FOCUSED FEASIBILITY STUDY REPORT
FOR
40TH AVENUE PROJECT AREA
IN THE ST. LOUIS RIVER AREA OF CONCERN

August 28, 2015

APPENDIX F. SUBSTRATE AND WOOD WASTE MAPS

Presented in this Appendix are maps of sample locations where wood waste or wood particles were encountered, maps of projected sediment textural classifications and a map of percent moisture for sediment samples.

Figure No.

Appendix F - Figure 1

Title

Wood Waste Description Map

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C. of Duluth, St. Louis Co., MN

193702726
Prepared by MCP on 2015-01-06
Technical Review by XXX on 2015-XX-XX
Independent Review by XXX on 2015-XX-XX

0 400 800 Feet

1:9,600 (At original document size of 11x17)

N

Legend

Approximate Project Location

Sample Location - 2014 Stantec

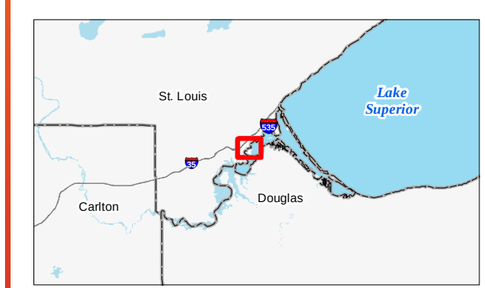
- Wood Pieces
- Wood Pulp
- Trace Wood
- No Wood

Sample Location - 2014 USACE

- Wood Pieces
- Trace Wood
- No Wood

Sample Location - 2010 Fond du Lac RMD, US EPA, USFWS

- Wood Pieces
- Wood Pulp
- Trace Wood



Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources Include: Stantec, USACE, Fond du Lac Resource Management Department, USFWS, US EPA, Esri
3. Orthophotography: Esri

Stantec

JEWELL associates engineers, inc.
Engineers - Surveyors - Architects

U.S. FISH & WILDLIFE SERVICE

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V:\1937\active\193702726\07_gis\mxds\SedimentMapping\St Louis River SampleLocation WoodType overview multiSources.mxd Revised: 2015-03-23 By: mpichler

Figure No.

Appendix F - Figure 2

Title

Substrates - Surface

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

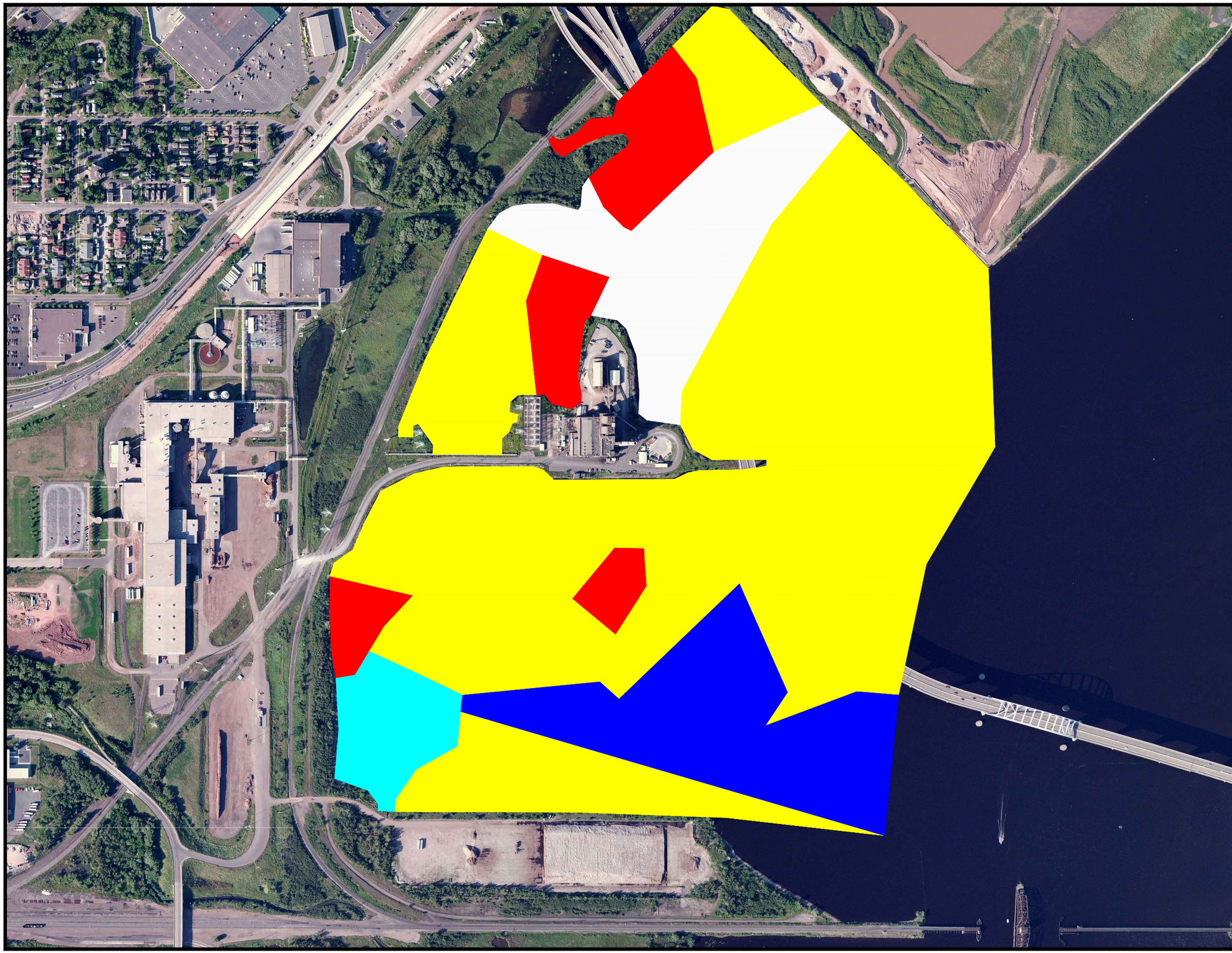
Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1: 9,600 (At original document size of 11X17)

N



Legend

- Silt
- Organic Silt
- Peat
- Silty Sand
- Sand

Notes
1. Coordinate System: NAD 1983 UTM Zone 15N

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Engineers - Surveyors - Architects

FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\SURFACE\SUBSTRATES – SURFACE TLD.DWG
LAYOUT : SUBTRATES – SURFACE

PLOT DATE : 6/8/2015
PLOT TIME : 2:53:46 PM

PLOT BY : DEIBERT, TODD

PLOT SCALE : 1" = 1'

Figure No.

Appendix F - Figure 3

Title

Substrates - 15 cm (0.5 ft) Deep

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1:9,600 (At original document size of 11X17)

N

Legend

- Silt
- Organic Silt
- Peat
- Silty Sand
- Sand

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N

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FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\15 CM\SUBSTRATES – 15 CM (0.5 FT) DEEP – TLD.DWG
LAYOUT : 15 CM (0.5 FT) DEEP
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PLOT TIME : 11:35:36 AM
PLOT BY : SCHWALENBERG, MATT
PLOT SCALE : 1" = 1'

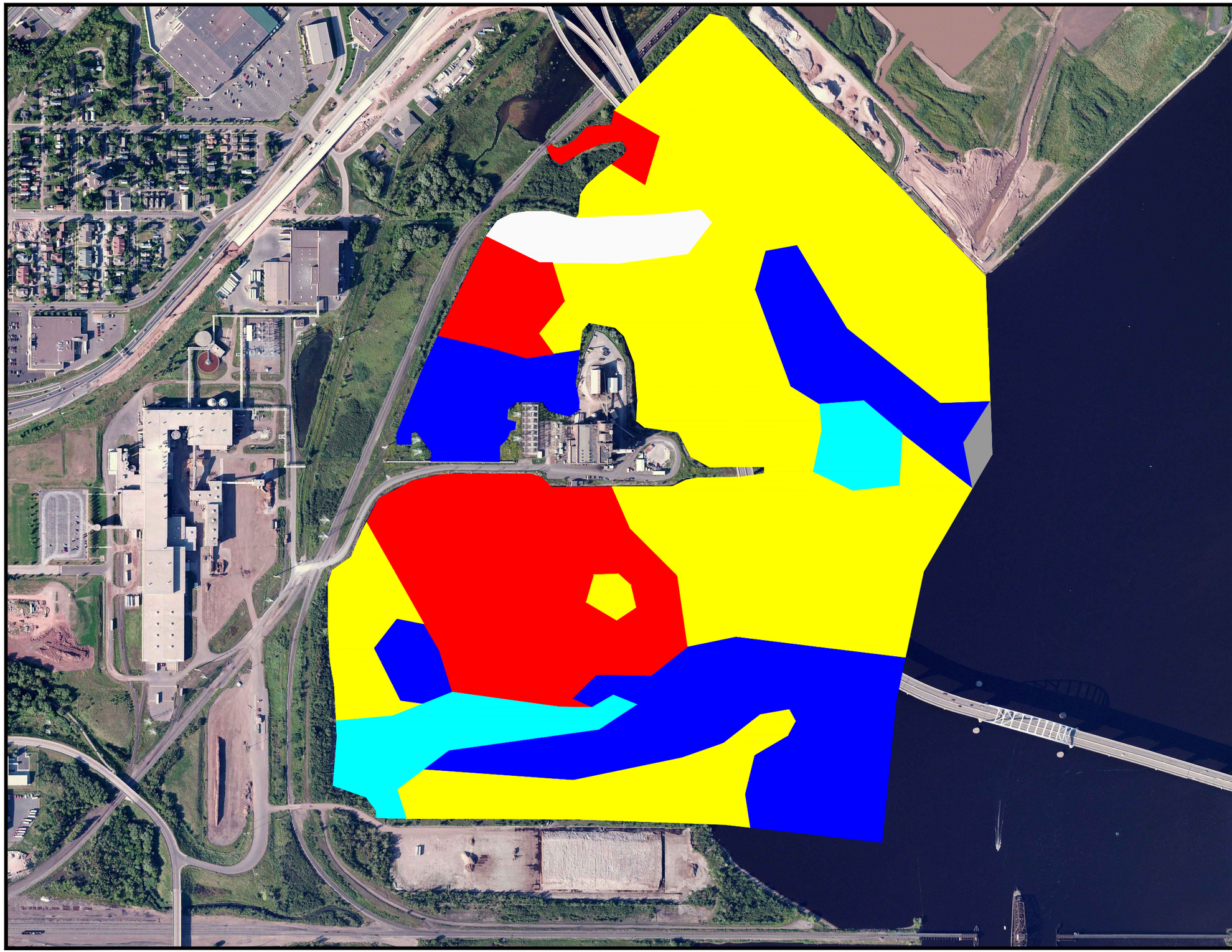

Figure No.

Appendix F - Figure 4

Title

Substrates - 50 cm (1.6 ft) Deep

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1:9,600 (At original document size of 11X17)

N

Legend

- Silt
- Organic Silt
- Peat
- Silty Sand
- Sand
- Clay

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N

Stantec

JEWELL associated engineers, inc.

FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\50 CM\SUBSTRATES – 50CM (1.6 FT) DEEP TLD.DWG
LAYOUT : 50 CM (1.6 FT) DEEP

PLOT DATE : 6/3/2015
PLOT TIME : 11:30:42 AM

PLOT BY : SCHWALENBERG, MATT

PLOT SCALE : 1" = 1'

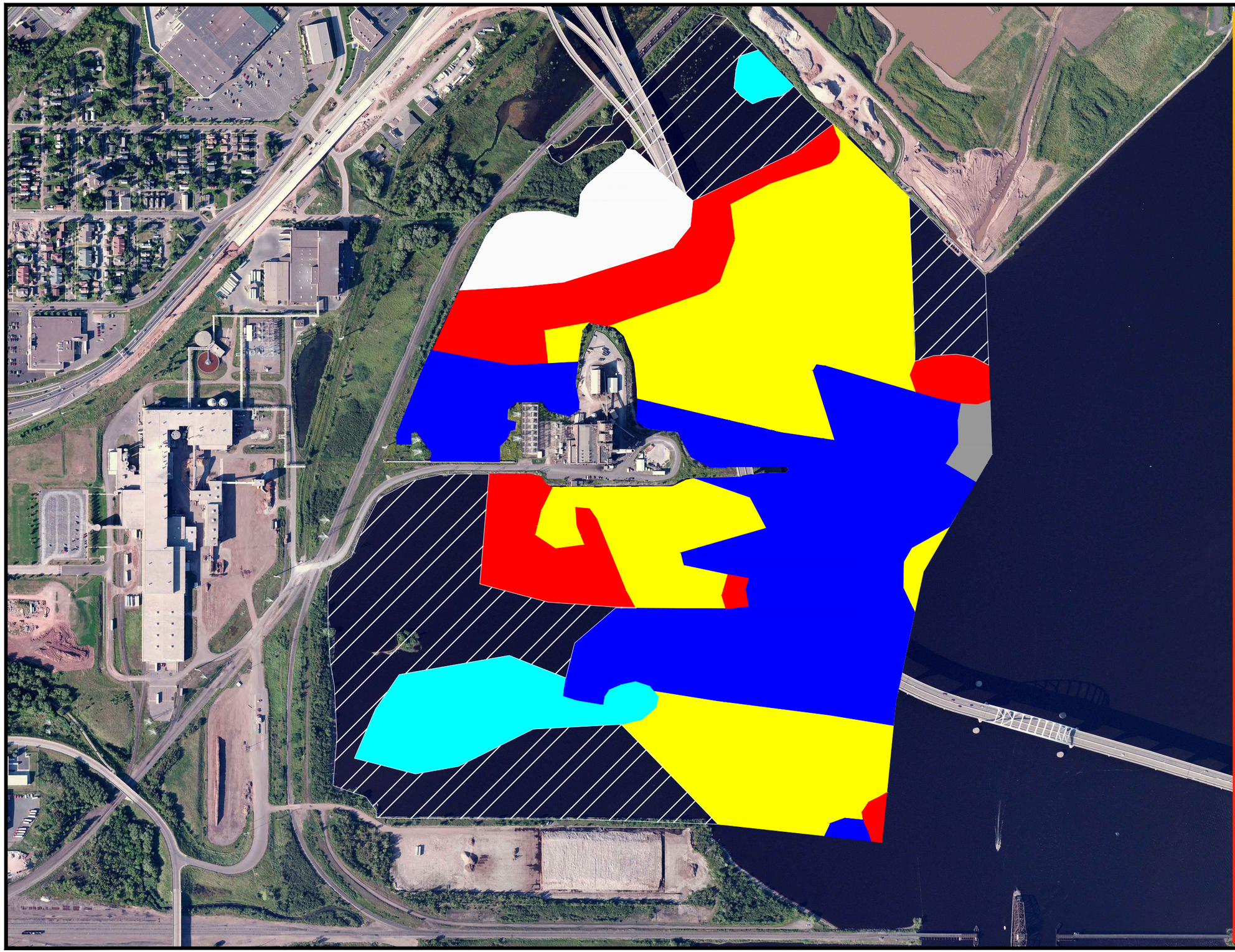

Figure No.

Appendix F - Figure 5

Title

Substrates - 100 cm (3.3 ft) Deep

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1:9,600 (At original document size of 11X17)

N

Legend

- Silt
- Organic Silt
- Peat
- Silty Sand
- Sand
- Clay
- No Data

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N

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FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\100 CM\SUBSTATES – 100 CM (3.3 FT) DEEP – MTS.DWG
LAYOUT : 100 CM (3.3 FT) DEEP
PLOT DATE : 6/3/2015
PLOT TIME : 11:58:04 AM
PLOT BY : SCHWALENBERG, MATT
PLOT SCALE : 1" = 1'

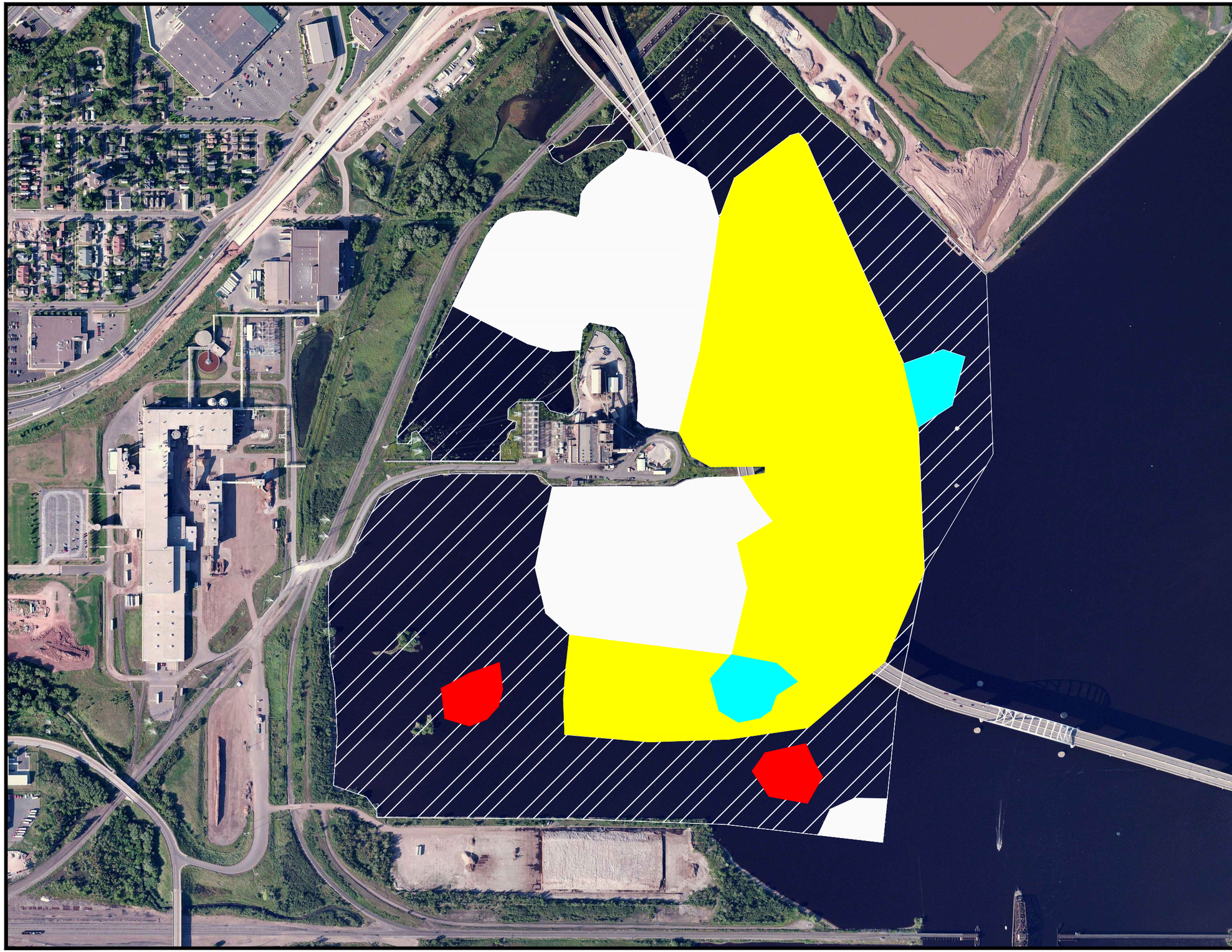

Figure No.

Appendix F - Figure 6

Title

Substrates - 200 cm (6.6 ft) Deep

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1:9,600 (At original document size of 11X17)

N

Legend

- Silt
- Organic Silt
- Peat
- Silty Sand
- Sand
- Clay
- No Data

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N

Stantec

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FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\200 CM\SUBSTRATES – 200 CM (6.6 FT) DEEP – MTS.DWG
LAYOUT : 200 CM (6.6 FT) DEEP
PLOT DATE : 6/3/2015
PLOT TIME : 1:22:27 PM
PLOT BY : SCHWALENBERG, MATT
PLOT SCALE : 1" = 1'

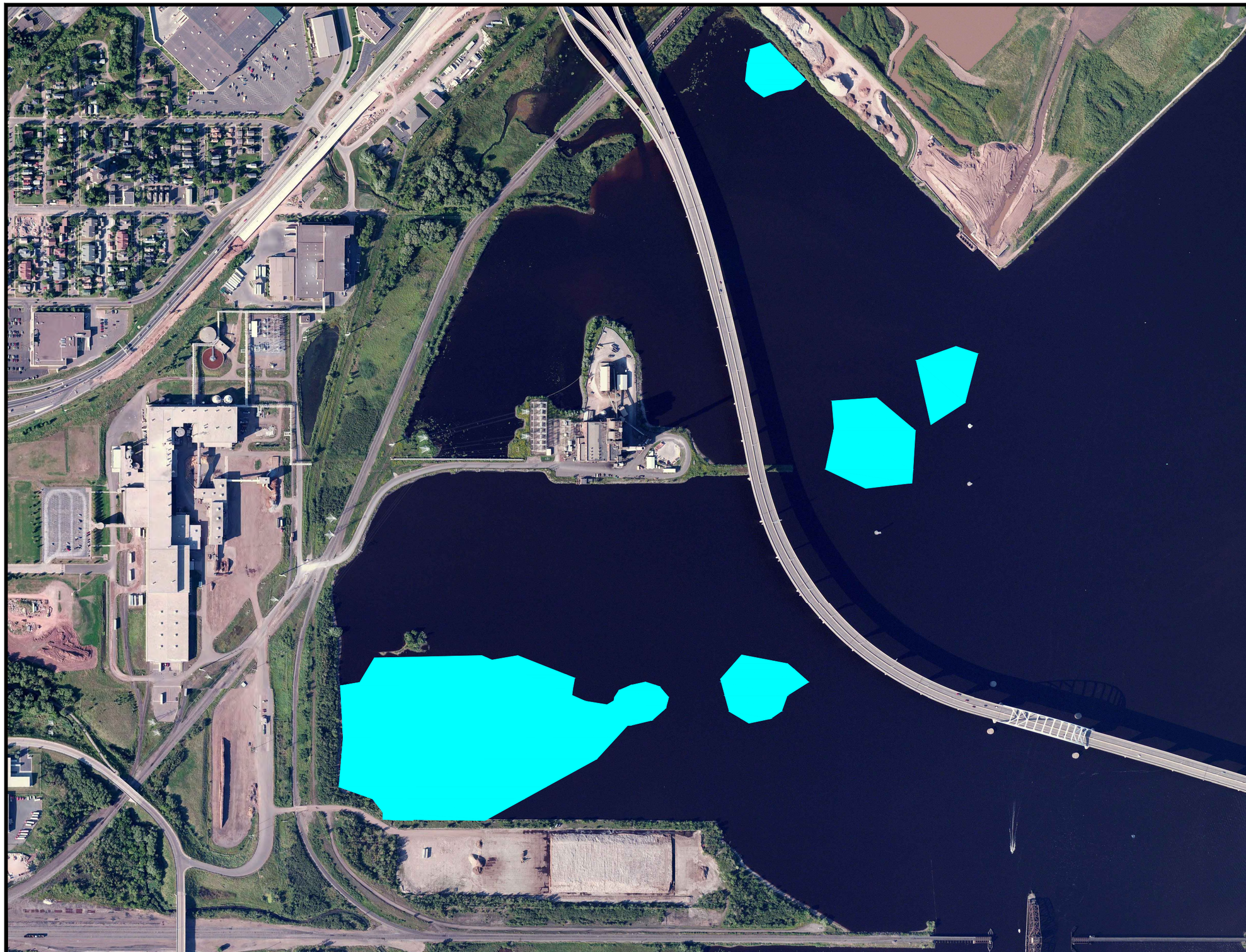

Figure No.

Appendix F - Figure 7

Title

Peat Locations - All Depths

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by MTS
Technical Review by TLD

100 250 500 Feet
1:9,600 (At original document size of 11X17)

N

Legend

Peat

Notes

1. Coordinate System: NAD 1983 UTM Zone 15N

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JEWELL associates engineers, inc.

FILE NAME : S:\PROJECTS\U18010 – USFW ST LOUIS RIVER FEASIBILITY STUDY\GEOTECH\GEOTECH MODULE\NEW MAPPING FILES\PEAT\PEAT LOCATIONS.DWG
LAYOUT : PEAT LOCATIONS
PLOT DATE : 6/3/2015
PLOT TIME : 9:48:47 AM
PLOT BY : SCHWALENBERG, MATT
PLOT SCALE : 1" = 1'

Figure No.

Appendix F - Figure 8

Title

Sediment Sample Locations Percent Moisture Results

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C. of Duluth, St. Louis Co., MN

193702726
Prepared by MCP on 2014-11-26
Technical Review by XXX on 2014-XX-XX
Independent Review by XXX on 2014-XX-XX

0 400 800 Feet

1:9,600 (At original document size of 11x17)

N

Legend

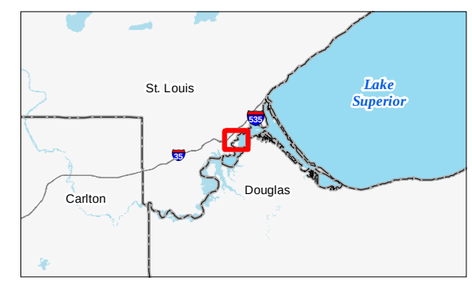
Approximate Project Location

Percent Moisture Result

- No Sample
- 0-20%
- 21-40%
- 41-60%
- 61-80%
- 81-100%

Layered points represent collections at different sediment horizons

0-15cm
16-50cm
51-100cm
101-200cm



Notes

1. Coordinate System: NAD 1983 UTM Zone 15N
2. Data Sources Include: Stantec
3. Orthophotography: Esri

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V:\1937\active\193702726\07_gis\mxds\SedimentMapping\St_Louis_River_SampleLocation_Moisture_overview.mxd Revised: 2015-03-25 By: mpichler