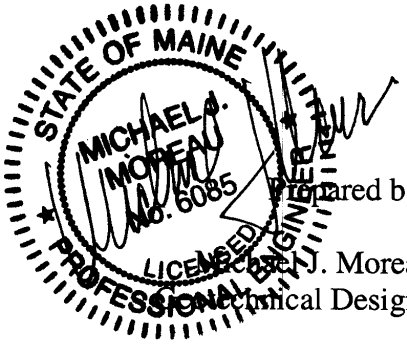
Maine Department of Transportation

Highway Program
Geotechnical Section

GEOTECHNICAL DESIGN REPORT
for
INTERSTATE I-295 AUXILLARY LANE CONSTRUCITON
TOWN OF SOUTH PORTLAND
CUMBERLAND COUNTY, MAINE



Prepared by:

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Geotechnical Engineer

Cumberland County | PIN 11231.00 | Soils Report 2007-17
Federal Number STP-1123(100)X

August 2007

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1.0 GEOTECHNICAL DESIGN SUMMARY

This report summarizes our geotechnical engineering evaluations for the construction of a southbound auxiliary lane for I-295 between exits 3 and 4 in the Town of South Portland, Cumberland County, Maine. The design and construction recommendations below are discussed in greater detail in Section 4.0, Evaluation and Recommendations.

Pavement Design Considerations

- Salvage existing pavement removed at all locations for use in project paving operations.

- Construct pavement structure with the following elements:

  Mainline Auxiliary Lane:
  - 10 inches new Hot Mix Asphalt (HMA) over the auxiliary lane and extending 8 inches beyond shoulder break.
  - 18 inches of MaineDOT Specification 703.06 Type B Aggregate Base Course Gravel (ABCG) over subgrade in travel lane areas.

  Shoulders:
  - 3 inches HMA over shoulder areas
  - 25 inches of MaineDOT Specification 703.06 Type B ABCG over subgrade in shoulder areas.

  Ramp Extensions:
  - 8 inches HMA over ramp extensions
  - 18 inches of MaineDOT Specification 703.06 Type B ABCG over subgrade

- Place and compact all the layers described above in accordance with project specifications.

Highway Drainage

- Use full ditches or install Type B or C underdrains in curb or box sections as appropriate. Connect underdrains to closed drainage systems, nearby culverts and/or daylight the outlets.

Highway Construction Considerations

This is a Full Construction project with the following requirements/recommendations-

- Excavation
  - Removal and salvage of asphalt pavement is required
  - Excavate existing subbase and subgrade soils as required to planned elevation.
  - Remove cobbles and boulders larger than 6 inches at subgrade level in full construction sections.

- Prepare and protect the exposed subgrade in accordance with Standard Specification 203.17. Remove and replace disturbed or rutted soil materials with compacted sand and gravel.
- If weak subgrade soil sections are found, place stabilization geotextile over the weak subgrade beneath travel lane, or over-excavate and replace 12 inches with Gravel Borrow compacted to specification.
- Use approximately 50-foot long subgrade excavation transition zones at the beginning and end of the full reconstruction sections.

- Reuse of Excavated Soil and Bedrock
  - Do not use excavated existing subbase aggregate for pavement structure construction or to re-base shoulders. Excavated subbase sand and gravel may be used as fill below subgrade elevation in fill embankment areas.
  - Do not use excavated marine clay-silt soils for fill anywhere beneath the pavement structure or dressing slopes. Use these soils to dress slopes only below the bottom elevation of the shoulder subbase gravel.
  - Marine silty sand and glacial till (silty sand and gravel) may be used as common borrow in accordance with MaineDOT Standard Specification Sections 203 and 703. It may be necessary to spread out and dry portions of these soils that are excessively moist.
  - Place and compact dredge spoils from the riprap key trench along Long Creek in the waste area designated on the plans.

- Dewatering
  - Control groundwater and surface water infiltration to permit construction in-the-dry.
  - Temporary ditches, pumping from sumps, granular drainage blankets, stone ditch protection, or hand-laid riprap with geotextile underlayment may be needed to divert groundwater if significant seepage is encountered during ditch excavation.
  - Use French drains daylighted to nearby ditches if significant seepage is encountered in the subgrade along the full reconstruction sections.

- Embankment Fill Areas
  - Fill slope extensions along Long Creek between approximate STA 180+00 and 191+00 shall be armored at the toe with heavy riprap. The heavy riprap shall be constructed with a key trench in accordance with the plans and Special Provision Section 610, Heavy Riprap Shear Key.
  - Bench existing fill slope soils in accordance with MaineDOT Standard Specification 203.09, Preparation of Embankment Area, where new fill slope extensions are constructed over existing slopes steeper than 2:1 (H:V).
  - Fill Extensions over gas, oil, water and sewer utility pipeline crossings will result in pipeline settlements on the order of ¼-inch or less.

Erosion Control Recommendations

- Use MaineDOT Best Management Practices February 2008 to minimize erosion of fine-grained soils found along the project.

2.0 INTRODUCTION

The Maine Department of Transportation is constructing an approximately 0.9 mi long auxiliary lane between Exits 3 and 4 of I-295 southbound in South Portland, Cumberland County, Maine. (See Site Location Map in Appendix A, Figures). Current plans include a 12 ft travel lane and 10 to 15 ft shoulders. The project is needed primarily to add capacity to that corridor.

This project includes pavement salvage and full construction of the base aggregate and pavement for the new travel lane and shoulder in all sections. Planned construction includes drainage improvements such as, pavement underdrains, and replacing, installing, or extending drainage systems as needed (extending culverts, ditching, curb, underdrain and catch basins).

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Conditions

The project alignment lies generally northeast-southwest and traverses gentle to moderate slope grades in the highway direction over most of the project. Much of the adjacent land has been reshaped or has built up embankments to accommodate the construction of the interstate highway through this corridor. Surficial drainage along this project is generally directed to closed drainage systems or to adjacent land in ditches down to sag locations and cross culverts. The existing highway consists of four travel lanes (two in each the north and south directions) with paved shoulders. Land use adjacent to the corridor is primarily urban.

Surficial geology maps of the region indicate predominantly silt, clay, and minor sand of the Presumpscot Formation. The marine sediments may also include small amounts of sand, silt and minor gravel deposited in late glacial regression that may be inter-fingered or inter-bedded with the marine sediments at contact locations. There are no bedrock outcrops shown along the alignment. The marine sediments within the project area are both poorly drained and moderate to highly frost susceptible.

3.2 Subsurface Conditions

Our field investigation included 11 SPT borings and 3 pavement cores. The highway explorations were conducted in two phases in Nov/Dec 2004 and November 2006. The pavement cores were taken in August 2005. The soil explorations were conducted at locations left of the travel way considering the new auxiliary lane embankment construction including three borings in the Long Creek tidal area. We show the boring locations on the Geoplans in Appendix A, Figures.

In the pavement cores we observed 12 to 12.5 inches of pavement. Originally, this section of I-295 was paved with 10 inches of hot mix asphalt. We show the “as-built” typical sections in Appendix A. Thus, one or two maintenance overlays were performed since initial construction was completed in 1972.

In the borings along the existing travel way, we typically found some fill but predominantly marine sediments of variable depths consisting of silty sands, stiff silts, occasional soft clay-silts, as well as, glacial till soils. The sands and stiff silts were most common with layers ranging between 3 and 8 feet thick. The only soft clay we encountered occurred in HB-I295-102 between 14 and 17 feet below ground surface (bgs).

In the Long Creek tidal area borings, we encountered similar soils, but with much greater variability and stratification as a result of variable hydraulic deposition energy and tidal influence. This area was also influenced by man-made construction activities when Long Creek was relocated to its present position west of the existing highway during I-295 construction in the late 1960's. The sand and silt layers at these locations ranged between less than one foot and up to about 2 feet thick. The glacial till layers we encountered in HB-I295-201 through 203 ranged in thickness between 5 and 11 feet thick. We encountered one soft clay-silt layer 2 feet thick in HB-I295-202 and one layer 4 feet thick in HB-I295-203.

We observed ground water levels at 12.3 feet bgs at HB-I295-103, 11.7 feet bgs at HB-I295-104, and 23.9 feet bgs at HB-I295-109. All soils we observed in the tidal borings HB-I295-201 through 203 were saturated. However, the groundwater level will fluctuate with seasonal changes, runoff, and adjacent construction activities.

We encountered apparent bedrock at 11.4 to 25.5 feet bgs at borings HB-I295-107, HB-I295-201, HB-I295-202, and HB-I295-203. We estimated the presence of bedrock using roller cone drilling methods. For a more detailed description of the subsurface conditions, please refer to the boring exploration data in Appendix B, Field Exploration and Test Data.

3.3 Laboratory Testing

We conducted a laboratory soil testing program on selected samples recovered from the test borings to evaluate soil classification, material reuse, and subgrade soil properties. Laboratory testing consisted of 12 grain-size analyses and water content determinations and two Atterberg limits tests. Results of laboratory testing are presented in Appendix C, Laboratory Test Data. The AASHTO and USCS soil classification, water content and Atterberg limit test data are also presented on the boring logs in Appendix B.

4.0 EVALUATION and RECOMMENDATIONS

4.1 Pavement Design Considerations

4.1.1 Frost Penetration Estimates

We have evaluated the potential frost penetration at the South Portland site. Based on State of Maine frost depth maps and MaineDOT Bridge Design Guide Figure 5-1, the site has a design-freezing index of approximately 1250 F-degree days. This correlates to a frost penetration depth on the order of 5.0 feet.

4.1.2 Pavement Structure

Existing shoulder pavement will be salvaged for use in project paving operations. Except in fill embankment areas, the native subgrade soils along the project are predominantly marine sediments. This soil unit is moderately (silty sands) to very (clay-silt) frost susceptible and a deep pavement structural section is generally needed to minimize frost damage from heaving and thaw weakening.

Project plans call for construction of a 12-foot wide auxiliary lane and 10-foot wide paved shoulders (15-foot shoulders in guardrail sections). Throughout the entire project length between Exits 3 and 4, the original travel lane pavement section consisted of 10 inches of HMA and 42 inches of granular subbase and base. The shoulders were constructed with 3 inches of pavement over 39 inches of base gravel. John Dority, MaineDOT Chief Engineer, has required that the auxiliary lane construction replicate the original design.

We reviewed the adequacy of the pavement section using DARWin. In that analysis, we estimated a Resilient Modulus value of 4500 psi considering the compacted fill subgrade. We also used the current traffic data in our analysis. Our review showed that the section is adequate for the projected traffic (see Appendix D, Calculations). Consequently, the pavement structure will consist of:

Mainline:
10 in New HMA
18 in Type B ABCG
Shoulders:
3 in New HMA
25 in Type B ABCG

We recommend extending the new HMA base pavement layers 8 in beyond the shoulder break. This will provide better support for off-tracking and reduce thermal cracking at the critical shoulder break. We recommend placing and compacting all the layers described above in accordance with project specifications.

4.2 Highway Drainage Considerations

In general, highway drainage improvements should include culvert installation and replacement, installation of underdrains, curbing, and ditching. Removing water from the pavement section will improve long-term design life and performance of the pavement section. The ditches and underdrains are intended to prevent groundwater or trapped surface water from accumulating in the subbase course and on the subgrade.

The estimated seasonal frost penetration depth of 5 ft exceeds the anticipated thickness of the pavement section (42 in). Therefore, the entire pavement section and 1 ft to 2 ft of the subgrade are expected to freeze. Most of the subgrade soils are considered to be frost susceptible (heaving

when freezing and loss of strength upon thawing). Keeping water out of the pavement structure will improve pavement performance against freeze/thaw action.

Consequently, given the nature of the I-295 project and the need to provide adequate subbase drainage, we recommend maintaining pavement structure performance with Type B or C underdrains in curbed and box sections as appropriate and full ditches elsewhere. The ditches and underdrains should be constructed so that the ditch or pipe inverts extend below the bottom of the pavement structure. We recommend that underdrains outlet into culverts or daylight into existing drain ways onto riprap aprons. Standard ditches should be constructed with 4:1 (H:V) fore slopes and 2:1 (H:V) back slopes.

4.3 Highway Construction Considerations

4.3.1 Excavation

The marine sediment soils at the subgrade level will be susceptible to disturbance and rutting as a result of exposure to water or construction traffic. We recommend that the contractor protect the subgrade from exposure to water and any unnecessary construction traffic. If disturbance and rutting occur, we recommend that the contractor remove and replace the disturbed materials with compacted gravel borrow. If the subgrade soil contains cobbles or boulders, we recommend that the contractor remove any cobbles and boulders larger than 6 inches in diameter by raking the subgrade to a depth of 6 to 12 inches. After excavating to the subgrade level, the contractor should proof-roll the surface to identify weak soil areas. We recommend that the contractor use approximately 50-foot long subgrade excavation transition zones at the beginning and end of the new construction.

If weak subgrade sections are found during construction, we recommend using geotextile reinforcement over the highway subgrade beneath the travel lanes, or over-excavating and replacing 12 inches with gravel borrow compacted to specification as directed by the Resident.

We recommend that heavy riprap be keyed into the Long Creek shoreline sediments to armor the fill slope extension toe area between approximate STA 180+00 to 191+00. The contractor should place and compact the dredge spoils from the key trench excavation in the waste area designated on the plans at approximate STA 154+75 to 155+75.

4.3.2 Dewatering

The native marine sediment soils within the project area are both poorly drained and moderately to highly frost susceptible. In some locations, these soil units may be saturated and significant water seepage may be encountered during excavation for ditches or the pavement structure, or during underdrain construction. The groundwater may be trapped in layers and lenses of coarse-grained soil overlying marine sediments, glacial till, or from bedrock fractures and joints. We anticipate that this seepage will be temporary but we expect there will be localized sloughing and near-surface instability of some soil slopes.

The contractor should control groundwater and surface water infiltration to permit construction in-the-dry. We recommend that the contractor use temporary ditches, sumps, granular drainage blankets, stone ditch protection, or hand-laid riprap with geotextile underlayment to divert groundwater if significant seepage is encountered during ditch excavation. We also recommend using French drains daylighted to nearby ditches if significant seepage is encountered in the subgrade along the full reconstruction sections.

4.3.3 Reuse of Excavated Soil and Bedrock

The project plans call for full construction at all locations. To achieve planned grades, the contractor will excavate both the existing subbase gravel, and marine sediments. We do not recommend using the excavated subbase aggregate to re-base the shoulders. Excavated subbase sand and gravel may be used as fill below subgrade elevation in fill embankment areas provided all other requirements of MaineDOT Standard Specification Sections 203 and 703 are met.

We do not recommend using any marine clay-silt soil excavation as fill beneath the pavement structure. The clay is typically sensitive and susceptible to strength loss when disturbed. The clay-silt should be allowed as fill outside the limits defined by 1.5:1 (H:V) lines sloped outward and downward from the edge of shoulder as shown in the MaineDOT Standard Details. This soil may also be used for dressing slopes, but only below the bottom elevation of the shoulder subbase gravel.

Marine silty sand and glacial till may be used as common borrow in accordance with MaineDOT Standard Specification Sections 203 and 703. Contractors should expect that prior to placement and compaction it may be necessary to spread out and dry portions of these soils that are excessively moist.

4.3.4 Embankment Fill Areas

Embankment filling will be necessary to widen the highway along several sections of the project. Embankment slopes that are created or extended as part of the reconstruction and widening effort should be designed as earth fill slopes no steeper than 2:1 (H:V). Slopes steeper than 2:1 (H:V) typically require reinforcement or rock fill surfacing. In particular, fill slope extensions will be required between approximate STA. 180+00 to STA. 191+00. We recommend using granular excavation from the existing shoulder area to construct that fill slope. We also recommend providing MaineDOT 703.28 heavy riprap to armor the slope toe along this section.

In general, we recommend that embankment fill below the pavement section consist of MaineDOT 703.18 common borrow. We also recommend that the fill extension between approximate STA 180+00 to 191+00 be constructed with granular excavation from the existing shoulder area or MaineDOT 703.26, Gravel Borrow. The contractor should thoroughly and systematically compact all of the new embankment fill to the full limit of the slope. Where new fill slope extensions are constructed over existing slopes, we recommend benching the existing slope soils in accordance with MaineDOT Standard Specification 203.09, Preparation of

Embankment Area, to prevent creation of a preferential slip plane under the new embankment fill.

The new embankment fill loads and densification of the fill materials during construction will result in ground surface settlement and consolidation of the underlying soils. We anticipate that most of this settlement will occur during and immediately after construction of the embankments. Post-construction settlement is expected to be minimal.

4.3.5 Pipeline Settlement Estimates

We evaluated potential pipeline settlements resulting from the construction of fill slope extensions using FoSSA settlement analysis software. We analyzed settlements at the approximate locations listed below with following estimated settlement results:

STATION	UTILITY	ESTIMATED SETTLEMENT
152+49	10-inch Sewer Main	< 1/16-inch
155+00	10-inch Mobil Oil Pipeline	< 1/8-inch
164+18	24-inch Oil Pipeline, Portland Pipeline	~ 1/4-inch
170+91	12-inch Water Main	< 1/8-inch

In summary, our analyses show that pipe settlement as a result of fill slope extension construction will be on the order of ¼-inch or less at all pipeline crossing locations.

4.4 Erosion Control Recommendations

The fine-grained soils along the project are susceptible to erosion. We recommend using appropriate erosion control measures during construction as described in the February 2008 MaineDOT Best Management Practices guidelines.

5.0 CLOSURE

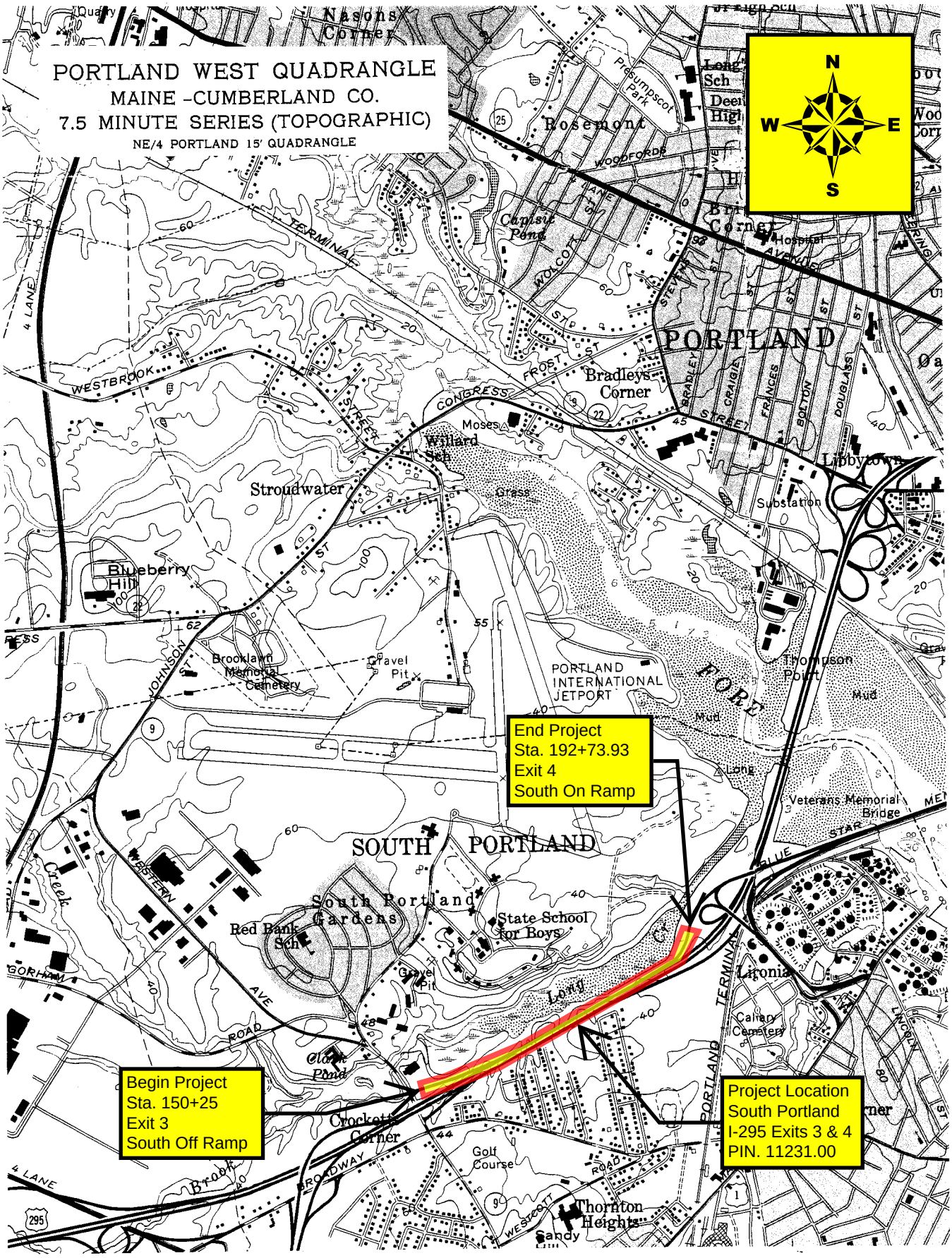
This report has been prepared for the use of the MaineDOT Highway Program for specific application to the I-295 Exit 3-4 southbound project. The report has been prepared in accordance with generally accepted soil and foundation engineering practices. No other intended use is implied.

In the event that any changes in the nature, design, or location of the proposed project are planned, this report should be reviewed by a geotechnical engineer to assess the appropriateness of the conclusions and recommendations and to modify the recommendations as appropriate to reflect the changes in design. Further, the analyses and recommendations are based in part upon limited soil explorations completed at discrete locations on the project site. If variations from the conditions encountered during the investigation appear evident during construction, it may also become necessary to re-evaluate the recommendations made in this report.

APPENDIX - A

Figures

Site Location Map


PORTLAND WEST QUADRANGLE
MAINE -CUMBERLAND CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 PORTLAND 15' QUADRANGLE
N
W
E
S
Begin Project
Sta. 150+25
Exit 3
South Off Ramp
End Project
Sta. 192+73.93
Exit 4
South On Ramp
Project Location
South Portland
I-295 Exits 3 & 4
PIN. 11231.00
PORTLAND
SOUTH PORTLAND
Stroudwater
Bradleys Corner
Willard Sch
Brooklawn Memorial Cemetery
Gravel Pit
PORTLAND INTERNATIONAL JETPORT
Thompson Point
Veterans Memorial Bridge
South Portland Gardens
Red Bank Sch
State School for Boys
Crockett's Corner
Golf Course
Thornton Heights
Calvary Cemetery
Rosemont
Capisic Pond
Clark Pond
Long
Mud
Grass
Substation
Hospital
Nasons Corner
Pleasumpscot Park
Libbytown
Blueberry Hill
Ligonia
TERMINAL
WESTBROOK
CONGRESS
FROST ST
WOLCOTT ST
JOHNSON ST
WESTERN AVE
GORHAM ROAD
BROADWAY
4 LANE
295
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 8.9 FEET

Geoplans

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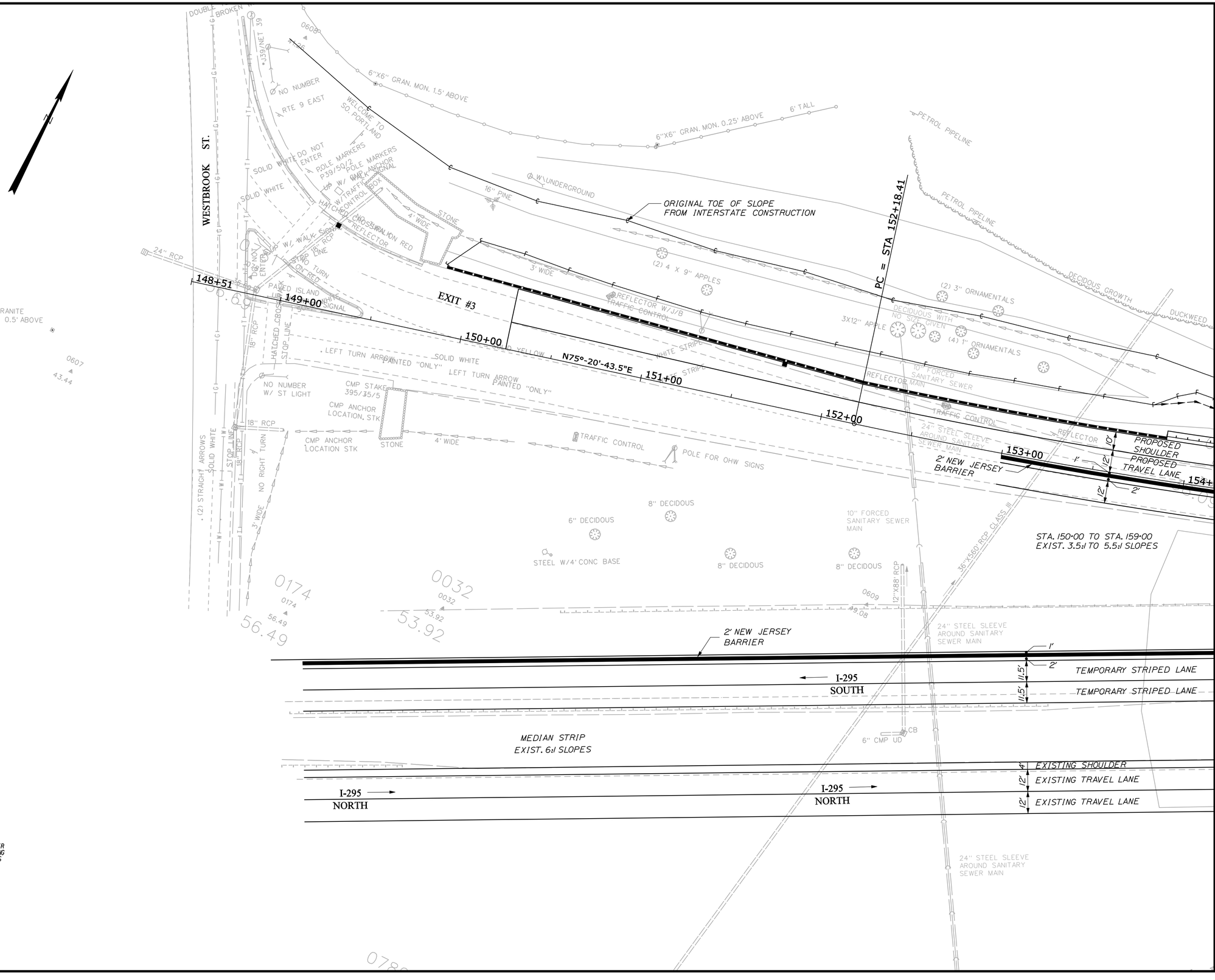

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN
11231.00

HIGHWAY PLANS

PROJ. MANAGER				
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CHECKED-REVIEWED	M. MOREAU	T. WHITE	JUNE 2007	SIGNATURE
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DESIGN3-DETAILED3	-----	-----	-----	-----
REVISIONS 1	-----	-----	-----	P.E. NUMBER
REVISIONS 2	-----	-----	-----	-----
REVISIONS 3	-----	-----	-----	-----
REVISIONS 4	-----	-----	-----	DATE
FIELD CHANGES	-----	-----	-----	-----

SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER

1

OF 9

CURVE DATA

PI = 154+38.20
D = 02° - 00' - 00.0"
Δ = 08° - 46' - 27.1" LT.
R = 2864.79'
L = 438.71'
T = 219.78'
E = 8.42'

PT = STA 156+57.12

ORIGINAL TOE OF SLOPE FROM INTERSTATE CONSTRUCTION

ORIGINAL TOE OF SLOPE FROM INTERSTATE CONSTRUCTION

STA. 150+00 TO STA. 159+00
EXIST. 3.5:1 TO 5.5:1 SLOPES

EXIST. OFF RAMP (POSSIBLE DETOUR AREA)

EXIT #3

N66°-34'-16.4"E

2' NEW JERSEY BARRIER

PROPOSED SHOULDER

PROPOSED TRAVEL LANE

TEMPORARY STRIPED LANE

I-295 SOUTH

I-295 NORTH

EXISTING SHOULDER

EXISTING TRAVEL LANE

MEDIAN STRIP
EXIST. 6:1 SLOPES

HARDWOODS

DECIDOUS GROWTH

DUCKWEED SUMAC 6' TALL

(2) 3" ORNAMENTALS

(4) 1" ORNAMENTALS

MOBIL OIL 6" PETROL PIPELINE

UNDERGROUND CABLE MDOT

OHW AIRPORT/BRDWAY SIGN

DECIDOUS W/ YEW

STEEL LIGHT POLE W/4 LIGHTS W/ CIRCULAR BASE

WARN PET PIPEL

VARIED PLANTS IN BED OF MULCH

HUSSON COLLEGE

WESTBROOK ST.

LIGHT POLE W/ CIRCULAR BASE

12"X78" RCP CLASS III

36"X560 RCP CLASS III

12"X64" RCP CLASS III

12"X44" RCP CLASS III

6" CMP UD

CB

HB-1295-101

HB-1295-102

REFLECTOR

YELLOW

24" STEEL SLEEVE AROUND SANITARY SEWER MAIN

10" FORCED SANITARY SEWER MAIN

MERGE

WARNING! PETRO PIPELINE (MOBIL OIL)

MIXED GROWTH

3" CRABAPPLE

4" CRABAPPLE

(2) 5" CRABAPP

72" TALL

FIELD 34.50

0522 41.80
0600 41.37
0760 41.08
0761 39.56
0762 37.05
0763 36.36
0764 36.67
0765 34.50

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN 11231.00

HIGHWAY PLANS

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PROJ. MANAGER	M. MOREAU	T. WHITE	JUNE 2007	
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CHECKED-REVIEWED				
DESIGN2-DETAILED2				
DESIGN3-DETAILED3				DATE
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REVISIONS 2				
REVISIONS 3				
REVISIONS 4				
FIELD CHANGES				

SOUTH PORTLAND
I-295 EXITS 3&4

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SHEET NUMBER

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OF 9

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN
11231.00

HIGHWAY PLANS

CURVE DATA

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R = 250'
L = 17.45'
T = 8.73'
E = 0.15'

PC = STA 165+16.28
PT = STA 165+33.73

ORIGINAL TOE OF SLOPE FROM INTERSTATE CONSTRUCTION

5 VARIED BIRCH TREES

14" WILLOW TREE

VARIED PLANTS IN BED OF MULCH

PROPOSED BORING LOC.

24" OIL (PORTLAND PIPELINE)

12"X128' RCP CLASS III

30"X148' RCP CLASS III

12"X116' RCP CLASS III

LIGHT POLE W/ 4 LIGHTS (CIRCULAR BASE)

WARN. CRUDE OIL PIPELINE EASEMENT (PORTLAND PIPELINE)

10" STEEL POLE

EXIT/30 MPH SIGN POST

(2) REFLECTORS

REFLECTOR

HB-1295-103

PROPOSED SHOULDER 5'
PROPOSED TRAVEL LANE 12'
1' 2'

160+00 161+00 162+00 163+00 164+00 165+00 166+00

I-295 SOUTH

2' NEW JERSEY BARRIER

N66°-34'-16.4"E

EXIST. OFF RAMP (POSSIBLE DETOUR AREA)

STA 150+00 TO STA 159+00
EXIST. 3.5:1 TO 5.5:1 SLOPES

2' TEMPORARY STRIPED LANE
TEMPORARY STRIPED LANE 11.5'

MEDIAN STRIP
EXIST. 6:1 SLOPES

6"X108' UD

CB

6"X10' CMP UD

12"X280' UD

I-295 NORTH

EXISTING SHOULDER 4'
EXISTING TRAVEL LANE 12'
EXISTING TRAVEL LANE 12'

4" CRABAPPLE

(2) 5" CRABAPPLES

1/2"X0.8"H PIPE

YIELD 34.85
DSGN 35.0

PIRA-512

1C01 1C02 1C03 1C04 1C05 1C06 1C07 1C08

PEM

REFLECTOR

MIXED GROWTH

OIL PIPELINE (PORTLAND PIPELINE)

WARNING OIL PIPELINE (PORTLAND PIPELINE)

HOBART ST

APPROX. 16' DEEP

0512 0513 0764 0765 0766 0501

33.56 38.57 32.65

37.05 37.74

PROJ. MANAGER			
DESIGN-DETAILED	M. MOREAU	T. WHITE	JUNE 2007
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
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REVISIONS 3	-----	-----	-----
REVISIONS 4	-----	-----	-----
FIELD CHANGES	-----	-----	-----

E.M. BY DATE

SIGNATURE

P.E. NUMBER

DATE

SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER
3
OF 9

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STATE OF MAINE
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REVISIONS 4		
FIELD CHANGES		

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SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

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OF 9

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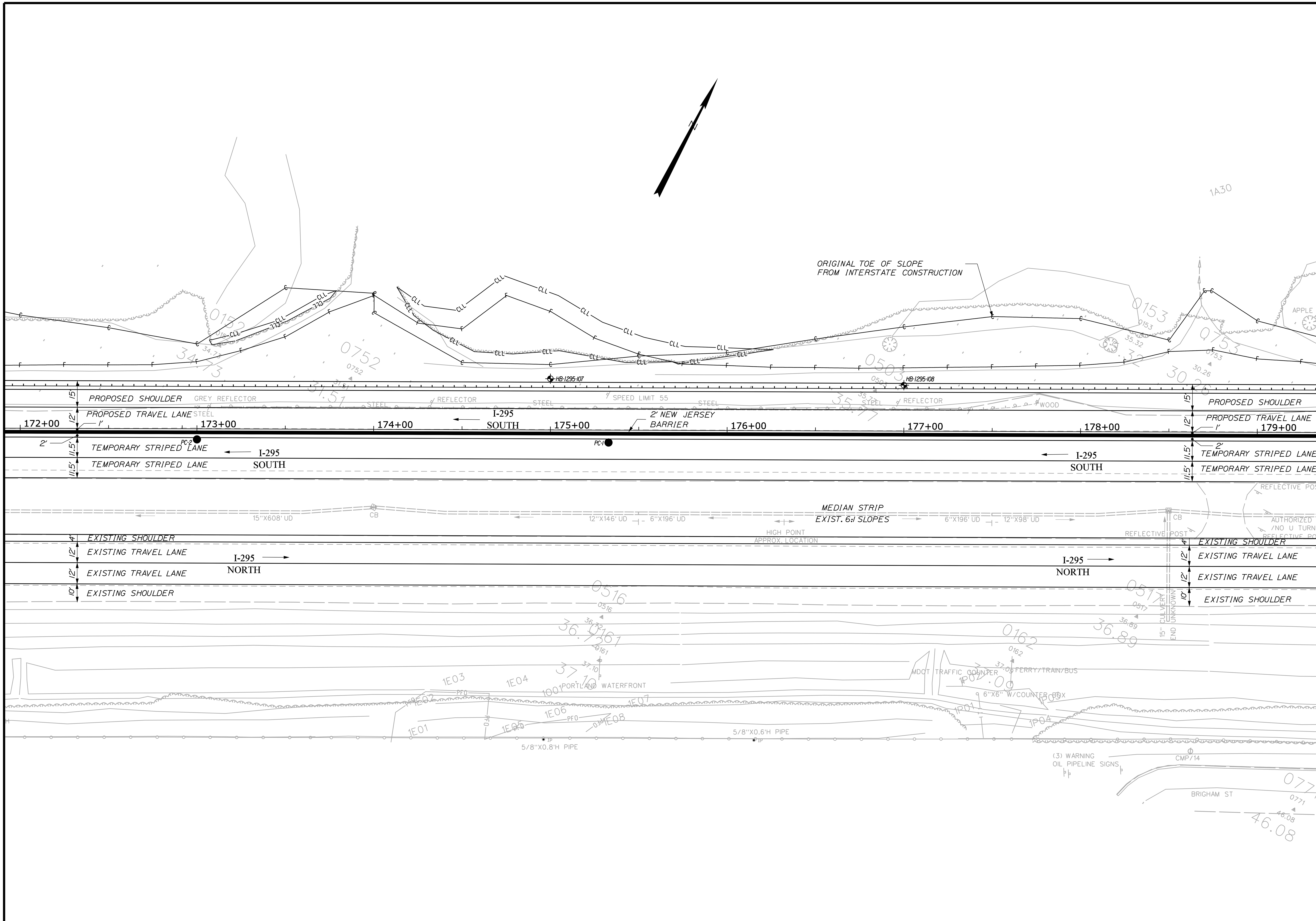

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN
11231.00

HIGHWAY PLANS

	E.M.	BY	DATE
PROJ. MANAGER	M. MOREAU	T. WHITE	JUNE 2007
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER
5
OF 9

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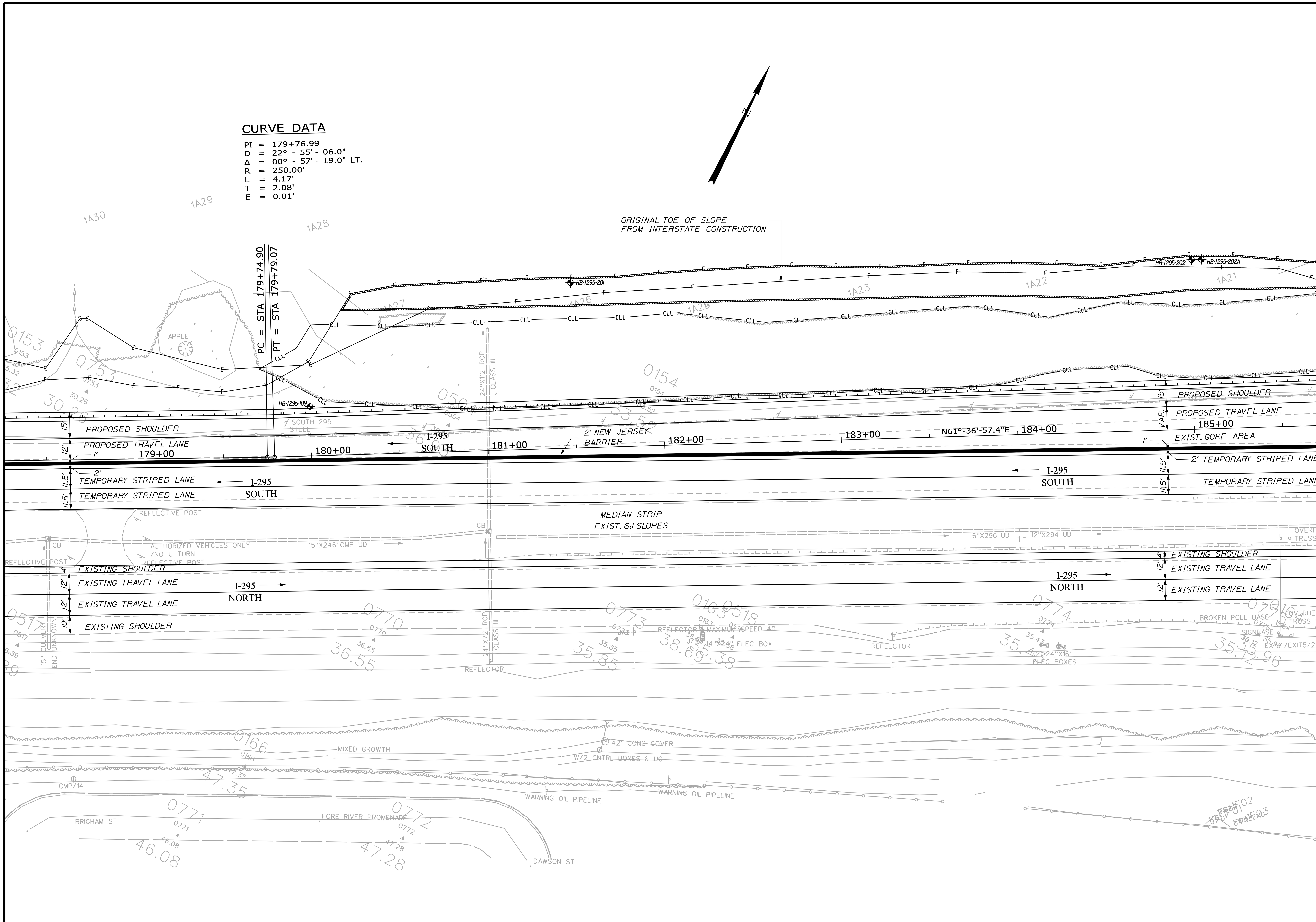

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN
11231.00

HIGHWAY PLANS

		BY	DATE
PROJ. MANAGER	E.M.		
DESIGN-DETAILED	M. MOREAU	T. WHITE	JUNE 2007
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER

6

OF 9

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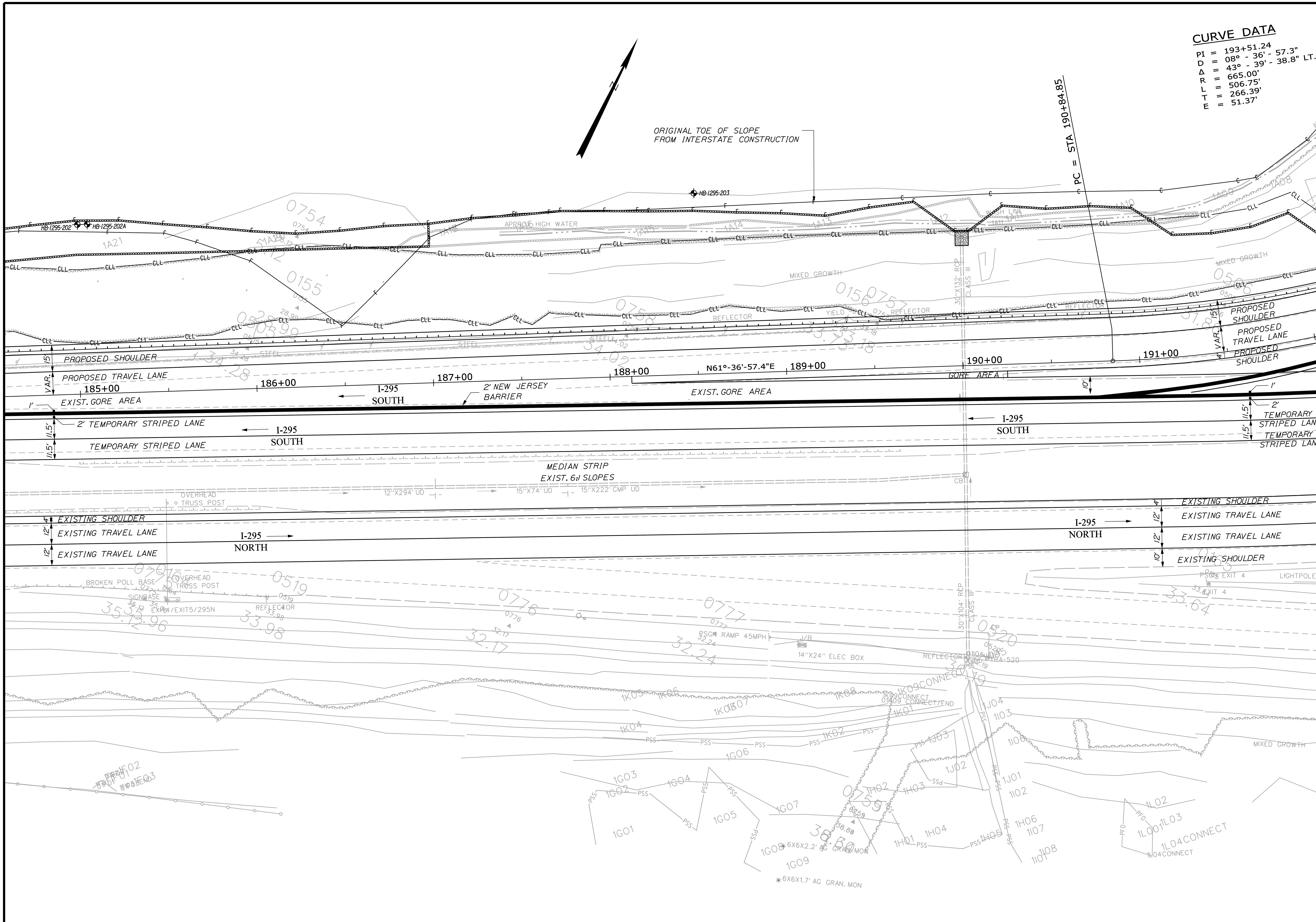


STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN 11231.00

HIGHWAY PLANS

	E.M.	BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED	M. MOREAU	T. WHITE	JUNE 2007
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

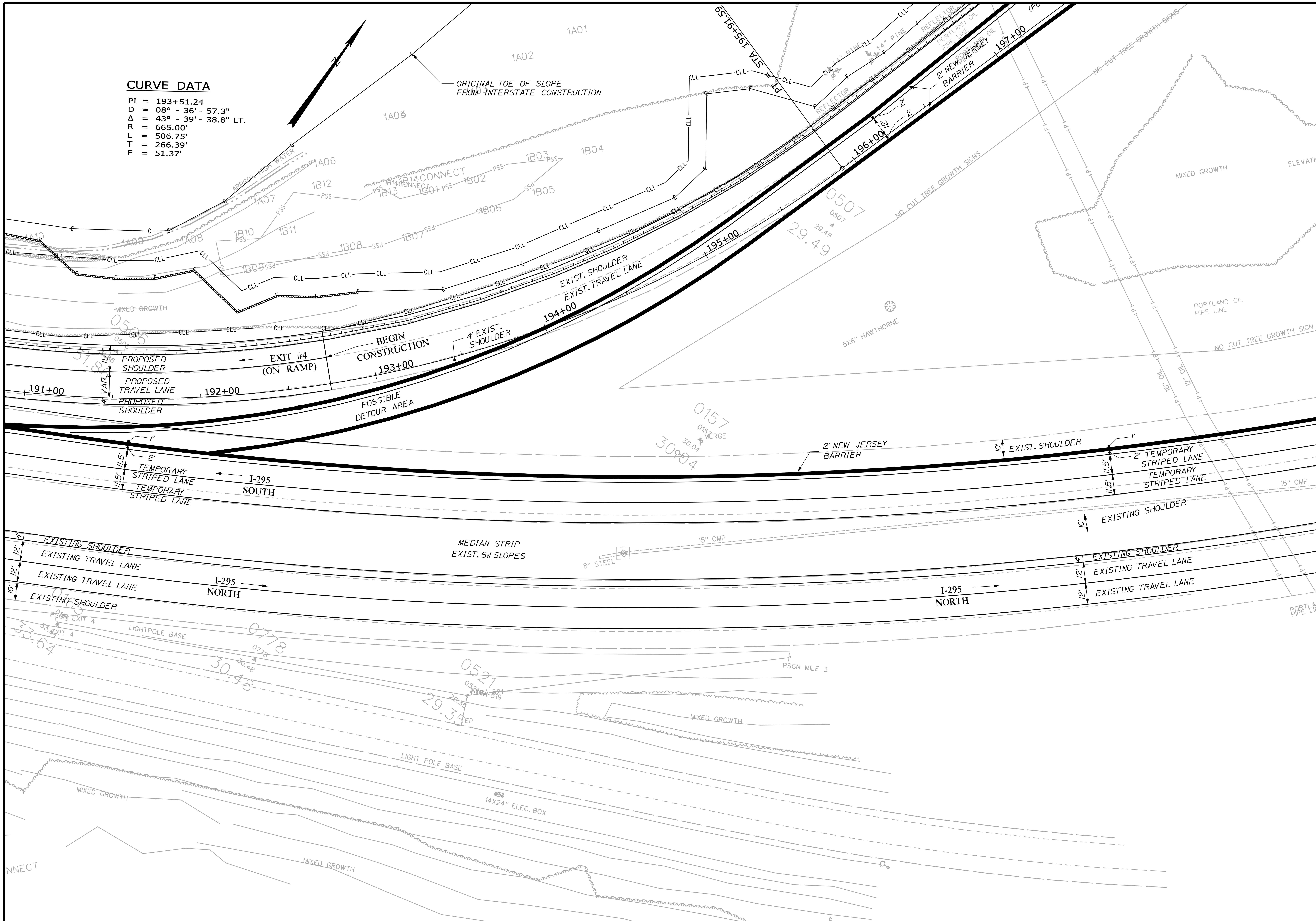
SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER

7

OF 9



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1123(100)X

PIN 11231.00

HIGHWAY PLANS

	E.M.	BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED	M. MOREAU	T. WHITE	JUNE 2007
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

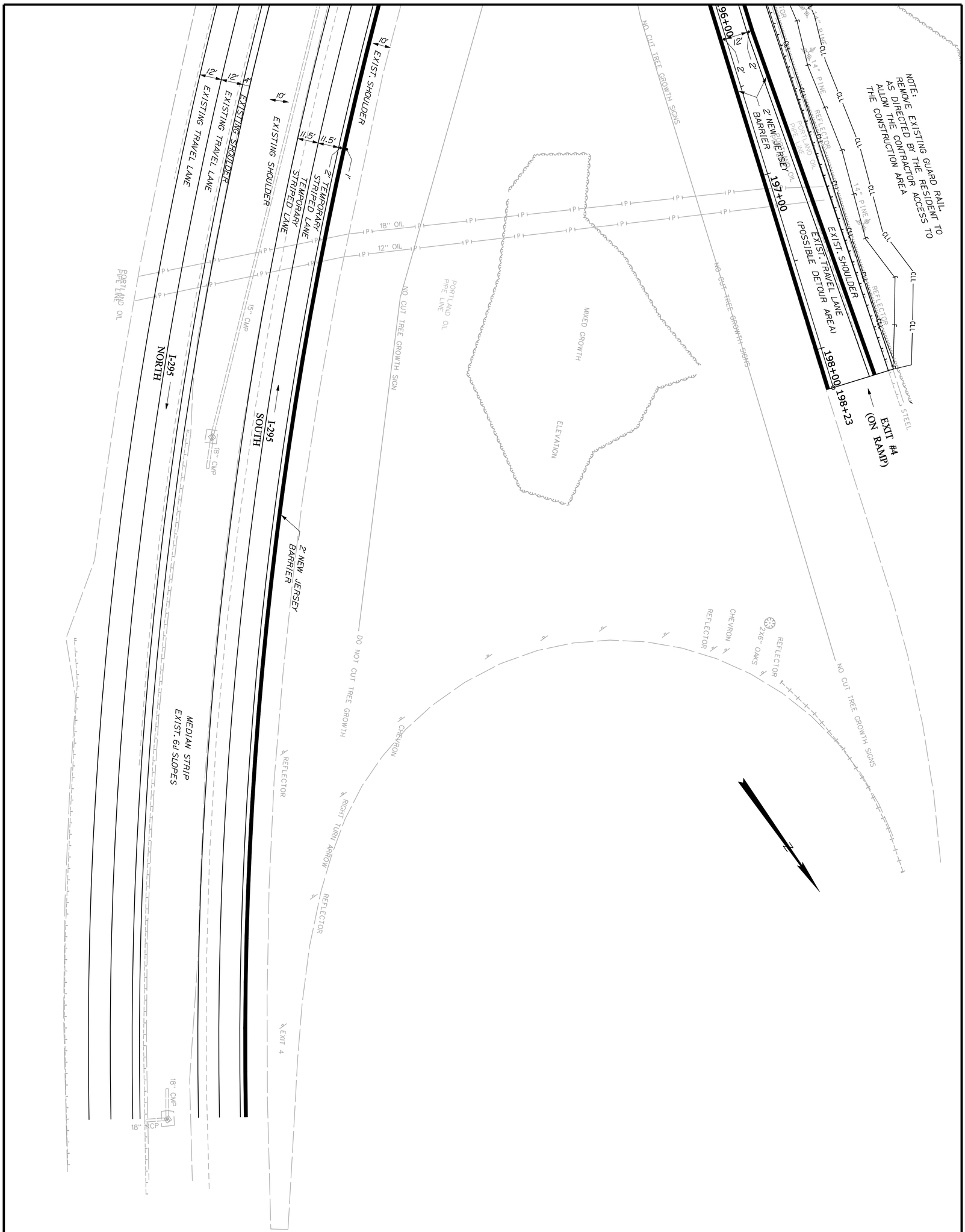
SOUTH PORTLAND
I-295 EXITS 3&4

GEOPLANS

SHEET NUMBER
8
OF 9

Filename: ...\geotech\msta\008_Geoplan8.dgn Division: GEOTECH Username: Terry.White Date:8/13/2007

Filename: ...\geotech\msta\009_Geoplan9.dgn Division: GEOTECH Username: Terry.White Date:8/13/2007



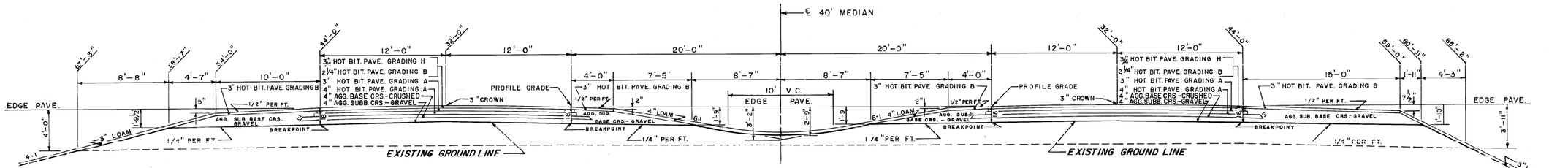
0508
42.36

SHEET NUMBER	SOUTH PORTLAND I-295 EXITS 3&4	PROJ. MANAGER	E.M.	BY	DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION
9 OF 9	GEOPLANS	DESIGN-DETAILED	M. MOREAU	T. WHITE	JUNE 2007	STP-1123(100)X
		CHECKED-REVIEWED				SIGNATURE
		DESIGN2-DETAILED2				
		DESIGN3-DETAILED3				P.E. NUMBER
		REVISIONS 1				
		REVISIONS 2				DATE
		REVISIONS 3				PIN 11231.00 HIGHWAY PLANS
		REVISIONS 4				
		FIELD CHANGES				

1972 As-Built Typical Sections

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	I-295-3(47)	1	59

3" HOT BITUMINOUS PAVEMENT



NORMAL FOUR LANE DIVIDED

2 – 4' SHOULDERS

AGG. SUBBASE COURSE – GRAVEL = 58.28 C.Y. PER 100 L.F.
STA. 150 + 41 TO STA. 162 + 50

1 – 4' SHOULDER

AGG. SUBBASE COURSE – GRAVEL = 29.14 C.Y. PER 100 L.F.
STA. 149 + 13 TO STA. 150 + 41 RT.
STA. 162 + 50 TO STA. 190 + 00 LT.

SOUTHBOUND

24' PAVEMENT

4" x 29' AGG. BASE COURSE – CRUSHED = 35.39 C.Y. PER 100 L.F.
4" AGG. SUBBASE COURSE – GRAVEL = 29.63 C.Y. PER 100 L.F.
STA. 149 + 13 TO STA. 190 + 00

10' SHOULDER

AGG. SUBBASE COURSE – GRAVEL = 17.32 C.Y. PER 100 L.F.
STA. 152 + 96 TO STA. 158 + 50 RT.
STA. 154 + 27.4 TO STA. 159 + 53 LT.
STA. 165 + 25 TO STA. 172 + 50 LT.
STA. 176 + 75 TO STA. 179 + 00 LT.

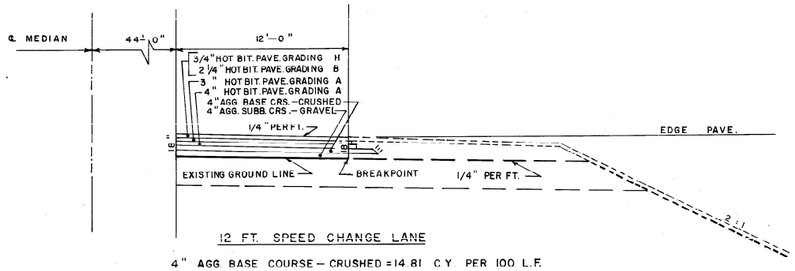
NORTHBOUND

24' PAVEMENT

4" x 29' AGG. BASE COURSE – CRUSHED = 35.39 C.Y. PER 100 L.F.
4" AGG. SUBBASE COURSE – GRAVEL = 29.63 C.Y. PER 100 L.F.
STA. 149 + 13 TO STA. 162 + 50

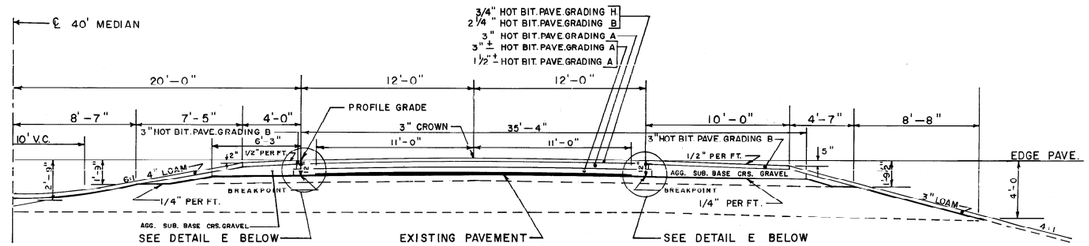
15' SHOULDER

AGG. SUBBASE COURSE – GRAVEL = 59.83 CY PER 100 L.F.
STA. 149 + 13 TO STA. 152 + 46 RT.
STA. 149 + 13 TO STA. 153 + 52.4 LT.
STA. 173 + 00 TO STA. 176 + 00 LT.
STA. 179 + 50 TO STA. 179 + 80 LT.



12 FT. SPEED CHANGE LANE

4" AGG BASE COURSE – CRUSHED = 14.81 C.Y. PER 100 L.F.
4" AGG. SUBBASE COURSE – GRAVEL = 14.81 C.Y. PER 100 L.F.
STA. 149 + 13 TO STA. 152 + 00 RT.
STA. 149 + 13 TO STA. 153 + 00 LT.



NORTHBOUND (ONLY)

1 – 4' SHOULDER

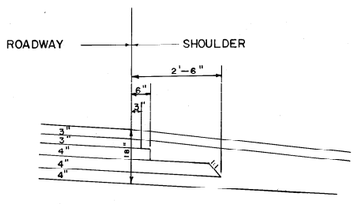
AGG. SUBBASE COURSE – GRAVEL = 15.62 C.Y. PER 100 L.F.
STA. 162 + 50 TO STA. 190 + 20 LT.

24' PAVEMENT OVER EXISTING 22' PAVEMENT

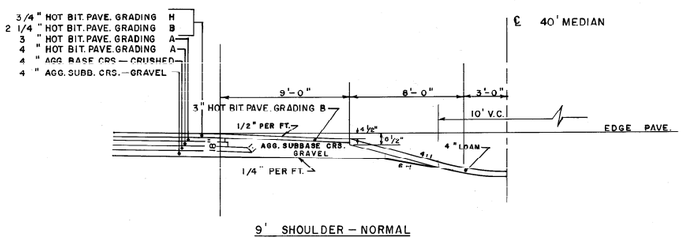
STA. 162 + 50 TO STA. 190 + 20

10' SHOULDER

AGG. SUBBASE COURSE – GRAVEL = 27.33 C.Y. PER 100 L.F.
STA. 169 + 50 TO STA. 184 + 61.4 RT.

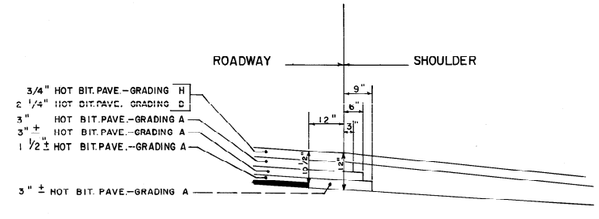


TYPICAL FOR ALL ROADWAYS WITH 10" PAVEMENT DEPTHS EXCEPT WHERE EXISTING PAVEMENT IS LOCATED.



9' SHOULDER – NORMAL

AGG. SUBBASE COURSE – GRAVEL = 47.87 C.Y. PER 100 L.F.
STA. 149+13 TO STA. 149 + 66 LT.



DETAIL E

BY	DATE
DESIGN – DETAILED	
CHECKED	
REVISIONS	
FIELD CHANGES	

PLANS

STATE HIGHWAY COMMISSION

TYPICAL SECTIONS
I-295
STA. 149+13 — STA. 190+00

SHEET OF AUGUSTA, MAINE

JANUARY 1968

I-295 SOUTH PORTLAND 2031 2080

APPENDIX - B

Field Exploration and Test Data

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-101
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	32.1	**Auger ID/OD:**	2.75"/8"
Operator:	Mike	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/30/04-11/30/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	154+90, 37.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	31.80		TOPSOIL, (Sod). 0.3	
									Brown, damp, medium dense, fine to medium SAND, trace coarse sand and silt.	
5	1D/A	24/18	5.0 - 7.0	4/13/13/13	26		26.60		(1D) 5.0-5.5' bgs. 5.5 (1D/A) 5.5-7.0' bgs. Light brown to grey-brown, damp to wet, medium dense, fine to medium SAND, little silt.	
10	2D	24/16	10.0 - 12.0	4/6/7/5	13					G#175290 A-3, SP-SM WC=26.0%
							18.10		14.0 Grey-brown, saturated, loose, silty fine SAND, trace clay.	
15	3D	24/20	15.0 - 17.0	2/6/3/3	9		15.10		17.0 **Bottom of Exploration at 17.0 feet below ground surface.** NO REFUSAL	
20										
25										

Remarks:

Hole caved at 11.6' bgs.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-102
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	31.3	**Auger ID/OD:**	2.75"/8"
Operator:	Mike	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/30/04-11/30/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	158+26, 30.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	30.90		TOPSOIL, (Sod). 0.4	
									Brown, wet, fine to medium SAND, little gravel (fill).	
							29.00		2.3	
									Brown, wet, very loose, silty fine to coarse SAND, trace gravel.	
5	1D	24/14	5.0 - 7.0	2/1/3/5	4					G#175291 A-4, SM WC=19.4%
							23.90		7.4	
									Grey, wet, medium dense, fine to coarse SAND, little silt, trace gravel.	
10	2D	24/15	10.0 - 12.0	1/12/15/42	27					
							17.30		14.0	
									Grey, wet, soft, CLAY-SILT, trace fine sand.	
15	3D	24/22	15.0 - 17.0	1/2/1/1	3					G#175292 A-4, CL-ML WC=33.9%
							14.30		17.0	
									Bottom of Exploration at 17.0 feet below ground surface. NO REFUSAL	
20										
25										

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-103
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	29.5	**Auger ID/OD:**	2.75"/8"
Operator:	Mike	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/4/04-12/4/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	162+26, 24.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	12.3' bgs.

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.0 - 2.0	3/7/6/5	13	HSA	29.10		TOPSOIL, (Sod). 0.4 Brown, wet, medium dense, fine to coarse SAND, little silt, trace gravel (fill).	
5	2D	24/14	5.0 - 7.0	6/6/7/9	13		24.50		5.0 Light brown, damp, medium dense, silty fine to coarse SAND, trace gravel.	G#175293 A-4, SM WC=14.9%
10	3D	24/14	10.0 - 12.0	1/2/7/7	9		20.00		9.5 Grey, wet, loose, fine to coarse SAND, trace gravel, some silt.	G#175294 A-2-4, SM WC=19.1%
15	4D	24/24	15.0 - 17.0	11/22/26/26	48		17.00		12.5 Grey, wet, dense, fine to coarse SAND, trace gravel and silt.	
20							12.50		17.0 **Bottom of Exploration at 17.0 feet below ground surface.** NO REFUSAL	
25										

Remarks:

Hole caved at 10.6' bgs.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-104
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	30.8	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/30/04-11/30/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	167+50, 28.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	11.7' bgs.

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	30.20		TOPSOIL, (Sod). 0.6	
									Grey, wet, silty fine to medium SAND, little gravel.	
5	1D	24/24	5.0 - 7.0	7/9/12/17	21		25.80		5.0 Olive-brown, wet, very stiff, clayey SILT, little sand layers, moderately plastic.	
							22.30		8.5 Brown, wet, very dense, fine to coarse SAND, little gravel, some silt.	
10	2D	24/22	10.0 - 12.0	28/30/44/65	74					G#175295 A-2-4, SM WC=8.4%
							18.30		12.5	
15	3D	24/10	15.0 - 17.0	11/15/11/13	26				Brown, wet, medium dense, fine to coarse SAND, trace silt, trace gravel.	
							13.80		17.0 **Bottom of Exploration at 17.0 feet below ground surface.** NO REFUSAL	
20										
25										

Remarks:

Hole caved at 12.0' bgs.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-105
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	33.4	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/30/04-11/30/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	170+00, 23.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	No standing water.

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	33.00		TOPSOIL, (Sod). 0.4	
									Brown, damp, GRAVEL, (Fill).	
							29.40		4.0	
5	1D	24/10	5.0 - 7.0	2/3/4/6	7				Grey-brown, wet, loose, silty fine to medium SAND, trace clay.	
							26.90		6.5	
10	2D	24/24	10.0 - 12.0	3/5/6/9	11				Brown, wet, stiff to very stiff, fine to medium sandy SILT, trace coarse sand and gravel.	
15	3D	24/6	15.0 - 17.0	17/13/7/8	20		16.40		17.0	
									Bottom of Exploration at 17.0 feet below ground surface. NO REFUSAL	
20										
25										

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-107
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	33.1	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/6/04-12/6/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	175+00, 29.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	32.70		TOPSOIL, (Sod).	
									0.4	
									Brown, damp, gravelly medium to coarse SAND.	
							30.60		2.5	
									Olive, moist, very stiff, CLAY-SILT, trace fine to coarse sand (till?).	
5	1D	24/16	5.0 - 7.0	8/13/14/18	27					G#175296 A-6, CL WC=21.7% LL=32 PL=20 PI=12
							24.50		8.6	
									Grey-brown, wet, hard, fine to medium sandy SILT, trace coarse sand and gravel, bedrock fragments (till?)	
10	2D/A	24/20	10.0 - 12.0	10/21/23/27	44				(2D) 10.0-11.4' bgs.	
							21.70		11.4	
	3D	24/16	12.0 - 14.0	11/9/13/9	22				(2D/A) 11.4-12.0' bgs. Weathered Bedrock.	
							19.10		14.0	
15									**Bottom of Exploration at 14.0 feet below ground surface.** NO REFUSAL	
20										
25										

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-108
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	35.0	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/2/04-12/2/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	177+00, 26.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/18	0.0 - 2.0	1/4/5/5	9	HSA	34.50		TOPSOIL, (Sod). 0.5 Reddish brown, moist, loose to dense, silty fine to medium SAND, trace coarse sand and gravel.	
5	2D/A	24/18	5.0 - 7.0	44/22/10/9	32				(2D) 5.0-6.0' bgs.	
							29.00		6.0 (2D/A)6.0-7.0' bgs. Grey-reddish brown, moist, hard, fine to medium sandy SILT, trace coarse sand and gravel.	
							25.50		9.5	
10	3D	24/16	10.0 - 12.0	23/48/46/71	94				Brown, moist, dense to very dense, fine to coarse SAND, trace gravel, trace to little silt.	G#175298 A-2-4, SM WC=6.8%
15	4D	24/16	15.0 - 17.0	15/22/10/18	32					
							18.00		17.0 **Bottom of Exploration at 17.0 feet below ground surface.** NO REFUSAL	
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-109
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	31.5	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/2/04-12/2/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	180+00, 28.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	32.9' bgs.

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						HSA	30.70		TOPSOIL, (Sod). 0.8	
							30.50		Old PAVEMENT. 1.0	
									Grey, wet, sandy SILT, trace gravel, trace clay.	
5	1D	24/24	5.0 - 7.0	9/15/17/24	32		26.50		5.0 Olive, moist, stiff to hard, CLAY-SILT, trace fine sand in partings, slightly to moderately plastic.	
10	2D	24/24	10.0 - 12.0	8/9/10/14	19					
15	3D/A	24/24	15.0 - 17.0	4/6/8/9	14		16.00		(3D) 15.0-15.5' bgs. 15.5 (3D/A) 15.5-17.0' bgs. Grey, wet, stiff, CLAY-SILT, trace fine to coarse sand, trace gravel.	G#175299 A-7-6, CL WC=33.9% LL=41 PL=24 PI=17 G#175300 A-7-6, CL WC=35.3%
20	4D	24/24	20.0 - 22.0	1/3/7/20	10		10.00		21.5 Brown, moist, loose, fine to medium SAND, trace silt.	
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-109
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	31.5	**Auger ID/OD:**	2.75"/8"
Operator:	Mike/Brad	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B50 Tracked	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/2/04-12/2/04	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	180+00, 28.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	32.9' bgs.

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	5D	24/12	25.0 - 27.0	2/3/15/81	18		5.50		Grey, wet, medium dense, fine to coarse SAND, some gravel and silt, (Till). 26.0	G#183509 A-2-4, SM WC=13.3%
30	6D	24/16	30.0 - 32.0	29/45/35/49	80		1.50		Grey, wet, very dense, silty fine to coarse SAND, trace gravel, rock fragments, (Till). 30.0	
35	7D	24/18	35.0 - 37.0	26/31/60/100	91					G#183510 A-4, SM WC=16.2%
40	8D	16.8/14	40.0 - 41.4	55/101/130(5")	---		-9.90		41.4 **Bottom of Exploration at 41.4 feet below ground surface.** SPOON REFUSAL per K. Gross	
45										
50										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-201
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	1.1	**Auger ID/OD:**	N/A
Operator:	Brad/Josh	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	G. Lidstone	**Rig Type:**	CME 45C on Barge	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/1/06; 07:15-11:00	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	181+49, 94.0' Lt	**Casing ID/OD:**	HW	**Water Level*:**	Tidal

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D/AB	24/16	0.0 - 2.0	4/3/1/2	4	2	0.80		(1D/A) 0.0-0.3' bgs. Organics, some grey, wet, very loose, silty fine to medium sand.	
						2			0.3 (1D/B) 0.3-2.0' bgs. Grey, wet, very loose, silty fine SAND, little medium sand, trace clay, organics.	
	2D/AB	24/12	2.0 - 4.0	3/3/7/11	10	8	-1.00		(2D/A) 2.0-3.7' bgs.	
						18			2.1 Grey, moist, loose, silty fine to medium SAND, trace coarse sand, trace gravel.	
	3D	24/8	4.0 - 6.0	13/15/17/16	32	28	-2.60 -2.90		3.7 (2D/B) 3.7-4.0' bgs. Brown, moist, loose, silty fine to medium SAND, trace coarse sand.	
5						37			4.0 Brown, layered, wet, dense, fine to medium SAND, little silt, trace coarse sand.	
	4D	24/11	6.0 - 8.0	3/8/14/20	22	12	-4.90		6.0 Brown, wet, medium dense, medium SAND, little coarse sand, trace silt, trace fine sand, trace gravel.	
						37				
	5D/AB	24/13	8.0 - 10.0	20/15/17/31	32	34	-6.90		8.0 (5D/A) 8.0-9.9' bgs. Grey, moist, dense, fine to medium SAND, little silt, little gravel, (Till?)	
						59	-8.80		9.9	
10	6D	24/11	10.0 - 12.0	24/37/28/36	65	82	-9.00		(5D/B) 9.9-10.0' bgs. Weathered Rock.	
						79			10.1 Grey, moist, very dense, silty fine SAND, some gravel, trace medium sand, trace coarse sand, (Till).	
	7D/AB	9.6/2	12.0 - 12.8	24/50(3.6")	---		-11.50		(7D/A) 12.0-12.6' bgs. Roller coned ahead from 12.0-14.9' bgs.	
									12.6 (7D/B) 12.6-12.8' bgs. Weathered Rock. Mud seam from 14.0-14.4' bgs.	
15							-13.80		14.9 **Bottom of Exploration at 14.9 feet below ground surface.** REFUSAL	
20										
25										

Remarks:

Donut hammers, cathead and rope.
Tidewater deck to ground 5.0' at 07:15, no water near low tide.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-202
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	-0.6	**Auger ID/OD:**	N/A
Operator:	Brad/Josh	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	G. Lidstone	**Rig Type:**	CME 45C on Barge	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/2/06-11/2/06	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	185+01, 96.0' Lt	**Casing ID/OD:**	HW	**Water Level*:**	Tidal

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D/AB	24/11	0.0 - 2.0	WOR/WOR/WOR/ WOR	0	WOH			(1D/A) 0.0-1.8' bgs. Grey, wet, very soft, CLAY-SILT, trace fine sand, trace organics.	
						WOH	-2.40		1.8	
	2D	24/16	2.0 - 4.0	WOH/1/2/2	3	5	-2.60		(1D/B) 1.8-2.0' bgs. Grey, wet, very loose, silty fine to medium SAND, trace gravel, trace organics and shells.	
						4			2.0 Grey, moist, soft, CLAY-SILT, shells, organics, trace fine sand.	
	3D/AB V1	24/20	4.0 - 6.0 4.3 - 4.4	1/3/5/6 Su=2173+ psf	8	15	-5.30		(3D/A) 4.0-4.7' bgs. 20x40 mm vane test reached maximum torque reading of 27 in/lbs +.	
5						19			4.7 (3D/B) 4.7-6.0' bgs.	
	4D/AB V2	24/17	6.0 - 8.0 6.3 - 6.4	3/4/5/6 Su= 2173+ psf	9	20	-6.60 -7.10		Grey, wet, loose, silty fine SAND, wood, shells, trace clay, trace medium sand. 6.0 (4D/A) 6.0-6.5' bgs.	
						17			Grey, moist, stiff, CLAY-SILT, trace fine sand, trace shells and organics. 20x40 mm vane test reached maximum torque reading of 27 in/lbs +.	
	5D/AB	24/18	8.0 - 10.0	3/5/6/6	11	29	-8.60		6.5 (4D/B) 6.5-8.0' bgs.	
						24	-9.40		Brown and grey, moist, loose, silty fine SAND, trace clay, trace organics. 8.0	
10	6D	24/15	10.0 - 12.0	2/1/4/2	5	25	-10.60		(5D/A) 8.0-8.8' bgs. Brown and grey, moist, medium dense, silty fine SAND, trace clay.	
						20			8.8 (5D/B) 8.8-10.0' bgs. Brown, wet, medium dense, silty fine SAND, little medium sand, little coarse sand.	
	7D/AC	24/15	12.0 - 14.0	3/3/12/19	15	36	-12.60		10.0	
						50	-13.60		Grey, wet, loose, silty fine to medium SAND, trace clay, trace coarse sand, trace gravel.	
	8D/AB	24/16	14.0 - 16.0	28/55/47/52	102	72	-14.30 -15.10		12.0 (7D/A) 12.0-13.0' bgs. Grey, wet, medium dense, silty fine SAND with grey, wet, silty clay layers.	
15						108			13.0 (7D/B) 13.0-13.7' bgs. Grey and brown, wet, medium dense, silty fine to medium SAND, little gravel.	
	9D/AB	24/15	16.0 - 18.0	37/62/80/88	142	99			13.7 (7D/C) 13.7-14.0' bgs. Brown, layered, moist, medium dense, silty fine to medium SAND, little coarse sand and gravel.	
						205			(8D/A) 14.0-14.5' bgs.	
	10D	15.6/13	18.0 - 19.3	38/45/77(3.6")	---	58			14.5 (8D/B) 14.5-16.0' bgs.	
						48	-19.90 -20.30		Brown and grey, moist, very dense, fine to medium SAND, trace coarse sand, trace to little gravel, little silt to silty, weathered rock fragments, (Till).	
20	11D	24/16	20.0 - 22.0	23/35/42/41	77	OPEN HOLE			(9D/A) 16.0-17.0' bgs. (9D/B) 17.0-18.0' bgs. Roller coned ahead from 18.0-20.0' bgs.	
									19.3 Cobble from 19.3-19.7' bgs.	
									19.7 Roller coned ahead from 20.0-25.0' bgs. Brown and grey, moist, very dense, fine to medium SAND, trace coarse sand, trace to little gravel, little silt to silty, weathered rock fragments, (Till).	
25										

Remarks:

Donut hammers, cathead and rope.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-202
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	-0.6	**Auger ID/OD:**	N/A
Operator:	Brad/Josh	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	G. Lidstone	**Rig Type:**	CME 45C on Barge	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/2/06-11/2/06	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	185+01, 96.0' Lt	**Casing ID/OD:**	HW	**Water Level*:**	Tidal

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	12DA/B	7.2/5	25.0 - 25.6	22/83(1.2")	---		-25.60			
							-26.10		(12D/A) 25.0-25.5' bgs. Brown, wet, gravelly fine to coarse SAND, trace silt. Roller coned ahead from 25.0-27.4' bgs.	
							-28.00		(12D/B) 25.5-25.6' bgs. Weathered Rock.	
									Bottom of Exploration at 27.4 feet below ground surface. REFUSAL	
30										
35										
40										
45										
50										

25.0
25.5
27.4

Remarks:

Donut hammers, cathead and rope.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-202A
PIN: 11231.00

Driller:	N/A	**Elevation (ft.)**	-0.6	**Auger ID/OD:**	N/A
Operator:	G. Lidstone	**Datum:**	NAVD 88	**Sampler:**	N/A
Logged By:	G. Lidstone	**Rig Type:**	N/A	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	11/2/06-11/2/06	**Drilling Method:**	Vane with Rod	**Core Barrel:**	N/A
Boring Location:	185+07, 96.0' Lt	**Casing ID/OD:**	N/A	**Water Level*:**	

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	V1		0.4 - 0.5	Su=579/80 psf					See HB-I295-202 for visual descriptions and remarks. 20x40 mm raw torque readings: V1: 7.2/1 in-lbs	
	V2		1.1 - 1.2	Su=1368/443 psf					20x40 mm raw torque readings: V2: 17.0/5.5 in-lbs	
	V3		2.1 - 2.2	Su=1569/765 psf			-2.90		20x40 mm raw torque readings: V3: 19.5/9.5 in-lbs	
									2.3 **Bottom of Exploration at 2.3 feet below ground surface.** Wouldn't push past 2.3' bgs.	
5										
10										
15										
20										
25										

Remarks:

Used vane and rod only. Pushed to 0.5' bgs, then to 1.2' bgs, then to 2.2' bgs.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 SB, Exit 3 Ramp
Location: South Portland, Maine

Boring No.: HB-I295-203
PIN: 11231.00

Driller:	Maine Test Boring Inc.	**Elevation (ft.)**	0.5	**Auger ID/OD:**	N/A
Operator:	Brad/Josh	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	G. Lidstone	**Rig Type:**	CME 45C on Barge	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/3/06-11/3/06	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	188+51, 103.0' Lt	**Casing ID/OD:**	HW	**Water Level*:**	Tidal

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D/AB	24/9	0.0 - 2.0	WOR/2/2/3	4	6	0.00		(1D/A) 0.0-0.5' bgs. Grey, wet, soft, CLAY-SILT, organics, little fine sand.	
						7	-0.5		(1D/B) 0.5-2.0' bgs. Grey, wet, very loose, fine to medium SAND, trace silt, trace coarse sand and gravel, trace organics.	
	2D/AB	24/5	2.0 - 4.0	1/2/0/1	2	4	-2.30		(2D/A) 2.0-2.8' bgs.	
						4	-2.8		(2D/B) 2.8-4.0' bgs. Grey, wet, very loose, silty fine to medium SAND, trace coarse sand and shells, trace organics.	
	3D	24/24	4.0 - 6.0	WOH/WOH/WOH/1	---	5	-3.50			
5						4	-4.0		Grey, wet, very soft, CLAY-SILT, trace fine sand, shells.	
	4D	24/17	6.0 - 8.0	WOR/WOR/WOP/ WOP	---	6			[a]Failed Water Pressure Piston Sampler	
	MU	24/0	6.0 - 8.0	[a]WPPS					Failed 55x110 mm vane	
	MV		7.0 - 7.0	Wouldn't Push		5	-7.50			
	5D/AB	24/16	8.0 - 10.0	6/3/7/11	10	22	-8.0		(5D/A) 8.0-9.0' bgs. Grey, wet, loose, silty fine to medium SAND, shells.	
						27	-8.50			
10							-9.0		(5D/B) 9.0-10.0' bgs. Grey, moist, loose, silty fine SAND, trace clay.	
	6D	24/9	10.0 - 12.0	11/16/19/13	35	20	-9.50			
						35	-10.0		Brown, wet, dense, silty fine SAND, trace medium sand.	
	7D/AB	24/15	12.0 - 14.0	18/16/8/7	24	33	-11.50			
						28	-12.0		(7D/A) 12.0-13.0' bgs. Brown, wet, medium dense, fine SAND, little medium sand, trace coarse sand and silt.	
	8D	24/12	14.0 - 16.0	13/20/25/28	45	42	-12.50			
15						59	-13.0		(7D/B) 13.0-14.0' bgs. Grey, wet, medium dense, silty fine SAND, little medium sand.	
	9D	24/9	16.0 - 18.0	17/19/15/24	34	32	-13.50			
						64	-14.0		Brown, moist, dense, silty fine to medium SAND trace coarse sand, little gravel, weathered rock fragments, (Till).	
	10D	24/8	18.0 - 20.0	19/12/10/10	22	31	-15.50			
						37	-16.0		Grey, moist, medium dense, silty fine to medium SAND, trace medium sand, little gravel, (Till).	
20						101	-20.30			
							-20.8		Weathered Rock. Roller coned ahead from 21.0-22.0' bgs.	
							-21.50			
							-22.0		**Bottom of Exploration at 22.0 feet below ground surface.** REFUSAL	
25										

Remarks:

Donut hammers, cathead and rope.
Deck to ground 6.5' at 07:30, High tide at 08:31.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

State of Maine - Department of Transportation

Pavement Core Summary Sheet

Town(s): South Portland Project Number: 11231.00

Station (Feet)	Offset (Feet)	Pavement Depth (Inches)	Unbound Pavement	PC-Number	Saved Core	Comments / Date 8/4/2005
175+33	7.0 Rt.	12.0		PC-1	yes	Elev. 38.4'
173+00	6.0 Rt.	12.5		PC-2	no	Elev. 38.3'
169+40	5.0 Rt.	12.0		PC-3	---	Elev. 36.5'

Logged By: K. Gross

APPENDIX - C

Laboratory Test Data

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): South Portland Project Number: 11231.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
HB-I295-101, 2D	154+90	37.0 Lt.	10.0-12.0	175290	1	26.0			SP-SM	A-3	0
HB-I295-102, 1D	158+26	30.0 Lt.	5.0-7.0	175291	1	19.4			SM	A-4	III
HB-I295-102, 3D	158+26	30.0 Lt.	15.0-17.0	175292	1	33.9			CL-ML	A-4	IV
HB-I295-103, 2D	162+26	24.0 Lt.	5.0-7.0	175293	1	14.9			SM	A-4	III
HB-I295-103, 3D	162+26	24.0 Lt.	10.0-12.0	175294	1	19.1			SM	A-2-4	II
HB-I295-104, 2D	167+50	28.0 Lt.	10.0-12.0	175295	1	8.4			SM	A-2-4	II
HB-I295-107, 1D	175+00	29.0 Lt.	5.0-7.0	175296	2	21.7	32	12	CL	A-6	III
HB-I295-108, 3D	177+00	26.0 Lt.	10.0-12.0	175298	2	6.8			SM	A-2-4	II
HB-I295-109, 3D	180+00	28.0 Lt.	15.0-15.5	175299	2	33.9	41	17	CL	A-7-6	III
HB-I295-109, 3D/A	180+00	28.0 Lt.	15.5-17.0	175300	2	35.3			CL	A-7-6	III
HB-I295-109, 5D	180+00	28.0 Lt.	25.0-27.0	183509	2	13.3			SM	A-2-4	II
HB-I295-109, 7D	180+00	28.0 Lt.	35.0-37.0	183510	2	16.2			SM	A-4	III

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

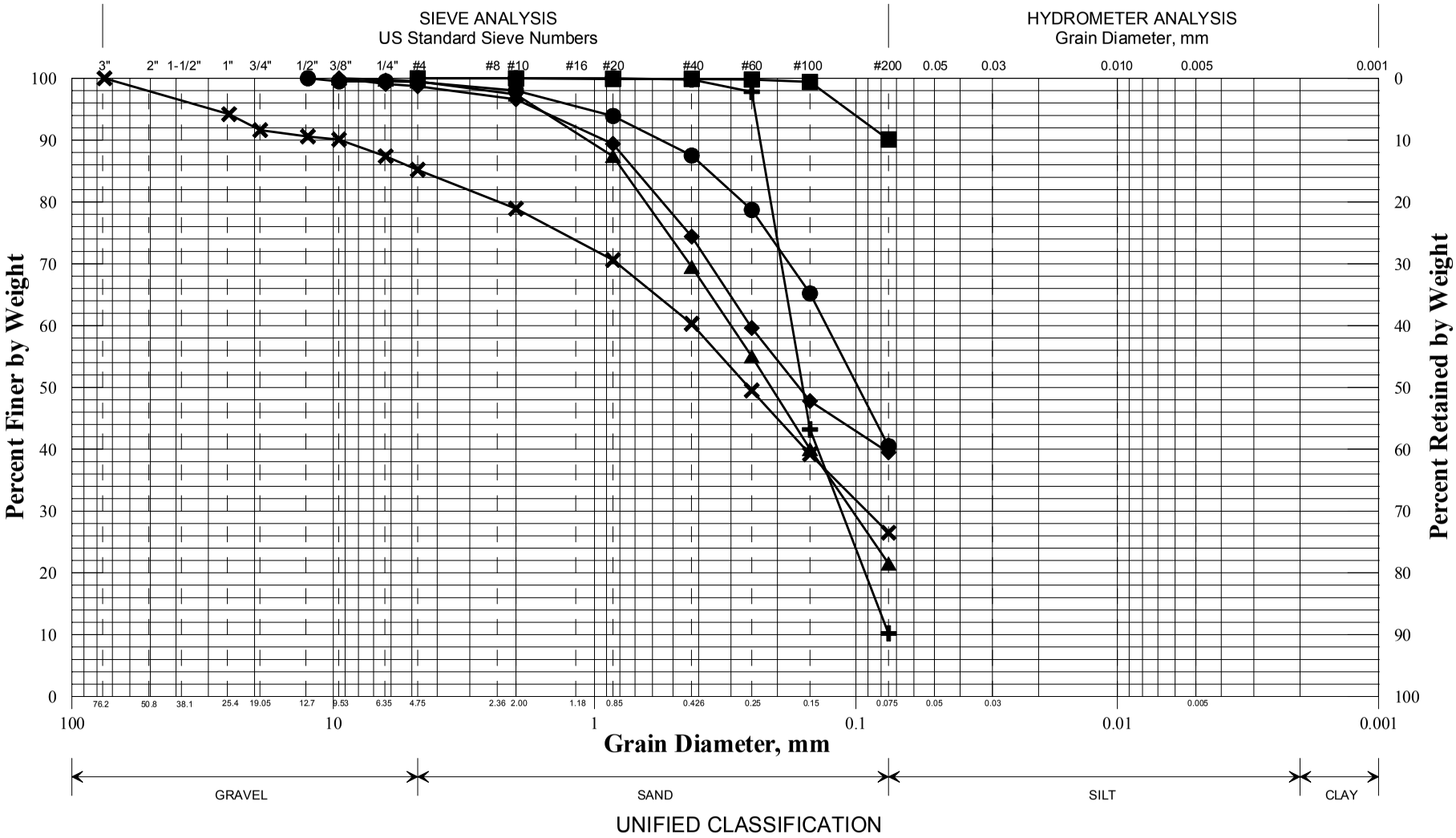
WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

State of Maine Department of Transportation

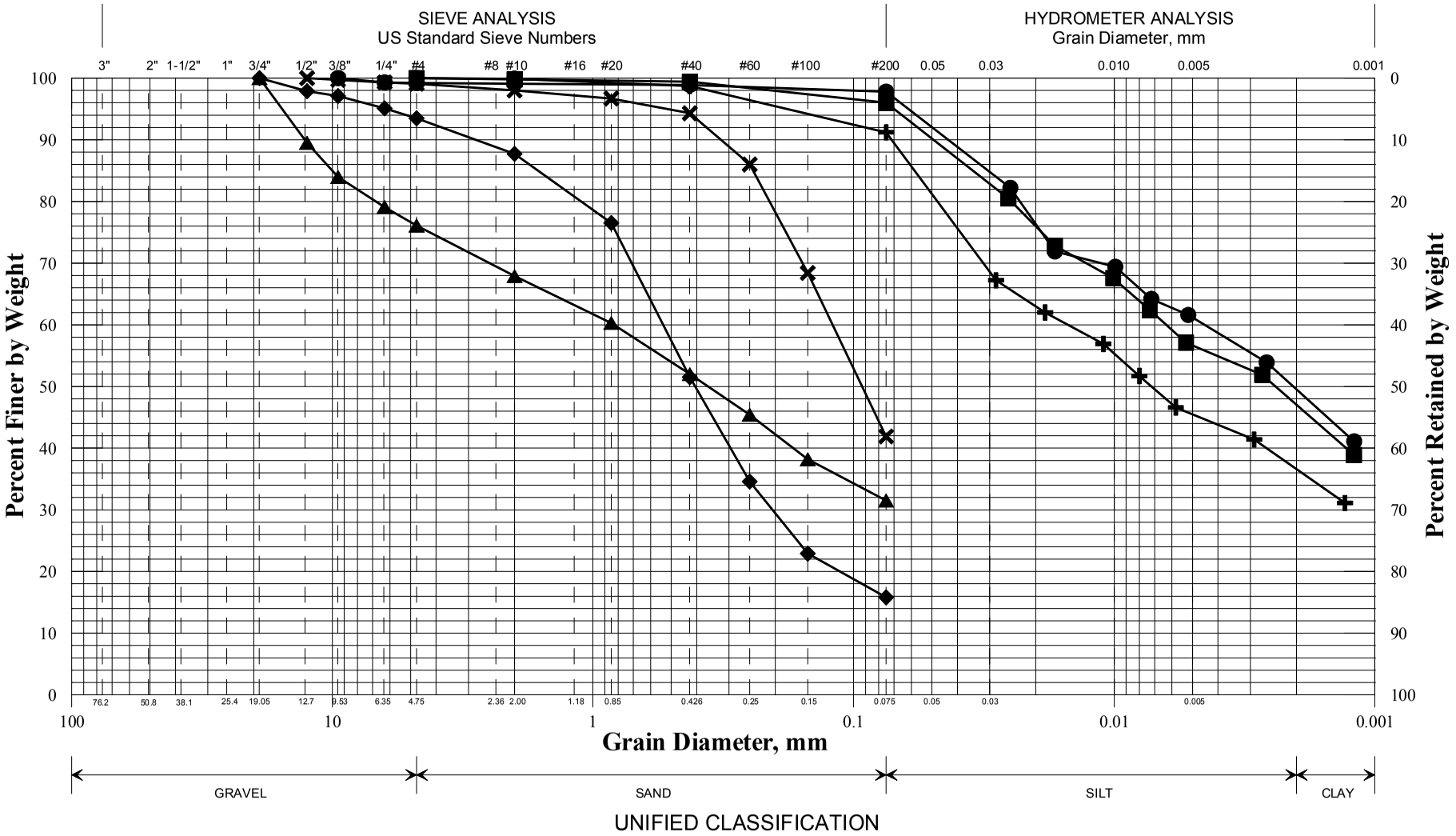
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-I295-101/2D	154+90	37.0 LT	10.0-12.0	SAND, trace silt.	26.0			
◆	HB-I295-102/1D	158+26	30.0 LT	5.0-7.0	Silty SAND, trace gravel.	19.4			
■	HB-I295-102/3D	158+26	30.0 LT	15.0-17.0	SILT with clay, trace sand.	33.9			
●	HB-I295-103/2D	162+26	24.0 LT	5.0-7.0	Silty SAND, trace gravel.	14.9			
▲	HB-I295-103/3D	162+26	24.0 LT	10.0-12.0	SAND, some silt, trace gravel.	19.1			
✕	HB-I295-104/2D	167+50	28.0 LT	10.0-12.0	SAND, some silt, little gravel.	8.4			

PIN
011231.00
Town
South Portland
Reported by/Date
WHITE, TERRY A 8/13/2007

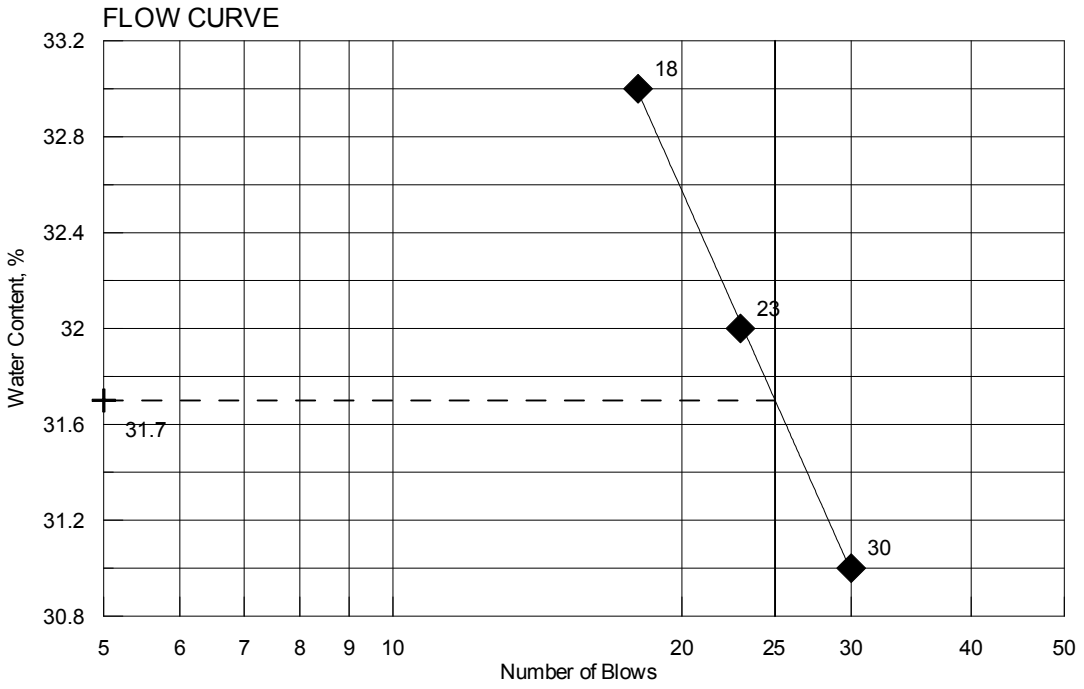
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE

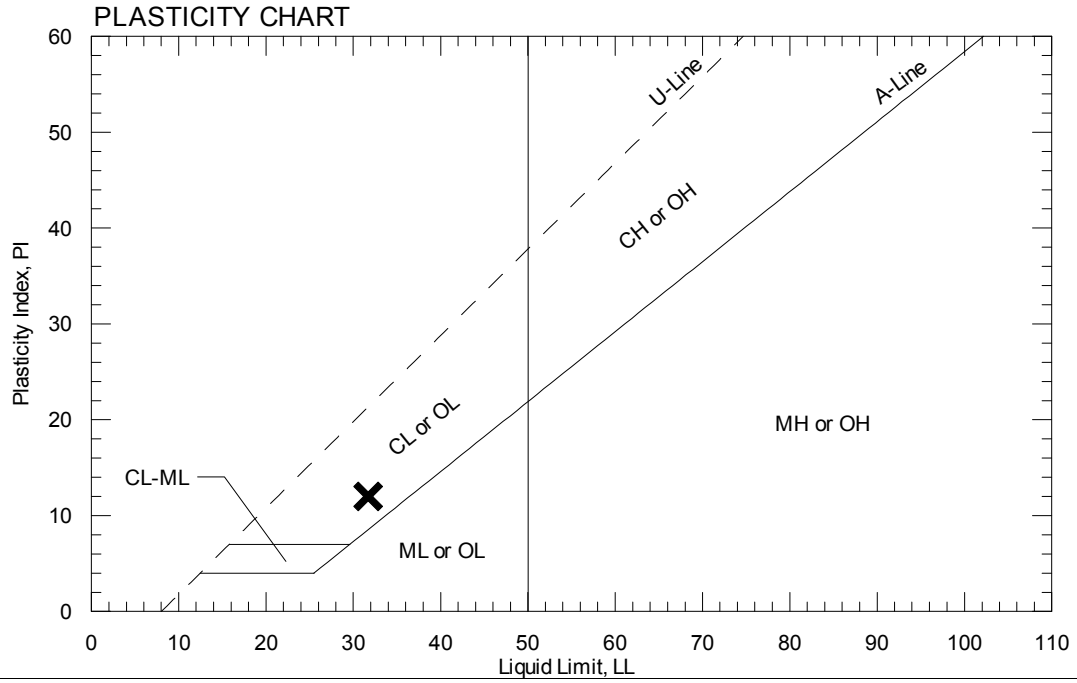


	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-I295-107/1D	175+00	29.0 LT	5.0-7.0	Clayey SILT, trace sand.	21.7	32	20	12
◆	HB-I295-108/3D	177+00	26.0 LT	10.0-12.0	SAND, little silt, trace gravel.	6.8			
■	HB-I295-109/3D	180+00	28.0 LT	15.0-15.5	Clayey SILT, trace sand.	33.9	41	24	17
●	HB-I295-109/3DA	180+00	28.0 LT	15.5-17.0	Silty CLAY, trace sand, trace gravel.	35.3			
▲	HB-I295-109/5D	180+00	28.0 LT	25.0-27.0	SAND, some silt, some gravel.	13.3			
✖	HB-I295-109/7D	180+00	28.0 LT	35.0-37.0	Silty SAND, trace gravel.	16.2			

PIN	
011231.00	
Town	
South Portland	
Reported by/Date	
WHITE, TERRY A	8/13/2007

TOWN	South Portland	Reference No.	175296
PIN	011231.00	Water Content, %	21.7
Sampled	12/6/2004	Plastic Limit	20
Boring No./Sample No.	HB-I295-107/1D	Liquid Limit	32
Station	175+00	Plasticity Index	12
Depth	5.0-7.0	Tested By	BBURR



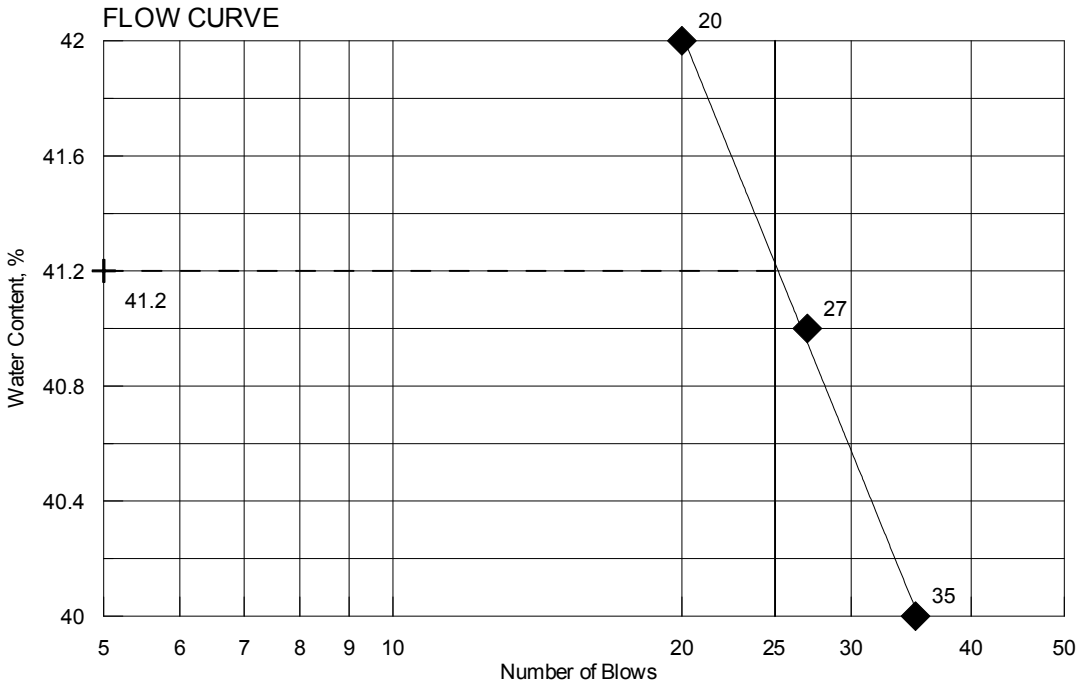


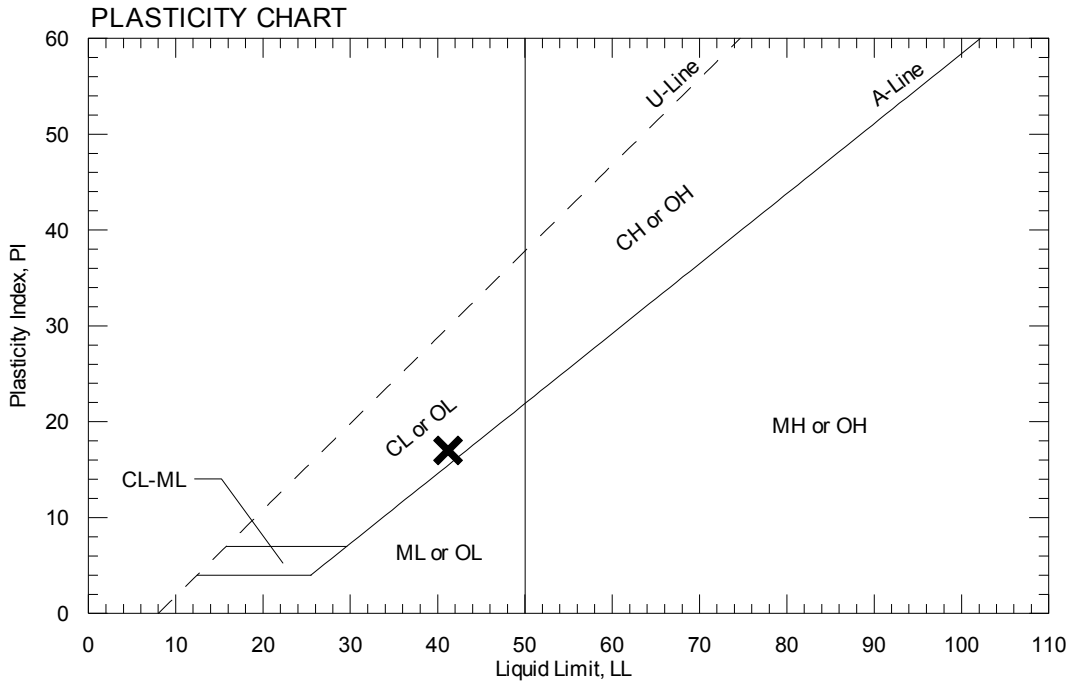
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/3/2005**

Paper Copy: Lab File; Project File; Geotech File

TOWN	South Portland	Reference No.	175299
PIN	011231.00	Water Content, %	33.9
Sampled	12/2/2004	Plastic Limit	24
Boring No./Sample No.	HB-I295-109/3D	Liquid Limit	41
Station	180+00	Plasticity Index	17
Depth	15.0-15.5	Tested By	BBURR





AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/3/2005**

Paper Copy: Lab File; Project File; Geotech File

APPENDIX - D

Calculations

Frost Penetration

Definition of Units:

$psf := \frac{lbf}{ft^2}$ $pcf := \frac{lbf}{ft^3}$ $tsf := g \cdot \left(\frac{ton}{ft^2}\right)$ $kip := 1000 \cdot lbf$ $ksi := \frac{kip}{in^2}$ $ksf := \frac{kip}{ft^2}$

FROST PENETRATION:

Reference: MaineDOT Bridge Design Guide, Design Freezing Index (DFI) Map and Depth of Frost Penetration Table 5-1.

DFI =1250 degree-days
Site has Coarse-Grained Soils.
Use Coarse-Grained for design With W_n = 11.5% to 19%. Use W_n = 20%

From the 2003 Bridge Design Guide Table 5-1:

$Frost\_depth := [0.5 \cdot (63.0in - 60.4in) + 60.4in]$

$Frost\_depth = 61.7 \cdot in$

$Frost\_depth = 5.14 \cdot ft$ **Use 5 feet**

Settlement

I-295 Exit 3-4 Project

PROJECT IDENTIFICATION

Title:	I-295 Exit 3-4 Project
Project Number:	PIN 11231 -
Client:	
Designer:	Mike Moreau, PE
Station Number:	STA 152+49

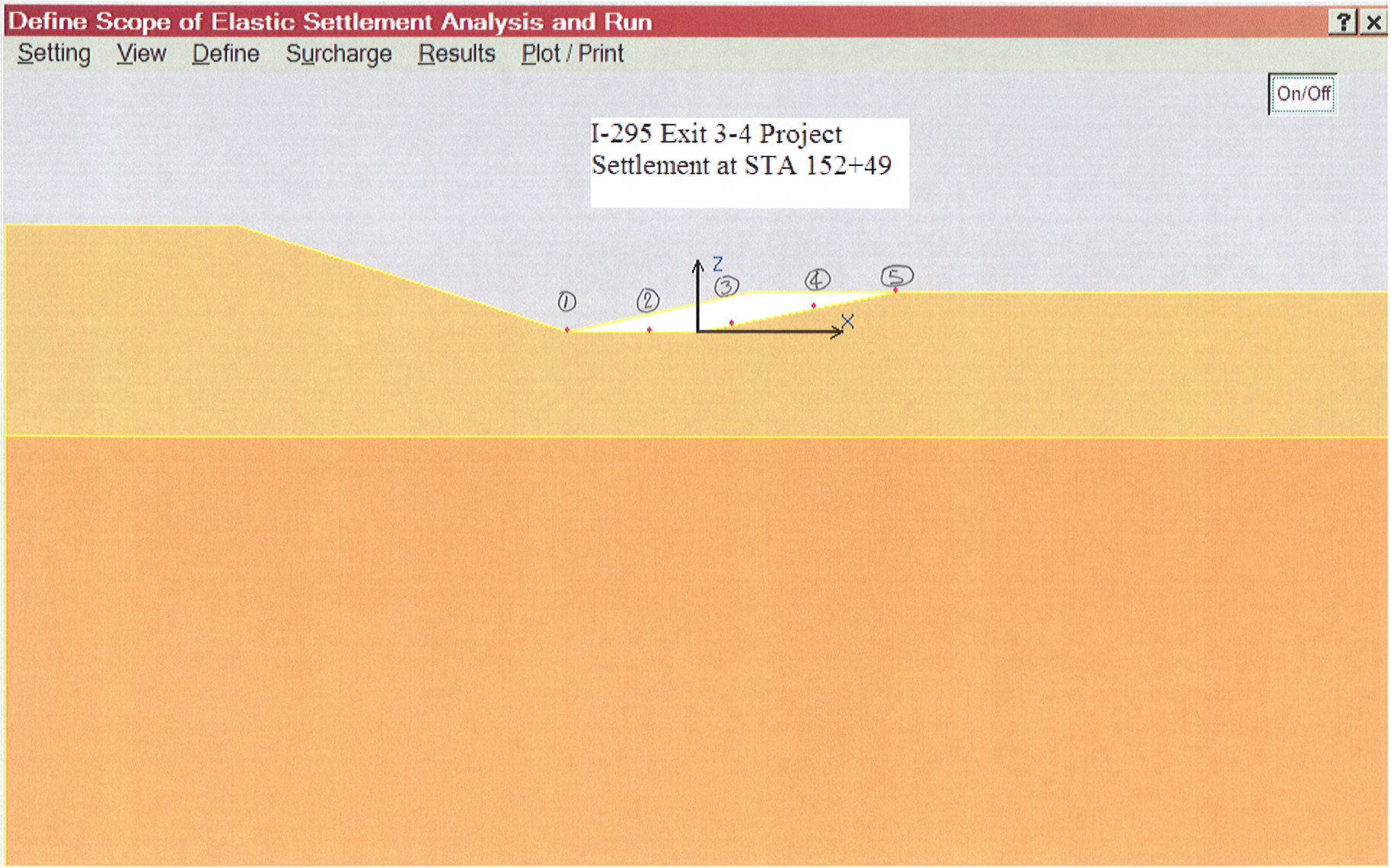
Description: Settlement at 10-inch Sewer Main Crossing

Company's information:

Name:	MaineDOT
Street:	16 State House Station Augusta, ME 04333-0016
Telephone #:	
Fax #:	
E-Mail:	

Original file path and name: C:\FoSSA\11231 I295 STA 152+49.F2S
Original date and time of creating this file: Thu May 17 14:29:27 2007

GEOMETRY: Analysis of a 2D geometry


Define Scope of Elastic Settlement Analysis and Run
Setting
View
Define
Surcharge
Results
Plot / Print
On/Off
I-295 Exit 3-4 Project
Settlement at STA 152+49
Z
X
1
2
3
4
5

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer #	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Si(k) [ft.]	Z initial [ft.]	Z final [ft.]
1	305.00	0.00	1	900000	0.2500	0.0001	322.00	322.00
			2	900000	0.3000	0.0000		
2	311.25	0.00	1	900000	0.2500	0.0011	322.00	322.00
			2	900000	0.3000	0.0000		
3	317.50	0.00	1	900000	0.2500	0.0018	322.50	322.50
			2	900000	0.3000	0.0001		
4	323.75	0.00	1	900000	0.2500	0.0012	323.75	323.75
			2	900000	0.3000	0.0000		
5	330.00	0.00	1	900000	0.2500	0.0001	325.00	325.00
			2	900000	0.3000	0.0000		

152+50.00

1" = 10 ft

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90

TA. 152+41.75 LT.
ECIDUOUS TREE
TH NO SIZE GIVEN

STA. 152+30.93 LT.
3 - 12" APPLE TREES

39.8' 4:1

DITCH ELEV. = 34.09

10.00' = PROP. SHLDR.

12.00' = PROP. TW

37.61

22.00' TO PROP. GUTTER = (BEGINS 36.97 AT STA. 149+18.41 LT.)

PROP. SLOPE = -4.00%

PROP. SLOPE = -2.00%

31.72 (FL. OF 6" UD.)

EXISTING RAMP NO. 3 (OFF RAMP)

10" FORCED SANITARY SEWER MAIN CROSSING C.L. (UNKNOWN ELEV.) (ENCASED IN 24" STEEL SLEEVE)

STA. 152+32.81 RT.
8" DECIDUOUS TREE

EDGE OF EXISTING SHLDR.
I - 295 - SOUTHBOUND (93.65')

152+49.01

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90

10.804' = PROP. SHLDR.

12.266' = PROP. TW

23.07' TO PROP. GUTTER

37.18

36.51

PROP. SLOPE = -3.852%

PROP. SLOPE = -2.046%

40.0' 4:1

DITCH ELEV. = 33.90

31.36 (FL. OF 6" UD.)

EXISTING RAMP NO. 3 (OFF RAMP)

EDGE OF EXISTING S
I - 295 - SOUTHBOUN

I-295 Exit 3-4 Project

PROJECT IDENTIFICATION

Title: I-295 Exit 3-4 Project
Project Number: PIN 11231 -
Client:
Designer: Mike Moreau, PE
Station Number: STA 155+00

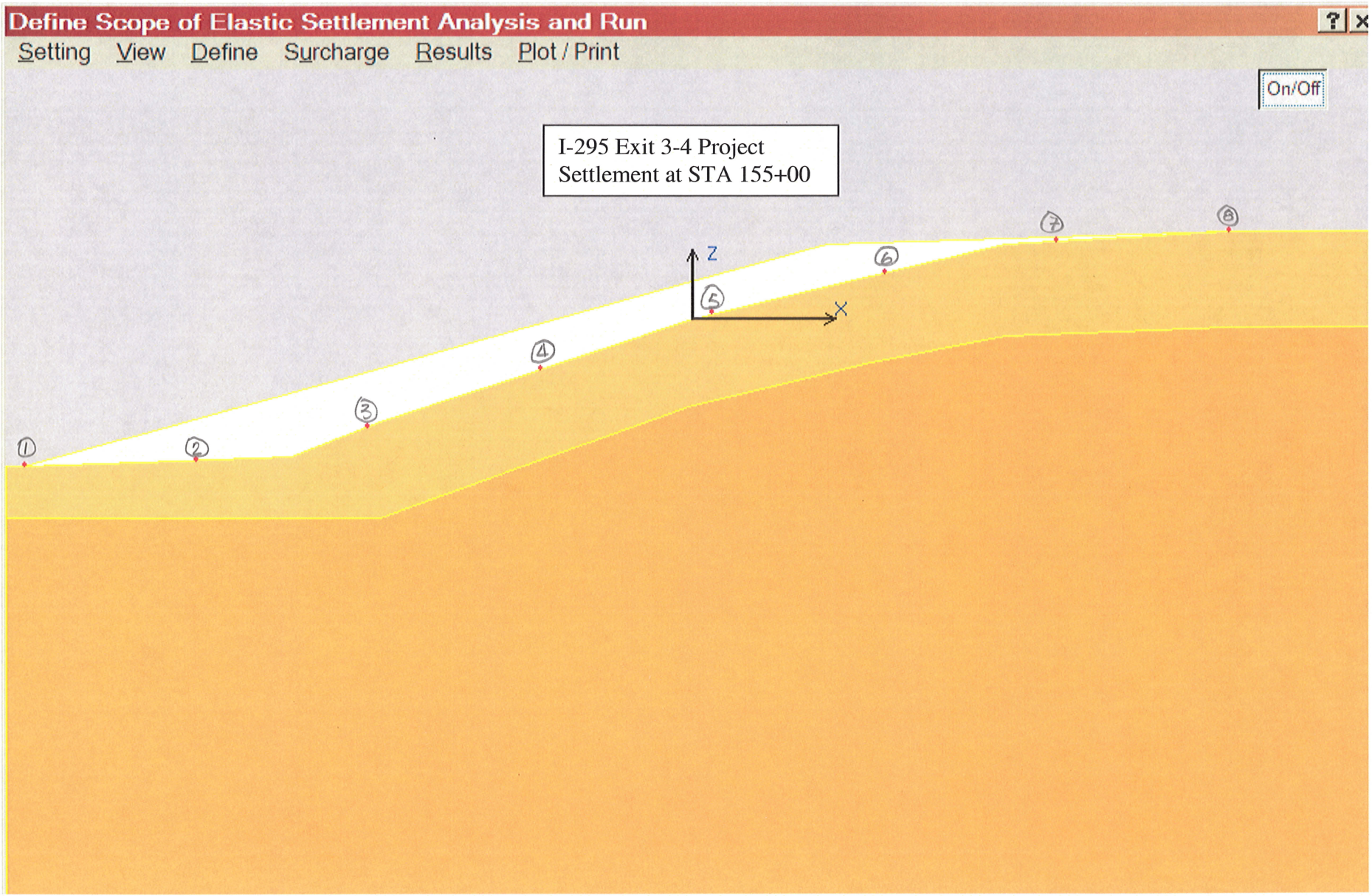
Description: Settlement at 10-inch Mobil Oil Pipeline Crossing

Company's information:

Name: MaineDOT
Street: 16 State House Station
Augusta, ME 04333-0016
Telephone #:
Fax #:
E-Mail:

Original file path and name: C:\FoSSA\11231 I295 STA 155+00 Pipe@6FT.F2S
Original date and time of creating this file: Fri June 6 2008

GEOMETRY: Analysis of a 2D geometry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View
Define
Surcharge
Results
Plot / Print
On/Off
I-295 Exit 3-4 Project
Settlement at STA 155+00
Z
X
1
2
3
4
5
6
7
8

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer #	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Si(k) [ft.]	Z initial [ft.]	Z final [ft.]
1	250.00	0.00	1	900000	0.2500	-0.0001	307.00	307.00
			2	900000	0.3000	-0.0000		
2	269.29	0.00	1	900000	0.2500	0.0031	307.64	307.64
			2	900000	0.3000	0.0006		
3	288.57	0.00	1	900000	0.2500	0.0043	311.43	311.42
			2	900000	0.3000	0.0026		
4	307.86	0.00	1	900000	0.2500	0.0033	318.12	318.11
			2	900000	0.3000	0.0048		
5	327.14	0.00	1	900000	0.2500	0.0028	324.52	324.51
			2	900000	0.3000	0.0063		
6	346.43	0.00	1	900000	0.2500	0.0028	329.20	329.20
			2	900000	0.3000	0.0058		
7	365.71	0.00	1	900000	0.2500	0.0007	332.84	332.84
			2	900000	0.3000	0.0003		
8	385.00	0.00	1	900000	0.2500	-0.0001	334.00	334.00
			2	900000	0.3000	-0.0004		

Case 1 Pipe@ 6 FT BGS

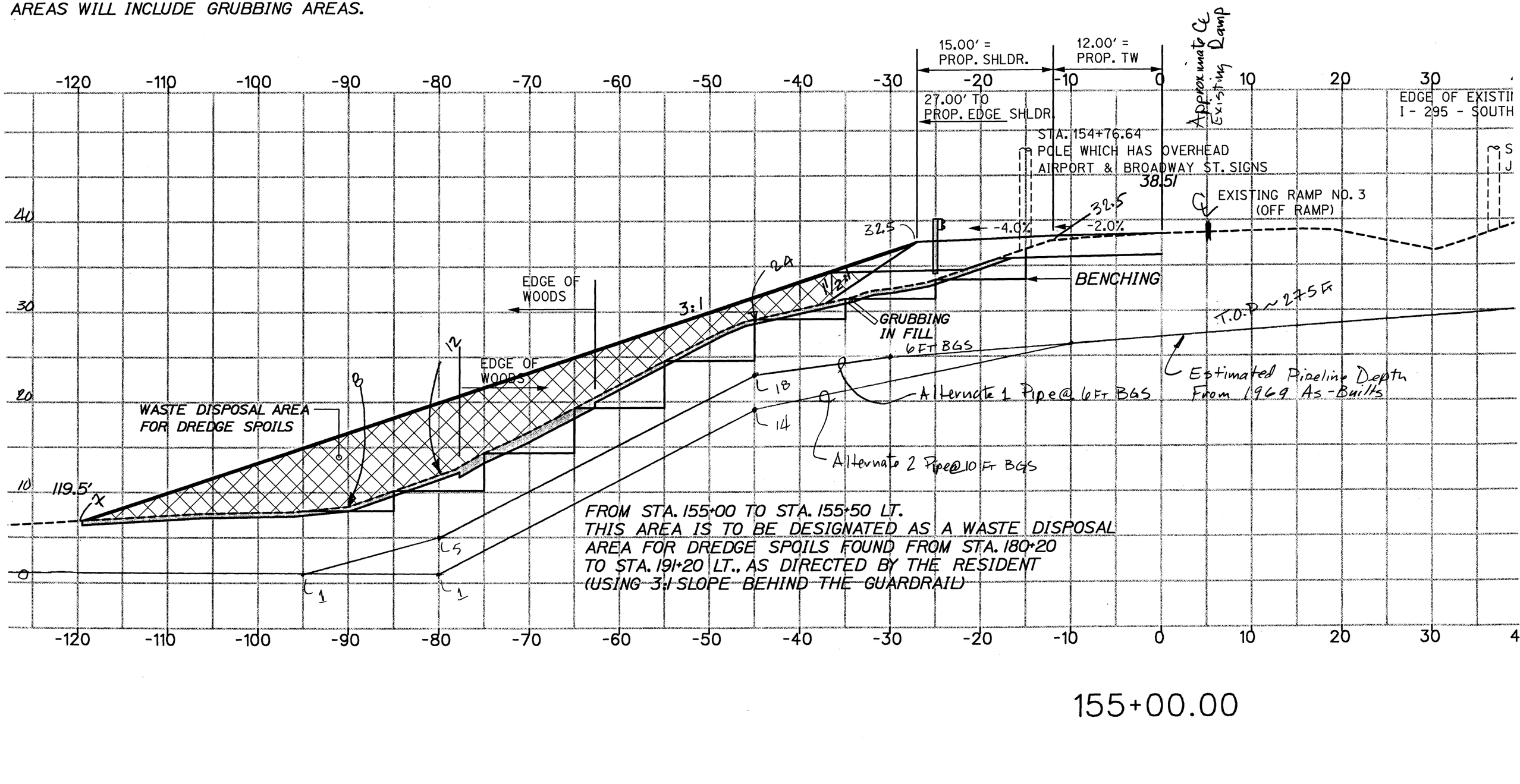
IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer #	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Si(k) [ft.]	Z initial [ft.]	Z final [ft.]
1	250.00	0.00	1	900000	0.2500	-0.0001	307.00	307.00
			2	900000	0.3000	-0.0000		
2	269.29	0.00	1	900000	0.2500	0.0031	307.64	307.64
			2	900000	0.3000	0.0006		
3	288.57	0.00	1	900000	0.2500	0.0063	311.43	311.42
			2	900000	0.3000	0.0008		
4	307.86	0.00	1	900000	0.2500	0.0051	318.12	318.11
			2	900000	0.3000	0.0033		
5	327.14	0.00	1	900000	0.2500	0.0045	324.52	324.51
			2	900000	0.3000	0.0050		
6	346.43	0.00	1	900000	0.2500	0.0032	329.20	329.20
			2	900000	0.3000	0.0055		
7	365.71	0.00	1	900000	0.2500	0.0007	332.84	332.84
			2	900000	0.3000	0.0003		
8	385.00	0.00	1	900000	0.2500	-0.0001	334.00	334.00
			2	900000	0.3000	-0.0004		

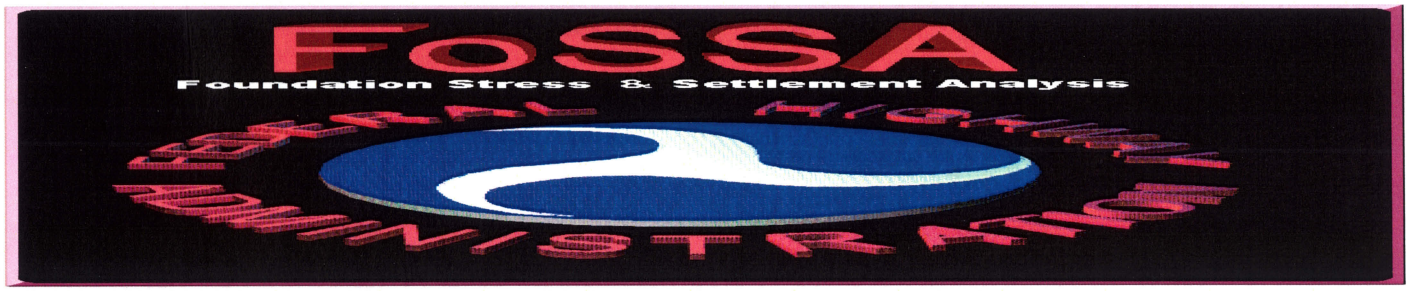
Case 2 Pipe @ 10 FT BGS

155+27.01

NOTE:
FROM STA. 155+00 TO STA. 159+00 LT.
BENCH EXISTING FILL SLOPE SOIL IN ACCORDANCE WITH MAINE DOT STANDARD SPECIFICATION 203.09, PREPARATION OF EMBANKMENT AREA WHERE NEW FILL SLOPES ARE CONSTRUCTED OVER EXISTING SLOPES GREATER THAN 2:1 (H.V.). BENCHING SHOWN ON THE CROSS SECTIONS ARE FOR ILLUSTRATION ONLY. THE BENCHING AREAS WILL INCLUDE GRUBBING AREAS.



155+00.00



I-295 Exit 3-4 Project

PROJECT IDENTIFICATION

Title: I-295 Exit 3-4 Project
Project Number: PIN 11231 -
Client:
Designer: Mike Moreau, PE
Station Number: STA 164+18

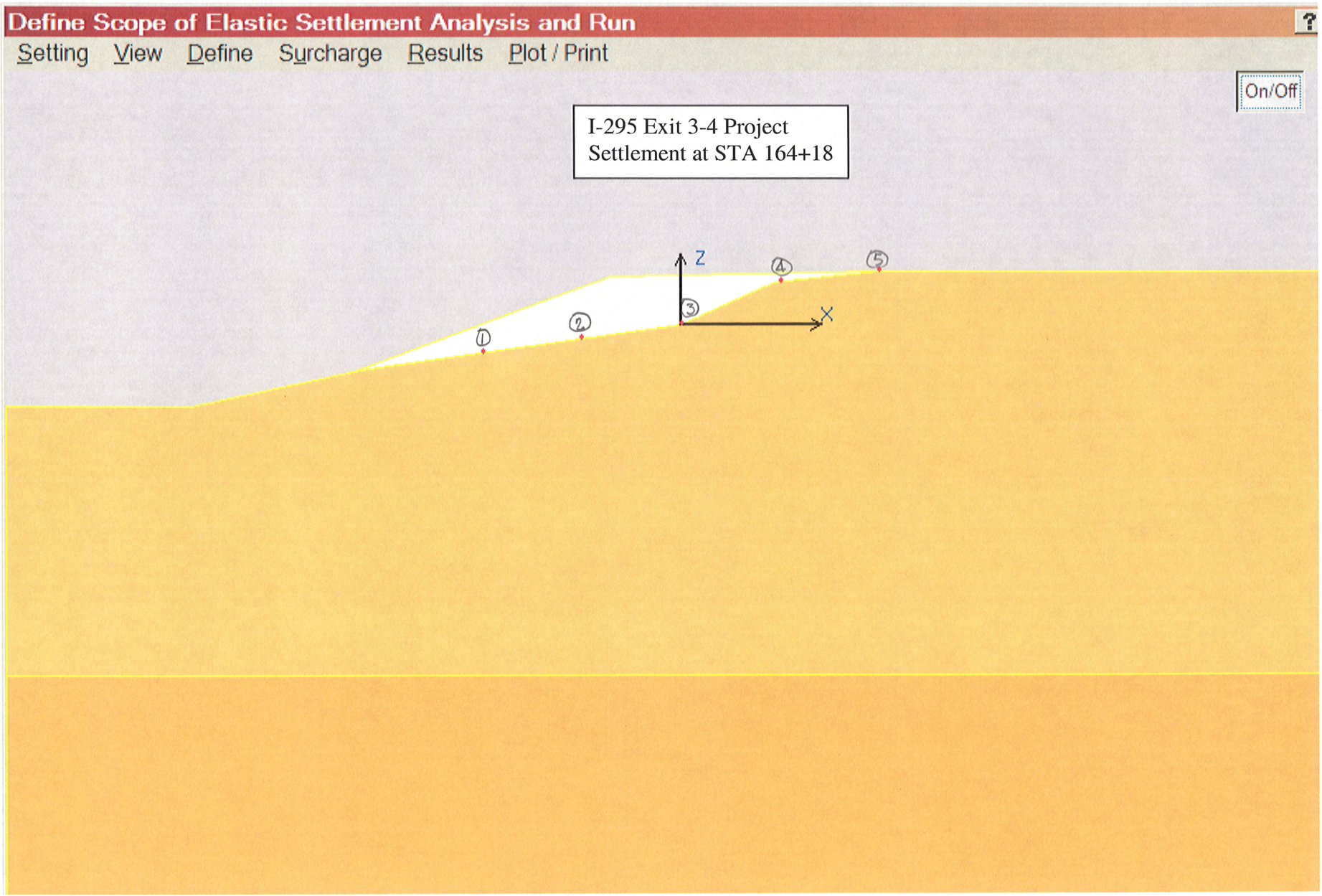
Description: Settlement at 24-inch Oil Pipeline, Portland Pipeline Crossing

Company's information:

Name: MaineDOT
Street: 16 State House Station
Augusta, ME 04333-0016
Telephone #:
Fax #:
E-Mail:

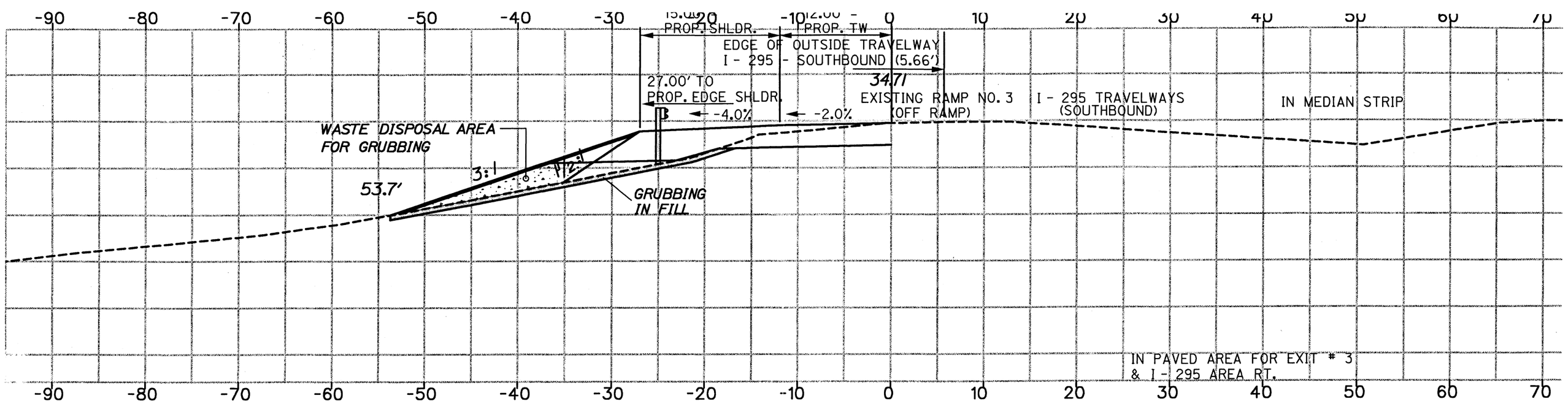
Original file path and name: C:\FoSSA\11231 I295 STA 164+18.F2S
Original date and time of creating this file: Fri June 6 2008

GEOMETRY: Analysis of a 2D geometry


Define Scope of Elastic Settlement Analysis and Run
Setting
View
Define
Surcharge
Results
Plot / Print
On/Off
I-295 Exit 3-4 Project
Settlement at STA 164+18
Z
X
1
2
3
4
5

IMMEDIATE SETTLEMENT, Si

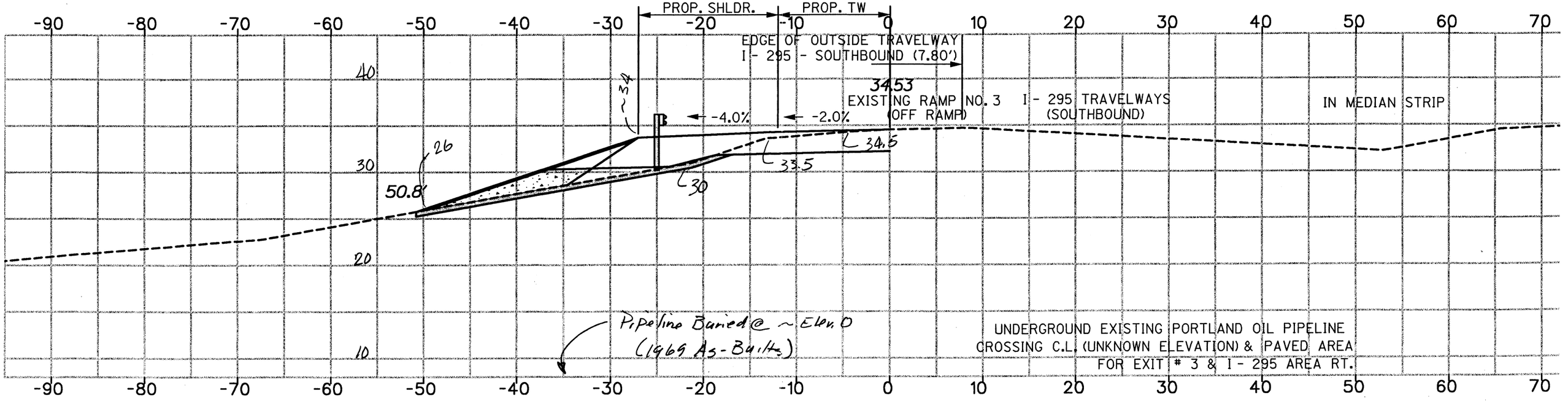
Node #	Settlement along section: X [ft.]	Y [ft.]	Layer #	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Si(k) [ft.]	Z initial [ft.]	Z final [ft.]
1	305.00	0.00	1	500000	0.2000	0.0129	327.57	327.56
			2	500000	0.3000	0.0019		
2	313.50	0.00	1	500000	0.2000	0.0206	328.79	328.76
			2	500000	0.3000	0.0023		
3	322.00	0.00	1	500000	0.2000	0.0197	330.00	329.98
			2	500000	0.3000	0.0021		
4	330.50	0.00	1	500000	0.2000	0.0084	333.56	333.55
			2	500000	0.3000	0.0015		
5	339.00	0.00	1	500000	0.2000	0.0020	334.50	334.50
			2	500000	0.3000	0.0008		



164+50.00

15.00' = PROP. SHLDR.

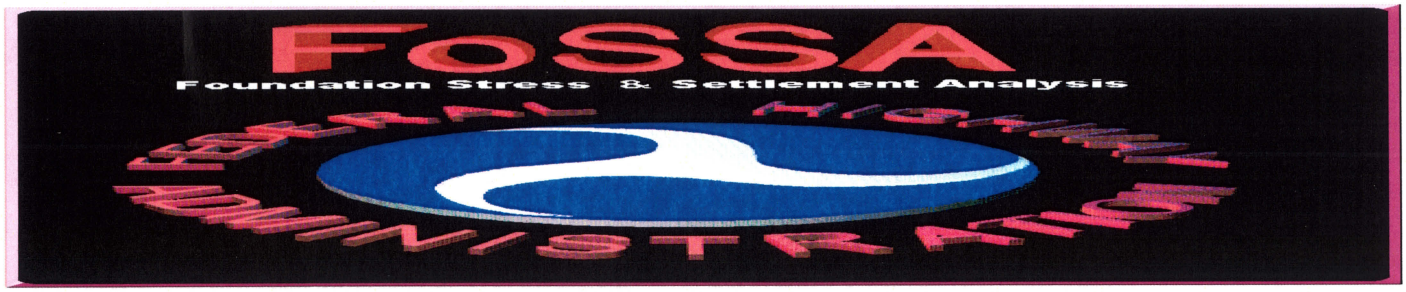
12.00' = PROP. TW



164+17.81

15.00' = PROP. SHLDR.

12.00' = PROP. TW



I-295 Exit 3-4 Project

PROJECT IDENTIFICATION

Title: I-295 Exit 3-4 Project
Project Number: PIN 11231 -
Client:
Designer: Mike Moreau, PE
Station Number: STA 170+91

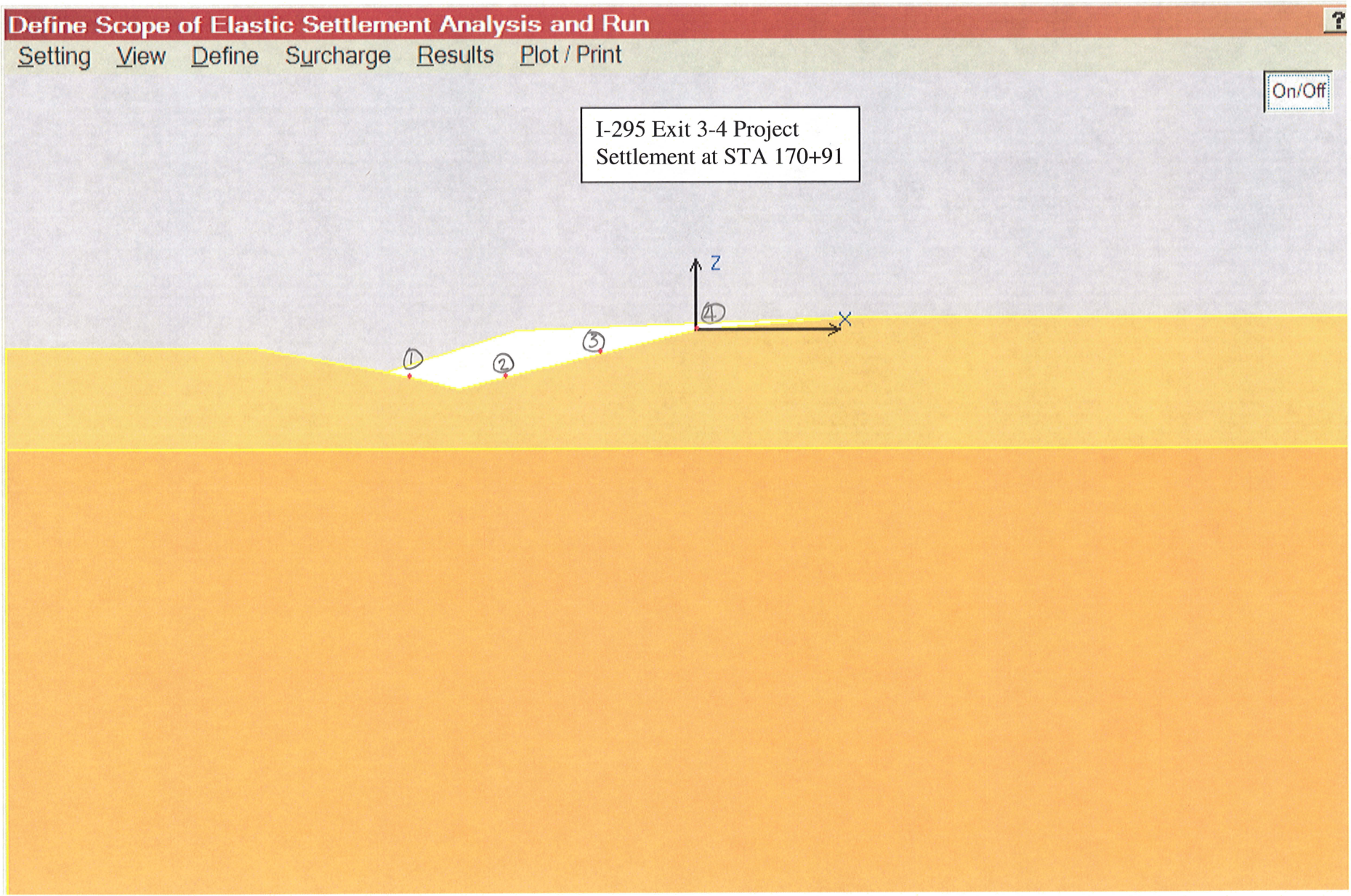
Description: Settlement at 12-inch Water Main Crossing

Company's information:

Name: MaineDOT
Street: 16 State House Station
Augusta, ME 04333-0016
Telephone #:
Fax #:
E-Mail:

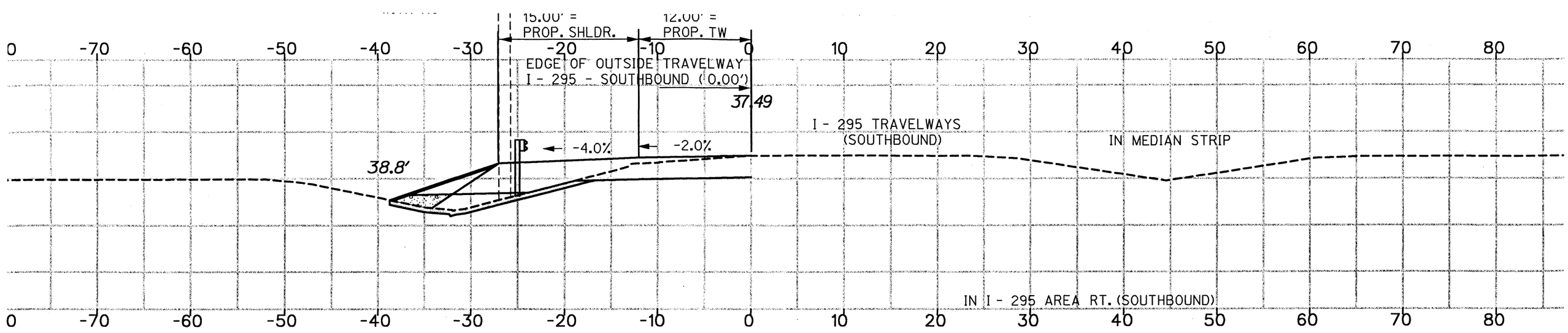
Original file path and name: C:\FoSSA\11231 I295 STA 170+91.F2S
Original date and time of creating this file: Fri June 6 2008

GEOMETRY: Analysis of a 2D geometry

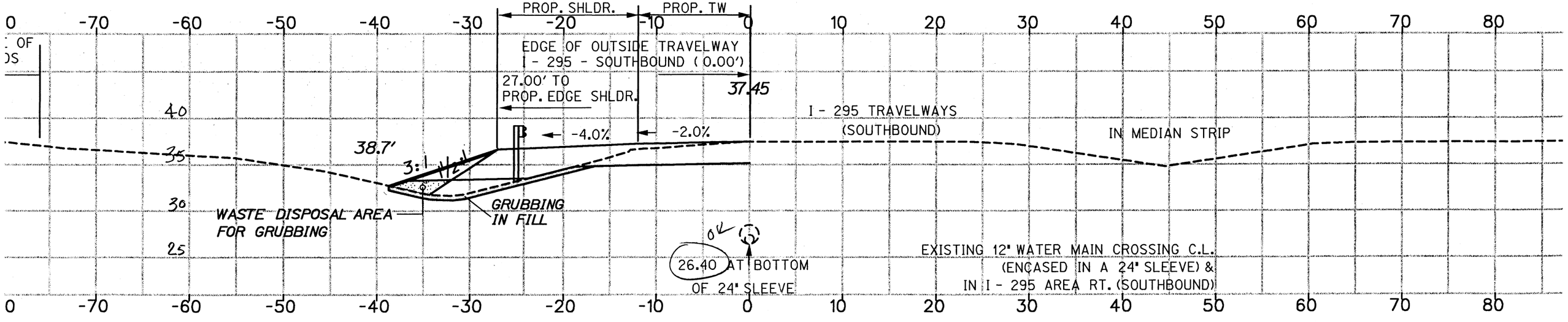

Define Scope of Elastic Settlement Analysis and Run
Setting
View
Define
Surcharge
Results
Plot / Print
On/Off
I-295 Exit 3-4 Project
Settlement at STA 170+91
Z
X
1
2
3
4

IMMEDIATE SETTLEMENT, Si

Node #	Settlement along section: X [ft.]	Y [ft.]	Layer #	Young's Modulus, E [lb/ft ²]	Poisson's Ratio, μ	Si(k) [ft.]	Z initial [ft.]	Z final [ft.]
1	293.00	0.00	1	500000	0.2000	0.0014	332.50	332.50
			2	500000	0.3000	0.0016		
2	301.00	0.00	1	500000	0.2000	0.0044	332.50	332.49
			2	500000	0.3000	0.0036		
3	309.00	0.00	1	500000	0.2000	0.0035	334.50	334.49
			2	500000	0.3000	0.0026		
4	317.00	0.00	1	500000	0.2000	0.0011	336.50	336.50
			2	500000	0.3000	0.0009		



171+00.00



170+91.00

Pavement Design

5/30/07

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product
State of Maine

Flexible Structural Design Module

I-295 Exit 3-4, South Portland
10-Inch Pavement Section
PIN 11231

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	11,351,500
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level	95 %
Overall Standard Deviation	0.45
Roadbed Soil Resilient Modulus	4,500 psi
Stage Construction	1
Calculated Design Structural Number	5.95 in

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	New HMA	0.44	1	4	-	1.76
2	Nwe HMA	0.34	1	6	-	2.04
3	Base Aggregate	0.12	1	18	-	2.16
Total	-	-	-	28.00	-	5.96

STATE OF MAINE
INTERDEPARTMENTAL MEMORANDUM

FILE: I-295
Returned 10/30/06

Date: 10/12/2006 Update

To: ~~Ed Hanscom~~

Dept.: MDOT, Bureau of Planning

From: **Mike Moreau**

Dept.: Central Office Team

Subject: **Request for Traffic Information**

Project Manager:

TOWN(S): South Portland

P.I.N. **11231.00**

COUNTY: Cumberland

ROUTE: I-295

LOCATION/ DESCRIPTION: I-295 (Between Exits 3 and 4)

(Select by making bold, circling, and/or entering 'other')

Existing Location	Relocation (Attach Sketch)	Turning Movement (Provide Locations under Comments)	Other:	

Prep By: MAM

	Sec. 1	Sec. 2	Sec. 3	Sec. 4	Sec. 5
Description of Sections	I-295 SB (Between Exits 3 & 4)	I-295 NB (Between Exits 3 & 4)			
Current AADT (Year)	37610 (2005)	38090 (2005)			
Current **2007** AADT	38360	38850			
Future **2027** AADT	46030	46620			
Future ____ AADT					
DDHV - % of AADT	11%	10%	%	%	%
Design Hourly Volume	5080 (PM)	4650 (AM)			
% Heavy Trucks (AADT)	5%	5%	%	%	%
% Heavy Trucks (DHV)	4%	4%	%	%	%
Direct.Dist. (DHV)	100%	100%	%	%	%
18-KIP Equivalent P 2.0	1632	1563			
18-KIP Equivalent P 2.5	1555	1490			

Notes or Remarks: 18-Kip ESALS is based on 20 year life

PLEASE PROVIDE A MAP OF THE PROJECT AREA, AND THE CURRENT AND FUTURE YEARS FOR WHICH YOU WANT THE AADT CALCULATED

Comments: ESALS = 1555 x 365 x 20 = 11,351,500

APPENDIX - E

Special Provisions

SPECIAL PROVISION
SECTION 304
AGGREGATE BASE AND SUBBASE COURSE

The following replaces Section 304.02, Aggregate, in the Standard Specifications.

304.02 Aggregate. **Type B base aggregate** shall conform to the requirements specified in Standard Specification Section 703.06.

Aggregate base shall be material meeting Type B aggregate for the entire 18 inch depth of the base layer below the travel lane and 25 inch depth beneath shoulder pavement areas. Type B aggregate shall be paid for under Pay Item 304.08.

The portion of the material passing a 75 mm (3 in) sieve at the time it is deposited on the roadway shall conform to the gradation requirements of the contract. Oversized stones shall be removed before depositing on the roadway. Oversized stones are stones that will not pass a 100 mm (4 in) square mesh sieve.

Special Provision
SECTION 400
RECYCLED ASPHALT PAVEMENT
(Excess material to State)

400.01 Description All salvaged pavement will become property of the State and will be hauled to the Scarborough Maintenance Yard. The contractor shall be responsible for hauling and stockpiling the salvaged pavement into a neat pile. The contractor may retain enough pavement to use for 10% RAP in new HMA. Pavement salvage shall be paid under Pay Item 202.20.

SPECIAL PROVISION
SECTION 610
RIPRAP
(Heavy Riprap Key Trench and Slope Toe Armor)

Description. This work shall consist of placing heavy riprap for the key trench and slope toe armor in accordance with this Section and the construction plans.

Materials.

Heavy riprap for the key trench and slope toe armor, as shown on the plans, shall consist of material as described under Section 703.28 of the Standard Specifications, with the following added provisions:

1) All of the material shall be angular, consistent with blasted rock material.

2) Round or thin, flat stones will not be permitted.

3) The heavy riprap material shall contain a sufficient amount of smaller stones to fill the void spaces and provide interlocking of the larger boulders.

Geotextile meeting the requirements of MaineDOT Standard Specification 722.01, Stabilization Geotextile. For this application the geotextile shall be non-woven.

Construction.

1) The key trench shall be constructed first, followed by placement of heavy riprap over the subgrade back toward the existing slope. Heavy riprap for the key trench shall be placed in stages at low tide to minimize siltation of Long Creek and to accommodate placement of the geotextile in the key trench and over the subgrade. Adjacent panels of stabilization geotextile used above and below the heavy riprap shall be overlapped a minimum of 18 inches.

2) Heavy riprap for the key trench and slope toe armor shall be dropped from a clam-shell or end-dumped from a truck into place. The distance of the drop shall be determined by the Contractor, and shall be sufficient to meet the requirements of this Section, without having the heavy riprap roll beyond the immediate construction operation, as approved by the Resident. Alternative methods of placement of the heavy riprap shall be approved by the Resident.

3) Spreading of riprap shall be with heavy, track-mounted equipment. The heavy riprap shall be consistent throughout its mass, with interlocking between individual pieces in both the vertical and horizontal planes, as approved by the Resident. A key trench and slope toe armor consisting of flat pieces, oriented in the horizontal direction will not be allowed.

5) The heavy riprap shall be compacted by proof-rolling with heavy construction equipment. The number of passes for compaction shall be a minimum of 4, or as directed by the Resident. Proof-rolling of the heavy riprap material shall be in lifts not to exceed 4 feet in thickness, unless otherwise approved by the Resident.

6) The top of the heavy riprap layer shall incorporate a choke stone material that fills and blocks the voids between the larger stones. After placement and compaction of the choke stone layer, a layer of stabilization geotextile shall be placed over the top of the heavy riprap layer as shown on the Heavy Riprap Slope Toe Detail in the plan set.

Measurement. Heavy Riprap for Key Trench and Slope Toe Armor shall be measured by the cubic yard complete in place.

Basis of Payment. The accepted quantity of Heavy Riprap for Key Trench and Slope Toe Armor will be paid for at the contract unit price per cubic yard complete in place. Payment shall be full compensation for furnishing all labor, equipment and materials.

Cost of stabilization geotextile and choke stone will not be paid for separately, but will be considered incidental to the Heavy Riprap for Key Trench and Slope Toe Armor construction.

Payment will be made under:

610.16 Heavy Riprap for Key Trench and Slope Toe Armor	cubic yard