U.S. Army Corps of Engineers

Great Lakes & Ohio River Division

Huntington District

REVIEW PLAN

Review Plan for I-70/I-71/SR-315 INTERCHANGE PROJECT

FRA-70-8.93
PID 77369

Columbus, Ohio

By the Ohio Department of Transportation

With the Cooperation of the City of Columbus

Pursuant to 33 USC § 408

MSC Approval Date:

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1. Introduction

a. Purpose of This Review Plan

This Alteration-Specific Review Plan is intended to ensure quality of the review by the Huntington District for the request to alter a US Army Corps of Engineers (USACE) civil works project within the Huntington District's area of responsibility. This review plan was prepared in accordance with Engineer Circular (EC) 1165-2-216, "Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408" (reference paragraph 7.c.(4) in EC 1165- 2-216). This review plan provides the review guidelines associated with a specific alteration request pursuant to 33 USC 408 (Section 408). The requester of this Section 408 permit is the Ohio Department of Transportation (ODOT), District 6, Planning and Engineering department and the City of Columbus (City) is the non-federal sponsor.

b. Description and Information

The Project 4A/4R/4H involves bridge widening from the I-70 eastbound (EB) bridge over Souder Avenue at the western terminus to a new bridge over I-70 EB & westbound (WB) at South High Street at the eastern terminus**.** The reconstruction of the I-70/I-71/SR-315 interchange requires complete replacement of the existing EB and WB I-70 bridges over the Scioto River and provides a new river crossing just south of the existing EB I-70 bridge with two additional new river crossing bridges located north of the existing WB I-70 bridge. To help alleviate traffic congestion problems, improve safety and eliminate weaving and merging movements, Ramp C5 is proposed along the south side of the existing EB I-70 to provide a direct route to downtown Columbus for the traffic coming from the west side and south side of the city. Five retaining walls (4W5, 4W6, 4W8, 4W9 4W10) and 4 bridges (FRA-70-1301A, FRA-70-1358A, FRA-70-1373A, FRA-70-1390) are needed to construct this ramp C5. This project also accommodates the realignment of I-71 northbound (NB) by providing a new proposed Ramp A5 that connects to Ramp C5 providing improved access to downtown Columbus.

Project 6A consists of the reconstruction of 0.8 miles of I-70 WB and 0.6 miles of I-71 southbound (SB) in the City. Work includes the reconfiguration of local streets due to the bridge replacements. Work also includes the construction of four (4) bridges within the interchange which cross over local streets and railroads, reconstruction of the trunk line storm sewers, replacement of the freeway lighting system, and resurfacing and reconstruction of city street intersections including the traffic control upgrades.

Project 6R consists of restriping 0.67 miles of I-70 WB/I-71SB and the reconstruction of 1.1 miles of I-71 SB in the City of Columbus, including the partial reconfiguration of a system

interchange. Work includes the reconfiguration of local street access to the freeways and reconstruction of a city street to one-way to provide access to the freeway. Work also includes the construction of two (2) bridges within the interchange that cross over and under the freeway system, reconstruction of the trunk line storm sewers, replacement of the freeway lighting system, and resurfacing and reconstruction of city street intersections including the traffic control upgrades. The project also includes relocation of a 10 inch and 36 inch diameter sanitary force main and an 18 inch diameter sanitary stormwater overflow force main around the proposed I-71 bridge pier near Dodge Park pump station and installation of storm sewers to drain I-71 SB bridge's storm water at the same location. East of the river, the project includes relocation of sanitary force mains from under proposed ramp D7's mechanically stabilized earth (MSE) wall and tie back into the existing Olentangy Scioto Interceptor Sewer (OSIS).

This Review Plan covers proposed alterations and potential impacts to the West Columbus, Ohio, Local Protection Project (WCLPP), resulting from the Ohio Department of Transportation (ODOT) proposed construction of Project 4 and Project 6. As part of those projects it will be necessary to alter portions of the WCLPP. Proposed alterations include:

- **ODOT Area A:** LPP feature impacted: I-wall. In order to accommodate the required widening and reconstruction for I-71 NB and Ramp A5, approximately 415 feet of the existing I-wall floodwall will need to be relocated and reconstructed from ODOT Sta. 257+06 (I-71 NB) to Sta. 5007+35 (Ramp A5) (approximate USACE Sta. 231+17 to Sta. 235+32). The existing I-wall falls within the proposed pavement of the new ramp. A new I-wall will be constructed approximately 10 feet to the east of the existing alignment and will function in the same manner as the existing. The exposed height of the new I-wall within Area A ranges from approximately 2.9 feet to 5.7 feet.

- **ODOT Area B:** LPP feature impacted: Levee. In order to accommodate required widening and reconstruction for I-71 NB and Ramp A5, approximately 420 feet of the existing levee located south of the existing I-wall within ODOT Area A will also be impacted from approximately ODOT Sta. 252+86 to Sta. 257+06 (I-71 NB) (approximate USACE Sta. 235+32 to Sta. 239+50). Earthwork and proposed permanent slopes associated with the pavement widening which extend toward the Scioto River would impact the top width and top elevation of the existing levee. Therefore, a new permanent I-wall will be constructed along the edge of roadway shoulder to provide the necessary earth retention and flood protection. This I-wall will be continuous with the I-wall to be built within ODOT Area A. The exposed height of the new I-wall within Area B ranges from approximately 3.5 feet to 5.4 feet.

- **ODOT Area C:** LPP features impacted: Dodge Park Combined Pumping Station and Storm Water Pumping Station. Due to the construction of the FRA-71-1503L Bridge Pier 9L location at ODOT Sta. 250+20 (I-71 SB), it requires the relocation of 10-inch

and 36-inch diameter sanitary force mains, and an 18-inch diameter sanitary stormwater overflow force main. The relocation of the existing force mains (approximate USACE Sta. 213+12 to Sta. 215+96) require: 1) excavation and reconnection of the 10-inch and 36-inch diameter mains to the existing mains near (within approximately 11 feet of) the existing WCLPP sheetpile cutoff, 2) removal of an air release valve manhole and backfilling, and 3) removal of or filled in place with control density fill (CDF) the portions of the force mains that will no longer be in service. The relocation of the force mains near the sheetpile cutoff will be evaluated for possible temporary flood protection measures to be implemented during construction. A new storm sewer will be required for the bridge scupper outlets.

Other aspects associated with ODOT's proposed construction of Project 4 and Project 6 that could potentially impact the WCLPP are listed due to the close proximity to the levee system:

<u>Reconstruction of FRA-70-1321R (I-70 EB over the Scioto River)</u>
The FRA-70-1321R bridge structure carries I-70 eastbound over the Scioto River. The existing structure will be completely removed and replaced, and the proposed structure will consist of a five-span bridge with a total length of approximately 1,075 feet. The existing bridge will be widened to the south approximately 15 feet. The proposed west abutment (approximate ODOT Sta. 148+00 (I-70 EB)) will be constructed behind the existing abutment and within the existing floodwall right-of-way (approximate USACE Sta. 219+17) and therefore will be part of the review plan. Construction of the new abutment and removal methods for the existing abutment (partially) will be evaluated for possible temporary flood protection measures to be implemented during construction.

<u>Construction of FRA-70-1321A (Ramp A5/B5/C5 over the Scioto River)</u>
The FRA-70-1321A bridge structure carries relocated Ramps A5, B5 & C5 over the Scioto River. The new structure will consist of a five-span bridge with a total length of approximately 1,030 feet. The bridge starts where the FRA-71-1518A bridge ends, near ODOT Sta. 5017+07, where they share a common pier. It would be approximately 65 feet south of the proposed FRA-70-1321R bridge. This westernmost pier (the shared pier) is partially located within the existing floodwall right-of-way (approximate USACE Sta. 221+80) and therefore will be part of the review plan. Construction of the new west bridge abutment and the piers are supported on drilled shafts. As such, possible temporary flood risk reduction measures during construction will be evaluated.

<u>Construction of FRA-71-1301A (Ramp C5 over SR 315)</u>
The FRA-70-1301A bridge structure carries Ramp C5 traffic over S.R. 315, then via the bridge over the Scioto River, to downtown Columbus to the east. The new

structure will consist of an eight-span bridge with a total length of approximately 966 feet. The rear abutment and all the piers are located outside the existing floodwall right-of-way. Pier 4 (approximate ODOT Sta. 5050+00 (Ramp C5)) is the closest substructure to Pump Stations ST-1/ST-1A (approximate USACE Sta. 223+29 and Sta. 223+65), but would not negatively impact the structural integrity of the stations. Pier No. 5, Pier No. 6 and Pier No. 7 are placed in a way that would not negatively impact the existing maintenance access. When the bridge is completely constructed, this structure will accommodate one 16-foot lane of traffic. Construction of the pier #7 will be evaluated for possible temporary flood risk reduction measures to be implemented during construction.

Construction of FRA-71-1518A (Ramp A5 over the Scioto River)

The FRA-71-1518A bridge structure carries the relocated Ramp A5 over the Scioto River. The new structure will consist of a two-span bridge with a total length of approximately 171 feet. The bridge is approximately 802 feet north of where the new floodwall will tie into the existing floodwall. At the south end of the bridge, the rear abutment (approximate ODOT Sta. 5015+40 (Ramp A5)) is supported in new MSE wall embankment and is within the existing floodwall right-of-way (approximate USACE Sta. 223+33). The embankment (comprising part of the WCLPP line of protection) for the new rear abutment fill will be raised in elevation due to the relocation of Ramp A5. The new piers will be supported on drilled shafts and will have little effect on the Scioto River, but are also partially within the floodwall right-of-way. As such this structure will be part of the review plan. Possible temporary flood risk reduction measures during construction will be evaluated.

Construction of FRA-70-1322L (I-70 Westbound over the Scioto River)

The FRA-70-1322L bridge structure carries relocated I-70 Westbound over the Scioto River. The new structure will consist of a five-span steel bridge with a total length of 1,018 feet. The bridge begins at the top of the west bank of the Scioto River at ODOT Station 149+13.68, approximately 15 feet behind the existing I-70 bridge abutment. The structure ends at the east bank of the Scioto River at ODOT Station 159+22.02, approximately 60 feet behind the existing abutment. All piers will be supported directly on drilled shafts. The west abutment (approximate ODOT Sta. 149+14 (I-70 WB)) is within the existing floodwall right-of-way (approximate USACE Sta. 217+18) and will be part of the review plan. Construction of the new abutment and removal methods for the existing abutment will be evaluated for possible temporary flood risk reduction measures to be implemented during construction.

Construction of FRA-70-1323L (Ramp D3 over the Scioto River)

The FRA-70-1323L bridge structure carries Ramp D3 over the Scioto River. The new structure will consist of a five-span steel bridge with a total length of 1,020 feet. The bridge begins at the top of the west bank of the Scioto River at ODOT Station 3042+28.79,

approximately 15 feet behind the existing I-70 bridge abutment. The structure ends at the east bank of the Scioto River at ODOT Station 3052+44.77. All piers will be supported directly on drilled shafts. The west abutment is within the existing floodwall right-of-way (approximate USACE Sta. 216+49) and will be part of the review plan. Construction of the new abutment will be evaluated for possible temporary flood risk reduction measures to be implemented during construction.

Construction of FRA-71-1503L (I-71 Southbound over the Scioto River)
The FRA-71-1503L bridge structure carries relocated I-71 Southbound over the Scioto River, as well as numerous features including two railroads and the State Route 315 Interchange. The new structure will consist of a 23-span bridge with a total length of approximately 4,683 feet. Impacts to the Scioto River are limited to Spans 10 through 14, located from approximately ODOT Station 251+00 to 262+00. The piers located within this area are supported directly on drilled shafts. Portions of the substructure units for this bridge are within the floodwall right-of-way (approximate USACE Sta. 214+55 to Sta. 214+95) and will be included with the review plan. The location of Bridge Pier 9L requires vehicle access modification to the Dodge Park Storm Water Pumping Station as necessary for continued Operations & Maintenance activities. ODOT is developing a plan to maintain the non-federal sponsor's requisite access.

Relocation of 10-inch and 36-inch diameter sanitary force mains east of the Scioto River:
The construction of FRA-070-1373B rear abutment (approximate ODOT Sta. 7007+60 (Ramp D7)) requires the relocation of the existing 10-inch and 36-inch diameter force mains that run along the south side of Mound Street along with reconnecting them to the City's OSIS. These force mains are components of the WCLPP and will be included with the review plan.

Gatewells and existing I-70/I-71/SR-315 pump stations
The existing gatewells #4, #5, #6 and #7, the existing pump stations (ST-1 and ST-1A) located within the loop ramp infield of the I-70/I-71/SR-315 interchange and the 42-inch and 48-inch diameter storm force mains near these pump stations are to remain with no impacts from the proposed construction. For gatewell #6, the design depth of the sheet piling required for the new I-wall may necessitate making provisions to allow passage of the existing 18-inch diameter reinforced concrete storm sewer pipe through the sheet piling in order to reconnect it with the gatewell (approximate ODOT Sta. 5004+58 (Ramp A5); approximate USACE Sta. 233+91), including possible excavation and backfill.

A summary table listing the aforementioned proposed alterations and areas of proposed ODOT construction that could potentially impact the WCLPP follows:

Description of Proposed Alteration or Construction	Location (Sta.)	Type	Disposition
I-71 NB and Ramp A5 realigned over existing I-wall – **Area A**	Sta. 257+06 (I-71 NB) to Sta. 5007+35 (Ramp A5)	I-wall	Install new I-wall approximately 10 feet to east of existing.
I-71 NB and Ramp A5 realigned over existing levee – **Area B**	Sta. 252+86 to Sta. 257+06 (I-71 NB)	Levee	Install / extend new I-wall south to provide earth retention and flood protection.
Project 6R's I-71SB has been realigned over the existing levee, near the Dodge Park Pump Station using a flyover bridge FRA-71-1503L – **Area C**	Sta. 250+20 (I-71 SB)	Pump Station Force-mains	FRA-71-1503L Bridge Pier (9L) requires relocation of existing force mains. The new force mains will reconnect to the existing force mains near the sheetpile cutoff wall.
The west abutment of FRA-70-1321R (I-70 EB over the Scioto River) is in close proximity to the LOP. Portion of the abutment (South end) passes over the LOP.	Sta. 148+00 (Eastbound)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment. Existing abutment below grade to remain for providing flood protection and strengthen levee system.
The westernmost pier of FRA-70-1321A (Ramp A5/B5/C5 over the Scioto River) will be partially located within the WCLPP right-of-way.	Sta. 5017+07 (Ramp A5/B5/C5)	LOP	Drilled shafts will be used to support the proposed pier.
The MSE wall at the abutment and pier of FRA-70-1518A (Ramp A5 over the Scioto River) is in close proximity to the LOP.	Sta. 5015+00 (Ramp A)	LOP	The embankment (comprising part of the WCLPP line of protection) for the new rear abutment fill will be raised in elevation due to the relocation of Ramp A5.
The rear abutment and all the piers of FRA-70-1301A bridge structure are located outside the existing floodwall right-of-way. Pier 4 is the closest substructure to Pump Stations ST1/ST1A, but would not negatively impact the structural integrity of the stations.	Sta. 5050+00 (Ramp C5)	LOP	Pier 4 would not negatively impact the structural integrity of the stations. Pier No. 5, Pier No. 6 and Pier No. 7 are placed in a way that would not negatively impact the existing maintenance access.

Project 6A's west abutment for FRA-70-1322L (I-70 WB) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	Sta. 148+75 (I-70 WB)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment and will provide for increased flood protection.
Project 6A's west abutment for FRA-70-1323L (Ramp D3) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	Sta. 3042+00 (Ramp D3)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment and will provide for increased flood protection.
Project 6R's I-71SB has been realigned over the existing levee, near the Dodge Park Pump Station using a flyover bridge FRA-71-1503L.	Sta. 251+00 (I-71 SB)	LOP	FRA-71-1503L Bridge Pier (9L) closest to the LOP does not impact the existing levee, but does require access modification in order to maintain the non-federal sponsor's O&M capabilities.
Construction of FRA-070-1373B rear abutment requires relocation of existing 10-inch and 36-inch diameter sanitary force mains along the south side of Mound Street, east of the Scioto River.	Sta. 7007+60 (Ramp D7)	Force mains	Existing force mains, which are components of the WCLPP, but east of the Scioto River, will be relocated and reconnected to the City's OSIS.
I-71 NB and Ramp A5 construction requires relocation and construction of a new I-wall in the area near existing Gatewell #6.	Sta. 5004+58 (Ramp A5)	Gatewell	Design depth of the sheet piling required for new I-wall may necessitate making provisions to allow passage of the existing 18-inch diameter reinforced concrete storm sewer pipe through the sheet piling in order to reconnect it with the gatewell, including possible excavation and backfill.

Figure 1: Plan of West Columbus Local Protection Project Showing Impact Areas

Note: See Appendix B for selected plan sheets showing WCLPP and ODOT project features not specifically identified in Figure 1. Some plan sheets utilize a line labeled "Line of Protection" (LOP) to identify the WCLPP centerline.

Figure 2: LPP Project Features within Impact Areas A & B

Note: See Appendix B for selected plan sheets showing WCLPP and ODOT project features not specifically identified in Figure 2. Some plan sheets utilize a line labeled "Line of Protection" (LOP) to identify the WCLPP centerline.

Authorization under Sections 10/404/103 is not being pursued. Credit under Section 221 of the Flood Control Act of 1970, as amended is not being sought. Nor is approval under Section 204(f) of WRDA 1986. All work will be within existing ODOT/City right of way and the use of federally owned property is not required. The proposed ODOT alterations to the West Columbus LPP involves areas where the reconstruction of the I-70/I-71/SR-315 interchange, reconstruction of I-71 NB and Ramp A5 project footprint overlaps the location of WCLPP components and/or right-of-way. These locations are itemized in Appendix A - ODOT Type II IEPR Review Plan.

c. Background

The West Columbus, Ohio, Local Protection Project (WCLPP) is located in Franklin County, Ohio, along Dry Run and the Scioto River in the western portion of the City of Columbus. The protection extends approximately 2,400 feet along the lower right descending bank of Dry Run and continues from its confluence with the Scioto River along the right descending bank and floodplain of the Scioto River for approximately 7.2 miles. To facilitate engineering and design, and construction, the project was divided into three phases and each phase was further subdivided.

Phase I consists of five parts. Phases IA and IB consist of 3,100 linear feet of the upstream end of the project known as Dry Run Levee; and, Phases IC, ID, and IE utilize three different Ohio Department of Transportation (ODOT) highway projects for the addition of necessary flood risk reduction features. Phase IC is the Souder Avenue Closure constructed as a part of ODOT's Souder Avenue Extension. Phase ID, the Interstate 670 Modification, has incorporated flood risk reduction features in ODOT's four- lane Interstate 70 highway embankment project. Phase IE is the State Route (SR) 315 Gate Closure constructed as a part of ODOT's SR-315 Modification Project.

Phase II was constructed utilizing five construction contracts. Phases IIA, IIC, and IID continue the floodwall/levee system, while Phase IIB covers the Dodge Park storm water pump station and Phase IIE covers the Dodge Park combined pump station. Two existing highway storm water pump stations, ST-2 and ST-8, were also incorporated into the project.

Phase III consists of the remainder of the project and includes levee, floodwall, and a storm water pump station. Phase IIIA provides risk reduction from Interstate 70 to Greenlawn Avenue and was constructed under two separate contracts, Phase IIIA (North) and Phase IIIA (South). Phase IIIB provides risk reduction from Greenlawn Avenue to Frank Road and also includes the Renick Run storm water pump station.

Phase IIIC provides risk reduction from Frank Road to the end of the project at Whims Ditch. Two existing highway storm water pump stations, ST-1 and ST-1A, were also incorporated into the Phase III segment of the project.

The LPP features include levee, inverted T-base wall (T-wall), I-wall, closures and interior drainage facilities. Levee/floodwall features consist of approximately 10,900 feet of I-wall/T-wall, 7,100 feet of levee with sheet pile cutoff, 8,700 feet of existing high ground, and 13 closures (6-Stoplog, 1-Roller Gate, 6-Sand Bag). Levees typically have 1 vertical on 2.5 horizontal side slopes, a 10- foot wide top, and a 5-foot inspection trench. Along the northern section of the project, a highly visible floodwall section at the Veteran's Memorial Center was integrated into natural surroundings by the incorporation of the open space into a waterfront park. The Phase IIIB concrete floodwall section utilized a combination of wall graphics and landscaping to soften its appearance. Interior drainage features are highlighted by a 100,000-gallon per minute (gpm) storm water pumping station at Dodge Park, and a 140,000-gpm storm water pumping station on the Renick Run Storm Sewer near Emig Road. The 140,000-gpm pumping station has been designed with expansion capability to 200,000 gpm. Three existing interstate storm water pump stations, ST-1, ST-1A, and ST-8 were incorporated into the project. ST-2 is located along SR 315 and is owned and operated by the State.

One combined sewer pump station at Dodge Park and a portion of the 120-inch Scioto Main sanitary sewer was constructed during various phases of the WCLPP. The extension of the 120-inch Scioto Main sanitary sewer to the Jackson Pike Wastewater Treatment Plant (WWTP) as well as modifications to the Jackson Pike WWTP Headworks which were constructed under City of Columbus capital improvement projects are also important part of the flood risk reduction system. Operation of the Jackson Pike headworks is also governed by the Interim Interconnector Sewer Operational Plan. In addition, approximately eight-tenths of a mile of bicycle/pedestrian trail were constructed for recreational purposes. The trail runs along the riverside of the project from the esplanade below the Broad Street Bridge to Souder Avenue.

A flood warning system has also been developed to provide assistance in operating the project. This system collects and feeds rainfall and flood stage information from various locations throughout the upper Scioto River drainage basin into a central computer system, currently located at the City's Fairwood Avenue facility. The central computer system continuously monitors current conditions and stores real-time data for reference and use in determining the rate of rise of the river.

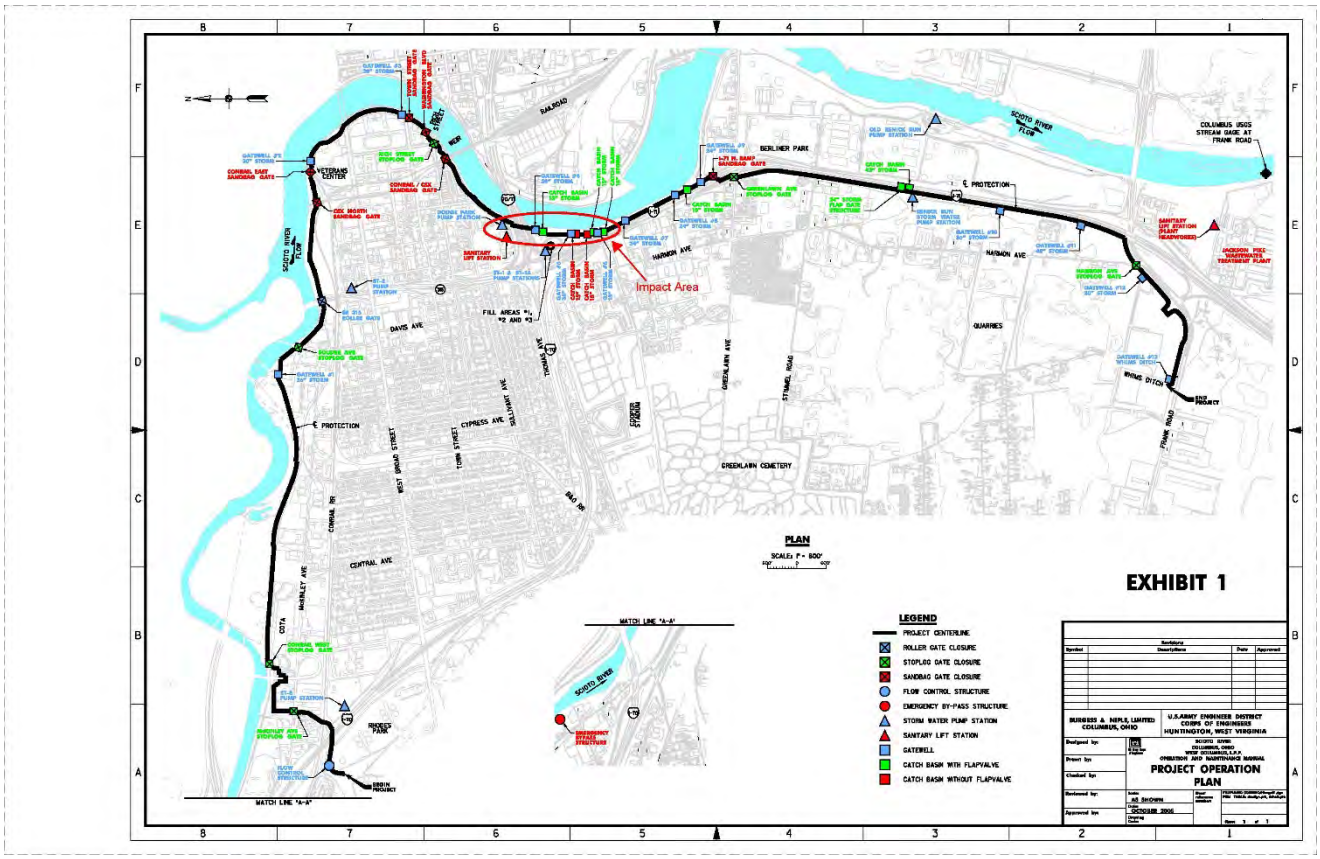

Figure 3: Plan of West Columbus Local Protection Project Showing Impact Area

Note: See Appendix B for selected plan sheets showing ODOT project features not specifically identified in Figure 3.

d. Review Management Organization (RMO) Coordination

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for the peer review effort described in this Review Plan is the USACE Risk Management Center (RMC). The RMC will determine whether this proposed alteration request will require a formal presentation to the Levee Senior Oversight Group (LSOG).

2. Review Requirements

a. Level of Review Required by the Requester

(1) **Quality Assurance and Quality Control (QA/QC) Review**. QA/QC is the review of basic science and engineering work products focused on fulfilling the project's quality requirements. QC will consist of Quality Checks and reviews and will be accomplished by the requester. All QC/QA documentation will be provided to the ATR Team (Appendix C).

(2) **Independent External Peer Review**. A Type II Independent External Peer Review (IEPR) will be required for ODOT's proposed alteration to the West Columbus LPP project. Rationale for this determination is in accordance with procedures in EC 1165-2-217 "Review Policy for Civil Works". The LRH Chief of Engineering and Construction Division has determined that the proposed alteration would pose a significant threat to human life and public safety.

Risk Drivers leading to this determination include:

- The proposed alteration compromises the levee system:
  - Approximately 415 feet of the existing I-wall floodwall will need to relocated and reconstructed (Area A). The existing I-wall falls within the proposed pavement of the ramp. A new I-wall will be constructed to the east of the existing alignment with exposed height ranging from 2.9 feet to 5.7 feet.
  - Approximately 420 feet of existing levee located south of the existing I-wall will also be impacted by widening and reconstruction of I-71 NB and Ramp A5 (Area B). A new and extended I-wall will be constructed along the edge of shoulder of the new pavement with exposed height ranging from 3.5 feet to 5.4 feet.
  - Soil-Structure interaction and lessons learned following the 2005 Hurricane Katrina incident will need to be applied during design of the new I-walls. Also, live loads from traffic are a concern.
  - Excavation along the top of the west bank of the river. Slope stability may be a concern given the proposed construction techniques.
- Flood exposure will exist where the new I-wall must transition to tie into the existing I-wall at ODOT Sta. 5007+35 (Ramp A5) within Area A as well as during excavation for the extended I-wall's upper concrete portion within Area B. Mitigation for these risks and construction sequencing is critical in the event a flood event does occur during construction.

- The West Columbus LPP provides flood risk reduction for a major US city. The leveed area, about 2,800 acres, is completely urban with a mix of residential, industrial, and commercial development.
- In applying lessons learned from current ODOT project, this construction activity could negatively affect the flood risk reduction system
- Temporary flood protection measures may be required during construction
- Cost for construction of the approximately 831 linear feet of I-wall relocation/construction is estimated to be [redacted]
- A Screening-Level Risk Assessment for the WCLPP was approved by HQUSACE in 2016. The system provides flood risk reduction for an annual chance exceedance probability of 0.002 (500-year return frequency). In the event of breach or overtopping of the levee system, the entire 3,000 acre leveed area could be inundated with greater than 2 feet of water, impacting up to 14,000 people and 4,600 residential and commercial buildings. Critical affected facilities include five schools, a major hospital, fire station, four chemical facilities, museum, and a correctional medical facility and camp complex. Property damages are estimated to be at least [redacted], or 37% of the total property value.

The review plan for the Type II IEPR has been developed by the requester, ODOT (Appendix A). The proposed alteration is to a USACE floodwall / levee project. The review comments will be documented, using the USACE DrCHECKS Software system, for tracking purposes, and to maintain Quality Control of the product. The Huntington District will ensure that ODOT is aware and understands all USACE comments, and that each comment is properly addressed and incorporated into the contract documents.

A Type II IEPR will be performed on the plans, specifications, and design analysis (i.e. Design Documentation Report) by the IEPR team listed in Appendix A. During the midpoint of construction of the I-wall and upon completion of construction, IEPR reviews will be conducted for the geotechnical and structural disciplines.

b. Level of Review Required by the District

The review of this alteration request shall include a district-led Agency Technical Review (ATR), reference paragraph 7.c.(4) in EC 1165-2-216. The Agency Technical Review (ATR) for this proposed alteration will be led and performed by Huntington District USACE professionals. Legal compliance review will be conducted by the Huntington District Office of Counsel.

An ATR will be performed on the plans, specifications, and design analysis by the ATR team listed in Appendix C.

c. Decision-Level Determination

A final decision by the Division Commander at the Great Lakes and Ohio River Division (LRD) is required because a Type II Independent External Peer Review (IEPR) is required for ODOT's proposed alteration to the West Columbus LPP. Once the District recommends approval, then the Section 408 request requires LRD level review and decision.

d. District Review Purpose

The review of all work products will be in accordance with the guidelines established within this review plan. The purpose of this review is to ensure the proper application of established criteria, regulations, laws, codes, principles and professional practices and that the requirements set forth in EC-1165-2-216 have been met. For the purposes of this Section 408, the ATR team will make the following determinations:

1) Impair the Usefulness of the Project Determination. The objective of this determination is to ensure that the proposed alteration will not limit the ability of the project to function as authorized and will not compromise or change any authorized project conditions, purposes, or outputs.
2) Injurious to the Public Interest Determination. Proposed alterations will be reviewed to determine the probable impacts, including cumulative impacts, on the public interest. The decision whether to approve an alteration will be determined by the consideration of whether benefits are commensurate with risks.
3) Legal and Policy Compliance Determination. A determination will be made as to whether the proposed alteration meets all legal and policy requirements.

3. District-led Agency Technical Review Team

The District-led Agency Technical Review Team is comprised of reviewers with the appropriate independence and expertise to conduct a comprehensive review in a manner commensurate with the type of proposed alteration described in Section 1.b of this review plan.

Agency Technical Review (ATR). ATR is an in-depth review, managed within USACE, and conducted by a qualified team that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices.

The ATR team reviews the various work products and assure that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel, preferably recognized subject matter experts with the appropriate technical expertise such as regional technical specialists (RTS), and may be supplemented by outside experts as appropriate.

The Huntington District ATR team is listed in Appendix C. EC Reviewers are CERCAP registered or are in the process of obtaining their registration. Disciplines required for this review include:

- Civil/Site,
- Structural,
- Geotechnical,
- Hydrology and Hydraulics,
- Levee Safety,
- Electrical/Mechanical,
- Maintenance and Operation (Sponsor),
- Real Estate,
- Planning/NEPA.

4. National Environmental Policy Act

Under the National Environmental Policy Act (NEPA) the District will assess the potential environmental impacts of any recommended Federal actions. It is anticipated the activity will likely fall under a Categorical Exclusion. The District would complete the analysis and prepare all necessary documentation, District Quality Control review and agency coordination, as required.

5. Execution Plan

a. Review Procedures

Reviews will be conducted in a fashion which promotes dialogue between the ATR team and the Requestor regarding the quality and adequacy of the required documentation. The ATR team will review the documents provided. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process.

The four key parts of a review comment will normally include:

1) The review concern – identify the deficiency or incorrect application of policy, guidance, or procedures.
2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed.
3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the district's ability to make a decision as to whether to approve or deny the Section 408 request.
4) The probable specific action needed to resolve the concern – identify the action(s) that the design engineer must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks must include the text of each ATR concern, the Requester's response, a brief summary of the pertinent points in any discussion, including any vertical coordination (the vertical team includes the District, RMO, and MSC), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the Requester, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in ER 1105-2-100, Appendix H and EC 1165-2-217, Paragraph 9.l.(3), as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

This Review Plan defines the scope and level of ATR review for the proposed alterations to the West Columbus LPP project.

References

(1) Engineer Circular (EC) 1165-2-217, Review Policy For Civil Works, 20 February 2018
(2) Engineer Regulation (ER) 1110-1-12, Quality Management, 31 July 2006
(3) Engineer Circular (EC) 1165-2-216, Water Resource Policies and Authorities, 31 July 2014

b. Completion and Certification of the ATR

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

(1) Identify the document(s) reviewed and the purpose of the review;
(2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of

each reviewer;

(3) Include the charge to the reviewers;

(4) Describe the nature of their review and their findings and conclusions;

(5) Identify and summarize each unresolved issue (if any); and

(6) Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The vertical team consists of 1) District: Chief, Engineering and Construction Division/DSO/LSO, 2) RMO: RMC Review Manager, and 3) MSC: Division Section 408 Coordinator. The ATR lead will prepare a completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project. A Sample Completion of ATR and Certification of ATR are included in Appendix D.

c. Review Schedule

The following timeline is a Draft and for Estimation purposes.

Event	Date
Review Plan Completion by District	November 2018
Review Plan Submission to RMC	December 2018
Review Plan Endorsed by RMC	December 2018
Review Plan Submission to LRD	January 2019
Review Plan Approval by LRD	March 2019
Start ATR & IEPR Review	April 2019

d. Review Cost

The anticipated cost for the District is projected to be [redacted]. The anticipated cost for ATR is [redacted]. This cost includes project management, project coordination, Review Plan development, ATR, real estate evaluation, site visits, environmental documentation preparation and review, and Section 408 Summary of Findings. ODOT has provided payment to the Huntington District for the review.

The anticipated cost for IEPR is [redacted] The IEPR cost includes [redacted] for review of the Design Analysis and Project Plans and Specifications by three experts (one geotechnical, one structural, and one hydraulics) and [redacted] for review during the midpoint of construction and upon construction completion by two experts (one geotechnical and one structural) from external panels.

e. Public Participation

As required by EC 1165-2-217, the approved Review Plan will be posted on the District public website (http://www.lrh.usace.army.mil/Missions/PublicReview.aspx). This is not a formal comment period and there is no set timeframe for the opportunity for public comment. If and when comments are received, the PDT will consider them and decide if revisions to the review plan are necessary. This engagement will ensure that the peer review approach is responsive to the wide array of stakeholders and customers, both within and outside the federal government.

6. Review Plan Points of Contact

Name/Title	Organization	Email/Phone
[redacted]; District Section 408 Coordinator	CELRH-PM-PP	Email: [redacted] Office Phone: [redacted]
[redacted]; RMC Review Manager	CEIWR-RMC-WD	Email: [redacted] Office Phone: [redacted]
[redacted]; Division Section 408 Coordinator	CELRD-RBT	Email: [redacted] Office Phone: [redacted]

APPENDIX A

TYPE II IEPR REVIEW PLAN

OHIO DEPARTMENT OF TRANSPORTATION

Type II IEPR Review Plan
Ohio Department of Transportation

for the U.S. Army Corps of Engineers Huntington District
Great Lakes and Ohio River Division

FRA-70-8.93

PID 77369

West Columbus LPP

By the Ohio Department of Transportation and the

City of Columbus

Pursuant to 33 USC § 408

West Columbus LPP

8 June 2018

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1. Purpose and Requirements

a. Purpose

The Huntington District, U.S. Army Corps of Engineers has determined that the proposed alterations to the West Columbus LPP Project requires a Type II Independent External Peer Review (IEPR). This Type II IEPR Review Plan is intended to verify that a quality-engineering project is developed by the Ohio Department of Transportation (ODOT). This Review Plan has been developed for the proposed alterations to the West Columbus LPP Project, resulting from the Ohio Department of Transportation (ODOT) proposed construction of the southeastern corner of the I-70/I-71/SR-315 interchange and to accommodate the realignment of I-71 Northbound providing a new proposed Ramp A5 which will provide access to downtown Columbus. The project also include relocation of sanitary and storm water overflow force mains around the proposed I-71 bridge pier near Dodge Park pump station, install storm sewers to drain I-71 SB bridge's storm water at the same location. East of the river, the project includes relocation of sanitary force mains from under proposed ramp D7's MSE wall and tie back into the existing OSIS.

This Review Plan was prepared in accordance with EC 1165-2-217, "Review Policy for Civil Works" and EC 1165-2-216, "Policy and Procedural Guidance for Processing Requests To Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408". The Review Plan shall layout a value added process that verifies the correctness of the information shown and how that quality process will be documented. The Review Plan identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project.

b. Guidance and Policy References

- EC 1165-2-216, Policy and Procedural Guidance for Processing Requests To Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408, 31 July 2014
- EC 1165-2-217, "Review Policy for Civil Works", 20 February 2018

c. Requirements.

This review plan was developed in accordance with EC 1165-2- 217 which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R).

2. Project Description and Information

The project (Project 4A/4R/4H) consists of the construction of 1.37 miles of I-70 Eastbound with a bridge over Souder Avenue at the western terminus to a new bridge over I-70 EB & WB at South High Street at the eastern terminus and proposed Ramp C5 as well as the widening and realignment of I-71 Northbound providing a new proposed Ramp A5 which will provide access to downtown Columbus. The project will eliminate the weaving issues between I-70 EB and I-71 NB within the I-70/I-71/SR-315 interchange. The existing levee reach extends approximately 815 feet along the east side shoulder of the I-71 NB ramp in the southeastern corner of the I-70/I-71/SR-315 interchange, which is along the top of the west bank of the Scioto River.

Project 6A consists of the reconstruction of 0.8 miles of I-70 WB and 0.6 miles of I-71 SB in the City of Columbus. Work includes the reconfiguration of local streets due to the bridge replacements. Work also includes the construction of four (4) bridges within the interchange which cross over local streets and railroads, reconstruction of the trunk line storm sewers, replacement of the freeway lighting system, and resurfacing and reconstruction of city street intersections including the traffic control upgrades.

Project 6R consists of restriping 0.67 miles of I-70 WB/I-71SB and the reconstruction of 1.1 miles of I-71 SB in the City of Columbus, including the partial reconfiguration of a system interchange. Work includes the reconfiguration of local street access to the freeways and reconstruction of a city street to one-way to provide access to the freeway. Work also includes the construction of two (2) bridges within the interchange that cross over and under the freeway system, reconstruction of the trunk line storm sewers, replacement of the freeway lighting system, and resurfacing and reconstruction of city street intersections including the traffic control upgrades. The project also include relocation of sanitary and storm water overflow force mains around the proposed I-71 bridge pier near Dodge Park pump station, install storm sewers to drain I-71 SB bridge's storm water at the same location. East of the river, the project includes relocation of sanitary force mains from under proposed ramp D7's MSE wall and tie back into the existing OSIS.

PROJECT MAP

Note: See Appendix B for selected plan sheets showing ODOT project features not specifically identified in the Project Map above.

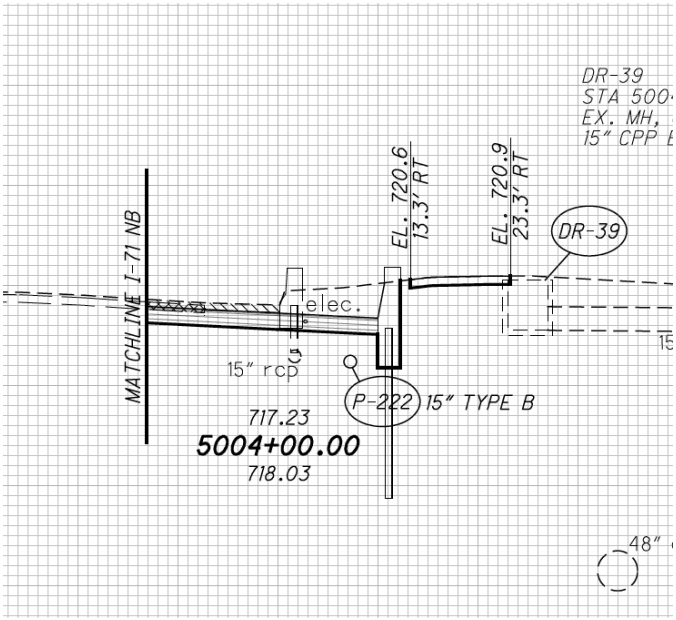
Specific areas where the project footprint overlaps the location of the LOP are summarized in the table below.

Description of Overlap	Location (Sta.)	Type	Disposition
I-71 NB and Ramp A5 realigned over existing I-wall – **Area A**	Sta. 257+06 (I-71 NB) to Sta. 5007+35 (Ramp A5)	I-wall	Install new I-wall approximately 10 feet to east of existing.
I-71 NB and Ramp A5 realigned over existing levee – **Area B**	Sta. 252+86 to Sta. 257+06 (I-71 NB)	Levee	Install / extend new I-wall south to provide earth retention and flood protection.
Project 6R's I-71SB has been realigned over the existing levee, near the Dodge Park Pump Station using a flyover bridge FRA-71-1503L – **Area C**	Sta. 250+20 (I-71 SB)	Pump Station Force-mains	FRA-71-1503L Bridge Pier (9L) requires relocation of existing force mains. The new force mains will reconnect to the existing force mains near the sheetpile cutoff wall.
The west abutment of FRA-70-1321R (I-70 EB over the Scioto River) is in close proximity to the LOP. Portion of the abutment (South end) passes over the LOP.	Sta. 148+00 (Eastbound)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment. Existing abutment below grade to remain for providing flood protection and strengthen levee system.
The MSE wall at the abutment and pier of FRA-70-1518A (Ramp A5 over the Scioto River) is in close proximity to the LOP.	Sta. 5015+00 (Ramp A)	LOP	The embankment (comprising part of the WCLPP line of protection) for the new rear abutment fill will be raised in elevation due to the relocation of Ramp A5.
The rear abutment and all the piers of FRA-70-1301A bridge structure are located outside the existing floodwall right-of-way. Pier 4 is the closest substructure to Pump Stations ST1/ST1A, but would not negatively impact the structural integrity of the stations.	Sta. 5050+00 (Ramp C5)	LOP	Pier 4 would not negatively impact the structural integrity of the stations. Pier No. 5, Pier No. 6 and Pier No. 7 are placed in a way that would not negatively impact the existing maintenance access.
Project 6A's west abutment for FRA-70-1322L (I-70 WB) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	Sta. 148+75 (I-70 WB)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment and will provide for increased flood protection.

Project 6A's west abutment for FRA-70-1323L (Ramp D3) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	Sta. 3042+00 (Ramp D3)	LOP	The Proposed abutment will be constructed at a higher elevation than the existing abutment and will provide for increased flood protection.
Project 6R's I-71SB has been realigned over the existing levee, near the Dodge Park Pump Station using a flyover bridge FRA-71-1503L.	Sta. 251+00 (I-71 SB)	LOP	FRA-71-1503L Bridge Pier (9L) closest to the LOP does not impact the existing levee, but does require access modification in order to maintain the non-federal sponsor's O&M capabilities.

The overlap areas that contain a written disposition in the table above are more specifically described below with an evaluation of a public risk factor (low-medium-high) associated with the related construction activity.

Area A – In the southeast corner of the I-70/I-71/SR-315 interchange, the realignment and reconstruction of I-71 NB and Ramp A5 results in a required shift of the existing I-wall approximately 10 feet to the east, due to its conflict with the proposed new alignment of the Ramp A5 pavement. The profile of the ramp within the limits of the new wall location is being lowered, therefore, the new wall will be located within the flat top of bank section outside of the existing ramp shoulder. Therefore, the wall will be located in a cut section of the existing embankment. The existing I-wall has a roadway barrier mounted to the top that serves as the roadside protection along the east shoulder of the existing I-71 NB ramp. As shown in the Figure below, a new I-wall will be constructed to the east of the existing alignment and will function in the same manner as the existing, to support traffic loads and provide floodwall protection.

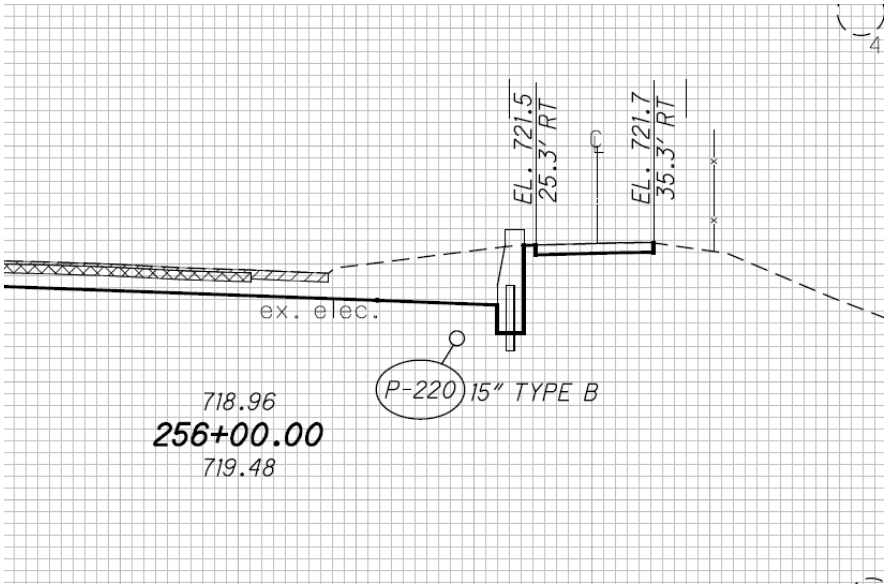


Representative cross section within **Area A** I-Wall (existing to left; new to right)

The top of wall will be set to maintain the required level of protection as indicated in the plans for the original wall and will be designed to match or exceed the height of the existing I-wall. The proposed barrier shape on top of the proposed sheet pile wall will match that of the new southern wall being constructed as part of the FRA-71-9.74 project (PID 93497), which utilizes a straight face roadside barrier with a constant height. **Risk Factor – High**. The new I-wall shall be designed to be constructed before demolition of the existing wall, therefore flood barrier protection will be maintained for a majority of the construction duration for Ramp A5. Flood exposure will exist where the new wall transitions to tie into the existing I-wall (approximately 50 feet of length). Mitigation for this risk will be to supply enough sand bags 'at hand' for the contractor to install if a flood event does occur during construction. Also, after installation of the new sheet pile for the I-wall, flood exposure could exist during excavation activities necessary to install the upper concrete portions of the new I-wall. Depending on the proximity of the excavation limits to the existing wall, excavation for the new wall could reduce stability of the existing wall where shallow embedment of sheeting exists. Mitigation within these potential risk areas will be to require the contractor to only excavate that length of wall in which the contractor can successfully backfill and compact within a maximum period of 8 hours. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations, locations of storage areas for embankment materials, and other information necessary to demonstrate that the excavated area adjacent to the existing wall can be backfilled and stabilized by the contractor if a 500-year flood event does occur during construction. The Area A floodwall relocation is estimated to cost [redacted]

Area B – In order to accommodate required widening and reconstruction for I-71 NB and Ramp A5, approximately 420 feet of the existing levee located south of the existing I-wall within ODOT Area A will also be impacted from approximately ODOT Sta. 252+86 to Sta. 257+06 (I-71 NB). Earthwork and proposed permanent slopes associated with the pavement widening which extend toward the Scioto River would impact the top width and top elevation of the existing levee. Therefore, a new permanent I-wall will be constructed along the edge of roadway shoulder to provide the necessary earth retention and flood protection. This I-wall will be continuous with the I-wall to be built within ODOT Area A**.** **Risk Factor – High.** After installation of the new sheet pile sections for this I-wall, flood exposure could exist during excavation activities necessary to install the upper concrete portions of the I-wall. Mitigation for this risk will be to require the contractor to only excavate that length of wall in which the contractor can successfully backfill and compact within a maximum period of 8 hours. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations,

locations of storage areas for embankment materials, and other information necessary to demonstrate that the excavated area of the levee can be backfilled and stabilized by the contractor if a 500-year flood event does occur during construction. The Area B floodwall construction is estimated to cost [redacted]



Representative cross section within **Area B** I-Wall (new)

Area C – FRA-71-1503L (I-71 SB) Bridge Pier (9L) will impact the existing sanitary and storm water overflow force mains. In order to accommodate the proposed pier it will require the relocation of existing sanitary and stormwater overflow force mains. The force mains will be relocated to the west side of the existing Dodge Park Storm Water Pump Station. Currently the existing force mains are located to the east of the pump station about 11.0 feet from the existing levee sheet piling wall. Earthwork for the proposed force mains will not change the existing grade but will tie into the existing sanitary force mains approximately 11.0 feet behind the levee's sheet pile wall. The existing force mains taken out of service will either be removed or filled in place. **Risk Factor – Low.** It will be required that the contractor only excavate the length of trench that the pipe can be installed in one working day and that both force mains cannot be out of service at the same time. Due to all the work occurring in close proximity to the LOP, the contractor will be required to submit an emergency action plan for the force mains installation.

RISK FACTOR SUMMARY		
AREA	RISK FACTOR	COMMENTS
A	HIGH	New wall will be in place prior to removal of existing wall. Flood exposure will exist where the new wall transitions to tie into the existing I-wall for a length of approximately 50 feet. Mitigation for this risk will consist of sand bags on site for the contractor to install in the event a flood event does occur during construction. Flood exposure may also exist during excavation work for the new wall when in close proximity to the existing wall resulting in a reduced stability condition. Mitigation for this risk will be to require the contractor to only excavate that length of wall in which the contractor can successfully backfill and compact within a maximum period of 8 hours. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations in the event a flood event does occur during construction.
B	HIGH	New I-wall will be constructed in the existing levee area. Flood exposure will exist during excavation to install the upper concrete portion of the wall after sheet pile sections have been installed. Mitigation for this risk will be to require the contractor to only excavate that length of wall in which the contractor can successfully backfill and compact within a maximum period of 8 hours. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations in the event a flood event does occur during construction.
C	LOW	A new I-71 SB pier (9L) will be constructed behind the existing levee near Dodge Park Pump Station. This will require the existing force mains to be relocated around I-71 SB pier (9L). All this work will occur in close proximity to the LOP, thus the contractor will be required to submit an Emergency Action Plan.
The west abutment of FRA-70-1321R (I-70 EB over the Scioto River) is in close proximity to the LOP. Portion of the abutment (South end) passes over the LOP.	LOW	The proposed abutment will be constructed behind and at a higher elevation than the existing abutment. We will provide a note in bridge general note sheet to ensure the existing abutment shall remain until the completion of proposed west abutment. Existing abutment below grade shall remain for providing flood protection and strengthen levee system. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations in the event a flood event does occur during construction.

The MSE wall at the abutment and pier of FRA-70-1518A (Ramp A5 over the Scioto River) is in close proximity to the LOP.	LOW	The embankment (comprising part of the WCLPP line of protection) for the new rear abutment fill will be raised in elevation due to the relocation of Ramp A5, therefore the contractor will not be required to submit an Emergency Action Plan.
Project 6A's west abutment for FRA-70-1322L (I-70 WB) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	LOW	The proposed abutment will be constructed behind and at a higher elevation than the existing abutment. Designer of Record will provide a note in bridge general note sheet at the Stage 3 submission to ensure the existing abutment shall remain until the completion of proposed west abutment. Existing abutment below grade shall remain for providing flood protection and strengthen levee system. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations in the event a flood event does occur during construction.
Project 6A's west abutment for FRA-70-1323L (Ramp D3) over the Scioto River is in close proximity to the LOP. The approach slab for said abutment passes over the LOP.	LOW	The proposed abutment will be constructed behind and at a higher elevation than the existing abutment. Designer of Record will provide a note in bridge general note sheet at the Stage 3 submission to ensure the existing abutment shall remain until the completion of proposed west abutment. Existing abutment below grade shall remain for providing flood protection and strengthen levee system. The contractor will be required to submit an Emergency Action Plan detailing the means and methods of the backfilling operations in the event a flood event does occur during construction.
Project 6R's I-71SB has been realigned over the existing levee, near the Dodge Park Pump Station using a flyover bridge FRA-71-1503L.	LOW	FRA-71-1503L Bridge Pier (9L) closest to the LOP does not impact the existing levee's sheet piling wall, therefore the contractor will not be required to submit an Emergency Action Plan.
The rear abutment and all the piers of FRA-70-1301A bridge structure are located outside the LOP. Pier 4 is the closest substructure to Pump Station ST1/ST1A.	LOW	Pier 4 would not negatively impact to the structural integrity of the station, therefore the contractor will not be required to submit an Emergency Action Plan.

In section 1. Introduction, b. Description and Information in this Review Plan (pages 2-7 of this document), there is a list of "Other aspects associated with ODOT's proposed construction of Project 4 and Project 6 that could potentially impact the WCLPP are listed due to the close proximity to the levee system." As part of the scope of the IEPR, a limited review will be performed of these listed features of the design, to a sufficient level to verify their impact to the West Columbus LPP (if any) and provide a mitigation measure if necessary.

3. Quality Control (QC)

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo Quality Control (QC). QC is an internal, independent peer-review process of basic science and engineering work products focused on fulfilling the project quality requirements. Basic quality control tools include seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc.

GPD and MS employs a process where all components of work are reviewed and concurred on for:

- Accuracy of the work product
- Conformance to client, company, and industry standards
- Coordination with other disciplines

QC documentation shall clearly illustrate that all documents, computations, graphics, etc. have been independently peer-reviewed, to include initials of reviewer and date of review; this will be kept in the project file. A copy of the documentation will be provided to the ATR Team. In addition, all projects undergo a senior level review to ensure completeness and interdisciplinary coordination of the work product.

The proposed alterations to the West Columbus LPP Project, resulting from reconstruction of I-70/I-71/SR-315 interchange and widening and realignment of I-71 Northbound providing a new proposed Ramp A5 will be designed and constructed in accordance with the following list of references containing evaluation processes, design standards, and operations and maintenance procedures:

- EM 1110-1-1005, Control and Topographic Surveying
- EM 1110-1-1804, Geotechnical Investigations
- EM 1110-1-1904, Settlement Analysis
- EM 1110-2-1913, Design & Construction of Levees
- EM 1110-2-1601, Hydraulic Design of Flood Control Channels
- EM 1110-2-1902, Slope Stability
- EM 1110-2-1906, Laboratory Soils Testing
- EM 1110-2-2002, Evaluation and Repair of Concrete Structures
- EM 1110-2-2100, Stability Analysis of Concrete Structures
- EM 1110-2-2104, Strength Design for Reinforced-Concrete Hydraulic Structures
- EM 1110-2-2502, Retaining and Flood Walls
- EM 1110-2-2504, Sheet Pile Walls
- EM 1110-2-2902, Conduits, Culverts, and Pipes
- EC 1110-2-6066, Design of I-walls
- ECB 2014-18 Design and Evaluation of I-walls Including Sheet Pile Walls
- ETL 1110-2-583, Engineering and Design: Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures
- ETL 1110-2-575, Evaluation of I-walls

4. Agency Technical Review (ATR)

To be conducted by the Huntington District, U.S. Army Corps of Engineers.

5. Independent External Peer Review (IEPR)

IEPR may be required for implementation documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-217, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted.

Decision on Type II IEPR. The Huntington District, U.S. Army Corps of Engineers has determined that the proposed alterations to the West Columbus LPP Project requires a Type II Independent External Peer Review (IEPR). A Type II IEPR will be performed on the design plans, analysis and supporting data for the activities associated with the reconstruction of the I-70/I-71/SR-315 interchange, which requires complete replacement of the existing Eastbound and Westbound I-70 bridges over Scioto River and provides a new river crossing just south of the existing Eastbound I-70 bridge with two additional new river crossing bridges located north of the existing Westbound I-70 bridge. This project also accommodates the realignment of I-71 Northbound by providing a new proposed Ramp A5 that connects to Ramp C5 providing access to downtown Columbus. Relocate sanitary and storm water overflow force mains around the proposed I-71 bridge pier near Dodge Park pump station, install storm sewers to drain I-71 SB bridge's storm water at the same location. East of the river, the project includes relocation of sanitary force mains from under proposed ramp D7's MSE wall and tie back into the existing OSIS. A new I-wall that will be constructed on the east side of the proposed alignment of Ramp A5 in the southeast corner of the I-70/I-71/SR-315 interchange. A risk-informed decision was made as to whether IEPR is appropriate based on the factors to consider for conducting a Type II IEPR review that are outlined in EC 1165-2-217, Paragraph 12. h. (1) thru (3). A risk informed decision was made that this project does pose a threat to human life (public safety) since it involves the construction of several bridges, a new 831 feet I-wall and construction of NB-71 and Ramp A5 located to the west of the existing floodwall. For a Type II IEPR, that the selection of IEPR review panel members will be made up of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of expertise suitable for the review being conducted. For a Type II IEPR, that the selection of IEPR review panel members will be selected using the National Academy of Science (NAS) Policy which sets the standard for "independence" in the review process.

The IEPR panel members will include the following:

Independent External Peer Review Expert Reviewers	
DISCIPLINE	**EXPERTISE REQUIRED**
Geotechnical Engineer	Recognized expert in soil mechanics and properties
Structural Engineer	Recognized expert in analysis and design of I-walls, sheet pile walls, retaining walls and reinforced concrete barriers and has a strong understanding of gap formation and other lessons learned from hurricane Katrina.
Hydraulic Engineer	Recognized expert in pump station hydraulics, floodplain, floodway analysis and levees.

A Type II IEPR will be performed on the design plans, analysis and supporting data for the activities associated with the new I-wall that will be constructed on the east side of I-71 NB / Ramp A5 and the relocated force mains at Dodge Park Storm Water Pumping Station.

Reviews will include structural and geotechnical reviews of the design calculations and plan presentation of the I-wall, hydraulic review of the impact of the project on the Scioto River, hydraulic review of the relocated force mains, and a structural review of the wall from the highway perspective as a retaining wall and traffic barrier.

Prepare Final Report: The SAR Type II IEPR contractor shall prepare a Final Review Report to include the panel review of the I-wall. The review report shall contain comments addressing the analysis, design plans and flood risk associated with the construction activities. DrChecks review software will be used to document the Type II IEPR comments and aid in the preparation of the Review Report. Comments should address the adequacy and acceptability of the engineering and environmental methods, models, and analyses used. A suggested report outline is an introduction, the composition of the review team, a summary of the review during design, a summary of the review during construction, any lessons learned in both the process and/or design and construction, and appendices for conflict of disclosure forms, comments to any appendices, supporting analyses, and assessments of the adequacy and acceptability of the methods, models, and analyses used. All comments in the report will be finalized by the panel prior to their release to USACE for each review plan milestone.

The reviewer's comments should generally include the four key parts of a quality review comment and normally include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the design engineer must take to resolve the concern.

An independent A/E contractor will be responsible for compiling and entering comments into DrChecks. The Type II IEPR team will prepare a Final Report that will be submitted to the Huntington District and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers prepared by the ODOT;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

This review report, including reviewer comments and a recommendation letter will be provided to the RMC as soon as they become available. The final report will also be submitted to the LRD Chief, Business Technical Division. Written responses to the IEPR Review Report will be prepared by the Designer(s) of Record to explain the agreement or disagreement with the views expressed in the report, the actions undertaken or to be undertaken in response to the report, and the reasons those actions are believed to satisfy the key concerns stated in the report (if applicable). These comment responses will be provided to the RMC for concurrence. The revised submittal (i.e. Final Report) will be provided to the RMO with the Designer(s) of Record's response and all other materials related to the review.

6. Policy and Legal Compliance Review

To be conducted by the Huntington District, U.S. Army Corps of Engineers.

ATTACHMENT 1: TEAM ROSTERS

Review Plan Points of Contact

Name/Title	Organization	Email/Phone
[redacted]	ODOT	[redacted]

TABLE 1: Design Team		
NAME	**DISCIPLINE**	**ORGANIZATION**
[redacted]	Structural	GPD Group
[redacted]	Structural	MS
[redacted]	Hydraulics	GPD Group
[redacted]	Geotechnical	GPD Group
[redacted]	Civil/Site	GPD Group
[redacted]	Civil/Site	MS
[redacted]	Hydraulics	MS
[redacted]	Geotechnical	MS

TABLE 2: Independent External Peer Review Expert Reviewers		
NAME	**DISCIPLINE**	**EXPERIENCE**
[redacted]	Geotechnical Engineer	Recognized expert in geotechnical design of I-walls and levees including a understanding of EC 1110-2-6066 Design of I-walls, ETL 110-2-575 Evaluation of I-walls, EM 1110-2-2504 Design of Sheet Pile Walls, and Gap Formation.
[redacted]	Structural Engineer	Recognized expert in structural design of I-walls including a understanding of EC 1110-2-6066 Design of I-walls, ETL 110-2-575 Evaluation of I-walls, EM 1110-2-2504 Design of Sheet Pile Walls, and Gap Formation.

[redacted]	Hydraulic Engineer	Recognized expert in floodplain and floodway analysis for levees and other flood prevention projects including a good understanding of USACE practice for hydraulics.

ATTACHMENT 2: RESUMES

[redacted]
Senior Engineering Manager

Years of Experience
23 (11 with Parsons Brinckerhoff; 12 with others)

Education
[redacted]

Professional Registrations
[redacted]

Key Qualifications
[redacted] has diverse geotechnical engineering experience encompassing flood mitigation, dams, levees, waterfront and marine structures, highway bridges, airports, tunnels, buildings, rapid transit facilities and environmental and industrial facilities. He is responsible for planning and executing subsurface investigations, applying soil mechanics, performing geotechnical analyses, developing design recommendations and developing contract documents for: deep and shallow foundations, earth retaining structures, slope stabilization, cofferdams, ground anchoring systems, dams, ground improvement applications, bulkheads, wharfs and tunneling operations. He is experienced in geotechnical earthquake engineering which includes establishing seismic design criteria, specifying methods of analysis for seismic soil-structure interaction and performing seismic liquefaction and site-specific ground response analyses. He has provided extensive geotechnical engineering support services during construction, including planning and implementing major foundation testing programs. He is also experienced in dam and levee inspection programs. He is familiar with relevant USACE guidance documents such as EC 1110-2-6066 Design of I-walls, ETL 110-2-575 Evaluation of I-walls and EM 1110-2-2504 Design of Sheet Pile Walls.

Relevant Project Experience

Flood Mitigation

- Ohio Department of Transportation, West Columbus LPP, Type II Independent External Peer Review (IEPR), FRA-71-9.74: served as the lead geotechnical reviewer associated with the proposed Highway Widening project for its potential impact to the USACE West Columbus Local Protection Project. Reviewed existing plans, reports and calculations of the existing levee, floodwall and flood control structure. Reviewed proposed construction documents and engineering calculations for the planned highway expansion. Provided comments and reported results using the USACE Dr. Checks system.
- Port Authority of New York and New Jersey Post-Sandy Flood Mitigation Work, Harrison, Port Newark, Hoboken and Jersey City, NJ (2013-2014): Superstorm Sandy in 2012 was the largest Atlantic hurricane on record, and its damage was estimated at about $75 billion and the second costliest hurricane after 2005 Katrina. For this task order, Monty managed and participated in design effort on flood mitigation measures at various PANYNJ facilities including PATH Harrison Maintenance Yard, Port Newark administration and facility buildings, and PATH Hoboken and Exchange Place stations. Work included evaluation and design for flood mitigation measures such as sheet pile/I-type floodwall with cast-in-place concrete, prefabricated flood barriers, horizontal flood covers, and pre-cast concrete bin block flood barriers. Conducted site visits, organized structural and geotechnical design effort, production of contract documents, and shop drawing review.
- New York State Department of Transportation, Emergency Repairs to Ocean Parkway on Jones Beach Island and Robert Moses Causeway on Fire Island, NY (2013-2014). As the lead geotechnical engineer, performed geotechnical design analyses associated with various restoration schemes for the beach front at these two locations, both of which sustained significant damage as a result of SuperStorm Sandy. Analyzed restoration schemes included hardened protection involving steel sheet piling and rock berm as well as unreinforced sand dunes. Work was done under extremely short delivery schedule due to the urgency of the repair work.

- United States Army Corps of Engineers, Periodic Levee Inspections, Keansburg and South Orange, New Jersey (2007-2009): served as inspection team leader for the first periodic inspections of four designated levee systems (Thorns Creek levee and Pews Creek levee located in Keansburg, and East Branch Rahway River Right Bank levee and Left Bank levee located in South Orange). The levee systems included levee embankments, floodwalls, coastal beach dune systems, interior drainage structures, flood damage reduction channels, closure structures and pumping stations. The Keansburg system also included ocean front sand dune system with associated stone groins, drainage features and navigation control facilities. The systems were designed and constructed by the U.S. Army Corps of Engineers (USACE) and operated and maintained by local and state governments. This work is part of a USACE effort to establish a nationwide levee safety program. Work included reviewing current USACE design criteria relevant to flood damage reduction systems, historical design and construction records, and operations and maintenance documents; compiling pre-inspection packets for the designated levee systems, organizing and leading field inspections utilizing a USACE-provided tablet computer loaded with the Levee Inspection System (LIS) software, writing periodic inspection reports documenting inspection results and engineering recommendations, and performing out-briefing to USACE officials.
- New York State Governor's Office of Storm Recovery, Living Breakwaters, off south shore of Staten Island, NY (2014-ongoing). Currently serving as the geotechnical lead for design of 13,000-foot long breakwater structure to be built in the ocean waters between the shoreline and the USACE navigation channel. Project combines engineering measures with considerations on environmental protection and marine life habitats creation. Working together with a coastal dune system, the system is expected to provide significantly improved flood risk mitigation for the southern shore of Staten Island.

Dams and Water Resource

- City of Allentown, Pennsylvania Trout Run Dam Inspection for Seepage Problems: performed on-site inspection and report writing for the 102-foot-high (31-meter-high) earth embankment dam on a water supply reservoir providing drinking water to Allentown and vicinity. Seepage through the bottom weep holes on the concrete spillway was observed to have recently progressed to higher elevations. On-site inspection included observing and recording piezometric levels throughout the dam, taking seepage water samples, and a thorough inspection of the pertinent dam features. Wrote a report to summarize findings and recommendations for further actions.

- South Dam Rehabilitation, Birmingham, Alabama: performed and coordinated geotechnical work for slope stability analyses for the existing dam and proposed dam rehabilitation; a proposed cellular cofferdam structure to replace the existing earth embankment dam; and a permanent braced sheet pile cofferdam structure to facilitate construction and provide access to a proposed valve chamber in the reservoir. Work included subsurface investigation, design calculations, report writing, development of drawings and specifications and participation in a peer review. Slope stability analyses included both static and seismic loadings as well as a seismic deformation analysis. Staged design calculations were performed for the cellular cofferdam and for the braced sheet pile cofferdam, in a joint effort with the structural engineer.

- Big Creek Dam Spillway Rehabilitation, Mobile, Alabama: provided comprehensive geotechnical design services for the rehabilitation of an aged concrete spillway structure, over 1,000 feet (300 meters) in length. The spillway, built in the 1940s, is not capable of passing the Probable Maximum Flood (PMF) by modern design standards and has been subject to structural damage in its base slab and side walls due to soil erosion, hydrostatic uplift pressure and retaining wall instability. Geotechnical work included design of new under drains and side drains, steady-state and transient seepage analyses to determine the uplift pressure, retaining wall stability analysis for the existing wall and proposed wall rehabilitation and design of soil anchors for the spillway slab to resist uplift pressure. Coordinated with structural and hydrologic/hydraulic engineers. Provided technical consultation during soil tiedown anchor installation and testing.

- Formal Dam Safety Inspection of Pawnee Dam, Birmingham, Alabama: performed and coordinated the geotechnical work associated with a formal dam safety inspection of the aged embankment dam structure. Work included subsurface investigation with soil borings and seismic refraction survey for rock surface mapping, static and seismic slope stability analyses in accordance with the U.S. Army Corps of Engineers guidelines and writing design reports.
- Tarbela Dam Tunnel-Five Sticking Gates, Tarbela, Pakistan: performed 3-D solid modeling of the sticking tunnel gates, based on measured spatial coordinates of thousands of points representing the contacting parts of the gates and the guide assemblies. The 50-foot-tall (15-meter-tall) steel gates are essential parts of the irrigation tunnels as part of the world largest concrete gravity dam. The gates stopped functioning because they were stuck in their concrete shafts due to excessive deformation of the gate/shaft assembly. Using software package IDEAS, 3-D computer models of the assembly were established. Kinematical analyses were then carried out to identify the physical interferences at each gate position. Remedial measures were recommended as a result. The gates resumed normal operation after completion of the recommended remedial measures.
- East of Hudson Dam Maintenance Facility, Lewisboro, New York: managed geotechnical subsurface investigation, geotechnical evaluations and analyses, foundation design recommendations and report writing for the development of this building structure planned by the New York City Department of Environmental Protection (NYCDEP).
- Hillview Reservoir Concrete Cover, Yonkers, New York: responsible for geotechnical engineering for the concrete cover structure for the 90-acre (36-hectare) Hillview reservoir, which provides pressure balancing and chemical treatment to 90% of drinking water in New York City. Work included geotechnical seismic code compliance review per Building Code of New York State (adopted from the International Building Code (IBC)), pile foundation and spread footing design, ring wall design, rim embankment stability analysis and dividing wall stability analysis.
- Hillview Reservoir Chlorine Addition Facility, Yonkers, New York: performed geotechnical analyses and foundation design for a new Chlorine Addition Facility at the Hillview Reservoir site, which serves to provide balancing storage and regulate pressures within New York City's water supply system. Foundation design included 10-inch-diameter (0.3-meter-diameter) bored piles (mini-piles) and retaining walls. Seismic analysis was performed in conformance with the IBC 2000.
- Kensico Reservoir Flow Control Modifications, Valhalla, New York: performed design and analysis for the support system of a 50-foot-deep (15-meter-deep) excavation, which accommodates construction activities to modify the supply and return conduits connecting the reservoir and an inactive aerator. The original design involved a vertical support system of soldier piles and timber lagging with a monitoring system consisting of piezometers and settlement markers. Reviewed contractor's alternative design with a combination of sheet piling, sloped open cut and gabion walls. Provided technical guidance and timely resolution to a sheet pile failure incident during a severe storm.

Marine/Waterfront Structures

- Port Everglades Southport Turning Notch Expansion, Broward County, Florida: currently serving as the geotechnical discipline lead for the design of new bulkhead and berthing structures as well as retrofitting existing bulkhead structures associated with the planned expansion of the turning notch. New bulkhead structures are expected to be king pile/sheet pile structures connected to deadman sheeting with tie rods. Environmentally Friendly Bulkhead (EFB) is required in the mangrove area, where ground disturbance during construction is prohibited. The EFB will consist of steel king pile/sheet pile structures tied back with drilled in ground anchors. To retrofit the existing bulkhead to accommodate the new dredge depth, a “toe wall” scheme is being designed.
- Charleston Naval Base Terminal, North Charleston, South Carolina: currently serving as Project Manager for the design of remediation measures for the new Naval Base Container Terminal Containment Wall. The wall was originally designed by others and experienced large deformation during construction. Remediation design would potentially include ground improvements (deep soil mixing) and staged surcharge program. Work will also include design of wick drains and a preload/surcharge program for the tideland and upland fill areas.
- Charleston Veteran’s Terminal Temporary Containment Structures, North Charleston, South Carolina: coordinated the geotechnical design effort to support the design of a temporary containment structure necessary to enclose the environmental dredging effort necessitated by the failure of an existing bulkhead. The containment structure will involve 4-foot diameter interlocked pipe piles, designed to provide a water cutoff and to withstand the design flood event.
- Magellan Oil Terminal, New Haven, Connecticut: provided geotechnical engineering services to support reconstruction of Mooring Dolphin No. 4 at the oil ship terminal. Work included planning and execution of geotechnical subsurface investigation program with borings over water, conducting analysis and design of the mooring dolphin foundation consisting of vertical and battered steel pipe piles, establish pile driving criteria and preparation of contract documents, review of construction submittals and construction phase support.
- Derecktor Ship Yard Improvements, Bridgeport, Connecticut: provided geotechnical engineering services for preliminary design of a proposed ship launching facility to accommodate construction and launching of a 280-foot (85-meter) super yacht. Geotechnical work involves design of an anchored sheet pile bulkhead and a pile supported relief platform. Also performed evaluation of lateral load capacity of existing spud piles for mooring of a dry dock.
- Whitehall Ferry Terminal, New York City: participated in conceptual/preliminary design, design development and final design for the new ferry terminal building. Performed subsurface condition assessment, seismic response and liquefaction evaluation and vertical and lateral load analyses for the 36-inch-diameter (0.9-meter-diameter) drilled caissons socketed into rock. Studied the influence of the caisson loadings on the adjacent existing underground facilities, including tunnels for New York City subway lines, including the 1/9, 4/5 and N/R and the Battery Park Underpass. Developed analytical procedures to evaluate soil pressure on the tunnel wall exerted by loadings of adjacent foundation caissons. Prepared drawings and specifications. Planned a substantial monitoring program for the NYCT/New York City Department of Transportation (NYCDOT) tunnels during foundation construction. Collaborated with NYCT during the design and permitting periods resulting in a timely approval by the agency.

- NRG Arthur Kill Power Plant Improvement, Staten Island, New York: as project manager, coordinated subsurface boring and laboratory testing programs, directed geotechnical analyses and evaluations, provided anchorage system recommendations and wrote geotechnical report for the proposed Marine Life Excursion System surrounding the generating station's intake structure.

[redacted]
Senior Supervising Structural Engineer
Years of Experience
38 (30 with PB; 8 with others)

Education
[redacted]

Professional Affiliations
Structural Engineers Association of Washington

Professional Registrations
Professional Engineer: Washington, 1984 (20252 Civil & Structural); Oregon, 1981 (11152 Civil & Structural); Nevada, 2004 (016530 Civil & Structural); California, 1991 (C48625)
Structural Engineer: California, 1993 (S3744)
Oregon Bridge Inspection Certification: Oregon Department of Transportation
Certified Disaster Service Worker, Safety Assessment Program: State of California (SAPV10935)

Key Qualifications

[redacted] has extensive experience in structural/seismic analysis and design, seismic retrofitting, field inspection, and construction support services. His broad range of project experience includes floodwalls, retaining walls, hydraulic structures, cut and cover structures, bridges and buildings.

Ali has frequently used the USACE design manuals and guidance documents on previous and on-going flood mitigation projects. He is proficient in the use of EC 1110-2-6066 Design of I-walls, ETL 110-2-575 Evaluation of I-walls, EM 1110-2-2504 Design of Sheet Pile Walls, and Gap Formation.

Ali has provided structural engineering services on flood control projects in both **pre-** and **post-Hurricane Katrina** period. Ali is currently providing structural engineering services on Prado Dam Auxiliary Dike Floodwall Project and Coachella Valley Levee Project.

Relevant Project Experience

- Prado Dam Auxiliary Dike Floodwall, USACE Los Angeles District, City of Corona, California: structural engineer-of-record responsible for structural analysis and design of cantilever reinforced concrete floodwall supported on reinforced concrete cast-in-drilled-hole (CIDH) piles. The floodwall is of varying height up to 17 feet high. It is located in a narrow 20-feet wide easement area, approximately 1,000 feet total length. The floodwall is adjacent to a BNSF Railroad track. It will protect the City of Corona in case Prado Dam breaks. It is designed to resist waves similar to those in sea or ocean. Orange County Flood Control District (OCFCD) is a sponsor of this project.
- Coachella Valley Channel Banks, Levees and a Drop Structure Improvement, Riverside County, California: structural engineer responsible for the structural analysis, design and detailing for channel banks, levees and a drop structure related to flood control improvements. The project limits are from Avenue 54 to Thermal Drop Structure.
- South Sacramento County Streams Floodwalls, US Army Corps of Engineers, California: responsible for structural analysis and design of the floodwalls. This project includes levee modifications and construction of 30,000 feet of floodwalls. The floodwalls were of two types: cantilever reinforced concrete and driven structural steel sheet pilings with reinforced concrete caps.
- Whitewater River Basin Levees, Channel & Culvert, Thousand Palms, Riverside County, California: responsible for structural analysis and design of concrete baffle structures, drop structures, water flow control structures and retaining walls. The US Army Corps of Engineers' project consisted of 5 miles of levees, 2 miles of channel and a 100-foot wide by 220-foot long culvert/bridge. [redacted]

[redacted]

- San Marcos Creek Floodwalls & Stoplog Structures, San Marcos, California: responsible for structural analysis and design of reinforced concrete floodwalls and stoplog structure. The project includes approximately 10,000-foot long flood protection levee and 1,400-foot long floodwall as well as stop-log structures.
- City of St. Helena Floodwalls, California: responsible for structural analysis and design of reinforced concrete floodwalls. The project includes approximately 1,100-foot long flood protection levee and 2,800-foot long floodwall to protect Vineyard Valley Mobile Home Park (VVMHP).
- Channel Lining, Inlet & Outlet Structures and Other Drainage Structures, Metrolink, Raymer to Bernson Double Track Project, Los Angeles, California: structural engineer-of-record responsible for structural analysis and design of structural steel pipelines, corrugated steel pipelines, culverts, inlets structures, outlets structures and channel lining. The outlet structures were connected to Limekiln Creek Channel, Bull Creek Channel and Aliso Creek Channel.
- Los Angeles County Flood Control District's Storm Drains, Exposition Light Rail (EXPO2) Project, Los Angeles County, California: structural engineer-of-record responsible for the structural analysis and design of protection system for the existing storm drain structures of LACFCD due to new loadings from EXPO 2 light rail vehicles. Three storm drain structures (Tabor Street, Military Avenue and Barrington Avenue) were deficient under new loading. Design of protection system for these storm drains include using load relieving reinforced concrete slab spanning over the storm drain and modifications to the existing storm drains.
- Sossaman Channel Modifications, Tucson, Arizona: responsible for the structural analysis and design of reinforced concrete retaining walls forming boundary of the water and the concrete lining forming the bottom and sides of the channel. Also, analyzed and designed 8-foot long, 12'-6" wide by 8-foot high reinforced concrete junction structure and outlet structures.
- Drainage Structures, I-10 to Shea Boulevard, Phoenix, Arizona: responsible for the structural analysis and design of 20- feet extension for an existing 36-foot long, 10-foot diameter reinforced concrete drop shaft. The drop shaft connects box culvert with de-aeration chamber. Also, analyzed and designed 50-foot long reinforced concrete box culvert 7 feet by 8 feet for storm sewer, junction boxes, manholes, catch basins, and vaults.
- 7th Street Extension Flood Gate, Levee Modification & Retaining Walls, Sacramento, California: responsible for structural analysis, design and cost estimating of the undercrossing composed of floodgate support walls, conventional reinforced concrete retaining walls and reinforced slurry walls on each side of the 900-foot long undercrossing. The undercrossing dips down and continues under an 80-foot long UPRR bridge. The walls at some locations are more than 17 feet high. The existing levee was cut and roadway was placed with floodgate incorporated in the levee and retaining walls.
- SAFCA (Sacramento Area Flood Control Agency), Beaver Exclusion Structures: responsible for structural analysis and design of structural steel structures supported on reinforced concrete footing.
- John Day Dam, US Army Corps of Engineers, Dalles, Oregon: responsible for structural analysis and design for an elevated reinforced concrete channel with a width of up to 13 feet, supported on concrete bents; the structure is 780 feet long.
- Upper San Fernando Dam, Los Angeles, California: responsible for reviewing engineering report on earth dam describing damage due to Northridge earthquake, repair scheme, and cost estimate. After site visit determining the eligible earthquake damage, approved repair scheme, and independent cost estimate for FEMA funding.
- Lower San Fernando Dam, Los Angeles, California: responsible for reviewing engineering report on earth dam describing damage due to Northridge earthquake, repair scheme, and cost estimate. After site visit determining the eligible earthquake damage, approved repair scheme, and independent cost estimate for FEMA funding.
- City of Moreno Valley Diversion Structure, City of Moreno Valley, California: responsible for structural analysis and design of reinforced concrete box diversion structure. The underground structure is 12'-6" wide by 8 ft high.

[redacted]
Senior Supervising Engineer

Years of Experience
40 (3 with Parsons Brinckerhoff; 37 with others)

Education
[redacted]

Professional Registration
Indiana, 1980 (60018664)

Key Qualifications
[redacted] is a Senior Supervising Engineer having a strong background in hydraulics and hydrology, stormwater management, drainage, erosion control, and water resources. His experience includes a long history of serving the Indiana Department of Transportation (INDOT) with water resources needs. He has also developed excellent working relationships with multiple water related agencies including the United States Corps of Engineers (USACE). He has served as a successful project manager and an effective principal-in-charge on numerous water resources projects, including transportation related projects. [redacted]. [redacted] served as the chairman of the technical committee which developed the floodplain modeling guidelines for Indiana, and served on the technical committee that developed dam safety guidelines for Indiana.

Relevant Project Experience
[redacted] is closely familiar with current USACE practice for hydraulics for levees and other flood prevention projects. He is proficient in use and application of many of the most popular and widely used water resources modeling programs, including the USACE HEC-RAS and HEC-HMS programs, and has applied these programs on multiple infrastructure projects. His work on the Borman Expressway Flood Prevention projects in Indiana and the City of Dallas Trinity River Levee project in Texas, detailed below, both applied current (post-Katrina) USACE standards.

USACE Levee Project Experience

- Ohio Department of Transportation, West Columbus LPP, Type II Independent External Peer Review (IEPR), FRA-71-9.74, PID 93497: served as the lead hydraulics reviewer associated with the proposed Highway Widening project for its potential impact to the USACE West Columbus Local Protection Project. Reviewed existing plans, hydraulic reports and calculations of the existing levee, floodwall and flood control structure. Reviewed proposed construction documents and engineering calculations for the planned highway expansion. Provided comments and reported results using the USACE Dr. Checks system.
- Borman Expressway Flood Prevention Improvements Analysis, Lake County, Indiana: Project manager responsible for determining flood protection measures and preparing designs and construction documents to provide flood protection for the Borman Expressway/I-65 interchange for INDOT. This interchange experienced significant flooding during the September 2008 event, which resulted in closure of the interchange for several days. After a comprehensive analysis including review of available USACE flood models and September 2008 highwater marks, the team determined that a series of floodwalls and gatewell structures would provide protection. The project team prepared designs and developed construction documents for the the installation of approximately 4,200 lineal feet of sheet pile floodwalls (to USACE standards); six new gatewell structures; and paved side ditch along all floodwall sections. The team maintained close coordination with the LaPorte District, USACE, LCRBDC, and the local communities. 2011 – 2012]
- Borman Expressway Flood Prevention Improvements Analysis, Lake County, Indiana: Project manager who performed an analysis of the September 2008 flooding of Borman Expressway.

The project team was responsible for identifying locations of highway flooding and other areas vulnerable to future flooding; assessing and recommending proven flood protection measures; and preparing designs and construction documents. This project required analysis of the Borman Expressway and applicable segments of the Little Calumet Flood Control Levee from the Illinois State line east to Exit 13. Vulnerable areas included Indianapolis Boulevard, Chase Street and the I-65 interchange. The team prepared designs and developed construction documents developed for the installation of a gatewell structure and several flood valves at culverts near the Indianapolis Boulevard interchange; installation of semi-permanent reinforced concrete block closure structure at Chase Street; and repair of the pavement and foundation for an existing post and panel closure structure at 35th Street. The team maintained coordination with the LaPorte District, USACE, the Little Calumet River Basin Development Commission and the local communities. [2010 – 2012]

- City of Dallas, Levee System Rehabilitation Study, Dallas, Texas – The Dallas Floodway consists of approximately 31 miles of levee which channels the Trinity River through the City of Dallas. The most recent Periodic Inspection of the Dallas Floodway system by the US Army Corps of Engineers (USACE) Fort Worth District recommended that FEMA remove the 100-year level of protection certification of the federal levee system. In response to the USACE's recommendations, the City of Dallas engaged a design team to respond to the USACE noted deficiencies, perform an independent inspection of the system, perform analysis for the existing level of protection, and perform design to re-establish the existing appropriated level of protection. [redacted] served as the hydraulic lead for performance of the levee system rehabilitation study and coordinated with the USACE Fort Worth District [2010 – 2012].
- INDOT SR 39 Evaluation of Levee Solutions, Martinsville, Indiana - Project manager assisting INDOT's Seymour District in assessing and determining the condition of an existing earthen levee constructed by INDOT in the early 1950's along with an adjacent reach of the existing SR 39 highway embankment in Martinsville, which combined to form the Martinsville levee system. Due to current Federal Emergency Management Agency (FEMA) remapping efforts in Martinsville, the Martinsville levee system needed to be certified to meet the requirements of 44 CFR 65.10. Under [redacted] direction, the project team determined the existing conditions of the levee and highway embankment and conduits, evaluated improvement alternatives for the Martinsville levee system to achieve FEMA certification; provided alternatives to obtaining FEMA certification; provided estimates of costs; and presented recommendations to INDOT [Nov. 2010- April 2012].
- City of Indianapolis Department of Public Works, Flood Control Levee Inspection and Repair 2001 and 2002, Indianapolis, Indiana. Project manager responsible for inspection, design and construction-related services for improvements to the Indianapolis flood control levee system. Managed categorization of necessary levee and flood structure improvements along White River, Eagle Creek, and Fall Creek. Directed inspection of approximately 100 flap gates and sluice gates previously reported to be in need of repair throughout the Indianapolis levee system. Developed and implemented a television monitoring and videotaping procedure in order to appropriately inspect sluice gates and document conditions for City personnel, contractors, and manufacturers. Many of the sluice gates and manholes had not been inspected for many years. Supervised prioritization of twenty-four levee flood structures or repair based on their condition, size, land use and acreage of the areas of potential inundation behind the levee, and ownership. Supervised preparation of construction plans, technical specifications, and bid documents for repair or replacement of these flood control structures utilizing digital photography for construction bid package amount of approximately $600,000. Expedited development of the construction bid package, including final plans and technical specifications, in order to meet the city's request to have completed within 60 days from receiving authorization to proceed. Used available resources and carefully tracked progress of the project in order to meet this accelerated schedule. [2001 – 2002]

ATTACHMENT 3: CONFLICT OF INTEREST FORMS

APPENDIX B

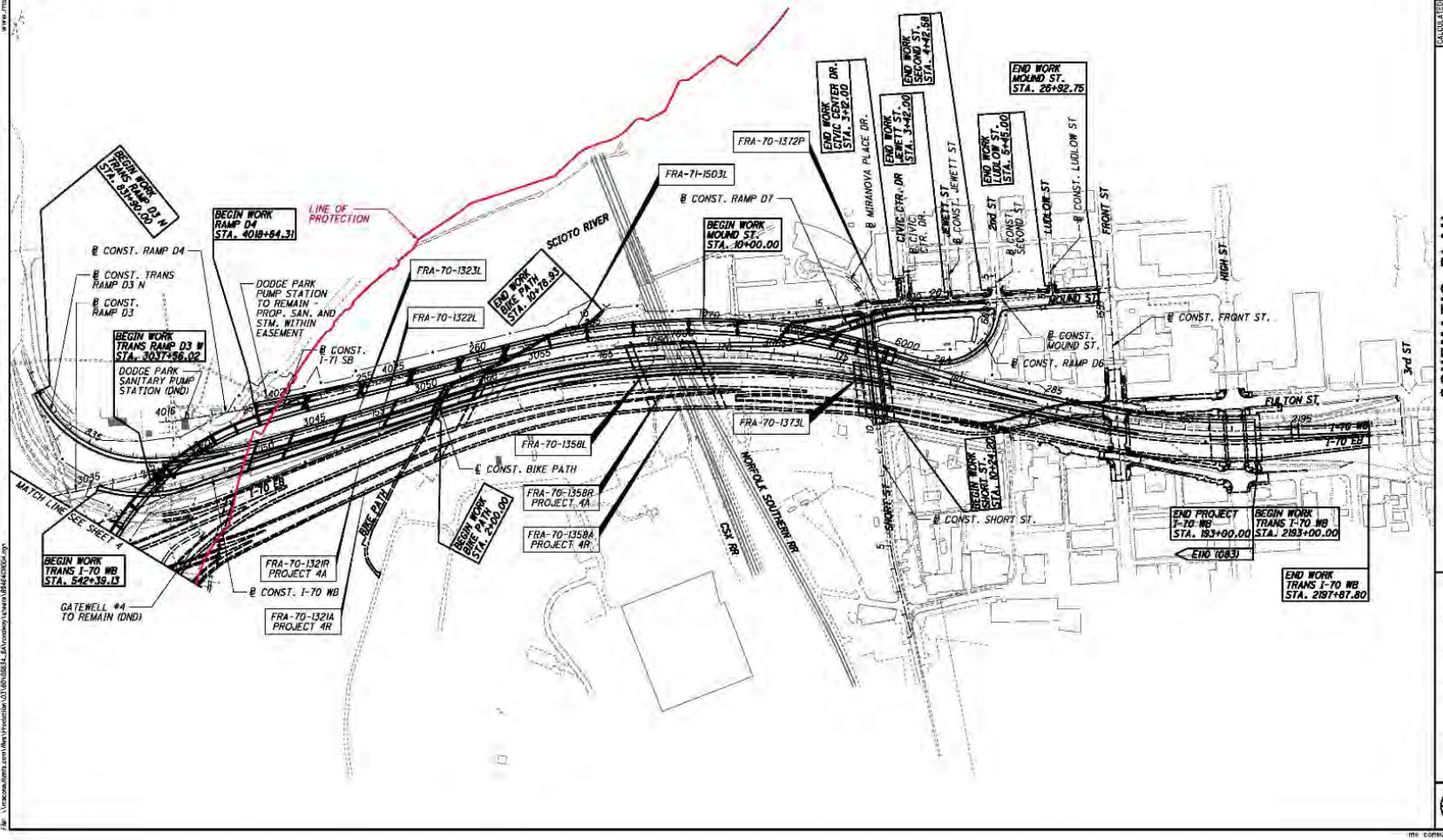
EXHIBITS – SELECTED SITE PLANS

OHIO DEPARTMENT OF TRANSPORTATION

ALIGNMENT NAME:	CONNECT TO:
TRANS RAMP D3 N	EXISTING 315 NB
TRANS RAMP D3 W	EXISTING I-70 WB
TRANS I-70 WB (WEST)	EXISTING 315 NB
TRANS I-70 WB (EAST)	EXISTING I-70 WB

LEGEND
(DND) = DO NOT DISTURB

FOR I-70 EB GEOMETRICS, SEE FRA-70-12.98



HORIZONTAL SCALE IN FEET 0 100 200 400

CALCULATED ACW
CHECKED

SCHEMATIC PLAN

FRA-70-13.10

ms consultants, inc.

34" x 22"

Model: Sheet View: FENCE_VIEW1
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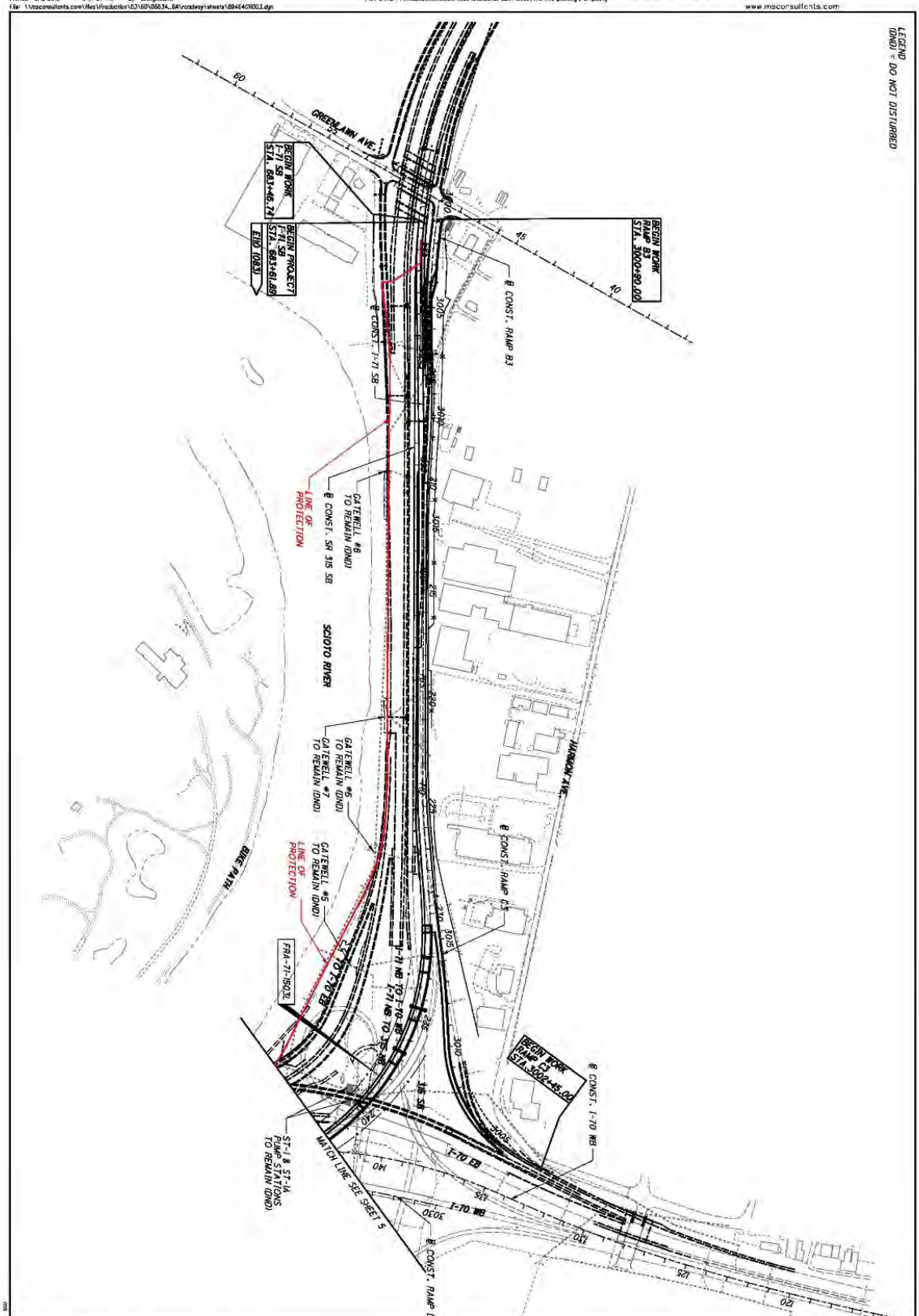
PCF: 60-06634_6A_Columbus

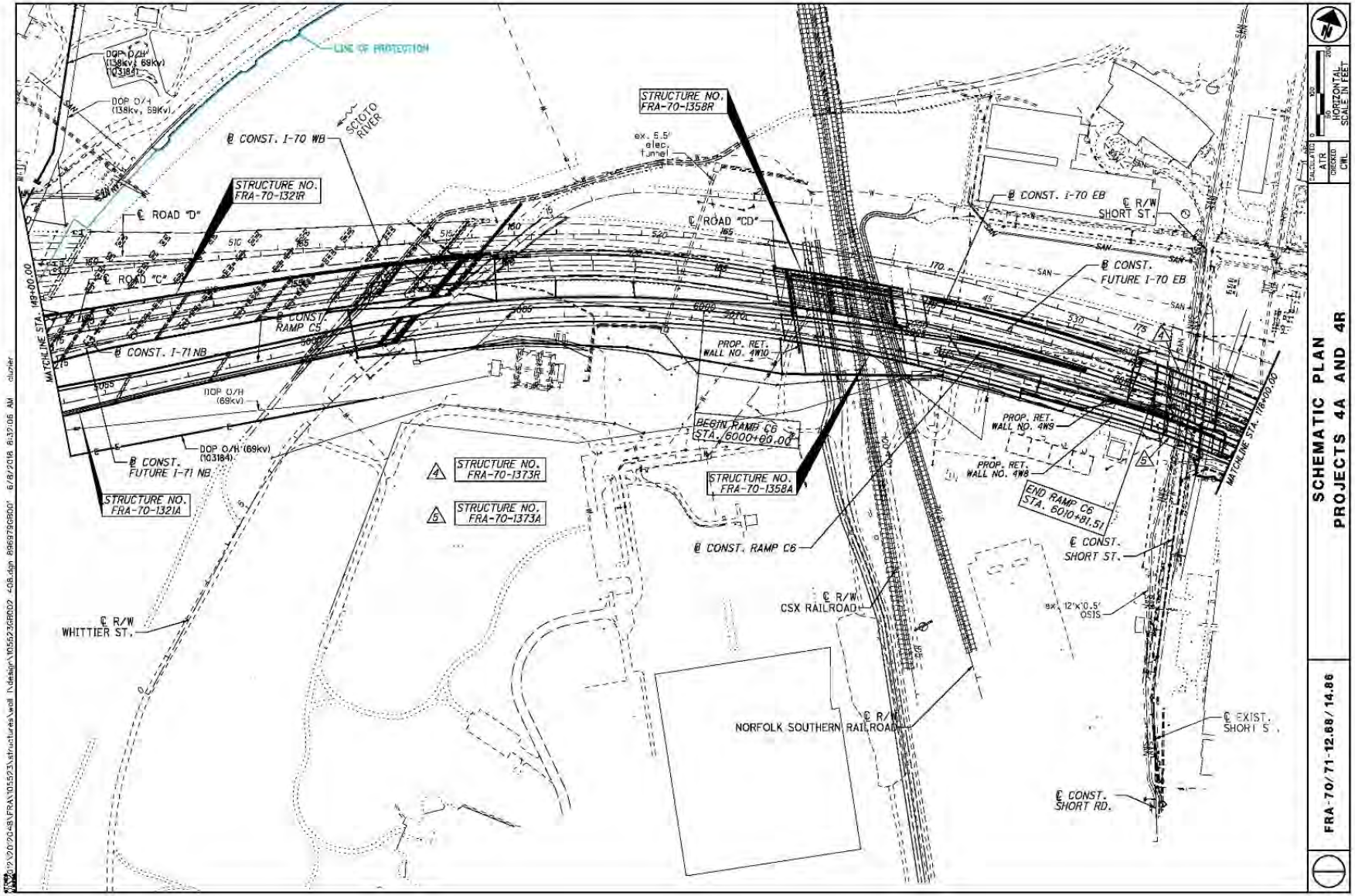
Ohio DOT Workspace
70\71 Fast Interchange 6A

www.msconsultants.com



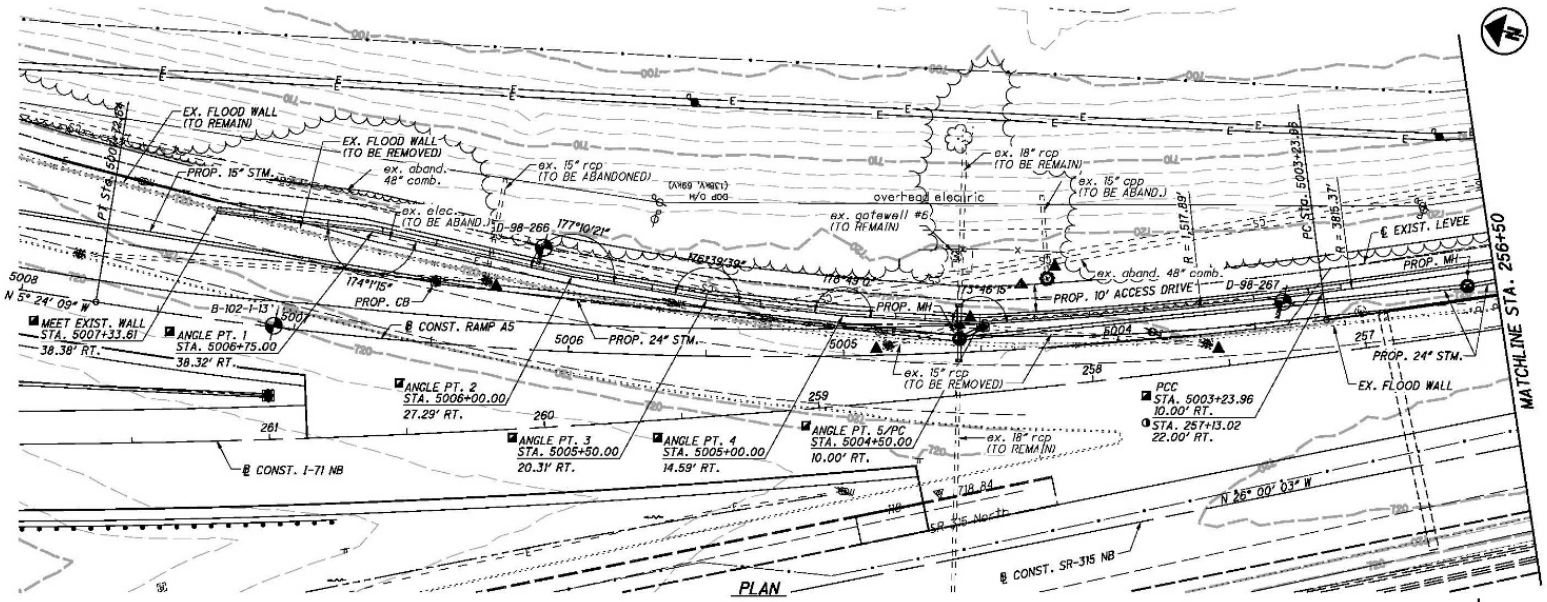
4 / 995	FRA-70-13.10	SCHEMATIC PLAN	CALCULATED ACW / CHECKED / HORIZONTAL SCALE IN FEET

ms consultants, inc.

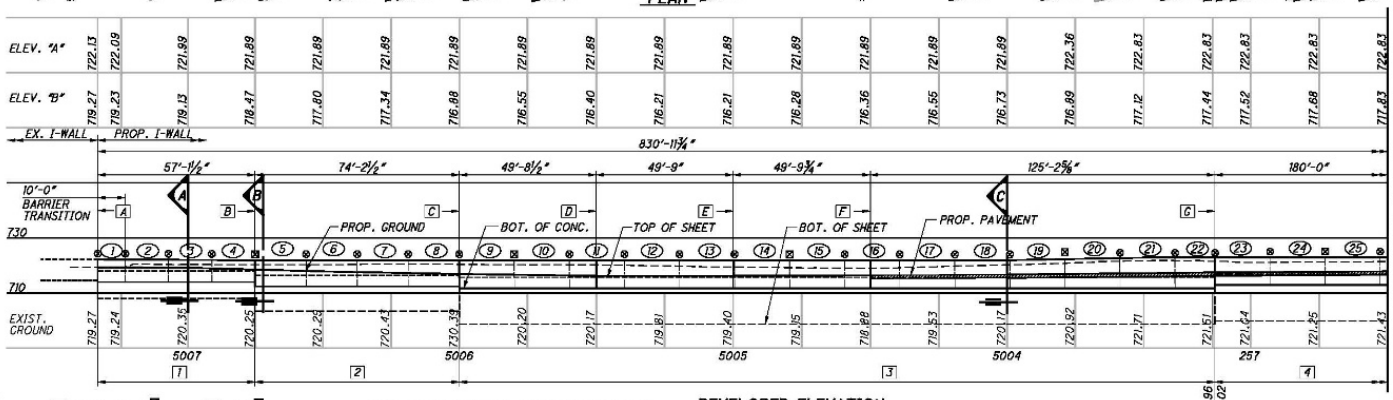


SCHEMATIC PLAN
PROJECTS 4A AND 4R

FRA-70/71-12.68/14.86



PLAN



DEVELOPED ELEVATION

LEGEND:

- A BEGIN WALL STA. 5007+33.61 38.38' RT.
- B ANGLE PT. 1 STA. 5006+75.00 38.32' RT.
- C ANGLE PT. 2 STA. 5006+00.00 27.29' RT.
- D ANGLE PT. 3 STA. 5005+50.00 20.31' RT.
- E ANGLE PT. 4 STA. 5005+00.00 14.59' RT.
- F ANGLE PT. 5/PC STA. 5004+50.00 10.00' RT.
- G PCC STA. 5003+23.96 10.00' RT.
- H END WALL STA. 257+06.28 22.00' RT.
- 1 BOT. CONC. 714.00 TOP SHEET 718.00 BOT. SHEET 708.00
- 2 BOT. CONC. 712.38 TOP SHEET 716.38 BOT SHEET 703.38
- 3 BOT. CONC. 711.71 TOP SHEET 715.71 BOT. SHEET 698.71
- 4 BOT. CONC. 712.95 TOP SHEET 716.95 BOT. SHEET 699.95

- ▲ INDICATES MEASURED TO LOCAL TANGENT
- ◐ REFERENCES ℄ CONST. 1-71 NB
- ◪ REFERENCES ℄ CONST. RAMP A5
- ⊗ INDICATES CONTRACTION JOINT
- ⊠ INDICATES EXPANSION JOINT
- ▲ INDICATES EX. CATCH BASIN OR MANHOLE BE REMOVED
- SOIL BORING

NOTES:

1. FOR SECTIONS A, B AND C SEE SHT. NO. 3/5.
2. FOR LOCATION OF ELEV. "A" AND ELEV. "B" SEE SHT. NO. 3/5.

DESIGNER AGENCY
GPD GROUP
Gannett Fleming, Parsons Brinckerhoff, Dewberry, Inc.
8800 Worldwide Blvd., Suite 100, Cincinnati, OH 45241 513-772-7777
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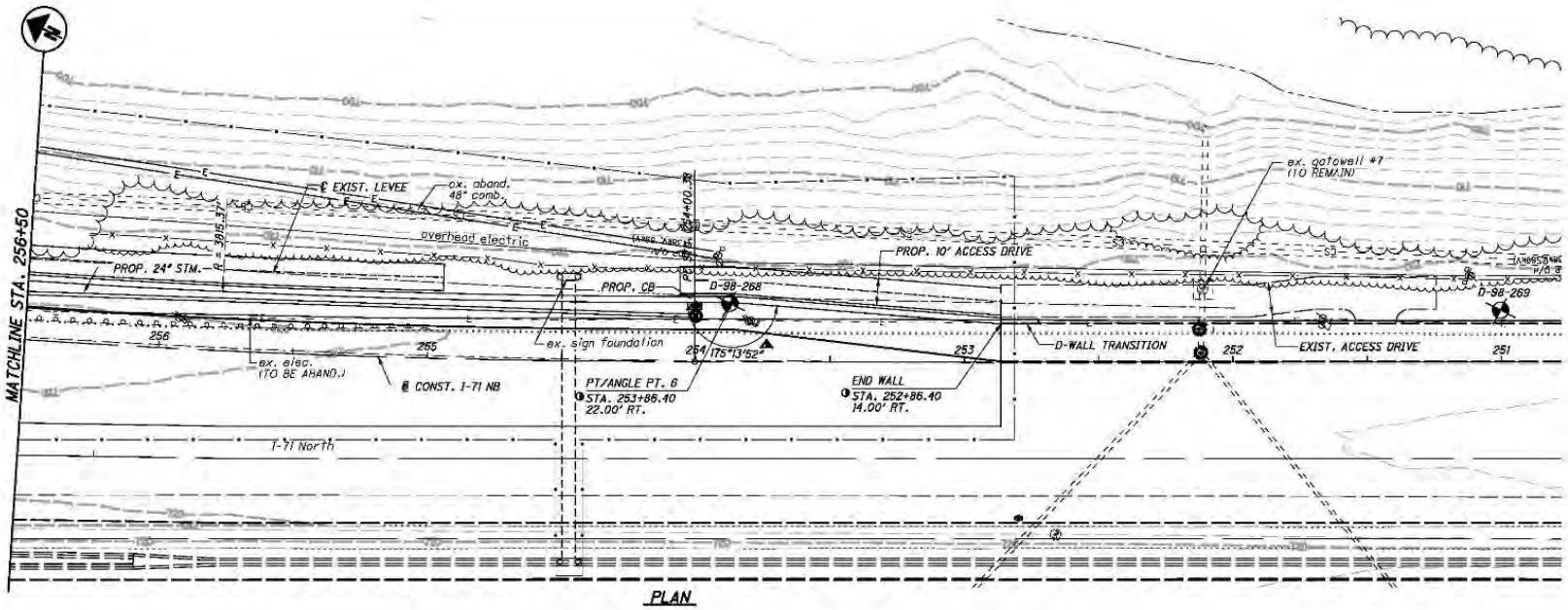
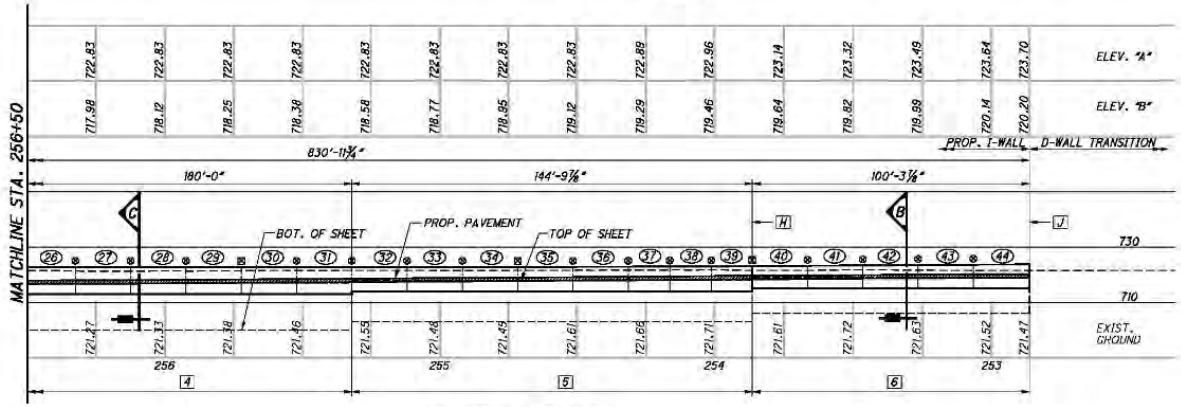
DESIGNED TJW	DRAWN RPR	REVISED	DATE 02-06-18	DGN	FILE NUMBER N/A
CHECKED DJC	REVISED		STRUCTURE		

FLOODWALL PLAN & ELEVATION
RAMP A5 & I-71 NB

FRA-70-12.68
PID No. 105523



PLAN



DEVELOPED ELEVATION

NOTES:

1. FOR SECTIONS A, B AND C SEE SHT. NO. 3/5 .
2. FOR LOCATION OF ELEV. "A" AND ELEV. "B" SEE SHT. NO. 3/5 .

LEGEND:

- H PT/ANGLE PT. 6 STA. 253+86.40 ◐ 22.00' RT.
- J END WALL STA. 252+86.40 ◐ 14.00' RT.
- 4 BOT. CONC. 712.95 TOP SHEET 716.95 BOT. SHEET 699.95
- 5 BOT. CONC. 714.00 TOP SHEET 718.00 BOT. SHEET 703.00
- 6 BOT. CONC. 715.05 TOP SHEET 719.05 BOT. SHEET 706.05

▲ INDICATES MEASURED TO LOCAL TANGENT
◐ REFERENCES ℄ CONST. I-71 NB
◪ REFERENCES ℄ CONST. RAMP A5
⊗ INDICATES CONTRACTION JOINT
⊠ INDICATES EXPANSION JOINT
▲ INDICATES EX. CATCH BASIN OR MANHOLE BE REMOVED
SOIL BORING

DESIGN AGENCY
GPD GROUP
Copyright GPD Group, Inc. Dublin, Ohio 43017 - 614.755.1111
Copyright Gale Ely, Columbus, Ohio 43215 - 614.224.2275

DESIGNED	DRAWN	REVISED	DATE
TJM	RPR	DGN	2-6-18
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DJC		N/A	

FLOODWALL PLAN & ELEVATION

RAMP A5 & I-71 NB

FRA-70-12.68
PID No. 105523

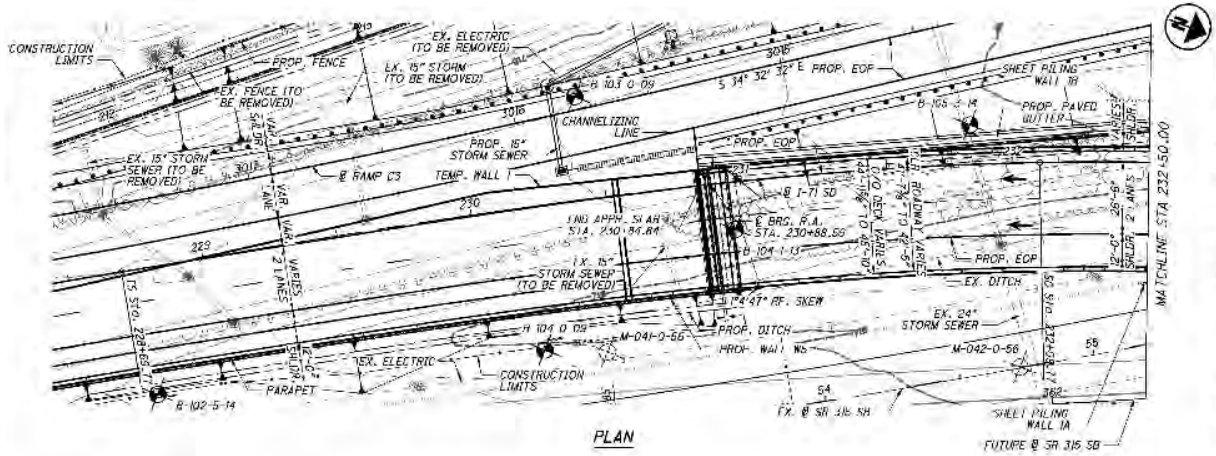
HORIZONTAL SCALE IN FEET

CALCULATED ATR
CHECKED CWL

SCIOTO RIVER CROSSING BRIDGES

FRA-70

012\2012048\FRA\105523\structures\wall_1\design\105523_408.dgn 896979GB001 6/8/2018 8:29:40 AM cluzier



PLAN

BENCHMARK DATA

BM #1 STA. 6002+17.25 , ELEV. 737.79 , OFFSET 42.35 RT, RAMP D6
BM #2 STA. 332+44.01 , ELEV. 719.82 , OFFSET 2.39 RT, SR 315 NB
BM #3 STA. 6004+80.97 , ELEV. 707.50 , OFFSET 48.23 RT, RAMP A6

FOR ADDITIONAL BENCHMARK INFORMATION, SEE ROADWAY PLAN SHEET

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
ALL EXISTING UTILITIES TO REMAIN (U.N.O.)

DESIGN TRAFFIC:

RAMP TO I 71 SB/315 OVER SCIOTO RIVER
2015 ADT = 29,550 2015 ADTT = 4,450
2035 ADT = 38,300 2035 ADTT = 5,745
DIRECTIONAL DISTRIBUTION = 1.0

I 71 SB (WEST OF SR 315 SPLIT)
2015 ADT = 16,950 2015 ADTT = 3,220
2035 ADT = 21,100 2035 ADTT = 4,000
DIRECTIONAL DISTRIBUTION = 1.0

LEGEND

PROJECT BORING LOCATION

HISTORIC BORING LOCATION

* DISTANCE MEASURED ALONG ℄ I-71 SB

HYDRAULIC DATA

DRAINAGE AREA = 1,629 SQ. MILES
Q (100) = 75,000 CFS V (100) = 5.4 FT/S
Q (50) 62,100 CFS V (50) 5.0 FT/S
STRUCTURE CLEARS THE 50 YEAR DESIGN HW BY 29.92 FEET

HORIZONTAL CURVE DATA I-71 SB

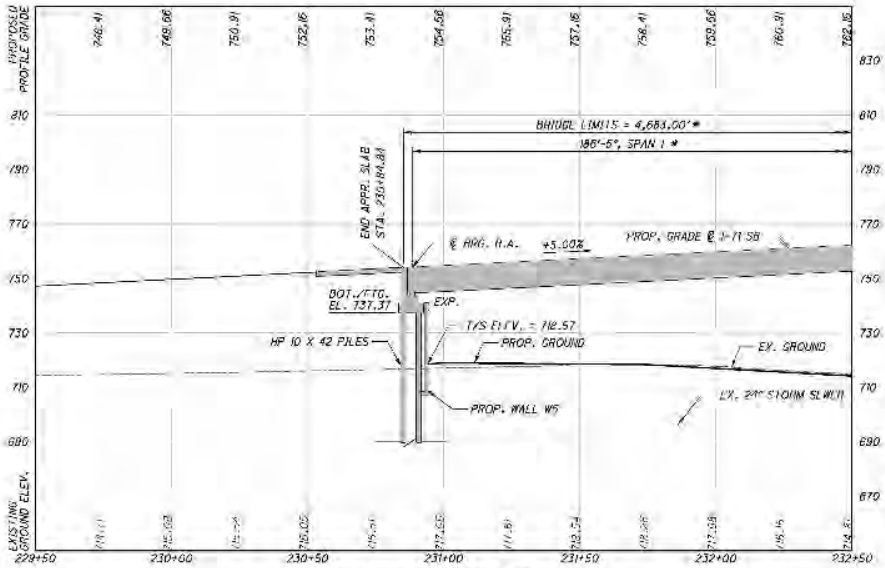
CURVE C8	CURVE C9
P.I. STA. 230+96.70	P.I. STA. 242+59.88
Ls = 340.00'	Δ = 34° 59' 20" (RT)
θs = 8° 30' 00"	Dc = 5° 00' 00"
Lt = 226.93'	R = 1,145.92'
ST = 113.57'	T = 1,049.83
x = 339.25'	L = 1,699.78
y = 16.79'	E = 408.20
k = 169.88'	PC STA. 232+09.77
p = 4.20'	PT STA. 249+09.55
TS STA. 228+69.77	V (des) = 55 MPH
SC STA. 232+09.77	e (max) = 0.060
	WIDENING = 26.50'

ESTIMATED PILE LENGTH

LOCATION	EST. LENGTH
REAR ABUT.	85.0 FT.
FWD. ABUT.	100.0 FT.

TOP OF ROCK ELEVATION

BORING	TOP OF SHALE	TOP OF LIMESTONE
B-104-1-13	-	654.0±



BRIDGE PROFILE ALONG ℄ I-71 SB

EXISTING STRUCTURE

TYPE: CONTINUOUS CURVED STEEL W/ REINFORCED CONCRETE DECK AND CONCRETE COLUMN PIERS AND CONCRETE STUB ABUTMENTS
SPANS: 68.0'±, 95.25'±, 90.25'±, 83.5'±, 108.0'± & 124.0'± (C/C BRGS.)
ROADWAY: 30' 0" FACE TO FACE OF PARAPET
LOADING: HS20 44 & INTERSTATE ALTERNATE
SKEW: VARIES
APPROACH SLABS: AS-1-67, 25'-0" LONG
ALIGNMENT: VARIES
SUPERELEVATION: 0.0833'/FT
WEARING SURFACE: 1" MONOLITHIC CONCRETE
STRUCTURE FILE NO.: 2507579
DATE BUILT: 1975
DISPOSITION: TO BE REMOVED

PROPOSED STRUCTURE

TYPE: 3 UNIT (3 SPAN, 2 SPAN, AND 2 SPAN) COMPOSITE WELDED STEEL GIRDER (ASTM A709 GRADE 50W & GRADE 70W) WITH REINFORCED CONC. DECK, REAR AND FORWARD ABUTMENTS ON PILES BEHIND MSE WALLS, PIERS ON DRILLED SHAFTS
SPANS: 186.4', 232.00', 223.89', 253.82', 253.82', 253.82', 240.85', 176.35', 102.78', 213.46', 242.06', 219.22', 214.52', 200.00', 197.27', 163.40', 198.49', 237.00', 210.00', 201.5', 217.50', 101.50', 128.34' C/C BEARINGS, MEASURED ALONG BASE LINE
ROADWAY: VARIES - MIN. 41'-7¾", MAX. 85'-2" T/T PARAPET
LOADING: HL93 AND FUTURE WEARING SURFACE 0.06 KSF
SKEWS: VARIES, SEE REF. CHORD DIAGRAMS
WEARING SURFACE: 1" MONOLITHIC CONCRETE
APPROACH SLABS: AS 1-16, 30' LONG (MODIFIED)
ALIGNMENT: VARIES
SUPERELEVATION: VARIES, MAX. 0.06
COORDINATES: LATITUDE 39° 58' 55"
LONGITUDE 83° 00' 59"

DESIGN AGENCY: mb consultants, inc. 2221 Schrock Road Columbus, Ohio 43229

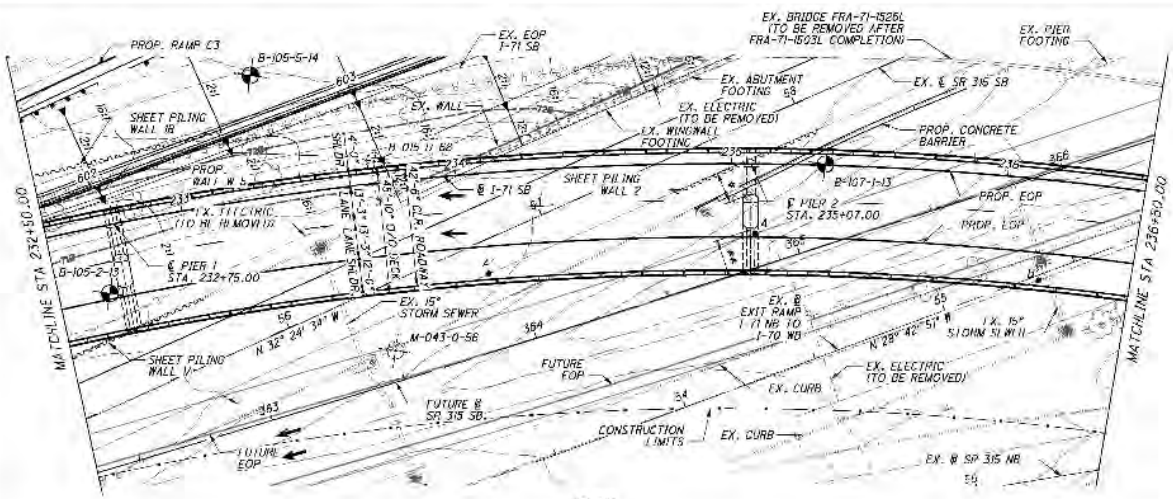
DESIGNED	DRAWN	REVIEWED	DATE
TPA	CMB	SR/TS	05-Sep
CHECKED	REVISED	STRUCTURAL	FILE NAME
TEW		91.00	75100.25

FRANKLIN COUNTY
STA. 230+84.84
STA. 717+67.34

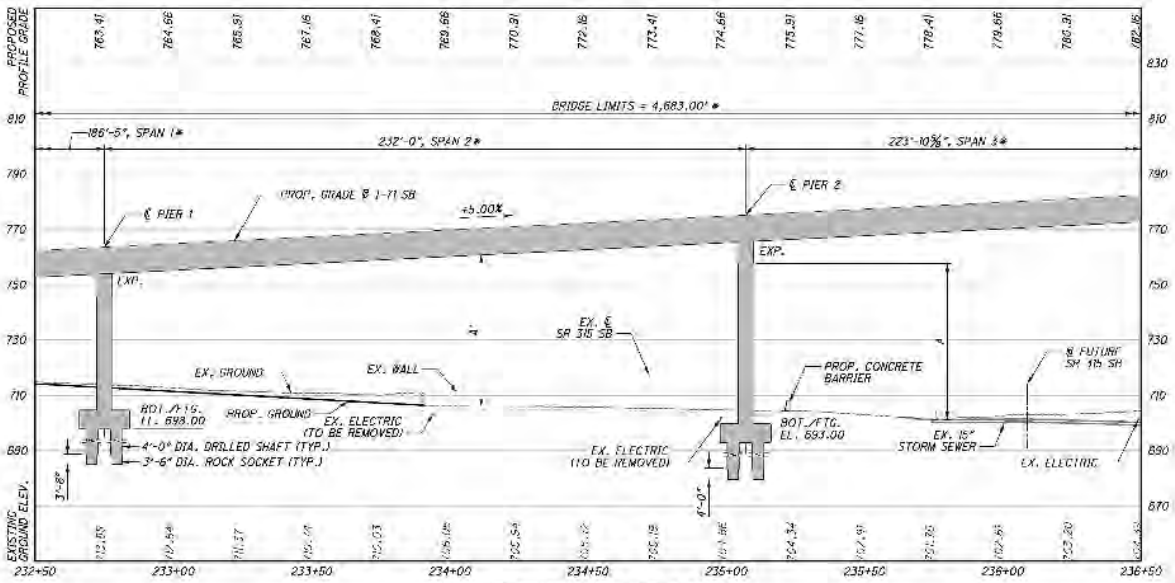
SITE PLAN (1 OF 12)
BRIDGE NO. FRA-71-1503L
I 71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No 89484

1 / 268



PLAN



BRIDGE PROFILE ALONG @ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- HISTORIC BORING LOCATION
- * DISTANCE MEASURED ALONG @ I-71 SB

● 15'-6" (REQUIRED MINIMUM VERTICAL CLEARANCE)
PT. A = 42.60' ACTUAL VERTICAL CLEARANCE
PT. A' = 52.41' ACTUAL VERTICAL CLEARANCE
PT. B' = 64.00' ACTUAL VERTICAL CLEARANCE (SHOWN IN PROFILE VIEW ON NEXT SHEET)

* = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
11'-5⅞" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

** = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
13'-10¼" = ACTUAL HORIZONTAL CLEARANCE (TO BE PROTECTED BY BARRIER)

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET V269.

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-105-2-13	-	651.0±
B-107-1-13	-	650.2±

DESIGN AGENCY: ms consultants inc. 2221 Schrock Road Columbus, OH 43229

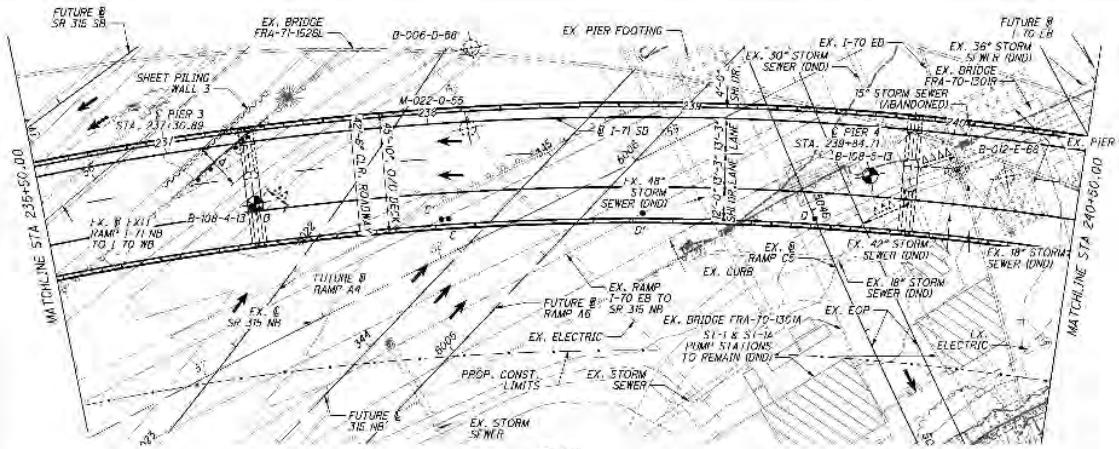
REVISED	DATE
SLG	15-Sep
91-FRA-71-1503L	2510125

DESIGNED	DRAWN	REVIEWED
CMA	CMB	SLG
CHECKED		
FBM		

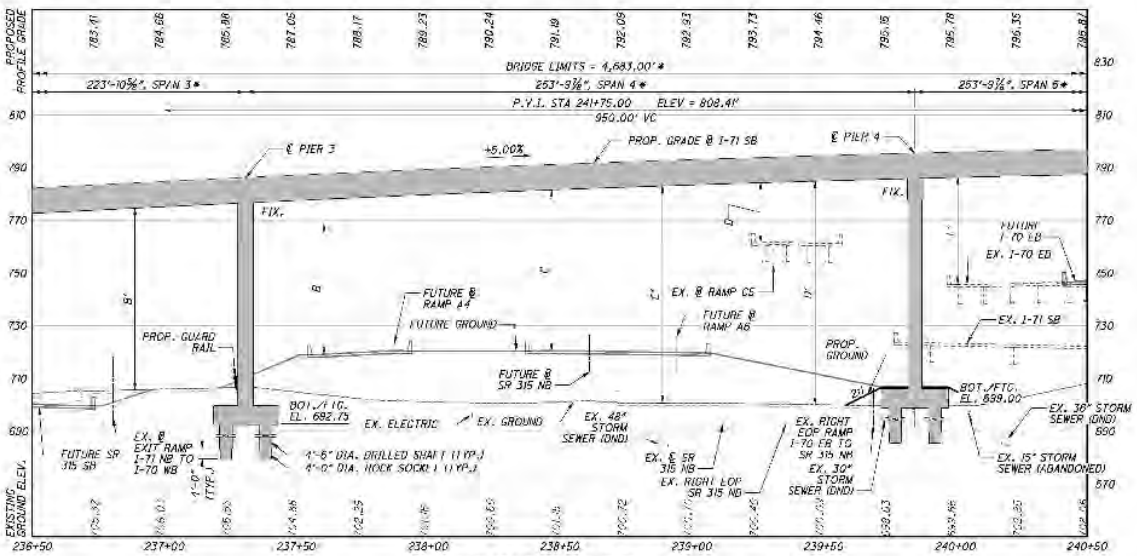
FRANKLIN COUNTY
STA. 230+84.84
STA. 271+67.84

SITE PLAN (12 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



BRIDGE PROFILE ALONG @ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- HISTORIC BORING LOCATION
- * DISTANCE MEASURED ALONG @ I-71 SB

* 15'-6" REQUIRED MINIMUM VERTICAL CLEARANCE

PT. B = 39.22' ACTUAL VERTICAL CLEARANCE

PT. B' = 64.00' ACTUAL VERTICAL CLEARANCE (PT. ON PREVIOUS SHEET IN PLAN VIEW)

PT. C = 57.87' ACTUAL VERTICAL CLEARANCE

PT. C' = 76.22' ACTUAL VERTICAL CLEARANCE

PT. D = 20.25' ACTUAL VERTICAL CLEARANCE

PT. D' = 89.09' ACTUAL VERTICAL CLEARANCE

PT. E' = 42.54' ACTUAL VERTICAL CLEARANCE (PT. ON NEXT SHEET IN PLAN VIEW)

Δ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
17'-10½" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

ΔΔ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
9' 8¾" = ACTUAL HORIZONTAL CLEARANCE (TO BE PROTECTED BY BARRIER)

ΔΔΔ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
19'-0½" = ACTUAL HORIZONTAL CLEARANCE (TO BE PROTECTED BY BARRIER)

ΔΔΔΔ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
14' 5⅝" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

TOP OF ROCK ELEVATION

BORING	TOP OF SHALE	TOP OF LIMESTONE
B-108-4-13	–	653.22
B-108-5-13	–	645.84

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 17282.

DESIGN AGENT: ms consultants, inc. 2221 Schrock Road Columbus, OH 43229

REVISED	DATE
08-13	18-Sep

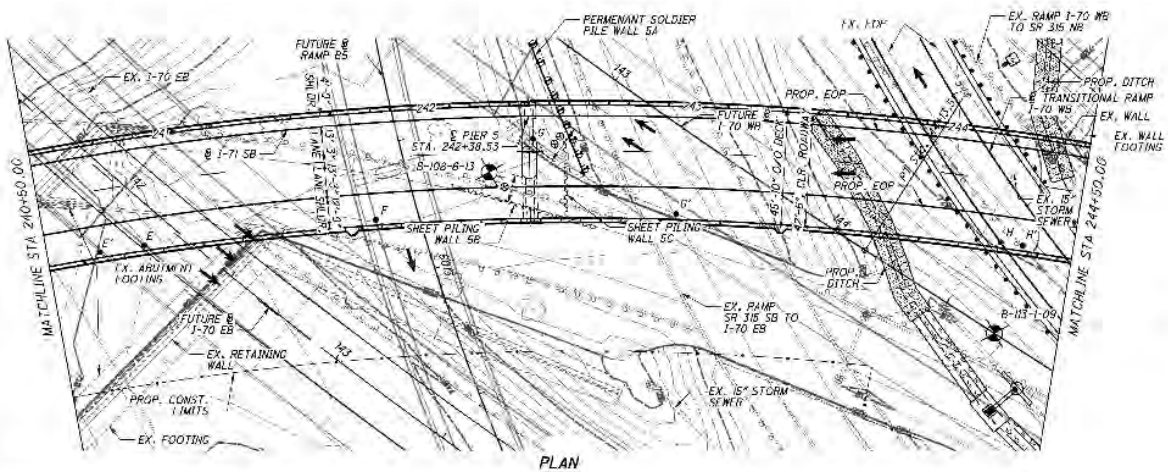
DRAWN	CHKD
RJ/SSE	STI/JTJ/JCS/MMJ/PM/DJS

DESIGNED	CHECKED
DJA	FHM

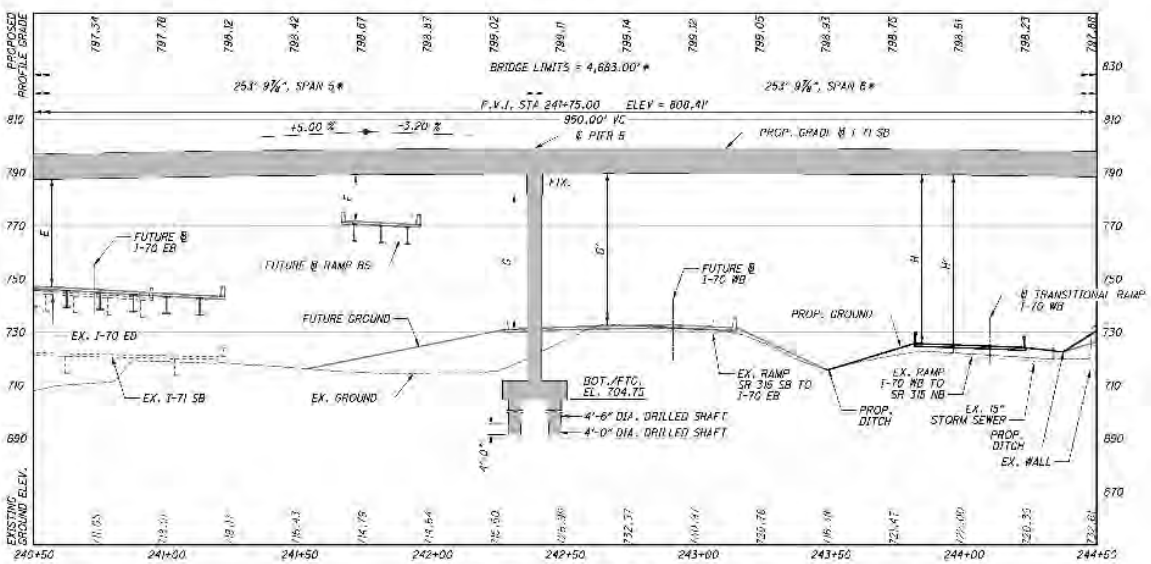
FRANKLIN COUNTY
STA. 230+84.84
STA. 277167.84

SITE PLAN (3 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- * DISTANCE MEASURED ALONG ℄ I-71 SB

▪ 15'-6" REQUIRED MINIMUM VERTICAL CLEARANCE

PT. E = 40.10' ACTUAL VERTICAL CLEARANCE

PT. E' = 42.54' ACTUAL VERTICAL CLEARANCE (SHOWN IN PROFILE VIEW ON PREVIOUS SHEET)

PT. F = 16.31' ACTUAL VERTICAL CLEARANCE

PT. G = 35.84' ACTUAL VERTICAL CLEARANCE

PT. G' = 54.74' ACTUAL VERTICAL CLEARANCE

PT. H = 60.88' ACTUAL VERTICAL CLEARANCE

PT. H' = 86.33' ACTUAL VERTICAL CLEARANCE

⊗ = 23'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
10'-4⅝" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

⊗⊗ = 23'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
14'-1⅞" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-108-6-13	-	651.04

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 12268.

DESIGN AGENCY
mb consultants, inc.
2227 Sawver Road
Columbus, OHIO 43220

REVIEWED	DATE
SLG	18-Sep
9/12/2016	--- NAD/NGVD
2580-75	

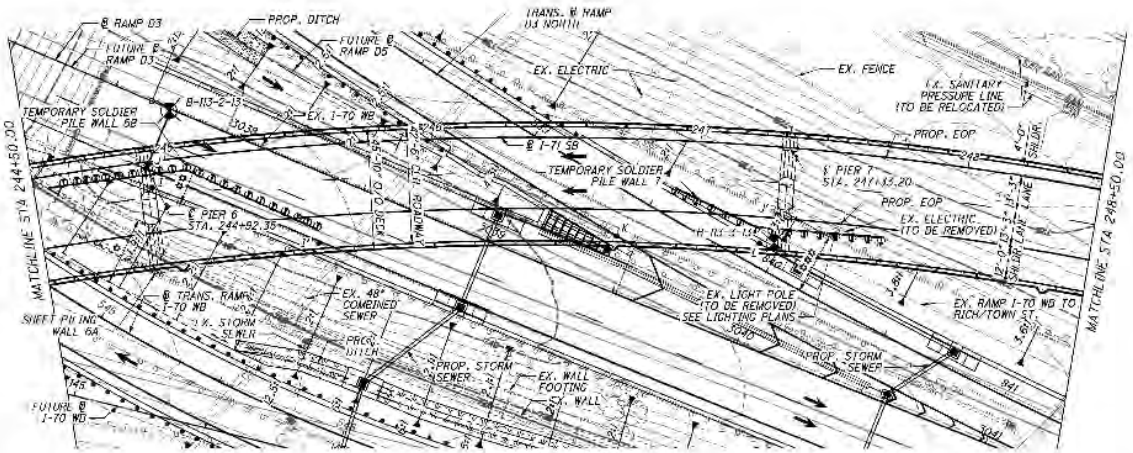
DRAWN	DESIGNED
CMB	TMA
8/1/2016	CHECKED
	TBM

FRANKLIN COUNTY
STA. 230+84.84
STA. 277+67.84

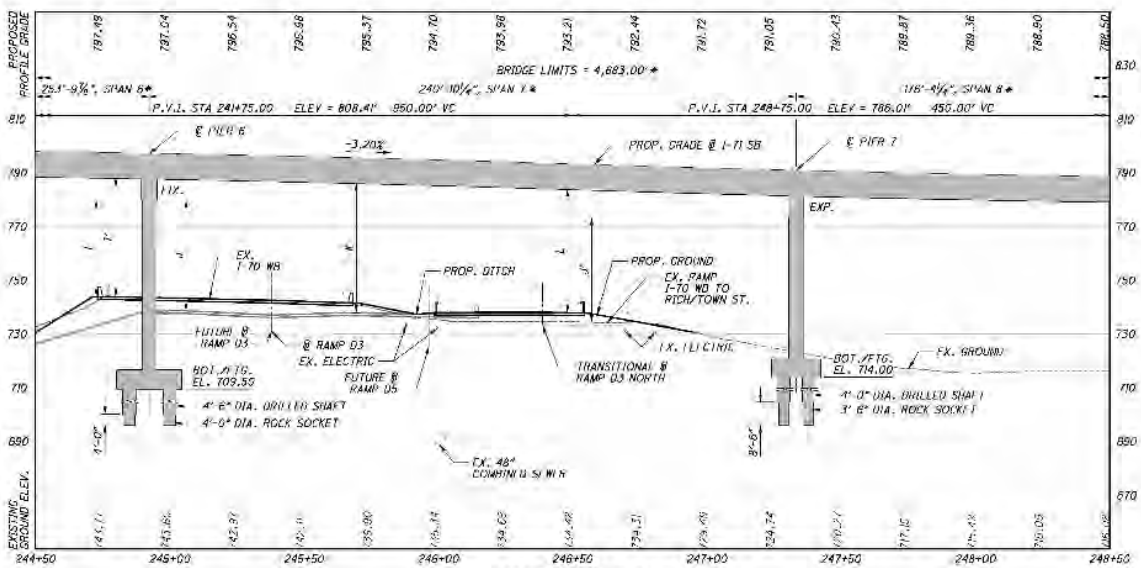
SITE PLAN (4 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464

4 / 268



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

LEGEND

PROJECT BORING LOCATION

DISTANCE MEASURED ALONG ℄ I-71 SB

■ 15'-6" REQUIRED MINIMUM VERTICAL CLEARANCE

PT. I = 22.73' ACTUAL VERTICAL CLEARANCE

PT. I' = 42.01' ACTUAL VERTICAL CLEARANCE

PT. J = 37.91' ACTUAL VERTICAL CLEARANCE

PT. J' = 35.14' ACTUAL VERTICAL CLEARANCE

PT. K = 43.71' ACTUAL VERTICAL CLEARANCE

PT. L = 40.77' ACTUAL VERTICAL CLEARANCE

☆ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
25'-6¾" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

☆☆ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
15'-0¾" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

☆☆☆ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
22'-10⅝" ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-113-2-13	-	654.1±
B-113-3-13	658.3±	653.3±

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 1/268.

DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, Ohio 43228

REVIEWED: SLG DATE: 16-Sep

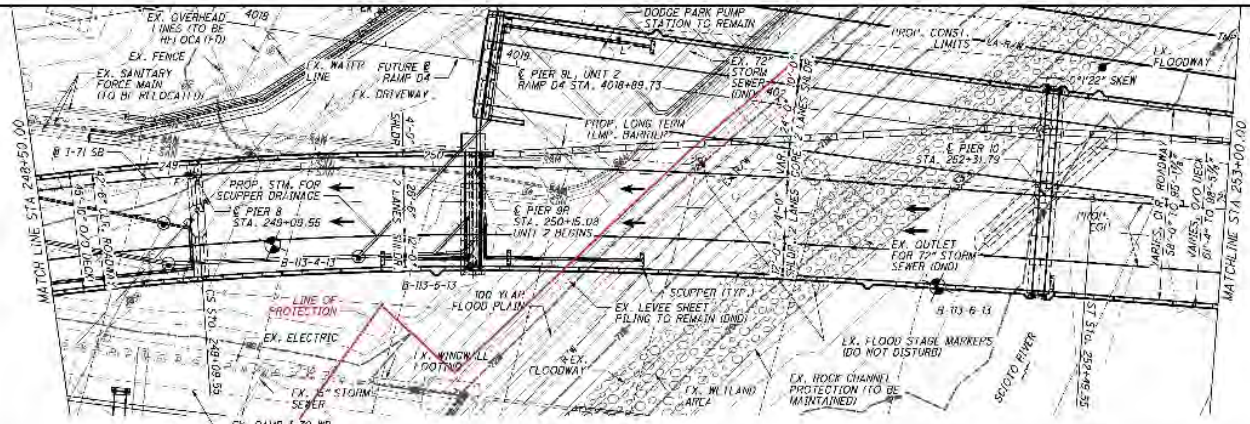
DRAWN: CMA REVISED: 2510025

DESIGNED: CMA CHECKED: FBW

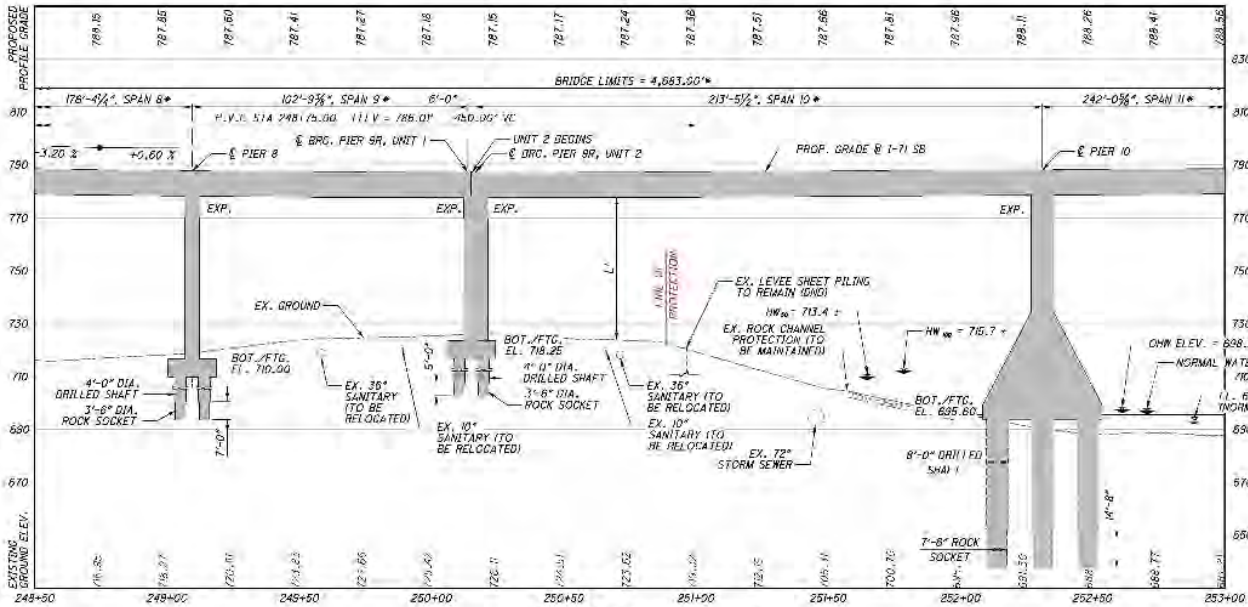
FRANKLIN COUNTY STA. 230+84.84 STA. 277+67.84

SITE PLAN (5 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

LEGEND

PROJECT BORING LOCATION

* DISTANCE MEASURED ALONG ℄ I-71 SB

HORIZONTAL CURVE DATA

I-71 SB CURVE C10
P.I. STA. 250+23.12
I.a = 340.00'
Δ a = 8° 30' 00"
LT = 226.93'
ST = 113.57'
x = 339.25'
y = 16.19'
k = 169.88'
p = 4.20'
CS STA. 249+09.55
ST STA. 252+49.55

I-71 SB CURVE T8
STA. = 252+49.55
STA. = 261+80.04
L = 930.49'
BRG. = N 70° 49' 44" E

RAMP D4 CURVE C24
P.I. STA. 4015+18.08
I.a = 140.00'
Δ a = 7° 00' 00"
LT = 93.41'
ST = 46.73'
x = 139.79'
y = 5.10'
k = 69.97'
p = 1.42'
CS Sta. 4014+71.35
ST Sta. 4015+11.35

RAMP D4 CURVE C25
P.I. Sta. 4021+67.61
Δ = 5° 33' 30" (LT)
Da = 0° 30' 00"
R = 11,459.15'
T = 556.27'
L = 1,111.68'
E = 13.49'
ST Sta. 4016+11.35
YT Sta. 4027+23.00
V (des) = 60 MPH
e (max) = NC
WIDENING = N/A

- 15'-6" MIN. REQUIRED VERTICAL CLEARANCE

PT. L' = 51.94' ACTUAL VERTICAL CLEARANCE

- 50'-0" MIN. REQUIRED VERTICAL CLEARANCE (OVER EX. LIFT STATIONS)

PT. L'' = 52.87' ACTUAL VERTICAL CLEARANCE

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-113-4-13	652.7±	649.2±
B-113-5-13	652.2±	650.8±
B-113-6-13	652.2±	647.6±

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 27B8.

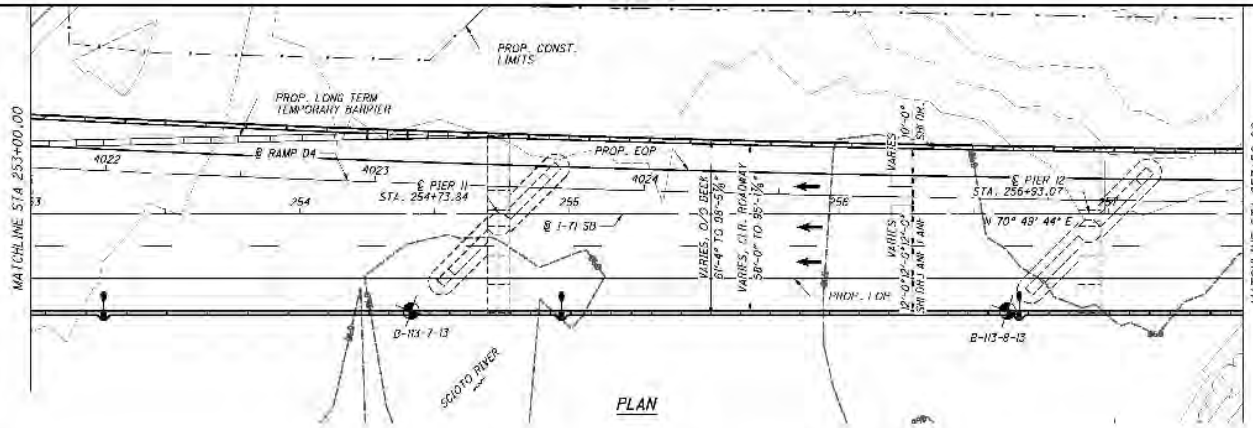
DESIGN AGENCY
mks consultants, inc.
2221 Schrock Road
Columbus, Ohio 43228

DATE	REVISED	DRAWN	DESIGNED
15-Sep	9/12/2016	CMA	CMA
25/10/25	REVISE	REVISE	CHECKED SHM

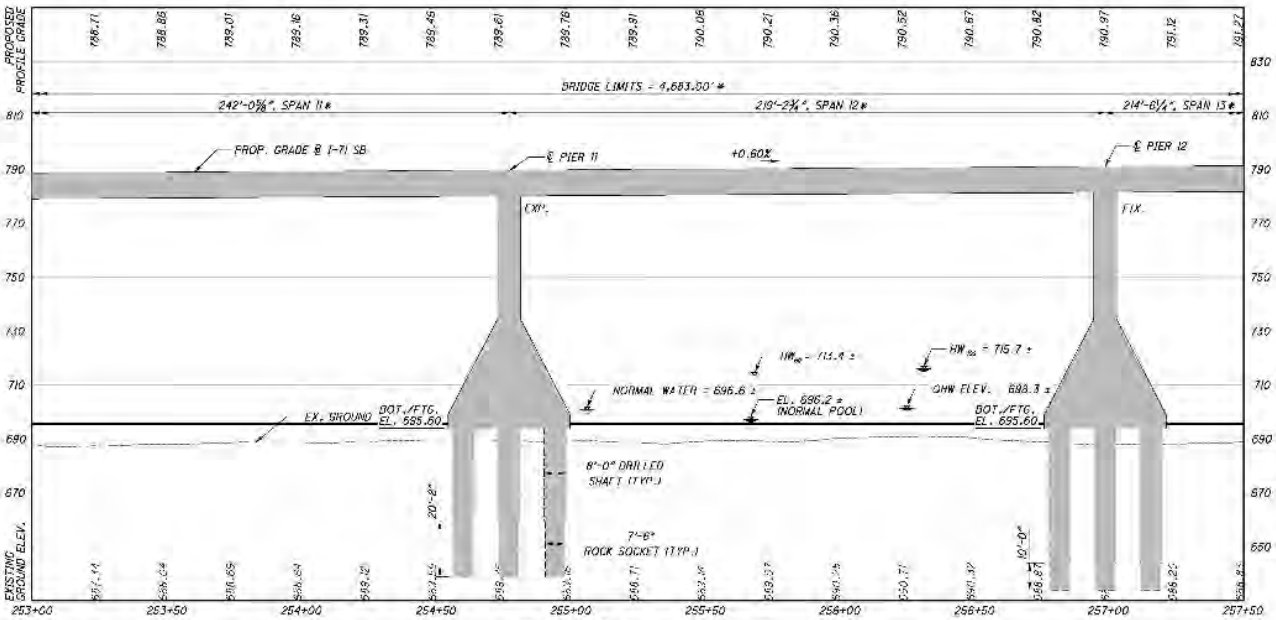
FRANK. IN COUNTY
S.A. 230+81.84
S.A. 271+67.84

SITE PLAN (6 OF 12)
BRIDGE NO. FRA-71-1603L
71 NB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-113-7-13	659.4±	648.8±
B-113-8-13	-	644.0±

LEGEND

PROJECT BORING LOCATION

* DISTANCE MEASURED ALONG ℄ I-71 SB

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 1/268.

DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, Ohio 43228

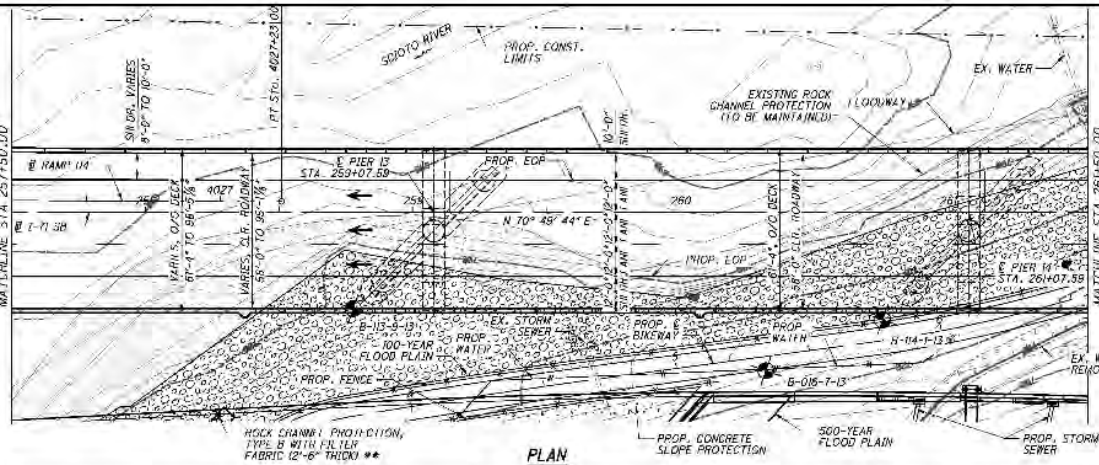
DESIGNED CMA | CHECKED FBW | DRAWN CMA | REVIEWED SLG | DATE 15-Sep | STRUCTURE NUMBER 2510025

FRANKLIN COUNTY STA. 230+84.84 STA. 277+67.84

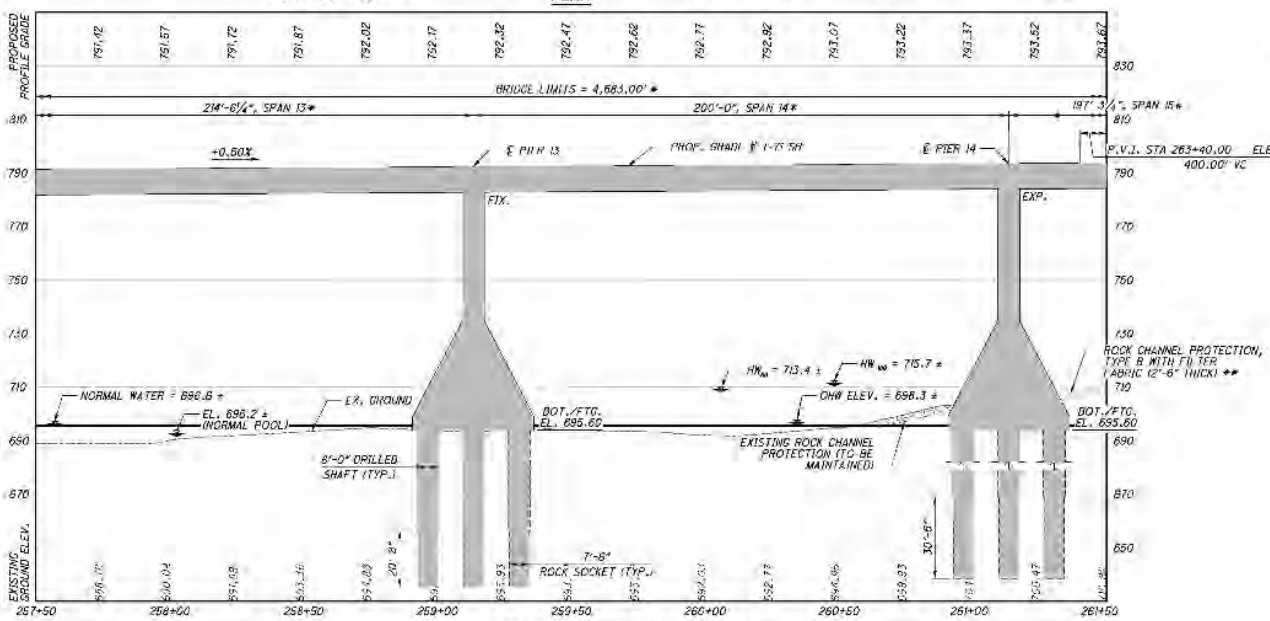
SITE PLAN (7 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464

7/268



PLAN



BRIDGE PROFILE ALONG @ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- * DISTANCE MEASURED ALONG @ I-71 SB
- ** ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC PAID FOR UNDER ROADWAY ITEM 601

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 1/268.

BORING	TOP OF ROCK ELEVATION TOP OF SHALE	TOP OF LIMESTONE
B-013-9-13	656.3±	645.6±
H-014-1-13	655.3±	654.8±

DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, Ohio 43228

REVIEWED: DATE: SLC 10-30-2015

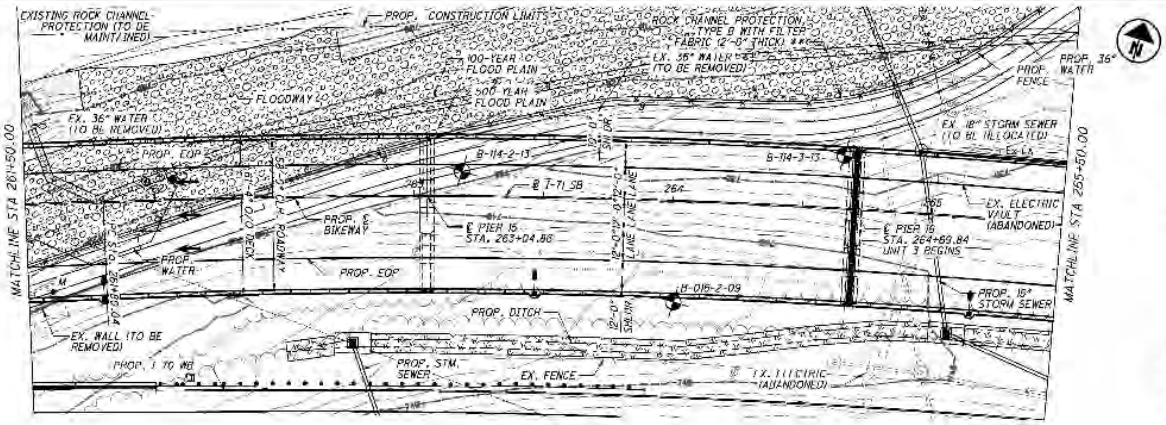
DESIGNED: DRAWN: CHECKED: REVISED: TMA CMA TMA CMA FEW RJSC

FRANKLIN COUNTY STA. 230+84.84 STA. 277167.84

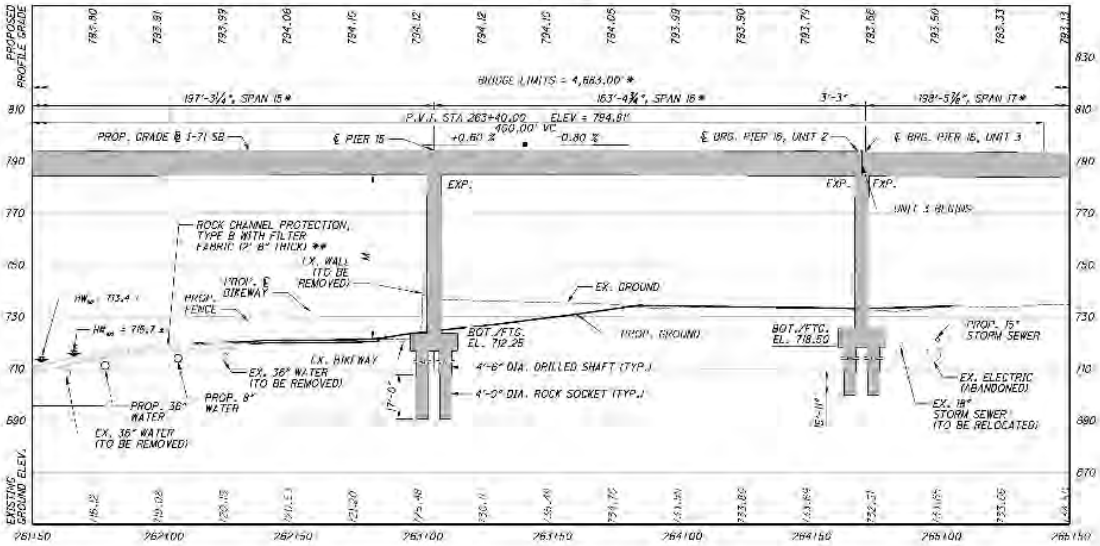
SITE PLAN (8 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No 89464

8/258



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- * DISTANCE MEASURED ALONG ℄ I-71 SB
- ** ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC PAID FOR UNDER ROADWAY ITEM 601

HORIZONTAL CURVE DATA I-71 SB

CURVE C11
P.I. Sta. 269+71.54
Δ = 39° 53' 23" (RT)
Dc = 2° 00' 00"
R = 2,864.79'
T = 791.51'
L = 1,544.48'
E = 107.33'
PC Sta. 261+80.03
PT Sta. 277+24.52
V (dsg) = 60 MPH
e (max) = 0.045
WIDENING = N/A

* 16'-0" MIN. REQUIRED VERTICAL CLEARANCE
PT. M = 62.76' ACTUAL VERTICAL CLEARANCE

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 1/268.

TOP OF ROCK ELEVATION

BORING	TOP OF SHALE	TOP OF LIMESTONE
B-114-2-13	660.0±	643.0±
B-114-3-13	661.1±	645.7±

DESIGN AGENT: ms consultants, inc. 2221 Schrock Road Columbus, OHIO 43228

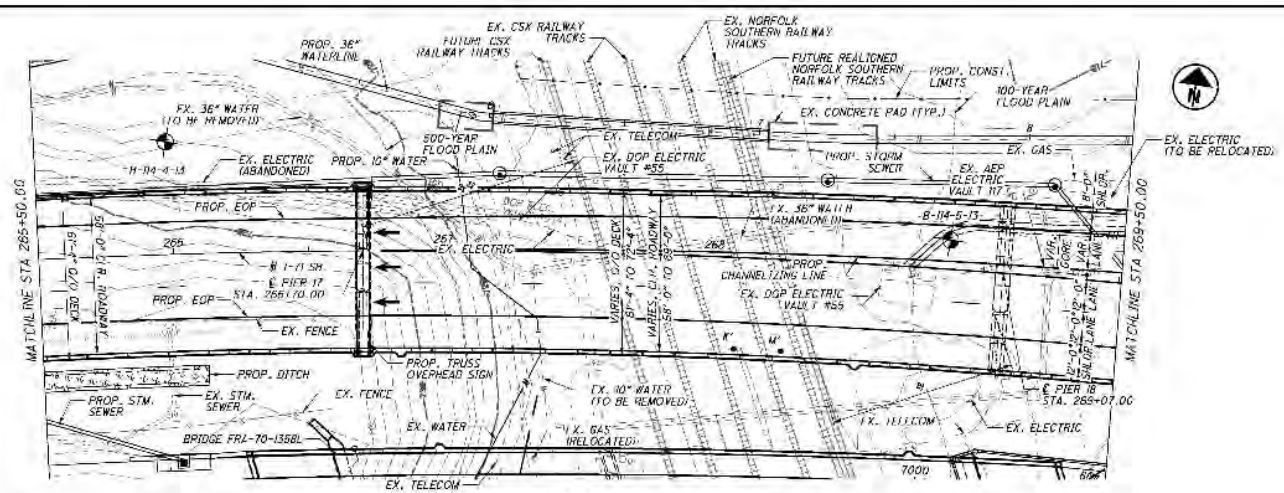
DESIGNED	DRAWN	REVIEWED	DATE
TMA	GMP	SB/SS	05-SEP

FRANKLIN COUNTY
STA. 230+84.84
STA. 277+67.24

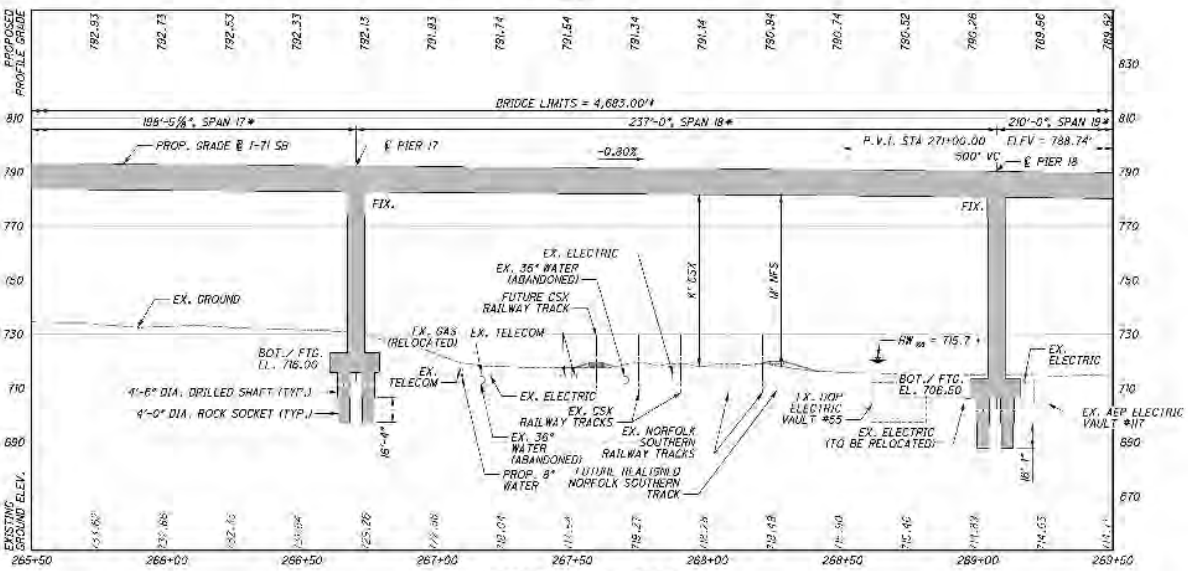
SITE PLAN (9 OF 12)
BRIDGE NO. FRA-71-1500L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464

9 / 268



PLAN



BRIDGE PROFILE ALONG ℄ I-71 SB

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-114-4-13	660.6±	644.3±
B-114-5-13	651.8±	635.7±

LEGEND

PROJECT BORING LOCATION

+ DISTANCE MEASURED ALONG ℄ I-71 SB

• 23'-0" MIN. REQUIRED VERTICAL CLEARANCE (OVER RAILROAD)

PT. K' = 62.01' ACTUAL VERTICAL CLEARANCE

PT. M' = 61.36' ACTUAL VERTICAL CLEARANCE

✢ = 25'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON NS RAILROAD REQUIREMENTS)
68'-9 7/8" = ACTUAL HORIZONTAL CLEARANCE

✢✢ = 25'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CSX RAILROAD REQUIREMENTS)
82'-3 3/8" = ACTUAL HORIZONTAL CLEARANCE

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 1/268.

DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, Ohio 43228

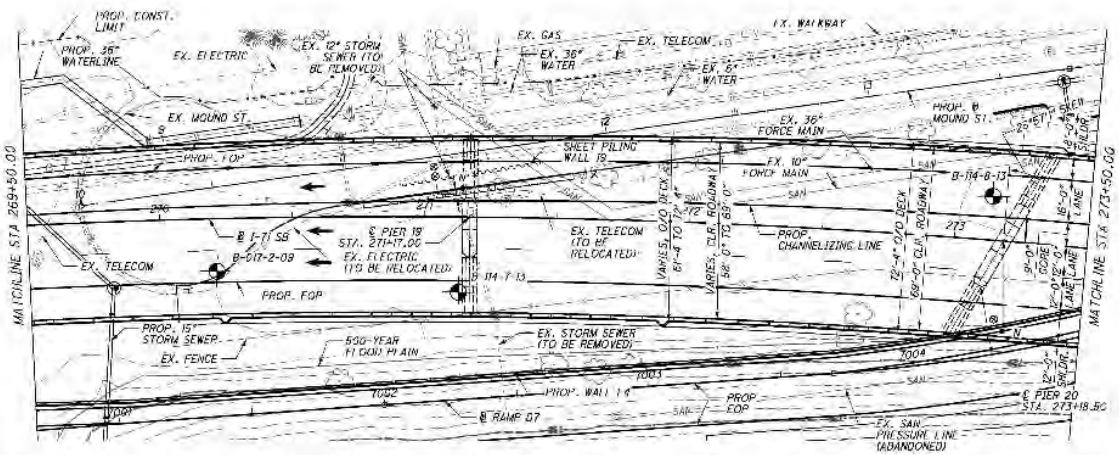
REVIEWED: SLG DATE: 15-Sep 2010 | DRAWN: CMA | CHECKED: FBW | DESIGNED: CMA | REVISED: | STRUCTURE NUMBER: 2510075

FRANKLIN COUNTY STA. 230+84.84 STA. 277+67.84

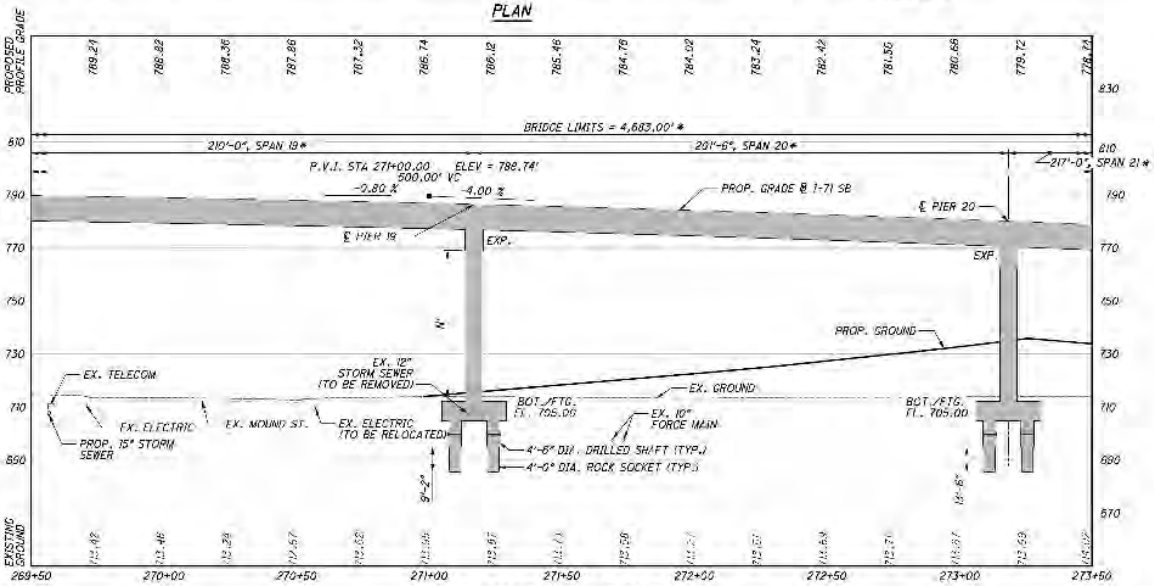
SITE PLAN (10 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464

10/268



PLAN



BRIDGE PROFILE ALONG @ I-71 SB

LEGEND

- PROJECT BORING LOCATION
- * DISTANCE MEASURED ALONG @ I-71 SB

HORIZONTAL CURVE DATA I-71 SB

CURVE C11
P.I. Sta. 269+71.54
Δ = 30° 53' 23" (RT)
Dc = 2° 00' 00"
R = 2,864.79'
T = 791.51'
L = 1,544.48'
E = 107.33'
PC Sta. 261+80.04
PT Sta. 277+24.52
V (dsg) = 60 MPH
e (max) = 0.045
WIDENING = N/A

* 15'-6" MIN. REQUIRED VERTICAL CLEARANCE
PT N = 16.80' ACTUAL VERTICAL CLEARANCE (SHOWN IN PROFILE VIEW ON NEXT SHEET)
PT N' = 44.72' ACTUAL VERTICAL CLEARANCE

⊗ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
25'-10 1/2" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

⊗⊗ = 8'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
3'-6 1/2" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-114-7-13	648.4±	639.3±
B-114-8-13	650.5±	637.0±

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 17282.

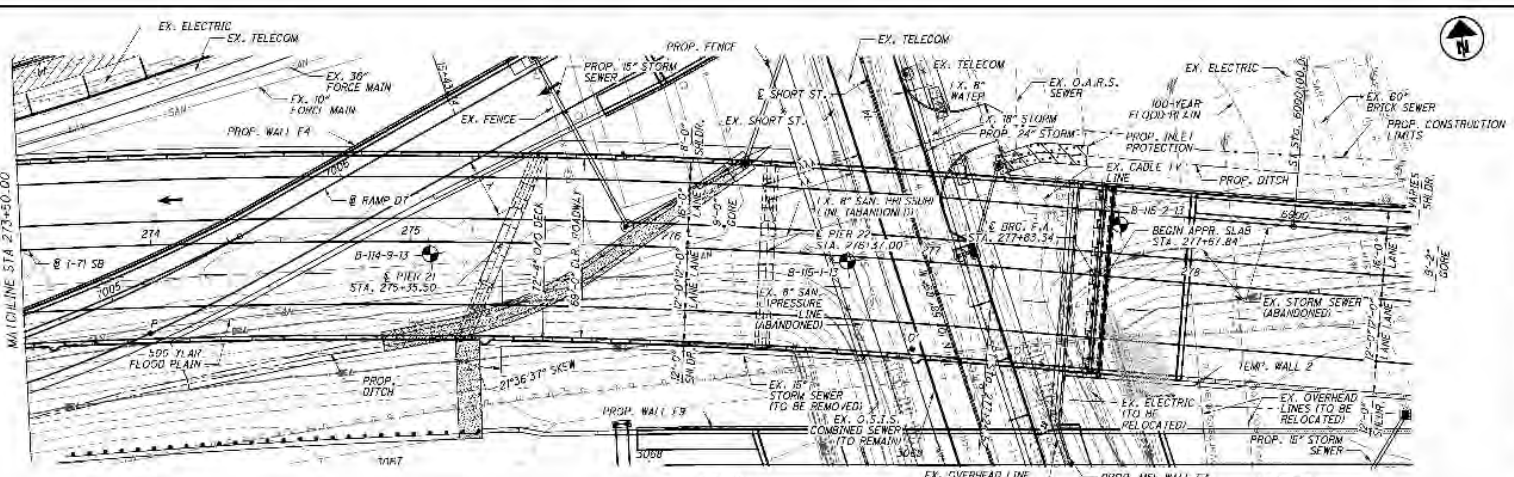
DESIGN AGENCY
mbs Associates inc.
2650 Sullivant Avenue
Columbus, Ohio 43228

REVISED 15-Sep
REVIEWED BLG
DRAWN CMA
DESIGNED ZDA
CHECKED FBW

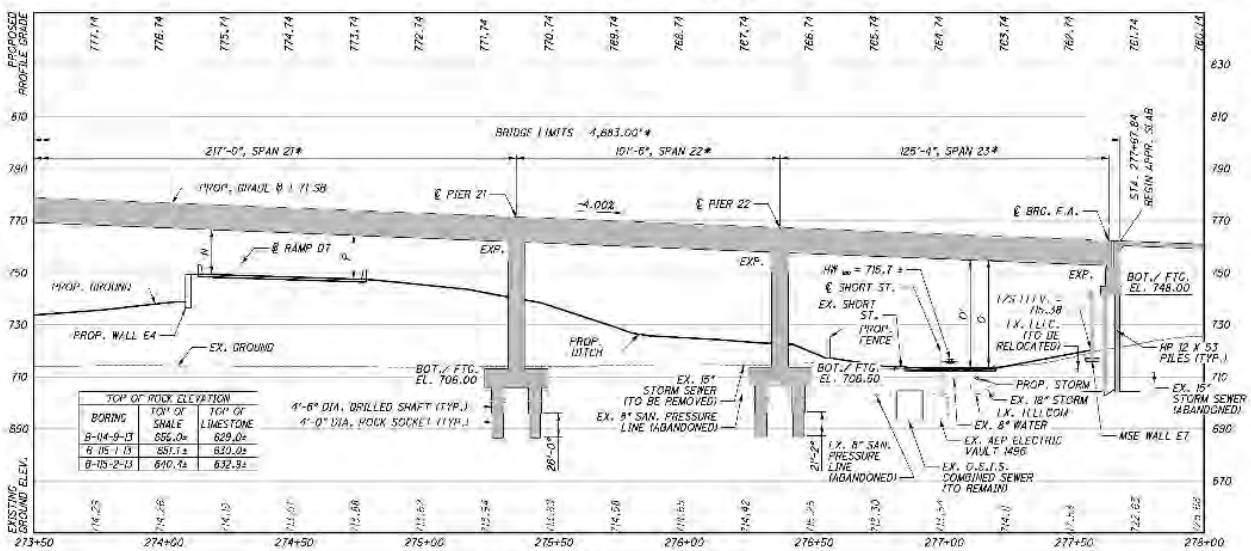
FRANKLIN COUNTY
STA. 230+84.81
STA. 277167.84

SITE PLAN (11 OF 12)
BRIDGE NO. FRA-71-1503L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



TOP OF ROCK ELEVATION		
BORING	TOP OF SHALE	TOP OF LIMESTONE
B-114-9-13	655.0±	629.0±
B-115-1-13	651.1±	630.0±
B-115-2-13	640.4±	632.9±

BRIDGE PROFILE ALONG ℄ I-71 SB

LEGEND

PROJECT BORING LOCATION

* DISTANCE MEASURED ALONG ℄ I-71 SB

HORIZONTAL CURVE DATA I-71 SB

TANGENT T9
STA. = 277+24.52
STA. = 281+07.81
L = 383.29'
BRG. = S 78° 16' 53" E

- 16'-6" MIN. REQUIRED VERTICAL CLEARANCE

PT. N = 18.80' ACTUAL VERTICAL CLEARANCE (PT. ON PREVIOUS SHEET IN PLAN VIEW)

PT. O = 41.94' ACTUAL VERTICAL CLEARANCE

PT. O' = 43.57' ACTUAL VERTICAL CLEARANCE

PT. P = 16.92' ACTUAL VERTICAL CLEARANCE

λ = 29'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
22'-7⅞" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

λλ = 17'-0" = REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
34'-3⅜" = ACTUAL HORIZONTAL CLEARANCE

λλλ = 17'-0" = REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
39'-0¼" = ACTUAL HORIZONTAL CLEARANCE

† = 17'-0" = REQUIRED MINIMUM HORIZONTAL CLEARANCE (BASED ON CLEAR ZONE)
9'-2" = ACTUAL HORIZONTAL CLEARANCE (PROTECTED BY BARRIER)

NOTES:

1. FOR ADDITIONAL INFORMATION, SEE SHEET 12(268).

DESIGN AGENCY
ms consultants, inc.
2221 Schrock Road
Columbus, OH 43229

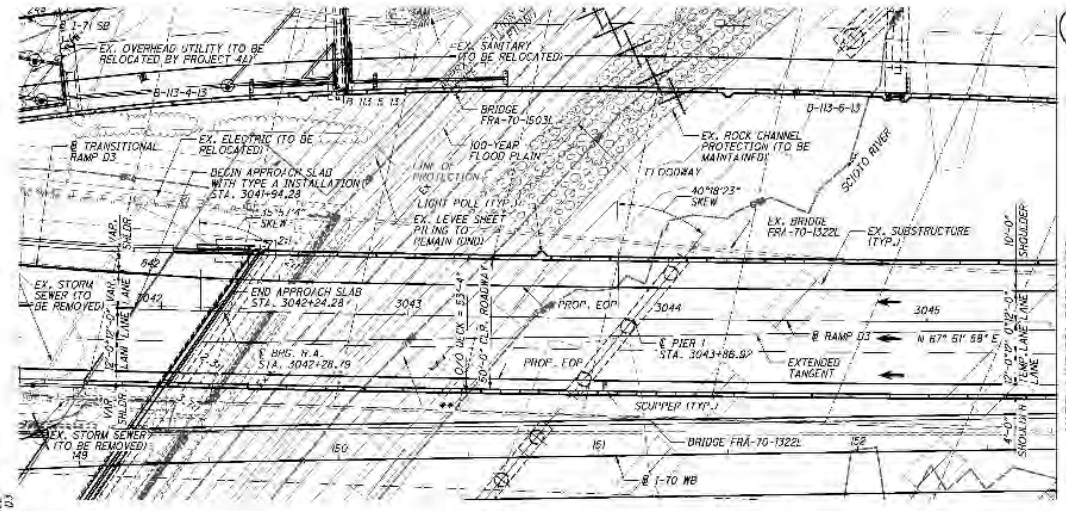
DESIGNED	DRAWN	REVIEWED	DATE
TMA	CMR	SLS	15-Sep
CHECKED	REVISED	STRUCTURE REVIEW	
HW			75/02/25

FRANKLIN COUNTY
STA. 250+81.81
STA. 277+67.84

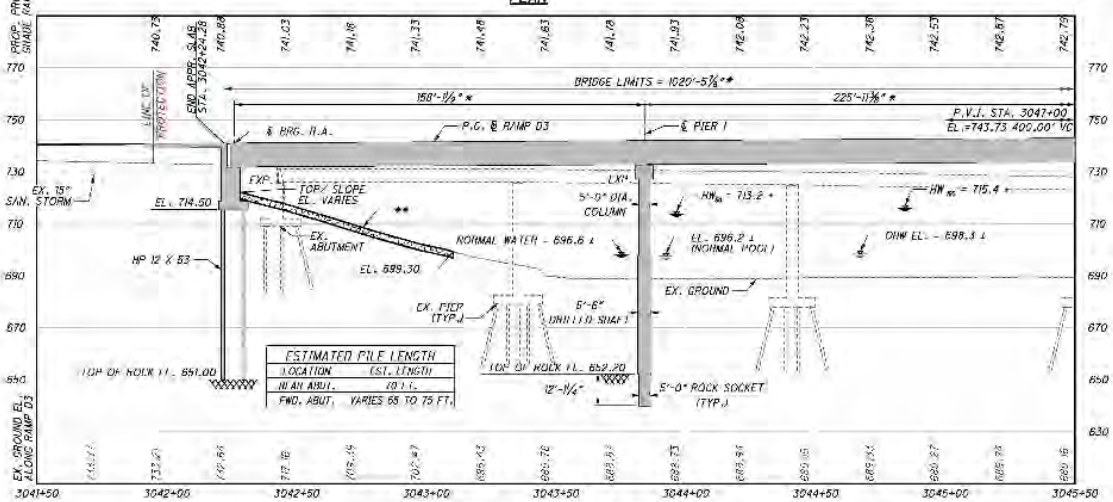
SITE PLAN (12 OF 12)

BRIDGE NO. FRA-71-1500L
I-71 SB OVER SCIOTO RIVER

FRA-70-13.10
PID No 89484



PLAN



BRIDGE PROFILE ALONG ℄ RAMP D3

ESTIMATED PILE LENGTH	
LOCATION	(EST. LENGTH)
REAR ABUT.	(81' E.)
FWD. ABUT.	VARIES 65 TO 75 FT.

BENCHMARK DATA

BM #1 STA. 6002+17.25 , ELEV. 737.79 , OFFSET 42.35 RT, RAMP D6
BM #2 STA. 332+44.01 , ELEV. 719.82 , OFFSET 2.30 RT , I15 NB
BM #3 STA. 6004+80.97, ELEV. 707.50 , OFFSET 46.23 RT, RAMP I16

FOR ADDITIONAL BENCHMARK INFORMATION, SEE ROADWAY PLAN SHEET

LEGEND

- BORING LOCATION
- ROCK CHANNEL PROTECTION
- CONCRETE SLOPE PROTECTION
- * DISTANCE MEASURED ALONG ℄ RAMP D3
- ** ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC (37-64) PAID FOR UNDER ROADWAY (11 M 60).

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.

DESIGN TRAFFIC:
2015 ADT = 10,470 2015 ADTT = 940
2035 ADT = 17,300 2035 ADTT = 1,400
DIRECTIONAL DISTRIBUTION = 1.0

HORIZONTAL CURVE DATA

RAMP D3 CURVE 22
P.I. STA. = 3043+09.31
Δ = 3° 48' 44" (LT)
Dc = 0° 21' 00"
R = 16,370.22'
T = 544.81'
L = 1,089.22'
L = 9.06'
PCC Sta. = 3037+64.50
PT Sta. = 3048+53.72
V (des) = 80 MPH
e (max) = NE
WIDENING = N/A

HYDRAULIC DATA

DRAINAGE AREA = 1,829 SQ. MILES
Q (100) = 75,000 CFS V (100) = 5.1 FT/S
Q (50) = 62,100 CFS V (50) = 4.8 FT/S
STRUCTURE CLEARS THE 50 YEAR DESIGN HW BY 19 FEET

EXISTING STRUCTURE

TYPE: NINE SPAN CONTINUOUS STEEL GIRDER WITH REINFORCED CONCRETE DECK AND SUPERSTRUCTURE

SPANS: 88.95'±, 101.67'±, 108.56'±, 105.38'±, 113.15'±, 105.38'±, 98.30'±, 90.32'±, 79.70'± C/C BEARINGS

ROADWAY: VARIES, SLAB WIDTH 111'-6"± TO 74'-6"±

LOADING: HS20-44 & INTERSTATE ALTERNATE

WEARING SURFACE: 5"± ASPHALT OVERLAY

SKEW: VARIES

APPROACH SLABS: 25'-0" LONG

ALIGNMENT: TANGENT, VARIES

CROWN: ⅜" / FT.

STRUCTURAL FILE NUMBER: 2500413

DATE BUILT: 1975

DISPOSITION: TO BE REMOVED

PROPOSED STRUCTURE

TYPE: FIVE SPAN CONTINUOUS COMPOSITE CURVED STEEL GIRDER (ASTM A709 GRADE 50W AND GRADE HPS 70W) WITH REINFORCED CONCRETE DECK ON CAPPED PILE ABUTMENTS AND MULTI-COLUMN PIERS ON DRILLED SHAFTS.

SPANS: 158.13', 275.94', 231.93', 218.42', 176.44' C/C BEARINGS, MEASURED ALONG BASE LINE OF RAMP D3

ROADWAY: 50'-0" TOE/TOE PARAPET

LOADING: HL-93 AND FUTURE WEARING SURFACE 0.06 KSF

WEARING SURFACE: 1" MONOLITHIC CONCRETE

SKEW: R.A. 35°57'4" LF, PIER 1 40°18'23" LF, PIER 2 THRU F.A. 44°57'4" LF

APPROACH SLABS: 30'-0" LONG (AS-1-15 MODIFIED)

ALIGNMENT: VARIES

SUPERELEVATION: VARIES, MAX. 0.04

COORDINATES: LATITUDE 39° 57' 8"
LONGITUDE 83° 0' 45"

JACOBS
ms consultants, inc.
2221 Schrock Road
Columbus, Ohio 43229

DESIGNED	DRAWN	REVIEWED	DATE
TLS	TLS	GLG	15 Apr
CHECKED	QUANTITIES	SUBMITTED	
AKS	NEPRU	JC KNAUF	2/9/2018

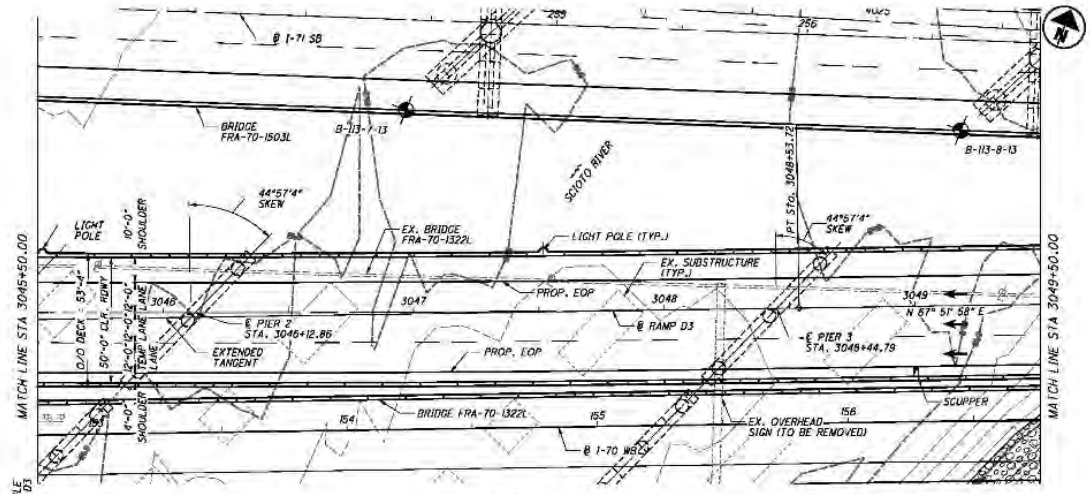
FRANKLIN COUNTY
S.R. 30/0+24.28
S.R. 30/32+44.77

SITE PLAN (SHEET 1 OF 3)

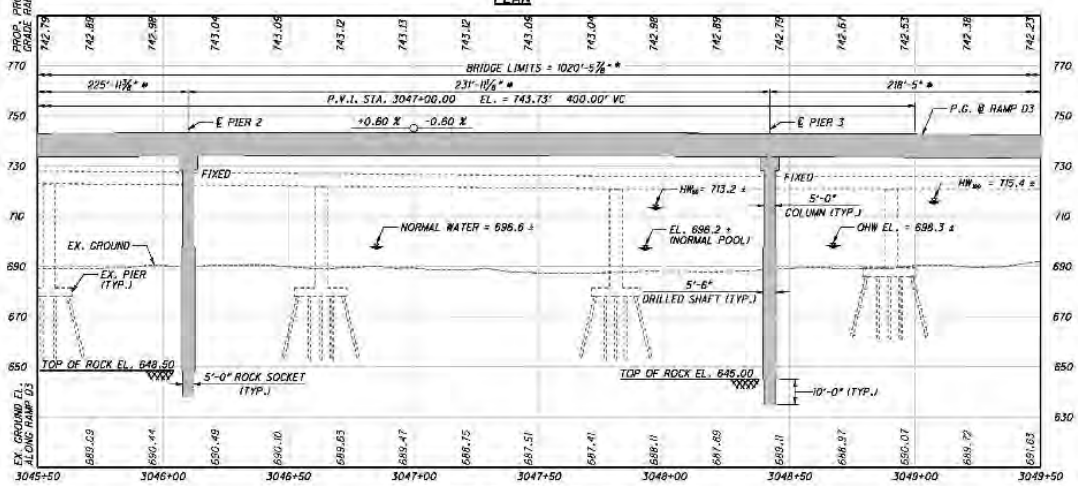
BRIDGE NO. FRA-70-1322L
RAMP D3 OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464

ms consultants, inc.



PLAN



BRIDGE PROFILE ALONG ℄ RAMP D3

HORIZONTAL CURVE DATA

RAMP D3 - TANGENT 14
STA. = 3048+53.72
STA. = 3051+24.75
L = 271.03'
BRG. = N 67°51' 58" E

LEGEND

- BORING LOCATION
- ROCK CHANNEL PROTECTION
- CONCRETE SLOPE PROTECTION

* DISTANCE MEASURED ALONG ℄ RAMP D3.
** ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC (2'-6") PAID FOR UNDER ROADWAY ITEM 601.

NOTES

1. REFER TO TRAFFIC PLANS FOR LIGHT POLE AND SIGN TRUSS LOCATIONS AND STATIONS.
2. FOR SCUPPER LOCATIONS AND DETAILS, SEE SHEET 57/69.

DESIGN AGENCY: mb consultants, inc. 2800 Corporate Exchange Columbus, Ohio 43229

REVIEWED:	DATE:
GLC	15-Apr
STRUCTURE NUMBER: 2510026	

DRAWN:	REVIEWED:
LLS	

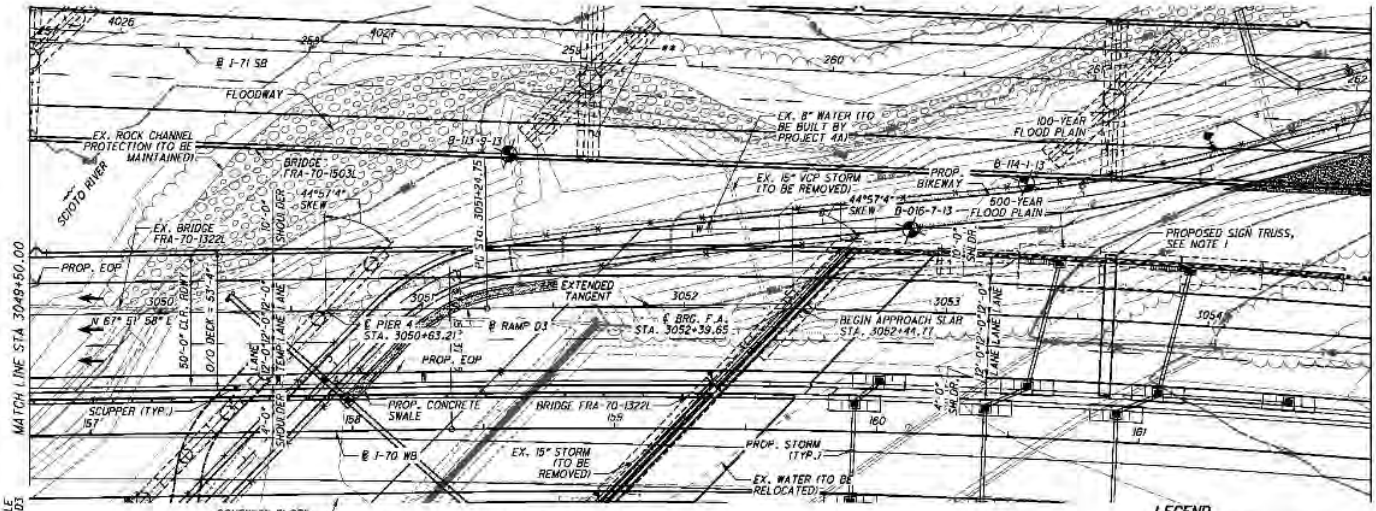
DESIGNED:	DETAILED:	REVIEWED:
LLS	LLS	
	AKS	

FRANKLIN COUNTY
STA. 3042+24.28
STA. 3052+44.77

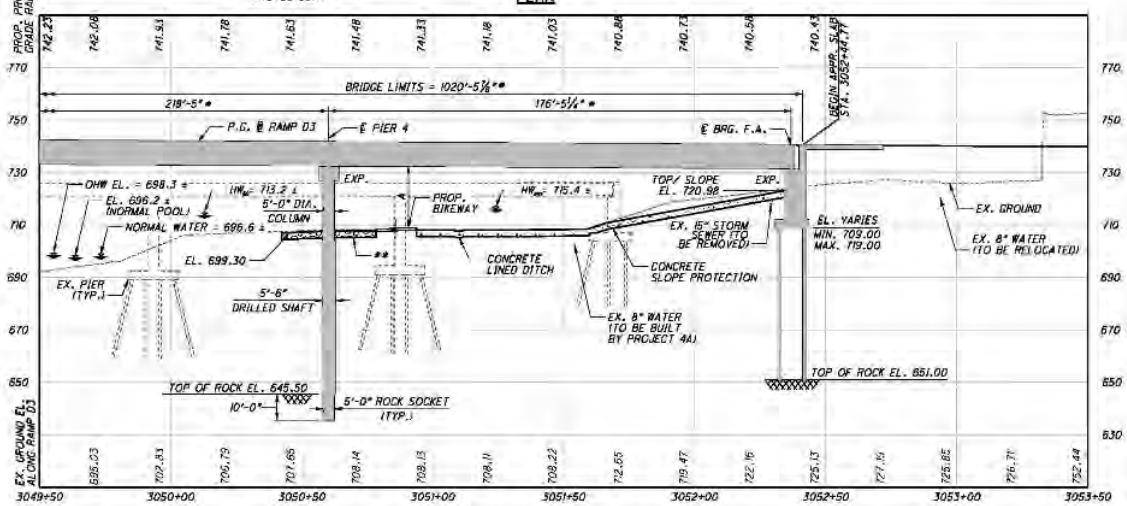
SITE PLAN (SHEET 2 OF 3)

BRIDGE NO. FRA-70-1323C
RAMP D3 OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



BRIDGE PROFILE ALONG ℄ RAMP D3

LEGEND

- BORING LOCATION
- ROCK CHANNEL PROTECTION
- CONCRETE SLOPE PROTECTION

* DISTANCE MEASURED ALONG ℄ RAMP D3
** ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC (2'-6") PAID FOR UNDER ROADWAY ITEM 601.

HORIZONTAL CURVE DATA

RAMP D3 - CURVE 23
P.I. Sta. 3060+07.07
Δ = 29° 08' 02" (RT)
Dc = 1° 41' 15"
R = 3,395.31'
T = 882.32'
L = 1,726.45'
E = 112.77'
PC Sta. 3051+24.75
PT Sta. 3068+51.20
V (des) = 60 MPH
e (max) = 0.040
WIDENING = N/A

■ 10'-0" REQUIRED MINIMUM VERTICAL CLEARANCE
PT. A = 21.87' ACTUAL VERTICAL CLEARANCE

NOTES

1. REFER TO TRAFFIC PLANS FOR LIGHT POLE AND SIGN TRUSS LOCATIONS AND STATIONS.
2. FOR SCUPPER LOCATIONS AND DETAILS, SEE SHEET 57/69.

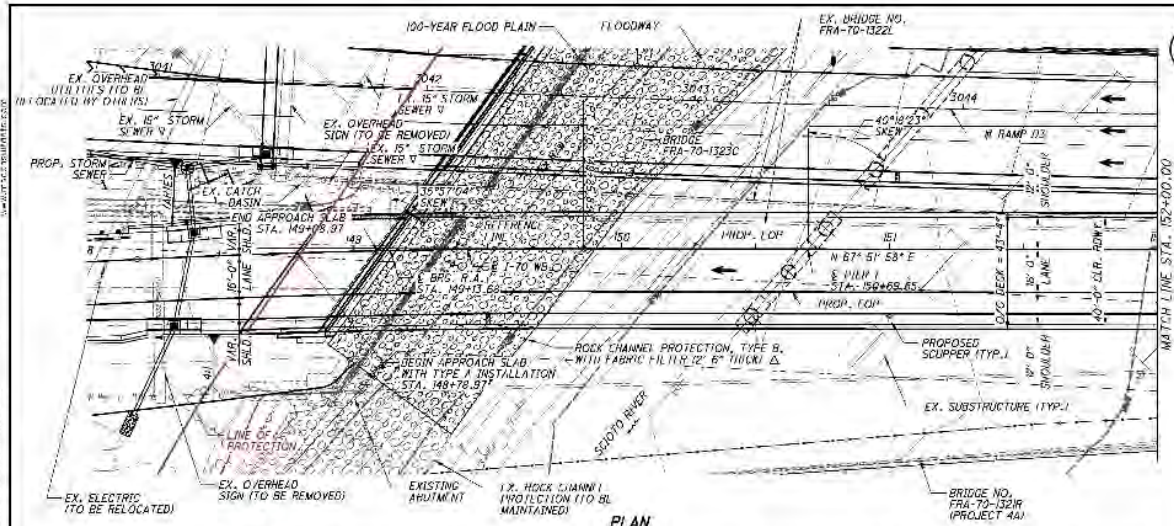
DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, Ohio 43229

DESIGNED	DRAWN	REVIEWED	DATE
DLS	DLS	GLG	15-Apr
CHECKED	REVISED	STRUCTURE FILE NUMBER	
AKS		2510026	

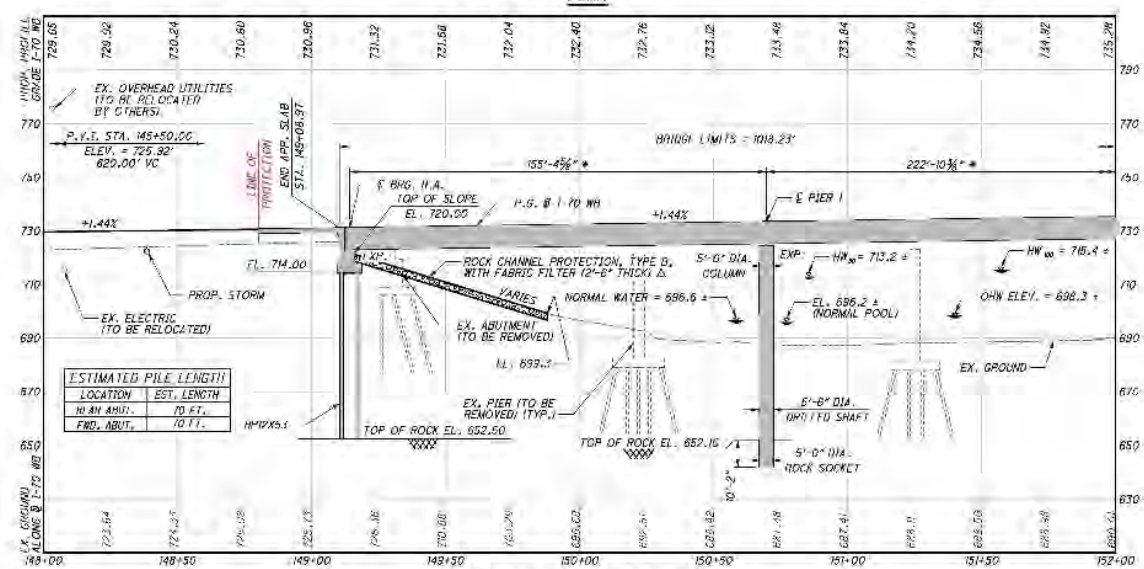
FRANKLIN COUNTY
STA. 3042+24.28
STA. 3052+44.77

SITE PLAN (SHEET 3 OF 3)
BRIDGE NO. FRA-70-1323C
RAMP D3 OVER SCIOTO RIVER

FRA-70-13.10
PID No. 89464



PLAN



ESTIMATED PILE LENGTH	
LOCATION	EST. LENGTH
NB ABUT.	70 FT.
END. ABUT.	70 FT.

BRIDGE PROFILE ALONG @ I-70 WB

BENCHMARK DATA

BM #1 STA. 6002+17.25, ELEV. 737.79, OFFSET 42.35' RT., RAMP D6
BM #2 STA. 332+44.01, ELEV. 719.62, OFFSET 2.30' RT., 315 NB
BM #3 STA. 6004+80.97, ELEV. 707.50, OFFSET 48.23' RT., RAMP A6

FOR ADDITIONAL BENCHMARK INFORMATION, SEE ROADWAY PLAN SHEET

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.

DESIGN TRAFFIC:
2015 ADT = 30,890 2015 ADTT = 3,700
2035 ADT = 31,900 2035 ADTT = 3,800
DIRECTIONAL DISTRIBUTION = 1.0

LEGEND

- PROJECT BORING LOCATION
- ▽ TO BE REMOVED
- HISTORIC BORING LOCATION
- Δ ROCK CHANNEL PROTECTION, TYPE B WITH FILTER FABRIC PAID FOR UNDER ROADWAY ITEM 601.
- CONCRETE SLOPE PROTECTION
- ROCK CHANNEL SLOPE PROTECTION
- ✱ DISTANCE MEASURED ALONG REFERENCE LINE (EXTENDED TANGENT)

HORIZONTAL CURVE DATA

I-70 WB – CURVE C18	I-70 WB – TANGENT T12
P.I. Sta. 148+34.78	STA. = 149+85.83
Δ = 5° 17' 26" (RT)	STA. = 158+37.85
Dc = 1° 45' 00"	L = 852.02'
R = 3,274.04'	BRG. = N 67° 51' 58" E
T = 151.27'	
L = 302.32'	
E = 3.49'	
P.C. Sta. 146+83.51	
PT Sta. 149+85.83	
V (des) = 60 MPH	
e (max) = 0.041	
WIDENING = N/A	

HYDRAULIC DATA

DRAINAGE AREA = 1,629 SQ. MILES
Q (100) = 75,000 CFS V (100) = 5.2 FT/S
Q (50) = 62,100 CFS V (50) = 4.6 FT/S
STRUCTURE CLEARS THE 50 YEAR DESIGN HW BY 8.5 FEET.

EXISTING STRUCTURE

TYPE: NINE SPAN CONTINUOUS STEEL GIRDER WITH REINFORCED CONCRETE DECK AND SUPERSTRUCTURE
SPANS: 88.98'±, 101.67'±, 108.56'±, 105.38'±, 113.55'±, 105.38'±, 98.30'±, 90.32'±, 79.70'± C/C BEARINGS
ROADWAY: VARIES, SLAB WIDTH 81'-9" TO 74'-6"±
LOADING: HS20-44 & INTERSTATE ALTERNATE
WEARING SURFACE: 5" ASPHALT OVERLAY
SKEW: VARIES
APPROACH SLABS: 25'-0" LONG
ALIGNMENT: TANGENT, VARIES
CROWN: 3/16" / FT
STRUCTURAL FILE NUMBER: 2504413
DATE BUILT: 1975
DISPOSITION: TO BE REMOVED

PROPOSED STRUCTURE

TYPE: FIVE SPAN CONTINUOUS COMPOSITE STEEL GIRDERS (ASTM A709, GRADE 50W/HPS70W) WITH COMPOSITE REINFORCED CONCRETE DECK ON CAPPED PILE ABUTMENTS AND MULTI-COLUMN PIERS.
SPANS: 155.39', 222.86', 233.69', 218.42', 178.36' C/C BEARINGS MEASURED ALONG REFERENCE LINE
ROADWAY: 40'-0" TOE/TOE PARAPET
LOADING: HL-93 AND FUTURE WEARING SURFACE 0.05 KSF
WEARING SURFACE: 1" MONOLITHIC CONCRETE
SKEW: VARIES
APPROACH SLABS: 40' 0" LONG (AS 1 TO MOHIO DOT)
ALIGNMENT: TANGENT, VARIES
SUPERELEVATION: VARIES, MAX. = 0.038
COORDINATES: LATITUDE = 39° 57' 08"
LONGITUDE 83° 00' 44"

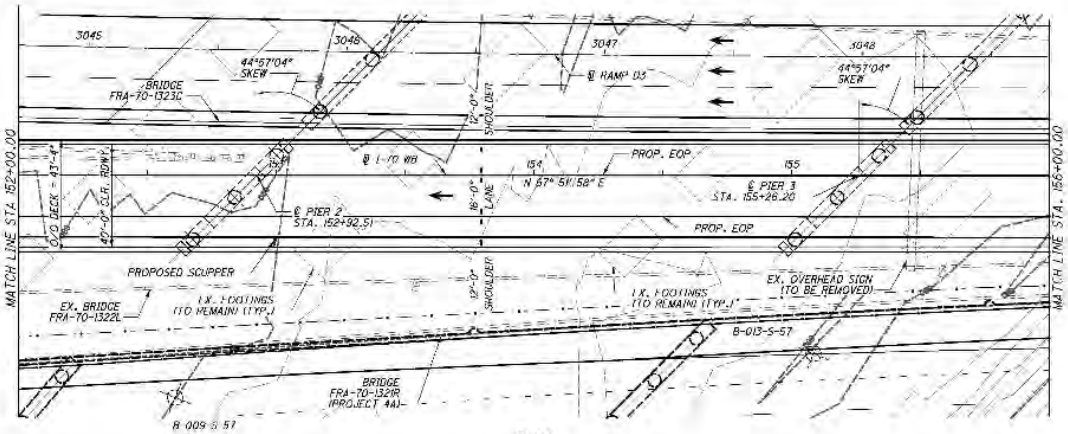
DESIGN AGENCY: ms consultants, inc. 2221 Schrock Road Columbus, OH 43228
SITE 17-Mcr
REVIEWED JB CG
DRAWN RMM
REVISED
DESIGNED AK
CHECKED MTK
FRANKLIN COUNTY
S.R. 149+08.97
S.R. 5917.70

SITE PLAN (1 OF 3)

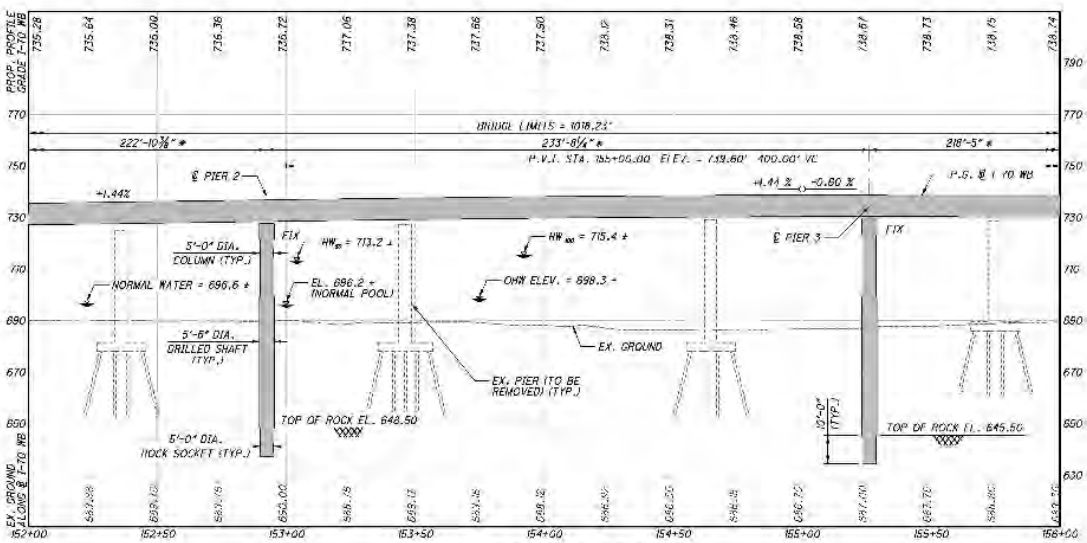
BRIDGE NO. FRA-70-1322L
I-70 NB OVER THE SCIOTO RIVER

FRA-70-13.10
PID No. 89464

ms consultants, inc.



PLAN



BRIDGE PROFILE ALONG ℄ I-70 WB

LEGEND

- PROJECT BORING LOCATION
- HISTORIC BORING LOCATION
- DISTANCE MEASURED ALONG REFERENCE LINE

DESIGN AGENCY
ms consultants, inc.
2221 Schrock Road
COLUMBUS, OHIO 43228

REVISED	DATE
G.L.C.	17-Mar

STRUCTURE: US HAMILTON 25/0027

DESIGNED	DRAWN	REVIEWED
LAW	KTM	G.L.C.
CHECKED	(EXISTING)	
WTP		

HANCOCK COUNTY
STA. 149+08.97
STA. 159+27.20

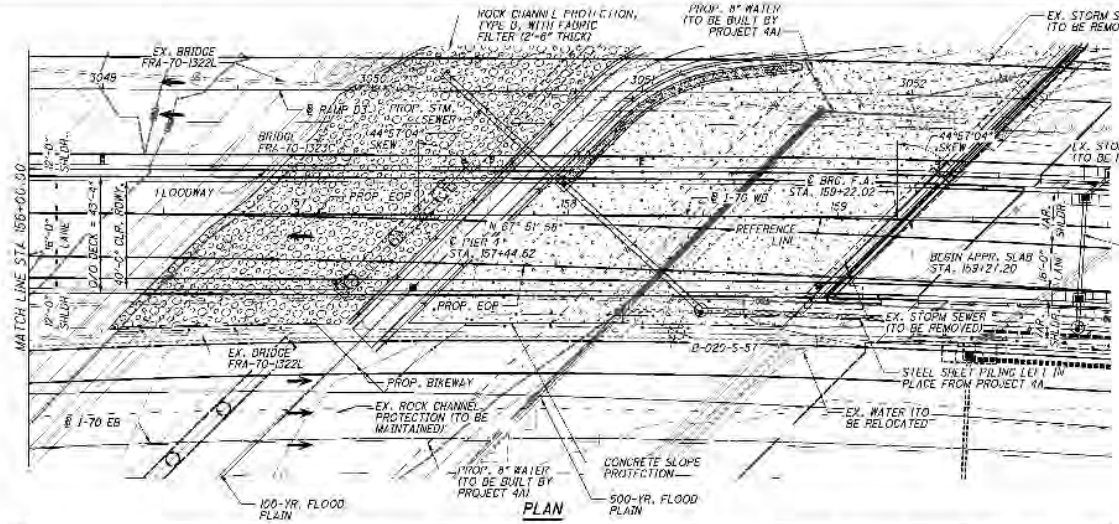
SITE PLAN (2 OF 3)

BRIDGE NO. FRA-70-1322L
I-70 WB OVER THE SCIOTO RIVER

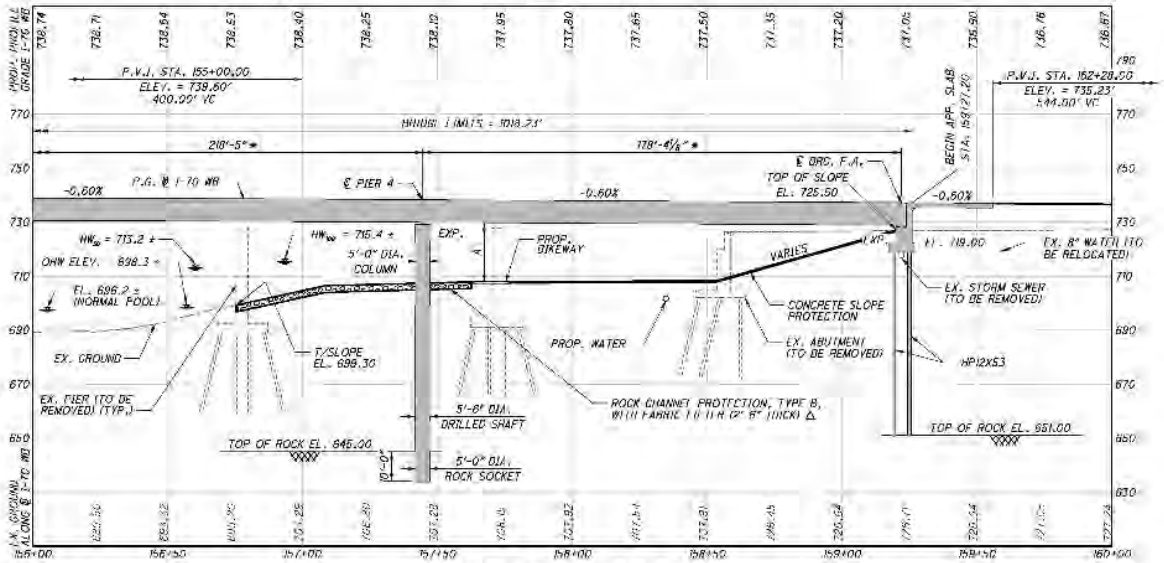
FRA-70-13.10
PID No. 89464

2 / 59

822
995



PLAN



BRIDGE PROFILE ALONG ℄ I-70 WB

HORIZONTAL CURVE DATA

I-70 WB - CURVE C19
P.I. Sta. 167+89.88
Δ = 29° 03' 49" (RT)
Dc = 1° 33' 36"
R = 3,672.81'
T = 952.03'
L = 1,863.05'
l = 121.38'
PC Sta. 158+37.85
PT Sta. 177+00.90
V (des) = 60 MPH
e (max) = 0.038
WIDENING = N/A

● 10'-0" REQUIRED MINIMUM VERTICAL CLEARANCE
POINT A = 21.84' ACTUAL MINIMUM VERTICAL CLEARANCE

LEGEND

- PROJECT BORING LOCATION
- HISTORIC BORING LOCATION
- * DISTANCE MEASURED ALONG REFERENCE LINE
- △ ROCK CHANNEL PROTECTION, TYPE B WITH FABRIC FILTER FABRIC PAID FOR UNDER ROADWAY ITEM 601.
- CONCRETE SLOPE PROTECTION
- ROCK CHANNEL SLOPE PROTECTION

DESIGN AGENCY
ms Consultants, Inc.
2221 Schrock Road
Columbus, OH 43229

DATE 17-Nov-2011
REVISED 01 15 01/21/16 JCS RAMP 2SLDR

DRAWN S.MA 02/15/02
DESIGNED L.AM CHECKED M.W.

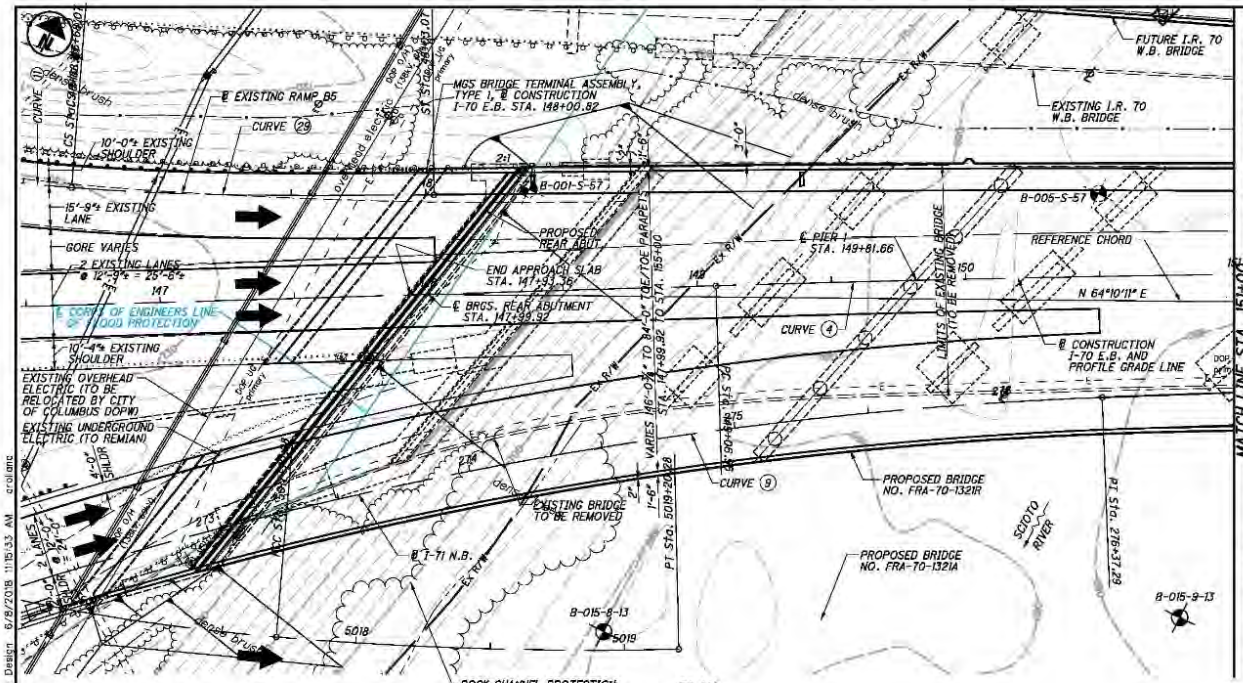
FRANKLIN COUNTY
STA. 149+08.97
STA. 159+27.20

SITE PLAN (3 OF 3)
BRIDGE NO. FRA-70-1322L
I-70 WB OVER SCIOTO RIVER

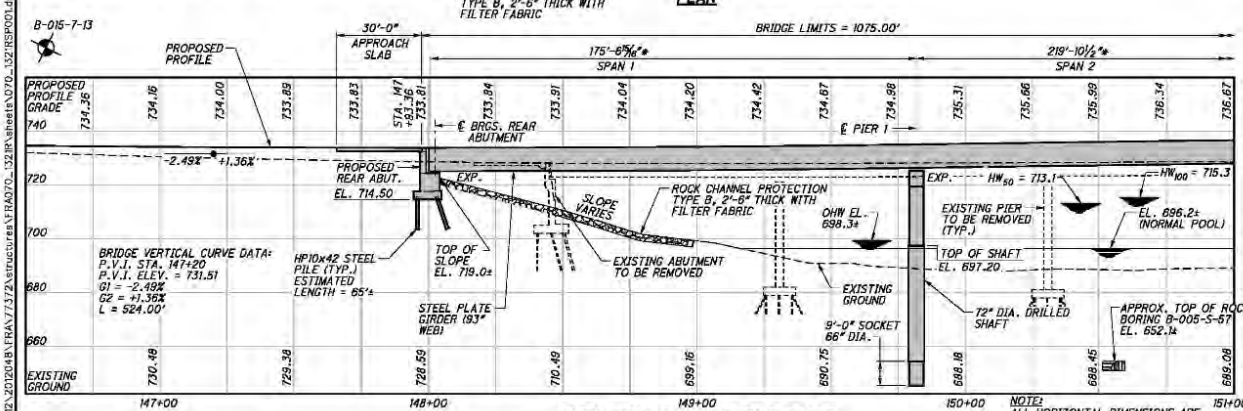
FRA-70-13.10
PID No. 89464

3 / 59

823 / 995



PLAN



ELEVATION ALONG PROFILE GRADE

NOTE:
ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG ℄ I-70 E.B. UNLESS NOTED OTHERWISE.

BENCHMARK DATA

BM #1 STA.	, ELEV.	, OFFSET	,
BM #2 STA.	, ELEV.	, OFFSET	,
BM #3 STA.	, ELEV.	, OFFSET	,
BM #4 STA.	, ELEV.	, OFFSET	,

FOR ADDITIONAL BENCHMARK INFORMATION. SEE ROADWAY PLAN SHEET 13 / 99.

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.

SEE SHEET 5 / 99 FOR GEOMETRIC LAYOUT.

DESIGN TRAFFIC:
2015 ADT = 67,330 2015 ADTT = 7070
2035 ADT = 96,300 2035 ADTT = 10,112
DIRECTIONAL DISTRIBUTION = 100%

LEGEND

HISTORIC BORING LOCATION

PROJECT BORING LOCATION

(SEE SHEET 3 / 99 FOR SOIL BORING TABLE.)

ABUT. = ABUTMENT
BRGS. = BEARINGS
EXP. = EXPANSION
* = MEASURED ALONG THE REFERENCE CHORD

HYDRAULIC DATA

DRAINAGE AREA = 1629± SQ. MILES
Q (100) = 75,000 CFS V (100) = 5.10 FT/S
Q (50) = 62,100 CFS V (50) = 4.46 FT/S
STRUCTURE CLEARS THE 50-YEAR
DESIGN HW BY 7.98 FEET.

HORIZONTAL CURVE DATA

SEE SHEET 2 / 99

LOW GIRDER ELEVATION	
LOCATION	ELEVATION
STA. 147+19 RIGHT FASCIA	721.08±

EXISTING STRUCTURE

TYPE: NINE SPAN CONTINUOUS WELDED PLATE GIRDERS WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURES

SPANS: 84'-4 1/8"±, 99'-3 3/8"±, 108'-2 3/8"±, 119'-0"±, 128'-0"±, 119'-0"±, 111'-0"±, 102'-0"± and 90'-0"± CENTERLINE TO CENTERLINE OF BEARINGS MEASURED ALONG EXISTING REFERENCE TANGENT AND ITS EXTENSION.

ROADWAY WIDTH: VARIES F/F SAFETY CURB

LIVE LOAD: CF2000 OHIO 1951 SPECIFICATIONS (1958) HS-20 AND ALTERNATE MILITARY LOAD (1974, 2008 & 2011)

SKEW: VARIES

APPROACH SLABS: 25' LONG

ALIGNMENT: 0°28' CURVE RIGHT AND 1°30' CURVE RIGHT

WEARING SURFACE: ASPHALT

SUPERELEVATION: VARIES

STRUCTURAL FILE NUMBER: 2504448

DATE BUILT: 1958 (REHABILITATED 1974, 2008 & 2011)

DISPOSITION: TO BE REMOVED

DESIGN AGENCY
CPD GROUP,
Dan, Yu, Jones, Sam & Gilbert, Inc.
100 Nationwide Blvd., Suite 500, Columbus, Ohio 43215-2591
Phone: 614.221.7600 Fax: 614.221.7601 E-Mail: cpd@cpdgroup.com

DESIGNED	DRAWN	REVIEWED	DATE
DGN	RPR	TJW	3-30-15
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DJC		2510016	

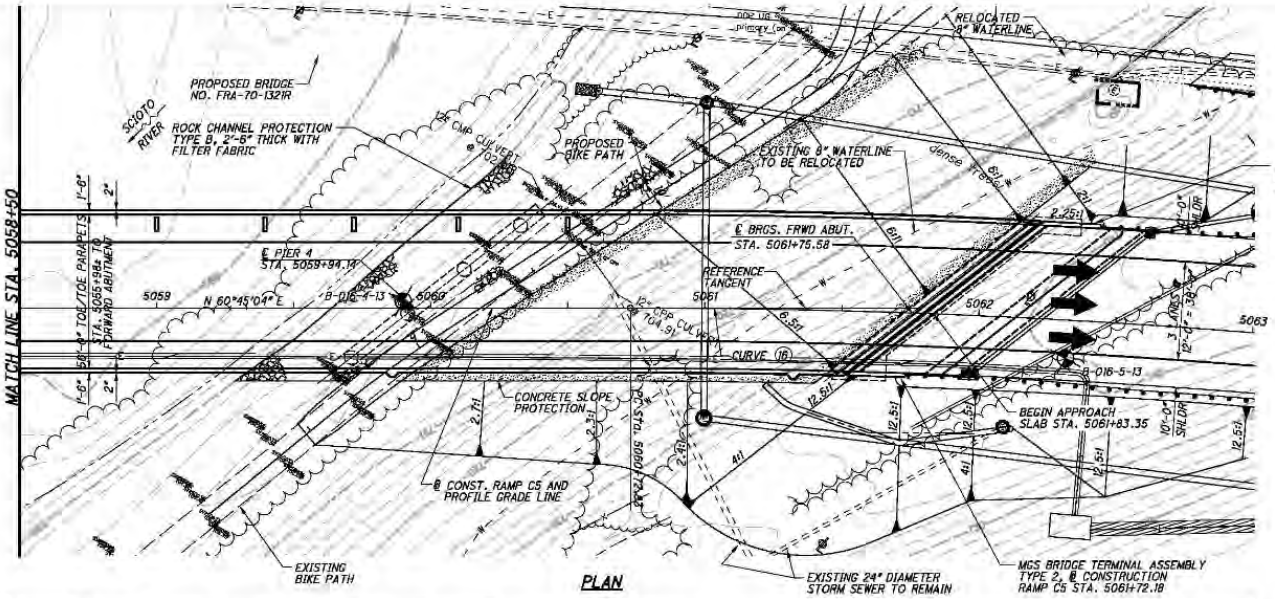
FRANKLIN COUNTY
STA. 147+93.36
STA. 158+68.36

SITE PLAN - 1
BRIDGE NO. FRA-70-1321R
I-70 E.B. OVER THE SCIOTO RIVER

FRA-70-12.68
PID No. 77372

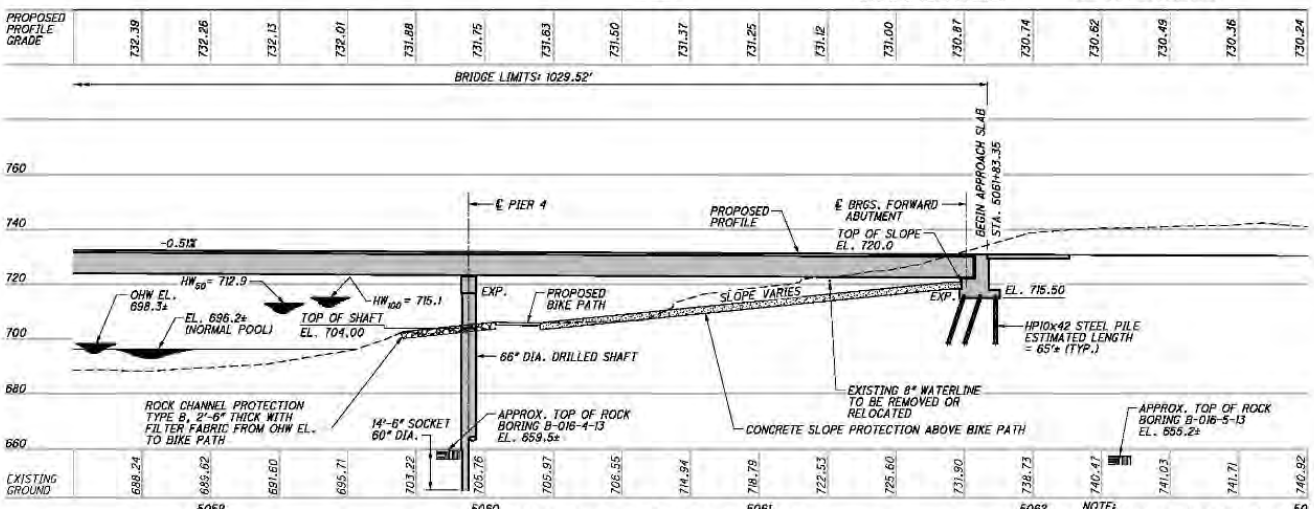
1183
VALUE

FILE=
PLOT=
PLOT SCALE=
PLOT DATE=
\\cpd\2012\2012048\FRA\77372\structures\FRA070_1321R\sheets\070_1321RSP001.dgn Design 6/8/2018 11:15:33 AM crolanc



PLAN

SOIL BORING TABLE (NEW BORINGS)	
BORING NO.	APPROX. TOP OF BEDROCK ELEVATION
B-015-7-13	651.3±
B-015-8-13	651.7±
B-015-9-13	652.2±
B-016-3-13	643.8±
B-016-4-13	659.5±
B-016-5-13	655.2±



PROFILE ALONG ℄ CONST. RAMP C5

NOTE:
ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG @ RAMP C5 UNLESS NOTED OTHERWISE.

* = MEASURED ALONG THE REFERENCE TANGENT

NOTE:
FOR CURVE DATA SEE SHT. 2/94.

LOW GIRDER ELEVATION	
LOCATION	ELEVATION
STA. 5061+51 RIGHT FASCIA	721.78

SITE PLAN - 3
BRIDGE NO. FRA-70-1321A
RAMP A5/B5/C5 OVER THE SCIOTO RIVER

FRANKLIN COUNTY
STA. 5061+53.83
STA. 5061+83.35

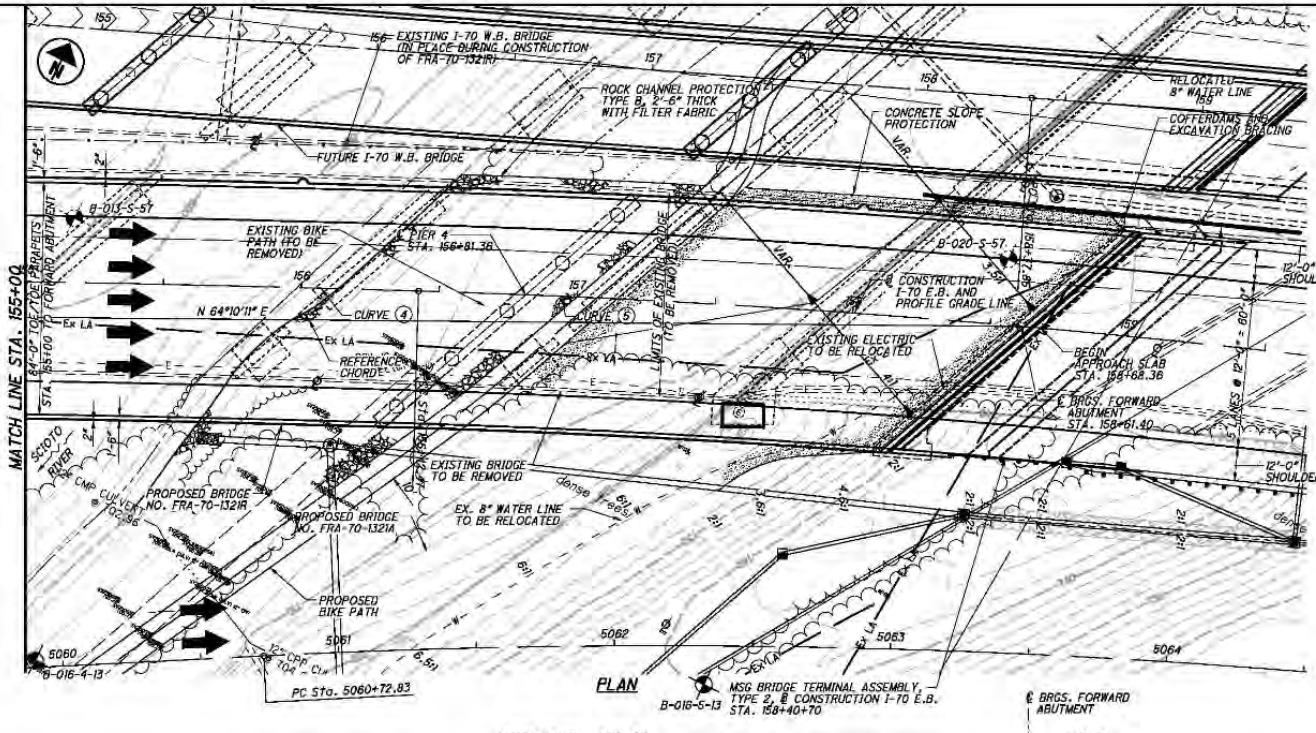
FRA-70/71-12.88/14.86
PID No. 105523

3/94

1153/1664

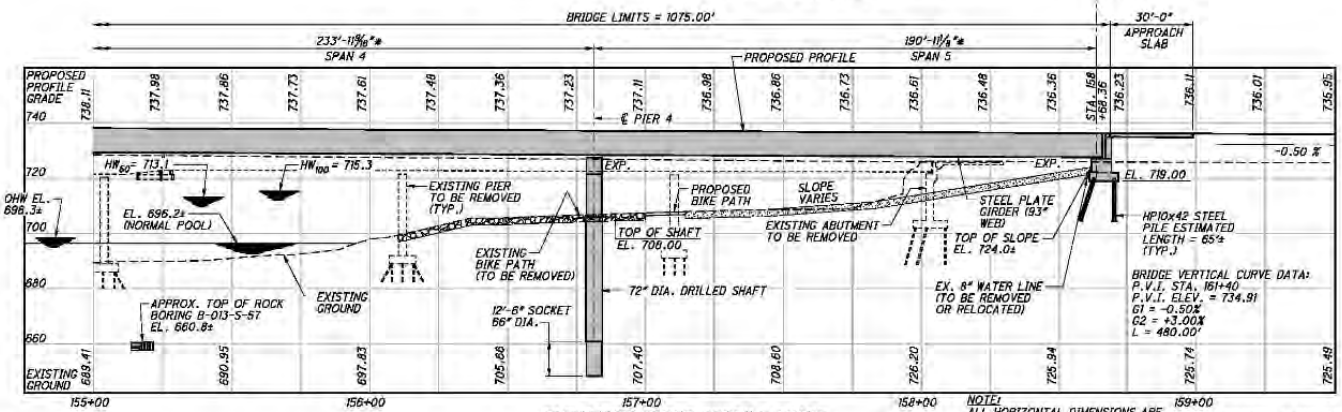
CPD GROUP

DESIGNED DGM
CHECKED TJW
DRAWN RPR
REVIEWED
REVISED DJC 3-30-18
SHEET NO. 3 OF 3 SHEETS
25100E



SOIL BORING TABLE		
BORING NO.	TYPE	APPROX. TOP OF BEDROCK ELEVATION
B-001-S-57	HISTORIC	N.E.
B-005-S-57	HISTORIC	652.1±
B-009-S-57	HISTORIC	650.8±
B-013-S-57	HISTORIC	660.8±
B-020-S-57	HISTORIC	N.E.
B-016-7-13	NEW	651.3±
B-016-8-13	NEW	651.7±
B-016-9-13	NEW	652.2±
B-016-3-13	NEW	643.8±
B-016-4-13	NEW	659.5±
B-016-5-13	NEW	655.2±

N.E. = NOT ENCOUNTERED



ELEVATION ALONG PROFILE GRADE

NOTE: ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG ℄ I-70 E.B. UNLESS NOTED OTHERWISE.

* = MEASURED ALONG THE REFERENCE CHORD

DESIGN AGENCY: CPD GROUP

REVIEWED: TJM | DATE: 3-30-15 | STRUCTURE FILE NUMBER: 2510018

DRAWN: BPR | DESIGNED: DGN | CHECKED: DJC | REVISED:

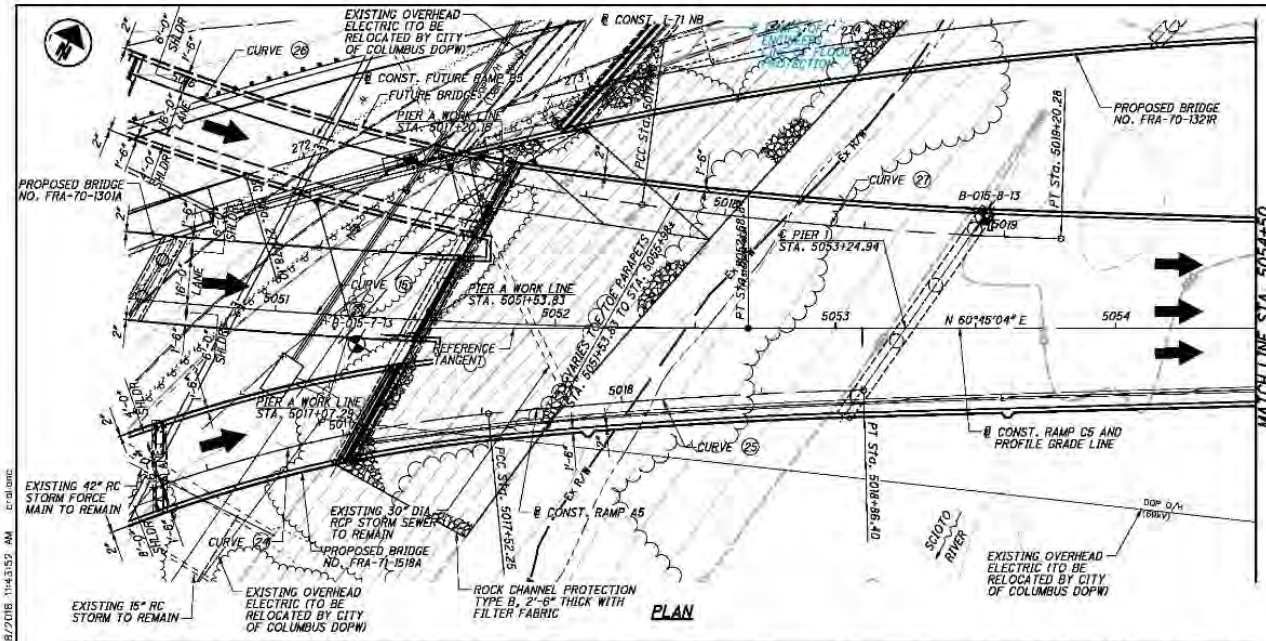
FRANKLIN COUNTY
STA. 147+93.36
STA. 158+68.36

SITE PLAN - 3
BRIDGE NO. FRA-70-1321R
I-70 E.B. OVER THE SCIOTO RIVER

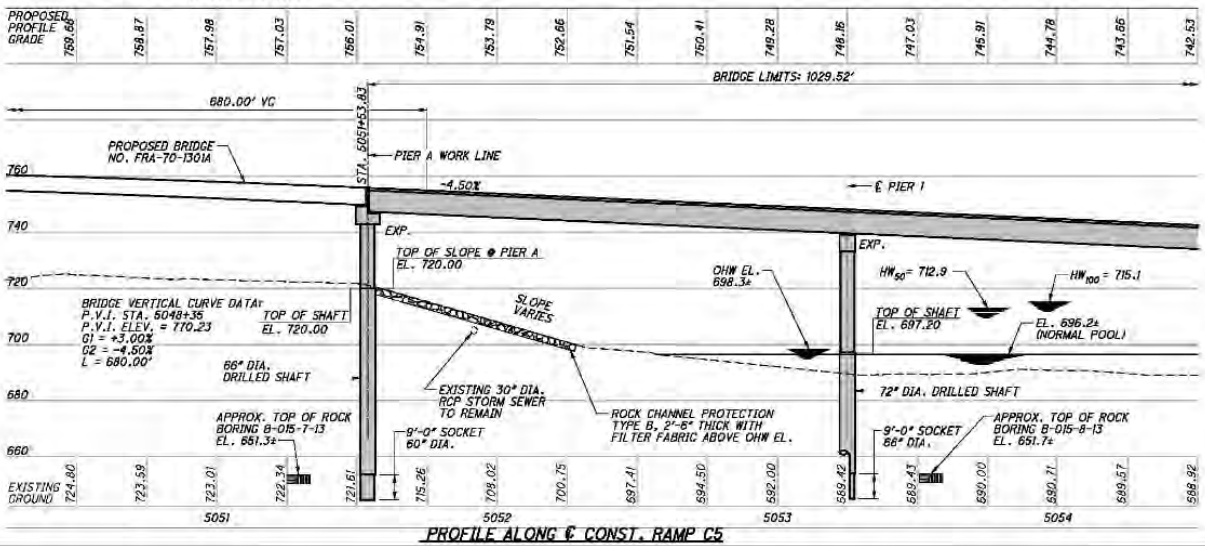
FRA-70-12.68
PID No. 77372

3/99

1040
1696



PLAN



PROFILE ALONG ℄ CONST. RAMP C5

BENCHMARK DATA

BM #1 STA.	, ELEV.	, OFFSET	,
BM #2 STA.	, ELEV.	, OFFSET	,
BM #3 STA.	, ELEV.	, OFFSET	,
BM #4 STA.	, ELEV.	, OFFSET	,

FOR ADDITIONAL BENCHMARK INFORMATION, SEE ROADWAY PLAN SHEET 16/1664

NOTES

1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
2. SEE SHEET 5/94 FOR GEOMETRIC LAYOUT PLAN.

DESIGN TRAFFIC:
2015 ADT = 17,250 2015 ADTT = 1812
2035 ADT = 17,440 2035 ADTT = 1832
DIRECTIONAL DISTRIBUTION = 100%

LEGEND

PROJECT BORING LOCATION

SEE SHEET 1153/1664 FOR BORING TABLE.

* = MEASURED ALONG THE REFERENCE TANGENT
BRGS. = BEARINGS
EXP. = EXPANSION

HYDRAULIC DATA

DRAINAGE AREA = 1629 SQ. MILES
Q (100) = 75,000 CFS V (100) = 5.67 FT/S
Q (50) = 62,100 CFS V (50) = 5.11 FT/S
STRUCTURE CLEARS THE 50-YEAR
DESIGN HW BY 8.88 FEET.

HORIZONTAL CURVE DATA

SEE SHEET 2/94

EXISTING STRUCTURE - NONE

PROPOSED STRUCTURE

TYPE: FIVE SPAN CONTINUOUS HYBRID STEEL PLATE GIRDERS A709 GRADE 50W/HPS 70W WITH COMPOSITE REINFORCED CONCRETE DECK SUPPORTED BY REINFORCED CONCRETE SUBSTRUCTURES

SPANS: 170'-11 3/16", 212'-10 1/2", 231'-10 5/8", 224'-5 1/4" AND 183'-9 7/16" C/C BEARINGS, MEASURED ALONG REFERENCE TANGENT

ROADWAY: VARIES 56'-0" TO 94'-7" TOE/TOE PARAPET

LOADING: HL-93 AND 60 PSF FUTURE WEARING SURFACE

SKEW: 60°45'04" PIER A, 56°02'48" PIER 1, 49°20'33" PIER 2, 43°38'17" PIER 3, 37°56'01" PIER 4, 37°56'01" FRWD. ABUT.

APPROACH SLABS: 30' LONG (AS-1-15)

ALIGNMENT: 2°30' CURVE LEFT, TANGENT AND 2°00' CURVE RIGHT

WEARING SURFACE: 1" MONOLITHIC CONCRETE

SUPERELEVATION: VARIES

COORDINATES: LATITUDE 39°57'05" N
LONGITUDE 83°00'46" W

NOTE:
ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG ℄ RAMP C5 UNLESS NOTED OTHERWISE.

DESIGN AGENCY: GPD GROUP

DESIGNED DCN	DRAWN RPR	REVIEWED DJC	DATE 3-30-18
CHECKED TJW	REVISED	STRUCTURE FILE NUMBER 2510016	

FRANKLIN COUNTY
STA. 5051+53.83
STA. 5061+83.36

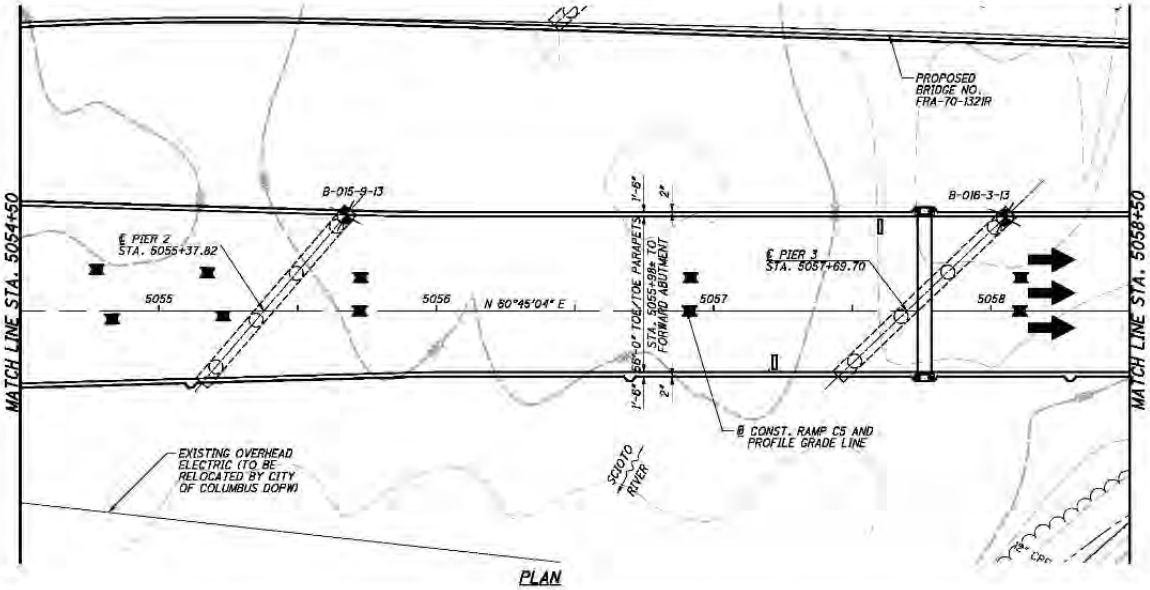
SITE PLAN - 1
BRIDGE NO. FRA-70-1321A
RAMP A5/B5/C5 OVER THE SCIOTO RIVER

FRA-70/71-12.68/14.86
PID No. 106523

1/94

1151/1664

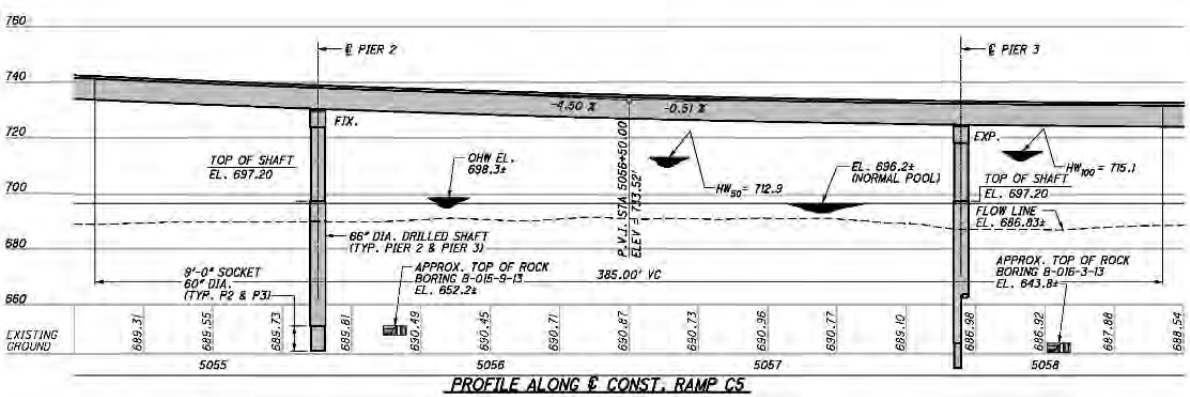
FILE= PORTION= DGN= SCALE= 1:12 \\2012\2012048\FRA\105523\structures\FRA70 1321A\sheets\070_1321ASP001.dgn Sheet: 6/8/2018, 11:43:52 AM crallanc



PLAN

PROPOSED PROFILE GRADE	741.42	740.37	739.39	738.47	737.62	736.83	736.10	735.45	734.85	734.32	733.86	733.46	733.13	732.86	732.65	732.51

BRIDGE LIMITS: 1029.52'



PROFILE ALONG ℄ CONST. RAMP C5

HORIZONTAL CURVE DATA

(15) ℄ CONST. RAMP C5
P.I. Sta. 5047+05.72
Δ = 28° 46' 35" (LT)
Dc = 2° 30' 00"
R = 2,291.83'
T = 587.94'
L = 1,151.06'
E = 74.21'
C = 1,139.00'
C.B. = N 75° 08' 21" E
e max = 0.04
P.C. = Sta. 5041+17.78
P.T. = Sta. 5052+68.84
D.S. = 50 MPH

(16) ℄ CONST. RAMP C5
P.I. Sta. 5065+40.48
Δ = 18° 32' 33" (RT)
Dc = 2° 00' 00"
R = 2,864.79'
T = 467.65'
L = 927.12'
E = 37.92'
C = 923.08'
C.B. = N 70° 01' 20" E
e max = 0.035
P.C. Sta. 5060+72.83
P.T. Sta. 5069+99.95
D.S. = 50 MPH

(24) ℄ CONST. RAMP A5
P.I. Sta. 5015+13.15
Δ = 60° 32' 16" (RT)
Dc = 11° 20' 00"
R = 505.55'
T = 295.05'
L = 534.18'
E = 79.80'
C = 509.66'
C.B. = N 24° 52' 00" E
e max = 0.060
P.C. Sta. 5012+18.10
P.C.C. Sta. 5017+52.25
D.S. = 40 MPH
HORZ. SSD = 259'
(NDC = 305')

(25) ℄ CONST. RAMP A5
P.I. Sta. 5018+19.35
Δ = 4° 01' 28" (RT)
Dc = 3° 00' 00"
R = 1,909.86'
T = 67.10'
L = 134.14'
E = 1.18'
C = 134.12'
C.B. = N 57° 08' 52" E
e 1 = 0.06
e 2 = N.C.
P.C.C. Sta. 5017+52.25
P.T. Sta. 5018+86.40
D.S. = 45 MPH

(26) ℄ CONST. FUTURE RAMP B5
P.I. Sta. 5013+32.82
Δ = 101° 35' 19" (LT)
Dc = 7° 10' 00"
R = 799.48'
T = 980.06'
L = 1,417.52'
E = 465.31'
V = 45 MPH
C = 1,239.00'
C.B. = S 60° 49' 05" E
e max = 0.058
P.C. Sta. 5003+52.76
P.C.C. Sta. 5017+70.28
D.S. = 45 MPH

(27) ℄ CONST. FUTURE RAMP B5
P.I. Sta. 5018+45.35
Δ = 6° 00' 00" (LT)
Dc = 4° 00' 00"
R = 1,432.39'
T = 75.07'
L = 150.00'
E = 1.97'
V = 45 MPH
C = 149.93'
C.B. = N 65° 23' 15" E
e 1 = 0.058
e 2 = N.C.
P.C.C. Sta. 5017+70.28
P.T. Sta. 5019+20.28
D.S. = 50 MPH

NOTE:
ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG ℄ RAMP C5 UNLESS NOTED OTHERWISE.

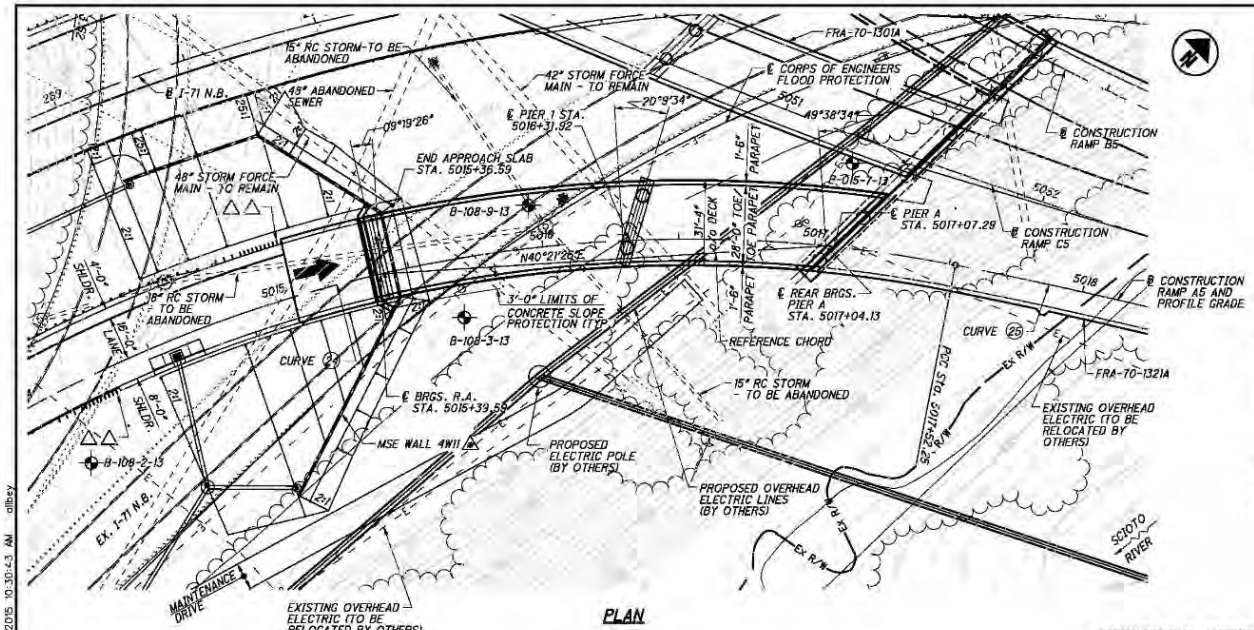
* = MEASURED ALONG THE REFERENCE TANGENT

DESIGN AGENCY
GPD GROUP
Urban Planners Engineers Architects Inc.
500 Grant Street, Suite 2000, Pittsburgh, PA 15219-2514
Tel: 412.562.1200 Fax: 412.562.1201
Columbus, Ohio Pittsburgh, PA Cleveland, OH Cincinnati, OH

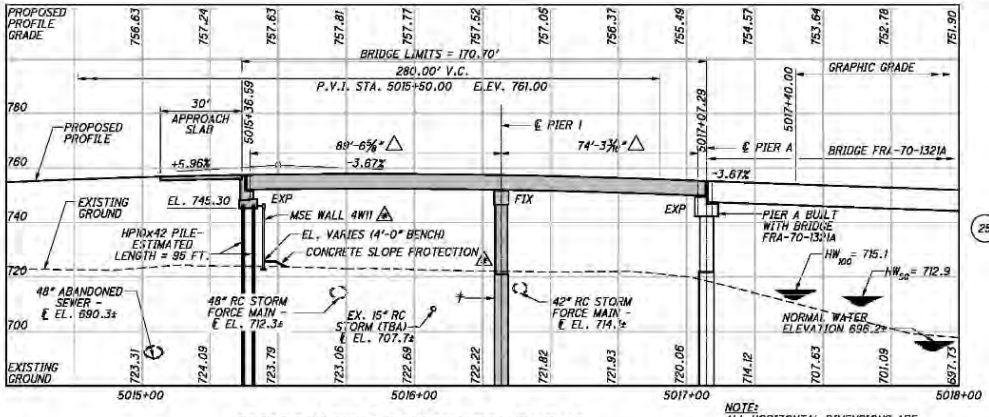
DATE	REVIEWED	DRAWN	DESIGNED	FRANKLIN COUNTY
3-30-18	DJC	RPR	DGN	STA. 5051+53.83
STRUCTURE FILE NUMBER	REVISED		CHECKED	STA. 5061+83.35
2510015			TJW	

SITE PLAN - 2
BRIDGE NO. FRA-70-1321A
RAMP A5/B5/C5 OVER THE SCIOTO RIVER

FRA-70/71-12.88/14.86
PID No. 106523



PLAN



PROFILE ALONG ℄ CONSTRUCTION RAMP A5

NOTE:
ALL HORIZONTAL DIMENSIONS ARE MEASURED ALONG ℄ CONSTRUCTION RAMP A5 UNLESS NOTED OTHERWISE.

HORIZONTAL CURVE DATA

(24) ℄ CONST. RAMP A5
P.I. Sta. 5015+13.15
Δ = 80° 32' 16" (RT)
Dc = 11° 20' 00"
R = 505.55'
T = 295.05'
L = 534.16'
E = 79.80'
C = 509.66'
C.B. = N 24° 52' 00" E
P.C. Sta. 5012+18.10
P.C.C. Sta. 5017+52.25
e^{max} = 0.060
D.S. = 40 MPH
HORZ. SSD = 259'
(NDC = 305')

(25) ℄ CONST. RAMP A5
P.I. Sta. 5018+19.35
Δ = 4° 01' 28" (RT)
Dc = 3° 00' 00"
R = 1,909.86'
T = 67.10'
L = 134.14'
E = 1.18'
C = 134.12'
C.B. = N 57° 08' 52" E
P.C.C. Sta. 5017+52.25
P.T. Sta. 5018+86.40
e^{1} = 0.060
e^{2} = N.C.
D.S. = 45 MPH

BENCHMARK DATA

BM #1 STA.	, ELEV.	, OFFSET	,
BM #2 STA.	, ELEV.	, OFFSET	,
BM #3 STA.	, ELEV.	, OFFSET	,
BM #4 STA.	, ELEV.	, OFFSET	,

FOR ADDITIONAL BENCHMARK INFORMATION. SEE ROADWAY PLAN SHEET ⊖

NOTES

1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
2. SEE BRIDGE NO. FRA-70-1321A FOR HYDRAULIC DATA.

DESIGN TRAFFIC:
2015 ADT = 4,310 2015 ADTT = 300
2035 ADT = 4,810 2035 ADTT = 340
DIRECTIONAL DISTRIBUTION = 100%

LEGEND

PROJECT BORING LOCATION

R.A. = REAR ABUTMENT
TBA = TO BE ABANDONED
+ = 60" DIAM. DRILLED SHAFT ABOVE ROCK
EST. LENGTH = 68 FT.
54" DIAM. DRILLED SHAFT INTO BEDROCK
LENGTH = 4.5 FT.

▲# = SEE MSE WALL PLANS FOR DETAILS AND PAYMENT

△ = MEASURED ALONG REFERENCE CHORD

△△ = MGS BRIDGE TERMINAL ASSEMBLY, TYPE 1
FIRST POST STA. 5014+33.20 (RIGHT SIDE)
FIRST POST STA. 5015+06.91 (LEFT SIDE)
(SEE ROADWAY PLANS FOR DETAILS AND PAYMENT)

BORING LOCATIONS ▲

BORING	STATION	OFFSET	APPROX. TOP OF BEDROCK ELEV.
B-108-2-13	5014+11.97	28.9' RT.	NOT ENCOUNTERED *
B-108-3-13	5015+67.23	22.0' RT.	NOT ENCOUNTERED **
B-108-9-13	5015+86.50	15.7' LT.	655.4
B-015-7-13	5051+29.66 ℄ CONSTR. RAMP C5	9.8' RT.	651.3

* = DRILLING TERMINATED AT ELEV. 672±
** = DRILLING TERMINATED AT ELEV. 673±
▲ = STATIONS AND OFFSETS ARE REFERENCED TO ℄ CONSTRUCTION RAMP A5 UNLESS NOTED OTHERWISE

EXISTING STRUCTURE - NONE

PROPOSED STRUCTURE

TYPE: 2-SPAN PRESTRESSED CONCRETE I-BEAMS WITH COMPOSITE REINFORCED CONCRETE DECK, PILE-SUPPORTED STUB ABUTMENT BEHIND MSE WALL (R.A.), PIERS SUPPORTED ON DRILLED SHAFTS (PIERS 1 & A)

SPANS: 88'-3¾" AND 73'-0¼" ℄ BRG. TO ℄ BRG. ALONG REFERENCE CHORD

ROADWAY: 28'-0" TOE/TOE PARAPET

LOADING: HL-93 AND 60 PSF FUTURE WEARING SURFACE

SKEW: 9°19'26" R.F. (R.A.), 20°09'34" L.F. (PIER 1), 49°38'34" L.F. (PIER A) WITH RESPECT TO REF. CHORD

APPROACH SLAB: 30' LONG (AS-1-81 MODIFIED) (R.A. ONLY)

ALIGNMENT: 11°20'00" RIGHT CURVE

WEARING SURFACE: 1" MONOLITHIC CONCRETE

SUPERELEVATION: 0.06 FT/FT

COORDINATES: LATITUDE 39°57'02" N
LONGITUDE 83°00'52" W

BURGESS & NIPLE
Engineers ■ Architects ■ Planners

DESIGNED RMK/BLS	DRAWN RMK/BLS	REVIEWED CAS
CHECKED JAL	REVISED	DATE 3/20/15
		STRUCTURE FILE NUMBER 25100113

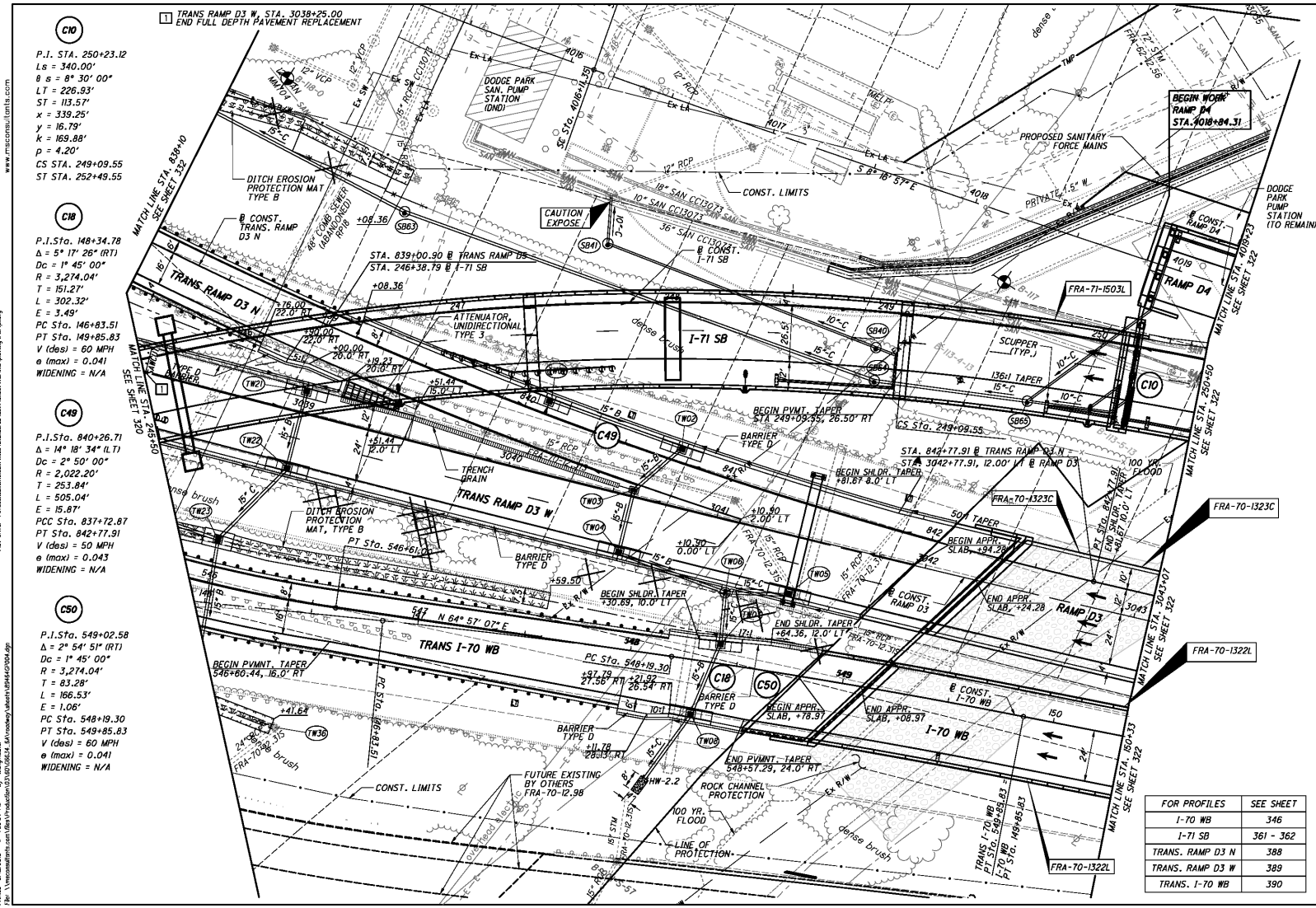
FRANKLIN COUNTY
STA. 5015+36.59
STA. 5017+07.29

SITE PLAN
BRIDGE NO. FRA-71-1518A
RAMP A5 OVER THE SCIOTO RIVER

FRA-70-12.58
PID No. 77372

1006
1696

P:\FRA5178\Ira\77372\structures\FRA071_1518A\Stage 2\Sheets\071_1518ASP001.dgn 3/25/2015 10:30:43 AM dlbey



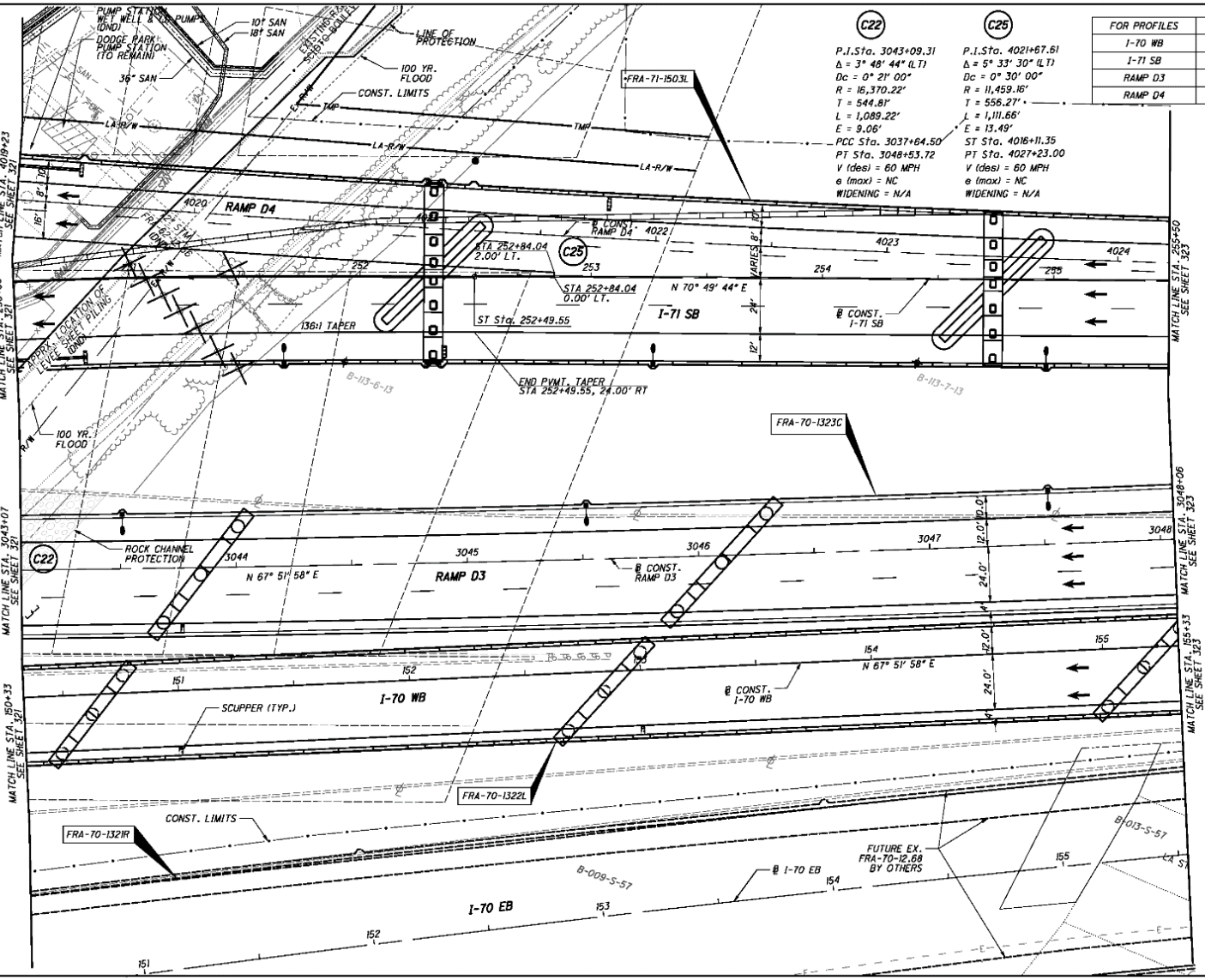
FOR PROFILES	SEE SHEET
I-70 WB	346
I-71 SB	361 - 362
TRANS. RAMP D3 N	388
TRANS. RAMP D3 W	389
TRANS. I-70 WB	390

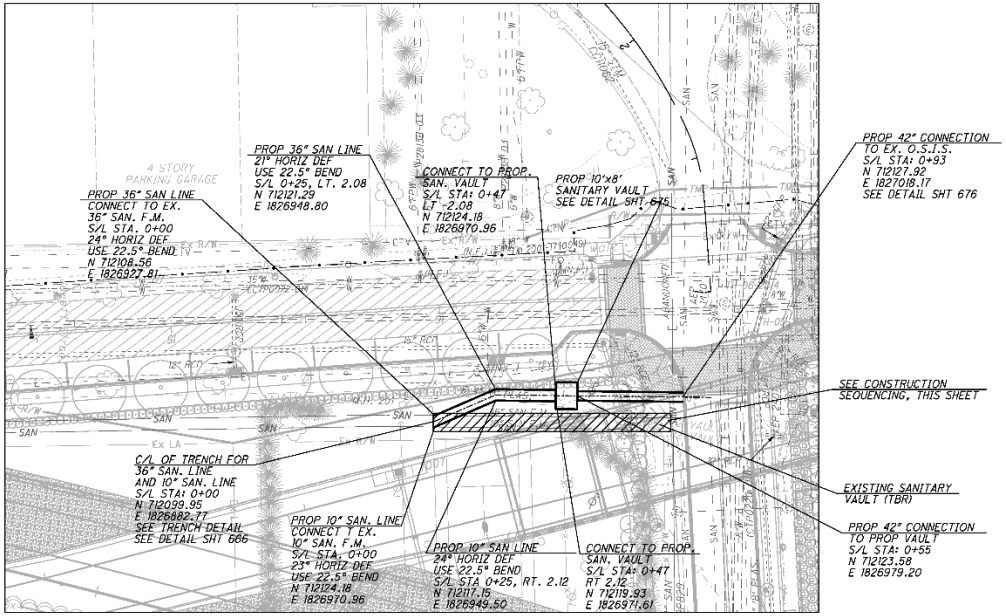
PLAN - I-71 SOUTHBOUND
STA. 245+50 TO STA. 250+50

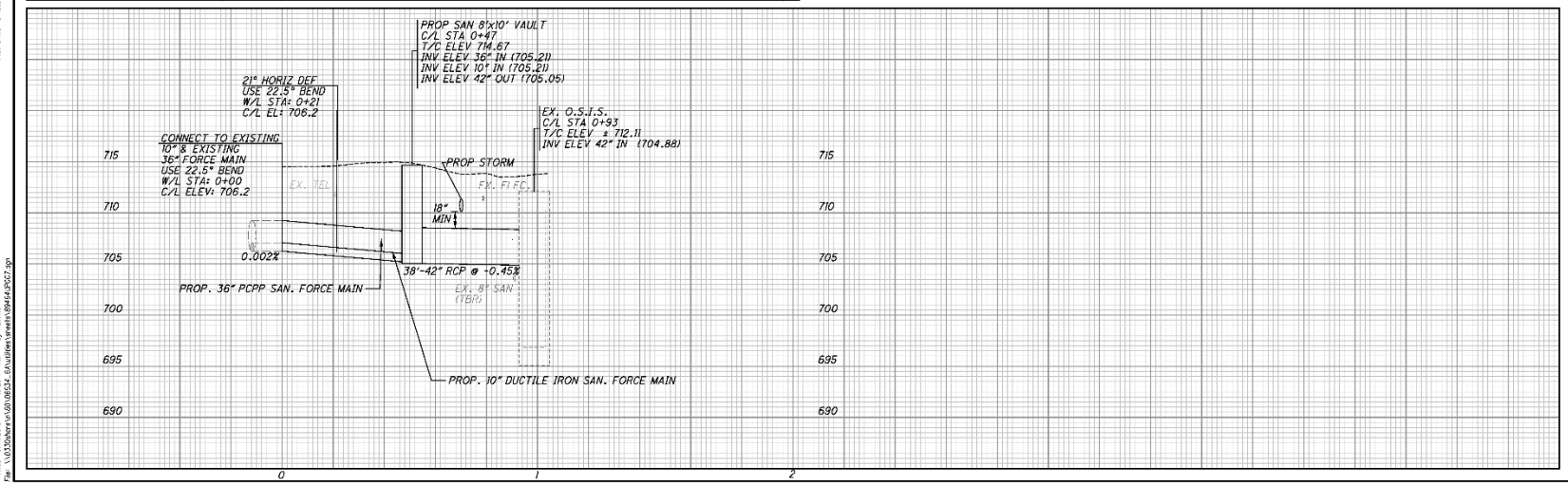
FRA-70-13.10

321
995

ms consultants, inc.


C22
P.I.Sta. 3043+09.31
Δ = 3° 48' 44" (LT)
Dc = 0° 21' 00"
R = 16,370.22'
T = 544.81'
L = 1,089.22'
E = 9.06'
PCC Sta. 3037+64.50
PT Sta. 3048+53.72
V (des) = 60 MPH
e (max) = NC
WIDENING = N/A
C25
P.I.Sta. 4021+67.61
Δ = 5° 33' 30" (LT)
Dc = 0° 30' 00"
R = 11,459.16'
T = 556.27'
L = 1,111.66'
E = 13.49'
ST Sta. 4016+11.35
PT Sta. 4027+23.00
V (des) = 60 MPH
e (max) = NC
WIDENING = N/A
FOR PROFILES | SEE SHEET
1-70 WB | 346, 347
1-71 SB | 362, 363
RAMP D3 | 375, 376
RAMP D4 | 381
MATCH LINE STA. 4019+23 SEE SHEET 321
MATCH LINE STA. 250+50 SEE SHEET 321
MATCH LINE STA. 3043+07 SEE SHEET 321
MATCH LINE STA. 150+33 SEE SHEET 321
MATCH LINE STA. 255+50 SEE SHEET 323
MATCH LINE STA. 3048+06 SEE SHEET 323
MATCH LINE STA. 155+33 SEE SHEET 323
RAMP D4
RAMP D3
I-71 SB
I-70 WB
I-70 EB
@ CONST. RAMP D4
@ CONST. I-71 SB
@ CONST. RAMP D3
@ CONST. I-70 WB
@ I-70 EB
STA 252+84.04 2.00' LT.
STA 252+84.04 0.00' LT.
ST Sta. 252+49.55
N 70° 49' 44" E
N 67° 51' 58" E
136:1 TAPER
END PVMT. TAPER STA 252+49.55, 24.00' RT
FRA-71-1503L
FRA-70-1323C
FRA-70-1322L
FRA-70-1321R
ROCK CHANNEL PROTECTION
SCUPPER (TYP.)
CONST. LIMITS
LINE OF PROTECTION
100 YR. FLOOD
FUTURE EX. FRA-70-12.68 BY OTHERS
B-113-6-13
B-113-7-13
B-009-S-57
B-013-S-57
PLAN - I-71 SOUTHBOUND
STA. 250+50 TO STA. 255+50
FRA-70-13.10
322
995
HORIZONTAL SCALE IN FEET
CALCULATED
CHECKED
ms consultants, inc.





CONSTRUCTION SEQUENCING:

* CONTRACTOR TO BEGIN CONSTRUCTING PROPOSED SANITARY VAULT AND 36-INCH AND 10-INCH FORCE MAINS FROM STA 0+25 TO STA. 0+47.
* CONSTRUCT 42-INCH SEWER AND MAKE CONNECTION TO PROPOSED SANITARY VAULT AND O.S.I.S.
* CONSTRUCT 36-INCH FM FROM STA. 0+00 TO STA 0+25, MAKING THE CONNECTION TO EXISTING 36-INCH FM.
* ONCE PROPOSED 36-INCH FM IS OPERATIONAL, CONTRACTOR MAY CONNECT 10-INCH FM. ONE FORCE MAIN MUST BE OPERATIONAL AT ALL TIMES. CONTRACTOR TO COORDINATE WITH COC DOSD REGARDING OUTAGES.
* ONCE PROPOSED WORK IS COMPLETE, CONTRACTOR TO REMOVE AND PROPERLY DISPOSE OF EXISTING 36-INCH, 10-INCH FM, AND EXISTING SANITARY VAULT.
* GROUT AND SEAL EXISTING 42-INCH CONNECTION TO O.S.I.S.
* PROPERLY BACKFILL EXCAVATIONS PER COC CMS 911.

HORIZONTAL SCALE IN FEET

CALCULATED
CHECKED

SANITARY PLAN AND PROFILE
STA. 0+00 TO STA. 0+93

FRA-70-13.10

ms consultants, inc.
msconsultants.com
Ohio 1201 Workspace
701/71 East Interchange 6A
www.msconsultants.com
UCF: 0/0/0/1/95
PCF: 60 08634_6A_Columbus
Bentrpkt Spec: \\0330shore\n\60\08634_6A\stormcrk\phase\bntrpk.spc
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By: Shaw, Jeffrey A.
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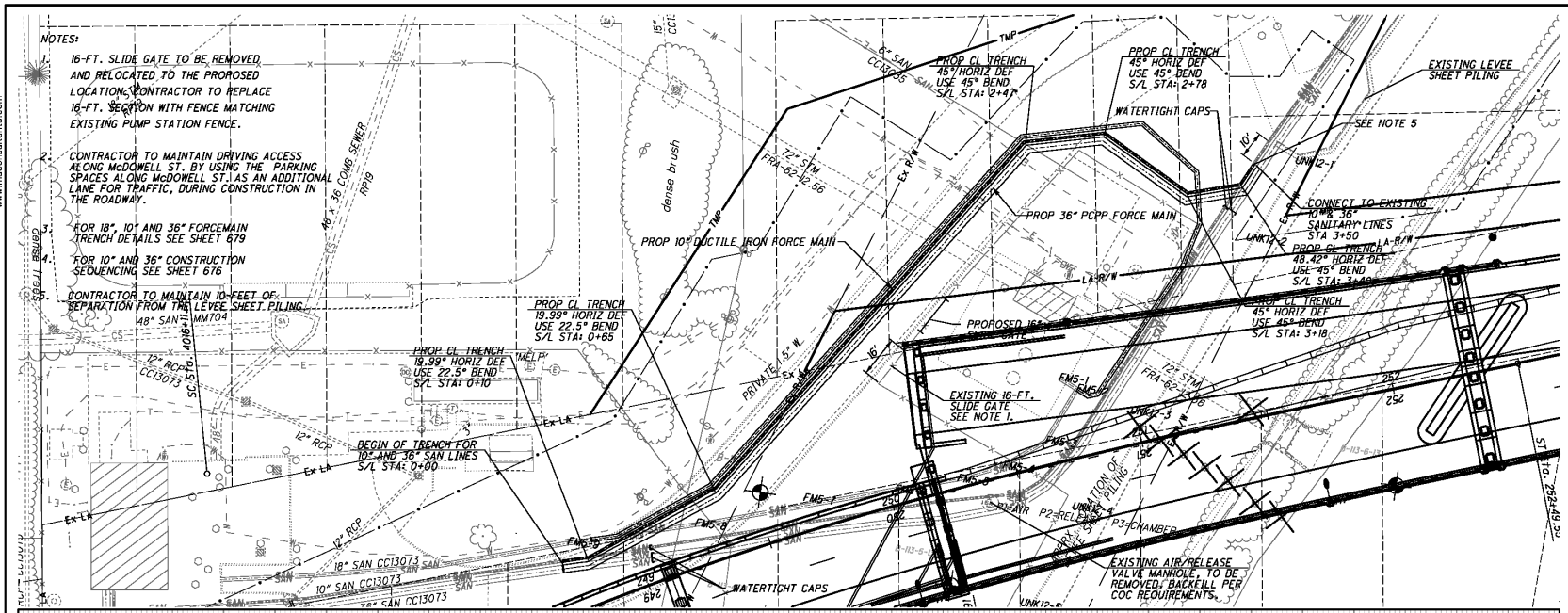
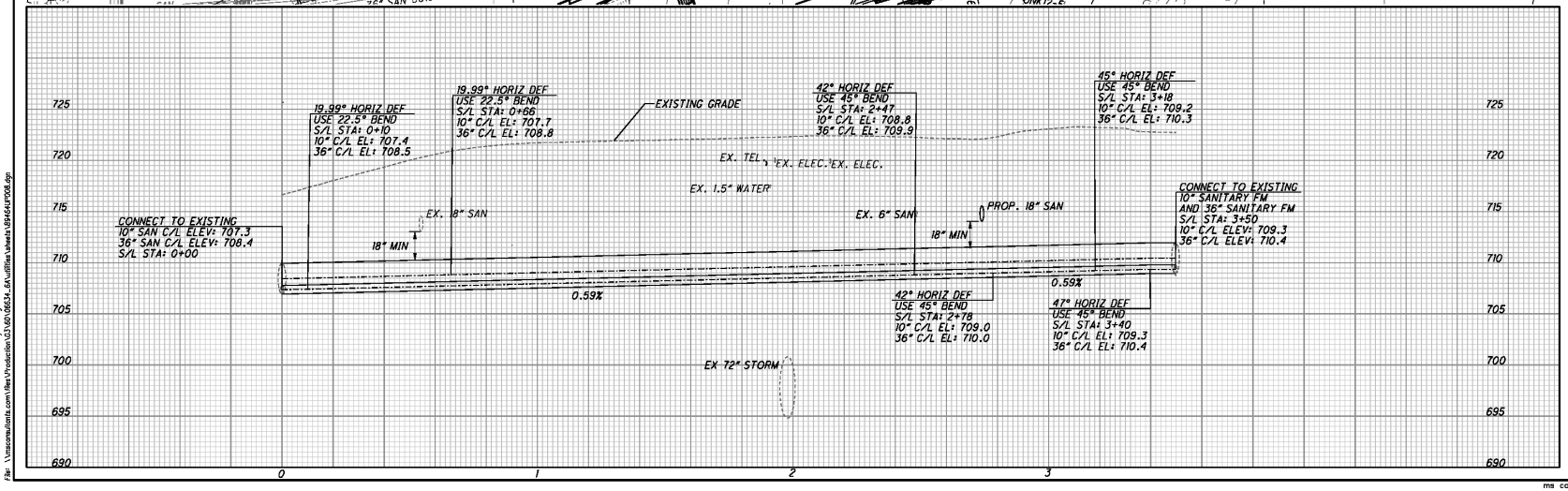
ms consultants, inc.

NOTES:

1. 16-FT. SLIDE GATE TO BE REMOVED AND RELOCATED TO THE PROPOSED LOCATIONS. CONTRACTOR TO REPLACE 16-FT. SECTION WITH FENCE MATCHING EXISTING PUMP STATION FENCE.
2. CONTRACTOR TO MAINTAIN DRIVING ACCESS ALONG McDOWELL ST. BY USING THE PARKING SPACES ALONG McDOWELL ST. AS AN ADDITIONAL LANE FOR TRAFFIC, DURING CONSTRUCTION IN THE ROADWAY.
3. FOR 18", 10" AND 36" FORCEMAIN TRENCH DETAILS SEE SHEET 679
4. FOR 10" AND 36" CONSTRUCTION SEQUENCING SEE SHEET 676
5. CONTRACTOR TO MAINTAIN 10-FEET OF SEPARATION FROM THE LEVEE SHEET PILING.





HORIZONTAL SCALE IN FEET

CALCULATED

CHECKED

SANITARY PLAN AND PROFILE
10" SANITARY AND 36" SANITARY LINES

FRA-70-13.10

672
995

ms consultants, inc.

PLOT.DEL

ms consultants, inc.
msconsultants.com

www.msconsultants.com

34" x 22"

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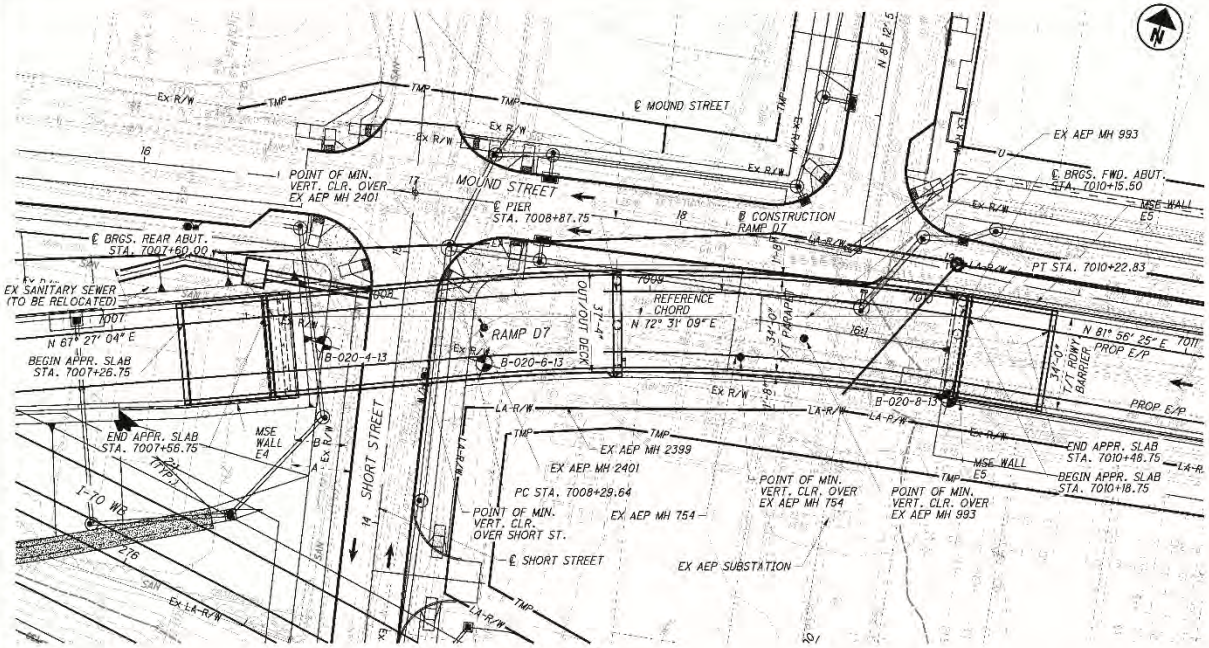
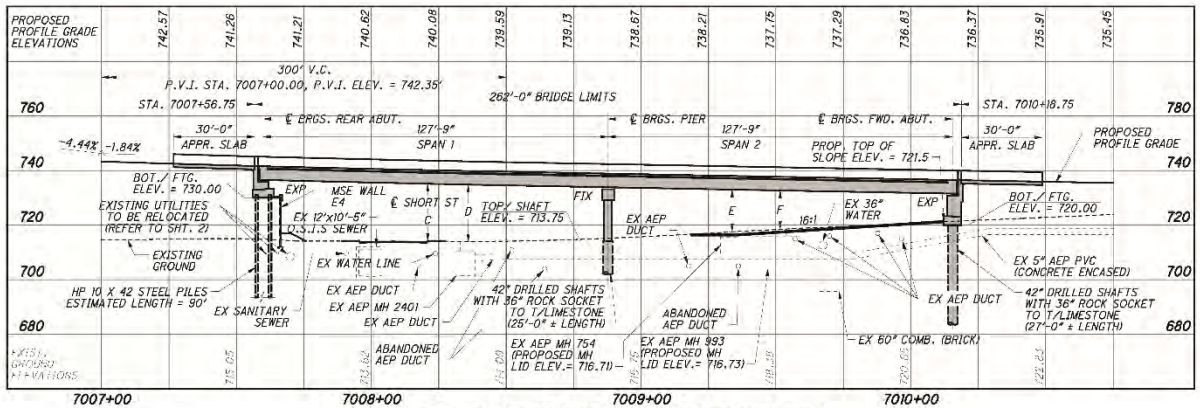


PLAN



PROFILE ALONG RAMP D7 ℄ SURVEY & CONSTRUCTION

BENCHMARK DATA

BM #1 RAMP D6 STA. 6002+17.25, ELEV. 737.79, OFFSET 42.35' RT.
BM #2 315 NB STA. 332+44.01, ELEV. 719.82, OFFSET 2.30' RT.
BM #3 RAMP A6 STA. 6004+80.97 ELEV. 707.50, OFFSET 48.23' RT.

FOR ADDITIONAL BENCHMARK INFORMATION, SEE ROADWAY PLAN SHEET

NOTES

1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
2. FOR UTILITY DISPOSITIONS, SEE SHEET 2.

DESIGN TRAFFIC:

2015 ADT = 8,200 2015 ADTT = 246
2035 ADT = 8,900 2035 ADTT = 270
DIRECTIONAL DISTRIBUTION = 1.00

HORIZONTAL CURVE DATA

P.I. STA. =7009+26.75
Δ =14°29'21.03" RT.
Dc =7°30'00.00"
R =763.94'
T =97.11'
L =193.19'
E =6.15'

LEGEND

BORING LOCATION

MINIMUM HORIZONTAL CLEARANCES
"A" 22'-6" ACTUAL, 15'-0" REQUIRED (F/WALL TO E/ TRAVELLED WAY)
"B" 20'-5" ACTUAL, 20'-0" REQUIRED (F/WALL TO O.S.I.S.)

MINIMUM VERTICAL CLEARANCES
"C" 20'-10" ACTUAL, 14'-6" REQUIRED
"D" 20'-6" ACTUAL, 15'-0" REQUESTED (MH2401)
"E" 15'-2" ACTUAL, 15'-0" REQUESTED* (MH754)
"F" 15'-2" ACTUAL, 15'-0" REQUESTED* (MH993)

* ACTUAL VERTICAL CLEARANCES WILL BE REALIZED AFTER LOWERING OF MANHOLE RISERS (MH754 - 9", MH993 - 5½")

APPROX. TOP OF BEDROCK ELEV.			
LOCATION	BORING	SHALE	LIMESTONE
REAR ABUT.	B-020-4-13	649.6	630.3
PIER	B-020-6-13	653.7	628.6
FWD. ABUT.	B-020-8-13	656.0	629.0

EXISTING STRUCTURE - NONE

PROPOSED STRUCTURE

TYPE: 2 - SPAN CONTINUOUS COMPOSITE CURVED 44" DEEP STEEL GIRDER (ASTM A709 GRADE 50W, PAINTED) WITH REINFORCED CONCRETE DECK.

SPANS: 127'-9", 127'-9" C/C BEARINGS

ROADWAY: 34'-0" TOE/TOE PARAPET

LOADING: HL-93, FWS=60 PSF

WEARING SURFACE: MONOLITHIC CONCRETE

SKEW: NONE

APPROACH SLABS: 30'-0" LONG (AS-1-15, AS-2-15 TYPE C)

ALIGNMENT: CURVE

SUPERELEVATION: VARIES, 0.047 MAX

COORDINATES: LATITUDE 39°57'15" N
LONGITUDE 83°00'14" W

CH2M
1193 Schrock Road, Suite 400
Columbus, Ohio 43229

DESIGNED DGS	DRAWN JBA	REVIEWED VS	DATE 05/15
CHECKED JTC	CHECKED	SHEET	TOTAL SHEETS
		2510030	

FRANKLIN COUNTY
STA. 7007+56.75
STA. 7010+18.75

SITE PLAN
BRIDGE NO. FRA-070-13.73B
RAMP D7 OVER SHORT STREET

FRA-70-13.10
PID No. 89464

APPENDIX C

USACE ATR TEAM for Section 408

Agency Technical Review (ATR) Team		
Name	**Discipline**	**Office**
[redacted]	ATR Leader and Civil/Site	CELRH-EC-DC
[redacted]	Structural	CELRH-EC-DS
[redacted]	Geotechnical	CELRH-EC-GW-G
[redacted]	Hydrology & Hydraulics (H&H)	CELRH-EC-GW-W
[redacted]	Mechanical	CELRH-EC-DE
[redacted]	Electrical	CELRH-EC-DE
[redacted]	Real Estate	CELRH-RE-P
[redacted]	Planning/NEPA	CELRH-PM-PD-F
[redacted]	Levee Safety	CELRH-EC-GW-G
[redacted]	Maintenance and Operation (Sponsor)	City of Columbus

Name & Discipline	Experience
[redacted] ATR Leader and Civil/Site	[redacted] is a registered Professional Engineer and Project Management Professional with 11 years of experience working on civil/structural projects. During this time, he reviewed several projects prior to release for construction. [redacted] has knowledge of EC 1165-2-217 "Water Resources Policies and Authorities, Review Policy for Civil Works." [redacted] has experience as the BCOES Civil Lead on the Atwood Intake Structure project.

[redacted] Structural	[redacted] is a registered Professional Engineer with 25 years of design experience with the Corps of Engineers including structural design and evaluation of features associated with inland flood damage reduction systems and navigation lock and dam systems. Experience includes design, inspection and evaluation of flat-based and sloped-base T-walls and I-walls associated with local flood protection projects, reinforced concrete and structural steel features of flood control dams, associated inlet and outlet works and spillways, mass concrete lock walls, gate sills, fill/empty systems and appurtenant components associated with navigation locks and dams. Served as a structural team member for the district Levee Screening Program. Served as the lead structural engineer on the Grundy Local Protection Project during design, the Marmet Lock and Dam – Additional Lock Project and Bluestone Dam DSA Project - Phase 3 during construction. Currently serving on the Bluestone DSA Project: Phase 4 and Phase 5 - DDR Team and also serves as a Team Leader for the District Bridge Inspection Program
[redacted] Geotechnical	[redacted] is a registered Professional Engineer with 9 years of experience at the Huntington District, including assessment of dams and levees. [redacted] has served as a geotechnical team member for multiple District Dam and Levee Safety studies including risk assessments for dams and levees, performing seepage analyses, filter analysis, slope stability analyses, and I-wall stability evaluations. He has also been the designer for several levee safety issues including the design of relief well systems, filter berms, and cutoff walls.
[redacted] Hydrology and Hydraulics	[redacted] is a registered Professional Engineer with over eighteen years of experience as a civil engineer. [redacted] has over twelve years of experience with the USACE Huntington District and Lakes and River Division. [redacted] holds Bachelor in Civil Engineering from West Virginia Institute of Technology and a Master's Degree in Engineering from Marshall University. [redacted] presently serves as the Chief of Hydraulics and Hydrology Section where his responsibilities include reviewing and approving technical products including Periodic and Routine Inspections, Design Reports, Screening Level Risk Assessments, Section 408 Modifications, as well as various studies related to the water resources. Routinely provides District Quality Control (DQC) reviews following Periodic Inspection of completed works and has served as ATR for several District projects. As a Hydraulic engineer and Hydrologist, he has performed investigations and engineering design and is independently responsible for broad features of project development including investigations and studies required in connection with project planning in dealing with water resources.

[redacted] Mechanical	[redacted] is a Registered Professional Mechanical Engineer with 28 years of experience. He has been Chief of the Electrical/Mechanical Section in Huntington District for eleven years. Prior to that, he was a senior mechanical engineer in the section and the Mechanical Regional Technical Specialist for the Great Lakes and Ohio River Division. He has been responsible for the design of mechanical components for new navigation locks at several locations. These components have included direct connected miter gate machinery, filling and emptying valves and machinery, hydraulic and utility piping systems, vertical lift gates, and plumbing and HVAC systems. He has also been responsible for the design of components as requested by Operations Division necessary for the continued safe and reliable operation of projects. He has also been the lead mechanical engineer on several new storm water pump stations. He has a B.S. in Mechanical Engineering from West Virginia University and is a licensed Professional Engineer in the state of West Virginia.
[redacted] Electrical	[redacted] is a registered Professional Electrical Engineer with over 15 years of industry experience, with extensive design, testing, commissioning, and maintenance knowledge with respect to power distribution, controls and automation, transformers, motors, and power electronics. [redacted] has extensive regulatory compliance and electrical safety training and experience. [redacted] has a working knowledge of the USACE standards related to dam/pump station electrical safety, design and reliability. [redacted] has performed numerous designs and analyses associated with dam/pumpstation power distribution, control systems, lighting, and communications. [redacted] serves as an ATR reviewer for many districts and serves as an electrical engineer for the OCA program.
[redacted] Real Estate	[redacted], chief of LRH Real Estate Planning and Control Branch, is a registered Professional Land Surveyor with 22 years of Federal Civil Works Real Estate planning, mapping, and survey experience. [redacted] has successfully implemented large and small scale real estate planning and mapping efforts, and leads a staff of multi-disciplinary Realty Specialists with extensive experience in CADD/GIS, planning, and mapping. [redacted] has experience in large and small scale Public Facility relocations and contracts.

[redacted] Planning and NEPA	[redacted] is a Community Planner for the Huntington District, Planning Branch. She has a B.A. and M.A. in Geography from Marshall University. [redacted] has 10 years of assuring compliance under NEPA for a multitude of projects. As part of NEPA compliance, [redacted] has completed projects involving multiple federal statues/laws including the Endangered Species Act, National Historic Preservation Act, and Clean Water Act.
[redacted] Levee Safety	[redacted] is a registered Professional Engineer with over five years of experience as a Civil Engineer with the USACE Huntington District and prior experience working as a Construction QA Manager in private sector and as a Structural Engineer for the West Virginia Division of Highways. [redacted] holds Bachelor and Master degrees in Civil Engineering from West Virginia University. [redacted] presently serves as the District's Levee Safety Program Manager in the Dam and Levee Safety Section to manage inspections and coordinate with sponsors on 28 levee systems comprising 70 miles of levees. Responsibilities include reviewing and approving technical products including Periodic and Routine Inspections, Screening Level Risk Assessments, Section 408 Modifications, NFIP evaluations, as well as various studies related to the operation and maintenance of federally constructed levees and channel projects. He has served as Levee Safety Team Lead to perform numerous continuing eligibility annual inspections and Technical Lead Engineer on several Huntington District projects, including the Winfield, WV, Locks and Dam cutoff wall installation and Section 14 Emergency Streambank Protection Projects. Routinely provides District Quality Control (DQC) reviews following Periodic Inspection of completed works and has served as ATR Lead for several Section 408 modification projects. As a Geotechnical Engineer, he has performed geotechnical investigations and engineering design and was independently responsible for broad features of project

	development including investigations and studies required in connection with project planning in dealing with soil structures and foundations. He has performed embankment and levee seepage, slope stability, and settlement analyses for many projects and routinely conducts subsurface explorations, sampling, and testing of soils for proposed modifications to levees, slopes, and embankments.
[redacted] Maintenance and Operation (Sponsor)	[redacted] is a registered Professional Engineer in the State of Ohio with 9 years of experience. Prior to joining the Division of Sewerage and Drainage with the City of Columbus, [redacted] worked as a Geotechnical Engineer in the private sector on numerous projects involving embankments, earthen dams, and slope stability analyses. [redacted] holds Bachelor and Master degrees from The Ohio State University with a specialization in Geotechnical Engineering. Currently, [redacted] serves the City of Columbus as a Project Manager, managing the procurement, design, and construction of several small- and large-scale Capital Improvement Projects. Additionally, [redacted] serves the City as a technical lead on the West Columbus Local Protection Project and acts as a liaison between the Army Corps of Engineers and the Ohio Department of Transportation.

APPENDIX D

ATR Certification

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the West Columbus, Ohio, Local Protection Project, resulting from the Ohio Department of Transportation (ODOT) proposed I-70/I-71/SR-315 Interchange Project (ODOT Contract No. FRA-70-8.93).

The ATR was conducted as defined in the Alteration-Specific Review Plan to comply with the requirements of EC 1165-2-217. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

_____ _____ Date

ATR Team Leader
CELRH-EC-DC

_____ _____ Date

Project Manager / District Section 408 Coordinator
CELRH-PM-PP

_____ _____ Date

Director, RMC

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:
[Describe the major technical concerns and their resolution and specifically list any agreed-upon deferrals to be completed in the next phase of work.]

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

_____ _____
[redacted]
Chief, Engineering & Construction Division
CELRH-EC

Date