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Mitigation Action Completion Report

Mayflower Pipeline Incident Response
Mayflower, Arkansas

March 2015

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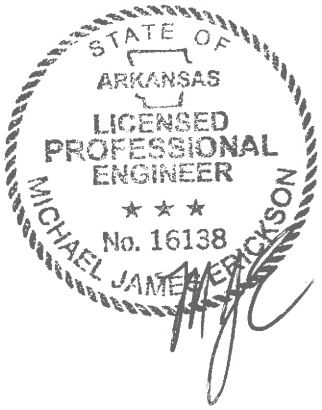

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Mayflower Pipeline Incident Response
Mayflower, Arkansas

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ExxonMobil Environmental Services Company

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Table of Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

action plan	Mitigation Action Plan
ADEQ	Arkansas Department of Environmental Quality
ARCADIS	ARCADIS U.S., Inc.
completion report	Mitigation Action Completion Report
CQA	construction quality assurance
CQAP	Construction Quality Assurance Plan
CRA	Conestoga-Rovers & Associates
DADAR	Downstream Areas Data Assessment Report
EMES	ExxonMobil Environmental Services Company
ESV	ecological screening value
I-40	Interstate 40
Lancaster Laboratories	Eurofins Lancaster Laboratories, Inc.
µg/L	micrograms per liter
NTU	nephelometric turbidity units
PAH	polycyclic aromatic hydrocarbon
RAO	remedial action objective
site	Mayflower Pipeline Incident Response Site located in Mayflower, Arkansas
USEPA	U.S. Environmental Protection Agency

Executive Summary

This Mitigation Action Completion Report (completion report) summarizes the mitigation action implemented in the cove of the Mayflower Pipeline Incident Response Site located in Mayflower, Arkansas (site; Figure 1-1) to meet the remedial action objective (RAO) established in the Arkansas Department of Environmental Quality (ADEQ) approved Downstream Areas Data Assessment Report, Revision 5 (DADAR; ARCADIS U.S., Inc. [ARCADIS] 2014a). This completion report was prepared for ExxonMobil Environmental Services Company, on behalf of ExxonMobil Pipeline Company. The mitigation action was implemented between August 21 and December 18, 2014 in accordance with the ADEQ-approved Mitigation Action Plan, Revision 1 (action plan; ARCADIS 2014c) in the following three subareas of the cove (Figure 1-2):

- Inlet Channel: Main channel between Interstate 40 and the Open Water Area of the cove
- Open Water Area: Open marsh and water area located between the Inlet Channel and the Heavily Vegetated Area
- Heavily Vegetated Area: Vegetated area located east of the Open Water Area, including several natural channels

The RAO identified for the site was to mitigate surface water sheens related to crude oil from the Pegasus Pipeline to the extent technologically feasible (ARCADIS 2014a). The following activities were conducted in accordance with the action plan to meet the RAO (ARCADIS 2014c).

Targeted Sediment Removal in the Inlet Channel

Targeted sediment excavation was conducted in the Inlet Channel between September 5 and 25, 2014 to remove sheen-bearing sediment. The excavation depths in the Inlet Channel varied from 3 to 36 inches (0.25 to 3 feet). Sediment excavation was conducted after dewatering the removal area, using temporary diversion berms and a bypass pumping system. Approximately 800 cubic yards of sediment was excavated from the 1,300-foot-long Inlet Channel using an amphibious excavator and solidified by adding Portland cement, prior to transporting to an off-site landfill facility for disposal. Following confirmation of achieving removal goals, removal areas, with excavations deeper than 0.5 foot below original grade, were backfilled with clean material to a final surface elevation within 0.5 foot of the original grade. A cover layer of 1 to 2 inches of clean backfill material was placed in areas with removal depths less than 0.5 foot below original grade.

Targeted In-Situ Amendment in the Heavily Vegetated Area

PMFI® organoclay (developed by CETCO™) was placed directly over approximately 2 acres of sediment surface within the Heavily Vegetated Area to reduce the potential for sheen generation in this area. Between

October 7 and 24, 2014, approximately 48 tons of organoclay was placed within the Heavily Vegetated Area to meet the target organoclay coverage of approximately 1 pound per square foot. Organoclay was typically placed using an amphibious long-reach excavator; however in two small areas (approximately 1,100 square feet) organoclay was placed manually by spreading the amendment material from an airboat.

Reactive Cap Placement in the Open Water Area

The reactive cap material, consisting of sand and PM-199 organoclay (developed by CETCO™) mixture, was placed in the Open Water Area to reduce the potential for crude-oil-related sheens to be generated by sediments. Approximately 2,100 cubic yards of reactive cap material was placed on the sediment surface within an area of approximately 4.5 acres using an amphibious long-reach excavator from October 16 through November 4, 2014. The thickness of the reactive cap varied between approximately 3 to 7 inches, with an average of 3.6 inches. The average distribution of organoclay was 3.6 pounds per square foot.

Construction Quality Assurance

Monitoring activities described in the Construction Quality Assurance Plan (Appendix C of the action plan, ARCADIS 2014c) were completed and documented during construction activities to confirm sediment removal, amendment placement, and reactive capping. Air and surface water quality were monitored in the cove during construction activities to document the effectiveness of environmental protection controls and to manage potential environmental impacts of construction activities. Sheen samples were also collected from the cove downstream of the construction area in September and October 2014 to determine the chemical composition of the sheens via forensic analysis. The forensic analysis for sheen samples indicated that these sheen samples do not resemble crude oil from the Pegasus Pipeline.

Following completion of construction activities, demobilization and decontamination activities were conducted as required. A final site inspection was conducted on December 18, 2014, and on December 31, 2014, the ADEQ confirmed that sediment removal, cap installation, and in-situ amendment placement activities were conducted according to the ADEQ-approved action plan (ADEQ 2014b). Sheens have not been observed since the completion of construction activities (between December 19, 2014 and date of this report).

Restoration and re-vegetation activities started at the site on March 9, 2015 to address areas temporarily disturbed during the construction activities. These activities include seeding and planting in the cove in accordance with the Cove Restoration Planting Plan (ARCADIS 2015). Additionally, biweekly sheen monitoring will be conducted within the cove (Inlet Channel, Open Water, Area, and Heavily Vegetated Area), for up to 6 months, to document achievement of the RAO.

1. Introduction

ARCADIS U.S., Inc. (ARCADIS) has prepared this Mitigation Action Completion Report (completion report) for ExxonMobil Environmental Services Company (EMES) on behalf of ExxonMobil Pipeline Company for the Mayflower Pipeline Incident Response located in Mayflower, Arkansas (Figure 1-1). For the purposes of this report, the site consists of the cove located between Interstate 40 (I-40) and Lake Conway, which is predominantly a marsh environment that receives surface water from drainage leading from the location of the crude oil release (Figure 1). This completion report summarizes the mitigation activities completed at the site in accordance with the Mitigation Action Plan, Revision 1 (action plan; ARCADIS 2014c). The action plan was submitted on June 26, 2014 and approved by the Arkansas Department of Environmental Quality (ADEQ) on July 8, 2014 (ADEQ 2014a). Construction activities to implement the mitigation action occurred between August 21 and December 18, 2014. Representatives from the ADEQ visited the site during this period. On December 18, 2014, a final site walk was conducted with representatives of the ADEQ and Arkansas Game and Fish Commission, who confirmed that the construction activities were completed in accordance with the ADEQ-approved action plan (ADEQ 2014b).

1.1 Project Area Description

On March 29, 2013, the crude oil was released near a residential neighborhood in Mayflower, Arkansas due to a breach in a pipeline operated by ExxonMobil Pipeline Company (the 20-inch Pegasus Pipeline; Figure 1-1). The crude oil was identified to be Wabasca heavy crude oil (herein referred to as “crude oil”). A substantial amount of the crude oil was removed during an emergency response action that was implemented immediately to mitigate the release. Following the emergency response action, soil, sediment, and surface water were sampled at the site in July and August 2013 in accordance with the ADEQ-approved Downstream Areas Remedial Sampling Plan (ARCADIS 2013). The sampling activities were conducted to evaluate environmental conditions following the response actions. In addition, sheen monitoring and sampling were initiated on October 21, 2013 (EMES 2013) with the primary objectives of observing and characterizing sheens in the downstream areas. The sheen monitoring program was revised in March 2014 (EMES 2014), and is currently ongoing, along with the surface water sampling activities (ARCADIS 2014b).

Environmental sampling results for soil, sediment, and surface water supported the conclusion documented in the Downstream Areas Data Assessment Report, Revision 5 (DADAR; ARCADIS 2014a) that no action is necessary to protect ecological populations at the site. However, sheen mitigation actions were recommended based on sheen monitoring results for areas where ongoing sheens related to crude oil were observed. Based on the results from environmental sampling activities, a refined ecological risk evaluation, and sheen monitoring and sampling results, the remedial action objective (RAO) was identified for the site (ARCADIS 2014a). As described in the action plan (ARCADIS 2014c), the sheen mitigation actions were proposed for the areas where sheens related to crude oil were observed. The extent of these areas was

confirmed and refined based on a pre-design study conducted between March 31 and May 7, 2014, as described in the action plan (ARCADIS 2014c).

The sheen mitigation action was recommended for the following three subareas of the cove (Figure 1-2):

- Inlet Channel: Main channel between I-40 and the Open Water Area of the cove
- Open Water Area: Open marsh and water area located between the Inlet Channel and the Heavily Vegetated Area
- Heavily Vegetated Area: Vegetated area located east of the Open Water Area, including several natural channels.

1.2 Mitigation Action Objective and Summary

As presented in the action plan (ARCADIS 2014c), the RAO identified for the site was to mitigate surface water sheens related to the crude oil from the Pegasus Pipeline to the extent technologically feasible. The following activities were conducted in accordance with the Mitigation Action Plan to meet the RAO identified for the site (ARCADIS 2014c):

- Site preparation, including the construction of staging areas and other temporary facilities, vegetation removal, and fulfillment of applicable permit requirements
- Excavation of localized sheen-bearing sediments in the Inlet Channel, and off-site disposal of removed sediments
- Installation of a reactive cap over sediments where sheens have been observed in the Open Water Area
- Placement of in-situ amendments at targeted locations where sheens have been observed within the Heavily Vegetated Area
- Monitored natural attenuation at locations within the Heavily Vegetated Area that are inaccessible and were left in place during the emergency response due to the habitat value and limited extent of oiling
- Restoration and re-vegetation of the areas affected by construction (addressed separately in accordance with the Cove Restoration Planting Plan [ARCADIS 2015])

1.3 Project Organization

For this project, EMES was responsible for coordinating and performing the mitigation action and ARCADIS served as the Design Engineer and Field Engineer. In these roles, ARCADIS provided the design and construction quality assurance (CQA) services for the duration of construction between August and December 2014.

EMES retained Conestoga-Rovers & Associates (CRA) as the construction contractor (Contractor) to perform the mitigation action in accordance with the action plan (ARCADIS 2014c). The following subcontractors were retained by CRA to perform mitigation activities:

- ANU Works, Inc. (dba Stan's Airboat & Marsh Excavator Service) assisted with daily construction and monitoring activities including sediment excavation, containment boom management, airboat service, and water quality monitoring.
- Wilco Marsh Buggies & Draglines, Inc. assisted with the reactive cap and in-situ amendment placement.
- Kooyers Services, Inc. assisted with mixing sand and organoclay for reactive cap placement.
- Crafton, Tull & Associates, Inc. provided surveying services.

In addition, Eurofins Lancaster Laboratories, Inc. (Lancaster Laboratories) in Lancaster, Pennsylvania and B&B Laboratories, Inc. in College Station, Texas analyzed samples collected during the construction activities.

1.4 Report Organization

The remainder of this completion report is organized into the following sections:

2 – Summary of Work Performed	Summarizes the site preparation activities, the mitigation action completed at the site, and CQA monitoring conducted to verify implementation of mitigation action.
3 – Environmental Monitoring	Describes air and water quality monitoring activities performed at the site during construction.

4 – Site Demobilization	Discusses demobilization, decontamination, and inspection activities performed at the site.
5 – Post-Construction Monitoring Plan	Describes future post-construction monitoring activities to verify effectiveness of the mitigation action performed at the site.
6 – References	Lists the references cited throughout this report.

Tables, figures, and appendices are provided as attachments to this completion report and include further detail and supporting documentation.

2. Summary of Work Performed

This section describes the work activities conducted at the site to implement the mitigation action. Work activities performed at the site between August 21 and December 18, 2014 included site preparation, sediment removal from the Inlet Channel, reactive cap placement in the Open Water Area, and in-situ amendment placement in the Heavily Vegetated Area. Details of each construction activity are provided in the following sections. Daily Project Reports summarizing work activities are included in Appendix A and photos documenting work activities are included in Appendix B.

2.1 Site Preparation

2.1.1 Site Access and Support Areas

The site was prepared prior to the start of construction activities in August 2014. Existing access points established during the emergency response action (i.e., rock yard staging area and staging area on the east side of Interstate Drive) were used during the construction activities (Figure 2-1). Warning signs were placed along Interstate Drive, approximately 300 feet from the access points in accordance with the Arkansas State Highway and Transportation Department standards. Vehicle traffic at the access points was controlled by a spotter. Site security was implemented to restrict unauthorized access to the work and staging areas during active operations and non-working hours.

Other temporary access roads were installed, maintained, and relocated throughout the construction activities. The temporary access roads were constructed using interlocking polyethylene road mats and were installed by using a tracked skid steer.

Vegetation was cleared and grubbed at the site, as needed, to allow for safe access to the work area during construction and the construction of staging areas. Surficial debris and vegetation were removed from within the Inlet Channel and Open Water Area, as required, to allow sediment removal and/or reactive cap placement. This debris and vegetation were transported to an approved off-site disposal facility (Appendix C). During clearing and subsequent construction activities, mature and/or large-diameter trees were protected to the extent practicable.

Storm water erosion and sedimentation control measures (e.g., hay bales) were temporarily installed around the staging areas for erosion protection, in accordance with a site-specific Storm Water Pollution Prevention Plan developed by the Contractor. The CQA Monitor visually inspected the material and equipment staging areas and stabilized construction surfaces. Any issues, if identified, were documented in the Daily Project Report (Appendix A) and reported to the Site Field Manager.

2.1.2 Environmental Protection and Monitoring

Temporary water quality control measures were installed before commencement of construction activities, and were maintained throughout the duration of the construction work. Additionally, environmental monitoring activities were conducted during construction to monitor effectiveness of environmental protection measures and to assess potential impacts of construction on workers, neighbors, or waterways as described in the action plan (ARCADIS 2014c).

The environmental protection measures implemented during construction to reduce potential construction-related impacts to surface water included:

- Isolation of water during the Inlet Channel removal activities by water diversion and temporary soil berms
- Maintenance of containment booms within the cove
- Placement and maintenance of silt curtain, containment boom, and/or absorbent boom downstream of the work area

The Contractor prepared a Spill and Contamination Prevention Plan prior to construction, and retained spill containment kits, additional sorbent booms, sorbent pads, and replacement silt curtain materials at the site during construction.

Environmental monitoring conducted during construction activities included air monitoring, surface water quality monitoring and sampling, and sheen monitoring to confirm that construction activities are not affecting water quality downstream of the work areas (see Section 3). Environmental monitoring was conducted in accordance with the Construction Quality Assurance Plan (CQAP; Appendix C of the action plan, ARCADIS 2014c).

2.1.3 Permits

Prior to the start of construction activities, the Contractor obtained two required permits:

- Short Term Activity Authorization. This authorization request was submitted to the ADEQ on July 9, 2014 and approved on August 20, 2014.
- Faulkner County Floodplain Protection Ordinance 11-15. The application for this ordinance was submitted July 10, 2014 and approved by the Mayflower Floodplain Manager on September 9, 2014.

In accordance with the ADEQ requirements, the Notice of Coverage and the Contractor's Storm Water Pollution Prevention Plan were posted at the Incident Command Center prior to commencing the construction activities.

2.2 Targeted Sediment Removal in the Inlet Channel

As described in the action plan (ARCADIS 2014c), the targeted sediment removal was conducted to remove sheen-bearing sediment in the Inlet Channel. The removal activities also included excavation of sheen-bearing materials along the banks, as needed, in some areas of the Inlet Channel. Between September 5 and 25, 2014, sediment was excavated along the approximately 1,300-foot-long Inlet Channel, located between I-40 and the Open Water Area as shown on Figures 2-2a through 2-2c. The excavated areas with excavation depths greater than 0.5 foot below original grade were backfilled using clean borrow material (general fill/clay).

2.2.1 Inlet Channel Dewatering

Prior to the excavation activities, the Inlet Channel removal area was dewatered using temporary diversion dams and a bypass pumping system. The temporary dams, consisting of earthen berms, were constructed on the upstream and downstream ends of three segments (approximately 400 feet long) using clean clay and geotextile fabric (Figures 2-2a through 2-2c). The bypass pumps were installed within containment pads on wooden board mats placed at an approximate elevation of 267.2 feet (North American Vertical Datum of 1988).

After installation of the bypass pumping system, water within the Inlet Channel removal area was pumped to a discharge point located downstream of the removal segment (Figure 2-1). The discharge point included a diffuser surrounded by silt fence and a sorbent boom, to absorb sheens, if present. The diffuser area was approximately 25 feet long and 5 feet wide near the discharge point, flaring to 25 feet wide at the end. The diffuser area was constructed by placing a geotextile fabric with an approximate 1-foot-thick layer of riprap (5 to 6 inches in diameter) to prevent erosion and evenly distribute the water flow.

2.2.2 Sediment Removal and Handling

Sediment excavation was conducted using a low-ground-pressure amphibious excavator to reduce the disturbance of sediment and adjacent areas. Sediment was excavated from most of the Inlet Channel in relatively dry conditions. Approximately 80-foot-long portion at the end of the Inlet Channel was not well channelized; therefore, the sediment removal activities in this portion were conducted in wet conditions.

The excavator loaded sediment directly into small tracked dump trucks to transfer the removed material to the Interstate Drive staging area for solidification. At the Interstate Drive staging area, sediment was

unloaded into a water-tight roll-off box for solidification, which included addition of Portland cement to reduce the moisture content of excavated sediment. Approximately 7 tons of Portland cement was used throughout the course of the sediment excavation and solidification. The Paint Filter Test (U.S. Environmental Protection Agency [USEPA] Method 9095B) was conducted by collecting a representative sample of solidified sediment at a frequency of one sample per 100 cubic yards. The Contractor performed these tests to verify that solidified sediment contained no free liquid prior to disposal at an off-site landfill facility. All samples passed the test and these results were recorded by the CQA Monitor in the Daily Project Reports (Appendix A).

Based on the pre-design study results, the vertical extent of sheen-bearing sediment in the Inlet Channel was estimated to vary from 6 to 18 inches (0.5 to 1.5 feet), as described in the action plan (ARCADIS 2014c). However, the actual excavation depths varied from 3 to 36 inches (0.25 to 3 feet) because the observed depth of sheen-bearing sediment was deeper in certain areas (Figures 2-2a through 2-2c). Approximately 800 cubic yards of sediment was excavated from the Inlet Channel for disposal at an off-site landfill facility (Appendix C).

2.2.3 Confirmation Sampling

To meet requirements of the CQAP (Appendix C of the action plan, ARCADIS 2014c), grab sediment samples were collected from along the bottom of the channel for sheen stir testing to confirm the removal of sheen-bearing materials. Confirmation sampling and sheen stir tests were performed by the CQA Monitor at approximately every 20 feet along the Inlet Channel.

The sheen stir test was conducted by collecting representative surface sediment samples (the upper 1 to 2 inches) from three to four locations across a transect line that was perpendicular to the channel. The samples from the transect were placed into a clean jar, homogenized, and stirred to observe sheen generation, if any. If sheen was observed, sheen characteristics were documented in the Confirmation Sampling Form and the sample was photographed.

If no sheen was observed in the confirmation sample and no sheens were visible along the face of the banks between toe of bank and top of bank, the removal goal was achieved. If the confirmation sheen sample indicated sheen presence, the CQA Monitor directed the Contractor to remove an additional 3 to 6 inches of material along the bottom of the channel. If the visual observation indicated sheen presence along the bank, then approximately 2 inches of material was removed from that side of the bank. Additional excavation and confirmation sampling was completed until the removal goal was achieved.

A summary of the confirmation sampling is included in Table 2-1, and a layout of confirmation sample locations is presented on Figures 2-2a through 2-2c.

2.2.4 Backfill

Following achievement of removal goals, removal areas with excavated depths greater than 0.5 foot below original grade were backfilled with clean material and lightly compacted using an excavator to a final surface elevation within 0.5 foot of the original grade. In areas where no backfill was needed to be within 0.5 foot of original elevations, a cover layer of 1 to 2 inches of clean backfill material was placed. The backfill material was obtained from an approved, off-site borrow source and was also used for backfilling the residential areas near the crude oil release point in 2013. A sample of this backfill material was analyzed by Lancaster Laboratories in 2013 for volatile organic compounds, semivolatile organic compounds, inorganic constituents (including cyanide), pesticides, herbicides, and polychlorinated biphenyls (Table 2-2). Laboratory analytical reports for backfill samples are included in Appendix D. Following completion of backfill activities, a topographic survey of the Inlet Channel was conducted by Crafton, Tull & Associates, Inc. on October 1, 2014 to document the final elevations (Appendix E).

2.3 Targeted In-Situ Amendment in the Heavily Vegetated Area

Targeted in-situ amendment placement was selected for the Heavily Vegetated Area to reduce the potential for sheens to be generated in this area while limiting disturbance to the existing vegetation (ARCADIS 2014c). The extent of the targeted in-situ amendment was approximately 2 acres (Figure 2-3) and was determined based on the pre-design study results as described in the action plan (ARCADIS 2014c). Targeted in-situ amendment in the Heavily Vegetated Area included placing PMFI® organoclay (developed by CETCO™) directly over the sediment surface to meet the target organoclay coverage of approximately 1 pound per square foot. The in-situ amendment was placed within the Heavily Vegetated Area between October 7 and 24, 2014, and included placing approximately 48 tons of organoclay. Prior to the commencement of amendment placement, the CQA Manager confirmed that the organoclay testing results (i.e., quaternary amine loading, oil sorption capacity, and bulk density), included in a material certification from the vendor, were in accordance with the accepted values. The organoclay testing was conducted by the vendor at a frequency of one sample per 20 tons of organoclay material.

On September 30, 2014, a test run for the organoclay placement was conducted using a portable pneumatic system (spray application), as specified in the action plan (ARCADIS 2014c). However, the method employed during the test run was not as effective as that used in the initial pilot study conducted by the Contractor, and resulted in dust generation at the site. Therefore, alternative methods for amendment placement were identified. One alternate method included use of an amphibious long-reach excavator and two amphibious deck buggies mounted on tracked pontoon systems. The organoclay was loaded onto the amphibious deck buggy using an excavator and was transported to the amphibious excavator positioned in the area intended for amendment placement. The approximate loading capacity of each deck buggy was 10 cubic yards. The amphibious excavator then filled the bucket (approximately 1 cubic yard) with organoclay from the deck buggy and distributed the material uniformly over the area to maintain the application of 1

pound per square foot. This method was used for the majority of the Heavily Vegetated Area. In addition, amendment was placed in the two areas (approximately 1,100 square feet) shown on Figure 2-3 near the north and south banks by manually spreading the amendment material from an airboat.

The amount of organoclay required within the Heavily Vegetated Area was pre-determined based on the total area of 2 acres and application of approximately 1 pound per square foot. Both of these alternative application methods were effective in delivery and spreading of the target amount of organoclay within the Heavily Vegetated Area.

Between October 7 and 17, 2014, approximately 47 tons of organoclay was placed using the amphibious excavator in the Heavily Vegetated Area (Figure 2-3). Within two areas located near the north and south banks, the organoclay was manually distributed from the airboat (Figure 2-3). Approximately 1 ton of organoclay was placed in these areas on October 16 and 24, 2014.

The CQA Monitor verified the weight of amendment required in each grid against the actual weight of organoclay placed using the amphibious excavator and manual method. The CQA Monitor recorded the weight of the organoclay placed in the Heavily Vegetated Area in the Daily Project Reports (Appendix A).

2.4 Reactive Cap Placement in the Open Water Area

The reactive cap placement was recommended for the Open Water Area to reduce the potential for crude-oil-related sheens to be generated by sediments in this area (ARCADIS 2014c). The extent of the reactive cap was determined based on the pre-design study results, and covered an area of approximately 4.5 acres (Figure 2-4). The reactive cap was placed from October 16 through November 4, 2014, and included the placement of approximately 2,100 cubic yards of reactive cap material. The thickness of the reactive cap, placed directly over the sediment surface within the Open Water Area, varied between approximately 3 and 7 inches with an average of 3.6 inches. The reactive cap material included a mixture of clean sand and PM-199 organoclay developed by CETCO™. The organoclay was placed at an average distribution of 3.6 pounds per square foot.

The Contractor sent sand material samples to Lancaster Laboratories for analysis of grain size. One composite sample of these samples was analyzed for volatile organic compounds, semivolatile organic compounds, inorganic constituents (including cyanide), pesticides, herbicides, and polychlorinated biphenyls at a frequency of one sample per 1,000 cubic yards. Additionally, the organoclay was tested by the vendor for quaternary amine loading, oil sorption capacity, and bulk density at a frequency of one sample per lot (approximately every 20 tons of material). Prior to the start of capping activities, the CQA Manager reviewed and confirmed that the sand and organoclay testing results are in accordance with the accepted values. Analytical results for sand samples are summarized in Tables 2-2 and 2-3.

The reactive cap material was mixed using an open-top concrete mixing truck placed at the Interstate Drive staging area. The moisture content of the clean sand was sufficient to provide adequate hydration for the organoclay to prevent flotation of organoclay particles; therefore, no water was added while mixing sand and organoclay.

Similar to the in-situ amendment placement, the reactive capping was conducted using an amphibious long-reach excavator and deck buggies mounted on tracked pontoon systems to achieve placement of a consistent cap layer. The amphibious excavator was equipped with a global positioning system to achieve uniform distribution of cap material. The pre-determined coordinates and capping extent were entered into the on-board global positioning system of the amphibious excavator as a quality assurance measure. Additionally, the Contractor marked the capping areas using wooden stakes and flags to assist the operator with placement of the reactive capping material. Where there was adequate water depth, the reactive cap material was placed through the water column. In areas without adequate water depth, the cap material was placed directly on the exposed sediment surface. The CQA Monitor recorded the amount of sand and organoclay mixed and placed (weight and volume) each day in the Daily Project Report (Appendix A). The daily placement of reactive cap material is summarized in Table 2-4.

The CQA Monitor confirmed the reactive cap thickness by deploying one or two test pans at random locations within the grid of approximately 2,500 square feet, as specified in the CQAP (Appendix C of the action plan, ARCADIS 2014c). Following placement of the cap material in the target area, the test pan was removed from the water and the average thickness of material placed was determined by the CQA Monitor by reading thickness gage posts affixed to the bottom of each test pan. If the cap thickness was less than 3 inches, required additional volume was calculated and additional cap material was placed. If the cap thickness was within the range of 3 to 6 inches, no further action was required and the CQA Monitor directed the operator to place cap material within the small area where each test pan was previously located. The CQA Monitor documented the cap thickness results from the test pans, and a summary of these results is included in Table 2-5.

Water levels within the Open Water Area fluctuate throughout the year (ARCADIS 2014a). Therefore, temporary erosion controls were installed in the areas with exposed cap material (approximately 19,000 square feet), at the time of reactive cap the placement, between November 19 and December 12, 2014 (Figure 2-4). The erosion controls included placement of biodegradable jute mat over exposed cap material and installation of straw wattles along the shoreline to prevent localized erosion by storm water. Jute mat and straw wattles were installed in accordance with the manufacturer's instructions. The temporary biodegradable erosion controls were left in place to biodegrade.

3. Environmental Monitoring

Environmental monitoring was conducted in the cove during construction activities to document the effectiveness of environmental protection controls and to help in managing potential environmental impacts of construction activities. The environmental monitoring was completed in accordance with the CQAP (Appendix C of the action plan, ARCADIS 2014c) as described in the following sections.

3.1 Air Monitoring

Continuous real-time monitoring for particulates (dust) was performed during construction activities at the Inlet Channel, which included ground-intrusive operations such as grading, sediment excavation, backfilling, material transfer, and stockpiling. Dust monitoring was conducted through visual inspection of the site for airborne particles and measurement at two locations via a SidePak™ Personal Aerosol Monitor. Two continuous air monitoring stations were established to collect data at the background or upwind conditions and the maximum disturbance or downwind conditions. Monitoring stations were relocated, as required, to accommodate construction progress, prevailing wind direction, and staging areas. Corrective actions were taken if visible inspection deemed that a response was necessary or the action level (dust reading of 150 micrograms per cubic meter above background over a 15-minute period) was attained.

In response to visual observation of dust, dust suppression was conducted by spraying water in the work area, on the access roads, and near temporary staging areas. No exceedances were recorded by the air monitor. The air monitoring logs are included in Appendix F.

3.2 Sheen Monitoring and Removal

Sheen monitoring was conducted downstream of the construction area to confirm that the water quality controls were effective and construction activities did not affect downstream water quality, as described in the CQAP (Appendix C of the action plan, ARCADIS 2014c). Sheens observed in the work area and downstream of the work area were removed using absorbent material. A summary of sheen monitoring and sampling activities is included in Table 3-1 and described below.

3.2.1 Downstream of the Construction Area

Daily surface water sheen monitoring and removal was conducted in the cove downstream of the construction area in accordance with the procedures outlined in the CQAP (Appendix C of the action plan, ARCADIS 2014c). Sheen observations for the downstream area are summarized in Table 3-1 and presented on Figure 3-1. Between August 21 and December 18, 2014, 12 brittle and two non-brittle sheens were observed in the downstream area. These sheens included metallic, silver gray, and/or rainbow-colored patches, streamers, patches/streamers, and/or covers (no particular structure). Extensive brittle sheens

have been observed within the cove and are generally associated with microbial activity. Sources and types of sheens are discussed in Appendix M of the DADAR (ARCADIS 2014a).

Additionally, three sheen samples were collected from the southeast bank of the downstream area in September and October 2014 to evaluate their chemical composition (Figure 3-1). These samples were analyzed by B&B Laboratories, Inc. for polycyclic aromatic hydrocarbons (PAHs; by USEPA Modified Method 8270 Select Ion Monitoring [USEPA 2007b]) and aliphatic and total petroleum hydrocarbons (TPH; by USEPA Modified Method 8015 [USEPA 2007a]). Laboratory reports for these samples are included in Appendix D and tables summarizing these analytical results are included in Appendix G. The analytical results for these sheen samples were compared with those for a crude oil sample (PR-MF-001) collected from the Pegasus Pipeline on April 5, 2013 to determine the chemical composition of the sheens via forensic analysis as described in Appendix M of the DADAR (ARCADIS 2014a). A detailed comparison of analytical results for forensic analysis of these samples is included in Appendix H. The PAH bar charts did not have bell curve-shaped PAH homolog distributions and the PAH chromatograms had limited resolved peaks and no unresolved complex mixture curve (Appendix H). Additionally, the aliphatic hydrocarbon bar charts had prevalence of heavier normal alkanes (n-C15 to n-C35) and the TPH chromatograms had very limited resolved peaks and no unresolved complex mixture curve (Appendix H). The forensic analysis for the three sheen samples collected downstream of the construction area indicated that these sheen samples do not resemble crude oil from the Pegasus Pipeline (Table 3-2).

3.2.2 Heavily Vegetated Area

Following in-situ amendment placement in the Heavily Vegetated Area, sheen monitoring and removal activities were conducted in this area three times per week. During the construction activities, brittle and non-brittle sheens were observed at four locations within this area between October 23 and December 18, 2014. These sheens included patches/streamers of metallic/rainbow or silver gray-colored sheens. The results of the sheen monitoring within the Heavily Vegetated Area are summarized in Table 3-1 and shown on Figure 3-2.

3.2.3 Additional Sheen Sampling from Open Water Area

Three sheen samples were collected from the Open Water Area on September 25, 2014, prior to the reactive cap placement, to provide supplemental pre-construction data. The chemical composition of these samples resembled the crude oil sample (PR-MF-001) from the Pegasus Pipeline. Results are provided in Appendix H.

3.2.4 Post-Construction Monitoring

Between December 19, 2014 and February 28, 2015, weekly sheen monitoring was conducted within the Heavily Vegetated Area and downstream of the construction area. No sheens were observed within the cove during this period. Post-construction sheen monitoring will be continued as described in Section 5.

3.3 Surface Water Monitoring

Water quality monitoring conducted in the cove included turbidity monitoring and surface water sampling, as described in the CQAP (Appendix C of the action plan, ARCADIS 2014c).

3.3.1 Turbidity Monitoring

Prior to the commencement of construction activities, turbidity readings were recorded during normal flow conditions at the Inlet Channel culvert under I-40 (upstream) and at the cove outlet (downstream) to establish background data (Figure 2-1; ARCADIS 2014c). Pre-construction turbidity readings were measured at both locations twice daily from August 21 through 28, 2014. Turbidity readings recorded at the upstream and downstream locations varied from 48.2 to 88.6 nephelometric turbidity units (NTU) and 24.5 to 51.4 NTU, respectively. The 95% upper confidence limit for the cove outlet data was approximately 40 NTU, which was used as a background turbidity level. The turbidity trigger level of 140 NTU was selected to identify if modification of water quality controls or construction operations was needed. The pre-construction turbidity monitoring data are summarized in Table 3-3.

During active construction, turbidity readings from the cove outlet were recorded two times per day to compare against the turbidity trigger level of 140 NTU. The frequency of turbidity monitoring at the cove outlet was reduced to once a day, starting on November 17, 2014, after completion of reactive capping in the Open Water Area.

During active construction, the turbidity readings recorded at the cove outlet ranged from 17.9 to 86.4 NTU (Table 3-4). There were no exceedances of the turbidity trigger level of 140 NTU, which indicates that the water quality controls were effective in maintaining the surface water quality during the construction activities.

3.3.2 Surface Water Sampling

As described in the CQAP (Appendix C of the action plan, ARCADIS 2014c), ongoing weekly surface water sampling was continued during the construction activities, per the ADEQ-approved Surface Water Sampling and Analysis Plan (ARCADIS 2014b). This program included collection of surface water samples at five locations in the cove (WS-004 and WS-007) and Lake Conway (WS-001, WS-009, and

WS-021) for analysis of PAHs (Figure 3-3). The analytical results for 85 weekly surface water samples, collected between August 21 and December 18, 2014, are included in Appendix G. Appendix G also includes the analytical results for weekly samples collected prior to the construction activities between February 10 and August 17, 2014. Surface water sampling data collected prior to February 9, 2014 are included in the DADAR (ARCADIS 2014a). A statistical summary for surface water sampling results is presented in Table 3-5.

The analytical results for 85 weekly surface water samples collected during construction activities indicate that 11 of 18 PAHs have been detected in weekly surface water samples collected from the cove and Lake Conway (Table 3-5). Of the 11 detected PAHs, benzo(a)pyrene and pyrene were detected at concentrations higher than the associated ecological screening values (ESVs). Benzo(a)pyrene was detected at concentrations higher than the ESV of 0.015 micrograms per liter (µg/L) in two samples collected from the cove (WS-004) on October 15 (0.016 µg/L) and December 11, 2014 (0.015 µg/L), and one sample collected from Lake Conway (WS-021) on October 23, 2014 (0.017 µg/L). Pyrene was detected at a concentration (0.051 µg/L) higher than the ESV of 0.025 µg/L in one sample collected from Lake Conway (WS-009) on September 25, 2014. No other detections higher than the ESVs were recorded in the weekly samples collected during the construction activities (Table 3-5).

The comparison of analytical results for surface water samples collected prior to the start of construction and during construction activities indicated that construction activities did not have any adverse impact on the concentrations of PAHs in surface water (Table 3-5). In general, the concentrations of detected PAHs in surface water samples collected during construction activities were lower than those in samples collected prior to construction activities.

3.3.3 Post-Construction Sampling

The ADEQ-approved weekly surface water sampling program was continued from December 19, 2014 through February 28, 2015. During this period, 50 surface water samples were collected from five locations within the cove and Lake Conway and analyzed for PAHs. The analytical results for these samples are included in Appendix G. Table 3-5 includes a statistical summary of post-construction surface water sampling.

The analytical results for 50 weekly surface water samples collected after the completion of construction activities indicate that 10 of 18 PAHs have been detected in weekly surface water samples collected from the cove and Lake Conway (Table 3-5). Of the 10 detected PAHs, pyrene was detected at a concentration slightly higher than the associated ESV. Pyrene was detected at a concentration (0.026 µg/L) higher than the ESV of 0.025 µg/L in one sample collected from the cove (WS-007) on January 6, 2015. No other detections higher than the ESVs were recorded in the post-construction samples (Table 3-5).

4. Site Demobilization

Following completion of the mitigation action, construction equipment was decontaminated, the temporary staging areas were deconstructed, and temporary facilities and construction equipment were demobilized from the work area. Gravel and materials used for construction of the staging areas and access roads were removed and disposed at the off-site landfill facility along with construction-related debris (Appendix C). An approximately 20,000-square-foot area on the southwest side of the Open Water Area, near the temporary staging area, was disturbed during construction due to movement of deck buggies during loading of reactive cap material (Figure 4-1). This disturbed area was covered by placing an approximately 3-inch-thick layer of sand/organoclay material through the water column between November 4 and 6, 2014. This disturbed area was covered to mitigate disturbance to any sheen-bearing material potentially present. A small disturbed area (approximately 2,500 square feet) located on the west side of the decontamination area was also addressed by placing approximately 5 cubic yards of sand/organoclay material with an equivalent average thickness of about 2.5 inches (Figure 4-1). This area was disturbed due to vehicular traffic during construction activities.

After completing the mitigation action, the containment booms located at the western boundary of the Heavily Vegetated Area and all sorbent booms within the Open Water Area and Heavily Vegetated Area were removed. Two containment booms located downstream of the Heavily Vegetated Area are currently in place. A post-construction layout of the site is shown on Figure 4-2.

4.1 Pre-Final Inspection

On November 13, 2014, the pre-final inspection of the work areas was conducted by the CQA Monitor to satisfy the requirements described in the CQAP (Appendix C of the action plan, ARCADIS 2014c). The pre-final inspection was conducted by walking through each of the staging areas and then through the mitigation areas (i.e., Inlet Channel, Open Water Area, and Heavily Vegetated Area). A memorandum summarizing findings of the pre-final inspection is included in Appendix I.

The CQA Monitor documented that the mitigation action objectives for the Inlet Channel, Open Water Area, and Heavily Vegetated Area were met in accordance with the CQAP (Appendix C of the action plan, ARCADIS 2014c). A list of action items recorded by the CQA Monitor during this inspection was provided to the Contractor in order to implement corrective measures prior to the final inspection and demobilization from the site.

4.2 Final Inspection

On December 18, 2014, the final inspection of the work areas was conducted by the ADEQ, Arkansas Game and Fish Commission, EMES, ARCADIS, and CRA. The final inspection confirmed that sediment

removal, cap installation, and in-situ amendment placement activities were conducted according to the ADEQ-approved action plan (ADEQ 2014b). In addition, the action items from the pre-final inspection were confirmed to be completed by the ARCADIS CQA Manager.

4.3 Site Restoration

The Cove Restoration Planting Plan, Revision 1 (ARCADIS 2015), summarizing methodologies to restore areas temporarily disturbed during the construction activities, was submitted to the U.S. Army Corps of Engineers on February 20, 2015. This Cove Restoration Planting Plan focuses on restoration and re-vegetation of the disturbed Inlet Channel and forested wetlands in the cove. The restoration activities, initiated on March 9, 2015, include seeding and planting activities to maintain different wetland habitat types in the cove. The restoration activities in the Inlet Channel include installing root wads and planting bare root seedlings and live stakes to armor stream banks, establish a riparian buffer, and create a diverse habitat structure for fish, reptiles, and amphibians (ARCADIS 2015). Trees and shrubs will be planted in the disturbed areas at sufficient density to account for natural competition and mortality among seedlings (ARCADIS 2015).

5. Post-Construction Monitoring Plan

Post-construction monitoring will be conducted to document achievement of the site RAO, which is to mitigate surface water sheens related to crude oil from the Pegasus Pipeline to the extent technologically feasible. Sheen monitoring will be conducted as described below.

5.1 Post-Construction Sheen Monitoring

Following the completion of construction, it is proposed that sheens will be monitored every 2 weeks for up to 6 months following the completion of the mitigation action or until the ADEQ approves discontinuation of monitoring. Sheen monitoring will be conducted in accordance with a revised Sheen Monitoring and Maintenance Plan as follows:

- The banks of the Inlet Channel will be walked and inspected for in-situ sheens.
- Visual observations of the Open Water Area and Heavily Vegetated Area will be completed during a walking inspection along the edge of water, and/or observations will performed via boat, depending on weather conditions and water depth.
- Sheens observed at the site will be characterized using National Oceanic and Atmospheric Administration-specified terminology (e.g., color, structure; National Oceanic and Atmospheric Administration 2007) in accordance with the Sheen Field Description and Characterization Standard Operating Procedure included in the CQAP (Appendix C of the action plan, ARCADIS 2014c).
- Monthly reports summarizing the sheen monitoring observations will be provided to the ADEQ.

If monitoring results indicate that surface water sheens have been mitigated to the extent technologically feasible, the mitigation action will be considered complete and the remaining hard booms will be removed in October 2015. However, if monitoring results show a recurrence of sheens related to crude oil from the Pegasus Pipeline, the following maintenance activities may be employed (following discussion with the ADEQ) during the post-construction monitoring period to mitigate sheens:

- Increased monitoring to once per week and removal of observed sheen using sorbent materials.
- Placement of additional organoclay in target areas.
- Deployment of sorbent booms or pads.

If any extended period of site maintenance activities is required based on the post-construction monitoring data, it may be appropriate to identify additional measures to repair, enhance, or maintain the mitigated areas at locations producing sheens. If maintenance activities require intrusive construction activities, a maintenance work plan will be developed for the ADEQ's approval.

5.2 Discontinuation of Surface Water Monitoring

The post-construction sheen monitoring data indicate that the mitigation action has been successful in mitigating sheen within the cove. Based on the successful implementation of the mitigation action and the post-construction surface water monitoring results (Section 3.3.3), it is proposed that the surface water sampling program will be discontinued with the ADEQ approval of this completion report.

6. References

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ARCADIS

Tables

Table 2-1
Summary of Inlet Channel Removal and Confirmation Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Removal Area	Sample ID[1, 2]	Date	Northing	Easting	Sample Depth[3] (inches)	Design Removal Depth[3] (inches)	Final Removal Depth[3, 4] (inches)	Sheen Observed	Sheen Characterization	Qualitative Sheening Amount[5]	Notes
ICR-1	ICR-1-1	9/5/2014	230105.44	1186437.77	12	12	12	No	--	--	
ICR-1	ICR-1-2	9/5/2014	230103.63	1186455.03	12	12	12	No	--	--	
ICR-1	ICR-1-3	9/5/2014	230098.33	1186468.08	12	12	--	Yes	Patches of rainbow sheen with one oil spot	Lighter	Additional step-out sample (ICR-1-4) 10 feet to west to determine limits of further excavation. Excavated additional 3 inches
ICR-1	ICR-1-4	9/5/2014	230101.60	1186460.47	12	12	12	No	--	--	
ICR-1	ICR-1-5	9/5/2014	230100.97	1186469.51	15	12	15	No	--	--	Sample after re-excavation at ICR-1-3
ICR-2	ICR-2-1	9/5/2014	230092.48	1186488.76	6	6	22	No	--	--	
ICR-2	ICR-2-2	9/5/2014	230091.91	1186508.11	12	6	22	No	--	--	
ICR-2	ICR-2-3	9/5/2014	230095.20	1186525.68	12	6	22	No	--	--	
ICR-2	ICR-2-4	9/6/2014	230089.49	1186526.88	36	6	36	No	--	--	
ICR-2	ICR-2-5	9/6/2014	230098.38	1186547.79	30	6	36	No	--	--	
ICR-2	ICR-2-6	9/6/2014	230115.57	1186557.88	12	6	21	No	--	--	
ICR-2	ICR-2-7	9/6/2014	230128.12	1186570.04	12	6	21	No	--	--	
ICR-2	ICR-2-8	9/6/2014	230145.19	1186589.01	8	6	15	No	--	--	
ICR-2	ICR-2-9	9/8/2014	230153.97	1186603.73	9	6	15	No	--	--	
ICR-2	ICR-2-10	9/8/2014	230164.34	1186622.58	9	6	15	No	--	--	
ICR-2	ICR-2-11	9/8/2014	230171.08	1186642.10	9	6	21	No	--	--	
ICR-2	ICR-2-12	9/8/2014	230182.76	1186658.85	9	6	--	Yes	Streamers of rainbow sheen	Heavier	Excavated additional 3 inches
ICR-2	ICR-2-13	9/8/2014	230186.46	1186661.21	12	6	21	No	--	--	Sample after re-excavation at ICR-2-12
ICR-2	ICR-2-14	9/8/2014	230204.65	1186664.64	6	6	21	No	--	--	
ICR-2	ICR-2-15	9/8/2014	230217.64	1186649.69	6	6	21	No	--	--	
ICR-3	ICR-3-1	9/8/2014	230223.66	1186630.59	12	12	27	No	--	--	
ICR-3	ICR-3-2	9/8/2014	230236.45	1186621.45	12	12	27	No	--	--	
ICR-4	ICR-4-1	9/8/2014	230250.63	1186637.29	6	6	6	No	--	--	
ICR-4	ICR-4-2	9/8/2014	230258.20	1186658.31	6	6	6	No	--	--	
ICR-4	ICR-4-3	9/8/2014	230255.74	1186677.85	6	6	12	No	--	--	
ICR-4	ICR-4-4	9/8/2014	230243.97	1186694.71	6	6	12	No	--	--	
ICR-5	ICR-5-1	9/10/2014	230232.38	1186116.07	12	12	12	No	--	--	
ICR-5	ICR-5-2	9/10/2014	230235.86	1186735.88	12	12	12	No	--	--	
ICR-5	ICR-5-3	9/12/2014	230247.33	1186755.32	12	12	12	No	--	--	
ICR-5	ICR-5-4	9/15/2014	230258.25	1186774.44	15	12	15	No	--	--	
ICR-6	ICR-6-1	9/15/2014	230263.04	1186793.92	15	6	15	No	--	--	
ICR-6	ICR-6-2	9/15/2014	230278.81	1186808.05	24	6	28	No	--	--	
ICR-6	ICR-6-3	9/15/2014	230291.77	1186800.41	6	6	6	No	--	--	
ICR-6	ICR-6-4	9/15/2014	230309.89	1186792.89	12	6	--	Yes	Streamers of rainbow sheen	Medium	Excavated additional 6 inches
ICR-6	ICR-6-5	9/15/2014	230309.89	1186792.89	18	6	18	No	--	--	Sample after re-excavation at ICR-6-4
ICR-7	ICR-7-1	9/15/2014	230323.24	1186783.82	12	12	18	Yes	Streamers of rainbow sheen with oil spots	Medium	Excavated additional 6 inches

Table 2-1
Summary of Inlet Channel Removal and Confirmation Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Removal Area	Sample ID[1, 2]	Date	Northing	Easting	Sample Depth[3] (inches)	Design Removal Depth[3] (inches)	Final Removal Depth[3, 4] (inches)	Sheen Observed	Sheen Characterization	Qualitative Sheening Amount[5]	Notes
ICR-7	ICR-7-2	9/16/2014	230343.69	1186788.67	12	12	12	No	--	--	
ICR-7	ICR-7-3	9/16/2014	230353.28	1186804.20	12	12	15	No	--	--	
ICR-8	ICR-8-1	9/17/2014	230360.92	1186822.21	6	6	--	Yes	Streamers of metallic/rainbow sheen	Lighter	Additional step-out sample (ICR-8-2) 5 feet to west to determine limits of further excavation. Excavated additional 3 inches
ICR-8	ICR-8-2	9/17/2014	230358.22	1186818.80	6	6	--	Yes	Streamers of metallic/rainbow sheen	Medium	
ICR-8	ICR-8-3	9/17/2014	230358.22	1186818.80	9	6	9	No	--	--	Sample after re-excavation at ICR-8-2
ICR-8	ICR-8-4	9/17/2014	230368.01	1186837.80	9	6	9	No	--	--	
ICR-8	ICR-8-5	9/17/2014	230363.03	1186856.79	9	6	9	No	--	--	
ICR-8	ICR-8-6	9/17/2014	230368.15	1186875.81	9	6	12	No	--	--	
ICR-8	ICR-8-7	9/18/2014	230376.25	1186893.90	12	6	--	Yes	Patches of silver gray sheen	Lighter	Excavated additional 3 inches
ICR-8	ICR-8-8	9/18/2014	230376.25	1186893.90	15	6	29	No	--	--	Sample after re-excavation at ICR-8-7
ICR-8	ICR-8-9	9/18/2014	230378.56	1186882.01	24	6	29	Yes	Patches/streamers of metallic sheen	Medium	Sidewall sample from a tree stump. Excavated additional 5 inches
ICR-9	ICR-9-1	9/18/2014	230387.10	1186910.64	29	12	29	No	--	--	
ICR-9	ICR-9-2	9/19/2014	230398.24	1186926.39	15	12	29	No	--	--	
ICR-10	ICR-10-1	9/19/2014	230411.65	1186946.15	17	6	17	No	--	--	
ICR-10	ICR-10-2	9/19/2014	230420.57	1186964.01	17	6	--	Yes	Patches/streamers of metallic/rainbow sheen	Medium	Additional step-out sample (ICR-10-3) 5 feet to west to determine limits of further excavation. Excavated additional 12 inches
ICR-10	ICR-10-3	9/19/2014	230409.60	1186942.41	17	6	17	No	--	--	
ICR-10	ICR-10-4	9/19/2014	230420.57	1186964.01	29	6	29	No	--	--	Sample after re-excavation at ICR-10-2
ICR-10	ICR-10-5	9/19/2014	230428.17	1186982.95	9	6	9	No	--	--	
ICR-10	ICR-10-6	9/20/2014	230428.17	1186982.95	9	6	9	No	--	--	
ICR-10	ICR-10-7	9/20/2014	230420.56	1186982.95	9	6	18	No	--	--	Sidewall sample. Additional excavation to remove tree stump from south bank.
ICR-10	ICR-10-8	9/20/2014	230425.06	1186999.66	9	6	9	No	--	--	
ICR-10	ICR-10-9	9/20/2014	230406.42	1187007.33	6	6	6	No	--	--	
ICR-10	ICR-10-10	9/22/2014	230383.39	1187009.79	12	6	12	No	--	--	
ICR-10	ICR-10-11	9/22/2014	230366.90	1187013.36	9	6	12	No	--	--	
ICR-10	ICR-10-12	9/22/2014	230358.50	1187032.03	9	6	9	No	--	--	
ICR-10	ICR-10-13	9/22/2014	230364.08	1187053.26	12	6	--	Yes	Streamers of rainbow sheen with four small oil spots	Medium	Excavated additional 6 inches
ICR-10	ICR-10-14	9/22/2014	230364.08	1187053.26	18	6	18	No	--	--	Sample after re-excavation at ICR-10-13
ICR-11	ICR-11-1	9/22/2014	230378.09	1187063.59	18	18	18	No	--	--	
ICR-11	ICR-11-2	9/23/2014	230393.50	1187069.92	18	18	--	Yes	Streamers of silver gray sheen with small oil spots	Lighter	Excavated additional 6 inches
ICR-11	ICR-11-3	9/23/2014	230393.50	1187069.92	24	18	24	No	--	--	Sample after re-excavation at ICR-11-2
ICR-11	ICR-11-4	9/23/2014	230413.15	1187079.63	24	18	30	No	--	--	

Table 2-1
Summary of Inlet Channel Removal and Confirmation Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Removal Area	Sample ID[1, 2]	Date	Northing	Easting	Sample Depth[3] (inches)	Design Removal Depth[3] (inches)	Final Removal Depth[3, 4] (inches)	Sheen Observed	Sheen Characterization	Qualitative Sheening Amount[5]	Notes
ICR-11	ICR-11-5	9/23/2014	230436.47	1187086.91	18	18	18	No	--	--	
ICR-11	ICR-11-6	9/24/2014	230460.90	1187077.30	18	18	--	Yes	Streamers of rainbow sheen	Lighter	Excavated additional 6 inches
ICR-11	ICR-11-7	9/24/2014	230460.92	1187077.32	24	18	24	No	--	--	Sample after re-excavation at ICR-11-6
ICR-11	ICR-11-8	9/24/2014	230479.79	1187065.99	18	18	24	No	--	--	
ICR-12	ICR-12-1	9/24/2014	230498.48	1187060.64	6	6	6	No	--	--	
ICR-13	ICR-13-1	9/25/2014	230520.41	1187062.82	6	6	6	No	--	--	
ICR-13	ICR-13-2	9/25/2014	230531.63	1187082.93	6	6	6	No	--	--	
ICR-13	ICR-13-3	9/25/2014	230536.35	1187102.46	6	6	6	No	--	--	

Notes:

1. Confirmation samples were collected as described in Section 2.2.3 of the Mitigation Action Completion Report.

2. Purple highlight indicates interim confirmation sample collected after first excavation. Because these sample had sheens, additional excavation was conducted to remove sheen-bearing material, and a second confirmation sample was collected.

3. Depth is below the pre-excavation sediment surface.

4. Final removal depth varies from confirmation sample depth since additional excavation was conducted in some removal areas due to visual observation of sheen and/or preparation for backfill placement.

5. Qualitative sheening amount was determined from the visual observation of sheen generated on the water surface during stir test using following criteria:

   Lighter: 0-30% of Water Surface Covered with Sheen

   Medium: 30-60% of Water Surface Covered with Sheen

   Heavier: 60-100% of Water Surface Covered with Sheen

-- = not applicable

% = percent

ICR = Inlet Channel Removal

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

		Sample ID	SO-TS-BF-001	084949-070914-SANDCOMP-01
		Sample Date	7/9/2013	7/9/2014
		Supplier	A&B Dirt Movers, Inc.	Mallard Ready Mix
		Material	General Fill[1]	Bar Sand/Pit Sand[2]
		Application Area	Inlet Channel	Open Water Area
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**	**Result**	**Result**
Metals				
Aluminum	mg/kg	--	NA	1340
Antimony	mg/kg	--	0.866 J	< 2.11 U
Arsenic	mg/kg	14	5.23	< 2.11 U
Barium	mg/kg	753	76.3	13.1
Beryllium	mg/kg	--	0.473 J	< 0.527 U
Cadmium	mg/kg	--	< 0.569 U	0.0612 J
Calcium	mg/kg	--	NA	268
Chromium	mg/kg	69	11.3	2.04
Cobalt	mg/kg	--	NA	1.11
Copper	mg/kg	--	6.48	0.956 J
Iron	mg/kg	--	NA	2360
Lead	mg/kg	29	6.70	1.56 J
Magnesium	mg/kg	--	NA	417
Manganese	mg/kg	--	NA	37.0
Mercury	mg/kg	0.06	< 0.111 U	< 0.105 U
Nickel	mg/kg	40	8.95	1.99
Potassium	mg/kg	--	NA	265
Selenium	mg/kg	1.7	< 2.27 U	< 2.11 U
Silver	mg/kg	--	< 0.569 U	< 0.527 U
Sodium	mg/kg	--	NA	21.1 J
Thallium	mg/kg	--	< 3.41 U	< 3.16 U
Vanadium	mg/kg	146	20.8	4.32
Zinc	mg/kg	--	23.9	5.55
Other				
Cyanide	mg/kg	--	< 0.58 U	< 0.53 U
Cyanide, amenable	mg/kg	--	NA	< 0.51 U
Percent Moisture	%	--	13.8	6.1
Pesticides				
4,4-DDD	µg/kg	--	< 2.0 U	< 1.8 U
4,4-DDE	µg/kg	--	< 2.0 U	< 1.8 U
4,4-DDT	µg/kg	--	< 2.0 U	< 1.8 U
Aldrin	µg/kg	--	< 0.96 U	< 0.87 U
Alpha-BHC	µg/kg	--	< 0.96 U	< 0.87 U
Alpha-chlordane	µg/kg	--	NA	< 0.87 U
Beta-BHC	µg/kg	--	< 1.2 U	< 1.0 U
Camphechlor	µg/kg	--	< 38 U	< 35 U
Chlordane	µg/kg	--	< 20 U	< 18 U
Delta-Bhc	µg/kg	--	< 0.96 U	< 0.87 U
Dieldrin	µg/kg	--	< 2.0 U	< 1.8 U
Endosulfan I	µg/kg	--	< 0.96 U	< 0.87 U
Endosulfan II	µg/kg	--	< 2.0 U	< 1.8 U
Endosulfan Sulfate	µg/kg	--	< 2.0 U	< 1.8 U
Endrin	µg/kg	--	< 2.0 U	< 1.8 U
Endrin Aldehyde	µg/kg	--	< 2.0 U	< 1.8 U
Endrin Ketone	µg/kg	--	NA	< 1.9 U
Gamma-Bhc	µg/kg	--	< 0.96 U	< 0.87 U
Gamma-chlordane	µg/kg	--	NA	< 0.87 U

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

			Sample ID Sample Date Supplier Material Application Area	SO-TS-BF-001 7/9/2013 A&B Dirt Movers, Inc. General Fill[1] Inlet Channel	084949-070914-SANDCOMP-01 7/9/2014 Mallard Ready Mix Bar Sand/Pit Sand[2] Open Water Area
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**		**Result**	**Result**
Heptachlor	µg/kg	--		< 0.96 U	< 0.87 U
Heptachlor Epoxide	µg/kg	--		< 0.96 U	< 0.87 U
Methoxychlor	µg/kg	--		< 7.8 U	< 7.0 U
Mirex	µg/kg	--		NA	< 1.8 U
O,P-DDD	µg/kg	--		NA	< 1.8 U
O,P-DDE	µg/kg	--		NA	< 1.8 U
O,P-DDT	µg/kg	--		NA	< 1.8 U
Azinphos-Methyl	µg/kg	--		NA	< 71 U
Basudin, Neocidol	µg/kg	--		NA	< 71 U
Carbophenothion	µg/kg	--		NA	< 71 U
Chlorpyrifos	µg/kg	--		NA	< 71 U
Coumaphos	µg/kg	--		NA	< 71 U
Dasanit	µg/kg	--		NA	< 210 U
Demeton-O	µg/kg	--		NA	< 71 U
Demeton-S	µg/kg	--		NA	< 71 U
Dibrom	µg/kg	--		NA	< 71 U
Dichlorvos	µg/kg	--		NA	< 71 U
Disulfoton	µg/kg	--		NA	< 71 U
Ethion	µg/kg	--		NA	< 71 U
Ethoprophos	µg/kg	--		NA	< 71 U
Ethyl p-nitrophenyl phenylphosphorothioate	µg/kg	--		NA	< 71 U
Famphur	µg/kg	--		NA	< 71 U
Fenthion	µg/kg	--		NA	< 71 U
Folex	µg/kg	--		NA	< 71 U
Malathion	µg/kg	--		NA	< 71 U
Methyl Parathion	µg/kg	--		NA	< 71 U
Mevinphos	µg/kg	--		NA	< 71 U
Parathion	µg/kg	--		NA	< 71 U
Phorate	µg/kg	--		NA	< 71 U
Ronnel	µg/kg	--		NA	< 71 U
Sulprofos	µg/kg	--		NA	< 71 U
Tetrachlorovinphos	µg/kg	--		NA	< 71 U
Tokuthion	µg/kg	--		NA	< 71 U
Trichloronate	µg/kg	--		NA	< 71 U
PCBs					
Aroclor 1016	µg/kg	--		< 20 U	< 18 U
Aroclor 1221	µg/kg	--		< 20 U	< 18 U
Aroclor 1232	µg/kg	--		< 20 U	< 18 U
Aroclor 1242	µg/kg	--		< 20 U	< 18 U
Aroclor 1248	µg/kg	--		< 20 U	< 18 U
Aroclor 1254	µg/kg	--		< 20 U	< 18 U
Aroclor 1260	µg/kg	--		< 20 U	< 18 U
Herbicides					
2,2-Dichloropropionic Acid	µg/kg	--		< 100 U	< 96 U
2,4,5-T	µg/kg	--		< 2.0 U	< 1.8 U
2,4,5-TP	µg/kg	--		< 2.0 U	< 1.8 U
2,4-D	µg/kg	--		< 42 U	< 38 U
2,4-DB	µg/kg	--		< 20 U	< 18 U

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

		Sample ID	SO-TS-BF-001	084949-070914-SANDCOMP-01
		Sample Date	7/9/2013	7/9/2014
		Supplier	A&B Dirt Movers, Inc.	Mallard Ready Mix
		Material	General Fill[1]	Bar Sand/Pit Sand[2]
		Application Area	Inlet Channel	Open Water Area
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**	**Result**	**Result**
2-Methyl-4-Chlorophenoxyacetic Acid	µg/kg	--	< 2900 U	< 2700 U
Dicamba	µg/kg	--	< 14 U	< 13 U
Dichlorprop	µg/kg	--	< 20 U	< 18 U
Dinoseb	µg/kg	--	< 28 U	< 26 U
MCPP	µg/kg	--	< 2900 U	< 2700 U
Pentachlorophenol	µg/kg	--	< 2.0 U	< 1.8 U
SVOCs				
1-Methylnaphthalene	µg/kg	--	< 1.9 U	NA
2-Methylnaphthalene	µg/kg	--	< 1.9 U	< 18 U
Acenaphthene	µg/kg	--	< 1.9 U	< 18 U
Acenaphthylene	µg/kg	--	< 1.9 U	< 18 U
Anthracene	µg/kg	--	< 1.9 U	< 18 U
Benzo(a)Anthracene	µg/kg	--	< 1.9 U	< 18 U
Benzo(a)Pyrene	µg/kg	--	< 1.9 U	< 18 U
Benzo(b)Fluoranthene	µg/kg	--	< 1.9 U	< 18 U
Benzo(g,h,i)Perylene	µg/kg	--	< 1.9 U	< 18 U
Benzo(k)Fluoranthene	µg/kg	--	< 1.9 U	< 18 U
Chrysene	µg/kg	--	0.58 J	< 18 U
Dibenz(a,h)Anthracene	µg/kg	--	< 1.9 U	< 18 U
Fluoranthene	µg/kg	--	< 1.9 U	< 18 U
Fluorene	µg/kg	--	< 1.9 U	< 18 U
Indeno[1,2,3-cd]pyrene	µg/kg	--	< 1.9 U	< 18 U
Naphthalene	µg/kg	--	0.90 J	< 18 U
Phenanthrene	µg/kg	--	< 1.9 U	< 18 U
Pyrene	µg/kg	--	< 1.9 U	< 18 U
1,1-Biphenyl	µg/kg	--	NA	< 35 U
1,2,4-Trichlorobenzene	µg/kg	--	< 39 U	NA
1,2-Dichlorobenzene	µg/kg	--	< 39 U	NA
1,2-Diphenylhydrazine	µg/kg	--	< 39 U	NA
1,3-Dichlorobenzene	µg/kg	--	< 39 U	NA
1,4-Dichlorobenzene	µg/kg	--	< 39 U	NA
2,2-Oxybis(1-Chloropropane)	µg/kg	--	NA	< 35 U
2,4,5-Trichlorophenol	µg/kg	--	NA	< 35 U
2,4,6-Trichlorophenol	µg/kg	--	< 39 U	< 35 U
2,4-Dichlorophenol	µg/kg	--	< 39 U	< 35 U
2,4-Dimethylphenol	µg/kg	--	< 39 U	< 35 U
2,4-Dinitrophenol	µg/kg	--	< 1200 U	< 1000 U
2,4-Dinitrotoluene	µg/kg	--	< 190 U	< 170 U
2,6-Dinitrotoluene	µg/kg	--	< 39 U	< 35 U
2-Chloronaphthalene	µg/kg	--	< 38 U	< 35 U
2-Chlorophenol	µg/kg	--	< 39 U	< 35 U
2-Methyl-4,6-Dinitrophenol	µg/kg	--	< 580 U	< 520 U
2-Methylphenol	µg/kg	--	NA	< 35 U
2-Nitroaniline	µg/kg	--	NA	< 35 U
2-Nitrophenol	µg/kg	--	< 39 U	< 35 U
3-Nitroaniline	µg/kg	--	NA	< 170 U
3,3-Dichlorobenzidine	µg/kg	--	< 390 U	< 350 U
3,5,5-Trimethyl-2-Cyclohexene-1-One	µg/kg	--	< 39 U	< 35 U

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

		Sample ID Sample Date Supplier Material Application Area	SO-TS-BF-001 7/9/2013 A&B Dirt Movers, Inc. General Fill[1] Inlet Channel	084949-070914-SANDCOMP-01 7/9/2014 Mallard Ready Mix Bar Sand/Pit Sand[2] Open Water Area
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**	**Result**	**Result**
4-Bromophenyl Phenyl Ether	µg/kg	--	< 39 U	< 35 U
4-Chloro-3-Methylphenol	µg/kg	--	< 39 U	< 35 U
4-Chlorophenyl Phenyl Ether	µg/kg	--	< 39 U	< 35 U
4-Methylphenol	µg/kg	--	NA	< 35 U
4-Nitrophenol	µg/kg	--	< 580 U	< 520 U
Acetophenone	µg/kg	--	NA	< 35 U
Atrazine	µg/kg	--	NA	< 170 U
Benzaldehyde	µg/kg	--	NA	< 170 U
Benzidine	µg/kg	--	< 3900 U	NA
Benzyl Butyl Phthalate	µg/kg	--	< 190 U	< 170 U
Bis(2-Chloroethoxy)methane	µg/kg	--	< 39 U	< 35 U
Bis(2-Chloroethyl)ether	µg/kg	--	< 39 U	< 35 U
Bis(2-chloroisopropyl)ether	µg/kg	--	< 39 U	NA
Bis(2-Ethylhexyl)phthalate	µg/kg	--	< 200 U	< 180 U
Caprolactam	µg/kg	--	NA	< 170 U
Carbazole	µg/kg	--	NA	< 35 U
Dibenzofuran	µg/kg	--	NA	< 35 U
Diethyl Phthalate	µg/kg	--	< 190 U	< 170 U
Dimethyl Phthalate	µg/kg	--	< 190 U	< 170 U
Di-N-Butyl Phthalate	µg/kg	--	< 190 U	< 170 U
Di-n-Octyl Phthalate	µg/kg	--	< 190 U	< 170 U
Hexachloro-1,3-Butadiene	µg/kg	--	< 39 U	< 35 U
Hexachlorobenzene	µg/kg	--	< 20 U	< 18 U
Hexachlorocyclopentadiene	µg/kg	--	< 580 U	< 520 U
Hexachloroethane	µg/kg	--	< 190 U	< 170 U
Indeno[1,2,3-cd]pyrene	µg/kg	--	< 20 U	< 18 U
Nitrobenzene	µg/kg	--	< 39 U	< 35 U
n-Nitrosodimethylamine	µg/kg	--	< 190 U	NA
n-Nitrosodi-n-Propylamine	µg/kg	--	< 39 U	< 35 U
n-nitrosodiphenylamine	µg/kg	--	< 39 U	< 35 U
p-Chloroaniline	µg/kg	--	NA	< 35 U
Pentachlorophenol	µg/kg	--	< 200 U	< 180 U
Phenol	µg/kg	--	< 39 U	< 35 U
VOCs				
1,1,1,2-Tetrachloroethane	µg/kg	--	< 6 U	NA
1,1,1-Trichloroethane	µg/kg	--	< 6 U	< 5 U
1,1,2,2-Tetrachloroethane	µg/kg	--	< 6 U	< 5 U
1,1,2-Trichloroethane	µg/kg	--	< 6 U	< 5 U
1,1,2-Trichlorotrifluoroethane	µg/kg	--	< 12 U	< 11 U
1,1-Dichloroethane	µg/kg	--	< 6 U	< 5 U
1,1-Dichloroethene	µg/kg	--	< 6 U	< 5 U
1,1-Dichloropropene	µg/kg	--	< 6 U	NA
1,2,3-Trichlorobenzene	µg/kg	--	< 6 U	NA
1,2,3-Trichloropropane	µg/kg	--	< 6 U	NA
1,2,4-Trichlorobenzene	µg/kg	--	< 6 U	< 5 U
1,2,4-Trimethylbenzene	µg/kg	--	< 6 U	NA
1,2-Dibromo-3-Chloropropane	µg/kg	--	< 6 U	< 5 U
1,2-Dibromoethane (EDB)	µg/kg	--	< 6 U	< 5 U

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

		Sample ID	SO-TS-BF-001	084949-070914-SANDCOMP-01
		Sample Date	7/9/2013	7/9/2014
		Supplier	A&B Dirt Movers, Inc.	Mallard Ready Mix
		Material	General Fill[1]	Bar Sand/Pit Sand[2]
		Application Area	Inlet Channel	Open Water Area
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**	**Result**	**Result**
1,2-Dichlorobenzene	µg/kg	--	< 6 U	< 5 U
1,2-Dichloroethane	µg/kg	--	< 6 U	< 5 U
1,2-Dichloropropane	µg/kg	--	< 6 U	< 5 U
1,3,5-Trimethylbenzene	µg/kg	--	< 6 U	NA
1,3-Dichlorobenzene	µg/kg	--	< 6 U	< 5 U
1,3-Dichloropropane	µg/kg	--	< 6 U	NA
1,4-Dichlorobenzene	µg/kg	--	< 6 U	< 5 U
2,2-Dichloropropane	µg/kg	--	< 6 U	NA
2-Butanone (MEK)	µg/kg	--	< 12 U	< 11 U
2-Chlorotoluene	µg/kg	--	< 6 U	NA
2-Phenylbutane	µg/kg	--	< 6 U	NA
4-Chlorotoluene	µg/kg	--	< 6 U	NA
4-Methyl-2-pentanone (MIBK)	µg/kg	--	< 12 U	< 11 U
Acetone	µg/kg	--	10 J	< 21 U
Acrolein	µg/kg	--	< 120 U	NA
Acrylonitrile	µg/kg	--	< 24 U	NA
Allyl chloride	µg/kg	--	< 6 U	NA
Benzene	µg/kg	--	< 6 U	< 5 U
Bromobenzene	µg/kg	--	< 6 U	NA
Bromochloromethane	µg/kg	--	< 6 U	NA
Bromodichloromethane	µg/kg	--	< 6 U	< 5 U
Bromoform (Tribromomethane)	µg/kg	--	< 6 U	< 5 U
Bromomethane	µg/kg	--	< 6 U	< 5 U
Carbon Disulfide	µg/kg	--	NA	< 5 U
Carbon Tetrachloride	µg/kg	--	< 6 U	< 5 U
Chlorobenzene	µg/kg	--	< 6 U	< 5 U
Chloroethane	µg/kg	--	< 6 U	< 5 U
Chloroform	µg/kg	--	< 6 U	< 5 U
Chloromethane	µg/kg	--	< 6 U	< 5 U
cis-1,2-Dichloroethene	µg/kg	--	< 6 U	< 5 U
cis-1,3-Dichloropropene	µg/kg	--	< 6 U	< 5 U
Cyclohexane	µg/kg	--	NA	< 5 U
Dibromochloromethane	µg/kg	--	< 6 U	< 5 U
Dibromomethane	µg/kg	--	< 6 U	NA
Dichlorodifluoromethane (CFC-12)	µg/kg	--	< 6 U	< 5 U
Dichlorofluoromethane	µg/kg	--	< 6 U	NA
Diethyl ether (Ethyl ether)	µg/kg	--	< 6 U	NA
Ethylbenzene	µg/kg	--	< 6 U	< 5 U
Hexachloro-1,3-Butadiene	µg/kg	--	< 6 U	NA
Isopropylbenzene (Cumene)	µg/kg	--	< 6 U	< 5 U
Methyl Acetate	µg/kg	--	NA	< 5 U
Methyl N-Butyl Ketone	µg/kg	--	NA	< 11 U
Methylcyclohexane	µg/kg	--	NA	< 5 U
Methylene Chloride (Dichloromethane)	µg/kg	--	< 6 U	< 5 U
Methyl-tert-butyl ether	µg/kg	--	< 6 U	< 5 U
n-Butylbenzene	µg/kg	--	< 6 U	NA
n-Propylbenzene	µg/kg	--	< 6 U	NA
Phenols (Total)	mg/kg	--	< 4.0 U	NA

Table 2-2
Analytical Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

		Sample ID	**SO-TS-BF-001**	**084949-070914-SANDCOMP-01**
		Sample Date	**7/9/2013**	**7/9/2014**
		Supplier	**A&B Dirt Movers, Inc.**	**Mallard Ready Mix**
		Material	**General Fill[1]**	**Bar Sand/Pit Sand[2]**
		Application Area	**Inlet Channel**	**Open Water Area**
Analyte	**Units**	**Arkansas Background (95% UCL)[3]**	**Result**	**Result**
p-Isopropyltoluene (Cymene)	µg/kg	--	< 6 U	NA
Styrene	µg/kg	--	< 6 U	< 5 U
Tert-Butylbenzene	µg/kg	--	< 6 U	NA
Tetrachloroethene	µg/kg	--	< 6 U	< 5 U
Tetrahydrofuran	µg/kg	--	< 6 U	NA
Toluene	µg/kg	--	< 6 U	< 5 U
trans-1,2-Dichloroethene	µg/kg	--	< 6 U	< 5 U
trans-1,3-Dichloropropene	µg/kg	--	< 6 U	< 5 U
Trichloroethene	µg/kg	--	< 6 U	< 5 U
Trichlorofluoromethane (CFC-11)	µg/kg	--	< 6 U	< 5 U
Vinyl Chloride	µg/kg	--	< 6 U	< 5 U
Xylene (Total)	µg/kg	--	< 6 U	< 5 U

Notes:

1. General fill was obtained from the Toad Suck Park at Conway, Arkansas (1405 Lollie Road in Conway, Arkansas 72034).

2. Bar sand/pit sand was obtained from the banks of the Arkansas River at Bigelow, Arkansas (4426 Arkansas 60, Bigelow, Arkansas 72016).

3. Detected analytes were screened against the Arkansas background concentrations described in the Downstream Areas Data Assessment Report (ARCADIS 2014).

-- = not available or not applicable
% = percent
< = less than the limit of quantitation
J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NA = not analyzed
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
U = Compound was not detected
UCL = upper confidence limit
VOC = volatile organic compound

Reference:

ARCADIS. 2014. Downstream Areas Data Assessment Report, Revision 5. Mayflower Pipeline Incident, Mayflower, Arkansas. March 11.

Table 2-3
Grain Size Analysis Results for Borrow Source Sampling

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

	Sample ID	061914-SIEVE-001	084949-070914-SIEVE-01 Grab Soil[4]	084949-070914-SIEVE-02 Grab Soil	084949-070914-SIEVE-03 Grab Soil	084949-070914-SIEVE-04 Grab Soil[4]	084949-070914-SIEVE-05 Grab Soil
	Sample Date	6/19/2014	7/9/2014	7/9/2014	7/9/2014	7/9/2014	7/9/2014
	Supplier	Mallard Ready Mix	Mallard Ready Mix	Mallard Ready Mix	Mallard Ready Mix	Mallard Ready Mix	Mallard Ready Mix
	Material[1]	Bar Sand/Pit Sand	Bar Sand/Pit Sand	Bar Sand/Pit Sand	Bar Sand/Pit Sand	Bar Sand/Pit Sand	Bar Sand/Pit Sand
	Application Area	Open Water Area	Open Water Area	Open Water Area	Open Water Area	Open Water Area	Open Water Area
Sieve Size	**Gradation requirements[2]**	**Percent Passing**	**Percent Passing**	**Percent Passing**	**Percent Passing**	**Percent Passing**	**Percent Passing**
Sieve 75 mm	--	100	100	100	100	100	100
Sieve 37.5 mm	--	100	100	100	100	100	100
Sieve 19 mm	--	100	100	96.9	100	100	100
Sieve 4.75 mm	90 - 100	97.1	97.4	92.9	98.8	98.7	99.1
Sieve 3.35 mm	--	96.5	96.8	91.9	98	98.2	98.1
Sieve 2.36 mm	--	95.5	95.5	90.3	97.3	97.5	96.2
Sieve 1.18 mm	80 - 95	88.9	94.1	88.7	88.7	94.1	88.7
Sieve 0.6 mm	--	77.6	80	78.1	73.7	83.6	71.1
Sieve 0.422 mm[3]	50 - 90	59	55	62	58	63	54
Sieve 0.3 mm	--	37.8	29.6	43.6	40.4	39.2	36.8
Sieve 0.15 mm	--	9	4	7.2	9.9	5.3	20.6
Sieve 0.075 mm	2 - 10	3.6	1.8	2.5	2.1	1.7	9.7
Sieve 0.064 mm	--	2.5	1	2	1	1	8
Sieve 0.05 mm	--	2	0.5	1	0.5	0.5	6
Sieve 0.02 mm	--	1	0	0	0	0	2
Sieve 0.005 mm	--	0	0	0	0	0	0
Sieve 0.002 mm	--	0	0	0	0	0	0
Sieve 0.001 mm	--	0	0	0	0	0	0

Notes:

1. Bar sand/pit sand was obtained from the banks of the Arkansas River at Bigelow, Arkansas (4426 Arkansas 60, Bigelow, Arkansas 72016).

2. Grain size results were compared to the gradation requirements established for this project.

3. Sieve 0.422 mm was not included in the grain size analysis. Therefore, percent passing for Sieve 0.422 mm was estimated from a graph prepared for each sample by plotting the percent passing results for other sieves.

4. Samples 084949-070914-SIEVE-01 Grab Soil and 084949-070914-SIEVE-04 Grab Soil did not meet the gradation requirement for Sieve 0.075 mm. However, average result from all five grab samples (084949-070914-SIEVE-01 Grab Soil, 084949-070914-SIEVE-02 Grab Soil, 084949-070914-SIEVE-03 Grab Soil, 084949-070914-SIEVE-04 Grab Soil, and 084949-070914-SIEVE-05 Grab Soil) met the requirement; therefore, the material was accepted.

-- = not applicable
mm = millimeters

Table 2-4
Summary of Daily Reactive Cap Placement

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date of Cap Placement	Cap Placement Grid ID	Area (square feet)	Material Required To Meet Minimum Cap Thickness of 3 inches[1] (cubic yards)	Total Cap Material Placed[2] (cubic yards)	Notes
10/16/2014	L1[4]	900	8	10	
10/17/2014	L2[4]	900	31	50	
	K1	2,500			
10/20/2014	K2	2,500	93	135	
	K3	2,500			
	K4	2,500			
	K5	2,500			
10/21/2014	K6	2,500	81	116	
	K7	2,500			
	K8	2,500			
	K9	1,300			
10/22/2014	A1	746	139	140	
	A2	1,839			
	A3	2,445			
	A4	2,500			
	A5	2,500			
	A6	2,500			
	A7	2,500			
10/23/2014	B1	968	202	205	
	B2	2,500			
	B3	2,500			
	B4	2,500			
	B5	2,500			
	B6	1,500			60% area of grid capped
	C1	10			
	C2	1,880			
	C3	2,500			
	C4	2,500			
	C5	2,500			
10/24/2014	D2	384	99	125	
	D3	2,428			
	D4	2,500			
	E3	1,233			
	E4	2,000			80% area of grid capped
	F3	62			
	F4	2,000			
	F5	69			
10/27/2014	B6	1,000	81	86	Remaining 40% area of grid capped
	C6	2,500			
	D5	2,500			
	E4	500			Remaining 20% area of grid capped
	E5	2,225			

Table 2-4
Summary of Daily Reactive Cap Placement

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date of Cap Placement	Cap Placement Grid ID	Area (square feet)	Material Required To Meet Minimum Cap Thickness of 3 inches[1] (cubic yards)	Total Cap Material Placed[2] (cubic yards)	Notes
10/29/2014	B7	2,500	229	246	
	C7	2,500			
	D6	2,500			
	D7	2,500			
	E6	2,386			
	E7	2,500			
	F6	1,211			
	F7	2,500			
	G6	91			
	G7	2,211			
	H7	893			
	H8	2,500			
	J7	13			
	J8	373			
10/30/2014	A8	2,500	255	287	
	A9	2,500			
	A10	2,500			
	B8	2,500			
	B9	2,500			
	B10	2,500			
	C8	2,500			
	D8	2,500			
	E8	2,500			
	F8	2,500			
	G8	2,500			
10/31/2014	A11	2,500	177	210	
	A12	2,500			
	A13	1,198			
	B11	2,500			
	B12	2,500			
	B13	1,358			
	C11	2,500			
	C12	2,274			
	D11	250			10% area of grid capped
	D12	1,506			80% area of grid capped
11/1/2014	D11	2,250	117	148	Remaining 90% area of grid capped
	D12	377			Remaining 20% area of grid capped
	E11	2,500			
	E12	1,491			
	F11	2,500			
	F12	1,156			
	G12	2,045			
	H12	321			

Table 2-4
Summary of Daily Reactive Cap Placement

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date of Cap Placement	Cap Placement Grid ID	Area (square feet)	Material Required To Meet Minimum Cap Thickness of 3 inches[1] (cubic yards)	Total Cap Material Placed[2] (cubic yards)	Notes
11/3/2014	C9	2,500	185	243	
	C10	2,500			
	D9	2,500			
	D10	2,500			
	E9	2,500			
	E10	2,500			
	F9	2,500			
	F10	2,500			
11/4/2014	G9	2,500	114	147	
	G10	2,500			
	G11	2,500			
	H9	2,247			
	H10	1,615			
	H11	980			
	J9	4			
Total		**195,640**	**1,811**	**2,148**	

Notes:

1. The target reactive cap thickness was 3 to 6 inches and therefore, required cap material amount was calculated based on the minimum required reactive cap thickness of 3 inches.

2. Since the target reactive cap thickness was 3 to 6 inches, the reactive cap material placed in some grids was slightly more than the material amount calculated to meet the reactive cap thickness of 3 inches.

% = percent

Table 2-5
Summary of Reactive Cap Thickness Verification

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Cap Placement Grid ID	Area (square feet)	Cap Thickness from Test Pan[1] (inches)	Notes
A1	746	3.3	
A2	1,839	3.5	
A3	2,445	4.0	
A4	2,500	4.0	
A5	2,500	3.8	
A6	2,500	3.8	
A7	2,500	4.0	
A8	2,500	3.8	
A9	2,500	4.0	
A10	2,500	3.9	
A11	2,500	4.3	
A12	2,500	3.0	
A13	1,198	4.9	
B1	968	3.8	
B2	2,500	4.1	
B3	2,500	3.5	
B4	2,500	4.3	
B5	2,500	5.0	
B6	2,500	3.5	
B7	2,500	3.8	
B8	2,500	3.4	
B9	2,500	3.9	
B10	2,500	3.3	
B11	2,500	4.1	
B12	2,500	3.2	
B13	1,358	5.4	
C1	10	--	
C2	1,880	3.9	
C3	2,500	3.7	
C4	2,500	4.5	
C5	2,500	4.8	
C6	2,500	3.8	
C7	2,500	4.3	
C8	2,500	3.8	
C9	2,500	4.7	
C10	2,500	4.8	
C11	2,500	4.2	
C12	2,274	3.1	
D2	384	3.5	
D3	2,428	3.8	
D4	2,500	3.5	
D5	2,500	6.0	
D6	2,500	4.5	
D7	2,500	3.0	

Table 2-5
Summary of Reactive Cap Thickness Verification

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Cap Placement Grid ID	Area (square feet)	Cap Thickness from Test Pan[1] (inches)	Notes
D8	2,500	3.9	
D9	2,500	5.0	
D10	2,500	4.7	
D11	2,500	4.5	
D12	1,883	4.0	
E3	1,233	4.0	
E4	2,500	4.0	
E5	2,225	4.3	
E6	2,386	3.4	
E7	2,500	4.0	
E8	2,500	4.1	
E9	2,500	3.2	
E10	2,500	3.7	
E11	2,500	4.9	
E12	1,491	4.8	
F3	62	3.3	
F4	2,000	3.5	
F5	69	3.5	
F6	1,211	--	
F7	2,500	2.8	Additional 4 cy material placed
F8	2,500	5.5	
F9	2,500	5.5	
F10	2,500	5.6	
F11	2,500	4.3	
F12	1,156	2.5	Additional 2 cy material placed
G6	91	--	
G7	2,211	4.3	
G8	2,500	6.0	
G9	2,500	4.0	
G10	2,500	3.7	
G11	2,500	3.9	
G12	2,045	5.5	
H7	893	4.1	
H8	2,500	3.8	
H9	2,247	3.6	
H10	1,615	3.4	
H11	980	3.3	
H12	321	5.4	
J7	13	--	
J8	373	3.2	
J9	4	--	
K1	2,500	2.7	Additional 8 cy material placed
K2	2,500	4.5	
K3	2,500	5.5	

Table 2-5
Summary of Reactive Cap Thickness Verification

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Cap Placement Grid ID	Area (square feet)	Cap Thickness from Test Pan[1] (inches)	Notes
K4	2,500	4.8	
K5	2,500	4.2	
K6	2,500	4.9	
K7	2,500	4.5	
K8	2,500	5.0	
K9	1,300	3.5	
L1[2]	900	3.1	
L2[2]	900	2.5	Additional 5 cy material placed
Average Cap Thickness		**3.6**	

Notes:

1. The objective was to meet the reactive cap thickness of 3.5 inches, with a maximum variation of -0.5 inches and + 2.5 inches at one location. Therefore, the reactive cap thickness of 3 to 6 inches within the test pan indicated that the required thickness criteria has been met.

2. Cap thickness for grids L1 and L2 was measured using a tape because the sediment surface was exposed at the time of the reactive cap placement.

-- = not applicable

cy = cubic yard

Table 3-1
Summary of Sheen Monitoring and Sampling Activities During Construction

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Cove Sheen Monitoring Area	Sheen Observation Duration During Construction	Total Number of Sheens Observed	Brittle Sheens	Non-Brittle Sheens	Non-Brittle Sheens with Oil Spots	Sheen Samples
Downstream of Construction Area[1]	August 21 to December 18, 2014	14	12 (~86%)	2 (~14%)	0 (0% of Total)	2
Heavily Vegetated Area[2]	October 23 to December 18, 2014	4	1 (~25%)	3 (~75%)	1 (25% of Total)	0
Open Water Area[3]	--	--	--	--	--	3

Notes:

1. Daily surface water sheen monitoring was conducted downstream of the construction area.

2. Following the completion of in-situ amendment, sheen monitoring was conducted in the Heavily Vegetated Area three times per week.

3. No sheen monitoring activities were required in the Open Water Area. Three sheen samples were collected from the Open Water Area on September 25, 2014, prior to the reactive cap placement.

-- = not applicable
% = percent

Table 3-2
Summary of Sheen Sampling Analytical Results

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Sample ID	Date	Total PAHs (ng/net)	TPH (µg/net)	Total Resolved Hydrocarbons (µg/net)	Unresolved Complex Mixture (µg/net)	Total Alkanes (µg/net)	Sheen Type	Sheen Structure	Sheen Color	PAHs Resemble Crude Oil[1]	TPH Resemble Crude Oil[2]	Forensic Analysis Result[3]
Downstream of Construction Area												
COVE-005	9/3/2014	246	116	54	62	37.1	Brittle	Patches	Silver Gray	No	No	No
COVE-009	9/29/2014	348	12,160	2,534	9,625	19.6	Non-Brittle	Patches	Rainbow/Silver Gray	No	No	No
COVE-010	10/20/2014	103	40	19 J	22	5.5	Non-Brittle	Cover	Silver Gray	No	No	No
Open Water Area												
COVE-006	9/25/2014	943,756	71,648	4,377	67,270	690	Non-Brittle	Streamers	Rainbow/Silver Gray	Yes	Yes	Yes
COVE-007		21,225	6,028	153	5,874	39.4	Non-Brittle	Streamers	Rainbow/Silver Gray	Yes	Possible	Yes
COVE-008		28,236	4,128	170	3,959	6.7	Non-Brittle	Streamers	Rainbow/Silver Gray	Yes	No	Yes

Notes:

1. The resemblance to PAHs is based on the comparison of PAH bar charts and chromatograms for sheen samples and a crude oil sample collected from the Pegasus Pipeline, as described in Appendix M of the Downstream Areas Data Assessment Report (ARCADIS 2014).

2. The resemblance to TPH is based on the comparison of aliphatic hydrocarbon bar charts and TPH chromatograms for sheen samples and a crude oil sample collected from the Pegasus Pipeline, as described in Appendix M of the Downstream Areas Data Assessment Report (ARCADIS 2014).

3. The forensic analysis results provide an overall conclusion for each sample based on PAH and TPH resemblance to the crude oil sample.

µg/net = micrograms per sheen sample net
ng/net = nanograms per sheen sample net
PAH = polycyclic aromatic hydrocarbon
TPH = total petroleum hydrocarbons

Reference:

ARCADIS. 2014. Downstream Areas Data Assessment Report, Revision 5. Mayflower Pipeline Incident, Mayflower, Arkansas. March 11.

Table 3-3
Pre-Construction Turbidity Monitoring Data

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date	Location	Time	Turbidity[1, 2] (NTU)
Upstream Turbidity			
8/21/2014	Cove Inlet Channel culvert under I-40	9:30 AM	81.0
	Cove Inlet Channel culvert under I-40	4:20 PM	88.6
8/22/2014	Cove Inlet Channel culvert under I-40	10:00 AM	65.1
	Cove Inlet Channel culvert under I-40	4:15 PM	62.1
8/23/2014	Cove Inlet Channel culvert under I-40	9:00 AM	69.5
	Cove Inlet Channel culvert under I-40	1:00 PM	62.2
8/25/2014	Cove Inlet Channel culvert under I-40	9:35 AM	48.2
	Cove Inlet Channel culvert under I-40	4:25 PM	52.1
8/26/2014	Cove Inlet Channel culvert under I-40	8:30 AM	60.3
	Cove Inlet Channel culvert under I-40	2:00 PM	57.6
8/27/2014	Cove Inlet Channel culvert under I-40	8:15 AM	57.3
	Cove Inlet Channel culvert under I-40	3:40 PM	61.1
8/28/2014	Cove Inlet Channel culvert under I-40	9:00 AM	82.3
	Cove Inlet Channel culvert under I-40	1:15 PM	80.3
Range	**Cove Inlet Channel culvert under I-40**	**--**	**48.2 - 88.6**
95% UCL	**Cove Inlet Channel culvert under I-40**	**--**	**72.0**
Downstream Turbidity			
8/21/2014	Cove Outlet to Lake Conway	9:45 AM	26.2
	Cove Outlet to Lake Conway	4:35 PM	51.1
8/22/2014	Cove Outlet to Lake Conway	9:45 AM	51.4
	Cove Outlet to Lake Conway	4:00 PM	32.4
8/23/2014	Cove Outlet to Lake Conway	9:15 AM	30.8
	Cove Outlet to Lake Conway	1:15 PM	31.0
8/25/2014	Cove Outlet to Lake Conway	9:20 AM	24.5
	Cove Outlet to Lake Conway	4:10 PM	32.3
8/26/2014	Cove Outlet to Lake Conway	8:45 AM	37.7
	Cove Outlet to Lake Conway	2:15 PM	33.3
8/27/2014	Cove Outlet to Lake Conway	8:30 AM	31.1
	Cove Outlet to Lake Conway	3:55 PM	28.6
8/28/2014	Cove Outlet to Lake Conway	9:15 AM	47.7
	Cove Outlet to Lake Conway	1:30 PM	38.6
Range	**Cove Outlet to Lake Conway**	**--**	**24.5 - 51.4**
95% UCL[3]	**Cove Outlet to Lake Conway**	**--**	**40.0**

Notes:

1. Pre-construction turbidity monitoring was conducted to establish background turbidity level.
2. Turbidity was recorded using a HORIBA water quality meter.
3. Based on the turbidity data collected at upstream and downstream locations, the 95% UCL of 40 NTU for downstream location was selected as a background turbidity level.

-- = not applicable
I-40 = Interstate 40
NTU = nephelometric turbidity unit
UCL = upper confidence limit

Table 3-4
Cove Outlet Turbidity Monitoring Data During Construction

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date	Location	Time	Turbidity[1] (NTU)
9/3/2014	Cove Outlet to Lake Conway	12:15 PM	44.5
	Cove Outlet to Lake Conway	3:45 PM	52.2
9/4/2014	Cove Outlet to Lake Conway	11:25 AM	18.1
	Cove Outlet to Lake Conway	5:00 PM	21.9
9/5/2014	Cove Outlet to Lake Conway	11:30 AM	17.9
	Cove Outlet to Lake Conway	4:00 PM	32.4
9/6/2014	Cove Outlet to Lake Conway	11:45 AM	21.1
	Cove Outlet to Lake Conway	2:30 PM	25.0
9/8/2014	Cove Outlet to Lake Conway	11:45 AM	22.6
	Cove Outlet to Lake Conway	4:15 PM	18.9
9/9/2014	Cove Outlet to Lake Conway	11:30 AM	28.2
	Cove Outlet to Lake Conway	4:00 PM	21.0
9/10/2014	Cove Outlet to Lake Conway	10:00 AM	24.7
	Cove Outlet to Lake Conway	3:00 PM	25.0
9/11/2014	Cove Outlet to Lake Conway	8:30 AM	40.2
	Cove Outlet to Lake Conway	11:30 AM	41.7
9/12/2014	Cove Outlet to Lake Conway	9:00 AM	50.2
	Cove Outlet to Lake Conway	3:05 PM	37.3
9/13/2014	Cove Outlet to Lake Conway	Inclement Weather	--
	Cove Outlet to Lake Conway		--
9/15/2014	Cove Outlet to Lake Conway	11:10 AM	31.4
	Cove Outlet to Lake Conway	2:00 PM	28.8
9/16/2014	Cove Outlet to Lake Conway	10:00 AM	33.1
	Cove Outlet to Lake Conway	3:30 PM	32.8
9/17/2014	Cove Outlet to Lake Conway	9:00 AM	32.7
	Cove Outlet to Lake Conway	5:00 PM	32.2
9/18/2014	Cove Outlet to Lake Conway	8:55 AM	33.8
	Cove Outlet to Lake Conway	4:30 PM	32.0
9/19/2014	Cove Outlet to Lake Conway	9:00 AM	29.4
	Cove Outlet to Lake Conway	5:00 PM	23.0
9/20/2014	Cove Outlet to Lake Conway	8:40 AM	34.3
	Cove Outlet to Lake Conway	11:00 AM	23.0
9/22/2014	Cove Outlet to Lake Conway	10:00 AM	27.8
	Cove Outlet to Lake Conway	4:45 PM	32.1
9/23/2014	Cove Outlet to Lake Conway	10:30 AM	58.4
	Cove Outlet to Lake Conway	5:00 PM	48.6
9/24/2014	Cove Outlet to Lake Conway	12:30 PM	33.3
	Cove Outlet to Lake Conway	3:00 PM	31.7
9/25/2014	Cove Outlet to Lake Conway	1:00 PM	28.8
	Cove Outlet to Lake Conway	3:00 PM	28.5
9/26/2014	Cove Outlet to Lake Conway	1:00 PM	33.3
	Cove Outlet to Lake Conway	5:30 PM	40.1
9/27/2014	Cove Outlet to Lake Conway	10:00 AM	47.0
	Cove Outlet to Lake Conway	2:00 PM	38.9

Table 3-4
Cove Outlet Turbidity Monitoring Data During Construction

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date	Location	Time	Turbidity[1] (NTU)
9/29/2014	Cove Outlet to Lake Conway	1:30 PM	32.4
	Cove Outlet to Lake Conway	3:00 PM	34.1
9/30/2014	Cove Outlet to Lake Conway	9:00 AM	33.3
	Cove Outlet to Lake Conway	6:30 PM	29.4
10/1/2014	Cove Outlet to Lake Conway	9:00 AM	50.7
	Cove Outlet to Lake Conway	4:10 PM	70.0
10/2/2014	Cove Outlet to Lake Conway	9:15 AM	41.1
	Cove Outlet to Lake Conway	3:50 PM	54.8
10/3/2014	Cove Outlet to Lake Conway	9:25 AM	42.4
	Cove Outlet to Lake Conway	4:00 PM	44.1
10/6/2014	Cove Outlet to Lake Conway	10:00 AM	29.5
	Cove Outlet to Lake Conway	4:00 PM	28.3
10/7/2014	Cove Outlet to Lake Conway	10:00 AM	29.0
	Cove Outlet to Lake Conway	5:00 PM	28.3
10/8/2014	Cove Outlet to Lake Conway	1:00 PM	30.0
	Cove Outlet to Lake Conway	5:00 PM	27.6
10/9/2014	Cove Outlet to Lake Conway	8:30 AM	36.2
	Cove Outlet to Lake Conway	3:45 PM	35.8
10/10/2014	Cove Outlet to Lake Conway	9:00 AM	28.3
	Cove Outlet to Lake Conway	10:20 AM	34.7
10/14/2014	Cove Outlet to Lake Conway	10:15 AM	62.2
	Cove Outlet to Lake Conway	4:30 PM	74.1
10/15/2014	Cove Outlet to Lake Conway	11:00 AM	61.2
	Cove Outlet to Lake Conway	5:00 PM	54.1
10/16/2014	Cove Outlet to Lake Conway	10:15 AM	39.1
	Cove Outlet to Lake Conway	4:30 PM	23.6
10/17/2014	Cove Outlet to Lake Conway	10:50 AM	23.5
	Cove Outlet to Lake Conway	3:30 PM	24.6
10/20/2014	Cove Outlet to Lake Conway	10:00 AM	28.3
	Cove Outlet to Lake Conway	5:00 PM	29.2
10/21/2014	Cove Outlet to Lake Conway	2:00 PM	32.3
	Cove Outlet to Lake Conway	5:30 PM	30.9
10/22/2014	Cove Outlet to Lake Conway	11:00 AM	30.7
	Cove Outlet to Lake Conway	5:15 PM	31.1
10/23/2014	Cove Outlet to Lake Conway	12:00 PM	22.5
	Cove Outlet to Lake Conway	4:00 PM	22.0
10/24/2014	Cove Outlet to Lake Conway	11:30 AM	22.9
	Cove Outlet to Lake Conway	3:00 PM	25.1
10/27/2014	Cove Outlet to Lake Conway	1:00 PM	27.6
	Cove Outlet to Lake Conway	5:30 PM	29.2
10/28/2014	Cove Outlet to Lake Conway	Inclement Weather	--
	Cove Outlet to Lake Conway		--
10/29/2014	Cove Outlet to Lake Conway	12:00 AM	42.1
	Cove Outlet to Lake Conway	12:00 AM	32.8

Table 3-4
Cove Outlet Turbidity Monitoring Data During Construction

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Date	Location	Time	Turbidity[1] (NTU)
10/30/2014	Cove Outlet to Lake Conway	12:00 AM	29.8
	Cove Outlet to Lake Conway	Inclement Weather	--
10/31/2014	Cove Outlet to Lake Conway	12:00 AM	20.4
	Cove Outlet to Lake Conway	12:00 AM	37.4
11/1/2014	Cove Outlet to Lake Conway	12:00 AM	86.4
	Cove Outlet to Lake Conway	12:00 AM	63.9
11/3/2014	Cove Outlet to Lake Conway	12:00 AM	38.5
	Cove Outlet to Lake Conway	12:00 AM	41.5
11/4/2014	Cove Outlet to Lake Conway	9:00 AM	39.3
	Cove Outlet to Lake Conway	Inclement Weather	--
11/5/2014	Cove Outlet to Lake Conway	9:00 AM	53.2
	Cove Outlet to Lake Conway	2:00 PM	47.8
11/6/2014	Cove Outlet to Lake Conway	10:30 AM	36.2
	Cove Outlet to Lake Conway	3:00 PM	29.0
11/7/2014	Cove Outlet to Lake Conway	8:00 AM	40.2
	Cove Outlet to Lake Conway	2:30 PM	43.3
11/10/2014	Cove Outlet to Lake Conway	8:15 AM	32.3
	Cove Outlet to Lake Conway	2:30 PM	39.1
11/11/2014	Cove Outlet to Lake Conway	10:00 AM	40.3
	Cove Outlet to Lake Conway	1:30 PM	40.9
11/12/2014	Cove Outlet to Lake Conway	9:00 AM	38.7
	Cove Outlet to Lake Conway	2:00 PM	40.1
11/13/2014	Cove Outlet to Lake Conway	10:00 AM	39.7
	Cove Outlet to Lake Conway	3:00 PM	46.5
11/14/2014	Cove Outlet to Lake Conway	8:00 AM	32.3
	Cove Outlet to Lake Conway	12:00 PM	30.1
11/17/2014	Cove Outlet to Lake Conway	3:15 PM	28.9
11/18/2014	Cove Outlet to Lake Conway	2:40 PM	29.5
11/19/2014	Cove Outlet to Lake Conway	2:20 PM	30.3
11/20/2014	Cove Outlet to Lake Conway	2:30 PM	32.1
11/21/2014	Cove Outlet to Lake Conway	10:25 AM	25.2
Range	**Cove Outlet to Lake Conway**	**--**	**17.9 - 86.4**

Notes:
1. Turbidity was recorded using a HORIBA water quality meter.

-- = not applicable
NTU = nephelometric turbidity unit

Table 3-5
Statistical Summary for Surface Water Sampling Results

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Analyte	ESV[1] (µg/L)	Frequency of Detection	Detection Range (µg/L)	Maximum Detection Location	Maximum Detection Date	Count of Sample Results above ESV - Cove	Count of Sample Results above ESV - Lake Conway
Pre-Construction Sampling (February 10 through August 20, 2014)[2]							
1-Methylnaphthalene	2.1	0/208 (0%)	--	--	--	--	--
2-Methylnaphthalene	4.7	0/208 (0%)	--	--	--	--	--
Acenaphthene	17	0/208 (0%)	--	--	--	--	--
Acenaphthylene	4840	0/208 (0%)	--	--	--	--	--
Anthracene	0.012	3/208 (1.4%)	0.011 - 0.016	WS-007	3/27/2014	1	0
Benzo(a)Anthracene	0.018	20/208 (9.6%)	0.011 - 0.057	WS-007	3/27/2014	7	0
Benzo(a)Pyrene	0.015	20/208 (9.6%)	0.011 - 0.063	WS-007	3/27/2014	11	2
Benzo(b)Fluoranthene	9.07	37/208 (18%)	0.011 - 0.18	WS-007	3/27/2014	0	0
Benzo(g,h,i)Perylene	7.64	23/208 (7.5%)	0.011 - 0.3	WS-021	4/2/2014	0	0
Benzo(k)Fluoranthene	--	23/208 (7.5%)	0.011 - 0.056	WS-007	3/27/2014	--	--
Chrysene	--	30/208 (14%)	0.011 - 0.13	WS-007	3/27/2014	--	--
Dibenz(a,h)Anthracene	--	11/208 (5.3%)	0.011 - 0.3	WS-021	4/2/2014	--	--
Fluoranthene	39.8	47/208 (23%)	0.011 - 0.23	WS-007	3/27/2014	0	0
Fluorene	3	0/208 (0%)	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	4.31	24/208 (12%)	0.011 - 0.28	WS-021	4/2/2014	0	0
Naphthalene	62	19/208 (9.1%)	0.031 - 0.082	WS-007	6/5/2014	0	0
Phenanthrene	0.4	2/208 (1%)	0.040 - 0.049	WS-007	3/27/2014	0	0
Pyrene	0.025	35/208 (17%)	0.011 - 0.17	WS-007	3/27/2014	14	3
Construction Sampling (August 21 through December 18, 2014)[3]							
1-Methylnaphthalene	2.1	0/85 (0%)	--	--	--	--	--
2-Methylnaphthalene	4.7	0/85 (0%)	--	--	--	--	--
Acenaphthene	17	0/85 (0%)	--	--	--	--	--
Acenaphthylene	4840	1/85 (1.1%)	0.017	WS-004	10/2/2014	0	0
Anthracene	0.012	0/85 (0%)	--	--	--	--	--
Benzo(a)Anthracene	0.018	3/85 (3.5%)	0.011 - 0.018	WS-021	10/23/2014	0	0
Benzo(a)Pyrene	0.015	3/85 (3.5%)	0.016 - 0.017	WS-021	10/23/2014	2	1
Benzo(b)Fluoranthene	9.07	7/85 (8.2%)	0.011 - 0.031	WS-004	12/11/2014	0	0
Benzo(g,h,i)Perylene	7.64	2/85 (2.4%)	0.012 - 0.016	WS-004	12/11/2014	0	0
Benzo(k)Fluoranthene	--	1/85 (1.1%)	0.011	WS-004	12/11/2014	--	--
Chrysene	--	4/85 (4.7%)	0.011 - 0.039	WS-004	12/11/2014	--	--
Dibenz(a,h)Anthracene	--	0/85 (0%)	--	--	--	--	--
Fluoranthene	39.8	11/85 (13%)	0.012 - 0.028	WS-004	12/11/2014	0	0
Fluorene	3	0/85 (0%)	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	4.31	2/85 (2.4%)	0.012	WS-021, WS-004	10/23/2014, 12/11/2014	0	0
Naphthalene	62	7/85 (8.2%)	0.033 - 0.059	WS-004	10/30/2014	0	0
Phenanthrene	0.4	0/85 (0%)	--	--	--	--	--
Pyrene	0.025	10/85 (12%)	0.011 - 0.051	WS-009	9/25/2014	0	1

Table 3-5
Statistical Summary for Surface Water Sampling Results

Mayflower Pipeline Incident Response
ExxonMobil Environmental Services Company
Mitigation Action Completion Report

Analyte	ESV[1] (µg/L)	Frequency of Detection	Detection Range (µg/L)	Maximum Detection Location	Maximum Detection Date	Count of Sample Results above ESV - Cove	Count of Sample Results above ESV - Lake Conway
Post-Construction Sampling (December 19, 2014 through February 28, 2015)[3]							
1-Methylnaphthalene	2.1	0/50 (0%)	--	--	--	--	--
2-Methylnaphthalene	4.7	0/50 (0%)	--	--	--	--	--
Acenaphthene	17	0/50 (0%)	--	--	--	--	--
Acenaphthylene	4840	0/50 (0%)	--	--	--	--	--
Anthracene	0.012	0/50 (0%)	--	--	--	--	--
Benzo(a)Anthracene	0.018	1/50 (2%)	0.013	WS-021	12/30/2014	0	0
Benzo(a)Pyrene	0.015	3/50 (6%)	0.012 - 0.013	WS-021, WS-004	12/30/2014, 2/26/2015	0	0
Benzo(b)Fluoranthene	9.07	11/50 (22%)	0.012 - 0.029	WS-007	2/26/2015	0	0
Benzo(g,h,i)Perylene	7.64	4/50 (8%)	0.011 - 0.019	WS-021	1/20/2015	0	0
Benzo(k)Fluoranthene	--	2/50 (4%)	0.011	WS-004, WS-007	2/26/2015	--	--
Chrysene	--	9/50 (18%)	0.011 - 0.021	WS-007	2/26/2015	--	--
Dibenz(a,h)Anthracene	--	1/50 (2%)	0.016	WS-021	1/20/2015	--	--
Fluoranthene	39.8	15/50 (30%)	0.012 - 0.033	WS-007	2/26/2015	0	0
Fluorene	3	0/50 (0%)	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	4.31	5/50 (10%)	0.012 - 0.017	WS-021	1/20/2015	0	0
Naphthalene	62	0/50 (0%)	--	--	--	--	--
Phenanthrene	0.4	0/50 (0%)	--	--	--	--	--
Pyrene	0.025	13/50 (26%)	0.011 - 0.026	WS-007	1/6/2015	1	0

Notes:

1. Detected analytes were screened against the ESVs described in the Downstream Areas Data Assessment Report (ARCADIS 2014).

2. Evaluation based on three locations in cove (WS-004, WS-007, and WS-020) and nine locations in Lake Conway (WS-001, WS-006, WS-009, WS-010, WS-011, WS-012, WS-014, WS-015, and WS-021).

3. Evaluation based on the two locations in cove (WS-004 and WS-007) and three locations in Lake Conway (WS-001, WS-009, and WS-021).

-- = not applicable
% = percent
ESV = ecological screening value
µg/L = micrograms per liter

Reference:

ARCADIS. 2014. Downstream Areas Data Assessment Report, Revision 5. Mayflower Pipeline Incident, Mayflower, Arkansas. March 11.

ARCADIS

Figures

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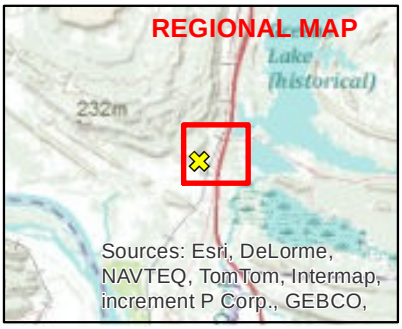
Path: Z:\GISPROJECTS_ENV\XOM_MayflowerAK\MXD\SEDIMENT\MitigationCompletionReport\FINAL\1-1_SED_SiteLocationR.mxd

LEGEND

- Source Point
- Drainage Path
- Approximate Limit of Work

Map Date: 3/16/2015



MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1-1

Office: CITRIX Author: MNesta Last Saved By: ssutton
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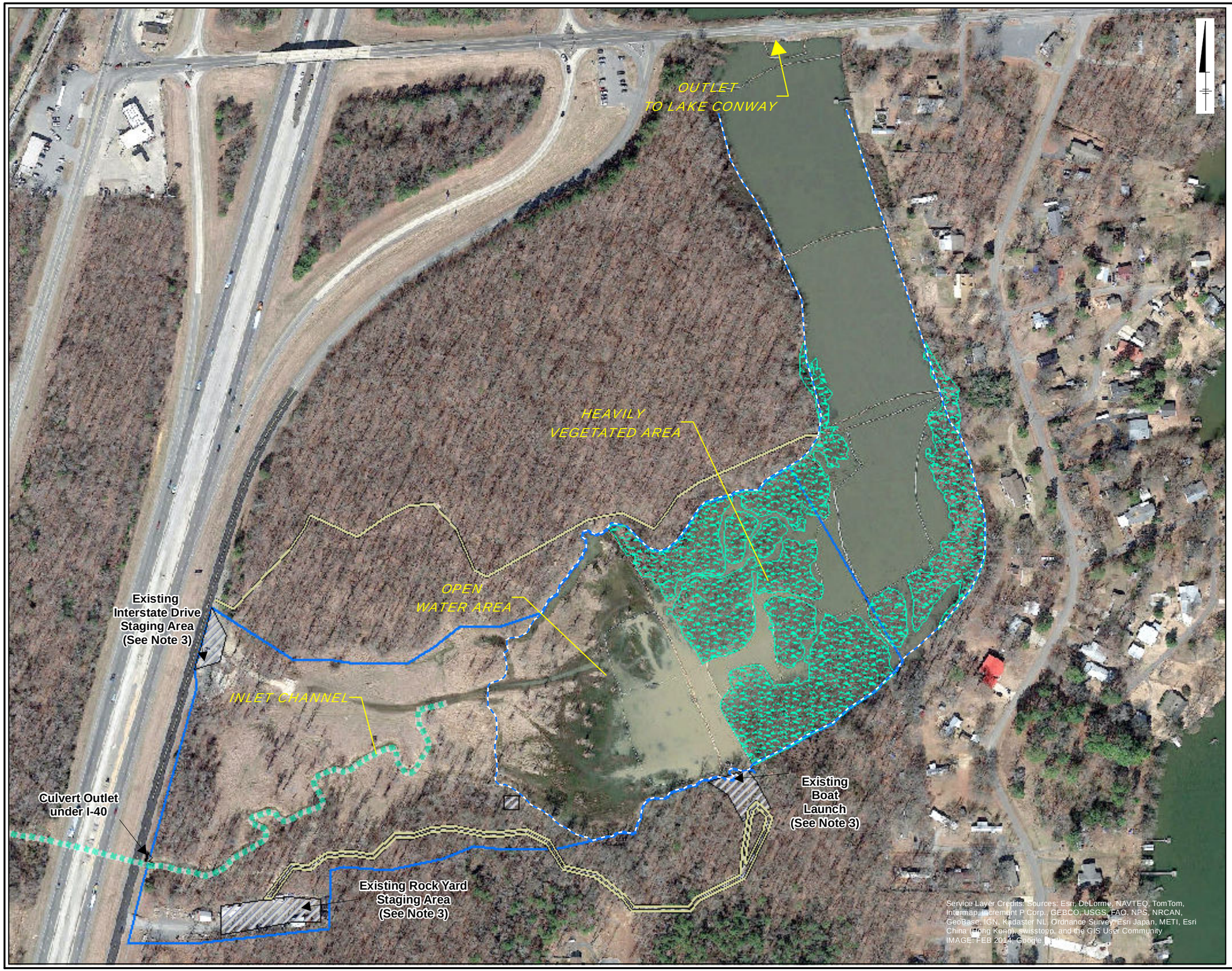

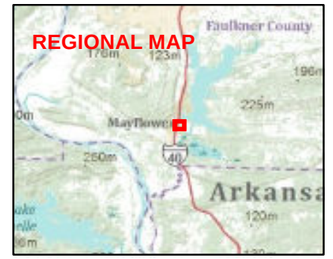

Legend

- Drainage Path
- Existing Two-Track Road
- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Staging Areas
- Approximate Limit of Work

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. Temporary staging areas and access roads established during the emergency response action were used during the mitigation action.

0 250 500
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

MITIGATION AREAS

ARCADIS

FIGURE
1-2

Office: CITRIX Author: MNesta Last Saved By: ssutton
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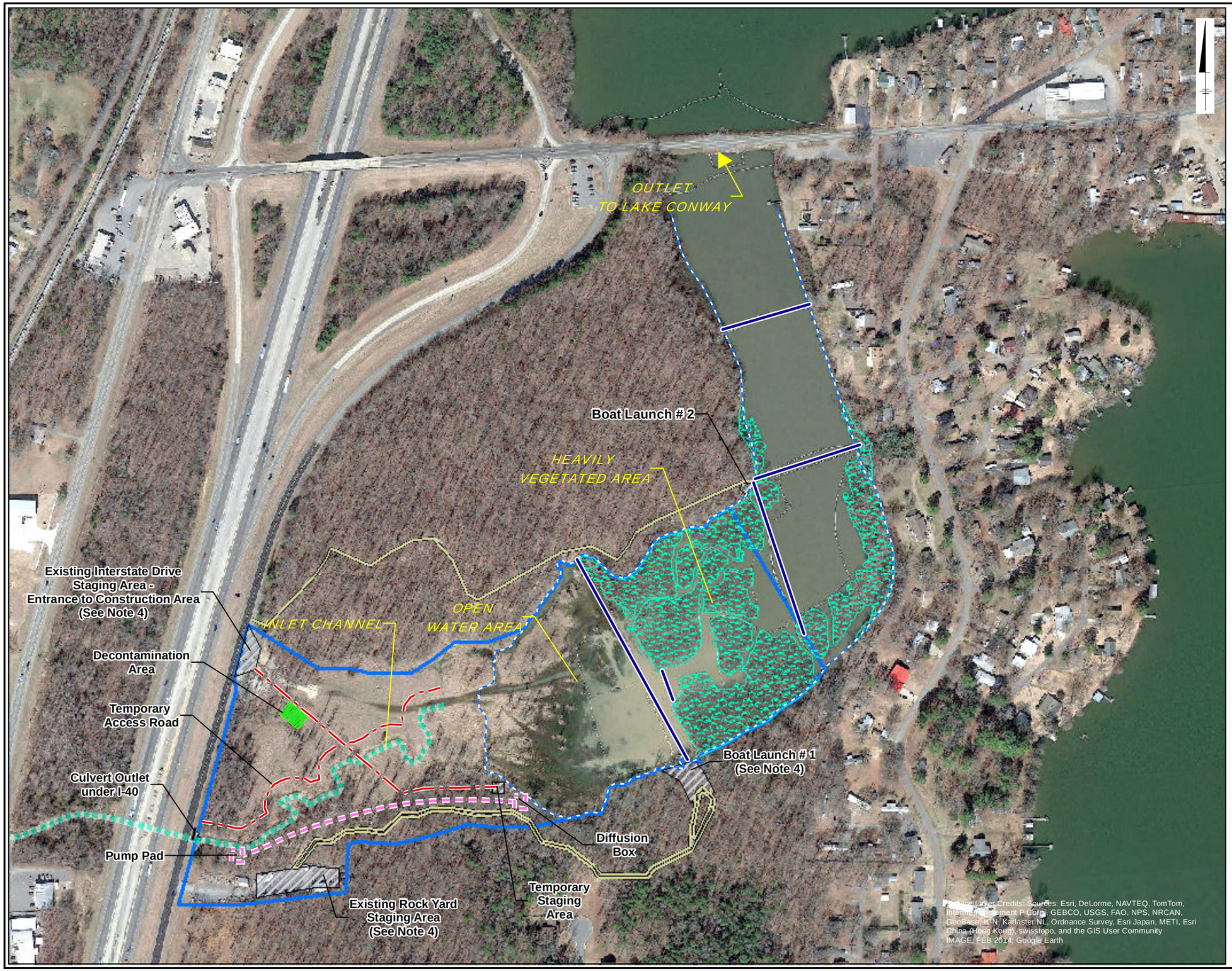
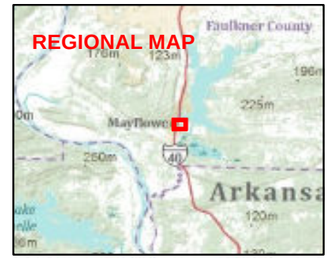




Legend

- Drainage Path
- Existing Two-Track Road
- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Approximate Limit of Work
- Temporary Road
- Temporary Water Diversion Line
- Temporary Containment Boom
- Decontamination Area
- Staging Areas

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. Figure shows approximate location of support areas and environmental protection measures.
4. Temporary staging areas and access roads established during the emergency response action were used during the construction activities. Additional temporary staging areas and access roads were established during construction activities, as required.

0 300 600
Feet

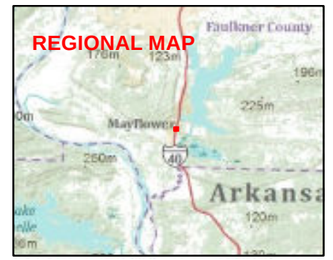
MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

MITIGATION ACTIVITIES SITE PLAN

ARCADIS

FIGURE
2-1

ICR-1-1 (12)
ICR-1-2 (12)
ICR-1-3 (12)
ICR-1-4 (12)
ICR-1-5 (15)
ICR-2-1 (6)
ICR-2-2 (12)
ICR-2-3 (12)
ICR-2-4 (36)
ICR-2-5 (30)
ICR-2-6 (12)
ICR-2-7 (12)
ICR-2-8 (8)
ICR-2-9 (9)
ICR-2-10 (9)
ICR-2-11 (9)
ICR-2-12 (9)
ICR-2-13 (12)
ICR-2-14 (6)
ICR-2-15 (6)
ICR-3-1 (12)
ICR-3-2 (12)
ICR-4-1 (6)
ICR-4-2 (6)
ICR-4-3 (6)
ICR-4-4 (6)
ICR-5-1 (12)
ICR-5-2 (12)



Legend

- Drainage Path
- Limit of Removal (See Note 1)
- Earthen Berm

Relative Sheening Observed During Stir-Test

- No Sheen
- Lighter Sheen
- Medium Sheen
- Heavier Sheen

Removal Depth (Inches)

- 0-6 (See Note 2)
- 6-12 (See Note 2)
- 12-24 (See Note 2)
- 24-36 (See Note 2)

ICR-1-1 (12) — **Confirmation Sample ID Sample Depth in inches (See Notes 3 & 4)**

1. The limits of removal are based on the survey data obtained by Crafton, Tull & Associates, Inc. in October 2014.
2. In areas with removal depth less than 6 inches, a cover layer of 1 to 2 inches of clean backfill material was placed. Areas with removal depths greater than 6 inches were backfilled within 6 inches of original elevation.
3. Confirmation samples were collected from top 1 to 2 inch layer of sediment surface after excavating the removal area. Sample depth indicates removal depth below the original sediment surface.
4. If sheen was observed in the confirmation sample collected after first excavation, additional excavation was conducted and second confirmation sample was collected. In such cases, first confirmation sample is indicated using **purple** color.

0 30 60
Feet

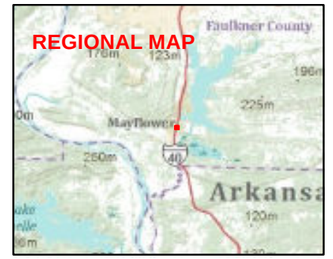
MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

INLET CHANNEL REMOVAL EXTENT AND CONFIRMATION SAMPLING LAYOUT 1

ARCADIS

FIGURE
2-2a

ICR-10-3 (17)
ICR-9-2 (15)
ICR-8-7 (12)
SEE NOTE 6
ICR-8-9 (24)
ICR-8-4 (9)
ICR-10-1 (17)
ICR-8-1 (6)
ICR-9-1 (29)
ICR-8-3 (9)
ICR-8-8 (15)
ICR-8-6 (9)
ICR-7-2 (12)
ICR-8-5 (9)
ICR-8-2 (6)
ICR-7-3 (12)
SEE NOTE 5
ICR-7-1 (12)
ICR-6-4 (12)
ICR-6-5 (18)
ICR-6-3 (6)
ICR-6-2 (24)
ICR-4-3 (6)
ICR-4-2 (6)
ICR-4-4 (6)
ICR-4-1 (6)
ICR-6-1 (15)
ICR-5-4 (15)
ICR-3-2 (12)
ICR-5-3 (12)
ICR-5-1 (12)
ICR-5-2 (12)
ICR-3-1 (12)
ICR-2-15 (6)
ICR-2-14 (6)
ICR-2-11 (9)
ICR-2-13 (12)
ICR-2-10 (9)
ICR-2-12 (9)



Legend

- Drainage Path
- Limit of Removal (See Note 1)
- Earthen Berm

Relative Sheening Observed During Stir-Test

- No Sheen
- Lighter Sheen
- Medium Sheen
- Heavier Sheen

Removal Depth (Inches)

- 0-6 (See Note 2)
- 6-12 (See Note 2)
- 12-24 (See Note 2)
- 24-36 (See Note 2)

ICR-1-1 (12) **Confirmation Sample ID Sample Depth in inches (See Notes 3 & 4)**

Notes:

1. The limits of removal are based on the survey data obtained by Crafton, Tull & Associates, Inc. in October 2014.
2. In areas with removal depth less than 6 inches, a cover layer of 1 to 2 inches of clean backfill material was placed. Areas with removal depths greater than 6 inches were backfilled within 6 inches of original elevation.
3. Confirmation samples were collected from top 1 to 2 inch layer of sediment surface after excavating the removal area. Sample depth indicates removal depth below the original sediment surface.
4. If sheen was observed in the confirmation sample collected after first excavation, additional excavation was conducted and second confirmation sample was collected. In such cases, first confirmation sample is indicated using **purple** color.
5. After additional excavation of area between samples ICR-6-4 and ICR-7-1, confirmation sample ICR-6-5 was collected near ICR-6-4 and visual observation was conducted at ICR-7-1. No sheen was observed following additional excavation.
6. Area near sample ICR-8-9 was visually observed after removing tree stump and additional material along the bank. No sheen was observed following additional excavation.

0 30 60
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

INLET CHANNEL REMOVAL EXTENT AND CONFIRMATION SAMPLING LAYOUT 2

ARCADIS

FIGURE 2-2b

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ICR-13-2 (6)
ICR-13-3 (6)
ICR-13-1 (6)
ICR-12-1 (6)
ICR-11-8 (18)
ICR-11-6 (18)
ICR-11-7 (24)
ICR-10-2 (17)
ICR-10-6 (9)
ICR-10-5 (9)
ICR-10-8 (9)
ICR-11-5 (18)
ICR-10-3 (17)
ICR-9-2 (15)
ICR-11-4 (24)
ICR-10-7 (9)
ICR-10-9 (6)
ICR-8-7 (12)
ICR-10-4 (29)
ICR-11-2 (18)
ICR-11-3 (24)
ICR-10-1 (17)
ICR-11-1 (18)
ICR-10-10 (12)
ICR-10-13 (12)
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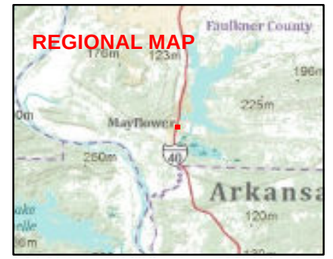
ICR-10-11 (9)
ICR-8-8 (15)
ICR-10-12 (9)
ICR-10-14 (18)



Legend

- Drainage Path
- Limit of Removal (See Note 1)
- Earthen Berm

Relative Sheening Observed During Stir-Test

- No Sheen
- Lighter Sheen
- Medium Sheen
- Heavier Sheen

Removal Depth (Inches)

- 0-6 (See Note 2)
- 6-12 (See Note 2)
- 12-24 (See Note 2)
- 24-36 (See Note 2)

ICR-1-1 (12) Confirmation Sample ID Sample Depth in inches (See Notes 3 & 4)

1. The limits of removal are based on the survey data obtained by Crafton, Tull & Associates, Inc. in October 2014.
2. In areas with removal depth less than 6 inches, a cover layer of 1 to 2 inches of clean backfill material was placed. Areas with removal depths greater than 6 inches were backfilled within 6 inches of original elevation.
3. Confirmation samples were collected from top 1 to 2 inch layer of sediment surface after excavating the removal area. Sample depth indicates removal depth below the original sediment surface.
4. If sheen was observed in the confirmation sample collected after first excavation, additional excavation was conducted and second confirmation sample was collected. In such cases, first confirmation sample is indicated using **purple** color.

0 30 60
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

INLET CHANNEL REMOVAL EXTENT AND CONFIRMATION SAMPLING LAYOUT 3

ARCADIS

FIGURE
2-2c

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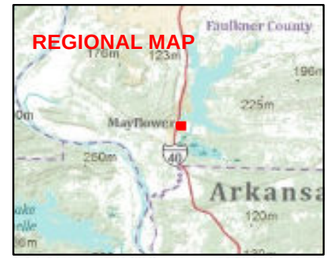

Legend

- Approximate Extent of Amendment Placement Areas
- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Temporary Containment Boom

Notes:
1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).

0 125 250
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

HEAVILY VEGETATED AREA AMENDMENT PLACEMENT EXTENT

ARCADIS

FIGURE 2-3

Office: CITRIX Author: MNesta Last Saved By: ssutton
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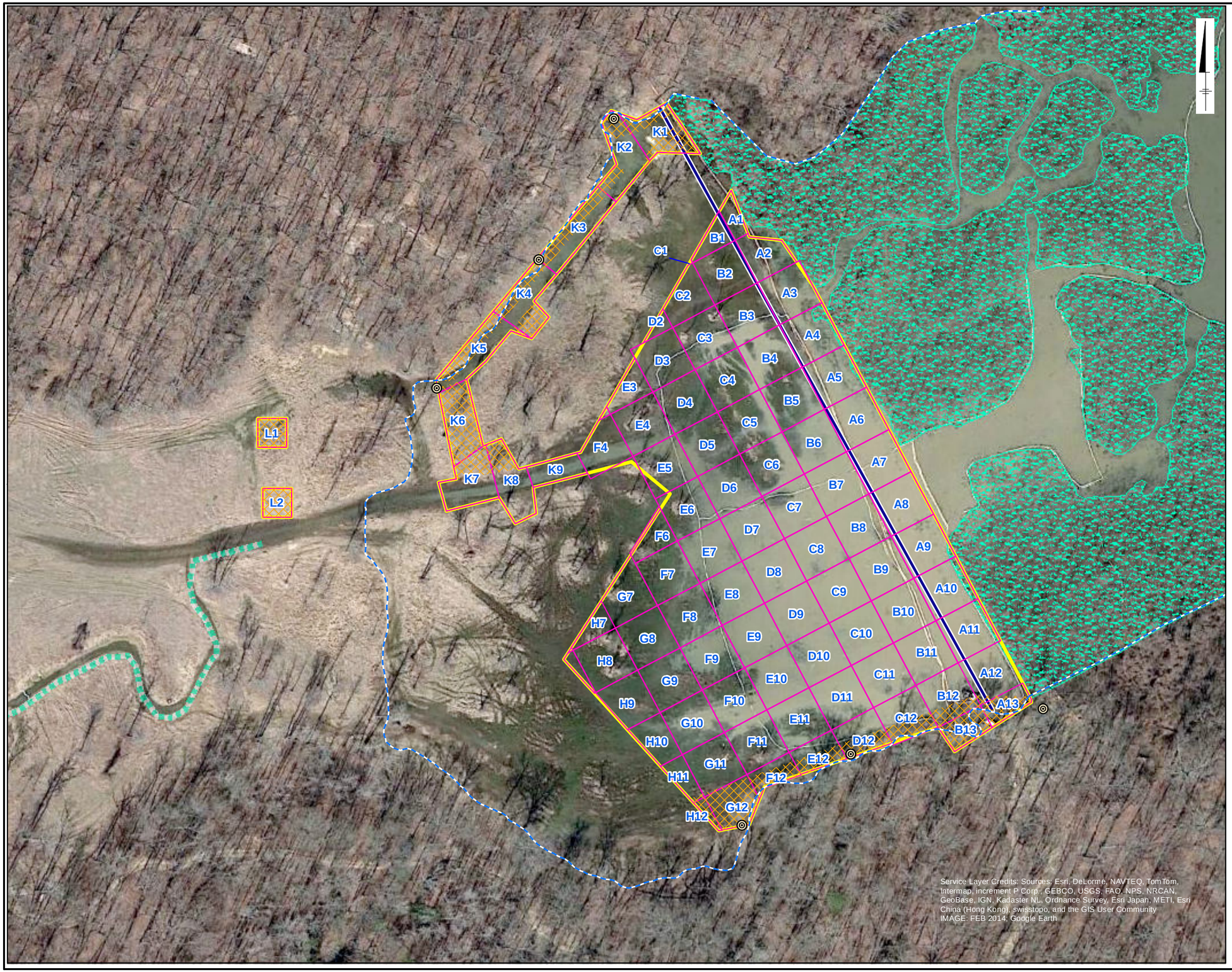
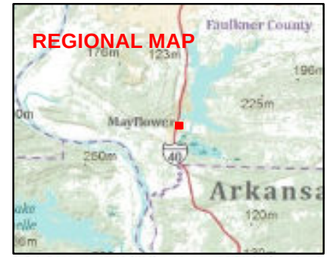




Legend

- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Location of Straw Wattle (See Note 3)
- Area for Erosion Control Mat Placement (See Note 3)
- Temporary Containment Boom
- Drainage Path
- Reactive Cap Extent
- Reactive Cap Material Placement Grid

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. The temporary erosion controls were installed in the areas with exposed cap material to prevent localized erosion.

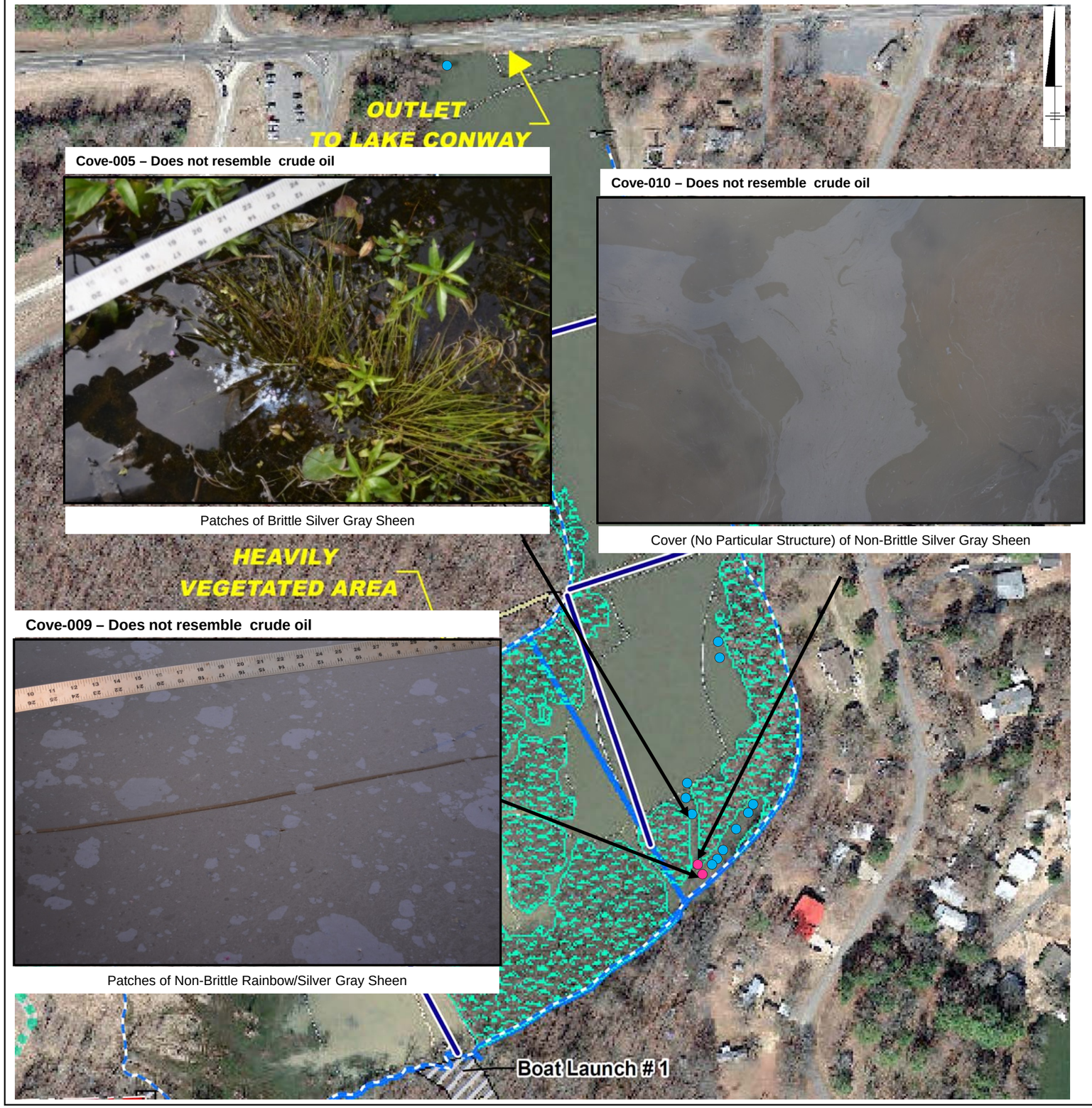
0 100 200
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

OPEN WATER AREA REACTIVE CAP EXTENT

ARCADIS

FIGURE
2-4



Cove-005 – Does not resemble crude oil

Patches of Brittle Silver Gray Sheen

Cove-010 – Does not resemble crude oil

Cover (No Particular Structure) of Non-Brittle Silver Gray Sheen

Cove-009 – Does not resemble crude oil

Patches of Non-Brittle Rainbow/Silver Gray Sheen

Legend:

- Brittle Sheen
- Non-Brittle Sheen
- Temporary Containment Boom
- Drainage Path
- Existing Two-Track Road
- Areas with Heavy Vegetation (See Note 1)
- Approximate Limit of Work
- Approximate Water's Edge (See Note 2)
- Staging Area
- COVE-005 Sheen Sample ID

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. Figure shows approximate location of sheens observed during sheen monitoring activities conducted from August 21 through December 18, 2014.
4. Daily sheen monitoring was conducted in the cove downstream of the construction area.
5. The analytical results for sheen samples were compared with the analytical results for a crude oil sample collected from the Pegasus Pipeline using the methodology described in Appendix M of the Downstream Areas Data Assessment Report (ARCADIS 2014).

Reference:

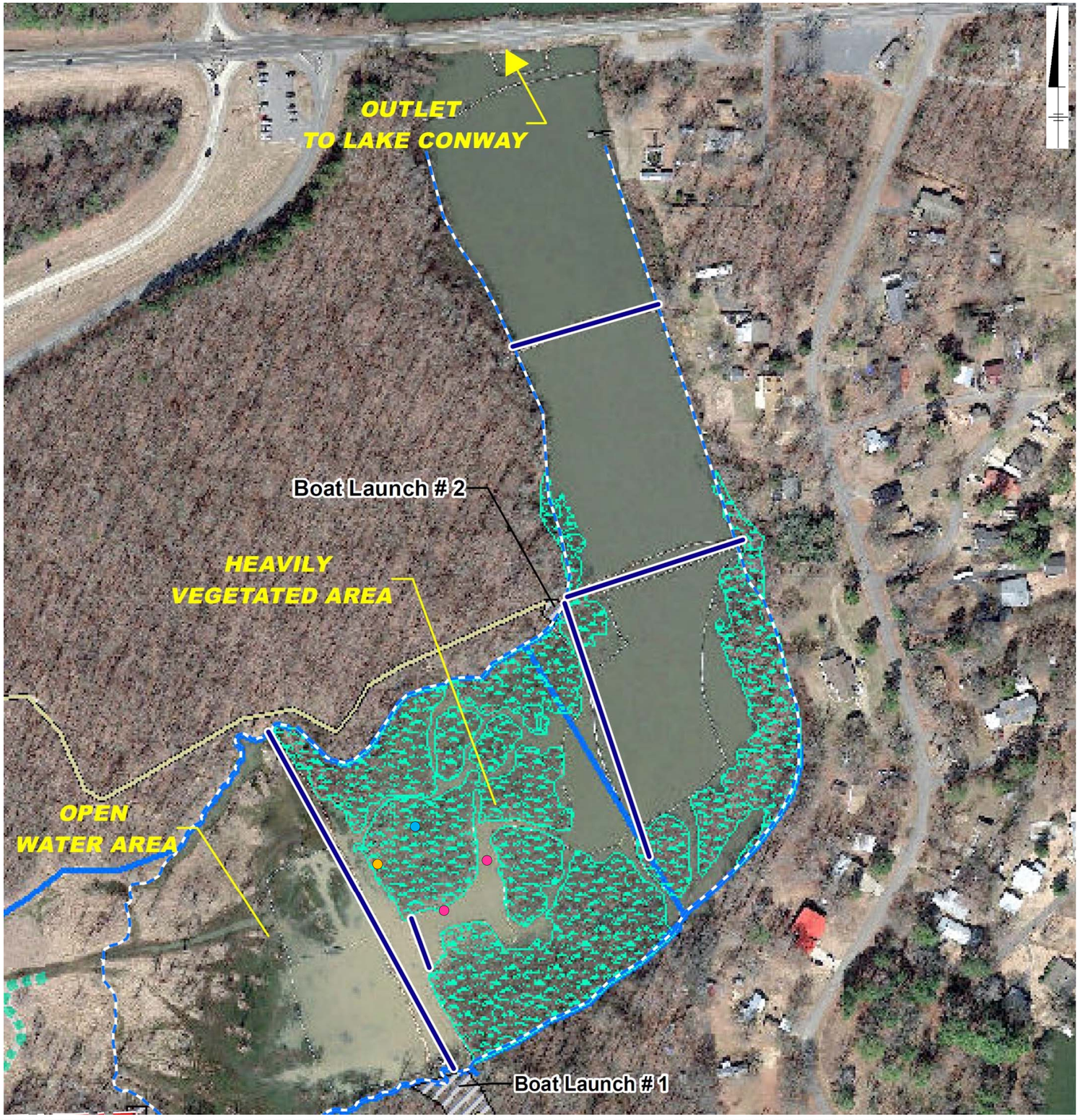
ARCADIS. 2014. Downstream Areas Data Assessment Report, Revision 5. Mayflower Pipeline Incident, Mayflower, Arkansas. March 11.

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

SHEEN OBSERVATIONS DOWNSTREAM OF CONSTRUCTION AREA

ARCADIS

FIGURE 3-1



Legend:

- Brittle Sheen
- Non-Brittle Sheen
- Non-Brittle Sheen with Oil Spot
- Temporary Containment Boom
- Drainage Path
- Existing Two-Track Road
- Areas with Heavy Vegetation (See Note 1)
- Approximate Limit of Work
- Approximate Water's Edge (See Note 2)
- Staging Area

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. Figure shows approximate location of sheens observed during sheen monitoring activities conducted between October 23 and December 18, 2014.
4. Following the completion of in-situ amendment, sheen monitoring was conducted in the Heavily Vegetated Area three times per week.

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SHEEN OBSERVATIONS IN HEAVILY VEGETATED AREA

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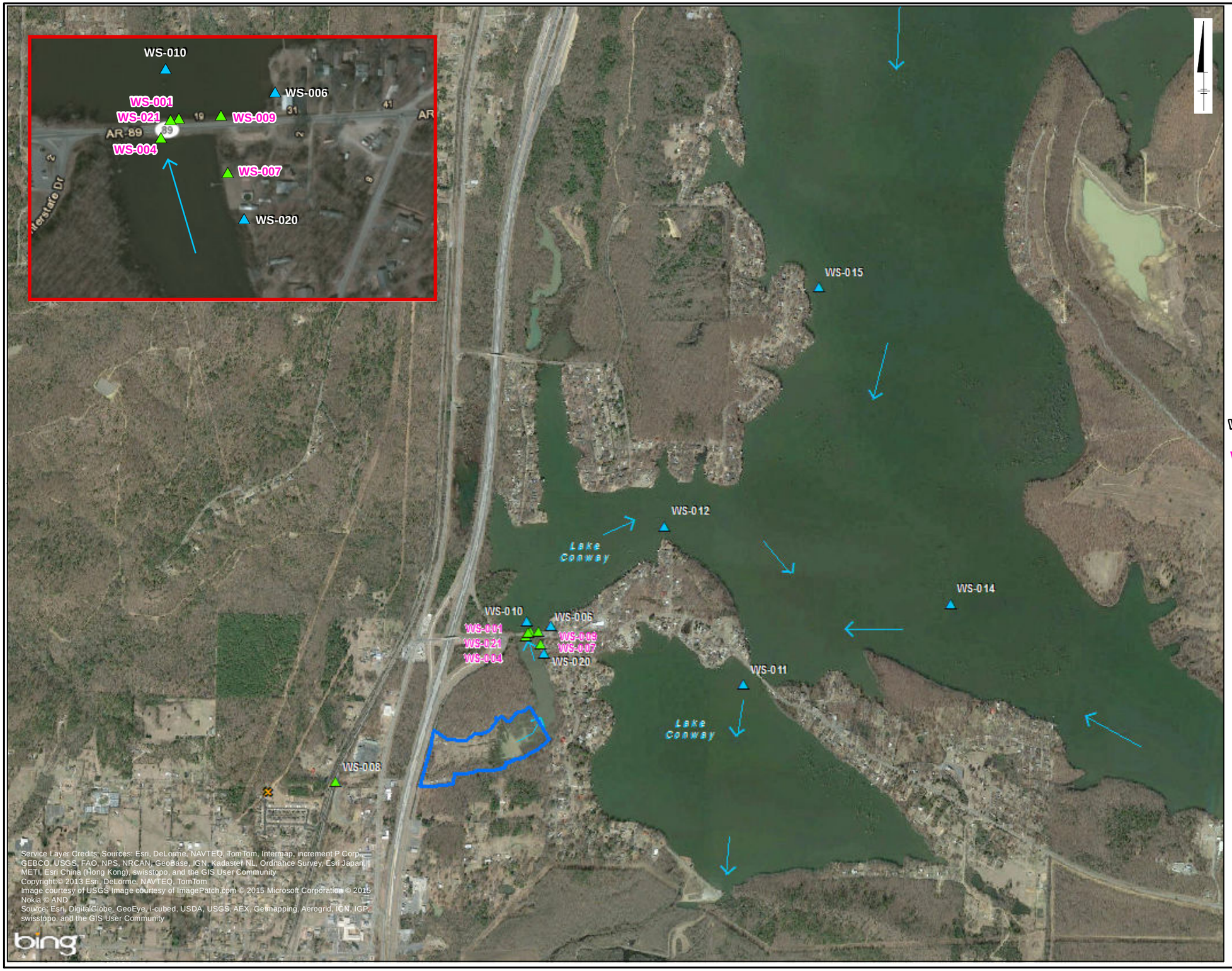
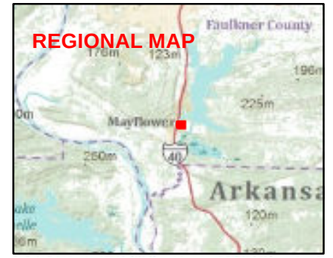
FIGURE
3-2

Office: CITRIX Author: MNesta Last Saved By: ssutton
Path: Z:\GISPROJECTS_ENV\XOM_MayflowerAK\MXD\SEDIMENT\MitigationCompletionReport\FINAL\3-3_SW Sampling Locations.mxd 3/16/2015 10:58:50 AM





Legend

- Surface Water Sample Locations Accessed by Foot
- Surface Water Sample Locations Accessed by Boat
- Source Point
- Approximate Surface Water Flow Direction
- Stream/River: Intermittent
- Stream/River: Perennial
- Approximate Limit of Work
- WS-003 Previous Sample Location (See Note 1)
- WS-001 Current Sample Location (See Note 2)

Notes:
1. White sample IDs indicate locations sampled between February 10 and March 23, 2014.
2. Pink sample IDs indicate locations sampled between February 10, 2014 and February 28, 2015.

0 1,500 3,000
Feet

MAYFLOWER PIPELINE INCIDENT RESPONSE
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
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WEEKLY SURFACE WATER SAMPLE LOCATIONS

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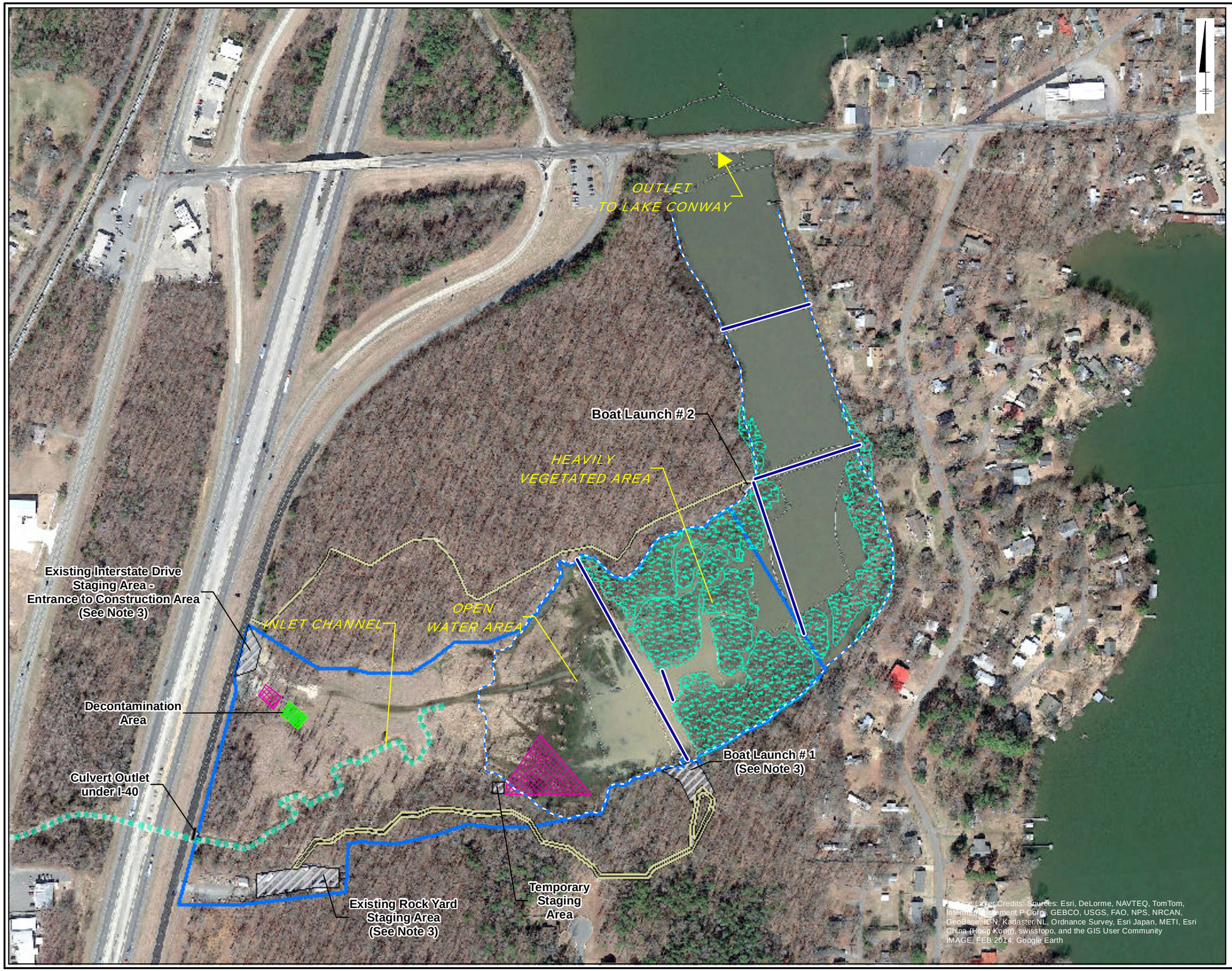
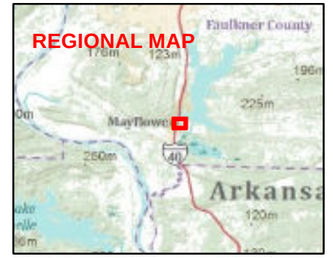
FIGURE
3-3

Office: CITRIX Author: MNesta Last Saved By: ssutton
Path: Z:\GISPROJECTS_ENV\XOM_MayflowerAK\MXD\SEDIMENT\MitigationCompletionReport\FINAL\4-1_DistrubedAreas_Construction.mxd 3/16/2015 10:59:53 AM





Legend

- Drainage Path
- Existing Two-Track Road
- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Approximate Limit of Work
- Temporary Containment Boom
- Decontamination Area
- Staging Area
- Disturbed Areas During Construction

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014 when the water surface elevation in Lake Conway was approximately 262.92 feet (North American Vertical Datum of 1988).
3. Temporary staging areas and access roads established during the emergency response action were used during the construction activities. Additional temporary staging areas and access roads were established during construction activities, as required.

0 300 600
Feet

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EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
MITIGATION ACTION COMPLETION REPORT

DISTURBED AREAS DURING CONSTRUCTION

ARCADIS

FIGURE
4-1

Office: CITRIX Author: MNesta Last Saved By: ssutton
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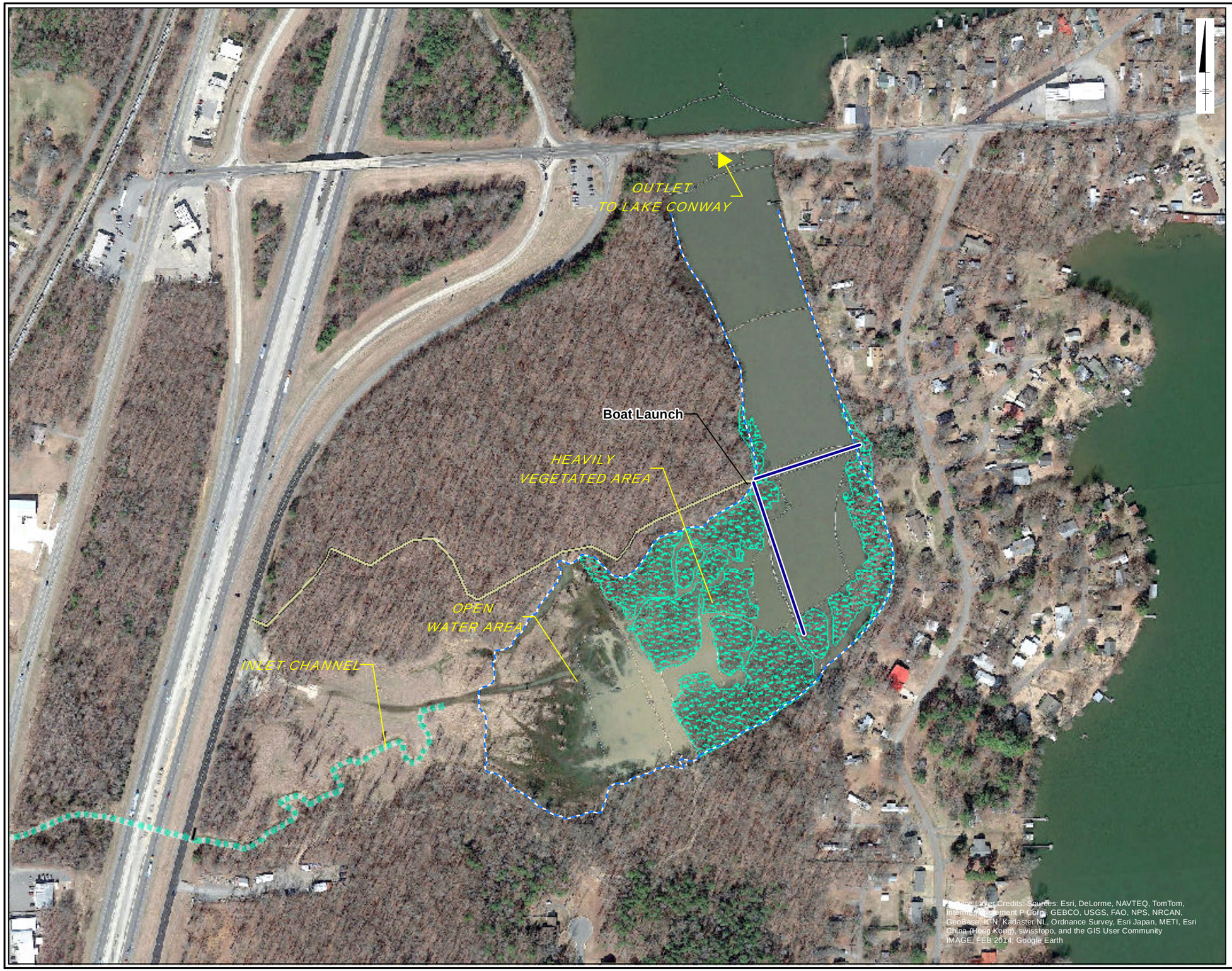

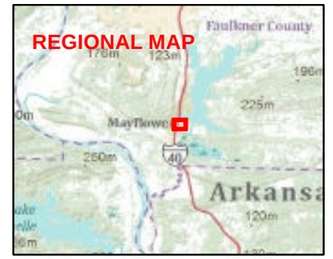

Legend

- Drainage Path
- Areas with Heavy Vegetation (See Note 1)
- Approximate Water's Edge (See Note 2)
- Two-Track Road
- Temporary Containment Boom

Notes:

1. The Heavily Vegetated Area shown in this report was digitized based on the February 2014 aerial photo that was acquired via Google Enterprise Geo Master License.
2. The water's edge changes based on season and recent rainfall. The approximate water's edge is based on conditions during the pre-design study in April 2014.
3. Figure shows access road and staging area that will be used for future post-construction monitoring. All other staging areas and access roads established during the emergency response action and construction activities were deconstructed.

0 300 600
Feet

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POST-CONSTRUCTION SITE LAYOUT

ARCADIS

FIGURE
4-2