

Agenda

Natural Features Protection

Review Board



City of Kalamazoo

Tuesday, April 22, 2025

4:00 PM

City Commission Chambers at City Hall - 241 W. South Street

A. CALL TO ORDER/ROLL CALL

1. Excuse Absent Board Members (**Action: Motion to Excuse Absent Board Members**)

B. ADOPTION OF AGENDA

(Action: Motion to approve the agenda)

1. Agenda Approval (**Action: Motion to Approve Agenda**)

C. APPROVAL OF MINUTES

1. Approval of the minutes from the Natural Features Protection Review Board meeting on March 25, 2025 (**Action: Motion to approve the minutes from the Natural Features Protection Review Board meeting on March 25, 2025**)

D. PUBLIC COMMENTS

E. BOARD MEMBER COMMENTS

F. NEW BUSINESS

1. (**Action: Motion to approve the recommendation to the Zoning Board of Appeals to grant relief from the Wetlands and Water Resources Standards to allow the installation of New Stormwater BMPs within the setbacks of Wetlands and Water Resources**) Approval of a recommendation to the Zoning Board of Appeals to grant relief from the NFP Wetlands and Water Resources Standards to allow the installation of New Stormwater BMPs within the setbacks of Wetlands and Water Resources for the City of Kalamazoo Stormwater Project at 433 Reed Court.

G. UNFINISHED BUSINESS

1. NFP Board Work Session

H. STAFF REPORTS AND UPDATES

I. COMMUNICATIONS AND ANNOUNCEMENTS

J. ADJOURNMENT



**Natural Features
Protection Review
Board
Minutes
March 25, 2025
Held at City Hall
Commission Chambers 4:00 p.m.**

A. Call to Order: Director Martin called the meeting to order at 4:00 p.m.

Members absent: Director Murgia

- 1. Excuse Absent Board Members:** The motion to excuse absent board members was made by Director Hollander and supported by Director Lettow, and the motion passed unanimously.

B. Adoption of Agenda

Motion to adopt the agenda made by Director Lettow, supported by Director Fredrickson, motion passed unanimously.

C. Approval of the Meeting Minutes

Motion to approve the minutes from February 25, 2025, NFP Review Board Meeting made by Director Lettow supported by Director Fuller, passed unanimously.

D. General Citizen Comments

There were no general citizen comments, either in person or by phone.

E. Board Comments

No comments



F. New Business

We have two applicants for the two openings, one for the Ecology seat and the Hydrogeologist seat. Nolan and Chair Martin met with Logan Rowe, and he fits the Ecology position. He has experience with entomology, the study of insects and how they affect our ecosystem. Also, he has experience with MNFI, rare species review, and birds and reptiles for the wetland reviews.

Motion to approve a recommendation to the City Commission for the appointment of Logan Rowe to the NFP Board for a full term of three years by Director Fuller and supported by Director Lettow, roll call vote passed unanimously

Matt Stemple has experience as an Arborist for various municipalities and has interacted with NFP in past on projects, and is familiar with processes.

Motion to approve a recommendation to the City Commission for the appointment of Matt Stemple to the NFP Board for a full term of three years by Director Hollander and supported by Director Bassett, roll call vote passed unanimously

NFP Board Member Appointment for Logan Rowe and Matt Stemple starting in May upon approval from City Commission.



Question?

Public Comments:

Unfinished Business

1. NFP Board Work Session discussion on a guide to improving NFP

- Hot topics – Enforcement; Permitting; Imagine Kalamazoo Processes
Looking to have a representative from each expertise to speak to the board and answer questions.
- Hollander brought up the idea of one of the board members go on site visits with an Inspector to get a better understanding of what is in the process and see the end result.
- List of resources, State of Michigan database, as a reference for people to explore before they start a project. Not an ordinance but will have authoritative resources in the NFP Guide.
- Stormwater, we have stringent and strict storm water management criteria when dealing with an NFP property. Contacting Public Services to see if they have a representative to talk to us about stormwater management.
- Environmental Concerns Committee to connect with Natural Features Protection Review board.

Staff Reports and Update

None

Communications and Announcements

None

Adjourn Meeting



NFP Review Board Staff Report

City of Kalamazoo

TO: The Natural Features Protection Review Board

FROM: Nolan Bergstrom, NFP Board Liaison

DATE: April 22, 2025

SUBJECT: **(Action: Motion to approve the recommendation to the Zoning Board of Appeals to grant relief from the Wetlands and Water Resources Standards to allow the installation of New Stormwater BMPs within the setbacks of Wetlands and Water Resources)** Approval of a recommendation to the Zoning Board of Appeals to grant relief from the NFP Wetlands and Water Resources Standards to allow the installation of New Stormwater BMPs within the setbacks of Wetlands and Water Resources for the City of Kalamazoo Stormwater Project at 433 Reed Court.

RECOMMENDATION:

It is recommended the Natural Features Protection (NFP) Review Board approve a recommendation to the Zoning Board of Appeals to grant relief from the NFP Wetlands and Water Resources Standards to allow the installation of New Stormwater BMPs within the setbacks of Wetlands and Water Resources for the City of Kalamazoo Stormwater Project at 433 Reed Court.

The project is in alignment with the intent of the NFP by advancing restoration activities related to Stormwater on an environmentally sensitive site. This project is also in alignment with:

- The Portage and Arcadia Creek sub-watershed plans
- City of Kalamazoo Community Sustainability Plan (Page 113)
- Michigan Department of Environment, Great Lakes, and Energy goals around managing pollutants and stormwater systems
 - MI Healthy Climate Plan
- Imagine Kalamazoo 2025 Strategic Vision:
 - Environmental Responsibility
 - Safe Community
 - Complete Neighborhood

BACKGROUND:

433 Reed Court / 433 Reed Avenue is owned by the Kalamazoo Brownfield Redevelopment Authority and is undeveloped. The parcel is zoned RM-15 zone district. The City of Kalamazoo Public Works Department received approval from the Brownfield Redevelopment Authority at the April 17th Brownfield Redevelopment Authority Board meeting to transfer ownership from the Brownfield Redevelopment Authority to the City of Kalamazoo. This transfer requires City Commission Approval to proceed.

The goal of the project is to improve the site by adding new Stormwater BMPs (Best Management Practices) focused on restoring and enhancing the existing wetlands, and taking restorative actions near Portage Creek. Some new Stormwater infrastructure and a pedestrian path are included in the project scope.

This project is before the NFP Board for a variance from the Wetland and Water Resources Standards due to new Stormwater BMPs being prohibited within the setbacks of wetlands or water resources.

Stormwater BMPs are defined in the City of Kalamazoo Zoning Code (Chapter 50) ([§ 50-1.3 Definitions](#)) as *Tools used to prevent or reduce stormwater runoff and/or associated pollutants as determined by professional associations, [State of Michigan](#), or federal government, such as the [Michigan Low Impact Development Manual](#).*

FINDINGS:

The Kalamazoo River Watershed Council, in partnership with the City of Kalamazoo and Kaiser & Associates, identified sites in the [Portage and Arcadia Creek Watershed](#) that could be worked on to improve the health of the watershed. One of the identified areas in this sub-watershed plan was the parcel located at 433 Reed Court.

The site is within the NFP Overlay District due to the presence of Portage Creek and a wetland area adjacent to Portage Creek. The site also requires Rare Species Review. The parcel is undeveloped.

Since the project is located within the NFP Overlay District, the site requires the following NFP Site Development Standards:

- **Water Resources Standard ([§ 50-6.2D](#))**– New Stormwater BMPs are prohibited within the water resource setback ([§ 50-6.2D\(2\)\(b\)](#))
- **Wetland Standard ([§ 50-6.2C](#))** – New Stormwater BMPs are prohibited within the wetland setback ([§ 50-6.2C\(3\)\(b\)](#))
- **Woodland Protection Standard ([§ 50-6.2G](#))** – The site does contain contiguous areas of woodland and so the Woodland standard would apply. The Protected Tree Standard does not apply to a woodland area.

- **Rare Species Review** – This site will require Rare Species Review to be completed by the [Michigan State University Extension](#).
- **Plant Selection** – Plantings are dictated by multiple NFP Standards and will be reviewed more fully during the Site Plan Review process.
- **Stormwater Management (§ 50-6.2J(6))** – Stormwater requirements on NFP sites are stricter and are dictated by the City of Kalamazoo Performance Standards for Groundwater Protection within Wellhead Protection Capture Zones.

The applicant has also submitted materials to EGLE (Michigan Department of Environment, Great Lakes, and Energy) which will be required. This project is scheduled to go before the Zoning Board of Appeals in May and then begin the Site Plan Review process. The NFP Board will see this project again during the Site Plan Review process.



Public Services

415 E Stockbridge Ave
Kalamazoo, MI 49001
Phone: (269) 337-8047
311 (269) 337-8000
www.kalamazoocity.org

April 1, 2025

Notice of Natural Features Protection Review for the Reed Court Floodplain and Stormwater Improvement Project

Dear Resident,

The City of Kalamazoo is presenting the proposed Reed Court Floodplain and Stormwater Improvement Project (Project) to the Natural Features Protection Board for Site Plan Review. This public meeting will take place April 22, 2025, at 4pm at City Hall (241 W South St) in the Commission Chambers room.

The Project is to be located along the west bank of Portage Creek, north (downstream) of Reed Avenue on a parcel owned by the City Brownfield Redevelopment Authority, bounded by Stockbridge to the north, Reed Court to the east and Grand Elk rail to the west. The property address is 433 Reed Ave (parcel ID 06-22-467-002) with a land area of 4.2 acres.

The project proposes to enhance key aspects of the wetlands, flood plain and riparian areas of Portage Creek on this parcel. This includes the creation of stormwater bioretention features coupled with floodplain and wetland reconnection/enhancement at the site. The project is supported by funds from the Kalamazoo River Natural Resources Damage Assessment as administered by NRDA Trustees.

Plans can also be viewed online at the link shown below. If you have comments, please email palumbot@kalamazoocity.org by April 15. *(If you don't have email, you can send via mail Attn: Tom Palumbo to the Public Services address at the top of this letter.)*

<https://drive.google.com/file/d/1X7ijui7-AnGcgOtKNafsJ67LfSif1Zb7/view?usp=sharing>

Construction on this project is anticipated to begin late 2025 / early 2026.

Thank you,

Tom Palumbo, PE
Senior Civil Engineer
Public Works Division
City of Kalamazoo





CONCEPT REDERINGS OF VIEWING DECK

SUPPLEMENTAL SITE PLAN REVIEW APPLICATION FOR NATURAL FEATURES PROTECTION

For projects located within the Natural Features Protection (NFP) Overlay District, separate site plan approval is required before the full site plan can be approved. This review is done either by the NFP Review Board or administratively by staff to verify conformance with NFP Overlay District zoning code ([Chapter 50, NFP](#)). The NFP Overlay District map can be found on the [City's GIS mapping website](#) (select "Planning & Zoning" layer and make sure "NFP Overlay" is clicked on).

The NFP Supplemental Application must be completed and submitted with the regular Site Plan Review Application and checklists. The NFP Review Board meets monthly to review and approve applications. City staff can assist in scheduling a project at an upcoming NFP Review Board meeting. While the review process offers some flexibility, projects often seek NFP approval between the Pre-Application meeting and regular Site Plan Review meeting.

Section I. Project & Applicant Information

All projects must complete Section I. If the project will not impact any natural features on the site, and does not trigger additional stormwater controls or treatment, applicants should sign and submit Section I only. Staff will review and determine if the application can be approved administratively.

Section II. Natural Features Checklist & Attachments

For projects proposing improvements or changes to the site that impact natural features, change grading, or involve work in or near NFP setbacks, Sections II and III must be completed. Section II identifies which natural features are present and standards apply. Section III will assist you in determining what documentation and additional plan sets are needed for a complete application. Once a complete application is submitted to the City, the project will be scheduled for the next available NFP Review Board meeting and an application fee of \$110 will apply.

QUESTIONS

Contact the NFP staff liaison with any questions about your NFP Supplemental Application at (269) 337-8045 or development@kalamazoocity.org.

SECTION I. PROJECT AND APPLICANT INFORMATION

Please provide all of the project and applicant information requested below. Include the date of your regular site plan review meeting, if one has been scheduled or already taken place.

APPLICANT NAME:	Tom Palumbo (first) (last)		
APPLICANT ADDRESS:	COK Dept. 0 City of Kalamazoo (number) (street name)		
	Kalamazoo (city)	MI (state)	49007 (Zip)
APPLICANT EMAIL:	palumbot@kalamazoocity.org	PHONE:	269-337-8697
PARCEL ADDRESS/PIN:	433 Reed Avenue with parcel ID 06-22-467-002		
PROJECT DESCRIPTION:	The proposed Reed Court Floodplain and Stormwater Improvement Project is located along the west bank of Portage Creek north (downstream) of Reed Avenue on a City-owned brownfield parcel located between Reed Avenue, Stockbridge		
OWNER NAME: (if different)	City of Kalamazoo Brownfield (first) (last)		
HAS REGULAR SITE PLAN REVIEW MEETING OCCURRED?	☐ Yes ☒ No	DATE OF SITE PLAN REVIEW MEETING:	06/10/2024

NFP APPLICATION REQUIRED?

Is the project limited to interior work <u>only</u> with no exterior ground changes or increase in impervious coverage?	
☒ YES	If YES , Sections II & III of this application are not needed. Sign below & submit only this page with your site plan review or permit application.
☐ NO	If NO , proceed to Sections II & III. Do NOT sign below.

By signing below, the applicant certifies that no natural features will be disturbed as part of this project.

Print name: Only sign if No is selected above _____

Signature: _____ Date: _____

SECTION II. NFP SITE PLAN CHECKLIST & ATTACHMENTS

Use the checklist to determine what documentation and additional plans sets must be prepared for this application. All plan sets, maps, and additional information must be attached to this application to be considered complete. If you checked “no” to certain NFP items in questions 1-7 in Section II, record “N/A” on the checklist.

REQUIRED: NFP SITE PLAN SET

All applications must include separate sheets in the plan set showing the following:

1. Existing conditions map showing an inventory of all protected natural features and any associated natural features setbacks with distances (use checklist below)
2. Future development plan overlaid onto the existing conditions and natural features inventory; indicate where and to what extent protected natural features will be disturbed, removed, altered, or impacted in any way and which natural features will be protected during and after construction

Future development plan must include:

- **Boundary with extent of re-grading**, construction, or site preparation activities
 - **All existing and new building footprints** (mark whether existing buildings will be removed or maintained)
 - **New and existing parking** surfaces or structures, sidewalks, trails, and other impervious or semi-impervious surfaces including decks, patios, viewing platforms, etc. (list proposed surface materials and whether existing surfaces will be maintained or removed)
 - **Proposed location of fencing and screening**, whether permanent, natural, or construction silt fencing and/or natural feature protection fencing (with specifications)
 - **Stormwater facilities** showing boundary of ground disturbance, grading or construction activities, if located near natural features
 - **New utilities** and/or relocation of existing utilities showing corridors that could impact natural features
3. Landscape plan detailing the minimum elements needed to meet zoning code requirements and all proposed additional landscaping elements or features (include table with species name)
 4. Any additional plans or tables detailing which natural features will be restored or replaced after construction, if required (e.g., riparian buffer installation or slope restoration plan may be required under certain circumstances when the ordinance allows changes within these protected areas)

WETLANDS	Present:	Included on page #:	Notes:
Mark existing wetland boundaries with notes about wetland conditions. <i>Attach a copy of EGLE permit or permit application for work impacting Part 303 wetlands regulated by the State.</i>	☒ Yes ☐ No	if yes, include	if yes, include
WATER RESOURCES	Present:	Included on page #:	Notes:
Mark the location of all water resources on the parcel and those within 25 feet of the parcel boundaries. <i>Attach a copy of EGLE permit or permit application for work impacting Part 301 waters regulated by the State.</i>	☒ Yes ☐ No	if yes, include	if yes, include
Show required setbacks with dimensions; describe existing or future ground cover within riparian setbacks.		if yes, include	if yes, include
TREES	Present:	Included on page #:	Notes:
Mark the location of all “protected” trees that are proposed to be removed and those that will remain and require protection fencing.	☒ Yes ☐ No	if yes, include	if yes, include
Include a table with species name, size (DBH and height), and condition of “protected” trees that are proposed to be removed and list replacement tree information.		if yes, include	if yes, include
Provide a note with justification for removal.		if yes,	if yes, include
WOODLANDS	Present:	Included on page #:	Notes:
Delineate the boundary of all woodlands on the parcel noting where woodlands likely extend onto adjacent parcels.	☒ Yes ☐ No	if yes, include	if yes, include
Mark all areas of woodland that will be retained and removed (i.e., cleared).		if yes, include	if yes, include
Include a table or note with the required preservation ratio (based on existing woodland coverage), percentage proposed to be removed, and rationale for selecting area for removal.		if yes, include	if yes, include
SLOPES	Present:	Included on page #:	Notes:
Provide a slope analysis that shows the boundaries of all “protected” slopes and mark the required setback(s).	☐ Yes ☒ No	if yes, include	if yes, include
Include a note with co-existing feature that triggers “protected” slope status (e.g., wooded, within 500 ft of water resource).		if yes, include	if yes, include

NATURAL HERITAGE AREAS	Present:	
Is an MNFI* rare species review required? <i>Parcels can be pre-screened using the City's GIS website, click on the "Planning & Zoning" layer and "NFP Overlay" layer; then click on parcel and see MNFI status.</i>	☐ Yes ☒ No	
If an MNFI rare species review is required, attach the resulting report.		

*Michigan Natural Features Inventory (MNFI) Rare Species Reviews can be requested at:

<https://mnfi.anr.msu.edu/services/rare-species-reviews>

ACCEPTED DATA SOURCES & ANALYSIS

All data sources, analysis, and professionals are subject to approval by the City Planner according to Chapter 50-6.2. The following guidance may be useful when selecting a professional or methodology for inventorying natural features.

1. WETLANDS

- Wetland delineation report performed by a qualified consultant including a map denoting delineated boundary of all wetlands, OR
- Most recent US Fish & Wildlife Service's National Wetlands Inventory boundary (State of Michigan mapper: <https://www.michigan.gov/egle/about/organization/water-resources/wetlands/inventory-maps>)

2. PROTECTED TREE IDENTIFICATION

- May be performed by an qualified professional (including ISA Certified Arborist or similar); a full tree inventory is not required if all necessary information can be obtained and communicated using another survey, inventory, or site assessment methodology

3. WOODLANDS

- A qualified professional, such as an ISA Certified Arborist, landscape architect, or license engineer may perform a desktop analysis or field survey to delineate woodlands
- When a variances is being requests to remove more woodland cover than is allowed under the preservation ration, the following is required
 - Woodland assessment report with determination that the Trees per Area (TPA) meets the NFP definition of a woodland and mapped delineation of woodland
 - Woodland assessment report with a determination that Basal Area is equivalent to the TPA in the NFP definition and meets definition of a woodland and mapped delineation of woodland
 - In addition to determination of whether stand of trees meets NFP definition of a woodland, assessment must include information on general species diversity,
 -

composition of species, any notable trees (either notable species or size), invasive species composition, and general health and age observations of tree stand

4. PROTECTED SLOPES

- Topographic survey performed in the field by a qualified consultant to delineate areas of a slope with grade of 20% or greater
- Desktop analysis performed using U.S. Geological Survey digital topographic maps, LIDAR, digital elevation map, or equivalent data showing 2' intervals or finer resolution, performed by a qualified consultant or engineer



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
Phone: (517) 351-2555 Fax: (517) 351-1443



In Reply Refer To:

01/10/2025 14:23:28 UTC

Project Code: 2025-0040055

Project Name: Reed Ct Floodplain and Stormwater Improvements

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Official Species List

The attached species list identifies any Federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the IPaC website (<https://ipac.ecosphere.fws.gov/>) at regular intervals during project planning and implementation. To update an Official Species List in IPaC: from the My Projects page, find the project, expand the row, and click Project Home. In the What's Next box on the Project Home page, there is a Request Updated List button to update your species list. Be sure to select an "official" species list for all projects.

Consultation requirements and next steps

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize Federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-Federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are two approaches to evaluating the effects of a project on listed species.

Approach 1. Use the All-species Michigan determination key in IPaC. This tool can assist you in making determinations for listed species for some projects. In many cases, the determination key

will provide an automated concurrence that completes all or significant parts of the consultation process. Therefore, we strongly recommend screening your project with the **All-Species Michigan Determination Key (Dkey)**. For additional information on using IPaC and available Determination Keys, visit <https://www.fws.gov/media/mifo-ipac-instructions> (and click on the attachment), or for a video overview, please visit: <https://www.youtube.com/watch?v=FfcerNCiL0I>. Please carefully review your Dkey output letter to determine whether additional steps are needed to complete the consultation process.

Approach 2. Evaluate the effects to listed species on your own without utilizing a determination key. Once you obtain your official species list, you are not required to continue in IPaC, although in most cases using a determination key should expedite your review. If the project is a Federal action, you should review our section 7 step-by-step instructions before making your determinations: <https://www.fws.gov/office/midwest-region-headquarters/midwest-section-7-technical-assistance>. If you evaluate the details of your project and conclude “no effect,” document your findings, and your listed species review is complete; you do not need our concurrence on “no effect” determinations. If you cannot conclude “no effect,” you should coordinate/consult with the Michigan Ecological Services Field Office. The preferred method for submitting your project description and effects determination (if concurrence is needed) is electronically to EastLansing@fws.gov. Please include a copy of this official species list with your request.

For all **wind energy projects**, please contact this field office directly for assistance, even if no Federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Migratory Birds

Please see the “Migratory Birds” section below for important information regarding incorporating migratory birds into your project planning. Our Migratory Bird Program has developed recommendations, best practices, and other tools to help project proponents voluntarily reduce impacts to birds and their habitats. The Bald and Golden Eagle Protection Act prohibits the take and disturbance of eagles without a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <https://www.fws.gov/program/eagle-management> to help you avoid impacting eagles or determine if a permit may be necessary.

Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your consideration of threatened and endangered species during your project

planning. Please include a copy of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

(517) 351-2555

PROJECT SUMMARY

Project Code: 2025-0040055
Project Name: Reed Ct Floodplain and Stormwater Improvements
Project Type: Restoration / Enhancement - Wetland
Project Description: Project is located on the west side of Portage Creek north (downstream) of Reed Avenue on a 4.2 acre brownfield parcel owned by the City of Kalamazoo. The project will restore floodplain and riparian habitat, redirect a stormwater discharge through the restored habitat rather than directly into Portage Creek, and create a public access walking path.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@42.275554400000004,-85.57698966799538,14z>



Counties: Kalamazoo County, Michigan

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ipac.ecosphere.fws.gov/project/5ATFYDYW5JBJ5CDP7AKLLDZ2BA/documents/generated/6982.pdf	Endangered

BIRDS

NAME	STATUS
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

REPTILES

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: For all Projects: Project is within EMR Range Species profile: https://ecos.fws.gov/ecp/species/2202 General project design guidelines: https://ipac.ecosphere.fws.gov/project/5ATFYDYW5JBJ5CDP7AKLLDZ2BA/documents/generated/5280.pdf	Threatened

INSECTS

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8062	Endangered
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

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

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

-
1. The [Bald and Golden Eagle Protection Act](#) of 1940.
 2. The [Migratory Birds Treaty Act](#) of 1918.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information](#)

[on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

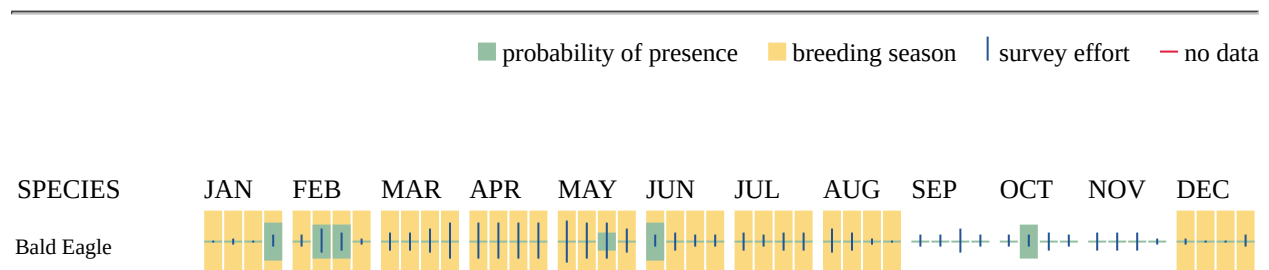
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Non-BCC
Vulnerable

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Cerulean Warbler <i>Setophaga cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 22 to Jul 20
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Golden-winged Warbler <i>Vermivora chrysoptera</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Grasshopper Sparrow <i>Ammodramus savannarum perpallidus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Henslow's Sparrow <i>Centronyx henslowii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-eared Owl <i>asio otus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15

NAME	BREEDING SEASON
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

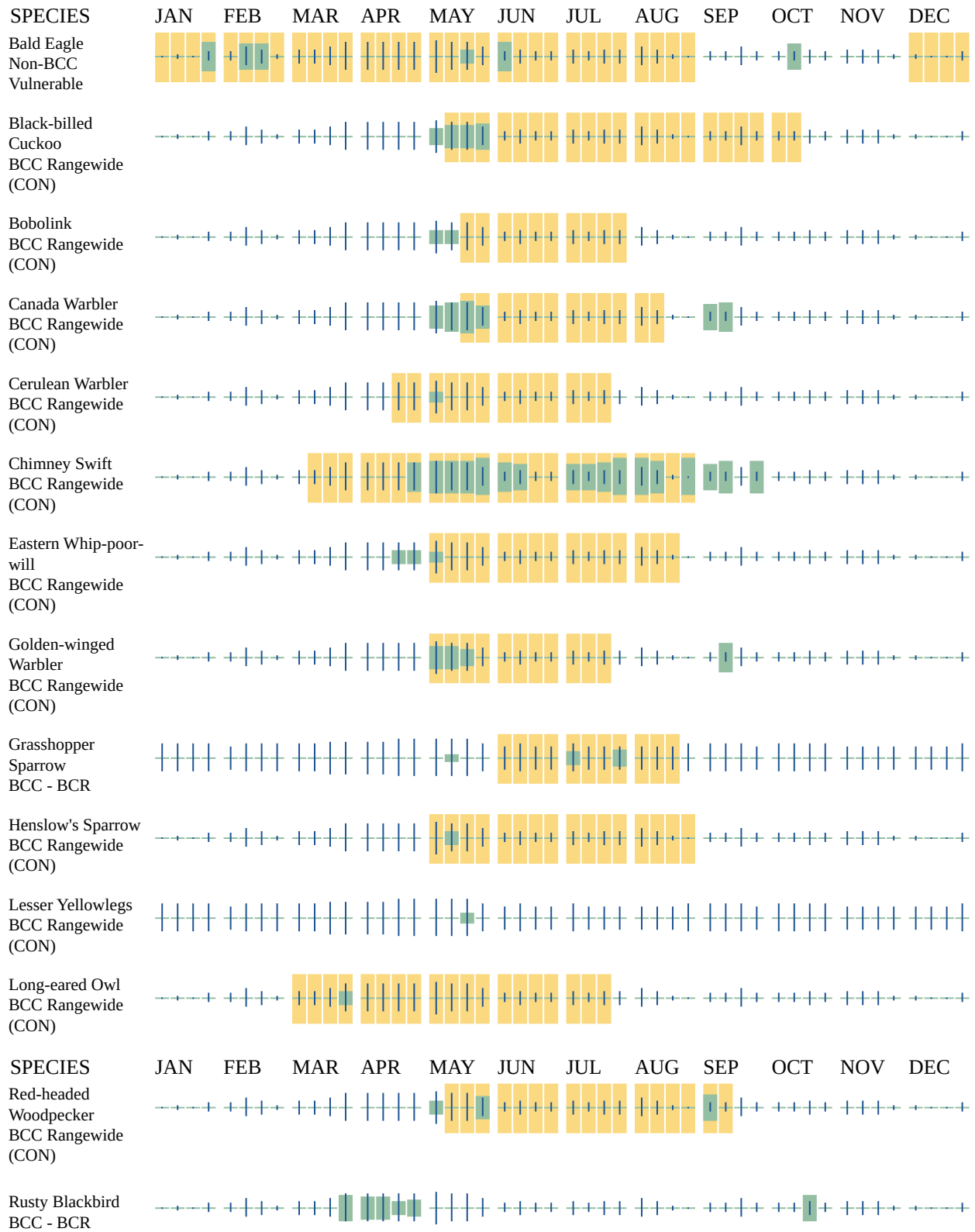
Survey Effort (|)

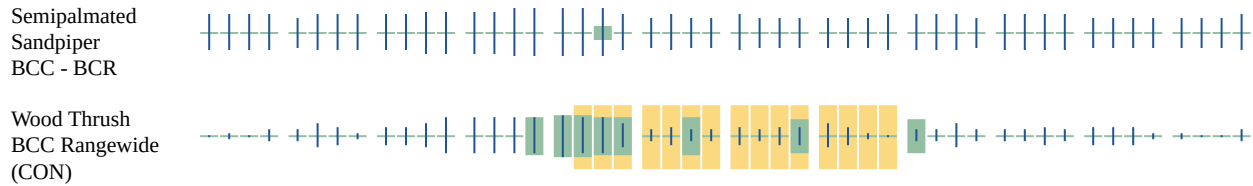
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort — no data





Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

WETLANDS

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

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R5UBH

IPAC USER CONTACT INFORMATION

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Hydraulic Report

Reed Court Floodplain and Stormwater Improvement Project

Prepared for

City of Kalamazoo

October 14, 2024

2220530

Contents

1	Introduction	1
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Tables

Table 1	100 Year Flood Elevations under Existing Conditions
Table 2	100 Year Floodplain Elevations under Proposed Conditions

Appendices

Appendix A	Site Location
Appendix B	Energy Grade Line Tables
Appendix C	Site Plan
Appendix D	Section Cut and Fill

1 Introduction

Portage Creek is located in southwest Michigan. Its headwaters are in Kalamazoo County, and it drains into the Kalamazoo River. The project area is located west of Reed Court in the City of Kalamazoo in the floodplain of Portage Creek. The improvements include many environmental enhancements including bioswales, micro-pools and wetland enhancements, and associated regrading of the existing floodplain. Figure 1 in Appendix A shows the site location.

Topographic data used in the model came from survey points and from a Digital Elevation Model (DEM). The analysis includes a comparison of existing conditions and proposed conditions to show no adverse impact on Portage Creek.

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2 Method of Analysis

There are eight model simulations included in this report. The 10, 25, 50, and 100-year flood flows for existing conditions and the 10, 25, 50, and 100-year flood flows for proposed conditions. The modeling method chosen for this analysis was a steady state, one dimensional model. This method is appropriate cause because the flow moves essentially in one direction only. A steady state, one dimensional model assumes flow is constant, and gradually varied (except at hydraulic structures). The channels have slopes less than 1:10.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center, River Analysis System (HEC-RAS) Version 6.5 was used to generate water surface profiles. The model supports one-dimensional, steady or unsteady flow water surface profile calculations, using the conservation of energy and momentum principles.

Flood frequency discharges were obtained from the existing FEMA model for Portage Creek. The flow for the 100-year storm event at the site location is 650 cubic feet per second.

This portion of Portage Creek was originally modeled in 1992 as part of the FEMA Flood Insurance Study. It was originally a HEC-2 model and the resulting maps were updated in 2010 using improved contour data and then further updated with a HEC-RAS model in 2024.

Figure 2 (Appendix A) shows the locations of the cross sections in the model, as well as new cross sections that were added to simulate the proposed conditions of the Reed Court project.

3 Upstream and Downstream Modeling Limits

The boundary conditions were taken from the existing FEMA model. The downstream boundary condition was set using normal depth with a slope of 0.000905. The 100-year flood event was simulated with existing conditions in the model. The flood elevation matched the 100-year flood elevation shown on the existing FEMA FIS profiles.

4 Variables and Coefficients

Modeling parameters were reviewed based on available data from the site, reference texts and the existing models. The analyzed area is wooded and brushy, with ponds and open vegetated areas throughout. Thus, the Manning “n” was 0.06 for the left overbank. A Manning’s “n” of 0.035 used for the river bottom, which is consistent with existing cross sections. The left overbanks of the proposed cross sections contain residential areas to the east of Reed Court. The area of the right overbank contains a mix of short grass and paved asphalt/concrete surfaces. A Manning’s “n” of 0.060 was used on the left overbank. These Manning’s “n” values for the right and left overbank and main channel are the same as nearby existing cross sections in the model.

Expansion and contraction coefficients are used to compute the head losses due to the contraction and expansion of flows from section to section. These losses are computed in the model by multiplying the coefficient by the difference in velocity head between the two segments. The magnitude of the contraction or expansion coefficient is dependent on how gradual the transition between segments. For an abrupt change such as often occurs at a bridge or culvert, typical contraction and expansion coefficients of 0.3 and 0.5 respectively, are used. More gradual changes in channel flow geometry have loss coefficients of 0.1 and 0.3 for contraction and expansion.

Bridge and culvert modeling options were based on the existing FEMA model.

5 Discussion

The hydraulic analysis provides the existing and proposed energy grade line for the 100-year flood event. The modeling was completed to demonstrate the project will have no adverse impacts.

5.1 Existing Conditions

The existing system was modeled to represent current conditions at the site. Cross sections 8664, 8496, 8464, 8430, 8379, and 8260 were added to accurately represent existing conditions at the site. Cross section information came from survey data and from DEM data. The results of this simulation provide a baseline hydraulic grade. Results are shown in the following Table 1.

Table 1 - 100 Year Flood Elevations under Existing Conditions

Cross Section Number in Model	Total Flow (cfs)	Channel Bottom Elevation (ft)	Energy Grade Elevation (ft)
9995	600	765.01	769.52
9856.33*	600	764.66	769.07
9717.67*	600	764.3	768.60
9579	600	763.95	767.96
9322	600	762.43	767.14
9046	600	761.9	766.85
8962	600	761.85	766.72
8921 Reed Street			
8858	650	761.65	766.40
8664	650	760.2	765.56
8496	650	760.2	764.67
8464	650	760.27	764.65
8430	650	761.59	764.63
8379	650	760.57	764.61
8260	650	760.5	764.59
8231	650	760.41	764.58
7895	650	758.59	764.47

* Interpolated Cross Sections

5.2 Proposed Conditions

Proposed conditions were simulated with the proposed cut and fill per the proposed improvements. Model simulation results are shown in Table 2. These results show that the energy grade line does not increase and, in some locations, has a decrease for the 10-year, 25-year, 50-year and 100-year events.

Simulations were completed for comparison with existing conditions. Results follow in Table 2. The energy grade line of the creek for the 10-, 25-, and 50-year storm would also decrease at the project site as shown in Appendix B. A Site plan is included in Appendix C and figures of the cut and fill are included in Appendix D.

Table 2 - 100 Year Flood Elevations under Proposed Conditions

Cross Section Number in Model	Total Flow (cfs)	Channel Bottom Elevation (ft)	Existing Energy Grade Elevation (ft)	Proposed Energy Grade Elevation (ft)	Energy Grade Elevation Difference**
9995	600	765.01	769.52	769.52	0
9856.33*	600	764.66	769.07	769.07	0
9717.67*	600	764.3	768.60	768.60	0
9579	600	763.95	767.96	767.95	-0.01
9322	600	762.43	767.14	767.02	-0.12
9046	600	761.9	766.85	766.65	-0.2
8962	600	761.85	766.72	766.49	-0.23
8921 Reed Street					0
8858	650	761.65	766.40	766.06	-0.34
8664	650	760.2	765.56	765.02	-0.54
8496	650	760.2	764.67	764.66	-0.01
8464	650	760.27	764.65	764.64	-0.01
8430	650	761.59	764.63	764.63	0
8379	650	760.57	764.61	764.61	0
8260	650	760.5	764.59	764.59	0
8231	650	760.41	764.58	764.58	0
7895	650	758.59	764.47	764.47	0

* Interpolated Cross Sections

** Difference is based on a comparison of the energy grade line in Table 1

6 Conclusions

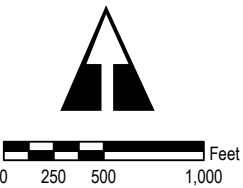
Harmful interference is defined as “causing an increase stage or change in the direction of flow that causes or is likely to cause: damage to property; a threat to life; pollution, impairment, or destruction of water or other natural resources”. The model results indicate that there is 0.00 feet change or a decrease due to the proposed site grading for flood events up to the 100-year event. Therefore, we believe the project will not have a adverse impact at the site.

Appendix A

Site Location

Figure 1 – Site Location

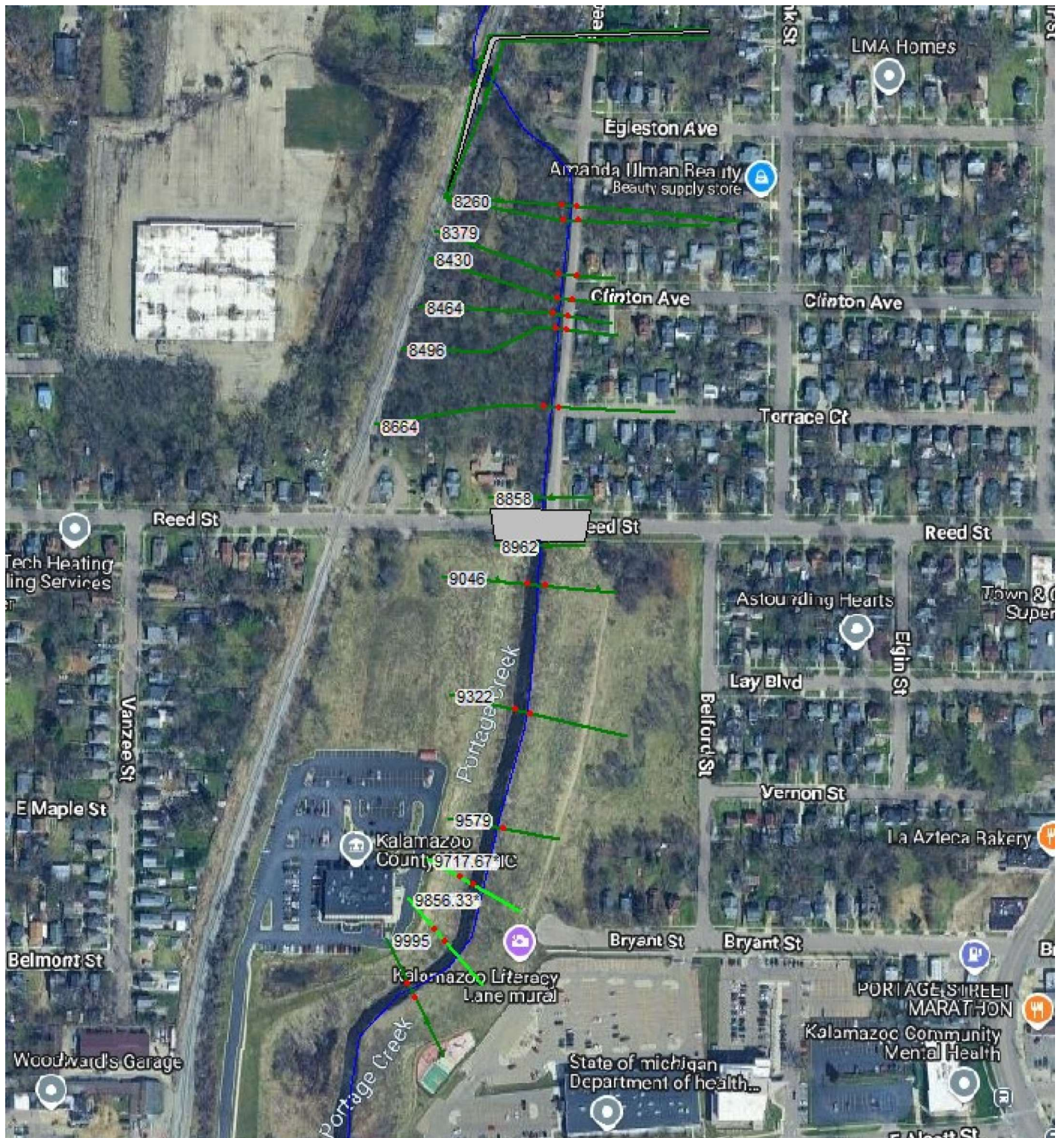
Figure 2 – Cross Section Location Map



PORTAGE CREEK
CITY OF KALAMAZOO, KALAMAZOO COUNTY, MICHIGAN

FIGURE 1: SITE LOCATION

FIGURE 2: MODEL CROSS SECTION LOCATION MAP



Appendix B

Energy Grade Line Tables

Table 3 – 10-Year Storm Event

Cross Section Number in Model	Total Flow (cfs)	Existing Energy Grade Elevation (ft)	Proposed Energy Grade Elevation (ft)	Energy Grade Elevation Difference
9995	360	768.60	768.60	0
9856.33*	360	768.20	768.20	0
9717.67*	360	767.76	767.76	0
9579	360	767.13	767.12	-0.01
9322	360	766.21	766.06	-0.15
9046	360	765.85	765.53	-0.32
8962	360	765.75	765.37	-0.38
8921 Reed Street				0
8858	400	765.55	765.01	-0.54
8664	400	764.58	764.02	-0.56
8496	400	763.47	763.43	-0.04
8464	400	763.41	763.39	-0.02
8430	400	763.36	763.34	-0.02
8379	400	763.29	763.29	0
8260	400	763.23	763.23	0
8231	400	763.21	763.21	0
7895	400	762.99	762.99	0

* Interpolated Cross Sections

Table 4 – 25-Year Storm Event

Cross Section Number in Model	Total Flow (cfs)	Existing Energy Grade Elevation (ft)	Proposed Energy Grade Elevation (ft)	Energy Grade Elevation Difference
9995	450	768.97	768.97	0
9856.33*	450	768.56	768.56	0
9717.67*	450	768.11	768.11	0
9579	450	767.49	767.47	-0.02
9322	450	766.71	766.44	-0.27
9046	450	766.45	765.97	-0.48
8962	450	766.35	765.82	-0.53
8921 Reed Street				0
8858	500	766.16	765.44	-0.72
8664	500	765.07	764.42	-0.65
8496	500	763.93	763.91	-0.02
8464	500	763.89	763.88	-0.01
8430	500	763.87	763.86	-0.01
8379	500	763.83	763.83	0
8260	500	763.79	763.79	0
8231	500	763.78	763.78	0
7895	500	763.62	763.62	0

* Interpolated Cross Sections

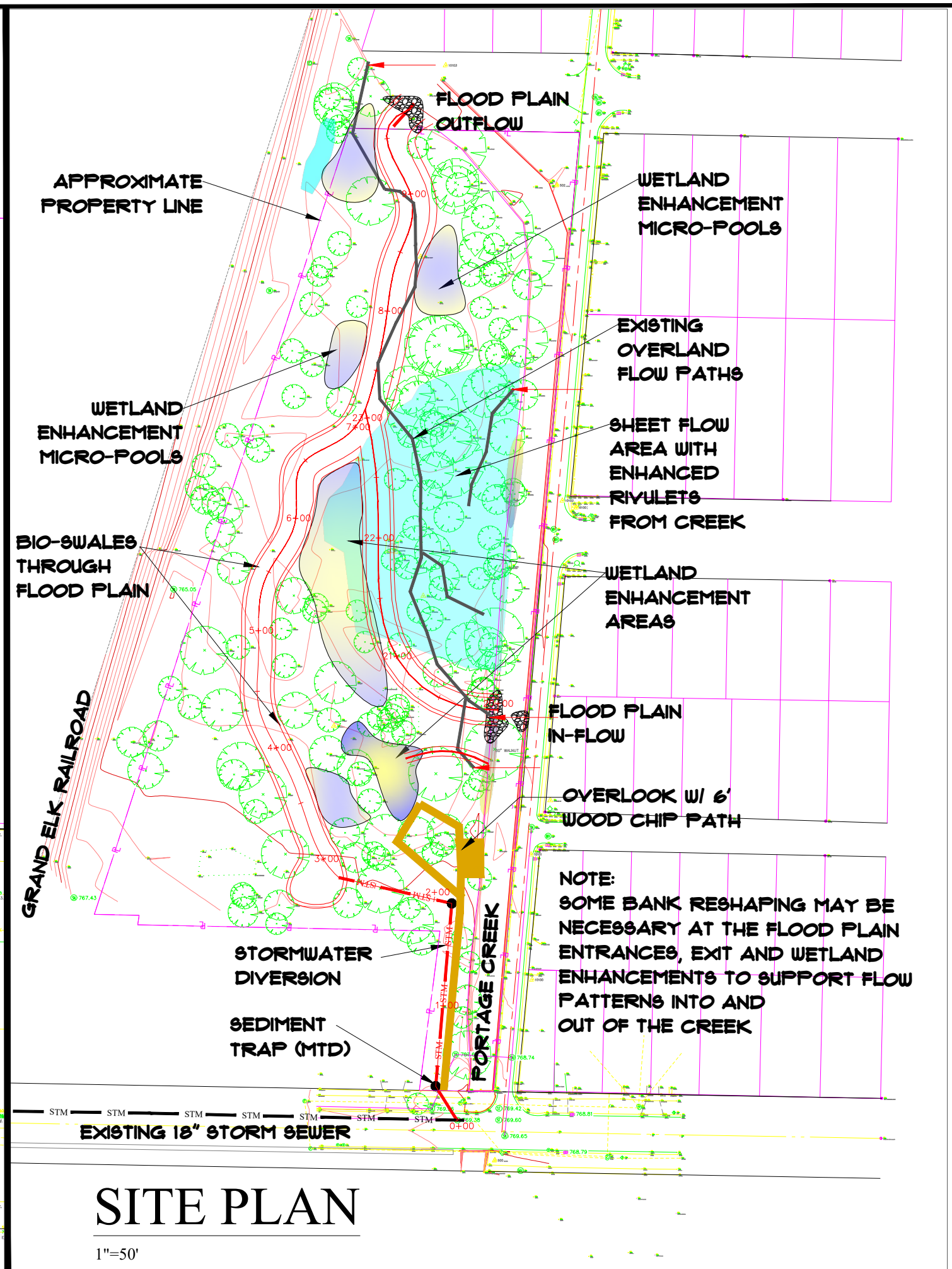
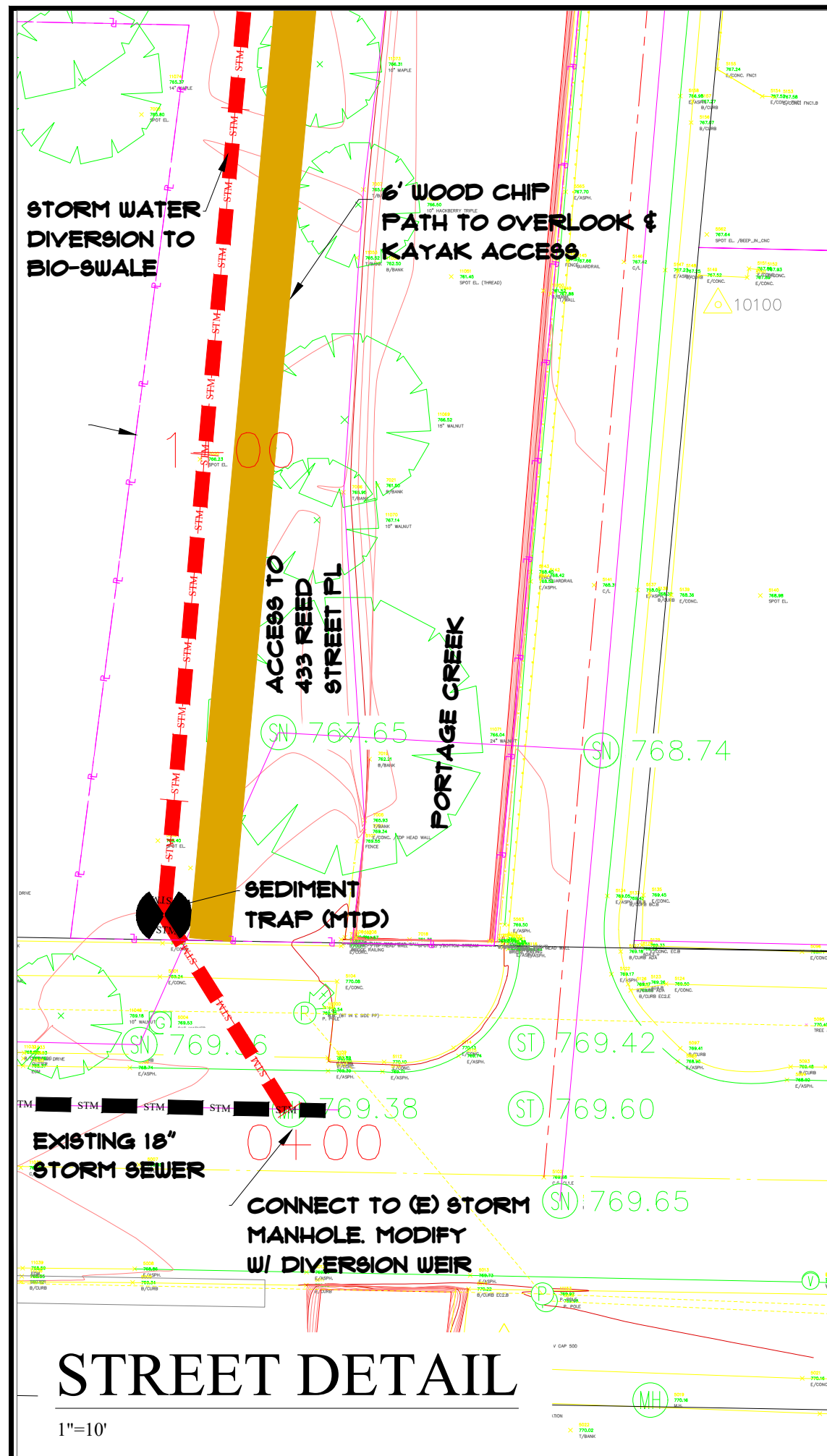
Table 5 – 50-Year Storm Event

Cross Section Number in Model	Total Flow (cfs)	Existing Energy Grade Elevation (ft)	Proposed Energy Grade Elevation (ft)	Energy Grade Elevation Difference
9995	500	769.17	769.17	0
9856.33*	500	768.74	768.74	0
9717.67*	500	768.28	768.28	0
9579	500	767.66	767.64	-0.02
9322	500	766.86	766.67	-0.19
9046	500	766.58	766.26	-0.32
8962	500	766.48	766.11	-0.37
8921 Reed Street				0
8858	600	766.30	765.84	-0.46
8664	600	765.48	764.76	-0.72
8496	600	764.32	764.30	-0.02
8464	600	764.29	764.28	-0.01
8430	600	764.27	764.26	-0.01
8379	600	764.24	764.24	0
8260	600	764.21	764.21	0
8231	600	764.20	764.20	0
7895	600	764.06	764.06	0

* Interpolated Cross Sections

Appendix C

Site Plan



DRAWN BY: _____

CHECKED BY: _____

revisions

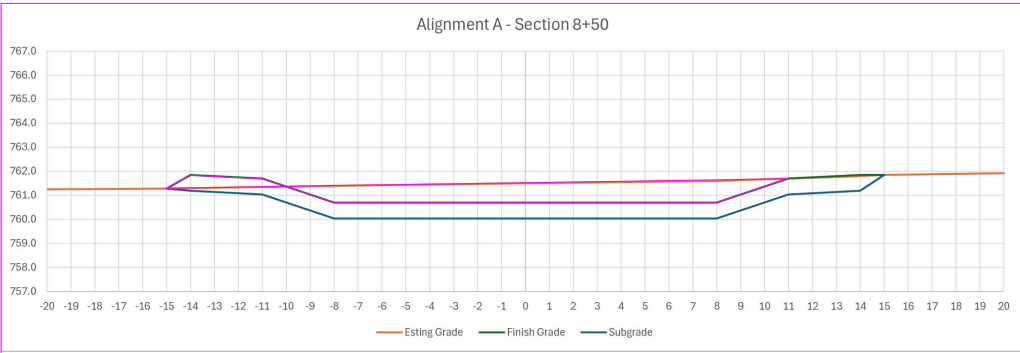
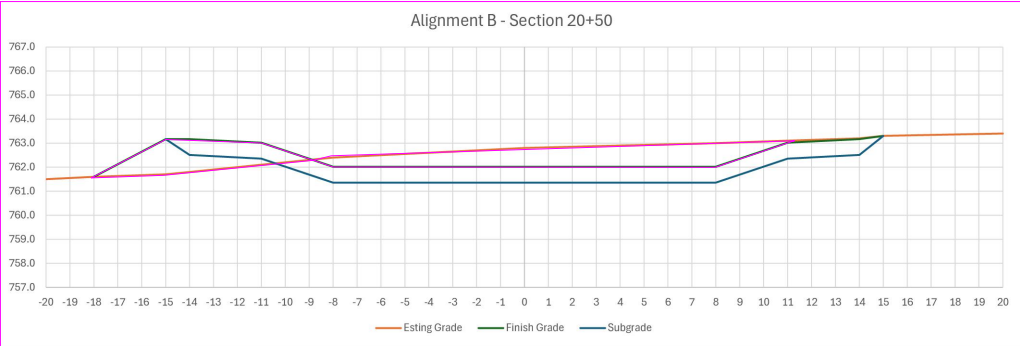
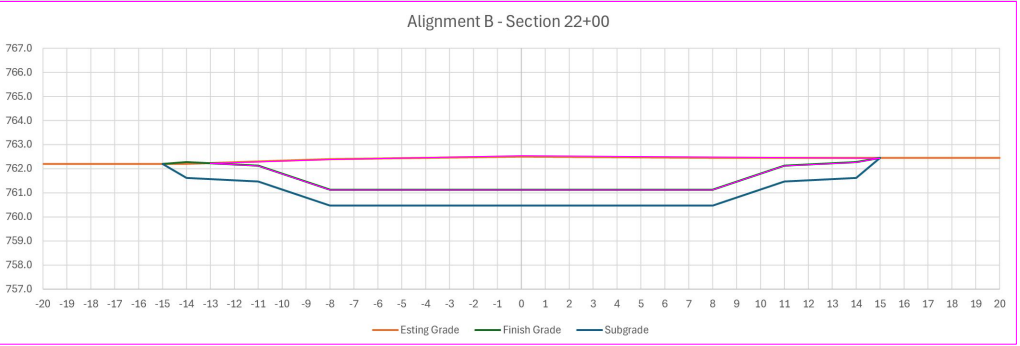
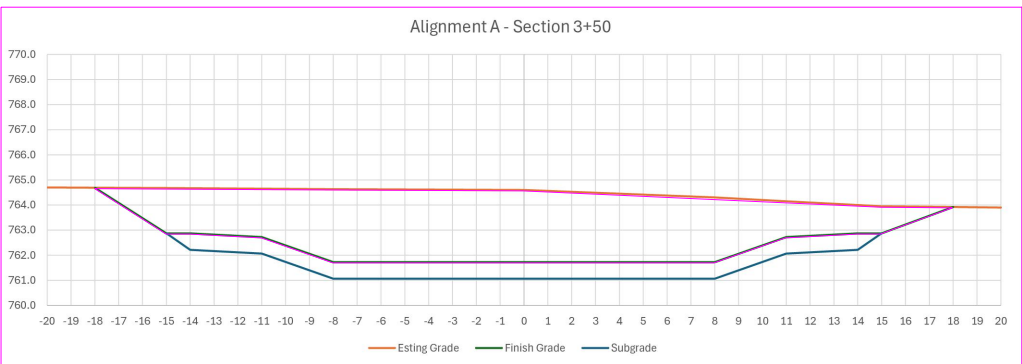
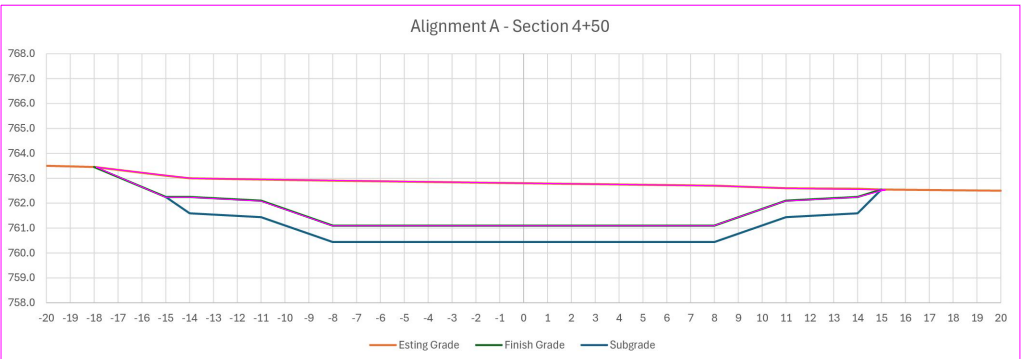
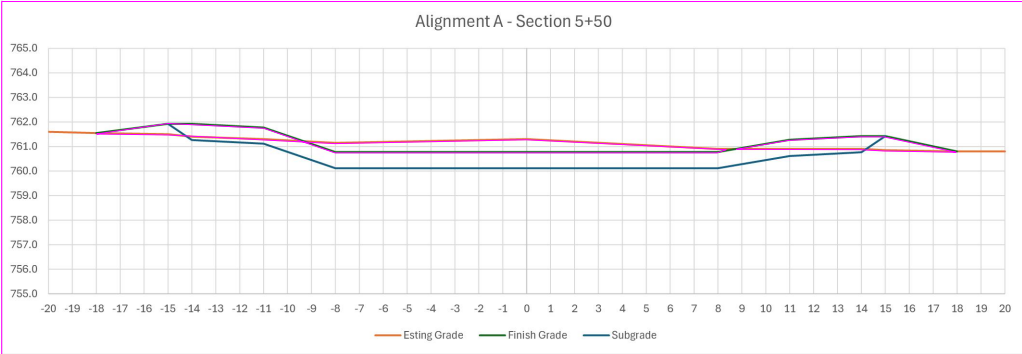
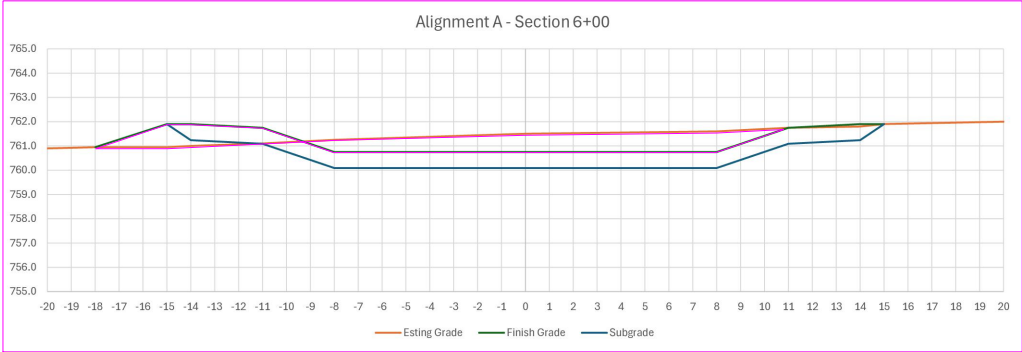
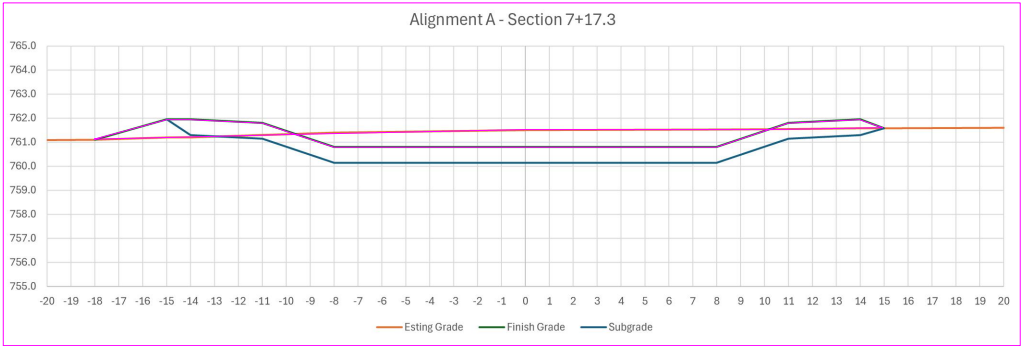


**REED COURT
FLOODPLAIN
AND
STORMWATER
IMPROVEMENT
PROJECT**

***SITE
PLAN***

Appendix D

Section Cut and Fill



SECTIONS

KIESER ASSOCIATES
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AND

Prein & Newhof

DRAWN BY:
CHECKED BY:

revisions



**PORTAGE
CREEK
RENAISSANCE:
REED COURT
RESTORATION
PROJECT**

SECTIONS

DRAWING

6

Conceptual Projects Summary

In preparation for potential grant opportunities with the State of Michigan in 2018-2019, K&A has drafted several conceptual watershed improvement implementations and stormwater BMP scenarios for nine unique sites. These draft conceptual projects were discussed and considered by the technical update Steering Committee. This list represents a small part of the many potential improvement projects included in Attachment 14. Several of these draft concepts were developed in conjunction with other projects, implemented and not-yet implemented, conceptualized during the development of the WMP. These potential implementation sites include the following locations:

- Milham Park Golf Course (PC S10)
- Milham Park (PC S10)
- Reed Court Brownfield Site (PC S13)
- Stadium Drive Corridor (AC S9-11)
- WMU Power Plant Property (AC S12)
- Maple Street to Howard Street (AX S2)
- Westnedge Ave to Park Street (AX S5)
- Parkview Hills at Cherry Creek (WF S3)
- Pratt Road (WF S9)

During the WMP technical update, K&A prepared and revised conceptual design sketches, stormwater BMP load reduction and construction cost estimates (where feasible), and conceptual before and after photos for each of the sites, in accordance with the Portage-Arcadia Watershed Management Plan. A summary for each project follows:

Milham Park Golf Course Stormwater Project (PC S10):

- See Figure 1.
- Urban Stormwater BMP located at the City of Kalamazoo's Milham Park Golf Course, utilizing a mostly-unused low-lying area of the course for stormwater infiltration.
- Captures and treats stormwater from a project drainage area of 108 acres.
- Stormwater capture and treatment of initial runoff from Portage Creek drainage area upstream of Milham Park, which currently discharges directly to Portage Creek Stretch 10, at Milham Park.
- Concepts include diversion of existing storm sewer drainage into infiltration ponds, including a forebay, and two stormwater wetponds with subgrade infiltration trenches, a 1.3-acre wetpond, and a secondary 0.3-acre wetpond with emergency overflow.
- Over time, these detention ponds would take on the appearance of wetlands with open water. Photodegradable erosion control blankets, seeding, native plantings, and mulching would be used at the site. The planting of native plants within the BMP area will work to prevent erosion, stabilize soils, and provide habitat. Native plantings (generally using

supplemental plugs along with seeding) will likely include emergent wetlands species, native prairie grasses, and forbs.

- This stormwater treatment project would improve hydrology of the creek at Milham Park, create small pocket wetlands on the golf course, reduce sediment and phosphorus loading to Portage Creek, and protect receiving stream habitat.
- Outcomes would include:
 - Approximately 144 pounds of phosphorus per year and approximately 19 tons of sediment per year prevented from input to Portage Creek.
 - Additional stormwater treatment best management practices installed on publicly-owned property.
 - Progress toward TMDL load reduction goals.

Milham Park Streambank and Floodplain Restoration Expansion (PC S10):

- See Figure 2.
- Expansion of riparian streambank and floodplain project completed in 2010 on the South section of Milham Park to the East and North sections of Milham Park, a publicly-owned park in the City of Kalamazoo with historical and cultural significance.
- >12ft width riparian buffer enhancements on all remaining exposed streambanks, including reseeded banks with deep-rooted native plants to prevent erosion and renaturalize streambanks.
- Wetland planters and rain gardens in existing and created low spots including native wetland seeds and plugs to capture and treat surface runoff and help manage drainage.
- Create expanded floodplain in currently mowed-turf grass area prone to flooding and sparsely used for recreation, with deep rooted native wetland vegetation.
- Vegetated infiltration trenches along automobile drives and bridges.
- In-stream grade considerations as this project area could be developed in conjunction with considerations for removal of the dam at Lovers Lane.
- Outcomes would include:
 - Phosphorus and sediment reduction via nutrient uptake by wetland plants and erosion prevention via streambank stabilization.
 - Renaturalization of riparian area via streambank stabilization, native plantings, and floodplain restoration, including aesthetic and community benefits.
 - Relevance to other projects (South side of Milham Park, proposed dam removal).

Reed Court Brownfield Redevelopment Site Stormwater Project (PC S13):

- See Figure 3.
- Ultra-urban stormwater BMP to enhance all aspects of the stream corridor on this Kalamazoo City-owned parcel.

- Diversion of direct stormwater inputs to a stormwater BMP system including a sediment forebay and two bioretention areas to capture and treat runoff. Treated stormwater would outflow to Portage Creek, reducing direct stormwater inputs and pollutant loading.
- Naturalized creek corridor with increased wetland and floodplain with incorporation of native vegetation into the riparian, wetland, and upland areas for additional on-site stormwater treatment and wildlife habitat.
- Develop pedestrian trails in conjunction with upstream and downstream development of walking/biking trails which will connect the Portage Creek and KRVV trail systems.
- Public education via signage along pedestrian trails.
- Water quality improvement outcomes to include:
 - Urban drainage area treated = 6.48 acres
 - Additional floodplain capacity = 3.4 acre-feet
 - Stormwater volume reduction = 11.68 acre-feet/year
 - Total phosphorus reduction = 7.6 lbs/year
 - Total suspended solids = 1.5 tons/year
 - Total nitrogen = 104 lbs/year

Stadium Drive Corridor Stormwater Infrastructure Projects (AC S9-11):

- See Figure 4.
- Series of stormwater infrastructure updates and enhancements to be undertaken during planned reconstruction and redevelopment of the Stadium Drive Corridor between Howard Street and W Michigan Ave, within the City of Kalamazoo.
- Multi-jurisdictional coordination between City of Kalamazoo and Western Michigan University.
- Integration of innovative stormwater improvements to further capture and treat stormwater via low-impact development BMPs such as curb cuts, bioswales, and vegetated medians, and larger-scale infiltration systems such as bioretention areas and/or retention ponds.
- General watershed improvement outcomes to include:
 - Reduction of direct stormwater and pollutant loading to Arcadia Creek.
 - Integration of innovative stormwater infrastructure improvements in a high-traffic, high-visibility area.
 - Enhancement of riparian and upland vegetation with seeding and planting of native vegetation in conjunction with stormwater BMPs.
 - Integrated enhancement of pedestrian trails and bike lanes for community and aesthetic value.
- The currently planned Urban Campus Improvements on WMU's south campus will include direct improvements to Arcadia Creek. Project benefits would include:
 - Floodplain enhancement and related stream stabilization; physical, vegetative and managerial BMPs; and LID.

- Up to 1,000 feet of restored stream length; another 7.3 ac-ft of floodplain storage; and load reductions of at least 3 lbs P/y and 3 tons TSS/yr through flow stabilization.
- Off-lining direct stormwater discharges with detention, infiltration into new floodplains will additionally treat 32 ac-ft/yr shaving 10-yr wet weather discharges of 56.3 cfs by 64% yielding estimated reductions of 21 lbs P/yr and 4.2 tons TSS/yr.
- WMU's major campus renovations will additionally take untreated stormwater discharges from 6.5 acres to zero with LID match efforts.

WMU Power Plant Property Stormwater Project (AC S12):

- See Figure 5.
- Implementation of stormwater BMPs on Western Michigan University (WMU) property to intercept stormwater runoff originating from approximately 18-acres owned by the State of Michigan and WMU.
- Diversion of underground conveyance utilities to existing open space on WMU's powerplant property, where a stormwater detention and limited infiltration system will be constructed, preventing the currently direct, untreated discharge to Arcadia Creek.
- Reduction of TP, TSS, and flashy peak flow conditions in the Arcadia Creek watershed.
- Protection of upland riparian habitat via enhancement of native vegetation, and protection of aquatic habitat via reduction of peak flows, sediment and nutrient loading, and erosion prevention at the existing outfall.
- Relatively cost-effective pollutant reductions.
- Estimated environmental outcomes include:
 - Treatment of 18 acres of highly impervious surface resulting in an annual reduction of 32 acre-feet of stormwater runoff to Arcadia Creek.
 - Pollutant removal via proposed BMP system of 21 pounds TP/year and 4.2 tons TSS/year.

Maple Street to Howard Street Stormwater Project (AX S2):

- See Figure 6.
- Implementation of a major stormwater BMP on the Maple Street Magnet Academy property between Maple Street and Howard Street to intercept and treat stormwater from the upland stormwater drainage area.
- Diversion of existing direct stormwater drainage to Axtell Creek to a constructed sediment forebay and expanded wetland infiltration area.
- Integration and expansion of native plants including deep rooted wetland plants to further capture surface flows and enhance wildlife habitat.

- Reduction of TP, TSS, and flashy peak flow conditions in Axtell Creek, including downstream flood prevention by way of reduced surface water peak flows.
- Relevance to past riparian enhancement projects in Axtell Creek Stretches 2-3.
- Estimated environmental outcomes include:
 - 0.6-acre forebay/wetpond to capture and treat 5.2ac-ft of runoff.
 - 1.3-acre created wetland to capture and treat 4.0ac-ft of runoff.
 - Reduction of TP and TSS loading, and reduction of peak flows.

Westnedge Avenue to Park Street Stormwater BMPs & Riparian Restoration (AX S5):

- See original concept, Figure 7.
- Implementation of various stormwater BMPs and riparian restoration practices in this high visibility, flood-prone area of Axtell Creek, owned mostly by Covenant Academy, an alternative school chartered by Grand Valley State University (GVSU)
- An all-encompassing restoration effort in this area would include streambank stabilization, reduction of existing impervious surfaces, and construction of retention/detention areas to intercept direct stormwater discharges.
- Streambank restoration in a highly erosion-prone stretch of Axtell Creek would include:
 - Large rock rip rap stone to secure and protect existing portions of streambank from further erosion and undercutting, with sheet pile retaining walls included as necessary;
 - Removing portions of the existing asphalt parking area to accommodate a naturalized streambank slope with bioengineered streambank stabilization including native plantings.
- Stormwater BMPs in this highly flood-prone stretch of Axtell Creek would include:
 - Parking lot infiltration trenches;
 - Bioinfiltration rain gardens to accommodate direct runoff from remaining impervious surfaces;
 - Reduction of large asphalt pavement area (0.73acres) to accommodate construction of retention/detention bioinfiltration areas which intercept existing direct stormwater discharges for treatment and flow reduction;
 - Integration of pervious pavers to further reduce surface runoff from impervious surfaces.
- Environmental outcomes would include:
 - Reduction in sediment and nutrient pollutant loading by addressing severe streambank erosion issues.
 - Reduction in sediment and nutrient pollutant loading and peak flow volumes by capturing surface water runoff from roadways and parking lots, and by reducing impervious surfaces.
 - Reduction in sediment and nutrient pollutant loading and peak flow volumes by diverting stormwater discharges to retention/detention infiltration areas.

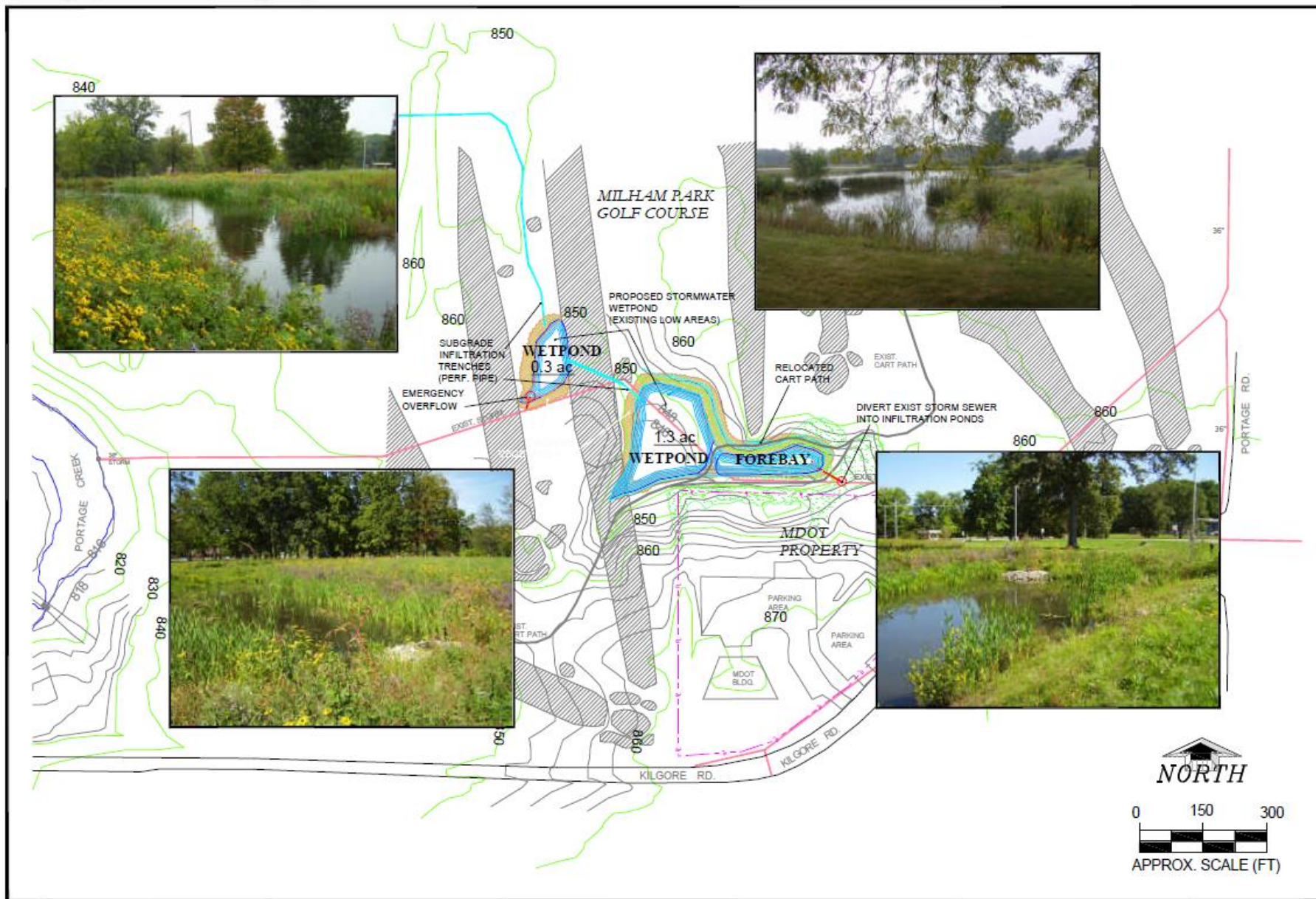
- Aesthetic and community value through enhanced vegetation and riparian renaturalization.
- Reduced runoff at peak flows which contribute to flooding in this low area.

Parkview Hills Erosion Site Remediation at Cherry Creek (WF S3):

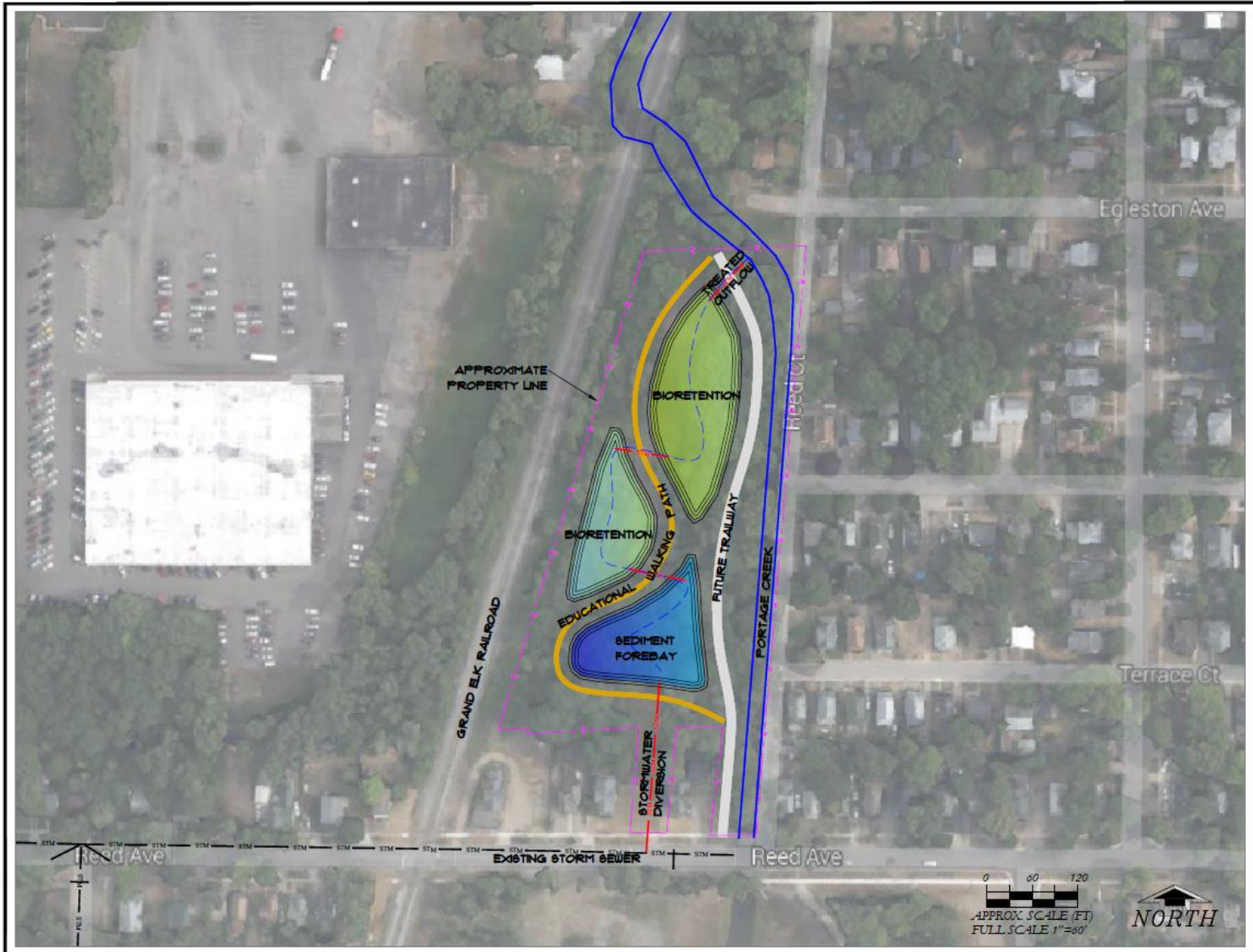
- Reconstruction of eroding hillside and stormwater infrastructure contributing to sediment and nutrient loading to Cherry Creek, a tributary of the West Fork of Portage Creek, within Parkview Hills, a private, planned unit community in the City of Kalamazoo.
- Addressing existing upland stormwater infrastructure causing erosive conditions, with the construction of an upland infiltration swale.
- Addressing existing significant erosive conditions through reconstruction of stormwater infrastructure and physical reconstruction of an eroding hillside in the upland riparian area of Cherry Creek.
- Construction of a bioswale with native vegetation to capture and treat direct stormwater discharges at the stormwater outfall to Cherry Creek.
- Environmental outcomes will include:
 - Reduction in sediment and nutrient loading to Cherry Creek by correcting stormwater infrastructure leading to surface erosion and reconstruction of eroding areas to prevent further negative impacts.
 - Diversion and infiltration of direct stormwater pollutant loads to Cherry Creek via construction of a vegetated swale at the stormwater outfall.

Pratt Road Streambank & Riparian Zone Restorations (WF S9):

- This project intends to repair soil erosion areas at two culverts and along both sides of West Fork Portage Creek where it flows parallel to Pratt Road.
- Streambank stabilization would occur at select areas along the approximately 700ft length of West Fork along Pratt Road, including at culverts where the creek bends sharply, causing erosive conditions.
- A vegetated riparian buffer would be established and a “no-mow” zone required in the riparian area, where residential lawn mowing to creek’s edge has caused erosive conditions.
- Environmental outcomes would include:
 - Reduction of sediment and nutrient loading by correcting erosive conditions along Pratt Road.
 - Naturalization of riparian area of the creek to reduce erosion, reduce surface water runoff, and to reduce nutrient loading from grass clippings entering the creek.
 - Aesthetic and community value.







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319 IMPLEMENTATION GRANT #2015-0046
 ULTRA-URBAN BMP RETROFITS FOR WMP & TMDL GOALS

DRAWN BY:
 CHECKED BY:

DRAFT
 FOR DISCUSSION ONLY

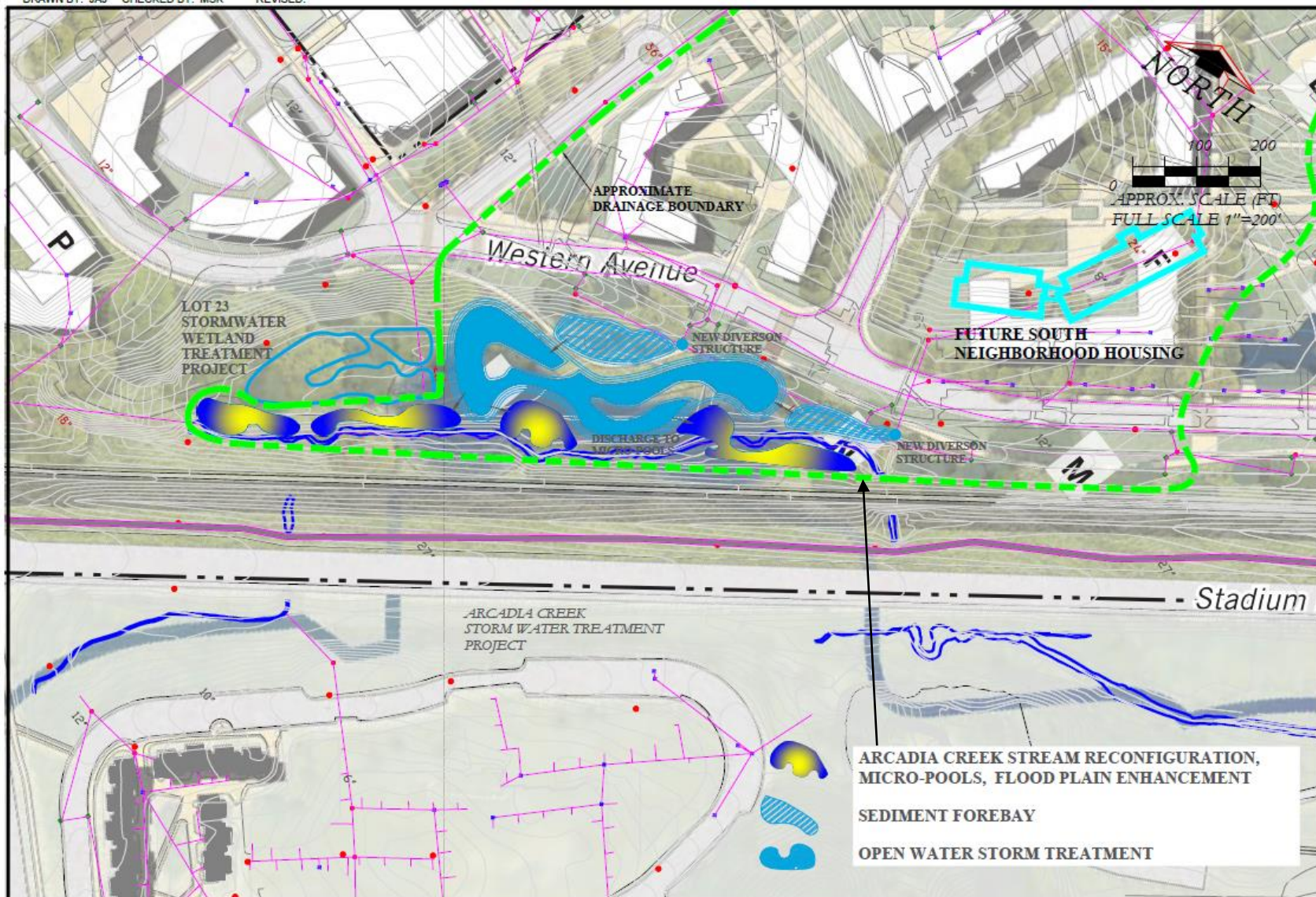


CONCEPT SCHEMATIC

KALAMAZOO VALLEY
 COMMUNITY COLLEGE
 KALAMAZOO, MI

FIGURE
 3

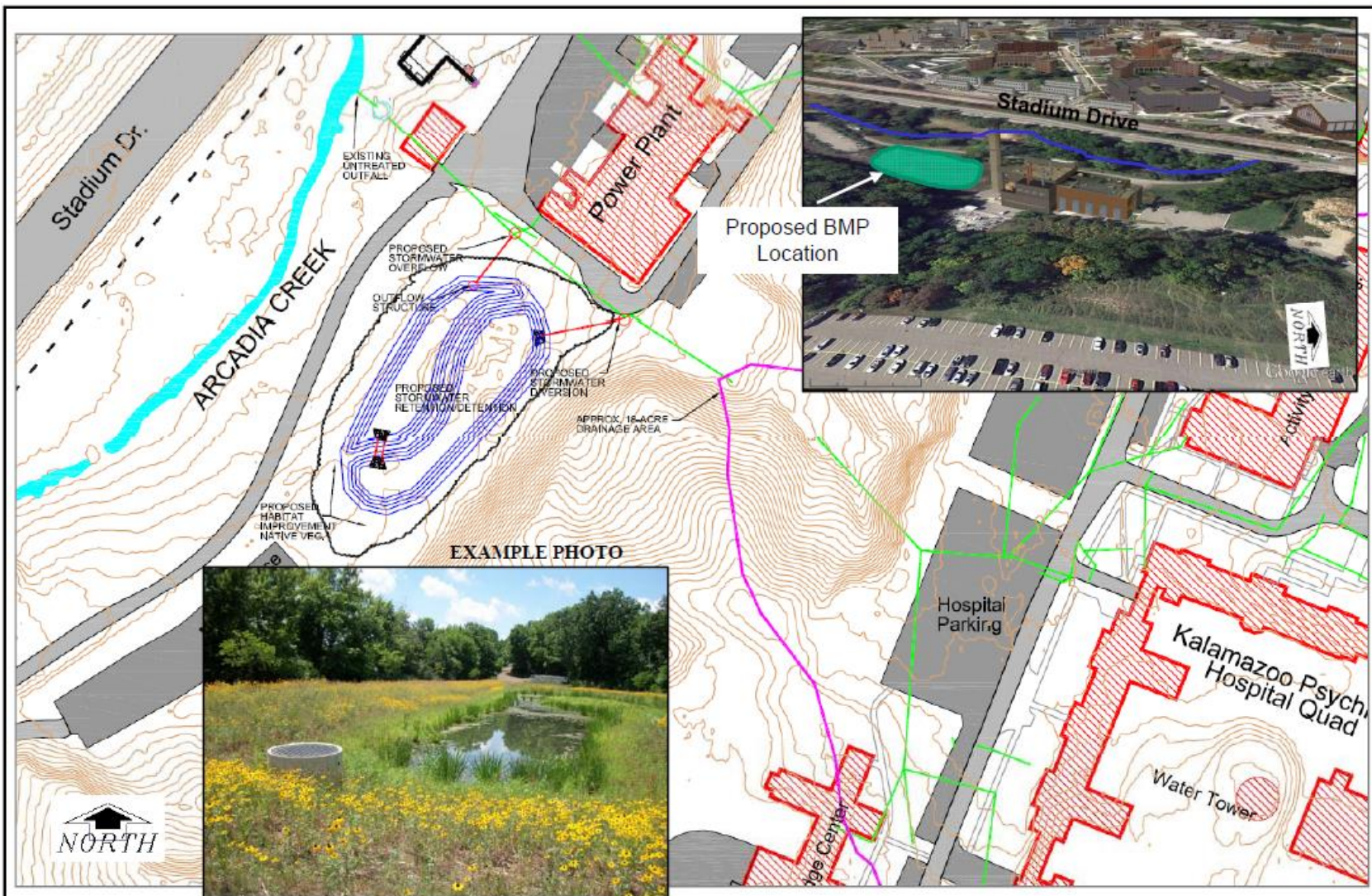
Portage-Arcadia Watershed Management Plan:
 Attachment 12: DRAFT Conceptual Projects



Portage-Arcadia Watershed Management Plan:
Attachment 12: DRAFT Conceptual Projects

Arcadia Creek Restoration and Urban Campus Corridor Improvements
(Tracking Code #: 2019-0029)
Site Sketch of Proposed Restoration and Campus Improvements

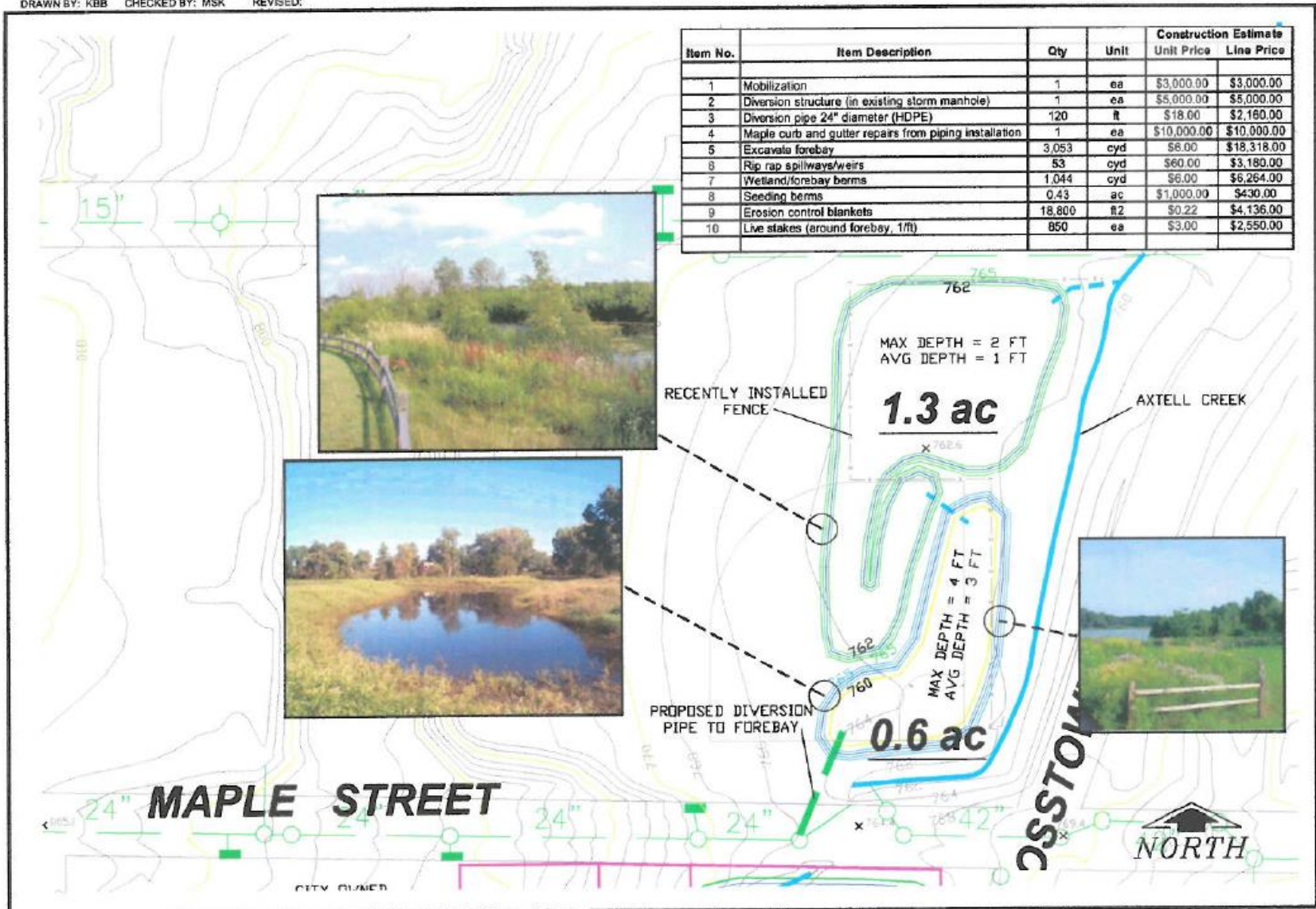
FIGURE
4



Portage-Arcadia Watershed
Management Plan:
Attachment 12: DRAFT Conceptual Projects

WMU Stormwater Neutral Improvements
Site sketch of proposed power plant BMP project area with respect to Arcadia Creek and surrounding features.

FIGURE
5

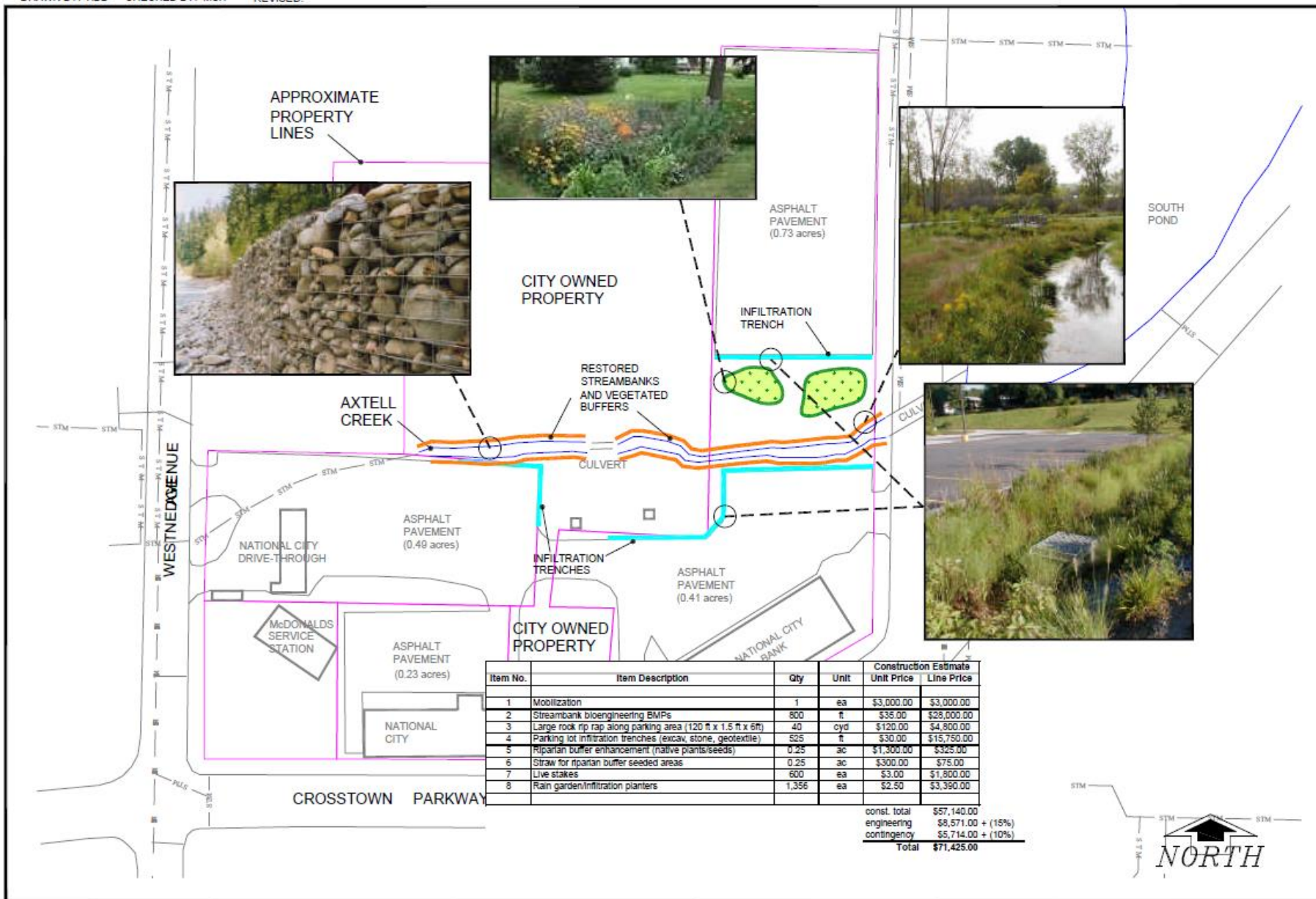


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Portage-Arcadia Watershed Management Plan:
Attachment 12: DRAFT Conceptual Projects

FIGURE
6



SHEET LIST:

- 1 TITLE SHEET
- 2 TOPOGRAPHIC SURVEY
- 3 DEMOLITION PLAN & TREE PROTECTION
- 4 SITE PLAN
- 5 PLAN DETAILS
- 6 SECTIONS
- 7 LANDSCAPE CONCEPTS
- 8 LANDSCAPE DETAILS
- 9 SOIL EROSION AND SEDIMENT CONTROL PLAN
- 10 WETLAND DELINEATION AND PROTECTION DETAILS
- 11 PCB HISTORICAL LOCATIONS AND SAMPLING PLAN



LOCATION MAP

The City of Kalamazoo



***REED COURT FLOODPLAIN
AND
STORMWATER IMPROVEMENT PROJECT***

FUNDING:

NOAA Restoration Center
On Behalf of the Kalamazoo River
NRDA Trustees

CONSULTANTS:

Prein&Newhof
Engineering
Services

KIESER & ASSOCIATES, LLC
Environmental Science
and Engineering Services

O'Boyle, Cowell,
Blalock, & Associates, Inc.
Landscape Architects

Merchant Environmental
and Regulatory
Consulting Services

DRAWN BY:
CHECKED BY:

revisions



**REED COURT
FLOODPLAIN
AND
STORMWATER
IMPROVEMENT
PROJECT**

***TITLE
SHEET***

DRAWING
1

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AND

Prein&Newhof

Description	Diam	Species	xcoord	ycoord	Description	Diam	Species	xcoord	ycoord
24" Dead	24	Dead	-85.5769	42.27468	10" Walnut	10	Walnut	-85.5768	42.27419
12" Dead	12	Dead	-85.5767	42.27478	15" Walnut	15	Walnut	-85.5766	42.27443
12" Dead	12	Dead	-85.5768	42.27523	10" Walnut	10	Walnut	-85.5766	42.27439
30" Dead	30	Dead	-85.5765	42.27525	24" Walnut	24	Walnut	-85.5766	42.27431
24" Dead	24	Dead	-85.5768	42.27581	10" Hackberry Triple	10	Hackberry	-85.5766	42.27452
18" Dead Twin	18	Dead	-85.5768	42.27579	10" Maple	10	Maple	-85.5766	42.27457
30" Dead	30	Dead	-85.5767	42.27591	14" Maple	14	Maple	-85.5767	42.27456
30" Dead	30	Dead	-85.5767	42.27591	22" Maple	22	Maple	-85.5768	42.27461
24" Dead	24	Dead	-85.5767	42.27591	10" Maple	10	Maple	-85.5768	42.27464
10" Maple	10	Maple	-85.577	42.27654	12" Maple	12	Maple	-85.5766	42.27471
20" Basswood	20	Catalpa	-85.5769	42.27648	10" Hackberry	10	Hackberry	-85.5766	42.27481
10" Maple	10	Maple	-85.577	42.27641	18" Maple	18	Maple	-85.5767	42.27481
10" Maple Twin	10	Maple	-85.577	42.27639	10" Maple	10	Maple	-85.5767	42.27476
10" Poplar	10	Poplar	-85.5771	42.27642	18" Walnut	18	Walnut	-85.5768	42.2748
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12" Basswood	12	Catalpa	-85.5766	42.27621	12" Walnut	12	Walnut	-85.5773	42.27466
36" Basswood	36	Catalpa	-85.5765	42.27618	12" Walnut	12	Walnut	-85.5773	42.27466
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24" Basswood	24	Catalpa	-85.5766	42.27581	18" Walnut	18	Walnut	-85.5772	42.27534
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15" Maple	15	Maple	-85.577	42.27578	10" Dead	10	Dead	-85.5771	42.27609
10" Elm	10	Elm	-85.577	42.276	12" Dead	12	Dead	-85.577	42.27614
					24" Maple	24	Maple	-85.5769	42.27624

LIST OF TREES GREATER THAN 10" DIA.

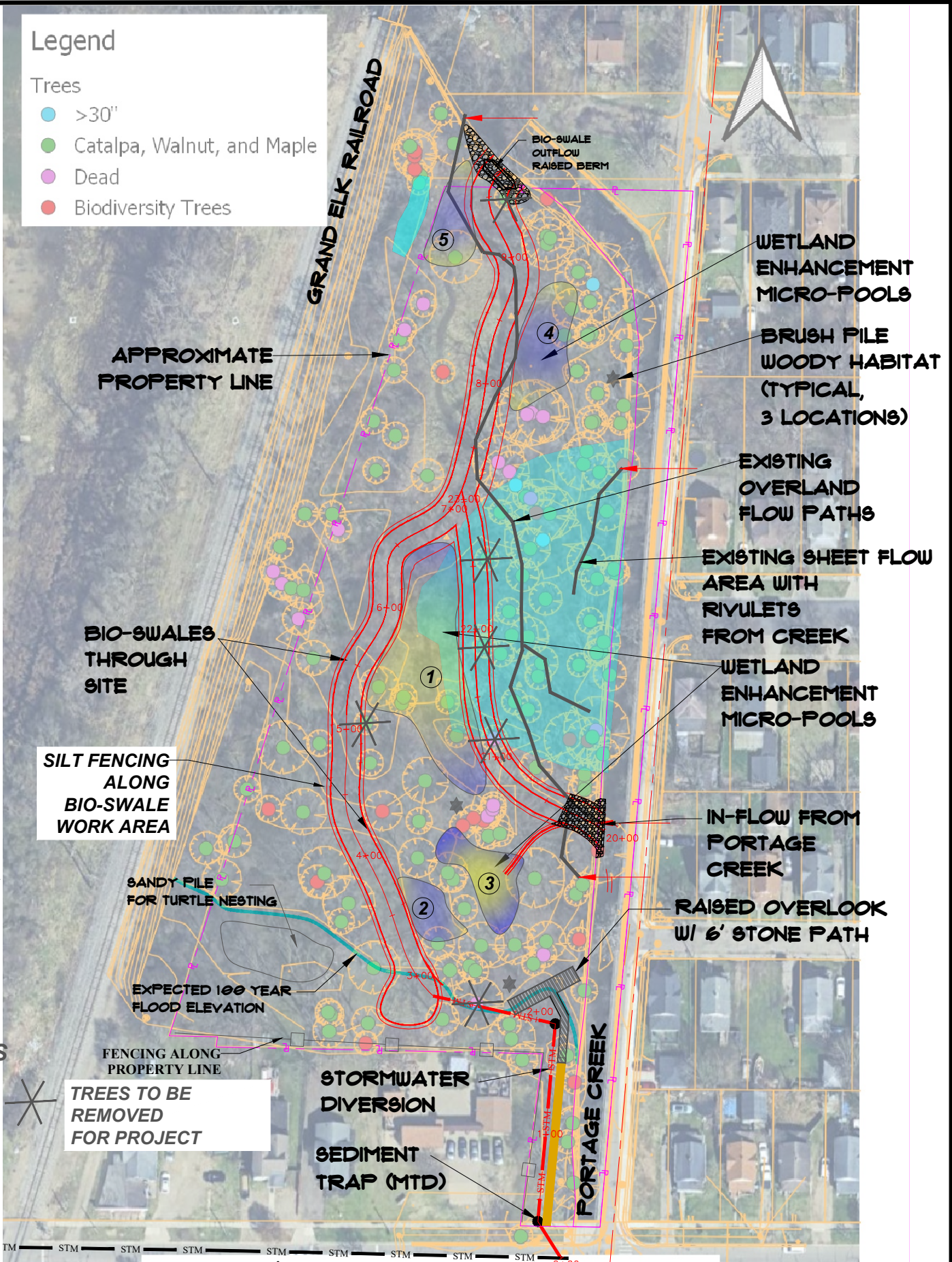
PARCEL AREA = 4.23 ACRES

PORTAGE CREEK = 0.65 ACRES

WOODLANDS = 3.57 ACRES

SURVEYED TREES 165 TREES > 10" DIA.

TREES REMOVED FOR PROJECT 6



DEMOLITION & TREE PROTECTION

SCALE 1"=50'

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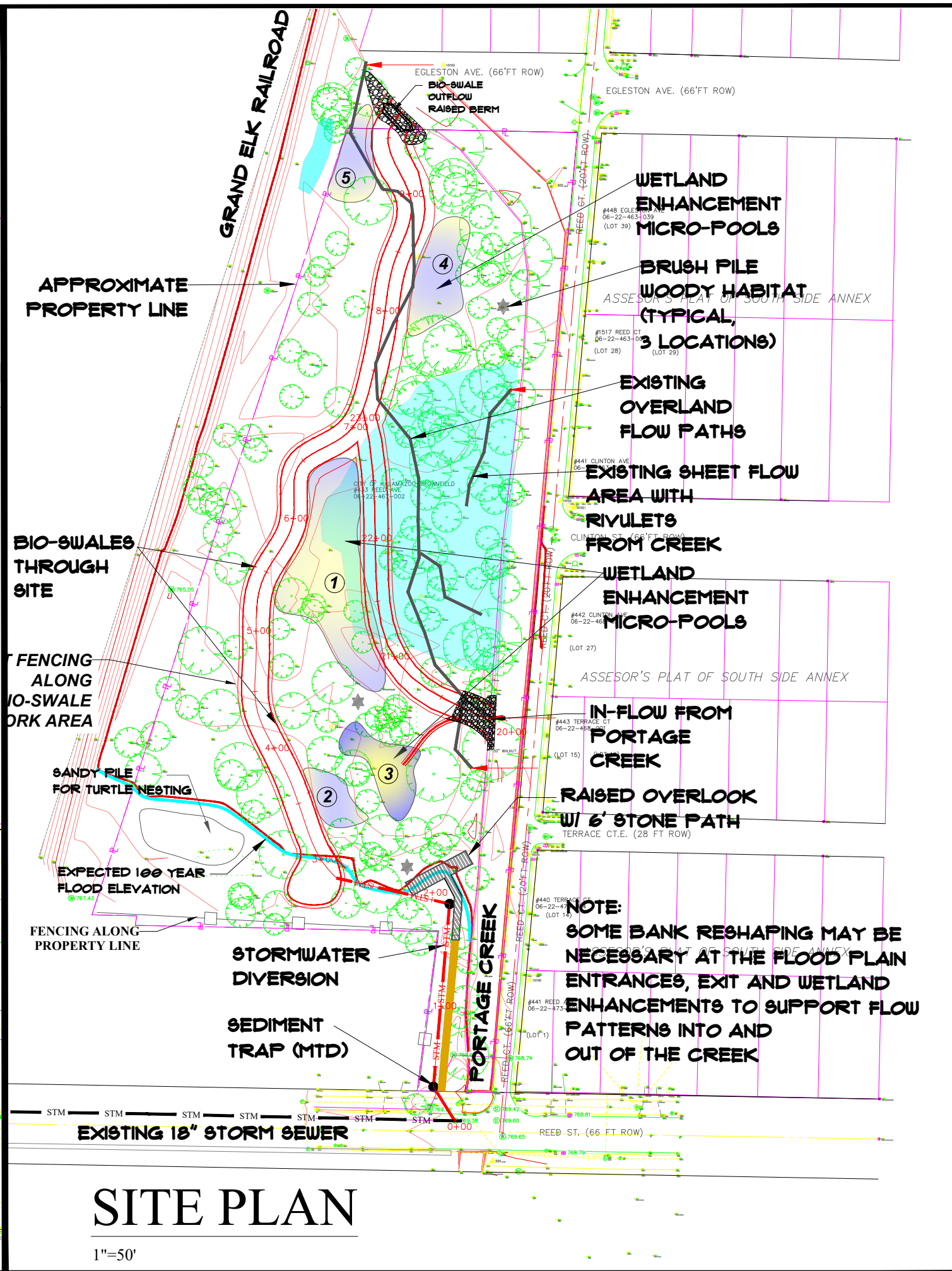
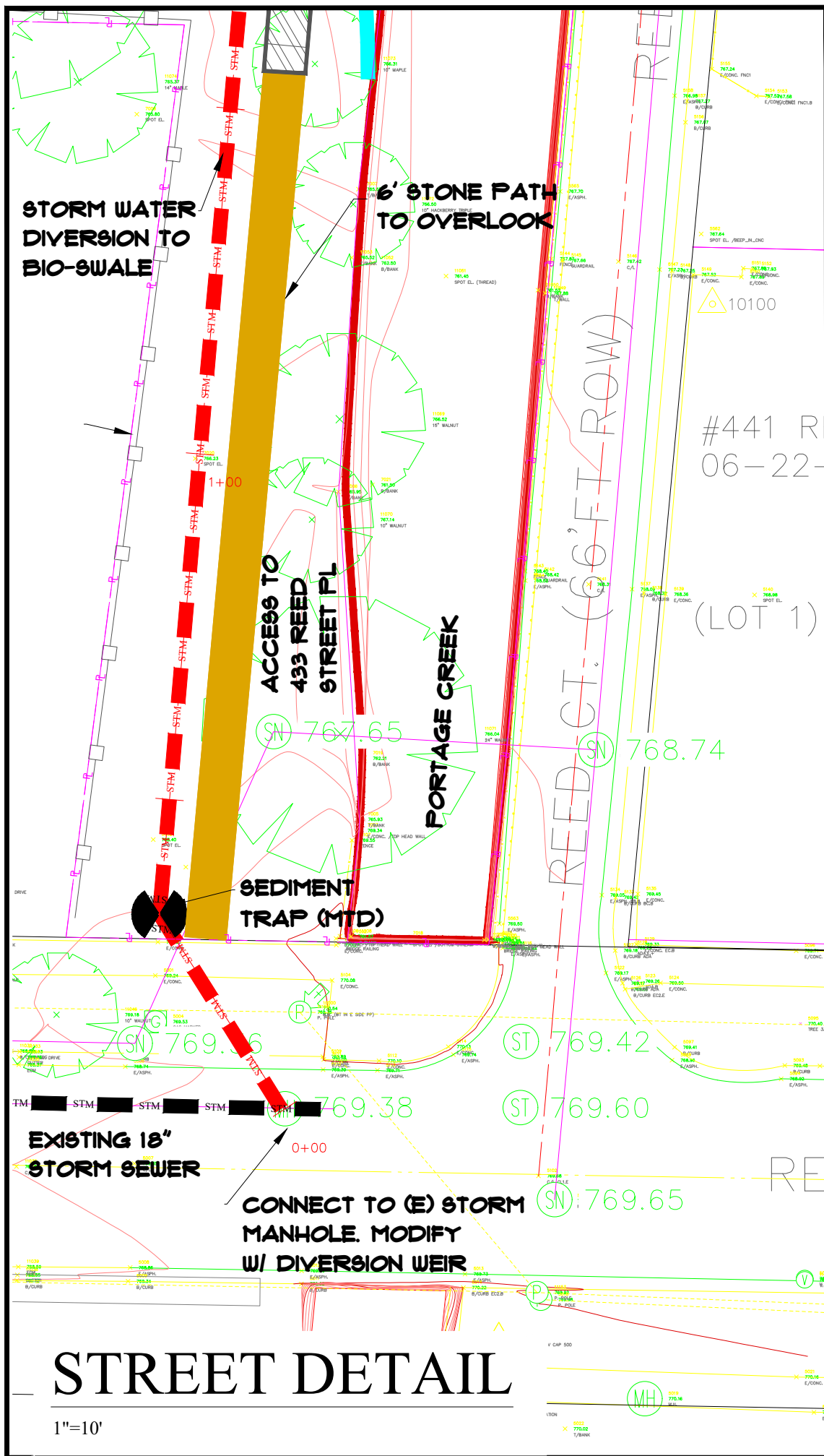
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REED COURT
FLOODPLAIN
AND
STORMWATER
IMPROVEMENT
PROJECT

DEMOLITION
& TREE
PROTECTION

DRAWING
3



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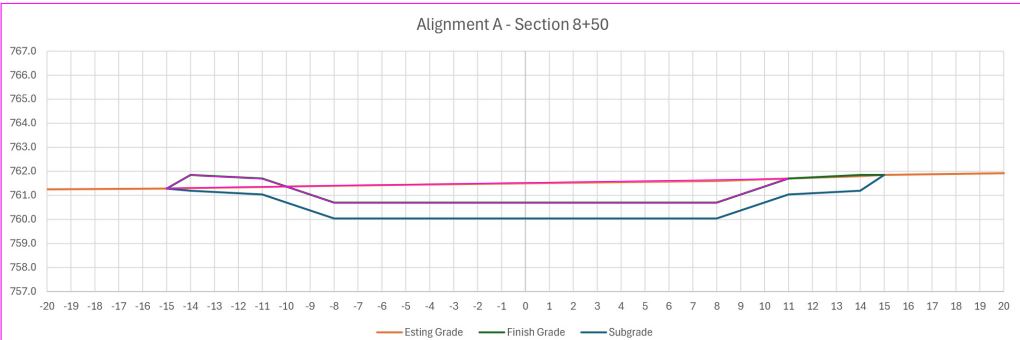
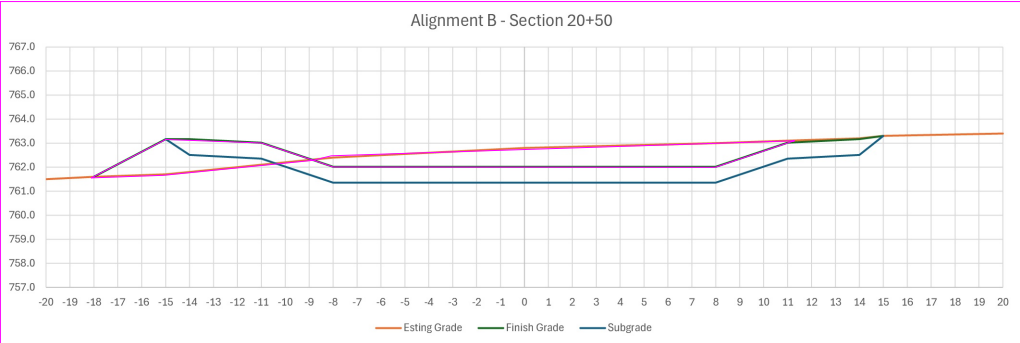
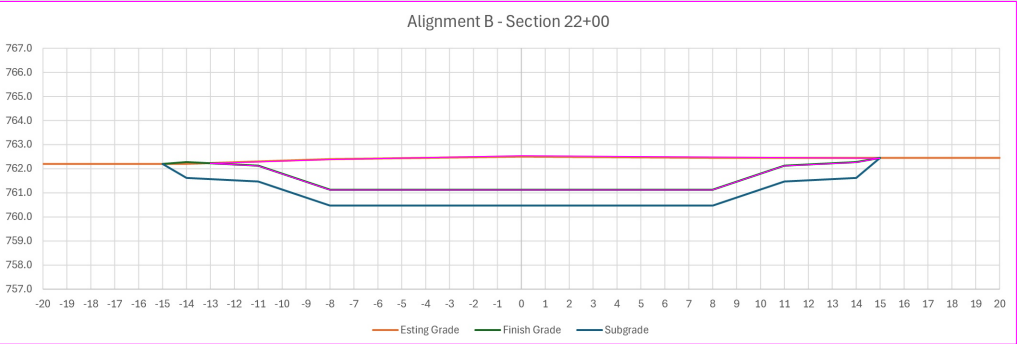
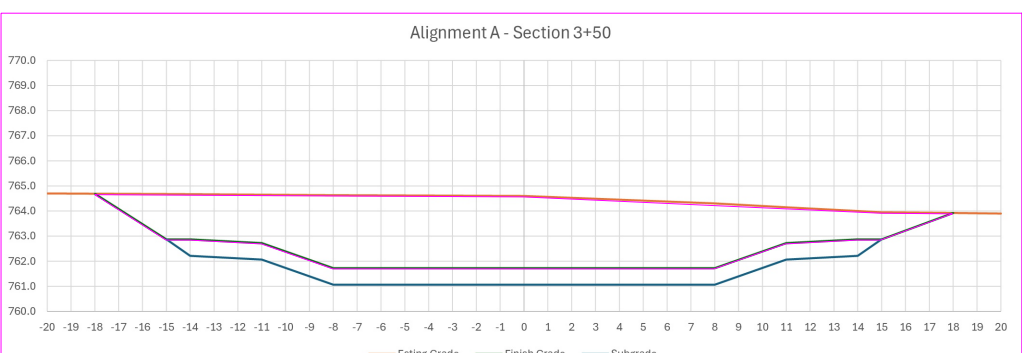
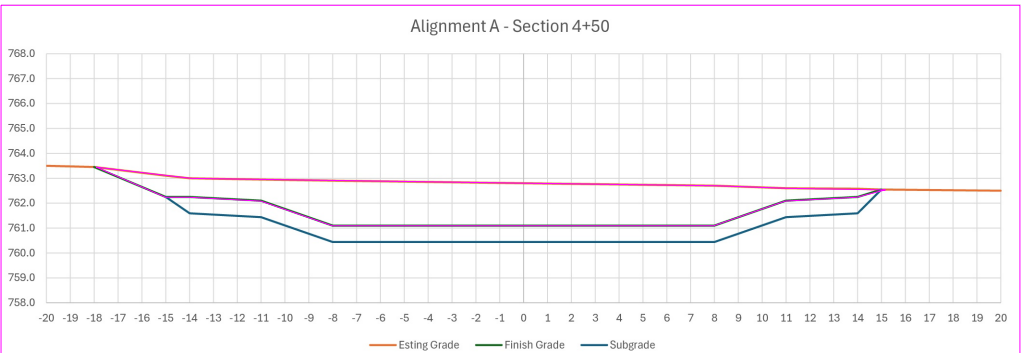
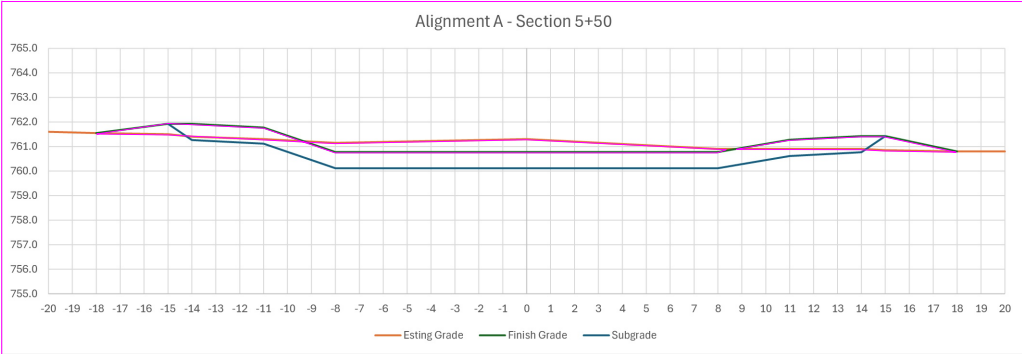
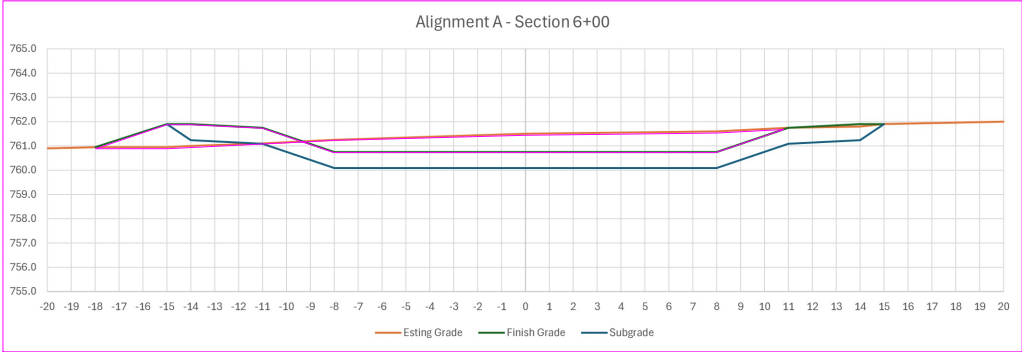
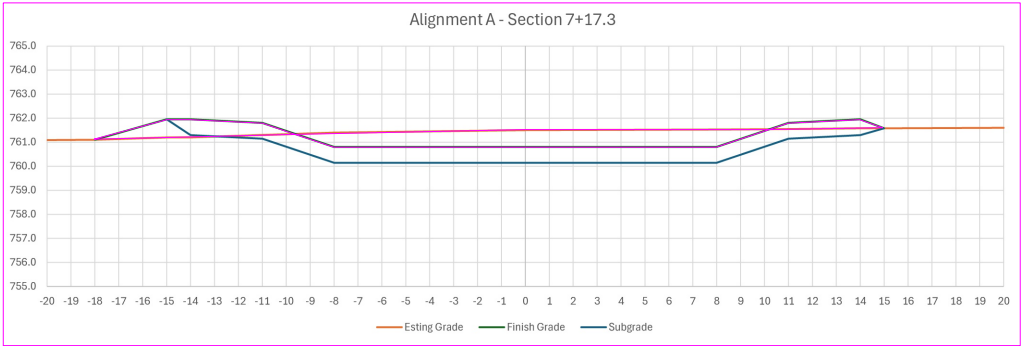
REVISIONS

THE CITY OF
Kalamazoo

**REED COURT
 FLOODPLAIN
 AND
 STORMWATER
 IMPROVEMENT
 PROJECT**

**SITE
 PLAN**

DRAWING
4



SECTIONS

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AND

Prein & Newhof

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**PORTAGE
CREEK
RENAISSANCE:
REED COURT
RESTORATION
PROJECT**

SECTIONS

DRAWING

6



CONCEPT REDERINGS OF VIEWING DECK.

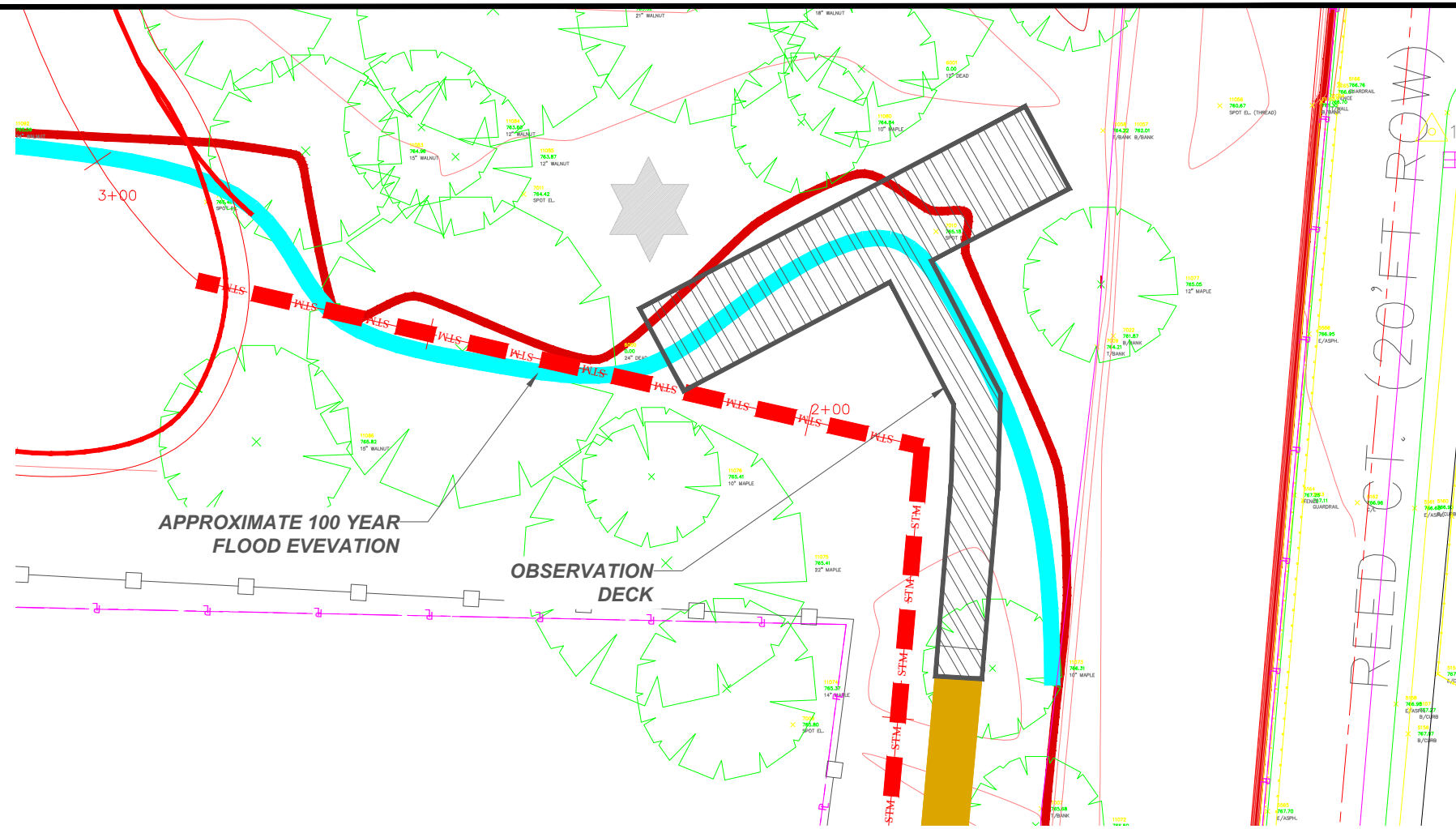
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**REED COURT
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 STORMWATER
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 PROJECT**

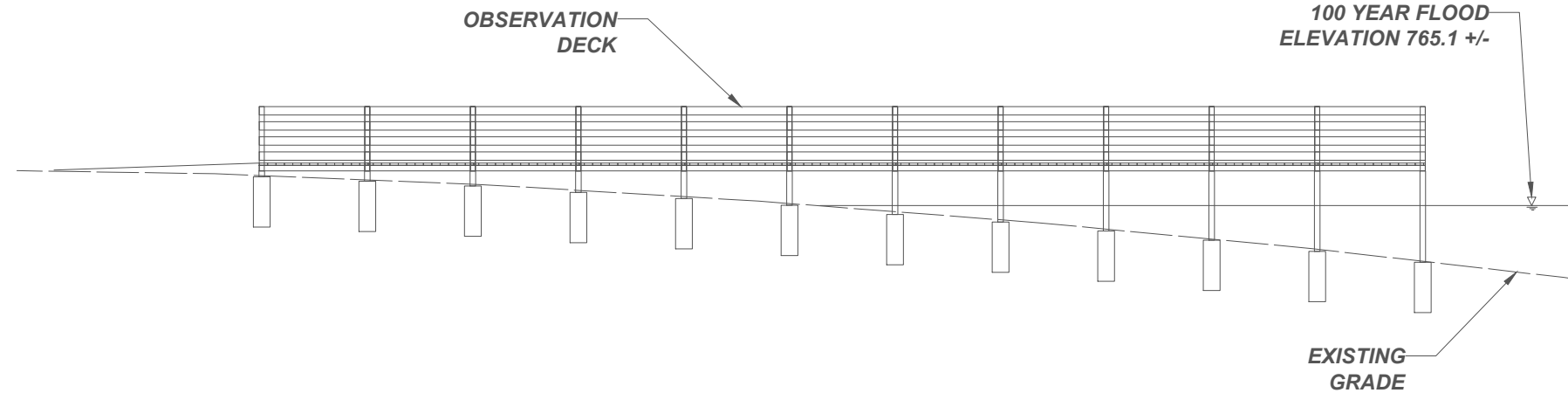
**LANDSCAPE
 CONCEPTS**

DRAWING
7



PLAN VIEW

1"=10'



LONGITUDE SECTION

1"=5'

CONCEPT DETAILS OF VIEWING DECK.

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REED COURT FLOODPLAIN AND STORMWATER IMPROVEMENT PROJECT

LANDSCAPE DETAILS

DRAWING
8

