LOW IMPACT HYDROPOWER INSTITUTE CERTIFICATION APPLICATION

MELDAHL LOCK AND DAM PROJECT

(FERC Project No. 12667)

Prepared by:

American Municipal Power, Inc.

Columbus, Ohio

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1. FACILITY DESCRIPTION

On June 25, 2008, the Federal Energy Regulatory Commission (FERC) issued a new license for a period of 50 years to the City of Hamilton, Ohio, to construct and operate the Meldahl Hydroelectric Project (Project). On March 1, 2009, the City of Hamilton, American Municipal Power, Inc., and Meldahl, LLC entered into a Purchase, Construction, and Ownership Agreement (PCOA) that established Meldahl, LLC as the sole owner and operator of the Project. On June 16, 2010, FERC granted the City of Hamilton's request to add American Municipal Power, Inc. (AMP) to the License as a co-licensee.

The Meldahl Project reached full commercial operations in April 2016. Annual generation varies with the seasonal water flows of the river and fluctuates directly with the changing differential head and flow conditions. As of the end of 2021, annual generation at the plant has averaged 471,261 MWh per calendar year. The Project is located at the U.S. Army Corps of Engineers' (USACE) existing Captain Anthony Meldahl Locks and Dam at Ohio River Mile 436.2 as measured from its source in Pittsburgh PA. AMP owns or maintains four other hydroelectric projects along the Ohio River including: Willow Island (FERC Project No. 6902), Belleville (FERC Project No. 6939), Cannelton (FERC Project No. 10228), and Smithland (FERC Project No. 6641). Each project can be located in Figure 1 below. The City of Hamilton also owns and maintains the Greenup Hydroelectric Project (FERC Project No. 2614).

Figure 1 – Ohio River Mainstem Dams

(Source)

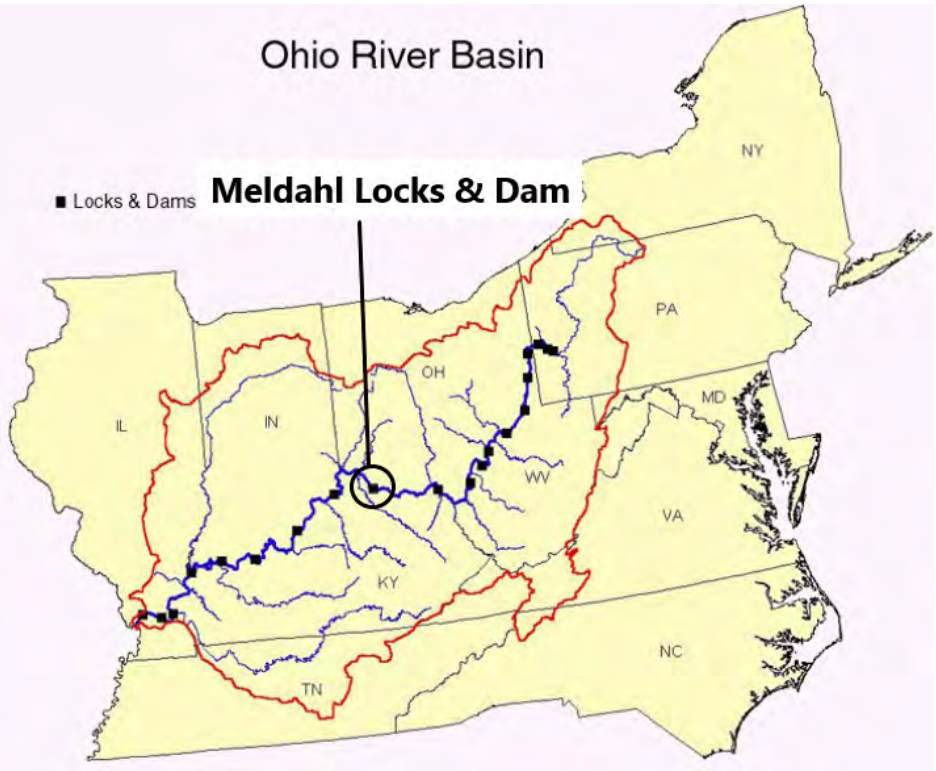

Figure 2 – Geographic Overview of Meldahl Lock and Dam Project

([Source])

Facility Details

The Meldahl Locks and Dam are 436.2 miles below Pittsburgh, PA, and 1.7 miles below Chilo, Ohio. The powerhouse is located on the Kentucky side approximately 550 feet from the last spillway pier to the center of the powerhouse. The existing structure consists of a main lock, 1,200 feet long and 110 feet wide and an auxiliary lock, 600 feet long and 110 feet wide. The navigation locks are located on the Ohio (river right) bank. The dam was completed in 1964 and is a concrete fixed weir with 12 Tainter gates, each 100 feet long and 35 feet high above the sills. The dam is 1,752 feet in length. At the southern end of the gated section of the dam, there is a 372-foot-long concrete gravity overflow weir. The weir extends to the southern end of the gated section to the south bank of the Ohio River.

The Meldahl Hydroelectric Project is on the Kentucky (river left) shore of the Ohio River, at the existing Locks and Dam Project. The hydropower plant includes a 210-foot-wide reinforced concrete powerhouse containing three 35-megawatt (MW) turbine generating units for a total installed capacity of 105 MW; an 1,850-foot-long intake channel; an 1,850-foot-long tailrace channel; an approximately 5-mile-long, 138-kilovolt (kV) transmission line connecting the powerhouse to a new switching station adjacent to East Kentucky Electric Cooperative, Inc.'s Boone-Spurlock transmission line; and other appurtenant facilities.

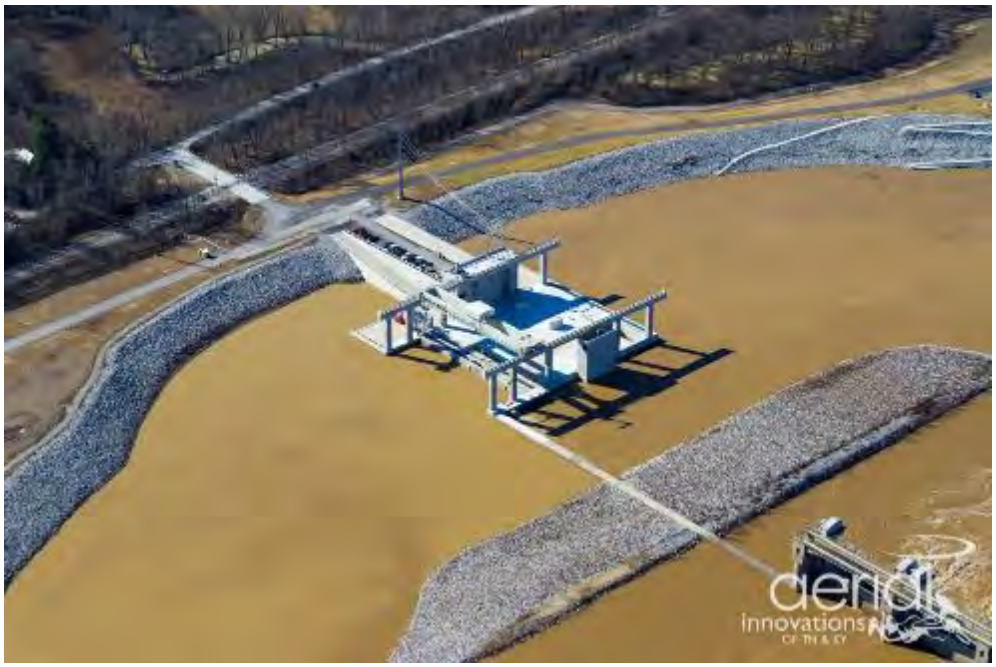

Figure 3 – Aerial View of Project

Figure 4 – View of Project looking towards Kentucky bank of river

Figure 5 – View of Project Looking Upstream

Project Operation

As directed by the USACE Memorandum of Agreement (MOA) and the Project License, the project is operated by the City of Hamilton in run-of-river mode for protection of navigation, water quality, and aquatic resources on the Ohio River.

The Huntington District of the USACE maintains the upstream Meldahl pool at approximately 485.0 feet mean sea level (m.s.l.), the upper pool's length is 95.2 miles to Greenup Dam and the surface area is 21,700 acres. The normal lower (Markland) pool elevation is held at approximately 455.0 m.s.l. During normal operation, the Hydropower Project shall generate with one, two or three of the units 24 hours a day when river flows through the Project range from approximately 2,300 cubic feet per second (cfs) to about 65,000 cfs. During low flow periods when the Ohio River is being regulated for protection of Federal Interests, all water discharged from the Hydropower Project shall be controlled by the Meldahl Locks and Dam Lockmaster. The Huntington District shall maintain the upstream navigational pool when discharging any flow through the Meldahl Dam.

Figure 6 – Close-up aerial view of Meldahl Hydroelectric Project

Table 1 - Facility Information.

Item	***Information Requested***	***Response (include references to further details)***
Name of the Facility	Facility name (use FERC project name or other legal name)	Meldahl Hydroelectric Project, FERC Project No. 12667
Reason for applying for LIHI Certification	1. To participate in state RPS program 2. To participate in voluntary REC market (e.g., Green-e) 3. To satisfy a direct energy buyer's purchasing requirement 4. To satisfy the facility's own corporate sustainability goals 5. For the facility's corporate marketing purposes 6. Other (describe)	(select and describe only applicable reasons) 1. ☒ State Program: Pennsylvania 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ describe: Click or tap here to enter text.
	If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification	Amount of MWh participating: 514,1575 % of total MWh generated: 100%
Location	River name (USGS proper name)	Ohio River
	Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html	Middle Ohio – Little Miami; HUC – 05090201 HUC - 05090201 Middle Ohio - Little Miami (usgs.gov)
	Nearest town(s), county(ies), and state(s) to dam	Felicity, Chilo, Neville, and Moscow in Clermont County, OH; Foster, Willow Grove, and Bradford in Bracken County, KY
	River mile of dam above mouth	The Project is located at river mile 436.2 below Pittsburgh, PA
	Geographic latitude and longitude of dam	Latitude: 38.795190 Longitude: -84.136620
Facility Owner	Application contact names	Owner: Meldahl, LLC; AMP is the sole member of Meldahl, LLC
	Facility owner company and authorized owner representative name.	Owner same as above Owner representative name is Adam Ward, AMP Senior Vice President of Member Services & External Affairs

	FERC licensee company name (if different from owner)	Co-Licensees: American Municipal Power, Inc. & the City of Hamilton, OH
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	FERC Project No. 12667
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Major
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	Water Quality Certification #2009-018-8 issued May 4,2009 by the Kentucky Department for Environmental Protection.
	Hyperlinks to key electronic records on FERC e-Library website or other publicly accessible data repositories[1]	Included separately
Powerhouse	Date of initial operation (past or future for pre-operational applications)	Full commercial operations were achieved at the project in April 2016
	Total installed capacity (MW) **For recertifications: Indicate if installed capacity has changed since last certification**	Total installed capacity at the Project is 105 MW
	Average annual generation (MWh) and period of record used **For recertifications: Indicate if average annual generation has changed since last certification**	Average annual generation is 514,157 MWh for the period from 2017 - 2021
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) **For recertifications: Indicate if mode of operation has changed since last certification**	Run-of-River
	Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit	Number: 3 Type: Horizontal Kaplan Bulb Type Max Hydraulic Capacity: 65,000 cfs Min Hydraulic Capacity: 2,300 cfs Max Output: 35 MW
	Trashrack clear spacing (inches) for each	8 inches
	Approach water velocity (ft/s) at each intake if known	2.1 ft/s
	Dates and types of major equipment upgrades	There have been no notable equipment upgrades or operations

[1] For example, the FERC license or exemption, recent FERC Orders, Water Quality Certificates, Endangered Species Act documents, Special Use Permits from the U.S. Forest Service, 3rd-party agreements about water or land management, grants of right-of-way, U.S. Army Corps of Engineers permits, and other regulatory documents. If extensive, the list of hyperlinks can be provided separately in the application.

		changes since the plant was commissioned in April 2016
	Dates, purpose, and type of any recent operational changes	N/A
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	N/A
Dam or Diversion	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	The USACE began construction of the locks and dam in April 1958. Construction of the locks was started in March 1959 and they were placed into operation in November 1962. Construction of the dam was started in April 1961 and it was placed in operation in December 1964. The pool was raised to full height in March of 1965. USACE Meldahl Locks and Dam – Huntington District
	Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like	The existing Meldahl Locks and Dam consist of a 1,200-foot-long by 110-foot-wide main lock and a 600-foot-long by 110-foot-wide auxiliary lock at the northern end of a 1,384-foot-long spillway. The existing spillway consists of 12 gates, each 100 feet long by 37 feet high, with intermediate piers, each 14 feet wide by 15 feet wide. There is a 310-foot-long concrete gravity overflow weir immediately adjacent to the southern spillway pier with a crest elevation of 487 feet mean sea level (msl), which is 2 feet above the normal Meldahl level.
	Spillway maximum hydraulic capacity	Unknown
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	N/A
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Navigation
Impoundment and Watershed	Authorized maximum and minimum impoundment water surface elevations	Normal upper pool elevation is 485 feet m.s.l.
	Normal operating elevations and normal fluctuation range	Normal upper pool elevation is 485 feet m.s.l., normal lower pool elevation 455 feet m.s.l.

	Gross storage volume and surface area at full pool	Normal upper pool surface area: 21,700 acres Storage Volume: 609,800 Acre-Ft USACE National Inventory of Dams
	Usable storage volume and surface area	0 (Run-of-River facility)
	Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions.	N/A
	Upstream dams by name, ownership (including if owned by an affiliate of the applicant's company) and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Emsworth Lock and Dam, Owned by USACE, river mile 6.2. FERC Project No. 13757 and No. 13761 Dashields Lock and Dam, Owned by USACE, river mile 13.3 Montgomery Lock and Dam, Owned by USACE, river mile 31.7. FERC Project No. 13768 New Cumberland Lock and Dam, Owned by USACE, river mile 54.4 Pike Island Lock and Dam, Owned by USACE, river mile 84.2 Hannibal Locks and Dam, Owned by USACE, river mile 126.4. FERC Project No. 3206 Willow Island Locks and Dam, Owned by USACE, river mile 161.7 (AMP owns hydroelectric Project, FERC Project No. 6902) Belleville Locks and Dam, Owned by USACE, river mile 203.9. OMEGA JV5 owns and AMP operates Belleville Hydroelectric Project, FERC Project No. 6939 Racine Locks and Dam, Owned by USACE, river mile 237.5. FERC Project No. 2570

		Robert C. Byrd Locks and Dam, Owned by USACE, river mile 279.2. FERC Project No. 15094 Greenup Locks and Dam, Owned by USACE, river mile 341. City of Hamilton own Greenup Hydro Project, FERC Project No. 2614 All upstream dams have downstream fish passage
	Downstream dams by name, ownership (including if owned by an affiliate of the applicant's company), river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Markland Locks and Dam, Owned by USACE, river mile 531.5. FERC Project No. 2211 McAlpine Locks and Dam, Owned by USACE, river mile 606.8 Cannelton Locks and Dam, Owned by USACE, river mile 720.7. AMP owns Cannelton Hydropower Project, FERC Project No. 10228. Newburgh Locks and Dam, Owned by USACE, river mile 776.1. FERC Project No. 12962 John T. Myers Locks and Dam, Owned by USACE, river mile 846 Smithland Locks and Dam, Owned by USACE, river mile 918.5. AMP owns Smithland Hydropower Project. Olmstead Locks and Dam, Owned by USACE, river mile 964.4 All downstream dams have upstream fish passage
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	All upstream and downstream facilities are operated by USACE for navigational purposes. The Project does operate under a 2015 MOA established with the Huntington District of USACE (see reference link above)

<table>
<tr><td></td><td>Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property.</td><td>Area of Land: 82.3 acres

Refer to Exhibit G drawing in Apprendix C for more information</td></tr>
<tr><td rowspan="5">Hydrologic Setting</td><td>Average annual flow at the dam, and period of record used</td><td>Average Annual Flow: 87,406 CFS
Period: 2021</td></tr>
<tr><td>Average monthly flows and period of record used</td><td>2021 ORSANCO Flow Data (Link)
<table>
<tr><th>Month</th><th>Average Flow (CFS)</th></tr>
<tr><td>January</td><td>115,403</td></tr>
<tr><td>February</td><td>119,157</td></tr>
<tr><td>March</td><td>194,677</td></tr>
<tr><td>April</td><td>92,700</td></tr>
<tr><td>May</td><td>109,077</td></tr>
<tr><td>June</td><td>64,286</td></tr>
<tr><td>July</td><td>64,237</td></tr>
<tr><td>August</td><td>45,128</td></tr>
<tr><td>September</td><td>55,217</td></tr>
<tr><td>October</td><td>39,774</td></tr>
<tr><td>November</td><td>61,537</td></tr>
<tr><td>December</td><td>87,763</td></tr>
</table></td></tr>
<tr><td>Location and name of closest stream gaging stations above and below the facility</td><td>Above Facility: USGS Gage No. 03216600 on Ohio River at Greenup Dam near Greenup, KY;

Below Facility: USFS Gage No. 03277200 on Ohio River at Markland Dam near Warsaw, KY</td></tr>
<tr><td>Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation.</td><td>The watershed area is 70,800 square miles at the Meldahl Locks and Dam. The number was found in the USACE National Inventory of Dams (link below)

USACE National Inventory of Dams</td></tr>
<tr><td>Other facility specific hydrologic information (e.g., average hydrograph)</td><td>N/A</td></tr>
<tr><td rowspan="2">Designated Zones of Effect</td><td>Numbers and names of each zone of effect (e.g., “Zone 1: Impoundment”)</td><td>Zone 1: Impoundment

Zone 2: Downstream</td></tr>
<tr><td>River mile of upstream and downstream limits of each zone of effect
(e.g., “Zone 1 Impoundment: RM 6.3 - 5.1”)</td><td>Zone 1 Impoundment: From Bullskin Creek downstream of Utopia to the dam, Approximately River Mile 431.6 - 436.2</td></tr>
</table>

		Zone 2 Downstream: From the dam to Big Indian Creek at Point Pleasant, Approximately Ohio River Mile 436.2 - 445

Standards Selection

In consultation with LIHI, two designated zones of effect have been identified for the Meldahl Hydroelectric Project (Figure 1). Zone 1 has been identified as the stretch of the river upstream of the Project beginning at the confluence of the Ohio River and Bullskin Creek at approximately river mile 431.6 as measured from the river's source and ending at the Locks and Dam at river mile 436.2. Zone 2 has been identified as the stretch of the river downstream of the Project beginning at river mile 436.2 and ending at the confluence of the Ohio River and Big Indian Creek at approximately river mile 445.

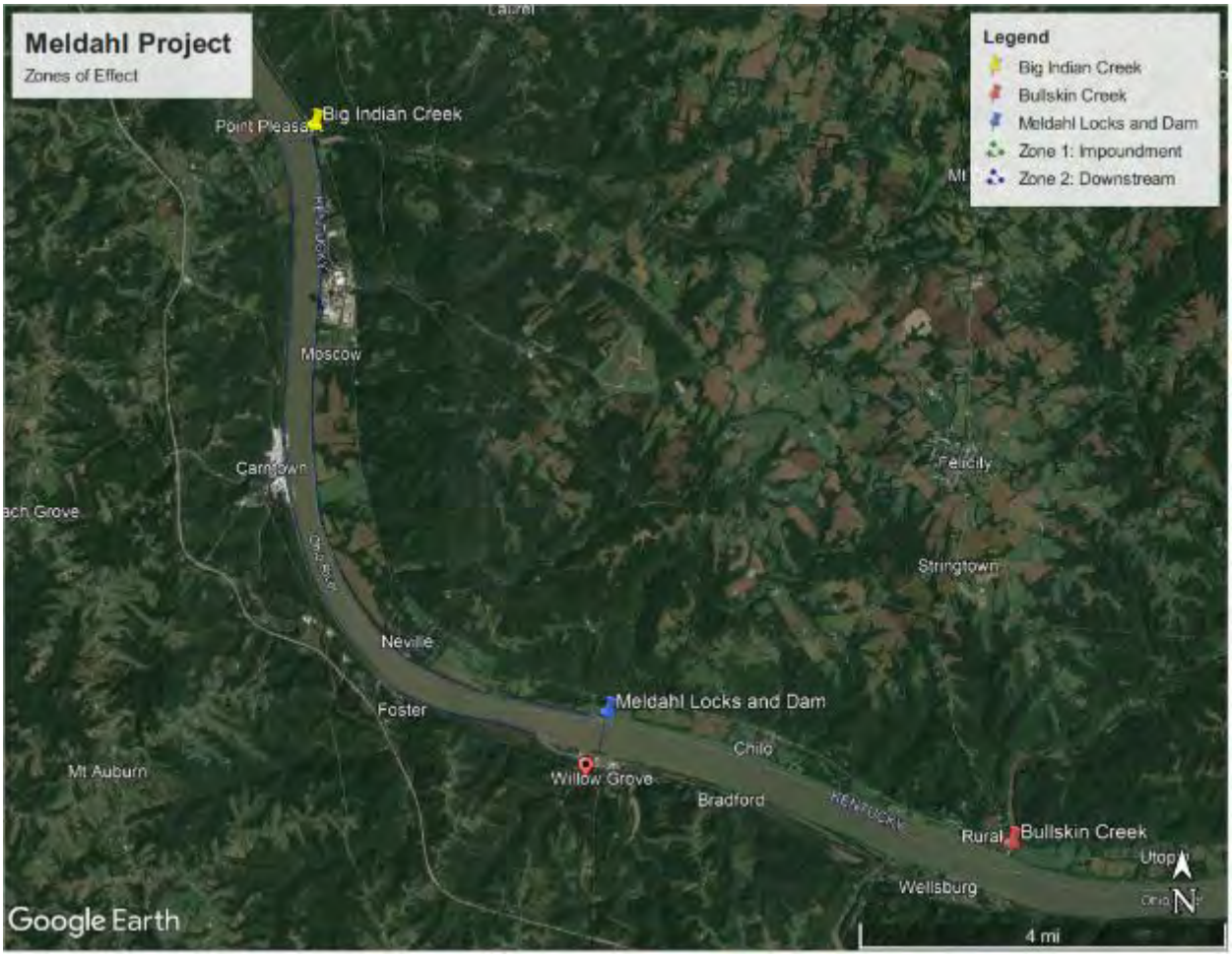

Figure 7 – Designated Zones of Effect

2. STANDARDS MATRIX

Table 2 - Standards Matrix for Two Zones of Effect

Facility Name: Meldahl Hydroelectric Project

Zone of Effect: There are two Zones of Effect for the Project. Descriptions are included on the previous page.

Zone:		**1: Impoundment Reach**	**2: Downstream Reach**
River Mile at upper and lower extent of Zone:		431.6 – 436.2	436.2 - 445
Criterion		***Standard Selected***	
A	Ecological Flows	1	1
B	Water Quality	3	3
C	Upstream Fish Passage	1	1
D	Downstream Fish Passage	1	1
E	Shoreline and Watershed Protection	2	2
F	Threatened and Endangered Species	2	2
G	Cultural and Historic Resources	2	2
H	Recreational Resources	2	2

3. SUPPORTING INFORMATION

Ecological Flow Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: A	**Standard**	**1**	**1**
Instructions	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to any dam/diversion structures and demonstrate that there are no bypassed reaches in the designated Zone of Effect. • For run-of-river facilities, provide details on operations and describe how flows, water levels, and operations are monitored to ensure such an operational mode is maintained. In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones, explain water management (e.g., fluctuations, ramping, refill rates, restrictions) and how those requirements support fish and wildlife habitat within the ZoE.		

The Project powerhouse is located directly adjacent to the Meldahl Dam (Figure 3 & 4) and does not have a bypassed reach.

The Project license states that "The Corps will control the flows available for operation of the Meldahl Project. As such, the project operation will be subordinate to the operation of the Meldahl Locks and Dam." Additionally, the Project is operated in Run-of-River mode per its FERC License requirement and MOA with USACE. Because USACE maintains the pool elevation to maintain a depth suitable for navigation, the Meldahl Project does not have any ability or authority to operate in anything but run-of-river mode. The USACE determines the total discharge flow from the dam and the Project uses a portion of that flow for generation. There is no storage capacity in the pools.

License Article 404 requires the Project operate in a run-of-river mode within the constraints established by the Huntington District, USACE at the Meldahl locks and dam to protect water quality, fish and aquatic resources in the Ohio River and to meet the Corps operational requirements at the dam of providing navigation on the Ohio River. License Article 404 also instructs that the Project licensees shall at all times act to minimize fluctuation of the reservoir (Meldahl pool) elevation by maintaining a discharge from the project such that, at any point in time, flows, as measured immediately downstream from the project tailrace approximate the sum of inflows to the reservoir.

As noted above, the Project is operated according to its FERC license and MOA with USACE. The MOA between the Corps and the licensees specifies the operating restrictions needed to protect navigation, recreation, water quality, and flood control. The MOA dictates the following specific operational details:

- The USACE maintains the upper Meldahl pool at an elevation of 485 feet mean sea level.
- During low periods when the river is being regulated for protection of navigation, or other Federal interests, all discharges for the Project are controlled by the lockmaster, who issues specific discharge instructions.

- When the Project is discharging, the operators of the Project regulate flows according to the direction of the Meldahl Locks and Dam Lockmaster such that the upper gauge readings stay between the limits of 13.2 ft. and 11.8 ft. depending on the total Ohio River flow
- If river flows exceed approximately 250,000 cfs or if the river flow is less than 2,300 cfs, the Project shuts down and all flows are passed through the Dam.
- The licensees agree to notify USACE before the planned starting or stopping of a generating unit and as soon as possible whenever a generating unit is subject to an unanticipated forced outage. The licensees also agree to keep USACE advised of any change in generation that will affect the flow of water through the Project, or cause any significant fluctuations in the upper or lower pools

Water Quality Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: B	**Standard**	**3**	**3**
Instructions:	Site Specific Studies: - Define all waterbodies and reaches where water quality is directly affected by the facility, including those affected areas outside the facility boundary. - The facility is in compliance with all water quality conditions contained in a recent Water Quality Certificate or science-based resource agency recommendation. - If facility is located on a Water Quality Limited River reach, provide an agency letter stating that the facility is not a cause of such limitation. - Provide a copy of the most recent Water Quality Certificate, including the date of issuance. - Identify any other agency recommendations related to water quality and explain their scientific or technical basis. - Describe all compliance activities related to the water quality related agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.		

Ohio

Link to most recent final 2020 CWA Section 303(d) impaired waters list: Link

Section 305(b) integrated water quality report: Same as above

Listed impairments in the Ohio portion of the Project area are for recreation due to e coli (see assessment unit OH050902011106 – Bear Creek, Ohio River, Link).

Kentucky

Link to most recent final 2018/2020 CWA Section 303(d) impaired waters list: Link

Section 305(b) integrated water quality report: Same as above

Listed impairments in the Kentucky portion of the project area are for fish consumption (see assessment unit IDs KY66 and KY67, Link).

ORSANCO 2020 Biennial Assessment of Ohio River Water Quality Conditions: Link

Designated uses for the Ohio River include aquatic life, contract recreation, public water supply, and fish consumption. The most recent impaired waters list (link above) prepared by ORSANCO concluded the following:

- Ohio River is fully supporting of aquatic life use, public water supply use, and fish consumption use (Mercury)
- Ohio River is partially supporting of fish consumption use (PCB/Dioxins)

- 641.5 miles of the Ohio River is classified as impaired for Contact Recreation use

As the listed impairments incorporate the full 981 mile stretch of the Ohio River, the Project would not have any significant impact on any of the impairments. With the exception of fish consumption (for which the entire river was listed as impaired), the 2008 Environmental Assessment for the Meldahl Project concluded that the Ohio River met all designated uses in the reach extending 41 miles upstream of the Meldahl Locks and Dam to 26 miles downstream of the Meldahl dam.

The licensees for the Project requested a water quality certification on October 6, 2006, however the Kentucky Division of Water (DOW) did not act on the application within 1 year so the certification was deemed waived by FERC. On January 26, 2008 the Kentucky DOW filed a request for an extension of time for issuing its water quality certification for the Meldahl Project. The request included conditions the Kentucky DOW intended to include in the certification and were identical to the five water quality certification conditions that the licensees had proposed in the request for certification. FERC determined that although the water quality certification had been deemed waived, FERC staff considered the request and five conditions to be late comments to a November 8, 2007 public notice. On February 21, 2008 the Kentucky DOW and the licensees jointly agreed to withdraw Kentucky DOW's request for extension of time to issue certification and concluded that the extension was not necessary since the state agency and licensees agreed on the water quality conditions for the proposed project. The Kentucky DOW's water quality recommendations were provided for in the license in Articles 302 (Contract Plans and Specifications), Article 402 (Dissolved Oxygen Standards), and Article 403 (Dissolved Oxygen Monitoring Plan).

On October 27, 2011, the licensees applied to the Ohio EPA for water quality certification for a proposed transmission line amendment. On May 30, 2012, Ohio EPA issued certification for the amendment application. The certification included: (1) best management practices (2) wildlife protection conditions and (3) other administrative and general conditions.

License Article 402 requires licensees to maintain dissolved oxygen (DO) concentrations in the powerhouse discharge at or above the water quality standard of 5.0 mg/L averaged over a 24-hour period and 4.0 mg/L as an instantaneous reading.

License Article 403 required the licensees to file for a plan to monitor the water quality of the Ohio River downstream and upstream from the project and maintain DO levels. On July 17, 2014, and supplemented on August 27, and September 25, 2014, the licensees filed a Final Dissolved Oxygen Monitoring Plan. On October 27, 2014 FERC issued an Order Modifying and Approving the Final Dissolved Oxygen Monitoring Plan. Pursuant to the Dissolved Oxygen Monitoring Plan, the Meldahl Project has submitted annual DO reports to FERC and consulting agencies since the first year of commercial operation in 2016. From 2016-2021 (During the DO monitoring season), there were no instances when the Project was generating in which the DO measurements fell below the water quality standard established in license article 402. As noted in the 2016 annual report, the DO levels did fall below the 5.0 mg/L standard on a handful of occasions, however, the plant was not in operation during those events.

In 2012, the US Army Corps of Engineers (USACE) Lakes and Rivers Division issued the Operations Order (2012-075) (OPORD) establishing water quality monitoring and reporting requirements for non-federal

hydropower projects on the Ohio River. The language in the USACE Operations Order was included in the MOA between the Meldahl Project and USACE.

Upstream Fish Passage Standard

Zone		1: Impoundment Reach	2: Downstream Reach
Criterion: C	**Standard**	**1**	**1**
Instructions:	Not Applicable / De Minimis Effect: - List all migratory fish species that are present or historically occurred at the facility. - Demonstrate that upstream passage provisions are sufficient to support healthy populations of migratory species. - Explain why the facility does not impose a barrier to upstream fish passage in the Zone of Effect. - Document available fish distribution data and the lack of migratory fish species in the vicinity. - If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.		

As indicated in the Project's FERC license, Section 18 of the Federal Power Act (FPA) provides that FERC shall require the construction, maintenance, and operation by a licensees of such fishways as may be prescribed by the Secretary of the Interior of Commerce, as appropriate. No fishway prescriptions or reservations of authority were filed under section 18 of the FPA and no federal or state fish and wildlife agencies filed Section 10(j) recommendations.

The Environmental Assessment for the Meldahl Project reached the following conclusion regarding the Project's impact on Ohio River fish populations:

- Project would not significantly affect the fishery and associated aquatic resources of the Ohio River.
- Construction of the Project would not affect the ability of fish to pass upstream via lockage.

Since the Locks and Dam were already in place, the addition of the Meldahl Project posed no further impediment to upstream fish passage.

A list of all fish collected on the main stem of the Ohio River in the upstream and downstream pools of the Project from 2003-2021 can be found in Appendix C. This data is sourced from the Ohio River Valley Water Sanitation Commission's (ORSANCO) database.

Downstream Fish Passage and Protection Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: D	**Standard**	**1**	**1**
Instructions:	Not Applicable / De Minimis Effect: - List all fish species that occur now or have occurred historically in the area affected by the facility - The facility is in compliance with a science-based resource agency recommendation for downstream fish passage and/or fish protection. - Identify the proceeding, and source, date, and specifics of the agency recommendation applied. - Explain the scientific or technical basis for the agency recommendation including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. - Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.		

The Meldahl Environmental Assessment concluded the following regarding downstream fish passage and fish entrainment/mortality:

- Entrainment losses are not expected to significantly affect the populations levels of any fish species in the Meldahl or Markland pools
- There would be little benefit in conducting an entrainment assessment and substantial effects on fish populations are unlikely
- In addition to high survival rates associated with large bulb turbines at low head dams, the distance between dams on this section of the Ohio River (approximately 95 miles between dams) is considerable and only a small portion of the fish population in these large pools would be entrained
- The fish populations in the Markland pool do not depend on recruitment from upstream of Meldahl dam and no anadromous species, which would need to pass one or more dams in order to complete their life cycles, are present
- Project operation and the associated fish entrainment through the project's turbines would result in some minor, long-term effects on resident fish in the Meldahl and Markland pools in the Ohio River. However, these effects would be mitigated by installing trashracks and implementing recommended fisheries enhancement plan for the area downstream of Meldahl dam.
- The fish habitat enhancement plan was included as a staff alternative to a fish entrainment and mortality plan.

In consideration of the fishery enhancements recommended in the Project's Environmental Assessment, FERC required that the licensee's recreation plan include provisions to develop and maintain fish structures that would improve the recreational fishery and angling opportunities affected by the project. More information regarding the Project's recreation related features are discussed in the Recreational Resources Standard. As noted above, no fishway prescriptions or reservations of authority were filed

under section 18 of the FPA and no federal or state fish and wildlife agencies filed Section 10(j) recommendations.

Results of the 2017 Ohio River Pool Assessment conducted by ORSANCO in the Meldahl Pool yielded the following conclusions:

- On average, fish in the Meldahl Pool were in good condition and the macroinvertebrates were in fair condition. ORSANCO concluded that overall, results indicated that the Meldahl Pool harbored healthy aquatic communities
- 2017 ORSANCO River Pool Assessment - Meldahl (Upstream Pool)

Results of the 2021 Ohio River Pool Assessment conducted by ORSANCO in the Markland Pool yielded the following conclusions:

- On average, fish in the Markland Pool were in good condition and the macroinvertebrates were in fair condition. ORSANCO concluded that overall, results indicated that the Markland Pool harbored healthy aquatic communities
- 2021 ORSANCO River Pool Assessment - Markland (Downstream Pool)

As indicated in the Upstream fish passage standard, a list of all fish collected on the main stem of the Ohio River in the upstream and downstream pools of the Project from 2003-2020 can be found in Appendix C.

Watershed and Shoreline Protection Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: E	**Standard**	**2**	**2**
Instructions:	Agency Recommendation: - The facility is in compliance with all government agency recommendations in a license, exemption, water quality certificate, or other authorization, such as an approved SMP or equivalent for protection, mitigation or enhancement of shoreline surrounding the facility. - Provide copies or links to any agency recommendations or management plans that are in effect related to protection, mitigation, or enhancement of shoreline surrounding the facility.		

Article 407 of the Project's license required the Licensees to develop a plan to protect wetlands that could be affected by project construction. The licensees submitted the Wetland Survey and Protection Plan to FERC on May 21, 2009, which was subsequently approved in a July 30, 2009 FERC Order.

Project construction required clearing and excavating about 62 acres of terrestrial habitat, which prompted the inclusion of Article 408 into the Project's license. Article 408 required the licensees to file for FERC approval a terrestrial plant protection plan at least 90 days before any land disturbing or land clearing activities associated with project construction. The plan was to protect the Virginia mallow (identified by Kentucky as a species of special concern) and any federally-listed plants that could be affected by project construction, operation, and maintenance. FERC approved the plan in an Order dated July 30, 2009.

On July 31, 2009, a site restoration and aesthetics plan was filed pursuant to article 412 of the Order Issuing Original License for the Meldahl Project. The plan stipulated that following the completion of construction, landscaping of the area would be done and efforts made to blend the project area with the existing visual environment. The Plan was approved by the Commission in the "Order Modifying and Approving Site Restoration and Aesthetics Plan" issued November 10, 2009, with a requirement to prepare and file a Planting Plan.

The Meldahl Project submitted the required final planting plan on February 12, 2010 which was subsequently approved in an August 2, 2010 FERC Order. The plan was prepared in coordination with consulting agencies and provided information on specific seed mixes and seeding schedules for temporary (during construction) and permanent (following completion of construction) vegetative cover, as well as a representative map of seeding areas.

On April 8, 2010, the USACE Huntington District issued authorization for a Section 404 and Section 10 permit (Permit #LRH-2009-00080-OHR) for activities that impact the Ohio River and 0.72 acres of jurisdictional wetlands to facilitate the construction of the Meldahl Hydroelectric Project. The USACE authorization included a special condition to mitigate for unavoidable losses to the deciduous forested area located upstream of the dam and spillway which consisted of a flood frequency most closely associated with bottomland hardwood forests in the United States. The licensees proposed to mitigate project impacts by utilizing available mitigation credits at an existing mitigation bank (Northern Kentucky Mitigation Bank) and enhancing multiple riparian areas along Banklick Creek and the Licking Creek River throughout Kenton County, Kentucky. USACE approved the proposed mitigation plan via e-mail on

September 8, 2018. As part of the mitigation plan, the licensees conducted annual quantitative monitoring inspections since the fall of 2019 at all mitigation sites to determine plant survivability. All sites are required to be inspected at least annually for five years from the planting date. After review of the year five monitoring report, the USACE Huntington District will determine if the mitigation project has met the established success criteria outlined in the performance standards of the Mitigation Plan. If the mitigation plan is determined successful, the mitigation sites shall be released from any further maintenance or monitoring requirements.

Threatened and Endangered Species Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: F	**Standard**	**2**	**2**
Instructions:	Finding of No Negative Effect - There are, or may be listed species in the facility area, but the facility has been found by an appropriate resource management agency to have no negative effect on them; or habitat for the species does not exist within the facility's affected area or is not impacted by facility operations - Identify all listed species in the facility area based on current data from the appropriate state and federal natural resource management agencies - Provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.		

Article 406 required the licensees to file, for Commission approval, a freshwater mussel survey and protection plan. The plan was to ensure the protection of the federally and state-listed fanshell mussel; the federally listed pink mucket, ring pink, orangefoot, pimbleback, and clubshell mussels; and the sheepnose mussel, a federal-candidate species (now listed as endangered) that occur in habitat that could be affected by construction and operation of the project. A freshwater mussel survey was conducted on the Ohio River in the vicinity of Meldahl Locks and Dam in July 2008. No federally or state-listed threatened or endangered mussel species were collected during the survey. On May 21, 2009, the licensees filed a freshwater mussel survey and protection plan which was approved in a FERC Order dated July 28, 2009.

Article 409 required the licensees to file an Indiana Bat Survey and Protection Plan prior to any land-clearing activities associated with Project construction. The purpose of the plan was to ensure protection of the Indiana Bat that occur in habitat that could be affected by Project construction and operation. On July 28, 2009 FERC issued an Order Approving the Indiana Bat Survey and Protection Plan pursuant to Article 409. FERC agreed that since no Indiana Bats or other federally listed species were observed or heard during the survey, no additional protective measures would be required and previous restrictions regarding land clearing could be removed. USFWS stated its concurrence that the Project would not likely adversely affect the Indiana Bat in a letter dated November 20, 2008. In August 2010, summer mist net surveys were conducted for the federally endangered Indiana bat (*Myotis sodalis*) at the Project. The 2010 survey concluded that the development of the proposed project was not likely to adversely affect the Indiana bat and the Ohio Power Siting Board concurred with the findings of the survey in a November 29, 2011 license amendment application (see page 60-61).

The Environmental Assessment for the Meldahl Project concluded that following the industry standard for raptor-friendly transmission lines would minimize the potential for avian mortality and injury due to collision or electrocution. Accordingly, Article 410 of the Project License required the design and construction of the proposed transmission line in accordance with the guidelines set forth in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC *et al*., 2006).

On August 23, 2012, FERC approved a License Amendment for the Meldahl Project to allow for changes to the Project's proposed transmission line that would go through Kentucky and Ohio. The U.S. Fish and Wildlife Service (USFWS) identified one federally listed endangered animal, the Indiana bat (*Myotis*

sodalist), and one federally listed endangered plant, running buffalo clover (*Trifolium stoloniferum*), that may potentially occur within the proposed transmission line corridor and substation site. Previously, in September 2010 and February 2011, surveys were conducted for the running buffalo clover and its habitat. No running buffalo clover populations were observed within the habitats surveyed. Additional habitat information and photographs were provided to USFWS in July 2011.Page 3 of the 2012 FERC amendment stated that "By letter dated November 10, 2010, FWS concurred with the findings of the surveys and indicated that no further consultation related to either species is required." We were unable to locate the referenced USFWS letter. The licensees had previously conducted surveys for the Indiana Bat and no populations or suitable habitat were identified.

In response to comments expressing concerns about possible adverse effects to migratory birds and their habitat, caused by the proposed transmission lines and structures, the 2012 license amendment added article 416 to the original license. Article 416 required the licensees to file an avian mortality monitoring plan to assess bird mortality from power line collisions for the transmission line that spans the Ohio River. On December 24, 2012, the Project licensees filed an Avian Monitoring Plan pursuant to license article 416, which was modified and approved by FERC in a December 17, 2013 Order. The Avian Mortality Monitoring Plan required a report to be filed within 90 days of completing a three year monitoring effort. The report required the licensees to propose continuation or cessation of the monitoring. Due to the low number of avian interactions with the transmission lines, the licensees proposed to discontinue avian monitoring at the Project in the June 20, 2019 Avian Monitoring Report. FERC issued an Order Approving the Avian Monitoring Report on November 19, 2019 and agreed that the licensees' request to discontinue avian monitoring should be approved.

The IPaC report generated on June 22, 2022 includes these additional federally listed species not noted above:

- Gray Bat
- Northern Long-eared bat
- Rabbitsfoot mussel
- Rough Pigtoe mussel
- Snuffbox mussel
- Spectaclecase mussel
- Northern Riffleshell mussel

The list also includes nine species of migratory birds protected under the federal Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. A copy of this report can be found in Appendix E.

Kentucky threatened and endangered species in Bracken County include Northern long-eared bat, Indiana bat, fanshell, sheepnose, and clubshell mussels. The list of state listed species in Bracken County, KY can be found here: Link

Ohio threatened and endangered animal species in Clermont County include Northern harrier hawk, blue corporal dragonfly, Indiana bat, five fish species and twelve species of mussels some of which are also federally listed. The list of state listed animal species in Clermont County, OH can be found here: Link

Ohio threatened and endangered plants include thirteen species, one of which is also federally listed (running buffalo clover). The list of state listed plant species in Clermont County, OH can be found here: Link

Cultural and Historic Resources Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: G	**Standard**	**2**	**2**
Instructions:	Approved Plan: - Facility is in compliance with approved state, federal, and recognized tribal plans for protection, enhancement, or mitigation of impacts to cultural or historic resources affected by the facility. - Provide documentation of all state, provincial, federal, and recognized tribal plans for protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. - Document that the facility is in compliance with all such plans.		

Article 413 of the Project's FERC license required the licensees to consult with the Kentucky State Historic Preservation Officer (SHPO), USACE and Tribes prior to starting any land-clearing or land-disturbing activities associated with Project construction, other than those specifically authorized by the license. If previously unidentified archaeological remains are discovered while maintaining project works or other facilities at the project, the licensees are required to stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the appropriate agencies. In the case that any previous unidentified archeological or historic properties are determined eligible for inclusion in the National Register of Historic Places, a Historic Properties Management Plan (HPMP) is required to be prepared for FERC approval. The Environmental assessment for the Meldahl Project concluded that the proposed project would not affect any known cultural resources.

Within Kentucky, archaeological surveying was performed in association with a February 2010 FERC license amendment approving the location of a new powerhouse location. No significant archaeological deposits were detected within the project area.

Subsequently, cultural resource literature reviews and field surveys were conducted by the licensees to determine if any historic properties would be affected by a 2012 FERC license amendment that revised the Project's transmission line route through Kentucky and Ohio. A summary of the survey findings are detailed below:

- One historic property, the Meldahl Locks and Dam, and one potentially eligible site (BK-432) were identified in Kentucky. The Kentucky SHPO concluded that the undertaking as proposed would not affect any qualities that made BK-432 potentially eligible for listing.
- Three archaeological sites were determined potentially eligible for inclusion in the National Register of Historic Places (NRHP) in Ohio.
    - Due to the potential archaeological significance of the Ohio sites, the licensees revised the proposed transmission line's route in Ohio to avoid impacting the archaeological sites. No significant archeological materials were found along the adjusted route and the licensees determined the project would have no adverse effect on historic properties or their viewsheds.
- Page 4 of the 2012 FERC amendment stated that "In separate letters dated August 29, 2011, and September 20, 2011, the SHPOs of Ohio and Kentucky, respectively, concurred with the no adverse effects determination." We were unable to locate the referenced letters.

Recreational Resources Standard

Zone:		1: Impoundment Reach	2: Downstream Reach
Criterion: H	**Standard**	**2**	**2**
Instructions:	Agency Recommendation: - Demonstrate that flow-related recreational impacts are mitigated to a reasonable extent in all Zones of Effect where there is flow-related recreation. - The facility shall provide the public with relevant up-to-date information on reservoir levels and river flows. - Recreation activities must be consistent with the assurance of reasonable safety of employees and the public, and with Critical Energy Infrastructure protections dictated by state or federal authorities. - Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. - Document that the facility is in compliance with all such recommendations and plans.		

Article 411 of the Project's License required development of a recreation plan, which was subsequently submitted to FERC for review on July 31, 2009. On November 20, 2009, the Commission issued an order approving and modifying the recreation plan for the Meldahl Project. The order required the licensees to file additional details for the approved recreation plan.

- Implementation schedule, including estimated start-of-construction dates and estimated completion dates for all permanent recreation facilities.
- Design drawings for each permanent recreation facility.
- Descriptions of the construction materials and methods to be used for the shoreline undulations.
- Discussion of how the shoreline-undulation fishing enhancements would be monitored for effectiveness and any needed modifications.

On December 9, 2013, the licensees filed additional details for the Project's recreation plan, which was subsequently modified and approved by FERC in a March 26, 2015 Order.

On September 5, 2017, the licensees filed an as-built site plan drawing of the recreation sites that also included an overall site plan drawing that shows the Commission approved recreation sites in relation to the project boundary. The as-built site plan drawing was approved by a FERC Order on September 7, 2017.

The Meldahl Recreation area include an access road, parking areas, public restrooms, fishing pier, picnic areas, and multi-level walkways along the shoreline for fishing access. The recreation area encompasses both the Project tailrace fishing area as well as the Big Snag Creek Sandbar Area. The Exhibit G drawing in Appendix D shows the locations of the recreation facilities.

There has been no FERC Environmental and Recreation Inspection since the Project was commissioned.

4. ATTESTATION AND WAIVER FORM

ATTESTATION

As an Authorized Representative of American Municipal Power, Inc., the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to the final certification decision and prior to marketing the electricity product as LIHI Certified® (which includes selling RECs in a market that requires LIHI Certification).

The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board, and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.

Company Name: American Municipal Power, Inc.

Authorized Representative:

Name: Adam Ward

Title: Senior Vice President of Member Services & External Affairs

Authorized Signature: 

Date: August 9, 2022

5. CONTACT FORMS

Table 3. Applicant-related contacts

Facility Owner:	
Name and Title	Adam Ward, Senior Vice President Member Services and External Affairs
Company	Meldahl, LLC; AMP is the sole member of Meldahl, LLC
Phone	614-540-1100
Email Address	award@amppartners.org
Mailing Address	1111 Schrock Rd, Suite 100 Columbus OH 43229
Facility Operator:	
Name and Title	N/A
Company	N/A
Phone	N/A
Email Address	N/A
Mailing Address	N/A
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	Adam Ward, Senior Vice President Member Services & External Affairs
Company	American Municipal Power, Inc.
Phone	614-540-1100
Email Address	award@amppartners.org
Mailing Address	1111 Schrock Rd, Suite 100 Columbus OH 43229
Party responsible for accounts payable:	
Name and Title	Adam Ward, Senior Vice President Member Services & External Affairs
Company	American Municipal Power, Inc.
Phone	614-540-1100
Email Address	award@amppartners.org
Mailing Address	1111 Schrock Rd, Suite 100 Columbus OH 43229

Table 4. Current relevant state, federal, and tribal resource agency contacts.

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Ohio River Valley Sanitation Commission (ORSANCO)	☒ Flows ☒ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Jason Heath, Technical Programs Director	
Phone	513-231-7719 (ext. 112)	
Email address	jheath@orsanco.org	
Mailing Address	5735 Kellog Avenue, Cincinnati, OH 45320	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	The United States Fish and Wildlife Service (USFWS)	☐ Flows ☐ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Lee Andrews, Kentucky Field Office Supervisor	
Phone	502-695-0468 ext. 46108	
Email address	Lee.andrews@fws.gov	
Mailing Address	J C Watts Federal Building; 330 West Broadway, Room 265 Frankfort, KY 40601-8670	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Kentucky Department of Fish & Wildlife Resources	☐ Flows ☐ Water Quality ☒ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Mike Hardin, Assistant Director of Fisheries	
Phone	502-564-3400	
Email address	Mike.hardin@ky.gov	
Mailing Address	#1 Sportsman's Lane, Frankfort, KY 40601	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Kentucky Division of Water, Water Quality Certification Section	☐ Flows ☒ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Cabrina Pennington, Certification Project Manager	
Phone	502-782-1052	
Email address	Cabrina.Pennington@ky.gov	
Mailing Address	300 Sower Blvd, 3rd Floor, Frankfort, KY 40601	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Kentucky Department for Natural Resources	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	J.D. Sparks, Division Director	
Phone	502-782-7177	
Email address		
Mailing Address	2 Hudson Hollow Road; Frankfort, KY 40601	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Kentucky State Historic Preservation Office (SHPO)	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Kentucky Heritage Council	
Phone	502-564-7005	
Email address	Click or tap here to enter text.	
Mailing Address	410 High St., Frankfort, KY 40601	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	United States Army Corps of Engineers, Huntington District	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Belinda M. Weikle, M.S.C.E., P.E.	
Phone	304-399-5808	
Email address	Belinda.M.Weikle@usace.army.mil	
Mailing Address	Water Resources Engineering Section 502 Eighth Street, Huntington, WV 25701	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	United States Army Corps of Engineers, Huntington District	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Major Patrick Kelley	
Phone	304-399-5189	
Email address	Patrick.J.Kelley@usace.army.mil	
Mailing Address	502 Eighth Street, Huntington, WV 25701	

Agency Contact		***Area of Responsibility (check applicable boxes)***
Agency Name	Kentucky Environmental and Public Protection Cabinet	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Richard Wahrer	
Phone		
Email address	Click or tap here to enter text.	
Mailing Address	300 Fair Oaks, Frankfort, KY 40601	

Stakeholder Contact		***Area of Responsibility (check applicable boxes)***
Organization Name	The United Keetoowah Band of Cherokee	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Click or tap here to enter text.	
Phone	1-918-871-2800	
Email address	info@ukb-nsn.gov	
Mailing Address	P.O. Box 746, Tahlequah, OK 74465	

Stakeholder Contact		***Area of Responsibility (check applicable boxes)***
Organization Name	The Miami Tribe of Oklahoma	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Click or tap here to enter text.	
Phone	918-541-1300	
Email address	Click or tap here to enter text.	
Mailing Address	P.O. Box 1326, Miami, OK 74355	

Stakeholder Contact		***Area of Responsibility (check applicable boxes)***
Organization Name	The Peoria Tribe of Indians of Oklahoma	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Click or tap here to enter text.	
Phone	918-540-2535	
Email address	Click or tap here to enter text.	
Mailing Address	P.O. Box 1527, Miami OK 74355	

Stakeholder Contact		***Area of Responsibility (check applicable boxes)***
Organization Name	The Eastern Band of Cherokee Indians	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☒ Cultural/Historic ☐ Recreation
Name and Title	Click or tap here to enter text.	
Phone	828-497-7000	
Email address	Click or tap here to enter text.	
Mailing Address	P.O. Box 455, Cherokee, NC 28719	

Appendix A

Project Photographs and Drawings

Photo 1 – Side View of Hydro Project & Dam

Photo 2 - Inside the Hydroelectric Plant

Photo 3 – View from Project Parking Area looking upstream

Photo 4 – Meldahl Project Approach Channel

Photo 5 – View of Multi-Level Walkways, Recreation Area, and Fishing Pier

Photo 6 – View of Project Tailrace Channel

Photo 7 – View of Approach Channel from Deck

Photo 8 – Powerhouse Intake

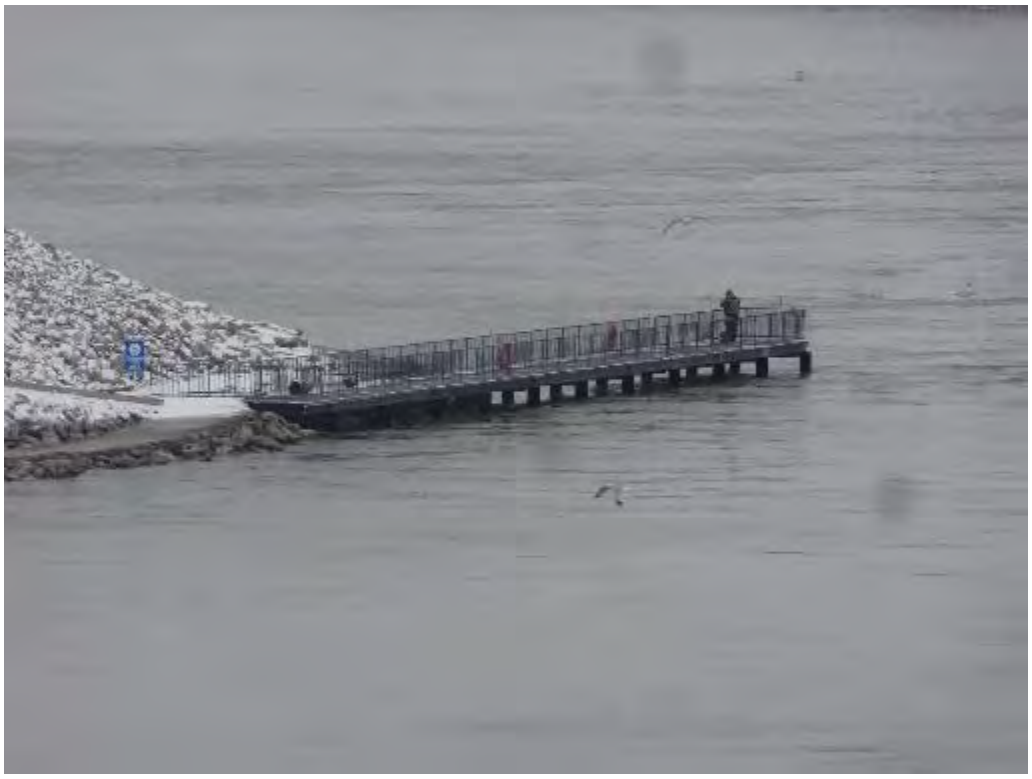

Photo 9 – Fisherman using fishing pier

Photo 10 – Recreation Area

Photo 11 – Aerial view of Hydro Project & Island

Appendix B

List of Key Electronic Records

- **FERC License and amendments**
    - Order Approving FERC License **(link)**
    - 2010 License amendment (link)
    - 2012 Amendment to Revise transmission line route **(link)**
- **Memorandum of Agreement (MOA) with USACE (link)**

Appendix C

Fish species in Upper Meldahl Pool and Lower Markland Pool

ORSANCO Fish Data for Upstream (Meldahl) & Downstream (Markland) Pools (2003-2021)

Latin Name	Common Name	Highly Mobile	Meldahl L&D (RM 436.2)	
			DS POOL Markland	US POOL Meldahl
Alosa chrysochloris	skipjack herring	X	X	X
Ambloplites rupestris	rock bass		X	X
Ammocrypta pellucida	eastern sand darter			X
Anguilla rostrata	American eel	X		X
Aplodinotus grunniens	freshwater drum		X	X
Campostoma anomalum	central stoneroller		X	X
Carpiodes carpio	river carpsucker		X	X
Carpiodes cyprinus	quillback		X	X
Carpiodes sp	Carpiodes sp		X	X
Carpiodes velifer	highfin carpsucker		X	X
Ctenopharyngodon idella	grass carp		X	
Cycleptus elongatus	blue sucker	X	X	
Cyprinella spiloptera	spotfin shiner		X	X
Cyprinus carpio	common carp		X	X
Cyprinus carpio x Carassius auratus	carp x goldfish		X	
Dorosoma cepedianum	gizzard shad		X	X
Dorosoma petenense	threadfin shad		X	X
Erimystax x-punctatus	gravel chub			X
Esox masquinongy	muskellunge		X	
Etheostoma blennioides	greenside darter		X	X
Etheostoma caeruleum	rainbow darter		X	X
Etheostoma flabellare	fantail darter		X	X
Etheostoma nigrum	johnny darter		X	
Etheostoma zonale	banded darter		X	X
Gambusia affinis	western mosquitofish		X	
Hiodon alosoides	goldeye		X	X
Hiodon tergisus	mooneye		X	X
Hypentelium nigricans	northern hog sucker		X	X
Hypophthalmichthys molitrix	silver carp	X	X	
Hypophthalmichthys nobilis	bighead carp	X	X	
Ichthyomyzon unicuspis	silver lamprey	X	X	X
Ictalurus furcatus	blue catfish		X	
Ictalurus punctatus	channel catfish		X	X
Ictiobus bubalus	smallmouth buffalo		X	X
Ictiobus cyprinellus	bigmouth buffalo		X	X
Ictiobus niger	black buffalo		X	X
Labidesthes sicculus	brook silverside		X	X
Lepisosteus oculatus	spotted gar		X	X
Lepisosteus osseus	longnose gar		X	X
Lepisosteus platostomus	shortnose gar		X	X
Lepomis cyanellus	green sunfish		X	X

Appendix B - ORSANCO Fish Data for Upstream (Meldahl) & Downstream (Markland) Pools (2003-2021)

Latin Name	Common Name	Highly Mobile	Meldahl L&D (RM 436.2)	
			DS POOL Markland	US POOL Meldahl
Lepomis gibbosus	pumpkinseed		X	X
Lepomis gulosus	warmouth		X	X
Lepomis humilis	orangespotted sunfish		X	X
Lepomis hybrid	Lepomis hybrid		X	X
Lepomis macrochirus	bluegill		X	X
Lepomis macrochirus x L. cyanellus	bluegill x green sunfish			X
Lepomis macrochirus x L. megalotis	bluegill x longear sunfish			X
Lepomis megalotis	longear sunfish		X	X
Lepomis megalotis x L. cyanellus	longear x green sunfish		X	
Lepomis microlophus	redear sunfish		X	X
Lepomis sp	Lepomis sp		X	X
Lethenteron appendix	American brook lamprey		X	
Luxilus chrysocephalus	striped shiner		X	X
Lythrurus umbratilis	redfin shiner			X
Macrhybopsis hyostoma	shoal chub			X
Macrhybopsis storeriana	silver chub		X	X
Micropterus dolomieu	smallmouth bass		X	X
Micropterus punctulatus	spotted bass		X	X
Micropterus salmoides	largemouth bass		X	X
Micropterus sp	Micropterus sp		X	X
Minytrema melanops	spotted sucker		X	X
Morone americana	white perch		X	X
Morone chrysops	white bass		X	X
Morone mississippiensis	yellow bass		X	
Morone saxatilis	striped bass	X	X	X
Morone saxatilis x M. chrysops	hybrid striper	X	X	X
Morone sp	Morone sp		X	X
Moxostoma anisurum	silver redhorse		X	X
Moxostoma breviceps	smallmouth redhorse		X	X
Moxostoma carinatum	river redhorse		X	X
Moxostoma duquesnei	black redhorse		X	X
Moxostoma erythrurum	golden redhorse	X	X	X
Moxostoma sp	Moxostoma sp			X
Notemigonus crysoleucas	golden shiner		X	
Notropis atherinoides	emerald shiner		X	X
Notropis blennius	river shiner		X	X
Notropis buccatus	silverjaw minnow			X
Notropis hudsonius	spottail shiner		X	X
Notropis photogenis	silver shiner		X	
Notropis rubellus	rosyface shiner		X	

Appendix B - ORSANCO Fish Data for Upstream (Meldahl) & Downstream (Markland) Pools (2003-2021)

Latin Name	Common Name	Highly Mobile	Meldahl L&D (RM 436.2)	
			DS POOL Markland	US POOL Meldahl
Notropis sp	Notropis sp		X	X
Notropis stramineus	sand shiner			X
Notropis wickliffi	channel shiner		X	X
Noturus flavus	stonecat		X	
Perca flavescens	yellow perch		X	
Percina caprodes	logperch		X	X
Percina copelandi	channel darter		X	X
Percina evides	gilt darter			X
Percina phoxocephala	slenderhead darter		X	X
Percina sciera	dusky darter			X
Percina shumardi	river darter		X	X
Phenacobius mirabilis	suckermouth minnow		X	X
Pimephales notatus	bluntnose minnow		X	X
Pimephales promelas	fathead minnow		X	
Pimephales vigilax	bullhead minnow		X	X
Polyodon spathula	paddlefish	X	X	
Pomoxis annularis	white crappie		X	X
Pomoxis nigromaculatus	black crappie		X	X
Pylodictis olivaris	flathead catfish		X	X
Sander canadensis	Sauger	X	X	X
Sander canadensis x S. vitreus	saugeye	X	X	X
Sander vitreus	walleye	X	X	X
Semotilus atromaculatus	creek chub			X

Appendix D

Exhibit G Drawing

SURVEYOR'S STATEMENT

I hereby state that the Meldahl Hydroelectric Project Boundary delineation and coordinates shown on this Exhibit "G" were developed from a CORPSCON transformation of NAD783/NAD88 Ohio South Zone State Plane Coordinates to NAD27/NGVD29 which were then localized to conform to the U.S. Army Corps of Engineers coordinates for pedestal monument "P-3" as published on Sheet 1 of Engineering Drawing titled "Meldahl Locks and Dam, Ohio Instrumentation-First Observation-Settlement Pins", dated November 8, 1984. The delineation as shown on this Exhibit "G" was developed within reasonable accuracies (+/- 40 feet) as required in 18CFR4.41 to show the correct geographical location on the referenced topographical map.

By L. Edward Rinehart, Jr. Date March 20, 2013

L. Edward Rinehart, Jr., Kentucky R.L.S. 2283

STATE OF KENTUCKY
L. EDWARD RINEHART, JR.
2283
LICENSED PROFESSIONAL
LAND SURVEYOR

82.3 acres of federal land managed by the United States Army Corp of Engineers (USACE) are occupied by the Meldahl Hydroelectric Project. Licensees have acquired easments on parcels owned by private parties.

Recreation Feature	Recreation Feature Name	Recreational Resource Type
1	Tailwater Fishing Pier	Tailwater Fishing Facility
2	Tailwater Picnic Area	Picnic Area
3	Tailwater Open Play Area	Active Recreation Area
4	Big Snag Creek Sandbar Fishing Access	Tailwater Fishing Facility
5	Big Snag Creek Sandbar Picnic Area	Picnic Area
6	Big Snag Creek Sandbar Open Play Area	Active Recreation Area

Legend

- Reference Point
- Project Boundary
- 433309D017 Non-Federal Parcel
- 11-07 Federal Parcel (USACE)
- State Boundary
- Ohio River Boundary
- Road
- Stream
- 760 Contour

5°55' W MN

Projection: NAD 1927, StatePlane - Ohio South FIPS 3402

N 303510.755
E 1532835.3603

Substation Access Road

Electrical Substation

Bear Creek

Bear Creek Rd

082113D034
J & H
CLASGENS CO

082113C010
CITY OF
HAMILTON

082113C011
JARMAN TIM

Chilo-Cemetery-Mckendr-Rd

433309E012
CITY OF
HAMILTON

Bert Reed Memorial Rd

433309D017
CITY OF
HAMILTON

Woods Hill Cemetery Rd

082113C012
SIMMERMON

N 299034.8503
E 1534819.9256

State Rte 222

433309D018
CITY OF
HAMILTON

433309A023
NUTLEY BRUCE
F & NEDA J

433309A002
EUBANKS
LEE R

433309A020
USACE

Crooked Run

US Hwy 52

Ohio
Clermont County

Parcel 11-07 owner (USACE) has title to lands extending to the thread of the Ohio River.

Meldahl Powerhouse

Tailrace Channel

Intake Channel

Parcel 11-08C owner (City of Hamilton) has title to lands extending to the thread of the Ohio River.

Mary Ingles Hwy

Willow Creek

11-07
USACE

11-08C
CITY OF
HAMILTON

Ohio River
Direction of Flow

Kentucky
Bracken County

N 292080.1327
E 1523059.9772

Willow Creek Rd

Existing Access Road

State Hwy 8

AMERICAN MUNICIPAL POWER, INC.
CITY OF HAMILTON, OHIO
MELDAHL HYDROELECTRIC PROJECT

FERC LICENSE No. 12667 FERC DWG. NO. 12667-12

PROJECT BOUNDARY

0 310 620 1,240 Feet

DATE:	SCALE:	
April 5, 2013	1 inch = 620 feet	EXHIBIT G-1

Appendix E

Additional Documentation

MELDAHL HYDROELECTRIC PROJECT

FINAL MITIGATION PLAN
FOR UPLAND & BOTTOMLAND HARDWOOD FOREST

Submitted by

City of Hamilton, Ohio
345 High Street, Suite 450
Hamilton, Ohio 45011

and

American Municipal Power, Inc.
1111 Schrock Road, Suite 100
Columbus, OH 43229

Submitted to

U.S. Army Corps of Engineers
Huntington District
502 Eighth Street
Huntington, West Virginia

September 2015

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1.0 INTRODUCTION

On June 25, 2008, the City of Hamilton, Ohio received a license from the Federal Energy Regulatory Commission ("FERC" or "Commission") to construct and operate the Meldahl Hydroelectric Project (or the "Project"). This license was amended on June 16, 2009 to add American Municipal Power, Inc. (AMP) as a co-licensee with the City of Hamilton. The site of the Project is the Captain Anthony Meldahl Locks and Dam, located on the Ohio River at river mile 436.2, upstream and to the southeast of Cincinnati, Ohio (Figure 1). The existing dam and associated locks and other navigational facilities are owned by the Federal Government and operated by the Huntington District of the U.S. Army Corps of Engineers (USACE). The navigation locks are located on the north, or Ohio, side of the river. The Project will be located at the dam abutment on the south, or Kentucky, side of the River in Bracken County, Kentucky. Figure 2 depicts the proposed location of the project and transmission line.

The elevation of the 100-year floodplain at Meldahl Locks and Dam is 508 feet above mean sea level (msl), which is 23 feet above the normal pool elevation. The entire Project site lies within the 100-year floodplain.

On April 8, 2010 the USACE Huntington District issued authorization for a Section 404 and Section 10 permit (Permit # LRH-2009-00080-OHR) for activities that impact the Ohio River and 0.72 acres of jurisdictional wetlands to facilitate the construction of the Meldahl Hydroelectric Project. Additionally the USACE authorization included a special condition to mitigate for unavoidable losses to the deciduous forested area located upstream of the dam and spillway (Area of Interest) (Figure 3). This area of interest within the project site consists of a flood frequency most closely associated with bottomland hardwood forests in the United States.

The City of Hamilton proposes to mitigate project impacts within the Area of Interest by utilizing available mitigation credits at an existing mitigation bank (Northern Kentucky Mitigation Bank) and enhancing multiple riparian areas along Banklick Creek and the Licking River throughout Kenton County, Kentucky. This document provides supporting details for the mitigation of impacts to the Area of Interest upstream of the existing dam at the Meldahl Hydroelectric Project.

2.0 BASELINE INFORMATION

2.1 MELDAHL HYDROELECTRIC PROJECT SITE

Construction of the Meldahl Hydroelectric Project will result in unavoidable permanent impacts to the Area of Interest (Figure 3). A wetland delineation and rare, threatened, and endangered (RTE) species survey were conducted in July 2008. No wetland areas or RTE species were observed within the Area of Interest. The site was characterized as a deciduous forest dominated by silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*) and box elder (*Acer negundo*). Understory species present included scouring rush (*Equisetum hyemale*), blackberry (*Rubus allegheniensis*), and spotted

touch-me-not (*Impatiens capensis*). The height of the trees ranged between 40 and 80 feet. Cavities were observed in live trees, dead standing trees, and fallen wood observed at the site. Avian species, nests, and animal tracks were also observed at the site. No old-growth forest was present within the study area; all woods were second or third growth. This area was disturbed during the construction of the lock and dam structure; therefore, the existing vegetation developed after lock and dam construction activities were completed. Site photographs are located in Appendix A.

In addition, and at the request of USACE – Huntington District, a bottomland hardwood survey was conducted in September 2009 within the Area of Interest. The Guidebook for Application of Hydrogeomorphic (HGM) Assessments to Riverine Wetlands was used to evaluate the area identified by USACE-Huntington as possibly being a bottomland hardwood forest. Based on the evaluation of the 15 functions within the HGM, the site did not exhibit the required characteristics of a bottomland hardwood forest. However, based on comments provided by USACE-Huntington on the bottomland hardwood survey, additional efforts associated with possible bottomland hardwood resources at the site have been expended. As a result, an analysis of flood frequency and duration for the Area of Interest was conducted.

Hydrology is the most important factor affecting the local distribution of bottomland hardwood forest tree species within their natural ranges (Allen et al. 2004). Hydrology includes the frequency, duration, depth, seasonality, and source of flooding and/or soil saturation that occurs on a site, as well as the depth of the water table. The depth and seasonality of flooding, as well as numerous other site characteristics, varies substantially with topographic position. Generally, bottomland hardwoods flood anywhere from several inches to several feet seasonally, typically during the winter and spring months (Figure 4).

Since hydrology is the most important factor affecting the local distribution of Bottomland Hardwood Forest tree species within their natural ranges (Allen et al. 2004), the frequency and duration of overland flooding of the site was investigated. Ohio River water surface elevations for the period April 1965 to April 2008 were analyzed and correlated with existing site topography (Table 1). Based on a review of available literature addressing bottomland hardwood flooding frequency and duration, data recorded during previous site investigations, and the recorded water surface elevations in Table 1, the portion of the site that likely experiences these conditions was delineated. Because the adjacent Ohio River is regulated for transportation, high flow events with water surface elevations high enough to flood the Area of Interest are episodic and typically do not occur on an annual basis. A flooding duration of 2-12.5 percent of the growing season (Zone V – See Figure 4) was used as a conservative assumption, even though the site experiences flooding for much shorter periods of time and at lower frequencies. The analysis of flood frequency and corresponding inundation resulted in an estimate of frequently flooded area. This analysis likely over estimates the area and duration of inundation based on observable site conditions (i.e., lack of rack lines other than at the immediate shoreline, lack of buttressed trunks).

Table 1. Elevation Duration Table for Ohio River at Meldahl From April 1965 Through April 2008 (Percent Of Days When Elevation Is ≥ Class)

CLASSES (FEET)	FOR PERIOD	FOR MONTH											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
507.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
506.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
505.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
504.0	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
503.0	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
502.0	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
501.0	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
500.0	0.1%	0.0%	0.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
499.0	0.1%	0.0%	0.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
498.0	0.1%	0.1%	0.1%	0.8%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
497.0	0.2%	0.4%	0.2%	1.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
496.0	0.2%	0.8%	0.2%	1.3%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
495.0	0.3%	1.2%	0.5%	1.5%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
494.0	0.5%	2.0%	0.6%	1.7%	0.1%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.5%
493.0	0.6%	2.3%	1.0%	2.0%	0.1%	0.7%	0.1%	0.0%	0.0%	0.2%	0.0%	0.2%	0.8%
492.0	0.8%	2.7%	1.1%	2.5%	0.4%	1.1%	0.1%	0.0%	0.0%	0.2%	0.0%	0.2%	1.1%
491.0	1.0%	2.9%	1.6%	3.5%	1.1%	1.3%	0.1%	0.0%	0.0%	0.2%	0.0%	0.2%	1.3%
490.0	1.3%	3.4%	2.7%	4.2%	1.7%	1.7%	0.1%	0.1%	0.1%	0.3%	0.0%	0.5%	1.4%
489.0	1.6%	3.6%	3.2%	5.2%	2.3%	2.1%	0.2%	0.1%	0.1%	0.3%	0.0%	0.5%	1.5%
488.0	1.9%	4.0%	4.0%	6.4%	2.9%	2.5%	0.2%	0.1%	0.1%	0.3%	0.0%	0.5%	1.8%
487.0	2.4%	4.7%	5.5%	8.0%	4.1%	3.5%	0.2%	0.1%	0.1%	0.3%	0.0%	0.7%	2.1%
486.0	7.4%	7.8%	9.5%	10.8%	6.2%	5.9%	6.3%	10.4%	9.5%	8.8%	5.7%	4.8%	3.3%
485.0	89.5%	87.5%	87.0%	85.5%	86.9%	87.4%	90.0%	92.5%	93.8%	94.0%	92.0%	92.5%	84.9%
484.9	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Shaded area represents active growing season months and site elevations that meet thresholds of Bottomland Hardwood Zone V flooding (2 to 12.5 percent of growing season)

An elevation duration table was created for the site using data from April 1965 through April 2008 as described previously (Table 1). The analysis was prepared using data included in The Great Lakes and Ohio River Division archived hydrologic data in the Hydrologic Engineering Center's (HEC) Data Storage System (DSS) databases and is included in Table 1. Flood frequencies from the growing season (April through September) were summed and elevations were determined for durations of flooding of at least 2 percent. Note: the shaded box in Table 1 portrays a slightly higher surface elevation in an effort to adequately encompass the Area of Interest. This analysis yielded durations of flooding of at least 2 percent for elevations of 491 ft above msl and below. A topography map from the site was then used to depict areas at 491 ft above msl and below as shown in Figure 3. Therefore, the square footage of the site that is less than or

equal to the elevation of 491 ft above msl that experiences the referenced flooding frequency and duration was determined and includes 6.18 acres at the site. The 6.18 acres of the Area of Interest is an over estimate of the area most likely to be closely associated with bottomland hardwood forests, as a function of flood frequency and duration.

2.2 MITIGATION GOALS & OBJECTIVES

On April 8, 2010 the USACE Huntington District issued authorization for a Section 404 and Section 10 permit (Permit # LRH-2009-00080-OHR) for activities that impact the Ohio River and 0.72 acres of jurisdictional wetlands to facilitate the construction of the Meldahl Hydroelectric Project. Additionally the USACE authorization included a special condition (Special Condition #10) to mitigate for unavoidable losses to the deciduous forested area located upstream of the dam and spillway (Area of Interest) (Figure 3). This area of interest within the project site consists of a flood frequency most closely associated with bottomland hardwood forests in the United States. The City of Hamilton proposes to mitigate project impacts within the Area of Interest by utilizing available mitigation credits at an existing mitigation bank (Northern Kentucky Mitigation Bank) and enhancing multiple riparian areas along Banklick Creek and the Licking River throughout Kenton County, Kentucky.

This proposed mitigation plan provides supporting details for the mitigation of impacts to the Area of Interest upstream of the existing dam at the Meldahl Hydroelectric Project which will include the enhancement and reforestation of bottomland hardwood forest within Northern Kentucky.

3.0 MITIGATION SITE SEARCH

Since November 2009, EA Engineering, Science, and Technology, Inc., PBC (EA) and the City of Hamilton have worked to develop a suitable plan to mitigate for the permanent impacts associated with the Meldahl Hydroelectric Project. The City of Hamilton, in conjunction with Northern Kentucky University (NKU) initially identified the Banklick Creek site as a potential mitigation site. The Banklick Creek site is a combination of several parcels located along Banklick Creek and an unnamed tributary to Banklick Creek in Kenton County, Kentucky. In 2010, the City of Hamilton, with support from EA, prepared a mitigation plan to mitigate project impacts within the Area of Interest by purchasing 10 acres of bottomland hardwood forest credits at the Northern Kentucky Mitigation Bank (NKMB) and enhancing a riparian area at the Banklick Creek site. A Memorandum of Agreement (MOA) between the City of Hamilton, Kenton County conservation District, Kenton Conservancy, Northern Kentucky Area Planning Commission, Sanitation District1, and the Northern Kentucky University Center for Applied Ecology (CAE) was included in the final Banklick Creek Mitigation Plan. Unfortunately, after the Banklick Creek Mitigation Plan was finalized and approved by the USACE, attempts to preserve the parcels within the Banklick Creek site were unsuccessful and new mitigation sites had to be identified.

To assist with the identification of potential sites, the City of Hamilton entered into an agreement with the Kenton County Conservation District. In December 2013, the Kenton County Conservation District provided the City of Hamilton with two locations that have the potential to fulfill the Meldahl Hydroelectric Project mitigation requirement: the Wolfsing Mitigation Site and the Morning View Mitigation Site. Upon review of these sites, the USACE raised concerns over the suitability of these sites to fulfill the bottomland hardwood mitigation requirement. EA staff visited these sites in March 2014 and determined that the Wolfsing mitigation site was not suitable and should be dropped from consideration. During these site reviews, EA also determined that the Morning View area provided two properties that contained suitable areas for both upland planting and bottomland hardwood planting (Figure 5). After calculating the area of suitable space, EA determined that additional acreage would be necessary to fulfill the bottomland hardwood mitigation requirement.

In June 2014, Kenton County presented the City of Hamilton and EA with approximately 15 properties located within a large floodplain area along Madison Pike, just south of Covington, Kentucky. EA conducted an additional site visit at these proposed floodplain sites to collect data and identified 11 of the 15 sites as being suitable for bottomland hardwood planting or enhancement (Figure 5). Additional information on the sites suitability for the Madison Pike Floodplain Sites is provided below in Section 3.1.

The City of Hamilton has worked exhaustively since 2009 in search of potential mitigation sites to fulfill the bottomland hardwood forest mitigation requirements and after numerous proposed sites have been discussed with USACE staff these proposed sites documented in this mitigation plan appears to be the best logical approach to fulfil the mitigation requirements.

3.1 PROPOSED MITIGATION SITES

3.1.1 Madison Pike Floodplain Sites

The proposed Madison Pike Floodplain Sites, located along Banklick Creek, were identified by the Kenton County Conservation District as potential areas for bottomland hardwood restoration. These floodplain sites have been the subject of several studies since a major flood event in July 1962 that was responsible for the death of one person and caused an estimated $500,000 in damages. A major watershed project was initiated through the United States Department of Agriculture, Soil Conservation Service (now Natural Resources Conservation Service) and the Boone and Kenton County Conservation Districts. This project proposed to construct three multipurpose retention structures and one flood control structure in the Banklick Creek Watershed. The project resulted in one structure being built under Public Law 566 (Banklick Flood Control Structure known as the Doe Run Lake and Dam). Another major flood event occurred in 1996, which resulted in damages to 45 homes with estimated losses of $1.106 million. In 1999, citizens presented the Kenton County Fiscal Court with a book that outlined flooding events, including maps and photographs of damages. A Federal Emergency Management Agency Flood Insurance Study for the City of Independence, Kentucky,

was issued in March 1980, and another study was issued for Kenton County in January 1981; a number of other Flood Insurance studies followed. Residents of the area presented a "Blue Book" to Kenton County Fiscal Court, which contained information—compiled by the residents—on flooding conditions in 1996, 1997, and 1998. In September 2000, the USACE released "Flood Damage Reduction/Ecosystem Restoration," and a flood-proofing study was initiated. A restoration plan was issued by the USACE in 2004. A Federal Emergency Management Agency (FEMA) Flood Insurance Study for Kenton County, Kentucky and Incorporated areas was issued in March 2009. A number of other flood events have occurred over the years, resulting in damages to properties as well as expenditure of funds by local governments for public safety services and maintenance and repair of roads, other public facilities, and amenities in the area. The Kenton County Fiscal Court has continued to seek remedies for problems related to the ongoing flooding events. Utilizing FEMA grant money, Kenton County has purchased more than a dozen sites which are currently included in the Kenton County program.

EA conducted site visits to the proposed floodplain sites in June 2014, and identified 11 sites (Appendix A: Figures 6a, 6b and 6c) sites as being suitable for bottomland hardwood planting or enhancement. During EA's site visit, it was observed that each of the 11 identified sites was within a large valley along Banklick Creek. The majority of these 11 sites consisted of open fields and minimally maintained grass areas. Within the open areas onsite, EA identified low-lying areas coinciding with the mapped floodplain that would be suitable for bottomland hardwood planting (Appendix A: Figures 7a, 7b, and 7c). EA also identified areas within the 11 sites that contain small trees and shrubs and are overgrown with a large number of invasive and non-native species (Appendix A: Figures 8a, 8B, and 8C). These overgrown areas could be enhanced by invasive species removal and supplemental native plantings. Based on the close proximity to Banklick Creek, low elevation in relation to the river—including location within the 100-year floodplain and floodway—and extensive documentation on past flooding, EA believes the proposed 11 sites are suitable for bottomland hardwood mitigation. Table 3 details the proposed mitigation type and area at each of the sites.

During the June 2014 assessment EA noted that the 11 sites are partially fragmented from each other and it was noted through discussions with the USACE that this could increase failure for the mitigation plan and increase cost associated with implementation and maintenance. The factors associated with the fragmentation of the 11 floodplain sites were considered during the development of the mitigation plan and although these sites are not a single large contiguous tract of land they are contiguous to existing stream channels and riparian forested areas.

3.1.2 Morning View Mitigation Site

Sites 12 and 13 (Appendix A: Figure 6d) are located within the Morning View Area and were part of the originally proposed mitigation areas sent to the USACE for review in August 2013. After discussing the Morning View Areas with the USACE in early 2014, EA was requested to conduct site visits and collect additional information to determine the suitability of these Morning View area sites. During the site visit, EA determined that

the lower terrace on both Sites 12 and 13 were suitable for bottomland hardwood planting (Figure 8d). The lower terrace is located within the floodway and 100-year floodplain of the Licking River, and has open areas that were historically used for agriculture. In addition, EA identified a transition slope between the lower and upper terrace on Site 12 that consists of predominately non-native vegetation and a low density of native shrubs or small trees that could be supplemented with additional plantings. Although flooding at these two sites is not as well documented as the other sites, Kenton County has provided EA with photographs from multiple flooding events over the last 3-4 years that show the lower terrace at Sites 12 and 13 as completely flooded. Table 2 details the proposed mitigation type and area at each of the sites. Additionally, Kenton County has identified additional acreage for upland plantings available for reforestation on the higher elevation of Site 12 and 13, which is also included in Table 3 and discussed in Section 5.0 of this mitigation plan.

3.1.3 Northern Kentucky Mitigation Bank

In February 2010, the City of Hamilton purchased 10 acres of bottomland hardwood mitigation credits from the NKMB to cover a portion of the required mitigation. The NKMB property is held under a conservation easement, ensuring the land will be permanently protected and managed. The NKMB property is located off Wolf Road in Campbell County, Kentucky. The property is situated along the banks of the Licking River (HUC 05100101) and contains a diverse range of ecological habitats including prior-converted agricultural land, forested upland hillsides, and riparian bottomlands and has been planted with native hardwood species, such as pin oak (*Quercus palustris*) and river birch (*Betula nigra*).

4.0 CREDIT DETERMINATION

The amount of mitigation required for impacts to the Area of Interest upstream of the dam and spillway at the proposed Meldahl Hydroelectric Project was determined by applying acreage replacement ratios specific to the types of resource being impacted.

The Meldahl Hydroelectric Project is projected to impact 12.63 acres upstream of the dam. Acreage replacement ratios were used to determine the mitigation requirements. For the forested area located within the area of the floodplain with a flood frequency most closely associated with bottomland hardwood forests, a 3:1 mitigation ratio was used for the 6.18 acres resulting in 18.54 acres of floodplain forest to be mitigated. The adjacent, higher elevation forest will be mitigated using a 1:1 ratio resulting in 6.45 acres of required mitigation.

During the site visits to the 13 proposed mitigation sites, EA collected global positioning system (GPS) data to field locate the extent of the open areas available for bottomland hardwood plantings, upland planting areas, as well as areas proposed for enhancement that were identified as containing predominately invasive species. Staying consistent with the 2010 approved Banklick Creek Mitigation Plan that fell through due to easement issues, EA is proposes the same credit ratios for this revised plan; which will include a 1:1 ratio for planting areas, and a 1:4 ratio for enhancement areas (Table 2). Areas that

contain a dense native coverage of shrubs or trees have been excluded from the proposed mitigation areas, as well as areas that are located outside of the 100-year floodplain. EA also excluded areas that contain existing conditions that would inhibit planting, such as existing access roads or intermittent stream channels.

Table 2. Available Bottomland Hardwood Mitigation Credits Available at Each of the Proposed Sites

SITE	AREA	MITIGATION TYPE	MITIGATION AREA (AC.)	MITIGATION RATIO	CREDIT (AC.)
1	Floodplain Sites	Hardwood Planting	0.34	1:1	0.34
2	Floodplain Sites	Hardwood Planting	0.73	1:1	0.73
3	Floodplain Sites	Hardwood Planting	0.30	1:1	0.30
4	Floodplain Sites	Hardwood Planting	0.29	1:1	0.29
5	Floodplain Sites	Hardwood Planting	0.76	1:1	0.76
6	Floodplain Sites	Hardwood Planting	0.30	1:1	0.30
7	Floodplain Sites	Enhancement	0.75	1:4	0.19
7	Floodplain Sites	Hardwood Planting	0.20	1:1	0.20
8	Floodplain Sites	Enhancement	0.40	1:4	0.05
9	Floodplain Sites	Hardwood Planting	2.56	1:1	2.56
10	Floodplain Sites	Hardwood Planting	0.39	1:1	0.39
11	Floodplain Sites	Hardwood Planting	0.16	1:1	0.16
12a	Morning View	Enhancement	0.59	1:4	0.15
12a	Morning View	Hardwood Planting	1.15	1:1	1.15
13	Morning View	Hardwood Planting	1.45	1:1	1.45
			Total Mitigation Proposed		**9.02**

The mitigation for the upland hardwood planting is also proposed at a 1:1 ratio (Table 3), which is consistent with the mitigation ratio for the bottomland hardwood planting.

Table 3. Available Upland Hardwood Mitigation Credits Available at Each of the Proposed Sites

SITE	AREA	MITIGATION TYPE	MITIGATION AREA (AC.)	MITIGATION RATIO	CREDIT (AC.)
12a	Morning View	Upland Hardwood Planting	1.66	1:1	1.66
12b	Morning View	Upland Hardwood Planting	1.71	1.1	1.71
13	Morning View	Upland Hardwood Planting	3.08	1:1	3.08
			Total Mitigation Proposed		**6.45**

A summary of the current mitigation status and the available credits associated with these proposed sites is provided in Table 4.

Table 4. Summary of the General Mitigation Credit Status for the Project

MITIGATION	ACRES
Total Bottomland Mitigation Required	18.54
Bottomland Mitigation Credits Purchased from NKMB	10.00
Bottomland Mitigation Proposed With New Sites	9.02
Bottomland Harwood Mitigation in Excess of Requirements	0.48
Upland Hardwood Mitigation Required	6.45
Upland Hardwood Mitigation Proposed	6.45

5.0 MITIGATION WORK PLAN

5.1 NORTHERN KENTUCKY MITIGATION BANK

Prior to initiation of construction, the purchase of the 10 available mitigation credits from the Northern Kentucky Mitigation Bank was completed. A receipt of payment for the mitigation credits was sent to the USACE – Huntington District prior to initiation of construction activities within the Area of Interest.

5.2 MADISON PIKE FLOODPLAIN AND MORNING VIEW SITES

The City of Hamilton is proposing this final mitigation plan to enhance the environment by restoring degraded habitat and help improve water quality. Approximately 7.38 acres at the Madison Pike Floodplain Mitigation Sites and 3.19 acres at the Morning View Mitigation Sites will be enhanced through the planting of native bottomland hardwood tree species and the removal of invasive species. Additionally, the Morning View Sites will include a combined 6.45 acres of upland hardwood planting to offsite upland impacts associated with the Meldahl Hydroelectric Project. The mitigation at these sites includes tree planting, invasive species removal, and preservation of the project through conservation easements.

Invasive plant species will be eradicated by physically removing the plant species or cut and stump herbicide treatment of woody invasive species, including bush honeysuckle. Non-woody invasive species, such as fescue, will be mowed and treated with an approved herbicide. Spot treatments to invasive plants species will be conducted as necessary during the five year monitoring period. It is expected that enhancement of the area will increase plant and animal diversity over the existing condition and provide an enhanced habitat for the area.

Table 5. Summary of Bottomland Hardwood Mitigation Sites

SITE NUMBER	SITE COORDINATES**		PARCEL SIZE (ACRES)	ACREAGE		
	NORTHING	EASTING		100-YEAR FLOODPLAIN	EXISTING BOTTOMLAND HARDWOOD	PROPOSED FOR MITIGATION
Floodplain Sites						
1	547806.90178	1558408.36053	0.42	51 sq. ft.	0.05	0.34
2	547107.09546	1558361.97308	1.31	0.00	0.32	0.73
3	547104.38491	1558095.28577	0.30	0.30	0.00	0.30
4	547431.67895	1557754.90726	0.94	0.17	0.06	0.29
5	547363.64102	1557880.88847	0.82	0.81	0.23	0.76
6	547764.82162	1557872.85076	0.84	0.55	0.21	0.30
7	546015.05058	1558333.49589	1.58	0.00	0.54	0.39
8	546031.48258	1558101.37389	0.62	0.39	0.00	0.05
9	545288.93979	1557879.46172	4.50	1.71	0.54	2.56
10	541534.19366	1559124.63190	0.61	0.00	0.00	0.39
11	541338.44072	1558930.32727	0.21	0.08	0.00	0.16
Morning View Sites						
12a	482292.58837	1582492.60994	6.49	2.56	1.03	1.30*
13	483378.22763	1582293.73885	9.85	3.45	2.39	1.45*

* Additional upland planting proposed at Site 12/13 (see Table 6)

** Site coordinates are provided for the approximate center of each mitigation site and are recorded in NAD 1983 Kentucky State Plane - North

Table 6. Summary of Upland Hardwood Mitigation Sites

SITE NUMBER	SITE COORDINATES		PARCEL SIZE (ACRES)	MITIGATION PROPOSED (ACRES)
	NORTHING	EASTING		
Morning View Sites				
12a	482292.58837	1582492.60994	6.49	1..66
12b	482196.29338	1581359.97537	13.33	1.71
13	483378.22763	1582293.73885	9.85	3.08

** Site coordinates are provided for the approximate center of each mitigation site and are recorded in NAD 1983 Kentucky State Plane - North

Vegetation

Native plant species will be planted at the mitigation site and include native plant species that have been observed at this site, as well as the Meldahl site. Additional species have been selected to increase the species diversity of the mitigation site. Table 7 presents the species to be used as part of the mitigation plan, and all of the plant species to be installed are adapted to the proposed conditions and are native to the region. However, final plant species selection shall be based on nursery availability at the time of the planting effort.

Trees to be planted within the open area will be grown in at least 1-gallon containers. Tree and shrub species will be intermixed and planted in a random manner for spatial

distribution and density throughout the area. Approximately 800 seedlings per acre will be planted in the oldfield/disturbed areas. Herbaceous species will be seeded at 10-12 pounds/acre. Planting will occur immediately following the incorporation of the appropriate soil amendments. Fertilizer and pH adjustment recommendations will be generated as part of the soil testing process. Soil amendments will be incorporated in sufficient quantities to a depth of 12 inches prior to installation of plant material. After the plants have become established, their basic nutrient requirements will be met without additional chemical fertilizer inputs. The plant species will be watered and maintained as necessary throughout the seasons to ensure successful establishment.

The placement of tree species will be defendant on site conditions and the upland and facultative upland species shall be planted throughout the upland hardwood planting areas, while the facultative and facultative wetland species shall be planted within the bottomland hardwood areas.

Table 7. Possible Plant Species Proposed for the 13 Proposed Mitigation Sites

SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS*
Tree Species		
Acer rubrum	Red maple	FAC
Acer saccharinum	Silver maple	FACW
Celtis occidentalis	Hackberry	FACU
Cercis canadensis	Redbud	FACU
Diospyros virginiana	Common persimmon	FAC
Lindera benzoin	Spicebush	FAC
Platanus occidentalis	Sycamore	FACW
Quercus bicolor	Swamp white oak	FACW
Quercus imbricaria	Shingle oak	FAC
Quercus macrocarpa	Bur oak	FAC
Quercus palustris	Pin oak	FACW
Quercus shumardii	Shumard oak	FAC
Herbaceous Plants		
Ageratina altissima	White snakeroot	FACU
Aster novae-angliae	New England aster	FACW
Chamaecrista fasciculata	Partridge pea	FACU
Elymus virginicus	Virginia wildrye	FACW-
Eupatorium perfoliatum	Boneset	FACW+
Heliopsis helianthoides	Oxeye sunflower	UPL
Panicum cladestinum	Deertongue grass	UPL
Ratibida pinnata	Gray-headed coneflower	UPL
Rudbeckia hirta	Black-eyed Susan	FACU-
Rudbeckia laciniata	Cut-leaf coneflower	FACW
Rudbeckia triloba	Browneyed Susan	FACU
Schizachyrium scoparium	Little bluestem	FACU-
Sorghastrum nutans	Indiangrass	UPL

*OBL=Obligate. Greater than 99 percent estimated occurrence in wetlands
FACW=Facultative Wetland. 67 to 99 percent estimated occurrence in wetlands
FAC=Facultative. 34 to 66 percent estimated occurrence in wetlands
FACU=Facultative Upland. 1 to 33 percent estimated occurrence in wetlands
UPL=Upland

Plant material, unless otherwise specified, shall be nursery grown, uniformly branched and have a vigorous root system. Plant material shall be healthy, vigorous plants free from defects, decay, disfiguring roots, sunscaled injuries, abrasions of the bark, plant disease, insect pest eggs, boxers, infestations or objectionable disfigurements. Plant material that is weak or which has been cut back from larger graders to meet requirements will be rejected. The plants shall be freshly dug; no heeled-in plant or plants from cold storage shall be accepted.

6.0 MONITORING, MAINTENANCE, AND PERFORMANCE STANDARDS

The above documented work plan shall be completed within one year of receipt of approval of this final mitigation plan from the USACE-Huntington District. Additionally, following the completion of the mitigation completion the sites will be monitored as described in Section 6.2.1 of this report in an effort to document the site conditions and determine of the performance standards described in Section 6.2.2 are met.

6.1 Northern Kentucky Mitigation Bank

Northern Kentucky Mitigation Bank will be responsible for the monitoring and maintenance requirements associated with mitigation credits purchased for the proposed project. These requirements have been set forth in the relevant mitigation instrument and have been approved by the Louisville District of USACE.

6.2 Proposed Mitigation Sites

6.2.1 Annual Monitoring

Upon completion of the mitigation activities outlined in the above work plan, the 13 Mitigation Sites will be monitored for a period of five years. The vegetation will be monitored to ensure that the planted species are established, vegetation is naturally succeeding, and the riparian area is functioning effectively. During the 5-year monitoring process, Kenton County will conduct the annual monitoring effort to document the success of the hardwood planting areas. Vegetation success will be documented during each annual monitoring event which will be conducted within the growing season (April –November) using an appropriate vegetative assessment approach. The vegetation monitoring should generally document the plant survivability using a plot sampling approach in order to document the overall success of each individual proposed mitigation site. Additionally, during the monitoring events each year the percent cover of invasive species at each site will be documented to determine the aerial coverage of invasive species within each site boundary.

The following method for measuring the success of the vegetative colonization should be conducted annually for the duration of five years after the mitigation effort is complete. Vegetation sample plots shall be located on a stratified random basis over each of the sites in order to sample plant success. A minimum of 3 plots per acre should be

conducted with each plot being a size no less than 400 square feet for woody plants and 3'x3' for herbaceous plants (or circular with approximately the same surface area). The vegetation data shall be collected during the growing season and shall include:

i. Dominant vegetation species identification
ii. Percent ground cover assessment
iii. Number of woody plant stems (total and #/acre)
v. Percent survival by planted species
vi. An invasive/noxious species assessment including percent cover

Each plot shall be photo-referenced and locations will be GPS located for consistent sampling from year to year. Data collected at each sample plot will include dominant vegetation, percent cover, and percent survival of woody planted material, exotic invasive species, percent cover of exotic invasive species, and wildlife utilization and depredation. The results from the vegetation assessment will be included in the annual monitoring report with a discussion of remedial actions, if needed. Documentation and discussion of vegetative establishment, including presence of exotic invasive species throughout the riparian buffer and floodplain planted areas will be evaluated once a year for evidence of infestation, disease, browsing and mortality.

Upon completion of the annual monitoring event an annual monitoring report will be completed and submitted to the USACE-Huntington District no later than December 31 of the that monitoring year following completion of the mitigation projects, for a minimum of five years.

These monitoring reports shall include at a minimum the results of the annual monitoring inspections, photographs with locations or stations depicted on the plans for the sample plot locations and any noted deficiencies and associated corrective measures. The monitoring reports will also include a site map showing the location of data collection, an assessment of the presence and level of occurrence of invasive species, an assessment of the degree to which performance standards are being met, proposed corrective actions to improve attainment of performance standards, and a narrative summary of the results and conclusions of the monitoring. If deficiencies are noted during the monitoring event, recommendations to correct these issues shall be made in the monitoring report for review and approval by the USACE. Additional information regarding corrective action measures are detailed in Section 6.2.3 for adaptive management.

After the review of the year five monitoring report, the USACE-Huntington District will determined if the mitigation project has met the established success criteria outlined in the performance standards. If the mitigation plan is determined successful, the mitigation sites shall be released from any further maintenance or monitoring requirements. If required performance has not been met, the monitoring period may be extended beyond the five years and corrective actions may be required. At the end of the monitoring period, the USACE will determine if the mitigation project is successful.

6.2.2 Performance Standards

Mitigation plans are required to provide written performance standards for assessing whether the mitigation is achieving planned goals based on the results of the annual monitoring events. Adaptive management activities may be required to adjust to unforeseen or changing circumstances, and responsible parties may be required to adjust mitigation projects or rectify deficiencies. The performance standards evaluation will be used to determine whether the environmental benefits or "credit(s)" for the entire project equal or exceed the environmental impact(s) or "debit(s)" of authorized activities. The performance standards for the mitigation sites are based on quantitative characteristics that can be practicably measured. The performance standards for this mitigation project include:

- A value of no more than 10 percent areal cover of invasive species within each of the individual mitigation sites

- 50% vegetation success of planted material for both hardwood and herbaceous species.

6.2.3 Maintenance and Adaptive Management

During the 5 year monitoring period following the mitigation completion, the 13 mitigation sites will be continually maintained. The plant species will be watered and maintained as necessary throughout the growing seasons to ensure successful establishment.

An adaptive management approach will be utilized to handle deficiencies of the mitigation site as it pertains to the performance standards for the project. Adaptive management would be managed and implemented by USACE. In the event that monitoring or other information identifies a deficiency in the compensatory mitigation project, at any time during or following construction of the project, USACE is to be notified of the discovery of the deficiency and described in the formal monitoring report documenting the deficiencies to be addressed. USACE shall assess the deficiencies and recommendations within the monitoring report to determine whether the recommendations are sufficient and should be undertaken prior to the next monitoring period.

If it is found that the deficiencies have significantly impaired the progress of the compensatory mitigation project, then the participating parties will consult to produce appropriate measures in coordination with the permittee. USACE shall have the final approval over the measure implemented to address the mitigation project deficiencies.

If the invasive species coverage is greater than 10% at any of the mitigation sites the invasive plant species will be eradicated by physically removing the plant species or cut and stump herbicide treatment of woody invasive species, including bush honeysuckle. Non-woody invasive species, such as fescue, will be mowed and treated with an

approved herbicide. Spot treatments to invasive plants species will be conducted as necessary during the five year monitoring period.

During the monitoring period if the vegetation survivability is determined to be below 50% the site may require replanting of various species in order to replace the loss of vegetation. IT may be determined that various species may need to be replaced with a substitute species of determined that the site conditions warrant such a change.

7.0 LONG TERM MANAGEMENT AND SITE PROTECTION INSTRUMENT

Kenton County has noted that the primary concern will be over mowing of the properties adjacent to the proposed mitigation site in order to keep a clean landscaped look in the area. The final proposed planting plan developed from Kenton County shall include the location of habitat restoration signage along the mitigation area boundary to identify the areas to be left in a natural state.

As previously stated, the mitigation plan at the 13 Mitigation Sites includes the planting and enhancement of 10.37 acres of land to achieve 9.02 acres of bottomland hardwood mitigation in addition to 6.45 acres of upland planting. All of the land proposed for use to meet the mitigation requirements for the project have been purchased and are currently in the ownership of Kenton County.

Kenton County will place each of the 13 proposed mitigation sites in a conservation easement using the USACE model conservation easement (Appendix C) as a template. Once this final mitigation plan is approved, Kenton County will work with the USACE to finalize and gain approval of the required conservation easement documents, which will be developed on the final approved planting plans developed by Kenton County. The USACE approval of the final site protection instrument is required prior to the instrument being executed.

The NKMB property is currently held under a conservation easement, ensuring the land will be permanently protected and managed. The conservation easements will prohibit development activities on the mitigation bank site.

8.0 ADDITIONAL REQUIREMENTS

The mitigation plan requirements will be covered by the use of an approved mitigation bank (NKMB), Kenton County (Madison Pike Flood Plain Sites), and the Kenton County Conservation District (Morning View Mitigation Site). NKMB, Kenton County, and the Kenton County Conservation District will be responsible for obtaining and executing the final approved conservation easement as well as developing the final planting plans which will be submitted to the USACE-Huntington District under a separate cover for approval upon approval of this final mitigation plan.

9.0 REFERENCES

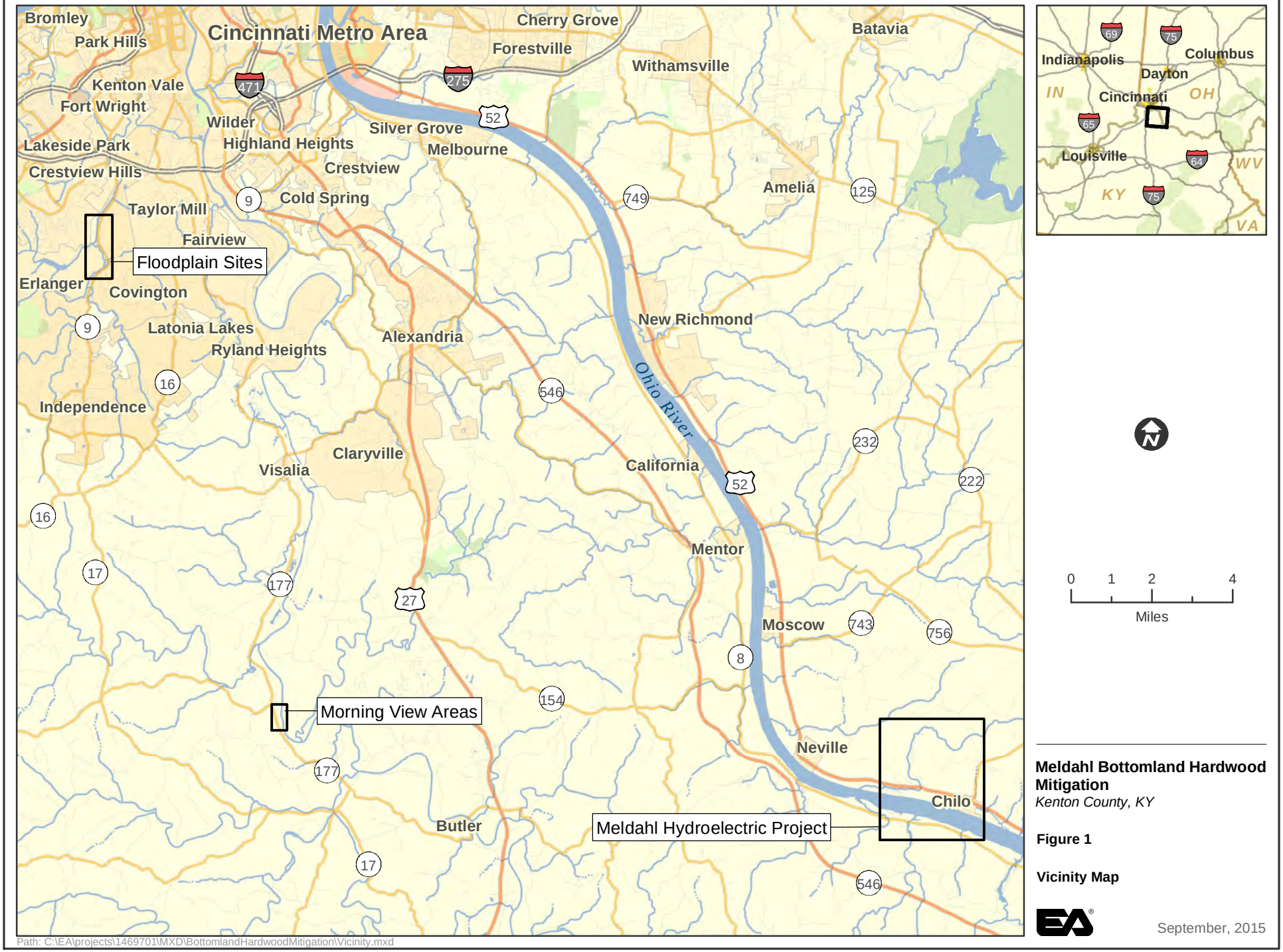
Allen, J.A., Keeland, B.D., Stanturf, J.A., Clewell, A.F., and Kennedy, H.E., Jr. 2001 (revised 2004). *A Guide to Bottomland Hardwood Restoration*. U.S. Geological Survey, Biological Resources Division Information and Technology Report USGS/BRD/ITR–2000-0011, U.S. Department of Agriculture, Forest Service, Southern Research Station, General Technical Report SRS–40, 132 p. Available [online]: http://www.nwrc.usgs.gov/wdb/pub/diglib/bottomland_hardwood.htm

Kentucky Environmental and Public Protection Cabinet (KY Environmental). 2008. *Final 2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky. Volume II. 303(d) List of Surface Water*. Division of Water <http://www.water.ky.gov/sw/tmdl/303d.htm>. Accessed January 7, 2010.

Wharton, C. H., Kitchens, W. M., Pendleton, E. C., and Sipe, T. W. 1982. *The Ecology of Bottomland Hardwood Swamps of the Southeast: A Community Profile*. U.S. Fish and Wildlife Service, Biological Services Program, Washington, DC. FWS/OBS-81/37.

APPENDIX A

Figures



Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 1

Vicinity Map

September, 2015

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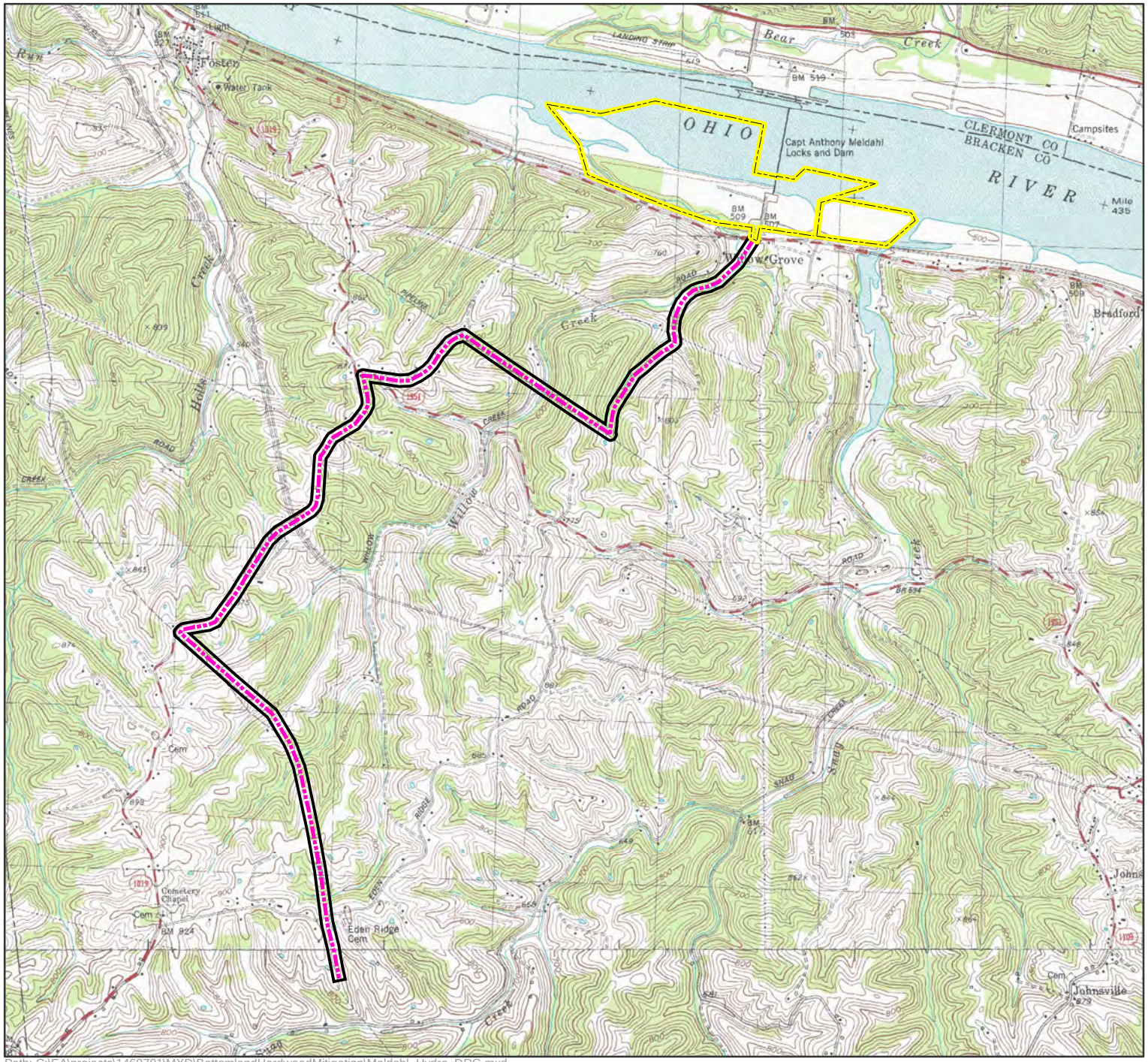


Legend

- Transmission Line
- Buffer
- Project Area

0 1,000 2,000 4,000

Feet

Proposed Meldahl Hydroelectric Project

Bracken County, KY

Figure 2

Project Area for the Proposed Meldahl Hydroelectric Project

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Meldahl_Hydro_DRG.mxd

Figure 3. Mapped Area of Interest at the Meldahl Hydroelectric Project Site as a Result of Flood Frequency and Topography Analyses

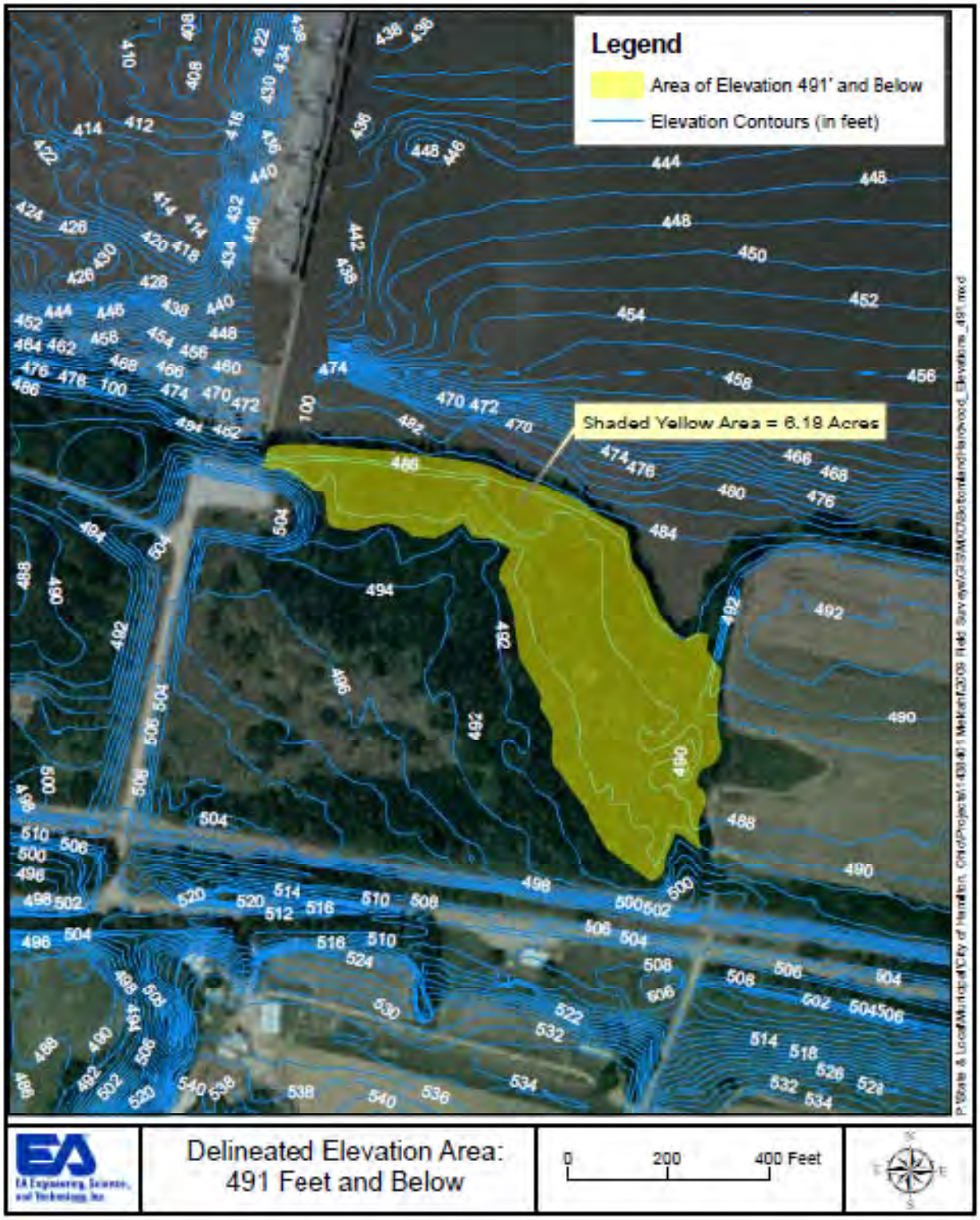
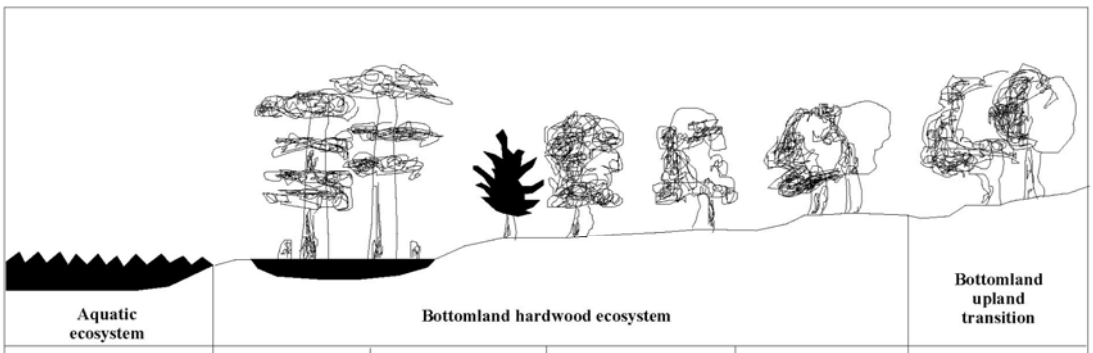
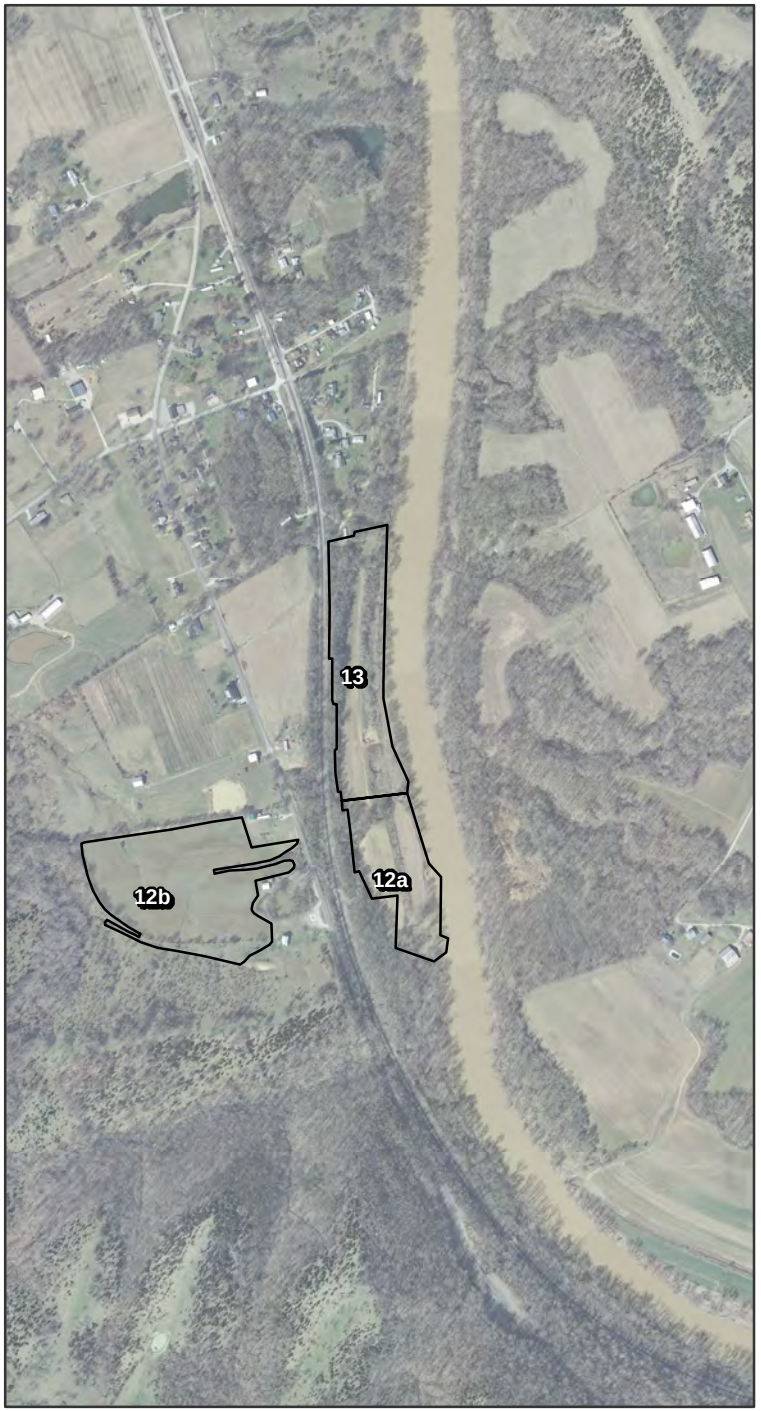
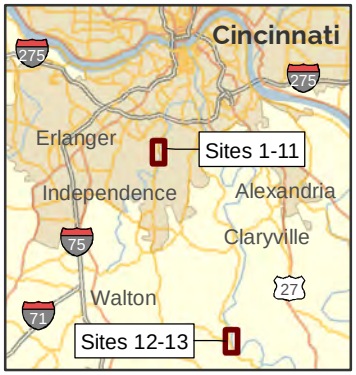


Figure 4. Characteristics of Bottomland Hardwood Ecosystems Based Upon Zones Described in Wharton et al. (1982).



Zone	I	II	III	IV	V	VI
Name	Open water	Swamp	Lower hardwood wetlands	Medium hardwood wetlands	Higher hardwood wetlands	Transition to uplands
Water modifier	Continuously flooded	Intermittently flooded	Semipermanently flooded	Seasonally flooded	Temporarily flooded	Intermittently flooded
Flooding frequency, % of year	100	~100	51 - 100	51 - 100	11 - 51	1 - 10
Flooding duration, % of growing season	100	~100	> 25	12.5 - 25	2 - 12.5	< 2





Legend

Parcel Boundary

0 250 500 1,000

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 5

Proposed Sites

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\ProposedSites.mxd

Legend

Parcel Boundary

10' Elevation Contour

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 6a

Topography, Sites 1-6

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

10' Elevation Contour

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 6b

Topography, Sites 7-9

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

10' Elevation Contour

0 25 50 100

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 6c

Topography, Sites 10 and 11

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

10' Elevation Contour

0 100 200 400

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 6d

Topography, Sites 12 and 13

September, 2015

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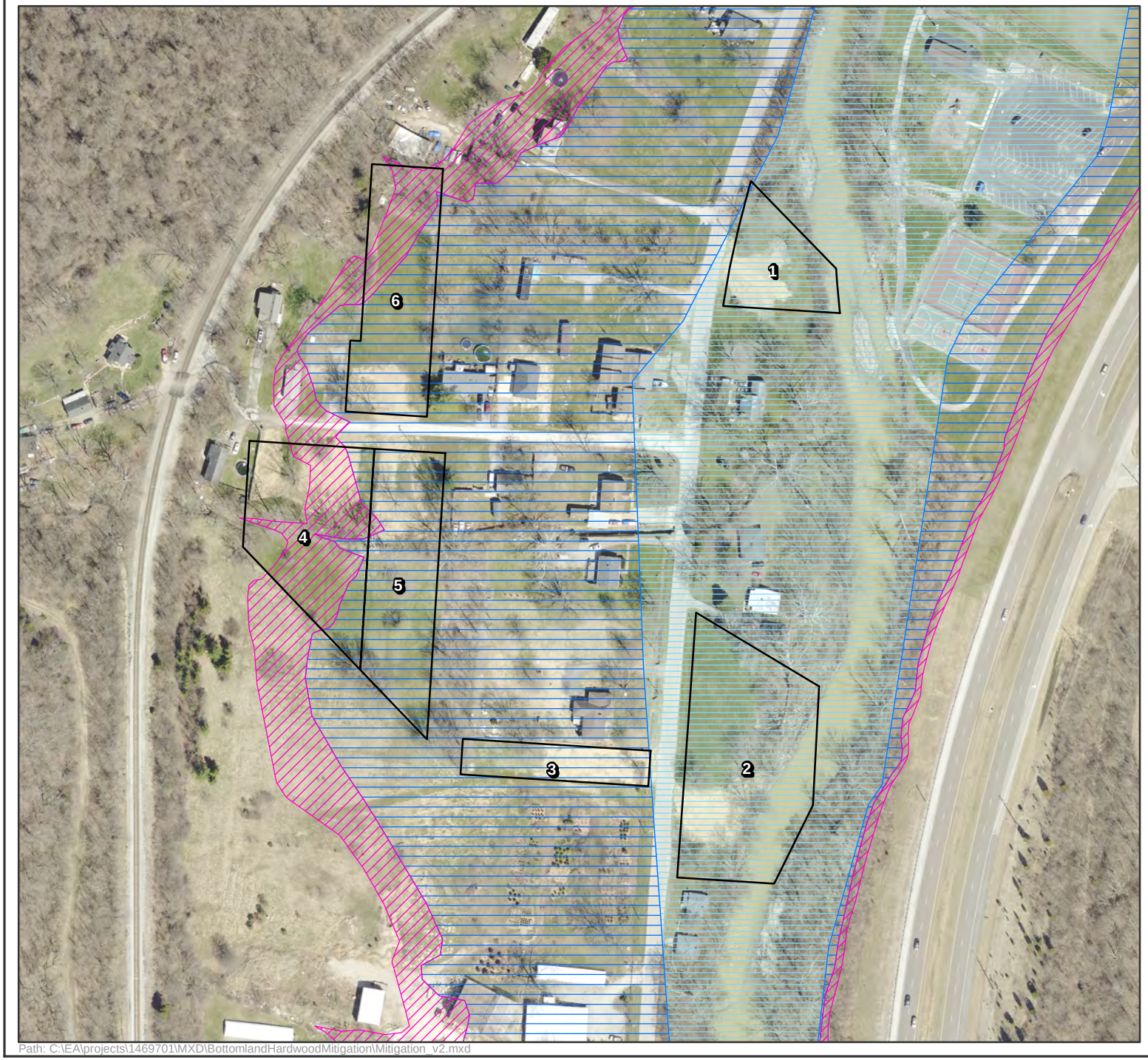


Legend

- Parcel Boundary
- 100-year Floodplain
- 500-year Floodplain
- Regulatory Floodway

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 7a

Floodplains, Sites 1-6

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

- Parcel Boundary
- 100-year Floodplain
- 500-year Floodplain
- Regulatory Floodway

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

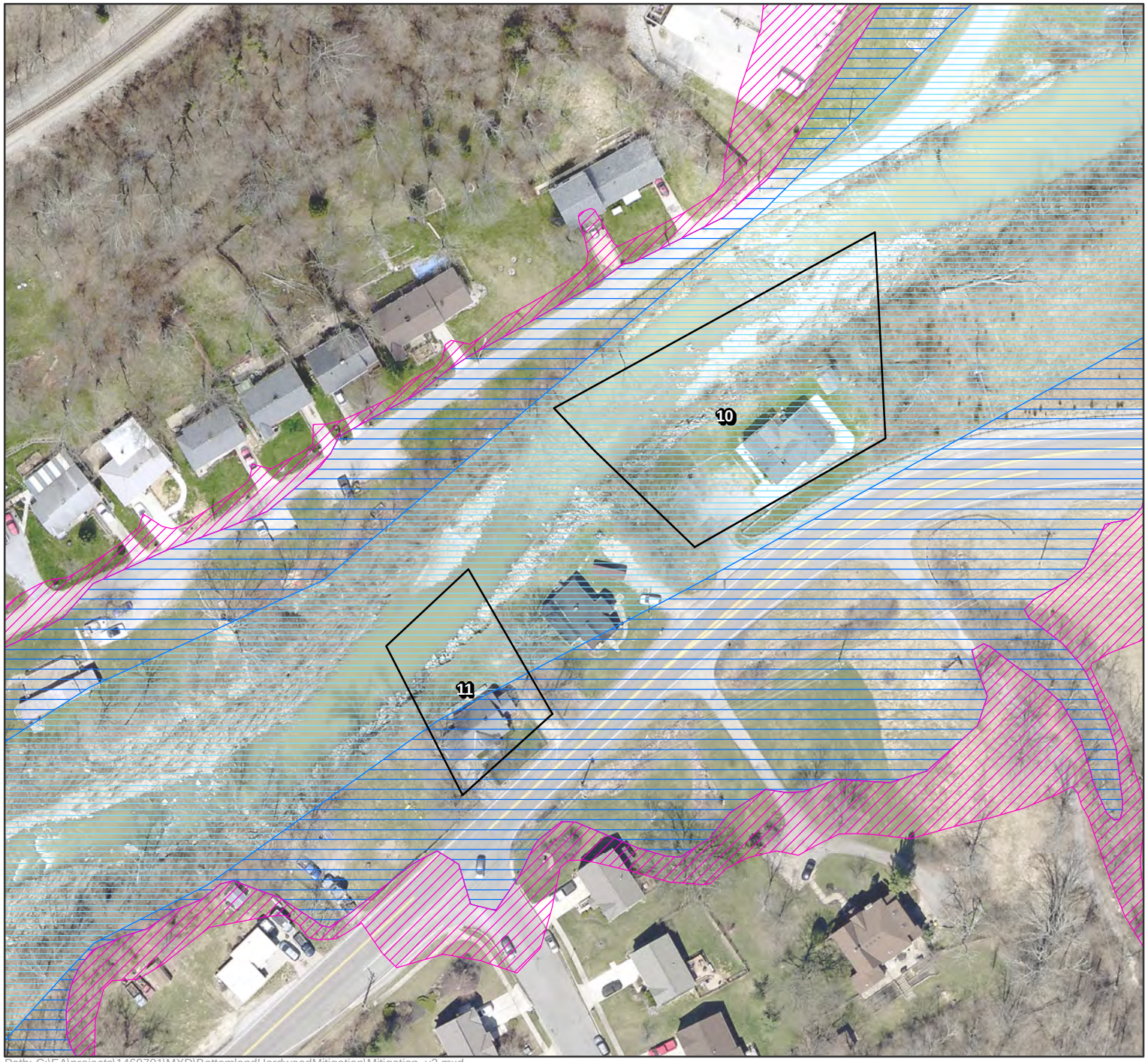
Kenton County, KY

Figure 7b

Floodplains, Sites 7-9

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd



Legend

- Parcel Boundary
- 100-year Floodplain
- 500-year Floodplain
- Regulatory Floodway

0 25 50 100

Feet

Meldahl Bottomland Hardwood Mitigation

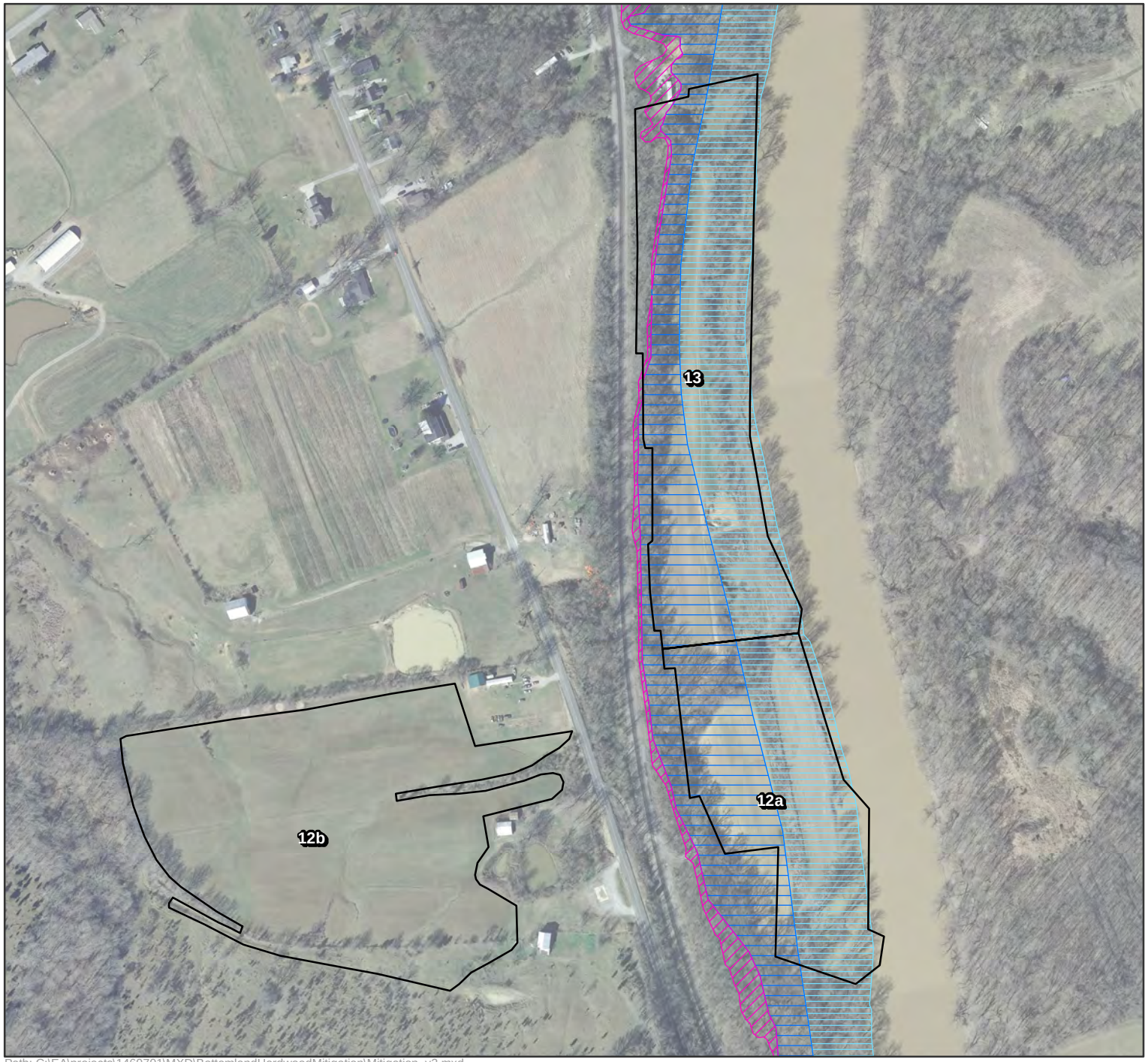
Kenton County, KY

Figure 7c

Floodplains, Sites 10 and 11

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd



Legend

- Parcel Boundary
- 100-year Floodplain
- 500-year Floodplain
- Regulatory Floodway

0 100 200 400

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 7d

Floodplains, Sites 12 and 13

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

Existing Hardwood Area

Mitigation Type

Potential Hardwood Planting

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 8a

Potential Mitigation, Sites 1-6

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

Existing Hardwood Area

Mitigation Type

Potential Enhancement

Potential Hardwood Planting

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 8b

Potential Mitigation, Sites 7-9

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd

Legend

Parcel Boundary

Mitigation Type

Potential Hardwood Planting

0 25 50 100

Feet

Meldahl Bottomland Hardwood Mitigation

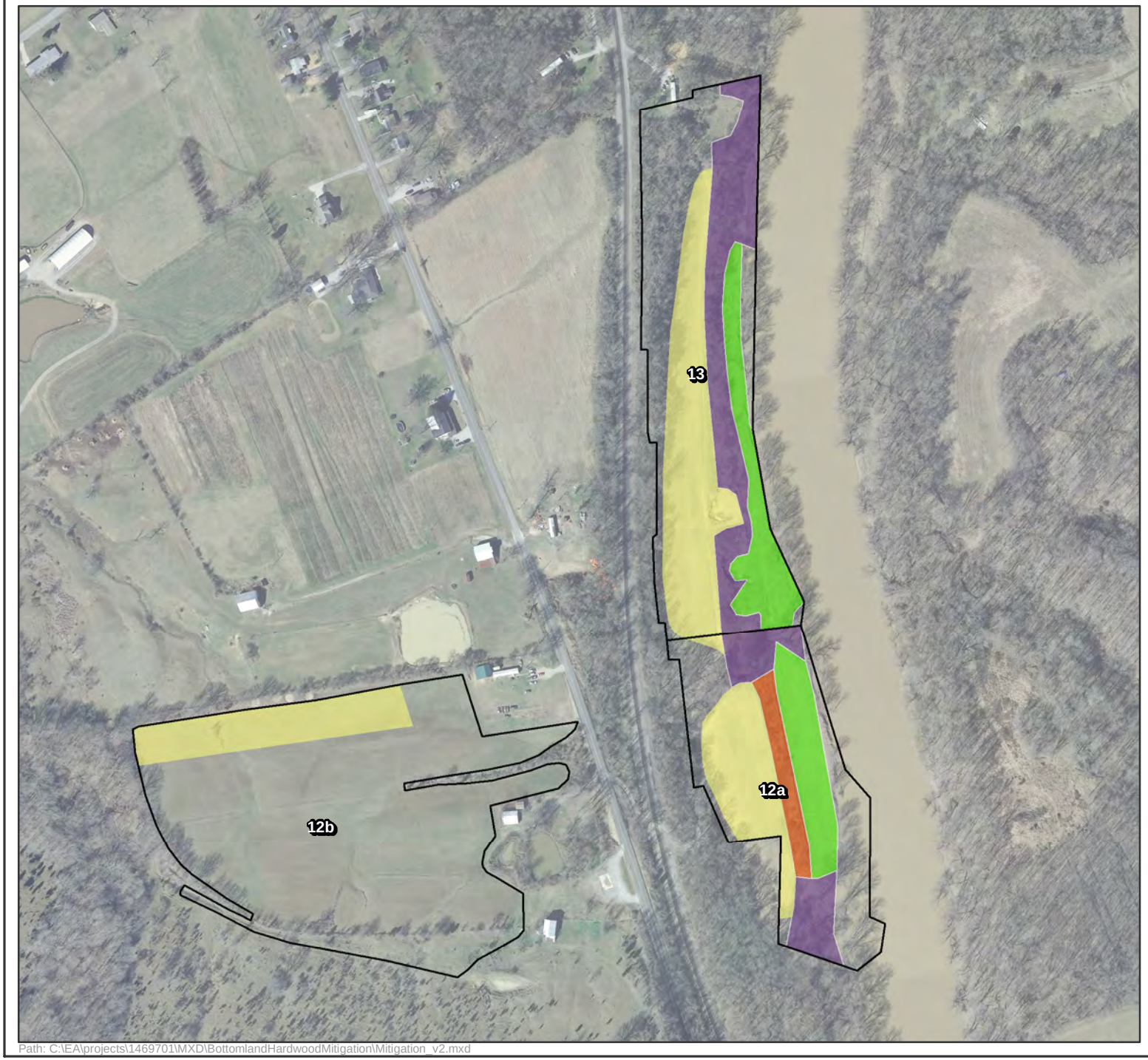
Kenton County, KY

Figure 8c

Potential Mitigation, Sites 10 and 11

September, 2015

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation_v2.mxd



Legend

Parcel Boundary

Existing Hardwood Area

Mitigation Type

Potential Enhancement

Potential Hardwood Planting

Upland Planting Area

N

0 100 200 400

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Figure 8d

Potential Mitigation, Sites 12 and 13

September, 2015

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APPENDIX B
Site Photographs

EA Engineering, Science, and Technology, Inc.

Photographic Record

Floodplain Sites
Kenton County, Kentucky

1. Overview of Site 1.

2. Thin riparian edge along Banklick Creek at Site 1.

3. Overview of Site 2.

4. View of Banklick Creek from Site 2.

5. Overview of Site 3.

6. Overview of the eastern portion of Sites 4 and 5.

EA Engineering, Science, and Technology, Inc.

Photographic Record

Floodplain Sites
Kenton County, Kentucky

7. Overview of the western portion of Site 4 and Site 5.

8. Intermittent stream channel located between the northern and southern portions of sites 4 and 5.

9. Overview of Site 6.

10. Potential enhancement area at Site 7.

11. Potential planting area at Site 7.

12. Potential enhancement area at Site 8.

EA Engineering, Science, and Technology, Inc.

Photographic Record

Floodplain Sites
Kenton County, Kentucky

13. Eastern portion of Site 9.

14. Central portion of Site 9.

15. Western portion of Site 9.

16. Overview of Site 10.

17. Overview of Site 11.

18. View of Banklick Creek from Site 11.

EA Engineering, Science, and Technology, Inc.

Photographic Record

Morning View Mitigation Areas
Kenton County, Kentucky

19. View of the Licking River along the eastern boundary of the Morning View Areas during normal river conditions.

20. Concave lower terrace of the Morning View Areas (Site 12).

21. View of the Licking River flooding the lower terrace during flood conditions on Site 12.

22. Intermittent stream channel located between Site 12 and Site 13.

23. Concave lower terrace on Site 13

24. Upper terrace of the Morning View Areas available for upland planting

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Photographic Map 1

July, 2014

Legend

Site Boundary

10' Elevation Contour

0 50 100 200

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Photographic Map 2

July, 2014

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation.mxd

Legend

Site Boundary

10' Elevation Contour

0 25 50 100

Feet

Meldahl Bottomland Hardwood Mitigation

Kenton County, KY

Photographic Map 3

July, 2014

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation.mxd

Meldahl Bottomland Hardwood Mitigation
Kenton County, KY

Photographic Map 4

July, 2014

Path: C:\EA\projects\1469701\MXD\BottomlandHardwoodMitigation\Mitigation.mxd

APPENDIX C
USACE Model Conservation Easement

Charleston District Conservation Easement Model of September 2010
See http://www.sac.usace.army.mil for latest edition of this model.

STATE OF SOUTH CAROLINA CONSERVATION EASEMENT AND ACCEPTANCE

COUNTY OF _____

THIS INDENTURE, is made this _____ day of _____, 20____, by and between _____ ("Grantor(s)"), of _____, South Carolina, and _____, ("Grantee(s)"), of _____, South Carolina.

WHEREAS, Grantor is the owner in fee simple of certain real property *["real property" includes surface waters and wetlands, any interest in submerged lands, uplands, associated riparian/littoral rights*] located in _____ County, South Carolina, more particularly described [*description of tract must include: 1) acreage, and 2) reference the surveyed plat(s) required below*] ("Protected Property");

WHEREAS, Grantor desires to convey to the Holder a conservation easement placing certain limitations and affirmative obligations on the Protected Property for the protection of wetlands, scenic, resource, environmental, and other values, and in order that the Protected Property shall remain substantially in its natural condition forever;

WHEREAS, Holder is qualified to hold a conservation easement, and is either
(a) a governmental body empowered to hold an interest in real property under the laws of this State or the United States; or
(b) a charitable, not-for-profit or educational corporation, association, or trust [*, qualified under § 501(c)(3) and §170 (h) of the Internal Revenue Code*], the purposes or powers of which include one or more of the purposes (a) - (d) listed below;

(a) retaining or protecting natural, scenic, or open-space aspects of real property;
(b) ensuring the availability of real property for recreational, educational, or open-space use;
(c) protecting natural resources;
(d) maintaining or enhancing air or water quality.

WHEREAS, Grantor and Holder agree that third-party rights of enforcement shall be held by the U.S. Army Corps of Engineers, Charleston District and the S.C. Department of Health and Environmental Control ("Third-Parties," to include any successor agencies), and may be exercised through the appropriate enforcement agencies of the United States and the State of South Carolina, and that these rights are in addition to, and do not limit, the rights of enforcement under Department of the Army permit number _____, or any permit or certification issued by the Third-Parties.

[Insert for approved mitigation banks: WHEREAS, the Protected Property has been approved by the Third-Parties for use as a mitigation bank, to be known as _____ Mitigation Bank;]

COVENANTS, TERMS, CONDITIONS, AND RESTRICTIONS

A. PURPOSE

1. The purpose of this Conservation Easement is to ensure the Property will be preserved in a "Natural Condition", as defined herein in perpetuity and to prevent any use of the Property that will materially impair or interfere with the Conservation Values of the property (the "Purpose"). Grantor intends that this Conservation Easement will confine the use of the Property to such activities, including without limitation, those involving the restoration, enhancement, and/or preservation of aquatic resources in a manner consistent with the conservation purposes of this Conservation Easement.

2. The term "natural condition," as referenced in the preceding paragraph and other portions of this conservation easement, shall mean the condition of the property, as it exists at the time this Conservation easement is executed, as well as future restoration, enhancement, or other changes to the property that occur directly as a

result of the compensatory mitigation measures required by section 404 Permit(s) pursuant [to the Mitigation Banking Instrument [*and/or described in the Final Mitigation and Monitoring Plan*] dated, _____, 20__ ("Mitigation Plan"), the cover page and Executive Summary of which are attached as Exhibit "_," including implementation, maintenance, and monitoring activities (collectively, "Compensatory Mitigation").

3. **Baseline Documentation**. The Current Conditions (which may or may not include restoration and enhancement efforts pursuant to compensatory mitigation activities), of the Property as of the date of this Deed are further documented in a "Present Conditions Report," dated,_____, 20__ and prepared by [*preparer's name*], which report is acknowledged as accurate by Grantor and Grantee. The present conditions report includes:

(a) a current aerial photograph of the Protected Property at an appropriate scale taken as close as possible to the date the donation is made;

(b) on-site photographs taken at appropriate locations on the Protected Property, including of major natural features; and,

(c) a surveyed plat of the Protected Property showing all relevant property lines, all existing man-made structures, improvements, features, and major, distinct natural features such as waters of the United States, and shall be recorded in the RMC office for each county in which the Protected Property is situated prior to the recording of this Conservation Easement, and is recorded at [insert book and page references, county and date of recording]

(d) [etc. - insert any additional documentation which may be used to evidence the natural condition of the ` Protected Property]

The Present Conditions Report has been provided to both parties and will be used by Grantee to assure that any future changes in the use of the Property will be consistent with the terms of this Deed. However, the Present Conditions Report is not intended to preclude the use of other evidence to establish the condition of the Property as of the date of this Deed.

4. **Baseline Documentation Update**. After the completion of the compensatory mitigation activities on the protected property, Grantor, grantee, and third-parties agree that the baseline documentation can and should be updated to reflect the new conditions of the protected property. In the event that such an update is needed, grantor agrees to provide such necessary update, including photographs, narratives, and any other data needed to accurately reflect the conditions of the protected property.

5. Grantor certifies to Third Parties and Grantee that to the Grantors actual knowledge, there are no previously granted easements existing on the property that interfere or conflict with the Purpose of this Conservation Easement as evidenced by the title Report attached at "Exhibit _."

6**.** **Current Liens**. **[*fill in as appropriate*]** At the time of conveyance of this Easement, the Property is subject to a Mortgage or Deed of Trust, the holder of which has agreed, by separate instrument, a copy of which is attached hereto as **Exhibit __**, to subordinate its rights in the Property to the extent necessary to permit the Trust to enforce the purposes of this Easement in perpetuity and to prevent any modification or extinguishment of this Easement Deed by the exercise of any rights of the Deed of Trust holder.

NOW THEREFORE, for the foregoing consideration, and in further consideration of the restrictions, rights, and agreements herein, Grantor hereby conveys to Holder a conservation easement over the Protected Property consisting of the following:

B. PROHIBITED USES

Any activity on or use of the property inconsistent with the Purpose of this Conservation Easement and not reserved as a right of Grantor is prohibited. These Restrictions shall run with the land and be binding on Grantor's heirs, successors, administrators, assigns, lessees, or other occupiers and users, and are subject to the Reserved Rights which follow. The Following uses by Grantor, Grantee, their respective guests, agents, assigns, employees, representatives, successors, and third parties are expressly prohibited on the Property except as otherwise provided herein or unless specifically provided for in the Section 404 Permit and any amendments thereto, the Mitigation

Plan, and any easements and reservations of rights in the chain of title to the property at the time of this conveyance (as set forth on Exhibit __):

1. **General**. There shall be no filling, flooding, excavating, mining or drilling; no removal of natural materials; no dumping of materials; and, no alteration of the topography in any manner.

2. **Waters and Wetlands**. In addition to the General restrictions above, there shall be no draining, dredging, damming or impounding; no changing the grade or elevation, impairing the flow or circulation of waters, reducing the reach of waters; and, no other discharge or activity requiring a permit under applicable clean water or water pollution control laws and regulations, as amended.

3. **Trees/Vegetation**. There shall be no clearing, burning, cutting or destroying of trees or vegetation, except as expressly authorized in the Reserved Rights; there shall be no planting or introduction of non-native or exotic species of trees or vegetation.

4. **Activities**. No industrial activities, commercial activities, residential activities, or agricultural activities (including livestock grazing) shall be undertaken or allowed.

5. **Structures**. There shall be no construction, erection, or placement of buildings, billboards, or any other structures, nor any additions to existing structures.

6. **New Roads**. There shall be no construction of new roads, trails or walkways without the prior written approval of the Holder and Third-Parties, including of the manner in which they are constructed.

7. **Utilities**. There shall be no construction or placement of utilities or related facilities without the prior written approval of Holder and Third-Parties.

8. **Pest Control**. There shall be no application of pesticides or biological controls, including for problem vegetation, without prior written approval from the Holder and Third-Parties.

9. **Subdivision**. There shall be no legal or de facto division, subdivision or portioning of the property.

10. **Other Prohibitions**. Any other use of, or activity on, the Protected Property which is or may become inconsistent with the purposes of this grant, the preservation of the Protected Property substantially in its natural condition, or the protection of its environmental systems, is prohibited.

[11. *Additional, case-specific restrictions may need to be inserted*]

C. GRANTEE'S RIGHTS

To accomplish the Purpose of this Conservation Easement, Grantor, its successor and assign hereby grants and conveys the following rights to Grantee and Third Parties.

1. To preserve and protect the Conservation Values of the Property, including enforcing the terms of this Conservation Easement in order to assure the protected property remains in its "natural condition," defined herein, in perpetuity.

2. To enter upon the property at reasonable times in order to monitor compliance with and to otherwise enforce the terms of this Conservation Easement.

3. To prevent any activity on or use of the property that is inconsistent with the Purpose of this Conservation Easement and to require the restoration of such areas or features of the Property that may be damaged by any act, failure to act, or any use that is inconsistent with the Purpose of this Conservation Easement.

4. All mineral, air, and water rights necessary to protect and sustain the biological resources of the Property, provided that any exercise or sale of such rights by Grantee shall not result in conflict with the Conservation Purpose.

5. All present and future development rights allocated, implied, reserved or inherent in the properties; such rights are hereby terminated and extinguished, and may not be used or transferred to any portion of the Properties.

6. The right to enforce by means, including, without limitation, injunctive relief, the terms and conditions of this Conservation Easement.

D. GRANTOR'S RESERVED RIGHTS

Notwithstanding the foregoing Restrictions, Grantor reserves for Grantor, its heirs, successors, administrators, and assigns the following Reserved Rights, which may be exercised upon providing prior written notice to Holder and to Third-Parties, except where expressly provided otherwise:

1. **Landscape Management**. Landscaping by the Grantor to prevent severe erosion or damage to the Protected Property or portions thereof, or significant detriment to existing or permitted uses, is allowed, provided that such landscaping is generally consistent with preserving the natural condition of the Protected Property.

2. **Forest Management**. Harvesting and management of timber by Grantor is limited to the extent necessary to protect the natural environment in areas where the forest is damaged by natural forces such as fire, flood, storm, insects or infectious organisms. *[Additional language related to fire management plans may be added as necessary]* Such timber harvest and management shall be carried out in accordance with Best Management Practices approved by the South Carolina Forestry Commission or successor agency, as amended.

3. **Recreation**. Grantor reserves the right to engage in any outdoor, non-commercial recreational activities, including hunting (excluding planting or burning) and fishing, with cumulatively very small impacts, and which are consistent with the continuing natural condition of the Protected Property. No written notice required.

4. **Mineral Interests**. Grantor specifically reserves a qualified mineral interest (as defined in § 170(h)(6) of the Internal Revenue Code) in subsurface oil, gas or other minerals and the right to access such minerals. However, there shall be no extraction or removal of, or exploration for, minerals by any surface mining method, nor by any method which results in subsidence or which otherwise interferes with the continuing natural condition of the Protected Property.

5. **Road Maintenance**. Grantor reserves the right to maintain existing roads, trails or walkways. Maintenance shall be limited to: removal or pruning of dead or hazardous vegetation; application of permeable materials (e.g., sand, gravel, crushed) necessary to correct or impede erosion; grading; replacement of culverts, water control structures, or bridges; and, maintenance of roadside ditches.

6. **Vegetation, Debris, and Exotic Species Removal**. Grantor reserves the right to engage in the removal or trimming of vegetation downed or damaged due to natural disaster, removal of man-made debris, removal of parasitic vegetation (as it relates to the health of the host plant) and removal of non-native or exotic plant or animal species.

7. **Compensatory Mitigation**. Grantor reserves the right to perform any restoration, enhancement, and other wetland mitigation activities required by Section 404 permit's and/or Mitigation Banking Instruments, including the use of all equipment necessary to successfully complete any mitigation requirements contained therein.

8. **Other Reserved Rights**. Grantor reserves the right to engage in all acts or uses not prohibited by the Restrictions, and which are not inconsistent with the conservation purposes of this grant, the preservation of the Protected Property in its natural condition, and the protection of its environmental systems.
9. [*Insert for approved mitigation banks: 7. Grantor reserves the sole and unrestricted right to sell credits or other entitlements or interests in the Protected Property in order to perfect and carry out the purpose of a mitigation bank*.]

10. [Additional*, case-specific reservations may be listed, e.g., fire or wildlife management plans.*]

E. GENERAL PROVISIONS

The following General Provisions shall be binding upon, and inure to the benefit of, the Grantor, Holder and Third-Parties, and the heirs, successors, administrators, assigns, lessees, licensees and agents of each:

1. **Marking of Property.** Grantor shall install and maintain permanent signs saying "Protected Natural Area" or establish an equivalent, permanent, marking system along the boundary of any protected areas such as upland buffers, riparian zones, and aquatic resources.

2. **Rights of Access and Entry**. Holder and Third-Parties shall have the right to enter and go upon the Protected Property for purposes of inspection, and to take actions necessary to verify compliance with the Restrictions. Holder shall also have the rights of visual access and view, and to enter and go upon the Protected Property for purposes of making scientific or educational observations and studies, and taking samples, in such a manner as will not disturb the quiet enjoyment of the Protected Property by Grantor. No right of access or entry by the general public to any portion of the Protected Property is conveyed by this Conservation Easement.

3. **Enforcement**. In the event of a breach of the Restrictions by Grantor or another party, the Holder or one of the Third-Parties must notify the Grantor in writing of the breach. The Grantor shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to swiftly correct the conditions constituting the breach. If the Grantor fails to take such corrective action within thirty (30) days, or fails to complete the necessary corrective action, the Holder and/or the Third-Parties may undertake such actions, including legal proceedings, as are necessary to effect such corrective action. Among other relief, Holder and/or Third-Parties shall be entitled to a complete restoration for any breach of the Restrictions. Breaches of General Provisions of this Conservation Easement shall be actionable without notice. The costs of a breach, correction or restoration, including the Holder's expenses, court costs, and attorneys' fees, shall be paid by Grantor, provided Grantor is determined to be responsible for the breach. Enforcement shall be at the discretion of the Holder and/or Third-Parties, and no omission or delay in acting shall constitute a waiver of any enforcement right. These enforcement rights are in addition to, and shall not limit, enforcement rights available under other provisions of law or equity, or under any applicable permit or certification.

4. **Events Beyond Grantor's Control**. Nothing herein shall be construed to authorize the Holder or Third-Parties to institute any proceedings against Grantor for any changes to the Protected Property caused by acts of God or circumstances beyond the Grantor's control such as earthquake, fire, flood, storm, war, civil disturbance, strike, the unauthorized acts of third persons, or similar causes.

5. **Obligations of Ownership**. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Protected Property. Grantor shall keep the Protected Property free of any liens or other encumbrances for obligations incurred by Grantor. Holder shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Protected Property, except as expressly provided herein. Nothing herein shall relieve the Grantor of the obligation to comply with federal, state or local laws, regulations and permits which may apply to the exercise of the Reserved Rights.

6. **Long Term Management**. Grantor will accomplish the long-term management activities identified in the approved mitigation plan, dated _____. The required activities include but are not limited to *management activities (i.e., control of invasive species, fire, etc) and the maintenance and/or replacement of structures (fences,*

ditch plugs, weirs, etc) that are critical to the long-term success of the mitigation activities as described in the approved mitigation plan.

7. **Extinguishment**. In the event that changed conditions render impossible the continued use of the Protected Property for the conservation purposes, this Conservation Easement may only be extinguished, in whole or in part, by judicial proceeding.

8. **Eminent Domain**. Whenever all or part of the Protected Property is taken in the exercise of eminent domain so as to substantially abrogate the Restrictions imposed by this Conservation Easement, the Grantor and Holder shall join in appropriate actions at the time of such taking to recover the full value of the taking, and all incidental and direct damages due to the taking.

9. **Proceeds**. This Conservation Easement constitutes a real property interest immediately vested in Holder. In the event that all or a portion of this Protected Property is sold, exchanged, or involuntarily converted following an extinguishment or the exercise of eminent domain, Holder shall be entitled to the fair market value of this Conservation Easement. The parties stipulate that the fair market value of this Conservation Easement shall be determined by multiplying the fair market value of the Protected Property unencumbered by this Conservation Easement (minus any increase in value after the date of this grant attributable to improvements) by the ratio of the value of this easement at the time of this grant to the value of the Protected Property (without deduction for the value of this Conservation Easement) at the time of this grant. The values at the time of this grant shall be the values used, or which would have been used, to calculate a deduction for federal income tax purposes, pursuant to Section 170(h) of the Internal Revenue Code (whether eligible or ineligible for such a deduction). Holder shall use its share of the proceeds in a manner consistent with the purposes of this Conservation Easement.

10. **Notification**. Any notice, request for approval, or other communication required under this Conservation Easement shall be sent by registered or certified mail, postage prepaid, to the following addresses (or such address as may be hereafter specified by notice pursuant to this paragraph):

To Grantor: _____ To Holder: _____
_____ _____
_____ _____

To Third Parties: U.S. Army Corps of Engineers _____
Attn: Regulatory Division _____
69A Hagood Avenue _____
Charleston, South Carolina 29403

9. **Assignment**. This Conservation Easement is transferable, but only to a qualified holder under 501 (C)(3) and § 170(h) of the Internal Revenue Code as described herein. As a condition of such transfer, the transferee shall agree to all of the restrictions, rights, and provisions herein, and to continue to carry out the purposes of this Conservation Easement. Assignments shall be accomplished by amendment of this Conservation Easement under paragraph 12. Grantee shall notify Third Parties at least 60 days prior to any such assignment or transfer.

10. **Failure of Holder**. If at any time Grantee is unable or fails to enforce this Conservation Easement, or if Grantee ceases to be a qualified holder under §501(c)(3) and § 170(h) of the Internal Revenue Code, and if within a reasonable period of time after the occurrence of one of these events the Grantee fails to make an assignment pursuant to paragraph 9, then the Holder's interest shall become vested in another qualified holder in accordance with an appropriate (e.g., cy pres) proceeding in a court of competent jurisdiction.

11. **Subsequent Transfer**. Grantor agrees to incorporate the terms of this Conservation Easement in any deed or other legal instrument which transfers any interest in all or a portion of the Protected Property. Grantor agrees to provide written notice of such transfer to Grantee and Third Parties at least 60 days prior to the date of transfer. The

failure of Grantor to comply with this paragraph shall not impair the validity or enforceability of this Conservation Easement.

12. **Amendment**. This Conservation Easement may be amended, but only in writing signed by all parties hereto, and provided such amendment does not affect the purpose of this Conservation Easement or the status of the Grantee under any applicable laws, including S.C. Code Title 7, Chapter. Any amendments must be consistent with the conservation purposes of this grant.

13. **Severability**. Should any separable part of this Conservation Easement be found void or unenforceable by a court of competent jurisdiction, the remainder shall continue in full force and effect.

14. **Warranty**. Grantor warrants that it owns the Protected Property in fee simple, and that Grantor either owns all interests in the Protected Property which may be impaired by the granting of this Conservation Easement or that there are no outstanding mortgages, tax liens, encumbrances, or other interests in the Protected Property which have not been expressly subordinated to this Conservation Easement. Grantor further warrants that Holder shall have the use of and enjoy all the benefits derived from and arising out of this Conservation Easement.

15. **Habendum Clause**. To have and to hold, this Easement together with all and singular the appurtenances and privileges belonging or in any way pertaining thereto, either in law or equity, either in possession or expectancy, for the proper use and benefit of the Grantee, its successors and assigns, forever.

[Signature Pages Attached]

IN WITNESS WHEREOF, Grantor and Grantee have executed this Conservation Easement, and the Third-Parties have approved this Conservation Easement, on the date written above. By its execution and acceptance of this Conservation Easement, Grantee accepts the third-party rights of enforcement herein.

SIGNED, SEALED AND
DELIVERED IN THE PRESENCE OF:

GRANTOR:

_____ Signature: _____
(Witness)

_____ _____
(Witness) [type/print name of grantor]

STATE OF SOUTH CAROLINA)
) ss.
COUNTY OF _____)

I, a Notary Public, do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

WITNESS my hand and seal this _____ day of _____, 20____.

_____(S
ignature of Notary Public)

_____
(Typed/Printed name of Notary Public)

NOTARY PUBLIC FOR SOUTH CAROLINA
My Commission Expires: _____

Continuation of Signature Page
For Deed of Conservation Easement

GRANTEE:

_____ Signature: _____
(Witness)

_____ _____
(Witness) [type/print name of grantee]

_____
[Title and Organization]

STATE OF SOUTH CAROLINA)
) ss.
COUNTY OF _____)

I, a Notary Public, do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

WITNESS my hand and seal this _____ day of _____, 20____.

_____
(Signature of Notary Public)

_____
(Typed/Printed name of Notary Public)

NOTARY PUBLIC FOR SOUTH CAROLINA
My Commission Expires: _____

Approval by Third-Parties

U.S. Army Corps of Engineers,
Charleston District,

By: _____

_____
[type/print name]

Title: _____

S.C. Department of Health and
Environmental Control

By: _____

_____
[type/print name]

Title: _____

STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

May 4, 2009

Mr. Michael Perry
City of Hamilton, Ohio
345 High Street
Hamilton, OH 45011

Re: Water Quality Certification #2009-018-8
Meldahl Hydroelectric Project
AI No.: 70871
Activity ID: APE20080003
Ohio River
Bracken County, Kentucky

Dear Mr. Perry:

Pursuant to Section 401 of the Clean Water Act (CWA), the Commonwealth of Kentucky certifies it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 5, established pursuant to Sections 301, 302, 303, 304, 306, and 307 of the CWA, will not be violated by the above referenced project provided that the U.S. Army Corps of Engineers authorizes the activity under 33 CFR part 330, and the attached conditions are met.

All future correspondence on this project must reference **AI No. 70871**. **The attached document is your official Water Quality Certification; please read it carefully**. If you should have any questions concerning the conditions of this water quality certification, please contact Barbara Scott of my staff by calling (502) 564-3410.

Sincerely,

Alan Grant

Alan Grant, Supervisor
Water Quality Certification Section
Kentucky Division of Water

AG:BJS
Attachment

COPIES SENT TO:

Lee Andrews, USFWS: Frankfort

Mike Hardin, KDFWR: Frankfort

Debra Roby, Jennings, Strouss, and Salmon, PLC

Jeffrey Boltz, EA Engineering, Science, and Technology

Ken Halstead, USACE: Huntington

Water Quality Certification

Meldahl Hydroelectric Project
Facility Requirements
Permit Number: WQC #2009-018-8
Activity ID No.: APE20080003

STRC0000000002 (Hydroelectric power facility) Construction of hydroelectric power facility at Meldahl Dam by the City of Hamilton, Ohio:

Narrative Requirements:

Condition No.	Condition
T-1	The work approved by this certification shall be limited to the construction of a hydroelectric project at the Captain Anthony Meldahl Locks and Dam on the Ohio River, mile 436.2: - Fill of 100 linear feet for the approach channel - Excavation of 940 linear feet for the approach channel - Fill of 900 linear feet for the construction of a coffer dam - Excavation of 820 linear feet for the tailrace channel - Excavation and fill of 450 linear feet for the navigation groin - Fill of 0.72 acres of wetland with spoil material. [Clean Water Act]
T-2	All work performed under this certification shall adhere to the design and specifications set forth in the following documents: - The Application for Permit to Construct Across or Along a Stream and/or Water Quality Certification, submitted November 6, 2008. - Request for Water Quality Certification, dated May 12, 2008. - Dissolved Oxygen Monitoring Plan, Final Plan, dated October, 2008. - Final Plans under License Articles 401, 403 and 405 P-12667 Meldahl Hydroelectric Project, dated December 2008. - Response to December 2, 2008 Request for Additional Information, dated December 19, 2008 - Application for License for Major Project -- Existing Dam, City of Hamilton, Ohio, FERC Project No. 12667, dated May 12, 2006. [Clean Water Act]
T-3	Dissolved oxygen concentration shall be maintained at 5.0 mg/L or above, daily average, with an instananeous minimum of no less than 4.0 mg/L. With respect to the operation of the hydropower units during periods of low river dissolved oxygen, the City of Hamilton will ensure that the dam and hydropower units will produce as high or higher dissolved oxygen as the river background upstream from the dam and hydropower units. [Clean Water Act Section 404]
T-4	Items of agreement between the interests represented by the Kentucky Department of Fish and Wildlife, the U.S. Army Corps of Engineers, the Kentucky Environmental and Public Protection Cabinet, and the Ohio River Valley Water Sanitation Commission relating to water quality will be met, consistent with license articles. [Clean Water Act]
T-5	Should evidence of stream use impairment or violation of water quality standards occur as a result of the construction, operation, or maintenance of the hydroelectric project (either from a spill or other forms of water pollution), the City of Hamilton will notify the Kentucky Emergency Response Team, the Kentucky Division of Water's Water Quality Branch, and the Florence Regional Office immediately. [Clean Water Act]
T-6	The project will be constructed in such a manner as to control, to the extent practicable, all sources of pollution. [Clean Water Act]

STRC0000000002 (continued):

Narrative Requirements:

Condition No.	Condition
T-7	The applicant is responsible for preventing degradation of waters of the Commonwealth from soil erosion. An erosion and sedimentation control plan must be designed, implemented, and maintained in effective operating condition at all times during construction. [Clean Water Act]
T-8	The Division of Water reserves the right to modify or revoke this certification should it be determined that the activity is in noncompliance with any condition set forth in this certification. [Clean Water Act]
T-9	If construction does not commence within three years of the date of this letter, this certification will become void. A letter requesting a renewal should be submitted. [Clean Water Act]
T-10	Other permits may be required from the Division of Water for this project. If this project takes place within the floodplain, a permit may be required from the Surface Water Permits Branch. The contact person is Ron Dutta. If this project will disturb one acre or more of land, a KPDES general storm water permit will be required from the Surface Water Permits Branch. The contact person is Allen Ingram. Both can be reached at 502/564-3410. [Clean Water Act]

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Kentucky and Ohio

Local offices

Ohio Ecological Services Field Office

(614) 416-8993

(614) 416-8994

4625 Morse Road, Suite 104
Columbus, OH 43230-8355

Kentucky Ecological Services Field Office

(502) 695-0468
(502) 695-1024

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an

office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Gray Bat Myotis grisescens Wherever found This species only needs to be considered if the following condition applies: • The project area includes potential gray bat habitat. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat Myotis sodalis Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat Myotis septentrionalis Wherever found This species only needs to be considered if any of the following conditions apply: • The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species. • Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS

Clubshell Pleurobema clava — Endangered

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3789

Fanshell Cyprogenia stegaria — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4822

Northern Rifflesheil Epioblasma rangiana — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/527

Orangefoot Pimpleback (pearlymussel) Plethobasus cooperianus — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1132

Pink Mucket (pearlymussel) Lampsilis abrupta — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7829

Rabbitsfoot Quadrula cylindrica cylindrica — Threatened

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/5165

Ring Pink (mussel) Obovaria retusa — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4128

Rough Pigtoe Pleurobema plenum — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6894

Sheepnose Mussel Plethobasus cyphyus — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6903

Snuffbox Mussel Epioblasma triquetra — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4135

Spectaclecase (mussel) Cumberlandia monodonta — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7867

Insects

NAME — STATUS

Monarch Butterfly Danaus plexippus — Candidate
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 23 to Jul 20
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

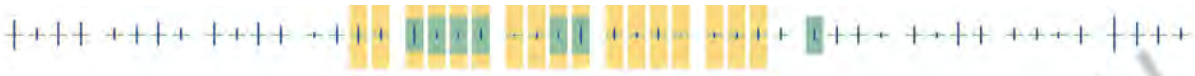
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Cerulean Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

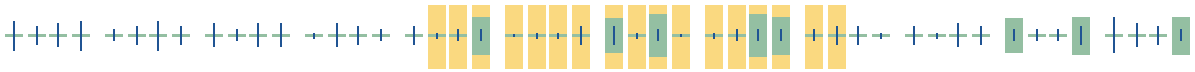
Kentucky Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



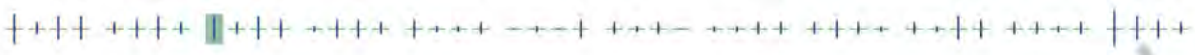
Prairie Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prothonotary Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-headed Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rusty Blackbird BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Wood Thrush BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or

longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Coastal Barrier Resources System

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

THERE ARE NO KNOWN COASTAL BARRIERS AT THIS LOCATION.

Data limitations

The CBRS boundaries used in IPaC are representations of the controlling boundaries, which are depicted on the official CBRS maps. The boundaries depicted in this layer are not to be considered authoritative for in/out determinations close to a CBRS boundary (i.e., within the "CBRS Buffer Zone" that appears as a hatched area on either side of the boundary). For projects that are very close to a CBRS boundary but do not clearly intersect a unit, you may contact the Service for an official determination by following the instructions here: https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation

Data exclusions

CBRS units extend seaward out to either the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward extent of the units is not shown in the CBRS data, therefore projects in the offshore areas of units (e.g., dredging, breakwaters, offshore wind energy or oil and gas projects) may be subject to CBRA even if they do not intersect the CBRS data. For additional information, please contact CBRA@fws.gov.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and

nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.