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Post Office Box 942836
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Subject: Revised Five-Year Plan
Reclamation District No. 2028, Bacon Island

Dear Ms. Lobato:

On behalf of Reclamation District No. 2028, attached is the final draft of Reclamation District No. 2028, Bacon Island, Five-Year Plan (Plan). The final Plan includes maps, cost estimates, cross-sections, background literature, DWR comments and the District's response to the comments.

If you have any questions, please call me at (916) 456-4400.

Sincerely,
MBK ENGINEERS

Nate Hershey, P.E.

BJ
4290-18 ANDREA LOBATO 2022-12-08

cc: Reclamation District No. 2028
Mr. David A. Forkel (w/o attachments)

December 5, 2022

RECLAMATION DISTRICT NO. 2028 BACON ISLAND

2022 FIVE–YEAR PLAN

PRESENTED BY: MBK ENGINEERS
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TABLE OF CONTENTS

List of Tables

List of Abbreviations

AB – Aggregate Base
CDFW – California Department of Fish and Wildlife
CEQA – California Environmental Quality Act
DFG – California Department of Fish and Game
DRMS - Delta Risk Management Strategy
DWR – California Department of Water Resources
EIR/S – Environmental Impact Report/Statement
FEMA – Federal Emergency Management Agency
HMP – Hazard Mitigation Plan
LAFCO – Local Agency Formation Commission
LiDAR – Light Detection and Ranging
LHA – Levee Habitat Assessment
PG&E – Pacific Gas and Electric
NGVD – National Geodetic Vertical Datum
USACE – United States Army Corps of Engineers
RMA – Routine Maintenance Agreement

Appendices

Appendix A – Maps and Exhibits
Appendix B – Typical Cross Sections, Levee Profiles and Cross Sections
Appendix C – Cost Estimates
Appendix D – Habitat Assessment
Appendix E – Response to Comments

Section 1. Executive Summary

EXECUTIVE SUMMARY

Reclamation District No. 2028 (District), Bacon Island, has prepared this Five-Year Plan (Plan) to support future planning efforts by the California Department of Water Resources (DWR) and local agencies. This plan is comprised of historical knowledge of the District, as well as recent findings and analysis to describe its existing conditions and future plans. This document will serve as a guide for future project development for the District.

The District's goal has been to attain and maintain its levee system at or above a sustainable minimum levee standard. The District's levee system consists of approximately 14.34 miles of non-project levee in the Delta primary zone including 1.33 miles along Railroad Cut, 5.28 miles along Old River, 2.71 miles along Connection Slough, and 5.02 miles along Middle River. The existing levee system meets the minimum elevation requirements of the Federal Emergency Management Agency's (FEMA) Short Term Hazard Mitigation Plan[1] (HMP) for an agricultural levee in the Sacramento-San Joaquin Delta (Delta). The District continues to maintain this minimum geometry to remain eligible for federal assistance in the event of a disaster. The District's long-term rehabilitation plans incorporate an increase in the levee dimensions based on geotechnical recommendations to achieve DWR's Bulletin 192-82[2] levee standard, as well as improve overall levee integrity.

With 95 percent cost share from DWR, and approval from the California Department of Fish and Wildlife (CDFW) and other agencies to proceed with planning, documentation, and design, the District can complete all rehabilitation to meet a sustainable Bulletin 192-82 levee standard within five years, subject to funding. To meet the adopted standard, the District will need roughly 954,000 cubic yards of onsite fill and 93,000 tons of imported aggregate base (Appendix B, Quantity Estimate). Engineering, planning, and construction are expected to cost an estimated $28.8 million (Appendix C, Cost Estimate) if onsite borrow material is available. This plan assumes funding will be available under the Delta Levees Special Flood Control Projects Program, also referred to as Special Projects, as the District implements rehabilitation over the identified five-year period. DWR's involvement and any other agencies willing to contribute funding will help the District achieve their goal.

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[1] HMP criteria are requirements to qualify for future federal disaster assistance. Minimum criteria include (1) levees shall have a 1' of freeboard above the 100-year flood frequency elevation, as provided by the USACE; (2) the minimum crown width shall be at least 16'; (3) waterside slopes shall be at least 1.5 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slope shall be at least 2 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

[2] Bulletin 192-82 standards are levee standards established by Bulletin 192 published by DWR in December 1982. Minimum standards include (1) levees shall have a 1.5' of freeboard above the 300-year flood frequency elevation, as provided by the USACE; (2) the minimum crown width shall be at least 16'; (3) waterside slopes shall be at least 2 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slope shall be at least 3 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

Section 2. Background

FOREWORD

The levee protecting Bacon Island is maintained by Reclamation District No. 2028 (District). The District was formed on March 21, 1918 to maintain the District's levee system that protects approximately 5,625 acres of agricultural land, local infrastructure and on-island assets. Bacon Island has approximately 20 residents and there is no known transient population.

Bacon Island is located in the central Delta in San Joaquin County, north of Woodward Island, east of both Holland and Palm Tracts, south of Mandeville Island and west of both Mildred Island and Lower Jones Tract (Appendix A, Vicinity Map). The District can be accessed by land via Bacon Island Road, as well as by personal watercraft or barge. The location of the District along Old and Middle Rivers, as well as the infrastructure located on-island, combine to make the District's reliability and sustainability of significant value to regional and statewide interests (Appendix A, Regional Infrastructure Map).

The 14.34-mile-long levee system protects critical utility infrastructure, which includes natural gas pipelines owned and operated by the Pacific Gas and Electric Company (PG&E). Approximately 4.3 miles of pipeline are within the island's perimeter levee system (Appendix A, District Infrastructure Map). A variety of agricultural operations are also protected. Total assets are estimated at nearly $44 million based on the Delta Risk Management Strategy (DRMS) Phase 1 analysis, Impact to Infrastructure Technical Memorandum. This does not include the land value which is estimated to be approximately $44.1 million, according to 2018 data obtained from the San Joaquin County Assessor.

The perimeter levee system protects an important variety of habitat, as documented in the EIR/S for the Delta Wetlands Project, dated September 1995, and updated for changes to cropping patterns in 2008. In 2008, 578 acres were planted in wheat, 1,914 in corn, 1,787 in alfalfa, 207 in oats, and 374 in sunflower. As of 2008, the island also contains wetlands (58.63 acres) and other waters such as canals, ditches, and ponds (45.51 acres). Some agricultural operations are seasonally flooded over the fall and winter (Draft Place of Use Environmental Impact Report, 2010).

In accordance with FEMA's Short-Term HMP requirements, the District rehabilitated its levee to the HMP criteria in the early 1990s. The District maintains its levee at or above the HMP standard levee elevation (Appendix B, Typical Cross Section). There is also a well-maintained all-weather road around the District. Given the existing peat foundation thicknesses present in this area of the Delta, the perimeter levee system is susceptible to foundation consolidation thus requiring maintenance to comply with the HMP short-term criteria.

The District's long-term goal is to attain and maintain its levee at or above the DWR Bulletin 192-82 standard for an agricultural levee. Prior to project implementation, the District's geotechnical engineer provides design recommendations for sustainably meeting the selected design standard for an extended period of time based on the existing site conditions. This plan was prepared based

on typical design parameters utilized in past projects, and the District can reasonably expect similar design criteria for future projects. Based on these assumptions, several miles of levee require rehabilitation to meet these standards and to protect the resources and key infrastructure on the island. The District is working aggressively to rehabilitate its levee and has identified high priority reaches of levee requiring rehabilitation.

The District's levee system is important to statewide planning as it protects key utility and conveyance corridors. The levee system provides protection along Old and Middle Rivers, which are along the conveyance corridors supplying fresh water to the State Water Project and the Central Valley Project. The conveyance route along Middle River and Victoria Canal to the export pumps is identified as the Emergency Freshwater Pathway by the State Water Contractors providing emergency conveyance to south Delta export facilities in the event of severe earthquake-generated levee failures in the south Delta. Its development and operation is referred to as the Earthquake Middle River Recovery Strategy in the Department of Water Resources' Delta Flood Emergency Management Plan (DWR, 2018). There are public roads and utilities on-island, including two large Pacific Gas and Electric natural gas pipelines. This Plan describes the District's intent to reach a sustainable Bulletin 192-82 levee standard within a five-year period. The ability of the District to meet this standard within five years is entirely dependent on funding support from DWR.

Assessment of the Status of the Existing Levee System

The District's levee system has historically protected the island from flooding or severe overtopping. There have been multiple instances of seepage or erosion, which have been repaired and improved to maintain the integrity of the levee. The District currently maintains its levee by utilizing funds within the Delta Levees Maintenance Subventions Program (Subventions Program). The District has also performed rehabilitation projects under the Special Projects Program as recent as 2019. The District's goal is to progress towards complete rehabilitation to sustainably meet or exceed the Bulletin 192-82 levee standard. The cost and effectiveness of recent projects indicate that full rehabilitation is attainable within five years with adequate funding from DWR.

Historical Flood Issues

Bacon Island has flooded once, in 1938. In recent years, there have been several flood fights and erosion repairs in the area, although no flooding or inundation of the island has been reported.

Existing Level of Protection Provided by Levee System

In 1987, the District surveyed its levee as required by FEMA. It was found that portions of the levee crown were as much as 3.2 feet below the 100-year flood elevation, or 4.2 feet below the minimum HMP standard. In addition, portions of the levee crown roadway were not graveled and impassable when wet. Since the passage of Senate Bill 34 (SB 34) in 1988, the District has raised, and continues to maintain, its levee above the HMP minimum elevation. The District has

also constructed and maintains an all-weather gravel access crown roadway in areas where there is no county-maintained roadway.

As with any typical Delta island, subsidence of peat has occurred historically on Bacon Island. Generally, subsidence as a result of farming activity does not appear to be occurring close enough to the levee to be of concern from a stability standpoint. The current elevations (2017-2018 DWR Delta LiDAR) of the island are shown in Appendix A, District Elevation Exhibit. The elevations of the island floor generally range from -4 feet to -20 feet (NGVD 29 Datum).

Recent rehabilitation projects have raised and widened the levee to sustainably meet HMP for an extended period of time. However, areas that have not been recently rehabilitated have very little overbuild above the HMP minimum elevation. Consequently, as the underlying foundation material consolidates, the District must continue to add material to the levee crown to maintain minimum elevation standards. The following table identifies existing levee standard conditions.

TABLE 1. EXISTING LEVEE STANDARD CONDITIONS

Levee Standard	**Stationing** (*feet*)	**Total Length** *(miles)*	**Percent Compliant** (%)
At HMP or Above	0+00 to 756+92	14.3	100
At PL 84-99 or Above	Various	6.5	45
At Bulletin 192-82 or Above	Various	0.4	3

Maps identifying the areas meeting HMP, PL 84-99 and Bulletin 192-82 are included in the appendix. Specific stationing for the levee standard conditions is included in Appendix B. There are no miles of levee meeting FEMA requirements. All levee work completed has utilized the Subventions and Special Projects Programs since the inception of the Programs.

PREVIOUS FIVE-YEAR PLAN PROGRESS REPORT

SUMMARY OF PREVIOUSLY SUBMITTED FIVE-YEAR PLAN

In 2009, the District's Five-Year Plan included a toe berm project recommended for funding under Special Projects for fiscal year 2008/2009 as well as 5 phases of future improvements. At the time of submittal, the toe berm project was on the east levee along Middle River from Station 50+00 to 200+00. Phase 1 included the southwest levee along Old River from Station 550+00 to 625+00. Phase 2 included the west levee along Old River from Station 430+00 to 550+00. Phase 3 included the west levee along Old River from 360+00 to 430+00. Phase 4 included the northwest levee along Connection Slough and Old River from Station 265+00 to

360+00. Finally, Phase 5 encompassed the north levee along Connection Slough from Station 200+00 to 265+00.

STATUS OF PROJECTS SUBMITTED IN 2009 FIVE-YEAR PLAN

Since submitting the 2009 Five-Year Plan, the District completed what was identified as the Toe Berm Project as well as Phases 1-3 and a portion of Phase 4. Table 2 below provides a summary of the status of the previously proposed projects. Work that was not completed under the 2009 Five-Year Plan has been included and prioritized in the 2022 Five-Year Plan.

TABLE 2. STATUS OF 2009 FIVE-YEAR PLAN PROJECTS

2009 Phase	Standard	Stationing (*feet*)	Completion Date	Objectives Achieved
Toe Berm Project	N/A	50+00 - 200+00	May 2013	Rehabilitated levee; increased stability; 100% complete
Phase 1	Sustainable HMP	550+00 - 625+00	November 2014	Rehabilitated levee; encroachments removed; 100% complete
Phase 2	Sustainable HMP	430+00 - 550+00	November 2019	Rehabilitated levee; encroachments removed; habitat enhanced; 100% complete
Phase 3	Sustainable HMP	360+00 - 430+00	November 2019	Rehabilitated levee; encroachments removed; habitat enhanced; 100% complete
Phase 4	Sustainable HMP	265+00 - 360+00	November 2019 (300+00 – 360+00) Work Not Completed (265+00 – 300+00)	Rehabilitated levee; encroachments removed; habitat enhanced; 63% complete
Phase 5	Sustainable HMP	200+00 – 265+00	Work Not Completed	N/A; 0% complete
CALFED Levee Stability Program	PL 84-99	0+00 – 200+00 625+00 – 756+92	Work Not Completed	N/A; 0% complete

Objectives not achieved were primarily a result of a lack of funding. Adequate funding is necessary for the District to achieve future objectives.

HISTORY WITH THE DELTA LEVEES PROGRAM

PARTICIPATION WITH DELTA LEVEES SPECIAL PROJECTS & MAINTENANCE SUBVENTIONS PROGRAMS

The District is a long-time participant in both the Delta Levees Special Projects and Delta Levees Maintenance Subventions Programs. The District has participated in the Special Projects Program after the Program was made available to reclamation districts outside the eight western Delta islands. The District completed rehabilitation of approximately 2.8 miles of levee toe berm in May 2013 (BN-09-2), 1.4 miles of levee in November 2014 (BN-10-1), and 4.7 miles of levee in November 2019 (BN-15-1-SP) under the Special Projects Program. These projects are identified above as "Toe Berm Project," Phases 1-3 and a portion of Phase 4. With the exception of the toe berm project, the rehabilitation included habitat enhancements, including 4 discrete enhancement areas and the landside slopes were drill-seeded with native grasses. Participation in the Special Projects Program allowed the District to meet the Five-Year Plan objectives in the project areas.

The District has participated in the Subventions Program each year since 1987 and has received a total of $7,010,478.84 to date through the program. The average annual amount received is $202,758.90. Participation in the Subventions Program and the State assistance received enables the District to maintain the levee system in its current configuration. The entire levee system is eligible for participation in both the Special Projects and Subventions Programs.

Section 3. Plan for Flood Protection

DESIRED LEVEL OF PROTECTION AND STRATEGY TO MEET GOAL

DESIRED LEVEL OF PROTECTION PLANNED WITHIN FIVE-YEARS

The District's goal is to meet the Bulletin 192-82 levee standard within a five-year period. Each project will have specific design recommendations by the District's geotechnical engineer for sustainably meeting the Bulletin 192-82 standard for an extended period of time. DWR conducted studies of levee design criteria suitable for use in the Delta and published its results in 1983 as DWR Bulletin 192-82. The Bulletin 192-82 cross-section recommendations produces a levee that is designed for a water level with a 1 in 300 annual chance of occurrence; including freeboard of 1.5 feet for levees protecting rural areas and freeboard of 3 feet for levees protecting urban areas. The levee system in this case directly protects rural areas, although indirectly facilitates conveyance of fresh water to extensive urban areas. Meeting a sustainable levee standard will provide the necessary levee improvements to help prevent levee breaches or overtopping, and other catastrophic or emergency events. This standard would also likely enable the District to be eligible for FEMA assistance, potentially providing the ability to leverage federal funds in the event of a disaster. Typical levee cross sections are included in Appendix B.

It should be noted that as the District implements projects to meet the Bulletin 192-82 standard, the levees will also meet the U.S. Army Corps of Engineers PL 84-99 guidelines for rehabilitation of non-federal levees in the Delta, including waterside slopes of 2:1 minimum, landside slopes of 3:1 to 5:1 depending on depth of peat, a 16-foot minimum crown width, 1.5 feet of freeboard above the 100-year flood elevation and a toe drain at a prescribed distance from the landside toe.

PHASING OF WORK AND LIST OF PROPOSED PROJECTS

The District has phased the work for the Plan according to the existing conditions of the levee structure as well as its geographic location (Appendix A, Project Phasing Exhibit and Appendix B, 500 Foot Conceptual Design Cross Sections). Reaches that currently have lower crown elevations and relatively narrow crown widths or experience stability issues are a higher priority than other areas. The geographic location of a levee reach is also considered. An example of why this is important is a levee reach that exists adjacent to a wide expanse of open water may be subject to more harsh environmental conditions (e.g. increased wind and wave erosion) than other areas of the levee system.

The proposed rehabilitation plan consists of six phases of construction. It should be noted that the proposed phasing can be modified based on the availability of funds and is intended for use as a planning tool only. The first five phases of construction will consist of full rehabilitation of the levee. The final phase of construction includes portions of the levee system that require minimal rehabilitation and will consist primarily of aggregate base (AB) placement on the levee crown.

Phase 1 (Project Phasing Map, Exhibit A) will include the south levee along Santa Fe Cut from Station 625+00 to 707+00. Phase 2 will include the north levee along Connection Slough from 200+00 to 300+00. Phase 3 includes the east levee along Middle River from Station 120+00 to 200+00. Phase 4 will include the east levee along Middle River from Station 40+00 to 120+00. Phase 5 will include the east levee along Middle River from Stations 707+00 to 756+92 and 0+00 to 40+00. Phase 6 involves work on the crown of the levee and will include placing AB on the remainder of the island previously rehabilitated. AB will be placed to meet Bulletin 192-82 elevation criteria.

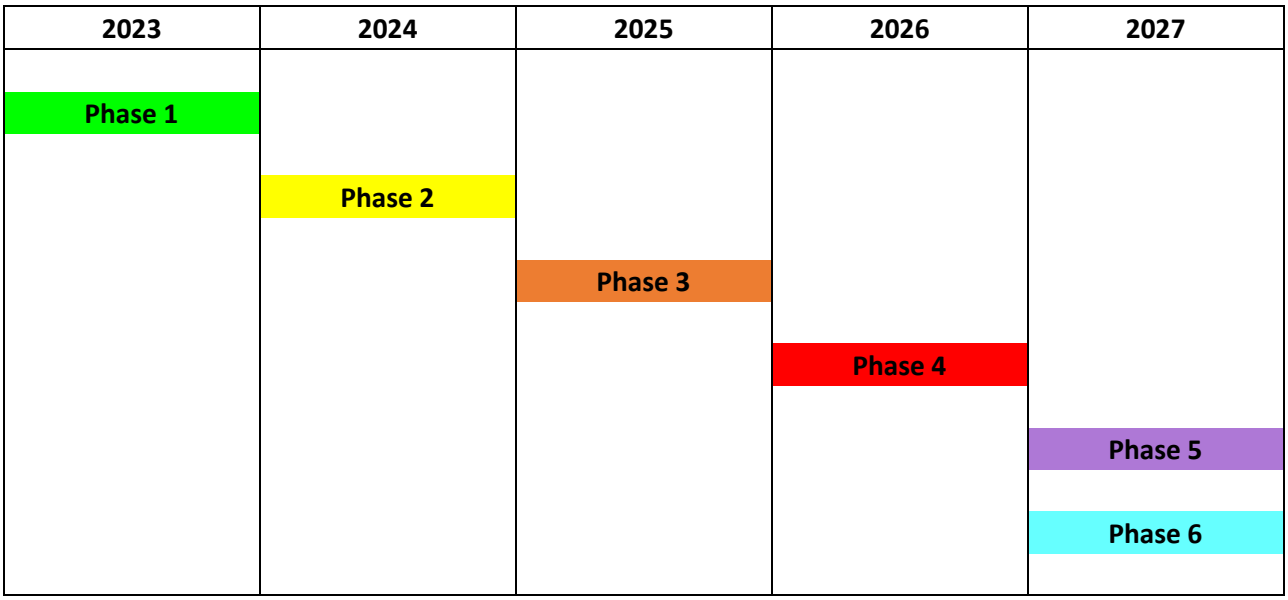
TABLE 3. PROJECT PHASING (APPENDIX A, PROJECT PHASING EXHIBIT)

Phase	Standard	Description	Stationing (*feet*)	Current Levee Conditions/ Rationale for Prioritization	Target Completion Date	Anticipated Long Term Habitat Impacts/Mitigation
1	Bulletin 192-82	Levee Rehabilitation, Revetment, Habitat Enhancement	625+00 – 707+00	Deficient geometry, displaced revetment	December 2023	No Impacts, Pre-Mitigated
2	Bulletin 192-82	Levee Rehabilitation, Revetment, Habitat Enhancement	200+00 – 300+00	Deficient geometry, displaced revetment	December 2024	No Impacts, Pre-Mitigated
3	Bulletin 192-82	Levee Rehabilitation, Revetment, Habitat Enhancement	120+00 – 200+00	Deficient geometry, displaced revetment	December 2025	No Impacts, Pre-Mitigated
4	Bulletin 192-82	Levee Rehabilitation, Revetment, Habitat Enhancement	40+00 – 120+00	Deficient geometry, displaced revetment	December 2026	No Impacts, Pre-Mitigated
5	Bulletin 192-82	Levee Rehabilitation, Revetment, Habitat Enhancement	707+00 – 756+92 0+00 – 40+00	Deficient geometry, displaced revetment	December 2027	No Impacts, Pre-Mitigated
6	Bulletin 192-82	Crown Fill/AB Only	300+00 – 625+00	Low crown elevation	December 2027	No Impacts, Pre-Mitigated

Various studies and reports are anticipated for each project phase in this plan, including, but not limited to, geotechnical investigations, environmental studies and documentation, plans and specifications, a comprehensive Scope of Work, and a completion report. Once funding is secured, plans and specifications will be developed, and bidding and construction will commence as soon as possible.

To complete all project phases by the end of 2027, funding must be made available progressively starting with funds for the design and construction of Phase 1. Assuming funding is available, each project phase could be completed in one construction season, with planning and engineering occurring in the winter months prior to the commencement of each construction phase. A graphical depiction of the schedule to implement this Plan to attain a sustainable Bulletin 192-82 levee system is included below.

TABLE 4. ANTICIPATED PROJECT TIMELINES



ESTIMATED COST TO ACHIEVE FIVE-YEAR PLAN GOAL

Bacon Island potentially has the ability to utilize on-island borrow material for levee rehabilitation projects. It is currently unknown if the island has sufficient capacity to rehabilitate the levee system using only on-island borrow material. Borrow investigations will be required for each phase of construction to locate areas containing suitable material that can be efficiently excavated and transported. In the event that suitable material cannot be located for a specific project, import material may be required to rehabilitate portions of the levee identified in this plan. Considering this uncertainty, multiple cost estimates and cash flow scenarios have been generated. Two scenarios have been analyzed. The first assumes onsite fill material is available for all projects and the second assumes import fill material is required for all projects. The intent is to provide a range of costs the District could expect to incur depending on the final constraints of each project.

The estimated onsite fill required for levee rehabilitation under this plan is 954,400 cubic yards. It is anticipated that 93,200 tons of aggregate base will be required to construct an all-weather road surface on the levee crown. The estimated cost to complete all phases of the Plan and successfully build the District's levee to the Bulletin 192-82 standard using onsite fill is approximately $28.8 million. In the event imported fill is required, the estimated total cost is

$49.4 million, subject to market conditions. The quantity and cost estimates to attain a sustainable standard around the entire island are included in Appendices B & C. It should be noted that these quantities and costs are planning level estimates and are subject to final design criteria to be determined as engineering for each phase is completed.

The estimated quantity for the District to meet the Bulletin 192-82 standard was calculated utilizing DWR's Delta LiDAR data (2017-2018) for the Sacramento – San Joaquin Delta. Geotechnical investigations have not been fully completed for future construction, however reasonable design criteria have been assumed. The assumed design criteria enabled planning level estimates to be generated for purposes of this plan; however, final quantities and associated costs will vary based on the final design recommendations.

As mentioned above, the District's geotechnical engineer, Hultgren-Tillis Engineers, has prepared geotechnical investigations for previous levee rehabilitation projects. Generally, recommended design parameters have consisted of a 21-foot-wide levee crown[3], constructed 1 foot above the design elevation to account for future settlement as the underlying foundation material consolidates. Increases in width are incorporated as needed to accommodate site specific conditions, such as the presence of a county road or other feature that may require a design adjustment. Water side slopes are a minimum of 2:1 and catch on the waterside levee hinge of the existing crown, resulting in minimal waterside impacts. A 3:1 embankment slope is typically recommended on the landside and is buttressed by a toe berm. An all-weather road surface will be constructed on the subgrade of the levee crown using Class 2 aggregate base material. A county road runs along portions of the east and north levees. Rehabilitation that occurs in these areas will include replacing the county roadway in kind. The results of this Bulletin 192-82 compliant design have proven that this design is an efficient use of fill and is sustainable for an extended period of time.

The estimated cost for the District to meet a sustainable levee standard was calculated assuming multiple factors that would enable the complete rehabilitation of the levee system. The Cost Estimate summary tables in Appendix C provide an itemized breakdown of the cost per phase. The assumptions are based on calculated quantities and a three percent annual increase in construction costs due to inflation. The engineering, design, permitting, coordination and inspection are limited to 20 percent of the total project cost using onsite borrow material and are held constant in the import fill scenario.

POTENTIAL COST-SHARING PARTNERS

The District has a limited ability to pay for large scale rehabilitation projects. The District is allowed to levy assessments for drainage and flood control services based on California Government Code Sections 54710 *et seq*. The method used for apportioning the assessment is based upon the proportional special benefits from the services to be derived by the properties

[3] The Bulletin 192-82 levee standard requires a minimum 16' wide crown. Due to settlement over time, minimum levee standards cannot be maintained without additional overbuild incorporated; both vertically and spatially.

in the assessment area over and above general benefits. The assessment is not based on value, rather benefit. The assessments collected from landowners enable the District to maintain the levee in its current state, with minimal funds remaining for additional activities. Based on data provided by the District, approximately $210,000 per year is available for levee maintenance and related activities. The District can leverage these funds through the Subventions Program, receiving reimbursement of up to 75 percent of eligible expenses, less $1,000 per mile of levee, in accordance with the program guidelines.
The Special Projects program has historically funded large-scale levee rehabilitation on Bacon Island. As a result of the District having very limited financial capacity to fund projects, Special Projects has provided funding for rehabilitation projects with up to 97 percent State cost share for the District. This program is the most viable funding mechanism for financing the rehabilitation of the District's levee system and is essential for the District to implement its five-year rehabilitation plan.

Requested Cost-Sharing with the Delta Levees Special Projects Program

Due to the magnitude of the projected rehabilitation costs and the District's limited ability to fund those costs, the District requests a minimum 95% State share of project costs under the Special Projects Program. The requested cost sharing is consistent with previous projects implemented on Bacon Island. Assuming the District's cost share is 5% of the total projected cost, the District would need to provide funding in the amount of between $1,441,015 – $2,468,460 over the projected five-year period, depending on whether fill is obtained onsite or imported.

Estimated Contribution from Delta Levees Special Projects & Maintenance Subventions Programs

The ability of the District to reach the complete build-out to a sustainable levee standard by the end of five years will depend on the interest of DWR to support the District throughout the process. The District has very limited resources to perform large scale levee rehabilitation projects. The District's annual assessments to fund operations total $455,418. The portion of the assessment revenue that is available for levee maintenance after other expenses are deducted is approximately $210,000. The District can leverage this amount by utilizing DWR's Subventions Program and receive reimbursement for up to 75 percent of qualified expenses, less $1,000 per levee mile in accordance with the program guidelines. It is anticipated that the Subventions Program will allow the District to adequately maintain the levee system, however the ability to fund rehabilitation projects is limited.

A second funding mechanism available to the District is the Special Flood Control Projects Program, also referred to as Special Projects, authorized under SB 34. This program distributes grants to local agencies to construct projects that are selected using a competitive process. Cost shares under this program are variable and are based on various metrics identified in the program guidelines. This Plan is reliant upon the Special Projects Program to fund the identified projects at the requested cost share. Funding from the Special Projects Program is necessary for achievement of the Five-Year Plan goals. The Special Projects Program would need to

provide funding in the amount of between $27,379,285 – $46,900,740 over the projected five-year period, depending on whether fill is obtained onsite or imported.

Estimated Contribution from Other Agencies

At this time, the District has no other cost sharing partners to provide funding for rehabilitation and maintenance. Therefore, there is no estimated contribution from agencies other than funding provided by DWR. However, the District has previously participated in a partnership with a coalition of urban water agencies that provided the local cost share for a rehabilitation project along Old River. The project was a tremendous success, rehabilitating approximately 4.7 miles of levee and adding ecosystem enhancements. It demonstrated that a multi-agency approach can be successful and can potentially be a model for future partnerships. The District will continue its efforts to secure funding commitments from other agencies for future projects.

Potential Constraints and Obstacles

There could potentially be a multitude of constraints and obstacles throughout the planning, design and implementation of the rehabilitation projects:

- Structures may have to be relocated, or removed from the levee crown and landside levee toe (Appendix A, District Infrastructure Map);
- Multiple siphons will need to be raised and extended along the exterior levee;
- Trees and some vegetation removal may be required;
- The cost of the rehabilitation during the various phases of the projects will vary depending on the additional planning, design, coordination, and permitting required for project construction at each site;
- All projects will require ongoing coordination between the District, landowners, and all agencies involved in the rehabilitation process;
- Coordination may be required with PG&E and other utility providers as the rehabilitation project planning commences along power lines, communication lines, or pipelines.

These considerations are typical of rehabilitation projects and the District is well-versed in navigating the various hurdles of a rehabilitation project. The District will openly communicate and work with the various stakeholders to develop solutions that are acceptable to the various Program and project interests.

Needed Improvements to Reduce Existing Hazards

Local Assets

Agricultural lands, primarily irrigated lands, cover the vast majority of Bacon Island. A network of approximately 32 siphons divert water for irrigation purposes. The District operates two pumping stations to dewater and manage the water levels on the island. The District's levee system protects active agricultural operations including approximately 1,914 acres of corn, 578 acres of wheat, 1,787 acres of alfalfa, 207 acres of oats, and 374 acres of sunflower annually. Operations are supported by an on-island farming enterprise with warehouses, facilities and farming equipment. The agricultural lands are seasonally flooded adding to the available habitat for migratory waterfowl within the Pacific Flyway during the fall and winter seasons. In addition, the levee system also protects 660 acres of mixed habitat types as documented in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Delta Wetlands Project, dated September 1995. The habitat located on-island includes riparian (3.4) acres, marsh (33.1 acres), herbaceous uplands (528.4 acres), and open water (94.5 acres).

PG&E owns and operates two high-pressure gas transmission pipelines that cross the island, identified as Lines 57B and 57C. An abandoned line also exists, referred to as Line 57A. The majority of this line has been removed. PG&E constructed Line 57C, which is approximately 6.4 miles in total length, in 2007. The purpose of this project was to provide redundant pipeline capacity in the transmission of natural gas between Brentwood and the McDonald Island Storage Field. The redundancy provides protection in the event there is a failure in Line 57B.

Line 57B is 22 inches in diameter and is typically a minimum of 3.5 feet below the ground surface. Line 57C is 24 inches in diameter and is typically 6 feet below the ground surface. Both lines are rated for pressures up to 2,160 psi.

Bacon Island Road, a county-maintained roadway, is located on the crown of the east levee. Bacon Island Road is the main transportation corridor that provides primary access to Mandeville Island. A disruption to this corridor due to a levee breach could isolate Mandeville Island if Bacon Island was inundated. In this scenario, access would likely require use of either aircraft or watercraft.

Non-Local Assets and Public Benefits

District levee improvements would also benefit In-Delta and export water supply reliability. The District's levee along Old River and Middle River is along the freshwater corridor conveying flows to the water export facilities. Rehabilitation of the levee will benefit the reliability of the current conveyance system. The risk of a levee failure in the rehabilitated segment will be reduced, thus reducing other associated risks to the water supply, such as the potential to jeopardize the reliability of the water supply for both local and export interests in the event the island flooded.

A railroad corridor is located south of the island in the dredger cut between Bacon Island and Woodward Island. If the south levee system was ever breached and did not remain intact, the railroad corridor could potentially be susceptible to damage from wind and wave action if the island was inundated due to the relatively large fetch that would be created.

Risks for Current Land Use based on Existing Assets

The rehabilitation of the District levee to the Bulletin 192-82 levee standard increases the factor of safety for the island and lowers the potential risk from overtopping or levee breach. By performing the phased projects previously mentioned, the District and the State could alleviate the possible $31.59 million in repair costs due to damages to the District infrastructure, as estimated in the DRMS Impacts to Infrastructure Technical Memorandum.

A detailed risk and uncertainty analysis for the District was not performed for this Plan. The available information that was used came from the methodologies and model used by the DRMS team. The estimated repair costs were provided based on potential flood damage incurred to existing structures and infrastructure. Impacts to businesses, employment, levee repair, and crop damages are unknown at this time, and would depend greatly on when the flood occurred and how long the island remained inundated, as well as the severity of the flood event.

The District does not maintain records of on island infrastructure to compare to the results of the DRMS technical memorandum. Therefore, it is not the intent of the District to evaluate the results, but merely to report on findings from the analysis and economic modeling that was utilized.

Consequences of Levee Failure or Breach

If flooding occurred as a result of a high-water event, the repair costs would be expected to reach $31,586,000 out of an estimated value of assets of $43,916,000 in 2007 dollars (DRMS, 2007). The DRMS report shows that the island currently has 37,654 feet of minor roads; 28,288 feet of natural gas pipelines; 5 houses; and multiple utility corridors. The information above was taken from the DRMS Technical Memorandum for Impact to Infrastructure and does not take into account levee repair costs due to the levee breaching or scours. The DRMS stated island value does not include the value of the land. The total land value, according to 2018 San Joaquin County assessment data, is estimated to be $44.1 million.

Depending on multiple factors, the repair to the District's levee and drainage system after a levee breach could vary by orders of magnitude. The severity of the conditions during the emergency, the repair of both the interior and exterior of the levee system, drainage facilities, debris removal and contamination cleanup, levee access and utility repairs all need to be considered when evaluating the costs to repair the levee system.

The loss and costs that would impact the agriculture on island could vary greatly depending on multiple factors including the time of year, size and duration of the inundation, water quality conditions, and crops planned or planted for that period, and overall market conditions.

EXISTING DEFICIENCIES IN SYSTEM

The southern levee along Sante Fe Cut generally has a lack of sufficient revetment and is susceptible to damage during storm events with a strong south wind. The District has made emergency repairs in the area during past storm events and the levee needs to be rehabilitated. The area is actively monitored during the flood season.

The north levee along Connection Slough is a relatively tall levee and lacks the desired geometry in areas where no county roadway is present. Emergency repairs have also historically occurred in the area and the levee needs to be rehabilitated to increase the overall island safety.

An analysis of the 2017-2018 DWR LiDAR data indicates that a group of sites are very close to the minimum HMP criteria for elevation. These sites are mostly located along the county road and include the following:

TABLE 5 - SITES CLOSE TO HMP MINIMUM GEOMETRY

Site	Beginning Station	Ending Station	Length (*feet*)
1	25+67	29+27	360
2	29+75	30+29	54
3	51+46	53+05	159
4	53+42	55+08	166
5	61+81	64+13	232
6	65+30	66+14	84
7	67+97	69+41	144
8	70+81	72+06	125
9	77+02	78+60	158
10	79+34	79+88	54
11	81+09	88+18	709
12	90+70	91+67	97
13	119+11	121+88	277
14	123+22	125+23	201
15	161+83	166+87	504
16	173+10	174+15	105
17	176+19	176+85	66

18	202+56	206+44	388
19	715+46	718+02	256
20	720+78	721+56	78
21	726+11	726+97	86
22	742+97	744+47	150

The accuracy of the LiDAR data is such that it cannot be conclusively determined that the sites are, in fact, below HMP. These areas should continue to be monitored and the LiDAR data should be confirmed with a higher accuracy conventional terrestrial-based survey, subject to available funding. If the sites are determined at some point to have actually settled below the minimum HMP geometry, maintenance should be considered to maintain minimum width and elevation requirements.

Multiple encroachments are located along the southern portion of the east levee. The encroachments are part of an on-island farming enterprise and are located on the crown and at the toe of the levee. Maintenance activities in this area are difficult due to the location of the encroachments and access constraints. The District is working toward the removal of all encroachments that are no longer necessary to maintain the integrity of the levee system.

Urgency of Repair Work

Flood fights performed in 2017 highlight the urgency of the repair work, especially along the north and south levee segments. High water during the 2017 flood caused significant waterside scour and erosion at various locations between Stations 200+00-300+00 and 625+00-670+00. Flood fights were initiated, and emergency repairs were performed. Additional riprap was placed to stabilize the waterside slope. These areas have been prioritized in the phasing of projects.

It is also likely that unknown encroachments exist in the proposed project areas, highlighting the urgency of the repair work. Rehabilitation and associated remedial actions during grading (exploratory trenching) will likely address this issue and will result in a safer levee system.

Opportunities for Multi-Benefit Projects

The main goal of the District during the next five years is to attain a sustainable Bulletin 192-82 levee standard around the entire island. It should be noted that each levee rehabilitation project identified under this Plan can be identified as having multiple objectives. These projects not only lower the flood risk for the lands within the District, but they also lower the risk of impacts to water quality and conveyance, as well as impacts to neighboring islands that are associated with a flood event.

Ecosystem Restoration and Habitat Enhancement

The landside slope will be seeded to propagate a CDFW-approved native grass seed mix. The District will consult with DWR and CDFW on seed selection and best management practices, such as soil preparation, timing of seeding, irrigation, and weed management for achieving the long-term establishment of native grass cover.

Reversing Land Subsidence

The anticipated design template for the levee improvements will require the construction of a stability berm along the landside toe of the levee. In compliance with California Water Code Section 12316(g), this toe berm will raise the elevation of the land immediately adjacent to the levee and provide a cap over exposed peat that could otherwise oxidize over time. The berm will also minimize any future farming practices immediately adjacent to the levee.

Ensuring Adequate and Effective Emergency Response Plans

A rehabilitated levee results in a safer, wider levee system than what existed previously. A wider levee enables better access and supports emergency response efforts. It is difficult to respond to emergencies if access is restricted. The most significant constraint to achieving this objective is the ability to secure adequate funding. Old and Middle Rivers also represent important freshwater conveyance corridors to the export pumps highlighting the need for levee integrity

Water Quality and Supply Reliability Improvement

The proposed levee system improvements would benefit In-Delta and export water supply reliability. Portions of the District's levee are along Middle and Old River and are related to the protection of the freshwater corridors conveying flows to the export pumps. Rehabilitation of the levee in these areas will benefit the reliability of the current conveyance system. The island is also along a potential tunnel alignment of the California WaterFix project, with a main construction shaft for the tunnel planned on the interior of the island. The risk of a levee failure in the rehabilitated segment will be reduced, thus reducing other associated risks to the water supply, such as the potential to jeopardize the reliability of the water supply for both local and export interests in the event the island flooded.

Levee Stability and Integrity Improvement

The proposed projects will improve the static stability of the levee in the project area. The geotechnical report for the projects will include a discussion on slope stability. The design for previous projects on the island resulted in landside factors of safety for the long-term rehabilitated levee that are significantly higher than the levee that previously existed. It is anticipated that a similar design will be recommended for these projects, with a comparable improvement in the static stability.

The proposed projects will also improve the seismic stability of the levee in the project area. For several of the proposed projects, a landside berm will be placed to support the levee, while also

enhancing post-seismic recovery. A detailed evaluation of the seismic safety is beyond the scope of this plan; however, our experience is that the long-term seismic performance of the levee should increase after the levee is rehabilitated for static conditions. It is anticipated that the final design will result in a net improvement in the seismic stability. Metropolitan Water District has performed extensive seismic stability analyses along the Middle River freshwater pathway levee system south of the San Joaquin River and has concluded that levees with similar cross-sectional improvements have substantially improved stability under severe earthquake shaking. Levee stability analyses performed by AECOM/Schnabel on behalf of MWD finds that, given potential seismic deformation, levees perform more effectively under earthquake loading and to support effective emergency response at or near the Bulletin 192-82 design standard.

Actions in the Governor's California Water Action Plan

This Plan is consistent with the relevant actions identified in the governor's California Water Action Plan (2016 Update). The rehabilitation and habitat enhancements proposed contribute toward achieving the co-equal goals for the Delta. Levee rehabilitation and meeting the Bulletin 192-82 Standard enhances flood control while also maintaining water supply reliability. The habitat enhancements contribute toward a healthier ecosystem. This plan is compatible with and supports the actions identified in the California Water Plan.

Section 4. Plan for Permits and Habitat

Habitat Mitigation and Enhancement

In the early 1990s, the District explored the possibility of mitigating for all impacts that would result from levee maintenance and rehabilitation, both past and future. The goal was to provide a programmatic solution and address the mitigation issues that each project must consider. Reclamation District Nos. 756, 2025, 2026, 2028, 2041, DWR and CDFW (formerly DFG) all participated in a collaborative process to create a mitigation site for the participating districts. On September 20, 1993, a mitigation agreement was executed between CDFW and Reclamation District No. 2041, providing 50 acres of mitigation on Medford Island. CDFW has subsequently confirmed that all habitat impacts resulting in levee maintenance and rehabilitation that occur within 150 feet of the levee centerline have been previously mitigated for the participating districts under the agreement, with the exception of impacts to Shaded Riverine Aquatic (SRA) habitat.

In 2000, Kjeldsen Biological Consulting completed a habitat assessment of the levee system (Appendix D, Reclamation District No. 2028 Bacon Island Habitat Assessment, Kjeldsen biological Consulting, 2000). The habitat assessment describes the wildlife habitat and vegetation resources observed along the levee system.

No habitat mitigation requirements are anticipated for the landside work proposed in this Plan. The proposed projects will be designed to avoid impacts to SRA habitat; therefore, no mitigation is anticipated at this time.

Pre-existing Habitat Conditions

The levee system currently protects an important variety of habitat, as documented in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Delta Wetlands Project, dated September 1995. The habitat located on-island includes riparian (3.4 acres), marsh (33.1 acres), woody, herbaceous uplands (528.4 acres), and open water (94.5 acres).

Anticipated Impact and Opportunities for Avoidance of Habitat Impact

The District will remove all vegetation on the landside slope during the rehabilitation process. The vast majority of habitat to be removed is ruderal. There is very little vegetation on the waterside slope. The District is pre-mitigated out to 150' from the levee centerline on the landside of the levee for impacts to riparian forest, scrub shrub, and freshwater marsh through the 1994 Mitigation Agreement between Reclamation District 2041 (Medford Island) and CDFW. The District is a beneficiary under the agreement. The District will work with CDFW and other regulatory agencies as appropriate to assess impacts from construction.

In compliance with Water Code Section 12314, the District will minimize its impact on the project areas. The following measures are proposed for implementation as part of the levee rehabilitation activities to help conserve and minimize impacts to vegetation and wildlife.

- The project will be restricted to the proposed levee footprint.
- No work will be performed below mean high water on the waterside of the levee.
- Anticipated impacts will be to grasses, ruderal weeds, and a small number of trees and shrubs. Tree and shrub removal will be on the landside only and has been pre-mitigated, resulting in no net loss of habitat.
- The land adjacent to the levee is active agricultural land, and the proposed habitat enhancements provide a net habitat improvement.

If necessary, the District will request to be included in a State-sponsored program to meet the requirement of no net long-term loss of habitat and a net habitat improvement.

Potential On-site Habitat Mitigation Opportunities

Mitigation opportunities within the levee footprint are somewhat limited, however opportunities may exist elsewhere on the island. Since little to no mitigation is anticipated as a result of the proposed projects, there has been little focus on identifying opportunities. However, the District is open to exploring opportunities that may potentially benefit Delta interests.

Potential On-site Ecosystem Enhancement Opportunities

Ecosystem enhancement opportunities may exist along the levee and within the interior of the island. The District has proposed ecosystem enhancements where feasible, including seeding the landside slopes with native grasses. The District has previously explored potential ecosystem enhancements within on-island borrow sites and is open to exploring opportunities that may potentially benefit both the District and Delta interests.

Compliance with CEQA and Required Permit Procurement

Required Permits and Environmental Compliance Documents

The work described in this plan will generally take place along the landside and crown of the levee within the existing levee footprint and is considered rehabilitation of an existing serviceable structure. It is anticipated that a Streambed Alteration Agreement will be required to armor the newly placed crown fill on the water side. The existing riprap will be compacted to create a bench that will support the new riprap and prevent material from entering the water. Section 401 and 404 permits should not be necessary as work will be conducted above the ordinary high-water mark (OHWM) and the levee does not exhibit wetland characteristics. No additional permits are anticipated to be necessary. The District intends to work with DWR and DFW in a collaborative fashion regarding its CEQA documentation and permit requirements for projects that are funded by a project funding agreement.

Environmental Documentation, Permit Status, and Meeting Agency Requirements

It is anticipated that the environmental documentation required will generally consist of a CEQA Mitigated Negative Declaration for the bulk of the work associated with this plan. Environmental documentation will be reviewed by the District's attorney and environmental consultants to determine whether the proposed documentation satisfies the legal requirements that exist at the time. If any additional permits are required, the District will coordinate with the appropriate agencies and will obtain the necessary permits prior to construction. The District will act as the Lead Agency under CEQA and DWR will be a Responsible Agency for the projects it provides funding for.

Once the proposed projects have been constructed, the District has a Routine Maintenance Agreement (RMA) with DFW. The RMA covers many aspects of the District's maintenance responsibilities, and allows for various types of trimming, pruning, clearing, and is dependent upon multiple factors, including time of year. The RMA also allows for small erosion repair at sites that will not place rock or fill in the water. This RMA was developed through arbitration as described in the CDFW code and complies with CEQA's Categorical Exemption requirements and the no net loss of habitat requirements of the Delta Levees Program.

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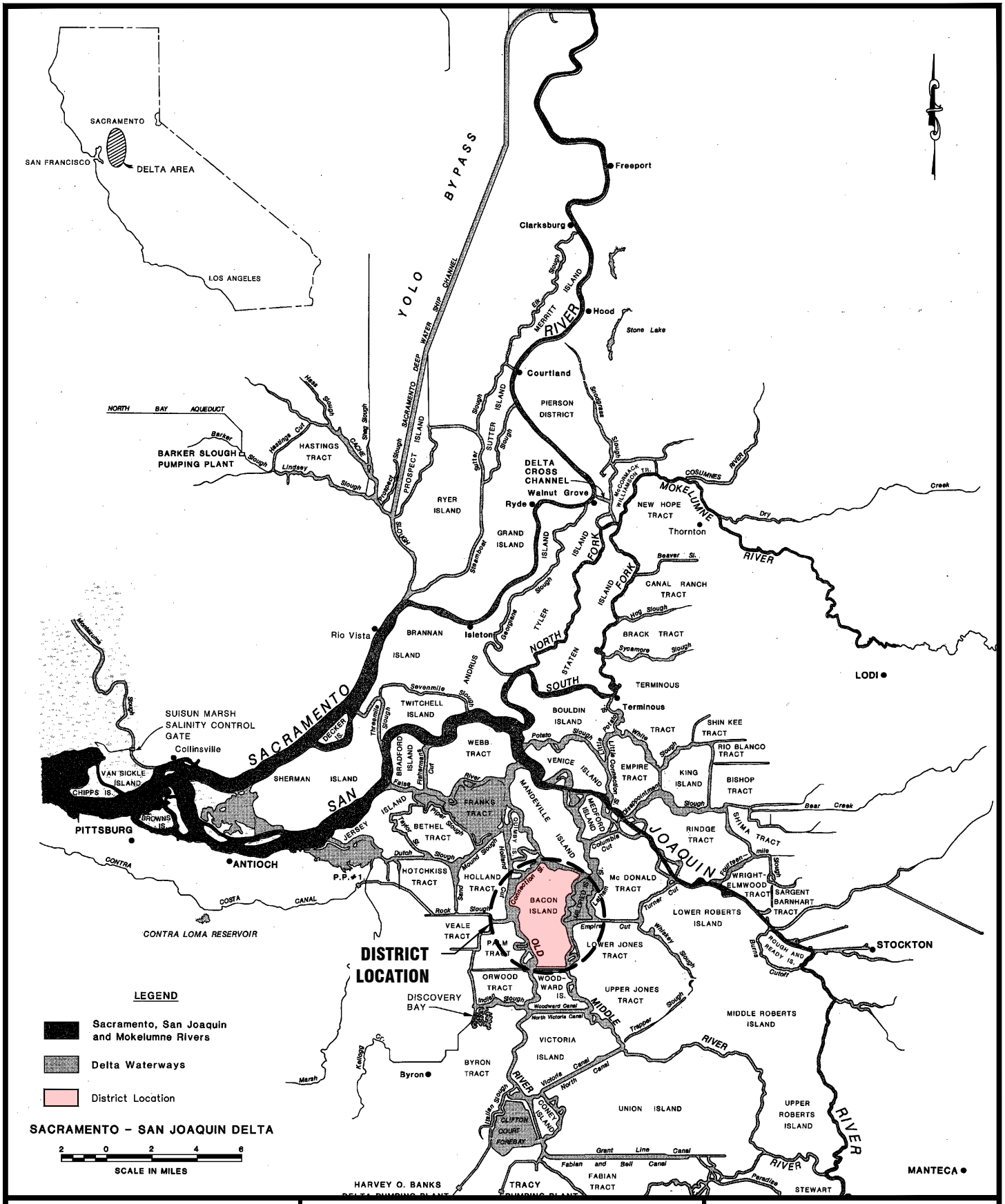
Thompson, John, 1957, The Settlement Geography of the Sacramento-San Joaquin Delta, California: Doctor of Philosophy, Geography Dissertation from Stanford University.

URS Corporation and J.R. Benjamin & Associates, Inc., 2007, Technical Memorandum: Delta Risk Management Strategy (DRWS) Phase 1 Draft Risk Analysis: prepared for the California Department of Water Resources.

TABLE 6. TABLE OF REQUIRED TABULATED INFORMATION

Required Information	Value/Units	Discussion
Total acreage protected by Local Agency levees	5,625 acres	
Total levee miles maintained by Local Agency	14.34 miles	
Levee miles in the Local Agency service area that are not maintained through the Delta Levee Program (e.g., Dry levees, cross levees)	0 miles	
Percentage of Local Agency's levee system at or above HMP Levee Standard	100%	
Miles of Local Agency's levee system raised to meet the minimum HMP Standard through the Delta Levees Special Projects Program	10.79 miles	
Percentage of Local Agency's levee system at or above Bulletin 192-82 Levee Standard	3%	
Miles of Local Agency's levee system raised to meet the Bulletin 192-82 Levee Standard through the Delta Levees Special Projects Program	0 miles	
Number of levee rehabilitation projects funded through the Delta Levees Special Projects Program for the Local Agency	4	
Total State funds expended for levee rehabilitation projects on the Local Agency's Island/Tract through the Delta Levees Special Projects Program	$20,156,590	
List of local and non-local assets and critical infrastructure protected by the Local Agency's levee system		• Farming complex • 4,860 acres of mixed crops • 660 acres of mixed habitat types • 2 high-pressure gas transmission pipelines • Bacon Island Road (county road) • Fresh water conveyance corridor • Railroad corridor along Santa Fe Cut

Appendix A – Maps and Exhibits



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RECLAMATION DISTRICT NO. 2028
BACON ISLAND

VICINITY MAP

SCALE:	AS NOTED
JOB NUMBER:	4290-18
DRAWN BY:	JB
DATE:	04/16/2020
SHEET:	1 OF 9

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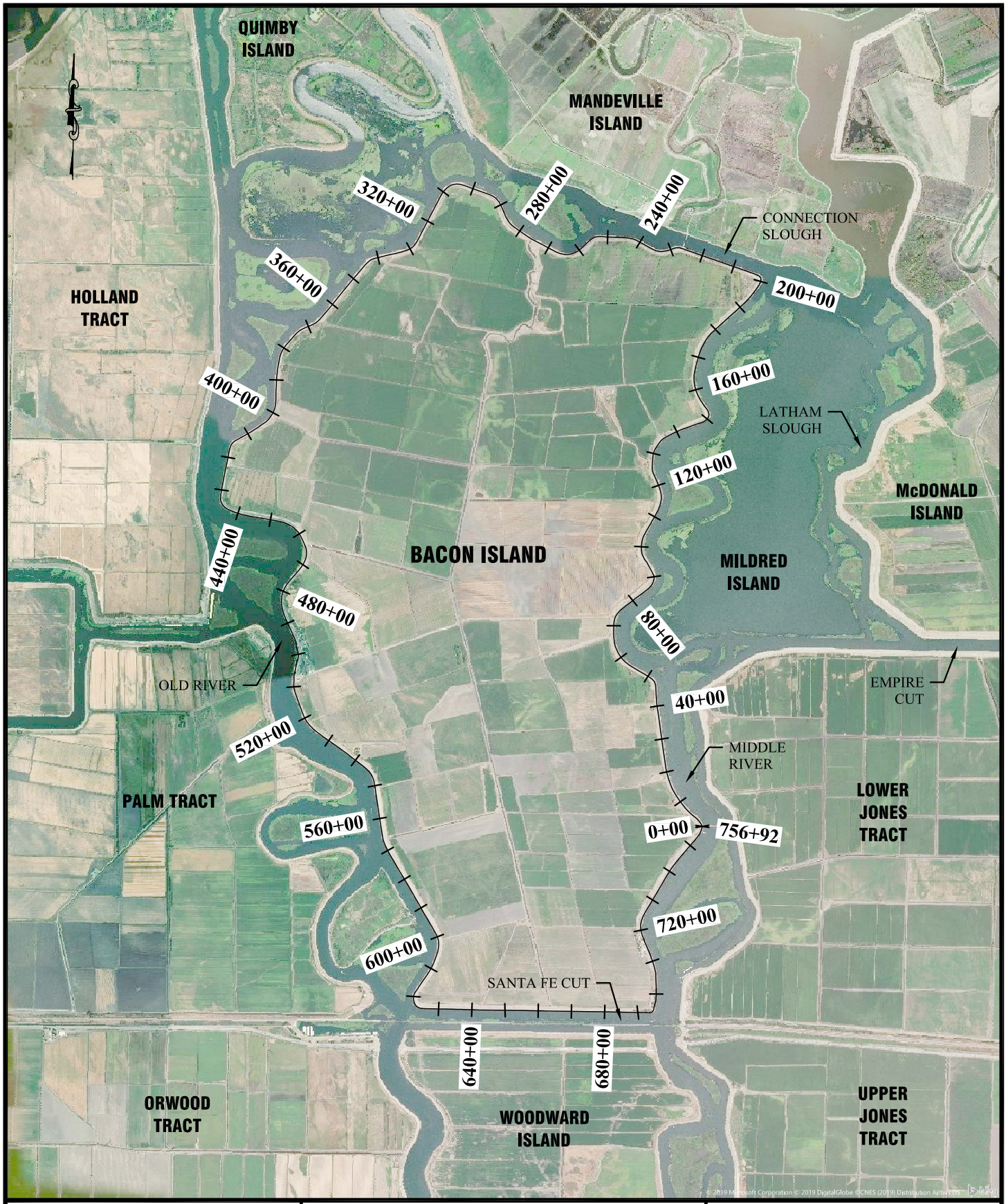

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RECLAMATION DISTRICT NO. 2028
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AERIAL MAP WITH STATIONING

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DRAWN BY:	JB
DATE:	04/16/2020
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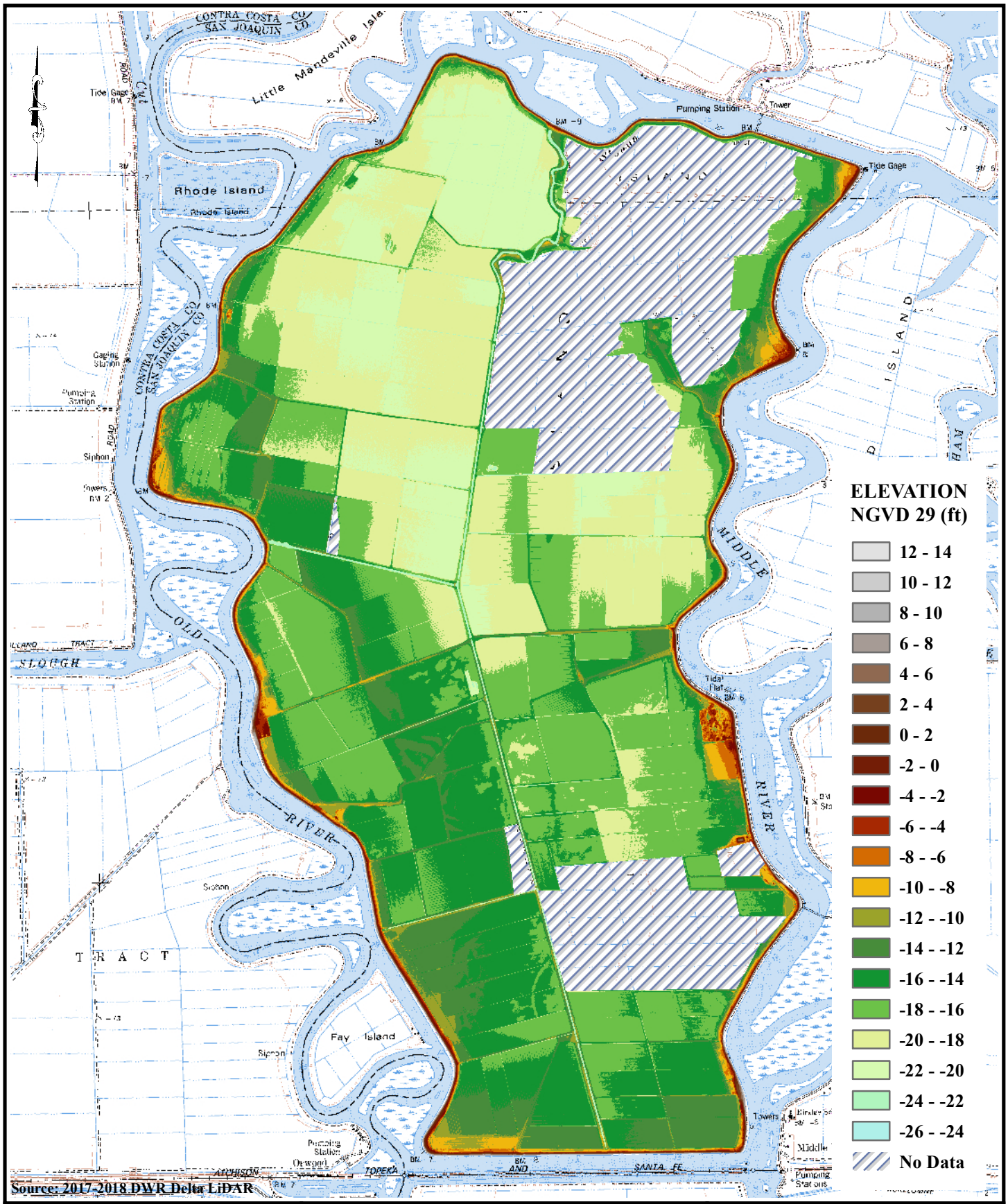

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RECLAMATION DISTRICT NO. 2028
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DISTRICT ELEVATION EXHIBIT

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SHEET:	3 OF 6

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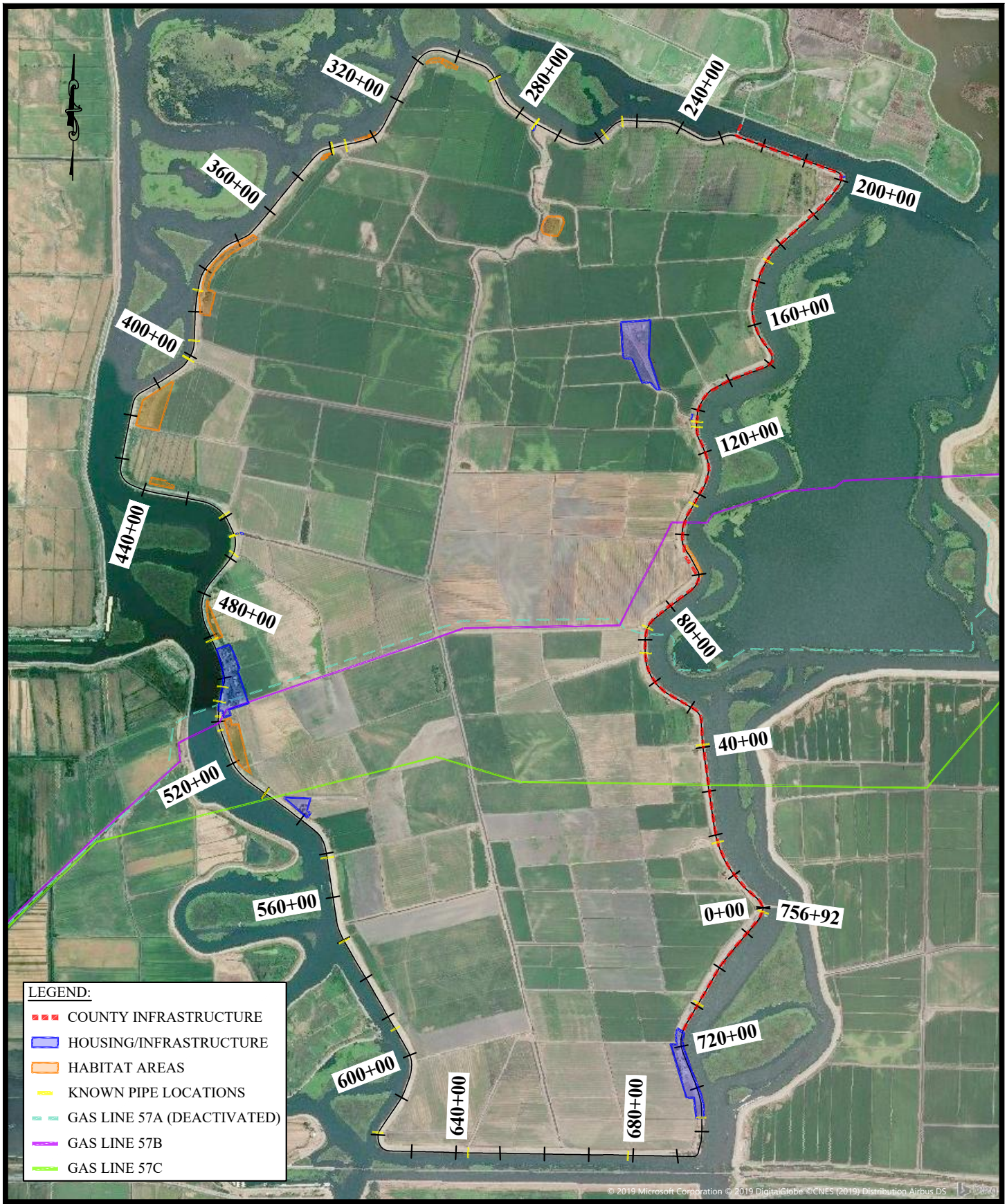

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BACON ISLAND

DISTRICT INFRASTRUCTURE MAP

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DRAWN BY:	JB
DATE:	04/16/2020
SHEET:	4 OF 9

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PIPER SLOUGH
FRANKS TRACT STATE RECREATION AREA
BETHEL ISLAND
SUGAR BARGE RESORT AND MARINA
JERSEY ISLAND
TAYLOR SLOUGH
BETHEL ISLAND MARINA
HOLLAND CUT
QUIMBY ISLAND
ORQ
MANDEVILLE ISLAND
MIDDLE RIVER
MEDFORD ISLAND
SAN JOAQUIN RIVER
RINDGE TRACT
DSJ
BIF
FRP
HOL
BRIDGE ACCESS TO/FROM MANDEVILLE ISLAND
BRIDGE ACCESS TO/FROM JERSEY ISLAND
DUTCH SLOUGH
EMERALD POINT MARINA
HLL
WOODS HARBOR MARINA
JERSEY ISLAND RD
HOTCHKISS TRACT
HOLLAND TRACT
HLT
McDONALD ISLAND
SACRAMENT DEEP WATER SHIP CHANNEL
RGP
SANDMOUND SLOUGH
OLD RIVER
MILDRED ISLAND
E CYPRESS RD
LATHAM SLOUGH
McDONALD ISLAND GAS STORAGE FACILITY
CCWD PIPELINE
DUTCH SLOUGH DAM (A.K.A. ROCK SLOUGH DAM)
BRENTWOOD MARINA
BACON ISLAND
TURNER CUT
RSL
HOLLAND RIVERSIDE MARINA
ROCK SLOUGH INTAKE
TIKI LAGOON RESORT AND MARINA
ROBERTS ISLAND
DELTA RD
BRIDGE ACCESS TO/FROM HOLLAND TRACT
ROCK SLOUGH
OBI
OMR
BACK
EMPIRE CUT
BRIDGE ACCESS TO/FROM McDONALD ISLAND
VEALE TRACT
BRYON HWY
BRIDGE ACCESS TO/FROM BACON ISLAND
WHISKEY SLOUGH
KNIGHTSEN
LOWER JONES TRACT
PALM TRACT
FAYE ISLAND
BULLFROGS MARINA
MDM
BIR
BXP
BIX
RAILWAY
SANTA FE CUT
MIDDLE RIVER
UPPER JONES TRACT
EBMUD AQUEDUCTS
HOLT
INDIAN SLOUGH
WOODWARD ISLAND
OLD RIVER
JTR
ECD
DBI
BACON ISLAND RD
BRIDGE ACCESS TO/FROM WOODWARD ISLAND
TRAPPER SLOUGH
DISCOVERY BAY
DISCOVERY BAY MARINA
VICTORIA ISLAND
WOODWARD CANAL

LEGEND:
- DISTRICT BOUNDARY
- CDEC STATION LOCATION & ID
- STATE INFRASTRUCTURE
- COUNTY INFRASTRUCTURE
- BRIDGE/FERRY ACCESS
- MAIN WATERWAYS
- RAILWAYS
- AQUEDUCT/INCASED CANAL
- GAS LINE 57A (DEACTIVATED)
- GAS LINE 57B
- GAS LINE 57C

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NO.	DATE	REVISION

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BACON ISLAND

REGIONAL INFRASTRUCTURE MAP

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BY:	JB
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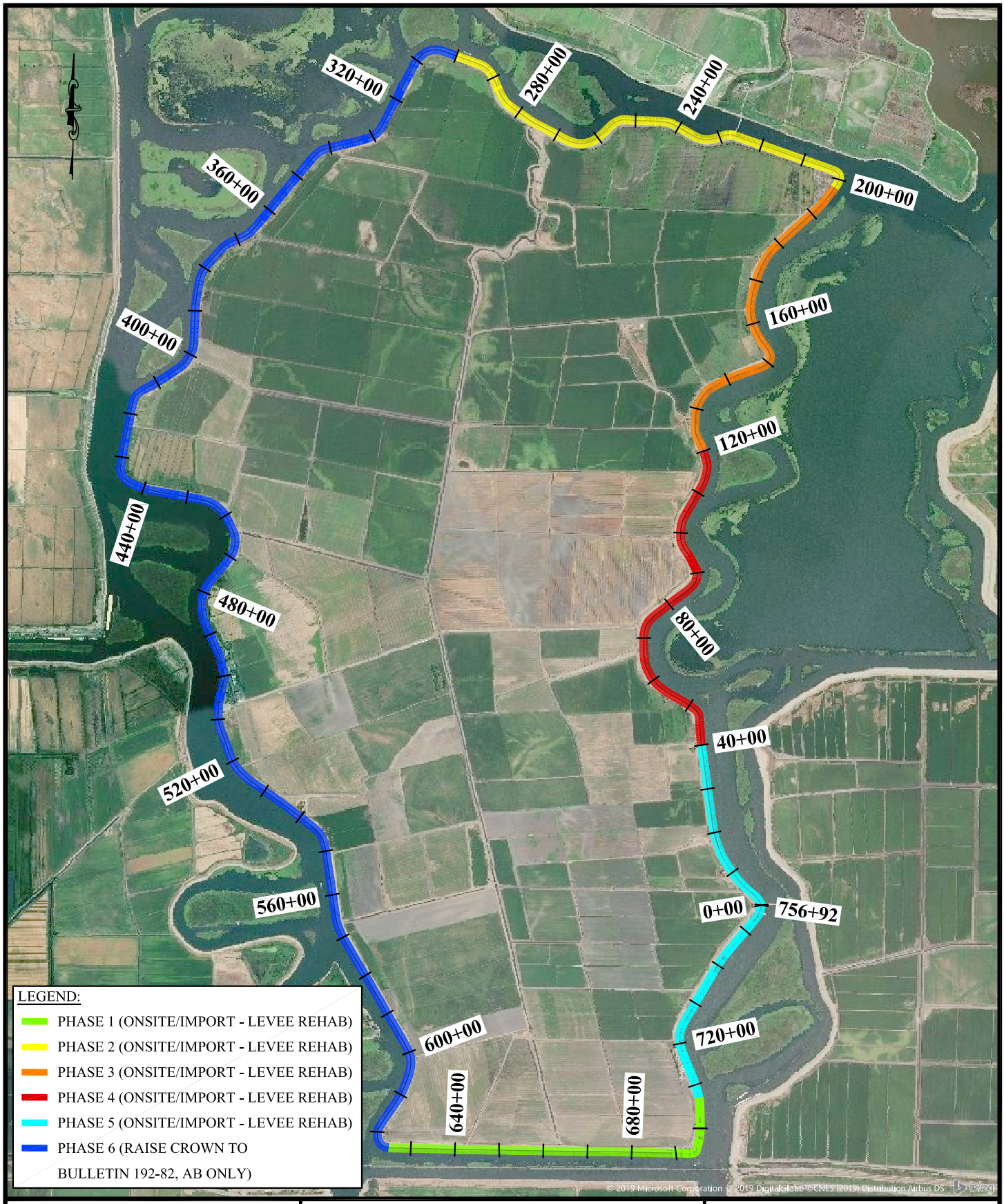

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BACON ISLAND

PROJECT PHASING EXHIBIT

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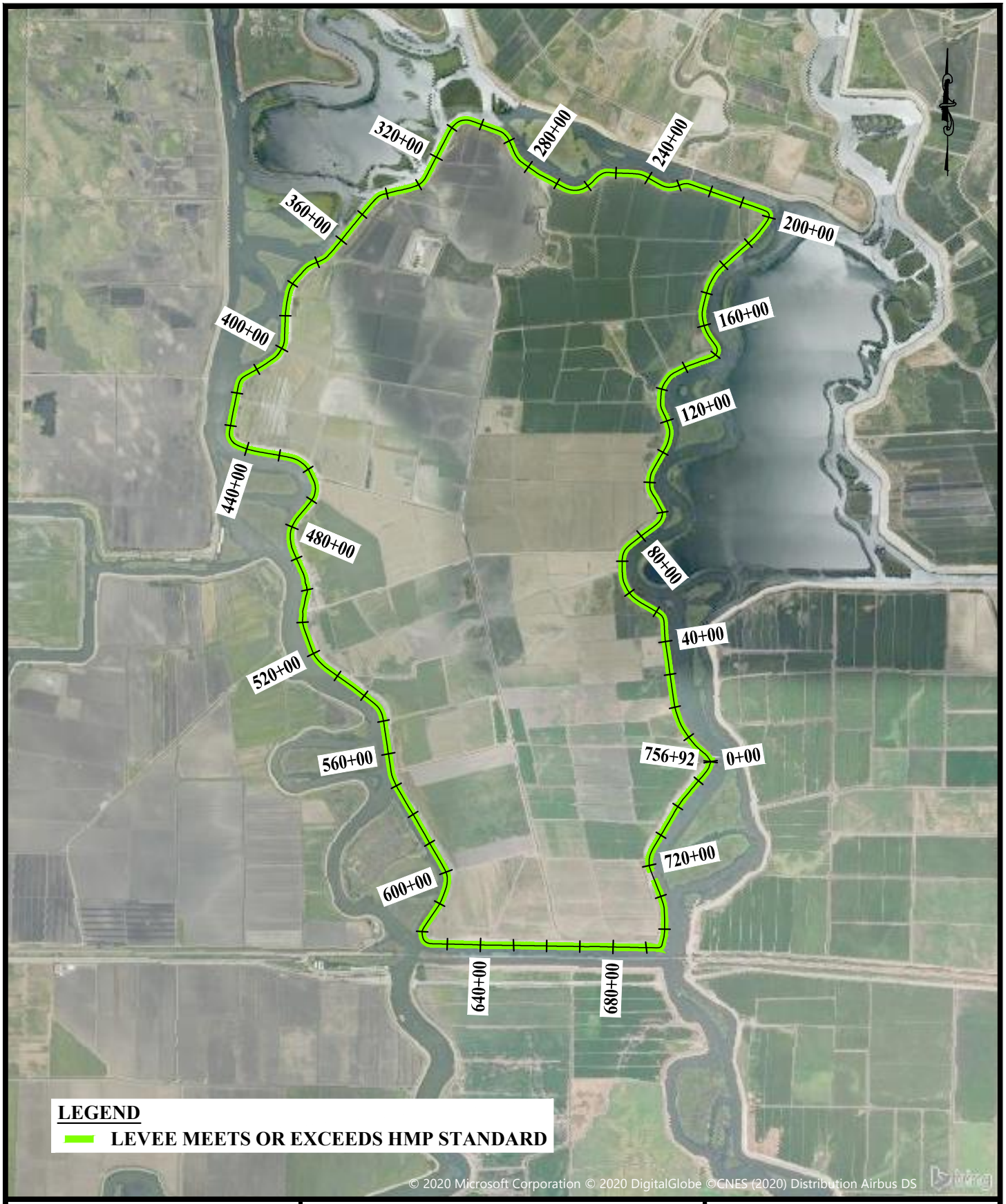

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DELTA LEVEE STANDARD STATUS - HMP

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DATE:	04/01/2020
SHEET:	7 OF 9

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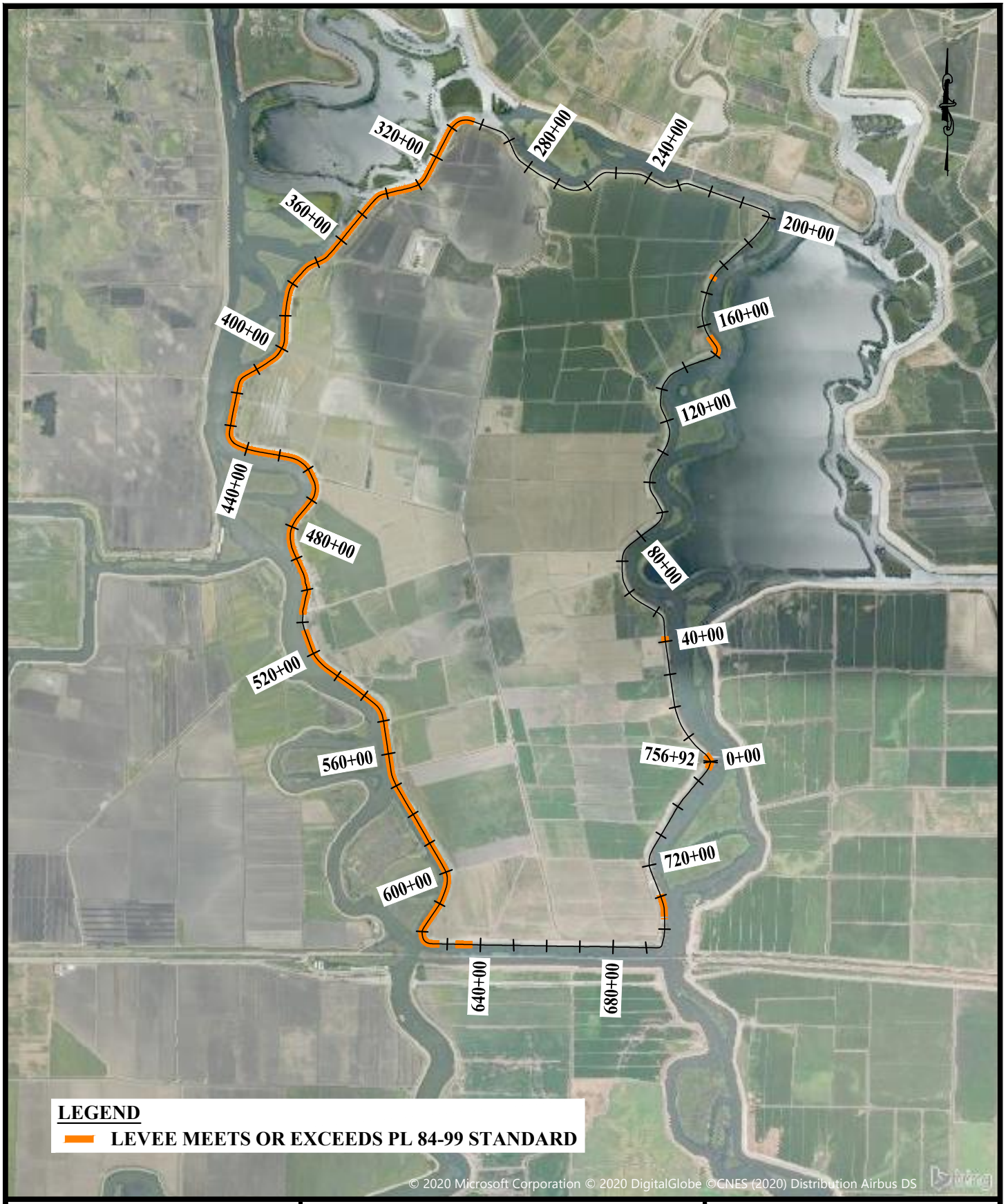

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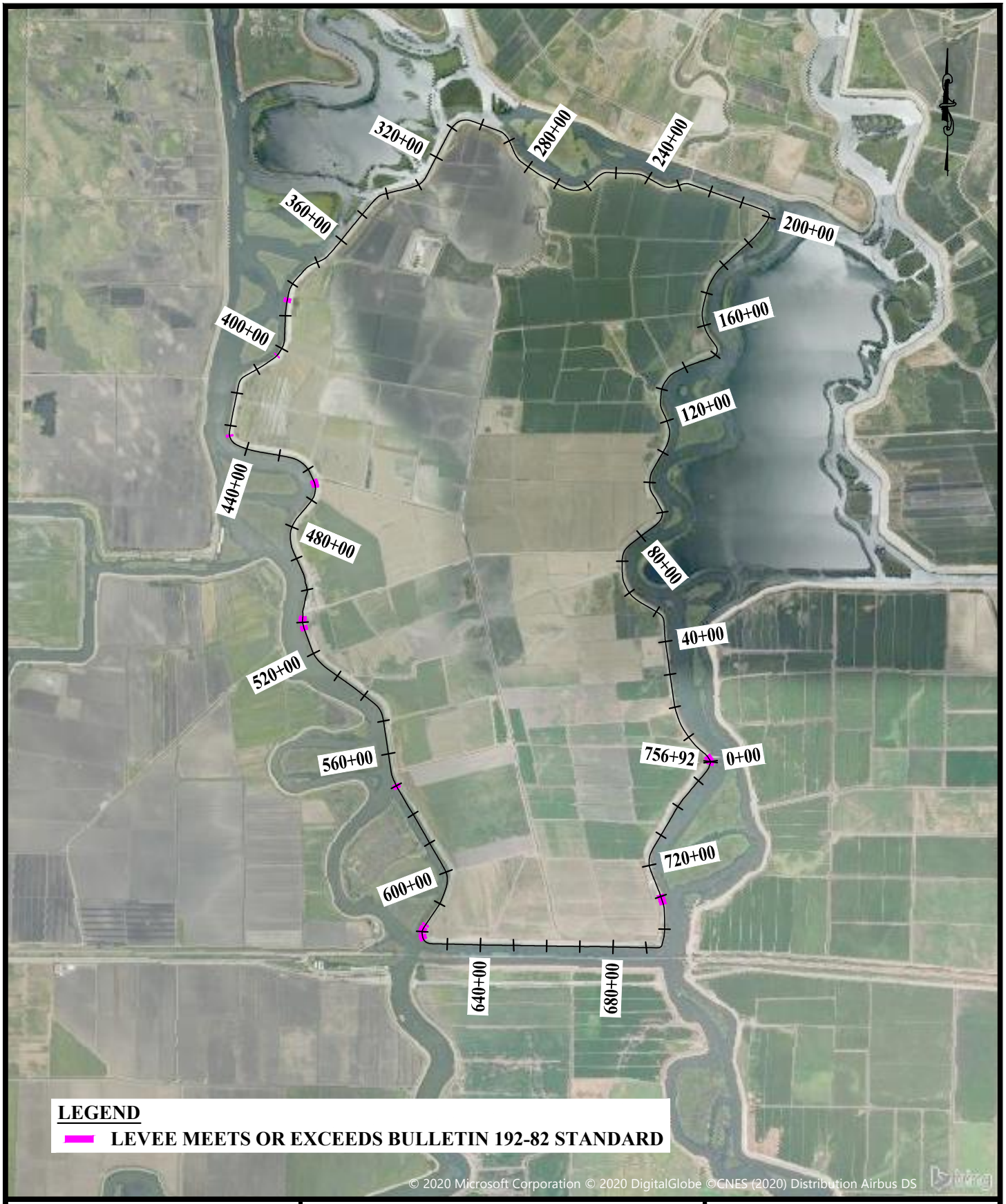
RECLAMATION DISTRICT NO. 2028
BACON ISLAND

DELTA LEVEE STANDARD STATUS - PL 84-99

SCALE:	1" = 4000'
JOB NUMBER:	4290-18
DRAWN BY:	AR
DATE:	04/01/2020
SHEET:	8 OF 9

R:\2526.00 Delta General\2018_5 Year Plan\2028\Maps\Levee Standard Status Maps.dwg 4/1/2020 2:39 PM reece



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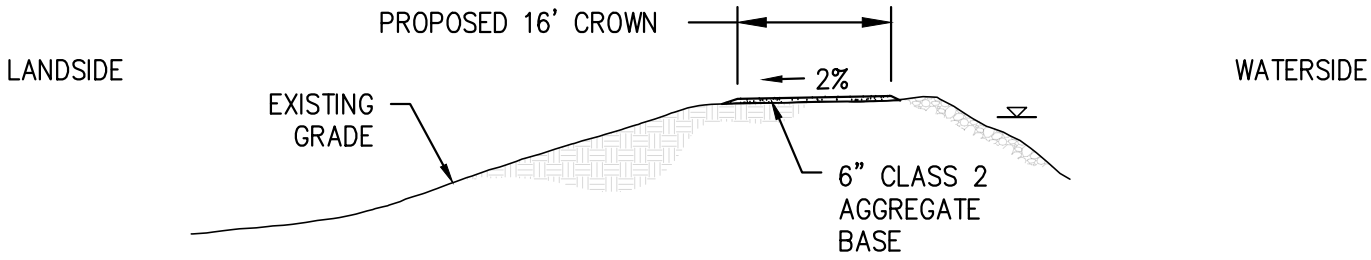
RECLAMATION DISTRICT NO. 2028
BACON ISLAND

DELTA LEVEE STANDARD STATUS - BULLETIN 192-82

SCALE:	1" = 4000'
JOB NUMBER:	4290-18
DRAWN BY:	AR
DATE:	04/01/2020
SHEET:	9 OF 9

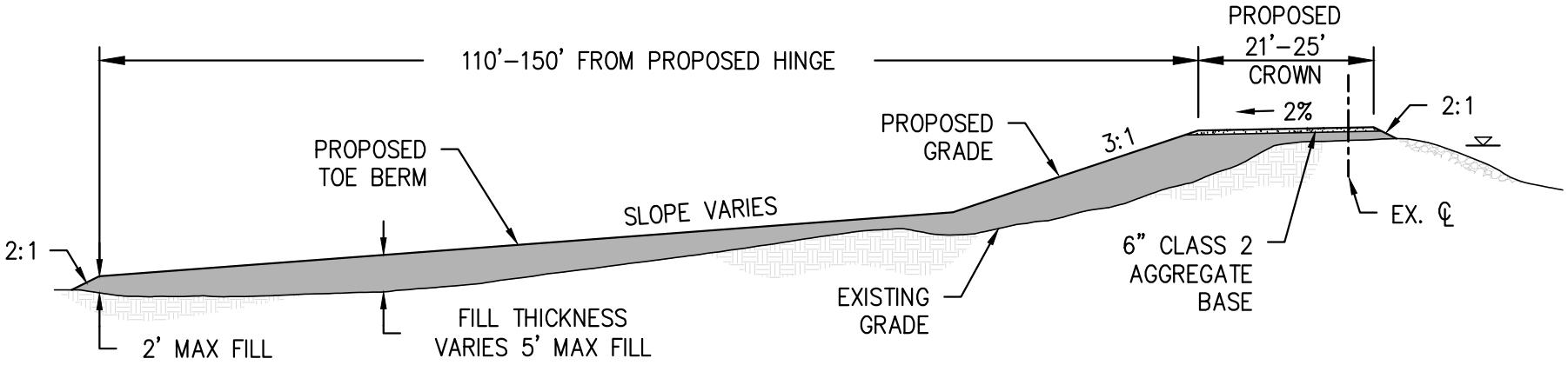
R:\2526.00 Delta General\2018_5 Year Plan\2028\Maps\Levee Standard Status Maps.dwg 4/1/2020 2:41 PM reece

Appendix B – Typical Cross Sections, Levee Profiles, and Cross Sections



TYPICAL BULLETIN 192-82 CROSS SECTION WITH 16' TO 21' AB CROWN ROADWAY

BULLETIN 192-82, 16' CROWN : STATIONS 300+00 TO 625+00
BULLETIN 192-82 +1', 21' CROWN : STATIONS 705+00 TO 720+00



TYPICAL BULLETIN 192+82 CROSS SECTION WITH 21' TO 25' AB CROWN ROADWAY AND 110' TO 150' TOE BERM

BULLETIN 192-82 +1', 21' CROWN, 110' TOE-BERM : STATIONS 625+00 - 695+00
BULLETIN 192-82 +1', 21' CROWN, 140' TOE-BERM : STATIONS 226+50 - 300+00
BULLETIN 192-82 +1', 21' CROWN, 150' TOE-BERM : STATIONS 695+00 - 705+00
BULLETIN 192-82 +1', 25' CROWN, 120' TOE-BERM : STATIONS 720+00 - 740+00
BULLETIN 192-82 +1', 25' CROWN, 120' TOE-BERM : STATIONS 0+00 - 185+00, 720+00 - 740+00
BULLETIN 192-82 +1', 25' CROWN, 140' TOE-BERM : STATIONS 185+00 - 226+50
BULLETIN 192-82 +1', 25' CROWN, 150' TOE-BERM : STATIONS 740+00 - 756+92

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RECLAMATION DISTRICT NO. 2028
BACON ISLAND

TYPICAL CROSS SECTIONS

SCALE:	1" = 20'
JOB NUMBER:	4290-18
DRAWN BY:	JB
DATE:	07/09/2020
SHEET:	1 OF 1

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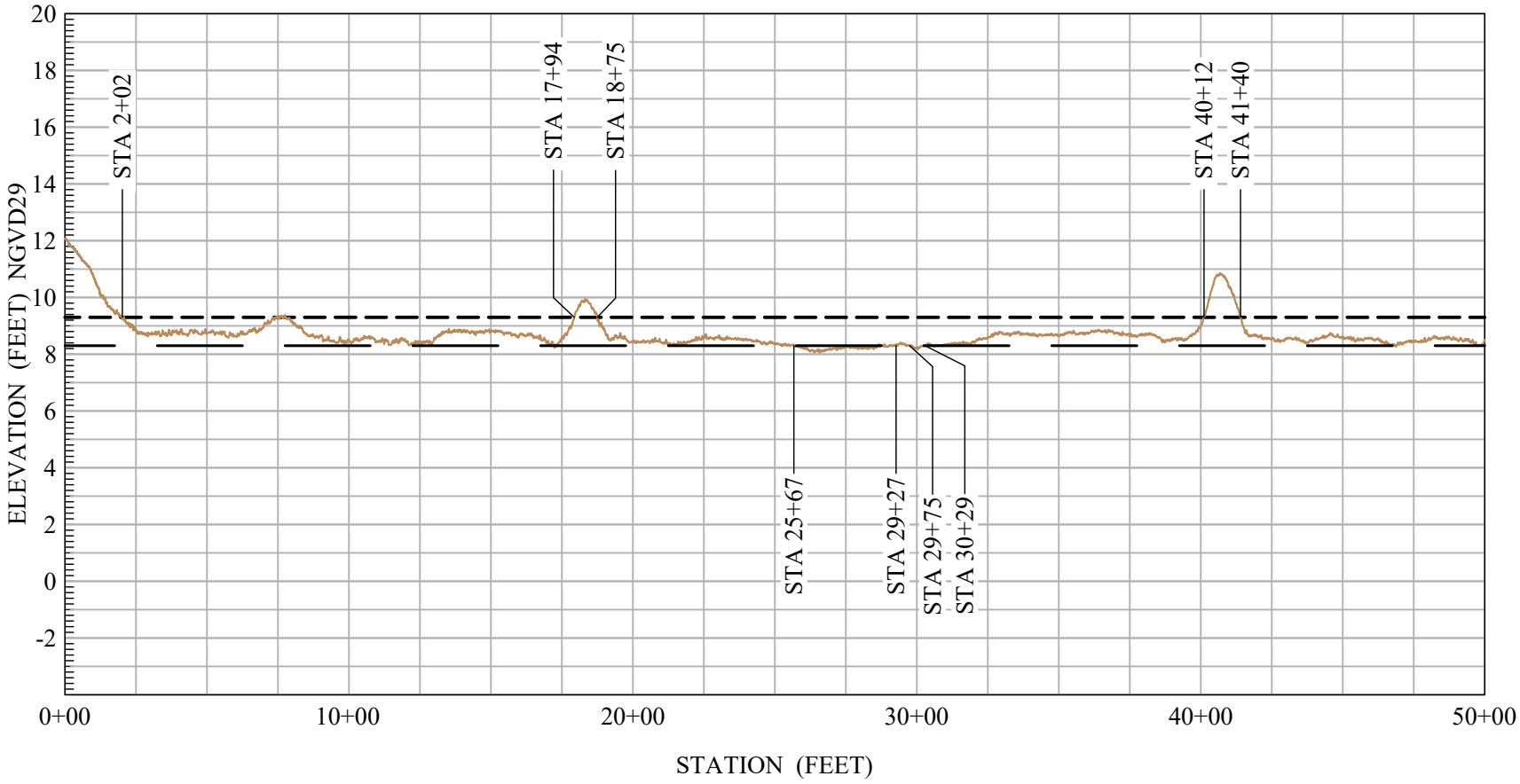
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 0+00 - 50+00



PROFILE SHEET: 1 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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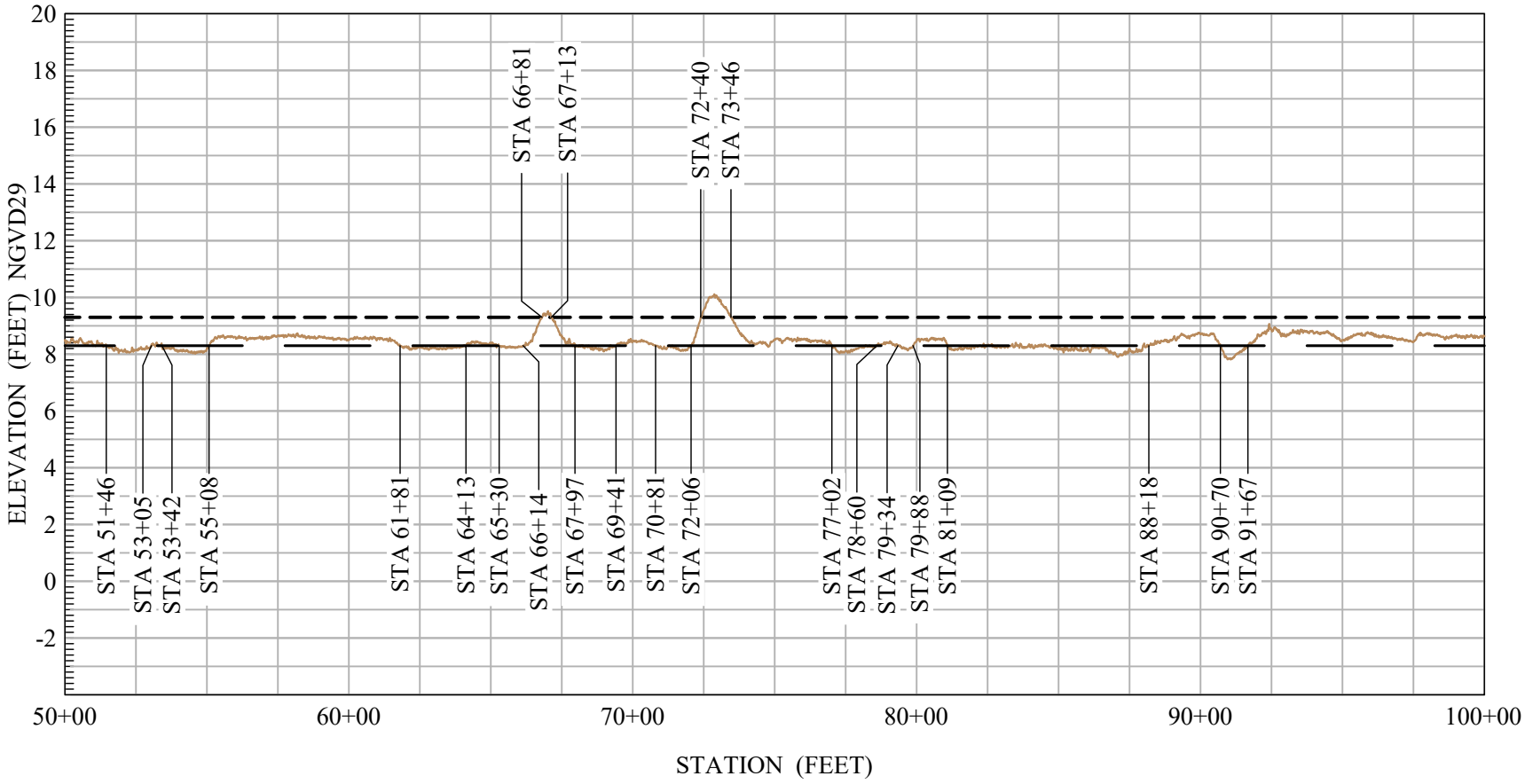
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 50+00 - 100+00



PROFILE SHEET: 2 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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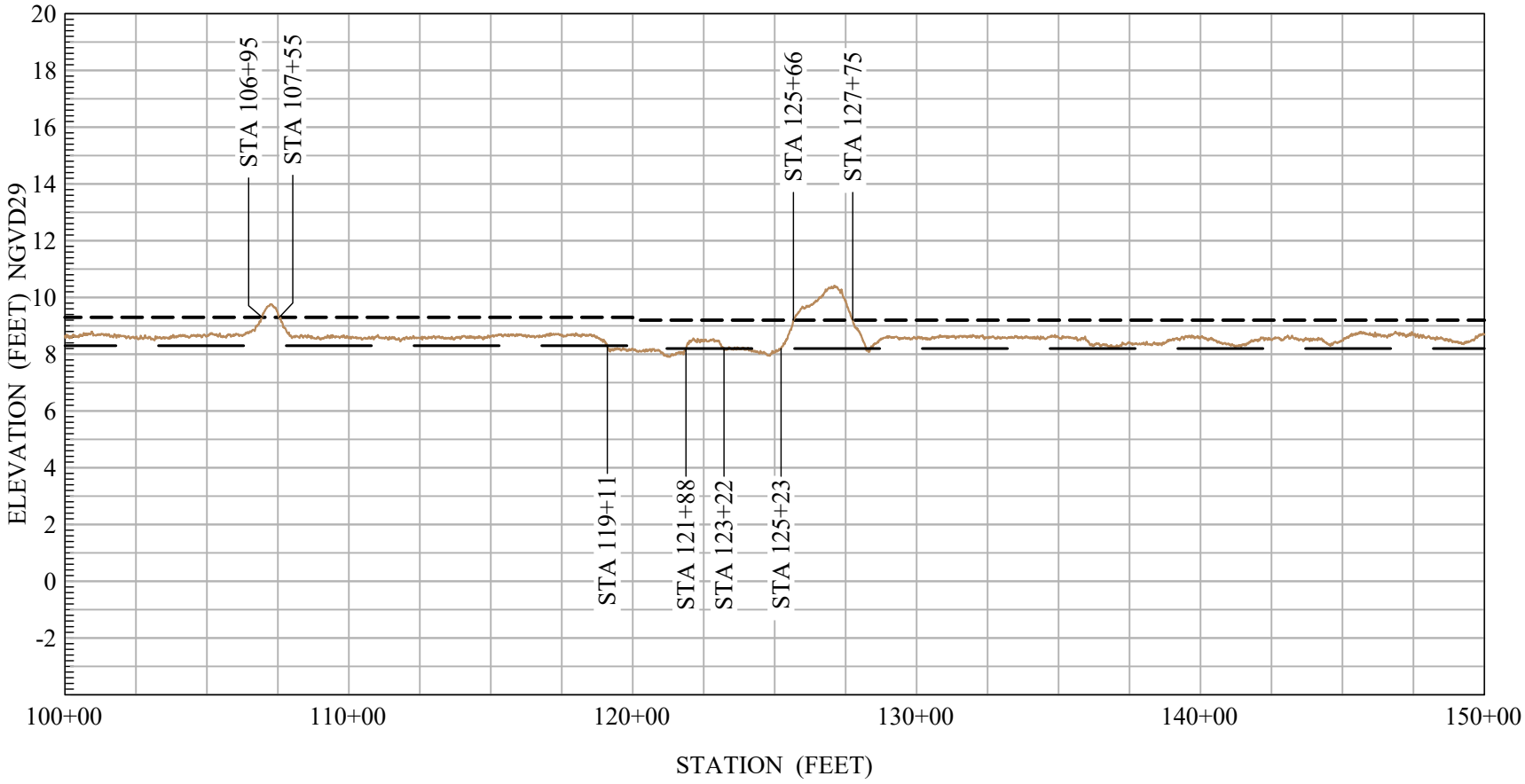
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 100+00 - 150+00



PROFILE SHEET: 3 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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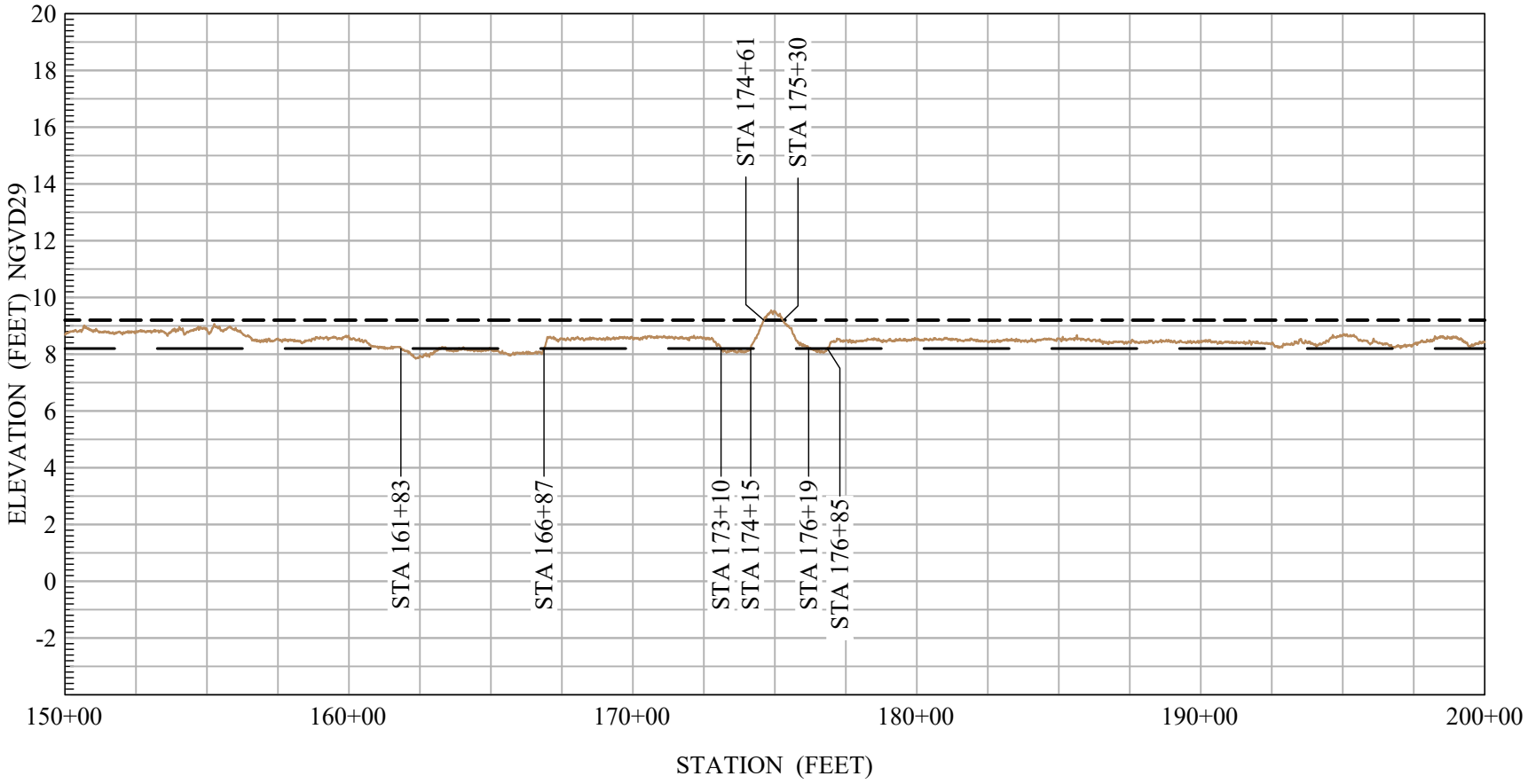
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 150+00 - 200+00



PROFILE SHEET: 4 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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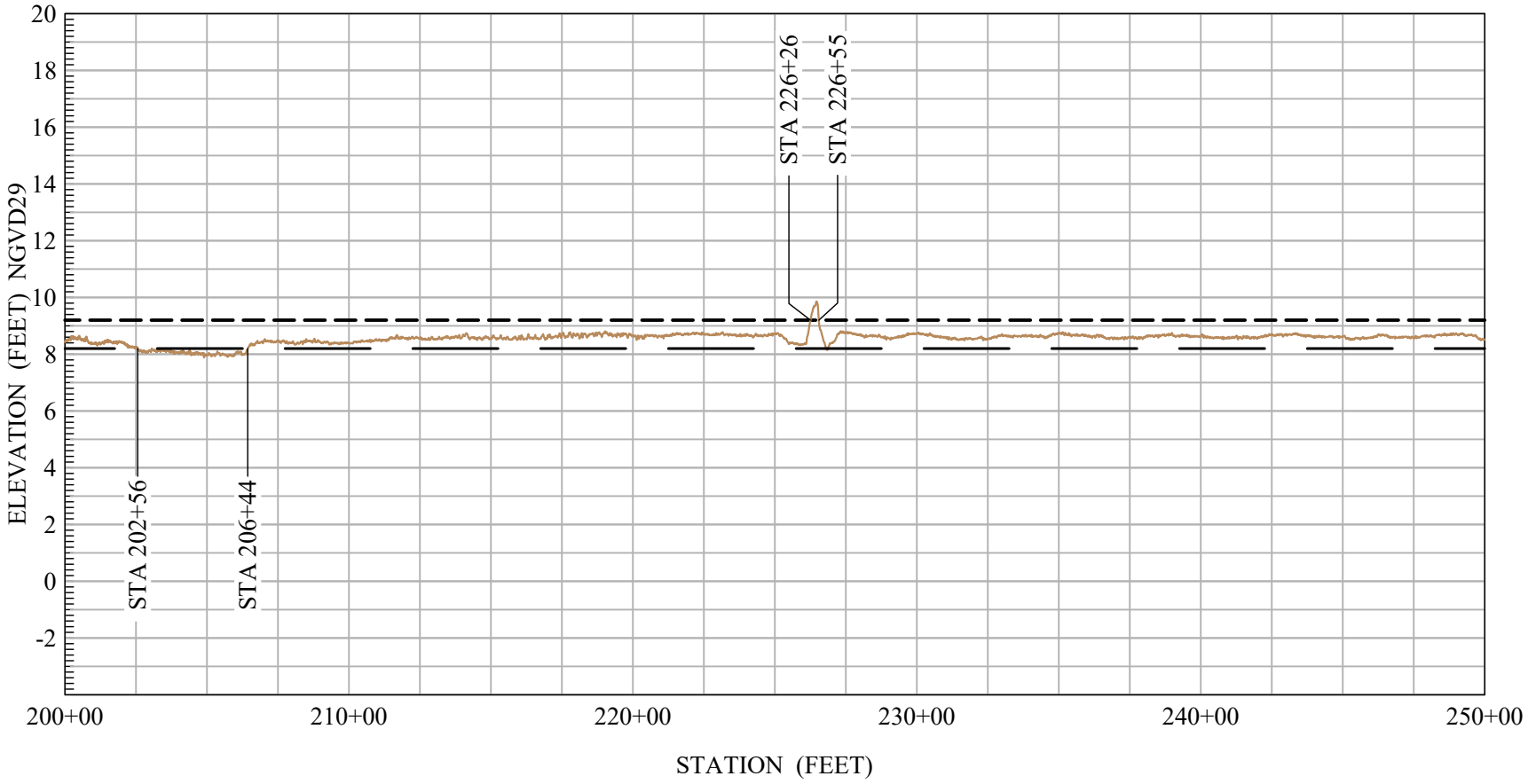
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 200+00 - 250+00



PROFILE SHEET: 5 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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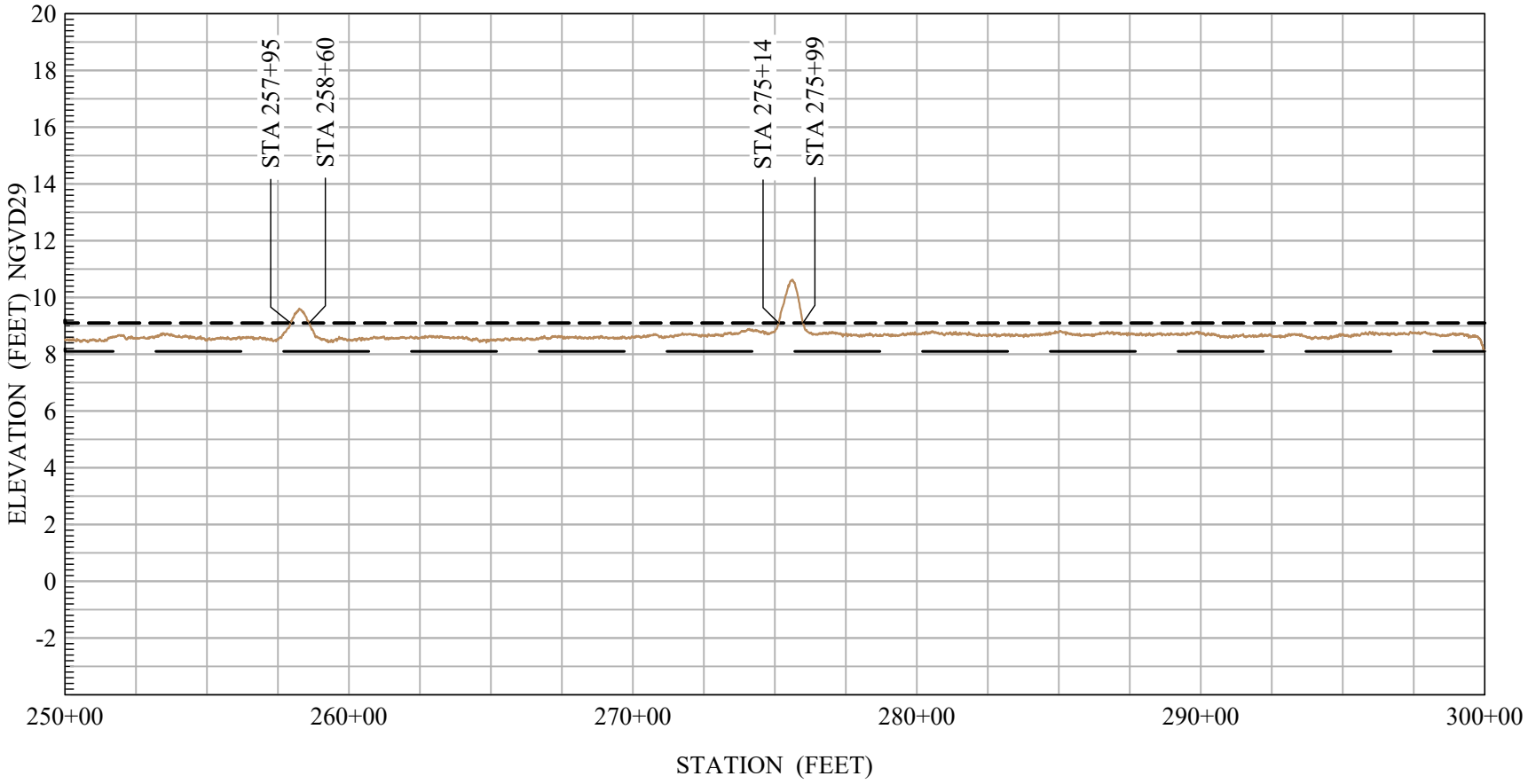
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 250+00 - 300+00



PROFILE SHEET: 6 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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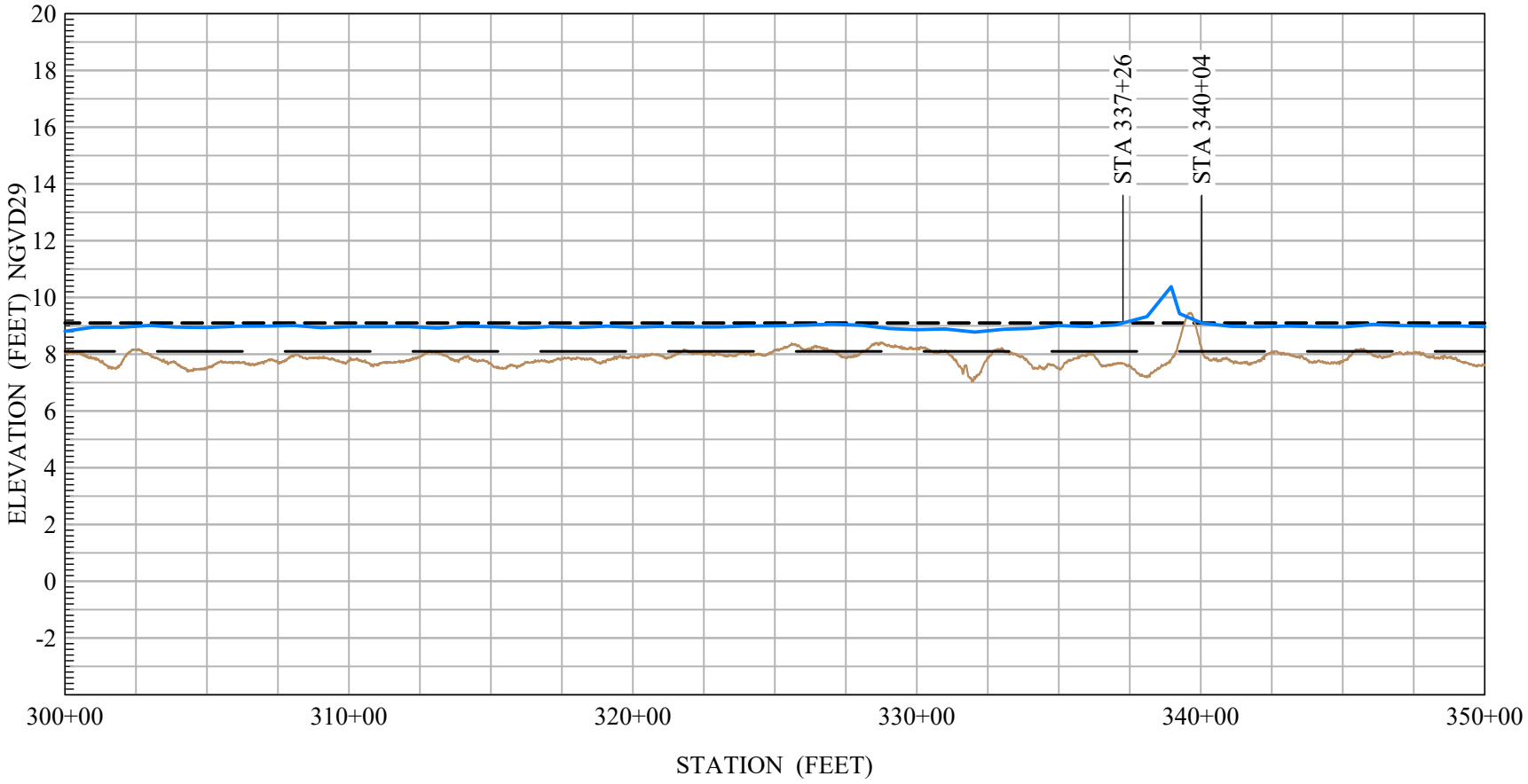
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 300+00 - 350+00



PROFILE SHEET: 7 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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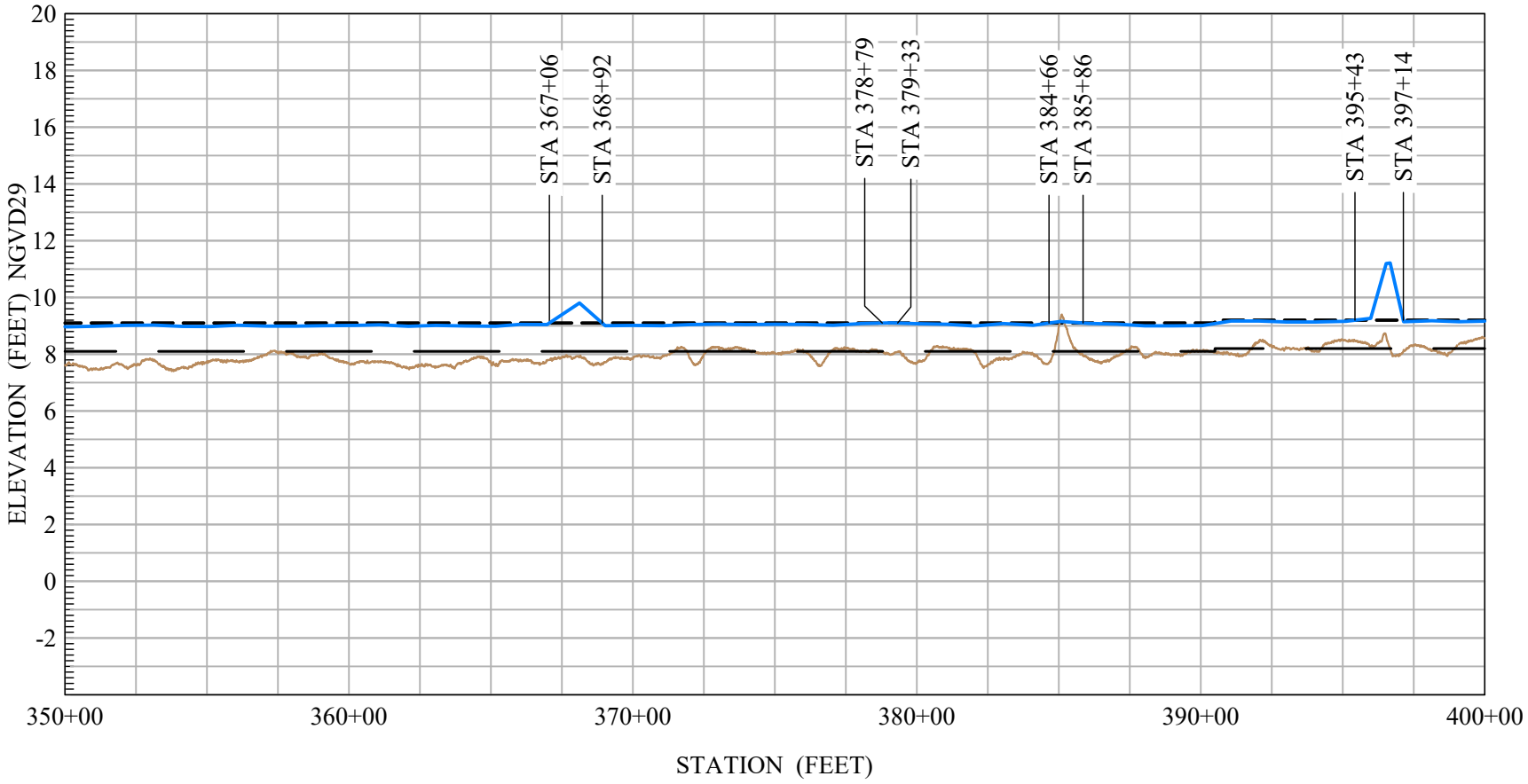
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 350+00 - 400+00



PROFILE SHEET: 8 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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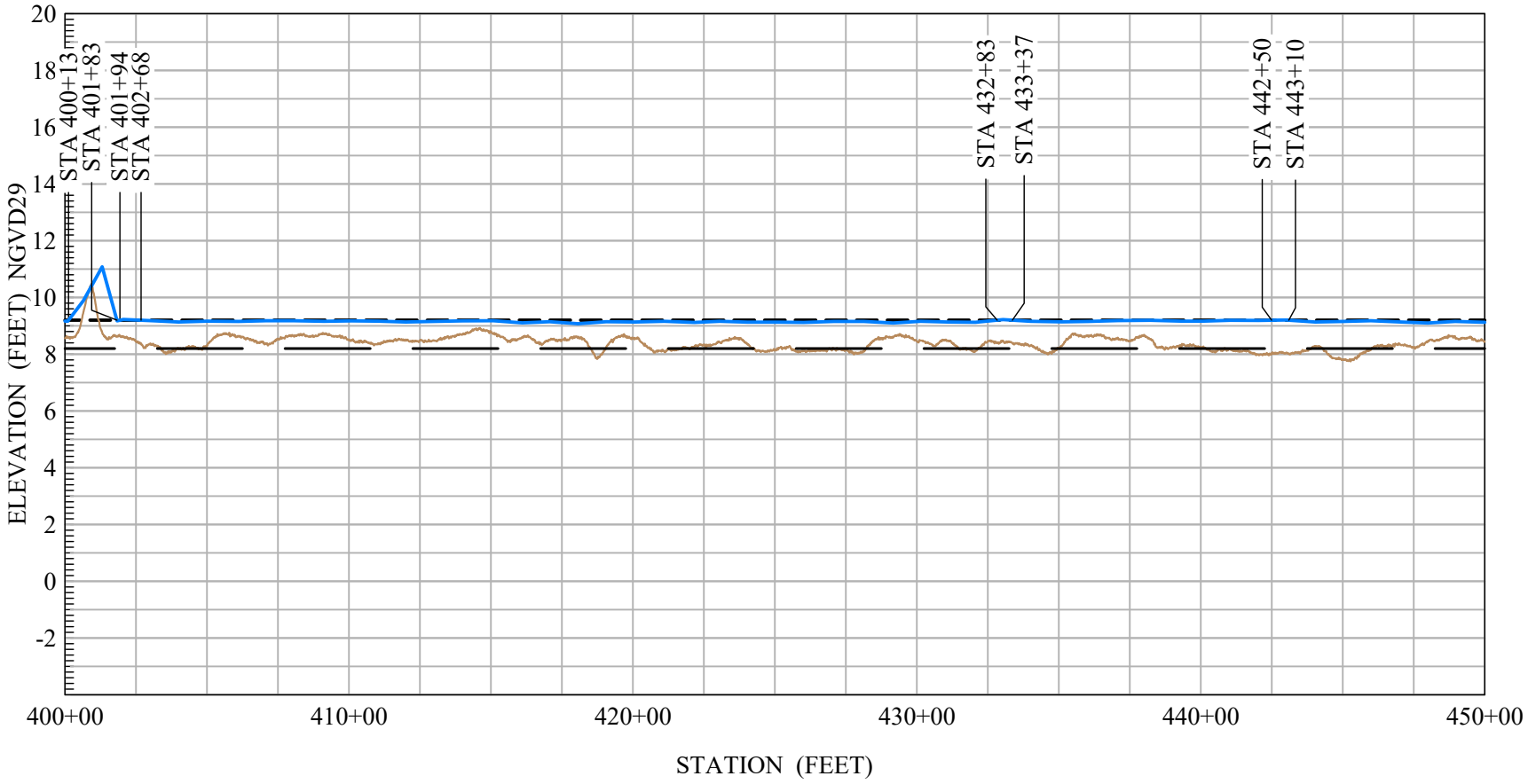
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 400+00 - 450+00



PROFILE SHEET: 9 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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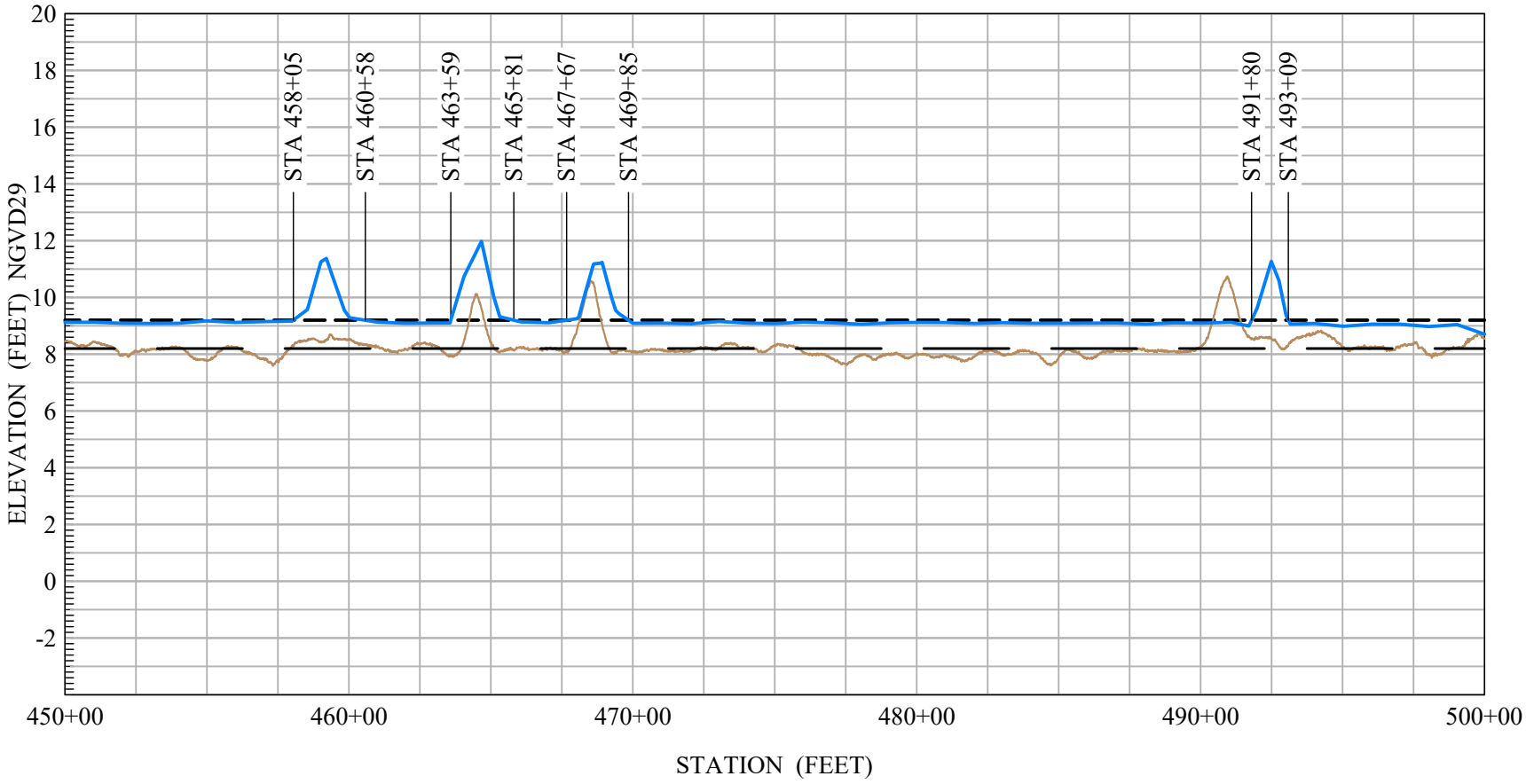
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 450+00 - 500+00



PROFILE SHEET: 10 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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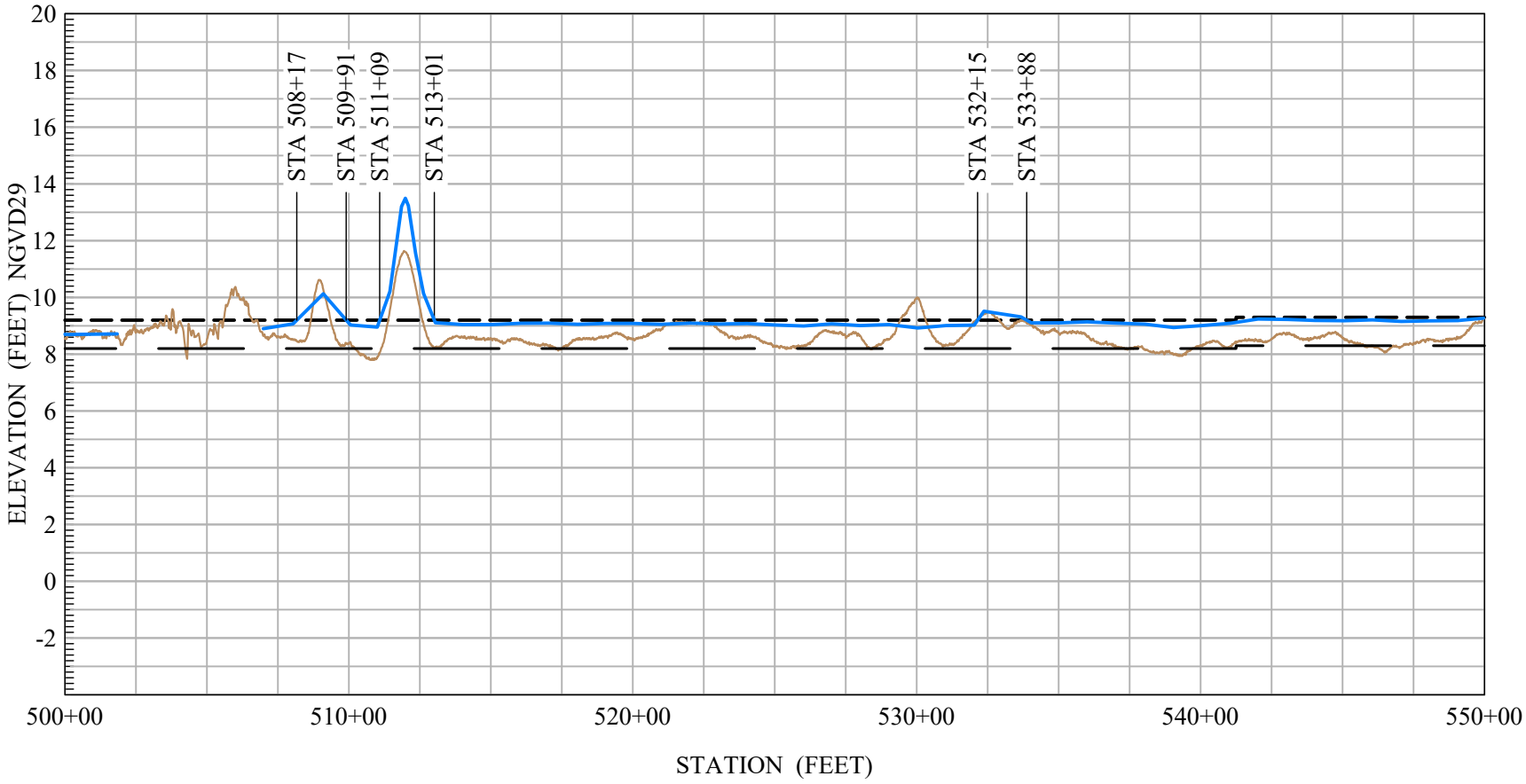
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 500+00 - 550+00



PROFILE SHEET: 11 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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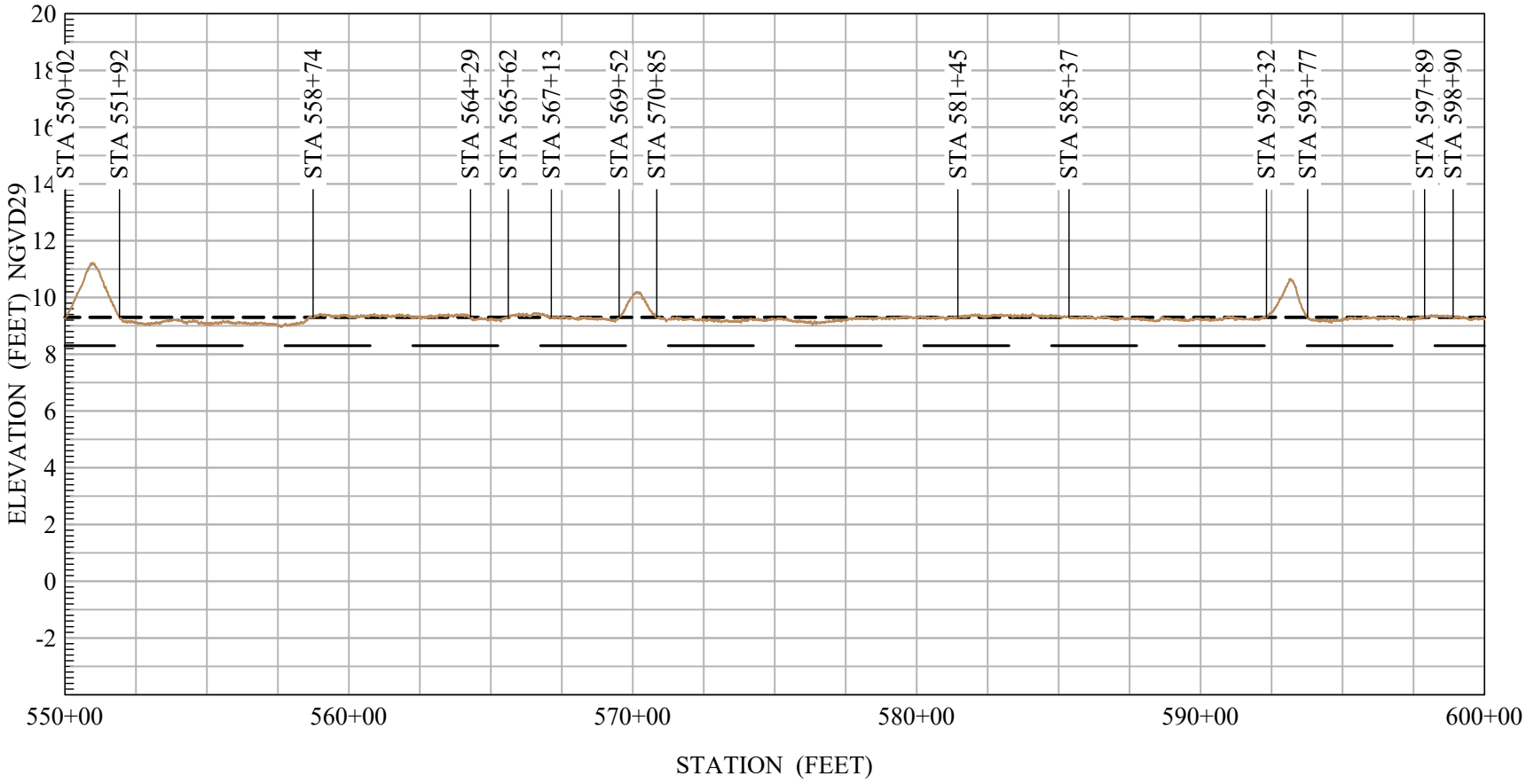
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 550+00 - 600+00



PROFILE SHEET: 12 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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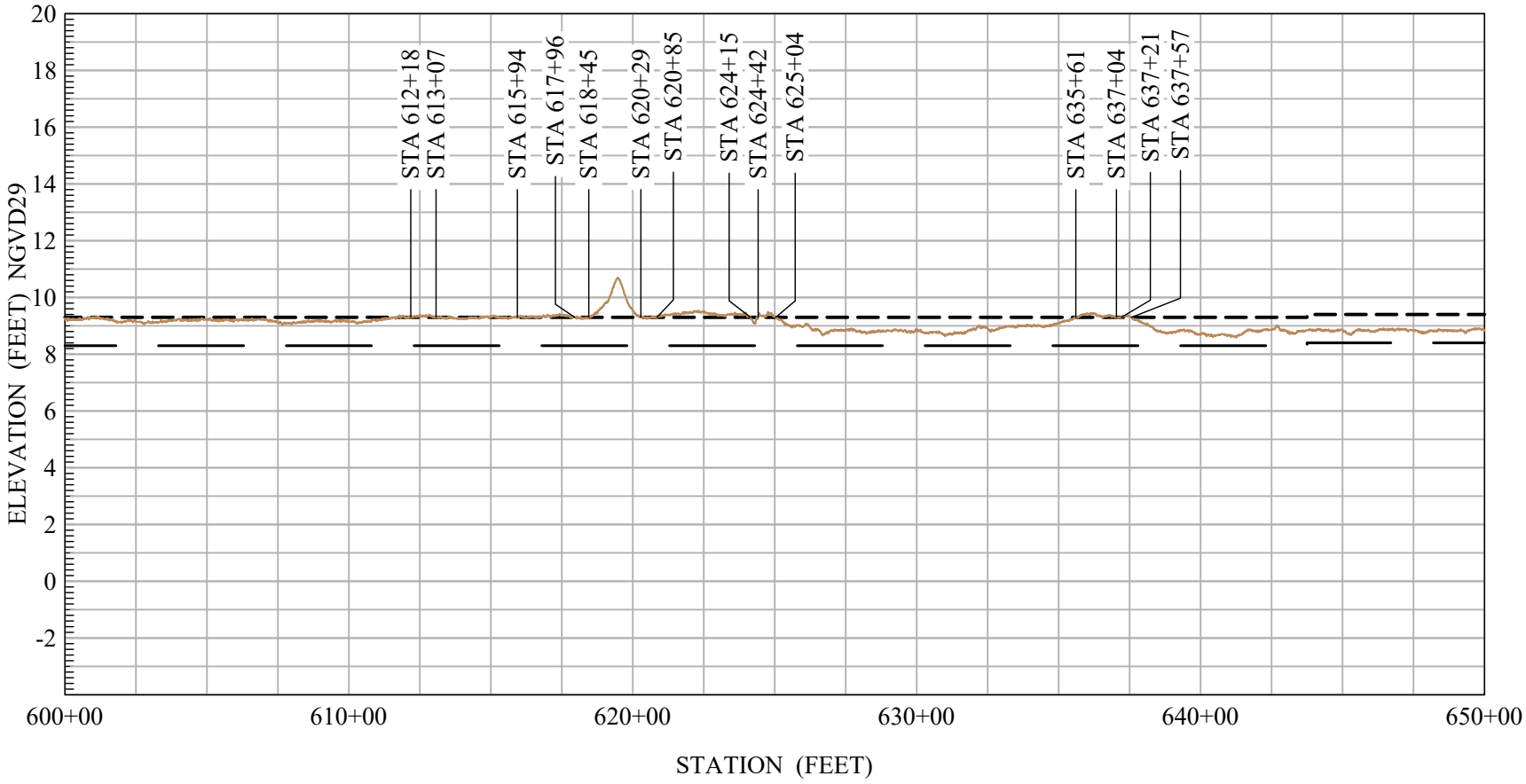
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 600+00 - 650+00



PROFILE SHEET: 13 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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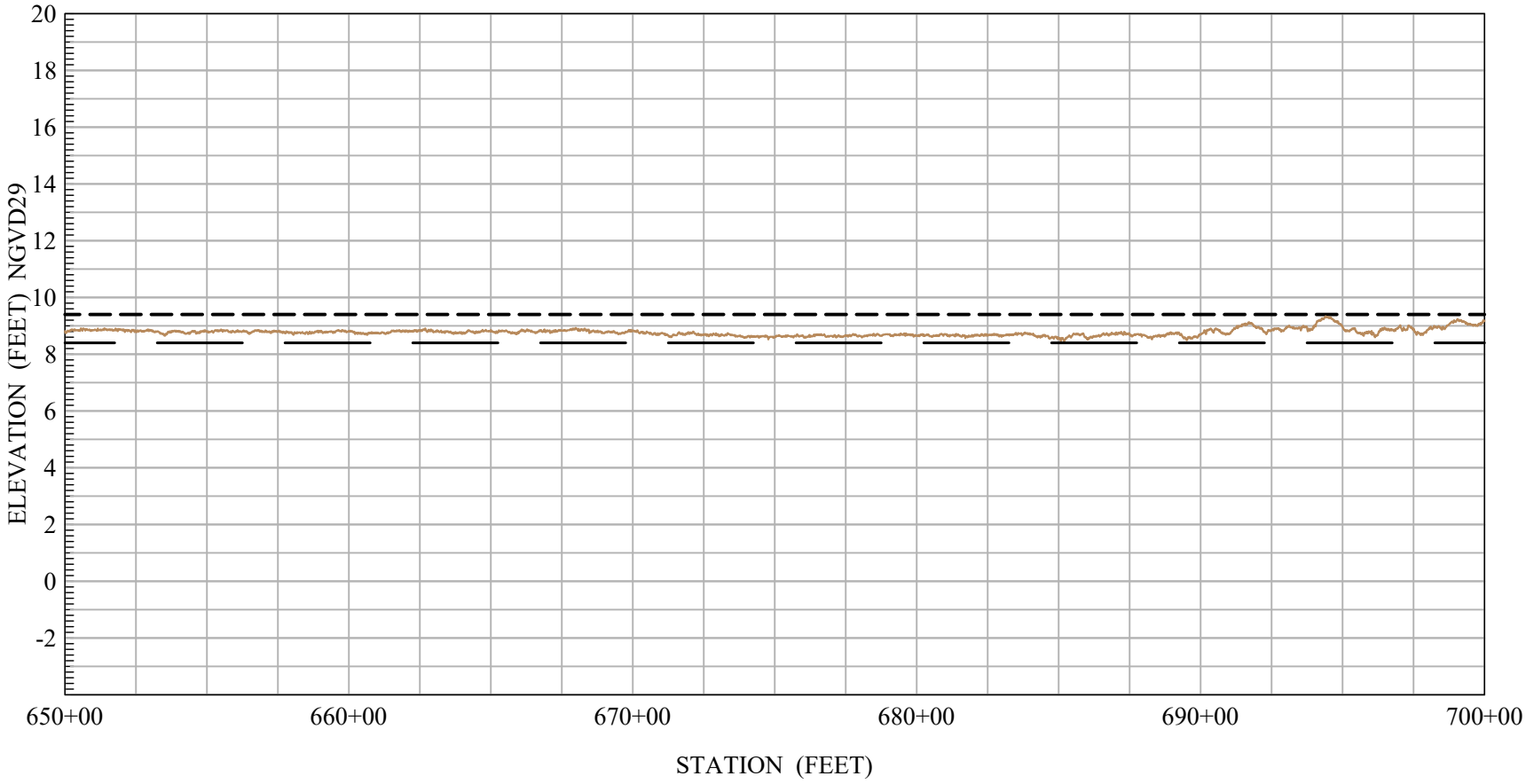
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 650+00 - 700+00



PROFILE SHEET: 14 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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Last Updated: 2020-07

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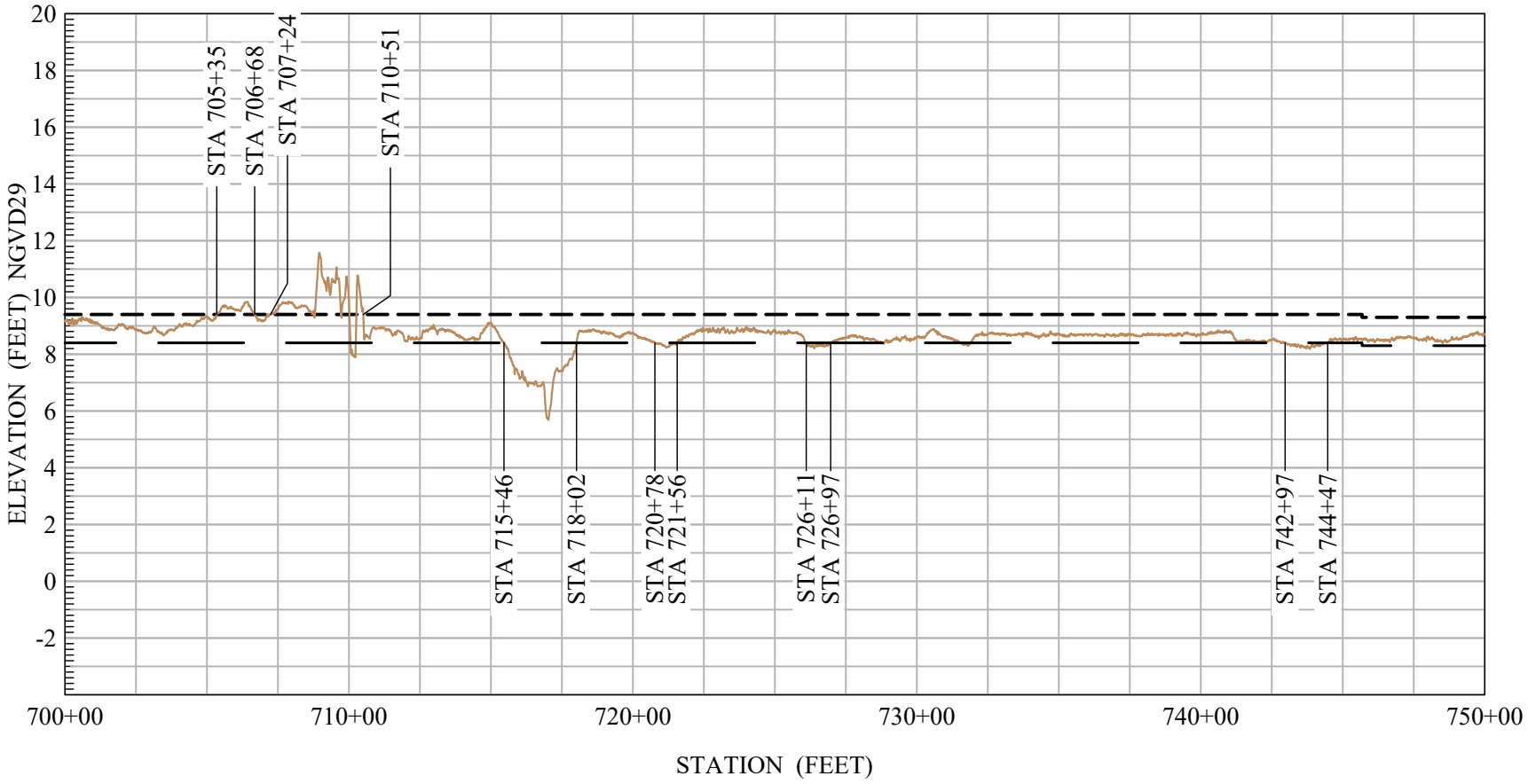
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 700+00 - 750+00



PROFILE SHEET: 15 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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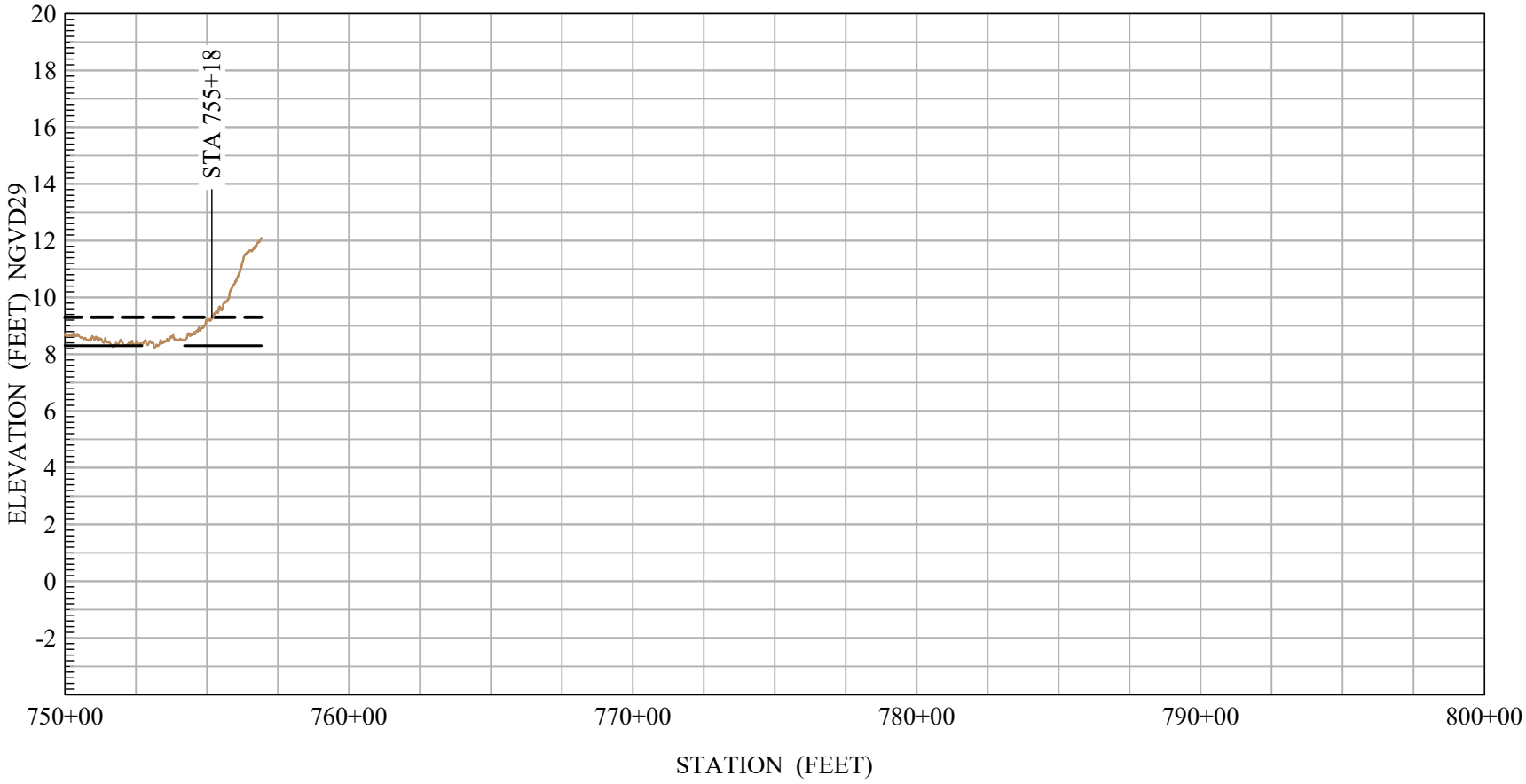
RD 2028 - BACON ISLAND
LEVEE CENTERLINE PROFILE 750+00 - 800+00



PROFILE SHEET: 16 OF 16

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2019-12 As-Built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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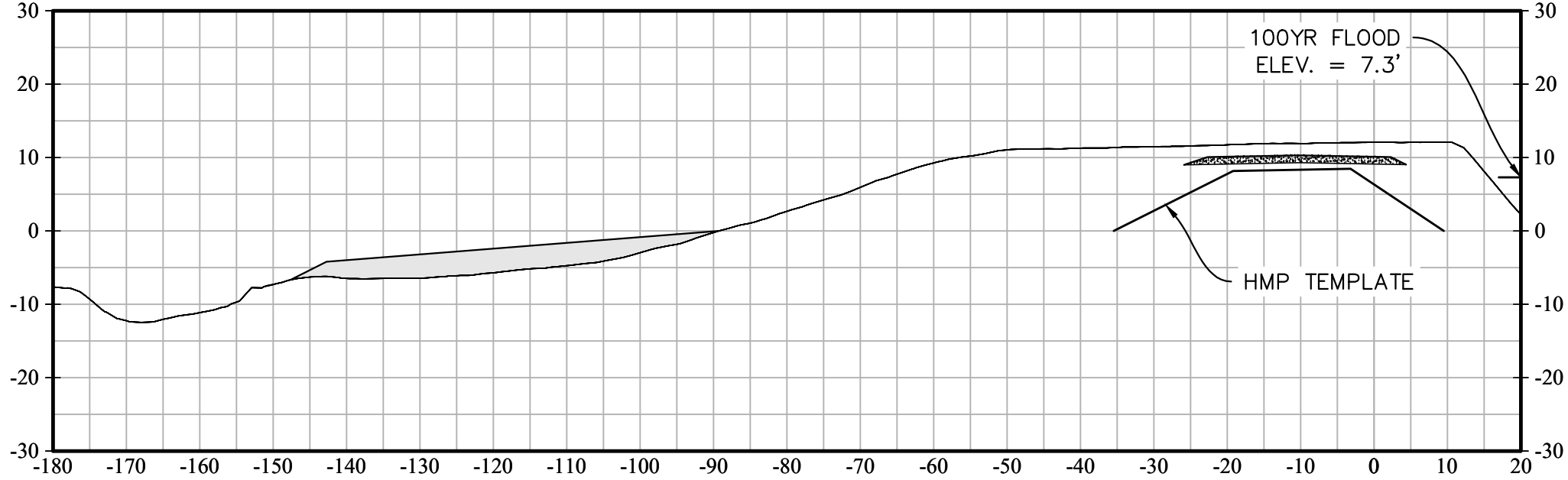
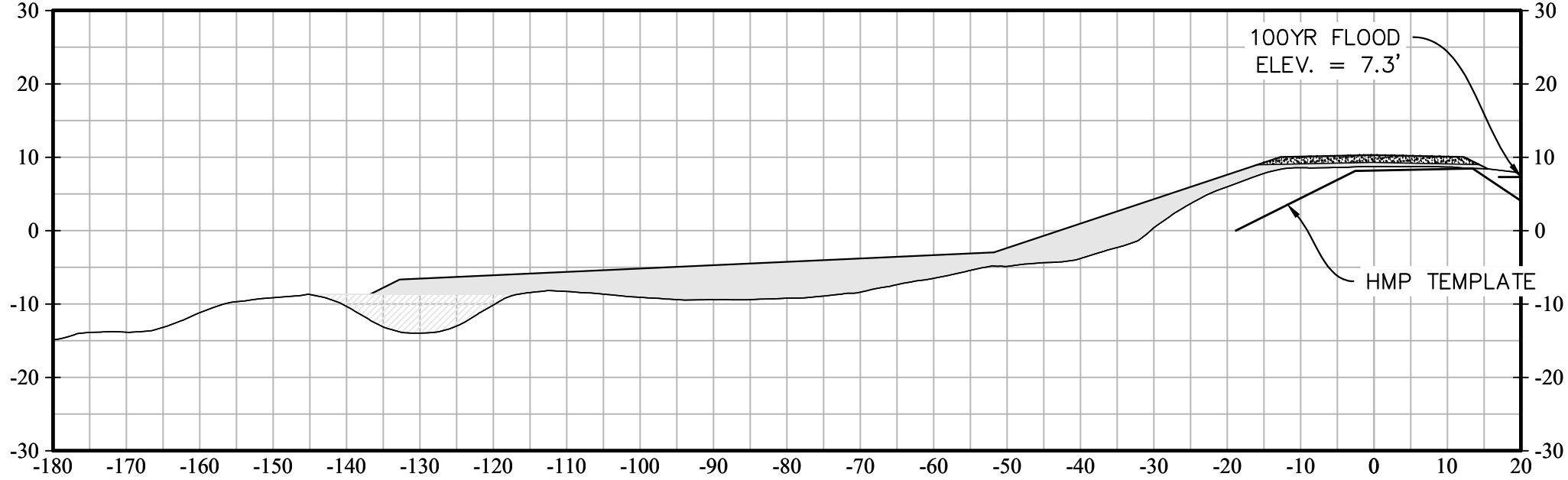
* VERTICAL DATUM = NGVD 29

0+00



5+00



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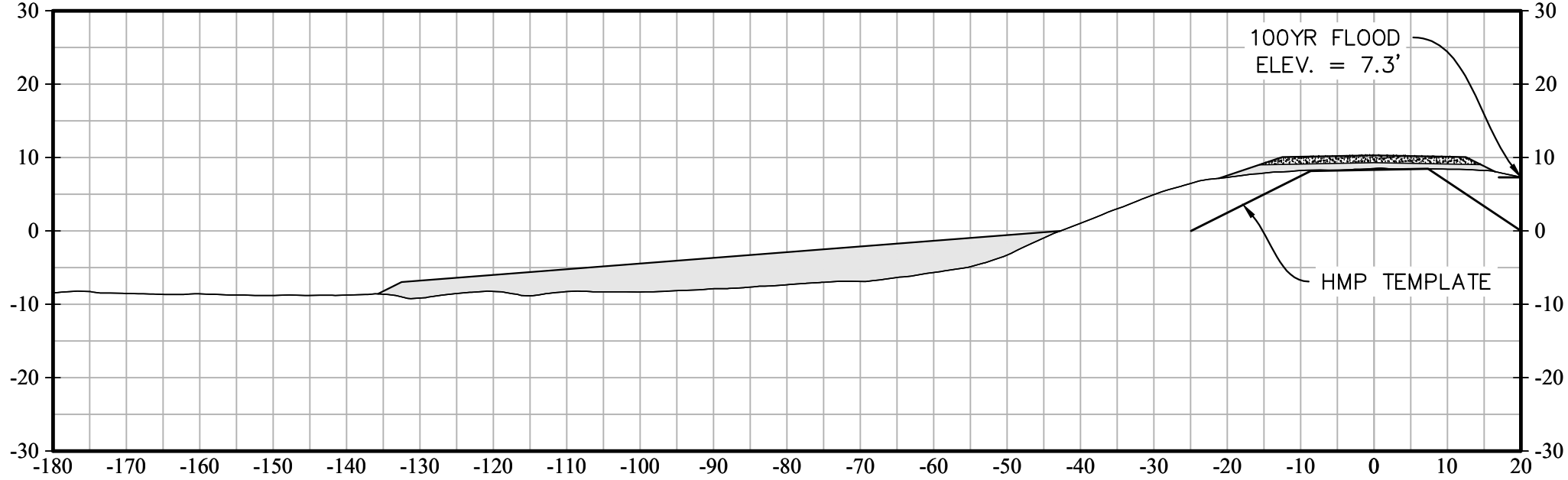
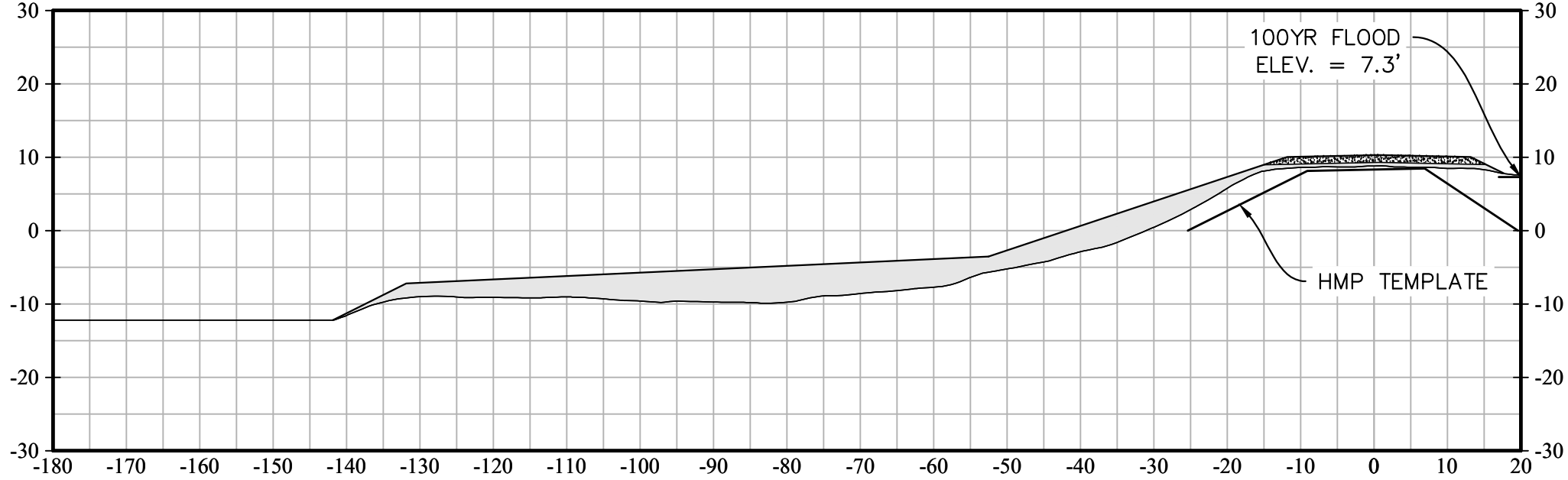
* VERTICAL DATUM = NGVD 29

10+00



15+00



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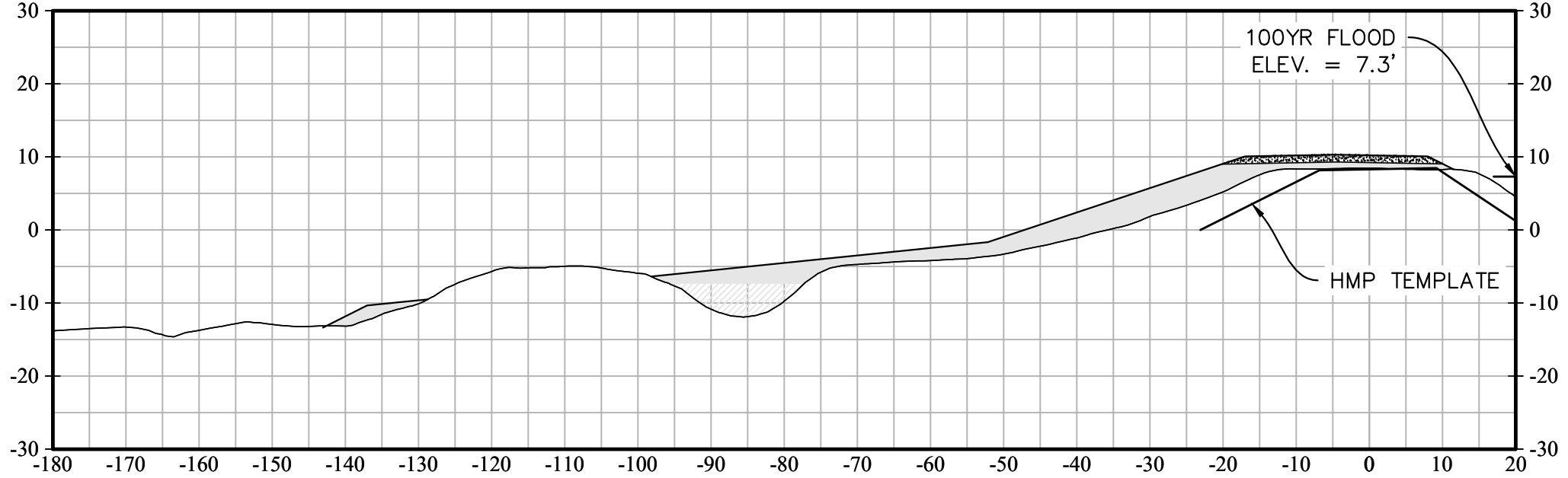
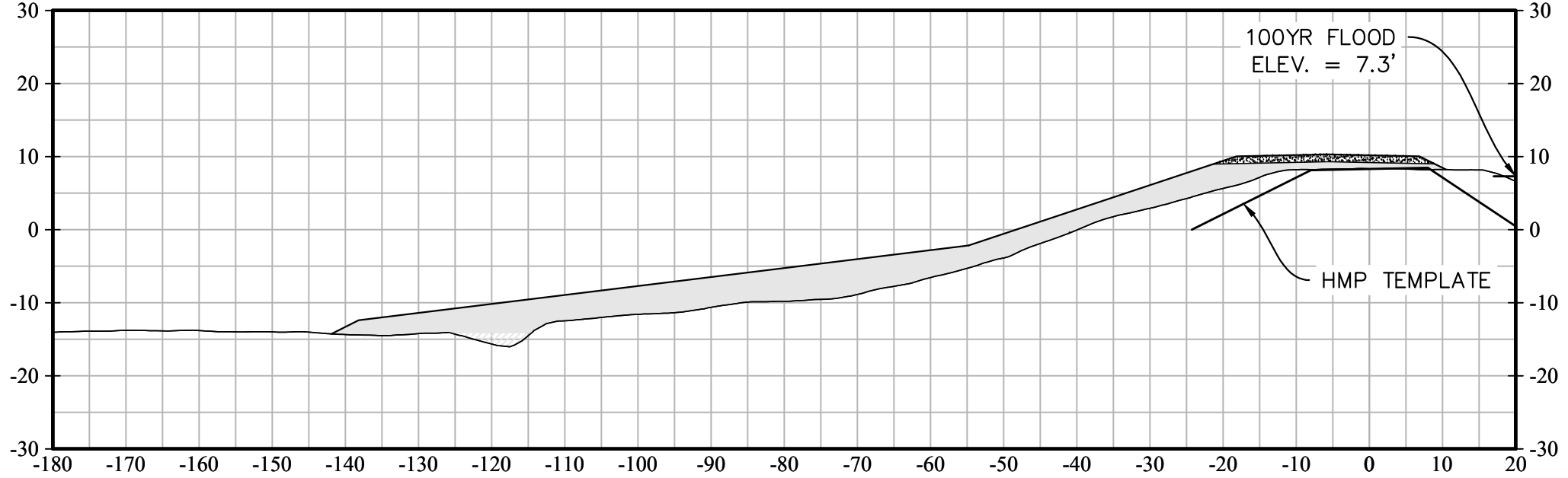
* VERTICAL DATUM = NGVD 29

20+00



25+00



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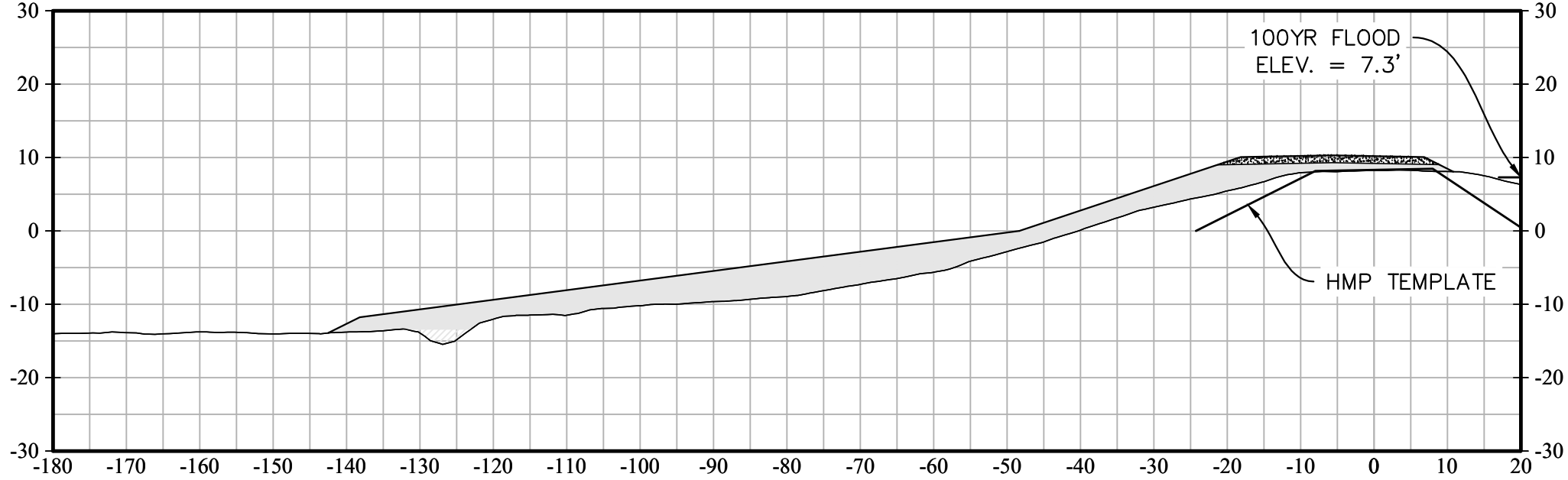
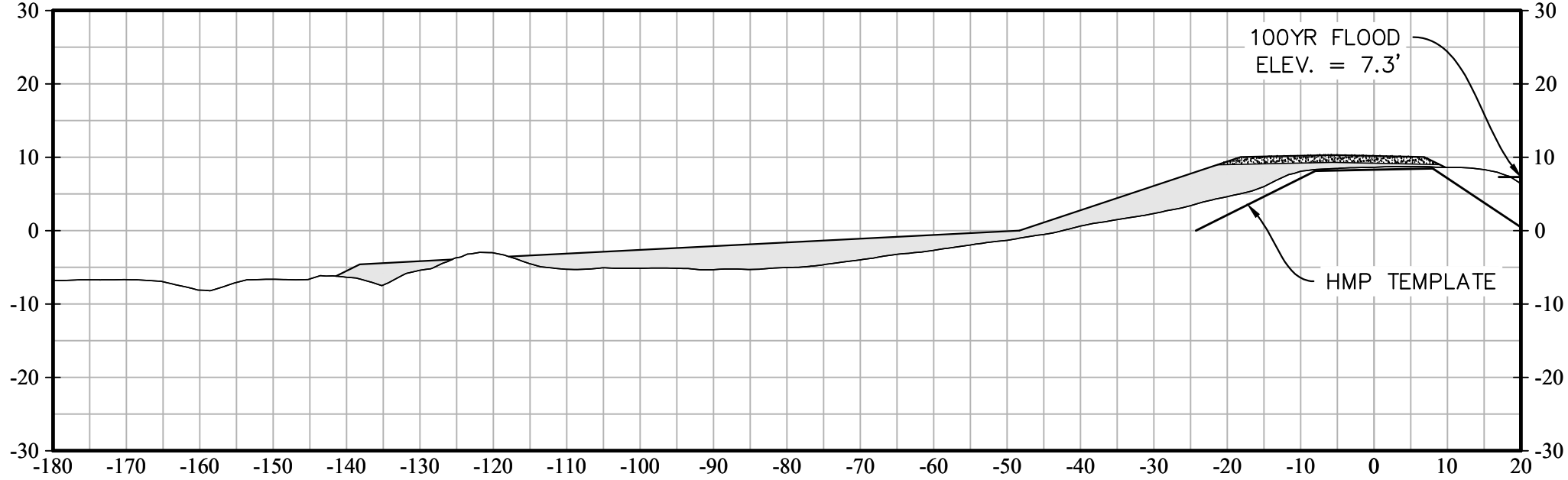
* VERTICAL DATUM = NGVD 29

30+00



35+00



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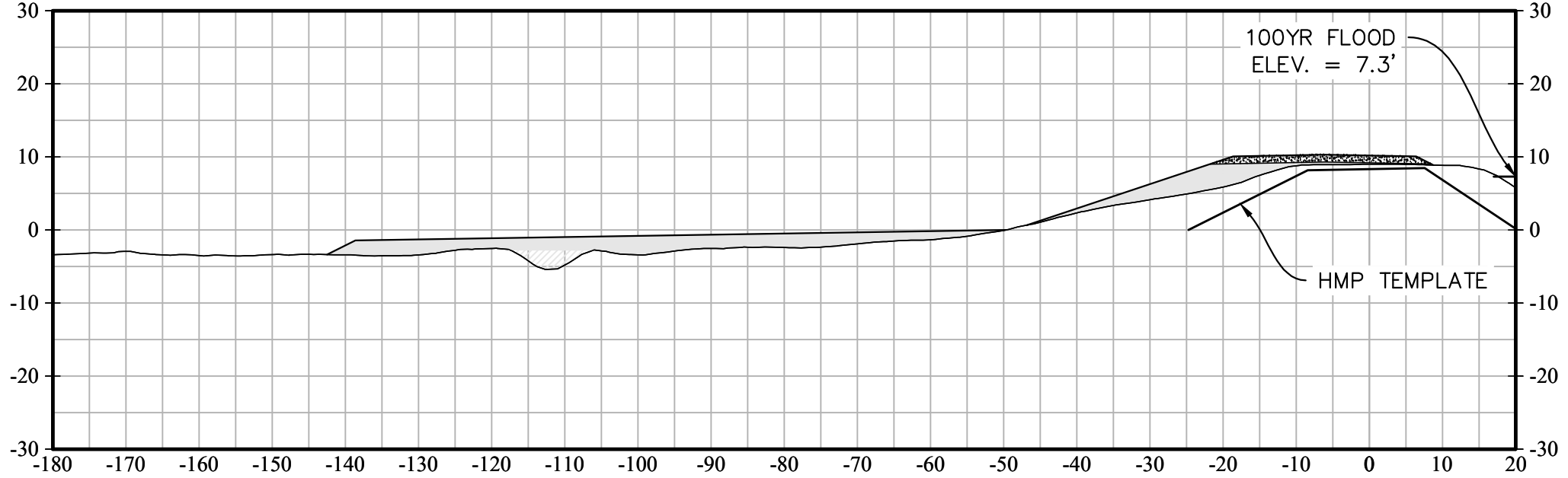
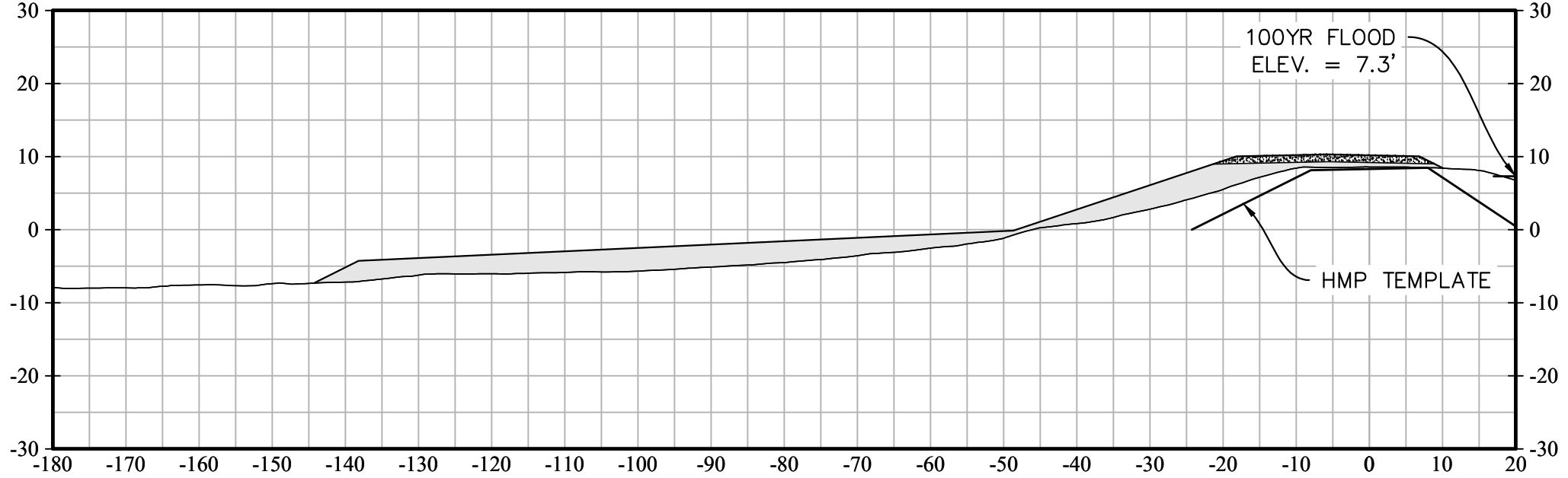
* VERTICAL DATUM = NGVD 29

40+00



45+00



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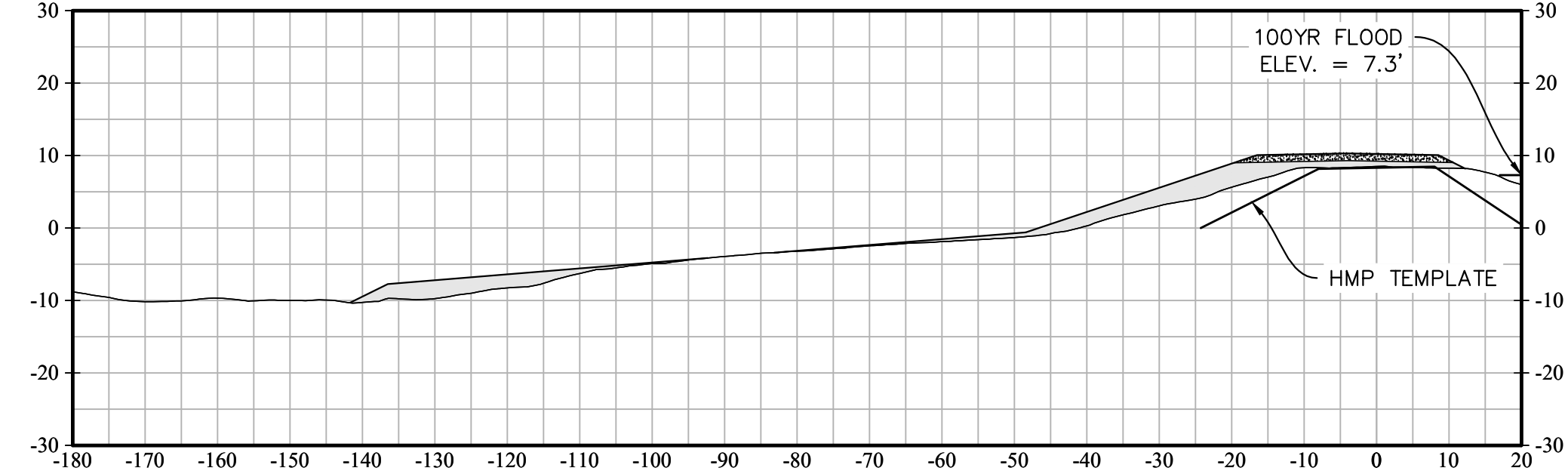
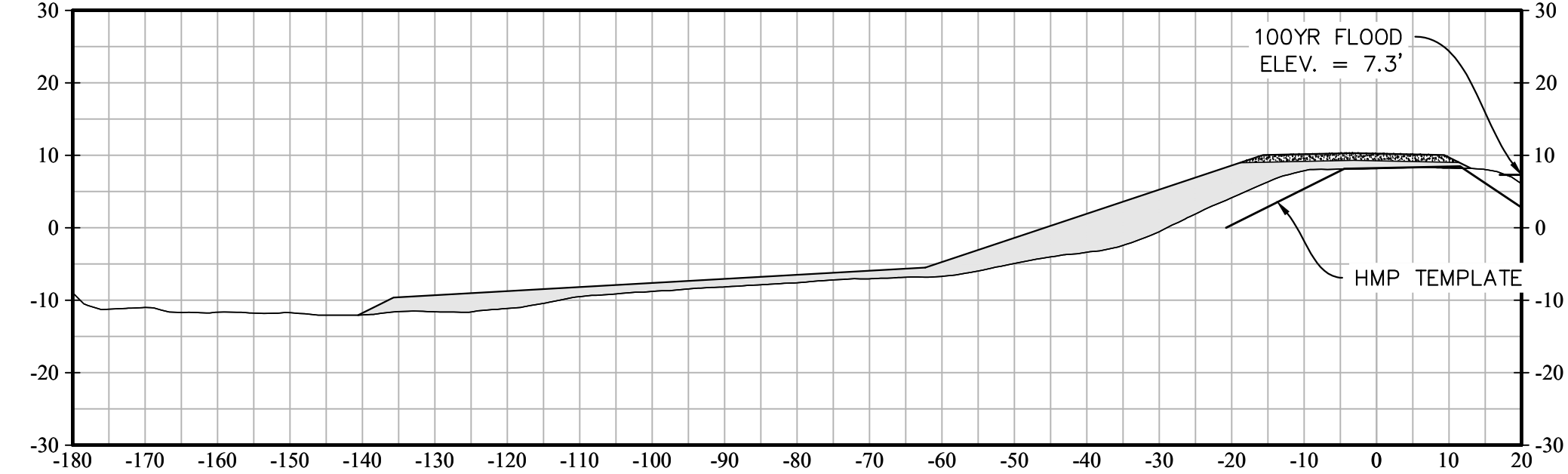
* VERTICAL DATUM = NGVD 29

50+00



55+00



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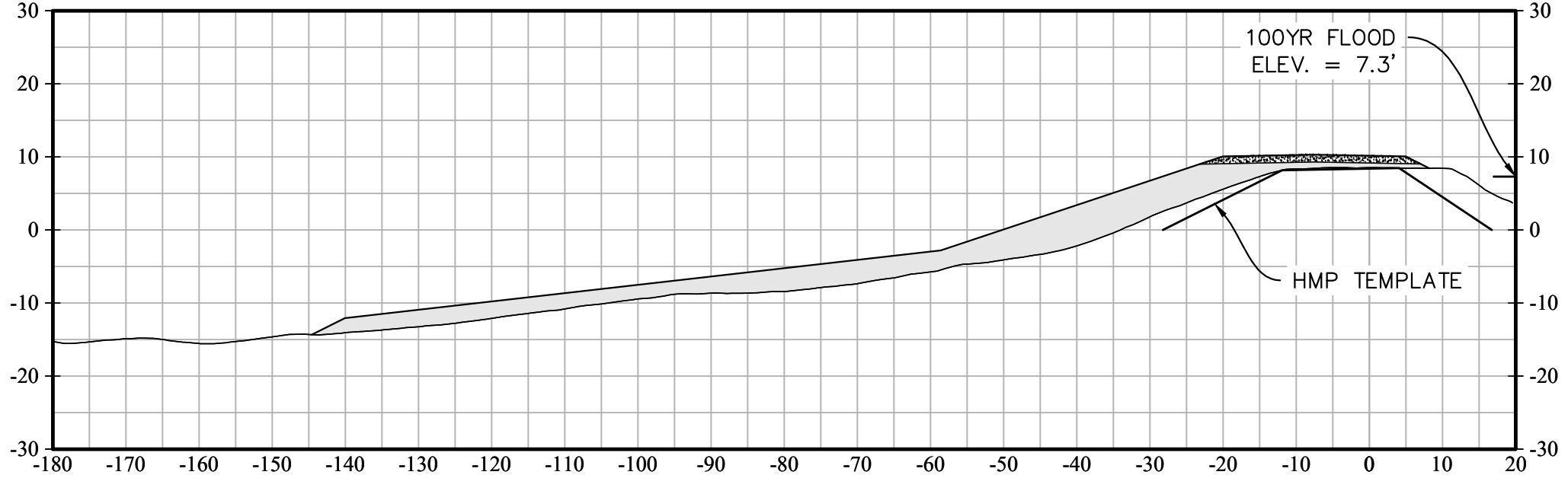
60+00



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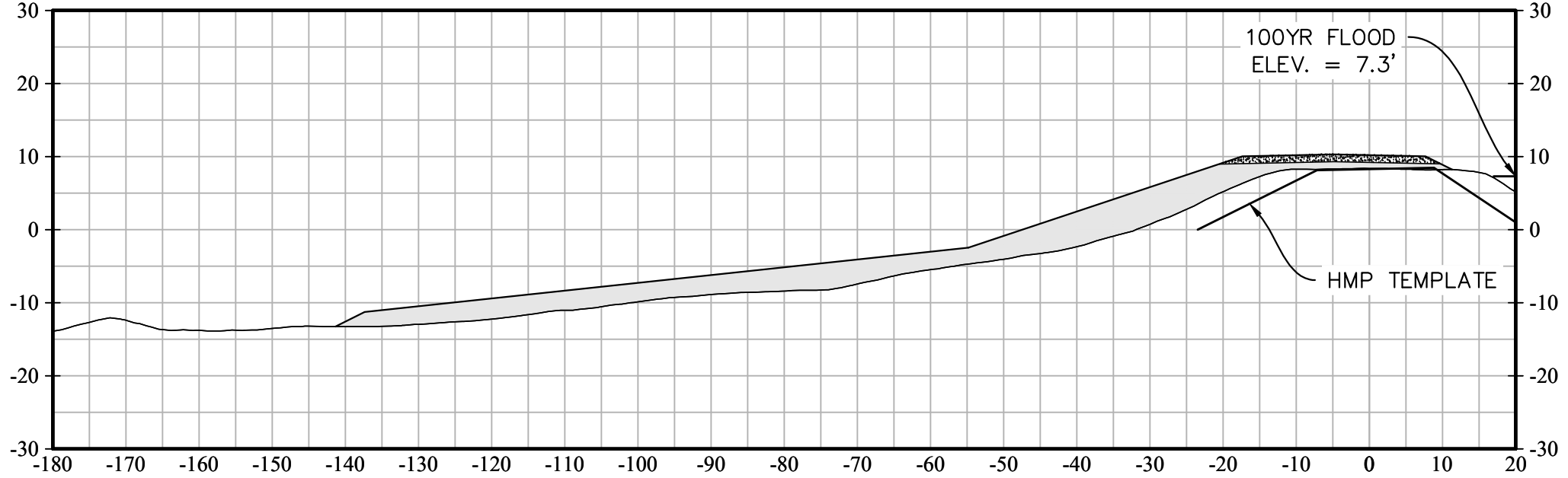

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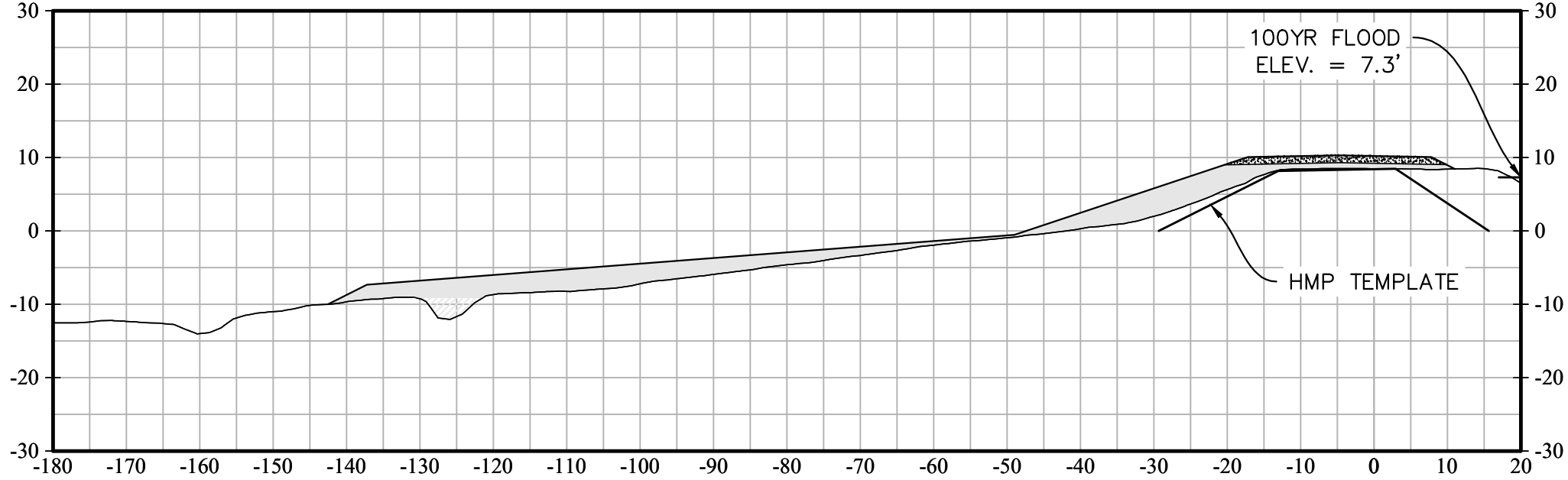
70+00



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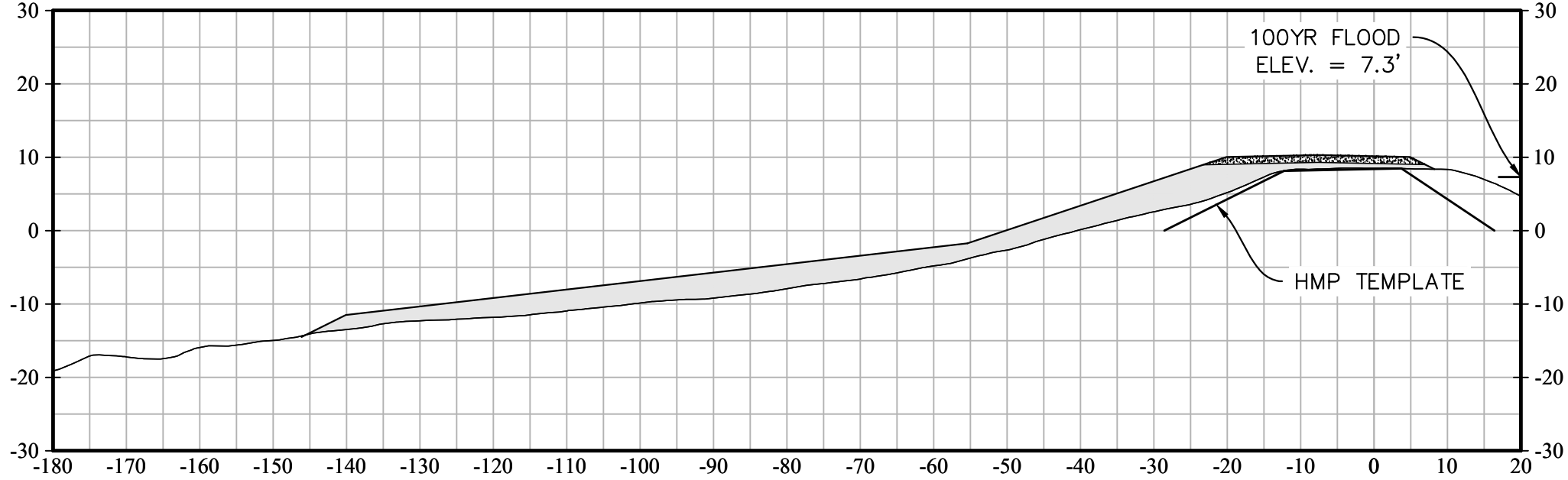

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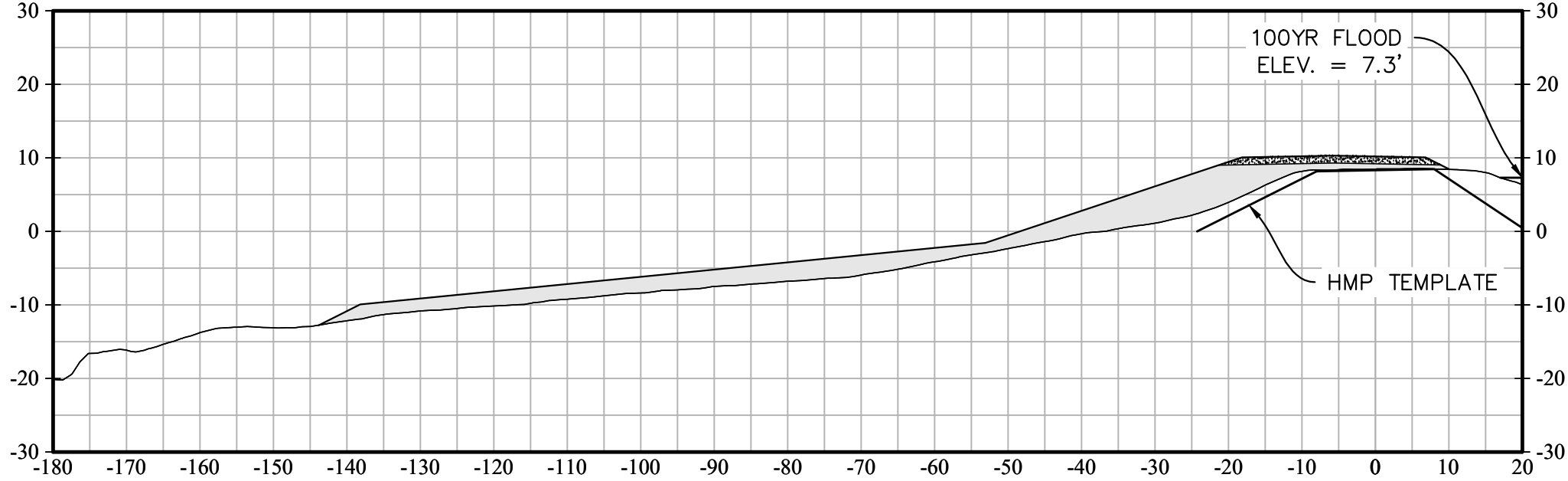
80+00



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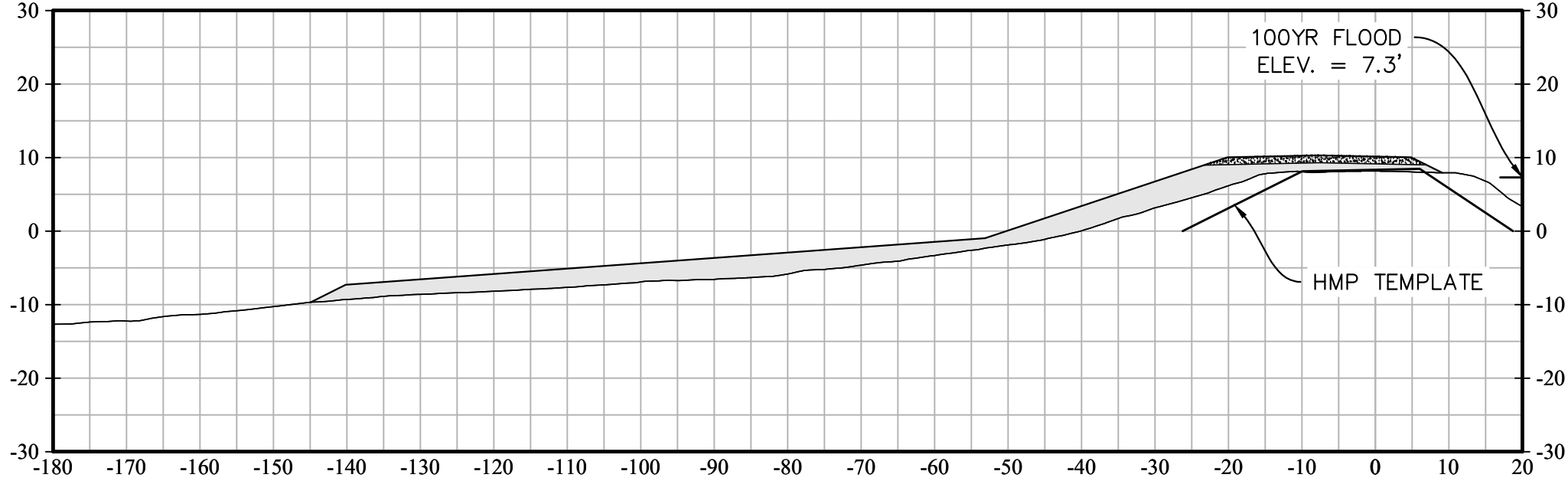

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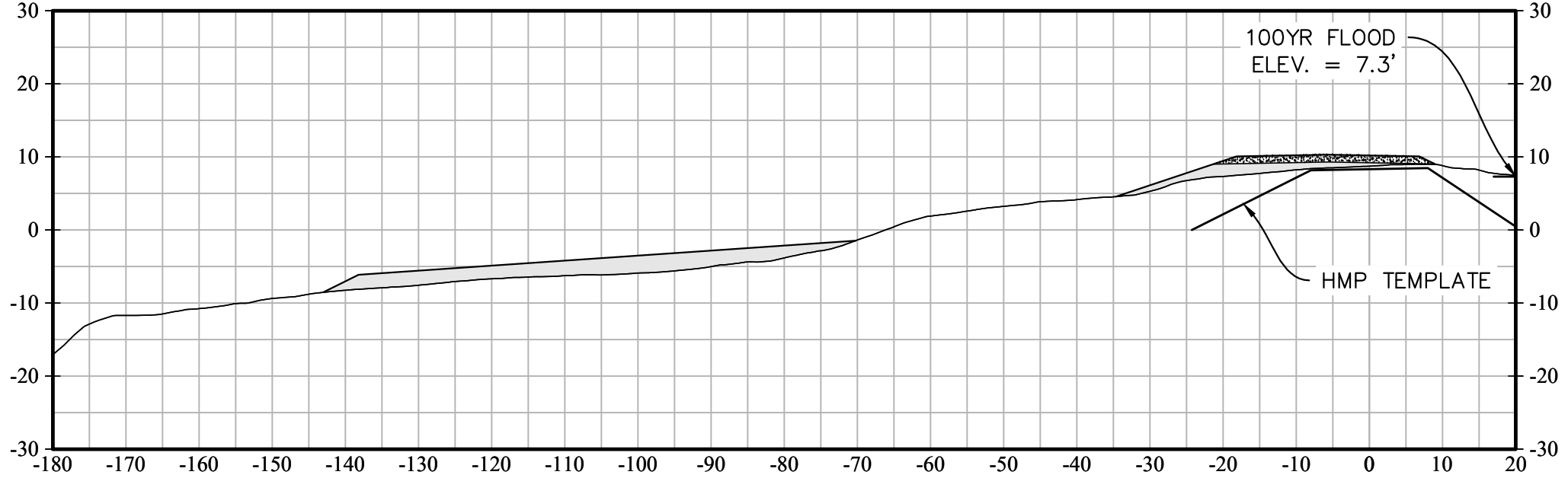
90+00



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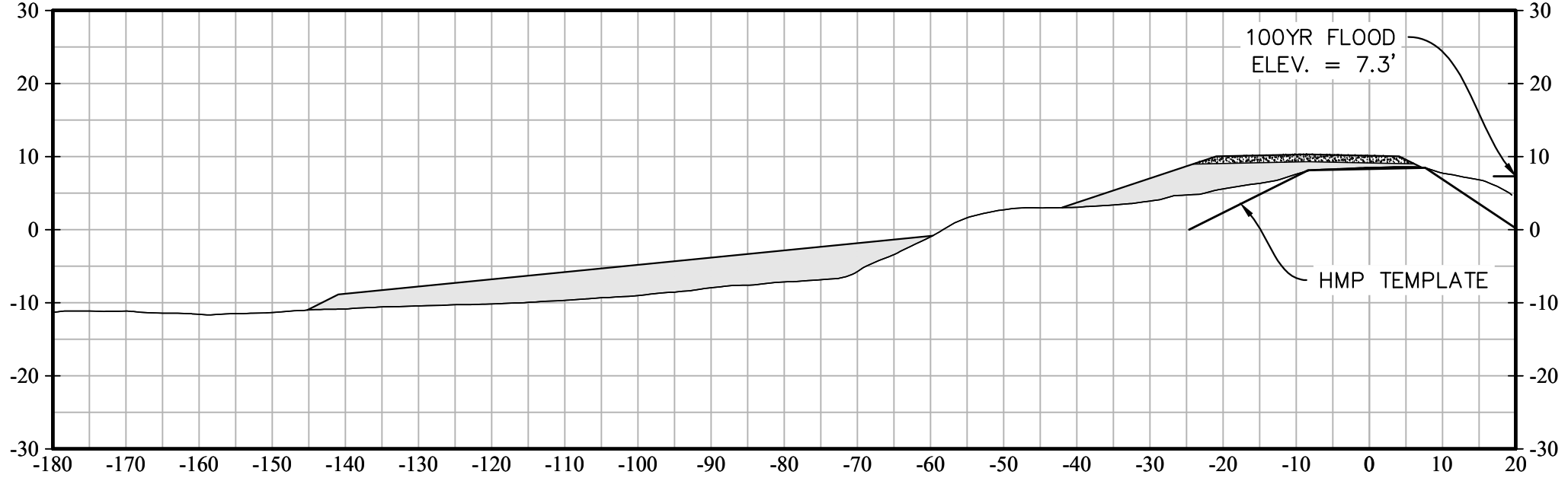

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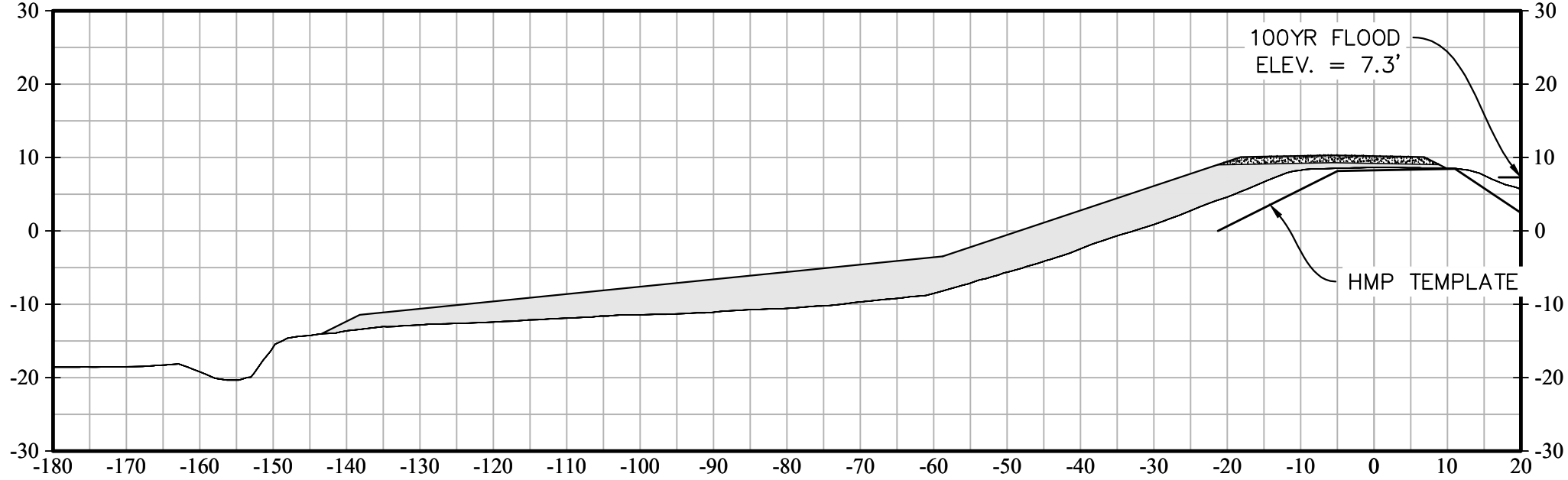
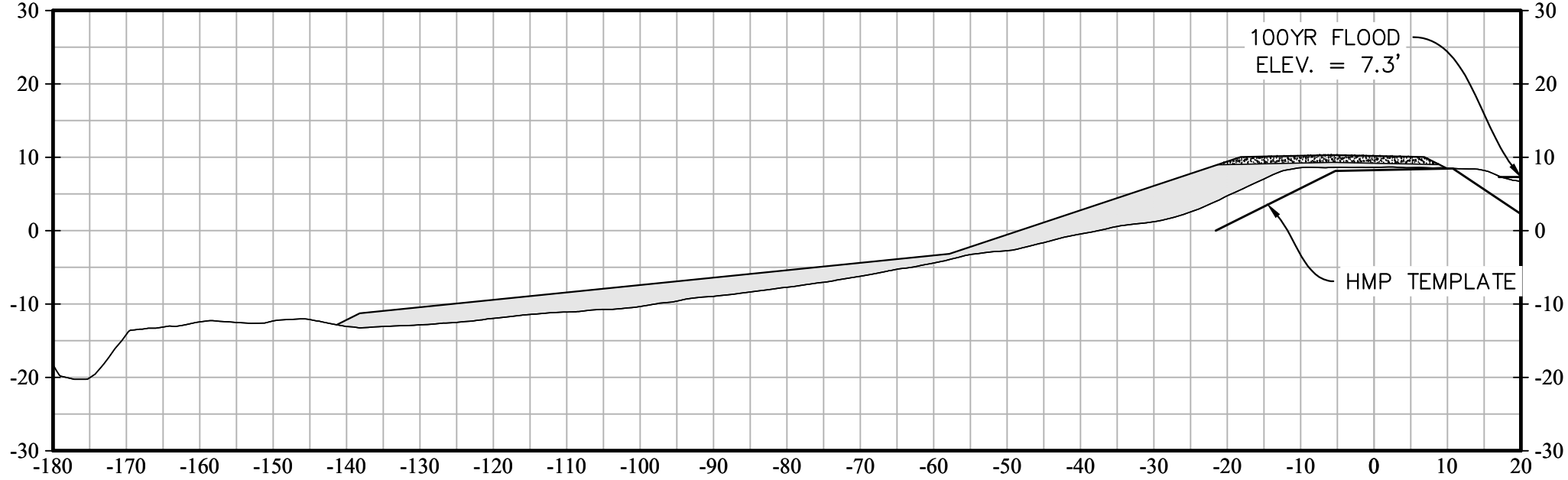
100+00



105+00



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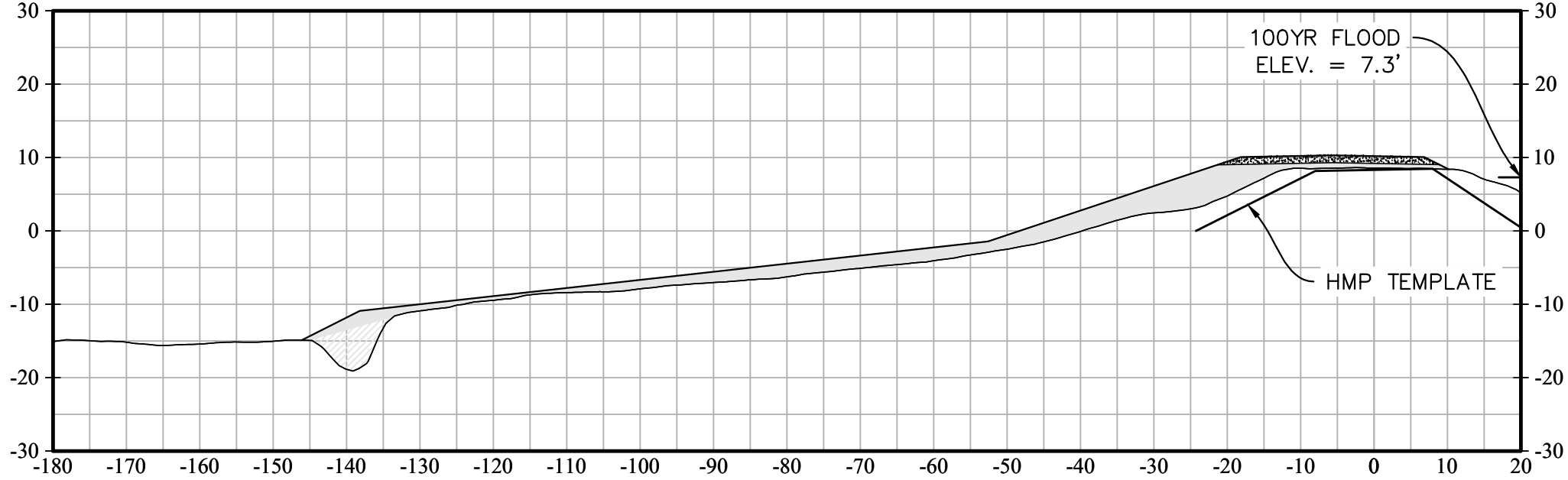
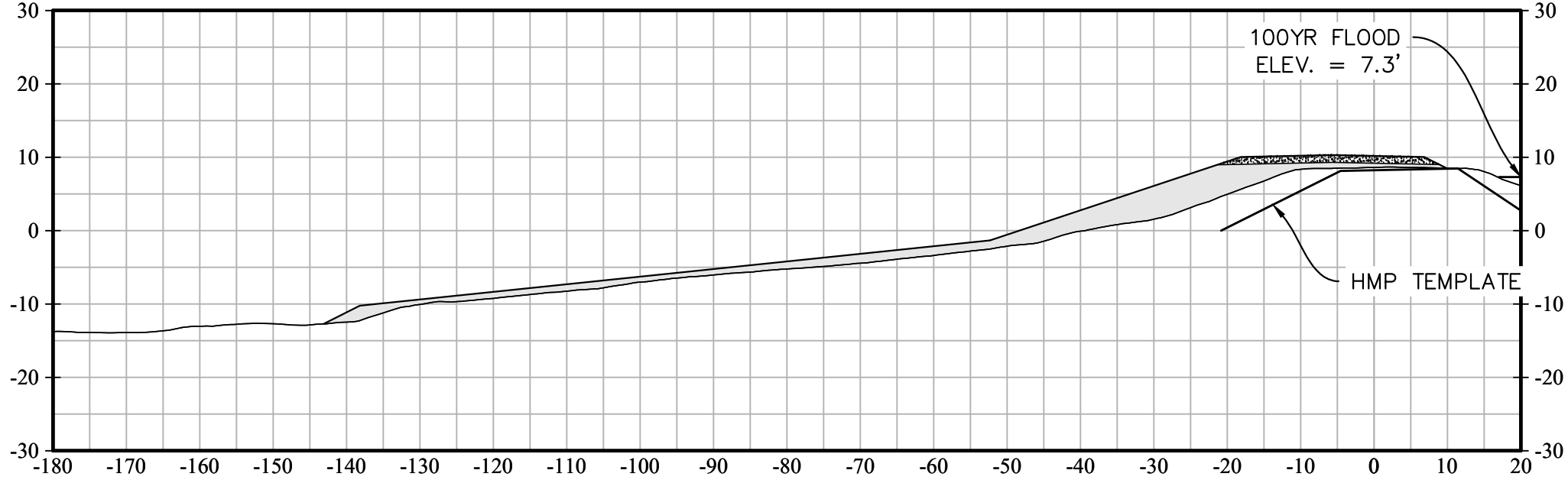
110+00



115+00



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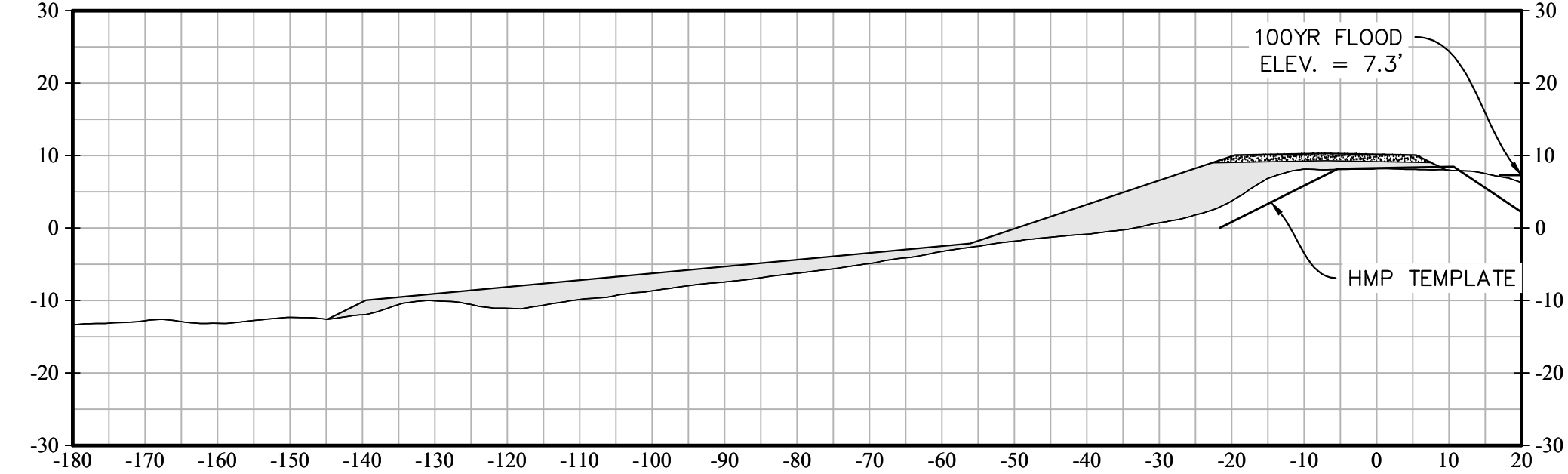
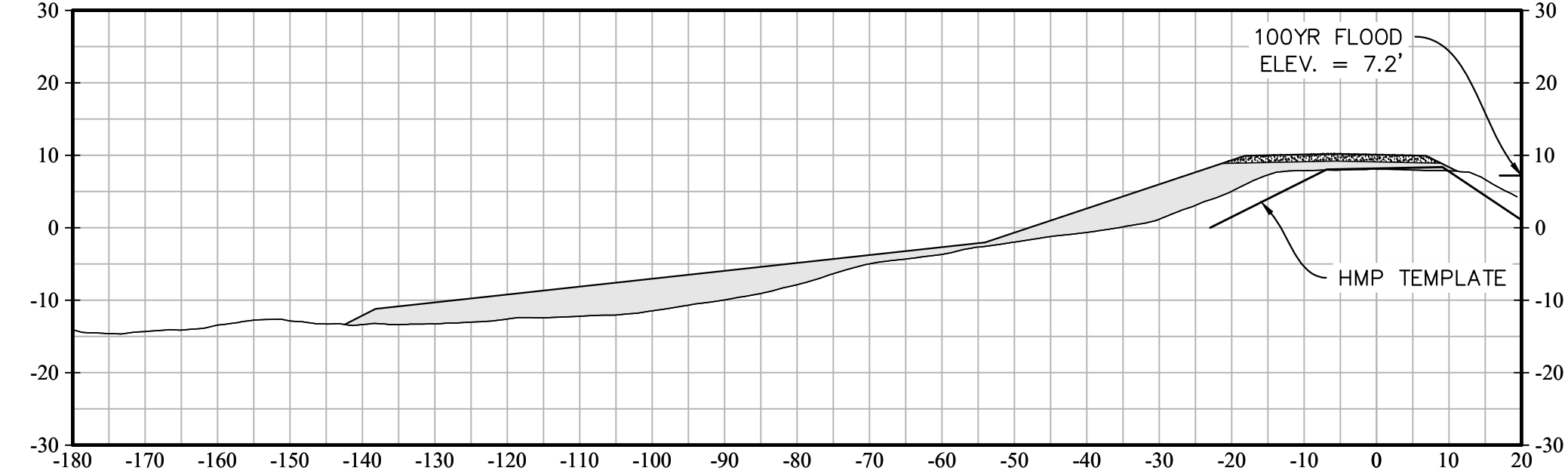
120+00



125+00



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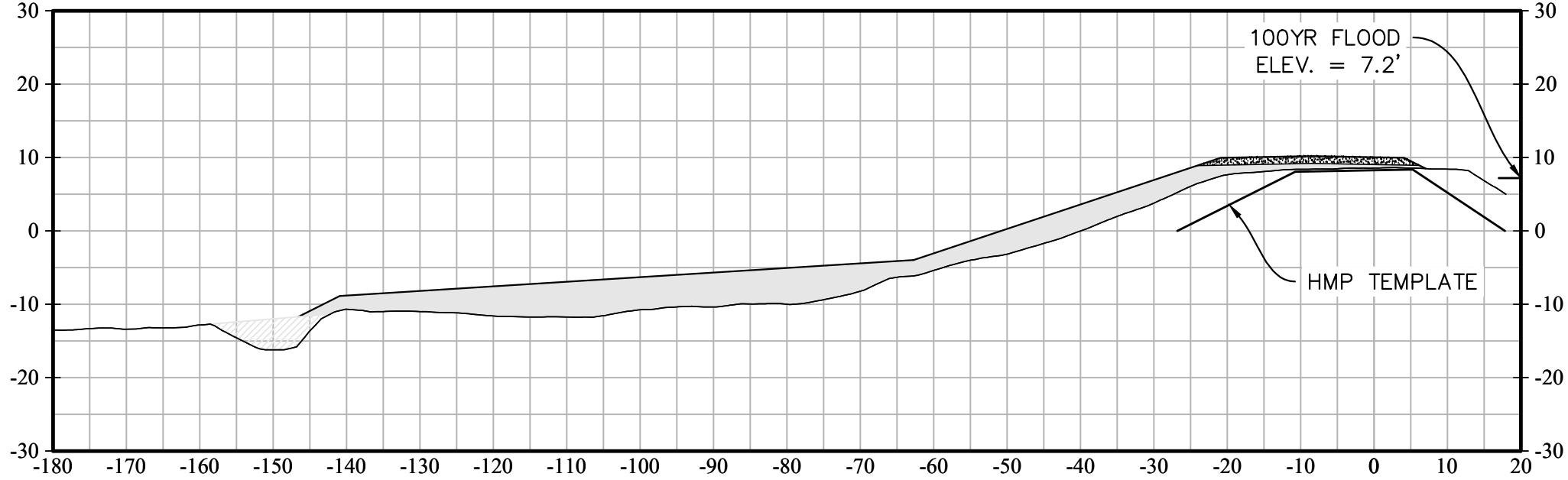
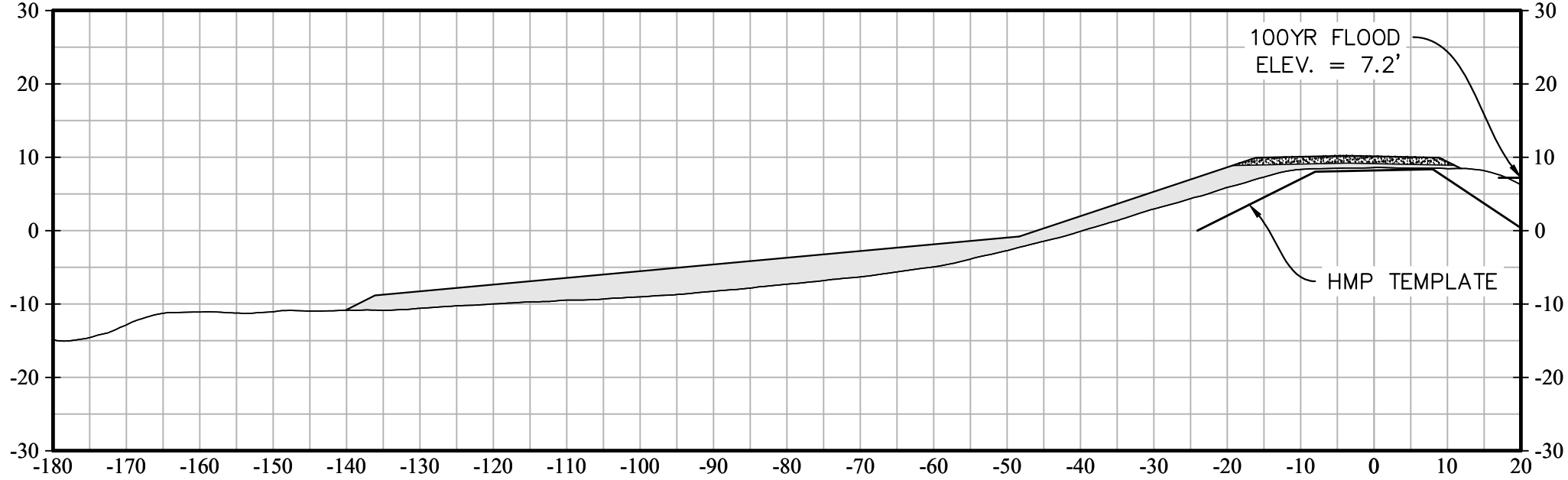
130+00



135+00



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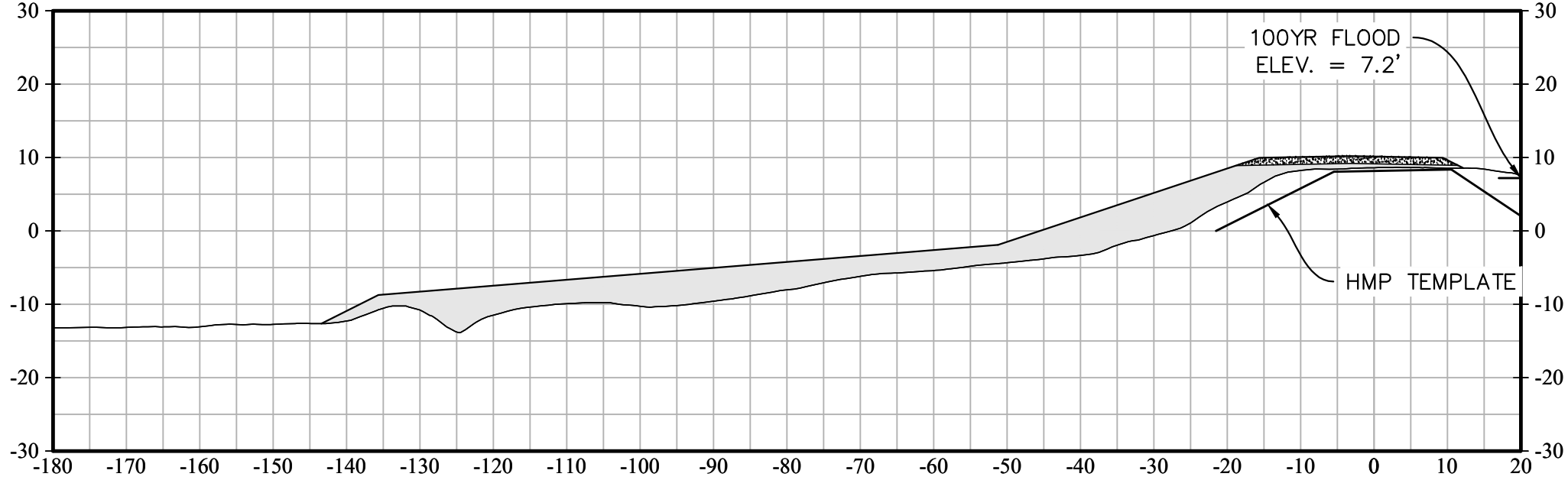
140+00



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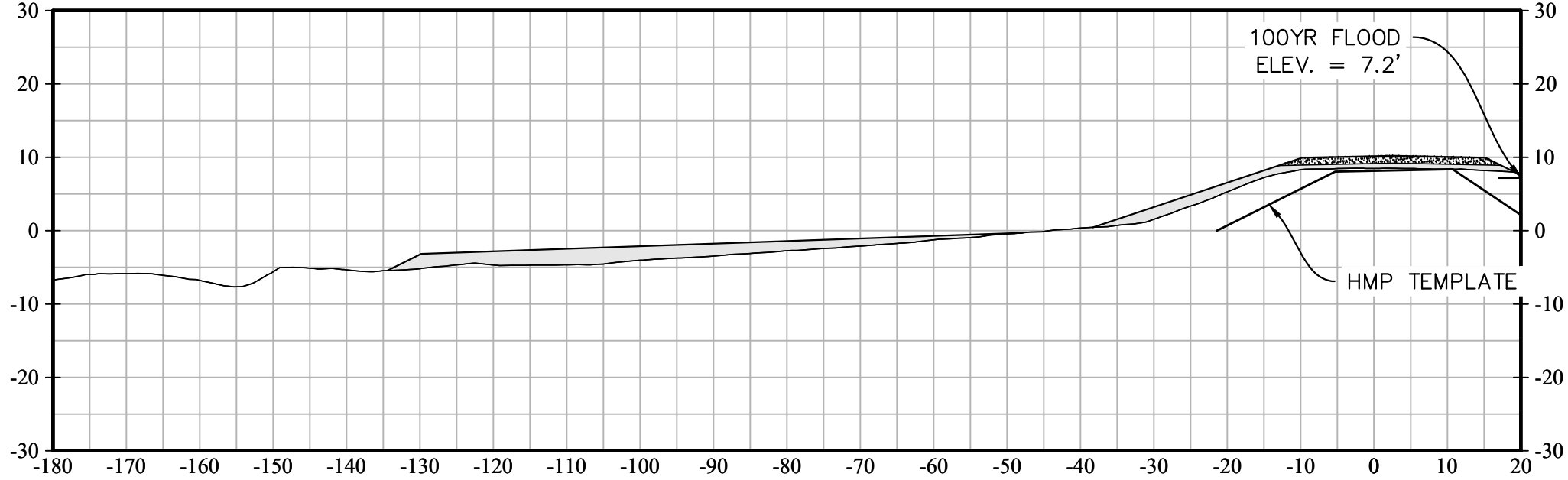

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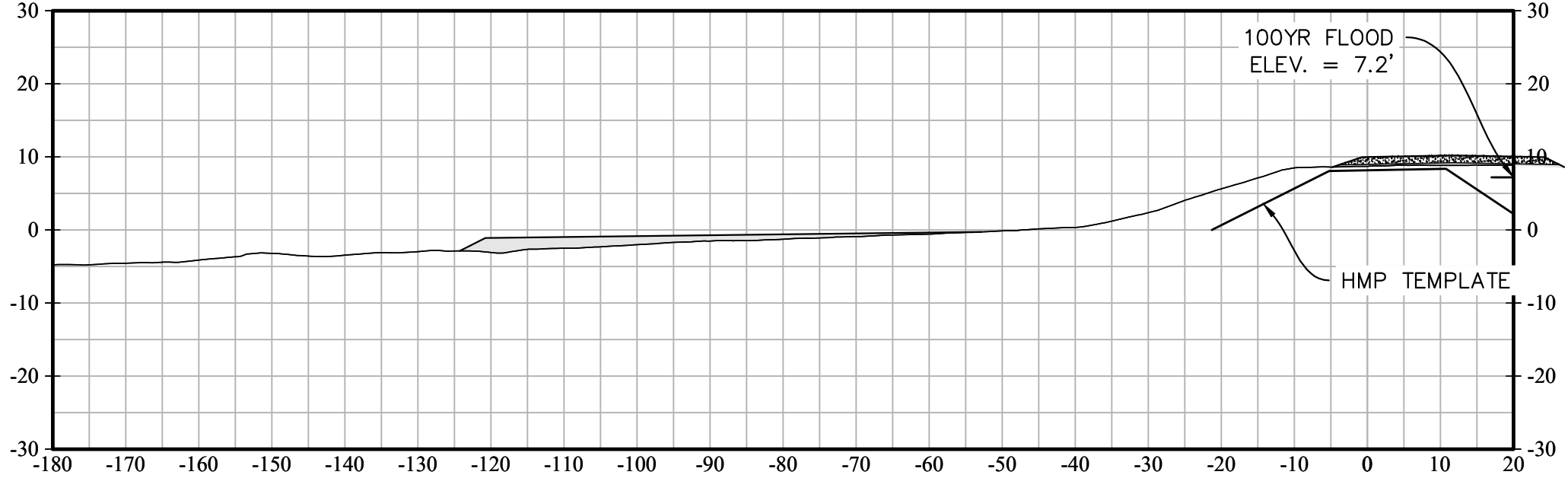
150+00



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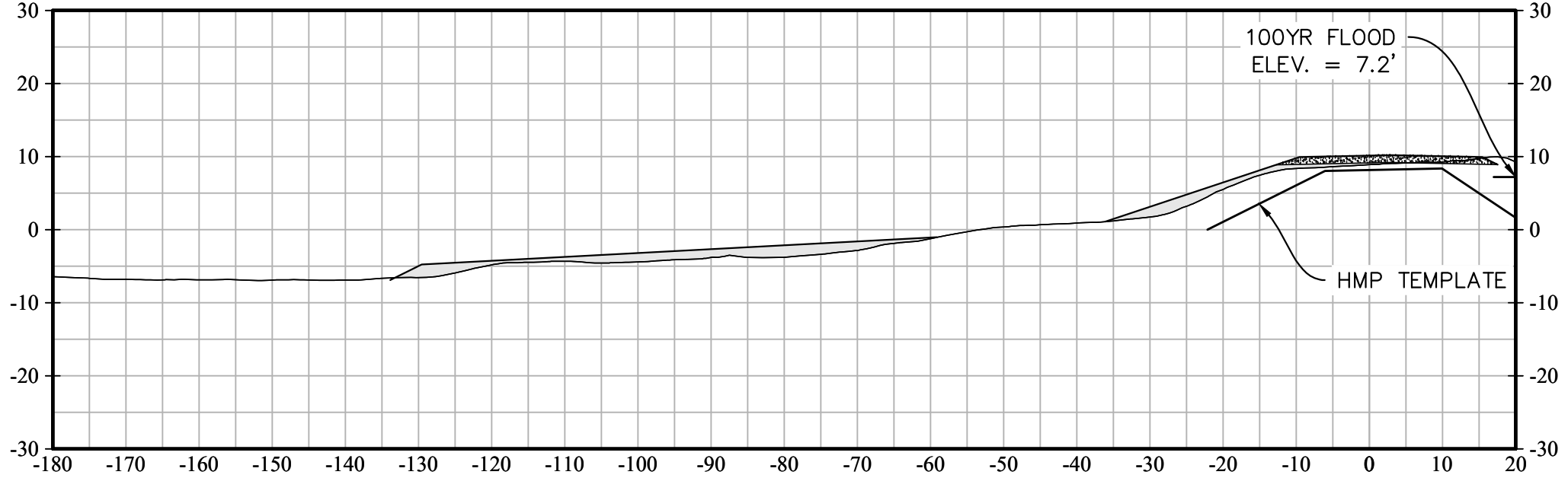

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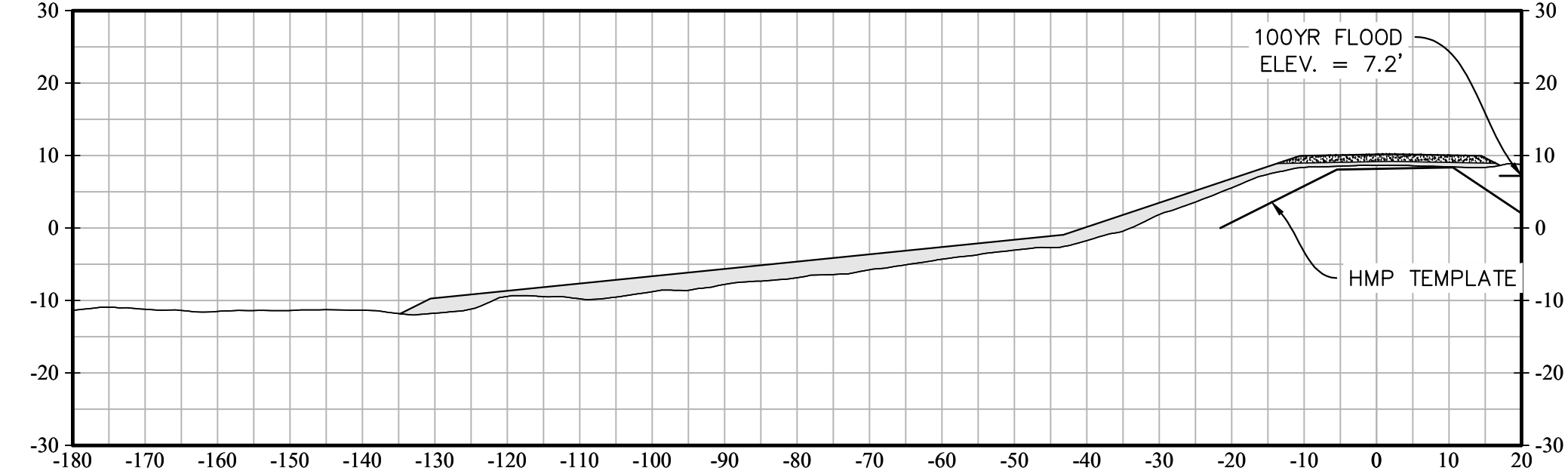
160+00



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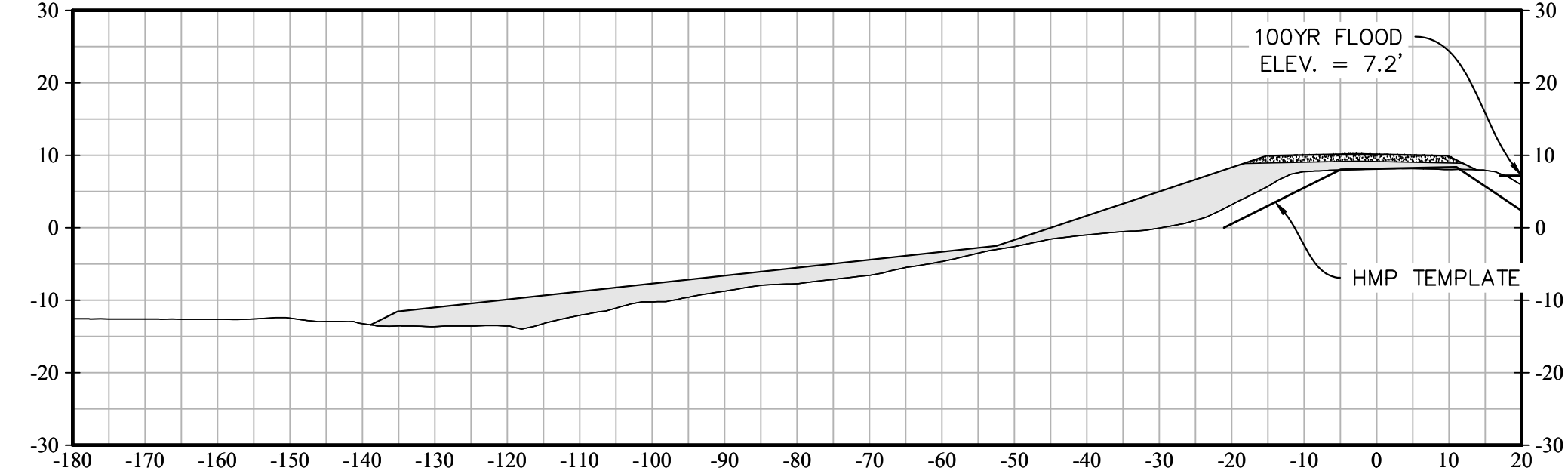

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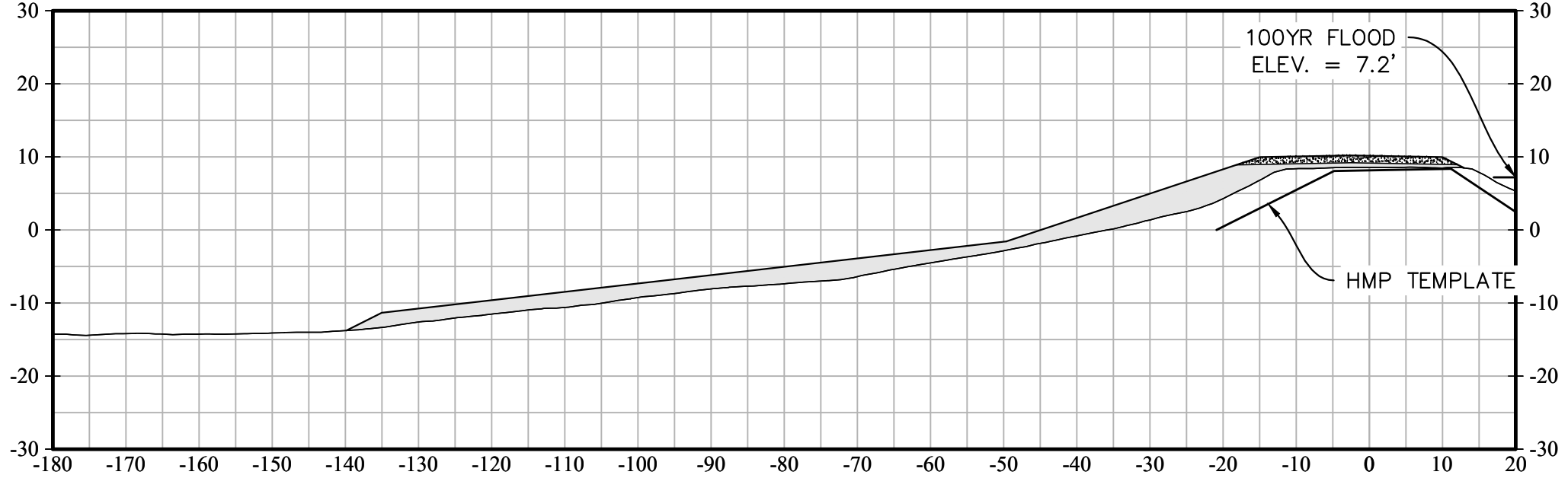
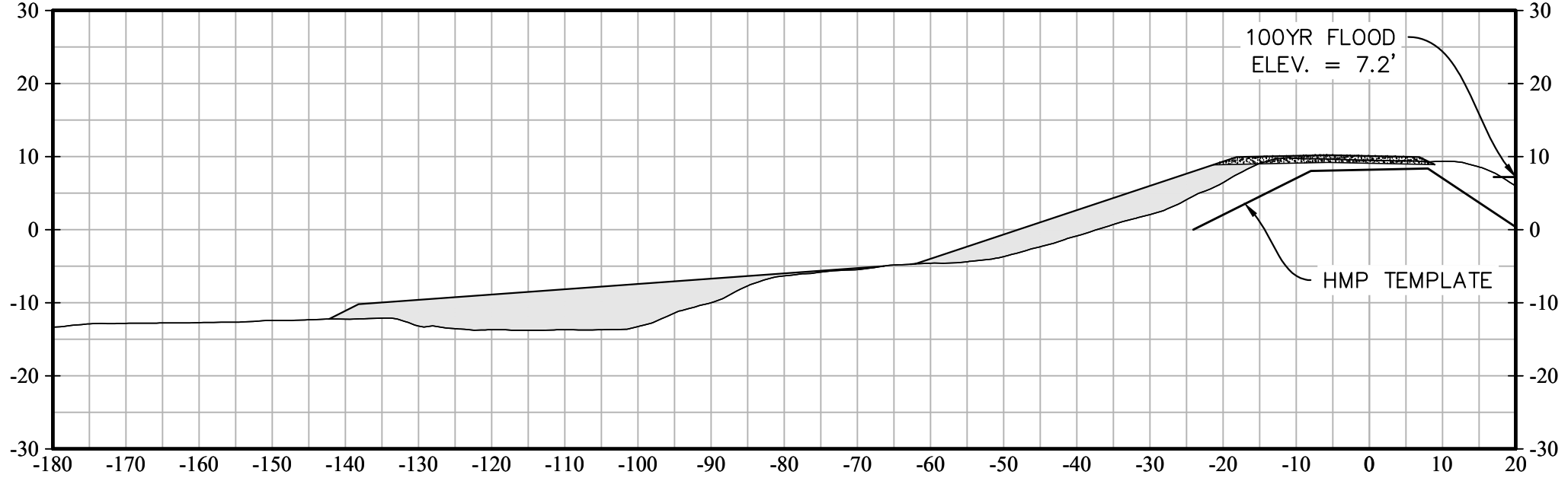
170+00



175+00



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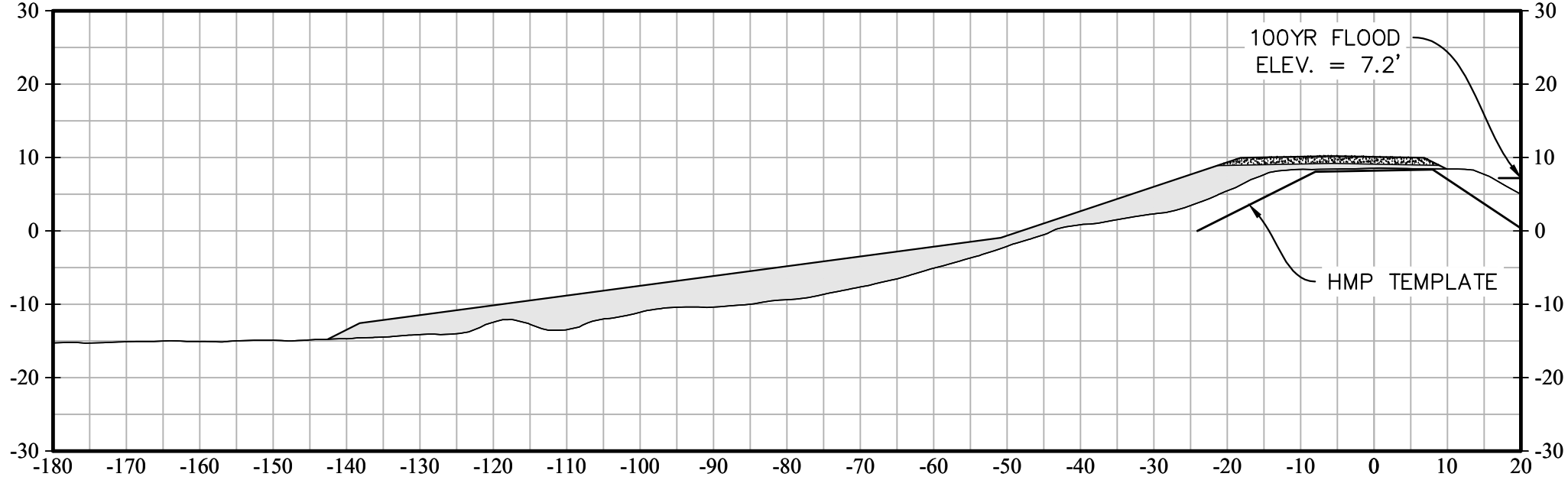
180+00



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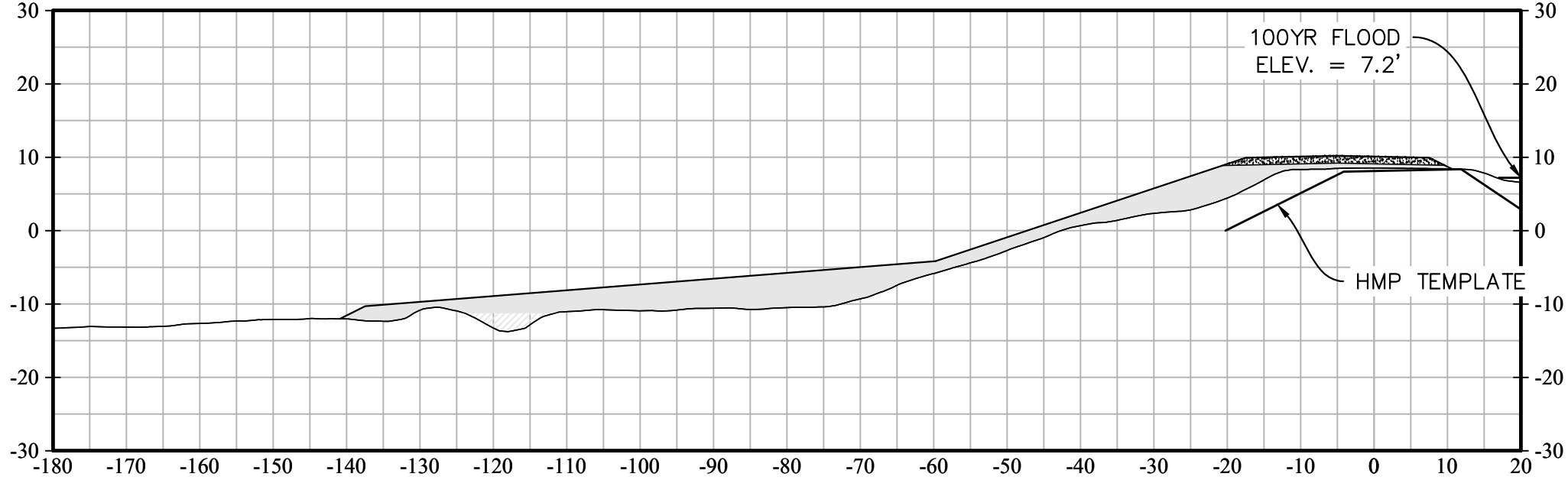

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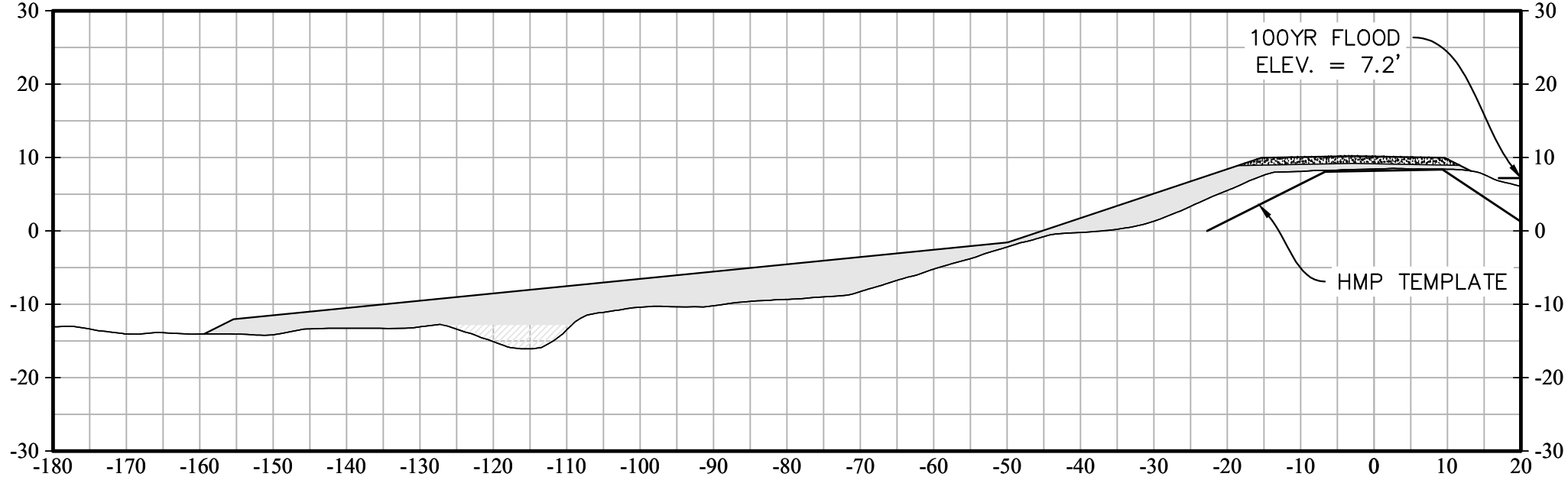
190+00



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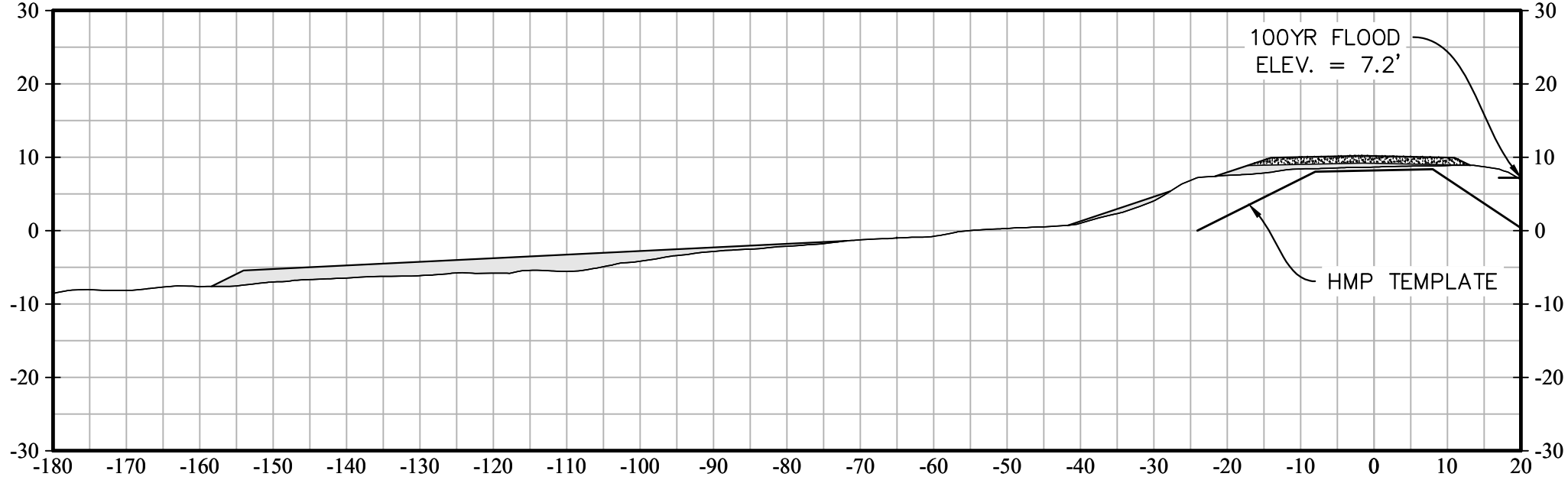

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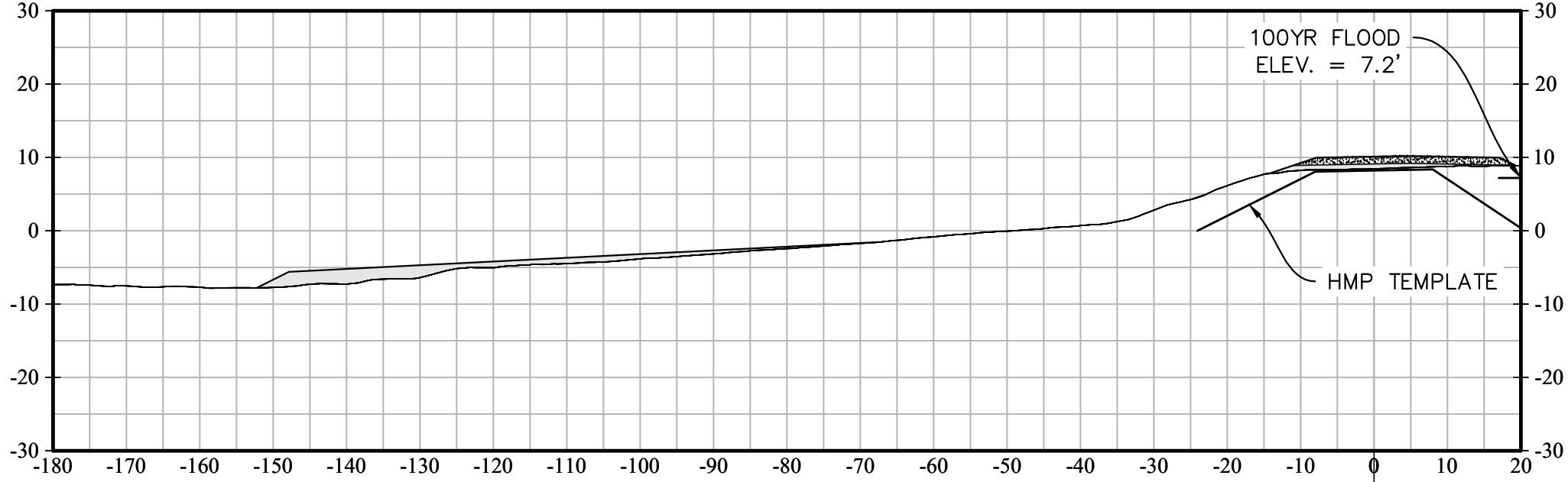
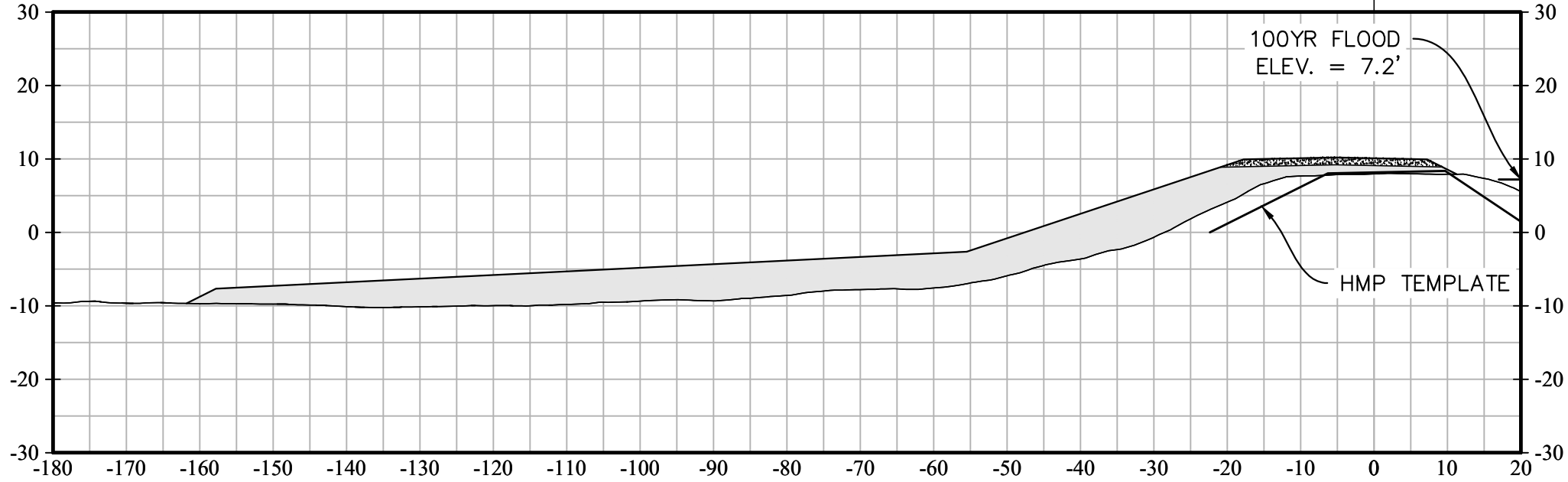
200+00



205+00



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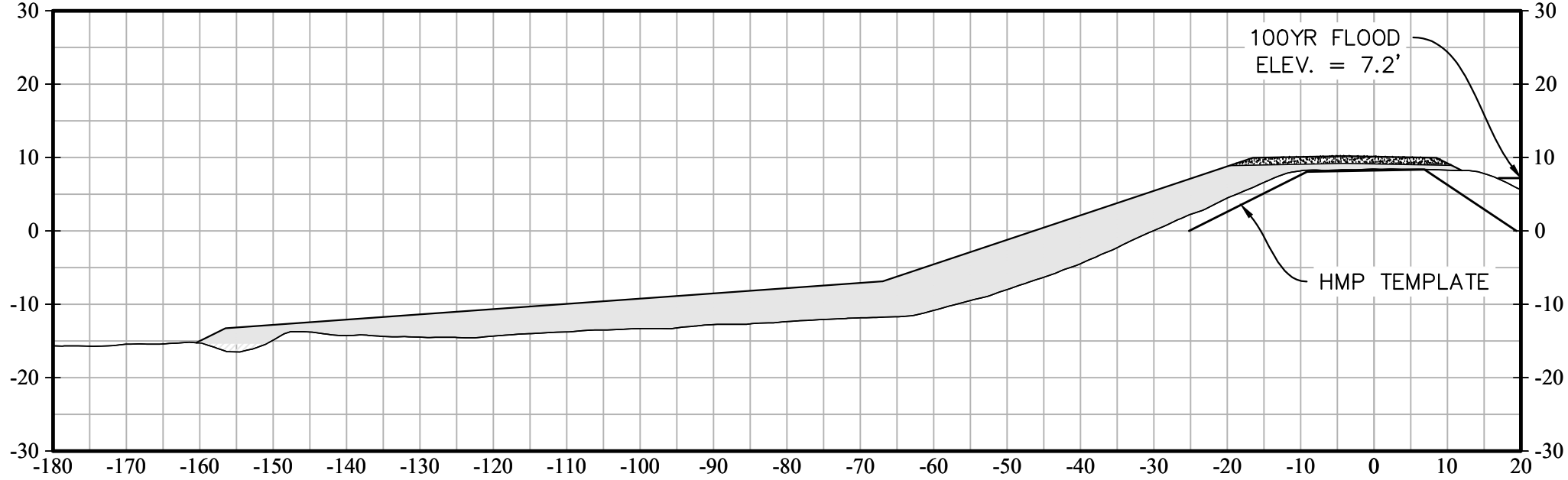
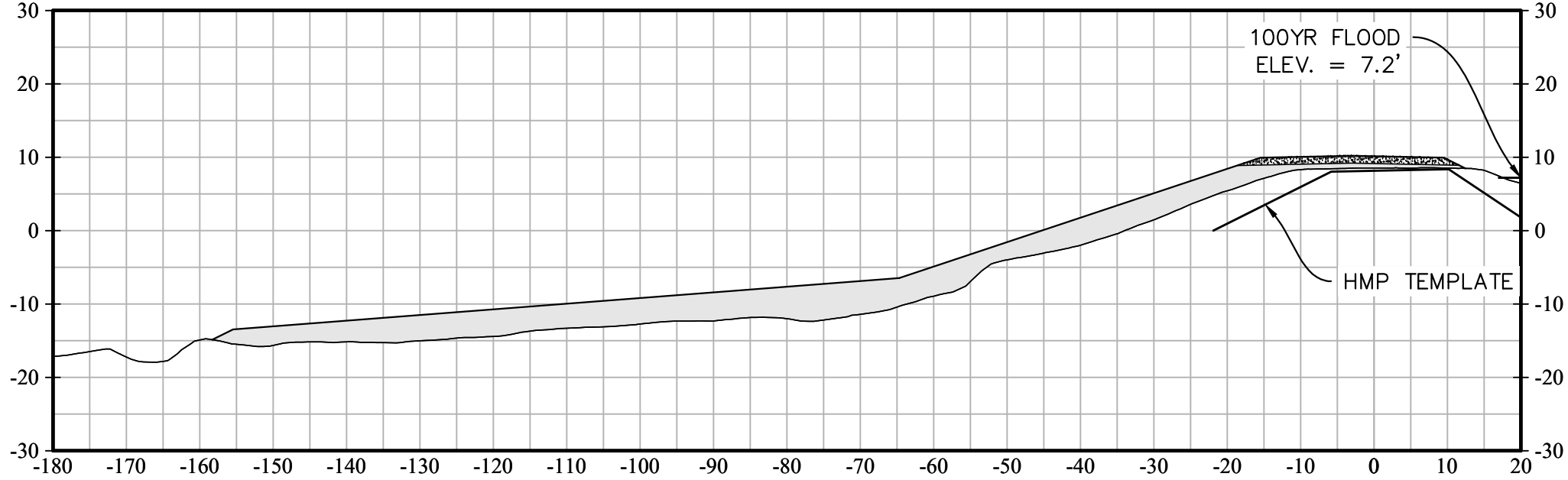
210+00



215+00



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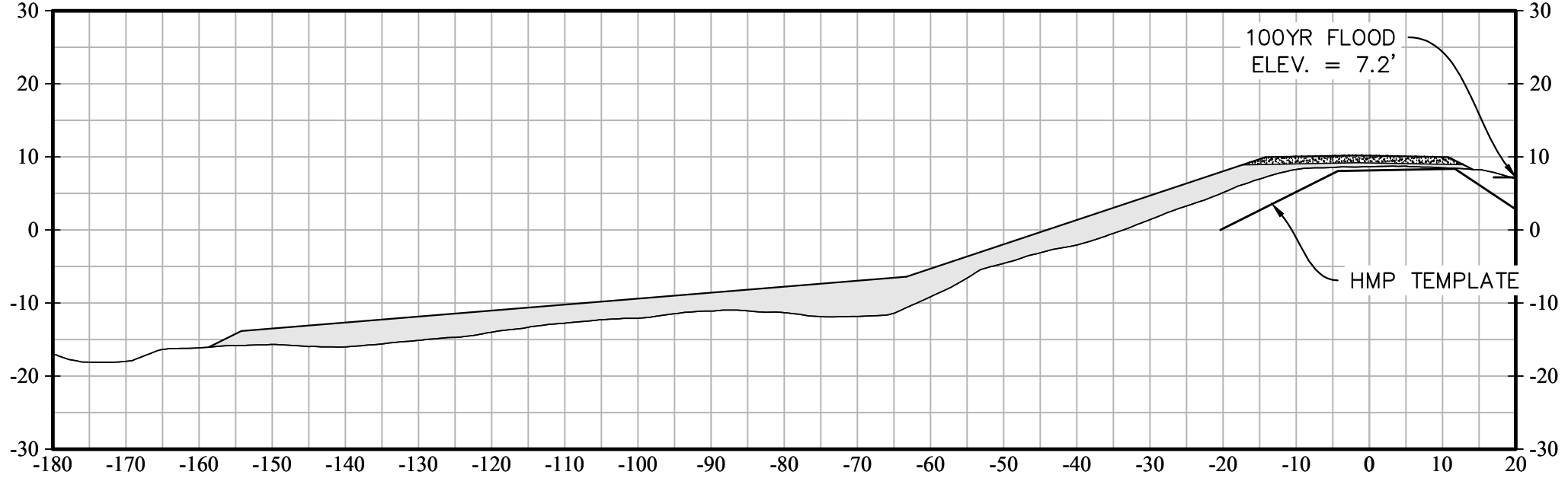
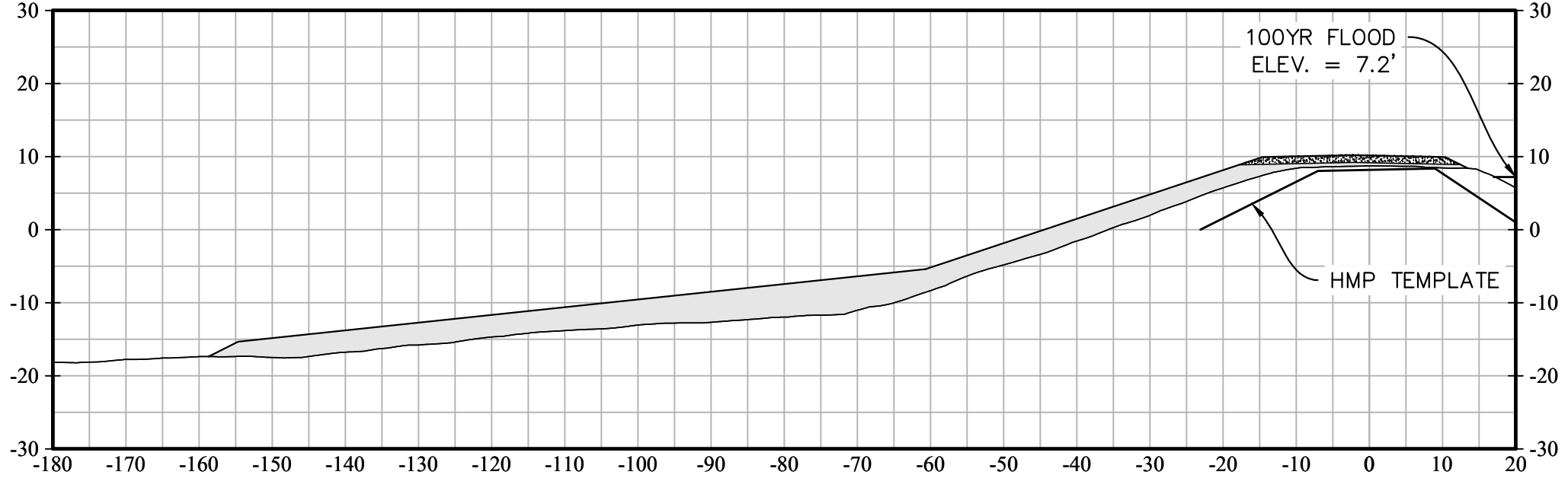
220+00



225+00



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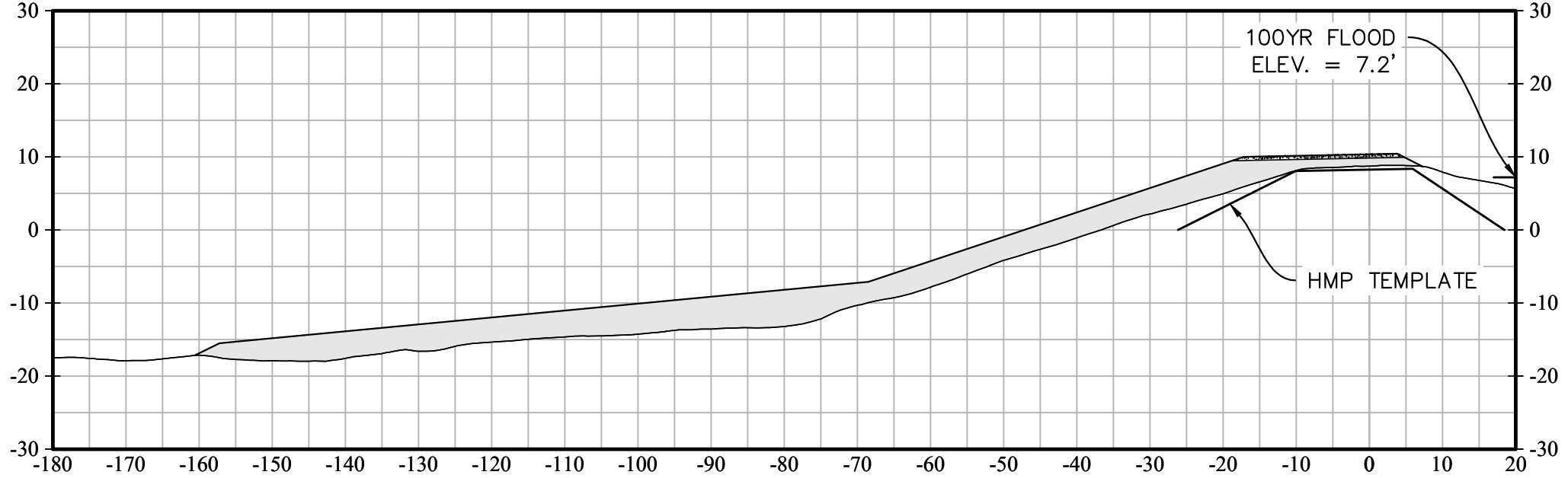
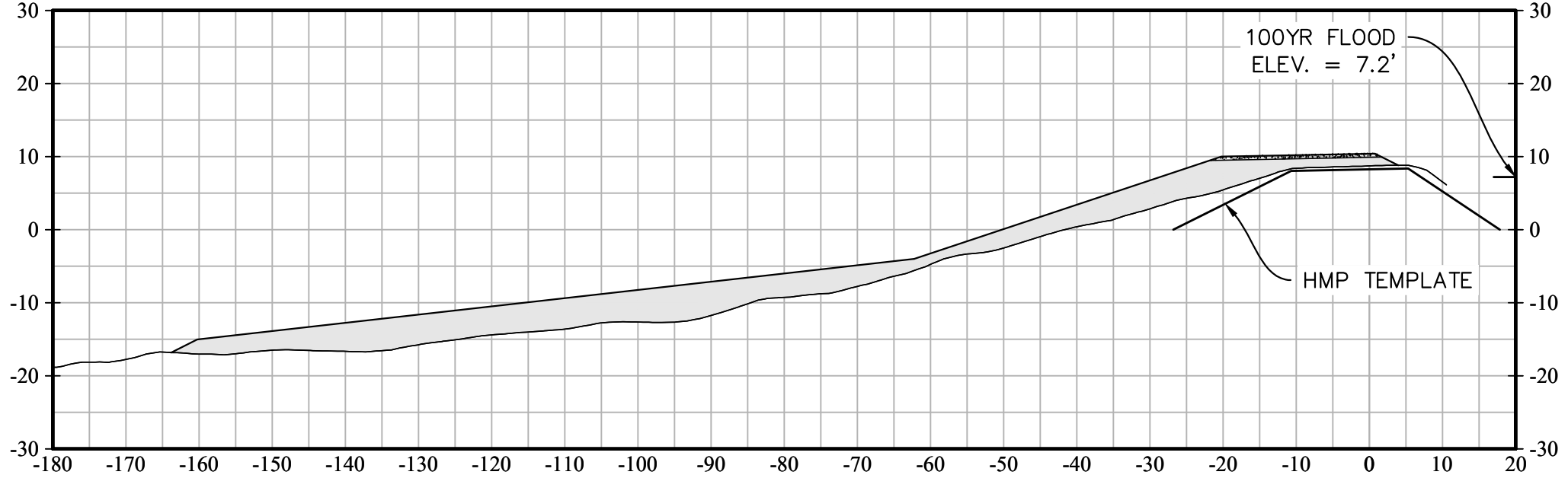
230+00



235+00



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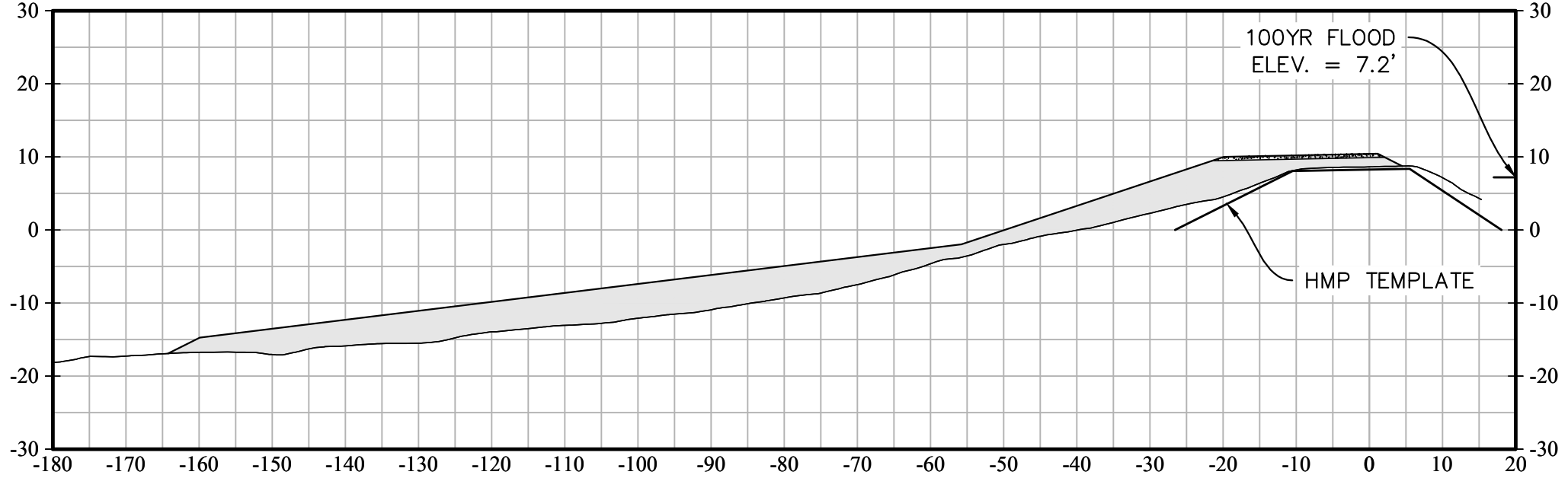
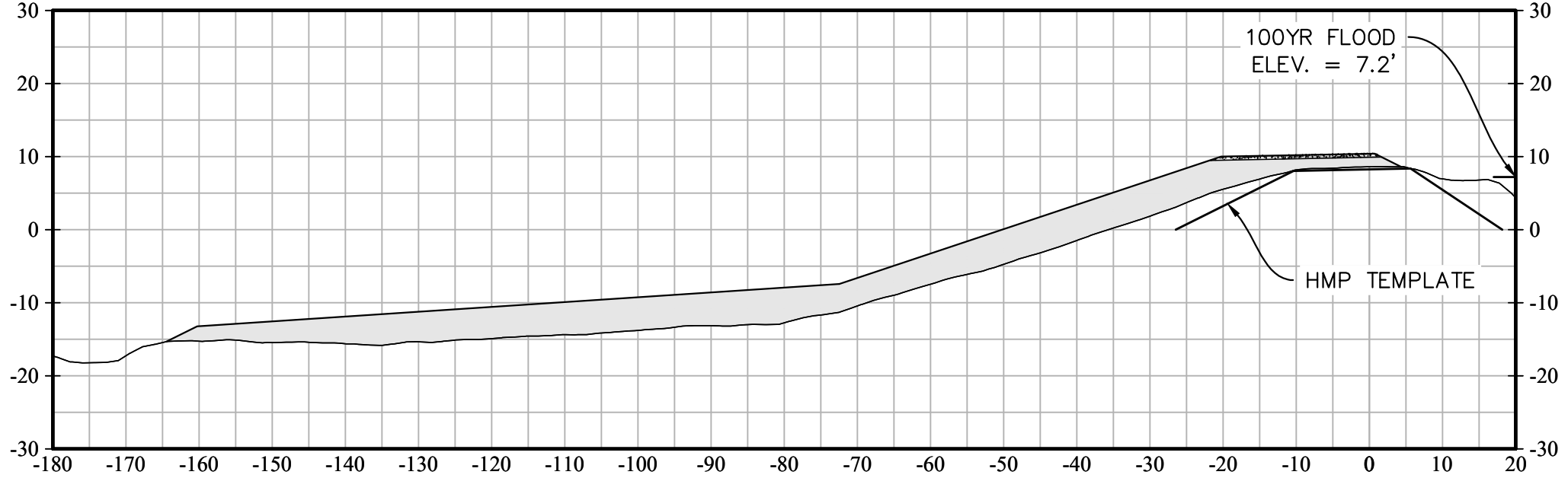
240+00



245+00



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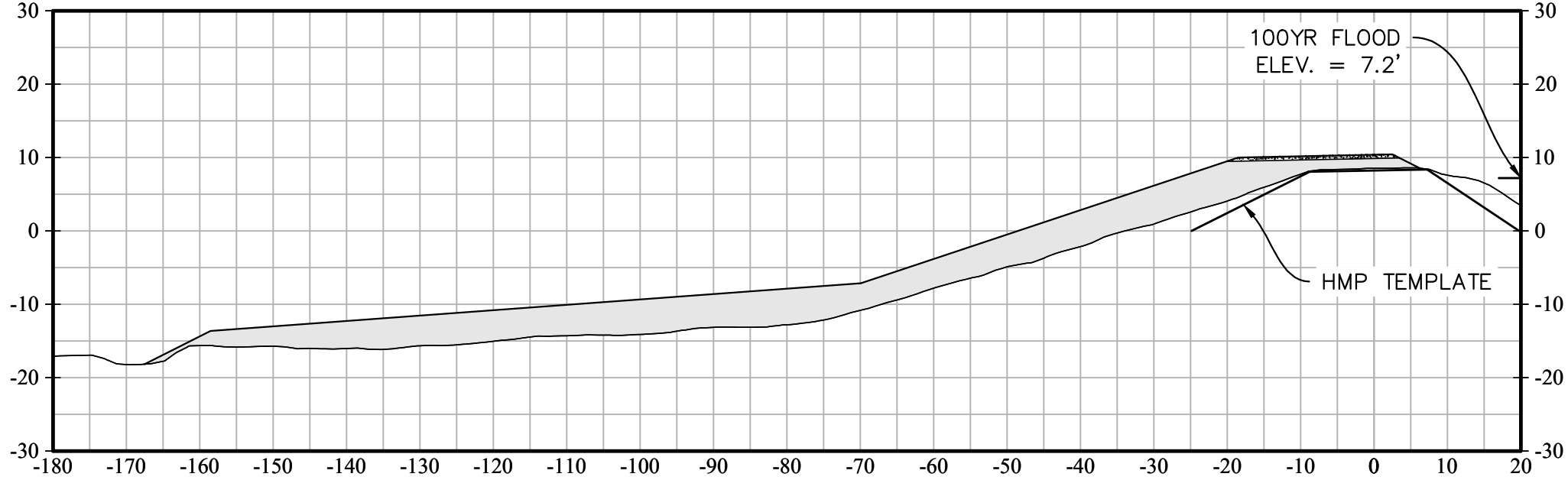
250+00



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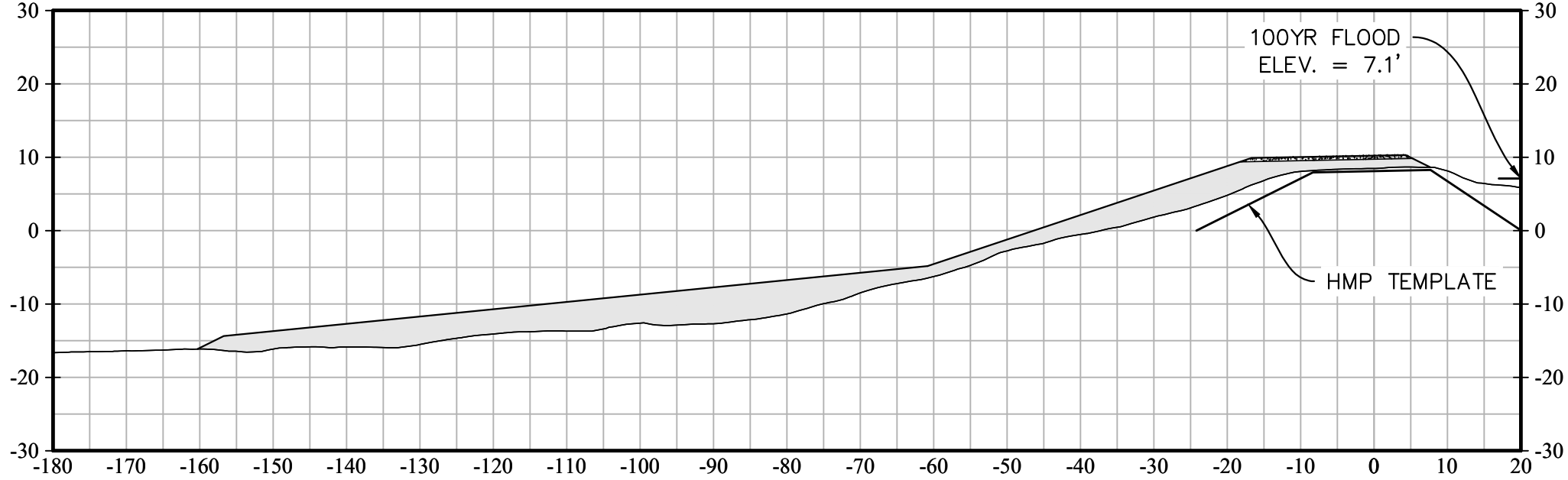

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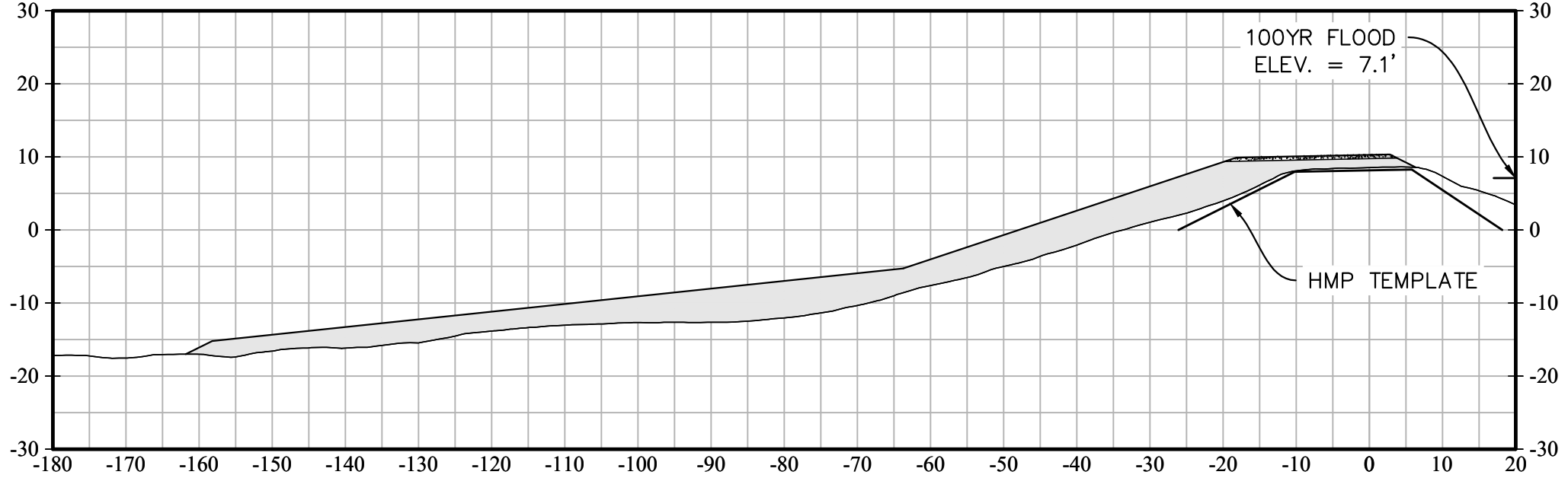
260+00



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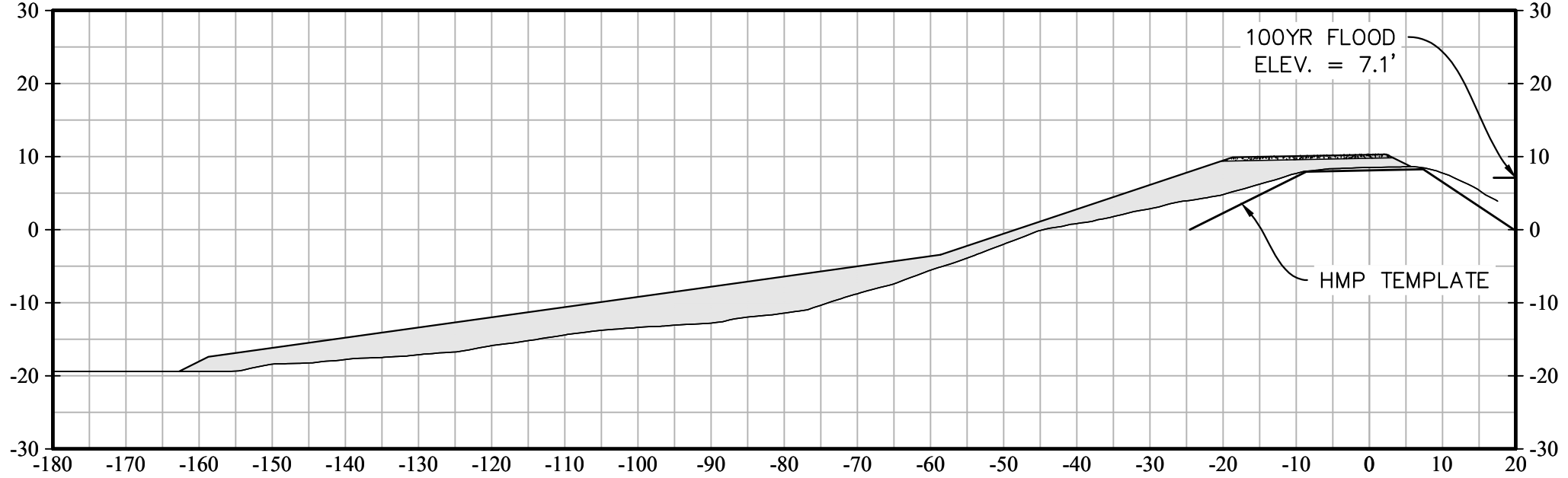

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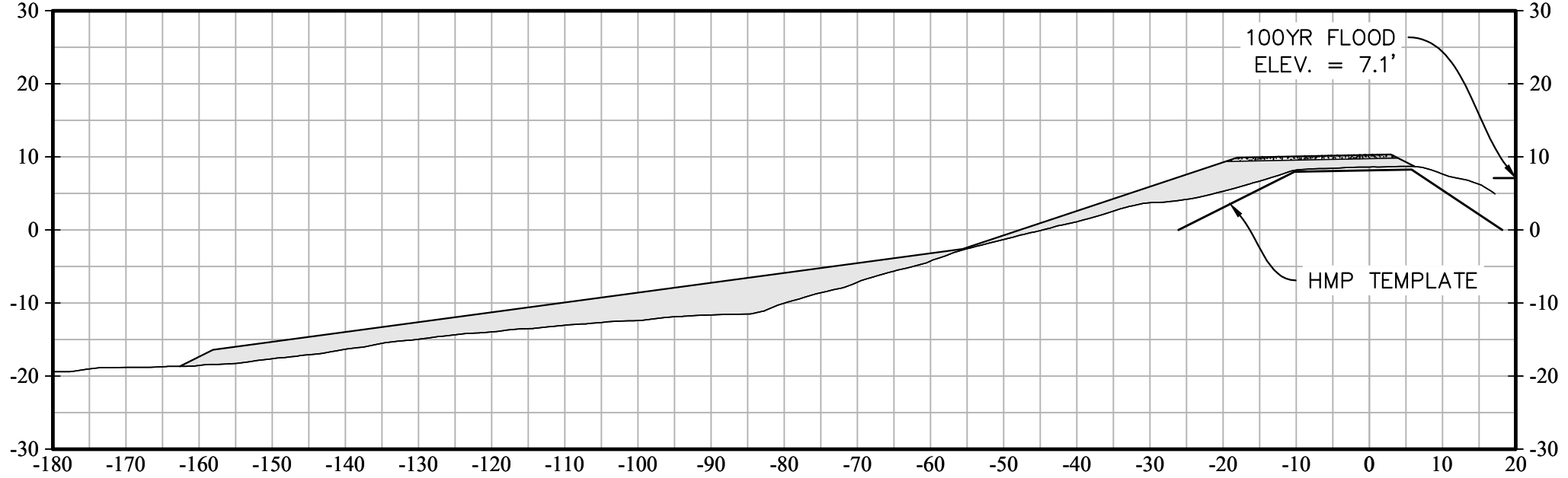
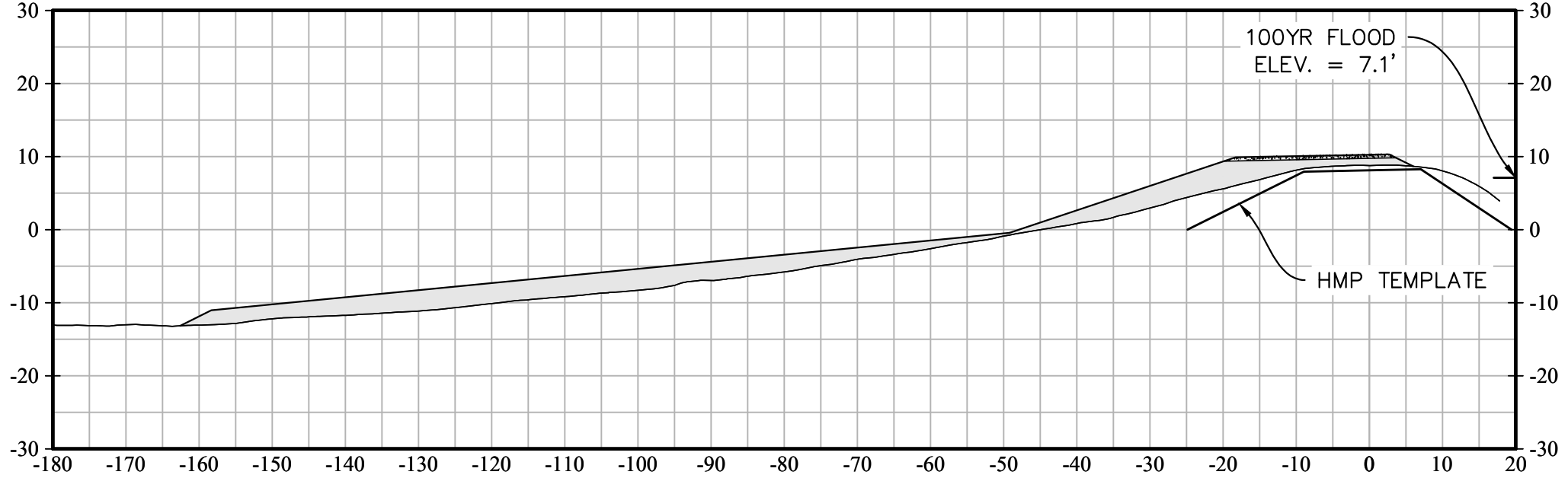
270+00



275+00



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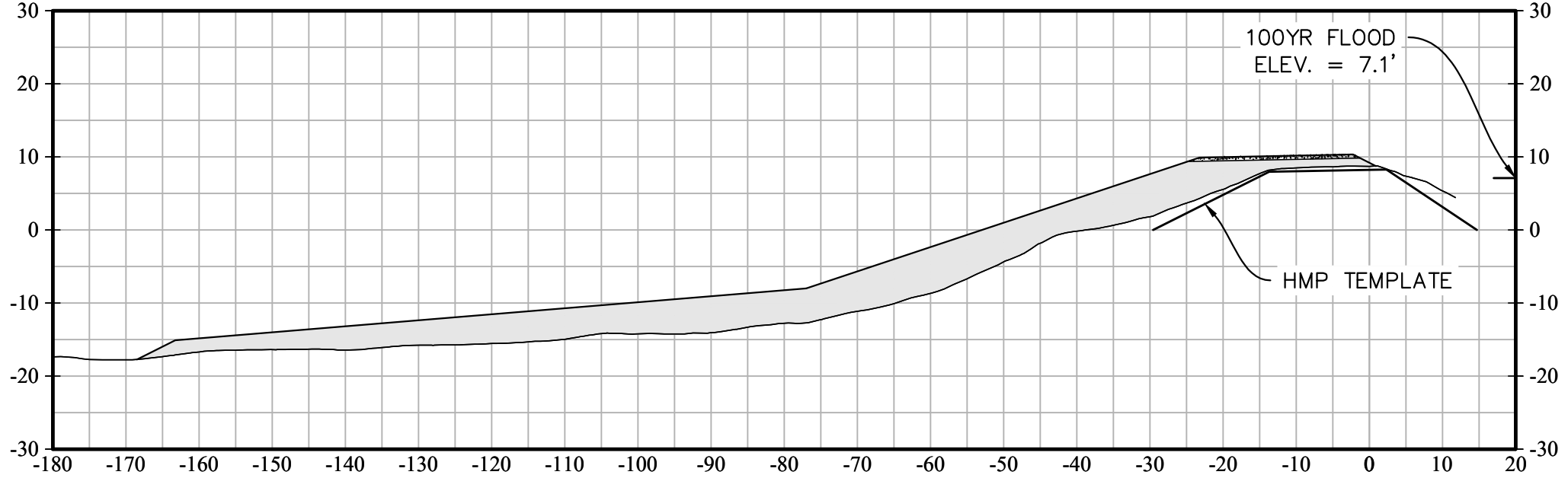
280+00



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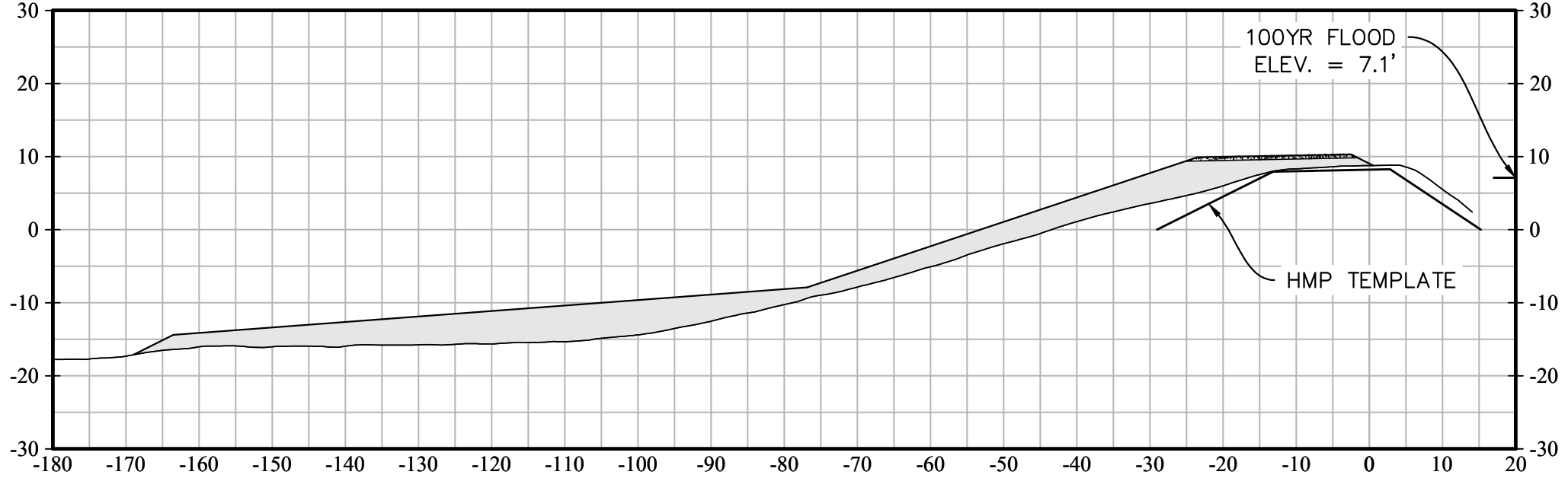

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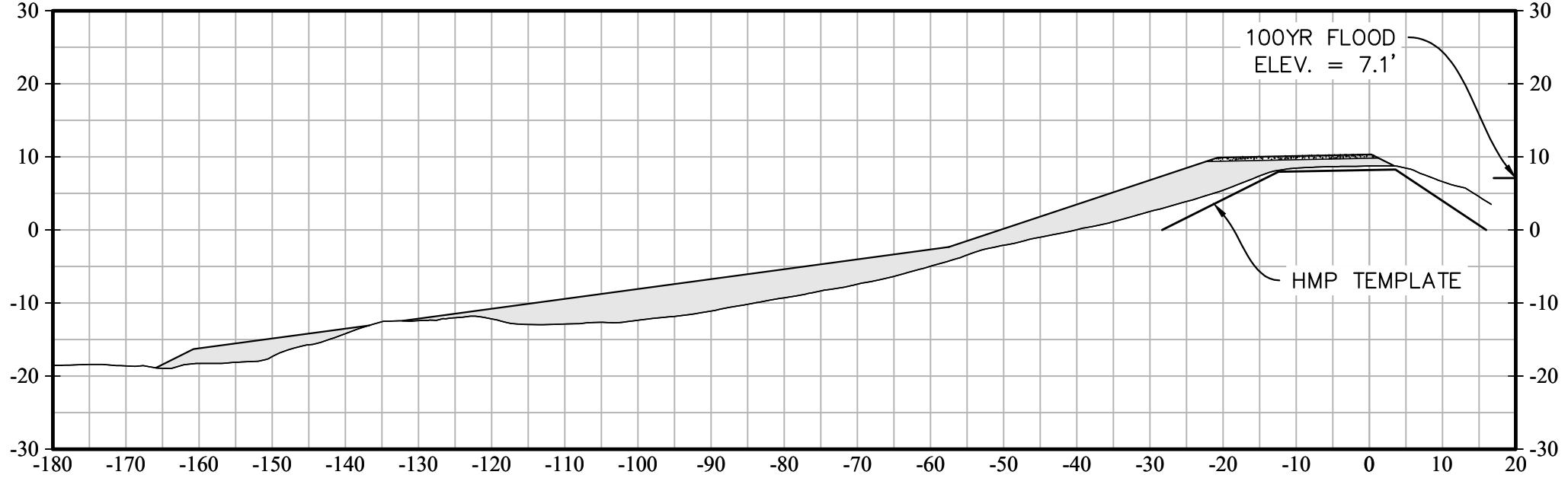
290+00



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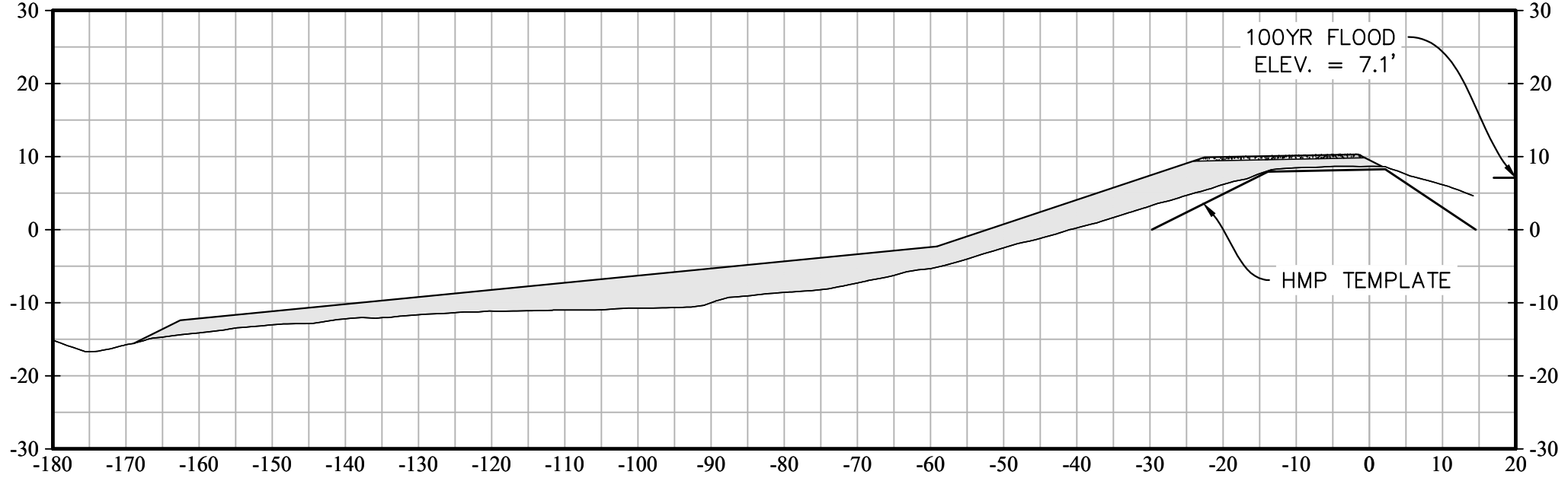

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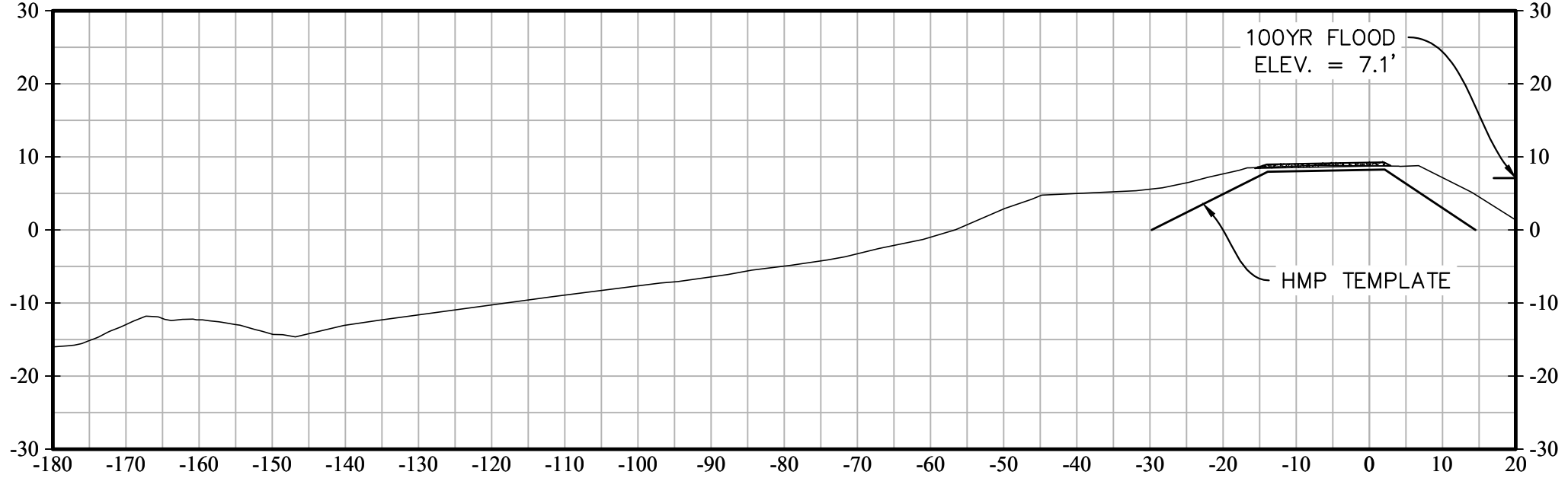
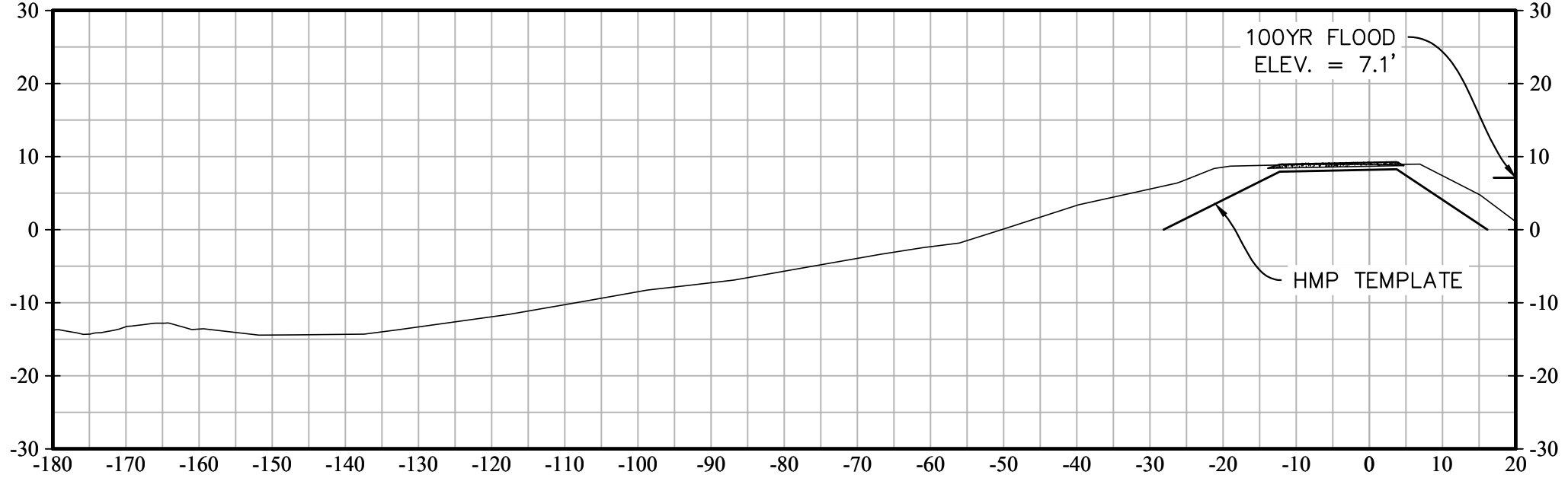
* VERTICAL DATUM = NGVD 29

300+00



305+00



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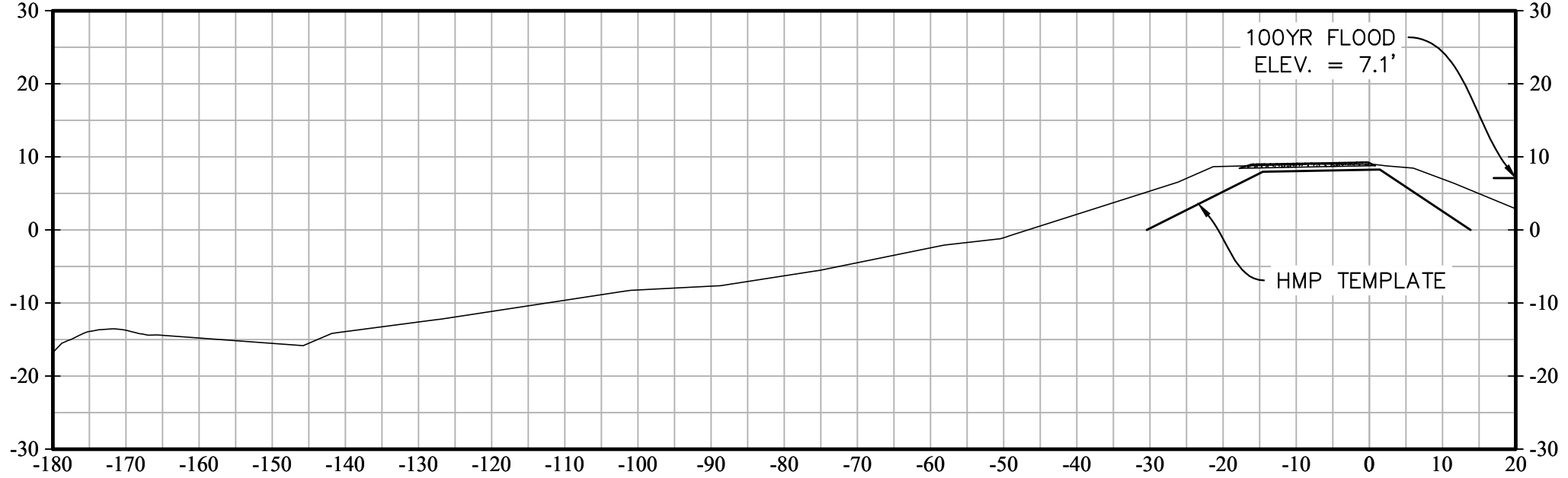
310+00



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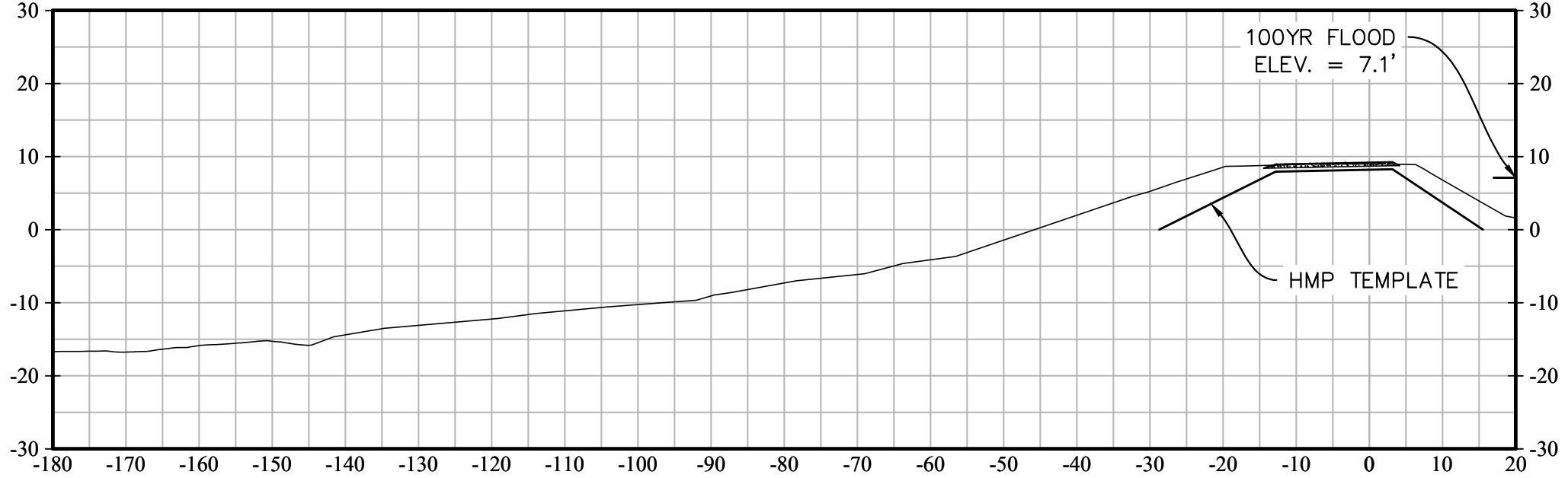

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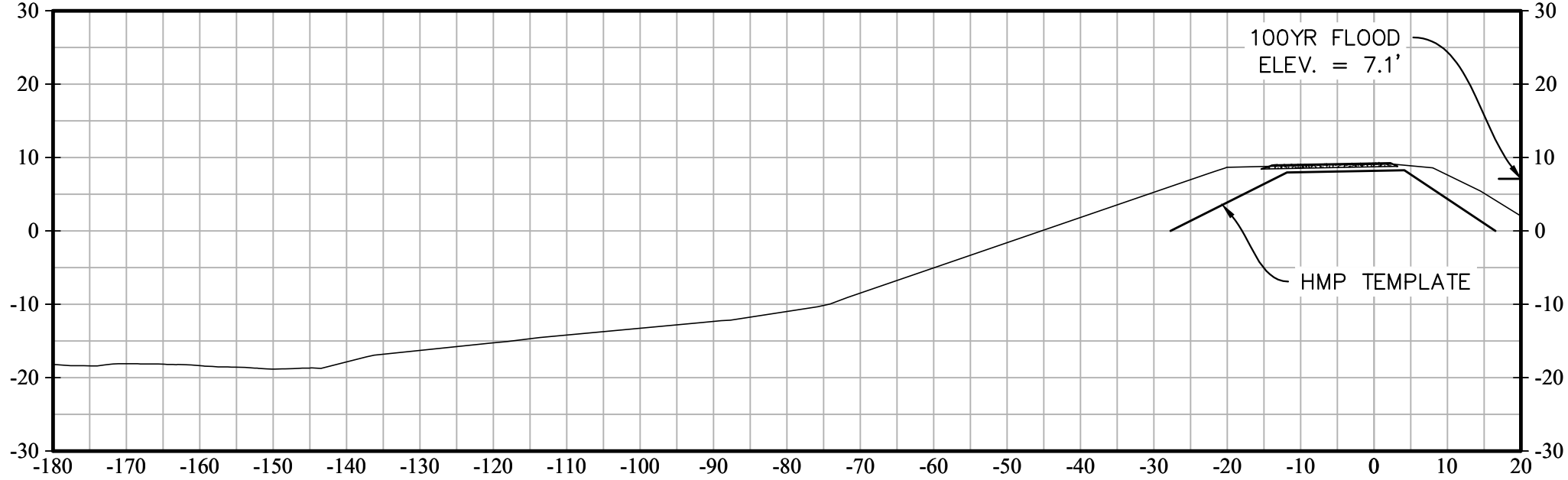
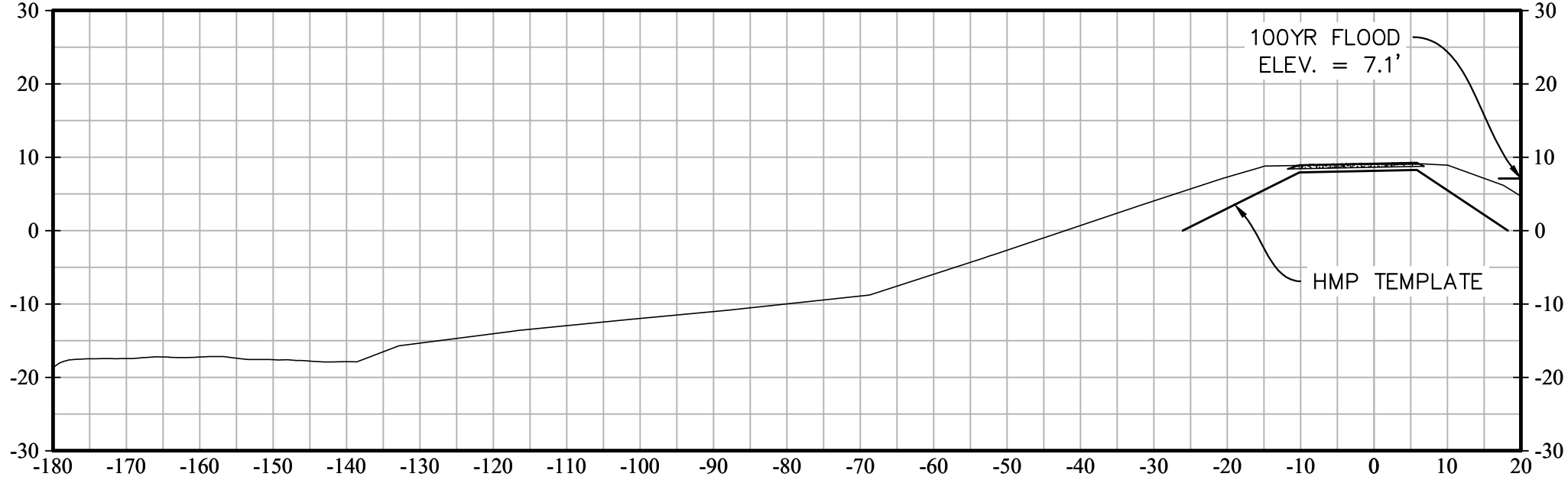
320+00



325+00



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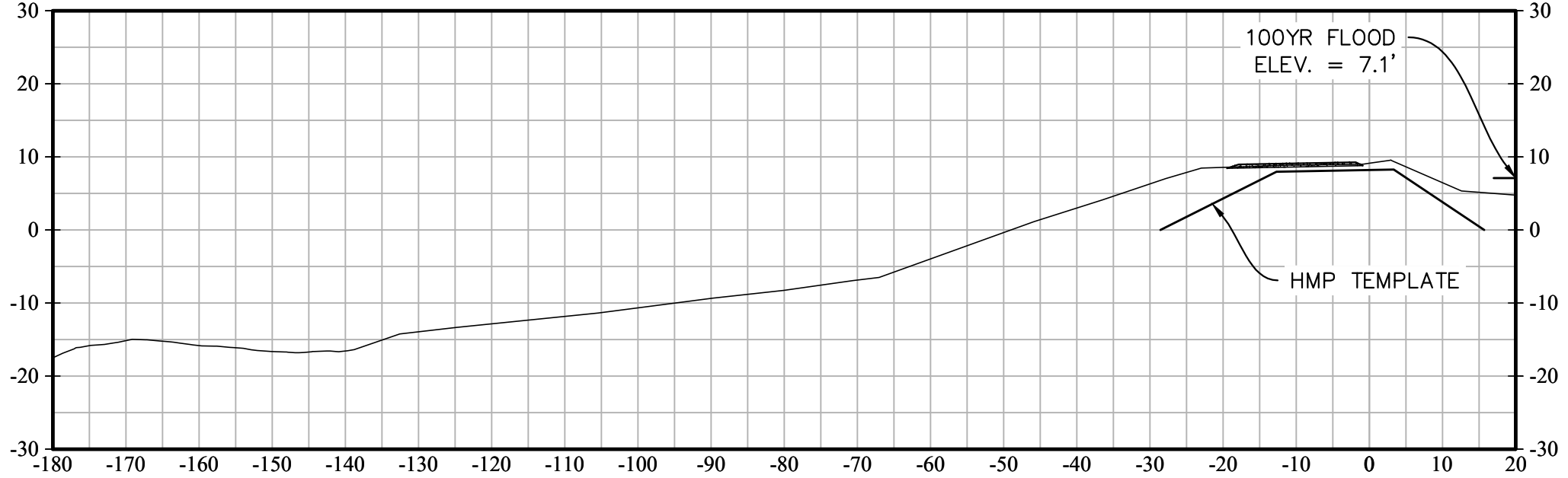
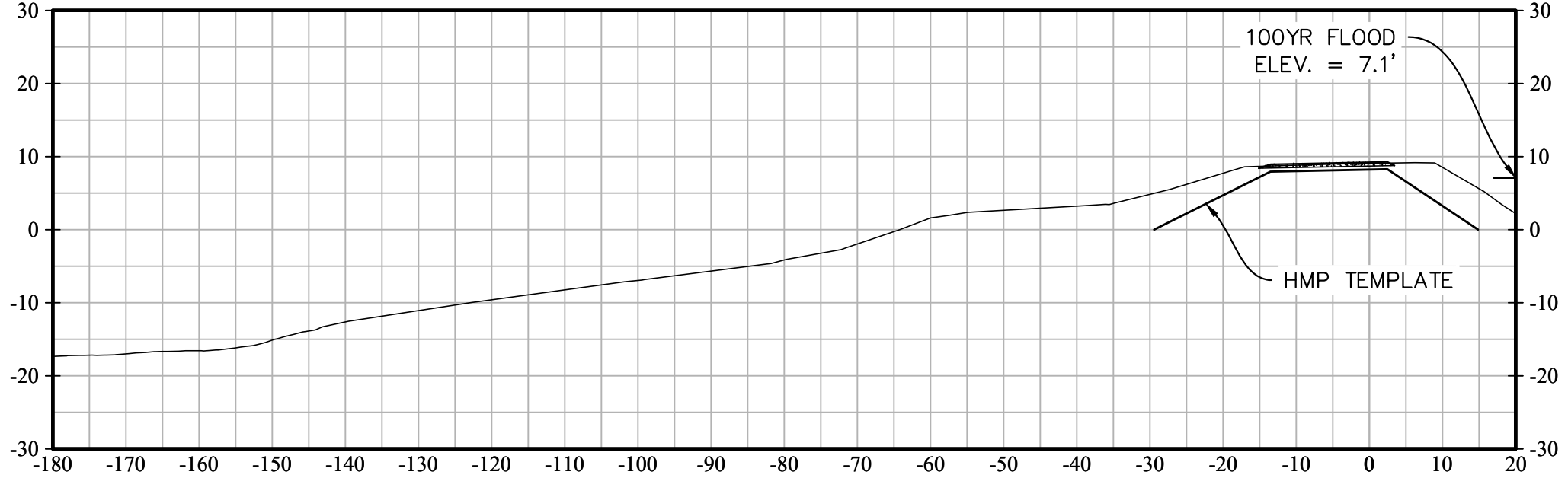
330+00



335+00



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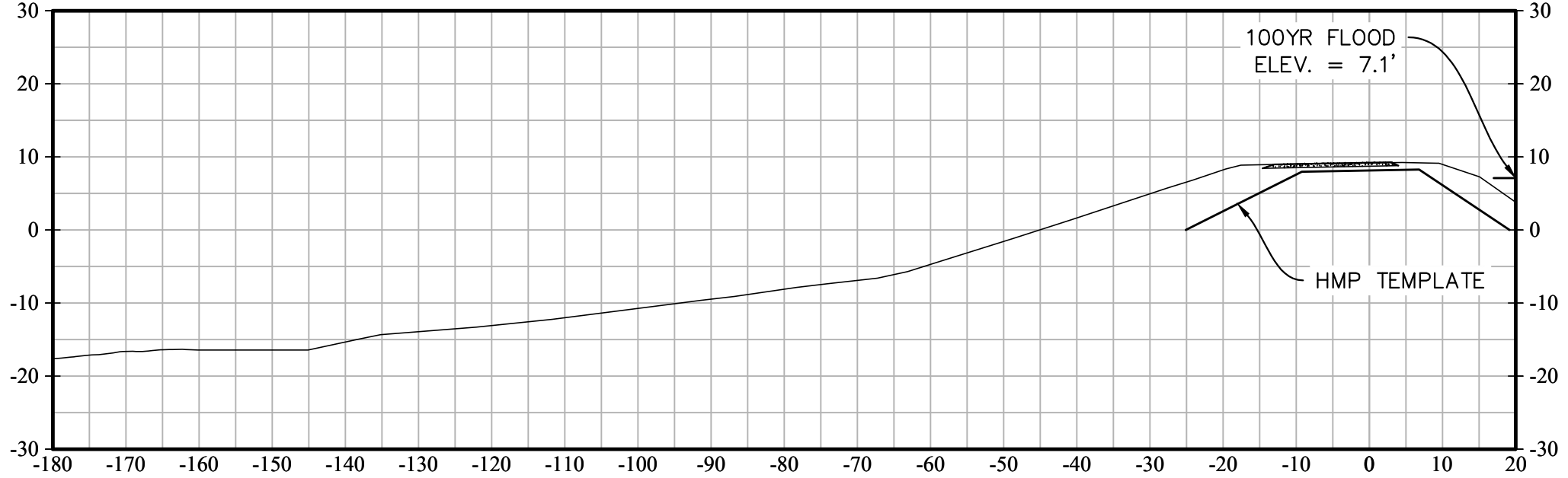
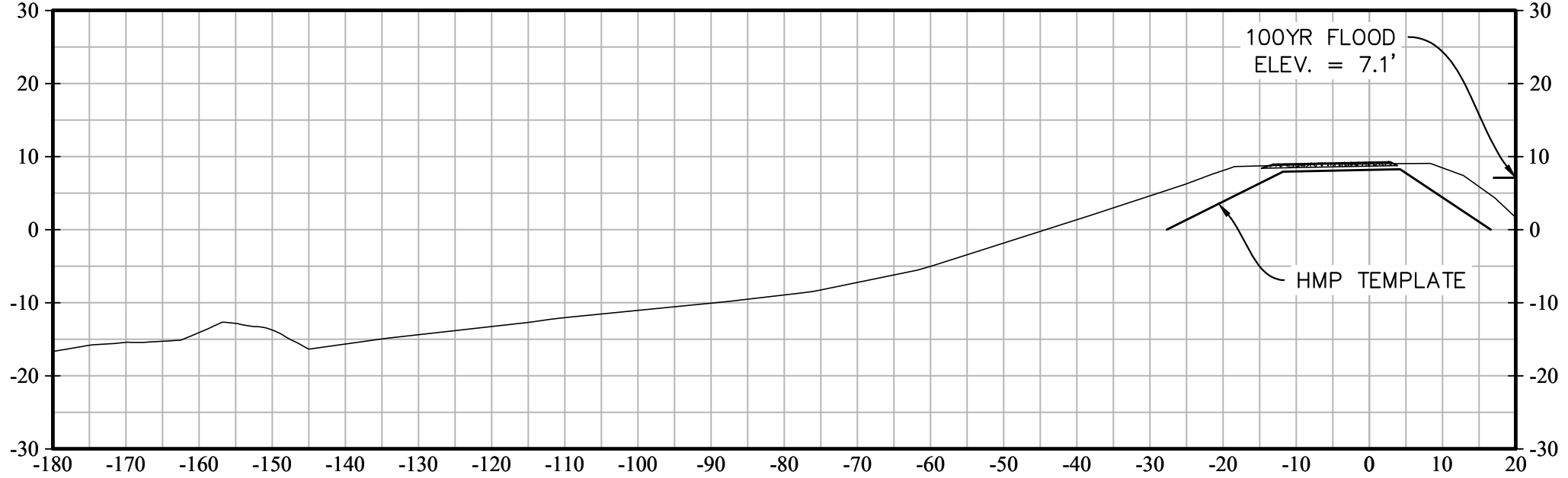
340+00



345+00



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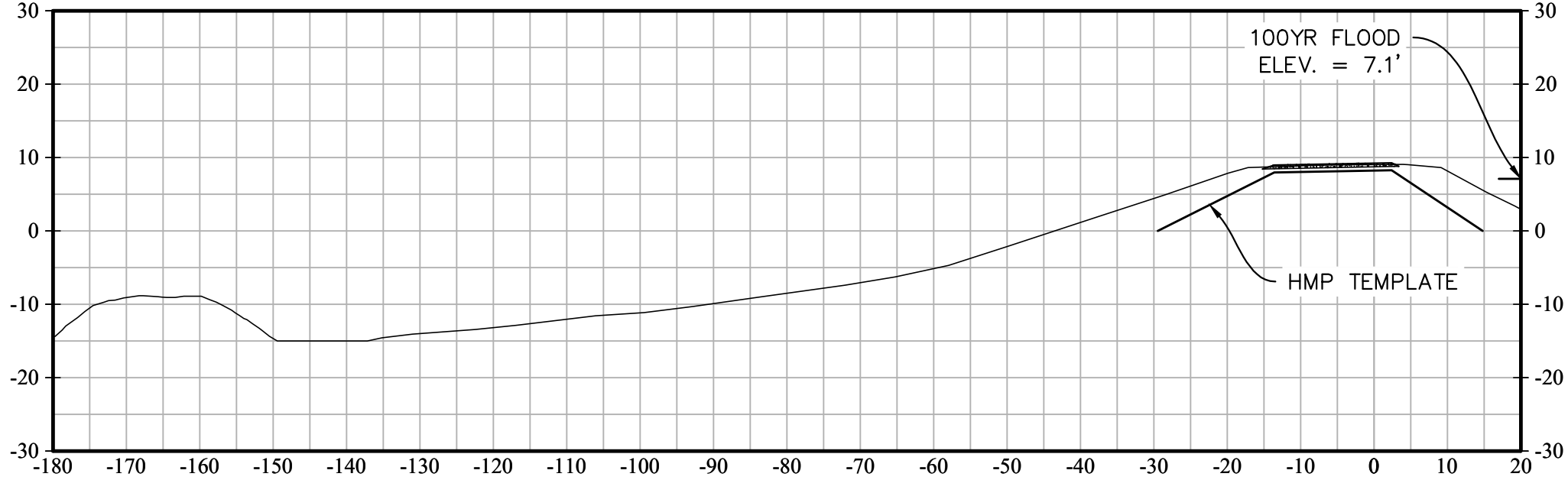
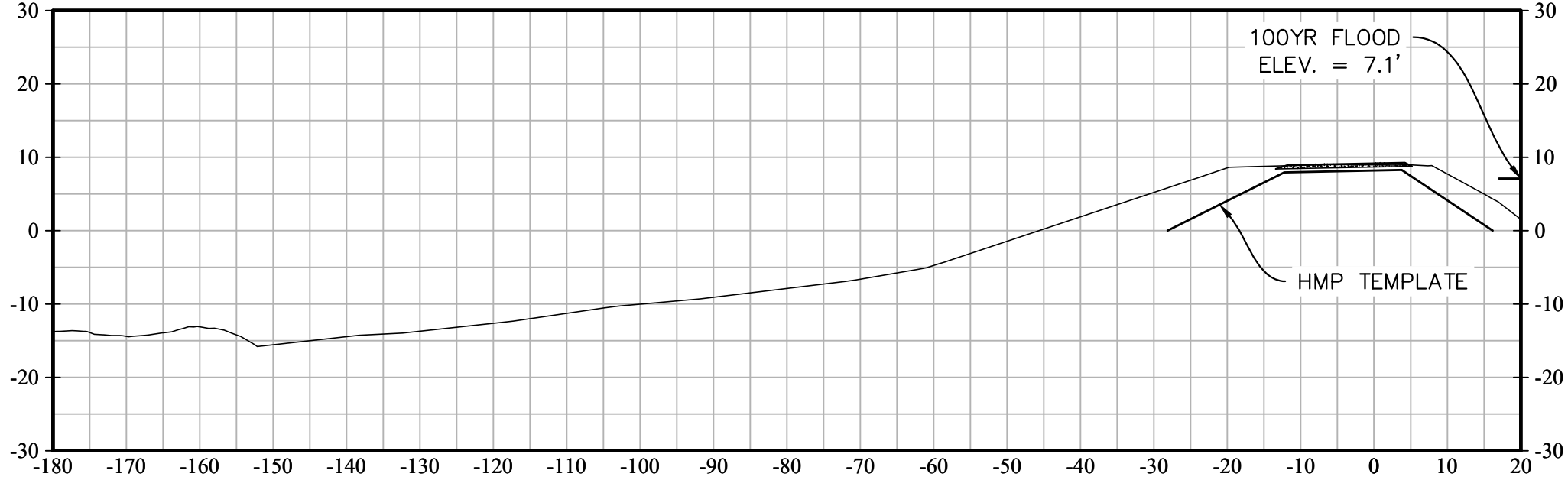
350+00



355+00



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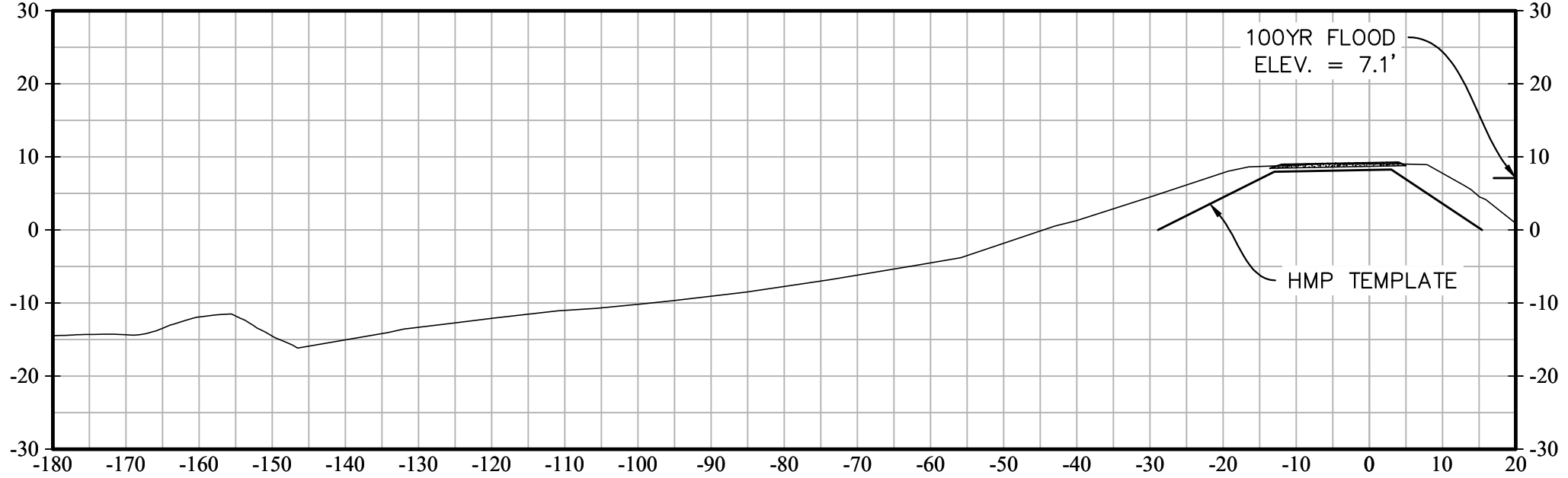
360+00



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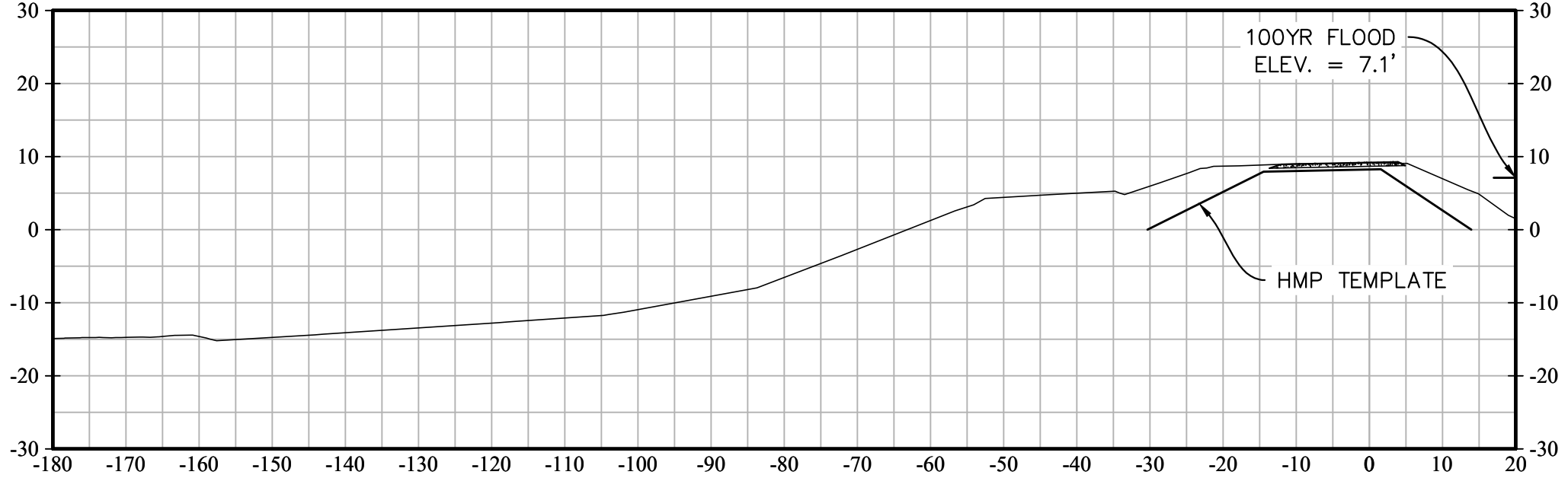

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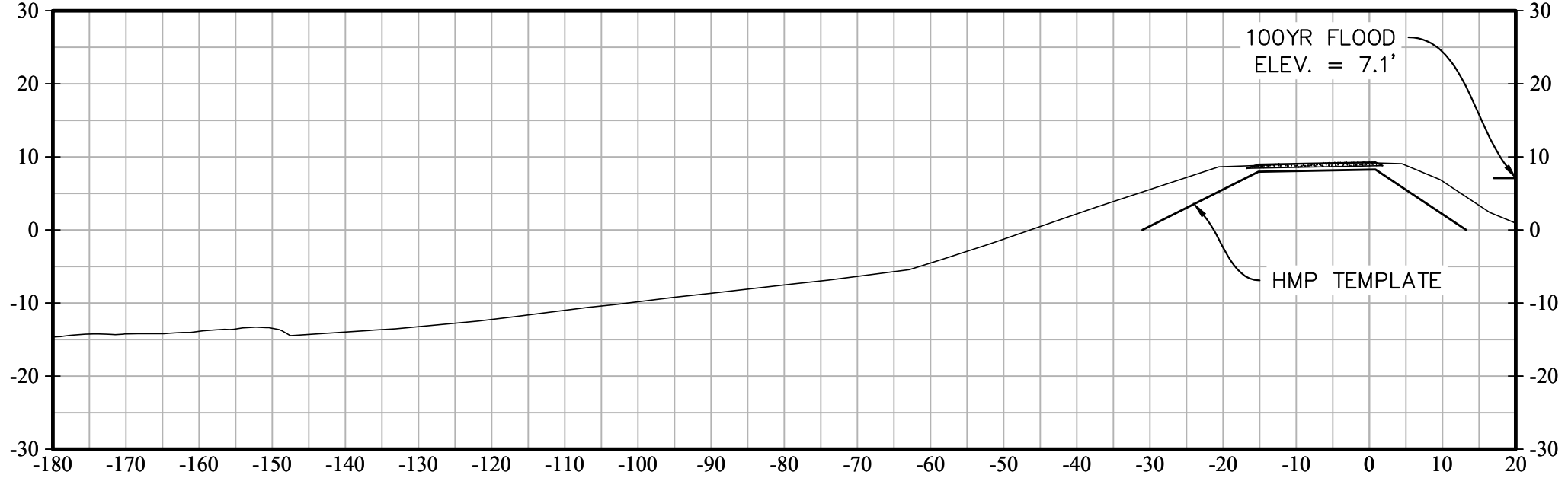
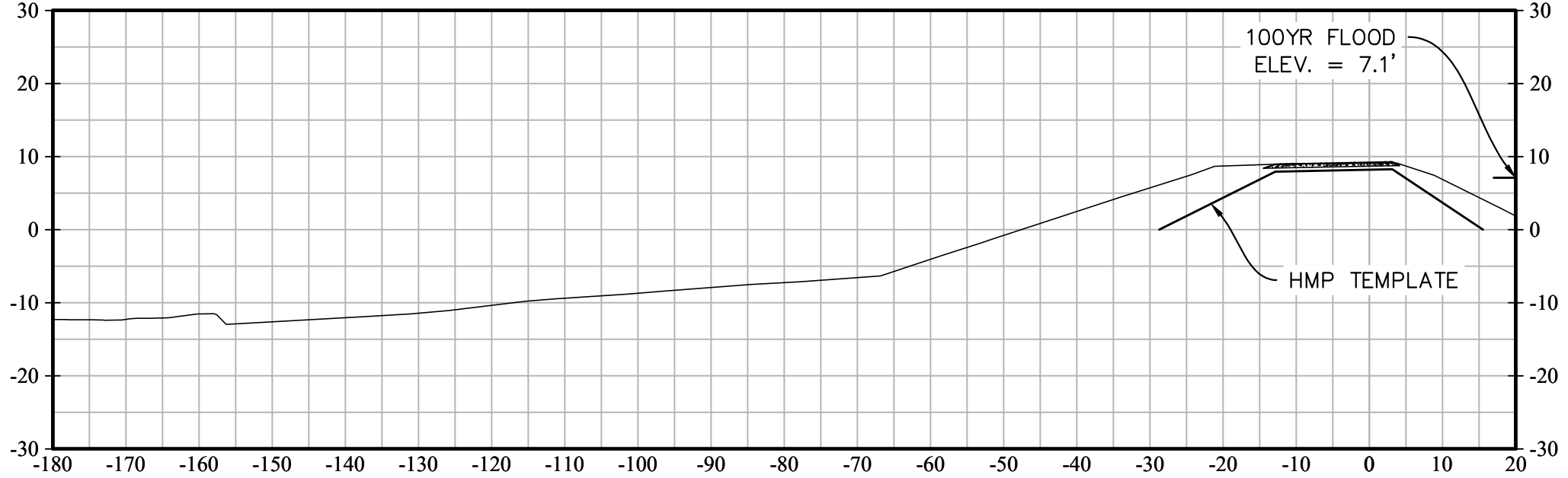
370+00



375+00



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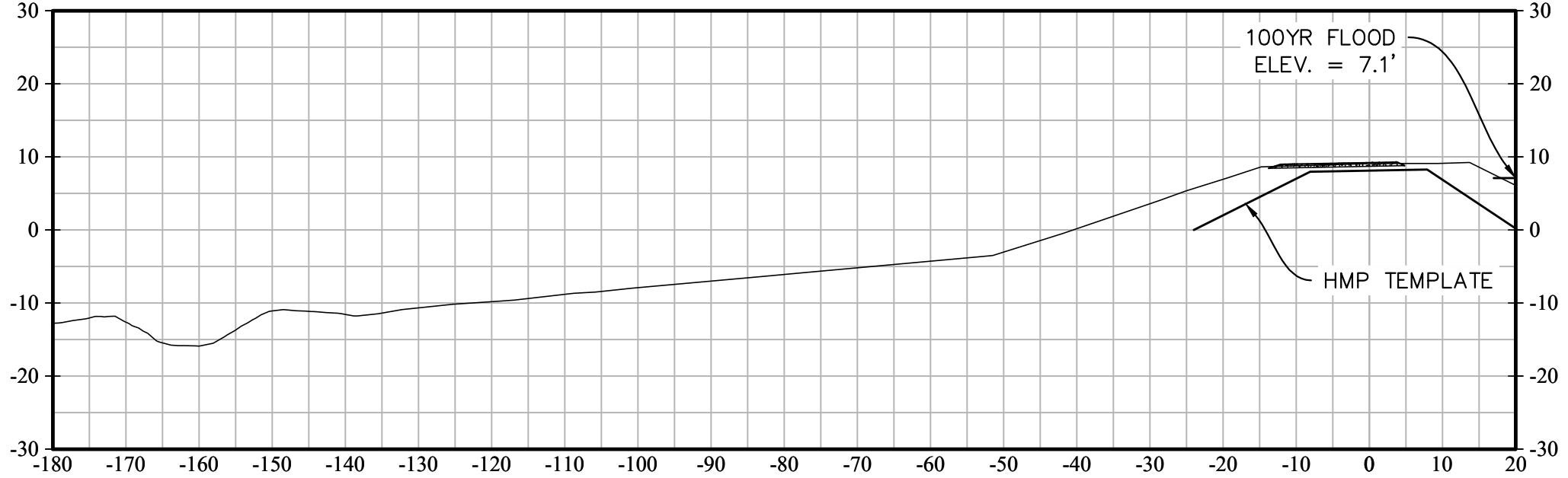
380+00



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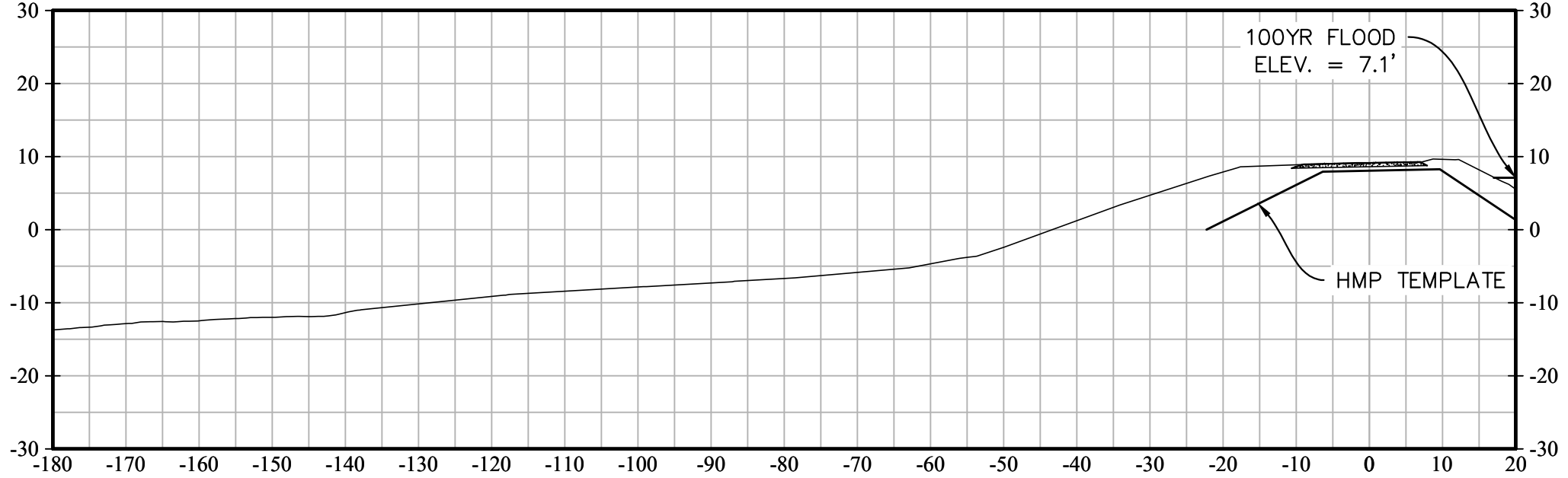

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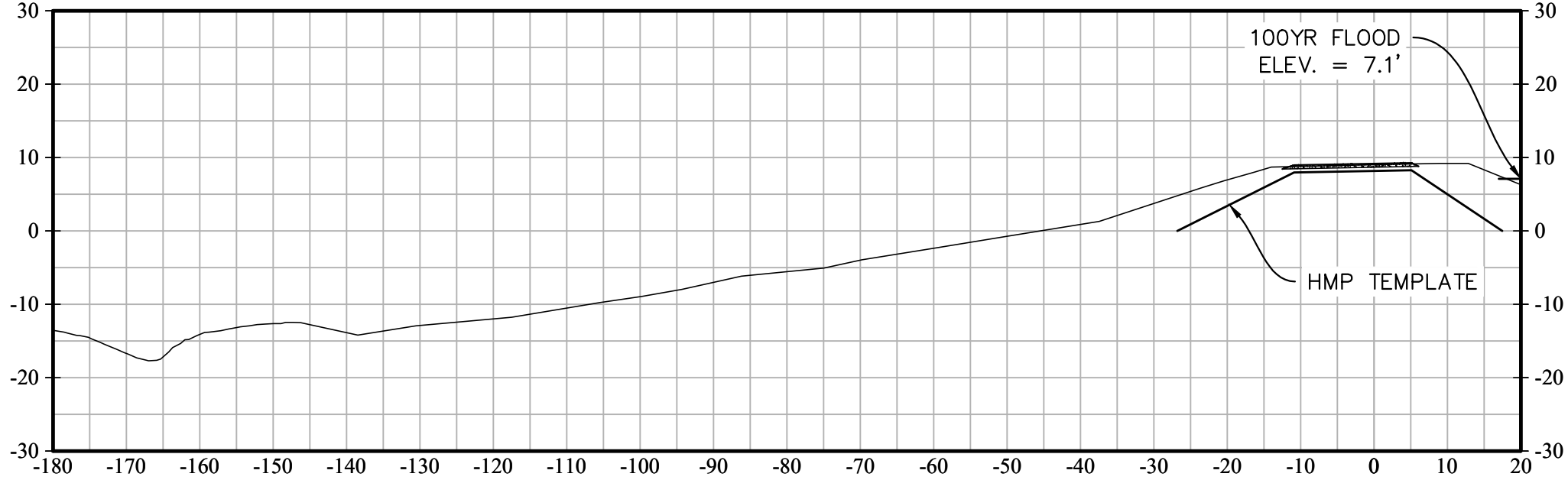
390+00



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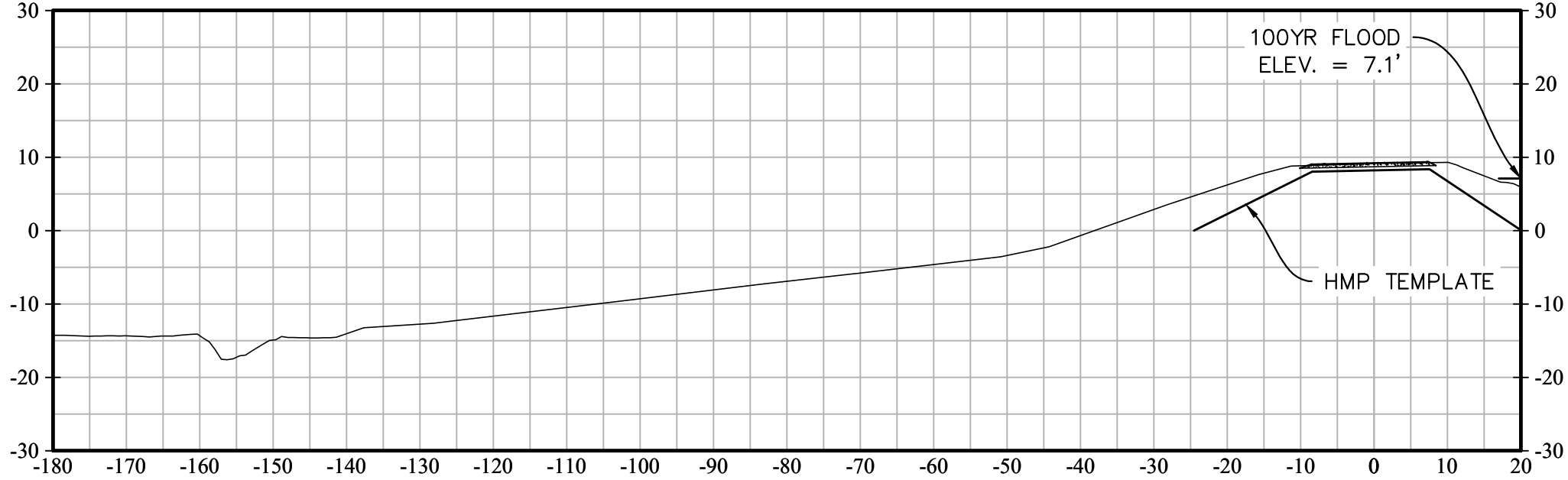

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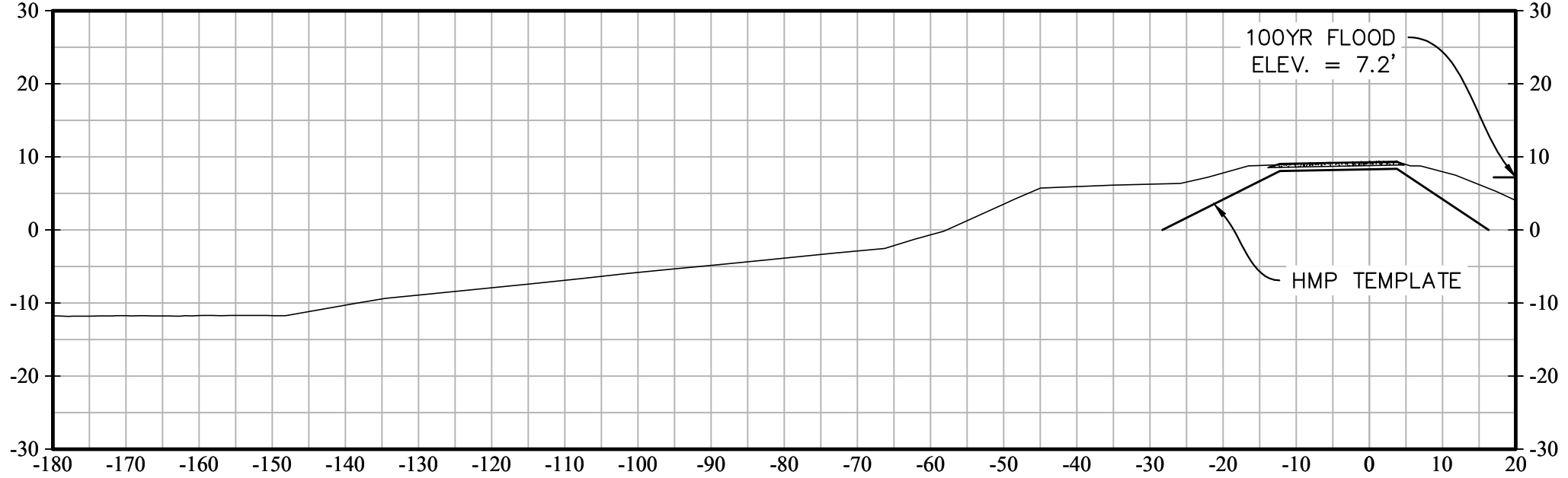
400+00



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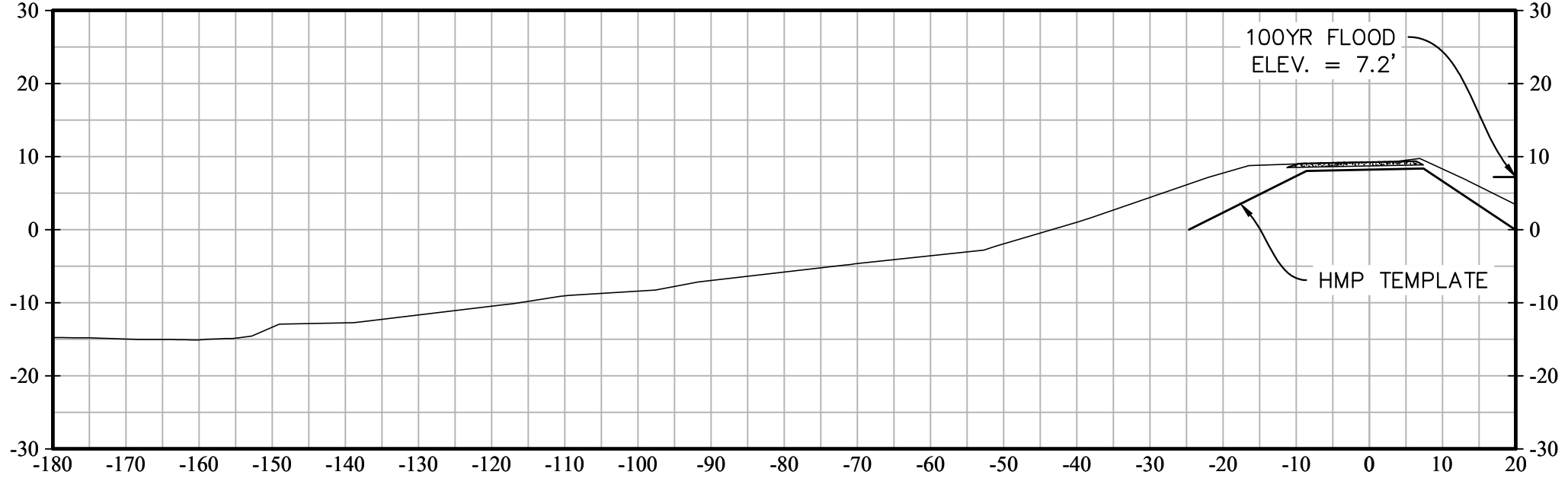

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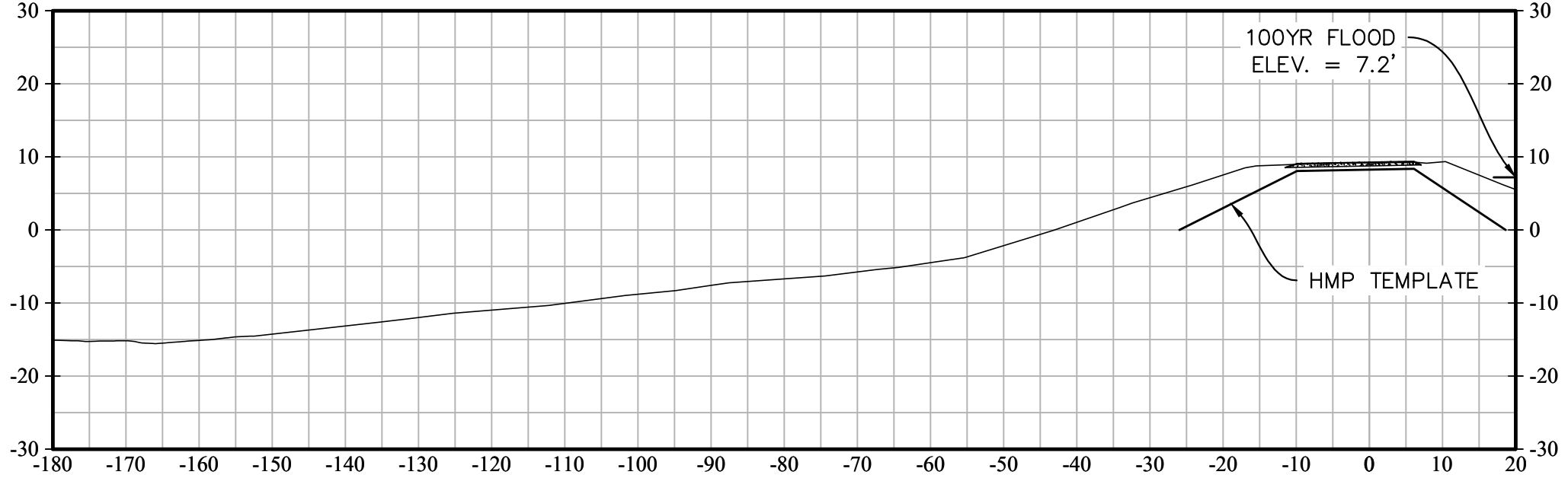
410+00



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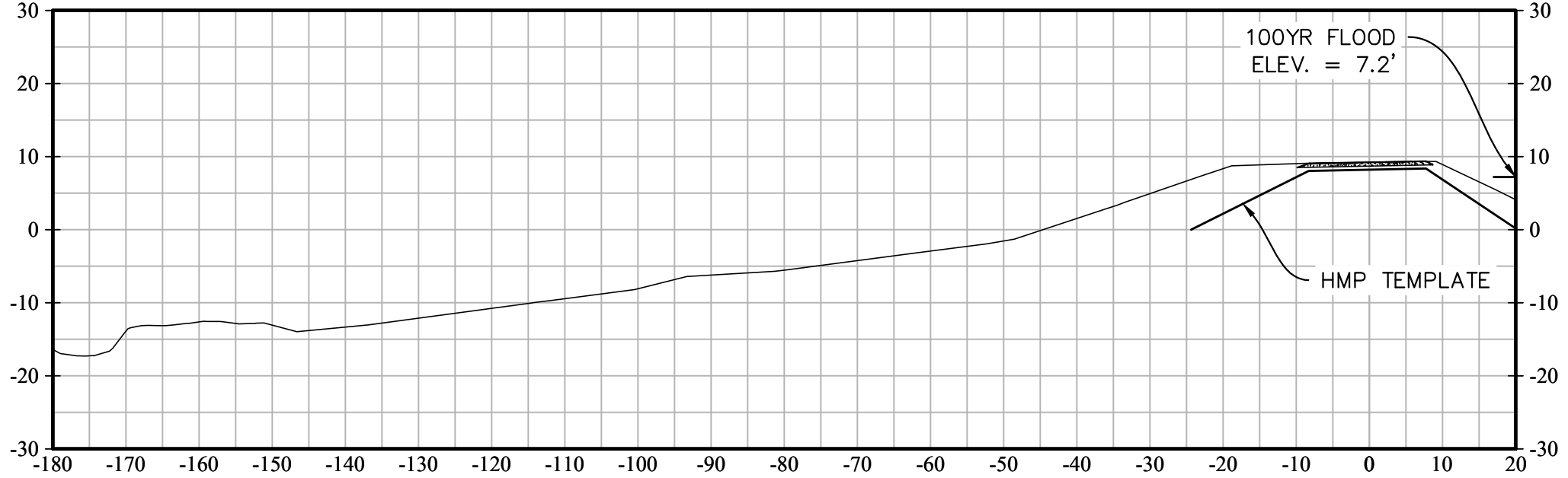

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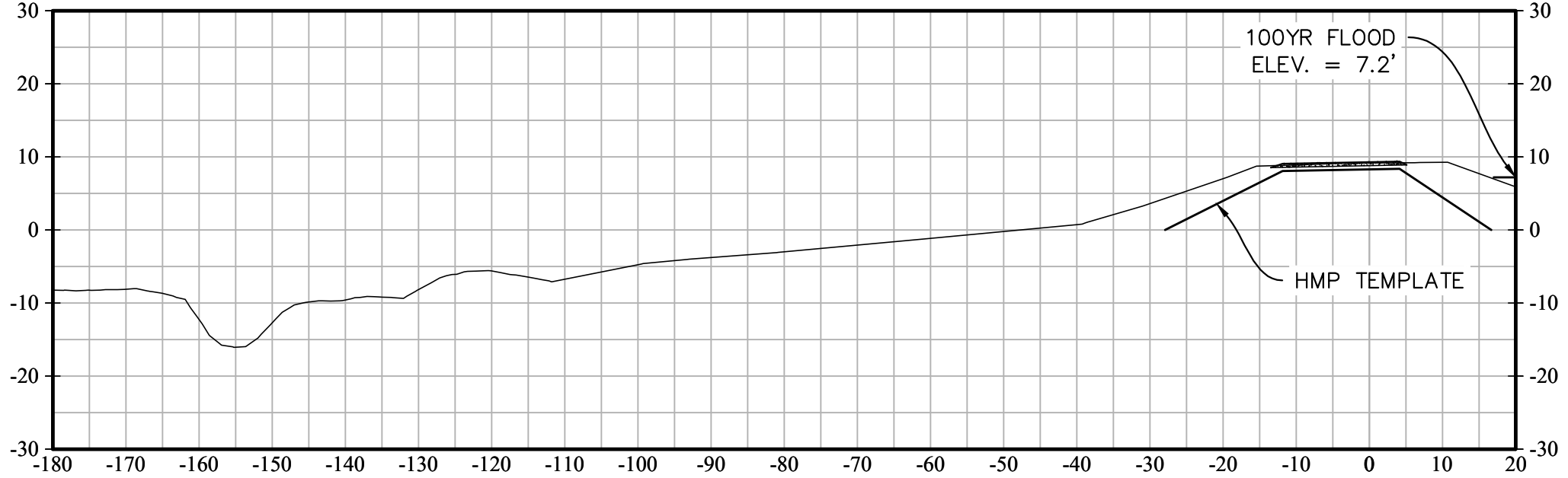
420+00



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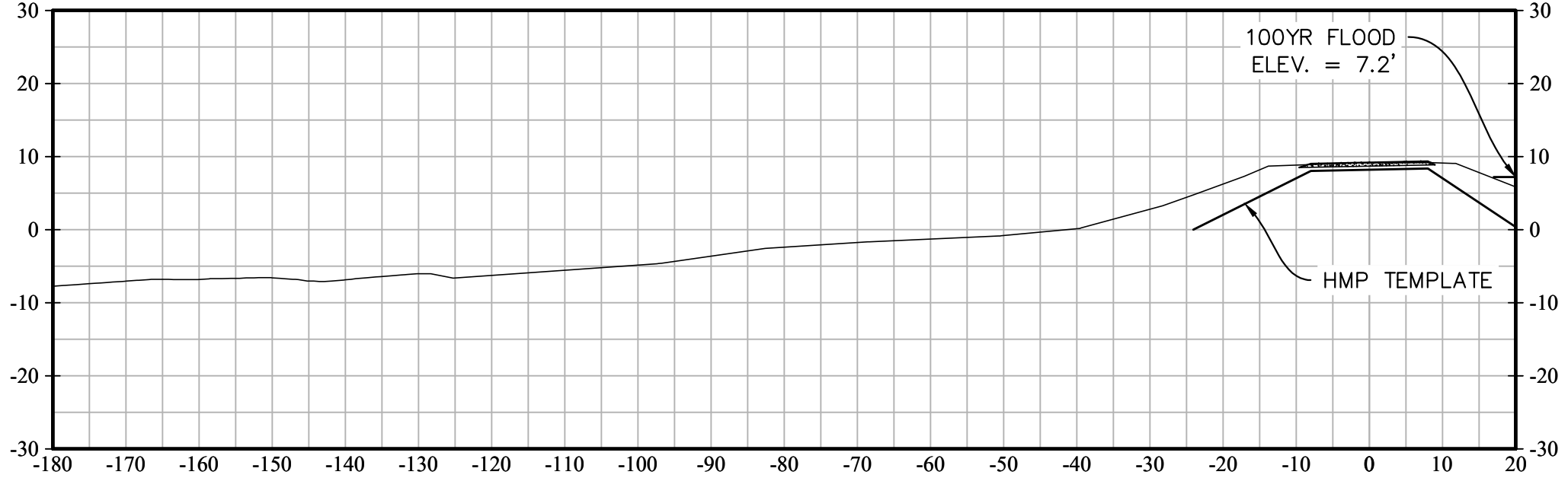

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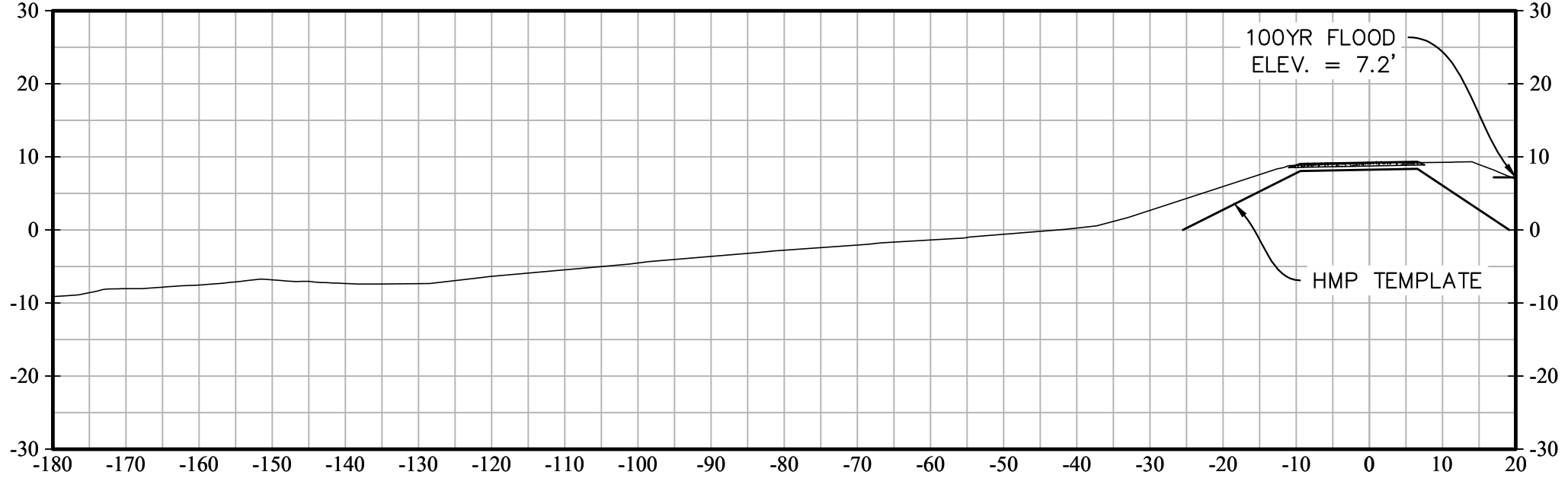
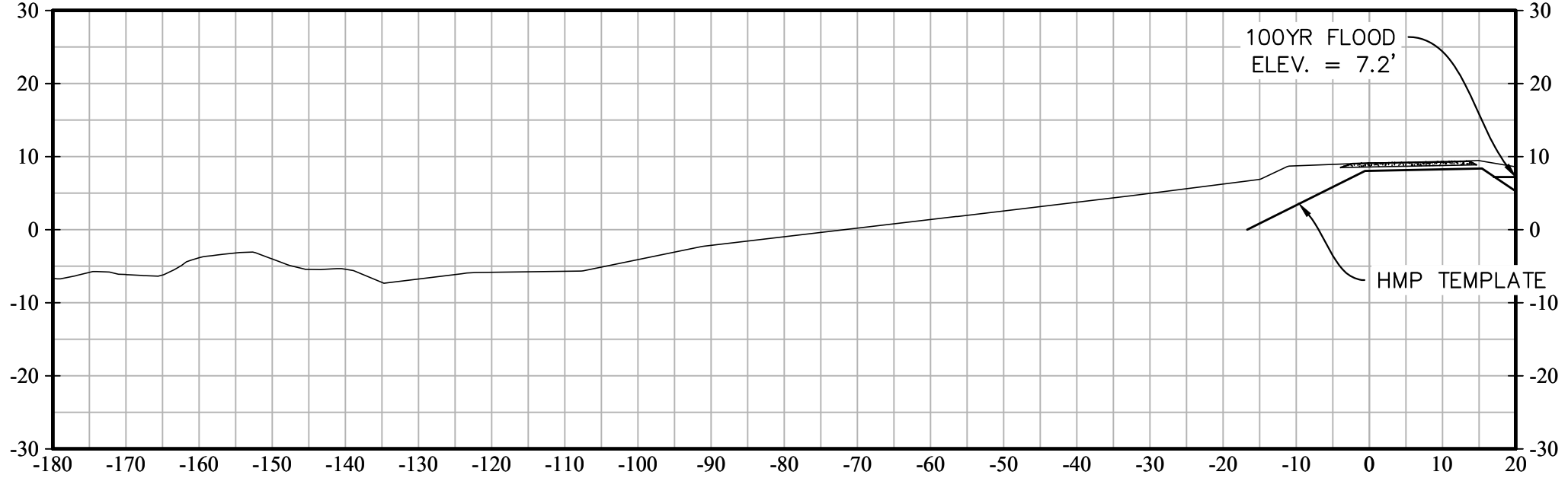
430+00



435+00



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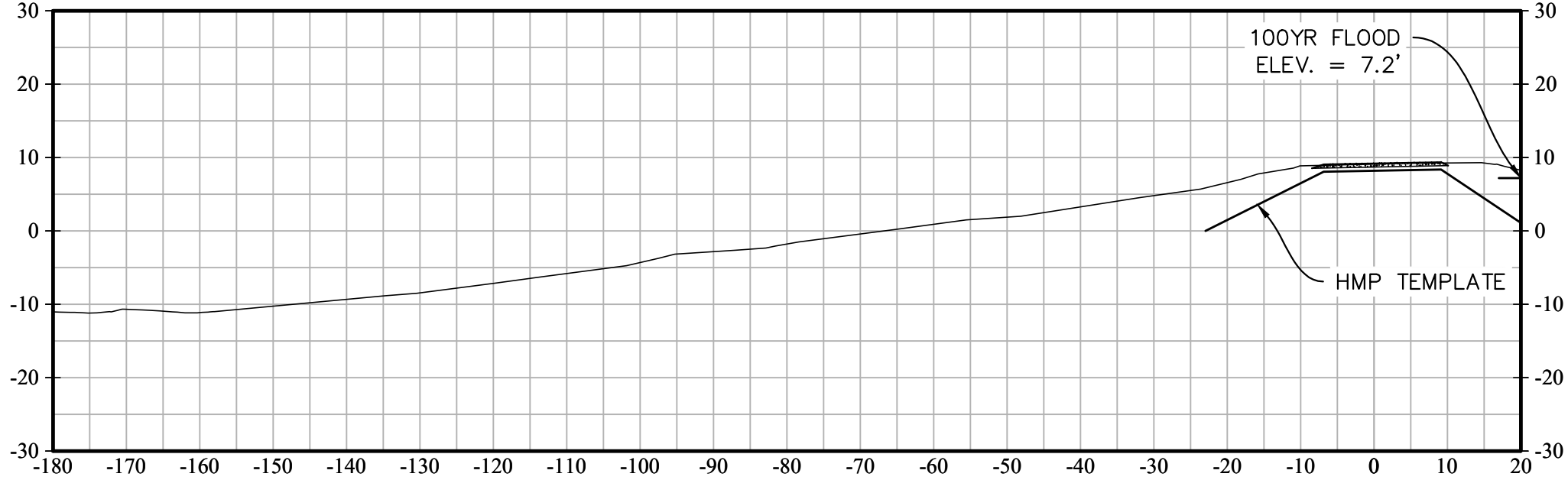
440+00



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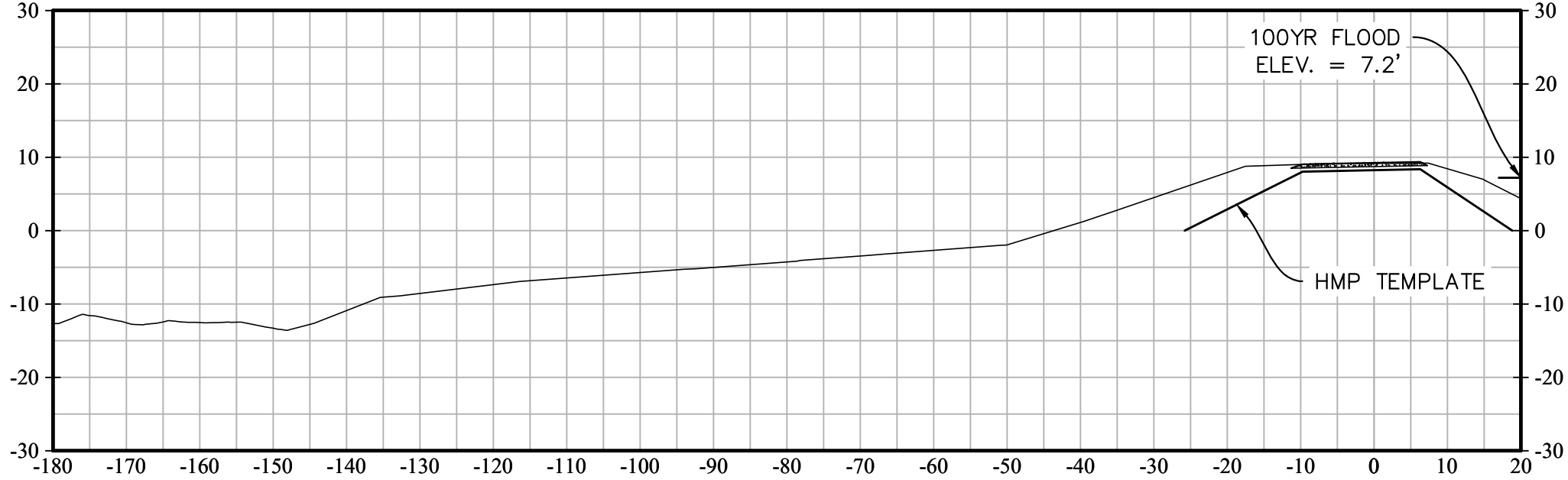

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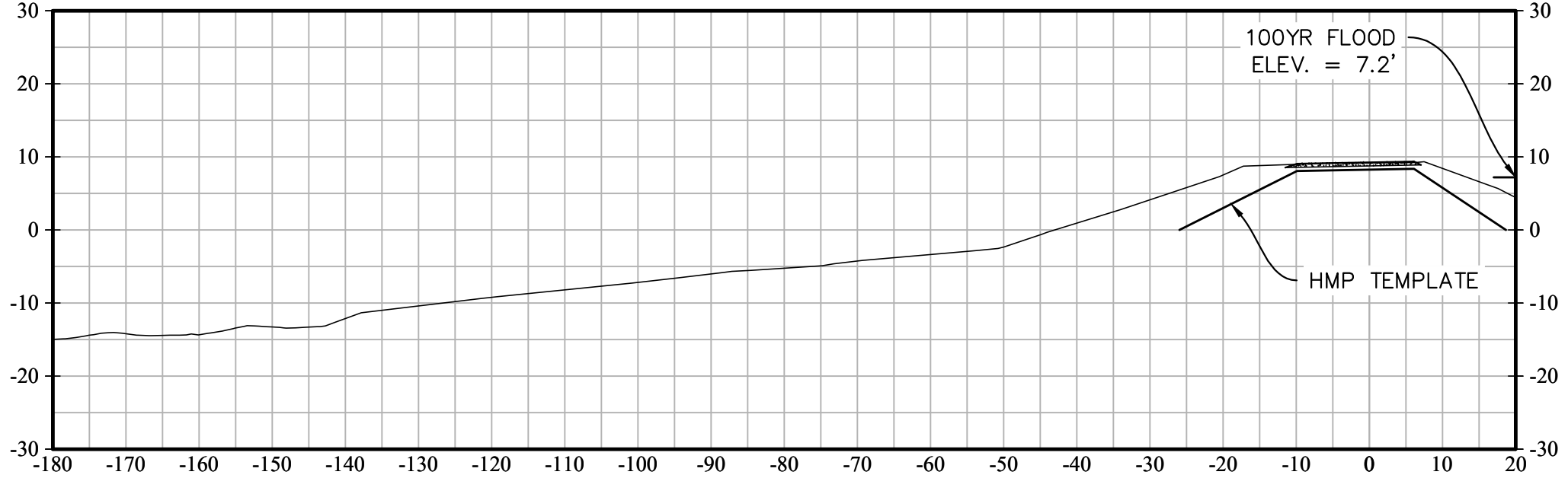
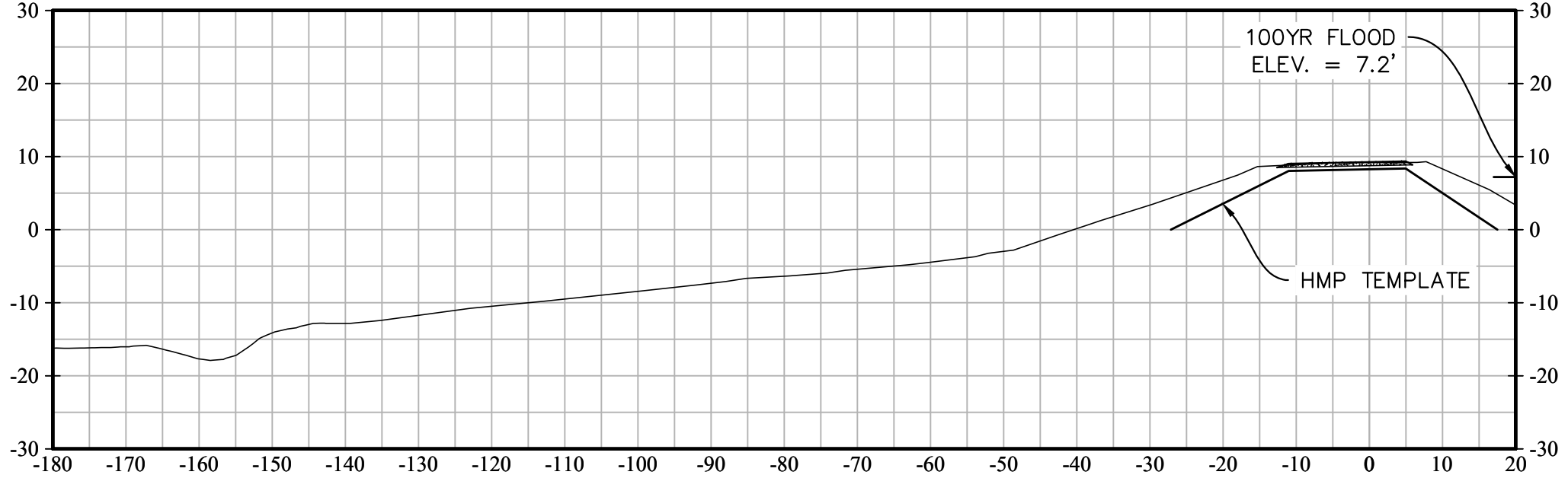
450+00



455+00



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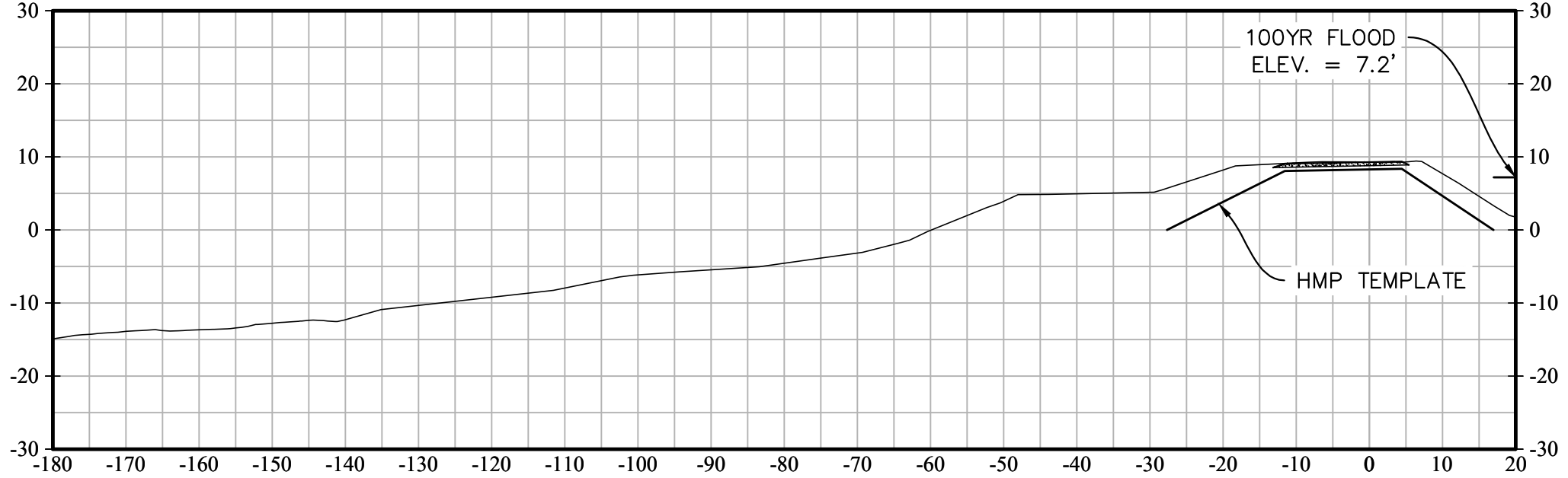
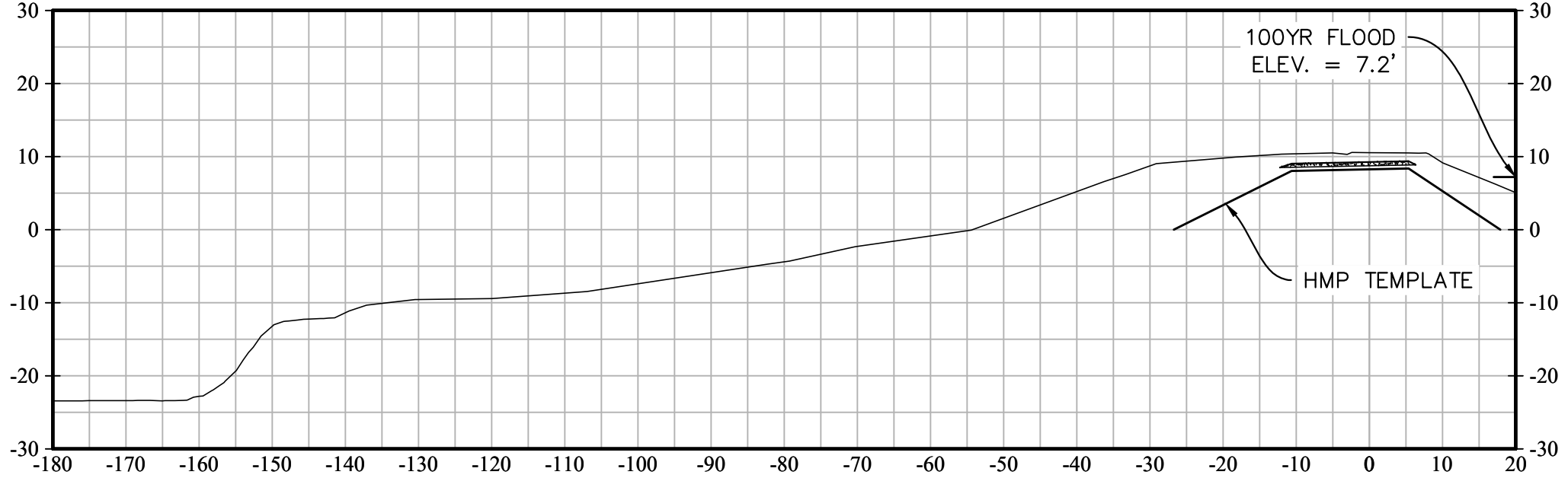
460+00



465+00



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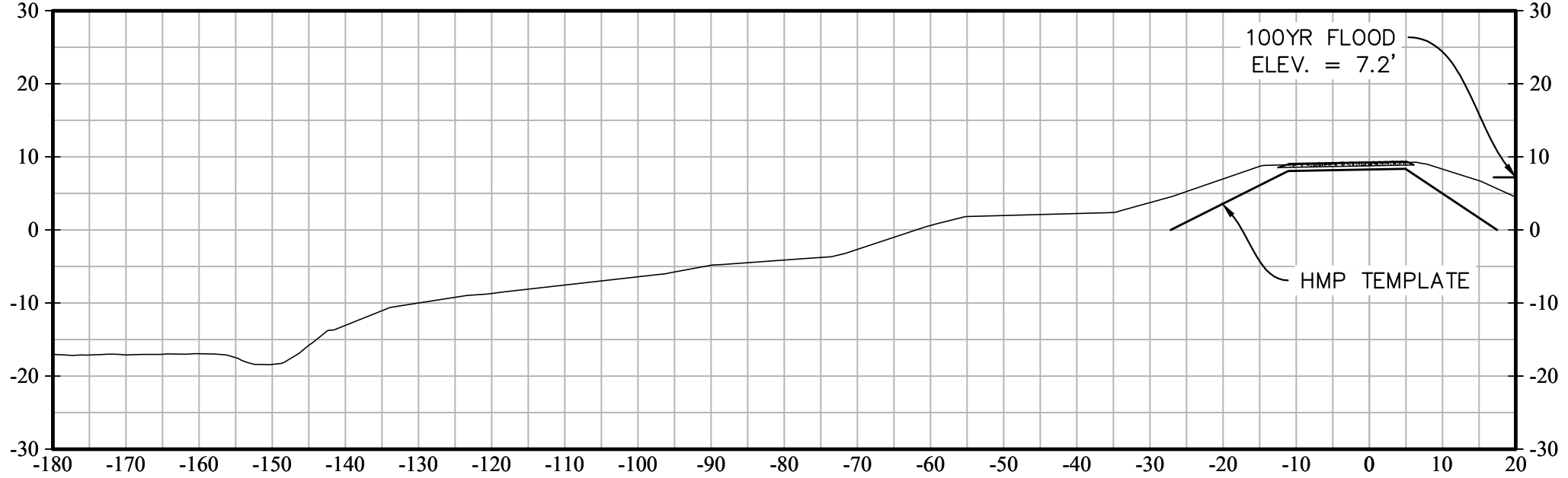
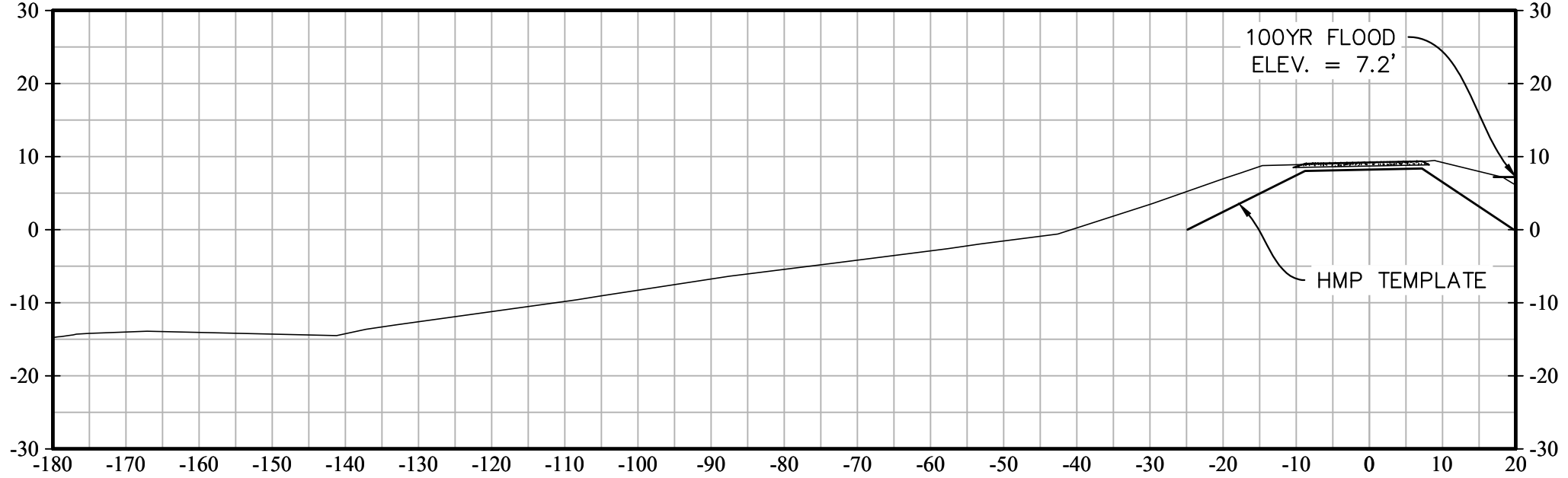
470+00



475+00



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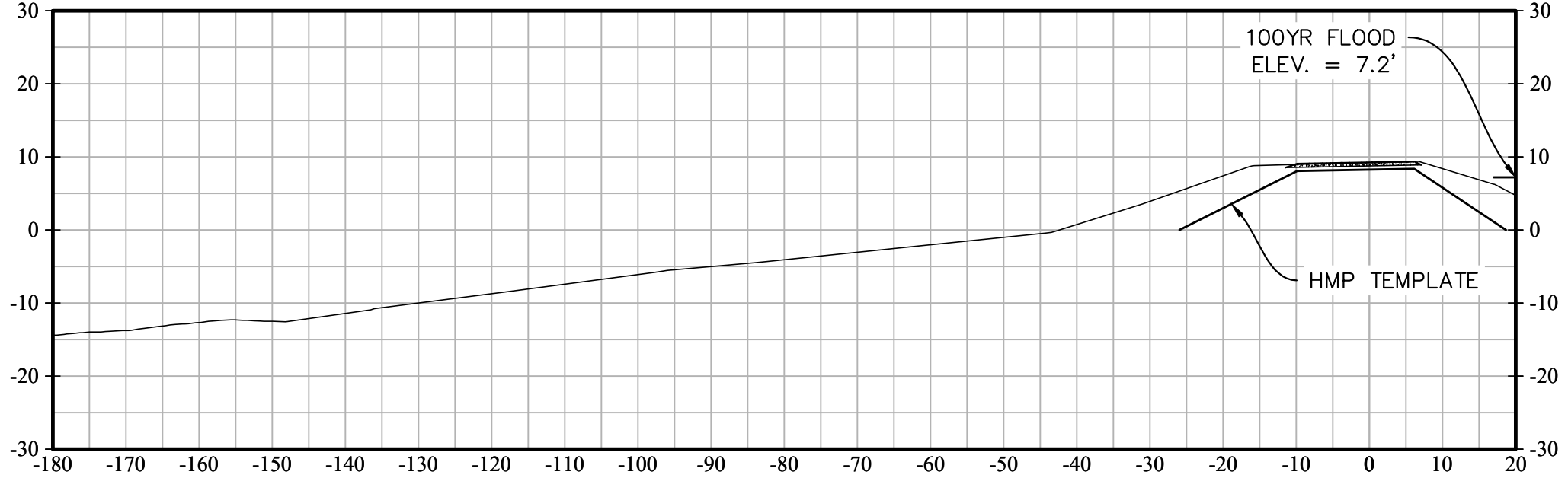
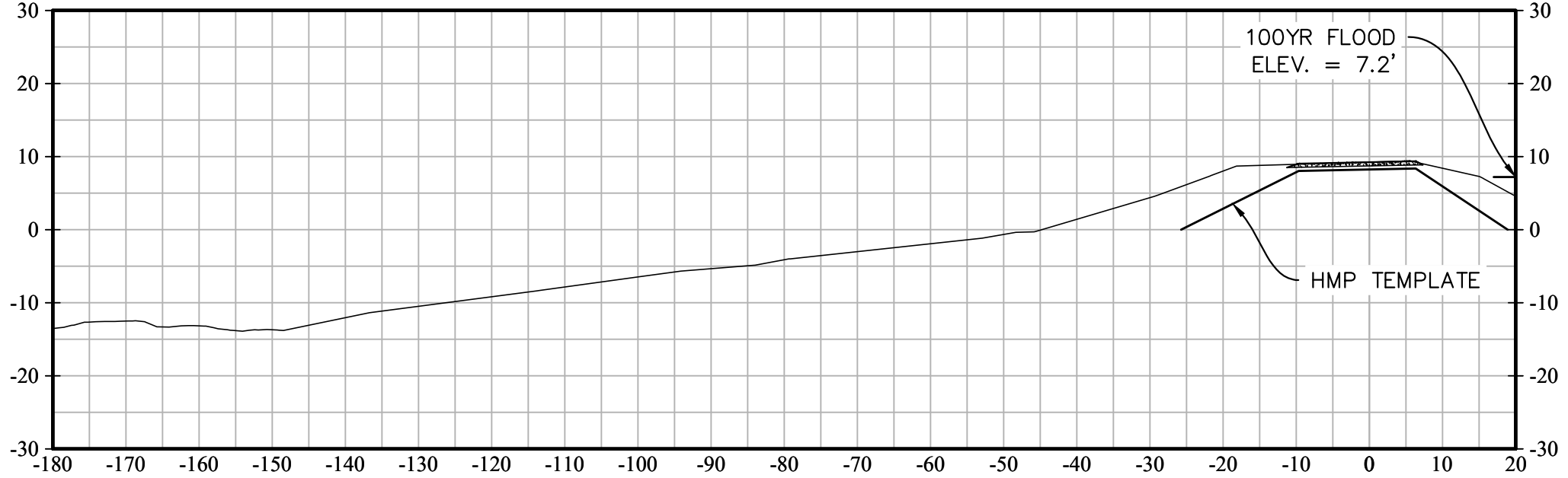
480+00



485+00



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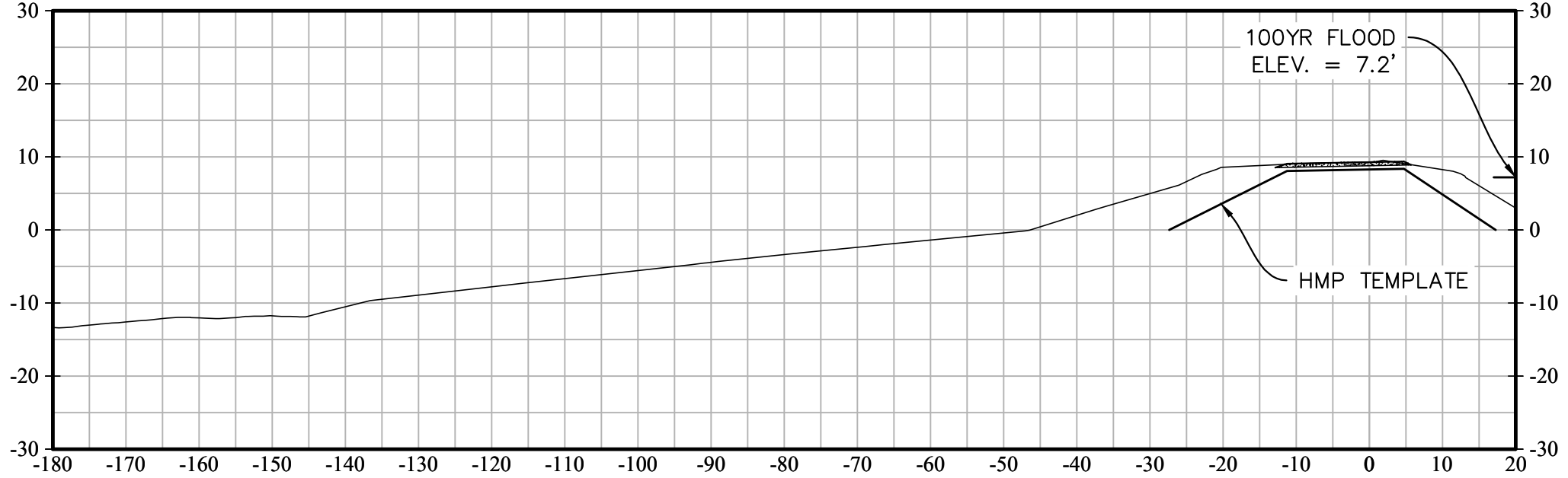
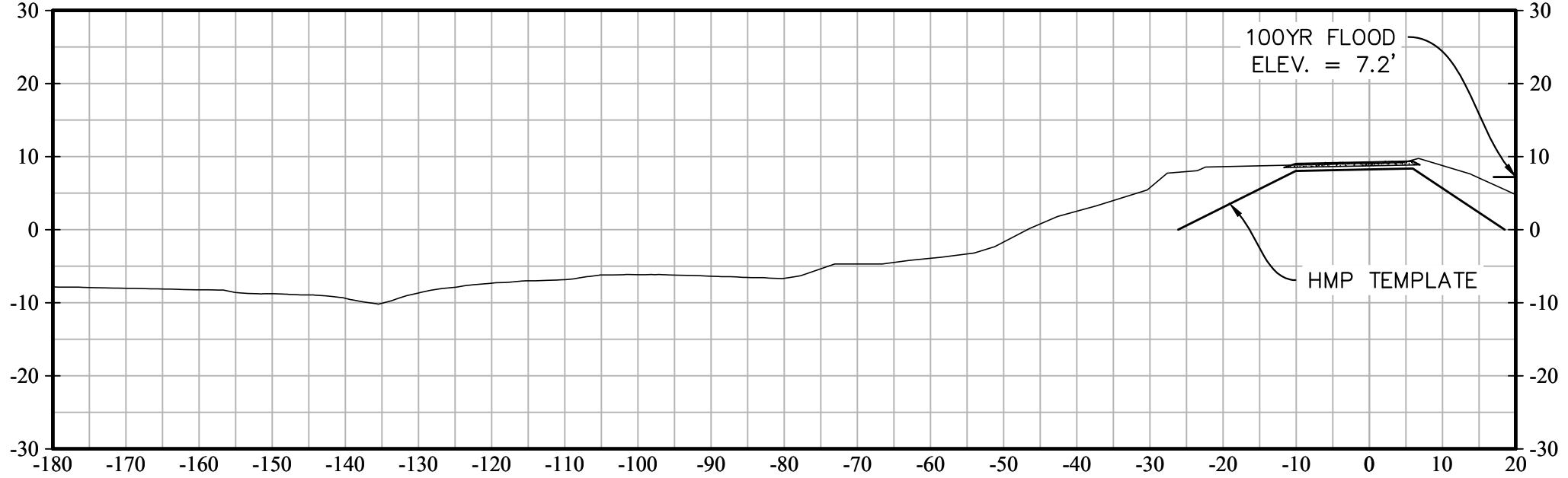
490+00



495+00



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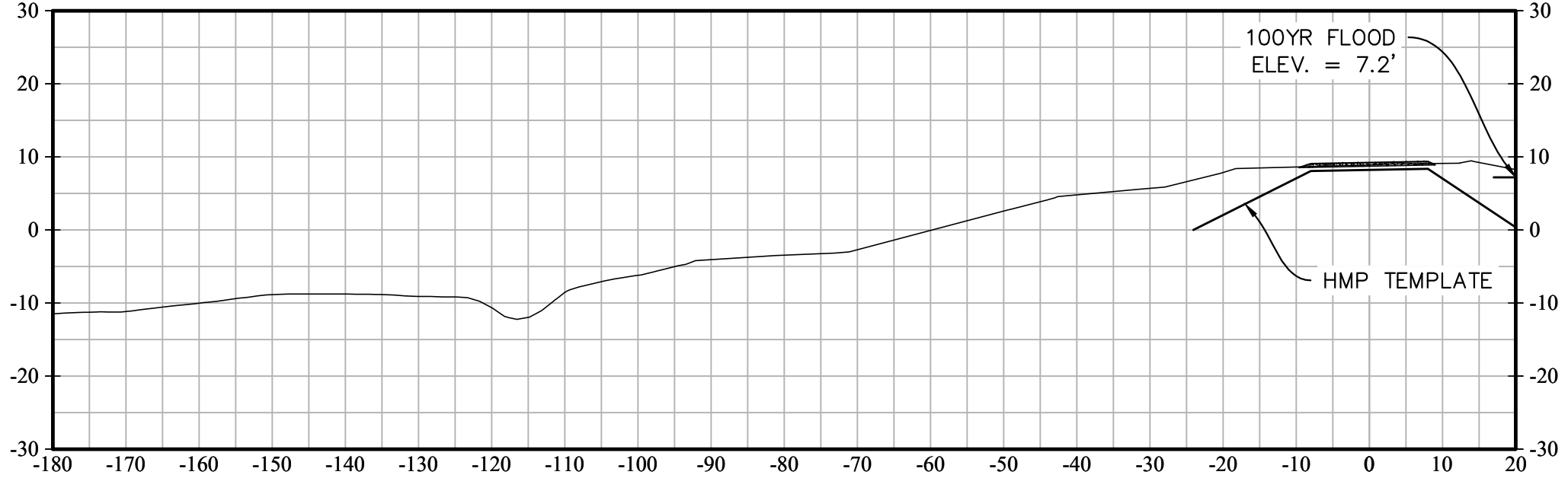
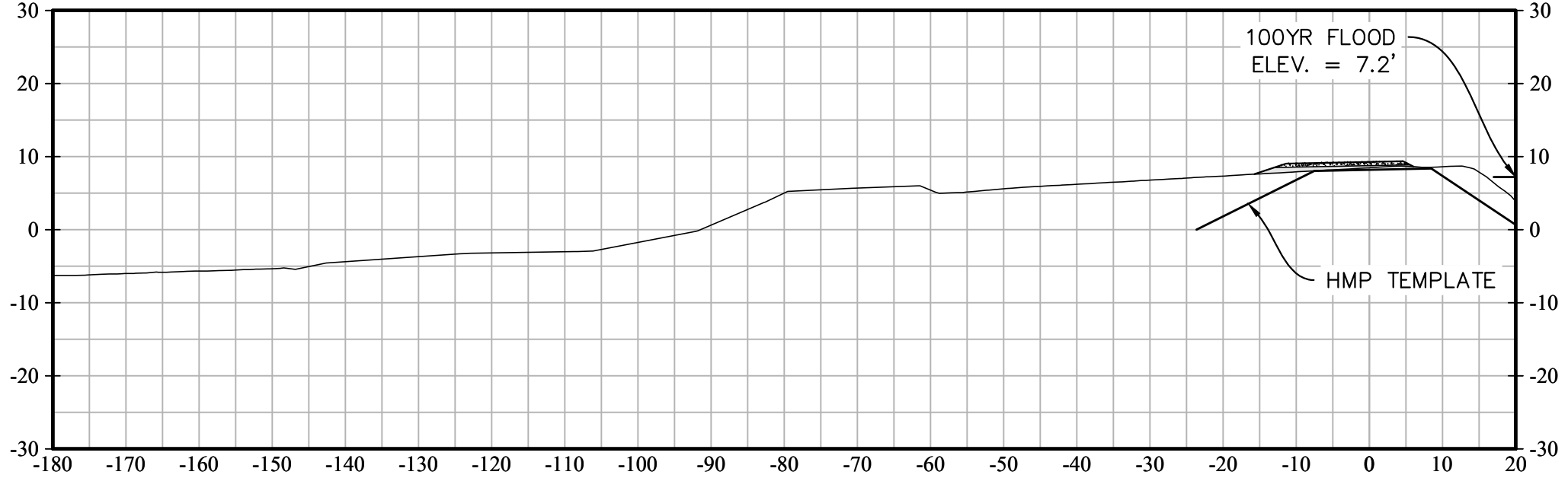
500+00



505+00



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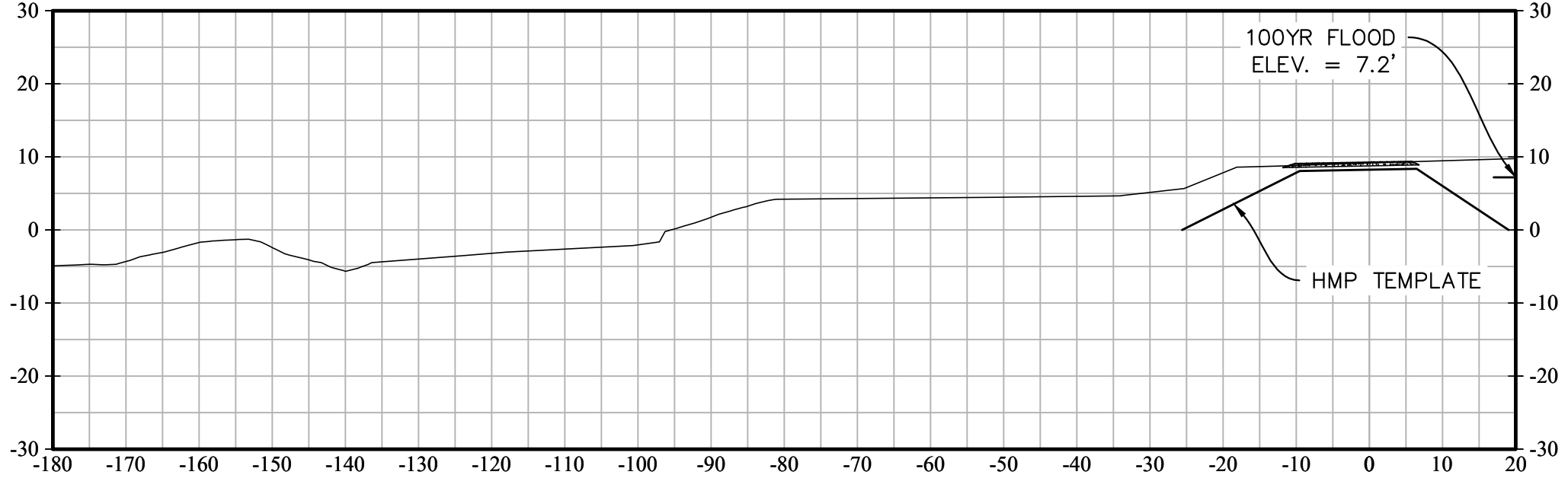
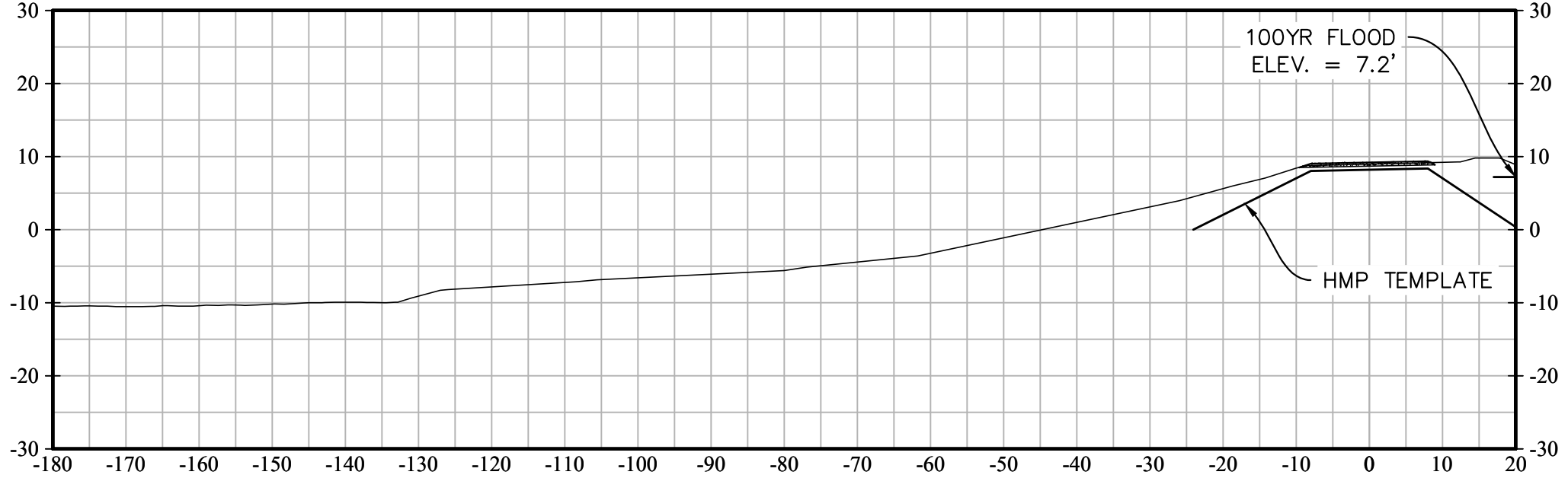
510+00



515+00



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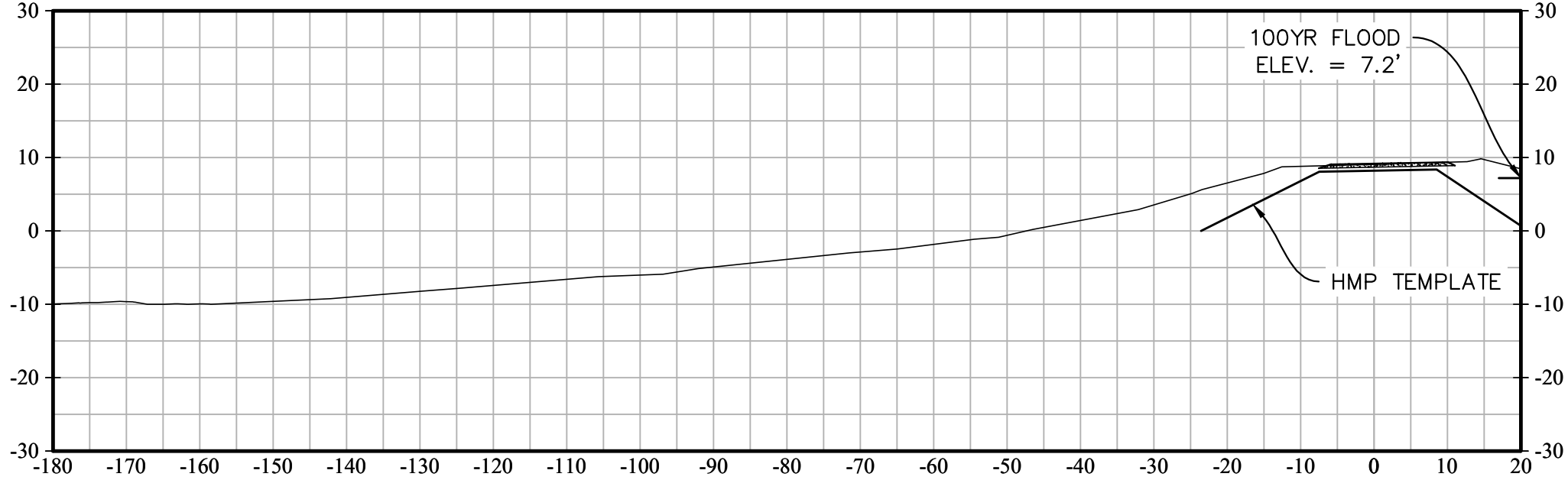
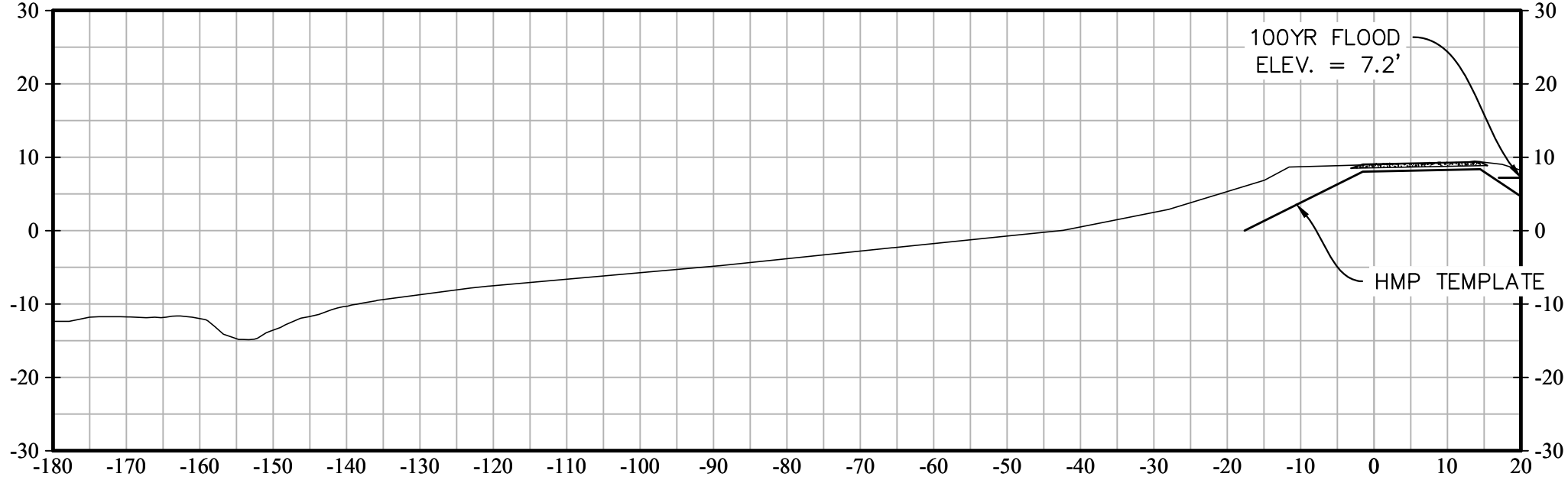
520+00



525+00



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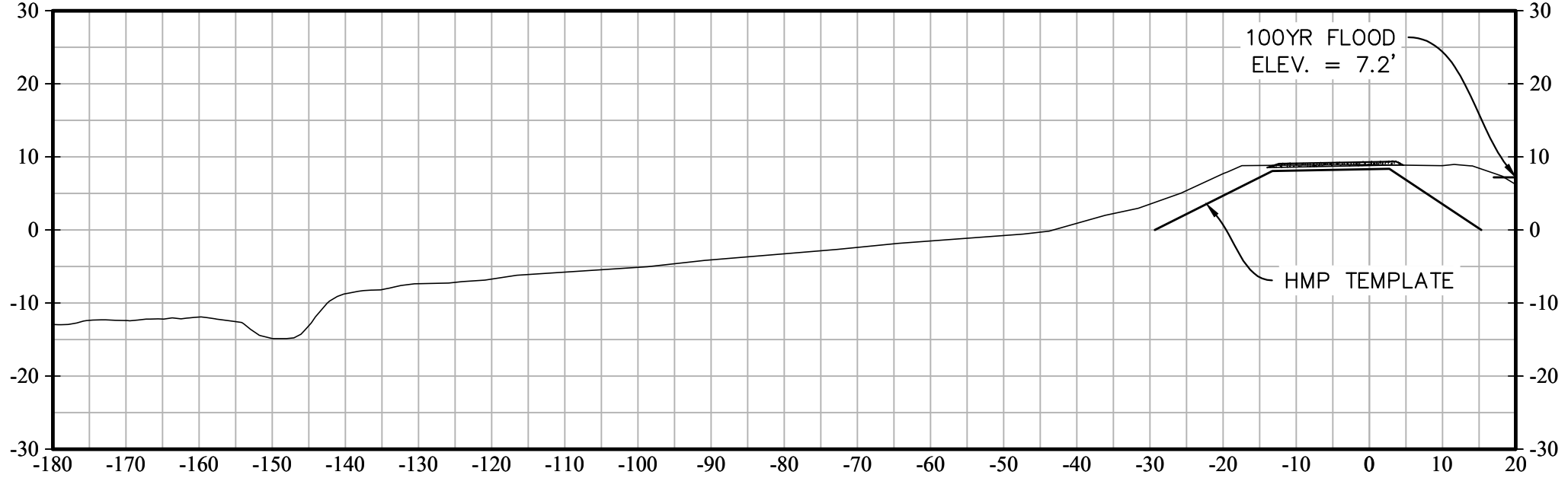
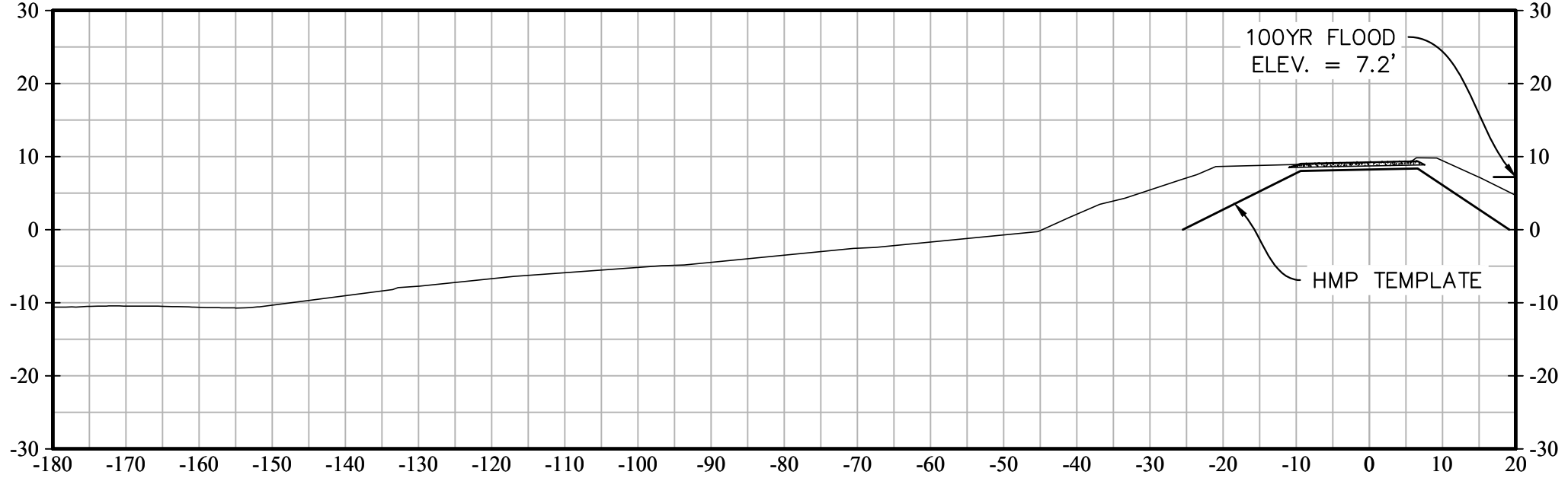
530+00



535+00



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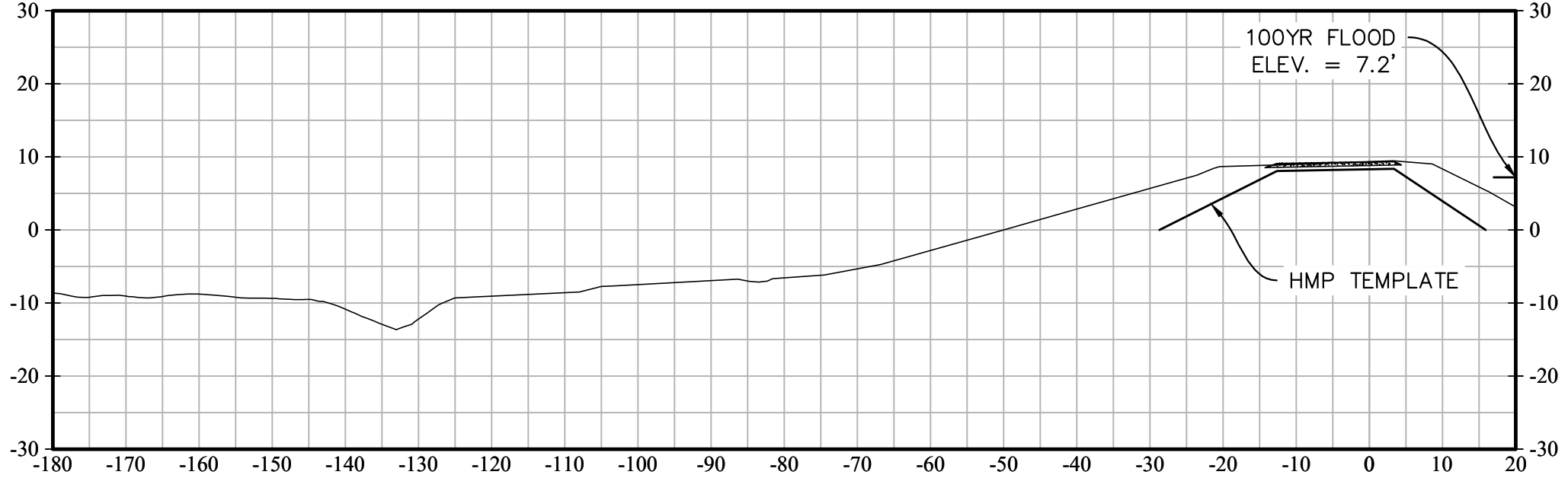
540+00



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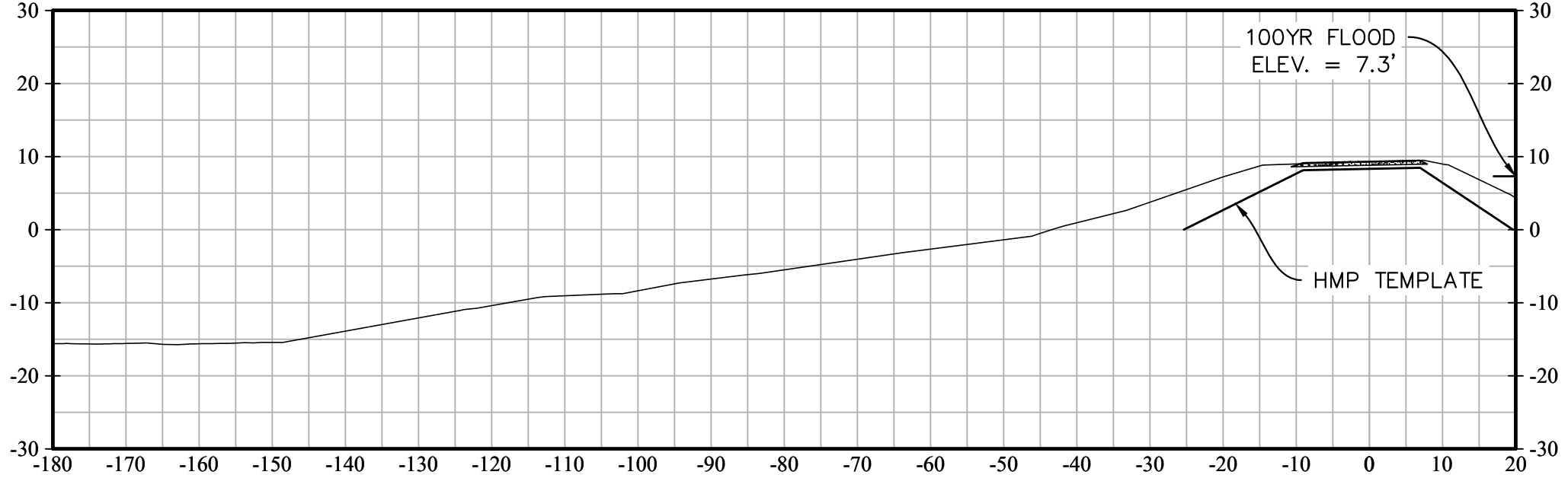

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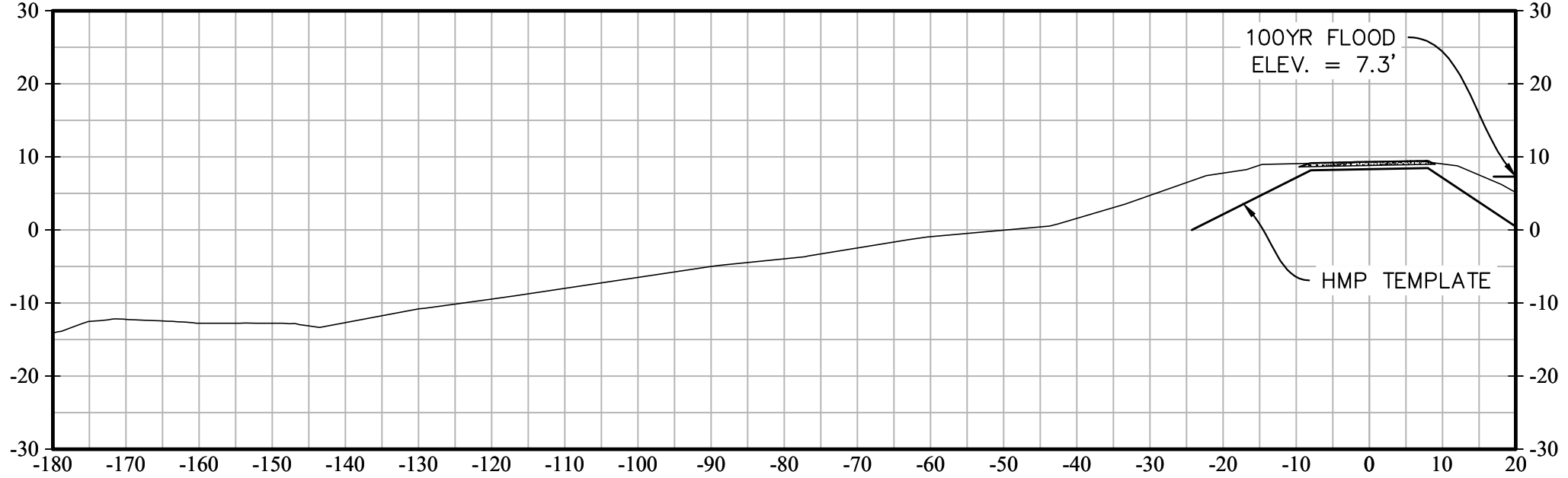
550+00



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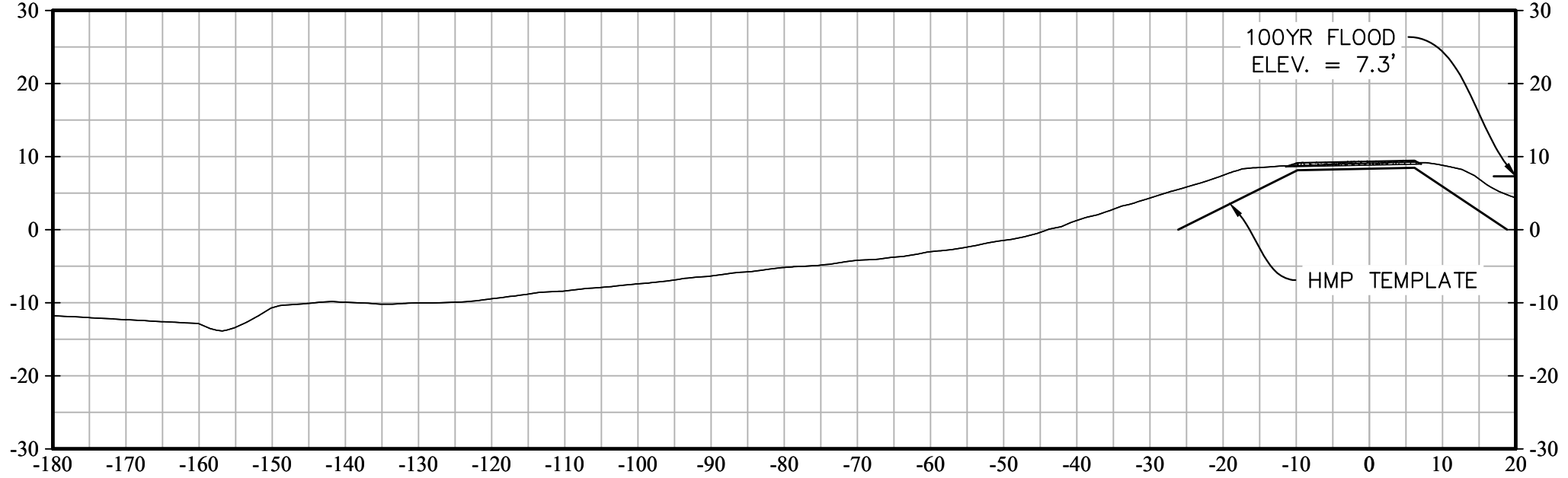

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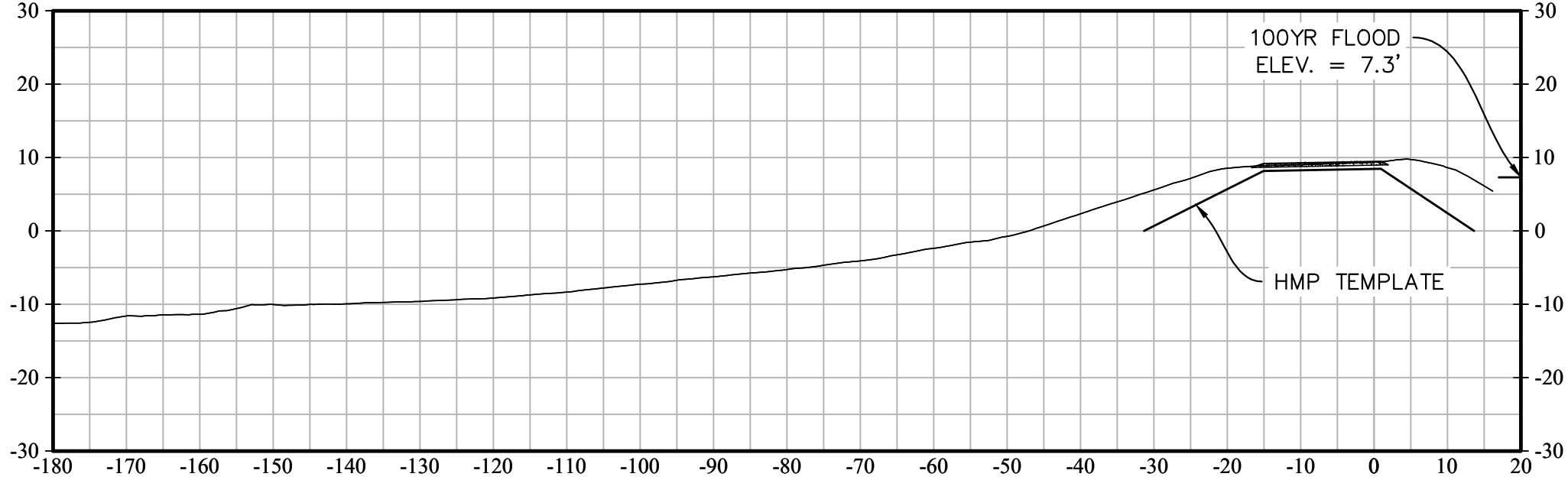
560+00



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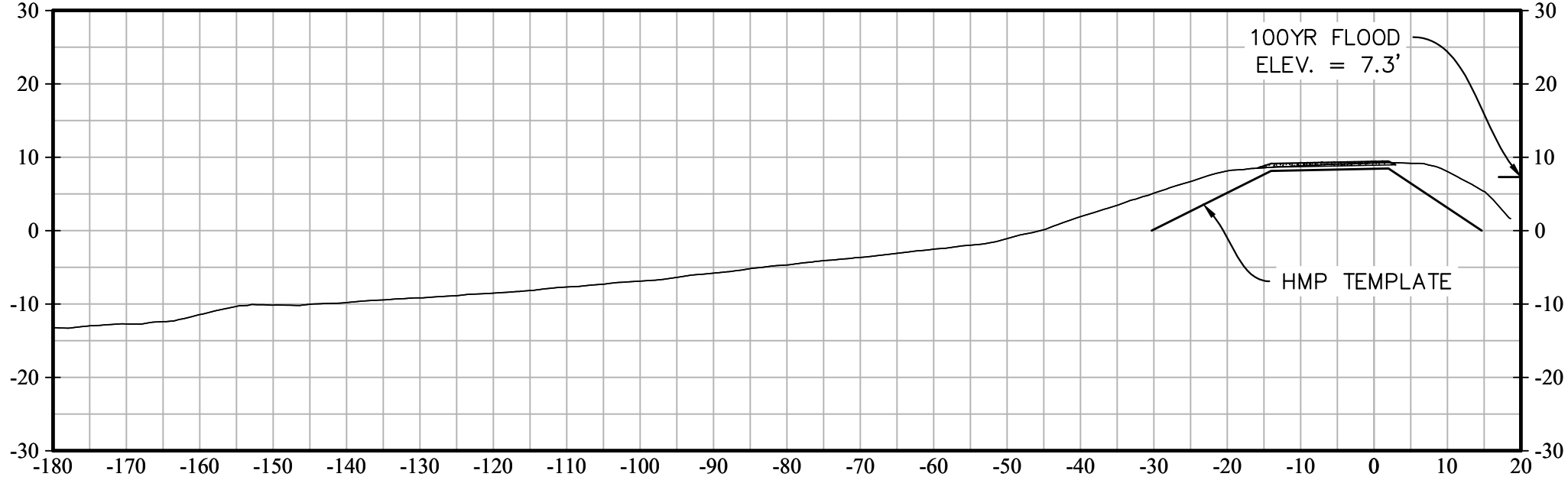

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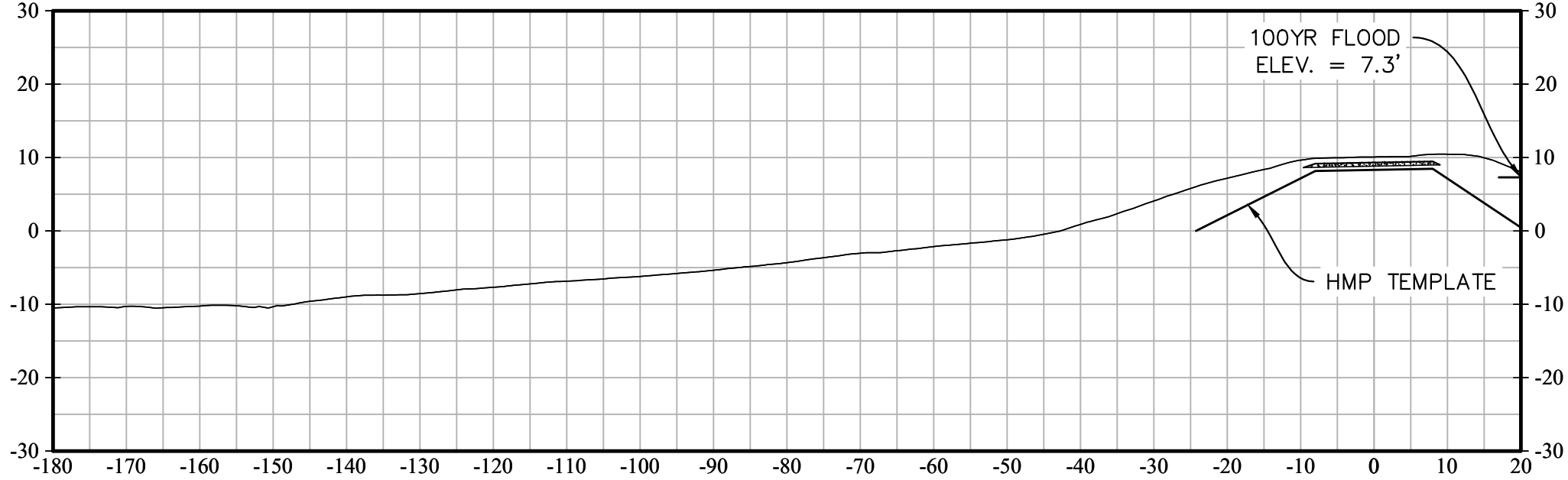
570+00



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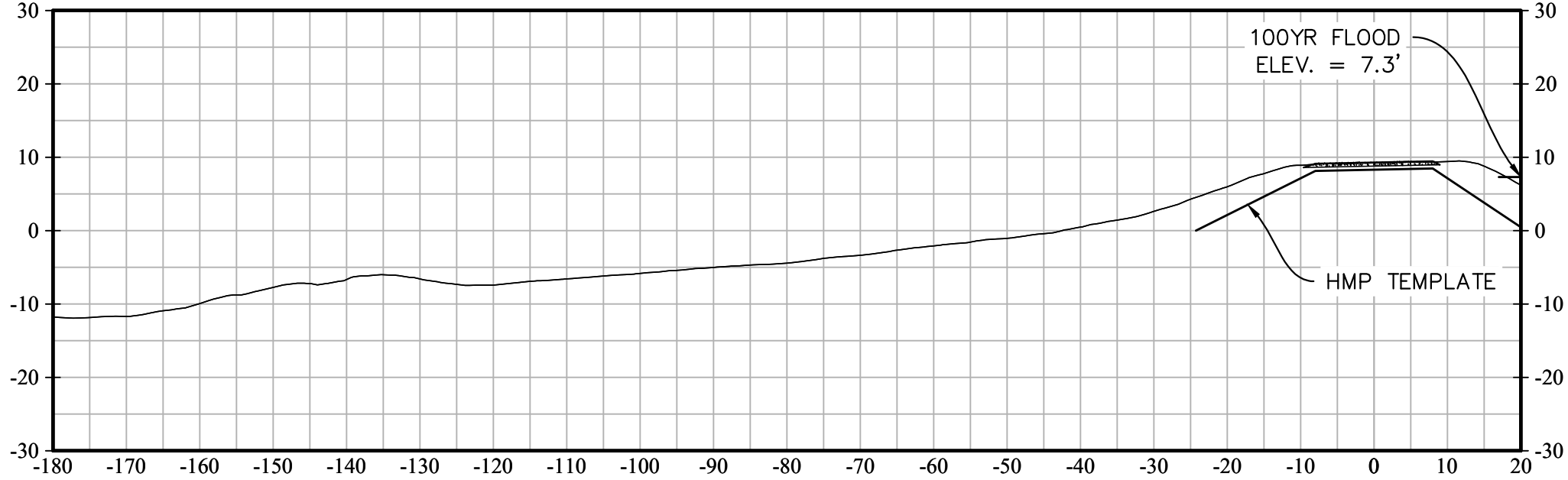

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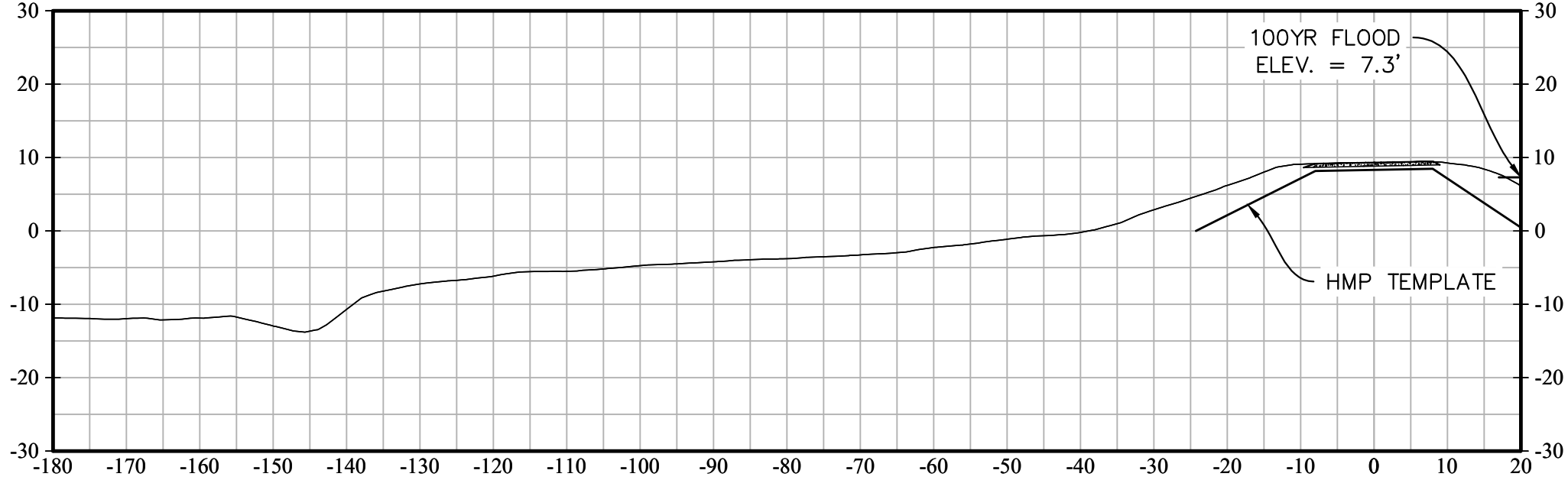
580+00



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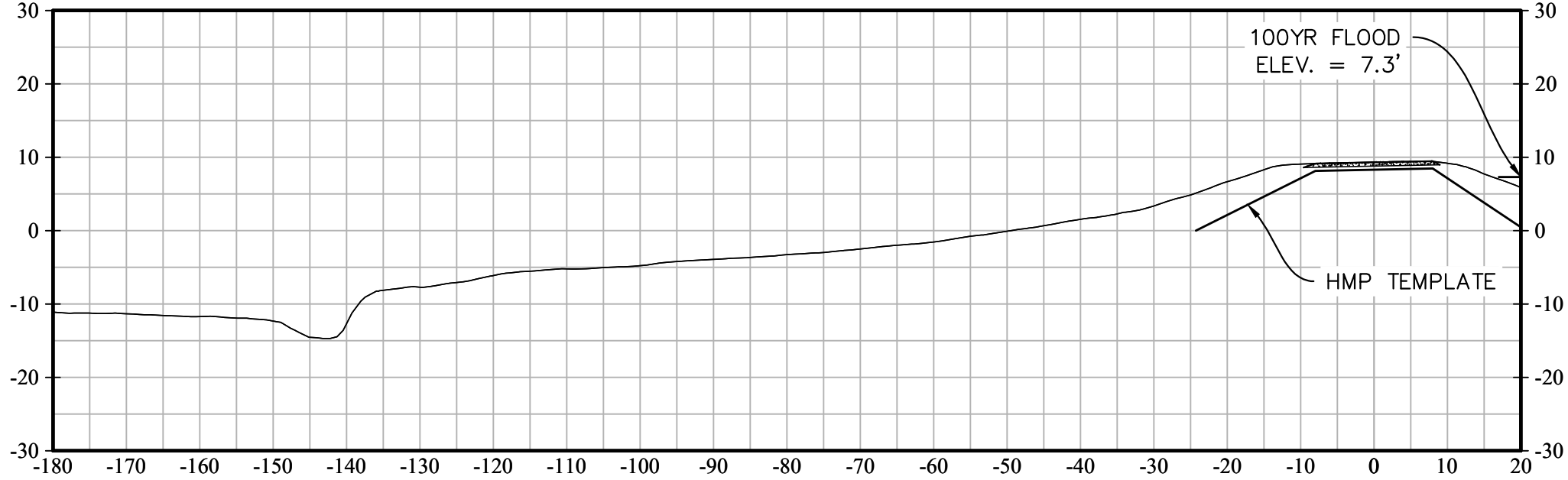

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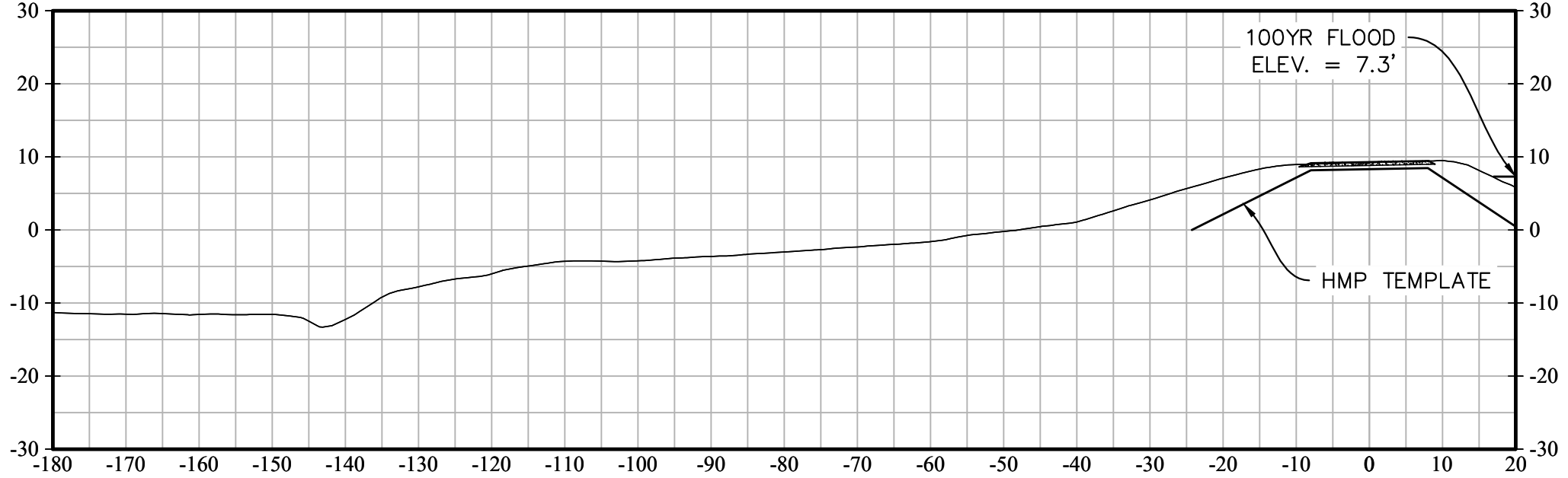
590+00



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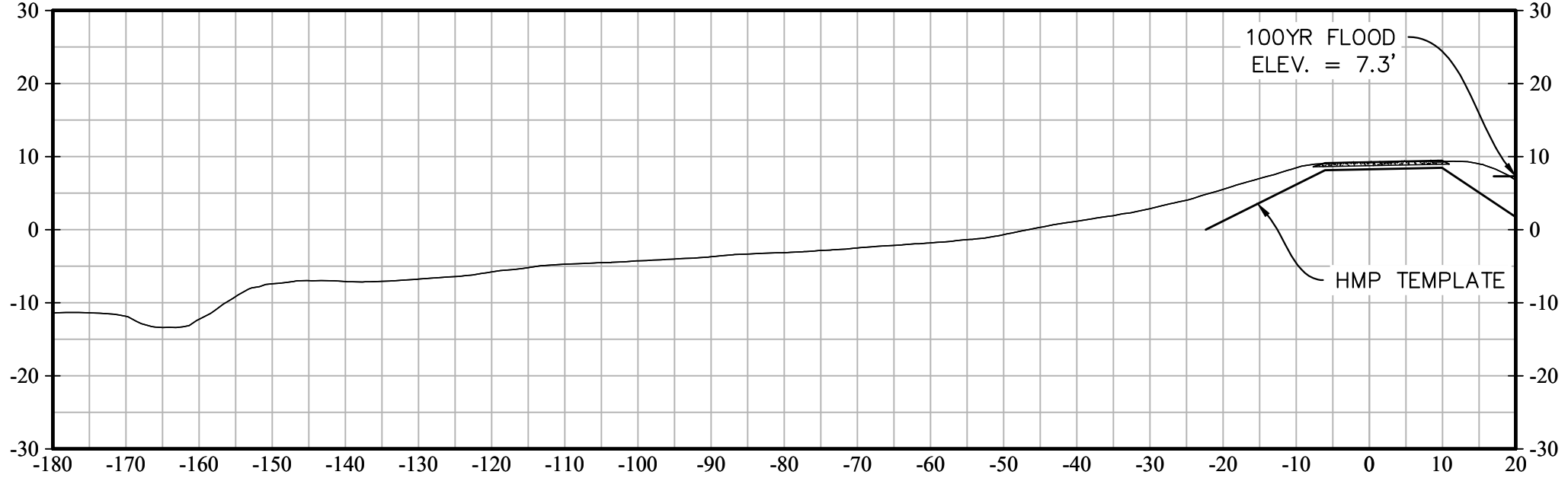

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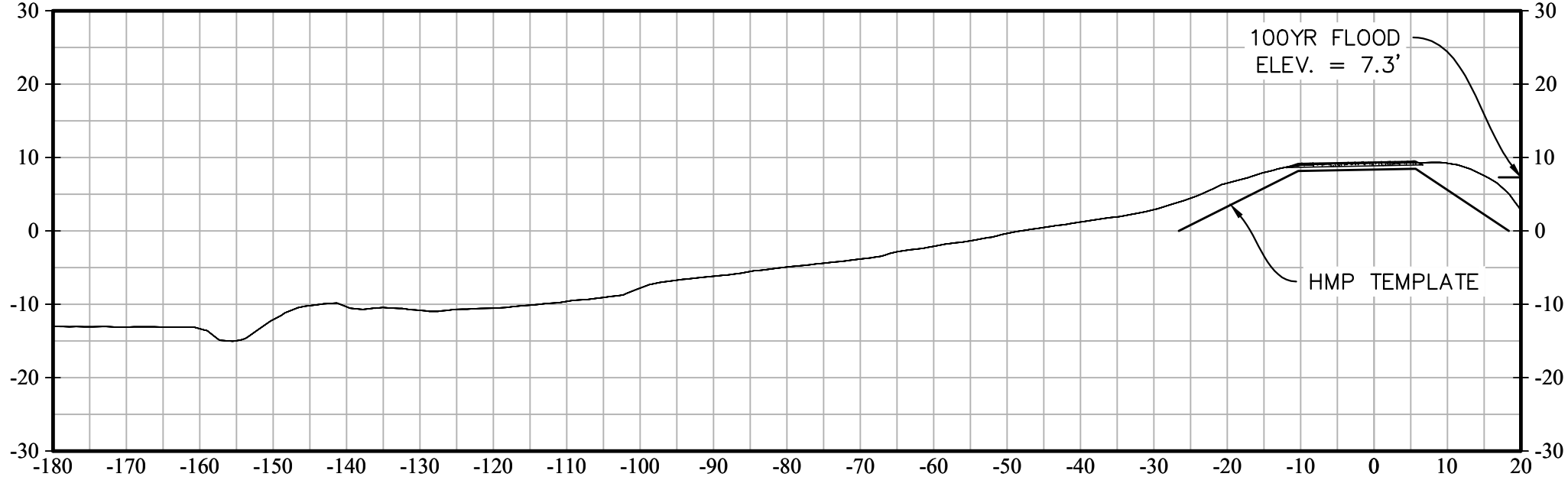
600+00



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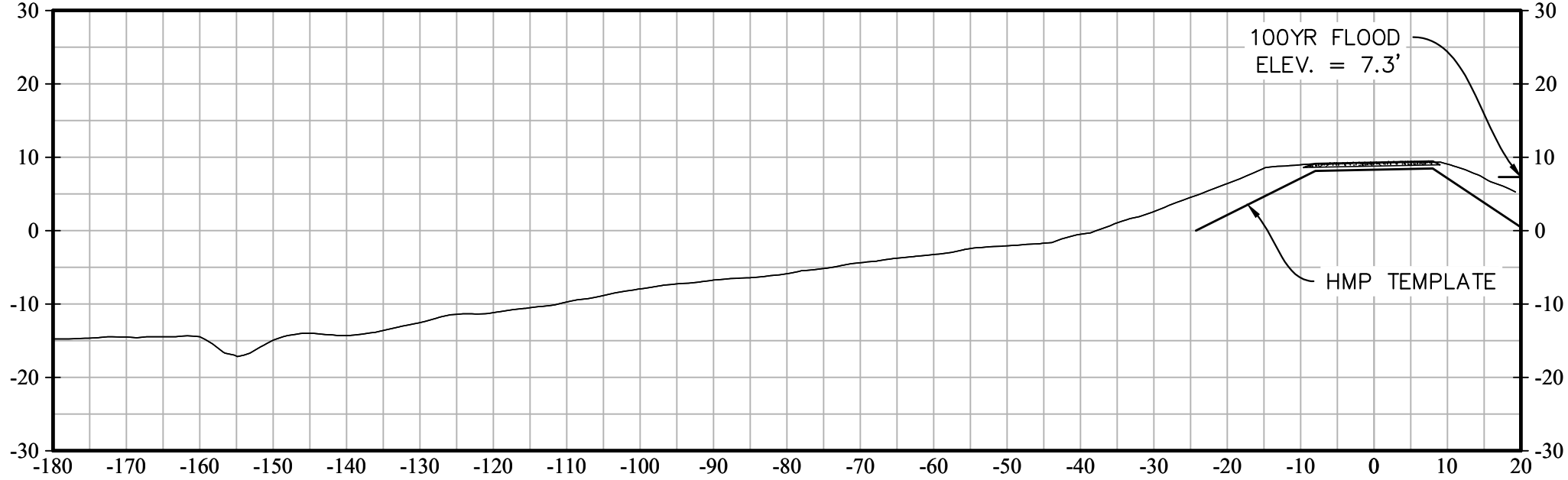

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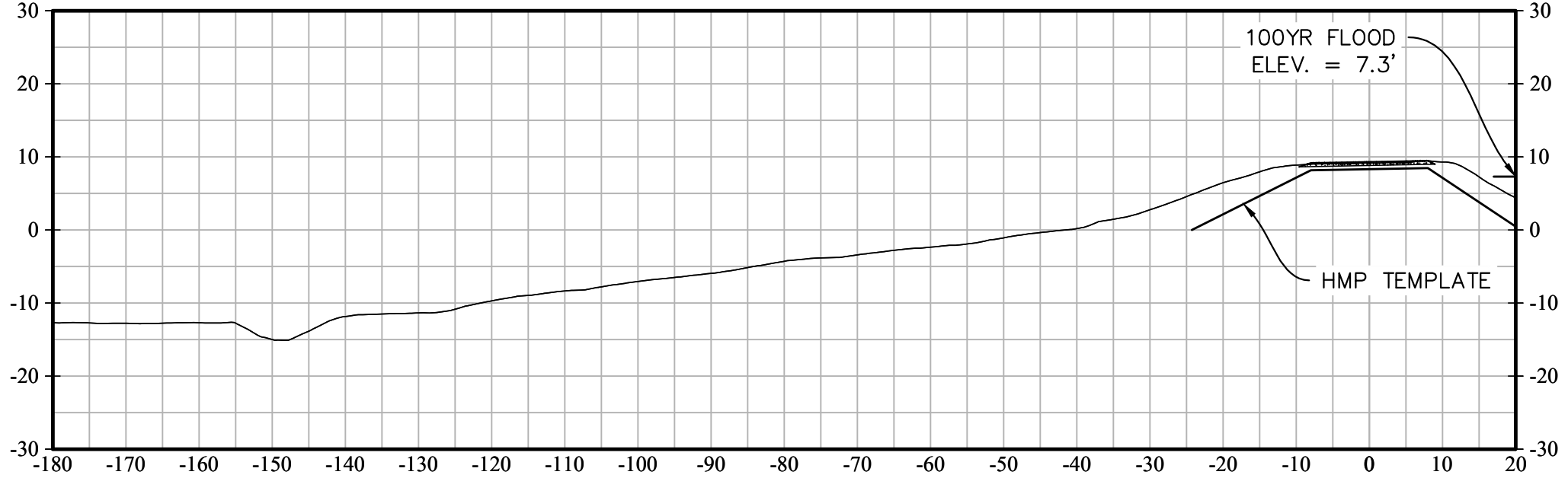
610+00



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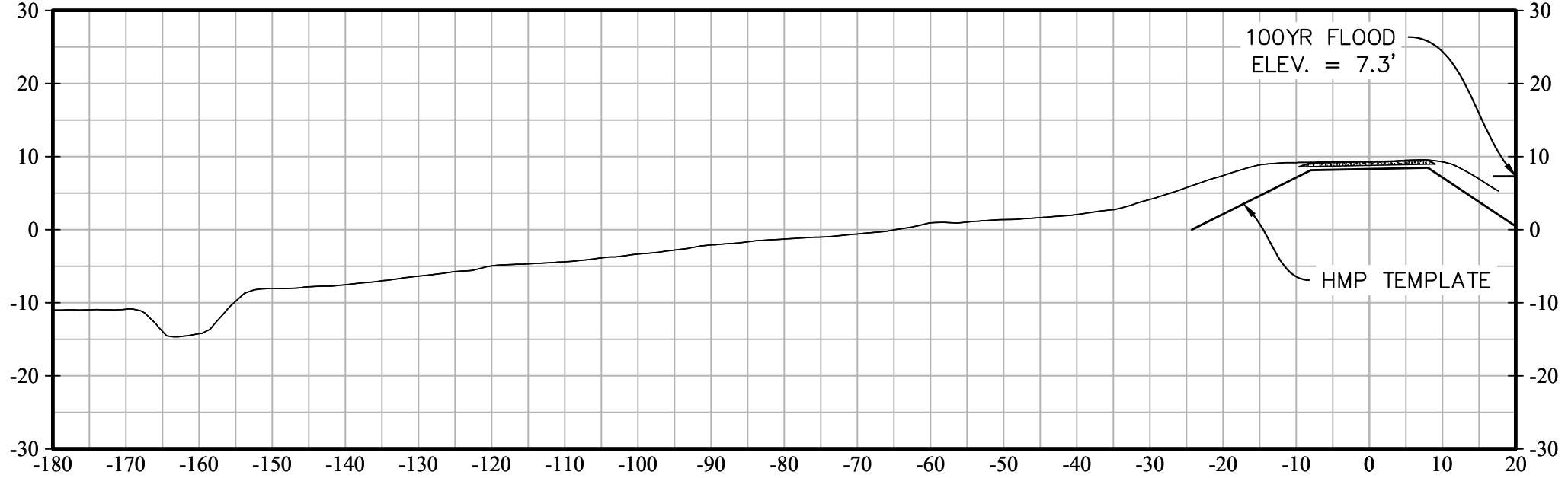

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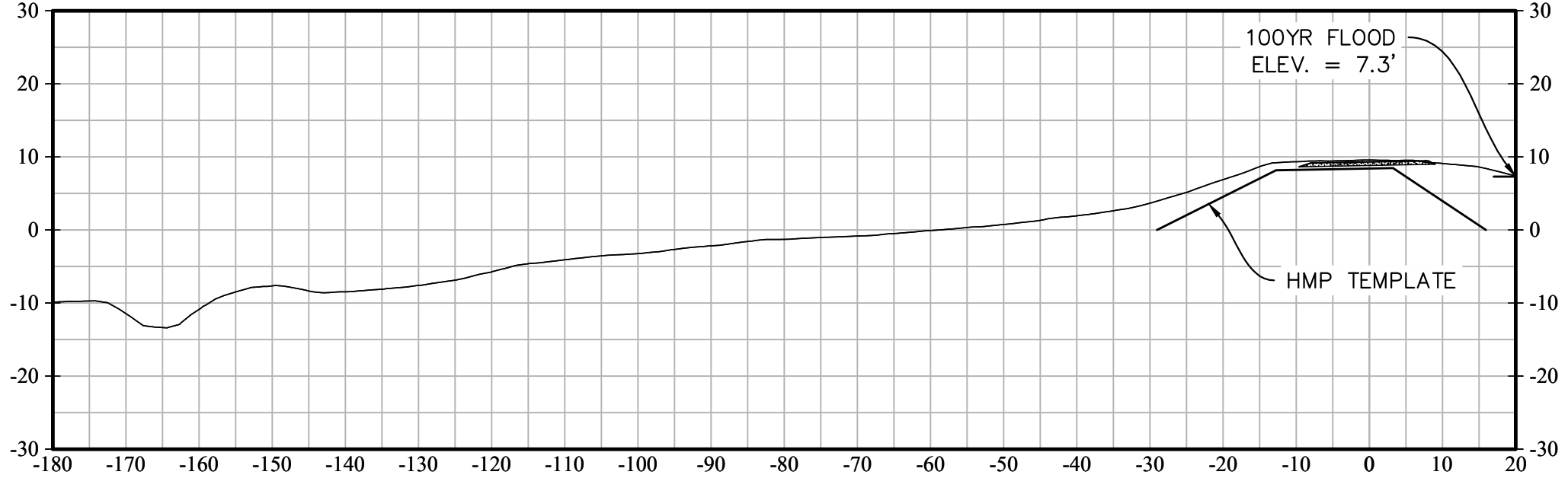
620+00



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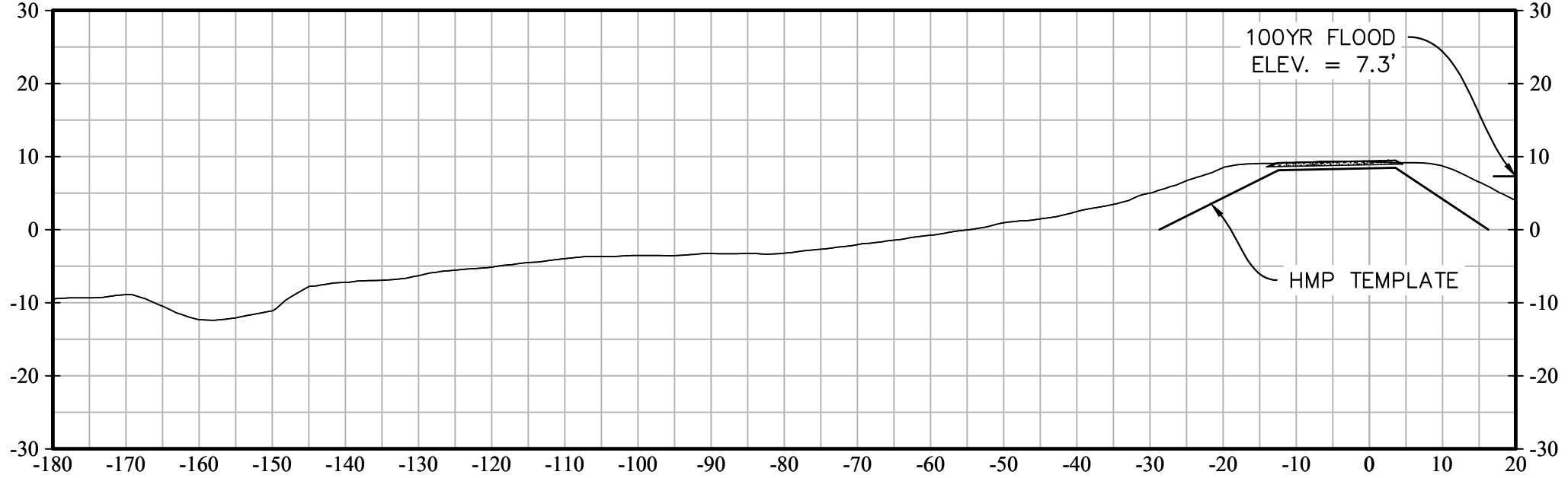

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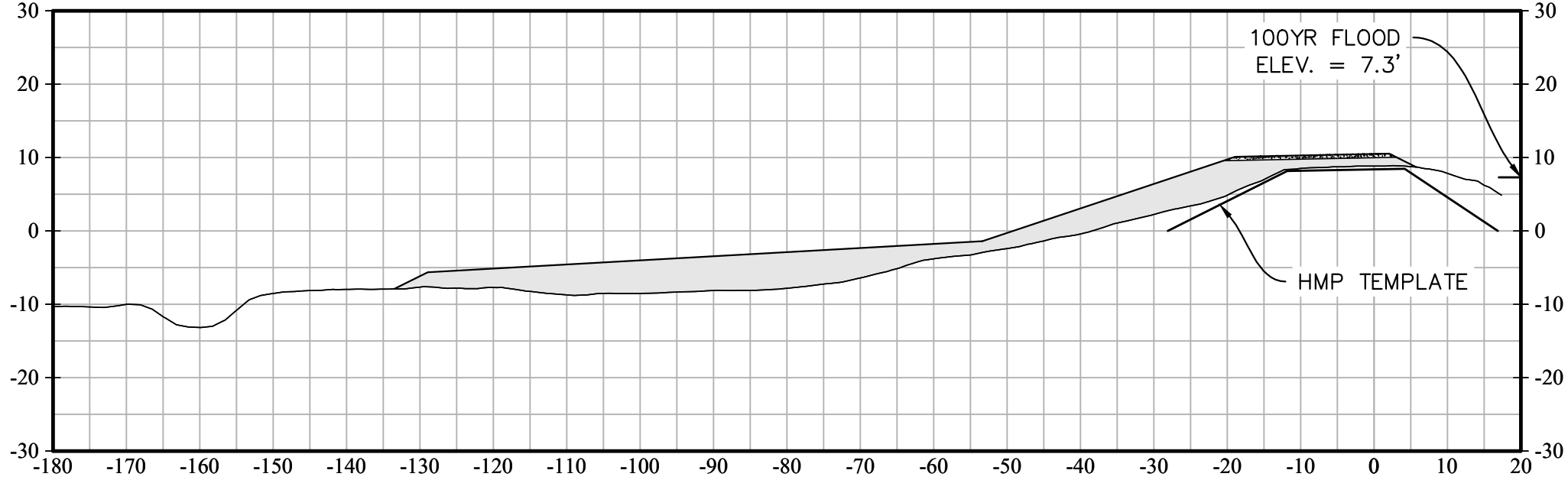
630+00



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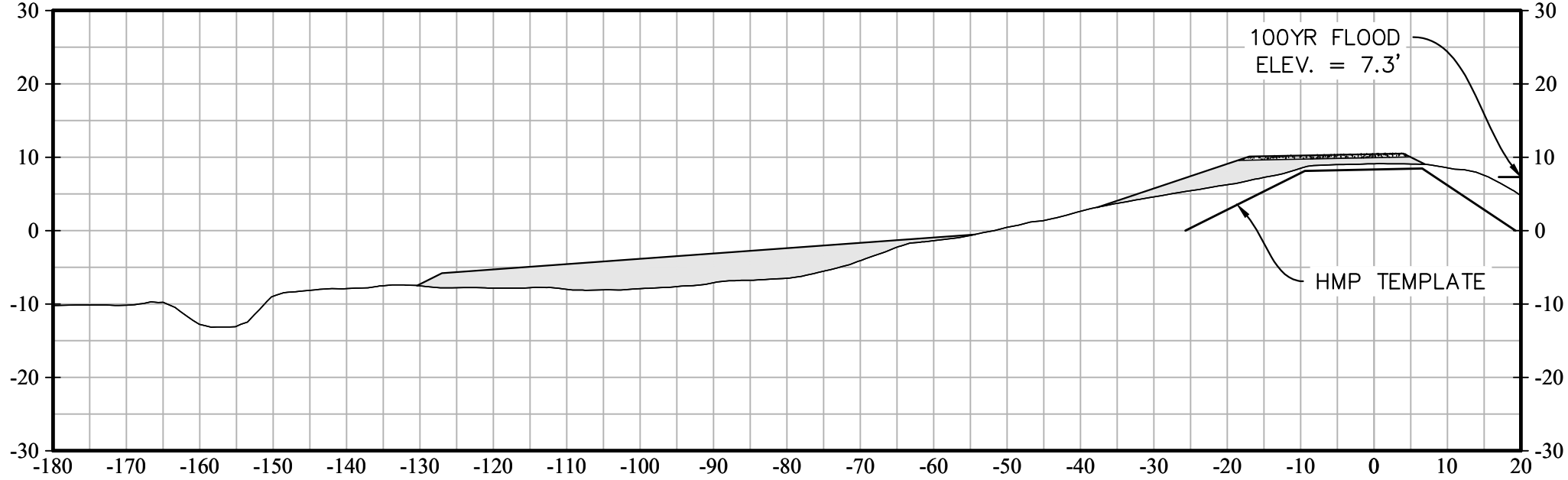

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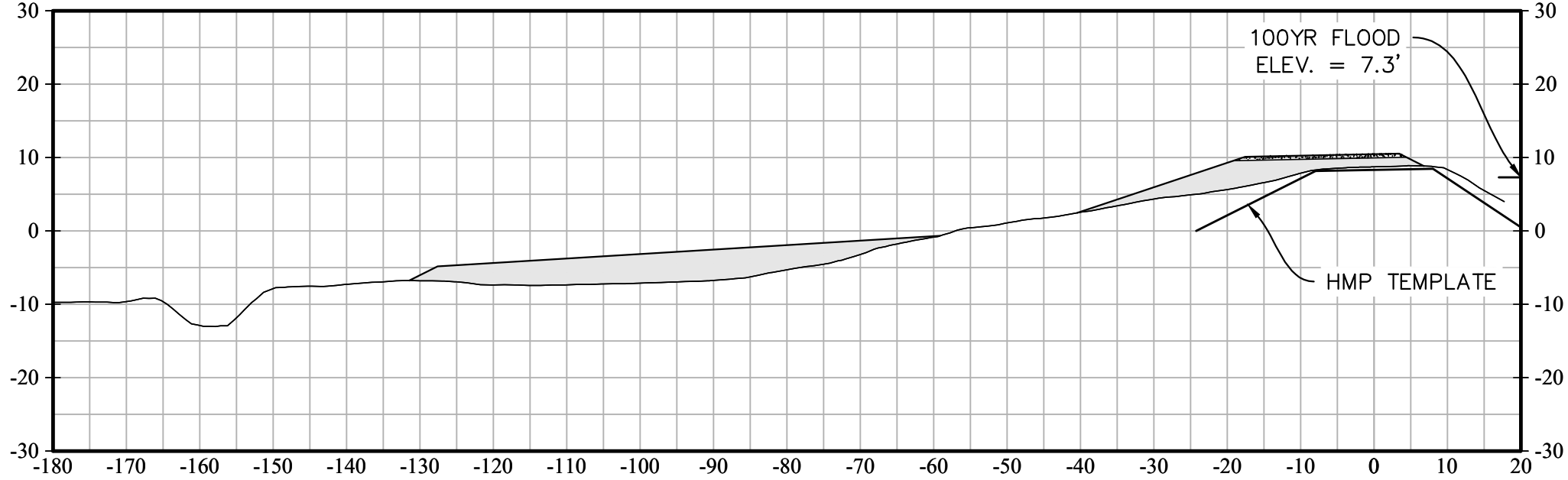
640+00



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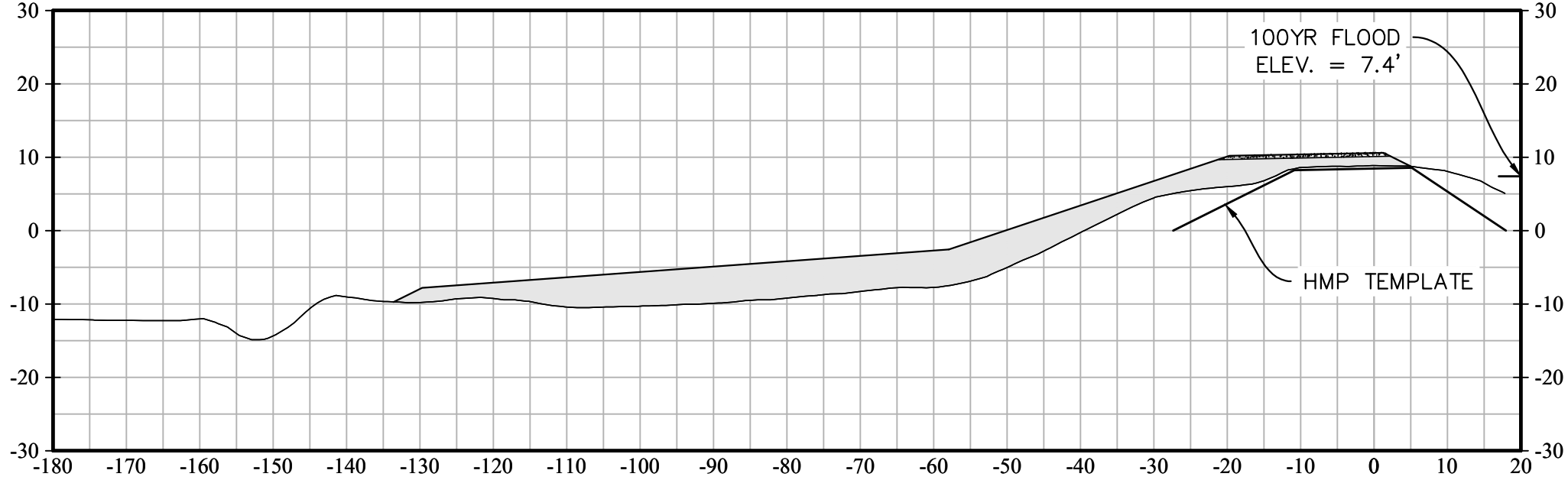

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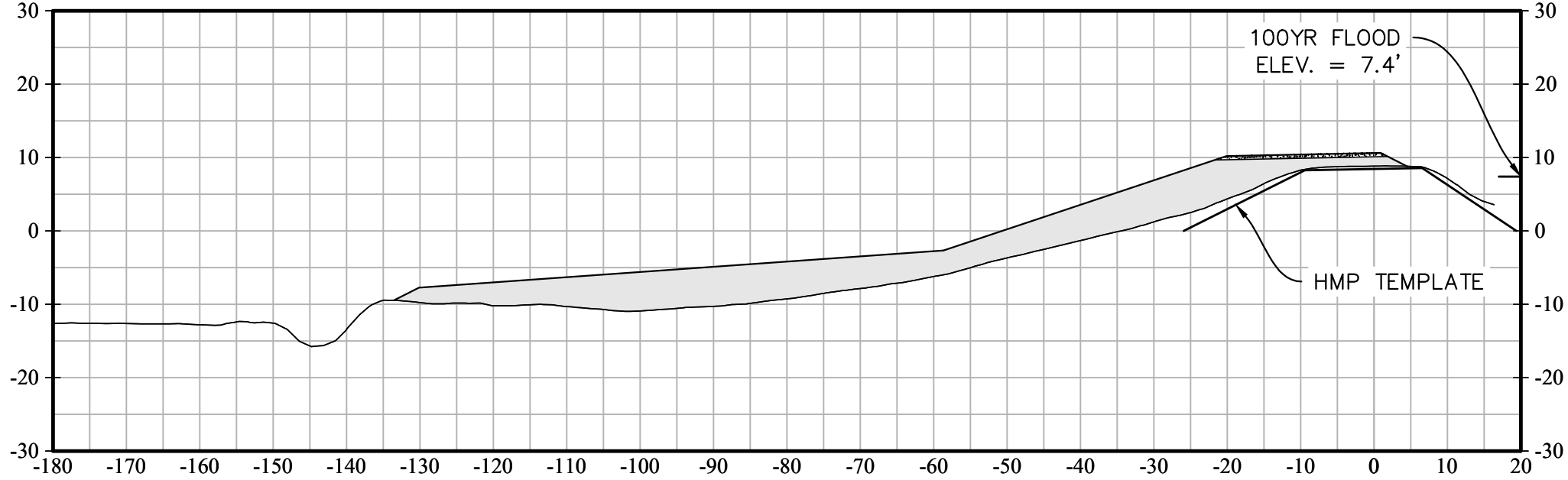
650+00



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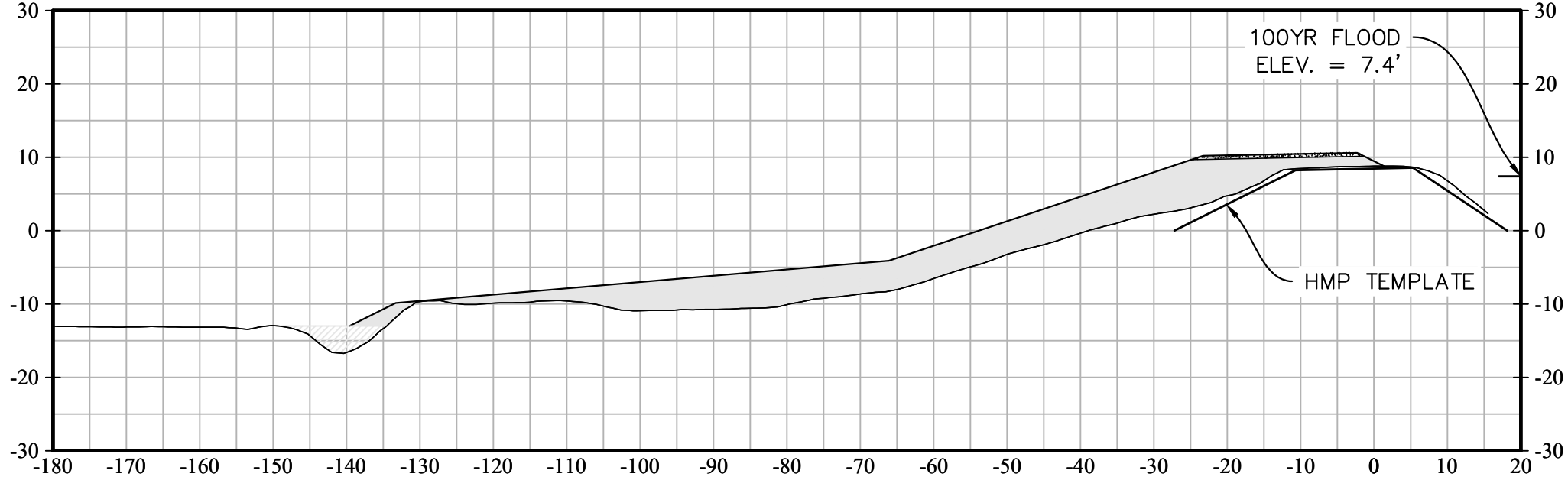

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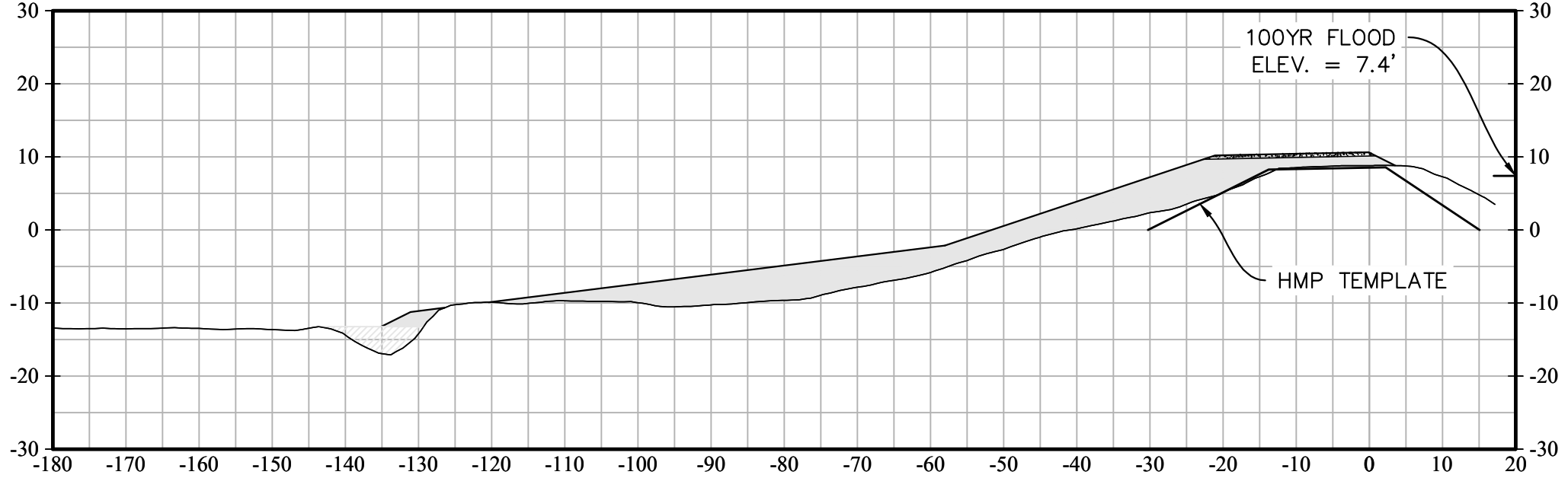
660+00



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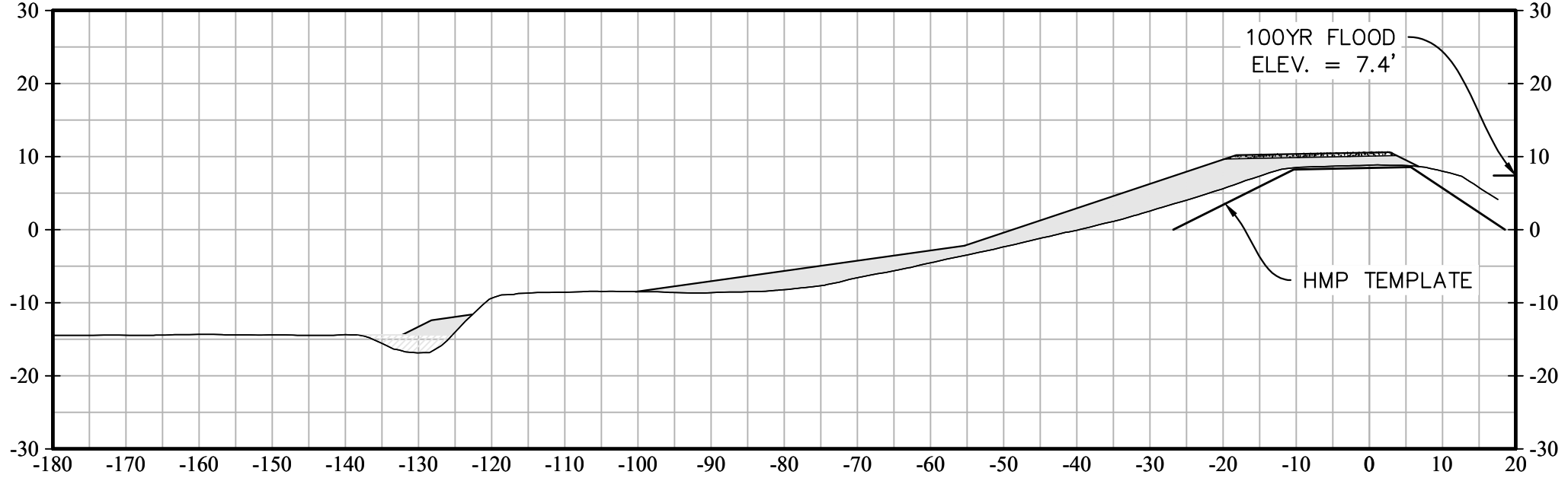

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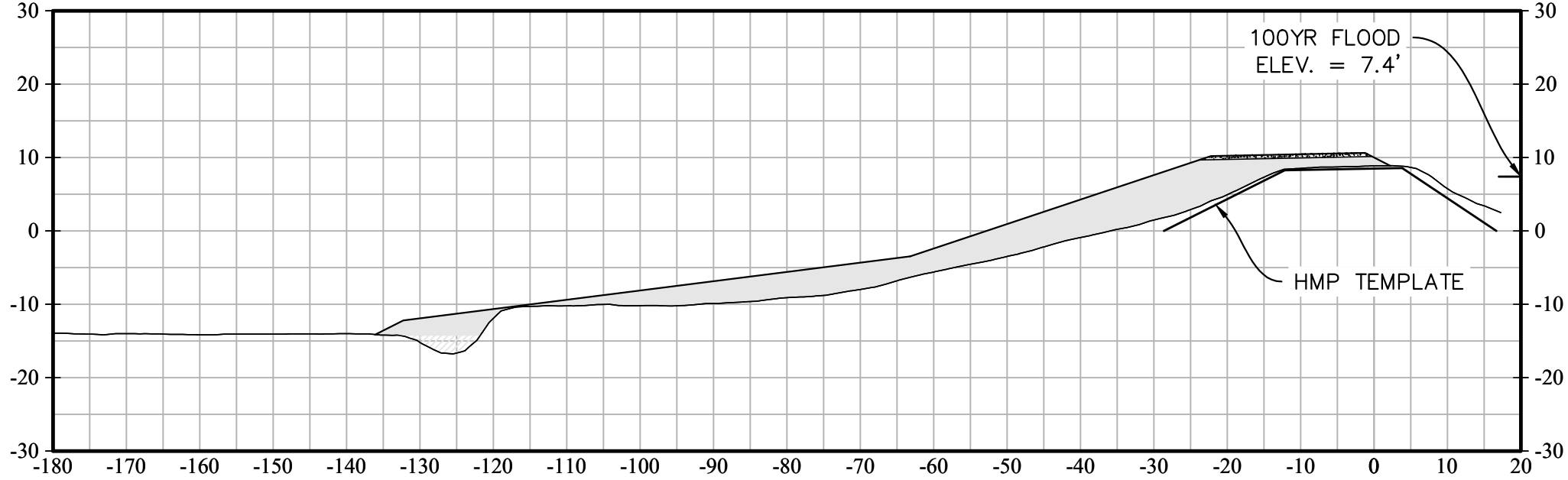
670+00



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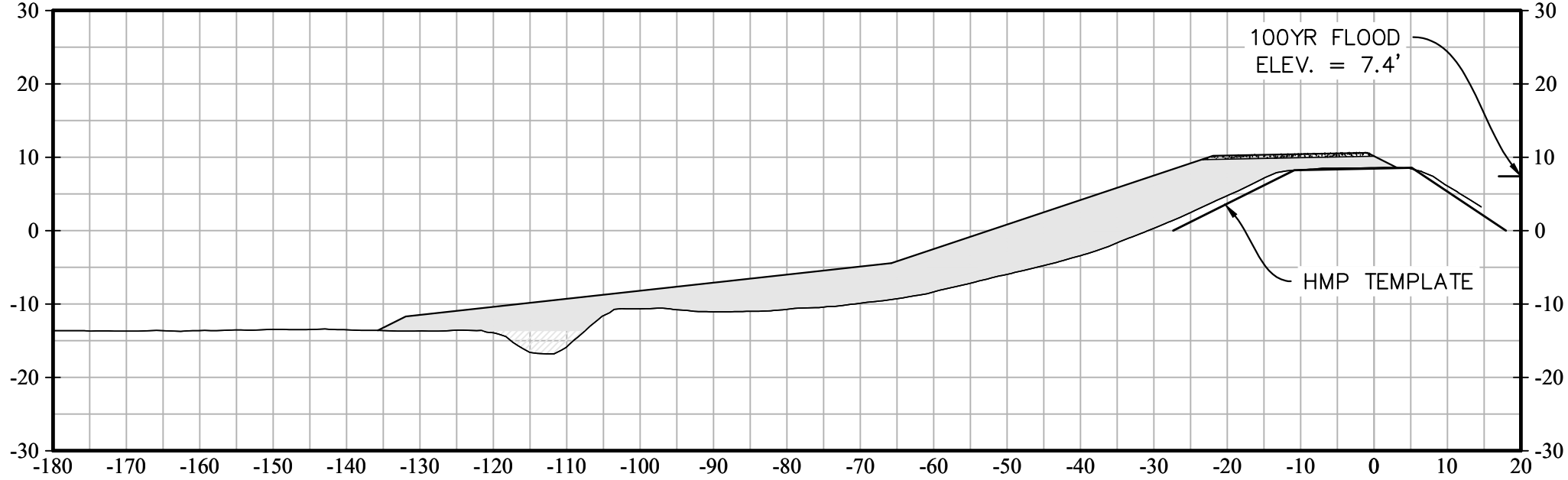

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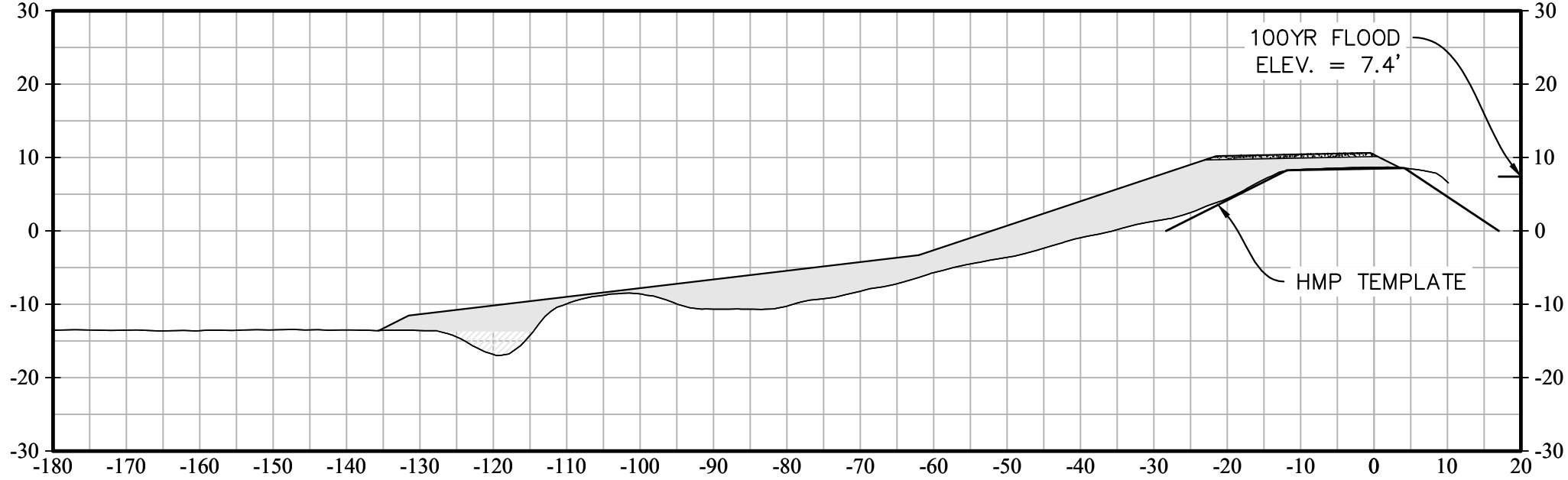
680+00



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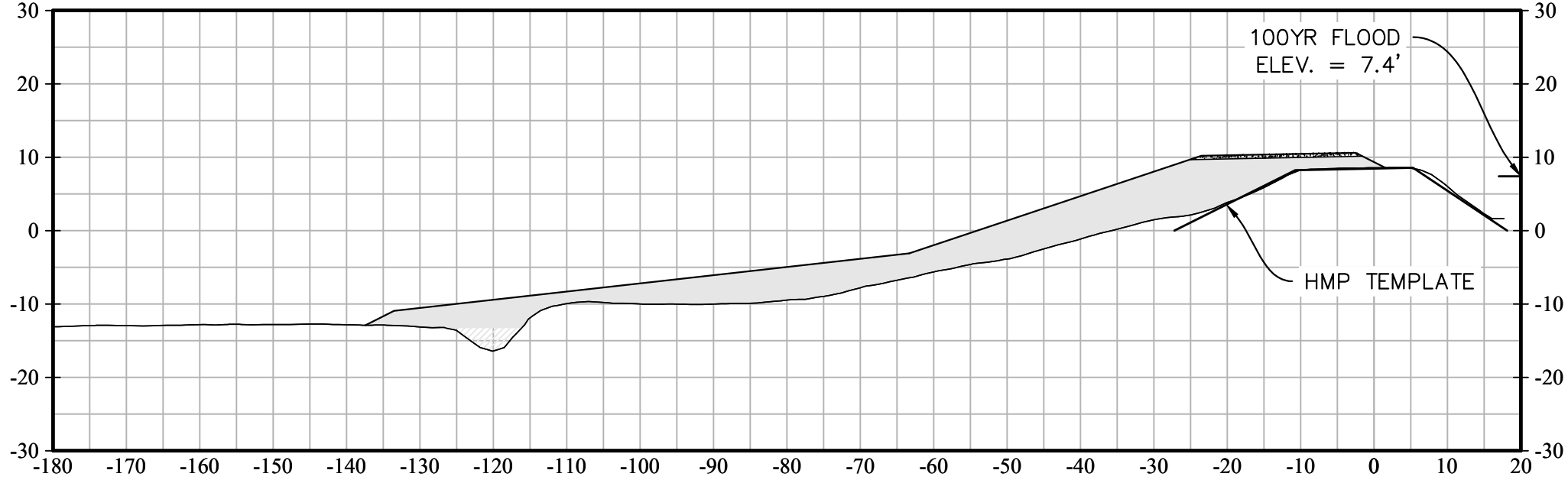

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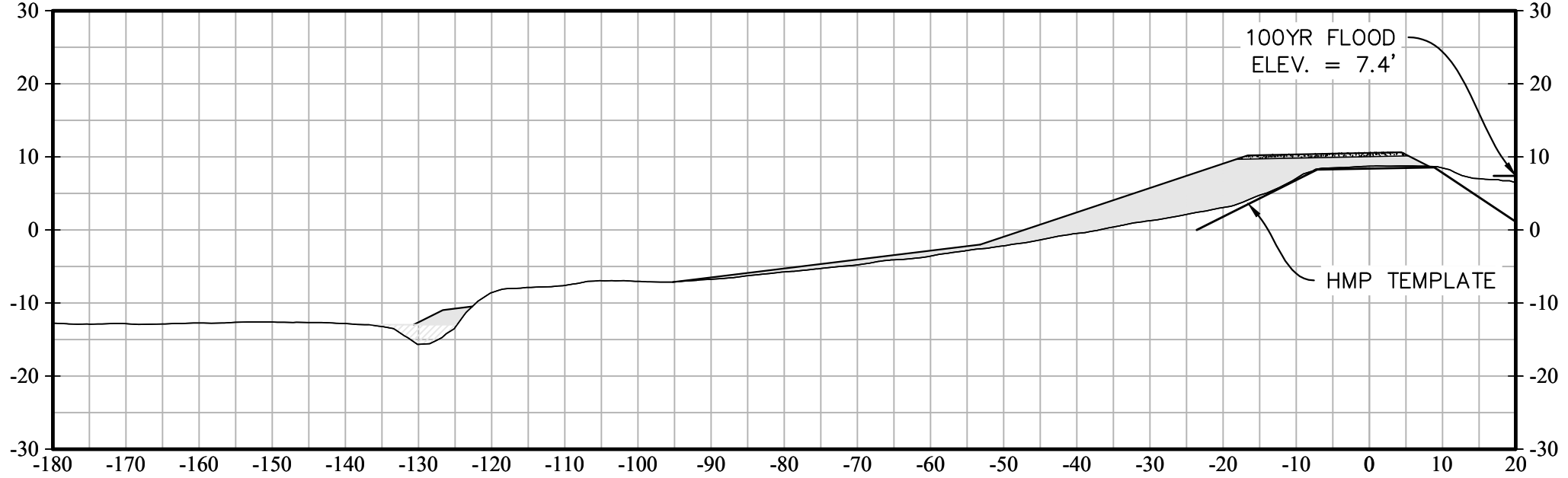
690+00



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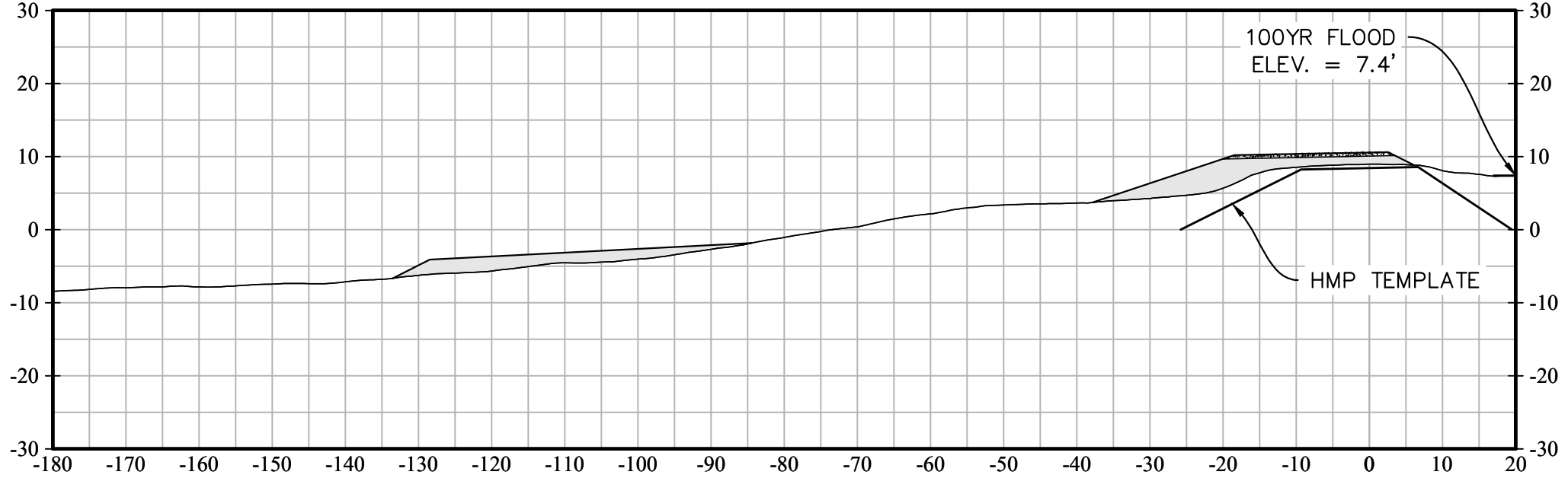

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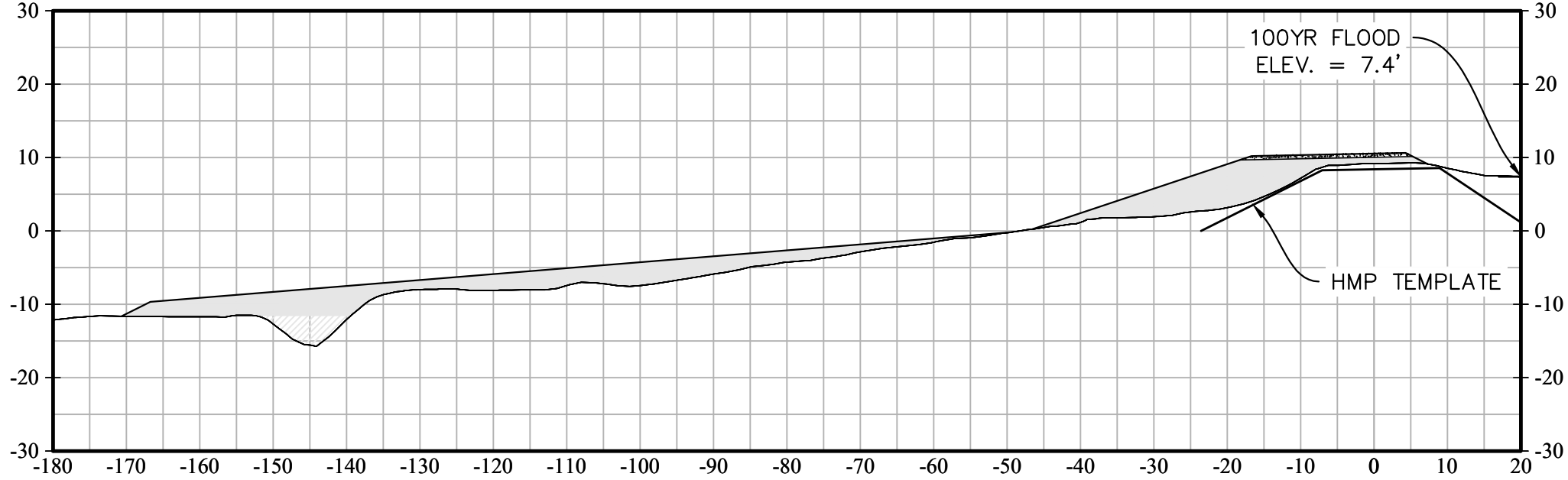
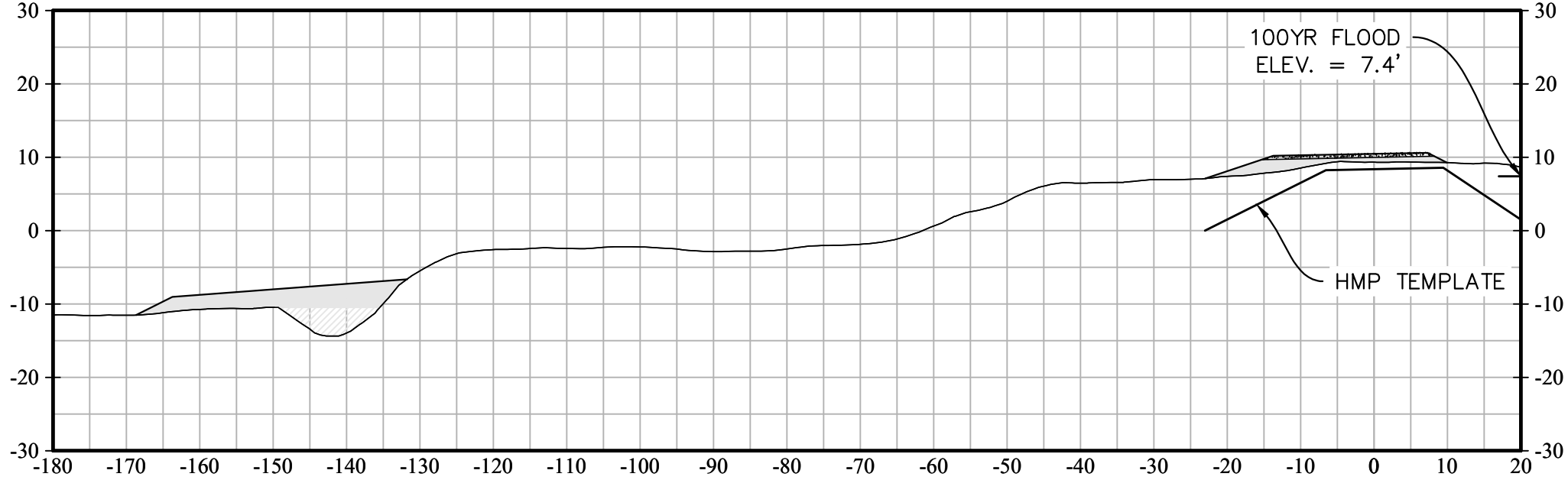
700+00



705+00



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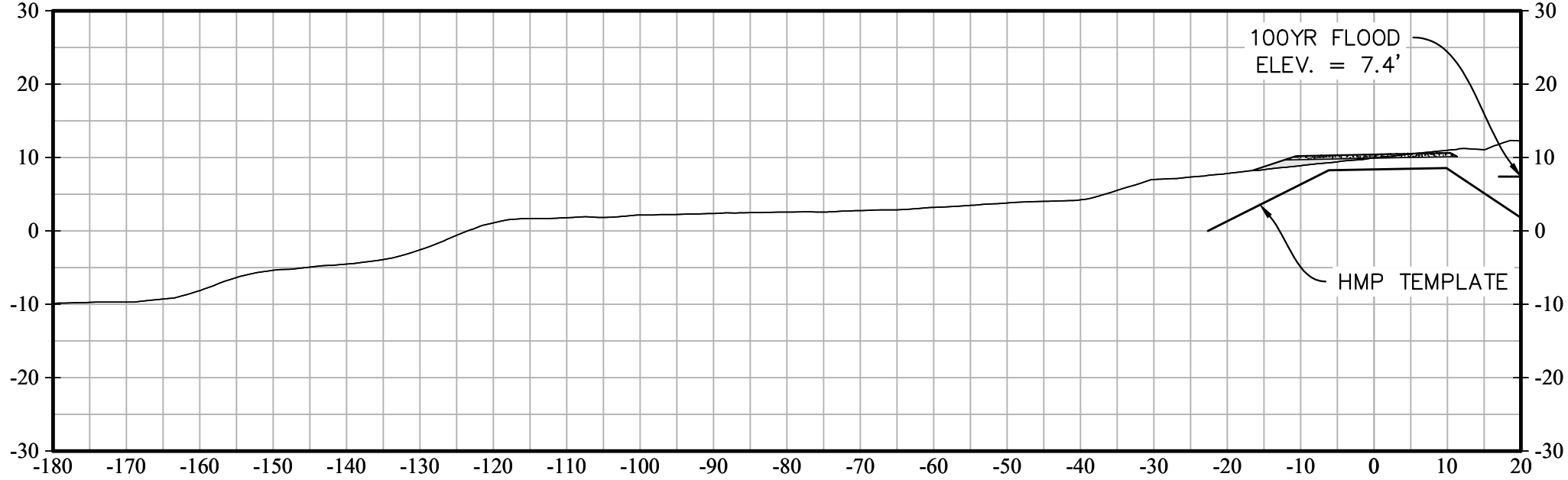
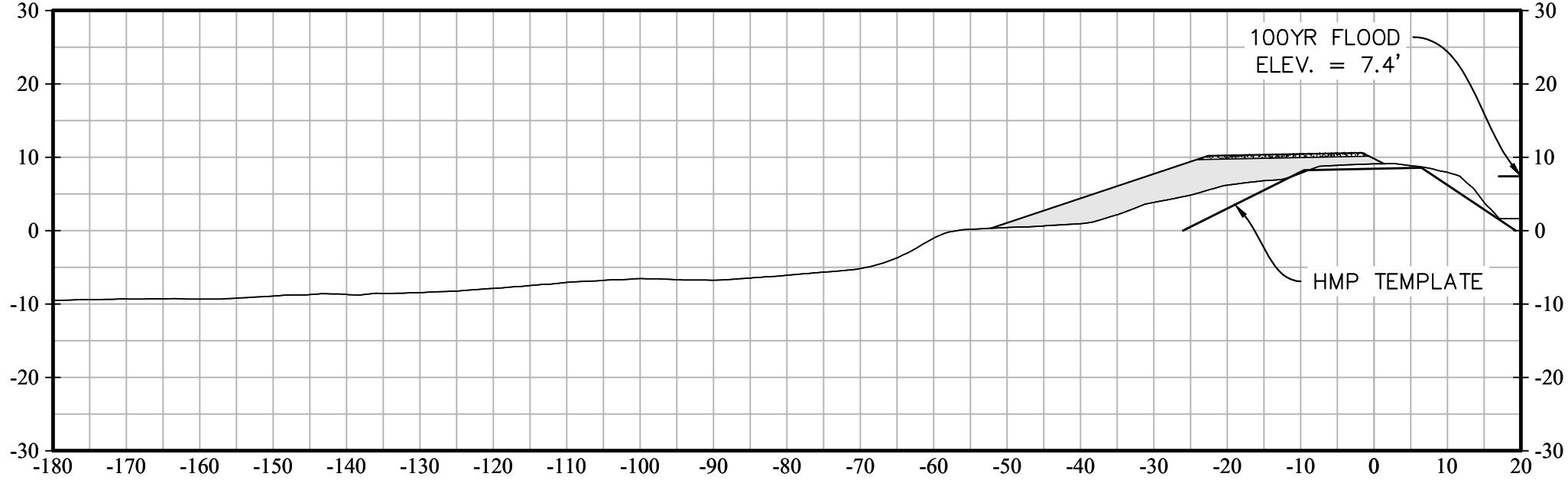
710+00



715+00



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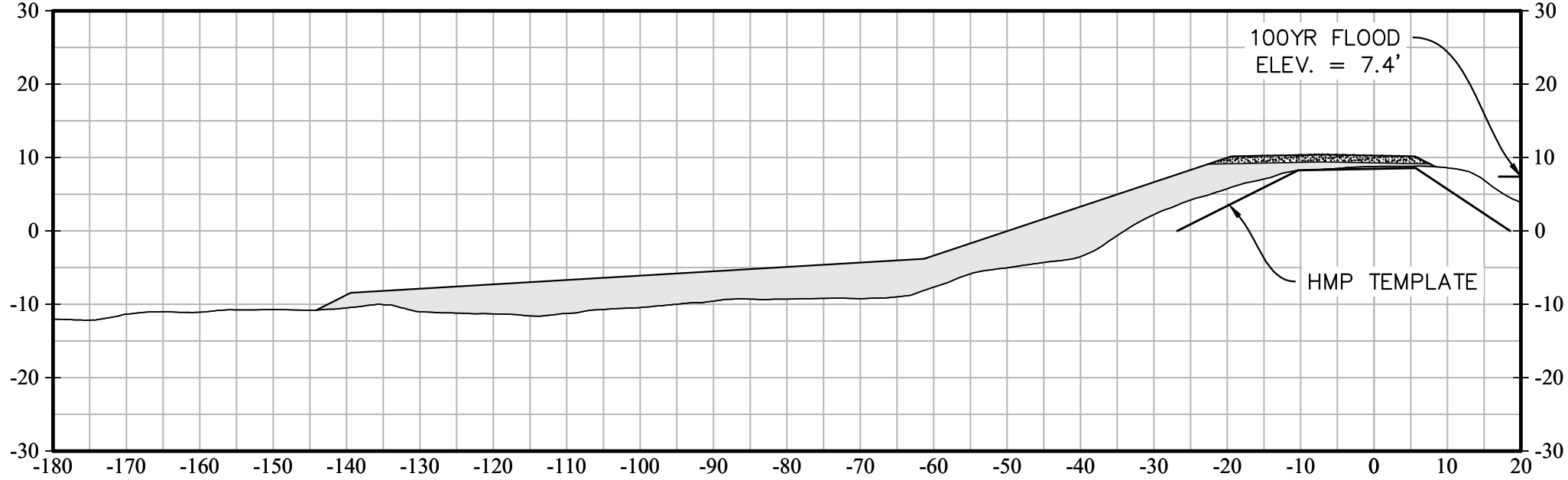
720+00



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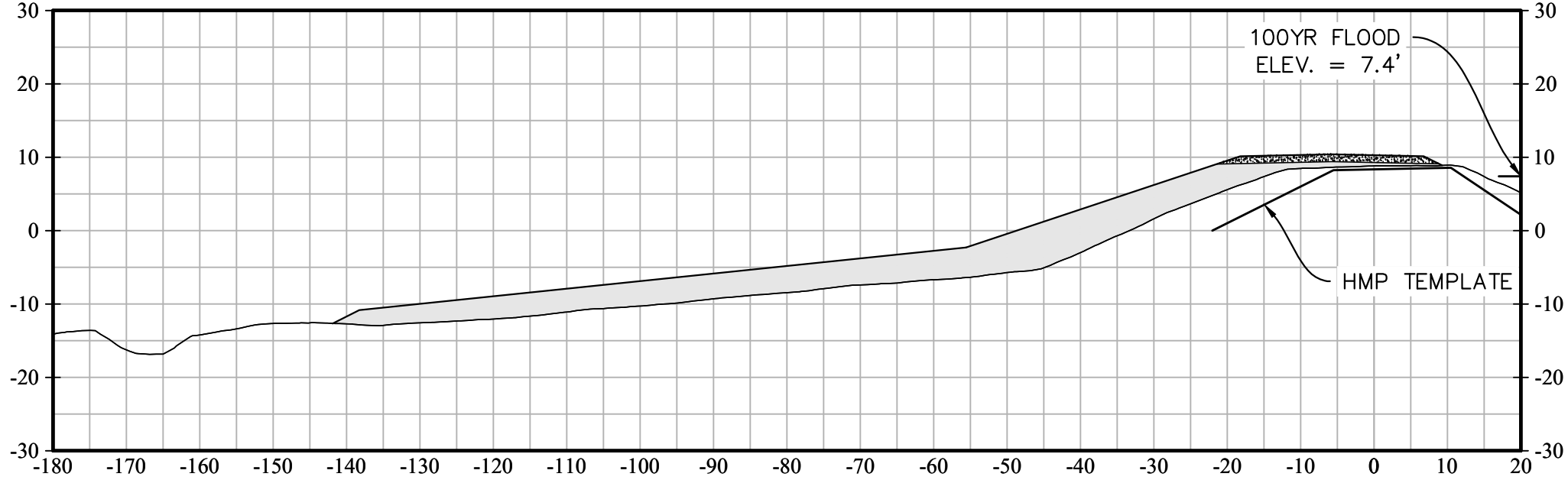

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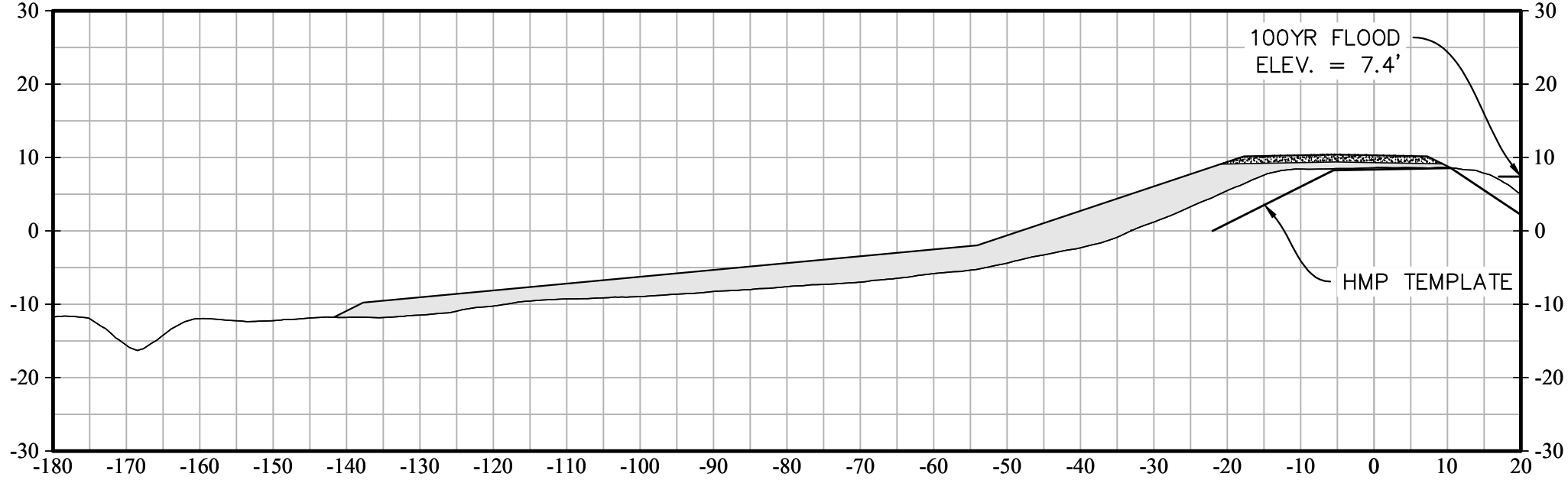
730+00



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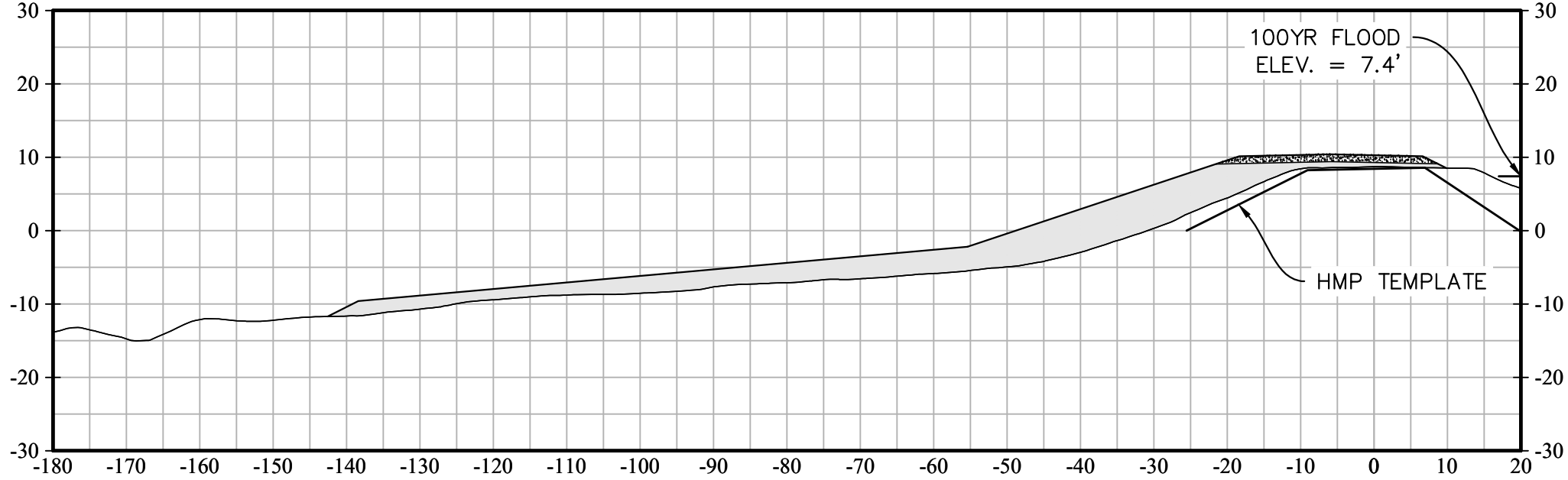

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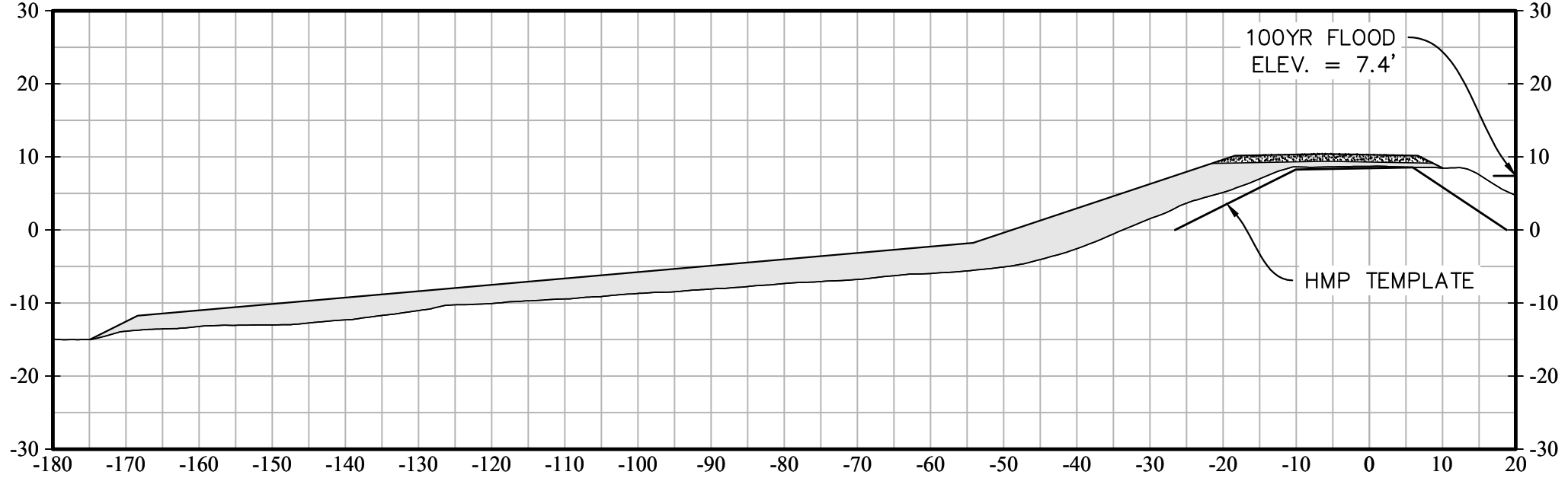
740+00



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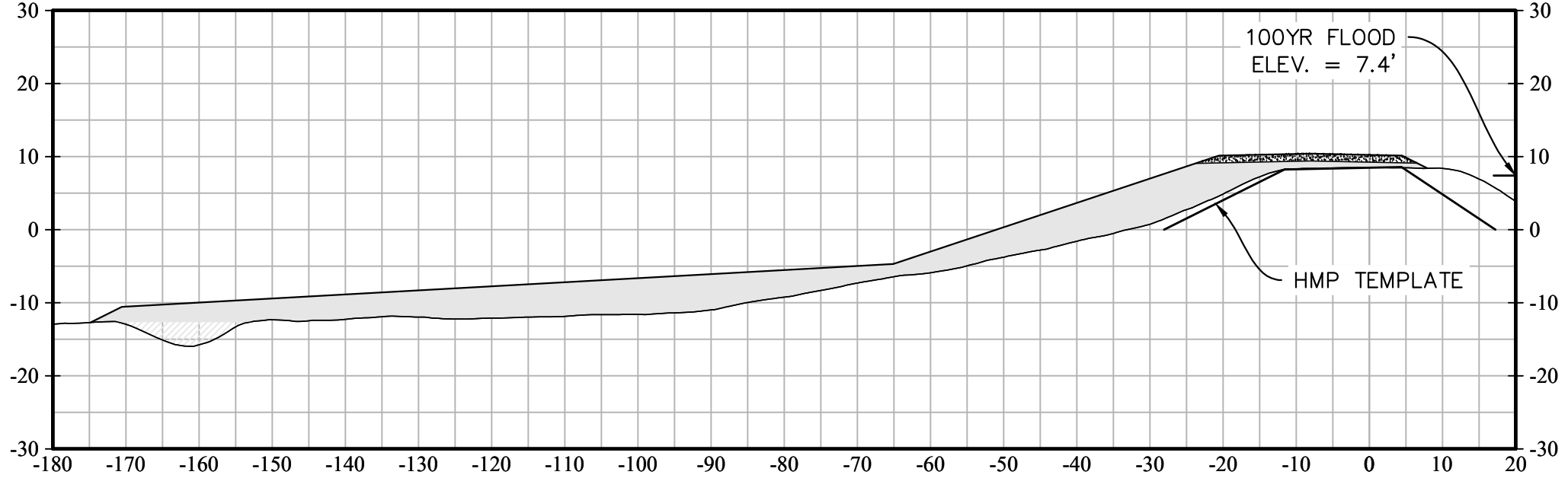

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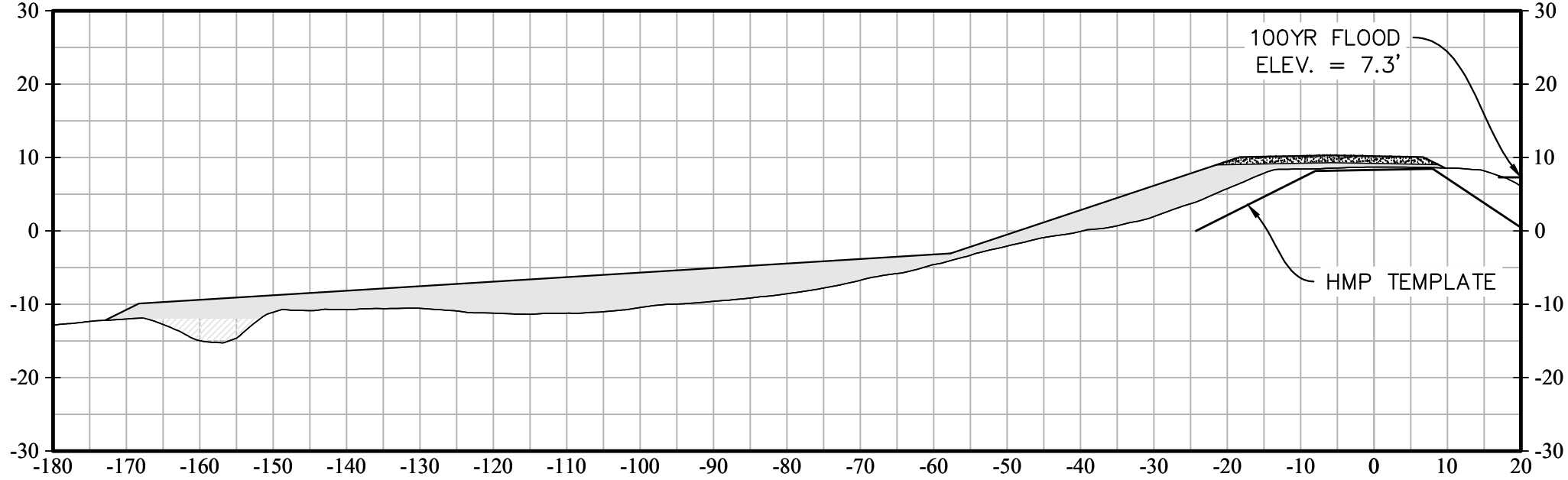
750+00



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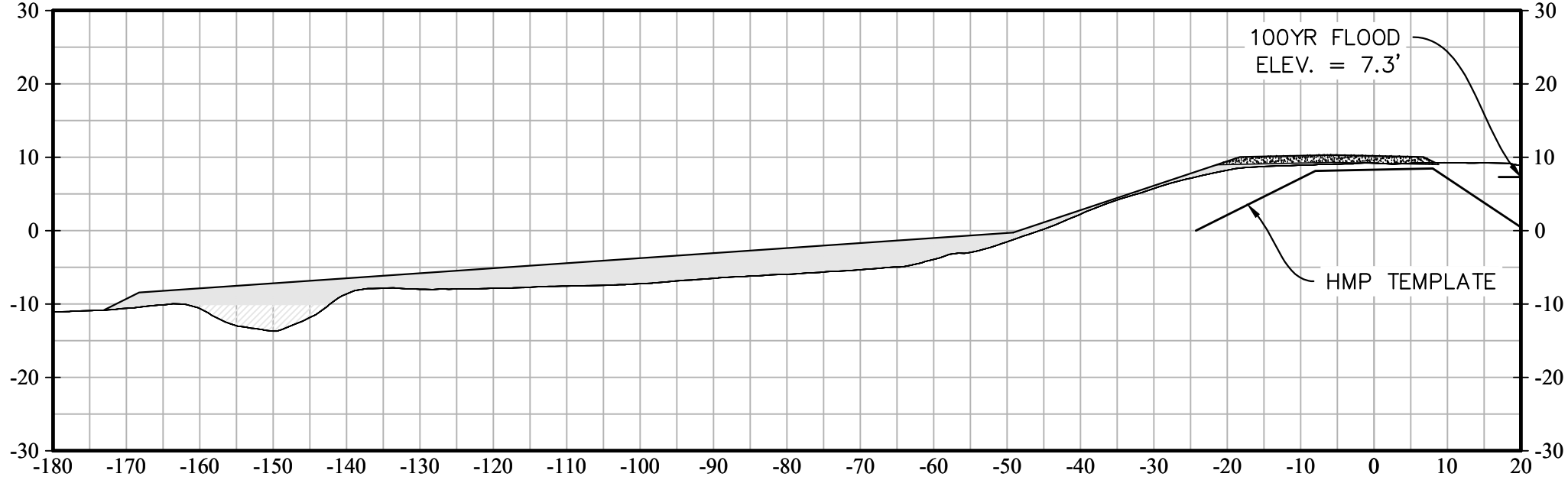

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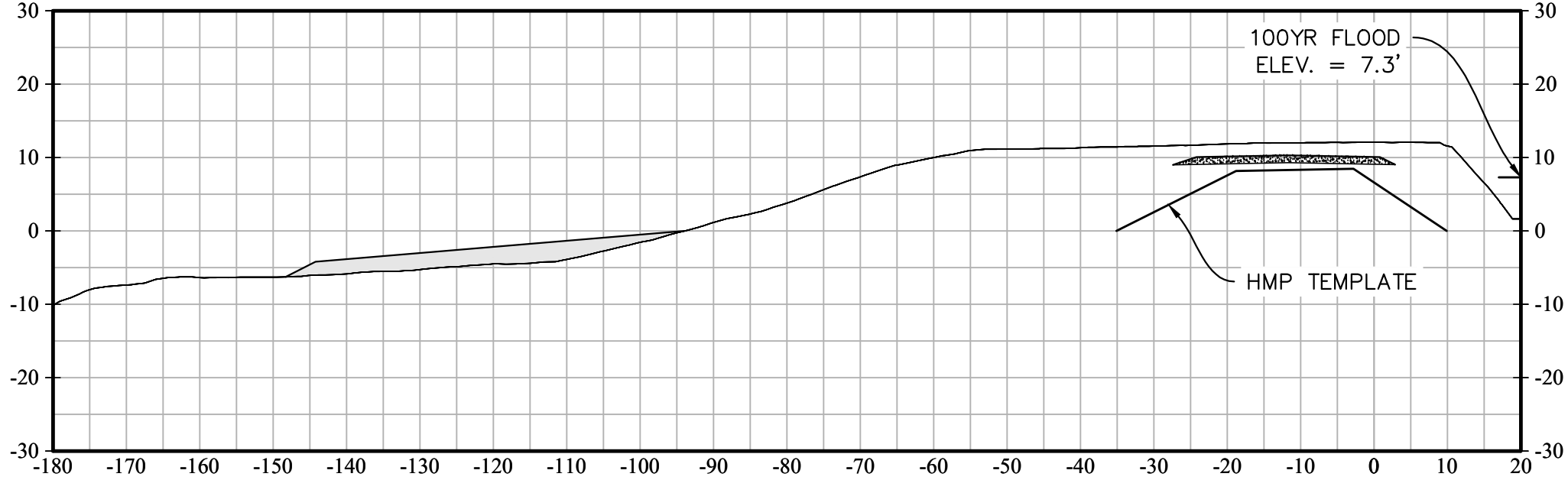
756+92



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Quantity Estimate

Reclamation District No. 2028 - Bacon Island

Stations from 0+00 to End

Five Year Plan Design Cross Sections

Quantity Summary

Phase	*Volumes (CY)*		*Design Critera*
	Raw Fill	*AB*	
1	*113,188*	*3,301*	*21' Crown @ 192-82 +1', 110'-150' Toeberm or no Toeberm*
2	*189,775*	*5,448*	*21'-25' Crown @ 192-82 +1', 140' Toeberm*
3	*90,936*	*8,191*	*25' Crown @ 192-82 +1', 120'-140' Toeberm*
4	*100,126*	*8,191*	*25' Crown @ 192-82 +1', 120' Toeberm*
5	*129,572*	*8,494*	*21'-25' Crown @ 192-82 +1', 120'-150' Toeberm or no Toeberm*
6	*0*	*10,561*	*16' Crown @ 192-82, No Toeberm*
Totals (CY)	***623,597***	***44,187***	

Phase	Station	Length (FT)	Area (FT^2)	Raw Volume (CY)
Phase 5	+	250	144.31	1336.16
	5+00	500	429.54	7954.44
	10+00	500	346.28	6412.64
	15+00	500	417.54	7732.28
	20+00	500	244.14	4521.11
	25+00	500	472.64	8752.62
	30+00	500	451.84	8367.49
	35+00	500	320.34	5932.18
	40+00	500	221.05	4093.43
Phase 4	45+00	500	344.97	6388.39
	50+00	500	173.20	3207.33
	55+00	500	350.46	6490.06
	60+00	500	417.02	7722.50
	65+00	500	422.25	7819.42
	70+00	500	287.17	5317.96
	75+00	500	402.67	7456.84
	80+00	500	356.94	6610.00
	85+00	500	354.18	6558.81
	90+00	500	172.80	3200.00
	95+00	500	381.56	7065.99
	100+00	500	542.88	10053.32
	105+00	500	348.85	6460.21
	110+00	500	258.33	4783.84
	115+00	500	234.47	4342.01
	120+00	500	359.08	6649.70
Phase 3	125+00	500	408.09	7557.24
	130+00	500	459.95	8517.67
	135+00	500	365.55	6769.46
	140+00	500	499.32	9246.63
	145+00	500	174.32	3228.22
	150+00	500	69.95	1295.31
	155+00	500	107.97	1999.36
	160+00	500	237.81	4403.84
	165+00	500	371.00	6870.36
	170+00	500	297.04	5500.81
	175+00	500	371.79	6884.98
	180+00	500	422.44	7822.97
	185+00	500	391.82	7255.96
	190+00	500	499.42	9248.50

Quantity Estimate

Reclamation District No. 2028 - Bacon Island

Stations from 0+00 to End

Five Year Plan Design Cross Sections

Quantity Summary

Phase	*Volumes (CY)*		*Design Critera*
	Raw Fill	*AB*	
1	*113,188*	*3,301*	*21' Crown @ 192-82 +1', 110'-150' Toeberm or no Toeberm*
2	*189,775*	*5,448*	*21'-25' Crown @ 192-82 +1', 140' Toeberm*
3	*90,936*	*8,191*	*25' Crown @ 192-82 +1', 120'-140' Toeberm*
4	*100,126*	*8,191*	*25' Crown @ 192-82 +1', 120' Toeberm*
5	*129,572*	*8,494*	*21'-25' Crown @ 192-82 +1', 120'-150' Toeberm or no Toeberm*
6	*0*	*10,561*	*16' Crown @ 192-82, No Toeberm*
Totals (CY)	***623,597***	***44,187***	

Phase	Station	Length (FT)	Area (FT^2)	Raw Volume (CY)
	+	250	144.31	1336.16
	195+00	500	145.59	2696.04
	200+00	500	88.48	1638.52
	205+00	500	675.62	12511.41
	210+00	500	643.12	11909.56
	215+00	500	511.38	9470.07
	220+00	500	458.87	8497.52
	225+00	500	482.00	8926.00
	230+00	500	555.47	10286.42
	235+00	500	526.66	9752.87
	240+00	500	583.09	10798.00
	245+00	500	640.84	11867.34
Phase 2	250+00	500	658.41	12192.74
	255+00	500	504.17	9336.54
	260+00	500	577.73	10698.66
	265+00	500	519.83	9626.41
	270+00	500	406.55	7528.66
	275+00	500	359.65	6660.16
	280+00	500	658.21	12188.99
	285+00	500	525.23	9726.48
	290+00	500	440.72	8161.52
	295+00	500	520.32	9635.59
	300+00	500	0.00	0.00
	305+00	500	0.00	0.00
	310+00	500	0.00	0.00
	315+00	500	0.00	0.00
	320+00	500	0.00	0.00
	325+00	500	0.00	0.00
	330+00	500	0.00	0.00
	335+00	500	0.00	0.00
	340+00	500	0.00	0.00
	345+00	500	0.00	0.00
	350+00	500	0.00	0.00
	355+00	500	0.00	0.00
	360+00	500	0.00	0.00
	365+00	500	0.00	0.00
	370+00	500	0.00	0.00
	375+00	500	0.00	0.00
	380+00	500	0.00	0.00

Quantity Estimate

Reclamation District No. 2028 - Bacon Island

Stations from 0+00 to End

Five Year Plan Design Cross Sections

Quantity Summary

Phase	*Volumes (CY)*		*Design Critera*
	Raw Fill	*AB*	
1	*113,188*	*3,301*	*21' Crown @ 192-82 +1', 110'-150' Toeberm or no Toeberm*
2	*189,775*	*5,448*	*21'-25' Crown @ 192-82 +1', 140' Toeberm*
3	*90,936*	*8,191*	*25' Crown @ 192-82 +1', 120'-140' Toeberm*
4	*100,126*	*8,191*	*25' Crown @ 192-82 +1', 120' Toeberm*
5	*129,572*	*8,494*	*21'-25' Crown @ 192-82 +1', 120'-150' Toeberm or no Toeberm*
6	*0*	*10,561*	*16' Crown @ 192-82, No Toeberm*
Totals (CY)	***623,597***	***44,187***	

Phase	Station	Length (FT)	Area (FT^2)	Raw Volume (CY)
	+	250	144.31	1336.16
Phase 6	385+00	500	0.00	0.00
	390+00	500	0.00	0.00
	395+00	500	0.00	0.00
	400+00	500	0.00	0.00
	405+00	500	0.00	0.00
	410+00	500	0.00	0.00
	415+00	500	0.00	0.00
	420+00	500	0.00	0.00
	425+00	500	0.00	0.00
	430+00	500	0.00	0.00
	435+00	500	0.00	0.00
	440+00	500	0.00	0.00
	445+00	500	0.00	0.00
	450+00	500	0.00	0.00
	455+00	500	0.00	0.00
	460+00	500	0.00	0.00
	465+00	500	0.00	0.00
	470+00	500	0.00	0.00
	475+00	500	0.00	0.00
	480+00	500	0.00	0.00
	485+00	500	0.00	0.00
	490+00	500	0.00	0.00
	495+00	500	0.00	0.00
	500+00	500	0.00	0.00
	505+00	500	9.07	167.99
	510+00	500	0.00	0.00
	515+00	500	0.00	0.00
	520+00	500	0.00	0.00
	525+00	500	0.00	0.00
	530+00	500	0.00	0.00
	535+00	500	0.00	0.00
	540+00	500	0.00	0.00
	545+00	500	0.00	0.00
	550+00	500	0.00	0.00
	555+00	500	0.00	0.00
	560+00	500	0.00	0.00
	565+00	500	0.06	1.16
	570+00	500	0.00	0.00

Quantity Estimate

Reclamation District No. 2028 - Bacon Island

Stations from 0+00 to End

Five Year Plan Design Cross Sections

Quantity Summary

Phase	*Volumes (CY)*		*Design Critera*
	Raw Fill	*AB*	
1	*113,188*	*3,301*	*21' Crown @ 192-82 +1', 110'-150' Toeberm or no Toeberm*
2	*189,775*	*5,448*	*21'-25' Crown @ 192-82 +1', 140' Toeberm*
3	*90,936*	*8,191*	*25' Crown @ 192-82 +1', 120'-140' Toeberm*
4	*100,126*	*8,191*	*25' Crown @ 192-82 +1', 120' Toeberm*
5	*129,572*	*8,494*	*21'-25' Crown @ 192-82 +1', 120'-150' Toeberm or no Toeberm*
6	*0*	*10,561*	*16' Crown @ 192-82, No Toeberm*
Totals (CY)	***623,597***	***44,187***	

Phase	Station	Length (FT)	Area (FT^2)	Raw Volume (CY)
	+	250	144.31	1336.16
	575+00	500	0.00	0.00
	580+00	500	0.00	0.00
	585+00	500	0.00	0.00
	590+00	500	0.00	0.00
	595+00	500	0.00	0.00
	600+00	500	0.00	0.00
	605+00	500	0.00	0.00
	610+00	500	0.00	0.00
	615+00	500	0.00	0.00
	620+00	500	0.00	0.00
	625+00	500	0.00	0.00
Phase 1	630+00	500	448.17	8299.44
	635+00	500	277.16	5132.56
	640+00	500	295.49	5472.01
	645+00	500	494.02	9148.43
	650+00	500	547.59	10140.64
	655+00	500	490.10	9075.88
	660+00	500	403.81	7477.97
	665+00	500	247.14	4576.68
	670+00	500	429.44	7952.65
	675+00	500	603.85	11182.46
	680+00	500	468.94	8684.09
	685+00	500	537.96	9962.23
	690+00	500	220.05	4074.95
	695+00	500	145.11	2687.17
	700+00	500	389.67	7216.18
	705+00	500	113.66	2104.88
Phase 5	710+00	500	8.23	152.49
	715+00	500	143.99	2666.40
	720+00	500	560.39	10377.50
	725+00	500	487.63	9030.23
	730+00	500	422.41	7822.39
	735+00	500	424.31	7857.59
	740+00	500	544.40	10081.43
	745+00	500	635.79	11773.84
	750+00	500	518.44	9600.82
	755+00	346	369.96	4740.90
	756+92	96	102.82	365.57

Quantity Estimate

Reclamation District No. 2028 - Bacon Island

Stations from 0+00 to End

Five Year Plan Design Cross Sections

Quantity Summary

Phase	*Volumes (CY)*		*Design Critera*
	Raw Fill	*AB*	
1	*113,188*	*3,301*	*21' Crown @ 192-82 +1', 110'-150' Toeberm or no Toeberm*
2	*189,775*	*5,448*	*21'-25' Crown @ 192-82 +1', 140' Toeberm*
3	*90,936*	*8,191*	*25' Crown @ 192-82 +1', 120'-140' Toeberm*
4	*100,126*	*8,191*	*25' Crown @ 192-82 +1', 120' Toeberm*
5	*129,572*	*8,494*	*21'-25' Crown @ 192-82 +1', 120'-150' Toeberm or no Toeberm*
6	*0*	*10,561*	*16' Crown @ 192-82, No Toeberm*
Totals (CY)	***623,597***	***44,187***	

Phase	Station	Length (FT)	Area (FT^2)	Raw Volume (CY)
	+	250	144.31	1336.16
TOTALS		**75,692**	**33,953**	**623,766**

Appendix C – Cost Estimates

Reclamation District No. 2028 - Bacon Island

Five Year Plan Cost Estimate Summary

Phase	Standard	Stationing (*feet*)	Project Length (*feet*)	Estimate[1] *Import Fill (tn)*	Estimate[1] *AB (tons)*	Construction Cost Estimate[2] *($)*	Engineering & Environmental[3] *($)*	Total *($)*
1	Bulletin 192-82	625+00 - 707+00	8,200	280,400	7,000	$8,084,000	$1,616,800	$9,700,800
2	Bulletin 192-82	200+00 - 300+00	10,000	456,500	11,500	$2,235,122	$447,024	$2,682,146
3	Bulletin 192-82	120+00 - 200+00	8,000	229,200	17,300	$8,485,943	$1,697,189	$10,183,131
4	Bulletin 192-82	40+00 - 120+00	8,000	250,300	17,300	$9,566,613	$1,913,323	$11,479,936
5	Bulletin 192-82	707+00 - 756+92 0+00 - 40+00	8,992	318,100	17,900	$12,107,658	$2,421,532	$14,529,189
6	Bulletin 192-82	300+00 - 625+00	32,500	0	22,200	$1,307,885	$261,577	$1,569,462
						Grand Total (rounded):		**$50,144,700**

[1]Quantities are subject to final plans and specifications.

[2]Construction costs include any mitigation and enhancement proposed, and 5% annual inflation included.

[3]Allocation for engineering and environmental is 20% of construction cost.

Reclamation District No. 2028 - Bacon Island

Five Year Plan Cost Estimate Summary

Phase	Standard	Stationing (*feet*)	Project Length (*feet*)	Estimate[1] *Onsite Fill (cy)*	Estimate[1] *AB (tons)*	Construction Cost Estimate[2] *($)*	Engineering & Environmental[3] *($)*	Total *($)*
1	Bulletin 192-82	625+00 - 707+00	8,200	174,200	7,000	$3,863,000	$772,600	$4,635,600
2	Bulletin 192-82	200+00 - 300+00	10,000	285,200	11,500	$6,219,150	$1,243,830	$7,462,980
3	Bulletin 192-82	120+00 - 200+00	8,000	141,900	17,300	$4,674,600	$934,920	$5,609,520
4	Bulletin 192-82	40+00 - 120+00	8,000	155,200	17,300	$5,198,894	$1,039,779	$6,238,673
5	Bulletin 192-82	707+00 - 756+92 0+00 - 40+00	8,992	197,900	17,900	$6,291,460	$1,258,292	$7,549,752
6	Bulletin 192-82	300+00 - 625+00	32,500	0	22,200	$1,307,885	$261,577	$1,569,462
							Grand Total (rounded):	**$33,066,000**

[1]Quantities are subject to final plans and specifications.

[2]Construction costs include any mitigation and enhancement proposed, and 5% annual inflation included.

[3]Allocation for engineering and environmental is 20% of construction cost.

Appendix D – Habitat Assessment

Reclamation District No. 2028
Bacon Island
Habitat Assessment

Prepared
By

Chris K. Kjeldsen Ph.D., Botany
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At the Request
of
Gilbert Cosio
MBK Engineers

February 2000

Reclamation District No. 2028
Bacon Island
Habitat Assessment

CONTENTS

Reclamation District No. 2028
Bacon Island
Habitat Assessment

EXECUTIVE SUMMARY

This Habitat Assessment describes the wildlife habitat and vegetation resources observed along the levee of Bacon Island that may be impacted by the District's levee maintenance work program and future regularly scheduled maintenance programs. The report is required as part of the AB 360 legislation. The field studies for this report were conducted August 10, 1999.

The findings are the following:

1) no special status animals were observed during our field work;

2) one special-status plant the California Hibiscus was found along the levee during our field survey. The location of California Hibiscus levee Station 14+30, 14+89, 739+37, and 730+73 is shown in the levee log and on the Habitat Map (1"=1000');

3) no Shaded Riverine Aquatic habitat (SRA) was recorded;

4) the Riparian Forest (RF) habitat on the waterside of the levee consisted of individual trees or extensive reaches of continuous canopy with either open understory or with extensive Shrub/Scrub understory. The Riparian Forest was found to total 884 lineal feet;

5) the Shrub/Scrub (SS) habitat consists of Blackberries, Rose and Willow on the waterside of the levee. The Shrub/Scrub, independent of that found as an understory of the riparian forest, was found to total 2,705 lineal feet;

6) the Freshwater Marsh (FM) habitat of tules along the levee waterside toe was found to total 38,552 lineal feet;

7) the landside levee slopes consisted of bare ground, ruderal vegetation, urbanized environment

with cultivated plants, Shrub/Scrub habitat, and Riparian Forest of individual trees or continuous canopy with varying amounts of Shrub/Scrub understory;

8) the landside Riparian Forest along the levee was recorded at 1,298 lineal feet;

9) the landside Shrub/Scrub habitat along the levee was recorded at 1,934 lineal feet;

10) the landside urbanized or developed area along the levee totaled 3,457 lineal feet;

11) normal annual maintenance repairs and rehabilitation of the levee;

a) will include vegetation control which is a part of routine levee maintenance;

b) will include rodent control as an ongoing program;

12) there are Shaded Riverine Aquatic (SRA) Riparian Forest (RF) and Shrub/Scrub (SS) resources on the waterside and landside toe of the levee as shown in the levee log and on the Habitat Map, which, if removed, may necessitate mitigation or habitat enhancement;

13) SB 34 mandated that there shall be no net long-term loss of habitat, AB 360 (1996) mandates that there shall be an "enhancement of habitat;" and

14) The *Arundo donax* on the land and waterside of the levee should be removed.

Summary of Habitat Types and Area of Each Habitat Type Found Along The Levee. Reclamation District No. 2028 Bacon Island

HABITAT TYPES	RF Lineal Ft. Riparian Forest	SRA Lineal Ft. Shaded Riverine Aquatic	SS Lineal Ft. Palustrine Shrub/Scrub	FM Lineal Ft. Freshwater Marsh	U Lineal Ft. Urban
Total Lineal Ft. Waterside	884	0	234	38,552	0
Total Lineal Ft. Landside	1,298	--	1,934	-	4,907
Total Lineal Ft.	2,182		2,168	38,552	4,907

Reclamation District No. 2028
Bacon Island
Habitat Assessment

INTRODUCTION

A field survey, conducted on August 10, 1999, of the levee along Bacon Island, Reclamation District No. 2028, was conducted at the request of Gilbert Cosio, of MBK Engineers. The purpose of the survey was to identify the habitat types found along the levee of Bacon Island to determine if any habitat will be impacted by the levee maintenance program, and to locate any organisms that are identified as special-status that may occur or be impacted by levee maintenance. The report is required as part of the SB 34 (1988), AB 360 (1996), and related legislation.

Bacon Island, Reclamation District No. 2028, is located in San Joaquin County just north of Highway 4. It is bordered by Mandeville Island on the north, Lower Jones Tract the east, Woodward Island on the south, and Holland and Palm Tract on the on the west. The waterways surrounding Bacon Island are Connection Slough on the north and northwest side. Middle River on the east, and Old River on the west side. There are 14.3miles of non-project levee. There is a paved road running along the east side of the levee.

A Delta levee, by definition, is "the area required for purposes of maintenance and, therefore, includes the toe at the channel side and extends to space landward from the seep ditch necessary for maintenance of the ditch," (reference - Letter from John L. Winther to Colonel Jack A. LeCuyer, U. S. Army, Corps of Engineers, February 23, 1990). This definition or footprint was the basis for the area of our survey and analysis of habitat.

It is the intent of Reclamation District No. 2028 to maintain the non-project levee in compliance with the Corps of Engineers standards. The District's subventions application addresses maintenance of HMP requirements and annual routine maintenance activities such as; routine inspections, extermination of burrowing rodents along the levee, the repair of slipouts, repair of site-specific conditions that threaten levee stability, and annual weed/vegetation control of the levee slopes (mowing or disking of ruderal vegetation on the landside slopes, herbicide application and burning with permitted methods, all trees on the levee which are not detrimental to levee safety and stability will be pruned and left standing).

FIELD TECHNIQUES

The field survey by Daniel Kjeldsen, was conducted on August 10, 1999, from the levee crown access road. The habitat types and vegetation were recorded using the base map of the Reclamation District provided by Mr. Gilbert Cosio. Photographs, using print film were taken along the levee at points that provide a view of the waterside of the levee.

Habitat types were mapped and recorded in the levee log using the five habitat types defined below. A habitat map (1"=1000') depicting lineal distances is included at the back of this report.

Shaded Riverine Aquatic - Stretches of vegetation that overhangs the water, regardless of tidal stage.

Riparian Forest - Trees greater than twenty feet in height with a shrub understory layer (in some areas of the levee single trees are found without a Shrub/Scrub understory). This hatitat type is referenced in other reports as Palustrine Forest Habitat.

Scrub-Shrub - Trees and woody shrubs and vines less than twenty feet in height. In many references this is referenced as Palustrine Shrub/Scrub Habitat.

Freshwater Marsh - Shallow water with palustrine emergent vegetation along the toe of the levee, or growing along drainage ditches or other areas on the interior of the levee. In other reports this is referred to as Palustrine Emergent Habitat.

Riverine - In-water vegetation, such as tules, and floating vegetation such as pondweed. In other reports this is referenced as either Riverine Aquatic Bed- aquatic plants that are attached below the tidal influence and Riverine Emergent- plants that are submerged only with flood waters or extreme high tides.

This Habitat Assessment provides:

1) An analysis and map of habitat types found along the levee;

2) Habitat acreage for all areas that support the above vegetation types;

3) Description of habitat quality, composition, size, and relative abundance of trees or other major vegetation types;

4) An inventory of the plants and animals found along the levee; and

5) Photos depicting habitat types mapped for Bacon Island, showing the structure and the typical vegetation associated with the different habitat types.

A levee log was prepared using the base map and the NU-METRICS NS-50 distance measuring instrument. The NU-METRICS NS-50 distance measuring instrument was calibrated at the beginning of each field day using a pre-measured distance. At known levee reference points along the levee the NU-METRICS NS-50 distance measuring records were reconciled. We found that irregularities in the road surface and slight driving deviations produce several feet of error per mile and this necessitated corrections at known reference points. These field measurements are the basis for the levee log and the habitat map. One field day was spent with DFG personnel establishing standards for field work. The length of each habitat type was determined from measurements along the levee road and area calculated by determining average widths of the levee using a hand tape.

The 1:1000 scale habitat map was prepared from field notes and the levee log. The map shows the location of Riparian Forest, Shrub/Scrub, Shaded Riverine Aquatic, and Freshwater Marsh habitat. In areas where there were scattered trees, the beginning and end of these are shown, but for accurate reference one should refer to the levee log. Single trees and urban areas with accompanying vegetation are not plotted on the habitat map, but they are shown in the levee log.

The field survey for special-status species of plants and animals was undertaken as we were recording information for the levee log. Our field work concentrated on the waterside slope. In many areas the toe of the levee could not be seen due to thick vegetation. The landside levee slopes are either routinely maintained and cleared of vegetation or planted with cultivated vegetation and, as such, represent a disturbed habitat.

Field Notes were recorded using the following DFG guidelines:

1) Plant species on and adjacent to levees;

   i) Vegetation which extends 30 ft. from the landside levee toe or to the toe ditch which ever is greater;

2) Woody vegetation which has the potential to;

   i) be affected by levee maintenance activities, and
   ii) provide fish and/or wildlife habitat;

3) Locations of invasive plants such as Giant Reed and Pampas Grass;

4) Note habitat type as defined in the AB 360 Program
   - Shaded Riverine Aquatic (SRA),
   - Riparian Forest (RF),
   - Scrub/Shrub (SS),
   - Freshwater Marsh (FM), and
   - Riverine (R), qualitatively noted where readily observed;

5) Record Riparian Forest understory as either light, moderate, or heavy:

6) Note location and species of individual trees by engineering station, note start and end of canopy cover of a lineal strip of trees/shrubs. Identify representative species within habitat types. Estimate percent coverage for discontinuous lineal strips when numerous small (under 25 ft.) habitat breaks occur. Note any recently cut trees or shrubs;

7) Include both measured length and estimated width of habitat strips. "Calibrate" your estimation of levee width with an initial measurement;

8) Estimate tree height by 5-foot increments. Minimum height to record is 10 feet;

9) Record domestic property as *urban*. Delineate as lineal strip including structures and altered areas. Note general habitat conditions if applicable;

10) Include photo locations and general /incidental observations (including birds and mammals) under "Notes;" and

11) Although not a Threatened & Endangered species survey, record any observed Threatened & Endangered species.

The acreage of each habitat type was calculated by determining with a field tape an average width.

FINDINGS:

The habitat analysis is divided into two sections:

A. Levee waterside
B. Levee landside

A. LEVEE WATERSIDE

The waterside of the levee of Bacon Island is revetted along most of the lower portion of the waterside levee. The waterside is dominated by Freshwater Marsh (FM) habitat see Figure 1. The majority of the waterside levee is clear, although there are areas on the waterside that support Riparian Forest and Shrub/Scrub habitat.

Our field survey findings are:

1) There were five distinctive habitat types found along the levee waterside:
Riparian Forest (RF);
Shrub/Scrub (SS);
Freshwater Marsh (FM);
Urbanized, and
Ruderal,

2) No Shaded Riverine Aquatic Habitat (SRA) was recorded;

3) Shrub/Scrub (SS) on the waterside of the levee consisted of 2,705 ft and totaled 0.62 acres (this does not include the Shrub/Scrub that is part of the understory of the Riparian Forest)

4) The Freshwater Marsh (FM)) on the waterside of the levee consisted of 38,552 lineal feet and calculate an acreage of 8.85 acres;

5) The Riparian Forest (RF) along the waterside of the levee was dominated by Willows Sp., Alders, and Cottonwoods. We recorded 884 lineal feet and calculate a total area of this habitat type along the levee of 0.3 acres;

6) No urbanized areas along the waterside were recorded;

7) The Riverine (R) is an association of vascular plants that are rooted and exist on the submerged levee toe. This habitat type was not recorded but can be assumed to exist as a more or less continuous bed along the levee;

8) Table I summarizes the different habitat types found along the waterside of the levee.

Table I. Summary Of Habitat Types And Area Of Each Habitat Type Found Along The Levee Waterside.

HABITAT TYPES	RF Lineal Ft. Riparian Forest	SRA Lineal Ft. Shaded Riverine Aquatic	SS Lineal Ft. Palustrine Shrub/Scrub	FM Lineal Ft. Freshwater Marsh	U Lineal Ft. Urban
Total Lineal Ft. Waterside	884	0	2705	38,552	0
Area in Acres	0.30	0	0.62	8.85	0

Table II. Summary Of Habitat Types And Area Of Each Habitat Type Found Along The Levee Landside.

HABITAT TYPES	RF Riparian Forest	SS Shrub/Scrub	FM Freshwater Marsh	U Urban
Total Lineal Ft. Landside	1,298	1,934	Present in areas where levee seep toe ditch present	3,457
Area in Acres	0.45	0.66	--	---

B. LEVEE LANDSIDE

The landside levee slopes are routinely maintained or they are "urbanized". The landside slopes consists mostly of ruderal species see Figure 2 . There are areas where Riparian Forest habitat and Shrub/Scrub exist on portions of the landside levee. The levee landside habitat is shown in the levee log and on the vegetation map.

Our field survey findings are:

1) There were four distinctive habitat types found along the levee landside:
   - Riparian Forest,
   - Shrub/Scrub,
   - Urbanized, and
   - Ruderal.

2) The Freshwater Marsh habitat associated with the toe ditch along the levee was not recorded. This levee structure was not present along all of the levee and where it is present it is regularly cleaned;

3) The Shrub/Scrub (S/S) habitat on the landside was dominated by Willow sp.and was recorded at 1,934 lineal feet;

4) The Riparian Forest along the landside of the levee was dominated by Willow sp., Cottonwoods, and Alders. We recorded 1,298 lineal feet. ;

5) There were urbanized areas along the landside totaling 3,457 lineal feet.;

6) Table II summarizes the different habitat types found along the landside of the levee. The area not included in the habitat types is ruderal;

REPORT AUTHORS

Chris K. Kjeldsen, Ph.D., Botany, Oregon State University, Corvallis, Oregon. Dr. Kjeldsen has over thirty years of professional experience in the study of California flora. He was a member of the Sonoma County Planning Commission and Board of Zoning (1972 to 1976). He has over 25 years of experience in managing and conducting environmental projects involving impact assessment and preparation of compliance documents, Biological Assessments, DFG Habitat Assessments, DFG SB 34 Mitigation projects, COE Mitigation projects and State Parks and Recreation Biological Resource Studies. Experience includes conducting special-status surveys, jurisdictional wetland delineations, general biological surveys, 404 and 1601-1603 permitting, and consulting on various projects.

Responsibilities: Project Manager, senior technical lead, and assistance with report preparation.

Daniel T. Kjeldsen, B. S., Natural Resource Management, California State Polytechnic University, San Louis Obispo, California. Daniel spent 1994 to 1996 in the Peace Corps managing natural resources in the Olancho watershed of Honduras, Central America. His work in Central America focused on watershed inventory, mapping and protection. He has over five years of experience in conducting Biological Assessments, DFG Habitat Assessments, COE wetland delineations, wetland rehabilitation, and development of mitigation projects. He has also developed forestry management plans.

Responsibilities: Field work and document editing. Responsible for preparation of tables, maps, and graphics.

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Figure 1.
Levee Station 20+00
Showing waterside
Freshwater marsh habitat.
CA Hibiscus in Photo.

Figure 2.
Levee Station 680+00
Showing landside
Ruderal habitat.

Figure 3.
Levee Station 710+00
Showing Waterside Shrub/scrub
and Riparian Forest. Landside
Urban and Riparian Forest.

APPENDIX I

Levee Log Bacon Island RD No. 2028

Habitat Map Key

Levee Side

L= Landside
W= Waterside

Habitat Type

RF= Riparian Forest
SRA= Shaded Riverine Aquatic
S/S= Scrub-Shrub
FM= Freshwater Marsh
U= Urban
R= Riverine

Species Code

A= Alder
W= Willow
SBW Sand Bar Willow
T= Tule
BL= Black Locus
BB= Blackberry
BW= Button Willow
Syc= Sycamore
Euc= Eucalyptus
B Elder = Box Elder
O Ash = Oregon Ash
V Oak = Valley Oak

Location on Levee

L= Low
M= Mid
H= High

Reclamation District: Bacon **Date:8/10/99**

Levee Side	Engineering Station Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
	0+00								Center of bridge
W	124	6783		5	FM	Tule	80%		
W	953		30	20		Walnut			
L						Urban			
W	1489								CA Hibiscus
L	1714		10	25		Button Willow			
	1820								Pipe
L	3834	4067				Urban			
L	3873					Button Willow			
L	4792	5142			SS		30%		Willow in toe ditch
L	6443		30			Walnut	1:1		
W	6915	8745			FM	Tule	80%		
L	9652	9962			U	Walnut			
W	8845	10036		5	FM	Tule			Riverine
W	9840								Arundo
W	10174	10700		5	FM	Tule			
W	10964	11509		5	FM	Tule	60%		
W	11617	11649		5	FM	Tule			
W	11758	12308		5	FM	Tule	80%		
W	12396	12696		5	FM	Tule			
L	13609	13649			U		M		Cottonwood
L	12834	13885			U		L		Cottonwood
W	14830								CA Hibiscus
W	12696	19056		10	FM	Tule	80%		
W	19056	20262		5	FM	Tule	60%		
	20056								Pump station

Reclamation District: Bacon

Levee Side	Engineering Station Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
W	20262	22706		10	FM	Tule			
	22611								Wire power line
	22646								Center of bridge
W	22883	25300		10	FM	Tule	75%	L	
	25186			10		Button Willow			
W	25429	27300		10	FM	Tule			
L	27333					Button Willow			
W	27313			8'		Button Willow			
	27570								Middle pipe, pump station
W	27758	28826		5	FM	Tule	80%		Fragmities upper portion of levee
W	28545		25			Willow			SRA
W	28955	29037		5	FM	Tule	60%		
W	29120		10			Peach			
W	29167								60' Rose
W	29404	29548			FM	Tule	50%		
W	30512	30624		5	FM	Tule	50%		
W	30750			5	FM	Tule			Fragmities
W	30904		25			Willow			
W	30921	30980			FM	Tule			Fragmities Levee Top R
W	31494	31540	30	25	RF	Willow			
W	32526			20	SS	Willow	60%		
W	32846	32946		15'	SS	Willow			
W	33086	33135		15'	SS	Willow			
L	33176			10		Fig		L	
W	33180	33245	70		RF	Euc			

Reclamation District: Bacon

Levee Side	Engineering Station: Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
L	33274	33487			U	CottonWood			
W	33245	33508			SS	BlackBerry			
W	33555	34266		20	SS	Walnut SB Willow			
	33919					100' Arundo			
W	35117	35230		15	RF	Willow			
W	35921	36398	15		SS	W		H	Fragmities on levee
W	36625	36787				Arundo			
L	36744	37900			BB			Toe ditch	20' wide
W	36787	36992		5	FM	Tule	50%		
L	37968	38515			SS	BB W			10x40 (land side disked)
W	38186			10		Button Willow			
W	38227			10		Button Willow			
W	38247	28279	60		RF	Alder			Fragmities
L	38515	38711			RF	CW		L	Toe ditch
W	38614					B Willow			
W	38711	38879			FM	Tule	40%		
W	39033	40392							Fragmities
W	40295		10	50		Button Willow			Pipe 39839- reset 4000
W	41414	41925		5	FM	Tule	30%		
W	41925	42700		25	FM	Tule	70%		
L	42559	42850			U	Urban			2 large cottonwoods
W	42700			15	FM	Tule	80%		
L	43249	44323	20		SS	Walnut			
L	43577	43825	25'		SS	Willow			In toe ditch

Reclamation District: Bacon

Levee Side	Engineering Station: Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
W	44077		20			Button Willow			
W	46233	48773		10	FM	Tule	80%		
W	45222	46233	15		SS	Willow Sandbar	80%		Levee 15'
	46672								Pump Station
L	48583		10						BB Button Willow 40" w
L	48666	49261			RF	Willow			Tow Ditch
W	49163	53034		10	FM	Tule	80%		
L	49597	51176			U	Oliander			Exocits Processing plant
W	51825		20			Walnut			
W	53222		10			Button Willow			
W	53491		15	20'	SS	Button Willow			Levee width 20
W	53944		10			Walnut			
W	54323	54526		10	FM	Tule	80%		
W	54660	55295		10	FM	Tule	60%		
W	55328		40			Walnut	1:1		
W	55468					Arundo			
W	57181	57261		10	SS		40	H	
W	58300					Arundo			
W	58666					Arundo			
W	58300	58666			BB				
W	58847	59270			BB				
W	59027	59050	10		SS	Willow			
W	59384		25			Walnut	1:1		
L	59702	59757	15		SS	CW		L	
W	59822	60514			FM	Tule	60%	H	Fragmities on levee

Reclamation District : Bacon

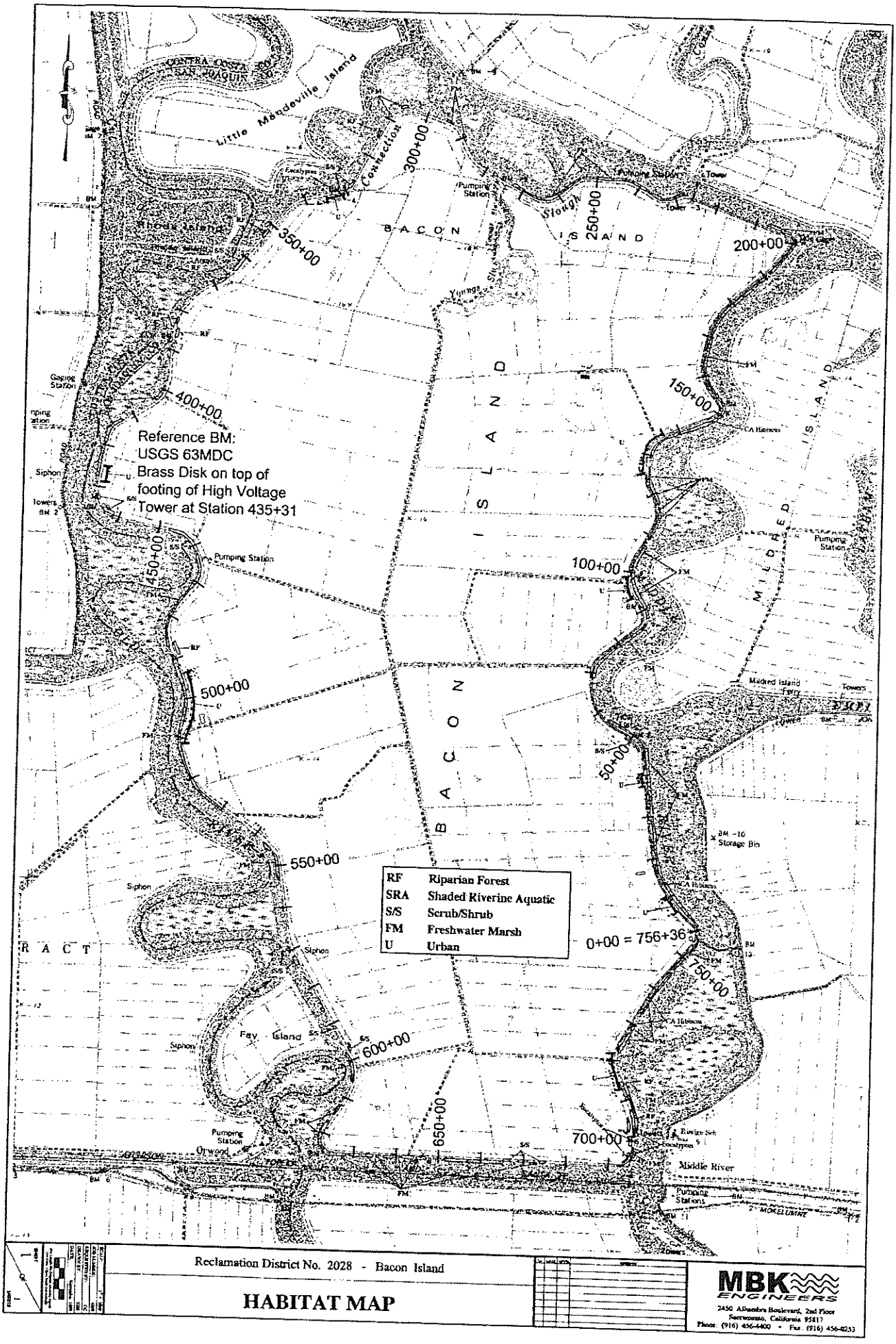
Levee Side	Engineering Station Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
W	61280	61541		10	FM	Tule	80%		
W	61745	62269		20	FM	Tule	80%		
W	62490	62819		15	FM	Tule	60%		
W	62819	63417		40	FM	Tule	98%		
W	63541	63567		10	FM	Tule			
W	63725	64411		30	FM	Tule			
W	63863	66503				BB		Top H	
W	64411	64771		20	FM	Tule	80%		
W	65152	66675		20	FM	Tule	60		
W	66503	66675	10		SS	W Sandbar			
W	66930	67012	5-10	10	SS				
W	67100	67525				BB			
W	67100	67165		10	FM	Tule	80		
W	67311	67411		10	SS	SB Willow			
W	68340	69113				BB		H	Top
W	69187	69684	65"		RF	Euc	70	H	
L	69487	69684	40"		RF	Euc			
	69551								Gate
W	69601	69780		10	FM	Tule			
W	69821	69890			RF	Euc		H	
L	69821	70131			RF	Euc	60	H	
W	70020	70131	50		RF	Euc			
	70271								Pump Station
W	70271	70304	70		RF	Euc			
W	70340	70765	20		RF	Willow			

Reclamation District: Bacon

Levee Side	Engineering Station Beginning	Ending	Estimated: Height(H)	Width(W)	Habitat Type	Species Code	Ratio	Location on Levee(L,M,H)	Notes
W	70390	71454		10	FM	Tule			
L	70131	70491						L	5 Planted trees on levee toe
L	70688				U				
W	71495	71554	70		RF	Euc			
W	71603					Arundo			
W	71704	72200			U	Urban			
W	72257	72708		10	FM	Tule	80%		
L	71709	72288			U				
W	72793	73073		5	FM		40%		
W	73073								CA Hibiscus
W	73328	74513		5	FM	Tule	60%		
	73835					Arundo			
W	73937								CA Hibiscus
W	74478					Arundo			
W	74765	75800		15	FM	Tule	98%		
	END								

APPENDIX II.

Habitat Map (1"=1000')



Reclamation District No. 2028 - Bacon Island

HABITAT MAP

MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
Phone: (916) 456-4400 • Fax: (916) 456-4253

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CALIFORNIA 95670
(916) 355-7020

August 6, 1991

Mr. John L. Winther
P.O. Box 1267
Lafayette, California 94549

Dear Mr. Winther:

This letter is regarding your recent written proposal (letter of July 16, 1991) and subsequent telephone conversations with Mr. Jerry Mensch concerning mitigation for levee work on Bouldin Island, Holland Tract, and Webb Tract. Mitigation proposals involve 1) expanding the planned Harbor Cove Project mitigation area on Empire Tract, or 2) developing new habitat on the interior of Rindge Tract, Medford Island, or some other area. You have proposed that this habitat be created to replace the long-term losses of wetland habitat on the three islands caused by past and future levee work funded by the Delta Flood Protection Act of 1988, and to satisfy the mitigation requirements of the two pending Corps 404 permits for work planned on Holland Tract (Public Notice No. 10195) and Webb Tract (Public Notice No. 9001104).

We agree with the concept of creating wetland habitat on Empire Tract or an alternative location as mitigation for long-term losses of freshwater marsh and 404 jurisdictional wetland habitat caused by levee work on Bouldin Island, Webb Tract, and Holland Tract. We believe these mitigation alternatives will also satisfy the wetlands mitigation requirements for the pending Corps 404 permits on Webb Tract and Holland Tract. However, upon review of our field inspection records, comprised of notes, photographs and videotapes (including the videotape you prepared in August of 1989), and the Habitat Assessments prepared to date by RES Associates for Bouldin Island and Webb Tract, we have determined that the proposed off-site wetlands mitigation will not be adequate to replace all of the habitat types affected by levee improvement and maintenance on the islands. For example, Shaded Riverine Aquatic habitat occurred on Webb Tract along Fisherman's Cut in August of 1989. Based upon the available information, we have estimated the net long-term loss, in acres, for each habitat type found on the three islands. Those estimated losses are summarized below:

	Scrub-shrub	Freshwater marsh	Riparian forest	Shaded Riverine Aquatic	Ruderal
Boul	H(? ac.)	0 ac.	0 ac.	0	H(90ac)
Webb	11.0 ac. H(? ac.)	1.4 ac.	0 ac.	9000 lin. ft.	H(275ac)
Holl	4.5 ac. H(? ac.)	1.4 ac.	4.1 ac.	0	H(100ac)
TOTAL	15.5 ac. +H(? ac.)	2.8 ac.	4.1 ac.	9000 lin. ft.	H(465ac)

NOTE:The symbol "H" represents impacts from historic (i.e. post-July 1987) maintenance activities that have reduced habitat acreages or have kept habitat values lower than they would be without the maintenance activities. These historic impacts will be the subject of a separate analysis we will be pursuing through a contract in the future; a separate mitigation plan must be developed to address historic impacts.

Scrub-shrub, Freshwater Marsh, and Riparian Forest habitat impacts can be effectively mitigated on Empire Tract or some alternate location near the three islands. Because the Shaded Riverine Aquatic habitat on Webb Tract provided a significant aquatic value at the land-water interface, we recommend those impacts be mitigated on-site adjacent to the levee on Webb Tract by construction of a low-water berm that will be planted with riparian species. In the absence of a full Habitat Evaluation Procedure (HEP), we are recommending the following replacement actions:

1. Scrub-shrub: In-kind and acre-for-acre replacement (15.5 acres), off-site

2. Freshwater Marsh: In-kind and acre-for-acre replacement (2.8 acres), off-site

3. Riparian Forest: In-kind and 2 acres replacement for every 1 acre of impact (Riparian Forest habitat will require several years to reach the habitat value of the lost habitat on Holland Tract.)
(4.1 acres x 2 = 8.2 acres), off-site

4. Shaded Riverine Aquatic: In-kind and equal linear replacement (9000 lineal feet), on-site

The DFG estimates that it will require a total of 26.5 acres of land on an alternative site to replace the Scrub-shrub, Riparian Forest, and Freshwater Marsh habitats. Replacement of the Shaded Riverine Aquatic habitat will require the development of 9000 lineal feet of near-shore low-water berm with vegetation at appropriate locations on the waterside shoreline of Webb Tract. The historic impacts of maintenance practises on Ruderal habitat (465 acres) and Scrub-shrub habitat (unknown acreage) will require the development of a separate impact assessment and mitigation plan based upon the impact assessment.

We look forward to working with you to develop the long-term mitigation plan for Bouldin Island, Holland Tract, and Webb Tract. In addition to the mitigation measures we have described above, the mitigation plan should include provisions for protection of State- and Federally- listed and Candidate fish, wildlife, and plant species that may be associated with or depend upon habitat provided by the levees. The mitigation plan should also include provisions for permanent protection of the mitigation area, monitoring of the mitigation area to assure the success of the mitigation measures, and permanent management of the mitigation area. We are preparing a model "Mitigation Agreement" which may be of use in developing the mitigation plan. We will send a copy of that document to you as soon as it is completed.

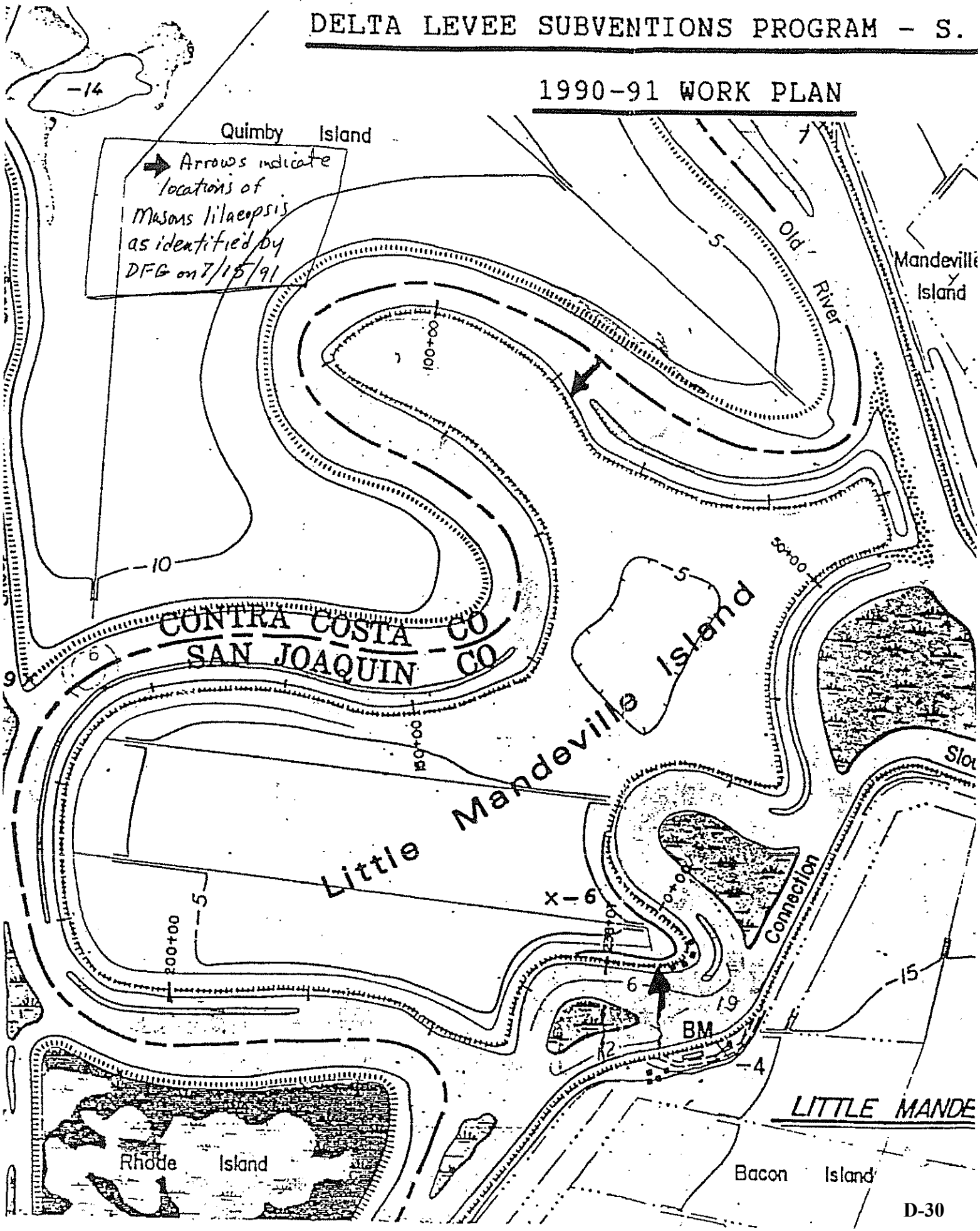
If you have any questions regarding this letter, please contact Mr. Jerry Mensch, Environmental Services Supervisor, Mr. Scott Clemons, Associate Wildlife Biologist, or Mr. Frank Gray, Associate Fishery Biologist, at (916) 355-7030.

James D. Messersmith
Regional Manager

cc: Ms. Mary Johannis
DWR Central District
3251 S Street
Sacramento, California 95816

Mr. Scott Morris
Murray, Burns, & Kienlen
1616 29th Street, Suite 300
Sacramento, California 95816

Mr. Tom Coe
Regulatory Section
U.S. Army Corps of Engineers
Sacramento District
650 Capitol Mall
Sacramento, California 95814 -4794


DELTA LEVEE SUBVENTIONS PROGRAM - S.
1990-91 WORK PLAN
Quimby Island
Arrows indicate locations of Masons lilaeopsis as identified by DFG on 7/15/91
Old River
Mandeville Island
CONTRA COSTA CO
SAN JOAQUIN CO
Little Mandeville Island
Connection
BM
LITTLE MANDE
Rhode Island
Bacon Island
-14
-10
-5
-6
-4
-15
80+00
100+00
200+00

STATE OF CALIFORNIA—THE RESOURCES AGENC.

PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CALIFORNIA 95670

(916) 355-7020

February 11, 1992

Mr. John Winther
Delta Wetlands, Inc.
3697 Mt. Diablo Blvd., Suite 120
Lafayette, California 94549

Dear Mr. Winther:

The Department of Fish and Game has reviewed the proposal regarding mitigation for net long-term losses to wildlife habitat associated with levee repair and maintenance activities on the four islands you manage. These islands include Reclamation Districts No. 756 (Bouldin Island, San Joaquin County), No. 2025 (Holland Tract- Contra Costa County), No. 2026 (Webb Tract, Contra Costa County), and No. 2028 (Bacon Island, San Joaquin County). Your proposal involves paying the owner of Medford Island to dedicate approximately 49 acres of fallow agricultural land on the interior of Medford Island as wetland habitat.

Since July 1, 1987, SB 34 funded levee maintenance and improvement activities have resulted in losses of habitat at all four Districts. We assume that these levee maintenance and improvement activities will continue for the foreseeable future. We have reviewed the existing habitat information and estimated the total habitat losses from past and future levee maintenance and improvement activities on the four subject Districts will involve 45.7 acres of riparian and wildlife habitat: (scrub-shrub = 26.6 acres; riparian forest = 6.1 acres; freshwater marsh = 13.0 acres). This loss provides the basis for the creation of the 49 acre mitigation area. In addition to the above losses, 10,780 lineal feet (6.1 acres) of shaded riverine aquatic habitat will be replaced elsewhere under a separate mitigation plan and agreement.

The DFG endorses the concept of developing the subject 49-acre area on Medford Island into a mitigation area, and the timely implementation of a DFG-approved mitigation plan and mitigation agreement for this property. This would satisfy all of the mitigation requirements for the aforementioned reclamation districts with the exception of shaded riverine aquatic habitat losses. The mitigation area should produce riparian and scrub shrub habitat in addition to the existing potential for

freshwater marsh. Native trees should be planted, and there should be a permanent water supply to ensure long-term growth and survival of all plants.

We have been in contact with Mr. Earl Cooley, who provided us with a letter regarding a proposed mitigation bank area to be developed on Medford Island January 16, 1991 (attached). DFG personnel will make a site visit soon with Mr. Cooley to consider possible area designs. We agree that the timely implementation of mitigation is essential.

If you have any questions, please call Mr. Frank Gray or Mr. Scott Clemons, Environmental Specialists, of our Rancho Cordova office at (916) 355-7030.

Sincerely,

James Messersmith
Regional Manager

Attachment

cc: Earl Cooley
L & L Farms
No. 1 Medford Island
Stockton, CA 95219

Ms. Mary Johannis
Department of Water Resources
3251 S Street
Sacramento, CA 95816

Mr. Scott Morris
Murray, Burns, & Keinlen
1619 29th Street, Suite 300
Sacramento, CA 95816

Mr. Scott Clemons
Department of Fish and Game
Rancho Cordova, CA

Mr. Frank Gray
Department of Fish and Game
Rancho Cordova, CA

L & L FARMS

MEDFORD ISLAND
STOCKTON, CALIFORNIA

VIA FAX 916-355-7102

January 16, 1991

State of California
Department Fish & Game
Attn: Scott Clemons

Dear Mr. Clemons:

It is the intent of L & L Farms ownership to engage in the restoration, enhancement and protection of wetlands, riparian and aquatic habitat values on Medford Island for the benefit of all wildlife including sensitive plant and animal species.

To facilitate funding for these major habitat improvements, it is hoped the department will approve Medford Island as an acceptable location for mitigation projects.

The attached mitigation plan outlines the development of approximately 100 acres in the S.E corner of the island as a pilot project, for the Medford Island natural community conservation planning area mitigation site. We would also be willing to utilize this pilot project as a subventious program habitat restoration demonstration area so other districts could learn to incorporate wildlife habitat improvement into their construction activities. It would also provide other districts with a mitigation alternative which would not require acquisition, development, or maintenance on their part.

Development

It is already late winter and the window of opportunity for cost effective riparian restorations only extends for a couple of months longer. Expensive container plantings with irrigation systems could extend the planting season but in our experience the planting or cuttings from willows and cottonwoods supplemented by container plantings of elderberry and wild grape, all irrigated by fluctuating adjacent wetland water levels have provided the most benefit for the least cost. With that window of opportunity time is of the essence.

Most earthmoving and water control structures are already in place. Development of the precise character of the wetlands portions of the project will be controlled by utilizing water management techniques providing sufficient inundation to produce a palustrine emergent wetland dominated by stands of perennial rooted herbaceous plants, primarily roundstem bullrushes and cattails. Other typical moist soil plants will include smartweed and watergrass.

Specific details regarding the sale of a conservation easement, establishment of a maintenance annuity and development of a monitoring and maintenance plan will require additional negotiations between the island's ownership and R.D. 2041 to incorporate department recommendations as to the precise structure of the joint venture and subsequent operations agreement requirements identified during our continued consultations.

Field planting would begin immediately. If the department is willing to document the applicability of those improvements as mitigation for the offsite impacts of other reclamation districts or organizations who as a result of SB-34 participation or other permit process requirements were required to mitigate the impact of their activities.

Such negotiation will begin upon conceptual approval of the general plan by the department. We request an opportunity to consult with you after your review of the draft so we may incorporate your recommendations and address any concerns before a final plan is submitted.

Yours truly,

EARL COOLEY
Facility Manager

EC/jkr
Enclosures

CC: J.F. Riedel
C.A. Luckey
Dave Brown, Dept. of Water Resources
Medford File
E.C. M/B

MITIGATION PROJECT AREA DESCRIPTION

Medford Island is a 1,200 acre island centered in the Delta (see attached map). Small grain production and grazing have historically been the major land uses. Winter flooding of cereal grain production fields provides a significant waterfowl wintering area. The island is home to a number of sensitive plant and annual species.

The proposed mitigation sites consist of Unit A composed of 42.8 acres in field 24 and 20 acres in field 23.

Units A & B were proposed as potential mitigation project sites as early as 1988. In 1989 in cooperation with C.W.A. and the island's ownership entered into a one year agreement to actively manage those fields in Unit A for the benefit of waterfowl. This experimental plot was flooded that winter and left fallow the next year. In 1990 it was proposed as subventions program mitigation site. In 1991 corn was planted and left standing as a conservation feed plot for the benefit of wintering waterfowl. Some experimental planting of moist soil plants were done to evaluate different restoration techniques. This experimental plot will be put back into commercial row crop production this year if a conservation easement sale cannot be negotiated.

Unit B

45.7 acres contained in Field 25. This field was last farmed in 1989 and has been used as a reclamation district borrowing area for the subvention program levee rehabilitation activities.

The result has been a reconfiguration of the area through excavation that could, if property developed, produce characteristics of a palustrine emergent wetland with scrub shrub plantings maturing into palustrine forests values. This location would optimize moist soil plant diversity by creating non-uniform water depth that would discourage monotypic stands of emergent vegetation and increase the edge effect associated with riparian restorations. This area would most likely be leveled for ag production unless a mitigation project is approved for this location.

FISH AND WILDLIFE HABITAT

MITIGATION AGREEMENT BY AND BETWEEN

RECLAMATION DISTRICT NO. 2041

AND

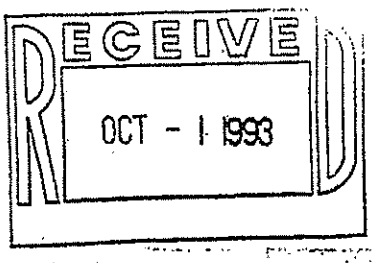
CALIFORNIA DEPARTMENT OF FISH AND GAME

This Mitigation Agreement ("Agreement") is made and entered into by and between Reclamation District No. 2041 (Medford Island), hereafter referred to as the "District", and the California Department of Fish and Game, hereafter referred to as the "Department".

The purpose of this Agreement is to guarantee adequate mitigation for the loss of 13 acres of freshwater marsh, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat that were growing on or adjacent to local non-project levees in the Sacramento-San Joaquin Delta. These habitat losses are long-term in nature, and occurred in conjunction with the rehabilitation and maintenance or the non-project levees that surround Medford Island, San Joaquin County (work performed by the District), Holland Tract, Contra Costa County (work performed by Reclamation District No. 2025), Webb Tract, Contra Costa County (work performed by Reclamation District No. 2026), and Bacon Island, San Joaquin County (work performed by Reclamation District No. 2028). Reclamation districts 2025, 2026 and 2028 asked the District to develop and manage the mitigation efforts on Medford Island on their behalf. The District accepted this responsibility. Reclamation districts 2025, 2026, and 2028 are thus beneficiaries of this Agreement because the habitat to be restored by the District shall satisfy part of their mitigation requirement under the provisions of the Delta Flood Protection Act of 1988. Said three reclamation districts shall have rights to enforce the provisions of this Agreement.

The levee rehabilitation and maintenance activities noted above shall hereafter be referred to as the Project. The Project was performed pursuant to the provisions of the Delta Flood Protection Act of 1988. The authority for this Agreement comes from Sections 1600, 1755 and 1801, et. al. of the Fish and Game Code, Sections 21001 and 21002 of the Public Resources Code, Sections 15040 (c) and 15041 of the California Environmental Quality Act (CEQA) Guidelines, and Section 12987 of the Water Code.

The specified mitigation measures and actions to be undertaken by the District and the Department pursuant to this



Agreement are attached hereto as Exhibit 1 (hereinafter the "Mitigation Plan").

WITNESSETH

WHEREAS, the four named reclamation districts requested the Department to approve their plans for levee rehabilitation and maintenance under the provisions of the Delta Flood Protection Act of 1988, and

WHEREAS, the Department, after reviewing the plans and conducting several site inspections determined that the nature of the Project made it impossible to avoid impacts on-site, and

WHEREAS, the Department believes that in-kind replacement of 13 acres of freshwater emergent marsh habitat, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat is feasible on lands currently owned by L & L Farms on Medford Island in San Joaquin County, and

WHEREAS, pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation and protection of fish, wildlife and native plants and holds these resources in trust for the people of California, and

WHEREAS, pursuant to Water Code Section 12987, the Department must disapprove plans prepared under the provisions of the Delta Flood Protection Act of 1988 if those plans result in the unmitigated use of channel islands for levee repair materials, or if the plans result in a net long-term loss of fisheries, wildlife, or riparian habitat, and

WHEREAS, the Department desires permanent replacement of the specified scrub-shrub, freshwater marsh, and riparian forest habitat to assure that any net long-term losses of those habitats are adequately mitigated, and

WHEREAS, L&L Farms agrees to grant an easement as more particularly set forth in Exhibit 2, attached hereto (hereinafter the "Conservation Easement"), and

WHEREAS, the District, acting for itself and on behalf of the other three named reclamation districts, agrees to mitigate as specified in the Mitigation Plan for Project-induced losses of 13 acres of freshwater marsh habitat, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat.

NOW THEREFORE, the parties agree as follows:

A. DUTIES

1. The Department shall acquire a Conservation Easement over 73.59 acres of land (hereinafter referred to as "Habitat Areas") on Medford Island. This acquisition shall occur within 6 months of the execution of this Agreement.

2. The District acting in its own capacity, or through a designated agent approved by the Department, shall preserve, enhance, and maintain the Habitat Areas in good condition in perpetuity.

3. As mitigation for the habitat losses resulting from the Project, the District agrees to complete the initial habitat plantings and water structure development actions described in the Mitigation Plan within a reasonable time but no later than twelve (12) months from the execution of this Agreement. These actions shall take place within the Habitat Areas, within a 50 acre area hereinafter referred to as the "Mitigation Area". A portion of the remaining 23.59 acres of the Habitat Areas shall serve as a buffer zone to protect the Mitigation Area. L&L Farms may utilize the 23.59 acre buffer zone for purposes as described in the Mitigation Plan or Conservation Easement. The Department reserves the right to designate all or part of the 23.59 acres as mitigation for habitat losses which may result from the District's future levee maintenance and improvement activities which are eligible for funding under the Delta Flood Protection Act of 1988.

4. If the Mitigation Area is damaged or destroyed by catastrophic events beyond the control of the District (including but not limited to flood, fire, wildlife disease, and vandalism), the District shall notify the Department and the Department shall determine the appropriate course of action. If the Department determines the Mitigation Area must be restored, the District shall perform the restoration to the extent that funds are available from monies provided to the Department by the California Legislature in 1991 (Chapter 1140). If the levees surrounding Medford Island fail, and Medford Island is not reclaimed, the District shall have no further obligation for restoration or management of the Mitigation Area.

5. The Department and the District have entered into this Mitigation Agreement contemplating normal operating and maintenance expenses based on historical practices in the San Joaquin Delta region. In the event subsequent laws, rules, or regulations or other events occur which modify the historical procedures and significantly impact the cost or expense of operating and/or maintaining the Habitat Area, the Department and the District shall meet and mutually confer in an effort to

reasonably allocate the sharing of the additional cost or expense. In the event the parties are unable to agree with respect to such allocation the matter shall be referred to arbitration pursuant to the provisions of the California Code of Civil Procedure $1280, et seq.

B. COSTS

The parties to this Agreement have determined that the direct cost of acquiring the Conservation Easement and the direct cost of enhancing and managing the Mitigation Area will be as set forth below.

1. Acquiring a permanent Conservation Easement over the Habitat Area.
   Cost: $ 91987.50

2. Enhancement, operation and maintenance of the Mitigation Area during the development phase (three years) as described in the Mitigation Plan.
   Cost: $178,121

3. Perpetual operation and maintenance of the Mitigation Area and payment of levee assessments for the Habitat Areas following the development phase, as described in the Mitigation Plan.
   Cost: $179,699

C. FUND MANAGEMENT

Funding for the mitigation actions required by this Agreement shall be provided from the Department's account established for habitat mitigation under Chapter 1140, Statutes of 1991. The following describes how the funding will be managed for the development and operations and maintenance activities described in the Mitigation Plan and in this Agreement:

1. Development Phase Payment Terms

The Department shall pay the District to enhance, operate and maintain the Mitigation Area during the development phase, using funds identified in Section B.2.. Funds for development shall be disbursed to the District under the following terms:

a) Seventy-five percent (75%) of the total development cost ($133,590.75) will be paid to the District within 90 days from the execution of this Agreement.

described in this Agreement and in the Mitigation Plan. This report shall be sent to the Department's Region 2 Office, attention Regional Administrative Officer.

D. DEFAULT

Upon information and belief that the District has not complied with the conditions or obligations required of it in this Agreement or in the Mitigation Plan, the Department shall notify the District in writing that a default has occurred and give the reasons therefor. The District shall have 30 days following receipt of such notice within which to commence (and thereafter diligently pursue) corrective action to cure such a default. In the event the District fails to cure the default within 120 days following receipt of such notice, the Department shall have all rights and remedies available at law or equity including but not limited to specific performance and injunctive relief.

E. DEPARTMENT COVENANTS, REPRESENTATIONS AND WARRANTIES

The Department hereby covenants, warrants and represents as follows:

1. The Department, its designee, or successor shall hold a permanent easement deed to and protect all lands conveyed under this Agreement solely for the purposes of conservation, restoration and enhancement of those riparian and wildlife habitats and species adversely impacted by the Project. This covenant shall run with the land and no use of such land shall be permitted by the Department or any subsequent easement holder or assignee which is in conflict with the stated conservation purposes of this Agreement. If at any time in the future the Department, the District, the titleholder, or any subsequent transferee uses or threatens to use such lands for purposes not in conformance with the stated conservation purposes contained herein, the California Attorney General, or California residents shall have standing as interested beneficiaries to challenge such nonconforming uses of lands transferred herein; AND

2. The Department, its designee, or successor shall record on each deed a statement that the lands (or an easement over said lands) described in the deed of record have been conveyed to the Department or its agent for purposes of conservation, preservation, restoration and maintenance of those species and habitats adversely impacted by the Project. Such statement shall be substantially as provided in Exhibit 2.

b) Fifteen percent (15%) of the total development cost ($26,718.15) will be paid to the District upon the Department's determination that the District has satisfactorily completed the berm construction, water system development (including renovation of the existing irrigation and drainage system, and replacement of one siphon), and initial habitat plantings, as described in the Mitigation Plan.

c) Ten percent (10%) of the total development cost ($17,812.10) will be paid to the District upon determination by the Department that the District has met the performance standard specified in the Mitigation Plan (successful establishment of 13 acres of freshwater marsh, and survival of 1,600 trees and shrubs at the end of three years from the date of the initial plantings).

2) Long-term Operation and Maintenance

Within 90 days from the execution of this Agreement, the Department shall provide the District with $179,699. The District shall use this fund to create an operation and maintenance trust account which shall be dedicated to the perpetual operation and maintenance of the Mitigation Area and to the payment of specified annual levee assessment fees to the District for the Habitat Areas. The District shall begin to draw funds from this trust account after completion of the development phase. The District shall withdraw funds from the trust account on an as-needed basis; the total annual draw shall not exceed $7,188, except during years when replacement of the siphon(s) is necessary. A portion of the total annual draw shall be used by the District as the annual levee assessment fees for the Habitat Areas. Said annual levee assessment fees shall be paid at $25 per acre (total annual fee: $1,570), and such fees may be increased to a maximum of $34.84 per acre (total annual fee: $2,188) in the event of increased levee repair costs due to flood damage or levee failure.

3) Annual Accounting Report

By February 1 of each year the District shall prepare and present a report detailing expenditures from the funds provided for the mitigation actions

F. MISCELLANEOUS PROVISIONS

1. NOTICES

All notices and other communications required or permitted to be given or delivered pursuant to this Agreement shall be in writing and shall be delivered in person or by courier, by telecopy, or sent by first-class or certified mail, return receipt requested. All such notices or transmittals shall be deemed delivered upon the earlier of actual receipt or three days after posting by certified mail addressed to the recipient as follows:

DISTRICT
Mr. Tom Luckey
2495 West March Lane
Stockton, California 95207

DEPARTMENT (1) Regional Office Address:
California Department of Fish and Game
Region 2
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

(2) STATE HEADQUARTERS ADDRESS:
California Department of Fish and Game
Legal Affairs Division
1416 Ninth Street, 12th Floor
Sacramento, California 95814

2. ENTIRE AGREEMENT

This Agreement, along with the exhibits attached hereto, constitutes the entire Agreement and understanding between the Department and the District for the Project. This Agreement supersedes all prior and contemporaneous agreements, representations or understandings of the parties, if any, whether oral or written.

3. GOVERNING LAW

This Agreement shall be governed by the laws of the State of California. Actual or threatened breach of this Agreement may be prohibited or restrained by a court of competent jurisdiction.

4. BENEFIT OF AGREEMENT

This Agreement is for the benefit of the People of the State of California by and through the Department and its successors and assigns. This Agreement provides the mitigation for habitat loss as identified, and acceptable performance by the District shall satisfy the mitigation requirements specified for all four identified reclamation districts.

5. AMENDMENTS

This Agreement cannot be amended or modified in any way except by a written instrument duly executed by the District and the Department.

6. TERMINATION

This Agreement may be terminated under the following circumstances:

a. The Department notifies the District in writing that the Agreement is terminated. Termination shall become effective within 30 days following receipt of such notice.

b. The Department determines that a default has occurred, and the District does not correct the default within a reasonable time.

c. A catastrophic event beyond the control of the District occurs, damaging the Mitigation Area, and the Department determines that the Mitigation Area cannot be restored.

d. The levees surrounding Medford Island fail, the Mitigation Area is flooded, and Medford Island is not reclaimed.

e. By law or judicial action.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Mitigation Agreement to be in effect as of the date last signed below.

RECLAMATION DISTRICT NO. 2041

By: _____

Dated: 9-20, 1993

Tom Luckey, President
Reclamation District No. 2041

CALIFORNIA DEPARTMENT OF FISH & GAME

By: _____

Dated: 9/10/93, 1993

Boyd Gibbons, Director
California Department
of Fish and Game

Approved as to form:

By: _____

Dated: September 30, 1993

Craig Manson
General Counsel
California Department
of Fish and Game

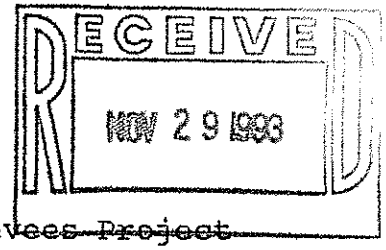
State of California

The Resources Agency

Memorandum

To : Mr. Dave Lawson
Department of Water Resources
3251 S Street
Sacramento, California 95816

Date : November 23, 1993



From : Department of Fish and Game - Ed Littrell, Delta Levees Project

Subject: "Future" Impacts' Mitigation and Funding at Medford Island

It has come to our attention that the recently signed mitigation agreement for Medford Island will require revision. The goal will be to allow the designated 73.59-acre site to serve as a mitigation area for all for past and future impacts from SB 34 related work at Holland, Bacon, Webb, and Medford Island. Mitigation for losses of shaded riverine aquatic habitat would be addressed separately. The expectation of the representatives for the subject districts is for the agreement to address future impacts, whereas the payment for the area is currently being made from the $3 million past impacts account. The "past impacts" account should not fund that portion of the site which will address future impacts.

I would like to meet with you to resolve this issue, possibly by reimbursing the past impacts account with funds from another account. This will then enable us to make the necessary revisions in the Medford agreement and facilitate approval of future workplans.

To arrange a meeting, or if you have any questions, please call me at (916) 355-0271.

Ed Littrell
Delta Levees Project Manager

cc: Mr. Gilbert Cosio
Murray, Burns, and Kienlen
1616 29 th St., Suite 300
Sacramento, CA 95816

Appendix E – Response to Comments

RECLAMATION DISTRICT NO. 2028
(BACON ISLAND)

343 East Main Street, Suite 815
Stockton, CA 95202
Office (209) 943-5551
Fax (209) 943-0251

Board of Trustees
RANDALL D. NEUDECK
DAVID A. FORKEL
RUSSELL E. RYAN

District Engineer
NATHAN HERSHEY, MBK Engineers
Secretary
PAMELA A. FORBUS

December 6, 2022

Andrea Lobato, P.E., Manager
Delta Levees Program – Special Projects
Department of Water Resources
Post Office Box 942836
Sacramento, CA 94236-0001

Subject: Response to Comments on Five-Year Plan
Reclamation District No. 2028, PFA Plan BN-18-1.1-SP

Dear Ms. Lobato:

This is in response to your letter dated September 24, 2021, providing comments on the Five-Year Plan. A response to each comment is included below, and the modified Five-Year Plan providing additional information is attached to this letter.

DWR Comment: Please include page numbers for the entire report including the Appendices to make references easy to follow.

Response: The Plan has been updated to address this comment.

DWR Comment: Page 2 in the Executive Summary: The Plan states, "The existing levee system meets the minimum elevation requirements of the Federal Emergency Management Agency's (FEMA) Short Term Hazard Mitigation Plan (HMP) for an agricultural levee in the Sacramento-San Joaquin Delta." Please consider editing this statement in consideration of the HMP deficient areas identified on Page 17.

Response: Content was added clarifying that the LiDAR data is inconclusive when considering HMP compliance. The most recent ground-based survey data on file indicates that the District meets the minimum HMP elevation requirements.

DWR Comment: Page 5, Existing Level of Protection Provided by Levee System: The Plan says that the District has raised and continues to maintain its levee above the HMP minimum elevation. However, under the section, Existing Deficiencies in System, Table 5 - Sites Close to HMP Minimum Geometry, shows portions of the levee not meeting the minimum HMP elevation. Please clarify. Please also be sure the HMP deficient areas are consistent through the map in the Appendices, Delta Levee Standard Status-HMP.

Response: Table 5 identifies sites that are very close to HMP based on the LiDAR data. The accuracy of the LiDAR data is such that it cannot be conclusively determined that the sites are, in fact, below HMP. A conventional terrestrial-based survey with higher accuracy is required to provide confirmation.

DWR Comment: Page 7, Status of Projects Submitted in 2009 Five-Year Plan: Table 2 - Status of 2009 Five-Year Plan, shows Phases 4 and 5 to reach the sustainable HMP standard as not completed. Please provide the level of achievement for objects outlined in the 2009 Five-Year-Plan as a percentage. Please provide a summary of why some objectives were not achieved, and what can be done differently to achieve the goals outlined in this Plan. Please clarify why the work was not completed Project Funding Agreement BN-12-1.0.

Response: The Plan has been updated to address this comment. The objectives that were not achieved were due to a lack of funding. The combination of the projects identified in the previous Five-Year Plan, in addition to the work completed under BN-12-1.0 and Subventions, resulted in HMP compliance for the entire levee system.

DWR Comment: Page 7, Status of Projects Submitted in 2009 Five-Year Plan: Please explain what the abbreviation CALFED LSP is.

Response: The Plan has been updated to address this comment. The CALFED Levee Stability Program (LSP) was an effort by the US Army Corps of Engineers to study the feasibility of funding Delta levee improvements. No federal funding ever came to fruition.

DWR Comment: Page 7, History with the Delta Levees Program: Please include the project funding agreements executed between the District and the Special Projects Program and their relation to the achievement of goals outlined in the 2009 Five-Year Plan and if there are currently any executed project funding agreements related to the goals outlined in the 2009 Five-Year Plan. Please describe the frequency of the District's involvement in the Subventions program, and the approximate funding assistance the District has received annually to date through the Program.

Response: The Plan has been updated to address this comment. Currently, the District has an executed PFA (BN-19-1.3-SP) that addresses the remainder of Phase 4, all of Phase 5, and a portion of the CALFED phase in the 2009 Plan. This work is included in the 2022 Plan as Phases 1 and 2.

DWR Comment: Page 9, Desired Level of Protection and Strategy to Meet Goal: The Plan states "Meeting a sustainable levee standard will provide the necessary levee improvement to help prevent levee breaches or overtopping and other catastrophic or emergency events." Please address why the current levee system at the Delta specific PL 84-99 standard (45.1% of the total system) is not a sustainable levee standard for the District and why it needs to be rehabilitated to Bulletin 192-82.

Response: It should not be implied that the PL 84-99 standard is not sustainable. The District opted to adopt the State's Bulletin 192-82 standard as it is a higher standard and it is allowed under the Program.

DWR Comment: Page 9, Phasing of Work and List of Proposed Projects: Please include the studies and reports anticipated for each project phase, including but not limited to: Scope of Works, Completion Reports, Geotechnical Investigations, etc.

Response: The Plan has been updated to address this comment.

DWR Comment: Page 14, Potential Constraints and Obstacles: The Plan states the District is well versed in navigating the various constraints and obstacles listed. Please describe how the District plans to mitigate and/or overcome the obstacles.

Response: The Plan has been updated to address this comment.

DWR Comment: Page 17, Existing Deficiencies in the System: Table 1 - Existing Levee Standard Conditions, describes the total length of levee meeting the HMP standard as 14.3 miles; however, the Forward describes the District as having a 14.4-mile-long levee system. Please clarify, is this due to the encroachments described along the southern portion of the east levee and does this include the 22 sites identified as being below the HMP standard in Table 5. Please include the stationing of the multiple encroachments and describe if they prevent the District from reaching the HMP standard in this area.

Response: The Plan has been updated to address this comment. The levee system is 14.34 miles and the 14.4 miles listed was a typo. The encroachments are generally located between Stations 708+75 to 718+00. The District recently performed maintenance in the area to maintain HMP compliance.

DWR Comment: Page 17, Existing Deficiencies in the System: It is mentioned that the 2017-2018 DWR LiDAR data should be confirmed with a conventional terrestrial based survey. Please state if and when the District intends to perform terrestrial based surveys to confirm the LiDAR data is accurate.

Response: The Plan has been updated to address this comment. The District has performed an updated HMP survey and is in the process of analyzing the results.

DWR Comment: Page 18, Urgency of Repair Work: The Plan describes flood fights performed in 2017 and highlight the urgency of repair work. Please provide the stationing where the flood fights occurred, what emergency repair work was performed, and if this area been prioritized in the phasing of projects.

Response: The Plan has been updated to address this comment.

DWR Comment: Page 18, Urgency of Repair Work: The Plan indicates that it is likely unknown encroachments exist. Please clarify if this refers to the area where the repair work was performed, or all the District's levees.

Response: The Plan has been updated to address this comment. The Plan provides clarification that unknown encroachments likely exist in the proposed project areas.

DWR Comment: Page 25 in section, Table of Required Tabulated Information: Please complete the information in the table.

Response: The table has been updated.

DWR Comment: Habitat: The District's Plan does not include enhancement in Table 3 – Project Phasing. However, the Ecosystem Restoration and Habitat Enhancement Section indicates "the landside slope will be seeded to propagate a CDFW-approved native grass seed mix." The Plan also states there are limited opportunities for potential on-site ecosystem enhancement and there was "little focus on identifying opportunities" since little to no mitigation is anticipated.

- Please consider that future PSPs will likely focus on multi-benefit projects. Projects that include program habitat types of freshwater marsh, riparian forest, scrub-shrub forest, and especially SRA or waterside habitat are likely to score higher when evaluated.

Response: Comment noted.

DWR Comment: CEQA: Please consider that projects filing as Categorical Exemptions will need to provide justification, as part of the draft SOW, that there are no exceptions to the exemption they intend to work under (Article 19 Categorical Exemptions; Section 15300.2 Exceptions). Projects filing as an IS/MND will need to provide the Initial Study for review as part of the draft SOW before an MND can be filed.

- Please indicate that the District will act as the Lead Agency under CEQA and DWR will be a Responsible Agency.

Response: The Plan has been updated to address this comment.

DWR Comment: Permits:

- Please identify any possible permits that could be required for activities involved in the Plan's projects.
- Please indicate how the project plans to keep fill material from entering the water for "newly placed crown fill on the waterside." And indicate why 401 and 404 permits should not be needed (i.e. indicated work will be conducted above the ordinary high-water mark (OHWM) and the levee does not exhibit wetland characteristics).

Response: The Plan has been updated to address this comment.

DWR Comment: Please include the miles of non-project levee, project levee in the primary zone, and project levee in the secondary zone in the District.

Response: The Plan has been updated to address this comment.

DWR Comment: Please include the amount of permanent and transient population in the District.

Response: The Plan has been updated to address this comment.

DWR Comment: Please identify if there are any resources of State interest such as: legacy towns, historic landmarks, public schools, hospitals, fire stations, flood fight warehouse, communication infrastructure, police, or prisons in the District.

Response: There are no resources identified above within the District. However, the island is along important water conveyance corridors as identified in the plan. See Local Assets and Non-Local Assets and Public Benefits sections.

DWR Comment: Please clarify if there is any transportation infrastructure such as: State highway, freeways, county highways, provides sole access to District, is adjacent to Stockton DWR, adjacent to Sacramento DWR, the port of Stockton, the port of Sacramento, railroads, private airstrip, or gas stations.

Response: See Local Assets and Non-Local Assets and Public Benefits sections.

DWR Comment: Please identify if there is any water infrastructure on the island.

Response: The Plan has been updated to address this comment.

DWR Comment: Please identify if there are any: public access parks, marinas, golf courses, hunting preserves, residential, industrial, agricultural, wineries, or CAFs (dairies).

Response: The island is agricultural and has 5 residences – see Consequences of Levee Failure or Breach section.

DWR Comment: Please identify if there are any gas wells, sand or gravel mining, or peat mining on the District.

Response: There are no gas wells or other mining operations within the District.

DWR Comment: Please include how many feet of Shaded Riverine Aquatic how many acres of existing Scrub Shrub exist on the island.

Response: The Habitat Assessment included in Appendix D indicates no SRA was recorded, 0.3 acres of Riparian Forest, and 0.62 acres of Scrub Shrub.

We look forward to the approval of the Five-Year Plan. If you have any questions or require additional information, please contact Nate Hershey with MBK Engineers at (916) 456-4400.

Respectfully submitted,
RECLAMATION DISTRICT No. 2028

Dave Forkel, Chairman

NL/BJ
4290-18 ANDREA LOBATO RESPONSE TO COMMENTS

cc: Mr. Todd Gardner, Department of Fish and Wildlife
MBK Engineers

DEPARTMENT OF WATER RESOURCES
DIVISION OF MULTIBENEFIT INITIATIVES
P.O. BOX 942836
SACRAMENTO, CA 94236-0001

3/15/2023

Mr. David A. Forkel, Chairman
Reclamation District 2028 (Bacon Island)
c/o Ms. Pamela A. Forbus
343 East Main Street, Suite 815
Stockton, California 95202

Project Funding Agreement BN-18-1.3-SP

Dear Mr. Forkel,

This is in response to your December 5, 2022, letter which responded to our comments and submitted a revised draft of the Five-Year Plan. We have reviewed the responses to your letter and the revised Five-Year Plan for completeness and consistency with the 2018 Requirements for the Five-Year Plan and find them to be acceptable. Please provide us with a hard copy of the final Five-Year Plan, that includes the revisions provided in your submittal.

Retention for previously approved invoices is still being held. The District may request the release of retention funds at its discretion once the final Five-Year Plan has been submitted.

If you have any questions, please contact Project Engineer Carlous Johnson Jr. at (916) 902-6807, or Bobby Jafarnejad, Manager of Delta Levees Special Projects, at (916) 902-6727.

Sincerely,

Andrea L. Lobato, P.E., Manager
Delta Levees Program

cc: MBK Engineers
455 University Avenue, Suite 100
Sacramento, CA 95825