



**US Army Corps
of Engineers®**
St. Paul District

Appendix E: Cost Engineering

CAP Section 205 Flood Risk Management Study

Arcadia, WI

Final Feasibility Study Report with Integrated
Environmental Assessment

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1. Introduction

This appendix presents a summary of the detailed cost estimate prepared for the Feasibility Study Report with Integrated Environmental Assessment (Feasibility Report). The study investigated alternative measures to address problems and opportunities associated with flood risk reduction in the city of Arcadia, Wisconsin in accordance within Continuing Authorities Program Section 205. USACE along with the city of Arcadia, serving as the Non-Federal sponsor, developed this estimate based on selection of a Recommended Plan. The project consists of constructing a series of new levees, floodwalls, flood gates, engineered high ground, and other flood risk reduction features through Arcadia, Wisconsin. The estimate is at feasibility level of design detail, and all costs are based on quantities developed from the feasibility report and design layout as reviewed.

This estimate includes; lands and damages; planning, engineering and design (PED); construction; construction management (CM); and operation and maintenance, repair, rehabilitation, and replacement (OMRR&R) costs of the Recommended Plan to allow for final design and construction to proceed subsequent to document approval.

Guidance for the preparation of the estimate and attachments was obtained from Engineer Regulations (ER)-1110-2-1150, Engineering and Design for Civil Work Projects; ER 1110-2-1302, Civil Works Cost Engineering; Engineer Technical Letters (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works; Engineering and Construction Bulletin (ECB) 2007-17, Application of Cost Risk Analysis Methods to Develop Contingencies for Civil Work Total Project Costs; EM 1110-2-1304, Civil Works Construction Cost Index System, and ER 1105-2-100, Planning Guidance Notebook - Appendix E. In addition, the Assistant Secretary of the Army for Civil Works approved a policy deviation on September 19, 2019 that allows the non-federal sponsor for this project to pay all costs that exceed the statutory federal participation limit for the Section 205 authority.

2. Background

A complete description of plan formulation measures and alternatives can be found in Section 3 of the Feasibility Report. This cost appendix presents only the Recommended Plan, optimized in the second phase of the feasibility study by parametric comparison of system performance level. The Recommended Plan is defined in the Feasibility Report as the National Economic Development (NED) plan. The performance levels studied and parametric costs are shown in Section 3.6 of the Feasibility Report.

3. Recommended Plan

Plan 3: Top of levee designed at a peak flow rate of 35,000 cfs is the Recommended Plan selected. The Recommended Plan includes four reaches (reaches 1, 2, 3, and 4). The main features of the Recommended Plan include, levees, floodwalls, engineered high ground, road and railroad closures, two channel realignments. Section 3.10 of the main report further documents all four reaches and all features of the Recommended Plan. A full description of the Recommended Plan flood risk reduction features can be found in the Section 3.10 of the Feasibility Report.

4. Assumptions and Constraints

It is assumed that all work necessary to complete the Recommended Plan will be done within the existing and proposed right of way as described in the Real Estate Plan and as estimated by Real Estate. Borrow material needed to complete the levee features is assumed to be available within a 5 mile round trip of any place on the levees. It is also assumed that the disposal of all

waste materials removed from the project site will be disposed of at the local landfill within a 6 mile round trip from the project site.

5. USACE Civil Works Work Breakdown Structure (CWWBS)

This section provides elements of the Civil Works Work Breakdown Structure (CWWBS). Implementation costs for flood risk management (FRM) projects are normally cost shared at a rate of 65 percent federal and 35 percent non-federal. The statutory federal participation limit for a CAP Section 205 project is \$10,000,000. During the feasibility phase of the study it was determined that 65 percent of the estimated cost of the Recommended Plan would exceed \$10,000,000. The policy deviation allows the non-federal sponsor to contribute funds for any costs that would normally be part of the federal share but are over the per-project limit. (*Engineer Pamphlet 1105-2-58, Continuing Authorities Program, 10b (1)*). A copy of the approval memo can be found in Appendix A – Coordination and Public Involvement.

5.1. CWWBS 01 Lands and Damages

The lands and damages account includes the costs for the lands and administrative costs necessary for the construction of the Recommended Plan. Costs included the acquisition and relocation of 2 commercial structures and 4 residential properties, permanent and temporary construction easements, and fee title lease agreements. A separate real estate contingency was supplied by Real Estate in the amount of 25 percent for this feasibility effort.

5.2. CWWBS 02 Relocations

The relocations account includes costs for both permanent and temporary relocations of infrastructure modifications and municipal utilities such as pavement, railroad adjustment, curb and gutter, water, sanitary, storm, electrical, natural gas, and fiber optic. Restorations of associated demolition to existing features, and hauling and disposal of materials not to remain within the project. This account also includes the costs for levee fill materials and environmental mitigation credits.

5.3. CWWBS 09 CHANNELS

The channels account includes the costs for the permanent channel realignment in Reaches 1 and 2. Reconstruction, dewatering and control of water during construction, existing channel rehabilitation, bank and vegetation stabilization, and hauling and disposal of waste materials.

5.4. CWWBS 11.01 LEVEE

The levees account includes costs for the permanent construction of the earthen levees, relief wells, engineered high ground, vegetation stabilization, and hauling and disposal of waste materials.

5.5. CWWBS 11.02 FLOODWALLS

The floodwalls account includes costs for the permanent construction of the floodwalls, sheetpile, and flood gates for street crossings and railroad crossings, and hauling and disposal of waste materials.

5.6. CWWBS 30 Pre-Construction, Engineering and Design

The pre-construction engineering and design (PED) account includes costs for project management, preliminary design, final design; geotechnical and hazardous, toxic and radioactive waste (HTRW) investigations; preparation of plans and specification, engineering during construction, contract advertisement, opening of bids and contract award. Based on discussions between the project manager and cost engineer, the cost for

this account is assumed to be 22 percent of the construction costs. This is assumed to be reasonable as the design is a relatively a straightforward description of work to include, relocations, channel, earthen levees, and closure structures, and is essentially the same design for multiple structures and features.

5.7. CWWBS 31 Construction Management

The construction management (CM) account includes costs for contract supervision, construction administration, technical management activities, and district office supervision and administration costs. Based on discussions between the project manager and cost engineer, the cost for this account was assumed to be 7 percent of the construction costs. This is assumed to be reasonable as the design is a relatively a straightforward description of work to include, relocations, channel, earthen levees, relief wells, and closure structures, and is essentially the same design for multiple structures and features.

6. Cost Methodology

6.1. Price Level

The feasibility report cost estimate is based on October 2019, fiscal year prices, unless noted otherwise. This level 3 estimate was prepared using version 4.4 of the MII Cost Estimating Program, see Attachment 1. Project costs were developed using MII English Cost Book 2016, and the MII 2018 EP Region 4 Equipment Manual. Estimated costs are considered fair and reasonable for a prudent and capable contractor and include overhead, subcontractor profit, and bond. Based on the location of the project in the small town of Arcadia, Wisconsin, it is assumed per diem will be required to be included in the estimate.

6.2. Unit Prices

Unit costs were developed using internal estimates of similar projects, contractor conversations, material quotes from suppliers, recent bid abstracts, published construction cost index resources and the 2016 English Cost book for MII cost engineering software.

6.3. Quantity Takeoffs

Approximate dimensions, areas and volumes were determined using hand computation, digital drawings, scaling, and comparison to similar order-of-magnitude installations. These dimensions were used to generate quantity tabulations in spreadsheet and hand computation formats. Most major dimensions are the result of preliminary engineering analysis. Minor approximations were necessary to account for costly items. In most cases, major dimensions used to calculate dimensional variation associated with differing flow scenarios at each structure location and preliminary structural analysis. See Attachment 3 for the current quantities as developed above and the quantity assurance and quality certification.

6.4. Labor Rates

Labor rates reflect Davis Bacon rates for Trempealeau County, Wisconsin for heavy construction and are current as of October 2019.

6.5. Mark-Ups

6.5.1. Overtime

Overtime was based on a 6-day, 8-hour workweek with multipliers of 1.5 for Monday through Saturday and 2.0 for Sunday.

6.5.2. Contractor Mark-Ups

- Contractor mark-ups were based on mark-ups used on District projects of similar size and scope if not specified as separately calculated.
- Mobilization and Demobilization are assumed to be 6 percent of the construction costs.
- Job Office Overhead (JOOH) includes itemized equipment and personnel needed to accomplish JOOH tasks, and was developed based on 10 percent of the running costs.
- Home Office Overhead (HOOH) include shop drawing preparation, as well as general administration costs, and was developed based on 10 percent of the running cost.
- Profit was developed based on 8.02 percent of the running costs.
- Bond was developed based on 1 percent of the direct construction costs.

7. Construction Methodology

7.1. Staging Areas and Site Access

General access to the project for delivery of equipment, materials, and personnel, will be on public primary and secondary roads. The roads along the project area are gravel, asphalt, and concrete surfaced and will require vehicle tracking control, maintenance, and restoration. Traffic control signage, and roadway and railway flaggers will be needed to caution the public during construction activities. Detours and road closures will be necessary to construct the project. Temporary access roads will be constructed to allow materials to be brought to the individual reaches as necessary. These access roads will be built by first stripping the topsoil to create the driving surface, roadway aggregate will then be placed as required to form a stable roadbed. Frost penetration in the ground during winter construction season may eliminate the need for aggregate in some areas. A primary staging and storage area will be cleared to provide a location for office trailers, and parking for workers, location is identified in Appendix C – Civil Engineering. The size of staging area required for storing materials and construction equipment when not being used depends on the number of excavators, backhoes, compactors and dozers needed for production. Smaller staging areas are assumed to be located adjacent to the reaches to allow equipment and material storage throughout the project.

7.2. Material Sources and Disposal Sites

Material sources to be used will be based on the lowest price for materials of acceptable quality. Local commercial riprap, bedding, and aggregate sources are assumed to be within 25 miles of the project, based on discussions with local suppliers. Cleared trees and brush will be taken from the site and properly disposed. Materials removed from the project for disposal are assumed to be permanently disposed of in the Arcadia landfill approximately 3 miles (6 miles roundtrip) from the center of the project.

7.3. Soil Factor Development

Shrinkage at the disposal site is not factored into the cost estimate due to materials being spread at the local landfill. Excavation for utility removals and relocations are considered in-place cubic yards, with no shrink or swell soil factors applied, it is assumed the excavation volumes were made conservative to capture the variance of the soils and debris materials. The Levee embankment material is assumed to be sand with a swell of approximately 115 percent (soil factor 1.15) from the banked cubic yard (BCY) to loose cubic yards (LCY). This soil factor is based on past experience with sand embankment materials that are likely to be encountered on this project. Additional soil boring and soil analysis data will reduce uncertainty with earthwork assumptions and will be available prior to plans and specification.

Dimensions shown on Drawings and quantities are at feasibility level, pending further design efforts.

7.4. Dewatering and Temporary By-Passes

Earthen cofferdams and localized pumping are anticipated to be necessary to construct the rerouted Turton Creek channel features of the project.

8. Cost Schedule and Risk Analysis

In compliance with (ER) 1110-2-1302, Civil Works Cost Engineering, dated September 15, 2008, a Monte-Carlo based risk analysis was conducted on 18 October 2019 by the Project Development Team (PDT) on remaining costs. The purpose of this risk analysis study is to present the cost and schedule risks considered, and those cost and schedule risks determined and respective to calculate the project contingencies at a recommended 80 percent confidence level of successful execution to project completion. Based on the results of the analysis, the Cost Engineering Mandatory Center of Expertise for Civil Works (MCX located in Walla Walla District) recommends a cost contingency of approximately 28 percent the base project cost at an 80 percent confidence level of successful execution, and a schedule contingency of 21 percent. For full CSRA report discussion see Attachment 5. Contingencies used are intended to identify an estimated construction cost amount that is not likely to be exceeded, given the current project scope. The contingency selected for this project is not a means of adding costs to the project for possible schedule slippage or future cost growth, or to cover items that are not specifically being considered in the current scope. Contingencies were chosen to account for uncertainties in quantities, uncertainties in unit pricing, and pure unknowns. Contingencies were not included in quantity computations.

9. Total Project Cost Summary

A total project cost summary (TPCS) was developed for the estimated construction costs, see Attachment 6. The TPCS was developed using the current Cost DX Excel spreadsheet which incorporates the cost for all feature accounts developed in the Recommended Plan estimate at the FY 2020 price level, and escalated to the midpoint of design (3rd quarter FY 2021) and midpoint of construction (1st quarter FY 2024). The non-Federal cost share includes feasibility costs, lands, easements, rights-of-way, relocations (LERRDs) and related administrative costs. The current estimate assumes fee title acquisition of the project footprint. Fee title is appropriate where features are constructed (e.g., a site not already within State or county right-of-way). Maximum use of easements will improve project acceptability to local interests (the non-federal local sponsor, city, county, and landowners) because it will reduce costs, retain the tax base, and mitigate major impacts on individuals.

10. Average Annual Costs

Average annual costs for City of Arcadia, Wisconsin Continuing Authorities Program Section 205 flood risk management study can be found in the Appendix F - Economics.

11. Operation and Maintenance

Operation and Maintenance (OMRR&R) costs were developed to cover periodic monitoring, inspections, repairs, rehabilitation, and future replacement of all project features. The estimate includes costs for routine Levee Inspections to be conducted annually for the first five years, then periodically every other year until year 11, and every five years from year 15. Routine annual maintenance of the levees and diversion channel would include mowing of grass and vegetation and spraying herbicide on the riprap to prevent growth of woody materials and brush. A five year cycle is assumed for repairs to the riprap, bedding, impervious fill, topsoil, turf, and

closure structures. Maintenance of concrete structures is assumed to be on a longer interval at ten years and would include repair to concrete as well as painting the railings, and major repair/rehabilitation/replacement at year 50. For a summary of the Recommended Plan OMRR&R costs see Attachment 7.

12. Attachments

ATTACHMENT 1	MII SUMMARY REPORT
ATTACHMENT 2	RISK MANAGEMENT PLAN
ATTACHMENT 3	QUANTITIES
ATTACHMENT 4	PROJECT AND CONSTRUCTION SCHEDULES
ATTACHMENT 5	COST AND SCHEDULE RISK ANALYSIS (CSRA)
ATTACHMENT 6	TOTAL PROJECT COST SUMMARY (TPCS)
ATTACHMENT 7	OPERATION AND MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT (OMRR&R)

ATTACHMENT 1
MII SUMMARY REPORT

U.S. Army Corps of Engineers
Project : ARCADIA CAP STUDY (POST DQC REVIEW)
ARCADIA-DQC
CURRENT WORKING ESTIMATE

Feasibility Design Docs - and COST CERTIFICATION

EXECUTIVE SUMMARY (\$1K)

NOTE: EXEC. SUMMARY DOES NOT INCLUDE CONTINGENCY

POST MVD REVIEW = \$ 28,898,800.40 (INCLUSION OF COMPLETE REAL ESTATE PLAN)

This estimate presents the detailed cost estimate prepared for the Feasibility Study Report with Integrated Environmental Assessment (Feasibility Report) investigates the feasibility of alternative measures to address problems and opportunities associated with the City of Arcadia, Wisconsin Continuing Authorities Program Section 205 flood risk management study. The Corps with the City of Arcadia serving as the Non-Federal sponsor developed this estimate based on selection of the Tentatively Selected Plan (TSP). The project consists of constructing a series of new levees, floodwalls, and other flood risk reduction features through Arcadia, Wisconsin. The estimate is at feasibility level of design detail, and all costs are based on quantities developed from the feasibility report and design layout as reviewed.

This estimate includes; lands and damages; planning, engineering and design (PED); construction; construction management (CM); and operation and maintenance, repair, rehabilitation, and replacement (OMRR&R) costs of the TSP to allow for final design and construction to proceed subsequent to document approval.

Guidance for the preparation of the estimate and attachments was obtained from Engineer Regulations (ER)-1110-2-1150, Engineering and Design for Civil Work Projects; ER 1110-2-1302, Civil Works Cost Engineering; Engineer Technical Letters (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works; Engineering and Construction Bulletin (ECB) 2007-17, Application of Cost Risk Analysis Methods to Develop Contingencies for Civil Work Total Project Costs; EM 1110-2-1304, Civil Works Construction Cost Index System, and ER 1105-2-100, Planning Guidance Notebook - Appendix E.

Acquisition Strategy is assumed to be a Small Business Set Aside.

General Assumptions:

Assume OT worked at 6 x10s.

Assume construction paired in this order: Reach No. 1 & No. 3, and Reach No. 2 & No. 4

No contingency or escalation is applied (applied in TPCS).

Estimated by SUSAN TAYLOR

Designed by USACE PDT

Prepared by SUSAN TAYLOR

Preparation Date 11/1/2019

Effective Date of Pricing 10/1/2019

Estimated Construction Time 1,095 Days

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Markups: see for more info.
Sales Tax: 5.5% Arcadia, WI

Estimated by SUSAN TAYLOR

Designed by USACE PDT

Prepared by SUSAN TAYLOR

Preparation Date 11/1/2019

Effective Date of Pricing 10/1/2019

Estimated Construction Time 1,095 Days

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Description	ProjectCost
ARCADIA-CDX	28,899
	28,898.80
TSP = RECOMMENDED_PLAN	28,899
	4,959.20
01 LANDS AND DAMAGES	4,959
	4,959.20
01_01 REAL ESTATE	4,959
	3,289.20
01_01-A REACH 1	3,289
	1,100.00
01_01-B REACH 2	1,100
	142.50
01_01-C SHARED BETWEEN REACHES	570
	18,557.83
TOTAL PROJECT CONSTRUCTION COST SUBTOTAL	18,558
	7,310.70
02 RELOCATIONS	7,311
	616.10
02_01 REACH NO.1	616
	110.66
02_01-A ROADS	111
	40.53
02_01-A1 DEMOLITION - ROADS/CURBS AND GUTTERS	41
	70.14
02_01-A2 TEXAS CROSSING	70
	505.44
02-01-B UTILITIES AND STRUCTURES	505
	256.61
02_01-B1 UTILITIES	257
	0.05
02_01-B1a DEMO 4" WATER	18
	15.88
02_01-B1b RELOCATE UTILITY POLES	238
	248.83
02_01-B2 STRUCTURES	249
	329.02
02_02 REACH NO.2	329
	172.99
02_02-A ROADS	173

Description	ProjectCost
02_02-A1 DEMOLITION - ROADS/CURBS AND GUTTERS	95.97 96
02_02-A2 ROAD REPLACEMENT	77.03 77
02_02-B UTILITIES AND STRUCTURES	156.03 156
02_02-B1 UTILITIES	31.62 32
02_02-B1a DEMO 12" CIP	0.05 10
02_02-B1b DEMO 12" RCP	0.08 15
02_02-B1c DEMO 18" DIP	0.22 8
02_02-B2 STRUCTURES	124.42 124
02_03 REACH NO.3	4,532.00 4,532
02-03-A ROADS	2,403.00 2,403
02-03-B UTILITIES AND STRUCTURES	126.00 126
02-03-C RAILROADS	2,003.00 2,003
02_04 REACH NO.4	926.32 926
02-04-A ROADS	9.81 10
02-04-A1 DEMOLITION - ROADS/CURBS AND GUTTERS	9.81 10
02-04-B UTILITIES	916.50 917
02-04-B1 DEMO 4" SS CIP	0.05 4
02-04-B2 DEMO 8" WATER	0.08 2
02-04-B3 DEMO 10" WATER	0.06 23
	0.09

Description	ProjectCost
02-04-B4 DEMO 14" CIP	108
02-04-B5 DEMO 36" RCP	0.31
02-04-B6 DEMO 48" RCP	13
02-04-B7 DEMO 60" RCP	0.31
02-04-B8 NEW 10" WATER	15
02-04-B9 NEW 14" SS FORCEMAIN	0.91
02_05 ENVIRONMENTAL MITIGATION	43
02_05-A TOTAL WETLAND CREDIT	0.21
02_05-A1 REACH 1 - 02 ACCOUNT	49
02_05-A2 REACH 2 - 02 ACCOUNT	0.24
02_05-A3 REACH 4 - 02 ACCOUNT	659
02_06 FILL MATERIALS	494.21
02_06-A REACH NO.1	494
02_06-B REACH NO.2	494.21
02_06-C REACH NO.3	494
02_06-D REACH NO.4	89.86
09 CHANNEL IMPROVEMENTS	180
09_01 REACH NO.1	89.86
09_01-A EXCAVATION AND DISPOSAL	225
09_01-B BANK STABILIZATION	89.86
	90
	413.06
	413
	52.24
	52
	192.05
	192
	118.37
	118
	50.41
	50
	525.21
	525
	344.27
	344
	158.35
	158
	185.92
	186

Description	ProjectCost
09_01-B1 EMBANKMENT PLACEMENT	0.03 87
09_01-B2 RIPRAP	0.09 36
09_01-B3 TOPSOIL	0.01 44
09_01-B4 TURF ESTABLISHMENT	11.22 19
09_02 REACH NO.2	180.93 181
09_02-A EXCAVATION AND DISPOSAL	41.87 42
09_02-B BANK STABILIZATION	139.07 139
09_02-B1 TOPSOIL	0.01 17
09_02-B2 TURF ESTABLISHMENT	11.23 7
09_02-B3 STREAM BANK MITIGATION	115.62 116
09_02-B3a EXCAVATION AND DISPOSAL	0.02 25
09_02-B3b BANK STABILIZATION	90.59 91
09_02-B3b1 BEDDING	0.09 59
09_02-B3b2 RIPRAP	0.08 29
09_02-B3b3 TOPSOIL	0.01 2
09_02-B3b4 TURF ESTABLISHMENT	11.21 1
11 LEVEES AND FLOODWALLS	10,721.92 10,722
11_01 LEVEES	7,106.29 7,106
11_01-A REACH NO.1	1,849.00 1,849
	1,000.00

Description	ProjectCost
11_01-A1 DRAINAGE	1,000
11_01-A2 EXCAVATION AND DISPOSAL	372.65
11_01-A2a Inspection Trench	373
11_01-A2a Inspection Trench	0.04
11_01-A2a Inspection Trench	56
11_01-A3 BANK STABILIZATION	476.35
11_01-A3 BANK STABILIZATION	476
11_01-A3a EMBANKMENT PLACEMENT	283.22
11_01-A3a EMBANKMENT PLACEMENT	283
11_01-A3a EMBANKMENT PLACEMENT	0.09
11_01-A3b BEDDING	47
11_01-A3b BEDDING	0.08
11_01-A3c RIPRAP	98
11_01-A3c RIPRAP	0.00
11_01-A3d TOPSOIL	29
11_01-A3d TOPSOIL	11.22
11_01-A3e TURF ESTABLISHMENT	20
11_01-A3e TURF ESTABLISHMENT	4,259.72
11_01-B REACH NO.2	4,260
11_01-B1 DRAINAGE	2,760.00
11_01-B1 DRAINAGE	2,760
11_01-B2 EXCAVATION AND DISPOSAL	358.73
11_01-B2 EXCAVATION AND DISPOSAL	359
11_01-B2a Inspection Trench	0.04
11_01-B2a Inspection Trench	150
11_01-B3 BANK STABILIZATION	1,140.99
11_01-B3 BANK STABILIZATION	1,141
11_01-B3a EMBANKMENT PLACEMENT	634.16
11_01-B3a EMBANKMENT PLACEMENT	634
11_01-B3b BEDDING	0.09
11_01-B3b BEDDING	118
11_01-B3c RIPRAP	0.08
11_01-B3c RIPRAP	248
11_01-B3d TOPSOIL	0.00
11_01-B3d TOPSOIL	84
11_01-B3e TURF ESTABLISHMENT	11.22
11_01-B3e TURF ESTABLISHMENT	57
11_01-C REACH NO.3	449.35
11_01-C REACH NO.3	449

Description	ProjectCost
11_01-C1 EXCAVATION AND DISPOSAL	30.96 31
11_01-C1a Inspection Trench	0.04 14
11_01-C2 BANK STABILIZATION	418.39 418
11_01-C2a EMBANKMENT PLACEMENT	390.84 391
11_01-C2b TOPSOIL	0.00 18
11_01-C2c TURF ESTABLISHMENT	11.22 9
11_01-D REACH NO.4	548.22 548
11_01-D1 EXCAVATION AND DISPOSAL	284.03 284
11_01-D1a Inspection Trench	0.04 131
11_01-D2 BANK STABILIZATION	264.19 264
11_01-D2a EMBANKMENT PLACEMENT	157.77 158
11_01-D2d TOPSOIL	0.00 63
11_01-D2e TURF ESTABLISHMENT	11.22 43
11_02 FLOODWALLS AND CLOSURES	3,615.63 3,616
11_02-A REACH NO.2	3,615.63 3,616
11_02-A1 CLOSURES	946.79 947
11_02-A1a EXCAVATION AND DISPOSAL	12.06 12
11_02-A1b REINFORCED CONCRETE	707.14 707
11_02-A1b-1 MAIN STREET CLOSURE	293.16 293
	79.23

Description	ProjectCost
11_02-A1b-1A BASE SLAB	79
11_02-A1b-1B SILL, PIERS, AND WALLS CONCRETE	213.93 214
11_02-A1b-2 RIVER STREET CLOSURE	189.32 189
11_02-A1b-2A BASE SLAB	60.34 60
11_02-A1b-2B SILL, PIERS, AND WALLS CONCRETE	128.98 129
11_02-A1b-3 RAILROAD CLOSURE	224.67 225
11_02-A1b-3A BASE SLAB	67.19 67
11_02-A1b-3B SILL, PIERS, AND WALLS CONCRETE	157.48 157
11-02-A2c SHEETPILE	51.65 52
11_02-A2d MISCELLANEOUS METALS AND SEALS	175.93 176
11_02-A2 FLOODWALLS	2,668.85 2,669
11_02-A2a EXCAVATION AND DISPOSAL	53.85 54
11_02-A2b REINFORCED CONCRETE	2,495.63 2,496
11_02-A2b-1 10' FLOODWALLS	1,254.90 1,255
11_02-A2b-1A BASE SLAB	383.94 384
11_02-A2b-1B WALL CONCRETE	870.95 871
11_02-A2b-2 11.5' FLOODWALLS	1,240.73 1,241
11_02-A2b-2A BASE SLAB	385.24 385
11_02-A2b-2B WALL CONCRETE	855.49 855
11_02-A2c SHEETPILE	10.42 10

Description	ProjectCost
11_02-A2d MISCELLANEOUS FLOODWALL ITEMS	108.95
	109
30 PLANNING, ENGINEERING, AND DESIGN	4,082.72
	4,083
31 CONSTRUCTION MANAGEMENT	1,299.05
	1,299

ATTACHMENT 2
RISK MANAGEMENT PLAN

CSRA Totals			\$0	\$1,971,600	\$12,046,550	0 Months	3 Months	10 Months	\$0	\$0	\$463,950		\$2,721,600	3 Mo			
			Risk Event Exceeds (CHECK ASSUMPTIONS and COST & SCHED SUMMARY SHEETS FOR VALUES)														
Information			Negligible														
			Marginal														
			Moderate														
			Significant														
			Critical														
			Cost Model			Schedule Model			Cost due to Schedule Risk								
			COST			Schedule Model			Cost From Schedule						TOTAL Cost	TOTAL Schedule	
CREf	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
Organizational and Project Management Risks (PM)																	
PM1	Road and Utility Realignments	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	Utilities are noted to be running through existing levee, and will need to be removed as part of a new levee or floodwall plan. Location of major utilities are known based on local sponsor information, but field locates have not been verified. Texas Crossing at Oak Street changes the grade north of the bridge. Potential for scope growth from project management and scope growth is marginal and the impact is marginal.										100%	100%	\$0	100%	0 Mo
PM2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	Meandering channel for environmental mitigation added to offset impacts. Potential for scope growth from project management and scope growth is marginal and the impact is marginal.										100%	100%	\$0	100%	0 Mo
PM3	Earthen Levees	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	RR requirements are unknown at this time (potential raise or additional levee sections). Potential for scope growth from project management and scope growth is significant and the impact is likely.	\$0	\$500,000	\$1,065,900							100%	100%	\$500,000	100%	0 Mo
PM4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	Floodwalls and Closure structures are necessary road and railroad crossings throughout the project. Additional levee in Reach 3 would require an additional RR closure. Potential for scope growth from project management and scope growth is moderate and the impact is possible.	\$0	\$250,000	\$361,600							100%	100%	\$250,000	100%	0 Mo
PM5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	The Local Sponsor is likely to request permission to do advance work in kind and identify a locally-preferred plan (LPP), potentially Reach 3. Most of the feasibility level design structures are not complicated. The possibility of reducing seepage features to the levees, closure structures, and floodwalls will require additional PED (+/- cost of the relief wells). Potential for scope growth with added features is possible due to the intermediate level of design and the impact to project cost increase is moderate.										100%	100%	\$0	100%	0 Mo
PM6	Construction Management	<ul style="list-style-type: none"> Potential for scope growth, added features? Project accomplishes intent? Funding Difficulties? Sufficient Staffing/Support? 	Construction in the City of Arcadia will likely be overseen by the Eastern Area office in Winona. Concerns would be the portions of the project that are being accomplished by the local sponsor (interior drainage and other advanced work), timing with the RR construction and Ashley furniture. Most of the feasibility level design structures are not complicated, but will need to tie into the local interior drainage will be challenging. Potential for project cost increase due to project management and scope growth for Construction Management (CM) is likely with significant impact, because CM is independent of project management and scope growth.										100%	100%	\$0	100%	0 Mo
Contract Acquisition Risks (CA)																	
CA1	Road and Utility Realignments	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.										100%	100%	\$0	100%	0 Mo

CREF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Cost Model			Schedule Model			Cost due to Schedule Risk					TOTAL Cost		TOTAL Schedule	
				Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)	
				CA2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.										100%	100%
CA3	Earthen Levees	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.										100%	100%	\$0	100%	0 Mo	
CA4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.										100%	100%	\$0	100%	0 Mo	
CA5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.										100%	100%	\$0	100%	0 Mo	
CA6	Construction Management	<ul style="list-style-type: none"> Contracting plan firmly established? 8a or small business likely? Requirement for subcontracting? Accelerated schedule or harsh weather schedule? High-risk acquisition limits competition, design/build? Limited bid competition anticipated? Bid schedule developed to reduce quantity risks? 	Acquisition strategy and bid schedule have not been determined at this stage of study. Regional Contractors may be limited due to the community being rather small, however it is within a reasonable travel distance to larger cities from both MN and WI with additional competition and no need for per diem expenses. Potential for project cost increase due to acquisition strategy possible with negligible impact, because the design is independent to the Contractor selected.	\$0	\$0	\$2,783,700	0 Months	3 Months	1 Months	\$0	\$0	\$46,395	100%	100%	\$0	100%	3 Mo	
Construction Elements (CO)																		

CRIF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Cost Model			Schedule Model			Cost due to Schedule Risk				TOTAL Cost		TOTAL Schedule	
				Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
				C01	Road and Utility Realignments	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Ashley Way will be temporarily closed but will be restored upon construction completion. Existing utility locates have not been field located, but most have been identified by locals AE. It is assumed that several utilities will have to be relocated, and may require subcontracting effort. The existing levee will be removed has utilities that will also need to be relocated prior to installation of new levee materials. Potential for project cost increase due to Construction Elements is possible with marginal impact.									100%	100%
C02	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Turton creek re-alignment may be constructed in the wet, requiring special equipment or subcontracting effort. Channel realignment elements are known, mitigation features have been identified, and channel stabilization is required. Potential for project cost increase due to Construction Elements is likely with marginal impact.	\$0	\$0	\$131,250							100%	100%	\$0	100%	0 Mo
C03	Earthen Levees	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Current alternative layouts show levee alignment passing through swamp/marsh-like land (Reach 2), need for dewatering (Reach 2 and inspection trench) prior to and during construction. Relief wells are assumed to be needed to mitigate seepage, and would require a specific expertise and likely a subcontractor. Reach 4 levee alignment may impact wastewater ponds and further investigation is needed. Interior flood control is challenging with minimal existing control structures. Wet weather conditions are likely during construction. Potential for project cost increase due to Construction Elements is likely with moderate impact.	\$0	\$0	\$1,421,200							100%	100%	\$0	100%	0 Mo
C04	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Current alternative layouts show floodwall need for dewatering (Reach 2, Reach 3? at RR, and inspection trench) prior to and during construction. Relief wells are assumed to be needed to mitigate seepage, and would require a specific expertise and likely a subcontractor. Interior flood control is challenging with minimal existing control structures. Sheet pile will require specialized subcontractor. Potential for project cost increase due to Construction Elements is likely with moderate impact.	\$0	\$0	\$723,200							100%	100%	\$0	100%	0 Mo
C05	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WL. The potential for project cost increase due to construction elements is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
C06	Construction Management	<ul style="list-style-type: none"> Accelerated schedule or harsh weather schedule? High risk or complex construction elements, site access, in-water? Water care and diversion plan? Unique construction methods? Special mobilization? Special equipment or subcontractors needed? Potential for construction modification and claims? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WL. The potential for project cost increase due to construction elements is possible with moderate impact.										100%	100%	\$0	100%	0 Mo
Specialty Construction or Fabrication (SC)																	

CRIF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Cost Model			Schedule Model			Cost due to Schedule Risk			TOTAL Cost		TOTAL Schedule		
				Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
				SC1	Road and Utility Realignments	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WI. Unkown lead times for RR features. The potential for project cost increase due to Specialty Construction or Fabrication is likely with moderate impact.	\$0	\$0	\$1,462,200	0 Months	0 Months	1 Months	\$0	\$0	\$46,395	100%
SC2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WI. The potential for project cost increase due to Specialty Construction or Fabrication is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
SC3	Earthen Levees	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WI. The potential for project cost increase due to Specialty Construction or Fabrication is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
SC4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. Floodwalls will be utilized to keep the Ashley Way road from being rerouted and to maintain the parking/storage yard, meaning the purchase of mitigation to respond to the floodway impact. Unkown RR closure, based on RR design. The site is accessible from highways and is centrally located to be supported from both MN and WI. The potential for project cost increase due to Specialty Construction or Fabrication is possible with moderate impact.	\$0	\$0	\$904,000	0 Months	0 Months	2 Months	\$0	\$0	\$92,790	100%	100%	\$0	100%	0 Mo
SC5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WI. The potential for project cost increase due to Specialty Construction or Fabrication is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
SC6	Construction Management	<ul style="list-style-type: none"> • Atypical construction elements, unusual material or equipment manufactured or installed? • Confidence in constructibility or methodology? • One of a kind and confidence in fabrication and installation? • Ability to reasonably transport? • Risk of specialty equipment functioning first time? Testing? 	Preliminary feasibility level of design utilizes means and methods customary and standard to heavy construction operations. The site is accessible from highways and is centrally located to be supported from both MN and WI. The potential for project cost increase due to Specialty Construction or Fabrication is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
Technical Design & Quantities																	

				Cost Model			Schedule Model			Cost due to Schedule Risk							
CRIF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
				TOTAL Cost													
TD1	Road and Utility Realignments	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	Its assumed that several utilities will have to be removed from the levee or levee/floodwall footprints. Its assumed that the utilities would be relocated as part of this project effort. The need for a specialty subcontractor for directionally drilling the forcemain will be needed. The potential for project cost increase due to Technical Design and Quantities is likely with marginal impact.										100%	100%	\$0	100%	0 Mo
TD2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	WI DNR would like a reduction of the amount of riprap used on the FP side of the channel (+/- in cost of materials). The potential for project cost increase due to Technical Design and Quantities is likely with moderate impact.										100%	100%	\$0	100%	0 Mo
TD3	Earthen Levees	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	Current geologic information is outdated (30 years old) and could change the design when update data is obtained. The current assumption is a levee with erosion protection (bedding and riprap). Remediation for areas of concern may include drainage systems that would increase costs. The potential for project cost increase due to Technical Design and Quantities is possible with moderate impact.										100%	100%	\$0	100%	0 Mo
TD4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	Current geologic information is outdated (30 years old) and could change the design when update data is obtained. The assumption for the design at this point is that there wouldn't be any seepage concerns along the floodwall. Remediation for areas of concern may include longer sheet piling, drainage systems, or other alternatives that would increase cost. Quantities are computed based on developed structural details. The potential for project cost increase due to Technical Design and Quantities is possible with moderate impact.										100%	100%	\$0	100%	0 Mo
TD5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	A solid design with accurate quantities leads to a successful construction management effort. The PED will be determined by regulation and requirements. The potential for project cost increase due to Technical Design and Quantities is possible with marginal impact.										100%	100%	\$0	100%	0 Mo
TD6	Construction Management	<ul style="list-style-type: none"> Level of confidence based on design and assumptions? Possibility for increased quantities due to loss, waste, or subsidence? Appropriate methods applied to calculate quantities? Sufficient investigations to develop quantities? Quality control check applied? 	A solid design with accurate quantities leads to a successful construction management effort. The potential for project cost increase due to Technical Design and Quantities is possible with negligible for the impact.										100%	100%	\$0	100%	0 Mo
Estimate and Schedule Risks (ES)																	
ES1	Road and Utility Realignments	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Cost estimate is affected by the PED design level of confidence and completeness. Unknown interior Drainage costs has potential will increase total project cost to local sponsor. The potential for project cost increase due to Cost Estimate is very likely with moderate impact.	\$0	\$1,231,100	\$1,462,200							100%	100%	\$1,231,100	100%	0 Mo

CRIF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Cost Model			Schedule Model			Cost due to Schedule Risk			TOTAL Cost		TOTAL Schedule			
				Low Variance (Min)	Likely (C)	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)	
				ES2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Individual features will not be affected by the cost estimate. The potential for project cost increase due to Cost Estimate is possible with negligible impact.										100%	100%
ES3	Earthen Levees	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Individual features will not be affected by the cost estimate. The potential for project cost increase due to Cost Estimate is possible with negligible impact.										100%	100%	\$0	100%	0 Mo	
ES4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Individual features will not be affected by the cost estimate. The potential for project cost increase due to Cost Estimate is possible with negligible impact.										100%	100%	\$0	100%	0 Mo	
ES5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Cost estimate is affected by the PED design level of confidence and completeness. Unkown interior Drainage costs has potential will increase total project cost to local sponsor. The potential for project cost increase due to Cost Estimate is very likely with moderate impact.	\$0	\$0	\$1,020,750								100%	100%	\$0	100%	0 Mo
ES6	Construction Management	<ul style="list-style-type: none"> Reliability and number of key quotes? Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime? Site accessibility, transport delays, congestion? Overuse of Cost Book, lump sum, allowances? Lack confidence on critical cost items? 	Construction Management will not affect the cost estimate, however the inclusion of means and method assumptions will be included within the estimate. The potential for project cost increase due to Cost Estimate is possible with negligible impact.											100%	100%	\$0	100%	0 Mo
External Project Risks																		

				Cost Model			Schedule Model			Cost due to Schedule Risk				TOTAL Cost		TOTAL Schedule	
CREF	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Low Variance (Min)	COST	High Variance (80%H)	Low Variance (S) (Min)	Likely (S)	High Variance (S) (80%H)	Low Variance (CS) (Min)	Likely Added Cost (CS)	High Variance (CS) (80%H)	Event Prob (PC)	Event Prob (PCS)	Simulated Cost (C) + (CS)	Event Prob (PS)	Simulated Sched (S)
EX1	Road and Utility Realignments	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Local preferences (RR and Ashley not agreeing or delaying process) may affect roads and utility work.	\$0	\$431,900	\$731,100	0 Months	0 Months	3 Months	\$0	\$0	\$139,185	100%	100%	\$431,900	100%	0 Mo
EX2	Channel Realignment and Stabilization	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Local preferences may affect roads and utility work.										100%	100%	\$0	100%	0 Mo
EX3	Earthen Levees	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Local preferences (RR and Ashley not agreeing or delaying process) may affect levee work in particular Reach 4.										100%	100%	\$0	100%	0 Mo
EX4	Floodwalls and Closure Structures	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Local preferences (Ashley not agreeing or delaying process) may affect floodwall along Ashley Way, RR potentially delaying progress at closure structures. Design of major features is done by comparison to other similar structural features in similar projects. Quantities are computed based on developed structural details. Site condition and market pricing may change. To account for the unknowns we are assuming a likely with moderate risk to cost increase.	\$0	\$111,200	\$904,000	0 Months	0 Months	1 Months	\$0	\$0	\$46,395	100%	100%	\$111,200	100%	0 Mo
EX5	Preconstruction Engineering & Design	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Unknown flow of local and federal funds could delay start of phase. Feasibility level of design. Design of major features is done by comparison to similar projects and are conservative. Quantities are computed based on developed recommended design. Site condition and market prices might varies. To account for the unknowns we are assuming a possible likelihood with moderate risk to cost increase.	\$0	\$111,200	\$204,150							100%	100%	\$111,200	100%	0 Mo
EX6	Construction Management	<ul style="list-style-type: none"> Potential for severe adverse weather? Political influences, lack of support, obstacles? Unanticipated inflations in fuel, key materials? Potential for market volatility impacting competition, pricing? Funding Constraints 	Unknown flow of local and federal funds could delay start of phase. Feasibility level of design. Design of major features is done by comparison to similar projects and are conservative. Quantities are computed based on developed recommended design. Site condition and market prices might varies. To account for the unknowns we are assuming a possible likelihood with moderate risk to cost increase.	\$0	\$86,200	\$259,800	0 Months	0 Months	1 Months	\$0	\$0	\$46,395	100%	100%	\$86,200	100%	0 Mo
Lands and Damages (LD)																	
LD1	Real Estate	Possibility that additional lands would be required beyond the current plan.	Confident in footprint as currently designed. For example, levee design footprint extends 15' beyond toe.										100%	100%	\$0	100%	0 Mo
Regulatory Environmental Risks (RG)																	
RG1	Mitigation Costs	Revisions to construction staging areas and feature footprints may increase the required mitigation effort beyond what is currently assumed in the estimate.	Channel construction will require meandering and structures. Requirement for wetland mitigation will be necessary.	\$0	\$0	\$39,000	0 Months	0 Months	1 Months	\$0	\$0	\$46,395	100%	100%	\$0	100%	0 Mo

ATTACHMENT 3
QUANTITIES

01 ACCOUNT

01-01 REAL ESTATE

SEE "BUILINDGS TO BE ACQUIRED" EXHIBIT (PDF)

PARCEL ID	POSTAL ADDRESS	LAND VALUE	IMPVALUE	EST. FULL MARKET VALUE	REACH
1.00	PO BOX 729 ADAMS, WI 53910	\$ 4,500.00	\$ -	\$ 4,800.00	2.00
2.00	206 N OAK ST ARCADIA, WI 54612	\$ 17,700.00	\$ 128,700.00	\$ 156,000.00	1.00
3.00	206 N OAK ST ARCADIA, WI 54612	\$ 14,000.00	\$ -	\$ 14,900.00	1.00
4.00	225 S GILLESPIE AVE #34 ARCADIA, WI 54612	\$ 15,000.00	\$ 50,900.00	\$ 70,200.00	1.00
5.00	568 E MAIN ST ARCADIA, WI 54612	\$ 15,000.00	\$ 38,500.00	\$ 57,000.00	1.00
6.00	125 N OAK ST ARCADIA, WI 54612	\$ 17,000.00	\$ 93,900.00	\$ 118,100.00	1.00
7.00	PO BOX 1106 ST CLOUD, MN 56302	\$ -	\$ -	\$ 502,700.00	2.00
8.00	756 RAIDER DR ARCADIA, WI 54612	\$ -	\$ -	\$ -	2.00
9.00	OAK STREET (ROAD)	\$ -	\$ -	\$ -	1.00
REACH TOTALS					
	REACH NO.1	\$ 416,200.00			
	REACH NO.2	\$ 507,500.00			

01-02 FILL MATERIALS

01-02-A REACH NO.1

LEVEE MATERIAL REACH NO.1	12,596.00	CY
TEXAS CROSSING MATERIALS	2,771.80	CY

01-02-B REACH NO.2

LEVEE MATERIAL REACH NO.2	46,308.90	CY
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01-02-C REACH NO.3

LEVEE MATERIAL REACH NO.3		CY
RAILROAD MATERIALS	2,519.60	

01-02-D REACH NO.4

LEVEE MATERIAL REACH NO.4	11,521.10	CY
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01-03 ENVIRONMENTAL MITIGATION

01-03-A

STREAM BANK MITIGATION

Rock Upstream of Oak Street Bridge:

EXCAVATION	816.2	CY
R80 RIPRAP	253.3	CY
B2 BEDDING	562.9	CY

110' Turton Creek Meanders:

EXCAVATION	620.4	CY		
TOPSOIL	400.7	SY		
TURF ESTABLISHMENT	0.08	AC		
R20 RIPRAP	127.9	CY	381.20	TOTAL RIPRAP
B1 BEDDING	63.9	CY	626.80	TOTAL BEDDING

01-03-B

QUANTITIES FROM LEE ANN (ENV)

CREDITS

REACH NO.1			
	EMERGENT	0.60	AC
	FORESTED	0.50	AC
REACH NO.2			
	EMERGENT	1.40	AC
	FORESTED	1.00	AC
REACH NO.3		-	AC
REACH NO.4			
	EMERGENT	0.50	AC
TEMPORARY MITIGATION			
	EMERGENT	1.00	AC
	FORESTED	0.50	AC
PERMANENT MITIGATION			
	EMERGENT	2.50	AC
	FORESTED	1.50	AC
TOTAL WETLAND MITIGATION		5.50	AC

02 RELOCATIONS

02-01	REACH NO.1		
02-01-A	ROADS		
02-01-A1	DEMOLITION - ROADS/CURBS AND GUTTERS		
	Roads, Construction Activities	1,816.20	SY
	DISPOSAL AND HAULING	809.12	LCY
02-01-A2	TEXAS CROSSING		
	BASE COURSE	758.50	SY
	REINFORCING	758.50	SY
	CONCRETE PAVING	758.50	SY
02-01-B	UTILITIES		
02-01-B1a	DEMO 4" WATER PIPE	404.00	LF
	EXCAVATION	969.60	CY
	PIPE DEMO	404.00	LF
	DISPOSAL AND HAULING	4.04	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	1,308.96	
02-01-B1b	UTILITY POLE		
	DEMO POLE	15.00	EA
	EXCAVATION	150.00	CY
	CONCRETE	105.00	CY
	DISPOSAL AND HAULING	141.75	CY
	NEW POLES	15.00	EA
	BACKFILL AND COMPACT	60.75	CY
02-01-B2	STRUCTURES		
	HOUSES	6.00	EA
02-02	REACH NO.2		
02-02-A	ROADS		
02-02-A1	DEMOLITION - ROADS/CURBS AND GUTTERS		
	Roads, Construction Activities	4,301.17	SY
	DISPOSAL AND HAULING	1,916.17	LCY
02-02-A2	NEW SURFACES		
	BASE COURSE	1,314.89	SY
	SIDEWALK	4,385.00	SF
	HOT MIX ASPHALT (HMA)	7,449.03	SF
02-02-B	UTILITIES		
02-02-B1a	DEMO 12" CIP	206.00	LF
	EXCAVATION	494.40	CY
	PIPE DEMO	206.00	LF
	DISPOSAL AND HAULING	2.06	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	667.44	CY
02-02-B1b	DEMO 12" RCP	178.00	LF
	EXCAVATION	427.20	CY
	PIPE DEMO	178.00	LF
	DISPOSAL AND HAULING	1.78	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	576.72	CY
02-02-B1c	DEMO 18" SS DIP	34.00	LF
	EXCAVATION	81.60	CY
	PIPE DEMO	34.00	LF
	DISPOSAL AND HAULING	0.34	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	110.16	CY
02-02-B2	STRUCTURES		
	HOUSES	2.00	EA
	PLAYGROUND	1.00	EA
02-03	REACH NO.3		
02-03-A	ROADS		
02-03-A1	DEMOLITION - ROADS/CURBS AND GUTTERS		
	Roads, Construction Activities	54,826.40	SY
	DISPOSAL AND HAULING	24,425.16	LCY
02-03-A2	NEW SURFACES		
	BASE COURSE	-	SY
	SIDEWALK	-	SF
	HOT MIX ASPHALT (HMA)	-	SF
02-03-B	UTILITIES		
02-03-B1a	DEMO 12" CIP	-	LF
	EXCAVATION	-	CY
	PIPE DEMO	-	LF
	DISPOSAL AND HAULING	-	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	-	CY
02-03-B1b	DEMO 12" RCP	-	LF
	EXCAVATION	-	CY
	PIPE DEMO	-	LF
	DISPOSAL AND HAULING	-	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	-	CY
02-03-B1c	DEMO 18" SS DIP	-	LF
	EXCAVATION	-	CY
	PIPE DEMO	-	LF
	DISPOSAL AND HAULING	-	HR
	PLUG	2.00	EA
	BACKFILL AND COMPACT	-	CY
02-03-B2	STRUCTURES		
	HOUSES	2.00	EA
	PLAYGROUND	1.00	EA

From just overlaying the current design on an aerial, I count 1

09-01-A	CHANNEL - REACH NO.1			
	EXCAVATION	11,946.80	CY	
	DISPOSAL	16,128.18	LCY	
	LANDFILL MATERIAL PLACEMENT	53.76	HR	
09-01-B	EMBANKMENT PLACEMENT	2771.8	CY	
	BEDDING	0	CY	
	RIPRAP	409.8	CY	
	GEOTEXTILE	864	SY	includes 15% for overlapping
	TOPSOIL	8059.21	SY	
	TURF ESTABLISHMENT	1.67	AC	
09-02-A	CHANNEL - REACH NO.2			
	EXCAVATION	3,169.10	CY	
	DISPOSAL	4,278.29	LCY	
	LANDFILL MATERIAL PLACEMENT	14.26	HR	
09-02-B	BEDDING	0	CY	
	RIPRAP	0	CY	
	TOPSOIL	2995.00	SY	
	TURF ESTABLISHMENT	0.62	AC	

ATTACHMENT 4
PROJECT AND CONSTRUCTION
SCHEDULES

15 October 2019

Arcadia PDT – DQC review and Implementation schedule discussion

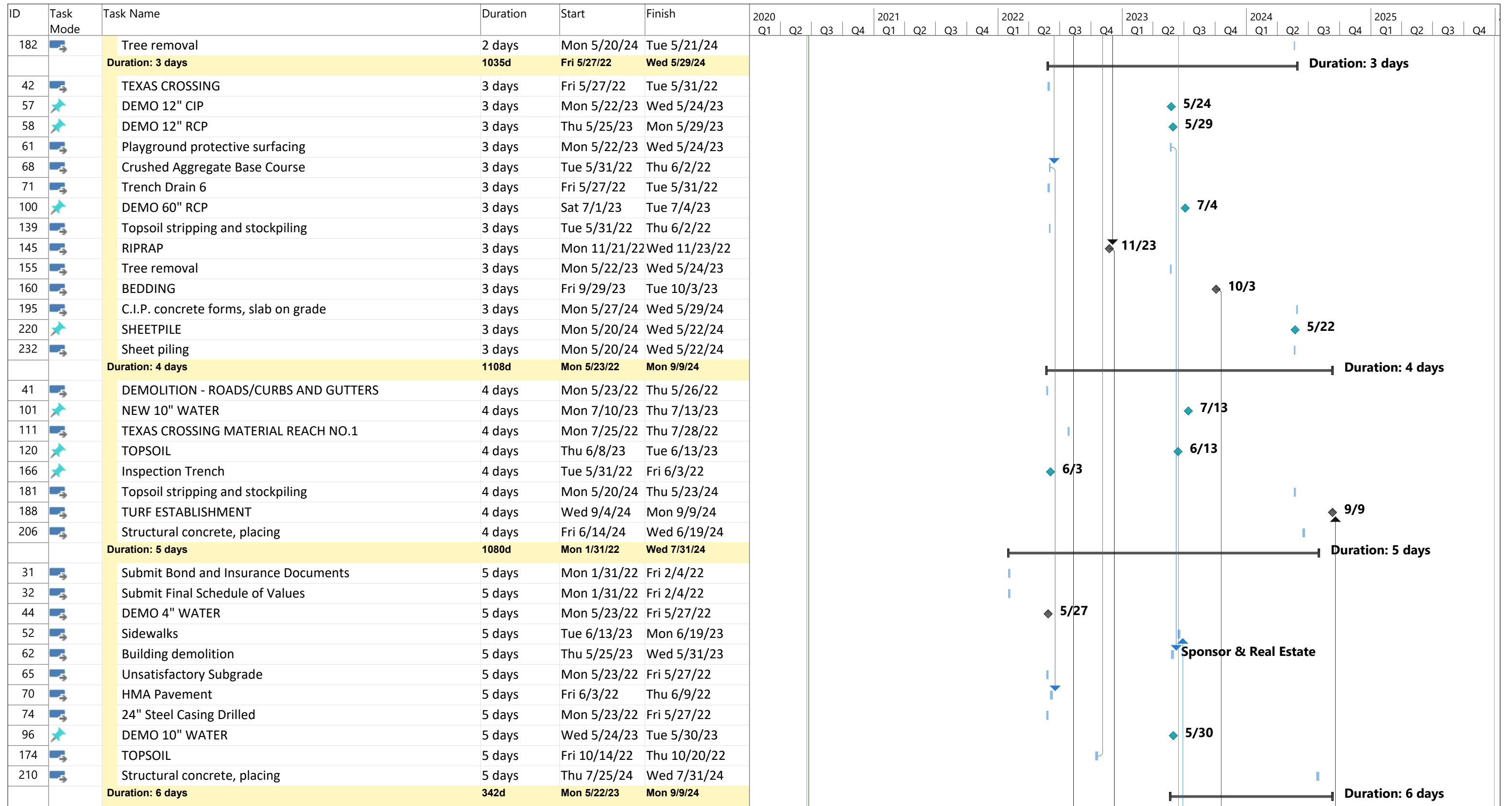
Event	Schedule
Release draft report for Concurrent Public, Agency, and ATR review, issue press release	Week of 6 Jan 2020
Public information meeting in Arcadia	22 Jan 2020
End of Public Review period	10 February 2020
Finalize report	6 Apr 2020
ATR back-check of final report	Week of 20 Apr 2020
Submit Final Report	Target: week of 4 May 2020
MVD Commanders Endorsement	Target: Week of 6 July 2020
Sign PPA/obtain funding	September 2020/October 2020
Start Design Phase	October 2020
Investigations: conduct baseline environmental monitoring in Turton Creek; conduct topographic surveys; install piezometers and conduct pump tests to confirm relief well spacing; identify material sources for bedding, riprap and fill; conduct subsurface investigations and soil testing;	Start in summer 2020. Complete by March 2021.
Start geotech design	March 2021.
Conduct Value Engineering assessment	End of March 2021
Real estate drawings	Best 1 year before award.
65% Draft Plans & Specs and Design Documentation report, conduct ATR, apply for 401 water quality, wetland fill, stream reroute permits	June 2021
95% Final P&S + ATR	Sep 2021
Receive 401 water qual, wetland fill, stream reroute permits	Oct 2021

BCOES signoff	Nov 2021
Award Construction Contract	Jan 2022
NTP	Feb 2022
Complete Construction	3 seasons after award. (spring 2025)
Draft O&M Manuals	Feb 2023
Final O&M Manuals, initial periodic inspection	Spring 2025
Closeout	Dec 2025

ID	Task Mode	Task Name	Duration	Start	Finish	2020				2021				2022				2023				2024				2025			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Duration: 1 day			1081d	Fri 12/31/21	Thu 8/1/24	Duration: 1 day																							
15	➔	Closing Costs	1 day?	Fri 12/31/21	Fri 12/31/21	Sponsor & Real Estate																							
30	➔	Notice to Proceed & Sign Contract	1 day	Mon 1/31/22	Mon 1/31/22																								
59	➔	DEMO 18" DIP	1 day	Mon 5/22/23	Mon 5/22/23	◆ 5/22																							
76	➔	18" Apron End Wall	1 day	Mon 5/23/22	Mon 5/23/22																								
77	➔	48"x48" Square Manhole Inlet	1 day	Mon 5/23/22	Mon 5/23/22																								
94	➔	DEMO 4" SS CIP	1 day	Mon 5/22/23	Mon 5/22/23	◆ 5/22																							
95	➔	DEMO 8" WATER	1 day	Tue 5/23/23	Tue 5/23/23	◆ 5/23																							
110	➔	LEVEE PLACEMENT	1 day	Fri 7/22/22	Fri 7/22/22																								
121	➔	TURF ESTABLISHMENT	1 day	Wed 6/14/23	Wed 6/14/23	◆ 6/14																							
128	➔	RIPRAP	1 day	Thu 6/15/23	Thu 6/15/23																								
129	➔	TOPSOIL	1 day	Fri 6/16/23	Fri 6/16/23																								
130	➔	TURF ESTABLISHMENT	1 day	Sat 6/17/23	Sat 6/17/23																								
144	➔	BEDDING	1 day	Fri 11/18/22	Fri 11/18/22	◆ 11/18																							
169	➔	Tree removal	1 day	Tue 5/31/22	Tue 5/31/22																								
175	➔	TURF ESTABLISHMENT	1 day	Fri 10/21/22	Fri 10/21/22	◆ 10/21																							
197	➔	Structural concrete, placing	1 day	Mon 5/27/24	Mon 5/27/24																								
215	➔	Structural concrete, placing	1 day	Thu 8/1/24	Thu 8/1/24																								
Duration: 2 days			1029d	Mon 1/31/22	Tue 5/21/24	Duration: 2 days																							
34	➔	Install Temporary Power	2 days	Mon 1/31/22	Tue 2/1/22																								
35	➔	Install Temporary Water	2 days	Mon 1/31/22	Tue 2/1/22																								
36	➔	Prep Site - Lay Down Yard & Temp Fence	2 days	Mon 1/31/22	Tue 2/1/22																								
37	➔	Set-up Site Office	2 days	Mon 1/31/22	Tue 2/1/22																								
38	➔	Equipment Mobilization	2 days	Mon 1/31/22	Tue 2/1/22																								
54	➔	Aggregate base course for roadways	2 days	Tue 5/30/23	Wed 5/31/23																								
66	➔	Pulverize & Salvage Existing Pavement (8")	2 days	Fri 5/27/22	Mon 5/30/22																								
67	➔	Pulverize & Salvage Existing Pavement (3.5")	2 days	Fri 5/27/22	Mon 5/30/22																								
69	➔	Sawcutting	2 days	Mon 5/23/22	Tue 5/24/22																								
72	➔	MISC	2 days	Tue 5/31/22	Wed 6/1/22																								
78	➔	Heavy Riprap with Geotextile (for inlet protection)	2 days	Mon 5/23/22	Tue 5/24/22																								
98	➔	DEMO 36" RCP	2 days	Tue 6/27/23	Wed 6/28/23	◆ 6/28																							
99	➔	DEMO 48" RCP	2 days	Thu 6/29/23	Fri 6/30/23	◆ 6/30																							
112	➔	RIPRAP	2 days	Mon 7/25/22	Tue 7/26/22	◆ 7/26																							
114	➔	TURF ESTABLISHMENT	2 days	Wed 8/10/22	Thu 8/11/22	◆ 8/11																							
127	➔	BEDDING	2 days	Tue 6/13/23	Wed 6/14/23																								
167	➔	Cycle hauling	2 days	Tue 5/31/22	Wed 6/1/22																								
168	➔	Topsoil stripping and stockpiling	2 days	Tue 5/31/22	Wed 6/1/22																								

Project: Arcadia - Schedule
Date: Tue 6/23/20

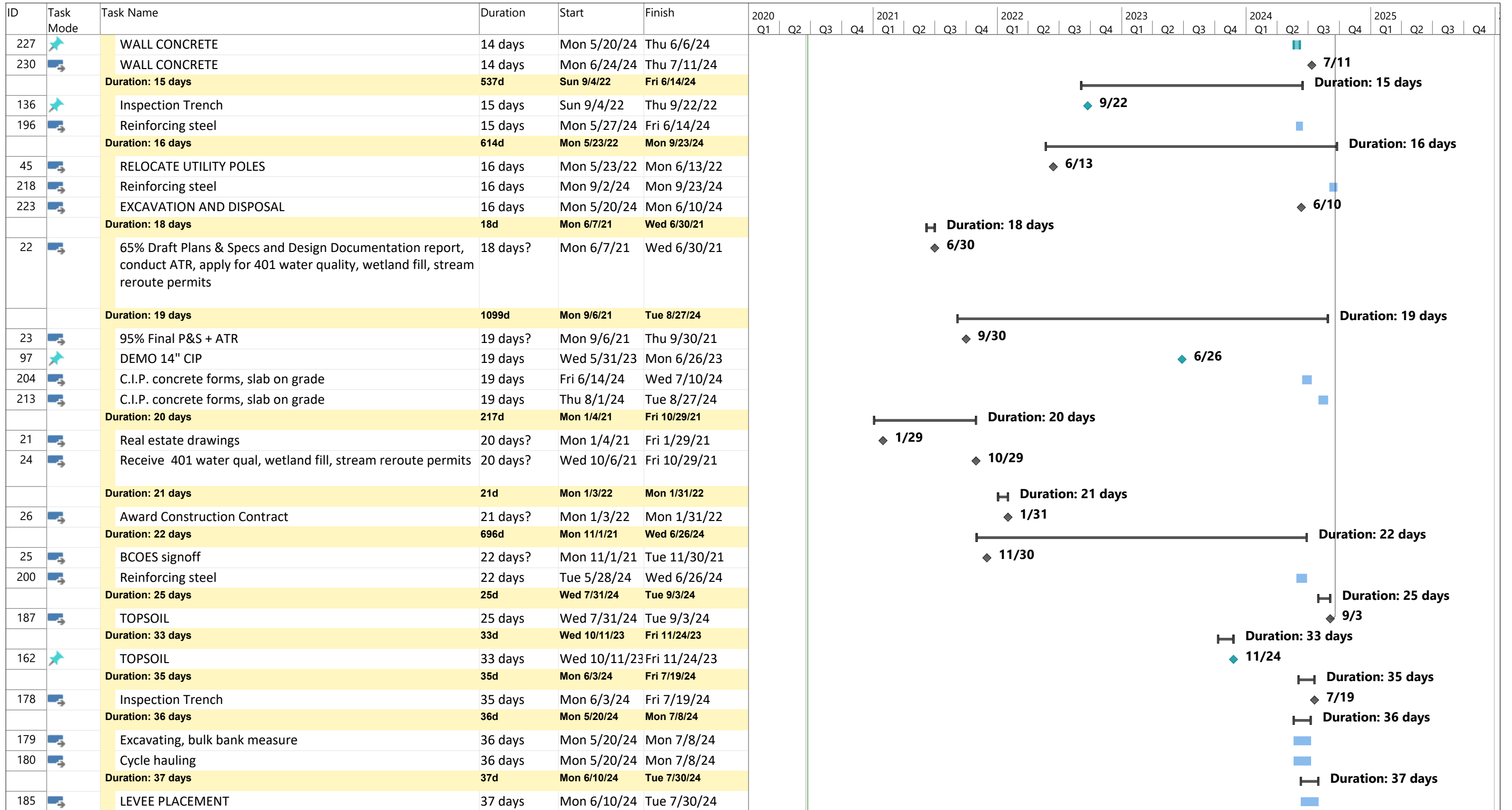
Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			



Project: Arcadia - Schedule Date: Tue 6/23/20	Task		Project Summary		Manual Task		Start-only		Deadline	
	Split		Inactive Task		Duration-only		Finish-only		Progress	
	Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
	Summary		Inactive Summary		Manual Summary		External Milestone			

ID	Task Mode	Task Name	Duration	Start	Finish	2020				2021				2022				2023				2024				2025			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
50		Cycle hauling	6 days	Mon 5/22/23	Mon 5/29/23																								
92		Cycle hauling	6 days	Mon 5/22/23	Mon 5/29/23																								
124		Excavating, bulk bank measure	6 days	Thu 6/8/23	Thu 6/15/23																								
125		Cycle hauling	6 days	Thu 6/8/23	Thu 6/15/23																								
154		Topsoil stripping and stockpiling	6 days	Mon 5/22/23	Mon 5/29/23																								
161		RIPRAP	6 days	Wed 10/4/23	Wed 10/11/23																								
191		EXCAVATION AND DISPOSAL	6 days	Mon 5/20/24	Mon 5/27/24																								
201		Structural concrete, placing	6 days	Tue 5/28/24	Tue 6/4/24																								
219		Structural concrete, placing	6 days	Mon 9/2/24	Mon 9/9/24																								
Duration: 8 days			309d	Thu 6/1/23	Mon 8/5/24																					Duration: 8 days			
53		Asphaltic concrete paving	8 days	Thu 6/1/23	Mon 6/12/23																								
208		C.I.P. concrete forms, retaining wall	8 days	Thu 7/25/24	Mon 8/5/24																								
Duration: 9 days			9d	Mon 5/22/23	Thu 6/1/23																					Duration: 9 days			
49		Demolish, remove pavement & curb	9 days	Mon 5/22/23	Thu 6/1/23																								
91		Demolish, remove pavement & curb	9 days	Mon 5/22/23	Thu 6/1/23																								
Duration: 10 days			608d	Mon 5/23/22	Fri 9/13/24																					Duration: 10 days			
46		STRUCTURES	10 days	Mon 5/23/22	Fri 6/3/22																								
113		TOPSOIL	10 days	Wed 7/27/22	Tue 8/9/22																								
217		C.I.P. concrete forms, retaining wall	10 days	Mon 9/2/24	Fri 9/13/24																								
221		MISCELLANEOUS METALS AND SEALS	10 days	Mon 5/20/24	Fri 5/31/24																								
229		BASE SLAB	10 days	Mon 6/24/24	Fri 7/5/24																								
Duration: 11 days			875d	Mon 3/1/21	Fri 6/28/24																					Duration: 11 days			
19		Start geotech design	11 days?	Mon 3/1/21	Mon 3/15/21																								
75		18" Storm Sewer Pipe	11 days	Mon 5/23/22	Mon 6/6/22																								
205		Reinforcing steel	11 days	Fri 6/14/24	Fri 6/28/24																								
226		BASE SLAB	11 days	Mon 5/20/24	Mon 6/3/24																								
Duration: 12 days			651d	Thu 11/24/22	Sat 7/29/23																					Duration: 12 days			
102		NEW 14" SS FORCEMAIN	12 days	Fri 7/14/23	Sat 7/29/23																								
146		TOPSOIL	12 days	Thu 11/24/22	Fri 12/9/22																								
Duration: 13 days			901d	Mon 3/15/21	Mon 8/19/24																					Duration: 13 days			
20		Conduct Value Engineering assessment	13 days?	Mon 3/15/21	Wed 3/31/21																								
117		Excavating, bulk bank measur	13 days	Mon 5/22/23	Wed 6/7/23																								
118		Cycle hauling	13 days	Mon 5/22/23	Wed 6/7/23																								
214		Reinforcing steel	13 days	Thu 8/1/24	Mon 8/19/24																								
233		MISCELLANEOUS METALS AND SEALS	13 days	Mon 5/20/24	Wed 6/5/24																								
Duration: 14 days			62d	Mon 5/20/24	Tue 8/13/24																					Duration: 14 days			
199		C.I.P. concrete forms, retaining wall	14 days	Tue 5/28/24	Fri 6/14/24																								
209		Reinforcing steel	14 days	Thu 7/25/24	Tue 8/13/24																								

Project: Arcadia - Schedule Date: Tue 6/23/20	Task		Project Summary		Manual Task		Start-only		Duration-only		Finish-only		Manual Progress		Deadline
	Split		Inactive Task		Manual Summary Rollup		External Tasks		Manual Summary		External Milestone		Manual Progress		Progress
	Milestone		Inactive Milestone		Manual Summary		External Milestone		Manual Progress		Progress		Manual Progress		Progress
	Summary		Inactive Summary		Manual Summary		External Milestone		Manual Progress		Progress		Manual Progress		Progress



Project: Arcadia - Schedule
Date: Tue 6/23/20

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
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Summary		Inactive Summary		Manual Summary		External Milestone			

ID	Task Mode	Task Name	Duration	Start	Finish	2020				2021				2022				2023				2024				2025			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
3		Acquisition of Levee Foot Print currently owned by Private Parties – 22.16 Acres or 965,290 Square Feet (sq ft)	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
4		Procurement of Decent, Safe & Sanitary Replacement Housing within the Local Market for four (4) households	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
5		Expenses to Relocate four (4) residences @ \$30,000 per Residence	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
6		Acquisition of four (4) Residences & outbuildings (Reach 1)	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
8		Acquisition of two (2) Commercial Entities (Reach 2)	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
9		Relocation expenses for two (2) commercial entities	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
11		USACE's Real Estate Labor & Admin Costs	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
12		NFS's Real Estate Labor & Admin Costs	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
13		Surveys	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
14		Title	260 days?	Wed 1/6/21	Fri 12/31/21	Sponsor & Real Estate																							
Duration: 365 days			365d	Mon 5/23/22	Tue 10/10/23	Duration: 365 days																							
80		RR subcontractor MOB/DEMOB	365 days	Mon 5/23/22	Tue 10/10/23	Sponsor & Real Estate																							
81		Flagging services	365 days	Mon 5/23/22	Tue 10/10/23																								
82		Temporary Hauling road	365 days	Mon 5/23/22	Tue 10/10/23																								
83		Raising and Tamping Existing Tracks	365 days	Mon 5/23/22	Tue 10/10/23																								
84		Turn out removal and replacement	365 days	Mon 5/23/22	Tue 10/10/23																								
85		Mainline RR track	365 days	Mon 5/23/22	Tue 10/10/23																								
86		Siding RR track	365 days	Mon 5/23/22	Tue 10/10/23																								
87		Spur RR track	365 days	Mon 5/23/22	Tue 10/10/23																								
88		RR Granite Ballast	365 days	Mon 5/23/22	Tue 10/10/23																								

Project: Arcadia - Schedule
Date: Tue 6/23/20

Task	Project Summary		Manual Task		Start-only		Deadline	
Split	Inactive Task		Duration-only		Finish-only		Progress	
Milestone	Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary	Inactive Summary		Manual Summary		External Milestone			

ATTACHMENT 5
COST AND SCHEDULE RISK ANALYSIS (CSRA)

Project Development Stage/Alternative: Feasibility (TSP) - For Milestone #2

Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Meeting Date: 10/18/2019

Schedule Duration

Mar-2021
From (Month/Year)

Nov-2025
From (Month/Year)

Schedule Duration:

56.1 Months

21%

Schedule Contingency

80% Finish Date

Oct-2026

WBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
Risk Not included within CSRA Model					
01	LANDS AND DAMAGES	Real Estate	\$ 4,959,000	25%	\$ 1,239,750 \$ 6,198,750
Risk included within CSRA Model					
1	02 RELOCATIONS	Road and Utility Realignments	\$ 7,311,000	28%	\$ 2,047,080 \$ 9,358,080
2	09 01 CHANNELS	Channel Realignment and Stabilization	\$ 525,000	28%	\$ 147,000 \$ 672,000
3	11 01 LEVEES	Earthen Levees	\$ 7,106,000	28%	\$ 1,989,680 \$ 9,095,680
4	11 02 FLOODWALLS	Floodwalls and Closure Structures	\$ 3,616,000	28%	\$ 1,012,480 \$ 4,628,480
5				0%	\$ - \$ -
6			\$ -	0%	\$ - \$ -
20			\$ -	0%	\$ - \$ -
21			\$ -	0%	\$ - \$ -
22			\$ -	0%	\$ - \$ -
23	DDC Costs	Preconstruction Engineering & Design	\$ 4,083,000	28%	\$ 1,143,240 \$ 5,226,240
24	S&A	Construction Management	\$ 1,299,000	28%	\$ 363,720 \$ 1,662,720
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -

Totals					
	Real Estate	\$ 4,959,000	25%	\$ 1,239,750	\$ 6,198,750
	Total Construction Estimate	\$ 18,558,000	28%	\$ 5,196,240	\$ 23,754,240
	Total Planning, Engineering & Design	\$ 4,083,000	28%	\$ 1,143,240	\$ 5,226,240
	Total Construction Management	\$ 1,299,000	28%	\$ 363,720	\$ 1,662,720
	Fixed Dollar Risk Equally Distributed	\$ -	0%	\$ -	\$ -
	Total (ROUNDED)	\$ 28,899,000	27%	\$ 7,943,000	\$ 36,842,000

ATTACHMENT 6
TOTAL PROJECT COST SUMMARY (TPCS)

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **CAP Section 205 Flood Risk Management Study**
 PROJECT NO: **XXXXXX**
 LOCATION: **ARCADIA, WI**

DISTRICT: **MVP**

PREPARED: **11/4/2019**

POC: **CHIEF, COST ENGINEERING, James Sentz**

This Estimate reflects the scope and schedule in report; Draft Feasibility Study Report with Integrated Environmental Assessment

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST FUNDED (FULLY)				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	Program Year (Budget EC):		Effective Price Level Date:		2020 1-Oct-19 Spent Thru: (\$K)	TOTAL FIRST COST (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
						ESC (%)	COST (\$K)	CNTG (\$K)	REMAINING COST (\$K)						
02	RELOCATIONS	\$7,311	\$2,047	28%	\$9,358		\$7,311	\$2,047	\$9,358		\$9,358	12.8%	\$8,245	\$2,308	\$10,553
09	CHANNELS & CANALS	\$525	\$147	28%	\$672		\$525	\$147	\$672		\$672	12.8%	\$592	\$166	\$758
11-01	LEVEES	\$7,106	\$1,990	28%	\$9,096		\$7,106	\$1,990	\$9,096		\$9,096	12.8%	\$8,014	\$2,244	\$10,258
11-02	FLOODWALLS	\$3,616	\$1,012	28%	\$4,628		\$3,616	\$1,012	\$4,628		\$4,628	12.8%	\$4,077	\$1,142	\$5,219
CONSTRUCTION ESTIMATE TOTALS:		\$18,558	\$5,196		\$23,754		\$18,558	\$5,196	\$23,754		\$23,754	12.8%	\$20,928	\$5,860	\$26,788
01	LANDS AND DAMAGES	\$4,959	\$1,240	25%	\$6,199		\$4,959	\$1,240	\$6,199		\$6,199	3.2%	\$5,118	\$1,280	\$6,398
30	PLANNING, ENGINEERING & DESIGN	\$4,083	\$1,143	28%	\$5,226		\$4,083	\$1,143	\$5,226		\$5,226	7.2%	\$4,378	\$1,226	\$5,604
31	CONSTRUCTION MANAGEMENT	\$1,299	\$364	28%	\$1,663	0.0%	\$1,299	\$364	\$1,663		\$1,663	16.2%	\$1,510	\$423	\$1,933
PROJECT COST TOTALS:		\$28,899	\$7,943	27%	\$36,842		\$28,899	\$7,943	\$36,842		\$36,842	10.5%	\$31,934	\$8,788	\$40,722

- _____ CHIEF, COST ENGINEERING, James Sentz
- _____ PROJECT MANAGER, Nan Bischoff
- _____ CHIEF, REAL ESTATE, Kevin Sommerland
- _____ CHIEF, PLANNING, Aaron Snyder
- _____ CHIEF, ENGINEERING, Michael Bart
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- _____ CHIEF, CONSTRUCTION, Michael Bart
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- _____ CHIEF, PM-PB, Nathan Wallerstedt
- _____ CHIEF, DPM, Kevin Wilson

ESTIMATED TOTAL PROJECT COST: \$40,722
 ESTIMATED FEDERAL COST: \$9,025
 ESTIMATED NON-FEDERAL COST: \$31,697

22 - FEASIBILITY STUDY (CAP studies): \$1,850
 ESTIMATED FEDERAL COST (+ \$100 FOR FEDERAL INTEREST): ~50% \$975
 ESTIMATED NON-FEDERAL COST: 50% \$875

ESTIMATED FEDERAL COST OF PROJECT \$10,000

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: CAP Section 205 Flood Risk Management Study
 LOCATION: ARCADIA, WI
 This Estimate reflects the scope and schedule in report; Draft Feasibility Study Report with Integrated Environmental Assessment

DISTRICT: MVP
 POC: CHIEF, COST ENGINEERING, James Sentz

PREPARED: 11/4/2019

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 4-Jan-20 Estimate Price Level: 1-Oct-19				Program Year (Budget EC): 2020 Effective Price Level Date: 1-Oct-19								
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
NON-FEDERAL PROJECT														
02	RELOCATIONS	\$7,311	\$2,047	28.0%	\$9,358		\$7,311	\$2,047	\$9,358	2024Q1	12.8%	\$8,245	\$2,308	\$10,553
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11-01	LEVEES	\$7,106	\$1,990	28.0%	\$9,096		\$7,106	\$1,990	\$9,096	2024Q1	12.8%	\$8,014	\$2,244	\$10,258
11-02	FLOODWALLS	\$3,616	\$1,012	28.0%	\$4,628		\$3,616	\$1,012	\$4,628	2024Q1	12.8%	\$4,077	\$1,142	\$5,219
CONSTRUCTION ESTIMATE TOTALS:		\$18,558	\$5,196	28.0%	\$23,754		\$18,558	\$5,196	\$23,754			\$20,928	\$5,860	\$26,788
01	LANDS AND DAMAGES	\$4,959	\$1,240	25.0%	\$6,199		\$4,959	\$1,240	\$6,199	2021Q1	3.2%	\$5,118	\$1,280	\$6,398
30	PLANNING, ENGINEERING & DESIGN													
2.00%	Project Management	\$371	\$104	28.0%	\$475		\$371	\$104	\$475	2021Q3	5.8%	\$393	\$110	\$503
1.00%	Planning & Environmental Compliance	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
10.00%	Engineering & Design	\$1,856	\$520	28.0%	\$2,375		\$1,856	\$520	\$2,375	2021Q3	5.8%	\$1,964	\$550	\$2,513
1.00%	Reviews, ATRs, IEPRs, VE	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
1.00%	Life Cycle Updates (cost, schedule, risks)	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
1.00%	Contracting & Reprographics	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2024Q1	16.2%	\$216	\$60	\$276
2.00%	Engineering During Construction	\$371	\$104	28.0%	\$475		\$371	\$104	\$475	2024Q1	16.2%	\$431	\$121	\$552
2.00%	Planning During Construction	\$371	\$104	28.0%	\$475		\$371	\$104	\$475	2021Q3	5.8%	\$393	\$110	\$503
1.00%	Adaptive Management & Monitoring	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
1.00%	Project Operations	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
31	CONSTRUCTION MANAGEMENT													
3.50%	Construction Management	\$650	\$182	28.0%	\$831		\$650	\$182	\$831	2024Q1	16.2%	\$755	\$211	\$966
1.00%	Project Operation:	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2024Q1	16.2%	\$216	\$60	\$276
2.50%	Project Management	\$464	\$130	28.0%	\$594		\$464	\$130	\$594	2024Q1	16.2%	\$539	\$151	\$690
CONTRACT COST TOTALS:		\$28,899	\$7,943		\$36,842		\$28,899	\$7,943	\$36,842			\$31,934	\$8,788	\$40,722

ATTACHMENT 7

OPERATION AND MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT
(OMRR&R)

Alternative I.D.: **O&MRR&R
PLAN 100yr + 3'**

O&MRR&R - O&M AND MAJOR REPLACEMENT COSTS

EQUIVALENT AVERAGE
ANNUAL O&M/MAJOR
REPLACEMENT VALUE

Item Description	ESTIMATED O&M CYCLE	QUANTITY FACTOR	PROJECT QUANTITY	O&M QUANTITY	UNIT	UNIT PRICE	AMOUNT	PRESENT VALUE	ANNUAL COST	
00 PERIODIC INSPECTIONS										
1 st 5 years	1	YEAR	1.00	1.00	1.00	JOB \$	30,000.00 \$	30,000.00 \$	138,377.46	\$5,125.63
Year 7, 9, 11 and 13	2	YEARS	1.00	1.00	1.00	JOB \$	20,000.00 \$	20,000.00 \$	61,104.11	\$2,263.35
Every 5 years beginning year 15	5	YEARS	1.00	1.00	1.00	JOB \$	20,000.00 \$	20,000.00 \$	69,499.34	\$2,574.32
Routine Annual Inspections	1	YEARS	1.00	1.00	1.00	JOB \$	5,000.00 \$	5,000.00 \$	126,808.09	\$4,697.09
Total Inspections								\$	395,789.00	\$14,660.39
02 RELOCATIONS										
Municipal Utilities and Street Repair	10	YEARS	0.03	1.00	0.05	JOB \$	1,890,557.70 \$	94,527.89 \$	225,186.48	\$8,341.11
Total Relocations								\$	225,186.48	\$ 8,341.11
09 CHANNELS AND CANALS										
Channel	10	YEARS	0.03	1.00	0.03	JOB \$	567,792.71 \$	17,033.78 \$	40,578.26	\$1,503.06
Mowing	1	YEAR	4.00	0.62	2.48	ACRE \$	100.00 \$	248.00 \$	6,289.68	\$232.98
Fertilizing & Weed Control	1	YEAR	2.00	0.62	1.24	ACRE \$	100.00 \$	124.00 \$	3,144.84	\$116.49
Total Channels								\$	50,012.78	\$ 1,852.52
11 LEVEES AND FLOODWALLS										
Levee, Floodwalls, and Closures	10	YEARS	0.03	1.00	0.03	JOB \$	13,305,860.60 \$	399,175.82 \$	950,925.71	\$35,223.16
Structural rehab - Major	50	YEAR	0.50	1.00	0.50	JOB \$	13,305,860.60 \$	6,652,930.30 \$	1,713,647.32	\$63,475.07
Mowing	1	YEAR	4.00	13.32	53.28	ACRE \$	100.00 \$	5,328.00 \$	135,126.70	\$5,005.22
Fertilizing & Weed Control	1	YEAR	2.00	13.32	26.64	ACRE \$	100.00 \$	2,664.00 \$	67,563.35	\$2,502.61
Total Levees and Floodwalls								\$	2,867,263.08	\$ 106,206.06
								Present Value	Annual Cost	
TOTAL FRM OMRR&R								\$	3,538,251.33	\$ 131,060.08

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW CERTIFICATION STATEMENT

For Project No. 403427

MVP – City of Arcadia Trempealeau County, WI Section 205 Flood Risk Management

The City of Arcadia Section 205 – Flood Risk Management Study as presented by St Paul District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of March 31, 2020, the Cost MCX certifies the estimated total project cost:

FY20 Project First Cost:	\$36,842,000
Fully Funded Total Project Cost:	\$40,722,000
Federal Cost of Project:	\$10,000,000 *

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

* The Assistant Secretary of the Army for Civil Works approved a policy deviation on September 19, 2019 that allows the non-federal sponsor for this project to pay all costs that exceed the statutory federal participation limit for the Section 205 authority.



Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **CAP Section 205 Flood Risk Management Study**
PROJECT NO: **P2# 403427**
LOCATION: **ARCADIA, WI**

DISTRICT: **MVP**

PREPARED: **11/4/2019**

POC: **CHIEF, COST ENGINEERING, James Sentz**

This Estimate reflects the scope and schedule in report; Draft Feasibility Study Report with Integrated Environmental Assessment

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02	RELOCATIONS	\$7,311	\$2,047	28%	\$9,358		\$7,311	\$2,047	\$9,358		\$9,358	12.8%	\$8,245	\$2,308	\$10,553
09	CHANNELS & CANALS	\$525	\$147	28%	\$672		\$525	\$147	\$672		\$672	12.8%	\$592	\$166	\$758
11-01	LEVEES	\$7,106	\$1,990	28%	\$9,096		\$7,106	\$1,990	\$9,096		\$9,096	12.8%	\$8,014	\$2,244	\$10,258
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31	CONSTRUCTION MANAGEMENT	\$1,299	\$364	28%	\$1,663	0.0%	\$1,299	\$364	\$1,663		\$1,663	16.2%	\$1,510	\$423	\$1,933
PROJECT COST TOTALS:		\$28,899	\$7,943	27%	\$36,842		\$28,899	\$7,943	\$36,842		\$36,842	10.5%	\$31,934	\$8,788	\$40,722

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**** CONTRACT COST SUMMARY ****

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DISTRICT: MVP
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PREPARED: 11/4/2019

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		Estimate Prepared: 4-Jan-20 Estimate Price Level: 1-Oct-19				Program Year (Budget EC): 2020 Effective Price Level Date: 1-Oct-19								
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
NON-FEDERAL PROJECT														
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1.00%	Adaptive Management & Monitoring	\$186	\$52	28.0%	\$238		\$186	\$52	\$238	2021Q3	5.8%	\$196	\$55	\$251
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