Suite 310
Golden, CO 80401
800-233-1510 OR 303-373-1234
FAX: 303-373-1223
www.invisiblestructures.com
rev. 09/2011

A.G. Wassenaar Inc.
Geotechnical and Environmental Consultants

2180 South Ivanhoe Street, Suite 5
Denver, Colorado 80222-5710
303-759-8100 Fax 303-756-2920
www.agwassenaar.com

ASTM D1621-10 COMPRESSIVE STRENGTH RESULTS
MARCH 13, 2015

Grasspave2 Sand-filled Ring Units

Source: 100% Recycled HDPE Resins

Form Tested: Four sand-filled Rings attached by grid and confined by taping (see photographs)

Sample No.	Total Load (lbs)	Gross Area Strength (psi)	Net Area Strength (psi)	Deflection (in.)
1	500,000*	15,940	15,940	0.575
2	500,000*	15,940	15,940	0.581
3	500,000*	15,940	15,940	0.579
	Average	15,940	15,940	0.578

Note:
1. *Maximum total load was not achieved, 500,000 pounds is the maximum load of this testing machine.
2. Testing Machine: Forney Model No. F-502F-F96
   Serial No. 03040
   Capacity: 500,000 pounds
3. Silica Sand: Oglebay/Norton washed silica sand, Colorado Springs, Colorado
4. Sand was confined by taping ring edges.
5. Area calculated is the total gross and net area including the area filled by sand.

FOR ALL AREAS LABELED AS GRASSPAVE MATERIAL
SEE SHEET C-0206 FOR SPECIFICATIONS

NOTE:
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WALTER L. PHILLIPS INCORPORATED
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Landscape Architects • Arborists
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DRAWN: AI
CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

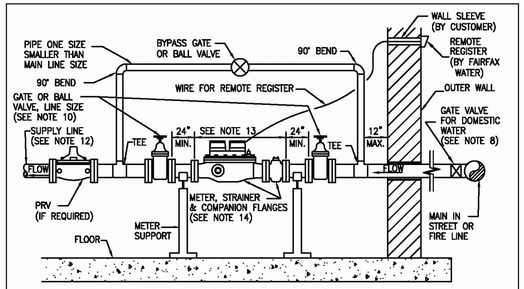
NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE
REVISION APPROVED BY					

SCALE: AS NOTED
DATE: 9/12/2017

DETAILS

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0204



TYPICAL INSTALLATION SECTION VIEW

NOTES:
1. THE WATER METER WILL BE LOCATED IN AN ACCESSIBLE LOCATION AND WILL NOT BE INSTALLED UNDER EXISTING PIPING OR CLOSE TO OTHER FACILITIES. CRAWL SPACES ARE UNACCEPTABLE.
2. WATER METER TO BE INSTALLED NOT MORE THAN 2.0' ABOVE THE FLOOR, OR CLOSER THAN 1.0' TO ANY WALL OR OTHER FIXED OBJECT.
3. THE DEVELOPER SHALL MAKE PROVISIONS FOR DISCHARGE OF A LARGE VOLUME OF EXCESS WATER RESULTING FROM METER TESTING AND METER REPAIRS AS REQUIRED BY FAIRFAX WATER.
4. THE METER INSTALLATION WILL BE INSPECTED AND APPROVED BY FAIRFAX WATER. CALL 703-289-6402 FOR INSPECTION PRIOR TO PLACING LINE IN SERVICE. (REMOTE REGISTER TO BE INSTALLED OUTSIDE BUILDING IF REQUIRED).
5. IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO PREVENT THE METER FROM FREEZING.
6. SUPPORT IS REQUIRED FOR THE METER.
7. INCOMING LINE SIZE MUST BE THE SAME AS METER SIZE AT LEAST 3' BEFORE THE METER.
8. A 3" MINIMUM GATE VALVE WITH A 2" OPERATING NUT MUST BE INSTALLED AT THE MAIN IN THE STREET OR FIRE LINE.
9. NO TAPS, PRV'S, STRAINERS, OR BACKFLOW PREVENTOR ARE TO BE INSTALLED BEFORE METER.
10. GATE VALVES OR BALL VALVES MUST BE INSTALLED ON BOTH SIDES OF THE METER, AND ON THE BYPASS. BUTTERFLY VALVES ARE NOT ACCEPTABLE.
11. FAIRFAX WATER TO SUPPLY AND INSTALL REMOTE REGISTER. WIRE FOR REMOTE REGISTER TO BE FURNISHED BY FAIRFAX WATER AND INSTALLED BY CUSTOMER IF REQUIRED.
12. BACKFLOW PREVENTIONS WILL BE REQUIRED IN ACCORDANCE WITH FAIRFAX COUNTY'S REGULATIONS.
13. 3" METER IS 24" LONG, 4" IS 29" LONG AND 6" IS 36" LONG.
14. METER, STRAINER AND COMPANION FLANGES FURNISHED BY FAIRFAX WATER AND INSTALLED BY CUSTOMER.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
INTERIOR METER INSTALLATION WITH BY-PASS 3" AND LARGER COMPOUND METERS	DRAWING NO. 11
DATE: 1/12	

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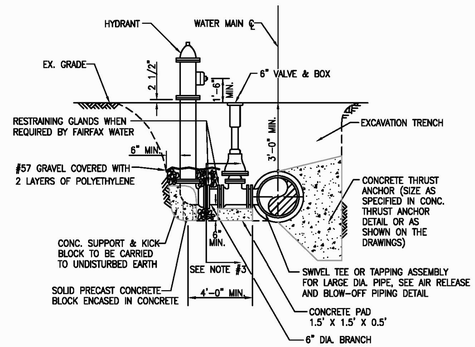

NOTES:
1. IF SWIVEL TEE IS NOT USED, VALVE MUST BE RESTRAINED TO TEE WITH RESTRAINING GLANDS BY CONTRACTOR.
2. HYDRANT'S SHALL BE PAINTED AS FOLLOWS:
   HYDRANT BARREL– DURON DTM GLOSS CHINESE RED PAINT # 601834864.
   TOPS AND CAPS – DURON DURACLAD READY MIX ALUMINUM PAINT #601839327.
3. POLYETHYLENE PIPE WRAPPING TO CONTINUE UP TO 90 DEGREE BEND AT BASE OF HYDRANT.
4. FOR HYDRANT LOCATION IN REGARD TO FACE OF CURB, SEE FAIRFAX COUNTY PUBLIC FACILITIES MANUAL.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
STANDARD HYDRANT INSTALLATION	DRAWING NO. 30
DATE: 1/12	

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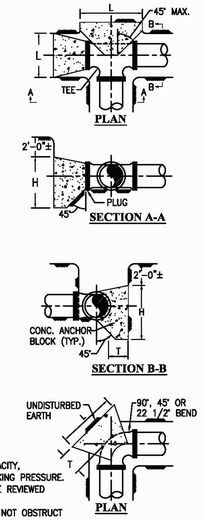
PIPE SIZE INCHES	DEGREE OF BEND (ø)	(1) WORKING PRESSURE (175 PSI) L	H	T
6	90	3.0	2.0	1.25
	45	2.0	1.5	1.0
	22.5	1.5	1.0	1.0
8	90	4.0	2.5	1.75
	45	2.5	2.0	1.0
	22.5	2.0	1.5	1.0
12	90	5.5	4.0	2.25
	45	4.0	3.0	1.5
	22.5	3.0	2.0	1.0
16	90	7.5	5.0	3.25
	45	5.0	4.5	2.0
	11.25/22.5	4.0	3.0	1.5
20	90	9.5	6.0	4.0
	45	7.0	4.5	2.75
	11.25/22.5	5.5	3.0	2.0
24	90	13.0	6.5	5.5
	45	9.0	5.0	3.5
	11.25/22.5	6.0	4.0	2.0



NOTES:
1. MINIMUM CONCRETE ANCHOR BLOCK DIMENSIONS IN FEET.
2. PROVIDE FORM WORK FOR ALL CONCRETE.
3. CONCRETE SHALL BE CLASS D 2000 PSI.
4. THE ABOVE TABLE IS BASED ON 2000 PSF SOIL BEARING CAPACITY, R=2PA SIN (ø/2) AND FOR A TEST PRESSURE = 1.5 x WORKING PRESSURE.
5. ANCHOR BLOCK DESIGN FOR PIPE LARGER THAN 24" SHALL BE REVIEWED ON AN INDIVIDUAL BASIS BY FAIRFAX WATER.
6. WRAP FITTING WITH POLYETHYLENE SHEETING. CONCRETE MUST NOT OBSTRUCT ACCESS TO MECHANICAL JOINT ASSEMBLY.
7. CONCRETE ANCHOR BLOCK DIMENSIONS FOR TEES TO BE SAME AS FOR 90° BENDS.
8. HEIGHT OF CONCRETE ANCHOR BLOCK ABOVE PIPE CENTERLINE IS 1/3 THE H DIMENSION.
9. BLOCKING SHALL BACK TO UNDISTURBED EARTH.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
CONCRETE THRUST ANCHORS	DRAWING NO. 23
DATE: 1/12	

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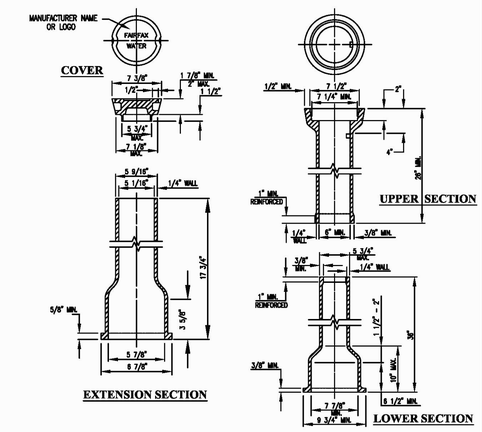

NOTES:
1. THE MANUFACTURER IDENTIFICATION AND COUNTRY OF ORIGIN (IF OTHER THAN U.S.) SHALL BE CAST INTO ALL PARTS.
2. GUARD POSTS ARE NOT TO BE INSTALLED AT VALVES UNLESS INDICATED ON DRAWINGS, OR AS SPECIFIED BY FAIRFAX WATER.
3. VALVE BOX MUST MEET SPECIFICATIONS CONTAINED IN FAIRFAX WATER'S APPROVED PRODUCTS LIST.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
VALVE BOX	DRAWING NO. 27
DATE: 1/12	

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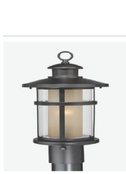
4/17/2017 VaxcelLightingLights.com Cutsheet

STYLES of LIGHTING



T0088 - Cadiz - One Light Outdoor Post Lantern by Vaxcel Lighting

Specs

Family/Collection:	Cadiz
Height:	16.50"
Length:	9.00"
Width/Diameter (+/-):	9.00"
# of Bulbs:	1
Standard Wattage:	10W
Bulb Type:	Medium
Weight:	3.17 lbs.

Style and Options 1

Style:	Oil Rubbed Bronze Finish with Clear/Amber Glass
Item #:	T0088
Price:	$178.00

FOR POLE LIGHTING (OR SIMILAR)

CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE.

MADRAX

MADRAX DIVISION
GRABER MANUFACTURING, INC.
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WAUNAKEE, WI 53597
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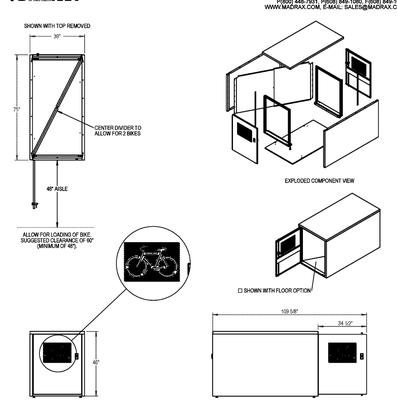
WWW.MADRAX.COM, E-MAIL: SALES@MADRAX.COM



CHECK LOCKING STYLE
- STEEL PADLOCK STYLE HANDLE (PADLOCK NOT INCLUDED)
- HEAVY DUTY 4398 POP-OUT T® HANDLE WITH 2 USER KEYS (KEYED DIFFERENTLY)
- STEEL U-LOCK AND PADLOCK STYLE HANDLE (PADLOCK AND U-LOCK NOT INCLUDED)

OTHER AVAILABLE OPTIONS:
- PERFORATED WALLS AND DOORS
- GRAB HOOKS
- NUMBER PLATES
- GRAFFITI RESISTANT ADDITIONAL COATING

PRODUCT: ML2F-PD
DESCRIPTION: MADLOCK, BIKE LOCKER
1 UNIT - 2 DOOR, 2 BIKE CAPACITY
WITH FLOOR AND BIKE PERF DOOR
DATE: 5-13-16
ENG: SMZ

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NOTES:
1. INSTALL BIKE RACKS ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. CONSULTANT TO SELECT COLOR/FINISH. SEE MANUFACTURER'S SPECIFICATIONS.
3. SEE SITE PLAN FOR LOCATION OR CONSULT OWNER.

BIKE LOCKER

CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE.

Cape May Downward Low Voltage Post Cap Light By LMT Mercer

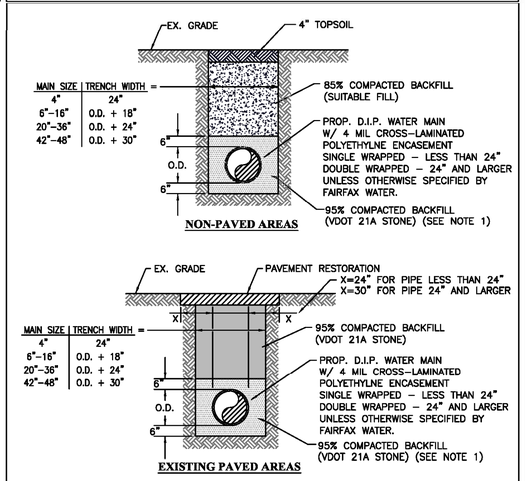
★★★★★ 2 Reviews

Cape May Downward Low Voltage Post Cap Light by LMT Mercer - White

FOR BOLLARD LIGHTING (OR SIMILAR)

CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE.

PRODUCT SPECIFICATIONS	
Colors	Standard Colors: Almond, Beige, Khaki, White Premium Colors: Antique Brown, Antique Copper, Antique Gold, Antique Gray, Black Hammertone, Patina
Post Cap Opening Size	4-1/16" and 5-1/16"
Voltage	12 volts DC
Wattage	About 1 watt per cap
Transformer Type	DC
Compatible Transformers	Click here to read more about choosing the right transformer Click here to view a list of DC transformers
Compatible Dimmers	Low Voltage LED Dimmer by LMT Mercer
Compatible Wire	18-2
Material Type	Vinyl
Bulb	Integrated LED
Color Temperature	Cool white (5000 Kelvin)
Overall Dimensions (width x depth x height)	n/a
Inset Measurement	1/2"
Wire Leads	8' harness (female connection)



NOTES:
1. VDOT NO. 57 STONE SHALL BE USED AT CREEK CROSSINGS OR IN AREAS WHERE TRENCH CONTAINS GROUND WATER.
2. ALL PAVEMENT RESTORATION AND COMPACTED BACKFILL WITHIN VDOT ROW SHALL ADHERE TO ALL APPLICABLE VDOT SPECIFICATIONS.
3. RESTRAINED JOINT PIPE SHALL BE IDENTIFIED WITH MARKING TAPE PLACED 2 FEET ABOVE PIPE.
4. ALL WATER MAIN INSTALLATION IN AREAS WITH PROPOSED PAVING SHALL ADHERE TO APPROVED DEVELOPMENT PLAN.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
TRENCH – DUCTILE IRON PIPE	DRAWING NO. 12
DATE: 1/12	

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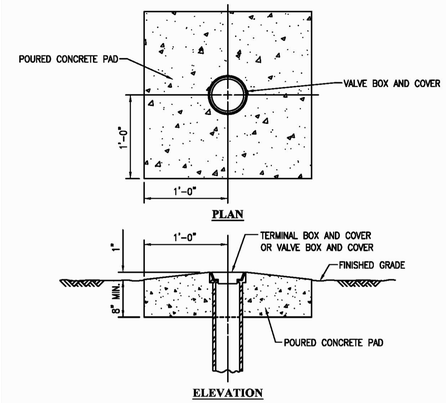

NOTES:
1. CONCRETE PADS FOR WATER MAIN VALVE AND TERMINAL BOX ARE TO BE INSTALLED USING REQUIREMENTS FOR CLASS "D" CONCRETE (2000 PSI).
2. VALVE BOX CONCRETE PAD TO BE INSTALLED ON ALL VALVES IN NON-PAVED AREAS OR AS DIRECTED BY FAIRFAX WATER.
3. GUARD POSTS ARE NOT TO BE INSTALLED AT VALVES UNLESS INDICATED ON DRAWINGS, OR AS SPECIFIED BY FAIRFAX WATER.

FAIRFAX WATER STANDARD DETAILS	SCALE: NOT TO SCALE
VALVE BOX CONCRETE PAD	DRAWING NO. 28
DATE: 1/12	

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NOTE:
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DETAILS

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Landscape Architects • Arborists
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DATE: 9/12/2017

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

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

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0205

Invisible Structures, Inc.
1600 Jackson St., Suite 310
Golden, CO 80401
Toll Free 800-233-1510
Phone 303-233-8383
Fax 303-233-8282
E-Mail sales@invisiblestructures.com
Website www.invisiblestructures.com

April 2015

Grasspave2 Product Specification (CSI Format)

Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat* (1995 Edition), *SectionFormat*, and *PageFormat*, contained in the CSI *Manual of Practice*.

The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

SECTION 32 12 43
POROUS FLEXIBLE PAVING
(Formerly 02795 Porous Paving)

Notes: This section covers Grasspave2 Porous Pavement System from Invisible Structures. The system provides vehicular and heavy load support over grass areas while protecting grass roots from harmful effects of traffic.

The major components of the complete system are the Grasspave2 units, an engineered base course, Hydrogrow soil amendment/fertilizer, sand, and grass from seed, hydromulch, or sod.

Consult Invisible Structures, Inc. for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Porous pavement system.

1.2 RELATED SECTIONS

A. Section [31 20 00 – Earth Moving] [__ __ __ - _____].
B. Section [33 46 00 – Subdrainage] [__ __ __ - _____].
C. Section [32 10 00 – Bases, Ballasts, and Paving] [__ __ __ - _____].

Notes: Edit the following list as required for the project. List other sections with work directly related to the porous pavement system.

D. Section [32 30 00 - Site Improvements] [__ __ __ - _____].
E. Section [32 90 00 Planting] [__ __ __ - _____].
F. Section [32 92 00 – Manufacturers of Turfs and Grasses] [__ __ __ - _____].
G. Section [32 80 00 – Irrigation or Section 32 84 13 – Drip Irrigation] [__ __ __ - _____].

1.3 REFERENCES

A. ASTM F 1951-08 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
B. ASTM D 638-10 Standard Test Method for Tensile Properties of Plastics
C. ASTM C 33 Standard Specification for Concrete Aggregates
D. AASHTO M6 Standard Specification for Fine Aggregate for Hydraulic Cement Concrete

1.4 SYSTEM DESCRIPTION

A. The Grasspave2 porous pavement system provides vehicular and pedestrian load support for grass areas, while protecting grass roots from harmful effects of traffic.
B. Major Components of the Complete System
1. Grasspave2 units, assembled in rolls.
2. Engineered sand and gravel base course.
3. Hydrogrow soil amendment and fertilizer, supplied with Grasspave2.
4. Sand fill or USGA greens mix.
5. Selected grass from seed, hydroseeding/hydro-mulching, or sod.
6. Selected topsoil (only for seeded installation).
7. Mulch (needed only for seeded or hydroseeded installations).
C. The Grasspave2 grass paving units, sand, and base course work together to support imposed loading.
D. The Grasspave2 grass paving units, Hydrogrow, and sand fill contribute to vegetation support.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00.
B. Shop Drawings: Submit design detail showing proper cross-section.
C. Samples: Submit manufacturer's sample of Grasspave2 10" x 10" section of Grasspave2 material.
D. Installation Instructions: Manufacturer's printed installation instructions. Include methods for maintaining installed products.
E. Certificates:
1. Manufacturer signed certificate stating the product is made in the USA.
2. Submit Material Certificates for base course and sand (or USGA mix) fill materials
3. Product certificates signed by the manufacturer certifying material compliance of polyethylene used to make Grasspave2 units.
4. ISO Certificate certifying manufacturer's quality management system is currently registered to ISO 9001:2008 quality standards.
F. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
3. Description of Grasspave2 in stormwater design to limit the disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff and eliminating contaminants.
4. Designing elements for Grasspave2 to limit the disruption and pollution of natural water flows by managing stormwater runoff.
5. Documenting the use of Grasspave2 to reduce heat islands to minimize the impact on

microclimates and human and wildlife habitats.

G. Substitutions: No material will be considered as an equivalent to the Grasspave2 unit specified herein unless it meets all areas of this specification without exception. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Specifier to prove equivalency.
H. Manufacturer's Material Certification: Product manufacturers shall provide certification of compliance with all applicable testing procedures and related specifications upon written request. Request for certification shall be submitted by the purchasing agency no later than the date of order placement.
I. Product manufacturers shall also have a minimum of 30 years' experience producing products for porous pavement systems.
J. Manufacturer Quality Certification: ISO Certification certifying manufacturer's quality management system for its Grasspave2 system is currently registered to ISO 9001:2008 quality standards. Any alternate materials submitted shall provide a certification that their porous pavement system manufacturing process is part of an ISO program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Protect Grasspave2 units/rolls from damage during delivery and store rolls upright, under tarp, to protect from sunlight, when time for delivery to installation exceeds one week.
C. Store Hydrogrow in a dark and dry location
D. Handling: Protect materials during handling and installation to prevent damage

1.7 MAINTENANCE SERVICE

Notes: Once healthy turf has been established, the cell wall structure will have minimal visibility when proper turf maintenance practices are followed.

A. Installer responsible for maintenance of grass plants – water/irrigation, fertilizing, mowing – for one growing season. DO NOT AERATE. See *Grasspave2 Maintenance Guide* from Invisible Structures
B. System to be maintained by _____, after one growing season.

1.8 Project Conditions

A. Maintain environmental conditions within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
B. Do not begin installation of porous pavements until all hard surface paving adjacent to porous pavement areas, including concrete walks and asphalt paving, is completed.
C. Install turf when ambient air temperatures is at least 55 degrees F (13 degrees C).
D. In cold weather, do not use frozen materials or materials mixed or coated with ice or frost, and do not build on frozen base or wet, saturated or muddy subgrade.
E. Protect partially completed paving against damage from other construction traffic when work is in progress.
F. Adequately water sod or grass seed to assure germination of seed and growth of root system.
G. Grass coverage on the sand-filled Grasspave2 rings must be completed within one week: See *Part 3 Execution*.
H. DO NOT DRIVE, PARK ON, or use Grasspave2 system for two or three mowing cycles until grass root system has matured (about 3 to 4 weeks for sod or 6 to 8 weeks for seeded areas). Any barricades constructed must still be accessible by emergency and fire equipment during and after installation.

1.9 LIMITED WARRANTY

A. Invisible Structures, Inc. (ISI) warrants to its purchasers that all products furnished by ISI will be free from defects in material and/or workmanship.
B. This warranty shall be extended for a period of five (5) years following the date of shipment by ISI.
C. Providing a written claim is presented to ISI within the warranty period and after inspection by ISI showing the materials have failed under this warranty, all defective materials shall be refurnished under this warranty, at no charge, excluding re-installation costs. This in lieu of all other warranties expressed or implied and is the sole warranty extended by ISI.
D. Our liability under this warranty is limited to the refurnishing of materials and does not include any responsibility for incidental, consequential, or other damages of any nature.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Invisible Structures, Inc., which is located at: 1600 Jackson St. Suite 310 ; Golden, CO 80401; Toll Free Tel: 800-233-1510; Tel: 303-233-8383; Email: request info (sales@invisiblestructures.com); Web: www.invisiblestructures.com.
B. Substitutions: Not permitted.

2.2 GRASSPAVE2

A. Composition:
1. Manufactured in the USA.
2. High density polyethylene (HDPE): 100 percent recycled materials.
3. Color: black
4. Color Uniformity: Uniform color throughout all units rolls.
5. Carbon Black for ultraviolet light stabilization.
6. Hydrogrow soil amendment and fertilizer, provided by manufacturer with Grasspave2.
B. Performance Properties:
1. Maximum Loading Capability: 15,940 psi (2.29 million psf, 109,906 kPa) when filled with sand.
2. Wheelchair Access testing for ADA Compliance: Passing ASTM F 1951-08.
3. Wheelchair Access testing for ADA Compliance: Passing Rotational Penetrometer testing.
4. Tensile strength, pull-apart testing: 458 lbf/in from ASTM D638 Modified.
5. System Permeability (Grasspave2, sand, base course): 2.63 to 38.55 inches of water per hour.
6. Effective Imperviousness (E.I.): 10%.
C. Dimensions (individual units are assembled and distributed into rolls):
1. Roll area: From 108 sq ft (10 sq m) to 538 sq ft (50 sq m), in 108 sq ft (10 sq m) increments
2. Roll Widths: From 3.3 ft (1 m) to 8.2 ft (2.5 m), in 1.6 ft (0.5 m) increments.
3. Roll Lengths: From 32.8 ft (10m) to 65.6 ft (20 m), in 3.3 ft (1 m) increments.
4. Roll Weights: From 41 lbs (19kg) to 205 lbs (93kg), in 41 lbs (19 kg) increments.
5. Unit Nominal Width by Length: 20 inches by 20 inches (0.5 m by 0.5 m) or 40 inches by 40 inches (1 m by 1 m).
6. Nominal Depth: 1 inch (2.5 cm) – for rolls and individual units.
7. Unit Weight: 18 oz (510 g) or 5 lbs. (2.27 kg).
8. Volume Solid: 8 percent.

2.3 SYSTEM MATERIALS

Notes: All measurements are subject to manufacturing tolerances, unless otherwise specified.

A. Base Course: Sandy gravel material from local sources commonly used for road base construction (recycled materials such as crushed concrete or crushed asphalt are NOT acceptable).
1. Conforming to the following sieve analysis and requirements:
a. 100 percent passing sieve size 1 inch (25 mm).
b. 90-100 percent passing sieve size 3/4 inch (19 mm).
c. 70-80 percent passing sieve size 3/8 inch (9 mm).
d. 55-70 percent passing sieve size #4.
e. 45-55 percent passing sieve size #10.
f. 25-35 percent passing sieve size #40.
g. 3-8 percent passing sieve size #200.
2. Provide a base course material nearly neutral in pH (range from 6.5 to 7.2) to provide adequate root zone development for turf.
3. Material may be either "pit run" or "crusher run." Avoid using clay based crusher run/pit run. Crusher run material will generally require coarse, well-draining sand conforming to AASHTO M6 or ASTM C 33 to be added to mixture (20 to 30 percent by volume) to ensure long-term porosity.
4. Alternative materials such as crushed shell, limerock, or crushed lava may be used for base course use, provided they are mixed with sharp sand (20 to 30 percent) to ensure long-term porosity, and are brought to proper compaction. Without added sand, crushed shell and limerock set up like concrete and become impervious.
5. Alternative size and/or composition of base course materials should be submitted to Invisible Structures, Inc. (Manufacturer) for approval.
B. Sand Fill for Rings and Spaces Between Rings: Clean sharp sand (washed concrete sand). Choose one of the following:
1. Coarse, well-draining sand, such as washed concrete sand conforming to AASHTO M6 or ASTM C-33.
2. United States Golf Association (USGA) greens, section - sand mix "The Root Zone Mixture."
C. Turf Conditioner:
1. Hydrogrow a proprietary soil amendment manufactured by Invisible Structures, Inc. and provided with Grasspave2.
2. NO SUBSTITUTIONS.

Notes: Use grass species resistant to wear by traffic generally a Blue/Rye/Fescue mix used for athletic fields in northern climates, and Zoysia, Fescue, or Bermuda types in southern climates. Check with local sod and seed suppliers for preferred mixtures. Dedicated fire lanes can use same grass species used on surrounding turf. Parking applications require greatest wear-resistant species possible, generally available only by seed or hydroseeding/hydro-mulching.

D. Grass – Choose either sod or seed:

1. Sod: [_____]. Use 13 mm (0.5") thick (soil thickness) rolled sod from a reputable local grower. Species should be wear resistant, free from disease, and in excellent condition. Sod shall be grown in sand or sandy loam soils only. Sod grown in soils of clay, silt, or high organic materials such as peat, will not be accepted.
2. Seed: [_____]. Use seed materials, of the preferred species for local environmental and projected traffic conditions, from certified sources. Seed shall be provided in containers clearly labeled to show seed name, lot number, net weight, % weed seed content, and guaranteed % of purity and germination. Pure Live Seed types and amount shall be as shown on plans.
a. Mulch – needed only for hydroseeding: Wood or paper cellulose commercial mulch materials compatible with hydroseeding operations. Mulch depth according to mulch

manufacturers' recommendation. DO NOT use mulch of straw, pine needles, etc., because of their low moisture holding capacity.
b. Topsoil – needed only for seeding, recommended for hydroseeding: Obtain specified topsoil for a light "dusting" (no more than ½" or 13mm) above rings filled with sand for seeding germination.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine subgrade and base course installed conditions. Do not start porous paving installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.
B. For fire lane installations: prior to installing base course for turf paving, obtain approval of local fire authorities of sub-base.
C. Start of installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Architect for resolution.

3.2 PREPARATION

Notes: Ensure that subbase materials are structurally adequate to receive designed base course, wearing course, and designed loads. Generally, excavation into undisturbed normal strength soils will require no additional modification. Fill soils and otherwise structurally weak soils may require modifications, such as geotextiles, geogrids, and/or compaction (not to exceed 90%). Ensure that grading and soil porosity of the subbase will provide adequate subsurface drainage

A. Subgrade Preparation:
1. Prepare subgrade as specified in Section 32 10 00. Verify subgrade in accordance with porous paving system manufacturer's instructions.
2. Proper subgrade preparation will enable the Grasspave2 rolls/units to connect properly and remain

Notes: For Fire lanes and emergency access, It is recommended that Fire Department inspectors be scheduled to inspect installation of Grasspave2 during preparation of the subbase, installation of the base course, and installation of Grasspave2 units. Most small projects can accommodate these inspections all on the same day. Verify with Fire Department if certificates of inspection are required.

level and stationary after installation.
3. Excavate area allowing for unit thickness, the engineered base depth (where required), and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).
4. Provide adequate drainage from excavated area if area has potential to collect water, when working with in-place soils that have poor permeability.
5. Ensure in-place soil is relatively dry and free from standing water.
6. Uniformly grade base.
7. Level and clear base of large objects, such as rocks and pieces of wood.
B. Base Preparation:
1. Install Base as specified in Section 32 10 00. Verify engineered base (if required) is installed in accordance with porous paving system manufacturer's instructions.
2. Coordinate base installation and preparation with subdrains specified in Section 33 46 00.
3. If required, place a geotextile separation layer between the natural ground and the 'engineered base'.
4. If required, install the specified sub-drain and outlet according to construction drawings.
5. Coordinate base installation and preparation with irrigation and drip irrigation lines specified in Section 32 80 00 and 32 84 13, respectively.
6. Place engineered base in lifts not to exceed 6 inches (150 mm), compacting each lift separately to

95 percent Modified Proctor.
7. Leave 1 inch (2.5 cm) of depth below final grade for porous paver unit and sand fill and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).

Notes: Delete requirement for on-site manufacturer's field representative if not required

3.3 ON-SITE MANUFACTURER'S FIELD REPRESENTATIVE

A. A qualified Manufacturer's field representative shall be available for a pre-construction meeting via phone or in person and will provide installation videos, design details, installation instructions, and the technical specifications.
B. The time for on-site observation shall be indicated in the Contract Documents and included in the base bid price.

3.4 HYDROGROW INSTALLATION

A. Spread all Hydrogrow mix provided (spreader rate = 4.53 kg per 100 m2 (10 lbs per 1076 ft2) evenly over the surface of the base course with a hand-held, or wheeled, rotary spreader.
B. The Hydrogrow mix should be placed immediately before installing the Grasspave2.

3.5 GRASSPAVE2 INSTALLATION

A. Install the Grasspave2 units by placing units with rings facing up, and using snap-fit connectors, pegs and holes, provided to maintain proper spacing and interlock the units. Units can be easily shaped with pruning shears or knife. Units placed on curves, slopes, and high traffic areas shall be anchored to the base course, using 40d common nails with fender washer, as required to secure units in place. Tops of rings shall be between 6 mm to 13 mm (0.25" to 0.5") below the surface of adjacent hard-surface pavements.
B. Install sand in rings as they are laid in sections by "back-dumping" directly from a dump truck, or from buckets mounted on tractors, which then exit the site by driving over rings already filled with sand. The sand is then spread laterally from the pile using flat bottomed shovels and/or wide "asphalt rakes" to fill the rings. A stiff bristled broom should be used for final "finishing" of the sand. The sand must be "compacted" by using water from hose, irrigation heads, or rainfall, with the finish grade no less than the top of rings and no more than 6 mm (0.25") above top of rings.

3.6 INSTALLATION OF GRASS

A. Grass coverage on the sand-filled rings must be completed within one week. Sand must be re-installed and leveled and Grasspave2 checked for integrity if rings become exposed due to wind, rain, traffic, or other factors. (Choose one paragraph below to meet grass installation method desired.)

Notes: Choose one paragraph below to match grass installation method

1. Preferred method: Hydroseeding/hydro-mulching - A combination of water, seed and fertilizer are homogeneously mixed in a purpose-built, truck-mounted tank. The seed mixture is sprayed onto the site at rates shown on plans and per hydroseeding manufacturer's recommendations. Coverage must be uniform and complete. Following germination of the seed, areas lacking germination larger than 20 cm x 20 cm (8" x 8") must be reseeded immediately. Seeded areas must be fertilized and kept moist during development of the turf plants.). DO NOT DRIVE ON SYSTEM:
Hydroseeded/hydro-mulch areas must be protected from any traffic, other than emergency vehicles, for a period of 6 to 8 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
2. Install thin sod directly over sand filled rings, filled no higher than the top of the rings. Sod strips should be placed with very tight joints. Sodded areas must be fertilized and kept moist during root

establishment (minimum of 3 weeks). DO NOT DRIVE ON SYSTEM: Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
3. Install grass seed at rates per grass type. A light "dusting" of commercial topsoil mix, not to exceed 1/2" (25 mm) will be placed above the rings and seed mix to aid germination rates. Seeded areas must be fertilized and kept moist during development of the turf plants.). DO NOT DRIVE ON SYSTEM: Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 6 to 8 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
B. Adequately water sod or grass seed to assure germination of seed and growth of root system.

3.7 PROTECTION

Notes: Choose one paragraph below to match grass installation method.

A. Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 4 to 8 weeks, or until the grass is mature to handle traffic.
B. Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until the root system has penetrated below the Grasspave2 units.

3.8 FIELD QUALITY CONTROL

A. Remove and replace segments of Grasspave2 units where three or more adjacent rings are broken or damaged, reinstalling as specified, so no evidence of replacement is apparent.
B. Perform cleaning during the installation of work and upon completion of the work. Remove all excess materials, debris, and equipment from site. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

3.9 MAINTENANCE

A. Maintain grass in accordance with manufacturer's instructions and as specified in Section 32 92 00 Manufacturers of Turfs and Grasses.
B. Lawn Care: Normal turf care procedures should be followed, including de-thatching.
C. DO NOT AERATE. Aerator will damage the Grasspave2 units. Aeration in not necessary in a sand root zone.
D. When snow removal is required, keep a metal edged plow blade a minimum of ¾ inch (17 mm) above the surface during plowing operations to avoid causing damage to the Grasspave2 units, or
1. Use a plow blade with a flexible rubber edge, or
2. Use a plow blade with skids on the lower outside corners set so the plow blade does not come in contact with the units.

END OF SECTION

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

WALTER L. PHILLIPS INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
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COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
PROFESSIONAL ENGINEER
9/12/17

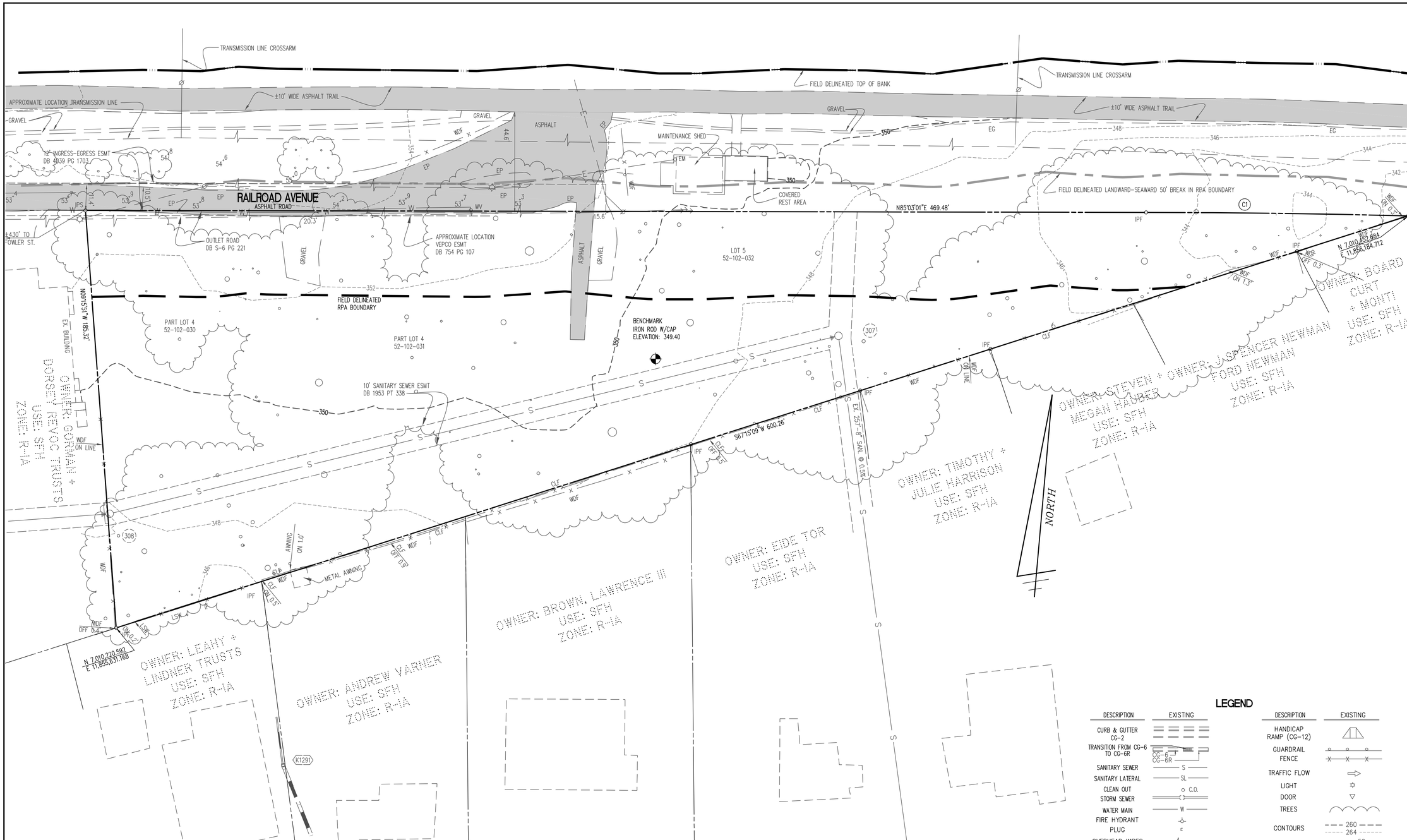
REVISION APPROVED BY				
NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

DRAWN: AL
CHECKED: KW
SCALE: AS NOTED
DATE: 9/12/2017

GRASS PAVE SPECIFICATIONS

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0206



NOTES:
1. RPA LINE SHOWN AS "FIELD DELINEATED" PER INFORMATION PROVIDED BY TNT ENVIRONMENTAL, INC.
2. EX. BUILDINGS ON SOUTHERN PROPERTIES ARE APPROXIMATE ONLY AND FROM RECORD INFORMATION.

SANITARY SEWER AS-BUILT

SMH 308	
TOP	349.36
8" INV IN (WEST)	338.41
8" INV OUT (SMH 307)	338.37
SMH 307	
TOP	348.65
8" INV IN (SMH 308)	335.45
8" INV OUT (SMH 305)	335.40
SMH 305	
TOP	341.55
8" INV IN (SMH 307)	334.05
8" INV IN (EAST)	333.92
8" INV OUT (WEST)	333.87

PIPE SIZES ARE FROM RECORD INFORMATION

STORM SEWER AS-BUILT

SD K1291	
GRATE INLET TOP =	343.51
6"DIP IN =	341.56
18" CMP OUT (SD K1290) =	340.36
SD K1290	
JUNCTION BOX TOP =	342.67
18"CMP IN (SD K1291) =	337.49
18"CMP OUT (SD K1230) =	337.42

CURVE TABLE

CURVE	RADIUS	LENGTH	DELTA	TANGENT	CHORD	CHORD BEARING
C1	4582.19'	116.00'	1°27'02"	58.01'	116.00'	N85°42'06"E

LEGEND

DESCRIPTION	EXISTING
CURB & GUTTER CG-2	
TRANSITION FROM CG-6 TO CG-6R	CG-6 CG-6R
SANITARY SEWER	S
SANITARY LATERAL	SL
CLEAN OUT	C.O.
STORM SEWER	
WATER MAIN	W
FIRE HYDRANT	
PLUG	
OVERHEAD WIRES	
UTILITY POLE	
UNDERGROUND ELECTRIC	UE
TELEPHONE	T
GAS MAIN	G
ELECTRICAL	E
TRANSFORMER	

DESCRIPTION	EXISTING
HANDICAP RAMP (CG-12)	
GUARDRAIL	
FENCE	
TRAFFIC FLOW	
LIGHT	
DOOR	
TREES	
CONTOURS	260 264
SPOT ELEVATION	+264 50
DRAINAGE FLOW DIRECTION	
TOP OF CURB	TC
BOTTOM OF CURB	BC
TOP OF WALL	TW
BOTTOM OF WALL	BW
HIGH POINT	H.P.
FIELD VERIFIED RPA BOUNDARY	
LIMITS OF CLEARING AND GRADING	

20 0 10 20 40 80

(IN FEET)
1 INCH = 20'

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DRAWN: AJ
CHECKED: KW
SCALE: 1" = 20'
DATE: 9/12/2017

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
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9/12/17
PROFESSIONAL ENGINEER

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

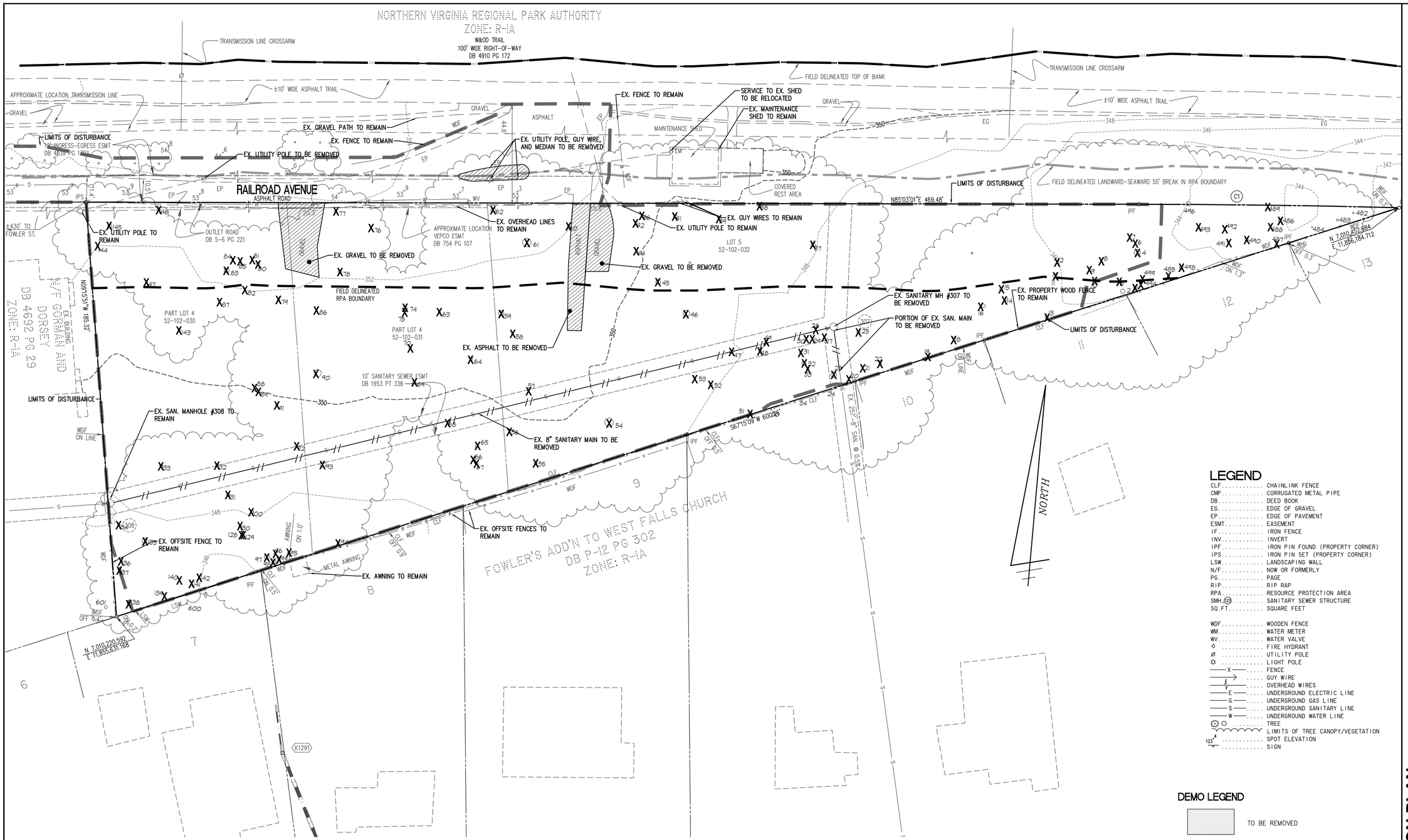
EXISTING CONDITIONS PLAN

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0301

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0301.dwg Xref:



LEGEND

CLF	CHAINLINK FENCE
CMP	CORRUGATED METAL PIPE
DB	DEED BOOK
EG	EDGE OF GRAVEL
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
IF	IRON FENCE
INV	INVERT
IPF	IRON PIN FOUND (PROPERTY CORNER)
IPS	IRON PIN SET (PROPERTY CORNER)
LSW	LANDSCAPING WALL
N/F	NOW OR FORMERLY
PG	PAGE
RIP	RIP RAP
RPA	RESOURCE PROTECTION AREA
SMH (S)	SANITARY SEWER STRUCTURE
SQ.FT	SQUARE FEET
WDF	WOODEN FENCE
WM	WATER METER
WV	WATER VALVE
◇	FIRE HYDRANT
ø	UTILITY POLE
☼	LIGHT POLE
—X—	FENCE
—→	GUY WIRE
—/—	OVERHEAD WIRES
—E—	UNDERGROUND ELECTRIC LINE
—G—	UNDERGROUND GAS LINE
—S—	UNDERGROUND SANITARY LINE
—W—	UNDERGROUND WATER LINE
☼ ○	TREE
⌒⌒⌒	LIMITS OF TREE CANOPY/VEGETATION
123.4	SPOT ELEVATION
—▽—	SIGN

DEMO LEGEND

	TO BE REMOVED
X	TREES TO BE REMOVED
	TO BE DEMOLISHED
	LIMITS OF DISTURBANCE

20 0 10 20 40 80

(IN FEET)
1 INCH = 20'

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DRAWN: AI
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9/12/17
PROFESSIONAL ENGINEER

SCALE: 1" = 20'
DATE: 9/12/2017

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

REVISION APPROVED BY

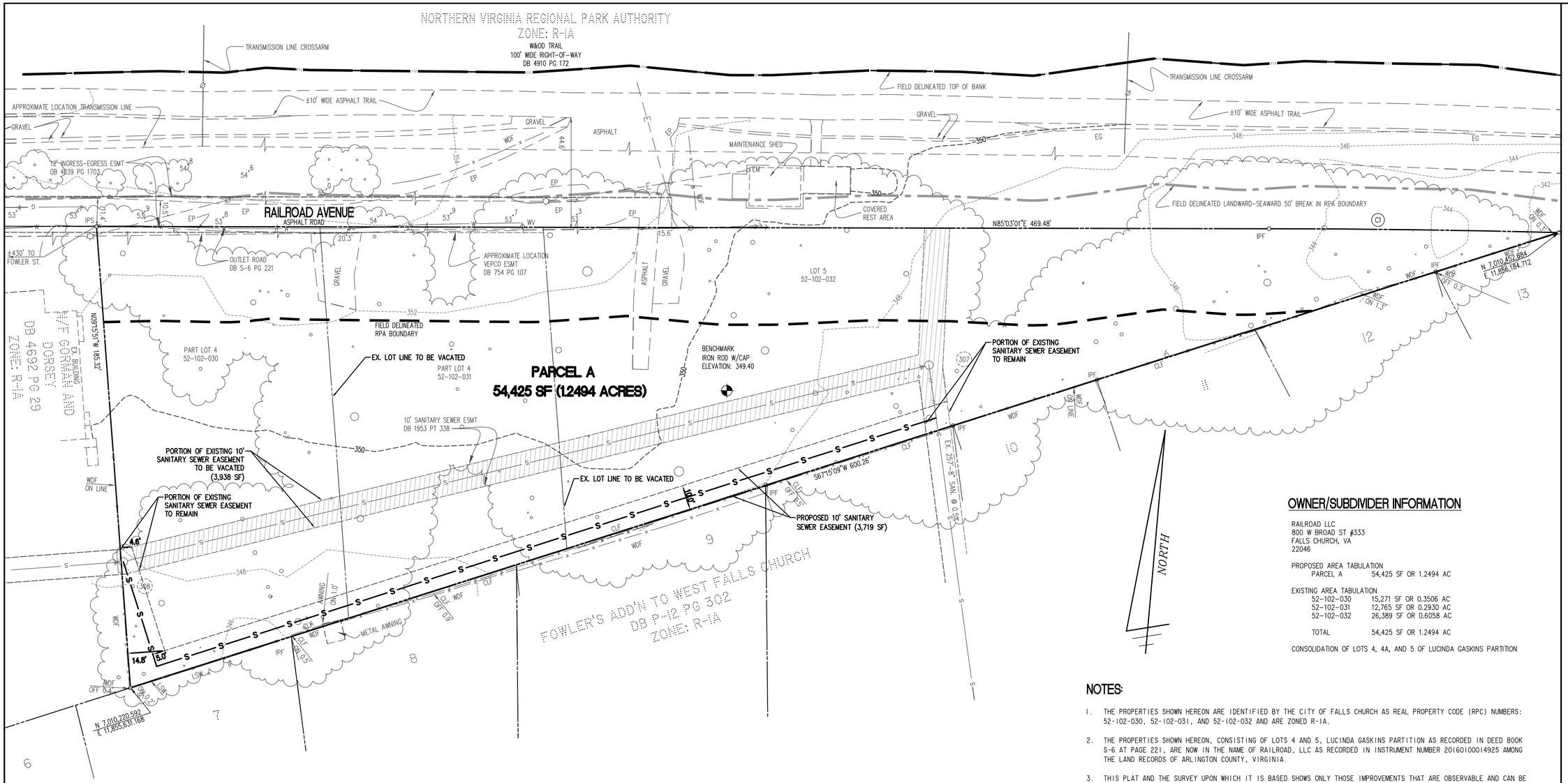
DEMOLITION PLAN

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0302.dwg Xref:

SHEET: C-0302



OWNER/SUBDIVIDER INFORMATION

RAILROAD LLC
800 W BROAD ST #333
FALLS CHURCH, VA
22046

PROPOSED AREA TABULATION

PARCEL A	54,425 SF OR 1.2494 AC

EXISTING AREA TABULATION

52-102-030	15,271 SF OR 0.3506 AC
52-102-031	12,765 SF OR 0.2930 AC
52-102-032	26,389 SF OR 0.6058 AC
TOTAL	54,425 SF OR 1.2494 AC

CONSOLIDATION OF LOTS 4, 4A, AND 5 OF LUCINDA GASKINS PARTITION

NOTES:

1. THE PROPERTIES SHOWN HEREON ARE IDENTIFIED BY THE CITY OF FALLS CHURCH AS REAL PROPERTY CODE (RPC) NUMBERS: 52-102-030, 52-102-031, AND 52-102-032 AND ARE ZONED R-1A.

2. THE PROPERTIES SHOWN HEREON, CONSISTING OF LOTS 4 AND 5, LUCINDA GASKINS PARTITION AS RECORDED IN DEED BOOK S-6 AT PAGE 221, ARE NOW IN THE NAME OF RAILROAD, LLC AS RECORDED IN INSTRUMENT NUMBER 201601000014925 AMONG THE LAND RECORDS OF ARLINGTON COUNTY, VIRGINIA.

3. THIS PLAT 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.

5. TOTAL AREA OF THE PROPERTY IS 54,425 SQUARE FEET OR 1.2494 ACRES.

6. THIS PLAT IS BASED ON A FIELD SURVEY BY THIS FIRM PERFORMED ON 8/25/2016.

7. THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAPS FOR THE CITY OF FALLS CHURCH, VIRGINIA, MAP NUMBER 5100540001C, REVISED JULY 16, 2004, DESIGNATES THE PROPERTY AS BEING IN ZONE X, "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN."

8. EASEMENTS, CONDITIONS, COVENANTS AND RESTRICTIONS, SHOWN AND/OR NOTED ARE PER THE TITLE REPORT ISSUED BY EKKO TITLE, FILE M-16050002, DATED BY DAVIS TITLE SERVICES JUNE 2, 2016.

9. 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 0.99994791. 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.

10. THIS SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, JAMES A. MADISON, JR., L.S., FROM AN ACTUAL [X] GROUND OR [ ] AIRBORNE SURVEY MADE UNDER MY SUPERVISION; THAT THE IMAGERY AND/OR ORIGINAL DATA WAS OBTAINED ON AUGUST 25, 2016; AND THAT THIS PLAT, MAP, OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.

11. THIS SURVEY WAS PERFORMED AT THE REQUEST OF THE YOUNG GROUP (BOB YOUNG).

12. THE PROPERTY IS SUBJECT TO AN AGREEMENT WITH VEPCO RECORDED IN DEED BOOK 1181 AT PAGE 329.

13. THERE ARE NO BUILDINGS ON THIS SITE. THERE WERE NO ADDRESSES POSTED. CITY OF FALLS CHRUCH RECORDS SHOW LOT 5 AS HAVING AN ADDRESS OF 1006 RAILROAD AVENUE.

LEGEND

CLF..... CHAINLINK FENCE
DB..... DEED BOOK
EG..... EDGE OF GRAVEL
EP..... EDGE OF PAVEMENT
ESMT..... EASEMENT
IF..... IRON FENCE
IPF..... IRON PIN FOUND (PROPERTY CORNER)
IPS..... IRON PIN SET (PROPERTY CORNER)
LSW..... LANDSCAPING WALL
N/F..... NOW OR FORMERLY
PG..... PAGE
RPA..... RESOURCE PROTECTION AREA
SMH (123)..... SANITARY SEWER STRUCTURE
SQ.FT..... SQUARE FEET
SSRPA..... SITE SPECIFIC RESOURCE PROTECTION AREA
WDF..... WOODEN FENCE
WM..... WATER METER
WV..... WATER VALVE
..... FIRE HYDRANT
..... UTILITY POLE
..... LIGHT POLE
—X—..... FENCE
..... GUY WIRE
..... OVERHEAD WIRES
—E—..... UNDERGROUND ELECTRIC LINE
—G—..... UNDERGROUND GAS LINE
—S—..... UNDERGROUND SANITARY LINE
—W—..... UNDERGROUND WATER LINE
..... TREE
..... LIMITS OF TREE CANOPY/VEGETATION
123.4 ..... SPOT ELEVATION
..... SIGN

SANITARY SEWER AS-BUILT

SMH 308	
TOP	349.36
8" INV IN (WEST)	338.41
8" INV OUT (SMH 307)	338.37
SMH 307	
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SMH 305	
TOP	341.55
8" INV IN (SMH 307)	334.05
8" INV IN (EAST)	333.92
8" INV OUT (WEST)	333.87

PIPE SIZES ARE FROM RECORD INFORMATION

CURVE TABLE

CURVE	RADIUS	LENGTH	DELTA	TANGENT	CHORD	CHORD BEARING
C1	4582.19'	116.00'	1°27'02"	58.01'	116.00'	N85°42'06"E

STORM SEWER AS-BUILT

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20 0 10 20 40 80
(IN FEET)
1 INCH = 20'

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ESTABLISHED 1945

DRAWN: AJ
CHECKED: KW
DATE: 9/12/2017
SCALE: 1" = 20'

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

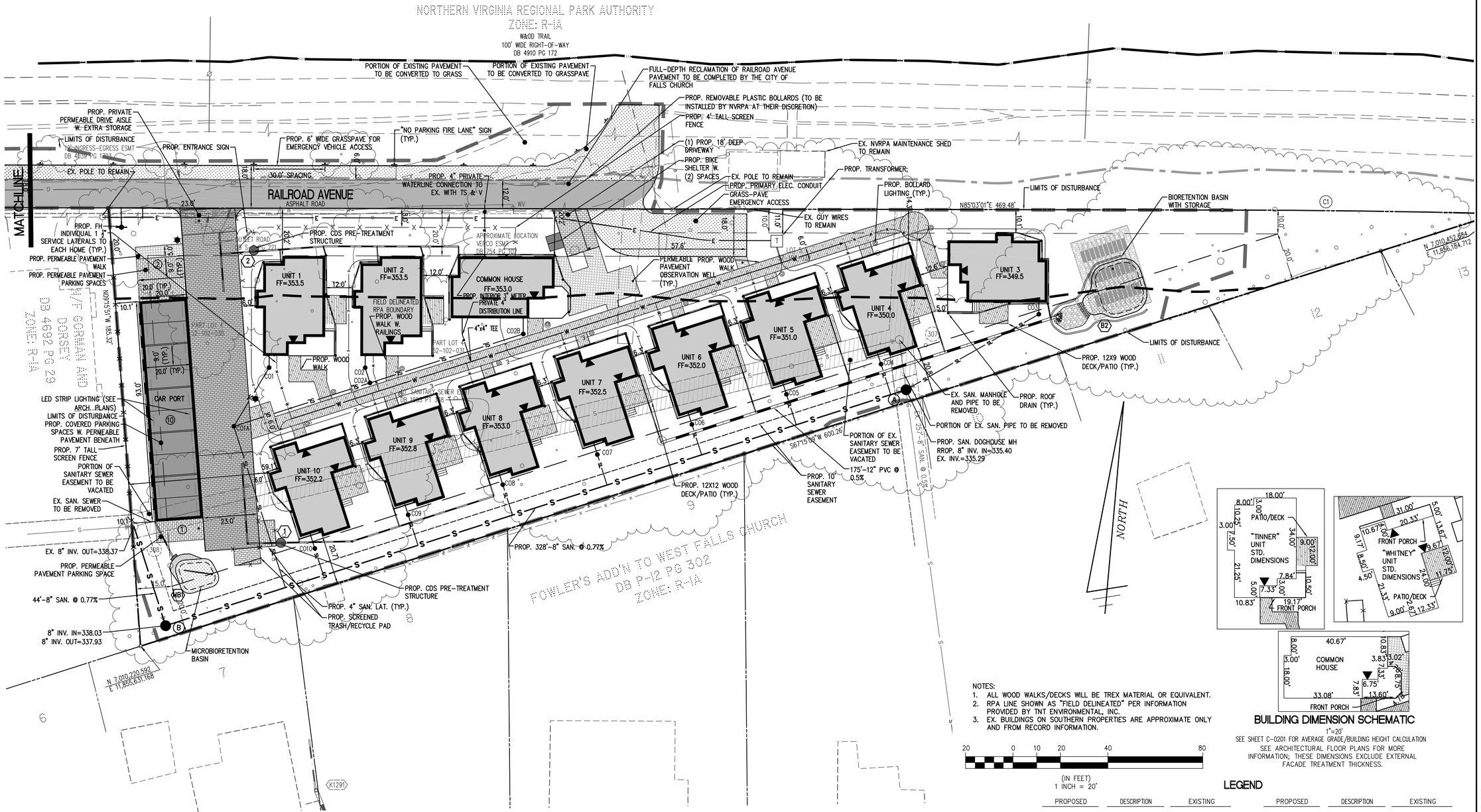
REVISION APPROVED BY

PRELIMINARY SUBDIVISION PLAT

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0303



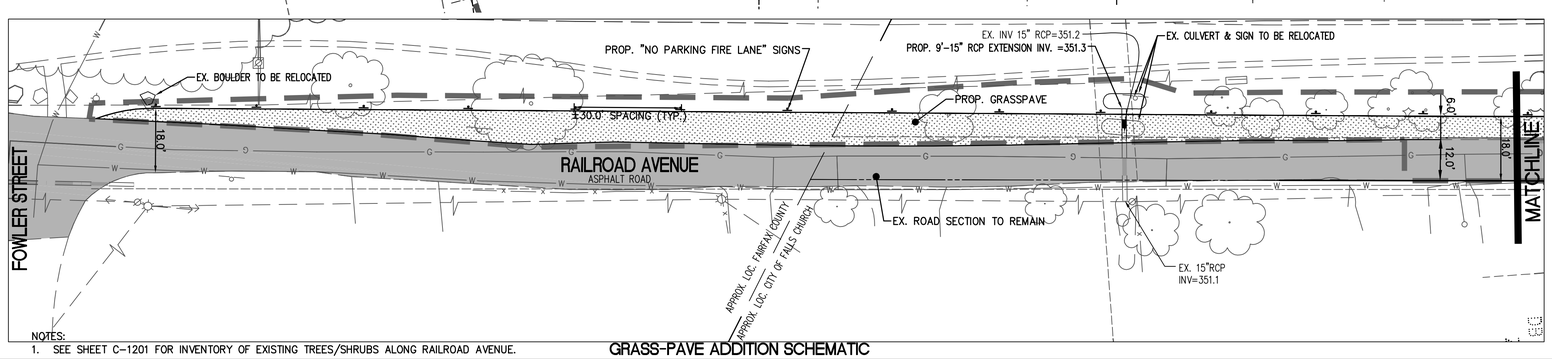
NOTES:
1. ALL WOOD WALKS/DECKS WILL BE TREX MATERIAL OR EQUIVALENT.
2. RPA LINE SHOWN AS "FIELD DELINEATED" PER INFORMATION PROVIDED BY TNT ENVIRONMENTAL, INC.
3. EX. BUILDINGS ON SOUTHERN PROPERTIES ARE APPROXIMATE ONLY AND FROM RECORD INFORMATION.

20 0 10 20 40 80
(IN FEET)
1 INCH = 20'

BUILDING DIMENSION SCHEMATIC

1"=20'

SEE SHEET C-0201 FOR AVERAGE GRADE/BUILDING HEIGHT CALCULATION
SEE ARCHITECTURAL FLOOR PLANS FOR MORE INFORMATION; THESE DIMENSIONS EXCLUDE EXTERNAL FACADE TREATMENT THICKNESS.



NOTES:
1. SEE SHEET C-1201 FOR INVENTORY OF EXISTING TREES/SHRUBS ALONG RAILROAD AVENUE.

GRASS-PAVE ADDITION SCHEMATIC

LEGEND

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	
CG-6R CG-6	TRANSITION FROM CG-6 TO CG-6R	CG-6 CG-6R
	SANITARY SEWER	S
SL	SANITARY LATERAL	SL
C.O.	CLEAN OUT	C.O.
	STORM SEWER	
	WATER MAIN	W
	FIRE HYDRANT	
	PLUG	

PROPOSED	DESCRIPTION	EXISTING
	OVERHEAD WIRES	
	UTILITY POLE	
UE	UNDERGROUND ELECTRIC	UE
T	TELEPHONE	T
G	GAS MAIN	G
E	ELECTRICAL	E
	TRANSFORMER	
	HANDICAP RAMP (CG-12)	
	GUARDRAIL	
	FENCE	
	TRAFFIC FLOW	
	POLE LIGHT	
	DOOR	
	TREES	
	LIMITS OF CLEARING AND GRADING	
	TEST PIT	
	BOLLARD LIGHTING	

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KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

REVISION APPROVED BY

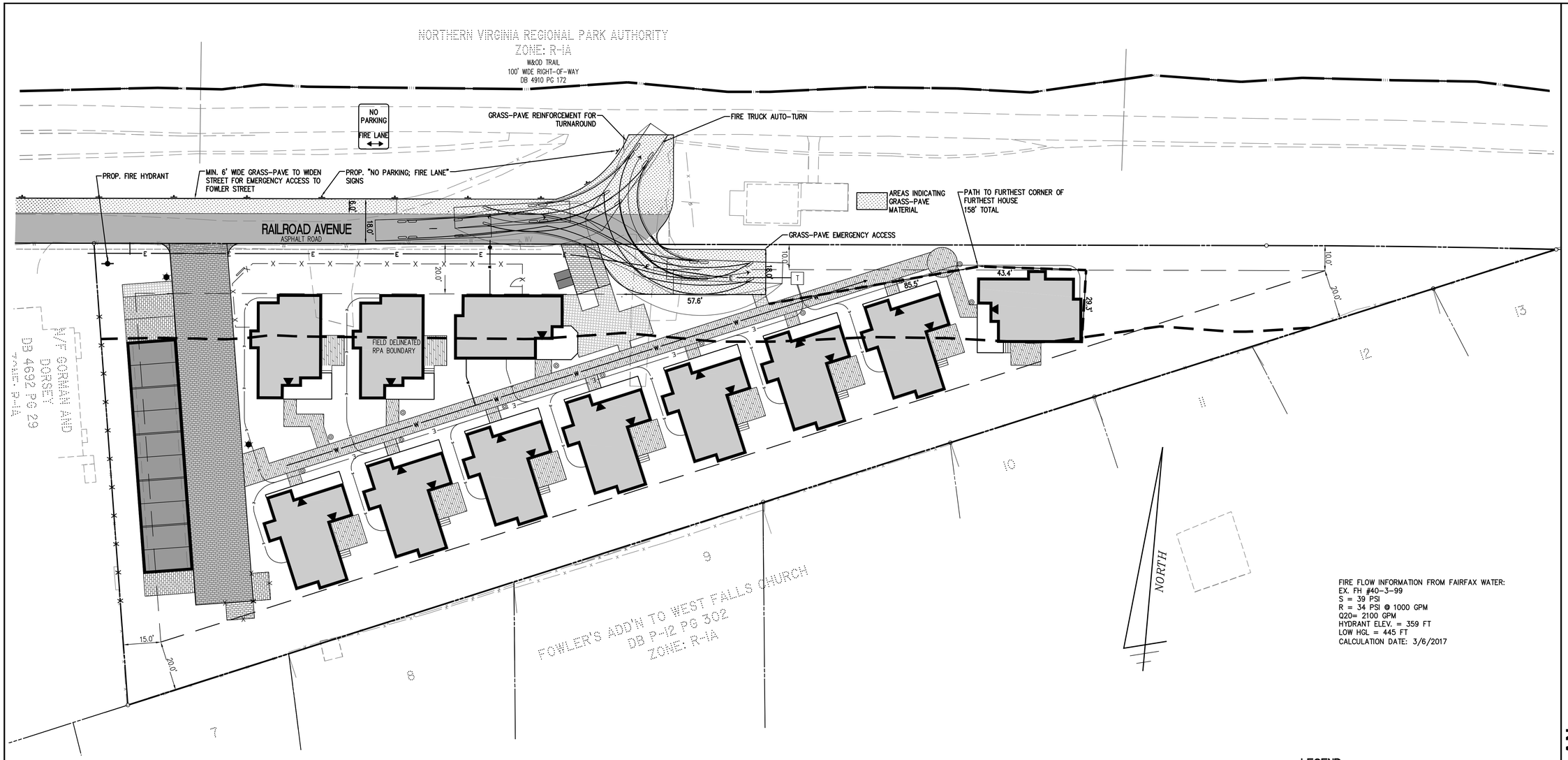
SCALE: 1"=20'
DATE: 9/12/2017

LAYOUT PLAN

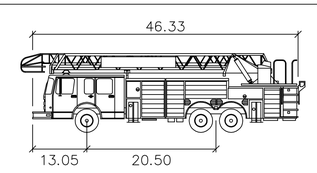
RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0401



FIRE FLOW INFORMATION FROM FAIRFAX WATER:
EX. FH #40-3-99
S = 39 PSI
R = 34 PSI @ 1000 GPM
Q20= 2100 GPM
HYDRANT ELEV. = 359 FT
LOW HGL = 445 FT
CALCULATION DATE: 3/6/2017



Arlington Tower Ladder

	feet
Width	: 8.33
Track	: 7.22
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

TRUCK TURN VEHICLE PROFILE

LEGEND

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	
CG-6R CG-6	TRANSITION FROM CG-6 TO CG-6R	CG-6 CG-6R
	SANITARY SEWER	S
SL	SANITARY LATERAL	SL
C.O.	CLEAN OUT	C.O.
	STORM SEWER	
	WATER MAIN	W
	FIRE HYDRANT	
	PLUG	

PROPOSED	DESCRIPTION	EXISTING
	OVERHEAD WIRES	
	UTILITY POLE	
UE	UNDERGROUND ELECTRIC	UE
T	TELEPHONE	T
G	GAS MAIN	G
E	ELECTRICAL	E
T	TRANSFORMER	
	HANDICAP RAMP (CG-12)	
	GUARDRAIL	
	FENCE	
	TRAFFIC FLOW	
	LIGHT	
	DOOR	
	TREES	
	LIMITS OF CLEARING AND GRADING	
	TEST PIT	

20 0 10 20 40 80
(IN FEET)
1 INCH = 20'

FIRE MARSHAL, SIGNAGE & MARKING PLAN

RAILROAD COTTAGES

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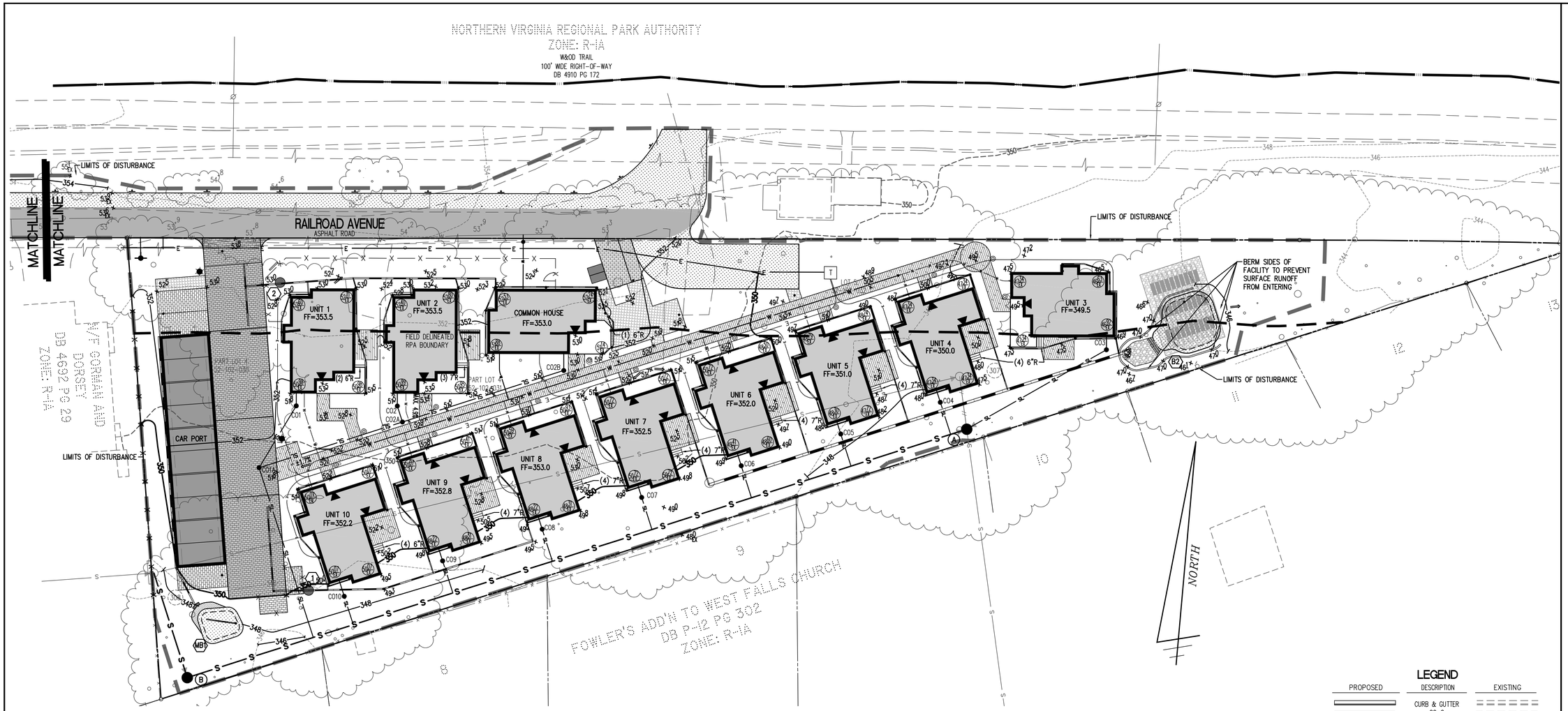
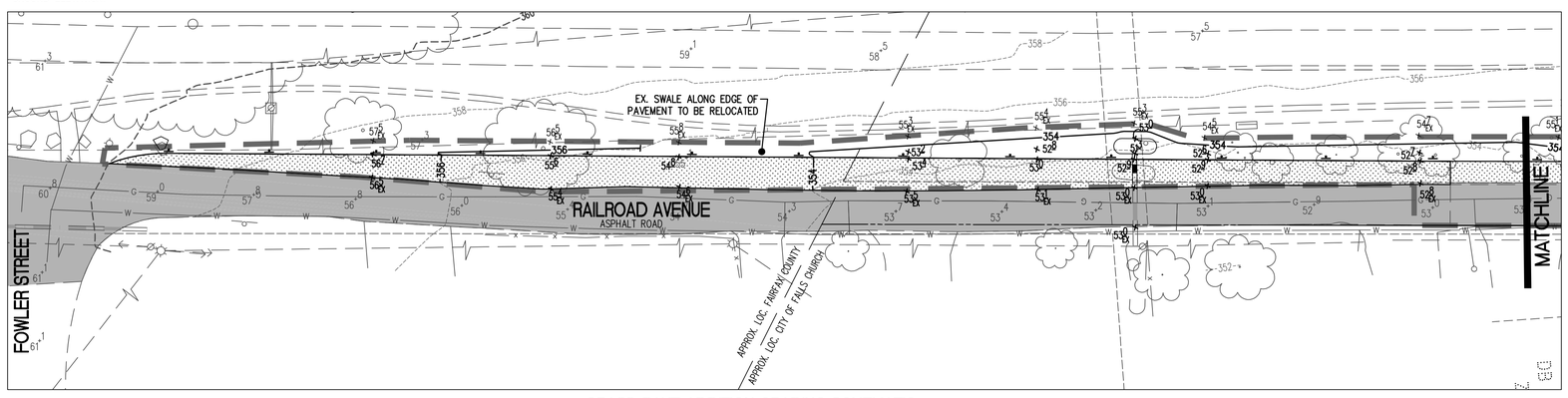
File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0402.dwg Xref:

SHEET: C-0402



NOTES:
1. SEE SHEET C-0201 FOR BUILDING HEIGHT CALCULATIONS.
2. SEE SHEET C-0706 FOR BIORETENTION DETAILED GRADING.
3. SPOT ELEVATIONS SHOWN ALONG WALKS ARE BOARDWALK ELEVATION, ELEVATED ABOVE GROUND ELEVATION.



GRASS-PAVE ADDITION GRADING SCHEMATIC

LEGEND

PROPOSED	DESCRIPTION	EXISTING
	CURB & GUTTER CG-2	
CG-6R CG-6	TRANSITION FROM CG-6 TO CG-6R	CG-6 CG-2 CG-6R
	SANITARY SEWER	S
SL	SANITARY LATERAL	SL
C.O.	CLEAN OUT	C.O.
	STORM SEWER	
	WATER MAIN	W
	FIRE HYDRANT	
	PLUG	
	OVERHEAD WIRES	
	UTILITY POLE	
UE	UNDERGROUND ELECTRIC	UE
T	TELEPHONE	T
G	GAS MAIN	G
E	ELECTRICAL	E
	TRANSFORMER	
	HANDICAP RAMP (CG-12)	
	GUARDRAIL	
	FENCE	
	TRAFFIC FLOW	
	LIGHT	
	DOOR	
	TREES	
260 264	CONTOURS	260 264
+264 50	SPOT ELEVATION	+264 50
	DRAINAGE FLOW DIRECTION	
TC	TOP OF CURB	TC
BC	BOTTOM OF CURB	BC
TW	TOP OF WALL	TW
BW	BOTTOM OF WALL	BW
HP	HIGH POINT	H.P.
	LIMITS OF CLEARING AND GRADING	

(IN FEET)
1 INCH = 20'

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0501.dwg Xref:

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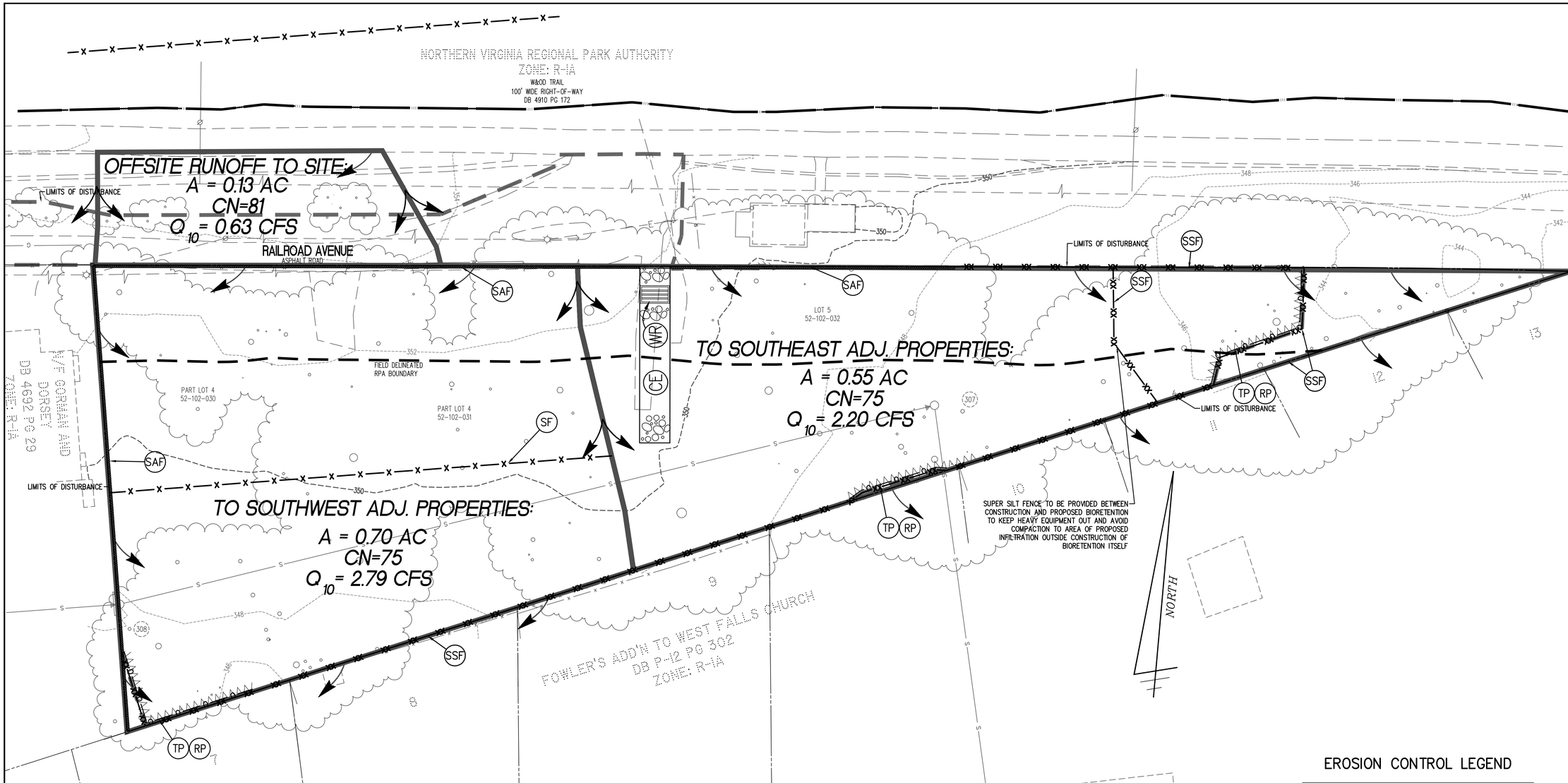
GRADING PLAN

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0501



EROSION CONTROL LEGEND

KEY	TITLE	SYMBOL
CE	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE WITH WASH RACK	
TP	TREE PROTECTION	
SAF	SAFETY FENCE	
SSF	SUPER SILT FENCE	
SF	SILT FENCE	
	DRAINAGE DIVIDES	
RP	ROOT PRUNING	

NOTES

1. THIS PLAN IS FOR THE DEMOLITION OF EXISTING SITE FEATURES AND CLEARING OF THE SITE.

20 0 10 20 40 80

(IN FEET)
1 INCH = 20'

EROSION & SEDIMENT CONTROL PLAN - PHASE 1

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

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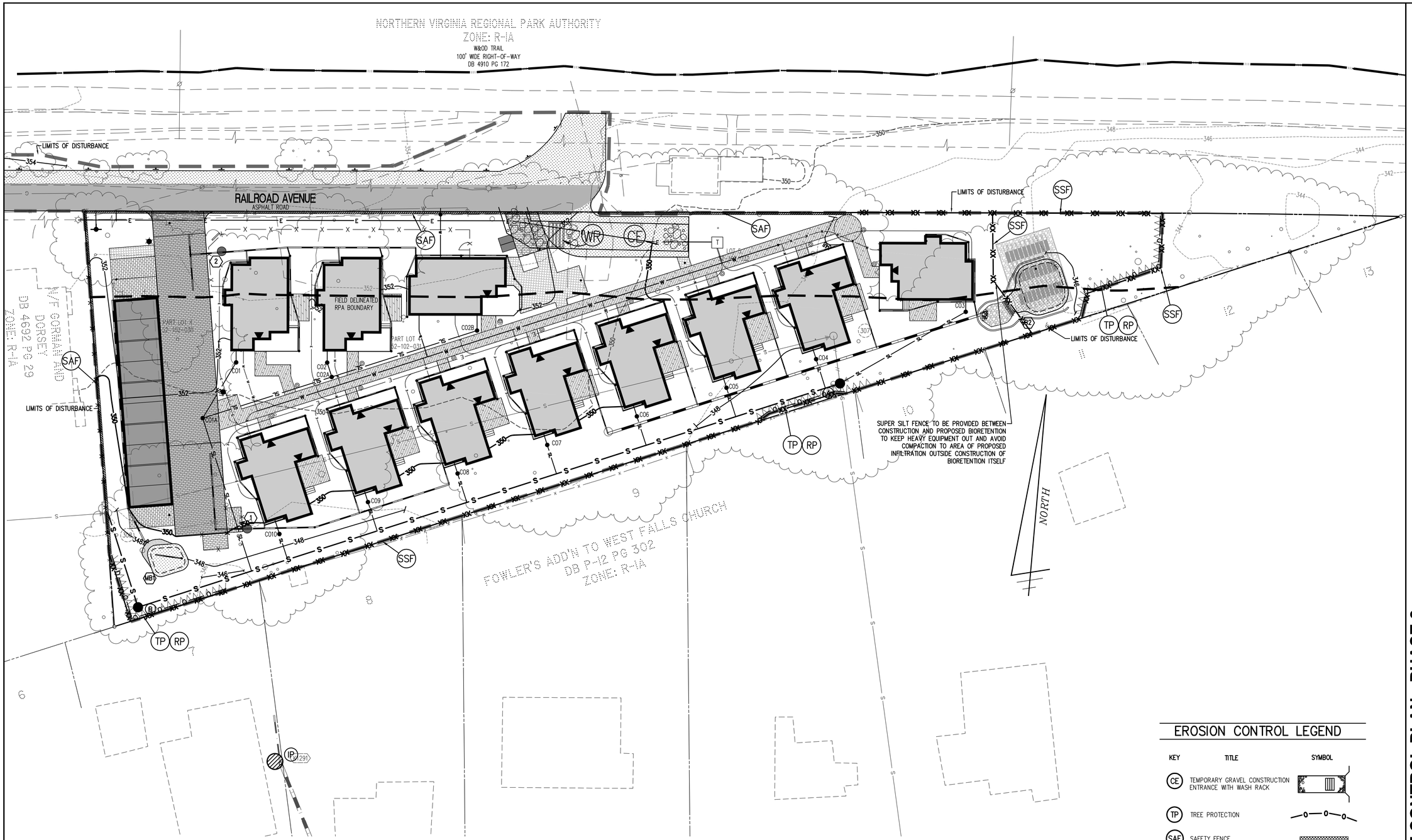

EROSION CONTROL LEGEND

KEY	TITLE	SYMBOL
CE	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE WITH WASH RACK	
TP	TREE PROTECTION	
SAF	SAFETY FENCE	
SSF	SUPER SILT FENCE	—XX—XX—
IP	INLET PROTECTION	
RP	ROOT PRUNING	

20 0 10 20 40 80

(IN FEET)
1 INCH = 20'

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0602.dwg Xref:

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EROSION & SEDIMENT CONTROL PLAN - PHASE 2

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0602

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION:
THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT (10) COTTAGE HOMES, A COMMON HOUSE, AND A JOINT CAR PORT WITH PRIVATE DRIVE. CONSTRUCTION WILL ENTAIL APPROXIMATELY 64,463 SF OF DISTURBED AREA. OFFSITE CONSTRUCTION WILL BE LIMITED TO ROAD IMPROVEMENTS IN RAILROAD AVENUE, INSTALLATION OF UTILITY CONNECTIONS AND A POTENTIAL NEW STORM SEWER PIPE CONNECTION THROUGH THE ADJACENT PROPERTY TO THE SOUTH IF AN EASEMENT CAN BE OBTAINED.

EXISTING SITE CONDITIONS:
THE EXISTING SITE IS CURRENTLY UNDEVELOPED WITH (2) DRIVEWAYS. THE GRADES ON AVERAGE ARE 4.0–4.5% ACROSS THE ENTIRE SITE.

ADJACENT PROPERTIES:
NORTH: RAILROAD AVENUE AND NVRPA PROPERTY
WEST: SINGLE–FAMILY HOME
SOUTH: SINGLE–FAMILY HOMES
EAST: SINGLE–FAMILY HOMES

SOILS:
SEE THIS SHEET FOR SOILS MAP AND SOILS INFORMATION.

CRITICAL EROSION AREAS:
NO PART OF THE SITE IS CONSIDERED A CRITICAL EROSION HAZARD, HOWEVER VIGILANT MONITORING OF THE EROSION & SEDIMENT CONTROLS, PARTICULARLY THE SUPER SILT FENCE IS IMPORTANT FOR MAINTAINING CONTROL OF SEDIMENT ONTO ADJACENT PROPERTIES TO THE SOUTH.

PHASING NARRATIVE:
THE FOLLOWING EROSION AND SEDIMENT CONTROL MEASURES WILL BE ACCOMPLISHED IN TWO PHASES. PHASE I SHALL BE IN PLACE PRIOR TO CLEARING AND SHALL REMAIN IN PLACE THROUGHOUT THE CLEARING AND DEMOLITION PROCESS. THE GENERAL CONTRACTOR IS TO PROVIDE DUST CONTROL THROUGHOUT LAND DISTURBING ACTIVITIES IN ACCORDANCE WITH VESCH STANDARD 3.39. FOR ALL PHASES, HEAVY EQUIPMENT SHALL BE KEPT OUTSIDE AREAS OF PROPOSED BIORETENTION PRACTICES TO PRESERVE PREVIOUSLY TESTED INFILTRATION RATES AND AVOID COMPACTION.

PHASE 1:
AS THE FIRST ITEM OF CONSTRUCTION, THE CONTRACTOR IS TO PLACE THE SUPER SILT FENCE, SAFETY FENCE PERIMETER CONTROL AROUND THE SITE, AND TREE PROTECTION. REFER TO EROSION AND SEDIMENT CONTROL PLAN– PHASE 1 FOR LOCATION OF THESE MEASURES. THIS ACTIVITY IS TO BE FOLLOWED BY THE PLACEMENT OF THE CONSTRUCTION ENTRANCE AND TEMPORARY WATER SERVICE AS COORDINATED WITH FAIRFAX WATER. A SPRAY NOZZLE IS TO BE PROVIDED ADJACENT TO THE CONSTRUCTION ENTRANCE TO CLEAN CONSTRUCTION VEHICLES BEFORE THEY ENTER THE PUBLIC RIGHT–OF–WAY. THE CONTRACTOR IS TO MAINTAIN ADJACENT ROADWAYS AND PARKING AREAS IN A MUD AND DUST FREE CONDITION. FOLLOWING INSTALLATION OF PHASE 1 CONTROLS, THE CONTRACTOR IS TO SCHEDULE CITY INSPECTION. FOLLOWING INSPECTOR APPROVAL, SITE CLEARING AND GRADING MAY PROCEED.

PHASE 2:
SAFETY FENCE TO BE PROVIDED AROUND THE SITE PERIMETER AS SHOWN ON THE PHASE 2 E&S PLAN. UTILITY IMPROVEMENTS WILL TAKE PLACE IN RAILROAD AVENUE AND THROUGH THE ADJACENT PROPERTY TO THE SOUTH. EROSION AND SEDIMENT CONTROLS ARE TO BE ADJUSTED AS REQUIRED BY THE SITE CONSTRUCTION OR AS DIRECTED BY THE INSPECTOR. INLET PROTECTION SHALL BE PROVIDED FOR EXISTING STRUCTURE K1291 WHEN THE STORM SEWER CONSTRUCTION OCCURS.

IN ORDER TO ENSURE THAT THE PERMEABLE PAVEMENT DOES NOT GET CLOGGED DURING CONSTRUCTION, THE PERMEABLE PAVERS SHALL BE INSTALLED LAST AND PROTECTED UNTIL THE END OF CONSTRUCTION.

PERMANENT STABILIZATION:
PERMANENT SOIL STABILIZATION SHALL BE IN ACCORDANCE TO VESCH SECTIONS 3.29 TO 3.36. ANY SOIL NOT TO BE BROUGHT TO FINAL GRADE FOR MORE THAN 30 DAYS IS TO BE SEEDED AND MULCHED. THIS IS TO INCLUDE ANY DENUDED AREAS OR STOCKPILES. AND AREAS LEFT DORMANT OR NOT BROUGHT TO FINAL GRADE SHALL BE PERMANENTLY SEEDED AND MULCHED.

ALL STORM AND SANITARY LINES NOT IN THE STREET SHALL BE MULCHED AND SEEDED WITHIN 7 DAYS AFTER BACKFILL, NO MORE THAN 500 FEET SHALL BE OPEN AT ANY ONE TIME. ELECTRIC, TELEPHONE, CABLE, AND GAS UTILITY TRENCHES SHALL BE COMPACTED, SEEDED, MULCHED WITHIN FIVE DAYS AFTER BACKFILL.

DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE IMMEDIATELY STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

DEWATERING NOTE:
RAINWATER/GROUNDWATER ACCUMULATION FROM WITHIN THE EXCAVATION IS TO BE PUMPED OUT, AS NECESSARY. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

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 IF NECESSARY.

EROSION AND SEDIMENT CONTROL MEASURES:

1. ALL EROSION AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO LAND DISTURBANCE ACTIVITY, FOLLOWING THE IMPLEMENTATION OF TREE PRESERVATION MEASURES.
2. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL ALL GROUND DISTURBING ACTIVITY CEASES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS IS COMPLETE.
3. ALL STANDARDS AND SPECIFICATIONS REFER TO THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
4. A CONSTRUCTION ENTRANCE SHALL BE INSTALLED AND MAINTAINED FOR THE DURATION OF ALL DISTURBING ACTIVITIES AS SHOWN ON THE PLAN PER STD. AND SPEC. NO. 3.02 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. NO CONSTRUCTION TRAFFIC SHALL BE PERMITTED TO ENTER THE SITE OTHER THAN THIS ENTRANCE UNTIL PARKING LOT IS PAVED.
5. 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.
6. 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.

GENERAL LAND CONSERVATION NOTES

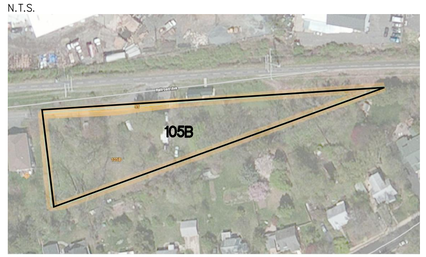
1. NO DISTURBED AREA WILL BE DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OR HIS AGENT.
2. ALL EROSION AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO CLEARING AND GRADING.
3. ALL STORM AND SANITARY LINES NOT IN STREETS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET ARE TO BE OPEN AT ANY ONE TIME.
4. ELECTRIC POWER, TELEPHONE, AND GAS SUPPLY TRENCHES AREA TO BE COMPACTED, SEEDED, AND MULCHED WITHIN 5 DAYS AFTER BACKFILL.
5. DURING CONSTRUCTION, MONITOR NEAREST INLETS TO ENSURE NO CONSTRUCTION SEDIMENT ENTERS THE INLETS. PROVIDE INLET PROTECTION AND MONITOR THE SEDIMENT LEAVING THE SITE.
6. ANY DISTURBED AREA NOT COVERED BY NOTE #1 ABOVE AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1ST, OR DISTURBED AFTER THAT DATE, IS TO BE MULCHED WITH HAY OR STRAW MULCH AT THE RATE OF TWO TONS PER ACRE AND OVER–SEEDED NO LATER THAN MARCH 15TH.
7. AT THE COMPLETION OF CONSTRUCTION PROJECTS, AND PRIOR TO THE RELEASE OF THE BOND, ALL TEMPORARY SILTATION AND EROSION CONTROLS SHALL BE REMOVED AND DISTURBED AREAS SHALL BE STABILIZED.
8. IF THE MAXIMUM PERIOD FOR DENUDATION IS EXCEEDED AND ANY AREAS REMAIN EXPOSED WITHOUT COVER OR SURFACE, THE CITY MAY (IN THE EVENT THE DEVELOPER DOES NOT) INSTALL SUCH GROUND COVER OR OTHER STABILIZING DEVICES AND/OR MATERIAL TO THE MINIMUM EXTENT NECESSARY TO ACHIEVE EROSION AND SEDIMENT CONTROL EQUAL TO THAT WHICH WOULD HAVE BEEN FURNISHED BY THE PERMANENT COVER SHOWN ON THE APPROVED PLANS. THE COST OF ANY SUCH TEMPORARY MEASURES TAKEN BY THE CITY SHALL BE BORNE BY THE DEVELOPER AND SHALL BE A CHARGE AGAINST THE CONSERVATION DEPOSIT.
9. WHERE CONSISTENT WITH JOB SAFETY REQUIREMENTS, ALL EXCAVATED MATERIAL IS TO BE PLACED ON THE UPHILL SIDE OF TRENCHES. NO MATERIAL IS TO BE PLACED IN STREAMBEDS. NO STOCKPILE IS PERMITTED. WHERE SOIL IS PLACED ON DOWNHILL SIDE OF TRENCHES, IT IS TO BE BACK–SLOPED TO DRAIN TOWARD THE TRENCH. WHEN NECESSARY TO DEWATER THE TRENCHES, THE PUMP DISCHARGE HOSES MUST OUTLET IN A STABILIZED AREA TO AN EXISTING STORM INLET.

MAINTENANCE NOTES

1. MAINTENANCE OF THE TEMPORARY CONSTRUCTION ENTRANCE SHALL BE REQUIRED TO PREVENT MUD DEPOSITS IN THE RIGHT–OF–WAY.
2. INLET PROTECTION SHALL BE INSPECTED AT THE END OF EACH DAY AND AFTER EACH RAINFALL AND REQUIRED REPAIRS MADE IMMEDIATELY.
3. EROSION AND SEDIMENT CONTROL DEVICES SHALL BE MAINTAINED IN PLACE UNTIL GROUND DISTURBING CONSTRUCTION AND PERMANENT STABILIZATION IS COMPLETE AND SHALL BE REMOVED BY PERMISSION OF THE COUNTY INSPECTOR.
4. FILTER STONE SHALL BE REGULARLY CHECKED TO ENSURE THAT FILTRATION PERFORMANCE IS MAINTAINED. STONE CHOKED WITH SEDIMENT SHALL BE REMOVED AND CLEANED OR REPLACED.

SOIL MAP

N.T.S.



SOIL INFORMATION

Map Unit Description: Wheaton-Glenelg complex, 2 to 7 percent slopes—Falls Church City, Virginia

Falls Church City, Virginia

105B—Wheaton-Glenelg complex, 2 to 7 percent slopes

Map Unit Setting
National map unit symbol: 2218f
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 45 to 67 degrees F
Frost-free period: 185 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition
Wheaton and similar soils: 45 percent
Glenelg and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wheaton

Setting
Landform: Interfluves
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mine spoil or earthy fill derived from phyllite

Typical profile
H1 - 0 to 9 inches: loam
H2 - 9 to 60 inches: loam

Properties and qualities
Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Glenelg

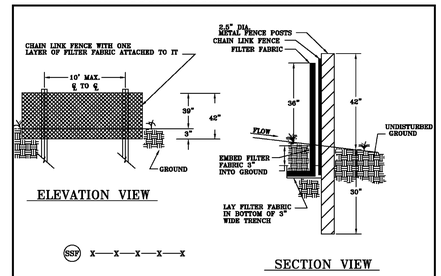
Setting
Landform: Interfluves

SOILS MAP AND INFORMATION FROM USDA NRCS WEB SOIL SURVEY (http://websoilsurvey.nrcs.usda.gov/)

GENERAL EROSION AND SEDIMENT NOTES

1. UNLESS OTHERWISE INDICATED ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS EROSION AND SEDIMENT CONTROL REGULATIONS.
2. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE–CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO FINAL INSPECTION.
3. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
4. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
5. PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF–SITE BOTTOM OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
6. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
7. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
8. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO ON APPROVED FILTERING DEVICE.
9. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
10. CONTRACTOR IS TO REMOVE MUD/SWEEP STREET AS NEEDED OR DAILY TO KEEP FREE OF SEDIMENT.

FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



SUPER SILT FENCE
NO SCALE

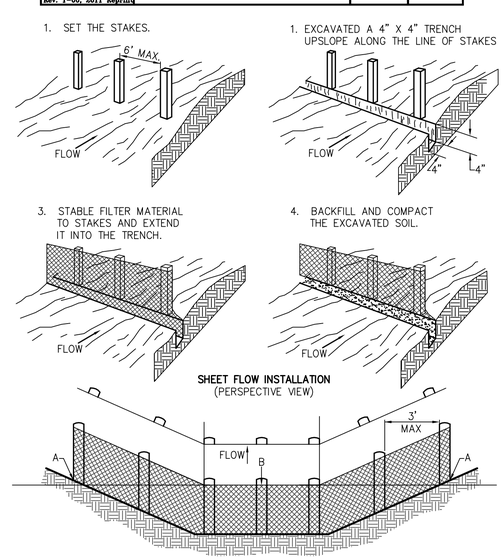
FENCING

Chain link fence shall be 39" above grade with 3" embedded for a total fabric width of 42". The post shall be 42" above grade with 30" placed below grade (without concrete) for a total length of 72".

NOTES

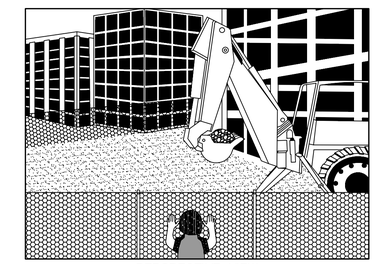
1. Chain link fence shall be fastened securely to fence posts with wire ties.
2. Filter fabric shall be fastened securely to chain link fence with ties spaced horizontally 24" at the top and midsection.
3. Physical properties of the filter fabric shall conform to the latest edition of THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.
4. When two sections of filter fabric adjoin each other, they shall be overlapped 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.

Ref. Sec. 11-0110.3, 11-0110.3J	SUPER SILT FENCE NO SCALE	PLATE NO.	STD. NO.
Rev. 1-00, 2011 Reprint		7-11	

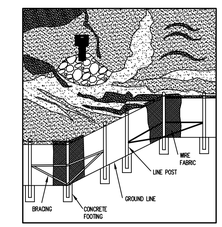


CONSTRUCTION OF SILT FENCE
(WITHOUT WIRE SUPPORT)
NOT TO SCALE

1992 3.01



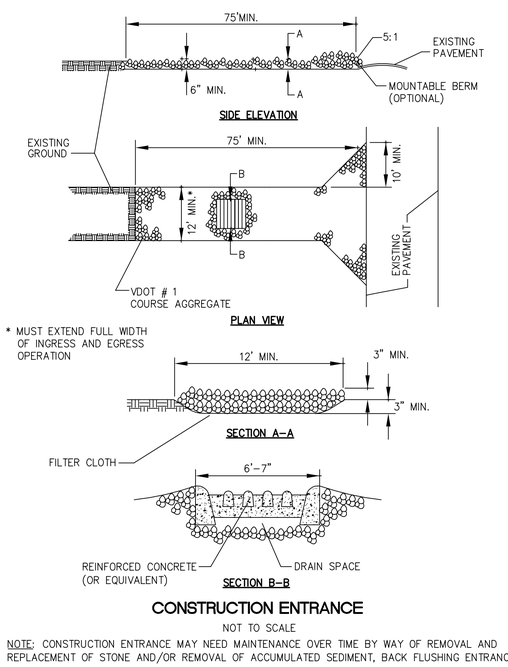
PERSPECTIVE VIEW



PERSPECTIVE VIEW
METAL FENCE

SAFETY FENCE
(METAL FENCE IS REQUIRED)

SOURCE: ADAPTED FROM CONWED PLASTICS AND VDOT ROAD AND BRIDGE STANDARDS PLATE 3.01–1



CONSTRUCTION ENTRANCE
NOT TO SCALE

NOTE: CONSTRUCTION ENTRANCE MAY NEED MAINTENANCE OVER TIME BY WAY OF REMOVAL AND REPLACEMENT OF STONE AND/OR REMOVAL OF ACCUMULATED SEDIMENT, BACK FLUSHING ENTRANCE, ETC.

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COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

SCALE: 1" = 20' DATE: 9/12/2017 DRAWN: AI CHECKED: KW

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

EROSION & SEDIMENT CONTROL NARRATIVES & DETAILS

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0603

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C–0602.dwg Xref:

NORTHERN VIRGINIA REGIONAL PARK AUTHORITY
ZONE: R-1A
W&OD TRAIL
100' WIDE RIGHT-OF-WAY
DB 4910 PG 172

ROOFS AND PAVEMENT TO INFILTRATION FOR 10-YEAR
A = 0.23 AC
CN=98

RAILROAD AVENUE
ASPHALT ROAD

FIELD DELINEATED RPA BOUNDARY

TO SOUTHEAST ADJ. PROPERTIES:
A = 0.45 AC
CN=74
Q_{10} 1.74= CFS

ROOFS TO INFILTRATION FOR 10-YEAR
A = 0.13 AC
CN=98

TO SOUTHWEST ADJ. PROPERTIES:
A = 0.44 AC
CN=76
Q_{10} 1.82 = CFS

FOWLER'S ADD'N TO WEST FALLS CHURCH
DB P-12 PG 302
ZONE: R-1A

W/F CORMAN AND DORSET
DB 4692 PG 29
ZONE: R-1A

NORTH

LEGEND

TITLE	SYMBOL
DRAINAGE DIVIDES	

20 0 10 20 40 80
(IN FEET)
1 INCH = 20'

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0701.dwg Xref:

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DRAWN: AI
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SCALE: 1" = 20'
DATE: 9/12/2017

COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

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

PROPOSED DRAINAGE DIVIDES

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0701

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0

○ 2011 BMP Standards and Specifications ◉ 2013 Draft BMP Standards and Specifications

Project Name:	RAILROAD AVE.
Date:	4/12/2017
Linear Development Project?	No

CLEAR ALL

data input cells
constant values
calculation cells
final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area *(acres)* → 1.25

Maximum reduction required:	*20%*
The site's net increase in impervious cover (acres) is:	*0.404155188*
Post-Development TP Load Reduction for Site (lb/yr):	*0.81*

Check:

BMP Design Specifications List:	2013 Draft Stds & Specs
Linear project?	No
Land cover areas entered correctly?	✓
Total disturbed area entered?	✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed			1.22		1.22
Impervious Cover (acres)			0.03		0.03
					1.25

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed			0.81		0.81
Impervious Cover (acres)			0.44		0.44
Area Check	OK.	OK.	OK.	OK.	1.25

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

LAND COVER SUMMARY -- PRE-REDEVELOPMENT

Land Cover Summary-Pre

Pre-ReDevelopment	Listed	Adjusted[1]
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	1.22	0.81
Weighted Rv(turf)	0.22	0.22
% Managed Turf	97%	96%
Impervious Cover (acres)	0.03	0.03
Rv(impervious)	0.95	0.95
% Impervious	3%	4%
Total Site Area (acres)	**1.25**	**0.85**
Site Rv	**0.24**	**0.25**

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.0250	0.0176
Pre-ReDevelopment Treatment Volume (cubic feet)	1,088	765
Pre-ReDevelopment TP Load (lb/yr)	**0.68**	**0.48**
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.55	0.57
Baseline TP Load (lb/yr) (**0.41 lbs/acre/yr** applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		*0.35*

[1] *Adjusted Land Cover Summary:*
Pre ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column I shows load reduction requriement for new impervious cover (based on new development load limit, 0.41 lbs/acre/year).

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary-Post (Final)

Post ReDev. & New Impervious	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.81
Weighted Rv (turf)	0.22
% Managed Turf	65%
Impervious Cover (acres)	0.44
Rv(impervious)	0.95
% Impervious	35%
Final Site Area (acres)	**1.25**
Final Post Dev Site Rv	**0.48**

Land Cover Summary-Post

Post-ReDevelopment	
Forest/Open Space Cover (acres)	0.00
Weighted Rv(forest)	0.00
% Forest	0%
Managed Turf Cover (acres)	0.81
Weighted Rv (turf)	0.22
% Managed Turf	96%
ReDev. Impervious Cover (acres)	0.03
Rv(impervious)	0.95
% Impervious	4%
Total ReDev. Site Area (acres)	**0.85**
ReDev Site Rv	**0.25**

Land Cover Summary-Post

Post-Development New Impervious	
New Impervious Cover (acres)	0.40
Rv(impervious)	0.95

Treatment Volume and Nutrient Load

Final Post-Development Treatment Volume (acre-ft)	0.0496	**Post-ReDevelopment Treatment Volume (acre-ft)**	0.0176	**Post-Development Treatment Volume (acre-ft)**	0.0320
Final Post-Development Treatment Volume (cubic feet)	2,159	**Post-ReDevelopment Treatment Volume (cubic feet)**	765	**Post-Development Treatment Volume (cubic feet)**	1,394
Final Post-Development TP Load (lb/yr)	**1.36**	**Post-ReDevelopment Load (TP) (lb/yr)***	**0.48**	**Post-Development TP Load (lb/yr)**	**0.88**
Final Post-Development TP Load per acre (lb/acre/yr)	1.09	Post-ReDevelopment TP Load per acre (lb/acre/yr)	0.57		
		Max. Reduction Required (Below Pre-ReDevelopment Load)	**20%**		
		TP Load Reduction Required for Redeveloped Area (lb/yr)	**0.10**	**TP Load Reduction Required for New Impervious Area (lb/yr)**	**0.71**

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	**0.81**

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.89	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.70

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)	0.29	0.15	0.00	0.00	0.00	OK.
IMPERVIOUS COVER TREATED (ac)	0.29	0.15	0.00	0.00	0.00	OK.
MANAGED TURF AREA (ac)	0.38	0.43	0.00	0.00	0.00	OK.
MANAGED TURF AREA TREATED (ac)	0.00	0.00	0.00	0.00	0.00	OK.
AREA CHECK	OK.	OK.	OK.	OK.	OK.	

Site Treatment Volume (ft^3) 2,159

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 (ft^3)	616	407	0	0	0	1,023
TP LOAD AVAILABLE FOR REMOVAL (lb/yr)	0.82	0.54	0.00	0.00	0.00	1.36
TP LOAD REDUCTION ACHIEVED (lb/yr)	0.45	0.29	0.00	0.00	0.00	0.74
TP LOAD REMAINING (lb/yr)	0.37	0.25	0.00	0.00	0.00	0.62
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	3.11	2.09	0.00	0.00	0.00	5.20

Total Phosphorus

FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	1.36
TP LOAD REDUCTION REQUIRED (lb/yr)	0.81
TP LOAD REDUCTION ACHIEVED (lb/yr)	0.74
TP LOAD REMAINING (lb/yr):	0.62
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.07

Total Nitrogen (For Information Purposes)

POST-DEVELOPMENT LOAD (lb/yr)	9.70
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	5.20
REMAINING POST-DEVELOPMENT NITROGEN LOAD (lb/yr)	4.51

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

1-year storm	2-year storm	10-year storm
2.64	3.19	4.90

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

***Notes (see below):**

[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.

[2] Runoff Volume (RV) for pre- and post-development drainage areas must be in volumetric units (e.g., acre-feet or cubic feet) when using the Energy Balance Equation. Runoff measured in watershed-inches and shown in the spreadsheet as RV(watershed-inch) can only be used in the Energy Balance Equation when the pre- and post-development drainage areas are equal. Otherwise RV(watershed-inch) must be multiplied by the drainage area.

[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.

Drainage Area Curve Numbers and Runoff Depths*

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

Drainage Area A		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.00	0.38	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.00	0.29	0.00
	CN	98	98	98	98

Total Area (acres):	0.67
Runoff Reduction Volume (ft^3):	616

$CN_{(D.A. A)}$ **84**

	1-year storm	2-year storm	10-year storm
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*	1.23	1.67	3.18
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*	0.97	1.42	2.93
Adjusted CN*	**80**	**80**	**81**

**See Notes above*

Drainage Area B		A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.00	0.00	0.00	0.00
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.00	0.00	0.43	0.00
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.00	0.00	0.15	0.00
	CN	98	98	98	98

Total Area (acres):	0.58
Runoff Reduction Volume (ft^3):	407

$CN_{(D.A. B)}$ **80**

	1-year storm	2-year storm	10-year storm
$RV_{Developed}$ *(watershed-inch)* with no Runoff Reduction*	0.99	1.39	2.81
$RV_{Developed}$ *(watershed-inch)* with Runoff Reduction*	0.79	1.20	2.61
Adjusted CN*	**76**	**77**	**78**

**See Notes above*

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DRAWN: AL CHECKED: KW

COMMONWEALTH OF VIRGINIA PROFESSIONAL ENGINEER KAREN L. S. WHITE Lic. No.041850 9/12/17

DATE: 9/12/2017 SCALE: NONE

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NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

Drainage Area A

CLEAR BMP AREAS

Drainage Area A Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover Rv
Forest/Open Space (acres)					0.00	0.00
Managed Turf (acres)			0.38		0.38	0.22
Impervious Cover (acres)			0.29		0.29	0.95
				Total	0.67	

Total Phosphorus Available for Removal in D.A. A (lb/yr)	0.82
Post Development Treatment Volume in D.A. A (ft^3)	1,300

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 (ft^3)	Runoff Reduction (ft^3)	Remaining Runoff Volume (ft^3)	Total BMP Treatment Volume (ft^3)	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
3. Permeable Pavement (RR)													
3.a. Permeable Pavement #1 (Spec #7)	45			0	0	0	0	25	0.00	0.00	0.00	0.00	
3.b. Permeable Pavement #2 (Spec #7)	75		0.09		229	76	305	25		0.19	0.16	0.04	None
6. Bioretention (RR)													
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40			0	0	0	0	25	0.00	0.00	0.00	0.00	
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	80		0.04	0	118	29	147	50	0.00	0.09	0.08	0.01	
7. Infiltration (RR)													
7.a. Infiltration #1 (Spec #8)	50		0.16	0	269	269	537	25	0.00	0.34	0.21	0.13	
7.b. Infiltration #2 (Spec #8)	90			0	0	0	0	25	0.00	0.00	0.00	0.00	

Practice	Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (lbs)	Remaining Nitrogen Load (lbs)
3. Permeable Pavement (RR)					
3.a. Permeable Pavement #1 (Spec #7)	25	0.00	0.00	0.00	0.00
3.b. Permeable Pavement #2 (Spec #7)	25		1.37	1.11	0.26
6. Bioretention (RR)					
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40	0.00	0.00	0.00	0.00
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	60	0.00	0.66	0.61	0.05
7. Infiltration (RR)					
7.a. Infiltration #1 (Spec #8)	15	0.00	2.41	1.39	1.03
7.b. Infiltration #2 (Spec #8)	15	0.00	0.00	0.00	0.00

Drainage Area B

CLEAR BMP AREAS

Drainage Area A Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover Rv
Forest/Open Space (acres)					0.00	0.00
Managed Turf (acres)			0.43		0.43	0.22
Impervious Cover (acres)			0.15		0.15	0.95
				Total	0.58	

Total Phosphorus Available for Removal in D.A. B (lb/yr)	0.54
Post Development Treatment Volume in D.A. B (ft^3)	858

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 (ft^3)	Runoff Reduction (ft^3)	Remaining Runoff Volume (ft^3)	Total BMP Treatment Volume (ft^3)	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
3. Permeable Pavement (RR)													
3.a. Permeable Pavement #1 (Spec #7)	45			0	0	0	0	25	0.00	0.00	0.00	0.00	
3.b. Permeable Pavement #2 (Spec #7)	75		0.02		55	18	74	25		0.05	0.04	0.01	
6. Bioretention (RR)													
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40			0	0	0	0	25	0.00	0.00	0.00	0.00	
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	80		0.13	0	352	88	440	50	0.00	0.28	0.25	0.03	

Practice	Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (lbs)	Remaining Nitrogen Load (lbs)
3. Permeable Pavement (RR)					
3.a. Permeable Pavement #1 (Spec #7)	25	0.00	0.00	0.00	0.00
3.b. Permeable Pavement #2 (Spec #7)	25		0.33	0.27	0.06
6. Bioretention (RR)					
6.a. Bioretention #1 or Micro-Bioretention #1 or Urban Bioretention (Spec #9)	40	0.00	0.00	0.00	0.00
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	60	0.00	1.97	1.82	0.16

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SCALE: NONE

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0703

WATER QUANTITY BALANCE EQUATIONS

1 YR STORMWATER COMPUTATIONS BALANCE EQUATION	
Qdeveloped ≤ I.F. * (Qpre-developed * RVpre-developed) / RVdeveloped	
I.F. = 0.9 (less than 1 acre) I.F. = 0.8 (greater than 1 acre)	
Qdeveloped = Qundetained (1.098 CFS) + Qdetained (0 CFS)=	1.098 CFS
I.F. * (Qpre-developed * RVpre-developed) / RVdeveloped =	
(Rv developed = Rv undetained + RV detained)	
0.8* (1.543 * 3122) / 2223 =	1.734 CFS
	1.098 CFS < 1.734 CFS

10 YR STORMWATER COMPUTATIONS
Qdeveloped (detained & undetained) ≤ Qpre-developed
0 CFS (detained) + 3.55 CFS (undetained) = 3.55 CFS
3.55 CFS < 4.99 CFS pre-development

OUTFALL NARRATIVE

UNDER EXISTING CONDITIONS, APPROXIMATELY HALF OF THE MOSTLY PERVIOUS SITE OUTFALLS TO THE SOUTHWEST ADJACENT PROPERTIES BY SURFACE RUNOFF, AND THE OTHER HALF OF THE SITE OUTFALLS TO THE SOUTHEAST ADJACENT PROPERTIES BY SURFACE RUNOFF. THE OUTFALL PATHS RUN INTO PARKER BRANCH AND PEARSON BRANCH AND EVENTUALLY OUTFALL TO TRIPPS RUN.

THE REDEVELOPMENT OF THIS SITE WILL RESULT IN AN INCREASE OF IMPERVIOUS AREA. HOWEVER, WITH THE BMP MEASURES PROPOSED TO SEND UNITS 1, 2, 7, 8, 9, 10, AND THE COMMON HOUSE TO INFILTRATION, TO SEND THE CARPORT ROOF TO A MICRO-BIORETENTION BASIN, TO SEND UNITS 3-6 TO A BIORETENTION BASIN, AND TO PROPOSE PERMEABLE PAVEMENT FOR ALL VEHICULAR AND PATIO AREAS, RUNOFF REDUCTION WILL BE ACHIEVED AS DEMONSTRATED IN THE VRRM WORKSHEET ON SHEET C-0702. ADDITIONALLY, STORAGE IS PROVIDED BENEATH THE PERMEABLE PAVEMENT DRIVEWAY AND BENEATH THE BIORETENTION BASIN #2, SIZED TO CAPTURE AND INFILTRATE THE 10-YEAR STORM THAT OUTFALLS TO EACH FACILITY. SEE SHEETS C-0705 AND C-0706 FOR THE SIZING. BECAUSE THE RUNOFF TO THESE FACILITIES INFILTRATE INTO THE GROUND WITHIN THE 48-HOUR ALLOWABLE DRAWDOWN PERIOD, THE RUNOFF IS DISCOUNTED FROM LEAVING THE SITE – SEE DRAINAGE DIVIDES ON SHEET C-0701.

WATER QUALITY:
WATER QUALITY REQUIREMENTS ARE PROPOSED TO BE MET THROUGH TREATMENT OF ALL IMPERVIOUS AREAS. ROOF AREAS ARE TREATED WITH INFILTRATION AND BIORETENTION, AND VEHICULAR AREA AND PATIOS ARE TREATED WITH PERMEABLE PAVEMENT. SEE DISTRIBUTION OF TREATMENT ON SHEET C-0705. A REMAINING PHOSPHORUS REMOVAL REQUIREMENT OF 0.07 LBS WILL BE MET THROUGH NUTRIENT CREDIT PURCHASE.

WATER QUANTITY
AS DEMONSTRATED BY THE WATER QUANTITY BALANCE EQUATIONS ABOVE, BOTH THE 1-YEAR AND 10-YEAR STORMS ARE REDUCED FROM EXISTING CONDITIONS (WHICH IS ALMOST ALL PERVIOUS AREA) TO PROPOSED CONDITIONS, BY INFILTRATING THE 10-YEAR STORM ONSITE. AS REQUIRED BY THE COTTAGE DEVELOPMENT ORDINANCE SECTION 48-241(8), THE FIRST INCH OF RAINFALL SHALL BE CAPTURED AND RETAINED ONSITE FROM ROOF AND PARKING AREAS. SEE BELOW FOR CALCULATION OF VOLUME OF FIRST INCH OF RAINFALL FROM ROOF AND PARKING AREAS, AND STORAGE PROVIDED. SINCE THE SITE PROPOSES TO RETAIN AND INFILTRATE THE 10-YEAR STORM, THE STORAGE PROVIDED EXCEEDS THE FIRST INCH OF RAINFALL.

DUE TO THE RESULTS OF THIS ANALYSIS AND THE FACT THAT THE PROJECT WILL RESULT IN THE REDUCTION OF RUNOFF FROM THE SITE FROM EXISTING CONDITIONS, IT IS THE OPINION OF THE SUBMITTING ENGINEER THAT THIS OUTFALL IS ADEQUATE, AND THAT IMPACT ONTO THE ADJACENT PROPERTIES ARE IMPROVED FROM EXISTING CONDITIONS BY REDUCING RUNOFF ONTO THEIR SITES.

SITE VOLUME RETENTION CALCULATION	
ROOF AREAS	14,202 SF
VEHICULAR AREAS	4,218 SF
TOTAL AREA	*18,420 SF*
1" RAINFALL	0.0833 SF
TOTAL VOLUME TO BE RETAINED	**1,535 CF**
STORAGE VOLUME PROVIDED	**3,489 CF**
	3489 CF > 1535 CF

SEE SHEETS C-0705 AND C-0706 FOR STORAGE PROVIDED.

res

Date: April 21, 2017

To: Railroad, LLC
c/o The Young Group, Inc.
800 West Broad Street, #333
Falls Church, VA 22046

From: Claire Wolanski
Credit Sales Coordinator
Resource Environmental Solutions

Subject: Potomac Watershed – Nutrient Credit Pricing

Project Reference: Railroad Cottages, Falls Church, HUC 02070010

This letter is to confirm the pricing of Nutrient Credits to be sold and debited from one or more of Resource Environmental Solutions, LLC's nutrient bank facilities within the above-referenced watersheds. Upon approval and release by DEQ, all such Nutrient Credits may be used by permit applicants within these watersheds 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. We appreciate the opportunity to assist you with your project. Currently our Nutrient Credit price for your project is as follows:

- 0.07 pounds of Phosphorus Credits = **$2,750.00**

This pricing is good for 60 days as of the date of this correspondence.

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

Sincerely,

Claire Wolanski

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

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21117

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701 E. Bay St.
Suite 306
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5020 Montrose Blvd.
Suite 650
Houston, TX
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1200 Camellia Blvd.
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70508

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

33 Terminal Way
Suite 431
Pittsburgh, PA
15219

302 Jefferson St.
Suite 110
Raleigh, NC
27605

1521 W. Main
2nd Floor
Richmond, VA
23220

HYDROGRAPHS

Hydrograph Report

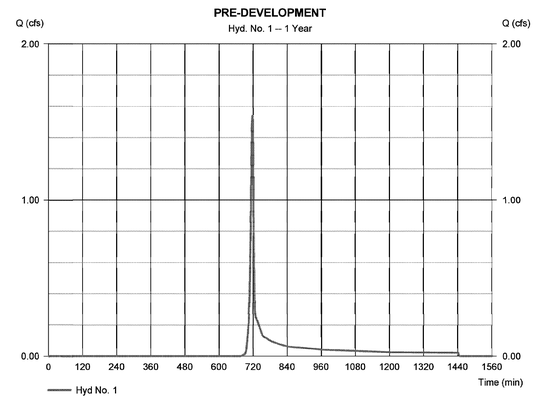
1

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Wednesday, 04 / 19 / 2017

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 1.543 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,122 cuft
Drainage area	= 1.250 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

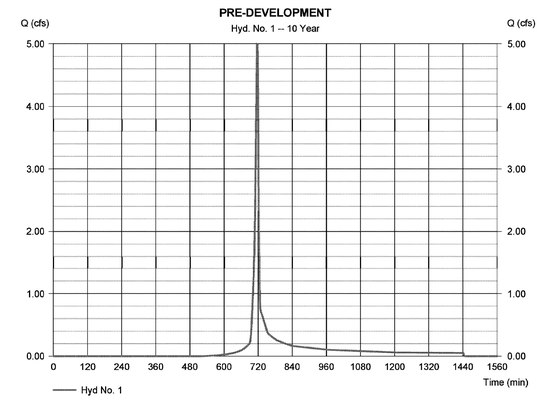
2

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Wednesday, 04 / 19 / 2017

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 4.990 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 10,075 cuft
Drainage area	= 1.250 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

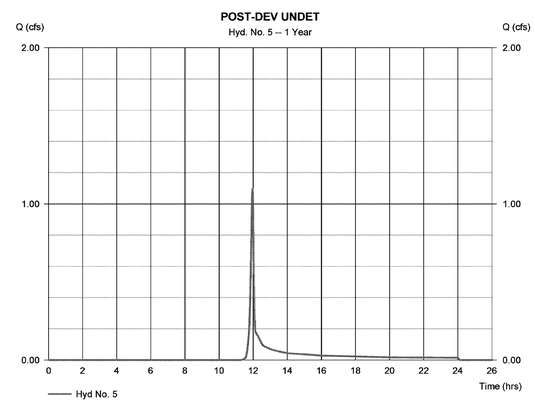
1

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Wednesday, 04 / 19 / 2017

Hyd. No. 5

POST-DEV UNDET

Hydrograph type	= SCS Runoff	Peak discharge	= 1.098 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 2,223 cuft
Drainage area	= 0.890 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

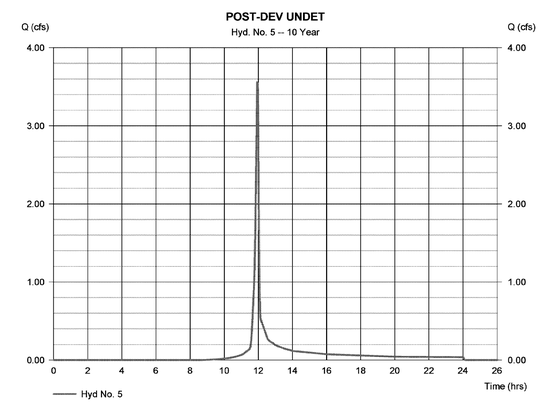
2

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 — Wednesday, 04 / 19 / 2017

Hyd. No. 5

POST-DEV UNDET

Hydrograph type	= SCS Runoff	Peak discharge	= 3.553 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 7,173 cuft
Drainage area	= 0.890 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



HYDROGRAPHS & OUTFALL NARRATIVE

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

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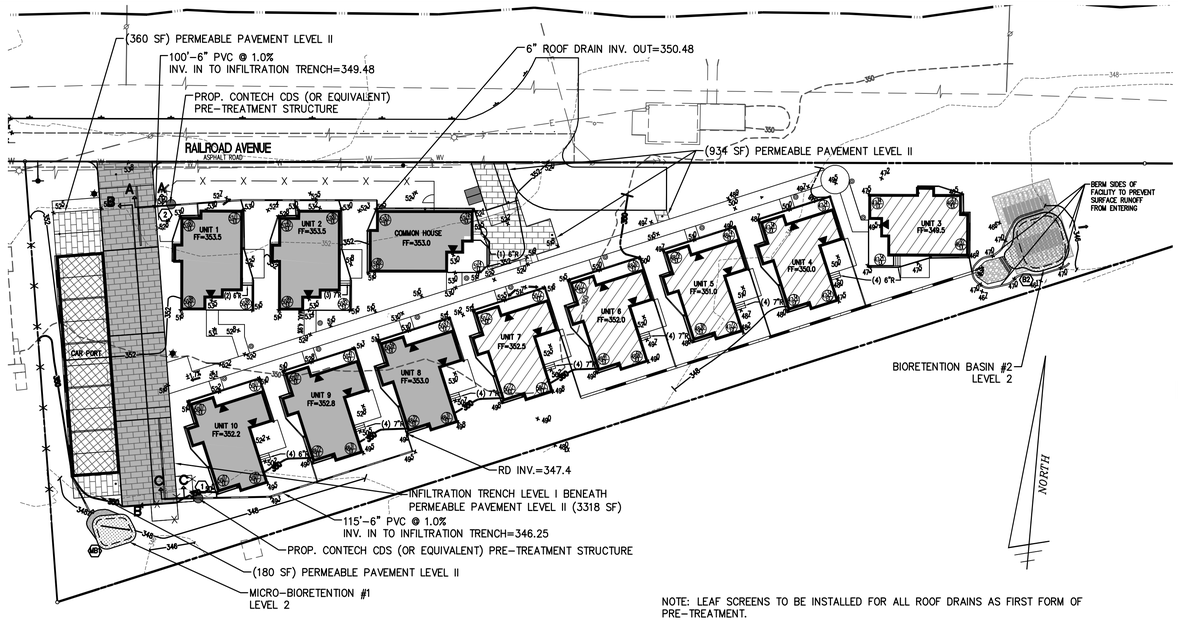
COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

REVISION APPROVED BY

DRAWN: AJ
CHECKED: KW
SCALE: NONE
DATE: 9/12/2017

SHEET: C-0704



NOTE: LEAF SCREENS TO BE INSTALLED FOR ALL ROOF DRAINS AS FIRST FORM OF PRE-TREATMENT.

TO INFILTRATION TRENCH LEVEL I BENEATH DRIVEWAY AREA (6789 SF)

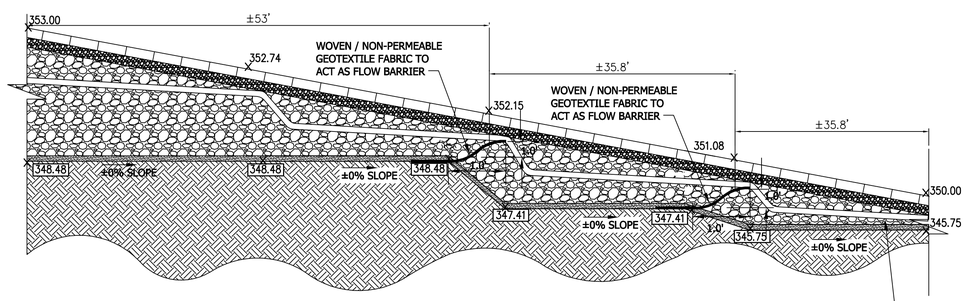
PERMEABLE PAVEMENT LEVEL II

BMP SCHEMATIC

SCALE: 1"=30'

TO MICRO-BIORETENTION #1 (LEVEL 2)

TO BIORETENTION #2 (LEVEL 2)

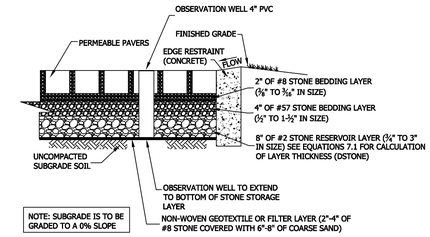


NOTES:
1. LAY WOVEN / NON-PERMEABLE GEOTEXTILE FABRIC TO 12" HEIGHT OF HIGH SIDE STONE SECTION.
2. EXTEND 12" IN BOTH DIRECTIONS TO HOLD IN PLACE.

SECTION B-B

PERMEABLE PAVEMENT WITH INFILTRATION TRENCH GRAVEL FLOW BARRIER DETAIL (FOR STEP DOWN INSTALLATION)

N.T.S.



TYPICAL PERVIOUS PAVEMENT CONSTRUCTION DETAIL

N.T.S.

Table 7.6. Material Specifications for Underneath the Pavement Surface

Material	Specification	Notes
Bedding Layer	PC: None PA: 2 in. of No. 57 stone IP: 2 in. of No. 8 stone over 4 inches of No. 57 stone	ASTM D448 size No. 8 stone (e.g. 3/8 to 3/16 inch in size). Should be washed and clean and free of all fines.
Reservoir Layer	PC: No. 57 stone PA: No. 2 stone IP: No. 2, 3, or 4 stone	ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size). No. 2 Stone (e.g. 3 inch to 3/4 inch in size). Depth is based on the pavement structural and hydraulic requirements. Should be washed and clean and free of all fines.
Underdrain	Use 4 to 6 inch diameter perforated PVC (AASHTO M 252) pipe, with 3/8-inch perforations at 6 inches on center; each underdrain installed at a minimum 0.5% slope located 20 feet or less from the next pipe (or equivalent corrugated HDPE may be used for smaller load-bearing applications). Perforated pipe installed for the full length of the permeable pavement cell, and non-perforated pipe, as needed, is used to connect with the storm drain system. T's and Y's installed as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the Ts and Ys.	
Filter Layer	The underlying native soils should be separated from the stone reservoir by a thin, 2 to 4 inch layer of choker stone (e.g. No. 8) covered by a 6 to 8 inch layer of coarse sand (e.g. ASTM C 33, gradation).	The sand should be placed between the stone reservoir and the choker stone, which should be placed on top of the underlying native soils.
Filter Fabric (optional)	Use an appropriate filter fabric for the particular application based on AASHTO M288-06 Filter Fabric should have a Flow Rate greater than 125 gpm/sq. ft. (ASTM D4491), and an Apparent Opening Size (AOS) equivalent to a US # 70 or # 80 sieve (ASTM D4751). The geotextile AOS selection is based on the percent passing the No. 200 sieve in "A" Soil subgrade, using FHWA or AASHTO selection criteria.	
Impermeable Liner	Use a thirty mil (minimum) PVC Geomembrane liner covered by 8 to 12 oz./sq. yd.2 non-woven geotextile. NOTE: THIS IS USED ONLY FOR KARST REGIONS.	
Observation Well	Use a perforated 4 to 6 inch vertical PVC pipe (AASHTO M 252) with a lockable cap, installed flush with the surface.	

Table 7.7. Different Permeable Pavement Specifications

Material	Specification	Notes
Permeable Interlocking Concrete Pavers	Surface open area: 5% to 15%. Thickness: 3.125 inches for vehicles. Compressive strength: 55 Mpa. Open void fill media: aggregate	Must conform to ASTM C936 specifications. Reservoir layer required to support the structural load.
Concrete Grid Pavers	Open void content: 20% to 50%. Thickness: 3.5 inches. Compressive strength: 35 Mpa. Open void fill media: aggregate, topsoil and grass, coarse sand.	Must conform to ASTM C 1319 specifications. Reservoir layer required to support the structural load.
Plastic Reinforced Grid Pavers	Void content: depends on fill material. Compressive strength: varies, depending on fill material. Open void fill media: aggregate, topsoil and grass, coarse sand.	Reservoir layer required to support the structural load.
Pervious Concrete	Void content: 15% to 25 %. Thickness: typically 4 to 8 inches. Compressive strength: 2.8 to 28 Mpa. Open void fill media: None	May not require a reservoir layer to support the structural load, but a layer may be included to increase the storage or infiltration.
Porous Asphalt	Void content: 15% to 20 %. Thickness: typically 3 to 7 in. (depending on traffic load). Open void fill media: None.	Reservoir layer required to support the structural load.

PERMEABLE PAVEMENT LEVEL II RESERVOIR CALCULATION

FOR THE PERMEABLE PAVEMENT PARKING SPACES AND PATIOS/WALKS.

PER EQUATION 7.1 OF THE VA DEQ STORMWATER DESIGN SPECIFICATION

$$d(stone) = \frac{(PxAp)}{n(r)xAp}$$

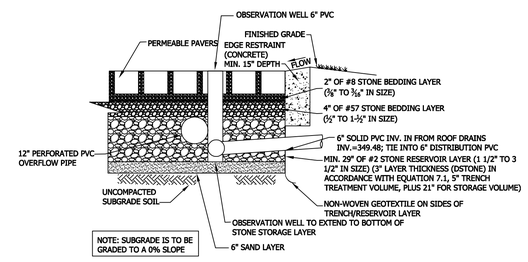
WHERE:

d(stone) = DEPTH OF THE STONE RESERVOIR LAYER (FT.)
P = THE RAINFALL DEPTH (IN FEET) FOR THE TREATMENT VOLUME (LEVEL 1 = 1 INCH (0.08 FT)
n(r) = POROSITY OF RESERVOIR LAYER (0.4)

(SECTION A–A)

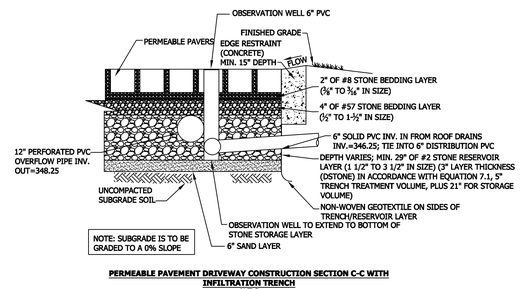
$$d(stone) = \frac{(0.09x1474\ SF)}{0.40x1474\ SF}$$

d(stone) = 0.20 ; MINIMUM 3" REQUIRED, 8" PROVIDED



PERMEABLE PAVEMENT DRIVEWAY CONSTRUCTION SECTION A-A WITH INFILTRATION TRENCH

N.T.S.



PERMEABLE PAVEMENT DRIVEWAY CONSTRUCTION SECTION C-C WITH INFILTRATION TRENCH

N.T.S.

Table 7.8. Recommended Maintenance Tasks for Permeable Pavement Practices

Maintenance Task	Frequency[1]
• For the first 6 months following construction, the practice and contributing drainage area should be inspected at least twice after storm events that exceed 1/2 inch of rainfall. Conduct any needed repairs or stabilization.	After installation
• Mow grass in grid paver applications	At least 1 time every 1-2 months during the growing season
• Stabilize the CDA to prevent erosion • Remove any soil or sediment deposited on pavement. • Replace or repair any necessary pavement surface areas that are degenerating or spalling	As needed
• Vacuum pavement with a standard street sweeper to prevent clogging	2-4 times per year (depending on use)
• Conduct a maintenance inspection • Spot weeding of grass applications	Annually
• Remove any accumulated sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Conduct maintenance using a regenerative street sweeper • Replace any necessary joint material	If clogged

[1] Required frequency of maintenance will depend on pavement use, traffic loads, and surrounding land use.

INFILTRATION STORAGE VOLUME CALCULATION

BENEATH THE PERMEABLE PAVEMENT DRIVE AISLE

DRAINAGE AREA 'A' GRAVEL INFILTRATION VOLUME CALCULATION	
AREA TO INFILTRATION FROM ROOFS	6789 SF
AREA TO INFILTRATION FROM PP DRIVEWAY	3318 SF
10-YEAR RV FROM VRRM	2.86 IN
TOTAL 10-YR RUNOFF VOLUME	**2289 CF**
DRAWDOWN TIME CALCULATION:	
INFILTRATION RATE	0.5 IN/HR
DESIGN RATE	0.25 IN/HR
	0.5 FT/DAY
INFILTRATION SURFACE AREA	3318 SF
DRAWDOWN TIME	1.38 DAYS
	1.38 DAYS < 2.0 DAYS MAX
STORAGE VOLUME PROVIDED:	
SURFACE AREA	3318 SF
DEPTH OF GRAVEL	1.75 FT
GRAVEL VOID RATIO	0.4
TOTAL VOLUME	2322 CF
	2322 CF > 2289 CF

PROVIDE MIN. 1.75' (21") OF GRAVEL FOR STORAGE VOLUME.

INFILTRATION TREATMENT VOLUME CALCULATION

INFILTRATION TRENCH:
DESIGN BASIS: LEVEL 1 DESIGN
MEASURED RATE: 0.50 IN/HR
DESIGN RATE: 0.25 IN/HR OR 0.50 FT/DAY

HSG B

DRAINAGE AREA	SF	Rv
PERVIOUS AREA	0	0.20
IMPERVIOUS AREA	6789	0.95

$$\text{MINIMUM REQUIRED Tv} = \frac{(1.0 \times Rv \times A)}{12} = \frac{1.0\ [0.95(6789)]}{12} = 537\ CF$$

SURFACE AREA PROVIDED = 3318 SF

GRAVEL STORAGE DEPTH FOR Tv = 5"

WATER STORED/TREATED IN FILTER MEDIA AND GRAVEL STORAGE LAYERS
EQUIVALENT STORAGE DEPTH = (0.416')(0.4) = 0.1664'

TOTAL VOLUME OF STORAGE PROVIDED
VOLUME = (3318 SF)(.1664')
= 552 CF > TREATMENT VOLUME (537 CF)

PROVIDE MIN. 5" OF GRAVEL FOR TRENCH TREATMENT VOLUME.

PERMEABLE PAVEMENT TREATMENT VOLUME CALCULATION

FOR THE PERMEABLE PAVEMENT DRIVEWAY

PER EQUATION 7.1 OF THE VA DEQ STORMWATER DESIGN SPECIFICATION

$$d(stone) = \frac{(PxAp)}{n(r)xAp}$$

WHERE:

d(stone) = DEPTH OF THE STONE RESERVOIR LAYER (FT.)
P = THE RAINFALL DEPTH (IN FEET) FOR THE TREATMENT VOLUME (LEVEL 1 = 1 INCH (0.08 FT)
n(r) = POROSITY OF RESERVOIR LAYER (0.4)

$$d(stone) = \frac{(0.09x3318\ SF)}{0.40x3318\ SF}$$

d(stone) = 0.20 ; MINIMUM 3" REQUIRED, 8" PROVIDED

NOTE: NO CREDIT FOR ADDITIONAL CONTRIBUTING IMPERVIOUS DRAINAGE AREA IS TAKEN FOR UP–GRADIENT AREA THAT IS NOT INSTALLED AS PERMEABLE PAVEMENT.

GEOSYNTHETICS

N040
TECHNICAL DATA SHEET NONWOVEN GEOTEXTILE

* OR EQUIVALENT

N040 is a polypropylene, needle punched nonwoven geotextile for use in drainage and separation applications. It has been stabilized to resist degradation due to ultraviolet exposure and is resistant to commonly encountered mildew, insects and soil chemicals, and is non-biodegradable.

SPECIFICATIONS:

The N040 polypropylene nonwoven fabric will utilize the following characteristics:

PROPERTY	TEST METHOD	TYPICAL ROLL VALUE
Grab Tensile Strength[1]	ASTM D4632	100 lbs
Grab Tensile Elongation	ASTM D4632	50%
CBR Puncture	ASTM D6241	280 lbs
Trapezoid Tear Strength	ASTM D4533	50 lbs
UV Resistance @ 500 hrs	ASTMD4355	70%
Apparent Opening Size (AOS)	ASTM D4751	70 US Sieve
Permittivity (sec^{-1})	ASTM D4491	2.0 (sec^{-1})
Flow Rate	ASTM D4491	140 gpm/ft^2

Values quoted above are the result of multiple tests conducted at an independent testing facility. N040 meets or exceeds values listed.
[1] Values apply to both machine and cross-machine directions

PACKAGING:

Roll Width	12.5 ft.	15 ft.
Roll Length	360 ft.	360 ft.
Roll Area	500 yd^2	600 yd^2

Disclaimer: ACF Environmental assumes no liability for the completeness or accuracy of this information or the ultimate use of this information. This document should not be construed as engineering advice. Always consult the project engineer for project specific requirements. The end user assumes sole responsibility for the use of this information and product.

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COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

DRAWN: AI
CHECKED: KW
SCALE: AS NOTED
DATE: 9/12/2017

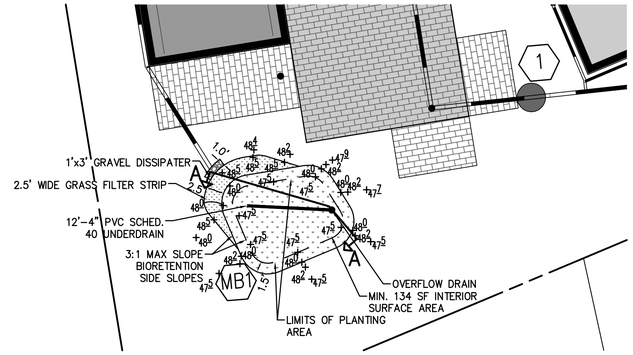
REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

BEST MANAGEMENT PRACTICES DETAILS

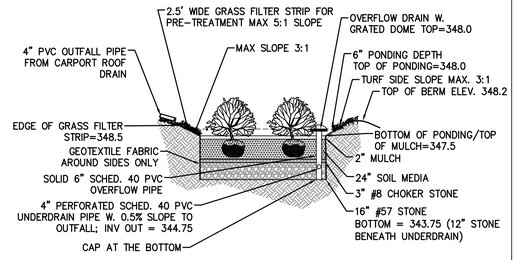
RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0705



MICRO-BIORETENTION #1 LEVEL II ENLARGEMENT

SCALE: 1"=10'



MICRO-BIORETENTION #1 DETAIL SECTION A-A

NTS

MICRO-BIORETENTION #1 LEVEL II

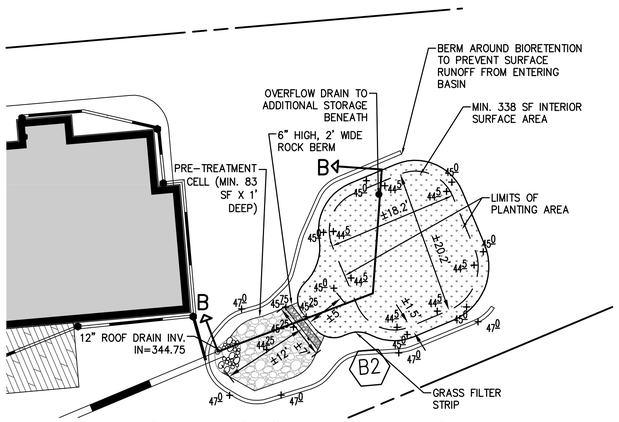
AREA TO BIORETENTION — 1860 SF

TREAT 1.25" STORM RUNOFF PER DEQ SPEC. #9

Tv_{BMP} = 0.95 x 1860 SF x 0.104' = 185 CF

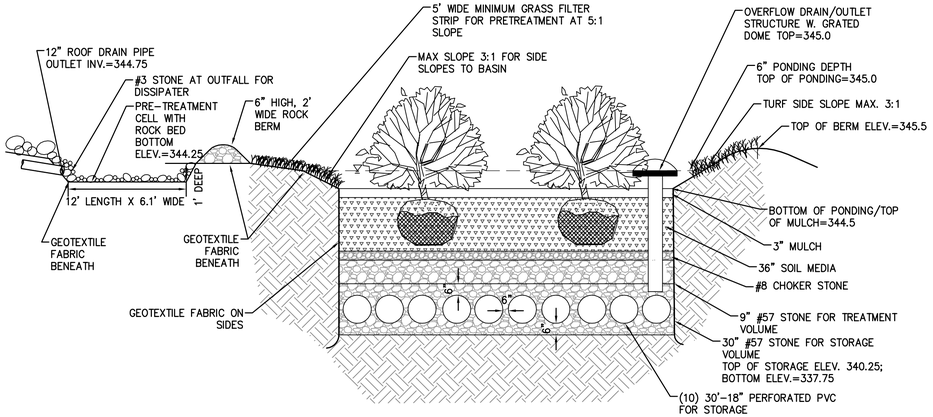
SIZE OF THE BIORETENTION = 134 SF

V1 (PONDING DEPTH)	= 134 SF X 0.5	= 67	CF
V2 (SOIL MEDIA)	= 134 SF X 2 X 0.25 (VOIDS)	= 67	CF
V3 (#57 & PEA GRAVEL)	= 134 SF X 1 X 0.4 (VOIDS)	= 53	CF
	TOTAL VOLUME	= 187	CF PROVIDED



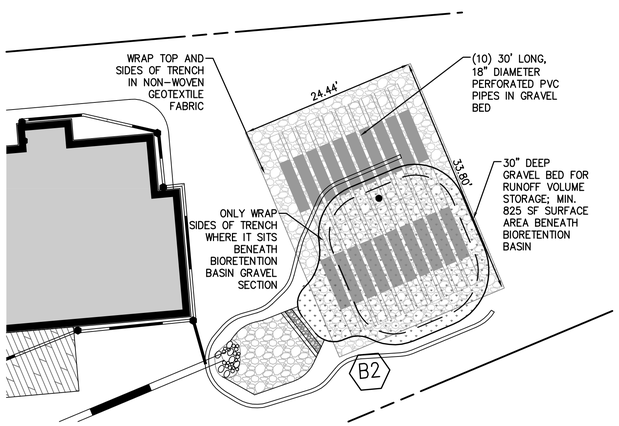
BIORETENTION #2 LEVEL II ENLARGEMENT

SCALE: 1"=10'



BIORETENTION #2 DETAIL SECTION B-B

NTS



UNDERGROUND STORAGE BENEATH BIORETENTION ENLARGEMENT

SCALE: 1"=10'

0 5 10 20

(IN FEET)
1 INCH = 10'

DRAINAGE AREA 'B' GRAVEL INFILTRATION VOLUME CALCULATION

AREA TO BIORETENTION FROM ROOFS	5553 SF
10-YEAR RV FROM VRRM	2.56 IN
TOTAL 10-YR RUNOFF VOLUME	**1126 CF**
DRAWDOWN TIME CALCULATION:	
INFILTRATION RATE	0.7 IN/HR
DESIGN RATE	0.35 IN/HR
	0.7 FT/DAY
INFILTRATION SURFACE AREA	825 SF
DRAWDOWN TIME	1.95 DAYS
	1.95 DAYS < 2.0 DAYS MAX
STORAGE VOLUME PROVIDED:	
SURFACE AREA	850 SF
DEPTH OF GRAVEL	2.50 FT
GRAVEL VOID RATIO	0.4
GRAVEL STORAGE VOLUME VOLUME	***637 CF***
18" PERFORATED PVC AREA	1.77
LENGTH OF PIPE	30'
# OF PIPES	10
PIPE STORAGE VOLUME	***530 CF***
TOTAL STORAGE VOLUME PROVIDED	**1167 CF**
	1167 CF > 1126 CF

BIORETENTION # 2 LEVEL II

AREA TO BIORETENTION — 5553 SF

TREAT 1.25" STORM RUNOFF PER DEQ SPEC. #9

Tv_{BMP} = 0.95 x 5553 SF x 0.104' = 550 CF

SIZE OF THE BIORETENTION = 338 SF

V1 (PONDING DEPTH)	= 338 SF X 0.5	= 169	CF
V2 (SOIL MEDIA)	= 338 SF X 3 X 0.25 (VOIDS)	= 253	CF
V3 (#57 & PEA GRAVEL)	= 338 SF X 1 X 0.4 (VOIDS)	= 135	CF
	TOTAL VOLUME	= 557	CF PROVIDED

PRE-TREATMENT CELL MIN. VOLUME (15% OF Tv) = 83 CF

CONTECH ENGINEERED SOLUTIONS — CDS Flow-Based Sizing per VADEQ Regulations

Project Name:	Railroad Cottages		
Site Designation:	1	**Date:**	8/21/17
County or Independent City:	Falls Church	**Design Engineer:**	JLW
State:	VA		
Annual Rainfall (inches)	43		
Target Rainfall Event, P (inches)	1.00		

Volume from Upstream Runoff Reduction Practice to BMP:

	Remaining Volume from Upstream RR Practice (cf)	Runoff Coefficient (R_v)	Effective Area (ac)
Managed Turf	0		0.00
Impervious Cover	0	0.95	0.00

Volume from Additional Credit Area to BMP:

	Treatment Volume from Untreated Credit Area (cf)	Runoff Coefficient (R_v)	Effective Area (ac)
Managed Turf	0	0.25	0.00
Impervious Cover	276	0.95	0.08

Total Volume to be Treated	276	cf
Total Effective Area to be Treated	0.08	ac
Composite Rv	0.95	
Time of Concentration (Tc)	5.00	min
Unit Peak Discharge (qu)	1000	cfs/mi2/in
Treatment Volume Peak Discharge	0.12	cfs
Model Name	2015-4	

CONTECH ENGINEERED SOLUTIONS — CDS Flow-Based Sizing per VADEQ Regulations

Project Name:	Railroad Cottages		
Site Designation:	2	**Date:**	8/21/17
County or Independent City:	Falls Church	**Design Engineer:**	JLW
State:	VA		
Annual Rainfall (inches)	43		
Target Rainfall Event, P (inches)	1.00		

Volume from Upstream Runoff Reduction Practice to BMP:

	Remaining Volume from Upstream RR Practice (cf)	Runoff Coefficient (R_v)	Effective Area (ac)
Managed Turf	0		0.00
Impervious Cover	0	0.95	0.00

Volume from Additional Credit Area to BMP:

	Treatment Volume from Untreated Credit Area (cf)	Runoff Coefficient (R_v)	Effective Area (ac)
Managed Turf	0	0.25	0.00
Impervious Cover	262	0.95	0.08

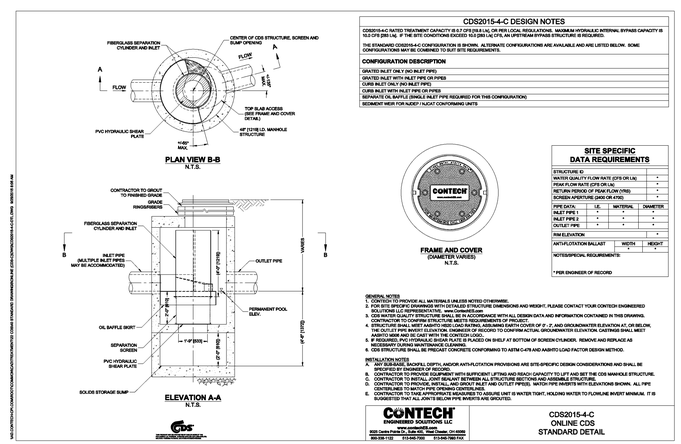
Total Volume to be Treated	262	cf
Total Effective Area to be Treated	0.08	ac
Composite Rv	0.95	
Time of Concentration (Tc)	5.00	min
Unit Peak Discharge (qu)	1000	cfs/mi2/in
Treatment Volume Peak Discharge	0.11	cfs
Model Name	2015-4	

Table 9.7. Bioretention Material Specifications

Material	Specification	Notes
Filter Media Composition	Filter Media to contain: • 80% - 90% sand • 10%-20% soil fines • 3%-5% organic matter	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
Filter Media Testing	Available P between L+ and M per DCR 2005 Nutrient Management Criteria.	The media should be certified by the supplier.
Mulch Layer	Use aged, shredded hardwood bark mulch or stable coarse compost.	Lay a 2 to 3 inch layer on the surface of the filter bed.
Alternative Surface Cover	Use river stone or pea gravel, coir and jute matting, or turf cover.	Lay a 2 to 3 inch layer of to suppress weed growth.
Top Soil For Turf Cover	Loamy sand or sandy loam texture, with less than 5% clay content, pH corrected to between 6 and 7, and an organic matter content of at least 2%.	3 inch surface depth.
Geotextile/Liner	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Apply only to the sides and directly above the underdrain. For hotspots and certain karst sites only, use an appropriate liner on bottom.
Choking Layer	Lay a 2 to 4 inch layer of sand over a 2 inch layer of choker stone (typically #8 or #89 washed gravel), which is laid over the underdrain stone.	
Stone Jacket for Underdrain and/or Storage Layer	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	12 inches for the underdrain; 12 to 18 inches for the stone storage layer, if needed
Underdrains, Cleanouts, and Observation Wells	Use 6 inch rigid schedule 40 PVC pipe (or equivalent corrugated HDPE for micro-bioretention), with 3/8-inch perforations at 6 inches on center; position each underdrain on a 1% or 2% slope located nor more than 20 feet from the next pipe.	Lay the perforated pipe under the length of the bioretention cell, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the Ts and Ys.
Plant Materials	Plant one tree per 250 square feet (15 feet on-center, minimum 1 inch caliper). Shrubs a minimum of 30 inches high planted a minimum of 10 feet on-center. Plant ground cover plugs at 12 to 18 inches on-center; Plant container-grown plants at 18 to 24 inches on-center, depending on the initial plant size and how large it will grow.	Establish plant materials as specified in the landscaping plan and the recommended plant list. In general, plant spacing must be sufficient to ensure the plant material achieves 80% cover in the proposed planting areas within a 3-year period. If seed mixes are used, they should be from a qualified supplier, should be appropriate for stormwater basin applications, and should consist of native species (unless the seeding is to establish maintained turf).

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 • Remove invasive plants using recommended control methods • Stabilize the contributing drainage area to prevent erosion	As needed
• Spring inspection and cleanup • Supplement mulch to maintain a 3 inch layer • Prune trees and shrubs	Annually
• Remove sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Replace the mulch layer	Every 3 years



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COMMONWEALTH OF VIRGINIA — KAREN L. S. WHITE — LIC. NO. 041850 — 9/12/17 — PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE	APPROVED	REV. BY	DATE

REVISION APPROVED BY

BIORETENTION & INFILTRATION PRE-TREATMENT DETAILS

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

DRAWN: AI | CHECKED: KW | SCALE: 1" = 10' | DATE: 9/12/2017

TRIAD TRIAD ENGINEERING, INC. ▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸ TRIAD Listens, Designs & Delivers

MD | OH | PA | VA | WV

December 22, 2016

Railroad, LLC
c/o Mr. Joe Wetzel, Senior Vice President
The Young Group, Inc.
800 West Broad Street, Suite 333
Falls Church, VA 22046

RE: Report of Infiltration Testing Services
Railroad Avenue Infiltration Testing
Falls Church, Virginia
Triad Report No. 07-16-0338

Dear Mr. Wetzel:

Triad Engineering, Inc. (Triad) has completed infiltration testing for the planned SWM/BMP areas within the three parcels located south of the terminus of Railroad Avenue in Falls Church, Virginia. The purpose of this study was to explore and evaluate the subsurface conditions at the subject site with the main focus on evaluating the in-situ infiltration properties at the planned SWM/BMP facilities. The scope of work for this project was completed in substantial conformance with the scope of work outlined in our proposal dated November 29, 2016 and authorized by receipt of a signed professional services agreement on November 30, 2016.

The subsurface exploration was performed to evaluate the subsurface conditions encountered at the planned SWM/BMP locations for the limited purposes of preparing design and construction recommendations for geotechnical aspects of the project. It is emphasized that subsurface conditions may vary dramatically between test locations, and Triad makes no representations as to subsurface conditions other than those encountered at the specific locations.

This report has been prepared for the exclusive use of Railroad, LLC for specific application to the design of the planned SWM/BMP areas for the three proposed lots along Railroad Avenue in Falls Church, Virginia. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above. To observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction, it is recommended that Triad be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work.

We appreciate the opportunity to provide our services during the design phase of the project. If you should have any questions concerning this report, or if you require any additional information, please do not hesitate to contact us.

Sincerely,

TRIAD ENGINEERING, INC.

Matthew Beck
Staff Geologist

Randy L. Moulton, P.E.
Principal Engineer

COMMONWEALTH OF VIRGINIA
RANDY L. MOULTON
Lic. No. 019214
PROFESSIONAL ENGINEER

Geotechnical engineering personnel from our office were present during the drilling work to supervise the field exploration program, log all of the borings and observe drilling of the infiltration probes and perform the infiltration testing. The recovered soil and rock samples were transported to our laboratory for further testing. Detailed descriptions of materials encountered in the test borings and probes are contained on the boring logs in Appendix B. Figure No. 1 contains a description of the classification system and terminology utilized. A professional geologist was on site during the drilling to visually observe the drilling and determine the Seasonal High Water Table (SHWT). Boring locations were established by taping distances from prominent site features.

Subsurface Strata

The materials encountered in the field exploration are generally described below. Stratification lines indicated on the logs represent the approximate boundaries between material types.

Surface Materials: Approximately 3 to 5 inches of topsoil was encountered at the ground surface in all of the test locations. The topsoil generally consisted of brown clayey silt and silty sand with appreciable amounts of root matter. Greater topsoil thicknesses should be expected adjacent to the large root balls associated with the mature trees present at the site.

Residual Soils: Residual soil was encountered below the surface materials in all of the borings. The residuum was present to the planned termination depth of 12 feet below existing grades. The residuum generally consisted of an upper layer of clayey silt or lean clay with minor amounts of sand, rock fragments and mica. The upper soil stratum is underlain by silty sand with varying amounts of clay, rock fragments and minor amounts of mica. SPT N-values obtained in the residuum ranged from 3 to 29 blows per foot indicating soft consistencies to medium dense relative densities. N-values obtained in the residuum generally exhibited a medium stiff consistency. N-values exhibiting soft conditions were isolated to the surface sample from borings B-1 and B-2.

Infiltration Testing

Infiltration testing was performed in two (2) probe locations that were offset within 5 feet from the primary boring. The offset probes were extended to 10 feet below existing grades, as requested. The majority of the soil located at the bottom of the SWM/BMP areas generally consisted of brown silty sand with varying amounts of clay and gravel and trace amounts of mica.

The infiltration testing was performed in general accordance with the requirements provided in the VA DEQ Stormwater Design Specification No. 8. The sides of the holes were scarified prior to testing, and solid 3-inch PVC pipe was installed to the bottom of the test hole. Water readings were obtained over a four hour period. The drilling depths at each location, the average infiltration rates obtained over the four hour period and the recommended design infiltration rates are presented in the following table.

BORING LOCATION	TEST LOCATION	AVERAGE MEASURED INFILTRATION RATE (in./hr.)	DESIGN INFILTRATION RATE (in./hr.)
B-1	P-1A	0.60	0.50
	P-1B	0.45	
B-2	P-2A	1.45	1.20
	P-2B	1.10	
B-3	P-3A	0.75	0.70
	P-3B	0.70	

Groundwater Observations

The borings and offsets were checked for the presence of groundwater during the exploration. Groundwater was not encountered in any of the borings or offsets during or upon completion of the drilling. No evidence of gray mottling or other conditions suggesting a SHWT were encountered during the drilling. However, it is important to note that fluctuations in groundwater levels may occur due to variations in environmental conditions, surface drainage and other factors which may not have been evident at the time measurements were made and reported herein.

LABORATORY TESTING

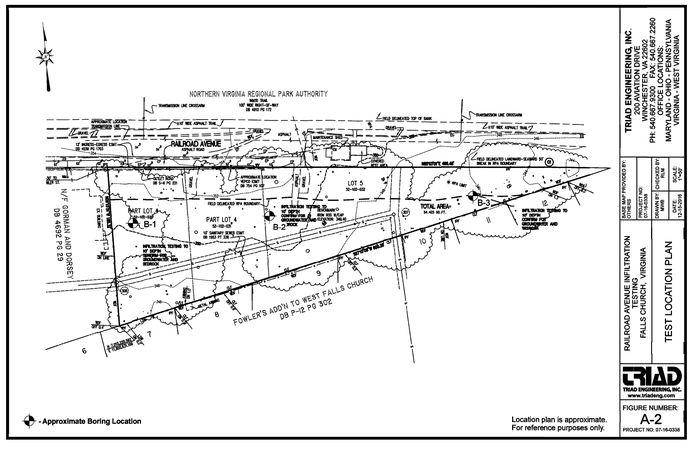
Laboratory testing was performed as part of the exploration. The soils we encountered during our field exploration were consistent with the types of residual soils in the area. A summary of the laboratory test results is presented below.

TEST TYPE	TEST RESULTS
Natural Moisture Contents	26.7 % to 44.3 %
Atterberg Limits: Liquid Limit Plasticity Index	NV (all samples) NP (all samples)
Percent Passing No. 200 Sieve	44 % to 58 %
USCS Classifications	SM (all samples)
USDA Textural Classifications	Loam and Sandy Loam

FINDINGS AND RECOMMENDATIONS

The infiltration testing was accomplished in general conformance with the VA DEQ Stormwater Design Specification No. 8. As provided in a previous table, the average measured infiltration rate for the lots ranged from 0.50 to 1.25 inches per hour. Given the low variability of infiltration rates across the site, we recommend that the design rates equal the infiltration rates observed at the test locations. Laboratory testing determined that the USDA textural classifications for the materials obtained within 2 feet of requested test locations were determined to be loam and sandy loam. The materials present at the anticipated bottom levels of the SWM/BMPs consisted primarily of silty sand with varying amounts of clay, mica and rock fragments. Based on the results of the field testing, infiltration testing and laboratory testing, it is our opinion that the types of facilities proposed are suitable based on existing subsurface conditions. However, the infiltration rate of 0.50 inch/hour is marginal and underdrains should be considered for this location.

Light grading equipment such as a small tracked dozer should be utilized for gravel placement and other construction within the SWM/BMP areas. In addition, prior to completion, heavy construction traffic within the SWM/BMP facility areas should be prohibited so that the infiltration subgrade soils will not be over-compacted. During all site construction and until final site stabilization, methods should be implemented so that the infiltration subgrade is not clogged with fines, mud or other possible sediment from sources such as stormwater runoff or construction equipment.



TRIAD ENGINEERING, INC.
200 AVIATION DRIVE
WINCHESTER, VA 22602
PH: 540.667.9300 FAX: 540.667.2260
OFFICE LOCATIONS:
MARYLAND, OHIO, PENNSYLVANIA
WEST VIRGINIA, VIRGINIA

RAILROAD AVENUE INFILTRATION
RAILROAD, LLC
FALLS CHURCH, VIRGINIA

TEST LOCATION PLAN

TRIAD ENGINEERING, INC.
www.triadeng.com

FIGURE NUMBER: A-2
PROJECT NO: 07-16-0338

TEST BORING LOG

Sheet 1 of 1

Project Number: 07-16-0338 | Project Name: Railroad Avenue Infiltration Testing | Boring No.: B-1
Logger: KBA | Boring Location: See Figure No. A-2
Date Started: 12/8/16 | Drill/Method: CME-55
Date Completed: 12/8/16 | Driller: TRIAD | Ground Elev.: 350

Shelby Tube; Standard Split Spoon; Core Sample; Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
							4" TOPSOIL				
	S-1		1-1-3	72%			Brown clayey SILT, little sand, trace rock fragments and mica, soft, moist				
	S-2		9-16-13	100%			-orange-gray-tan, very stiff, some sand and rock fragments, trace mica				
							-RESIDUUM-				
5.0	S-3		2-3-3	100%		5.0	Tan-brown silty SAND, loose, little clay, trace mica and rock fragments				345.0
	S-4		2-2-3	100%			-loose, higher clay content				
10.0	S-5		2-3-3-4	100%			-loose				
						12.0	-RESIDUUM-				338.0
15.0							-BORING TERMINATED AT 12.0 FEET-				

TRIAD ENGINEERING, INC.
200 Aviation Drive
Winchester, VA
P: 540.667.9300
F: 540.667.2260

Remarks: No groundwater encountered during or upon completion of drilling. Surface elevation is approximate. Cave in at 7.0 feet.

TEST BORING LOG

Sheet 1 of 1

Project Number: 07-16-0338 | Project Name: Railroad Avenue Infiltration Testing | Boring No.: B-2
Logger: KBA | Boring Location: See Figure No. A-2
Date Started: 12/8/16 | Drill/Method: CME-55
Date Completed: 12/8/16 | Driller: TRIAD | Ground Elev.: 351

Shelby Tube; Standard Split Spoon; Core Sample; Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
							3" TOPSOIL				
	S-1		WOH-1-2	83%			Orange-brown lean CLAY, little sand, trace rock fragments and mica, soft, low plasticity, moist PP=1.0 tsf				
	S-2		4-5-1	100%			-stiff, trace black staining PP=3.25 tsf				
							-RESIDUUM-				
5.0	S-3		3-9-14	100%		4.5	Brown-orange silty SAND, little to some clay, trace rock fragments, mica and black staining, medium dense, moist				346.5
	S-4		3-5-6	100%			-medium dense				
10.0	S-5		2-2-5-8	100%			-loose				
						12.0	-RESIDUUM-				339.0
15.0							-BORING TERMINATED AT 12.0 FEET-				

TRIAD ENGINEERING, INC.
200 Aviation Drive
Winchester, VA
P: 540.667.9300
F: 540.667.2260

Remarks: No groundwater encountered during or upon completion of drilling. Surface elevation is approximate. Cave in at 9.0 feet.

TEST BORING LOG

Sheet 1 of 1

Project Number: 07-16-0338 | Project Name: Railroad Avenue Infiltration Testing | Boring No.: B-3
Logger: KBA | Boring Location: See Figure No. A-2
Date Started: 12/8/16 | Drill/Method: CME-55
Date Completed: 12/8/16 | Driller: TRIAD | Ground Elev.: 349

Shelby Tube; Standard Split Spoon; Core Sample; Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
							4" TOPSOIL				
	S-1		2-4-5	67%			Brown clayey SILT, little sand, trace rock fragments, stiff, moist				
						3.0	-RESIDUUM-				346.0
	S-2		3-4-5	33%			Gray-tan silty SAND, little clay, trace rock fragments and mica, loose, moist				
5.0	S-3		2-2-3	89%			-loose				
	S-4		2-3-4	100%			-loose				
10.0	S-5		2-2-3-3	100%			-loose				
						12.0	-RESIDUUM-				337.0
15.0							-BORING TERMINATED AT 12.0 FEET-				

TRIAD ENGINEERING, INC.
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Winchester, VA
P: 540.667.9300
F: 540.667.2260

Remarks: No groundwater encountered during or upon completion of drilling. Surface elevation is approximate. Cave in at 7.0 feet.

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www.WLPINC.com

SCALE: NONE | DATE: 9/12/2017 | DRAWN: AL | CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

INFILTRATION TEST REPORT

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0707

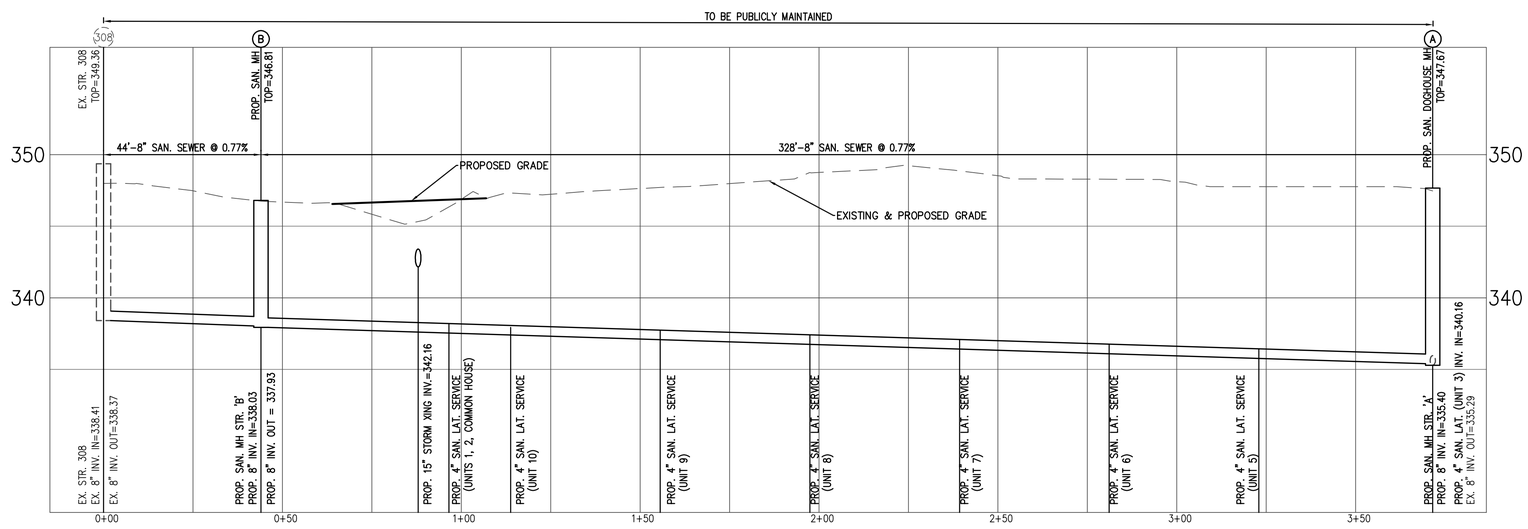
File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-0706.dwg Xref:

PLAN VIEW

SCALE: 1"=20'

PROPOSED SANITARY LATERAL SCHEDULE

	FROM MH	TO MH		SANITARY STATION	8" MAIN INVERT	4" INVERT @ MAIN	LENTH TO C.O.	4" INV.@ C.O.	SLOPE TO C.O.
RAILROAD AVE.	B	A							
			CO 1A	0+53	337.52	338.19	70.88	339.67	2.08%
			CO 1				29.18	342.58	10.00%
			CO 2A				60.25	342.68	5.00%
			CO 2				7.32	343.04	5.00%
			CO 2B				67.92	346.07	5.00%
			CO 10	0+69	337.39	338.06	11.96	339.26	10.00%
			CO 9	1+12	337.07	337.74	14.00	339.14	10.00%
			CO 8	1+53	336.75	337.42	14.00	338.82	10.00%
			CO 7	1+95	336.42	337.09	13.00	338.39	10.00%
			CO 6	2+37	336.10	336.77	13.50	338.12	10.00%
			CO 5	2+79	335.78	336.45	13.50	337.80	10.00%
			CO 4	3+21	335.46	336.13	13.66	337.49	10.00%
			CO 3	3+28	335.40	340.16	64.36	341.50	2.08%



SANITARY PROFILE

SCALE: H: 1"=20'
V: 1"=5'

TEST PITS TO BE PERFORMED 60 DAYS PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY DESIGN ENGINEER WITH ANY INVERT ISSUES FROM TEST PIT RESULTS.

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DRAWN: AI
CHECKED: KW

SCALE: HOR. 1"=20'
VERT. 1"=5'
DATE: 9/12/2017

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

UTILITY PROFILES

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

NORTHERN VIRGINIA REGIONAL PARK AUTHORITY
ZONE: R-1A
W&OD TRAIL
100' WIDE RIGHT-OF-WAY
DB 4910 PG 172

LIMITS OF DISTURBANCE
INGRESS-EGRESS ESMT
DB 4039 PG 793

RAILROAD AVENUE
ASPHALT ROAD

OUTLET ROAD
DB S-6 PG 221

APPROXIMATE LOCATION
VEPCO ESMT
DB 754 PG 107

LOT 5
52-102-032

FIELD DELINEATED
RPA BOUNDARY

PART LOT 4
52-102-030

PART LOT 4
52-102-031

10' SANITARY SEWER ESMT
DB 1953 PT 338

H/F GORMAN AND
DOREY
DB 4682 PG 29
ZONE: R-1A

FOWLER'S ADD'N TO WEST FALLS CHURCH
DB P-12 PG 302
ZONE: R-1A

NORTH

SSF

TP RP

K1291

LEGEND

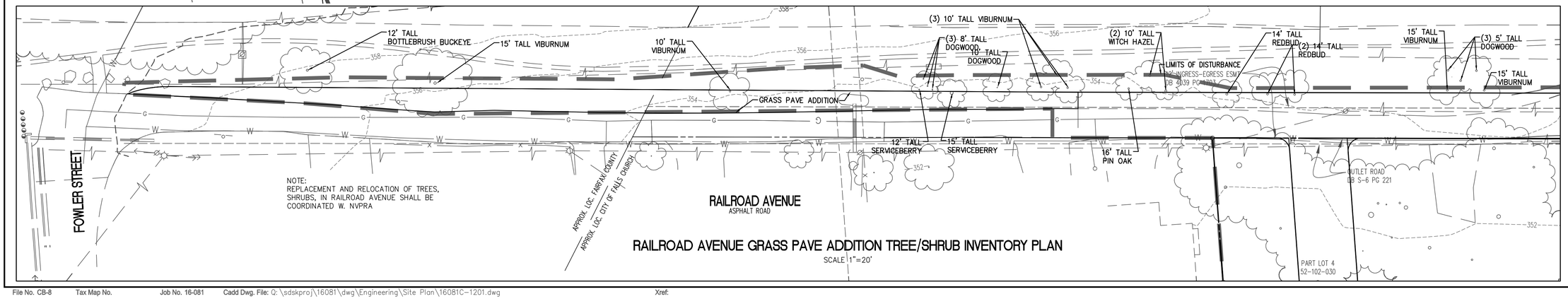
RP	ROOT PRUNING
TP	TREE PROTECTION
	CRZ –CRITICAL ROOT ZONE (TREE TO BE SAVED)
X	TREE TO BE REMOVED INCLUDING CRZ
	EXISTING TREELINE
	LIMITS OF CLEARING AND GRADING

20 0 10 20 40 80
(IN FEET)
1 INCH = 20'

TREE PRESERVATION PLAN
SCALE 1"=20'

TREE PRESERVATION AND LANDSCAPE PLAN PREPARED BY:

01/09/2017
BENJAMIN J. SCHITTER, CERTIFIED ARBORIST ISA #MA-5385A



RAILROAD AVENUE GRASS PAVE ADDITION TREE/SHRUB INVENTORY PLAN
SCALE 1"=20'

WALTER L. PHILLIPS INCORPORATED
ESTABLISHED 1945
Engineers • Surveyors • Planners
Landscape Architects • Arborists
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DRAWN: AI
CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

SCALE: 1" = 20'
DATE: 9/12/2017

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

TREE INVENTORY & PRESERVATION PLAN

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-1201

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-1201.dwg Xref:

Tree Inventory - Railroad Ave - Falls Church, VA

Tree #	Botanical Name	Common Name	Size DBH (in)	Critical Root Zone (CRZ) Radius (ft)	Species Rating (%)	Condition%	Removal	Activities: Tree Protection Fence/ Super Silt Fence	Activities: Root Prune	Notes
Tree Survey Information Completed by Walter Phillips, Inc - Arborist Ben Schitter- ISA # MA-5385A #(project) 1/9/2017										
1	Morus alba	White mulberry	14"	21'	30%	50%	X			lean
2	Juglans nigra	Black walnut	25"	38'	68%	75%		X	X	
3	Fraxinus americana	White ash	5"	8'	53%	69%	X			
4	Fraxinus americana	White ash	40"	60'	53%	59%	X			multi-stem
6	Quercus alba	White oak	7"	11'	88%	50%	X			vines
7	Dead	Dead	8"	0'	0%	0%	X			
8	Dead	Dead	6"	0'	0%	0%	X			
9	Quercus alba	White oak	9"	14'	88%	50%	X			vines
10	Fraxinus americana	White ash	2"	8'	53%	66%	X			
11	Juglans nigra	Black walnut	24"	36'	68%	63%	X			lean, vines
12	Acer platanoides	Norway maple	3"	8'	55%	63%	X			
13	Juglans nigra	Black walnut	20"	30'	68%	66%	X			vines
14	Fraxinus americana	White ash	18"	27'	53%	66%	X			
15	Fraxinus americana	White ash	18"	27'	53%	69%	X			
16	Morus alba	White mulberry	16"	24'	30%	47%	X			lean
18	Morus alba	White mulberry	6"	9'	30%	50%	X			vines
19	Morus alba	White mulberry	8"	12'	30%	50%	X			vines
20	Cornus florida	Flowering dogwood	4"	8'	60%	50%	X			vines
21	Acer platanoides	Norway maple	3"	8'	55%	50%	X			vines
22	Morus alba	White mulberry	12"	18'	30%	50%	X			vines
23	Acer rubrum	Red maple	28"	42'	70%	47%	X			major damage
24	Acer rubrum	Red maple	12"	18'	70%	63%		X	X	shared
25	Morus alba	White mulberry	6"	9'	30%	50%	X			
27	Robinia pseudoacacia	Black locust	13"	20'	55%	56%	X			vines
28	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X			vines
29	Prunus serotina	Black cherry	5"	8'	55%	59%	X			vines
30	Prunus serotina	Black cherry	4"	8'	55%	59%	X			
31	Robinia pseudoacacia	Black locust	6"	9'	55%	50%	X			vines
32	Robinia pseudoacacia	Black locust	24"	36'	55%	50%	X			vines
33	Acer rubrum	Red maple	15"	23'	70%	50%	X			vines, lean
34	Morus alba	White mulberry	6"	9'	30%	50%		X	X	grown into fence, offsite
37	Morus alba	White mulberry	30"	45'	30%	50%	X			multi-stem
38	Juglans nigra	Black walnut	14"	21'	68%	69%	X			
39	Juglans nigra	Black walnut	6"	9'	68%	69%	X			
40	Juglans nigra	Black walnut	6"	9'	68%	69%	X			
41	Juglans nigra	Black walnut	20"	30'	68%	69%	X			
42	Fraxinus americana	White ash	18"	27'	53%	66%	X			
43	Morus alba	White mulberry	16"	24'	30%	56%	X			
44	Morus alba	White mulberry	9"	14'	30%	59%	X			
45	Ulmus rubra	Slippery elm	25"	38'	73%	59%	X			multi-stem
46	Morus alba	White mulberry	20"	30'	30%	59%	X			multi-stem
47	Acer platanoides	Norway maple	26"	39'	55%	56%	X			lean
48	Robinia pseudoacacia	Black locust	14"	21'	55%	50%	X			vines
49	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X			vines
50	Morus alba	White mulberry	5"	8'	30%	69%		X	X	
51	Morus alba	White mulberry	12"	18'	30%	63%	X			
52	Fraxinus americana	White ash	15"	23'	53%	50%	X			vines, lean
53	Morus alba	White mulberry	3"	8'	30%	69%	X			
54	Juglans nigra	Black walnut	40"	60'	68%	59%	X			
55	Quercus alba	White oak	12"	18'	88%	72%	X			
56	Morus alba	White mulberry	8"	12'	30%	63%	X			vines
57	Prunus serotina	Black cherry	9"	14'	55%	69%	X			
58	Juglans nigra	Black walnut	10"	15'	68%	69%	X			
59	Tilia americana	American basswood	20"	30'	73%	56%	X			co-dominant, lean
60	Robinia pseudoacacia	Black locust	8"	12'	55%	66%	X			
61	Acer rubrum	Red maple	60"	90'	70%	23%	X			
62	Robinia pseudoacacia	Black locust	30"	45'	55%	50%	X			
63	Juglans nigra	Black walnut	11"	17'	68%	66%	X			
64	Morus alba	White mulberry	13"	20'	30%	50%	X			co-dominant, deadwood
65	Juglans nigra	Black walnut	20"	30'	68%	59%	X			vines
66	Morus alba	White mulberry	8"	12'	30%	59%	X			
67	Morus alba	White mulberry	10"	15'	30%	59%	X			
68	Juglans nigra	Black walnut	4"	8'	68%	63%	X			
69	Fraxinus americana	White ash	12"	18'	53%	72%	X			
70	Robinia pseudoacacia	Black locust	20"	30'	55%	63%	X			multi-stem

DBH = Diameter at Breast Height (measured 4.5 feet above ground)

CRZ = Critical Root Zone = 1.5 foot radius per inch of tree diameter

CRZ values for trees with multiple stems were calculated using the diameter of a tree with the basal area equivalent to the sum of the basal areas for all stems.

Condition Ratings provided as percentages based on methods outlined in the 9th edition of the Guide for Plant Appraisal, published by

Tree Inventory - Railroad Ave - Falls Church, VA

Tree #	Botanical Name	Common Name	Size DBH (in)	Critical Root Zone (CRZ) Radius (ft)	Species Rating (%)	Condition%	Removal	Activities: Tree Protection Fence/ Super Silt Fence	Activities: Root Prune	Notes
Tree Survey Information Completed by Walter Phillips, Inc - Arborist Ben Schitter- ISA # MA-5385A #(project) 1/9/2017										
74	Morus alba	White mulberry	13"	20'	30%	63%	X			
75	Morus alba	White mulberry	9"	14'	30%	63%	X			
76	Morus alba	White mulberry	10"	15'	30%	63%	X			
77	Quercus palustris	Pin oak	13"	20'	70%	59%	X			heavy pruned
78	Acer rubrum	Red maple	24"	36'	70%	66%	X			vines
79	Morus alba	White mulberry	10"	15'	30%	66%	X			twin
80	Robinia pseudoacacia	Black locust	12"	18'	55%	59%	X			
81	Robinia pseudoacacia	Black locust	6"	9'	55%	59%	X			
82	Liriodendron tulipifera	Yellow-poplar	8"	12'	70%	69%	X			
83	Prunus serotina	Black cherry	20"	30'	55%	66%	X			multi-stem
84	Morus alba	White mulberry	8"	12'	30%	63%	X			
85	Morus alba	White mulberry	4"	8'	30%	63%	X			
86	Dead	Dead	5"	0'	0%	0%	X			
87	Morus alba	White mulberry	4"	8'	30%	69%	X			
88	Morus alba	White mulberry	11"	17'	30%	63%	X			
89	Morus alba	White mulberry	11"	17'	30%	63%	X			
90	Quercus palustris	Pin oak	38"	57'	70%	75%	X			dead wood
91	Juglans nigra	Black walnut	13"	20'	68%	72%	X			
92	Juglans nigra	Black walnut	9"	14'	68%	75%	X			
93	Quercus palustris	Pin oak	27"	41'	70%	63%	X			co-dominant, vines
94	Juglans nigra	Black walnut	15"	23'	68%	69%	X			
95	Acer platanoides	Norway maple	15"	23'	55%	69%	X			co-dominant
96	Prunus serotina	Black cherry	9"	14'	55%	66%	X			lean
97	Robinia pseudoacacia	Black locust	30"	45'	55%	69%	X			
98	Acer platanoides	Norway maple	8"	12'	55%	47%	X			
99	Cornus florida	Flowering dogwood	5"	8'	60%	63%	X			
100	Robinia pseudoacacia	Black locust	18"	27'	55%	59%	X			vines, dead wood
129	Robinia pseudoacacia	Black locust	3"	8'	55%	53%	X			
130	Robinia pseudoacacia	Black locust	15"	23'	55%	53%	X			dead wood
131	Robinia pseudoacacia	Black locust	16"	24'	55%	53%	X			dead wood, vines
132	Robinia pseudoacacia	Black locust	15"	23'	55%	69%	X			
133	Juglans nigra	Black walnut	18"	27'	68%	75%	X			
134	Ulmus rubra	Slippery elm	10"	15'	73%	66%	X			
135	Robinia pseudoacacia	Black locust	28"	42'	55%	53%	X			dead wood, vines
136	Prunus serotina	Black cherry	9"	14'	55%	72%	X			
137	Acer rubrum	Red maple	6"	9'	70%	50%	X			
138	Ulmus rubra	Slippery elm	12"	18'	73%	63%	X			
139	Robinia pseudoacacia	Black locust	6"	9'	55%	59%	X			
140	Robinia pseudoacacia	Black locust	3"	8'	55%	50%	X			
141	Robinia pseudoacacia	Black locust	10"	15'	55%	50%	X			
142	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X			
143	Dead	Dead	30"	0'	0%	0%	X			
144	Prunus spp.	Ornamental Cherry	16"	24'	55%	69%	X			
145	Ulmus rubra	Slippery elm	24"	36'	73%	66%	X			
146	Ilex opaca	American holly	4"	8'	73%	69%	X			
147	Cercis canadensis	Eastern redbud	8"	12'	73%	66%	X			
482	Cupressocyparis leylandii	Leyland cypress	10"	15'	60%	63%		X		
483	Cupressocyparis leylandii	Leyland cypress	10"	15'	60%	63%		X		
484	Cupressocyparis leylandii	Leyland cypress	8"	12'	60%	59%		X		
485	Fraxinus americana	White ash	10"	15'	53%	66%	X			dead wood
486	Ulmus rubra	Slippery elm	18"	27'	73%	63%	X			vines
487	Acer platanoides	Norway maple	7"	11'	55%	59%	X			vines, dead wood
488	Acer platanoides	Norway maple	4"	8'	55%	56%	X			lean
489	Acer platanoides	Norway maple	2"	8'	55%	63%	X			multi-stem
490	Liriodendron tulipifera	Yellow-poplar	20"	30'	70%	56%	X			vines, lean
491	Morus alba	White mulberry	13"	20'	30%	50%	X			lean
492	Acer platanoides	Norway maple	13"	20'	55%	50%	X			lean
493	Quercus alba	White oak	8"	12'	88%	63%	X			vines
494	Morus alba	White mulberry	5"	8'	30%	63%	X			lean, vines
496	Liriodendron tulipifera	Yellow-poplar	24"	36'	70%	56%		X	X	vines (cut), shared
498	Fraxinus americana	White ash	24"	36'	53%	63%	X			heavy lean
499	Fraxinus americana	White ash	4"	8'	53%	63%	X			dead wood
600	Pinus virginiana	Virginia pine	10"	15'	50%	72%	X			offsite
601	Ulmus rubra	Slippery elm	18"	27'	73%	69%	X			offsite

DBH = Diameter at Breast Height (measured 4.5 feet above ground)

CRZ = Critical Root Zone = 1.5 foot radius per inch of tree diameter

CRZ values for trees with multiple stems were calculated using the diameter of a tree with the basal area equivalent to the sum of the basal areas for all stems.

Condition Ratings provided as percentages based on methods outlined in the 9th edition of the Guide for Plant Appraisal, published by

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COMMONWEALTH OF VIRGINIA PROFESSIONAL ENGINEER
KAREN L. S. WHITE
Lic. No.041850
9/12/17

DRAWN: AI
CHECKED: KW

SCALE: 1" = 20'
DATE: 9/12/2017

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

TREE INVENTORY

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

TREE PRESERVATION PROCEDURES AND SPECIFICATIONS
City of Falls Church, VA – Urban Forestry / Development Services

1. Prior to allowing any vehicle or construction equipment to enter the site, the construction foreman and project arborist (also foreman of company doing actual tree work if different from project arborist) is to meet the City Arborist to mark the location of the *limits of clearing/ tree preservation fencing*, erosion control fabric, and root pruning line (where required), access routes, storage areas, and parking areas. The location of the LIMITS OF CLEARING/TREE PRESERVATION FENCING is to be installed in accordance with the approved plan and field located from existing benchmarks, landmarks, and building stakeout survey markers. All work procedures and tree preservation measures are to be discussed at this time. An appointment must be made with the arborist for the City a minimum of three days prior to the establishment of the tree preservation measures is required by City Code (Sec. 35-15 (b), see enclosed. Contact the City Arborist for an appointment at 703-248-5183.

2. Trees to be removed shall be clearly marked and approved by the City Arborist prior to demolition or entry of any equipment on site. A tree contractor licensed and bonded to work in the City shall perform all tree work, including all tree removals. Check with the City Arborist for a copy of the most recent list of Tree Contractors.

3. *Tree preservation fencing* shall be either of the following:

   a. Six (6) foot high chain link fence sections attached to one and five eights (1 5/8) inch outside diameter pipe with eleven (11) -gauge mesh in a two (2) inch diamond pattern. The fencing noted above may be temporary panels set in concrete blocks at the base and secured at the top with saddle clamps
   or
   b. Four (4) foot high fourteen (14) gauge welded wire fence supported by six (6) foot long metal stakes (2" width) to be spaced eight (8) feet on center and sunk into the ground.

   Both of the fencing types noted above shall be flagged with brightly colored surveyor ribbon to improve their visibility. The contractor must maintain fencing in place throughout construction. **In the event fencing must be temporarily removed for any reason, contact must be made first with the arborist at 703-248-5183**. The City Arborist must grant approval before any tree preservation fencing is removed, even temporarily.

4. Erosion and sediment control fencing shall be placed on the inside (toward construction) from the tree preservation fencing and any root-pruning trenches.
   Erosion control devices such as silt fencing, debris basins, and water diversion structures shall be installed to prevent siltation and/or erosion within the tree protection zone.
   Property owners are advised to impose fines in contracts with construction companies if tree preservation measures are violated.

5. Demolition and Site Clearing:

   a. The City Arborist shall be notified a minimum of three (3) days in advance of commencing any form of tree work. Call 703-248-5183 for an appointment.

   b. Trees to be removed shall be felled so as to fall away from tree protection zones and to avoid pulling breaking of roots of trees to remain. If roots are entwined, the consultant may require first severing the major woody root mass before extracting the trees. This may be accomplished by cutting through the roots by hand, with a vibrating knife, rock saw, and narrow trencher with sharp blades, or other approved root-pruning equipment.
   c. Trees being cut within the tree preservation zone shall be cut near ground level and the stumps ground out with a walk-behind grinding machine.
   d. All downed brush and trees shall be removed from the tree protection zone either by hand or with equipment sitting outside the tree protection zone. Extraction shall occur by lifting the material out, not by skidding it across the ground.
   e. Brush shall be chipped and placed in the tree protection zone to a depth of 6 inches, with no chips against the trunks of trees.
   f. Structures and underground features to be removed within the tree protection zone shall use the smallest equipment possible and operate from outside the tree protection zone. The City Arborist shall be present during all such operations within the tree protection zone to monitor demolition activity. Phone 703-248-5183 at least three (3) days in advance for an appointment.
   g. Any damage to trees due to demolition activities shall be reported to the City Arborist within 6 hours so that prompt remedial action can be taken.
   h. If temporary haul or access roads must pass over the root area of trees to be retained, a roadbed of at least 10 inches of mulch shall be created to protect the soil. The roadbed material shall be replenished as necessary to maintain a10-inch depth. The City Arborist must approve the use of any such temporary road in the tree protection area.

6. Pruning & Other Preservation Measures Specifications:
   a. The City Arborist shall be notified a minimum of three (3) days in advance of commencing any form of tree work. Call 703-248-5183 for an appointment.
   b. Root pruning, where required, shall be mechanically done with a narrow trencher with sharp blades. Once a trench is opened up, approximately 18-24" in depth and 4" wide all exposed roots will be hand pruned so that the clean-cut ends can regrow.
   The tree preservation fencing shall be placed 6-12" outside the root-pruning trench (construction side of the trench). The erosion and sediment fencing shall be placed outside the tree preservation fencing (construction side of the fence).
      - Where required, apply a slow-release complete fertilizer containing major and trace elements, but low in water-soluble nitrogen during the season before the commencement of construction. An application of a *mychorrizae* product may also be required to assist in the preservation of highly stressed trees.
   c. All trees to be saved will be pruned (in accordance with American National Standards Institute (ANSI) Standard Practices for Trees, Shrubs, and Other Woody Plan Maintenance ANSI A300 and adhere to the most recent edition of ANSI Z133.1.
   d. Treat any disease or insect pest as required to reduce stress on trees.
   e. Remove all invasive vines growing on trees and from the area around the trees
   f. Specifications for work to be performed on individual trees shall be indicated under the "maintenance" column of the Tree Survey.
   g. All trees within the project area shall be pruned to:
      - clear the crown of diseased, crossing, weak, and dead wood to a minimum size of 1 ½ inches diameter;
      - provide 14 feet of vertical clearance over streets and 8 feet over sidewalks;

      - remove stubs, cutting outside the woundwood tissue that has formed around the branch;
      - reduce end weight on heavy, horizontal branches selectively removing small diameter branches, no greater than 2 to 3 inches near the ends of the scaffolds.
   h. Where temporary clearance is needed for access, branches shall be tied back to hold them out of the clearance zone. The City Arborist must approve such tying.
   i. Pruning shall not be performed during periods of flight of adult boring insects because fresh wound attract pests. Pruning shall be performed only when the danger of infestation is past.
   j. All work must be performed by a tree contractor licensed and bonded to work in the City and in accordance with the direction of the project certified arborist and the City Arborist.
   k. Interior branches shall not be stripped out.
   l. Pruning cuts larger than 4 inches in diameter, except for dead wood, shall be avoided.
   m. Pruning cuts that expose heartwood shall be avoided whenever possible.
   n. No more than 20 percent of live foliage shall be removed from a tree at on time.
   o. While in the tree, the arborist shall perform an aerial inspection to identify defects that require treatment. Any addition work needed shall be reported to the City Arborist.
   p. Brush shall be chipped and chips shall be spread underneath trees within the tree protection zone to a maximum depth of 6 inches, leaving the trunk and root flare clear of chips.
   q. It may also be necessary to fertilize, aerate and otherwise treat the "trees to be saved" as required by the arborist for the City, following a meeting with the owner's/developer's arborist and approval of the "tree preservation plan". All tree work must be completed prior to construction.
   r. 'Selective clearing' in wooded areas will be allowed only under the direction of the City Arborist. Trees to be removed will be felled by hand so that minimal damage is done to "trees to be saved".
   s. No vehicles or storage of materials of any kind will be allowed inside the limits of clearing. No storage of material or debris will be allowed within the "tree save area". No burning will be allowed on site.

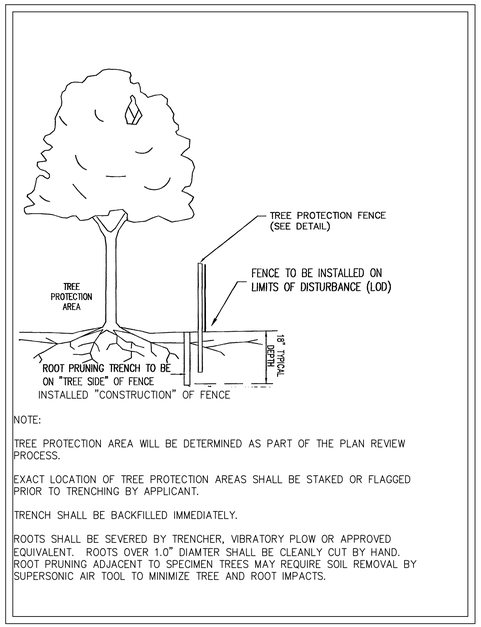
7. Construction Specifications:
   a. Supplemental water shall be supplied to trees being preserved when natural rainfall is less than 1" a week, from early spring until the ground freezes in the fall. Irrigation should be designed to wet the soil to a depth of 2-3 feet. Lacking a source of water early on the construction site, this may be accomplished by constructing a 6" berm around the tree protection zone and filling the basin with a water truck or by injecting the soil using a pressure system from a truck mounted water tank. Shallow frequent watering should be avoided
   b. Have a licensed and bonded tree contractor remove torn, hazardous, or prominent deadwood as it occurs, using ANSI standards noted under # 4 above. .
   c. Where construction traffic must occur in the area of tree roots it shall be necessary to apply the following procedure: cover undisturbed soil with 10-15 inches wood chips and topped with chain link fence pulled taught and anchored or topped with 5/8 to 3/4 inch plywood with non-skid surface.
   d. Where compaction occurs during construction, vertical mulch with good quality compost.
   e. Before grading, pad preparation, or excavation for foundations, footings, walls, or trenching, relevant trees shall be root pruned 1 foot outside the tree protection zone by cutting all roots cleanly to a depth of 24 inches to the maximum depth of root penetration, (usually 3 feet). Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blades, or other approved root-pruning equipment. Pruned roots shall be promptly covered with soil.
   f. Any roots damaged during grading or construction shall be exposed to sound tissue and cut leanly with a saw and promptly covered with moist soil.
   g. Soil from trenches, basements or other excavations shall not be placed within the tree protection zone, either temporarily or permanently. Soil stockpiles should be placed only in previously designated areas. No vehicles or construction equipment shall be parked in the tree protection zone.
   h. No burn piles or debris pits shall be placed within the tree protection zone. No ashes, debris or garbage may be dumped or buried within the tree protection zone. No materials of any kind shall be stored in the tree protection zone.
   i. Maintain fire-safe areas around fenced areas. Also, no heat sources, flames, ignition sources, or smoking is allowed near mulch of trees.
   j. A copy of the "approved plan" and TREE PRESERVATION PROCEDURES AND SPECIFICATIONS must be maintained on site at all times.
   k. All underground utilities and drain or irrigation lines shall be routed outside the tree protection zone. If lines must traverse the protection area, they shall be tunneled or bored under the tree(s) with the approval of the City Arborist.
   l. A licensed and bonded tree contractor must perform additional tree pruning required for clearance during construction under the direction of the City Arborist. Construction workers shall not be allowed to prune trees.
   m. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use. Any pesticides used on site must be tree-safe and not easily transported by water.
   n. If injury should occur to any tree during construction, it should be treated as soon as possible under the direction of the City Arborist.
   o. The City Arborist must monitor any grading, construction, demolition, or other work that is expected to encounter tree roots.
   p. At the completion of construction (and all equipment has been removed from site), notify the City Arborist for an inspection before removing the tree preservation fencing. At this time, all trees will be inspected and any repairs needed will be stipulated by the City and promptly made by the Contractor. (Refer to Sec. 35-15(b) of the City Code for guidance on finalizing the requirements of the bond agreement.

8. The planting of the new tree(s) specified on the plan shall take place after the completion of construction. The City Arborist must inspect the trees prior to planting (see Arborist Notification) and also inspect the placement and installation of the tree(s). All products and workmanship related to the planting of the tree(s) must be in accordance with the **Tree Planting Specifications** attached. The Contractor/Owner must present the City with a copy of a one-year guarantee from the landscape contractor for the newly planted tree(s). The tree will need to be thriving and in good condition one year from the date of planting or will need to be replaced.

If you have questions on any of the "procedures" or "specifications" noted above or concerns that may arise during construction, please contact the City Arborist at (703) 248-5183 or the Senior Urban Forester at (703) 248-5016.

ARBORIST NOTIFICATION AND VERIFICATION:

PRIOR TO THE SIGN OFF AND SUBSEQUENT RELEASE OF THE GRADING PLAN ALL PRESERVATION MEASURES REQUIRED, AS PART OF THE *LANDSCAPE CONSERVATION PLAN*, MUST BE INSPECTED AND APPROVED BY THE CITY OF FALLS CHURCH ARBORIST. THIS MAY INCLUDE BUT IS NOT LIMITED TO TREE WORK, FENCING, MULCHING AND ROOT PRUNING. VIOLATIONS OF THE *LANDSCAPE CONSERVATION PLAN* SHALL RESULT IN FINES, STOP WORK ORDERS AND/OR THE RESUBMISSION OF A "MITIGATION PLAN".
THE REQUIRED REPLACEMENT VEGETATION SHALL BE INSPECTED PRIOR TO PLANTING BY THE CITY ARBORIST. VEGETATION THAT IS INSTALLED UN INSPECTED WILL BE REJECTED. TO ARRANGE AN APPOINTMENT CALL THE SENIOR URBAN FORESTER (703) 248-5016.



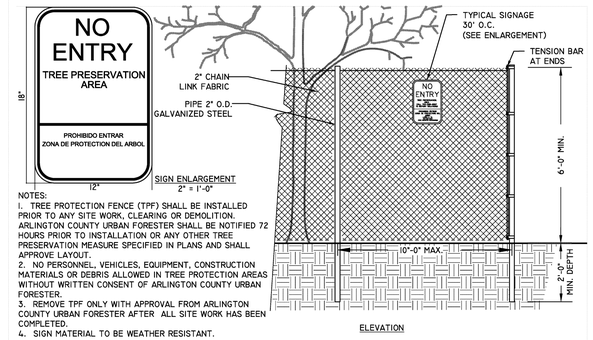
NOTE:

TREE PROTECTION AREA WILL BE DETERMINED AS PART OF THE PLAN REVIEW PROCESS.

EXACT LOCATION OF TREE PROTECTION AREAS SHALL BE STAKED OR FLAGGED PRIOR TO TRENCHING BY APPLICANT.

TRENCH SHALL BE BACKFILLED IMMEDIATELY.

ROOTS SHALL BE SEVERED BY TRENCHER, VIBRATORY PLOW OR APPROVED EQUIVALENT. ROOTS OVER 1.0" DIAMTER SHALL BE CLEANLY CUT BY HAND. ROOT PRUNING ADJACENT TO SPECIMEN TREES MAY REQUIRE SOIL REMOVAL BY SUPERSONIC AIR TOOL TO MINIMIZE TREE AND ROOT IMPACTS.



NOTES:
1. TREE PROTECTION FENCE (TPF) SHALL BE INSTALLED PRIOR TO ANY SITE WORK, CLEARING OR DEMOLITION. ARLINGTON COUNTY URBAN FORESTER SHALL BE NOTIFIED 72 HOURS PRIOR TO INSTALLATION OR ANY OTHER TREE PRESERVATION MEASURE SPECIFIED IN PLANS AND SHALL APPROVE LAYOUT.
2. NO PERSONNEL, VEHICLES, EQUIPMENT, CONSTRUCTION MATERIALS OR DEBRIS ALLOWED IN TREE PROTECTION AREAS WITHOUT WRITTEN CONSENT OF ARLINGTON COUNTY URBAN FORESTER.
3. REMOVE TPF ONLY WITH APPROVAL FROM ARLINGTON COUNTY URBAN FORESTER AFTER ALL SITE WORK HAS BEEN COMPLETED.
4. SIGN MATERIAL TO BE WEATHER RESISTANT.

6' CHAIN LINK TREE PROTECTION FENCE

TREE PRESERVATION TECHNIQUES
(Both techniques described below can be combined with the pruning of roots that may occur beyond the area of treatment).

#1 – For Use in Areas Where Equipment Must Operate in Areas That Will Remain at Existing Grade:

- In the woodchip and plywood or chainlink fence area shown in figure 1 below, spread 10-15" of wood chips by hand.
- On top of the wood chips, lay 5/8 to ¾ inch plywood or heavy-gauge chain link fence to provide a path for equipment and workers to operate.

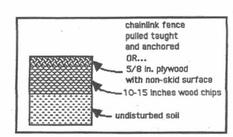


Figure 1

#2 – For Use in Areas Where Fill Soil Will Be Placed Over the Root Zone:

- An aeration system shall be installed in the area shown in figure 2 below prior to grading. The aeration system (see diagram below) shall consist of *geotextile* fabric laid on top of the undisturbed ground; with not less than six inches of river rock on top of it; and with a second layer of *geotextile* fabric laid on top of the rock.
- Fill dirt can then be placed on top of the *geotextile* fabric.

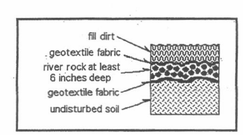


Figure 2

TYPICAL SIGNAGE FOR TREE PRESERVATION AREA
REFERENCE DETAIL 2.A.5

ATTACHMENT TO TREES OR VEGETATION IS PROHIBITED

SIGNS TO BE PROPERLY MAINTAINED THROUGHOUT CONSTRUCTION

SIGN POSTS MAY BE WOOD OR METAL BUT MUST MAKE THE SIGN VISIBLE FROM A STANDING POSITION

SIGNS MUST BE PLACED SUCH THAT A SIGN CAN BE SEEN BY ALL PARTICIPANTS IN THE LAND DISTURBING ACTIVITY AT ALL TIMES, A MINIMUM OF EVERY 50'.

SIGNS MUST BE LAMINATED OR A DURABLE, WEATHERPROOF MATERIAL

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Landscape Architects • Arborists
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FALLS CHURCH, VIRGINIA 22046
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www.WLPINC.com

DRAWN: AJ
CHECKED: KW
SCALE: NONE
DATE: 9/12/2017

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

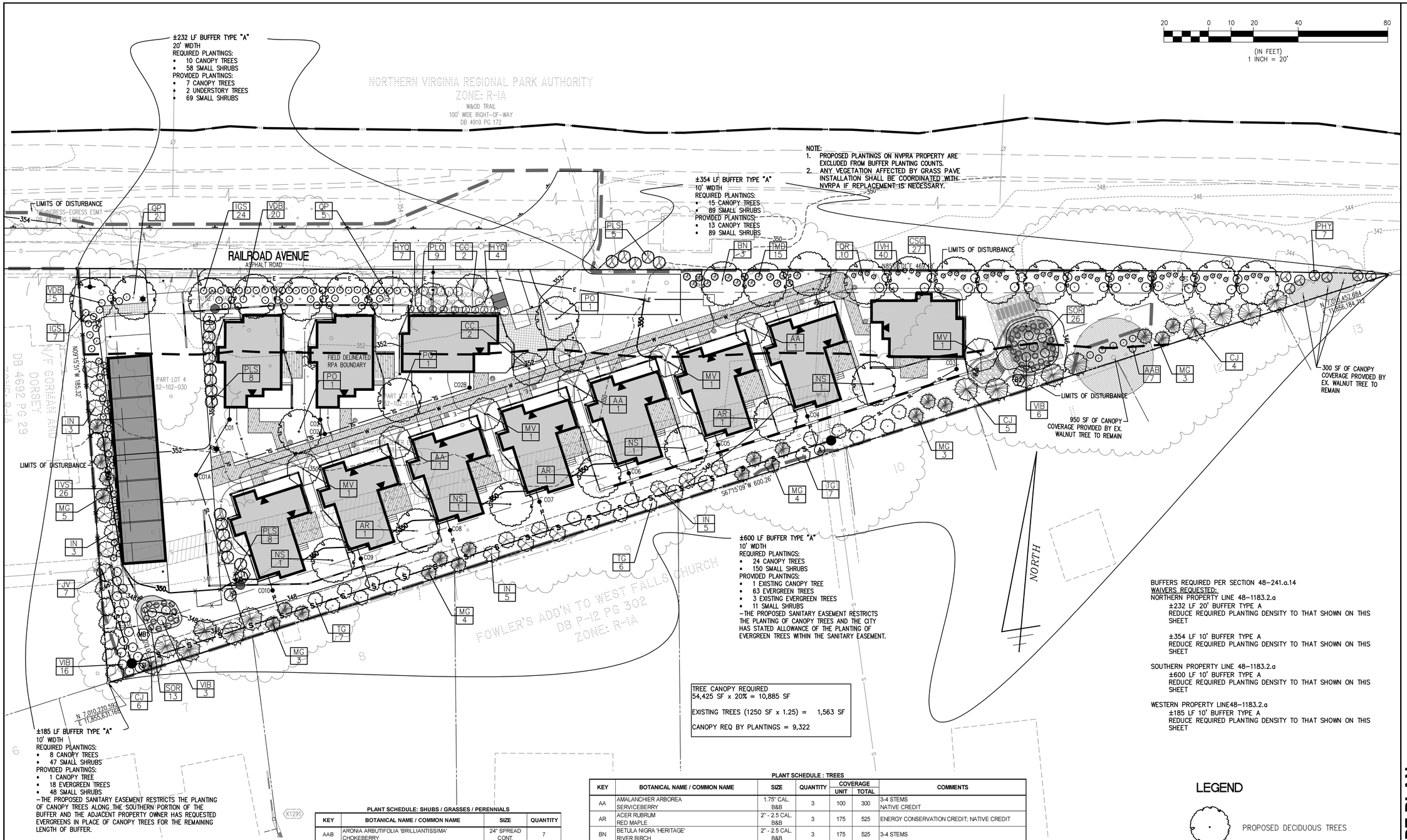
REVISION APPROVED BY			
NO.	DESCRIPTION	DATE	REV. BY	APPROVED

TREE PRESERVATION NOTES & DETAILS

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-1203



(IN FEET)
1 INCH = 20'

TREE CANOPY REQUIRED
54,425 SF x 20% = 10,885 SF

EXISTING TREES (1250 SF x 1.25) = 1,563 SF

CANOPY REQ BY PLANTINGS = 9,322

BUFFERS REQUIRED PER SECTION 48–241.a.14
WAIVERS REQUESTED:
NORTHERN PROPERTY LINE 48–1183.2.a
±232 LF 20' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON THIS SHEET

±354 LF 10' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON THIS SHEET

SOUTHERN PROPERTY LINE 48–1183.2.a
±600 LF 10' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON THIS SHEET

WESTERN PROPERTY LINE48–1183.2.a
±185 LF 10' BUFFER TYPE A
REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON THIS SHEET

PLANT SCHEDULE: SHUBS / GRASSES / PERENNIALS

KEY	BOTANICAL NAME / COMMON NAME	SIZE	QUANTITY
AAB	ARONIA ARBUTIFOLIA 'BRILLIANTISSIMA' CHOKEBERRY	24" SPREAD CONT.	7
CSC	CORNUS SERICEA 'CARDINAL' RED TWIG DOGWOOD	24"-30" SPREAD CONT.	27
HYQ	HYDRANGEA QUERCIFOLIA OAK LEAF HYDRANGEA	24" SPREAD CONT.	11
IGS	ILEX GLABRA 'SHAMROCK' INKBERRY	24" SPREAD CONT.	31
IVS	ILEX VERTICILLATA 'RED SPRITE' WINTERBERRY	24" SPREAD CONT.	26
IVH	ITEA VIRGINIANA 'HENRY'S GARNET' VIRGINIA SWEETSPIRE	24" SPREAD CONT.	40
PHY	PHYSOCARPUS OPULIFOLIUS NINEBARK	24" SPREAD CONT.	7
PLO	PRUNUS LAUROCERASUS 'OTTO LUYKEN' OTTO LUYKEN LAUREL	24" SPREAD CONT.	9
PLS	PRUNUS LAUROCERASUS 'SCHIPKAENSIS' SKIP LAUREL	30" SPREAD CONT.	21
SOR	SORGHASATRUM NUTANS INDIAN GRASS	1 GAL CONT.	39
TMD	TAXUS MEDIA 'DENSIFORMUS' YEW	24" SPREAD CONT.	15
VIB	VIBURNUM DENTATUM ARROWWOOD VIBURNUM	24" SPREAD CONT.	25
VDB	VIBURNUM DENTATUM 'BLUE MUFFIN' ARROWWOOD VIBURNUM	24" SPREAD CONT.	25

PLANT SCHEDULE : TREES

KEY	BOTANICAL NAME / COMMON NAME	SIZE	QUANTITY	COVERAGE UNIT	COVERAGE TOTAL	COMMENTS
AA	AMALANCHIER ARBOREA SERVICEBERRY	1.75" CAL. B&B	3	100	300	3-4 STEMS NATIVE CREDIT
AR	ACER RUBRUM RED MAPLE	2" - 2.5 CAL. B&B	3	175	525	ENERGY CONSERVATION CREDIT; NATIVE CREDIT
BN	BETULA NIGRA 'HERITAGE' RIVER BIRCH	2" - 2.5 CAL. B&B	3	175	525	3-4 STEMS
CC	CERCIS CANADENSIS 'FOREST PANSY' 'FOREST PANSY' REDBUD	1.75" CAL. B&B	4	100	400	SINGLE STEM
CJ	CRYPTOMERIA JAPONICA 'RADICANS' CRYPTOMERIA	6' 7' TALL B&B	15	25	375	
IN	ILEX x 'NELLIE R. STEVENS' NELLIE R. STEVENS HOLLY	6' 7' TALL B&B	16	25	400	
JV	JUNIPERUS VIRGINIANA EASTERN REDCEDAR	6' 7' TALL B&B	7	25	175	NATIVE CREDIT
MG	MAGNOLIA GRANDIFOLIA 'LITTLE GEM' LITTLE GEM SOUTHERN MAGNOLIA	6' 7' TALL B&B	22	25	550	
MV	MAGNOLIA VIRGINIANA SWEETBAY MAGNOLIA	1.75" CAL. B&B	4	100	400	3-4 STEMS NATIVE CREDIT
NS	NYSSA SYLVATICA BLACK GUM	2" - 2.5 CAL. B&B	4	125	500	ENERGY CONSERVATION CREDIT; NATIVE CREDIT
PO	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	2" - 2.5 CAL. B&B	3	175	525	(2) ENERGY CONSERVATION CREDIT; NATIVE CREDIT
QP	QUERCUS PALUSTRIS PIN OAK	2" - 2.5 CAL. B&B	7	175	1225	NATIVE CREDIT
QR	QUERCUS RUBRA RED OAK	2" - 2.5 CAL. B&B	10	175	1750	NATIVE CREDIT
TG	THUJA 'GREEN GIANT' GREEN GIANT ARBORVITAE	6' 7' TALL B&B	20	25	500	
				TOTAL:	8150	

CREDITS

25% NATIVE PLANT SPECIES	1350 SF
25% ENERGY CONSERCATION	344 SF
10% DIVERSITY BONUS	815 SF
	2509 SF

PROPOSED CANOPY
2509 SF + 8150 SF = 10659 SF

TOTAL CANOPY
10659 SF + 1563 SF = 12222 SF

LEGEND

- PROPOSED DECIDUOUS TREES
- PROPOSED UNDERSTORY TREE
- PROPOSED EVERGREEN TREE
- PROPOSED SHRUBS
- PROPOSED GROUNDCOVER, GRASSES, PERENNIALS
- LIMITS OF CLEARING AND GRADING

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COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

LANDSCAPE PLAN

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-1204

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskproj\16081\dwg\Engineering\Site Plan\16081C-1204.dwg Xref:

SPECIFICATIONS FOR PLANTING
City of Falls Church, VA – Urban Forestry / Development Services

1. Contractor shall verify existing conditions and utility locations. The City Arborist prior to the planting must approve adjustments to locations of plant material due to field conditions. Any substitutions in plant material and sizes specified will not be accepted, unless approved by the City Arborist prior to installation.

2. All plant material shall conform the American Standard for Nursery, latest edition, published by the **American Nursery and Landscape Association**. All plants must be free from injury, insect infestations and disease. All plant material must be inspected by the City Arborist prior to planting. The Contractor shall phone at least three (3) days prior to installation for inspection of the material and for inspection of the planting operation.

3. All plant material must bear original nursery tags indicating the genus, species and if applicable, cultivars and variety. All tags shall be removed after the City Arborist has inspected the plant material.

4. Test soil drainage before planting. Dig a hole as deep as your planting hole and fill with water. If water drains at a rate les than one inch per hour, install drainage to carry water away from the planting hole base, or moving or raising the planting site (berm construction)

5. Examine soil for compaction before planting. If soils are compacted in an area where a group of plants are to be installed, incorporated several inches of a combination of organic materials such as composted yard waste, finely shredded pine bark mulch (*superfines*) or shredded, composted leaf mulch (*leaf-gro*) and till to a depth of tweleve (12) to eighteen (18) inches over the entire area. Do not till if planting is within a tree preservation area. Apply the organic matter at a rate of one-quarter organic matter to three-quarters existing soil. Do not incorporate small quantities of sand – compaction will increase and drainage decreases. For single tree plantings, backfill planting holes with unamended soil. Increase the width of the top of the planting hole in area where soil has been compacted. Do not incorporate organic matter such as peat moss into backfill for individual planting holes.

6. Tree pits shall be a minimum of two (2) and a half (1/2) times the width of the root ball and no deeper than the height of the root ball. On balled and burlaped trees, remove pinning nails or rope lacing, then cut away the wrapping and then backfill. Remove the top 12" of the wire basket. Remove all rope, whether jute or nylon, from trunks. For container materials, remove the container completely. Select trees grown in containers with vertical ribs or a copper-treatment on the interior wall. These container modification and treatments minimize circling root formation. If roots are circling around the root ball exterior of container plants (trees, shrubs or perennials) cut through the roots and soil in a few places. Container tree with multiple circling roots will be rejected. Place shrubs and perennials at the same depth they were in the containers. For bare root perennials plant with the soil even with the top of the crown. Dig the hole wide enough to allow the roots to spread out in the soil. Push the soil back into the hole over the roots and around the top of the plant.

7. A soil test shall be made and the results submitted to the City Arborist prior to the installation of the plant material.

   For trees: A slow-release granular fertilizer shall be incorporated into the top four (4) inches of backfill soil to provide nitrogen, or if a soil test indicated a need for phosphorus or potassium. Use no more that 1 lb. Actual nitrogen per 1,000 ft. of planting hole surface. (Example – if using 18-6-12 with a 5' diameter hole, incorporate 0.3 oz. per planting hole.)

   For shrubs: A slow-release granular fertilizer shall be incorporated into the top four (4) inches of backfill soil to provide nitrogen, or if a soil test indicates a need for phosphorus or potassium. Use quantities in accordance with manufacturer's direction.

   For perennials, bulbs and annuals: A slow –release high phosphate fertilizer such as 7:40:6 or approved equal shall be incorporated into the top four (4) inches of the backfill mix. Alternatively, use Plant-tone on approved equal for sun perennials, together with rock phosphate at rates in accordance with manufacturers directions. Alternatively, for shade perennials use Hollytone or approved equal, together with super phosphate at a rate in accordance with manufacturers directions. Use gypsum, a soil conditioner, for clay soils. For bulbs commercial raw finely ground Bone Meal with an analysis of 4% nitrogen and %20 phosphorus acid shall be incorporated into the backfill mix.

8. When half of the backfill has been returned to the planting hole, water shall be applied to provide settlement and eliminate air pockets. The tree shall be thoroughly watered again after the remaining soil has been placed in the planting pit. A three (3) to four (4) inch dam of soil shall be constructed around the planting pit.

9. Two (2) to three (3) inches of mulch shall be placed over the tree-planting pit, but shall be kept three (3) to four (4) inches away from the trunk of the tree or crowns of shrubs. Do not allow mulch to touch the trunks of trees or crowns of shrubs. Use mulch that is compatible with the type of plant used. Avoid mulch that has not been nitrogen composted, as the pH of the soil could change as the mulch degrades. Pine bark mulch will not change the pH of the soil as it degrades. This is the best type of mulch for use with perennials. In mulching perennials, use no more than 1-2". For Mediterranean type of perennials, such as lavender, or for peonies or iris, use no mulch at all.

10. Trees shall be planted at the height of the surrounding grade with root flares visible. Should soil have been piled over the root flare during the digging process, this soil shall be removed so that the flare is slightly above grade.

11. Any pruning must be done with the approval of the City Arborist. Pruning at the time of planting shall be done only to remove broken branches or double (co dominant) leaders.

12. Remove tags and labels from trees and shrubs to prevent girdling branches and trunks.

13. Stakes shall be used only in area of high traffic or highly windy locations. A tree-staking diagram should be provided if staking is necessary. Stake for maximum of one year. Allow trees a slight amount of flex rather than holding them rigidly in place. Use guying or attaching that won't damage the bark. To prevent trunk girdling, remove all guying material after one year.

14. Use tree wrap only on thin barked trees planted in spring or summer into hot or paved areas. In these instances use white wrap, attaching with out the use of wire, rope, ties or tape, and remove after one year.

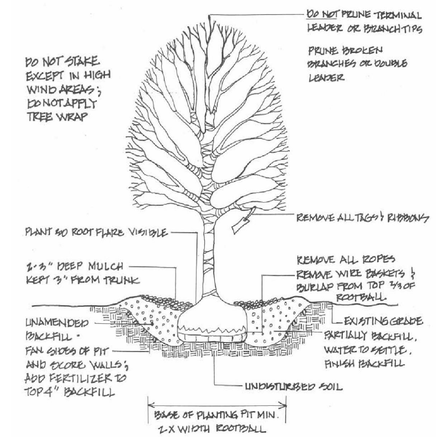
15. Planting Season – Planting shall be done only within the following dates:

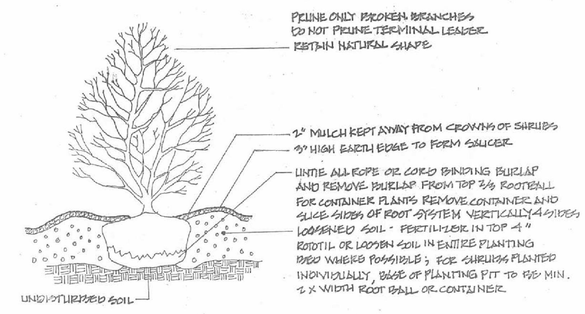
    a. Deciduous Trees – March 15 to May 30 or September 15 to December 15 (oaks and black gum to be spring dug and planted only).
    b. Evergreen Trees – March 1 to May 15 or September 15 to November 15.

16. All plant material shall be guaranteed by the Contractor for one year from the date of acceptance to be in good, healthy and flourishing condition. In the event that a plant dies or in the judgment of the City Arborist, fails to flourish; the Contractor shall replace in accordance with the above noted specifications.

17. The Contractor shall be responsible for the maintenance of the plants during this one-year warranty period. This maintenance shall include providing water on a weekly basis when natural rainfall is less than one inch a week. Drip irrigation systems and water reservoir devices can facilitate watering. Root balls of trees should be slowly and thoroughly soaked at time of watering. For planting beds (i.e., trees, shrubs and perennials), water slowly and deeply putting down 1"-2" of water in a 6-12 hour period. This should give a penetration of 12-18" depth.

TREE PLANTING DETAIL





TYPICAL SHRUB PLANTING

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CHECKED: KW

COMMONWEALTH OF VIRGINIA
KAREN L. S. WHITE
Lic. No.041850
9/12/17
PROFESSIONAL ENGINEER

SCALE: NONE
DATE: 9/12/2017

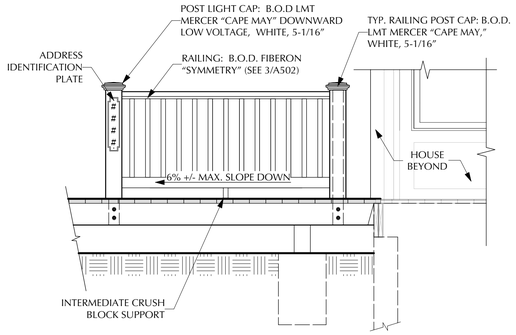
REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED	DATE

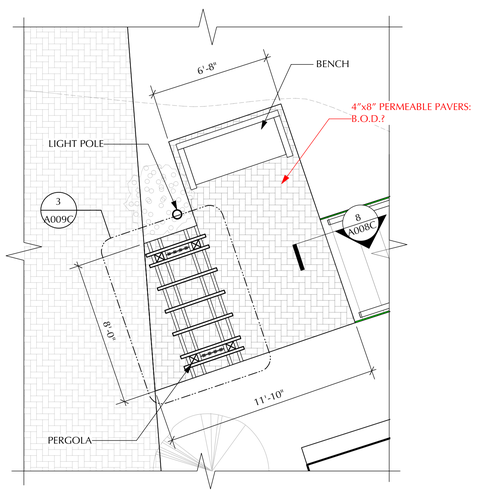
PLANTING NOTES & DETAILS

RAILROAD COTTAGES

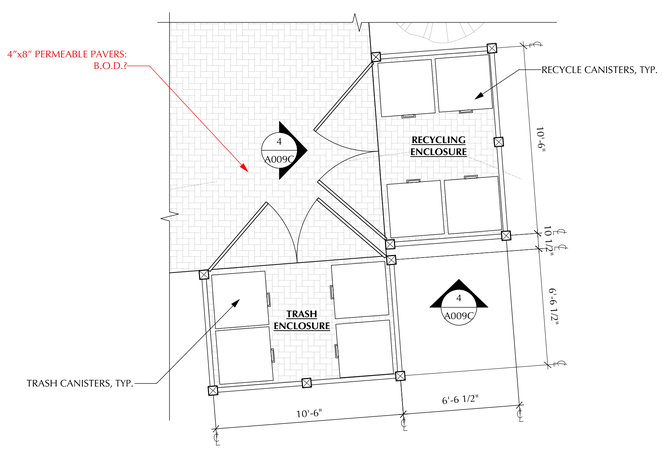
CITY OF FALLS CHURCH, VIRGINIA



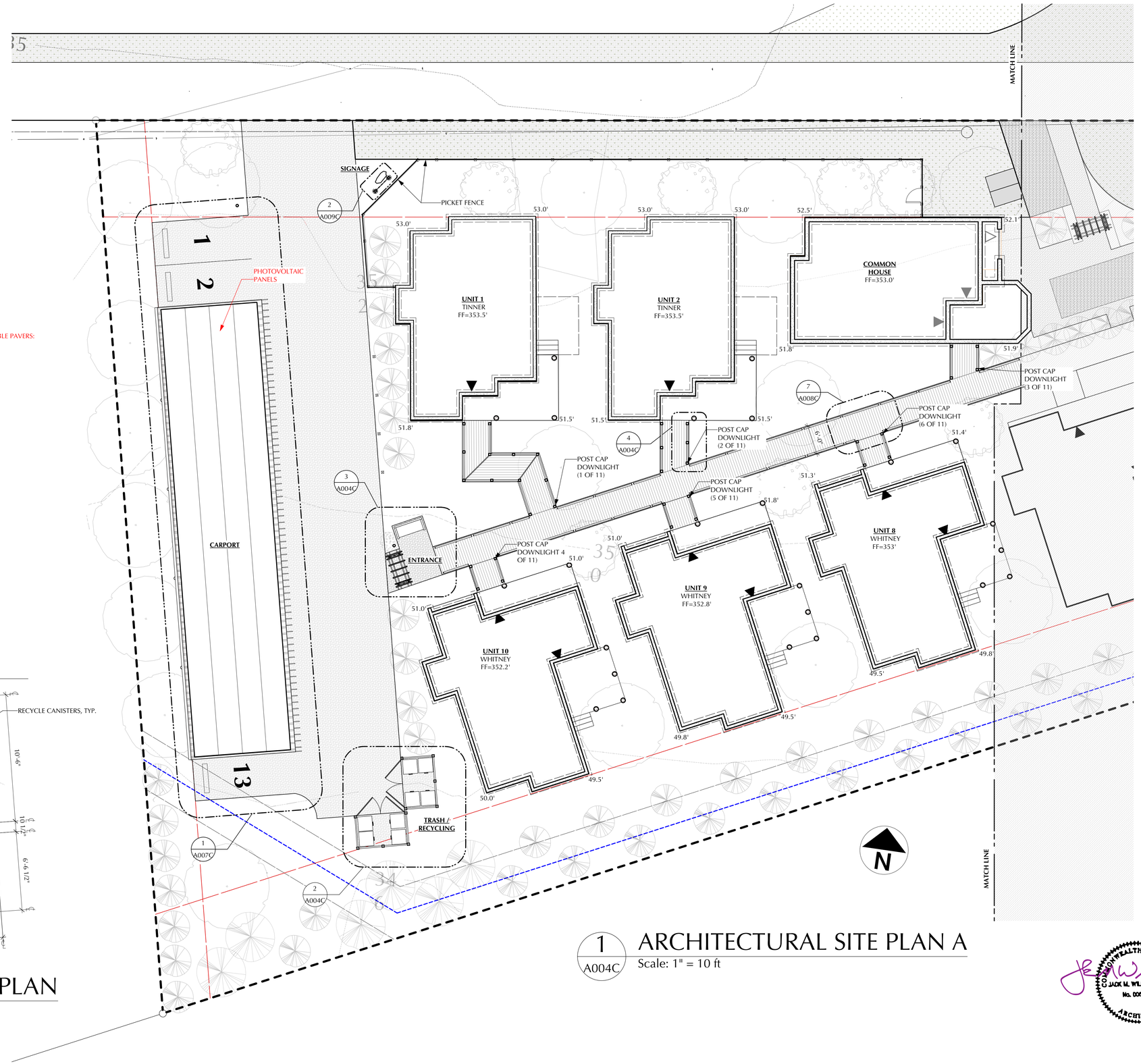
4 / A004C **TYP. SITE RAILING**
Scale: 1/2" = 1'-0"



3 / A004C **ENTRANCE PLAN**
Scale: 1/4" = 1'-0"



2 / A004C **TRASH ENCLOSURE PLAN**
Scale: 1/4" = 1'-0"



1 / A004C **ARCHITECTURAL SITE PLAN A**
Scale: 1" = 10 ft

ISSUE DATE:
100% REVIEW 5.3.2017

REVISION DATE:

RAILROAD COTTAGES

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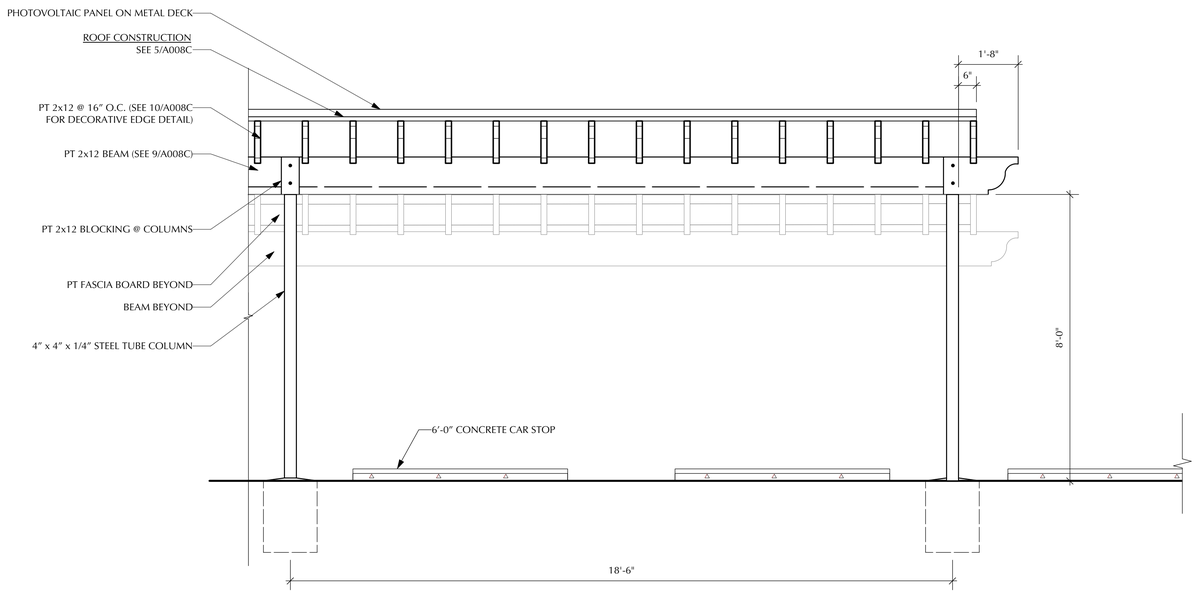
JACK M. WILBERN, JR.
No. 006560
ARCHITECT

ARCH. SITE PLAN A

A-004C

x OF x

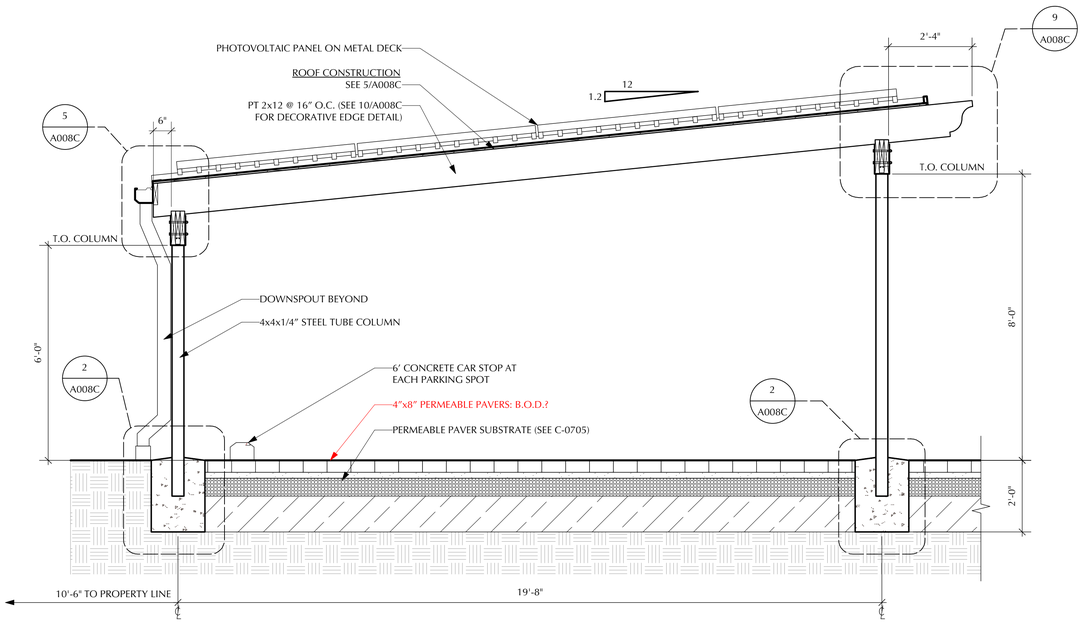
16054



3 A007C

CARPORT PARTIAL ELEVATION

Scale: 1/2" = 1'-0"



2 A007C

CARPORT SECTION

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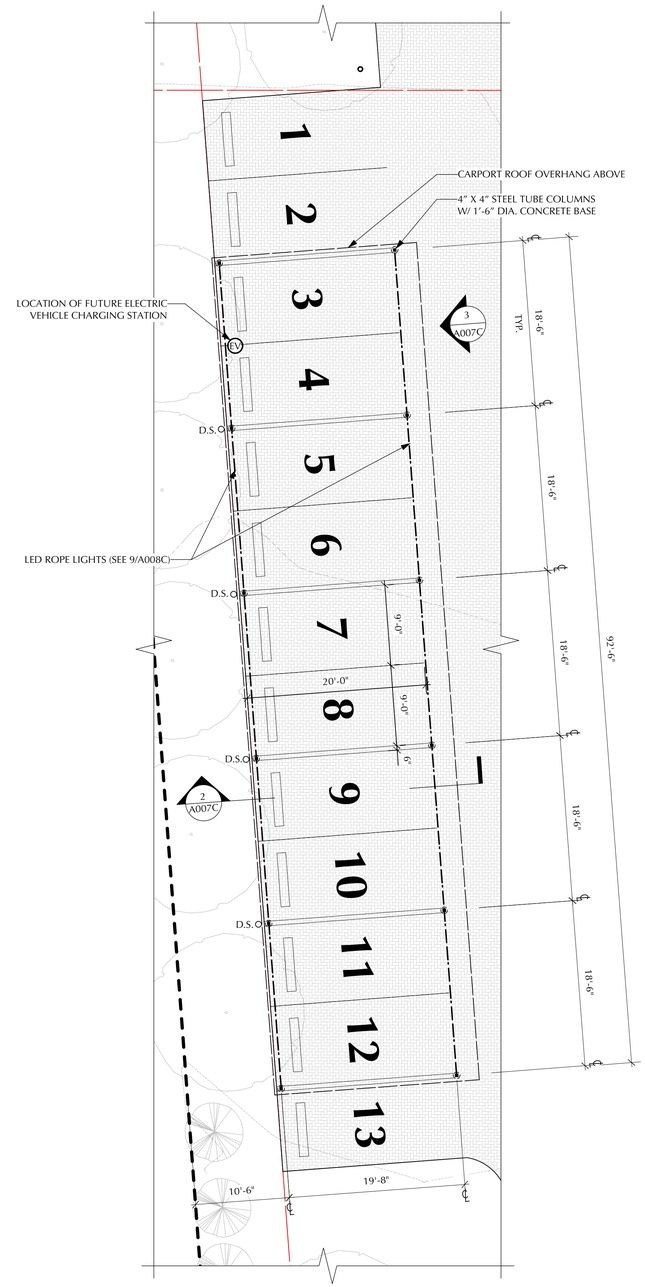

1 A007C

CARPORT PLAN

Scale: 1/8" = 1'-0"

ISSUE DATE:

100% REVIEW 5.3.2017

REVISION DATE:

RAILROAD COTTAGES

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Falls Church, Virginia 22046

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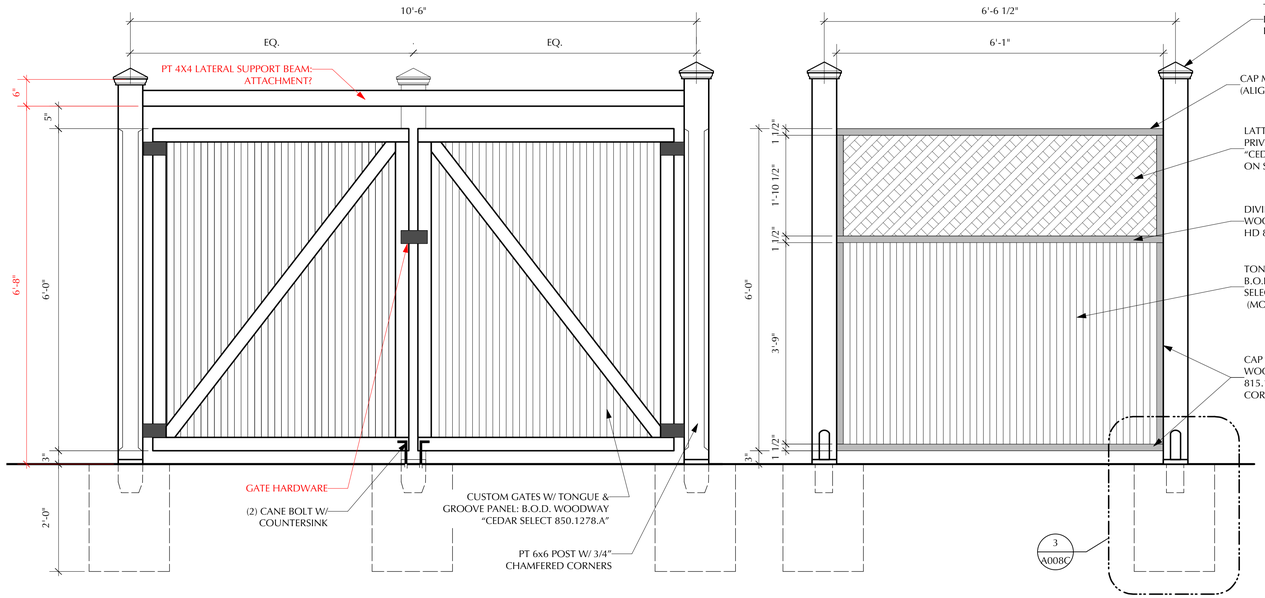
JACK M. WILBERN, JR.
No. 006500
ARCHITECT

CARPORT PLAN/
ELEVATION

A-007C

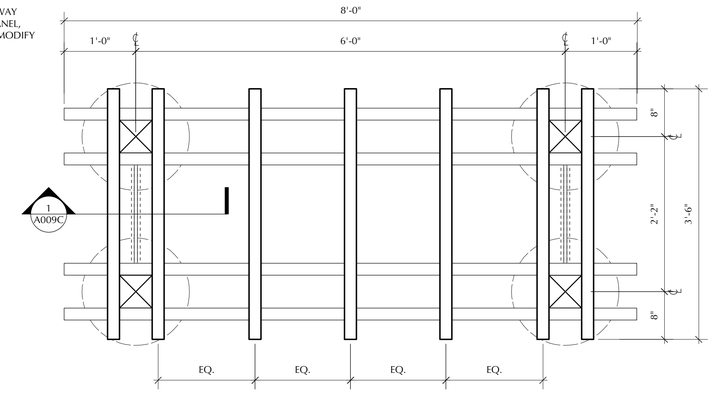
x OF x

16054



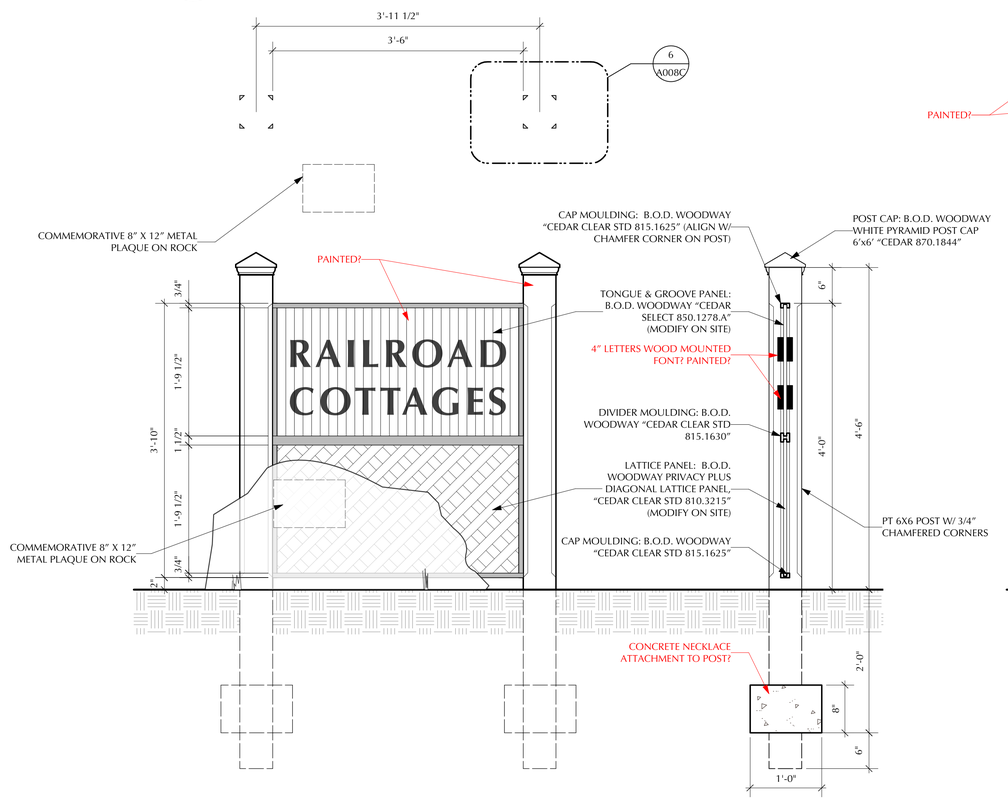
4 A009C TRASH & RECYCLING ENCLOSURE ELEVATIONS

Scale: 3/4" = 1'-0"



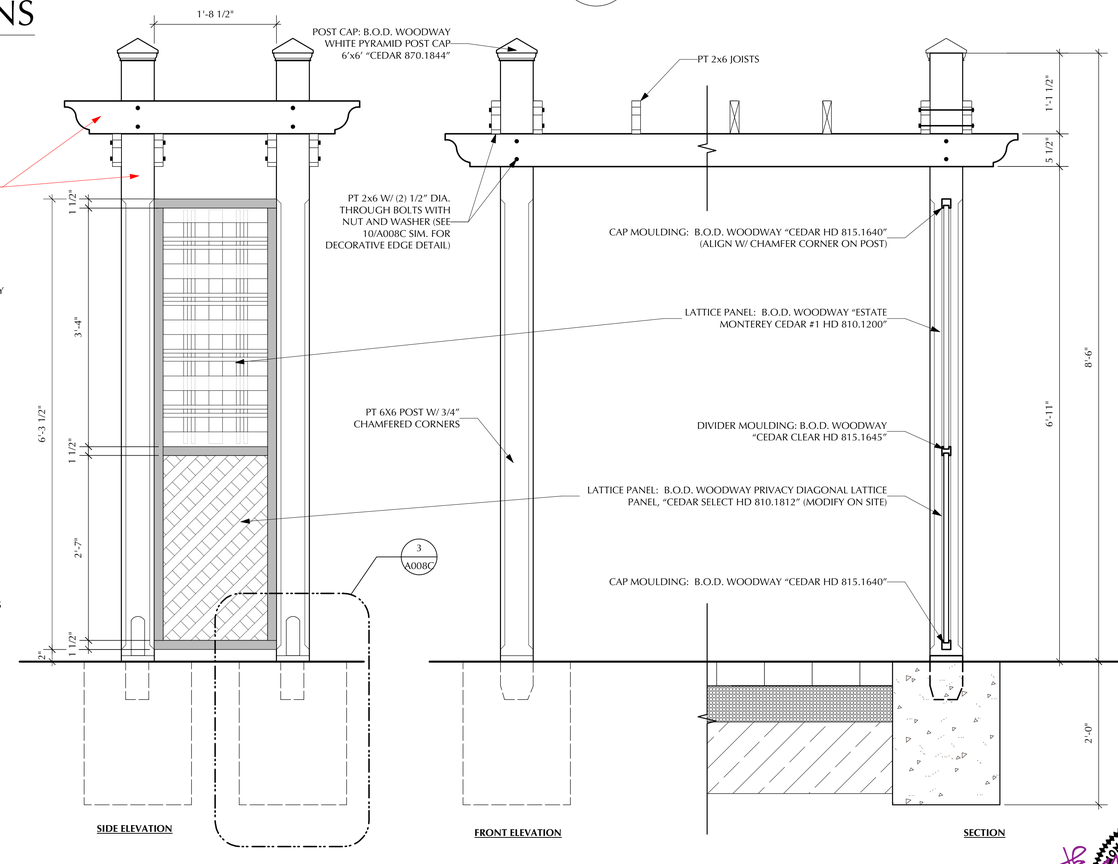
3 A009C PERGOLA PLAN

Scale: 1" = 1'-0"



2 A009C ENTRANCE SIGN PLAN/ ELEVATION/ SECTION

Scale: 1" = 1'-0"



1 A009C PERGOLA ELEVATION / SECTION

Scale: 1" = 1'-0"

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SITE FEATURES

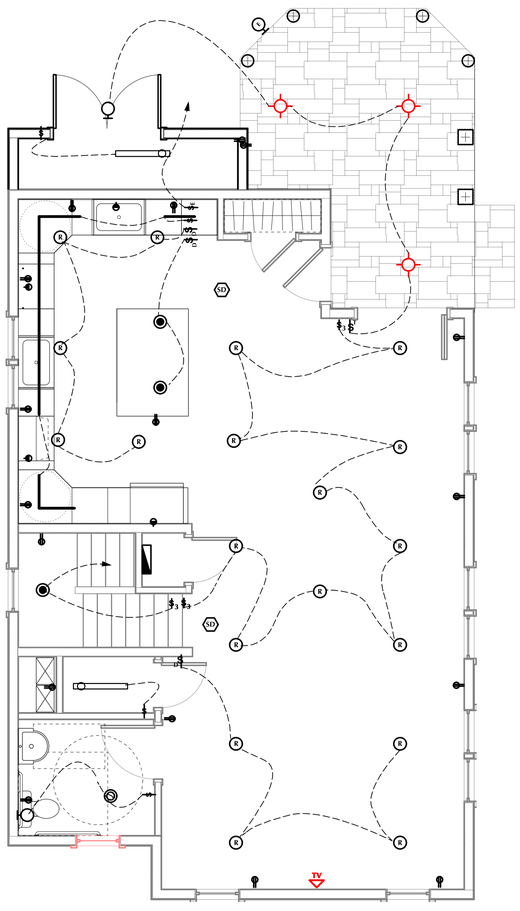
A-009C

x OF x

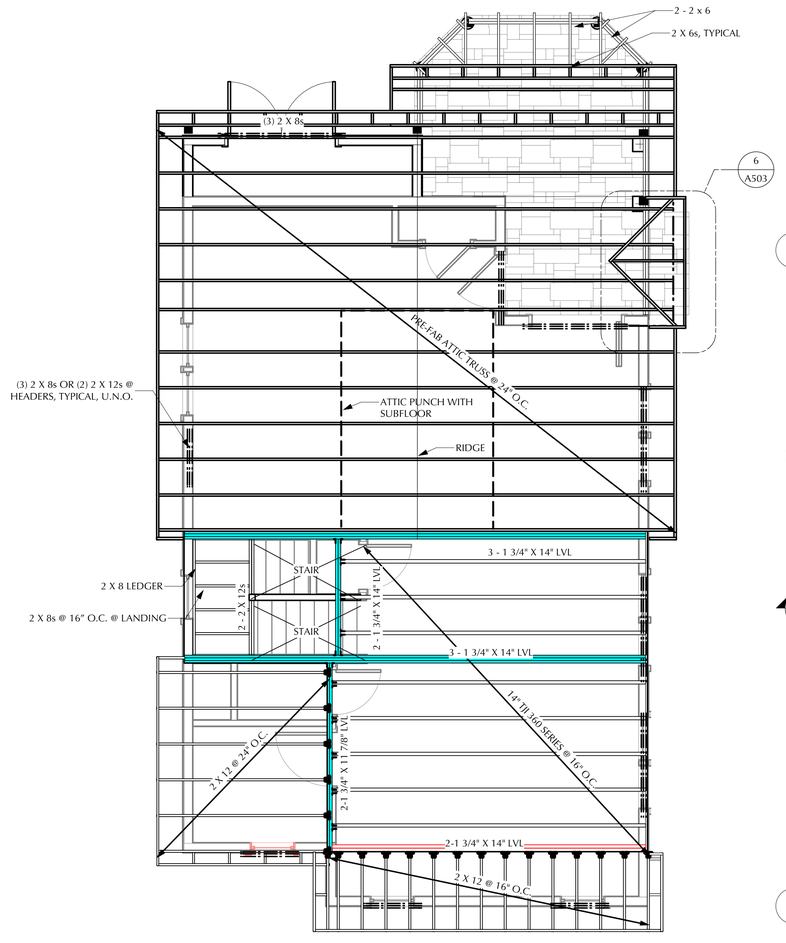
16054

ELECTRICAL SYMBOLS LIST:

R	RECESSED DOWN LIGHT		DUPLEX OUTLET
	UNDERCABINET LED STRIP LIGHTING		WATERFROOF OUTLET
	FLUORESCENT TUBE		GFI OUTLET, 42" A.F.F.
	PENDANT LIGHTING		DESIGNATED APPLIANCE OUTLET
	CEILING MOUNTED SURFACE LIGHT		SINGLE POLE SWITCH
	WALL SCONCE	D	SINGLE POLE SWITCH ('D' SUBSCRIPT INDICATES DIMMER)
	EMERGENCY STROBE, SURFACE MOUNTED FACE OF HOUSE	T	SINGLE POLE SWITCH ('T' SUBSCRIPT INDICATES TIMER)
F	CEILING MOUNTED FAN / LIGHT	3	3-WAY SWITCH
SD	SMOKE DETECTOR, HARDWIRED THROUGH HOUSEX	TV	TV WIRING
		PHONE	PHONE WIRING



3 A-101C FIRST FLOOR ELECTRICAL PLAN
Scale: 1/4" = 1'-0"

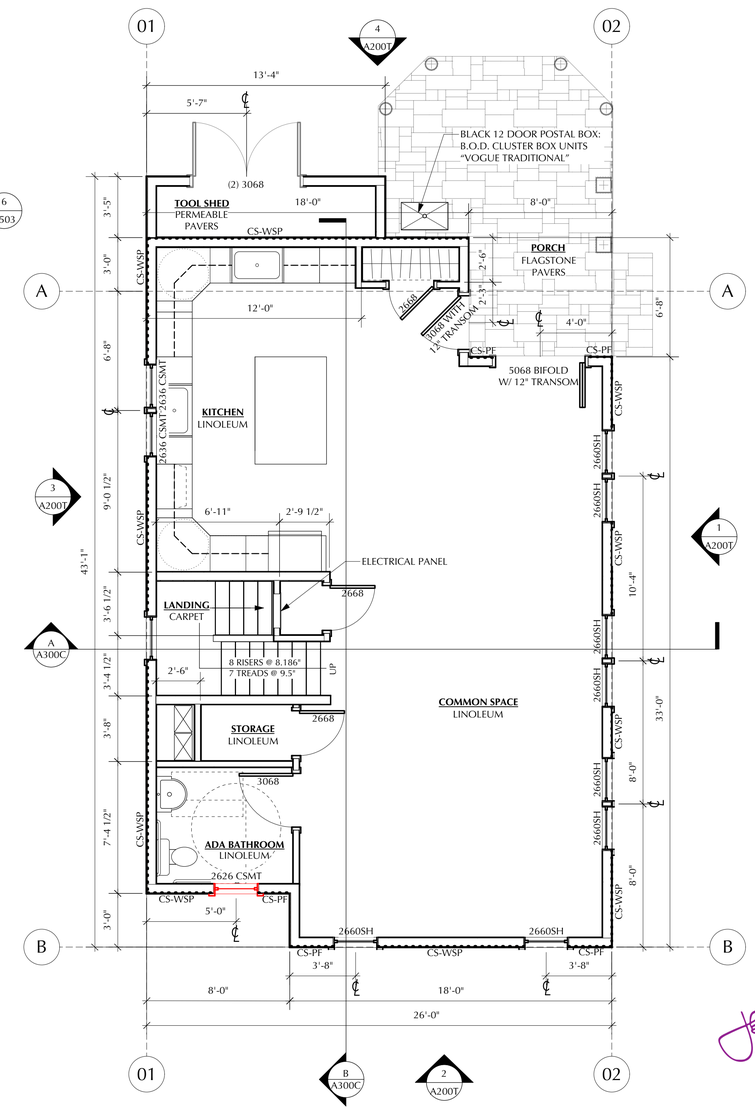


FRAMING NOTE:
1. FRAMING NOTE: ALL SHEATHING ALIGNS WITH OUTSIDE OF 10" CONCRETE FOUNDATION WALLS, THEREFORE WALL PLATES SHOULD BE OFFSET FROM OUTSIDE OF 10" FOUNDATION WALLS TO ACCOMODATE WALL SHEATHING. ALSO, ALIGN INSIDE OF 10" CONCRETE FOUNDATION WALLS, THEREFOR WALL PLATES SHOULD BE OFFSET FROM OUTSIDE OF 10" FOUNDATION WALLS TO ACCOMODATE WALL SHEATHING.
2. SEE DETAIL 2/A201 (2) 2x12s HEADERS @ OPENINGS, TYP. UNLESS OTHERWISE NOTED.

3. STRUCTURAL COORDINATION

2 A-101C SECOND FLOOR FRAMING PLAN
Scale: 1/4" = 1'-0"

WALL BRACING KEY:
CS-WSP = CONTINUOUS WOOD STRUCTURAL PANEL SHEATHING,TYP. (SEE SHEET S-071)
CS-PF = CONTINUOUS PORTAL FRAME, TYP. (SEE SHEET S-071)



1 A-101C FIRST FLOOR PLAN / WALL BRACING
Scale: 1/4" = 1'-0"

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FIRST FLOOR PLAN

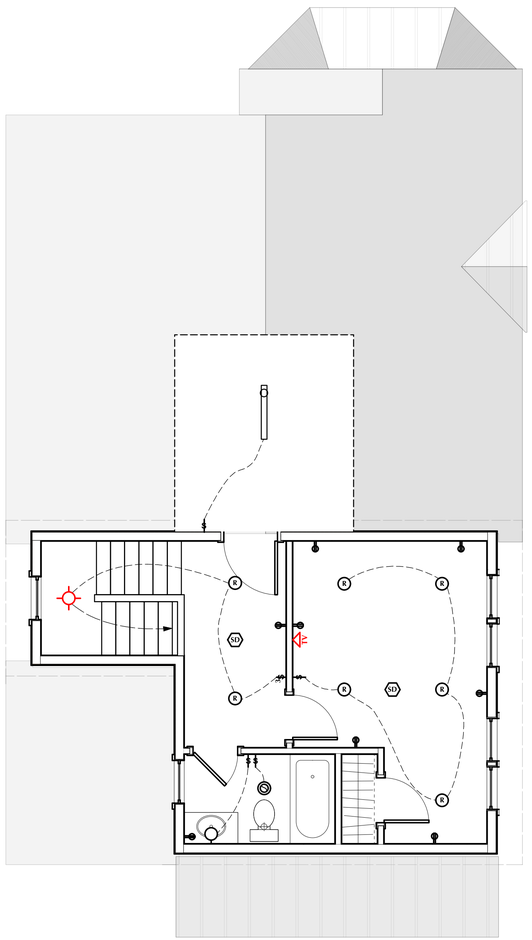
A-101C

1 OF 1

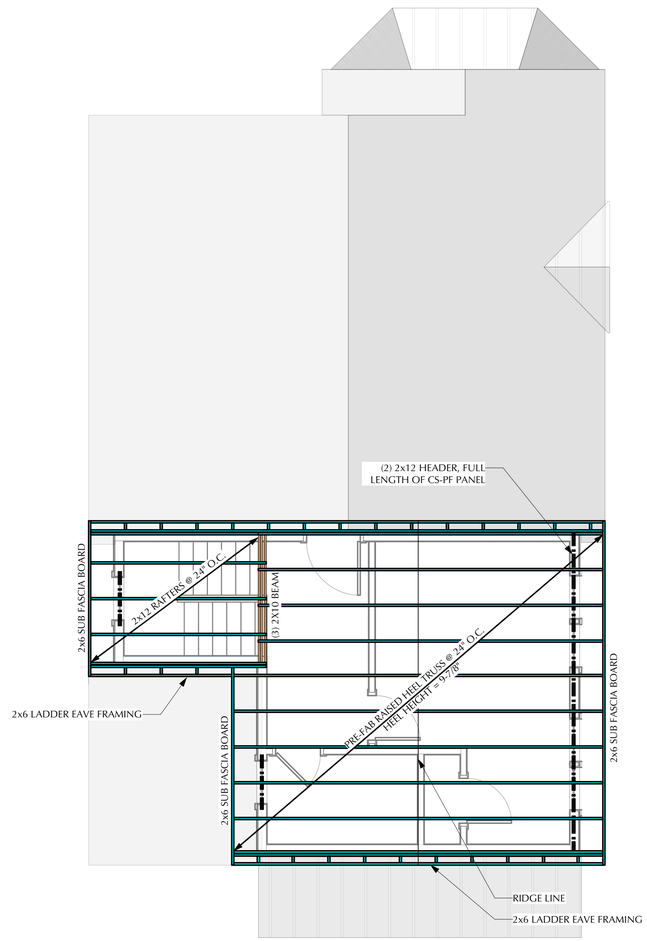
16054

ELECTRICAL SYMBOLS LIST:

R	RECESSED DOWN LIGHT		DUPLEX OUTLET
	UNDERCABINET LED STRIP LIGHTING		WATERFROOF OUTLET
	FLUORESCENT TUBE		GFI OUTLET, 42" A.F.F.
	PENDANT LIGHTING		DESIGNATED APPLIANCE OUTLET
	CEILING MOUNTED SURFACE LIGHT		SINGLE POLE SWITCH
	WALL SCONCE	D	SINGLE POLE SWITCH ('D' SUBSCRIPT INDICATES DIMMER)
	EMERGENCY STROBE, SURFACE MOUNTED FACE OF HOUSE	T	SINGLE POLE SWITCH ('T' SUBSCRIPT INDICATES TIMER)
	CEILING MOUNTED FAN / LIGHT	3	3-WAY SWITCH
SD	SMOKE DETECTOR, HARDWIRED THROUGH HOUSEX	TV	TV WIRING
		PHONE	PHONE WIRING



3 A-102C SECOND FLOOR ELECTRICAL PLAN
Scale: 1/4" = 1'-0"

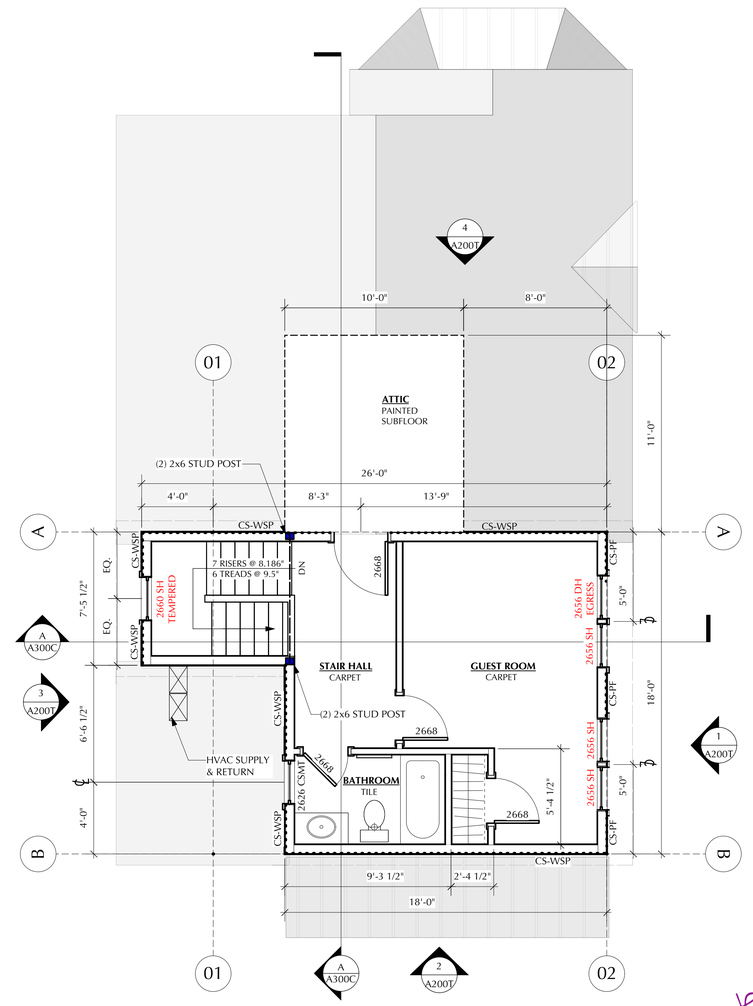


FRAMING NOTE:
1. OUTSIDE OF WALL SHEATHING ALIGNS WITH OUTSIDE OF 10" CONCRETE FOUNDATION WALLS, THEREFORE WALL PLATES SHOULD BE OFFSET FROM OUTSIDE OF 10" FOUNDATION WALLS TO ACCOMODATE WALL SHEATHING. (SEE 1/A501)

2. (3) 2x8s OR (2) 2X12s HEADERS @ OPENINGS, TYP. UNLESS OTHERWISE NOTED.

3. STRUCTURAL COORDINATION

2 A-102C ROOF FRAMING PLAN
Scale: 1/4" = 1'-0"



WALL BRACING KEY:
CS-WSP = CONTINUOUS WOOD STRUCTURAL PANEL SHEATHING,TYP. (SEE SHEET S-071)
CS-PF = CONTINUOUS PORTAL FRAME, TYP. (SEE SHEET S-071)

1 A-102C SECOND FLOOR PLAN / WALL BRACING
Scale: 1/4" = 1'-0"

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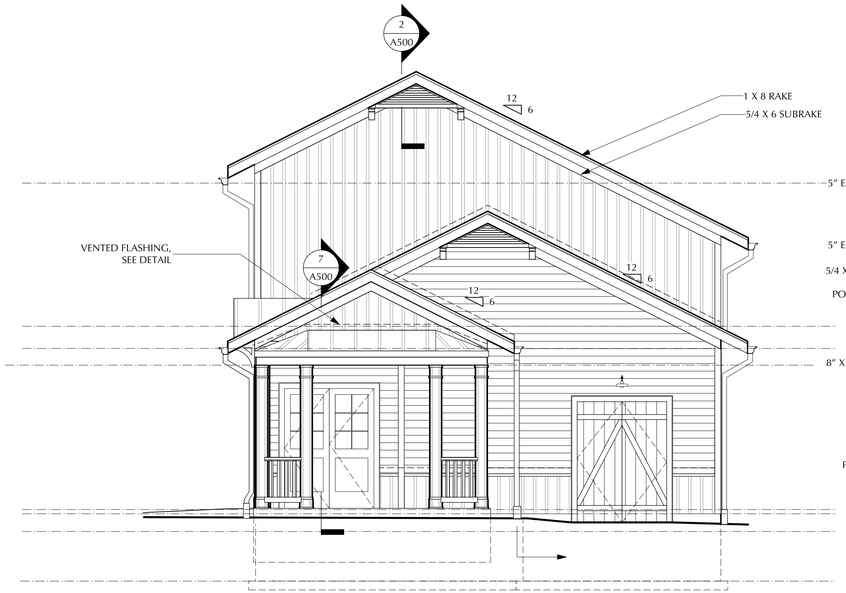
SECOND FLOOR PLAN

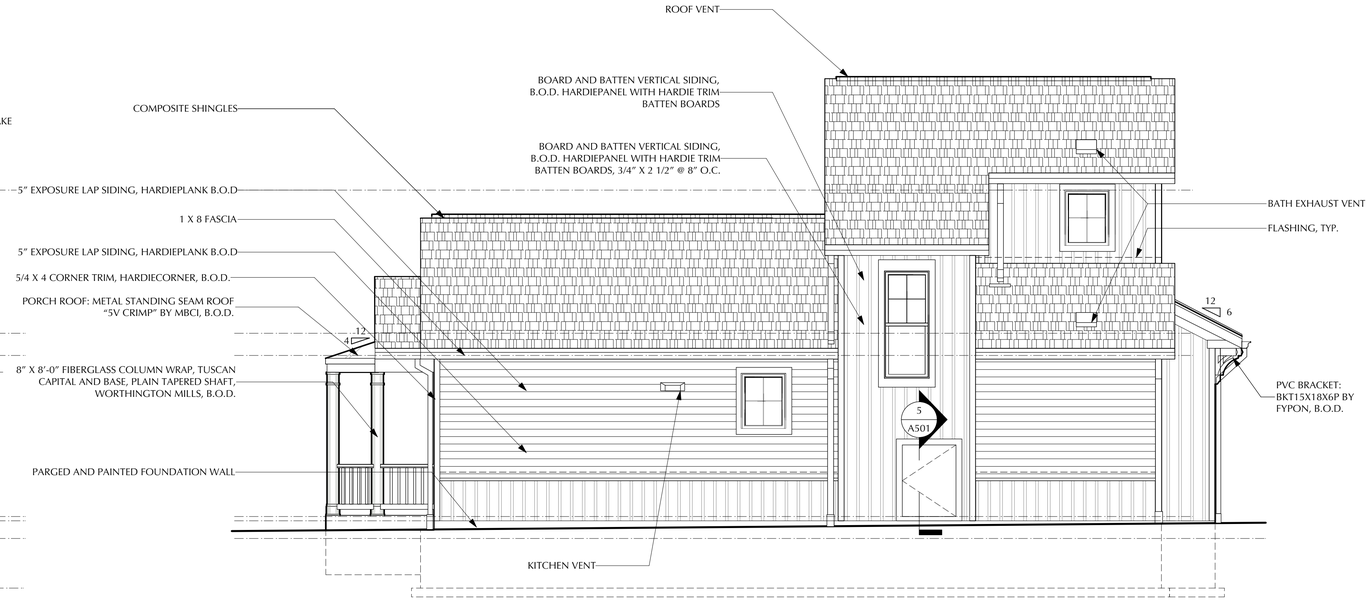
A-102C

1 OF 1

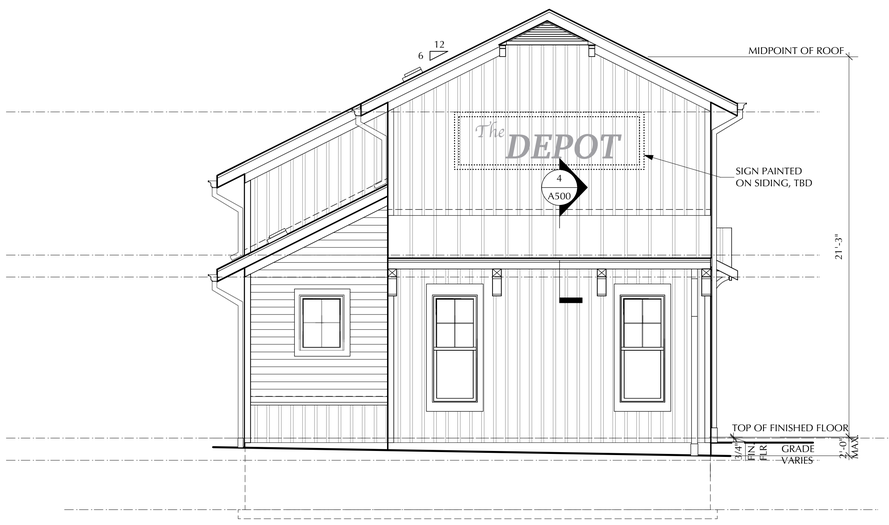
16054



4 A-200C **EAST ELEVATION**
Scale: 1/4" = 1'-0"



3 A-200C **REAR ELEVATION**
Scale: 1/4" = 1'-0"



2 A-200C **WEST ELEVATION**
Scale: 1/4" = 1'-0"

COMMON HOUSE AREA

FIRST FLOOR: 1,000 SF
SECOND FLOOR: 387 SF
PORCH: 190 SF

1 A-200C **FRONT ELEVATION**
Scale: 1/4" = 1'-0"

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ELEVATIONS

A-200C

1 OF 1

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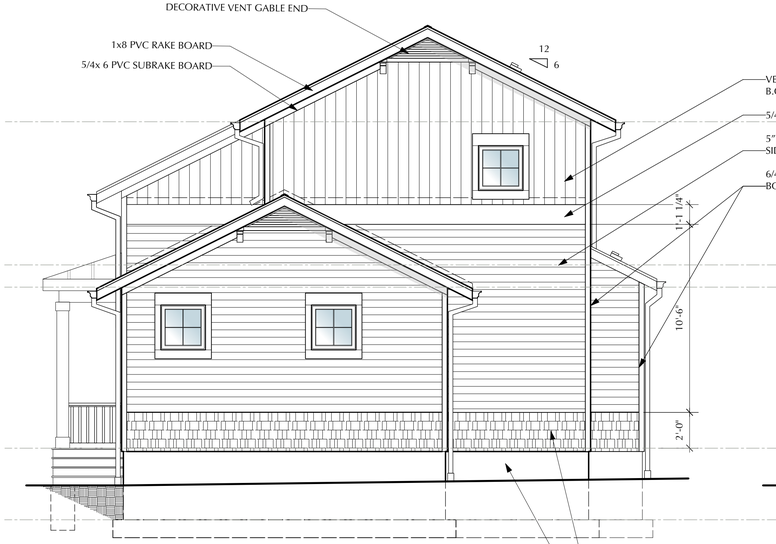
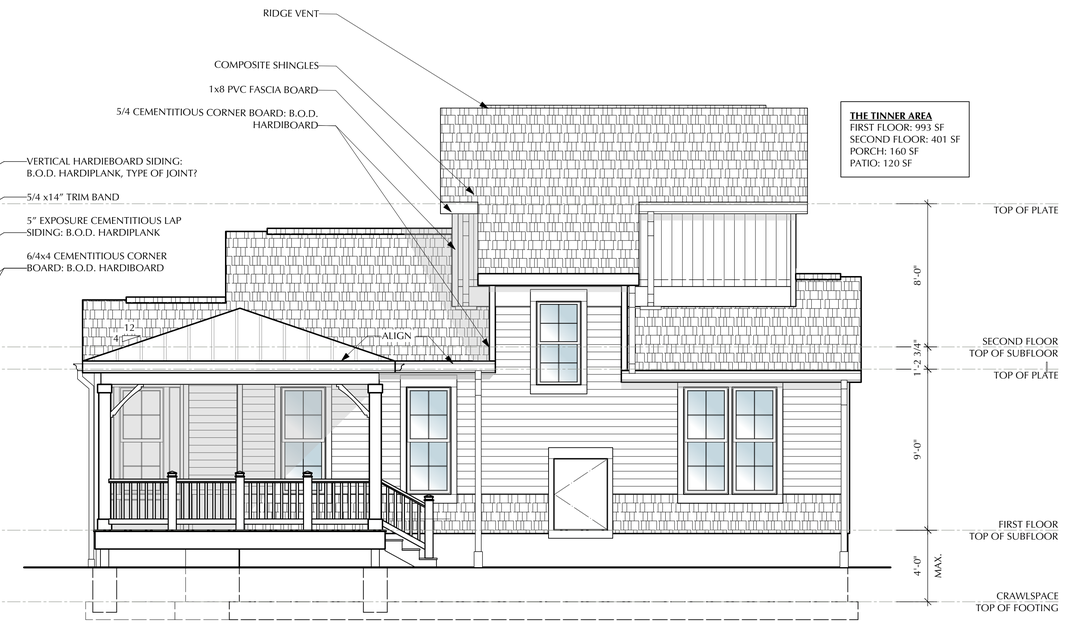
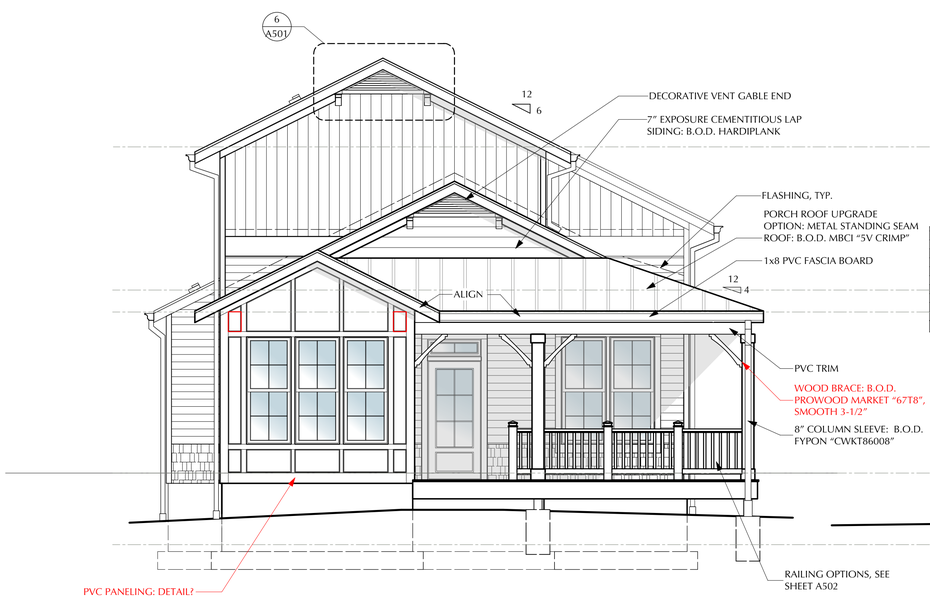


4 A-103T **REAR ELEVATION**
Scale: 1/4" = 1'-0"

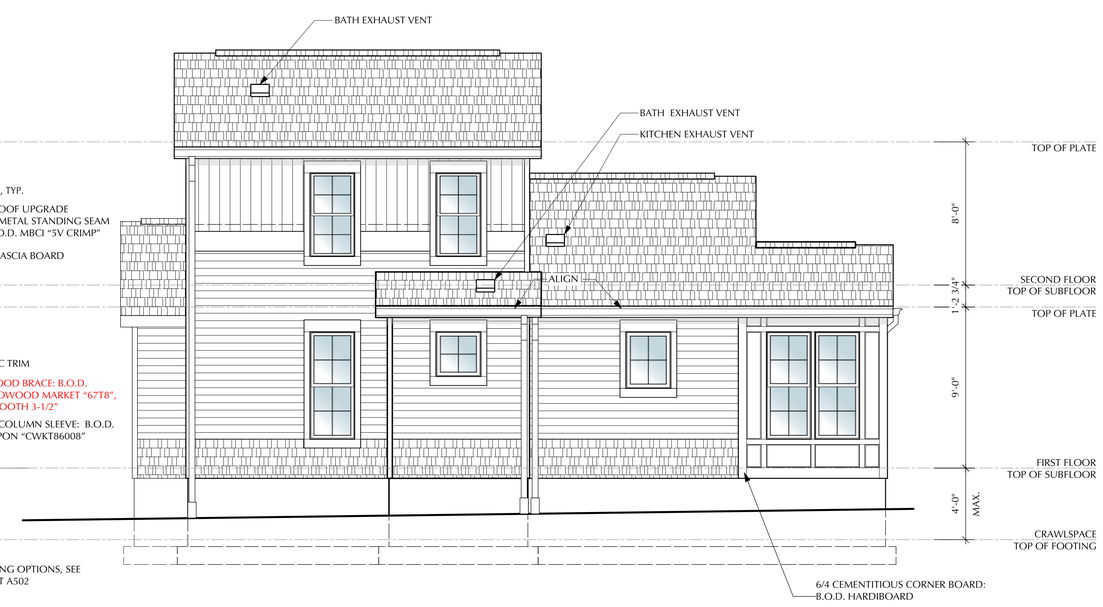


THE TINNER AREA
FIRST FLOOR: 993 SF
SECOND FLOOR: 401 SF
PORCH: 160 SF
PATIO: 120 SF

3 A-103T **LEFT ELEVATION**
Scale: 1/4" = 1'-0"



2 A-103T **FRONT ELEVATION**
Scale: 1/4" = 1'-0"



1 A-103T **RIGHT ELEVATION**
Scale: 1/4" = 1'-0"

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Elevations

A-200T

x OF x

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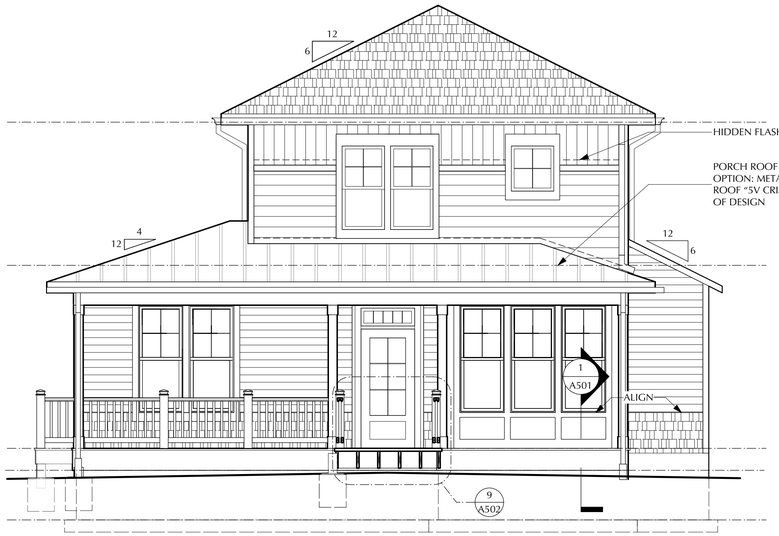
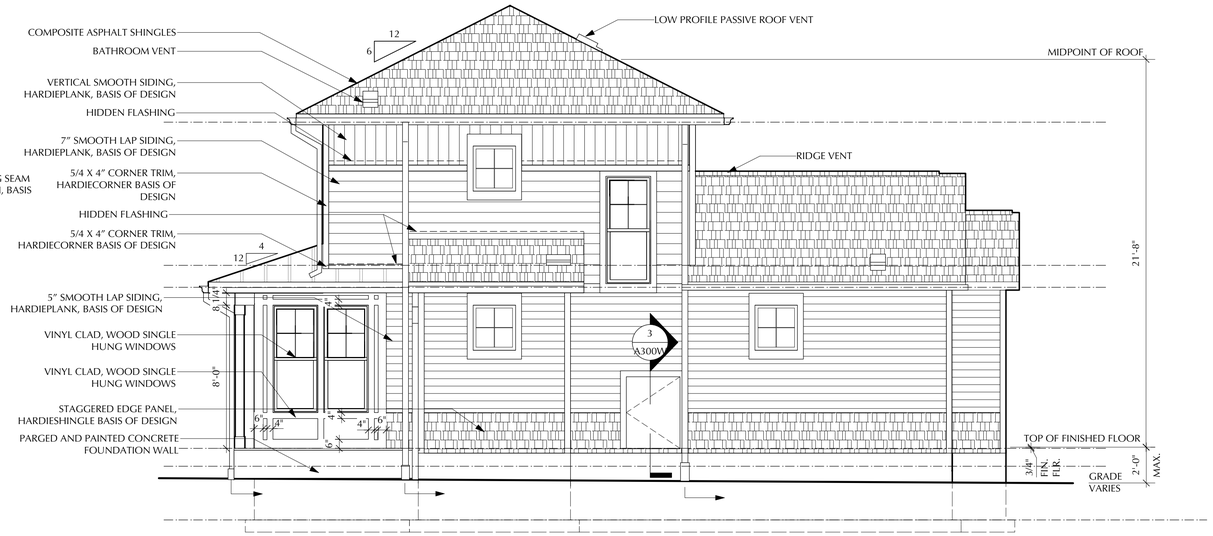


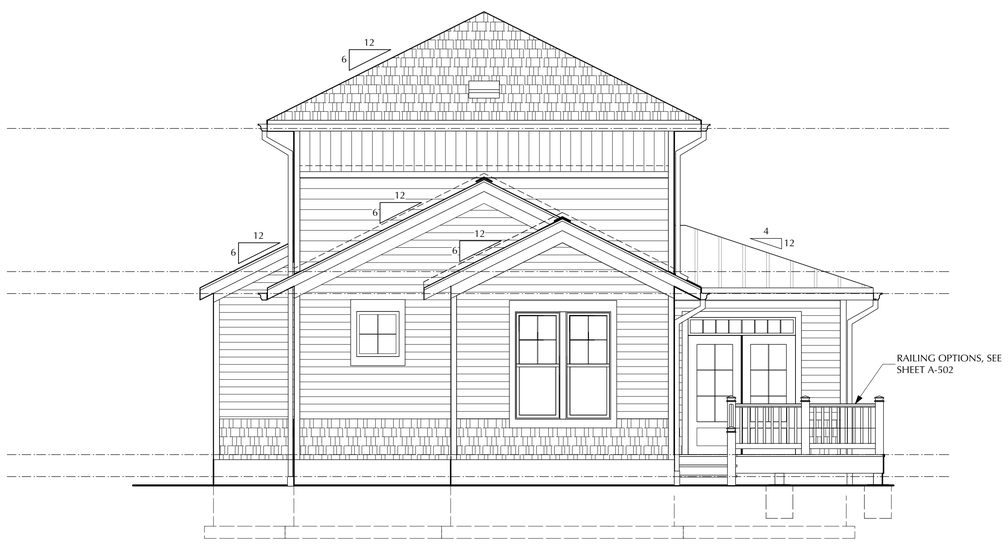
4 A-200W **FRONT ELEVATION**
Scale: 1/4" = 1'-0"



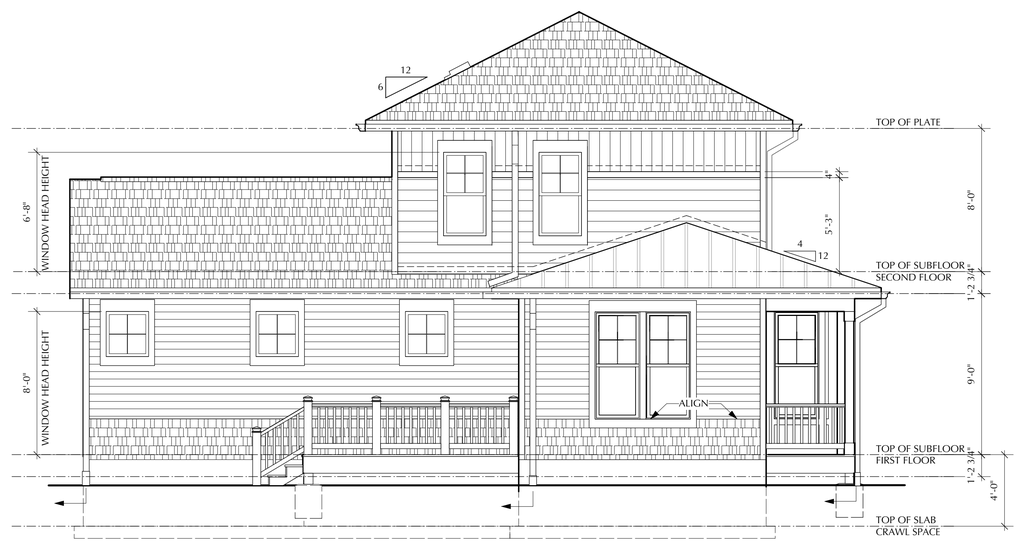
2 A-200W **RIGHT ELEVATION**
Scale: 1/4" = 1'-0"

THE WHITNEY AREA

FIRST FLOOR: 996 SF
SECOND FLOOR: 442 SF
PORCH: 111 SF
DECK: 140 SF



3 A-200W **REAR ELEVATION**
Scale: 1/4" = 1'-0"



1 A-200W **LEFT ELEVATION**
Scale: 1/4" = 1'-0"

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Elevations

A-200W

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