STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 13, 2006

NCDENR - Division of Water Quality
Wetlands Unit
1650 Mail Service Center
Raleigh, NC 27699-1650

Attention: Mr. John Hennessy
Transportation Permitting Unit

Subject: **Additional Information for Section 401 Water Quality Certification/Neuse Buffer Certification and Section 404 Nationwide Permits 14 & 33** for US 1/64 From US 64/SR 1009 (Tryon Road) Interchange to South of I-40 in Cary, Wake County; **TIP No. U-3101C & D**; State Project No. 8.1403101; Federal Aid Project No. STPNHF-1(4); USACE Action ID Nos. 200120922 & 200421562; NCDENR-DWQ Project No. 041055; WBS Element 34897.1.1.

Reference:
- NCDENR-DWQ Section 401 Water Quality Certification Nos. 3404 & 3366 (NCDENR-DWQ Project No. 041055) and Neuse Buffer certification, dated August 27, 2004 (and Modification dated October 5, 2004).
- USACE Section 404 Nationwide Permits 14 & 33 (Action ID Nos. 200120922 & 200421562), dated September 10, 2004 (and Modification dated April 8, 2005).

The purpose of this letter is to provide the NC Division of Water Quality (DWQ) and the US Army Corp of Engineers (USACE) with additional information for the 401 water quality/buffer certification and the 404 permit to address design changes. Due to the failure of the existing metal cross pipe at Station 26+60-L-RT, the pipe will be abandoned in favor of a new outlet to the left of Station 26+60. To satisfy the buffer requirements, a level spreader with splitter box will be incorporated. The preformed scour hole (PSH) previously permitted will act as a forebay for the level spreader, and a berm will be constructed on the R/W side of the level spreader to ensure water from the PSH does not bypass the level spreader. The roadway fill slope will provide confinement on the other side of the level spreader and the level spreader will also include endwalls. A new section of pipe with splitter box will be constructed to convey the initial inch of water from the base ditch to the PSH, and to convey the overflow storm capacity to the RCBC located at Station 27+50-L-LT. The resulting increase in drainage area will be negligible (487 acres vs. 489 acres, a 0.4% increase), and the water quality impact to Long Creek will be negligible.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
NATURAL ENVIRONMENT UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1334 or
919-715-1335

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
PARKER LINCOLN BUILDING
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

Additionally, the NCDOT will be incorporating a design change to address concerns that the "water quality pipes (WQP)" that outlet the stormwater sometimes have a tendency to "push" the water over the level spreader ahead of the outlet, instead of totally filling the level spreaders as intended. NCDOT will be shortening the WQP where it enters the level spreader at two locations, left of Station 27+80-L-LT and left of Station 43+60-L-LT, rather than having the pipe end directly ahead of the level spreader as currently permitted. A flared riprap-lined ditch will also be incorporated from the end of the pipe to the level spreader as a method to allow some energy dissipation prior to the flow entering the level spreader. The following sheets are attached: level spreader calculation sheet, revised Buffer Sheet 9 of 19 (Site 2), revised Buffer Sheet 12 of 19 (Site 5), and Plan Sheets 8, 2-JJJ, 2-TT, and 2-UU.

The project revisions do not result in any changes to the permitted jurisdictional stream or buffer impacts. As such, a permit modification is not warranted. The project revision was discussed with Nicole Thomson with DWQ and Eric Alsmeyer with USACE prior to submittal of this letter. NCDOT received verbal notification that a permit modification would not be required. The information contained in this letter, along with the attached plan sheet has been provided as a Permit Addendum. A copy of this letter is being provided to USACE for their use.

NCDOT would like to reserve the right to make adjustments to reduce the outlet velocities from the WQPs into the level spreaders at other locations, as described above (as depicted on revised buffer Sheet 9 of 19) or by similar means. All methods of adjustment will occur outside of the riparian buffers and no additional impacts will be incurred.

Thank you for your assistance with this project. If you have any questions or need additional information, please call Bill Barrett at (919) 715-1624.

Sincerely,

Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Branch

cc:
w/attachment
Mr. Eric Alsmeyer, USACE
Mr. Travis Wilson, NCWRC
Mr. Clarence W. Coleman, P.E., FHWA
Mr. Gary Jordan, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Jon Nance, P.E., Division Engineer
Mr. Chris Murray, DEO Division 5
Mr. Cadmus Capehart, Division 5 Aviation Parkway Resident Engineer's Office

w/o attachment
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Richard Brewer, P.E., Project Planning Engineer
Mr. Carl Goode, PE, Human Environment Unit Head

STA 27+20 LT.

$A_p = 0.66$ ha $c = 0.9$

$A_g = 0.73$ ha $c = 0.4$

$C = 0.64$ $A_{TOT} = 1.39$

$Q_{10} = 0.64(155)(1.39)(0.00275) = 0.38$ cms (13.4cfs)

$Q_{1"} = 0.64(25)(1.39)(0.00275) = 0.061$ cms (2.16cfs)

use level spreader designed for 1" storm intensity

use 8" csp w/ 24" overflow

1) Note: because discarge is 92% of discharge for level spreader design at 27+80Rt, use same Design, see calculations below

Top of level spreader elevation = 115.6m
OTCB @ 27+05 LT Top = 116.7 ; inv = 115.7

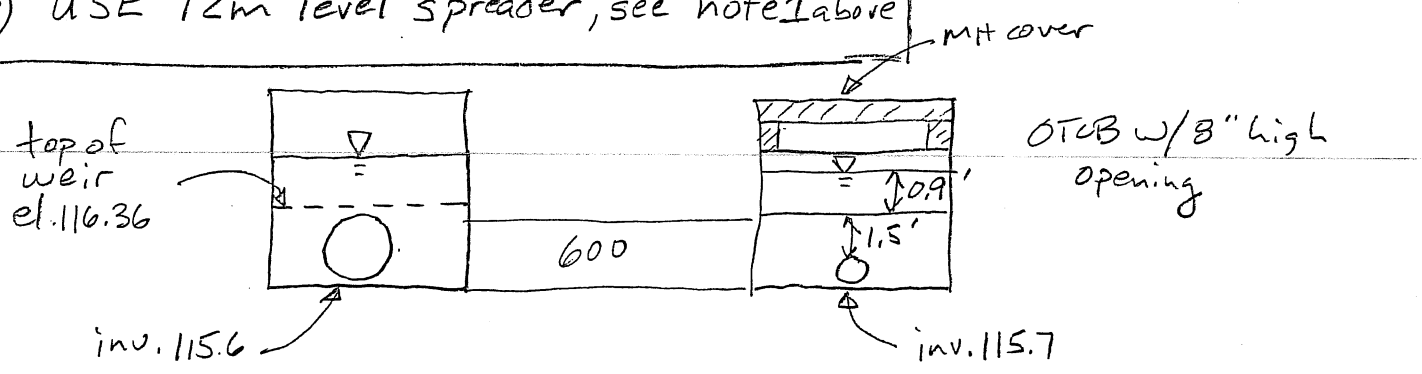
refer to schematic; 8" outlet pipe to PSH/Level spreader and 24" overflow to JB w/ MH cover ; JB has 4' weir

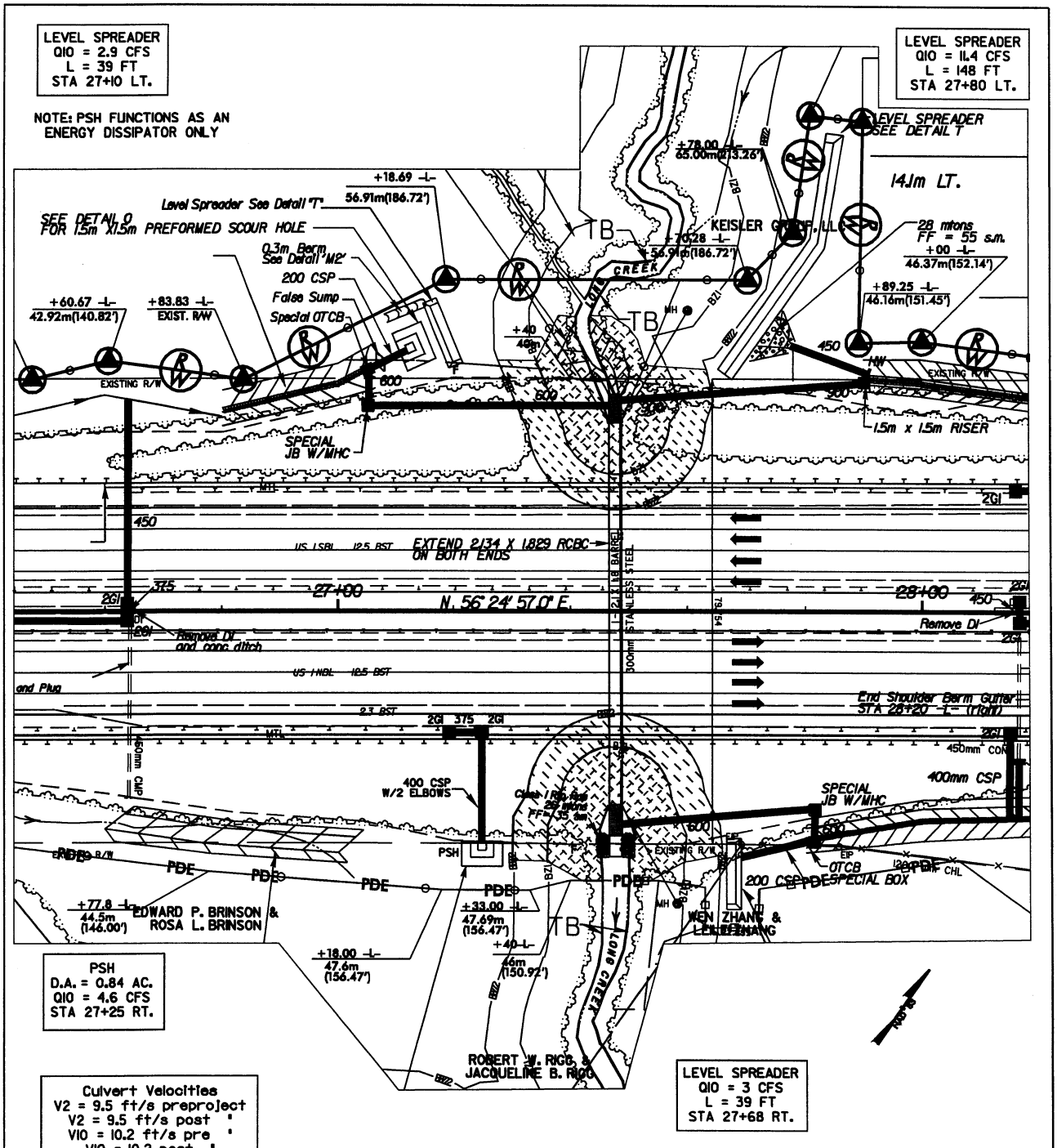
weir elevation = 116.36m and inv. of 24" = 115.7m

4' weir in JB w/ 0.9' of head allows 10.8 cfs overflow. The additional 0.9' of head on the 8" csp creates a total head of 2.4' on the 8" csp, which allows 2.9 cfs to pass through the 8" csp.

Therefore, use level spreader length = 2.9 x 13 = 37.7'
or in metric, use 11.5m Level spreader.

2) USE 12m level spreader, see note 1 above





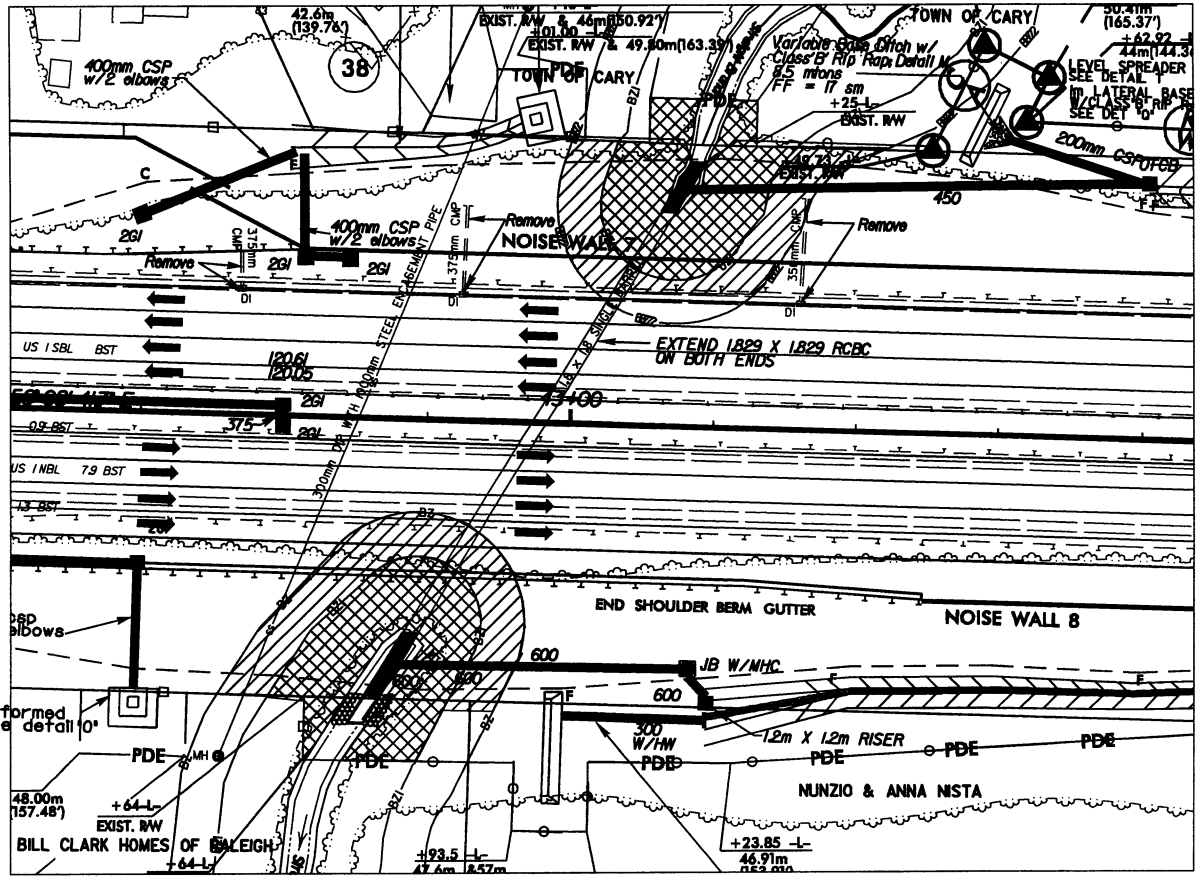
SITE 2
PLAN VIEW

NCDOT
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 8.1403101 (U-3101)

US 1/64 FROM US 1/64/SR1009 (TRYON RD.) INTERCHANGE TO SOUTH OF I-40 IN CARY

SHEET 9 OF 19 rev. 4-11-06

Revised



SITE 5

PLAN VIEW

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1403101 (U-3101)

US 1/64 FROM US 1/64/SR1009 (TRYON RD.) INTERCHANGE TO SOUTH OF I-40 IN CARY

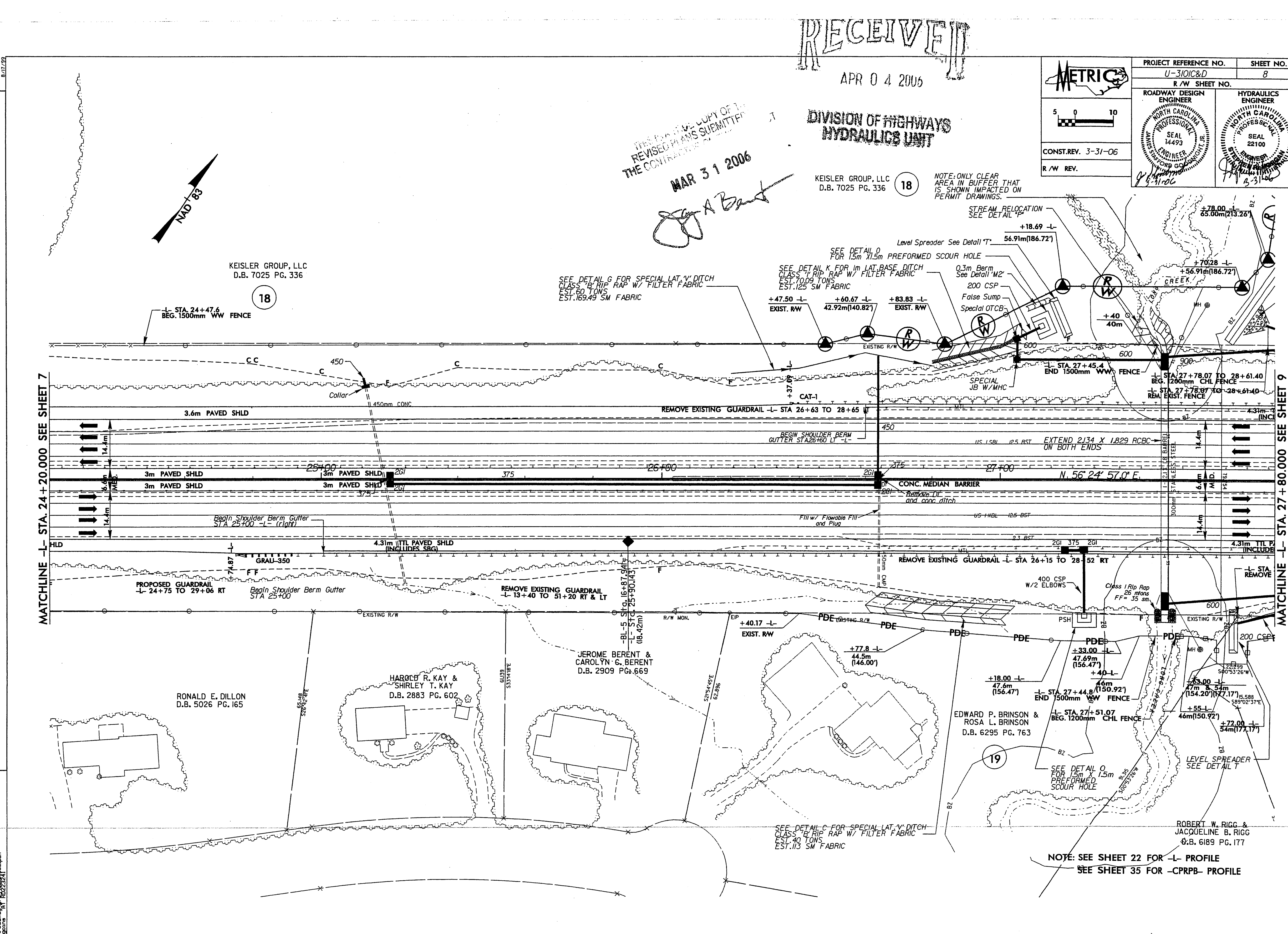
SHEET 12 OF 19

rev. 4-12-06
6-11-03

Revised

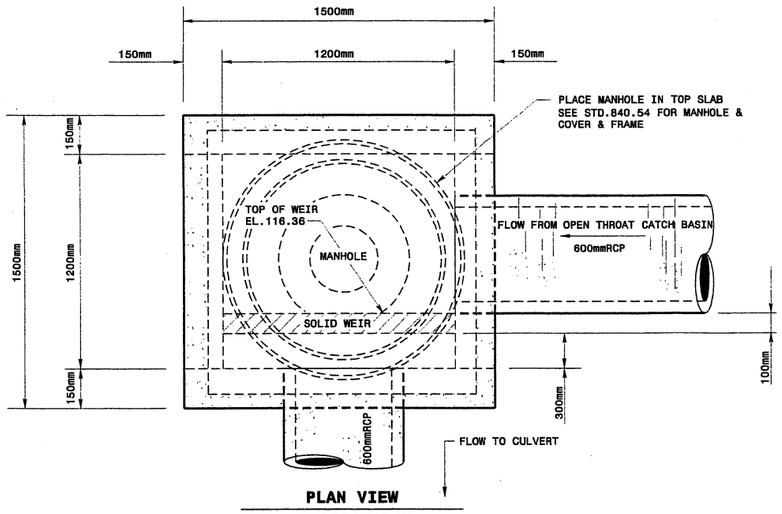
REVISIONS

LEVEL SPREADER ADDED(27+20 LT);450mm PIPE OUTLET ADDED (26+63 LT);EXISTING 450mm ABANDONED (26+63 RT);W.D.P.OUTLET REV.27+80 LT. SRM 3-31-06



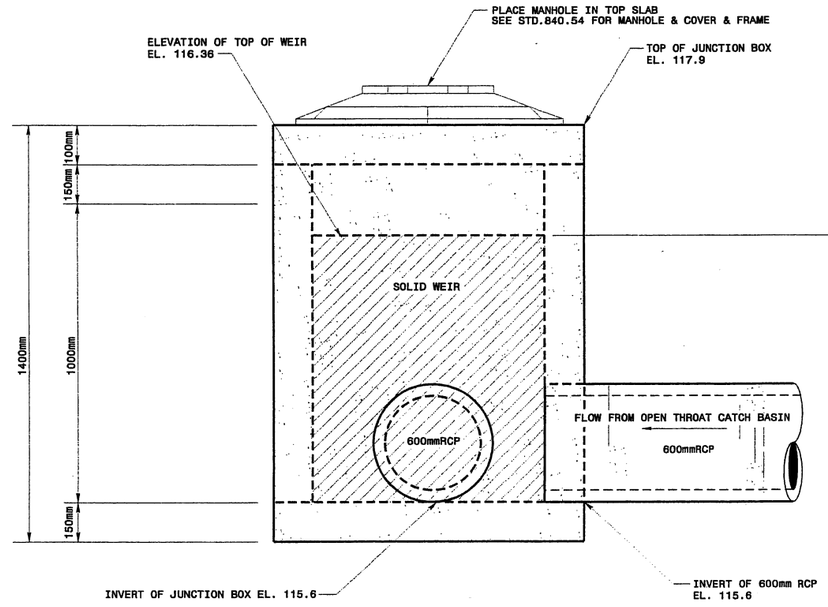
PROJECT REFERENCE NO.	SHEET NO.
U-3101 C&D	2-JJJ

METRIC



PLAN VIEW

JUNCTION BOX

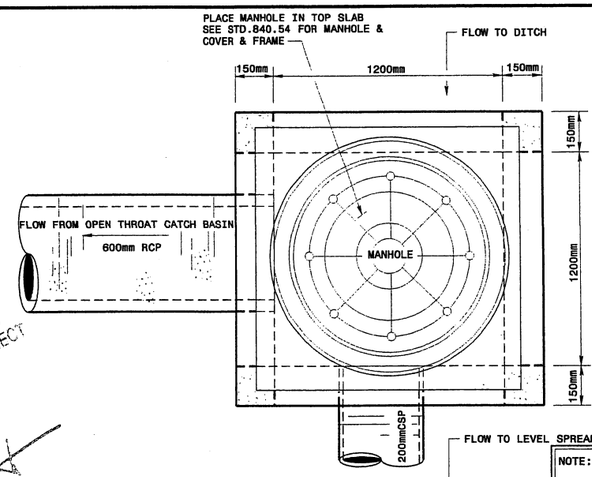


ELEVATION

JUNCTION BOX

THIS IS A TRUE COPY OF THE REVISED PLANS SUBMITTED TO THE CONTRACTOR DURING THE PROJECT

MAR 31 2006



PLAN VIEW

OPEN THROAT CATCH BASIN

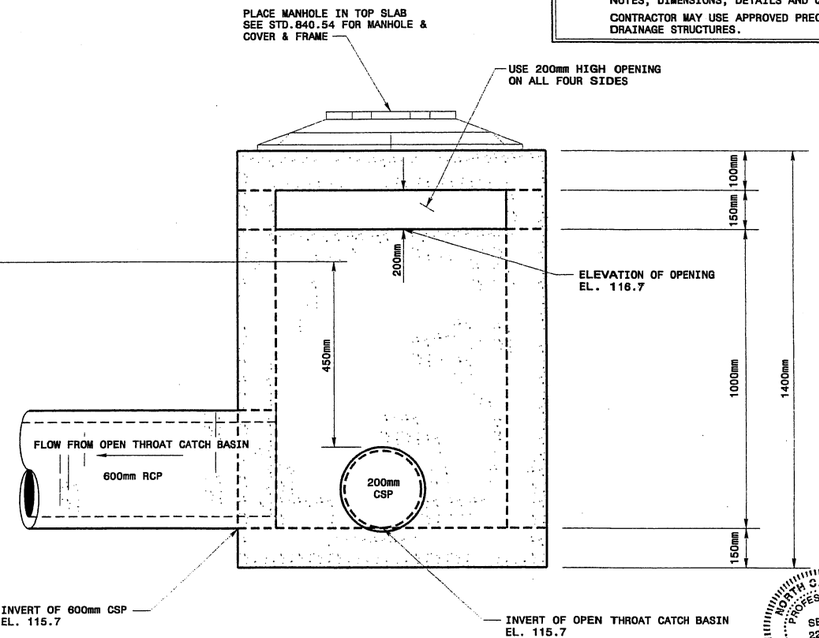
NOTE:
USE 200mm HIGH OPENING
ON ALL FOUR SIDES

NOTE: ELEVATIONS SHOWN MAY VARY DEPENDING ON ACTUAL FIELD ELEVATIONS. DIMENSIONS SHOULD NOT VARY.

* CRITICAL DIMENSIONS: TOP OF WEIR NEEDS TO BE 450mm ABOVE TOP OF 200mm CSP

SEE STD. NO. 840.04 FOR DRAINAGE STRUCTURE NOTES, DIMENSIONS, DETAILS AND QUANTITIES.

CONTRACTOR MAY USE APPROVED PRECAST CONCRETE DRAINAGE STRUCTURES.



ELEVATION

OPEN THROAT CATCH BASIN

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN B. MCGRADY 3/1/06

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOEL S. HOWERTON 3/1/06

Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.

SPECIAL JUNCTION BOX AND OPEN THROAT CATCH BASIN
STA. 27+05-L- LT.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

JUNCTION BOX AND OPEN THROAT CATCH BASIN

ORIGINAL BY:		DATE:
MODIFIED BY:	rnbritt	DATE: 02-27-06
CHECKED BY:		DATE: 2/27/06
FILE SPEC.:	/details/rnbritt/metric/murban/u3101risers.dgn	

RNBRITT/STANDARDS/DETAILS

27-FEB-2006 11:35
/projects/contracts/special details/rnbritt/metric/murban/u3101risers.dgn
rnbritt PS-Oce34dtbond

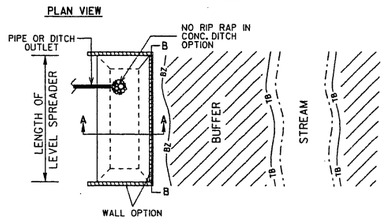
8/17/98

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	U-3101C&D	2-TT
	R /W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV. 3-31-06		
R /W REV.		

NORTH CAROLINA PROFESSIONAL SEAL 22100 ENGINEER STEPHEN R. MORGAN

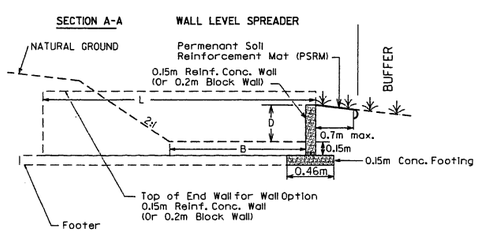
DETAIL T
LEVEL SPREADER DETAIL
(NOT TO SCALE)

PLAN VIEW

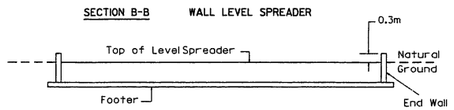


Note: Set inlet Pipe Invert no more than 100mm above levelspreader bottom or as directed by the engineer

SECTION A-A WALL LEVEL SPREADER



SECTION B-B WALL LEVEL SPREADER



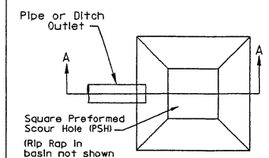
STATION	LENGTH	D	B	L	TOP ELEV.
20+45 -L- LT.	5m	0.3m	1.0m	2.6m	125.4
27+68 -L- RT.	12m	0.45m	1.2m	3.1m	115.4
27+80 -L- LT.	47m	0.45m	1.2m	3.1m	116.2
38+45 -L- RT.	43m	0.45m	1.2m	3.1m	111.1
43+02 -L- RT.	16m	0.45m	1.2m	3.1m	113.7
43+55 -L- LT.	12m	0.45m	1.2m	3.1m	115.2
27+10 -L- LT.	12m	0.45m	1.2m	3.1m	115.6

NOTE: ELEVATIONS SHOWN MAY VARY DEPENDING ON ACTUAL FIELD ELEVATIONS. DIMENSIONS SHOULD NOT VARY.

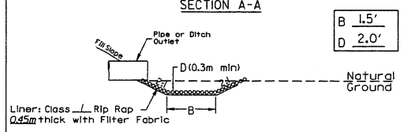
STATION 27+10 ADDED TO DETAIL "T" BY SRM 2-27-06

DETAIL V
PREFORMED SCOUR HOLE

PLAN VIEW



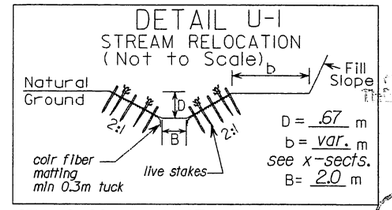
SECTION A-A



B	1.5'
D	2.0'

10/10/01

DETAIL U-I
STREAM RELOCATION
(Not to Scale)



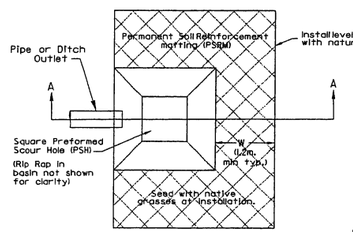
STA 16+96 -L- to STA 17+60 -L- (left)

ARE SUBMITTED TO THE CONSTRUCTION OF THIS PROJECT

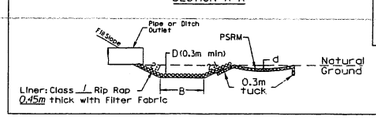
MAR 3 1 2006

DETAIL O
PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON

PLAN VIEW



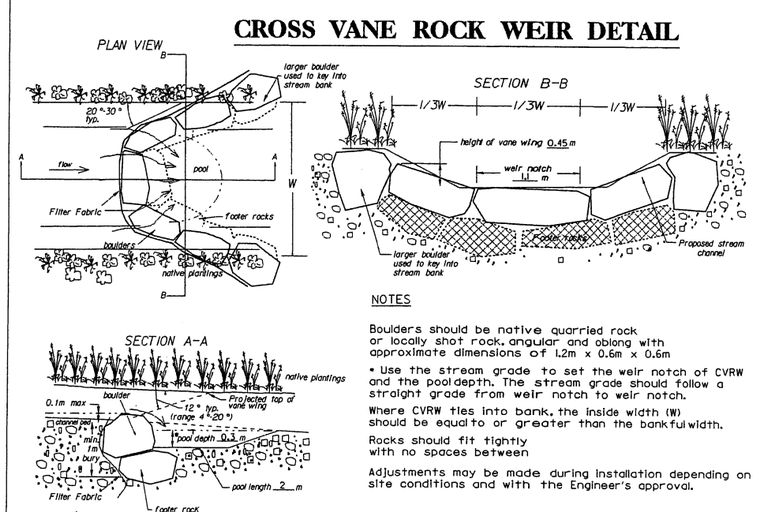
SECTION A-A



B	1.5'
D	2.0'
W	1.5'
d	0.5'

10/10/01

DETAIL W
CROSS VANE ROCK WEIR DETAIL



NOTES

Boulders should be native quarried rock or locally shot rock, angular and oblong with approximate dimensions of 1.2m x 0.6m x 0.6m

• Use the stream grade to set the weir notch of CVRW and the pool depth. The stream grade should follow a straight grade from weir notch to weir notch.

Where CVRW ties into bank, the inside width (W) should be equal to or greater than the bankful width.

Rocks should fit tightly with no spaces between

Adjustments may be made during installation depending on site conditions and with the Engineer's approval.

USE WITH DETAIL U-I
APPROX. 28 MTONS BOULDERS PER EACH CVRW
APPROX. 20 S.M. FILTER FABRIC PER EACH CVRW

30-MAR-2006 09:05
N:\Roadway\Projects\3101_ditchdetails.dgn
tdgoins RP 2223241

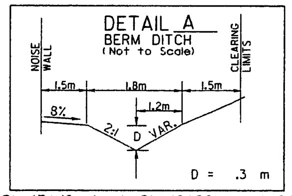
PROJECT REFERENCE NO.	SHEET NO.
U-3101C&D	2-UU
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

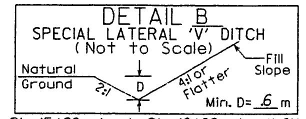
CONST.REV. 3-31-06

R/W REV.

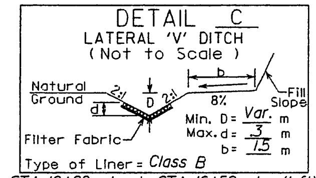
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22100 STEPHEN R. MORGAN 3-31-06



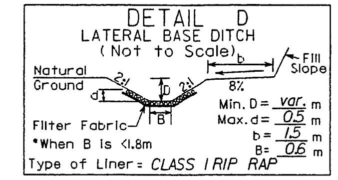
Sta 13+40 -L- to Sta 16+20 -L- (left)
Sta 39+40 -L- to Sta 41+80 -L- (left)
Sta 44+00 -L- to Sta 52+20 -L- (left)



Sta 15+60 -L- to Sta 16+00 -L- (left)
STA 49+20 TO STA 49+40 -L- RT.

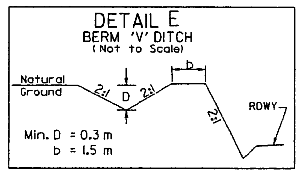


STA 16+20 -L- to STA 16+50 -L- (left)
STA 35+20 -L- to STA 35+60 -L- (right)
STA 26+60 -L- to STA 27+00 -L- (right)

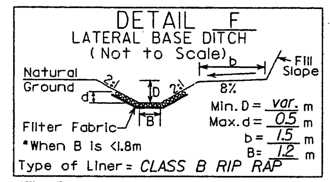


STA 2+00 CPRPA to STA 2+60 CPRPA (rt)
STA 27+80 TO STA 28+60 -L- RT.
STA 43+20 TO STA 44+00 -L- RT.
(Transition from B=3m @ STA 27+80 and 43+20 -L- RT.)

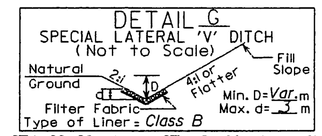
MAR 31 2006



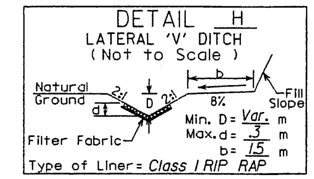
STA 17+60 -L- to STA 19+00 -L- (right)
STA 22+80 -L- to STA 23+40 -L- (left)



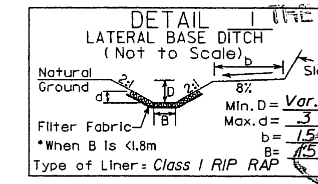
STA 17+60 -L- to STA 20+00 -L- (left)



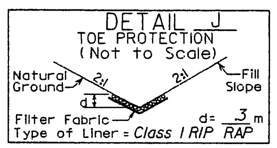
STA 20+80 -L- to STA 21+00 -L- (left)
STA 26+20 -L- to STA 26+80 -L- (left)
STA 19+60 -L- to STA 19+80 -L- (right)



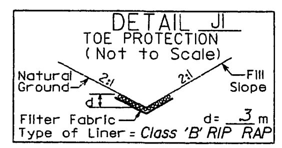
STA 47+80 -L- to STA 48+00 -L- (right)
STA 42+60 -L- to STA 42+92 -L- (left)



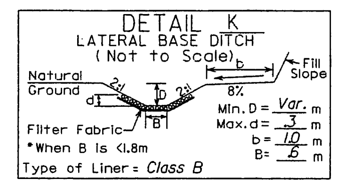
STA 27+90 -L- to STA 28+60 -L- (left)
STA 11+00 TO STA 11+60 -RPBWS- LT.



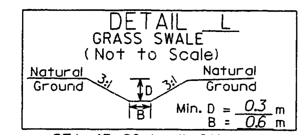
STA 37+50 -L- to STA 37+80 -L- (left)
STA 16+50 -L- to STA 16+73 -L- (lt)
STA 11+55 CPLPA to STA 11+65 CPLPA (rt)
STA 2+70 CPRPA to STA 3+20 CPRPA (rt)
STA 11+40 TO STA 11+60 -LPBWS- RT.



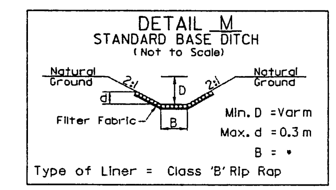
STA 63+80 -L- to STA 64+46 -L- (right)



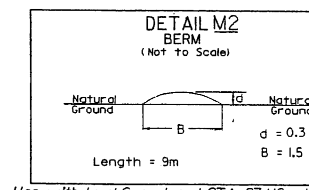
STA 38+60 -L- to 40+00 -L- (right)
USE B=3.0m @ STA 38+60 -L- RT.
STA 26+80 -L- to 27+10 -L- (lt)



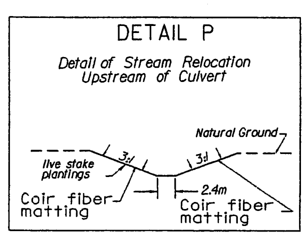
STA 47+80-L- (left)
(Extend ditch from pipe outlet to noise wall.)
STA 13+70 TO STA 14+40 -L- RT.



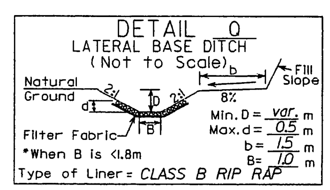
* 0.6m base ditch at STA 50+75 -L- (left)
* Vary from 0.6m to 5.5m at 27+80 -L- (left)
* Vary from 0.6m to 2.5m at 43+60 -L- (left)



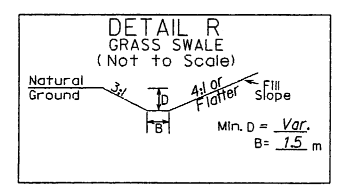
Use with Level Spreader at STA 27+10 -L- (left)



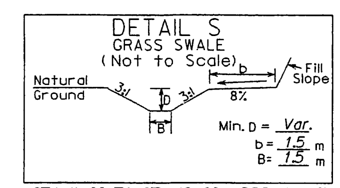
STA. 27+48 -L- LT.
STA 37+80 -L- LT.



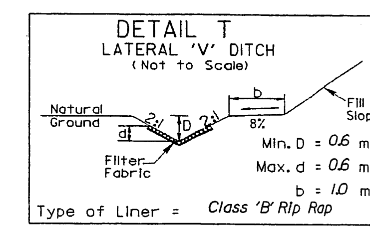
STA 43+20 -L- to STA 44+00 -L- (lt)



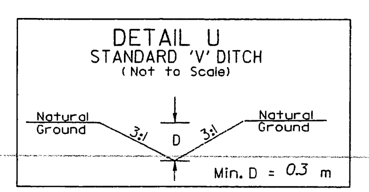
STA 12+00 TO STA 12+80 -RPBWS- LT
STA 11+80 TO STA 12+92 -LPBWS- RT.
STA 11+00 TO STA 11+35 -LPBWS- RT.



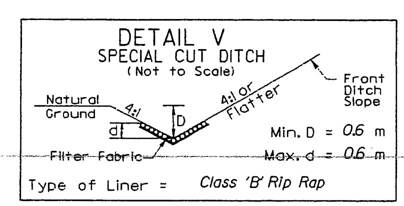
STA 11+60 TO STA 12+00 -RPBWS- LT.
STA 37+80 TO STA 39+20 -L- LT.



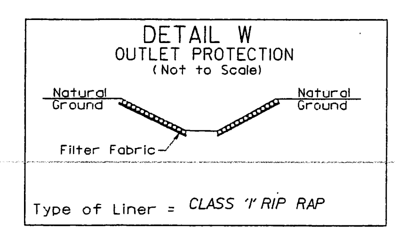
From 11+40 to 11+60 RPBWS Lt.



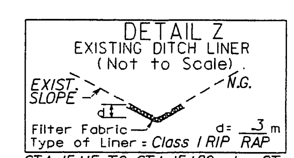
FROM STA 12+40 TO STA 12+60 -CPRPB- LT.



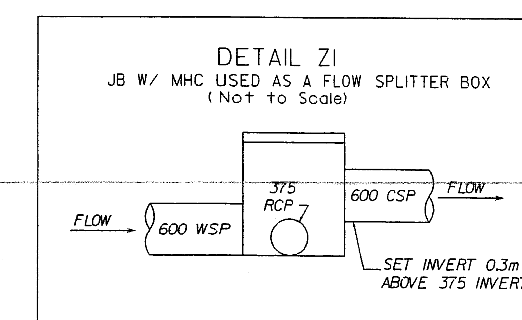
From 11+80 to 12+00 RPBWS Lt.



STA 11+36 -RPBWS- LT
STA 11+70 -LPBWS- LT.



STA 15+15 TO STA 15+80 -L- RT.



STA 15+80 -L- RT.

DET. "M" STATIONS REVISED BY SRM 3-31-06.

30-MAR-2006 09:05 r:\roadway\proj\u3101_ditchdetails.dgn tdgoins AT R0222241

/30/2006 u3101 ditchdetails tdgoins RD-Oce34