# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 1.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 471.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 451.79 | |
| WT. OF WATER LOST: | | | 19.51 | POST-IGNITION |
| WT. OF BOTTLE: | | | 86.60 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 365.19 | |
| PERCENT OF WATER: | | | 5.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 241

WT. OF TOTAL SAMPLE: 365.2 WT. OF WASH SAMPLE: 107.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 27.8 | 27.8 | 7.6 | 92.4 |
| 3/8" | 78.9 | 51.1 | 14.0 | 78.4 |
| # 4 | 96.6 | 17.7 | 4.8 | 73.5 |
| #10 | 123.7 | 27.1 | 7.4 | 66.1 |
| #40 | 47.8 | 47.8 | 29.4 | 36.7 |
| #200 | 86.1 | 38.3 | 23.6 | 13.2 |
| PASS #200 | | 21.4 | 13.2 | |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 86.8 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 34.46 | | 653.80 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.81 | | 574.03 | |
| WT. OF WATER LOST: | 2.65 | | 79.77 | POST-IGNITION |
| WT. OF BOTTLE: | 22.36 | | 87.82 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.45 | | 486.21 | |
| PERCENT OF WATER: | 28.00 | | 16.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 28.0 | | | LOSS %: |

WT PASSING #10 SIEVE: 432

WT. OF TOTAL SAMPLE: 486.2 WT. OF WASH SAMPLE: 101.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 3.4 | 3.4 | 0.7 | 99.3 |
| #4 | 12.5 | 9.1 | 1.9 | 97.4 |
| #10 | 54.1 | 41.6 | 8.6 | 88.9 |
| #40 | 35.1 | 35.1 | 30.7 | 58.1 |
| #200 | 67.6 | 32.5 | 28.5 | 29.7 |
| PASS #200 | | 33.9 | 29.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 28.0 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 70.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 4.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 642.70 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 597.78 | |
| WT. OF WATER LOST: | | | 44.92 | POST-IGNITION |
| WT. OF BOTTLE: | | | 78.37 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 519.41 | |
| PERCENT OF WATER: | | | 8.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 358

WT. OF TOTAL SAMPLE: 519.4 WT. OF WASH SAMPLE: 117.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 60.8 | 60.8 | 11.7 | 88.3 |
| #4 | 103.4 | 42.6 | 8.2 | 80.1 |
| #10 | 161.8 | 58.4 | 11.2 | 68.8 |
| #40 | 57.8 | 57.8 | 34.0 | 34.8 |
| #200 | 89.2 | 31.4 | 18.5 | 16.4 |
| PASS #200 | | 27.8 | 16.4 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 83.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 6.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 490.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 467.31 | |
| WT. OF WATER LOST: | | | 22.89 | POST-IGNITION |
| WT. OF BOTTLE: | | | 89.19 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 378.12 | |
| PERCENT OF WATER: | | | 6.10 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 259

WT. OF TOTAL SAMPLE: 378.1 WT. OF WASH SAMPLE: 101.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 43.3 | 43.3 | 11.5 | 88.5 |
| #4 | 78.0 | 34.7 | 9.2 | 79.4 |
| #10 | 118.9 | 40.9 | 10.8 | 68.6 |
| #40 | 45.1 | 45.1 | 30.6 | 38.0 |
| #200 | 76.0 | 30.9 | 21.0 | 17.0 |
| PASS #200 | | 25.1 | 17.0 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 83.0 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 8.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 658.50 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 619.01 | |
| WT. OF WATER LOST: | | | 39.49 | POST-IGNITION |
| WT. OF BOTTLE: | | | 76.35 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 542.66 | |
| PERCENT OF WATER: | | | 7.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 411

WT. OF TOTAL SAMPLE: 542.7 WT. OF WASH SAMPLE: 112.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 45.7 | 45.7 | 8.4 | 91.6 |
| #4 | 82.9 | 37.2 | 6.9 | 84.7 |
| #10 | 131.5 | 48.6 | 9.0 | 75.8 |
| #40 | 64.4 | 64.4 | 43.3 | 32.4 |
| #200 | 91.7 | 27.3 | 18.4 | 14.1 |
| PASS #200 | | 20.9 | 14.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 85.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 10.0

Elevation: _____ Source: SS2-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 445.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 423.60 | |
| WT. OF WATER LOST: | | | 21.80 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.22 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 336.38 | |
| PERCENT OF WATER: | | | 6.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 245

WT. OF TOTAL SAMPLE: 336.4 WT. OF WASH SAMPLE: 105.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 30.0 | 30.0 | 8.9 | 91.1 |
| #4 | 56.0 | 26.0 | 7.7 | 83.4 |
| #10 | 91.6 | 35.6 | 10.6 | 72.8 |
| #40 | 46.8 | 46.8 | 32.3 | 40.5 |
| #200 | 77.8 | 31.0 | 21.4 | 19.1 |
| PASS #200 | | 27.6 | 19.1 | |
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 80.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 7

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 12.0

Elevation: _____ Source: SS2-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.27 | 21.83 | 678.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.00 | 20.34 | 572.72 | |
| WT. OF WATER LOST: | 2.27 | 1.49 | 105.68 | POST-IGNITION |
| WT. OF BOTTLE: | 22.34 | 12.94 | 86.71 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.66 | 7.40 | 486.01 | |
| PERCENT OF WATER: | 26.20 | 20.10 | 21.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 26.2 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 375

WT. OF TOTAL SAMPLE: 486.0 WT. OF WASH SAMPLE: 113.9

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 27.1 | 27.1 | 5.6 | 94.4 |
| 3/8" | 48.1 | 21.0 | 4.3 | 90.1 |
| # 4 | 57.4 | 9.3 | 1.9 | 88.2 |
| #10 | 111.1 | 53.7 | 11.0 | 77.1 |
| #40 | 7.4 | 7.4 | 5.0 | 72.1 |
| #200 | 17.4 | 10.0 | 6.8 | 65.4 |
| PASS #200 | | 96.5 | 65.4 | |
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 26.2 |
| PLASTIC LIMIT: | 20.1 |
| PLASTICITY INDEX: | 6.1 |
| % SAND AND GRAVEL: | 34.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(2) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 8

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 14.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.85 | 19.93 | 571.60 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 27.33 | 18.44 | 467.40 | |
| WT. OF WATER LOST: | 3.52 | 1.49 | 104.20 | POST-IGNITION |
| WT. OF BOTTLE: | 18.77 | 12.62 | 87.30 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.56 | 5.82 | 380.10 | |
| PERCENT OF WATER: | 41.10 | 25.60 | 27.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 41.1 | | | LOSS %: |

WT PASSING #10 SIEVE: 368

WT. OF TOTAL SAMPLE: 380.1 WT. OF WASH SAMPLE: 102.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 0.8 | 0.8 | 0.2 | 99.8 |
| #10 | 12.1 | 11.3 | 3.0 | 96.8 |
| #40 | 7.8 | 7.8 | 7.4 | 89.4 |
| #200 | 21.3 | 13.5 | 12.8 | 76.7 |
| PASS #200 | | 81.2 | 76.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 41.1 |
| PLASTIC LIMIT: | 25.6 |
| PLASTICITY INDEX: | 15.5 |
| % SAND AND GRAVEL: | 23.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-6(12) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 16.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 32.40 | 22.57 | 718.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 29.51 | 20.99 | 627.85 | |
| WT. OF WATER LOST: | 2.89 | 1.58 | 90.45 | POST-IGNITION |
| WT. OF BOTTLE: | 19.37 | 13.24 | 88.31 | DISH & SOIL: |
| WT. OF DRY SOIL: | 10.14 | 7.75 | 539.54 | |
| PERCENT OF WATER: | 28.50 | 20.40 | 16.80 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 28.5 | | | LOSS %: |

WT PASSING #10 SIEVE: 425

WT. OF TOTAL SAMPLE: 539.5 WT. OF WASH SAMPLE: 105.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 27.6 | 27.6 | 5.1 | 94.9 |
| 3/8" | 36.0 | 8.4 | 1.6 | 93.3 |
| # 4 | 51.0 | 15.0 | 2.8 | 90.5 |
| #10 | 114.2 | 63.2 | 11.7 | 78.8 |
| #40 | 16.0 | 16.0 | 12.0 | 66.8 |
| #200 | 37.3 | 21.3 | 16.0 | 50.8 |
| PASS #200 | | 67.7 | 50.8 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
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| | | | | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 28.5 |
| PLASTIC LIMIT: | 20.4 |
| PLASTICITY INDEX: | 8.1 |
| % SAND AND GRAVEL: | 49.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(2) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 18.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 34.51 | 20.58 | 665.50 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.42 | 19.17 | 561.27 | |
| WT. OF WATER LOST: | 3.09 | 1.41 | 104.23 | POST-IGNITION |
| WT. OF BOTTLE: | 21.99 | 12.73 | 86.55 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.43 | 6.44 | 474.72 | |
| PERCENT OF WATER: | 32.80 | 21.90 | 22.00 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 32.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 404

WT. OF TOTAL SAMPLE: 474.7 WT. OF WASH SAMPLE: 103.3

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 11.2 | 11.2 | 2.4 | 97.6 |
| #4 | 23.1 | 11.9 | 2.5 | 95.1 |
| #10 | 71.0 | 47.9 | 10.1 | 85.0 |
| #40 | 11.6 | 11.6 | 9.5 | 75.5 |
| #200 | 29.5 | 17.9 | 14.7 | 60.8 |
| PASS #200 | | 73.8 | 60.8 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 32.8 |
| PLASTIC LIMIT: | 21.9 |
| PLASTICITY INDEX: | 10.9 |
| % SAND AND GRAVEL: | 39.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(5) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 11

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 20.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.41 | 21.21 | 740.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.28 | 19.80 | 624.92 | |
| WT. OF WATER LOST: | 3.13 | 1.41 | 115.48 | POST-IGNITION |
| WT. OF BOTTLE: | 21.73 | 13.12 | 88.12 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.55 | 6.68 | 536.80 | |
| PERCENT OF WATER: | 36.60 | 21.10 | 21.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 36.6 | | | LOSS %: |

WT PASSING #10 SIEVE: 436

WT. OF TOTAL SAMPLE: 536.8 WT. OF WASH SAMPLE: 110.7

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 30.9 | 30.9 | 5.8 | 94.2 |
| #4 | 42.1 | 11.2 | 2.1 | 92.2 |
| #10 | 100.4 | 58.3 | 10.9 | 81.3 |
| #40 | 13.0 | 13.0 | 9.5 | 71.7 |
| #200 | 33.9 | 20.9 | 15.3 | 56.4 |
| PASS #200 | | 76.8 | 56.4 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 36.6 |
| PLASTIC LIMIT: | 21.1 |
| PLASTICITY INDEX: | 15.5 |
| % SAND AND GRAVEL: | 43.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(6) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 12

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 22.0

Elevation: _____ Source: SS2-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 32.00 | 30.71 | 526.60 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.88 | 29.19 | 449.37 | |
| WT. OF WATER LOST: | 3.12 | 1.52 | 77.23 | POST-IGNITION |
| WT. OF BOTTLE: | 19.24 | 22.27 | 76.45 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.64 | 6.92 | 372.92 | |
| PERCENT OF WATER: | 32.40 | 22.00 | 20.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 32.4 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 314

WT. OF TOTAL SAMPLE: 372.9 WT. OF WASH SAMPLE: 102.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 15.4 | 15.4 | 4.1 | 95.9 |
| #4 | 24.8 | 9.4 | 2.5 | 93.3 |
| #10 | 58.5 | 33.7 | 9.0 | 84.3 |
| #40 | 16.8 | 16.8 | 13.8 | 70.5 |
| #200 | 41.9 | 25.1 | 20.6 | 49.9 |
| PASS #200 | | 60.7 | 49.9 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 32.4 |
| PLASTIC LIMIT: | 22.0 |
| PLASTICITY INDEX: | 10.4 |
| % SAND AND GRAVEL: | 50.1 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(2) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 13

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 24.0

Elevation: Source: SS2-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.63 | | 638.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.62 | | 521.78 | |
| WT. OF WATER LOST: | 4.01 | | 116.42 | POST-IGNITION |
| WT. OF BOTTLE: | 21.20 | | 79.08 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.42 | | 442.70 | |
| PERCENT OF WATER: | 35.10 | | 26.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 35.1 | | | LOSS %: |

WT PASSING #10 SIEVE: 342

WT. OF TOTAL SAMPLE: 442.7 WT. OF WASH SAMPLE: 106.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 43.6 | 43.6 | 9.8 | 90.2 |
| #4 | 62.6 | 19.0 | 4.3 | 85.9 |
| #10 | 101.1 | 38.5 | 8.7 | 77.2 |
| #40 | 12.6 | 12.6 | 9.1 | 68.0 |
| #200 | 61.3 | 48.7 | 35.3 | 32.7 |
| PASS #200 | | 45.1 | 32.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 35.1 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 67.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS2-1

**Contract:** 25-106-02

**Boring Location:** Sta. 503+95, 105' Lt. I-95 Northbound

**Boring Surface Elev.:** 96.54 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** |
| **Core Bit:** | | **O.D.** | **O.D. of Rock Core:** | | **IN.** |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 24.0'
**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/28/2009 | | | | Dry | |
| | | | | | 96.5 |
| | | | | | 96.5 |
| | | | | | 96.5 |

**Pay Quantities:**
**2 1/2 in. Dia. Dry Sample Boring:** 26.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**
**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of:** **U-Samples:**
**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** **Ft.**

**Boring Contractor:** Walton Corporation
**Driller:** Gary Truver
**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 1.0' | 8<br>9 | Moist orange gravel and coarse to fine sand w/ some silt. | A-1-b | Asphalt - 7". |
| | | | 2.0' | | 9" RECOVERY | | |
| 2.35 | | 2 | 2.0' | 12<br>9<br>9<br>7 | Moist medium dense brown silty coarse to fine sand w/some gravel. | A-2-4(0) | |
| | | | 4.0' | | 15" RECOVERY | | |
| 4.7 | | 3 | 4.0' | 5<br>12<br>25<br>30 | Moist dense orange coarse sand and gravel w/ some fine sand and silt. | A-1-b | |
| | | | 6.0' | | 18" RECOVERY | | |
| 7.05 | | 4 | 6.0' | 58<br>61 | Moist very dense orange gravel and coarse to fine sand w/some silt. | A-1-b | |
| | | | 8.0' | | 10" RECOVERY | | |
| 9.4 | | 5 | 8.0' | 11<br>24<br>22<br>34 | Moist dense orange coarse sand and gravel w/ some fine sand and silt. | A-1-b | |
| | | | 10.0' | | 18" RECOVERY | | |
| 11.75 | | 6 | 10.0' | 50/5" | Moist very dense orange coarse to fine sand and gravel w/some silt. | A-1-b | |
| | | | 12.0' | | 5" RECOVERY | | |
| 14.1 | | 7 | 12.0' | 9<br>8<br>7<br>5 | Moist stiff gray clayey gravelly silt w/trace of fine to coarse sand. | A-4(2) | |
| | | | 14.0' | | 15" RECOVERY | | |

**Remarks:** GTA Inspector - D. Zmijewski - Boring offset 20' East due to lane closure.

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS2-1
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 8 | 14.0' | 6<br>4<br>4<br>12 | Wet firm grayish brown mottled clay w/some fine sand, trace of coarse sand and gravel. | A-7-6(12) | |
| | | | 16.0' | | 17" RECOVERY | | |
| 16.45 | | 9 | 16.0' | 13<br>13<br>17<br>17 | Moist very stiff orangish brown clayey gravelly silt w/some fine to coarse sand. | A-4(2) | |
| | | | 18.0' | | 21" RECOVERY | | |
| 18.8 | | 10 | 18.0' | 4<br>5<br>6<br>7 | Moist stiff orangish gray mottled clay w/some fine sand and gravel, trace of coarse sand. | A-6(5) | |
| | | | 20.0' | | 24" RECOVERY | | |
| 21.15 | | 11 | 20.0' | 8<br>9<br>10<br>12 | Wet very stiff orange clay w/some fine sand, trace of coarse sand and gravel. | A-6(6) | |
| | | | 22.0' | | 22" RECOVERY | | |
| 23.5 | | 12 | 22.0' | 5<br>6<br>8<br>8 | Wet stiff orange clayey fine sandy silt w/some gravel and coarse sand. | A-4(2) | |
| | | | 24.0' | | 22" RECOVERY | | |
| 25.85 | | 13 | 24.0' | 10<br>14<br>17<br>23 | Wet dense orangish white mottled silty fine sand and gravel w/trace of coarse sand. | A-2-4(0) | |
| | | | 26.0' | | 16" RECOVERY | | |
| 28.2 | | | | | End of Boring | | |
| 30.55 | | | | | | | |
| 32.9 | | | | | | | |
| 35.25 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|

**Strata symbols**

| | |
|---|---|
|  | Silty sand |
|  | Silty low plasticity clay |
|  | Poorly graded, silty or clayey sands and gravel |
|  | Clayey sand |

**Notes:**

1. Exploratory borings were drilled on 9-28-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 0.5

Elevation: _____ Source: SS2-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.00 | 23.78 | 181.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.16 | 22.33 | 164.88 | |
| WT. OF WATER LOST: | 2.84 | 1.45 | 16.32 | POST-IGNITION |
| WT. OF BOTTLE: | 22.38 | 15.42 | 77.61 | DISH & SOIL: |
| WT. OF DRY SOIL: | 7.78 | 6.91 | 87.27 | |
| PERCENT OF WATER: | 36.50 | 21.00 | 18.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 36.5 | | | LOSS %: _____ |

WT PASSING SIEVE:

| WT. OF TOTAL SAMPLE: | | WT. OF WASH SAMPLE: | | |
|---|---|---|---|---|
| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
| | | | | |
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 36.5 |
| PLASTIC LIMIT: | 21.0 |
| PLASTICITY INDEX: | 15.5 |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 2.0

Elevation: _____ Source: SS2-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 34.58 | 21.49 | 461.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.85 | 20.10 | 428.40 | |
| WT. OF WATER LOST: | 2.73 | 1.39 | 32.80 | POST-IGNITION |
| WT. OF BOTTLE: | 22.09 | 13.25 | 86.60 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.76 | 6.85 | 341.80 | |
| PERCENT OF WATER: | 28.00 | 20.30 | 9.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 28.0 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 175

WT. OF TOTAL SAMPLE: 341.8 WT. OF WASH SAMPLE: 51.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 29.3 | 29.3 | 8.6 | 91.4 |
| 3/8" | 96.8 | 67.5 | 19.7 | 71.7 |
| # 4 | 126.6 | 29.8 | 8.7 | 63.0 |
| #10 | 166.5 | 39.9 | 11.7 | 51.3 |
| #40 | 10.1 | 10.1 | 10.2 | 41.1 |
| #200 | 25.8 | 15.7 | 15.8 | 25.3 |
| PASS #200 | | 25.2 | 25.3 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 28.0 |
| PLASTIC LIMIT: | 20.3 |
| PLASTICITY INDEX: | 7.7 |
| % SAND AND GRAVEL: | 74.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 8.4

Elevation: _____ Source: SS2-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 129.10 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 127.45 | |
| WT. OF WATER LOST: | | | 1.65 | POST-IGNITION |
| WT. OF BOTTLE: | | | 97.36 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 30.09 | |
| PERCENT OF WATER: | | | 5.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 9.9

Elevation: Source: SS2-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 35.86 | 21.50 | 440.60 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.91 | 20.02 | 385.42 | |
| WT. OF WATER LOST: | 2.95 | 1.48 | 55.18 | POST-IGNITION |
| WT. OF BOTTLE: | 22.40 | 12.72 | 87.34 | DISH & SOIL: |
| WT. OF DRY SOIL: | 10.51 | 7.30 | 298.08 | |
| PERCENT OF WATER: | 28.10 | 20.30 | 18.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 28.1 | | | LOSS %: |

WT PASSING #10 SIEVE: 201

WT. OF TOTAL SAMPLE: 298.1 WT. OF WASH SAMPLE: 107.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 29.6 | 29.6 | 9.9 | 90.1 |
| 3/8" | 55.1 | 25.5 | 8.6 | 81.5 |
| # 4 | 72.7 | 17.6 | 5.9 | 75.6 |
| #10 | 97.0 | 24.3 | 8.2 | 67.5 |
| #40 | 24.2 | 24.2 | 15.2 | 52.3 |
| #200 | 63.4 | 39.2 | 24.6 | 27.7 |
| PASS #200 | | 44.1 | 27.7 | |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 28.1 |
| PLASTIC LIMIT: | 20.3 |
| PLASTICITY INDEX: | 7.8 |
| % SAND AND GRAVEL: | 72.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 18.4

Elevation: _____ Source: SS2-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.83 | 24.46 | 609.70 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.55 | 22.88 | 440.21 | |
| WT. OF WATER LOST: | 3.28 | 1.58 | 169.49 | POST-IGNITION |
| WT. OF BOTTLE: | 22.66 | 15.47 | 84.44 | DISH & SOIL: |
| WT. OF DRY SOIL: | 10.89 | 7.41 | 355.77 | |
| PERCENT OF WATER: | 30.10 | 21.30 | 47.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 30.1 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 235

WT. OF TOTAL SAMPLE: 355.8 WT. OF WASH SAMPLE: 112.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 23.0 | 23.0 | 6.5 | 93.5 |
| #4 | 65.9 | 42.9 | 12.1 | 81.5 |
| #10 | 120.7 | 54.8 | 15.4 | 66.1 |
| #40 | 22.7 | 22.7 | 13.3 | 52.7 |
| #200 | 49.3 | 26.6 | 15.6 | 37.1 |
| PASS #200 | | 63.2 | 37.1 | |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 30.1 |
| PLASTIC LIMIT: | 21.3 |
| PLASTICITY INDEX: | 8.8 |
| % SAND AND GRAVEL: | 62.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 19.9

Elevation: Source: SS2-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.99 | 22.27 | 294.50 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.00 | 20.56 | 249.98 | |
| WT. OF WATER LOST: | 2.99 | 1.71 | 44.52 | POST-IGNITION |
| WT. OF BOTTLE: | 22.13 | 15.08 | 87.57 | DISH & SOIL: |
| WT. OF DRY SOIL: | 5.87 | 5.48 | 162.41 | |
| PERCENT OF WATER: | 50.90 | 31.20 | 27.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 50.9 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 50.9 |
| PLASTIC LIMIT: | 31.2 |
| PLASTICITY INDEX: | 19.7 |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 7

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 21.4

Elevation: _____ Source: SS2-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 34.21 | 19.74 | 420.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.14 | 18.11 | 352.59 | |
| WT. OF WATER LOST: | 4.07 | 1.63 | 67.71 | POST-IGNITION |
| WT. OF BOTTLE: | 22.29 | 12.97 | 86.93 | DISH & SOIL: |
| WT. OF DRY SOIL: | 7.85 | 5.14 | 265.66 | |
| PERCENT OF WATER: | 51.80 | 31.70 | 25.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 51.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 189

WT. OF TOTAL SAMPLE: 265.7 WT. OF WASH SAMPLE: 101.8

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 2.4 | 2.4 | 0.9 | 99.1 |
| #4 | 19.8 | 17.4 | 6.5 | 92.5 |
| #10 | 76.3 | 56.5 | 21.3 | 71.3 |
| #40 | 39.4 | 39.4 | 27.6 | 43.7 |
| #200 | 57.6 | 18.2 | 12.7 | 30.9 |
| PASS #200 | | 44.2 | 30.9 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 51.8 |
| PLASTIC LIMIT: | 31.7 |
| PLASTICITY INDEX: | 20.1 |
| % SAND AND GRAVEL: | 69.1 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-7(2) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 8

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 22.9

Elevation: Source: SS2-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.68 | 20.15 | 467.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 26.35 | 18.04 | 354.48 | |
| WT. OF WATER LOST: | 4.33 | 2.11 | 112.72 | POST-IGNITION |
| WT. OF BOTTLE: | 19.43 | 13.24 | 80.76 | DISH & SOIL: |
| WT. OF DRY SOIL: | 6.92 | 4.80 | 273.72 | |
| PERCENT OF WATER: | 62.60 | 44.00 | 41.20 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 62.6 | | | LOSS %: |

WT PASSING #10 SIEVE: 264

WT. OF TOTAL SAMPLE: 273.7 WT. OF WASH SAMPLE: 106.2

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 2.9 | 2.9 | 1.1 | 98.9 |
| #4 | 3.6 | 0.7 | 0.3 | 98.7 |
| #10 | 10.0 | 6.4 | 2.3 | 96.3 |
| #40 | 12.8 | 12.8 | 11.6 | 84.7 |
| #200 | 37.1 | 24.3 | 22.0 | 62.7 |
| PASS #200 | | 69.1 | 62.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 62.6 |
| PLASTIC LIMIT: | 44.0 |
| PLASTICITY INDEX: | 18.6 |
| % SAND AND GRAVEL: | 37.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-5(13) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 24.4

Elevation: Source: SS2-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.13 | 20.60 | 418.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.32 | 18.52 | 324.79 | |
| WT. OF WATER LOST: | 4.81 | 2.08 | 93.51 | POST-IGNITION |
| WT. OF BOTTLE: | 19.38 | 12.89 | 81.46 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.94 | 5.63 | 243.33 | |
| PERCENT OF WATER: | 53.80 | 36.90 | 38.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 53.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 240

WT. OF TOTAL SAMPLE: 243.3 WT. OF WASH SAMPLE: 110.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 1.9 | 1.9 | 0.8 | 99.2 |
| #10 | 3.2 | 1.3 | 0.5 | 98.7 |
| #40 | 5.1 | 5.1 | 4.6 | 94.1 |
| #200 | 33.5 | 28.4 | 25.5 | 68.6 |
| PASS #200 | | 76.5 | 68.6 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 53.8 |
| PLASTIC LIMIT: | 36.9 |
| PLASTICITY INDEX: | 16.9 |
| % SAND AND GRAVEL: | 31.4 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-5(13) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS2-2

**Contract:** 25-106-02

**Boring Location:** Sta. 503+95, 20' Rt. I-95 Northbound

**Boring Surface Elev.:** 93.98 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 3.4

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/18/2009 | | | | Dry | |
| | | | | | 94.0 |
| | | | | | 94.0 |
| | | | | | 94.0 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 25.9 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 12.0 **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Jason Truver

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 2<br>50/3" | No Sieve Analysis - Indication of moist hard brown sandy lean clay. | | Topsoil - 7". |
| | | | 2.0' | | 2" RECOVERY | | |
| 2.35 | | 2 | 2.0' | 10<br>40<br>50/3" | Moist very dense brown clayey gravel w/some fine sand, trace of coarse sand. | A-2-4(0) | |
| | | | 3.4' | | 10" RECOVERY | | |
| | | R-1 | 3.4' | | Gniess, gray and white, coarse grained, slightly weathered, hard<br>10" Recovery = 16.67%<br>RQD = 0.0% (very poor) | | RQD - Rock Quality Designation |
| 4.7 | | | | | | | |
| 7.05 | | | 8.4' | | 10" RECOVERY | | |
| | | 3 | 8.4' | 9<br>11<br>10 | No Sieve Analysis - Indication of wet medium dense brown silty sand w/rock fragments. | | |
| 9.4 | | | 9.9' | | 1" RECOVERY | | |
| | | 4 | 9.9' | 4<br>13<br>50/4" | Wet very dense gray clayey gravel and fine sand. | A-2-4(0) | |
| | | | 11.4' | | 12" RECOVERY | | |
| 11.75 | | R-2 | 11.4' | | Gniess, gray and white, coarse grained, slightly weathered, hard + Quartz<br>7" Recovery = 29.17%<br>RQD = 0.0% (very poor) | | RQD - Rock Quality Designation |
| | | | 13.4' | | 7" RECOVERY | | |

**Remarks:** GTA Inspector - J. Lafferty - Boring offset 5' North due to boulder.

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS2-2
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 14.1 | | R-3 | 13.4' | | Gniess, gray and white, coarse grained, slightly weathered, hard<br>12" Recovery = 20.0%<br>RQD = 6.0% (very poor) | | RQD - Rock Quality Designation |
| 16.45 | | | 18.4' | | 12" RECOVERY | | |
| 18.8 | | 5 | 18.4' | 7<br>7<br>6 | Wet stiff brownish orange clayey gravelly silt w/some fine to coarse sand. | A-4(0) | |
| | | | 19.9' | | 12" RECOVERY | | |
| | | 6 | 19.9' | 4<br>4<br>7 | No Sieve Analysis - Indication of wet stiff brownish orange sandy lean clay, trace of rock fragments. | | |
| 21.15 | | | 21.4' | | 5" RECOVERY | | |
| | | 7 | 21.4' | 8<br>8<br>9 | Wet medium dense brownish orange clayey gravel and coarse sand w/some fine sand. | A-2-7(2) | |
| | | | 22.9' | | 10" RECOVERY | | |
| 23.5 | | 8 | 22.9' | 4<br>8<br>7 | Wet stiff red and white fine sand clay w/some coarse sand, trace of gravel. | A-7-5(13) | |
| | | | 24.4' | | 12" RECOVERY | | |
| | | 9 | 24.4' | 5<br>7<br>7 | Wet stiff brownish white fine sandy clay w/ trace of coarse sand and gravel. | A-7-5(13) | |
| 25.85 | | | 25.9' | | 12" RECOVERY | | |
| | | | | | End of Boring | | |
| 28.2 | | | | | | | |
| 30.55 | | | | | | | |
| 32.9 | | | | | | | |
| 35.25 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|

**Strata symbols**

Clayey sand

Frac rock

Silty sand

Elastic silt

**Notes:**

1. Exploratory borings were drilled on 9-18-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV TRAK CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.5

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.52 | 20.82 | 476.97 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.16 | 19.79 | 430.34 | |
| WT. OF WATER LOST: | 2.36 | 1.03 | 46.63 | POST-IGNITION |
| WT. OF BOTTLE: | 18.82 | 12.72 | 87.70 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.34 | 7.07 | 342.64 | |
| PERCENT OF WATER: | 25.30 | 14.60 | 13.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 25.3 | | | LOSS %: |

WT PASSING #10 SIEVE: 183

WT. OF TOTAL SAMPLE: 342.6 WT. OF WASH SAMPLE: 54.7

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 44.8 | 44.8 | 13.1 | 86.9 |
| #4 | 74.5 | 29.7 | 8.7 | 78.3 |
| #10 | 159.6 | 85.1 | 24.8 | 53.4 |
| #40 | 6.5 | 6.5 | 6.3 | 47.1 |
| #200 | 13.1 | 6.6 | 6.4 | 40.6 |
| PASS #200 | | 41.6 | 40.6 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 25.3 |
| PLASTIC LIMIT: | 14.6 |
| PLASTICITY INDEX: | 10.7 |
| % SAND AND GRAVEL: | 59.4 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(1) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 31.97 | 21.50 | 570.68 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 29.66 | 20.41 | 489.78 | |
| WT. OF WATER LOST: | 2.31 | 1.09 | 80.90 | POST-IGNITION |
| WT. OF BOTTLE: | 22.39 | 12.97 | 98.97 | DISH & SOIL: |
| WT. OF DRY SOIL: | 7.27 | 7.44 | 390.81 | |
| PERCENT OF WATER: | 31.80 | 14.70 | 20.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 31.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 306

WT. OF TOTAL SAMPLE: 390.8 WT. OF WASH SAMPLE: 111.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 8.3 | 8.3 | 2.1 | 97.9 |
| #4 | 24.6 | 16.3 | 4.2 | 93.7 |
| #10 | 84.5 | 59.9 | 15.3 | 78.4 |
| #40 | 18.1 | 18.1 | 12.7 | 65.6 |
| #200 | 39.5 | 21.4 | 15.1 | 50.6 |
| PASS #200 | | 71.9 | 50.6 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 31.8 |
| PLASTIC LIMIT: | 14.7 |
| PLASTICITY INDEX: | 17.1 |
| % SAND AND GRAVEL: | 49.4 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(5) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2A

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 3.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 37.48 | | 397.83 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 35.65 | | 317.80 | |
| WT. OF WATER LOST: | 1.83 | | 80.03 | POST-IGNITION |
| WT. OF BOTTLE: | 22.89 | | 86.41 | DISH & SOIL: |
| WT. OF DRY SOIL: | 12.76 | | 231.39 | |
| PERCENT OF WATER: | 14.30 | | 34.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 14.3 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 162

WT. OF TOTAL SAMPLE: 231.4 WT. OF WASH SAMPLE: 53.3

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 13.9 | 13.9 | 6.0 | 94.0 |
| #4 | 37.4 | 23.5 | 10.2 | 83.8 |
| #10 | 69.6 | 32.2 | 13.9 | 69.9 |
| #40 | 13.7 | 13.7 | 18.0 | 51.9 |
| #200 | 27.4 | 13.7 | 18.0 | 34.0 |
| PASS #200 | | 25.9 | 34.0 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 14.3 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 66.0 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 40.11 | | 586.00 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.79 | | 402.78 | |
| WT. OF WATER LOST: | 6.32 | | 183.22 | POST-IGNITION |
| WT. OF BOTTLE: | 22.09 | | 77.29 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.70 | | 325.49 | |
| PERCENT OF WATER: | 54.00 | | 56.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 54.0 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 325

WT. OF TOTAL SAMPLE: 325.5 WT. OF WASH SAMPLE: 103.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #10 | 0.0 | 0.0 | 0.0 | 100.0 |
| #40 | 36.7 | 36.7 | 35.6 | 64.4 |
| #200 | 66.8 | 30.1 | 29.2 | 35.1 |
| PASS #200 | | 36.2 | 35.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 54.0 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 64.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-5(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 6.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 115.74 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 108.00 | |
| WT. OF WATER LOST: | | | 7.74 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.20 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 20.80 | |
| PERCENT OF WATER: | | | 37.20 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 8.0

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 771.38 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 610.80 | |
| WT. OF WATER LOST: | | | 160.58 | POST-IGNITION |
| WT. OF BOTTLE: | | | 86.56 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 524.24 | |
| PERCENT OF WATER: | | | 30.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 474

WT. OF TOTAL SAMPLE: 524.2 WT. OF WASH SAMPLE: 119.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 17.7 | 17.7 | 3.4 | 96.6 |
| #4 | 19.4 | 1.7 | 0.3 | 96.3 |
| #10 | 50.6 | 31.2 | 6.0 | 90.3 |
| #40 | 55.8 | 55.8 | 42.2 | 48.2 |
| #200 | 85.8 | 30.0 | 22.7 | 25.5 |
| PASS #200 | | 33.7 | 25.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 74.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 10.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 741.21 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 585.76 | |
| WT. OF WATER LOST: | | | 155.45 | POST-IGNITION |
| WT. OF BOTTLE: | | | 75.05 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 510.71 | |
| PERCENT OF WATER: | | | 30.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 438

WT. OF TOTAL SAMPLE: 510.7 WT. OF WASH SAMPLE: 113.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 2.9 | 2.9 | 0.6 | 99.4 |
| #4 | 16.6 | 13.7 | 2.7 | 96.7 |
| #10 | 72.4 | 55.8 | 10.9 | 85.8 |
| #40 | 54.9 | 54.9 | 41.5 | 44.3 |
| #200 | 83.1 | 28.2 | 21.3 | 23.0 |
| PASS #200 | | 30.5 | 23.0 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 77.0 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 7

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 12.0

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 631.95 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 495.18 | |
| WT. OF WATER LOST: | | | 136.77 | POST-IGNITION |
| WT. OF BOTTLE: | | | 86.64 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 408.54 | |
| PERCENT OF WATER: | | | 33.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 376

WT. OF TOTAL SAMPLE: 408.5 WT. OF WASH SAMPLE: 100.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 29.0 | 29.0 | 7.1 | 92.9 |
| #10 | 32.6 | 3.6 | 0.9 | 92.0 |
| #40 | 49.9 | 49.9 | 45.7 | 46.3 |
| #200 | 75.9 | 26.0 | 23.8 | 22.5 |
| PASS #200 | | 24.5 | 22.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 77.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 8

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 14.0

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 649.05 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 521.89 | |
| WT. OF WATER LOST: | | | 127.16 | POST-IGNITION |
| WT. OF BOTTLE: | | | 78.95 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 442.94 | |
| PERCENT OF WATER: | | | 28.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 391

WT. OF TOTAL SAMPLE: 442.9 WT. OF WASH SAMPLE: 121.8

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 10.0 | 10.0 | 2.3 | 97.7 |
| #10 | 52.2 | 42.2 | 9.5 | 88.2 |
| #40 | 53.9 | 53.9 | 39.0 | 49.2 |
| #200 | 85.8 | 31.9 | 23.1 | 26.1 |
| PASS #200 | | 36.0 | 26.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 73.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 16.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 392.32 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 330.26 | |
| WT. OF WATER LOST: | | | 62.06 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.13 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 243.13 | |
| PERCENT OF WATER: | | | 25.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 208

WT. OF TOTAL SAMPLE: 243.1 WT. OF WASH SAMPLE: 53.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 5.4 | 5.4 | 2.2 | 97.8 |
| #10 | 35.1 | 29.7 | 12.2 | 85.6 |
| #40 | 24.5 | 24.5 | 39.3 | 46.3 |
| #200 | 37.9 | 13.4 | 21.5 | 24.8 |
| PASS #200 | | 15.5 | 24.8 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 75.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 18.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 44.61 | | 714.55 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 38.21 | | 559.51 | |
| WT. OF WATER LOST: | 6.40 | | 155.04 | POST-IGNITION |
| WT. OF BOTTLE: | 22.40 | | 86.46 | DISH & SOIL: |
| WT. OF DRY SOIL: | 15.81 | | 473.05 | |
| PERCENT OF WATER: | 40.50 | | 32.80 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 40.5 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 434

WT. OF TOTAL SAMPLE: 473.1 WT. OF WASH SAMPLE: 102.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 5.8 | 5.8 | 1.2 | 98.8 |
| #10 | 39.5 | 33.7 | 7.1 | 91.6 |
| #40 | 36.4 | 36.4 | 32.5 | 59.1 |
| #200 | 60.0 | 23.6 | 21.1 | 38.0 |
| PASS #200 | | 42.5 | 38.0 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 40.5 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 62.0 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 11

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 20.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 45.37 | | 723.43 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 38.72 | | 566.64 | |
| WT. OF WATER LOST: | 6.65 | | 156.79 | POST-IGNITION |
| WT. OF BOTTLE: | 22.29 | | 86.80 | DISH & SOIL: |
| WT. OF DRY SOIL: | 16.43 | | 479.84 | |
| PERCENT OF WATER: | 40.50 | | 32.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 40.5 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 447

WT. OF TOTAL SAMPLE: 479.8 WT. OF WASH SAMPLE: 102.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 3.4 | 3.4 | 0.7 | 99.3 |
| #10 | 33.3 | 29.9 | 6.2 | 93.1 |
| #40 | 30.7 | 30.7 | 27.9 | 65.2 |
| #200 | 58.2 | 27.5 | 25.0 | 40.2 |
| PASS #200 | | 44.3 | 40.2 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 40.5 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 59.8 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 12

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 22.0

Elevation: _____ Source: SS4-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 31.88 | 19.29 | 639.04 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 29.28 | 18.36 | 458.06 | |
| WT. OF WATER LOST: | 2.60 | 0.93 | 180.98 | POST-IGNITION |
| WT. OF BOTTLE: | 19.23 | 13.00 | 88.31 | DISH & SOIL: |
| WT. OF DRY SOIL: | 10.05 | 5.36 | 369.75 | |
| PERCENT OF WATER: | 25.90 | 17.40 | 48.90 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 25.9 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 363

WT. OF TOTAL SAMPLE: 369.8 WT. OF WASH SAMPLE: 100.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 6.8 | 6.8 | 1.8 | 98.2 |
| #40 | 14.2 | 14.2 | 13.9 | 84.3 |
| #200 | 53.3 | 39.1 | 38.2 | 46.2 |
| PASS #200 | | 47.3 | 46.2 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 25.9 |
| PLASTIC LIMIT: | 17.4 |
| PLASTICITY INDEX: | 8.5 |
| % SAND AND GRAVEL: | 53.8 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(1) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 13

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 24.0

Elevation: Source: SS4-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 37.22 | | 684.32 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.84 | | 557.06 | |
| WT. OF WATER LOST: | 4.38 | | 127.26 | POST-IGNITION |
| WT. OF BOTTLE: | 21.26 | | 89.39 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.58 | | 467.67 | |
| PERCENT OF WATER: | 37.80 | | 27.20 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 37.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 437

WT. OF TOTAL SAMPLE: 467.7 WT. OF WASH SAMPLE: 110.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 30.8 | 30.8 | 6.6 | 93.4 |
| #40 | 43.0 | 43.0 | 36.3 | 57.1 |
| #200 | 76.6 | 33.6 | 28.4 | 28.7 |
| PASS #200 | | 34.0 | 28.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 37.8 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 71.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS4-1

**Contract:** 25-106-02

**Boring Location:** Sta. 26+21, 30' Lt. Ramp 5

**Boring Surface Elev.:** 138.96 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | | **O.D.** | **O.D. of Rock Core:** | | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 24.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/3/2009 | 9:00 a.m. | 24.0' | | 7.1' | 131.9 |
| | | | | | 139.0 |
| | | | | | 139.0 |
| | | | | | 139.0 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 26.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Jason Truver

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 2<br>11<br>10 | Moist very stiff brown clayey gravelly silt w/ trace of fine to coarse sand. | A-4(1) | Topsoil - 6". |
| | | | 2.0' | | 12" RECOVERY | | |
| 2.43 | | 2 | 2.0' | 4<br>7 | Moist very stiff brown gravelly clay w/some fine to coarse sand. | A-6(5) | |
| | | | 3.0' | | 12" RECOVERY | | |
| | | 2A | 3.0' | 9<br>9 | Wet medium dense white silty gravel w/some fine to coarse sand. | A-2-4(0) | |
| | | | 4.0' | | 9" RECOVERY | | |
| | | 3 | 4.0' | 2<br>4<br>7<br>8 | Wet medium dense brown silty coarse to fine sand. | A-2-5(0) | |
| 4.86 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 4<br>7<br>7<br>5 | No Sieve Analysis - Indication of wet medium dense white silty sand. | | |
| 7.29 | ▽ | | 8.0' | | 1" RECOVERY | | |
| | | 5 | 8.0' | 2<br>5<br>9<br>10 | Wet medium dense tan and white silty coarse to fine sand w/trace of gravel. | A-2-4(0) | |
| 9.72 | | | 10.0' | | 19" RECOVERY | | |
| | | 6 | 10.0' | 6<br>6<br>7<br>9 | Wet medium dense tan and white silty coarse to fine sand w/some gravel. | A-1-b | |
| 12.15 | | | 12.0' | | 20" RECOVERY | | |
| | | 7 | 12.0' | 2<br>2<br>8<br>16 | Wet loose tan and white silty coarse to fine sand w/trace of gravel. | A-1-b | |
| | | | 14.0' | | 19" RECOVERY | | |

**Remarks:** GTA Inspector - J. Williams

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS4-1
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 14.58 | | 8 | 14.0' | 2<br>2<br>1<br>8 | Wet very loose tan silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| | | | 16.0' | | 17" RECOVERY | | |
| | | 9 | 16.0' | 7<br>8<br>8<br>4 | Wet medium dense tan silty coarse to fine sand w/some gravel. | A-1-b | |
| 17.01 | | | 18.0' | | 10" RECOVERY | | |
| | | 10 | 18.0' | 2<br>4<br>4<br>6 | Wet firm tan coarse to fine sandy silt w/trace of gravel. | A-4(0) | |
| 19.44 | | | 20.0' | | 18" RECOVERY | | |
| | | 11 | 20.0' | 5<br>6<br>5<br>6 | Wet stiff tan coarse to fine sandy silt w/trace of gravel. | A-4(0) | |
| 21.87 | | | 22.0' | | 19" RECOVERY | | |
| | | 12 | 22.0' | 6<br>9<br>9<br>11 | Wet very stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | |
| | | | 24.0' | | 14" RECOVERY | | |
| 24.3 | | 13 | 24.0' | 7<br>9<br>11<br>16 | Wet medium dense brownish white silty coarse to fine sand w/trace of gravel. | A-2-4(0) | |
| | | | 26.0' | | 12" RECOVERY | | |
| 26.73 | | | | | End of Boring | | |
| 29.16 | | | | | | | |
| 31.59 | | | | | | | |
| 34.02 | | | | | | | |
| 36.45 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
|  | Clayey sand |
|  | Low plasticity clay |
|  | Silty sand |
| **Misc. Symbols** | |
|  | Water table during drilling |

**Notes:**

1. Exploratory borings were drilled on 9-3-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.5

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 43.06 | 30.45 | 498.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 38.31 | 28.77 | 412.93 | |
| WT. OF WATER LOST: | 4.75 | 1.68 | 85.37 | POST-IGNITION |
| WT. OF BOTTLE: | 22.02 | 21.35 | 79.58 | DISH & SOIL: |
| WT. OF DRY SOIL: | 16.29 | 7.42 | 333.35 | |
| PERCENT OF WATER: | 29.20 | 22.60 | 25.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 29.2 | | | LOSS %: |

WT PASSING #10 SIEVE: 289

WT. OF TOTAL SAMPLE: 333.4 WT. OF WASH SAMPLE: 110.7

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 4.4 | 4.4 | 1.3 | 98.7 |
| #4 | 7.6 | 3.2 | 1.0 | 97.7 |
| #10 | 44.3 | 36.7 | 11.0 | 86.7 |
| #40 | 14.1 | 14.1 | 11.0 | 75.7 |
| #200 | 34.0 | 19.9 | 15.6 | 60.1 |
| PASS #200 | | 76.7 | 60.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 29.2 |
| PLASTIC LIMIT: | 22.6 |
| PLASTICITY INDEX: | 6.6 |
| % SAND AND GRAVEL: | 39.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(2) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 39.62 | 27.71 | 312.30 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 35.26 | 26.04 | 277.03 | |
| WT. OF WATER LOST: | 4.36 | 1.67 | 35.27 | POST-IGNITION |
| WT. OF BOTTLE: | 22.25 | 19.37 | 86.22 | DISH & SOIL: |
| WT. OF DRY SOIL: | 13.01 | 6.67 | 190.81 | |
| PERCENT OF WATER: | 33.50 | 25.00 | 18.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 33.5 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 33.5 |
| PLASTIC LIMIT: | 25.0 |
| PLASTICITY INDEX: | 8.5 |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2A

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 3.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 266.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 231.31 | |
| WT. OF WATER LOST: | | | 34.89 | POST-IGNITION |
| WT. OF BOTTLE: | | | 77.93 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 153.38 | |
| PERCENT OF WATER: | | | 22.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: SS4-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 194.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 177.32 | |
| WT. OF WATER LOST: | | | 16.88 | POST-IGNITION |
| WT. OF BOTTLE: | | | 86.69 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 90.63 | |
| PERCENT OF WATER: | | | 18.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 6.0

Elevation: _____ Source: SS4-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 162.00 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 147.64 | |
| WT. OF WATER LOST: | | | 14.36 | POST-IGNITION |
| WT. OF BOTTLE: | | | 78.40 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 69.24 | |
| PERCENT OF WATER: | | | 20.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 8.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.65 | | 593.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.87 | | 445.59 | |
| WT. OF WATER LOST: | 5.78 | | 147.81 | POST-IGNITION |
| WT. OF BOTTLE: | 19.43 | | 89.19 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.44 | | 356.40 | |
| PERCENT OF WATER: | 50.50 | | 41.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 50.5 | | | LOSS %: |

WT PASSING #10 SIEVE: 333

WT. OF TOTAL SAMPLE: 356.4 WT. OF WASH SAMPLE: 114.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 3/8" | 0.0 | 0.0 | 0.0 | 100.0 |
| #4 | 1.2 | 1.2 | 0.3 | 99.7 |
| #10 | 23.6 | 22.4 | 6.3 | 93.4 |
| #40 | 34.4 | 34.4 | 28.1 | 65.3 |
| #200 | 66.3 | 31.9 | 26.0 | 39.3 |
| PASS #200 | | 48.2 | 39.3 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 50.5 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 60.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-5(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 10.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 44.04 | | 643.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 35.98 | | 403.46 | |
| WT. OF WATER LOST: | 8.06 | | 239.74 | POST-IGNITION |
| WT. OF BOTTLE: | 23.47 | | 77.79 | DISH & SOIL: |
| WT. OF DRY SOIL: | 12.51 | | 325.67 | |
| PERCENT OF WATER: | 64.40 | | 73.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 64.4 | | | LOSS %: |

WT PASSING #10 SIEVE: 322

WT. OF TOTAL SAMPLE: 325.7 WT. OF WASH SAMPLE: 114.2

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 3.8 | 3.8 | 1.2 | 98.8 |
| #40 | 37.1 | 37.1 | 32.1 | 66.7 |
| #200 | 66.4 | 29.3 | 25.4 | 41.4 |
| PASS #200 | | 47.8 | 41.4 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 64.4 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 58.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-5(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 7

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 12.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 38.50 | | 721.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.32 | | 519.13 | |
| WT. OF WATER LOST: | 6.18 | | 202.07 | POST-IGNITION |
| WT. OF BOTTLE: | 19.57 | | 89.39 | DISH & SOIL: |
| WT. OF DRY SOIL: | 12.75 | | 429.74 | |
| PERCENT OF WATER: | 48.50 | | 47.00 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 48.5 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 48.5 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 8

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 14.0

Elevation: Source: SS4-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 37.10 | | 277.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.10 | | 240.52 | |
| WT. OF WATER LOST: | 4.00 | | 36.88 | POST-IGNITION |
| WT. OF BOTTLE: | 20.94 | | 87.34 | DISH & SOIL: |
| WT. OF DRY SOIL: | 12.16 | | 153.18 | |
| PERCENT OF WATER: | 32.90 | | 24.10 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 32.9 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | 32.9 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 16.0

Elevation: _____ Source: SS4-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 156.90 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 143.16 | |
| WT. OF WATER LOST: | | | 13.74 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.49 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 55.67 | |
| PERCENT OF WATER: | | | 24.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
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## SUMMARY

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|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 23.0

Elevation: _____ Source: SS4-2

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 533.90 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 491.51 | |
| WT. OF WATER LOST: | | | 42.39 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.23 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 404.28 | |
| PERCENT OF WATER: | | | 10.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 213

WT. OF TOTAL SAMPLE: 404.3 WT. OF WASH SAMPLE: 54.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 123.7 | 123.7 | 30.6 | 69.4 |
| #4 | 159.6 | 35.9 | 8.9 | 60.5 |
| #10 | 191.2 | 31.6 | 7.8 | 52.7 |
| #40 | 14.8 | 14.8 | 14.3 | 38.4 |
| #200 | 39.9 | 25.1 | 24.3 | 14.1 |
| PASS #200 | | 14.6 | 14.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 85.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS4-2

**Contract:** 25-106-02

**Boring Location:** Sta. 26+21, 50' Rt. Ramp 5

**Boring Surface Elev.:** 139.09 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 18.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/9/2009 | 9:00 a.m. | 18.0' | | 7.0' | 132.1 |
| | | | | | 139.1 |
| | | | | | 139.1 |
| | | | | | 139.1 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 24.5 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 10.0 **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Billy Holden

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 1 2 3 | Moist firm black and gray clayey silt w/some fine to coarse sand and gravel. | A-4(2) | Topsoil - 4". |
| | | | 2.0' | | 12" RECOVERY | | |
| 2.43 | | 2 | 2.0' | 3 4 | No Sieve Analysis - Indication of moist stiff brown clayey silt. | | |
| | | | 3.0' | | 8" RECOVERY | | |
| | | 2A | 3.0' | 10 8 | No Sieve Analysis - Indication of moist stiff brownish orange silt. | | |
| | | | 4.0' | | 6" RECOVERY | | |
| | | 3 | 4.0' | 10 9 8 9 | No Sieve Analysis - Indication of moist medium dense brownish orange silty sand. | | |
| 4.86 | | | | | | | |
| | | | 6.0' | | 4" RECOVERY | | |
| | | 4 | 6.0' | 12 7 4 2 | No Sieve Analysis - Indication of wet medium dense brownish orange silty sand. | | |
| 7.29 | ▽ | | | | | | |
| | | | 8.0' | | 4" RECOVERY | | |
| | | 5 | 8.0' | 1 2 3 4 | Wet firm brownish orange coarse to fine sandy silt w/trace of gravel. | A-5(0) | |
| 9.72 | | | | | | | |
| | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 4 6 9 8 | Wet stiff brownish orange coarse to fine sandy silt w/trace of gravel. | A-5(0) | |
| | | | 12.0' | | 19" RECOVERY | | |
| 12.15 | | 7 | 12.0' | 4 3 3 2 | No Sieve Analysis - Indication of wet firm brownish white sandy silt. | | |
| | | | 14.0' | | 22" RECOVERY | | |

**Remarks:** GTA Inspector - J. Lafferty

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS4-2
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 14.58 | | 8 | 14.0' | 21<br>50/1" | No Sieve Analysis - Indication of wet very dense orangish white slightly mottled silty sand, trace of gravel. | | |
| | | | 16.0' | | 6" RECOVERY | | |
| | | 9 | 16.0' | 50/3" | No Sieve Analysis - Indication of wet very dense orangish white slightly mottled silty sand, trace of gravel. | | |
| 17.01 | | | 18.0' | | 2" RECOVERY | | |
| | | R-1 | 18.0' | | Gniess, gray and white, coarse grained, slightly weathered<br>14" Recovery = 23.33%<br>RQD = 0.0% (very poor) | | RQD - Rock Quality Designation |
| 19.44 | | | | | | | |
| 21.87 | | | 23.0' | | 14" RECOVERY | | |
| | | 10 | 23.0' | 35<br>27<br>50/3" | Wet very dense brown gravel and fine sand w/ some coarse sand and silt. | A-1-b | |
| 24.3 | | | 24.5' | | 14" RECOVERY | | |
| | | R-2 | 24.5' | | Gniess, gray and white, coarse grained, unweathered, hard<br>45" Recovery = 75.0%<br>RQD = 51.6% (fair) | | RQD - Rock Quality Designation |
| 26.73 | | | | | | | |
| 29.16 | | | 29.5' | | 45" RECOVERY | | |
| | | | | | End of Boring | | |
| 31.59 | | | | | | | |
| 34.02 | | | | | | | |
| 36.45 | | | | | | | |

# KEY TO SYMBOLS

**Symbol Description**

**Strata symbols**

**Silt**

**Silty sand**

**Frac rock**

**Misc. Symbols**

**Water table during drilling**

**Notes:**

1. **Exploratory borings were drilled on 9-9-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.**

2. **No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.**

3. **Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.**

4. **These logs are subject to the limitations, conclusions, and recommendations in this report.**

5. **Results of tests conducted on samples recovered are reported on the logs.**

6. **All blow counts are uncorrected.**

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.5

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.48 | 20.33 | 419.70 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.34 | 18.82 | 373.39 | |
| WT. OF WATER LOST: | 3.14 | 1.51 | 46.31 | POST-IGNITION |
| WT. OF BOTTLE: | 22.35 | 13.12 | 77.29 | DISH & SOIL: |
| WT. OF DRY SOIL: | 7.99 | 5.70 | 296.10 | |
| PERCENT OF WATER: | 39.30 | 26.50 | 15.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 39.3 | | | LOSS %: |

WT PASSING #10 SIEVE: 243

WT. OF TOTAL SAMPLE: 296.1 WT. OF WASH SAMPLE: 100.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 4.4 | 4.4 | 1.5 | 98.5 |
| #4 | 13.5 | 9.1 | 3.1 | 95.4 |
| #10 | 52.9 | 39.4 | 13.3 | 82.1 |
| #40 | 20.6 | 20.6 | 16.9 | 65.2 |
| #200 | 44.9 | 24.3 | 20.0 | 45.3 |
| PASS #200 | | 55.1 | 45.3 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 39.3 |
| PLASTIC LIMIT: | 26.5 |
| PLASTICITY INDEX: | 12.8 |
| % SAND AND GRAVEL: | 54.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(3) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.83 | 20.73 | 525.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 27.66 | 19.26 | 466.02 | |
| WT. OF WATER LOST: | 3.17 | 1.47 | 59.18 | POST-IGNITION |
| WT. OF BOTTLE: | 19.09 | 13.24 | 86.22 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.57 | 6.02 | 379.80 | |
| PERCENT OF WATER: | 37.00 | 24.40 | 15.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 37.0 | | | LOSS %: |

WT PASSING #10 SIEVE: 230

WT. OF TOTAL SAMPLE: 379.8 WT. OF WASH SAMPLE: 107.9

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 55.0 | 55.0 | 14.5 | 85.5 |
| #4 | 85.0 | 30.0 | 7.9 | 77.6 |
| #10 | 149.4 | 64.4 | 17.0 | 60.7 |
| #40 | 20.6 | 20.6 | 11.6 | 49.1 |
| #200 | 43.3 | 22.7 | 12.8 | 36.3 |
| PASS #200 | | 64.6 | 36.3 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 37.0 |
| PLASTIC LIMIT: | 24.4 |
| PLASTICITY INDEX: | 12.6 |
| % SAND AND GRAVEL: | 63.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(1) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 4.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.76 | 24.72 | 816.70 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.87 | 23.16 | 731.64 | |
| WT. OF WATER LOST: | 3.89 | 1.56 | 85.06 | POST-IGNITION |
| WT. OF BOTTLE: | 18.86 | 15.08 | 77.59 | DISH & SOIL: |
| WT. OF DRY SOIL: | 14.01 | 8.08 | 654.05 | |
| PERCENT OF WATER: | 27.80 | 19.30 | 13.00 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 27.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 576

WT. OF TOTAL SAMPLE: 654.0 WT. OF WASH SAMPLE: 120.3

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 6.7 | 6.7 | 1.0 | 99.0 |
| #4 | 21.7 | 15.0 | 2.3 | 96.7 |
| #10 | 78.2 | 56.5 | 8.6 | 88.0 |
| #40 | 30.2 | 30.2 | 22.1 | 65.9 |
| #200 | 61.4 | 31.2 | 22.8 | 43.1 |
| PASS #200 | | 58.9 | 43.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 27.8 |
| PLASTIC LIMIT: | 19.3 |
| PLASTICITY INDEX: | 8.5 |
| % SAND AND GRAVEL: | 56.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(1) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 6.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.44 | 22.89 | 977.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.31 | 21.15 | 799.72 | |
| WT. OF WATER LOST: | 5.13 | 1.74 | 177.68 | POST-IGNITION |
| WT. OF BOTTLE: | 21.19 | 14.81 | 78.97 | DISH & SOIL: |
| WT. OF DRY SOIL: | 10.12 | 6.34 | 720.75 | |
| PERCENT OF WATER: | 50.70 | 27.40 | 24.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 50.7 | | | LOSS %: |

WT PASSING #10 SIEVE: 680

WT. OF TOTAL SAMPLE: 720.8 WT. OF WASH SAMPLE: 124.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 0.6 | 0.6 | 0.1 | 99.9 |
| #4 | 6.8 | 6.2 | 0.9 | 99.1 |
| #10 | 40.9 | 34.1 | 4.7 | 94.3 |
| #40 | 19.0 | 19.0 | 14.4 | 79.9 |
| #200 | 38.9 | 19.9 | 15.1 | 64.8 |
| PASS #200 | | 85.2 | 64.8 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 50.7 |
| PLASTIC LIMIT: | 27.4 |
| PLASTICITY INDEX: | 23.3 |
| % SAND AND GRAVEL: | 35.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-6(15) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 8.0

Elevation: _____ Source: SS5-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.31 | 20.55 | 570.20 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.54 | 18.14 | 431.13 | |
| WT. OF WATER LOST: | 4.77 | 2.41 | 139.07 | POST-IGNITION |
| WT. OF BOTTLE: | 21.25 | 12.63 | 87.30 | DISH & SOIL: |
| WT. OF DRY SOIL: | 7.29 | 5.51 | 343.83 | |
| PERCENT OF WATER: | 65.40 | 43.70 | 40.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 65.4 | | | LOSS %: |

WT PASSING #10 SIEVE: 294

WT. OF TOTAL SAMPLE: 343.8 WT. OF WASH SAMPLE: 111.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 2.0 | 2.0 | 0.6 | 99.4 |
| #4 | 5.5 | 3.5 | 1.0 | 98.4 |
| #10 | 49.5 | 44.0 | 12.8 | 85.6 |
| #40 | 18.9 | 18.9 | 14.6 | 71.0 |
| #200 | 39.6 | 20.7 | 15.9 | 55.1 |
| PASS #200 | | 71.5 | 55.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 65.4 |
| PLASTIC LIMIT: | 43.7 |
| PLASTICITY INDEX: | 21.7 |
| % SAND AND GRAVEL: | 44.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-5(11) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 10.0

Elevation: _____ Source: SS5-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 33.55 | 19.87 | 696.00 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 29.37 | 18.20 | 533.50 | |
| WT. OF WATER LOST: | 4.18 | 1.67 | 162.50 | POST-IGNITION |
| WT. OF BOTTLE: | 20.66 | 13.26 | 87.30 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.71 | 4.94 | 446.20 | |
| PERCENT OF WATER: | 48.00 | 33.80 | 36.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 48.0 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 446

WT. OF TOTAL SAMPLE: 446.2 WT. OF WASH SAMPLE: 117.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #10 | 0.0 | 0.0 | 0.0 | 100.0 |
| #40 | 23.2 | 23.2 | 19.7 | 80.3 |
| #200 | 61.3 | 38.1 | 32.4 | 47.8 |
| PASS #200 | | 56.2 | 47.8 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 48.0 |
| PLASTIC LIMIT: | 33.8 |
| PLASTICITY INDEX: | 14.2 |
| % SAND AND GRAVEL: | 52.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-5(4) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 7

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 12.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 39.24 | | 618.40 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.96 | | 514.76 | |
| WT. OF WATER LOST: | 5.28 | | 103.64 | POST-IGNITION |
| WT. OF BOTTLE: | 22.18 | | 78.95 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.78 | | 435.81 | |
| PERCENT OF WATER: | 44.80 | | 23.80 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 44.8 | | | LOSS %: |

WT PASSING #10 SIEVE: 337

WT. OF TOTAL SAMPLE: 435.8 WT. OF WASH SAMPLE: 103.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 49.1 | 49.1 | 11.3 | 88.7 |
| #4 | 57.4 | 8.3 | 1.9 | 86.8 |
| #10 | 99.3 | 41.9 | 9.6 | 77.2 |
| #40 | 39.5 | 39.5 | 29.5 | 47.7 |
| #200 | 75.2 | 35.7 | 26.7 | 21.1 |
| PASS #200 | | 28.2 | 21.1 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 44.8 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 78.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 8

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 14.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.03 | | 689.00 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 31.10 | | 530.27 | |
| WT. OF WATER LOST: | 4.93 | | 158.73 | POST-IGNITION |
| WT. OF BOTTLE: | 22.09 | | 77.28 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.01 | | 452.99 | |
| PERCENT OF WATER: | 54.70 | | 35.00 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 54.7 | | | LOSS %: |

WT PASSING #10 SIEVE: 447

WT. OF TOTAL SAMPLE: 453.0 WT. OF WASH SAMPLE: 107.7

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 6.2 | 6.2 | 1.4 | 98.6 |
| #40 | 29.8 | 29.8 | 27.3 | 71.3 |
| #200 | 60.2 | 30.4 | 27.8 | 43.5 |
| PASS #200 | | 47.5 | 43.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 54.7 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 56.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-5(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 16.0

Elevation: _____ Source: SS5-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 44.91 | | 782.00 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 37.98 | | 616.58 | |
| WT. OF WATER LOST: | 6.93 | | 165.42 | POST-IGNITION |
| WT. OF BOTTLE: | 22.13 | | 86.41 | DISH & SOIL: |
| WT. OF DRY SOIL: | 15.85 | | 530.17 | |
| PERCENT OF WATER: | 43.70 | | 31.20 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 43.7 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 439

WT. OF TOTAL SAMPLE: 530.2 WT. OF WASH SAMPLE: 114.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 53.9 | 53.9 | 10.2 | 89.8 |
| #4 | 61.3 | 7.4 | 1.4 | 88.4 |
| #10 | 90.9 | 29.6 | 5.6 | 82.9 |
| #40 | 32.0 | 32.0 | 23.2 | 59.7 |
| #200 | 62.6 | 30.6 | 22.1 | 37.6 |
| PASS #200 | | 51.9 | 37.6 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 43.7 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 62.4 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-5(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 18.0

Elevation: Source: SS5-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 39.10 | | 646.60 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.14 | | 506.13 | |
| WT. OF WATER LOST: | 5.96 | | 140.47 | POST-IGNITION |
| WT. OF BOTTLE: | 21.11 | | 86.46 | DISH & SOIL: |
| WT. OF DRY SOIL: | 12.03 | | 419.67 | |
| PERCENT OF WATER: | 49.50 | | 33.50 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 49.5 | | | LOSS %: |

WT PASSING #10 SIEVE: 291

WT. OF TOTAL SAMPLE: 419.7 WT. OF WASH SAMPLE: 103.8

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 73.3 | 73.3 | 17.5 | 82.5 |
| #4 | 80.3 | 7.0 | 1.7 | 80.9 |
| #10 | 128.3 | 48.0 | 11.4 | 69.4 |
| #40 | 32.1 | 32.1 | 21.5 | 48.0 |
| #200 | 65.2 | 33.1 | 22.1 | 25.8 |
| PASS #200 | | 38.6 | 25.8 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 49.5 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 74.2 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-5(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS5-1

**Contract:** 25-106-02

**Boring Location:** Sta. 1011+00, 65' Lt. U.S. 202

**Boring Surface Elev.:** 186.27 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 20.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/9/2009 | 11:00 a.m. | 20.0' | | Dry | |
| | | | | | 186.3 |
| | | | | | 186.3 |
| | | | | | 186.3 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 20.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 5.0 **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Gary Truver

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 9<br>25<br>11 | Moist hard brown clay w/some fine to coarse sand and gravel. | A-6(3) | Topsoil - 4".<br>Rock Fragments |
| | | | 2.0' | | 11" RECOVERY | | |
| 2.43 | | 2 | 2.0' | 5<br>5<br>9<br>39 | Moist stiff brown gravelly clay w/some fine to coarse sand. | A-6(1) | Rock Fragments |
| | | | 4.0' | | 10" RECOVERY | | |
| | | 3 | 4.0' | 10<br>16<br>11<br>11 | Moist very stiff brown clayey fine to coarse sandy silt w/some gravel. | A-4(1) | |
| 4.86 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 12<br>13<br>13<br>14 | Wet very stiff brown clay w/some fine to coarse sand, trace of gravel. | A-7-6(15) | |
| 7.29 | | | 8.0' | | 23" RECOVERY | | |
| | | 5 | 8.0' | 4<br>7<br>14<br>16 | Wet very stiff orange clay w/some fine to coarse sand and gravel. | A-7-5(11) | |
| 9.72 | | | 10.0' | | 13" RECOVERY | | |
| | | 6 | 10.0' | 14<br>15<br>13<br>21 | Wet hard orange fine sandy clay w/some coarse sand. | A-7-5(4) | |
| 12.15 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 8<br>19<br>17<br>15 | Wet dense brown silty micaceous coarse to fine sand and gravel. | A-1-b | Rock Fragments |
| | | | 14.0' | | 15" RECOVERY | | |

**Remarks:** GTA Inspector - T. Kane

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS5-1
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 14.58 | | 8 | 14.0' | 4<br>7<br>9<br>8 | Wet very stiff brown coarse to fine sandy micaceous silt w/trace of gravel. | A-5(0) | |
| | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 10<br>14<br>14<br>29 | Wet very stiff brown coarse to fine sandy mnicaceous silt w/some gravel. | A-5(0) | Rock Fragments |
| 17.01 | | | 18.0' | | 21" RECOVERY | | |
| | | 10 | 18.0' | 5<br>9<br>10<br>22 | Wet medium dense brown silty gravel and fine to coarse sand. | A-2-5(0) | Rock Fragments |
| 19.44 | | | 20.0' | | 14" RECOVERY | | |
| | | R-1 | 20.0' | | Gniess, gray, hard, fractured<br>45" Recovery = 75.0%<br>RQD = 36.0% (poor) | | RQD - Rock Quality Designation |
| 21.87 | | | | | | | |
| 24.3 | | | 25.0' | | 45" RECOVERY | | |
| | | | | | End of Boring | | |
| 26.73 | | | | | | | |
| 29.16 | | | | | | | |
| 31.59 | | | | | | | |
| 34.02 | | | | | | | |
| 36.45 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
|  | Silty sand |
|  | Clayey sand |
|  | High plasticity clay |
|  | Elastic silt |
|  | Frac rock |

**Notes:**

1. Exploratory borings were drilled on 9-9-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.5

Elevation: Source: SS6-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 24.01 | 21.98 | 633.36 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 21.08 | 20.74 | 526.04 | |
| WT. OF WATER LOST: | 2.93 | 1.24 | 107.32 | POST-IGNITION |
| WT. OF BOTTLE: | 12.62 | 15.42 | 86.53 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.46 | 5.32 | 439.51 | |
| PERCENT OF WATER: | 34.60 | 23.30 | 24.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 34.6 | | | LOSS %: |

WT PASSING #10 SIEVE: 434

WT. OF TOTAL SAMPLE: 439.5 WT. OF WASH SAMPLE: 101.3

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 5.5 | 5.5 | 1.3 | 98.7 |
| #40 | 0.2 | 0.2 | 0.2 | 98.6 |
| #200 | 3.3 | 3.1 | 3.0 | 95.5 |
| PASS #200 | | 98.0 | 95.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 34.6 |
| PLASTIC LIMIT: | 23.3 |
| PLASTICITY INDEX: | 11.3 |
| % SAND AND GRAVEL: | 4.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(12) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS6-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 25.90 | 21.77 | 665.15 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 22.19 | 20.72 | 545.89 | |
| WT. OF WATER LOST: | 3.71 | 1.05 | 119.26 | POST-IGNITION |
| WT. OF BOTTLE: | 12.60 | 16.54 | 80.23 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.59 | 4.18 | 465.66 | |
| PERCENT OF WATER: | 38.70 | 25.10 | 25.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 38.7 | | | LOSS %: |

WT PASSING #10 SIEVE: 450

WT. OF TOTAL SAMPLE: 465.7 WT. OF WASH SAMPLE: 117.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 4.3 | 4.3 | 0.9 | 99.1 |
| #4 | 8.1 | 3.8 | 0.8 | 98.3 |
| #10 | 15.5 | 7.4 | 1.6 | 96.7 |
| #40 | 6.0 | 6.0 | 5.0 | 91.7 |
| #200 | 20.9 | 14.9 | 12.3 | 79.4 |
| PASS #200 | | 96.1 | 79.4 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 38.7 |
| PLASTIC LIMIT: | 25.1 |
| PLASTICITY INDEX: | 13.6 |
| % SAND AND GRAVEL: | 20.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-6(11) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 4.0

Elevation: Source: SS6-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 24.84 | 19.97 | 505.35 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 21.17 | 18.22 | 400.70 | |
| WT. OF WATER LOST: | 3.67 | 1.75 | 104.65 | POST-IGNITION |
| WT. OF BOTTLE: | 12.88 | 12.94 | 86.40 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.29 | 5.28 | 314.30 | |
| PERCENT OF WATER: | 44.30 | 33.10 | 33.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 44.3 | | | LOSS %: |

WT PASSING #10 SIEVE: 285

WT. OF TOTAL SAMPLE: 314.3 WT. OF WASH SAMPLE: 107.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 8.1 | 8.1 | 2.6 | 97.4 |
| #4 | 17.0 | 8.9 | 2.8 | 94.6 |
| #10 | 28.9 | 11.9 | 3.8 | 90.8 |
| #40 | 16.7 | 16.7 | 14.2 | 76.6 |
| #200 | 49.7 | 33.0 | 28.0 | 48.7 |
| PASS #200 | | 57.4 | 48.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 44.3 |
| PLASTIC LIMIT: | 33.1 |
| PLASTICITY INDEX: | 11.2 |
| % SAND AND GRAVEL: | 51.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-7-5(3) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

## SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 6.0

Elevation: _____ Source: SS6-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 30.85 | 25.36 | 595.59 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 27.61 | 23.93 | 472.10 | |
| WT. OF WATER LOST: | 3.24 | 1.43 | 123.49 | POST-IGNITION |
| WT. OF BOTTLE: | 19.41 | 19.26 | 77.64 | DISH & SOIL: |
| WT. OF DRY SOIL: | 8.20 | 4.67 | 394.46 | |
| PERCENT OF WATER: | 39.50 | 30.60 | 31.30 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 39.5 | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 393

WT. OF TOTAL SAMPLE: 394.5 WT. OF WASH SAMPLE: 103.2

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| #4 | 0.0 | 0.0 | 0.0 | 100.0 |
| #10 | 1.1 | 1.1 | 0.3 | 99.7 |
| #40 | 16.0 | 16.0 | 15.5 | 84.3 |
| #200 | 59.0 | 43.0 | 41.6 | 42.7 |
| PASS #200 | | 44.2 | 42.7 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 39.5 |
| PLASTIC LIMIT: | 30.6 |
| PLASTICITY INDEX: | 8.9 |
| % SAND AND GRAVEL: | 57.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-4(1) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 8.0

Elevation: _____ Source: SS6-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 698.44 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 646.91 | |
| WT. OF WATER LOST: | | | 51.53 | POST-IGNITION |
| WT. OF BOTTLE: | | | 77.29 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 569.62 | |
| PERCENT OF WATER: | | | 9.00 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: _____ |

WT PASSING #10 SIEVE: 193

WT. OF TOTAL SAMPLE: 569.6 WT. OF WASH SAMPLE: 106.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 216.7 | 216.7 | 38.0 | 62.0 |
| #4 | 305.8 | 89.1 | 15.6 | 46.3 |
| #10 | 377.1 | 71.3 | 12.5 | 33.8 |
| #40 | 31.8 | 31.8 | 10.1 | 23.7 |
| #200 | 79.8 | 48.0 | 15.3 | 8.4 |
| PASS #200 | | 26.3 | 8.4 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 91.6 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-a |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 10.0

Elevation: Source: SS6-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 617.27 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 570.83 | |
| WT. OF WATER LOST: | | | 46.44 | POST-IGNITION |
| WT. OF BOTTLE: | | | 86.10 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 484.73 | |
| PERCENT OF WATER: | | | 9.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 231

WT. OF TOTAL SAMPLE: 484.7 WT. OF WASH SAMPLE: 107.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 95.0 | 95.0 | 19.6 | 80.4 |
| #4 | 163.0 | 68.0 | 14.0 | 66.4 |
| #10 | 253.9 | 90.9 | 18.8 | 47.6 |
| #40 | 53.6 | 53.6 | 23.8 | 23.8 |
| #200 | 87.6 | 34.0 | 15.1 | 8.7 |
| PASS #200 | | 19.5 | 8.7 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 91.3 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-a |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS6-1

**Contract:** 25-106-02

**Boring Location:** Sta. 447+00, 35' Lt. Ramp 4

**Boring Surface Elev.:** 194.59 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 13.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 8/24/2009 | | | | Dry | |
| | | | | | 194.6 |
| | | | | | 194.6 |
| | | | | | 194.6 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 13.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 10.0 **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Billy Holden

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 3<br>4<br>6 | Moist stiff brown clay w/trace of fine sand and gravel. | A-6(12) | Topsoil - 6". |
| | | | 2.0' | | 13" RECOVERY | | |
| 2.25 | | 2 | 2.0' | 2<br>7<br>6<br>6 | Moist stiff reddish brown clay w/some fine sand, trace of coarse sand and gravel. | A-6(11) | |
| | | | 4.0' | | 20" RECOVERY | | |
| 4.5 | | 3 | 4.0' | 6<br>5<br>7<br>6 | Moist stiff reddish brown fine sandy clay w/ some coarse sand, trace of gravel. | A-7-5(3) | |
| | | | 6.0' | | 17" RECOVERY | | |
| 6.75 | | 4 | 6.0' | 5<br>6<br>6<br>6 | Moist stiff reddish brown clayey fine sandy silt w/some coarse sand. | A-4(1) | |
| | | | 8.0' | | 22" RECOVERY | | |
| 9 | | 5 | 8.0' | 15<br>36<br>39<br>17 | Moist very dense brownish black micaceous gravel w/some fine sand, trace of coarse sand and silt. | A-1-a | |
| | | | 10.0' | | 18" RECOVERY | | |
| 11.25 | | 6 | 10.0' | 15<br>25<br>50/3" | Moist very dense brownish black micaceous gravel and coarse sand w/some fine sand, trace of silt. | A-1-a | |
| | | | 12.0' | | 12" RECOVERY | | |
| | | 7 | 12.0' | 50/2" | No Sample Recovery | | |
| | | | 13.0' | | 0" RECOVERY | | |

**Remarks:** GTA Inspector - J. Lafferty

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS6-1
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 13.5 | | R-1 | 13.0' | | Gniess, gray and white, coarse grained, unweathered, hard<br>58" Recovery = 96.67%<br>RQD = 32.9% (poor) | | RQD = Rock Quality Designation |
| 15.75 | | | | | | | |
| 18 | | | 18.0' | | 58" RECOVERY | | |
| | | R-2 | 18.0' | | Gniess, gray and white, coarse grained, unweathered, hard<br>53" Recovery = 88.33%<br>RQD = 55.8% (fair) | | RQD = Rock Quality Designation |
| 20.25 | | | | | | | |
| 22.5 | | | | | | | |
| | | | 23.0' | | 53" RECOVERY | | |
| 24.75 | | | | | End of Boring | | |
| 27 | | | | | | | |
| 29.25 | | | | | | | |
| 31.5 | | | | | | | |
| 33.75 | | | | | | | |

# KEY TO SYMBOLS

**Symbol Description**

**Strata symbols**

**Low plasticity clay**

**Silty sand**

**Well graded gravel with silt**

**Well graded sand with silt**

**Frac rock**

**Notes:**

1. **Exploratory borings were drilled on 8-24-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.**

2. **No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.**

3. **Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.**

4. **These logs are subject to the limitations, conclusions, and recommendations in this report.**

5. **Results of tests conducted on samples recovered are reported on the logs.**

6. **All blow counts are uncorrected.**

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.5

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 515.74 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 469.54 | |
| WT. OF WATER LOST: | | | 46.20 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.57 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 381.97 | |
| PERCENT OF WATER: | | | 12.10 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 304

WT. OF TOTAL SAMPLE: 382.0 WT. OF WASH SAMPLE: 101.0

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 11.2 | 11.2 | 2.9 | 97.1 |
| #4 | 24.8 | 13.6 | 3.6 | 93.5 |
| #10 | 77.6 | 52.8 | 13.8 | 79.7 |
| #40 | 35.3 | 35.3 | 27.9 | 51.8 |
| #200 | 75.3 | 40.0 | 31.6 | 20.3 |
| PASS #200 | | 25.7 | 20.3 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 79.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 680.10 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 622.94 | |
| WT. OF WATER LOST: | | | 57.16 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.30 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 535.64 | |
| PERCENT OF WATER: | | | 10.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 381

WT. OF TOTAL SAMPLE: 535.6 WT. OF WASH SAMPLE: 114.4

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 38.1 | 38.1 | 7.1 | 92.9 |
| #4 | 79.0 | 40.9 | 7.6 | 85.3 |
| #10 | 155.0 | 76.0 | 14.2 | 71.1 |
| #40 | 49.4 | 49.4 | 30.7 | 40.4 |
| #200 | 87.9 | 38.5 | 23.9 | 16.5 |
| PASS #200 | | 26.5 | 16.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 83.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 4.0

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 35.18 | 25.44 | 413.83 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 30.94 | 23.99 | 342.91 | |
| WT. OF WATER LOST: | 4.24 | 1.45 | 70.92 | POST-IGNITION |
| WT. OF BOTTLE: | 21.17 | 19.34 | 87.34 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.77 | 4.65 | 255.57 | |
| PERCENT OF WATER: | 43.40 | 31.20 | 27.70 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 43.4 | | | LOSS %: |

WT PASSING #10 SIEVE: 203

WT. OF TOTAL SAMPLE: 255.6 WT. OF WASH SAMPLE: 100.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 2" | 0.0 | 0.0 | 0.0 | 100.0 |
| 1" | 50.4 | 50.4 | 19.7 | 80.3 |
| 3/8" | 50.4 | 0.0 | 0.0 | 80.3 |
| # 4 | 50.4 | 0.0 | 0.0 | 80.3 |
| #10 | 52.3 | 1.9 | 0.7 | 79.5 |
| #40 | 24.2 | 24.2 | 19.2 | 60.4 |
| #200 | 57.1 | 32.9 | 26.0 | 34.3 |
| PASS #200 | | 43.4 | 34.3 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 43.4 |
| PLASTIC LIMIT: | 31.2 |
| PLASTICITY INDEX: | 12.2 |
| % SAND AND GRAVEL: | 65.7 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-7(0) |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 6.0

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 38.89 | | 669.69 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 32.94 | | 503.63 | |
| WT. OF WATER LOST: | 5.95 | | 166.06 | POST-IGNITION |
| WT. OF BOTTLE: | 19.12 | | 87.01 | DISH & SOIL: |
| WT. OF DRY SOIL: | 13.82 | | 416.62 | |
| PERCENT OF WATER: | 43.10 | | 39.90 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 43.1 | | | LOSS %: |

WT PASSING #10 SIEVE: 396

WT. OF TOTAL SAMPLE: 416.6 WT. OF WASH SAMPLE: 102.5

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 5.5 | 5.5 | 1.3 | 98.7 |
| #4 | 6.6 | 1.1 | 0.3 | 98.4 |
| #10 | 20.2 | 13.6 | 3.3 | 95.2 |
| #40 | 29.6 | 29.6 | 27.5 | 67.7 |
| #200 | 65.8 | 36.2 | 33.6 | 34.1 |
| PASS #200 | | 36.7 | 34.1 | |
| | | | | |
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 43.1 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 65.9 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-5(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 8.0

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 571.19 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 472.77 | |
| WT. OF WATER LOST: | | | 98.42 | POST-IGNITION |
| WT. OF BOTTLE: | | | 76.45 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 396.32 | |
| PERCENT OF WATER: | | | 24.80 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 228

WT. OF TOTAL SAMPLE: 396.3 WT. OF WASH SAMPLE: 102.2

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 87.2 | 87.2 | 22.0 | 78.0 |
| #4 | 117.1 | 29.9 | 7.5 | 70.5 |
| #10 | 168.3 | 51.2 | 12.9 | 57.5 |
| #40 | 26.7 | 26.7 | 15.0 | 42.5 |
| #200 | 72.9 | 46.2 | 26.0 | 16.5 |
| PASS #200 | | 29.3 | 16.5 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 83.5 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 10.0

Elevation: Source: SS6-2

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 45.35 | | 514.90 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 38.91 | | 408.25 | |
| WT. OF WATER LOST: | 6.44 | | 106.65 | POST-IGNITION |
| WT. OF BOTTLE: | 22.12 | | 80.76 | DISH & SOIL: |
| WT. OF DRY SOIL: | 16.79 | | 327.49 | |
| PERCENT OF WATER: | 38.40 | | 32.60 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 38.4 | | | LOSS %: |

WT PASSING #10 SIEVE: 238

WT. OF TOTAL SAMPLE: 327.5 WT. OF WASH SAMPLE: 100.6

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 19.5 | 19.5 | 6.0 | 94.0 |
| #4 | 45.9 | 26.4 | 8.1 | 86.0 |
| #10 | 89.3 | 43.4 | 13.3 | 72.7 |
| #40 | 28.1 | 28.1 | 20.3 | 52.4 |
| #200 | 68.8 | 40.7 | 29.4 | 23.0 |
| PASS #200 | | 31.8 | 23.0 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 38.4 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 77.0 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-2-4(0) |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS6-2

**Contract:** 25-106-02

**Boring Location:** Sta. 447+00, 25' Rt. Ramp 4

**Boring Surface Elev.:** 192.14 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 11.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 8/25/2009 | | | | Dry | |
| | | | | | 192.1 |
| | | | | | 192.1 |
| | | | | | 192.1 |

**Pay Quantities:**

| | | | | | |
|---|---|---|---|---|---|
| **2 1/2 in. Dia. Dry Sample Boring:** | 11.0 | **Ft.;** | **Dia. U-Sample Boring:** | | **Ft.** |
| **No. of 2 in. Dia. Shelby Tubes:** | | **;** | **No. of:** | **U-Samples:** | |
| **2 1/2 in. Dia. Contin. Sample Boring:** | | **Ft.;** | **Core Drilling in Rock:** | 15.0 | **Ft.** |

**Boring Contractor:** Walton Corporation
**Driller:** Billy Holden
**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.5' | 6<br>6<br>5 | Moist medium dense brown micaceous fine to coarse sand w/some silt and gravel. | A-2-4(0) | Topsoil - 7".<br>Petroleum odor in all samples. |
| 1.9 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 17<br>9<br>11<br>7 | Moist medium dense brown micaceous gravel and coarse to fine sand w/some silt. | A-1-b | |
| 3.8 | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 9<br>9<br>7<br>10 | Moist medium dense reddish brown clayey fine sand w/some coarse sand and gravel. | A-2-7(0) | |
| 5.7 | | | 6.0' | | 13" RECOVERY | | |
| | | 4 | 6.0' | 5<br>6<br>7<br>14 | Wet medium dense brownish orange silty fine to coarse sand w/trace of gravel. | A-2-5(0) | |
| 7.6 | | | 8.0' | | 20" RECOVERY | | |
| | | 5 | 8.0' | 40<br>14<br>7<br>7 | Wet medium dense brownish orange gravel and fine sand w/some silt and coarse sand. | A-1-b | |
| 9.5 | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 14<br>50/4" | Wet very dense brownish orange silty fine to coarse sand and gravel. | A-2-4(0) | |
| | | | 11.0' | | 7" RECOVERY | | |

**Remarks:** GTA Inspector - J. Lafferty

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS6-2
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| 11.4 | | R-1 | 11.0' | | Gniess, gray, coarse grained, unweathered, hard<br>21" Recovery = 35.0%<br>RQD = 18.3% (very poor) | | RQD = Rock Quality Designation |
| 13.3 | | | | | | | |
| 15.2 | | | 16.0' | | 21" RECOVERY | | |
| | | R-2 | 16.0' | | Gniess, gray and orange, coarse grained, unweathered, hard<br>30.5" Recovery = 50.83%<br>RQD = 21.6% (very poor) | | RQD = Rock Quality Designation |
| 17.1 | | | | | | | |
| 19 | | | | | | | |
| 20.9 | | | 21.0' | | 30.5" RECOVERY | | |
| | | R-3 | 21.0' | | Gniess, gray and orange, coarse grained, slightly weathered, hard<br>15" Recovery = 25.0%<br>RQD = 0.0% (very poor) | | RQD = Rock Quality Designation |
| 22.8 | | | | | | | |
| 24.7 | | | | | | | |
| | | | 26.0' | | 15" RECOVERY | | |
| 26.6 | | | | | End of Boring | | |
| 28.5 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
|  | Silty sand |
|  | Frac rock |

**Notes:**

1. Exploratory borings were drilled on 8-25-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.0

Elevation: Source: SS7-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 718.60 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 623.45 | |
| WT. OF WATER LOST: | | | 95.15 | POST-IGNITION |
| WT. OF BOTTLE: | | | 76.52 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 546.93 | |
| PERCENT OF WATER: | | | 17.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 453

WT. OF TOTAL SAMPLE: 546.9 WT. OF WASH SAMPLE: 101.2

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 5.7 | 5.7 | 1.0 | 99.0 |
| #4 | 22.2 | 16.5 | 3.0 | 95.9 |
| #10 | 93.5 | 71.3 | 13.0 | 82.9 |
| #40 | 41.9 | 41.9 | 34.3 | 48.6 |
| #200 | 74.5 | 32.6 | 26.7 | 21.9 |
| PASS #200 | | 26.7 | 21.9 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 78.1 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS7-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 739.70 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 624.65 | |
| WT. OF WATER LOST: | | | 115.05 | POST-IGNITION |
| WT. OF BOTTLE: | | | 87.33 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 537.32 | |
| PERCENT OF WATER: | | | 21.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 479

WT. OF TOTAL SAMPLE: 537.3 WT. OF WASH SAMPLE: 123.1

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 4.0 | 4.0 | 0.7 | 99.3 |
| #4 | 14.2 | 10.2 | 1.9 | 97.4 |
| #10 | 57.9 | 43.7 | 8.1 | 89.2 |
| #40 | 73.2 | 73.2 | 53.1 | 36.2 |
| #200 | 114.0 | 40.8 | 29.6 | 6.6 |
| PASS #200 | | 9.1 | 6.6 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 93.4 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: SS7-1

Type and Use of Material: _____

Method Placed: _____ Type of Sample: _____

Remarks: _____

_____ Date Sampled: _____

Sampled By: _____

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 31.55 | 25.87 | 280.67 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 28.14 | 24.56 | 240.66 | |
| WT. OF WATER LOST: | 3.41 | 1.31 | 40.01 | POST-IGNITION |
| WT. OF BOTTLE: | 18.78 | 19.36 | 87.11 | DISH & SOIL: |
| WT. OF DRY SOIL: | 9.36 | 5.20 | 153.55 | |
| PERCENT OF WATER: | 36.40 | 25.20 | 26.10 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 36.4 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 36.4 |
| PLASTIC LIMIT: | 25.2 |
| PLASTICITY INDEX: | 11.2 |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

_____
SOILS SUPERVISOR

_____
GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS7-1

**Contract:** 25-106-02

**Boring Location:** Sta. 309+50, 105' Lt. I-95

**Boring Surface Elev.:** 197.07 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 6.0'

**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 8/26/2009 | | | | Dry | |
| | | | | | 197.1 |
| | | | | | 197.1 |
| | | | | | 197.1 |

**Pay Quantities:**

**2 1/2 in. Dia. Dry Sample Boring:** 5.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**

**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**

**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 15.0 **Ft.**

**Boring Contractor:** Walton Corporation

**Driller:** Billy Holden

**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.0' | 3<br>5<br>5<br>6 | Moist loose brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| 2 | | | 2.0' | | 19" RECOVERY | | |
| | | 2 | 2.0' | 7<br>7<br>50/2" | Moist very dense brown coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| 4 | | | 4.0' | | 13" RECOVERY | | |
| | | 3 | 4.0' | 24<br>50/3" | No Sieve Analysis - Indication of moist very dense reddish brown sandy lean clay w/gravel. | | |
| 6 | | | 6.0' | | 7" RECOVERY | | |
| | | R-1 | 6.0' | | Gniess, gray, coarse grained, unweathered, hard<br>36" Recovery = 60.0%<br>RQD = 0.0% (very poor) | | RQD = Rock Quality Designation |
| 8 | | | | | | | |
| 10 | | | | | | | |
| | | | 11.0' | | 36" RECOVERY | | |

**Remarks:** GTA Inspector - J. Lafferty

**Reviewed By:** Hany Ferky **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS7-1
**Contract:** 25-106-02

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | R-2 | 11.0' | | Gniess, gray, coarse grained, unweathered, hard | | RQD = Rock Quality Designation |
| 12 | | | | | 47" Recovery = 78.33% | | |
| | | | | | RQD = 24.1% (very poor) | | |
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| 14 | | | | | | | |
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| | | | | | | | |
| 16 | | | 16.0' | | 47" RECOVERY | | |
| | | R-3 | 16.0' | | Gniess, gray, coarse grained, unweathered, hard | | RQD = Rock Quality Designation |
| | | | | | 58" Recovery = 96.67% | | |
| | | | | | RQD = 96.6% (excellent) | | |
| | | | | | | | |
| 18 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 20 | | | | | | | |
| | | | | | | | |
| | | | 21.0' | | 58" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
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| | | | | | | | |
| 24 | | | | | | | |
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| 26 | | | | | | | |
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| 28 | | | | | | | |
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| | | | | | | | |
| 30 | | | | | | | |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
|  | Silty sand |
|  | Well graded sand with silt |
|  | Frac rock |

**Notes:**

1. Exploratory borings were drilled on 8-26-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 0.0

Elevation: Source: SS8-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | | | 404.50 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | | | 363.33 | |
| WT. OF WATER LOST: | | | 41.17 | POST-IGNITION |
| WT. OF BOTTLE: | | | 78.37 | DISH & SOIL: |
| WT. OF DRY SOIL: | | | 284.96 | |
| PERCENT OF WATER: | | | 14.40 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | | | | |
| CORRECTED LIQUID LIMIT %: | NV | | | LOSS %: |

WT PASSING #10 SIEVE: 184

WT. OF TOTAL SAMPLE: 285.0 WT. OF WASH SAMPLE: 52.9

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
| 1" | 0.0 | 0.0 | 0.0 | 100.0 |
| 3/8" | 41.1 | 41.1 | 14.4 | 85.6 |
| #4 | 60.4 | 19.3 | 6.8 | 78.8 |
| #10 | 100.8 | 40.4 | 14.2 | 64.6 |
| #40 | 31.2 | 31.2 | 38.1 | 26.5 |
| #200 | 47.8 | 16.6 | 20.3 | 6.2 |
| PASS #200 | | 5.1 | 6.2 | |

## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | NV |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | 93.8 |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | A-1-b |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY:

REVIEWED BY:

# DELAWARE DEPARTMENT OF TRANSPORTATION

DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: Road:

Location: Depth: 2.0

Elevation: Source: SS8-1

Type and Use of Material:

Method Placed: Type of Sample:

Remarks:

Date Sampled:

Sampled By:

**FOR LABORATORY USE ONLY**

Location of Lab: DOVER

Date Received: Date Tested: Date Reported: 11/2/2009

| PHYSICAL TEST CONSTANTS | LIQUID LIMIT T-89 | PLASTIC LIMIT T-90 | MOISTURE T-265 | ORGANIC T-267 |
|---|---|---|---|---|
| BOTTLE NO.: | | | | PRE-IGNITION |
| WT. WET SOIL & BOTTLE: | 36.66 | | 417.10 | DISH & SOIL: |
| WT. DRY SOIL & BOTTLE: | 33.63 | | 370.86 | |
| WT. OF WATER LOST: | 3.03 | | 46.24 | POST-IGNITION |
| WT. OF BOTTLE: | 22.35 | | 78.16 | DISH & SOIL: |
| WT. OF DRY SOIL: | 11.28 | | 292.70 | |
| PERCENT OF WATER: | 26.90 | | 15.80 | DISH: |
| BLOWS REQUIRED FOR CLOSURE: | 25 | | | |
| CORRECTED LIQUID LIMIT %: | 26.9 | | | LOSS %: |

WT PASSING SIEVE:

WT. OF TOTAL SAMPLE: WT. OF WASH SAMPLE:

| SIEVE | CUM. RT. WT. | RT. WT. | % RET. | % PASSING |
|---|---|---|---|---|
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## SUMMARY

| | |
|---|---|
| LIQUID LIMIT: | 26.9 |
| PLASTIC LIMIT: | NP |
| PLASTICITY INDEX: | NP |
| % SAND AND GRAVEL: | |
| % SILT: | |
| % CLAY: | |
| CLASSIFICATION: | |

This sample conform with the requirements of the specifications. Material represented by this sample has been for use.

REMARKS:

COMPARISON:

INDEPENDENT ASSURANCE SUPERVISOR:

QUALITY ASSURANCE SUPERVISOR:

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

LB-44 (Rev 5/2003)
Doc # 55-08/04/07/20

# STATE OF DELAWARE
# DEPARTMENT OF TRANSPORTATION
# DIVISION OF HIGHWAYS

**F.A. Project:** I-95 & U.S. 202 Interchange **Boring No.:** SS8-1

**Contract:** 25-106-02

**Boring Location:** Sta. 1015+60, 55' Rt. U.S. 202

**Boring Surface Elev.:** 220.14 **Reference:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wt. of Casing Hammer:** | | **Lbs.** | **Average Fall:** | | **IN.** | | |
| **Wt. of Sample Hammer:** | 140 | **Lbs.** | **Average Fall:** | 30 | **IN.** | | |
| **Type of: D-Sampler:** | Split-Barrel | **O.D.** | **O.D. of Sampler:** | 2 | **IN.** | | |
| **S-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **U-Sampler:** | | **O.D.** | **O.D. of Samp. Tube:** | | **IN.** | | |
| **Core Bit:** | NQ2 | **O.D.** | **O.D. of Rock Core:** | 3 | **IN.** | | |

**Casing Size:** 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 4.4'
**Hollow Stem Auger:** **From Depth of:** **To:**

**Water Level Readings**

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|---|---|---|---|---|---|
| 9/15/2009 | | | | Dry | |
| | | | | | 220.1 |
| | | | | | 220.1 |
| | | | | | 220.1 |

**Pay Quantities:**
**2 1/2 in. Dia. Dry Sample Boring:** 4.0 **Ft.;** **Dia. U-Sample Boring:** **Ft.**
**No. of 2 in. Dia. Shelby Tubes:** **;** **No. of: U-Samples:**
**2 1/2 in. Dia. Contin. Sample Boring:** **Ft.;** **Core Drilling in Rock:** 20.0 **Ft.**

**Boring Contractor:** Walton Corporation
**Driller:** Gary Truver
**Helpers:**

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 0.0' | 3<br>4<br>6<br>7 | Moist loose brown coarse to fine sand and gravel w/trace of silt. | A-1-b | Topsoil - 3". |
| 1.7 | | | 2.0' | | 10" RECOVERY | | |
| | | 2 | 2.0' | 6<br>12<br>11<br>13 | No Sieve Analysis - Indication of moist medium dense orange silty sand. | | |
| 3.4 | | | 4.0' | | 12" RECOVERY | | |
| | | 3 | 4.0'<br>4.4' | 50/5" | No Sample Recovery<br>0" RECOVERY | | |
| 5.1 | | R-1 | 4.4' | | Gniess, blue and orange, coarse grained, weathered, hard<br>27" Recovery = 45.0%<br>RQD = 0.0% (very poor) | | RQD - Rock Quality Designation |
| 6.8 | | | | | | | |
| 8.5 | | | | | | | |
| | | | 9.4' | | 27" RECOVERY | | |

**Remarks:** GTA Inspector - D. Zmijewski

**Reviewed By:** Hany Fekry **Soils Supervisor:** Randy Ferguson

**STATE OF DELAWARE**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**

**F.A. Project:** I-95 & U.S. 202 Interchange
**Contract:** 25-106-02

**Boring No.:** SS8-1

| Depth (ft.) | Water Level | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|---|---|---|---|---|---|---|---|
| | | R-2 | 9.4' | | Gniess, blue and gray, coarse grained, hard<br>55" Recovery = 91.67%<br>RQD = 23.0% (very poor) | | RQD - Rock Quality Designation |
| 10.2 | | | | | | | |
| 11.9 | | | | | | | |
| 13.6 | | | | | | | |
| | | | 14.4' | | 55" RECOVERY | | |
| | | R-3 | 14.4' | | Gniess, blue and gray, coarse grained, hard<br>53" Recovery = 88.33%<br>RQD = 50.3% (fair) | | RQD - Rock Quality Designation |
| 15.3 | | | | | | | |
| 17 | | | | | | | |
| 18.7 | | | | | | | |
| | | | 19.4' | | 53" RECOVERY | | |
| | | R-4 | 19.4' | | Gniess, blue and gray, coarse grained, unweathered, hard<br>60" Recovery = 100.0%<br>RQD = 100.0% (excellent) | | RQD - Rock Quality Designation |
| 20.4 | | | | | | | |
| 22.1 | | | | | | | |
| 23.8 | | | | | | | |
| | | | 24.4' | | 60" RECOVERY | | |
| | | | | | End of Boring | | |
| 25.5 | | | | | | | |

# KEY TO SYMBOLS

**Symbol  Description**

**Strata symbols**

**Well graded sand with silt**

**Silty sand**

**Frac rock**

**Notes:**

1. **Exploratory borings were drilled on 9-15-2009 using a 3 1/4 - inch diameter hollow stem auger.  Rig is a ATV CME 55.**

2. **No free water was encountered at the time of drilling or when re-checked the following day,  unless recorded on 1st page.**

3. **Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.**

4. **These logs are subject to the limitations,  conclusions,  and recommendations in this report.**

5. **Results of tests conducted on samples recovered are reported on the logs.**

6. **All blow counts are uncorrected.**