US Army Corps of Engineers®

Buffalo District

Great Lakes and Ohio River Division

Project Title: Thatcher Brook, Gowanda, New York

Authority: Continuing Authority Program Section 205

P2/Project Number: 153722

Review Plan

PREPARED BY:

[redacted]

Project Manager
USACE, Buffalo District

RECOMMENDED BY

[redacted]

LTC, EN
Commanding
USACE, Buffalo District

ENDORSED BY:

[redacted]

Senior Regional Engineer
Review Management Organization Representative
USACE, Great Lakes and Ohio River Division

APPROVED BY:

[redacted]

for [redacted]
Acting Regional Business Director
USACE, Great Lakes and Ohio River Division

MSC APPROVAL DATE:

REVIEW PLAN ENGINEERING AND DESIGN PRODUCTS
THATCHER BROOK, GOWANDA, NY SECTION 205
BUFFALO DISTRICT

Current Version Date: 19 April 2023

Mandatory Revision Date: 19 April 2026

1. PURPOSE AND REFERENCES

a. Purpose. This review plan describes necessary quality reviews for engineering and design (E&D) products for the Thatcher Brook, Gowanda, NY Flood Risk Reduction Project.

b. References.

(1) Engineering Regulation (ER) 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews

(2) Engineering Regulation (ER) 1165-2-217, Civil Works Review Policy

(3) Qualtrax 08504 LRD, Supplemental Quality Procedures for Civil Works (CW) Engineering and Design (E&D) Products

(4) Project Management Plan (PMP)

2. REVIEW MANAGEMENT ORGANIZATION (RMO). The RMO for this project is the MSC (Great Lakes and Ohio River Division).

3. PROJECT SCOPE AND PRODUCTS

a. Project Description and Scope of Work. Thatcher Brook flows through the Village of Gowanda, which is approximately 30 miles south of the city of Buffalo, Erie County, New York. The village is part of both Erie and Cattaraugus Counties. The village has sustained several serious flooding events, with the most recent significant events occurring in 1998, 2006 and 2009. The project involves construction of an overflow channel spanning approximately 5,000 feet from Thatcher Brook to Cattaraugus Creek. The channel will be designed for a 1% annual chance event. It will connect at Thatcher Brook concrete headwall structure to buried box culvert. A motor actuated slide gate will be installed at the headwall to divert flow to the box culvert. The entire channel will have sections of grass and rip rap open channel and more buried box culvert. The culvert will cross a road and a railroad (converted to a tourist ride concession). Flow will discharge from an open grass channel section to Cattaraugus Creek. The channel will be excavated into native materials. See the figure on the last page for the project layout.

Project Number	153722
Business Line	Flood Risk Management Section 205
Project Type	Overflow structure
Geographic Location	Gowanda, NY
Main Project Features	Gated diversion structure, grass and riprap protected channel, box culvert channel, miscellaneous site improvements
Estimated Construction Cost	[redacted]
E&D Product Delivery Method	In-House Design
Construction Delivery Method	Fixed Price

b. Products. The E&D products to be reviewed include the following:

(1) Design Documentation Report (DDR)
(2) Plans and Specifications (P&S)
(3) Engineering Considerations and Instructions for Field Personnel (ECIFP)
(4) E&D Products for Engineering During Construction (EDC)

4. DOCUMENTATION OF RISKS AND ISSUES

a. Life Safety Assessment: The District Chief of Engineering has reviewed the project requirements and determined there is not a significant threat to human life if the project were to fail.

b. Technical Complexities and Risks. The project delivery team (PDT) performed a thorough risk analysis of the anticipated project design, construction, and operations activities and identified the critical technical complexities and risks listed below. Quality reviews will be planned and performed with the goal to best manage these project technical complexities and risks.

(1) Floating Debris: Drainage areas upstream of the channel inlet are forested. Natural debris may enter Thatcher Brook during storm events and be carried to the diversion structure. This debris could collect at the inlet structure and impede flow and slide gate operations during construction and project operations.

(2) Hazardous Waste (HTRW): The project vicinity has abandoned industrial areas and a closed Superfund site. The design channel alignment has been located to bypass areas having potential for HTRW contamination. More HTRW investigation will be performed during design. Potential HTRW discovery during project execution could increase design requirements, schedule, and costs.

(3) Railroad Replacement: The existing railroad embankment and track will be cut and replaced. Design may require specialized expertise for connections of new to old railroad track.

(4) Mechanical and Electrical Engineering Expertise: The District does not have senior mechanical and electrical engineers on staff. Outside mechanical and electrical expertise is recommended to review the inlet structure gate design.

5. REVIEW EXECUTION

a. Project Delivery Team (PDT): PDT members are listed in Attachment 1. PDT members will work collaboratively with review team members to ensure effective performance of the planned quality reviews.

b. District Quality Control (DQC): DQC is required for all products. Follow DQC procedures in Chapter 4 of ER 1165-2-217 and District local work instructions. The Engineering Technical Lead and DQC Lead will collaborate to oversee and ensure effective DQC performance.

c. Biddability, Constructability, Operability, Environmental, Sustainability (BCOES): BCOES reviews are required for all products. Follow BCOES review procedures in ER 415-1-11 and District local work instructions. The Engineering Technical Lead and DQC Lead will collaborate to oversee and ensure effective BCOES execution.

d. Agency Technical Review (ATR): ATR is required for all products and shall follow ATR procedures in Chapter 5 of ER 1165-2-217. ATR will address the technical complexities and risks described in sub-

section 4.b. Required senior technical disciplines and expertise needed for ATR are described in Table 1. Assigned ATR team members are listed in Attachment 1. The RMO representative has made a risk-informed decision and waived the requirement for the ATR Leader to be any employee outside the home MSC. PDT and review team leaders will collaborate to oversee and ensure effective execution.

Table 1. ATR Technical Discipline(s) and Required Expertise	
Technical Discipline	Expertise Required
ATR Team Leader	Middle to senior level professional experienced with leading ATR teams preferably with Section 205 flood risk management projects. May also serve as a discipline reviewer. CERCAP Level 1 or 2 certified.
Design Engineers	Middle to senior level professional experienced in the hydraulics engineering areas inlet structure and bypass channel design, mixed flow, curved channel flow, channel stability, and debris management. CERCAP Level 1 or 2 certified.
Mechanical Engineer	Middle to senior level professional experienced in the mechanical design of slide gates in stream flow structures. CERCAP Level 1 or 2 certified.
Electrical Engineer	Middle to senior level professional experienced in the mechanical design of electrical power supply and gate actuators. CERCAP Level 1 or 2 certified.

e. Safety Assurance Review (SAR): The District Chief of Engineering has reviewed the risks and determined the project will not benefit from performing a Safety Assurance Review.

f. Review Charge. Reviewers will refer to and perform ATR per Section 5.7 of ER 1165-2-217, Objectives, Scope, and Review Criteria. Reviewers shall check to confirm the project engineering and design addresses the technical complexities and risks described in Section 4.b.

6. REVIEW SCHEDULE AND BUDGETS. The schedule and budgets for reviews are shown in Table 2. BCOES reviews will not be done concurrently with DQC and ATR review periods.

Table 2. Review Schedule and Budgets			
Review Activities	Start Date	Finish Date	Budget ($)
Conceptual Design (CD) BCOES (Kickoff)	[redacted]	[redacted]	[redacted]
CD Design Documentation Report, 60% Design Analysis, 30% Drawings, Outline Specs, Min Class 3 Cost Estimate, Schedule (DQC)	[redacted]	[redacted]	[redacted]
CD Design Documentation Report, 60% Design Analysis, 30% Drawings, Outline Specs, Min Class 3 Cost Estimate, Schedule (ATR)	[redacted]	[redacted]	[redacted]
CD BCOES Design Document Report	[redacted]	[redacted]	[redacted]
Intermediate Design (ID) (60%) BCOES	[redacted]	[redacted]	[redacted]
ID Updated DDR, 100% Design Analysis, 60% Drawings, Specs, Cost Estimate (DQC)	[redacted]	[redacted]	[redacted]
ID updated DDR, 100% Design Analysis, 60% Drawings, Specs, Cost Estimate (ATR)	[redacted]	[redacted]	[redacted]
Final Design (FD) BCOES	[redacted]	[redacted]	[redacted]
Backcheck Final BCOES	[redacted]	[redacted]	[redacted]

Table 2. Review Schedule and Budgets			
Review Activities	Start Date	Finish Date	Budget ($)
FD 100% Drawings, Specs, Cost Estimate, Submittal Register (DQC)	[redacted]	[redacted]	[redacted]
FD 100% Drawings, Specs, Cost Estimate, Submittal Register (ATR)	[redacted]	[redacted]	[redacted]
Certification of Plans and Specs	[redacted]	[redacted]	[redacted]
Sign Drawings and Send to Contracting	[redacted]	[redacted]	[redacted]

7. REVIEW DOCUMENTATION. The ATR leader will prepare an ATR report per Section 5.10 of ER 1165- 2-217. The ATR report with certification form will be provided to the approval signatories, including the RMO representative. Review documents will be stored with the official project records.

8. REVIEW PLAN POINTS OF CONTACT. Questions and comments relating to this review plan can be directed to the following points of contact:

a. District Project Leaders
(1) Project Manager: Gabriel Schmidbauer, CELRB-PMP-M, gabriel.a.schmidbauer @usace.army.mil.
(2) Engineering Technical Lead: Green, Daniel, CELRB-TDD-A, daniel.n.green@usace.army.mil .

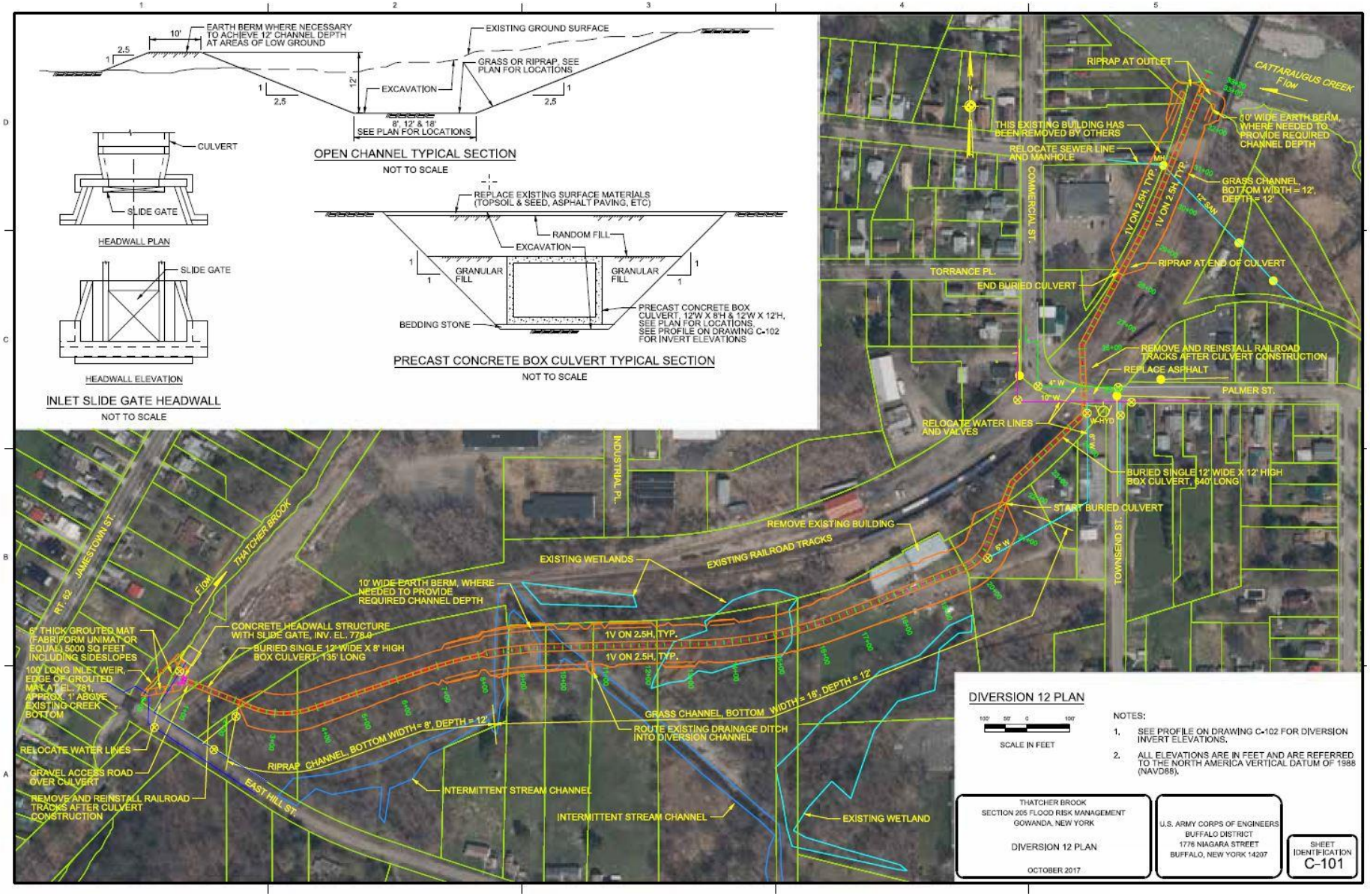
b. Review Management Organization (RMO) Representative: CELRD-ECD, Frank Appelfeller (frank.a.appelfeller@usace.army.mil) or Amit Dash (amit.k.dash@usace.army.mil).

9. APPROVED AND RECOMMENDED BY:

[redacted]
District Chief of Engineering
USACE, Buffalo District

ATTACHMENT 1 – TEAM MEMBERS

PROJECT DELIVERY TEAM		
Function/Discipline	Name (Last, First)	Office
Project Manager	[redacted]	CELRB-PMP-M
Plan Formulator	[redacted]	CELRB-PML-P
Biologist, Environmental Analysis	[redacted]	CELRB-PML-E
Engineering Team Lead	[redacted]	CELRB-TDD-A
Structural Engineer	[redacted]	CELRB-TDD-S
Geotechnical Engineer	[redacted]	CELRB-TDD-G
Cost Engineer	[redacted]	CELRB-TDD_C
District Value Engineer	[redacted]	CELRB-TDD-E
Geospatial Lead	[redacted]	CELRB-TDE-S
Program Analyst	[redacted]	CERLB-PM-PO
Program Specialist	[redacted]	CELRB-PM-PO
Safety and Occupational Health	[redacted]	CELRB-SO
Branch Chief, Contracting	[redacted]	CECT-LRB
Assistant District Counsel	[redacted]	CELRB-OC
Realty Specialist	[redacted]	CELRE-REP
Public Affairs Officer	[redacted]	CELRB-PA
H&H Engineer	[redacted]	CELRB-TDD-WH
DQC REVIEWERS		
Function/Discipline	Name (Last, First)	Office
DQC Lead -Chief Design	[redacted]	CELRB-TDD
Civil Structural Design	[redacted]	CELRB-TDD-S
H&H Engineering	[redacted]	CELRB-TDD-WH
Cost Engineering	[redacted]	CELRB-TDD-E
Coastal / Geotech	[redacted]	CELRB-TDD-C
A-E & Project Engineering	[redacted]	CELBR-TDD-A
Real Estate	[redacted]	CELRE-REP
BCOES REVIEWERS		
Function/Discipline	Name (Last, First)	Office
Operations	[redacted]	CELRB-TDO
Construction	[redacted]	CELRB-TDC
Counsel	[redacted]	CELRB-OC
Contracting	[redacted]	CECT-LRB
Environmental	[redacted]	CERLB-PML-E
Civil/Structural	[redacted]	CELRB-TDD-S
Geotechnical	[redacted]	CELRB-TDD-C
H&H Engineering	[redacted]	CELRB-TDD-WH
A-E & Project Engineering	[redacted]	CELRB-TDD-A
ATR Reviewers		
Function/Discipline	Name (Last, First)	Office
Leader/Mechanical Engineer	[redacted]	CELRN-ECD-E
H&H Engineer	[redacted]	CELRC-ECE-H
Electrical Engineer	[redacted]	CELRL-ED-D-M


EARTH BERM WHERE NECESSARY TO ACHIEVE 12' CHANNEL DEPTH AT AREAS OF LOW GROUND
EXISTING GROUND SURFACE
GRASS OR RIPRAP, SEE PLAN FOR LOCATIONS
EXCAVATION
8', 12' & 18' SEE PLAN FOR LOCATIONS
OPEN CHANNEL TYPICAL SECTION
NOT TO SCALE
CULVERT
SLIDE GATE
HEADWALL PLAN
SLIDE GATE
HEADWALL ELEVATION
INLET SLIDE GATE HEADWALL
NOT TO SCALE
REPLACE EXISTING SURFACE MATERIALS (TOPSOIL & SEED, ASPHALT PAVING, ETC)
RANDOM FILL
EXCAVATION
GRANULAR FILL
GRANULAR FILL
BEDDING STONE
PRECAST CONCRETE BOX CULVERT, 12'W X 8'H & 12'W X 12'H, SEE PLAN FOR LOCATIONS. SEE PROFILE ON DRAWING C-102 FOR INVERT ELEVATIONS
PRECAST CONCRETE BOX CULVERT TYPICAL SECTION
NOT TO SCALE
RIPRAP AT OUTLET
CATTARAUGUS CREEK FLOW
10' WIDE EARTH BERM, WHERE NEEDED TO PROVIDE REQUIRED CHANNEL DEPTH
THIS EXISTING BUILDING HAS BEEN REMOVED BY OTHERS
RELOCATE SEWER LINE AND MANHOLE
COMMERCIAL ST.
1V ON 2.5H, TYP.
GRASS CHANNEL, BOTTOM WIDTH = 12', DEPTH = 12'
RIPRAP AT END OF CULVERT
TORRANCE PL.
END BURIED CULVERT
REMOVE AND REINSTALL RAILROAD TRACKS AFTER CULVERT CONSTRUCTION
REPLACE ASPHALT
PALMER ST.
RELOCATE WATER LINES AND VALVES
BURIED SINGLE 12' WIDE X 12' HIGH BOX CULVERT, 840' LONG
START BURIED CULVERT
TOWNSEND ST.
INDUSTRIAL PL.
REMOVE EXISTING BUILDING
EXISTING RAILROAD TRACKS
EXISTING WETLANDS
JAMESTOWN ST.
RT. 62
THATCHER BROOK
FLOW
10' WIDE EARTH BERM, WHERE NEEDED TO PROVIDE REQUIRED CHANNEL DEPTH
6" THICK GROUTED MAT (FABRIFORM UNIMAT OR EQUAL), 5000 SQ FEET INCLUDING SIDESLOPES
100' LONG INLET WEIR, EDGE OF GROUTED MAT AT EL. 781, APPROX. 1' ABOVE EXISTING CREEK BOTTOM
CONCRETE HEADWALL STRUCTURE WITH SLIDE GATE, INV. EL. 778.0
BURIED SINGLE 12' WIDE X 8' HIGH BOX CULVERT, 135' LONG
1V ON 2.5H, TYP.
1V ON 2.5H, TYP.
GRASS CHANNEL, BOTTOM WIDTH = 8', DEPTH = 12'
ROUTE EXISTING DRAINAGE DITCH INTO DIVERSION CHANNEL
RELOCATE WATER LINES
GRAVEL ACCESS ROAD OVER CULVERT
REMOVE AND REINSTALL RAILROAD TRACKS AFTER CULVERT CONSTRUCTION
RIPRAP CHANNEL, BOTTOM WIDTH = 8', DEPTH = 12'
EAST HILL ST.
INTERMITTENT STREAM CHANNEL
INTERMITTENT STREAM CHANNEL
EXISTING WETLAND
DIVERSION 12 PLAN
SCALE IN FEET
NOTES:
1. SEE PROFILE ON DRAWING C-102 FOR DIVERSION INVERT ELEVATIONS.
2. ALL ELEVATIONS ARE IN FEET AND ARE REFERRED TO THE NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).
THATCHER BROOK
SECTION 205 FLOOD RISK MANAGEMENT
GOWANDA, NEW YORK
DIVERSION 12 PLAN
OCTOBER 2017
U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207
SHEET IDENTIFICATION
C-101