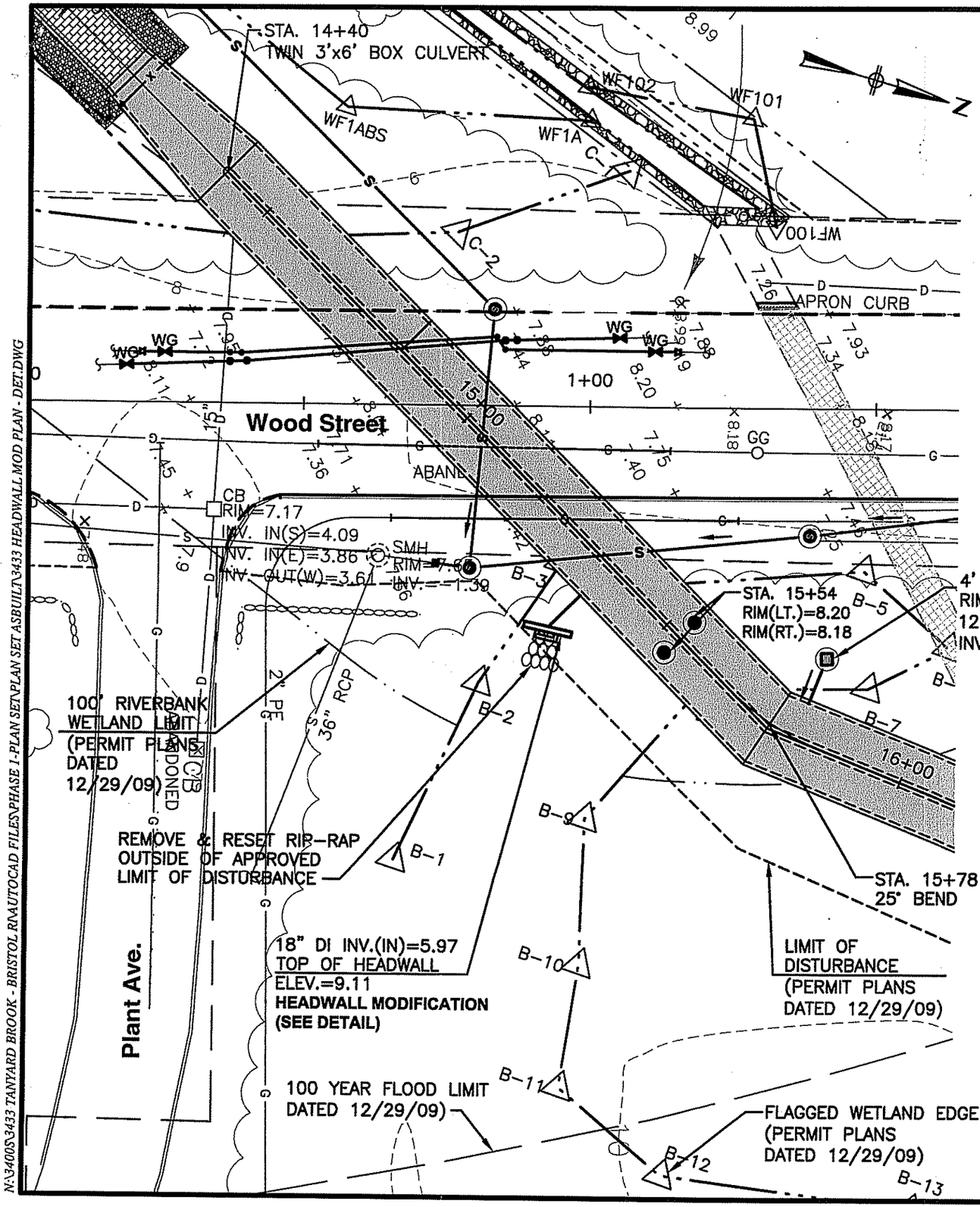
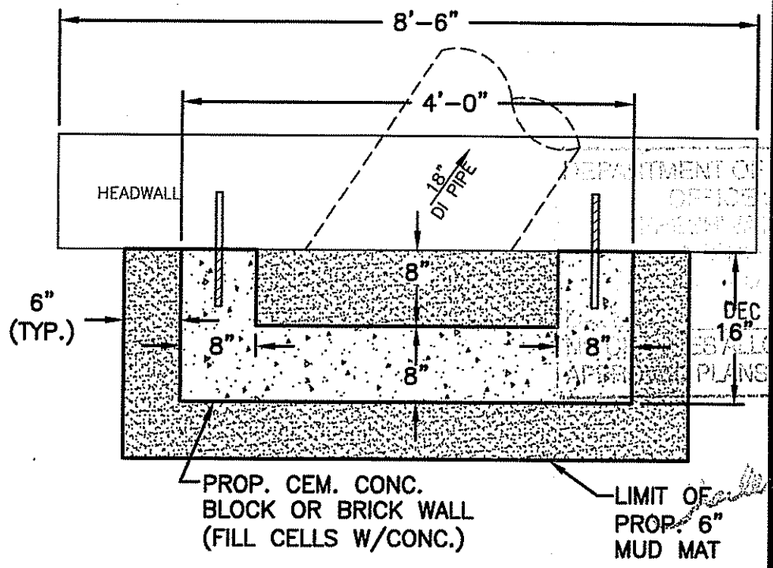
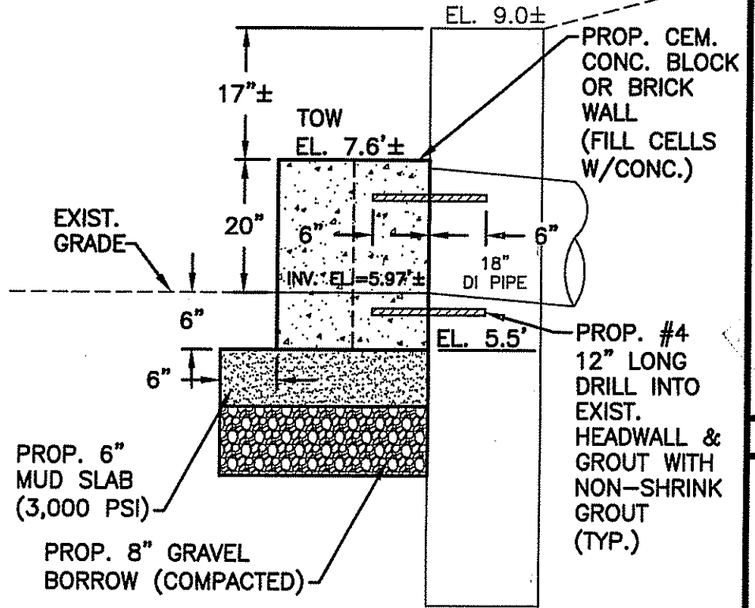




PLAN
NOT TO SCALE



ELEVATION
NOT TO SCALE

Prepared by:

BETA Group, Inc.
Engineers • Planners • Landscape Architects
Lincoln, RI - Norwood, MA - Hartford, CT

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
WETLANDS PROGRAM
WITH CONDITIONS
SEE LETTER OF APPROVAL
DEC 16 2014 FILE # 08-0395
ESTABLISHED WITHOUT PRIOR APPROVAL
PLANS MUST BE AT CONSTRUCTION SITE

Tanyard Brook Culvert Replacement

Headwall Modification (10/24/14)

Bristol, Rhode Island

NOV 25 2014

Print Date: 11/21/2014 11:34 AM

Scale: 1"=20'

Figure No. 1

Permit Modification Plan & Detail

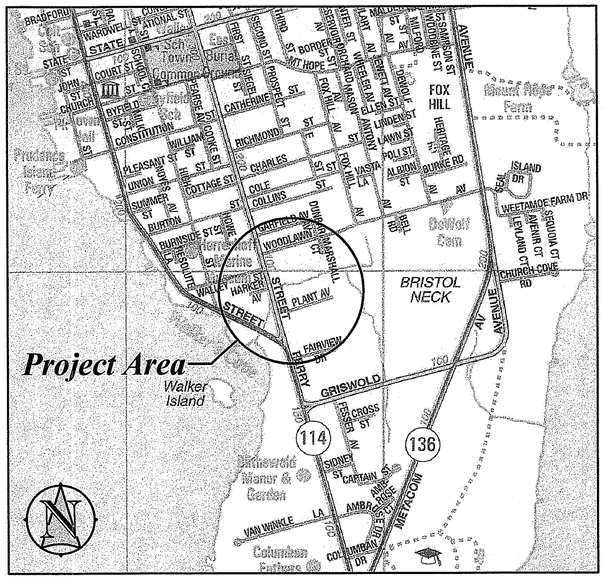
N:\3400S\3433 TANYARD BROOK - BRISTOL RI\AUTOCAD FILES\PHASE 1-PLAN SET\PLAN SET ASBUILT\3433 HEADWALL MOD PLAN - DET.DWG

Application to Alter a Freshwater Wetland

Tanyard Brook Culvert Replacement Project

Town of Bristol, Rhode Island

Index of Drawings



Location Plan
Scale: 1"=1,000'

Diane C. Mederos
Town Administrator

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Set 1 of 2

Permit Plans
January 16, 2009
Revised October 2, 2009
Revised December 11, 2009

Plans Prepared by:
BETA Group, Inc.
Engineers • Planners • Landscape Architects • Scientists
6 Blackstone Valley Place, Lincoln, RI 02865 Ph. 401.333.2382
with offices in: Norwood, MA & Rocky Hill, CT

LEGEND

GENERAL SYMBOLS

EXISTING	PROPOSED	
		CURB (TYPE AS NOTED)
		BERM
		EDGE OF PAVEMENT
▦ □ CB	▦ CB	CATCH BASIN (OR GUTTER INLET, LEACHING BASIN, DROP INLET, CATCH BASIN CURB INLET)
○ EHH	● EHH	ELECTRIC HANDHOLE (NUMBER AS NOTED)
Ⓔ	Ⓔ	ELECTRIC MANHOLE
Ⓣ	Ⓣ	TELEPHONE MANHOLE
Ⓦ	Ⓦ	WATER MANHOLE
Ⓢ	Ⓢ	SEWER MANHOLE
Ⓓ	Ⓓ	DRAINAGE MANHOLE
○ GG	⊗ GG	GAS GATE
○ WG	⊗ WG	WATER GATE
○ CS	⊗ CS	CURB STOP
HYD	HYD.	HYDRANT
FA	FAB	FIRE ALARM BOX
○ PM	• PM	PARKING METER
LP	LP	STREET LIGHT POLE
UP		UTILITY POLE
		SIGN
○ GUY	GUY	GUY POLE
		ABANDONED UTILITY LINE (TYPE AS NOTED)
D 12" RCP D	10'-12" RCP D	DRAIN PIPE (SIZE AS NOTED)
S 8" VCP	10'-8" PVC S	SEWER MAIN (SIZE AS NOTED)
E E		ELECTRIC DUCT
G 4" HP	G	GAS MAIN (SIZE AS NOTED)
W 8" CI	W	WATER MAIN (SIZE AS NOTED)
T T	T T	TELEPHONE DUCT (SIZE AS NOTED)
□ MB		MAIL BOX
		WOOD GUARD RAIL STEEL BEAM GUARD, WOOD OR STEEL POSTS (TYPE AS NOTED)
		STEEL GUARD RAIL, STEEL POSTS (TYPE NOTED)
		STONE WALL
		RETAINING WALL (TYPE NOTED)
⊡ BND	⊡ BND	HIGHWAY/PROPERTY BOUND (TYPE AS NOTED)
E.S.H.L.		STATE HIGHWAY LAYOUT LINE (S.H.L.)
Boundary Name		CITY, TOWN, COUNTY OR STATE BOUNDARY LINE
		PROPERTY LINE
T.E.B.	T.E.B.	TEMPORARY EASEMENT LINE
P.E.B.	P.E.B.	PERMANENT EASEMENT LINE
	2+00	CONSTRUCTION BASELINE
N00°00'00"E 000.00'		SURVEY LINE
		RAILROAD OR STREET RAILWAY TRACKS WITH SIDELINES
		WHEELCHAIR RAMP
		TREE (SIZE AND TYPE AS NOTED)
		HEDGE
x x x x WF-1	x x x x	FENCE (SIZE AND TYPE AS NOTED)
		EDGE OF WETLAND W/ FLAGGED NUMBER
		EDGE OF RIVER/STREAM LINE
		50-FT. WETLAND BUFFER LIMIT
		100-FT. WETLAND BUFFER LIMIT
		100-FT. RIVER FRONT LIMIT
		200-FT. RIVER FRONT LIMIT
		WOODED AREA / LIMIT OF CLEARING
x 00.0	x 00.00	SPOT GRADE
		SAW CUT LINE
	TP-1	TEST PIT
	B-1	BORING
		HAYBALES
		HAYBALE/SILT FENCE
		TEMPORARY SHEETING
		TURBIDITY CURTAIN

ABBREVIATIONS

GENERAL

ABAN.	ABANDON
ADJ.	ADJUST
AADT	ANNUAL AVERAGE DAILY TRAFFIC
APPROX.	APPROXIMATE
℄	BASELINE
BM	BENCH MARK
BIT.	BITUMINOUS
B.B.	BITUMINOUS BERM
B.C.	BITUMINOUS CURB
BOS	BOTTOM OF SLOPE
BOW	BOTTOM OF WALL
BD OR BND	BOUND
BLDG.	BUILDING
CEM.	CEMENT
℄	CENTER LINE
CLF	CHAIN LINK FENCE
CONC.	CONCRETE
C.C.	CONCRETE CURB
CONT.	CONTINUOUS
CONST.	CONSTRUCTION
CO.	COUNTY
D	DELTA ANGLE (CENTRAL ANGLE OF HORIZ. CURVE)
DHV	DESIGN HOURLY VOLUME
DWY.	DRIVEWAY
EB	EAST BOUND
E.P., E.O.P.	EDGE OF PAVEMENT
EL.	ELEVATION
E.T.W.	EDGE OF TRAVEL WAY
EXIST.	EXISTING
FLDSTN	FIELDSTONE
FDN.	FOUNDATION
GAR.	GARAGE
GRAN.	GRANITE
G.C.	GRANITE CURB
G.E.	GRANITE EDGING
GRAV.	GRAVEL
GD	GROUND
HOR.	HORIZONTAL
HMA	HOT MIX ASPHALT
HO	HOUSE
IP	IRON PIPE
JCT	JUNCTION
LT.	LEFT
L	LENGTH OF CURVE
LP	LOW POINT
MB	MAIL BOX
MHB	MASSACHUSETTS HIGHWAY BOUND
MAX.	MAXIMUM
MIN.	MINIMUM
NB	NORTH BOUND
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
PVMT.	PAVEMENT
PEB	PERMANENT EASEMENT BOUNDARY
P.S.B.	PLANTABLE SOIL BORROW
PCC	POINT OF COMPOUND CURVATURE
PC	POINT OF CURVATURE
PRC	POINT OF REVERSE CURVATURE
PI	POINT OF INTERSECTION
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PGL	PROFILE GRADE LINE
PROJ.	PROJECT
℄ OR PROP. LINE	PROPERTY LINE
PROP.	PROPOSED
R	RADIUS OF CURVATURE
RR	RAILROAD
R&D	REMOVE & DISPOSE
REM.	REMOVE
REMOD.	REMODEL
RET.	RETAINING
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT.	RIGHT
ROW OR R/W	RIGHT-OF-WAY
RD.	ROAD
SHT.	SHEET
SHLD.	SHOULDER
SDWK.	SIDEWALK
SB	SOUTH BOUND OR STONE BOUND
S.H.L.	STATE HIGHWAY LAYOUT LINE
STA.	STATION
ST.	STOPPING SIGHT DISTANCE
SSD	STREET
TAN	TANGENT
T	TANGENT DISTANCE OF CURVE/TRUCK PERCENTAGE
TEB	TEMPORARY EASEMENT BOUNDARY
TEMP.	TEMPORARY
TOS	TOP OF SLOPE
TOW	TOP OF WALL
TP	TURNING POINT
TYP.	TYPICAL
VERT.	VARIABLE
VAR.	VERTICAL
VC	VERTICAL CURVE
VGC	VERTICAL GRANITE CURB
WB	WEST BOUND
WCR	WHEELCHAIR RAMP
WD	WOOD

UTILITIES

ACCMP	ASPHALT COATED CORRUGATED METAL PIPE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
CL.	CLASS (PIPE, CONCRETE, EXCAVATION, ETC.)
COND.	CONDUIT
CAP	CORRUGATED ALUMINUM PIPE
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
CSP	CORRUGATED STEEL PIPE
CULV.	CULVERT
CI	CURB INLET
DI	DROP INLET
DIP	DUCTILE IRON PIPE
EL. (OR ELEV.)	ELEVATION
FM	FORCE MAIN
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
GIP	GALVANIZED IRON PIPE
GG	GAS GATE
GI	GUTTER INLET
HDW	HEADWALL
HYD.	HYDRANT
INV.	INVERT ELEVATION
LP	LIGHT POLE
MH	MANHOLE
PVC	POLY-VINYL-CHLORIDE PIPE
PWW	PAVED WATER WAY
R&D	REMOVE & DISPOSE
RCP	REINFORCED CONCRETE PIPE (CLASS III UNLESS NOTED)
SMH	SEWER MANHOLE
SD	SUBDRAIN
TSV&B	TAPPING SLEEVE, VALVE AND BOX
TS	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
UP	UTILITY POLE
VCP	VITRIFIED CLAY PIPE
WG	WATER GATE
WM	WATER METER/WATER MAIN
WIP	WROUGHT IRON PIPE

Engineered by:

BETA Group, Inc.
Engineers·Scientists·Planners

6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

RECEIVED
JAN 19 2010

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Legend and Abbreviations

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C1 Legend & Abbrev.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 **Date:** 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 26 2010 FILE # 08-0315
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Charles A. Horbert

Scale

None

Not for Construction

Sheet No.: (2 of 18)

C1.0

Plot Date: Dec 30, 2009 1:22pm

H:\3400s\3433 Tanyard Brook - Bristol RI\Auto\240 Files\Phase 1-Plan Set\Environmental Plan Set\3433-C1 Legend & Abbrev.dwg

GENERAL CIVIL NOTES

1. VERTICAL DATUM - NAVD 88.
2. THE 2004 STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION AND ALL APPROVED REVISIONS IN THE COMPILATIONS OF APPROVED SPECIFICATIONS, THE RHODE ISLAND STANDARD DETAILS WITH REVISIONS 9/08/08. THE 2003 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE RIDOT TRAFFIC DESIGN MANUAL (OCTOBER 2004), THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z-60.1-1986) AND ALL AMENDMENTS WILL GOVERN.
2. EXISTING TOPOGRAPHICAL SURVEY INFORMATION WAS PROVIDED BY BRYANT UNIVERSITY . SUPPLEMENTAL SURVEY COMPLETED BY GILBERT AND MALONEY, PROVIDENCE RI, JUNE 2008.
3. THE LOCATION OF SUBSURFACE UTILITIES SHOWN IS APPROXIMATE AND NOT GUARANTEED TO BE COMPLETE OR ACCURATE. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITY LINES AND STRUCTURES PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR MUST NOTIFY DIG SAFE PRIOR TO ANY EXCAVATION, DEMOLITION OR EXPLOSION WORK IN PUBLIC OR PRIVATE WAYS OR UTILITY COMPANY RIGHT OF WAY OR EASEMENT.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR THE RESOLUTION OF THE CONFLICT.
5. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SANITARY STRUCTURES AS NECESSARY FOR THE CHANGES IN GRADE, AND RESET ALL WATER, AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M04.03.1.
6. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, CABLE TV, FIRE ALARM AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES. ALL UTILITY CASTING AND FIRE ALARM BOXES SHALL BE ADJUSTED TO FINISHED GRADE BY THEIR RESPECTIVE OWNERS.
7. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
8. THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
9. TRENCH DEWATERING IS ANTICIPATED FOR THIS WORK AND DISCHARGE OF FINES OR SEDIMENTS IS NOT PERMITTED. SEE SOIL EROSION SEDIMENTATION CONTROL NOTES.
10. CONTRACTOR SHALL VERIFY EXISTING GRADE ELEVATIONS. IF ANY ADJUSTMENT IS REQUIRED DUE TO DIFFERENT EXISTING GRADES FOUND IN THE FIELD, THE CONTRACTOR SHALL NOTIFY AND OBTAIN THE APPROVAL OF THE ENGINEER PRIOR TO PERFORMING THE WORK.
11. EXCEPT WHERE NOTED BY PROPOSED CONTOUR LINES, ALL FINAL CONTOUR LINE ELEVATIONS SHALL BE THE SAME AS EXISTING CONTOUR LINE ELEVATIONS.

TREE PRESERVATION NOTES

1. TREES WITHIN THE LIMITS OF GRADING SHALL NOT BE REMOVED UNLESS APPROVED BY THE ENGINEER.
2. PRIOR TO CONSTRUCTION PROTECT TREES WITHIN THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH DETAIL.
3. PRIOR TO CONSTRUCTION DETERMINE REQUIRED CLEARANCES AND PRUNE TREES.
4. BRANCHES OR LIMBS DAMAGED DURING CONSTRUCTION SHALL BE CUT BACK TO THE TRUNK OR A LATERAL BRANCH.
5. MAKE EVERY EFFORT TO MAINTAIN EXCAVATION ACTIVITIES OUTSIDE LIMITS OF THE TREE CANOPY.
6. ROOTS LARGER THAN 1.5" IN DIAMETER ENCOUNTERED IN EXCAVATIONS SHALL BE CUT OFF SQUARELY USING A SHARP ARBORIST SAW.
7. STRIP AND SEGREGATE TOPSOIL PRIOR TO EXCAVATING IN UNPAVED AREAS. FOLLOWING BACKFILL OPERATIONS PLACE TOPSOIL BACK IN THE APPROPRIATE PLACE WITHOUT COMPACTION AND VERTICALLY MULCH ROOT SYSTEM. NO AMENDMENTS SHALL BE ADDED.
8. IMMEDIATELY FOLLOWING BACKFILL OPERATIONS PROVIDE DEEP WATERING OF THE ROOT SYSTEM, APPLICATION OF FERTILIZER, AND VERTICAL MULCHING.
9. MAINTAIN STORAGE OF EQUIPMENT AND MATERIALS A DISTANCE AT LEAST TWO (2) TIMES THE DISTANCE OF THE RADIUS OF THE TREE CANOPY.

SOIL EROSION AND SEDIMENTATION CONTROL NOTES

1. ALL EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES WILL BE INSTALLED AND INSPECTED PRIOR TO THE START OF CONSTRUCTION. THE E&S CONTROLS SHALL BE CLEANED AND MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION OPERATIONS AND UNTIL ALL DISTURBED AREAS ARE STABILIZED AFTER CONSTRUCTION IS COMPLETE. E&S CONTROLS SHALL BE INSPECTED AND CLEANED AFTER ALL STORM EVENTS AND UPON THE REQUEST OF THE OWNER OR ENGINEER. CONTRACTOR WILL MAINTAIN AN ADEQUATE SUPPLY OF HAY BALES AND SILT FENCE ON SITE TO BE INSTALLED IN AREAS WHERE EXISTING E&S CONTROLS HAVE FAILED OR AS DETERMINED NECESSARY BY THE ENGINEER. NO WORK OR STORAGE OF CONSTRUCTION EQUIPMENT WILL BE PERMITTED OUTSIDE THE LIMIT OF DISTURBANCE ADJACENT TO THE WETLAND. TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROLS (HAYBALES, SILT FENCE, ETC.) SHALL BE MAINTAINED UNTIL ALL EXPOSED SOILS ARE SATISFACTORILY STABILIZED.
2. ALL CATCH BASINS SHALL BE PROTECTED WITH STAKED HAYBALES (R.I. STD. 9.8.0) DURING CONSTRUCTION ACTIVITIES.
3. CONSTRUCTION ENTRANCES CONSISTING OF STONE STABILIZED PAD SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR TO PREVENT TRACKING OF OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS.
4. ALL REFERENCED SOIL EROSION AND SEDIMENTATION CONTROLS INCLUDING MATERIALS USED, APPLICATION RATES AND THE INSTALLATION PROCEDURES SHALL BE PERFORMED PER THE "RHODE ISLAND SOIL EROSION AND SEDIMENTATION CONTROL HANDBOOK", DATED 1989, WITH ALL SOIL CONSERVATION SERVICE, AND/OR THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
5. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN TWENTY FOUR HOURS AFTER AN EVENT WHICH GENERATES 0.25 INCHES OF RAIN IN A TWENTY FOUR HOUR PERIOD. MAINTENANCE SHALL INCLUDE CLEANOUT OF ACCUMULATED SEDIMENT BEHIND THE BALES IS NECESSARY IF ½ THE ORIGINAL HEIGHT OF THE BALES/FENCE BARRIER BECOMES FILLED WITH SEDIMENT. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE HAS BEEN REMOVED SHOULD BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.
6. VEGETATIVE PRACTICES ON DISTURBED SOILS, INCLUDING STOCKPILES, SHALL BEGIN AS SOON AS POSSIBLE BUT NO LATER THAN 14 DAYS AFTER THE LAST ACTIVITY IN THAT AREA UNLESS ACTIVITY IS TO RESUME WITHIN 21 DAYS.
7. AREAS HAVING SLOPES GREATER THAN OR EQUAL TO 3H:1V SHALL BE STABILIZED WITH EROSION CONTROL MAT OR BLANKET IN COMBINATION WITH SEEDING, AS INDICATED ON THE DRAWINGS AND SPECIFIED.
8. EXCESS SOIL, STUMPS, TREES, ROCKS, BOULDERS, AND OTHER REFUSE SHALL BE DISCARDED OFF-SITE IN AN APPROPRIATE UPLAND LOCATION, OUTSIDE OF ALL REGULATED WETLAND AREAS.
9. CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY SOIL AND EROSION CONTROL TO PREVENT SEDIMENTS AND DEBRIS FROM ENTERING THE EXISTING CULVERT.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW WITHIN THE EXISTING CHANNEL AT ALL TIMES.

FRESHWATER WETLAND NOTES

1. THE HAYBALE LINE OR SILT FENCE LINE ILLUSTRATED ON THESE PLANS, TO BE STAKED IN THE FIELD PRIOR TO CONSTRUCTION, SHALL SERVE AS THE STRICT LIMITS OF DISTURBANCE FOR THE PROJECT WITHIN OR ADJACENT TO REGULATED FRESHWATER WETLAND AREAS. NO ALTERATIONS, INCLUDING VEGETATIVE CLEARING OR SURFACE DISTURBANCE, SHALL OCCUR BEYOND THIS HAYBALE/SILT FENCE LINE.
2. THE LIMITS OF CLEARING, GRADING, AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THESE LIMITS, AS DEPICTED ON THE PROJECT SITE PLANS, SHALL BE TOTALLY UNDISTURBED, TO REMAIN IN A COMPLETELY NATURAL CONDITION.
3. STOCKPILES OF EARTH MATERIALS SHALL NOT BE LOCATED ADJACENT TO DRAINAGE STRUCTURES AND/OR WETLAND AREAS.
4. ALL DISTURBED AREAS WITHIN REGULATED FRESHWATER PERIMETER AND RIVERBANK WETLAND LIMITS SHALL BE PERMANENTLY STABILIZED WITH PLANTABLE SOIL AND SEED MIX PRIOR TO COMPLETION OF THE PROJECT.
5. ALL EXCESS SOIL, ROCKS, BOULDERS, AND OTHER REFUSE SHALL BE DISCARDED OFF-SITE IN AN APPROPRIATE UPLAND LOCATION, OUTSIDE OF ALL REGULATED FRESHWATER WETLAND AREAS.

DEWATERING

1. THE CONTRACTOR IS RESPONSIBLE FOR THE ADEQUATE DESIGN AND IMPLEMENTATION OF THE DEWATERING SYSTEM.
2. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL NECESSARY PERMITS FROM THE STATE AND LOCAL AUTHORITIES REGARDING THE OPERATION AND DISCHARGE OF THE DEWATERING SYSTEM.
3. DISPOSE OF ALL PUMPED WATER IN ACCORDANCE WITH RIDEM REQUIREMENTS.
4. DISCHARGE WATER THROUGH SETTLING BASINS OR METHOD APPROVED BY THE ENGINEER.
5. OPERATE DEWATERING SYSTEMS TO LOWER THE GROUNDWATER LEVEL IN EXCAVATIONS AND MAINTAIN 2' BELOW SUBGRADE ALLOWING ALL SUBSEQUENT WORK TO BE DONE ON A STABLE DRY SUBGRADE.
6. MODIFY DEWATERING PROCEDURES WHICH CAUSE, OR THREATEN TO CAUSE, DAMAGE TO NEW OR EXISTING FACILITIES, TO PREVENT FURTHER DAMAGE. MODIFICATIONS TO BE MADE AT NO ADDITIONAL EXPENSE TO THE OWNER. REPAIR DAMAGED FACILITIES AT CONTRACTOR'S EXPENSE.
7. DISCHARGE WATER IN A MANNER THAT WILL NOT CAUSE EROSION, FLOODING, DAMAGE TO PUBLIC OR PRIVATE AREAS, COMPLETED WORK, IMPROVED OR OTHERWISE.
8. REMOVE ALL MATERIAL AND EQUIPMENT FROM THE SITE UPON COMPLETION OF DEWATERING OPERATIONS.
9. REMOVE ALL DEWATERING WELLS OR SUMPS UPON COMPLETION OF THE WORK.

UTILITY EXCAVATION AND BACKFILL

1. THE FILL AND BACKFILL MATERIALS SHALL BE PLACED IN LAYERS NOT EXCEEDING 6 INCHES THICKNESS MEASURED PRIOR TO COMPACTION. UNLESS OTHERWISE INDICATED OR SPECIFIED, EACH LAYER SHALL BE COMPACTED TO 95% IN ACCORDANCE WITH ASTM D1557.
2. BACKFILL WITH THE MATERIALS AND TO THE LIMITS INDICATED ON THE DRAWINGS.
3. BACKFILL MATERIALS AROUND THE PIPE SHALL BE COMPACTED TO A MINIMUM OF 90%.
4. AS THE EXCAVATION APPROACHES PIPES, CONDUITS, OR OTHER UNDERGROUND STRUCTURES, DIGGING BY MACHINERY SHALL BE DISCONTINUED AND THE EXCAVATION SHALL BE DONE BY MEANS OF HAND TOOLS. SUCH MANUAL EXCAVATION WHEN INCIDENTAL TO NORMAL EXCAVATION SHALL BE INCLUDED IN THE WORK TO BE DONE UNDER ITEMS INVOLVING NORMAL EXCAVATION. DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
5. IF THE BOTTOM OF ANY EXCAVATION IS TAKEN OUT BEYOND THE LIMITS INDICATED OR PRESCRIBED, THE RESULTING VOID SHALL BE BACKFILLED AT THE CONTRACTOR'S EXPENSE WITH THOROUGHLY COMPACTED CRUSHED STONE.
6. IF MATERIAL UNSUITABLE FOR FOUNDATION AND/OR BACKFILLING (IN THE OPINION OF THE ENGINEER) IS FOUND AT OR BELOW THE GRADE TO WHICH EXCAVATION WOULD NORMALLY BE CARRIED IN ACCORDANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL REMOVE SUCH MATERIAL TO THE REQUIRED WIDTH AND DEPTH AND REPLACE IT WITH THOROUGHLY COMPACTED CRUSHED STONE, GRAVEL BORROW, FINE AGGREGATE OR CONCRETE AS DIRECTED.
7. EXCAVATE TRENCH TO DEPTHS PERMITTING THE PIPE TO BE LAID AT THE ELEVATIONS, SLOPES, OR DEPTHS OF COVER INDICATED ON THE DRAWINGS, AND AT UNIFORM SLOPES BETWEEN INDICATED ELEVATIONS.
8. LENGTH OF TRENCH OPEN AT ANY ONE TIME WILL BE CONTROLLED BY CONDITIONS, SUBJECT TO ANY LIMITS THAT MAY BE PRESCRIBED BY THE ENGINEER.
9. WHENEVER ANY TRENCH OBSTRUCTS PEDESTRIAN AND VEHICULAR TRAFFIC IN OR TO ANY PUBLIC STREET, PRIVATE DRIVEWAY OR PROPERTY ENTRANCE, OR ON PRIVATE PROPERTY, TAKE SUCH MEANS AS MAY BE NECESSARY TO MAINTAIN PEDESTRIAN AND VEHICULAR TRAFFIC AND ACCESS.
10. STREETS AND PREMISES ARE TO BE KEPT FREE FROM UNNECESSARY OBSTRUCTIONS, DEBRIS AND ALL OTHER MATERIALS.
11. ALL OPEN EXCAVATIONS ARE TO BE COVERED AT THE END OF EACH DAY BY MEANS OF STEEL PLATES OR SOME OTHER SATISFACTORY COVER OF ADEQUATE SIZE AND STRENGTH SUITABLY HELD IN PLACE TO KEEP ALL TRAFFIC OUT OF EXCAVATIONS.

CONSTRUCTION REQUIREMENTS

1. PROVIDE BYPASS PUMPING EQUIPMENT TO BYPASS WASTEWATER FLOWS AROUND WORK LOCATION IN ACCORDANCE WITH THE SPECIFICATIONS.
2. PROVIDE DAILY NOTIFICATION TO THOSE WHO WILL BE AFFECTED BY AN INTERRUPTION IN SEWER AND/OR WATER SERVICE.
3. PIPE REMOVAL EACH DAY SHALL BE LIMITED TO THE AMOUNT THAT CAN BE REPLACED ON THAT SAME DAY.
4. SERVICE CONNECTIONS SHALL BE COMPLETELY REESTABLISHED AT THE END OF EACH DAY.
5. SERVICE CONNECTION LOCATIONS ARE APPROXIMATE. CONNECTIONS SHALL BE LOCATED DURING EXCAVATION AND PROTECTED. TIME AND EXPENSE REQUIRED TO WORK IN THIS MANNER SHALL BE PART OF THE BID AND SHALL NOT BE THE BASIS FOR ANY CLAIM AGAINST THE OWNER.
6. EXISTING CAPPED SERVICE WYES SHALL NOT BE REPLACED UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

SEQUENCE OF CONSTRUCTION (SUGGESTED)

SITE SETUP

1. ESTABLISH PERIMETER CONTROLS AND SEDIMENT BARRIERS: A COMBINED SILT FENCE AND HAY BALE LINE (RI STD. 9.3.0) WILL BE INSTALLED AROUND THE PERIMETER OF THE SITE, EXCEPT AT CONSTRUCTION ENTRANCES.
2. RI STD. 9.9.O CONSTRUCTION ACCESS WILL BE INSTALLED AT ALL POINTS OF VEHICULAR ACCESS AS SHOWN ON THE PLANS.
3. CLEARING AND GRUBBING WILL INCLUDE BUT NOT BE LIMITED TO REMOVAL AND DISPOSAL OF TREES, STUMPS, BUSHES, HEDGES, ROOTS AND OTHER VEGETATION. THE CONTRACTOR AND ENGINEER SHALL JOINTLY MARK THE AREA TO BE CLEARED AND GRUBBED WITH BRIGHTLY COLORED RIBBON.
4. WHEN THE CLEARING AND GRUBBING IS COMPLETE, THE PRESERVED AREAS OF VEGETATION WILL BE LINED WITH TEMPORARY ORANGE COLORED PLASTIC MESH FENCE, AT LEAST 3 FEET HIGH AND SUPPORTED ON POSTS 4.5 FEET HIGH AND DRIVEN INTO THE GROUND A MINIMUM OF 18", AND SPACED 6 FEET APART.
5. THE CONTRACTOR SHALL INSTALL RI STD. 51.1.0 AND 51.2.0 ON ALL TREES AND SHRUBS IN CLOSE PROXIMITY TO THE WORK.
6. ALL TOPSOIL STRIPPED FROM THE WETLAND LIMITS SHALL BE STOCKPILED IN THE AREAS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE STOCKPILES SHALL BE LOCATED IN AREAS THAT WILL NOT INTERFERE WITH CONSTRUCTION ACTIVITIES AND SHALL BE LOCATED AT LEAST 15 FEET AWAY FROM AREAS OF CONCENTRATED FLOWS OR PAVEMENT. NO STOCKPILE SHALL BE LOCATED WITHIN ANY PERIMETER WETLAND OR RIVERBANK WETLAND. THE SLOPES OF THE TOPSOIL STOCKPILE SHALL NOT EXCEED 2:1. THE STOCKPILE SHALL BE SURROUNDED WITH RI STD. 9.2.0 SILT FENCE.

GENERAL EXCAVATION

7. THE NEW CONCRETE CULVERT WILL BE CONSTRUCTED USING OPEN CUT EXCAVATION TECHNIQUES. WHERE SPACE PERMITS, THE SIDE SLOPES OF THE EXCAVATION WILL BE BATTERED TO AN ANGLE OF 2:1 TO ENSURE SLOPE STABILITY. WHERE THE NEW CULVERT IS TO BE INSTALLED IN CLOSE PROXIMITY TO EXISTING STRUCTURES (I.E. BUILDINGS, WALLS, FENCES, ETC.), TEMPORARY SHEETING WILL BE INSTALLED.
8. ALL ACCEPTABLE MATERIAL REMOVED FROM THE EXCAVATION SHALL BE PLACED ADJACENT TO THE TRENCH EXCAVATION TO ALLOW FOR THE INSTALLATION OF THE NEW CULVERT SECTION. TEMPORARILY STOCKPILED ACCEPTABLE FILL WILL BE PROTECTED FROM MIGRATING BEYOND THE LIMITS OF WORK BY THE PERIMETER HAYBALE AND SILT FENCE LINE. BACKFILLING WITH THIS MATERIAL SHALL TAKE PLACE THE SAME DAY AS SOON AS THE CULVERT IS IN PLACE AND READY TO BE COVERED. ALL EXCESS AND UNACCEPTABLE MATERIAL SHALL BE SEPARATED AND LOADED INTO WAITING TRUCKS AND HAULED AWAY, EITHER TO DEFINED TEMPORARY STOCKPILE AREAS OR DIRECTLY OFF-SITE. THE LOADING OF UNSUITABLE MATERIAL WILL OCCUR WITHIN THE CONFINES OF THE SITE LIMITS AND THE PERIMETER EROSION AND SEDIMENT CONTROLS.
9. WHERE EXCAVATION FOR THE NEW ENCLOSED CULVERT OCCURS OFF-LINE FROM THE EXISTING CULVERT, THE EXISTING CHANNEL WILL CONTINUE TO COLLECT AND CONVEY STORMWATER DOWNSTREAM. SEDIMENT AND FOREIGN MATERIALS GENERATED BY THE ADJACENT CONSTRUCTION WILL BE CONTAINED BY THE HAYBALES.
10. THE NEW CHANNEL WILL BE COMPLETELY CLEANED OF ANY SEDIMENT, TRASH, OR CONSTRUCTION DEBRIS PRIOR TO DIVERTING STORMWATER TO THE NEW SECTIONS OF CONCRETE CHANNEL.
11. WHERE EXCAVATION OCCURS ON THE SAME ALIGNMENT AS THE EXISTING CULVERT, THE STORMWATER WILL BE DIVERTED UPSTREAM OF THE WORK AREA, AS DESCRIBED HEREIN, AND DISCHARGED TO COMPLETED AND CLEANED SECTIONS OF THE CONCRETE CULVERT DOWNSTREAM.
12. TO DIVERT FLOW AROUND THE CONSTRUCTION AREA, THE CONTRACTOR MAY CHOOSE ONE OF THE FOLLOWING METHODS:
    A. GRAVITY-FLOW PIPE: UNDER THIS OPTION, A PIPE OF SUFFICIENT SIZE TO CONVEY AVERAGE FLOWS ANTICIPATED DURING THE CONSTRUCTION PERIOD WILL BE CONSTRUCTED ADJACENT TO AND AT THE SAME INVERT ELEVATION AS THE CULVERT. STORM WATER WILL BE DIVERTED TO THE NEW PIPE USING SAND BAGS. DIVERSIONS WILL BE KEPT AS SHORT AS POSSIBLE.
    B. PUMP: UNDER THIS OPTION, SANDBAGS WILL BE INSTALLED UPSTREAM OF THE WORK ZONE, AND A PUMP UTILIZED TO PUMP FLOWS AROUND THE WORK ZONE TO COMPLETED SECTIONS OF CULVERT DOWN STREAM. THE PUMP SHOULD BE SIZED TO HANDLE AVERAGE FLOWS ANTICIPATED DURING THE CONSTRUCTION SEASON.

IN BOTH CASES, THE CONTRACTOR SHALL ANTICIPATE STORMS AND MAKE PROVISIONS NECESSARY TO SAFELY CONVEY THE RUNOFF THROUGH THE DRAINAGE SYSTEM WITH NO DAMAGE TO THE ADJACENT PUBLIC OR PRIVATE PROPERTIES.

13. OUTFALL PROTECTION: A FLOATING TURBIDITY CURTAIN WILL BE IN PLACE THROUGHOUT THE CONSTRUCTION PERIOD. THE TURBIDITY CURTAIN SHALL BE INSTALLED IMMEDIATELY DOWNSTREAM OF THE OUTFALL PIPE AND SHALL BE CONSTRUCTED TO PROVIDE PROTECTION DURING TIDE FLUCTUATIONS. THE TURBIDITY CURTAIN SHALL BE CONSTRUCTED OF HIGH STRENGTH GEOTEXTILE (PERVIOUS) FABRIC, WITH A STYROFOAM FLOTATION MATERIAL AT THE TOP, AND 5/16 INCH BALLAST CHAIN AT THE BOTTOM, WITH EXTERNAL ANCHORS ADDED TO SECURE THE CURTAIN IN PLACE. THE BOTTOM OF THE CURTAIN SHALL SIT 12' (MIN) ABOVE THE BOTTOM OF THE OCEAN FLOOR AT LOW TIDE. EXTERNAL ANCHORS SHALL BE SECURED TO POINTS ON SHORE. SHOP DRAWINGS FOR THIS ITEM WILL BE REQUIRED TO ENSURE THAT THE DESIGN IS ADEQUATE FOR THE TIDAL CONDITIONS.
14. DESIGNATED WASHOUT FACILITIES: IN AREAS WHERE CONCRETE WILL BE POURED ON SITE, A CONTAINED WASHOUT FACILITY WILL BE CONSTRUCTED. ALL EXCESS CONCRETE AND CONCRETE WASHOUT SLURRIES GENERATED FROM THE CONCRETE MIXER TRUCKS AND CHUTES WASHING OPERATIONS SHALL BE DISCHARGED TO THE WASHOUT FACILITY. SIGNS SHALL BE POSTED MARKING THE LOCATION OF THE WASHOUT FACILITY. WHEN FILLED OR NO LONGER REQUIRED, THE HARDENED CONCRETE ALONG WITH THE TEMPORARY FACILITY SHALL BE REMOVED AND DISPOSED OFF SITE AND THE AREA PERMANENTLY STABILIZED WITH 4" LOAM AND SEED.
15. INVASIVE SPECIES PREVENTION: IF INVASIVE SPECIES ARE FOUND TO BE GROWING IN THE PROJECT AREA, MEASURES WILL BE TAKEN TO REMOVE THEM AS SOON AS POSSIBLE. REMOVAL SHALL BE DONE BY HAND METHODS AND PLANTS WILL BE DISPOSED OF IN AN APPROPRIATE UPLAND AREA. INVASIVE SPECIES INCLUDE, BUT ARE NOT LIMITED TO, PURPLE LOOSESTRIFE, COMMON REED, COMMON BUCKTHORN, HONEYSUCKLES, GARLIC MUSTARD, JAPANESE KNOTWOOD, JAPANESE STILT GRASS, REED CANARY GRASS, ORIENTAL BITTERSWEET, BLACK SWALLOW-WORT, PALE SWALLOW-WORT, AND MULTIFLORA ROSE.
16. FINAL STABILIZATION: ALL AREAS WITHIN THE RESTORATION AREA WILL RECEIVE ORGANIC MATERIAL, AS DETAILED ON THE RESTORATION PLAN AND DESCRIBED IN THE CONTRACT DOCUMENTS. ALL OTHER AREAS WILL BE STABILIZED WITH 4" LOAM AND SEED USING HYDRO-SEEDING WITH PROPER INOCULUM AND FERTILIZER RATIONS.
17. WITHIN THE WETLAND RESTORATION AREA, A NATIVE WET MEADOW SEED MIX WILL BE USED, AS DETAILED IN THE SPECIFICATIONS. SEED PLANTING WILL COMMENCE AS SOON AS THE AREA IS FINISH GRADED AND ALL EQUIPMENT IS REMOVED FROM THE AREA. IF WINTER SEEDING IS NECESSARY BASED ON THE CONSTRUCTION SCHEDULE, SEEDS WILL BE INCORPORATED INTO THE SOIL DURING THE FREEZE/THAW PROCESS TO GERMINATE IN THE SPRING AS SOON AS CONDITIONS ARE FAVORABLE. SHRUB PLANTING WILL BE AS SHOWN ON THE RESTORATION PLAN. SHRUB SPECIES SHALL BE PLANTED NO LATER THAN OCTOBER 15.
18. EROSION CONTROL MEASURES AS INDICATED ON THE PLANS ARE EXPECTED TO CONTROL EROSION/SEDIMENTATION DURING ALL PHASES ON CONSTRUCTION AND THROUGHOUT THE FIRST WINTER. IF NECESSARY, SOIL TACKIFERS WILL BE ADDED TO THE HYDROSEED MIX IN ORDER TO STABILIZE EXPOSED SOIL AREAS. SHOULD THE SOIL TACKIFER ADDED TO THE HYDROSEED MIX PROVE NOT TO BE ADEQUATE (I.E. EROSION IS OBSERVED), MEASURES SHALL BE TAKEN TO RESTORE AND RE-STABILIZE ERODED AREAS, INCLUDING BUT NOT LIMITED TO STRAW/MULCH APPLICATIONS, EROSION CONTROL BLANKETS, ETC.
19. MONITORING WILL BE IMPLEMENTED DURING AND AFTER CONSTRUCTION TO ASSURE CONSTRUCTION COMPLIANCE IN AND AROUND THE WETLAND AND TO PROVIDE DATA ON WHETHER THE PROJECT AREA IS DEVELOPING IN A WAY THAT WILL ACHIEVE THE PROJECT GOALS. MONITORING WILL INCLUDE BUT NOT BE LIMITED TO:
    A. INSPECTION OF EROSION CONTROL MEASURES FOR EFFECTIVENESS
    B. REPLACEMENT OF DAMAGED OR MISSING EROSION CONTROL MEASURES
    C. CONSTRUCTION ACTIVITIES WITHIN THE WETLAND
    D. INSPECTION OF FINAL GRADES
    E. ADEQUATE REMOVAL AND DISPOSAL OF INVASIVE SPECIES
    F. CONSTRUCTION ACTIVITIES WITHIN THE WETLAND
    G. DURING PLANTING AND SEEDING TO ENSURE PROPER PLANTING AND SEEDING PROCEDURES HAVE BEEN FOLLOWED ACCORDING TO THE PLANS AND SPECIFICATIONS.
    H. DURING FINAL STABILIZATION TO ENSURE PROPER STABILIZATION TECHNIQUES ARE EMPLOYED.
20. POST CONSTRUCTION MONITORING SHALL CONSIST OF THE FOLLOWING:
    A. INSPECTION ONCE PER MONTH OR AFTER SIGNIFICANT RAIN STORMS AND/OR SNOW MELTS DURING THE FIRST WINTER AFTER RESTORATION
    B. INSPECTION AFTER THE FIRST MONTH OF THE GROWING SEASON TO INSPECT SEEDLING GROWTH AND TREE AND SHRUB PROPAGATION
    C. AFTER EACH OF THE FIRST TWO GROWING SEASONS TO DETERMINE VEGETATION DEVELOPMENT AND REGULATORY COMPLIANCE
21. SITE SPECIFIC WORKSHEETS WILL BE CREATED FOR MONITORING REPORTS. A PROJECT MONITORING REPORT SHALL BE SUBMITTED TO RIDEM AND THE TOWN OF BRISTOL IN THE LATE SPRING OF THE FIRST GROWING SEASON AND AT THE END OF THE FIRST TWO GROWING SEASONS. SITE PHOTOGRAPHS SHALL BE REQUIRED AS PART OF ALL MONITORING REPORTS. REPORTS SHALL INCLUDE RECOMMENDATIONS FOR ADDITIONAL PLANTINGS SHOULD THE PROJECT AREA FAIL TO MEET THE 75% RE-ESTABLISHMENT PERFORMANCE STANDARD. EACH MONITORING REPORT SHALL PROJECT POTENTIAL SUCCESSIONAL PATTERS BASED ON OBSERVED VEGETATION ESTABLISHMENT.
22. THE FINAL MONITORING REPORT SHALL BE ACCOMPANIED BY AN AS-BUILT PLAN, AND SHALL INDICATE THE CONDITIONS AT THE PROJECT SITE, INCLUDING STABILIZATION.
23. MONITORING WILL BE REQUIRED UNTIL ALL REGULATORY COMPLIANCE GOALS ARE MET.
24. ANY PLANTED TREE OR SHRUB SPECIES FOUND DEAD OR DYING AFTER THE FIRST GROWING SEASON SHALL BE REPLACED WITH ONE OF APPROXIMATELY THE SAME SIZE AND THE SAME SPECIES.

Engineered by:
BETA Group, Inc.
Engineers · Scientists · Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

General Notes

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C2 Gen Notes.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 Date: 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 6 2010 FILE # 08-0895
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE
Charles A. Horbert

Scale

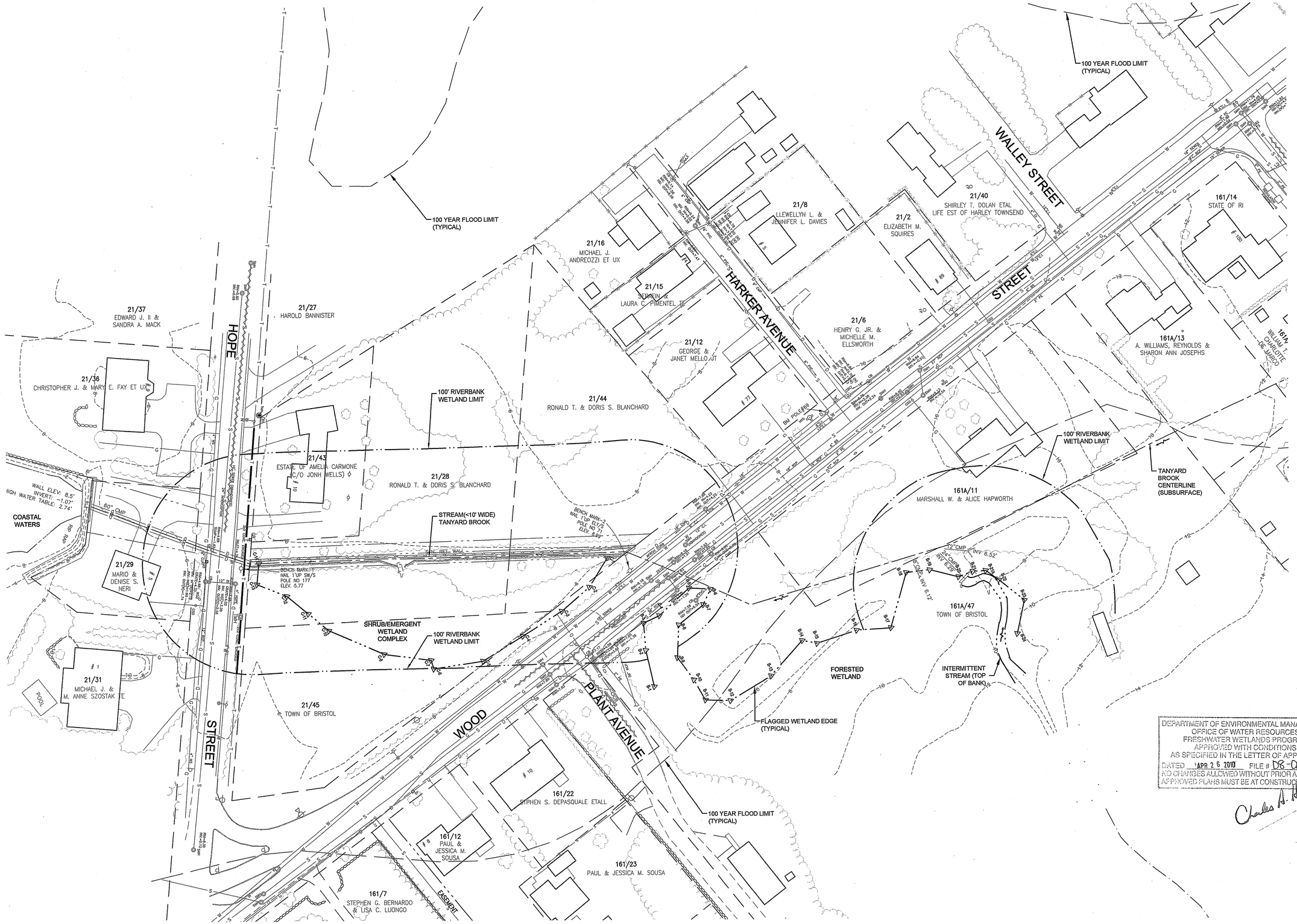
None

Not for Construction

Sheet No.: (3 of 18)

C2.0

Plot Date: Dec 29, 2009 8:54am



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6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12.29.09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Existing Conditions Plan No. 1

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File:	3433-C3 ExCond 1.dwg
Drawn By:	KJA
Dept. Ckd. By:	DH
Project Ckd. By:	KMA
Job No:	3433.01 **Date:** 11/14/08

North Arrow

Scale

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SCALE IN FEET: 1"=40'

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Sheet No.: (4 of 18)

C3.0

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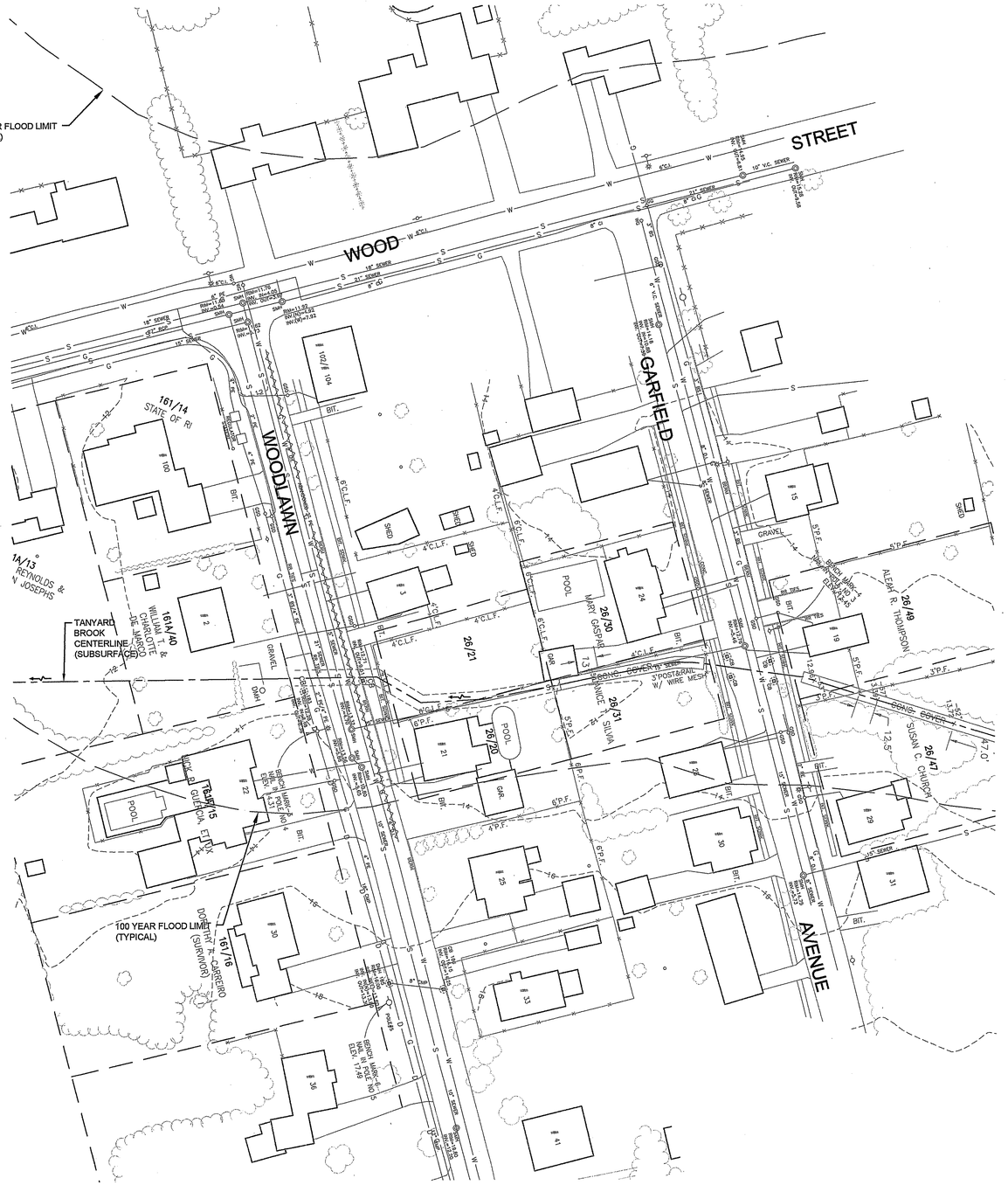

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6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

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KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
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Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Existing Conditions Plan No. 2

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File:	3433-C3 ExCond 2.dwg
Drawn By:	KJA
Dept. Ckd. By:	DH
Project Ckd. By:	KMA
Job No:	3433.01
Date:	11/14/08

North Arrow

W
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Scale

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SCALE IN FEET: 1"=40'

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Sheet No.: (5 of 18)

C3.1

Plot Date: Dec 29, 2009 8:55am

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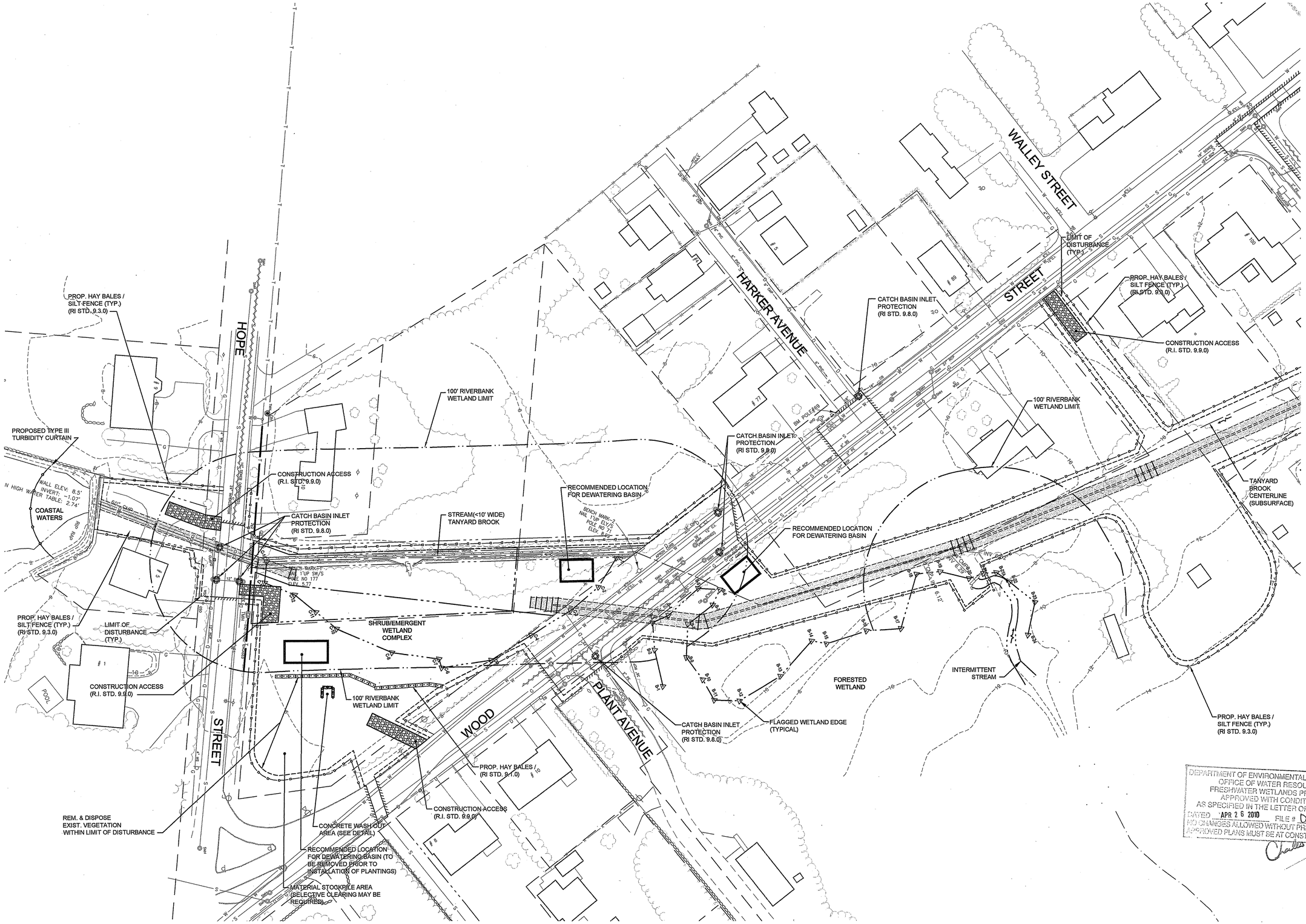

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Scale

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SCALE IN FEET: 1"=40'

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Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-Inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-24-09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Site Preparation Plan No. 1

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File: 3433-C4 Site Prep 1.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 **Date:** 11/14/08

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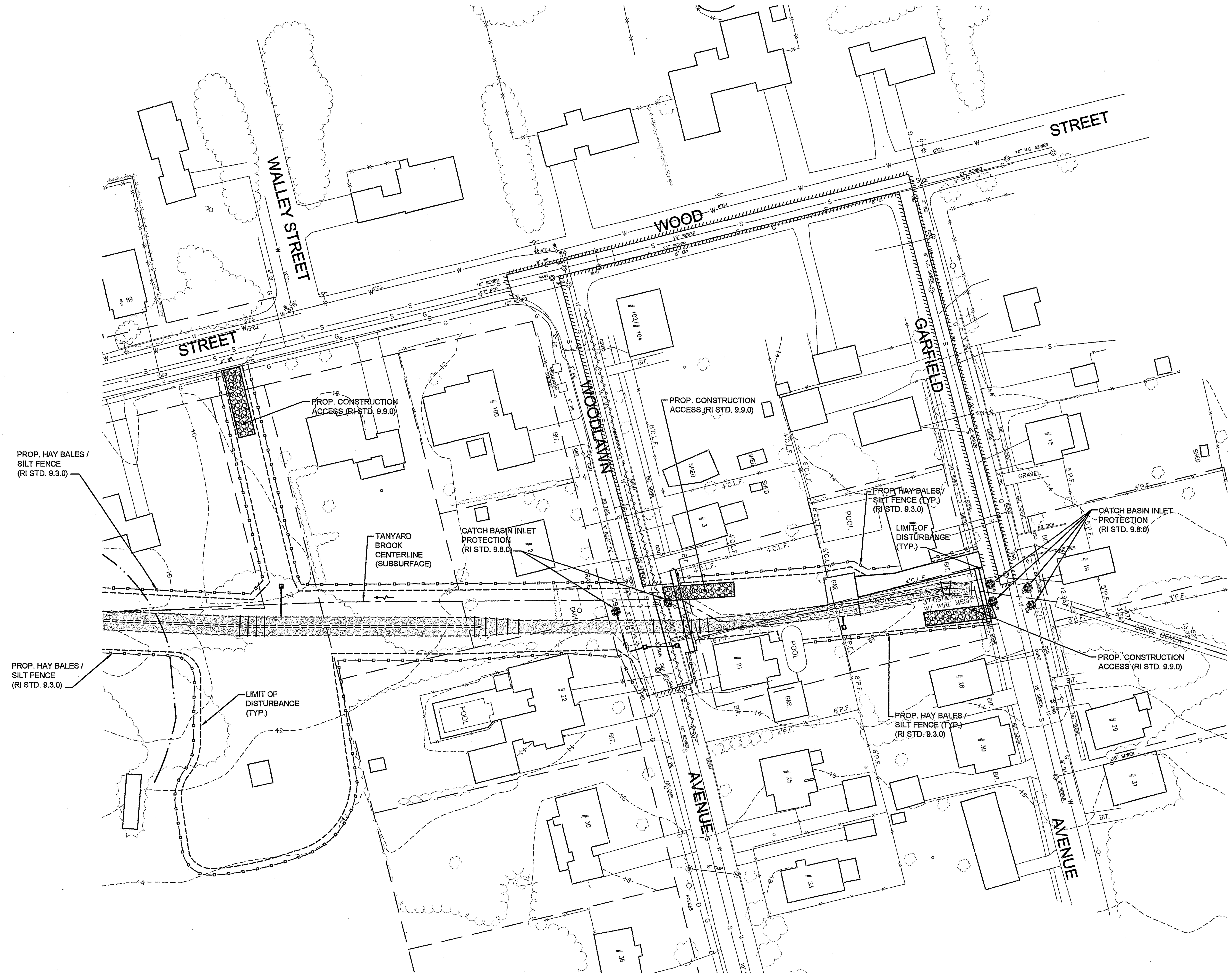
Sheet No.: (6 of 18)

C4.0

Plot Date: Dec 23, 2009 10:03am



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Engineers-Scientists-Planners

6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

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Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Site Preparation Plan No. 2

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File: 3433-C4 Site Prep 2.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 Date: 11/14/08

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W S N E

Scale

40 0 40 80

SCALE IN FEET: 1"=40'

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C4.1

Plot Date: Dec 29, 2009 8:56am

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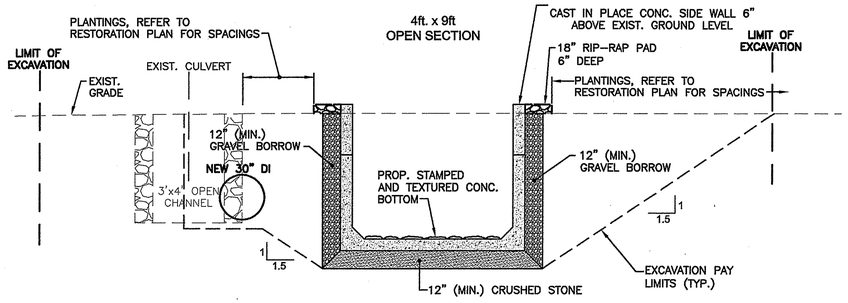

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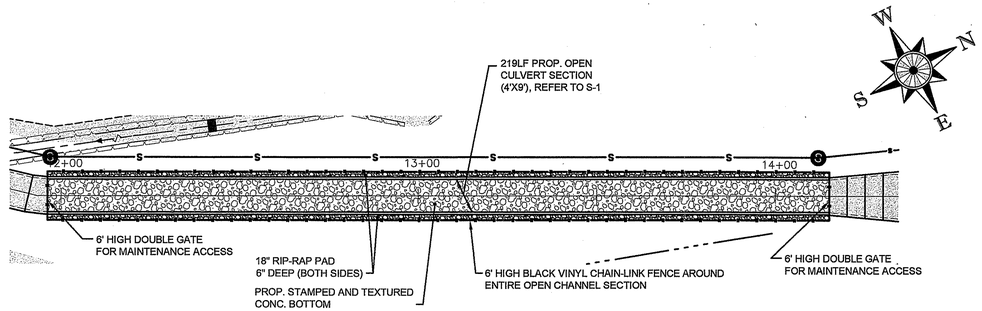
(IN FEET)
1 inch = 4 ft.



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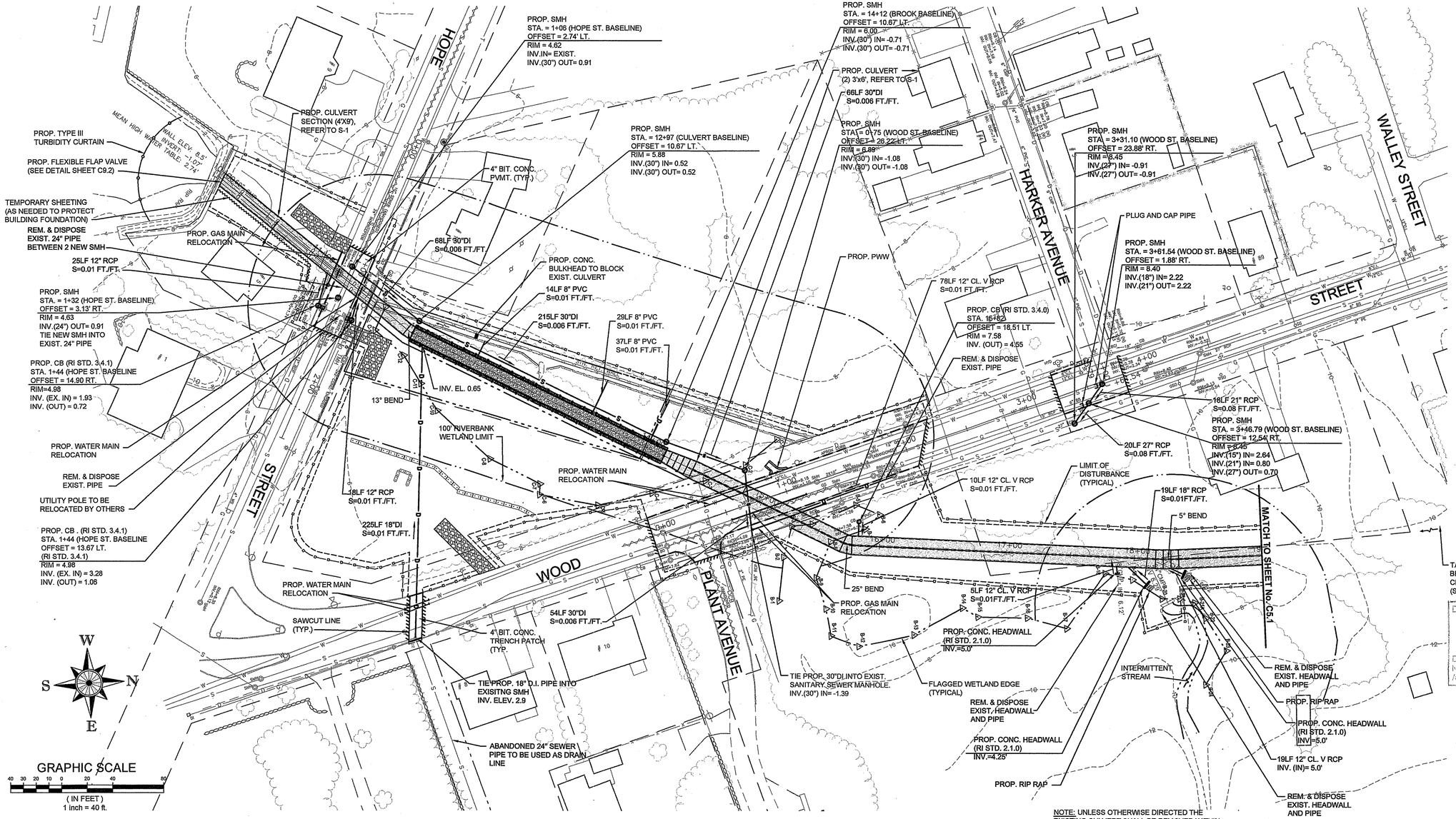
(IN FEET)
1 inch = 20 ft.



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Engineers · Scientists · Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Construction Plan No. 1

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File: 3433-C5 Construction Plan 1.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 **Date:** 11/14/08

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Scale

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As Shown

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Sheet No.: (8 of 18)

C5.0

Plot Date: Dec 23, 2009 10:05am

N:\3400s\3433-Tanyard Brook – Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C5 Construction Plan 1.dwg

NOTE: UNLESS OTHERWISE DIRECTED THE EXISTING CULVERT SHALL BE REMOVED WITHIN THE LIMITS OF THE NEW CULVERT.

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BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Construction Plan No. 2

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C5 Construction Plan 2.dwg
Drawn By: KJA
Dept. Ckd. By: DH
Project Ckd. By: KMA
Job No: 3433.01 **Date:** 11/14/08

North Arrow

Scale

HOR. SCALE IN FEET: 1"=40'
40 0 40 80
VER. SCALE IN FEET: 1"=4'
4 0 4 8

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Sheet No.: (9 of 18)

C5.1

Plot Date: Dec 29, 2009 8:57am

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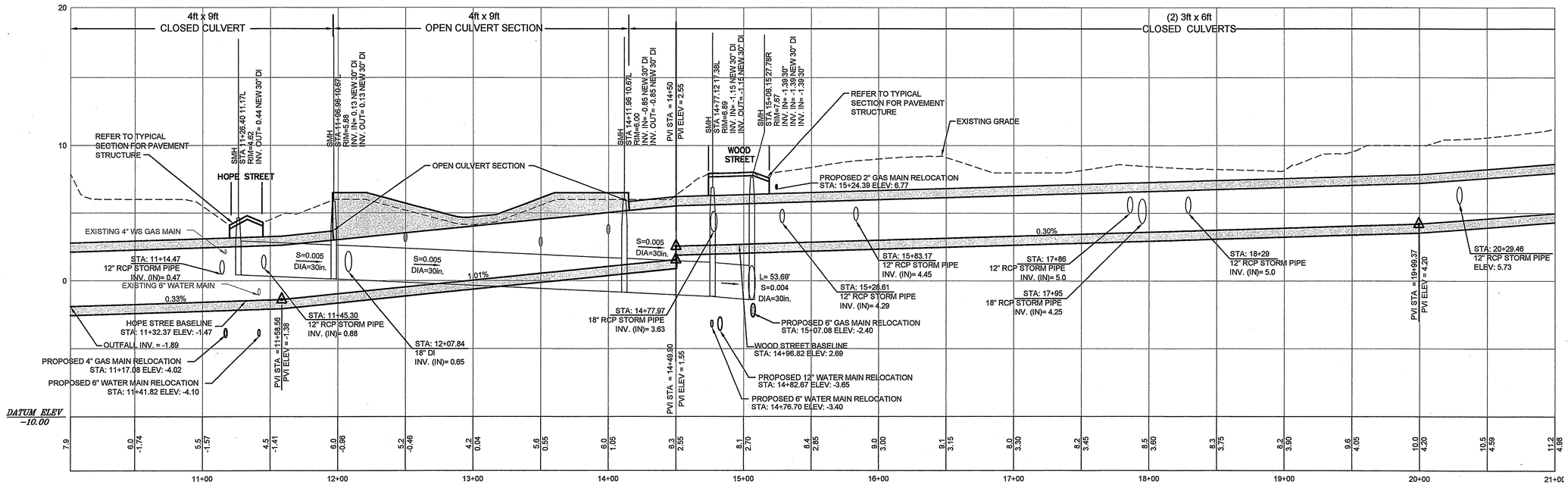

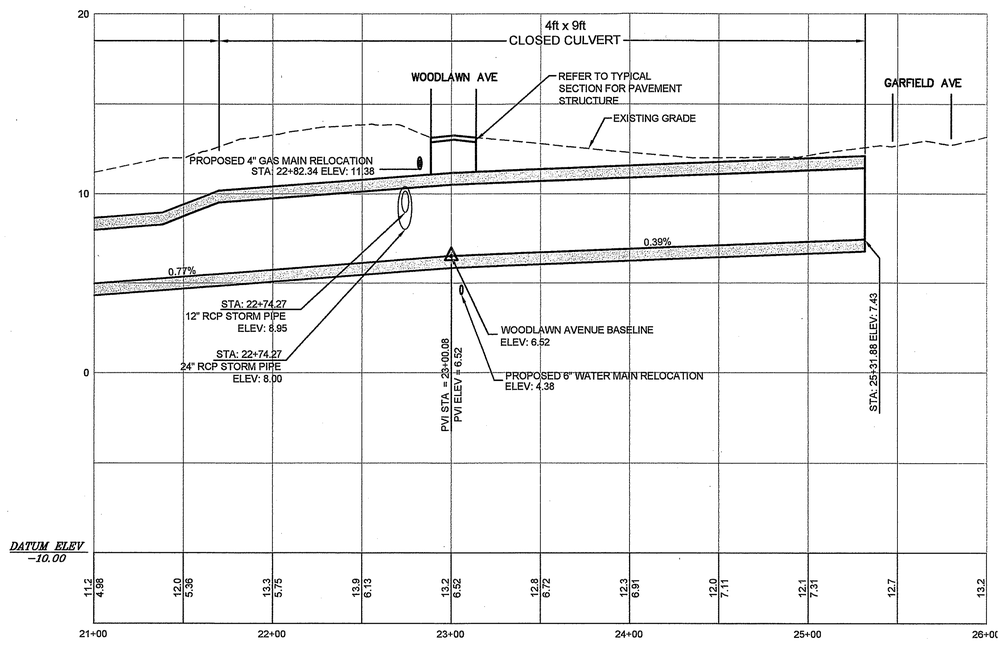

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BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12.29.09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Profile No. 1 (Tanyard Brook)

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C6 Profile 1.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 Date: 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 26 2010 FILE # 08-0395
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Scale

HOR. SCALE IN FEET: 1"=40'
40 0 40 80
VER. SCALE IN FEET: 1"=4'
4 0 4 8

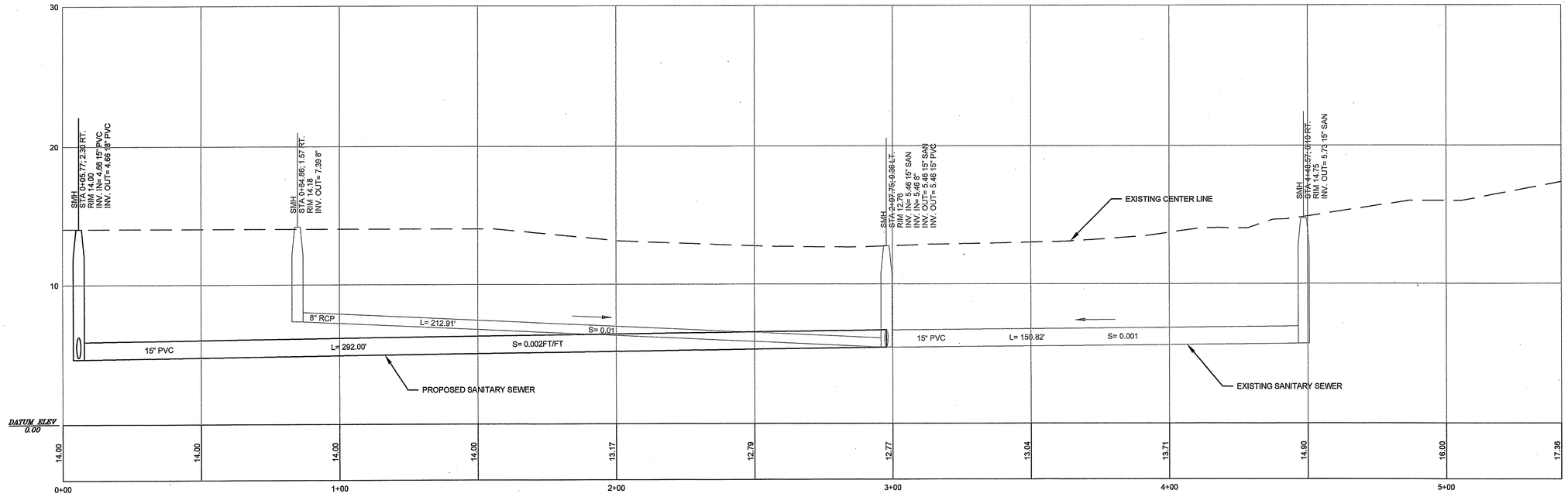
Not for Construction

Sheet No.: (10 of 18)

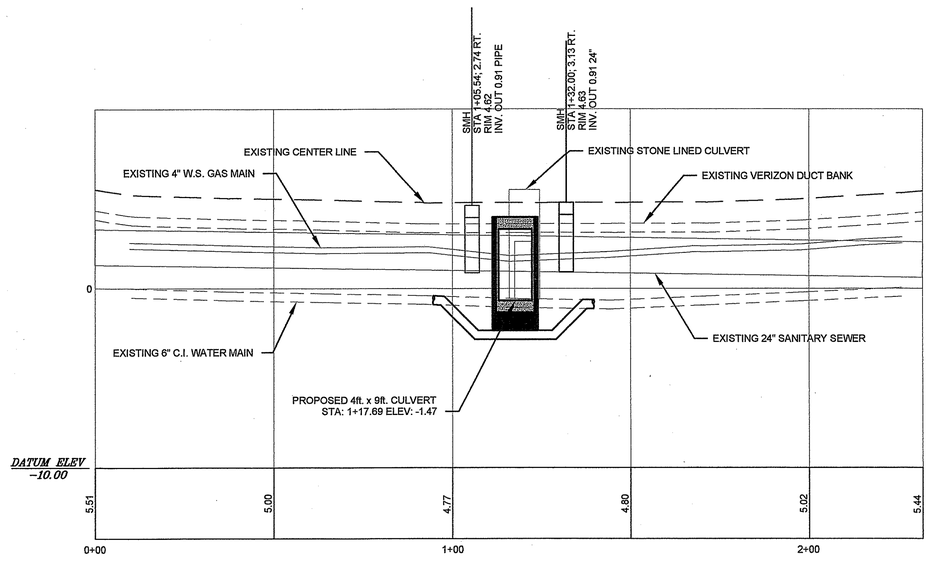
C6.0

Plot Date: Dec 29, 2009 8:57am

N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C6 Profile 1.dwg



Profile - Garfield Street



Profile - Hope Street

Engineered by:

BETA Group, Inc.
Engineers·Scientists·Planners

6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-Inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

RECEIVED
JAN 19 2010

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Profile No. 2 (Garfield Street and Hope Street)

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File:	3433-C6 Profile 2.dwg
Drawn By:	KJA
Dept. Ckd. By:	DH
Project Ckd. By:	KMA
Job No:	3433.01 **Date:** 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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DATED APR 26 2010 FILE # 08-0295
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APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Scale

HOR. SCALE IN FEET: 1"=20'
20 0 20 40
VER. SCALE IN FEET: 1"=4'
4 0 4 8

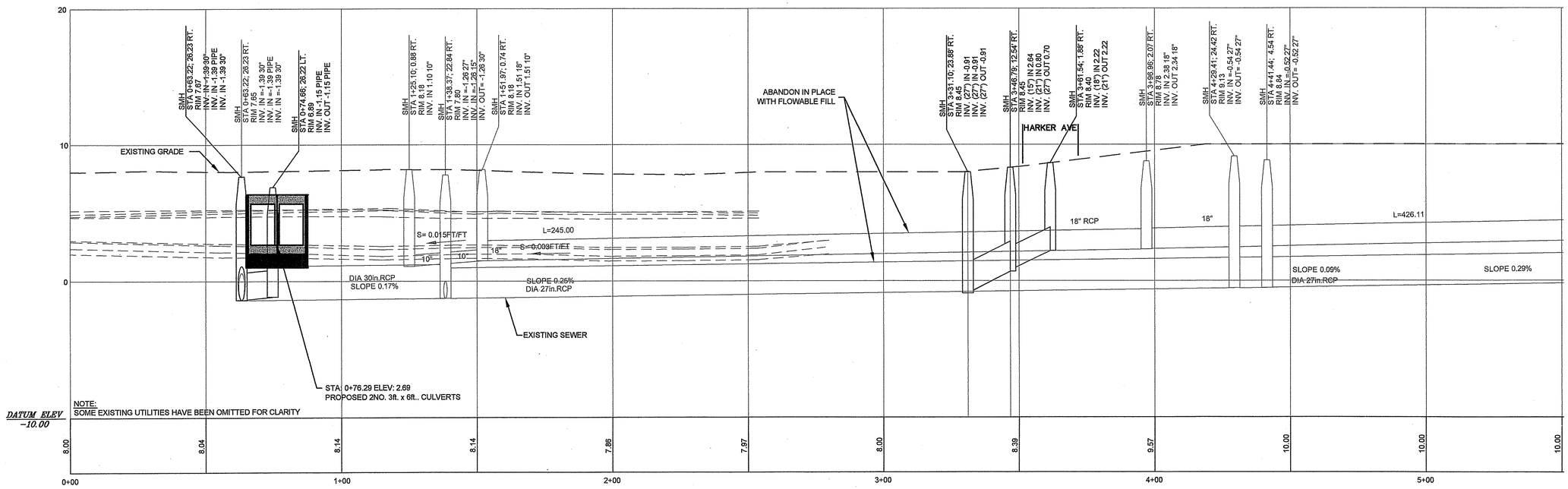
Not for Construction

Sheet No.: (11 of 18)

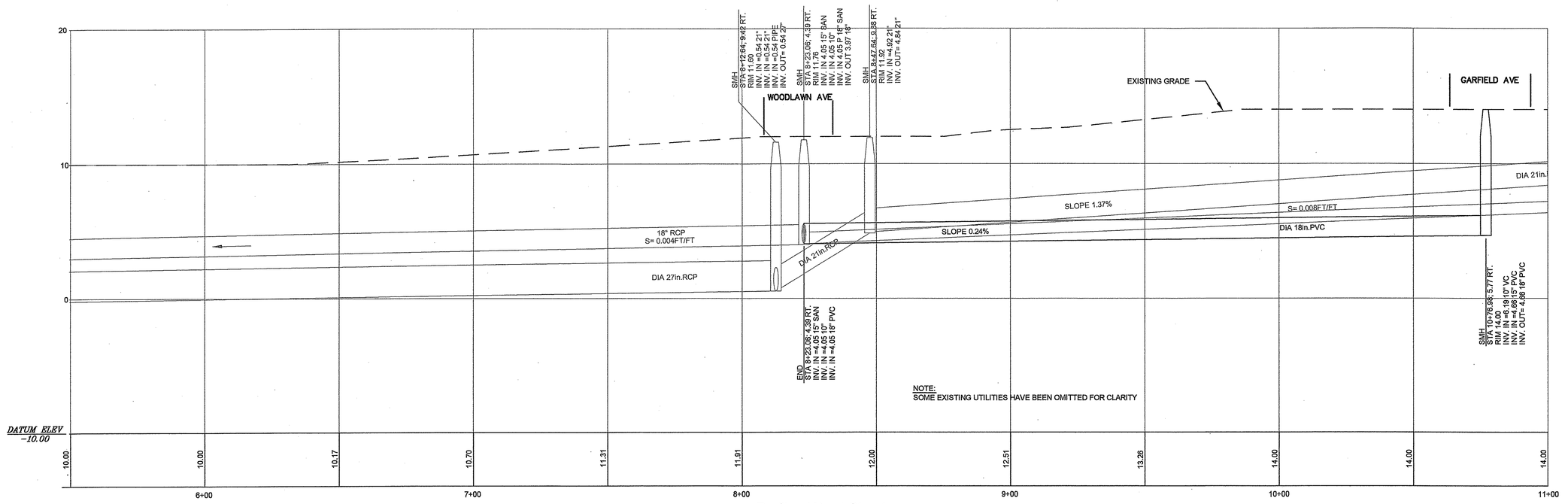
C6.1

Plot Date: Dec 29, 2009 8:58am

N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C6 Profile 2.dwg



Profile - Wood Street



Profile - Wood Street

N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C6 Profile 3.dwg

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Engineers · Scientists · Planners

6 Blackstone Valley Place
Lincoln, RI 02865
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email: BETA@BETA-inc.com

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12.29.09

Subconsultant:

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Profile No. 3 (Wood Street)

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C6 Profile 3.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 **Date:** 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 6 2010 FILE # 08-0395
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE
Charles A. Horbert

Scale

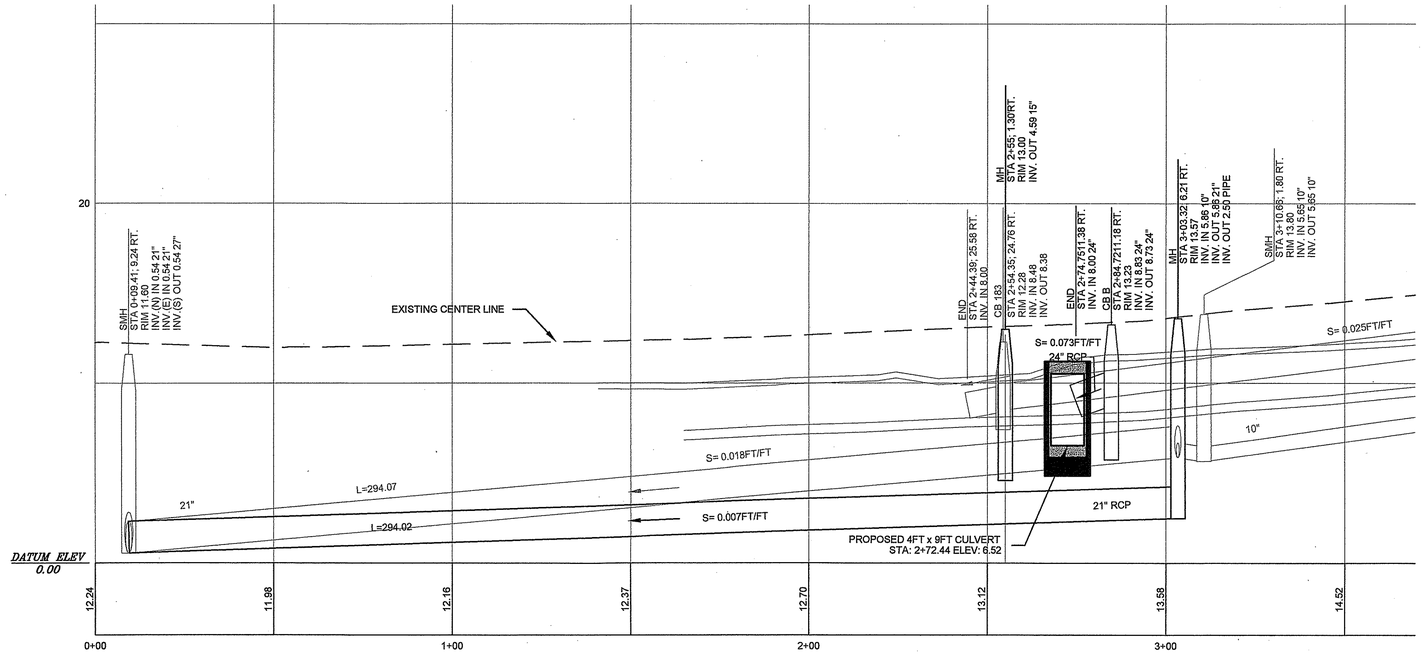
HOR. SCALE IN FEET: 1"=20'
20 0 20 40
VER. SCALE IN FEET: 1"=4'
4 0 4 8

Not for Construction

Sheet No.: (12 of 18)

C6.2

Plot Date: Dec 29, 2009 8:58am



Profile - Woodlawn Avenue

N:\3400s\3433 Tanyard Brook – Bristol RI\AutoCAD Files\Phase 1–Plan Set\Environmental Plan Set\3433–C6 Profile 4.dwg

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Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

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No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12.29.09

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Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Profile No. 4 (Woodlawn Avenue)

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C6 Profile 4.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 **Date:** 11/14/08

North Arrow

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 6 2010 FILE # 08-0295
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Scale

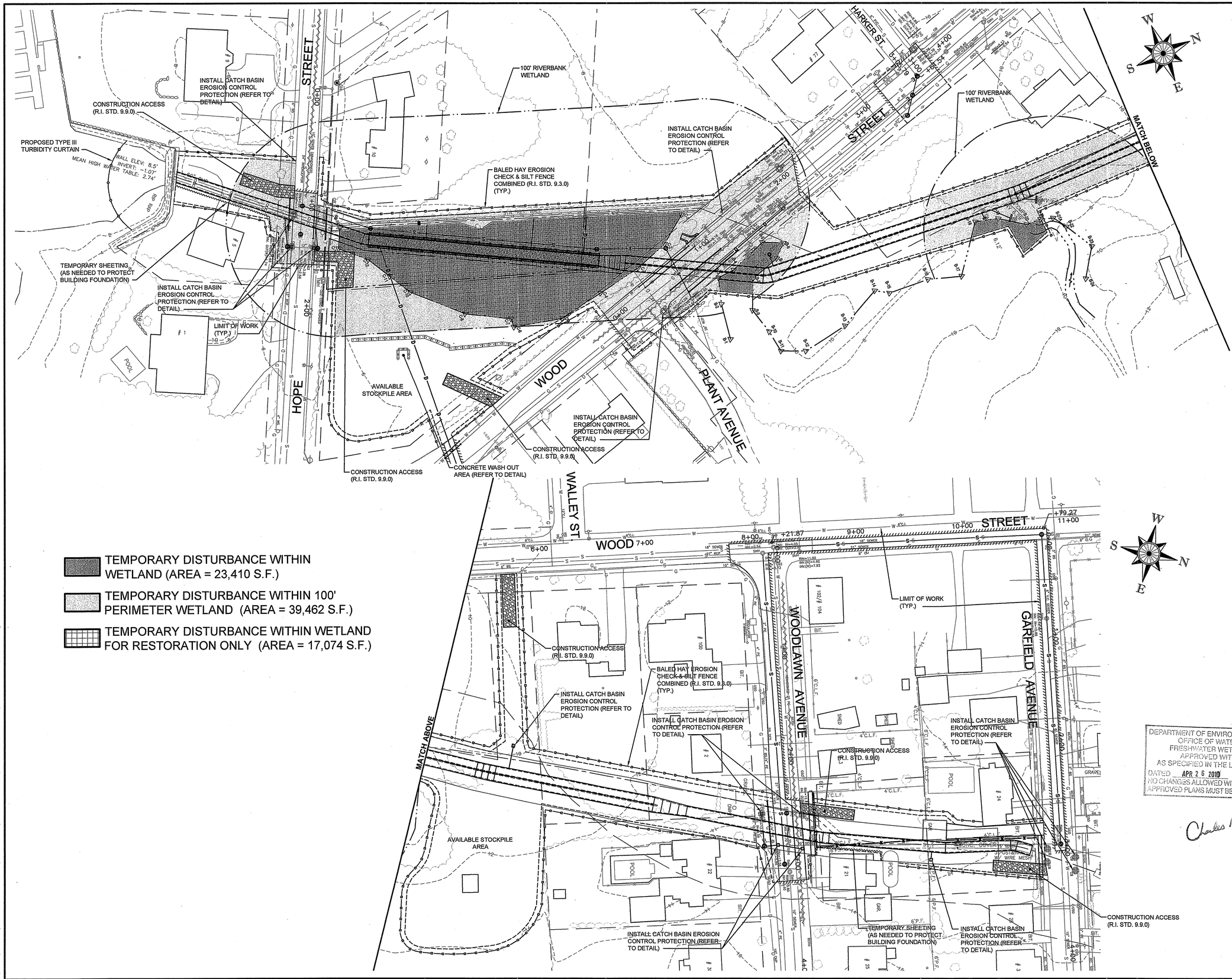
HOR. SCALE IN FEET: 1"=20'
20 0 20 40
4 0 4 8
VER. SCALE IN FEET: 1"=4'
UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

Not for Construction

Sheet No.: (13 of 18)

C6.3

Plot Date: Dec 29, 2009 8:58am



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 6 2010 FILE # 08-0905
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Charles A. Horbert

N:\3400s\3433-Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C7 Wet Impact Plan.dwg

Engineered by:

BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12·29·09

Subconsultant:

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JAN 19 2010

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Wetland Impact Plan

Revisions			
No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File:	3433-C7 Wet Impact Plan.dwg
Drawn By:	KJA
Dept. Ckd. By:	DH
Project Ckd. By:	KMA
Job No: 3433.01	Date: 11/14/08

North Arrow

As Shown

Scale

40 0 40 80
SCALE IN FEET: 1"=40'

Not for Construction

Sheet No.: (14 of 18)

C7.0

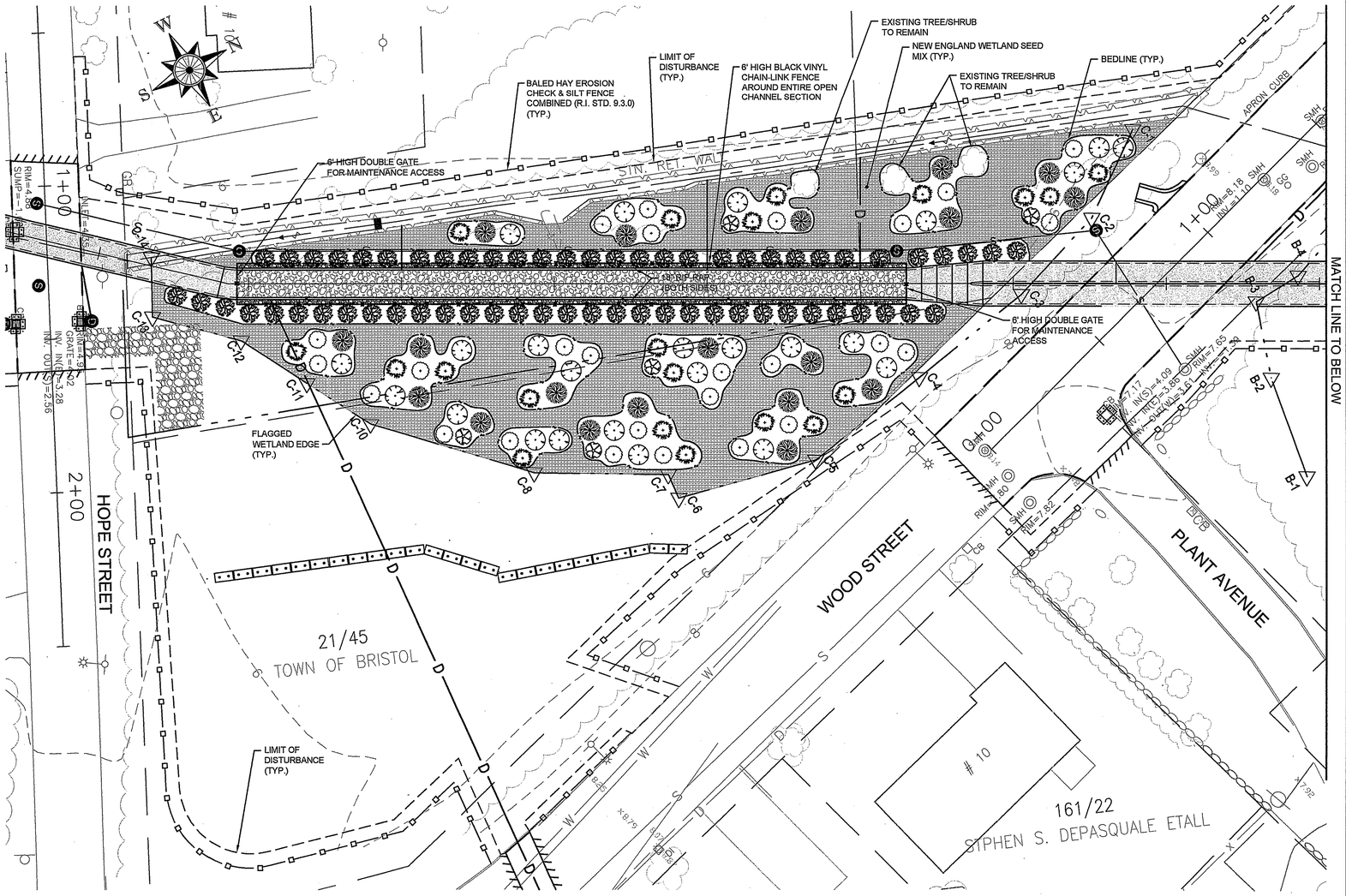
Plot Date: Dec 23, 2009 10:08am

NOTES:

1. ROOTS OF INVASIVE SPECIES TO BE GRUBBED AND DISPOSED OF IN A SUITABLE NON-JURISDICTIONAL UPLAND AREA.
2. EXISTING NATIVE SPECIES SHALL BE PRESERVED AS MUCH AS POSSIBLE. A QUALIFIED WETLAND SPECIALIST SHALL MARK WITH FLAGGING TAPE ALL SPECIES TO BE REMOVED AND ALL SPECIES TO REMAIN BEFORE THE BEGINNING OF CONSTRUCTION.
3. A QUALIFIED WETLAND SCIENTIST SHALL OVERSEE GRUBBING AND PLANTING OF VEGETATION TO ENSURE EFFICIENCY OF RESTORATION.
4. AFTER ONE(1) YEAR, A STATUS REPORT ON THE SURVIVABILITY OF PLANTINGS SHALL BE MADE TO RIDEM. PLANTS THAT HAVE NOT SURVIVED SHALL BE REPLACED IN KIND.
5. SEED MIX SHALL CONSIST OF WETLAND MIX (TYPE 5) AS SPECIFIED IN SECTION L.02 OF THE R.I. STANDARD DETAILS OR NEW ENGLAND WET MIX BY NEW ENGLAND WETLAND PLANTS AND SHALL BE SPREAD AT SPECIFIED RATES.

LEGEND:

Symbol	Species	Quantity	Size	Spacing
	Speckled Alder - [*Alnus incana*]	62	18"-24"	8' O.C.
	Highbush Blueberry - [*Vaccinium corymbosum*]	25	18"-24"	8' O.C.
	Spicebush - [*Lindera benzoin*]	22	18"-24"	8' O.C.
	Winterberry (Female) - [*Ilex verticillata*]	21	18"-24"	8' O.C.
	Winterberry (Male) - [*Ilex verticillata*]	5	15"-18"	As Shown
	Silky Dogwood - *[Cornus amomum]*	27	18"-24"	8' O.C.
	Eastern Red Cedar - [*Juniperus virginiana*]	32	3'-4'	10' O.C.



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 6 2010 FILE # 08-0315
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
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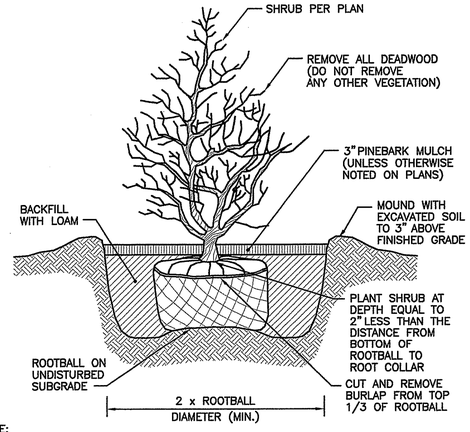


NOTE: SHALL BE IN ACCORDANCE WITH SECTION L.06 OF THE R.I. STANDARD SPECIFICATIONS.

BALL AND BURLAP SHRUB PLANTING DETAIL — NOT TO SCALE — R.I. STANDARD 50.3.0

Engineered by:
BETA Group, Inc.
Engineers · Scientists · Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:
KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12.29.09

Subconsultant:

JAN 19 2010

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Restoration Plan

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09
2	DEM COMMENTS	12/09

File: 3433-C8 Restoration Plan.dwg
Drawn By: KJA
Dept. Ckd. By: DH
Project Ckd. By: KMA
Job No: 3433.01 Date: 11/14/08

North Arrow

Scale

20 0 20 40
SCALE IN FEET: 1"=20'

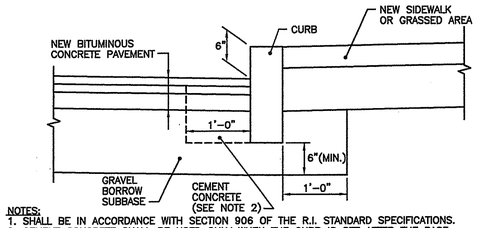
Not for Construction

Sheet No.: (15 of 18)

C8.0

Plot Date: Dec 23, 2009 10:10am

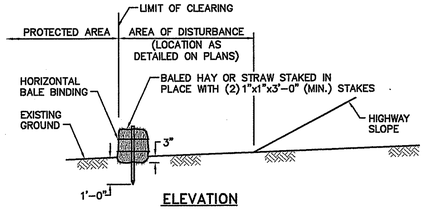
N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1--Plan Set\Environmental Plan Set\3433--C8 Restoration Plan.dwg



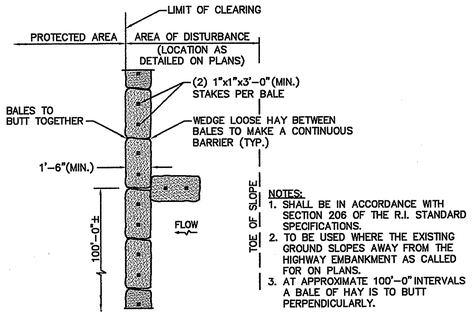
NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. CEMENT CONCRETE SHALL BE USED ONLY WHEN THE CURB IS SET AFTER THE BASE AND/OR BINDER COURSES ARE IN PLACE, OTHERWISE THE CEMENT CONCRETE WILL BE ELIMINATED AND THE GRAVEL BROUGHT UP TO BOTTOM OF THE BASE COURSE.

CURB SETTING DETAIL
NOT TO SCALE

R.I. STANDARD 7.6.0



ELEVATION

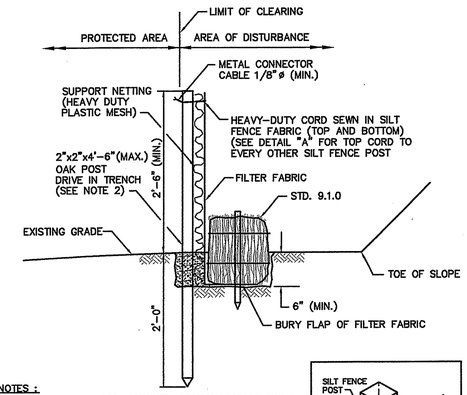


NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. TO BE USED WHERE THE EXISTING GROUND SLOPES AWAY FROM THE HIGHWAY EMBANKMENT AS CALLED FOR ON PLANS.
3. AT APPROXIMATE 100'-0" INTERVALS A BALE OF HAY IS TO BUTT PERPENDICULARLY.

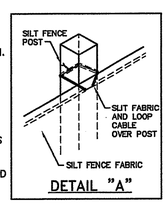
PLAN

BALED HAY EROSION CHECK
NOT TO SCALE

R.I. STANDARD 9.1.0



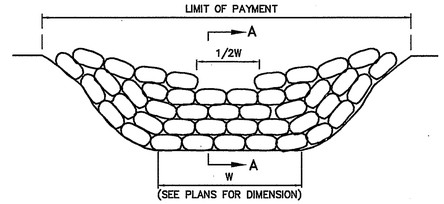
NOTES :
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. STD. 9.1.0 IS INSTALLED "TIGHT" AGAINST SILT FENCE. THOROUGHLY COMPACT EXCAVATED SOILS BACK INTO TRENCH AFTER INSTALLATION OF EROSION CONTROL DEVICE. SILT FENCE FABRIC SHALL NOT BE SLIT. STD. 9.1.0 POST SHALL BE DRIVEN THROUGH SILT FENCE FABRIC. 2"x2"x4'-6"(MAX.) OAK POST FOR SILT FENCE SHALL BE LOCATED 8'-0" (MAX.) O.C. IN WETLAND AREAS AND 4'-0" (MAX.) O.C. IN WETLAND RAVINE, GULLY OR DROP-OFF AREAS AS SHOWN ON PLANS.
3. 1"x1"x4'-6"(MIN.) POSTS PERMITTED FOR PRE-FABRICATED SILT FENCE.
4. SILT FENCE AND BALED HAY SHALL BE INSTALLED BEFORE ANY GRUBBING OR EARTH EXCAVATION TAKES PLACE.



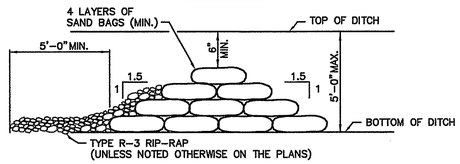
DETAIL "A"

BALED HAY EROSION CHECK AND SILT FENCE COMBINED
NOT TO SCALE

R.I. STANDARD 9.3.0



ELEVATION

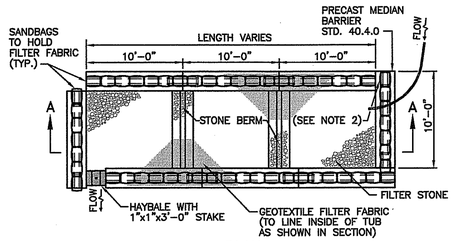


SECTION A-A

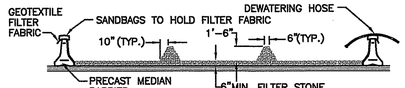
NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 207 OF THE R.I. STANDARD SPECIFICATIONS.

SAND BAG EROSION CHECK
NOT TO SCALE

R.I. STANDARD 9.6.0



PLAN

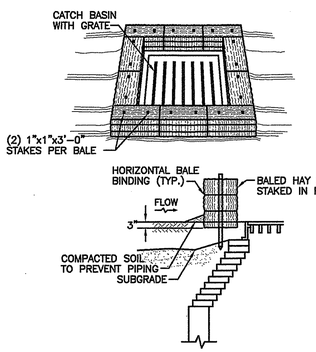


SECTION

NOTS:
1. SHALL BE IN ACCORDANCE WITH SECTION 208 OF THE R.I. STANDARD SPECIFICATIONS.
2. PROVIDE ADDITIONAL SAND BAGS AS REQUIRED TO FILL SPACE BETWEEN ADJACENT BARRIERS.

DEWATERING BASIN
NOT TO SCALE

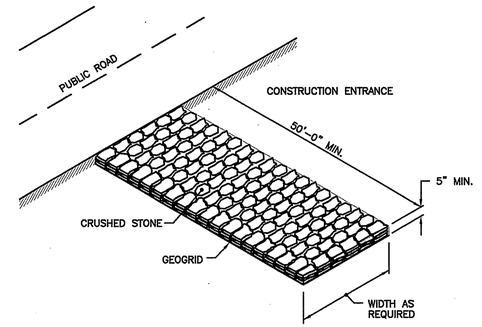
R.I. STANDARD 9.7.0



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 209 OF THE R.I. STANDARD SPECIFICATIONS.
2. THIS INLET PROTECTION CAN ALSO BE USED WHEN CONSTRUCTION SEQUENCING REQUIRES A CATCH BASIN TO BE EXPOSED TO SEDIMENT FROM THE SUBGRADE. THIS WILL BE ACHIEVED BY INSTALLING THE BALED HAY AS SHOWN ON THIS DETAIL INTO THE SUBGRADE.
3. THE PERIMETER CONFIGURATION OF THE BALED HAY WILL VARY DEPENDING ON THE PARTICULAR TYPE OF CATCH BASIN INLET BEING CONSTRUCTED. THE ENGINEER WILL PROVIDE SPECIFIC DIRECTION IN SUCH CASES.

BALED HAY CATCH BASIN INLET PROTECTION
NOT TO SCALE

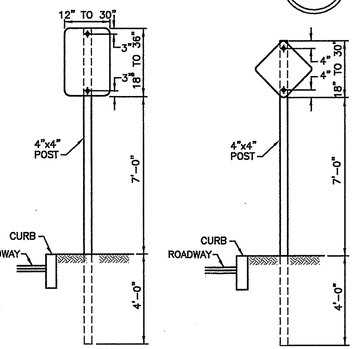
R.I. STANDARD 9.8.0



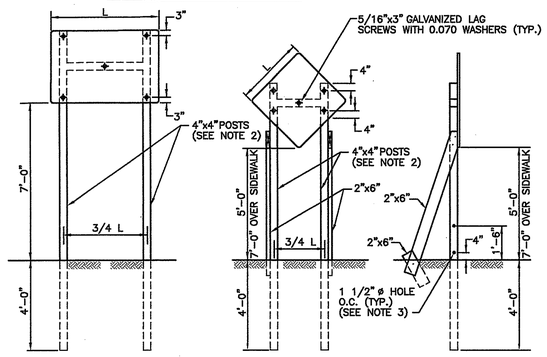
NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

CONSTRUCTION ACCESS
NOT TO SCALE

R.I. STANDARD 9.9.0



SIGNS UP TO 10 SQ. FT.

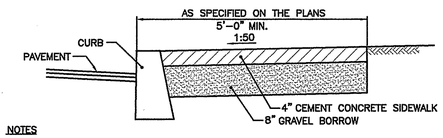


SIGNS UP TO 60 SQ. FT.

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION T.15 OF THE R.I. STANDARD SPECIFICATIONS.
2. USE (2) 4"x6" POSTS FOR SIGN AREAS GREATER THAN 20 SQ. FT.
3. DRILL 1 1/2"ø HOLES FOR 4"x6" POSTS ONLY.
4. FOR SIGNS 5'-0"x5'-0" AND LARGER USE DIAGONAL BRACING ON EACH VERTICAL POST AND 4 LAG SCREWS
5. CONSTRUCTION AND TEMPORARY SIGN PANELS SHALL BE 3/4" THICK EXTERIOR GRADE PLYWOOD OR ALUMINUM.
6. ALL SIGN SUPPORTS (INCLUDING TEMPORARY) MUST BE SUCCESSFULLY CRASH TESTED.
7. FOR SIGNS GREATER THAN 60 SQ. FT., REFER TO STD. 30.1.0, 30.1.1, 30.2.0, 30.2.1, 30.3.0, 30.3.1, 30.4.0, 30.4.1, 30.4.2 AND 30.4.3.

CONSTRUCTION AND TEMPORARY SIGN MOUNTINGS (SIGNS UP TO 60 SQ. FT.)
NOT TO SCALE

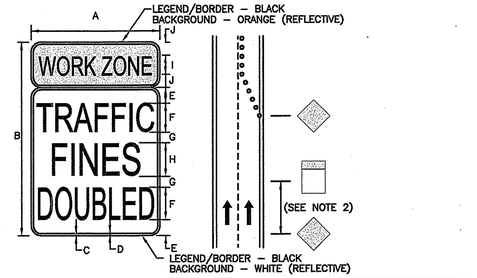
R.I. STANDARD 24.3.0



NOTES
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. FOR CURB SETTING DETAIL REFERENCE STD. 7.6.0.

CEMENT CONCRETE SIDEWALK
NOT TO SCALE

R.I. STANDARD 43.1.0

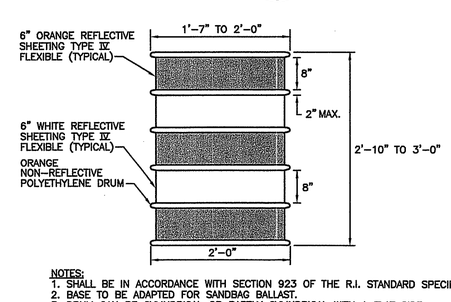


SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	I	J
STANDARD	24	36	3/8	5/8	3 1/2	6B	2 1/2	6C	4C	2
RURAL	36	54	5/8	7/8	5	8B	4	8C	6C	3
EXPRESSWAY	48	72	3/4	1 1/4	7	10B	5	10C	8C	5

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION T.15 OF THE R.I. STANDARD SPECIFICATIONS.
2. STANDARD: > 50'-0" < 200'-0"
   RURAL: > 200'-0" < 400'-0"
   EXPRESSWAY: > 400'-0" <800'-0"
3. WHEN INSTALLING ON JERSEY BARRIERS LESS THAN 48" WIDE, A 36"x54" SIGN DIMENSION MAY BE USED.

TRAFFIC FINES IN WORK ZONE REGULATORY SIGN
NOT TO SCALE

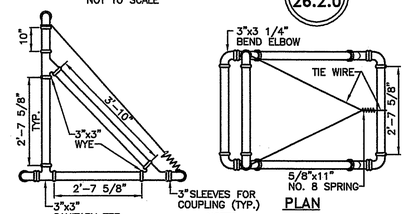
R.I. STANDARD 27.1.1



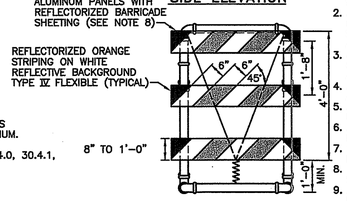
NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 923 OF THE R.I. STANDARD SPECIFICATIONS.
2. BASE TO BE ADAPTED FOR SANDBAG BALLAST.
3. DRUM CAN BE CYLINDRICAL OR PARTLY CYLINDRICAL WITH A FLAT SIDE.
4. WALL THICKNESS TO BE 1/2" MINIMUM.

POLYETHYLENE DRUM WITH MARKINGS
NOT TO SCALE

R.I. STANDARD 26.2.0



PLAN



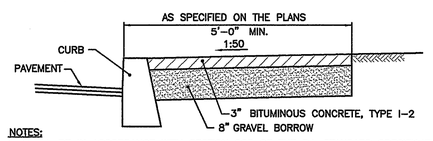
SIDE ELEVATION

FRONT ELEVATION

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 923 OF THE R.I. STANDARD SPECIFICATIONS.
2. ALL PIPE SHALL BE POLYVINYL CHLORIDE (PVC) PRESSURE RATED CLASS SDR 21 OR SDR 26 CONFORMING TO ASTM D2241 OR ASTM D2729.
3. JOINT FILLINGS MAY BE PVC-ASTM D 2665 OR ACRYLONITILE BUTADIENE STYRENE (ABS) ASTM D 2661 (DRAINAGE WASTE AND VENT).
4. ALL PIPES SHALL BE WHITE. WHITE FITTINGS ARE PREFERRED, BLACK MAY BE USED.
5. ALL JOINTS SHALL BE FREE TO SEPARATE UPON VEHICLE IMPACT.
6. A FIXED FRANGIBLE PAVEMENT CONNECTION PREFERRED. SAND BAGS MAY BE SUBSTITUTED.
7. STRIPES SHALL BE SLOPED DOWNWARD IN DIRECTION OF TRAFFIC TO PASS.
8. PVC PIPE SHALL BE ULTRAVIOLET LIGHT STABILIZED.
9. ATTACH PANELS WITH 1" NO. 14 PAN HEAD METAL SCREWS.

PVC PLASTIC PIPE TYPE III BARRICADE
NOT TO SCALE

R.I. STANDARD 26.3.0



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. FOR CURB SETTING DETAIL REFERENCE STD. 7.6.0.

BITUMINOUS CONCRETE SIDEWALK
NOT TO SCALE

R.I. STANDARD 43.2.0

Engineered by:
BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-29-09

Subconsultant:

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Construction Details No. 1

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C9 Con Det 1.dwg
Drawn By: KJA
Dept. Ckd. By: DH
Project Ckd. By: KMA
Job No: 3433.01 Date: 11/14/08

North Arrow

Scale

As Shown

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

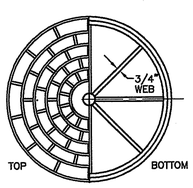
Not for Construction

Sheet No.: (16 of 18)

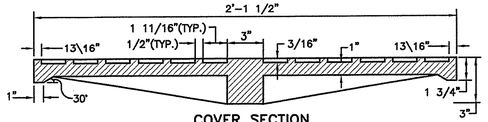
C9.0

Plot Date: Dec 29, 2009 8:59am

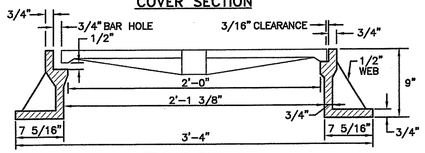
N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C9 Con Det 1.dwg



COVER FRAME



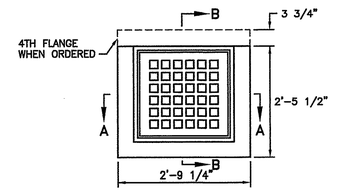
COVER SECTION

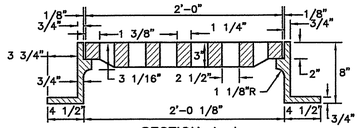


FRAME SECTION

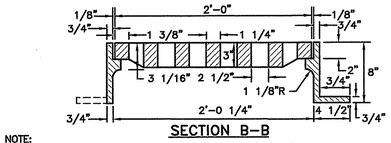
NOTES:
1. FRAME AND GRATE SHALL CONFORM TO SECTION M.04 OF THE R.I. STANDARD SPECIFICATIONS.
2. FRAME AND COVER SEATS MUST HAVE MACHINE FINISH.

HEAVY-DUTY ROUND FRAME AND COVER
NOT TO SCALE
R.I. STANDARD 6.2.1





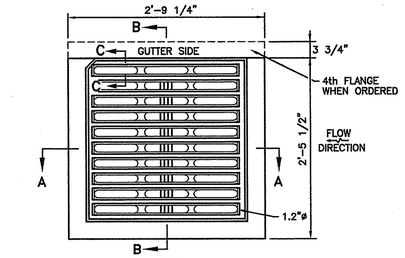
SECTION A–A

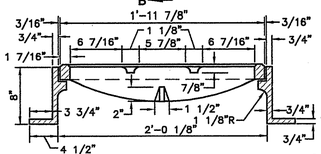


SECTION B–B

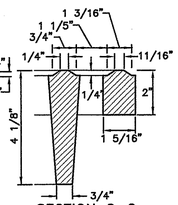
NOTE: FRAME AND GRATE SHALL CONFORM TO SECTION M.04 OF THE R.I. STANDARD SPECIFICATIONS.

SQUARE FRAME AND GRATE
NOT TO SCALE
R.I. STANDARD 6.3.0

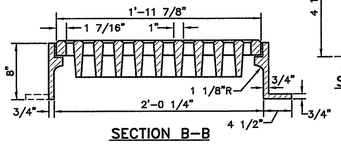




SECTION A–A

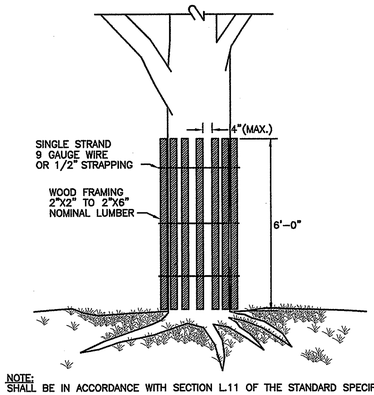


SECTION C–C



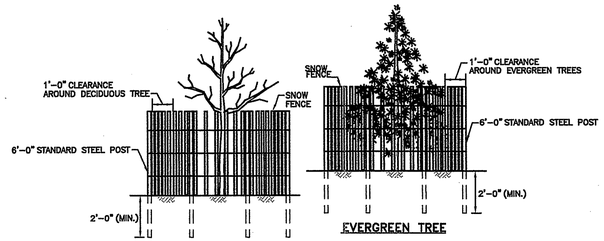
SECTION B–B

SQUARE FRAME AND GRATE (BICYCLE SAFE)
NOT TO SCALE
R.I. STANDARD 6.3.2



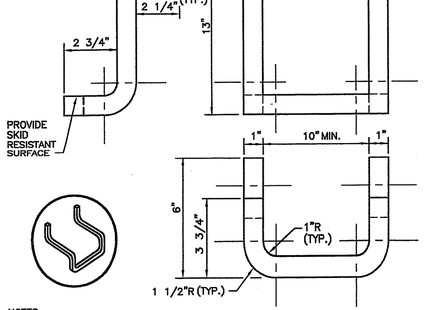
NOTE: SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE STANDARD SPECIFICATIONS.

TREE PROTECTION DEVICE
NOT TO SCALE
R.I. STANDARD 51.1.0



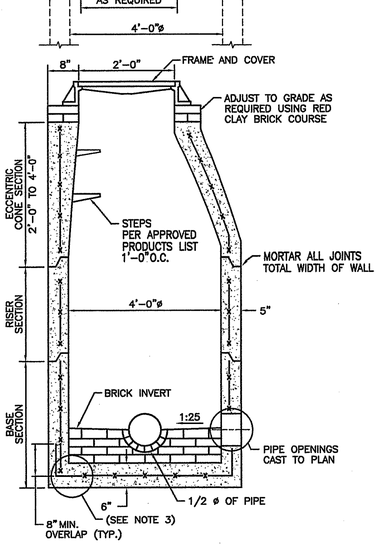
NOTE: SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE R.I. STANDARD SPECIFICATIONS.

DRIP LINE TREE PROTECTION DEVICE FOR EXISTING TREES
NOT TO SCALE
R.I. STANDARD 51.1.1



NOTES:
1. STEPS SHALL CONFORM TO SECTION M.04 OF THE R.I. STANDARD SPECIFICATIONS.
2. CROSS SECTION AREA MAY BE REDUCED UPON SUBMISSION OF CERTIFIED LOAD TESTS. STEPS MUST SUPPORT 300 LBS.
3. STOCK SHOWN IS 1" SQUARE WHICH MAY BE REPLACED BY 1" DIAMETER.

CATCH BASIN AND MANHOLE STEP
NOT TO SCALE
R.I. STANDARD 5.3.0



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED = 0.12 SQ. IN. / LIN. FT. MINIMUM.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN/LIN. FT. (BOTH WAYS).
4. ONE POUR MONOLITHIC BASE SECTION.
5. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
6. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.2).
8. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
9. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.

PRECAST 4'-0" ROUND MANHOLE
NOT TO SCALE
R.I. STANDARD 4.2.0

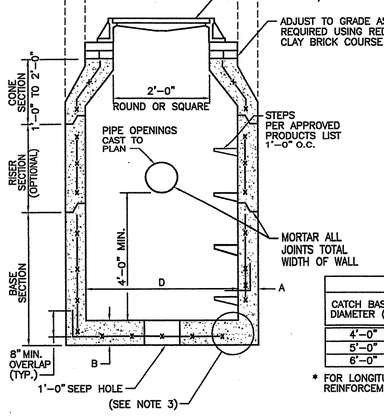
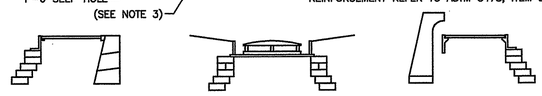


TABLE 1			
CATCH BASIN DIAMETER (D)	A	B	CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED *
4'-0"	5"	6"	0.12 SQ. IN./LIN. FT.
5'-0"	6"	7"	0.15 SQ. IN./LIN. FT.
6'-0"	7"	8"	0.18 SQ. IN./LIN. FT.

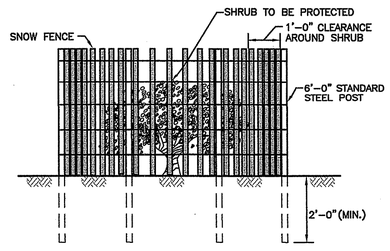
* FOR LONGITUDINAL (VERTICAL STANDING) REINFORCEMENT REFER TO ASTM C478, ITEM 8.1.2



TYPE CATCH BASIN AS REQUIRED

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. SEE TABLE 1 FOR STEEL REINFORCEMENT REQUIREMENTS.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
4. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
5. ONE POUR MONOLITHIC BASE SECTION.
6. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
7. CORBEL MADE OF RED CLAY BRICK WILL BE PERMITTED FOR THE "CONE SECTION" OF THE 4'-0" CATCH BASIN ONLY.
8. FOR CATCH BASIN TYPES "D" AND "F" STEPS MUST BE INSTALLED ON THE CURB SIDE OF THE STRUCTURE.
9. THE CENTERLINE OF THE OPENING MUST BE WITHIN 2'-0" FROM THE STEPS.
10. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.2).
11. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
12. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.
13. PROVIDE A MINIMUM OF 12 INCHES OF COMPACTED GRAVEL BORROW AROUND THE STRUCTURE.

PRECAST 4'-0", 5'-0", OR 6'-0" ROUND CATCH BASIN
NOT TO SCALE
R.I. STANDARD 4.4.0



NOTE: SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE R.I. STANDARD SPECIFICATIONS.

SHRUB PROTECTION DEVICE
NOT TO SCALE
R.I. STANDARD 51.2.0

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED APR 2 2010 FILE # 08-0295
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Engineered by:
BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:
KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12-27-09

Subconsultant:

RECEIVED JAN 19 2010

Project
Tanyard Brook Culvert Replacement
Bristol, Rhode Island

Title
Construction Details No. 2

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C9 Con Det 2.dwg
Drawn By: KJA
Dept. Ckd. By: DH
Project Ckd. By: KMA
Job No: 3433.01 Date: 11/14/08

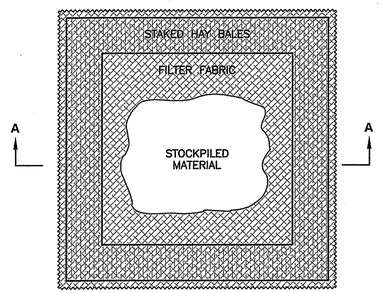
North Arrow

Scale
As Shown

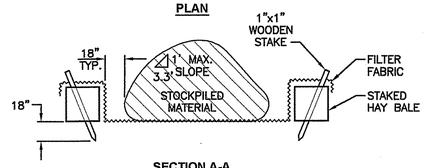
Not for Construction

Sheet No.: (17 of 18)
C9.1
Plot Date: Dec 29, 2009 8:59am

N:\3400s\3433 Tanyard Brook - Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C9 Con Det 2.dwg



PLAN

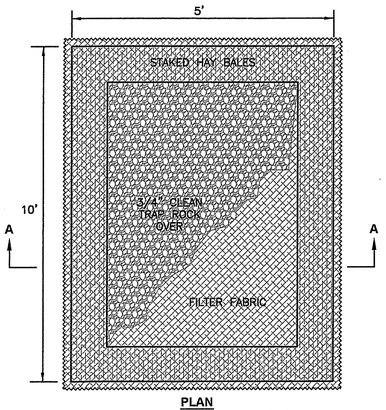


SECTION A-A

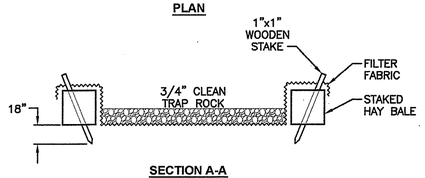
NOTE:
DIMENSIONS OF STOCKPILE AREA MAY VARY DEPENDING ON QUANTITY OF EXCAVATED MATERIAL. AVOID OVERTOPING OR SLOPES IN EXCESS OF 1:3.3.

PLAN OF TEMPORARY STOCKPILED AREA

NOT TO SCALE



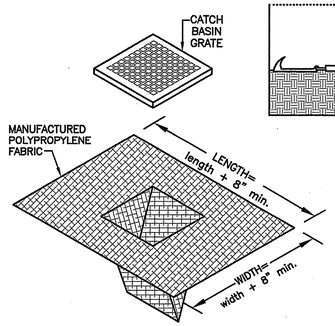
PLAN

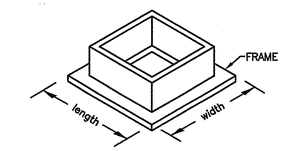


SECTION A-A

CONCRETE WASHOUT AREA DETAIL

NOT TO SCALE

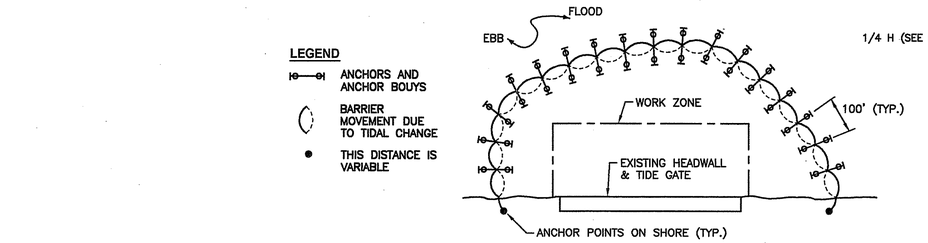




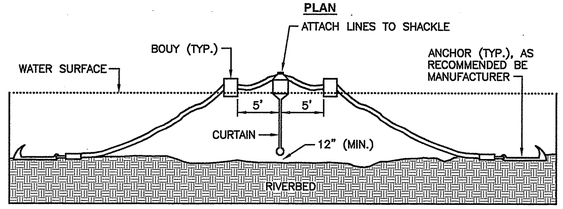
NOTES
1. LENGTH AND WIDTH OF POLYPROPYLENE FABRIC MUST EXCEED EXISTING CATCH BASIN FRAME DIMENSIONS BY A MINIMUM OF 8".
2. REMOVE CATCH BASIN GRATE AND INSTALL POLYPROPYLENE FABRIC OVER CATCH BASIN FRAME. REPLACE CATCH BASIN GRATE TO SECURE POLYPROPYLENE FABRIC IN PLACE.

TYPICAL CATCH BASIN EROSION CONTROL PROTECTION

NOT TO SCALE



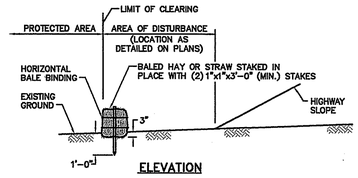
PLAN



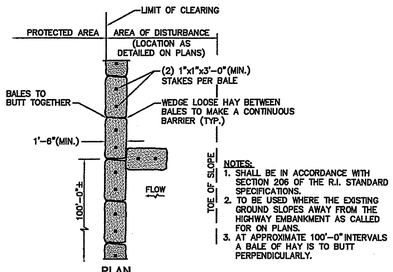
ELEVATION

TURBIDITY CURTAIN - TYPE III

NOT TO SCALE



ELEVATION



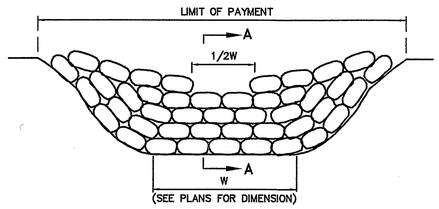
NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. TO BE USED WHERE THE EXISTING GROUND SLOPES AWAY FROM THE HIGHWAY EMBANKMENT AS CALLED FOR ON PLANS.
3. AT APPROXIMATE 100'-0" INTERVALS A BALE OF HAY IS TO BUTT PERPENDICULARLY.

PLAN

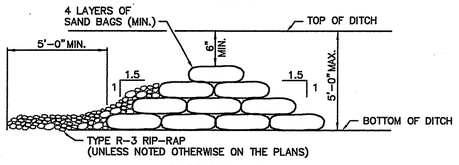
BALED HAY EROSION CHECK

NOT TO SCALE

R.I. STANDARD 9.1.0



ELEVATION



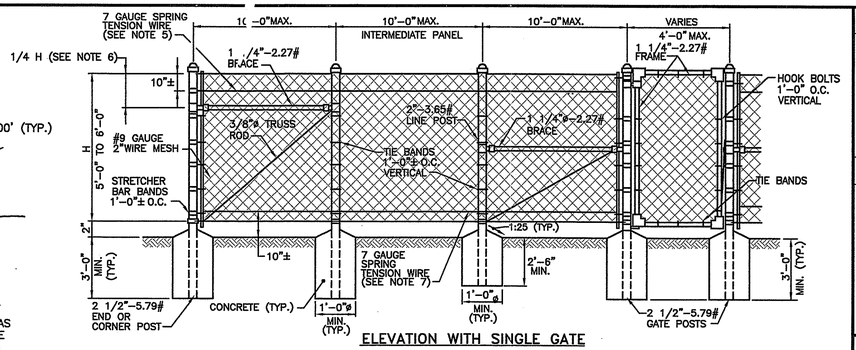
SECTION A-A

NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 207 OF THE R.I. STANDARD SPECIFICATIONS.

SAND BAG EROSION CHECK

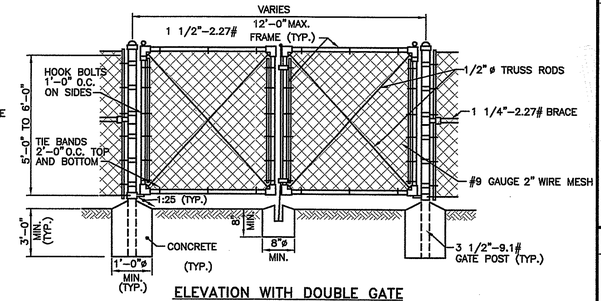
NOT TO SCALE

R.I. STANDARD 9.6.0



ELEVATION WITH SINGLE GATE

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 903 OF THE R.I. STANDARD SPECIFICATIONS.
2. 6 GAUGE STREET CLIPS TO BE USED TO FASTEN SPRING TENSION WIRE TO LINE POST.
3. SPRING TENSION WIRE – NO. 7 GAUGE CORRUGATED HEAVILY GALVANIZED (2.0 OZ. PER SQ. FT.) ALUMINUM COATED (0.4 OZ. PER SQ. FT.)
4. ALL PIPES REFER TO SCHEDULE 40 NOMINAL PIPE SIZES.
5. A 1 1/4"-2.27# TOP RAIL MAY BE SUBSTITUTED FOR THE TOP TENSION WIRE WHEN THE FENCE IS NOT LOCATED IN THE CLEAR ZONE.
6. WHEN A TOP RAIL IS USED, LOCATE THE BRACE RAIL AT 1/2 H.
7. WHEN A TOP RAIL IS USED, DELETE THE BOTTOM SPRING TENSION WIRE.

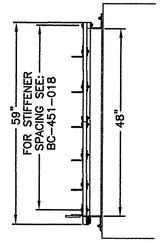


ELEVATION WITH DOUBLE GATE

CHAIN LINK FENCE 5'-0" TO 6'-0"

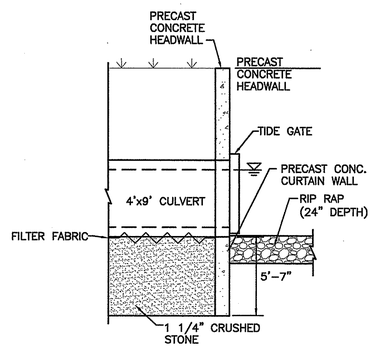
NOT TO SCALE

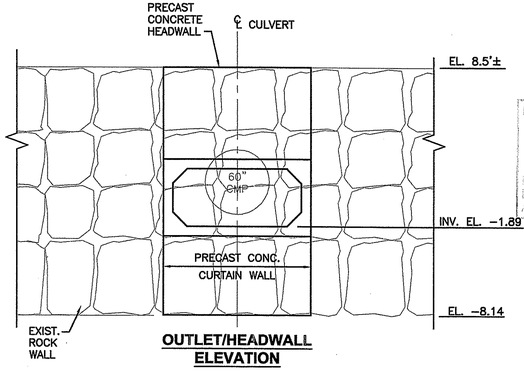
R.I. STANDARD 31.2.0



FLEXIBLE TIDE GATE

NOT TO SCALE





OUTLET/HEADWALL ELEVATION

NOTES:
1. PLACE 1" PRE-FORMED FILLER AGAINST VERTICAL SIDES OF THE CULVERT FOR THE FULL HEIGHT AND WIDTH OF THE RECONSTRUCTED MASON WALL AND NEW C.I.P. WINGWALL, SEAL EXPOSED FACE WITH ½" DEEP JOINT FILLER.
2. LIMITS OF EXISTING MASONRY BLOCK WALL UNKNOWN.
3. PROPOSED TIDE GATE TO BE BOLTED TO NEW CONCRETE HEADWALL. SEE FLEXIBLE TIDE GATE DETAIL ABOVE.

STATION 0+76.37

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 APR 2 6 2010 FILE # 08-0295
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

Charles A. Horbert

Engineered by:
BETA Group, Inc.
Engineers·Scientists·Planners
6 Blackstone Valley Place
Lincoln, RI 02865
401.333.2382
email: BETA@BETA-inc.com

P.E. Stamp:

KEVIN M. AGUIAR
No. 6913
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
12.29.09

Subconsultant:

RECEIVED JAN 19 2010

Project

Tanyard Brook Culvert Replacement

Bristol, Rhode Island

Title

Construction Details No. 3

Revisions

No.	Description	Date
1	DEM COMMENTS	9/09

File: 3433-C9 Con Det 3.dwg

Drawn By: KJA

Dept. Ckd. By: DH

Project Ckd. By: KMA

Job No: 3433.01 Date: 11/14/08

North Arrow

Scale

As Shown

Not for Construction

Sheet No.: (18 of 18)

C9.2

Plot Date: Dec 29, 2009 9:00am

N:\3400s\3433 Tanyard Brook – Bristol RI\AutoCAD Files\Phase 1-Plan Set\Environmental Plan Set\3433-C9 Con Det 3.dwg