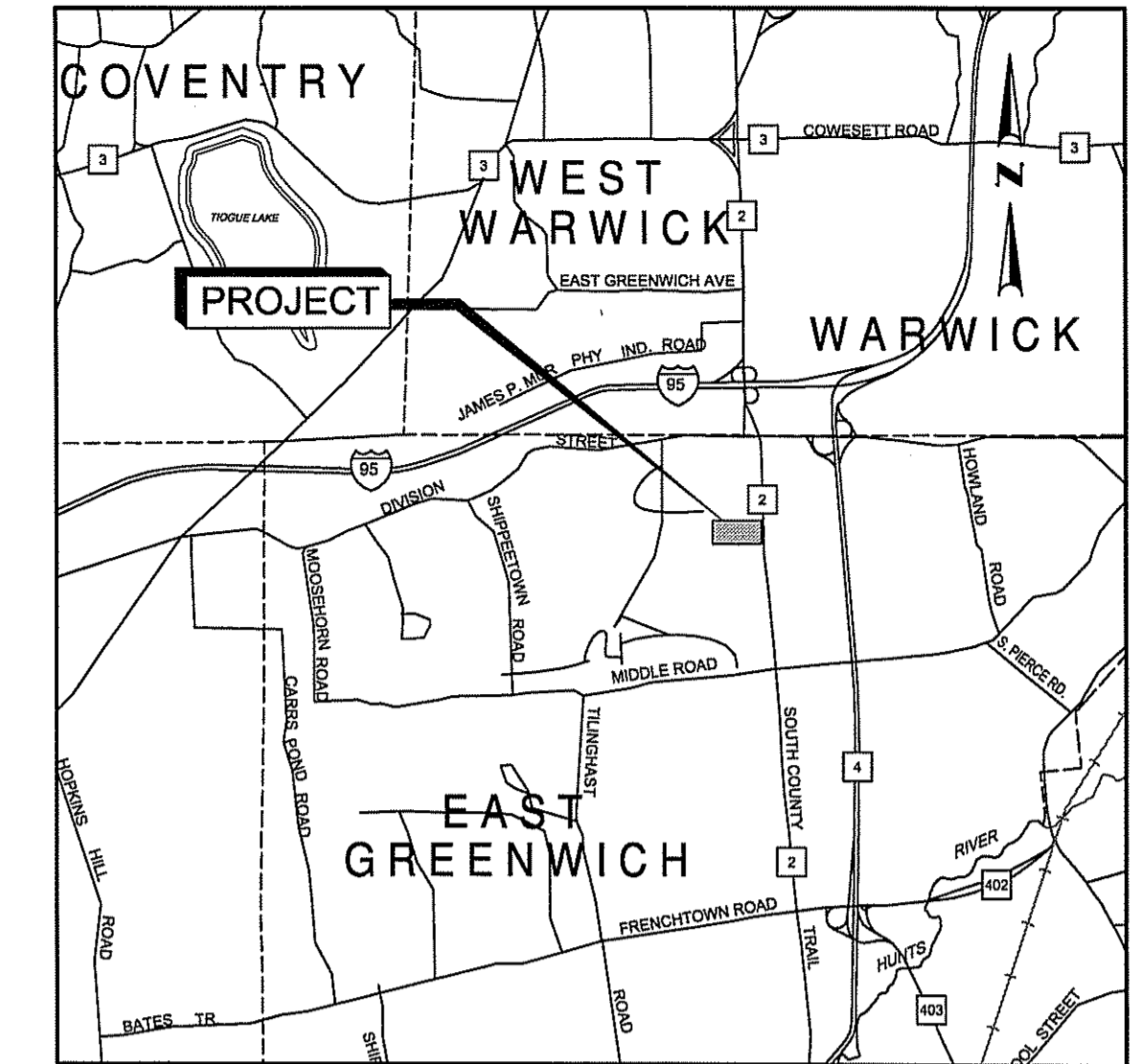


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**LOCATION PLAN**  
SCALE 1"=5000'

# UTILITY IMPROVEMENTS

## 1485 SOUTH COUNTY TRAIL PLAT 12A LOT 18 EAST GREENWICH, RHODE ISLAND

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
FRESHWATER WETLANDS PROGRAM  
APPROVED WITH CONDITIONS  
AS SPECIFIED IN THE LETTER OF APPROVAL  
DATED NOV 9 2017 FILE # 17-0233  
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. Herbert*

SEP 15 2017

TODD A. RAVENELLE  
No. 5928  
REGISTERED  
PROFESSIONAL ENGINEER

 **Gordon R. Archibald, Inc.**  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

**R.I.D.E.M. SUBMISSION  
SEPTEMBER 12, 2017**

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**GENERAL NOTES**

- REFERENCE IS MADE TO THE RIDOT 2010 EDITION "STANDARD AND SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" INCLUDING ALL REVISIONS, ADDENDA AND SUPPLEMENTAL SPECIFICATIONS; AND RIDOT 1998 "STANDARD DETAILS" INCLUDING ALL REVISIONS. ALL PROJECT SITE IMPROVEMENTS SHALL CONFORM TO THESE REGULATIONS AND THE SUB-REFERENCES INCORPORATED THEREIN.
- EXISTING UTILITIES HAVE BEEN PLOTTED FROM BEST AVAILABLE DATA AND ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING DRAINAGE AND UTILITIES BOTH UNDERGROUND AND OVERHEAD BEFORE EXCAVATION BEGINS IN ACCORDANCE WITH THE "DIG SAFE LAW" ENACTED BY R.I. LEGISLATURE BILL NO. 79S-291, WHICH BECAME EFFECTIVE JULY 1, 1979 AND BY CONTACTING THE INDIVIDUAL UTILITY COMPANIES. EXCAVATION SHALL BE IN ACCORDANCE WITH ALL STATUTES, ORDINANCES, RULES AND REGULATIONS OF ANY APPLICABLE CITY, TOWN, STATE OR FEDERAL AGENCY. THE CONTRACTOR SHOULD UNDERSTAND THAT NOT ALL UTILITIES SUBSCRIBE TO THE DIG SAFE PROGRAM. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY ALL UTILITY COMPANIES AND ENSURE THAT ALL UTILITIES HAVE BEEN MARKED PRIOR TO COMMENCING THEIR WORK. ANY DAMAGE TO EXISTING UTILITIES MARKED IN THE FIELD, OR AS A RESULT OF FAILING TO CONTACT THE APPROPRIATE UTILITY COMPANY, SHALL BE REPAIRED OR REPLACED AT NO COST TO THE OWNER.
- CONTRACTOR SHALL RECOGNIZE THAT WORK UNDER EXISTING OVERHEAD UTILITIES IS REQUIRED AND THAT MINIMUM CLEARANCE SHALL CONFORM TO UTILITY COMPANY REQUIREMENTS AND SHALL BE MAINTAINED AT ALL TIMES. THIS MAY REQUIRE SPECIAL CONSTRUCTION TECHNIQUES. SHOULD THE CONTRACTOR ELECT TO RELOCATE THE EXISTING OVERHEAD UTILITIES, THEN THE CONTRACTOR SHALL COORDINATE AND BEAR ALL ASSOCIATED COSTS.
- THE CONTRACTOR SHALL MAINTAIN ALL EXCAVATION IN A DRY CONDITION. NO SEPARATE PAYMENT OR ALLOWANCE SHALL BE MADE FOR DEWATERING.
- FILL NEEDED FOR THE EMBANKMENTS SHALL MEET SECTION M.01.01 COMMON BORROW OF THE RIDOT STANDARDS AND SPECIFICATIONS, 2004 EDITION UNLESS OTHERWISE NOTED.
- ALL GRASSED AREAS DISTURBED BY THE CONTRACTOR SHALL BE LOAMED AND SEEDED OR SODDED IF SO DIRECTED BY THE ENGINEER AND RETURNED TO THEIR ORIGINAL CONDITION. ALL OTHER VEGETATED OR WOODED AREAS DISTURBED SHALL BE LOAMED AND SEEDED.
- ALL EXISTING CURBING, SIDEWALK, AND OTHER PAVEMENT DISTURBED BY THE CONTRACTOR SHALL BE REPLACED AND RESTORED, IN KIND AT NO ADDITIONAL COST TO THE OWNER.
- ALL EXISTING PIPE, SUBSURFACE STRUCTURES, PAVEMENTS, EXCESS EXCAVATED MATERIALS AND MISCELLANEOUS MATERIALS REMOVED DURING THE COURSE OF WORK OF INSTALLING DRAINAGE, WATER, SEWER, STEAM, UNDERGROUND ELECTRIC AND COMMUNICATION LINES SHALL BE LEGALLY DISPOSED OF OFF THE PROJECT SITE BY THE CONTRACTOR OR AS DIRECTED BY THE OWNER.
- CONTINUOUS DUST CONTROL, USING CALCIUM CHLORIDE OR OTHER APPROVED METHODS, SHALL BE PROVIDED BY THE CONTRACTOR FOR ALL EARTH STOCKPILES, EARTH PILED ALONG EXCAVATIONS AND SURFACES OF BACK FILLED TRENCHES, AS DIRECTED AND SPECIFIED BY THE ENGINEER.
- THE CONTRACTOR SHALL GIVE NOTICES AND COMPLY WITH ALL PERMITS, LAWS, ORDINANCES, RULES AND REGULATIONS BEARING ON THE CONDUCT OF THE WORK AS DRAWN AND SPECIFIED.
- SOIL EROSION CONTROL MEASURES TO BE USED ON THE PROJECT ARE INDICATED ON THE PLANS. EROSION CONTROL MEASURES SHALL BE IN CONFORMANCE WITH THE PROVISIONS OF THE RHODE ISLAND SOIL EROSION & SEDIMENT CONTROL HANDBOOK AND THE EROSION AND SEDIMENT CONTROL PLAN IN THE SPECIFICATIONS.
- PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES, A CONTINUOUS UNINTERRUPTED LINE OF STAKED COMPOST FILTER SOCK OR SILT FENCING SHALL BE INSTALLED IN LOCATIONS SHOWN ON THE PLANS AND MAINTAINED IN EFFECTIVE CONDITION UNTIL DISTURBED AREAS HAVE BEEN STABILIZED WITH VEGETATION. FOLLOWING SUCCESSFUL STABILIZATION OF DISTURBED AREAS, ALL SILT FENCING AND COMPOST FILTER SOCK SHALL BE REMOVED. PRIOR TO REMOVAL OF THE SILT FENCING AND COMPOST FILTER SOCK, ALL ACCUMULATED TRAPPED SEDIMENT MUST BE REMOVED TO A SUITABLE UPLAND SITE.
- UNTIL VEGETATIVE COVER IS ESTABLISHED AND DISTURBED AREAS ARE STABILIZED, ACCUMULATED SEDIMENTS SHALL BE REMOVED AS SOON AS SEDIMENTS HAVE ACCUMULATED TO A DEPTH OF SIX (6) INCHES.
- THE LIMITS OF ALL CLEARING, GRADING AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE THE LIMITS OF DISTURBANCE SHALL BE TOTALLY UNDISTURBED.
- SOIL STOCKPILES AND DEPOSITION AREA FOR CONSTRUCTION MATERIALS SHALL BE LOCATED WITHIN THE LIMIT OF WORK AND SHALL BE SURROUNDED BY STAKED COMPOST FILTER SOCK.
- PLANTING OF GRASS SHALL BE ACCOMPLISHED BY THE CONTRACTOR AS EARLY AS POSSIBLE UPON COMPLETION OF GRADING AND CONSTRUCTION.
- THE CONTRACTOR'S WORK SHALL INCLUDE THE CLEARING AND GRUBBING OF THE WORK SITE WITHIN THE LIMITS OF DISTURBANCE DEFINED ON THE PLANS. THE WORK INCLUDES CUTTING AND REMOVING FROM THE GROUND, AND DISPOSING TREES, STUMPS, BRUSH, SHRUBS, HEDGES, ROOTS AND OTHER VEGETATION WHICH OCCUR WITHIN THE LIMIT OF DISTURBANCE.
- THERE ARE NO KNOWN EASEMENTS, PLAT RESTRICTIONS OR COVENANTS LOCATED ON THE SITE.
- THERE ARE NO KNOWN UNUSUAL NATURAL FEATURES, HISTORIC AREAS, CEMETERIES, ETC. LOCATED ON THE SITE.
- EXISTING CESSPOOLS SHALL BE FILLED IN ACCORDANCE WITH RIDEM REGULATIONS. CESSPOOLS SHALL BE EMPTIED OF WASTE AND EITHER REMOVED, FILLED WITH CLEAR SAND OR CRUSHED STONE AND THE AREA BACKFILLED WITH CLEAN SOIL.

**EROSION AND SEDIMENT CONTROL NOTES**

- DENUDED SLOPES SHALL NOT BE UNATTENDED OR EXPOSED IN AREAS WHERE WORK IS TO CEASE FOR 14 DAYS AND NOT SET TO RESUME WITHIN 21 DAYS OR THE INACTIVE WINTER SEASON.
- ALL DISTURBED SLOPES EITHER NEWLY CREATED OR EXPOSED PRIOR TO OCTOBER 15, SHALL BE SEEDED OR PROTECTED BY THAT DATE FOR ANY WORK COMPLETED DURING EACH CONSTRUCTION YEAR.
- THE SEEDED MIX SHALL BE INOCULATED WITHIN 24 HOURS, BEFORE MIXING AND PLANTING, WITH APPROPRIATE INOCULUM FOR EACH VARIETY.
- THE DESIGN MIX SHALL BE COMPRISED OF THE FOLLOWING:
 

MIXTURE	BY WT.	SEEDING DATE
RED FESCUE	70	APRIL 1 - JUNE 13
KENTUCKY BLUEGRASS	15	AUG. 15 - OCT. 15
COLONIAL BENTGRASS	5	
PERENNIAL RYEGRASS	10	
TOTAL	100 LBS./ACRE	
- TEMPORARY TREATMENTS SHALL CONSIST OF A HAY, STRAW, OR FIBER MULCH OR PROTECTIVE COVERS SUCH AS A MAT OR FIBER LINING (BURLAP, JUTE, FIBERGLASS NETTING, EXCELSIOR BLANKETS) THEY SHALL BE INCORPORATED INTO THE WORK AS WARRANTED OR AS ORDERED BY THE ENGINEER.
- HAY OR STRAW APPLICATIONS SHOULD BE IN THE AMOUNT OF 3,000-4,000 LBS./ACRE.
- ALL COMPOST FILTER SOCK, SILT FENCES OR TEMPORARY PROTECTION SHALL REMAIN IN PLACE UNTIL AN ACCEPTABLE STAND OF GRASS OR APPROVED GROUND COVER IS ESTABLISHED AND THE PROJECT RECEIVES A FAVORABLE APPROVAL FOR FINAL ACCEPTANCE FROM THE ENGINEER. IF NEEDED TEMPORARY SEEDING CAN HELP TO MINIMIZE EROSION. THE FOLLOWING SPECIES ARE RECOMMENDED:
 

SPECIES	LBS./AC.	LBS./1,000 SQ. FT.	SEEDING DATE
ANNUAL RYEGRASS	40-60	1.0-1.5	3/1-6/1
PERENNIAL RYEGRASS	40-60	1.0-1.5	3/1-6/1
SUDAN GRASS	30-40	0.7-1.0	5/15-8/15
MILLET	30-40	0.7-1.0	5/15-8/15
WINTER RYE	120	3.0	4/15-6/15
OATS	86-120	0.5-5.0	3/1-6/15
WEeping	5-20	0.5-5.0	5/1-7/1
- THE CONTRACTOR MUST REPAIR AND OR RESEED ANY AREAS THAT DO NOT DEVELOP WITHIN THE PERIOD OF ONE YEAR AND HE SHALL DO SO AT NO ADDITIONAL EXPENSE.
- THE NORMAL ACCEPTABLE SEASONAL SEEDING DATES ARE APRIL 1ST - JUNE 1ST AND AUGUST 15TH TO OCTOBER 15TH.
- STABILIZATION OF ONE FORM OR ANOTHER AS DESCRIBED ABOVE SHALL BE ACHIEVED WITHIN 15 DAYS OF FINAL GRADING.
- DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING DRAINAGE AND RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL.
- EROSION CONTROL DEVICES SHOULD INSPECTED WEEKLY AND AFTER RAINFALL EVENTS OF > 1/2" IN A 24-HOUR PERIOD. MAINTENANCE AND REPAIRS SHALL BE COMPLETED WITH 24 HOURS OF THE INSPECTION WHEN NECESSARY.
- IMMEDIATELY UPON COMPLETION OF THE CLEARING AND GRUBBING OPERATION AND PRIOR TO ANY ROUGH GRADING, TEMPORARY COMPOST FILTER SOCK OR SILT FENCES SHALL BE PLACED AS INDICATED ON THE PLANS.
- ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES SHALL BE PERIODICALLY MAINTAINED AS PER THE RESPECTIVE PROGRAMS DURING THE CONSTRUCTION.
- ALL INLETS (CATCH BASINS) TO BE INSTALLED AS PART OF THE PROPOSED DRAINAGE SYSTEMS SHALL BE PROVIDED WITH FABRIC FILTER BAG PROTECTION DEVICES (SILT SACK MANUFACTURED BY ACF ENVIRONMENTAL OR APPROVED EQUAL). DEVICES SHALL BE INSTALLED, MAINTAINED, AND CLEANED IN ACCORDANCE WITH RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK (REVISED AUGUST 2014) FOR THE DURATION OF CONSTRUCTION AND UNTIL ALL STORMWATER CONTROLS ARE FULLY STABILIZED AND ONLINE.

**STORMWATER MAINTENANCE NOTES**

- ALL MAINTENANCE (INCLUDING CLEANING) REQUIRED DURING THE CONSTRUCTION PHASE OF THE PROJECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL INCLUDE:
  - MEASURES NEEDED TO ENSURE THE PROPER OPERATION OF THE STORMWATER MANAGEMENT PRACTICES, SYSTEMS TO INCLUDE INSPECTION, CLEANING AND REPAIRS TO THE BIORETENTION SYSTEMS INCLUDING ALL PIPES, SWALES, INTAKE AND DISCHARGE STRUCTURES, CATCH BASIN SUMPS, AND MANHOLES.
  - INSPECTION OF ALL SLOPES, BERMS, AND OTHER CONTROL STRUCTURES FOR STRUCTURAL INTEGRITY/STABILITY AND EVIDENCE OF SOIL EROSION PROCESSES, AND MAINTENANCE OF THESE ELEMENTS AS REQUIRED. INSPECTIONS SHALL BE PERFORMED FOLLOWING ALL RAIN EVENTS OF 1/2 INCH RAINFALL OR MORE IN A 24-HOUR PERIOD, OR BI-MONTHLY IF NO RAINFALL EVENT OCCURS.
- UPON COMPLETION OF PROJECT CONSTRUCTION, AND PRIOR TO VACATING THE SITE, THE CONTRACTOR SHALL CONDUCT A FINAL INSPECTION AND CLEANING OF THE DRAINAGE SYSTEM AND ALL ASSOCIATED STRUCTURES.
- AFTER THE COMPLETION OF THE ENTIRE PROJECT TO THE SATISFACTION OF THE ENGINEER, ALL MAINTENANCE OF THE DRAINAGE SYSTEM SHALL THEN BE THE RESPONSIBILITY OF THE UNIVERSITY OF RHODE ISLAND OR THEIR APPOINTED AGENTS.
- IN ACCORDANCE WITH THE LONG-TERM OPERATION AND MAINTENANCE PLAN (O&M PLAN) FOR THE PROJECT, THE DRAINAGE SYSTEM AND ALL BEST MANAGEMENT PRACTICES SHALL BE INSPECTED, CLEANED AND MAINTAINED (ROUTINE MAINTENANCE) A MINIMUM OF TWO (2) TIMES IN A GIVEN CALENDAR YEAR TO ENSURE THAT ALL SYSTEM ELEMENTS ARE FUNCTIONING PROPERLY.
- CLEANING AND ROUTINE MAINTENANCE OF CATCH BASINS, MANHOLES, AND OTHER SYSTEM ELEMENTS SHALL INCLUDE THE REMOVAL OF ALL ACCUMULATED SEDIMENTS AND DEBRIS (EITHER MANUALLY OR BY VACUUM TRUCK) AS WELL AS OTHER ACTIVITIES REQUIRED TO ENSURE THE CONTINUED OPERATIONAL PERFORMANCE. ANY BARE SPOTS OR ERODED AREAS WITHIN SWALES, AT INLETS/OUTLETS, OR OTHER LOCATIONS WITHIN THE SYSTEMS MUST BE REPLANTED AND/OR STABILIZED IMMEDIATELY FOLLOWING OBSERVATIONS TO PREVENT SUBSEQUENT EROSION OR CLOGGING. SHOULD THE INSPECTION OF THE SYSTEMS REVEAL ANY EVIDENCE OF SEDIMENT ACCUMULATION WITHIN ANY OF THE BIORETENTION SWALES, SEDIMENTS SHALL BE REMOVED AND THE SURFACE LAYER RESTORED TO ITS ORIGINAL DEPTH AND CONDITION.
- BY THEIR NATURE, BIORETENTION SWALES HAVE AN OPERATIONAL LIFE CYCLE THAT WILL REQUIRE THE TILLING AND RESEEDING OF THE TOP LAYER (1/2") OF THE SWALE TO RESTORE DESIGN PERCOLATION RATES THROUGH THE SURFACE LAYER (WHICH MAY BECOME REDUCED OVER TIME DUE TO CLOGGING, BLINDING, AND/OR OTHER FACTORS). THIS TILLING SHOULD BE PERFORMED APPROXIMATELY ONCE EVERY 5-10 YEARS, WHEN INFILTRATION CAPACITY IS DIMINISHED TO THE POINT WHERE STANDING WATER REMAINS IN THE SWALE MORE THAN 72 HOURS FOLLOWING A RAINFALL EVENT. THE TILLING/RESEEDING OPERATION SHALL BE CONDUCTED DURING THE SPRING OR FALL GROWING PERIOD, WITH TILLING ACCOMPLISHED USING A ROTARY TILLER OR DISC HARROW AND THE SWALE BOTTOM RESEEDED IMMEDIATELY FOLLOWING TILLING TO PREVENT EROSION.
- ALL SEDIMENT, DEBRIS, AND OTHER MATERIALS REMOVED IN THE MAINTENANCE OF THE STORMWATER SYSTEMS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- ALL LANDSCAPED AND GRASSED AREAS SURROUNDING SHALL BE MOWED AT LEAST ONCE PER GROWING SEASON, WITH GRASSED AREAS FLANKING THE BIORETENTION AREAS CUT TO A HEIGHT NO SHORTER THAN FOUR (4) INCHES. GRASS PLANTINGS WITHIN THE BIORETENTION AREAS PROPER SHALL BE CUT AT LEAST ANNUALLY, SUCH THAT THE HEIGHT OF GRASS DOES NOT EXCEED TEN (10) INCHES ABOVE THE BIORETENTION SOIL MEDIA SURFACE. MOWING AND CUTTING WITHIN ALL BIORETENTION AREAS SHALL BE PERFORMED IN A MANNER THAT DOES NOT COMPACT THE UNDERLYING MEDIA (I.E., HAND-OPERATED, SMALL SCALE EQUIPMENT).
- THE OWNER SHALL BE RESPONSIBLE FOR ALL REPAIRS, REPLACEMENTS, AND OTHER WORK NECESSARY TO MAINTAIN THE PROPER FUNCTIONING OF THE SUBJECT BIORETENTION/FILTERING SYSTEMS. ANY REQUIRED REPAIR AND/OR REPLACEMENT OF DRAINAGE STRUCTURES OR FACILITIES SHALL BE PERFORMED PROMPTLY TO ENSURE PROPER FUNCTIONING OF THE SYSTEM(S). IN THE EVENT OF A SIGNIFICANT DECREASE IN PERFORMANCE OF A SYSTEM (E.G., STANDING WATER / PROLONGED DRAWDOWN TIMES), THE PERTINENT SYSTEMS ELEMENTS SHALL BE REPAIRED OR REPLACED SO AS TO RE-ESTABLISH ORIGINAL DESIGN FUNCTIONALITY.
- ANY INCIDENT OF INADVERTENT OR DELIBERATE DISCHARGE OF WASTE OIL OR OTHER CONTAMINANT(S) TO THE SYSTEMS SHALL BE IMMEDIATELY REPORTED TO THE RIDEM OFFICE OF WATER RESOURCES AT 401-222-6820. THE RIDEM AFTER-HOURS EMERGENCY TELEPHONE NUMBER IS (401) 222-3070.
- OPERATION AND MAINTENANCE OF THE DRAINAGE SYSTEMS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE TERMS AND CONDITIONS SET FORTH IN THE RIDEM APPROVALS ISSUED FOR THE PROJECT. WRITTEN NOTIFICATION OF ANY CHANGES TO (A) THE PHYSICAL INFRASTRUCTURE OF THE SYSTEMS OR (B) O&M PLAN PROCEDURES SHALL BE PROVIDED TO THE RIDEM OFFICE OF WATER RESOURCES.

**BIORETENTION NOTES:**

- THE USDA TEXTURAL CLASSIFICATION OF THE PLANTING SOIL FOR THE BSM SHALL BE LOAMY SAND OR SANDY LOAM. THE PLANTING SOIL SHALL BE SALVAGED OR FURNISHED. ADDITIONALLY, THE PLANTING SOIL SHALL BE TESTED AND MEET THE FOLLOWING CRITERIA:
 

ITEM	PERCENT BY WEIGHT	TEST METHOD
SAND (2.0 - 0.050 MM)	85 - 88%	AASHTO T88
SILT (0.050 - 0.002 MM)	0 - 12%	AASHTO T88
CLAY (LESS THAN 0.002 MM)	0 - 2%	AASHTO T88
ORGANIC MATTER	3 - 5%	AASHTO T194

THE TEXTURAL ANALYSIS FOR THE PLANTING SOIL SHALL BE AS FOLLOWS:

ASTM E11 SIEVE SIZE	MINIMUM % PASSING BY WEIGHT
2 IN.	100
NO. 4	90
NO. 10	80
- AT LEAST 45 DAYS PRIOR TO THE START OF CONSTRUCTION OF BIORETENTION FACILITIES, THE CONTRACTOR SHALL SUBMIT THE SOURCE OF THE PLANTING SOIL FOR THE BSM TO THE ENGINEER FOR APPROVAL. NO TIME EXTENSIONS WILL BE GRANTED SHOULD THE PROPOSED PLANTING SOIL FAIL TO MEET THE MINIMUM REQUIREMENTS STATED ABOVE. ONCE A STOCKPILE OF THE PLANTING SOIL HAS BEEN SAMPLED, NO MATERIAL SHALL BE ADDED TO THE STOCKPILE.
- THE BIORETENTION SOIL MIXTURE (BSM) SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES EXCLUDING MULCH. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE BIORETENTION AREA THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS.
- THE BIORETENTION SOIL MIXTURE SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:
 

ITEM	CRITERIA
CORRECTED PH	5.5 - 7.5
MAGNESIUM MINIMUM	32 PPM
PHOSPHORUS (PHOSPHATE - P2O5)	NOT TO EXCEED 69 PPM
POTASSIUM (K2O)	MINIMUM 78 PPM
SOLUBLE SALTS	NOT TO EXCEED 500 PPM
- SHOULD THE PH FALL OUTSIDE OF THE ACCEPTABLE RANGE, IT MAY BE MODIFIED WITH LIME (TO RAISE) OR IRON SULFATE PLUS SULFUR (TO LOWER). THE LIME OR IRON SULFATE MUST BE MIXED UNIFORMLY INTO THE BSM PRIOR TO USE IN BIORETENTION FACILITIES. SHOULD THE BSM NOT MEET THE MINIMUM REQUIREMENT FOR MAGNESIUM, IT MAY BE MODIFIED WITH MAGNESIUM SULFATE. LIKEWISE, SHOULD THE BSM NOT MEET THE MINIMUM REQUIREMENT FOR POTASSIUM, IT MAY BE MODIFIED WITH POTASH. MAGNESIUM SULFATE AND POTASH MUST BE MIXED UNIFORMLY INTO THE BSM PRIOR TO USE IN BIORETENTION FACILITIES.
- PLANTING SOIL AND/OR BSM THAT FAILS TO MEET THE MINIMUM REQUIREMENTS SHALL BE REPLACED AT NO ADDITIONAL COST. MIXING OF THE CORRECTIVE ADDITIVES TO THE BSM IS INCIDENTAL AND SHALL BE AT NO ADDITIONAL COST.
- MIXING OF THE BSM TO A HOMOGENEOUS CONSISTENCY SHALL BE DONE TO THE SATISFACTION OF THE ENGINEER.

**DRAINAGE LEGEND**

- (A) R.I. STD. 4.2.0 - 4'-0" ROUND MANHOLE WITH R.I. STD. 4.6.0 CONCRETE COVER FOR SHALLOW 4'-0" ROUND MANHOLE AND R.I. STD. 6.2.1 FRAME AND COVER AS REQUIRED.
- (B) R.I. STD. 4.4.0 (MOD) - 4'-0", 5'-0" OR 6'-0" DIAMETER CATCH BASIN WITH 4'-0" DEEP SUMP WITH OIL/WATER SEPARATOR WITH R.I. STD. 4.6.0 CONCRETE COVER FOR SHALLOW 4'-0" ROUND MANHOLE AND R.I. STD. 6.3.2 SQUARE FRAME AND GRATE (BICYCLE SAFE) AS REQUIRED.

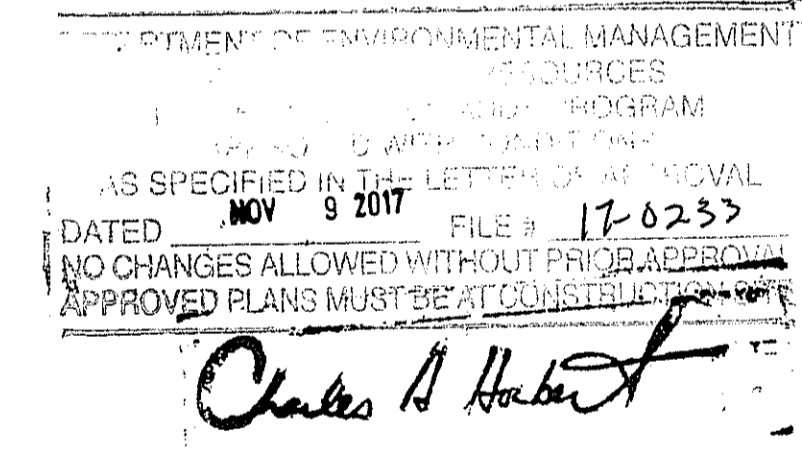
**SYMBOL LEGEND**

- ELEV. --- EXISTING CONTOUR LINE
- ELEV. --- EXISTING SPOT GRADE
- 6" S --- PROPOSED SEWER
- 8"W --- PROPOSED WATER
- 12" RCP --- PROPOSED DRAINAGE
- 000 --- PROPOSED CONTOUR
- 00.00 --- PROPOSED SPOT GRADE
- --- PROPOSED CURB
- --- PROPOSED BERM
- --- SAW CUT & MATCH PAVEMENT
- --- COMPOST FILTER SOCK
- --- BIO RETENTION BASIN

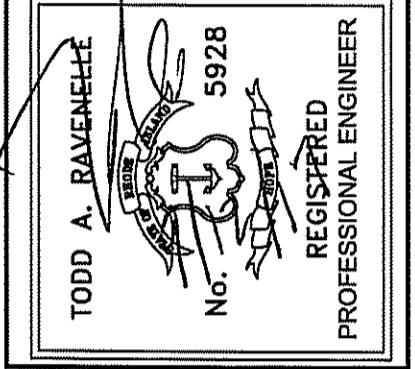
- (1.3.0) CONCRETE CONNECTING COLLAR
- (2.3.0) CONCRETE FLARED END SECTION
- (4.2.0) PRECAST 4'-0" ROUND MANHOLE
- (4.4.0) (MOD) PRECAST 4'-0", 5'-0" OR 6'-0" ROUND CATCH BASIN
- (4.6.0) CONCRETE COVER FOR SHALLOW 4'-0" ROUND MANHOLE
- (5.3.0) CATCH BASIN AND MANHOLE STEP
- (6.2.1) HEAVY-DUTY ROUND FRAME AND COVER
- (6.3.2) SQUARE FRAME AND GRATE (BICYCLE SAFE)
- (7.1.0) PRECAST CONCRETE CURB
- (7.1.2) 6" PRECAST CONCRETE TRANSITION CURB
- (7.5.1) BITUMINOUS BERM
- (7.6.0) CURB SETTING DETAIL
- (8.3.0) RIP-RAP DITCH
- (9.9.0) CONSTRUCTION ACCESS
- (43.1.0) CONCRETE SIDEWALK

- (CBP) CATCH BASIN INLET PROTECTION
- (CFB) NEW CONCRETE FILLED BOLLARD
- (CFS) COMPOST FILTER SOCK
- (CG) CLEAR AND GRUB
- (LS) 4" LOAM AND SEED
- (LOD) LIMIT OF DISTURBANCE
- (LOR) LIMIT OF REGRADING
- (DCC) REMOVE AND DISPOSE CONCRETE CURB
- (DCB) REMOVE AND DISPOSE BIT. CURB
- (DFP) REMOVE AND DISPOSE FLEXIBLE PAVEMENT
- (DMH) REMOVE AND DISPOSE MANHOLE
- (NFH) NEW FIRE HYDRANT
- (NPS) NEW PAVEMENT STRUCTURE (SEE DETAIL)
- (RD) REMOVE AND DISPOSE (LIST ITEM)
- (RDP) REMOVE AND DISPOSE PIPE
- (RDPL) REMOVE AND DISPOSE TELEPHONE POLE
- (RPS) ROADWAY PAVEMENT STRUCTURE
- (RRP) RIP RAP PAD (SEE DETAIL)
- (RUB) RELOCATE UTILITY POLE
- (SB) STONE BAFFLE
- (TB) THRUST BLOCK
- (4W) 4" EPOXY RESIN PAVEMENT MARKINGS - WHITE

**LEGEND**



PROJECT  
**UTILITY IMPROVEMENTS**  
 1485 SOUTH COUNTY TRAIL  
 PLAT 12A, LOT 18  
 EAST GREENWICH, RHODE ISLAND



CLIENT  
**1485 HOLDINGS LLC**  
**Gordon R. Archibald, Inc.**  
 Civil and Environmental Engineers  
 Pawtucket, Rhode Island

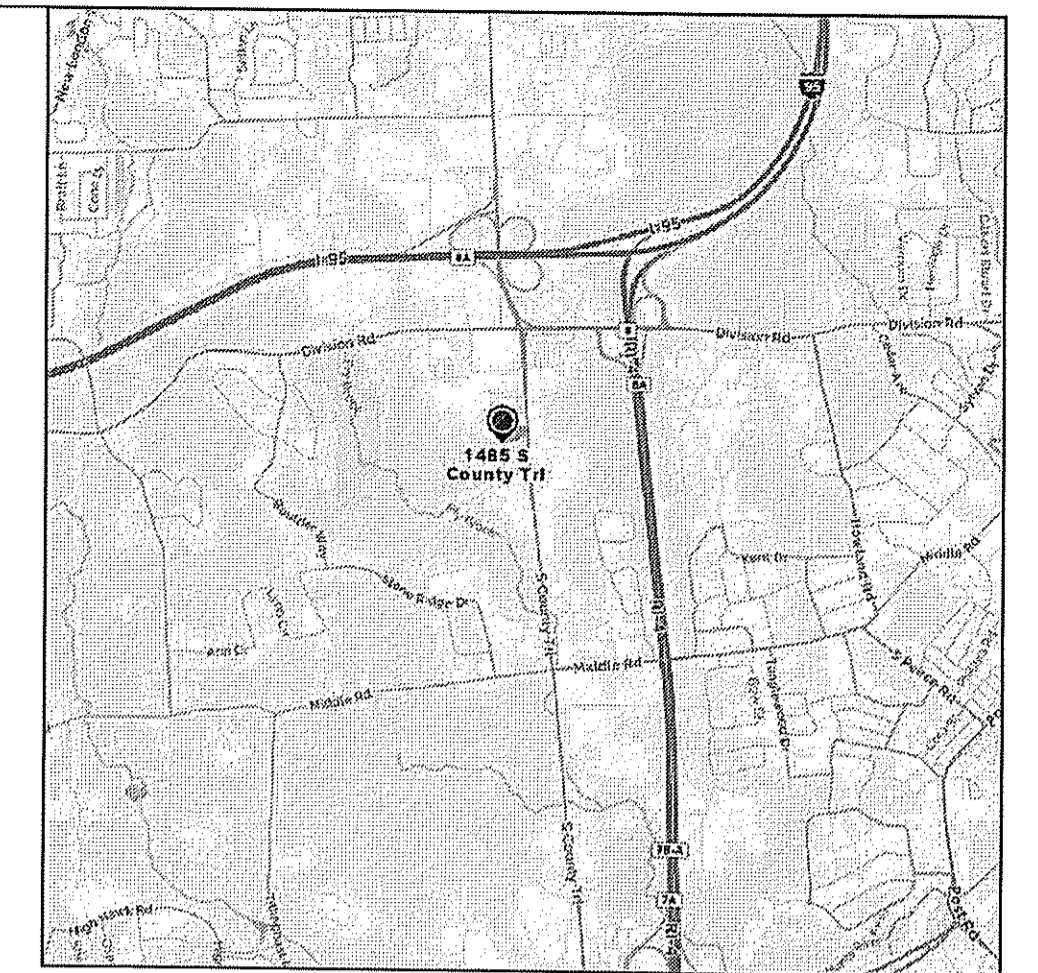
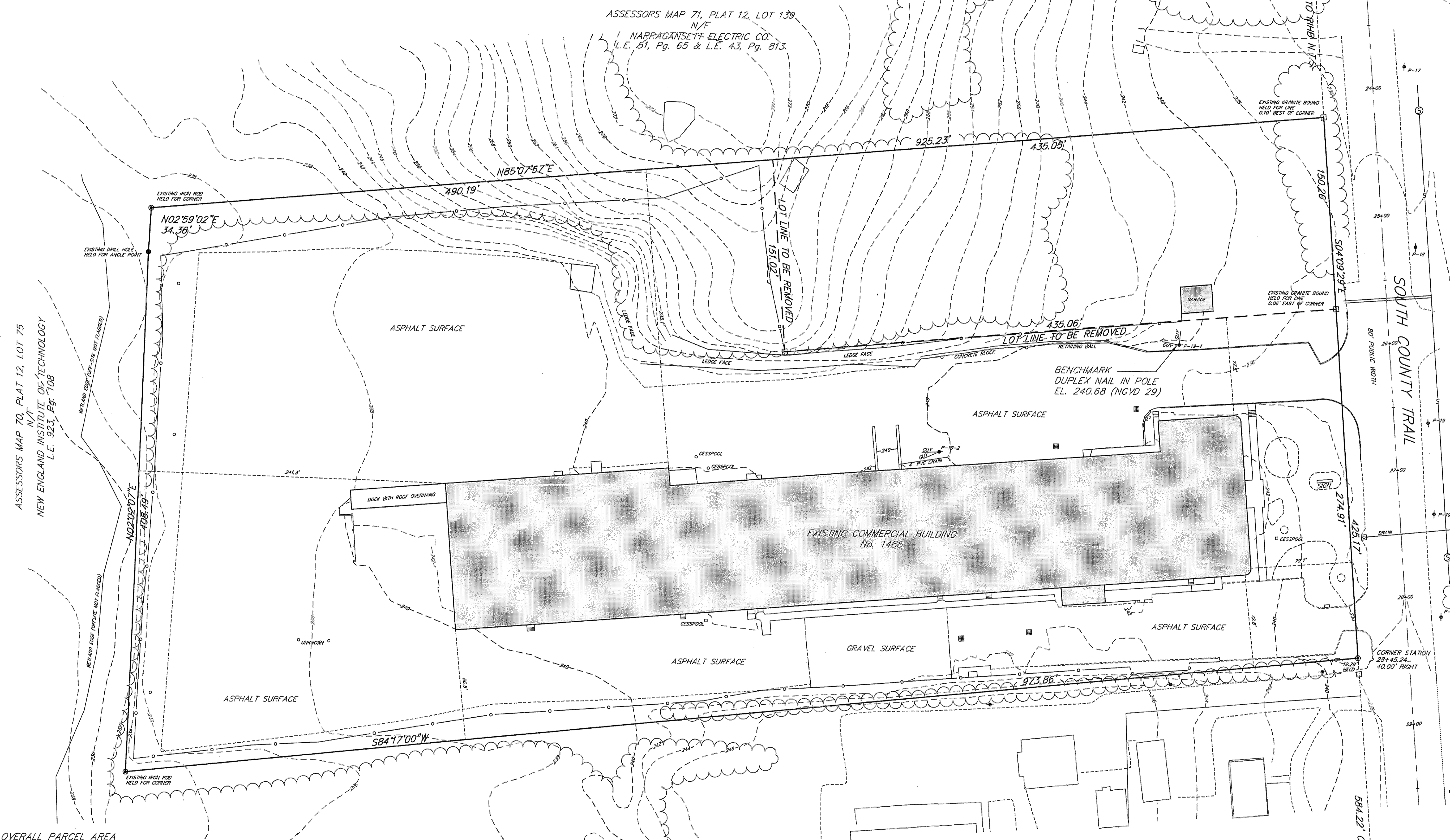
DRAWING TITLE  
**LEGEND & NOTES**

PROJECT NO.: 1713  
 DATE: SEPTEMBER 2017  
 SCALE: NONE  
 DRAWN BY: LBD  
 CHECKED BY: TAR  
 DRAWING NUMBER  
**2**  
 SHEET 2 OF 15

NO.	DATE	BY	REVISIONS

- LEGEND**
- - - - - EXISTING CONTOUR
  - - - - - EXISTING EDGE OF PAVEMENT
  - - - - - EXISTING CONCRETE SURFACE
  - - - - - EXISTING CHAINLINK FENCE
  - - - - - EXISTING CONCRETE CURB
  - - - - - EXISTING ASPHALT BERM
  - - - - - EXISTING WATER SERVICE
  - - - - - EXISTING GRANITE BOUND
  - - - - - EXISTING RIIB
  - - - - - EXISTING IRON ROD
  - - - - - EXISTING DRILL HOLE
  - - - - - EXISTING UTILITY POLE

**REFERENCES:**  
 STATE HIGHWAY LINE PLAT 287  
 RECORDED PLAT 762: "ADMINISTRATIVE SUBDIVISION..."  
 L.E. 51, Pg. 65 & L.E. 43, Pg. 813  
 RECORDED PLAT 825: "ROCKY HILL COMMONS..."  
 L.E. 1331, Pg. 199 & 202; SUBJECT PROPERTY



LOCUS NO SCALE

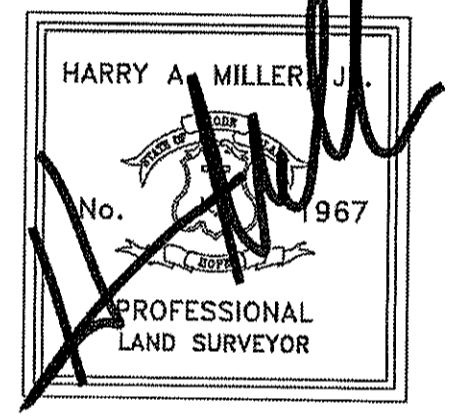
**CERTIFICATION:**  
 THIS PLAN, AND UNDERLYING SURVEY PRODUCT, WAS PREPARED FOR THE EXCLUSIVE USE OF THE PERSON, PERSONS, OR ENTITY NAMED IN THIS CERTIFICATION. SAID CERTIFICATION DOES NOT EXTEND TO ANY UN-NAMED PERSON, PERSONS, OR ENTITY WITHOUT AN EXPRESS RE-CERTIFICATION BY THE SURVEYOR OF RECORD NAMING SAID PERSON, PERSONS, OR ENTITY.

TO 1485 HOLDINGS LLC, IT IS HEREBY CERTIFIED THAT THIS SURVEY AND BEEN CONDUCTED AND THIS PLAN HAS BEEN PREPARED PURSUANT TO SECTION 9 OF THE RULES AND REGULATIONS ADOPTED BY THE RHODE ISLAND STATE BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS ON NOVEMBER 25, 2016, AS FOLLOWS:

LIMITED CONTENT BOUNDARY SURVEY CLASS 'Y'  
 TOPOGRAPHIC SURVEY CLASS 'III'

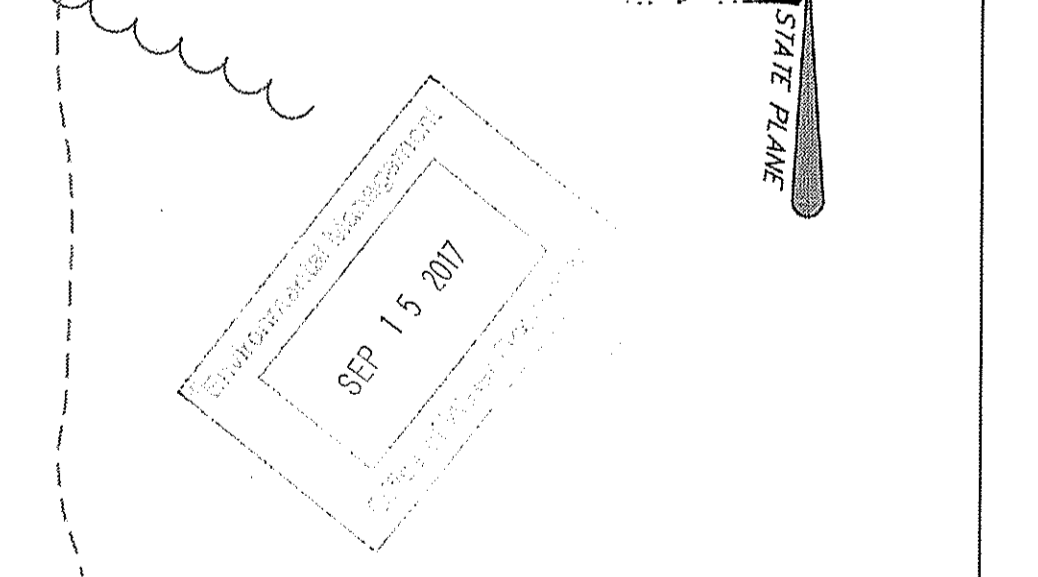
FURTHER, THE INFORMATION DERIVED ON HEREON WAS OBTAINED FROM FIELD OBSERVATIONS MADE ON THE SITE IN DECEMBER, 2016 FOR THE PURPOSE OF THE CONDUCT OF A SURVEY FOR THE PREPARATION OF AN ADMINISTRATIVE SUBDIVISION. NEED MONUMENTS WERE FOUND AND SUBSTITUTEDLY HELD AT ALL MAJOR PROPERTY CORNERS.

*H. Miller*  
 HARRY A. MILLER, JR., No. 1967  
 COA: LS-1101



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
 OFFICE OF WATER RESOURCES  
 FRESHWATER WETLANDS PROGRAM  
 APPROVED WITH CONDITIONS  
 AS SPECIFIED IN THE LETTER OF APPROVAL  
 DATED NOV 9 2017 FILE # 17-0233  
 NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
 APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. Hester*



**EXISTING CONDITIONS PLAN**

THIS PLAN SHALL BE INDEXED UNDER  
 ADJUTING STREETS:  
 SOUTH COUNTY TRAIL (ROUTE 2)  
 1"=50'

**OVERALL PARCEL AREA**  
 9.4220 Acres (410,422 S.F.)

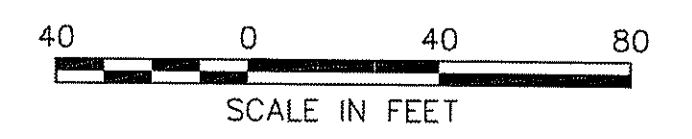
**PROJECT SURVEYOR**  
 HARRY A. MILLER, JR.  
 ALPHA ASSOCIATES, LTD.  
 35 ROCKY HOLLOW ROAD  
 EAST GREENWICH, RI 02818

**FLOOD NOTE:**  
 THE ENTIRE PARCEL FALLS WITHIN ZONE 'X' PER FEMA MAP NUMBERS:  
 44003C0117H, REVISED 10/2/15  
 44003C0119G, EFFECTIVE 12/3/10  
 44003C0136G, EFFECTIVE 12/3/10  
 44003C0138G, EFFECTIVE 12/3/10

**PARCEL ZONING**

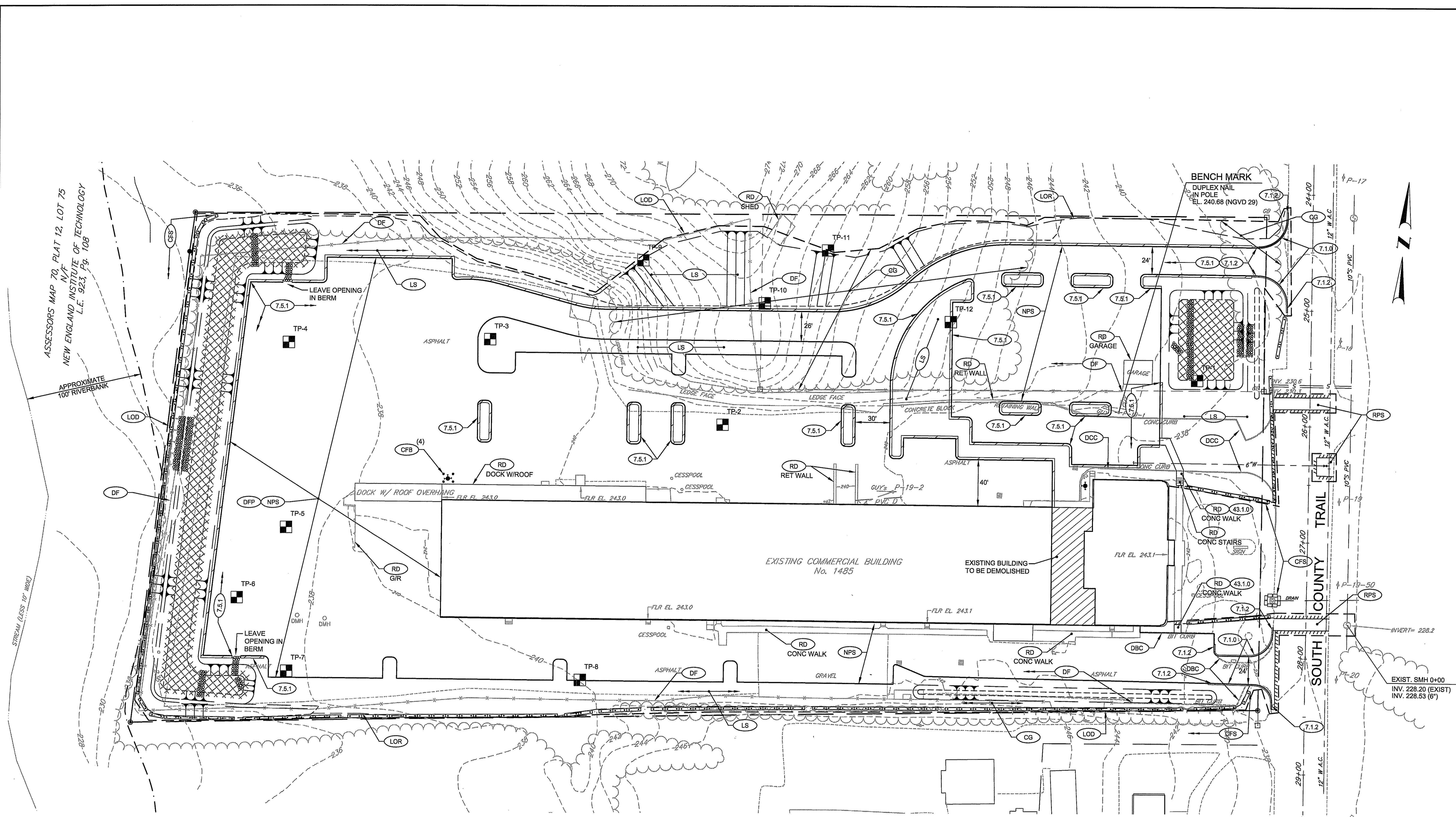
ZONE L10	
MIN. AREA	2 Acres
MIN. FRONTAGE	150'
FRONT YARD	100'
SIDE YARD	40'
REAR YARD	50'

ASSESSORS MAP 71, PLAT 12, LOT 97  
 N/F  
 WEST BAY PARTNERSHIPS LLC  
 L.E. 725, Pg. 241



**1485 SOUTH COUNTY TRAIL PLAT**

ADMINISTRATIVE SUBDIVISION  
 ASSESSORS MAP 71, PLAT 12, LOTS 18 & 71  
 EAST GREENWICH, RHODE ISLAND  
 PREPARED FOR: 1485 HOLDINGS LLC  
 PREPARED BY: ALPHA ASSOCIATES, LTD.  
 35 ROCKY HOLLOW ROAD  
 EAST GREENWICH, RI 02818  
 SCALE: 1"=40' JANUARY, 2017 SHEET 3 OF X



ASSESSORS MAP 70, PLAT 12, LOT 75  
 N.W.  
 NEW ENGLAND INSTITUTE OF TECHNOLOGY  
 L.E. 923, P.G. 108

APPROXIMATE  
 100 RIVERBANK

STREAM (LESS 10' WIDE)

**WETLANDS NOTE:**

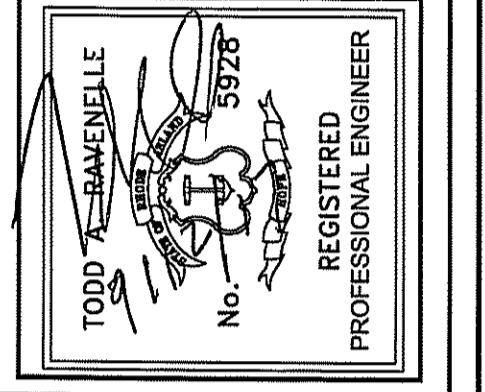
FRESHWATER WETLANDS (SWAMP AND STREAM) ARE PRESENT ON THE ADJACENT PARCEL WEST OF THE SUBJECT PROPERTY. THESE FEATURES WERE EVALUATED BY APPLIED BIO-SYSTEMS, INC. THROUGH SITE INSPECTION ON JULY 19, 2017 BUT WERE NOT ACCESSIBLE FOR DELINEATION. THE DEPICTED LOCATION OF THE STREAM (AND ASSOCIATED 100-FOOT RIVERBANK) IS APPROXIMATE AND BASED ON ANALYSES OF AERIAL PHOTOGRAPHY, SOIL SURVEY, AND LIDAR TOPOGRAPHIC DATA OBTAINED THROUGH THE R.I. GEOGRAPHIC INFORMATION SYSTEM (RIGIS). THE OUTER EXTENTS OF THE 50-FOOT PERIMETER WETLAND ARE APPROXIMATELY COINCIDENT WITH THOSE OF THE 100-FOOT RIVERBANK AT THIS LOCATION.

Professional Seal  
 SEP 15 2017

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
 OFFICE OF WATER RESOURCES  
 FRESHWATER WETLANDS PROGRAM  
 APPROVED WITH CONDITIONS  
 AS SPECIFIED IN THE LETTER OF APPROVAL  
 DATED NOV 9 2017 FILE # 17-0233  
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 APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. ...*

PROJECT  
**UTILITY IMPROVEMENTS**  
 1485 SOUTH COUNTY TRAIL  
 PLAT 12A, LOT 18  
 EAST GREENWICH, RHODE ISLAND



CLIENT  
**1485 HOLDINGS LLC**

Gordon R. Archibald, Inc.  
 Civil and Environmental Engineers  
 Pawtucket, Rhode Island

DRAWING TITLE  
**GENERAL PLAN**

NO.	DATE	REVISIONS	BY

PROJECT NO.: 1713

DATE: SEPTEMBER 2017

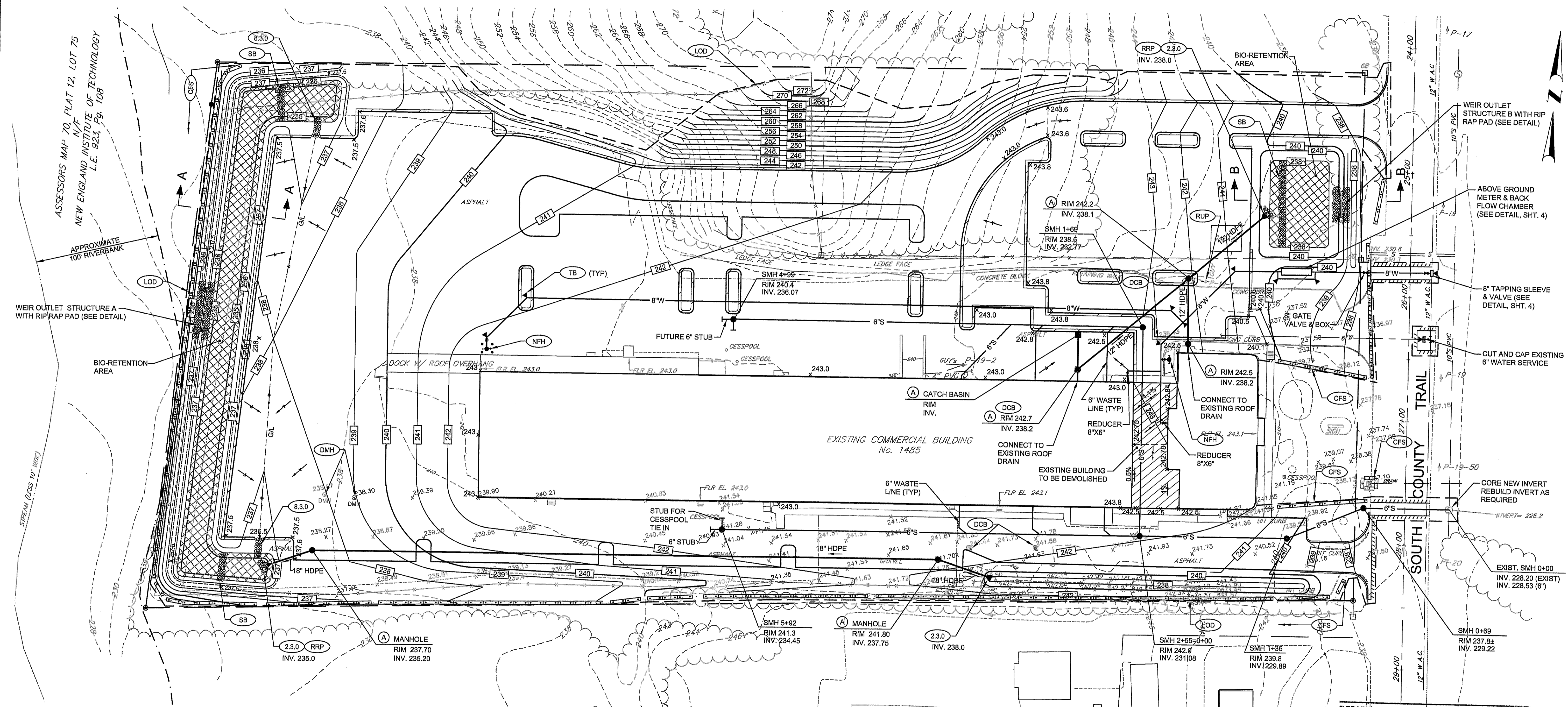
SCALE: 1"=40'

DRAWN BY: LBD

CHECKED BY: TAR

DRAWING NUMBER  
**4**

SHEET 4 OF 15



ASSESSORS MAP 70, PLAT 12, LOT 75  
 N/W  
 NEW ENGLAND INSTITUTE OF TECHNOLOGY  
 L.E. 923, P.9, 108

WEIR OUTLET STRUCTURE A WITH RIP/RAP PAD (SEE DETAIL)

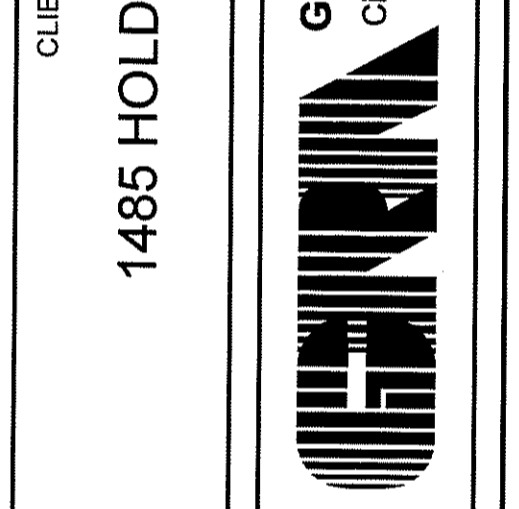
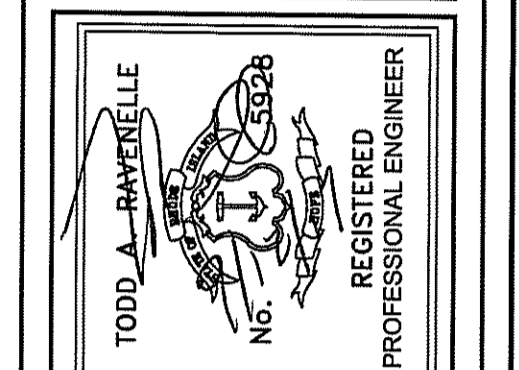
BIO-RETENTION AREA

**WETLANDS NOTE:**  
 FRESHWATER WETLANDS (SWAMP AND STREAM) ARE PRESENT ON THE ADJACENT PARCEL WEST OF THE SUBJECT PROPERTY. THESE FEATURES WERE EVALUATED BY APPLIED BIO-SYSTEMS, INC. THROUGH SITE INSPECTION ON JULY 19, 2017 BUT WERE NOT ACCESSIBLE FOR DELINEATION. THE DEPICTED LOCATION OF THE STREAM (AND ASSOCIATED 100-FOOT RIVERBANK) IS APPROXIMATE AND BASED ON ANALYSES OF AERIAL PHOTOGRAPHY, SOIL SURVEY, AND LIDAR TOPOGRAPHIC DATA OBTAINED THROUGH THE R.I. GEOGRAPHIC INFORMATION SYSTEM (RIGIS). THE OUTER EXTENTS OF THE 50-FOOT PERIMETER WETLAND ARE APPROXIMATELY COINCIDENT WITH THOSE OF THE 100-FOOT RIVERBANK AT THIS LOCATION.

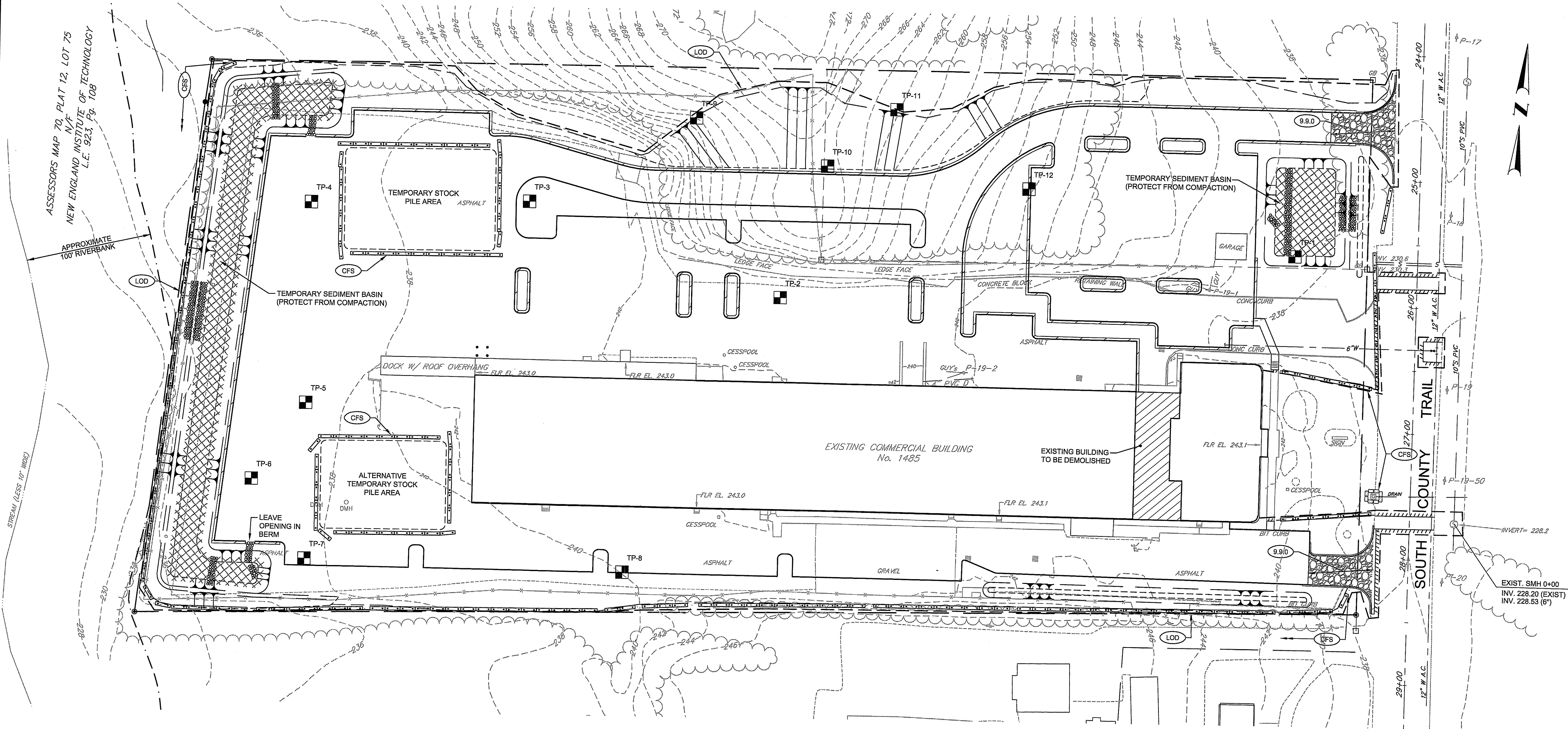
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
 OFFICE OF WATER RESOURCES  
 FRESHWATER WETLANDS PROGRAM  
 APPROVED WITH CONDITIONS  
 AS SPECIFIED IN THE LETTER OF APPROVAL  
 DATED NOV 9 2017 FILE # 17-0233  
 NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
 APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. Hackett*  
 SEP 15 2017

PROJECT		UTILITY IMPROVEMENTS 1485 SOUTH COUNTY TRAIL PLAT 12A, LOT 18 EAST GREENWICH, RHODE ISLAND	
CLIENT		1485 HOLDINGS LLC	
DRAWING TITLE		GRADING AND UTILITY PLAN	
NO.	DATE	BY	REVISIONS
PROJECT NO.:	1713	DATE:	SEPTEMBER 2017
SCALE:	1"=40'	DRAWN BY:	LBD
CHECKED BY:	TAR	DRAWING NUMBER	<b>5</b>
SHEET 5 OF 15		Gordon R. Archibald, Inc. Civil and Environmental Engineers Pawtucket, Rhode Island	



P:\FILES\CAD\0113\Project Plans\1713\grading and utility plan.dwg, 09/15/2017, 3:12:22 PM, USER:RBD



ASSESSORS MAP 70, PLAT 12, LOT 75  
 N/E  
 NEW ENGLAND INSTITUTE OF TECHNOLOGY  
 L.E. 923, P. 108

APPROXIMATE  
 100 RIVERBANK

**WETLANDS NOTE:**

FRESHWATER WETLANDS (SWAMP AND STREAM) ARE PRESENT ON THE ADJACENT PARCEL WEST OF THE SUBJECT PROPERTY. THESE FEATURES WERE EVALUATED BY APPLIED BIO-SYSTEMS, INC. THROUGH SITE INSPECTION ON JULY 19, 2017 BUT WERE NOT ACCESSIBLE FOR DELINEATION. THE DEPICTED LOCATION OF THE STREAM (AND ASSOCIATED 100-FOOT RIVERBANK) IS APPROXIMATE AND BASED ON ANALYSES OF AERIAL PHOTOGRAPHY, SOIL SURVEY, AND LIDAR TOPOGRAPHIC DATA OBTAINED THROUGH THE R.I. GEOGRAPHIC INFORMATION SYSTEM (RIGIS). THE OUTER EXTENTS OF THE 50-FOOT PERIMETER WETLAND ARE APPROXIMATELY COINCIDENT WITH THOSE OF THE 100-FOOT RIVERBANK AT THIS LOCATION.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
 OFFICE OF WATER RESOURCES  
 FRESHWATER WETLANDS PROGRAM  
 APPROVED WITH CONDITIONS  
 AS SPECIFIED IN THE LETTER OF APPROVAL  
 DATED NOV 9 2017 FILE # 17-0233  
 NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
 APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. Hallett*  
 SEP 15 2017

PROJECT  
**UTILITY IMPROVEMENTS**  
 1485 SOUTH COUNTY TRAIL  
 PLAT 12A, LOT 18  
 EAST GREENWICH, RHODE ISLAND

TODD A. RAVERNACLE  
 REG. NO. 9828  
 REGISTERED PROFESSIONAL ENGINEER

CLIENT  
**1485 HOLDINGS LLC**  
 GORDON R. ARCHIBALD, INC.  
 Civil and Environmental Engineers  
 Pawtucket, Rhode Island

DRAWING TITLE  
**EROSION AND SEDIMENT CONTROL PLAN**

NO.	DATE	REVISIONS	BY

PROJECT NO.: 1713

DATE: SEPTEMBER 2017

SCALE: 1"=40'

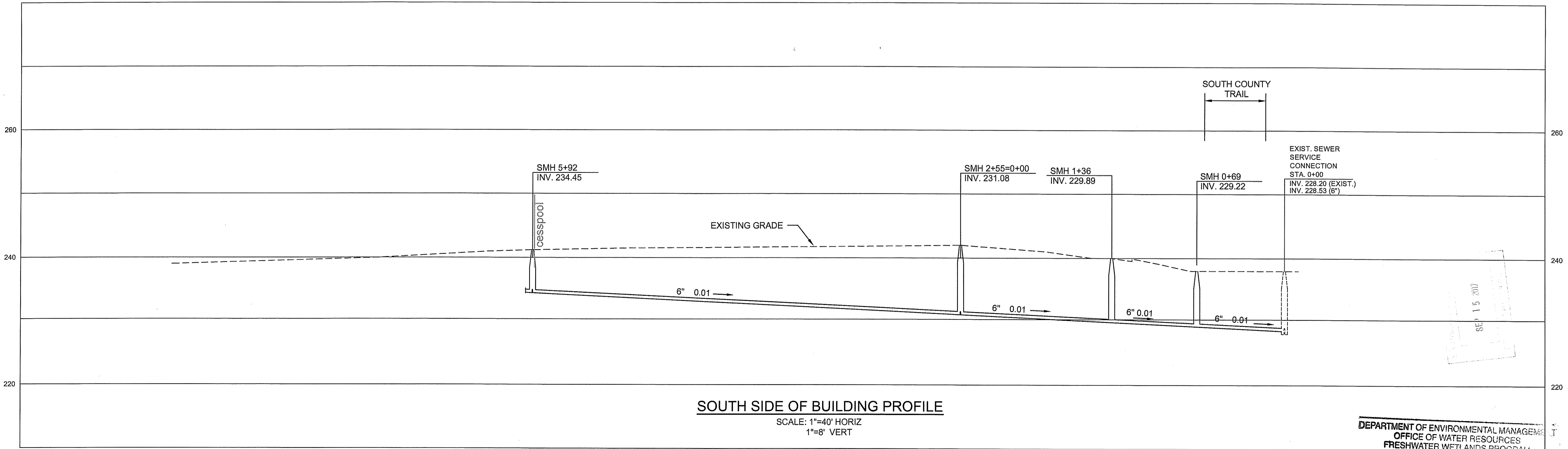
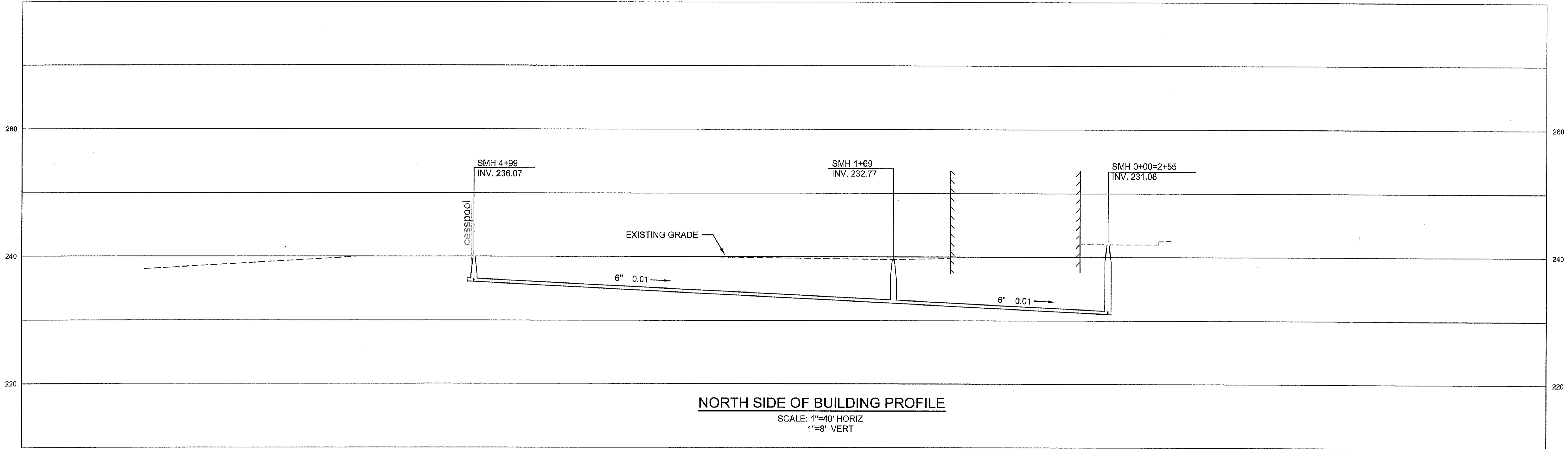
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CHECKED BY: TAR

DRAWING NUMBER

6

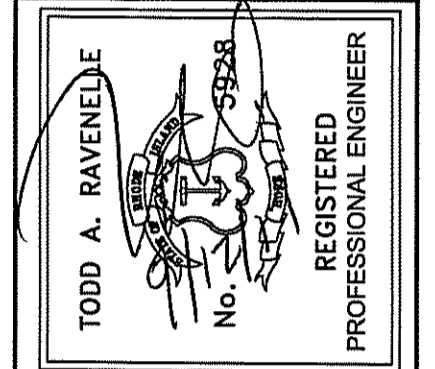
SHEET 6 OF 15



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
FRESHWATER WETLANDS PROGRAM  
APPROVED WITH CONDITIONS  
AS SPECIFIED IN THE LETTER OF APPROVAL  
DATED NOV 9 2017 FILE # 17-0233  
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
APPROVALS MUST BE AT CONSTRUCTION SITE

*Charles A. Hester*

PROJECT  
**UTILITY IMPROVEMENTS**  
1485 SOUTH COUNTY TRAIL  
PLAT 12A, LOT 18  
EAST GREENWICH, RHODE ISLAND



CLIENT  
**1485 HOLDINGS LLC**

**Gordon R. Archibald, Inc.**  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

DRAWING TITLE  
**SEWER PROFILES**

NO.	DATE	REVISIONS	BY

PROJECT NO.: 1713

DATE: SEPTEMBER 2017

SCALE: AS NOTED

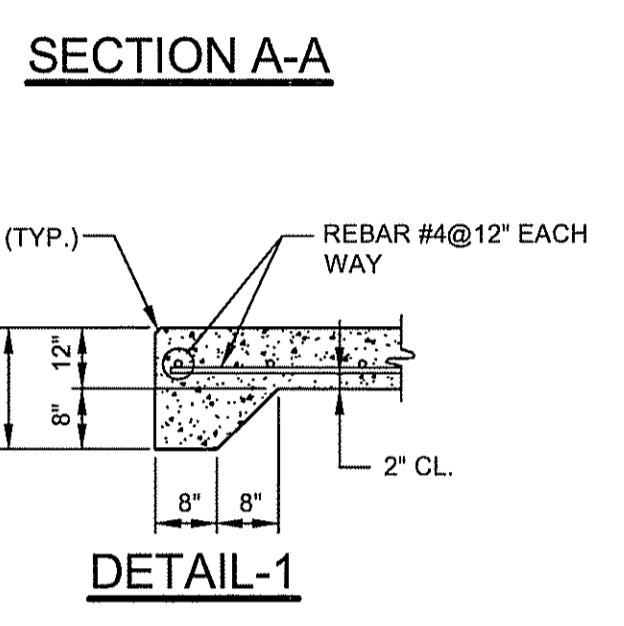
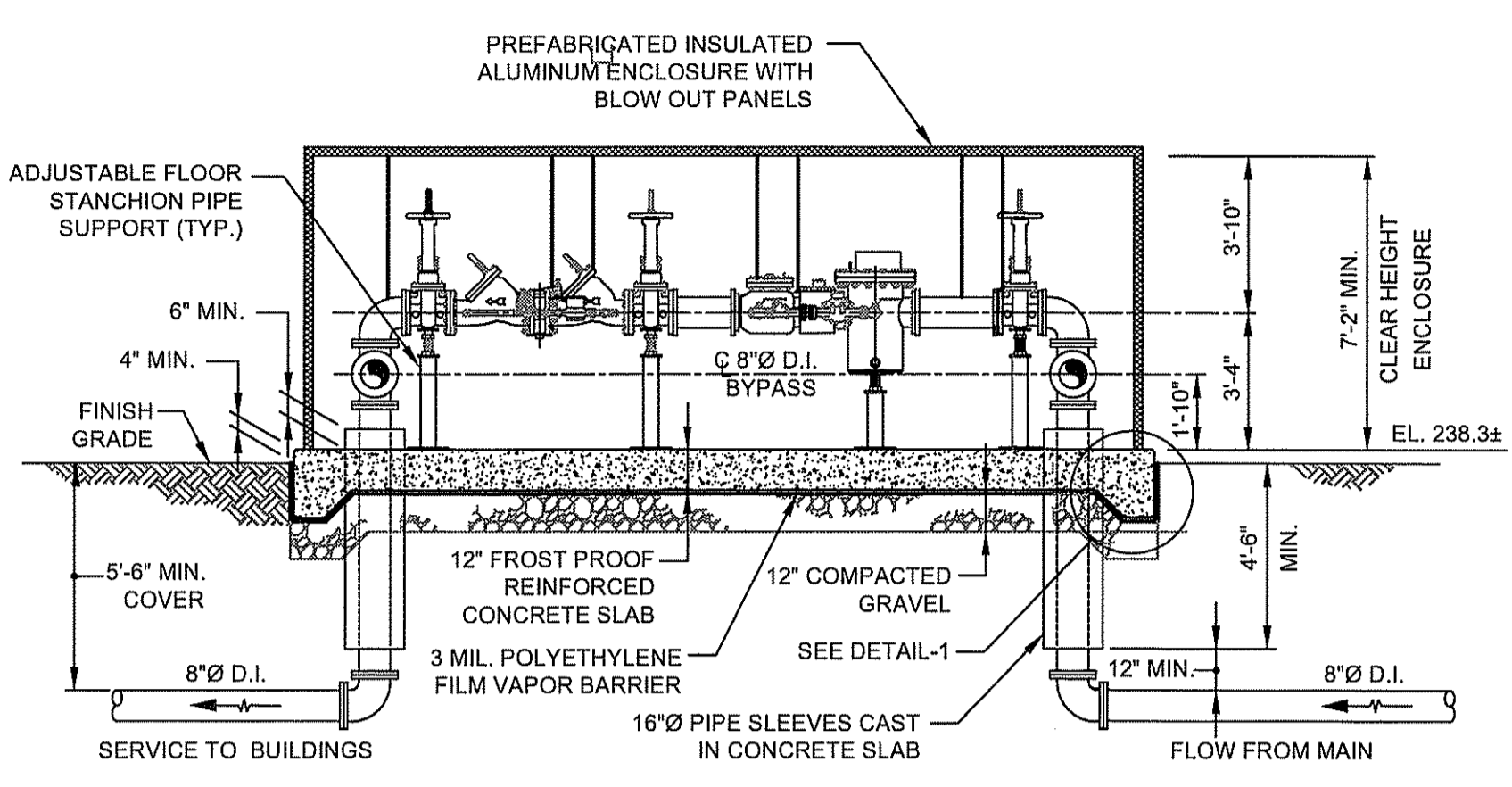
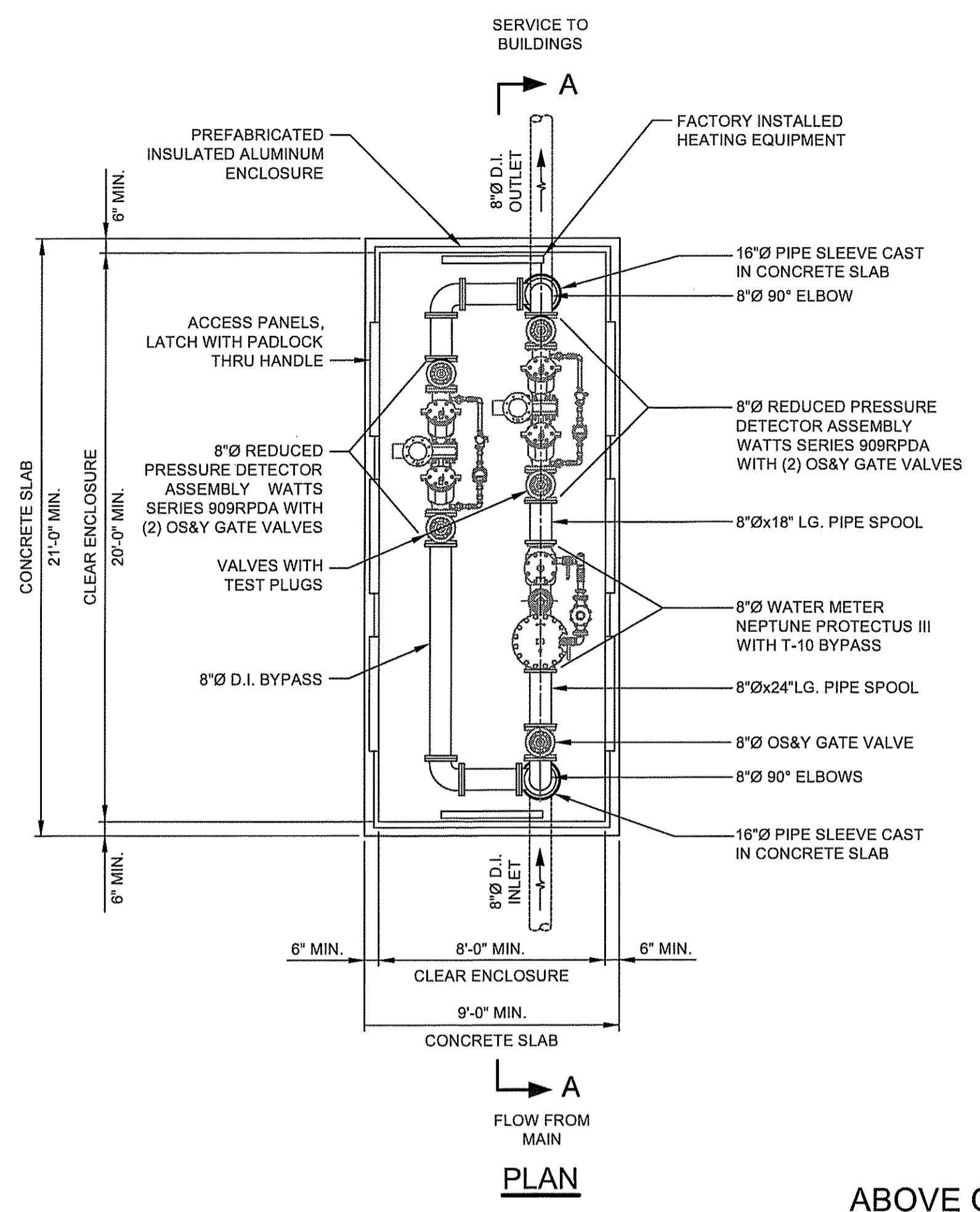
DRAWN BY: LBD

CHECKED BY: TAR

DRAWING NUMBER  
**7**  
SHEET 7 OF 15

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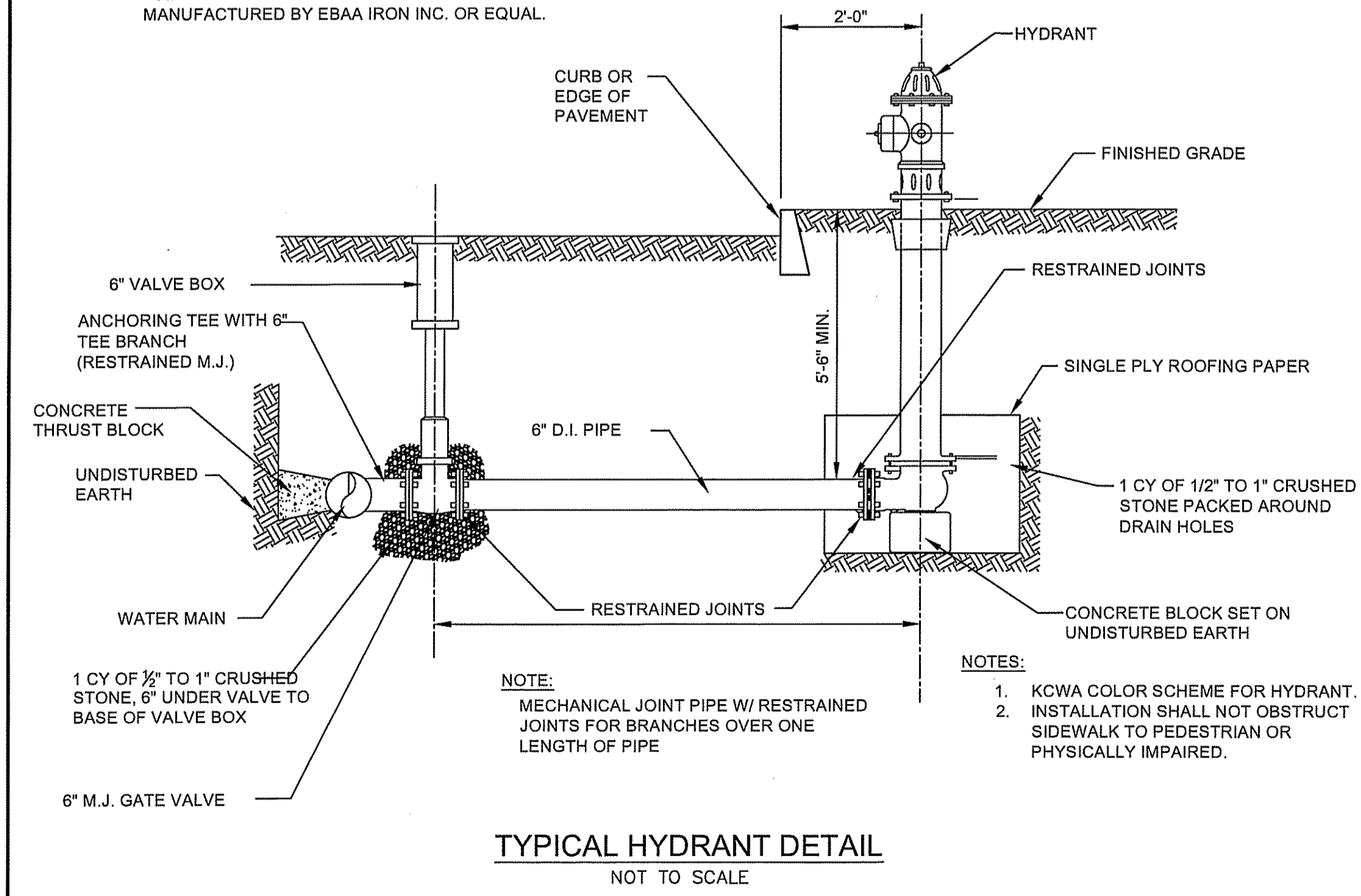




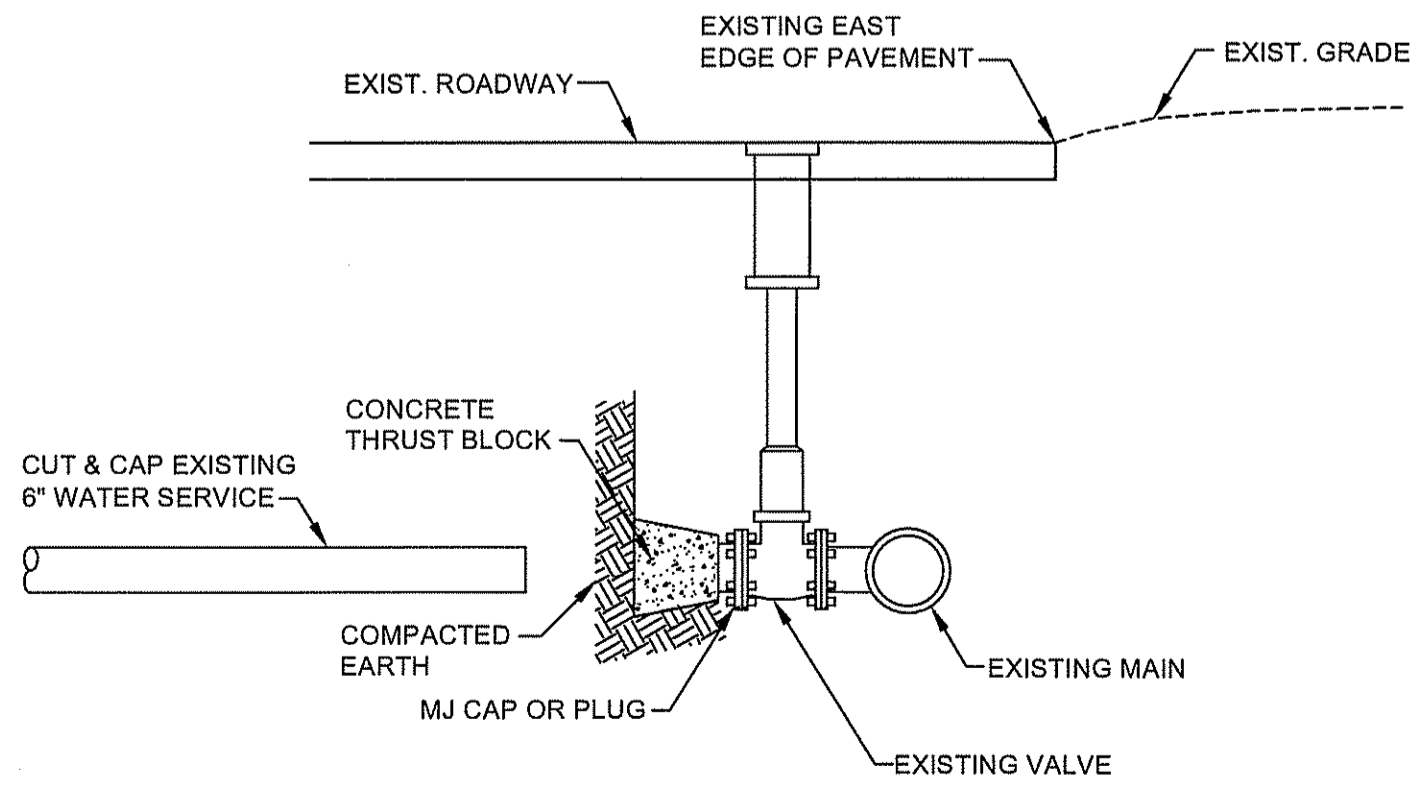
**ABOVE GROUND METER AND BACKFLOW CHAMBER DETAILS**  
N.T.S.

**SPECIAL NOTES:**

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE KENT COUNTY WATER AUTHORITY, LATEST EDITION.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION FOR ROAD AND BRIDGE CONSTRUCTION, WITH ALL ADDENDA.
3. ALL PIPE FITTINGS SHALL BE PROVIDED WITH RESTRAINED JOINT FITTINGS "MEG-A-LUG" THRUST RESTRAINT WEDGE MANUFACTURED BY EBAA IRON INC. OR EQUAL.



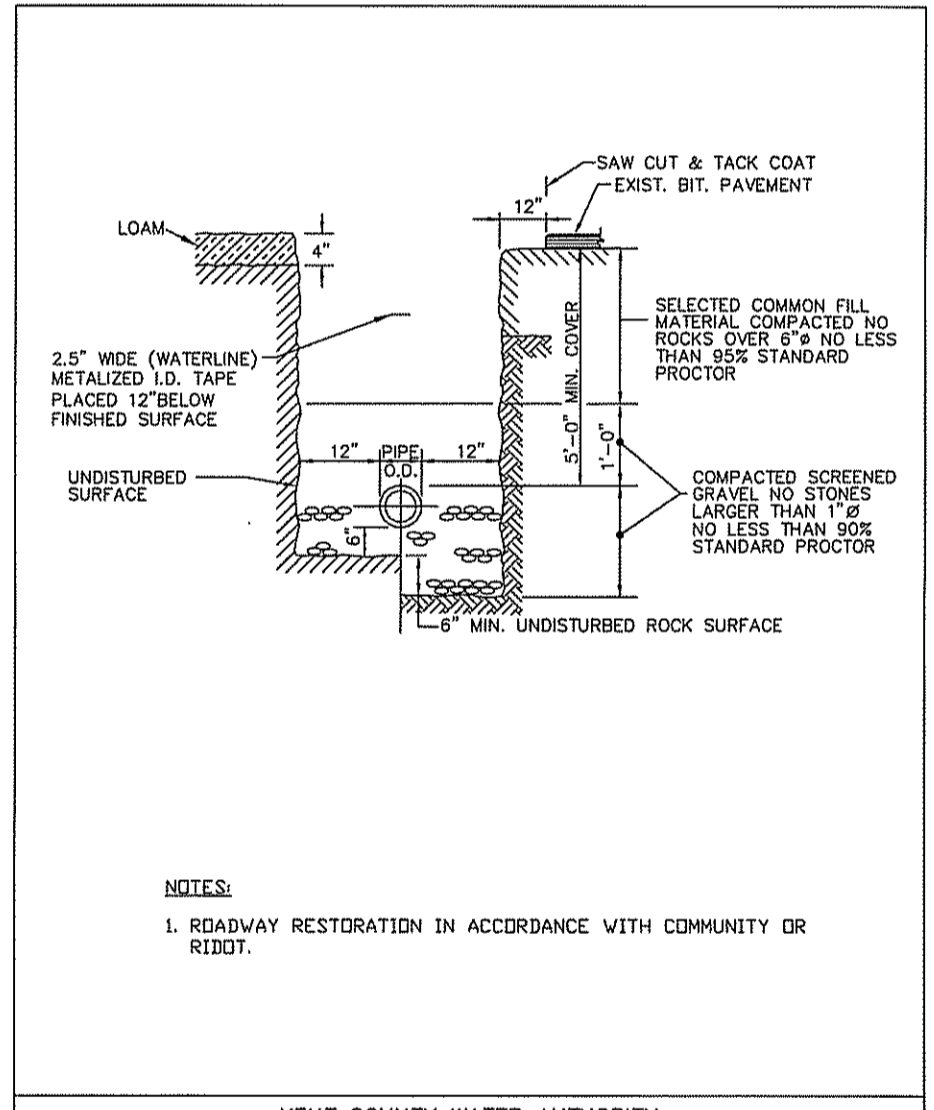
**TYPICAL HYDRANT DETAIL**  
NOT TO SCALE



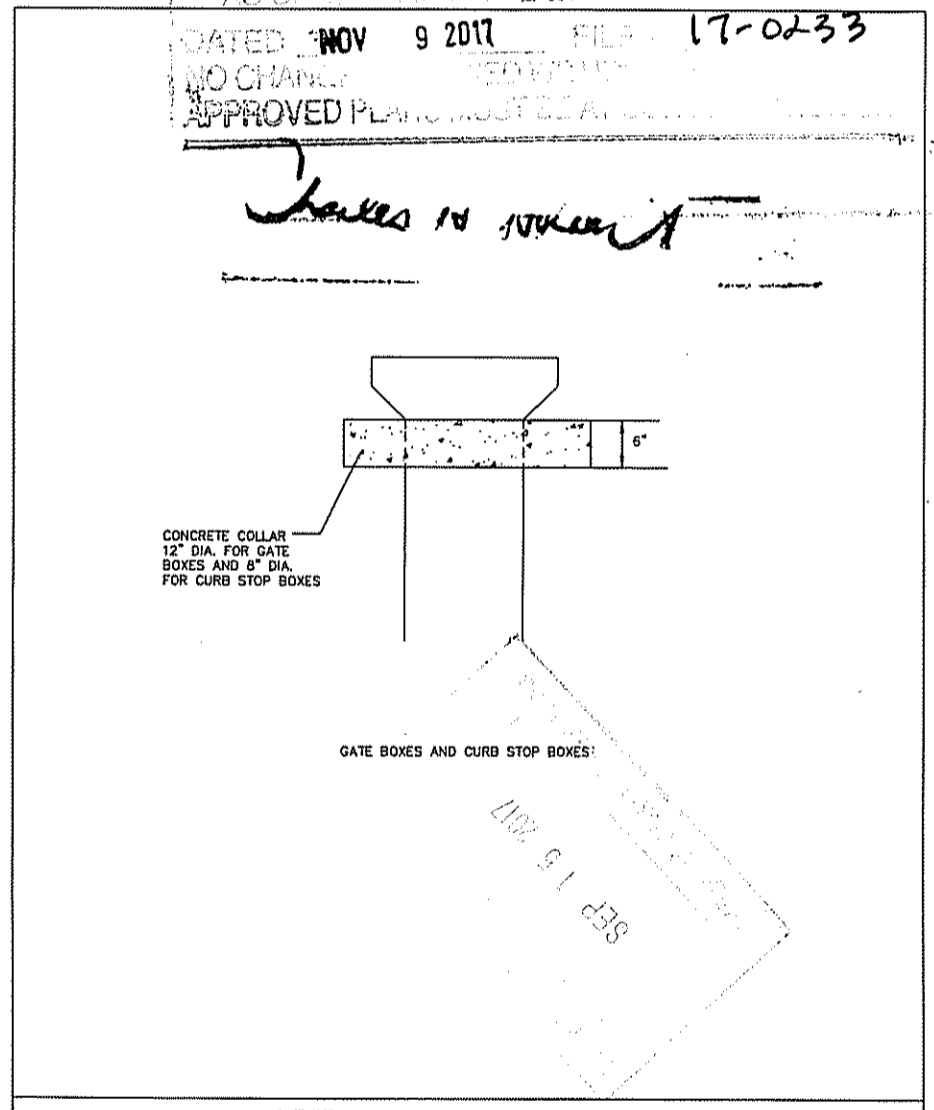
**CAP EXISTING SERVICE DETAIL**  
NOT TO SCALE

**CHAMBER NOTES:**

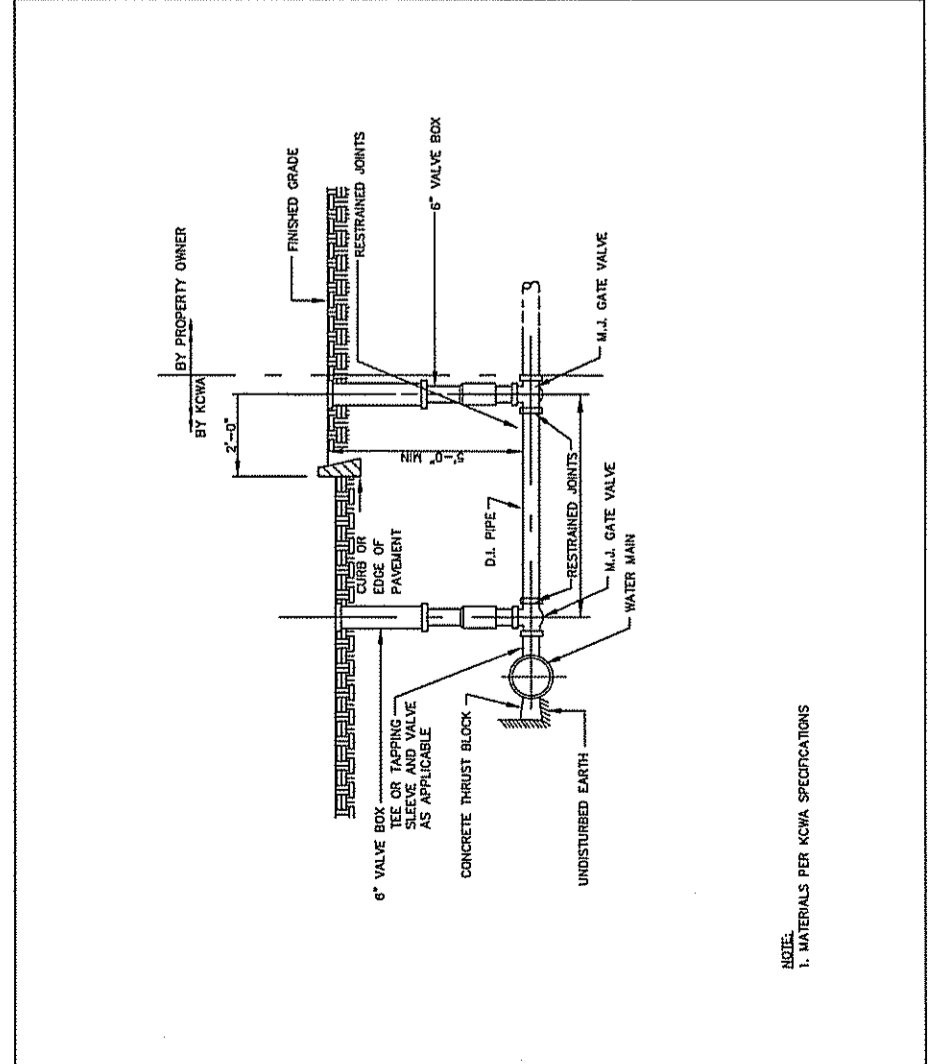
1. PROVIDE AND INSTALL MANUFACTURED, HEATED, INSULATED ENCLOSURE ABOVE GROUND. THE ROOF, WALLS AND ACCESS PANELS SHALL BE CONSTRUCTED OF MILL FINISH ALUMINUM, ASTM B209. MANUFACTURERS SHALL BE HOT BOX, HOT ROK, VALVE GUARD OR APPROVED EQUAL.
2. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS. REBAR SHALL BE GRADE 60, CONFORMING TO AASHTO M31 (ASTM A615).
3. GRAVEL SUBBASE SHALL BE 12" THICK MINIMUM THROUGHOUT ENTIRE LIMITS OF SLAB AND SHALL BE COMPACTED IN 8" LIFTS TO A MINIMUM OF 95% MODIFIED PROCTOR IN ACCORDANCE WITH ASTM D1557. GRAVEL SUBBASE SHALL CONFORM TO THE RI STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION LATEST EDITION. 100 PERCENT OF GRAVEL SHALL PASS THE 1/2" SIEVE.
4. STRUCTURAL MEMBERS SHALL BE ALUMINUM, NO WOOD OR PARTICLE BOARD SHALL BE ALLOWED.
5. INSULATION SHALL BE POLYISOCYANURATE FOAM, SPRAY APPLIED, WITH A MINIMUM "R" FACTOR OF EIGHT (8).
6. MULTI-SECTIONAL ENCLOSURE SHALL FIT TOGETHER WITH OVERLAPPING TONGUE AND GROOVE JOINTS AND BE SECURED INTERNALLY WITH MECHANICAL FASTENERS.
7. THE ENCLOSURE SHALL BE SECURELY ATTACHED TO THE CONCRETE SLAB WITH ANCHOR BRACKETS INSTALLED ON THE INTERIOR OF THE ENCLOSURE.
8. ACCESS PANELS SHALL BE PROVIDED TO ALLOW EASY ACCESS FOR OPERATIONS AND MAINTENANCE WITHOUT REMOVAL OF THE ENCLOSURE.
9. DRAIN OPENINGS SHALL BE DESIGNED TO REMAIN CLOSED EXCEPT WHEN THE DEVICE IS DISCHARGING WATER. OPENINGS SHALL ACCOMMODATE MAXIMUM DISCHARGE OF THE BACKFLOW PREVENTION DEVICE AND SHALL PROTECT AGAINST THE INTRUSION OF WIND, DEBRIS AND ANIMALS.
10. HEATING EQUIPMENT SHALL BE FURNISHED AND DESIGNED BY THE MANUFACTURER OF THE ENCLOSURE, TO MAINTAIN AN INTERIOR TEMPERATURE OF +40 DEGREES F WITH AN EXTERIOR TEMPERATURE OF -30 DEGREES F AND A WIND VELOCITY OF 15 MPH. THE FACTORY ASSEMBLED HEATING EQUIPMENT SHALL BE ETL, UL, OR CSA CERTIFIED.
11. ELECTRICAL SERVICE SHALL BE IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES. ELECTRIC POWER SOURCE FOR HEAT AND ACCESSORIES SHALL BE G.F.I. PROTECTED WITH 18" MINIMUM CLEARANCE FROM RECEPTACLE BASE TO TOP OF SLAB AND AT LEAST 6" ABOVE ANY WATER DISCHARGE POINT.
12. MOUNTING HARDWARE SHALL BE STAINLESS STEEL AND PROVIDED WITH THE ENCLOSURE BY THE MANUFACTURER.
13. ASSEMBLY FASTENERS SHALL BE STAINLESS STEEL OR ALUMINUM.
14. ANCHOR HARDWARE SHALL BE ADJUSTABLE UP TO 2" VERTICALLY TO ACCOMMODATE UNEVEN CONCRETE SLAB. ONCE THE ENCLOSURE HAS BEEN SET ON THE SLAB, USE A MASONRY BIT TO DRILL THROUGH BASE MOUNTING HOLES AND INSERT WEDGE ANCHORS AND BOLT FIRMLY TO CONCRETE.
15. INTERIOR PIPING AND VALVE JOINTS TO BE FLANGED.
16. EXTERIOR PIPING, VALVES AND FITTING JOINTS TO HAVE RESTRAINED JOINTS.



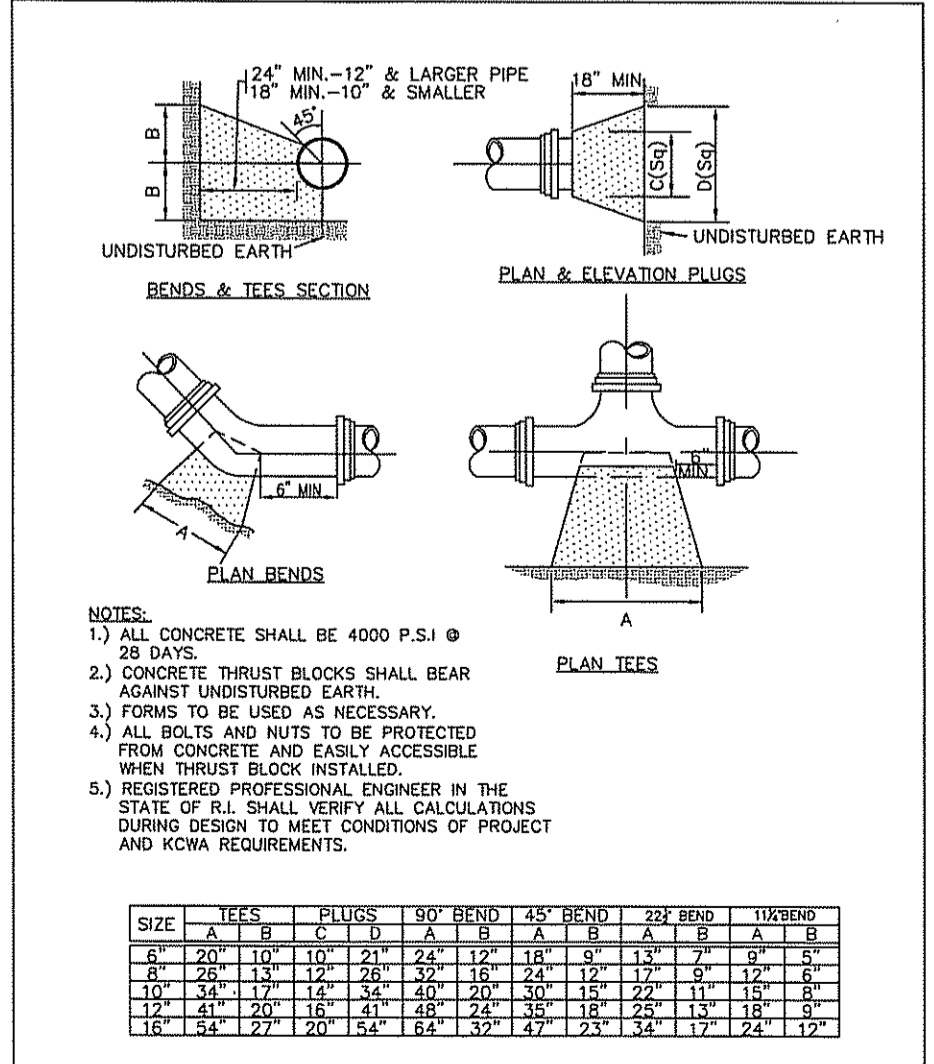
**KCWA TRENCH INSTALLATION IN ROCK AND SOIL**  
NOT TO SCALE



**KCWA CONCRETE COLLAR**  
NOT TO SCALE



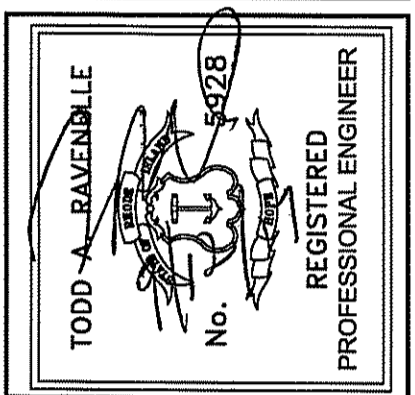
**KCWA SERVICE CONNECTION GREATER THAN 4 INCHES**  
NOT TO SCALE



**KCWA THRUST BLOCK**  
NOT TO SCALE

SIZE	TEES	PLUGS	90° BEND	45° BEND	22.5° BEND	10x10x10
6"	10	10	20	10	10	10
8"	10	10	20	10	10	10
10"	10	10	20	10	10	10
12"	10	10	20	10	10	10

PROJECT  
**UTILITY IMPROVEMENTS**  
1485 SOUTH COUNTY TRAIL  
PLAT 12A, LOT 18  
EAST GREENWICH, RHODE ISLAND



CLIENT  
**1485 HOLDINGS LLC**  
Gordon R. Archibald, Inc.  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

DRAWING TITLE  
**WATER DETAILS**

NO	DATE	REVISIONS	BY

PROJECT NO.: 1713  
DATE: SEPTEMBER 2017  
SCALE: NONE  
DRAWN BY: LBD  
CHECKED BY: TAR

DRAWING NUMBER  
**9**  
SHEET 9 OF 15

P:\FILES\2017\Projects\1713\WATER DETLS.dwg, 9/11/2017 2:26:30 PM, LBD

CONSTRUCTION NOTES:

3.11 NOTIFICATION: THE OWNER OR DULY APPOINTED REPRESENTATIVE SHALL NOTIFY KENT COUNTY WATER AUTHORITY AS FOLLOWS:
• NO LESS THAN (5) WORKING DAYS PRIOR TO CONSTRUCTION COMMENCEMENT ON ANY TYPE OF SERVICE OR MAIN EXTENSION INSTALLED WITHIN THE SYSTEM.
• NO LESS THAN THREE (3) BUSINESS DAYS PRIOR TO PRESSURE TESTING AND/OR CHLORINATION THE PROPOSER SHALL PROVIDE KENT COUNTY WATER AUTHORITY WITH WRITTEN NOTIFICATION, DETAILING THE PROPOSED EVENT SCHEDULE, CONNECTION POINTS, EQUIPMENT TO BE USED, METHOD OF ACCOMPLISHMENT, AND SAFETY PRECAUTIONS TO BE TAKEN.

• NO LESS THAN FIVE (5) BUSINESS DAYS PRIOR TO CONDUCTING FIRE FLOW TESTING THE PROPOSER SHALL PROVIDE KENT COUNTY WATER AUTHORITY WITH WRITTEN NOTIFICATION, DETAILING THE PROPOSED EVENT SCHEDULE, CONNECTION POINTS, EQUIPMENT TO BE USED, METHOD OF ACCOMPLISHMENT, AND SAFETY PRECAUTIONS TO BE TAKEN. IT MAY ALSO BE REQUIRED TO ADVERTISE IN THE PROVIDENCE JOURNAL, THE FIRE FLOW TESTING DATE, TIME AND POSSIBLE TESTING EFFECTS TO THE AFFECTED CUSTOMERS AT THE SOLE COST OF THE REQUESTING PARTY. KENT COUNTY WATER AUTHORITY SHALL REVIEW AND APPROVE TEXT PRIOR TO ADVERTISEMENT. APPROVAL IS A PRECONDITION OF CONDUCTING THE TESTING AND/OR SUBMITTING THE ADVERTISEMENT FOR PUBLICATION.

3.12 INSPECTION: INSPECTION OF ALL INSTALLATIONS SHALL BE CONDUCTED TO ENSURE COMPLIANCE WITH THE RULES AND REGULATIONS OF THE KENT COUNTY WATER AUTHORITY. KENT COUNTY WATER AUTHORITY EMPLOYEES SHALL BE GIVEN FULL ACCESS TO THE PROJECT AT ALL TIMES FOR INSPECTION OR OBSERVATION OF CONSTRUCTION IN PROGRESS AS DEEMED NECESSARY BY THE AUTHORITY. FAILURE TO CONSTRUCT THE NEW EXTENSION OF THE SYSTEM AS PER THE APPROVED DESIGN DRAWINGS OR KENT COUNTY WATER AUTHORITY'S RULES AND REGULATIONS WILL CAUSE IMMEDIATE CESSATION OF ALL CONSTRUCTION WORK. INSPECTION FEES MUST BE PAID IN FULL PRIOR TO COMMENCING INSTALLATION WORK.

THE OWNER OR DEVELOPER IS SOLELY RESPONSIBLE TO CONTROL THEIR CONTRACTOR IN THE PROGRESSION OF WORK TO ENSURE THE WATER INFRASTRUCTURE INSTALLATION IS ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS CONTAINED IN THE KENT COUNTY WATER AUTHORITY REGULATIONS AND APPROVED DESIGN. ANY PART OF THE INSTALLATION FOUND TO BE NONCOMPLIANT SHALL BE IMMEDIATELY CORRECTED AT THE OWNER'S COST TO THE SATISFACTION OF KENT COUNTY WATER AUTHORITY.

FULL TIME RESIDENT CONSTRUCTION OBSERVATION MAY BE REQUIRED AT THE DISCRETION OF THE GENERAL MANAGER/CHIEF ENGINEER BASED ON CONDITIONS OF THE DESIGN, SITE OR COMPLEXITY OF THE PROJECT. THE OWNER OR DEVELOPER SHALL PAY ALL COSTS ASSOCIATED WITH FULL TIME CONSTRUCTION OBSERVATION SERVICES. A DEPOSIT REFUNDING POLICY WILL BE IN EFFECT. FULL TIME CONSTRUCTION OBSERVATION SERVICES SHALL BE PAID IN FULL PRIOR TO COMMENCING ANY WORK ON THE WATER INFRASTRUCTURE INSTALLATION.

THE OWNER OR DEVELOPER IS SOLELY RESPONSIBLE TO CONTROL THEIR CONTRACTOR IN THE PROGRESSION OF WORK TO ENSURE THE WATER INFRASTRUCTURE INSTALLATION IS ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS CONTAINED IN THE KENT COUNTY WATER AUTHORITY REGULATIONS AND APPROVED DESIGN. ANY PART OF THE INSTALLATION FOUND TO BE NONCOMPLIANT SHALL BE IMMEDIATELY CORRECTED AT THE OWNER'S COST TO THE SATISFACTION OF THE KENT COUNTY WATER AUTHORITY.

DESIGN DRAWINGS ANNOTATED WITH CONSTRUCTION RECORD INFORMATION CONCURRENT WITH CONSTRUCTION PROGRESS SHALL BE MAINTAINED AT THE JOB SITE AND SHALL BE AVAILABLE FOR THE INSPECTOR OF THE KENT COUNTY WATER AUTHORITY TO VIEW AT ANY TIME. DRAWINGS AND RECORDS SHALL BE LEGIBLY MARKED AND RECORD ACTUAL DESCRIPTIONS OF INSTALLATION SPECIFICATIONS, CHANGES, MODIFICATIONS, PRODUCT DATA, MEASUREMENTS, AND DETAILS NOT SHOWN ON THE ORIGINAL DRAWING SUBMITTALS. FAILURE TO HAVE THESE DOCUMENTS AVAILABLE FOR REVIEW OR FAILURE TO HAVE THE PROPER DOCUMENTS PREPARED OR UPDATED WILL CAUSE IMMEDIATE CESSATION OF ALL CONSTRUCTION WORK AND DISCONNECTION FROM THE KENT COUNTY WATER SYSTEM UNTIL SUCH TIME AS POSITIVE ACTION TO COMPLY WITH THOSE REQUIREMENTS HAVE BEEN TAKEN TO SATISFY THE AUTHORITY.

3.13 AS-BUILT/RECORD DRAWINGS: UPON COMPLETION OF ALL WATER MAIN INFRASTRUCTURE AND APPURTENANCE WORK, THE DEVELOPER/OWNER SHALL PROVIDE A PRELIMINARY AS-BUILT DRAWING DOCUMENTING THE RECORD OF ACTUAL CONSTRUCTION. THE PRELIMINARY AS-BUILT DRAWING SHALL BE ON 24" X 36" SHEETS, PLAN SCALE 1" = 40' FOR REVIEW PRIOR TO ACTIVATION OF THE NEW CONSTRUCTION INFRASTRUCTURE. UPON APPROVAL BY THE AUTHORITY, WATER SERVICE MAY BE ACTIVATED TO FACILITATE DEVELOPMENT OF THE SITE.

THE OWNER/DEVELOPER SHALL PROVIDE REVISED AS-BUILT DRAWING REFLECTING MEASUREMENTS FROM THE BUILDING FOUNDATIONS AND ABOVE GRADE PERMANENT STRUCTURES AND/OR VISIBLE ACCESSIBLE PERMANENT FEATURES TO WATER APPURTENANCES SUCH AS VALVE BOXES, SERVICES AND SO ON. VALVE BOXES, CURB BOXES AND TELEPHONE POLES ARE NOT CONSIDERED PERMANENT FEATURES TO RETAIN MEASUREMENTS FROM. THE FINAL AS-BUILT DRAWINGS SET SHALL ACCURATELY MARK THE LOCATION OF EACH INFRASTRUCTURE COMPONENT OR APPURTENANCE AS CONSTRUCTED INCLUDING, BUT NOT LIMITED TO:

- MEASURED HORIZONTAL AND VERTICAL LOCATIONS OF THE ABOVE AND BELOW GRADE WATER MAIN, VALVES, FITTINGS, SERVICES, AND APPURTENANCES, REFERENCED TO PERMANENT SURFACE IMPROVEMENTS, ABOVE GRADE PERMANENT STRUCTURES, AND/OR PERMANENT VISIBLE AND ACCESSIBLE FEATURES OF THE INSTALLATION.
• INFORMATION CONCURRENT WITH THE ACTUAL CONSTRUCTION.
• DISTANCE FROM THE MAIN TO CURB BOX AT EACH SERVICE.
• THREE POINT MEASURED SWING TIES FROM PERMANENT SURFACE IMPROVEMENTS, ABOVE GRADE PERMANENT STRUCTURES AND/OR VISIBLE AND ACCESSIBLE FEATURES OF THE INSTALLATION TO IDENTIFY ALL BENDS, SERVICES AND END CAPS.
• DEPTH OF MAIN AT MAXIMUM OF 50-FOOT INTERVALS, TIES AT EVERY 100FOOT INTERVAL, EACH RECORDED SERVICE AND AT EACH BEND.
• TOTAL OVERLAP.
• DETAIL OF WATER MAIN TAP CONNECTION AND ALL UTILITY CROSSINGS.
• THE COMPLETED WATER MAIN AND ITS PROPER ORIENTATION.
• VALVE OPENING ROTATION (OPEN LEFT OR OPEN RIGHT)

ALL AS-BUILT DRAWINGS SHALL BE PREPARED UNDER THE DIRECTION OF A REGISTERED PROFESSIONAL ENGINEER OR PROFESSIONAL LAND SURVEYOR IN THE STATE OF RHODE ISLAND AND SO STAMPED AND SIGNED. AS-BUILT DRAWINGS SHALL NOT BE ACCEPTED WITH DISCLAIMERS IN REFERENCE TO VERIFICATION OF MEASUREMENTS. AS-BUILT DRAWINGS SHALL CONSIST OF A COVER SHEET, STANDARD DETAILS MODIFIED TO AS-BUILT CONDITIONS AND ALL PLAN SHEETS.

UPON APPROVAL OF THE "BLUE LINE" SUBMISSION, A 6-MIL, DOUBLE MATTE MYLAR MEDIA AND PRINT "WET STAMPED" BY A PROFESSIONAL ENGINEER OR PROFESSIONAL LAND SURVEYOR MUST BE SUBMITTED OF THE FINAL "AS-BUILT" RECORD DRAWINGS AND WILL REMAIN THE PROPERTY OF THE KENT COUNTY WATER AUTHORITY UPON ITS APPROVAL AND ACCEPTANCE.

UPON FINAL APPROVAL, THE CONTRACTOR SHALL ALSO PROVIDE THE "AS-BUILT" IN AUTO CAD, LATEST EDITION DIGITAL FORMAT ACCEPTABLE TO THE KENT COUNTY WATER AUTHORITY. LAYERS SHALL BE ASSIGNED AS INDICATED IN APPENDIX H.

WATER SERVICE WILL NOT BE ACTIVATED UNTIL ALL REQUIREMENTS OF THIS SECTION HAVE BEEN MET TO THE SATISFACTION OF THE KENT COUNTY WATER AUTHORITY.

3.14 RESTRICTIONS: NO NEW SERVICES, SERVICE PIPES OR EXTENSIONS WILL BE LAID DURING THE MONTHS OF NOVEMBER, DECEMBER, JANUARY, FEBRUARY AND MARCH, EXCEPT AT THE DISCRETION OF THE KENT COUNTY WATER AUTHORITY, OR WHEN THE ADDITIONAL EXPENSE INCIDENT TO THE CLIMATIC CONDITIONS IS BORNE BY THE APPLICANT.

ALL VALVES IN THE KENT COUNTY WATER AUTHORITY SYSTEM ARE THE PROPERTY OF KENT COUNTY WATER AUTHORITY AND AS SUCH SHALL NOT BE OPENED BY ANY INDIVIDUAL OTHER THAN WITH THE APPROVAL OF AND IN THE PRESENCE OF THE KENT COUNTY WATER AUTHORITY'S REPRESENTATIVE.

EXISTING SERVICES THAT WILL NOT BE REUSED, RESULTANT FROM DEMOLITION OF A BUILDING, STRUCTURE OR CHANGE IN THE SERVICE SIZE TO CONSTRUCT A NEW BUILDING, STRUCTURE OR CHANGE THE OCCUPANCY REQUIREMENTS SHALL BE DISCONNECTED AND PLUGGED AT THE MAIN.

ALL CONTRACTORS ARE STRICTLY FORBIDDEN FROM OPERATING ANY HYDRANTS OR VALVES WITHIN OUR SYSTEM WITHOUT APPROVAL FROM THE GENERAL MANAGER/CHIEF ENGINEER, AND UNDER THE DIRECTION OF AN ASSIGNED KENT COUNTY WATER AUTHORITY EMPLOYEE ON SCENE.

NO SIDEWALK OR OTHER PUBLIC PLACE SHALL BE OPENED FOR THE LAYING OF SERVICE PIPES UNTIL THE PROPERTY OWNER, THROUGH A LICENSED PLUMBER OR UTILITY CONTRACTOR, OBTAINS A PERMIT FROM THE PROPER CITY, TOWN OR STATE AGENCY.

A MINIMUM OF TEN-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED IN THE PLACEMENT OF WATER MAINS, SERVICES OR APPURTENANCES WITHIN THE VICINITY OF SEWER FACILITIES OR VICE VERSA. WHERE WATER MAINS CROSS SEWER MAINS, THE CROWN OF THE SEWER MAIN SHALL BE AT LEAST 18-INCHES BELOW THE BOTTOM OF THE WATER MAIN, IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN A 10-FOOT, HORIZONTAL SEPARATION OR IN THE CASE OF CROSSING THE EIGHTEEN-INCH, VERTICAL SEPARATION, A DEVIATION FROM THIS RESTRICTION MAY BE ALLOWED ON A CASE BY CASE BASIS WITH PRIOR APPROVAL FROM THE GENERAL MANAGER/CHIEF ENGINEER AS TO THE PROPOSED MATERIALS AND INTERVENTIONS TO BE TAKEN TO PROTECT THE WATER SYSTEM FROM THE POSSIBILITY OF CONTAMINATION. IN ALL CASES, FORCE MAIN SEWER INFRASTRUCTURE MUST BE LOCATED BELOW WATER MAINS.

A MINIMUM OF 24-INCHES HORIZONTAL SEPARATION SHALL BE MAINTAINED IN THE PLACEMENT OF WATER MAINS, SERVICES OR APPURTENANCES WITHIN THE VICINITY OF OTHER UTILITIES SUCH AS GAS, DRAINAGE, ELECTRICAL OR TELEPHONE. WHERE WATER MAINS CROSS OTHER UTILITIES, THE VERTICAL SEPARATION BETWEEN THE WATER INFRASTRUCTURE AND UTILITY SHALL BE AT LEAST 18INCHES. THE PLACEMENT OF OTHER UTILITIES IN THE VICINITY OF WATER FACILITIES SHALL MAINTAIN THESE SEPARATION DISTANCES. IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN THESE SEPARATION DISTANCES, A DEVIATION FROM THIS RESTRICTION MAY BE ALLOWED ON A CASE-BY-CASE BASIS WITH PRIOR APPROVAL FROM THE GENERAL MANAGER/CHIEF ENGINEER AS TO THE PROPOSED DESIGN CONSIDERATIONS.

IN SITUATIONS WHERE NEW SEWER MAIN IS BEING INSTALLED BELOW AN EXISTING ASBESTOS CEMENT WATER MAIN, THE CONTRACTOR SHALL REPLACE THE ASBESTOS CEMENT WATER MAIN WITH A FULL SECTION OF DUCTILE IRON PIPE. THE REPLACEMENT SECTION OF DUCTILE IRON PIPE SHALL BE CENTERED OVER THE SEWER CROSSING.

3.16 TAPPING VALVE AND SLEEVE: A VISUAL INSPECTION AND AIR TEST OF THE ASSEMBLED TAPPING VALVE AND SLEEVE SHALL OCCUR PRIOR TO CUTTING INTO THE PIPE. A FINAL INSPECTION OF THE ASSEMBLED VALVE SHALL OCCUR PRIOR TO BACKFILL. AN AUTHORIZED REPRESENTATIVE OF THE KENT COUNTY WATER AUTHORITY SHALL WITNESS ALL TESTS.

TAPPING SLEEVES SHALL BE UTILIZED IN ALL CASES WHERE THE MAIN CANNOT BE SHUT DOWN FOR INSTALLATION OF A STANDARD "T" CONNECTION.

ALL SIZE ON SIZE TAPPING SLEEVES SHALL BE FULL SIZE CAST IRON OR DUCTILE IRON, MECHANICAL JOINT WITH STAINLESS STEEL FASTENERS MADE IN THE NORTH AMERICA, AS APPROVED BY THE KENT COUNTY WATER AUTHORITY.

SLEEVE COUPLINGS AND ACCESSORIES SHALL BE PRESSURE RATED TO AT LEAST EQUAL THAT OF THE PIPE. COUPLINGS SHALL BE DUCTILE IRON. THE INTERIOR OF THE COUPLING SHALL BE EPOXY COATED IN ACCORDANCE WITH AMERICAN WATER WORKS ASSOCIATION ASTM & ANSI STANDARDS. COATING SHALL BE THERMOSETTING EPOXY WITH A MINIMUM DRY FILM THICKNESS OF 40 MILS AND A MAXIMUM OF 20 MILS. FABRICATED SLEEVES WILL BE ALLOWED ONLY ON DUCTILE IRON MAINS, CAST IRON MAINS OR PVC MAINS WITH PRIOR APPROVAL BY THE KENT COUNTY WATER AUTHORITY.

ALL SLEEVES SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS; COPIES OF THE INSTALLATION GUIDANCE SHALL BE AVAILABLE ON SITE DURING INSTALLATION.

WATER MAIN ON BRANCH SIDE OF TAPPING SLEEVE SHALL BE RESTRAINED IN ACCORDANCE WITH PERTINENT SECTIONS OF THE RULES AND REGULATIONS.

3.17 HYDRANTS: THE MINIMUM DEPTH SHALL BE 5' - 0", AS MEASURED FROM THE HYDRANT BARREL BURY LINE TO THE TOP OF THE PIPE TO WHICH THE HYDRANT IS CONNECTED.

HYDRANTS SHALL BE LOCATED A MINIMUM OF 2'-0" BEHIND FACE OF CURB OR EDGE OF PAVEMENT, WHERE SIDEWALKS ARE PRESENT, THE HYDRANT SHALL BE INSTALLED BEHIND THE SIDEWALK FACE TO PROVIDE FOR UNOBSTRUCTED PEDESTRIAN FLOW. FINAL PLACEMENT OF A HYDRANT MUST ACCOMMODATE THE 36 INCH MINIMUM HORIZONTAL CLEARANCE (ADA REQUIREMENT) BEHIND HYDRANT IN PATH OF PEDESTRIAN FLOW, IN SOME SITUATIONS, THE SETBACK LOCATION SHALL BE AS DIRECTED BY THE FIRE CHIEF OR AS LOCAL ORDINANCES DICTATE. IN ALL CASES THE HYDRANT SHALL BE POSITIONED ON THE SAME SIDE OF THE STREET AS THE MAIN. A FULL 360 DEGREE FOUR (4) FOOT MINIMUM DIAMETER CLEAR SWING DISTANCE IS REQUIRED FOR FULL OPERATION OF THE OPERATING NUT.

HYDRANTS SHALL BE SET PLUMB AND AT BURY GRADE LINE, AS SET BY THE MANUFACTURER WITH THE STEAMER PORT FACING THE ROADWAY. UNDER NO CIRCUMSTANCES, SHALL A HYDRANT INSTALLATION OBSTRUCT DRIVEWAYS, ROADWAYS OR PEDESTRIAN TRAFFIC ON SIDEWALKS.

FILTER FABRIC SHALL BE WRAPPED AROUND THE DRAIN HOLES OF THE BOOT. PRIOR TO BACKFILLING AND COMPACTION, ONE CUBIC YARD OF 1/2" TO 1" CRUSHED STONE SHALL BE PACKED AROUND THE BOOT AND HYDRANT VALVE UP TO THE BASE OF THE VALVE BOX. STONE SHALL BE WRAPPED IN FILTER FABRIC, HOLE BACKFILLED AND COMPACTED.

HYDRANT ISOLATION VALVES SHALL BE CONNECTED DIRECTLY TO THE SWIVEL OR ANCHOR TEE. AN APPROVED RESTRAINED GLAND STYLE FITTING SHALL BE UTILIZED ON THE HYDRANT BOOT SIDE FOR RESTRAINT. RODDING OF HYDRANTS IS STRICTLY FORBIDDEN AND THE USE OF POSITIVE MECHANICAL RESTRAINTS, SUCH AS AN APPROVED RESTRAINED GLAND STYLE FITTING, IS THE ONLY RESTRAINT SYSTEM AUTHORIZED. A THRUST BLOCK SHALL BE INSTALLED ON THE BACKSIDE OF THE ANCHOR TEE. THE MANUFACTURER SHALL PERMANENTLY COAT ALL MECHANICAL RESTRAINTS AGAINST CORROSION. THE INSTALLER, PRIOR TO BACKFILLING, SHALL REPAIR ANY DAMAGE TO THE HYDRANT COATING SYSTEM.

ANY PROPOSER INSTALLING ONE (1) OR MORE HYDRANTS SHALL PROVIDE TO KENT COUNTY WATER AUTHORITY AT TIME OF INSTALLATION A SET OF SPARE PARTS TO INCLUDE THE FOLLOWING: ONE TRAFFIC REPAIR KIT, ONE FULL SET OF "O" RINGS AND GASKETS, ONE SET OF DRAIN VALVE FACINGS, ONE HYDRANT VALVE REMOVAL WRENCH AND ONE HYDRANT OPERATING WRENCH STRAIGHT BAR STYLE ADJUSTABLE. FOR EVERY MULTIPLE OF 3 HYDRANTS AN ADDITIONAL SET OF SPARE PARTS (MINUS WRENCHES) ARE REQUIRED. ALL PARTS ARE TO BE PROPERLY LABELED AND HOUSED IN A CARTON WITH PART NUMBERS CLEARLY INDICATED. ALL PARTS SHALL BE ORIGINAL EQUIPMENT REPLACEMENT PARTS MANUFACTURED BY THE HYDRANT MANUFACTURER.

PRIVATE HYDRANTS SHALL HAVE BACKFLOW PREVENTION AND METERING INCLUDED IN THE INSTALLATION DESIGN SPECIFICATION. APPROVAL BY THE GENERAL MANAGER/CHIEF ENGINEER SHALL BE REQUIRED PRIOR TO COMMENCING WORK ON ANY HYDRANT INSTALLATION.

3.18 SERVICES: ALL CONDOMINIUM UNITS SHALL BE EQUIPPED WITH A STANDARD OF 3/4" SERVICE. UNITS OVER 200 FEET FROM THE WATER MAIN SHALL BE EQUIPPED WITH A WATER TIGHT METER CHAMBER AND MINIMUM OF 1" SERVICE. INFLUENT AND EFFLUENT VALVES SHALL BE PROVIDED INSIDE THE CHAMBER BEFORE AND AFTER THE METER. SERVICE SIZES ARE TO BE DETERMINED BY THE OWNER'S ENGINEER BASED ON THE PRESSURE SUPPLY AND DEMAND. A RESIDENTIAL BACKFLOW DEVICE MUST BE INSTALLED EITHER DIRECTLY AFTER THE METER OR JUST INSIDE THE BUILDING FOUNDATION BEFORE THE FIRST TAP TO ANY APPLIANCE OR PUMPING ARRANGEMENT.

WATER SERVICES SHALL BE LOCATED ALONG THE FRONTAGE OF THE PROPERTY THAT BOARDERS THE ROADWAY OF THE RECORDED STREET ADDRESS FOR THE PROPERTY. IN SITUATIONS WHERE A WATER MAIN DOES NOT CURRENTLY EXIST ACROSS THE FRONTAGE OF THE PROPERTY THE WATER SERVICE APPLICANT SHALL BE RESPONSIBLE TO EXTEND A FULL SIZE WATER MAIN TO THE PROPERTY AND ALONG THE ENTIRE FRONTAGE OF THE PROPERTY. IN ORDER TO AVOID DEAD END CONDITIONS, THE MAIN MAY BE REQUIRED TO BE EXTENDED TO COMPLETE AN INTERCONNECTION. THIS DETERMINATION WILL BE MADE BY THE GENERAL MANAGER/CHIEF ENGINEER OF THE AUTHORITY.

EACH TAP TO THE MAIN SHALL BE BY AN APPROVED METHOD AND EQUIPPED WITH A BRONZE CORPORATION STOP "CTS" COMPRESSION SERVICE SIDE END. EACH SERVICE SHALL BE EQUIPPED WITH A CURB STOP, WHICH SHALL BE INSTALLED TWO FEET BEHIND THE FACE OF CURB OR EDGE OF PAVEMENT. CURB STOP SHALL BE BRONZE CORPORATION FITTED AND OF NO DRIP CONFIGURATION. DIRECTION OF OPENING SHALL BE OPEN LEFT. CURB BOX SHALL BE INSTALLED DIRECTLY OVER THE CURB STOP AND BROUGHT TO FINISHED GRADE. BOX SHALL BE "BUFFALO" STYLE 2-1/2 INCH AND SUFFICIENT LENGTH FOR FULL COVER. A 1' X 6" CONCRETE RIG OR SLAB SHALL BE INSTALLED TO SUPPORT THE UPPER BOX IN AREAS WHERE THE INSTALLATION OF THE CURB BOX DOES NOT OCCUR WITHIN A PAVED OR CONCRETE SIDEWALK AREA.

DEPTH OF SERVICES SHALL BE AT A MINIMUM OF FIVE FEET TO FINISHED GRADE THROUGHOUT INSTALLATION.

ALL FITTINGS AND PIPE SHALL BE SWABBED WITH APPROVED CHLORINE SOLUTION AND CLEANED OF ALL FOREIGN MATERIAL PRIOR TO INSTALLATION. THE SERVICE PIPE SHALL BE DISINFECTED AND PRESSURE TESTED PRIOR TO METER INSTALLATION.

IDENTIFICATION TAPE AS SPECIFIED IN THE MATERIAL FACT SHEET SHALL BE UTILIZED FOR THE FULL LENGTH OF SERVICES AND SET TO A DEPTH FROM FINISHED GRADE OF NO MORE THAN 1'-0".

ALL SERVICES 1 1/2" OR 2" REQUIRE A SADDLE UNLESS DIRECT TAPPING EQUIPMENT IS AVAILABLE. ANY SERVICE BEING INSTALLED ON AC OR PLASTIC P.V.C. MAINS REQUIRE A SERVICE SADDLE REGARDLESS OF SIZE.

A BALL VALVE RATED FOR THE SERVICE PRESSURE, SHALL BE INSTALLED JUST PRIOR TO THE LOCATION OF THE METER COUPLING, AND ONE BALL VALVE AND RESIDENTIAL BACKFLOW DEVICE INSTALLED IMMEDIATELY AFTER THE OUTLET SIDE OF THE SECOND METER COUPLING.

SERVICES 4" AND ABOVE SHALL BE DUCTILE IRON AND CONFORM TO THE REQUIREMENTS FOR MAIN AND VALVE INSTALLATION.

SERVICE SIZE SHALL REMAIN CONSISTENT WITH THE SERVICE TAP SIZE UP TO THE POINT BEFORE THE METER WHERE SERVICE ENTERS THE BUILDING OR METER PIT.

3.20 THRUST RESTRAINT: RESTRAINING DEVICES SHALL BE UTILIZED ON ALL MAINS UNDER THE FOLLOWING CONDITIONS:

- PIPELINE DIRECTION CHANGES (TEES, BENDS), VERTICAL AND HORIZONTAL
• DEAD END LINES (CAPS OR PLUGS)
• TRANSITION PIECES (REDUCERS)
• VALVES ON DEAD END LINES
• HYDRANTS
• TAPPING SLEEVES

THRUST BLOCKS SHALL BE DESIGNED TO WITHSTAND THE FORCE IMPARTED BY THE HYDRAULIC INFLUENCE ENCOUNTERED WITHIN THE MAIN. MINIMUM 1-1/2 TIMES THE ANTICIPATED WORKING PRESSURE OF THE MAIN, BUT NOT LESS THAN 150 PSI. MAXIMUM LATERAL BEARING CAPACITY SHALL BE 1500 LB/SF.

ALL THRUST BLOCKS SHALL BE CONSTRUCTED FROM CONCRETE 3000 PSI, AT 28 DAYS, SIZED ACCORDING TO THE SIZE OF PIPELINE, TYPE OF FITTING, WATER PRESSURE AND THE CHARACTERISTICS OF THE SOIL. BEARING SURFACE SHALL BE AGAINST UNDISTURBED SOLID EARTH FOR THE REQUIRED BEARING AREA. THE CONCRETE SHALL BE PROPERLY FORMED AS TO SLOPE FOR THE GIVEN APPLICATION AND BEARING WIDTH. THE CONCRETE SHALL BE IN CONTACT ONLY WITH THE FITTING, NOT WITH THE PIPE ITSELF, FASTENERS OR THE JOINT. CURING TIME SHALL BE A MINIMUM OF 7 DAYS.

STONE, TIMBER, CONCRETE BLOCK OR ANY MATERIALS THAT DETERIORATE ARE STRICTLY FORBIDDEN TO USE AS A PERMANENT THRUST BLOCK OR RESTRAINT.

OPTIONAL THRUST RESTRAINT SHALL BE VIA RESTRAINED JOINT, DUCTILE IRON PIPE MEETING ANSII/AWWA C151/A21.51 AND ANSII/AWWA C11/A21.11 AND APPROVED BY THE GENERAL MANAGER/CHIEF ENGINEER. RESTRAINED JOINT PIPE LENGTHS (RESTRAINED LENGTH) SHALL BE SUFFICIENT TO RESTRAIN THRUST IMPARTED BY 1-1/2 TIMES THE ANTICIPATED WORKING PRESSURE, BUT NOT LESS THAN 150 PSI WITH A 1.5 FACTOR OF SAFETY.

THE USE OF THE RODS MAY BE ALLOWED BY WRITTEN PERMISSION OF THE GENERAL MANAGER/CHIEF ENGINEER. THIS TYPE OF RESTRAINT CONFIGURATION WILL ONLY BE CONSIDERED IN SITUATIONS WHERE APPROVED TYPES OF RESTRAINT SYSTEMS CANNOT BE USED. IF ALLOWED, THEY SHALL BE OF SUFFICIENT STRENGTH TO WITHSTAND FORCES IMPARTED TO THEM. A FACTOR OF SAFETY SHALL BE 2.0 FOR ALL ROD THICKNESS CALCULATIONS. ALL RODS SHALL BE STAINLESS STEEL OR PROTECTED FROM CORROSION WITH TWO COATS OF EPOXY PAINT.

APPROVED THRUST RESTRAINT SHALL BE BY AN APPROVED RESTRAINING GLAND SYSTEM UTILIZING IN COMBINATION WITH MECHANICAL JOINT PIPE AND FITTINGS. ALL CALCULATIONS MUST BE CONTAINED IN THE APPLICATION SUBMISSION AND SHALL BE IN CONFORMANCE WITH THE MANUFACTURING REQUIREMENTS FOR LENGTH, FITTING AND TYPE OF RESTRAINT.

3.21 INSTALLATION METHODS: INSTALLATION OF ALL WATER CONVEYANCES, MAINS, PIPES OR LINES SHALL BE IN ACCORDANCE WITH THE DUCTILE IRON PIPE RESEARCH ASSOCIATION'S INSTALLATION MANUAL AND ANSII/AWWA C600 AND ALL OTHER REQUIREMENTS OF THE KENT COUNTY WATER AUTHORITY.

WATER MAIN AND SERVICES SHALL BE INSTALLED WITH A MINIMUM COVER OF 5 FEET TO THE CROWN OF THE PIPE IN AN AMERICAN WATER WORKS ASSOCIATION "TYPE 5 TRENCH". WHERE UNSUITABLE MATERIAL IS FOUND AT OR BELOW THE GRADE OF THE PLACEMENT OF THE PIPE OR FITTING, THE UNDESIRABLE MATERIAL SHALL BE REMOVED TO THE REQUIRED WIDTH AND DEPTH AND REPLACED WITH THOROUGHLY COMPACTED BANK RUN GRAVEL ABOVE THE CROWN OF THE TRENCH IN LAYERS OF NOT MORE THAN 12" IN DEPTH BEFORE COMPACTION. EACH LAYER, TO WITHIN 12" OF SUBGRADE OF THE PERMANENT PATCH, SHALL BE COMPACTED TO 95% STANDARD PROCTOR. THE FINAL 12" SHALL BE PROCESSED GRAVEL COMPACTED IN TWO (2) EQUAL COURSES TO 95% STANDARD PROCTOR

EACH LENGTH OF PIPE AND OR FITTING SHALL BE INSPECTED FOR CRACKS, DEFECTS IN COATING ON LINDING, CLEANLINESS OR ANY OTHER EVIDENCE OF UNSUITABILITY.

PIPING SHALL BE LAID STRAIGHT TRUE TO LINE.

AIR RELEASE MANHOLES SHALL BE INSTALLED AT ALL HIGH POINTS THROUGHOUT THE PROPOSED INSTALLATION AND SHALL BE EQUIPPED WITH AUTOMATIC AIR RELEASE VALVES. MANHOLES SHALL BE LOCATED AT ROADWAY CROWNS OR AREAS WHERE IT IS FREE DRAINING AWAY FROM MANHOLE COVERS.

MANHOLES SHALL BE WATERTIGHT PRE-CAST CONCRETE CONSTRUCTED WITH WATERTIGHT CAST IRON MANHOLE FRAME (28" CLEAR OPENING) AND DIAMOND CHECK PATTERN COVER. OUTER COVER SHALL HAVE THE WORD "WATER" CAST UPON IT IN 4" CAPITAL LETTERS. THE INNER COVER SHALL BE GASKETED WITH ADJUSTABLE LOCKING BAR DESIGN. THE CHAMBER, FRAME, COVER, AND STRUCTURAL COMPONENTS SHALL BE DESIGNED TO WITHSTAND AN H-20 WHEEL LOADING.

MANHOLE STEPS SHALL BE OF SAFETY TYPE, 12" ON CENTER AND SHALL BE CAST INTO THE UNITS DURING THE MANUFACTURING PROCESS. THE DISTANCE FROM THE RIM OF THE COVER FRAME TO THE TOP STEP SHALL BE NO GREATER THAN 12".

THE MANHOLE CHAMBER SHALL BE FITTED WITH LEAK TIGHT MECHANICAL PIPE CONNECTIONS PROPERLY SIZED TO FIT THE PROPOSED WATER MAIN. MANHOLES SHALL BE VACUUM OR HYDROSTATICALLY TESTED FOR WATERTIGHT INTEGRITY OF THE MANHOLE INSTALLATION.

HORIZONTAL JOINTS BETWEEN ALL BARRELS, TOP SLAB, BASES, AND ENTRANCES SLAB JOINTS SHALL BE SEALED USING A FLEXIBLE BUTYL RESIN SEALANT CONFORMING TO FEDERAL SPECIFICATIONS SS-S-210A AND AASHTO-M-1988 OR EQUAL. THE EXTERIOR OF THE MANHOLE SHALL BE COMPLETELY COATED AND VOID FILLED WITH AN ASPHALTIC, WATERPROOFING COMPOUND.

LINE VALVES SHALL BE INSTALLED AT ALL INTERSECTIONS IN A CONFIGURATION THAT ALLOWS FOR ISOLATION IN ALL DIRECTIONS. ON LONG LENGTHS OF MAIN, VALVES SHALL BE INSTALLED AT A MINIMUM OF 800 FEET INTERVALS AND AT ALL DEAD END SECTIONS.

PIPE MAY BE DEFLECTED IN ORDER TO MAKE MINOR ADJUSTMENTS IN THE ALIGNMENT. ALL DEFLECTIONS SHALL BE A MAXIMUM OF 75% OF THE MANUFACTURER'S SAFE ALLOWABLE DEFLECTION PER PIPE LENGTH AS INDICATED IN THE FOLLOWING TABLES. IT IS REQUIRED THAT BENDS IN THE PIPE BE ACCOMPLISHED BY FITTINGS WHEREVER POSSIBLE.

ALLOWABLE DEFLECTION FOR 18-FOOT LENGTHS PIPE

Table with 3 columns: SIZE OF PIPE (IN.), PUSH-ON JOINT (IN.), MECH. JOINT (IN.). Rows include pipe sizes 4, 6, 8-12, 14-16, 18-20, 24-30.

ALLOWABLE DEFLECTION FOR 20-FOOT LENGTHS PIPE

Table with 3 columns: SIZE OF PIPE (IN.), PUSH-ON JOINT (IN.), MECH. JOINT (IN.). Rows include pipe sizes 4, 6, 8-12, 14-16, 18-20, 24-30.

WHENEVER PIPE REQUIRES CUTTING TO FIT THE LINE, THE WORK SHALL BE DONE ONLY BY EXPERIENCED (STATE OF RHODE ISLAND, LICENSED CONTRACTOR) OR PLUMBER, AND IN SUCH A MANNER AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE AND ON PIPE THAT IS CENTER ROUNDED DESIGNED SPECIALLY FOR FIELD CUTTING, THE CUT ENDS SHALL BE BEVELED TO CONFORM TO THE MANUFACTURED SMOOTH END. PARTICULAR CARE SHALL BE EXERCISED TO PREVENT DAMAGING THE LINING WITH CUTTING OR CEMENT-LINED CAST OR DUCTILE IRON PIPE. JOINTING OF PIPE OR FITTINGS SHALL BE MADE ONLY BY PERSONS THOROUGHLY SKILLED IN THIS WORK. FOR PIPE DIAMETERS 16" AND LARGER, PIPE CUTTING SHALL BE DONE BY MACHINE.

BLOCKING UNDER THE PIPE SHALL NOT BE PERMITTED EXCEPT WHERE A CONCRETE CRADLE IS PROPOSED.

METALIZED DETECTABLE IDENTIFICATION TAPE 2" IN WIDTH OR GREATER, BLUE IN COLOR AND PRINTED WITH "CAUTION WATER LINE BURIED BELOW" SHALL BE UTILIZED OVER ALL MAINS. SET TO A DEPTH FROM FINISHED GRADE OF NO MORE THAN 1' - 0".

A TEMPORARY PATCH SHALL BE INSTALLED OVER THE FRESHLY BACKFILLED TRENCH IN AN EXISTING STREET OR SIDEWALK USING HOT BITUMINOUS CONCRETE. IT SHALL BE AT LEAST 3" THICK CONSISTING OF EQUAL THICKNESS LAYERS OF MODIFIED BINDER AND TYPE I-1 WEARING COURSE. AFTER 60 DAYS, THE TEMPORARY PATCH SHALL BE REMOVED AND REPLACED WITH A PERMANENT PATCH.

AT ALL TEMPORARY CUL-DE-SACS AND FUTURE STREETS, THE MAIN SHALL END WITH A FULL SIZE LINE VALVE FOLLOWED BY A FULL LENGTH OF PIPE WITH AN ADDITIONAL 3-FOOT SECTION OF PIPE AND END WITH A (MJ) CAP, THRUST BLOCK AND 2-INCH STYLE BLOW OFF ASSEMBLY.

WATER DISTRIBUTION MAINS SHALL BE DESIGNED IN A GRID OR LOOP TYPE SYSTEM TO PREVENT THE OCCURRENCE OF DEAD END LINES. WHEN THE POTENTIAL FOR DEAD END LINES EXIST, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO PASS THE MAIN THROUGH THE DEVELOPMENT TO THE NEXT EXISTING DISTRIBUTION LINE.

IN ALL CASES WHERE A DEAD END MAIN IS TO BE INSTALLED ON A DEAD END STREET OR CUL-DE-SAC THE KENT COUNTY WATER AUTHORITY RESERVES THE RIGHT TO HAVE THE MAIN EXTENDED TO ANOTHER EXISTING MAIN OR LOOPED BACK TO THE FEEDER MAIN WITH PROPER VALVING TO PREVENT A DEAD END MAIN CONDITION.

WATER MAINS SHALL BE LAID WITH A MINIMUM OF TEN-FOOT HORIZONTAL CLEARANCE FROM ANY EXISTING SEWER FACILITIES. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. WATER MAINS CROSSING UNDER SEWERS SHALL BE FORBIDDEN. WATER MAINS CROSSING OVER SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL SEPARATION OF EIGHTEEN-INCHES BETWEEN THE INVERT OF THE WATER MAIN AND THE CROWN OF THE SEWER. RE-ALIGNMENT OF AN EXISTING WATER MAIN OR RELOCATION OF THE SEWER MAY BE NECESSARY TO ACHIEVE THIS VERTICAL SEPARATION. THE GENERAL MANAGER/CHIEF ENGINEER MUST APPROVE ANY DEVIATION FROM THESE REQUIREMENTS. CONCRETE ENCASING SHALL NOT BE ALLOWED IN THE DESIGN FOR SEWER AND WATER MAIN CROSSINGS.

DEFLECTED IN THE DIRECTION OF OPERATING WATER MAIN CROSSING.

AT ALL TIMES, DURING CONSTRUCTION, ALL PIPING AND FITTINGS SHALL BE KEPT FROM BECOMING CONTAMINATED FROM CONSTRUCTION MATERIALS, DIRT, NON POTABLE WATER, YARD WASTE OR SUBSTANCES PRODUCED AS A RESULT OF ANIMALS, RODENTS, AND INSECTS. WITHOUT EXCEPTION, ALL STORED PIPING SHALL BE TIMBER CRIBBED ABOVE GRADE, AND SHALL BE FITTED WITH WATERTIGHT PLUGS OR PLASTIC SHEET SECURELY FASTENED TO THE PIPE. ALL VALVES, FITTINGS, AND APPURTENANCES SHALL BE FITTED WITH CAPS, PLUGS OR PLASTIC SHEET SECURELY FASTENED TO THE FITTING. THE IMPLEMENTATION OF THESE PROTECTIVE MEASURES IS REQUIRED TO REDUCE THE SIGNIFICANT LOSS OF WATER AND LABOR HOURS EXPENDED DURING MULTIPLE ATTEMPTS TO SUFFICIENTLY CLEAN THE NEW MAINS TO MEET THE WATER QUALITY STANDARD SET BY THE US EPA PRIMARY DRINKING WATER REGULATIONS.

ADEQUATE, TEMPORARY PROVISIONS SHALL BE MADE TO CARE FOR THE FLOW FROM SEWERS OR DRAINS INTERFERED WITH BY THE WORK. ALL NECESSARY MEASURES SHALL BE TAKEN TO PREVENT SEWAGE OR OTHER CONTAMINATING MATTER FROM ENTERING THE WATER MAIN. ANY BROKEN OR DAMAGED UTILITY CONNECTION OR SERVICES (WATER, SEWER, GAS, TELEPHONE, ELECTRIC, ETC.) SHALL BE FULLY REPAIRED AT THE EXPENSE OF THE PARTY RESPONSIBLE FOR THE DAMAGE. UNDERGROUND STRUCTURES SHALL BE THOROUGHLY SUPPORTED OR OTHERWISE PROTECTED TO MAINTAIN UNINTERRUPTED SERVICE.

PIPE THAT IS REMOVED SHALL REMAIN THE PROPERTY OF THE PARTY WHOSE RESPONSIBILITY IT SHALL BE TO PROPERLY DISPOSE OF IT. FOR EXAMPLE, IF A PRIVATE CONTRACTOR IS AUTHORIZED TO DO THIS WORK, THE CONTRACTOR IS THE RESPONSIBLE PARTY AND MUST DISPOSE OF THE PIPE.

NO PERSON, EXCEPT AN AUTHORIZED REPRESENTATIVE OF THE KENT COUNTY WATER AUTHORITY OR UNDER THEIR OBSERVATION, WILL BE ALLOWED UNDER ANY CIRCUMSTANCES TO TAP THE MAINS OR DISTRIBUTION PIPES, INSERT CORPORATION STOPS THEREIN, SET OR REMOVE METERS ON SERVICE PIPES, OR INTERFERE WITH WATER GATES OR CURB STOPS. NO NEW PIPING SYSTEM SHALL BE PERMANENTLY CONNECTED TO AN EXISTING KENT COUNTY WATER AUTHORITY MAIN UNTIL AFTER OBTAINING SUCCESSFUL RESULTS FROM WATER QUALITY TESTS FROM A STATE OF RHODE ISLAND CERTIFIED LABORATORY MEETING THE STANDARDS SET BY RI DEPARTMENT OF HEALTH, AND WATER QUALITY TEST INDICATE THAT THE SAMPLES ARE CONSISTENT WITH THE QUALITY OF WATER IN THE KENT COUNTY WATER AUTHORITY SYSTEM, INCLUDING HETEROTROPHIC PLATE COUNT RESULTS.

TEMPORARY FITTINGS FOR FLUSHING, PRESSURE TESTING AND CHLORINATION ARE REQUIRED FOR ALL NEWLY INSTALLED MAINS. NEW MAINS SHALL BE CAPPED AT EACH END. EACH END SHALL BE FITTED WITH A TEMPORARY RISER OF SUFFICIENT LENGTH TO REACH FINISHED GRADE AND AN ISOLATION VALVE. THE LIVE MAIN TAP SHALL BE FITTED WITH AN ISOLATION VALVE, TWO FEET OF MAIN THAT IS RESTRAINED, RESTRAINED CAP AND TEMPORARY RISER OF SUFFICIENT LENGTH TO REACH FINISHED GRADE AND AN ISOLATION VALVE. RISERS AND ISOLATION VALVES SHALL BE SIZED TO PROVIDE A FLOWING WATER VELOCITY OF AT LEAST 2.5 FEET PER SECOND BASED ON THE INSTALLED MAIN SIZE. A METER AND TESTABLE BACKFLOW PREVENTER IS REQUIRED TO BE PLACED IN THE JUMPER LINE BETWEEN THE EXISTING AND NEW MAIN PRIOR TO OBTAINING WATER FOR ANY PROCESS. DEPENDING ON THE SIZE OF THE MAIN, MULTIPLE TAPS AND BACKFLOW PREVENTERS MAY BE REQUIRED TO PROVIDE THE REQUIRED VELOCITIES WITHIN THE NEW MAIN.

3.22 PRESSURE TEST: ALL SERVICES, WATER MAINS, BYPASS PIPING AND APPURTENANCES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ANY TEST. A PRESSURE TEST SHALL BE CONDUCTED ON ALL COMPLETED WATER LINES PRIOR TO ACCEPTANCE. THE PROPOSER, AT NO COST TO THE KENT COUNTY WATER AUTHORITY, SHALL ACCOMPLISH THE PRESSURE TEST. AN AUTHORIZED REPRESENTATIVE OF THE KENT COUNTY WATER AUTHORITY SHALL WITNESS THE TEST.

EACH VALVE SECTION OF THE MAIN SHALL BE FILLED SLOWLY WITH WATER AT A RATE NO GREATER THAN ONE FOOT OF PIPE SECTION PER SECOND. ALL AIR SHALL BE RELEASED. RESTRAINED CAP AND TEMPORARY RISER OF SUFFICIENT LENGTH TO REACH FINISHED GRADE AND AN ISOLATION VALVE. RISERS AND ISOLATION VALVES SHALL BE SIZED TO PROVIDE A FLOWING WATER VELOCITY OF AT LEAST 2.5 FEET PER SECOND BASED ON THE INSTALLED MAIN SIZE. A METER AND TESTABLE BACKFLOW PREVENTER IS REQUIRED TO BE PLACED IN THE JUMPER LINE BETWEEN THE EXISTING AND NEW MAIN PRIOR TO OBTAINING WATER FOR ANY PROCESS. DEPENDING ON THE SIZE OF THE MAIN, MULTIPLE TAPS AND BACKFLOW PREVENTERS MAY BE REQUIRED TO PROVIDE THE REQUIRED VELOCITIES WITHIN THE NEW MAIN.

THE TEST PRESSURE SHALL BE BROUGHT UP TO AT LEAST 50% HIGHER THAN THE NORMAL ANTICIPATED WORKING PRESSURE, OR 150 PSI, WHICHEVER IS GREATER, AND MAINTAINED FOR A CONTINUOUS TWO (2) HOUR PERIOD. AN AUTHORIZED REPRESENTATIVE OF THE KENT COUNTY WATER AUTHORITY SHALL WITNESS THE TEST. ANY LOSS OF PRESSURE INDICATES A LEAK, AND NO PIPE INSTALLATION WILL BE ACCEPTED WITH ANY LEAKAGE.

PROPER THRUSTING OF ALL PIPEFITTING, CAPS, HYDRANTS, AND APPURTENANCES SHALL BE PROVIDED TO RESIST THE IMPOSED TEST PRESSURE.

3.23 CHLORINATION/DISINFECTION: ALL NEW OR REPAIRED POTABLE WATER SYSTEM DISTRIBUTION MAINS, SERVICE PIPE AND APPURTENANCES SUCH AS VALVES, FITTINGS, CONTROL VALVES, AND ALL APPURTENANCES IN OR ADJACENT TO ANY RESIDENCE, BUILDING OR PREMISES SHALL BE PURGED OF DELETERIOUS MATTER AND SHALL BE DISINFECTED PRIOR TO UTILIZATION OR PERMANENT CONNECTION TO THE KENT COUNTY WATER AUTHORITY SYSTEM. THAT PORTION OF THE CUSTOMER'S SERVICE PIPE AFTER THE CURB STOP SHALL BE DISINFECTED UNDER THE SUPERVISION OF THE LOCAL PLUMBING OFFICIAL. THE OWNER MUST PROVIDE WRITTEN LABORATORY CERTIFIED DOCUMENTATION OF THE DISINFECTION TEST RESULTS TO THE KENT COUNTY WATER AUTHORITY BEFORE MAKING ANY PERMANENT CONNECTION TO THE KENT COUNTY WATER AUTHORITY SYSTEM OR BEFORE REACTIVATION OF ANY EXISTING WATER SERVICE CAN BE AUTHORIZED. PLEASE REFER TO APPENDICES FOR PROGRAM REQUIREMENTS OF THE CUSTOMER WATER SERVICE DISINFECTION POLICY.

THE PROPOSER OR THE CONTRACTOR FOR THE PROPOSER, IN ACCORDANCE WITH CHAPTER 5, DISTRIBUTION SYSTEM CHLORINATION, AMERICAN WATER WORKS ASSOCIATION MANUAL #20, SHALL PERFORM CHLORINATION. TABLET CHLORINATION SHALL NOT BE ALLOWED.

THE OWNER OR CUSTOMER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE DISINFECTION PROCESS OR PROCEDURE.

THE DISINFECTION MUST RESULT IN ELIMINATING FROM THE VARIOUS PARTS OF THE NEW PIPE LINE ANY EVIDENCE OF THE EXISTENCE, THEREIN, OF BACTERIA INDICATIVE OF ANY CONTAMINATION, AS DETERMINED BY TESTS OF THE BACTERIAL CONTENT OF SAMPLES OF WATER TAKEN FROM THE NEW WATER MAIN. THE DISINFECTION MAY BE ACCOMPLISHED BY INTRODUCING INTO ALL THE VARIOUS PARTS OF THE NEW WATER MAINS, A LIQUID SOLUTION CONTAINING 1% AVAILABLE CHLORINE IN SUCH VOLUME THAT THE RATE OF DOSAGE TO THE WATER MAINS SHALL BE AT LEAST 50 PARTS PER MILLION OF AVAILABLE CHLORINE. TABLET CHLORINATION IS NOT ALLOWED. THE CONTACT PERIOD FOR THIS DISINFECTION SHALL BE AT LEAST 24 HOURS, AND A LONGER PERIOD WILL BE REQUIRED IF TESTS OF RESIDUAL CHLORINE SHOW IT TO BE NECESSARY FOR PROPER DISINFECTION.

THE NEW WATER SYSTEM SHALL BE FLUSHED OUT AFTER DISINFECTION AND REFILLED WITH FRESH WATER. ALL CHLORINATED WATER USED IN THE DISINFECTION PROCESS SHALL BE DE-CHLORINATED PRIOR TO DISCHARGE TO THE SURROUNDING AREA.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT OFFICE OF WATER RESOURCES FRESHWATER WETLANDS PROGRAM APPROVED WITH CONDITIONS AS SPECIFIED IN THE LETTER OF APPROVAL

DATED NOV 9 2017 FILE # 17-0233 NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL APPROVED PLANS MUST BE AT CONSTRUCTION

Charles A. Hulse

CONSTRUCTION NOTES CONTINUED:

WATER MUST SIT IN THE MAIN FOR AT LEAST 24 HOURS PRIOR TO TAKING A TEST SAMPLE. WATER UTILIZED FOR THIS PURPOSE, FLUSHING OR PRESSURE TESTING, WHICH IS OBTAINED DIRECTLY FROM THE KENT COUNTY WATER AUTHORITY SYSTEM, MUST FLOW THROUGH AN ISOLATED CONNECTION TO THE KENT COUNTY WATER AUTHORITY SYSTEM VIA AN APPROVED METER, TESTABLE BACKFLOW PREVENTION DEVICE AND JUMPER LINE. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS FOR SECURING THE WATER FOR TEST PURPOSES AND SHALL BEAR THE EXPENSE OF THESE ARRANGEMENTS. THE INSTALLER SHALL FURNISH AND INSTALL SUITABLE TEMPORARY TESTING PLUGS, CAPS, PUMPS, PIPE CONNECTIONS AND OTHER APPURTENANCES, AS NECESSARY, TO OBTAIN SAMPLES AT POINTS NO FURTHER THAN 1,000 FEET APART.

AFTER FINAL FLUSHING AND BEFORE THE NEW WATER MAIN IS CONNECTED TO THE DISTRIBUTION SYSTEM, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES FOR COLIFORM BACTERIA AND HETEROTROPHIC PLATE COUNT (HPC), TAKEN 24 HOURS APART, SHALL BE COLLECTED FROM THE TERMINATION OF THE NEW MAIN. AT LEAST ONE SAMPLE SHALL BE COLLECTED EVERY 1000 FT. OF NEW MAIN, PLUS ONE SET OF TWO SAMPLES FROM THE END OF THE LINE. AT LEAST ONE SET OF TWO SAMPLES SHALL BE TAKEN FROM EACH BRANCH. SAMPLES SHALL BE COLLECTED BY KENT COUNTY WATER AUTHORITY EMPLOYEES, GIVEN A TWO-DAY NOTICE, AND TESTED BY A LABORATORY APPROVED BY KENT COUNTY WATER AUTHORITY. A FEE SHALL BE IMPOSED FOR THE SAMPLING TESTING FOR EACH TEST. THE FEE SHALL BE AT THE CURRENT RATE SCHEDULE IN EFFECT AT THE TIME OF TESTING. PAYMENT SHALL BE PRIOR TO SAMPLE COLLECTION BY THE KENT COUNTY WATER AUTHORITY. THE WATER SAMPLE TEST RESULTS MUST INDICATE THAT THE WATER QUALITY IN THE NEW MAIN IS CONSISTENT IN QUALITY WITH THE KENT COUNTY WATER AUTHORITY SYSTEM WATER.

WATER MATERIALS

4.2 SERVICES: SERVICE PIPE SIZES 1/2 TO 2 INCH SHALL BE EITHER COPPER OR H.D.P.E. PIPE. COLOR MUST BE BLUE WITH A VIRGIN CLEAR NATURAL CENTER. CONTINUOUS IDENTIFICATION MARKINGS COVER THE ENTIRE LENGTH OF THE PIPE WITH SEALED ENDS AND COILED IN ROLLS FROM 100 FT. MINIMUM. WHEN H.D.P.E. SERVICE PIPE IS CHOSEN, A SOLID STAINLESS STEEL INSERT SHALL BE INSTALLED AT EACH CONNECTION AND A 12-FOOT TYPE "K" COPPER WHIP SHALL BE INSTALLED AT THE POINT OF ENTRY INTO ANY BUILDING OR STRUCTURE, AND ON THE INLET AND OUTLET OF A METER PIT.

- H.D.P.E. SHALL CONFORM TO ASTM D1248 TYPE III, GRADE P34, CLASS A, CATEGORY 5, COLOR BLUE WITH VIRGIN CLEAR NATURAL CENTER. AWWA C901, 200 PSI (CTS).
COPPER PIPE SHALL BE TYPE "K" COPPER TUBING DESIGNED FOR POTABLE WATER SERVICE ANSII/ASTM B88.
SERVICES 3 INCH AND ABOVE SHALL BE DUCTILE IRON AND CONFORM TO THE REQUIREMENTS FOR MAIN MATERIALS AND INSTALLATION.

4.3 METERS: ALL METERS SHALL BE COMPATIBLE WITH THE SYSTEM UTILIZED BY THE KENT COUNTY WATER AUTHORITY. THE NEPTUNE E-CODER R-900: SYSTEM IS STANDARDIZED IN KENT COUNTY.

ALL METERS ARE TO READ IN CUBIC FEET. MUST BE CAPABLE OF BEING READ THE RADIO FREQUENCY SYSTEM IN PLACE AT THE KENT COUNTY WATER AUTHORITY. REGISTER SHALL CONTAIN A 9-DIGIT LOCAL REGISTRATION AND 4-8 DIGITS CAN BE COMMUNICATED FOR BILLING PURPOSES.

ANY METER LOCATED IN A METER PIT OR CHAMBER SHALL BE EQUIPPED WITH REGISTERS DESIGNED SPECIFICALLY FOR MOISTURE PROTECTION AND "PIT" STYLE APPLICATION.

ALL FIRE SERVICE METERS SHALL BE IN ACCORDANCE WITH THE KENT COUNTY WATER AUTHORITY AND NFPA STANDARDS WITH UL/FM APPROVED STRAINER DESIGNED FOR FIRE SERVICE.

4.4 METER CHAMBER/PITS: MAN SIZE METER CHAMBERS OR PITS SHALL BE CONSTRUCTED OF REINFORCED, PRE-CAST, "PORTLAND" TYPE CEMENT CONCRETE, DESIGNED TO WITHSTAND AN ASHTO H-20 DESIGN LOAD METER PIT. DIMENSIONS SHALL BE OBTAINED FROM THE DESIGN ENGINEER FOR THE PROJECT. BUOYANCY SHALL BE CONSIDERED IN THE DESIGN AND PLACEMENT OF THE CHAMBER.

AN ABOVE GRADE ALUMINUM STYLE HATCH WITH STAINLESS STEEL HARDWARE SHALL BE INSTALLED AT THE POINT OF ACCESS. ACCESS SHALL BE LOCATED IN THE CORNER WHERE THE INSIDE OF THE HATCH FRAME IS OFFSET 12 INCH AWAY FROM EACH INSIDE WALL. CORROSION RESISTANT, NONSLIP, STEPS OR LADDER SHALL BE INSTALLED INSIDE THE CHAMBER IN THE SIDEWALL AT THE ACCESS POINT.

SINGLE-FAMILY RESIDENTIAL METER CHAMBERS SHALL BE PREFABRICATED OF EITHER CONCRETE, FIBERGLASS OR PVC CONSTRUCTION AND FITTED WITH AN INNER AND OUTER COVER. THE INNER COVER SHALL BE FITTED WITH A GASKET AND CLAMPING MECHANISM TO PREVENT THE INTRUSION OF WATER. PITS SHALL BE OF SUFFICIENT SIZE FOR INSTALLATION AND MAINTENANCE OF METERS.

4.5 AIR RELEASE MANHOLE: AIR RELEASE MANHOLES SHALL BE WATERTIGHT PRE-CAST CONCRETE CONSTRUCTED WITH WATERTIGHT CAST IRON MANHOLE FRAME AND DIAMOND CHECK PATTERN COVER. COVER SHALL HAVE THE WORD "WATER" CAST UPON IT IN 4 INCH CAPITAL LETTERS. THE CHAMBER, FRAME, COVER, AND STRUCTURAL COMPONENTS SHALL BE DESIGNED TO WITHSTAND A H-20 WHEEL LOADING. THE FRAME AND WATERTIGHT COVER ASSEMBLY MUST CONFORM TO THE REQUIREMENTS OF THE KENT COUNTY WATER AUTHORITY FOR SIZE AND DIMENSION. MANHOLE SHALL BE OUTFITTED WITH CORROSION RESISTANT, NON-SLIP STEPS.

4.6 THRUST RESTRAINT: RESTRAINING DEVICES SHALL BE UTILIZED ON ALL MAINS. THRUST BLOCKS SHALL BE CONSTRUCTED FROM CONCRETE 3000 PSI AT 28 DAYS, SIZED ACCORDING TO THE SIZE OF PIPELINE, TYPE OF FITTING, WATER PRESSURE AND THE CHARACTERISTICS OF THE SOIL. THE CONCRETE SHALL BE PROPERLY FORMED AS TO SLOPE FOR THE GIVEN APPLICATION AND BEARING WIDTH. THE CONCRETE SHALL BE IN CONTACT ONLY WITH THE FITTING, NOT WITH THE PIPE ITSELF, FASTENERS OR THE JOINT. CONCRETE CURING TIME SHALL BE A MINIMUM OF 7 DAYS.

THRUST RESTRAINT MAY BE VIA RESTRAINED JOINT, DUCTILE IRON PIPE MEETING ANSII/AWWA C151/A21.51 AND ANSII/AWWA C111/A21.1. RESTRAINED JOINT PIPE LENGTHS (RESTRAINED LENGTH) SHALL BE SUFFICIENT TO RESTRAIN THRUST IMPARTED BY 1-1/2 TIMES THE ANTICIPATED WORKING PRESSURE BUT NOT LESS THAN 150 PSI WITH A 1.5 FACTOR OF SAFETY.

GLAND AND RESTRAINT COMPONENTS MADE FROM DUCTILE IRON AND SHALL HAVE A BITUMINOUS OUTSIDE COATING IN ACCORDANCE WITH ANSII/AWWA C151/A21.51 AND ANSII/AWWA C153/A21.53 RESPECTIVELY. CAPABLE OF BEING USED WITH STANDARDIZED MECHANICAL JOINT BELL CONFORMING TO AWWA C111 AND C153 MULTIPLE WEDGE STYLE RESTRAINT MECHANISM WITH POWDER COATED HEAT-TREATED DUCTILE IRON WEDGES. PROPER ACTUATION ENSURED BY TORQUE LIMITING TWIST OFF NUTS. MINIMUM SAFETY FACTOR 2 TO 1. RESTRAINED JOINTS SHALL BE SUITABLE FOR 150 PSI WORKING PRESSURE AND FABRICATED OF HEAVY SECTION DUCTILE IRON CASTING. GASKETS SHALL MEET THE MATERIAL REQUIREMENTS OF ANSII/AWWA C111 FOR MECHANICAL JOINT GASKETS. BOLTS AND NUTS AS REQUIRED SHOULD BE LOW CARBON STEEL CONFORMING TO ASTM A307, GRADE B.

4.7 WATER PIPE: ALL DUCTILE-IRON PIPE AND APPURTENANCES SHALL BE FROM A SINGLE MANUFACTURER SOURCE. FOREIGN PIPE FITTINGS AND GASKETS ARE STRICTLY FORBIDDEN. DUCTILE IRON PIPE SHALL CONFORM TO ANSII/AWWA C151/A21.51, ANSII/AWWA C150/A21.50 CLASS 52 DOUBLE CEMENT MORTAR LINED. GASKETS SHALL CONFORM TO ANSII/AWWA C111/A21.1. ALL PIPES SHALL HAVE A BITUMINOUS OUTSIDE COATING IN ACCORDANCE WITH ANSII/AWWA C151/A21.51 AND ANSII/AWWA C153/A21.53 RESPECTIVELY. ALL PIPES SHALL BE CEMENT-MORTAR LINED AND SEAL COATED IN ACCORDANCE WITH ANSII/AWWA C104/A21.4. EXCEPT THE LINING THICKNESS SHALL BE TWICE THAT SPECIFIED. JOINTS FOR PIPE SHALL BE PUSH-ON (TYTON STYLE ONLY) OR MECHANICAL JOINT CONFORMING TO ANSII/AWWA C111. ALL MECHANICAL JOINT PIPES SHALL BE SUPPLIED WITH ACCESSORIES. RESTRAINED JOINTS SHALL BE SUITABLE FOR 150 PSI WORKING PRESSURE AND FABRICATED OF HEAVY SECTION DUCTILE IRON CASTING. GASKETS SHALL MEET THE MATERIAL REQUIREMENTS OF ANSII/AWWA AND MADE IN THE USA.

- TYPE: DUCTILE IRON MEETING ANSII/AWWA C151/A21.51 ANSII/AWWA C150/A21.50. CLASS: SPECIAL THICKNESS CLASS 52.
LINING: DOUBLE CEMENT MORTAR MEETING ANSII/AWWA C151/A21.5.
END JOINTS: PUSH ON - TYTON STYLE ONLY - MEETING ANSII/AWWA C111/A21.51., MECHANICAL JOINT - MEETING ANSII/AWWA C111/A21.11.
COATING: EXTERIOR: ANSII/AWWA C104/A21.4.; INTERIOR: ALL REQUIREMENTS OF EPA FOR POTABLE WATER.
GASKET: RUBBER MEETING ANSII/AWWA C111/A21.11., NITRILE (IN CONTAMINATED SOIL).

4.8 PIPE FITTINGS: DUCTILE IRON FITTINGS SHALL CONFORM TO ANSII/AWWA C153/A21.53. FOREIGN FITTINGS, GASKET GLANDS AND ACCESSORIES ARE STRICTLY FORBIDDEN. ALL FITTINGS SHALL HAVE A BITUMINOUS OUTSIDE COATING IN ACCORDANCE WITH ANSII/AWWA C151/A21.51 AND ANSII/AWWA C153/A21.53 RESPECTIVELY. ALL FITTINGS SHALL BE CEMENT-MORTAR LINED AND SEAL COATED IN ACCORDANCE WITH ANSII/AWWA C104/A21.4 EXCEPT THE LINING THICKNESS SHALL BE TWICE THAT SPECIFIED. JOINTS FOR FITTINGS SHALL BE MECHANICAL JOINT CONFORMING TO ANSII/AWWA C111. ALL MECHANICAL JOINT FITTINGS SHALL BE SUPPLIED WITH GLANDS AND ACCESSORIES.

- TYPE: 4 INCH TO 12 INCH DUCTILE IRON COMPACT MEETING ANSII/AWWA C153/A21.53.; 16 INCH AND LARGER DUCTILE IRON MEETING ANSII/AWWA C153/A21.53 OR ANSII/AWWA C110/A21.10.
PRESSURE CLASS: PIPE FITTINGS SHALL HAVE A PRESSURE RATING OF 350 FOR 24-INCH AND SMALLER AND 250 PSI FOR 30-INCH AND LARGER. FITTINGS SHALL AT A MINIMUM HAVE THE SAME PRESSURE RATING AS THE CONNECTING PIPE.

- GASKETS: RUBBER MEETING ANSII/AWWA C111/A21.11. ; NITRILE (IN CONTAMINATED SOIL).

4.9 VALVES: VALVES SHALL BE CAST IRON OR DUCTILE IRON 250-PSI WORKING PRESSURE. OPERATING STEM SHALL BE PROVIDED WITH A MINIMUM OF TWO (2) O-RING STEM SEALS. BONNET AND GLAND BOLTS/WASHERS SHALL BE STAINLESS STEEL. WEDGES SHALL BE FULLY ENCAPSULATED. THE INTERIOR AND EXTERIOR SURFACES OF ALL CAST IRON OR DUCTILE IRON COMPONENTS SHALL BE FUSION BOND EPOXY COATED, 8 MILS MINIMUM THICKNESS. EPOXY COATING MUST BE UNDAMAGED WITH NO CHIPS OR ABRASIONS. FIELD TOUCH-UP OF INTERIOR COATING IS NOT ALLOWED. FIELD TOUCH-UP OF EXTERIOR SURFACES SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOATING SPECIFICATIONS ONLY. CONTRACTORS SHALL USE SPECIAL HANDLING AND INSTALLATION PRECAUTIONS WITH THE USE OF EPOXY COATED VALVES AS NECESSARY TO ENSURE THAT NO COATING SYSTEM DAMAGE OCCURS. AT A MINIMUM FIBER SLINGS OR BELTS SHALL BE USED FOR ALL HANDLING. ALL EPOXY-COATED VALVES SHALL BE PALLETIZED AND PROPERLY SHRINK-WRAPPED UPON DELIVERY TO ASSURE COATING SYSTEM INTEGRITY IS NOT COMPROMISED. ALL EPOXY VALVES FOUND MISHANDLED AT DELIVERY OR DURING INSTALLATION SHALL BE REJECTED AND REMOVED FROM THE JOB SITE. ALL VALVES SHALL BE MANUFACTURED TO MEET OR EXCEED AWWA C509 AND ISO 9000 ALONG WITH THE DESIGN AND OPERATING CHARACTERISTICS OF THE FOLLOWING DEVICES:

- RESILIENT SEAT GATE 4 INCH TO 12 INCH: TYPE: BURIED SERVICE NON-RISING STEM.; ABOVE GRADE SERVICE OR PITS OS & Y WITH HAND WHEEL OR NON-RISING STEM WITH HAND WHEEL.
WORKING PRESSURE: 250 PSI.
OPENING: LEFT OR RIGHT DEPENDING ON SYSTEM LOCATION.
STEM: 420 STAINLESS STEEL OR EQUAL WITH MINIMUM 60,000 PSI YIELD STRENGTH.
FASTENERS: STAINLESS STEEL, TYPE 304 FOR ALL OF THE VALVE.
COATINGS: INTERNAL & EXTERIOR TO BE COATED WITH FUSE BONDED HOLIDAY FREE EPOXY COATING MINIMUM 8 MILS NOMINAL THICKNESS MEETING OR EXCEEDING AWWA C550.
WEDGES: FULLY RUBBER ENCAPSULATED CAST IRON, DUCTILE IRON OR BRONZE GATE MEETING AWWA C509.
OPERATING NUT: 2 INCH SQUARE OPERATING NUT WITH HEXAGON STAINLESS STEEL BOLT FASTENER.
STEM SEAL: MINIMUM TWO O-RING SEALS.
CONNECTION: MECHANICAL JOINT.

- BUTTERFLY 16" AND LARGER: TYPE: RUBBER SEATED TIGHT CLOSING OR EXCEEDING AWWA C504 UNDERGROUND SERVICE. CLASS 150 OR 250 DEPENDING UPON SERVICE APPLICATION REQUIREMENTS.
STEM: GRADE 18-8 TYPE 304 STAINLESS STEEL.
VALVE VANE/DISC: DUCTILE IRON OR HIGH STRENGTH CAST IRON WITH EITHER MECHANICALLY FASTENED BUNA RUBBER SEAL OR TYPE 316 STAINLESS STEEL SEAL SEAT RING.
SEAT: STAINLESS STEEL OR BUNA N RUBBER. RUBBER SEAT CAN BE EITHER BONDED OR MECHANICALLY FASTENED AND SHALL NOT INTERRUPT FLOW.
ACTUATOR: DUAL LINK CONSTRUCTION WITHIN A SEALED HOUSING FOR UNDERGROUND USE DESIGNED FOR SUBMERGENCE IN WATER TO 25 FEET OF HEAD AND MEETING AWWA C504. VALVE NUT SHALL BE MINIMUM OF TWO-INCH SQUARE MADE OF DUCTILE IRON AND FASTENED TO STEM. OPERATOR TO BE TRAVELING NUT TYPE CAPABLE OF WITHSTANDING AN OVERLOAD INPUT TORQUE OF 450 FOOT-POUNDS WITHOUT DAMAGE TO THE VALVE OR OPERATOR.
OPENING: LEFT OR RIGHT DEPENDING ON SYSTEM LOCATION.
FASTENERS: GRADE 18-8 STAINLESS STEEL, TYPE 304 FOR ALL FASTENERS OF THE VALVE.
COATINGS: INTERIOR & EXTERIOR TO BE COATED WITH FUSE BONDED HOLIDAY FREE EPOXY MINIMUM THICKNESS 8 MILS NOMINAL MEETING OR EXCEEDING AWWA C-550.
CONNECTION: MECHANICAL JOINT OR FLANGED.

- TAPPING SLEEVES AND VALVES: VALVES SHALL BE FULL BODY AND FULL PORT TAPPING TYPE MEETING THE REQUIREMENTS PARAGRAPH 4.9.1.1 ABOVE. SLEEVES SHALL BE FULL PORT DUCTILE IRON OR GRADE 18-8 TYPE 304 STAINLESS STEEL. DUCTILE IRON SLEEVES SHALL BE OF THE SAME MANUFACTURER AS OF THE VALVE AND BITUMINOUS COATED. ALL SLEEVES SHALL BE MANUFACTURED TO MEET OR EXCEED THE DESIGN AND OPERATING CHARACTERISTICS OF ONE OF THE FOLLOWING DEVICES:
TYPE: RESILIENT SEAT GATE VALVES DESIGNED SPECIFICALLY FOR TAPPING.
SEAL: STAINLESS STEEL SLEEVES SHALL USE GRID PATTERN VIRGIN RUBBER ASTM 2000, FULL 360-DEGREE PIPE COVERAGE. DUCTILE IRON SLEEVES SHALL USE MECHANICAL JOINT WITH RUBBER SEALS.
MAXIMUM WORKING PRESSURE: 4 INCH-12 INCH 250 PSE, 16 INCH-24 INCH 200 PSI.
FASTENER: GRADE 18-8 TYPE 304 STAINLESS STEEL.

SWING-CHECK: SWING CHECK VALVES SHALL UTILIZE IRON-BODY BRONZE-MOUNTED DESIGN. THEY MAY EMPLOY METAL TO METAL OR COMPOSITION TO METAL SEAT CONSTRUCTION. WORKING PRESSURE SHALL BE A MINIMUM OF 175 PSI FOR VALVES UP TO 12 INCH AND 150 PSI FROM 16 INCH TO 24 INCH. SWING CHECK VALVES SHALL BE MOUNTED IN A HORIZONTAL POSITION. DIRECT ACCESS TO THE VALVE SHALL BE ACCOMPLISHED BY USING A PRECAST CONCRETE MANHOLE WITH HEAVY-DUTY CAST IRON MANHOLE FRAME AND SOLID COVER. CONCRETE STRUCTURE AND COVER SHALL BE CAPABLE OF WITHSTANDING AN ASHTO H-20 LOAD. THE COVER SHALL HAVE A DIAMOND CHECK PATTERN WITH THE WORD "WATER" (IN UPPER CASE LETTERS) CAST UPON IT. THE MANHOLE SHALL BE OUTFITTED WITH CORROSION RESISTANT, NON-SLIP, STEPS.

VALVE ROAD BOX: ALL VALVES (EXCEPT SWING-CHECK) SHALL BE EQUIPPED WITH A CAST IRON "BUFFALO" TYPE, ADJUSTABLE (SLIDING) VALVE ROAD BOX. THE UPPER PORTION SHALL BE 28 INCH LONG AND THE BOTTOM SECTION 48 INCH (MIN). COVERS SHALL BE 5-1/4" IN DIAMETER SOLID RING SEAT WITH THE WORD "WATER" (IN CAPS) CAST UPON IT. THE UPPER PORTION OF THE BOX SHALL BE MANUFACTURED WITH AN HEAVY FLANGE HAVING SUFFICIENT BEARING AREA TO PREVENT SETTLEMENT. THE LOWER SECTION SHALL BE CONFIGURED TO ENCLOSE THE VALVE STUFFING BOX WITH AN INSIDE DIAMETER OF AT LEAST 4-1/4 INCH. THE INSTALLED BOX SHALL BE CAPABLE OF VERTICAL ADJUSTMENT OF A MINIMUM OF 6 INCH WHILE MAINTAINING AN OVERLAP OF AT LEAST 4 INCH BETWEEN SECTIONS.

4.10 HYDRANTS: TO MAINTAIN SYSTEM WIDE STANDARDIZATION, HYDRANTS SHALL BE DRY BARREL TYPE WITH 5/4 INCH VALVE. HYDRANTS SHALL CONFORM TO THE "STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE," AWWA C-502, AND SHALL IN ADDITION MEET THE SPECIFIC REQUIREMENTS OF THE KENT COUNTY WATER AUTHORITY AS LISTED. HYDRANTS SHALL BE UL RATED FOR 250-PSI WORKING PRESSURE AND SERVICE INSTALLATION IN A TRENCH THAT WILL PROVIDE VARIOUS MINIMUM COVER. HYDRANTS SHALL BE ACCORDING TO MANUFACTURER'S STANDARD PATTERN UNLESS NOTED OTHERWISE AND OF STANDARD SIZE AND SHALL BE EQUIPPED WITH 6 INCH MECHANICAL JOINT CONNECTION FOR 6" DUCTILE IRON PIPE, ONE 4 1/4 INCH STEAMER NOZZLE AND TWO 2 1/2 INCH HOSE NOZZLES, BRASS OR BRASS SLEEVED DRAINS, NATIONAL STANDARD THREAD, HYDRANT INLET CONNECTIONS. HYDRANTS SHALL BE OF THE FULL COMPRESSION DESIGN, OPENING AGAINST AND CLOSING WITH THE WATER PRESSURE. THE HYDRANTS SHALL BE DESIGNED TO PERMIT ROTARY MOVEMENT OF THE UPPER BARREL ANY NUMBER OF DEGREES REQUIRED TO EFFECT PROPER ALIGNMENT WITHOUT SHUTTING DOWN SERVICE OR REMOVING FLANGE BOLTS AND NUTS. HYDRANT MUST OPEN TURNING OPERATING NUT TO LEFT. (COUNTER LOCKWHEEL AND MUST BE MARKED WITH AN ARROW AND WORD "OPEN" TO INDICATE THE DIRECTION TO TURN STEM TO OPEN. ALL FASTENERS USED SHALL BE STAINLESS STEEL.

BOOT COATINGS TO BE FUSE BONDED EPOXY OR THERMAL SET EPOXY FOR INTERIOR AND EXTERIOR-HOLIDAY FREE WITH MINIMUM THICKNESS 8 MILS MEETING OR EXCEEDING AWWA C550. EPOXY COATING MUST BE UNDAMAGED WITH NO CHIPS OR ABRASIONS. LOWER BARREL SHALL BE BITUMINOUS COATED OR EPOXY COATED. FIELD TOUCH-UP OF EPOXY INTERIOR COATING IS NOT ALLOWED. FIELD TOUCH-UP OF EXTERIOR SURFACES SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOATING SPECIFICATIONS ONLY. CONTRACTORS SHALL USE SPECIAL HANDLING AND INSTALLATION PRECAUTIONS WITH THE USE OF EPOXY COATED APPURTENANCES AS NECESSARY TO ENSURE THAT NO COATING SYSTEM DAMAGE OCCURS. ALL EPOXY APPURTENANCES FOUND MISHANDLED AT DELIVERY OR DURING INSTALLATION SHALL BE REJECTED AND REMOVED FROM THE JOB SITE. ABOVE GRADE EXPOSED HYDRANT COMPONENTS SHALL BE COATED WITH ONE COAT ZINC RICH URETHANE PRIMER @ 2.5-3.5 MILLS DRY FILM THICKNESS. HYDRANT BARREL, BREAKAWAY FLANGE, SHALL BE COATED WITH PHEROLIC URETHANE ENAMEL GLOSS SILVER, TWO COATS @ 4.0 MILS DRY FILM THICKNESS EACH COAT. TOP COAT SHALL PRODUCE A CONSISTENT AND HOLIDAY FREE COLOR COATING. CAPS AND BONNET SHALL RECEIVE TWO COATS OF GLOSS SAFETY RED, PHEROLIC URETHANE ENAMEL 4.0 MILS DRY FILM THICKNESS EACH COAT. COLOR COATS SHALL PRODUCE A CONSISTENT AND HOLIDAY FREE COLOR COATING. SURFACE SHALL BE SAND BLASTED TO SSPC/SP-6 PRIOR TO COATINGS. ALL HYDRANTS SHALL BE SHIPPED WITHOUT CHAINS. MANUFACTURE SHALL PROVIDE A TEN-YEAR WARRANTY ON ALL PARTS AND WORKMANSHIP. HYDRANT REPAIR KITS SHALL BE ORIGINAL MANUFACTURE SPECIFICALLY DESIGNED FOR THE HYDRANT. ALL HYDRANTS SHALL ALSO BE MANUFACTURED TO MEET OR EXCEED ADDITIONAL DESIGN AND OPERATING CHARACTERISTICS LISTED BELOW:

- TYPE: 5 1/2 INCH VALVE OPENING/3 PORT STYLE, DRY BARREL.
OPENING: OPEN LEFT.
DEPTH OF BURY: 5'-0" MINIMUM FROM BURY LINE TO TOP FLANGE OF HYDRANT BOOT.
PORTS: TWO 2 1/2 INCH BRONZE HOSE PORTS 180° APART NST THREAD.
ONE 4" X 1/2 INCH BRONZE PUMPER/STEAMER 90° FROM EACH HOSE PORT, NST THREAD.
BREAKAWAY: ALL HYDRANTS TO HAVE TRAFFIC BREAKAWAY FLANGE.
DRAIN WAYS: SLIDING DRAIN SEAL TYPE. DRAIN CHANNEL SHALL BE 360 DEGREES AND CONTAIN A MINIMUM OF TWO BRONZE OR BRASS SLEEVED OUTLET PORTS.
COATINGS: PRIOR TO PRIMING, SAND BLAST HYDRANT TO SSPC/SP-6 PRIMED WITH ZINC RICH URETHANE COMPATIBLE COATING. TOP COAT WITH TWO COATS EACH RED AND SILVER CONFORMING TO KWMA STANDARD COLOR, SILVER BARREL AND RED CAP AND BONNET.
BOOT COATINGS TO BE FUSE BONDED EPOXY OR THERMAL SET EPOXY FOR INTERIOR AND EXTERIOR - HOLIDAY FREE WITH MINIMUM THICKNESS 8 MILS MEETING OR EXCEEDING AWWA C550. EXTERIOR LOWER BARREL TO BE BITUMINOUS COATED OR EPOXY COATED.
STEM: STAINLESS STEEL UPPER AND LOWER STEM. ALL WETTED PARTS SUCH AS SPRINGS, PINS AND FASTENERS, SHALL BE STAINLESS STEEL OR OTHER COMPATIBLE LEAD FREE NON CORROSIVE MATERIALS.
MAIN VALVE: DUCTILE IRON OR CAST IRON CORE FULLY ENCAPSULATED IN RUBBER OR MULTIPLE PIECE. SEAT MAY BE EITHER BRONZE OR STAINLESS STEEL.
WEATHER SHIELD AND CAP: DUCTILE IRON.
CHAINS: NO CHAINS TO BE SUPPLIED.

4.11 CORPORATION STOP: CORPORATION STOPS SHALL BE BALL TYPE WITH EITHER STAINLESS STEEL, SYNTHETIC COATED BRASS BALL OR NICKEL COATED BRASS BALL DESIGNED FOR POTABLE WATER SERVICE UP TO 300 PSI. BODY SHALL BE HEAVY CAST LEAD FREE "ENVIROBRASSII" UNS ALLOY NUMBER C89520 ASTM B584-98A AND/OR AWWA C800/ASTM B-62 MEETING OR EXCEEDING THE LEAD LEACHING PERFORMANCE SPECIFICATIONS OF ANS/INSP 61 STANDARD. ALL CORPORATION STOPS SHALL MEET OR EXCEED DESIGN STANDARDS OF AWWA C800 ALONG WITH THE DESIGN AND OPERATING CHARACTERISTICS OF THE FOLLOWING:

- TYPE: FORD OR EQUAL.
SIZES: 3/4, 1 INCH, 1 1/2 INCH, AND 2 INCH
OPENING: OPEN LEFT.
END CONNECTIONS: COMPRESSION WITH NON-CORROSIVE GRIP RING MEETING ASTM B-159-BUNA N RUBBER AND CONDUCTIVITY RING. THREADED END SHALL BE AWWA CC TAPER THREAD FOR DIRECT CONNECTION.
MATERIAL: HEAVY CAST LEAD FREE "ENVIROBRASSII" UNS ALLOY NUMBER C89520 ASTM B584-98A AND/OR AWWA C800/ASTM B-62 MEETING OR EXCEEDING THE LEAD LEACHING PERFORMANCE SPECIFICATIONS OF ANS/INSP 61 STANDARD.

4.12 CURB STOPS: CURB STOPS SHALL BE BALL TYPE WITH EITHER STAINLESS STEEL, SYNTHETIC COATED BRASS OR NICKEL COATED BRASS BALL DESIGNED FOR WATER SERVICE UP TO 300 PSI. BODY SHALL BE HEAVY CAST LEAD FREE "ENVIROBRASSII" UNS ALLOY NUMBER C89520 ASTM B584-98A AND/OR MEET OR EXCEED THE LEAD LEACHING PERFORMANCE SPECIFICATIONS OF ANS/INSP 61 STANDARD. ALL CURB STOPS TO MEET OR EXCEED THE DESIGN STANDARDS OF AWWA C800 ALONG WITH THE DESIGN AND OPERATING CHARACTERISTICS OF THE FOLLOWING:
TYPE: FORD OR EQUAL.
SIZES: 3/4 INCH, 1 INCH, 1 1/2 INCH, AND 2 INCH
OPENING: OPEN LEFT.
END CONNECTIONS: COMPRESSION WITH NON-CORROSIVE GRIP RING MEETING ASTM B-159-BUNA N RUBBER AND CONDUCTIVITY RING.
MATERIAL: HEAVY CAST LEAD FREE "ENVIROBRASSII" UNS ALLOY NUMBER C89520 ASTM B584-98A AND/OR AWWA C800/ASTM B-62 MEETING OR EXCEEDING THE LEAD LEACHING PERFORMANCE SPECIFICATIONS OF ANS/INSP 61 STANDARD.
OPENING: OPEN LEFT.
DRAIN: NONE.

4.13 SERVICE & GATE BOX: CURB BOXES MAY BE MANUFACTURED IN NORTH AMERICA OR SELECTED FOREIGN MADE. SELECTED FOREIGN MADE BOXES MUST RECEIVE PRIOR APPROVAL BASED ON DESIGN AND STYLE SAMPLES TO BE PROVIDED FOR REVIEW. THEY SHALL BE HEAVY PATTERN CAST IRON, BUFFALO STYLE, SLIP ADJUSTABLE TYPE WITH HEAVY CAST IRON COVER AND BRASS BOLT FASTENER TYPE LOCK. THE WORD "WATER" SHALL BE CAST UPON THE COVER IN HEAVY PATTERN RAISED LETTERS. COVERS SHALL BE DROP IN TYPE WITHOUT FINS SOLID RING. BOXES SHALL HAVE A BITUMINOUS INTERNAL AND EXTERNAL COATING IN ACCORDANCE WITH ANSII/AWWA C151/A21.51 AND ANSII/AWWA C153/A21.53 RESPECTIVELY. BOXES SHALL HAVE BARRELS OF NOT LESS THAN 2 1/2 INCH IN DIAMETER. THE UPPER SECTION OF EACH BOX SHALL HAVE A BOTTOM FLANGE OF SUFFICIENT BEARING AREA TO PREVENT SETTLING. THE BOTTOM OF THE LOWER SECTION SHALL BE A REINFORCED ARCH CONFIGURATION AND SIZED TO ENCLOSE THE CURB STOP. BOX SECTIONS SHALL BE OF SUFFICIENT LENGTH TO PROVIDE COMPLETE COVERAGE FOR THE DEPTH OF BURY.

GATE VALVE BOXES MAY BE EITHER MANUFACTURED IN NORTH AMERICA OR SELECTED FOREIGN MADE. SELECTED FOREIGN MADE BOXES MUST RECEIVE PRIOR APPROVAL BASES ON DESIGN AND STYLE SAMPLES TO BE PROVIDED FOR REVIEW. THEY SHALL BE HEAVY PATTERN CAST IRON, SLIP ADJUSTABLE TYPE AND PROVIDED WITH HEAVY CAST IRON COVER. COVER SHALL HAVE THE WORD "WATER" CAST UPON HEAVY PATTERN RAISED LETTERS 5 1/4 INCH DIAMETER. COVER SHALL BE DROP IN TYPE WITHOUT FINISH RING. BOXES SHALL HAVE A BITUMINOUS INTERNAL AND EXTERNAL COATING IN ACCORDANCE WITH ANSII/AWWA C151/A21.51 AND ANSII/AWWA C153/A21.53 RESPECTIVELY. THE UPPER SECTION OF EACH BOX SHALL HAVE A BOTTOM FLANGE OF SUFFICIENT BEARING AREA TO PREVENT SETTLING. THE BOTTOM OF THE LOWER SECTION SHALL BE BELL SHAPED AND SIZED TO ENCLOSE THE STUFFING BOX AND OPERATING NUT OF THE VALVE. BOXES SHALL HAVE BARRELS OF NOT LESS THAN 5" IN DIAMETER. BOX SECTIONS SHALL BE OF SUFFICIENT LENGTH TO PROVIDE COMPLETE COVERAGE FOR THE DEPTH OF BURY. UPPER PORTION SHALL BE 26" LONG AND THE BOTTOM SECTION 48" (MIN) IN LENGTH.

4.14 SADDLES: SERVICE SADDLES AND REPAIR SADDLES SHALL BE DUCTILE IRON OR TYPE 304 STAINLESS STEEL, WITH STAINLESS STEEL BOLTS, WASHERS, NUTS AND BANDS. DUCTILE IRON COMPONENTS SHALL BE COATED WITH FUSION BONDED EPOXY MINIMUM 8 MILS THICKNESS MEETING OR EXCEEDING AWWA C550 OR NYLON COATED. SADDLES SHALL BE MANUFACTURED TO MEET OR EXCEED THE DESIGN AND OPERATING CHARACTERISTICS OF FOLLOWING:

- TYPE: FORD OR EQUAL.
BODY: DUCTILE IRON OR GRADE 18-8 TYPE 304 STAINLESS STEEL.
COATING: DUCTILE IRON COMPONENTS SHALL BE EPOXY COATED AWWA C 500 OR NYLON COATED.
BAND: GRADE 18-8 TYPE 304 STAINLESS STEEL DOUBLE BAND.
FASTENERS: 304 STAINLESS STEEL STUD, NUT & WASHERS.
GASKET: VIRGIN RUBBER ASTM 2000.
OUTLET: THREADED OUTLET TAPPED TO AWWA C 800 FOR THE APPROPRIATE SERVICE SIZE.

REPAIR: TYPE: FORD OR EQUAL.
BODY: DUCTILE IRON OR GRADE 18-8 TYPE 304 STAINLESS STEEL.
COATING: DUCTILE IRON COMPONENTS SHALL BE EPOXY COATED AWWA C 500 OR NYLON COATED.
BAND: GRADE 18-8 TYPE 304 STAINLESS STEEL DOUBLE BAND.
FASTENERS: 304 STAINLESS STEEL STUD, NUT & WASHERS.
GASKET: VIRGIN RUBBER ASTM 2000.
OUTLET: THREADED OUTLET TAPPED TO AWWA C 800 FOR THE APPROPRIATE SERVICE SIZE.

4.15 FULL CIRCLE REPAIR: ALL COMPONENTS AND FASTENERS SHALL BE TYPE 304 STAINLESS STEEL. GASKET SHALL BE VIRGIN RUBBER FOR WATER SERVICE. ALL REPAIR CLAMPS SHALL BE MANUFACTURED TO BE EQUAL TO THE MATERIAL AND DESIGN REQUIREMENTS THE FOLLOWING:
TYPE: FORD OR EQUAL.
BODY: GRADE 18-8 TYPE 304 STAINLESS STEEL.
FASTENERS: 304 STAINLESS STEEL STUD, NUT & WASHERS.
GASKET: GRID PATTERN VIRGIN RUBBER ASTM 2000, FULL 360 DEGREE COVERAGE.

4.16 DUCTILE IRON COUPLINGS: STRAIGHT AND TRANSITION COUPLINGS SHALL BE DUCTILE IRON MANUFACTURED TO MEET AWWA C 219 AND FITTED WITH STAINLESS STEEL BOLTS WASHERS AND NUTS. DUCTILE IRON COMPONENTS SHALL BE COATED WITH FUSION BONDED EPOXY MINIMUM 8 MILS THICKNESS MEETING OR EXCEEDING AWWA C550. COUPLINGS SHALL BE MANUFACTURED TO MEET OR EXCEED THE DESIGN AND OPERATING CHARACTERISTICS OF THE FOLLOWING:

- TYPE: FORD OR EQUAL.
BODY: DUCTILE IRON.
COATING: DUCTILE IRON COMPONENTS SHALL BE EPOXY COATED AWWA C 500.
FASTENERS: 304 STAINLESS STEEL STUD, NUT & WASHERS.
GASKET: RUBBER ASTM 2000.
TRANSITION: TYPE: FORD OR EQUAL.
BODY: DUCTILE IRON.
COATING: DUCTILE IRON COMPONENTS SHALL BE EPOXY COATED AWWA C 500.
FASTENERS: 304 STAINLESS STEEL STUD, NUT & WASHERS.
GASKET: RUBBER ASTM 2000.

4.17 BACKFLOW PREVENTERS: ALL DEVICES MUST HAVE BEEN APPROVED BY THE UNIVERSITY OF SOUTHERN CALIFORNIA (FCCCHR, USC), AMERICAN WATER WORKS ASSOCIATION AND AMERICAN SOCIETY OF SANITARY ENGINEERS. BACKFLOW DEVICE ASSEMBLIES TESTED WITH MANUFACTURERS ISOLATION VALVES TO MEET FCCCHR, USC STANDARDS SHALL BE INSTALLED WITH THE MANUFACTURER VALVES AS AN ASSEMBLY. BRONZE OR BRASS COMPONENTS SHALL MEET OR EXCEED THE LEAD LEACHING PERFORMANCE SPECIFICATIONS OF ANS/INSP 61 STANDARD OR BE MANUFACTURED WITH LEAD FREE "ENVIRO BRASS II" UNS ALLOY NUMBER C89520, ASTM B584-98A.

- TESTABLE DOUBLE CHECK: TYPE: WATTS OR EQUAL.
BODY: CAST IRON, BRONZE OR STAINLESS STEEL DEPENDING ON SIZE.
COATING: IRON COMPONENTS SHALL BE EPOXY COATED AWWA C-500.
SPRINGS: STAINLESS STEEL.
PRESSURE: MAXIMUM 150 PSI MINIMUM 10 PSI.

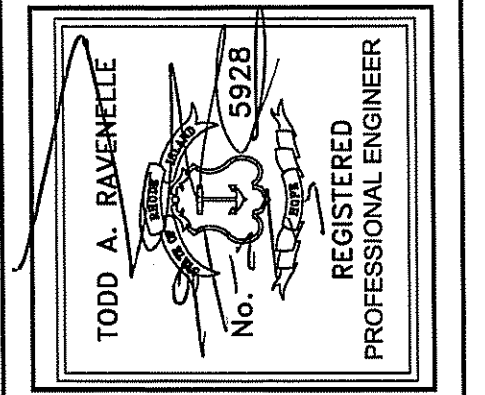
- TESTABLE REDUCED PRESSURE: TYPE: WATTS OR EQUAL.
BODY: CAST IRON, BRONZE OR STAINLESS STEEL DEPENDING ON SIZE.
COATING: IRON COMPONENTS SHALL BE EPOXY COATED AWWA C-500.
SPRINGS: STAINLESS STEEL.
PRESSURE: MAXIMUM 175 PSI - MINIMUM 10 PSI.

- HOUSEHOLD DUAL CHECK: TYPE: WATTS OR EQUAL.
BODY: CAST BRONZE.
SPRINGS: STAINLESS STEEL.
PRESSURE: MAXIMUM 150 PSI - MINIMUM 10 PSI.

4.18 BACKFILL: PIPE BEDDING SHALL BE PROCESSED BORROW GRAVEL, GRANULAR IN NATURE, THE MAJOR PORTION OF WHICH MAY BE SAND OR GRAVEL. IT SHALL BE FREE FROM PEAT, VEGETABLE OR ORGANIC MATTER OR ANY OTHER DEBRIS AND READILY COMPACTABLE. RECYCLED ROAD SWEEPINGS AND CONTAMINATED MATERIAL ARE FORBIDDEN.

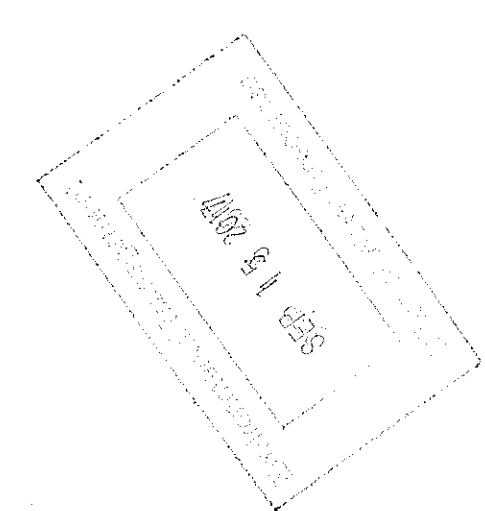
SELECTED BACKFILL MAY BE FROM EXCAVATED MATERIALS THAT SHALL BE FREE DRAINING CLEAN, GRANULAR SOIL SUITABLE FOR BACKFILL. IT SHALL BE FREE FROM PEAT, VEGETABLE OR ORGANIC MATTER OR ANY OTHER DEBRIS AND SHALL BE READILY COMPACTABLE TO THE REQUIREMENTS OF KENT COUNTY WATER AUTHORITY, TYPE 5 TRENCH. RECYCLED ROAD SWEEPINGS AND CONTAMINATED MATERIAL ARE FORBIDDEN. UP TO 20 PERCENT MAY BE ROCK LIKE MATERIAL, NOT TO EXCEED 3 INCH IN LENGTH OR DIAMETER AND MUST BE EVENLY DISTRIBUTED WITHIN THE TOTAL VOLUME OF THE FILL.

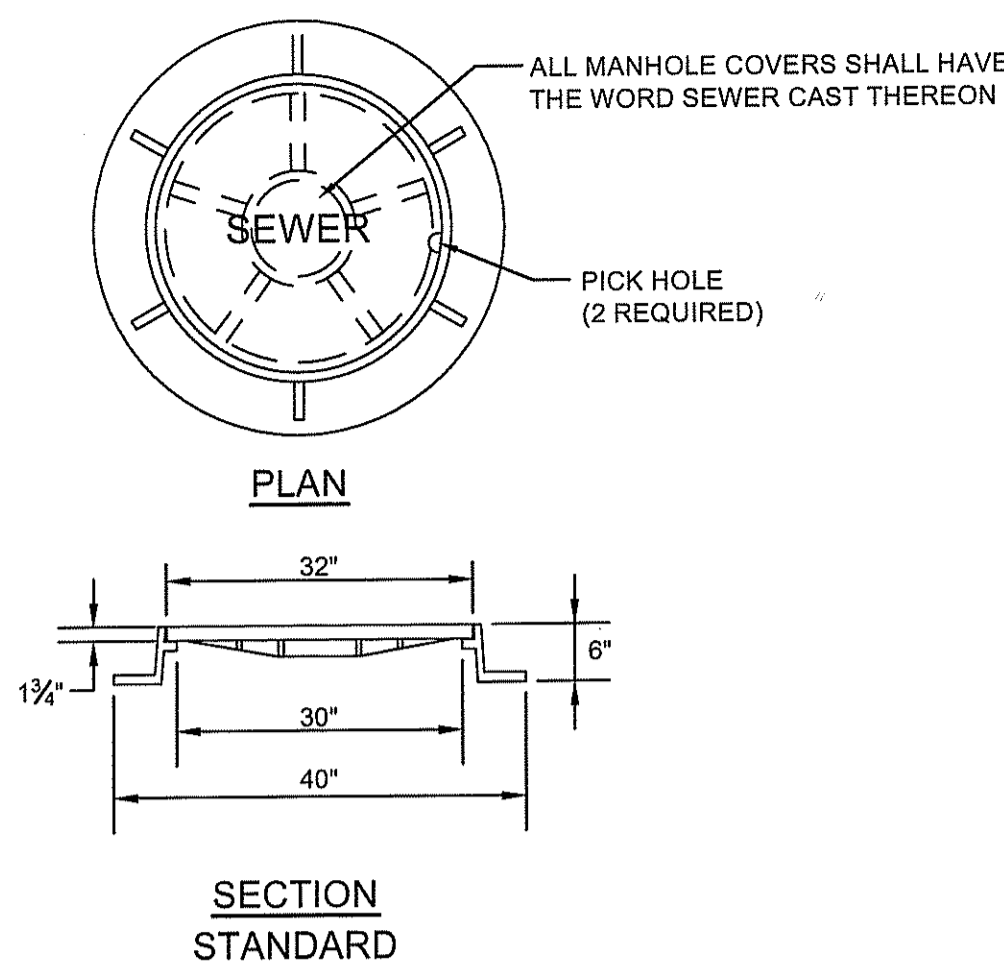
PROJECT: UTILITY IMPROVEMENTS
1485 SOUTH COUNTY TRAIL
PLAT 12A, LOT 18
EAST GREENWICH, RHODE ISLAND
CLIENT: 1485 HOLDINGS LLC
DRAWING TITLE: WATER NOTES - 2
PROJECT NO.: 1713
DATE: SEPTEMBER 2017
SCALE: NONE
DRAWN BY: LBD
CHECKED BY: TAR
DRAWING NUMBER: 11
SHEET 11 OF 15



Gordon R. Archibald, Inc.
Civil and Environmental Engineers
Pawtucket, Rhode Island

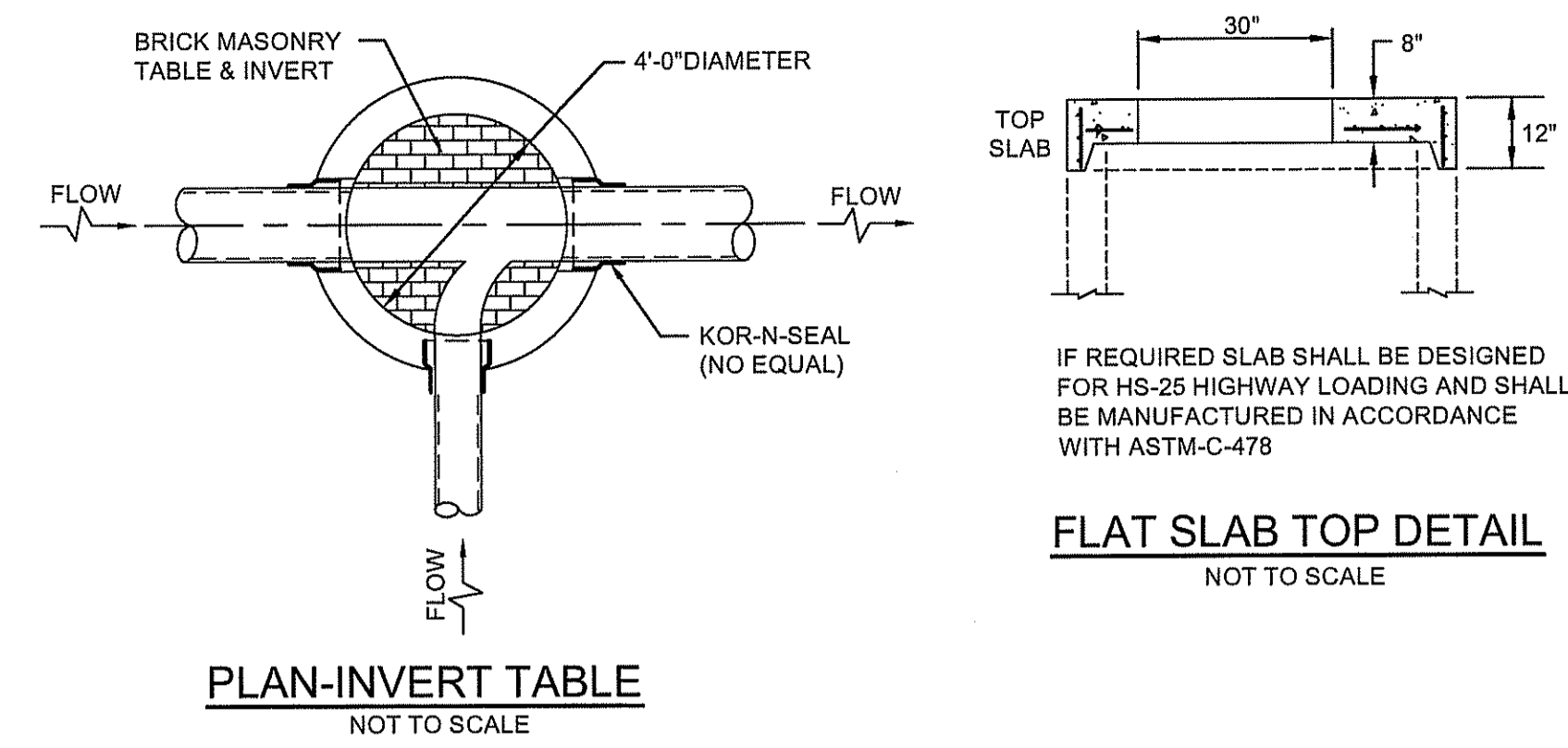
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED NOV 9 2017 FILE # 17-0233
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE
Charles R. Roberts





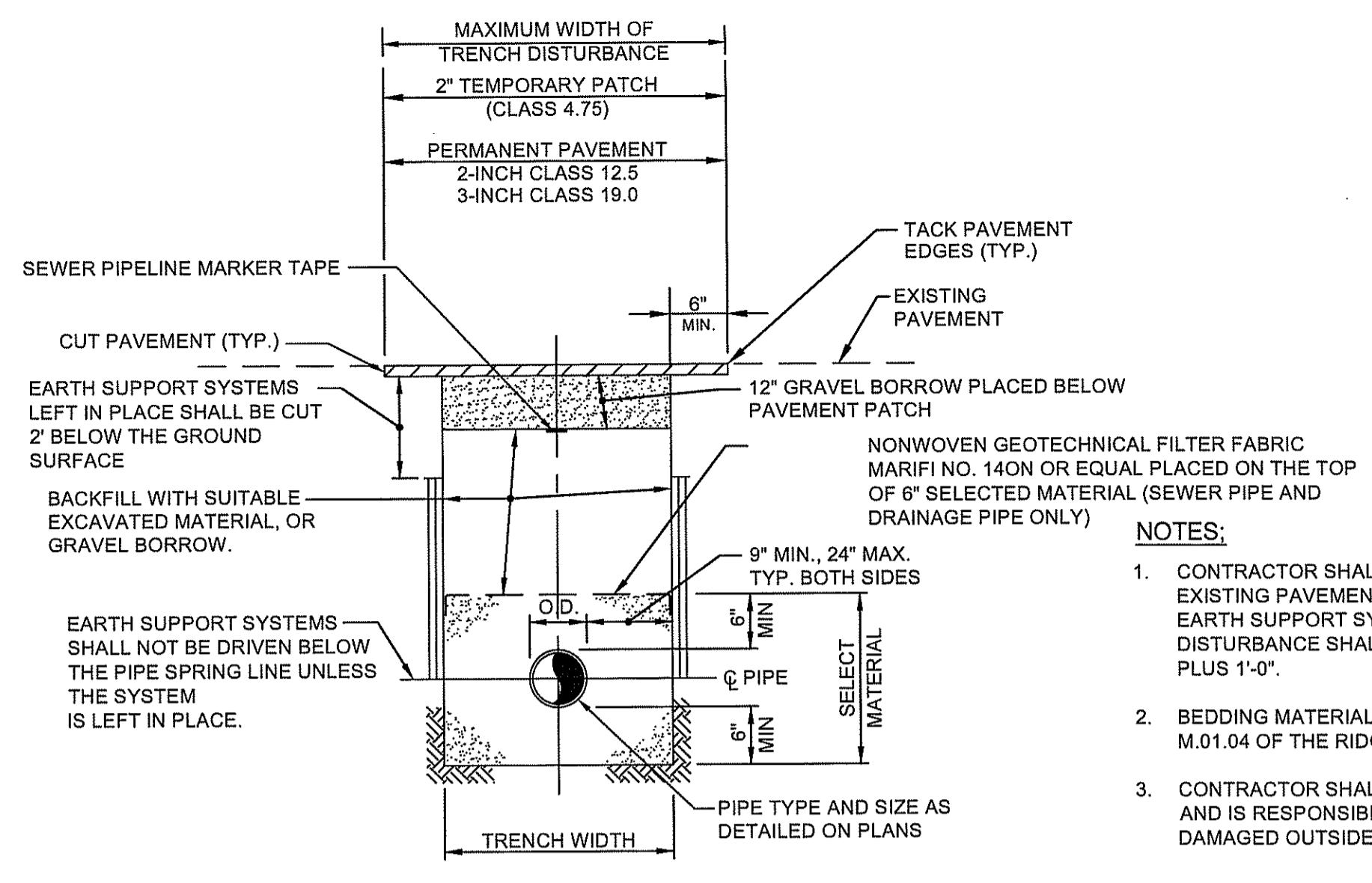
ALL MANHOLES SHALL BE STANDARD COVERS UNLESS OTHERWISE INDICATED ON THE PLANS

**SEWER MANHOLE COVER DETAILS**  
NOT TO SCALE



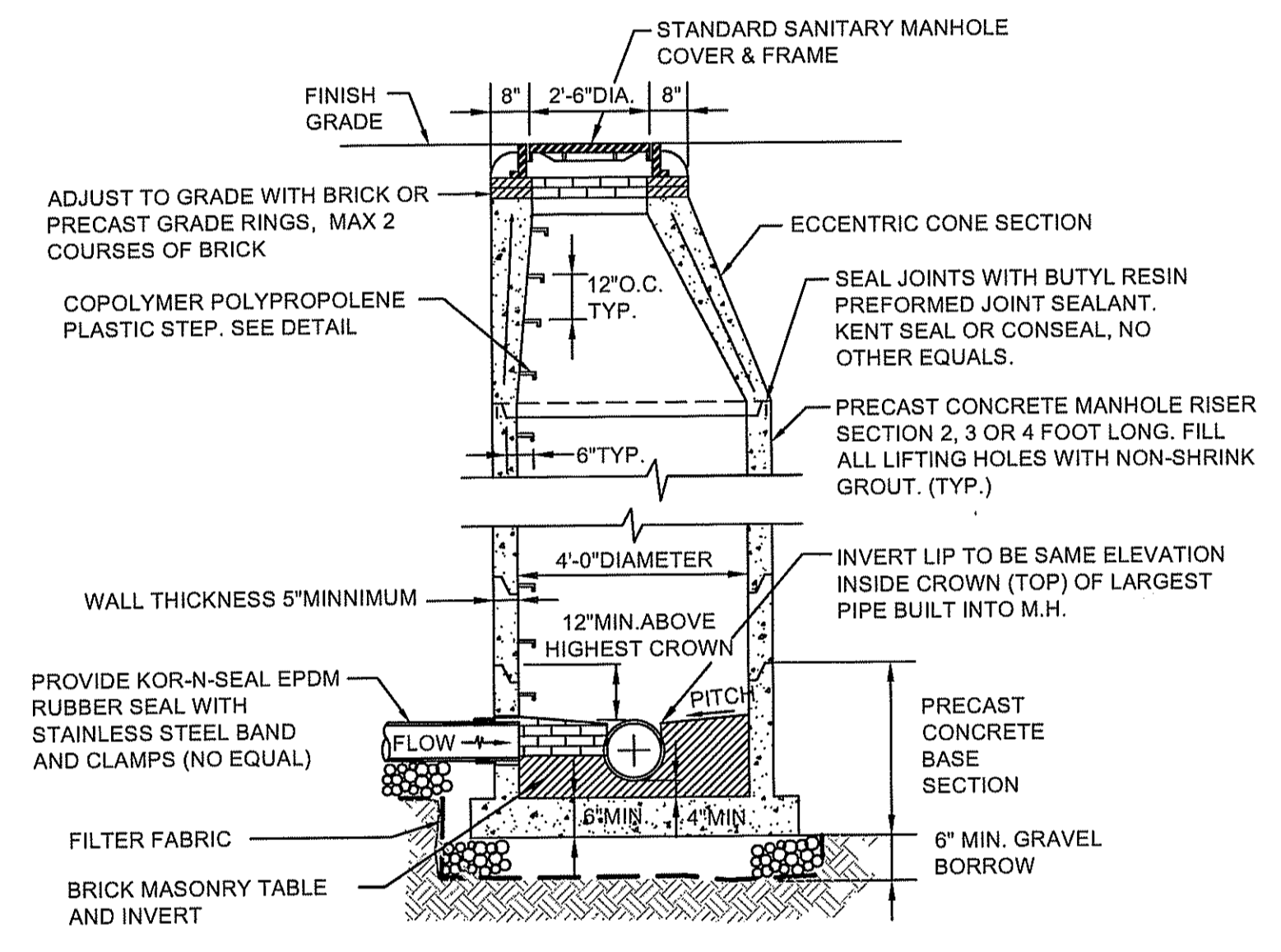
IF REQUIRED SLAB SHALL BE DESIGNED FOR HS-25 HIGHWAY LOADING AND SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM-C-478

**FLAT SLAB TOP DETAIL**  
NOT TO SCALE

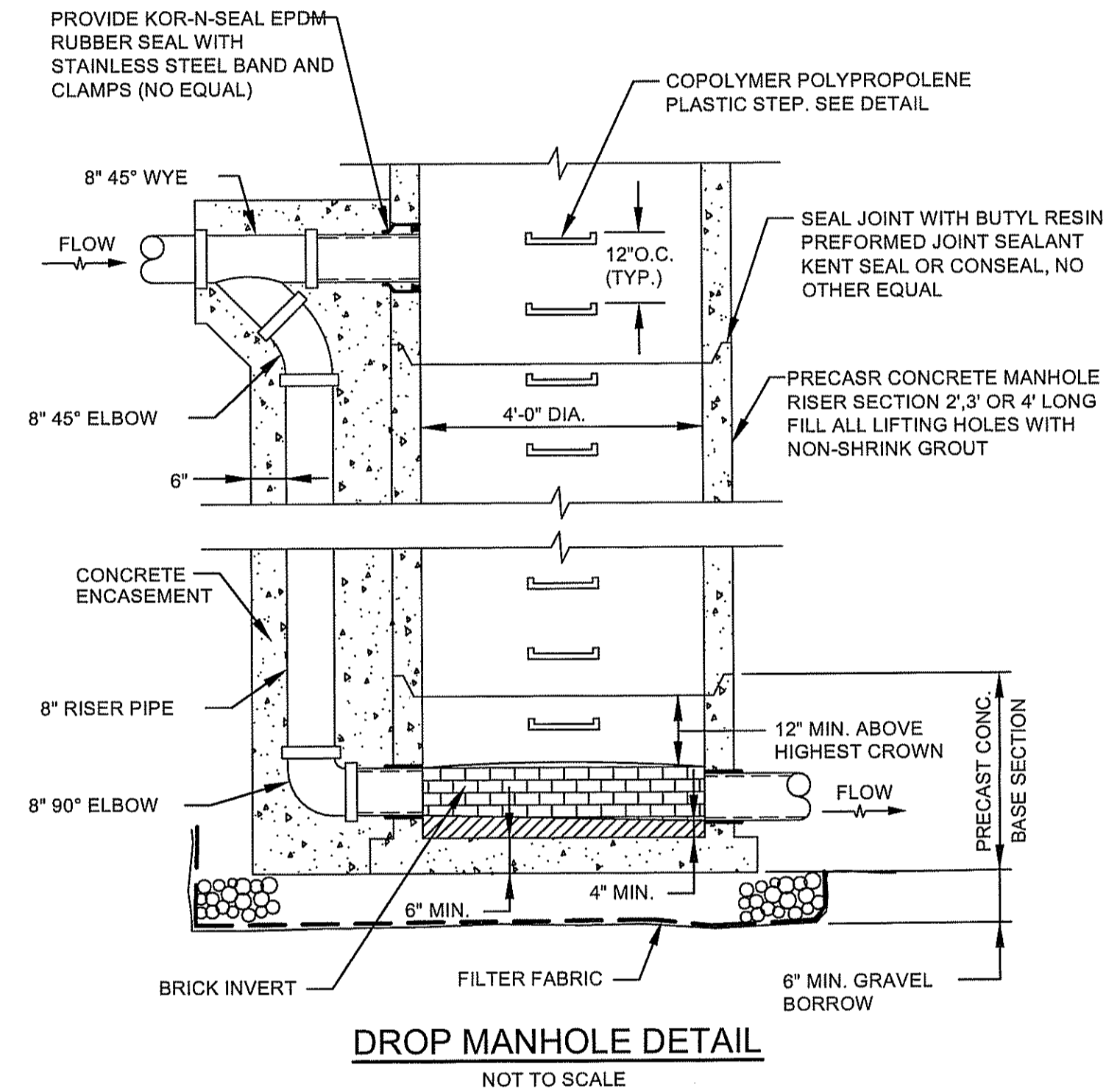


**TYPICAL TRENCH DETAIL FOR SEWER LATERALS, SERVICE CONNECTIONS, AND STORM WATER DRAINAGE PIPE**  
NOT TO SCALE

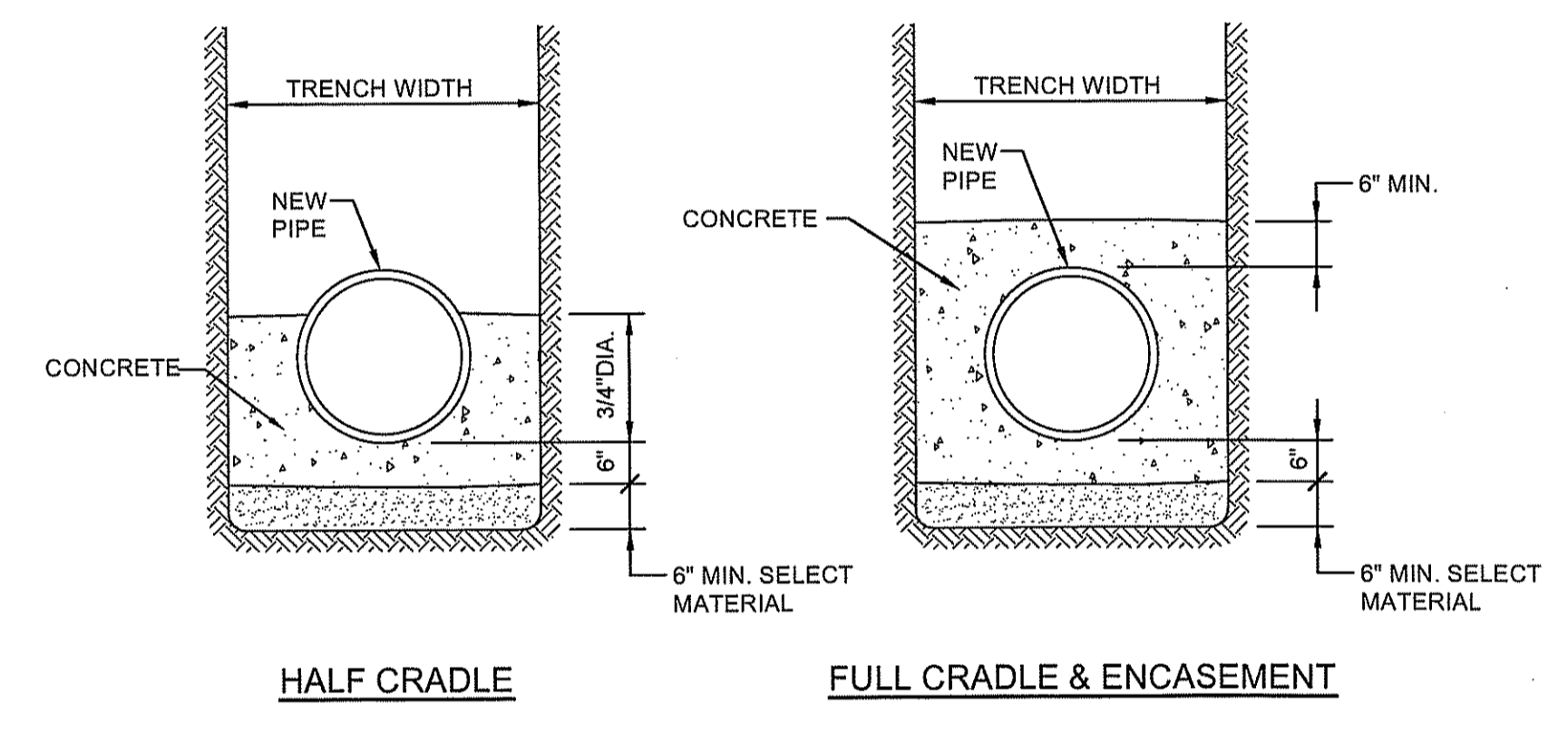
- NOTES:**
- CONTRACTOR SHALL ADJUST THE WIDTH OF SAW CUT OF EXISTING PAVEMENT BASED ON ACTUAL EQUIPMENT AND EARTH SUPPORT SYSTEM USED. MAXIMUM WIDTH OF DISTURBANCE SHALL BE WIDTH OF EARTH SUPPORT SYSTEM PLUS 1'-0".
  - BEDDING MATERIAL FOR SEWER PIPE SHALL CONFORM TO M.01.04 OF THE RIDOT STANDARD SPECIFICATION.
  - CONTRACTOR SHALL PROTECT ALL UTILITIES FROM DAMAGE AND IS RESPONSIBLE FOR REPAIR OF ALL UTILITIES DAMAGED OUTSIDE THE LIMIT OF DISTURBANCE.



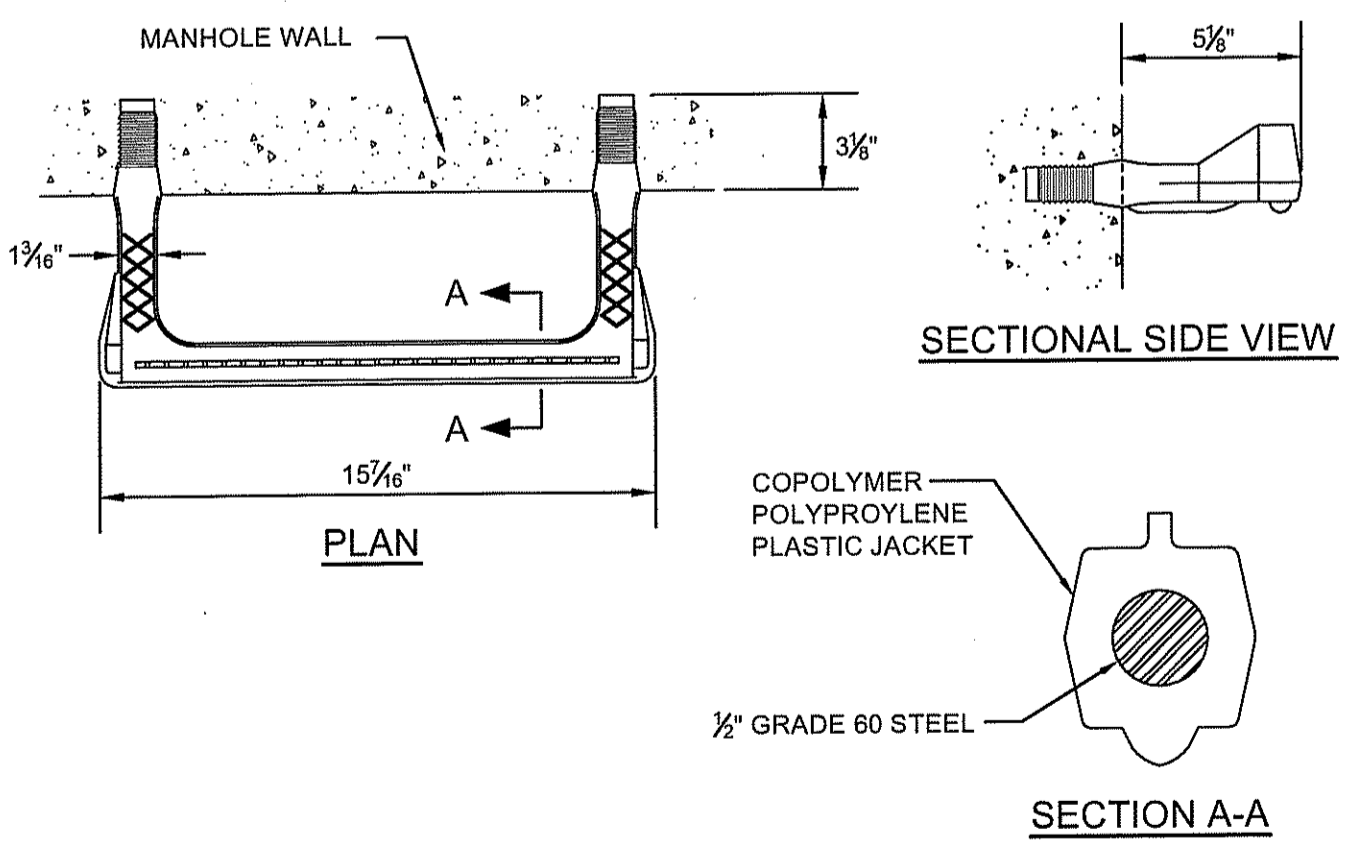
**SANITARY SEWER MANHOLE DETAIL**  
NOT TO SCALE



**DROP MANHOLE DETAIL**  
NOT TO SCALE



**CRADLE DETAIL**  
NOT TO SCALE



**MANHOLE STEP DETAIL**  
NOT TO SCALE

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
FRESHWATER WETLANDS PROGRAM  
APPROVED WITH CONDITIONS  
AS SPECIFIED IN THE LETTER OF APPROVAL  
DATED NOV 2 2017 FILE # 17-0233  
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

*Charles A. ...*

**SPECIAL NOTE:**

ALL SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE TOWN OF EAST GREENWICH SEWER DEPARTMENT.

PROJECT  
**UTILITY IMPROVEMENTS**  
1485 SOUTH COUNTY TRAIL  
PLAT 12A, LOT 18  
EAST GREENWICH, RHODE ISLAND

CLIENT  
**1485 HOLDINGS LLC**

DRAWING TITLE  
**SEWER DETAILS**

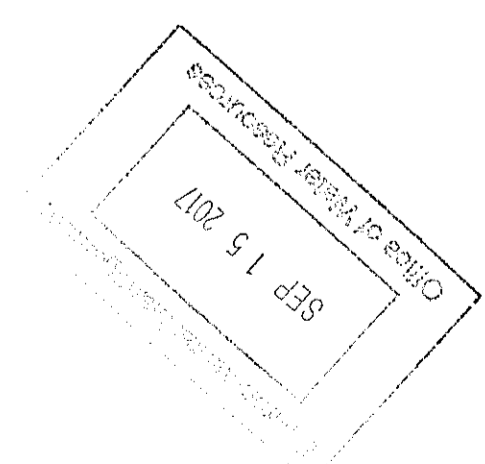
PROFESSIONAL ENGINEER  
TODD A. RAVENHILL  
REGISTERED PROFESSIONAL ENGINEER  
No. 06889

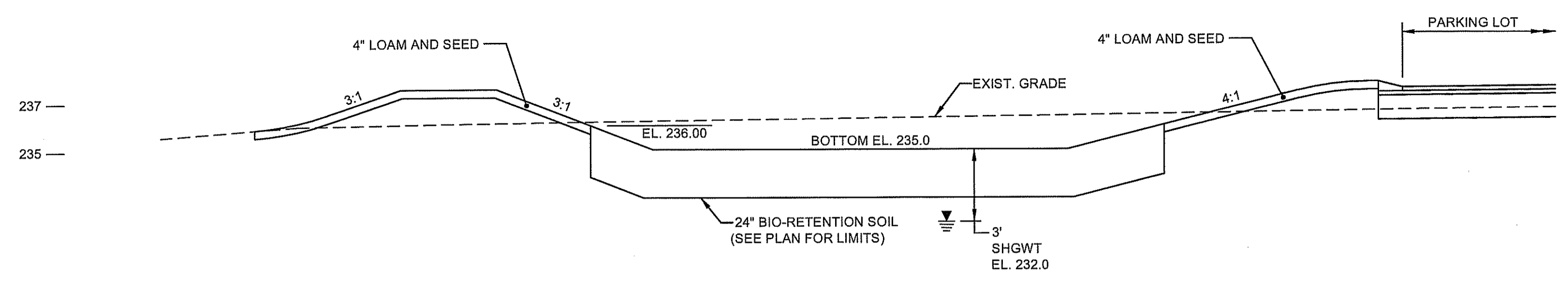
Gordon R. Archibald, Inc.  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

NO.	DATE	REVISIONS	BY

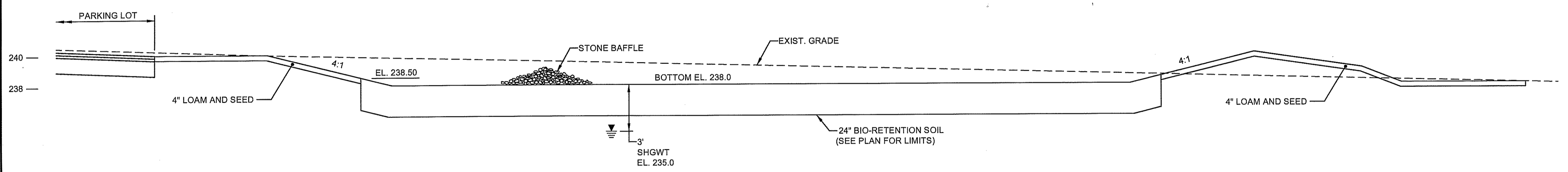
PROJECT NO.: 1713  
DATE: SEPTEMBER 2017  
SCALE: NONE  
DRAWN BY: LBD  
CHECKED BY: TAR

DRAWING NUMBER  
**12**  
SHEET 12 OF 15

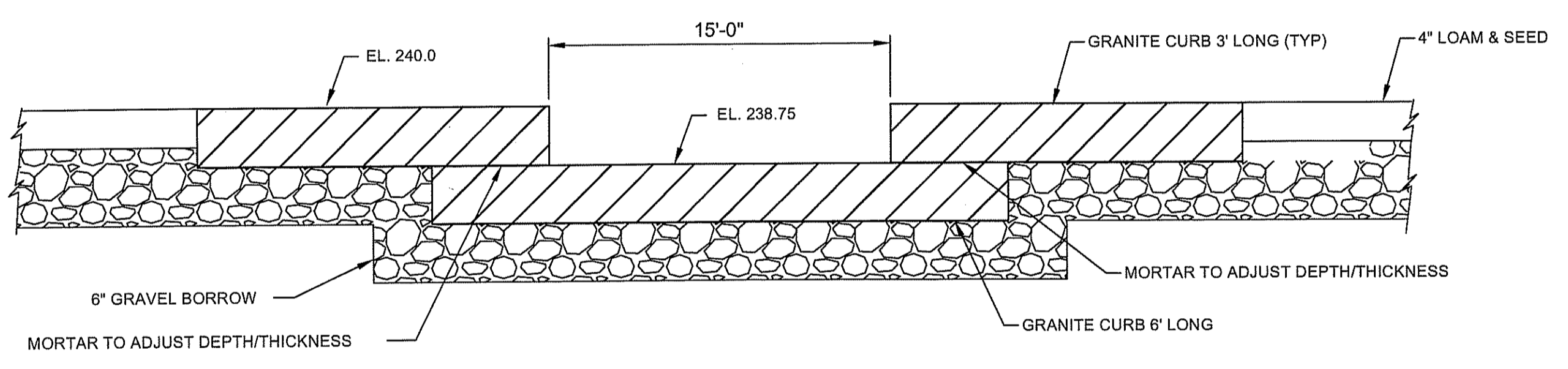




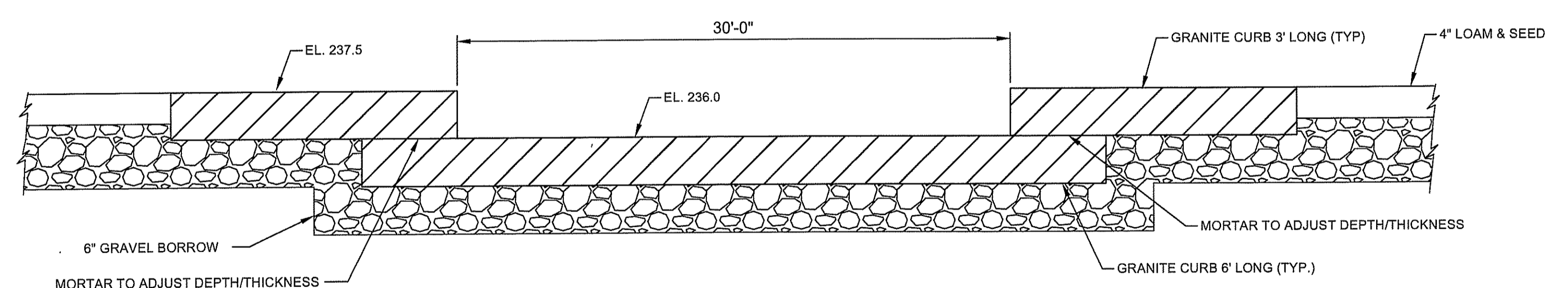
**SECTION A-A**  
SCALE: 1/4" = 1'-0"



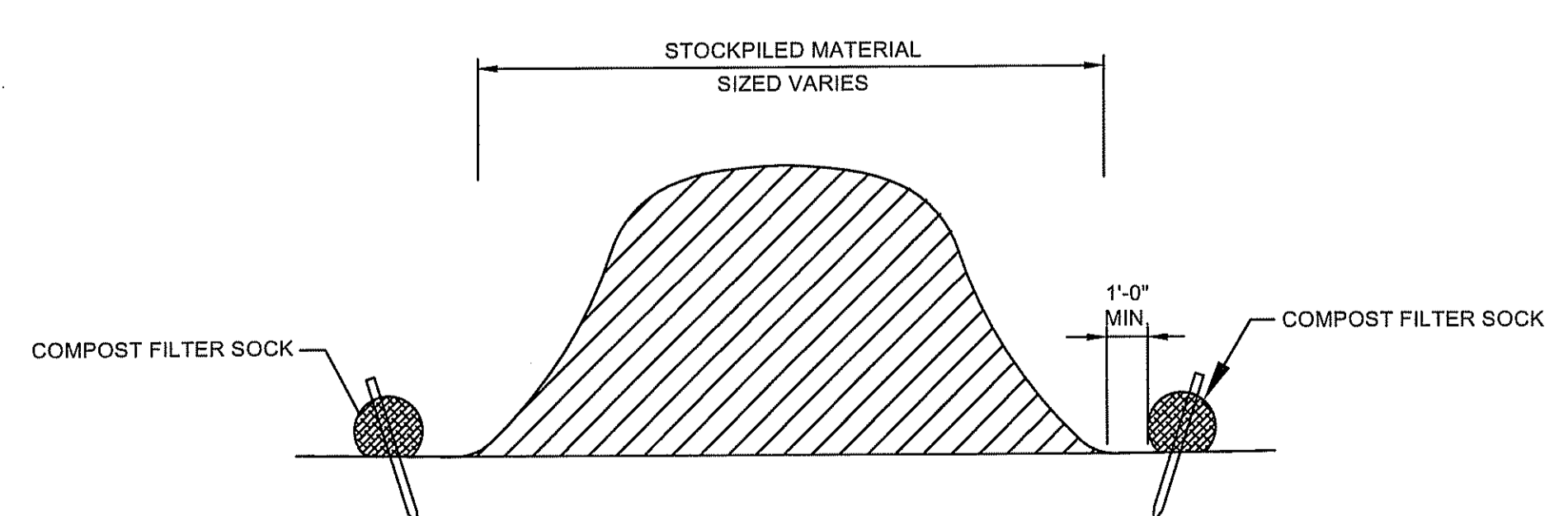
**SECTION B-B**  
SCALE: 1/4" = 1'-0"



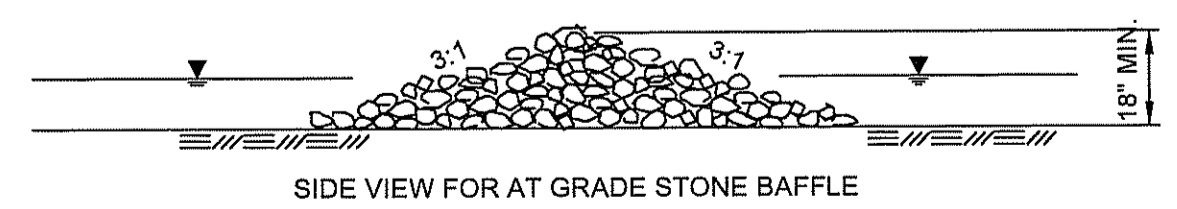
**OUTLET WEIR STRUCTURE - B**  
NOT TO SCALE



**OUTLET WEIR STRUCTURE - A**  
NOT TO SCALE

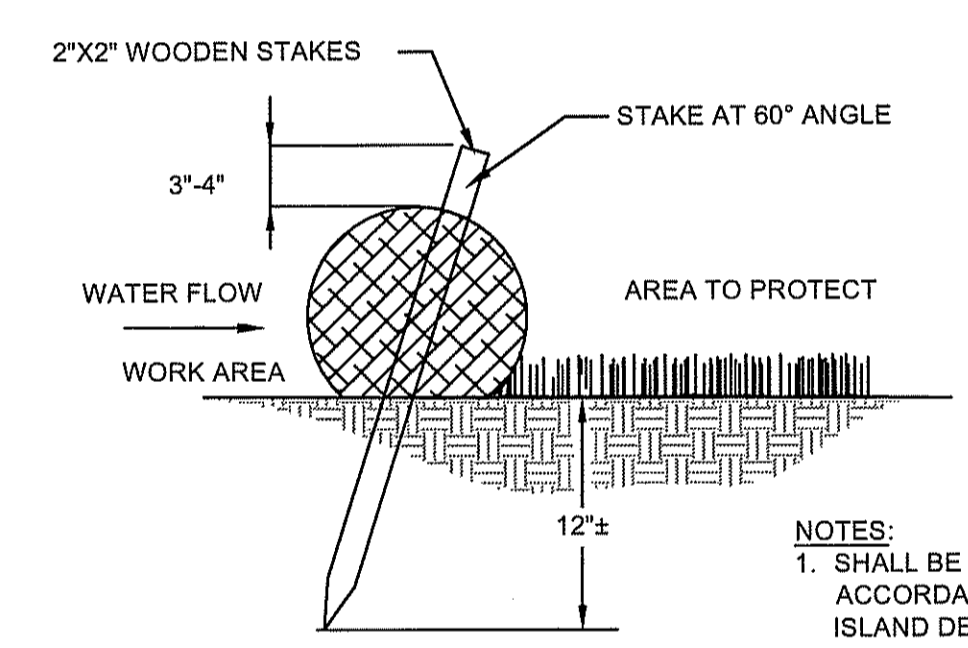


**TYPICAL STOCKPILE**  
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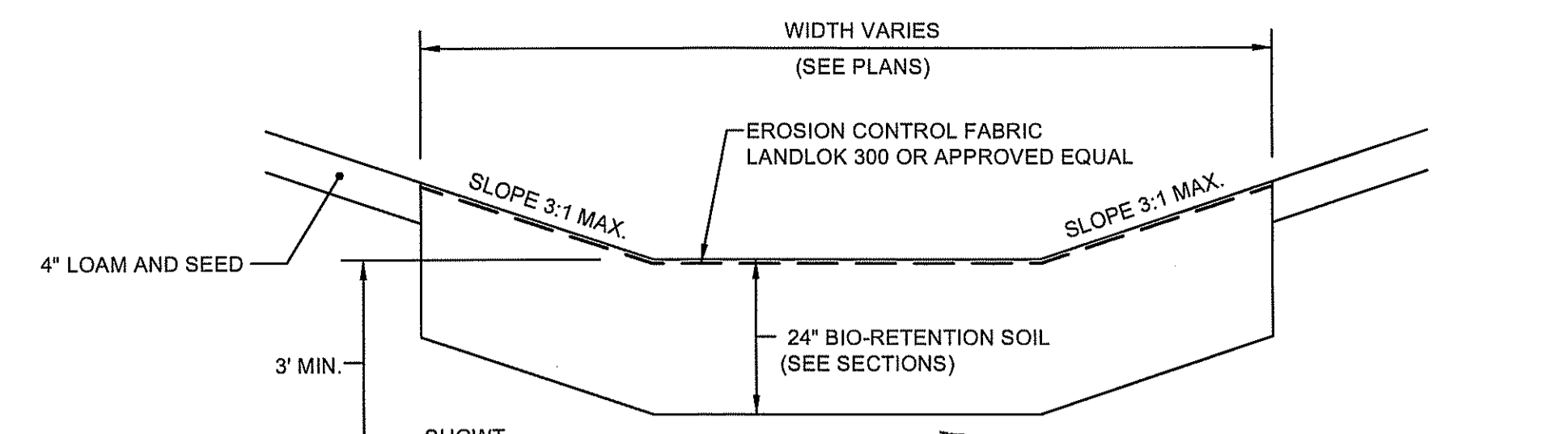
**STONE BAFFLE (SB)**  
N.T.S.

- NOTES**
- STONE SHALL MEET THE REQUIREMENTS FOR CRUSHED STONE IN SECTION M.01 BORROW AND AGGREGATES OF THE RIDOT STANDARD SPECIFICATION OR CONSIST ENTIRELY OF 2"-3" STONE.
  - HAND OR MECHANICAL PLACEMENT WILL BE NECESSARY TO CONSTRUCT BAFFLE.

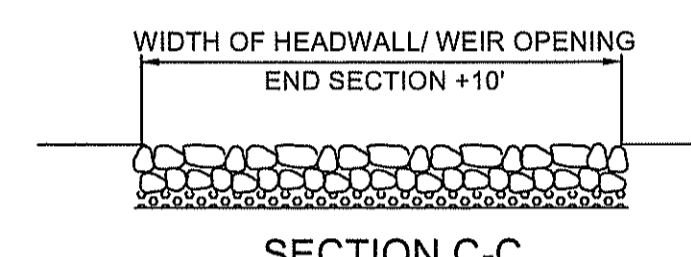
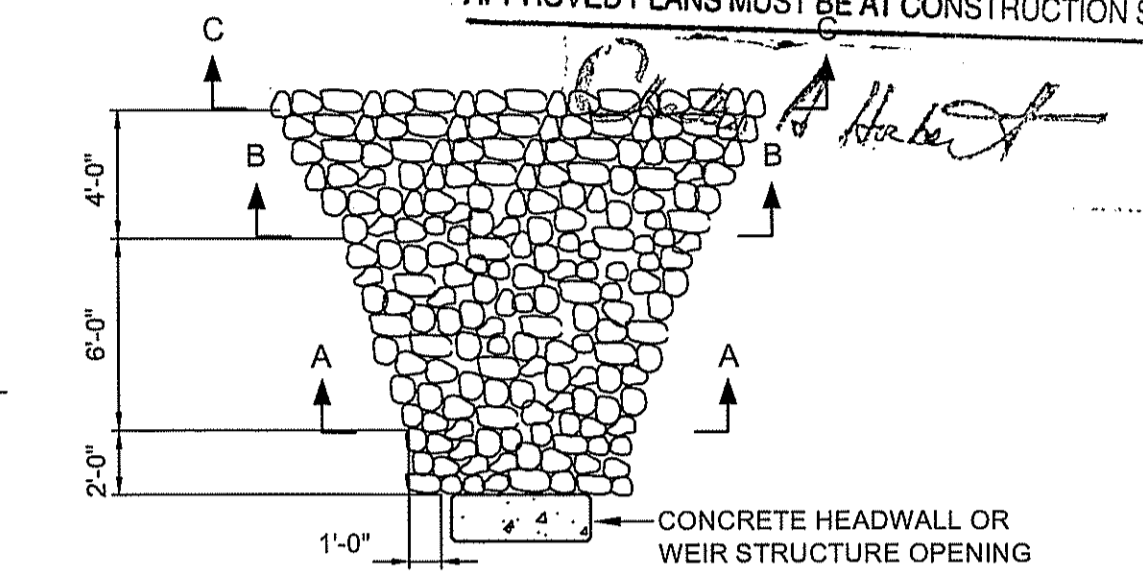


**8-INCH COMPOST FILTER SOCK (CFS)**  
NOT TO SCALE

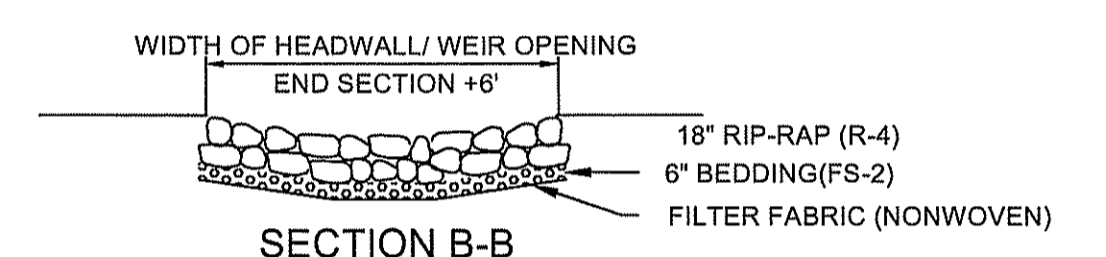
- NOTES**
- SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH SECTION 206 OF THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARDS SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.



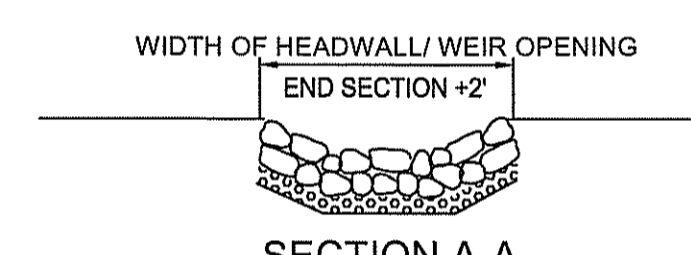
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
FRESHWATER WETLANDS PROGRAM  
APPROVED WITH CONDITIONS  
AS SPECIFIED IN THE LETTER OF APPROVAL  
DATED NOV 9 2017 FILE # 17-0233  
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APPROVED PLANS MUST BE AT CONSTRUCTION SITE



**SECTION C-C**



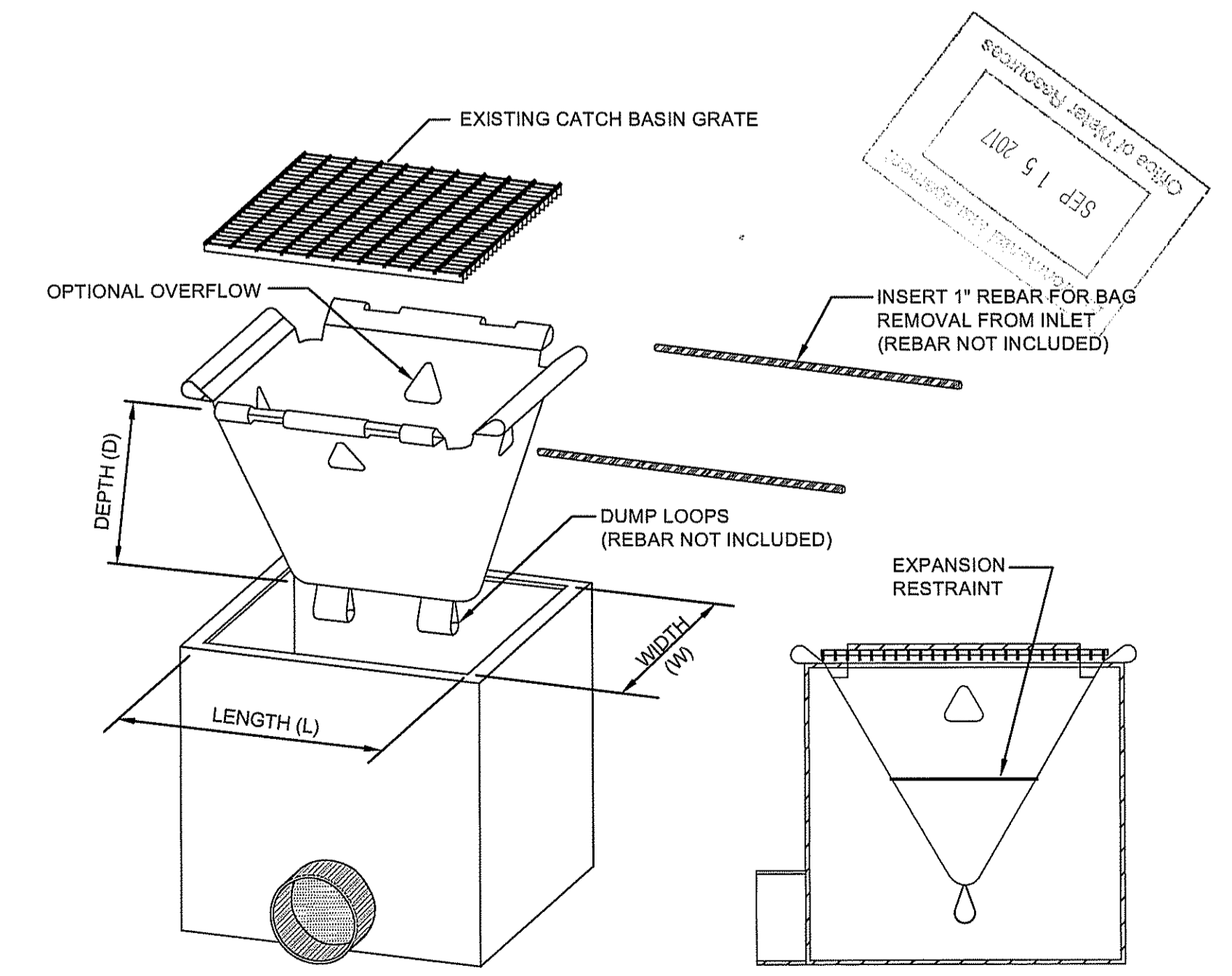
**SECTION B-B**



**SECTION A-A**

**RIP-RAP PAD (12" TO 18" OUTFALL) DETAIL (RRP)**  
NOT TO SCALE

- NOTES:**
- DIMENSIONS MAY BE MODIFIED BY ENGINEER TO MEET FIELD CONDITIONS.
  - UNLESS OTHERWISE SPECIFIED, DUMPED RIP-RAP SHALL BE USED.



**CATCH BASIN INLET PROTECTION TYPE A (CBP)**  
NOT TO SCALE

**PROJECT**  
UTILITY IMPROVEMENTS  
1485 SOUTH COUNTY TRAIL  
PLAT 12A, LOT 18  
EAST GREENWICH, RHODE ISLAND

TODD A. BAVENELLE  
No. 5928  
REGISTERED PROFESSIONAL ENGINEER

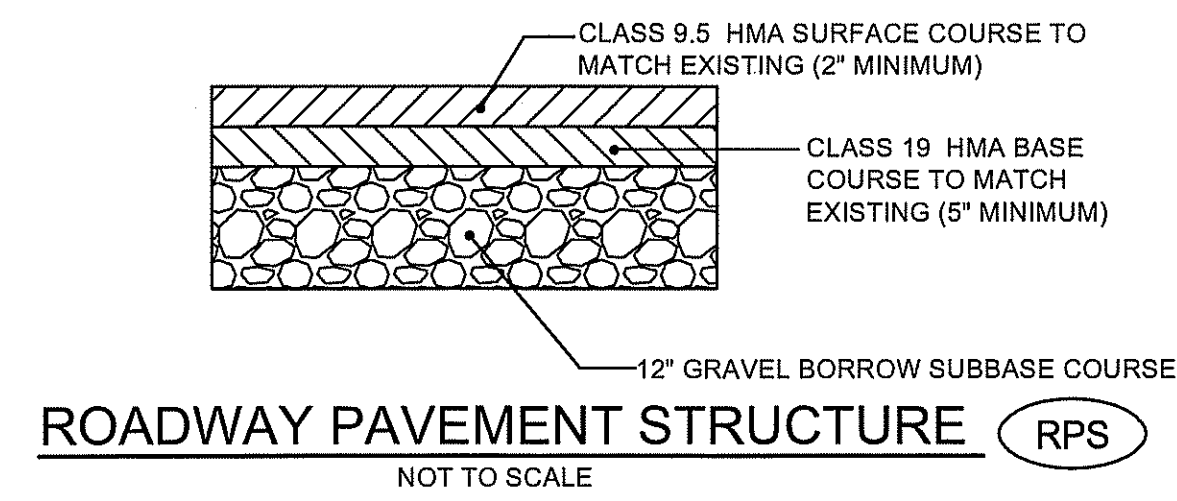
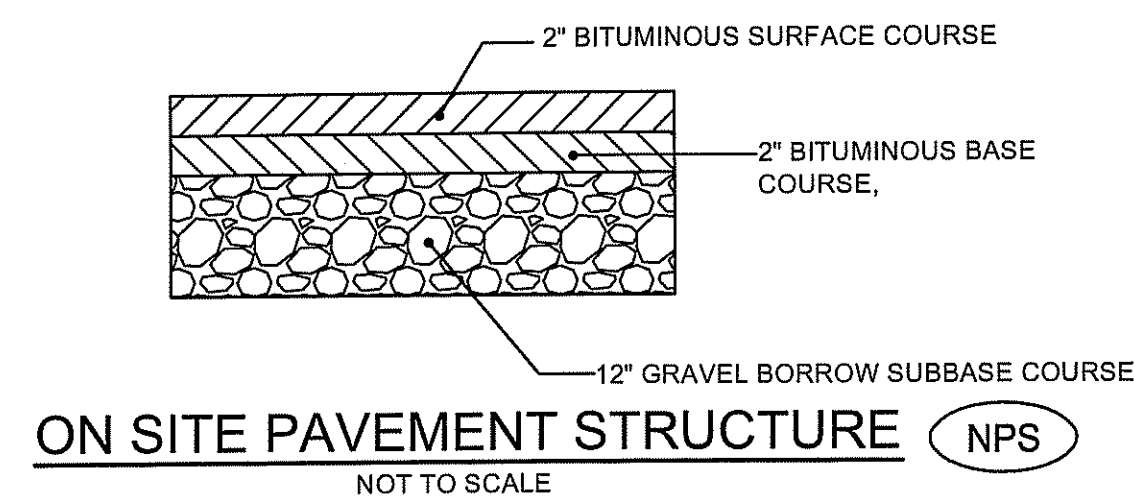
**CLIENT**  
1485 HOLDINGS LLC  
Gordon R. Archibald, Inc.  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

**DRAWING TITLE**  
MISCELLANEOUS DETAILS - 1

NO.	DATE	BY	REVISIONS

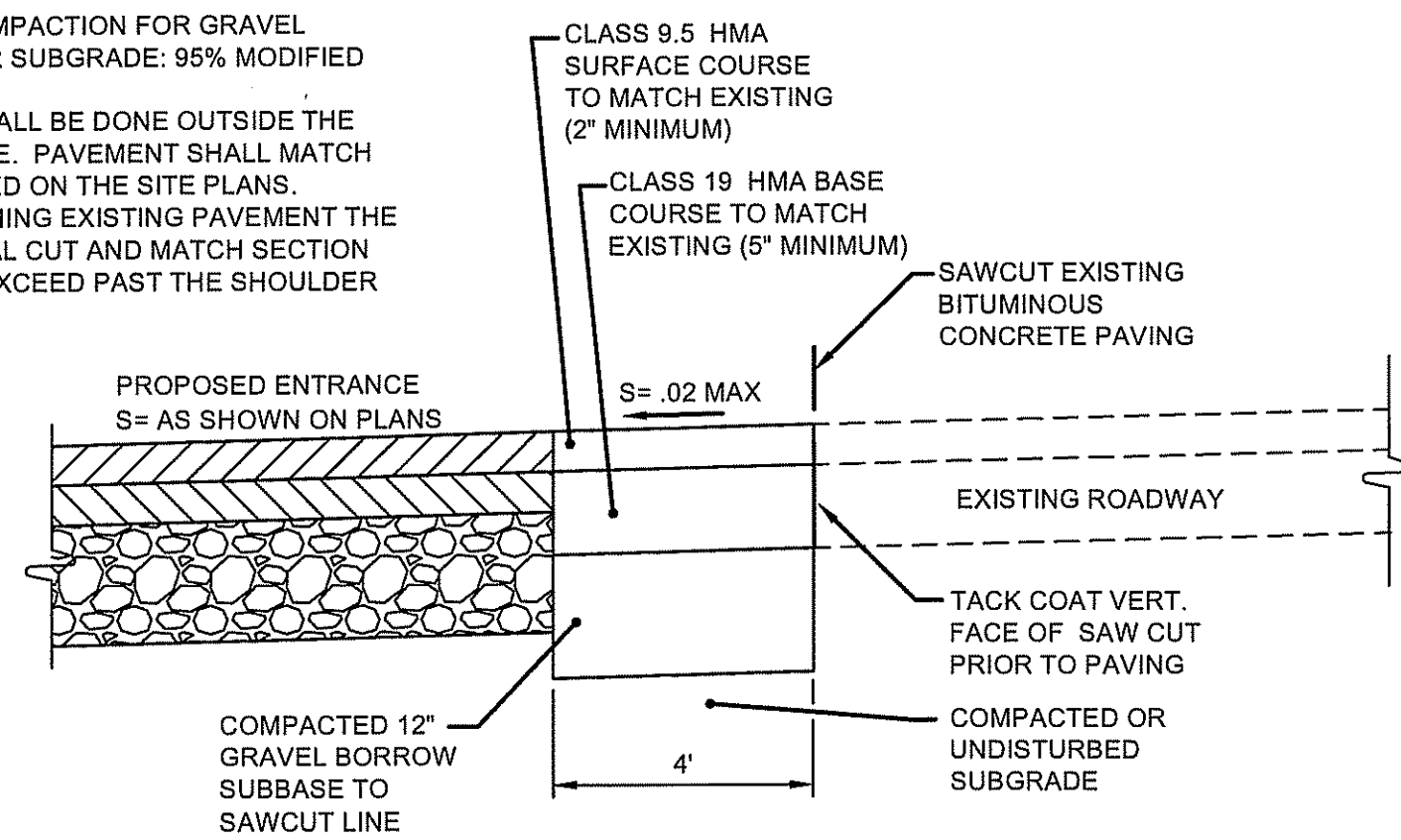
**PROJECT NO.:** 1713  
**DATE:** SEPTEMBER 2017  
**SCALE:** AS SHOWN  
**DRAWN BY:** LBD  
**CHECKED BY:** TAR  
**DRAWING NUMBER**  
**13**  
**SHEET 13 OF 15**

P:\PROJECTS\1713\1713-MISC-DETAILS-1.dwg, 9/15/2017 3:20:13 PM, USER:RBR

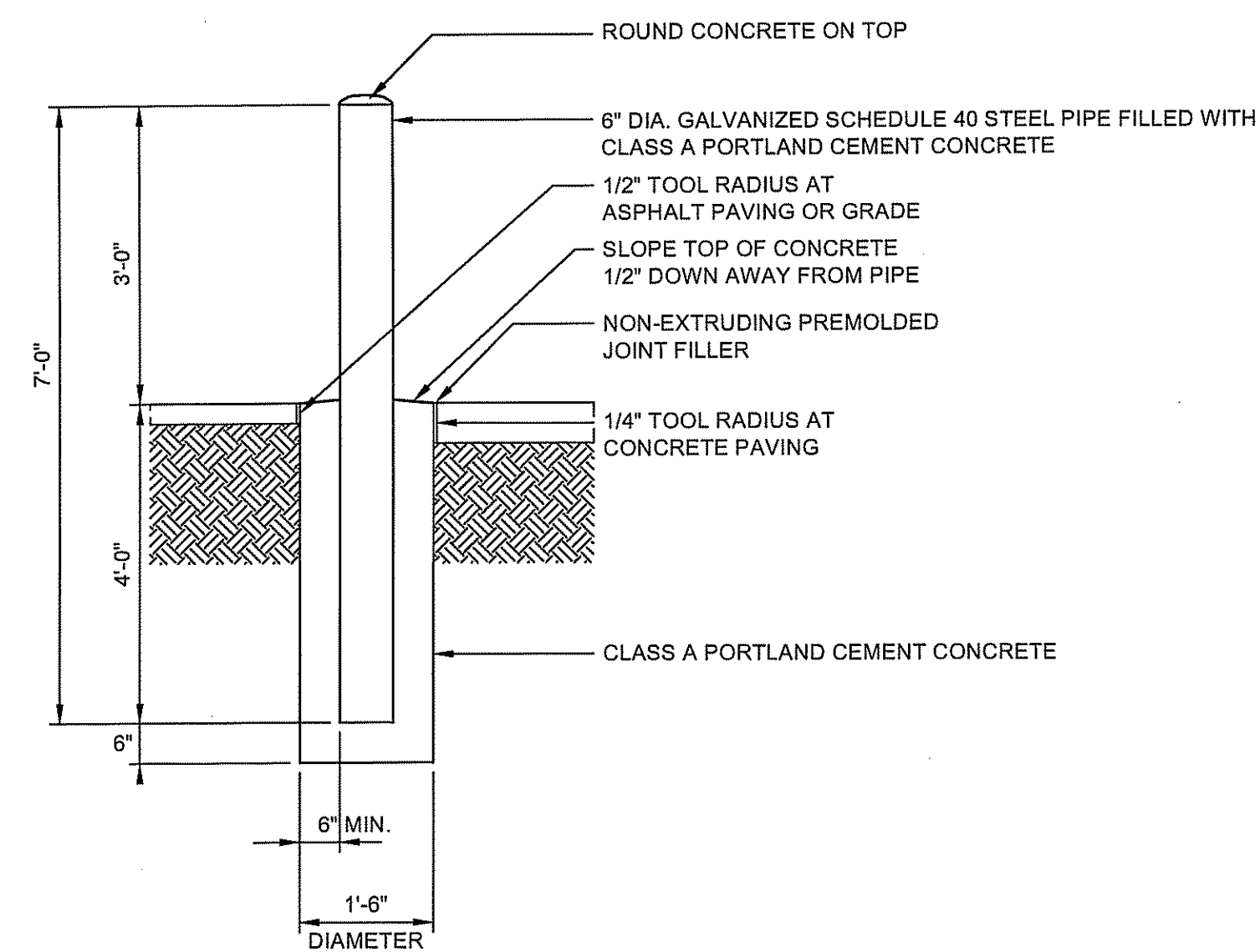


**NOTES:**

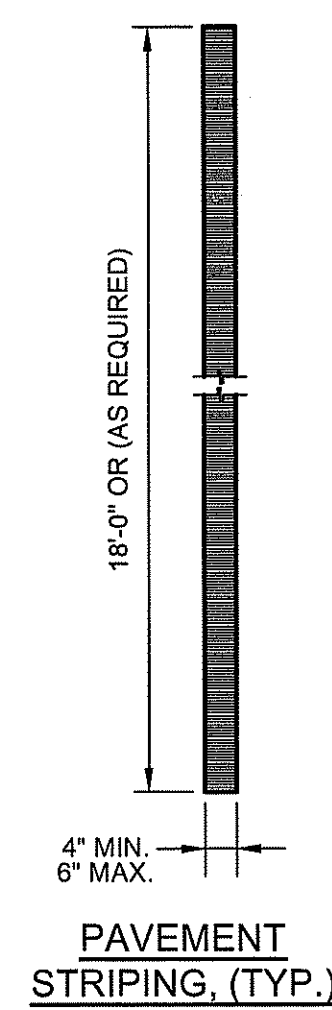
1. MINIMUM COMPACTION FOR GRAVEL SUB-BASE OR SUBGRADE: 95% MODIFIED PROCTOR.
2. NO WORK SHALL BE DONE OUTSIDE THE PROJECT SITE. PAVEMENT SHALL MATCH WHERE NOTED ON THE SITE PLANS.
3. WHEN MATCHING EXISTING PAVEMENT THE LONGITUDINAL CUT AND MATCH SECTION SHALL NOT EXCEED PAST THE SHOULDER STRIPING.



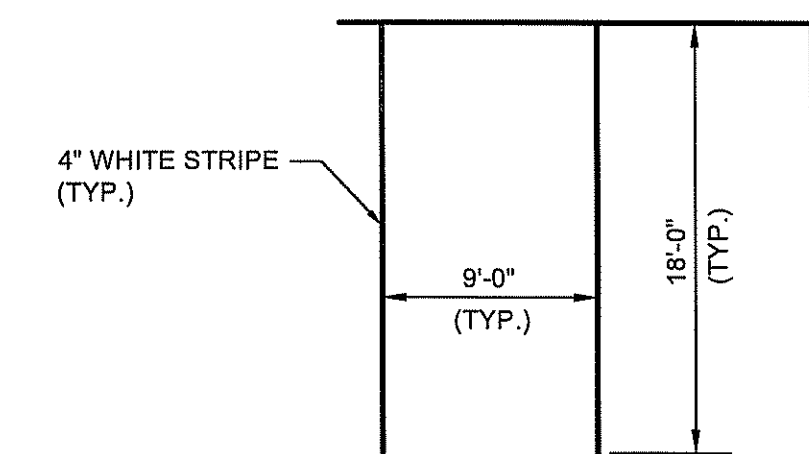
**ENTRANCE ACCESS SAWCUT & MATCH DETAIL**  
NOT TO SCALE



**CONCRETE FILLED BOLLARD DETAIL (CFB)**



**PAVEMENT STRIPING, (TYP.)**

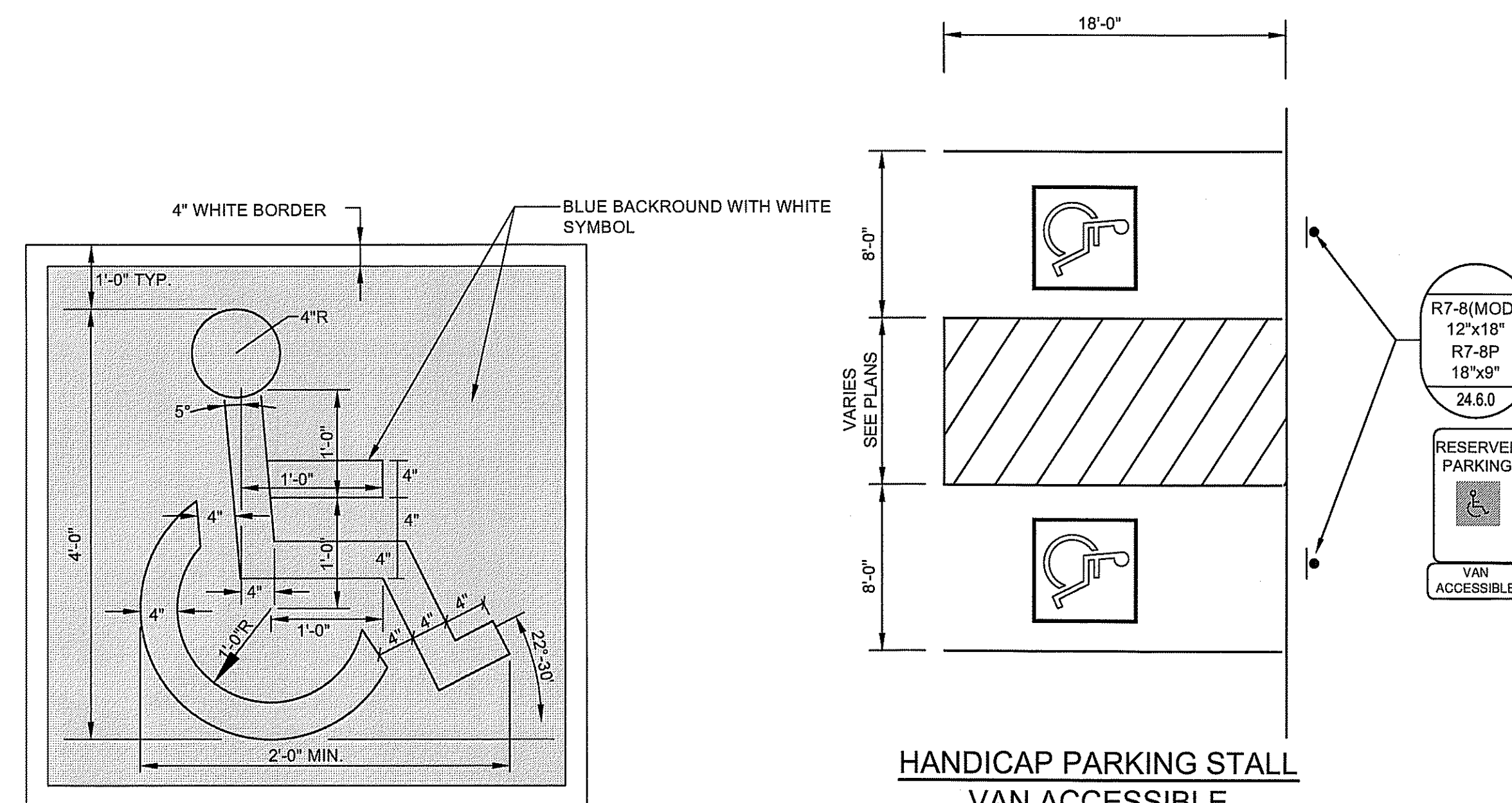


**90° PARKING SPACE DETAIL**

1. THE SPACING OF THE PAVEMENT MARKINGS WILL BE AS SHOWN ON THE PLAN
2. SYMBOLS SHALL MEET THE REQUIREMENTS OF THE FHWA STANDARD ALPHABET AND SYMBOLS FOR HIGHWAY PAVEMENT MARKINGS.
3. USE NON-REFLECTIVE YELLOW PAINT.
4. PARKING SPACE LABELS SHALL BE COORDINATED WITH THE OWNER.

**PAVEMENT MARKINGS - TYPICAL PAINTED SIGNAGE**

NOT TO SCALE



**PAINTED HANDICAP SYMBOL**

NOT TO SCALE

**HANDICAP PARKING STALL VAN ACCESSIBLE**

NOTE:  
ALL PARKING AREA STRIPING SHALL BE 4\"/>

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*Charles A. [Signature]*

RECEIVED AND APPROVED  
SEP 15 2017

PROJECT  
**UTILITY IMPROVEMENTS**  
1485 SOUTH COUNTY TRAIL  
PLAT 12A, LOT 18  
EAST GREENWICH, RHODE ISLAND

TODD A. RAVENHILL  
No. 3528  
REGISTERED PROFESSIONAL ENGINEER

CLIENT  
**1485 HOLDINGS LLC**

**Gordon R. Archibald, Inc.**  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

DRAWING TITLE  
**MISCELLANEOUS DETAILS - 2**

NO.	DATE	REVISIONS	BY

PROJECT NO.: 1713

DATE: SEPTEMBER 2017

SCALE: AS SHOWN

DRAWN BY: LBD

CHECKED BY: TAR

DRAWING NUMBER

**14**

SHEET 14 OF 15

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
CONCRETE HEADWALLS FOR PIPE CULVERTS

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 2.1.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PRECAST CONCRETE FLARED END SECTION

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 2.3.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PRECAST 4'-0" OR 6'-0" SQUARE MANHOLE OR CATCH BASIN

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 4.3.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PRECAST 4'-0", 5'-0", OR 6'-0" ROUND CATCH BASIN

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 4.5.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
SIGN POST SELECTION AND INSTALLATION DETAILS  
U-CHANNEL POST (SIGNS UP TO 8'-0" Wx4'-0" H)

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 24.2.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
REGULATORY SIGNS

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 27.1.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
TOP COVER FOR 4'-0" OR 6'-0" SQUARE CATCH BASINS AND MANHOLES

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 4.7.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
CATCH BASIN AND MANHOLE STEP

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 5.3.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
HEAVY-DUTY ROUND FRAME AND COVER

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 6.2.1

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
HIGH CAPACITY FRAME AND GRATE (BICYCLE SAFE)

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 6.3.4

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PRECAST CONCRETE CURB

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 7.1.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
6'-0" PRECAST CONCRETE TRANSITION CURB

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 7.1.2

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PRECAST CONCRETE 2'-0" RADIUS CORNER

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 7.1.4

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
CURB SETTING DETAIL

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 7.6.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
RIP-RAP DITCH

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 8.3.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
CONSTRUCTION ACCESS

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 9.9.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
PARKING SIGN MOUNTING DETAIL

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 24.6.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
CEMENT CONCRETE SIDEWALK

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 43.1.0

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION**  
TRANSVERSE PAVEMENT CUT AND MATCH

NO.	BY	DATE	REVISIONS
1	...	...	...

DATE: JUNE 15, 1999  
R.I. STANDARD 47.1.0

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Charles A. Hester

PROJECT: UTILITY IMPROVEMENTS  
1485 SOUTH COUNTY TRAIL  
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EAST GREENWICH, RHODE ISLAND

TODD A. RAVENELLE  
REGISTERED PROFESSIONAL ENGINEER

CLIENT: 1485 HOLDINGS LLC

Gordon R. Archibald, Inc.  
Civil and Environmental Engineers  
Pawtucket, Rhode Island

DRAWING TITLE: MISCELLANEOUS DETAILS - 3

NO.	DATE	REVISIONS

PROJECT NO.: 1713  
DATE: SEPTEMBER 2017  
SCALE: AS SHOWN  
DRAWN BY: LBD  
CHECKED BY: TAR  
DRAWING NUMBER: 15  
SHEET 15 OF 15