



## **PARK BOARD AGENDA**

City of Brainerd, Minnesota  
City Hall, 501 Laurel Street, Council Chambers  
Tuesday, September 12, 2023 @ 4:00 PM

The public is invited to attend these meetings in person

**Meetings are broadcast on CTC ch 8, Charter ch 181, YouTube, AppleTV, Roku, and Amazon FireTV**

1. **Call To Order**

2. **Roll Call**

\_\_\_ J. Miller \_\_\_ T. Rushmeyer \_\_\_ K. Schaefer  
\_\_\_ A. Shipe \_\_\_ K. Yeager

3. **Approval Of Agenda - Voice Vote**

4. **New Business**

A. **Discuss Lyman P. White Streambank Restoration Project 60% Plans**

5. **Adjourn**

Visit the Parks and Recreation Website at [www.ci.brainerd.mn.us/parks](http://www.ci.brainerd.mn.us/parks)

### **MISSION**

*"To serve Brainerd residents and visitors by offering high-quality, affordable recreational opportunities  
and by providing a clean, well-maintained park system"*



# Park Board Agenda Request

**MEETING DATE:** September 12, 2023

**TITLE OF ITEM:** Discuss Lyman P. White Streambank Restoration Project 60% Plans

**AGENDA:**

**ACTION REQUESTED:** Discussion Item

**SUBMITTED BY:** Jessie Dehn, Public Works Director **DEPARTMENT:** Public Works

**PRESENTER:** Jessie Dehn, Public Works Director **ESTIMATED TIME (MIN):** 10 Minutes

**SUMMARY OF ISSUE:** Attached to this item is the draft 60% plans for the Lyman P. White Streambank Restoration project including preliminary cost estimate. Below are some key points:

- The plans include 135 container trees. James Kramvik is assisting with collecting a proposed count of tree species for the Park Board to consider. The tree species will be specified in the final bid set.
- The final plans will include a sheet that identifies specific viewsheds throughout the project. Staff is requesting Park Board direction on the viewshed planning. Some questions would be where to have them and how long to extend them?

**ALTERNATIVE, OPTIONS, EFFECTS ON OTHERS/COMMENTS:** Discussion Item.

**RECOMMENDED ACTION/MOTION:** No action needed. Input and comments from the Park Board is requested.

**FINANCIAL IMPACT:** N/A



# MISSISSIPPI RIVERBANK RESTORATION

## CITY OF BRAINERD

60% DRAFT

### EXISTING PLAN SYMBOLS

|                             |           |
|-----------------------------|-----------|
| PROPERTY LINES/RIGHT-OF-WAY | -----     |
| UTILITY EASEMENT            | - - - - - |
| TREE LINE                   | ~~~~~     |
| SIGN                        | ⊕         |
| DECIDUOUS TREE              | ⊗         |
| SHRUB                       | ⊙         |
| CONIFEROUS TREE             | ✱         |

### EXISTING UTILITY SYMBOLS

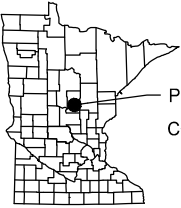
|                              |           |
|------------------------------|-----------|
| FIBER OPTIC CABLE            | — F/O —   |
| UNDERGROUND TELEPHONE        | — UGT —   |
| GAS LINE                     | — G —     |
| UNDERGROUND CABLE            | — — — — — |
| CABLE TV                     | — CTV —   |
| OVERHEAD COMMUNICATIONS LINE | — OH —    |
| UNDERGROUND POWER            | — UGE —   |
| OVERHEAD POWER               | — OHE —   |
| UNDERGROUND ELECTRIC         | — UGE —   |
| OVERHEAD TELEPHONE           | — OHT —   |
| WATER MAIN                   | —   —     |
| SANITARY SEWER               | — > —     |
| STORM SEWER                  | — >> —    |
| CATV VAULT                   | Ⓜ         |
| POWER POLE                   | ⊛         |
| ELECTRIC BOX                 | Ⓜ         |
| CATCH BASIN                  | Ⓜ         |
| STORM APRON                  | Ⓜ         |
| STORM SEWER MANHOLE          | Ⓜ         |
| GATE VALVE                   | Ⓜ         |
| HYDRANT                      | Ⓜ         |
| SANITARY SEWER MANHOLE       | Ⓜ         |



PROJECT LOCATION MAP

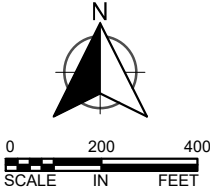
### EXCAVATION NOTICE SYSTEM

A CALL TO GOPHER STATE ONE (651-454-0002) IS REQUIRED A MINIMUM OF 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION.



PROJECT LOCATION  
COUNTY: CROW WING

| PLAN REVISIONS |           |             |
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| DATE           | SHEET NO. | APPROVED BY |
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### GOVERNING SPECIFICATIONS

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.  
  
ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING THE LATEST FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

### PLAN SET INDEX

| Sheet List Table |                                    |
|------------------|------------------------------------|
| SHEET NUMBER     | SHEET TITLE                        |
| 1                | TITLE SHEET                        |
| 2                | STATEMENT OF ESTIMATED QUANTITIES  |
| 3                | CONSTRUCTION NOTES                 |
| 4                | CONSTRUCTION STAGING AND ACCESS    |
| 5                | EXISTING CONDITIONS                |
| 6                | PROPOSED CONDITIONS                |
| 7 - 9            | CONSTRUCTION PLAN                  |
| 10 - 18          | CROSS SECTIONS                     |
| 19 - 20          | DETAILS                            |
| 21               | PLANTING PLAN                      |
| 22               | EROSION CONTROL & SITE RESTORATION |
| 23 - 25          | SWPPP                              |



THIS PLAN SET CONTAINS 25 SHEETS

THIS PLAN SET HAS BEEN PREPARED FOR:

CITY OF BRAINERD  
501 LAUREL ST  
BRAINERD, MN 56401  
(XXX) XXX-XXXX

ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

AMY ANDERSON, P.E.

DATE: MM/DD/YYYY LICENSE NUMBER: 50820

WSB PROJ. NO. 022575-000

SHEET  
1  
OF  
25



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| Mississippi Riverbank Restoration 60% Design Statement of Estimated Quantities |                |                                       |      |          |
|--------------------------------------------------------------------------------|----------------|---------------------------------------|------|----------|
| August 16, 2023                                                                |                |                                       |      |          |
| Line                                                                           | MnDOT Spec     | Item                                  | Unit | Quantity |
| 1                                                                              | 2021.501/00010 | MOBILIZATION                          | L S  | 1        |
| 2                                                                              | 2051.501/00010 | MAINT & RESTORATION OF HAUL ROADS     | L S  | 1        |
| 3                                                                              | 2101.605       | SELECTIVE HARVEST W/BUCKTHORN REMOVAL | AC   | 1.96     |
| 4                                                                              | 2511.507/00015 | RANDOM RIPRAP CLASS IV                | C Y  | 104      |
| 5                                                                              | 2511.507/00016 | RANDOM RIPRAP CLASS V                 | C Y  | 8        |
| 6                                                                              | 2571.502       | CONTAINER TREE                        | EA   | 135      |
| 7                                                                              | 2573.503/00064 | SEDIMENT CONTROL LOG TYPE COMPOST     | L F  | 90       |
| 8                                                                              | 2573.602       | STABILIZED CONSTRUCTION EXIT          | EA   | 1        |
| 9                                                                              | 2575.601/00030 | EROSION CONTROL                       | L S  | 1        |
| 10                                                                             | 2575.508       | SEED MIXTURE 36-211                   | LB   | 68       |
| 11                                                                             | 2575.508       | HYDRAULIC STABILIZED FIBER MATRIX     | LB   | 4,500    |
| 12                                                                             | 2575.509       | TYPE 1 MULCH WITH DISC ANCHORING      | TON  | 1.7      |
| 13                                                                             | 2575.601/00050 | PLANT MANAGEMENT - YEAR 1             | L S  | 1        |
| 14                                                                             | 2577.502       | LOG ROOTWAD                           | EA   | 16       |
| 15                                                                             | 2577.502/00020 | LIVE STAKES                           | EA   | 70       |



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Amy Anderson, P.E.  
DATE: MM-DD-YYYY LIC. NO. 50820

STATEMENT OF  
ESTIMATED  
QUANTITIES

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

WSB PROJECT NO.  
022575-000





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Amy Anderson, P.E.

DATE: MM-DD-YYYY LIC. NO. 50820

CONSTRUCTION NOTES

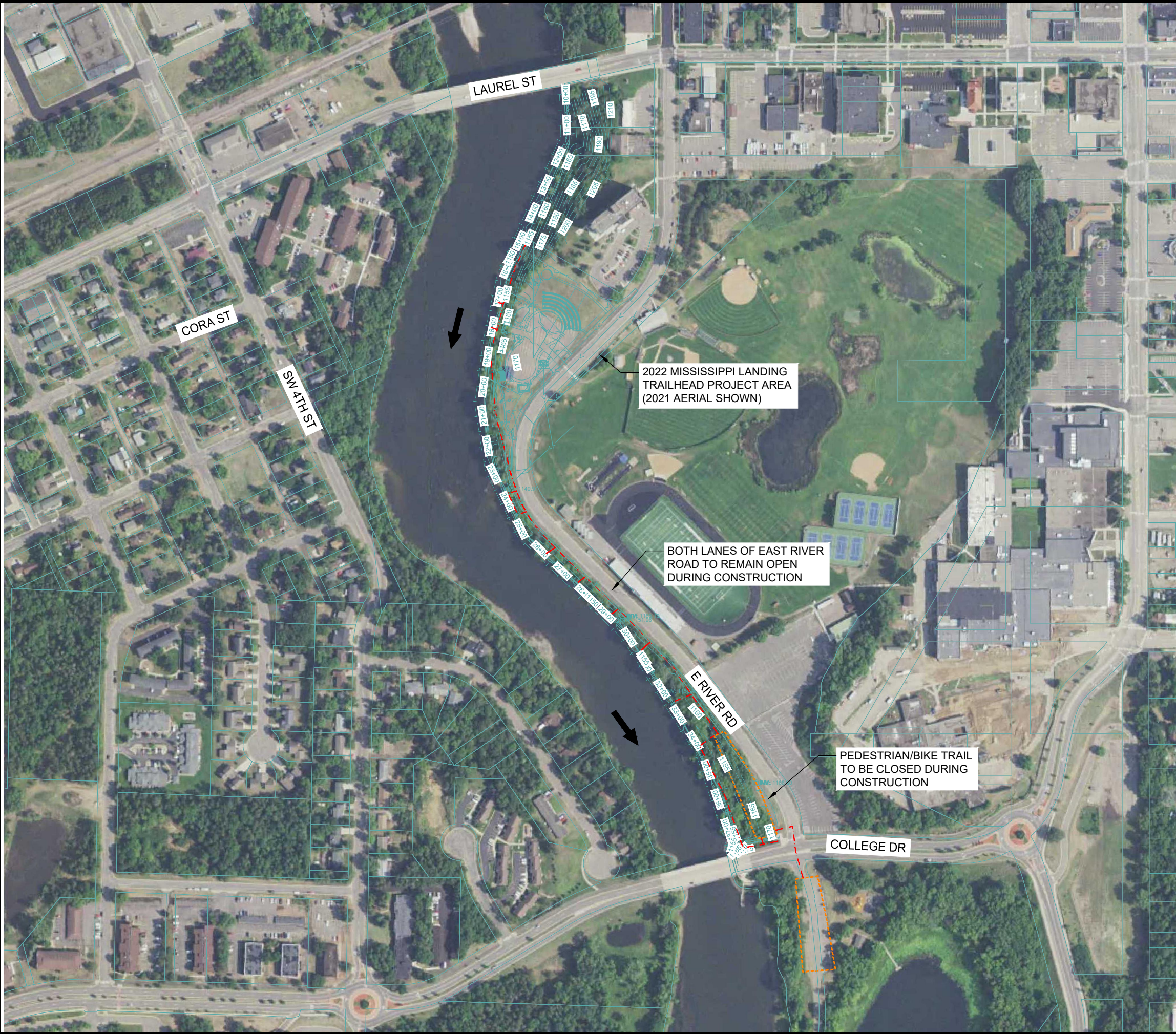
MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

WSB PROJECT NO.  
022575-000

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### LEGEND

- STREAM STATIONING
- CONSTRUCTION LIMITS
- EXISTING CONTOURS (5' INCREMENTS)
- PROPERTY LINE
- WET WETLAND BOUNDARY
- EDGE OF WATER
- EDGE OF RIPRAP
- EDGE OF CONCRETE
- EDGE OF BITUMINOUS
- TREELINE
- ACCESS ROUTE
- FLOW DIRECTION
- STAGING AREA
- ROCK CONSTRUCTION EXIT



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### CONSTRUCTION STAGING AND ACCESS

## MISSISSIPPI RIVERBANK RESTORATION CITY OF BRAINERD

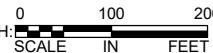
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- CONSTRUCTION LIMITS
- EXISTING CONTOURS (5' INCREMENTS)
- PROPERTY LINE
- WET WETLAND BOUNDARY
- EDGE OF WATER
- EDGE OF RIPRAP
- EDGE OF CONCRETE
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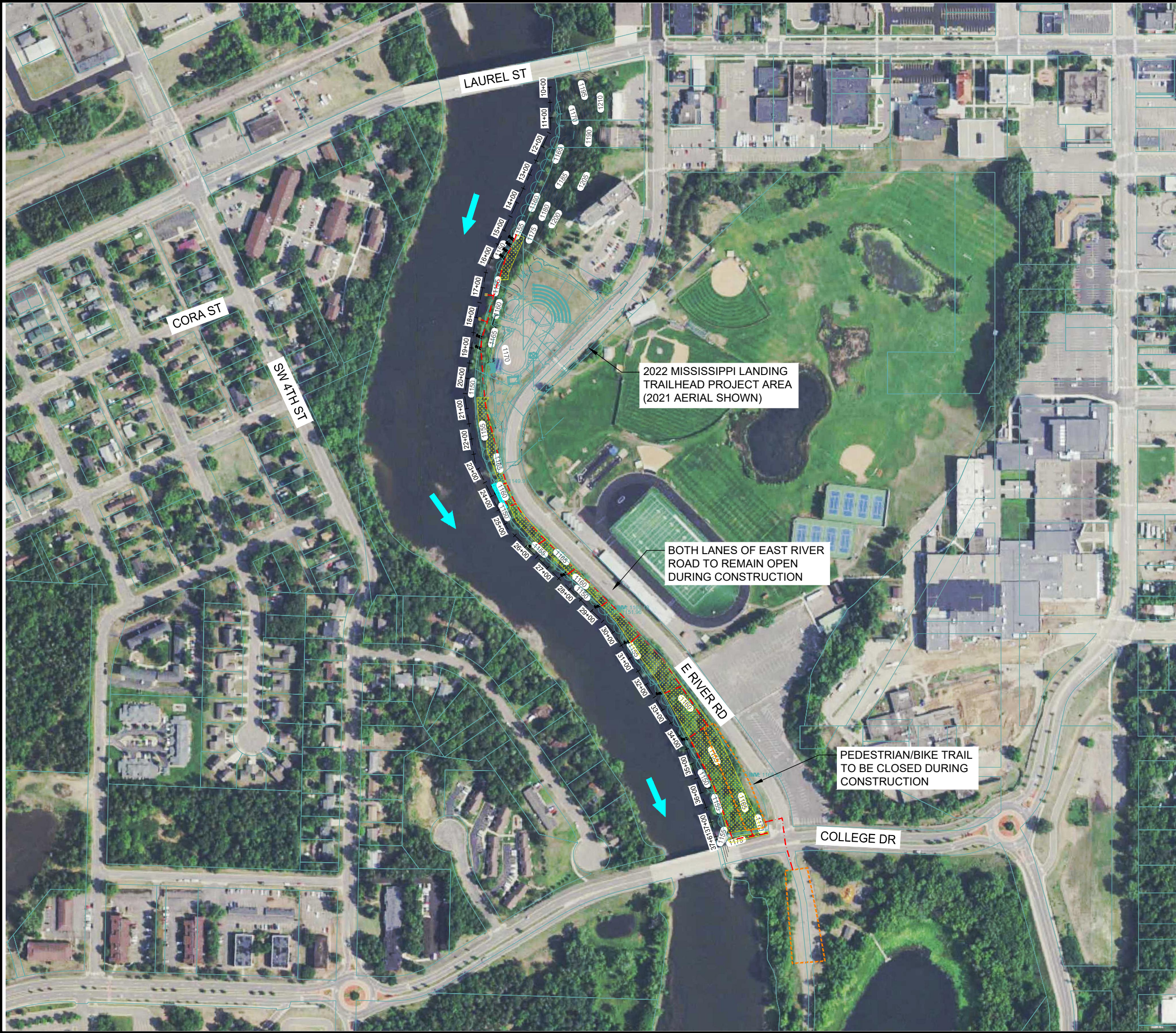
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EXISTING  
CONDITIONS

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD



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- PROPERTY LINE
- WET --- WETLAND BOUNDARY
- EDGE OF WATER
- EXISTING EDGE OF RIPRAP
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- BOULDER TOE
- SELECTIVE TREE HARVEST, BUCKTHORN REMOVAL AND SEED MIX 36-211
- COVER ROCK
- LOG ROOTWAD



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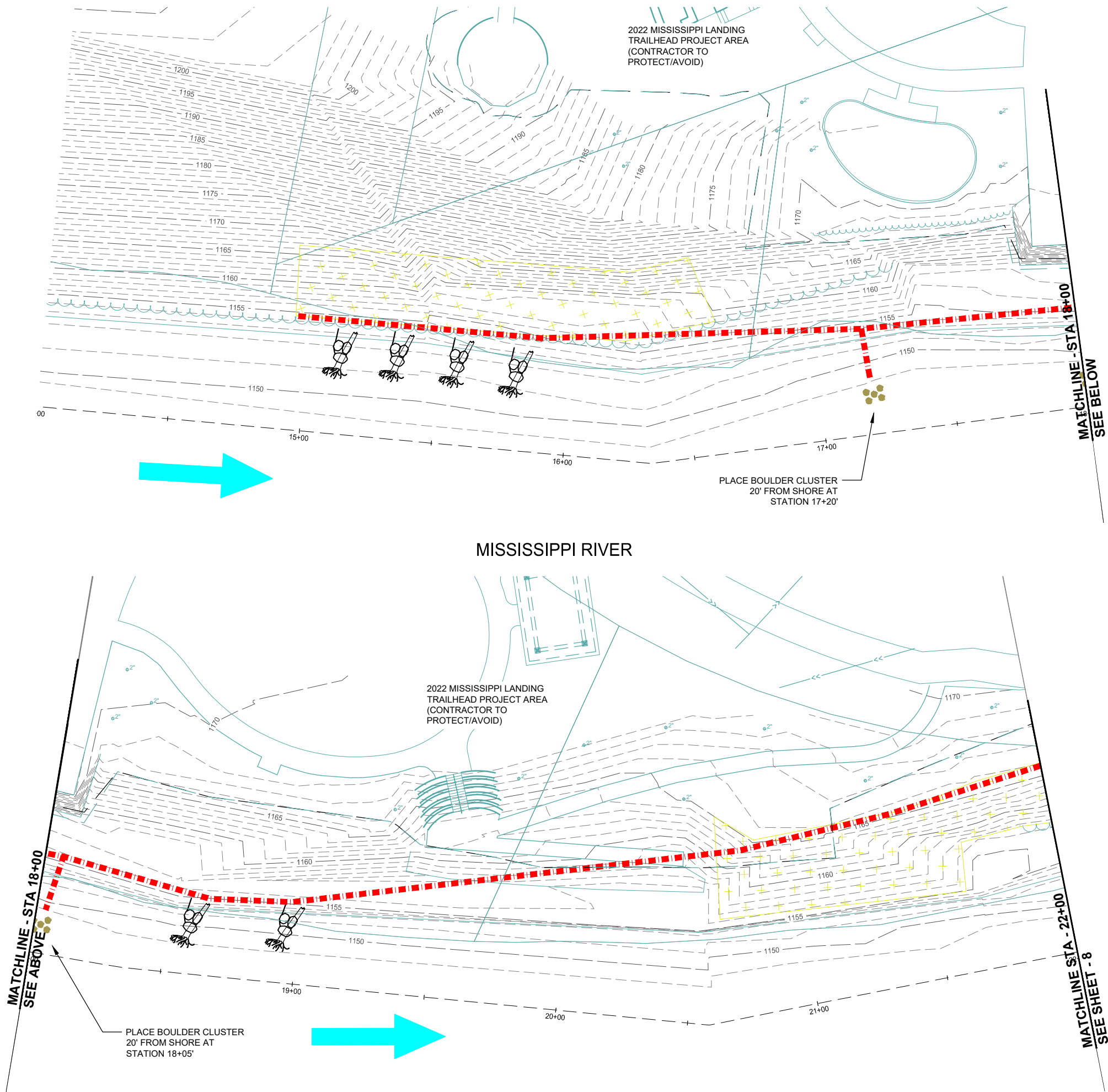
PROPOSED CONDITIONS

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

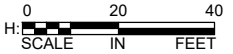
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- EXISTING CONTOURS (5' INCREMENTS)
- PROPOSED CONTOURS (1' INCREMENTS)
- PROPOSED CONTOURS (5' INCREMENTS)
- PROPERTY LINE
- WETLAND BOUNDARY
- EDGE OF WATER
- EXISTING EDGE OF RIPRAP
- EXISTING EDGE OF CONCRETE
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- STAGING AREA
- BOULDER TOE
- SELECTIVE TREE HARVEST, BUCKTHORN REMOVAL AND SEED MIX 36-211
- COVER ROCK
- LOG ROOTWAD



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Amy Anderson, P.E.  
DATE: MM-DD-YYYY LIC. NO.: 50820

CONSTRUCTION PLAN

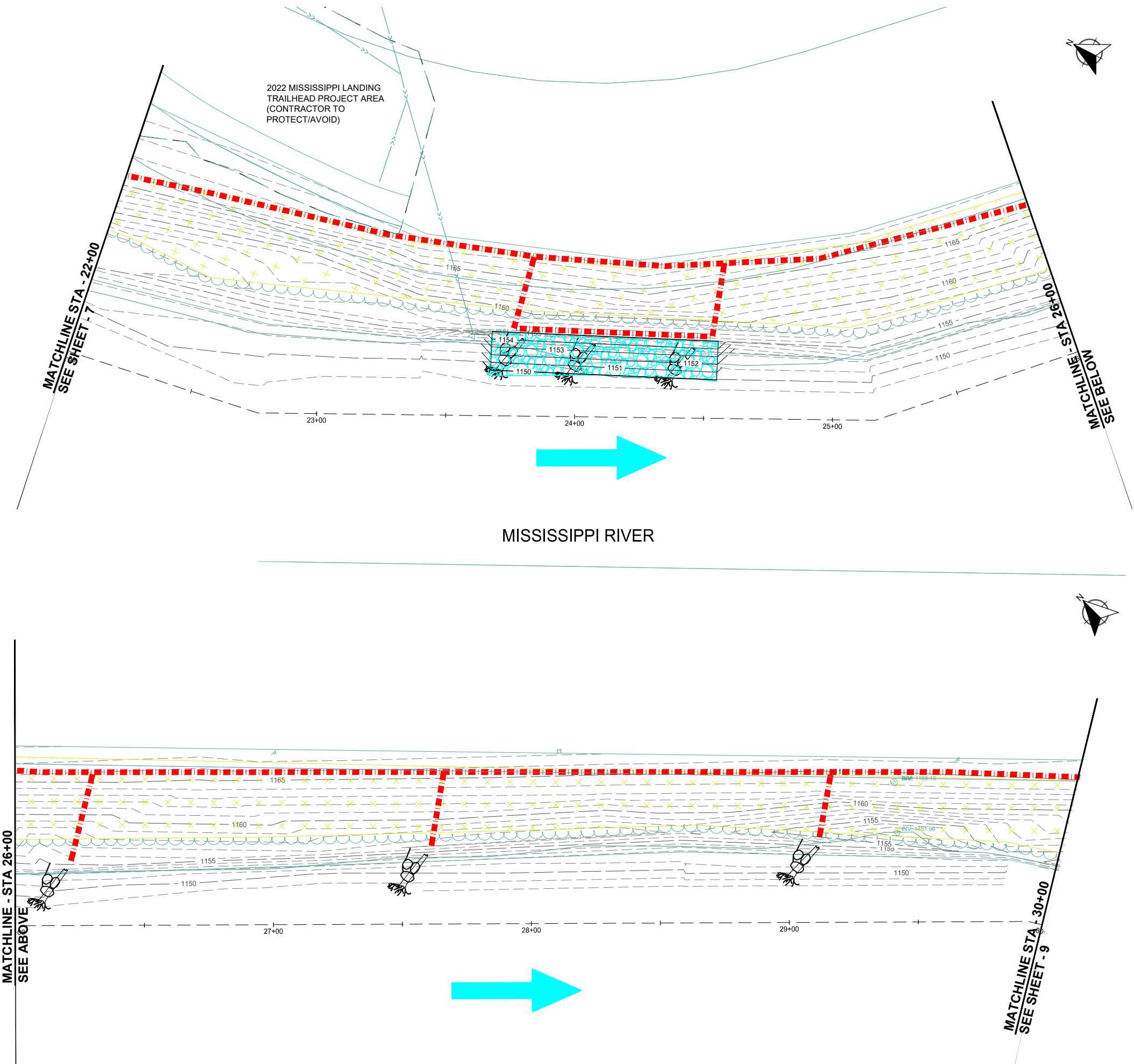
MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

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- PROPERTY LINE
- WETLAND BOUNDARY
- EDGE OF WATER
- EXISTING EDGE OF RIPRAP
- EXISTING EDGE OF CONCRETE
- EXISTING EDGE OF BITUMINOUS
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- ACCESS ROUTE
- FLOW DIRECTION
- STAGING AREA
- BOULDER TOE
- SELECTIVE TREE HARVEST, BUCKTHORN REMOVAL AND SEED MIX 36-211
- COVER ROCK
- LOG ROOTWAD



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DATE: MM-DD-YYYY LIC. NO. 50820

CONSTRUCTION PLAN

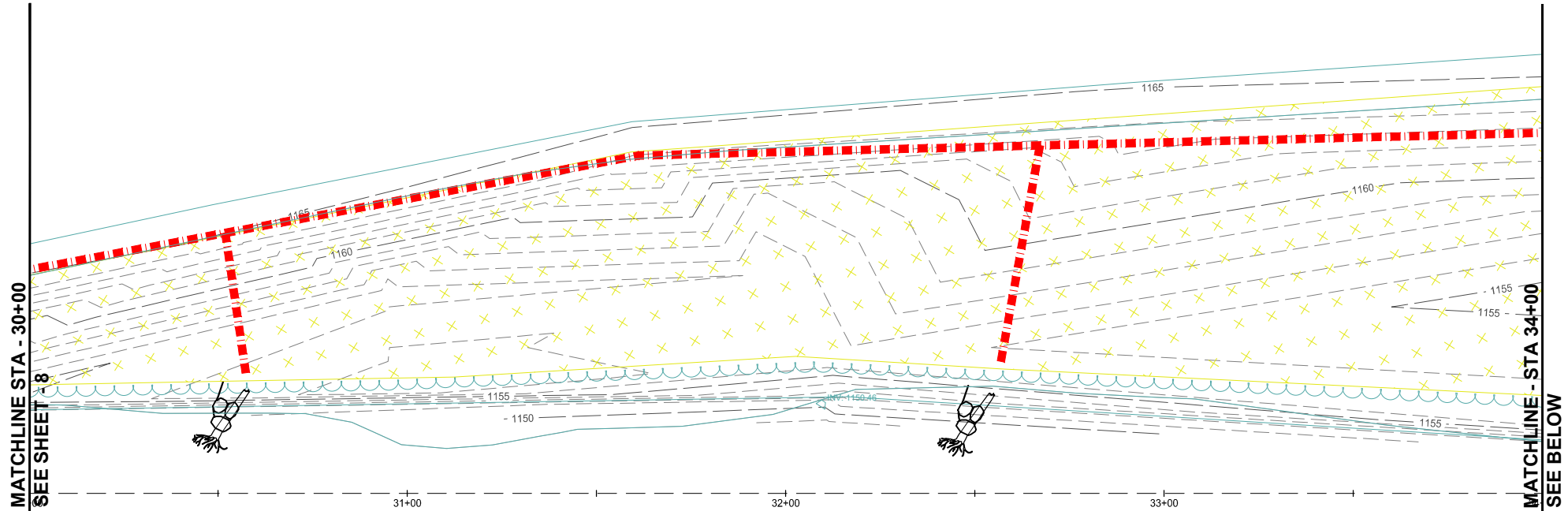
MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

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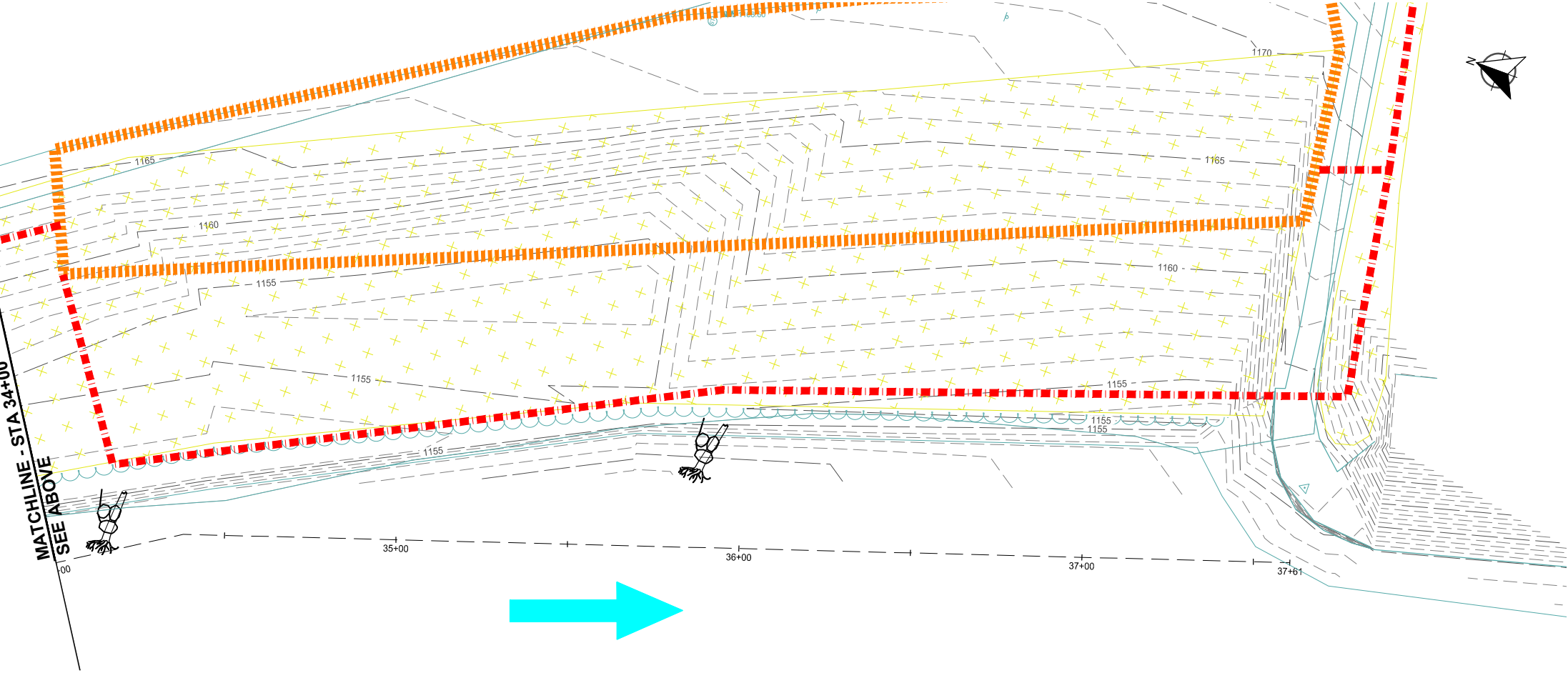
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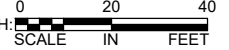
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MISSISSIPPI RIVER



LOCATION



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- STREAM STATIONING
- CONSTRUCTION LIMITS
- EXISTING CONTOURS (1' INCREMENTS)
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Any Anderson, P.E.  
DATE: MM-DD-YYYY LIC. NO. 50820

CONSTRUCTION PLAN

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

WSB PROJECT NO. 022575-000

SHEET

60% DRAFT



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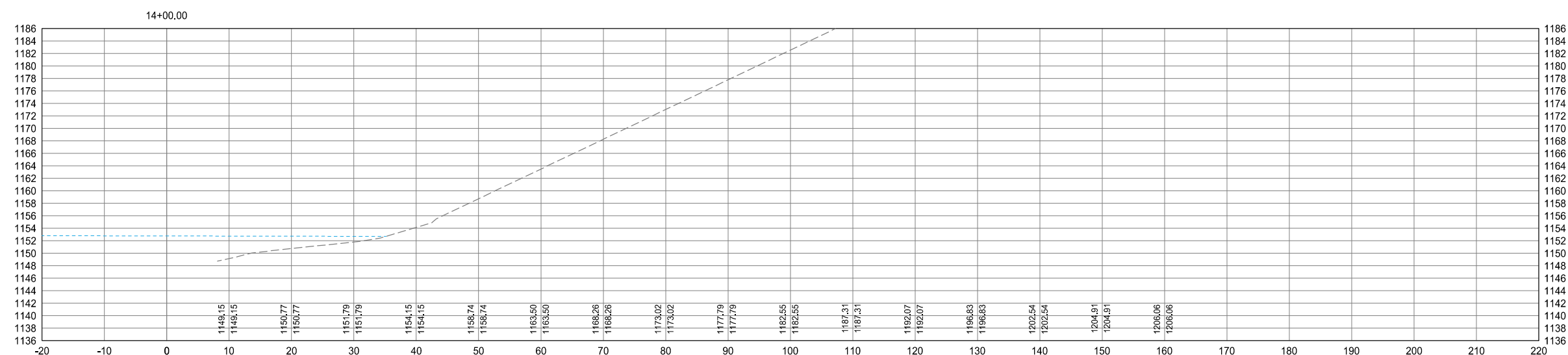
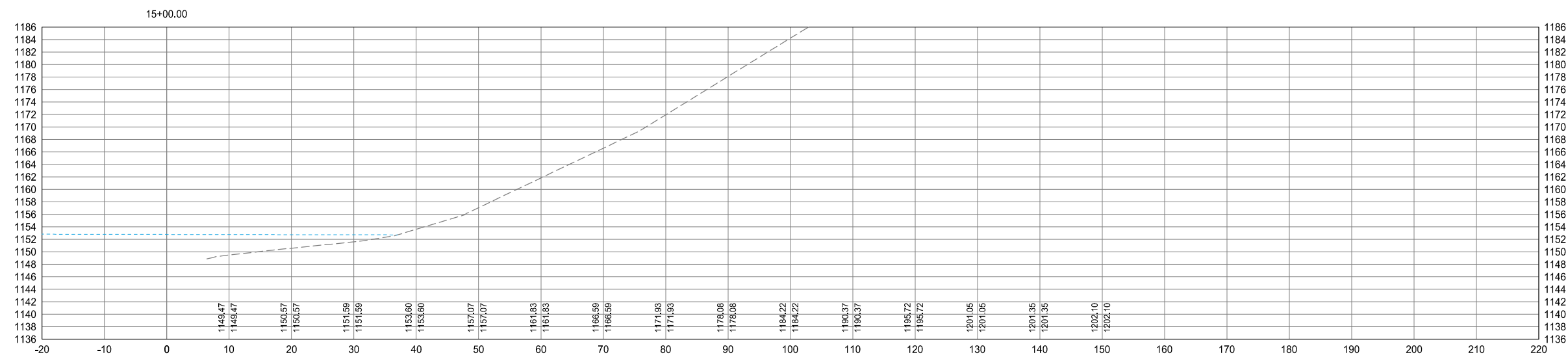
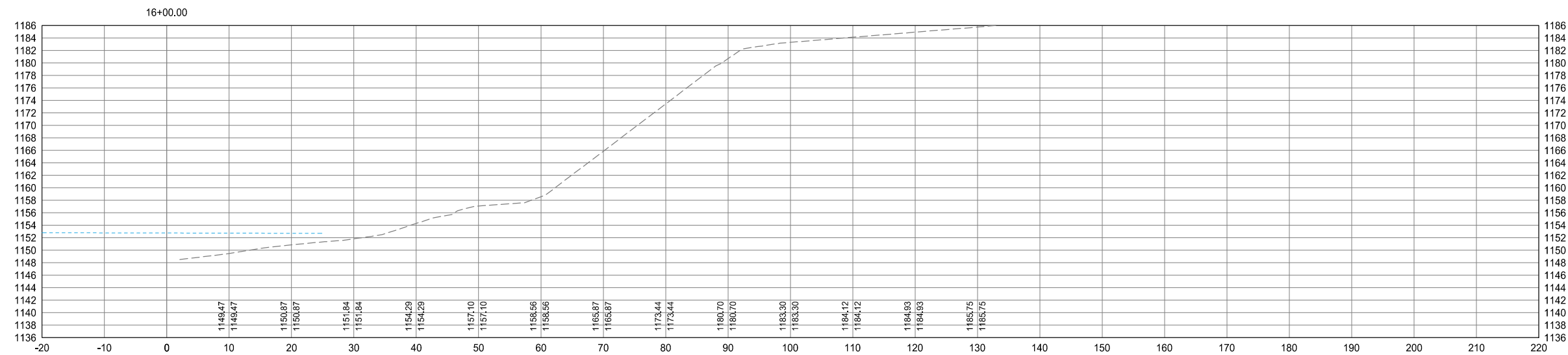
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## CROSS SECTIONS

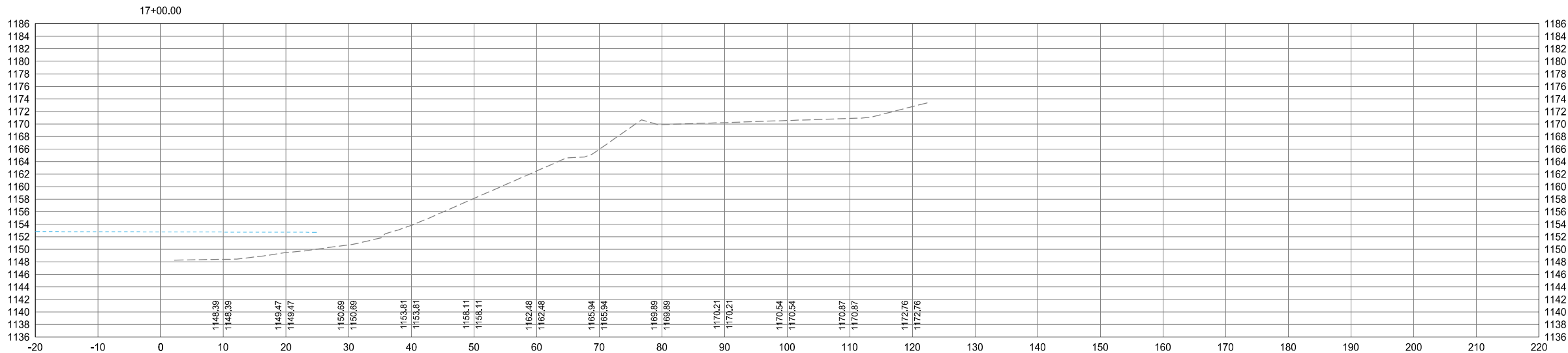
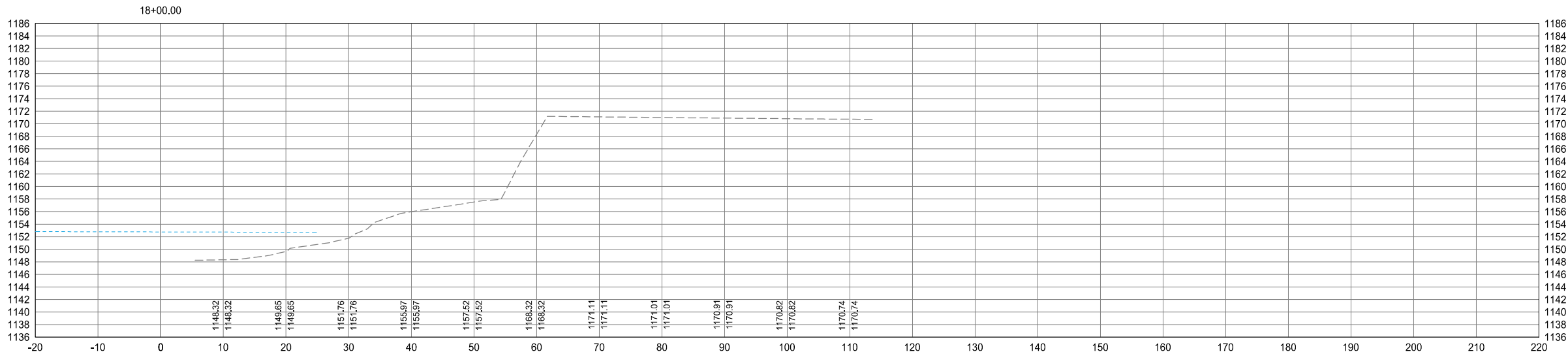
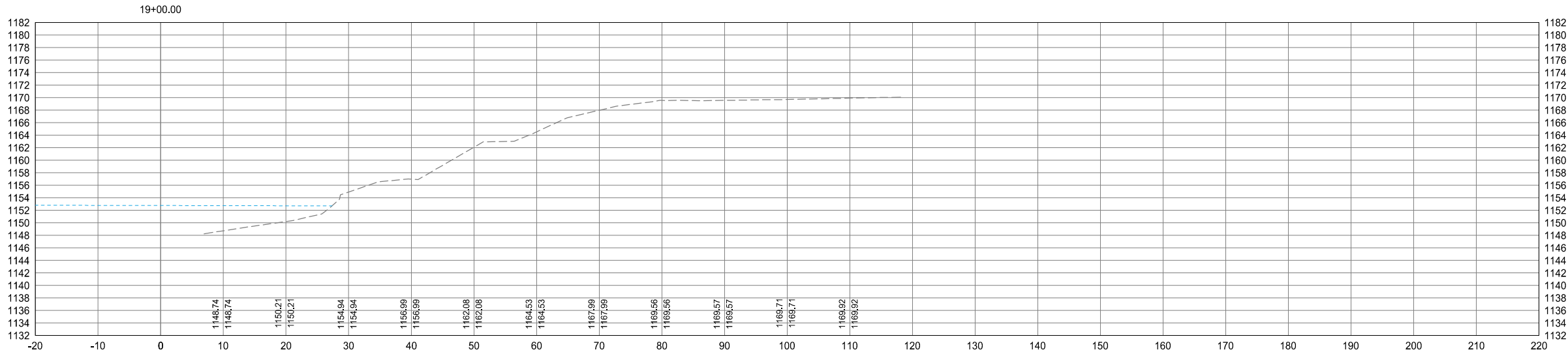
MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

SHEET





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Amy Anderson, P.E.  
DATE: MM-DD-YYYY LIC. NO. 50820

## CROSS SECTIONS

# MISSISSIPPI RIVERBANK RESTORATION CITY OF BRAINERD

WSB PROJECT NO.  
022575-000

SHEET



SCALE: AS SHOWN  
PLAN BY: SJP

DESIGN BY: ARA  
CHECK BY: XXX

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Amy Anderson, P.E.

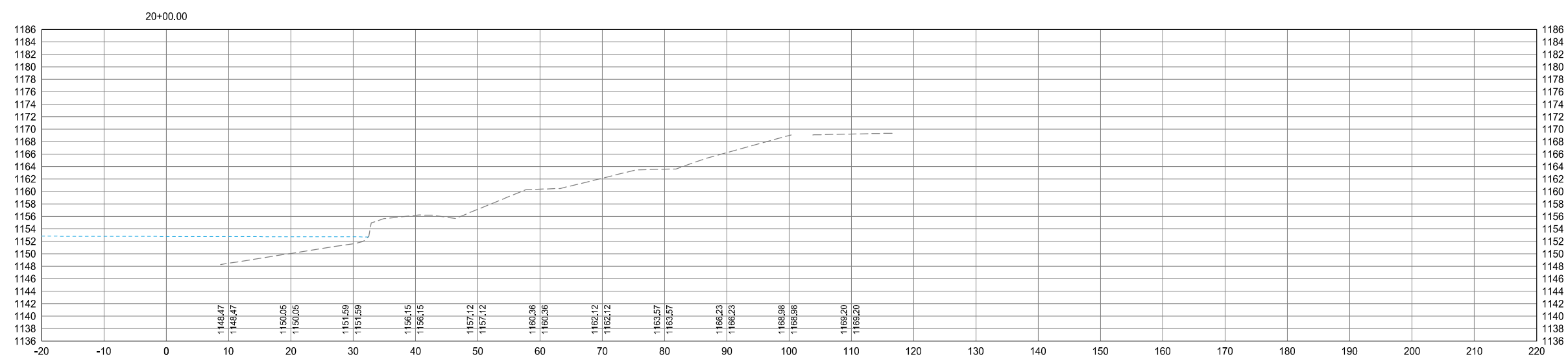
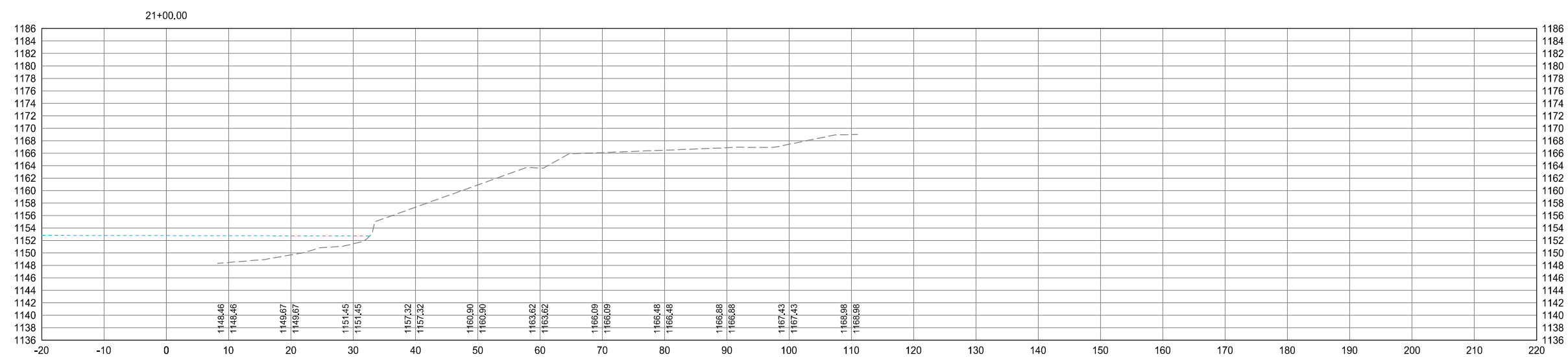
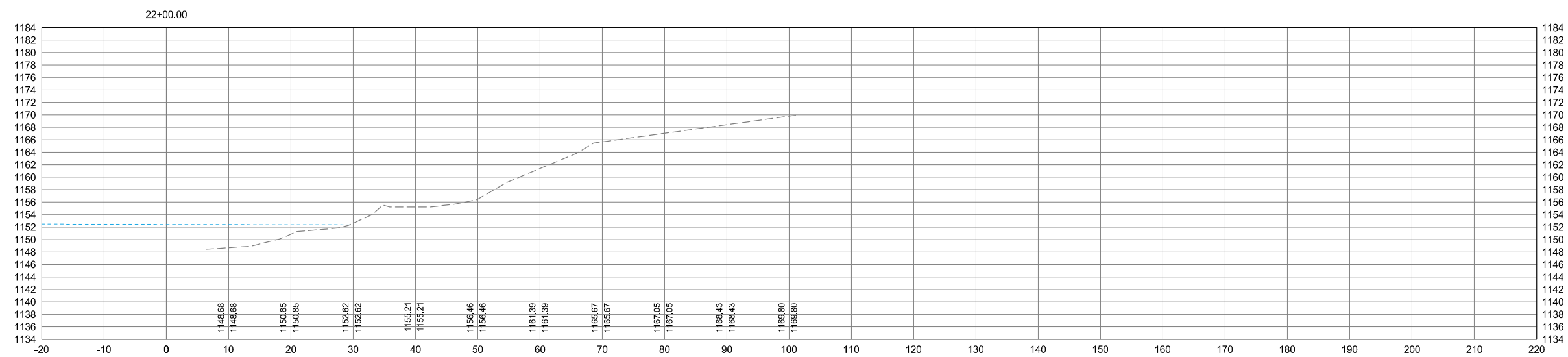
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## CROSS SECTIONS

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

WSB PROJECT NO.  
022575-000

12 SHEET OF ##  
Page 14 of 47





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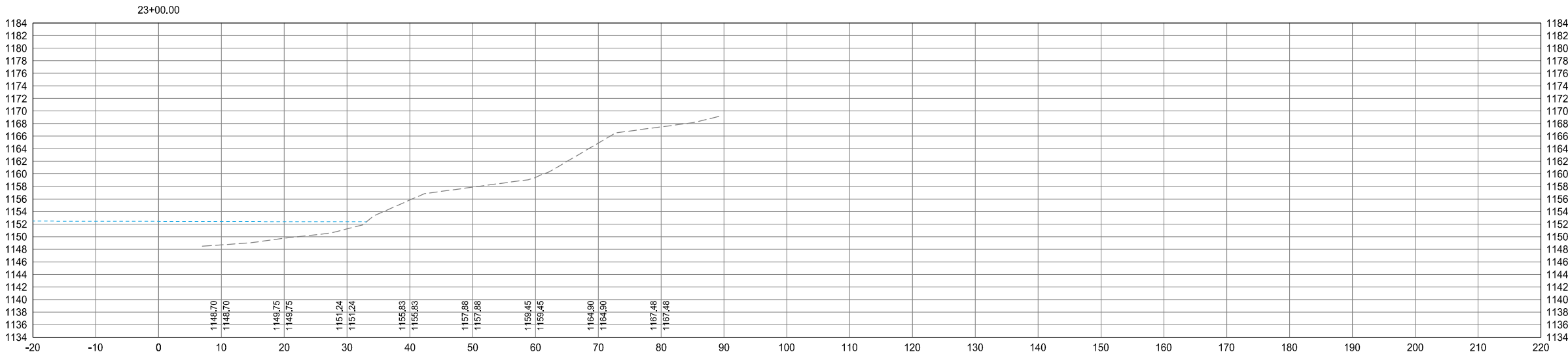
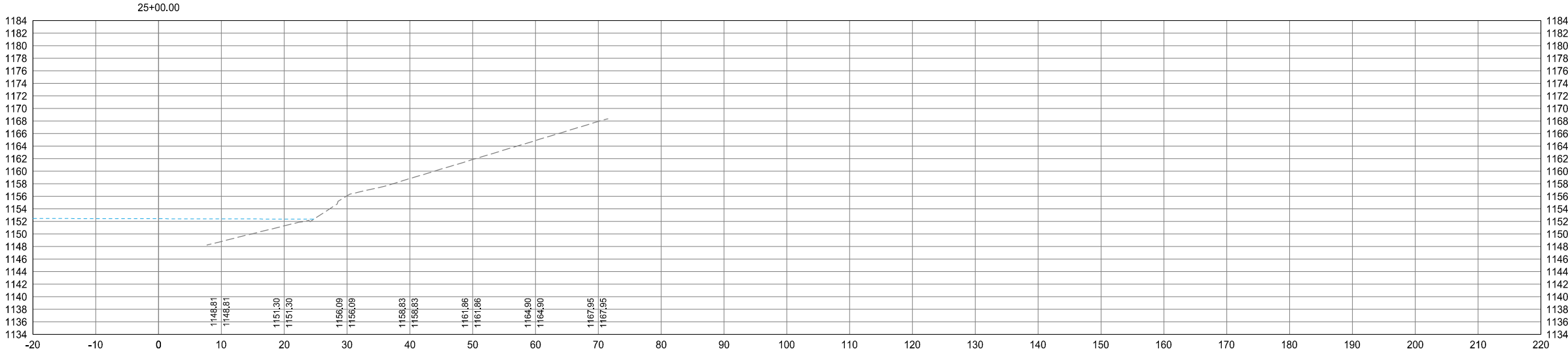
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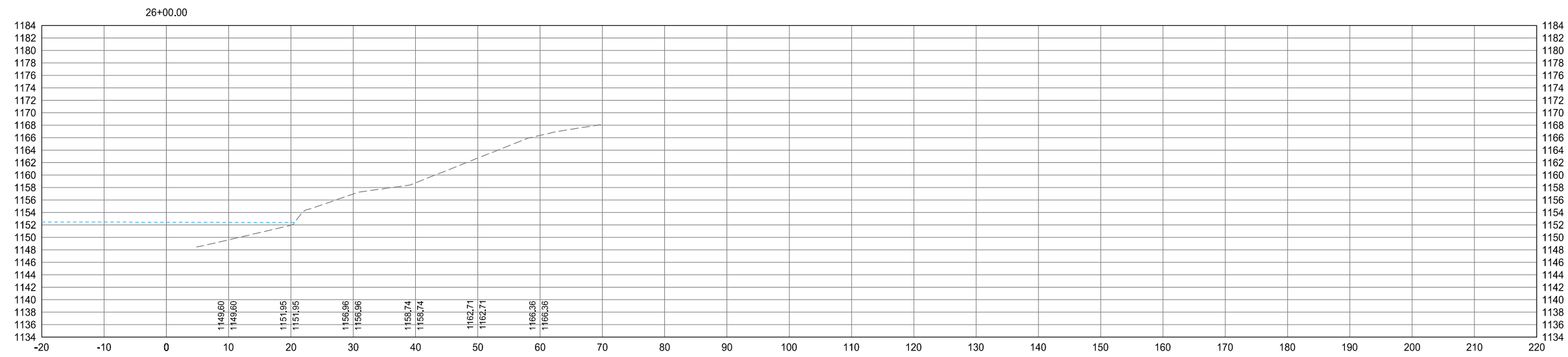
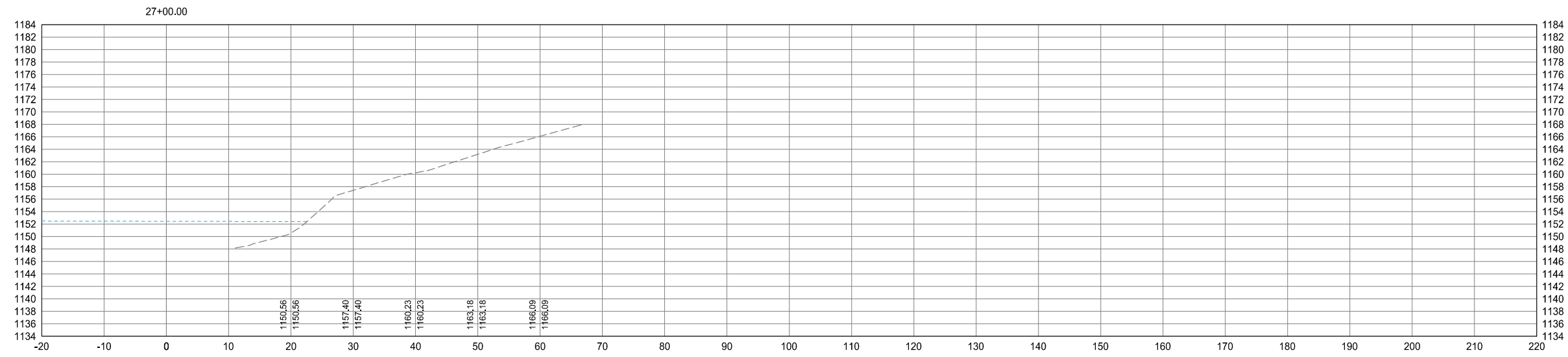
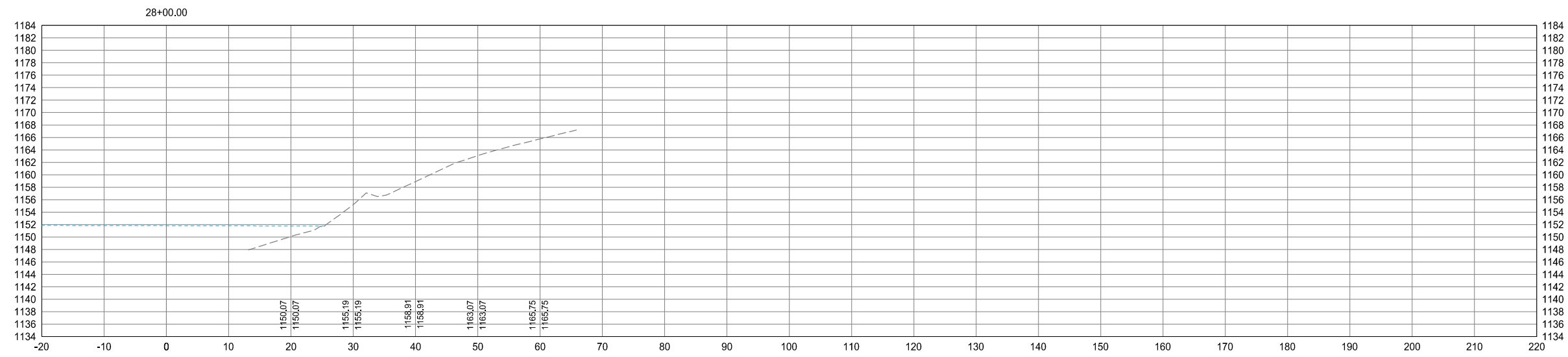
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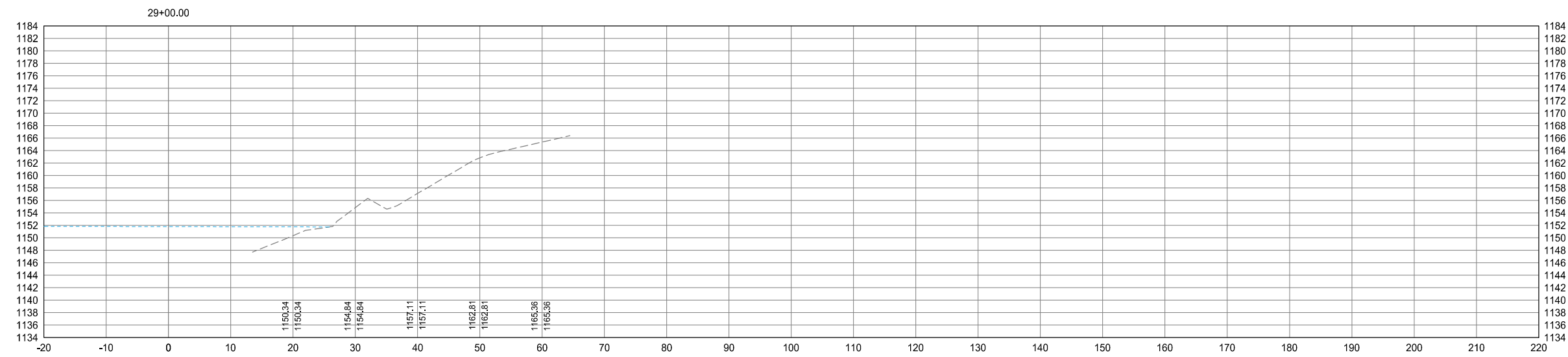
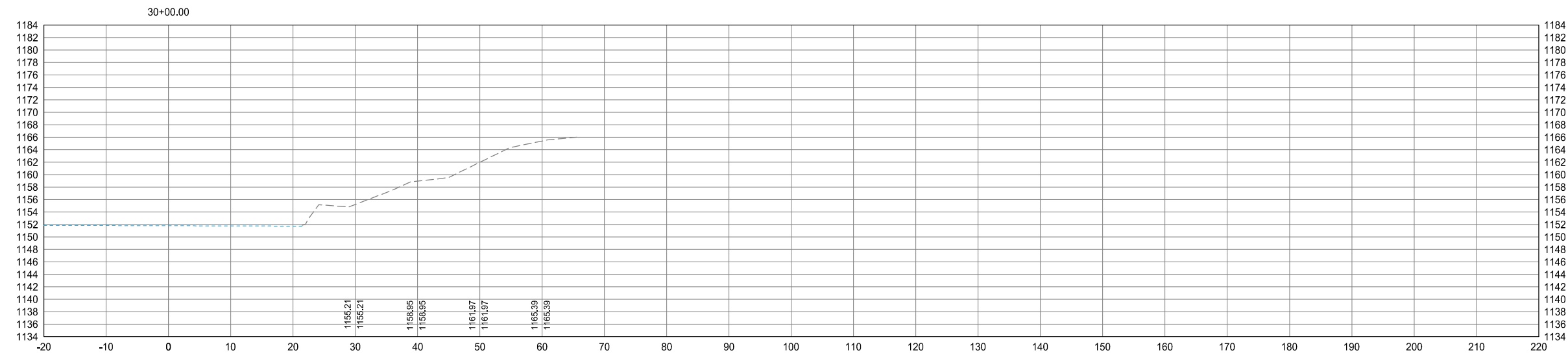
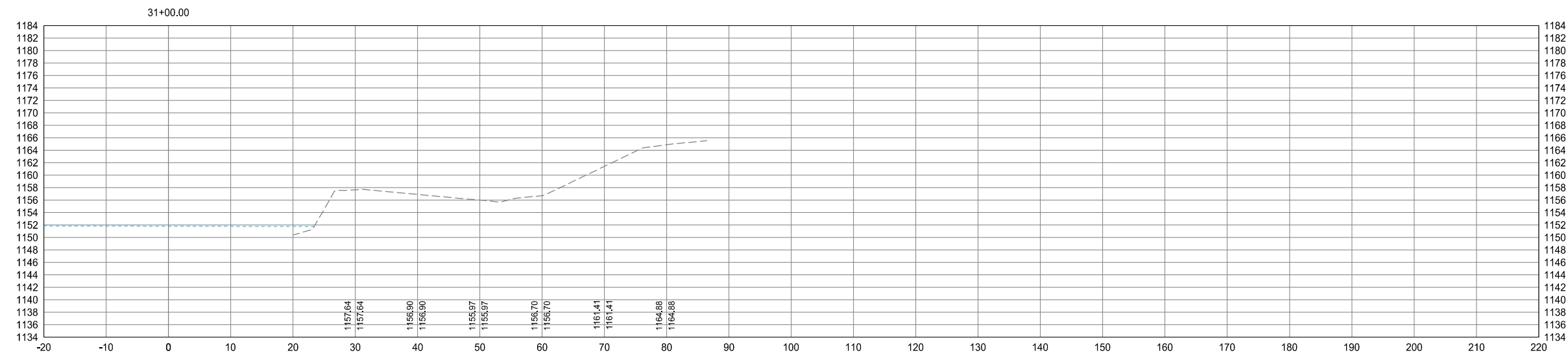
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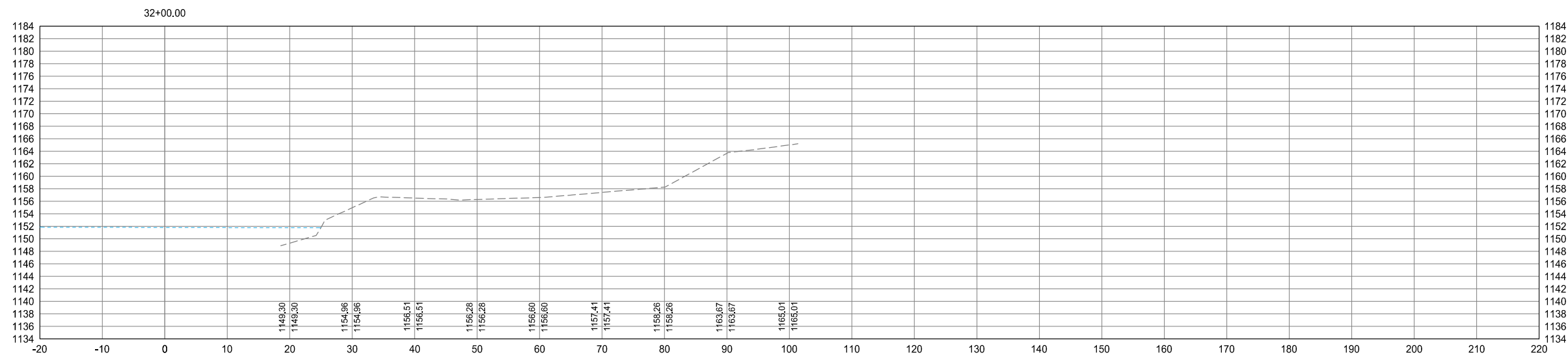
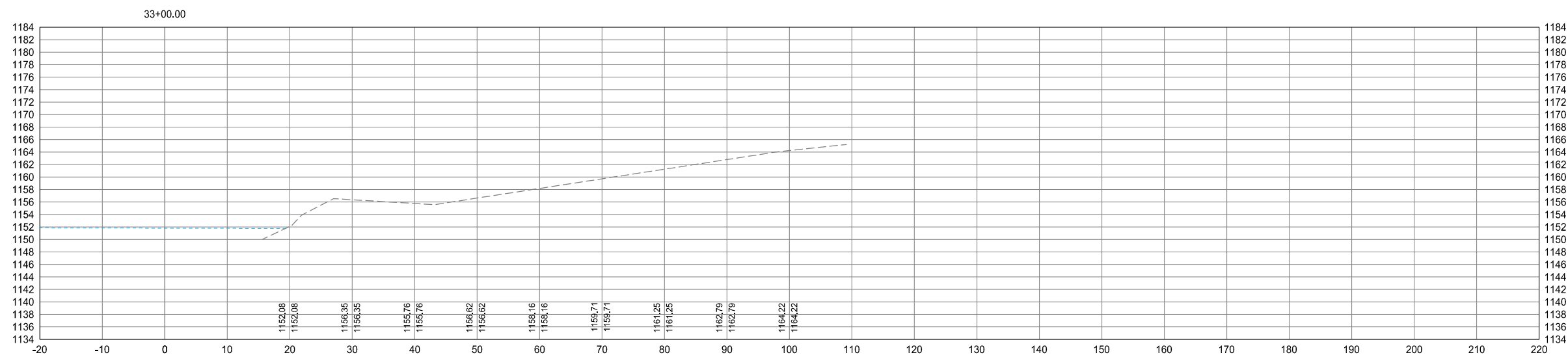
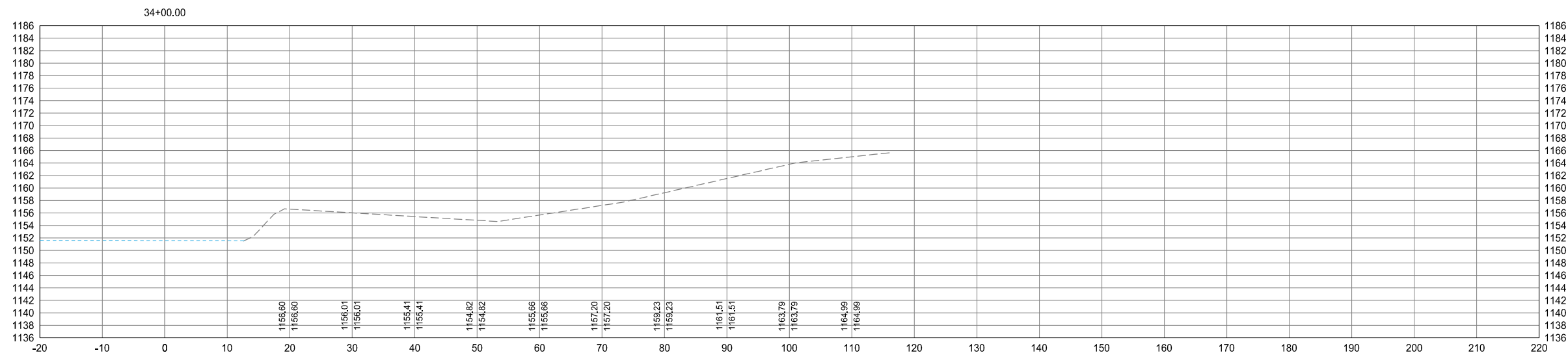
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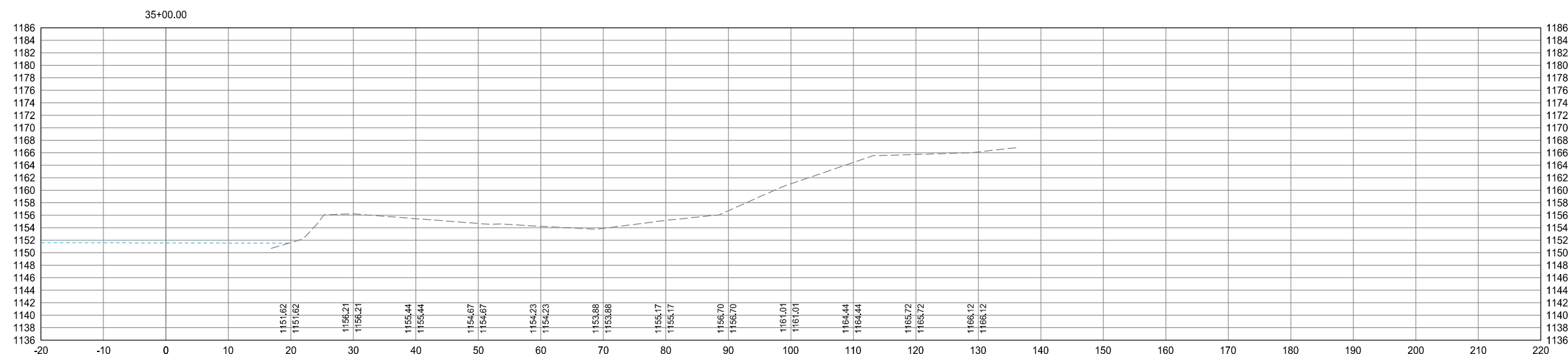
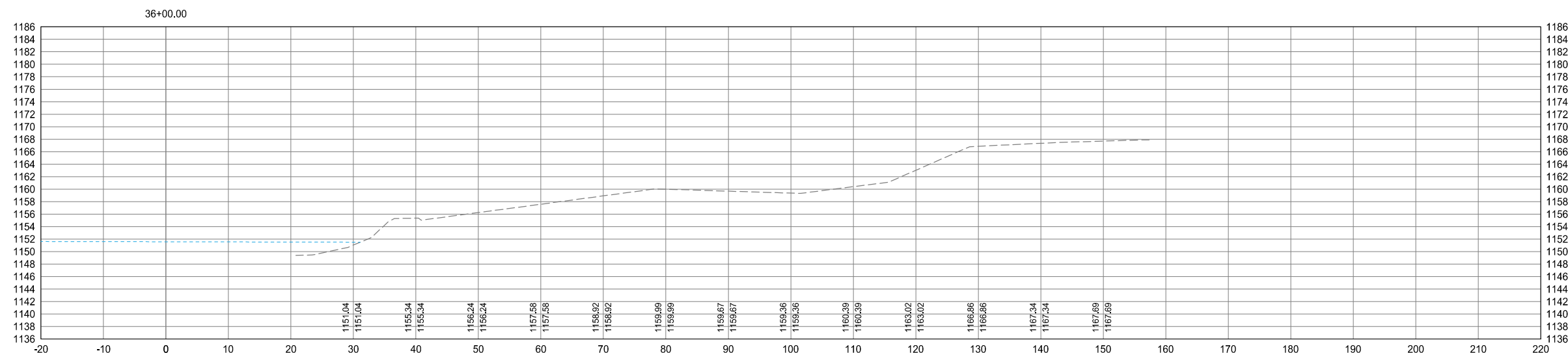
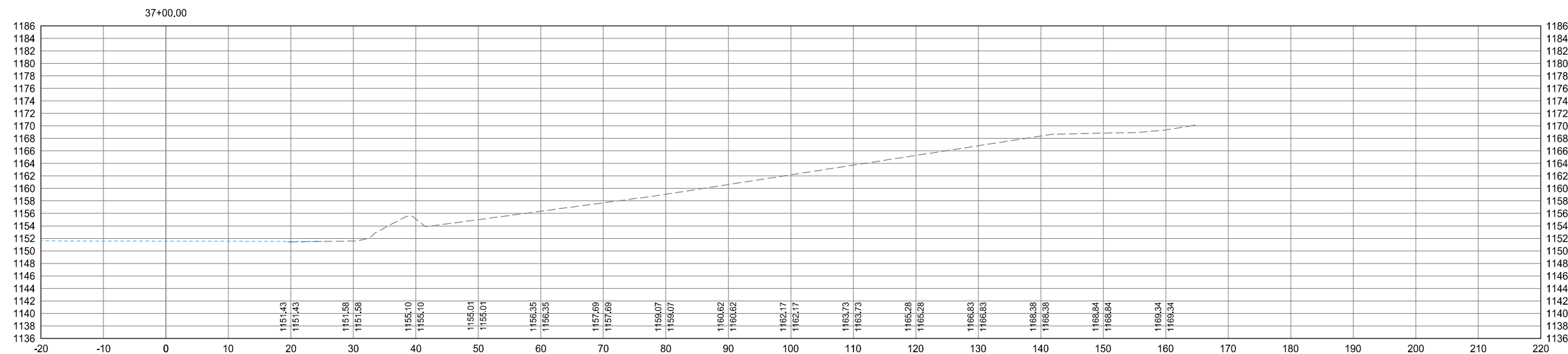
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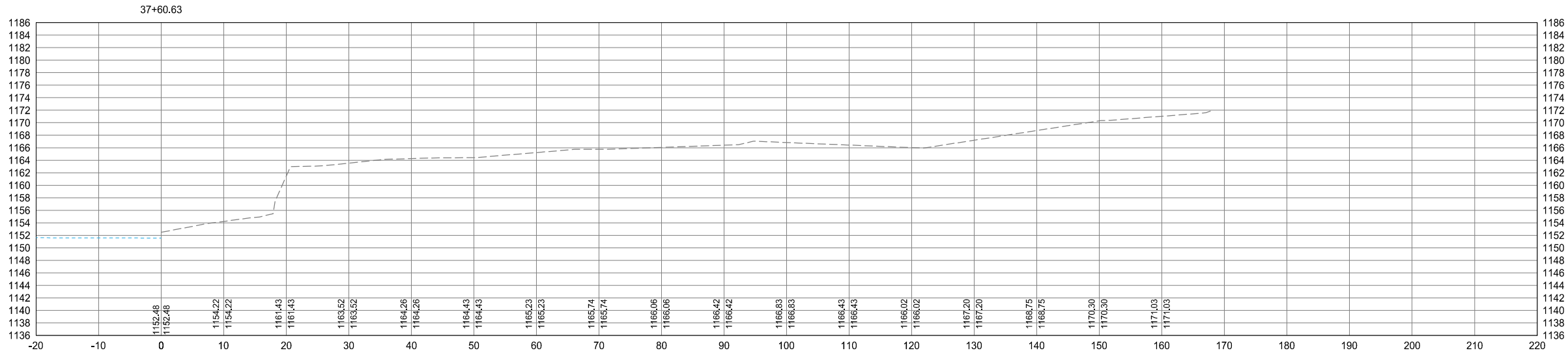
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CITY OF BRAINERD

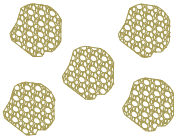
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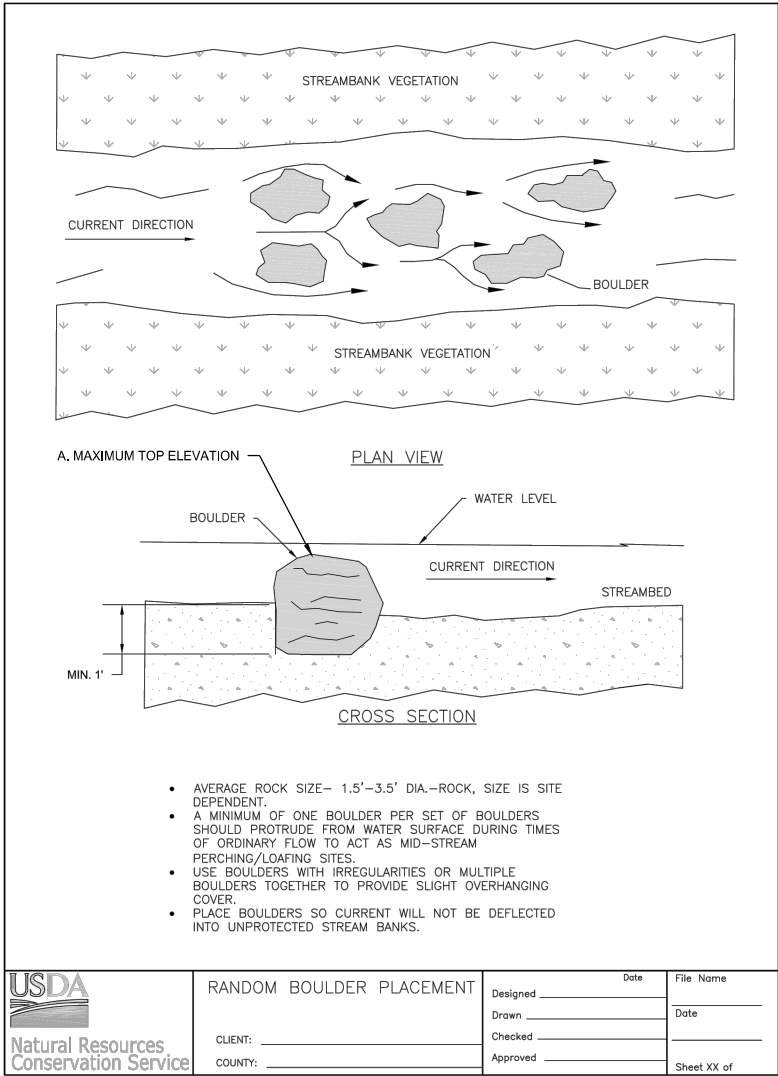
BOULDER CLUSTER



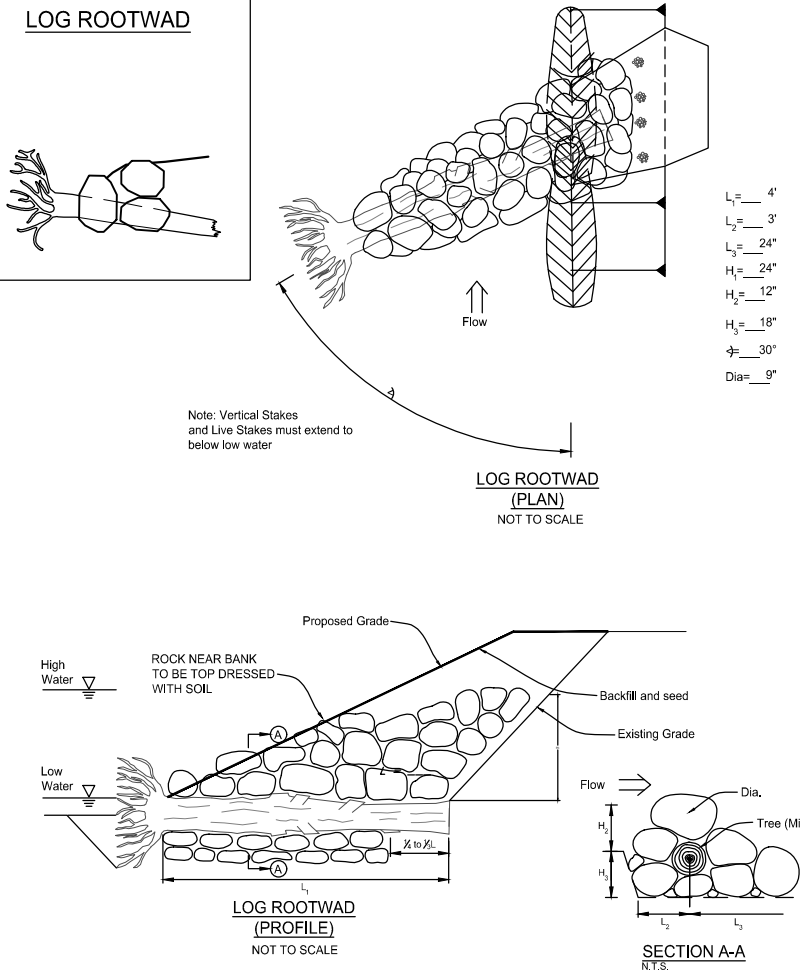
BOULDER CLUSTER NOTES:

- USE LARGE ANGULAR QUARRY BOULDERS
- PLACE BOULDERS IN THE MIDDLE TWO QUARTERS OF CHANNEL WIDTH AND NOT IN A DEPOSITION ZONE.
- BOULDERS SHOULD BE HAND PLACED BY AN EXCAVATOR WITH A THUMB ATTACHMENT AND SHOULD NOT BE DUMPED INTO THE STREAM FROM THE BANK.
- SPACING BETWEEN CLUSTERS SHOULD BE AT LEAST  $\frac{1}{3}$  OF CHANNEL WIDTH.
- BOULDERS SHOULD NOT BE PLACED IN LOW VELOCITY REACHES.
- DO NOT USE BOULDERS THAT ARE SO BIG THAT THEY DIVERT THE STREAM FROM ITS ORIGINAL CHANNEL OR INTO STREAM BANKS.

| Boulder Clusters |                             |  |
|------------------|-----------------------------|--|
| Station          | "A" - Maximum Top Elevation |  |
| 17+20            | 1149                        |  |
| 18+05            | 1149                        |  |



LOG ROOTWAD



DIMENSIONS

D = VARIES (in)

ROOTWAD

Species AS DIRECTED BY ENG. OR ENG. TECH.

Dia = 6 min (in) 12 max (in)

L = 7 min (ft) 10 max (ft)

E = 5 min (ft) 8 max (ft)

AS DIRECTED BY ENG. OR ENG. TECH. deg

FOOTER LOG

Species AS DIRECTED BY ENG. OR ENG. TECH.

Dia = 6 min (in) 12 max (in)

F = 10 min (ft) 15 max (ft)

ANGULAR ROCKS

Dia = 24 min (in) 30 max (in)

# of rocks per structure 5

**LOG ROOTWAD DETAIL**

drawing not to scale

| Station | Top of Rootwad | Top of Class V |
|---------|----------------|----------------|
| 15+10   | 1151.5         | 1153.5         |
| 15+30   | 1151.5         | 1153.5         |
| 15+50   | 1151.5         | 1153.5         |
| 15+70   | 1151.5         | 1153.5         |
| 18+50   | 1151.4         | 1153.4         |
| 19+00   | 1151.4         | 1153.4         |
| 23+75   | 1151.4         | 1153.4         |
| 24+00   | 1151.4         | 1153.4         |
| 24+50   | 1151.4         | 1153.4         |
| 26+10   | 1151.3         | 1153.3         |
| 27+50   | 1151.3         | 1153.3         |
| 29+00   | 1151.3         | 1153.3         |
| 30+50   | 1151.3         | 1153.3         |
| 32+50   | 1151.3         | 1153.3         |
| 34+25   | 1151.3         | 1153.3         |
| 35+90   | 1151.2         | 1153.2         |



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DESIGN BY: ARA  
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DATE: MM-DD-YYYY L.C. NO. 50820

**MISCELLANEOUS DETAILS**

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

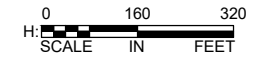
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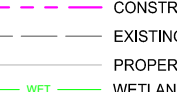
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### LEGEND

- 
- Legend for map symbols:
- STREAM STATIONING
  - CONSTRUCTION LIMITS
  - EXISTING CONTOURS (5' INCREMENTS)
  - PROPERTY LINE
  - WETLAND BOUNDARY
  - EDGE OF WATER
  - EDGE OF RIPRAP
  - EDGE OF CONCRETE
  - EDGE OF BITUMINOUS
  - ~ TREELINE
  - ▣ ROCK CONSTRUCTION EXIT
  - ← FLOW DIRECTION

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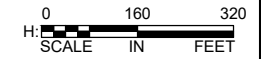
## PLANTING PLAN

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

WSB PROJECT NO.  
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### LEGEND

- |                                                                                     |                                                                                                         |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  | STREAM LIGNING                                                                                          |
|  | CONSTRUCTION LIMITS                                                                                     |
|  | EXISTING CONTOURS (5' INCREMENTS)                                                                       |
|  | PROPERTY LINE                                                                                           |
|  | WETLAND BOUNDARY                                                                                        |
|  | EDGE OF WATER                                                                                           |
|  | EDGE OF RIPRAP                                                                                          |
|  | EDGE OF CONCRETE                                                                                        |
|  | EDGE OF BITUMINOUS                                                                                      |
|  | TREELINE                                                                                                |
|  | SEDIMENT CONTROL LOG TYPE WOOD FIBER                                                                    |
|  | FLOW DIRECTION                                                                                          |
|  | WOODLAND SOUTH & WEST SEED MIX<br>36-211 @ LBS/AC. TYPE 1 MULCH<br>W/DISC ANCHORING @ 2 TONS/AC.        |
|  | WOODLAND SOUTH & WEST SEED MIX<br>36-211 @ 34.5 LBS/AC. HYDRAULIC<br>BONDED FIBER MATRIX @ 4000 LBS/AC. |

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## EROSION CONTROL & SITE RESTORATION

MISSISSIPPI RIVERBANK RESTORATION  
CITY OF BRAINERD

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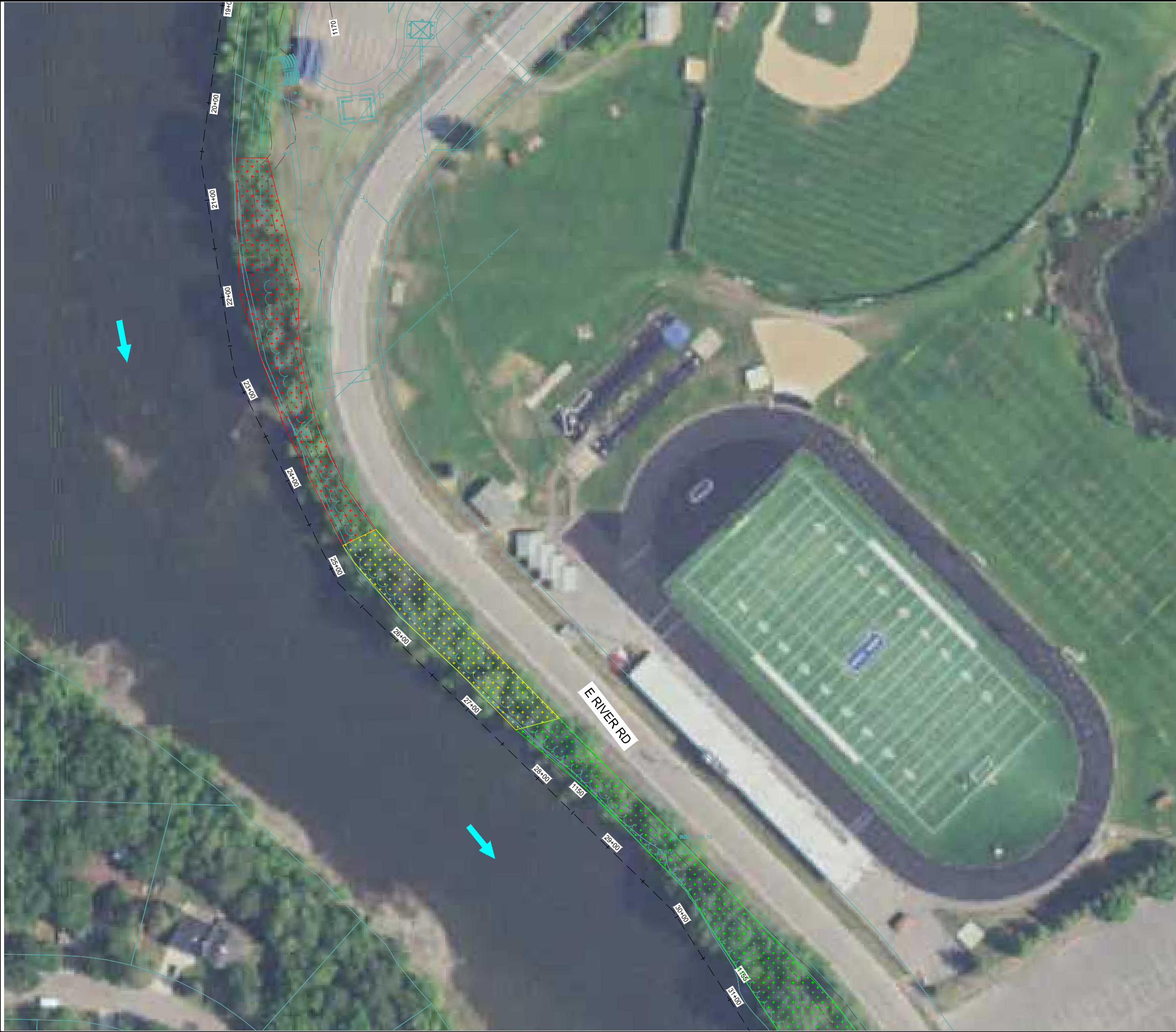
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LEGEND

- STREAM STATIONING
- CONSTRUCTION LIMITS
- EXISTING CONTOURS (5' INCREMENTS)
- PROPERTY LINE
- WET WETLAND BOUNDARY
- EDGE OF WATER
- EDGE OF RIPRAP
- EDGE OF CONCRETE
- EDGE OF BITUMINOUS
- TREELINE
- +++ VIEWSHED - HIGH INTENSITY WORK
- +++ VIEWSHED - MEDIUM INTENSITY WORK
- +++ VIEWSHED - LOW INTENSITY WORK
- ← FLOW DIRECTION

NOTES

- HIGH INTENSITY WORK INCLUDES SELECTIVE TREE HARVEST, BUCKTHORN REMOVAL, SEEDING, AND SHRUB PLANTINGS.
- MEDIUM INTENSITY WORK INCLUDES BUCKTHORN REMOVAL, SEEDING, AND SHRUB PLANTINGS.
- LOW INTENSITY WORK INCLUDES SELECTIVE TREE HARVEST ONLY.



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- CONSTRUCTION LIMITS
- EXISTING CONTOURS (5' INCREMENTS)
- PROPERTY LINE
- WET WETLAND BOUNDARY
- EDGE OF WATER
- EDGE OF RIPRAP
- EDGE OF CONCRETE
- EDGE OF BITUMINOUS
- TREELINE
- VIEWSHED - HIGH INTENSITY WORK
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CITY OF BRAINERD

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## Memorandum

To: Florence Township - Mike Blair, Town Board Supervision

From: Luke Lunde

Date: August 28, 2019

Re: WSB Project No. 014714

---

Florence Township Board Supervision Mike Blair has requested WSB to review current Valhalla Park Restoration and invasive species removal work completed in Management Zone Nine, View Zone Six and Seven by Prairie Restoration (contractor) to ensure the restoration work completed in May and June of 2019 complies with the Valhalla Park Restoration Protocol, Valhalla Park Restoration and Management Guidelines in addition to the Florence Township Park Plan.

### A. Project Location

The project is located in Valhalla Park, east of Garrard Avenue, City of Frontenac, Goodhue County, Minnesota. The project area consists of management zone nine, view zones six and seven (Figure 1).

### B. Project Purpose

Frontenac Township contracted with Prairies Restorations to complete vegetative restoration and invasive species removal in management zone nine, view zone six and seven in accordance to the Florence Township approved Valhalla Park Restoration Protocol, Valhalla Park Restoration and Management Guidelines and the Florence Township Park Plan. This memo is intended to address the current vegetative restoration and invasive species removal work completed by Prairies Restorations in May and June of 2019 in management zone nine, view zone six and seven. This project was authorized by Mike Blair-Florence Township Supervisor.

### C. Project Scope

The scope of this project was to complete an onsite review the existing conditions post restoration and invasive species removal efforts within the project area on August 14, 2019 and complete a summary memo of that includes the onsite review findings in addition to compliance with the Valhalla Park Restoration Protocol, Valhalla Park Restoration and Management Guidelines and the Florence Township Park Plan.

### D. Summary of Findings

#### *Onsite Site Review*

A review of existing site conditions was performed within the project area on August 14, 2019. The site review consisted of species dominance, erosion control/site stability and contractor prairie restoration and invasive species services compliance with the Valhalla Park Restoration Protocol, Valhalla Park Restoration and Management Plan Guidelines and Florence Township Park Plan.



Site inspection was completed at numerous locations throughout management zone 9, view zone 6 and 7. Site photos were taken at each location (See Appendix A). A description of the location, dominant vegetation and site stability were recorded at each location.

#### ***Valhalla Park Restoration Protocol Compliance***

After review of the existing conditions, Valhalla Park Restoration Protocol, Valhalla Park Restoration and Management Guidelines, Florence Township Park Plan and correspondence with the site contractor Prairie Solutions and Florence Township, the invasive species removal onsite currently meets the objective standards specified in step one objective of the Valhalla Park Restoration Protocol - to create a platform for subsequent steps by removing invasive and low priority trees, e.g. green ash, black locust, box elder, sumac and some hackberry.

The current outcome of the work completed has thinned the woods through removal of invasive species while at the same time as a result of the establishment of some of the current planted seed mix species and volunteer vegetation stabilized previous unstable soil conditions onsite.

Results of the onsite review include some planted species encountered onsite (See Appendix A). Continued vegetative management as specified in the Valhalla Park Restoration Protocol, Valhalla Park Restoration and management plan will be required to ensure establishment of native species planted in June of 2019 and maintain the project area due to invasive plant species encountered during the site review. These species include but are not limited to Buckthorn, Prickly Ash, and Giant Ragweed (See Appendix A and B). Remaining tree species in View Zones 6 and 7 include Pine Oak, Cottonwood, Basswood, Black Walnut and American Elm.

**Figure 1: Valhalla Park Management Plan - Site Map**







**Appendix A: 8/14/19 Site Inspection Photos**

View Zone 7



Photo #1: Dominant Species – Black Walnut, Wild Cucumber, Black Eyed Susan, Prickly Ash  
Site Stability: 100% Vegetative Cover no erosion encountered

View Zone 7



Photo #2: Dominant Species - Wild Cucumber, Black Eyed Susan, Giant Ragweed  
Site Stability: 95% Vegetative Cover no erosion encountered



View Zone 7



Photo #3: Dominant Species - Wild Cucumber, Black Eyed Susan, Prickly Ash  
Site Stability: 100% Vegetative Cover no erosion encountered

View Zone 7



Photo #4: Dominant Species - Wild Cucumber, Jewel Weed, Heath Aster  
Site Stability: 100% Vegetative Cover no erosion encountered

View Zone 7



Photo #5: Dominant Species - Wild Cucumber, Jewel Weed, Common Ox-eye, Prickly Ash, Aster  
Site Stability: 100% Vegetative Cover no erosion encountered

View Zone 7



Photo #6: Dominant Species – Wild Cucumber, Common Ox-eye, Jewel Weed, Buckthorn  
Site Stability: 100% Vegetative Cover no erosion encountered



View Zone 7

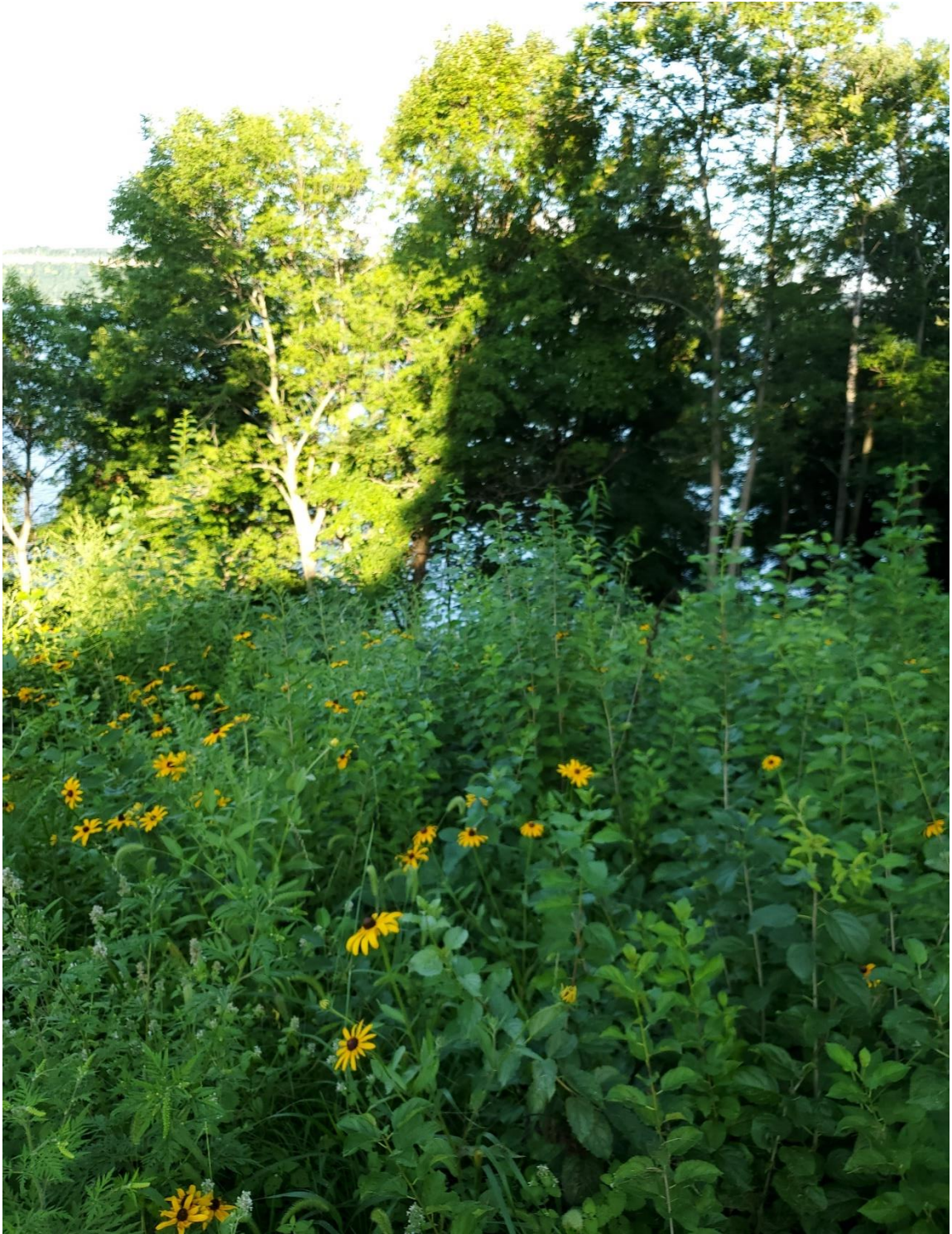


Photo #7: Dominant Species – Black Eyed Susan, Giant Ragweed, Buckthorn  
Site Stability: 95% Vegetative Cover no erosion encountered



View Zone 7



Photo #8: Dominant Species – Black Walnut, Giant Ragweed, Black Eyed Susan, Buckthorn  
Site Stability: 95% Vegetative Cover no erosion encountered



View Zone 6



Photo #9: Dominant Species – Giant Ragweed, Black Walnut, Black-eyed Susan, Prickly Ash  
Site Stability: 95% Vegetative Cover no erosion encountered



Photo #10: Dominant Species - Wild Cucumber, Jewel Weed, Prickly Ash  
Site Stability: 100% Vegetative Cover no erosion encountered



View Zone 6



Photo #11: Dominant Species – White Aster, Slender Wheat Grass, Jewel Weed, Ragweed  
Site Stability: 100% Vegetative Cover no erosion encountered



View Zone 6



Photo #12: Dominant Species – White Aster, Jewel weed, Giant Ragweed, Heath Aster  
Site Stability: 100% Vegetative Cover no erosion encountered



View Zone 6



Photo #13: Dominant Species – Black Walnut, Black-eyed Susan, White Aster, Jewel Weed  
Site Stability: 100% Vegetative Cover no erosion encountered



View Zone 6



Photo #14: Dominant Species - Wild Cucumber, Stinging Nettle, Giant Ragweed, Prickly Ash  
Site Stability: 95% Vegetative Cover no erosion encountered



View Zone 6



Photo #15: Dominant Species - Wild Cucumber, Black Walnut, Jewel Weed, Prickly Ash  
Site Stability: 100% Vegetative Cover no erosion encountered

View Zone 6



Photo #16: Dominant Species - Wild Cucumber, Jewel Weed, Basswood, Prickly Ash, Pin Oak  
Site Stability: 100% Vegetative Cover no erosion encountered



## Appendix B: Prairie Restorations Seeding and Planting Plan-Seed Mixes

### G. Plants and Planting:

1. Immediately following the seeding, the planting will be further diversified with native wildflower and/or grass plants (plugs or 4 inch pots). These will be planted individually in appropriate microhabitats throughout, or in designated areas of the project. The plants used will consist primarily of species other than those previously seeded.

#### **At least 20 species from this list at a target rate of 2,500 per acre**

|                                                     |                                                           |
|-----------------------------------------------------|-----------------------------------------------------------|
| Starry Solomon's Seal ( <i>Smilacina stellate</i> ) | Pasque Flower ( <i>Anemone patens</i> )                   |
| Prairie Groundsel ( <i>Packera plattensis</i> )     | Flowering Spurge ( <i>Euphorbia corollata</i> )           |
| Pennsylvania Sedge ( <i>Carex pensylvanica</i> )    | Alum Root ( <i>Heuchera americana</i> )                   |
| Prairie Sage ( <i>Artemisia ludoviciana</i> )       | Harebell ( <i>Campanula rotundifolia</i> )                |
| Prairie Rose ( <i>Rosa arkansana</i> )              | Butterfly Weed ( <i>Asclepias tuberosa</i> )              |
| Sand Reed ( <i>Calamovilfa longifolia</i> )         | Long-leaved Bluets ( <i>Houstonia longifolia</i> )        |
| Northern Bedstraw ( <i>Galium boreale</i> )         | Thimbleweed ( <i>Anemone cylindrica</i> )                 |
| Prairie Phlox ( <i>Phlox pilosa</i> )               | Prairie Violet ( <i>Viola pedatifida</i> )                |
| Prairie Larkspur ( <i>Delphinium carolinianum</i> ) | False lily-of-the-valley ( <i>Maianthemum dilatatum</i> ) |
| Pussytoes ( <i>Antennaria neglecta</i> )            | Azure Aster ( <i>Symphyotrichum oolentangiense</i> )      |
| Wild Strawberry ( <i>Fragaria virginiana</i> )      | Bird's-foot Violet ( <i>Viola pedata</i> )                |
| Compass Plant ( <i>Silphium laciniatum</i> )        | Heart-leaved Aster ( <i>Aster cordifolius</i> )           |
| Prairie Smoke ( <i>Geum triflorum</i> )             | Kittentails ( <i>Besseyia bullii</i> )                    |
| Wild Geranium ( <i>Geranium maculatum</i> )         | Cream Wild Indigo ( <i>Baptisia bracteata</i> )           |
| Hairy Grama ( <i>Bouteloua hirsuta</i> )            | Silky Aster ( <i>Symphyotrichum sericeum</i> )            |

### H. Management: [http://www.prairieresto.com/management\\_overview.shtml](http://www.prairieresto.com/management_overview.shtml)

1. Management (maintenance) plays a vital role in the eventual success of any native landscape installation, especially during the establishment period.
2. During the germination year, the project area may need to be mowed to control annual weed development. If a "closed" canopy of weed cover develops, it should be mowed to aid in the growth of the prairie seedlings by reducing competition. Mowing may also be necessary if the weeds are about to set seed. Optimum cutting height, depending on the wildflower species present, is typically 4 to 6 inches.
3. In years following the first growing season, Integrated Plant Management (IPM) services are utilized to control annual, biennial and perennial weed species within the developing native landscape. Typical IPM services include spot herbicide spraying, spot mowing, herbicide wicking or hand weeding.
4. Prescribed burning is a highly effective management tool and is recommended for aggressive use to maintain savanna. It will be the primary and most effective management tool.

**E. Site preparation:** [http://www.prairieresto.com/installation\\_preparation.shtml](http://www.prairieresto.com/installation_preparation.shtml)

1. Remove invasive woody species such as European buckthorn (*Rhamnus cathartica*) and Eurasian Honeysuckle (*Lonicera* spp.) by flush cutting and stump treating with Triclopyr herbicide (Garlon 4® or equivalent), to be completed by April of 2019.
2. Remove the dead vegetation by implementing a controlled burn using appropriate procedures, equipment and permits.
3. Drag or rake the soil to prepare the seedbed.

**F. Seed and Seeding:**

1. Seeding dates will be in the spring or summer before June 30, 2019
2. All seed will be applied by broadcasting.
3. The seed mixes will consist of the following species and amounts regionally suited to the area, all by PLS weight.

**Grasses & Sedges 15lbs/acre**

35% Little bluestem (*Schizachyrium scoparium*)  
25% Side oats grama (*Bouteloua curtipendula*)  
12% Junegrass (*Koeleria macrantha*)  
12% Prairie dropseed (*Sporobolus heterolepis*)  
5% Porcupine grass (*Hesperostipa spartea*)

4% Big bluestem (*Andropogon gerardii*)  
4% Kalm's brome (*Bromus kalmii*)  
2% Indian grass (*Sorghastrum nutans*)  
1% Switchgrass (*Panicum virgatum*)

**Forbs 2.5lbs/acre**

14% Purple prairie clover (*Dalea purpurea*)  
12% Black-eyed Susan (*Rudbeckia hirta*)  
8% Hoary vervain (*Verbena stricta*)  
8% White prairie clover (*Dalea candida*)  
7% Leadplant (*Amorpha canescens*)  
6% Golden Alexander (*Zizia aurea*)  
5% Wild Lupine (*Lupinus perennis*)  
4% Bush clover (*Lespedeza capitata*)  
3% Gray Goldenrod (*Solidago nemoralis*)  
3% Prairie rose (*Rosa arkansana*)  
3% Wild bergamot (*Monarda fistulosa*)  
3% Yellow Coneflower (*Ratibida pinnata*)  
3% Stiff goldenrod (*Solidago rigida*)  
3% Rough Blazing Star (*Liatris aspera*)

2% Stiff Sunflower (*Helianthus pauciflorus*)  
2% Common ox-eye (*Heliopsis helianthoides*)  
2% Showy goldenrod (*Solidago speciosa*)  
2% Prairie cinquefoil (*Drymocallis arguta*)  
2% Dotted Blazing Star (*Liatris punctata*)  
1.5% Canada tick trefoil (*Desmodium canadense*)  
1% Whorled Milkweed (*Asclepias verticillata*)  
1% Stiff Tickseed (*Coreopsis palmata*)  
1% Evening Primrose (*Oenothera biennis*)  
1% Purple giant  
hyssop (*Agastache scrophulariifolia*)  
0.5% Yarrow (*Achillea millefolium*)  
0.5% Smooth aster (*Symphyotrichum laeve*)  
0.5% Heath Aster (*Symphyotrichum ericoides*)



**Mississippi Riverbank Restoration 60% Design Engineer's Estimate of Cost**  
**August 16, 2023**

| Line                           | MnDOT Spec     | Item                                  | Unit | Quantity | Unit Cost   | Total Cost          |
|--------------------------------|----------------|---------------------------------------|------|----------|-------------|---------------------|
| 1                              | 2021.501/00010 | MOBILIZATION                          | L S  | 1        | \$15,000.00 | \$15,000.00         |
| 2                              | 2051.501/00010 | MAINT & RESTORATION OF HAUL ROADS     | L S  | 1        | \$2,000.00  | \$2,000.00          |
| 3                              | 2101.605       | SELECTIVE HARVEST W/BUCKTHORN REMOVAL | AC   | 1.96     | \$12,000.00 | \$23,520.00         |
| 4                              | 2511.507/00015 | RANDOM RIPRAP CLASS IV                | C Y  | 104      | \$130.00    | \$13,520.00         |
| 5                              | 2511.507/00016 | RANDOM RIPRAP CLASS V                 | C Y  | 8        | \$150.00    | \$1,200.00          |
| 6                              | 2571.502       | CONTAINER TREE                        | EA   | 135      | \$650.00    | \$87,750.00         |
| 7                              | 2573.503/00064 | SEDIMENT CONTROL LOG TYPE COMPOST     | L F  | 90       | \$5.00      | \$450.00            |
| 8                              | 2573.602       | STABILIZED CONSTRUCTION EXIT          | EA   | 1        | \$2,000.00  | \$2,000.00          |
| 9                              | 2575.601/00030 | EROSION CONTROL                       | L S  | 1        | \$5,000.00  | \$5,000.00          |
| 10                             | 2575.508       | SEED MIXTURE 36-211                   | LB   | 68       | \$42.00     | \$2,856.00          |
| 11                             | 2575.508       | HYDRAULIC STABILIZED FIBER MATRIX     | LB   | 4,500    | \$2.00      | \$9,000.00          |
| 12                             | 2575.509       | TYPE 1 MULCH WITH DISC ANCHORING      | TON  | 1.7      | \$275.00    | \$467.50            |
| 13                             | 2575.601/00050 | PLANT MANAGEMENT - YEAR 1             | L S  | 1        | \$8,000.00  | \$8,000.00          |
| 14                             | 2577.502       | LOG ROOTWAD                           | EA   | 16       | \$300.00    | \$4,800.00          |
| 15                             | 2577.502/00020 | LIVE STAKES                           | EA   | 70       | \$12.00     | \$840.00            |
| <b>CONSTRUCTION TOTAL</b>      |                |                                       |      |          |             | <b>\$176,403.50</b> |
| <b>CONTINGENCY TOTAL (20%)</b> |                |                                       |      |          |             | <b>\$35,280.70</b>  |
| <b>TOTAL</b>                   |                |                                       |      |          |             | <b>\$211,684.20</b> |