Block 10d: For regional sewage collection and treatment facilities, include a discussion of the technical feasibility, cost effectiveness and availability, and long-range plans outlined in state or local water quality management planning documents and applicable facility planning documents. (OAC 3745-1-05(C)(6)(i)):

The proposed project does not involve sewage collection or treatment facilities.

Block 10e: To the extent that information is available, list and describe any government and/or privately sponsored conservation projects that exist or may have been formed to specifically target improvement of water quality or enhancement of recreational opportunities on the affected water resource. (OAC 3745-1-05(B)(2)(g)):

Agency coordination (USACE, OEPA, USFWS, ODNR, FHWA, SHPO) completed during the required environmental coordination did not reveal any governmental or private protection programs targeting surface waters affected by the project.

Review of OEPA, ODNR, and a number of private conservation websites did not reveal any other governmental or private protection programs targeting surface waters affected by the project. Websites reviewed during this research included those administered by the OEPA Division of Surface Water; OEPA Division of Drinking and Ground Waters; ODNR Water Inventory Program; ODNR Water Planning Program; Friends of the Great Miami, and Miami Conservation District.

Friends of the Great Miami (FGOM) was contacted to get their opinion on the proposed project. A message was left for a board member and former president of FGOM requesting a response, to date no response has been received.

Sarah Hippensteel Hall, Manager, Watershed Partnership, The Miami Conservancy District (MCD), was contacted to determine how the proposed stream crossing would impact the watershed or any proposed preservation or conservation efforts of MCD in the area. A discussion of the proposed project including the general area and potential alternatives were provided to Mrs. Hippensteel Hall. Mrs. Hippensteel Hall indicated that she and LMRP are always in favor of projects that help connect people and the natural resources within the Great Miami River watershed. Mrs. Hippensteel Hall stated that she would obviously like to see project be completed with the minimal amount of impact to the watershed. Generally Mrs. Hippensteel Hall did not see any issues with the proposed project and also didn't believe the degradation that is anticipated by the project would have a detrimental impact to the watershed.

Review of the OEPA Division of Surface Water Watershed Assessment Unit (WAU) Summary indicated that the project area is located within the Great Miami River (Attachment H). The WAU contains streams that are listed with aquatic life uses of Exceptional Warmwater Habitat (EWH) with impairments consisting of natural conditions and nutrients; due to dam or impoundments and natural resources.

Block 10f: Provide an outline of the costs of water pollution controls associated with the proposed activity. This may include the cost of best management practices to be used during construction and operation of the project. (OAC 3745-01-05(C)(6)(g)):

Estimated costs of water pollution controls by alternative are summarized below:

Table 4a: EROSION AND SEDIMENT CONTROL MEASURES - Preferred Alternative					
Item No.	**Item Description**	**Quantity**	**Units**	**Unit Cost**	**Total**
1	Rock Channel Protection, Type B, Fabric Filter	1.00	CY	$75.00	$75
2	Rock Channel Protection, Type B, Agg. Filter	295.00	CY	$57.73	$17,030
3	Rock Channel Protection, Type C, Fabric Filter	20.00	CY	$85.24	$1,705
4	Seeding and Mulching	10,500.00	SY	$0.75	$7,875
5	Commercial Fertilizer	1.71	TON	$600.00	$1,026
6	Lime	2.61	ACRE	$60.00	$157
7	Water	68.00	MGAL	$1.55	$105
8	TEMP - SWPPP	1.00	LUMP	$5,000.00	$5,000
9	TEMP - Construction Seeding and Mulching	10,500.00	SY	$0.70	$7,350
10	TEMP - Filter Fabric Fence	900.00	LF	$3.00	$2,700
11	TEMP - Filter Fabric Ditch Check	82.00	LF	$8.00	$656
12	TEMP - Rock Channel Protection w/ Filter	3.00	CY	$71.00	$213
13	TEMP - Stream Protection - Silt Fence	150.00	LF	$3.00	$450
14	TEMP - Stream Protection - Seeding	833.00	SY	$0.70	$583
15	TEMP - Construction Entrance	1.00	LUMP	$1,000.00	$1,000
	Total				$45,925

Table 4b: EROSION AND SEDIMENT CONTROL MEASURES - Minimal Deg Alternative					
Item No.	**Item Description**	**Quantity**	**Units**	**Unit Cost**	**Total**
1	Rock Channel Protection, Type B, Fabric Filter	1.00	CY	$75.00	$75
2	Rock Channel Protection, Type B, Agg. Filter	295.00	CY	$57.73	$17,030
3	Rock Channel Protection, Type C, Fabric Filter	20.00	CY	$85.24	$1,705
4	Seeding and Mulching	12,654.00	SY	$0.75	$9,491
5	Commercial Fertilizer	1.71	TON	$600.00	$1,026
6	Lime	2.61	ACRE	$60.00	$157
7	Water	68.00	MGAL	$1.55	$105
8	TEMP - SWPPP	1.00	LUMP	$5,000.00	$5,000
9	TEMP - Construction Seeding and Mulching	12,556.00	SY	$1.05	$13,184
10	TEMP - Filter Fabric Fence	1,710.00	LF	$4.50	$7,695
11	TEMP - Filter Fabric Ditch Check	82.00	LF	$8.00	$656
12	TEMP - Rock Channel Protection w/ Filter	3.00	CY	$71.00	$213
13	TEMP - Stream Protection - Silt Fence	150.00	LF	$3.00	$450
14	TEMP - Stream Protection - Seeding	833.00	SY	$0.70	$583
15	TEMP - Construction Entrance	1.00	LUMP	$2,249.00	$2,249
	Total				$59,619

The difference in the best management practices (BMPs) consist of the increased need for additional seeding and mulching, temporary construction seeding and mulching, temporary filter fabric fence, and temporary construction entrance for the Minimal Degradation Alternative (MDA) versus that required for the Preferred Alternative (PA). .

Block 10g: Describe any impacts on human health and the overall quality and value of the water resource. (OAC 3745-1-05(C)(6)(c) and OAC 3745-1-54):

Preferred Alternative

The Preferred Alternative is expected to have some minor and temporary impact on human health related to safety, income, employment, air quality, and noise as reported in the final approved CE document (See Final CE document). Information concerning these impacts are summarized below. The project CE document states that there will be no relocations as a result of the proposed project. No impacts to human health from population or housing issues will result from the proposed project. The Preferred Alternative meets the project purpose and need, and will provide a connection to segments of the Great Miami River Recreation Trail.

Safety

The project proposes the construction of a stream crossing as part of a new segment of a multiuse trail. Currently along the approximate alignment of the proposed multiuse trail, pedestrians and cyclists are required to travel on the local roadways because currently no stream crossing exists. The use of local roadways for pedestrians and cyclists do not remove this traffic from the local roadways. The proposed multiuse trail and stream crossings will provide a safe crossing of the GMR.

Income and Employment

The project CE document did not report any substantial impacts to income as a result of the proposed project, and income levels would be expected to remain at current levels in the short-term. Because the construction of the stream crossing and multiuse trail would provide a connection between two existing segments of the Great Miami River Recreation Trail, potential improvement in income and employment may occur as accessibility is improved for existing and new future businesses in the local vicinity of the multiuse trail.

Air Quality

As reported in the CE document, the proposed project is located within a PM2.5 attainment and maintenance area. The project is also part of the approved and conforming State Transportation Improvement Program (STIP), and therefore, ozone issues have already been addressed. Additionally, the CE document states that a "PM analysis is not warranted because this project involves the exempt activity of "Bicycle and Pedestrian Facilities".

Multiuse trail construction for the Preferred Alternative would be expected to result in localized short-term generation of fugitive dust and emissions from construction equipment. PM2.5 particulates could increase within the immediate vicinity of the multiuse trail construction. However, standard mitigation measures will be used during construction to minimize fugitive dust generation. The Preferred Alternative was determined to have a negligible impact on regional air quality.

Noise Impacts

The Preferred Alternative is likely to increase non-motorized traffic along the proposed multiuse trail and adjacent roadways. Additionally, there are only a few noise sensitive land uses (residences) in the vicinity of the proposed project. Additionally, the CE document indicates that the project is a non-motorized, multi-use facility; therefore, it is exempt for the noise analysis requirement.

The Preferred Alternative would result in an increase in direct, negative, short-term noise levels during construction of the proposed project. However, due to the temporary nature of construction noise, no construction noise barriers are proposed for the project.

Overall Water Resource Impacts

The Preferred Alternative is not expected to result in any substantial adverse impacts to the overall quality and value of waters of the U.S. (i.e., streams), and it is not expected to result in a lowering of the existing aquatic life use for any of the features based on the following conclusions (see also Block 10b):

- The impacted stream (GMR) exhibits the characteristics of a stream feature with high aquatic value. The proposed impact to GMR, a perennial stream, will only result in a minor lowering of quality of this water resource. As a result of fill placement for the proposed project, only a minor lowering of water quality is expected for these features from loss of habitat.
- Impacts to the physical structure of the stream by the Preferred Alternative are expected to be localized. In other words, physical stream modifications will be limited to the footprint of the proposed area of the Preferred Alternative, with no adverse effects to stream functions (including hydraulics, velocity, and sediment-transport capabilities), drainage area, or aquatic community expected upstream or downstream of the support structures. It is anticipated that minor, localized, impacts to stream function may occur downstream of the project area following the installation of the in-stream fill materials (i.e., TAF).
- Impacts to the streams are expected to be offset by proposed mitigation measures (see Block 10k).
- The Preferred Alternative will not impact any waters used for public water supplies.
- The Preferred Alternative is not expected to result in the lowering of aquatic use designations in any of the streams outside the limits of the project.

<u>Minimal Degradation Alternative</u>

As this alternative would require nearly the same construction activities, impacts to human health related to water quality would be relatively the same as with the Preferred Alternative (see above). The Minimal Degradation Alternative provides increased avoidance and/or minimization of impacts to waters of the U.S. compared to the Preferred Alternative. Even though less impact to the GMR will occur through use of a partial width temporary access fill (TAF), water quality degradation will still occur from unavoidable stream impacts resulting from

the placement of fill into the stream channel. There is a need for temporary access fill (TAF) similar to that proposed in the Preferred Alternative, however the quantity is reduced for this alternative. The permanent RCP and other materials placed within the stream channel may provide habitat for macroinvertebrates and fish. Construction of the MDA requires a temporary partial width causeway that will allow for an approximate 80 ft. wide open channel allowing for natural flow and movement up and downstream of aquatic fauna within the construction corridor (See MDA Plan Sheet, Attachment F). As with the Preferred Alternative, there will be efforts to limit impacts to endangered species through compliance to the BO and ITS implementation of the Minimal Degradation Alternative. Overall, impacts to waters of the U.S. are reduced through implementing the Minimal Degradation Alternative instead of the Preferred Alternative. Implementation of the Minimal Degradation Alternative will cost more than the Preferred Alternative and, therefore, the Minimal Degradation Alternative is more environmentally sensitive, and an increase in financial burden, but still remains to be a cost-effective solution for the type of stream crossed by the project.

Non-Degradation Alternative

The Non-Degradation Alternative does not meet the transportation need in the project area for improving the safety and connection problems described previously. As described in the CE document if the proposed multiuse trail will not be constructed there will not be a safe connection for pedestrians and cycles between the existing two segments of the Great Miami River Recreation Trail, therefore not meeting the purpose and need for this project.

No direct impacts to water resources in the project area occur with the Non-Degradation Alternative.

Block 10h: Describe and provide an estimate of the important social and economic benefits to be realized through this project. Include the number and types of jobs created and tax revenues generated and a brief discussion on the condition of the local economy. (OAC 3745-1-5(B)(2)(e), and OAC 3745-1-05(C)(6)(i)):

Condition of the Local Economy

According to the Office of Strategic Research with the Ohio Department of Development (OSRODD), Miami County has steadily increased in population in the last 50 years, with an estimated population of 102,506 in 2010. The largest concentration of population in Miami County is within the limits of Troy city (25,058). Land use in Miami County is primarily Cropland (63.72%) and Forest (18.55%).

The OSRODD documents that the majority of civilian labor force in Miami County is employed in the private sector, primarily in the manufacturing industries. Major employers in Miami County include and Tool Works Inc. and Hobart. The US Census Bureau indicates that the median household income in Miami County in 2006-2010 was $51,507, placing Miami County above the median Ohio State household income of $47,358. In 2010, the per capita personal income in Miami County was $35,027. By comparison, the 2010 State of Ohio per capita personal income was $36,162.

The OSRODD, and the Bureau of Labor Statistics, indicate that unemployment in Miami County (10.5% in 2010) is above the state average (10% in 2010), and above and the national average (9.6% in 2010). The US Census Bureau also indicates that the poverty rate for Miami County (9.5%) was below the Ohio 2011 average of 14.2 percent.

Preferred Alternative

Economic Benefits Realized

Specific economic benefits to be realized as a result of the project are briefly described below.

Employment and Business Opportunities

No long-term jobs will be directly created by the project; however, economic opportunities are expected to increase through improved accessibility to the general area of the project. This improved economic base could potentially result in an increased number of employment opportunities at local businesses, and over time may promote the establishment of new industries in Miami County. Local businesses may experience a short-term employment increase related to the demands of the actual construction of the project; businesses most likely to benefit from the project include local eateries, service stations, and other businesses offering construction-related goods and services.

State and Local Tax Revenues Generated by the Project

No state or local tax revenues are expected to be generated by the proposed project.

Recreational Opportunity
According to the CE document the proposed stream crossing will link two segments of Great Miami River Recreation Trail. There is a regional and statewide effort underway by various agencies (including the Ohio Department of Natural Resource, Miami Valley Regional Planning Commission, the Miami Conservancy District, the Miami County Park District, and area cities and townships) and non-profit organizations (including Miami Valley Trails and Simon Kenton Pathfinders) to expand and link existing multi-use trails. In particular, the various groups are working together to further expand and connect the Great Miami River Recreation Trail. The proposed stream crossing will allow users to experience the natural features within Great Miami River Recreation Trail without the need to venture off designated paths or share the local roads.

Social Benefits Realized
The proposed project is not expected to directly support any major social benefits, although several indirect positive impacts are to be expected from the Preferred Alternative, as summarized below.

Accessibility of Facilities and Services
Overall, the stream crossing associated with the proposed multiuse trail project is expected to have a positive effect on local accessibility. The CE document reported that construction of the project is expected to have a positive impact on accessibility to facilities in the vicinity of the multiuse trail and along the existing segments of the Great Miami River Recreation Trail.

Community Cohesion
According to the CE document, the proposed project will not have adverse impacts on neighborhoods or communities. The project will not separate or sever any community nor will it isolate any residential or business activity. Since the project will improve cyclist and pedestrian access in the general area, it may promote cohesion between residences adjacent to Great Miami River Recreation Trail that currently do not have direct access or connection through the existing trail system.

Positive Aesthetics
Overall, the stream crossing and multiuse trail is consistent with the currently existing aesthetics of the project area. The multiuse trail will also provide additional access to viewing areas of the Great Miami River and adjacent connecting trails.

<u>Minimal Degradation Alternative</u>

The Minimal Degradation Alternative would be expected to have very similar effects on economic and social benefits as the Preferred Alternative (see above).

Non-Degradation Alternative

No social or economic benefits will be realized by construction of the Non-Degradation Alternative. This alternative does not address the transportation need in the area for improving the existing safety problems, and does not provide opportunity for an improved local economic base related to improved accessibility in the area.

Block 10i: Describe and provide an estimate of the important social and economic benefits that may be lost as a result of this project. Include the effect on commercial and recreational use of the water resource, including effects of lower water quality on recreation, tourism, aesthetics, or other use and enjoyment by humans. (OAC 3745-1-05(B)(2)(e,f), and OAC 3745-1- 05(C)(6)(e)):

Preferred Alternative

Economic Benefits Lost

As described below, it is not anticipated that any adverse economic impacts will result from the Preferred Alternative:

Employment Opportunities

No jobs will be directly lost by the proposed project and no business relocations are expected.

State and Local Tax Revenues Lost

The proposed project will not directly have an impact to State or Local Tax Revenues because the project requires only a minor impact (3.63 acres) of an area that may be used for agricultural purposes.

Displacements

The project CE document states that there will be no relocations or displacements as a result of the proposed project.

Impacts to Farmland

The CE document states that the proposed project will have minor impacts to actively farmed land, and that the proposed multiuse trail will take place within 3.63 acres of acquired right-of-way (ROW), the ROW will not limit future farming activities. Therefore, the proposed improvements will not result in a significant impact to the available actively farmed or farmable land in Miami County.

Commercial and Recreational Use

The proposed project is located entirely within acquired ROW or property under Miami County Park District and provides very limited commercial opportunities. Therefore, only very minor commercial impacts are expected from implementation of the proposed project. The existing parking area for use of the existing segment of the Great Miami River Recreation Trail north of the project area will be temporarily impacted during construction; however upon the completion use of the parking area and recreational use of the existing multiuse trail will resume. The proposed project is likely to enhance or improve recreational use within the vicinity of the project; therefore no long term recreational impacts are anticipated. Additionally, minor overall impacts resulting from the proposed project are not anticipated to lower water quality within the project area, or in other portions of the GMR, except for a possible minor, and temporary, lowering of water quality during project construction.

Social Benefits Lost
No adverse social impacts are expected as a result of construction of the Preferred Alternative. Local accessibility is expected to improve as a result of the project.

Minimal Degradation Alternative

The Minimal Degradation Alternative would be expected to have similar effects on economic and social conditions as the Preferred Alternative (see above).

Non-Degradation Alternative

The Non-Degradation Alternative does not meet the purpose and need of the project including addressing safety problems. The main benefit that would be lost as a result of this alternative is the opportunity to provide a safe and easily accessible connection to existing segments of Great Miami River Recreation Trail. Accessibility and associated economic benefits in the area, as well as improve pedestrian, cyclist, and other recreation traffic flow benefits, would not be realized.

Block 10j: Describe environmental benefits, including water quality, lost and gained as a result of this project. Include the effects on the aquatic life, wildlife, threatened or endangered species. (OAC 3745-1-05 (B)(2)(e,f), OAC 3745-1-05 (C)(6)(b) and OAC 3745-1-54):

Preferred Alternative

Environmental benefits lost as a result of the project are described in detail in Block 10b of this antidegradation evaluation and summarized in Block 10g which includes discussion of impacts to aquatic habitat, biota, and threatened and endangered species. In general, environmental benefits lost as a result of the Preferred Alternative consist of minor lowering of water quality in the GMR due to temporary placement of fill material, disturbance, and permanent fill placement.

These losses in environmental benefits are expected to be offset by the mitigation measures proposed for the Preferred Alternative (see Blocks 10g and 10k). Stream mitigation techniques to be implemented for this project are described in detail in Block 10k of this antidegradation evaluation.

Construction activities, including the installation of temporary access fill (TAF), are anticipated to begin during the autumn of 2013. A note within the construction plans state that the TAF shall be removed in its entirety and the river restored to pre-construction conditions with suitable materials upon the completion of construction activities.

Minimal Degradation Alternative

By comparison to the Preferred Alternative, the Minimal Degradation Alternative results in less impact to waters of the U.S. through avoidance and/or minimization measures incorporated into the multiuse trail design, e.g., use of a temporary partial width causeway will reduce impacts to the stream channel. The MDA, will allow for an open channel approximately 80 ft. in width that will remain unimpeded by TAF, this will allow for aquatic fauna movement within the construction corridor to occur in a segment of stream channel and substrate not impacted by construction. However, water quality degradation will still occur from the unavoidable impacts to GMR through construction of a bridge, support abutments, support pier, and RCP fill below OHWM. A proposed partial width temporary causeway will be required to construct the footings and placement of the in-stream support pier. The disturbed stream bed will be restored with suitable materials upon the completion of construction activities. Overall, impacts to waters of the U.S. are slightly reduced through implementation of the Minimal Degradation Alternative, as compared to the Preferred Alternative; however disturbance occurs to GMR in both alternatives.

Non-Degradation Alternative

The Non-Degradation Alternative will not directly impact any water resources and will not result in any direct environmental loss or gain. This alternative, however, does not meet the safe and easy accessibility needed for addressing connection issues in the project area. Additionally, if no multiuse trail or stream crossings are constructed, it is anticipated that current users of the Great Miami River Recreation Trail will continue to use the adjacent roadways, and therefore not meet the purpose and need for this project.

Block 10k: Describe mitigation techniques proposed (except for the Non-Degradation Alternative):

- **Describe proposed Wetland Mitigation (see OAC 3745-1-54 and Primer)**
- **Describe proposed Stream, Lake, Pond Mitigation (see Primer)**

Preferred Alternative

ODOT proposes off-site mitigation for stream impacts resulting from the proposed project.

Streams
One Stream (GMR), will be permanently impacted through implementation of the Preferred Alternative, and is located entirely within the proposed project area.

Unavoidable impacts to GMR will occur through the installation of a full width temporary construction causeway, support structure, and permanent RCP to allow for the construction of the multiuse trail above the stream (see Tables A and C, Attachment D). The TAF will be placed within and along the alignment of the stream channel to allow for access of equipment to construct the support structure within the stream channel. Upon completion of construction activities the temporary fill material will be removed from the stream channel. It is anticipated that these impacts will have no long-term effect on the flow or capacity of GMR, and that long-term habitat impacts will be negligible.

Off-Site Stream Mitigation
Because of the impracticalities of on-site compensatory mitigation, ODOT-OES proposes impacts to streams be mitigated through off-site mitigation at the Great Miami River/Lost Creek Pooled Mitigation Area. The off-site mitigation would be completed at a 1.5:1 ratio for a total stream preservation of 216 linear ft. of stream at the Great Miami River/Lost Creek Pooled Mitigation Area. This mitigation bank services the Lower Great Miami River (HUC 05080001) and is managed by the Miami Conservancy District, a political subdivision of the state of Ohio and operates under Ohio Revised Code Chapter 6101. The Great Miami River/Lost Creek Pooled Mitigation Area consists of 216.73 acres site that is part of ODOT's pooled mitigation areas that have been set aside for ODOT let projects that require mitigation and onsite mitigation is not a feasible alternative. This potential off-site mitigation area is located within the Lower Great Miami River watershed (Attachment I), approximately 10 miles north of the proposed project site. This pooled mitigation area is the only ODOT approved mitigation site within the vicinity of the proposed project area. ODOT suggests that the compensation for the impacts to GMR occur at the Great Miami River/Lost Creek Pooled Mitigation Area because this mitigation area has already been approved by OEPA to compensate for unavoidable impacts to streams. This pooled mitigation area is under ODOT's control, the property is protected by a conservation easement, and mitigation requirements have been finalized between ODOT and OEPA.

Minimal Degradation Alternative

Streams

As described above in the Preferred Alternative, the GMR will be temporarily and permanently impacted through implementation of the Minimal Degradation Alternative. The location and quality of the stream proposed to be impacted by the Minimal Degradation Alternative is similar to the Preferred Alternative (see above); the amount of impact has been decreased in the Minimal Degradation Alternative.

Unavoidable impacts to GMR will occur through the installation of a partial width temporary construction causeway, support structure, and permanent RCP to allow for the construction of the multiuse trail above the stream (see Tables A and C, Attachment D). The temporary impact from the partial width temporary construction causeway consists of approximately 1,665 cu yards of clean non-erodible fill that will impact approximately 116 linear ft. of the GMR. The permanent impacts will remain the same as the previously discussed Preferred Alternative (see above, Tables A and C). It is anticipated that these impacts will have no long-term effect on the flow or capacity of GMR, and that long-term habitat impacts will be negligible.

Off-Site Stream Mitigation

Due to the minor amount of stream impacts expected for the Minimal Degradation Alternative (116 linear ft.), and because of the impracticalities of on-site compensatory mitigation, ODOT proposes impacts to streams be mitigated through off-site mitigation at the Great Miami River/Lost Creek Pooled Mitigation Area.

Off-site mitigation would be completed at a 1.5:1 ratio for a total stream preservation of 174 linear ft. of stream at the Great Miami River/Lost Creek Pooled Mitigation Area. As a result of the nature of this alternative, ODOT proposes to use approximately 174 stream mitigation credits from the Lost Creek Pooled Mitigation Area as indicated for the Minimal Degradation Alternative.

ATTACHMENT D

Permit Tables

Table A. Streams Affected by the Proposed Project.

Site #/Feature	USGS Coord.	Description and Length Impacted	Drainage Basin	Total Length	Receiving Stream	Distance to Receiving Stream*	Drainage Area/Area at Impact Site	HHEI Score/OEPA Use Designation	Riparian Corridor and Adj. Habitats
Great Miami River (GMR)	40.105833, -84.228889	Approximately 116 linear ft (MDA) of temporary causeway & permanent impacts to this ephemerial stream	Great Miami River subbasin (8-digit HUC 05080001); subwatershed 14-digit HUC 05080001070080).	Total length of GMR approximately 116 Linear Ft	GMR (Ohio River)	112 miles	Total drainage area of GMR is approximately 3,802 mi^2. The drainage area at the location of the proposed project is approximately 880 mi^2.	Exceptional Warmwater Habitat (EWH)	Forested floodplain and forested upland areas immediately adjacent to the GMR

Table B. Nature of Proposed Activities by Impacted Feature for the Preferred, Minimal Degradation, and Non-Degradation Alternatives.

A. Streams

Site/ Feature	Approx. Station Location	Proposed Structure or Action	Existing Channel Disturbed Due to Placement of Proposed Structure, Highway Fill, Channel Change or Channel Protection[1]					Existing Channel Disturbed Due to Temporary Crossing		
			Length of Channel Disturbed	Excavation Below OHW		Fill Below OHW		Length of Channel Disturbed	Excavation/Fill Below OHW	
				Volume	Area	Volume	Area*		Volume	Area
Preferred Alternative										
GMR	205+72	Temporary causeway	N/A	N/A	N/A	N/A	N/A	144	4,523 cu yds	0.69 ac
GMR	205+27	Concrete Pier	35 linear ft	0	0	61 cu yds	0.0175 ac	N/A	N/A	N/A
GMR	203+98	RCP	79 linear ft	0	0	9 cu yds	0.0025 ac	N/A	N/A	N/A
Minimal Degradation Alternative										
GMR	205+72	Temporary causeway	N/A	N/A	N/A	N/A	N/A	116	1,665 cu yds	0.3 ac
GMR	205+27	Concrete Pier	35 linear ft	0	0	61 cu yds	0.0175 ac	N/A	N/A	N/A
GMR	203+98	RCP	79 linear ft	0	0	9 cu yds	0.0025 ac	N/A	N/A	N/A
Non-Degradation Alternative										
GMR	N/A	N/A	0	0	0	0	0	0	0	0

[1] Impact footprint of the Preferred Alternative includes areas upstream and/or downstream of proposed structures where energy and erosion control components (channel protection) are required to achieve pre-construction stream velocity, water surface elevation and channel stability conditions; no impact to stream flow patterns are expected.
* Area of total fill calculated for both RCP and Concrete Pier totalling 0.02 acres (ac); area of each material type is provided as estimate

B. Whole Project Summary of Activities

Total Project Lineal Stream Disturbances			Total Project Excavation						Total Project Fill					
Total Length Disturbed due to Proposed Structures, Highway Fill, Channel Change or Channel Protection	Length Disturbed due to Temporary Crossing	Net Length Disturbed	Stream Excavated*		Wetland Excavated		Total Excavation*		Stream Filled (standard roadfill, channel protection, temp crossing & other materials)[A]		Wetland Filled		Total Filled[B]	
			Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area
Preferred Alternative														
114 linear ft	144 linear ft	144 linear ft	4,523 cu yds	0.69 ac	N/A	N/A	4,523 cu yds	0.69 ac	4,593 cu yrd	0.69 ac	N/A	N/A	70 cu yrd	0.02 ac
Minimal Degradation Alternative														
114 linear ft	116 linear ft	116 linear ft	1,665 cu yds	0.30 ac	N/A	N/A	1,665 cu yds	0.30 ac	1,735 cu yrd	0.30 ac	N/A	N/A	70 cu yrd	0.02 ac
Non-Degradation Alternative														
0 linear ft	0 linear ft	0 linear ft	0 cu yds	0.00 acres	N/A	N/A	0 cu yds	0.00 acres	0 cu yrd	0.00 acres	N/A	N/A	0 cu yrd	0.00 ac

* - material consists of the clean non-erodible fill for the temporary causeway
[A] - fill amount includes temporary and permanent fill quantities
[B] - material consists of the permanent RCP and concrete within the stream channel (excludes the temporary causeway clean non-erodible fill)

Table C. Proposed Lowering of Water Quality by the Preferred, Minimal Degradation Alternatives, and Non-Degradation Alternative.

Alternative	Expected Impacts by Alternative [1]						
	Direct Stream Impacts	Aquatic Hab. (QHEI)/ Use Designation/Stream Flow	Aquatic Biota	T & E Species	Terrestrial Plant/Animals (Riparian Area)	Wetlands	Summary for Alternative
Preferred	144 linear ft GMR	GMR designated as a EWH in the vicinity of proposed bridge. Possible temporary lowering associated use designation during placement of causeway. Permanent addition of concrete and RCP within the stream channel may provide additional habitat beneficial to macroinvertebrates and fish. Stream would be expected to maintain the existing perennial (TNW) flow regime.	Minor loss of aquatic habitat through the placement of the clean, non-erodible fill and culvert pipes for the temporary causeway within the 144 linear ft of aquatic habitat. Some minor, temporary siltation impacts may also occur during construction.	Based on Biological Opinion (BO) the potential to "affect" the rayed bean a mussel survey by a qualified malacologist prior to the initiation of construction activities and the USFWS has issued an Incidental Take Statement (ITS) for impact to two individual rayed bean mussels. Any of the 5 PRTs that require removal for construction will be removed during the identified cutting window (September 30 to April 1). No anticipated impact to the state-listed species.	All riparian areas located adjacent to the GMR, and within the construction limits of the PA, will be impacted to facilitate project execution. No high quality or rare habitat or vegetation communities were identified with the project area. Therefore, limited fauna within the project area will be impacted by the construction of the project.	None	The Preferred Alternative is not expected to have a substantial impact on the water quality of the GMR by the project. Although the Preferred Alternative will impact a perinnial EWH stream (GMR), no substantial long term impacts to the water quality of the stream would be expected. Impacts to the streams would be offset by full implementation of on-site best management practices and off-site mitigation. Due to the BO and ITS, a mussel survey will be completed prior to the initiation of construction activities to avoid impacts to the Federally Endanged rayed bean mussel.
Minimal Degradation	116 linear ft GMR	GMR designated as a EWH in the vicinity of proposed bridge. Possible temporary lowering associated use designation during placement of causeway. Permanent addition of concrete and RCP within the stream channel may provide additional habitat beneficial to macroinvertebrates and fish. Stream would be expected to maintain the existing perennial (TNW) flow regime.	Minor loss of aquatic habitat through the placement of the clean, non-erodible fill and culvert pipes for the temporary work pad/causeway within the 116 linear ft of aquatic habitat. Some minor, temporary siltation impacts may also occur during construction.	Based on Biological Opinion (BO) the potential to "affect" the rayed bean a mussel survey by a qualified malacologist prior to the initiation of construction activities and the USFWS has issued an Incidental Take Statement (ITS) for impact to two individual rayed bean mussels. Any of the 5 PRTs that require removal for construction will be removed during the identified cutting window (September 30 to April 1). No anticipated impact to the state-listed species.	All riparian areas located adjacent to the GMR, and within the construction limits of the MDA, will be impacted to facilitate project execution. No high quality or rare habitat or vegetation communities were identified with the project area. Therefore, limited fauna within the project area will be impacted by the construction of the project.	None	The Minimal Degradation Alternative is not expected to have a substantial impact on the water quality of the GMR by the project. Although the Minimal Degradation Alternative will impact a perinnial EWH stream (GMR), no substantial long term impacts to the water quality of the stream would be expected. Impacts to the streams would be offset by full implementation of on-site best management practices and off-site mitigation. Due to the BO and ITS, a mussel survey will be completed prior to the initiation of construction activities to avoid impacts to the Federally Endanged rayed bean mussel.
Non Degradation	0	GMR designated as a EWH in the vicinity of proposed bridge. Stream would be expected to maintain the existing perennial (TNW) flow regime.	None	None	None	None	No direct impacts will occur as a result of this alternative.

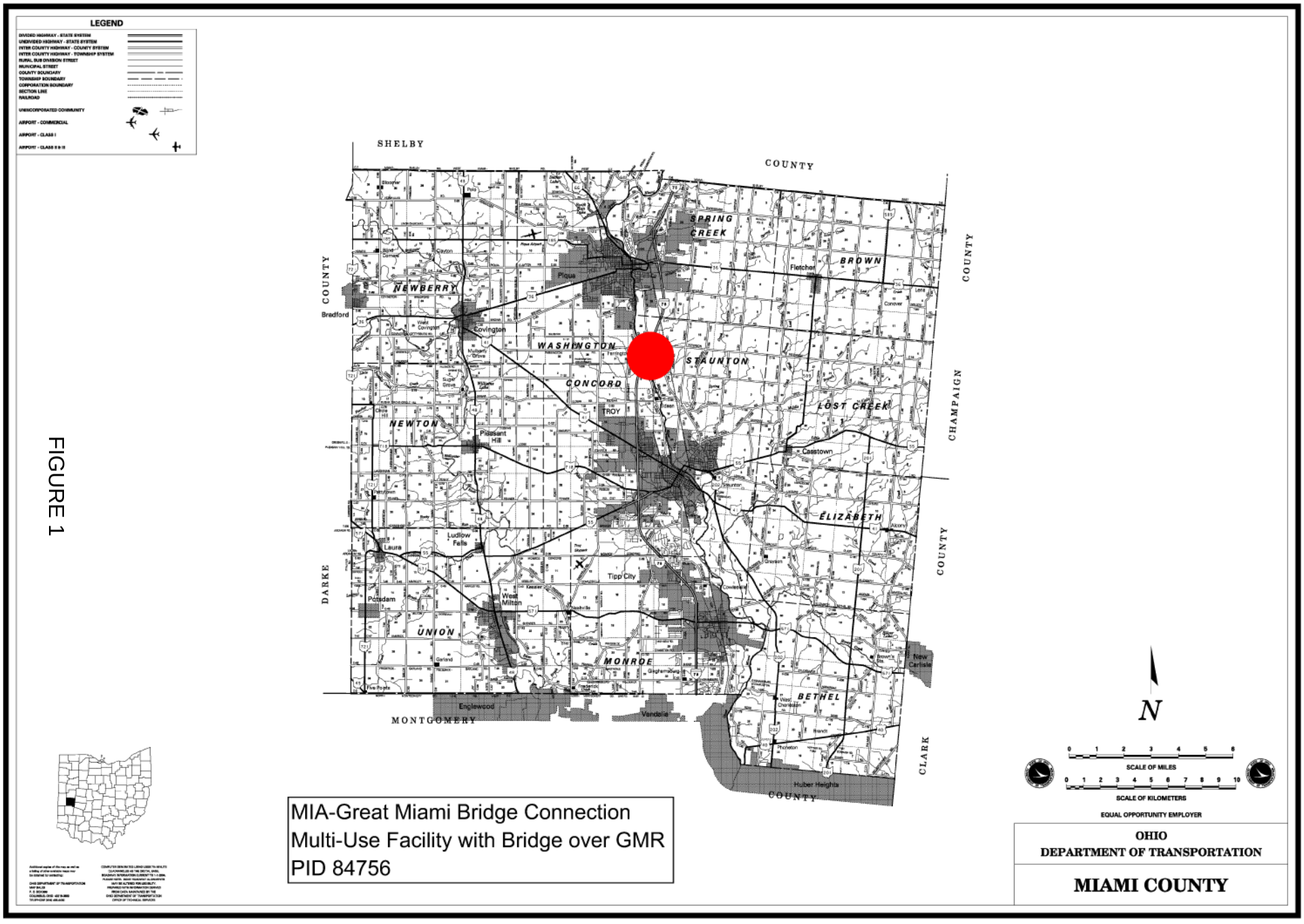
[1] Impact footprint of the Preferred Alternative includes areas upstream and/or downstream of proposed structures where energy and erosion control components (channel protection) are required to achieve pre-construction stream velocity, and channel stability conditions; no impact to stream flow patterns are expected.

Table D. Proposed Stream Mitigation for the Preferred and Antidegradation Alternatives.

Stream Name	Impacted Length	Type of Mitigation	Watershed (8 Digit HUC)		QHEI Score	HHEI Score	Mitigated Length	
			Impacted	Mitigated			On-site	Off-site
Preferred Alternative								
GMR	144	Preservation: Off-site, 1.5:1 mitigation to impact ratio, at Great Miami River/Lost Creek Pooled Stream Mitigation Area	05080001	05080001	N/A	N/A	N/A	216
Minimal Degradation Alternative								
GMR	116	Preservation: Off-site, 1.5:1 mitigation to impact ratio, at Great Miami River/Lost Creek Pooled Stream Mitigation Area	05080001	05080001	N/A	N/A	N/A	174

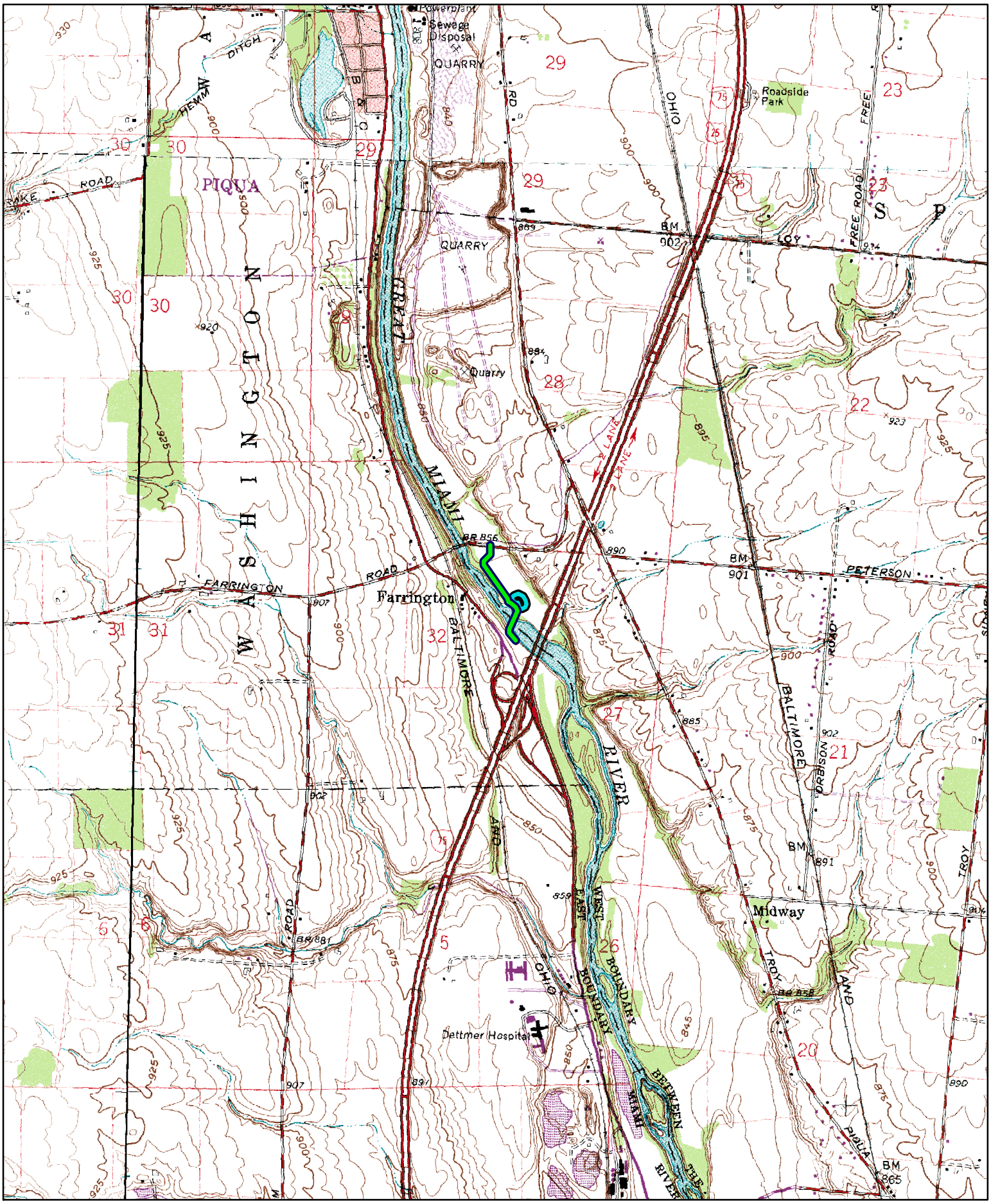
ATTACHMENT E

Figures



MIA-Great Miami Bridge Connection
Multi-Use Facility with Bridge over GMR
PID 84756

FIGURE 1



MIA-Great Miami Bridge Connection

FIGURE 2

PID 84756

Troy, Ohio Quadrangle; 1" = 2000'

Multi-Use Path

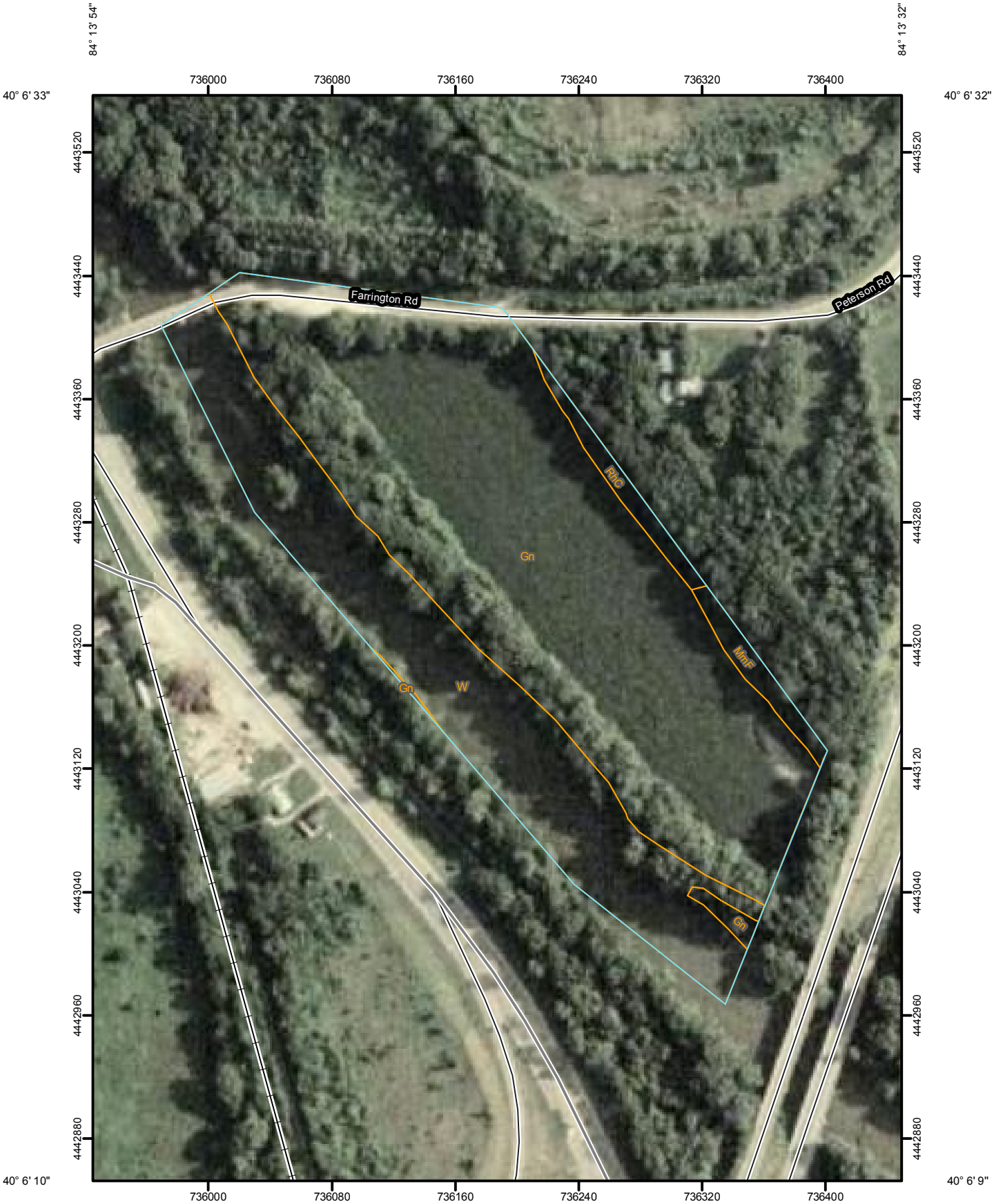
Borrow Pit

MIA-Great Miami Bridge Connection
PID 84756

FIGURE 3

Scale: 1" = 200'

Soil Map—Miami County, Ohio
(MIA-Great Miami Bikeway Bridge Connection)



Map Scale: 1:3,360 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

FIGURE 4