

| REVISION DATE | DESCRIPTION | W-08 |
|---------------|-------------------------------|------|
| 07/01/04 | WATER LINE VALVE INSTALLATION | |
| 03/01/06 | | |

| REVISION DATE | DESCRIPTION | S-16 |
|---------------|---------------|------|
| 07/01/04 | CONCRETE PIER | |
| 03/01/06 | | |

| REVISION DATE | DESCRIPTION | W-11 |
|---------------|---------------------------|------|
| 07/01/04 | IN-LINE BLOW-OFF ASSEMBLY | |
| 03/01/06 | | |

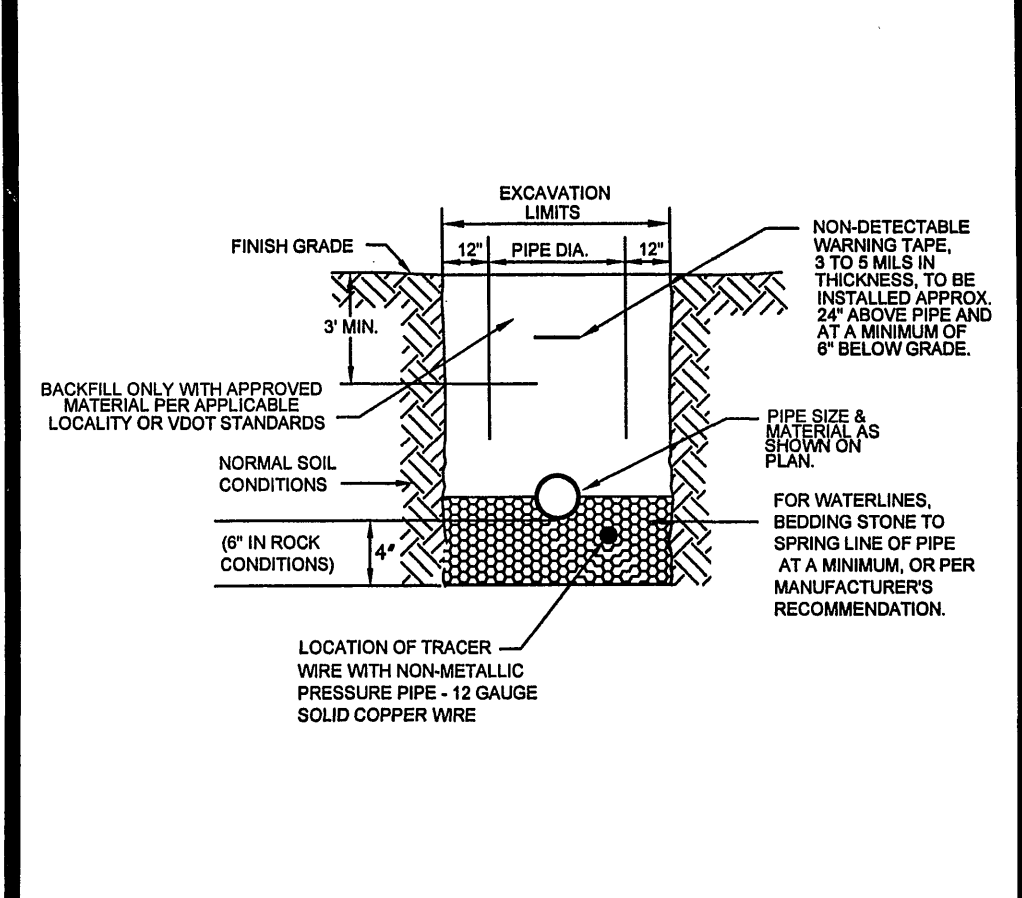
| REVISION DATE | DESCRIPTION | W-12 |
|---------------|--------------------------------|------|
| 07/01/04 | AUTOMATIC AIR RELEASE ASSEMBLY | |
| 03/01/06 | | |

| REVISION DATE | DESCRIPTION | W-18 |
|---------------|-----------------------|------|
| 07/01/04 | FIRE HYDRANT ASSEMBLY | |
| 03/01/06 | | |

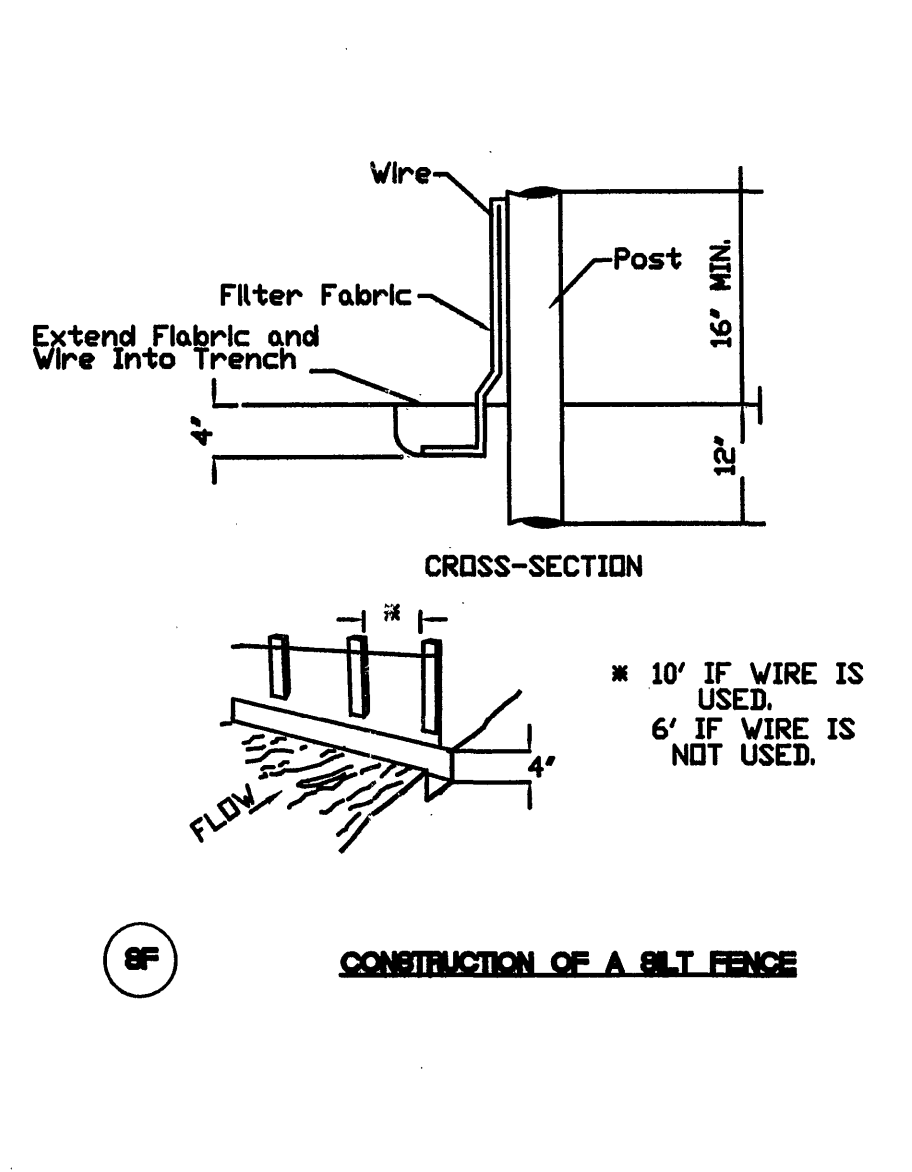
| REVISION DATE | DESCRIPTION | W-19 |
|---------------|---------------------------|------|
| 07/01/04 | THRUST BLOCK CONSTRUCTION | |
| 03/01/06 | | |

NOTES:

1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.
2. ALL PIPES SHALL BE BEDDED IN COMPACTED VDOT #7 OR #8 STONE.
3. IN AREAS NOT SUBJECTED TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 7" ABOVE THE PIPE AND THE REMAINING SHALL BE PLACED IN 12" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 1556.
4. BEDDING REQUIREMENTS FOR DUCTILE IRON WATER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS HAZARD RECOGNITION IN TRENCHING AND SHORING."



| REVISION DATE | DESCRIPTION | W-24 |
|---------------|---|------|
| 07/01/04 | BEDDING AND BACKFILL OUTSIDE OF PAVED AREAS | |
| 03/01/06 | | |



PERMANENT STABILIZATION

ALL AREAS DISTURBED BY CONSTRUCTION WILL BE STABILIZED WITH PERMANENT SEEDING WITHIN 7 DAYS OR IMMEDIATELY FOLLOWING FINISH GRADING. SEEDING WILL BE DONE ACCORDING TO STANDARD AND SPECIFICATION 3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. PERMANENTLY SEEDED AREAS SHALL BE PROTECTED DURING ESTABLISHMENT WITH STRAW MULCH.

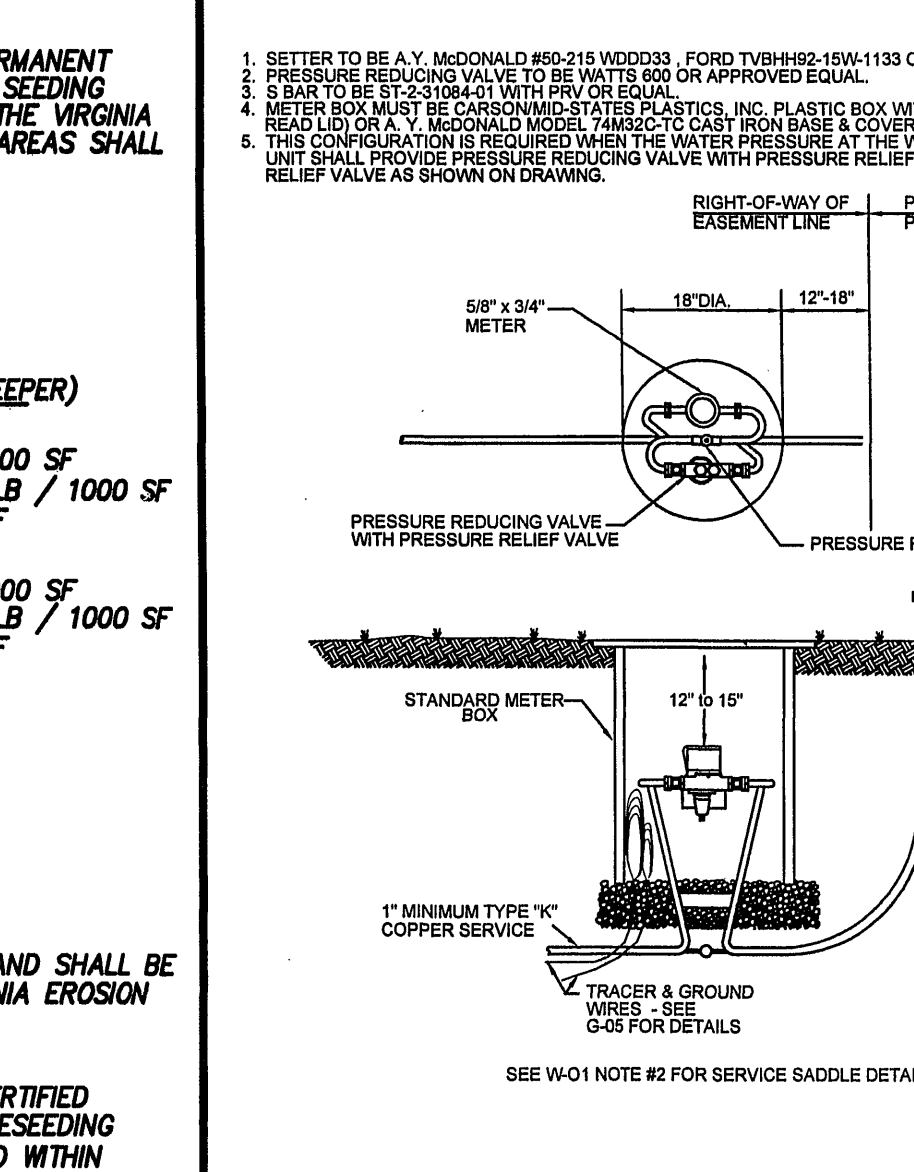
| TYPE A | TYPE B (SLOPES 3:1 OR STEEPER) |
|---|---|
| 15 OCTOBER TO 1 FEBRUARY K-31 FESCUE @ 5 LB / 1000 SF BORZY WINTER RYE @ 1/2 LB / 1000 SF | 15 MARCH TO 1 MAY CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF |
| 1 FEBRUARY TO 1 JUNE K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF | 15 AUGUST TO 1 OCTOBER CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF |
| 1 JUNE TO 1 SEPTEMBER K-31 FESCUE @ 5 LB / 1000 SF GERMAN MILLET @ 1/2 LB / 1000 SF | |
| 1 SEPTEMBER TO 15 OCTOBER K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF | |

LIME: 140 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE
FERTILIZER: 5-20-10 @ 25 LB / 1000 SF
38-0-0 @ 7 LB / 1000 SF

MULCH: IF REQUIRED, SHALL BE USED OVER ALL SEEDED AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 1.75 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

SOIL CONDITIONING: INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED SEED, MULCHING, MAINTENANCE OF NEW SEEDINGS, AND RESEEDING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS CONTAINED WITHIN THE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED BY THE INSPECTOR.

SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLOEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRIABLE, SEEDED. MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.



| REVISION DATE | DESCRIPTION | W-03 |
|---------------|--|------|
| 07/01/04 | TYPE "C" SINGLE RESIDENTIAL SERVICE FOR HIGH PRESSURE (LINE PRESSURE OVER 120 PSI) | |
| 03/01/06 | | |

GENERAL NOTES

1. THIS PLAN IS BASED ON A CURRENT FIELD SURVEY.
2. THIS PLAN DOES NOT GUARANTEE THE EXISTENCE OR LOCATION OF ANY UNDERGROUND UTILITIES.

STORM DRAIN STRUCTURES, SANITARY SEWER MANHOLES, AND ALL OTHER SURFACE UTILITIES WERE FIELD LOCATED. ALL UNDERGROUND UTILITIES SHOWN HEREON WERE ESTABLISHED USING ABOVE GROUND STRUCTURES, PAINTED MARKINGS MADE UNDER MISS UTILITY TICKET NUMBER A732400551 AND AVAILABLE UTILITY MAPS. ALL UNDERGROUND UTILITY LINES ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED PRIOR TO THE START OF ANY CONSTRUCTION.

3. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT AND THEREFORE MAY NOT SHOW ALL EASEMENTS OR ENCUMBRANCES TO THE SUBJECT PROPERTY.

4. CONTOUR INTERVAL = 2'

5. NO CONSTRUCTION/FIELD REVISIONS ARE ALLOWED WITHOUT THE APPROVAL OF THE CONSULTING ENGINEER, THE CITY OF ROANOKE, AND/OR THE WESTERN VIRGINIA WATER AUTHORITY.

CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT CITY OF ROANOKE STANDARDS AND SPECIFICATIONS AND THE CURRENT EDITION OF VDOT'S ROAD AND BRIDGE STANDARDS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE CITY OF ROANOKE AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM ANY AUTHORITY ISSUING PERMITS.
3. NO SUBSOIL INVESTIGATIONS HAVE BEEN FURNISHED TO THE DESIGNING ENGINEER.
4. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.
5. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
6. ALL WATER CONNECTIONS TO EXISTING LINES SHALL BE COORDINATED WITH AND PERFORMED BY THE WESTERN VIRGINIA WATER AUTHORITY AFTER THE CONTRACTOR HAS PERFORMED EXCAVATION AND SHORING PER OSHA REGS.
7. THRUST BLOCKS SHALL BE INSTALLED AT ALL BENDS IN ACCORDANCE WITH WVWA REGS.
8. THE CONTRACTOR AND OR OWNER SHALL PROVIDE A STORAGE CONTAINER FOR TEMPORARY STORAGE AND DISPOSAL OF LAND CLEARANCE DEBRIS AND BUILDING MATERIALS. ON-SITE BURIAL OF MATERIAL SHALL NOT BE PERMITTED.
9. ALL UTILITY SERVICE LATERALS OR SERVICE LINES SHALL BE INSTALLED UNDERGROUND. (THIS INCLUDES ELECTRIC SERVICE)
10. ALL WORK WITHIN THE RIGHT-OF-WAY SHALL COMPLY WITH THE CITY OF ROANOKE RIGHT-OF-WAY EXCAVATION AND RESTORATION STANDARDS.
11. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ABAJON ANY EXISTING WATER SERVICE AT THE MAIN UNDER THE SUPERVISION OF THE WVWA'S INSPECTOR.

GRADING NOTES

1. FILL MATERIAL SHALL BE FREE FROM ORGANIC MATTER AND ROCKS LARGER THAN 6 INCHES IN DIAMETER.
 2. NO SUBSURFACE SOILS INFORMATION HAS BEEN FURNISHED TO THE DESIGNING ENGINEER (LUMSDEN ASSOCIATES, P.C.). A QUALIFIED GEOTECHNICAL ENGINEER, LICENSED IN THE STATE OF VIRGINIA, SHOULD BE CONSULTED CONCERNING SOIL STABILITY, SLOPE STABILIZATION, SOIL COMPACTION, REGULARLY FOR SEDIMENT BUILDUP.
- LUMSDEN ASSOCIATES ASSUMES NO RESPONSIBILITY OR LIABILITY RELATING TO FAILURES RESULTING FROM SAME.

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION
THIS PROJECT CONSISTS OF THE CONSTRUCTION OF A NEW PUBLIC WATER LINE. TOTAL DISTURBED AREA IS APPROXIMATELY 0.30 ACRES.

EXISTING SITE CONDITIONS
THE SITE CONSISTS OF THE PUBLIC RIGHT-OF-WAY OF VAN WINKLE ROAD BETWEEN SOUTHERN HILLS DRIVE AND NARROWS LANE, AND TO THE EAST AND WEST BY RESIDENTIAL PROPERTY.

ADJACENT AREAS
THIS DEVELOPMENT IS BORDERED TO THE NORTH BY SOUTHERN HILLS DRIVE, TO THE SOUTH BY NARROWS LANE, AND TO THE EAST AND WEST BY RESIDENTIAL PROPERTY.

OFFSITE AREAS
NO OFFSITE AREAS ARE ASSOCIATED WITH THIS PROJECT.

SOILS
SOILS INFORMATION IS LISTED BELOW AND IS BASED ON AN INSPECTION OF SHEET NO. 11 OF THE SOIL SURVEY OF ROANOKE COUNTY AND THE CITIES OF ROANOKE AND SALEM, VIRGINIA, ISSUED IN 1997 AND HAS NOT BEEN FIELD VERIFIED.

THE DERROC COBBLY SANDY LOAM, 0 TO 4% SLOPES (MAP SYMBOL 13A) HAS LOW EROSION POTENTIAL, MODERATE PERMEABILITY, LOW SHRINK-SWELL POTENTIAL. THE TYPICAL SOIL LAYERS ARE AS FOLLOWS: THE SURFACE LAYER IS 0 TO 4 INCHES - VERY DARK GRAYISH BROWN COBBLY SANDY LOAM, THE SUBSOIL LAYERS ARE 4 TO 14 INCHES - DARK BROWN COBBLY SANDY LOAM, 14 TO 31 INCHES - DARK BROWN VERY COBBLY SANDY LOAM, THE SUBSTRATUM LAYER IS 31 TO 65 INCHES - DARK YELLOWISH BROWN EXTREMELY COBBLY LOAMY SAND.

THE EDMONTON CHANNERY SANDY LOAM, 15 TO 35% SLOPES (MAP SYMBOL 15D) HAS HIGH EROSION POTENTIAL, MODERATE PERMEABILITY, LOW SHRINK-SWELL POTENTIAL. THE TYPICAL SOIL LAYERS ARE AS FOLLOWS: THE SURFACE LAYER IS 0 TO 2 INCHES - VERY DARK GRAY CHANNERY SANDY LOAM, THE SUBSOIL LAYERS ARE 2 TO 18 INCHES - YELLOWISH BROWN LOAM, 18 TO 27 INCHES - BROWNISH YELLOW AND REDDISH BROWN LOAM, 27 TO 38 INCHES - STRONG BROWN CLAY LOAM WITH BROWNISH YELLOW & YELLOWISH RED MOTTLING, THE SUBSTRATUM LAYER IS 38 TO 49 INCHES - STRONG BROWN CLAY LOAM WITH YELLOWISH RED & VERY PALE BROWN MOTTLING.

THE EDMONTON CHANNERY SANDY LOAM, 35 TO 60% SLOPES (MAP SYMBOL 15E) HAS HIGH EROSION POTENTIAL, MODERATE PERMEABILITY, LOW SHRINK-SWELL POTENTIAL. THE TYPICAL SOIL LAYERS ARE AS FOLLOWS: THE SURFACE LAYER IS 0 TO 2 INCHES - VERY DARK GRAY CHANNERY SANDY LOAM, THE SUBSOIL LAYERS ARE 2 TO 18 INCHES - YELLOWISH BROWN LOAM, 18 TO 27 INCHES - BROWNISH YELLOW AND REDDISH BROWN LOAM, 27 TO 38 INCHES - STRONG BROWN CLAY LOAM WITH BROWNISH YELLOW & YELLOWISH RED MOTTLING, THE SUBSTRATUM LAYER IS 38 TO 49 INCHES - STRONG BROWN CLAY LOAM WITH YELLOWISH RED & VERY PALE BROWN MOTTLING. 49 TO 62 INCHES - STRONG BROWN CLAY LOAM WITH YELLOWISH RED & GRAY MOTTLING.

THE THURMONT SANDY LOAM, 7 TO 15% SLOPES (MAP SYMBOL 47C) HAS HIGH EROSION POTENTIAL, MODERATE PERMEABILITY, AND LOW SHRINK-SWELL POTENTIAL. THE TYPICAL SOIL LAYERS ARE AS FOLLOWS: THE SURFACE LAYER IS 0 TO 5 INCHES - DARK BROWN LOAM TO SUBSURFACE LAYER IS 5 TO 8 INCHES - BROWN FINE SANDY LOAM, THE SUBSOIL LAYERS ARE 8 TO 21 INCHES - STRONG BROWN CLAY LOAM, 21 TO 37 INCHES - YELLOWISH BROWN CLAY LOAM, 37 TO 44 INCHES - YELLOWISH BROWN CLAY LOAM THAT HAS BROWN MOTTLING, THE SUBSTRATUM LAYER IS 44 TO 51 INCHES - YELLOWISH RED GRAVELLY LOAM, 51 TO 62 INCHES - YELLOWISH RED VERY GRAVELLY LOAM.

CRITICAL AREAS
THE CONTRACTOR SHALL TAKE SPECIAL CARE TO INSURE THAT THE EXISTING STORM DRAINAGE SYSTEM IS PROTECTED. INSURE THAT ALL PERIMETER ESC MEASURES ARE STABILIZED AND FUNCTIONING TO MINIMIZE THE POTENTIAL FOR ANY SEDIMENT LEAVING THE SITE ONTO ADJACENT RESIDENTIAL PROPERTIES AND STREETS.

EROSION AND SEDIMENT CONTROL MEASURES
SILT FENCE (3.05) - SILT FENCE WILL BE INSTALLED AT THE LOWER ENDS OF THE PROJECT SITE TO INTERCEPT SEDIMENT LADEN RUN-OFF PRIOR TO EXITING THE SITE.

TEMPORARY SEEDING (3.31) - TEMPORARY SEEDING SHALL BE APPLIED TO TEMPORARY DIVERSION DIKES, TOPSOIL STOCKPILES, AND ALL AREAS TO BE ROUGH GRADED, BUT NOT FINISHED GRADING DURING THE INITIAL PHASE OF CONSTRUCTION. TEMPORARY SEEDING SHALL BE FAST GERMINATING TEMPORARY VEGETATION AND INSTALLED IMMEDIATELY FOLLOWING GRADING, OR INSTALLATION IF A TEMPORARY MEASURE. SEE ALSO MINIMUM STANDARDS.

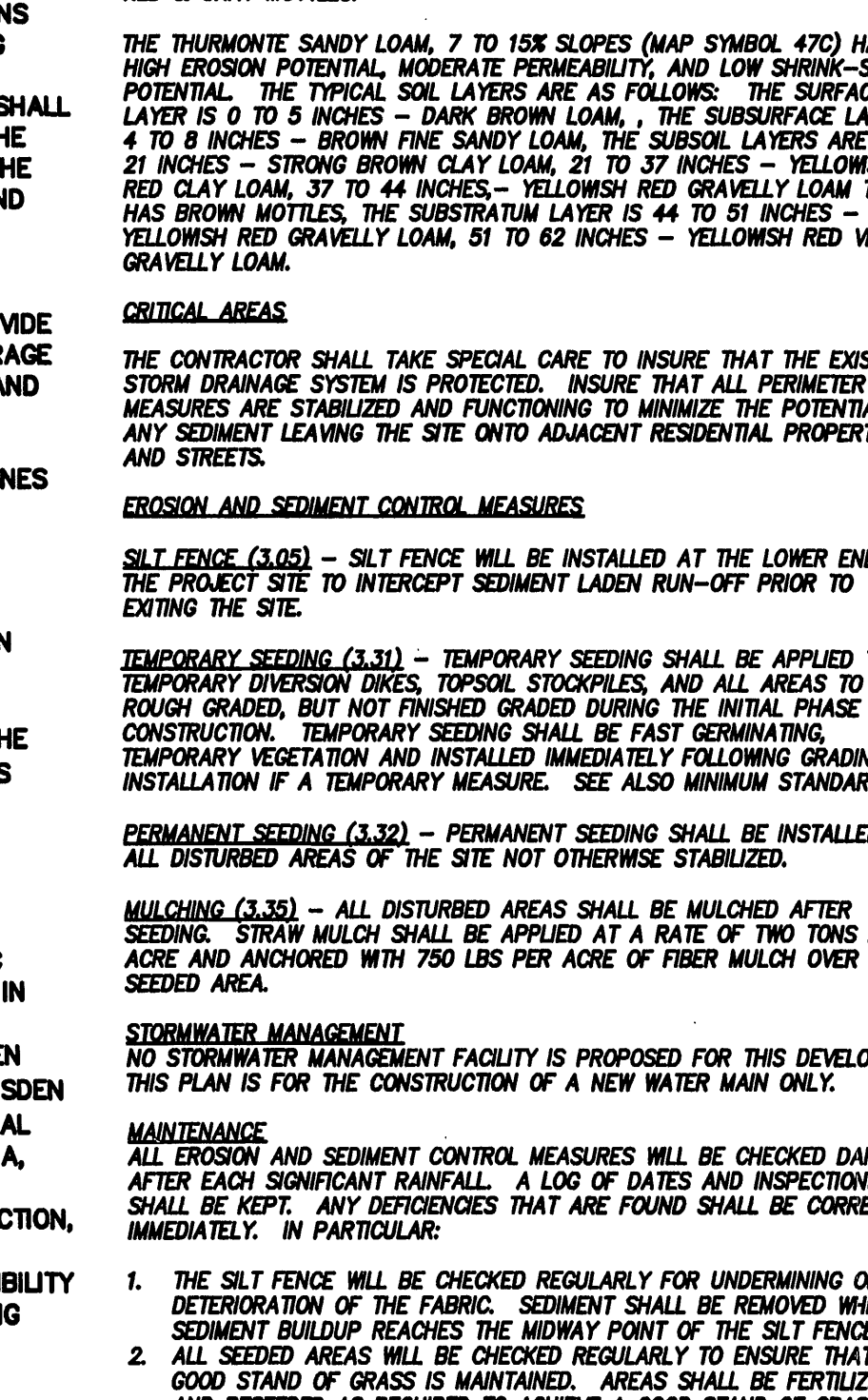
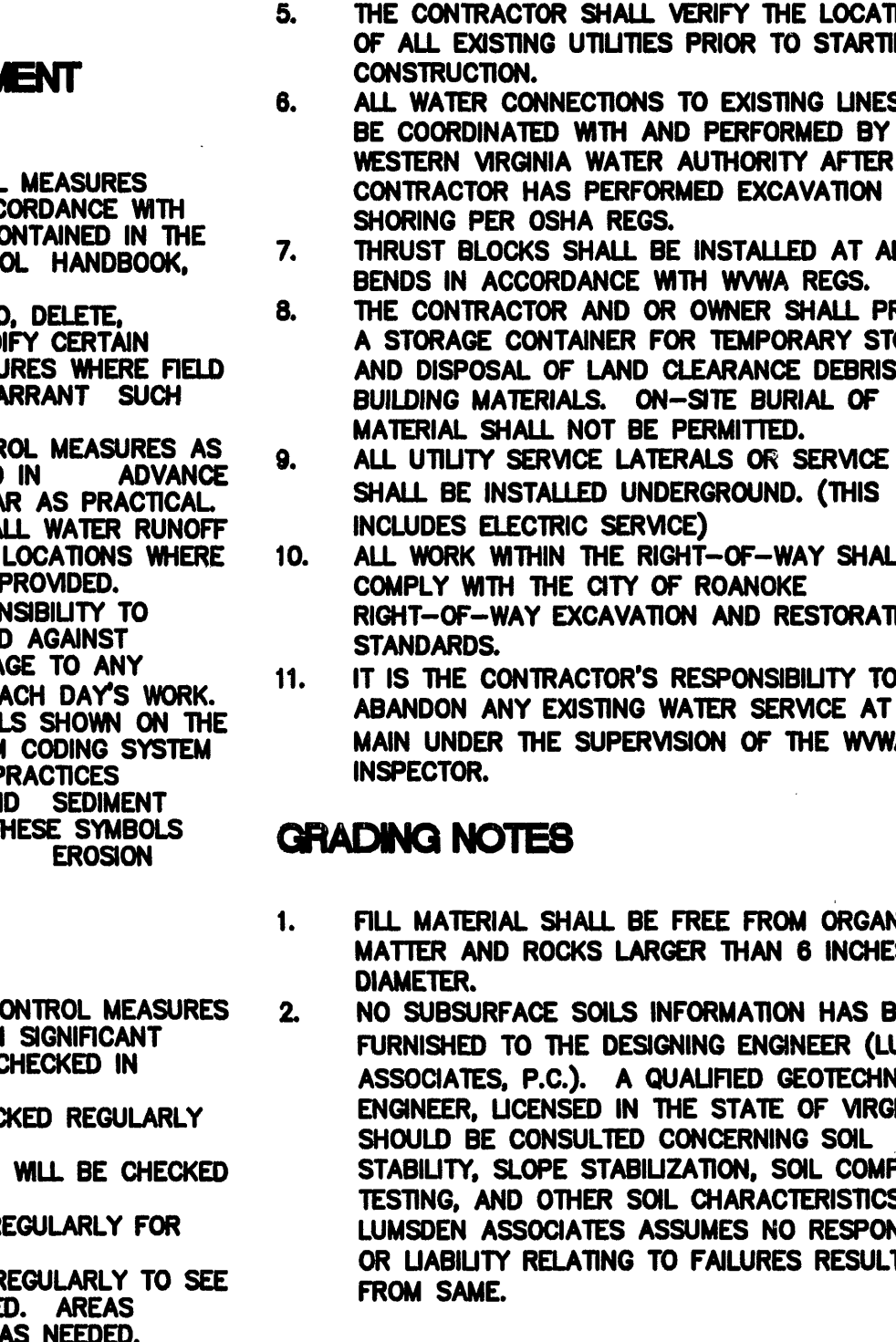
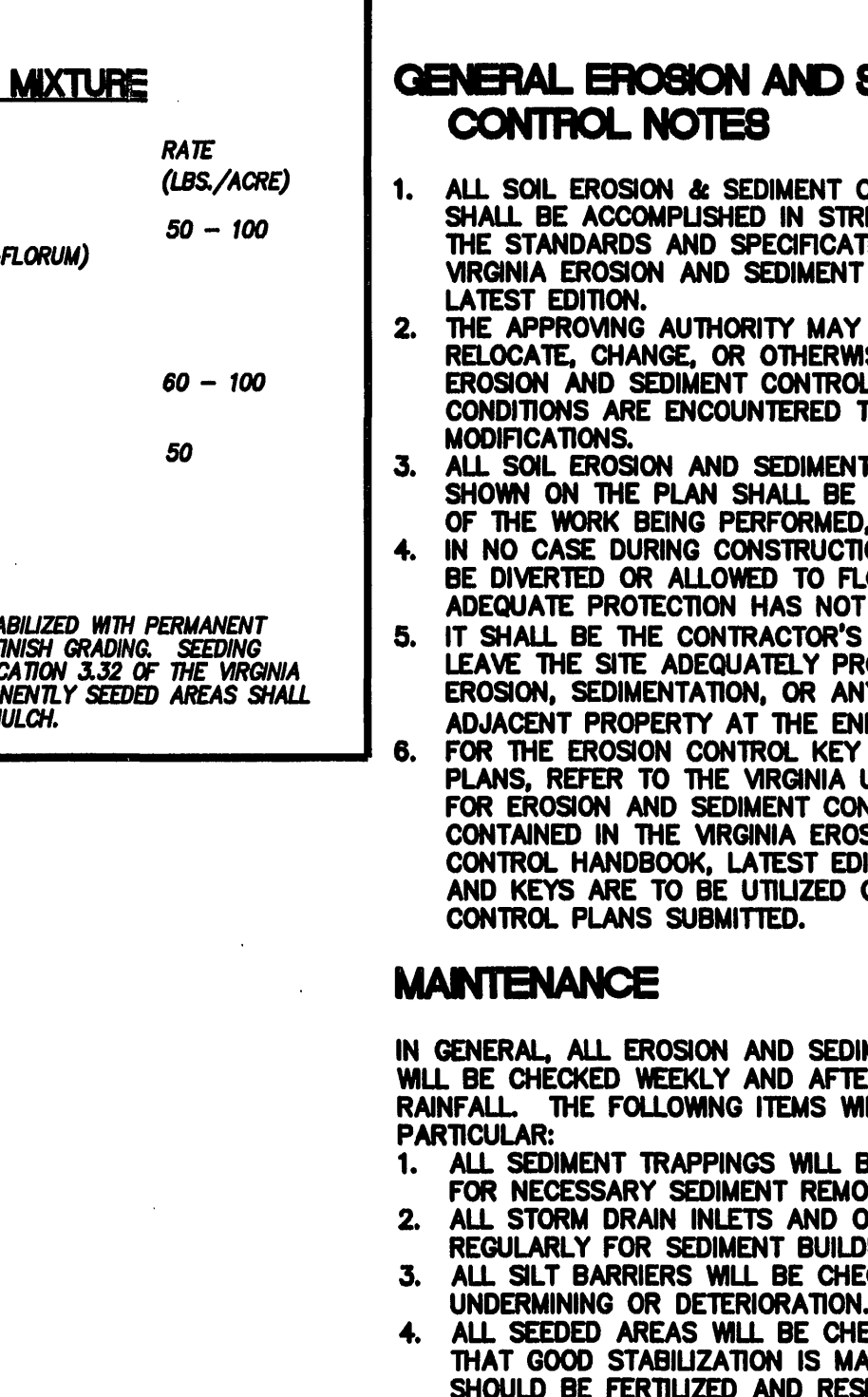
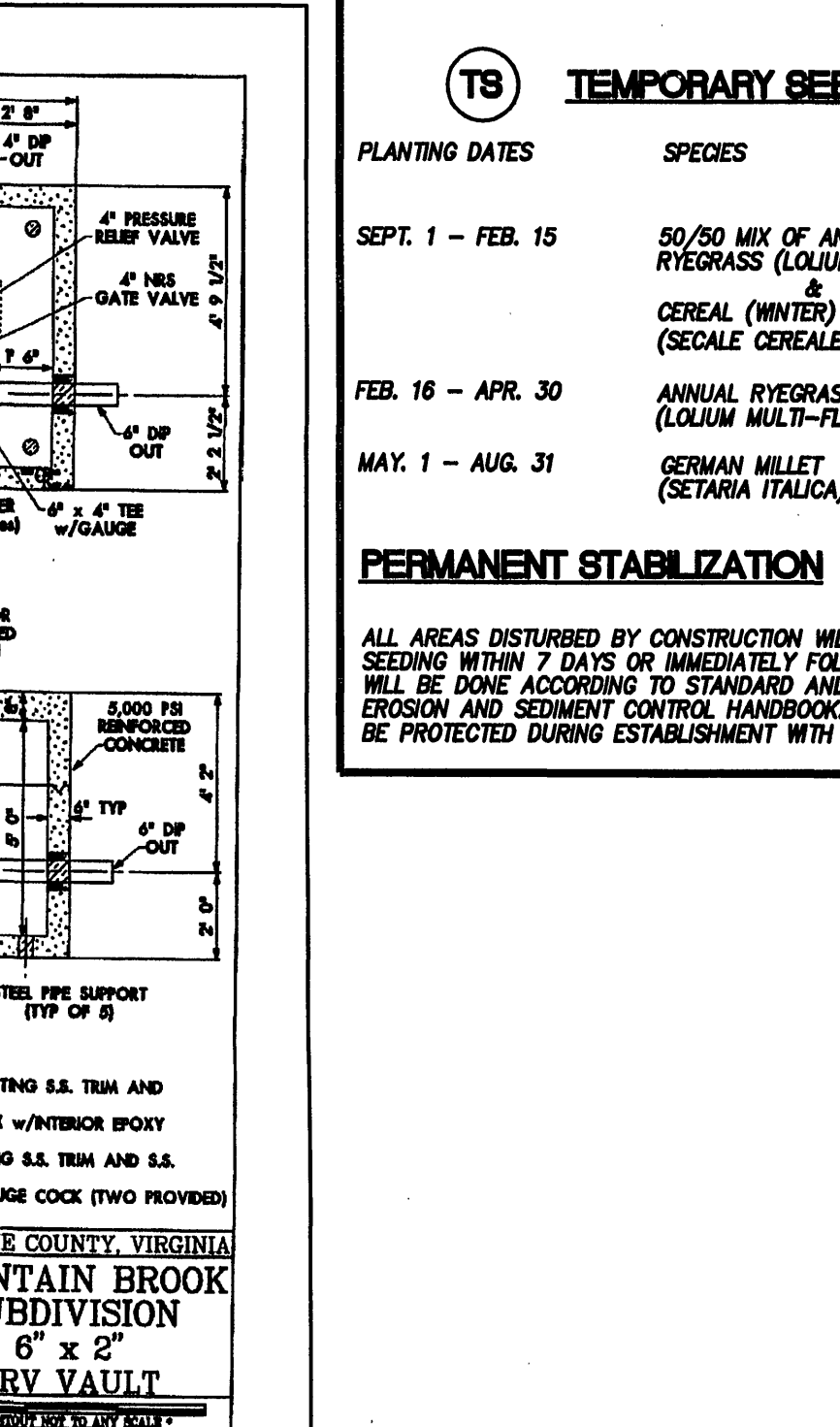
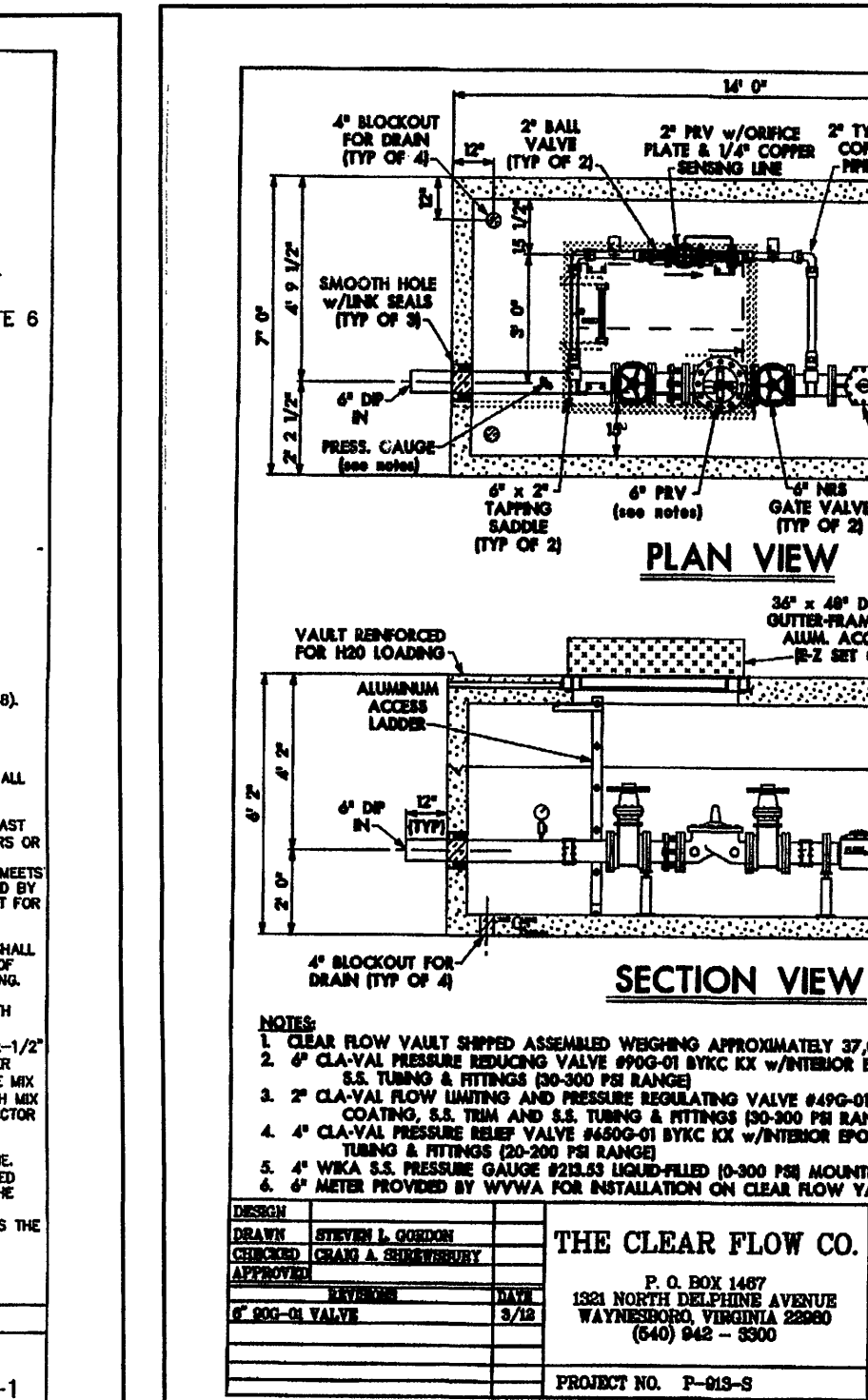
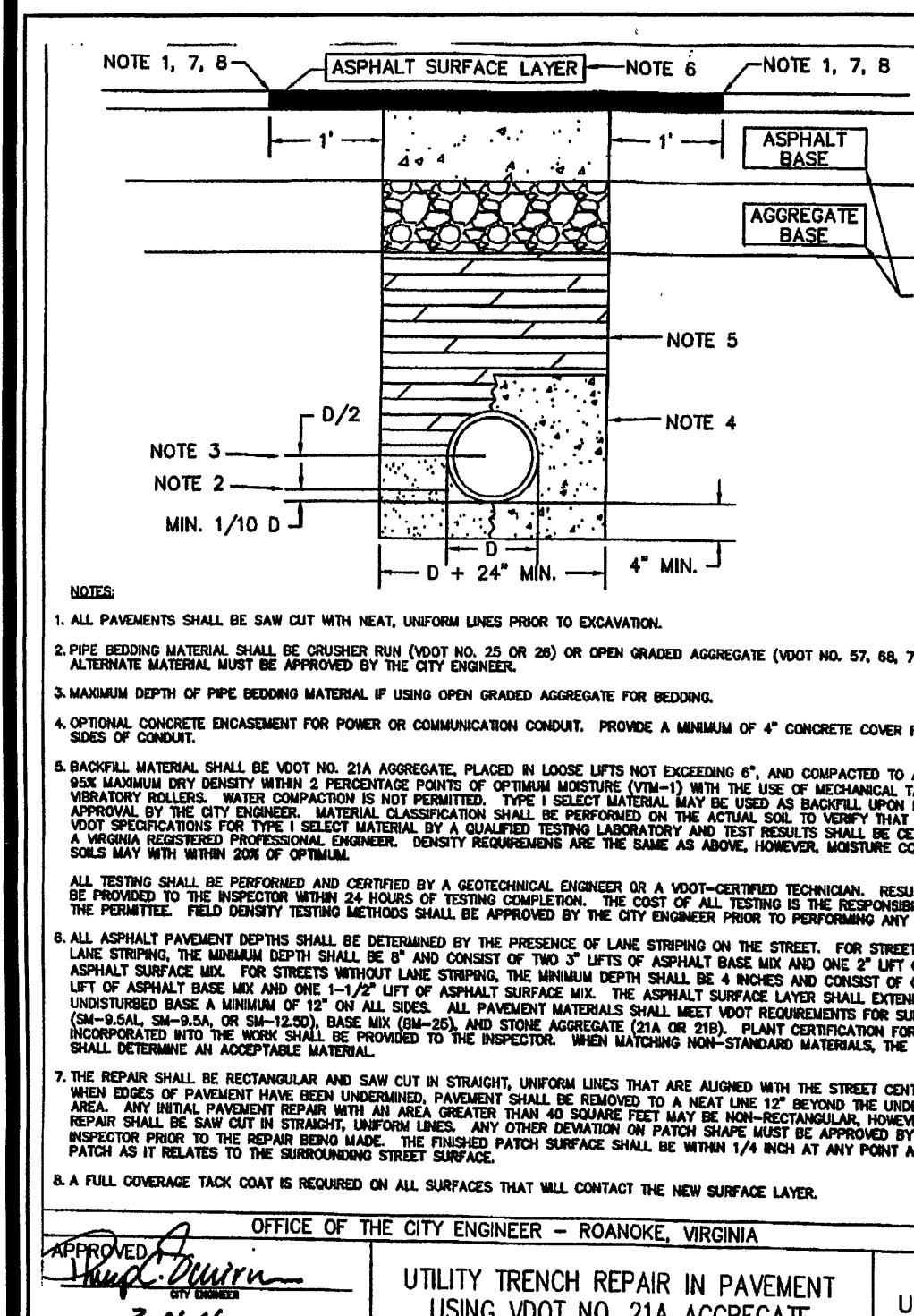
PERMANENT SEEDING (3.32) - PERMANENT SEEDING SHALL BE INSTALLED ON ALL DISTURBED AREAS OF THE SITE NOT OTHERWISE STABILIZED.

MULCHING (3.35) - ALL DISTURBED AREAS SHALL BE MULCHED AFTER SEEDING. STRAW MULCH SHALL BE APPLIED AT A RATE OF TWO TONS PER ACRE AND ANCHORED WITH 750 LBS PER ACRE OF FIBER MULCH OVER THE SEEDED AREA.

STORMWATER MANAGEMENT
NO STORMWATER MANAGEMENT FACILITY IS PROPOSED FOR THIS DEVELOPMENT. THIS PLAN IS FOR THE CONSTRUCTION OF A NEW WATER MAIN ONLY.

MAINTENANCE
ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND INSPECTED WEEKLY. ANY DEFICIENCIES THAT ARE FOUND SHALL BE CORRECTED IMMEDIATELY. IN PARTICULAR:

1. THE SILT FENCE WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE SEDIMENT BUILDUP REACHES THE MIDWAY POINT OF THE SILT FENCE.
2. ALL SEEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. AREAS SHALL BE FERTILIZED AND RESEED AS REQUIRED TO ACHIEVE A GOOD STAND OF GRASS.



LUMSDEN ASSOCIATES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
ROANOKE, VIRGINIA

GEOFFREY A. SPROUL
P.E. No. 014280
9-23-08

PROFESSIONAL ENGINEER

NOTES & DETAILS

SOUTHERN HILLS

WATER MAIN EXTENSION

PREPARED FOR

BOONE HOMES, INC. OF ROANOKE

ROANOKE, VIRGINIA

REVISIONS

DATE

DESCRIPTION

NO. 1 2 3 4 5

DATE: SEPTEMBER 23, 2008

COMMISSION NO. 03-374W

SHEET 2 OF 5