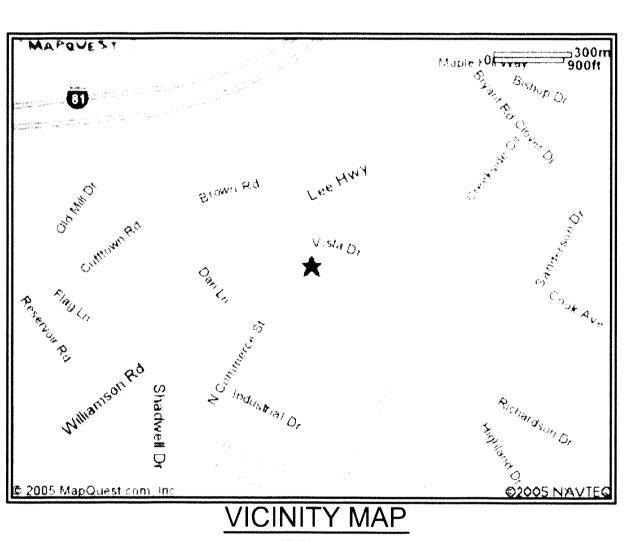
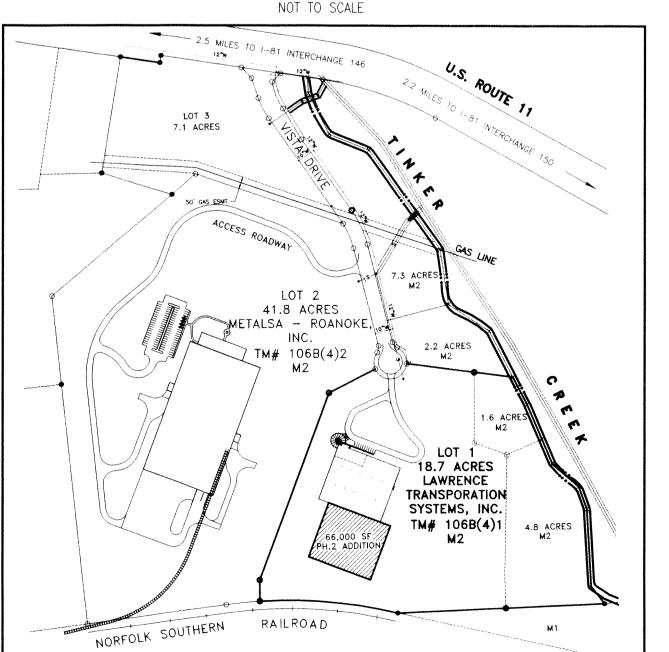
# SITE DEVELOPMENT ADDENDUM DRAWINGS FOR EXTENSION OF PHASE II ADDITION LAWRENCE TRANSPORTATION SYSTEMS BUILDING VISTA PARK BOTETOURT COUNTY, VIRGINIA

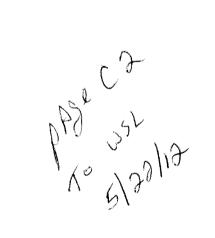




PARCEL KEY PLAN

TAX ID INFORMATION BASED ON BOTETOUR

COUNTY GIS RECORDS



3. FLOODPLAIN COMMUNITY PANEL NUMBER AND ZONE: 510018-175A NORTHERN PORTION OF SITE IS WITHIN FEMA DESIGNATED 100-YR FLOOD ZONE 4. ZONING : M2

5. SETBACKS & YARD REQUIREMENTS: FRONT SETBACK: 80FT + IMPERVIOUS SURFACE DIST. REAR SETBACK: 50FT FRONT YARD: 50FT SIDE YARD: 20FT REAR YARD: 40FT

6. BUILDING INFORMATION MAXIMUM HEIGHT=32' FOOTPRINT AREA = 65.000 S.F. +/-EXISTING

NEW ADDITION PHASE II FOOTPRINT AREA = 66.000 S.F. +/-NEW ADDITION PHASE II-B FOOTPRINT AREA = 60,000 s.f. +/-FOOTPRINT AREA = 191,000 s.f. +/-

7. PARKING: **REQUIREMENTS** 

1.0 PER EMPLOYEE IN LARGEST SHIFT. PARKING REQ'D: 8 SPACES PLUS 1 TRUCK SPACE PARKING PROVIDED: 12 EXIST. SPACE 8. FLOOR AREA RATIO: ALLOWABLE=0.4x18.68 AC= 7.47 ACRES EXISTING F.A.R.=.08=1.5 ACRES PROPOSED F.A.R.=.081=1.5 ACRES

TOTAL EXISTING & PROPOSED F.A.R.=.161=3 ACRES TOTAL EXISTING & PROPOSED F.A.R.(WITH PHASE II-B) =.23=4.38 ACRES

9. SIGNAGE IS NOT INCLUDED AS PART OF THIS SUBMITTAL 10. CONTRACTOR SHALL MAINTAIN LIMITS OF CONSTRUCTION WITHIN THE BOUNDARIES OF THE PROPERTY AS INDICATED ON THE SITE PLAN.

11. BOUNDARY & FIELD TOPOGRAPHY BY MATTERN & CRAIG, INC. & McMURRY SURVEYORS 12. PARKING LOT LIGHTING SHALL NOT GLARE ONTO ADJOINGING PROPERTIES OR RIGHT-OF-WAYS. NO NEW LIGHTING PROPOSED AS PART OF THIS WORK.

**CONTRACTOR:** PRICE BUILDINGS

1111 CALLAWAY ROAD ROCKY MOUNT, VIRGINIA 24151 CONTACT: HAVEN PRICE

**ENGINEER:** PROVIDENCE ENGINEERING 819 NAFF RD.

BOONES MILL, VIRGINIA 24065 CONTACT: SEAN GOLDSMITH, PE **OWNER:** CONTACT: CHIP LAWRENCE

LAWRENCE TRANSPORTATION SYSTEMS, INC. P.O. BOX 7667 ROANOKE, VIRGINIA 24019

#### SHEET INDEX

T1 TITLE SHEET & NOTES C1 EXISTING CONDITIONS & DEMOLITION C2 DIMENSIONAL LAYOUT

C3 GRADING & EROSION CONTROL C4 UTILITIES PLAN C5 ESC DETAILS

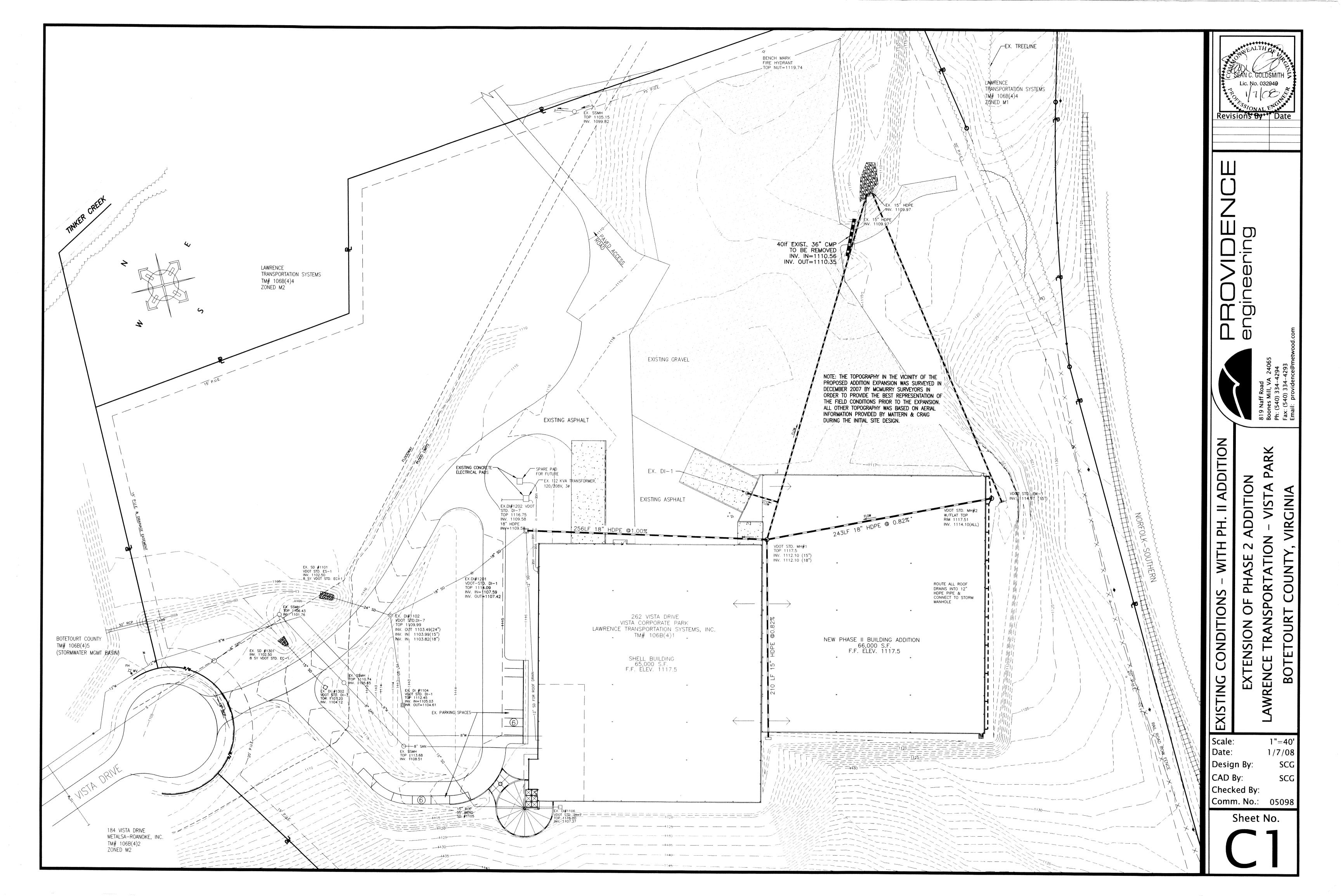
C6 SANITARY SEWER & MISC. DETAILS D1 DRAINAGE SHEET

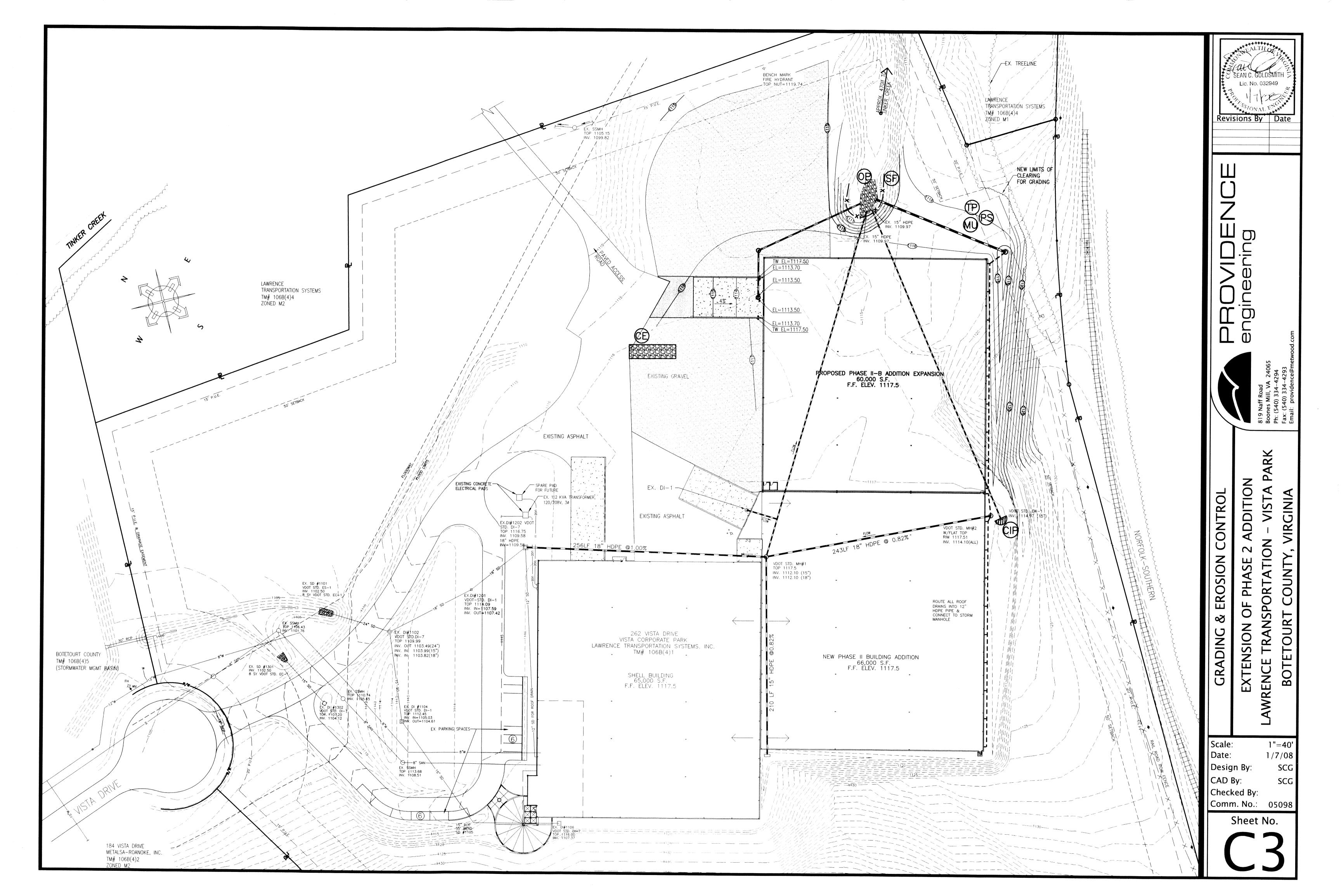
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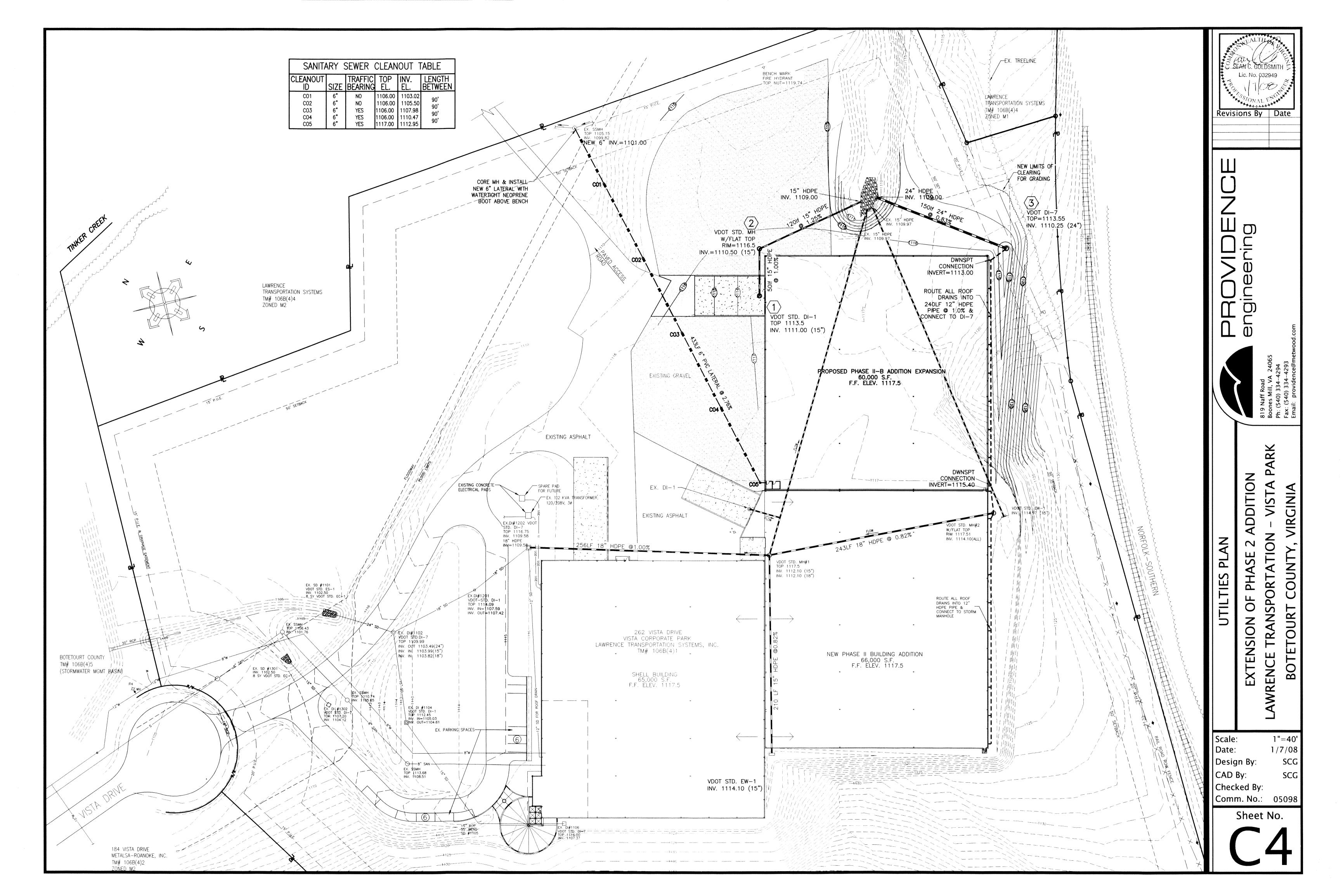
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1"=40' CAD By: Checked By: Comm. No.: 05098

Sheet No.







SHALL BE VDOT #57 OR APPROVED EQUAL

NOMINAL Ø MIN. RECOMMENDED

4 (100)

6 (150)

8 (200)

10 (250) 12 (300)

18 (450)

24 (600)

SURFACE LIVE

LOADING CONDITION

E80 RAILWAY

H25 (FLEXIBLE PAVEMENT)

H25 (RIGID PAVEMENT)

HEAVY CONSTRUCTION

in (mm) TRENCH WIDTH, in (mm)

UNLESS OTHERWISE SPECIFIED BY THE ENGINEER,

MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS:

21 (530)

23 (580)

34 (860)

39 (990)

48 (1220)

SUMMARIZED IN THE FOLLOWING TABLE. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE TAKEN FROM

THE TOP OF PIPE TO THE GROUND SURFACE.

\*TOP OF PIPE TO BOTTOM

OF BITUMINOUS PAVEMENT SECTION

MINIMUM COVER: MINIMUM RECOMMENDED DEPTHS OF COVER FOR VARIOUS LIVE LOADING CONDITIONS ARE

MINIMUM RECOMMENDED

COVER, in (mm)

12 (300)\*

12 (300)

24 (610)

48 (1220)

UNDISTURBED EARTH \_

MIN. TRENCH WIDTH

FOUNDATION

TYPICAL STORM SEWER TRENCH SECTION

#### SYMBOL TITLE SYMBOL TITLE ----ROCK CHECK DAMS 3.01 SAFETY FENCE TEMPORARY GRAVEL LEVEL SPREADER CONSTRUCTION ENTRANCE VEGETATIVE STREAMBANK CONSTRUCTION ROAD STABILIZATION STABILIZATION structural streambank STRAW BALE BARRIER STABILIZATION EMPORARY VEHICULAR SILT FENCE $\times \times \times \times$ STREAM CROSSING UTILITY STREAM CROSSING <del>- 2222222</del> BRUSH BARRIER 3.06 STORM DRAIN DEWATERING STRUCTURE <del>---(5)</del>--INLET PROTECTION TURBIDITY CURTAIN CULVERT INLET PROTECTION SUBSURFACE DRAIN ----TEMPORARY DIVERSION DIKE - (SR) --SURFACE ROUGHENING TEMPORARY FILL DIVERSION TEMPORARY RIGHT-OF-WAY \_\_\_\_(TO) TOPSOILING DIVERSION \_\_\_\_\_(TS) TEMPORARY SEEDING DIVERSION PS PS PERMANENT SEEDING TEMPORARY SEDIMENT TRAP \_\_\_\_(SO)\_\_\_\_ SODDING TEMPORARY SEDIMENT BASIN A A A A BERMUDA GRASS AND BE) TEMPORARY SLOPE DRAIN (ZE) DYSIAGRASS ESTABLISHMENT (MU) MULCHING PAVED FLUME SOIL STABILIZATION stormwater conveyance TREAT. 1 TREAT. BLANKETS AND MATTING CHANNE TREES, SHRUBS, VINES VEG -OUTLET PROTECTION AND GROUND COVERS TREE PRESERVATION TP ---RIPRAP AND PROTECTION ENDWALL

DISTANCE IS 6' MINIMUM IF

FLOW IS TOWARD EMBANKMENT.

MAINTAINED ON THE SITE AT ALL TIMES. ES-5 PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS). THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY. ES-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. ES-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. ES-8 DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE. ES-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 THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY. ES-10 AN INSPECTION REPORT MUST BE FILED WITH BOTETOURT COUNTY EROSION & SEDIMENT CONTROL ADMINISTRATOR ONCE EVERY TWO WEEKS, AND WITHIN 48 HOURS OF ANY RUNOFF- PRODUCING RAINFALL EVENT. FAILURE TO SUBMIT A REPORT WILL BE GROUNDS FOR IMMEDIATE REVOCATION OF THE LAND DISTURBING PERMIT. THE REPORT SCHEDULE SHALL BE MARKED FROM THE DATE OF THE ONSITE PRE-CONSTRUCTION MEETING. REPORTS MUST BE POSTMARKED WITHIN 24 HOURS OF THE DEADLINE. A STANDARD INSPECTION REPORT FORM WILL BE SUPPLIED, WHICH SHOULD BE COPIED AS NECESSARY THIS PROVISION IN NO WAY WAIVES THE RIGHT OF BOTETOURT COUNTY PERSONEL TO CONDUCT SITE INSPECTIONS, NOR DOES IT DENY THE RIGHT OF THE PERMITEE(S) TO ACCOMPANY THE INSPECTORS(S) TYPE B (SLOPES 3:1 OR STEEPER) CONSTRUCTION NOTES 15 OCTOBER TO 1 FEBRUARY 15 MARCH TO 1 MAY K-31 FESCUE @ 5 LB / 1000 SF CROWN VETCH @ 1/2 LB / 1000 SF BORZY WINTER RYE @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF BENCHED OR STEPPED PRIOR TO PLACING FILL ON THEM. RED TOP @ 1/8 LB / 1000 SF

EROSION CONTROL NOTES

TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND

ES-3 ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS

SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00

SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING

PRECONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND

ES-1 UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND

ES-2 THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE

DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

ES-4 A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE

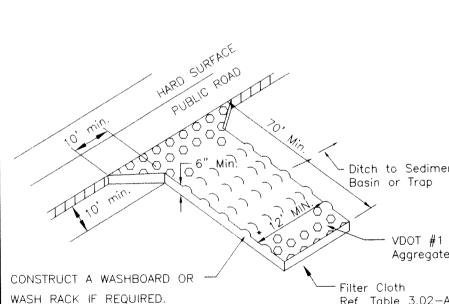
EROSION AND SEDIMENT CONTROL REGULATIONS.

THE FIRST STEP IN CLEARING

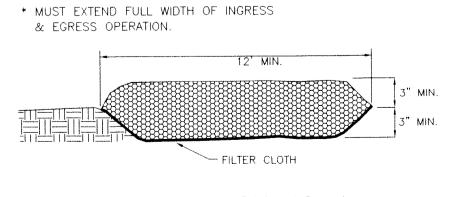
# 2. ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. FILL MATERIAL SOILS, IN GENERAL: SHALL BE COMPACTABLE

- 1. SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE
- SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE (SHRINKAGE OR SWELL) OR SETTLEMENT
- 3. FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (15.2 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (5.1
- CM) IN DIAMETER. 4. THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LOOSE LIFTS. EACH LIFT SHALL BE SPREAD IN UNIFORM LAYERS. FILL SOIL SHALL BE UTILIZED ONLY WITHIN A MOISTURE RANGE OF +/- 5% OF THE OPTIMUM MOISTURE CONTENT. COMPACTION OF THE FILL SHALL BE PERFORMED WITH APPROVED EQUIPMENT. COMPACTION
- OF THE LAYERS SHALL BE CONTINUOUS AND UNIFORM. 5. EMBANKMENT MATERIAL IN FILL AREAS SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES AND SHALL BE COMPACTED TO A MINIMUM 95% DENSITY IN ACCORDANCE WITH SECTION 303 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.
- 6. FIELD DENSITY TESTS ARE TO BE CONDUCTED BY AN INDEPENDENT SOILS TESTING LABORATORY UNDER THE DIRECTION OF A QUALIFIED GEOTECHNICAL ENGINEER. THE RESULTS OF THESE TESTS SHALL BE SUBMITTED TO THE DESIGN ENGINEER WITH AS-BUILT PLANS AS A CONDITION OF ACCEPTANCE OF THE FACILITY BY THE ENGINEER. FIELD DENSITY TESTS, AS DIRECTED BY THE ENGINEER SHALL BE PERFORMED PERIODICALLY TO DETERMINE THE DEGREE OF COMPACTION. ANY AREAS FAILING TO MEET THE ABOVE REQUIREMENTS SHALL BE REWORKED
- AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS 7. ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF

TOPSOIL AND SEEDED.



\* MUST EXTEND FULL WIDTH OF INGRESS & EGRESS OPERATION.



 Reinforced Concrete Drain Space

> EMPORARY GRAVEL CONSTRUCTION ENTRANCE

WASH RACK DETAIL (IF REQUIRED)

 $\sim$ Aggregate Ref. Table 3.02-A of Virginia ESC Handbook for requirements.

> **AS SHOWN** CAD By:

> > Sheet No.

4 0

BOTETOUR

Comm. No.: 05098

DIAMETER OF PIPE CULVERT GRAVEL (12"MIN. DEPTH) 24" 3'-2" 2'-3" 8'-0" 5'--0**"** ∠ SEDIMENT FLOW SPECIFIC APPLICATION This method of inlet protection is applicable where heavy concentrated flows are expected, but not where ponding around the structure might cause excessive inconvenience or damage to adjacent structures and unprotected areas.

EW-1 PRECAST ENDWALL DETAIL NOT TO SCALE

TYPICAL V-DITCH SECTION

If silt fence culvert inlet protection is not sufficient due to expected

SILT FENCE CULVERT INLET PROTECTION

high velocity of flow, contractor shall install optional stone

and inlet sediment trap protection per STD. & SPEC. 3.08.

TOE OF FILL -

SILT FENCE -

FINAL BACKFILL; TYPE 2

ACCORDANCE W/ VDOT

ROAD & BRIDGE SPEC.

SELECT MATERIAL IN

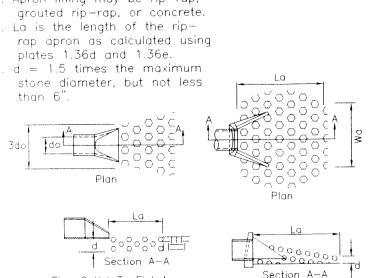
INITIAL BACKFILL

VDOT #57 GRAVEL TO SPRINGLINE OF PIPE

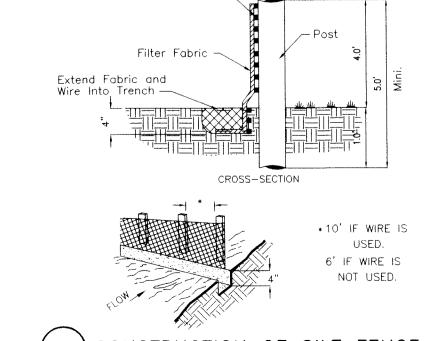
4" VDOT #57 GRAVEL

BEDDING MATERIAL

 Apron lining may be rip-rap, grouted rip-rap, or concrete 2. La is the length of the rip rap apron as calculated using plates 1.36d and 1.36e. . d = 1.5 times the maximum stone diameter, but not less



Section A-A <u>Pipe Outlet To</u> Well—Defined Channel OP) OUTLET PROTECTION



- EC-1 LINING

K-31 FESCUE @ 5 LB / 1000 SF

ANNUAL RYE @ 1/2 LB / 1000 SF

K-31 FESCUE @ 5 LB / 1000 SF

K-31 FESCUE @ 5 LB / 1000 SF

ANNUAL RYE @ 1/2 LB / 1000 SF

5-20-10 @ 25 LB / 1000 SF

38-0-0 @ 7 LB / 1000 SF

1 SEPTEMBER TO 15 OCTOBER

GERMAN MILLET @ 1/2 LB / 1000 SF

1 JUNE TO 1 SEPTEMBER

\* Gravel shall be VDOT #3, #357 or #5 coarse aggregate. ) GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER

15 AUGUST TO 1 OCTOBER

140 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE

AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

IF REQUIRED, SHALL BE USED OVER ALL SEEDED AREAS AND SHALL BE

APPLIED IN ACCORDANCE WITH SECTION 1.75 OF THE VIRGINIA EROSION

LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED

PERMANENT SEEDING MIXTURE

INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED

SEED. MULCHING, MAINTENANCE OF NEW SEEDLINGS, AND RESEEDI

THE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK,

SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRIABLE, SEEDBED.

MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

TOTAL DISTURBED AREA = 1.5+/- AC

SHALL BE IN ACCORDANCE WITH SPECIFICATIONS CONTAINED WITHIN

CROWN VETCH @ 1/2 LB / 1000 SF

RED TOP @ 1/8 LB / 1000 SF

PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF

(SF) CONSTRUCTION OF SILT FENCE

DDITIO

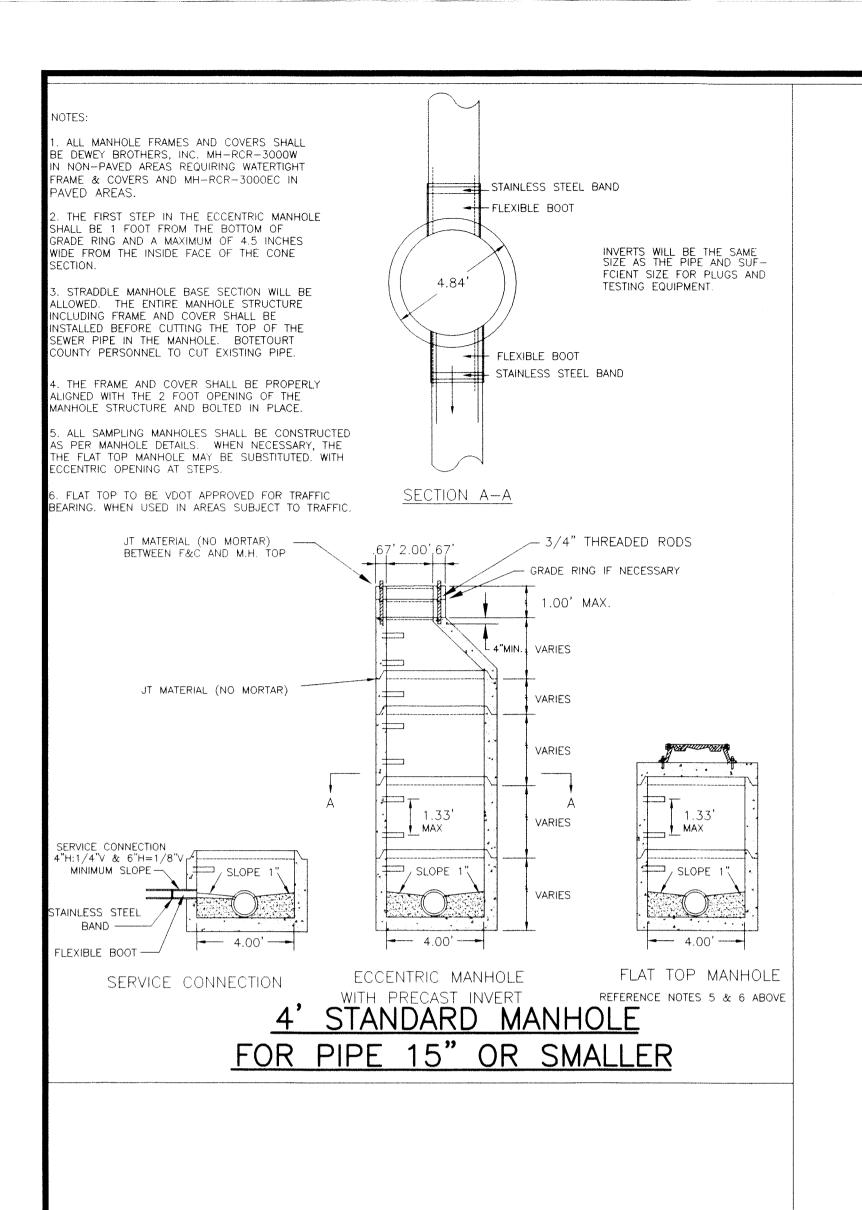
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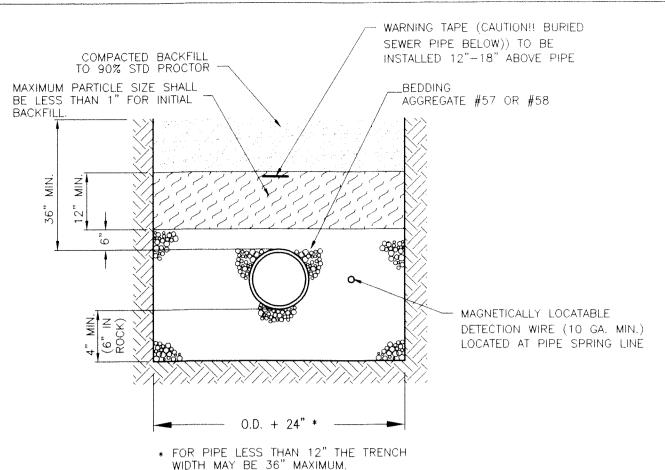
SEAN C. GOLDSMITH

Lic. No. 032949

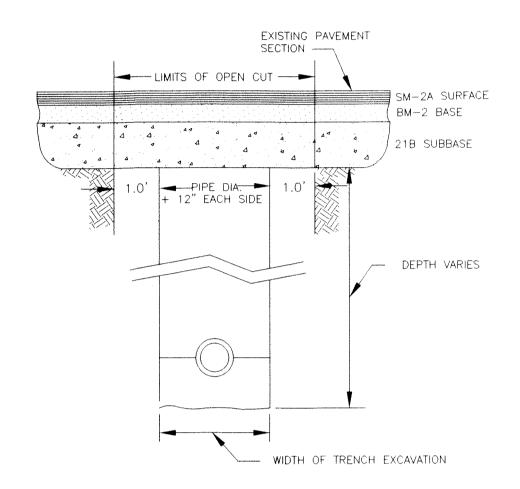
Revisions By | Date

1/7/08 Checked By:





## SANITARY SEWER BEDDING DETAIL



A. THE CONTRACTOR SHALL REPLACE THE OPEN CUT WITH A MINIMUM TOP COURSE, 2" VDOT SM-2A, BASE COURSE, 3" VDOT BM-2, AND SUBBASE, 8" VDOT 21B, B. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED OR AS REQUIRED BY C. ALL EXPOSED EDGES OF EXISTING BITUMINOUS SURFACE COURSE SHALL BE PRIMED WITH A MATERIAL SATISFACTORY TO THE DIRECTOR BEFORE THE BITUMINOUS MIXTURES ARE REPLACED. EDGES

OF TRENCH SHALL BE CUT TO A STRAIGHT LINE PRIOR TO PAVING. D. THE BACKFILL IN THE TRENCH SHALL BE SUITABLE AND THOROUGHLY COMPACTED IN 6-INCH LAYERS BY TAMPING OR BY OTHER APPROVED METHOD BEFORE THE OPENING IS PAVED. NO EXCAVATIONS UNDER THE EXISTING PAVEMENT WILL BE PERMITTED. SHEETING OR SHORING SHALL BE USED WHEN REQUIRED BY THE DEPTH OF THE TRENCH OR TYPE OF MATERIAL IN ACCORDANCE WITH VIRGINIA O.S.H.A. STANDARDS.

# PAVEMENT REPLACEMENT OPEN CUT ROADWAY

### SANITARY SEWER NOTES:

- 1. ALL CONSTRUCTION, INSTALLATION, AND TESTING OF WATER AND SANITARY SEWER SHALL COMPLY WITH THE CURRENT EDITION OF THE BOTETOURT COUNTY WATER AND SEWER STANDARDS.
- CONTRACTOR SHALL OBTAIN A COPY OF THE MOST RECENT EDITION OF THE BOTETOURT COUNTY WATER AND SEWER CONSTRUCTION STANDARDS & SPECIFICATIONS. CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE COUNTY CONCERNING THE CONTRACTOR'S POSSESSION OF AND FAMILIARITY WITH STANDARDS AND REQUIREMENTS THEREIN.
- CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION MEETING ONSITE TO BE ATTENDED BY NO LESS THAN THE FOLLOWING: BOTETOURT COUNTY REPRESENTATIVES, CONTRACTOR'S REPRESENTATIVE (INCLUDING SITE SUPERINTENDENT OF UTILITY INSTALLATION), DESIGN ENGINEER, ANY MATERIAL
- SUPPLIERS OR SUBCONTRACTORS THAT THE CONTRACTOR FEELS NECESSARY TO ATTEND. CONSTRUCTION AND START-UP OF ALL WORK SHALL NOT INTERFERE WITH THE OPERATION OF WATER AND SEWERAGE FACILITIES. THE CONTRACTOR SHALL COORDINATE AND SCHEDULE ALL WORK WITH THE OWNER AND LOCAL UTILITY DEPARTMENT AS REQUIRED.
- MINIMUM COVER ON ALL PIPE SHALL BE 3 FEET, UNLESS OTHERWISE SPECIFICALLY INDICATED ON THESE DRAWINGS. ALL PVC PIPE SHALL BE INSTALLED WITH COATED TRACER WIRE TO FACILITATE FUTURE LOCATION OF PIPE AFTER CONSTRUCTION IS COMPLETED.
- WHERE IT IS NECESSARY TO DEFLECT PIPE EITHER HORIZONTALLY OR VERTICALLY, PIPE JOINT DEFLECTION OR BARREL BEND RADIUS SHALL NOT EXCEED 75% OF THE MANUFACTURER'S RECOMMENDED DEFLECTION ANGLE OR BEND RADIUS.
- NO PLANTINGS SHALL BE ALLOWED WITHIN THE SANITARY SEWER EASEMENT. NO PLANTINGS SHALL BE ALLOWED WITHIN 10' OF SANITARY SEWER SERVICE CLEANOUTS. ALL PIPING SHALL BE SDR-35 PVC UNLESS OTHERWISE NOTED. ANY DUCTILE IRON PIPE SPECIFIED

#### SANITARY SEWER TESTING

SHALL BE TYTON JOINT, SEWER COAT, CLASS 52.

A. Air Testing:

1. The Contractor shall plug the pipe and shall conduct a low pressure air test to determine the acceptability of the completed work. The Contractor shall furnish all men, materials, and supplies necessary to assist in the conducting of the tests. The pressure tests shall conform to UNI-B-6-90 and ASTM F-1417.

a. Plug Test: Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe testes. Plugs shall resist internal test pressures without requiring external bracing or blocking. Plugs shall be tested prior to installation in a pipe run. A joint of pipe shall be sealed at both ends with the plugs to be used in the sewer test. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 9 psig. The plugs shall withstand this pressure without bracing or movement. No personnel shall be allowed in the alignment of the pipe during plug testing.

b. Line Pressurization: The line segment to be tested shall be plugged and pressurized to 4.0 psi greater than the groundwater backpressure but not to exceed 9 psi. The line pressure shall be allowed to stabilize for at least 2 minutes. Upon stabilization, the air supply hose shall be disconnected from the control panel. The continuous monitoring pressure gauge shall then be observed while the pressure decreases to not less than 3.5 psi greater than the average back pressure of any groundwater over pipe. c. Pressure Loss Timing: At a reading of 3.5 psi greater than the average back pressure of any groundwater over the pipe, the timing shall commence with a stopwatch that is at least 99.8 percent accurate. The time (to the nearest second) shall be noted for

the pressure to drop 1.0 psig. d. Test Time Criteria: All test times shall be calculated using Ramseier's equation T=0.085\*D\*K/Q; where: T=Shortest test time allowed for air pressure to drop 1.0 psig, in seconds; K=0.000419\*D\*L, but not less than 1.0; Q=0.0015 cubic feet/minute/square feet of internal surface; D=nominal pipe diameter, in inches; L=length of pipe being tested, in feet. Accordingly, minimum test times shall be:

3.8 minutes for 4 inch (L<597 ft.) 5.7 minutes for 6 inch (L<398 ft.) 7.6 minutes for 8 inch (L<298 ft.)

11.3 minutes for 12 inch (L<199 ft.

e. Acceptability: If the elapsed time to drop 1.0 psig is less than the test time criteria established above, then the air loss shall be considered excessive and the section of pipe has failed the test. Contractor shall, at his own expense, locate the source of the leakage, repair or replace all defective materials and/or workmanship, and re-test until satisfactory results are obtained.

B. Deflection Testing for PVC Pipe: All PVC gravity sewer lines shall be subject to vertical deflection testing using a GO-NO-GO mandrel no sooner than two weeks following completion of backfill and compaction of the trench. Maximum permissible deflection shall be 5% of the pipe's internal diameter. A nine arm Mandrel with a proving ring sized at 5 % less than the ASTM dimension for the pipe and a length equal to the nominal diameter of the pipe being tested. The mandrel shall be pulled through the sewer line manually. Any sewer not passing the mandrel test shall be corrected until the test is passed.

D. Manhole Vacuum Testing: Installation of vacuum equipment and indicating devices shall be in accordance with equipment specifications and performance information as provided by the manufacturer and acceptable to the engineer.

1. A measured vacuum of 10 inches of mercury shall be established in the manhole. The time for the vacuum drop to nine inches of mercury shall be recorded.

The minimum allowable elapsed time for a four-foot diameter manhole shall be in accordance with the following:

Manhole Depth Min. Elapsed Time for a Pressure Change of 1" Mercury 10ft. or less 60 seconds

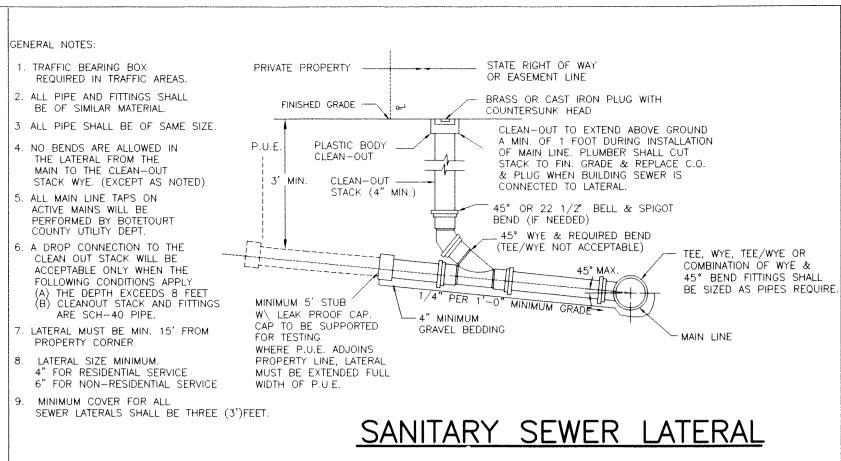
>10ft. but <15ft. 75 seconds

>15ft. but <25 90 seconds

For manholes five feet in diameter, add an additional 15 seconds. For manholes 6 feet in diameter, add an additional 30 seconds to the time requirements for four foot diameter manholes.

3. If the manhole fails the test, necessary repairs shall be made and the vacuum test and repairs shall be repeated until the manhole passes the test.

4. If a manhole joint mastic or gasket is pulled out during the vacuum test, then the manhole shall be disassembled and the mastic



PROPERTY LINE STATE RIGHT OF WAY OR EDGE OF PUBLIC-SEWER EASEMENT 15' MIN. PUE ---CLEAN-OUT STACK (4" MINIMUM) TEE, WYE, TEE/WYE OR COMBINATION OF WYE & W\ LEAK PROOF CAP.

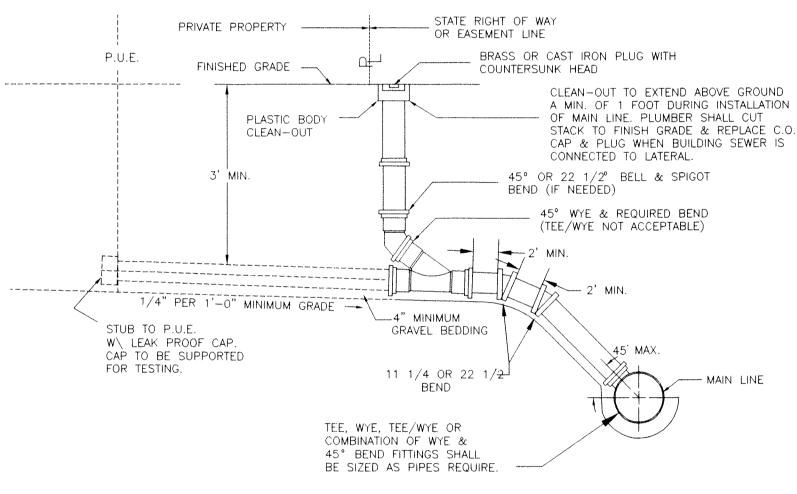
45 BEND FITTINGS SHALL

BE SIZED AS PIPES REQUIRE.

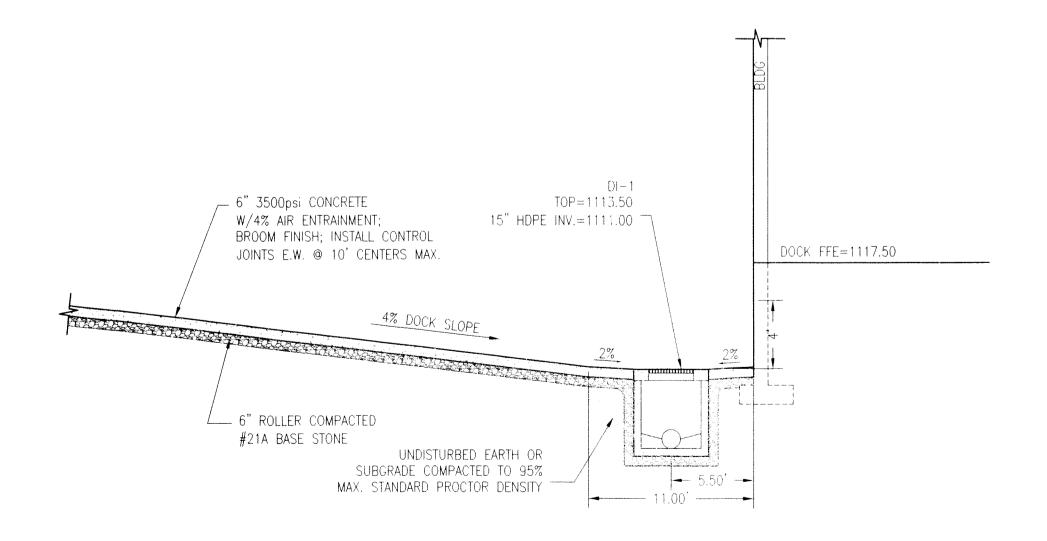
MAIN LINE

SANITARY SEWER LATERAL

- PRIVATE PROPERTY



SANITARY SEWER LATERAL IN P.U.E.



LOADING DOCK DETAIL

DITION SE PHA OF **EXTENSION** 

 $\propto$ 

Lic. No. 032949

Revisions By Date

CAP TO BE SUPPORTED

FOR TESTING.

**AS SHOWN** 

|Checked By: Comm. No.: 05098

**Sheet No** 

