Preliminary Jurisdictional Determination
Final

Prepared for:

State of Alaska
Department of Transportation and
Public Facilities

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March 2010

1—Introduction

The Alaska Department of Transportation & Public Facilities (DOT&PF) is evaluating alternatives to improve the Sterling Highway from Milepost (MP) 45 to 60. MP 45 to 60 of the Sterling Highway is located along the Kenai River in the Copper Landing area on the Kenai Peninsula. It has long been acknowledged that MP 45 to 60 of the Sterling Highway has needed improvements to address peak season traffic delays and to upgrade the highway to "rural principal arterial" standards. HDR Alaska, Inc., is supporting the DOT&PF through the process mandated by the National Environmental Policy Act that entails preparation of an environmental impact statement (EIS) in which the effects of project build alternatives and the no-build option are disclosed and evaluated.

A consideration for siting and selection of Sterling Highway Project build alternatives is the presence of wetlands. Federal regulations and policies require projects to minimize their impacts on wetlands, and to locate projects in wetlands only if there is no practicable alternative with lesser adverse environmental impact. Wetland identification and analysis of potential wetland-related impacts have been ongoing during development of the project alternatives.

This Preliminary Jurisdictional Determination describes the wetland identification process and describes the extent and types of wetlands and other jurisdictional waters found within the project corridor (a ¼ mile around proposed alternatives and the area surrounding the existing Quartz Creek material site). The project area encompasses the following locations within the Seward Meridian: T. 5N, R. 3W, S. 19, 25 to 33, 35, 36; T. 5N, R. 4W, S. 23 to 36; T. 5N, R. 5W, S. 35 and 36.

Changes in Mapping and Regulatory Policy

Several changes have occurred since the original 2005 submittal of this Preliminary Jurisdictional Determination (PJD). Locations of streams were modified using information presented in the Hydrology and Hydraulics (H&H) Study (HDR 2006). Seeps, drainage features, and larger streams were field verified by HDR hydrologists using handheld global positioning system (GPS) receivers for the H&H study. Locations were photographed and data collected regarding flow characteristics in terms of determining the necessary conveyance structures that would be required at crossing locations of each proposed alternative. Streams illustrated on the 2004 and 2005 PJD maps were replaced with the new information and are included on the attached map set. This information was used to help determine if and how wetland complexes were connected to navigable waters.

Additionally, in 2009 a 117.6-acre area situated outside of the previous mapping limits was added to the project area to encompass a modification of the Juneau Creek Alignment. Wetlands within this add-on area have been verified and those findings added to this PJD.

Two notable changes in wetland regulatory policy and procedure have also occurred since the original submittal of this PJD. These include:

1. *Rapanos v. United States & Carabell v. United States*
   In a decision on the consolidated cases Rapanos v. United States and Carabell v. United States (Rapanos), the United States Supreme Court addressed where the Federal government can apply the Clean Water Act, specifically by determining whether a wetland or tributary is

a water of the U.S. In December 2008, the U.S. Environmental Protection Agency (EPA) and the USACE issued joint guidance (revised from earlier June 2007 guidance) to implement the court's decision. The guidance is now being used by the EPA regions and USACE districts to determine whether aquatic resources such as lakes, streams, and wetlands are waters of the U.S., subject to regulation under the Clean Water Act (EPA and USACE 2008).

In accordance with the guidance, the USACE will assert jurisdiction, without the need for a significant nexus finding, over all traditional navigable waters (TNW), wetlands adjacent to a TNW, non-navigable tributaries to a TNW that are relatively permanent, and wetlands that directly abut such tributaries. The USACE will assert jurisdiction over non-navigable, non-relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a significant nexus to a TNW. These include the following types of waters when they have a significant nexus with a TNW: (1) non-navigable tributaries that are not relatively permanent, (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent, and (3) wetlands adjacent to, but not directly abutting, a relatively permanent tributary (e.g. separated from it by uplands or by a berm, dike, or similar feature). The guidance states that the USACE will assess flow characteristics and functions of the tributary itself, together with the functions performed by any wetlands adjacent to that tributary, to determine whether collectively they have a significant nexus with a TNW (EPA and USACE 2008).

2. Alaska Regional Supplement to the 1987 Wetland Delineation Manual

In 2007, the USACE adopted a new regional manual for delineating wetlands in Alaska. All projects in Alaska must now follow guidance presented in the Alaska Regional Supplement to the 1987 Wetland Delineation Manual (USACE 2007). The definition of a wetland did not change with the new manual; rather, it presented additional clarification and guidance for identifying certain indicators of wetlands in Alaska.

The data collection effort from 2004-05 was based solely on the 1987 Wetland Delineation Manual. The Regional Supplement's new tools for identifying wetlands were used in conjunction with the 2009 supplemental fieldwork.

2—Determination Methods

The jurisdictional determination for the Sterling Highway Project was completed in three phases: office-based pre-mapping, field delineation, and office-based GIS-mapping and final delineation.

Office-Based Pre-mapping

Initially, scientists pre-mapped wetlands and other waters of the U.S. in a broad project area encompassing the area of all the potential alternatives. This mapping entailed stereoscopic interpretation of aerial photographs (with varying scales). Initial wetland/upland boundaries and boundaries between wetland types were drawn on mylar overlays of the photos. Wetland areas were delineated based on vegetation characteristics (e.g., lower plant growth form and low-density stands), hydrologic indicators (such as stream locations and ponding), and topographic clues (such as concave topography). Upland locations were based on the lack of surface water visible in aerial photographs, the presence of tall and dense forests, and steep topography that

would allow good surface drainage. In addition to delineating upland and wetlands, scientists also delineated other waters of the U.S. including streams and ponds. This information was used as a preliminary step to determine the potential jurisdictional status of the project area wetlands. Several information sources were examined initially:

- Aerial photographs from AeroMap U.S.:
    - taken 5/3/00, scale 1:12,000, true color
    - taken 9/17/85, scale 1" = 1000', true color
    - taken 8/8/64, scale 1:6,000, black and white
- Detailed topographic information with 10' contour intervals from AeroMap U.S.
- National Wetlands Inventory (NWI) maps for quadrangles Seward C-8, Seward B-8, Kenai C-1, and Kenai B-1.
- Existing GIS layers including streams, water bodies, and NWI mapping.
- Sterling Highway Project MP 37-60 Draft Environmental Impact Statement, Alaska Department of Transportation and Public Facilities, 4/8/94.
- Kenai Road Corridor Soil Survey. USDA Forest Service, 1989.
- Soils of the Cooper Landing Area, Alaska (draft report). USDA Soil Conservation Service, 1984.
- Soil Resource inventory of the Kenai Peninsula, Chugach National Forest, Alaska. USDA Forest Service, 1980.

Wetland/upland boundaries drawn in the office were used to plan the field efforts and determine potential problem areas.

Field Delineation

Scientists verified wetland boundaries in the field during the fall of 2003 and the summer of 2004. Additional areas were visited in fall of 2009. The primary activities of these trips were to field verify office-based preliminary delineation and adjust premapped boundaries to actual on-the-ground conditions. The ground-truthing included identification of wetlands based on the wetland identification methodology described in the Corps of Engineers Wetland Delineation Manual (USACE, 1987). This methodology followed a three-parameter approach to wetland identification and delineation, using the criteria of hydric soils, dominant hydrophytic vegetation, and wetland hydrology. Prior to fieldwork, locations of representative wetland or upland sites (based on pre-mapping) as well as questionable areas were obtained using geographic information systems (GIS) and loaded into a hand-held GPS unit. Extra observations were made along the southern alternative (Cooper Creek Alternative) because of reports of perched wetlands along that route (pre-mapping did not indicate the presence of these wetlands).

Once in the field, wetland scientists used the predetermined waypoints in the GPS unit to navigate to areas needing investigation. Upon arrival at a waypoint scientists either completed a Corps of Engineers wetland determination form or took detailed notes. Where wetland sites were similar to areas where a data form had previously been completed, scientists took notes and photographs. Geographic coordinates were logged at all data collection locations (sites where wetland

determination forms were completed as well as note/photo points). In addition to wetland determination forms, wetland functional assessment forms were completed at the majority of wetland sites to provide information on wetland functions and values (to be discussed in the EIS). In addition to the prearranged waypoints, many sites along the proposed alternatives that were not pre-determined were also investigated.

Geographic coordinates were also collected whenever a proposed alignment crossed a stream. Additional data on project area streams were obtained during a fish presence study conducted in 2004 (HDR, 2004a) and a H&H study conducted in 2005 (HDR, 2006b).

Some of the fieldwork was done in the vicinity of alternatives that are no longer under consideration, but the findings are applicable throughout the project area.

Office-Based GIS Mapping and Final Delineation

Upon return from the field, the project team amended the office-delineated wetland boundaries. The wetland types were classified based on a review of field notes, data forms, and site photographs. Boundaries were digitized into the GIS using existing spatially rectified base mapping, georeferenced aerial photographs, and the project's proposed alignments. Wetland types were coded using the Cowardin et al. (1979) and NWI classification system. Wetland connections to navigable waters were also analyzed during this phase of wetland delineation. The final mapping has been prepared for a ¼-mile-wide corridor along each alternative and for the area adjacent to the existing Quartz Creek material site. To aid in the final mapping, the following resources were used:

- Premapped wetland/upland boundaries
- Digital georeferenced aerial photograph from AeroMap U.S. taken 10/9/00 with 2'-pixel resolution
- Detailed field notes, COE wetland determination data forms, and photographs
- GPS coordinates of field observation locations

3— Determination Results

Figures 2 through 10 delineate the wetland/upland boundaries, the boundaries between wetland types, and the major streams in the project corridor (¼ mile around proposed alternatives and the area surrounding the Quartz Creek material site). The attached figures also show where wetland delineation forms were completed as well as areas where photos and/or notes were taken. NWI codes for all wetlands within the study area are also shown on the attached figures. Figure 5 shows the locations of field efforts east and west of the Juneau Creek. Wetland boundaries in this area were not delineated since the alternative located in this area will not be brought forward in the EIS. Information gathered in this location was, however, used to help map and categorize other wetlands in the project area. Figure 4 shows the additional areas added to this PJD in 2009 to accommodate a alignment alternative of the Juneau Creek Alignment.

Wetland determination forms and site photography are included in Appendix A. Detailed field notes on all observation points are available upon request. Appendix B contains a list of plant species (common and scientific names) found within the study area.

Within the Sterling Highway Project area, fieldwork confirmed that most of the study area is upland. Forested uplands, in particular, dominate the project area. There are, however, sizable wetland complexes in the project corridor, most of which are associated with the numerous rivers and streams located throughout the area. Other jurisdictional waters in the project area include numerous streams and rivers, ponds, Kenai Lake, and the Kenai River.

Table 1. Wetland/Upland types within the Sterling Highway Project area

Wetland/Upland Type	Wetland Determination Form #'s
Wetlands	
Forested wetlands*	2, 15, 33, 35, 36, 41, 46
Deciduous shrub thickets*	16, 23, 25, 28, 31, 34, 38
Shrub-dominated bogs*	1, 3, 5, 14, 44, 51
Emergent wetlands*	17, 21, 22, 39, 42, *A13*
Uplands	
Needle-leaved forests	4, 6, 8, 13, 18, 19, 24, 30, 32, 40, 43, 45, 47, 49, 50, 52, *A9*
Deciduous forests	7, 9, 12, 20, 26, 48, *A5, A16*
Upland shrub thickets	27, 29, *A1*
Herbaceous meadows	10, 11

*Many of the forms include information on more than one type of wetland (i.e., forested-shrub wetlands).
- Data forms noted in *italics* are from the 2009 fieldwork.

3.1 Wetlands

Project area wetlands were grouped into four broad categories based on their dominant vegetation form. The major wetland types within the Sterling Highway Project area are forested wetlands, deciduous shrub thickets, shrub-dominated bogs, and emergent wetlands. Please note the color of each NWI code on Figures 2 through 10 indicates the major wetland type to which that wetland belongs.

Forested Wetlands

General Description. Forested wetlands occur throughout the project area and were generally dominated by black spruce (greater than 20 feet tall). Lutz spruce was also found in some forested wetlands. These wetlands varied greatly on the amount and type of understory present. Some sites displayed both prominent shrub and herbaceous strata while other sites lacked a well-developed understory of any type. Dominant understory species in some forested wetlands included low bush cranberry, crowberry, cloudberry, Barclay's willow, bog blueberry, Sitka alder, northern Labrador tea, meadow horsetail, field horsetail, and bluejoint reedgrass.

Soils and Water. All forested wetland sites displayed multiple wetland hydrology indicators including saturation in the upper 12 inches of the soil pit and drainage patterns in wetlands. Soils in these wetlands were variable. Some sites possessed histosols with sulfidic odor, while other

sites had 6 to 10 inches of organics atop mineral soil with redoximorphic features (that met the gleyed or low chroma color criteria for hydric soils in Alaska).

NWI Codes. The NWI codes for forested wetlands are:

- PFO4B (palustrine, closed needle-leaved evergreen forest, saturated)
- PFO4/SS1/EM1B (palustrine, open needle-leaved forested wetlands with deciduous shrub and persistent emergent understory, saturated)
- PFO4/SS1/EM2B (palustrine, open needle-leaved forested wetlands with deciduous shrub and non-persistent emergent understory, saturated)
- PFO4/SS1B (palustrine, open needle leaved forested wetlands with deciduous shrub understory, saturated)
- PFO4/EM2B (palustrine, open needle leaved forested wetlands with non-persistent emergent understory, saturated)

Deciduous Shrub Thickets

General Description. Almost all of the deciduous shrub thickets in the project area are adjacent to streams or ponds. These wetlands have a dense stratum of shrubs dominated by Sitka alder and Barclay's willow. Traces of black spruce, Lutz spruce, or paper birch were found at some sites. Dominant herbaceous species present at some of these sites included meadow horsetail, dwarf dogwood, and bluejoint reedgrass.

Soils and Water. Scientists in the field noted that these wetlands were generally located next to creeks and that soils were saturated in upper 12 inches of the soil pit. Most wetlands of this type that were visited in the field had histosols with sulfidic odor.

NWI Codes. The NWI codes for these wetlands are:

- PSS1A (palustrine, deciduous shrub/scrub-dominated wetlands, temporarily flooded)
- PSS1B (palustrine, deciduous shrub/scrub-dominated wetlands, saturated)
- PSS1/EM1B (palustrine, deciduous shrub/scrub-dominated wetlands with persistent emergent understory, saturated)
- PSS1/EM2B (palustrine, deciduous shrub/scrub-dominated wetlands with non-persistent emergent understory, saturated)

Shrub-Dominated Bogs

General Description. Shrub-dominated bogs are located throughout the project area. Dominant shrubs in this type of wetland include shrub-height black spruce (less than 20 feet tall), bog blueberry, dwarf birch, crowberry, northern Labrador tea, shrubby cinquefoil, sweet gale, Sitka alder, and Barclay's willow. Herbaceous species included bluejoint reedgrass, field horsetail, northern scouring-rush, and water sedge.

Soils and Water. Scientists in the field noted the following wetland hydrology indicators in this type of wetland: saturated soils within 5 inches of the surface, dominance by decidedly hydrophytic plant species (Facultative-neutral test), and drainage patterns in wetlands (small

creeks, dry drainage channels, or ponded water). Histosols were common in shrub-dominated bogs and sulfidic odor was almost always detected in this type of wetland.

NWI Codes. The NWI codes for these wetlands are:

- PSS1/4B (palustrine, deciduous shrub/scrub wetlands with some needle-leaved evergreen shrubs, saturated)
- PSS4/1B (palustrine, needle-leaved evergreen shrub/scrub wetlands with some deciduous shrubs, saturated)
- PSS1/EM1B (palustrine, deciduous shrub/scrub wetlands with persistent emergent understory, saturated)
- PSS1/EM2B (palustrine, deciduous shrub/scrub wetlands with non-persistent emergent understory, saturated)
- PSS4/EM1B (palustrine, needle-leaved evergreen shrub/scrub wetlands with persistent emergent understory, saturated)
- PSS4/EM2B (palustrine, needle-leaved evergreen shrub/scrub wetlands with non-persistent emergent understory, saturated)

Emergent Wetlands

General Description. The majority of emergent wetlands in the project area are located either in close proximity to the Kenai River or in the large wetland complex located north of Kenai River and west of Juneau Creek (see Figure 5). Most of these wetlands only have emergent vegetation present; however, some patterned bogs that contain higher mounds of shrubby vegetation are included in this wetland type. Patterned bogs were included in the emergent wetland type when emergent vegetation dominated the wetland complex. Dominant emergent vegetation in this type of wetland included beaked sedge, water sedge, narrow-leaved cotton grass, Chamisso's cotton grass, northern scouring-rush, few-flowered sedge and other *Carex* species. Higher areas within emergent wetlands supported shrub-sized black spruce, shrubby cinquefoil, dwarf birch, Sitka alder, and northern Labrador tea.

Soils and Water. Emergent wetlands were the wettest of the project area wetlands and all these sites were saturated at the surface. Scientists also noted areas of standing water or dried up areas that had, in the recent past, contained standing water. All sites also passed the Facultative-neutral test for wetland hydrology. All but one of the emergent wetland sites had histosols with sulfidic odor. The non-histosol site had a histic epipedon (which emitted a strong sulfidic odor), and had a gleyed mineral soil.

NWI Codes. The NWI codes for emergent wetlands within the project area are:

- PEM1F (palustrine, persistent emergent wetlands, semi-permanently flooded)
- PEM1C (palustrine, persistent emergent wetlands, seasonally flooded)
- PSS1/EM1C (palustrine, deciduous shrub/scrub wetlands with persistent emergent understory, seasonally flooded)

3.2 Jurisdictional Status of Project Area Wetlands

An evaluation of aerial photography and topography outside of the project area was conducted in GIS to identify possible hydrologic connections between mapped areas and other regulated waters. The Kenai River and Kenai Lake are federally listed TNW's and all of the major streams in the study area are tributaries to these waters (USACE 1995). The majority of wetlands in the project are adjacent to the Kenai River or one of its tributaries and as such, these wetlands are under the jurisdiction of the Corps. The direct connection of some wetlands in the project area is disturbed by the Sterling Highway. These wetlands, however, remain connected to the Kenai River through culverts and therefore are considered jurisdictional. Therefore, based on information reviewed for this PJD, it is likely the wetlands identified in the project area would be jurisdictional, subject to confirmation by the USACE.

3.3 Other Jurisdictional Waters of the United States

Other jurisdictional waters in the project area include the lower reach of Kenai Lake, Kenai River, Russian River, Juneau Creek, Cooper Creek, Fuller Creek, Bean Creek, smaller unnamed creeks, and several ponds.

Kenai Lake is coded by NWI as L1UBH (lacustrine, unconsolidated bottom, permanently flooded). Within the project area the Kenai River has two NWI codes: R3UBH (riverine, upper perennial, unconsolidated bottom, permanently flooded) and R3OWH (riverine, upper perennial, unknown bottom, permanently flooded). Gravel bars in and adjacent to the Kenai River are jurisdictional and are coded as R3USC (riverine, upper perennial, unconsolidated shore, seasonally flooded). Perennial rivers and creeks in the project area are coded as R3UBH. Intermittent creeks (as determined by the fish presence study conducted in September 2004) are coded R4SBC (riverine, intermittent, streambed, seasonally flooded). Large, year-round open water bodies in the project area are mapped as ponds. All mapped ponds are coded as PUBH (palustrine, unconsolidated bottom, permanently flooded bodies of water).

3.4 Uplands

The dominant types of uplands that occur in the project area are deciduous forests, needle-leaved forests, upland shrub thickets, and herbaceous meadows. The NWI code for all uplands is U.

Deciduous Forests

The two dominant types of deciduous forests within the study area are birch-dominated forests and aspen-dominated forests. Overstory species in these types of forests include varying amounts of paper birch and quaking aspen, with minor amounts of Lutz spruce, Sitka spruce, black spruce, western hemlock, and mountain hemlock. Understory plants include Sitka alder, high bush cranberry, soapberry, spirea, prickly rose, low bush cranberry, fireweed, field horsetail, twinflower, pink wintergreen, lupine species, and oak fern. No wetland hydrology indicators were present in these uplands. In addition, soils in these uplands were well drained, well developed Spodosols.

Needle-Leaved Forests

Three types of needle-leaved forests were found in the project area: black spruce forests, Lutz spruce forests, and hemlock forests.

Black spruce uplands were typically found near black spruce wetlands or in depressions. In contrast to black spruce wetlands, these uplands had slightly drier soils which supported taller spruce trees. Other trees found in this upland type included Lutz spruce and quaking aspen. Understory plants included low bush cranberry, crowberry, pumpkinberry, northern Labrador tea, bog blueberry, dwarf dogwood, field horsetail, meadow horsetail, and bluejoint reedgrass. While some black spruce uplands did display wetland hydrology (saturation in the upper 12 inches of the soil pit), these sites did not meet the criteria for hydric soils.

Lutz spruce forests occur throughout the project area and are dominated by Lutz spruce with lesser amounts of paper birch, cottonwood, mountain hemlock, western hemlock, and black spruce. Understory species in these uplands included prickly rose, low bush cranberry, high bush cranberry, Sitka alder, pumpkinberry, crowberry, rusty menziesia, Barclay's willow, fireweed, field horsetail, dwarf dogwood, bluejoint reedgrass, twinflower, and stiff clubmoss. No wetland hydrology indicators and no hydric soil indicators were found in the Lutz spruce uplands.

Hemlock forests also occur throughout the project area and are common along the southern alternative. In addition to mountain and western hemlock, some sites also contained paper birch and Lutz spruce. These forests typically had a poorly developed understory of low bush cranberry, northern Labrador tea, pumpkinberry, crowberry, rusty menziesia, pink wintergreen, and five leaved bramble. No primary wetland hydrology indicators were present and the majority of these sites had well developed soils (Spodosols).

Upland shrub thickets

Upland shrub thickets, like their wetland counterparts, were typically located near streams or ponds. These sites were dominated by Sitka alder, bluejoint reedgrass, lady fern, and meadow horsetail. Some sites also contained minor amounts of black cottonwood, Lutz spruce, or paper birch. While these uplands were located next to creeks, soils were not saturated. The soils at these sites were varied but none met the criteria for hydric soils. One site exhibited a folist, having 20 inches of unsaturated organics.

Herbaceous meadows

Herbaceous upland meadows occur throughout the project area but are primarily located in areas of past disturbance (such as along the Sterling Highway). These uplands are open areas with small amounts of paper birch or Lutz spruce. Some shrubs including Sitka alder, crowberry, and low bush cranberry were present. Herbaceous species including fireweed, field horsetail, bluejoint reedgrass, and oak fern dominated this type of upland. No signs of wetland hydrology were found at these sites and soils were well drained.

4—References

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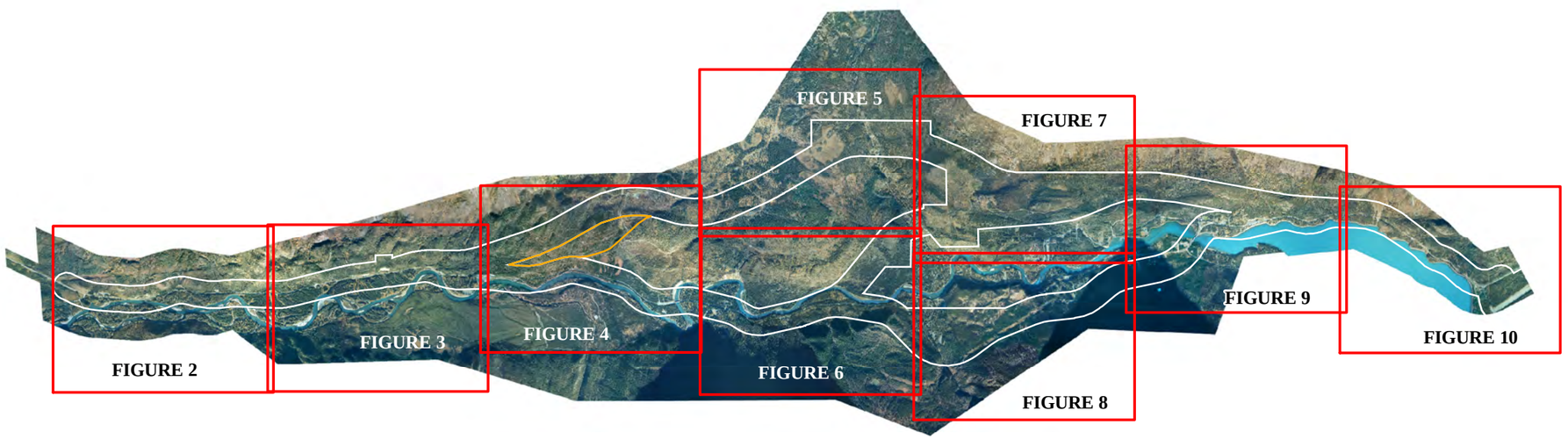
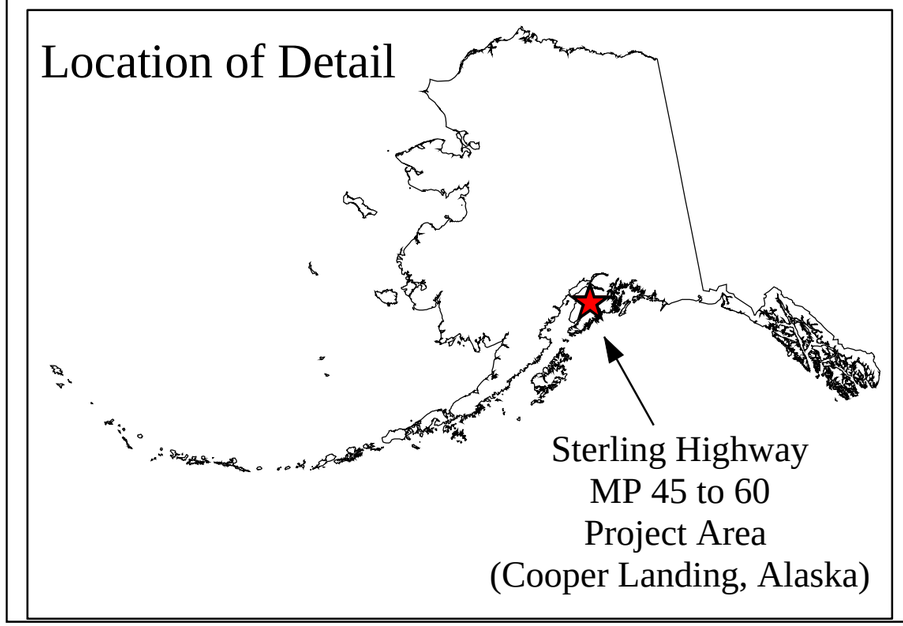
Sterling Highway Project MP 45 to 60
Index Map





Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

- # Figure # and Extent
- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

N

Miles
0 0.5 1 1.5

FIGURE 1

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Sterling Highway Project
MP 45 to 60
Preliminary Jurisdictional Determination

Legend

- Wetland Determination Data Form Site
- Note/Photo Site
- Stream (R3UBH or R4SBC)
- Wetland/Upland and Wetland Type Boundaries
- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands
- PFO4B
- PFO4/EM2B
- PFO4/SS1/EM1B
- PFO4/SS1/EM2B
- PFO4/SS1B

Deciduous Shrub Thickets
- PSS1A
- PSS1B
- PSS1/EM1B
- PSS1/EM2B

Shrub Bogs
- PSS1/4B
- PSS1/EM1B
- PSS1/EM2B
- PSS4/1B
- PSS4/EM1B
- PSS4/EM2B

Emergent Wetlands
- PEM1C
- PEM1F
- PSS1/EM1C

Other Jurisdictional Waters
- L1UBH
- PUBH
- R3OWH
- R3UBH
- R3USC

Non-Wetlands
- U

Scale: 1" = 850’

N

0 400 800 1,600 Feet

FIGURE 2 OF 10

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Sterling Highway Project
MP 45 to 60
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- Wetland Determination Data Form Site
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- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850'

N

0 400 800 1,600 Feet

FIGURE 3 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

- Wetland Determination Data Form Site
- Note/Photo Site
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- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850'

N

0 400 800 1,600 Feet

FIGURE 4 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

- Wetland Determination Data Form Site
- Note/Photo Site
- Stream (R3UBH or R4SBC)
- Wetland/Upland and Wetland Type Boundaries
- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850'

N

0 400 800 1,600 Feet

FIGURE 5 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd2009\Revised PJD2009_figures.mxd Date: 10-14-2009

Sterling Highway Project
MP 45 to 60
Preliminary Jurisdictional Determination

Legend

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- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850'

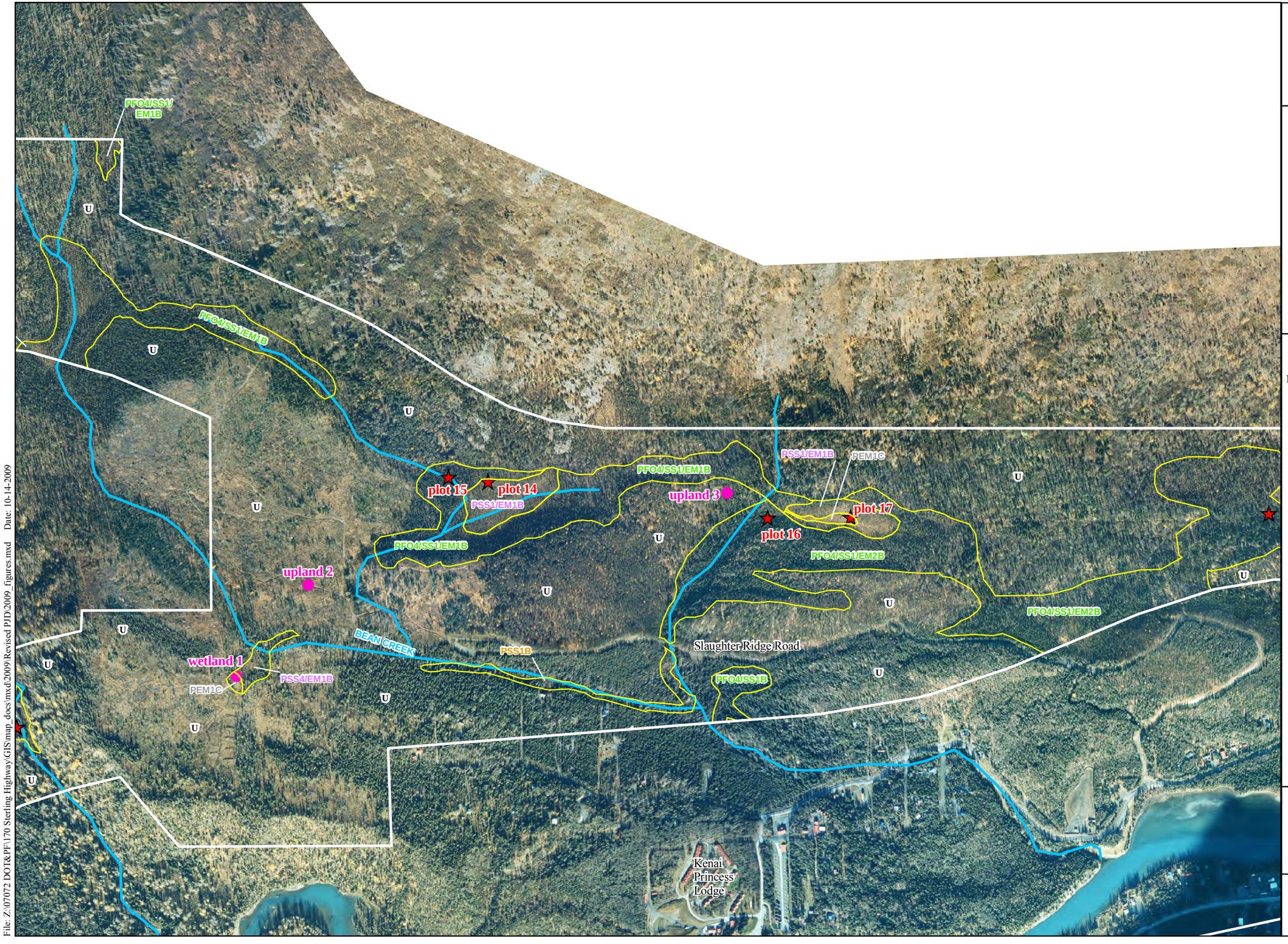
N

0 400 800 1,600 Feet

FIGURE 6 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project
MP 45 to 60
Preliminary Jurisdictional Determination



Legend

- Wetland Determination Data Form Site
- Note/Photo Site
- Stream (R3UBH or R4SBC)
- Wetland/Upland and Wetland Type Boundaries
- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands
PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets
PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs
PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands
PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters
L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands
U

Scale: 1" = 850’

N

0 400 800 1,600 Feet

FIGURE 7 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

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- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850’

N

0 400 800 1,600 Feet

FIGURE 8 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

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- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850’

N

0 400 800 1,600 Feet

FIGURE 9 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009

Sterling Highway Project MP 45 to 60

Preliminary Jurisdictional Determination

Legend

- Wetland Determination Data Form Site
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- Wetland/Upland and Wetland Type Boundaries
- Wetland Mapping Limits
- 2009 Add-on Mapping Limits

Major Wetland Types and NWI Mapping Codes

Note: color of NWI label indicates wetland category

Forested Wetlands

PFO4B
PFO4/EM2B
PFO4/SS1/EM1B
PFO4/SS1/EM2B
PFO4/SS1B

Deciduous Shrub Thickets

PSS1A
PSS1B
PSS1/EM1B
PSS1/EM2B

Shrub Bogs

PSS1/4B
PSS1/EM1B
PSS1/EM2B
PSS4/1B
PSS4/EM1B
PSS4/EM2B

Emergent Wetlands

PEM1C
PEM1F
PSS1/EM1C

Other Jurisdictional Waters

L1UBH
PUBH
R3OWH
R3UBH
R3USC

Non-Wetlands

U

Scale: 1" = 850’

N

0 400 800 1,600 Feet

FIGURE 10 OF 10

File: Z:\07072 DOT&PF\170 Sterling Highway\GIS\map_docs\mxd\2009\Revised PJD\2009_figures.mxd Date: 10-14-2009