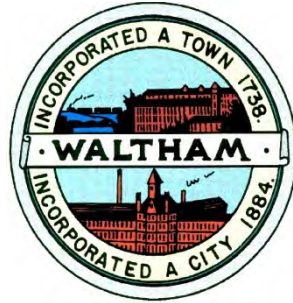


# The City of Waltham



**Invites  
Interested Parties  
To propose the best offer and or Bid  
For the service or product herewith described:**

**DEMOLITION AND CONSTRUCTION OF THE  
WAYSIDE TRAIL, CITY OF WALTHAM PORTION**

**Zoom Bid Opening: 10:00 AM on Wednesday January 19<sup>th</sup>, 2022**

(Meeting Link will be found on our City of Waltham website)

**Zoom Pre-Bid Meeting: 1:00 PM on Wednesday January 5<sup>th</sup>, 2022**

(Meeting Link will be found on our City of Waltham website)

**Last day for written questions: 12:00 PM Noon Friday January 7<sup>th</sup>, 2022**

(via email only to [cphilpott@city.waltham.ma.us](mailto:cphilpott@city.waltham.ma.us))

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**DIVISION 00**  
**BIDDING AND CONTRACT REQUIREMENTS**

**SECTION 00010**  
**INVITATION TO BID**

**Demolition and Construction of Wayside Trail, Waltham Portion, 2021**

Sealed Bids for the **Demolition and Construction of Wayside Trail, Waltham Portion** will be received by Crystal Philpott, Purchasing Agent, at City Hall 610 Main Street Waltham, Massachusetts until **10:00AM Wednesday January 19<sup>th</sup>, 2022** at which time and place all bids will be opened and read via ZOOM. Bids submitted after this time will not be accepted. **Pre-Bid Meeting via Zoom: 1:00 PM on Wednesday January 5<sup>th</sup>, 2022** (see the City of Waltham's website for meeting link.)

**Last day for written questions: 12:00 PM Noon Friday January 7<sup>th</sup>, 2022** (via email only to [cphilpott@city.waltham.ma.us](mailto:cphilpott@city.waltham.ma.us))

**Scope of Work:** This Bid is for Demolition and Construction of the Wayside Rail Trail from the boundary of rail trail work at the former Polaroid property to Beaver Street. (It does not cross over Beaver Street.) Excluded is the section of Beaver Street North to the Belmont Line. Also excluded is the section West of the former Polaroid property to Weston.

**In Addition to the Technical Specification, the Contractor shall comply with the Following:**

1. The City of Waltham must **Review and Approve any/all signage and/or engravings into Granite** before production begins. All Signage shall include phrase similar to: "Funding for the Construction of the Trail is paid for by the City of Waltham. Thank you to the Waltham Taxpayers for investing in this Rail Trail."
2. Contractor must follow the Waltham Historical Commission's request in **Appendix B** to preserve the historic resources listed. Contractor shall walk the site with the City Representative prior to Demolition.
3. Completion Timeline shall be **on or before June 30, 2023.**

Contract Documents may be obtained by visiting the City's website at: [www.city.waltham.ma.us/bids](http://www.city.waltham.ma.us/bids)

**BID SECURITIES** shall be in amount of **5% of the bid** and in the form of a certified check drawn upon a bank within the State of Massachusetts or a bid bond executed by a surety company authorized to do business in Massachusetts, made payable to the **OWNER**.

The successful bidder must furnish a **100% PERFORMANCE and PAYMENT BOND** and will be required to execute the Contract Agreement within five (5) days following notification of the acceptance of his Bid. The OWNER reserves the right to reject any or all bids, to accept any bid, to waive any informality on bids received, and to omit any item or items deemed advisable for the best interests of the OWNER. The award of the contract may be contingent upon the appropriation of funds from City Council Meeting. All costs associated with the preparation of the bids shall be the responsibility of the bidder, regardless of whether or not the Contract is award.

**Section 00 10 00****INSTRUCTIONS FOR BIDDERS****1. READ ALL DOCUMENTS.**

Bidders should familiarize themselves with all the documents contained herein; it is mandatory that all Bids be in compliance with all the provisions contained in said documents.

**2. FORMS AND ATTACHMENTS.**

Bids are to be completed on the forms provided ONLY and enclosed in a sealed envelope marked on the outside "BID (title)" and the name and address of bidder. Attachments submitted in addition to the Waltham Purchasing Department produced forms may not be considered.

**3. PRINTED OR TYPED RESPONSE.**

All information must be typewritten or printed in ink, including the price the bidder offers in the space as provided on the bid form.

**4. CORRECTIONS.**

Bids that are submitted containing cross outs, white outs or erasures, will be rejected. All corrections or modifications to the original bid are to be submitted in a separate envelope, properly marked on the outside, "CORRECTION/ MODIFICATION TO BID (title)" and submitted prior to the bid opening.

**ALL DOCUMENTS SUBMITTED WITH YOUR RESPONSE MAY BE INCORPORATED INTO THE CONTRACT.**

**5. PRICE IS ALL INCLUSIVE.**

Bid prices shall encompass everything necessary for furnishing all items, materials, supplies or services as specified, and in accordance with the specifications, including proper packing, cost of delivery, and in the case of services, completion of same, as per specifications.

**6. PRICE DISCREPANCY.**

In the event of a discrepancy between the Unit Price and the Extension, the Unit Price shall prevail.

**7. EXCEPTIONS**

No Exceptions will be acceptable to the City. The City's intent is to purchase precisely what is specified in the document.

**8. BID DEPOSITS.**

Bid deposits are to be made payable to the City of Waltham. In the event that the successful bidder fails to execute a Contract within (10) days of the receipt of said contract, such security shall be retained by the city as liquidated damages. Unsuccessful bidders' deposits will be returned immediately following the award to said successful bidder.

**9. WITHDRAW.**

A Bid may be withdrawn by written request prior to the schedule for the Bid Opening. No withdrawals are permitted after the bid opening date and time. Withdrawals after the bid opening date will cause the forfeit of the bid Deposit.

**10. AWARD.**

Bids will be awarded not later than (90) ninety days after the scheduled bid opening date, unless otherwise stated, in the specifications. Unless otherwise specified, bids will be evaluated on the basis of, completeness of your RFP response, responsiveness, responsibility, best price and experience.

**11. AWARD CRITERIA.**

Qualified and responsive proposals will be evaluated based on the following rating, which will apply to all Price, Technical, Experience and Compliance requirements.

**12. DISCOUNTS.**

Discounts for prompt payments, based on City Pay Day, will be considered when making awards.

**13. TAX EXEMPT.**

Purchases by the City of Waltham is exempt from any Federal, State or Massachusetts Municipal Sales and/or Excise Taxes.

**14. SAMPLES.**

The Waltham Purchasing Department may require the submission of samples either before or after the awarding of a contract. Samples are to be submitted, at no charge to the City, so

as to ascertain the product's suitability. If specifically stated in the Bid that samples are required, said samples must be submitted with the Bid prior to the Official Bid Opening. Failure to submit said samples would be cause for rejection of Bid. All samples must be called for and picked up within (30) thirty days of award or said samples will be presumed abandoned and will be disposed of.

15. ACTIVE VENDOR LIST.

Vendors who wish to remain on the Active Bid List must either submit a Bid, No Bid, or a letter requesting same, no later than the Official Bid Opening. This is applicable to those vendors who have received the Invitation to Bid.

16. FUNDS APPROPRIATION.

The contract obligation on behalf of the City is subject to prior appropriation of monies from the governmental body and authorization by the Mayor.

17. THE AWARDING AUTHORITY RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS, OR ANY PART OF ANY BID, WHICH IN THE OPINION OF THE AWARDING AUTHORITY, IS IN THE BEST INTERESTS OF THE CITY OF WALTHAM.

18. THE TAX ATTESTATION CLAUSE, CERTIFICATION OF NON-COLLUSION AND THE CORPORATION INFORMATION, are an integral part of the Invitation for Bid and must be completed and signed by the person submitting the Bid, or by the person/persons who are officially authorized to do so.

19. STANDARD OF QUALITY.

Where, in the specifications, one certain kind, type, catalog number, brand or manufacturer of material is named, it shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal and the Bidder may select one or the other. If the Bidder proposes to offer a substitute as an equal, he shall so indicate on the Bid Form, the kind, type, catalog number, brand, or manufacturer of material that is offered as an equal, and describe where it differs from the specifications. Substituted items must be capable of performing all the functions and/or operational features described or indicated in

the specifications. Failure to indicate the description of any substitute item on the Bid will be interpreted to mean that the Bidder will furnish the item or service as specified.

20. MODIFICATION.

No agreement, understanding, alteration or variation of the agreement, terms or provisions herein contained shall bind the parties, hereto unless made and executed in writing by the parties hereto.

21. ASSIGNMENT.

The final payment for work done under this Contract shall be made only after the Contractor has signed a statement under the penalty of perjury, certifying that he has completed the work described in the final estimate. Neither party hereto shall assign this Contract or sublet it in part or as a whole without the prior written consent of the other party hereto. The Contractor shall not assign any sum or sums due or becoming due to him hereunder without the prior written consent of the City.

22. DELIVERIES:

a) The Contractor shall pay all freight and delivery charges. The Waltham Purchasing Department does not pay for shipping and packaging expenses. Items must be delivered as stipulated in the specifications. All deliveries must be made to the inside of city buildings. Sidewalk deliveries will not be accepted. City personnel are not required to assist in the deliveries and contractors are cautioned to notify their shippers that adequate assistance must be provided at the point of delivery, when necessary.

b) All items of furniture must be delivered inside the building, set up, in place and ready for use. Deliveries are to be made between the hours of 8:30 a.m. and 3:00 p.m., Monday through Friday, except on holidays.

c) All damaged items, or items which do not comply with specifications will not be accepted and title therefore will not vest to the Waltham Purchasing Department until such items are accepted and signed for, in good order, by the receiving department.

d) The contractor must replace, without further cost to the Waltham Purchasing Department, such damaged or non-complying items before payment will be made.



**23. LABELING.**

All packages cartons or other containers must be clearly marked with (a) building and room destination; (b) description of contents of item number from specifications; (c) quantity; (d) City of Waltham Purchase Order Number and (e) Vendor's name and order number.

**24. GUARANTEES.**

Unless otherwise stipulated in the specifications, durable items and installation shall be guaranteed by the contractor for a period of not less than one year from the date of delivery and acceptance by the receiving department. In addition, the manufacturer's guarantee shall be furnished. Any items provided under this contract which are or become defective during the guarantee period shall be replaced the contractor free of charge with the specific understanding that all replacements shall carry the same guarantee as the original equipment. The contractor shall make such replacement immediately upon receiving notice from the Purchasing Agent.

**25. SINGLE VENDOR.**

The Waltham Purchasing Department desires to award a single contract based on the Grand Total Price. However, where applicable, the City reserves the right to make multiple awards on a unit price basis if, in the opinion of the Waltham Purchasing Department, it is in the best interest of the Waltham Purchasing Department.

**26. BEST AND FINAL OFFER.**

The Waltham Purchasing Department reserves the right to request best and final offers from one or more bidders. Best and final offer will be exercised should the CPO deem it is in the best interest of the Waltham Purchasing Department in order to obtain the best value.

**27. BALANCED BIDDING (if Applicable)**

Bids should be made on each separate item of work shown in the BID with reasonable relation to the probable cost of doing the work included in such items, and the right is reserved to reject wholly any Bid where an item or items thereof are obviously unbalanced or appear to the CITY to be so unbalanced as to affect or to be liable to affect adversely any interests of the CITY. The attention of the Bidder is called to the fact that unbalancing of Bids may adversely affect the CONTRACTOR if certain portions of the work are increased or decreased.

**28. ORIGINAL SIGNATURES**

Where a signature is required in the bid documents, the vendor is required to place an original "wet" signature. The Certificate of Vote Authorization, Certificate of Non Collusion Certificate, Tax Compliance Certificate, Debarment Certification, Notary Public Certification and the Bid Form (price form) MUST bear an original "Wet" signature by the authorized corporate officer. Electronic signatures are not allowed or accepted.

**29. PRINTING AND ASSEMBLY BID SUBMISSION**

Bid responses shall be submitted in single page printing format. No double sided printing is accepted by the City. The response binding shall be with an appropriately sized clip binder. No staples, no metal or plastic binding is accepted.

**30. TERMINATION FOR CONVENIENCE**

The City of Waltham may, in its sole discretion, terminate all or any portion of this Agreement or the work required hereunder, at any time for its convenience and/or for any reason by giving written notice to the Contractor thirty (30) calendar days prior to the effective date of termination or such other period as is mutually agreed upon in advance by the parties.

If the Contractor is not in default or in breach of any material term or condition of this Agreement, the Contractor shall be paid its reasonable, proper and verifiable costs up to the of termination to the extent previous payments made by the City of Waltham to the Contractor have not already done so. Such payment shall be the Contractor's sole and exclusive remedy for any Termination for Convenience, and upon such payment by the City of Waltham to the Contractor, the City of Waltham shall have no further obligation to the Contractor.

The City of Waltham shall not be responsible for the Contractor's anticipatory profits or overhead costs attributable to unperformed work.

**Section 00 20 00**

# **Compliance**

**The documents in this section shall bear "wet" Original signatures and returned with your bid**

# Compliance

The compliance documents in this section must be completed, signed and returned **with your bid package.**

## Purchasing Department

City of Waltham  
610 Main Street  
Waltham, MA 02452

Failure to submit the completed documents will cause the disqualification of the proposal.

### Section Index

Check when Complete

- Non-collusion form and Tax Compliance form..... \_\_\_\_\_
- Corporation Identification Form..... \_\_\_\_\_
- Certificate of Vote Authorization..... \_\_\_\_\_
- Certificate of Insurance (showing all limits of WC&GL)..... \_\_\_\_\_
- Three (3) References..... \_\_\_\_\_
- 5% Bid Bond or Certified Check>..... \_\_\_\_\_
- Debarment Certificate ..... \_\_\_\_\_
- Prevailing Wage Certificate..... \_\_\_\_\_
- Right-to-know Law..... \_\_\_\_\_
- OSHA 10 Certificate for all Assigned Employees (MGL ch30, §39M and Ch 149) \_\_\_\_\_

**Before the commencement of the Job, the contractor must provide to the above office:**

- Performance and Payment Bonds **each** for 100% of the contract value and naming the City of Waltham

Your Company's Name: \_\_\_\_\_

Service or Product Bid \_\_\_\_\_

**NOTE:** Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

**NON-COLLUSION FORM AND TAX COMPLIANCE FORM**

**CERTIFICATE OF NON-COLLUSION**

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity or group of individuals. The undersigned certifies that no representations made by any City officials, employees, entity, or group of individuals other than the Purchasing Agent of the City of Waltham was relied upon in the making of this bid

\_\_\_\_\_  
(Signature of person signing bid or proposal)      Date

\_\_\_\_\_  
(Name of business)

---

Wet Signature Required

**TAX COMPLIANCE CERTIFICATION**

Pursuant to M.G.L. c. 62C, & 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

\_\_\_\_\_  
Signature of person submitting bid or proposal      Date

\_\_\_\_\_  
Name of business

**NOTE**

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

**CERTIFICATE OF VOTE OF AUTHORIZATION**

Date:

I \_\_\_\_\_, Clerk of \_\_\_\_\_ hereby certify that at a meeting of the Board of Directors of said Corporation duly held on the \_\_\_\_\_ day of \_\_\_\_\_ at which time a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

VOTED: That \_\_\_\_\_ (*name*) is hereby authorized, directed and empowered for the name and on behalf of this Corporation to sign, seal with the corporate seat, execute, acknowledge and deliver all contracts and other obligations of this Corporation; the execution of any such contract to be valid and binding upon this Corporation for all purposes, and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of such directors and a certificate of such later vote attested by the Clerk of this Corporation.

I further certify that \_\_\_\_\_ is duly elected/appointed \_\_\_\_\_ of said corporation

SIGNED:

(Corporate Seal)

\_\_\_\_\_  
Clerk of the Corporation:

Print Name: \_\_\_\_\_

---

**COMMONWEALTH OF MASSACHUSETTS**

County of \_\_\_\_\_

Date:

Then personally appeared the above named and acknowledged the foregoing instrument to be their free act and deed before me, \_\_\_\_\_

Notary Public;

My Commission expires: \_\_\_\_\_

**CORPORATION IDENTIFICATION**

The bidder for the information of the Awarding Authority furnishes the following information.

**If a Corporation:**

Incorporated in what state \_\_\_\_\_  
President \_\_\_\_\_  
Treasurer \_\_\_\_\_  
Secretary \_\_\_\_\_  
Federal ID Number \_\_\_\_\_

**If a foreign (out of State) Corporation – Are you registered to do business in Massachusetts?**

Yes \_\_\_\_\_, No \_\_\_\_\_

If you are selected for this work you are required under M.G.L.ch. 30S, 39L to obtain from the Secretary of State, Foreign Corp. Section, State House, Boston, a certificate stating that you Corporation is registered, and furnish said certificate to the Awarding Authority prior to the award.

**If a Partnership: (Name all partners)**

Name of partner \_\_\_\_\_  
Residence \_\_\_\_\_  
Name of partner \_\_\_\_\_  
Residence \_\_\_\_\_

**If an Individual:**

Name \_\_\_\_\_  
Residence \_\_\_\_\_

**If an Individual doing business under a firm's name:**

Name of Firm \_\_\_\_\_  
Name of Individual \_\_\_\_\_  
Business Address \_\_\_\_\_  
Residence \_\_\_\_\_  
Date \_\_\_\_\_

Name of Bidder \_\_\_\_\_

By \_\_\_\_\_  
Signature

\_\_\_\_\_ Title

Business Address (POST OFFICE BOX NUMBER NOT ACCEPTABLE)

State Telephone Number Today's Date

**PROVIDE THREE (3) SERVICE APPROPRIATE REFERENCES**

1. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

2. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

3. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

**NOTE**

**Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.**



**WEEKLY PAYROLL RECORDS REPORT &  
STATEMENT OF COMPLIANCE**

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided, A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit, on a weekly basis, a copy of his or her weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those reports for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work, a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

---

**STATEMENT OF COMPLIANCE**

\_\_\_\_\_, 200\_\_\_\_\_

I \_\_\_\_\_, \_\_\_\_\_  
(Name of signatory party) (Title)

I do hereby state that I pay or supervise the payment of the persons employed by

\_\_\_\_\_ on the \_\_\_\_\_  
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature \_\_\_\_\_, Title \_\_\_\_\_

Print \_\_\_\_\_



**RIGHT TO KNOW LAW**

Any vendor who receives an order or orders resulting from this invitation agrees to submit a Material Safety Data Sheet (MSDS) for each toxic or hazardous substance or mixture containing such substance, pursuant to M.G.L. c. 111F, §§8,9 and 10 and the regulations contained in 441 CMR 21.06 when deliveries are made. The vendor agrees to deliver all containers properly labeled pursuant to M.G.L. c. 111F §7 and regulations contained in 441 CMR 21.05. Failure to furnish MSDS and/or labels on each container may result in civil or criminal penalties, including bid debarment and action to prevent the vendor from selling said substances, or mixtures containing said substances within the Commonwealth. All vendors furnishing substances or mixtures subject to Chapter 111F or M.G.L. are cautioned to obtain and read the laws, rules and regulations referenced above. Copies may be obtained from the State House Bookstore, Secretary of State, State House, Room 117, Boston, MA (617) 727-2834.

---

Authorized Signature Indicating Compliance with the Right-to-know laws:

---

Signature Date

---

Print Name

**NOTE**

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

**DEBARMENT CERTIFICATION**

In connection with this bid and all procurement transactions, by signature thereon, the respondent certifies that neither the company nor its principals are suspended, debarred, proposed for debarment, declared ineligible, or voluntarily excluded from the award of contracts, procurement or non procurement programs from the Commonwealth of Massachusetts, the US Federal Government and /or the City of Waltham. "Principals" means officers, directors, owners, partners and persons having primary interest, management or supervisory responsibilities with the business entity. Vendors shall provide immediate written notification to the Purchasing Agent of the City of Waltham at any time during the period of the contract of prior to the contract award if the vendor learns of any changed condition with regards to the debarment of the company or its officers. This certification is a material representation of fact upon which reliance will be placed when making the business award. If at any time it is determined that the vendor knowingly misrepresented this certification, in addition to other legal remedies available to the city of Waltham, the contract will be cancelled and the award revoked.

---

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_, State \_\_\_\_\_, Zip Code \_\_\_\_\_

Phone Number (\_\_\_\_) \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Signed by Authorized Company Representative:

\_\_\_\_\_

Print name \_\_\_\_\_

Date \_\_\_\_\_

**10 HOURS OSHA TRAINING CONFIRMATION**

**Chapter 306 of the Acts of 2004**

**CONSTRUCTION PROJECTS**

**AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC**

The undersigned hereby certifies that all employees to be employed at a worksite for construction, reconstruction, alteration, remodeling, repair, installation, demolition, maintenance or repair of any public work or any public building estimated to cost more than \$10,000.00 have successfully completed a course in construction safety and health approved by the **United States Occupational Safety and Health Administration** that is at least **10 hours** in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first payroll report for each employee and will comply with all laws and regulations applicable to awards of subcontracts subject to section 44F.

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Print Name \_\_\_\_\_

Date \_\_\_\_\_

***See Chapter 306 of the Acts of 2004***

**NOTE**

**Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.**

SECTION 00310

BID FORM

PROJECT IDENTIFICATION: Demolition & Construction of Wayside Trail, Waltham Portion

THIS BID IS SUBMITTED TO: City of Waltham Purchasing Department  
Attn: Crystal Philpott, Purchasing Agent  
Waltham City Hall  
610 Main Street  
Waltham, Massachusetts 02452

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- ARTICLE 4 – Bidder’s Certification
- ARTICLE 5 – Basis of Bid
- ARTICLE 6 – Time of Completion
- ARTICLE 7 – Bid Transmittal

**ARTICLE 1 – BID RECIPIENT**

- 1.01 This Bid is submitted to the Owner, as identified above.
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS**

- 2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 30 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**ARTICLE 3 – BIDDER’S REPRESENTATIONS**

- 3.01 In submitting this Bid, Bidder represents that:
  - A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder’s safety precautions and programs.

- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.
- K. That all, the Contract Documents have been carefully examined; that the undersigned is fully informed in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. These prices shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.
- L. The undersigned agrees that, if selected as general contractor, he/she will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.
- M. The time period for holding bids, where Federal approval is not required is 30 days, Saturdays, Sundays and legal holidays excluded, after the opening of bids.
- N. The Bid Security accompanying this Bid shall be in the amount of 5 percent of the Bid. The Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid.
- O. If a Notice of Award accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents is delivered to the undersigned within ninety days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the General Bids, the undersigned will within five days, excluding Saturdays, Sundays, and legal holidays, after the date of receipt of such notification, execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. The premiums for all Bonds required shall be paid by CONTRACTOR and shall be included in the Contract Price. The undersigned Bidder further agrees that the Bid Security accompanying this Bid shall become the property of OWNER if the Bidder fails to execute the Agreement as stated above.
- P. The undersigned agrees that extra work, if any, will be performed in accordance with Contract and will be paid for in accordance with the Contract.



- Q. In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and complete the work in its entirety in the manner and under the conditions required.
- R. The undersigned must furnish a 100 percent Performance Bond and a 100 percent Payment Bond with a surety company acceptable to OWNER.
- S. Where indicated for amounts to be shown in both words and figures, in case of discrepancy, the amount shown in words shall govern.

#### **ARTICLE 4 – BIDDER’S CERTIFICATION**

##### 4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
  - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  - 3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
  - 4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
- E. Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required under law.
- F. The undersigned hereby certifies that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.
- G. The undersigned bidder hereby certifies he/she will comply with the specific affirmative action steps contained in the equal employment opportunity/affirmative action (EEO/AA) provisions of this contract, including compliance with the disadvantaged business enterprise provisions as required under these contract provisions. The contractor receiving the award of the contract shall incorporate the EEO/AA provisions of this contract into all subcontracts and purchase orders so that such provisions will be binding upon each subcontractor or vendor.

**ARTICLE 5 - BASIS OF BID**  
**BID FORM**

NOTE: THE UNIT PRICE OF EACH ITEM MUST BE WRITTEN IN WORDS AND FIGURES. IN CASE OF DISCREPANCY, THE AMOUNT SHOWN IN WORDS WILL GOVERN.

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
101.	Clearing and Grubbing	3 AC	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
102.1	Tree Trimming	2,171 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
102.3	Control of Invasive Species on Site	28 HR	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
102.511.	Tree Protection	27 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
120.1	Unclassified Excavation	10,460 CY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
144.	Class B Rock Excavation	80 CY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
150.	Ordinary Borrow	5,400 CY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
151.	Gravel Borrow	9,170 CY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
170.	Fine Grading and Compacting	19,515 SY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
180.6	Miscellaneous Soil Testing	10 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
200.991	Bioretention Area A	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
200.992	Bioretention Area B	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
200.993	Bioretention Area C	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
234.99	Mitered Drain	9 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
450.22	Superpave Surface Course – 9.5 (SSC-9.5)	1,660 TON	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
450.32	Superpave Intermediate Course – 19.0 (SIC-19.0)	2,680 TON	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
452.	Asphalt Emulsion for Tack Coat	960 GAL	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
472.	Hot Mix Asphalt for Miscellaneous Work	50 TON	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
482.3	Sawcutting Asphalt Pavement	610 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
504.	Granite Curb Type VA4	7,080 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
509.	Granite Transition Curb for Wheelchair Ramps	80 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
593.	Edging Removed and Stacked	150 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
620.13	Guardrail, TL-3 (Single Faced)	106 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
644.072	72 inch Chain Link Fence (Spring Tension Wire)	1,515 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
655.	Cedar Rail Fence	8,920 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
701.2	Cement Concrete Wheelchair Ramp	167 SY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
748.	Mobilization	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
751.001	Landscaping Items	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
751.	Loam Borrow	1,550 CY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
767.12	Compost Filter Tubes	27,700 FT	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
815.1	Traffic Control Signal – Prospect Hill Road RRFB Signal – <b>City to Purchase/Install</b>	1 LS	\$ <u>N/A</u>	\$ <u>N/A</u>
	Unit Price in Words: _____			
	Total Price in Words: _____			
815.2	Traffic Control Signal – Bacon Street RRFB Signal	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
815.3	Traffic Control Signal – Lexington Street Full Signal	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
815.4	Traffic Control Signal – Lyman Street HAWK Signal	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
832.	Warning-Regulatory and Route Marker Alum. Panel (Type A)	420 SF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
847.1	Sign Sup (N/Guide) + Rte Mkr W/1 Brkway Post Assembly - Steel	60 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
850.41	<b>POLICE DETAILS ALLOWANCE</b>	700 HR	\$ <u>N/A</u>	\$ <u>\$50,000</u>
	Unit Price in Words: _____			
	Total Price in Words: _____			

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
851.1	Traffic Cones for Traffic Management	2,400 DAY	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
852.	Safety Signing for Traffic Management	550 SF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
853.1	Portable Breakaway Barricade Type III	20 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
864.04	Pavement Arrows and Legends Refl. White (Thermoplastic)	1,900 SF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
866.112	12 inch Reflectorized White Line (Thermoplastic)	1,128 LF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
867.106	6 inch Reflectorized Yellow Line (Thermoplastic)	5,810 LF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
945.102	Drilled Shaft Excavation 3.5 Foot Diam.	580 LF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
945.202	Rock Socket Excavation 3.5 Foot Diam.	210 LF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
945.302	Obstruction Excavation 3.5 Foot Diam.	40 LF	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			

<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
992.13	Alteration to Bridge Structure No. 8.92 (Concrete Culvert - Sta. 278+77)	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
992.14	Alteration to Bridge Structure No. 8.80 (Concrete Culvert - Sta. 285+19)	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
992.15	Alteration to Bridge Structure No. 8.75 (Timber Culvert - Sta. 287+59)	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
996.01	Prospect Hill Retaining Wall	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
996.02	Hammond Street Retaining Wall	1 LS	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			
999.01	Eco-counter Installation ( <b>CITY PURCHASED</b> )	2 EA	\$ _____	\$ _____
	Unit Price in Words: _____			
	Total Price in Words: _____			

**TOTAL BASE BID PRICE** \$ \_\_\_\_\_  
(Price in Numbers)

**TOTAL BASE BID PRICE** \$ \_\_\_\_\_  
(Price in Words)



<b>Item #</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit Price</b>	<b>Total</b>
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**ADD ALTERNATE A**

141.99 Utility Locating 1 LS \$ \_\_\_\_\_ \$ \_\_\_\_\_  
 Unit Price in Words: \_\_\_\_\_  
 Total Price in Words: \_\_\_\_\_

955.01 Timber Access Ramp – Linden Street 1 LS \$ \_\_\_\_\_ \$ \_\_\_\_\_  
 Unit Price in Words: \_\_\_\_\_  
 Total Price in Words: \_\_\_\_\_

992.11 Alteration to Bridge Structure No. 114 1 LS \$ \_\_\_\_\_ \$ \_\_\_\_\_  
 (Timber Bridge)  
 Unit Price in Words: \_\_\_\_\_  
 Total Price in Words: \_\_\_\_\_

996.03 GRS Retaining Wall-Linden Street Access 1 LS \$ \_\_\_\_\_ \$ \_\_\_\_\_  
 Ramp  
 Unit Price in Words: \_\_\_\_\_  
 Total Price in Words: \_\_\_\_\_

**TOTAL BID PRICE – ADD ALT A \$ \_\_\_\_\_**  
 (Price in Numbers)

**TOTAL BID PRICE – ADD ALT A \$ \_\_\_\_\_**  
 (Price in Words)



**ARTICLE 7 – BID SUBMITTAL**

BIDDER: *[Indicate correct name of bidding entity]*

\_\_\_\_\_  
By: *[Signature]*

\_\_\_\_\_  
*[Printed name]*

*(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:  
*[Signature]* \_\_\_\_\_

\_\_\_\_\_  
*[Printed name]*

Title: \_\_\_\_\_

Submittal Date: \_\_\_\_\_

Address for giving notices:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Contact Name and e-mail address: \_\_\_\_\_  
\_\_\_\_\_

**CERTIFICATIONS**

\_\_\_\_\_  
Social Security Number or  
Federal Identification Number

\_\_\_\_\_  
Individual or Corporate Name  
(Print or Type)

For Certifications by: \_\_\_\_\_  
(Signature of Authorized Person)

**Signatures for Joint Ventures** For Certifications by: \_\_\_\_\_  
(Signature of Authorized Person)

For Certifications by: \_\_\_\_\_  
(Signature of Authorized Person)

END OF SECTION

**SECTION 00430**

**5% BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned \_\_\_\_\_  
\_\_\_\_\_, as Principal, and  
\_\_\_\_\_, as Surety, are hereby held and  
firmly bound unto the City of Waltham, Massachusetts, a municipality in the Commonwealth of  
Massachusetts in the penal sum of \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_), for the payment of which, well and truly to be made,  
we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and  
assigns. Signed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

THE CONDITION OF THE ABOVE OBLIGATION is such that whereas the Principal has submitted to the City,  
a certain bid attached hereto and hereby made a part hereof to enter into a contract in writing for the  
“Demo & Construction of Wayside Trail - 2021 ”, for the City.

NOW THEREFORE,

- a. If said Bid shall be rejected, or
- b. If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form  
of Contract attached hereto (properly completed in accordance with said Bid) and shall  
furnish a bond for its faithful performance of said Contract, and for the payment of all  
persons performing labor or furnishing materials in connection therewith, and shall in all  
other respects perform the agreement created by the acceptance of said Bid, then this  
obligation shall be void, otherwise the same shall remain in force and effect; it being  
expressly understood and agreed that the liability of the Surety for any and all claims  
hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its  
bond shall in no way be impaired or affected by any extension of the time within which the Owner may  
accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of  
them as are corporations have caused their corporate seals to be hereto affixed and these presents to be  
signed by their proper officers, the day and year first set forth above.

SEAL

\_\_\_\_\_  
(Principal)

By \_\_\_\_\_

SEAL

\_\_\_\_\_  
(Surety)

Address \_\_\_\_\_

\_\_\_\_\_

Telephone No. \_\_\_\_\_

Fax No. \_\_\_\_\_

**SECTION 00 50 10**

**PERFORMANCE BOND**

**CITY OF WALTHAM**

KNOW ALL MEN BY THESE PRESENT THAT,

\_\_\_\_\_ as

principal and \_\_\_\_\_ as surety, are held and firmly bound unto the CITY OF WALTHAM and to such persons, firms, and corporations, who may furnish materials for or perform labor on the work, construction or improvements contemplated in the Contract hereinafter mentioned, or who may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, in the

SUM OF \_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_)

(lawful money of the United States of America) for the payment whereof the Contractor and the Surety of Sureties bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT for the above burden (the Contractor) its

\_\_\_\_\_ heirs, executors, administrators and assigns, shall faithfully perform the Contract, on his part and during the life of any guaranty or warranty, for defective materials and workmanship required under this Contract, and satisfy all claims and demands incurred for the same; and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of failure so to do, and shall fully reimburse and repay the City all outlay and expense which the City may incur in making good any such default, and shall promptly make payment to all persons supplying labor or materials for use in the prosecution of the work provided for in said Contract; and shall indemnify and save harmless the said City, its officers and agents from any and all suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that (except as to the City) no suit, action or proceeding by reason of any default whatever shall be brought on this Bond after two years from the day on which the final payment under the Contract falls due.

AND PROVIDED, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or any assignment, transfer or subletting of any part of the work, or the giving by the City of any extension of time for the performance of the Contract, or any other forbearance on the part of either the City or the Contractor to the other, shall not in any way release the Contractor and the Surety of Sureties, or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alterations, assignment, transfer, subletting extension or forbearance being hereby waived.

This Bond is made for the use and benefit of all persons, firms, and corporations who may furnish materials, or perform any labor for or on account of said work, construction or improvements, or who may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, and they and each of them are hereby made obligees hereunder the same as if their own proper names were written herein as such, and they and each of them may sue hereon in their own names for their own use and benefit.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed hereunder, or the Specifications accompanying the same, shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such changes, extension of time, alteration or addition to the terms of the Contract or to the work, or to the Specifications.

IN WITNESS WHEREOF, said Contractor and Surety have hereunto set their respective names this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

WITNESSES:

(CONTRACTOR)

(SEAL)

NAME \_\_\_\_\_ BY \_\_\_\_\_  
(SIGNATURE AND TITLE)

ADDRESS \_\_\_\_\_  
(SURETY) (SEAL)

NAME \_\_\_\_\_ BY \_\_\_\_\_  
(SIGNATURE AND TITLE)

ADDRESS \_\_\_\_\_ BY \_\_\_\_\_  
(ATTORNEY-IN-FACT)

**POWER OF ATTORNEY**

Attorneys-in-fact who sign bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

**SECTION 00 50 20**

**PAYMENT BOND**

**CITY OF WALTHAM**

KNOW ALL MEN BY THESE PRESENT THAT,

\_\_\_\_\_ as

principal and \_\_\_\_\_ as  
surety, are held and firmly bound unto the CITY OF WALTHAM and to such persons, firms, and corporations, who may furnish materials for or perform labor on the work, construction or improvements contemplated in the Contract hereinafter mentioned, or who may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, in the

SUM OF \_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_ )  
(lawful money of the United States of America) for the payment whereof the Contractor and the Surety of Sureties bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT for the above burden (the Contractor) its

\_\_\_\_\_  
heirs, executors, administrators and assigns, shall faithfully perform the Contract, on his part and during the life of any guaranty or warranty, for defective materials and workmanship required under this Contract, and satisfy all claims and demands incurred for the same; and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of failure so to do, and shall fully reimburse and repay the City all outlay and expense which the City may incur in making good any such default, and shall promptly make payment to all persons supplying labor or materials for use in the prosecution of the work provided for in said Contract; and shall indemnify and save harmless the said City, its officers and agents from any and all suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that (except as to the City) no suit, action or proceeding by reason of any default whatever shall be brought on this Bond after two years from the day on which the final payment under the Contract falls due.

AND PROVIDED, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or any assignment, transfer or subletting of any part of the work, or the giving by the City of any extension of time for the payment of the Contract, or any other forbearance on the part of either the City or the Contractor to the other, shall not in any way release the Contractor and the Surety of Sureties, or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alterations, assignment, transfer, subletting extension or forbearance being hereby waived.

This Bond is made for the use and benefit of all persons, firms, and corporations who may furnish materials, or perform any labor for or on account of said work, construction or improvements, or who



may have any suits or claims for injury or damage to persons or property resulting from or arising out of the work done under this Contract, and they and each of them are hereby made obligees hereunder the same as if their own proper names were written herein as such, and they and each of them may sue hereon in their own names for their own use and benefit.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed hereunder, or the Specifications accompanying the same, shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such changes, extension of time, alteration or addition to the terms of the Contract or to the work, or to the Specifications.

IN WITNESS WHEREOF, said Contractor and Surety have hereunto set their respective names this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

WITNESSES:

(CONTRACTOR)

(SEAL)

NAME \_\_\_\_\_ BY \_\_\_\_\_  
(SIGNATURE AND TITLE)

ADDRESS \_\_\_\_\_  
(SURETY) (SEAL)

NAME \_\_\_\_\_ BY \_\_\_\_\_  
(SIGNATURE AND TITLE)

ADDRESS \_\_\_\_\_ BY \_\_\_\_\_  
(ATTORNEY-IN-FACT)

POWER OF ATTORNEY

Attorneys-in-fact who sign bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

**SECTION 00700**

**STANDARD GENERAL CONDITIONS**

**1. INFORMATION**

All information shall come from the Office of the City Purchasing Agent. The Contractor shall inquire at this office for any information needed. Wherever the words “or equal as approved” are used, it is to be understood that the opinion of the City Purchasing Agent shall govern.

**2. SUITS**

The Contractor shall assume defense of and shall indemnify and hold the City and its agents harmless from all suits and claims against the City and its sub-contractors arising from the use of any invention, patent right labor or employment, or from any act of omission or neglect of the City, its agents, employees or any subcontractor in performing the work, under this contract.

**3. LAWS AND REGULATIONS**

The Contractor shall conform to all the applicable rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts, the United States of America and all agencies having jurisdiction over this contract.

**4. PROTECTION OF PROPERTY**

The Contractor shall take all proper precautions to protect the City’s property from damage and unnecessary inconvenience. Any City property damaged by the Contractor in carrying out the provisions of this contract shall be restored to its original condition, by and at the expense of the Contractor.

**5. PROTECTION OF PERSONS**

The Contractor shall take all proper precautions to protect persons from injury, unnecessary inconvenience, and shall be responsible for his failure to do so. The Contractor agrees to hold the City harmless from any and all liabilities of every nature and description, which may be suffered through bodily injury, including death, to any person, by reason of negligence of the Contractor, his agents or employees, or any subcontractor.

**6. INSURANCE**

A. **WORKMAN’S COMPENSATION:** The Contractor shall provide by insurance for the payment of compensation and furnishing of other benefits under Chapter 152 of the General Laws of the Commonwealth of Massachusetts to all persons to be employed under this contract, the premiums for which shall be paid by the Contractor.

B. **COMPREHENSIVE GENERAL LIABILITY**

Bodily Injury:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate
Property Damage:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate

C. **AUTOMOBILE (VEHICLE) LIABILITY**

Bodily Injury	\$2,000,000 Each Occurrence
Property Damage	\$1,000,000 Aggregate

D. **UMBRELLA POLICY**

General liability	\$2,000,000
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Your bid response must include a Certificate of Insurance with the above limits as a minimum. In addition, the Certificate of Insurance must have the following text contained in the bottom left box of the Certificate: **“The City of Waltham is a Named Additional Insured for all Insurance”**. The Certificate of Insurance must be mailed directly to:

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Purchasing Department  
City of Waltham  
610 Main Street  
Waltham, MA 02452

**7. LABOR AND MATERIALS BOND**

The Contractor agrees to execute and deliver to the City, a Performance Bond and a Labor and Materials Bond equal to 50% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond to be issued by a company licensed by the Commonwealth of Massachusetts.

A LETTER FROM A SURETY COMPANY CERTIFYING THAT THE CONTRACTOR IS QUALIFIED AND CAPABLE OF OBTAINING THE ABOVE BONDS MUST BE INCLUDED WITH HIS/HERS BID.

**8. PERSONNEL:**

The Contractor shall employ a competent supervisor and all properly licensed personnel necessary to perform the services required in this contract. The City Purchasing Agent shall have the right to require the Contractor to remove and/or replace any of the personnel for nonperformance or for unprofessional behavior. The City Purchasing Agent may require the Contractor to submit a weekly performance record of the areas and of the work performed, on forms approved by the City Purchasing Agent. The Contractor or his supervisor shall be available to inspect such work as required by the City Purchasing Agent.

**9. PREVAILING WAGES**

The Contractor is required to pay the prevailing wages as determined under the provisions of Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority. Copies of the Prevailing Wage Schedule is found on line at [www.city.waltham.ma.us/open-bids](http://www.city.waltham.ma.us/open-bids)

**10. MATERIALS**

The City or its Agent reserves the right to approve or reject any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any rejected supplies, materials or equipment, to the satisfaction of the City or its Agents.

**11. TERMINATION OF CONTRACT**

This contract may be terminated by the City upon deliverance to the Contractor of a five-day written notice of said termination.

**12. CONTRACT OBLIGATIONS**

Contract obligations on behalf of the City are subject to an annual appropriation to cover the contract obligation.

**13. BIDDER EXPERIENCE EVALUATION**

Each bidder shall submit with his bid, all the information relative to their experience and qualifications in performing the work required under this contract and shall have been in business for a minimum of five (5) years, in order for their bid to be considered.

**14. NOT-TO-EXCEED AMOUNT**

The bid amount proposed in your company's response is a "not-to- Exceed" amount unless the City makes changes, in writing, to the scope of work to be performed. The Change Order must be signed and approved by the City's Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have

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been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided

**16. FINANCIAL STATEMENTS.**

The City may require, within five (5) days after the bid opening, a complete and detailed Financial Statement prepared by a Certified Public Account, to determine a bidder's financial stability.

**17 BREACH OF CONTRACT/ NON PERFORMANCE**

If the Contractor shall provide services in a manner, which is not to the satisfaction of the City, the City may request that the Contractor refurnish services at no additional cost to the City until approved by the City. If the Contractor shall fail to provide services, which are satisfactory to the City, the City in the alternative may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract for nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor. If the damages sustained by the City exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand. The Contractor shall not be liable for any damages sustained by the City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence of which was a basic assumption under which this Contract was made, including a state of war, embargoes, expropriation of labor strike or any unanticipated federal, state or municipal governmental regulation of order, provided that the Contractor has notified the City in writing of such cause within seven (7) days after its occurrence.

**18 RIGHT TO AUDIT**

The City of Waltham has the right to review and audit documents related to this contract. This right extends to any subcontractor, supplier or other entity used by the prime contractor to fulfill the obligations under this contract.

**19. CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.**

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

**20. BID OPENING INCLEMENT WEATHER**

If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

**21 FUNDS APPROPRIATION.**

THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION BY THE MAYOR.

**22 THE AWARDING AUTHORITY RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS, OR ANY PART OF ANY BID, WHICH IN THE OPINION OF THE AWARDING AUTHORITY, IS IN THE BEST INTERESTS OF THE CITY OF WALTHAM.**

**END OF SECTION 00700**

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**SECTION 00710**

PREVAILING WAGE SCHEDULE

Please visit the City Web Site at [www.city.waltham.ma.us/open-bids](http://www.city.waltham.ma.us/open-bids) for a copy of the schedules

SECTION 00821

PERMITS

PART 1      GENERAL

**1.01**      **CONTRACT DOCUMENTS**

- A.      The general provisions of the Contract, including General and Supplemental Conditions and General Requirements, apply to the work specified in this section.

**1.02**      **PERMITS -City of Waltham**

- A.      The Contractor shall be responsible for obtaining and complying with all permits required of his equipment, work force, or particular operations (such as blasting and fuel storage permits, etc.) in the performance of the Contract. All costs associated with obtaining permits will be included in the price of the work.
- B.      If included as part of this project, The Contractor shall be responsible for complying with requirements of the Local Conservation Commission and the Cambridge Watershed Protection District. All costs associated with complying with the conditions will be included in the price of the work.
- C.      The Contractor shall be responsible for obtaining and complying with the requirements of the Street Opening and Trench Permits required by the City Department of Public Works in the performance of the Contract. All costs associated with complying with the conditions of the permits will be included in the price of the work. All costs associated with obtaining permits will be waived by the City.

**1.03**      **PERMITS - Commonwealth of MA Department of Conservation and Recreation (DCR),  
and Department of Environmental Protection (DEP)**

- A.      The Contractor shall be responsible for obtaining and complying with all permits required by Commonwealth of Massachusetts Department of Conservation and Recreation (DCR). All costs associated with obtaining permits will be included in the price of the work.
- B.      The Contractor shall be responsible for complying with the DEP 316-0744 Permitting including the attached Superseding Order of Conditions and Extension Permit for Superseding Order of Conditions. All costs associated with complying with the conditions will be included in the price of work.

END OF SECTION

**DIVISION 1**  
**TECHNICAL SPECIFICATIONS**

**JOB-SPECIFIC SPECIFICATIONS  
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The measurement and payment of all items shall be in accordance with the MassDOT Standard Specifications for Highways and Bridges, 2020 Edition, unless otherwise noted.

**ITEM 101.  
CLEARING AND GRUBBING**

DESCRIPTION: The work shall include the clearing of trees within the limits of the proposed path and its shoulders. Where possible, key trees identified by the City’s tree warden and/or DCR shall be maintained.

CONSTRUCTION METHODS: Trees, shrubs, stumps, brush, grasses, turf, herbaceous plants, downed timber, rubbish, organic matter, miscellaneous vegetation or extraneous debris not indicated on the Contract Documents or designated in the field by the Engineer to remain shall be cleared and grubbed.

Clearing shall include the felling, cutting, and satisfactory disposal of all trees, stumps and vegetative debris produced through the clearing operations.

Fell trees in such a way as to not injure trees to be saved. Excavation or grading within the branch spread of trees to be saved shall be performed only under the direction of the Engineer unless otherwise directed.

Existing stumps within the shoulder limits shall be removed to their full depth. Roots 3 inches and larger shall be removed to a depth of 2 feet below finished grade. Resulting holes shall be filled with ordinary borrow and 6” of loam, and seeded. See Specification Sections for Earthwork, Planting Soils, and Seeding. Stumps and debris shall be legally disposed of off-site.

**ITEM 102.1  
TREE TRIMMING**

DESCRIPTION: The work shall include trimming trees, cutting/mowing brush throughout the project to provide adequate clearance for construction equipment to access the site.

CONSTRUCTION METHODS: Only a certified Arborist shall undertake any tree work.

The maximum allowable horizontal and vertical limits of trimming/pruning are shown on the plans (Details – 7: Sheet 53); however, the Contractor may choose to trim less than the maximum areas if all contract work can be done without damaging existing trees and branches. If the Contractor elects not to cut to the maximum limits and is later unable to perform his work without damage to limbs the Engineer will direct that work be stopped and additional trimming be performed. Any damaged limbs remaining at the end of the project shall be pruned.

All trimming shall be done according to standard accepted pruning practices. All trimmed material shall be removed from the site. Wood chips and other debris shall not be deposited anywhere on the project and must be removed and disposed of away from the project.

**ITEM 102.3  
CONTROL OF INVASIVE PLANTS EXISTING ON SITE**

DESCRIPTION: Purpose of this item is to document the extent of existing invasive plants within the project area as shown on the plans prior to construction, propose an Invasive Plant Management Strategy (IPMS) for their control, and implement this strategy. The overall intent is to improve the habitat value of the site, protect the proposed landscape restoration and attempt to prevent future spread both on-site and to adjacent sites.

Measures to prevent the introduction of invasive plant species to the site and to correct their introduction as a result of construction-related activities shall be covered under the Standard Specifications, Division I - Sections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended in these Special Provisions.

Plant species targeted for management under this item include, but are not limited to, the following:

- Japanese Knotweed- *Polygonum cuspidatum*
- Oriental Bittersweet- *Celastrus orbiculatus*
- Poison Ivy- *Rhus radicans*
- Black Locust- *Robinia pseudoacacia*

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): “non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.”

Control of invasive plants shall begin immediately with the initiation of construction and continue for a minimum of two (2) growing seasons. Work shall be done during the growing season from May – October.

The general expectation of treatment results is that there is no re-growth of targeted plant species at end of the first season unless otherwise addressed in the Invasive Plant Management Strategy.

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section is (857) 368-9179.

**SUBMITTALS:** The Contractor shall be responsible for making all submittals to the Engineer in a timely and complete manner. Submittals include the following items.

#### Qualifications

Invasive Plant Control Contractor Qualification:

1. Company must provide proof of qualifications by providing the following:
  - a. Narrative describing company, its expertise and experience with invasive plant control.
  - b. Describe how sensitive areas were managed.
  - c. Describe company’s technical qualifications and past performance.
2. Company must meet licensing requirements:
  - a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
  - b. At least one or more applicator must have ROW certification if required for specific project.
  - c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
  - d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.
3. Company must provide proof of experience with invasive plant control to include following:
  - a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.

- b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
  - c. Photo documentation of these projects.
  - d. GPS coordinates of project locations, if available.
4. Crew leader must have expertise with invasive plant control and provide the following:
- a. Have held Core license for at least five (5) years.
  - b. Resume listing five (5) or more years of experience applying pesticides with the company or five (5) years of previous experience with another company specializing in vegetation management.

Approved Contractors include the following or approved equal:

Groundscapes Express, Inc.  
P.O. Box 737  
Wrentham, MA 02093  
Contact: John Engwer  
Phone: (508) 384-7140, FAX: (508) 384-0571

Chris Polatin  
Polatin Ecological Services, LLC  
Old Blake Farm  
334 Mountain Road  
Gill, MA 01351  
Phone: (413) 367-5292, Fax (732) 474-9757

Native Habitat Restoration  
P.O. Box 334  
Stockbridge, MA 01262  
Contact: Jess M. Toro : 413-358-7400  
Sari Hoy: (413) 394-0277

Vegetation Control Service, Inc.  
2342 Main St.  
Athol, MA 01331  
Contact: Jeff Taylor  
Phone: (800) 323-7706

Ted Elliman, Vegetation Management Coordinator  
New England Wild Flower Society  
180 Hemenway Road  
Framingham, MA 01701  
(508) 877-7630 x3203

Invasive Plant Management Strategy (IPMS)

Prior to the start of any invasive plant control treatment, submit in writing an IPMS proposal and Schedule of Control for approval by the Engineer and MassDOT Landscape Architect at least thirty (30) days prior to proposed treatment. All materials and methods proposed shall be consistent with applicable

Massachusetts Wetlands Protection Act - Orders of Conditions. The IPMS shall include, but not be limited to, the following:

1. Description of treatment areas including identification of targeted invasive plant species, locations, approximate size of areas and digital photos with time/date stamp. Delineate treatment areas with polygons outlining their perimeter or locations of individual plants. A free-hand sketch drawn on construction plans or an aerial photo can be used to show locations.
2. Proposed methods of treatment for each species or area, such as manual removal, cutting, or herbicide treatment.
3. If herbicides are proposed, submit product label including application methods and rates for each (entire MSDS information need not be submitted if available online).
4. Proposed application rate.
5. Proposed time of treatment based on target plant species and construction schedule.
6. Method for disposing of invasive plant material including stems, trunks, branches, roots, associated soils, etc.
7. General monitoring schedule.
8. Preliminary re-treatment schedule. Re-treatment shall be based on assessment of initial results and time of year.
9. Proposed performance metrics, or measure of treatment success, which shall be agreed upon by MassDOT.

Note: The IPMS is critical for identifying pre-construction conditions as well as strategies for minimizing import or spread of invasive plants. Failure to provide approved IPMS may jeopardize this item, in which case, the contractor will be responsible for control of invasive plants found on site at no cost to the contract.

#### Follow-up Treatment Schedule

Depending on treatment results after the first year, the IPMS may be re-assessed for the second year to address additional concerns or adjust to conditions. A follow-up treatment schedule shall follow the same format as outlined above and submitted to the Engineer and MassDOT Landscape Architect for approval at least thirty (30) days prior to proposed treatment.

#### Reporting

Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed MassDOT Herbicide Use Report contained within the Contract documents or available from the Engineer or the MassDOT Landscape Design Section. Where applicable, the Contractor shall provide the name/s of the associated water body/bodies affected by potential discharge, per the requirements of Sections 7.1 and 7.2 of the USEPA Pesticide General Permit for the Discharges from the Application of Pesticides.

#### Photo Documentation

Digital photos with date and time stamp shall be provided with IPMS and follow-up reporting.

**MATERIALS:** All proposed herbicides shall be as approved prior to use in the IPMS. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. All herbicide used shall be MDAR approved materials for Sensitive Areas. Application rates will depend on herbicide proposed and shall be per the manufacturer’s label for specific application.

**CONSTRUCTION METHODS:** All methods used shall be as approved in the IPMS.

Prior to the start of any work, Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect. The purpose of the site inspection is to identify limits of work, mark locations of areas designated for treatment and mark individual plants targeted for treatment or removal according to the IPMS. Contractor shall be responsible for marking plants and delineating areas to be preserved, removed, and otherwise treated. Fencing or other materials needed for marking and for delineating protected areas shall be incidental to this item.

**Herbicide Applications**

All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.

Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

Contractor shall take precautions to avoid herbicide applications before or during rain or precipitation events. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall be restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

**Disposal of Invasive Plant Material**

All material to be cleared shall become the property of the Contractor. The satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor's responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material shall not be permitted unless written approval is given as part of the Invasive Plant Management Strategy.

The Contractor shall be responsible for treating areas of re-growth due to improper disposal.

In some instances, it may be preferable to dispose of plants on site with on-going monitoring for re-sprouting. This may be used only if method and disposal locations have been approved in the IPMS. Site work such as grading and seeding to stabilize disposal area shall be incidental to this item.

## RECOMMENDED METHODS

The following specific treatments are provided as guidance to the Contractor for development of the Invasive Plant Management Strategy (IPMS). Actual treatments used shall be as proposed in the approved IPMS.

### ➤ Individual Tree Treatments

#### Cut-Stump Application

Application of herbicide for trees designated for cut-stump treatment shall immediately follow cutting.

To the extent possible, time of application shall be late spring and early summer. Treatment in the spring during period of heavy upward sap flows shall be avoided.

Re-treatment for stumps that re-sprout shall be at no additional cost.

Recommended Procedure:

Cut the top of the stump level to allow uniform herbicide coverage. Thoroughly wet the cambium layer next to the bark so the conducting tissue will carry the herbicide to the roots. On larger trees treat only the outer 2 to 3 inches of the stump (the internal heartwood of the tree is already dead). On trees 3 inches or less in diameter, treat the entire cut surface. Apply treatments immediately after cutting to achieve maximum effectiveness. If application is delayed after cutting, re-cut the stump and apply the herbicide to the live tissue. Moisture stress may affect control during the summer and early fall. Applications during the spring upward sap flow are not as successful as late spring and early summer treatments.

#### Glove Application Treatment

Woody saplings designated for glove application treatment shall be marked during site walk and treated at the appropriate time.

Recommended Procedure: Apply the herbicide to leaves after they have hardened off and during active growth in late spring through summer. Avoid applying herbicide to leaves in fall after plant begins the dormancy process. Follow safe and excepted practices for application, equipment and disposal of equipment. It is recommended that first application be made in late spring to allow time for a second application later in the season, if necessary. Second and subsequent applications may be necessary and shall be incidental to this item.

#### Basal Bark Treatment

Similar methods of trunk treatment such as injection or frilling may be used under this item.

Trees designated for basal bark treatment shall be marked during site walk and treated at the appropriate time.

Recommended Procedure: Apply the herbicide to the lower 12 to 18 inches of the tree trunk from early spring to mid-fall. Some species can be treated during winter. Make cuts around the entire circumference of the tree trunk with an axe or hatchet. Immediately apply the selected herbicide into the cuts. Use herbicide spray mixed with oil until the bark is saturated. Avoid application during heavy upward sap flow in the spring, when sap flowing out of the wound will prevent good absorption. This method is effective on trees of all sizes.

Treated and dead trees shall be removed prior to end of the contract.

For all treated trees, a follow-up foliar spray in the second season may be necessary and shall be incidental to this item.

➤ **Oriental Bittersweet (*Celastrus orbiculatus*) Control by Herbicide**

Oriental Bittersweet shall be treated in locations as identified on the plans and as located in the field by the Engineer and MassDOT Landscape Architect.

Stems cut for application shall be disposed of off-site and burned to ensure that berries don't establish new plants elsewhere. On-site burning shall not be permitted. Foliar spray shall be back-pack spray only, unless otherwise approved by the Engineer.

Recommended Methods for Oriental Bittersweet Control:

Cut Stem Application

Stem shall be cut between the first and second node and the remaining stem shall be painted with herbicide. A dye or marking paint shall be used to mark stems treated.

Rates will depend on herbicide used and shall be per the manufacturer's label for specific application.

Foliar Application

Foliar application shall consist of a low pressure, low-volume spray with marking pigment to identify treated plants. Spraying shall be done from October through November. Steps shall be taken to ensure herbicide does not come in contact with surrounding vegetation.

Oriental Bittersweet may be cut earlier in the season and then the re-growth sprayed in August-September to more easily apply back-pack sprayed herbicide and avoid desirable vegetation. Allow 6 weeks after cutting before applying herbicide to new growth.

Foliar application shall be made with spray equipment designed to apply small droplets over the entire plant (stems and leaves). These may be made with backpack applicators or hose-end sprayers. Applicators shall use care to treat only the target species, and not desirable neighboring vegetation. Foliar applications done within wetland limits shall not contain surfactants and shall meet all wetland requirements.

No spraying shall be done in rain or under windy conditions.

➤ **Japanese Knotweed (*Polygonum cuspidatum*) Control by Herbicide**

**Recommended Methods for Japanese Knotweed Control**

1. Injection Procedure

Applications shall be made just below the first or second node above the ground to allow for translocation to the root system. A hole in the back of the stem needs to be created to allow pressurized water to escape. An injection gun will do this at the time of injection. Otherwise, use



a probe to create a small opening on either side of the stem. Injection gun or syringe shall be metered to inject proper amount of herbicide and the dose shall be delivered as recommended by the manufacturer of the tool or in a downward diagonal through one of the two holes closest to the applicator. A permanent marker may be attached to the injection gun so that stem is marked at time of injection. Otherwise, stem must be separately marked. Plants will normally take up herbicide within 20 minutes of injection. Rates will depend on herbicide used and shall be per the manufacturer's label for specific application.

To the extent possible, every stem shall be injected as each cane has its own separate rhizome system. Each stem injected must be marked with a permanent marker to indicate which stems have been injected. Cutting of canes for treatment is not necessary with injection method. Spot spraying of foliage should be used on stems that are too small to successfully inject.

When canes are dead and as approved by the Engineer, remove canes and dispose as specified herein.

## 2. Cut Stem Application

Cut-stem application may be used in lieu of the injection gun. Canes cut for application shall be disposed of off-site and burned to ensure that berries don't establish new plants elsewhere.

Stem shall be cut between the first and second node and herbicide shall be delivered into the stem cavity. A dye or marking paint shall be used to mark stems treated.

Rates will depend on herbicide used and shall be per the manufacturer's label for specific application.

## 3. Foliar Application

Foliar spray shall be back-pack spray only, unless otherwise approved by the Engineer. No spraying shall be done in rain or under windy conditions.

Foliar application shall consist of a low pressure, low-volume spray with marking pigment to identify treated plants. Spraying shall be done during the bloom season, August through September. Steps shall be taken to ensure herbicide does not come in contact with surrounding vegetation.

For foliar application, Japanese knotweed should be cut earlier in the season and then the re-growth sprayed in August-September to more easily apply back-pack sprayed herbicide and avoid desirable vegetation. Allow 6 weeks after mowing before applying herbicide.

Foliar application shall be made with spray equipment designed to apply small droplets over the entire plant (stems and leaves). These may be made with backpack applicators or hose-end sprayers. Applicators shall use care to treat only the target species, and not desirable neighboring vegetation. Foliar applications done within wetland limits shall not contain surfactants and shall meet all wetland requirements.

## 4. Control by Cutting

Prior to start of work Contractor shall indicate in writing the proposed disposal of removed Japanese knotweed material for approval by the Engineer. Unless otherwise directed, all cut

Japanese knotweed stems shall be disposed of on-site so as to avoid potential spread to new locations.

Contractor shall walk the site with the Resident Engineer and representative MassDOT Landscape Design. Limits of Japanese knotweed to be removed shall be staked in the field for approval by the Engineer. Japanese knotweed canes shall be cut and maintained at a height 4-6 inches. This may require an initial removal of tall canes followed by as many as 8 cuts per growing season. If initial treatment begins once Japanese knotweed is too tall to mow, cutting shall be by sharp knife and thereafter by mowing or as deemed appropriate by Engineer to avoid spreading.

Care shall be taken not to spread rhizomes or crowns by mowing or cutting activities. Care shall be taken to prevent Japanese knotweed from entering waterways.

## **MONITORING**

After initial herbicide treatment, all treated plants and areas shall be monitored through visual observation and re-treated as necessary and appropriate throughout the season and for the duration of the contract per the management proposal and schedule for control submitted by Contract. Monitoring shall be incidental to all items.

A brief Monitoring Report on treatment results that includes digital photographs shall be submitted to the Engineer and MassDOT Landscape Architect at the end of each season.

## **METHOD OF MEASUREMENT:**

Work under this Item shall be measured and paid at the contract unit price of HOURS, which price shall include all labor, materials, equipment, tools and any incidentals required to complete the work as specified.

## **ITEM 102.511 TREE PROTECTION**

**DESCRIPTION:** Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.

The intent of the contract through these items is to prevent damage to branches, limbs, trunks, and root systems of existing individual trees to remain and to ensure their survival. Provisions under this item include procedures or protection measures to prevent soil and root disturbance for those trees near the work zone. Unless explicitly shown on the plans, the Contractor shall not conduct any construction activity within four (4) feet of the canopy (drip line) of trees to be retained. Prohibited activities include, but are not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment.

Prior to starting site demolition or clearing operations, the Contractor shall flag all trees to be saved, as noted on the Drawings and in the field, and shall receive approval by Engineer before beginning demolition. Contractor shall install tree protection prior to starting any demolition or other tree clearing operations.

The Contractor shall be responsible for the protection of all existing trees designated to remain for the length of the construction period and be protected, including liability for all damages as specified herein.

The Contractor shall protect all existing trees and plants within and immediately adjacent to the construction area that are not designated to be removed for the length of the Contract. The Contractor shall be solely responsible for judging the full extent of the work requirements, including, but not necessarily limited to any equipment and materials necessary for providing tree protection.

Prior to any construction activities, the Contractor and Arborist shall inspect the site together with the Engineer and Town Tree Warden to identify the specific appropriate protection measures to apply to each tree on the Tree Inventory. Other trees, bushes, shrubs, and/or quality vegetation not on the Inventory but within the work zone shall also be inspected to determine appropriate measures. The Arborist shall make recommendations as to specific work to be done on each tree. The Engineer will have the final decision as to the work to be done on each tree, and on the methods used to do the work.

Prior to execution of work the Contractor shall walk the entire length of the project with the Engineer, the City Tree Warden, and Massachusetts Certified Arborist retained by the Contractor.

Only a certified Arborist shall undertake any tree work.

SUBMITTALS: Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this item.

MATERIALS: Individual tree protection shall be temporary guards for existing trees fabricated from black corrugated plastic pipe in various sizes as shown on the Drawings.

Tree protection fencing shall be temporary 4 ft high orange snow fence around groups of existing trees as shown on the Drawings.

All materials will be subject to the approval of the Engineer. Fence fabric shall be polyethylene fencing or chain link fence (new or used) with a minimum height of four (4) feet. Fence posts shall be free-standing on approved supports or driven into the ground.

Tree protection shall be 2x4 inch cladding, at least 8 feet in length, bound together with wire, installed over burlap.

Wood chips shall conform to provisions of Wood Chip Mulch under Materials Section M6.04.3.

CONSTRUCTION: Water trees and other vegetation to remain within limits of contract work as required to maintain their health during the course of construction operations.

Prune and repair trees and vegetation indicated to remain that are damaged by construction operations, in a manner acceptable to the Owner.

To avoid damage to trees, which have part of their root systems in areas designated for excavation, such excavation shall be accomplished as carefully as possible by handwork or as directed by the Engineer.

Where specified, the Contractor shall wrap the area of the trunk of the tree with burlap prior to attaching 2x4 inch cladding. Cladding for tree trunks shall extend from the base of the tree to at least eight (8) feet from the base and shall encompass the full circumference of the trunk. Cladding shall be attached by binding it to the tree only. No nails, screws, or other mechanical fasteners will be allowed.

Where specified, the Contractor shall install protective fencing. Fencing shall be installed four (4) feet outside the drip line, or a minimum of ten (10) feet from the trunk. Fence posts shall be driven into the ground so as to avoid damaging the root system. Where free-standing supports are used, they shall be located so as to avoid damaging the root system.

Where construction activities within the protective fencing are required, the contractor shall place a protective layer of wood chip mulch to a depth of six (6) inches to protect the root system from construction equipment. The Contractor shall also tie back or otherwise protect branches and limbs from damage. Where excavation or embankment within the protective fencing is required, the Contractor shall use equipment and methods that shall minimize damage to the tree roots, as per the recommendations of the Arborist. Excavation operations in these areas shall be monitored by the Arborist to ensure that the impact to the root systems is held to a minimum.

Any tree roots exposed by construction activities shall be covered and watered immediately. Exposed tree roots shall be protected by dampened burlap until they can be covered with soil.

The contractor shall water each tree within the construction area where work is in progress twice per week until the surrounding soil of each tree is saturated for the duration of construction activities

#### Removal of Protection

After all other construction activities are complete, but prior to final seeding, wood chip mulch, tree protective fencing, branch protection, and trunk protection materials shall be removed and disposed off site.

#### Tree Damage

The Contractor shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the construction area. Damage that, in the Engineer's opinion, can be remedied by corrective measures shall be repaired immediately. Broken limbs shall be pruned according to industry standards. Wounds shall not be painted. Existing trees which, in the opinion of the Engineer, are damaged as a result of the Contractor's operations shall be assessed at a minimum cost of one hundred and fifty dollars (\$150.00) per caliper inch at breast height, in accordance with the "Guide for Establishing Values of Trees and Other Plants." Assessed damages shall be deducted from sums payable under the Construction Contract.

#### Tree Fencing and Armoring

All existing trees within the limits of the work, which are marked on the Plans to be retained, shall be protected by snow fence, chain link fence or other acceptable device in order to avoid tree damage. The Contractor's arborist shall stake out the drip zones for review by the Engineer and the City's Tree Warden. The tree protection barrier utilized by the Contractor shall be subject to the approval of the Engineer. The minimum height of the protective barrier for trees up to 8 inches caliper shall be 5 feet, and for trees over 8 inches caliper the minimum height of the protective barrier shall measure 6 feet. Additionally, wooden slats shall be placed around the trunk as shown on the details. All trees that sustain bark, root, or trunk damage caused by the Contractor's work force during the course of the work shall be repaired immediately by an experienced Massachusetts Certified Arborist, with proper tools, and according to proper horticultural practices.

## PROTECTION FROM STAGING

To avoid compaction of existing roots, the stockpiling of heavy equipment, debris or construction material within the protected tree root zone area and/or drip line of designated protected trees is strictly prohibited. No plants shall be used for crane stays, guys or their fastenings. Upon notification by the Engineer, any material placed in this unauthorized zone shall be removed immediately. If access is required in drip zones, a 4-inch depth of wood chips, seasoned at least one year, shall be installed to reduce compaction. If determined by the Engineer in consultation with the Tree Warden, that damage has occurred, the Contractor shall be required to undertake corrective measures including but not limited to aeration, fertilization, and watering. The securing of signs, barricades, temporary wire, cable and other materials to trees is prohibited.

## PROTECTION FROM EXCAVATION

The Contractor shall take due care to protect aerial branches from damage while performing work within the site. All low branching trees shall be protected from equipment damage and disturbance. Alternative operations shall be utilized to preserve smaller trees where required.

The contractor's arborist shall be present during excavation within the tree drip zone areas and shall determine the best method for excavation around existing tree roots based upon Massachusetts Arborist Association and the National Arborist Association standards of care. Excavation in drip zone areas where roots are present shall not cause the tearing or ripping of tree roots. Roots shall first be cleanly severed prior to continuing with the excavation, or otherwise avoided to prevent damage to the root. Tree roots shall not remain exposed. Root ends shall be covered within two hours of exposure with soil or burlap and kept moist until the final backfill, or grade is established.

Where excavation is required within the drip zone of designated trees to remain, the Contractor shall take measures to avoid damage to major roots. Within drip zones, the top 18 inches of excavation shall be directed by the arborist to avoid damage to the major (greater than 3 inches) tree roots. The removal of existing sidewalk within the drip zone shall be prosecuted carefully. The existing subgrade material under the sidewalk shall be reused, if it is deemed appropriate by the Engineer, in order to avoid damage to the tree roots.

If roots greater than 3 inches are encountered, especially for trees retained in the grass strip, the Contractor shall take precautions to ensure no damage is done to the tree roots. Under no circumstances shall tree roots measuring 3 inches or greater be cut without prior approval of the Engineer. The Engineer shall be notified 48 hours prior to excavation within drip lines of trees.

Tree roots greater than 3 inches in diameter and less than 12 inches below ground level shall not be cut without approval of the Engineer. Roots shall be cut cleanly, as far from the trunk of the tree as possible. Root pruning shall be to a depth of 18 inches. Root pruning shall be performed using tools and machines designed specifically for this purpose. The size and type of tools and machine used shall be governed by the referenced standards and as acceptable to the Engineer. Root pruning shall be completed prior to base or subgrade preparation.

Broken or torn branches shall be removed back to the nearest lateral branch. The cut shall be made at the branch collar. The indiscriminate lopping off of a damaged branch shall not be accepted. All pruning tools shall be cleaned between trees to reduce the spread of disease and insects.

Watering shall be provided if natural precipitation is not acceptable. Trees shall be watered when rainfall is less than 1 inch per week. Watering shall be by a slow flow method that will allow the water to percolate thoroughly into the soil. Methods shall be as approved by the Engineer.

Trees designated for protection shall receive continuous tree protection care. Such care shall include but shall not necessarily be limited to aerial (foliar) and injection fertilizing to repair damage to trees. The Contractor's Arborist, in conjunction with the Tree Warden, will inspect any trees suffering apparent significant damage for stability and vitality. For trees determined to be viable and stable, preservation care shall be provided as directed herein.

Trees designated for protection shall receive 3" depth aged pine bark mulch as specified in Section 771 of the Standard Specifications.

**METHOD OF MEASUREMENT:**

Work under this Item shall be measured and paid at the contract unit price of EACH, which price shall include all labor, materials, equipment, tools and any incidentals required to complete the work as specified.

**ITEM 107.97  
STRUCTURAL STEEL REPAIRS  
(BRIDGE NO. 113 - LINDEN STREET BRIDGE)**

**NOT FOR CONSTRUCTION**

**DESCRIPTION:** All work shall be in accordance with the relevant provisions of Sections 960 and 961 of the Standard Specifications and the following:

The work to be done under this Item consists of demolition and work involving existing painted steel, providing new steel, removing rivets, and replacing missing steel and fasteners in order to repair the deteriorated/damaged under bridge diagonal steel bracing members and connection plates, and horizontal gusset plates. Photos of respective areas of repair/replacement have been included at the end of the specification.

Gusset plates shall be replaced to best extent practicable, particularly at areas where existing damage to floor beams is present.

The work also includes all tasks associated with lead paint as described in Section 961.

Payment for this sub-item will be made under Item 992.12, Alteration to Bridge Structure No. 113 (Linden Street Bridge).

**MATERIALS:** All new structural steel used in the repairs shall be AASHTO designation M 270 (ASTM A 709) Grade 36 or 50, and all fasteners shall be ASTM A325 high strength bolts and nuts. All new structural steel and connectors shall be hot-dipped galvanized in accordance with the MassDOT Standard Specifications.

**CONSTRUCTION METHODS:** The contractor shall assume that the coatings on the existing steel contain lead (Pb), unless otherwise determined by testing. All demolition and work involving painted steel shall conform to the requirements of Section 961.

All existing steel member surfaces that will be in permanent contact with new steel shall be cleaned to at least SSPC-SP3 and primed with an approved primer before performing the repairs.

The methods of procedures, materials, equipment, and anchorage proposed by the Contractor shall be submitted on a standard shop drawing for approval by the Engineer prior to beginning of work. Approval shall not relieve the Contractor of responsibility for the successful completion of the work.

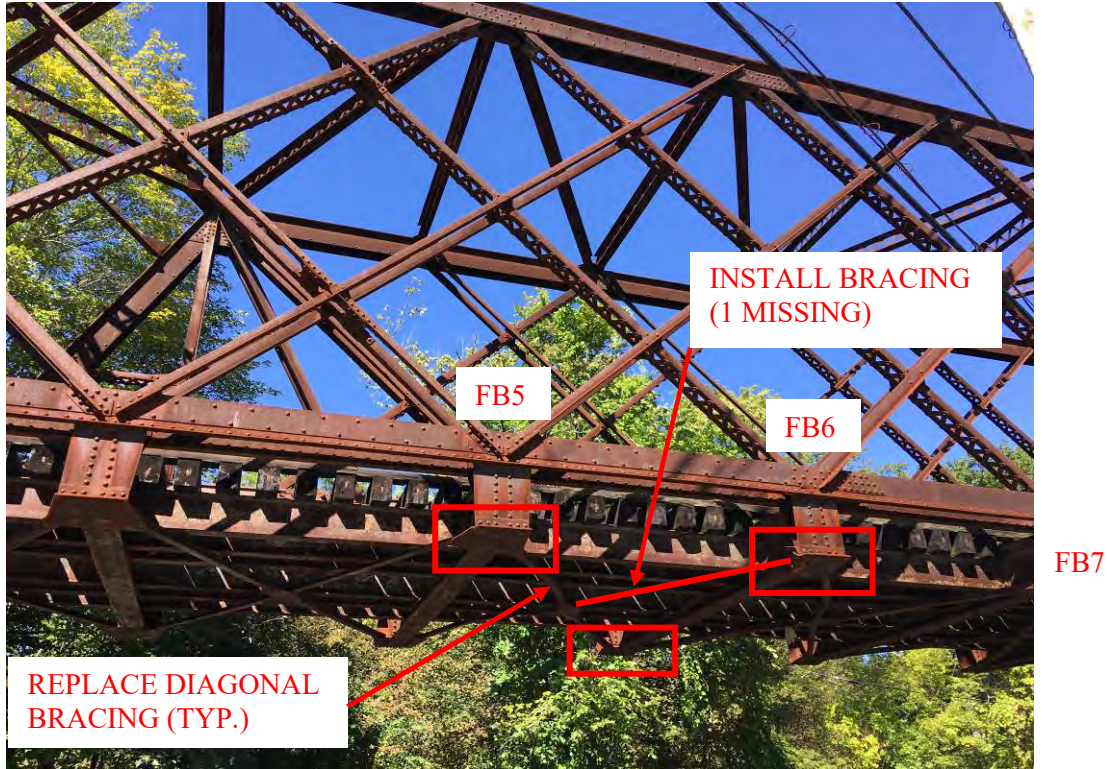
The work shall be done by methods not likely to produce fracture or other injury to the steel members. Torch cutting or heating of steel will not be permitted for rivet removal where the rivet is connected to any component to remain.

During the course of the work, it may be necessary to disconnect, support, or adjust steel which is to remain in the structure. For these situations, the Contractor shall submit his proposals for disconnecting, supporting, or adjusting the steel, as necessary, to the Engineer for approval. The Contractor's proposals shall be approved prior to the actual commencement of any disconnecting, supporting, or adjusting of steel. If, in the opinion of the Engineer, the Contractor's operations damage other members of the structure being repaired, he/she shall be required to change his/her methods of operations and make all necessary repairs to the damaged member as ordered by the Engineer at no additional cost to the City of Waltham.

Welding will not be permitted.



*Photo 1:* Overall underside view, looking east.



*Photo 2:* Floor beams 5 and 6, south side, looking north.

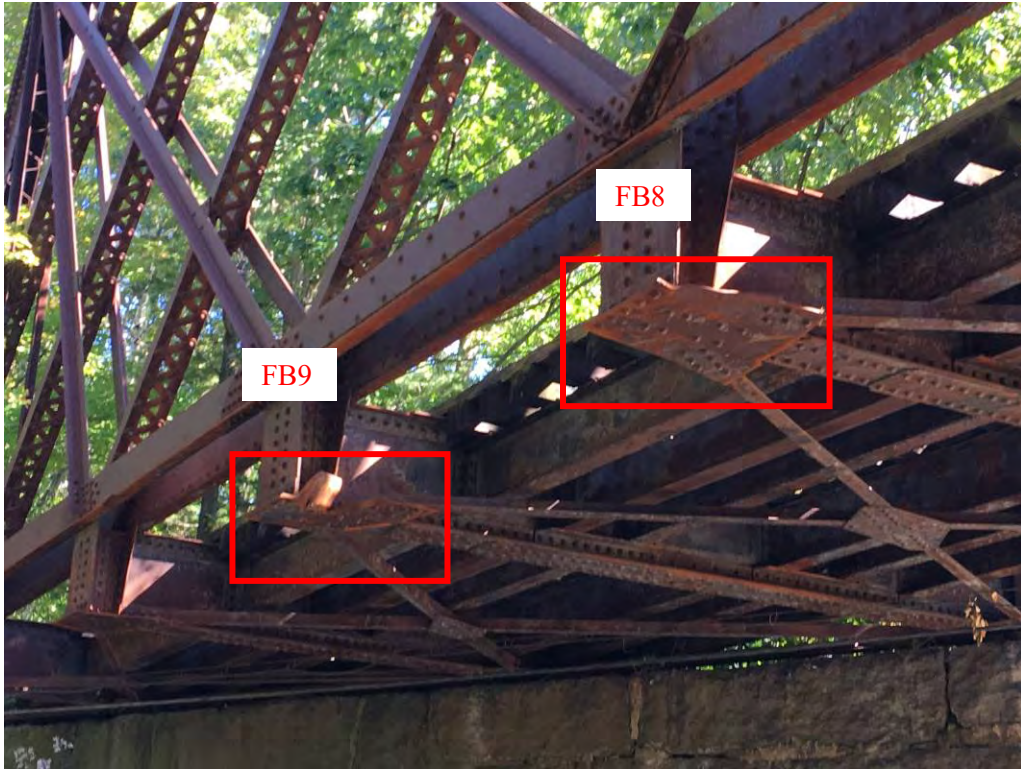
Replace north gusset plate at Floor beam 5, and north and south gusset plates at Floor beam 6. Replace all diagonal bracing members between Floor beams 5 & 6 and 6 & 7. Install missing bracing as shown.



*Photo 3:* Floor beam 7, north side, looking south.

Replace north gusset plate.





*Photo 4:* Floor beams 8 and 9, north side, looking east.  
Replace north gusset plates at both floor beams.

**ITEM 115.990  
DEMOLITION OF BRIDGE (BRIDGE NO. 114 - TIMBER BRIDGE)**

**NOT FOR CONSTRUCTION**

**ITEM 115.991  
DEMOLITION OF BRIDGE NO. 8.75 – (TIMBER CULVERT)**

**DESCRIPTION:** The work under this Item includes the complete removal and satisfactory disposal of all materials comprising the existing superstructure and portions of the substructure, as described below, and shall conform to the relevant provisions of Section 112 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the following:

**Timber Bridge:** Work under this Item includes the complete removal and disposal of the longitudinal timber stringers, timber pile bracing, timber pile caps, and timber abutment cribbing including all hardware. Work under this Item shall also include cutting the existing timber piles located at the abutments to 1'-0" below the proposed abutment reinforced soil foundation and cutting the existing timber pier piles to an elevation required for construction of the proposed timber pile cap and superstructure.

**Timber Culvert:** Work under this Item includes the complete removal and disposal of the longitudinal timber stringers and timber substructure elements including all hardware.

Payment for this sub-item will be made under Item 992.11, Alteration to Bridge Structure No. 114 (Timber Bridge) and Item 992.15, Alteration to Bridge Structure No. 8.75 (Timber Culvert).

The timber components of the existing structures are suspected to be treated with creosote, pentachlorophenol, CCA, and/or other hazardous materials. The items listed above shall include all costs for sampling, laboratory testing, loading, transportation, and disposal of the treated wood. The Contractor is required to submit disposal manifests to the Engineer prior to the completion of the project. All aspects of this Item are to be completed in accordance with state and federal regulations.

**CONSTRUCTION METHODS:** The work for development and implementation of a Health and Safety Plan and personal protection, shall be included in this item of work.

The Town of Waltham does not guarantee or represent that the bridge materials and existing conditions will actually coincide with any descriptions contained herein or represented on the plans. The Contractor shall make his own investigation of the existing structures including the size, shape, and connections of the materials that make up the structure and the structure's stability under demolition and construction loadings. No additional compensation, other than the lump sum price bid for this Item, shall be made if the materials or work provided is different than that inferred or described herein or shown on the plans.

The Contractor shall submit his proposed method of demolition including equipment, shielding, tools, devices, etc. to the Engineer for approval. The demolition procedure and work shall follow the requirements given for erection in Section 960.61, D. Erection, of the Standard Specifications. The demolition procedure, shielding design, and any necessary calculations and drawings shall bear the stamp of a Professional Engineer registered in the Commonwealth of Massachusetts certifying that all existing structural members are suitably braced and supported throughout the demolition process. Work shall not commence until the Engineer has given written approval of the method of demolition.

Debris from construction must be carefully contained within the work zones and prevented from falling into the waterways below. No foreign material or debris resulting from the Contractor's operations shall be permitted to enter or remain in the waterway. The Contractor shall be required to remove any debris generated from construction from the site immediately and to restore portions of the site affected by the operation to their original undisturbed condition or better. Removal of debris generated by demolition and construction will be performed at the Contractor's own expense. The Contractor shall be responsible for dust control as a result of the demolition operations.

The Contractor shall provide for the protection of the waterway and adjacent areas during demolition of the existing structures. This shall be accomplished by the utilization of adequate shielding placed beneath and adjacent to the existing structure prior to demolition. The Contractor shall not allow debris, tools, or incidental equipment of any kind to swing over areas where vehicular or pedestrian traffic exists.

The Contractor shall be responsible for adequately protecting any existing utility lines during his operations. If any utilities are damaged due to the Contractor's negligence, he shall make repairs at his own expense. The Town makes no assurances regarding the presented conditions, dimensions, and materials of the existing structures as shown on the Contract Drawings. The Contractor shall verify all existing conditions and construction features of the structures to be demolished, as necessary, for the proper planning and completion of the work. The Contractor shall base its bid on his/her own findings without any additional compensation for variances from the Plans or these Special Provisions regarding actual conditions for the items to be removed.

The Contractor shall be solely responsible for maintaining the stability of the existing structures at all times during the demolition and construction operations. The Contractor shall prepare and submit a plan

indicating its proposed demolition procedures including dust control, and methods to be used including equipment, tools, devices, crane capacity and location, schedule of operations, methods of utility protection, shielding design, pile and abutment/wall bracing design, disposal location, traffic management procedures, etc., to the Engineer for approval. The demolition procedures and any necessary calculations and drawings shall be stamped by a Professional Engineer registered in Massachusetts, certifying that all existing structural members, including foundation elements scheduled to remain in place, are suitably braced and supported throughout the demolition process.

Work under this item may not commence until the Engineer has given written approval.

The Contractor is responsible for designing, furnishing, installing and maintaining the shielding. When directed by the Engineer, the Contractor shall remove and dispose of the shielding to the satisfaction of the Engineer. The Contractor shall submit drawings and calculations, stamped by a Professional Engineer registered in the State of Massachusetts, for the proposed shielding to the Engineer for approval prior to installation. The drawings shall include details of all connections, brackets and fasteners.

No portion of the bridges shall be removed until the Protective Shielding is completely in place and the Contractor has approval from the Engineer to proceed. The shielding shall extend the full length of the bridge spans and a sufficient distance above and beyond the structures as required preventing debris from entering the waterways or banks below. All spaces along the perimeter of the shielding and at the seams shall be sealed to prevent dust and debris from escaping and falling into the waterways.

Shielding shall be designed to safely withstand all loads that it will be subjected to. The permissible design stresses shall be in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications. The design shall include a complete description of equipment and construction methods proposed for the elements removal. Shielding shall also be designed to withstand the impact imparted by the maximum sized piece of element should it fall during excavation or removal.

All material and debris shall become the property of the Contractor and shall be recycled, reused or disposed of in accordance with all applicable local, state and federal requirements

### **ITEM 120.1 UNCLASSIFIED EXCAVATION**

DESCRIPTION: The work under this item shall conform to the relevant provisions of Section 120 of the Standard Specifications and the following:

The work shall include the excavation and removal of materials of every description regardless of the type encountered within the project limits as shown on the drawings and as directed by the Engineer, except materials under the items of Disposal of Rails and Ties, Demolition of Bridge, Tree Pruning and Tree Clearing, and except those materials for which excavation is included with the work specified to be performed under other items of this Contract.

MATERIALS: The work shall include, but not be limited to, the removal of rails and ties, any existing pavements, stairs, walls, fences, curbing, sidewalk and earthwork. Also included shall be the removal and disposal of existing bricks and/or pavers, and all other materials not designated to be reused on the project or to be removed and stacked. The Engineer shall determine the disposition of all materials with respect to removal and disposal.

The Contractor shall perform all excavation in such a manner as to maintain proper and continuous drainage at all times.

Materials from excavation must be contained within the work zones and prevented from falling into the waterways below or adjacent. No foreign material resulting from the Contractor's operations shall be permitted to enter or remain in the waterways. The Contractor shall be required to remove any material generated from construction from the site immediately and to restore portions of resources within the site affected by the operation to their original undisturbed condition or better. Removal of material generated by excavation will be performed at the Contractor's own expense.

The Contractor shall assume that no more than 20% of excavation may be reusable for borrow.

**METHOD OF MEASUREMENT:** Measurement will be in accordance with Section 120 of the Standard Specifications and shall be in the unit cubic yards.

**BASIS OF PAYMENT:** No separate payment will be made for the off-site disposal of all existing material unsuitable for reuse in the proposed work, but all costs in connection therewith shall be considered incidental to the Contract and no additional compensation shall be allowed therefore. The accepted quantities for "Unclassified Excavation" will be paid for in cubic yards.

### **ITEM 141.99 UTILITY LOCATING**

**DESCRIPTION:** The work under this item shall consist of locating existing utilities and underground structures in the work area of the proposed Timber Access Ramp at Linden Street and within 5 feet of any area subject to subgrade construction work as directed by the Engineer. The work shall be conducted by a Utility Locating Contractor specializing in subgrade utility locating.

This work shall be completed, including submission of the utility plan to the Engineer, no less than 30 days prior to any other subgrade construction including any support of excavation installation.

**QUALIFICATIONS:** The Utility Locating Contractor shall have a minimum of 5 years of experience in utility locating. The Contractor shall submit company literature, the resume of the Utility Locating Contractor's Project Manager, and a list of at least 10 projects conducted during this period. The qualifications shall be reviewed and approved by the Engineer prior to starting the work.

**CONSTRUCTION METHODS:** Utility Locating shall be accomplished using vacuum pits to establish the location, depth, and size of utilities and structures.

All pits shall be backfilled with existing material and/or gravel borrow; any pavement shall be repaired with cold-patch asphalt.

The Contractor shall submit a plan clearly indicating the locations of all found utilities and structures for review by the Engineer.

**METHOD OF MEASUREMENT:** "Utility Locating" will be measured for payment as a "Lump Sum."

**BASIS OF PAYMENT:** "Utility Locating" will be paid for at the contract "Lump Sum" price as listed in the proposal. The price so stated shall constitute full and complete compensation for all labor, materials, tools, equipment, and all other incidentals necessary to finish the work, complete and accepted by the Engineer. Backfilling and asphalt patching shall be considered incidental to this item.

**ITEM 180.6  
MISCELLANEOUS SOIL TESTING**

DESCRIPTION: *This Item is included as a contingency item in the event that materials testing in accordance with Items 120.1, 115.990 and 115.991 indicate hazardous materials. Work to remediate the hazardous materials, if discovered, will require a soil management plan.*

The work under this item shall conform to all relevant provisions of the Standard Specifications, the Special Provisions and the following:

The Engineer may, from time to time, direct the Contractor to obtain soil samples from various locations within the project area and to perform laboratory analyses on those soil samples to assess reuse or disposal options.

SAMPLING AND ANALYSIS: The Contractor shall collect discrete soil sample(s) from locations within individual soil piles or specific land area identified by the Engineer. The soil samples shall be collected at a depth specified by the Engineer. The samples shall be delivered to a Massachusetts certified laboratory using proper chain-of-custody documentation for the analysis of Resource Conservation and Recovery Act (RCRA) 8 metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), pesticides, polyaromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). Subsequent testing, depending upon initial results, may be required for Toxicity Characteristic Leaching Procedure (TCLP) analyses (Method 1311) for metals.

SUBMITTAL: The Contractor shall review and summarize the laboratory data from the soil sampling analyses. The data will be compared to Massachusetts Contingency Plan (MCP) soil standards and acceptance criteria for soil recycling and landfill disposal facilities. A letter report shall be delivered to the Engineer outlining the soil sampling methods, laboratory analyses results and proposed options for reuse or disposal of the soil.

METHOD OF MEASUREMENT: Miscellaneous Soil Testing shall be measured by each round of samples collected, tested and reported to the Engineer. Each round of samples shall include a total of three samples.

BASIS OF PAYMENT: The accepted quantities for “Miscellaneous Soil Testing” will be paid for as each.

**ITEM 180.99  
DISPOSAL OF RAILS AND TIES**

DESCRIPTION: Work under this item shall include the removal and disposal of all railroad rails, associated ties and appurtenances, as indicated on the plans and as directed by the Engineer.

The rail ties are suspected to be treated with creosote or similar. This item shall include all sampling, laboratory testing, loading, transportation and appropriate disposal of the treated wood. The Contractor is required to submit disposal manifests to the Engineer prior to the completion of the project. All aspects of this Item are to be completed in accordance with state and federal regulations.

Debris from removal must be carefully contained within the work zones and prevented from falling into the waterways below or adjacent. No foreign material or debris resulting from the Contractor’s operations shall be permitted to enter or remain in the waterways. The Contractor shall be required to remove any debris generated from removal from the site immediately and to restore portions of resources within the site affected

by the operation to their original undisturbed condition or better. Removal of debris generated by demolition will be performed at the Contractor's own expense.

METHOD OF MEASUREMENT: Measurement shall be by the weight, in Tons, of rails and ties removed from the site and subsequently accepted at a licensed facility. The work shall be considered full compensation for all labor, tools, equipment, materials, testing, loading, transportation, approvals, and permits necessary for the completion of the work.

BASIS OF PAYMENT: No separate payment will be made for the removal and off-site disposal of rails and ties, due to the monetary value of the rails themselves which will become property of the contractor.

**ITEM 200.991**  
**BIORETENTION AREA A**  
**ITEM 200.992**  
**BIORETENTION AREA B**  
**ITEM 200.993**  
**BIORETENTION AREA C**

DESCRIPTION: This work consists of designing and installing the Bioretention Areas. Each Bioretention Area shall be installed at the locations indicated on the Plans.

MATERIALS: Bioretention soil media shall consist of 60% sand, 10-20% topsoil, 20-30% compost and 1.5-3% organic content. The soil shall be free of stones, stumps, roots, and other woody material over 1-inch in diameter, or brush/seeds from noxious weeds. Soil pH shall be within 5.5-6.5. The compost component of the soil must be processed from yard waste in accordance with MassDEP Guidelines. The compost shall not contain biosolids.

Bioretention area underdrain shall be set in 1 ½" diameter crushed stone. Gradation of stone shall fall within the following ranges: 100% passing the 1 ½" sieve, 10-40% passing the ¾" sieve, and 0-8% passing the ½" sieve. 1 ½" crushed stone shall be imported material.

High-Density Polyethylene (HDPE) drainpipe and fittings shall be ADS N-12 IB ST Smooth Interior Pipe, ADS N-12 IB ST High Capacity Large Diameter Pipe or approved equivalent. Joints shall be soil-tight and include a rubber gasket on the spigot end of the pipe. When installed into the bell end, the joint shall be sealed. Pipe shall conform to AASHTO M294 (Type 'S') for the specified diameters and strength classes. Pipe shall be rated to withstand H-20 Loading Criteria with 18" of cover. Perforated pipe shall conform to ASTM F 810. Perforations shall be 5/8" holes on 5" centers.

PVC drainpipe and fittings shall be per ASTM F 794 pipe, with bell-and-spigot ends: ASTM D 3034 fittings, with bell ends. The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusion or other injurious defects. The pipe shall be as uniform as commercially practical in color, capacity, density and other physical properties. Joints shall be bell and spigot. For SCH 40 PVC piping, joints shall be glued with PVC cement approved by the manufacturer. All fittings and accessories shall have dimensions as recommended by the manufacturer and have bell and/or spigot configurations compatible with that of the pipe. Pipe shall pass impact resistance test in accordance with ASTM D 2444 and minimum pipe stiffness test at 5% deflection in accordance with ASTM D 2412. The normal length of 12-inch size and smaller pipe shall be 12.5 feet. Pipe and fittings shall be manufactured in the United States of America and shall be accompanied by the manufacturer's certificate of compliance, in addition to meeting the performance tests specified hereinafter.

Area Drains shall be formed of PVC pipe stock meeting ASTM D1784 utilizing a thermoforming process to reform the pipe stock to the specified configuration. Drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. Joints shall use elastomeric seals and conform to ASTM D3212, latest revision. Flexible elastomeric seals shall conform to ASTM F477. Area drain frame and grate shall be 24” dia. ductile iron grate made specifically for each 24” diameter area drain. Casting shall conform to ASTM A536 grade 70-50-05. Area drain shall be rated to withstand HS-20 loading criteria and construction traffic. Area drains shall be equipped with a sump and outlet tee as specified on the plans and details.

Precast concrete manholes and catch basin sections shall be equal to that shown on the drawings and shall conform to ASTM Specifications C-478 and C-76 Class IV Wall “B”. The horizontal joints between sections shall be sealed using a flexible butyl resin sealant and shall conform to Federal Specifications SS-S-210A and AASHTO M-198B. In addition, the horizontal joints on the inside and outside of the manhole and catch basin shall be sealed with a “Quick Plug” as manufactured by Parson or approved equal. Openings for pipe insertions shall be round and shall be precast or cored only. The diameter of the opening shall be adequate to install a rubber boot seal. The cored or precast opening shall maintain a minimum undisturbed distance of 6” from manhole section joints. Flexible rubber boot shall be neoprene with stainless steel clamps and bands.

Cast-in-place manholes shall include Portland cement conforming to ASTM C150, Type III, high early strength. Aggregate shall conform to ASTM C330 and shall be graded, crushed stone with a resulting unit weight of concrete of up to one hundred fifty five (155) pounds per cubic foot, and a minimum unit weight of not less than one hundred forty-eight (148) pounds. Water shall be clear and free of injurious and deleterious substances. Concrete shall have a minimum strength of 5000 psi at twenty-eight (28) days and a strength of 3000 psi at the time of form release. During the process of manufacturing of the units not less than two (2) test cylinders shall be tested at time release of the form and two (2) at age twenty-eight (28) days. All compression test cylinders shall be made, cured and stored in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39. All concrete shall be air entrained as specified per MassDOT Standard Specifications. Admixtures shall only be used after prior approval of the Engineer. All reinforcing bars shall conform to the requirements of ASTM designation: A615, Grade 60. Welded wire fabric shall conform to the requirements of ASTM designation: A185.

Brick shall conform to ASTM Specification C-32 for sewer brick, except that the table therein is amended to provide that the required minimum compressive strength in pounds per square inch shall be for any individual brick 3,000 or 5,000 for the average of five bricks selected at random. The maximum absorption of water by five-hour boiling test shall not exceed 16% for any individual brick or 12% for the average of any five bricks selected at random.

Manhole Frames and Covers shall be cast iron and conform to the details on the drawings. Cast iron shall conform to ASTM A-48, Class 25. The underside of the cover and upper side of lip frame must present parallel plane surfaces, and at these points of contact, the frames and covers shall be machined to prevent covers from rocking in the frames under traffic. Covers shall bear evenly in the frame and both frame seats and covers shall be accurately fabricated so that covers are interchangeable for use with any and all frames. Where indicated, frames and covers shall be watertight, and locked. The sizes and weights (medium duty, heavy duty, etc.) are shown on the detail sheets for special manholes. Mortar shall consist of one-part cement and two parts clean sand. No lime shall be used. Covers shall have a non-slip surface and shall have the word “DRAIN”, inscribed. Frames and covers shall be installed on the manholes as indicated on the drawings. They shall be well bedded and encased in cement mortar and accurately set to the grades indicated or as directed. Red clay brick with cement mortar shall be used to adjust grade of frame and cover. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

Catch Basin Frames and Grates shall be cast iron and conform to the details on the drawings. Cast iron shall conform to ASTM A-48, Class 25. The underside of the grate and upper side of lip frame must present parallel plane surfaces, and at these points of contact, the frames and grates shall be machined to prevent grates from rocking in the frames under traffic. Grate shall bear evenly in the frame and both frame seats and grates shall be accurately fabricated so that grate is interchangeable for use with any and all catch basin frames. Mortar shall consist of one-part cement and two parts clean sand. No lime shall be used. Gratings shall have a non-slip surface. Gratings shall be installed on the catch basins as indicated on the drawings. They shall be well bedded and encased in cement mortar and accurately set to the grades indicated or as directed. Red clay brick with cement mortar shall be used to adjust frame and grate. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

Manhole steps shall be manufactured of Copolymer Polypropylene plastic with ½” grade 50 steel reinforcement. Steps shall conform to ASTM C-478 and Fed. Spec. FS RR-F-621. The capacity of each step shall be 1000 lb. at 5-1/8 inch distance from wall and 1500 lb. at 4-inch distance from wall. Steps shall measure 12 inches wide (min.) and extend 5-1/8 inches from wall. Manhole steps shall be provided in each base, riser and top section and shall be integrally cast in each; 12 inches O.C.

METHOD OF MEASUREMENT: The installation of each bioretention area shall be as defined and include all elements described above, and shall be measured as a lump sum item.

BASIS OF PAYMENT: The accepted quantities of “Bioretention Area A, Bioretention Area B, and Bioretention Area C” will each be paid for as a lump sum item. The price so stated constitutes full and complete compensation for all labor, materials, and equipment, and all other incidentals required to finish the work complete and accepted by the Engineer.

#### **ITEM 234.99 MITERED DRAIN**

DESCRIPTION: This work consists of designing and installing Mitered Drain at the locations indicated on the Plans. Mitered Drains prevents ponding of stormwater on the roadway when a raised crosswalk is being used. The drain is designed to run beneath the crosswalk with grates angled flush to the slope that allows for the passage of stormwater.

MATERIALS: The pipe material should be selected to support potential vehicular loading, though limited, due to the placement within the shoulder area. Grates shall be metal, of some type, to both support potential vehicular loading and withstand plow operations.

METHOD OF MEASUREMENT: The installation of Mitered Drain shall be as defined and including all elements described above, will be measured as a per each item. Mitered Drain shall be installed on both sides of the roadway on crowned roads and on the low side only on roads that are super elevated.

BASIS OF PAYMENT: The accepted quantities of “Mitered Drain” will be paid for as a per each item. The price so stated constitutes full and complete compensation for piping and grades, all labor, materials, and equipment, and all other incidentals required to finish the work complete and accepted by the Engineer.



**ITEM 450.22**  
**SUPERPAVE SURFACE COURSE – 9.5 (SSC – 9.5)**  
**ITEM 450.32**  
**SUPERPAVE INTERMEDIATE COURSE – 19.0 (SIC – 19.0)**  
**ITEM 452.**  
**ASPHALT EMULSION FOR TACK COAT**

**DESCRIPTION:** Work under these Items shall conform to the relevant provisions of Document 00717 SUPERPAVE REQUIREMENTS contained herein and the following:

The estimated traffic level to be used for SUPERPAVE HMA mixture designs for this contract, expressed in Equivalent Single Axle Loads (ESALs) for the design travel lane over a 20-year period is **1.8** Million 18-kip (80-kn) ESALs.

The Asphalt Binder used for all HMA mixtures under this contract shall comply with the requirements of Subsection 450.48. The PGAB Grade selected for this Contract is **PG 64-28**

The emulsion under this specification shall be Grade RS-1h and shall meet the requirements of AASHTO M 140.

**Warm-Mix Asphalt Additive**

All Hot Mix Asphalt mixtures shall be modified using a WMA additive capable of lowering plant production temperatures of unmodified binders to below 260°F. The WMA additive shall be a product listed on the Northeast Asphalt User Producer Group (NEAUPG) website ([http://www.neaupg.uconn.edu/?attachment\\_id=345](http://www.neaupg.uconn.edu/?attachment_id=345)), except that no WMA foaming technology which requires the mechanical injection of steam or water into the liquid asphalt will be permitted.

**For HMA mixtures placed on Bridge decks, the WMA additives shall serve as a compaction aide. Mixture production temperatures shall not be lowered for HMA placed on bridge decks.**

The WMA additive must be compatible with polyphosphoric acid modified binders, polymer modified binders, and the HMA Producer's HMA anti-stripping agents. The WMA additive shall be introduced in accordance with the Manufacturer's dosing rates and approved blending methods. The Manufacturer of the WMA additive shall have an on-site representative at the beginning of paving operations. The Manufacturer's representative shall be available for additional consultation during the remaining production.

Work shall conform to the provisions of Section 450. The WMA mixture design shall incorporate the requirements of AASHTO R35 Appendix X2: Special Mixture Design Considerations and Practices for Warm Mix Asphalt (WMA).

When the asphalt binder is modified with the WMA additive at the HMA plant, all WMA additive equipment shall be fully automated and integrated into the plant controls and shall record actual dosage rates on the plant printouts.

The HMA QC Plan shall provide mixture production and placement alterations due to the WMA additive and shall incorporate the modification of asphalt binders when the WMA additive is blended with the asphalt binder at the plant. This plan shall specifically address WMA metering requirements, tolerances and other QC measures.

All costs including the WMA additive, equipment, labor, Manufacturer's representative, production of samples and incidental costs required to modify the HMA shall be incidental to the associated HMA pay items with no additional compensation.

**ITEM 482.31  
SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES**

The work to be done under this Item consists of making a sealed kerf across the full width of the finished asphalt pavement at bridge abutments where called for on the Plans. The shape, width, and depth of the kerf shall be as shown on the Plans.

Prior to the start of the asphalt pavement operation, the Contractor shall place a mark on each curb or barrier on either side of the paved trail. These marks shall be aligned with the actual end of the bridge deck and shall be placed so that they will not be covered or otherwise obscured by the asphalt pavement.

After the completion of the paving operation, the Contractor shall snap a straight chalk line on the pavement between these two marks. The Contractor shall then saw cut the pavement along this line to the depth, width and shape as shown on the Plans. The equipment shall be approved by the Engineer prior to commencing work.

After completing the saw cutting, the Contractor shall clean the saw groove of any dust and debris with an oil free air blast. If the groove was wet sawn, the groove shall be cleaned with a water blast to remove any remaining slurry and debris, vacuumed with a Wet-or-Dry vacuum to remove any standing water, and then dried with an air blast from a Hot-Air-Lance.

Once the groove is clean and dry, the Contractor shall fill it completely with a hot-applied bituminous crack sealer meeting the requirements of M3.05.4 in accordance with the manufacturer's application instructions and restrictions regarding ambient and material temperatures. The crack sealer shall be thoroughly cured prior to opening the road to traffic. To reduce tackiness, only boiler slag aggregate (black beauty) shall be scattered over the sealer when required by the Engineer. Conventional sand shall not be used for this purpose.

**ITEM 751.001  
LANDSCAPING ITEMS**

The following shall constitute the subcomponents for landscaping that collectively are to be bid as lump sum item 751.001.

- ROOT BARRIER
- RIVERSTONE
- GRANITE SETTS
- CEMENT CONCRETE AND CONCRETE PAD
- BENCH
- TRASH/RECYCLING RECEPTACLE
- BICYCLE RACK
- IDENTIFICATION SIGN
- GRANITE STATION PILLAR
- GRANITE MILE POST (N.I.C.)
- SEEDING

- PLANTING
- EMERGENCY CALL BOX
- DESTINATION SIGN
- FLUSH PAVING BAND – RESIN IMPRINT

**ITEM 102.4  
ROOT BARRIER**

**DESCRIPTION:** Work under this item shall include the installation of tree root barriers.

**MATERIALS:** The Root Barrier shall be a mechanical barrier and root deflector to prevent tree roots from damaging hardscapes and landscapes.

The Root Barrier shall be Tree Root Barriers UB 24-2. as manufactured by Deep Root Partners, L.P., 530 Washington Street, San Francisco, CA 94111, 800-458-7668, or approval equal.

Tree Root Barrier shall have the following characteristics:

1. Size: 24" wide by 24" deep
2. 0.085" wall thickness, nominal, injection molded 50% post-consumer recycled polypropylene panels with UV inhibitors.
3. 7/16" wide integral molded 0.085" thickness double top edge with stiffening ribs; bottom edge attached to vertical root deflecting ribs.
  - a. Integral molded 0.085" thickness by 2" deep vertical root directing ribs spaced at 6" O.C.
  - b. Integral molded 0.085" thickness by 2" long by 3/8" wide horizontal anti-lift ground lock tabs, minimum nine per panel.
4. Integrated zipper joining system for panel connection to adjacent panel.
5. Color: Black.

Material shall meet the minimal properties below:

Test	ASTM Test Method	Value Copolymer Polypropylene
Tensile strength @ yield Wall	D638	2,354 PSI
Tensile strength @ yield Hinge	D638	2,846 PSI
Yield Elongation–Wall	D638	7.44%
Yield Elongation–Hinge	D638	7.01%
Flexural Modulus	D790B	119,625 PSI
Notched Izod Impact–Wall	D256A	3.84 (ft-lbs.)
Rockwell Hardness r. scale–Wall	D785A	84.4

**SUBMITTALS**

The Contractor shall submit:

1. Manufacturer’s product data.
2. Complete installation instructions for each item specified

The Contractor shall submit Shop drawings that indicate locations and extent for tree root barrier material.

The Contractor shall submit a Sample of the Tree root barrier: One full length panel.

**DELIVERY STORAGE AND HANDLING**

Provide materials in original unopened containers with manufacturer's labels intact and legible. Damaged materials determined by visual inspection will not be accepted. Remove rejected materials from project site immediately.

Store materials in dry area in manufacturer's protective packaging; in original containers with labels and instruction instructions intact.

## **CONSTRUCTION**

Root barrier shall be placed at each new tree within 10' of the trail and shall extend 20' parallel to the trail from the center point of the tree. Additionally, root barrier shall be placed at each existing 12" or greater caliper tree to remain within 10' of trail.

Provide maximum hardscape protection while utilizing all available rooting space for improved tree health by placing barriers in a straight line directly 3' from edge of the hardscape to be protected.

Verify that other work in other sections, in, at, and around landscaping work is complete to the extent that no damage will occur to newly planted materials or, any possible construction related damage will be minimal and replacement plant material is readily available for planting at no additional cost.

Obtain verification, in writing, from work required in other sections directly involving work in this section regarding correct grades have been provided, coordination of topsoil spreading, and lawns and grasses planting.

Beginning work without fulfilling conditions below requiring removal or replanting work in this section becomes responsibility of this section.

1. Not providing written notification to Owner's Representative of unacceptable conditions indicates acceptance of site.
2. Not receiving verification indicated above.
3. Work required not indicated as unacceptable requiring removal or replanting work.

Use methods necessary to prevent damage to completed sitework performed in other sections. Protect access to and areas around planted materials. Restore damaged areas to original compaction, grades, and lines, repair damaged grassed areas.

Trench to appropriate depth for installation of root guide so that top of guide is 2" below finish grade.

Place the tree root guide in plumb position in the trench with the vertical ribs facing toward the trees and parallel to the hardscape.

Backfill trench in 6" lifts as required in the Standard Specifications.

### **ITEM 152.8 RIVERSTONE**

**DESCRIPTION:** Work under this item shall consist of confirming the elevations of the bioretention basins and placement of riverstones as shown on the Drawings and directed by the Owner's Representative.

**MATERIALS:** All riverstones shall be provided from the same supplier. Riverstones shall be as specified below and as supplied by Stone Gallery Landscape & Masonry Supply, 49 Winchester Street, Newton, Massachusetts 02461, (617) 467-4785, or approved equal.

Medium Riverstones shall be rounded river rocks, sized 1”-3” in mixed tan/gray colors. Provide quantities necessary to complete the work as shown.

Large Riverstones shall be rounded river rocks, sized 3”-5” in mixed tan/gray colors. Provide quantities necessary to complete the work as shown.

**SUBMITTALS:** Contractor shall submit name of supplier and 1-pound bag of each type of riverstone for approval by Owner’s Representative.

**CONSTRUCTION:** The stones shall be placed upon an approved filter medium to the lines and grades shown on the plans and as directed by the Engineer.

Each stone shall be carefully placed, by hand or machine as required, on the prepared filter medium, normal to the slope and firmly bedded thereon.

Control groundwater and surface runoff to minimize disturbance of previously placed and compacted filter media in bioretention areas.

Do not place riverstones on frozen ground.

Place stones in uniform horizontal layers and compact immediately after placement. Where the horizontal layer meets a rising slope, the layer shall be keyed into the slope by cutting a bench during spreading of preceding lift.

Protect structures and pipes from damage during placement of riverstones. Repair damage at no cost to Owner.

Upon completion of the work, the final ground surface shall be left in a firm, unyielding, true, uniform condition free from ruts. Repair disturbed areas caused equipment traffic at no cost to Owner.

### **ITEM 606.3 GRANITE SETTS**

**DESCRIPTION:** Work under this item shall include the preparation and installation of granite setts on mortar setting bed on concrete base and gravel subbase as shown on project Drawings.

**MATERIALS:** Granite setts shall be 4”x4”x4” pre-assembled natural stone granite cobbles as provided by Hanover Architectural Products or approved equal. Stones shall be in stacked pattern, in Ashford White, with sawn sides and thermal finish top.

Joint material shall be wet mortar.

Setting bed shall be wet mortar supportive of cobbles. Mortar that sags under the weight of the cobbles will not be accepted.

Concrete base shall be concrete pavement as specified under Item 701.

**CONSTRUCTION:** The base should be a firm 4” concrete pavement installed as specified under Item 701.

The setting bed shall be mortar placed over the prepared concrete base. Setting bed shall be 1 1/2” thick wet mortar.

Place Granite modules over the prepared setting bed. Granite setts pre-assembled modules should be placed against each other, minimizing the spaces between them to create the appearance of each individual cobble being handset without modular definition. DO NOT plate compact the top of the granite setts. Hand tamp only using a 2” x 4” and rubber mallet.

Apply wet grout and pushed into joints using a broom or rubber squeegee.

Cleaning and Finishing: Grout will begin to set (or harden) in one hour. As soon as the grout starts to set, clean the surface by removing excess grout with large blankets or sponges aided by a flow of water and acid solution wash if necessary.

**ITEM 701.  
CEMENT CONCRETE SIDEWALK AND CONCRETE PAD**

**DESCRIPTION:** Work under this item shall conform to the relevant provisions of Section 701 of the Standard Specifications and the following:

**MATERIALS:** Shall be consistent with Section 701 of the Standard Specifications.

**SUBMITTALS:** The contractor shall construct a 10’ wide by 10’ long sample sidewalk section including at least one expansion joint to be approved by the City prior to construction under these items. A second panel shall be provided if the first is not accepted by the City and shall be constructed at the direction of the Engineer. Upon acceptance the sample panel shall be included as part of the final work.

**CONSTRUCTION:** Construct all pavement and concrete bases to be consistent with relevant portions of Section 701 of the Standard Specifications.

Scoring patterns for exposed cement concrete shall be as shown on the plans. Scoring shall not be saw cut, hand trowling is required.

Concrete shall be installed in locations as shown on the drawings.

Concrete shall be installed as base pads for details as shown on the drawings.

**ITEM 707.1  
BENCH**

**DESCRIPTION:** The work under this item shall include the furnishing and installation of park benches as shown on the plans and as directed by the Engineer.

**MATERIALS:** Bench shall be Trio Bench as manufactured by Forms+Surfaces, 30 Pine Street, Pittsburgh, PA 15223, or approved equal.

Bench shall be Backed in cast aluminum with integral armrests, wood slats of FSC 100% Ipé hardwood.

Fasteners shall be stainless steel.

Hardwood slat shall have penetrating oil finish.

Bench dimensions shall be 6 foot: 75.0” long x 22.7” deep x 33.6” high. Seat height 17.6”, seat depth 17.4”, armrest height 21.6”.

Bench shall be provided for Surface mount with anchors and stainless-steel mounting screws.

**SUBMITTALS:** Contractor shall submit

1. Manufacturer’s standard product literature.
2. Shop drawings.
3. Installation instructions.
4. Maintenance instructions.
5. Submit powdercoat finish samples for approval.
6. manufacturer’s FSC certification number.

**Quality Assurance:** Manufacturer shall have a minimum of 15 years’ experience in the manufacture of site seating.

**Delivery, Storage and Handling:** Handle products in accordance with manufacturer’s instructions. Store products in manufacturer’s original packaging until ready for installation. Protect products from impacts and abrasion during storage.

**Warranty:** Provide manufacturer’s standard warranty for one year from date of invoice against defects in materials and workmanship.

**CONSTRUCTION:** Coordinate construction of the concrete pad with the installation of the surrounding pavement. Assemble benches in conformance with the approved shop drawings and install benches, level and plumb at locations indicated on the plans.

Protect benches from paint spatter, concrete splashes and other construction damage by wrapping in plastic sheeting or heavy kraft paper and taping in place. Do not remove until adjacent work is completed. Protect bench pedestals from chipping during troweling operations. Repair any damage to painted finish.

The Contractor shall coordinate installation of the anchor bolts with the construction of the surrounding concrete surface or shall use a concrete anchor bolt system (drilled and mechanical expansion type system or drill and adhesive epoxy type system). The Contractor shall install the benches as recommended by the manufacturer for surface mounted applications. The concrete shall be core drilled and anchor bolts shall be set in epoxy grout with sealant.

**ITEM 707.2  
TRASH/RECYCLING RECEPTACLE**

**DESCRIPTION:** The work under this item shall include the furnishing and installation of trash/recycling receptacles as shown on the plans and construction details, and as directed by the Engineer.

**MATERIALS:** Trash/Recycling receptacle shall be High Capacity HC5, smart, solar powered, modular trash + recycling compacting containers, as manufactured by Bigbelly, Inc., 150 A Street | Suite 103, Needham, MA | 02494, 888-820-0300, or approved equal.

Receptacles shall have the capacity for 150 gallons with a built-in compactor for a 5:1 ration.

Receptacles shall include a wheeled interior lift bin.

For each location provide one (1) trash and (1) recycling receptacles. Provide each with an 11"x17" standard label: "trash" and "mixed recycling" respectively.

Supply all equipment hardware and required accessories required for complete, operating and installed site improvement item specified herein.

SUBMITTALS: The Contractor shall submit manufacturer's literature, brochures and/or specifications for the trash and recycling receptacles.

QUALITY ASSURANCE AND WARRANTY: Units shall be free of cracks, chips, scratches and any other defect at the time of delivery. All units shall be placed in a storage area, protected from damage prior to and during transit to the Owner's or Contractor's site.

Cutting, painting (other than touch-up), and welding in the field will not be permitted.

Contractor shall provide to the City the written maintenance and operational instructions, all warranties, and guarantees provided by the Manufacturers for the specific improvements and finishes, for a minimum of one year after Final Acceptance. If Manufacturer does not provide warranty for materials installed, Contractor shall assume all cost for replacement of specified material, if product fails during warranty period.

Contractor shall provide a guarantee of minimum of one year after acceptance of Workmanship and against defect as determined by the Department, and shall completely replace or repair site improvements at their own expense within two months after item is identified in the field.

DELIVERY, HANDLING AND STORAGE: Deliver units to the site in manufacturer's original, unopened containers and packaging. Upon delivery examine packages immediately to ensure all products are complete and undamaged. Remove and replace damaged items.

Store units in covered, dry locations, protected from weather, stored off the ground, and secured on-site. Avoid use of protective materials that trap heat and moisture

Protect product's finish from damage during handling and installation.

Secure all items from damage for any reason, including vandalism, and theft.

CONSTRUCTION: The Contractor shall coordinate installation of the anchor bolts with the construction of the surrounding concrete surface or shall use a concrete anchor bolt system (drilled and mechanical expansion type system or drill and adhesive epoxy type system). The Contractor shall install the trash receptacles as recommended by the manufacturer for surface mounted applications.

The Contractor shall install the receptacles once all heavy roadway construction is complete, as approved by the Engineer. The Contractor shall protect receptacles from paint spatter, concrete splashes and other construction damage by wrapping in plastic sheeting or heavy kraft paper and taping in place. The protective wrap shall not be removed until adjacent work is completed. The Contractor shall repair any damage to the receptacle finish.



**ITEM 707.9  
BICYCLE RACK**

**DESCRIPTION:** This item of work shall conform to the relevant provisions of Section 700 and shall consist of supplying and installing materials for bicycle racks. Bicycle rack locations shall be as shown on the drawings, in accordance with these specifications, and/or as required by the Engineer.

**MATERIALS:** The bicycle rack shall be the FINN-2- surface mounted in stainless steel, as manufactured by Madrax, a division of Graber Manufacturing, Inc. 1080 Uniek Drive, Waunakee, WI 53597, 800-448-7931, or approved equal.

Rack shall be constructed of 1 7/8" (47.7mm) diameter carbon steel tubing.

The Contractor shall be responsible for timing the delivery so as to minimize on-site storage time prior to installation. All stored materials and items must be protected from weather, careless handling and vandalism.

**SUBMITTALS:** Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.

Shop Drawings: Show fabrication and installation details, and attachments to other work. Include parking area plans and bicycle rack elevations.

**DELIVERY, STORAGE, AND HANDLING:** Protect finishes on exposed surfaces from damage by applying a temporary protective covering or wrapping before shipping. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other causes.

**WARRANTY:** Warranty period: [1] year from date of substantial completion.

**CONSTRUCTION:** Assemble and install surface mounted as per manufacturer's specifications.

Coordinate construction of the concrete footings with the installation of the surrounding pavement. Assemble bicycle racks in conformance with the approved shop drawings and install racks, level and plumb at locations indicated on the plans.

Protect the bicycle racks from paint spatter, concrete splashes and other construction damage by wrapping in plastic sheeting or heavy kraft paper and taping in place. Do not remove until adjacent work is completed.

Protect the bicycle rack from chipping during troweling operations. Repair any damage to painted finish.

**ITEM 708.3  
IDENTIFICATION SIGN**

**DESCRIPTION:** Work under this item involves furnishing and installing cantilever identification signs as shown on the plans. The sign mounting structure shall be a decorative wood post with cantilever arm as specified in the Department of Conservation and Recreation's Graphics Standards. All wood shall be pressure treated southern pine No. 1 and painted dark green. All steel hardware and fasteners shall be galvanized in accordance with AASHTO M 232.

**MATERIALS:** Sign Panel: The sign panel shall be an aluminum panel pre-coated with DCR “sage” color background (vinyl or painted). The aluminum panel shall be fitted within a wood frame as shown in the DCR graphics standards

Letters: The sign message shall be black letters. Logotype shall be “DCR burgundy”.

Typography: The name of the facility shall be in “Frutiger 65 Bold” and the reservation or park shall be “Frutiger 55 Roman”

The legend shall appear on both sides of the sign.

Concrete footing shall be 4,000 PSI cast-in-place concrete in conformance with Section 901 of the Standard Specifications.

**SUBMITTALS:** Shop drawings and paint color samples shall be submitted to the Engineer for approval before fabrication.

**CONSTRUCTION:** Construct Identification Sign according to Specification requirements and in conformance to the approved shop drawings.

Excavation, forms, reinforcement, placement and backfilling of concrete footing shall be in accordance with Section 901 of the Standard Specifications and as shown on the approved shop drawings.

Prior to installation, signs shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Signs shall be stored to allow air to circulate around the material and shall not be permitted to be in direct contact with the ground at any time during storage.

Signs shall be carefully handled to prevent chipping, breakage, soiling or other damage.

Damaged signs shall be repaired, if possible, or replaced with new signs at no additional cost.

The contractor shall install the signs as indicated on the drawings. Signposts shall be set plumb with sign panel level.

Upon completion all signs shall be cleaned to remove all dirt, stains and other blemishes. Should the signs become stained or damaged beyond repair due the operations of the contractor, they shall be removed and replaced with new signs at no additional cost.

### **ITEM 710.5 GRANITE STATION PILLAR**

**DESCRIPTION:** The work under this item shall consist of the furnishing and installation of Granite Station Pillars as shown on the plans, or as directed.

**SUBMITTALS:** The Contractor shall submit shop drawings to the Engineer for approval. Shop Drawings shall include lettering and artwork for each pillar with associated plan layout and include all dimensions and detailing for fabrication and installation.

Prior to ordering granite pillars, the contractor shall provide the Engineer with sample pieces of granite that demonstrate the color, shade, veining, texture, finish, text font and size to be used for approval by

DCR and landscape architect. No granite shall be ordered prior to receiving material approval from the Engineer

No work shall be commenced by the Contractor until approval of the drawings in writing has been received from the Engineer.

**MATERIALS:** Granite shall be free from seams which impair its structural integrity. Natural variations of the granite will be permitted. The granite pillars will be sized and finished as shown of the contract drawings. The granite shall be sawn cut on all four sides. The top shall be sawn.

- a. Granite shall conform to the requirements of ASTM C-615.
- b. Granite shall be standard grade, free of flaws, reeds, rifts, laminations, cracks seams, starts or other defects which may impair its strength, durability or function. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration or other defects which are not within the approved sample range and would affect its appearance.
- c. Granite color shall be an approved shade of light grey.
- d. Granite shall be cut to the dimensions and with finishes as indicated on the plans.
- e. Granite for Station Pillars shall be the same type and from the same fabricator as the Granite Mile Posts.

Concrete footing shall be 4,000 PSI cast-in-place concrete in conformance with Section 901 of the Standard Specifications.

**CONSTRUCTION:** Construct Granite Station Pillar according to Specification requirements and in conformance to the approved shop drawings.

Excavation, forms, reinforcement, placement and backfilling of concrete footing shall be in accordance with Section 901 of the Standard Specifications and as shown on the approved shop drawings.

Prior to installation, granite shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Granite shall be stored to allow air to circulate around the material and shall not be permitted to be in direct contact with the ground at any time during storage.

Granite shall be carefully handled to prevent chipping, breakage, soiling or other damage. Pinch or wrecking bars shall not be used without the protecting edges of granite with wood or other rigid materials. Granite shall be lifted with wide-belt type slings; wire rope or other materials that may cause staining or damage to the granite finish will not be permitted.

Damaged granite shall be repaired, if possible, or replaced with new stone at no additional cost.

The contractor shall excavate a hole to the lines and grades necessary to install the granite pillars to the depth as indicated on the drawings. Granite pillars shall be set plumb in locations as indicated on the drawings with stations facing east/west and “MCRT” text facing the trail. The pillar shall be set in a concrete footing as shown on the drawings. The contractor shall take precautions to keep the granite pillar plumb while the concrete sets and to avoid damaging the granite at all times.

Upon completion granite pillar shall be cleaned to remove all dirt, stains and other blemishes. Mild abrasive cleaners that contain no harsh caustic ingredients may be used, with fiber brooms or brushes and clean water. Wire brushes, steel wool, and acids or other solutions (gasoline) which may cause

discoloration are prohibited. Should the granite become stained or damaged beyond repair due the operations of the contractor, they shall be removed and replaced with new granite at no additional cost.

**ITEM 720  
GRANITE MILE POST – N.I.C.**

DESCRIPTION: The work under these items shall include the furnishing and installation of granite mile posts, lettered as shown on the plans and as directed by the Engineer.

MATERIALS: Granite shall be free from seams which impair its structural integrity. Natural variations of the granite will be permitted. The granite mile posts will be sized and finished as shown of the contract drawings. The granite shall be sawn cut on all four sides. The top shall be sawn.

- a. Granite shall conform to the requirements of ASTM C-615.
- b. Granite shall be standard grade, free of flaws, reeds, rifts, laminations, cracks seams, starts or other defects which may impair its strength, durability or function. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration or other defects which are not within the approved sample range and would affect its appearance.
- c. Granite color shall be an approved shade of light grey.
- d. Granite shall be cut to the dimensions and with finishes as indicated on the plans.
- e. Granite for Mile Posts shall be the same type and from the same fabricator as the Granite Station Pillars.

SUBMITTALS: The Contractor shall submit shop drawings to the Engineer for approval. Shop Drawings shall include lettering and artwork for each post with associated plan layout and include all dimensions and detailing for fabrication and installation.

Prior to ordering granite posts, the contractor shall provide the Engineer with sample pieces of granite that demonstrate the color, shade, veining, texture, finish, text font and size to be used for approval by DCR and landscape architect. No granite shall be ordered prior to receiving material approval from the Engineer

No work shall be commenced by the Contractor until approval of the drawings in writing has been received from the Engineer.

CONSTRUCTION: Prior to installation, granite shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Granite shall be stored to allow air to circulate around the material and shall not be permitted to be in direct contact with the ground at any time during storage.

All mile posts shall be installed at the stationing indicated on the plans and as directed by the Engineer. The Contractor shall confirm mile post locations in the field for approval by Engineer prior to installation.

Granite shall be carefully handled to prevent chipping, breakage, soiling or other damage. Pinch or wrecking bars shall not be used without the protecting edges of granite with wood or other rigid materials. Granite shall be lifted with wide-belt type slings; wire rope or other materials that may cause staining or damage to the granite finish will not be permitted.

Damaged granite shall be repaired, if possible, or replaced with new stone at no additional cost.

The contractor shall excavate a hole to the lines and grades necessary to install the granite posts to the depth as indicated on the drawings. Granite posts shall be set plumb with lettered markings facing east/west parallel to the bikeway as indicated on the drawings. The post shall be set in a concrete footing as shown on the drawings. The contractor shall take precautions to keep the granite post plumb while the concrete sets and to avoid damaging the granite at all times.

**ITEM 765  
SEEDING**

**DESCRIPTION:** The work of this Section includes, but is not limited to the following:

1. Seeding
2. Maintenance and protection

**SUBMITTALS:** At least 90 days prior to the first day of the seeding season described in this Section, submit to the Owner's Representative proof of certification of Foreman or Crew Leader as Massachusetts Certified Landscape Professional or Massachusetts Certified Horticulturist.

Submit proof of landscape contractor's experience to the Owner's Representative. At least 30 days prior to intended use, the Contractor shall provide the following samples and submittals for approval. Do not order materials until Owner's Representative's approval of samples, certifications or test results has been obtained. Delivered materials shall closely match the approved samples. Acceptance shall not constitute final acceptance. The Owner's Representative reserves the right to reject on or after delivery any material that does not meet these Specifications.

1. Material Sampling and Testing of Loam Borrow from Off-Site Sources
2. Fertilizer:
  - a. Submit product literature of seeding fertilizer and certificates showing composition and analysis.
  - b. Submit the purchasing receipt showing the total quantity purchased for the project prior to installation.
3. Seed: Submit a manufacturer's Certificate of Compliance to the Specifications with each shipment of each type of seed. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.
4. Erosion Control Matting: Submit 4 copies of manufacturer's literature and one material sample.
5. Hydroseeding: Prior to the start of hydroseeding, submit a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water.
6. Wood Cellulose Fiber Mulch: Submit 4 copies of manufacturer's literature and one material sample.
7. Limestone: Submit supplier's certification that the limestone being supplied conforms to these Specifications.
8. All additives needed to amend a specific soil in order to meet these specifications.

Maintenance Instructions: At the time of Acceptance, the Contractor shall submit complete maintenance instructions for lawn care for the Owner's use. The instructions shall be reviewed for approval by the Owner's Representative as a pre-condition for Acceptance.

EXAMINATION OF CONDITIONS: All areas to be improved shall be inspected by the Contractor before starting work and any defects such as incorrect grading, or drainage problems shall be reported to the Owner's Representative prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be improved.

The Contractor shall be solely responsible for judging the full extent of work requirements involved.

QUALITY ASSURANCE: Qualification of Landscape Contractor: The work shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five years' experience. Proof of this experience shall be submitted.

Qualification of Foreman or Crew Leader: All work of seeding / sodding shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist.

1. Landscape professional shall be a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
2. Horticulturist shall be a Massachusetts Certified Horticulturist as certified by the Massachusetts Nursery and Landscape Association.
3. Certification shall be current. Proof of certification shall be submitted.

The ratio of laborers to certified landscape professionals or certified horticulturist shall not exceed twelve to one. Certified Landscape Professional or Certified Horticulturist shall be on the project site throughout the day to day performance of the work.

MATERIALS: Loam borrow shall be specified.

Soil additives shall be specified except for additional applications of fertilizer based upon recommendations from soil analysis and testing.

Seed mixtures shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable. Seed containing endophyte must be kept cool and dry at all times; do not stockpile in the sun.

#### Lawn Seed Mixture Composition

1. Lawn seed shall be Pearl's Premium Ultra Low Maintenance Lawn Seed , Sunny Mix (www.pearlspremium.com) as distributed by Organic Mulch & Landscape Supply of New England in Hudson, MA (978-212-3280, www.organicmulchsupply.com, or approved equal. Proposed equals must meet the specified mix.
2. Seeding rate for the Lawn Seed Mix shall be 8 pounds per 1,000 square feet.

#### Woodland Seed Mixture Composition

1. Woodland Seed Mix shall be: New England Roadside Matrix Upland Seed Mix, as available through New England Wetland Plants, Inc., or approved equal.
2. Seeding rate for the Woodland Seed Mix shall be 25 LBS/ACRE (1743 SQ. FT./LB) as recommended by supplier.

#### Forebay Seed Mixture Composition

1. Forebay Seed Mix shall be: Retention Basin Floor Mix – Low Maintenance, as available through Ernst Seed, or approved equal.
2. Seeding rate for the Forebay Seed Mix shall be 25 LBS/ACRE (1743 SQ. FT./LB) as recommended by supplier.

Fertilizer shall be a commercial product complying with the State and United States fertilizer laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis.

Phosphorus shall be superphosphate or triple superphosphate.

Ground limestone for adjustment of loam borrow pH shall contain not less than 85 percent of total carbonates and shall be ground to such fineness that 40 percent will pass through 100 mesh sieve and 95 percent will pass through a 20 mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.

Erosion control matting for covering hydromulch areas with slopes steeper than or equal to three to one (3:1) shall be a bonded fiber matrix. The bonded fiber matrix shall be a hydraulically applied product that upon drying shall adhere to the soil in the form of a continuous 100% coverage, biodegradable erosion control blanket. The bonded fiber matrix shall be comprised of long strand wood fibers held together by a bonding agent that, upon drying, becomes insoluble and non-dispersible.

The bonded fiber matrix shall meet the following requirements. The binder shall not dissolve or disperse upon re-wetting. The matrix shall have no holes greater than 0.04 inch in size. The matrix shall have no gaps between product and soil. The matrix shall have water-holding capacity of 1.2 gallons per pound of matrix. The matrix shall have no germination or growth inhibiting factors and shall not form a water insensitive crust. The matrix shall be composed of materials that are 100% biodegradable and are beneficial to plant growth.

Wood Cellulose Fiber Mulch to cover hydroseeded areas with slopes less than 3 to one shall be fiber processed from whole wood chips and clean recycled newsprint in a 1:1 proportion manufactured specifically for standard hydraulic mulching equipment. Fiber shall not be produced from recycled material such as sawdust, paper, or cardboard.

Moisture content shall not exceed 10 percent, plus or minus 3 percent as defined by the pulp and paper industry standards. Fiber shall have a water holding capacity of not less than 900 grams water per 100 grams fiber.

The mulch shall be of such character that the fiber will be dispersed into a uniform slurry when mixed with water. It shall be nontoxic to plant life or animal life.

The mulch shall contain a non-petroleum based organic tackifier and a green dye to allow for easy visual metering during application but shall be non-injurious to plant growth.

Herbicides, chemicals and insecticides - No chemicals shall be used at this site. Contractor is required to provide certified organic materials to promote healthy seeding.

Water - The Contractor shall responsible to furnish his own supply of water to the site at no additional cost to the Owner. Contractor shall be responsible to furnish adequate supplies at his own cost.

CONSTRUCTION: Fill, compact and fine grade Loam as specified.

Lawn Seeding - Contractor shall obtain Owner's Representative's written approval of fine grading and bed preparation before doing any seeding.

Limit of grading and earthwork shall be limit of seeding unless otherwise indicated on the Contract Documents. All lawn areas disturbed outside the limit of seeding shall be prepared and seeded as specified herein at no additional cost.

The season for seeding shall be from April 1 to June 1 and from August 15 to September 30 unless otherwise specified herein. The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and by accepted practice in this locality. To prevent loss of soil via water and wind erosion and to prevent the flow of sediment, fertilizer, and pesticides onto roadways, sidewalks, and into catch basins, seed loam areas within 5 Days of spreading the loam.

Seed only when the bed is in a friable condition, not muddy or hard.

Woodland and Forebay Mix Seeding: The conservation seed mix may be applied by hydro seeding or by mechanical spreader. When applying on bare soil, rake the soil to create a slightly rough surface, apply seed, then gently rake over. Best results are obtained with a spring or summer seeding. Summer seeding will be successful with a light mulching of weed free straw to conserve moisture. These mixes are not well suited to late fall or winter dormant seeding.

Seeding of lawn shall be by Hydroseeding Method specified as follows:

1. Prior to the start of work, furnish a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of hydroseeding that can be covered with the quantity of solution in the hydroseeder.
2. Hydroseed with wood cellulose fiber mulch at a rate of 46 pounds per 1,000 square feet or 2000 pounds per acre.
3. For the hydroseeding process, a mobile tank with a capacity of at least 500 gallons shall be filled with water and the mixture noted above in the specified proportions. The resulting slurry shall be thoroughly mixed by means of positive agitation in the tank. Apply the slurry by a centrifugal pump using the hose application techniques from the mobile tank. Only hose application shall be permitted. At no time shall the mobile tank or tank truck be allowed onto the prepared hydroseed beds. The hose shall be equipped with a nozzle of a proper design to ensure even distribution of the hydroseeding slurry



over the area to be hydroseeded and shall be operated by a person thoroughly familiar with this type of seeding operation.

4. Contractor shall obtain Owner's Representative's written approval of fine grading and bed preparation before doing any hydroseeding.
5. Limit of grading and earthwork shall be limit of hydroseeding unless otherwise indicated on the Contract Documents. All lawn areas disturbed outside the limit of hydroseeding shall be hydroseeded.
6. Seed only when the bed is in a friable condition, not muddy or hard. Construction methods shall conform to hydraulic method requirements specified in the Standard Specification.
7. Hydroseeding shall be a two-step process.
  - a. Step one shall consist of spreading 100 percent of the required seed uniformly over the prepared loam bed so that the seed comes into direct contact with the soil. To mark the progress of the hydroseeding operation the Contractor may add 10 percent of the wood cellulose fiber mulch to the slurry.
  - b. Step two shall consist of a separate application of wood cellulose fiber mulch immediately following the first step of hydroseeding noted above. Apply the wood cellulose fiber mulch at a rate of 2,000 pounds per acre.
  - c. For all slopes steeper than or equal to three to one (3:1) immediately install erosion control matting.

Erosion control matting of heavy jute mesh shall be installed immediately after hydroseeding and hydromulching in the areas designated on the Contract Documents, on slopes steeper than three to one (3:1). Matting installation shall follow written acceptance of fine grading by Owner's Representative.

Matting shall be installed perpendicular to slopes and shall extend at least 3 feet beyond slope crest. Fibers shall be placed in contact with the soil for the entire length of the mat. Provide check slot at top of slope and anchor slot at bottom of slope where indicated.

Roll out the matting perpendicular to the slope. Do not stretch the fabric. In drainage swales, center the fabric along the flow line. Install the matting in a check slot at the top and bottom of the slope of the area to be covered. Check slots shall be 6 inches deep and 6 inches wide. Fabric shall extend down one wall of the check slot and across the full width of the base. Overlap edges of matting rolls 4 inches minimum and overlap the ends 18 inches at a minimum.

Install staples in check slots, edges, center and ends of rolls by driving specified steel staples 2 feet on center over the entire area to be covered, except at check slots and ends of rolls, where staples shall be placed 6 inches on center.

Fill check slots with loam and tamp firmly.

Following matting installation, roll the entire area with a smooth drum roller weighing between 50 and 75 pounds per linear foot of roller. The finished installation of matting shall be firmly in contact with the soil and provide a smooth, finished appearance free from lumps or depressions.

Woodland and Forebay Seed Mix - Within the first 30 days after seeding, the Contractor shall remove any weeds as directed by the Owner's representative.

The Contractor shall mow the areas seeded with the Woodland and Forebay Seed Mixes one time in the season following seeding: If Woodland and Forebay Seed Mix is installed in the Fall, the Contractor shall mow once in the following spring; if the Woodland and Forebay Seed Mixes is installed in the Spring, the Contractor shall mow once in the following fall.

No watering or other maintenance is necessary for the conservation seeding areas.

Lawn Maintenance - Maintenance shall begin immediately after any area is seeded and shall continue for a 60 (sixty) day active growing period for seeded areas or until Final Acceptance, whichever is longer. In the event that seeding operations are completed too late in the Fall for adequate germination and growth of grass, then maintenance shall continue into the following Spring for the minimum 60-day period. In addition, install blankets or netting to prevent loam degradation and movement over the winter. Submit product literature and samples to the Owner's Representative for review. Blankets and netting shall be placed in a timely manner at no additional cost to the Owner.

Maintenance shall include reseeding, mowing, watering, weeding, fertilizing a minimum of two times in addition to the fertilizer incorporated by harrowing into the spread loam, and resetting and straightening of protective barriers. Lawn work maintenance shall also include treatments as required for fungus and/or pest control.

During the maintenance period, any decline in the condition of seeded areas shall require immediate action to identify potential problems and to undertake corrective measures.

Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment.

1. The Contractor shall provide all labor and arrange for all watering necessary to establish an acceptable lawn. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary to maintain moist soil to a depth of at least 2 inches for seeded areas. At no time shall a tank truck be allowed on the lawn beds.
2. Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment to apply water to the required soil depths each 8-hour period.

Protection - Lawn areas shall be protected by a 3-foot high barrier constructed of 2 inch by 2 inch hardwood stakes or iron pipes set 18 inches in the ground at 10-foot intervals and connected by No. 10 wire. Flags of white cloth shall be secured to the wire at center points between stakes. Barriers must be raised immediately after lawn construction and shall be maintained until Acceptance.

After the grass in seeded areas has germinated, reseed all areas and parts of areas that fail to show a uniform stand of grass. Reseed such areas and parts of areas repeatedly until all areas are covered with a satisfactory growth of grass with no less than 20 grass shoots per square inch and 2880 grass shoots per square foot. Reseeding together with necessary grading, fertilizing, and trimming shall be done at the Contractor's expense.

Mowing and Edging:

1. The Contractor shall keep lawn areas mowed until Acceptance of the contract by cutting to a height of 2 inches when growth reaches 3 inches or as directed by the Owner's Representative.
2. At each mowing, all edges of walks, drives, plant beds and other border conditions shall be edge trimmed by hand or machine to produce straight and uniform edge conditions.
3. Remove and discard from paved areas only clippings and debris generated by each mowing and edging operation legally off-site. Owner's Representative, if practical and aesthetic, may allow sweeping (not blowing) clippings back into grass. Mowers shall be equipped with mulching blades. Do not remove from grass areas any clippings that have been generated by mowing operations. Do not mow grass when wet.

Fertilizing: The first application of fertilizer shall be as specified under Loam and Planting Soil. A second application of fertilizer shall be applied to seeded areas at the time of the first mowing. This second application shall be applied at a rate that ensures that one-half pound of nitrogen is applied per 1,000 square feet. Phosphorus and potassium shall be applied proportionally in accordance with the recommendations of the soil tests and the quantities previously integrated into the soil during the first application. A third application of nitrogen fertilizer shall be applied to seeded areas approximately two months after the second application. This third application shall correspond to the following application rates dependent upon the month of application.

1. May 1-15: Apply 1.0 pound of nitrogen per 1,000 square feet.
2. June 15-30: Apply 1.0 pound of nitrogen per 1,000 square feet.
3. August 15 through September 15: Apply 1.0 pound of nitrogen per 1,000 square feet.
4. November 1-15: Apply 1.5 pounds of nitrogen per 1,000 square feet.

\* Nitrogen fertilizer shall be composed of 50 percent slowly soluble or slow release nitrogen fertilizer. \*

Applying Limestone - The Contractor shall return to the site at the beginning of the next seeding season and spread limestone across all lawn areas installed under this Contract. Limestone shall be spread at rates determined by the soil tests specified.

Acceptance - Following the minimum required maintenance periods for lawn construction, the Contractor shall request the Owner's Representative in writing for a formal inspection of the completed work. Request for inspection shall be received by the Owner's Representative at least 10 days before anticipated date of inspection.

Acceptance Requirements

1. At the end of the maintenance period, lawn areas shall have a close stand of grass as defined above with no weeds present and no bare spots greater than 3 inches in diameter over greater than 5 percent of the overall seeded area. At least 90 percent of the grass established shall be permanent grass species. If seeded areas are deficient, the Contractor's responsibility for maintenance of all seeded areas shall be extended until deficiencies are corrected.

2. At the time of acceptance, the Contractor shall remove temporary barriers used to protect lawn areas.

Furnish full and complete written instructions for maintenance of the lawns to the Owner at the time of acceptance in conformance with Submittals requirements.

Owner's Representative's inspection shall determine whether maintenance shall continue in any part.

Clean-up - Absolutely no debris may be left on the site. Excavated material shall be removed as directed. Repair any damage to site or structures to restore them to their original condition, as directed by the Owner's Representative, at no cost to the Owner.

### **ITEM 772 PLANTING**

DESCRIPTION: The Work in this Section consists of all planting and related items as indicated on the Drawings or specified herein and includes, but is not limited to, the following:

1. Planting new trees, shrubs, and groundcover
2. Planting maintenance
3. Guarantee of plants
4. Soil amendments
5. Fertilizer
6. Bark mulch
7. Fine grading
8. Tree pruning as part of the landscape planting work

#### References and Standards

The following references and standards are used herein and shall mean:

1. Standard Specifications: Standard Specifications for Highways and Bridges, Commonwealth of Massachusetts Highway Department (formerly Massachusetts Department of Public Works), latest non-metric edition and all revisions.
2. ASNS: "American Standard for Nursery Stock," ANSI Z60.1, latest edition, published by the American Association of Nurserymen, (AAN).
3. SPN: "Standardized Plant Names," latest edition, by the American Joint Committee on Horticultural Nomenclature.
4. AOAC: Association of Official Agricultural Chemists.
5. Pruning Standards: The "Standards for Pruning Shade Trees," latest edition, published by the National Arborist Association, 174 Route 101, Bedford, NH 03102.
6. USDA: United States Department of Agriculture, Agricultural Research Service, "USDA Plant Hardiness Zone Map," miscellaneous publication No. 1475, latest edition.
7. "Guide for Establishing Values of Trees and Other Plants", latest edition, as published by the International Society of Arboriculture, Urbana, Illinois.

**SUBMITTALS:** Prior to ordering the below listed materials, submit certified testing results and representative samples to the Engineer for selection and approval. No materials shall be ordered or delivered until required samples, certifications, manufacturer's literature and test results have been reviewed by the Engineer. Delivered materials shall closely match the samples.

1. Fertilizer:
  - a. Submit one sample packet of planting fertilizer and six certificates showing composition and analysis. Submit six certificates of chemical analysis and size gradation for lawn fertilizer.
  - b. Submit the purchasing receipt showing the total quantity purchased for the project prior to installation.
2. Protective Tree Wrap for Shipment: Submit manufacturer's literature and sample.
3. Antidesiccant: Submit manufacturer's literature.
4. Bark Mulch: Two-pound sample and source.
5. Maintenance Instructions: At the time of Final Acceptance, the Contractor shall submit complete maintenance instructions for planting care to the City of Waltham. The instructions shall be reviewed and approved by the Engineer as a pre-condition for Final Acceptance.

#### Examination of Conditions

All areas to be planted shall be inspected by the Contractor before starting work and any defect such as incorrect grading shall be reported to the Engineer prior to beginning this Work.

The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining plants temporarily and rehandling plants prior to final installation.

#### Qualifications and Quality Control

All work in this contract shall be performed by personnel experienced in planting work and under the supervision of a Massachusetts Certified Horticulturist (MCH), Massachusetts Certified Arborist (MCA) or International Society of Arboriculture – Certified (ISAC). All pruning shall be performed by a Certified Arborist as indicated. The qualifications of the Arborist or nurseryman shall be submitted with the bid; no exceptions will be allowed.

#### Inspection of Plant Material

The Engineer will inspect the plant material for conformity to Specification requirements upon delivery. Approval shall not affect the right of inspections and rejection by the Engineer during the progress of the work.

The Contractor is responsible for providing adequate personnel and equipment on-site at the time of the plant inspection and installation. The personnel and equipment must allow for a complete staked layout and to unload, open and handle plant material during inspection.

#### Delivery, Storage and Handling

Deciduous plants in foliage shall be sprayed with an approved antidesiccant immediately after digging to prevent dehydration.

The Contractor shall dig, pack, transport and handle plants with care to ensure protection against injury.

Inspection certificates required by law shall accompany each shipment invoice or order to stock. Upon arrival, the certificate shall be filed with the Engineer.

If plants cannot be planted immediately upon delivery, the Contractor shall properly protect the plants with soil, wet peat moss, or in alternative manner approved by the Engineer. All plants shall be protected from drying out. Heeled-in plantings shall be watered daily by the Contractor.

Plants shall not be bound with rope or wire in a manner that could damage or break the branches.

All bound branches of all plants delivered to the site which are not planted in their final locations within 2 calendar days shall be untied by the Contractor.

Plants transported on open vehicles shall be covered with a protective covering to protect from wind burn, or they will be immediately rejected.

### Project Conditions

Work notification:

1. At the pre-construction meeting the Contractor shall notify the Engineer of the proposed planting schedule, source of plants, consideration of substitutes, topsoil materials and testing, and general review of the specifications and planting procedures.
2. The Contractor shall submit a request to the Engineer to visit the site and review the work with the Engineer before work begins. The request shall be submitted at least two weeks before scheduled site visit.
3. The Contractor shall notify the Engineer at least seven (7) days prior to the proposed arrival of plant material on-site.

The Contractor shall protect existing utilities, paving, site features, and other facilities from damage by landscaping operations.

### MATERIALS:

#### Plant Materials

The Contractor shall furnish the plants shown on the Drawings. No substitutions will be permitted without prior written approval. All plants shall be nursery grown. Under no circumstances shall any plant material, host species or not, be supplied from growing fields or holding yards within the Asian Longhorned Beetle Quarantine Zone as defined by the USDA, at any time. All pre-purchased and new planting material shall be inspected and tagged by the Owner's representative.

Plants shall be in accordance with ASNS as a minimum requirement for acceptance. Botanical plant names shall be in accordance with plant designations included in SPN.

All plants shall be typical of their species or variety, have a normal habit of growth, and meet the size and form requirements indicated on the Drawings. All plants shall be legibly tagged with the proper name. Only plant stock obtained from and grown between latitudes 40-49 degrees North and hardiness Zones 1 through 5, as established by the USDA, will be accepted. The Contractor's suppliers must certify in writing that the stock has actually been obtained from and grown within the zones indicated. Plants not

so certified will not be accepted and shall be replaced with the proper plant at no additional cost to the Town.

The root system of each plant shall be well provided with fibrous roots. All plant parts shall be moist and show active cambium when cut. Plants shall be sound, healthy, and vigorous, well-branched and densely foliated when in leaf. They shall be certified by the grower in writing as being free of disease, insect pests, eggs or larvae.

All plants must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated eight ounce burlap firmly held in place by a stout cord, or firmly wrapped burlap and cord set in non-coated steel wire containers relating to size of plant specified as per ASNS requirements. Plants delivered in galvanized or aluminum wire baskets shall not be approved for planting. Plants prepared with plastic or other non-biodegradable wrappings will not be accepted except when indicated in Plant List as 'container grown.' All non-biodegradable ties or pots shall be removed at planting. The diameter and depth of the balls of earth on balled and burlapped plants must be sufficient to encompass the fibrous root feeding system necessary for the healthy development of the plant. No plant will be accepted when the ball of earth surrounding its roots has been badly cracked or broken prior to or during the process of planting or after the burlap, staves, ropes, container, or platform required in connection with its transplanting have been removed. The plants and balls shall remain intact during all operations. All balled and burlapped plants that cannot be planted at once must be heeled in, by setting in the ground and covering the balls with soil and watering daily.

The height of the trees (measured from the crown of the roots to the tip of the top branch) shall be not less than the minimum size designated on Drawings or as required by ASNS based upon caliper size designated. Take caliper measurement for deciduous trees six inches above ground level up to and including four-inch caliper size and 12 inches above ground for larger sizes. Evergreen trees shall be of height designated on Drawings with spread in proportion to height, as designated in the ASNS Standards, and shall be well-branched to the ground. The trunk of each tree shall be a single trunk growing from a single un-mutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire, or other causes. No pruning wounds shall be present having a diameter exceeding two inches and such wounds must show vigorous scar tissue on all edges. Plants shall not be pruned prior to delivery to the site. No tree shall have evidence of ever having basal suckers. Trees shall not be wrapped.

Shrubs shall meet the requirements for spread or height stated in the Plant List indicated on the Drawings. The measurements for height at the nursery shall be taken from the top of the rootball or container soil to the average height of the shrub and not to the longest branch. Height at ground level after planting shall be verified that the average height of the shrub and not to the longest branch matches the specified height on the drawing. Single stemmed or thin plants will not be accepted. The side branches must be generous, well-twigged, and the plant as a whole well-branched to the ground. The plants must be in a moist vigorous condition, free from dead wood, bruises or other root or branch injuries. Plants shall not be pruned prior to delivery to the site.

Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in the container. No container-grown plants shall be pot bound.

Plants delivered by truck and plants requiring storage on site shall be properly wrapped and covered to prevent wind-drying and desiccation of branches, leaves, or buds; plant balls shall be firmly bound, unbroken, reasonably moist to indicate watering prior to delivery and during storage, and tree trunks shall

be free from fresh scars and damage in handling. Trees indicated as 'Single Stem' in the Plant List will not be accepted with double-leaders or twin-heads without the written approval of the Engineer. No plant material from cold storage will be accepted.

#### Planting Fertilizer

In addition to required fertilizer added to planting soil mix as recommended by the results of soil testing by the specified testing laboratory, all trees, shrubs and vines installed by the Contractor shall be provided with fertilizer through the use of slow-release fertilizer packets which are designed and certified by the manufacturer to provide controlled release of nutrients over a minimum three-year period. Each packet shall consist of four ounces of water-soluble fertilizer with a minimum guaranteed analysis of available elements by weight as follows:

Nitrogen	16%
Phosphoric Acid	8%
Potash	16%

Bone meal shall be domestic fine ground, steam-cooked, packing house bone with a minimum analysis of 23 percent phosphoric acid and one percent of nitrogen. Imported bone meal will not be accepted.

Fertilizer for seeded lawn areas shall be as recommended by the results of soil testing by the specified testing laboratory.

#### Bark Mulch

Bark mulch shall be shredded pine bark aged at least six months and not longer than two years. The mulch shall be natural dark brown in color, free of chunks and pieces of wood thicker than one-quarter inch. Mulch shall be free of stringy material over four inches in length, and free of chunks over three inches in width. It shall not contain, in the judgment of the Engineer, an excess of fine particles. Dyed mulch shall not be accepted.

#### Antidesiccants

Antidesiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Manufacturer of antidesiccant shall be subject to review by the Engineer. Antidesiccant shall be delivered in containers of the manufacturer and shall be mixed according to the manufacturer's instructions.

#### Water

The Contractor shall be responsible to furnish a daily supply of water, required materials, labor and equipment necessary to water all plantings on the site at no extra cost to the Town of Brookline if metered Town water is not available at the site at the time of planting. All plant materials injured or damaged due to the lack of water, or due to the use of too much water, shall be the Contractor's responsibility to remove and replace at no additional cost. Water used shall be potable quality, free from impurities injurious to vegetation, humans, and wildlife.

#### Chemicals and Insecticides

Provide chemicals and insecticides as needed for fungus or pest control for trees, shrubs and vines, and as required to produce seeded areas as specified. All pesticide application shall be performed by personnel



licensed by the Commonwealth of Massachusetts to do so. All chemicals and insecticides shall meet state regulations for the intended uses and application rates. No chemicals and insecticides will be used on this project without the written permission of the Brookline Conservation Commission. A record of all pesticides applied shall be forwarded to the Engineer within twenty-four hours of application.

#### Tree Paint

Do not use tree paint on tree wounds. Allow to heal and weather naturally.

#### CONSTRUCTION:

##### Protection of Existing Trees and Shrubs

Do not store material or carry on planting operations within the drip line or designated protection area of plants to be saved. Storage of materials, equipment, and vehicles shall not be allowed on lawn areas.

Within the drip line of trees to remain, do not excavate at all or fill more than two inches unless directed to do so by the Engineer.

There are instances where planting or seeding may need to occur within the drip line. In this case, limit the area of root disturbance. Where roots must be disturbed, cut roots by a trencher and hand trim roots over two inches in diameter. Digging by backhoe or other equipment among tree roots under canopy is not permitted.

If equipment must be brought close to trees, protect the trunks with 2x4 lumber placed as protective housing. Take particular care in the use of heavy machinery to prevent injury to roots and branches.

The Contractor shall be liable for all damage and/or disturbance to existing trees and shrubs not otherwise designated for clearing and removal. Existing trees which, in the opinion of the Department of Public Works, become damaged as a result of the Contractor's operations shall be assessed at a minimum cost of one hundred fifty dollars (\$150.00) per caliper inch at breast height or greater.

The Contractor shall submit to the Engineer a request to visit the site and review with the Contractor trees to remain before demolition begins. Request shall be submitted in writing at least one week before scheduled work.

Trees that have a 20% root loss or more, as determined by the Engineer, shall be thoroughly watered during the growing season as often as required depending on rainfall, and fertilized with slow-release fertilizer between November and April under the direction of the Town Forester.

Cover tree roots that are exposed to open air during growing season with bark mulch to a depth of three inches. Keep root area moist but not flooded.

Pruning shall leave collar cuts, not flush cuts. Do not cut the leader of any tree.

At the completion of planting operations, review with the Engineer the overall health and maintenance requirements of plants protected, including necessary pruning, watering, fertilizing, and insect or disease control measures.

### Soil Reuse

Existing topsoil shall be utilized for planting soil mixtures only if testing indicates total conformity to specifications for loam borrow; see Loam and Planting Soil for soil testing.

### Filling and Compaction for Fill Material in Planting Areas

#### Placing and Compacting Planting Loam

1. All areas to be filled shall be free of construction debris, refuse, compressible or decayable materials, and standing water. Do not place fill when fill materials are frozen. No fill material containing ice or frozen lumps shall be used.
2. The Contractor shall notify the Engineer when areas to be filled are ready for formal inspection. Placement of loam borrow, or planting soil mix shall not begin until the Engineer has inspected subgrade.
3. The Engineer shall reject the Contractor's compaction equipment if, in the opinion of the Engineer, the equipment is unsuited to or inadequate for compacting materials to the specified densities within a reasonable length of time, or if equipment or procedures are likely to damage underlying or adjacent structure or materials.
4. All loam and planting soil mix are to be placed "in-the-dry," to which end dewatering may be required. Spreading and drying of each layer may also be required.
5. Conversely, if the testing laboratory determines that the loam is too dry for proper compaction, water shall be added to provide the specified optimum moisture content, as necessary for proper compaction.
6. Compaction of each lift shall be done with hand-operated equipment, as specified herein and as determined by ASTM-D1556. Loam and planting soil mix shall be placed in successive horizontal lifts no thicker than six inches and compacted to the required density as specified herein. Maximum dry density shall be determined in accordance with ASTM-D1557, Method D. The following percentages of maximum dry densities shall be achieved for all fill materials in lawn or planting areas.
  - 1) All shrub area fills, 88-90%
  - 2) Tree plantings, 90-92%
7. In planting areas, compaction requirements for fills shall be considered minimums and maximums within the density percentages called for, and any over-compaction of fills which would be detrimental to planting objectives shall be corrected by loosening fills through tilling or other means and re-compacting to specified compaction limits at no additional cost to the Town of Brookline.

### Fine Grading

Loam and planting soil mix shall be supplied, placed, and spread in accordance with these specifications over designated areas to a depth sufficiently greater than shown on the Drawings so that after required compaction, the depths of loam or planting soil mix shall equal that which is herein specified.

After initial placement and grading of loam or planting soil mix, Contractor shall request review of rough grading by the Engineer.

Following review of rough grading, Contractor shall supply additional loam or planting soil mix as necessary so that following finish grading and compaction, the placed loam or planting soil mix shall conform to the depth required.

No loam or planting soil mix shall be placed in a wet or frozen condition.

Sufficient grade stakes shall be set for checking the finished grades. Deviation from elevations shown on Drawings which are greater than one-tenth of a foot shall not be permitted. Connect contours and spot elevations with an even slope. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.

After loam and planting soil mix has been spread, it shall be carefully prepared by hand raking.

Contractor shall obtain the Engineer's written permission stating that fine grading and bed preparation are acceptable, before doing any planting or seeding.

#### Planting Operations

Planting shall be in accordance with the construction methods of Section 771 of the Standard Specifications and as modified herein or within the Drawings.

Furnishing and planting of plant material includes the digging of the pits and plant beds, provision of soil additives required to adjust for pH requirements of specific plants, and furnishing the plants as specified as well as the labor of planting, fertilizing, mulching, guying, watering and maintenance.

The Contractor shall locate plant material sources for tagging and ensure that the plants tagged are shipped in timely fashion for installation.

Locations for all trees and outlines for shrub planting beds shall be staked on the ground by the Contractor for review by the Engineer before any plant pits or plant beds are dug.

The Engineer or representative will determine the exact location of every tree plant bed layout. The Engineer or representative reserves the right to change the location of any tree to an area of the same class or to adjust the shape and/or plant bed location.

#### Seasons for Planting

##### Spring:

Deciduous materials - March 21 through May 1

Evergreen materials - April 15 through June 1

Seeding - April 1 through June 1

##### Fall:

Deciduous materials - Oct. 1 through Nov. 15

Evergreen materials - Aug. 15 through October 15

Seeding - August 15 through September 30

All trees and shrubs shall be planted during the same planting season they are dug. The Contractor may opt to dig these plants at other times of year, but the maintenance and guarantee requirements will not be waived.

Planting:

1. Planting soil mix shall be installed as per requirements of this Section.
2. At least one month prior to the expected planting date, the Contractor shall request in writing that the Department of Public Work's Forestry Division representative(s) select and tag stock in the nursery(s) to be planted under this Section.
3. A representative of the Contractor shall accompany the Department of Public Work's Forestry Division representative(s) on all plant material selection field trips, unless otherwise ordered by the Engineer.
4. All trees and a representative sample of each shrub species specified shall be selected by the Department of Public Work's Forestry Division representative(s) at the place of growth for conformity to specification requirements as to quality, size, and variety. Such selection shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work. Cost of replacement of materials rejected by the Engineer at the site shall be borne by the Contractor.
5. Unless noted otherwise all plants for the project shall be individually tagged with the Town of Brookline's seals, and no plants shall be accepted by the Contractor for delivery to the site without such seals.
6. Tree trunks shall be wrapped and covered at the nursery just prior to shipping with protective material, soft foam or approved equal. Tree trunks shall then be unwrapped for inspection by the Engineer upon delivery to the site and rewrapped until final removal after installation. Tree wrap shall cover the entire trunk as far up as the first branch.
7. All digging of plant pits shall be done by hand and care shall be taken not to disturb any adjacent plant materials or site features. If, in the Engineer's opinion, any damage to adjacent materials occurs as a result of planting operations, the Contractor shall repair the damaged materials at Contractor's own expense.
8. Planting on slopes: Install plantings at spacing indicated on Drawings, tying shrub branches together with jute cord just before planting. Plant each row beginning at top of slope and working to bottom. Untie shrub branches only after specified mulch is placed over fabric.
9. Plant pits shall be excavated with sloped sides. Holes for trees shall be at least three times as wide as the root ball whenever possible. Root balls for trees should sit directly on undisturbed or compacted subgrade with the bottom of the pit scarified to a depth of four inches. Pits for shrubs shall be at least one foot greater in diameter than the ball and at least six inches deeper than the ball. Scarify the bottom of the shrub pit to the depth of four inches.
10. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation and at the site until the

final planting. Remove container plants from containers prior to planting. All plants shall be planted in the center of the holes and placed one to two inches higher than the adjacent finished grade. After plant is located in center of hole, remove the top one third of balling materials from top and sides of root ball and trunk and cut the top one third of wire basket from rootball and remove. Container plants which have roots circling the root ball shall have the roots cut in four places spaced equally around the ball. Planting soil mix shall be backfilled in layers of not more than six inches and each layer tamped sufficiently to settle before the next layer is put in place. Enough planting soil mix shall be used to bring the surface to finished grade when settled. A saucer shall be formed around each plant at a depth of three inches for trees and for shrubs or shrub beds.

11. At the time of planting, install fertilizer packets at a depth of six to eight inches equally spaced around the plant as it is being backfilled. Packets shall be placed approximately three inches away from the plant roots or plant ball. Packets shall not be cut, ripped or damaged. If it becomes necessary to remove and replace dead or unhealthy plants, any damaged or broken packets shall be replaced with new packets. The application rates for fertilizer packets shall be as follows:

<u>Type of Plant</u>	<u>Rate</u>
Deciduous Shade Tree	One packet for each tree's inch of caliper
Evergreen and Ornamental Trees	One packet for each 18 inches of height
Shrubs	One packet for each 12 inches of height or spread

12. All newly planted trees and shrubs shall be puddled at least twice within 24 hours including immediately following planting. At planting, a minimum of 10 gallons water will be used to ensure no air pockets in the soil around each tree's root ball. The Contractor shall inspect tree pits 24 hours after initial watering to confirm that they are draining properly. If surface water or excessively saturated plant pit soils exist, the Contractor shall immediately notify the Engineer.
13. Bark mulch as indicated on the Drawings shall be placed over entire saucer areas of individual trees and over the entire area of planting beds to a depth of three inches after settlement, not later than one week after planting. Bark mulch shall be held back from the base of all tree trunks a minimum of three inches and a minimum of two inches for shrubs. No mulch shall be applied prior to the first watering of plant materials.
14. Pruning:
  - a. Pruning shall be done only to ameliorate minor damage to branches incurred during shipping and planting; any plants with major damage shall be replaced as directed by the Engineer. Trees and shrubs shall be pruned in accordance with the American Nurserymen's Association Standards for Class I, fine pruning, to preserve the natural character of the plant. "Specimen Quality" plants as designated on the Drawings shall not be pruned except as directed by the Engineer.

- b. Tree pruning shall be undertaken to the full height of affected trees.
  - c. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.
15. Antidesiccant shall be applied to all evergreen and other plants in the late fall as directed by the Engineer.
16. Absolutely no debris may be left on the site. Excavated material shall be removed. Repair damage to site or structures to restore them to their original condition at no additional cost to the Town of Brookline. All debris and excavated material removed from site shall be disposed of legally.

### Planting Maintenance

Maintain plantings for a period of at least 60 days after completion of planting operation or until plants are sufficiently recovered from transplanting and in a healthy growing condition acceptable to the Engineer. Maintain planting installed after September 15 until May 30th of the following year. Ten percent of the total dollar amount of the contract will be withheld for these operations.

Maintenance shall consist of keeping the plants in a healthy growing condition and shall include but not be limited to watering, weeding, mowing, cultivating, re-mulching, removal of trash and dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.

1. Plants shall be inspected for watering needs at least twice each week and watered as necessary to promote plant growth and vitality. The Contractor shall make all arrangements to furnish 5 to 20 gallons of water at least once a week to all newly planted trees throughout the growing season. The watering interval may be increased or decreased at the discretion of the Engineer.
2. Planting beds shall be kept free of weeds, and mulch shall be maintained at the required depth.
3. Plants that die during the maintenance period shall be removed and replaced at once, unless otherwise designated by the Engineer.
4. Chemicals, pesticides, fungicides, insecticides or herbicides if required within planted areas or lawns shall be done by personnel licensed to do so in the Commonwealth of Massachusetts and only after obtaining written permission from the Brookline Conservation Commission indicating the materials and dispensing methods allowed, the dates, time and weather conditions under which procedures will occur, and traffic control, resident and pedestrian protection plan proposed. Spraying for insects, pests and diseases shall conform to the National Arborist Association Standards under the section entitled "Standards for Pesticide Application Operations", as currently adopted.
5. All trash and debris shall be removed from all planted and lawn areas weekly or before mowing of lawn areas.

During the maintenance period, any decline in the condition of plantings and lawns shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional Arborists and Horticulturalists to inspect plant

materials and to identify problems and recommend corrective procedures. The Engineer shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Engineer.

### Acceptance Inspection Procedures

#### General

1. Two inspections for acceptances shall be made for all planting operations - Initial Acceptance Inspection and Final Acceptance Inspection.
2. The Engineer shall make inspections of the work upon written request of the Contractor received by the Engineer at least ten days before the anticipated dates of inspection. Contractor shall not request inspections for any partially completed work.
3. Inspections shall be made by the Engineer with the Contractor present. Written reports issued by the Engineer shall notify the Contractor of the results of the inspections. Complete compliance with the provisions of the respective inspection acceptance shall be made before initial or final acceptance is made.

#### Initial Acceptance Inspection

1. Inspection for Initial Acceptance shall be requested by the Contractor only after all aspects of planting and seeding operations are completed and maintained according to Drawings and Specifications, all pertaining test results are acceptable, all seeded lawn areas show complete germination in progress, and all extraneous equipment, materials and debris are removed from the project site, and the plantings have been maintained for 60 days since installation.
2. At the time of inspection or if, in the Engineer's opinion, plantings, seeded lawns, materials or workmanship is deficient, acceptance will not be granted, and the Contractor's responsibility for maintenance of all plants and lawns shall be extended until plant replacements are made or other deficiencies are corrected. All dead and unsatisfactory plants shall be removed promptly from the project. Replacement plants and seeded lawn areas shall conform in all respects to the Specifications for the originals and shall be planted and maintained in the same manner until Initial Acceptance is made.
3. A written report issued by the Engineer shall indicate to the Contractor Initial Acceptance or remedial items to be corrected before Initial Acceptance is made.
4. The date of the completed Initial Acceptance shall instigate the one-year period of maintenance and the required guarantee for all plantings and seeded lawn areas.

#### Final Acceptance Inspection

1. All shrubs, trees and lawn areas shall be inspected by the Engineer one year after Initial Acceptance and shall be alive and in satisfactory growth at the end of that time. Maintenance of plantings shall continue after the contract end date. Request for Final Acceptance inspection shall be made by the Contractor only when there is complete compliance with Planting and Seeding Sections; no partial acceptance will be made.

3. Each plant shall show at least 75 percent healthy growth and shall have the natural character of a plant of its species as determined by the Engineer, and all lawn areas shall be green, healthy and mowed. Plants found to be unacceptable shall be removed promptly from the site and replaced immediately or during the next normal planting season, as permitted by the specifications, until the replaced plants live for one full year. A final replacement inspection will be made after the replacement plantings have lived through one full year.
3. All tree stakes, arbor tape, and staking and guying appurtenances will be removed after the staked trees have been in place for one year.
4. All replacements shall be plants of the same kind and size specified in the Plant List. The cost of plants and replanting due to disease, insects, or any natural causes shall be borne by the Contractor, except for possible replacements due to external damage beyond the control of the Contractor.
4. Maintenance Instructions for all Trees, Shrubs, and Lawns shall be submitted by the Contractor as referenced in 1.03 of this Section.

#### Warranty

1. Trees, shrubs and herbaceous plant materials:

The Contractor shall warrant the continued growth and health of all trees, shrubs and plant material for a period of one (1) year after completion and acceptance of the entire project. The inspection of plants will be made by the Engineer. Plants that are determined by the Engineer to be dead, unhealthy, unsightly, lost their shape due to dead branches or other causes shall be replaced in accordance with the Drawings or Specifications. The cost of such replacement shall be at the Contractor's expense. All replacement plants shall be warranted for one year from the date of replacement planting.

2. Warranty will not apply to damage or loss of trees, shrubs, plants and/or ground cover caused by fires, floods, freezing rain, lightning storm, winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area, acts of vandalism and negligence on the part of the Owner.
3. Any plants determined to be unsatisfactory by the Engineer during the initial planting installation, shall be removed and replaced immediately by the Contractor.

#### **ITEM 826.7 EMERGENCY CALL BOX**

**DESCRIPTION:** The work under this item shall include the furnishing and installation of emergency call boxes as shown on the plans and as directed by the Engineer.

**MATERIALS:** Emergency Call Box shall be a vandal-resistant communications device that is a multi-functional, freestanding pedestal constructed of carbon steel, model CB 1-e as manufactured by Code Blue Corporation. 800-205-7186, 259 Hedcor Street, Holland, Michigan 49423, or approved equal.



Call box shall include a high quality, hands-free communications device illuminated by a high intensity faceplate light and a powerful combination blue beacon/strobe light that serves to easily identify it from a distance.

Compliance:

- Emergency Call Box shall be ADA compliant. Americans with Disabilities Act (ADA) compliant
- UL 60950-1 and UL 2017 listed
- NFPA 72 Chapter 24 (2010) compliant
- Meets NEMA 4X and IP56 requirements

It shall include temperature-controlled AE Phasing. It shall include a mounting Ring.

Emergency Call Box shall meet the following specifications:

1. The unit shall be a cylinder constructed of ASTM A500 seamless carbon steel structural tube, schedule 20, 12.75” outside diameter x 0.25” thick wall, at a height of 108” and weigh approximately 330 lbs.
2. The unit shall have an internal anchor base plate that is MIG welded 2” above the base and fabricated with a minimum of 0.50” thick A-36 grade steel plate. It shall have a 5” diameter center hole for electrical conduit access. The base plate shall have four oblong holes on an 8” circular bolt pattern for attachment.
3. An access door measuring 14” H x 9.64” W will be placed 10.94” from the bottom of the base to provide access for mounting to the anchor bolts and connectivity to electrical facilities. The opening shall have a cover plate, which mounts flush and is the same steel and radius as the unit. The cover plate shall fit into the opening and have a weather-resistant gasket. The cover plate shall be held in place by two ¼-20 x 1” countersunk proprietary fasteners.
4. Tamper resistant fasteners shall be used.
5. A recessed opening shall be cut at a point beginning 36.6” above the bottom of the unit. The opening shall be 15.1” tall at the forward edge and 12.8” tall at the rear edge, creating a 25-degree angle from the horizontal and an arc of 160 degrees in the face.
  - a. The opening shall be enclosed by a 7-gauge steel plate with a single opening for a communication device.
6. Unit shall include a weather-resistant, vented rubberized gasket mounted into the base to prevent entry of sediment and pests.

The Contractor shall submit Power, Communication, Finish options, Graphics and Additional Options for selection by the Owner prior to ordering.

Power:

1. All electrical components shall have a modular plug for easy service and replacement and will be equipped with a fuse for protection from transient voltage conditions.
2. Requires 1 ampere at 24V AC.
3. Voltage options shall include: 12-24V AC/DC; 120, 240, 277 and 347V AC.
4. The unit shall have the option for Power over Ethernet for connectivity to a VoIP network switch with 802.3af or 802.3at (minimum) capabilities. Requires the IP5000 phone for connectivity to ToolVox or SIP/IAX2 compatible VoIP system.

Lights:

1. LED Beacon/Strobe: Located in the dome top assembly with a rating of no less than 270 Lumens/92 candela, it shall have a factory-set flash rate of up to 375 flashes per minute and be programmable. A deep blue UV-rated polycarbonate prismatic refractor shall

surround the LED Beacon/Strobe and be used to distribute the light in a horizontal pattern for maximum brightness and visibility.

- a. The communication device shall be factory programmed to activate the LED Beacon/Strobe for the duration of a call.
- b. The LED Beacon/Strobe shall be 5.10” tall and 5.50” in diameter.
2. Faceplate light: LED will direct light onto the communications device and be vandal resistant.
  - a. The opening shall measure 4.50” W x .50” H.
  - b. The light shall have a lifetime of 100,000 hours and a rating of 100 Lumens.

**Communications:**

1. The unit shall have a speakerphone communication device.
  - a. IP5000 - VoIP: Refer to the IP5000 Architect and Engineering Specification for further information.
  - b. IA4100 - Analog: Refer to the IA4100 Architect and Engineering Specification for further information.
2. The unit shall be capable of communicating via third party IP wireless and cellular devices, which can be housed within the unit.
3. EIA/TIA, ANSI, CSA and BICSI cabling or similar standards shall be adhered to for proper operation of devices connected to copper or fiber infrastructure.

**Finish:**

1. Four-coat paint process, with zinc-rich primer for corrosion resistance and baked-on polyurethane enamel for maximum gloss and shine.
  - a. Optional clear coating process available to provide additional environmental protection.
2. Substrate preparation shall be as required to comply with applicable ASTM impact and adhesion standards: D2794 Direct and Reverse Impact, D523 Gloss @ 60 Degrees, D3359B Cross hatch Adhesion, D1654 Corrosion Creep, D714 Scribe Blisters and D714 Field Blisters.
3. The finish color shall be British Racing Green or other as selected by Owner.
4. Minimum coverage thickness of 2.0 mils.

**SUBMITTALS:**

**Contractor shall submit**

1. Manufacturer’s standard product literature.
2. Shop drawings.
3. Installation instructions.
4. Maintenance instructions.
5. Submit powdercoat finish samples for approval.
6. manufacturer’s FSC certification number.

Quality Assurance: Manufacturer shall have a minimum of 15 years’ experience in the manufacture of site seating.

Delivery, Storage and Handling: Handle products in accordance with manufacturer’s instructions. Store products in manufacturer’s original packaging until ready for installation. Protect products from impacts and abrasion during storage.

Warranty: Provide manufacturer’s standard warranty for one year from date of invoice against defects in materials and workmanship.

**CONSTRUCTION:** Coordinate construction of the emergency call box with the installation of the surrounding pavement. Assemble call box in conformance with the approved shop drawings, and manufacturer’s instructions. Install call box plumb and in locations indicated as indicated on the plans.

Protect call boxes from paint spatter, concrete splashes and other construction damage by wrapping in plastic sheeting or heavy kraft paper and taping in place. Do not remove until adjacent work is completed. Protect call box pedestal from chipping during troweling operations. Repair any damage to painted finish.

The unit shall be mounted onto four anchor bolts that are set .50” above the concrete. Standard 0.75” x 24” galvanized steel anchor bolts, nuts and washers shall be supplied.

Excavation, forms, reinforcement, placement and backfilling of concrete footing shall be in accordance with Section 901 of the Standard Specifications and as shown on the approved shop drawings. The concrete foundation shall measure 24” x 24” minimum and the anchor bolts shall protrude 6” from the foundation.

**Warranty:** The Emergency Call Box shall be warrantied against any defects in material and workmanship, under normal use, for a period of 2 years from date of installation. If system is found by manufacturer to be defective within the warranty period, manufacturer shall repair and/or replace any defective parts, provided the equipment is returned to manufacturer.

**ITEM 832.2  
DESTINATION SIGN**

**DESCRIPTION:** Work under this item consists of furnishing and installing arrow shaped destination signs and steel posts as shown on the plans.

**MATERIALS:** Aluminum sign panels (Type A, 0.08” thickness), hardware, and reflectorized sheeting shall conform to applicable provisions of Section 828 of the standard specifications.

Supports for destination signs shall be round steel posts. The post shall be galvanized steel with an outside diameter of 2 3/8 inches. Posts shall be furnished with a galvanized acorn shape cap.

Each sign panel shall be mounted to its round support post with two pipe post brackets. The tip and corners of all sign panels shall be rounded to a 0.75” radius.

Colors: The sign legend shall be reflectorized with white letters on brown background.

**SUBMITTALS:** Shop drawings shall be submitted to the Engineer for approval before fabrication.

**CONSTRUCTION:** Construct Destination Sign according to Specification requirements and in conformance to the approved shop drawings.

Excavation, forms, reinforcement, placement and backfilling of concrete footing shall be in accordance with Section 901 of the Standard Specifications and as shown on the approved shop drawings.

Prior to installation, signs shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Signs shall be stored to allow air to circulate around the material and shall not be permitted to be in direct contact with the ground at any time during storage.

Signs shall be carefully handled to prevent scratches, chipping, breakage, soiling or other damage.

Damaged signs shall be repaired, if possible, or replaced with new signs at no additional cost.

The contractor shall install the signs as indicated on the drawings. Signposts shall be set plumb with sign panel level.

Upon completion all signs shall be cleaned to remove all dirt, stains and other blemishes. Should the signs become stained or damaged beyond repair due the operations of the contractor, they shall be removed and replaced with new signs at no additional cost.

**ITEM 865.2  
FLUSH PAVING BAND- RESIN IMPRINT**

DESCRIPTION: The work under this Item shall include the installation of flush paving band as a resin imprint surface where shown on the plans or as directed by the Engineer.

MATERIALS: Flush Paving Bands shall be a synthetic paving material shall be composed of a hot-applied, resin-based compound formulated with a color stable pigment throughout that shall be surface textured to simulate hand laid brick, stone and/or masonry.

Color and Pattern options shall be submitted for Owner’s selection.

The resin imprint material shall conform to the following:

Grade	45 (Light/Med Traffic)	60 (Heavy Traffic)
Average Temp. Range	25 - 113 degrees F	25 - 140 degrees F
Wheel Tracking @ 113 F	less than 1 mm/hr	less than 1 mm/ hr
Wheel Tracking @ 140 F	N/A	less than 5 mm/hr
Density	2.12	2.12
Cone Flow Test	15% maximum	(5 hrs. @ 194 F)
Plane Test	5% maximum	(5 hrs. @ 194 F)
Indent @ 104 F	25 dmm maximum	50 dmm maximum
Indent @ 122 F	N/A	75 dmm maximum
Ash Content	90% maximum	90% maximum
Skid Resistance Value	55 - 70	55 - 70

The resin shall conform to the minimum following physical and performance properties: hot-applied resin-based compound developed specifically for use on bituminous or cement concrete, with superior adhesion, flexibility and abrasion resistance characteristics, as well as color stability, chemical resistance and scrub ability.

SUBMITTALS: A copy of the manufacturer’s instructions shall be provided to the Engineer for review at least 2 weeks prior to beginning work.

The Contractor shall submit color and imprint pattern options for the Owner’s selection. The Owner will select the resin color from the available pigments supplied by the manufacturer.

CONSTRUCTION METHODS: In full-depth reconstruction areas, the width of the area to receive the resin application shall be paved to within 3/4 inches of the finished pavement surface.

In order to achieve an imprint surface that is level with the surrounding pavement, the pavement will require milling to achieve proper depth level before the application. The installation area boundaries shall be sawcut prior to excavating the pavement materials for a clean edge. All pavement materials shall be milled and all excess material removed. The depth of the milled area shall allow the depth of the imprint material to be maintained within a range of a range of ¾” to 1” depth across the entire installation.

The Contractor shall prepare the area to receive the resin application according to the resin manufacturer’s instructions and will not be allowed to proceed with the resin application until the area has been inspected by the resin manufacturer and the Engineer.

#### Texturized Decorative Surfacing

The Contractor shall be responsible for the preparation, placement and patterning of the resin according to the resin manufacturer and subject to the approval of the Engineer. The contractor will be required to overlay imprint in previously prepared recessed pavement surfaces as described in the excavation section and/or other areas, as directed and approved by the Engineer.

The Contractor must be a manufacturer authorized applicator, experienced with this specialized system subject to approval by the Owner’s Representative.

This work shall be performed as follows:

1. Using manufacturer prescribed methods and equipment, the Contractor shall adequately heat and uniformly mix the imprint material(s) together. Maximum heating temperature of the completed formulation is 440 degrees Fahrenheit.
2. The Contractor shall then apply the heated, mixed resin material to the surface of a hardened, structurally sound bituminous concrete or cement concrete pavement, as directed by the Engineer. The resin material shall be spread to the desired thickness (¾ inches) using specialized ironing tools, heated sufficiently to smooth the surface to a state of readiness for texturizing. No material shall be applied when precipitation is present or if the pavement surface is wet.
3. The color and surface pattern shall be as chosen by the Owner’s Representative and in accordance with the approved design submittal. Texturizing will begin immediately after leveling has occurred, while the material is still hot enough to allow the mold selected, to adequately penetrate the surface and create the desired pattern or form.
4. Once the finished surface has cooled sufficiently, the application area may be opened to vehicular and/or pedestrian traffic.
5. Any residue resulting from this work shall be removed and disposed of according to the satisfaction of the Engineer. The completed work area is to be left in a neat and clean condition.

The Contractor shall take all precautions and steps during the resin application process to prevent bodily harm or injury, damage to adjacent materials such as new curb, sidewalks, drainage structures or water supply facilities. If during the execution of the work, the Contractor, through willfulness or carelessness, permits or causes any damage to public or private property, the cost of repair or replacement shall be the responsibility of the Contractor at no cost to the Owner.

The Contractor will be required to own or have access to the required specialized machinery and equipment necessary to perform this work, including but not limited to specialized trucks, compressor, miscellaneous asphalt equipment, dispensers, applicators, cutters and/or specialized tools, etc.

**ITEM 751.  
LOAM AND PLANTING SOIL**

DESCRIPTION: This Section supercedes portions of the Standard Specification Section 751 LOAM BORROW, PLANTABLE SOIL BORROW or PROCESSED PLANTING MATERIAL, whereas only portions of the Standard Specification Section 751 are applicable to this work. More stringent requirements within this Section shall govern over the Standard Specification.

The work of this Section consists of providing all equipment and materials and do all work necessary to supply and place loam and planting soils as indicated on the Contract Documents and as specified. Supplying and placement of planting soils shall include, but not be limited to:

1. Sampling and testing of modified loam borrow.
2. Sampling and testing of existing on-site topsoil.
3. Supplying, placing, spreading and grading of modified loam borrow.
4. Modifying, screening, placing, spreading and grading of existing, on-site topsoil.
5. Providing all other sampling, testing, supplying, placing, spreading and grading of planting soils as required by this Section.

Examination of Conditions

All areas of the existing site where topsoil is to be sampled for testing shall be inspected by the Contractor before starting work and any issues that might inhibit or prevent the sampling operation shall be reported to the Owner’s Representative prior to beginning this work.

The Contractor and any sub-Contractor responsible for the execution of the Work of this Section shall review and confirm in writing that the subsoil elevations have been brought to the proper subgrade elevations prior to proceeding with the spreading of existing on-site topsoil or loam borrow.

The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to sampling and testing of on-site stockpiles of delivered off-site loam borrow prior to final planting installation.

Definitions

The following size distributions of mineral particles by diameter and sieve size shall apply to the following conventional names of soil types:

<u>Conventional Name</u>	<u>Retained on U.S. Sieve No.</u>	<u>Diameter (mm)</u>
Very coarse sand	#18	1 - 2
Coarse sand	#35	0.5 - 1
Medium sand	#60	0.25 - 0.5
Fine sand	#140	0.10 - 0.25
Very fine sand	#270	0.05 - 0.10
Silt	by hydrometer	0.002 - 0.05
Clay	by hydrometer	Less than 0.002

Loamy sands shall conform to USDA Soil Taxonomy definitions and as follows: Soil material that contains at the upper limit 85 to 90 percent sand, and the percentage of silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit the soil material contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

1. Loamy coarse sand: 25 percent or more very coarse and coarse sand, and less than 50 percent any other one grade of sand. Loamy sand: 25 percent or more very coarse, coarse, and medium sand, and less than 50 percent fine or very fine sand.
2. Loamy fine sand: 50 percent or more fine sand or less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
3. Loamy very fine sand: 50 percent or more very fine sand.

Sandy loams shall conform to USDA Soil Taxonomy definitions and as follows: Soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30 percent, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.

1. Coarse sandy loam: 25 percent or more very coarse and coarse sand and less than 50 percent any other grade of sand.
2. Sandy loam: 30 percent or more very coarse, coarse and medium sand, but less than 25 percent very coarse sand, and less than 30 percent very fine or fine sand.
3. Fine sandy loam: 30 percent or more fine sand and less than 30 percent very fine sand or between 15 and 30 percent very coarse, coarse, and medium sand.

**SUBMITTALS:** At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material that does not meet these Specifications.

1. Existing On-Site Topsoil: Sample and test existing on-site topsoil. The Contractor shall sample the existing loam soils of the construction site in the following manner:
  - a. Sampling of existing topsoil in situ prior to stockpiling: Using a spade, the Contractor shall take thin vertical slices from the top 10 in. to 12 in. of the soil.
  - b. Sampling Locations: Unless otherwise indicated, samples shall be taken at the following locations and frequency:
    - i. Ten (10) locations per one acre (0.4 hectares) of the site as directed by the Owner's Representative.
  - c. Preparation of Samples: Contractor shall place these soil slices into a large, clean plastic container and mix thoroughly. Contractor shall take one cup of soil mixture and dry it at room temperature (do not dry samples in an oven or on a stove or radiator). Once soil is dry, place soil in sandwich size zip-type plastic bag and close it tightly. Label each sample on outside of bag, identifying sample by soil type and acre. Provide an approved site plan showing locations of stockpiles cross referenced to soil samples and test results.

2. Testing will be at the Contractor's expense. Contractor shall deliver all samples to testing laboratories and shall have the testing report sent directly to the Owner's Representative. Perform all tests for gradation, organic content, soil chemistry, cation exchange capacity, and pH by UMASS Soil and Plant Tissue Laboratory, West Experiment Station, North Pleasant Street, University of Massachusetts, Amherst, MA 01003, (413) 545-2311 or by a private testing laboratory specializing in the testing of soils for fertilization of woody plant material. Testing reports shall include the following tests and recommendations.
  - a. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Sieve analysis shall be by combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D 422 after destruction of organic matter by H<sub>2</sub>O<sub>2</sub>. To facilitate review and approval of sieve analysis, provide a computer-generated gradation curve from UMASS Soil & Plant Tissue Laboratory.
  - b. Percent of organic matter shall be determined by the loss on ignition of oven-dried samples. Test Samples minus #10 material shall be oven-dried to a constant weight at a temperature of 450 degrees Fahrenheit (752 degrees Centigrade).
  - c. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Manganese, extractable Aluminum, Lead, Zinc, Cadmium, Copper, Soluble Salts, and acidity (pH) and buffer (pH). A Conductivity Meter shall be used to measure Soluble Salts in 1:2 soil/water (v/v). Except where otherwise noted, nutrient tests shall be for available nutrients.
  - d. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish lawn and planting work as specified.
3. If biosolid compost (Massachusetts Department of Environmental Protection-permitted material) is used as an organic component of the proposed planting soil mixture, the amount of organic material used shall not exceed agronomic rates for nitrogen and phosphorus for trees and shrubs, turf or ornamental perennials. Provide certificates of agronomic rates from vendor for organic matter used in loam borrow manufacturing process. Biosolid compost shall be tested by an approved testing laboratory to determine that the compost is mature, stable and suitable for use in a growing medium.
4. Peat Moss: Submit a one cubic foot sample and supplier's certification of contents.
5. Limestone: Submit supplier's certification that the limestone being supplied conforms to these Specifications.
6. Acidulant: Submit supplier's certification that the acidulant being supplied conforms to these Specifications.
7. Fertilizer:
  - a. Submit product data of seeding and planting fertilizer and certificates showing composition and analysis. Submit fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations.



- b. Submit the purchasing receipt showing the total quantity purchased for the project prior to installation.
- 8. Gypsum: Submit manufacturer's product data and 2-pound (1 kilogram) sample.
- 9. All additives needed to amend a specific soil in order to meet these specifications

**MATERIALS:** Loam: The Contractor shall provide sufficient loam borrow to complete all loamin operations required of the Contract Documents, as specified in this Section and as directed by the Owner’s Representative. Loam Borrow shall comply with the following specifications.

Loam borrow shall be obtained from one of the following sources:

- 1. Naturally well-drained areas which have never been stripped before and have a history of satisfactory vegetative growth. Comply with all City by laws or regulations concerning the removal of topsoil from their boundaries.
- 2. On-site topsoil stripped, stockpiled on the site and meeting the requirements of this specification.
- 3. All sources shall be acceptable provided that, after testing and the addition of necessary soil additives specified in this Section, the loam borrow meets the following specifications.

Loam shall be one of the following loamy sands and sandy loams; “loamy sand”, “loamy fine sand”, “loamy very fine sand”, or “coarse sandy loam”: determined by mechanical analysis (ASTM D 422) and based on the "USDA Classification System" and as defined in this Section. It shall be of uniform composition, without admixture of subsoil.

It shall be free of stones greater than 0.75 inches lumps, plants and their roots, debris and other extraneous matter as determined by the Owner’s Representative.

Planting soil for seeded areas shall have the following grain size distribution for material passing the #10 sieve:

<u>Millimeter</u>	<u>Percent Passing by Weight</u>	
	<u>Maximum</u>	<u>Minimum</u>
2	-----	100
1	100	82
0.5	87	65
0.25	72	49
0.10	45	30
0.05	32	22
0.002	5	2

- 1. Maximum size shall be 0.75 inches largest dimension. The maximum retained on the #10 sieve shall be 25% by weight of the total sample.
- 2. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6.0 or less. (D80/D30 < 6.0).

3. In addition to the foregoing, all loam borrow to be used for loaming and seeding shall be mechanically screened processed loam borrow that passes a 3/4 inch by 6-inch screen size.

Organic content and pH for specific planting use shall be as follows:

1. Areas planted with turf grasses:
  - a. pH: 6.0 through 7.0
  - b. Organic Content 4.0 - 6.0 percent as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours)
2. Loam borrow shall be pH adjusted for planting soil for particular planting applications and shall be adjusted prior to delivery to the Project site as recommended by UMASS Soil & Plant Tissue Laboratory test results.
  - a. When pH of loam borrow is equal to or greater than 7 use aluminum sulfate to adjust pH downward to required levels.
  - b. When pH of loam borrow is less than 7 use either sulfur or ferrous sulfate to adjust pH downward to required levels.
  - c. When pH of loam borrow must be raised to the required levels use limestone.
  - d. Regardless of amendment Contractor chooses to use, Contractor, not the Owner, shall be responsible for obtaining specified pH by seeding and/or planting time.

Loam borrow shall be free of plants and their roots, debris and other extraneous matter. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC2) of a 1:2 soil-water suspension shall be equal to or less than 1.0 milliohms/cm. (Test minus sieve #4 material.) Loam borrow shall not have levels of extractable aluminum greater than 200 parts per million except for Ericaceae and other acid-loving plants. Cation Exchange Capacity (CEC) shall be greater than or equal to 12, except when loam borrow is being used to establish Conservation seeding, in which case the CEC shall be between 2 and 5.

On-site topsoil stripped and stockpiled may be re-used if, with or without amending or blending with other material, it meets the above requirements. On-site topsoil and amendments shall be tested in accordance with requirements for loam borrow and submittals shall be made for review and acceptance. The Contractor shall provide additional loam borrow as required to complete the required work.

All loam borrow proposed for use shall be tested for conformance to the specifications.

The Owner's Representative reserves the right to reject on or after delivery to the project site any material which does not, in his opinion, meet these specifications.

#### Soil Additives

Soil additives shall be used to counteract soil deficiencies as recommended by the soil's analysis and as supplements for lawn construction as specified herein.

Acidulant for adjustment of loam borrow pH shall be commercial grade flours of sulfur, ferrous sulfate, or aluminum sulfate that are unadulterated. Acidulants shall be delivered in unopened containers with the name of the manufacturer, material, analysis and net weight appearing on each container.

Ground limestone for adjustment of loam borrow pH shall contain not less than eighty five percent (85%) of total carbonates and shall be ground to such fineness that forty percent (40%) will pass through 100 mesh sieve and ninety five percent (95%) will pass through a 20 mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.

Organic material shall be compost and peat moss used in equal proportions. Compost shall be a stable humus-like material produced from the aerobic decomposition of organic residues. The residues, if biosolids, shall consist of compost meeting MA-DEP Type 1 requirement or approved equal. The residues shall be dark brown or black in color, with no visible free water or dust and no unpleasant odor, meeting the following criteria certified by the producer.

- |   |  |
|---|--|
| 1. carbon-nitrogen ratio  | minimum 10:1 maximum 25:1  |
| 2. stability CO2 evolution test<br>or<br>Dewar self-heating test<br>or<br>Woods End Laboratory's Compost Test Kit | <10 mg CO2 - C/g BVS/day<br><br><10 degrees C above room temp.                 |
| 3. organic content<br>Ignition; minus #10 Sieve, 430  | 40 percent minimum dry weight (Loss on degrees C)                              |
| 4. particle size  | 90 percent passing one-half inch screen<br>100 percent passing one-inch screen |
| 5. inorganic debris   | 1 percent maximum (dry weight)   |
| 6. pH   | minimum 5.5 - maximum 8.0  |
| 7. Soluble Salts  | >2 and <4.0 mmhos/cm (ds/m)  |
| 8. density  | 850-1,050 lb./cy   |

Peat moss shall be composed of the partly decomposed stems and leaves of any of several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue and other foreign matter. It shall have an acidity range of 3.3 pH to 5.5 pH as determined in accordance with the methods of testing of A.O.A.C., latest edition. Its water absorbing ability shall be a minimum of 1,100% by weight on an oven-dry basis.

Sand, as required for mixing with topsoil to meet Specification requirements shall be uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock and free from loam or clay, surface coatings, mica, other deleterious materials with the following gradation.

<u>Millimeter</u>	Percent Passing by Weight	
	<u>Maximum</u>	<u>Minimum</u>
5	-----	100
2	100	80
1	86	58
0.5	50	18
0.25	24	7

0.10	0	10
0.05	0	4.5
0.002	0	0.3

1. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 4.0 or less. ( $D70/D20 < 4.0$ ).

Gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) shall be agricultural grade, granular form. Gradation shall conform to the following:

<u>Sieve Designation</u>	<u>Percent Passing by Weight</u>
No. 8 (2.36 mm)	100
No. 16 (1.18 mm)	97
No. 30 (0.60 mm)	82
No. 50 (0.30 mm)	46
No. 100 (0.15 mm)	21

Commercial fertilizer shall be a product complying with the State and United States fertilizer laws. Deliver fertilizer to the site in the original unopened containers bearing the manufacturer's certificate of compliance covering analysis and which shall be furnished to the Owner's Representative. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis.

1. Fertilizer for planting shall be formulated for top-dressing, soil surface application to plants. Fertilizer shall be designed and certified by the manufacturer to provide controlled release of fertilizer continuously for not less than 9 months. One hundred percent of the nitrogen content shall be derived from organic materials. Nitrogen source shall be coated to ensure slow release. Fertilizer percentages of weight of ingredients shall be as recommended by the soil testing and analysis.

CONSTRUCTION: Filling and Compaction: Perform percolation tests on existing subsoils or placed fill prior to placing and spreading loam borrow to determine whether or not the subgrade will drain properly.

In the event that percolation testing indicates that the subsoil, placed fills or ordinary borrow has been over compacted and will not drain, the contractor shall loosen up the top 36 inches of the subgrade and re-compact the borrow to a density that will percolate.

Do not damage the work previously installed. Maintain all required angles of repose of materials adjacent to the loam as shown on the Contract Documents. Do not over excavate compacted subgrades of adjacent pavement or structures during loaming operations.

Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the Contract Documents. Provide a written report to the Owner's Representative that the subgrade has been placed to the required elevations and that the subgrade drains water in accordance with the required percolation tests. Perform no work of placing and spreading loam until elevations have been confirmed and written report has been accepted by the Owner's Representative.

Clear the subgrade of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Such construction debris, trash,

rubble and foreign material shall be removed from the site and disposed of in a legal manner. Fill any over excavation with approved fill and compact to the required subgrade compaction levels.

Do not proceed with the installation of loam borrow until all utility work in the area has been installed.

Protect adjacent walls, walks and utilities from damage or staining by the loam borrow.

#### Fine Grading

Immediately prior to dumping and spreading the loam borrow, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish.

Loam borrow delivered to the site shall be protected from erosion at all times.

No loam borrow shall be handled, planted, or seeded in any way if it is in a wet or frozen condition.

Soil additives shall be spread and thoroughly incorporated into the layer of loam borrow by harrowing or other methods reviewed by the Owner's Representative. The following soil additives shall be incorporated:

1. Ground limestone or acidulant as required by soil analysis to achieve the required pH as described in this Section. Spread limestone at the rate required by soil analysis up to a maximum limit of 200 pounds per 1,000 square feet. Should recommendations of soil analysis require greater rates of application than 200 pounds per 1,000 square feet, a surface application of limestone not in excess of 50 pounds per 1,000 square feet, shall be made to the established lawn the season after Final Acceptance.
2. Fertilizer at the rate and of analysis recommended by the soil analysis. This shall be the first in a series of fertilizer applications made under this Contract.
3. Biosolid compost, peat moss, sand or other soil amendments as required by soil analysis.

After loam borrow and required additives have been spread, carefully prepare the loam borrow by scarifying, harrowing, or tilling the loam to integrate soil additives into the top six (6) inches of the loam.

Sufficient grade stakes shall be set for checking the finished grades. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.

During the compaction process, all depressions caused by settlement or rolling shall be filled with additional loam borrow and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.

The Contractor shall install loam borrow in successive horizontal lifts no thicker than 6 inches in turf areas to the desired compaction as described in this Section. The Contractor shall install the soil at a higher level to anticipate any reduction of loam borrow volume due to settling, erosion, decomposition, and other similar processes during the warranty period.

Compact loam to the required density: min 80%, max 85%. The loam borrow in each lift should feel firm to the foot in all areas and make only slight heel prints.

Select equipment and otherwise phase the installation of the loam borrow to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil.

Disturbed areas outside the limit of lawn work shall be graded smooth and spread with a minimum of 6 inches of loam borrow to the finished grade.

Contractor shall be responsible for maintaining all stockpiles of existing, on-site topsoil on the site until final placement of existing on-site topsoil and loam borrow has been approved by the Owner's Representative.

**ACCEPTANCE:** Confirm that the final grade of loam borrow is at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans. Request the presence of the Owner's Representative to inspect final grade. Do not proceed with the remaining work of this Contract until the Owner's Representative has given his/her written approval of the final grade.

### **ITEM 767.12 COMPOST FILTER TUBES**

**DESCRIPTION:** The purpose of this item is to provide a linear, compost-filled tube for filtering suspended sediments from storm water flow. This item shall conform to the requirements of Section 751 and 767 of the Standard Specifications and the following:

**MATERIALS:** Material for the filter tubes shall be compost meeting M1.06.0, except that no manure or bio-solids shall be used. In addition, no kiln-dried wood or construction debris shall be allowed. Particle size analysis: 98% shall pass through a 3-inch (75mm) sieve; 30-50% shall pass 3/8 inches (10mm) sieve.

Tubes for compost filters shall be a minimum of 12 inches (300 mm), a maximum of 18" (450mm) in diameter. Tube material shall be a knitted mesh with 1/8" - 3/8" (3-10 mm) openings and made of biodegradable (cotton or jute) materials. Photodegradable fabric may be used; however, photodegradable fabric must be removed and disposed of by the contractor, at his expense, at the end of the contract. Additional tubes shall be used at the direction of the Engineer.

Stakes for anchors, if required, shall be nominal 2 x 2 stakes.

**CONSTRUCTION METHODS:** Tubes of compost may be filled on site or shipped. Tubes shall be placed, filled and staked in place as required to ensure stability against water flows. All tubes shall be tamped to ensure good contact with soil. Stakes shall not puncture compost tubes.

The Contractor shall ensure that the filter tubes function as intended at all times. Tubes shall be inspected after each rainfall and at least daily during prolonged rainfall. The Contractor shall immediately correct all deficiencies, including, but not limited, to washout, overtopping, clogging due to sediment, and erosion. The contractor shall review location of tubes in areas where construction activity causes drainage runoff to ensure that the tubes are properly located for effectiveness. Where deficiencies exist, such as overtopping or wash-out, additional staking or compost material shall be installed as directed by the Engineer. The Contractor shall remove sediment deposits as necessary to maintain the filters in working condition. The functional integrity of filter tubes shall be maintained in sound condition at all times. Filter tubes that are decomposing, cut, or otherwise compromised shall be repaired or replaced as directed by the Engineer and be incidental to this item.

Filter tube fabric and stakes shall be removed by the Contractor when site conditions are sufficiently stable to prevent surface erosion, and after receiving permission to do so from the Engineer. All biodegradable tube fabric shall be cut and laid flat in place to decompose on-site at the direction of the Engineer. Tube fabric that is not decomposing satisfactorily shall be removed and disposed off-site by the

Contractor. At the direction of the Engineer, the Contractor may rake out and seed compost so that it is no greater than 2 inches (50 mm) in depth on soil substrate.

METHOD OF MEASUREMENT: Measurement for this item shall be by the foot of Compost Filter Tube installed, approved, and maintained in place.

BASIS OF PAYMENT: Payment shall be paid by the foot and shall be compensation for all labor equipment and materials necessary to complete the work specified above, including, but not limited to, stakes and tube fabric, compost mulch wedge along top of tubes, removal and disposal of fabric and stakes, raking and seeding of compost.

**ITEM 815.1**  
**TRAFFIC CONTROL SIGNAL LOCATION No. 1 (PROSPECT HILL/WAYSIDE)**  
**ITEM 815.2**  
**TRAFFIC CONTROL SIGNAL LOCATION No. 2 (BACON/WAYSIDE)**  
**ITEM 815.3**  
**TRAFFIC CONTROL SIGNAL LOCATION No. 3 (LEXINGTON/WAYSIDE)**  
**ITEM 815.4**  
**TRAFFIC CONTROL SIGNAL LOCATION No. 4 (LYMAN/WAYSIDE)**

DESCRIPTION: This work consists of installing new traffic control equipment and performing associated roadway improvements at the intersections of the Wayside Trail with Prospect Hill Road, Bacon Street, Lexington Street and Lyman Street in Waltham, Massachusetts, as indicated in the Contract Drawings.

MATERIALS: The traffic control equipment installed at these intersections shall be **Gloss Black** which shall match Color Number 17038 of the Federal Standard 595C "Colors Used in Government Procurement", with the exception of the signal head visors and backplates which will be **Flat Black** in accordance with Federal Color Number 37038.

CONSTRUCTION METHODS: The new equipment to be installed at these locations include the following:

**Prospect Hill Road – City of Waltham to Purchase and Install**

1. Two (2) signal pedestals
2. Two (2) Rectangular Rapid Flash Beacons (RRFBs)
3. Two (2) pedestrian signal pushbutton detectors

**Bacon Street –**

1. One (1) mast arm
2. One (1) signal pedestal
3. Four (4) Rectangular Rapid Flash Beacons (RRFBs)
4. Two (2) pedestrian signal pushbutton detectors

**Lexington Street –**

1. Two (2) mast arms
2. Four (4) signal pedestals
3. Four (4) traffic signal heads
4. Two (2) bicycle signal heads
5. Two (2) pedestrian signal heads
6. Two (2) pedestrian signal pushbuttons
7. Two (2) emergency preemption detectors
8. One (1) emergency preemption confirmation beacon

9. One (1) emergency preemption phase selector
10. 12 loop detectors
11. Nine (9) pull boxes
12. One (1) 4-channel loop detector amplifier
13. One (1) controller cabinet

Lyman Street –

1. One (1) mast arm
2. Three (3) signal pedestals
3. Four (4) High-Intensity Activated Crosswalk (HAWK) Beacons
4. Two (2) bicycle signal heads
5. Two (2) pedestrian signal heads
6. Two (2) pedestrian signal pushbutton detectors
7. Four (4) loop detectors
8. Six (6) pull boxes
9. One (1) 4-channel loop detector amplifier
10. One (1) controller cabinet

The Contractor shall install all loop detectors, conduit, wiring, pull boxes and service connections associated with this equipment, as indicated on the Contract Drawings. Additionally, all sidewalks and pedestrian ramps shall be reconstructed as indicated on the Plans and repaired, as necessary, to existing or ADA acceptable slopes and grades and any disturbed curbing shall be replaced.

Precaution should be taken to avoid damage to any existing materials that are to remain in place. If damage occurs, it shall be repaired by the Contractor at no additional cost to the City. The methods employed in performing the work, including all equipment, tools, and machinery used in handling material and executing any part of the work, shall be subject to the approval of the Engineer prior to the commencement of work. If the proposed methods are found unsatisfactory, they shall be changed to the Engineer's specifications and approval.

All improvements, equipment, and existing surfaces disturbed, damaged, or removed in performing this item of work shall be replaced to the satisfaction of the Engineer at no expense to the City. This item of work shall not commence until directed by the Engineer.

The intersection shall remain open to traffic while work is being performed on the traffic signal. It is the responsibility of the Contractor to maintain access to adjacent driveways during construction. The Contractor shall plan and schedule the work accordingly.

### **EMERGENCY VEHICLE PREEMPTION SYSTEM**

**DESCRIPTION:** The new traffic signal at the intersection of the Wayside Trail with Lexington Street shall provide Optical Emergency Vehicle Preemption. The system shall be compatible with the City's existing preemption equipment. The emergency vehicle preemption system shall be Global Traffic Technologies (GTT) Opticom Priority Control System model 700 series.

**MATERIALS:** The emergency vehicle preemption control system shall consist of a data-encoded phase selector to be installed within the traffic control cabinet. This unit will serve to validate, identify, classify and record the signal from the optical detectors located on support structures at the intersection. Upon receiving a valid signal from the detector, the phase selector shall generate a preempt call to the controller initiating a preemption operation as shown on the plans.



The optical detectors shall be single input, single output units used to control one approach. The optical detectors shall be GTT Opticom model 711. The optical confirmation beacon shall be GTT Opticom model 768.

The phase selector shall be a rack-mounted plug-in four channel, multi-mode, dual priority device manufactured by GTT Opticom model 764. The phase selector shall plug into the Loop Detector Rack or plug into a shelf-mounted single card slot chassis GTT Opticom Model 760 series. Programming the phase selector shall be via a PC-based computer utilizing unit specific software. One copy of software, on compact disc shall be supplied and licensed to the City of Waltham. A hard copy of final programming data shall be left in the control cabinet. The Contractor shall supply a complete set of interface cables for phase selector to laptop connection

The Contractor shall install a confirmation strobe at the traffic signal location as shown on the plans. The confirmation strobe shall serve to validate to the driver of the emergency vehicle that the traffic signal has recognized the preemption call and will initiate the proper preemption sequence. The confirmation strobe shall have a clear lens. The strobe light for the emergency vehicle preemption system shall not be energized by a spare traffic signal conductor. It shall be connected to the cabinet by its own cable/wire.

**CONSTRUCTION METHODS:** The Contractor shall be responsible for the proper programming of the phase selector, orientation of the optical detectors, and all other work necessary to provide a complete and operating emergency vehicle preemption system.

The Contractor may be required to field adjust the location of the optical detectors for optimum line of sight detection in the presence of the Engineer to properly detect preemption calls from approaching vehicles.

#### **ACCESSIBLE PEDESTRIAN PUSHBUTTON DETECTOR WITH R10-3e/R10-25 SIGNS**

**DESCRIPTION:** This work shall consist of furnishing and installing the components of a fully integrated Accessible Pedestrian Pushbutton Detector (APPD) with either R10-3e or R10-25 Signs, as indicated on the plan, consisting of a pushbutton detector with an audible signal, raised vibrotactile arrow, and pushbutton locator tone. The detector shall meet or exceed the requirements of the Manual on Uniform Traffic Control Devices, 2009 Edition (MUTCD) including all revisions, as well as the Massachusetts Amendments to the MUTCD. All detectors supplied for this project shall be identical models of current production. Untried or prototype units shall not be acceptable.

**MATERIALS:** The pedestrian pushbutton detector housing shall consist of a cast aluminum enclosure that is free of voids, pits, dents, excessive foundry grinding marks, and other exterior blemishes, and is water-tight and rated for outdoor use. The housing shall be furnished with a hole in the bottom and back that are tapped to accept a ½-inch NPT thread plug. The bottom hole shall be supplied with a threaded plug. The back hole shall be supplied with a non-threaded plastic plug or equivalent.

The APPD shall be compliant with the latest edition of the U.S. Access Board's ADA Accessibility Guidelines (ADAAG) that are approved by the U.S. DOT and shall be pressure-activated requiring no more than three (3) pounds of force to activate. Pushbuttons and solid-state switches shall be rated to 20 million actuations minimum. The APPD shall be mounted at a height between 3 feet 6 inches and 4 feet. The measurement shall be made from the center of the pushbuttons to the finished sidewalk elevation.

The APPD assembly shall include a sign with an arrow indicating the direction of the crossing associated with the pushbutton. The sign shall explain the meaning of each of the pedestrian signal indications that may be visible to a pedestrian standing at the button, and shall conform to the specific design included in

the latest MUTCD as called for on the Plans. All pedestrian detectors furnished and installed under this Contract shall be identical models of current production, and untried or prototype units will not be acceptable.

The APPD shall include features that provide audible, vibrotactile, and other visual information to pedestrians. The APPD shall meet or exceed the requirements for Accessible Pedestrian Signals and Detectors included in the latest MUTCD.

The APPD shall include a raised vibrotactile arrow incorporated into the pushbutton to clearly indicate the direction of crossing. The raised vibrotactile arrow shall have high visual contrast (light on dark or dark on light) and be aligned parallel to the direction of pedestrian travel on the crosswalk associated with the pushbutton. The vibrotactile arrow shall vibrate when the WALK signal is on for the crosswalk associated with the pushbutton and shall be motionless at all other times. This applies to the crossings at Lexington Street and Lyman Street only; vibrotactile indications shall not be used with the RRFB locations in accordance with the MUTCD Interim Approval 21.

The APPD shall include an audible pushbutton locator tone to allow visually disabled pedestrians to locate the pushbutton. The locator tone shall be deactivated or silent when the WALK signal is on for the crosswalk associated with the pushbutton and when the traffic signal is operating in a flashing mode; at all other times the locator tone, having a duration of 0.15 seconds or less and repeating at one (1) second intervals, shall emanate from the APPD. The volume of the locator tone shall be automatically adjusted in response to ambient sound level, up to a maximum volume of 100 dBA. The Contractor shall initially program the volume-intensity-responsive locator tone to emanate at a minimum of ambient sound and a maximum of 5 dBA louder than ambient sound. The locator tone shall be audible a distance of six (6) to twelve (12) feet away from the pushbutton or to the nearest edge of the building closest to the pushbutton, whichever is less.

The APPD shall emanate an audible indication of the WALK signal upon activation of the WALK signal for the crosswalk associated with the pushbutton. Such audible walk indications shall have the same duration as the pedestrian WALK signal except when the pedestrian signal rests in WALK (in the latter case the duration of the audible indication of the WALK signal shall be no more than seven (7) seconds).

The APPD -emanated indication of the WALK signal shall be audible from the entrance to the crosswalk associated with the pushbutton that is closest to the APPD.

Each APPD shall be capable of providing either a percussive tone or a verbal speech message for the audible indication of the WALK signal. The audible WALK indication shall be a rapid-tick percussive tone, repeating at eight (8) to ten (10) ticks per second and consisting of multiple frequencies with a dominant component at 880 Hz.

APPDs at Lexington and Lyman shall be programmed to use the speech walk message “STREET NAME, WALK SIGN IS ON TO CROSS STREET NAME” during the exclusive pedestrian phase. At Prospect Hill and Bacon, APPSs shall be programmed to speak the message “YELLOW LIGHTS ARE FLASHING.”

The APPD shall include a pushbutton confirmation light that is illuminated upon pushbutton activation. Once illuminated, the confirmation light shall remain on until the WALK signal turns on for the crosswalk associated with the pushbutton, when the confirmation light shall turn off. Each actuation of the confirmation light shall be accompanied by the audible verbal speech message: “Wait.” The “Wait.” speech message shall comply with the same recording, volume adjustment, and initial programming requirements stipulated above for audible WALK indication verbal speech messages.

All sounds shall emanate from the APPD via a weather- and water-proof speaker that is protected by a vandal-resistant screen. Minimum and maximum volumes for each different sound shall be able to be programmed independently.

All audible, vibrotactile, and visual features of the APPD shall be non-operational when the traffic signal is in flash mode.

**CONSTRUCTION METHODS:** The APPD shall be installed in accordance with the manufacturer's recommendations and the requirements of the most recent edition of the MUTCD, including all revisions and additions. The programming and operation of audible speech messages, percussive tones, locator tones, and confirmation tones, as well as all other vibrotactile and visual features required, shall be tested and checked for conformance with these specifications with the Engineer present. If any are not operating properly or to the satisfaction of the Engineer, they shall be corrected and the features re-tested until accepted by the Engineer.

The Contractor shall coordinate the testing schedule with the City to ensure the designated representative will be present.

### **DETECTABLE WARNING PAD**

**DESCRIPTION:** This work consists of providing and installing a detectable warning pad with truncated domes on wheelchair ramps and raised crossings constructed in accordance with MassDOT Construction Standard Drawings E 107.6.5. The detectable warning pads shall be installed at the locations indicated on the Plans and shall be compliant with Americans with Disabilities Act (ADA) warning and directional systems for the visually impaired.

**MATERIALS:** The detectable warning pad shall be of dimension and color contrast within ADA standards and the discretion of the Engineer. The panels shall be gray cast iron conforming to AASHTO M105 and AASHTO M306. The panels shall have integrally cast domes and shall be manufactured with integral embedment lugs for the express installation into fresh unset Portland cement concrete. The detectable warning pad shall be of the dimensions detailed in MassDOT Construction Standard Drawings E 107.6.5.

**CONSTRUCTION METHODS:** Pads shall be set flush into fresh unset concrete at the required line and grade to match the running grade and cross slope of the ADA accessible ramp or blended transition that warranted the installed pad. The contractor shall ensure that the alignment of the panel will match line and grade of the ramp such that the panel is flush with the ramp, and there is no physical conflict with other castings, fittings, structures, foundations or appurtenance thereof.

In areas where detectable warning is needed on existing sidewalk, detectable warning panels shall be used as manufactured by Detectable Warning Systems, Inc. or approved equivalent. There shall be no edges that would present a tripping hazard.

### **MAST ARMS AND FOUNDATIONS**

**DESCRIPTION:** This work consists of designing and installing mast arms and their foundations in accordance with MassDOT OVERHEAD SIGNAL STRUCTURE & FOUNDATION Standard Drawings. The mast arms and foundations shall be installed at the locations indicated on the Plans.

**MATERIALS:** In designing mast arms and mast arm foundations, the contractor shall refer to the boring logs attached to these specifications. For loading, the contractor shall account for signal head spacing as

indicated on the Plans. Specifically, for the mast arm at Bacon Street, the contractor shall account for proposed signage as well as potential future signal heads, to allow the City of Waltham flexibility to convert to a HAWK signal at the intersection in the future.

**METHOD OF MEASUREMENT:** “Traffic Control Signal Location No. 1 (Prospect Hill/Wayside)”, “Traffic Control Signal Location No. 2 (Bacon/Wayside)”, “Traffic Control Signal Location No. 3 (Lexington/Wayside)”, and “Traffic Control Signal Location No. 4 (Lyman/Wayside)” as defined and including all elements described above, will be measured as a lump sum item.

**BASIS OF PAYMENT:** The accepted quantities of “Traffic Control Signal Location No. 1 (Prospect Hill/Wayside)”, “Traffic Control Signal Location No. 2 (Bacon/Wayside)”, “Traffic Control Signal Location No. 3 (Lexington/Wayside)”, and “Traffic Control Signal Location No. 4 (Lyman/Wayside)” will be paid for as a lump sum item. The price so stated constitutes full and complete compensation for all labor, materials, and equipment, and all other incidentals required to finish the work complete and accepted by the Engineer. The timing of elements being purchased and/or installed by the City shall be coordinated by the Contractor.

**ITEM 904.99  
TIMBER PILE REPAIR**

**NOT FOR CONSTRUCTION**

**DESCRIPTION:** Item 904.99 is a sub-item of Item 992.11. The work under this sub-item shall be performed in accordance with the applicable provisions of Sections 901 and 955 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the following:

Work under this sub-item shall consist of removing deteriorated timber material, applying approved timber preservative, installing welded-wire-fabric, preparing, forming, casting, and curing concrete repairs, joint sealant, and any other work necessary to complete the work for the deteriorated timber piles to the limits shown on the Plans, as directed by the Engineer, and in accordance with this Job Specific Specification within the requirements and restrictions of all relevant permits. Any required excavation, backfill, and debris removal shall be considered incidental to this sub-item.

It is anticipated that the work will be coordinated with the control of water so that all concrete shall be poured and cured in the dry.

Payment for this sub-item will be made under Item 992.11, Alteration to Bridge Structure No. 114 (Timber Bridge)

**CONSTRUCTION METHODS:** This work shall be completed without any live load on the bridge. All soft, loose, and splintered wood shall be removed from the areas to be repaired by means of suitable power and hand tools to expose sound timber.

Care shall be taken during the removal of the designated portions of the piles to avoid damaging the portions that are to remain in place. Any damage caused by the Contractor to the existing piles that are designated to remain in place shall be repaired by the Contractor at its own expense to the satisfaction of the Engineer.

The Contractor shall prevent debris from entering the waterway. Any material that accidentally falls into such areas, which shall also include the waterway, shall be removed immediately at the Contractor's expense.

All materials removed under this item shall become the property of the Contractor and shall be removed from the job site.

The Contractor shall submit to the Engineer for review and approval a plan describing the repair procedure including all proposed materials and equipment that are to be used.

**BASIS OF PAYMENT:** Work under this sub-item shall include all materials, equipment, and labor needed to make the pile repairs complete in place, which includes the following: 4000 psi, 3/8 in., 610 Cement Concrete, welded steel wire fabric, approved wood preservative, and approved caulking material. Any excavation, backfill, debris removal, or any other work necessary to complete the work, shall be considered incidental to this sub-item.

Control of water will be paid for under a separate sub-item of Item 992.11.

**ITEM 909.999  
CONCRETE SLAB REPAIR**

**DESCRIPTION:** Item 909.999 is a sub-item to Items 992.13 and 992.14. This work consists of making repairs to structure concrete by removing and disposing deteriorated concrete; furnishing and installing steel reinforcement; preparing bonding surfaces of concrete; preparing and installing bonding agent; replacing the deteriorated concrete with a specified repair material; and finishing and curing as directed by the Engineer all in accordance with these Specifications.

**MATERIALS:** Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

4000 psi, 3/8 in., 660 Cement Concrete.....	M4.02.00
Epoxy Coated Reinforcing Bars.....	M8.01.7
Epoxy-Resin Base Bonding System for Concrete.....	M4.05.5

**CONSTRUCTION:** As directed by the Engineer, the Contractor shall sound the entire concrete deck surface using a chain drag 3 feet in width with chain drops spaced every 6 inches. During the sounding, the Engineer will determine and delineate the extent of the repair areas. The boundaries of areas to be removed shall be saw cut square to a minimum depth of 1 inch, unless otherwise noted on the Plans. Thin, tapered or feathered edges are prohibited.

**Surface Preparation:** All deteriorated soft or honeycombed concrete shall be removed from the areas to be repaired by means of suitable power and hand tools to a uniform depth, sufficient to expose a bonding surface of sound material. Power tools that cause or may cause over-breakage of concrete are prohibited. Pneumatic/chipping hammers shall not be heavier than the nominal 30-pound class. Pneumatic/chipping hammers or mechanical chipping tools, to remove concrete within two inches beneath or around reinforcing steel designated to remain, shall not be heavier than the nominal 15-pound class. Tools shall not contact reinforcing steel to remain.

In areas where reinforcing steel is found to be surrounded by deteriorated concrete or where at least one-half of the rebar surface area is exposed, the depth of concrete removal shall be such as to include all deteriorated concrete but not less than that depth necessary to allow for one inch minimum annular clearance around the reinforcing bars. All corroded reinforcing bars to remain within the concrete removal boundaries shall be thoroughly cleaned by sandblasting or by other suitable methods approved by the Engineer to remove all rust. Those bars that have lost 1/4 or more of their original diameter shall be supplemented by new bars spliced in place. New bars shall be lapped as indicated on the Plans to develop

the full strength of the bar. Additional concrete removal may be necessary to provide this lap. Dual bars of equivalent or greater cross-sectional area may be used.

All newly exposed concrete repair surfaces shall be free of loose particles and other foreign material. The repair areas shall be thoroughly cleaned and be left roughened by the use of sandblasting, compressed air, air and water blasting, steam, wire brushing, or by other methods approved by the Engineer. The Contractor may use one or all of the various means of cleaning the repair areas as approved or as ordered by the Engineer.

Care shall be taken during the removal of the designated portions of the structure to avoid damaging the portions that are to remain in place. Any damage caused by the Contractor to the existing structure that is designated to remain in place shall be repaired or replaced by the Contractor at its own expense to the satisfaction of the Engineer. Regardless of the method of removal, if in the opinion of the Engineer the removal operation causes excessive damage to portions of the concrete which are to remain, the Contractor shall cease his operations until such time that an alternate removal method has been proposed by the Contractor and has been approved by the Engineer. Claims for additional time or compensation due to such cessation of operations will not be approved.

The Contractor shall ensure that no debris or any other material falls into the waterway below the bridge. Should debris or material fall into the waterway, such shall be removed immediately and all work shall stop until such time as a revised procedure of operation has been submitted and approved by the Engineer. All damages or injuries as a result of debris or material falling shall be the responsibility of the Contractor.

All such debris and materials shall be removed and legally disposed of off the project site. Storing or burying of material or debris on site is not allowed.

Where bonding agents are specified for use, they shall be applied in accordance with the manufacturer's recommendations. The Contractor shall be aware of the contact time, as per the manufacturer's recommendation after the placement of the bonding agent, and shall perform the necessary coordination between the associated construction activities, primarily the surface preparation, the erection of forms, and the delivery and placement of concrete. The Contractor shall take measures to ensure that the contact time is not exceeded. If the contact time is exceeded, the bonding agent shall be re-applied in accordance with the manufacturer's recommended procedures for reapplication, at no additional cost to the Town of Waltham.

**Placement of Reinforcing:** If any reinforcement is damaged by the Contractor during the repair procedure, it shall be replaced at the Contractor's expense, as directed by the Engineer.

**Application of Form and Cast-in-Place Concrete:**

**a. General.** Repairs accomplished by the form and cast-in-place method shall be performed in accordance with the applicable requirements of Section 901.

**b. Bonding to Existing Surfaces.** Prior to placing the Cast-in-Place Concrete, surfaces shall be prepped in accordance with these specifications or as indicated on the Plans.

**c. Use of Self Consolidating Concrete (SCC) in Form and Cast-in-Place Concrete.** SCC concrete may be used for form and cast-in-place concrete repairs or as indicated on the plans. Concreting procedures shall be performed by personnel experienced with the placement of SCC mixes. All repair areas shall be adequately formed to contain the proposed SCC material, and all resulting holes from the

required formwork fasteners shall be properly filled with an approved cementitious material. Special care shall be taken so that the form is properly sealed against leaks, since SCC is more fluid than standard mixes. If excessive surface voids are observed when stripping a form, further placements of the SCC shall cease until the mix and/or placement problem is identified and corrected to the satisfaction of the Engineer.

**d. Final Finish.** All exposed surfaces shall be finished straight and true, approximating the original contour as close as practicable.

METHOD OF MEASUREMENT: Item 909.999 shall be paid for under a sub-item of Items 992.13 and 992.14.

BASIS OF PAYMENT: Work under this sub-item shall include all materials, equipment, and labor needed to make the repairs complete in place, which includes all cement concrete, epoxy coated reinforcing bars, and bonding agent. Any excavation or debris removal, or any other work necessary to complete the work, shall be considered incidental to this sub-item.

#### **ITEM 912.4 DRILLED AND GROUTED #4 DOWELS**

DESCRIPTION: The work to be done under this Item shall consist of drilling and grouting #4 steel reinforcement dowels in existing cement concrete or stone masonry as shown on the Plans, or as required.

Payment for this sub-item will be made under Item 992.12, Alteration to Bridge Structure No. 113 (Linden Street Bridge) and Item 992.15, Alteration to Bridge Structure No. 8.75 (Timber Culvert)

MATERIALS: The grout to be used for these dowels shall be a non-shrink cementitious mortar. Grouting material that has been tested, approved, and is listed on the Approved Products List is acceptable for use on Massachusetts Department of Transportation bridge projects.

Reinforcing steel dowels shall meet the requirements of AASHTO M31 Grade 60. All reinforcing steel dowels shall be epoxy coated.

CONSTRUCTION METHODS: All dowel holes shall be air drilled provided that the minimum edge distance of 6 inches is observed. Should, in the Engineer's opinion, air drilling be inappropriate due to questionable strength of the existing concrete or stone masonry or insufficient edge distance, the dowel holes shall be diamond core drilled. The inner surfaces of diamond core drilled dowel holes shall be cored to develop sufficient keying action. The method of coring of the dowel hole inner surfaces shall be subject to the approval of the Engineer. The depth and diameter of the drilled dowel holes shall be as shown on the plans. The holes shall be blown clear of any debris and shall have the approval of the Engineer prior to the placement of any grout material.

The drilling operation shall be performed without damage to any existing reinforcing or portion of the structure that is to remain in place. Any damage to any existing portion of the structure that is to remain in place shall be repaired to a condition equal to or better than that existing prior to the beginning of the Contractor's operations and shall be repaired at the Contractor's expense.

The Contractor shall strictly follow the recommendations of the manufacturer for mixing and placing the grout material prior to the placement of the dowels. The Contractor shall, at a minimum, adhere to the ACI code requirements regarding minimum and maximum temperatures while placing the grout. Any

excessive grout around the hole after placement of the dowel shall be struck off smooth while the grout is still fresh.

The minimum drill hole diameter for a #4 dowel bar shall be 1¼” and the minimum embedment length shall be 8”.

Dowels and threaded rods that are improperly bonded, as determined by the Engineer, will be rejected. Adjacent new holes shall be drilled, and new dowels or threaded rods shall be placed and securely anchored to the concrete or masonry. All work necessary to correct improperly anchored dowels and threaded rods shall be performed at the Contractor’s expense.

**ITEM 913.2  
CORING AND GROUTING ANCHOR BOLTS**

DESCRIPTION: The work to be done under this Item shall consist of coring and grouting steel anchor bolts in existing cement concrete or stone masonry as shown on the Plans, or as required.

Payment for this sub-item will be made under Item 992.15, Alteration to Bridge Structure No. 8.75 (Timber Culvert)

MATERIALS: The grout to be used for these dowels shall be a non-shrink cementitious mortar. Grouting material that has been tested, approved, and is listed on the Approved Products List is acceptable for use on Massachusetts Department of Transportation bridge projects.

Anchor bolts, nuts, and washers shall conform to ASTM F 1554 Grade 105 and shall be hot-dipped galvanized in accordance with AASHTO M 232.

CONSTRUCTION METHODS: The coring operation shall be performed without damage to any existing reinforcing or portion of the structure that is to remain in place. Any damage to any existing portion of the structure that is to remain in place shall be repaired to a condition equal to or better than that existing prior to the beginning of the Contractor’s operations and shall be repaired at the Contractor’s expense.

The Contractor shall strictly follow the recommendations of the manufacturer for mixing and placing the grout material prior to the placement of the dowels. The Contractor shall, at a minimum adhere to the ACI code requirements regarding minimum and maximum temperatures while placing the grout. Any excessive grout around the hole after placement of the anchor bolt shall be struck off smooth while the grout is still fresh.

Anchor bolts that are improperly bonded, as determined by the Engineer, will be rejected. All work necessary to correct improperly anchored bolts shall be performed at the Contractor’s expense.

**ITEM 913.99  
POST-INSTALLED MECHANICAL ANCHORS**

DESCRIPTION: Item 913.99 is a sub-item to Items 992.13 and 992.14. The work to be done under this sub-item shall consist of installing post-installed mechanical anchors to secure the timber bridge rail to the existing concrete culvert slab as shown on the Plans, or as required.

Payment for this sub-item will be made under Item 992.13, Alteration to Bridge Structure No. 8.92 (Concrete Culvert – Sta. 278+77) and Item 992.14, Alteration to Bridge Structure No. 8.80 (Concrete Culvert – Sta. 285+19)



MATERIALS: Anchors shall be Hilti brand or equal and shall be corrosion resistant. All materials shall be submitted to the Engineer for review and approval prior to any installation. Anchors and associated materials shall be capable of developing a capacity required to resist the applied loads shown on the Plans.

CONSTRUCTION METHODS: The Contractor shall strictly follow the recommendations of the manufacturer for installing the anchors.

The installation operation shall be performed without damage to any existing reinforcing or portion of the structure that is to remain in place. Any damage to any existing portion of the structure that is to remain in place shall be repaired to a condition equal to or better than that existing prior to the beginning of the Contractor's operations and shall be repaired at the Contractor's expense.

Anchors that are improperly installed, as determined by the Engineer, will be rejected. All work necessary to correct improperly installed anchors shall be performed at the Contractor's expense.

Care should be taken to avoid contact between dissimilar metals. Where dissimilar metals may contact each other, a barrier/break shall be provided between them.

The Contractor shall prevent debris from entering the waterway. Any material that accidentally falls into such areas, which shall also include the waterway, shall be removed immediately at the Contractor's expense.

All materials removed under this item shall become the property of the Contractor and shall be removed from the job site.

**ITEM 991.99  
CONTROL OF WATER (PROJECT WIDE)**

DESCRIPTION: This Item includes all dewatering necessary to accomplish timber pile repairs and abutment construction in the dry. The Work under this Item shall conform to the relevant provisions of Section 140 of the Standard Specifications and these Special Provisions.

Dewatering shall be conducted to ensure that all concrete is placed and cured in the dry.

It is the responsibility of the Contractor to determine the need and extent of stream diversions, sedimentation basins and dewatering techniques and sedimentation controls needed to control water and sediment at the site. It is also the Contractor's responsibility to ensure the proposed dewatering system is in conformance with permits provided through this contract. During the actual process of executing the excavation operations, the Contractor shall submit the methods and materials he proposes to use for the Engineer's approval.

The Contractor's methods shall consider the close proximity of right-of-way lines, wetland delineation, and existing structures to remain, all of which may require the dewatering controls to be coordinated with other work items. The Contractor shall also consider the timing of bridge work adjacent to waters and perform these tasks to the extent possible during seasonal low water to limit the extent of disturbance.

Plans and Calculations for dewatering measures shall be developed by the Contractor for this Item, prepared by a Professional Engineer Registered in the Commonwealth of Massachusetts and submitted for the review of the Engineer prior to the start of construction.

Payment for this sub-item will be made under Item 992.11, Alteration to Bridge Structure No. 114 (Timber Bridge). This sub-item will be considered incidental to all other items requiring control of water.

CONSTRUCTION METHODS: The Contractor is advised that the effectiveness of the water control method used will vary based on the field conditions at the time at which the work is being performed. The Engineer has the right to order the Contractor to stop all construction operations when in his judgment the Contractor's water control operations are failing to produce adequate results or are posing a threat to the environment.

The Contractor shall use such equipment and shall perform his operations in such a manner that boiling or other disturbances of the soil in the foundation/repair area will be prevented. The Contractor shall keep the area being excavated dry by such means that water will be prevented from entering from the adjacent soils and adversely affecting the stability of the foundation material or supporting soils.

All dewatering and related work shall be conducted in such a manner as to prevent siltation or contamination of the waterway or adjoining wetlands.

The pumping discharge shall not be allowed to enter directly into Beaver Brook. The water from the work areas shall be pumped to a settling tank/basin. The tank shall be constructed so as to allow for the pumped water to pass through the tank with sediments settling out before out letting to an area enclosed by hay bales. The tank can be constructed of concrete, fiberglass or any other material that will meet the following:

- A. Approximately 70 percent sedimentation trapping efficiency shall be achieved with a typical tank to ensure that the tanks are adequately sized to prevent overtopping from dewatering and to provide the required filtering.
- B. The outlet from the settling tank/basin shall not cause erosion of the surrounding area. An approved method of controlling erosion, such as an erosion control blanket, stone, etc., shall be used at the outlet of the tank/basin.

The settling tanks/basins shall be maintained as follows:

- A. Inspect at least twice daily during dewatering operations.
- B. Repair any damage immediately.
- C. Clean tank/basin outlet daily. Remove any debris immediately.
- D. Remove sediments when deposits reach eight (8) inches below the outlet invert.
- E. Dispose sediments outside of wetland areas at a location approved by the Engineer.

The Contractor shall inspect hay bales that surround the outlet daily and shall immediately replace any that are damaged.

The Contractor shall utilize dewatering stockpile basins and filter basins as shown on the plans for the purposes of dewatering excavated material.

Locations of the tanks/basins will be as directed by the Engineer due to specific site conditions and staging operations of the Contractor.

Pumping shall be conducted in a manner that will not adversely affect the freshly placed concrete within the excavation.

The Contractor shall provide and maintain ample pumps, pipes and other devices to promptly and continually remove and dispose of water from the excavation areas. The Contractor shall select the size and configuration of pumps and pipes.

**ITEM 992.11  
ALTERATION TO BRIDGE STRUCTURE NO. 114 (TIMBER BRIDGE)**

**NOT FOR CONSTRUCTION**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to alter the complete bridge structure, which includes the following: demolition of bridge, stream debris removal (unclassified excavation), bridge excavation, gravel borrow for backfilling structures and pipes, GRS abutments and walls, timber pile repair, concrete beam seats including epoxy coated reinforcement, sawing and sealing joints in asphalt pavement at bridges, glulam timber deck including all hardware, timber bridge railing including all hardware, timber pile caps and bracing members including all hardware, structural steel, elastomeric bearing pads, membrane waterproofing for bridge decks, and control of water.

Support of excavation and backfill outside of the reinforced zone, other than gravel borrow for backfilling structures and pipes, shall be considered incidental to this Item.

The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

**DEMOLITION OF BRIDGE**

The work to be done under this Sub-Item shall be per Item 115.99 of the Job Specific Specifications.

**UNCLASSIFIED EXCAVATION (stream debris removal)**

The work to be done under this Sub-Item shall be per Section 120 of the Standard Specifications except payment shall be lump sum (LS).

**SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES**

The work to be done under this Sub-Item shall be per Item 482.31 of the Job Specific Specifications.

**TREATED TIMBER – GLULAM TIMBER DECK / TIMBER BRIDGE RAILING / TIMBER PILE CAPS / TIMBER BRACING**

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following:

All hardware used for fastening including, but not limited to, drift pins, bolts, nuts, washers, steel plates and angles, split rings, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items. Preformed joint material shall be considered incidental to these items. Steel MC-shape stiffener beams and steel angles (used to connect the pile caps to the deck) are paid for under sub-item 960.1. All hardware and steel shapes shall be galvanized.

MEMBRANE WATERPROOFING FOR BRIDGE DECKS

The work to be done under this Sub-Item shall be per Item 965 of the Job Specific Specifications.

TIMBER PILE REPAIR

The work to be done under this Sub-Item shall be per Item 904.99 of the Job Specific Specifications.

CONTROL OF WATER

The work to be done under this Sub-Item shall be per Item 991.99 of the Job Specific Specifications.

GRS ABUTMENTS AND WALLS

The work to be done under this Sub-Item shall be per the Contract Plans. Sub-Item quantity of SF is based on the overall wall length and vertical height of concrete masonry unit (CMU) facing. The Sub-Item quantity includes the reinforced soil foundation, CMU blocks, precast concrete caps, cement concrete, reinforcing steel, reinforced backfill material, geosynthetic reinforcement, polystyrene foam boards, asphaltic coatings, steel flashing, and all other work considered as incidental to the work involved in furnishing and constructing the GRS abutments and walls.

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 992.11 Alteration to Bridge Structure No. 114 (Timber Bridge) will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 992.11, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 992.11. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

ALTERATION TO BRIDGE STRUCTURE NO. 114 (TIMBER BRIDGE): SCHEDULE FOR PARTIAL PAYMENT

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
115.99	Bridge Demolition	1	LS		
120.1	Unclassified Excavation (stream debris removal)	1	LS		
140.	Bridge Excavation	310	CY		
151.2	Gravel Borrow for Backfilling Structures and Pipes	100	CY		
482.31	Sawing & Sealing Joints in Asphalt Pavement at Bridges	33	FT		
904.	4000 psi, 0.75 in., 610 Cement Concrete	20	CY		
904.99	Timber Pile Repair	50	LF		
910.1	Steel Reinforcement for Structures – Epoxy Coated	400	LB		
932.	Elastomeric Bridge Bearing Pad	30	SF		
955.1	Treated Timber – Timber Pile Caps & Bracing	3.6	MBF		
955.2	Treated Timber – Glulam Timber Deck	15.7	MBF		
955.3	Treated Timber – Timber Bridge Railing	6.5	MBF		
960.1	Structural Steel – Coated Steel	9,000	LB		
965.	Membrane Waterproofing for Bridge Decks	200	SY		
991.99	Control of Water	1	LS		
996.99	GRS Abutments and Walls	1,060	SF		
Total Lump Sum Price for Item 992.11 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 992.11. unless specifically covered under another payment item.

**ITEM 992.12  
ALTERATION TO BRIDGE STRUCTURE NO. 113 (LINDEN STREET BRIDGE)**

**NOT FOR CONSTRUCTION**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to alter the complete bridge structure, which includes the following: structural steel repairs, sawing and sealing joints in asphalt pavement at bridges, reinforced concrete backwalls, curbs, and deck supports including epoxy coated reinforcing, glulam timber deck including all hardware and dowels, timber bridge railing including all hardware, timber beams including all hardware, Type I protective screen, drilling and grouting dowels, elastomeric bearing pads, and membrane waterproofing for bridge decks.

Bridge excavation, gravel borrow for backfilling structures and pipes, and debris removal shall be considered incidental to this Item.

Adhesive product used to attach wood to steel shall be submitted to the Engineer for review and approval and shall be considered incidental to this item.

The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

**STRUCTURAL STEEL REPAIRS**

The work to be done under this Sub-Item shall be per Item 107.97 of the Job Specific Specifications.

**SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES**

The work to be done under this Sub-Item shall be per Item 482.31 of the Job Specific Specifications.

**DRILLING AND GROUTED #4 DOWELS**

The work to be done under this Sub-Item shall be per Item 912.4 of the Job Specific Specifications.

**TREATED TIMBER – GLULAM TIMBER DECK / TIMBER BRIDGE RAILING / TIMBER BEAMS**

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following:

All hardware used for fastening including, but not limited to, bolts, nuts, washers, steel plates and angles, split

rings, cast aluminum alloy deck brackets, steel dowels, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items. Preformed joint material shall be considered incidental to these items.

MEMBRANE WATERPROOFING FOR BRIDGE DECKS

The work to be done under this Sub-Item shall be per Item 965 of the Job Specific Specifications.

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 992.12 Alteration to Bridge Structure No. 113 (Linden Street Bridge) will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 992.12, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 992.12. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

ALTERATION TO BRIDGE STRUCTURE NO. 113 (LINDEN STREET BRIDGE): SCHEDULE FOR PARTIAL PAYMENT

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
107.97	Structural Steel Repairs	800	LB		
482.31	Sawing & Sealing Joints in Asphalt Pavement at Bridges	33	FT		
904.	4000 psi, 0.75 in., 610 Cement Concrete	20	CY		
910.1	Steel Reinforcement for Structures – Epoxy Coated	100	LB		
912.4	Drilled and Grouted #4 Dowels	52	EA		
932.	Elastomeric Bridge Bearing Pad	22	SF		
955.1	Treated Timber – Timber Beams	4	MBF		
955.2	Treated Timber – Glulam Timber Deck	12.5	MBF		
955.3	Treated Timber – Timber Bridge Railing	6.25	MBF		
965.	Membrane Waterproofing for Bridge Decks	170	SY		
975.3	Protective Screen Type I	250	LF		
Total Lump Sum Price for Item 992.12 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 992.12. unless specifically covered under another payment item.

**ITEM 992.13**

**ALTERATION TO BRIDGE STRUCTURE NO. 8.92 (CONCRETE CULVERT – STA. 278+77)**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to alter the complete bridge structure, which includes the following: concrete slab repairs including epoxy coated reinforcing, drilling and grouting dowels, timber bridge railing including all hardware, and membrane waterproofing for bridge decks.

Bridge excavation, gravel borrow for backfilling structures and pipes, and any control of water shall be considered incidental to this Item.



The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

#### CONCRETE SLAB REPAIR

The work to be done under this Sub-Item shall be per Item 909.999 of the Job Specific Specifications.

Work under this Sub-Item shall include the removal of all debris, soil, etc. covering the existing concrete bridge deck to fully expose the entire concrete deck surface.

#### POST-INSTALLED MECHANICAL ANCHORS

The work to be done under this Sub-Item shall be per Item 913.99 of the Job Specific Specifications.

#### TREATED TIMBER – TIMBER BRIDGE RAILING

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following:

All hardware used for fastening including, but not limited to, bolts, nuts, washers, steel plates and angles, split rings, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items. Post-installed mechanical anchors are to be paid for under a separate sub-item unit price.

#### MEMBRANE WATERPROOFING FOR BRIDGE DECKS

The work to be done under this Sub-Item shall be per Item 965 of the Job Specific Specifications.

#### SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 992.13 Alteration to Bridge Structure No. 8.92 (Concrete Culvert – STA. 278+77) will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 992.13, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 992.13. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**ALTERATION TO BRIDGE STRUCTURE NO. 8.92 (CONCRETE CULVERT – STA. 278+77):  
SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
909.999	Concrete Slab Repair	16	SF		
913.99	Post-installed Mechanical Anchors	16	EA		
955.1	Treated Timber – Timber Bridge Railing	1	MBF		
965.	Membrane Waterproofing for Bridge Decks	20	SY		
Total Lump Sum Price for Item 992.13 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 992.13. unless specifically covered under another payment item.

**ITEM 992.14**

**ALTERATION TO BRIDGE STRUCTURE NO. 8.80 (CONCRETE CULVERT – STA. 285+19)**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to alter the complete bridge structure, which includes the following: concrete slab repairs including epoxy coated reinforcing, drilling and grouting dowels, timber bridge railing including all hardware, and membrane waterproofing for bridge decks.

Bridge excavation, gravel borrow for backfilling structures and pipes, and any control of water shall be considered incidental to this Item.

The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

CONCRETE SLAB REPAIR

The work to be done under this Sub-Item shall be per Item 909.999 of the Job Specific Specifications.

Work under this item shall include the removal of all debris, soil, etc. covering the existing concrete bridge deck to fully expose the entire concrete deck surface.

POST-INSTALLED MECHANICAL ANCHORS

The work to be done under this Sub-Item shall be per Item 913.99 of the Job Specific Specifications.

TREATED TIMBER – TIMBER BRIDGE RAILING

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following:

All hardware used for fastening including, but not limited to, bolts, nuts, washers, steel plates and angles, split rings, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items. Post-installed mechanical anchors are to be paid for under a separate sub-item unit price.

MEMBRANE WATERPROOFING FOR BRIDGE DECKS

The work to be done under this Sub-Item shall be per Item 965 of the Job Specific Specifications.

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 992.14 Alteration to Bridge Structure No. 8.80 (Concrete Culvert – STA. 285+19) will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 992.14, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 992.14. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**ALTERATION TO BRIDGE STRUCTURE NO. 8.80 (CONCRETE CULVERT – STA. 285+19):  
SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
909.999	Concrete Slab Repair	16	SF		
913.99	Post-installed Mechanical Anchors	16	EA		
955.1	Treated Timber – Timber Bridge Railing	1	MBF		
965.	Membrane Waterproofing for Bridge Decks	20	SY		
Total Lump Sum Price for Item 992.14 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 992.14, unless specifically covered under another payment item.

**ITEM 992.15**

**ALTERATION TO BRIDGE STRUCTURE NO. 8.75 (TIMBER CULVERT – STA. 287+59)**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to alter the complete bridge structure, which includes the following: demolition of bridge, bridge excavation, sawing and sealing joints in asphalt pavement at bridges, reinforced concrete abutment seats and backwalls including epoxy coated reinforcing, glulam timber deck including all hardware, steel stiffener beams, timber bridge railing including all hardware, drilling and grouting dowels, coring and grouting anchor bolts, elastomeric bearing pads, bituminous damp-proofing, and membrane waterproofing for bridge decks.

Gravel borrow for backfilling structures and pipes and any control of water shall be considered incidental to this Item.

The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this bridge structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

DEMOLITION OF BRIDGE

The work to be done under this Sub-Item shall be per Item 115.99 of the Job Specific Specifications.

SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES

The work to be done under this Sub-Item shall be per Item 482.31 of the Job Specific Specifications.

DRILLING AND GROUTED #4 DOWELS

The work to be done under this Sub-Item shall be per Item 912.4 of the Job Specific Specifications.

CORING AND GROUTING ANCHOR BOLTS

The work to be done under this Sub-Item shall be per Item 913.2 of the Job Specific Specifications.

TREATED TIMBER – GLULAM TIMBER DECK / TIMBER BRIDGE RAILING

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following:

All hardware used for fastening including, but not limited to, bolts, nuts, washers, steel plates and angles, split rings, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items.

MC steel stiffener beam is paid for under sub-item 960.1.

MEMBRANE WATERPROOFING FOR BRIDGE DECKS

The work to be done under this Sub-Item shall be per Item 965 of the Job Specific Specifications.

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 992.15 Alteration to Bridge Structure No. 8.75 (Timber Culvert – STA. 287+59) will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 992.15, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 992.15. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

ALTERATION TO BRIDGE STRUCTURE NO. 8.75 (TIMBER CULVERT – STA. 287+59):  
SCHEDULE FOR PARTIAL PAYMENT

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
115.99	Bridge Demolition	1	LS		
140.	Bridge Excavation	15	CY		
482.31	Sawing & Sealing Joints in Asphalt Pavement at Bridges	33	FT		
903.	3000 psi, 1.5 in., 470 Cement Concrete	4	CY		
910.1	Steel Reinforcement for Structures – Epoxy Coated	400	LB		
912.4	Drilled and Grouted #4 Dowels	34	EA		
913.2	Coring and Grouting Anchor Bolts	16	EA		
932.	Elastomeric Bridge Bearing Pad	30	SF		
955.1	Treated Timber – Glulam Timber Deck	1.5	MBF		
955.2	Treated Timber – Timber Bridge Railing	1	MBF		
960.1	Structural Steel – Coated Steel	155	LB		
965.	Membrane Waterproofing for Bridge Decks	20	SY		
970.	Bituminous Damp-Proofing	10	SY		
Total Lump Sum Price for Item 992.15 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 992.15. unless specifically covered under another payment item.

**ITEM 995.01  
TIMBER ACCESS RAMP - LINDEN STREET**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to construct the complete access ramp structure, which includes the following: earth excavation, bridge excavation, gravel borrow for backfilling structures and pipes, crushed stone for bridge foundations, concrete abutments, backwall,

curtain walls, and footings including epoxy coated reinforcement, elastomeric bearing pads, drilled shaft excavation, drilled shafts including epoxy reinforcement, steel sheeting, treated timber deck, stringers, diaphragms, pier caps, posts, and bracing including all hardware, treated timber bridge railing including all hardware, structural steel, and bituminous damp-proofing.

Support of excavation, other than Sub-Item 952, shall be considered incidental to this Item.

The following items shall be considered as included in this Item: Development of Assembly Plans, form liners, neoprene seals, backer rods, preformed and premoulded filler, joint sealer, caulking, closed cell foam, weep holes with bagged stone, all piping and drains, waterproofing protective course, and all other work considered as incidental to the work involved in furnishing and placing the concrete elements.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this access ramp structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

TREATED TIMBER – DECKING/ STRINGERS/ DIAPHRAGMS/ PIER CAPS/ POSTS/ BRACING/ TIMBER BRIDGE RAILING

The work to be done under this Sub-Item shall be per the Standard Specifications, the Plans, and shall include the following: All hardware used for fastening including, but not limited to bolts, nuts, washers, split rings, metal connectors, hangers, column bases, and fasteners, etc., shall be included in the sub-item unit price for Treated Timber, no separate payment will be made for these items.

Steel plates and angles other than Simpson (or equal) connectors are paid for under sub-item 960.1.

Non-slip deck surface treatment shall be considered incidental to the sub-item 955.1. The Contractor shall submit product information to the Engineer for review and approval. The Contractor shall verify with the manufacturer that the non-slip deck surface treatment is compatible with deck preservative treatment.

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 995.01 Timber Access Ramp - Linden Street will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the bridge structure as listed below. The bridge structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual bridge components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 995.01, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 995.01. Payment for similar materials and construction at locations other than at this bridge structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**TIMBER ACCESS RAMP - LINDEN STREET: SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
120.	Earth Excavation	60	CY		
140.	Bridge Excavation	54	CY		
151.2	Gravel Borrow for Backfilling Structures and Pipes	14	CY		
156.1	Crushed Stone for Bridge Foundations	70	TON		
901.	4000 psi, 1.5 in., 565 Cement Concrete	14	CY		
910.1	Steel Reinforcement for Structures – Epoxy Coated	900	LB		
932.	Elastomeric Bridge Bearing Pad	28	SF		
945.198	Drilled Shaft Excavation 24 Inch Diameter	220	LF		
945.199	Drilled Shaft Excavation 36 Inch Diameter	90	LF		
945.598	Drilled Shaft 24 Inch Diameter	240	LF		
945.599	Drilled Shaft 36 Inch Diameter	100	LF		
952	Steel Sheeting	5,000	LB		
955.1	Treated Timber – Timber Decking	6	MBF		
955.2	Treated Timber – Timber Stringers	7.5	MBF		
955.3	Treated Timber – Timber Diaphragms	1.5	MBF		
955.4	Treated Timber – Timber Pier Caps	2.4	MBF		
955.5	Treated Timber – Timber Posts	1	MBF		
955.6	Treated Timber – Timber Bracing	1	MBF		
955.7	Treated Timber – Timber Bridge Railing	6.5	MBF		
960.1	Structural Steel – Coated Steel	5,600	LB		
970.	Bituminous Damp-Proofing	10	SY		
Total Lump Sum Price for Item 995.01 =					



Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 995.01 unless specifically covered under another payment item.

**ITEM 996.01  
RETAINING WALL – PROSPECT HILL ROAD**

The work under this Item shall conform to the applicable provisions of Section 901, Section 945, and Section 996 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to construct the complete wall structure, which includes the following: drilled shaft, precast concrete posts and panels, steel reinforcement, weep drains, and all other embedded and attached components. Any fill, excavation, and support of excavation necessary to construct the complete wall structure shall be considered incidental to this Item.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this wall structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

RETAINING WALL

The work to be done under this Item shall be per the Contract Plans.

RELATED ITEMS

Item. 144. Class B Rock Excavation  
Item 945.102 Drilled Shaft Excavation 3.5 Foot Diameter  
Item 945.202 Rock Socket Excavation 3.5 Foot Diameter  
Item 945.302 Obstruction Excavation 3.5 Foot Diameter  
Item 996.02 Retaining Wall – Hammond Street

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 996.01 Retaining Wall – Prospect Hill Road will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor’s independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the wall structure as listed below. The wall structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual wall components.

The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 996.01, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 996.01. Payment for similar materials and construction at locations other than at this wall structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**RETAINING WALL – PROSPECT HIL ROAD: SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
904.3	5000 psi, ¾ Inch, 685 HP Cement Concrete	70	CY		
910.1	Steel Reinforcement for Structures – Epoxy Coated	18,700	LB		
945.502	Drilled Shaft 3.5 Foot Diameter	200	FT		
Total Lump Sum Price for Item 996.01 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 996.01 unless specifically covered under another payment item.

**ITEM 996.02  
RETAINING WALL – HAMMOND STREET**

The work under this Item shall conform to the applicable provisions of Section 901, Section 945, and Section 996 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to Specifications - Job Specific for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to construct the complete wall structure, which includes the following: drilled shaft, precast concrete posts and panels, steel reinforcement, weep drains, and all other embedded and attached components. Any fill, excavation, and support of excavation necessary to construct the complete wall structure shall be considered incidental to this Item.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this wall structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

RETAINING WALL

The work to be done under this Item shall be per the Contract Plans.

RELATED ITEMS

Item. 144. Class B Rock Excavation

- Item 945.102 Drilled Shaft Excavation 3.5 Foot Diameter
- Item 945.202 Rock Socket Excavation 3.5 Foot Diameter
- Item 945.302 Obstruction Excavation 3.5 Foot Diameter
- Item 996.01 Retaining Wall – Prospect Hill Road

SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 996.02 Retaining Wall – Hammond Street will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor’s independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the wall structure as listed below. The wall structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual wall components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 996.02, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 996.02. Payment for similar materials and construction at locations other than at this wall structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**RETAINING WALL – HAMMOND STREET: SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
904.3	5000 psi, ¾ Inch, 685 HP Cement Concrete	60	CY		
910.1	Steel Reinforcement for Structures – Epoxy Coated	17,000	LB		
945.502	Drilled Shaft 3.5 Foot Diameter	180	FT		
Total Lump Sum Price for Item 996.02 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 996.02 unless specifically covered under another payment item.

**ITEM 996.03  
GRS RETAINING WALL - LINDEN STREET ACCESS RAMP**

The work under this Item shall conform to the applicable provisions of Section 995 of the Massachusetts Department of Transportation (MassDOT) Standard Specifications and the specific requirements stipulated below for the component parts of this Item. Refer to the Special Provisions for individual component parts. For those component parts where no specific requirement is stipulated, the Standard Specifications shall apply except for payment.

Work under this Item shall include all materials, equipment, and labor needed to construct the complete wall structure, which includes the following: bridge excavation, gravel borrow for backfilling structures and pipes, and GRS retaining wall.

Support of excavation, excavation, and backfill outside of the reinforced zone shall be considered incidental to this Item.

The work does not include any items listed separately in the proposal. Payment for materials shown on the Plans as being part of this wall structure or which may be incidental to its construction and are not specifically included for payment under another Item shall be considered incidental to the work performed under this Item and shall be included in the unit price of the component of which they are a part.

#### GRS RETAINING WALL

The work to be done under this Sub-Item shall be per the Contract Plans. Sub-Item quantity of SF is based on the overall wall length and vertical height of concrete masonry unit (CMU) facing. The Sub-Item quantity includes the reinforced soil foundation, CMU blocks, precast concrete caps, cement concrete, reinforcing steel, reinforced backfill material, geosynthetic reinforcement, polystyrene foam boards, asphaltic coatings, steel flashing, and all other work considered as incidental to the work involved in furnishing and constructing the GRS abutments and walls.

#### SCHEDULE BASIS FOR PARTIAL PAYMENT

The Item No. 996.03 GRS Retaining Wall - Linden Street Access Ramp will be paid per the LUMP SUM unit at the Contract Bid Price, based on Contractor's independent investigation of the work prior to bidding. The Contract Bid Price shall include all labor, materials, tools, equipment, and all other incidentals that may be necessary to perform the work as specified, complete in place and accepted by the Engineer. No increase will be made to the Bid Price due to any unseen nature of the work or materials involved.

Within ten (10) days after the award of the Contract, the Contractor shall submit, in duplicate, for the approval of the Engineer, a schedule of unit prices for the major components of the wall structure as listed below. The wall structure Lump Sum breakdown quantities provided below are estimated and not guaranteed. The total of all partial payments to the Contractor shall equal the Lump Sum contract price regardless of the accuracy of the quantities furnished by the Engineer for the individual wall components. The cost of labor and materials for any Item not listed but required to complete the work shall be considered incidental to Item 996.03, and no further compensation will be allowed.

The schedule on the following proposal forms apply only to Item 996.03. Payment for similar materials and construction at locations other than at this wall structure shall not be included under this Item. Sub-Item numbering is presented for information only in coordination with MassDOT Standard Nomenclature.

**GRS RETAINING WALL - LINDEN STREET ACCESS RAMP: SCHEDULE FOR PARTIAL PAYMENT**

Sub-Item	Component	Quantity	Unit	Unit Price	Amount
140.	Bridge Excavation	315	CY		
151.2	Gravel Borrow for Backfilling Structures and Pipes	80	CY		
996.99	GRS Retaining Wall	740	SF		
Total Lump Sum Price for Item 996.03 =					

Any component not covered in these Job Specific Specifications, but shown on the plans, shall be included in the contract lump sum price for Item 996.03. unless specifically covered under another payment item.

**ITEM 999.01  
ECO-COUNTER INSTALLATION**

The contractor shall install two eco-counters, previously purchased by and in the possession of the City. The installation shall be coordinated with the City and their vendor. Documentation associated with the product type purchased is attached in Appendix A.

METHOD OF MEASUREMENT: Measurement shall be in the unit Each per eco-counter installed and operational.

BASIS OF PAYMENT: Payment shall include all materials and efforts required to install the eco-counter units pre-purchased by the City, complete with confirmed functionality. The accepted quantities for “Eco-counter Installation” will be paid for per Each.

## TECHNICAL SHEET

# ECO-DISPLAY COMPACT

The Eco-DISPLAY Compact is a real-time bike and pedestrian count data display that can be connected to any Eco-Counter Sensor\*. Pedestrians and/or cyclists counts can be displayed in addition to dynamic text. Two lines of information can be displayed on each side. For example, cumulative daily, monthly and yearly counts can be displayed, alternating with dynamic text messages. Both sides are fully customizable.

- + Lightweight & versatile
- + Customizable display
- + Robust and vandal-proof



### Material Characteristics

<b>Dimensions</b>	<ul style="list-style-type: none"> <li>+ Front panels: 61.5 x 61.5cm (24.20" x 24.20")</li> <li>+ Display with front panels and mounting bracket: 72 x 61.5 x 15.5cm (28.5" x 24.20" x 6")</li> </ul>
<b>Weight</b>	<ul style="list-style-type: none"> <li>+ ≈ 16.5kg (36.35lbs) with front panels</li> <li>+ ≈ 12kg (26.5lbs) without front panels</li> </ul>
<b>Display Surface</b>	<ul style="list-style-type: none"> <li>+ RGB LED lights - 16 colors</li> <li>+ Pixel pitch: 5mm (0.2")</li> <li>+ Automatic adjustment to ambient light levels</li> <li>+ Display surface size: 48 x 16cm (19" x 6,30")</li> </ul>
<b>Temperature Resistance</b>	- 30 °C / + 50 °C (-22 °F to 120 °F)
<b>Waterproofness</b>	IP41
<b>Power Supply</b>	Client must provide 230/110VAC power supply
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>+ Single-sided: Max. 45W</li> <li>+ Double-sided: Max. 90W</li> </ul>
<b>Communication</b>	TCP/IP (Cellular 3G/4G or Ethernet 100 Mbps), API REST, OPCUA server



### General Characteristics

<b>Installation</b>	Installation on flat surface or post
<b>Counter compatibility</b>	Compatible with any Eco-Counter sensor*
<b>Connection to the Sensor</b>	Wired connection to the sensor - CAN protocol
<b>Wind Resistance</b>	Zone 5 according to NV65 standard
<b>Frame Color</b>	RAL 9005
<b>Design</b>	Fully customizable
<b>Settings</b>	Embedded web server for maintenance and sensor calibration on site or remotely (through WiFi or Ethernet connection)

\* Except CITIX-IR

Eco-DISPLAY Compact on a post



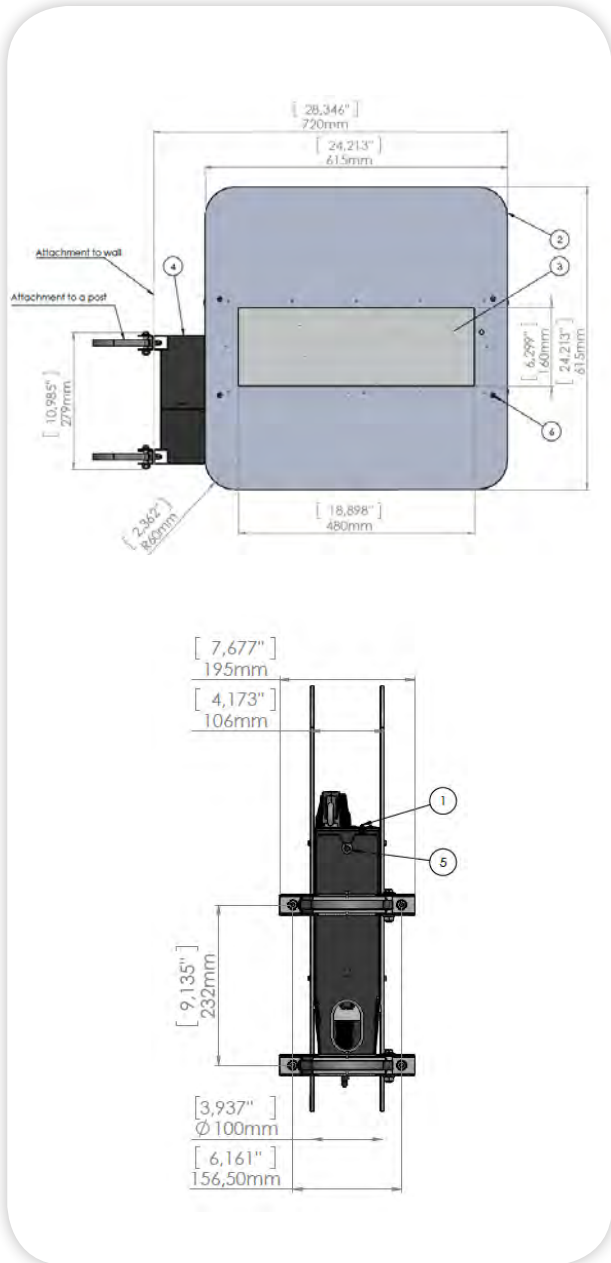
Eco-DISPLAY Compact on a wall



## TECHNICAL SHEET

# ECO-DISPLAY COMPACT

## Dimensions



## Installation Examples



Europe | Worldwide  
4 rue Charles Bourseul | 22300 Lannion, France  
+33 2 96 48 48 81

North America  
604-3981 Boul. St-Laurent | Montréal, QC | H2W 1Y5, Canada  
Direct: +1-514-849-9779 | Toll free: 1-866-518-4404

[www.eco-counter.com](http://www.eco-counter.com)

**DIVISION 2**  
**DRAWINGS**



# CITY OF WALTHAM

## PLAN AND PROFILE OF WAYSIDE TRAIL

### IN THE CITY/TOWN OF WALTHAM MIDDLESEX COUNTY

# ADVERTISEMENT

#### WALTHAM WAYSIDE TRAIL

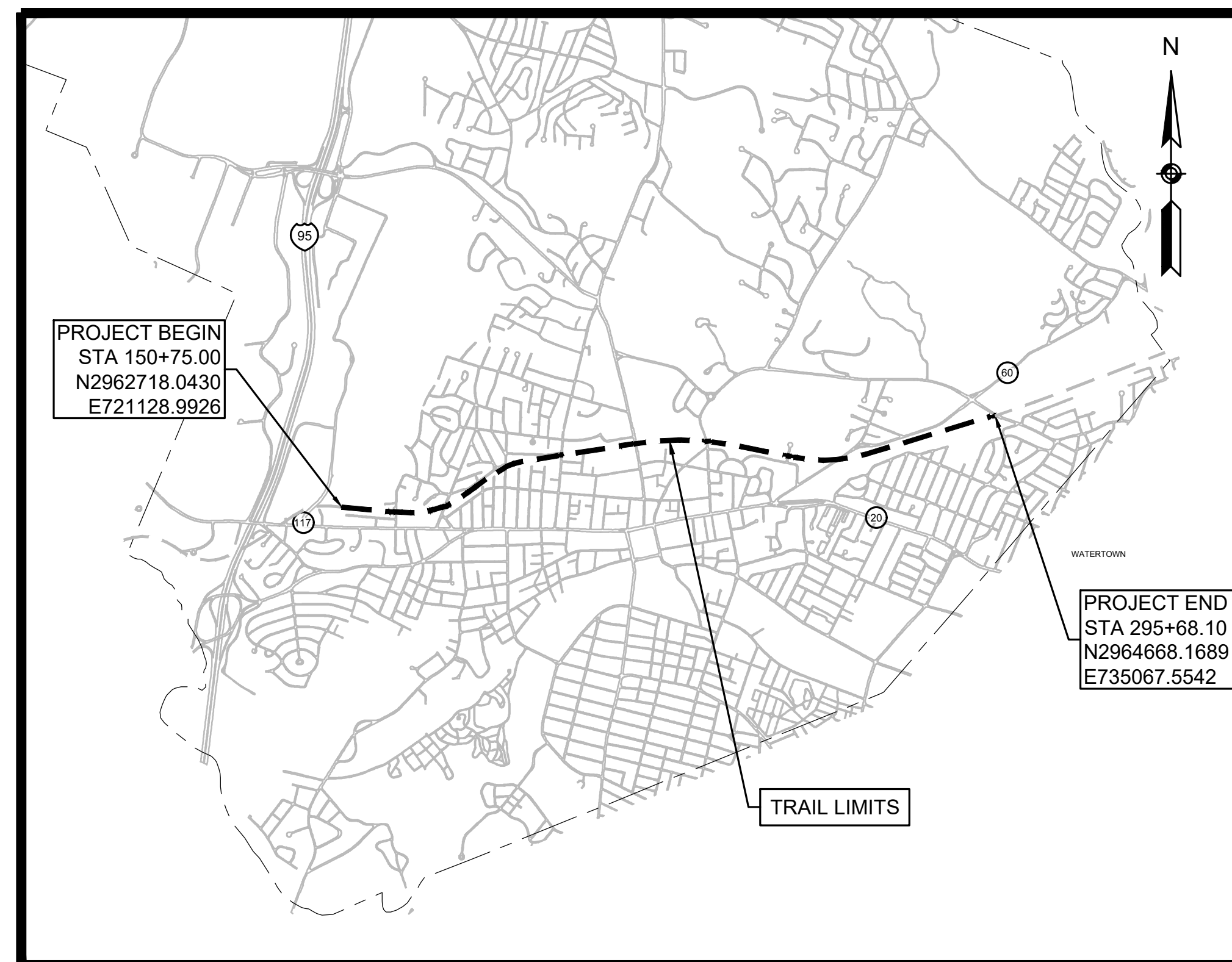
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	01	114

PROJECT FILE NO. 17112.00

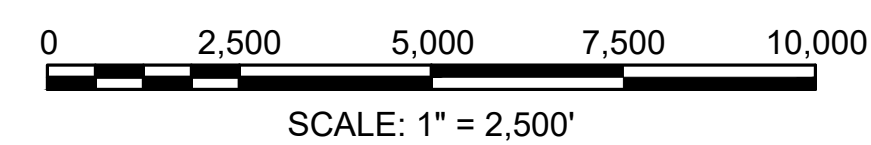
TITLE SHEET AND INDEX

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

INDEX	
SHEET NO.	DESCRIPTION
01	TITLE SHEET AND INDEX
02	LEGEND & ABBREVIATIONS
03	NOTES
04 - 05	KEY PLAN 1 & 2
06	TYPICAL SECTION
07 - 08	CONSTRUCTION BASELINE TIES 1 & 2
09	SUPERELEVATION
10 - 33	CONSTRUCTION PLAN 1 TO 24
34 - 43	LANDSCAPE PLAN 1 TO 10
44 - 46	SIGNAL PLAN 1 TO 3
47 - 55	DETAILS 1 TO 9
56 - 57	STRUCTURAL NOTES - 1 & 2
58 - 61	STRUCTURAL WALL PLAN - 1 TO 4
62 - 79	BRIDGE PLAN - 1 TO 18 (NOT FOR CONSTRUCTION)
80 - 84	CULVERT PLAN - 1 TO 5
85 - 114	CROSS SECTIONS - 1 TO 30



DESIGN DESIGNATION (WAYSIDE TRAIL)	
DESIGN SPEED	18 MPH
ADT (2017)	4,100
ADT (2037)	4,293
K	9%
D	
T (PEAK HOUR)	0%
T (AVERAGE DAY)	0%
DHV	387
DDHV	
FUNCTIONAL CLASSIFICATION	MULTI-USE PATH



LENGTH OF PROJECT = 14,493 FEET = 2.74 MILES

JULY 2021



FOR SHEETS  
01 TO 33, 44 TO 55,  
AND 85 TO 114



FOR SHEETS  
56 TO 61 AND 80 TO 84

 <b>PARE</b> PARE CORPORATION ENGINEERS - SCIENTISTS - PLANNERS 8 BLACKSTONE VALLEY PLACE LINCOLN, RI 02865 401-334-4100	 WALTHAM INCORPORATED A CITY 1884 INCORPORATED A TOWN 1736
DIVISION ADMINISTRATOR _____ DATE _____	CITY OF WALTHAM MAYOR _____ DATE _____

DATE	DESCRIPTION	REV #

**GENERAL SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING

		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		EDGE OF PAVEMENT
		TOP OR BOTTOM OF SLOPE / LIMIT OF WORK / COMPOST FILTER SOCK (UNLESS NOTED OTHERWISE ON PLANS)
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT
		WETLAND FLAG
		WETLAND EDGE
		REMOVE TREE
		TREE PROTECTION

**TRAFFIC SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

**PAVEMENT MARKINGS SYMBOLS**

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE - 12"
		CROSSWALK (SEE DETAIL)
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE (3-9-3)
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

**ABBREVIATIONS**

GENERAL		ABBREVIATIONS (cont.)
AADT	ANNUAL AVERAGE DAILY TRAFFIC	GENERAL
ABAN	ABANDON	R
ADJ	ADJUST	RADIUS OF CURVATURE
APPROX.	APPROXIMATE	R&D
A.C.	ASPHALT CONCRETE	REMOVE AND DISPOSE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE	RCP
BIT.	BITUMINOUS	REINFORCED CONCRETE PIPE
BC	BOTTOM OF CURB	ROAD
BD.	BOUND	RDWY
BL	BASELINE	ROADWAY
BLDG	BUILDING	REM
BM	BENCHMARK	REMOVE
BO	BY OTHERS	RET
BOS	BOTTOM OF SLOPE	RETAIN
BR.	BRIDGE	RET WALL
CB	CATCH BASIN	RETAINING WALL
CBCI	CATCH BASIN WITH CURB INLET	ROW
CC	CEMENT CONCRETE	RIGHT OF WAY
CCM	CEMENT CONCRETE MASONRY	RR
CEM	CEMENT	RAILROAD
CFS	COMPOST FILTER SOCK	R&R
CI	CURB INLET	REMOVE AND RESET
CIP	CAST IRON PIPE	R&S
CLF	CHAIN LINK FENCE	REMOVE AND STACK
CL	CENTERLINE	RT
CMP	CORRUGATED METAL PIPE	RIGHT
CSP	CORRUGATED STEEL PIPE	SB
CO.	COUNTY	STONE BOUND
CONC	CONCRETE	SHLD
CONT	CONTINUOUS	SHOULDER
CONST	CONSTRUCTION	SMH
CR GR	CROWN GRADE	SEWER MANHOLE
DHV	DESIGN HOURLY VOLUME	ST
DI	DROP INLET	STREET
DIA	DIAMETER	STA
DIP	DUCTILE IRON PIPE	STATION
DW	STEADY DON'T WALK - PORTLAND ORANGE	SSD
DWY	DRIVEWAY	STOPPING SIGHT DISTANCE
ELEV (or EL.)	ELEVATION	SHLO
EMB	EMBANKMENT	STATE HIGHWAY LAYOUT LINE
EOP	EDGE OF PAVEMENT	SW
EXIST (or EX)	EXISTING	SIDEWALK
EXC	EXCAVATION	T
F&C	FRAME AND COVER	TANGENT DISTANCE OF CURVE/TRUCK %
F&G	FRAME AND GRATE	TAN
FDN.	FOUNDATION	TANGENT
FLDSTN	FIELDSTONE	TEMP
GAR	GARAGE	TEMPORARY
GD	GROUND	TC
GG	GAS GATE	TOP OF CURB
GI	GUTTER INLET	TOS
GIP	GALVANIZED IRON PIPE	TOP OF SLOPE
GRAN	GRANITE	TYP
GRAV	GRAVEL	TYPICAL
GRD	GUARD	UP
HDW	HEADWALL	UTILITY POLE
HMA	HOT MIX ASPHALT	VAR
HOR	HORIZONTAL	VARIES
HYD	HYDRANT	VERT
INV	INVERT	VERTICAL
JCT	JUNCTION	VERTICAL CURVE
L	LENGTH OF CURVE	VC
LB	LEACH BASIN	WHEEL CHAIR RAMP
LP	LIGHT POLE	WCR
LT	LEFT	WATER GATE
MAX	MAXIMUM	WIP
MB	MAILBOX	WROUGHT IRON PIPE
MH	MANHOLE	WM
MHB	MASSACHUSETTS HIGHWAY BOUND	WATER METER/WATER MAIN
MIN	MINIMUM	X-SECT
NIC	NOT IN CONTRACT	CROSS SECTION
NO.	NUMBER	
PC	POINT OF CURVATURE	TRAFFIC SIGNAL ABBREVIATIONS
PCC	POINT OF COMPOUND CURVATURE	CAB
P.G.L.	PROFILE GRADE LINE	CABINET
PI	POINT OF INTERSECTION	CCVE
POC	POINT ON CURVE	CLOSED CIRCUIT VIDEO EQUIPMENT
POT	POINT ON TANGENT	DW
PRC	POINT OF REVERSE CURVATURE	STEADY UPRAISED HAND
PROJ	PROJECT	FDW
PROP	PROPOSED	FLASHING UPRAISED HAND
PSB	PLANTABLE SOIL BORROW	FR
PT	POINT OF TANGENCY	FLASHING CIRCULAR RED
PVC	POINT OF VERTICAL CURVATURE	FRL
PVI	POINT OF VERTICAL INTERSECTION	FLASHING RED LEFT ARROW
PVT	POINT OF VERTICAL TANGENCY	FRR
PVMT	PAVEMENT	FLASHING RED RIGHT ARROW
PWW	PAVED WATER WAY	FY
		FLASHING CIRCULAR YELLOW
		FYL
		FLASHING YELLOW LEFT ARROW
		FYR
		FLASHING YELLOW RIGHT ARROW
		G
		STEADY CIRCULAR GREEN
		GL
		STEADY GREEN LEFT ARROW
		GR
		STEADY GREEN RIGHT ARROW
		GSL
		STEADY GREEN SLASH LEFT ARROW
		GSR
		STEADY GREEN SLASH RIGHT ARROW
		GV
		STEADY GREEN VERTICAL ARROW
		OL
		OVERLAP
		PED
		PEDESTRIAN
		PTZ
		PAN, TILT, ZOOM
		R
		STEADY CIRCULAR RED
		RL
		STEADY RED LEFT ARROW
		RR
		STEADY RED RIGHT ARROW
		TR SIG
		TRAFFIC SIGNAL
		TSC
		TRAFFIC SIGNAL CONDUIT
		W
		STEADY WALKING PERSON
		Y
		STEADY CIRCULAR YELLOW
		YL
		STEADY YELLOW LEFT ARROW

**WALTHAM WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA		02	114

**LEGEND & ABBREVIATIONS**

**ABBREVIATIONS (cont.)**

GENERAL	
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

## REFERENCE

- PROJECT LOCATION: MASSACHUSETTS CENTRAL RAILROAD RIGHT-OF-WAY, CITY OF WALTHAM.
- PROJECT SURVEY COMPLETED BY WHITMAN & BINGHAM ASSOCIATES, LLC, DATED MARCH 2018. UTILITY LOCATIONS BASED ON AVAILABLE PLANS.
- WETLANDS AND RESOURCE AREAS WERE DELINEATED BY PARE CORPORATION IN OCTOBER 2017. WETLAND FLAGS WERE LOCATED BY WHITMAN & BINGHAM.
- VERTICAL DATUM IS NAVD 88. HORIZONTAL DATUM IS MASSACHUSETTS STATE PLANE.
- EXISTING UTILITIES, SIZES, AND ELEVATIONS WERE COMPILED FROM THE CITY OF WALTHAM'S GIS MAPS ONLINE, MOST RECENTLY ACCESSED ON AUGUST 21, 2018.

## GENERAL NOTES

- THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS, AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS, AND COORDINATE WITH THE ENGINEER AND OWNER'S REPRESENTATIVE AS REQUIRED.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AND/OR BARRIERS AROUND ALL OPEN EXCAVATED AREAS IN ACCORDANCE WITH OSHA STANDARDS.
- IF ANY DEVIATION OR ALTERATION OF THE WORK PROPOSED ON THESE DRAWINGS IS REQUIRED, THE CONTRACTOR IS TO IMMEDIATELY CONTACT AND COORDINATE WITH THE ENGINEER AND OWNER'S REPRESENTATIVE.
- ANY AREA OUTSIDE OF THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.
- ALL SITE WORK SHALL MEET OR EXCEED THE SITE WORK SPECIFICATIONS PREPARED FOR THIS PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE AND THE ENGINEER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK WHICH WOULD BE AFFECTED.
- ALL UTILITIES (LOCATION & ELEVATION) SHOWN SHALL BE CONSIDERED APPROXIMATE ONLY. BEFORE COMMENCING SITE WORK IN ANY AREA, CONTACT "DIG SAFE" AT 1-888-344-7233 AND CITY OF WALTHAM TO ACCURATELY LOCATE UNDERGROUND UTILITIES. ANY DAMAGE TO EXISTING UTILITIES OR STRUCTURES, AND THE COST TO REPAIR THE DAMAGES TO INITIAL CONDITIONS AS SHOWN ON THE PLANS, SHALL BE THE CONTRACTOR'S RESPONSIBILITY. NO EXCAVATION SHALL BE DONE UNTIL UTILITY COMPANIES ARE PROPERLY NOTIFIED.
- ANY DAMAGE TO EXISTING PAVEMENT, BRIDGES, CONDUIT, SIDEWALK, FENCES, ETC., CAUSED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PLACE ALL EQUIPMENT AND MATERIAL AS FAR AWAY AS POSSIBLE FROM THE EDGE OF THE ROADWAY TRAVEL LANES SO AS NOT TO CAUSE A SAFETY HAZARD.
- PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL EMPLOY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF MASSACHUSETTS TO ESTABLISH CONTROL ON THE SITE AND PERFORM FIELD MEASUREMENTS AS REQUIRED TO LAYOUT THE PROPOSED SITE IMPROVEMENTS.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE EXISTING CONDITIONS ARE NOT OBLITERATED BEFORE CONTROL POINTS ARE LOCATED AND CONSTRUCTION LAYOUT IS ESTABLISHED. THE CONSTRUCTION LAYOUT SHALL BE PROVIDED IN SUFFICIENT DETAIL, THEREBY ENABLING THE CONTRACTOR TO CONSTRUCT THE PROJECT IN CONFORMITY WITH THE PLANS AND SPECIFICATIONS. SURVEY WILL BE PROVIDED BY THE CONTRACTOR. THE OWNER OR OWNER'S REPRESENTATIVE SHALL NOT AUTHORIZE CONSTRUCTION ACTIVITIES TO BEGIN UNTIL THEY ARE SATISFIED THAT ALL GROUND CONTROL HAS BEEN ESTABLISHED, TIED DOWN, AND DULY RECORDED IN STANDARD FIELD BOOKS.
- ALL SIDEWALK AND DRIVEWAYS DESIGNATED FOR REPLACEMENT SHALL BE CUT AND MATCHED AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
- THE LIMITS OF CLEARING AND SURFACE DISTURBANCE MUST BE STRICTLY ADHERED TO IN ALL AREAS. IN ADDITION TO THOSE AREAS SPECIFICALLY DESIGNATED ON THE PLANS, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND PLACING, AT HIS OWN EXPENSE, PLANTABLE SOIL AND SEED IN AREAS WHICH ARE OUTSIDE OF THE PROJECT'S AREAS OF DISTURBANCE AND WHICH ARE IMPACTED BY CONSTRUCTION OPERATIONS INCLUDING THOSE AREAS WHERE VEHICLES, EQUIPMENT AND MATERIALS ARE STORED.
- UNDER NO CIRCUMSTANCE WILL THE CONTRACTOR BE ALLOWED TO STOCKPILE REMOVED PAVEMENT MATERIALS WITHIN THE PROJECT LIMITS.
- CLEANING AND SWEEPING OF PAVEMENT WILL INCLUDE REMOVAL OF ALL PAVEMENT DEBRIS PRIOR TO THE PLACEMENT OF EACH BITUMINOUS PAVEMENT LIFT. ALL CLEANING AND SWEEPING SHALL BE DONE TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE.
- PRIOR TO INSTALLATION, ALL SIGNS, MOUNTINGS AND LOCATIONS SHALL BE APPROVED OR MODIFIED BY OWNER OR OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ROADWAYS FREE OF DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS. ALL DEBRIS SHALL BE REMOVED TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST TO THE OWNER.
- NO FUEL STORAGE, VEHICLE REFUELING, OR EQUIPMENT STORAGE SHALL TAKE PLACE IN DESIGNATED WETLANDS, WETLANDS BUFFER ZONES, NOR WITHIN 100' OF ANY WATER BODY. THIS REQUIREMENT SHALL NOT SUPERSEDE ANY FEDERAL, STATE OR LOCAL LAW, ORDINANCE, RULE OR REGULATION THAT APPLIES TO THE SAME, UNLESS THIS REQUIREMENT IS MORE STRINGENT THAN SAID LAW, ORDINANCE, RULE OR REGULATION.
- ALL EMBANKMENTS SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 12" (AFTER COMPACTION) AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED.
- THE CONTRACTOR SHALL COMPACT ALL MATERIALS USED FOR SUBBASE BACKFILL IN MAXIMUM SIX-INCH LAYERS.
- FOLLOWING CONSTRUCTION OF QPA'S, CONSTRUCTION VEHICLES OR EQUIPMENT SHALL NOT BE PLACED OR DRIVEN OVER QPA'S. COMPACTION OF THESE AREAS IS PROHIBITED. ANY QPA'S DISTURBED BY VEHICLES OR EQUIPMENT SHALL BE RECONSTRUCTED AT NO ADDITIONAL EXPENSE TO THE OWNER. REFER TO QPA DETAILS FOR SUBGRADE PREPARATION.

## LAYOUT NOTES

- ALL LINES ARE PERPENDICULAR OR PARALLEL TO THE LINES FROM WHICH THEY ARE MEASURED, UNLESS OTHERWISE INDICATED.
- ACCESSIBLE RAMPS SHALL BE CONSTRUCTED PER THE AMERICANS WITH DISABILITIES ACT (ADA) ACCESSIBILITY GUIDELINES, LATEST REVISION.
- CONTRACTOR TO PERFORM BENCHMARK FIELD LEVEL VERIFICATION AND COORDINATE LAYOUT CHECK PRIOR TO CONSTRUCTION. CONTRACTOR SHALL CONTACT PARE CORPORATION IF ANY DISCREPANCIES ARE FOUND.

## DEMOLITION NOTES

- ALL NOTED ITEMS TO BE REMOVED AND DISPOSED, RELOCATED, OR STACKED REPRESENT ALL KNOWN SITE CONDITIONS TO BE DEMOLISHED. CONTRACTOR TO COORDINATE ANY UNFORESEEN CONDITIONS WITH THE PROJECT ENGINEER, OWNER, AND/OR RESPECTIVE UTILITY COMPANIES PRIOR TO PROCEEDING WITH THE WORK.
- REMOVAL OF EXISTING RAIL INCLUDES RAILS, TIES AND APPURTENANCES UNLESS OTHERWISE NOTED OR IDENTIFIED BY THE CITY.
- WATER, SEWER, DRAINAGE, GAS, AND OTHER SITE UTILITIES SERVICING THE EXISTING FACILITIES ARE TO REMAIN ACTIVE THROUGHOUT CONSTRUCTION.
- THERE SHALL BE NO INTERRUPTION OF UTILITY SERVICE THROUGHOUT THE DURATION OF CONSTRUCTION WITHOUT WRITTEN APPROVAL FROM THE OWNER.
- ALL EXISTING CATCH BASINS TO REMAIN SHALL BE CLEANED PRIOR TO COMMENCING WORK.

## EROSION AND SEDIMENTATION CONTROL NOTES

- THE CONTRACTOR AND RELEVANT SUBCONTRACTORS SHALL READ AND UNDERSTAND THE RIDEM FRESHWATER WETLANDS PERMIT, THE NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (GENERAL PERMIT) AND THE SITE SPECIFIC SOIL EROSION AND SEDIMENT CONTROL PLAN (SESS) PREPARED FOR THE PROJECT. ALL EROSION CONTROLS SHALL BE IN ACCORDANCE WITH THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL HANDBOOK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING OR INSTALLING ALL TEMPORARY SEDIMENT AND EROSION CONTROLS AS SHOWN ON THESE PLANS AND SHALL MAINTAIN ALL EROSION CONTROL MEASURES AS NECESSARY DURING THE ENTIRE CONSTRUCTION PERIOD.
- ANTI-TRACKING PADS SHALL BE PROVIDED AT ALL POINTS OF EGRESS OR INGRESS, PRIOR TO ANY ROADWAY ACCEPTING CONSTRUCTION TRAFFIC, AND SHALL BE MAINTAINED TO LIMIT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS.
- EROSION CONTROL BARRIERS SHALL BE INSTALLED AS SHOWN ON THE PLANS PRIOR TO COMMENCEMENT OF CONSTRUCTION OPERATIONS.
- SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EACH STORM EVENT OF 0.25 INCH OR GREATER DURING CONSTRUCTION TO ENSURE THAT CHANNELS, DITCHES AND PIPES ARE CLEAR OF DEBRIS AND THAT THE EROSION CONTROL BARRIERS ARE INTACT. THE CONTRACTOR SHALL CORRECT IDENTIFIED DEFICIENCIES IMMEDIATELY.
- DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL CLEAN AND MAINTAIN EROSION CONTROL BARRIER WHEN SEDIMENT ACCUMULATES TO ONE HALF THE HEIGHT OF THE BARRIER. MATERIAL COLLECTED FROM THE SEDIMENTATION BARRIERS SHALL BE REMOVED AS NECESSARY AND DISPOSED IN AN UPLAND AREA.
- THE CONTRACTOR SHALL SCHEDULE THE CONSTRUCTION SEQUENCE TO ALLOW THE FINISHED SUBGRADE ELEVATIONS TO DRAIN PROPERLY WITHOUT PONDING. SPECIFICALLY, ALLOW WATER TO ESCAPE WHERE PROPOSED CURB MAY RETAIN RUNOFF PRIOR TO APPLICATION OF SURFACE PAVING. PROVIDE TEMPORARY POSITIVE DRAINAGE, AS REQUIRED, TO STABILIZED DISCHARGE POINTS.
- INSTALLATION OF THE EROSION CONTROL BARRIERS AS ILLUSTRATED IS INTENDED TO REPRESENT THE MINIMUM SEDIMENTATION CONTROL FACILITIES NECESSARY TO MEET ANTICIPATED SITE CONDITIONS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST TO THE OWNER.
- REQUIRED SEDIMENTATION CONTROL FACILITIES MUST BE PROPERLY ESTABLISHED, CLEARLY VISIBLE AND IN OPERATION PRIOR TO INITIATING ANY LAND CLEARING ACTIVITY AND/OR OTHER CONSTRUCTION RELATED WORK. SUCH FACILITIES SHALL REPRESENT THE LIMIT OF WORK. WORKERS SHALL BE INFORMED THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THE LIMIT OF WORK AT ANY TIME THROUGHOUT THE CONSTRUCTION PERIOD.
- THE CONTRACTOR SHALL MAINTAIN A SUFFICIENT RESERVE OF VARIOUS EROSION CONTROL MATERIALS ONSITE AT ALL TIMES FOR EMERGENCY PURPOSES OR ROUTINE MAINTENANCE.
- THE CONTRACTOR SHALL REPLACE DAMAGED EROSION CONTROL AT THE OWNER, OWNER'S REPRESENTATIVE, OR ENGINEER'S REQUEST AT NO ADDITIONAL EXPENSE TO THE OWNER.
- DEWATERING WASTE WATERS PUMPED FROM EXCAVATIONS WILL BE CONVEYED BY HOSE TO AN UPLAND AREA AND DISCHARGED INTO A DEWATERING BAG. THE CONTRACTOR IS RESPONSIBLE FOR ALL ENGINEERING, EQUIPMENT, MATERIAL, AND LABOR REQUIRED FOR SITE WATER REMOVAL DURING CONSTRUCTION.
- THE CONTRACTOR SHALL NOT REMOVE ANY HAYBALES, COMPOST FILTER SOCKS, OR OTHER EROSION CONTROLS UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED.
- CONSTRUCTION SITE WASTE MATERIALS WILL BE PROPERLY CONTAINED ONSITE AND DISPOSED OFF SITE AT A LOCATION IN ACCORDANCE WITH THE LOCAL AND STATE REGULATIONS.
- RIP-RAP OR OTHER ENERGY DISSIPATORS WILL BE USED WHERE NECESSARY TO PREVENT SCOUR.
- THE CONTRACTOR SHALL NOT LEAVE DISTURBED AREAS UNSTABILIZED FOR PERIODS MORE THAN 14 DAYS. PROVIDE TEMPORARY SEED OR MULCH ON DISTURBED AREAS THAT WILL REMAIN EXPOSED FOR GREATER THAN 14 DAYS.
- ALL DRAINAGE STRUCTURES SHALL BE CLEARED OF ACCUMULATED SEDIMENT PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.
- NEWLY VEGETATED AREAS SHALL BE MAINTAINED REGULARLY TO ENSURE STABLE VEGETATED SURFACES.
- EROSION AND SEDIMENTATION CONTROLS WILL BE UTILIZED AS SHOWN ON THE PLANS. POTENTIAL EROSION AND SEDIMENTATION PROBLEMS ASSOCIATED WITH THE CONSTRUCTION OF THE PROJECT WILL BE AVOIDED THROUGH THE PROJECT SCHEDULING AND THE USE OF APPROPRIATE STANDARD CONTROLS (MASSACHUSETTS EROSION AND SEDIMENT CONTROL HANDBOOK) AS ILLUSTRATED ON THE PROJECT PLANS.
- WHERE EROSION CONTROLS ARE NEEDED ON IMPERVIOUS SURFACES, THE CONTRACTOR SHALL PROVIDE SAND BAG EROSION CONTROL BARRIER.
- TEMPORARY DIVERSION MAY CONSIST OF A DITCH OR SWALE, OR MAY BE ACHIEVED USING WOOD CHIPS, COIR LOGS, OR SIMILAR MATERIALS.
- THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN SILT SACKS IN ALL EXISTING AND NEWLY INSTALLED CATCH BASINS UNTIL THE UPSTREAM AREA IS STABILIZED.

## ELECTRICAL NOTES

- PVC ELECTRICAL CONDUIT TO BE INSTALLED THE LENGTH OF THE TRAIL FOR POTENTIAL FUTURE LIGHTING.
- HANDHOLES TO BE INSTALLED ALONG CONDUIT AT 200-FOOT SPACINGS.
- PULL STRINGS SHALL BE INCLUDED TO FACILITATE FUTURE INSTALLATION.

## CONSTRUCTION METHODS

- CONSTRUCTION OF THE TRAIL SHALL BE EXECUTED WITH MINIMALLY INVASIVE METHODS.
- LIMITS OF DISTURBANCE SHALL BE ADHERED TO TO THE EXTENT POSSIBLE TO MAINTAIN EXISTING TREE STANDS BETWEEN THE TRAIL AND ABUTTING PROPERTIES.
- CONSTRUCTION VEHICLES SHALL BE LIMITED TO A LOADING EQUIVALENT TO A H-10 TRUCK ON BRIDGE NO. 114 (TIMBER BRIDGE), BRIDGE NO. 113 (LINDEN BRIDGE), & BRIDGE NO. 8.76 (TIMBER CULVERT - STA. 287+59). THE TIMBER ACCESS RAMP AT LINDEN STREET HAS BEEN DESIGNED BASED ON PEDESTRIAN LIVE LOAD (90 PSF) ONLY.

## GRADING AND UTILITY NOTES

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK WHICH WOULD BE AFFECTED. NO FIELD ADJUSTMENTS IN THE LOCATION OF SITE ELEMENTS SHALL BE MADE WITHOUT THE ENGINEER'S APPROVAL.
- ALL WORK PERFORMED AND ALL MATERIALS FURNISHED SHALL CONFORM WITH THE LINES AND GRADES ON THE PLANS AND THE SITE WORK SPECIFICATIONS.
- AT ALL LOCATIONS WHERE EXISTING CURBING OR PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAWCUT TO A CLEAN, SMOOTH EDGE. BLEND NEW PAVEMENT AND CURBS SMOOTHLY INTO EXISTING BY MATCHING LINES, GRADES, AND JOINTS.
- ALL UTILITY COVERS, GRATES, ETC. SHALL BE ADJUSTED TO BE FLUSH WITH THE SURROUNDING SURFACE OR PAVEMENT FINISH GRADE. RIM ELEVATIONS OF STRUCTURES AND MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH AND CONSISTENT WITH THE GRADING PLANS.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION OF PRIVATE UTILITIES BY THE UTILITY COMPANIES, AS REQUIRED.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION.
- THE CONTRACTOR SHALL PROTECT ALL UNDERGROUND UTILITIES FROM EXCESSIVE VEHICULAR LOADS DURING CONSTRUCTION. ANY DAMAGE TO THESE UTILITIES RESULTING FROM CONSTRUCTION LOADS WILL BE RESTORED TO ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
- DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES BY PROVIDING TEMPORARY SUPPORTS OR SHEETING AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
- EXCAVATION REQUIRED WITHIN THE PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE OWNER.
- PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MIN. OF 1/8" PER FOOT UNLESS OTHERWISE SPECIFIED.
- THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL ROCK AND BOULDERS UNCOVERED DURING UTILITY INSTALLATION.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL EQUIPMENT, MATERIALS, AND LABOR REQUIRED TO CLEAN OUT EXISTING CATCH BASINS AND PIPING PRIOR TO COMMENCING WORK.

## STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE NOTES

### DURING CONSTRUCTION

- THE CONTRACTOR SHALL REMOVE SEDIMENT AND DEBRIS FROM ALL CATCH BASINS, MANHOLES, AND THE DRAINAGE SYSTEM ON A ROUTINE BASIS, IMMEDIATELY FOLLOWING SITE STABILIZATION, AND PRIOR TO PROJECT COMPLETION AND ACCEPTANCE.
- THE CLOSED DRAINAGE SYSTEM AND ASSOCIATED STRUCTURES SHALL BE CLEANED AND FLUSHED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION, AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM UNTIL ACCEPTANCE OF THE SYSTEM BY THE ENGINEER AND THE OWNER. FOLLOWING ACCEPTANCE OF THE PROPOSED DRAINAGE SYSTEM FOR THIS SITE, THE OWNER OF THE SITE SHALL BE RESPONSIBLE FOR THE LONG-TERM INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM.
- ANY ACCUMULATION OF PONDING WATER IN AREAS WITHIN THE LIMITS OF DISTURBANCE, OTHER THAN DESIGNATED AREAS, SHALL BE REMOVED ACCORDINGLY AND PREVENTED IN THE FUTURE.

FOLLOWING CONSTRUCTION, THE COMPLETION OF THE INSPECTION AND MAINTENANCE REQUIREMENTS BELOW SHALL BE THE RESPONSIBILITY OF THE OWNER.

- TRASH, LITTER, SEDIMENT AND OTHER DEBRIS SHALL BE REMOVED FROM ANY STORMWATER FACILITY (INCLUDING CATCH BASINS, MANHOLES, AND THE STORMWATER BMP'S) AT LEAST TWICE A YEAR, PREFERABLY SPRING AND FALL.
- THE SHARED USE PATH SHALL BE SWEEPED EVERY SPRING AND FALL TO REMOVE SEDIMENTS.

## BIORETENTION AREA INSPECTION, MAINTENANCE, AND REPAIR NOTES

- ON A MONTHLY BASIS THE SOIL SHALL BE INSPECTED FOR VOID AREAS, TRASH, DEAD VEGETATION, AND OTHER PROBLEMS WITH THE BIORETENTION AREA.
- ON A MONTHLY BASIS THE SOIL SHALL BE INSPECTED. ERODED AREAS SHALL BE REPAIRED, VOID AREAS SHALL BE REPLACED WITH STONE, AND TRASH AND LITTER SHALL BE REMOVED.
- THE OWNER SHALL MOW THE GRASS WITHIN THE BIORETENTION AREA AND SEDIMENT FOREBAY MONTHLY.
- DEAD VEGETATION SHALL BE REMOVED AND REPLACED SEMI-ANNUALLY.
- OWNER SHALL PRUNE AND RE-MULCH THE BIORETENTION AREA IN SPRING EVERY YEAR.
- UPON FAILURE, EXCAVATE BIORETENTION AREA, SCARIFY BOTTOM AND SIDES, REPLACE SOIL, REPLANT, AND MULCH.

## QUALIFYING PVIOUS AREA INSPECTION, MAINTENANCE, AND REPAIR NOTES

- THE QUALIFYING PVIOUS AREA (QPA) MUST BE INSPECTED TWICE YEARLY, AT A MINIMUM, FOR SEDIMENT, PONDING, EROSION, AND VEGETATION.
- REMOVE ACCUMULATED SEDIMENT FROM THE QPA IF SEDIMENT EXCEEDS 1".
- OWNER SHALL REPAIR ANY SLOPES THAT HAVE BEEN DAMAGED DUE TO EROSION OR OTHER MEANS. OWNER SHALL REPLACE ANY VEGETATION THAT HAS DIED OR BEEN DAMAGED.
- OWNER SHALL MOW GRASS WITHIN THE QPA A MINIMUM OF TWICE ANNUALLY TO MAINTAIN A MINIMUM GRASS HEIGHT OF 6".
- TRASH AND DEBRIS SHALL BE REMOVED FROM THE QPA AS NECESSARY.
- THE QPA SHALL NOT BE USED FOR SNOW STORAGE.

## DEEP SUMP CATCH BASIN INSPECTION, MAINTENANCE, AND REPAIR NOTES

- INSPECT OR CLEAN DEEP SUMP BASINS AT LEAST FOUR TIMES PER YEAR. SEDIMENT SHALL BE REMOVED ANNUALLY OR WHEN IT HAS REACHED 24" BELOW THE INVERT.
- SEDIMENT SHALL BE REMOVED ANNUALLY OR WHEN IT HAS REACHED 24" BELOW THE INVERT.

## SEDIMENT FOREBAY INSPECTION, MAINTENANCE, AND REPAIR NOTES

- THE SEDIMENT FOREBAY SHALL BE INSPECTED MONTHLY.
- THE SEDIMENT FOREBAYS SHOULD BE CLEANED OF SEDIMENT FOUR TIMES PER YEAR AND WHEN SEDIMENT DEPTH IS GREATER THAN 6".

## WALTHAM WAYSIDE TRAIL

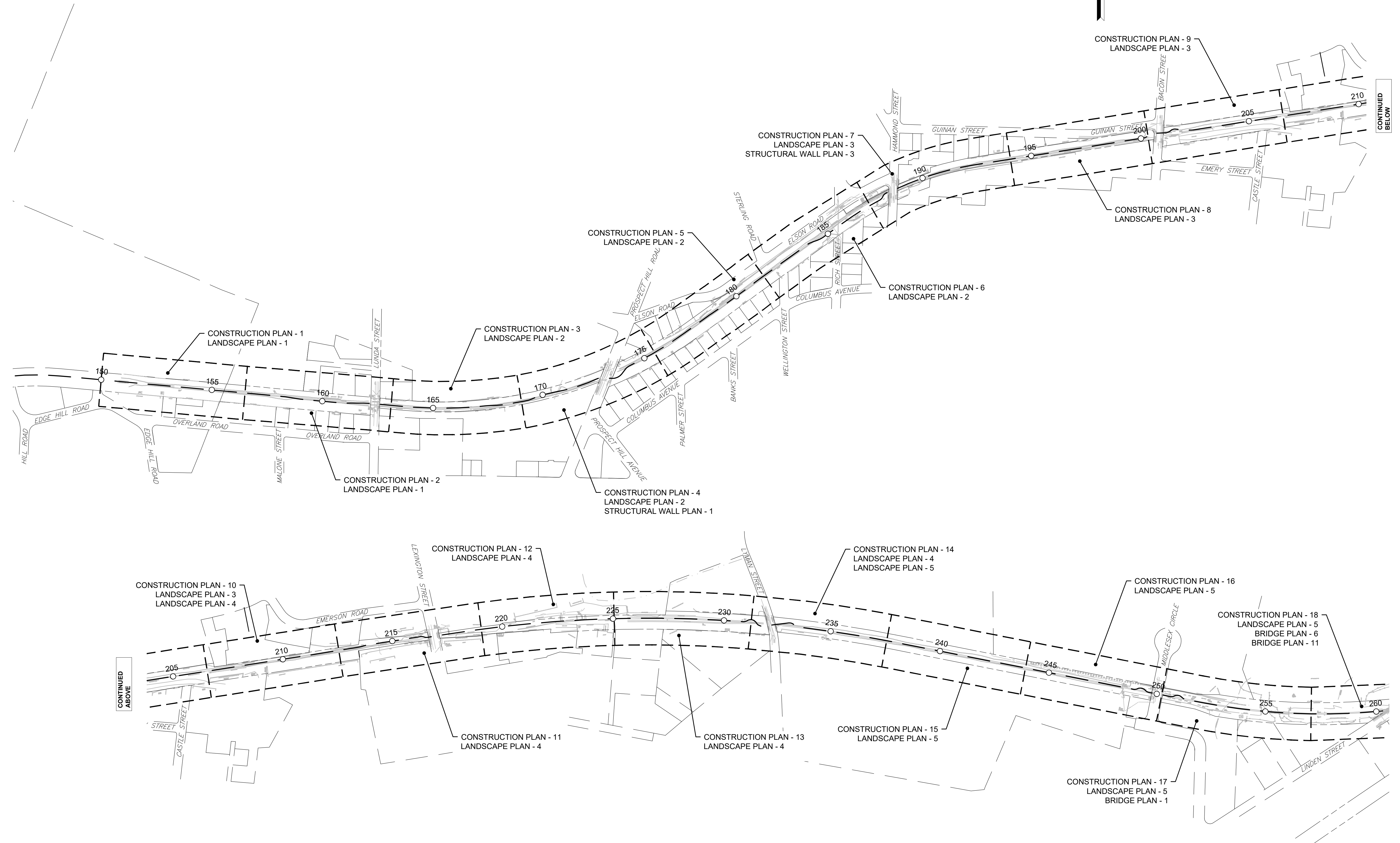
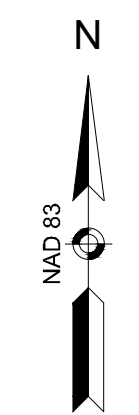
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MA	-	03	114
PROJECT FILE NO.		17112.00	

## NOTES

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	04	114
PROJECT FILE NO.		17112.00	

**KEY PLAN - 1**



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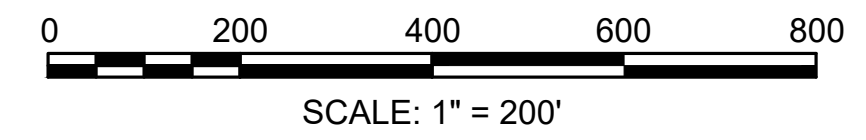
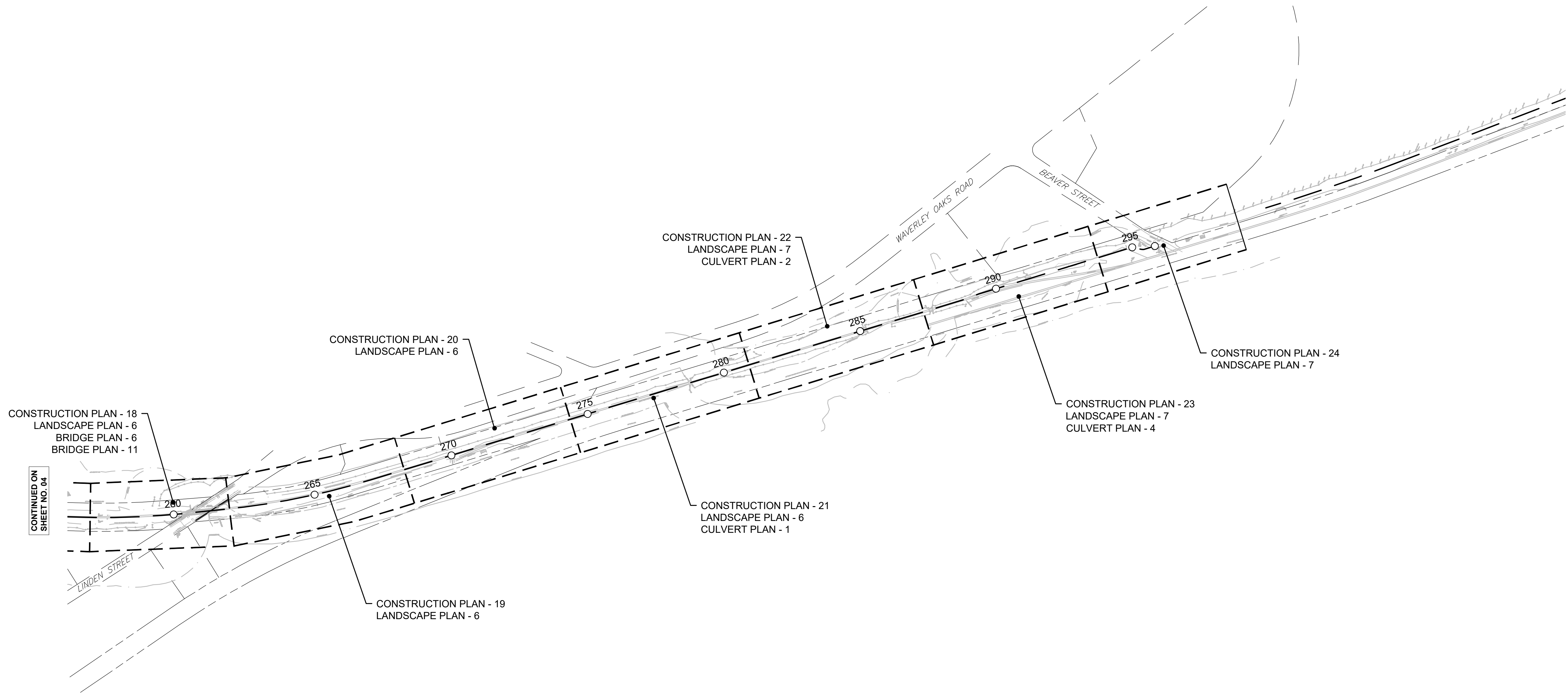
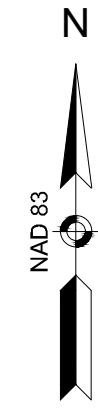
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0 200 400 600 800  
SCALE: 1" = 200'

**WALTHAM  
WAYSIDE TRAIL**

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PROJECT FILE NO.		17112.00	

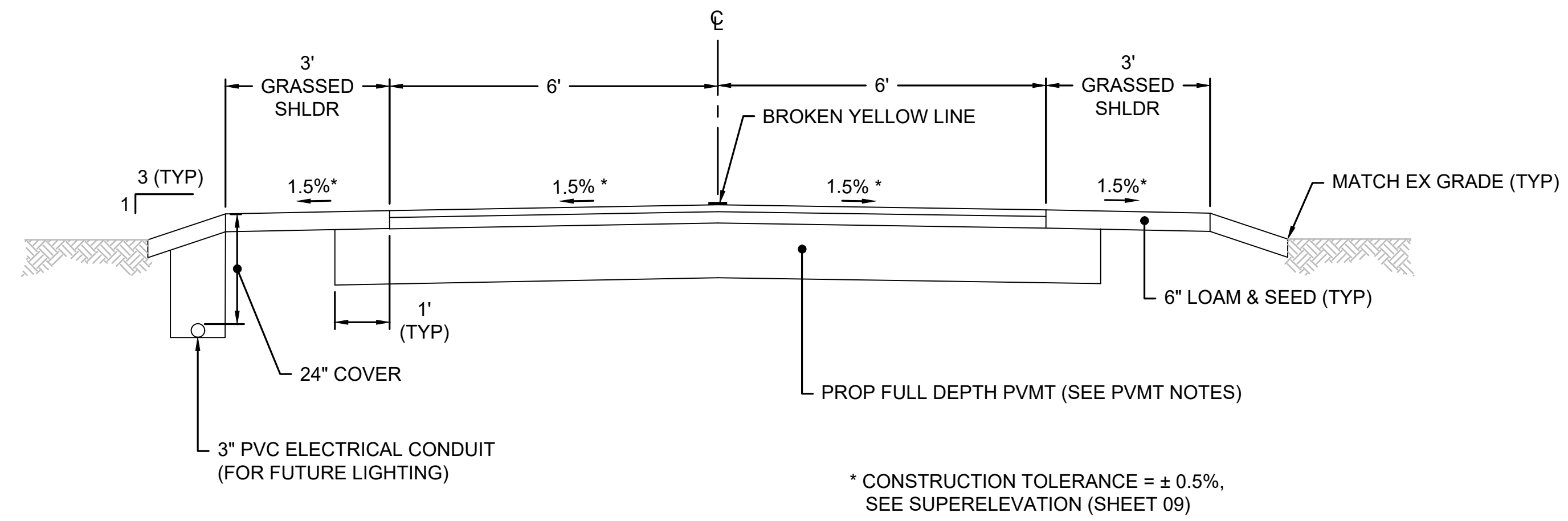
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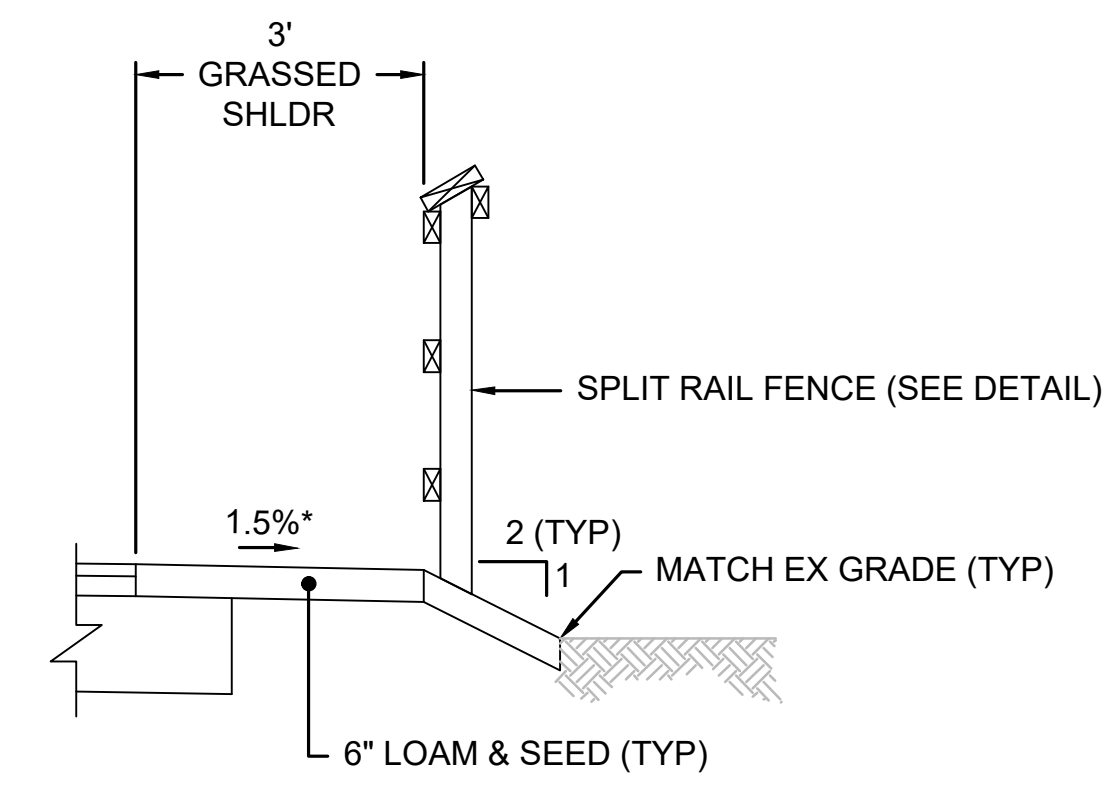
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	06	114
PROJECT FILE NO.		17112.00	

**TYPICAL SECTION**



**TYPICAL SECTION TRAIL**  
NOT TO SCALE



**TYPICAL SECTION WITH SPLIT RAIL FENCE**  
NOT TO SCALE

**PAVEMENT NOTES**

**FULL DEPTH CONSTRUCTION**

- TOP COURSE: 1.5" SUPERPAVE SURFACE COURSE - 9.5
- INTERMEDIATE COURSE: 2.5" SUPERPAVE INTERMEDIATE COURSE - 19.0
- SUBBASE: 12" GRAVEL BORROW
- SUBGRADE: SPECIAL BORROW AS REQUIRED BASED ON EXISTING SUBGRADE MATERIALS

**NOTES:**

1. ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED BETWEEN EACH PAVEMENT COURSE.

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	06	76
PROJECT FILE NO.		XXXXXX	

**CONSTRUCTION BASELINE TIES - 1**

PROP WAYSIDE TRAIL CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	148+13.04	2962742.021	720868.129		S84°44'53"E 1003.83'	158+16.87	2962650.137	721867.750
C1	158+16.87	2962650.137	721867.750	R=250.00' Δ=3°25'58" L=14.98' T=7.49'		158+31.85	2962648.320	721882.615
L2	158+31.85	2962648.320	721882.615		S81°18'56"E 68.23'	159+00.08	2962638.017	721950.066
C2	159+00.08	2962638.017	721950.066	R=250.00' Δ=3°26'01" L=14.98' T=7.49'		159+15.07	2962636.200	721964.935
L3	159+15.07	2962636.200	721964.935		S84°44'57"E 165.41'	160+80.47	2962621.062	722129.646
C3	160+80.47	2962621.062	722129.646	R=250.00' Δ=5°21'23" L=23.37' T=11.69'		161+03.84	2962620.013	722152.986
L4	161+03.84	2962620.013	722152.986		N89°53'40"E 83.81'	161+87.66	2962620.168	722236.797
C4	161+87.66	2962620.168	722236.797	R=250.00' Δ=5°20'55" L=23.34' T=11.68'		162+10.99	2962619.122	722260.103
L5	162+10.99	2962619.122	722260.103		S84°45'25"E 152.71'	163+63.70	2962605.167	722412.174
C5	163+63.70	2962605.167	722412.174	R=1905.00' Δ=11°19'20" L=376.45' T=188.84'		167+40.15	2962607.909	722788.001
C6	167+40.15	2962607.909	722788.001	R=250.00' Δ=4°39'17" L=20.31' T=10.16'		167+60.46	2962609.237	722808.262
L6	167+60.46	2962609.237	722808.262		N88°34'32"E 24.82'	167+85.28	2962609.854	722833.075
C7	167+85.28	2962609.854	722833.075	R=250.00' Δ=8°11'07" L=35.72' T=17.89'		168+21.00	2962613.285	722868.595
L7	168+21.00	2962613.285	722868.595		N80°23'25"E 93.94'	169+14.94	2962628.967	722961.214
C8	169+14.94	2962628.967	722961.214	R=150.00' Δ=14°17'57" L=37.44' T=18.82'		169+52.37	2962639.733	722996.966
L8	169+52.37	2962639.733	722996.966		N66°05'28"E 21.56'	169+73.93	2962648.473	723016.679
C9	169+73.93	2962648.473	723016.679	R=150.00' Δ=10°28'33" L=27.43' T=13.75'		170+01.36	2962657.240	723042.625
L9	170+01.36	2962657.240	723042.625		N76°34'01"E 38.52'	170+39.88	2962666.190	723080.094
C10	170+39.88	2962666.190	723080.094	R=250.00' Δ=3°29'38" L=15.24' T=7.62'		170+55.13	2962669.277	723095.020
C11	170+55.13	2962669.277	723095.020	R=771.05' Δ=14°47'39" L=199.09' T=100.10'		172+54.22	2962728.438	723284.540
C12	172+54.22	2962728.438	723284.540	R=40.00' Δ=25°32'00" L=17.83' T=9.06'		172+72.04	2962732.104	723301.834
L10	172+72.04	2962732.104	723301.834		S89°12'01"E 55.03'	173+27.08	2962731.336	723356.860
C13	173+27.08	2962731.336	723356.860	R=50.00' Δ=53°07'31" L=46.36' T=25.00'		173+73.44	2962750.772	723397.133
L11	173+73.44	2962750.772	723397.133		N37°40'28"E 28.44'	174+01.88	2962773.283	723414.515
C14	174+01.88	2962773.283	723414.515	R=50.00' Δ=26°45'06" L=23.35' T=11.89'		174+25.22	2962787.825	723432.506
C15	174+25.22	2962787.825	723432.506	R=1600.00' Δ=10°11'52" L=284.77' T=142.76'		177+10.00	2962932.906	723677.115
L12	177+10.00	2962932.906	723677.115		N54°13'43"E 142.73'	178+52.72	2963016.339	723792.919
C16	178+52.72	2963016.339	723792.919	R=250.00' Δ=2°17'26" L=9.99' T=5.00'		178+62.72	2963022.017	723801.143
L13	178+62.72	2963022.017	723801.143		N56°31'09"E 40.04'	179+02.76	2963044.108	723834.542
C17	179+02.76	2963044.108	723834.542	R=250.00' Δ=2°17'26" L=9.99' T=5.00'		179+12.76	2963049.787	723842.766

PROP WAYSIDE TRAIL CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L14	179+12.76	2963049.787	723842.766		N54°13'43"E 140.00'	180+52.76	2963131.627	723956.359
C18	180+52.76	2963131.627	723956.359	R=250.00' Δ=2°17'26" L=9.99' T=5.00'		180+62.76	2963137.630	723964.349
L15	180+62.76	2963137.630	723964.349		N51°56'16"E 40.04'	181+02.80	2963162.317	723995.877
C19	181+02.80	2963162.317	723995.877	R=250.00' Δ=2°17'26" L=9.99' T=5.00'		181+12.79	2963168.320	724003.868
L16	181+12.79	2963168.320	724003.868		N54°13'43"E 279.44'	183+92.24	2963331.671	724230.596
C20	183+92.24	2963331.671	724230.596	R=100.00' Δ=16°41'57" L=29.15' T=14.68'		184+21.38	2963345.046	724256.375
L17	184+21.38	2963345.046	724256.375		N70°55'40"E 22.85'	184+44.23	2963352.512	724277.969
C21	184+44.23	2963352.512	724277.969	R=100.00' Δ=16°41'57" L=29.15' T=14.68'		184+73.38	2963365.887	724303.748
L18	184+73.38	2963365.887	724303.748		N54°13'43"E 109.42'	185+82.80	2963429.848	724392.526
C22	185+82.80	2963429.848	724392.526	R=1420.00' Δ=7°53'08" L=195.43' T=97.87'		187+78.23	2963532.836	724558.442
C23	187+78.23	2963532.836	724558.442	R=30.00' Δ=41°09'34" L=21.55' T=11.26'		187+99.78	2963548.623	724572.426
C24	187+99.78	2963548.623	724572.426	R=30.00' Δ=47°16'53" L=24.76' T=13.13'		188+24.54	2963565.756	724589.319
L19	188+24.54	2963565.756	724589.319		N68°09'44"E 56.37'	188+80.91	2963586.723	724641.641
C25	188+80.91	2963586.723	724641.641	R=1260.00' Δ=16°09'03" L=355.18' T=178.77'		192+36.08	2963690.815	724979.993
L20	192+36.08	2963690.815	724979.993		N80°58'31"E 777.21'	200+13.29	2963812.730	725747.582
C26	200+13.29	2963812.730	725747.582	R=30.00' Δ=40°33'04" L=21.23' T=11.08'		200+34.53	2963822.905	725765.714
C27	200+34.53	2963822.905	725765.714	R=30.00' Δ=46°51'10" L=24.53' T=13.00'		200+59.06	2963833.418	725787.127
L21	200+59.06	2963833.418	725787.127		N87°16'37"E 60.03'	201+19.09	2963836.270	725847.088
C28	201+19.09	2963836.270	725847.088	R=30.00' Δ=41°02'17" L=21.49' T=11.23'		201+40.58	2963844.569	725866.413
C29	201+40.58	2963844.569	725866.413	R=30.00' Δ=47°37'12" L=24.93' T=13.24'		201+65.51	2963852.835	725889.181
L22	201+65.51	2963852.835	725889.181		S86°08'29"E 67.40'	202+32.91	2963848.299	725956.425
C30	202+32.91	2963848.299	725956.425	R=60.00' Δ=12°44'18" L=13.34' T=6.70'		202+46.24	2963848.882	725969.725
L23	202+46.24	2963848.882	725969.725		N81°07'13"E 865.64'	211+11.88	2963982.501	726824.987
C31	211+11.88	2963982.501	726824.987	R=2000.00' Δ=0°21'14" L=12.36' T=6.18'		211+24.24	2963984.446	726837.189
C32	213+50.26	2964020.713	727060.278	R=100.00' Δ=10°29'02" L=18.30' T=9.17'		213+68.55	2964025.280	727077.970
C33	213+68.55	2964025.280	727077.970	R=100.00' Δ=10°50'16" L=18.92' T=9.49'		213+87.47	2964029.945	727096.272
L25	213+87.47	2964029.945	727096.272		N81°07'13"E 242.26'	216+29.73	2964067.341	727335.631
C34	216+29.73	2964067.341	727335.631	R=30.00' Δ=29°55'05" L=15.67' T=8.02'		216+45.40	2964065.700	727351.031
C35	216+45.40	2964065.700	727351.031	R=30.00' Δ=30°08'13" L=15.78' T=8.08'		216+61.18	2964064.078	727366.545
L26	216+61.18	2964064.078	727366.545		N80°54'05"E 88.86'	217+50.04	2964078.130	727454.290

WALTHAM  
WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	08	114
PROJECT FILE NO.		17112.00	

CONSTRUCTION BASELINE TIES - 2

PROP WAYSIDE TRAIL CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C36	217+50.04	2964078.130	727454.290	R=5730.00' Δ=13°21'30" L=1335.93' T=671.01'		230+85.97	2964134.398	728786.012
C37	230+85.97	2964134.398	728786.012	R=30.00' Δ=36°41'26" L=19.21' T=9.95'		231+05.18	2964138.994	728804.329
C38	231+05.18	2964138.994	728804.329	R=30.00' Δ=91°38'51" L=47.99' T=30.88'		231+53.17	2964129.026	728846.190
C39	231+53.17	2964129.026	728846.190	R=30.00' Δ=66°09'57" L=34.64' T=19.54'		231+87.81	2964114.600	728875.593
L27	231+87.81	2964114.600	728875.593		N83°03'04"E 116.40'	233+04.22	2964128.683	728991.139
C40	233+04.22	2964128.683	728991.139	R=30.00' Δ=53°27'37" L=27.99' T=15.11'		233+32.21	2964119.550	729016.534
C41	233+32.21	2964119.550	729016.534	R=30.00' Δ=39°45'09" L=20.81' T=10.85'		233+53.02	2964110.405	729034.768
C42	233+53.02	2964110.405	729034.768	R=5730.00' Δ=4°23'36" L=439.37' T=219.79'		237+92.39	2964042.026	729468.671
L28	237+92.39	2964042.026	729468.671		S78°50'52"E 1094.58'	248+86.96	2963830.318	730542.577
C43	248+86.96	2963830.318	730542.577	R=30.00' Δ=36°52'12" L=19.31' T=10.00'		249+06.27	2963832.723	730561.398
C44	249+06.27	2963832.723	730561.398	R=30.00' Δ=73°44'23" L=38.61' T=22.50'		249+44.88	2963825.760	730596.718
C45	249+44.88	2963825.760	730596.718	R=30.00' Δ=36°52'12" L=19.31' T=10.00'		249+64.18	2963816.392	730613.218
L29	249+64.18	2963816.392	730613.218		S78°50'52"E 96.94'	250+61.12	2963797.643	730708.324
C46	250+61.12	2963797.643	730708.324	R=30.00' Δ=36°52'12" L=19.31' T=10.00'		250+80.42	2963800.048	730727.144
C47	250+80.42	2963800.048	730727.144	R=30.00' Δ=72°26'52" L=37.93' T=21.98'		251+18.36	2963793.583	730762.006
C48	251+18.36	2963793.583	730762.006	R=30.00' Δ=35°52'24" L=18.78' T=9.71'		251+37.14	2963784.683	730778.200
L30	251+37.14	2963784.683	730778.200		S79°08'36"E 77.56'	252+14.70	2963770.073	730854.376
C49	252+14.70	2963770.073	730854.376	R=2835.00' Δ=16°37'23" L=822.51' T=414.17'		260+37.22	2963733.675	731673.199
L31	260+37.22	2963733.675	731673.199		N84°14'01"E 133.68'	261+70.90	2963747.107	731806.207
C50	261+70.90	2963747.107	731806.207	R=2750.00' Δ=11°08'00" L=534.36' T=268.03'		267+05.27	2963851.951	732329.328
L32	267+05.27	2963851.951	732329.328		N73°06'01"E 2192.08'	288+97.35	2964489.186	734426.746
C51	288+97.35	2964489.186	734426.746	R=105.00' Δ=11°28'42" L=21.04' T=10.55'		289+18.39	2964497.269	734446.128
C52	289+18.39	2964497.269	734446.128	R=95.00' Δ=11°28'42" L=19.03' T=9.55'		289+37.42	2964504.583	734463.664
L33	289+37.42	2964504.583	734463.664		N73°06'01"E 560.34'	294+97.76	2964667.473	734999.808
C53	294+97.76	2964667.473	734999.808	R=30.00' Δ=46°55'55" L=24.57' T=13.02'		295+22.33	2964664.741	735023.543
C54	295+22.33	2964664.741	735023.543	R=30.00' Δ=46°55'54" L=24.57' T=13.02'		295+46.91	2964662.009	735047.278
L34	295+46.91	2964662.009	735047.278		N73°06'02"E 35.72'	295+82.63	2964672.394	735081.460



WALTHAM  
WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	09	114

PROJECT FILE NO. XXXXXX

SUPERELEVATION

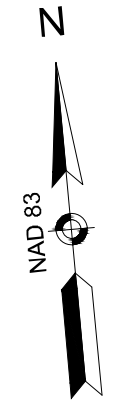
SUPERELEVATION TABLE

Station	Left	Right
150+77.06	-1.50%	-1.50%
169+10.00	-1.50%	-1.50%
169+35.00	-1.50%	1.50%
171+15.00	-1.50%	1.50%
171+40.00	1.50%	-1.50%
173+25.22	1.50%	-1.50%
173+55.00	-1.50%	-1.50%
188+00.00	1.50%	-1.50%
189+10.00	1.50%	-1.50%
190+40.00	-1.50%	-1.50%
197+40.00	-1.50%	-1.50%
197+65.00	-1.50%	1.50%
200+40.00	-1.50%	1.50%
200+67.19	-1.50%	-1.50%
201+10.52	-1.50%	1.50%
201+40.00	-1.50%	1.50%
206+90.00	-1.50%	-1.50%
288+97.35	-1.50%	-1.50%
289+37.42	1.50%	-1.50%
295+68.10	1.50%	-1.50%

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 1**



N/F 1265 MAIN STREET, LLC  
#1265 MAIN STREET  
BOOK 61795 PAGE 89  
ASSESSORS' PARCEL R48-3-1

N/F 1265 MAIN STREET, LLC  
#1265 MAIN STREET  
BOOK 61795 PAGE 89  
ASSESSORS' PARCEL R48-3-1

N/F CITY OF WALTHAM  
"PROSPECT HILL PARK"  
#1267 MAIN STREET  
BOOK 67750 PAGE 30  
ASSESSORS' PARCEL R48-3-1A

3' GRASS SHLD  
12' BIT PATH  
3' GRASS SHLD

REM EX RAIL (TYP)

☐ OF CONSTRUCTION

PROP FULL DEPTH PVMT

PROP LOAM & SEED

#1265 MAIN STREET, LLC  
N/F 1265 MAIN STREET, LLC  
BOOK 61795 PAGE 89  
ASSESSORS' PARCEL R48-3-1

APPROX. EXXON FUEL LINE  
APPROX. FIBER OPTIC  
APPROX. SHELL FUEL LINE

PROJECT BEGIN  
STA 150+75  
N2962718.0430  
E721128.9926

N/F ABC COMMERCIAL PROPERTIES WALTHAM, INC.  
#157 OVERLAND ROAD  
BOOK 61663 PAGE 224  
ASSESSORS' PARCEL R57-5-1

N/F 151 OVERLAND ROAD  
CONDOMINIUM  
#151 OVERLAND ROAD  
MASTER DEED BK. 48441 PG. 280  
ASSESSORS' PARCEL R58-12-1

BENCH MARK  
SPIKE IN TWIN 14" TREES  
ELEV. 123.24

N/F 11-13 LADD REALTY TRUST  
#145 OVERLAND ROAD  
BOOK 35534 PAGE 551  
ASSESSORS' PARCEL R58-12-2

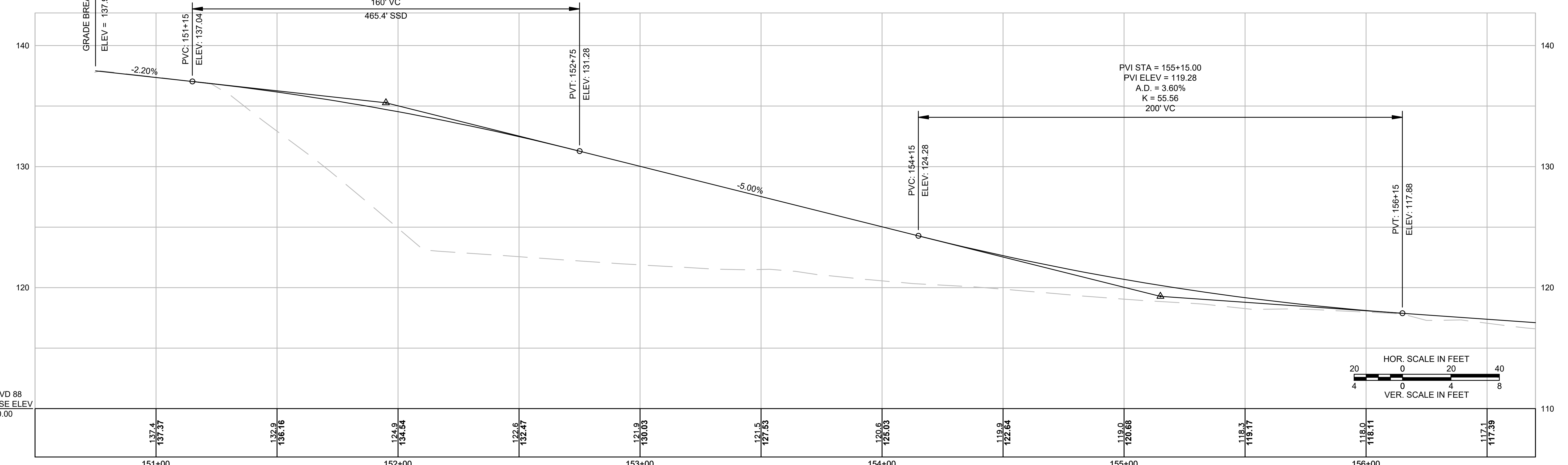
N/F 11-13 LADD REALTY TRUST  
#147 OVERLAND ROAD  
BOOK 35534 PAGE 551  
ASSESSORS' PARCEL R58-12-3

N/F WANARIA REALTY TRUST  
#115-123 OVERLAND ROAD  
BOOK 63702 PAGE 291  
ASSESSORS' PARCEL R058-12-4

EDGE HILL ROAD

PVI STA = 151+95.00  
PVI ELEV = 135.28  
A.D. = -2.80%  
K = 57.14  
160' VC

PVI STA = 155+15.00  
PVI ELEV = 119.28  
A.D. = 3.60%  
K = 55.56  
200' VC



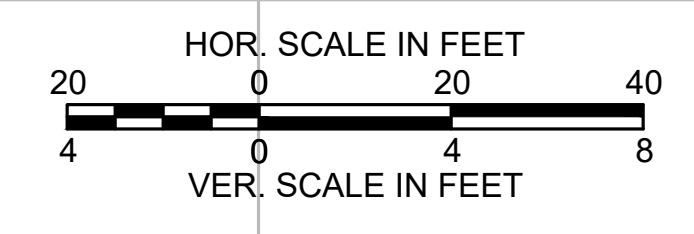
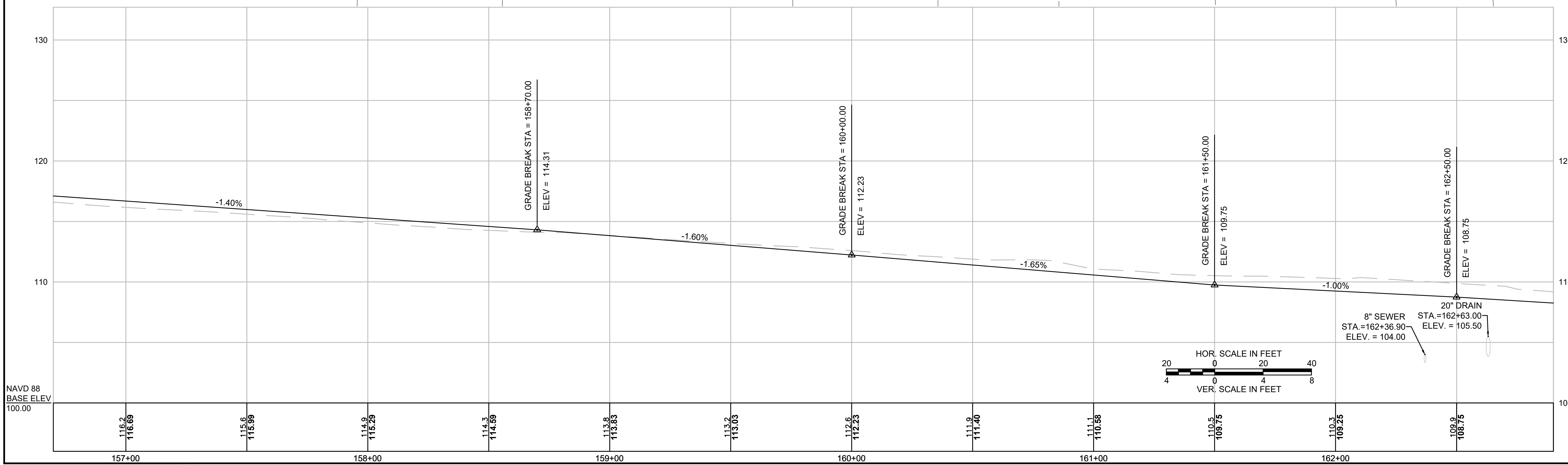
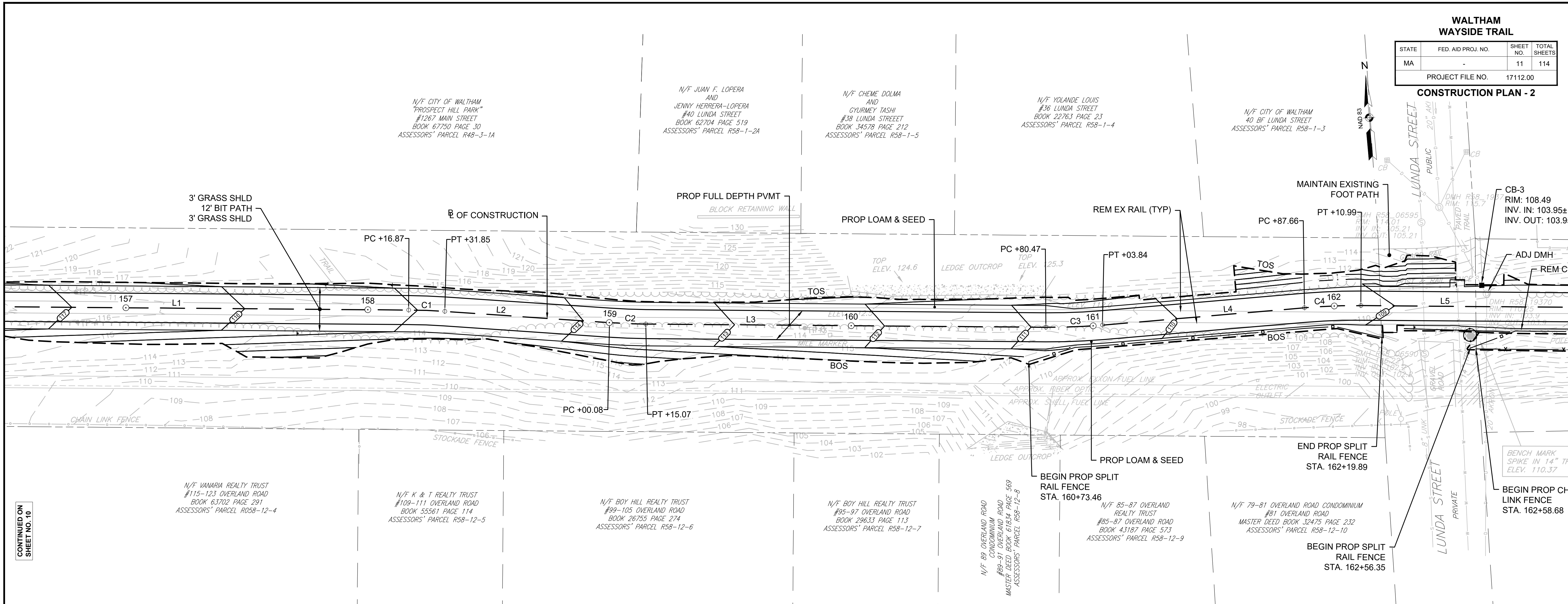
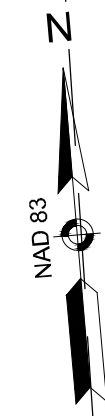
NAVD 88  
BASE ELEV  
110.00

CONTINUED ON  
SHEET NO. 11

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 2**



CONTINUED ON  
SHEET NO. 10

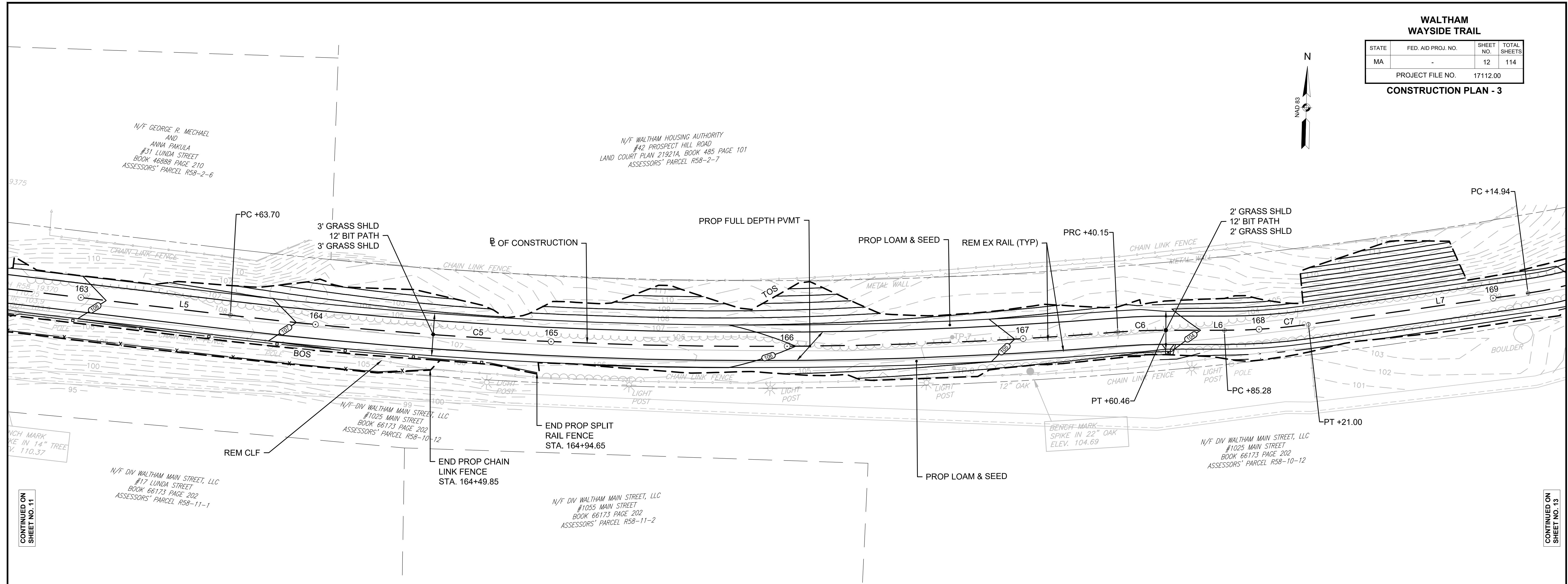
CONTINUED ON  
SHEET NO. 12

NAVD 88  
BASE ELEV  
100.00

**WALTHAM  
WAYSIDE TRAIL**

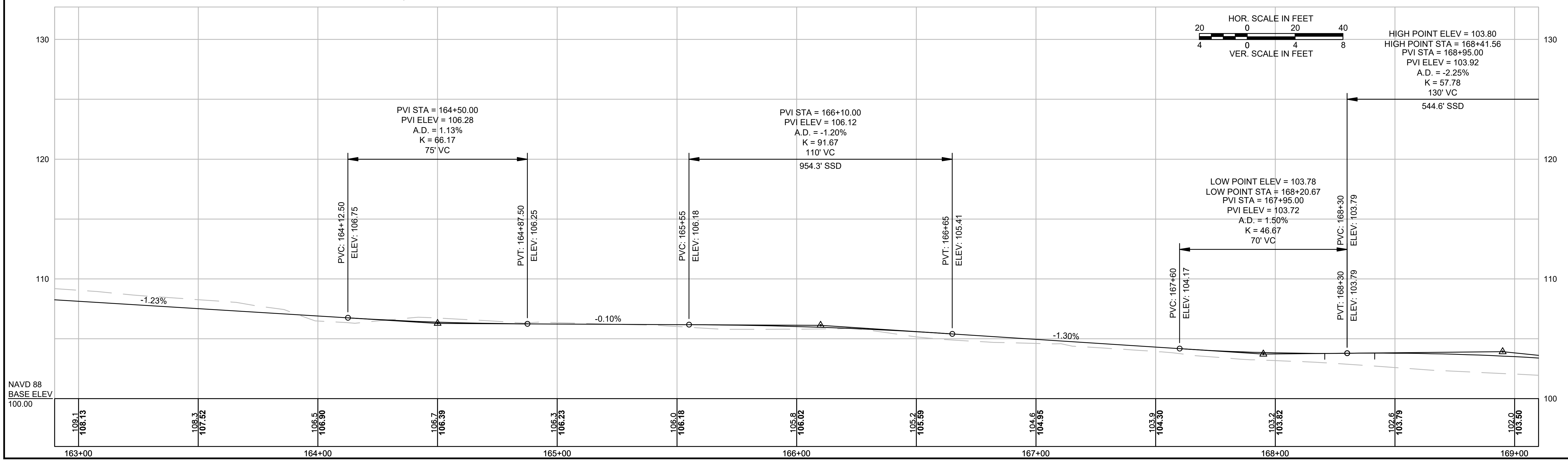
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 3**



CONTINUED ON  
SHEET NO. 11

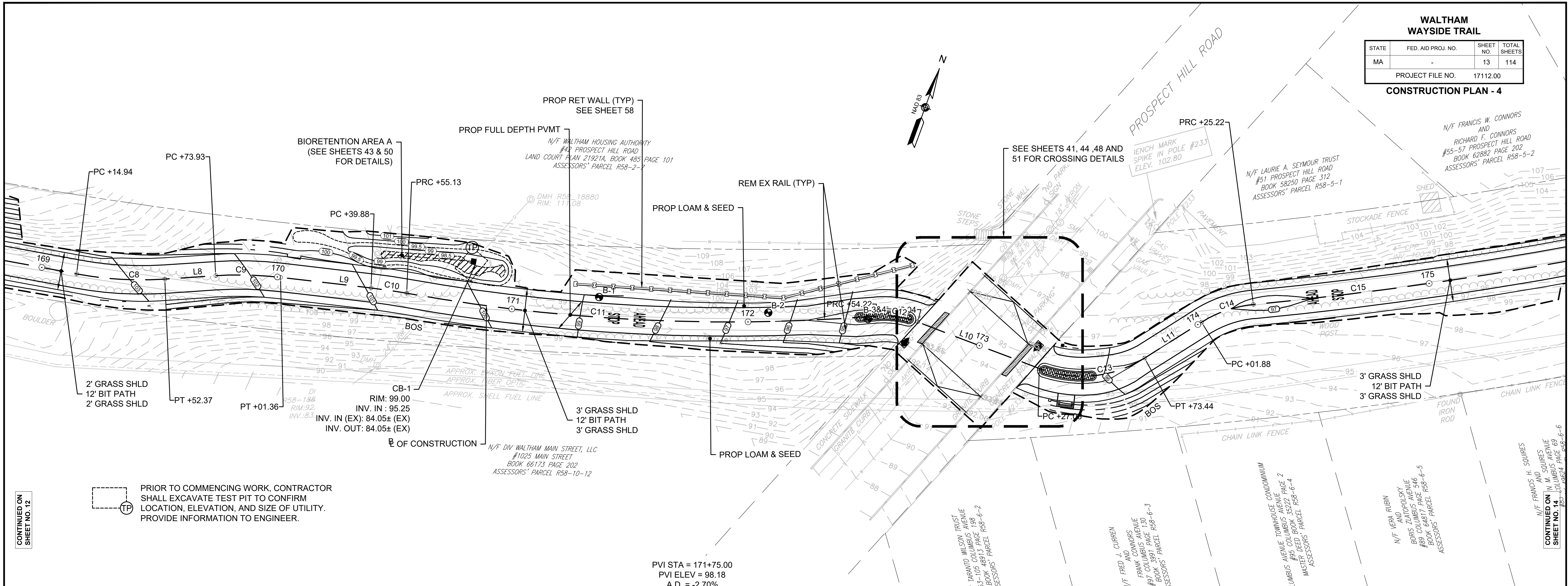
CONTINUED ON  
SHEET NO. 13



**WALTHAM  
WAYSIDE TRAIL**

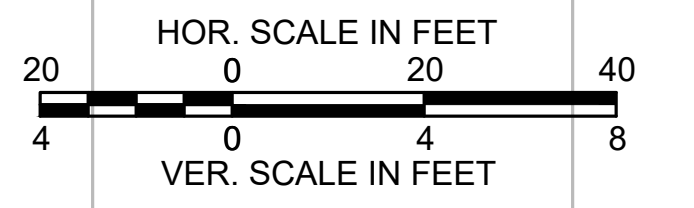
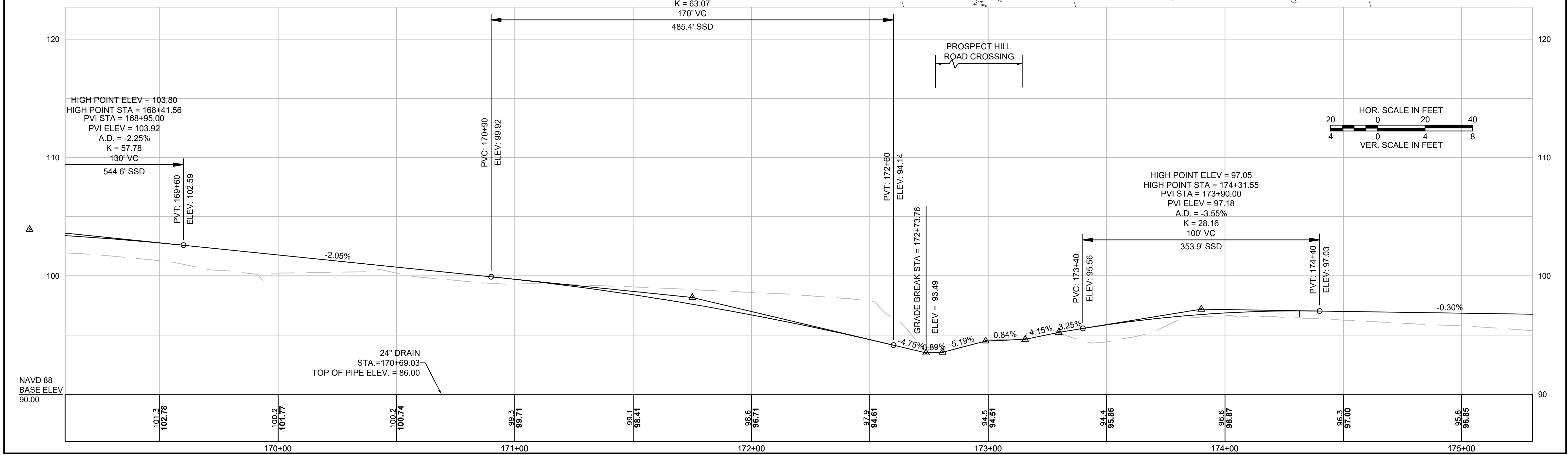
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 4**



Ⓣ PRIOR TO COMMENCING WORK, CONTRACTOR SHALL EXCAVATE TEST PIT TO CONFIRM LOCATION, ELEVATION, AND SIZE OF UTILITY. PROVIDE INFORMATION TO ENGINEER.

PVI STA = 171+75.00  
PVI ELEV = 98.18  
A.D. = -2.70%  
K = 63.07  
170' VC



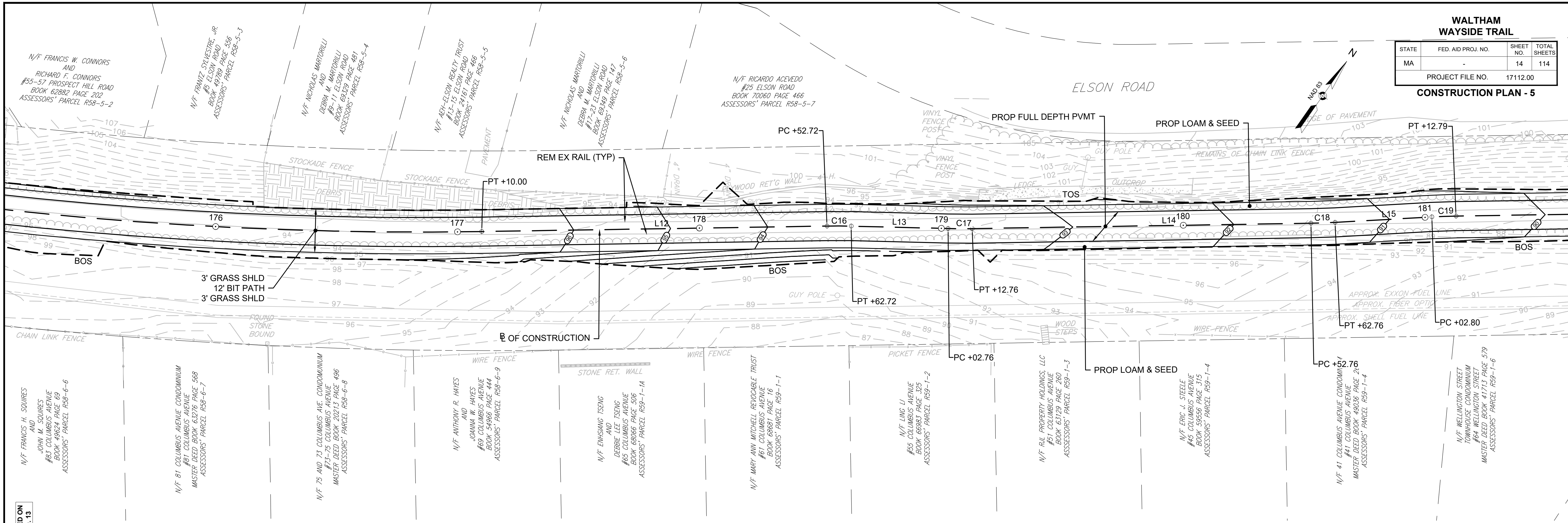
CONTINUED ON SHEET NO. 12

CONTINUED ON SHEET NO. 14

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 5**

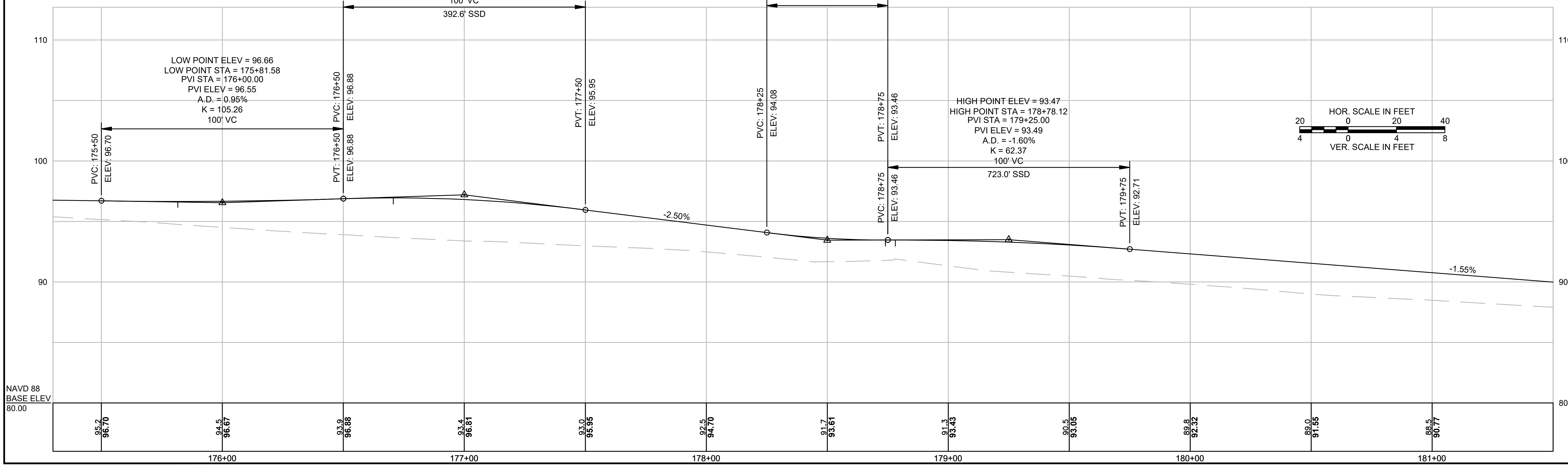


CONTINUED ON  
SHEET NO. 13

CONTINUED ON  
SHEET NO. 16

HIGH POINT ELEV = 96.94  
HIGH POINT STA = 176+70.63  
PVI STA = 177+00.00  
PVI ELEV = 97.20  
A.D. = -3.15%  
K = 31.75  
100' VC

LOW POINT ELEV = 93.46  
LOW POINT STA = 178+74.02  
PVI STA = 178+50.00  
PVI ELEV = 93.45  
A.D. = 2.55%  
K = 19.61  
50' VC

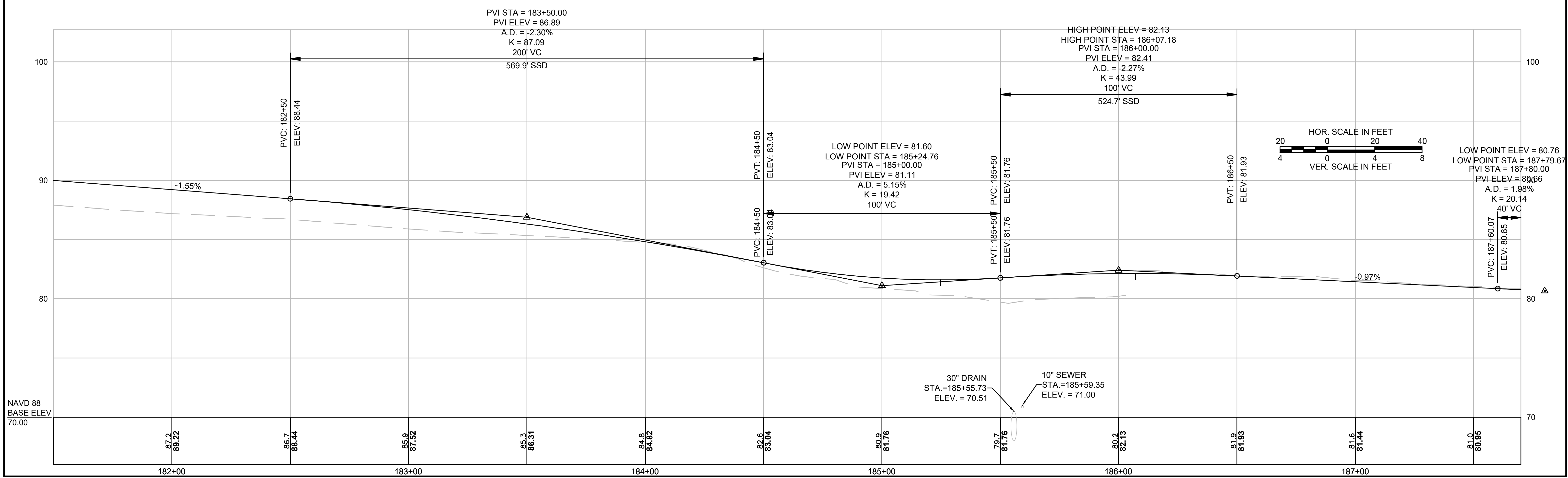
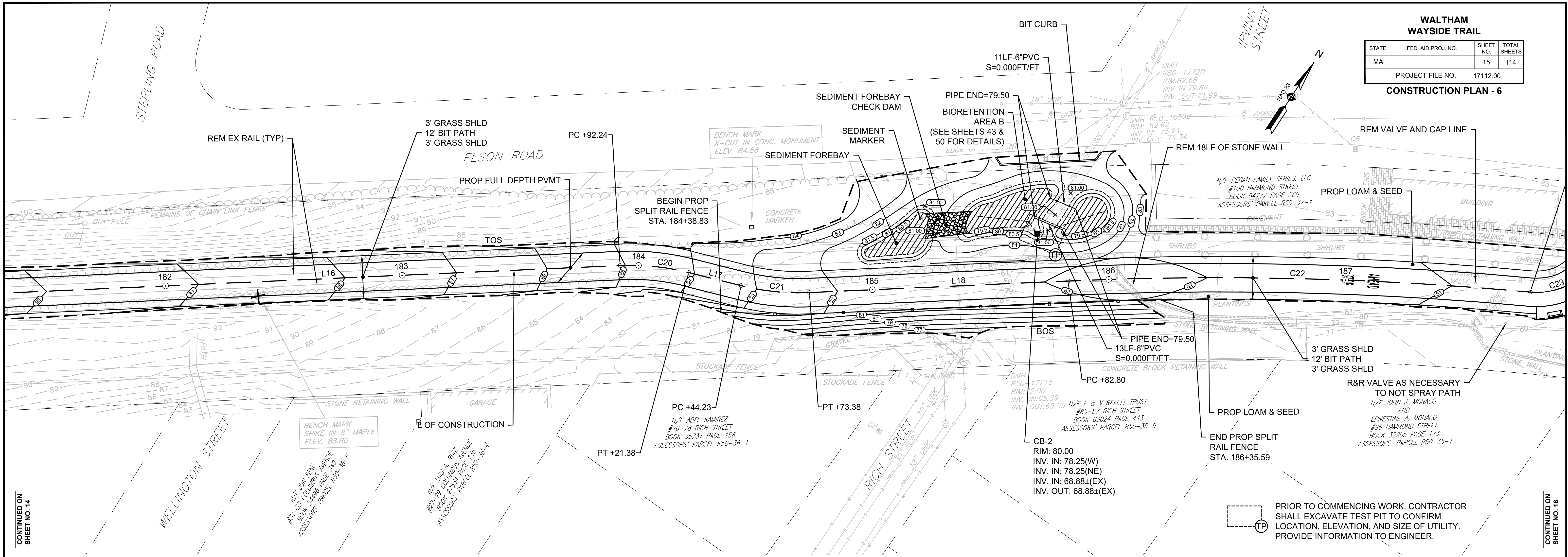


NAVD 88  
BASE ELEV  
80.00

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 6**



CONTINUED ON  
SHEET NO. 14

CONTINUED ON  
SHEET NO. 16

NAVD 88  
BASE ELEV  
70.00

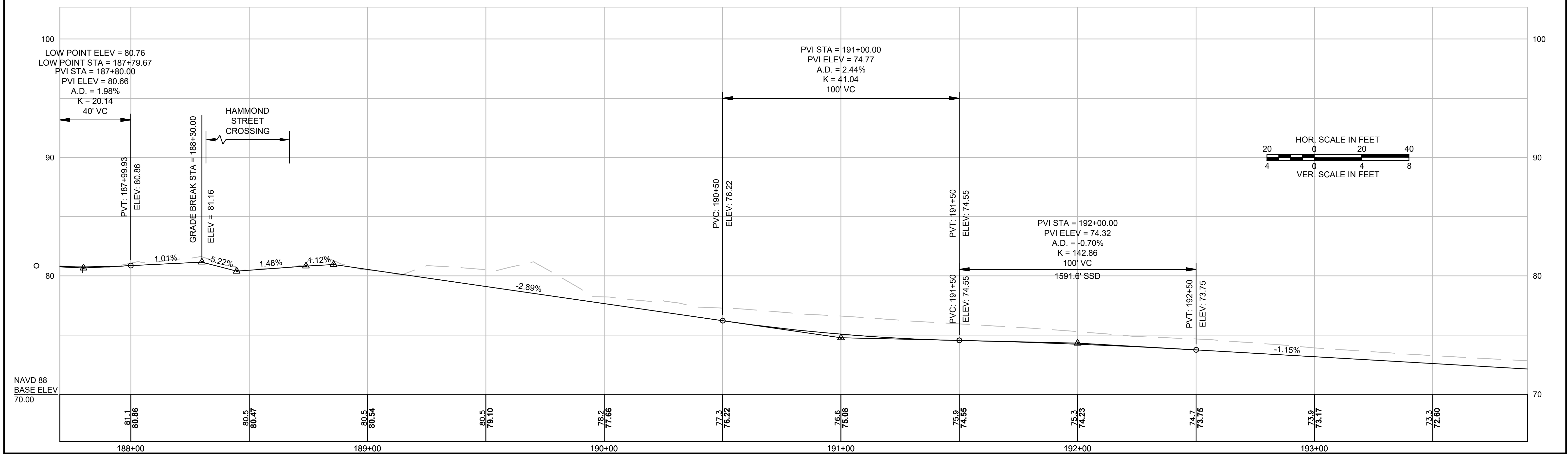
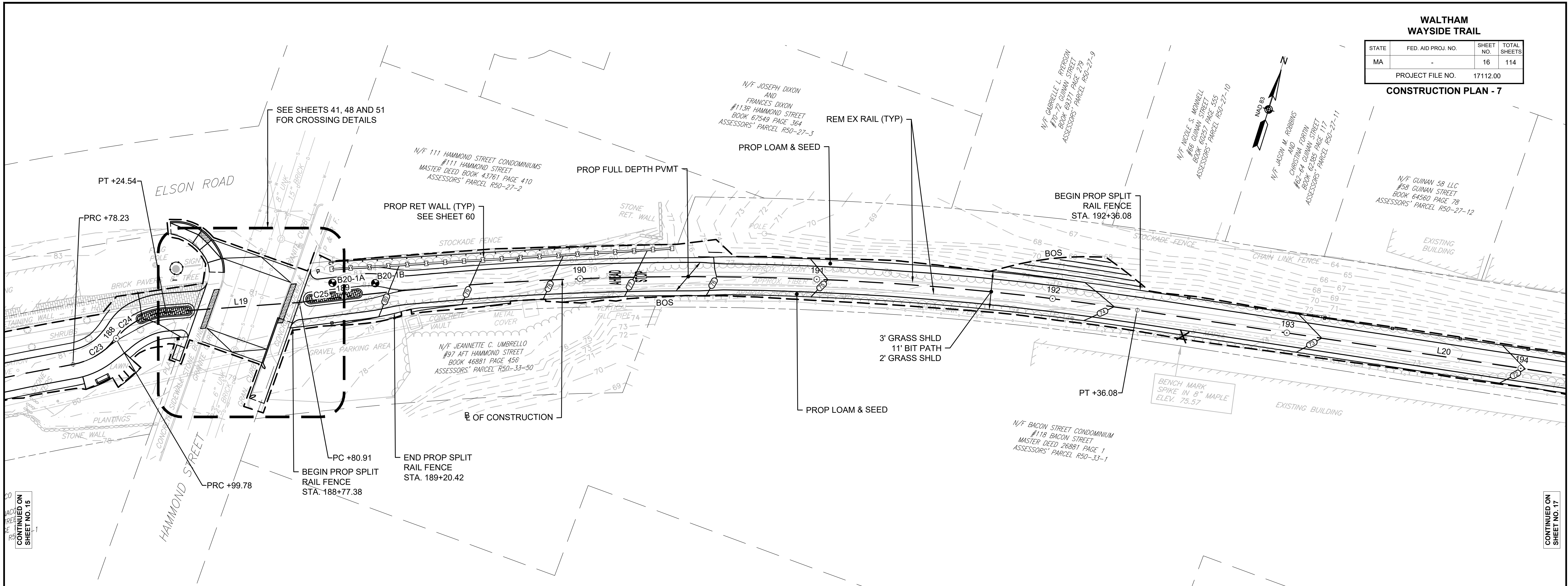
000000\_HD(CONST)PLAN - 6).DWG Plotted on 26-Jul-2021 12:30 PM

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	114

PROJECT FILE NO. 17112.00

**CONSTRUCTION PLAN - 7**



CONTINUED ON  
SHEET NO. 15

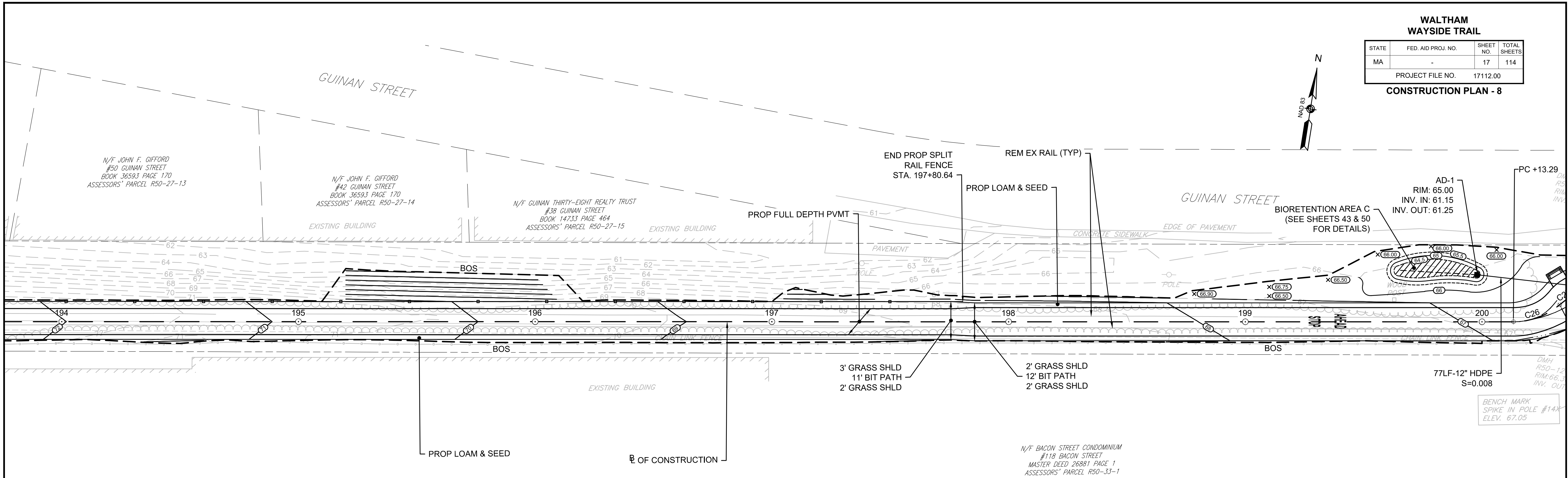
CONTINUED ON  
SHEET NO. 17



**WALTHAM  
WAYSIDE TRAIL**

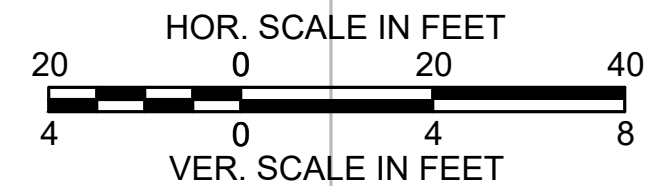
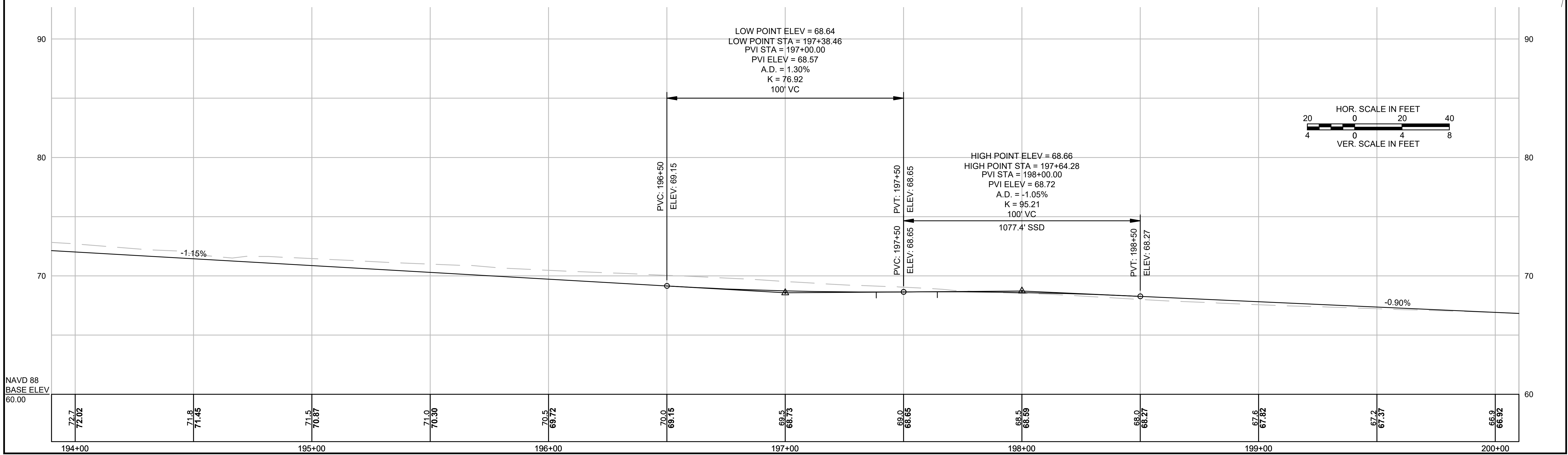
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 8**



CONTINUED ON  
SHEET NO. 16

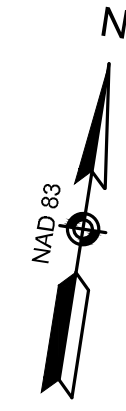
CONTINUED ON  
SHEET NO. 18



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	114
PROJECT FILE NO.		17112.00	

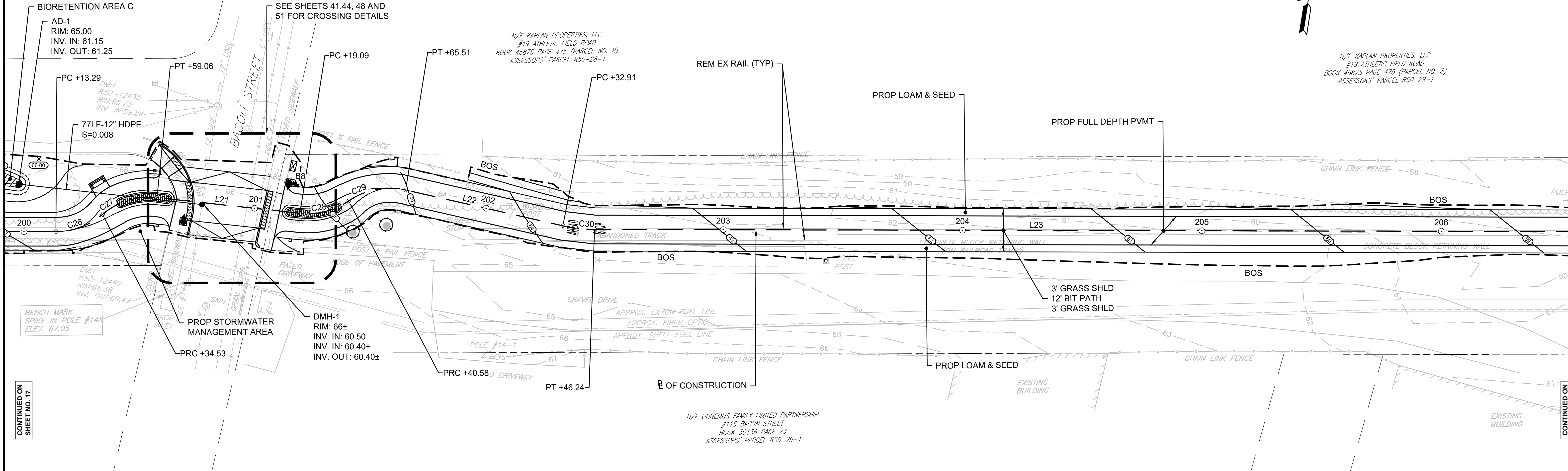
**CONSTRUCTION PLAN - 9**



N/F KAPLAN PROPERTIES, LLC  
#19 ATHLETIC FIELD ROAD  
BOOK 46875 PAGE 475 (PARCEL NO. 8)  
ASSESSORS' PARCEL R50-28-1

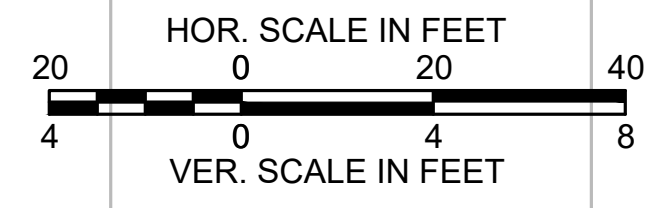
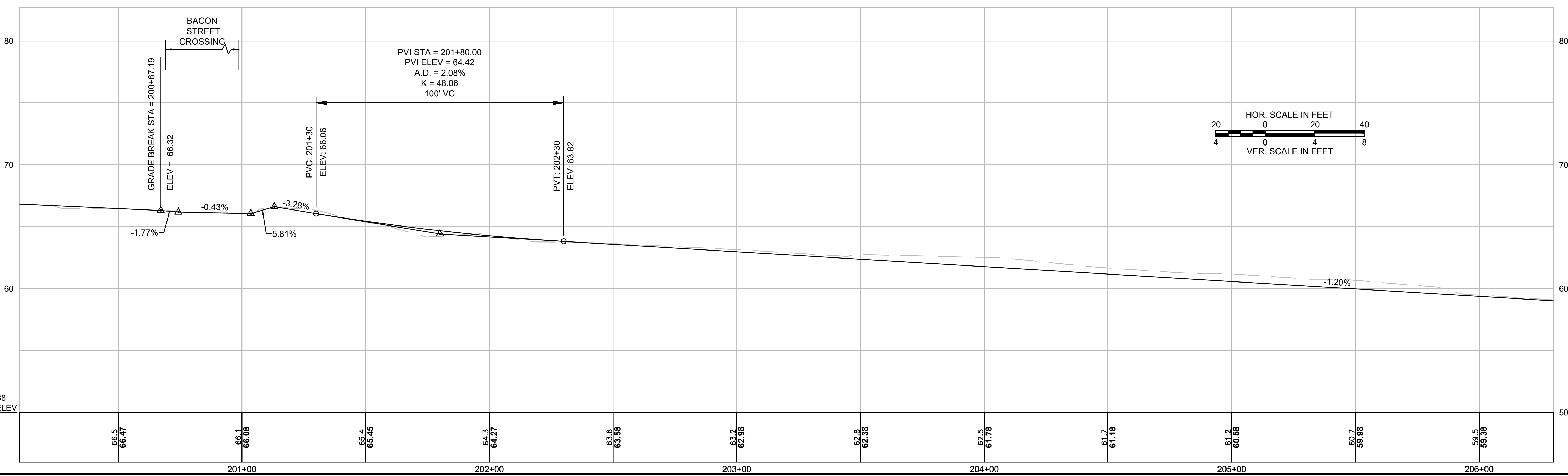
N/F KAPLAN PROPERTIES, LLC  
#19 ATHLETIC FIELD ROAD  
BOOK 46875 PAGE 475 (PARCEL NO. 8)  
ASSESSORS' PARCEL R50-28-1

N/F OHNEMUS FAMILY LIMITED PARTNERSHIP  
#115 BACON STREET  
BOOK 30136 PAGE 73  
ASSESSORS' PARCEL R50-29-1



CONTINUED ON  
SHEET NO. 17

CONTINUED ON  
SHEET NO. 19

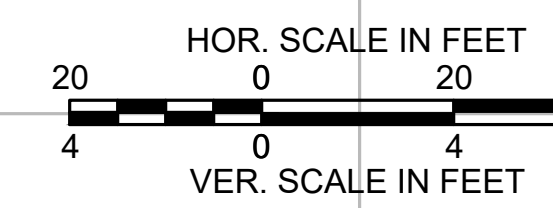
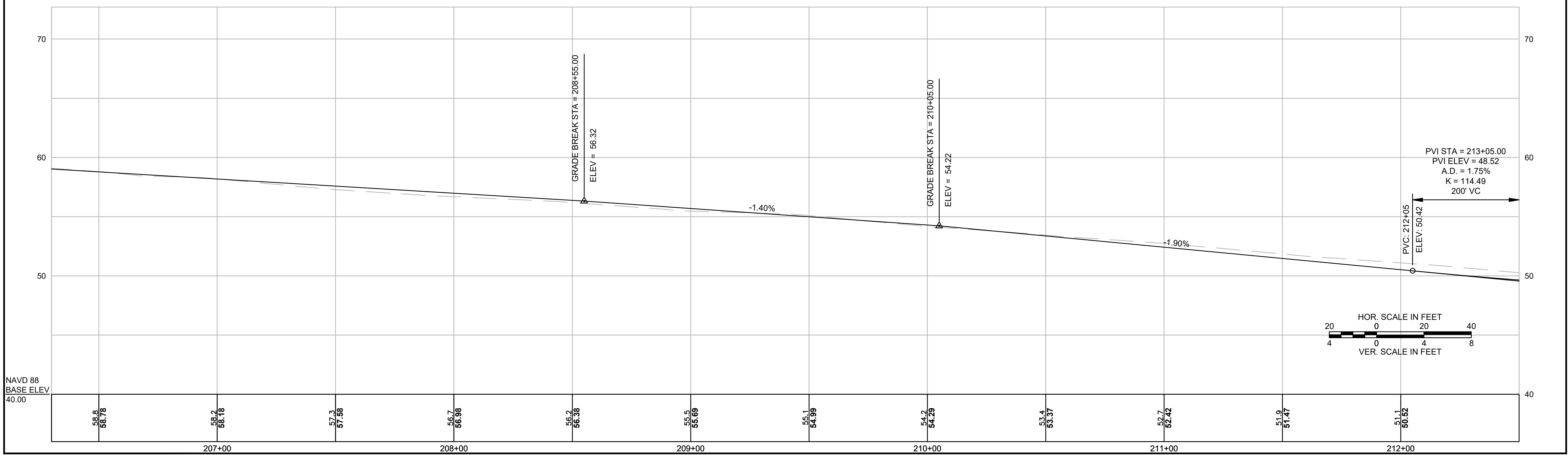
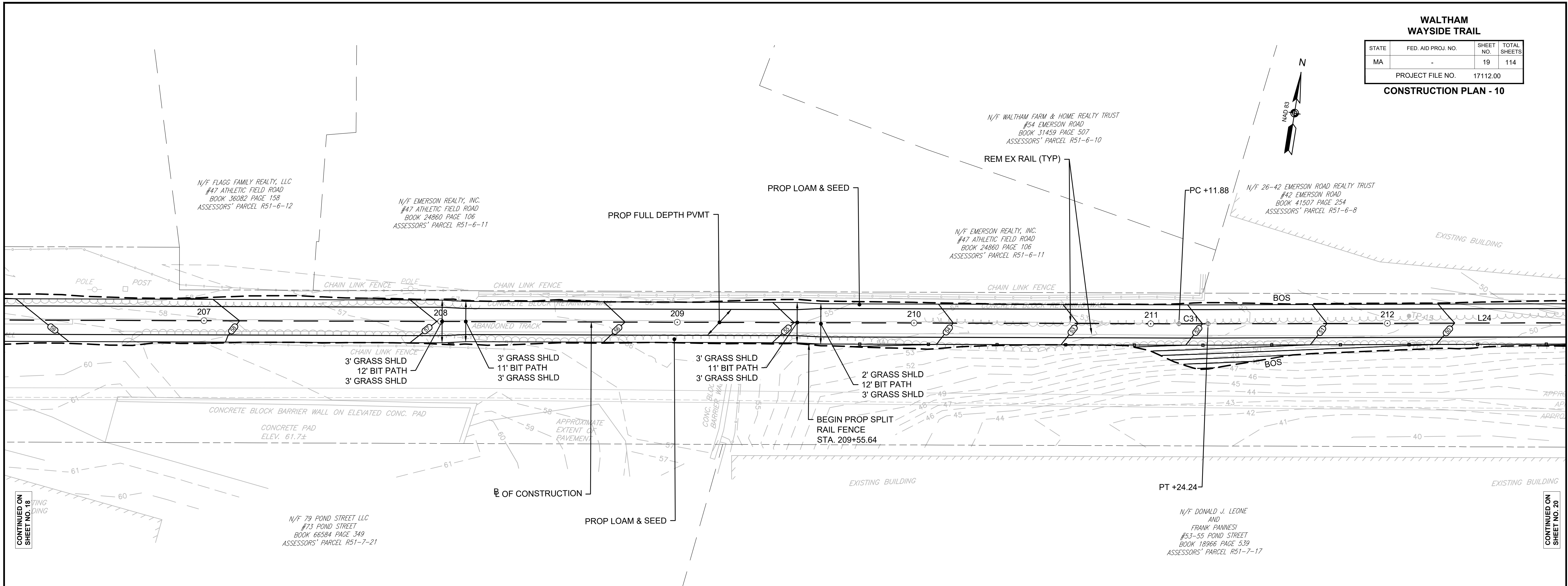


NAVD 88  
BASE ELEV  
50.00

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 10**



NAVD 88  
BASE ELEV  
40.00

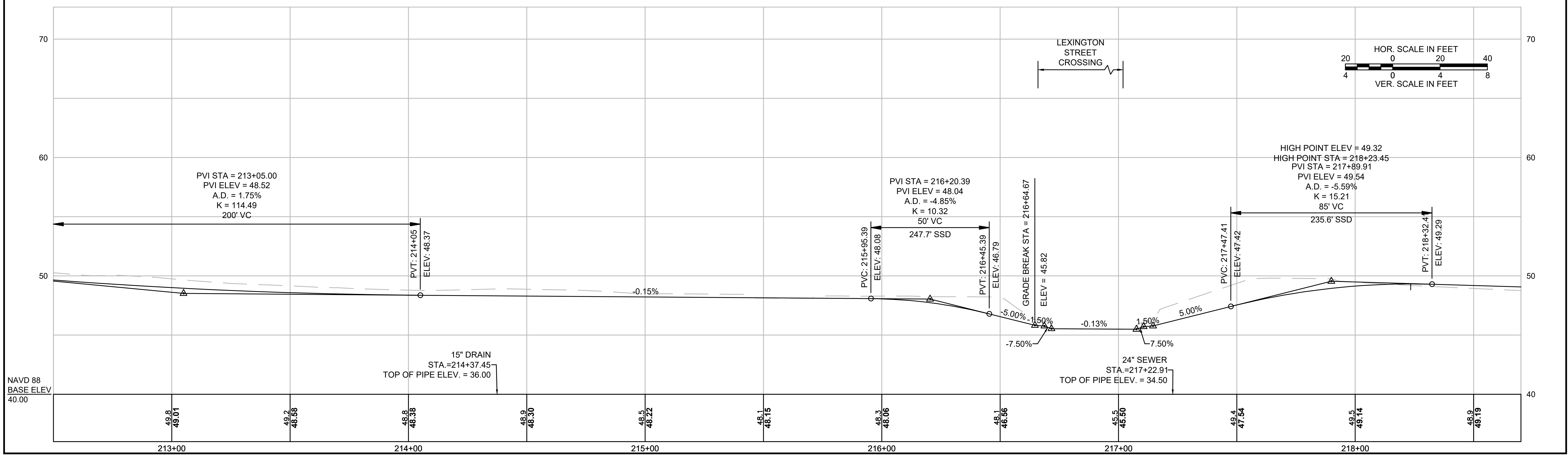
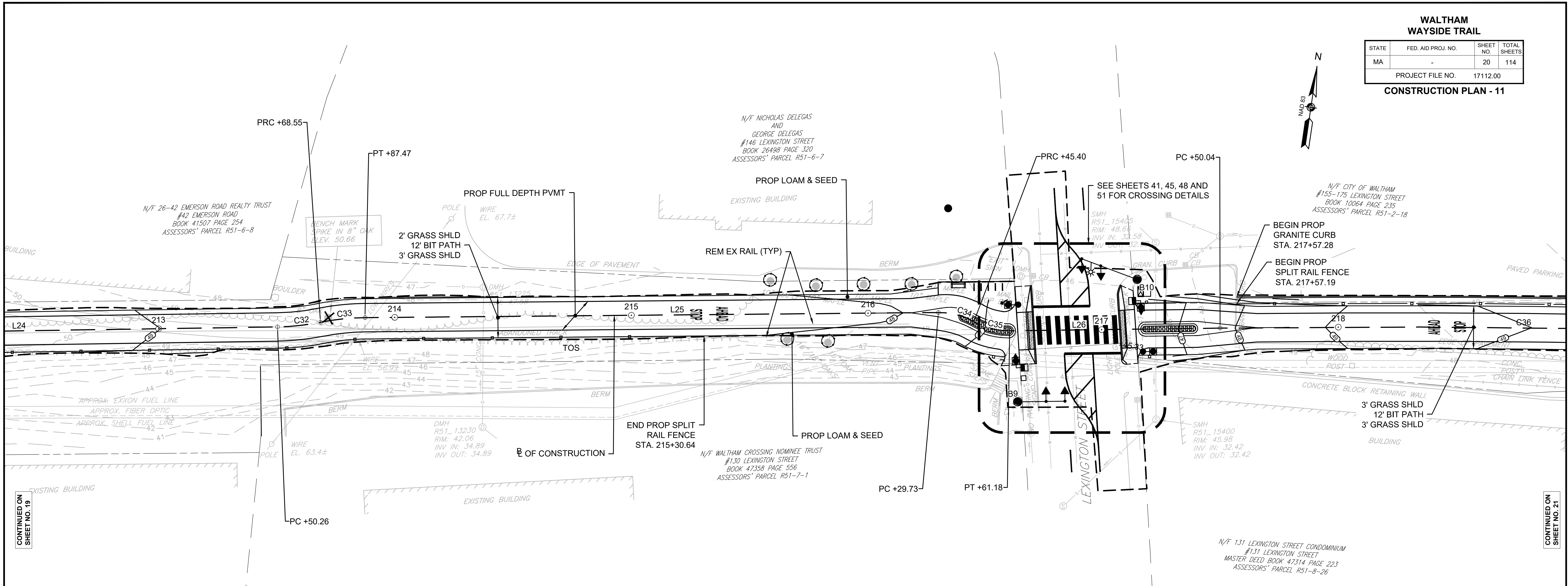
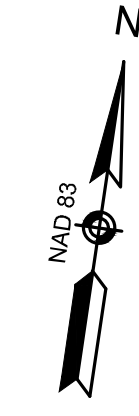
CONTINUED ON  
SHEET NO. 18

CONTINUED ON  
SHEET NO. 20

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	114

PROJECT FILE NO. 17112.00  
**CONSTRUCTION PLAN - 11**



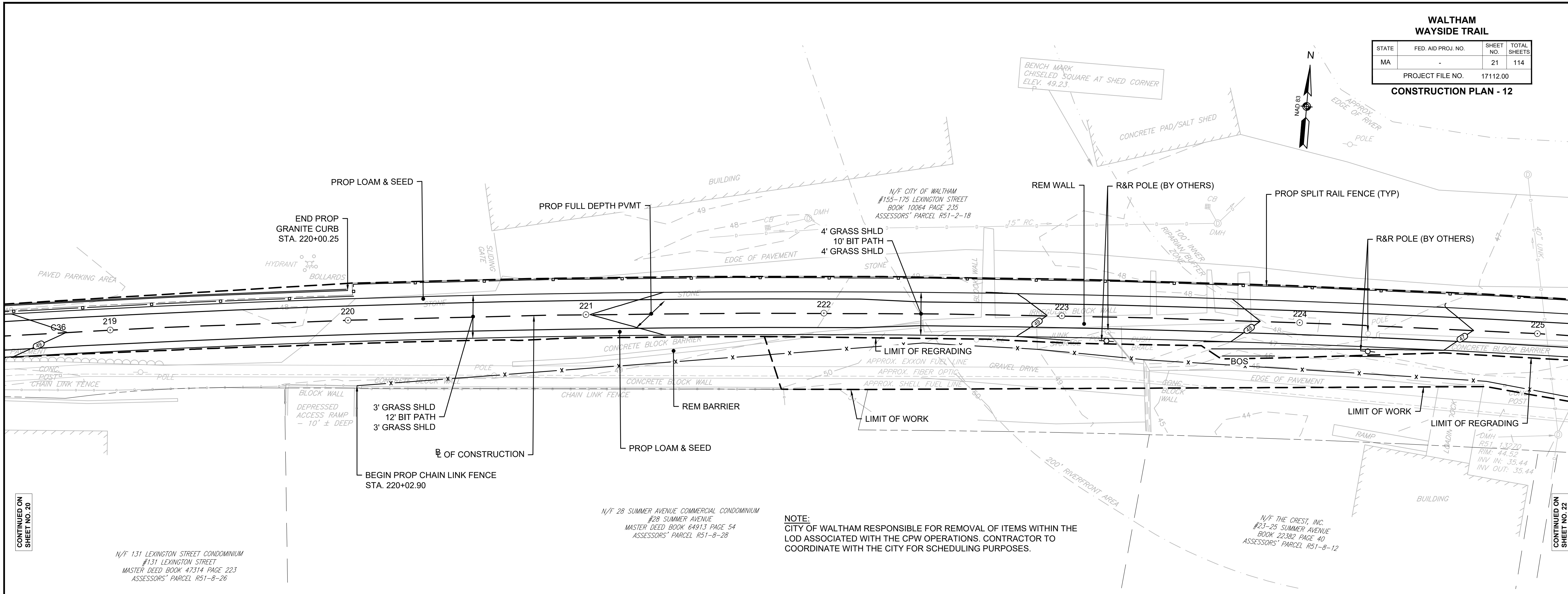
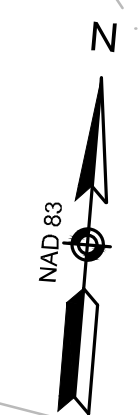
CONTINUED ON SHEET NO. 19

CONTINUED ON SHEET NO. 21

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	114
PROJECT FILE NO.		17112.00	

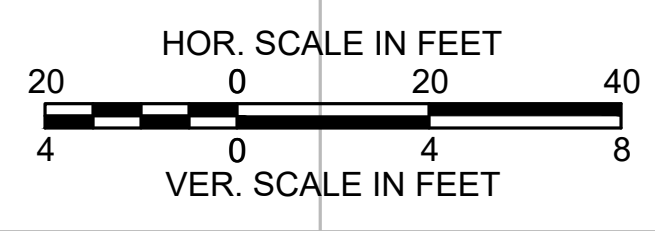
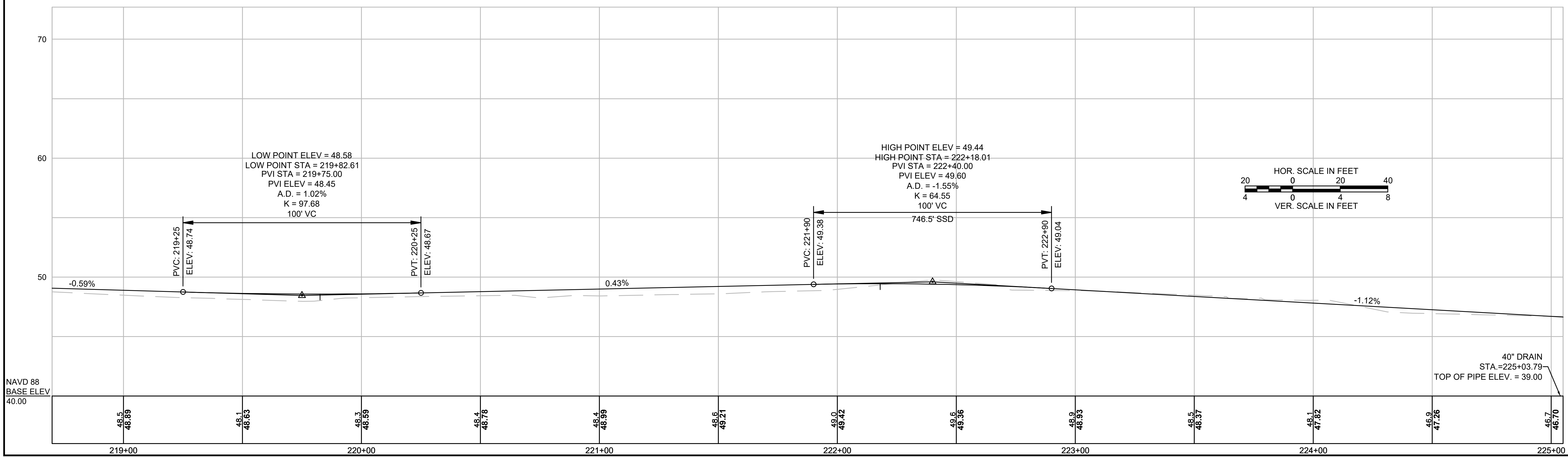
**CONSTRUCTION PLAN - 12**



**NOTE:**  
CITY OF WALTHAM RESPONSIBLE FOR REMOVAL OF ITEMS WITHIN THE LOD ASSOCIATED WITH THE CPW OPERATIONS. CONTRACTOR TO COORDINATE WITH THE CITY FOR SCHEDULING PURPOSES.

CONTINUED ON  
SHEET NO. 20

CONTINUED ON  
SHEET NO. 22



NAVD 88  
BASE ELEV  
40.00

**WALTHAM  
WAYSIDE TRAIL**

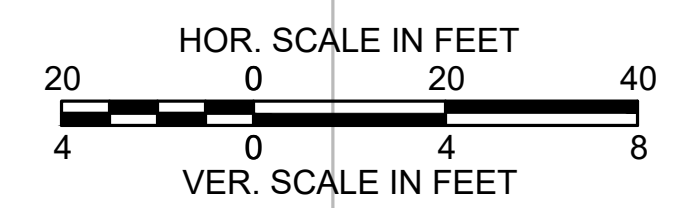
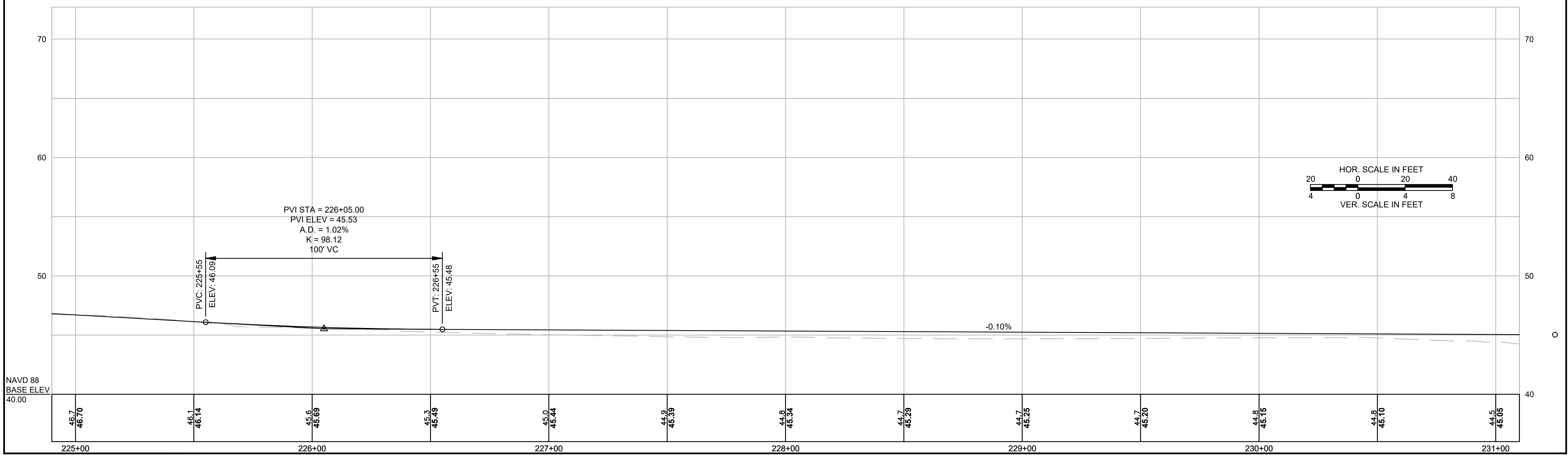
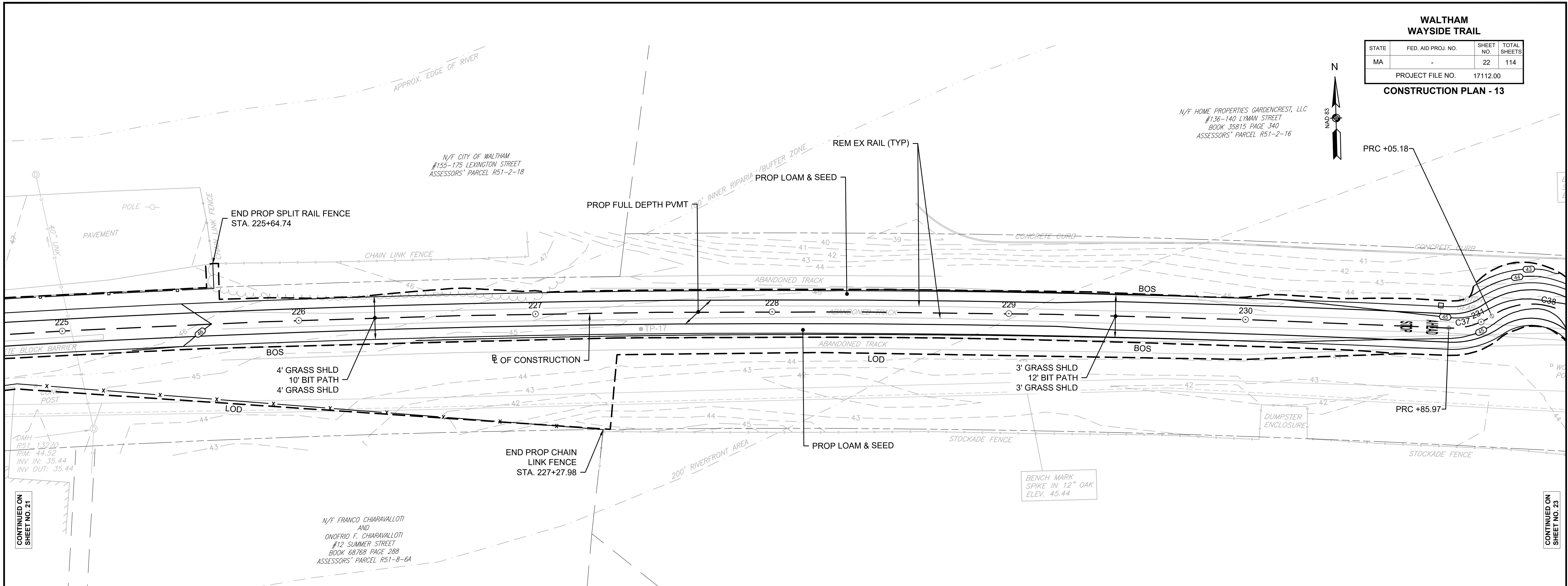
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	22	114

PROJECT FILE NO. 17112.00

**CONSTRUCTION PLAN - 13**



N/F HOME PROPERTIES GARDENCREST, LLC  
#136-140 LYMAN STREET  
BOOK 33815 PAGE 340  
ASSESSORS' PARCEL R51-2-16



NAVD 88  
BASE ELEV  
40.00

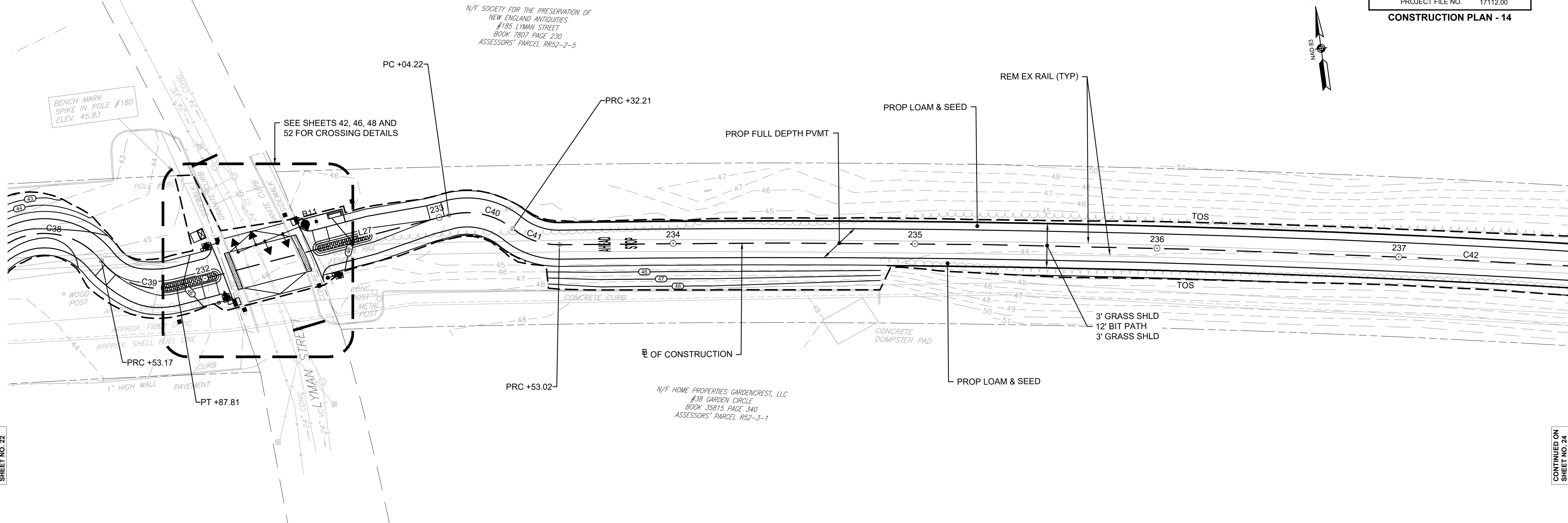
CONTINUED ON  
SHEET NO. 21

CONTINUED ON  
SHEET NO. 23

**WALTHAM  
WAYSIDE TRAIL**

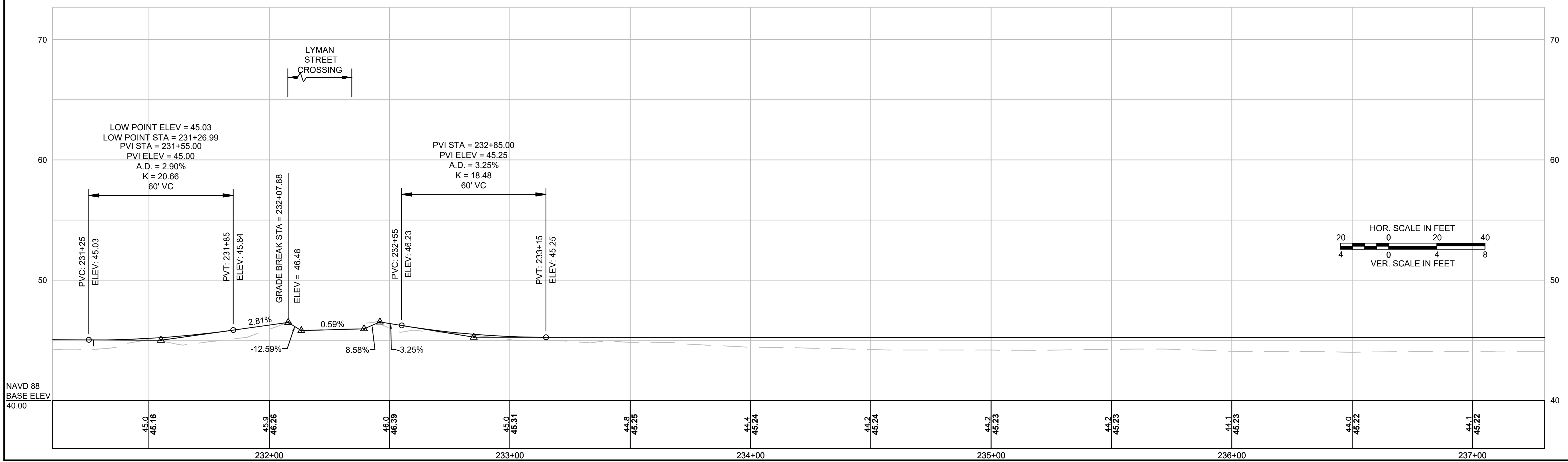
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 14**



CONTINUED ON SHEET NO. 22

CONTINUED ON SHEET NO. 24

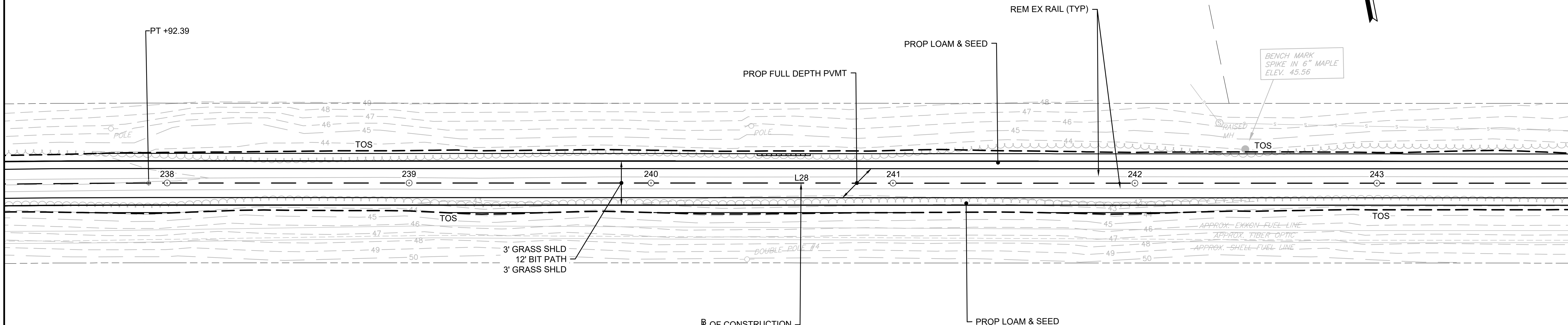
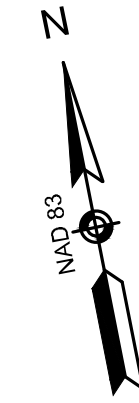


**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	24	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 15**

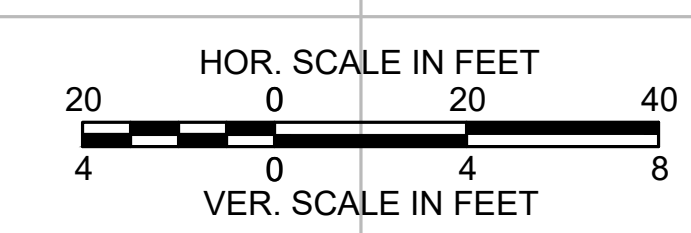
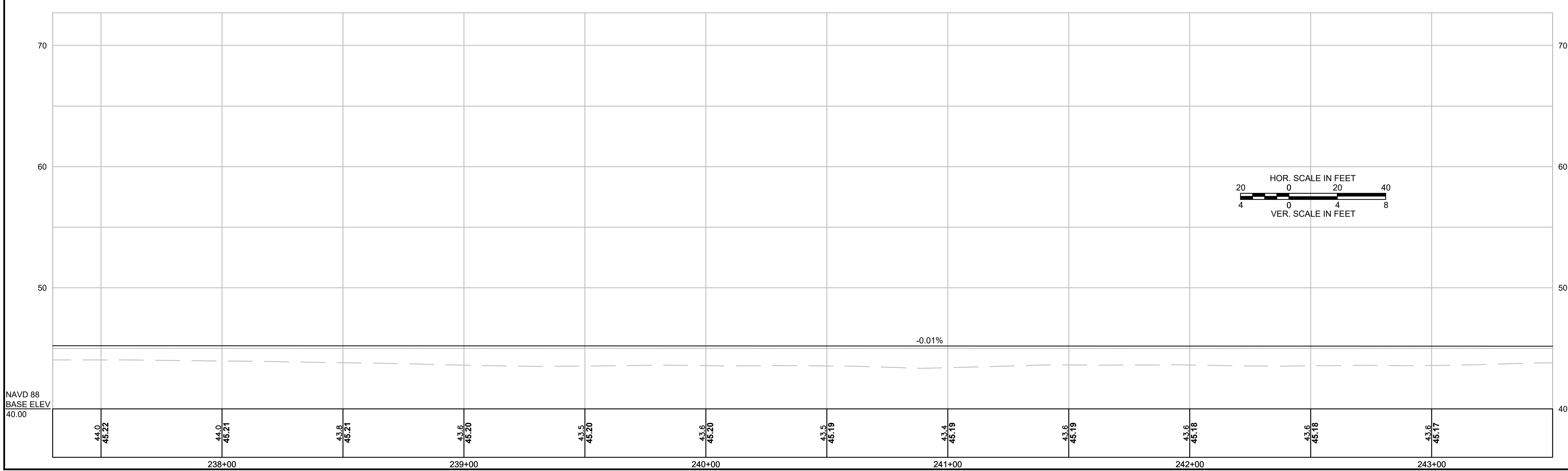
N/F SOCIETY FOR THE PRESERVATION OF  
NEW ENGLAND ANTIQUITIES  
#185 LYMAN STREET  
BOOK 7807 PAGE 230  
ASSESSORS' PARCEL RR52-2-5



N/F HOME PROPERTIES GARDENCREST, LLC  
#39 GARDEN CIRCLE  
BOOK 35815 PAGE 340  
ASSESSORS' PARCEL R52-3-1

CONTINUED ON  
SHEET NO. 23

CONTINUED ON  
SHEET NO. 25



NAVD 88  
BASE ELEV  
40.00



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	25	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 16**

N/F HOME PROPERTIES GARDENCREST, LLC  
#22-26 MIDDLESEX CIRCLE  
BOOK 35815 PAGE 340  
ASSESSORS' PARCEL R52-2-4

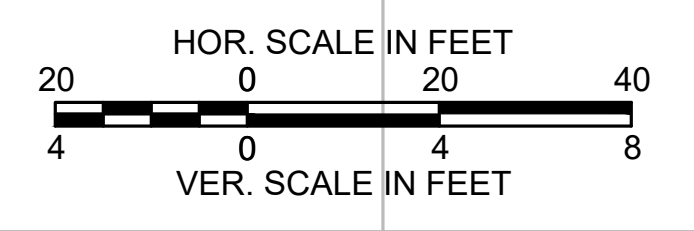
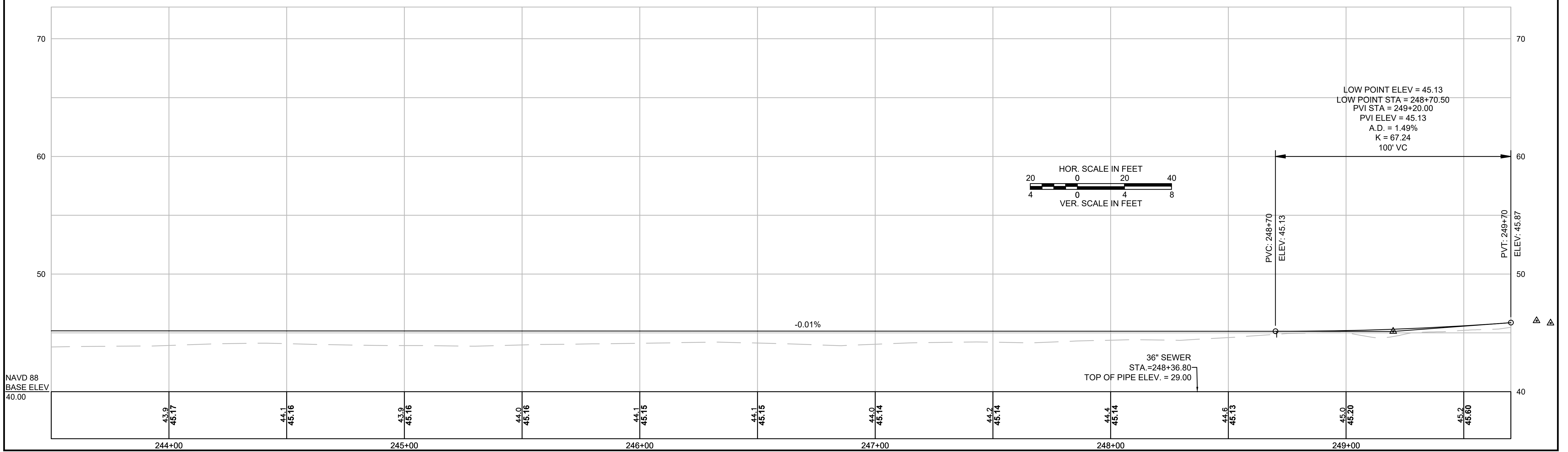
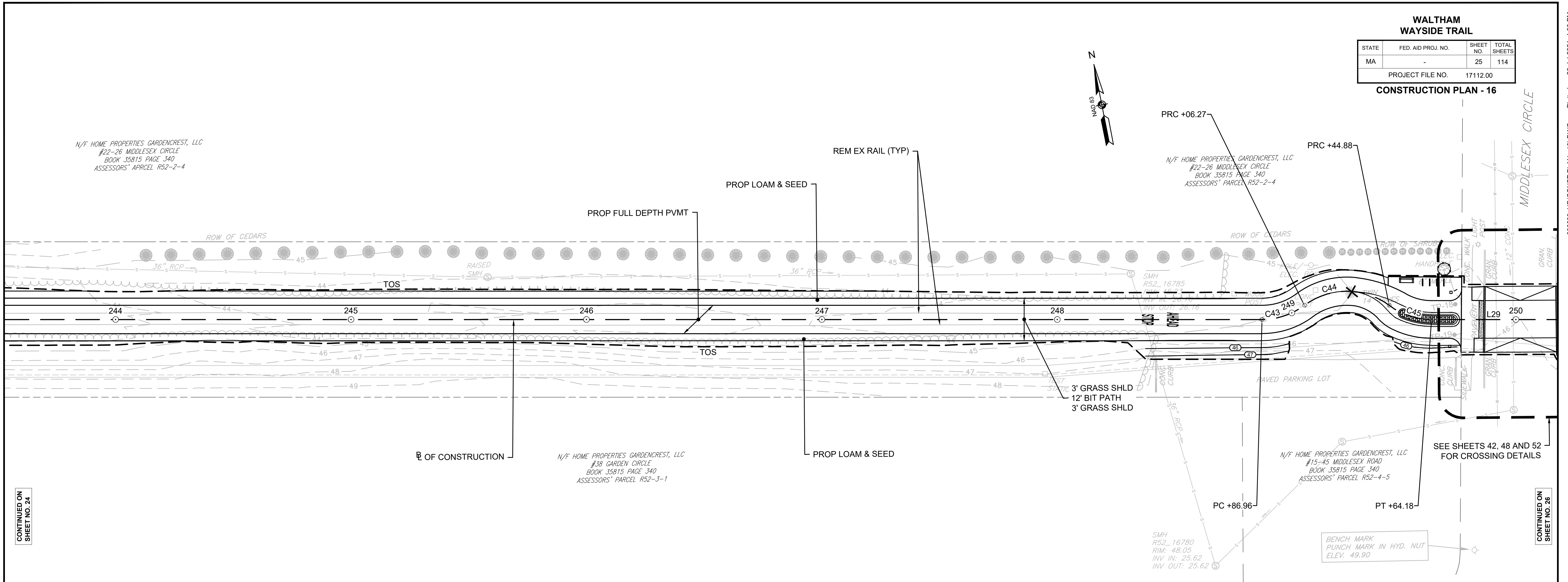
N/F HOME PROPERTIES GARDENCREST, LLC  
#22-26 MIDDLESEX CIRCLE  
BOOK 35815 PAGE 340  
ASSESSORS' PARCEL R52-2-4

N/F HOME PROPERTIES GARDENCREST, LLC  
#38 GARDEN CIRCLE  
BOOK 35815 PAGE 340  
ASSESSORS' PARCEL R52-3-1

N/F HOME PROPERTIES GARDENCREST, LLC  
#15-45 MIDDLESEX ROAD  
BOOK 35815 PAGE 340  
ASSESSORS' PARCEL R52-4-5

CONTINUED ON  
SHEET NO. 24

CONTINUED ON  
SHEET NO. 26



LOW POINT ELEV = 45.13  
LOW POINT STA = 248+70.50  
PVI STA = 249+20.00  
PVI ELEV = 45.13  
A.D. = 1.49%  
K = 67.24  
100' VC

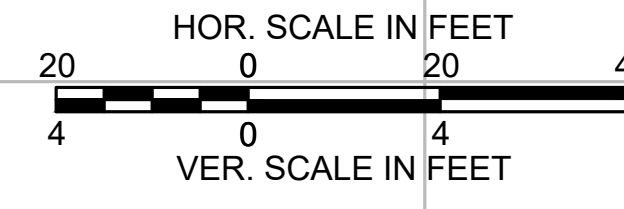
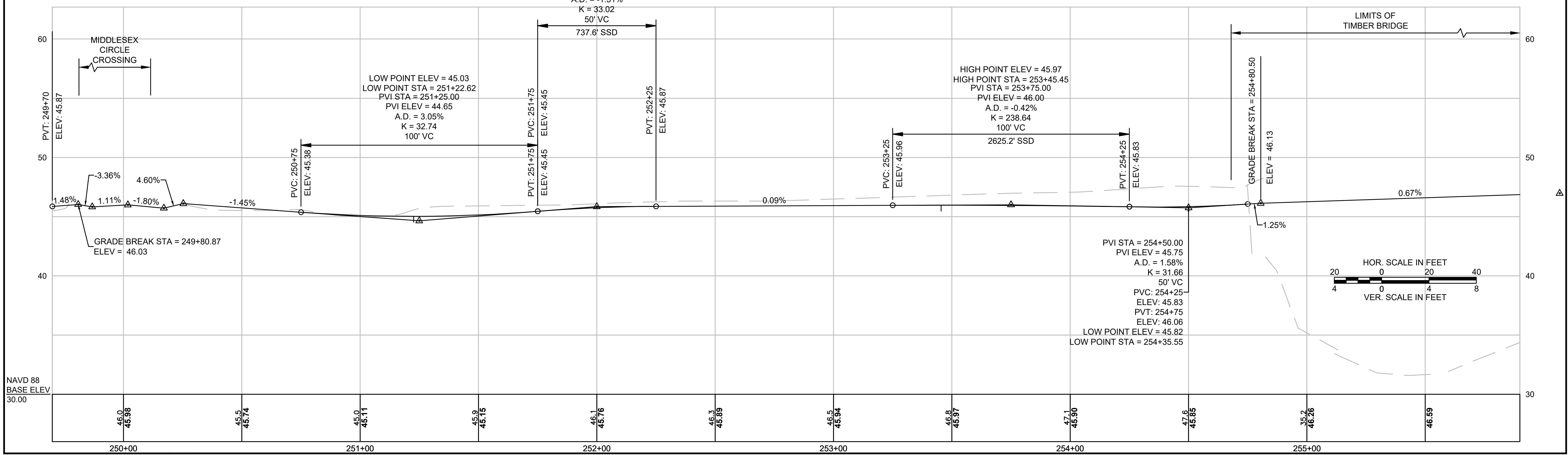
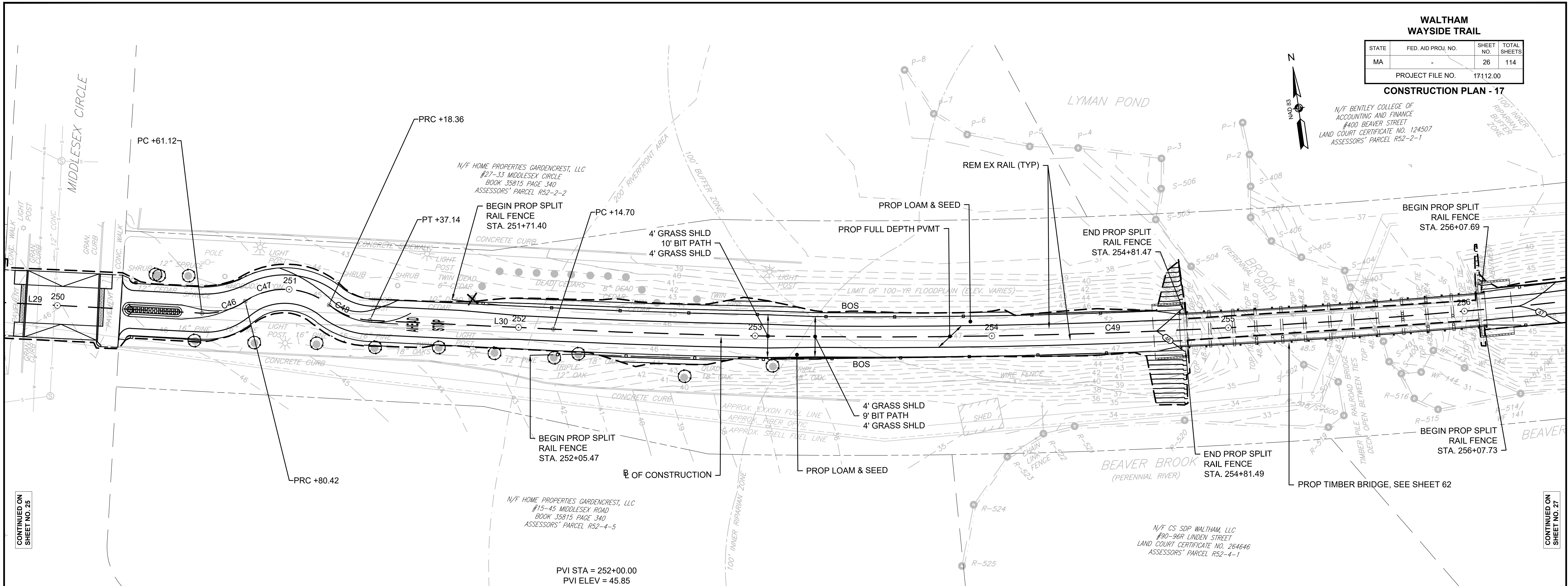
NAVD 88  
BASE ELEV  
40.00

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA		26	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 17**

N/F BENTLEY COLLEGE OF ACCOUNTING AND FINANCE  
#400 BEAVER STREET  
LAND COURT CERTIFICATE NO. 124507  
ASSESSORS' PARCEL R52-2-1



CONTINUED ON  
SHEET NO. 25

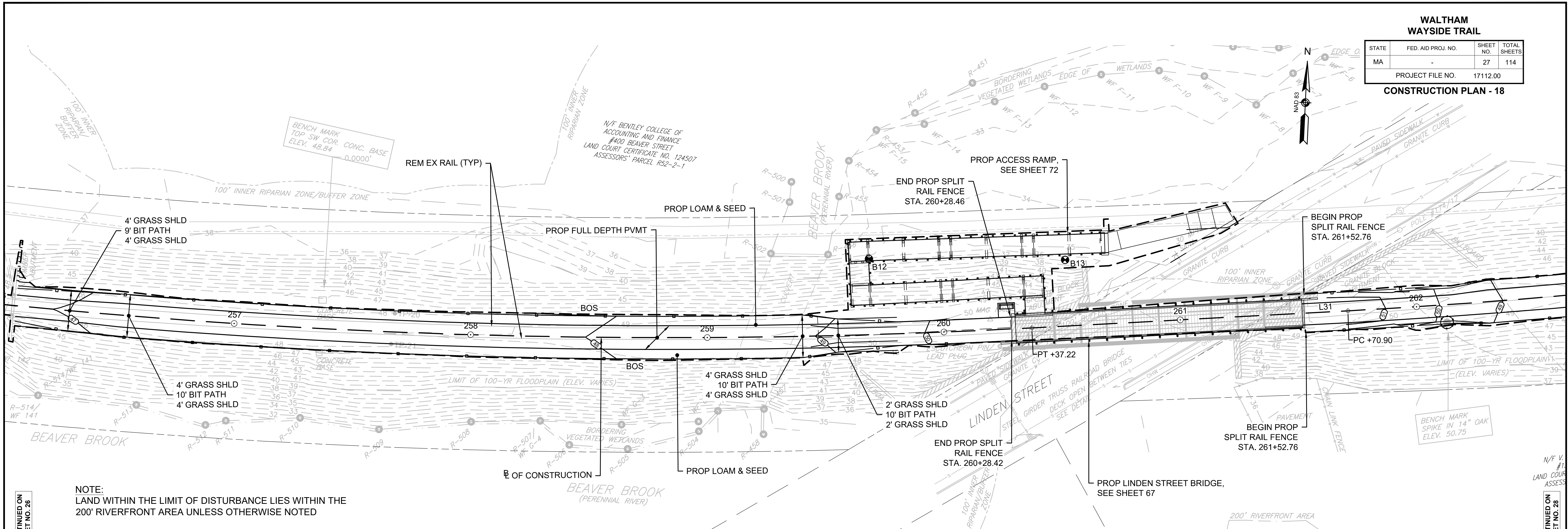
CONTINUED ON  
SHEET NO. 27

NAVD 88  
BASE ELEV  
30.00

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	27	114
PROJECT FILE NO.		17112.00	

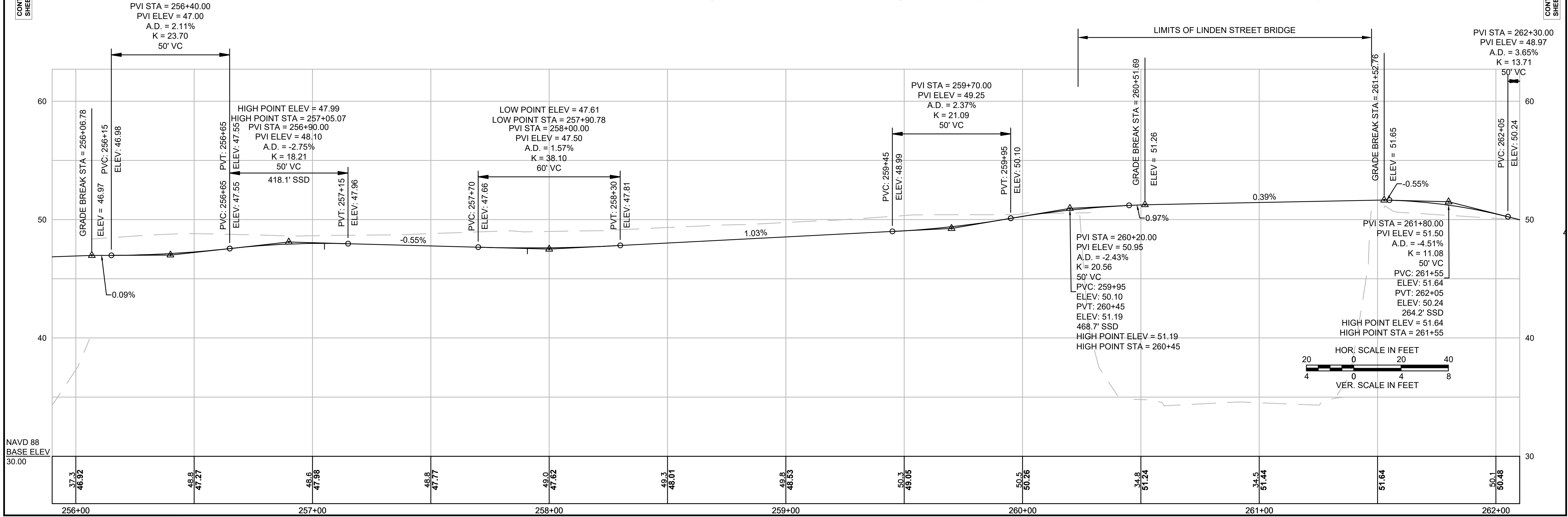
**CONSTRUCTION PLAN - 18**



NOTE:  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED

CONTINUED ON  
SHEET NO. 26

CONTINUED ON  
SHEET NO. 26

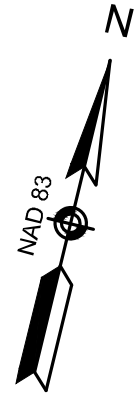


NAVD 88  
BASE ELEV  
30.00

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	28	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 19**



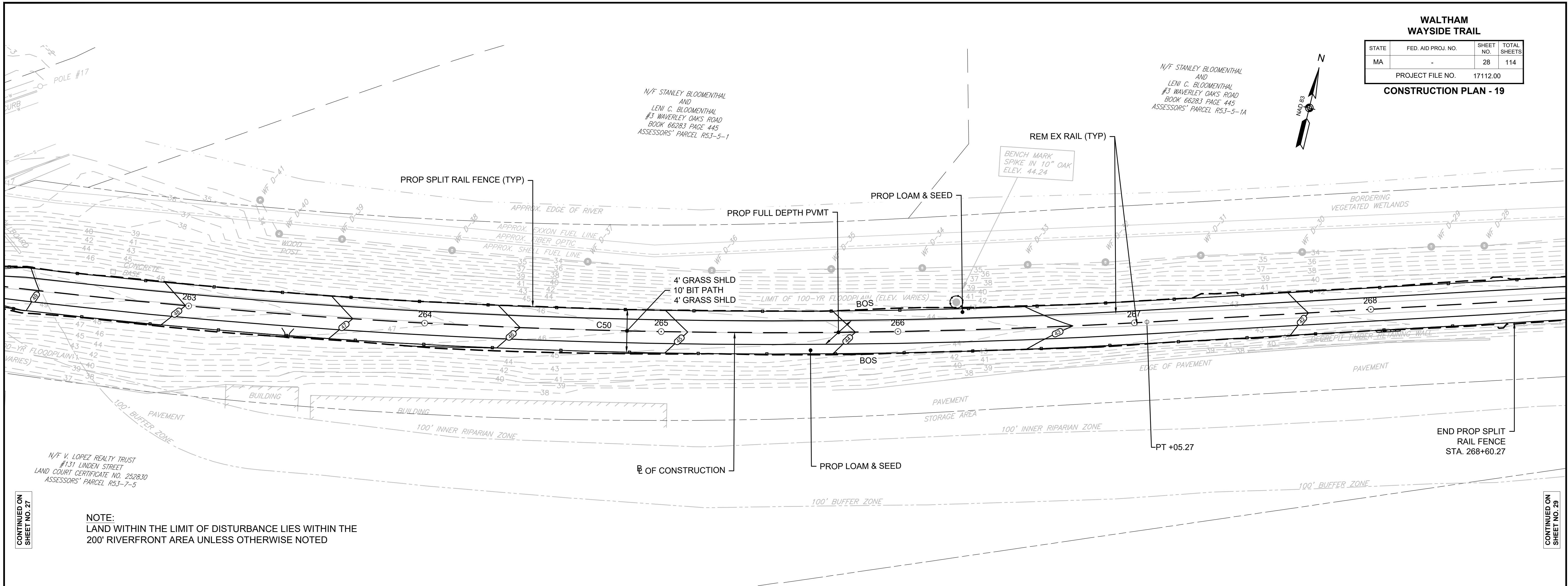
N/F STANLEY BLOOMENTHAL AND  
LENI C. BLOOMENTHAL  
#3 WAVERLEY OAKS ROAD  
BOOK 66283 PAGE 445  
ASSESSORS' PARCEL R53-5-1A

N/F STANLEY BLOOMENTHAL AND  
LENI C. BLOOMENTHAL  
#3 WAVERLEY OAKS ROAD  
BOOK 66283 PAGE 445  
ASSESSORS' PARCEL R53-5-1

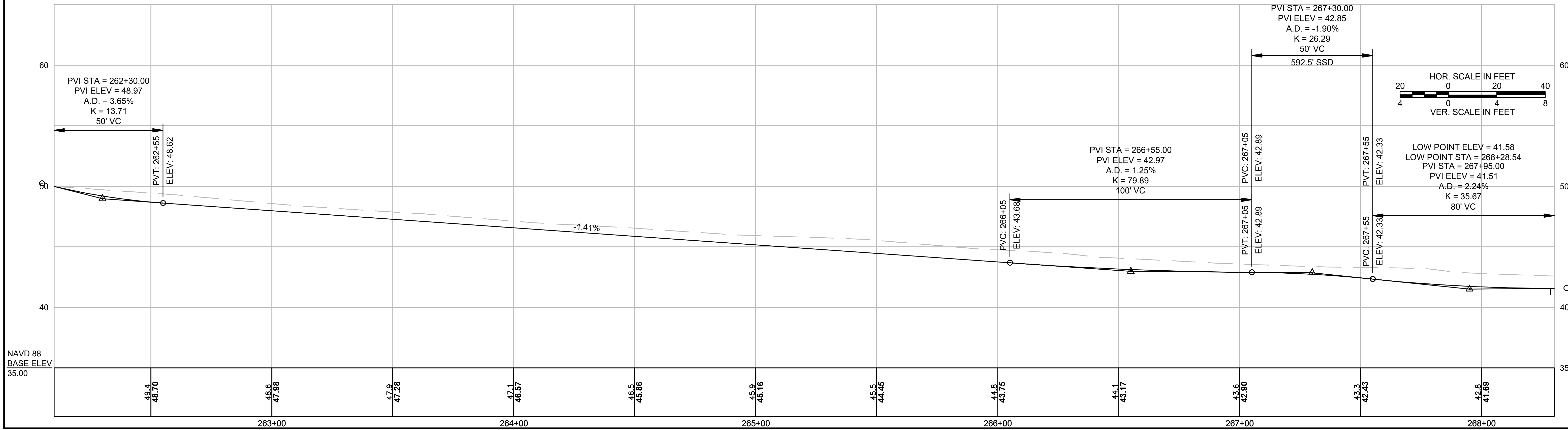
N/F V. LOPEZ REALTY TRUST  
#31 LINDEN STREET  
LAND COURT CERTIFICATE NO. 252830  
ASSESSORS' PARCEL R53-7-5

CONTINUED ON  
SHEET NO. 27

CONTINUED ON  
SHEET NO. 29



**NOTE:**  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED

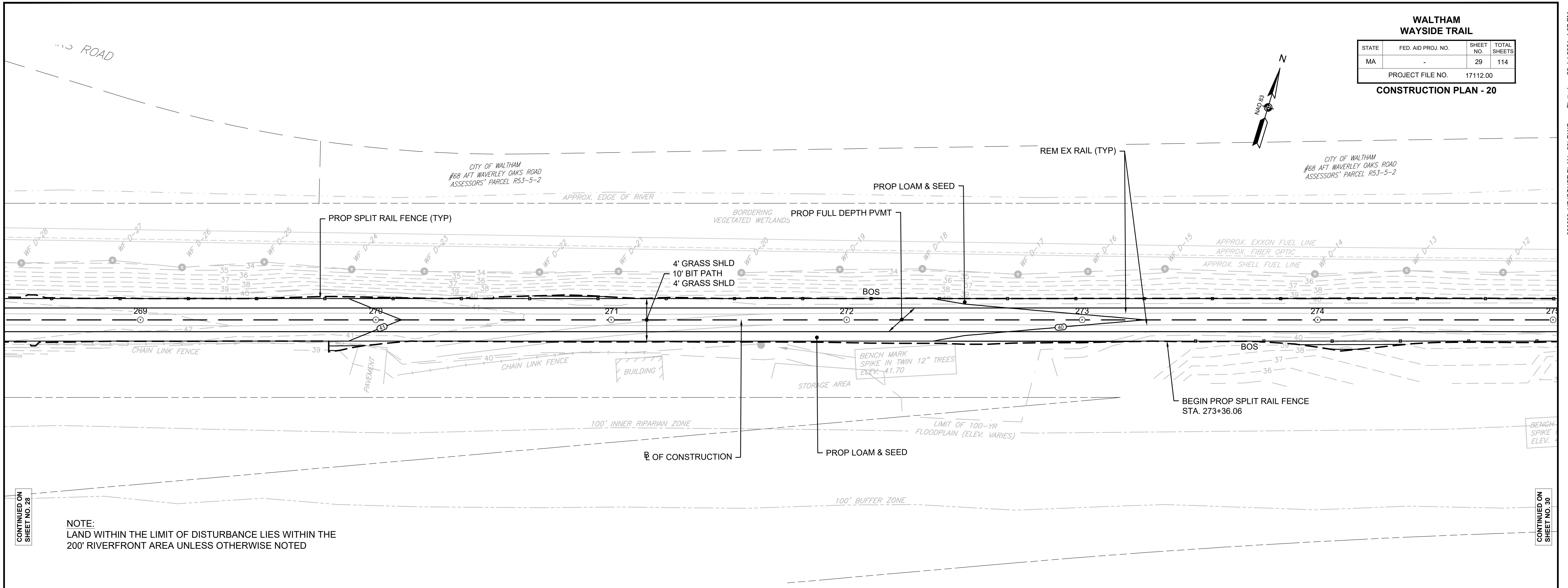
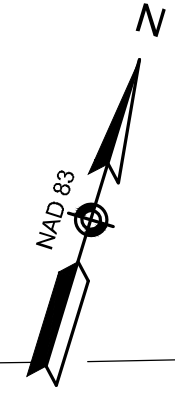


**WALTHAM  
WAYSIDE TRAIL**

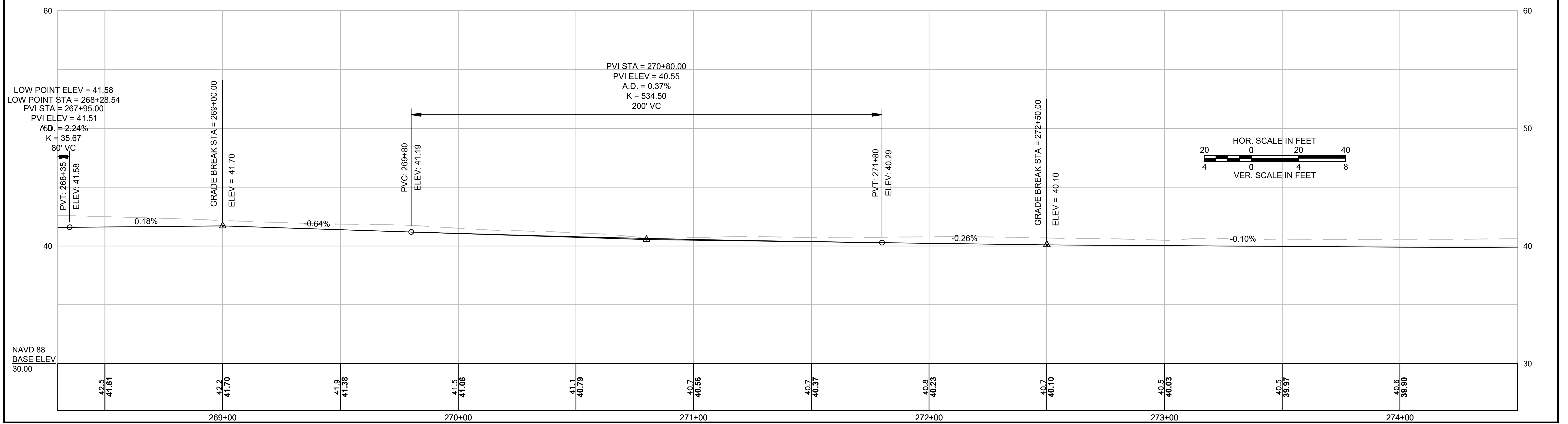
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	29	114

PROJECT FILE NO. 17112.00

**CONSTRUCTION PLAN - 20**



**NOTE:**  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE 200' RIVERFRONT AREA UNLESS OTHERWISE NOTED



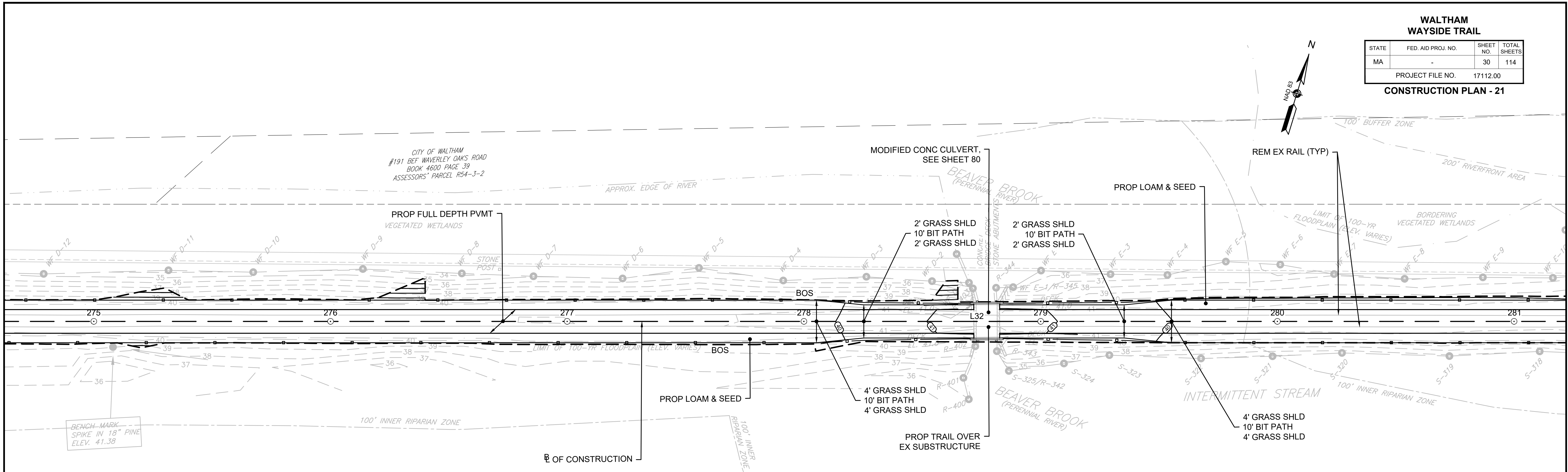
CONTINUED ON SHEET NO. 28

CONTINUED ON SHEET NO. 30

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	30	114
PROJECT FILE NO.		17112.00	

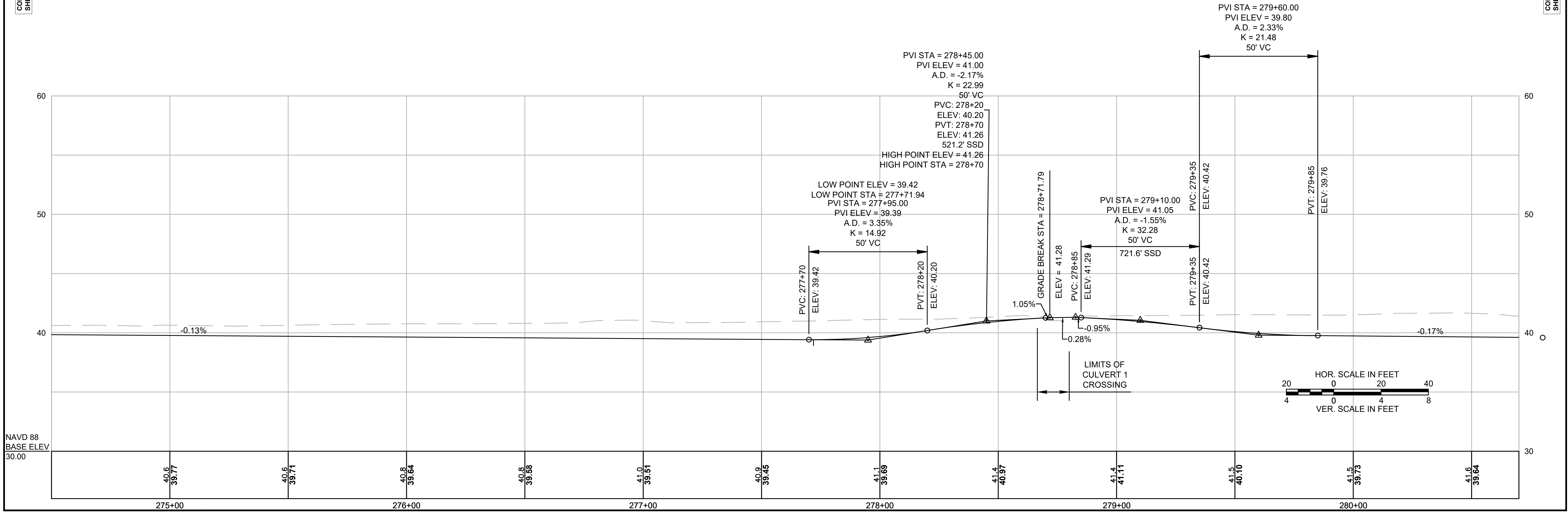
**CONSTRUCTION PLAN - 21**



**NOTE:**  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED

CONTINUED ON  
SHEET NO. 29

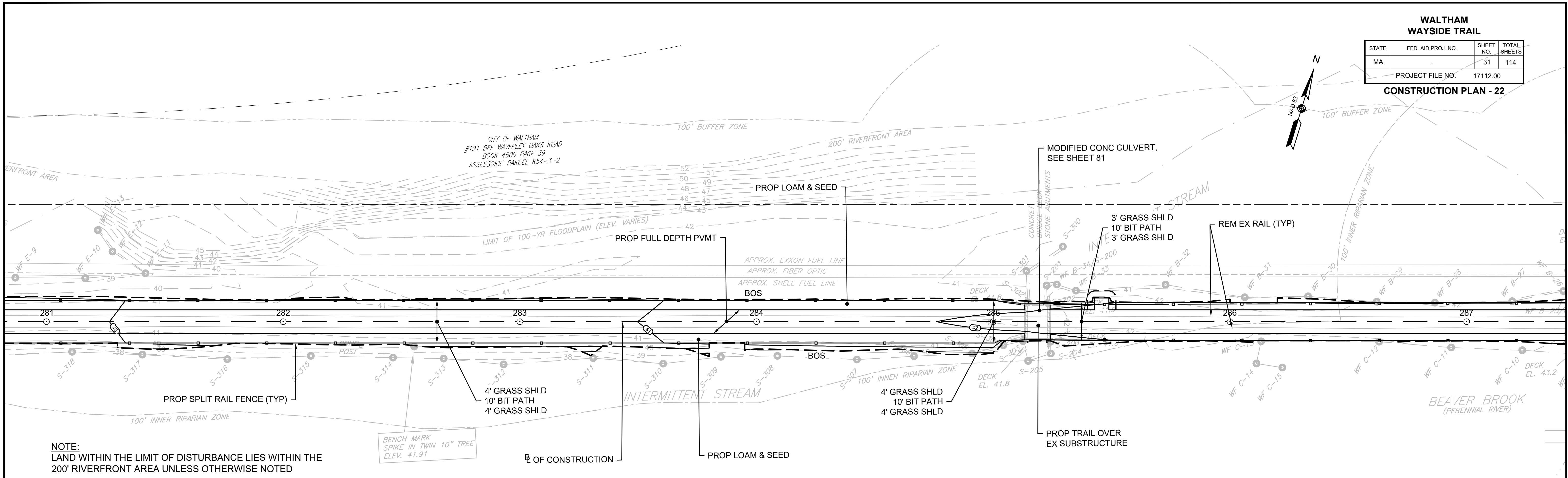
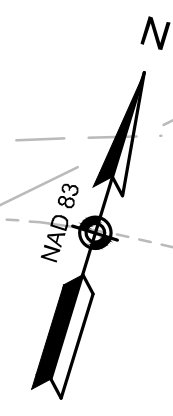
CONTINUED ON  
SHEET NO. 31



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	31	114
PROJECT FILE NO. 17112.00			

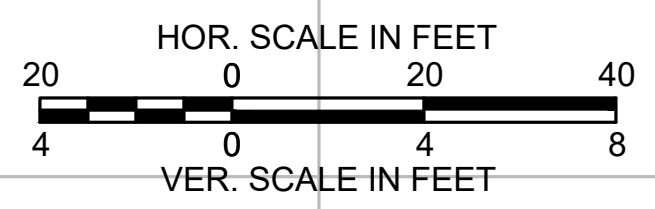
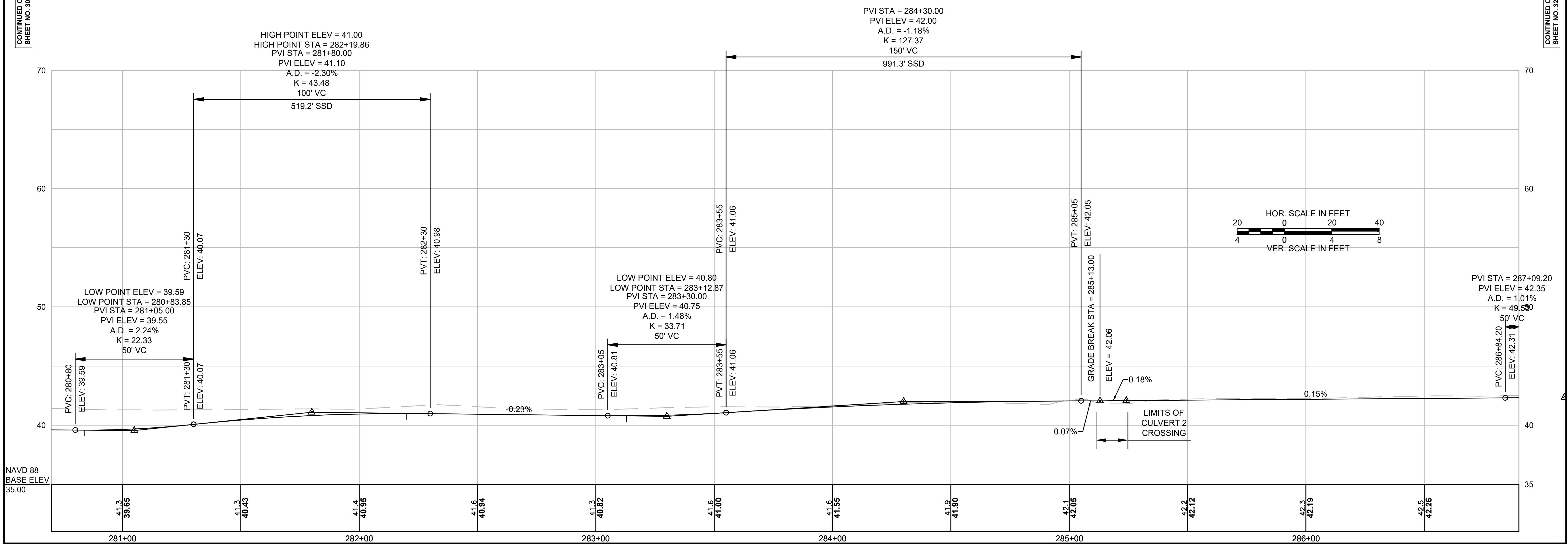
**CONSTRUCTION PLAN - 22**



NOTE:  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED

CONTINUED ON  
SHEET NO. 30

CONTINUED ON  
SHEET NO. 32

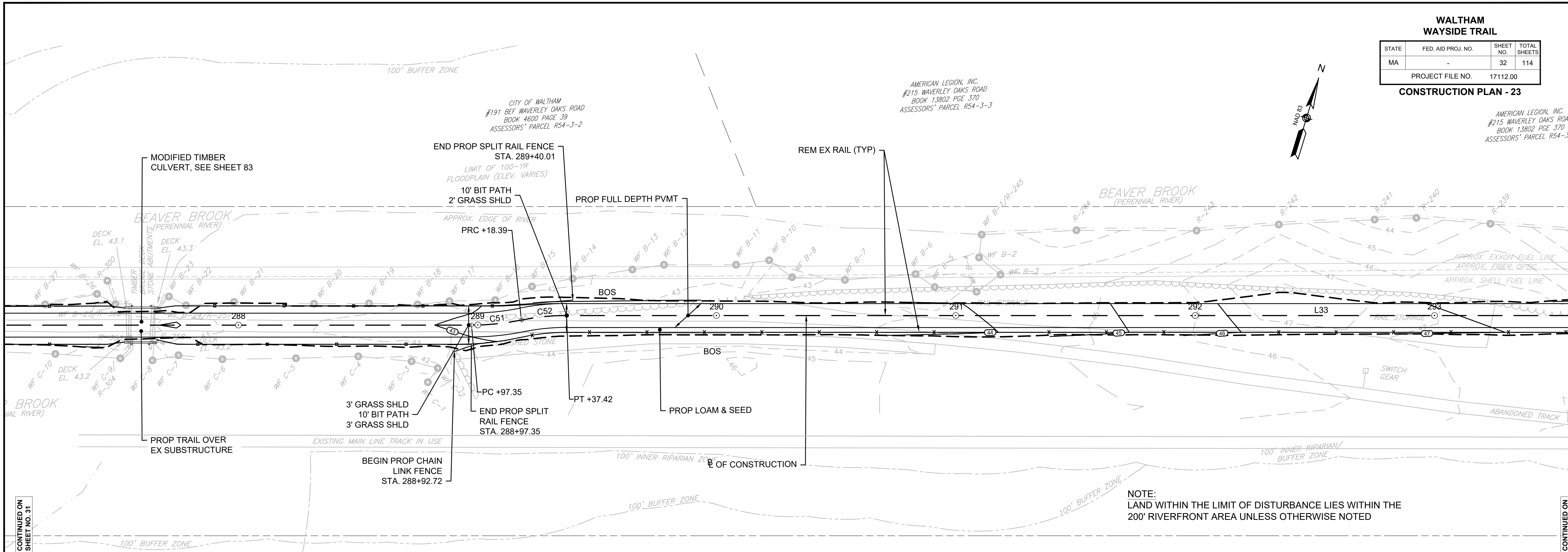
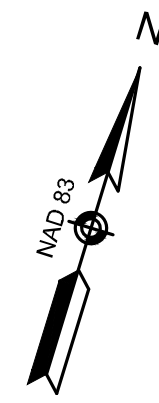


**WALTHAM  
WAYSIDE TRAIL**

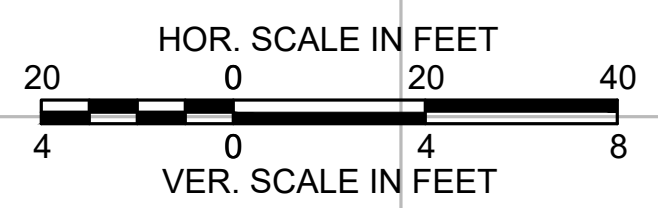
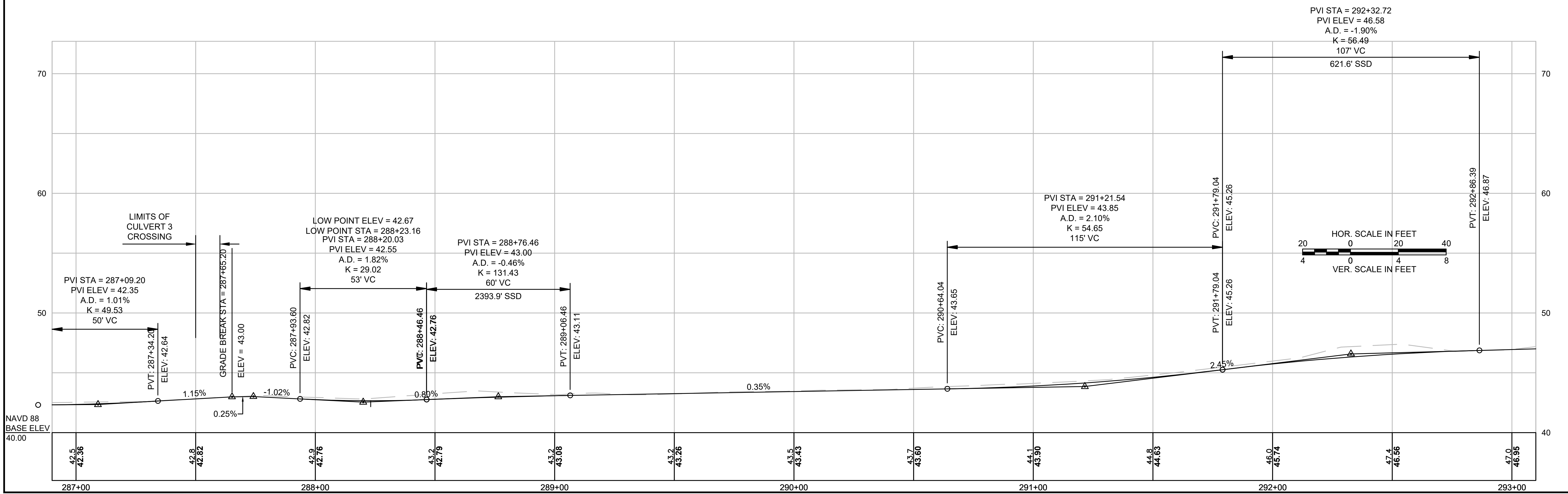
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	32	114
PROJECT FILE NO.		17112.00	

**CONSTRUCTION PLAN - 23**

AMERICAN LEGION, INC.  
#215 WAVERLEY OAKS ROAD  
BOOK 13802 PAGE 370  
ASSESSORS' PARCEL R54-3-3



NOTE:  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED



CONTINUED ON  
SHEET NO. 31

CONTINUED ON  
SHEET NO. 33

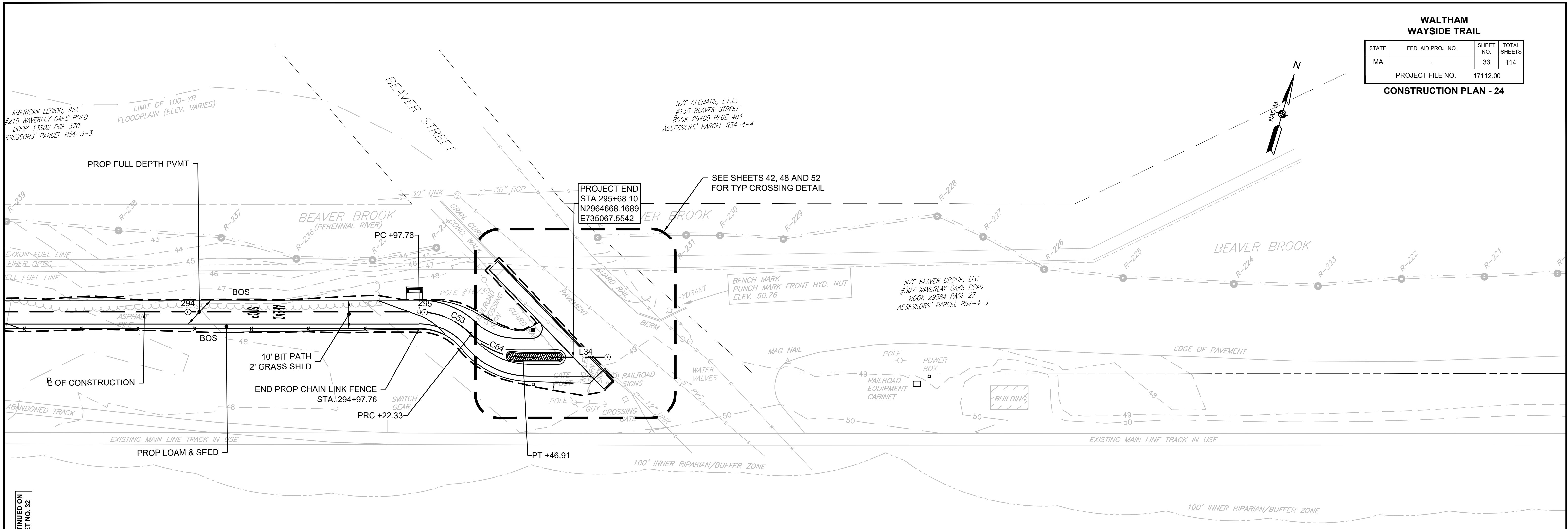
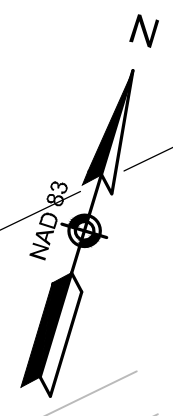


**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	33	114

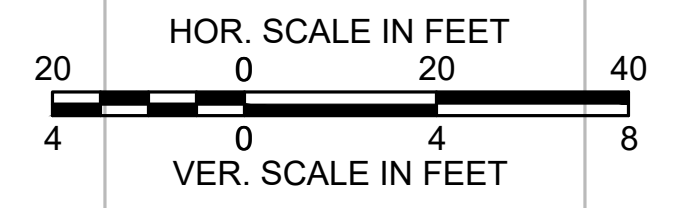
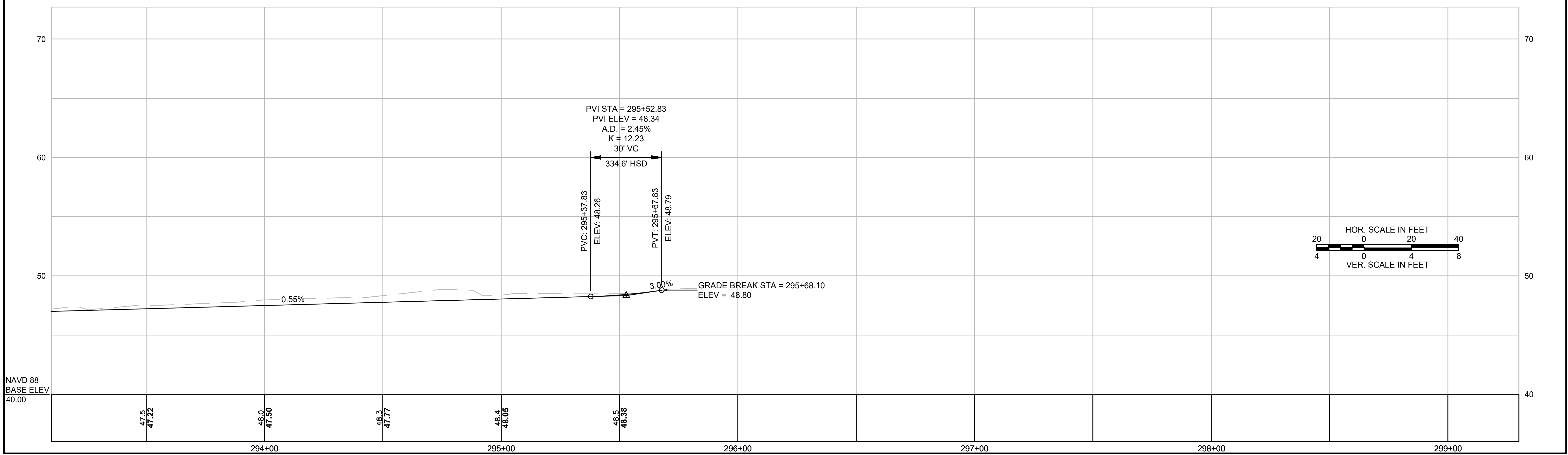
PROJECT FILE NO. 17112.00

**CONSTRUCTION PLAN - 24**



CONTINUED ON  
SHEET NO. 32

NOTE:  
LAND WITHIN THE LIMIT OF DISTURBANCE LIES WITHIN THE  
200' RIVERFRONT AREA UNLESS OTHERWISE NOTED



NAVD 88  
BASE ELEV  
40.00

**PLANTING NOTES:**

- BEFORE ANY TREES OR SHRUBS ARE REMOVED, THE CONTRACTOR SHALL ARRANGE A CONFERENCE ON SITE WITH THE OWNER'S REPRESENTATIVE TO IDENTIFY TREES AND SHRUBS WHICH ARE TO BE REMOVED, AS WELL AS THOSE WHICH ARE TO BE PROTECTED. DO NO CLEARING WITHOUT A CLEAR UNDERSTANDING OF EXISTING VEGETATION TO BE PRESERVED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN FOR THE LENGTH OF THE CONSTRUCTION PERIOD. VEHICLES SHALL NOT BE PARKED, NOR CONSTRUCTION MATERIALS BE STORED BENEATH THE DRIP LINE OF TREES TO BE SAVED. PROTECTION TECHNIQUES SHALL BE APPROVED BY OWNER'S REPRESENTATIVE.
- CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING AND INSTALLED UTILITY LINES PRIOR TO PLANTING AND REPORT ANY CONFLICTS TO THE OWNER'S REPRESENTATIVE.
- ALL NEW PLANT MATERIAL SHALL CONFORM TO THE "AMERICAN STANDARD FOR NURSERY STOCK", LATEST EDITION, PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION. IN ADDITION, ALL PLANT MATERIAL SHALL BE OF SPECIMEN QUALITY., EXCEPT SMALL CONSERVATION TREES.
- ALL NEW TREES AND SHRUBS SHALL BE BALLED AND BURLAPPED OR CONTAINER GROWN UNLESS OTHERWISE NOTED ON THE PLANT LIST.
- CONTRACTOR SHALL SUPPLY ALL NEW PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON THE DRAWINGS. IF MINOR DISCREPANCIES EXIST BETWEEN THE NUMBER OF PLANTS DRAWN ON THE PLANTING PLAN AND THE NUMBER OF PLANTS IN THE PLANT SCHEDULE, THE PLANTING PLAN SHALL GOVERN.
- ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT, AND CULTURE AND MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE.
- ALL NEW TREES SHALL BE TAGGED AND APPROVED BY THE OWNER'S REPRESENTATIVE AT THE NURSERY PRIOR TO DIGGING OR DELIVERY TO THE SITE. FOR SHRUBS AND SMALLER MATERIALS, REPRESENTATIVE TAGGING BY THE OWNER'S REPRESENTATIVE WILL BE ACCEPTABLE.
- NO TREES SHALL BE PLANTED BEFORE ACCEPTANCE OF ROUGH GRADING. TREES SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS THEY BORE TO FINISH GRADE BEFORE BEING DUG IN THE NURSERY. PRIOR TO PLANTING, REMOVE THE TOP OF THE BURLAP AND CONFIRM THAT PLANT ROOT CROWNS ARE NOT COVERED BY SOIL FROM THE NURSERY.
- STAKE LOCATION OF ALL PROPOSED PLANTS FOR APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF PLANTING.
- MULCH TREES AND PLANTING BEDS PER DETAILS AND SPECIFICATIONS. EXCEPT SMALL CONSERVATION TREES WHICH SHALL RECEIVE LOAM AND SEEDING AS SHOWN ON DRAWINGS.
- ALL NEW PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR FROM THE TIME OF WRITTEN ACCEPTANCE. SEE SPECIFICATIONS FOR LENGTH OF GUARANTEE.
- ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS INSIDE AND OUTSIDE THE LIMIT OF WORK SHALL BE LOAMED AND SEEDING AS SPECIFIED AND WITH MIX AS DIRECTED BY OWNER'S REPRESENTATIVE.
- ALL AREAS TO BE SEEDING SHALL RECEIVE 6" TOPSOIL PRIOR TO SEEDING.
- ALL SLOPES STEEPER THAN 3:1 SHALL RECEIVE 6" LOAM, WOODLAND SEED MIX, AND EROSION CONTROL FABRIC.

**LANDSCAPE LEGEND**

	CONCRETE PAVING	(3) D-7
	FLUSH ISLANDS	SEE TYPICAL ROADWAY CROSSING - DETAILS 2, SHEET 48
	PROPOSED TREE LINE- SEE CLEARING AND PRUNING	(2) D-7
	PROPOSED SHADE TREE	(14) D-9 (15) D-9
	PROPOSED EVERGREEN TREE	(16) D-9 (15) D-9
	PROPOSED FLOWERING TREE	(14) D-9 (15) D-9
	PROPOSED SHRUBS	(13) D-9
	PROPOSED SMALL TREES	SEE SPECIFICATIONS
	6" LOAM AND LAWN SEED	SEE SPECIFICATIONS
	6" LOAM AND WOODLAND SEED	SEE SPECIFICATIONS
	6" LOAM AND FOREBAY SEED	SEE SPECIFICATIONS
	SPLIT RAIL FENCE	SEE CIVIL SPECIFICATIONS
	CHAINLINK FENCE	SEE CIVIL SPECIFICATIONS
	GRANITE CURB	SEE CIVIL SPECIFICATIONS
	EMERGENCY CALL BOX	(7) D-7
	SITE BENCH	(5) D-7
	BICYCLE RACK	(6) D-7
	STATION PILLAR	(11) D-8
	DESTINATION SIGN	(9) D-8
	IDENTIFICATION SIGN	(8) D-8

SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS, FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.

SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.

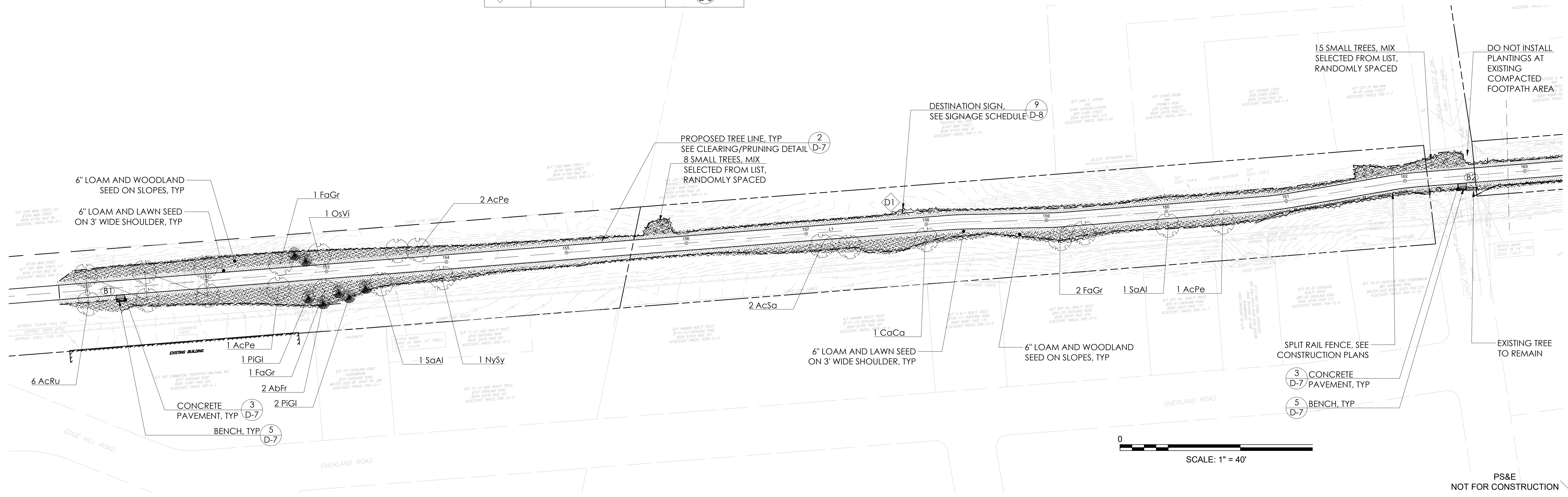
SEE DETAILS-9 FOR PLANT LISTS.

SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES

**SITE AMENITIES LAYOUT NOTES:**

- CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
- ALL SITE AMENITIES SHALL BE 3' MIN TO EDGE OF TRAIL, TYP.
- ALL SITE FURNISHINGS, SIGNS AND POSTS SHALL BE ORIENTED PERPENDICULAR TO TRAIL, UNLESS OTHERWISE DIRECTED BY OWNER'S REPRESENTATIVE.
- ALL SITE FURNISHINGS SHALL BE PLACED 6" FROM EDGE OF CONCRETE PAD UNLESS OTHERWISE DIRECTED BY OWNER'S REPRESENTATIVE.
- ALL POST LOCATIONS AND ORIENTATION SHALL BE CONFIRMED IN THE FIELD BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- ALL SIGNS SHALL PROVIDE VERTICAL CLEARANCES TO MEET ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES. SIGN LOCATIONS AND ORIENTATION SHALL BE CONFIRMED IN THE FIELD BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- ALL AT ALL LOCATIONS WHERE EXISTING PAVING ABOUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
- WHERE NEW PAVING MEETS EXISTING PAVING, SMOOTHLY BLEND LINE OF EXISTING WITH NEW.
- CONTRACTOR SHALL CONFIRM EXTENT OF NEW CONCRETE SIDEWALK BASED ON PROPOSED GRADES, SEE CONSTRUCTION PLANS.
- FOR CURB RAMPS, SEE CONSTRUCTION PLANS.

CITY OF WALTHAM WAYSIDE TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	34	114
PROJECT FILE NO.		17112.00	
LANDSCAPE PLAN - 1			



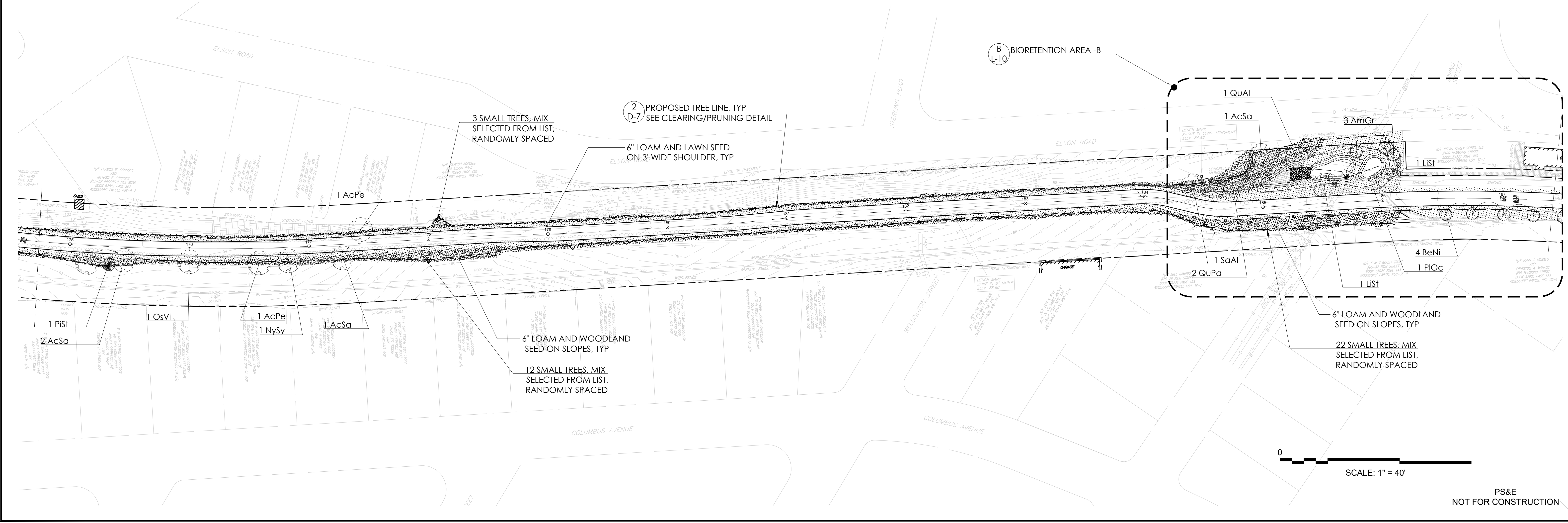
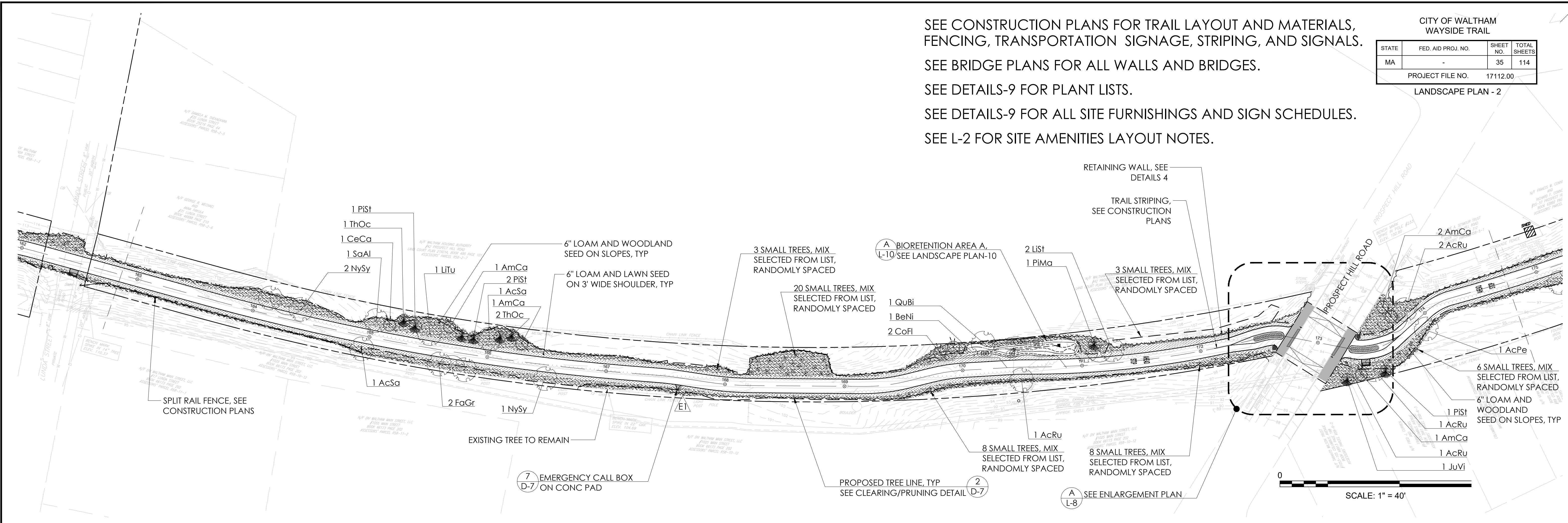
PS&E  
NOT FOR CONSTRUCTION

SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS,  
 FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.  
 SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.  
 SEE DETAILS-9 FOR PLANT LISTS.  
 SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.  
 SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.

CITY OF WALTHAM  
 WAYSIDE TRAIL

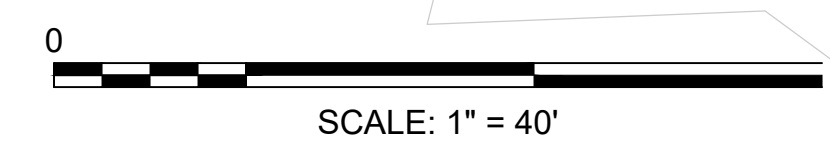
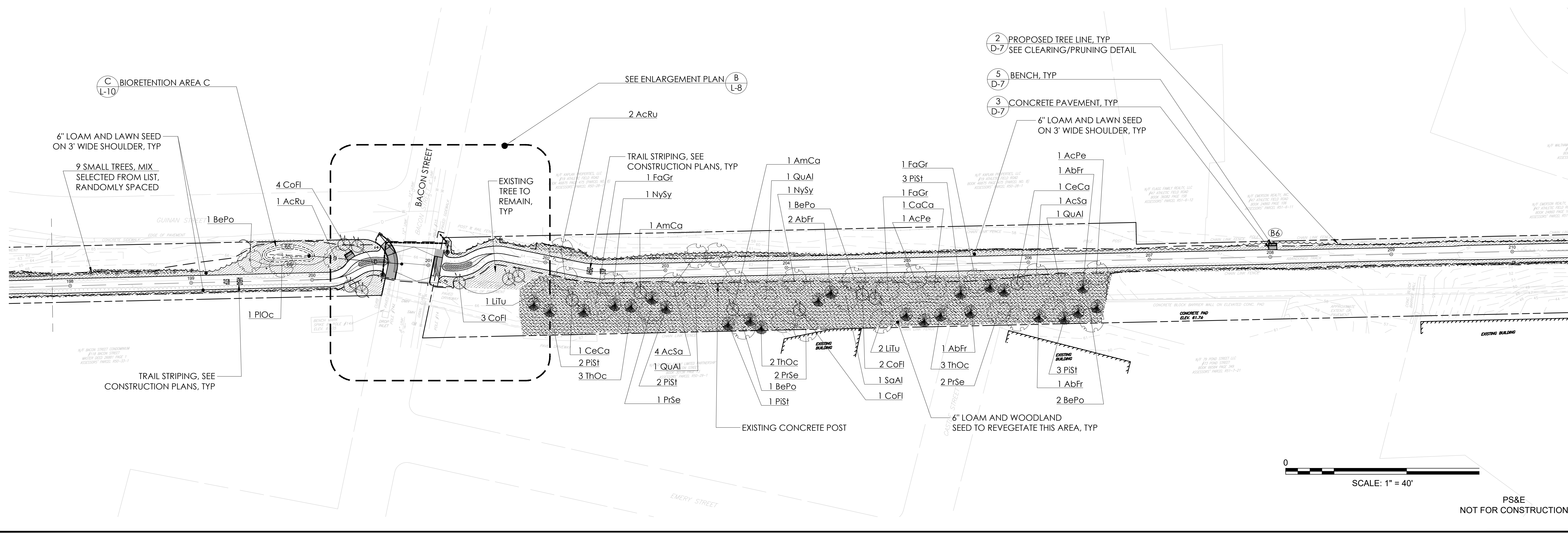
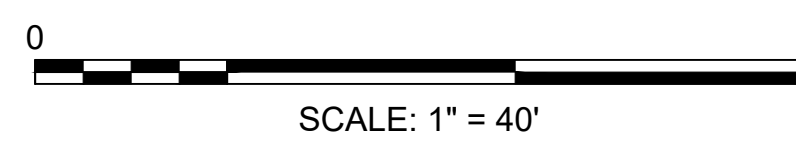
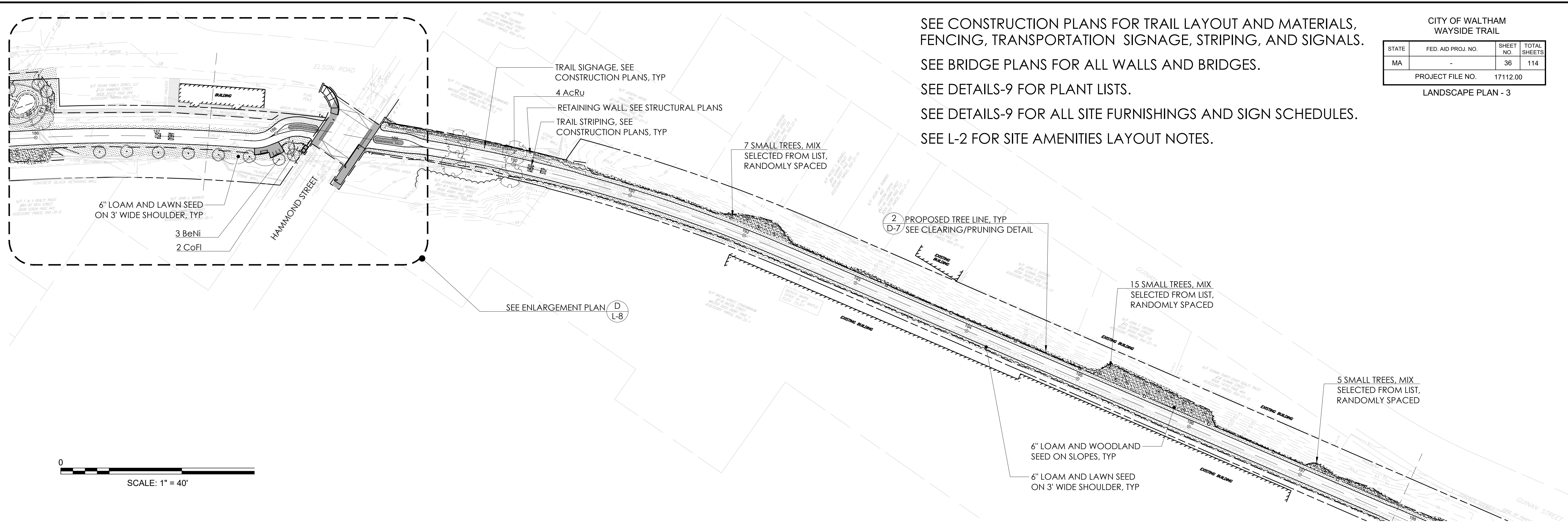
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	114
PROJECT FILE NO. 17112.00			

LANDSCAPE PLAN - 2



STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	114
PROJECT FILE NO. 17112.00		LANDSCAPE PLAN - 3	

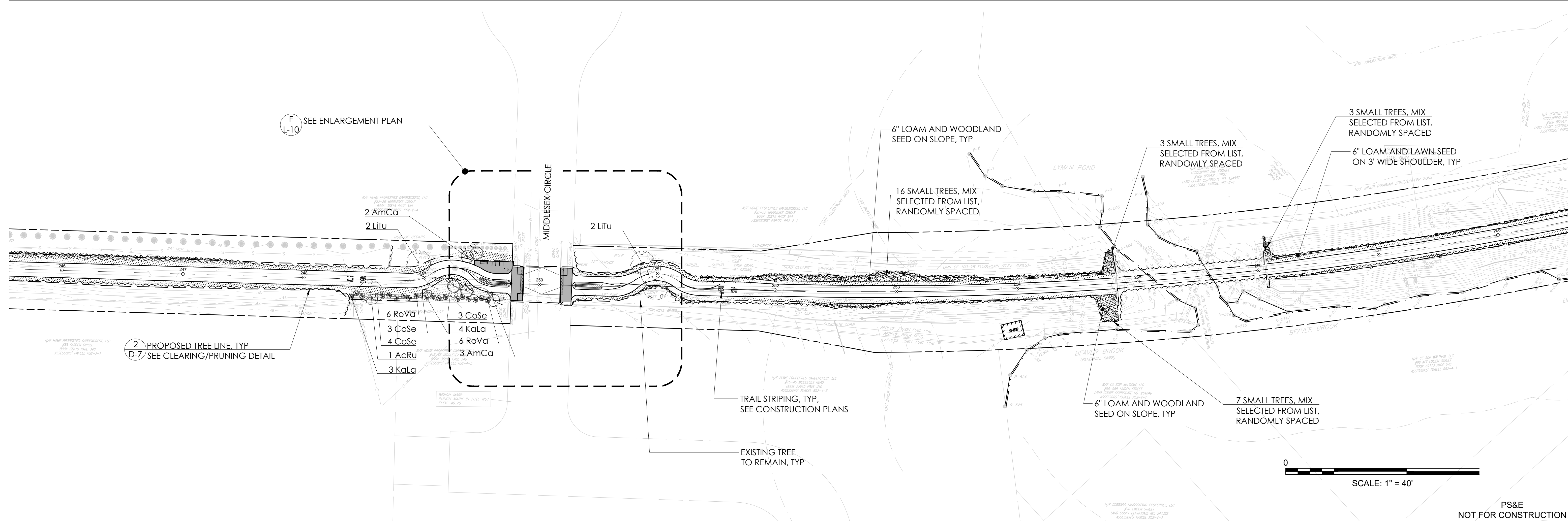
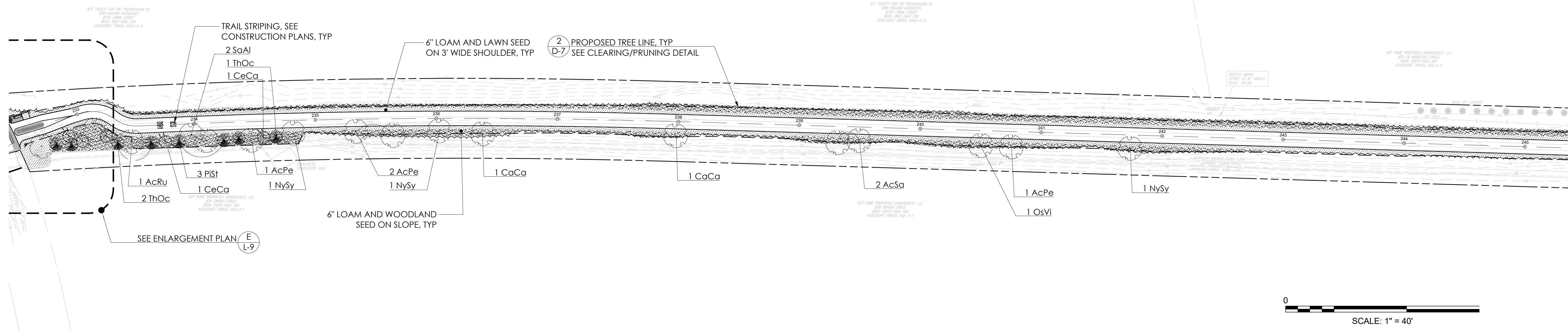
SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS,  
FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.  
SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.  
SEE DETAILS-9 FOR PLANT LISTS.  
SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.  
SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.





SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS, FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.  
 SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.  
 SEE DETAILS-9 FOR PLANT LISTS.  
 SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.  
 SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.

CITY OF WALTHAM WAYSIDE TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	38	114
PROJECT FILE NO. 17112.00			
LANDSCAPE PLAN - 5			



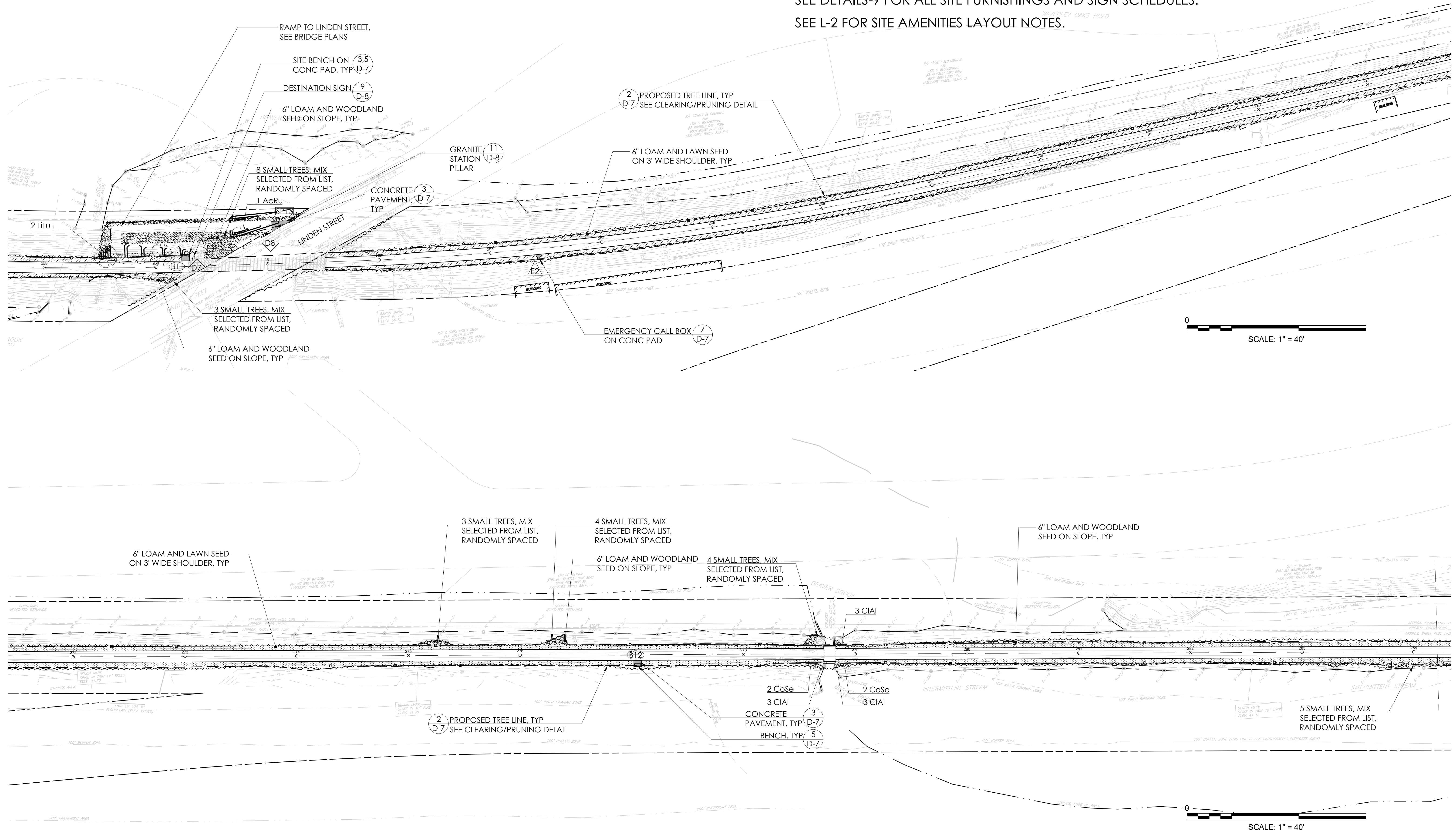
PS&E  
 NOT FOR CONSTRUCTION

SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS,  
 FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.  
 SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.  
 SEE DETAILS-9 FOR PLANT LISTS.  
 SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.  
 SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.

CITY OF WALTHAM  
 WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	39	114
PROJECT FILE NO.		17112.00	

LANDSCAPE PLAN - 6



PS&E  
 NOT FOR CONSTRUCTION

CITY OF WALTHAM  
WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	40	114
PROJECT FILE NO.		17112.00	

LANDSCAPE PLAN - 7

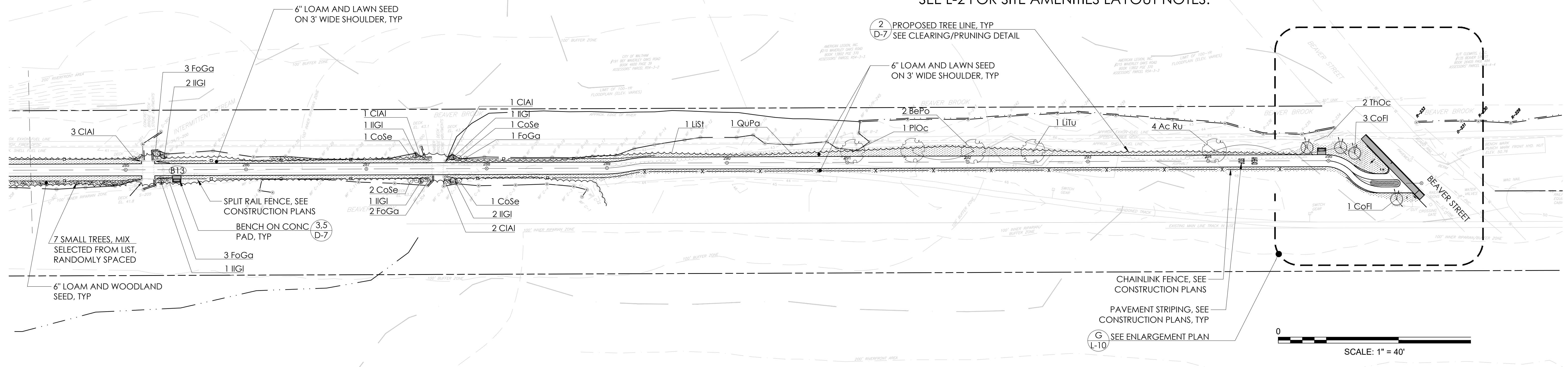
SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS,  
FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.

SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.

SEE DETAILS-9 FOR PLANT LISTS.

SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.

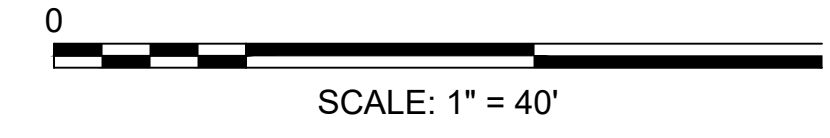
SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.



CHAINLINK FENCE, SEE  
CONSTRUCTION PLANS

PAVEMENT STRIPING, SEE  
CONSTRUCTION PLANS, TYP

SEE ENLARGEMENT PLAN





SEE LANDSCAPE PLAN 1-7 FOR CORRESPONDING PLANTING, TYP.

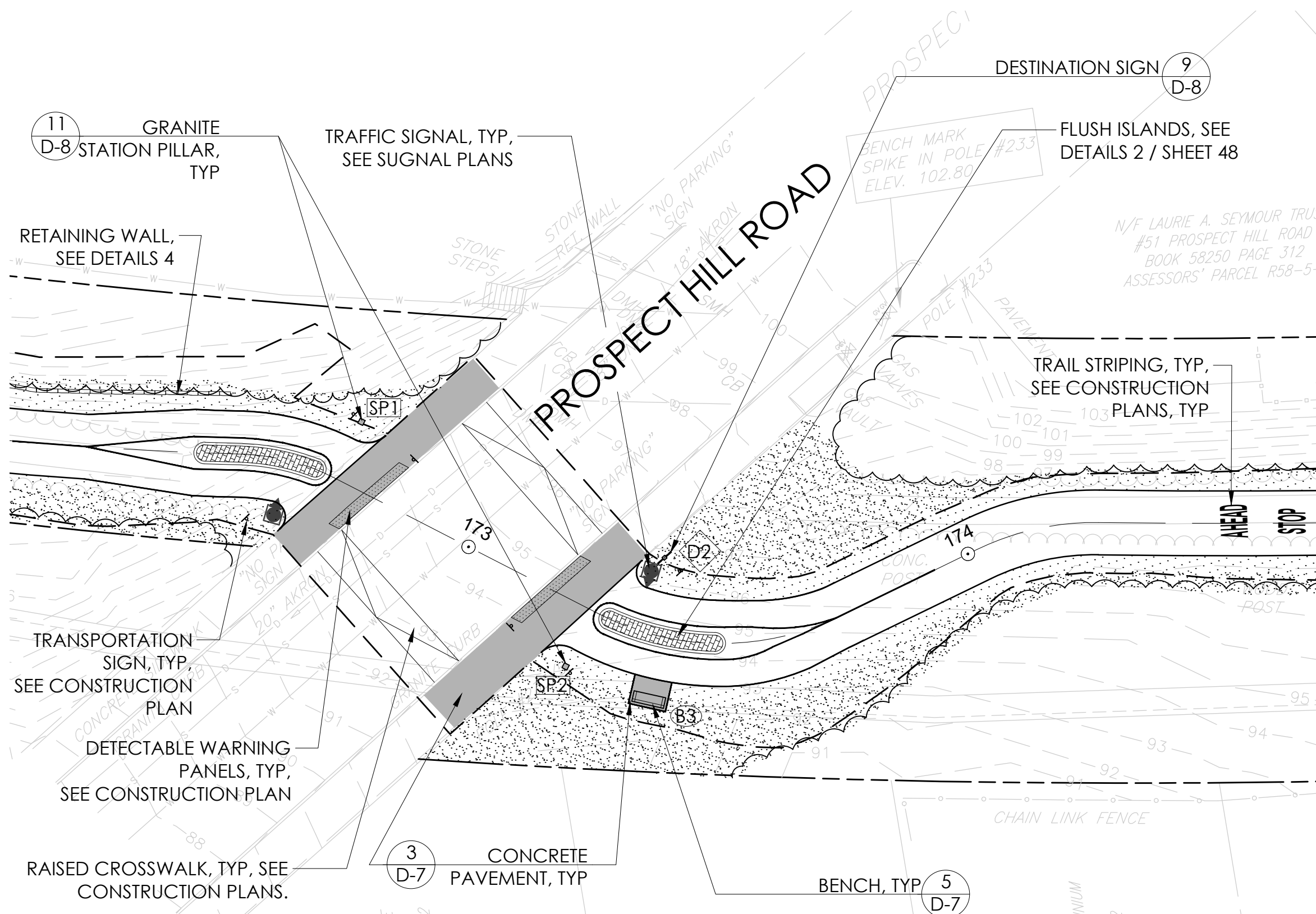


KEY PLAN 1"=2000'-0"

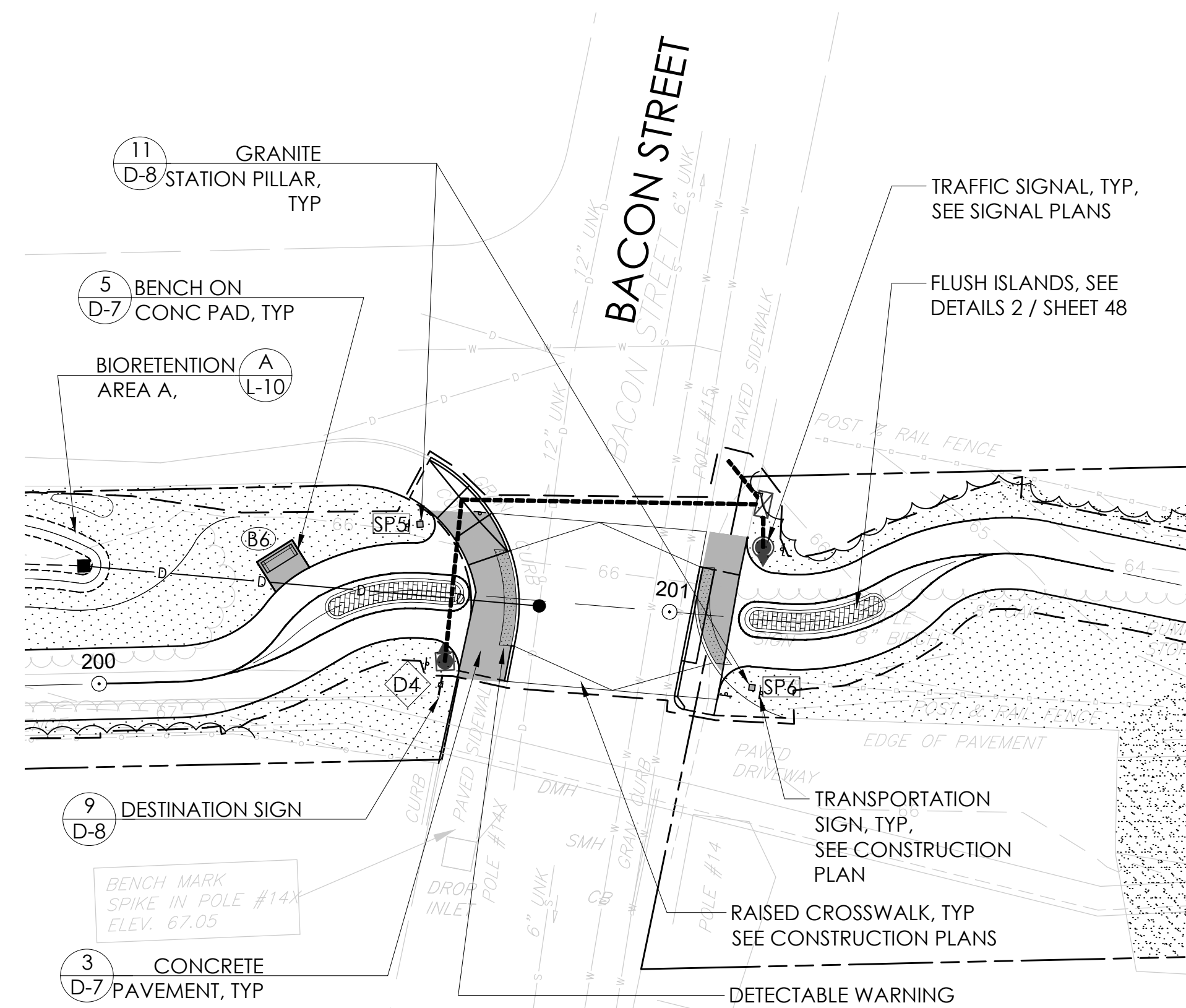
CITY OF WALTHAM WAYSIDE TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	41	114
PROJECT FILE NO. 17112.00			

LANDSCAPE PLAN - 8

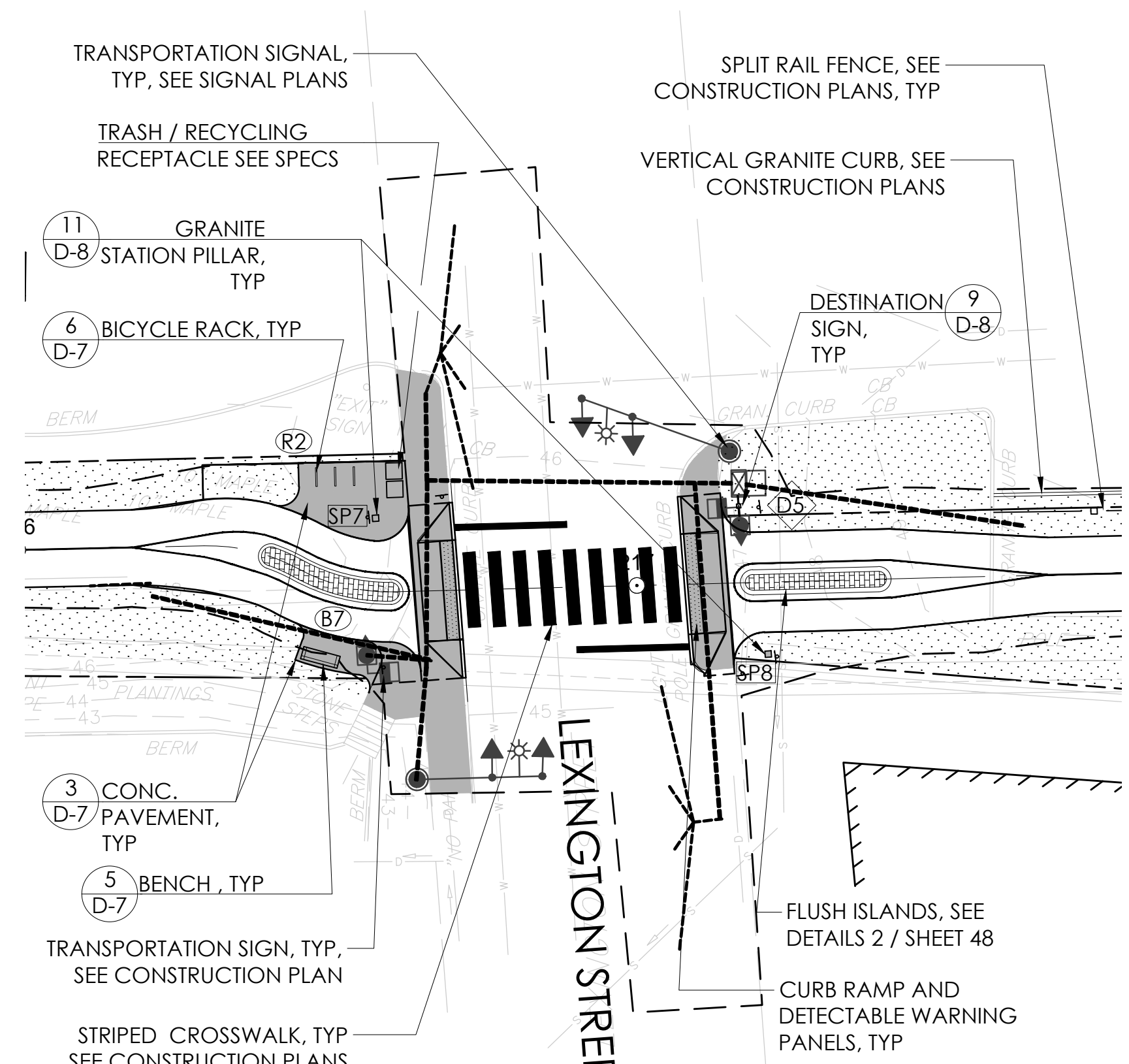
20  
SCALE: 1" = 20'



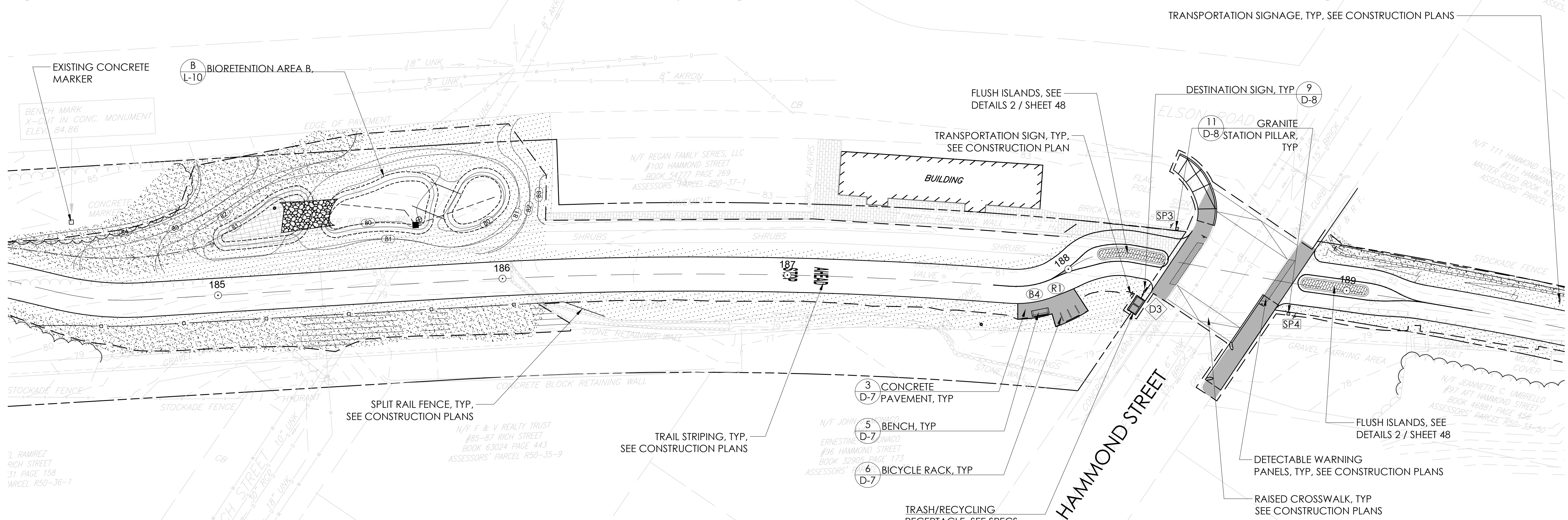
A PROSPECT HILL ROAD CROSSING



B BACON STREET ROAD CROSSING



C LEXINGTON STREET ROAD CROSSING



D HAMMOND STREET ROAD CROSSING

SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS, FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.

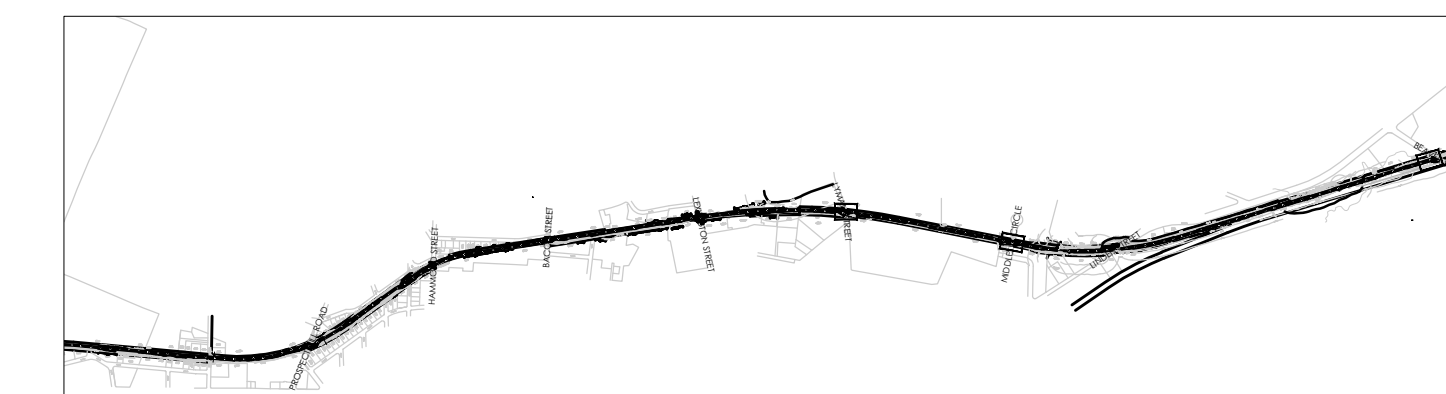
SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.

SEE DETAILS-9 FOR PLANT LISTS.

SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.

SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	42	114
PROJECT FILE NO.		17112.00	



KEY PLAN 1"=2000'-0"

SEE LANDSCAPE PLAN 1-7 FOR CORRESPONDING PLANTING, TYP.

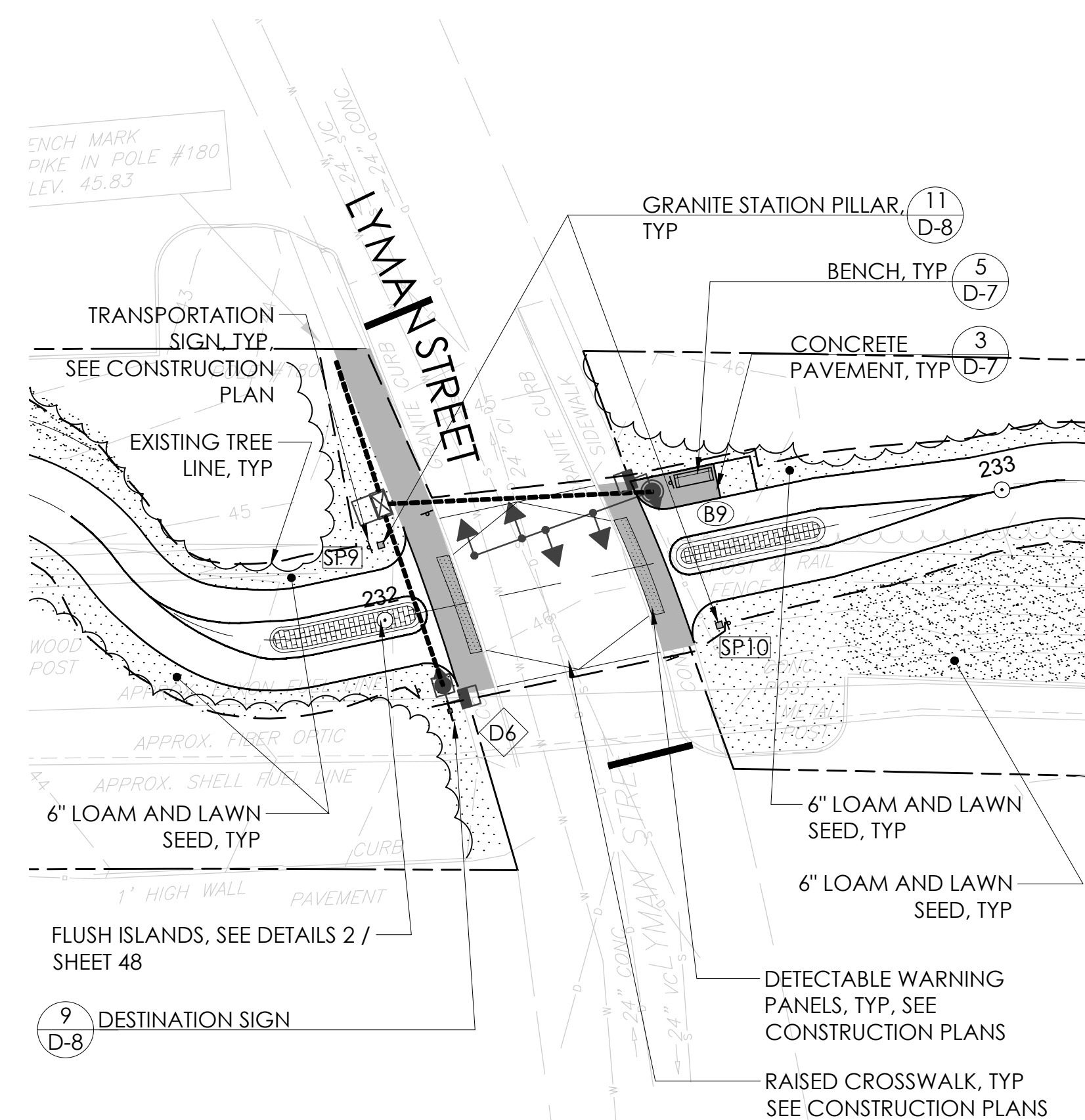
SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS, FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.

SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.

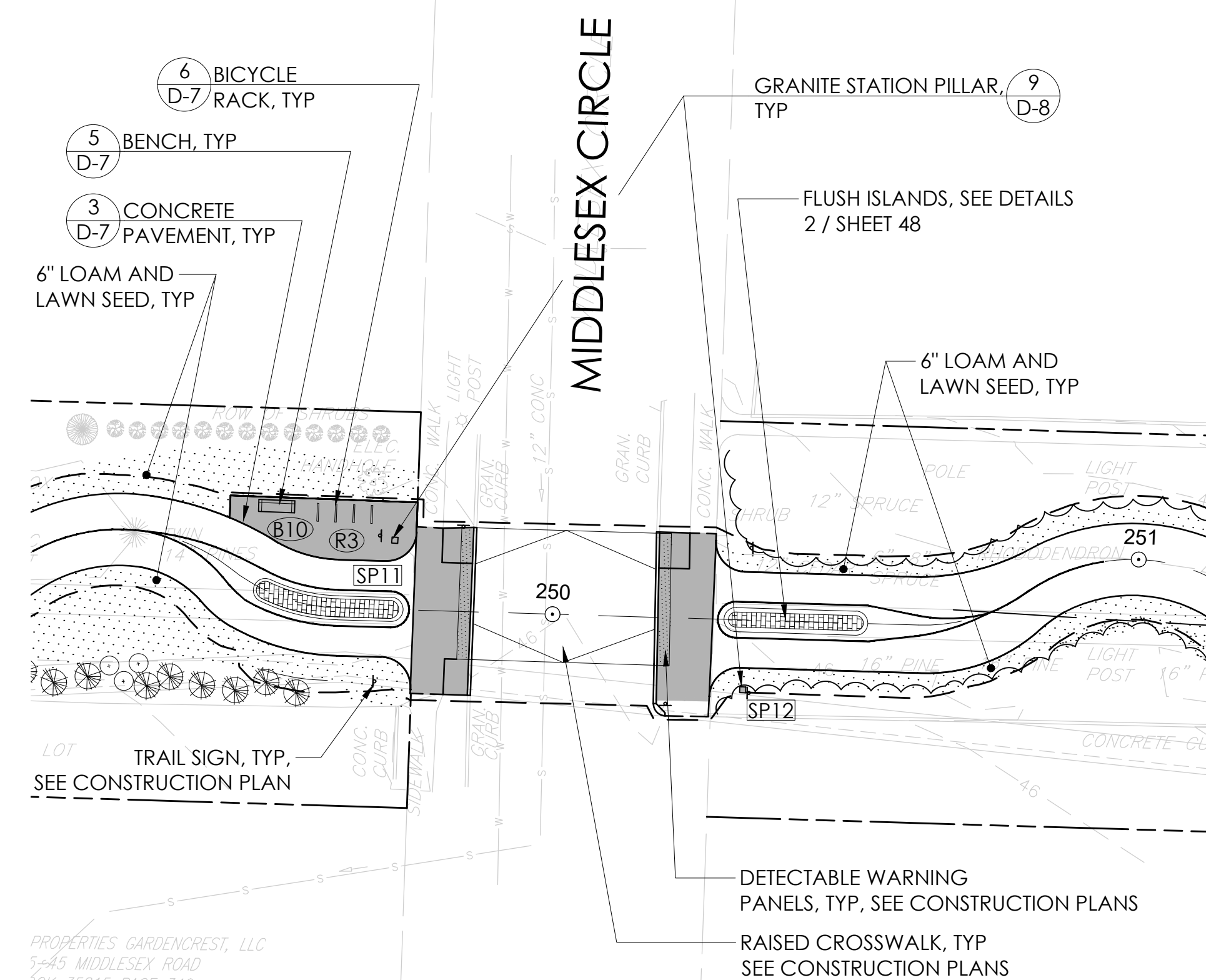
SEE DETAILS-9 FOR PLANT LISTS.

SEE DETAILS-9 FOR ALL SITE FURNISHINGS AND SIGN SCHEDULES.

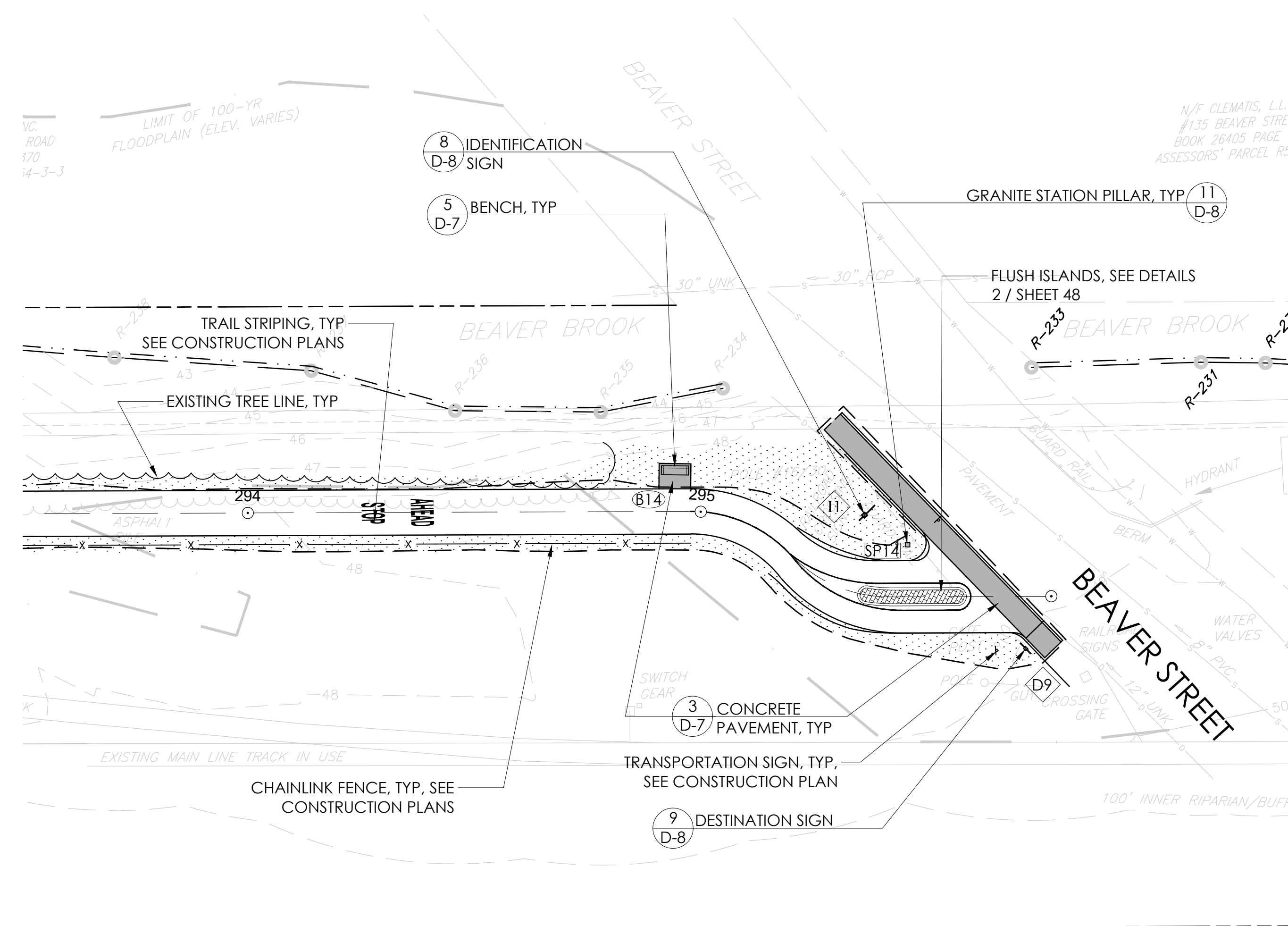
SEE L-2 FOR SITE AMENITIES LAYOUT NOTES.



E LYMAN STREET ROAD CROSSING



F MIDDLESEX CIRCLE ROAD CROSSING

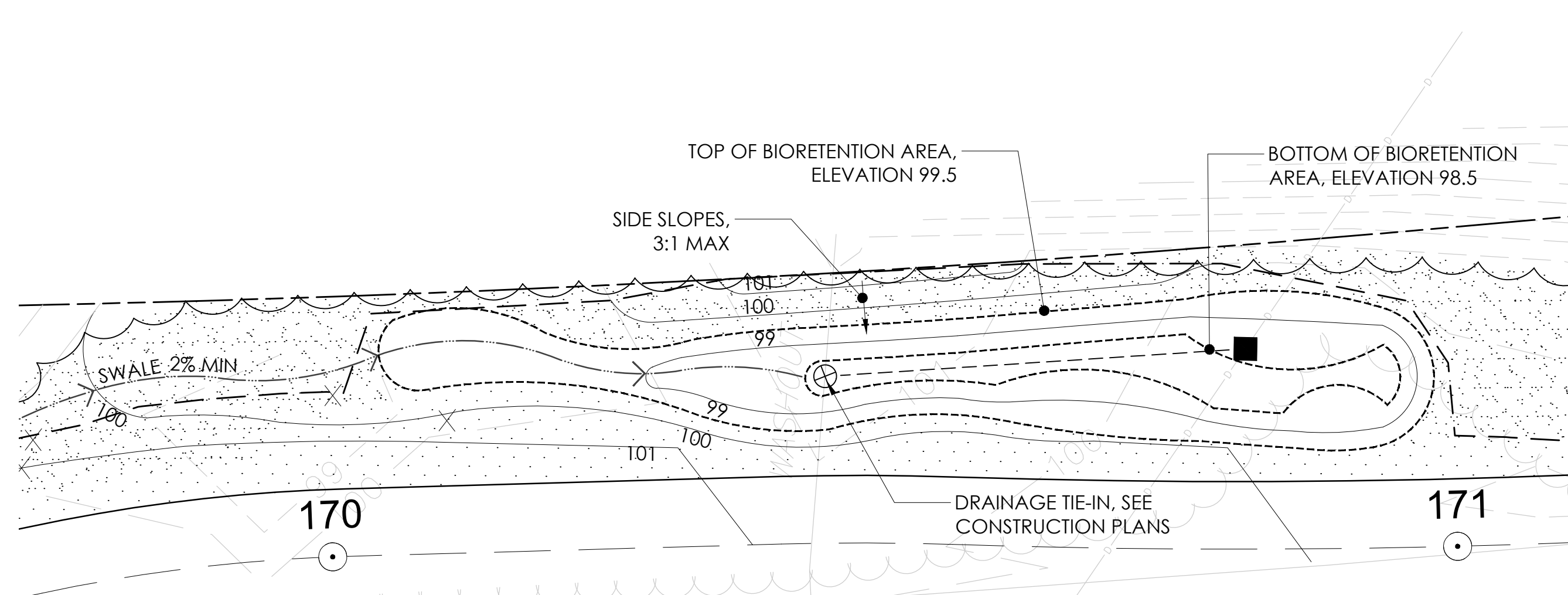


G BEAVER STREET ROAD CROSSING

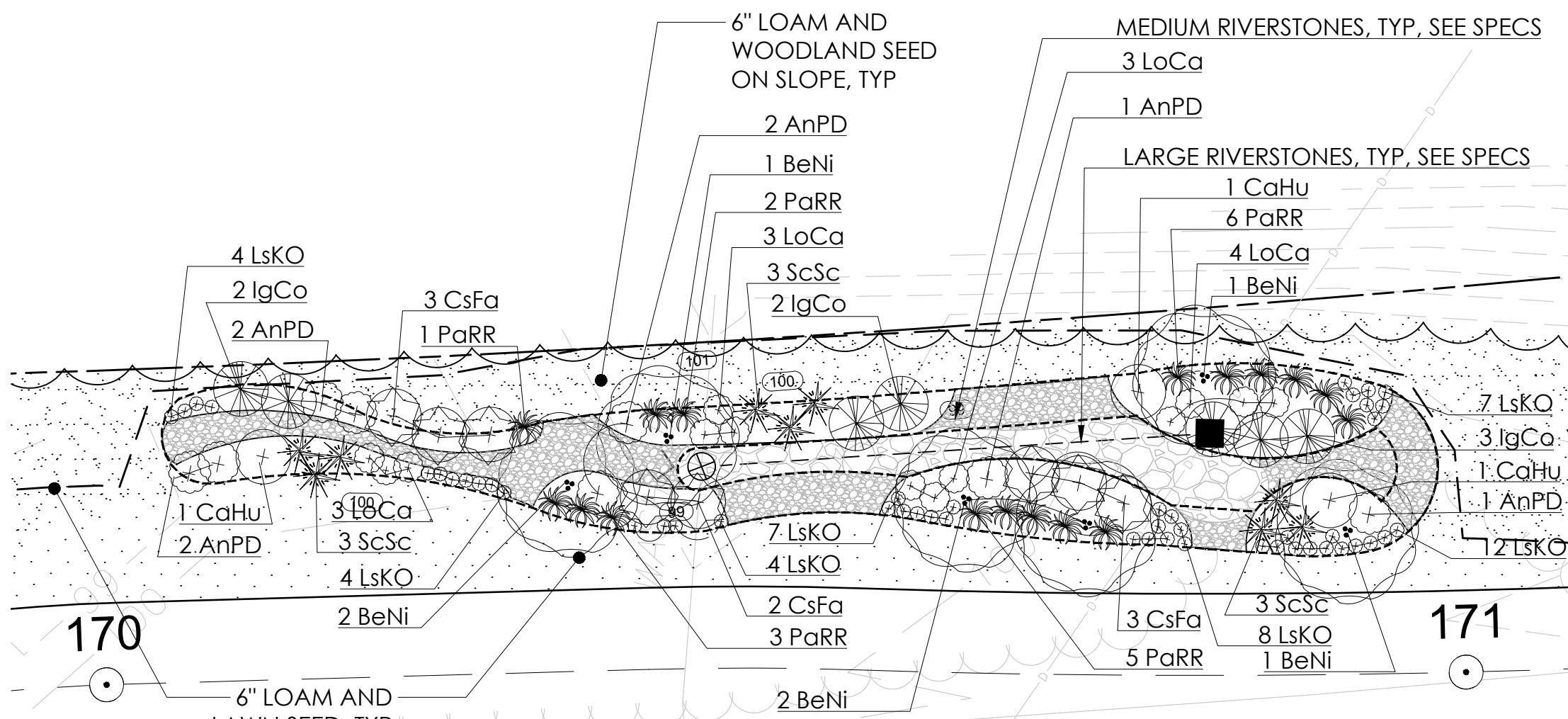


SCALE: 1" = 20'

PS&E  
NOT FOR CONSTRUCTION



**A** BIORETENTION AREA A - GRADING PLAN  
SCALE: 1"=10'-0"

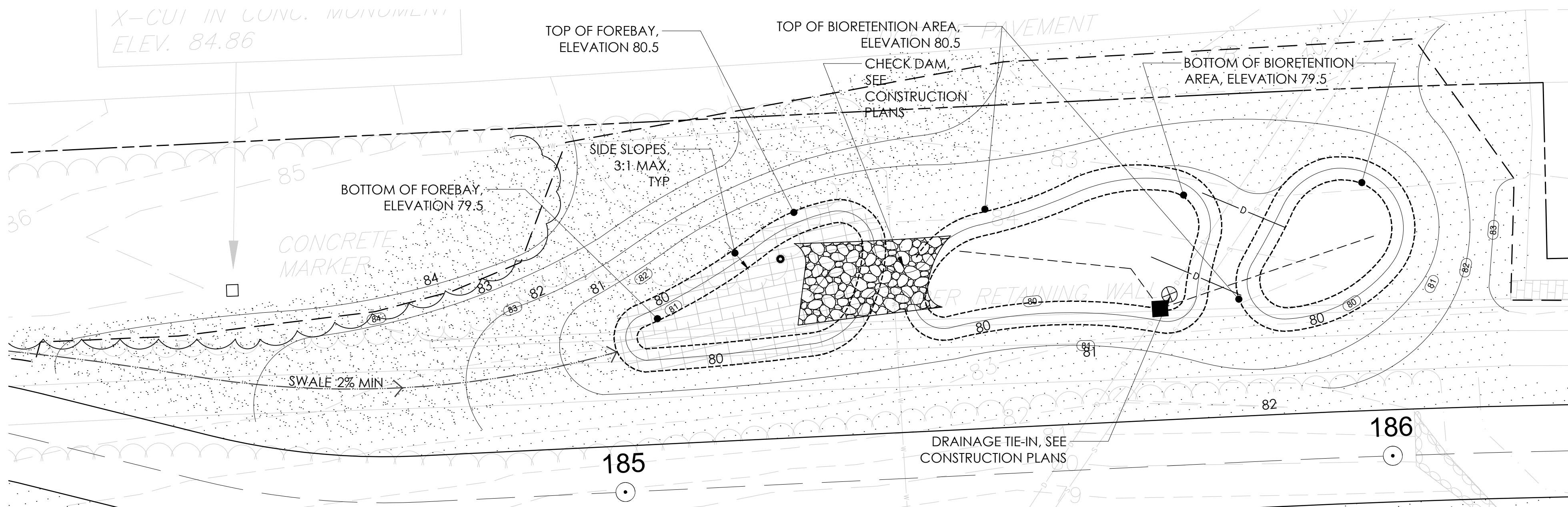


BIORETENTION AREA A - PLANTING PLAN

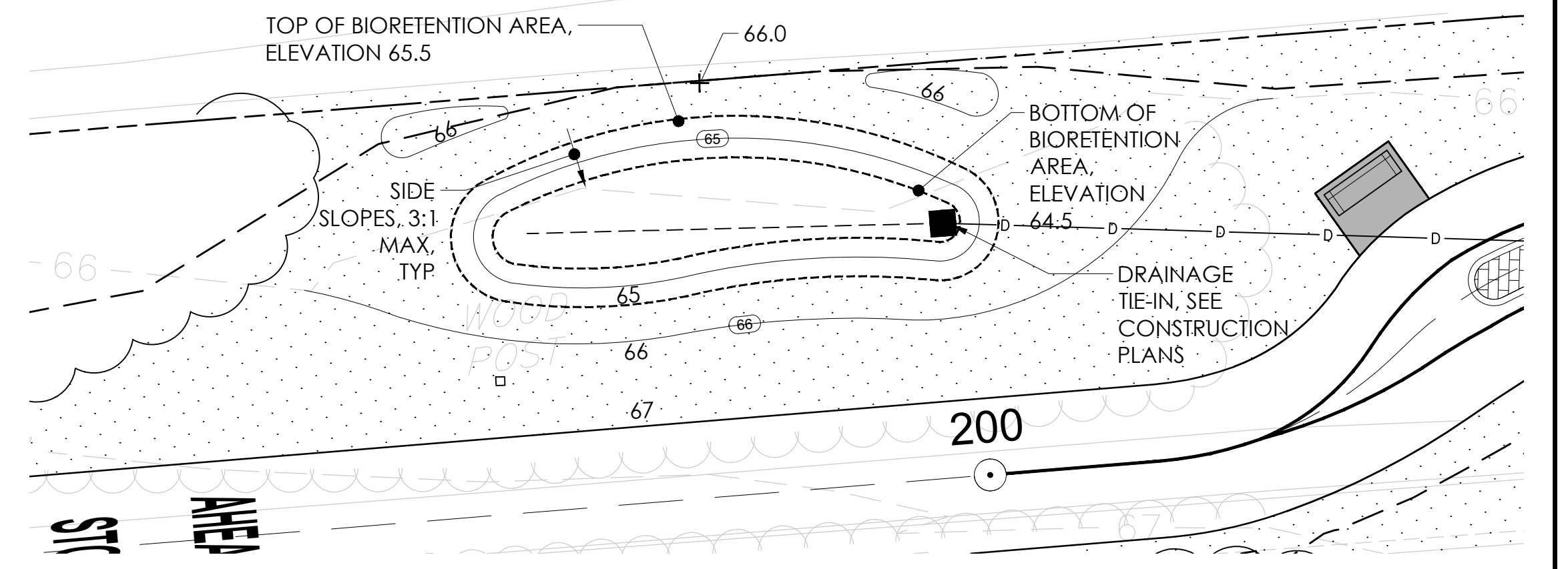
CITY/TOWN			
STREET/PROJECT NAME			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	43	114
PROJECT FILE NO. 17112.00		LANDSCAPE PLAN - 10	

SCALE: 1" = 10'

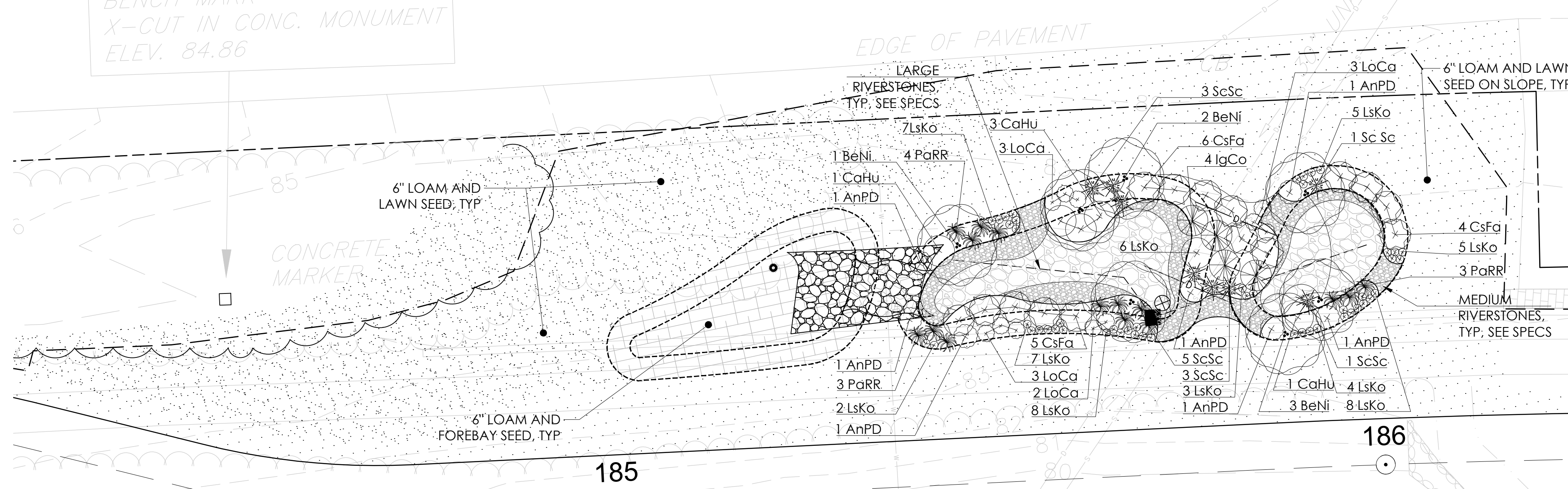
SEE CONSTRUCTION DETAILS FOR FOREBAY AND BIORETENTION AREAS.  
SEE CONSTRUCTION PLANS FOR TRAIL LAYOUT AND MATERIALS, FENCING, TRANSPORTATION SIGNAGE, STRIPING, AND SIGNALS.  
SEE BRIDGE PLANS FOR ALL WALLS AND BRIDGES.  
SEE DETAILS-9 FOR PLANT LISTS.



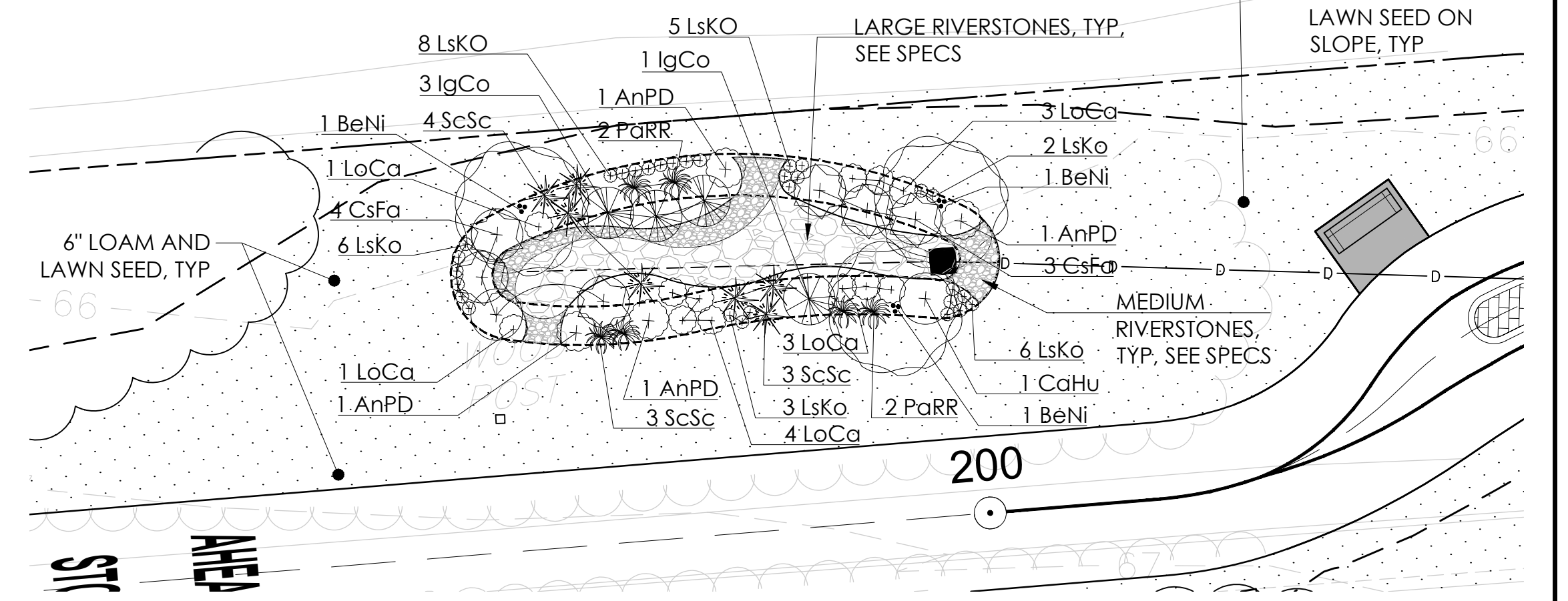
**B** BIORETENTION AREA B - GRADING PLAN  
SCALE: 1"=10'-0"



**C** BIORETENTION AREA C - GRADING PLAN  
SCALE: 1"=10'-0"



**B** BIORETENTION AREA B - PLANTING PLAN  
SCALE: 1"=10'-0"

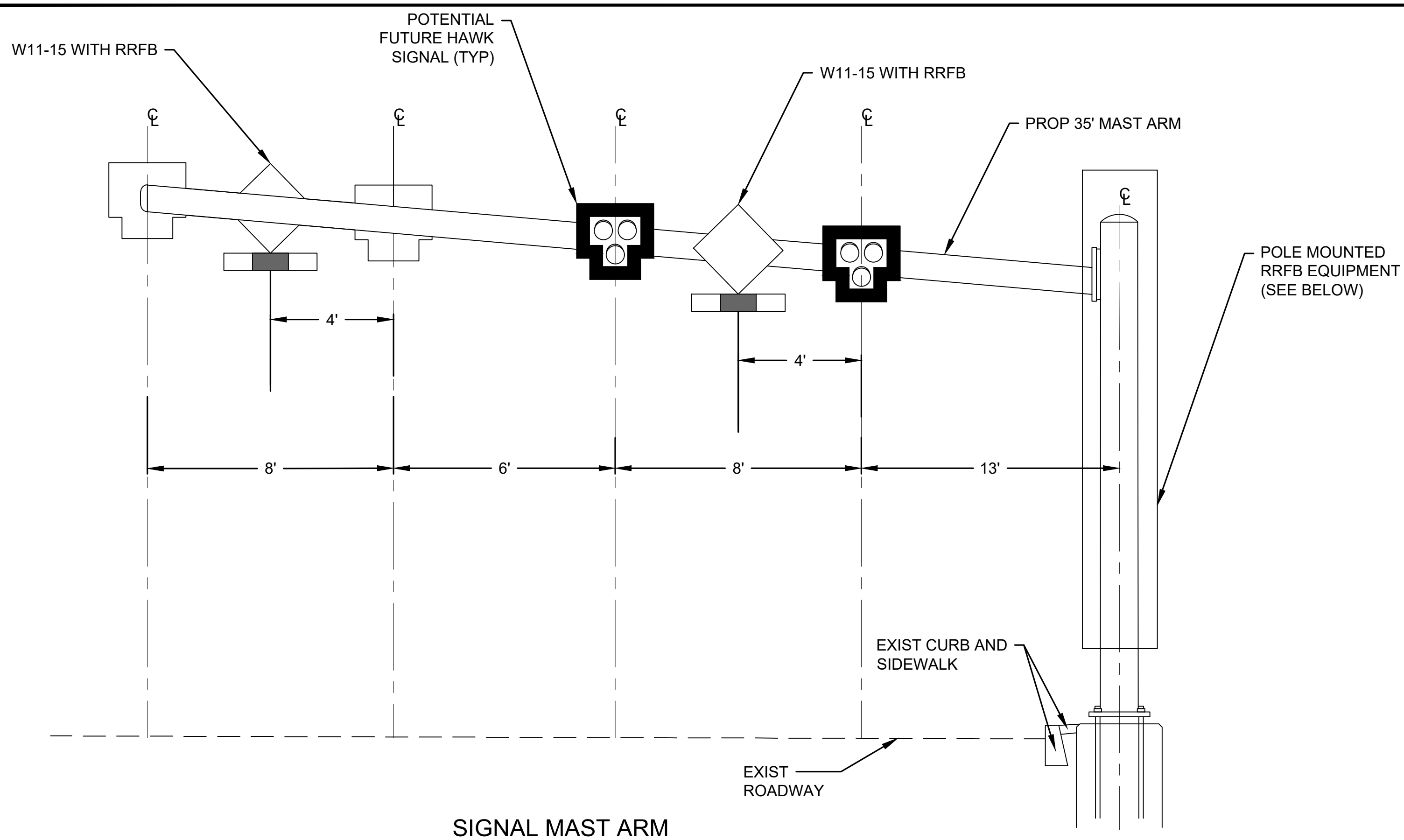


**C** BIORETENTION AREA C - PLANTING PLAN  
SCALE: 1"=10'-0"

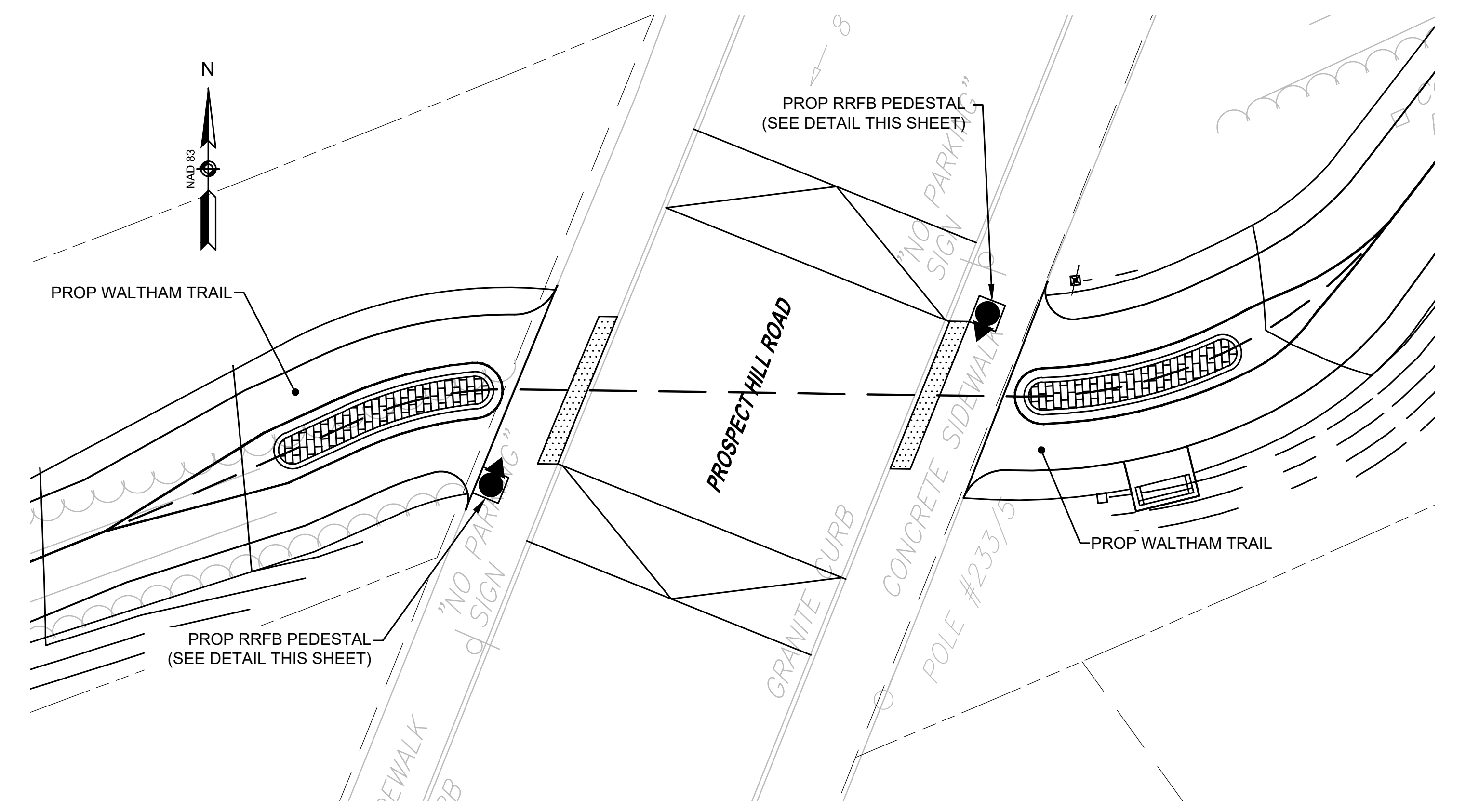
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	44	114
PROJECT FILE NO.		17112.00	

**SIGNAL PLAN - 1**



**SIGNAL MAST ARM**



**PROSPECT HILL ROAD**  
SCALE: 1"=10'

**CONSTRUCTION NOTES:**

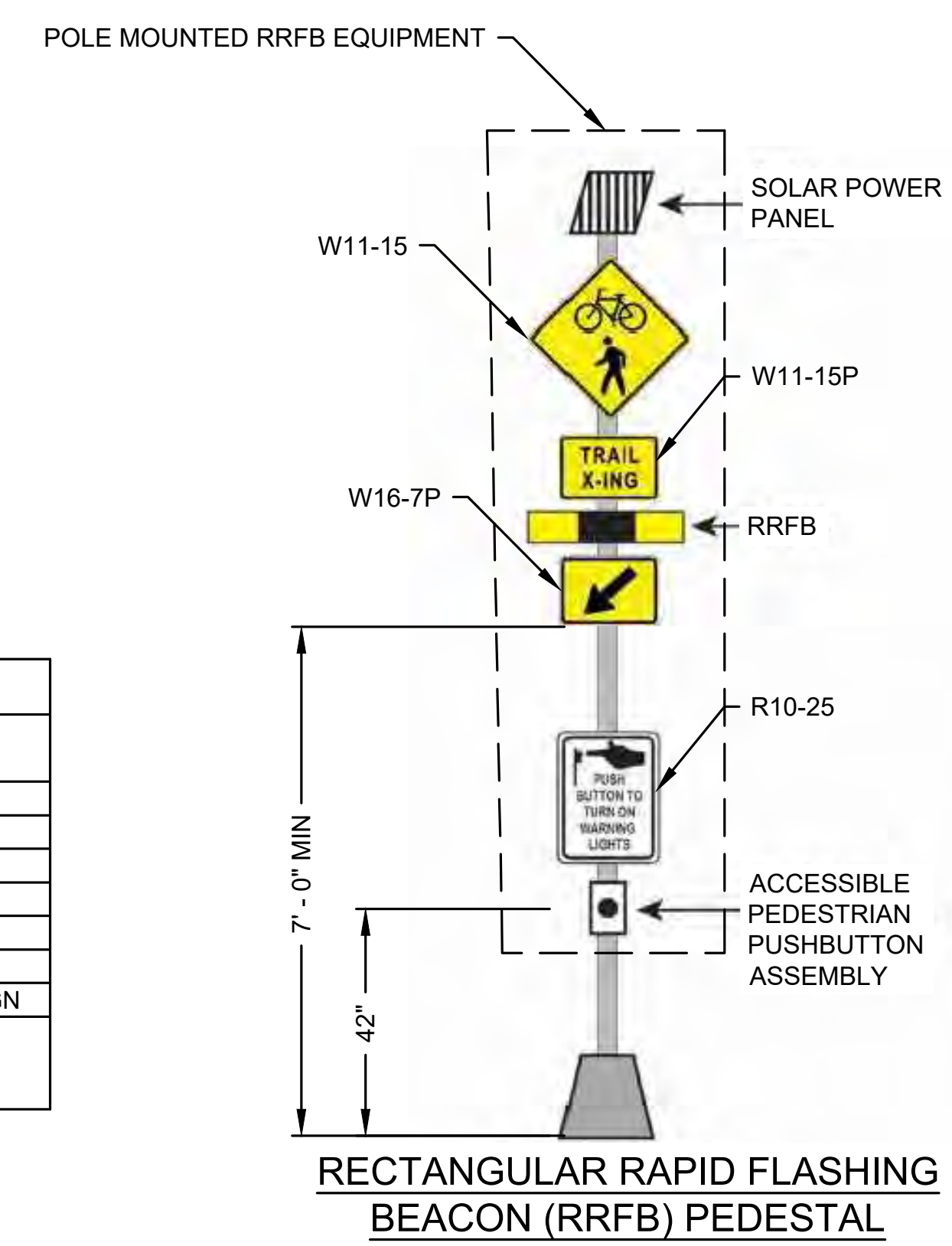
1. TRAFFIC SIGNAL WORK SHALL BE IN ACCORDANCE WITH THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES SECTION 800 - TRAFFIC CONTROL DEVICES.
2. THE CONTRACTOR SHALL MAINTAIN ROADWAY ACCESS AT ALL TIMES.
3. PEDESTRIAN SIGNALS SHALL BE EQUIPPED WITH ACCESSIBLE PEDESTRIAN PUSHBUTTONS WITH LOCATOR TONES IN ACCORDANCE WITH SECTION 4E.12 OF THE MUTCD 2009 EDITION. THE MESSAGE SHALL SAY "YELLOW LIGHTS ARE FLASHING."
4. SIGN (R10-25) AND PUSHBUTTON SHALL BE INSTALLED SO THAT THE FACE OF THE BUTTON IS PARALLEL TO THE CROSSWALK BEING USED.
5. MAST ARM MOUNTED SIGNS SHALL HAVE A MOUNTING BRACKET MOUNTED SECURELY WITH STAINLESS STEEL BANDS. THE MOUNTING BRACKET MUST BE ADJUSTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC. THE MOUNTING SHALL HOLD THE SIGN RIGIDLY IN PLACE AND RESIST MOVEMENT IN ALL DIRECTIONS.
6. THE MAST ARM SHALL BE DESIGNED BY THE CONTRACTOR. FOR LOADING, THE CONTRACTOR SHALL ACCOUNT FOR THE POTENTIAL FUTURE MOUNTING OF ALL HAWK SIGNALS IN ADDITION TO THE PROPOSED SIGNS.

**LEGEND:**

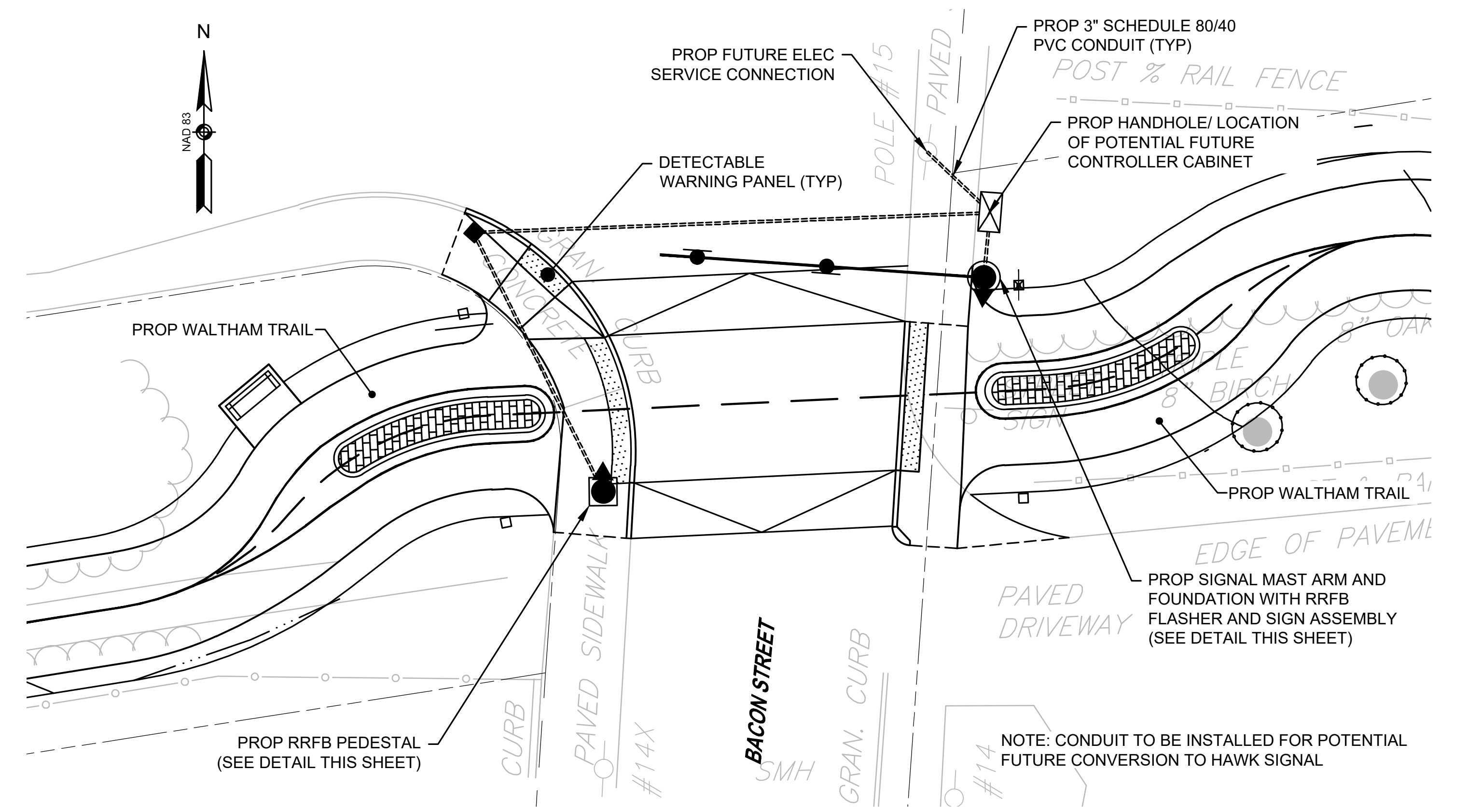
- ▼ PUSHBUTTON WITH LOCATOR TONE
- SIGNAL FOUNDATION
- PULL BOX
- ==== CONDUIT
- PEDESTAL FOUNDATION

MAJOR ITEMS REQUIRED		
QUANTITY	PHR   BS	DESCRIPTION
1		35 FOOT GALV. STEEL MAST ARM TRAFFIC SIGNAL POST AND FOUNDATION
2		PEDESTAL FOUNDATION
2		SIGNAL POST AND BASE STANDARD - 15 FOOT
2		SOLAR POWERED RRFB
55		3 INCH SCHEDULE 80 ELECTRICAL CONDUIT (UNDER ROADWAY)
45		3 INCH SCHEDULE 40 ELECTRICAL CONDUIT (UNDERGROUND)
2		ACCESSIBLE PEDESTRIAN SIGNAL PUSH BUTTON DETECTOR WITH R10-25 SIGN PLUS ALL MOUNTING HARDWARE, EQUIPMENT, LABOR, AND MATERIALS NECESSARY TO COMPLETE THE INSTALLATION OF A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL

NOTE: PHR = PROSPECT HILL ROAD; BS = BACON STREET



**RECTANGULAR RAPID FLASHING BEACON (RRFB) PEDESTAL**



**BACON STREET**  
SCALE: 1"=10'

NOTE: CONDUIT TO BE INSTALLED FOR POTENTIAL FUTURE CONVERSION TO HAWK SIGNAL

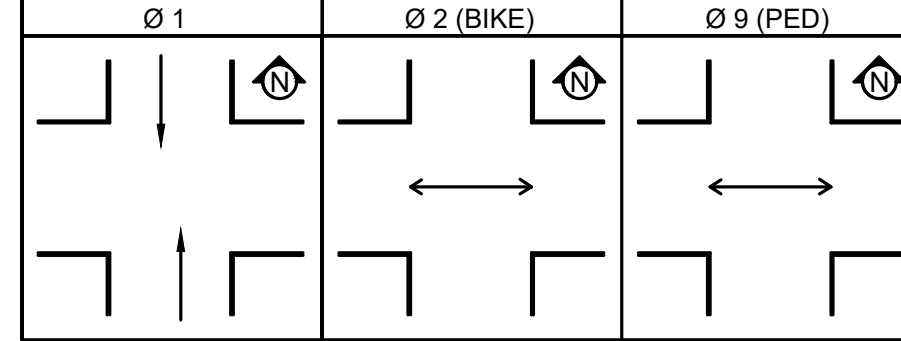
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	45	114
PROJECT FILE NO.		17112.00	

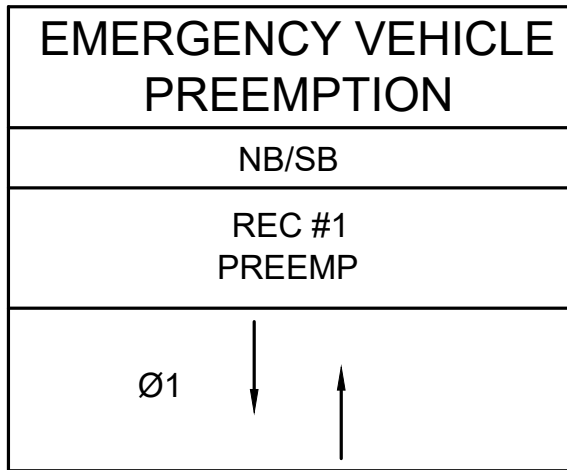
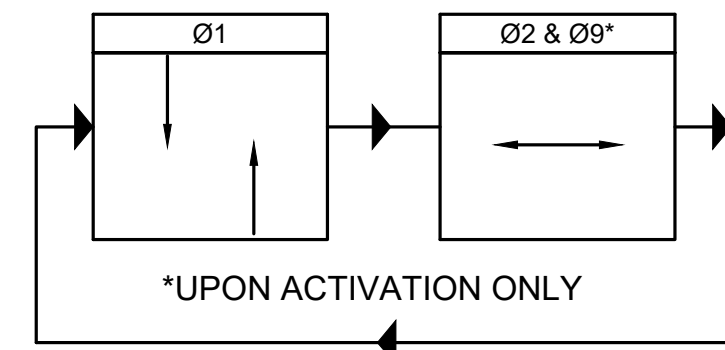
**SIGNAL PLAN - 2**

SIGNAL SEQUENCE AND TIMING									
APPROACH	DIRECTION	HOUSING	PHASE 1		PHASE 2		PHASE 9		FLASHING OPERATION
MINIMUM INTERVAL			12		12				
VEHICLE EXTENSION			3		3				
MAXIMUM 1			32.5		18				
MAXIMUM 2									
YELLOW CLEARANCE				3.5		3			
RED CLEARANCE					1		2		
PEDESTRIAN WALK CLEARANCE							9	11	3
LEXINGTON STREET	NB	A, B	G	Y	R	R	R	R	FR
LEXINGTON STREET	SB	C, D	G	Y	R	R	R	R	FR
WAYSIDE TRAIL	EB	E	R	R	R	G	Y	R	FR
WAYSIDE TRAIL	WB	F	R	R	R	G	Y	R	FR
PEDESTRIAN CROSSING	ALL	P1-P2	DW	DW	DW	DW	DW	W	FDW
DETECTOR			LOCK	NON - LOCK		NON - LOCK			
RECALL			MIN.	OFF		OFF			
			Ø 1	Ø 2 (BIKE)		Ø 9 (PED)			

NOTE:  
FLASHING OPERATIONS FOR CONFLICTING PHASES SHALL BE WIRED AND PROGRAMMED PER M.U.T.C.D.; PROGRAM FLASH SHALL NOT BE USED.



**PREFERENTIAL PHASE SEQUENCE**



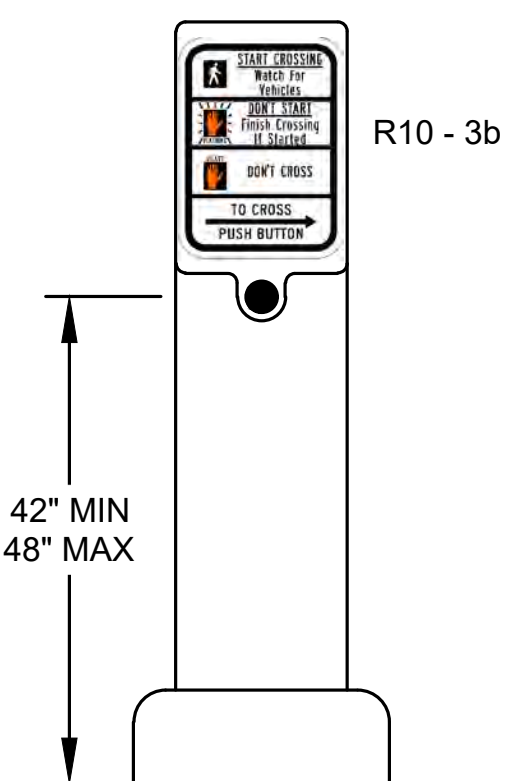
NOTE:  
CONTRACTOR SHALL ADJUST PREEMPTION RECEIVERS AND PREEMPTION TIMINGS AS REQUESTED BY THE CITY OF WALTHAM TO ALLOW FOR OPTIMAL RECEPTION OF THE PREEMPTION SIGNALS.

**EMERGENCY VEHICLE PREEMPTION OPERATION:**

- EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
- PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
- IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY AN OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED) OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
- PREEMPTION MINIMUM GREENS SHALL BE SIX SECONDS.
- NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
- ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT AND SHALL BE APPROVED BY THE CITY PRIOR TO OPERATION.

**CONSTRUCTION NOTES:**

- TRAFFIC SIGNAL WORK SHALL BE IN ACCORDANCE WITH THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES SECTION 800 - TRAFFIC CONTROL DEVICES.
- THE CONTRACTOR SHALL MAINTAIN ACCESS AT ALL TIMES.
- ALL TRAFFIC CONTROL SIGNAL EQUIPMENT USED SHALL BE ON THE MASSDOT TRAFFIC SIGNAL APPROVED PRODUCTS LIST.
- ALL RED, YELLOW, AND GREEN SIGNAL DISPLAYS SHALL BE EQUIPPED WITH LED MODULES.
- ALL TRAFFIC SIGNAL HEADS SHALL BE BLACK IN COLOR AND FURNISHED WITH LOUVERED BACK PLATES AND SIGNAL VISORS AS SHOWN. BACK PLATES SHALL BE EQUIPPED WITH A 3" YELLOW RETROREFLECTIVE STRIP IN ACCORDANCE WITH SECTION 4D.12 OF THE MUTCD 2009 EDITION.
- PEDESTRIAN SIGNALS SHALL BE EQUIPPED WITH ACCESSIBLE PEDESTRIAN PUSHBUTTONS WITH LOCATOR TONES IN ACCORDANCE WITH SECTION 4E.12 OF THE MUTCD 2009 EDITION.
- SIGN (R10-3b) AND PUSHBUTTON SHALL BE INSTALLED SO THAT THE FACE OF THE BUTTON IS PARALLEL TO THE CROSSWALK BEING USED.
- MAST ARM MOUNTED SIGNS SHALL HAVE A MOUNTING BRACKET MOUNTED SECURELY WITH STAINLESS STEEL BANDS. THE MOUNTING BRACKET MUST BE ADJUSTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC. THE MOUNTING SHALL HOLD THE SIGN RIGIDLY IN PLACE AND RESIST MOVEMENT IN ALL DIRECTIONS.



R10 - 3b

**SIGNAL HEAD DATA**

A, B, C, D	E, F	P1, P2
ALL 12" LENS	ALL 12" LENS	ONE SECTION

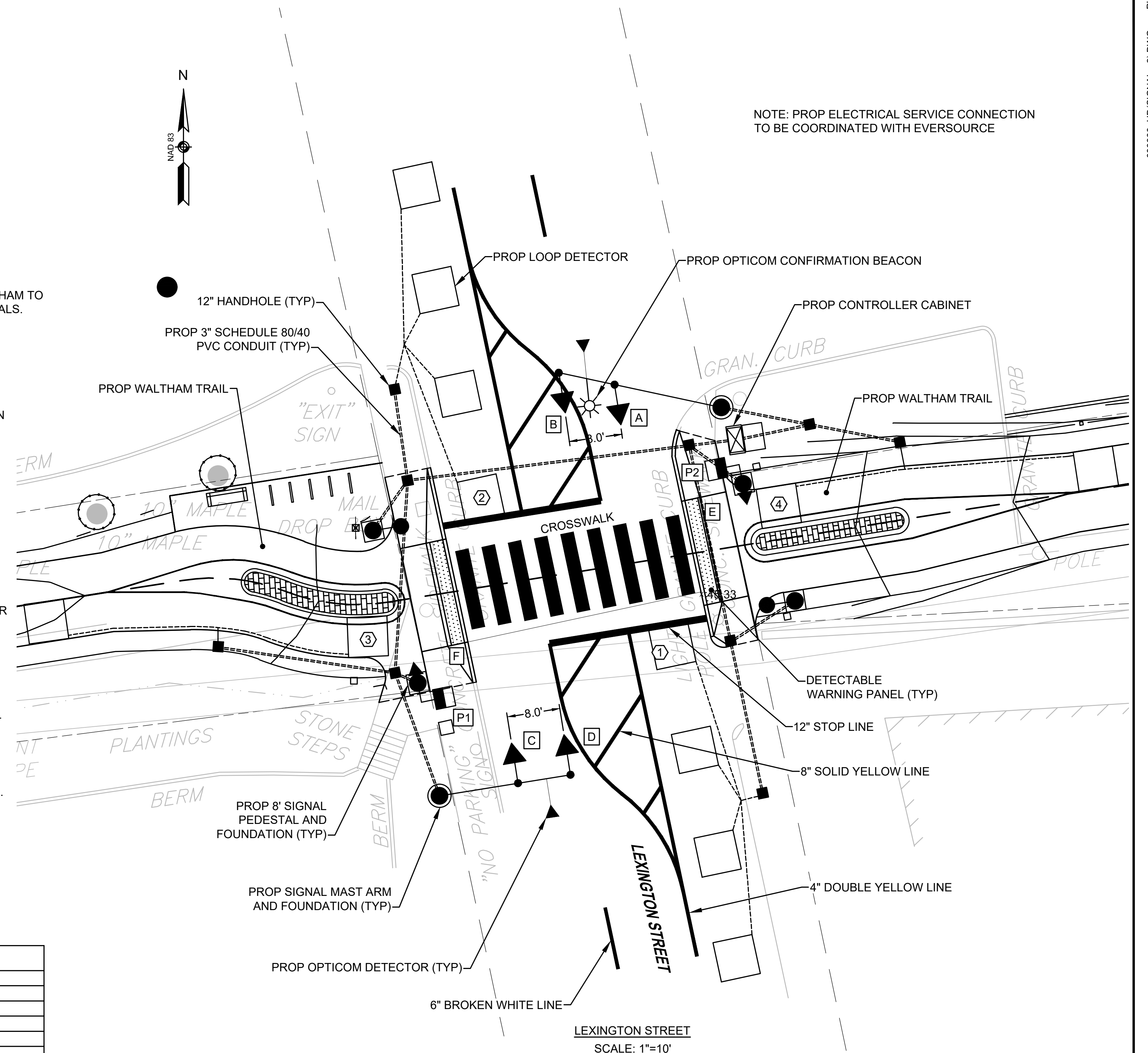
**LOOP DETECTOR DATA**

SEE PLAN SHEET LOOP DETECTOR DETAILS FOR LOOP CONSTRUCTION, SPLICING, DETAILS & NOTES. DELAY TIME EFFECTIVE ONLY DURING CALLED Ø RED. TIME IN SEC.

DETECTOR NUMBER	AMPLIFIER NUMBER	CHANNEL NUMBER	LOOP SIZE	Ø CALLED	DELAY TIME	EXT. TIME
1	1	2	6'x6'	1	3	3
2	1	2	6'x6'	1	3	3
3	1	2	6'x6'	2	3	3
4	1	2	6'x6'	2	3	3

**MAJOR ITEMS REQUIRED**

QUANTITY	DESCRIPTION
1	25 FOOT GALV. STEEL MAST ARM TRAFFIC SIGNAL POST AND FOUNDATION
1	20 FOOT GALV. STEEL MAST ARM TRAFFIC SIGNAL POST AND FOUNDATION
2	SIGNAL HEAD 1 WAY - 3 SECTION - BIKE WITH R10-10b
4	SIGNAL HEAD 1 WAY - 3 SECTION - VEHICLE
4	PEDESTAL FOUNDATION
2	SIGNAL POST AND BASE STANDARD - 8 FOOT
2	SIGNAL POST AND BASE STANDARD - 10 FOOT
2	OPTICOM DETECTOR
1	OPTICOM CONFIRMATION BEACON
43'	3 INCH SCHEDULE 80 ELECTRICAL CONDUIT (UNDER ROADWAY)
224'	3 INCH SCHEDULE 40 ELECTRICAL CONDUIT (UNDERGROUND)
9	PULL BOX 12" X 12"
12	WIRE LOOP (6' x 6')
1	TRAFFIC SIGNAL CABINET AND CONTROLLER
1	FOUR CHANNEL LOOP DETECTOR AMPLIFIER
1	OPTICOM PROCESSOR
1	SERVICE CONNECTION
2	ACCESSIBLE PEDESTRIAN SIGNAL PUSH BUTTON DETECTOR WITH R10-3b SIGN PLUS ALL WIRE, CABLE, MOUNTING HARDWARE, EQUIPMENT, LABOR, AND MATERIALS NECESSARY TO COMPLETE THE INSTALLATION OF A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL



**LEGEND:**

- VEHICLE SIGNAL HEAD
- BICYCLE SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- PUSHBUTTON WITH LOCATOR TONE
- SIGNAL FOUNDATION
- PEDESTAL FOUNDATION
- PULL BOX
- CONDUIT

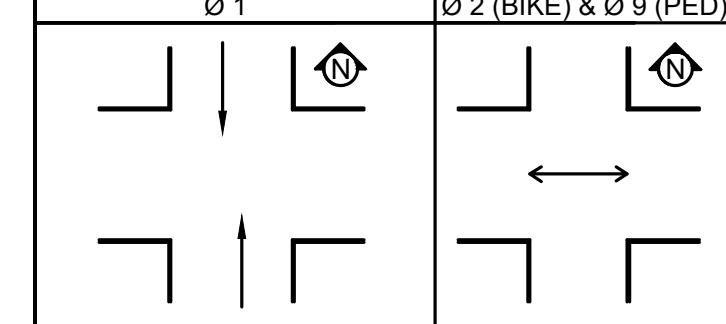
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	46	114
PROJECT FILE NO.		17112.00	

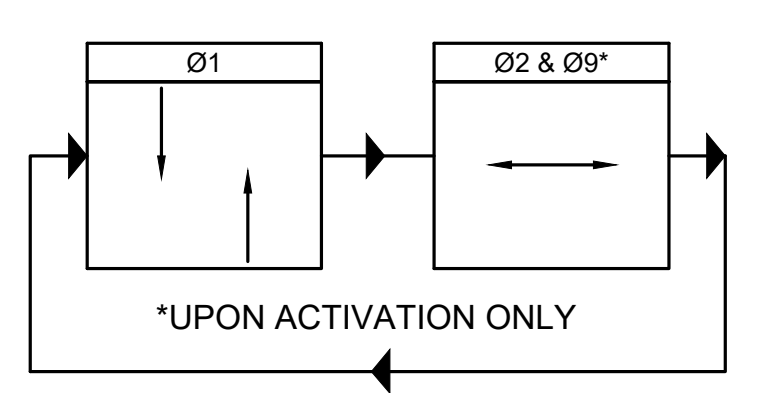
**SIGNAL PLAN - 3**

SIGNAL SEQUENCE AND TIMING									
APPROACH	DIRECTION	HOUSING		PHASE 1			PHASE 2 & 9		
MINIMUM INTERVAL			33						
FLASHING YELLOW INTERVAL				5					
STEADY YELLOW INTERVAL					5				
ALL RED INTERVAL						1			
STEADY RED INTERVAL							9	5/3	
ALT FLASHING RED INTERVAL									2
LYMAN STREET	NB	A, B	DARK	FY	SY	SR	SR	SR	AFR
LYMAN STREET	SB	C, D	DARK	FY	SY	SR	SR	SR	AFR
WAYSIDE TRAIL	EB	E	R	R	R	R	G	G/Y	R
WAYSIDE TRAIL	WB	F	R	R	R	R	G	G/Y	R
BIKE PATH CROSSING	ALL	P1-P2	DW	DW	DW	DW	W	FDW	DW
DETECTOR			LOCK	NON - LOCK					
RECALL			MAX	OFF					
			Ø 1	Ø 2 (BIKE) & Ø 9 (PED)					

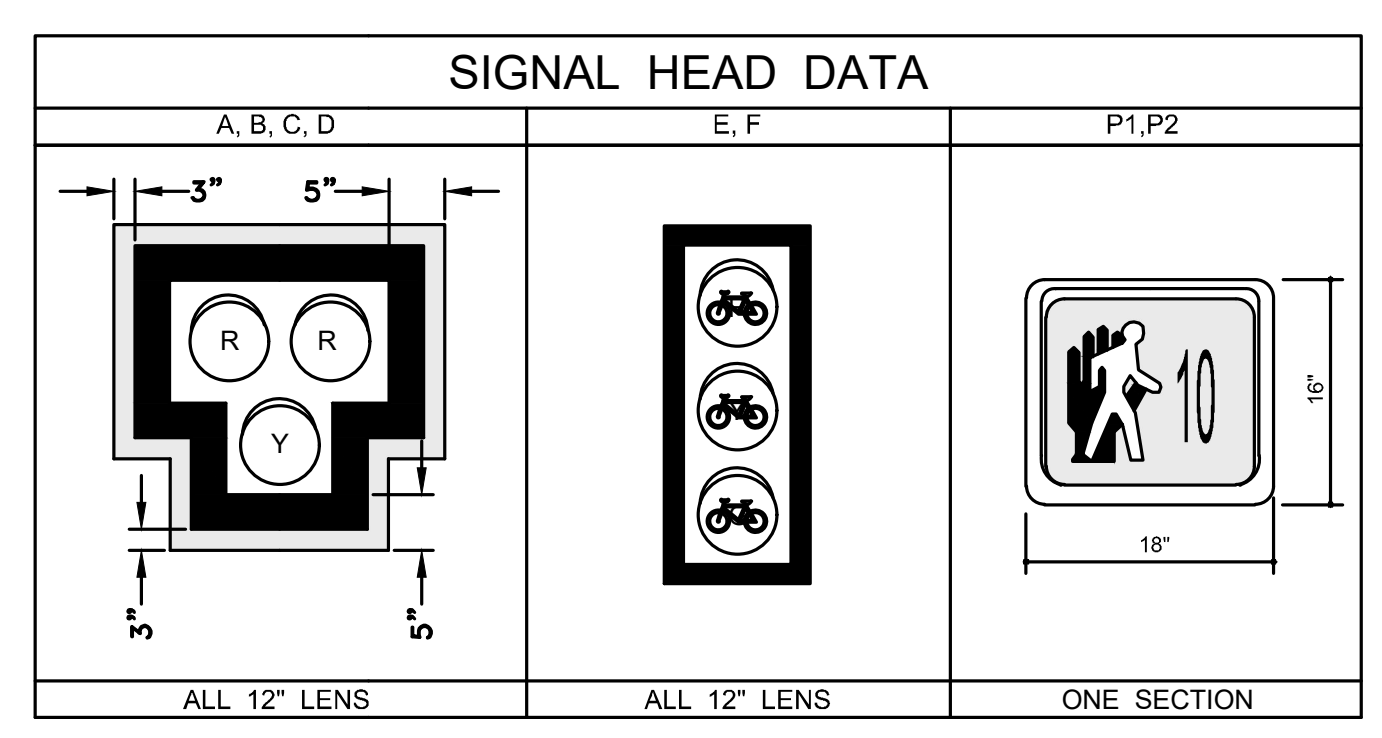
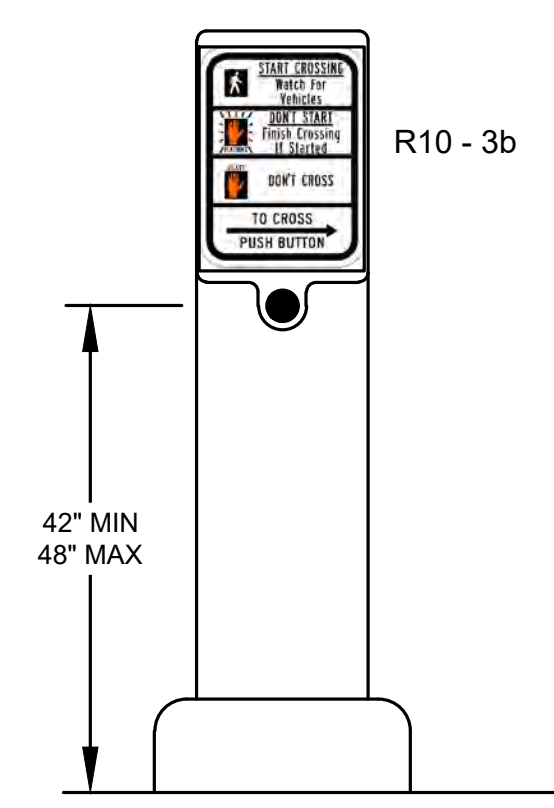
NOTE:  
SIGNAL OPERATION SHALL BE IN ACCORDANCE WITH SECTION 4F.03 OF THE MUTCD 2009 EDITION WITH ALL REVISIONS.



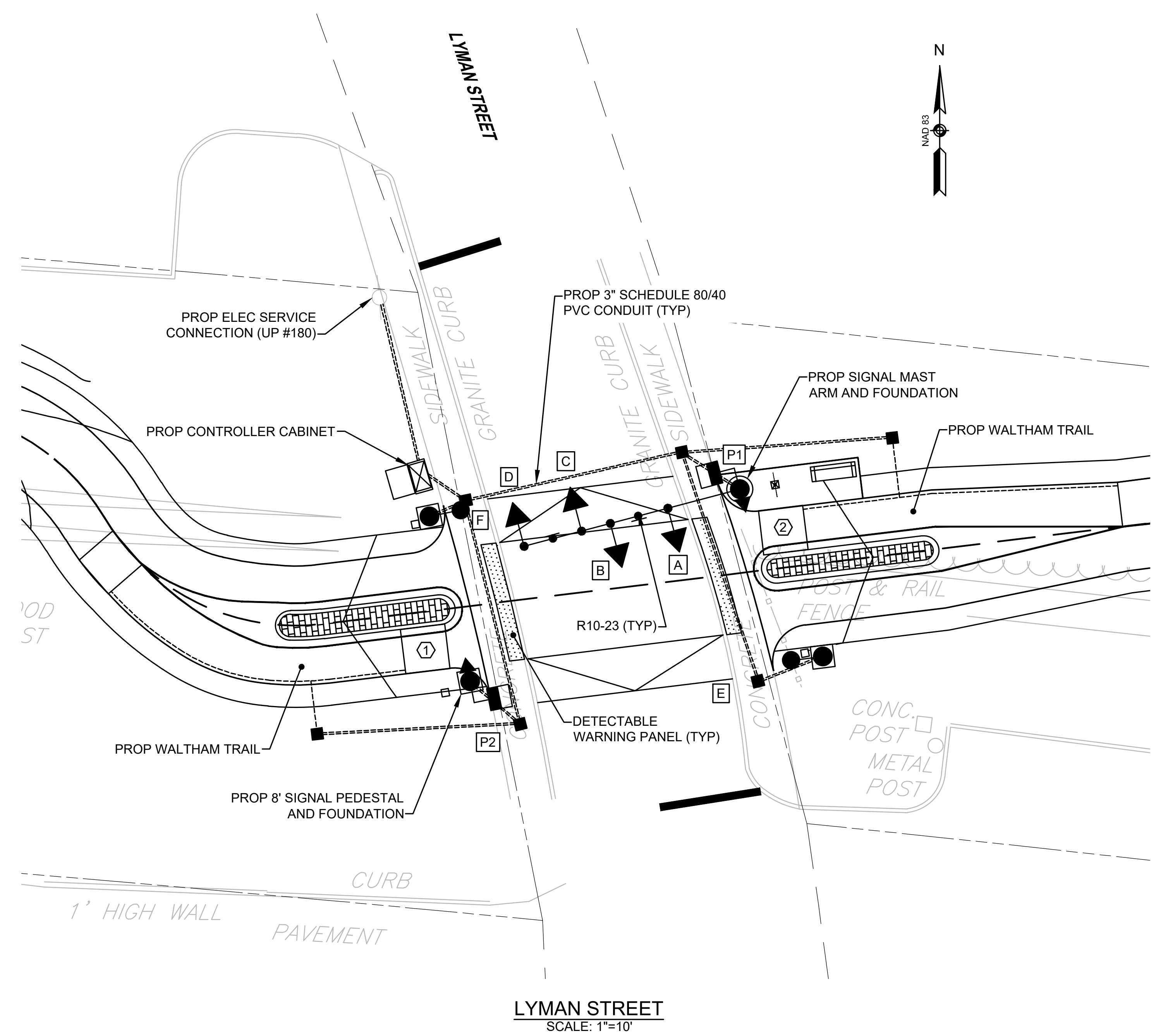
**PREFERENTIAL PHASE SEQUENCE**



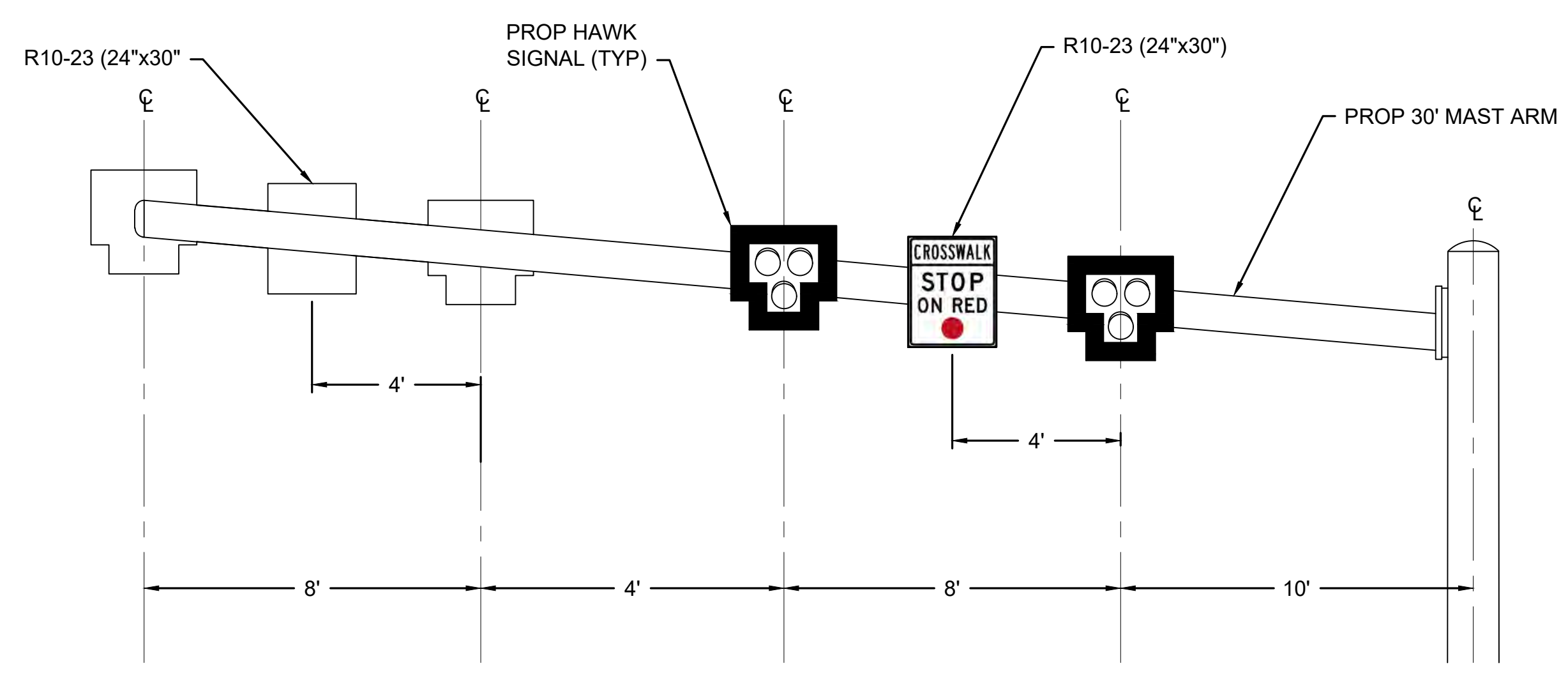
- CONSTRUCTION NOTES:**
- TRAFFIC SIGNAL WORK SHALL BE IN ACCORDANCE WITH THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES SECTION 800 - TRAFFIC CONTROL DEVICES.
  - THE CONTRACTOR SHALL MAINTAIN ROADWAY ACCESS AT ALL TIMES.
  - ALL TRAFFIC CONTROL SIGNAL EQUIPMENT USED SHALL BE ON THE MASSDOT TRAFFIC SIGNAL APPROVED PRODUCTS LIST.
  - ALL RED, YELLOW, AND GREEN SIGNAL DISPLAYS SHALL BE EQUIPPED WITH LED MODULES.
  - ALL TRAFFIC SIGNAL HEADS SHALL BE BLACK IN COLOR AND FURNISHED WITH LOUVERED BACK PLATES AND SIGNAL VISORS AS SHOWN. BACK PLATES SHALL BE EQUIPPED WITH A 3" YELLOW RETROREFLECTIVE STRIP IN ACCORDANCE WITH SECTION 4D.12 OF THE MUTCD 2009 EDITION.
  - PEDESTRIAN SIGNALS SHALL BE EQUIPPED WITH ACCESSIBLE PEDESTRIAN PUSHBUTTONS WITH LOCATOR TONES IN ACCORDANCE WITH SECTION 4E.12 OF THE MUTCD 2009 EDITION.
  - SIGN (R10-3b) AND PUSHBUTTON SHALL BE INSTALLED SO THAT THE FACE OF THE BUTTON IS PARALLEL TO THE CROSSWALK BEING USED.
  - THE COUNTDOWN FEATURE OF THE PEDESTRIAN SIGNAL HEADS (ASSEMBLIES P1 & P2) SHALL ONLY BE ACTIVE AND DISPLAY THE COUNTDOWN TIME DURING THE PEDESTRIAN CLEARANCE (FLASH DON'T WALK) INTERVAL.
  - MAST ARM MOUNTED SIGNS SHALL HAVE A MOUNTING BRACKET MOUNTED SECURELY WITH STAINLESS STEEL BANDS. THE MOUNTING BRACKET MUST BE ADJUSTED SUCH THAT THE FACE OF THE SIGN IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC. THE MOUNTING SHALL HOLD THE SIGN RIGIDLY IN PLACE AND RESIST MOVEMENT IN ALL DIRECTIONS.



MAJOR ITEMS REQUIRED	
QUANTITY	DESCRIPTION
1	30 FOOT GALV. STEEL MAST ARM TRAFFIC SIGNAL POST AND FOUNDATION
4	SIGNAL HEAD 1 WAY - 3 SECTION (HAWK)
2	SIGNAL - BIKE - W/R10-10b
3	PEDESTAL FOUNDATION
1	SIGNAL POST AND BASE STANDARD - 8 FOOT
2	SIGNAL POST AND BASE STANDARD - 10 FOOT
30'	3 INCH SCHEDULE 80 ELECTRICAL CONDUIT (UNDER ROADWAY)
170'	3 INCH SCHEDULE 40 ELECTRICAL CONDUIT (UNDERGROUND)
6	PULL BOX 12" X 12"
4	WIRE LOOP (6' x 6')
1	FOUR CHANNEL LOOP DETECTOR AMPLIFIER
1	TRAFFIC SIGNAL CABINET AND CONTROLLER
1	SERVICE CONNECTION
2	ACCESSIBLE PEDESTRIAN SIGNAL PUSH BUTTON DETECTOR WITH R10-3b SIGN PLUS ALL WIRE, CABLE, MOUNTING HARDWARE, EQUIPMENT, LABOR, AND MATERIALS NECESSARY TO COMPLETE THE INSTALLATION OF A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL



**LYMAN STREET**  
SCALE: 1"=10'



- LEGEND:**
- ◀ VEHICLE SIGNAL HEAD
  - ◻ PEDESTRIAN SIGNAL HEAD
  - ▼ PUSHBUTTON WITH LOCATOR TONE
  - SIGNAL FOUNDATION
  - ◼ PEDESTAL FOUNDATION
  - PULL BOX
  - ==== CONDUIT

**LOOP DETECTOR DATA**

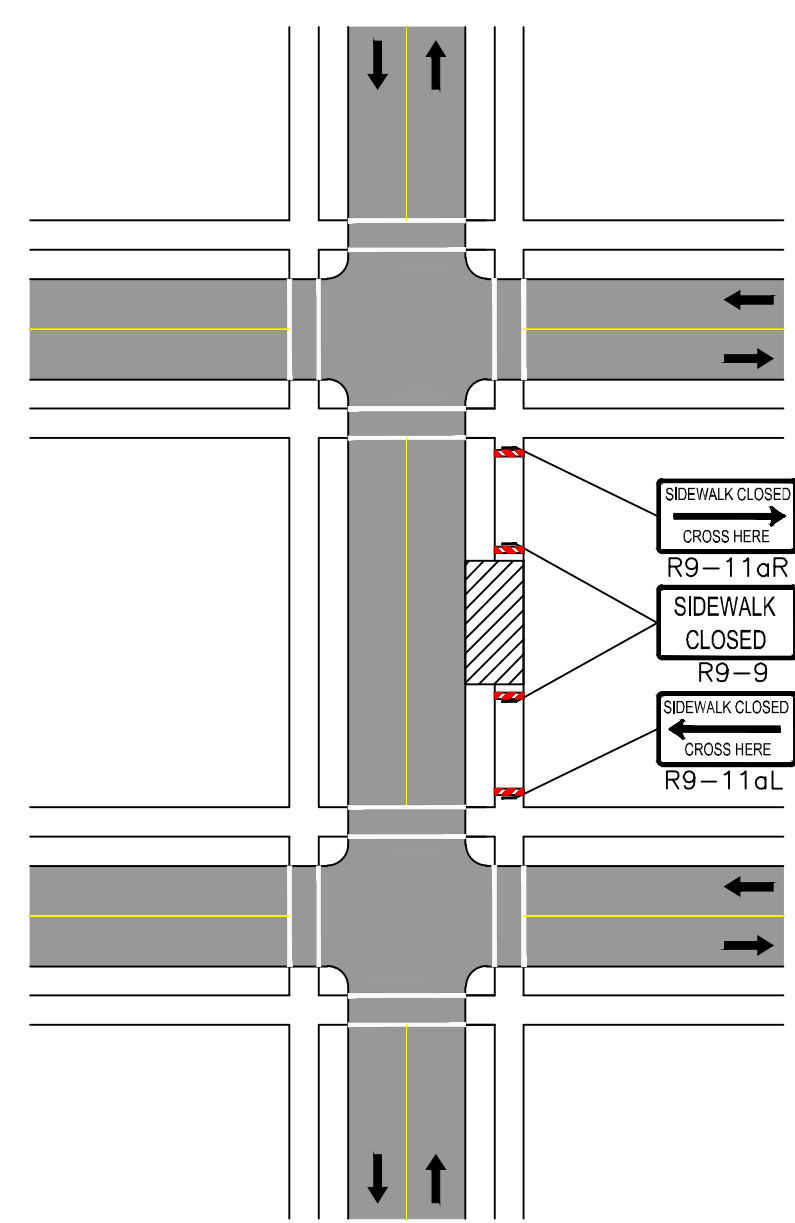
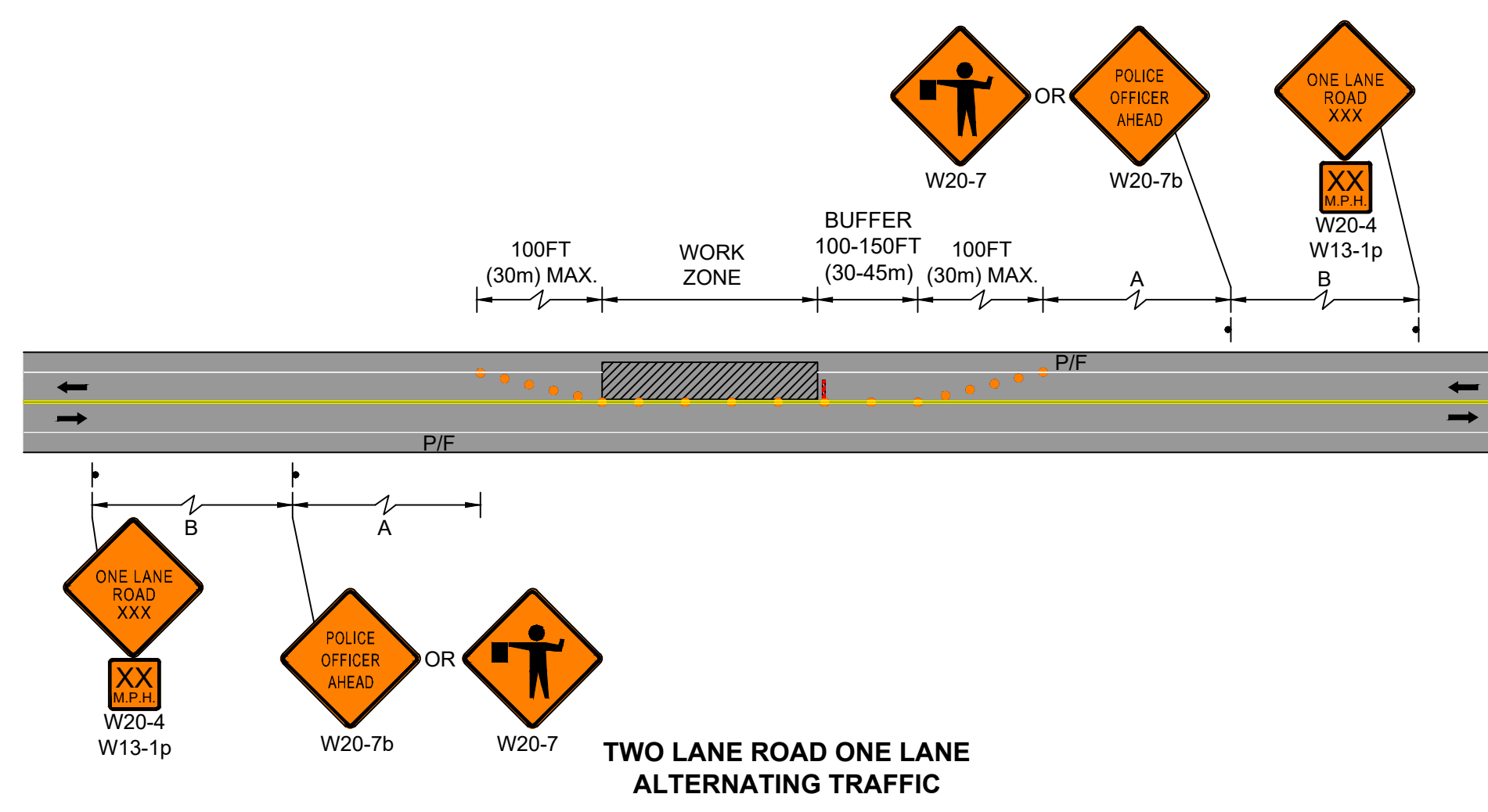
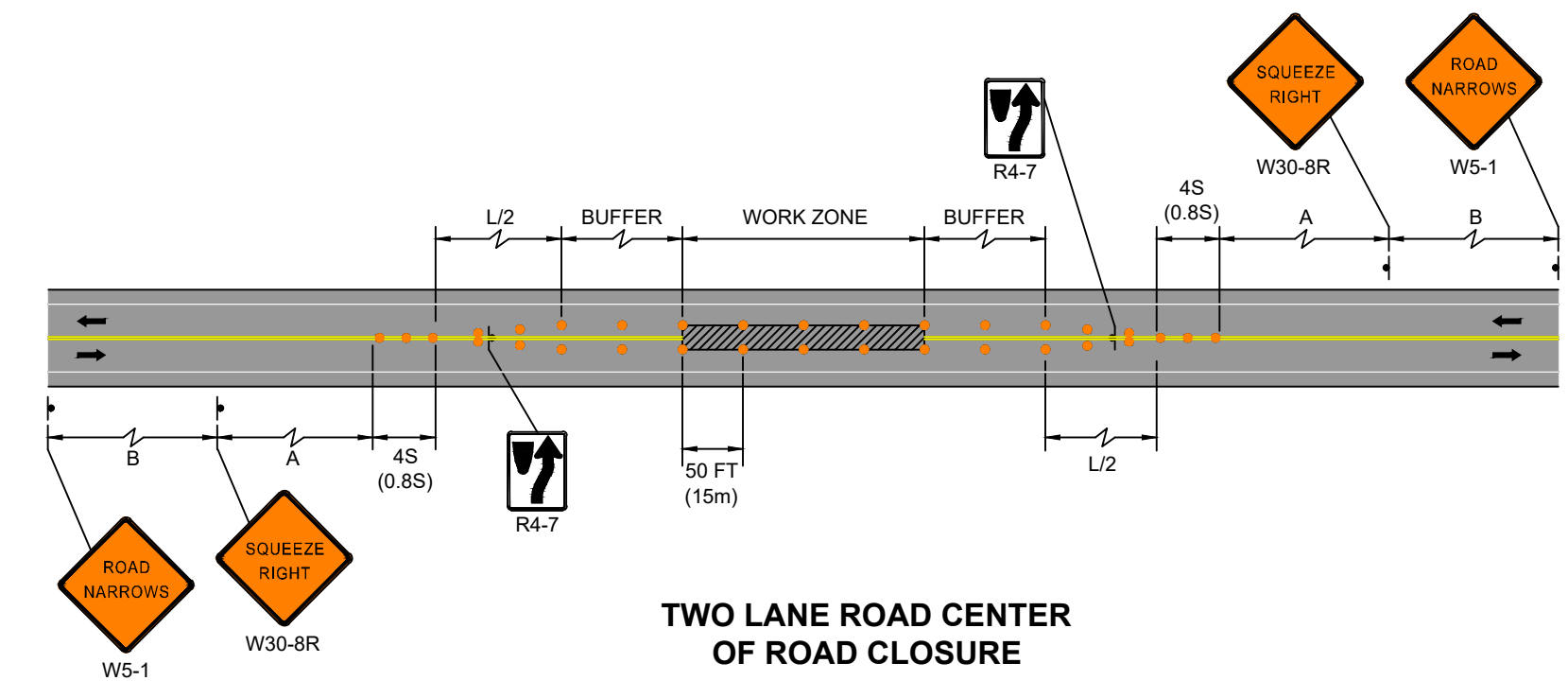
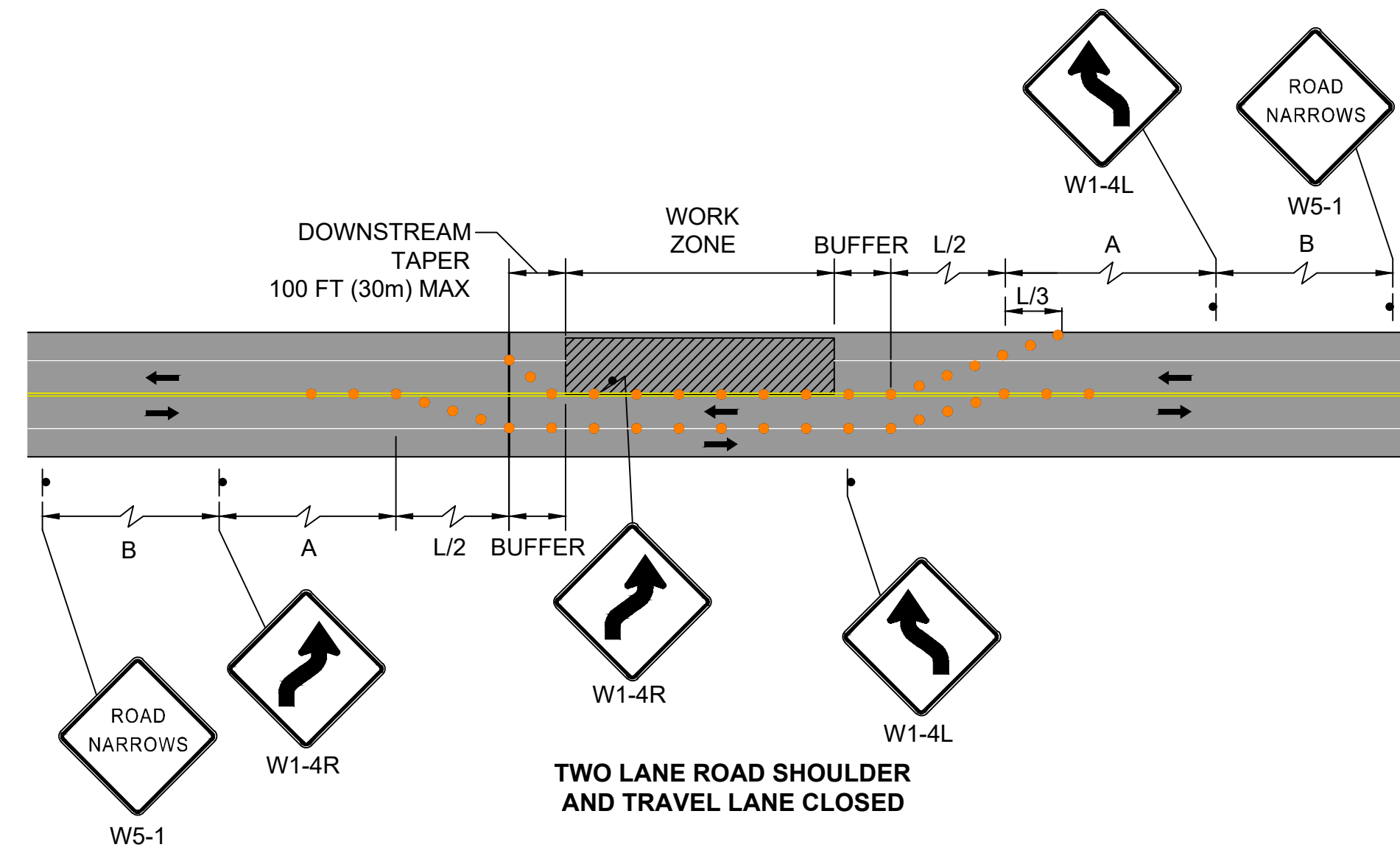
SEE PLAN SHEET-LOOP DETECTOR DETAILS FOR LOOP CONSTRUCTION, SPLICING, DETAILS & NOTES. DELAY TIME EFFECTIVE ONLY DURING CALLED Ø RED. TIME IN SEC.

DETECTOR NUMBER	AMPLIFIER NUMBER	CHANNEL NUMBER	LOOP SIZE	Ø CALLED	DELAY TIME	EXT. TIME
1	1	2	6'x6'	2	3	3
2	1	2	6'x6'	2	3	3

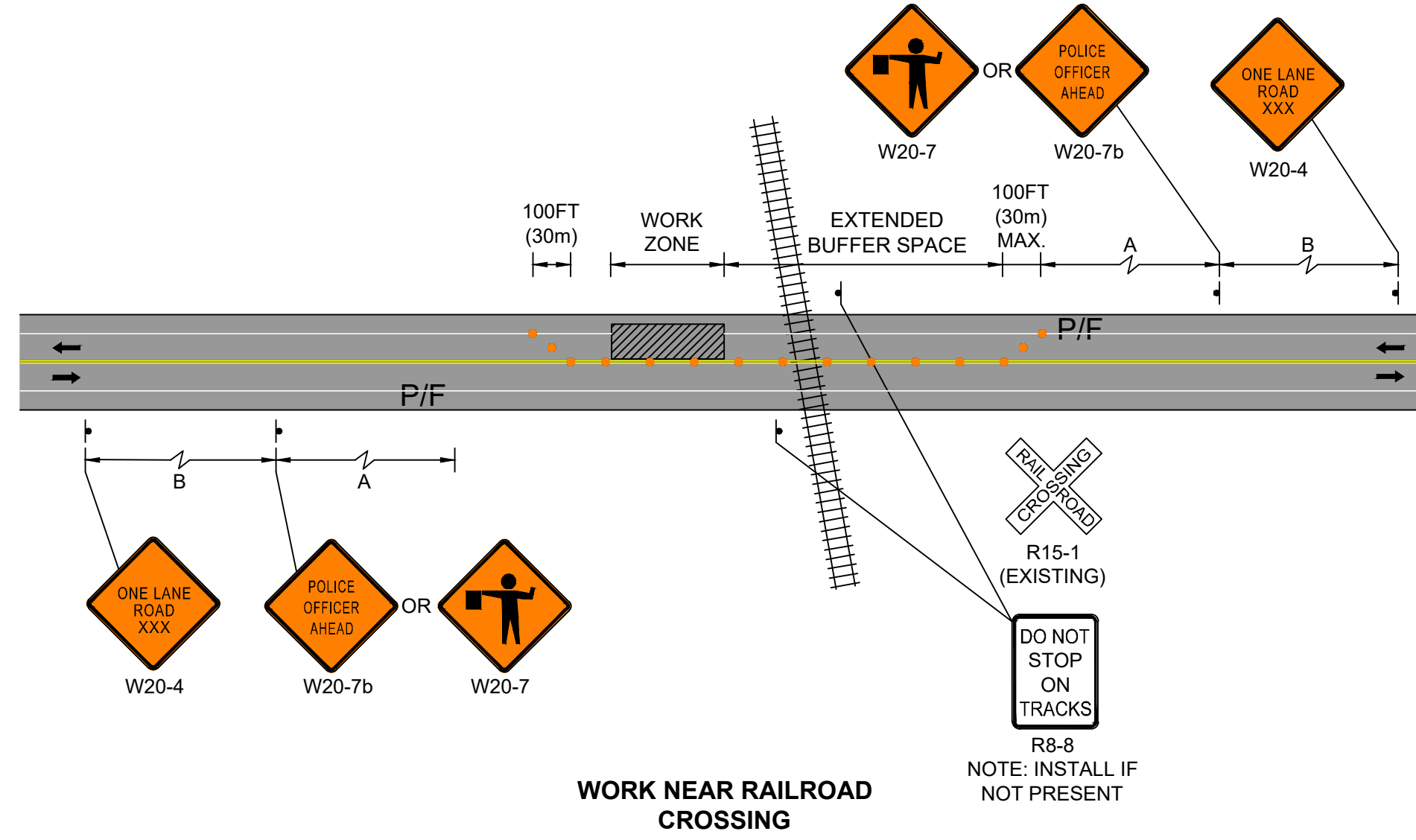
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	47	114
PROJECT FILE NO.		17112.00	

**DETAILS - 1**



NOTE: IF A MINIMUM WIDTH OF 48" OF SOLID SMOOTH UNOBSTRUCTED SURFACE REMAINS ALONG THE WORK AREA THEN THE DETAIL CAN BE DISREGARDED. DELINEATION OF THE WORK AREA WILL STILL BE REQUIRED. ALL PEDESTRIAN DETOUR ROUTES SHALL BE ADA/MAAB COMPLIANT IN THEIR ENTIRETY.



IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA IN SQUARE FEET	TOTAL AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
W20-1	36	36		SEE MUTCD			2	ORANGE	BLACK	BLACK	P5	9.0	18.0
MA-R2-10a	48	36					2	ORANGE/WHITE	BLACK	BLACK		12.0	24.0
MA-R2-10e	36	48					2	ORANGE/WHITE	BLACK	BLACK		12.0	24.0
W5-1	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
W1-4L	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
W1-4R	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
R4-7	24	30					2	WHITE	BLACK	BLACK		5.0	10.0
W20-4	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
W20-7 OR MA-W20-7b	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
W30-8R	36	36					2	ORANGE	BLACK	BLACK		9.0	18.0
R13-1P	24	24					2	ORANGE	BLACK	BLACK		4.0	8.0
R8-8	24	30					2	WHITE	BLACK	BLACK		5.0	10.0
R9-9	24	12					2	WHITE	BLACK	BLACK	MOUNTED ON BARRIER	2.0	4.0
R9-11aL	24	12					1	WHITE	BLACK	BLACK		2.0	2.0
R9-11aR	24	12					1	WHITE	BLACK	BLACK		2.0	2.0
TOTAL AREA OF SIGNS (SQUARE FEET)												210.00	

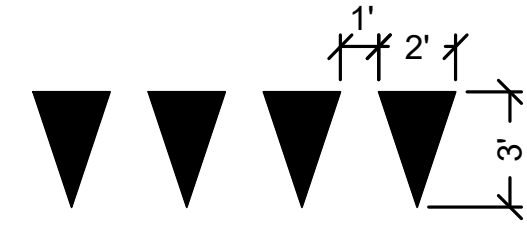
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	48	114
PROJECT FILE NO.		17112.00	

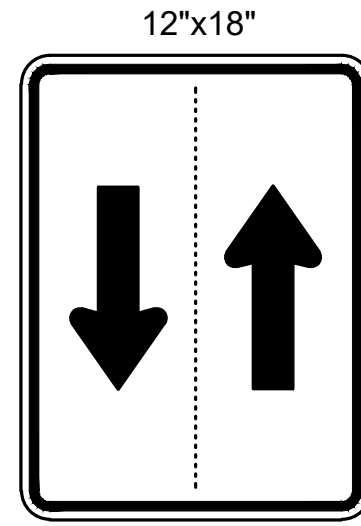
**DETAILS - 2**

**PAVEMENT MARKING NOTES:**

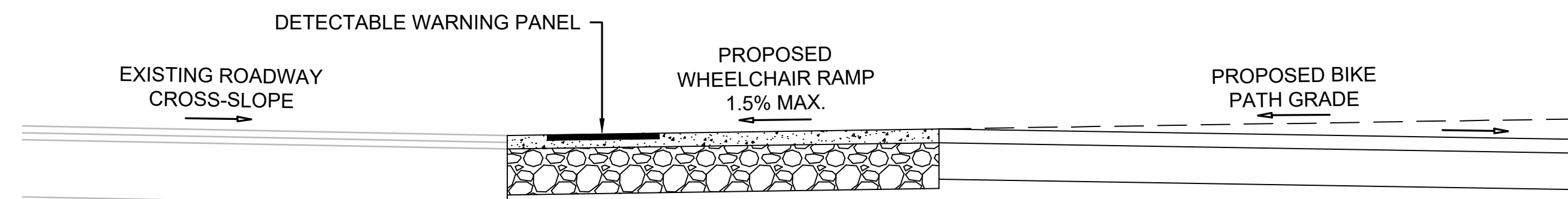
- MILE MARKERS SHALL BE MARKED ON THE FINAL SURFACE AT 0.5 MILE INCREMENTS, STARTING AT BEAVER STREET AND HEADING WESTWARD. EACH MARKER SHALL READ MILE X.X AND BE ENCLOSED IN A CIRCLE. BOTH LEGEND AND CIRCLE SHALL BE WHITE THERMOPLASTIC.
- THE LYMAN STREET CROSSING SHALL HAVE STOP LINES ALONG THE ROADWAY APPROACHES AS SHOWN ON THE PLANS RATHER THAN YIELD MARKINGS.



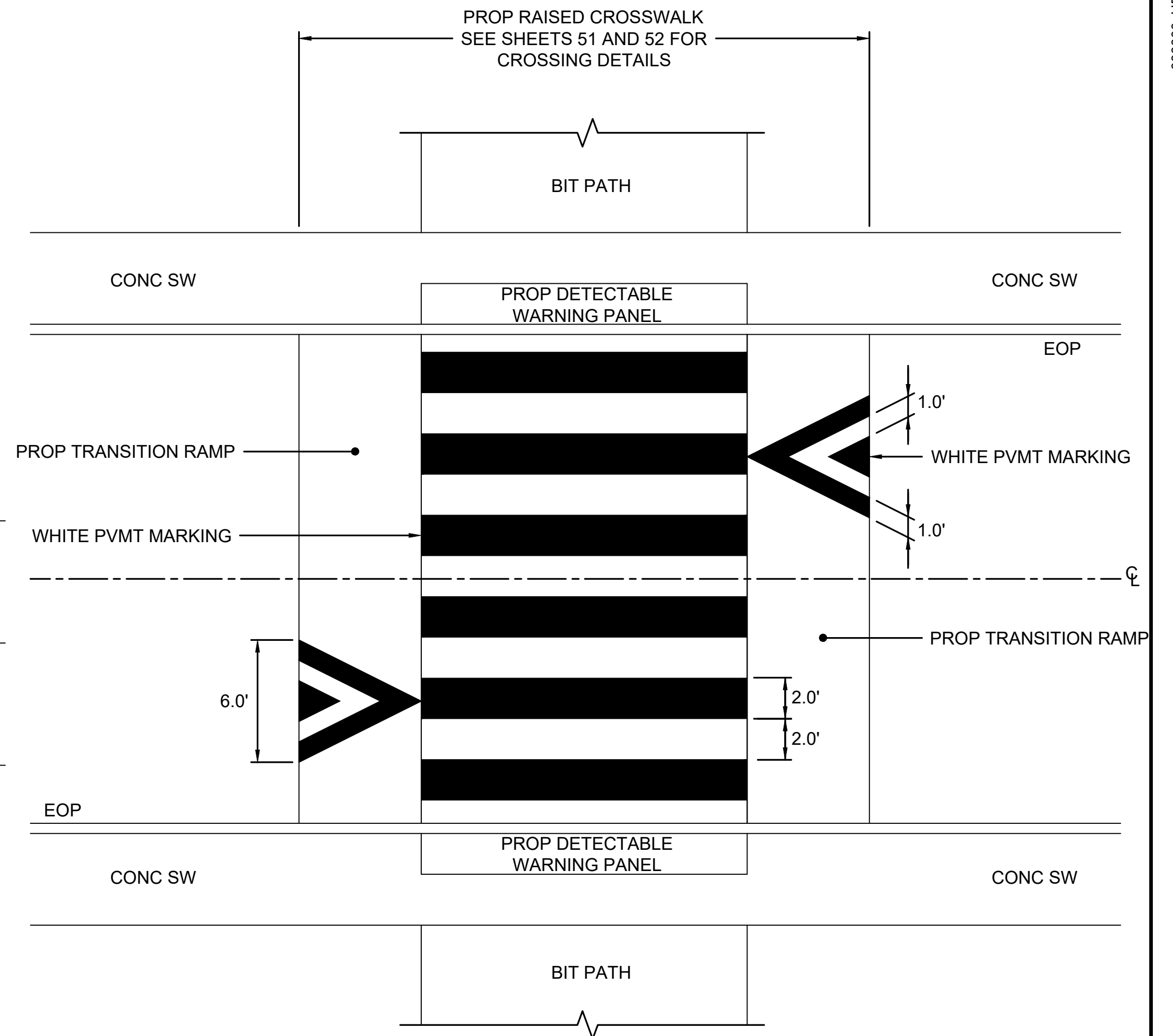
**PROPOSED YIELD MARKINGS**  
NOT TO SCALE



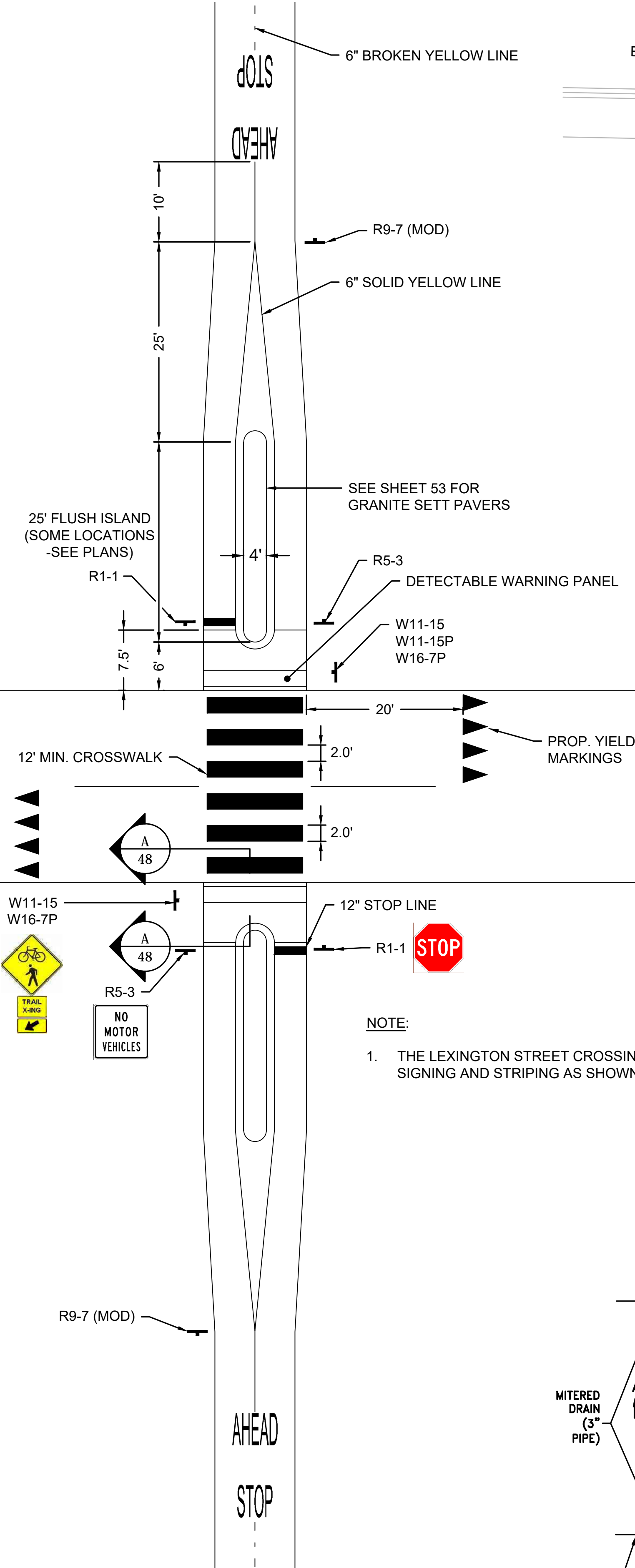
**SHARED-USE RESTRICTION SIGN (R9-7 MOD)**



**SECTION A-A**  
NOT TO SCALE

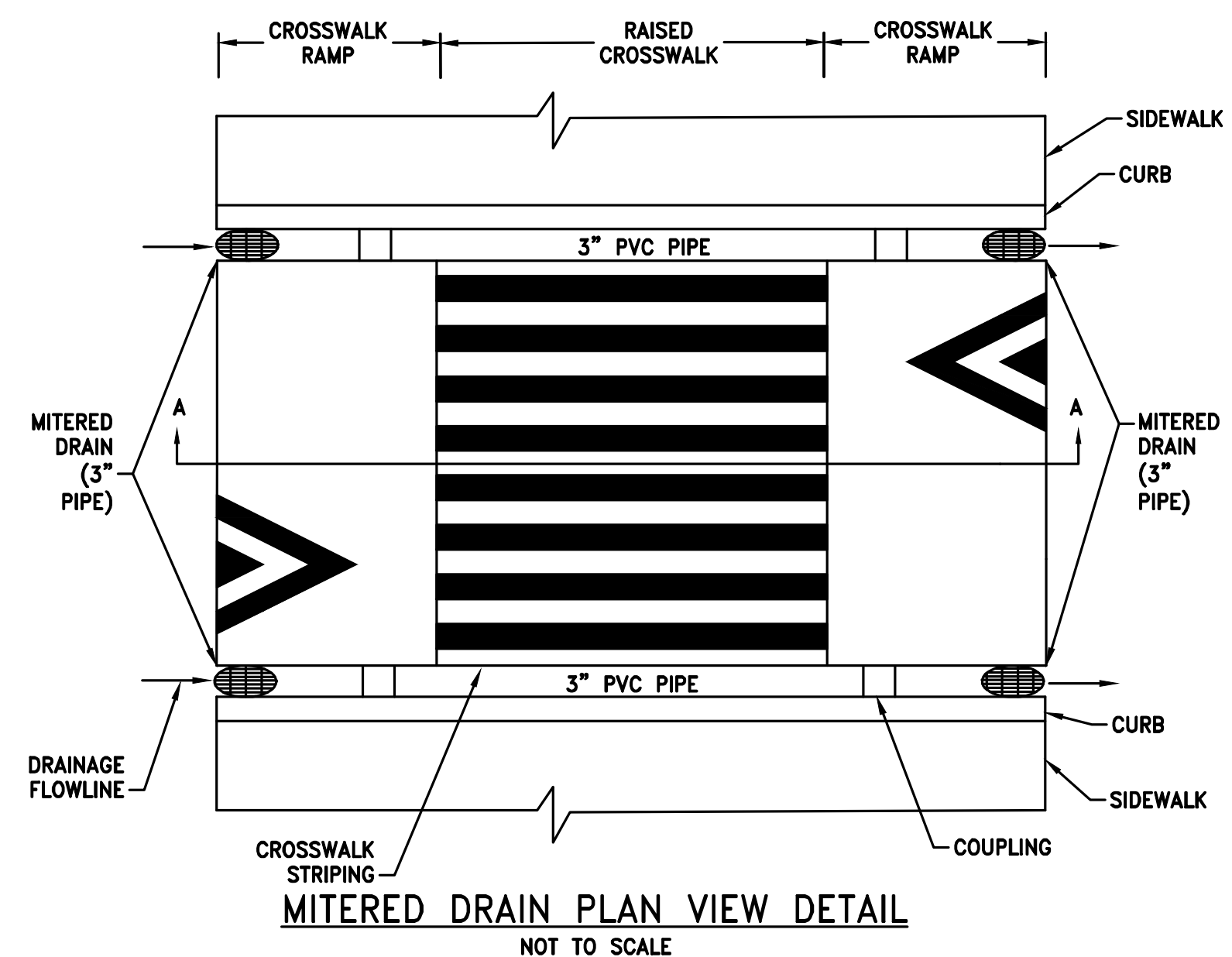


**PROPOSED RAISED CROSSWALK MARKINGS**  
NOT TO SCALE

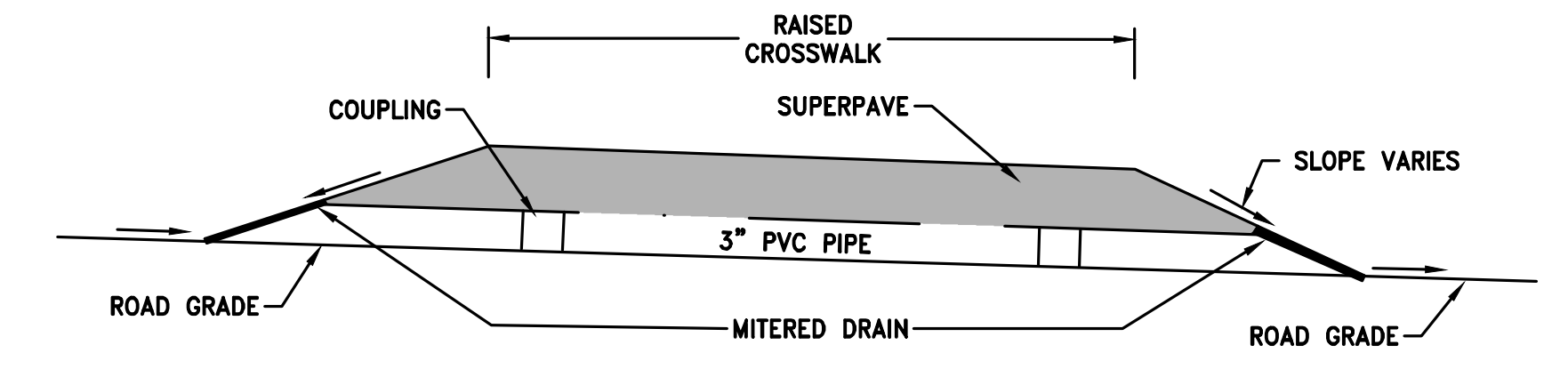


**TYPICAL ROADWAY CROSSING**  
SCALE: 1'=10'

- NOTE:**
- THE LEXINGTON STREET CROSSING SHALL HAVE SIGNING AND STRIPING AS SHOWN ON THE PLANS.



**MITERED DRAIN PLAN VIEW DETAIL**  
NOT TO SCALE



- NOTE:**
- MITERED DRAIN TO BE PLACED ALONG THE CURB UNDER RAISED CROSSWALKS ON BOTH SIDES OF ROADWAYS THAT ARE CROWNED AND ON THE LOW SIDE ONLY OF ROADWAYS THAT ARE SUPERELEVATED.

**MITERED DRAIN SECTION A-A**  
NOT TO SCALE

CROSSING	ROADWAY VOLUME (VEHICLES)	ROADWAY TRAIL VOLUME (USERS)	WARRANT
A. LEXINGTON	1597	387	FULL SIGNAL
C. LYMAN	1238	387	HAWK/PED
D. BACON	850	387	RRFB
E. PROSPECT HILL	782	387	RRFB
F. HAMMOND	277	387	UNSIG
G. MIDDLESEX	177	387	UNSIG

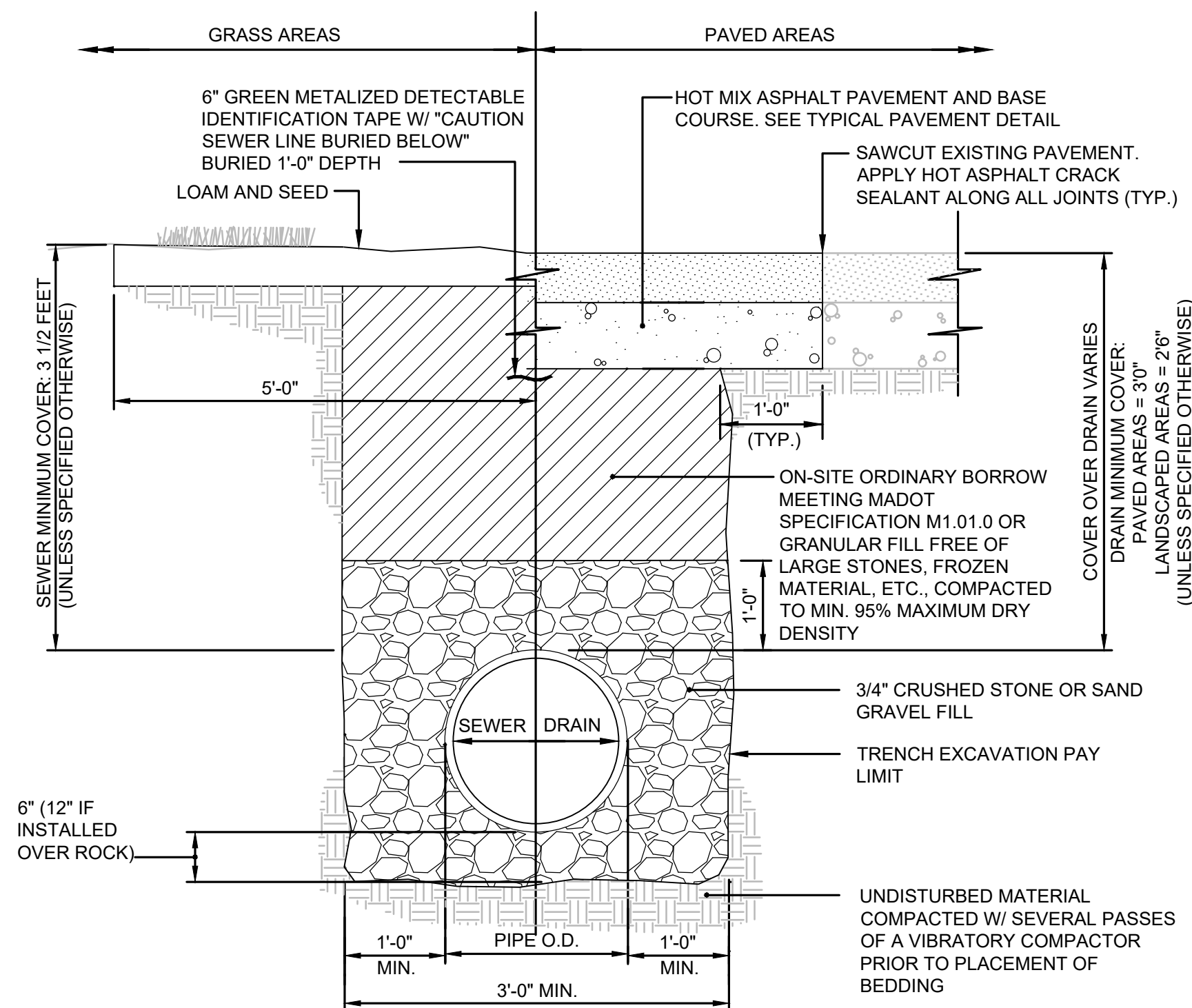
**ROADWAY CROSSING SIGNALIZATION**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	49	114
PROJECT FILE NO.		17112.00	

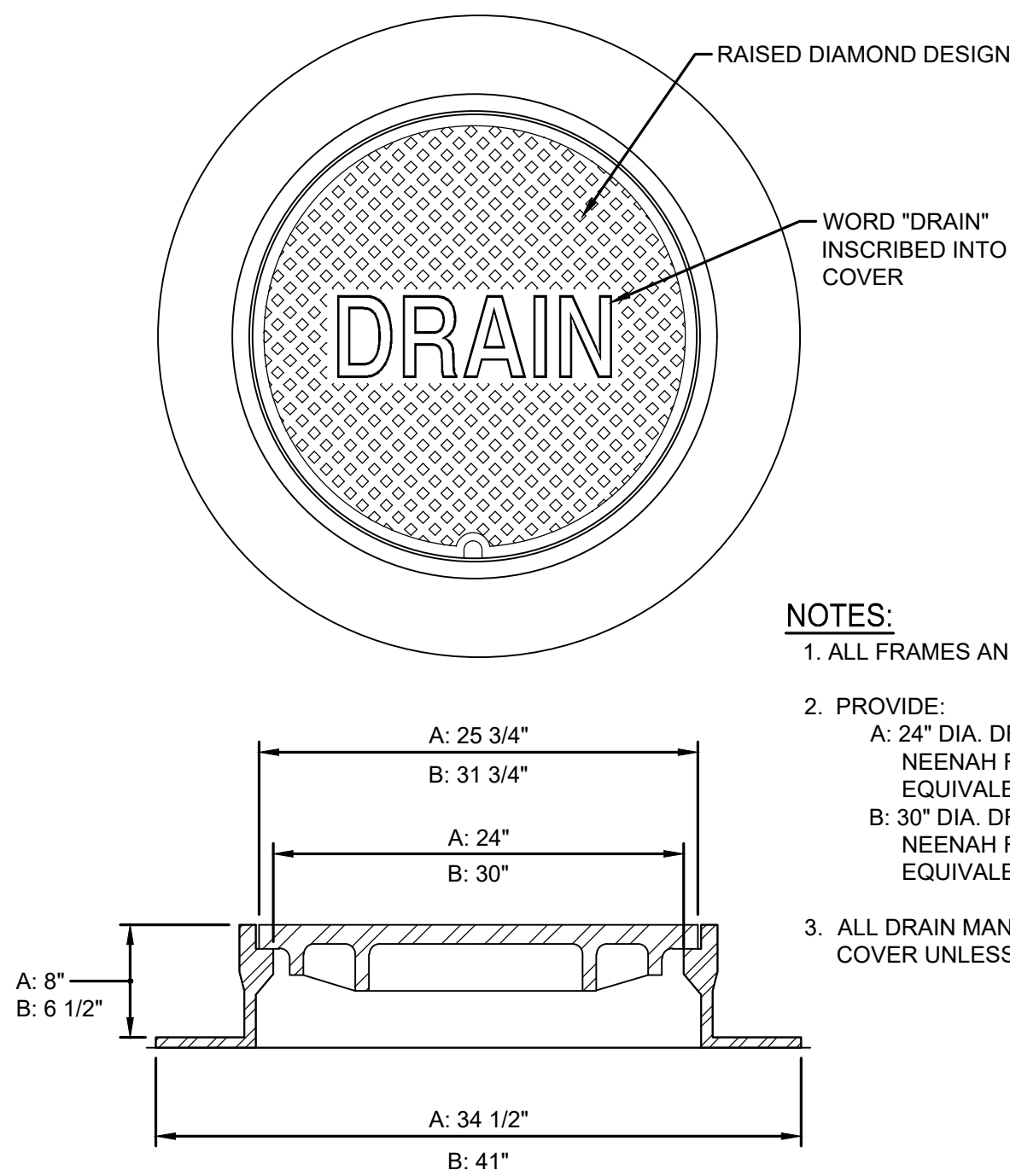
**DETAILS - 3**



- NOTES:**
- WHERE THE DISTANCE BETWEEN THE SAWCUT AND EDGE OF PAVEMENT IS 3' OR LESS, THE CONTRACTOR SHALL REPLACE THE PAVEMENT FROM THE TRENCH EDGE TO THE EXISTING EDGE OF PAVEMENT.
  - 3/4" DIA. CRUSHED STONE SHALL BE USED AS BEDDING WHERE TRENCH IS BELOW THE GROUND WATER TABLE.

**GRAVITY SEWER/DRAIN TRENCH DETAIL**

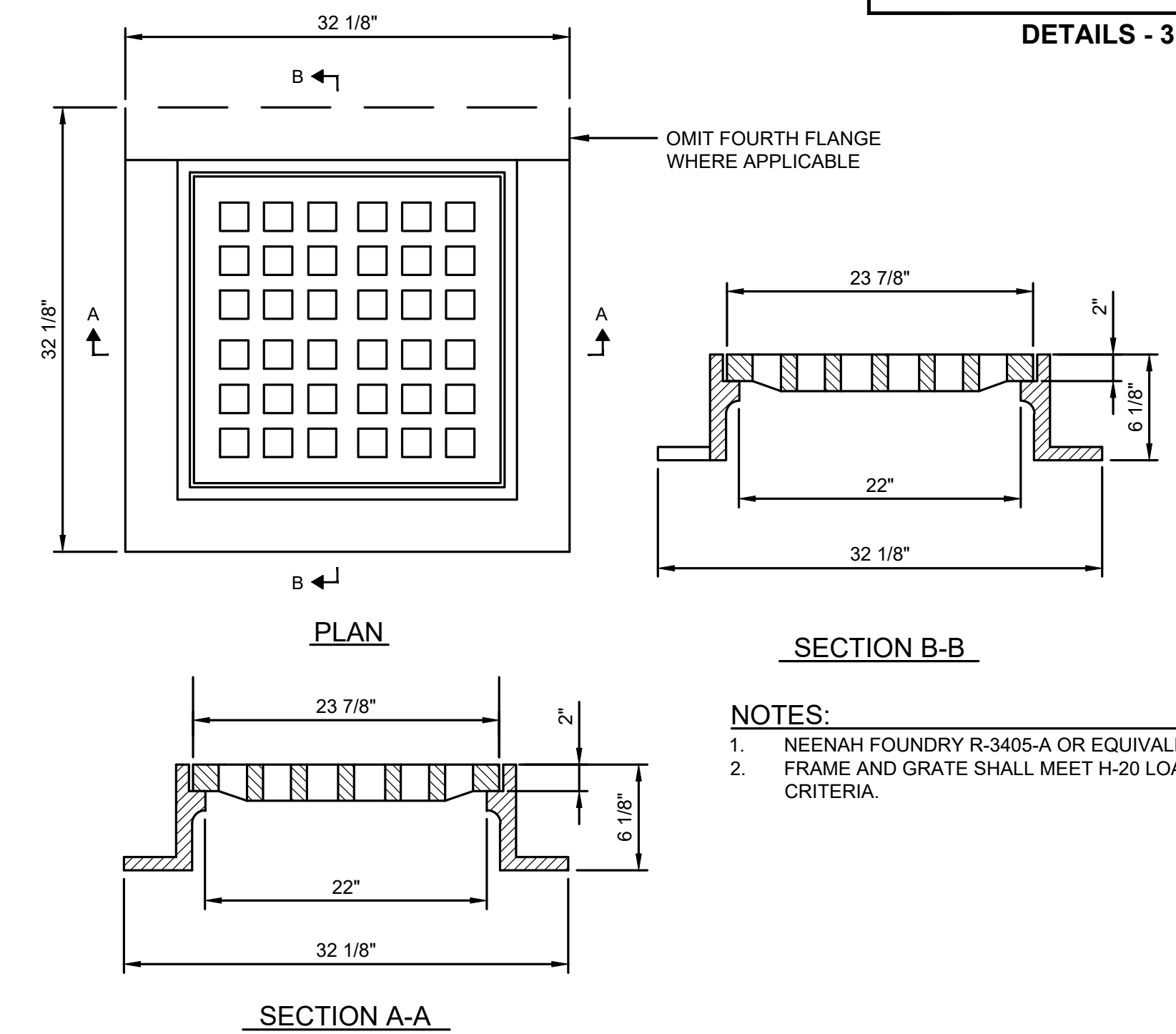
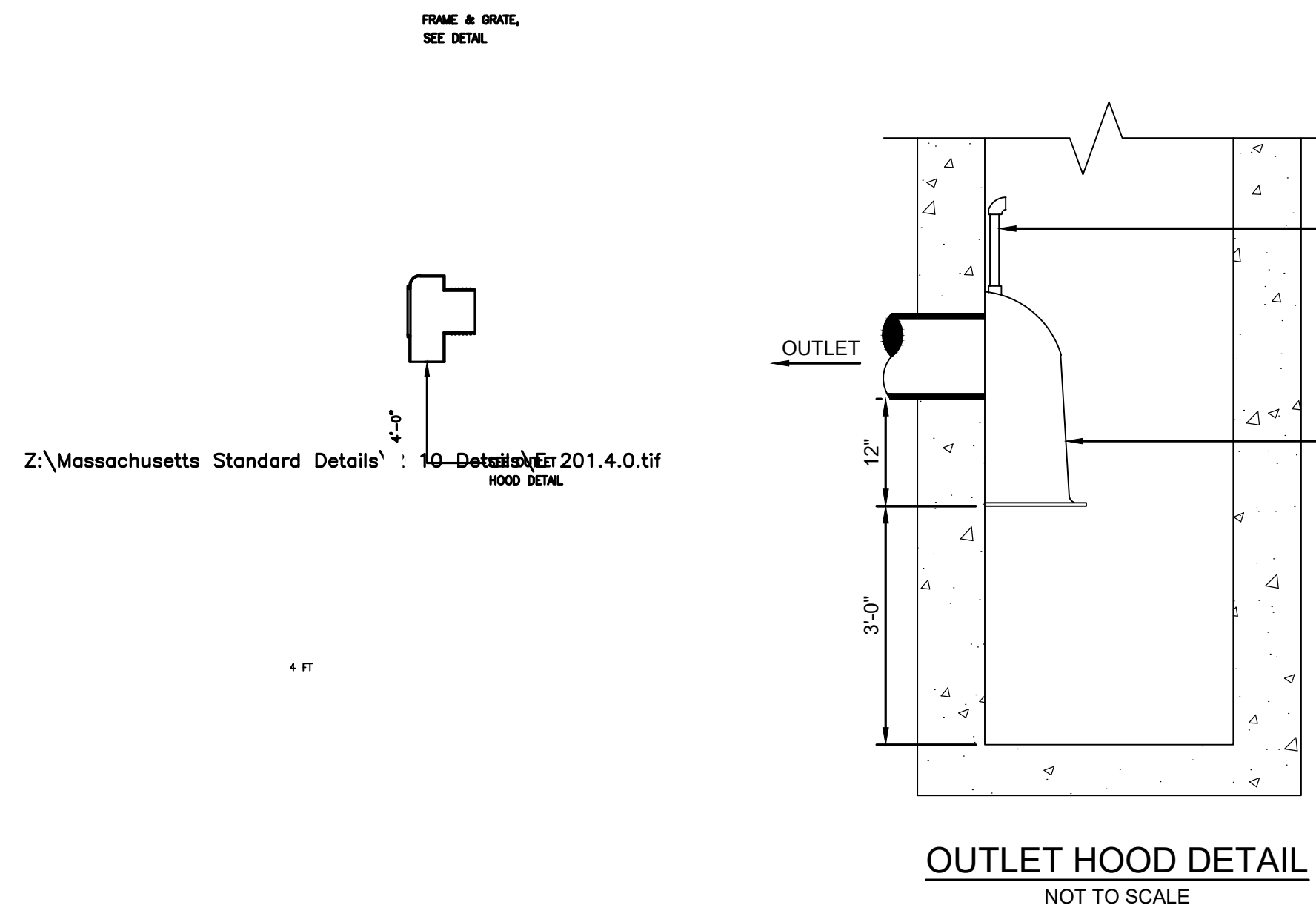
NOT TO SCALE



- NOTES:**
- ALL FRAMES AND COVERS SHALL MEET H-20 LOADING CRITERIA.
  - PROVIDE:  
A: 24" DIA. DRAIN MANHOLE FRAME AND COVER SHALL BE NEENAH FOUNDRY, INC. MODEL #R-1556 OR APPROVED EQUIVALENT.  
B: 30" DIA. DRAIN MANHOLE FRAME AND COVER SHALL BE NEENAH FOUNDRY, INC. MODEL #R-1557 OR APPROVED EQUIVALENT.
  - ALL DRAIN MANHOLES SHALL HAVE 24" DIA. DRAIN MANHOLE COVER UNLESS NOTED OTHERWISE.

**DRAIN MANHOLE FRAME & COVER**

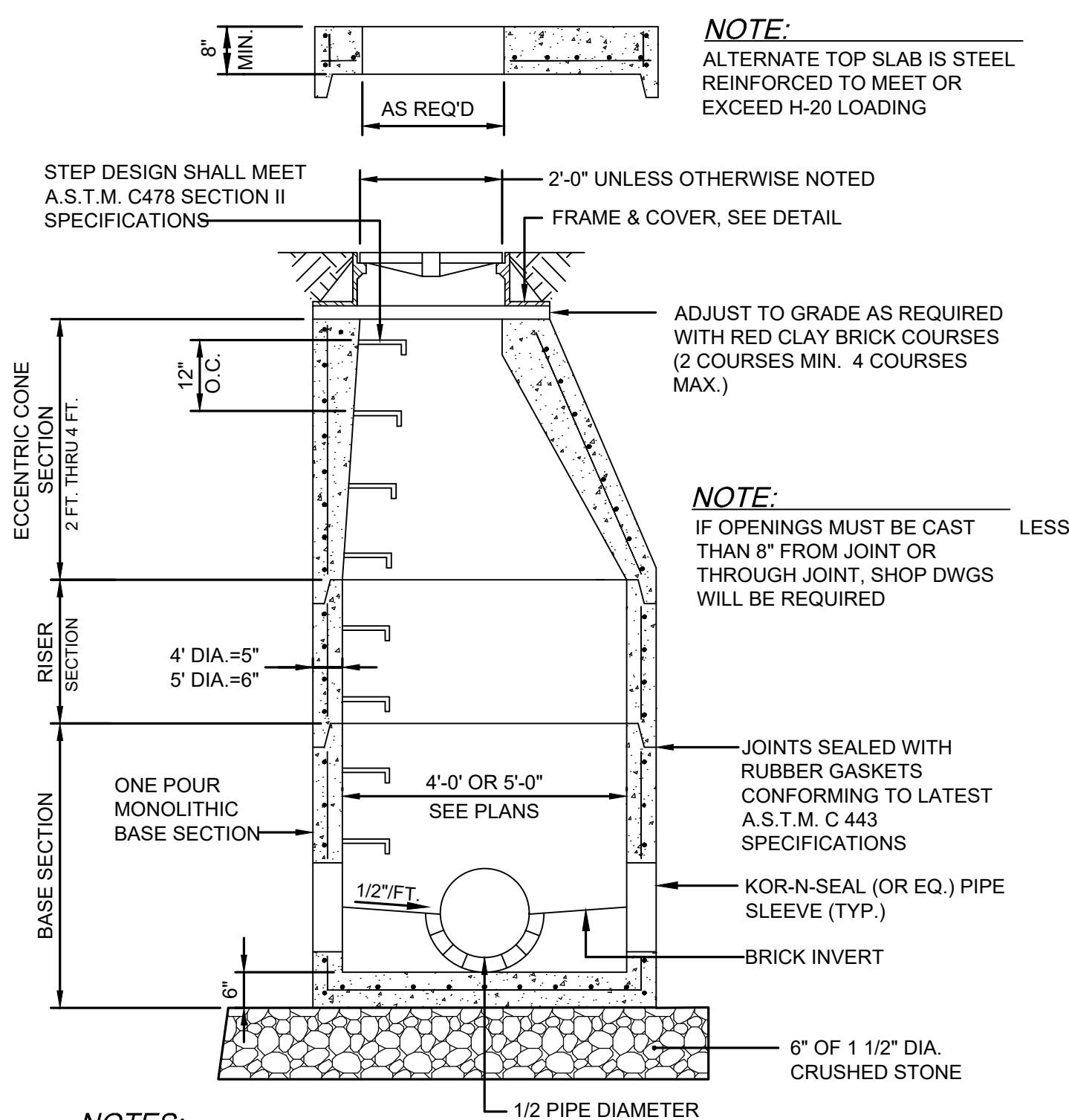
NOT TO SCALE



- NOTES:**
- NEENAH FOUNDRY R-3405-A OR EQUIVALENT.
  - FRAME AND GRATE SHALL MEET H-20 LOADING CRITERIA.

**SQUARE CATCH BASIN FRAME & GRATE**

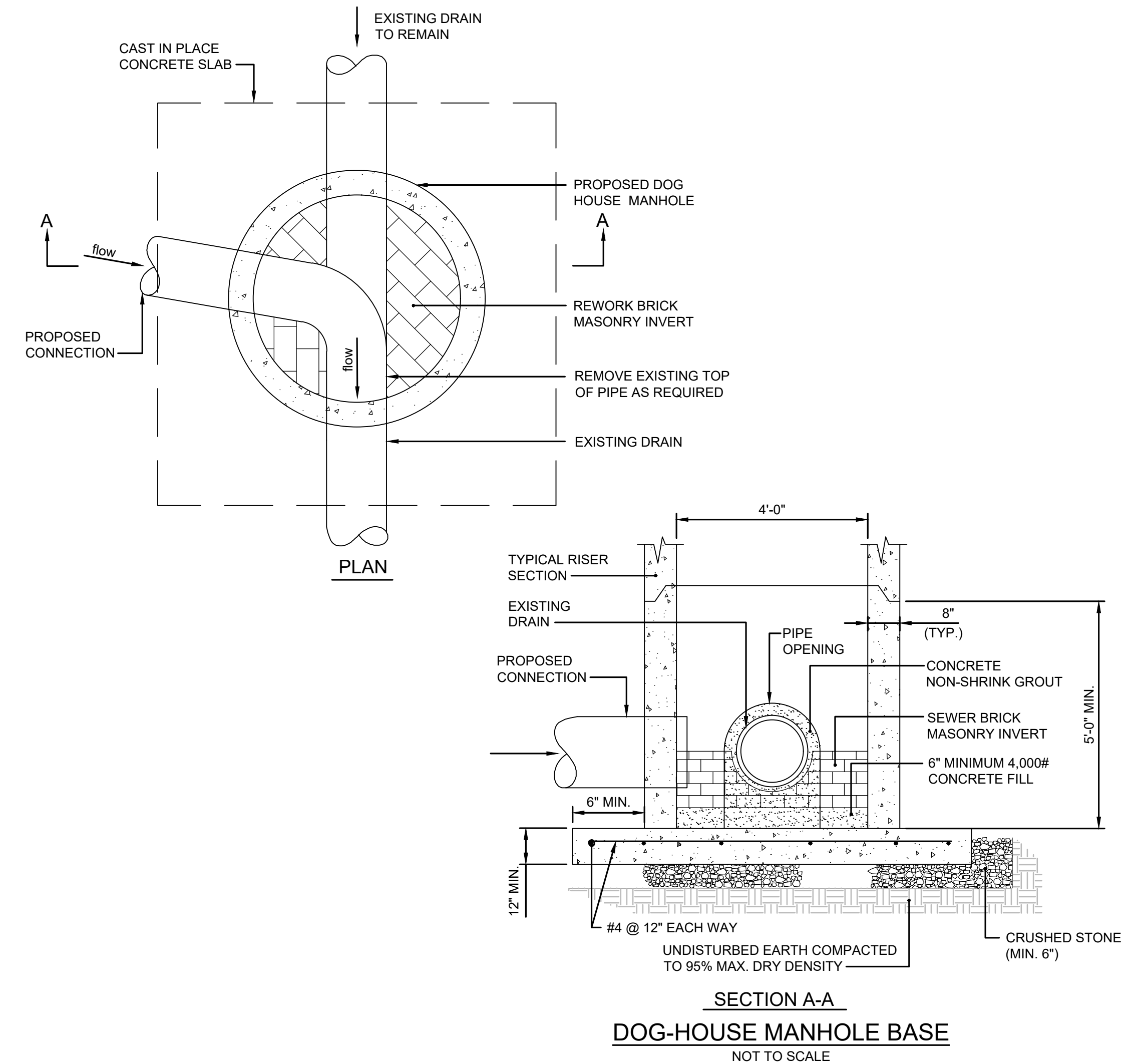
NOT TO SCALE



- NOTES:**
- STEEL REINFORCEMENT FOR BASE SECTION SHALL BE 0.12 SQ. IN./LF.
  - CIRCUMFERENTIAL STEEL REINFORCEMENT SHALL BE 0.15 SQ. IN./LF. MINIMUM.
  - STRUCTURE SHALL CONFORM TO MASS HIGHWAY SPECIFICATIONS.

**TYPICAL DRAIN MANHOLE DETAIL**

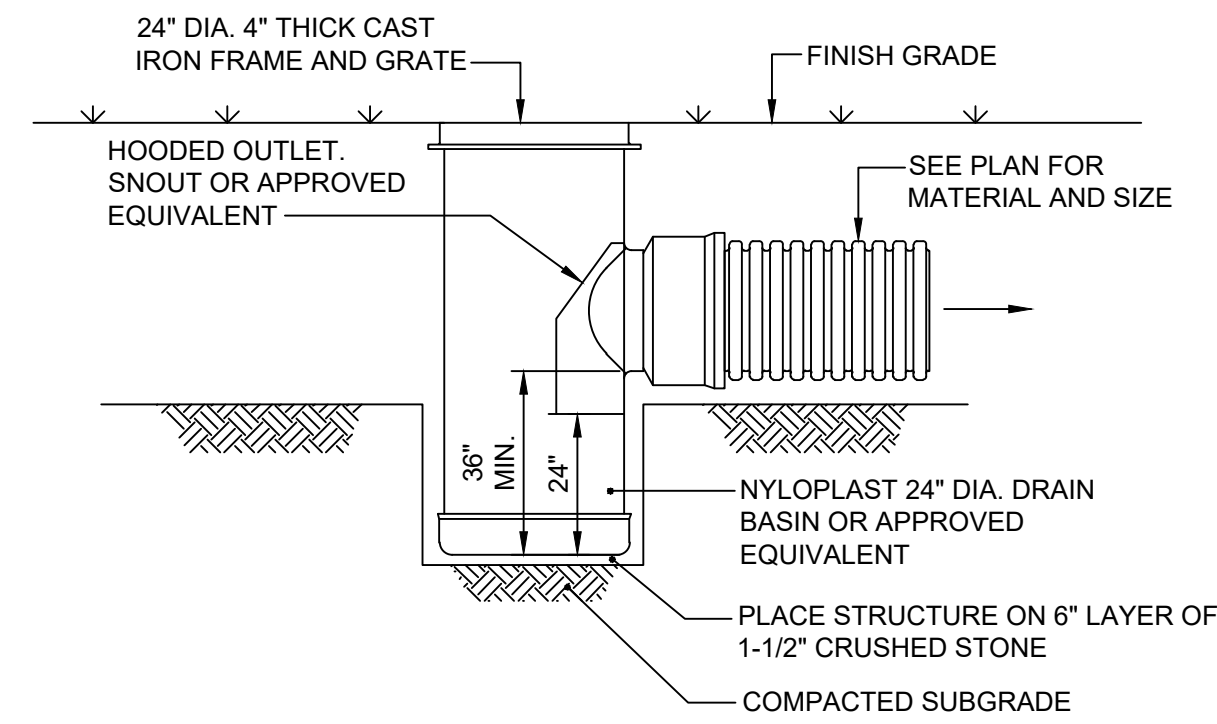
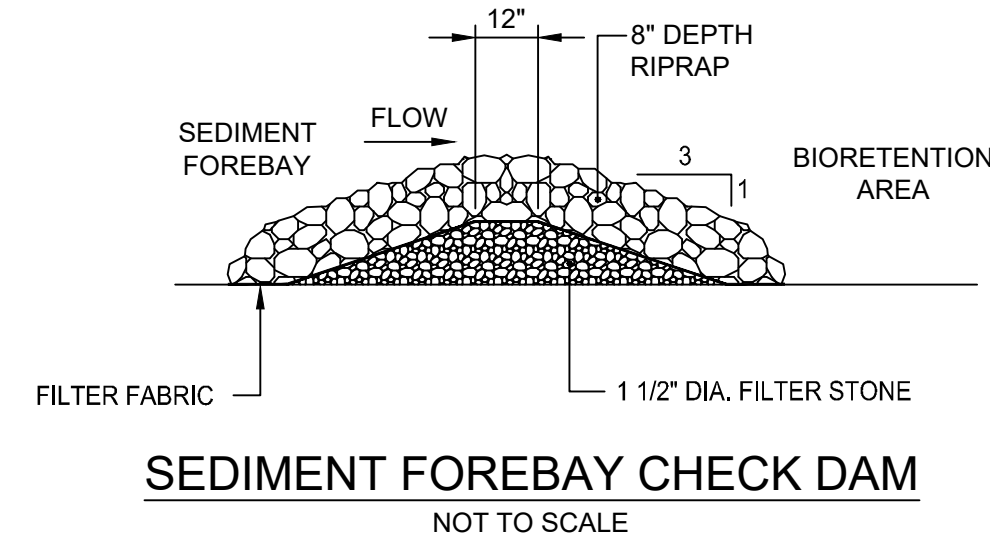
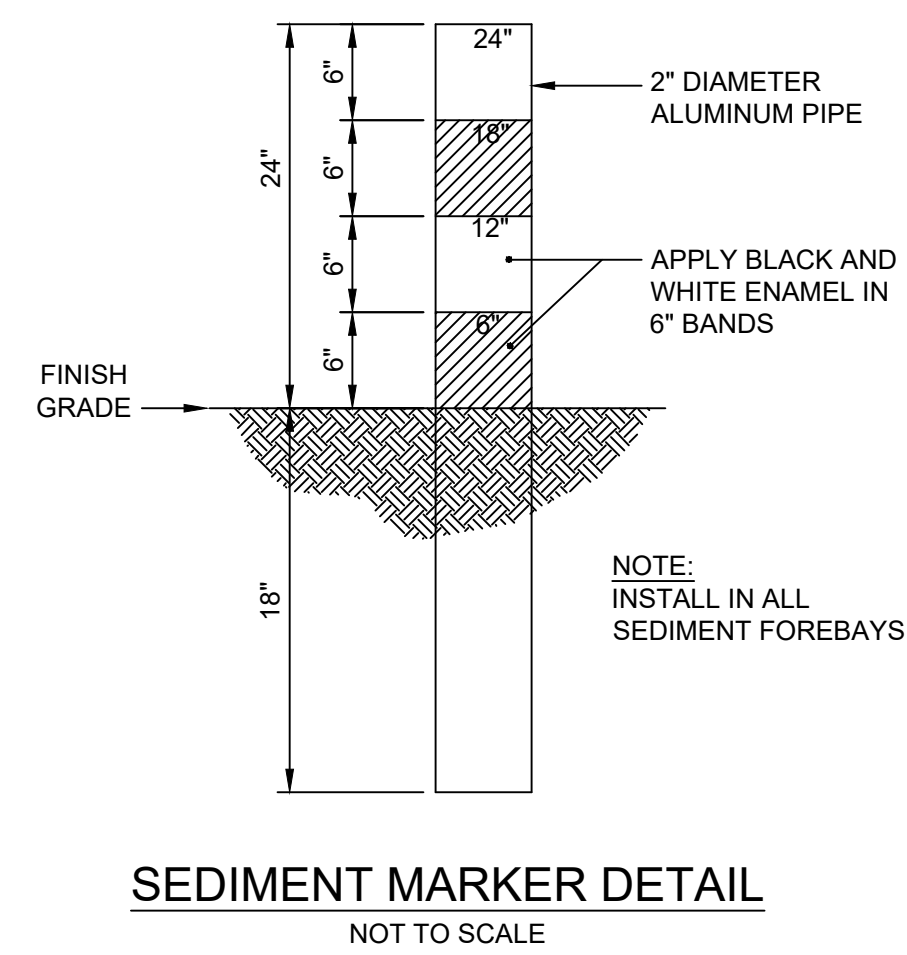
NOT TO SCALE



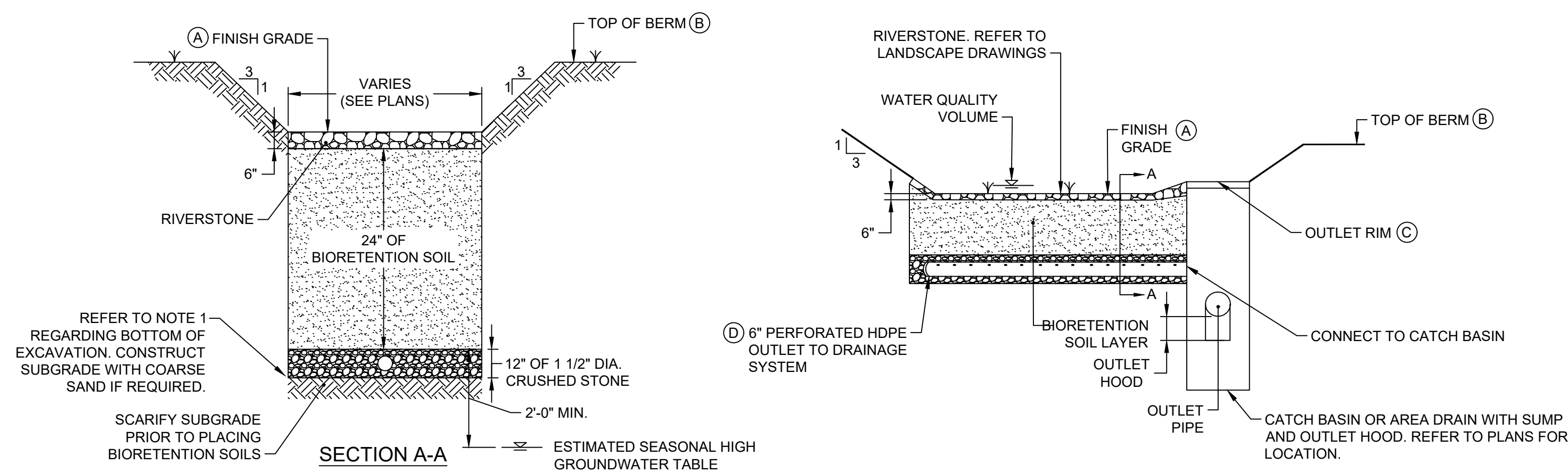
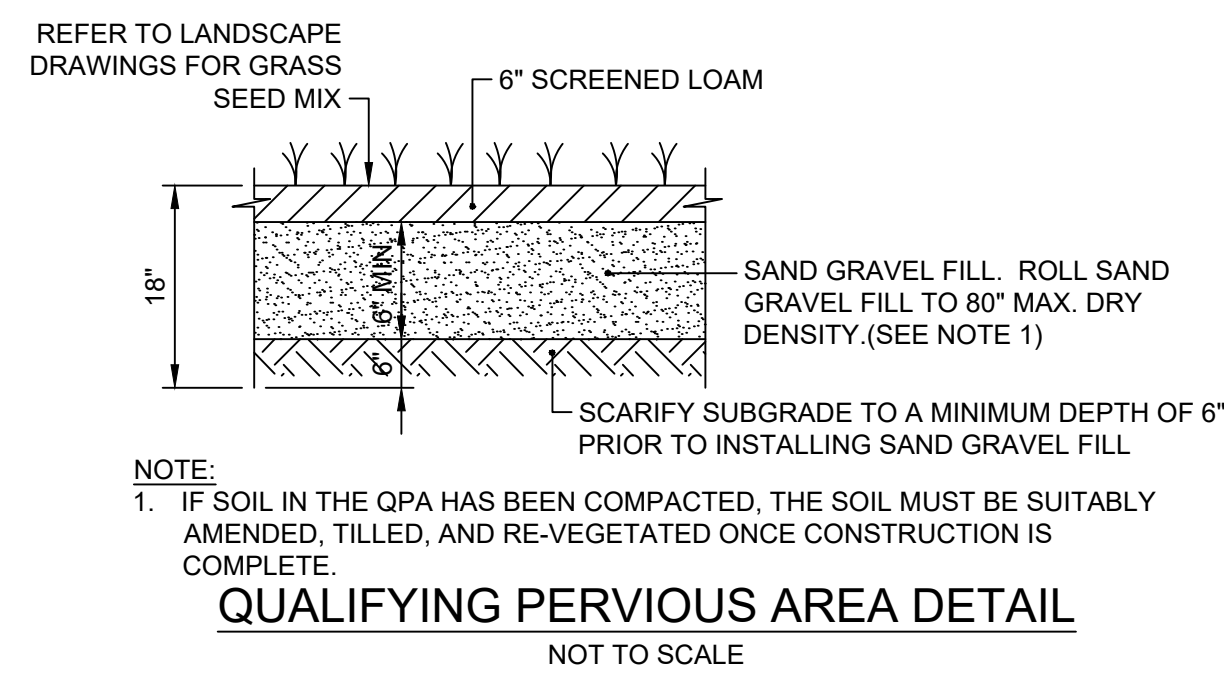
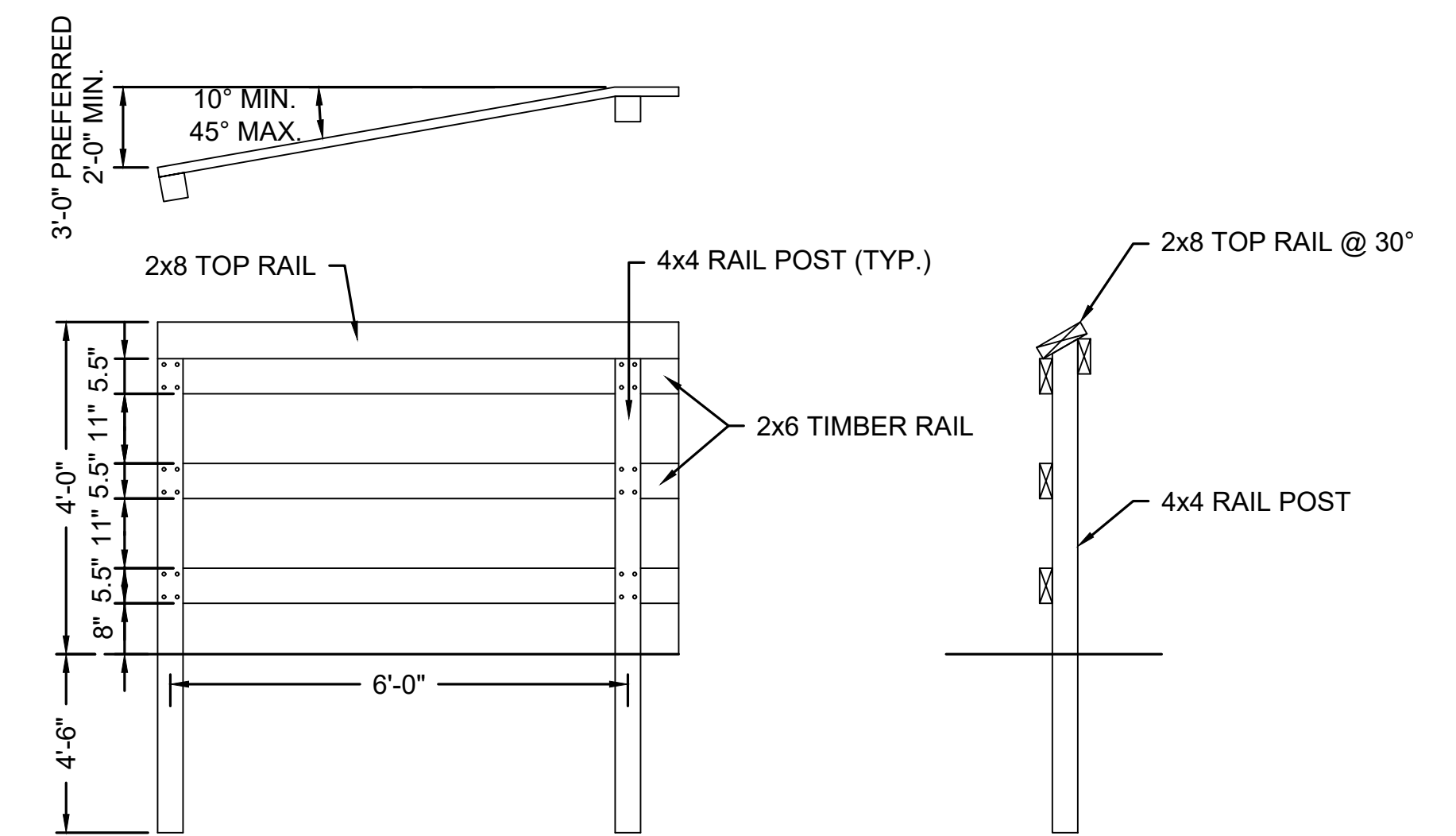
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	50	114
PROJECT FILE NO.		17112.00	

**DETAILS - 4**



- NOTES:**
- DRAIN BASIN SHALL BE CUSTOM MANUFACTURED FOR THE PROJECT WITH THE INLETS AND OUTLETS REQUIRED.
  - STRUCTURES SHALL BE CONSTRUCTED TO WITHSTAND LOADS IMPOSED BY CONSTRUCTION VEHICLES.
  - DRAIN BASIN SHALL BE CONSTRUCTED OF HIGH DENSITY POLYETHYLENE.
  - PROVIDE HOODED OUTLET ON ALL DRAIN BASINS.
  - FRAME AND GRATE SHALL BE CONSTRUCTED OF DUCTILE IRON AND CONFORM TO ASTM A536 GRADE 70-50-05. PROVIDE NYLOPLAST S499CGS OR APPROVED EQUIVALENT.



**BIORETENTION SOIL:** 60% SAND, 10-20% TOPSOIL, 20-30% COMPOST  
ORGANIC CONTENT SHALL BE 1.5%-3%

BIO	A	B	C
(A)	98.50	79.50	64.50
(B)	100.00	81.00	66.00
(C)	99.00	80.00	65.00
(D)	95.25	76.25	61.25

- NOTE:**
- CONTRACTOR SHALL EXCAVATE FILL DOWN TO NATURAL SOILS. REMOVE ALL 'A'-LAYER AND 'B'-LAYER & SOILS. CONSTRUCT SUBGRADE USING COARSE SAND. REFER TO TEST PIT LOGS FOR ELEVATION OF NATURAL SOILS.

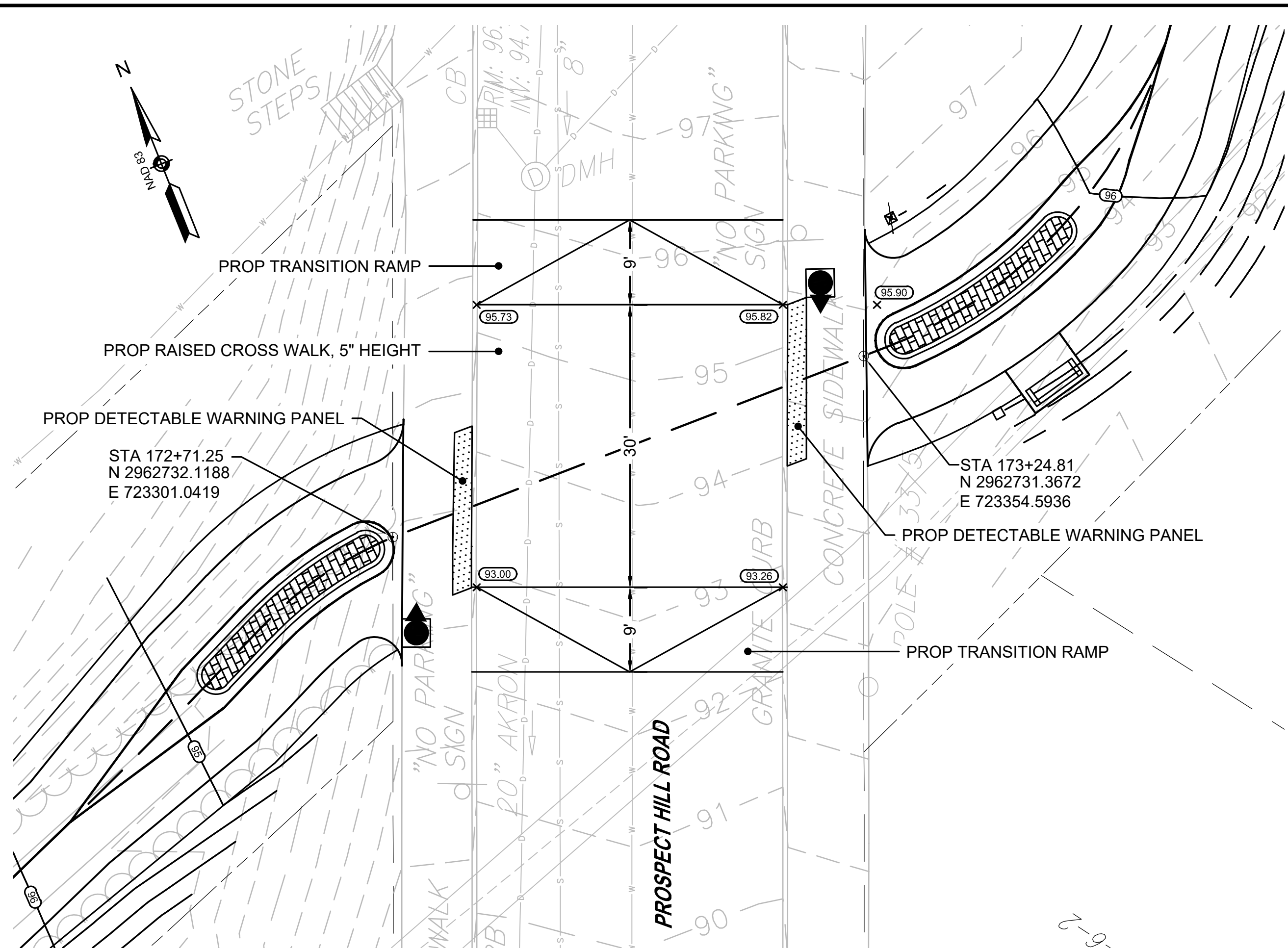
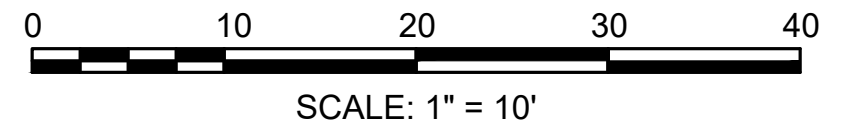
**TRAFFIC SIGN SUMMARY**

IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES)		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA IN SQUARE FEET	TOTAL AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R1-1	18	18	STOP	SEE MUTCD			12	RED	BLACK	BLACK	P5	2.3	27.0
R5-3	24	24	NO MOTOR VEHICLES				13	WHITE	BLACK	BLACK		4.0	52.0
R9-7(MOD)	12	18	↓↑				13	WHITE	BLACK	BLACK		1.5	19.5
R10-3b	9	12	STOP ON RED				4	WHITE	BLACK	BLACK		0.8	3.0
R10-10b	12	18	STOP ON RED				4	WHITE	BLACK	BLACK		1.5	6.0
R10-23	24	30	STOP ON RED				2	WHITE	BLACK	BLACK		5.0	10.0
R10-25	9	12	STOP ON RED				4	WHITE	BLACK	BLACK		0.8	3.0
W11-15	30	30	BIKE SIGNAL				24	YELLOW	BLACK	BLACK		6.3	150.0
W11-15P	24	12	TRAIL X-ING				24	YELLOW	BLACK	BLACK		2.0	48.0
W16-7P	24	12	LEFT TURN				12	YELLOW	BLACK	BLACK		2.0	24.0
W16-9P	24	12	AHEAD				12	YELLOW	BLACK	BLACK		2.0	24.0
<b>TOTAL AREA OF SIGNS (SQUARE FEET)</b>												<b>366.50</b>	

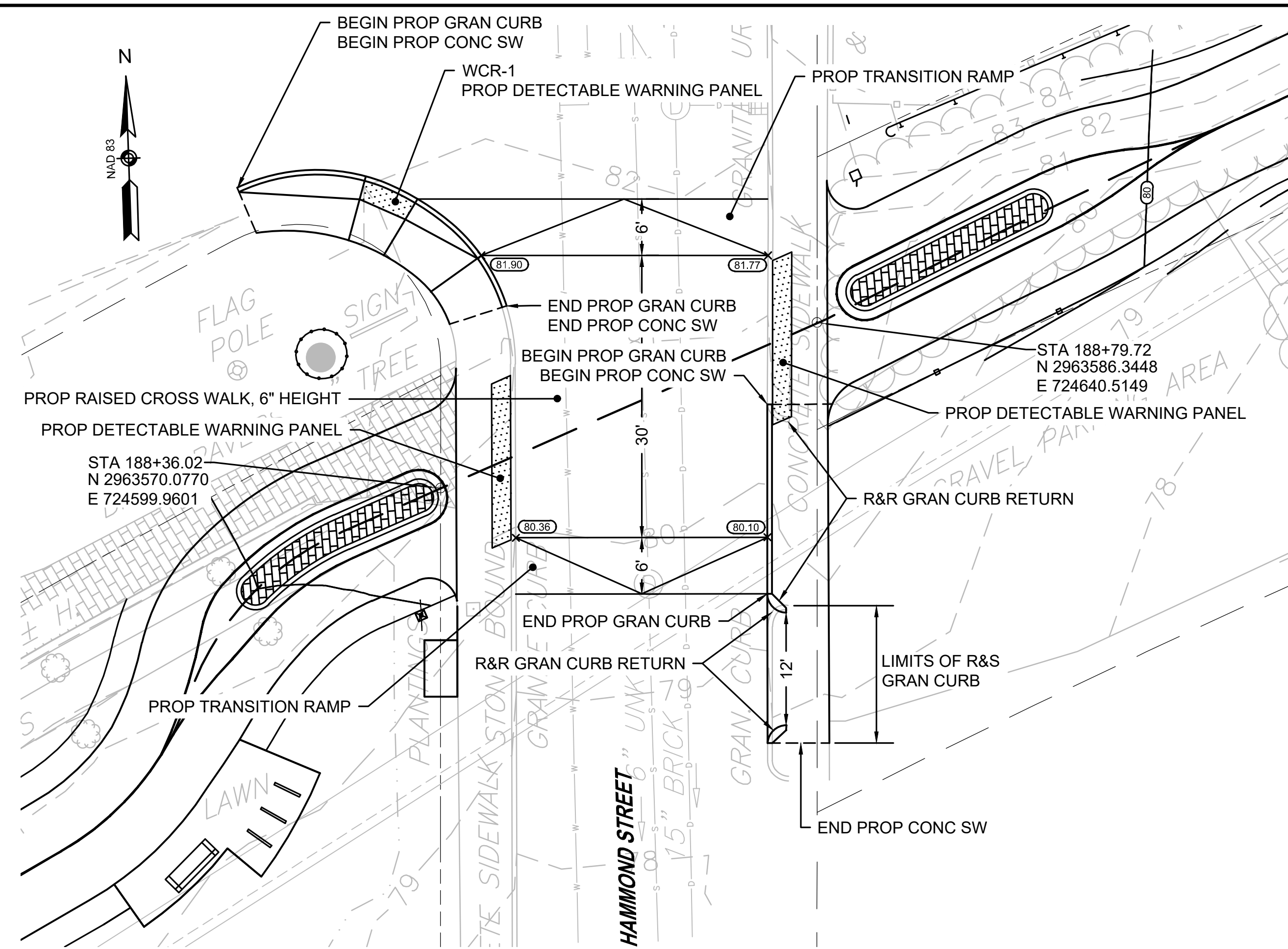
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	51	114
PROJECT FILE NO.		17112.00	

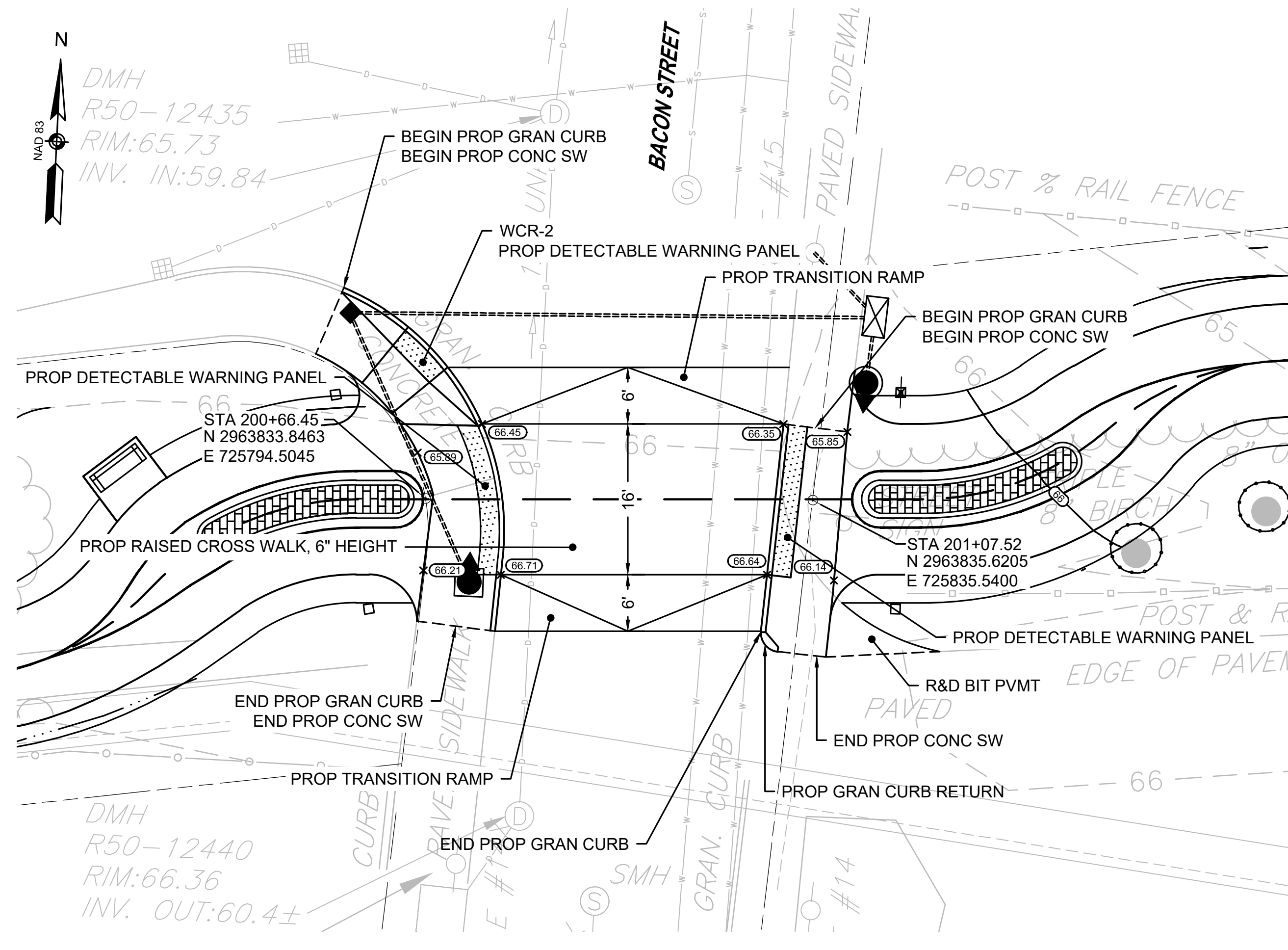
**DETAILS - 5**



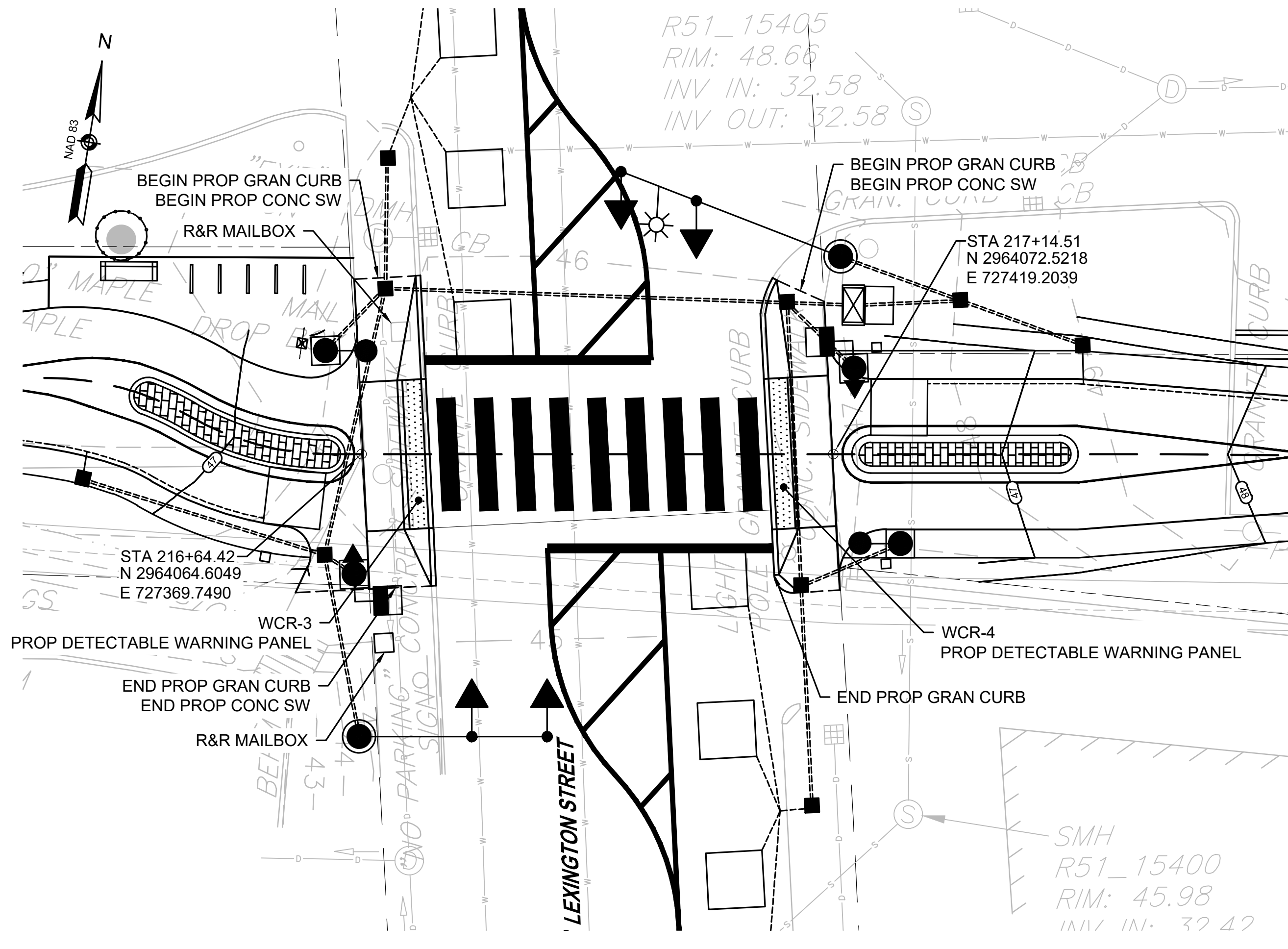
**PROSPECT HILL ROAD CROSSING**



**HAMMOND STREET ROAD CROSSING**



**BACON STREET ROAD CROSSING**

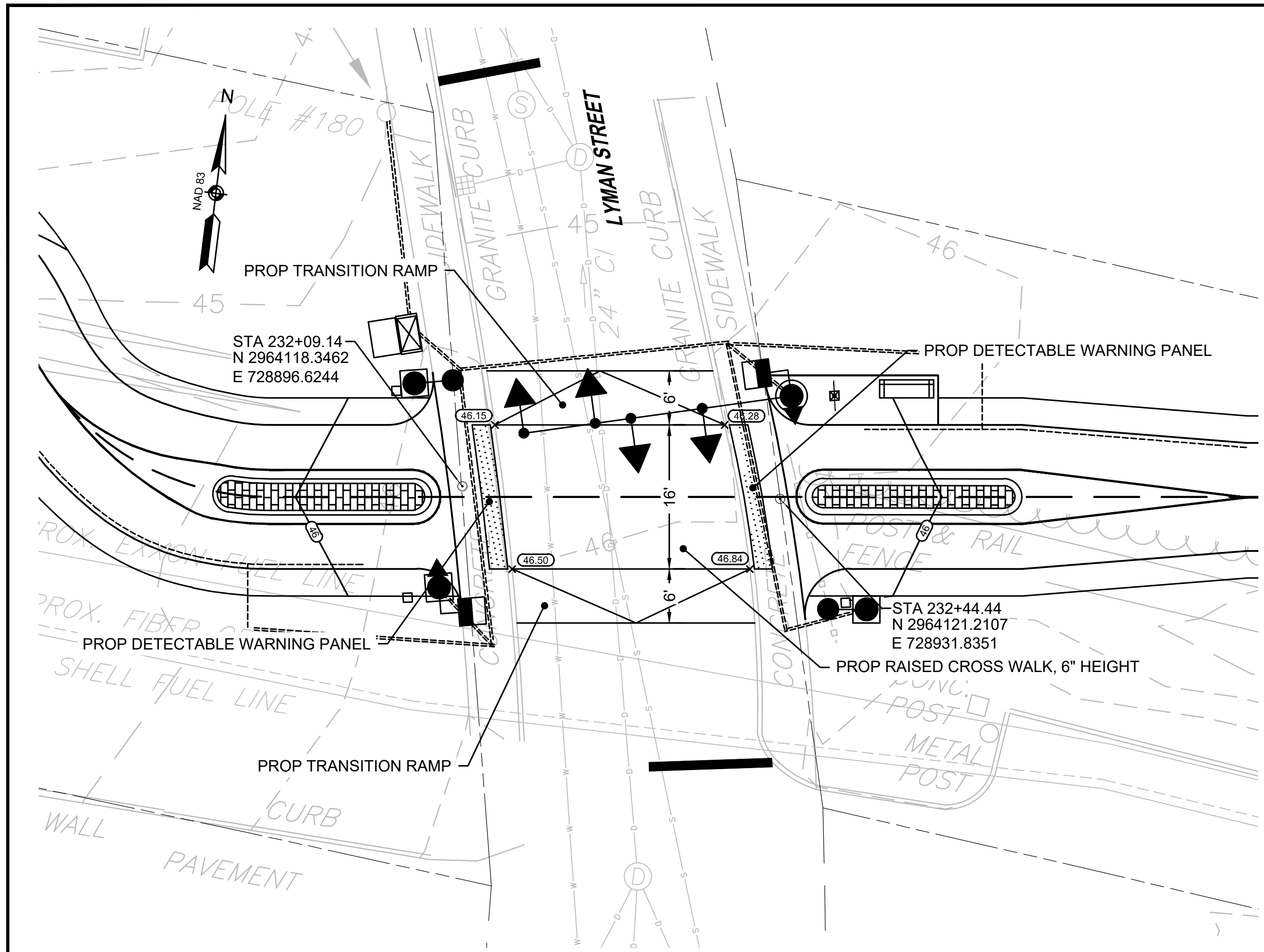
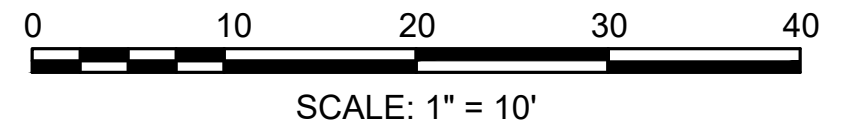


**LEXINGTON STREET ROAD CROSSING**

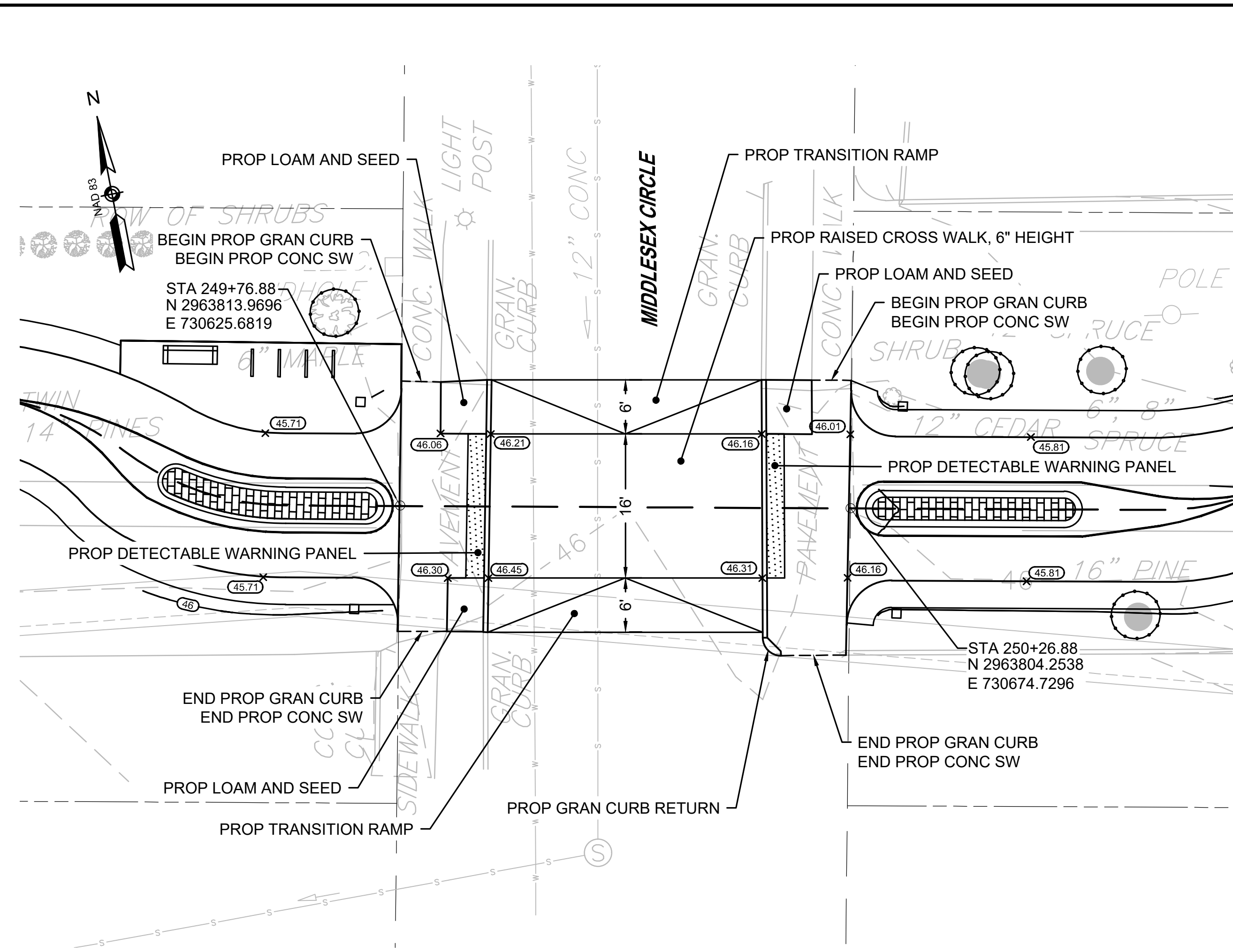
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	52	114
PROJECT FILE NO.		17112.00	

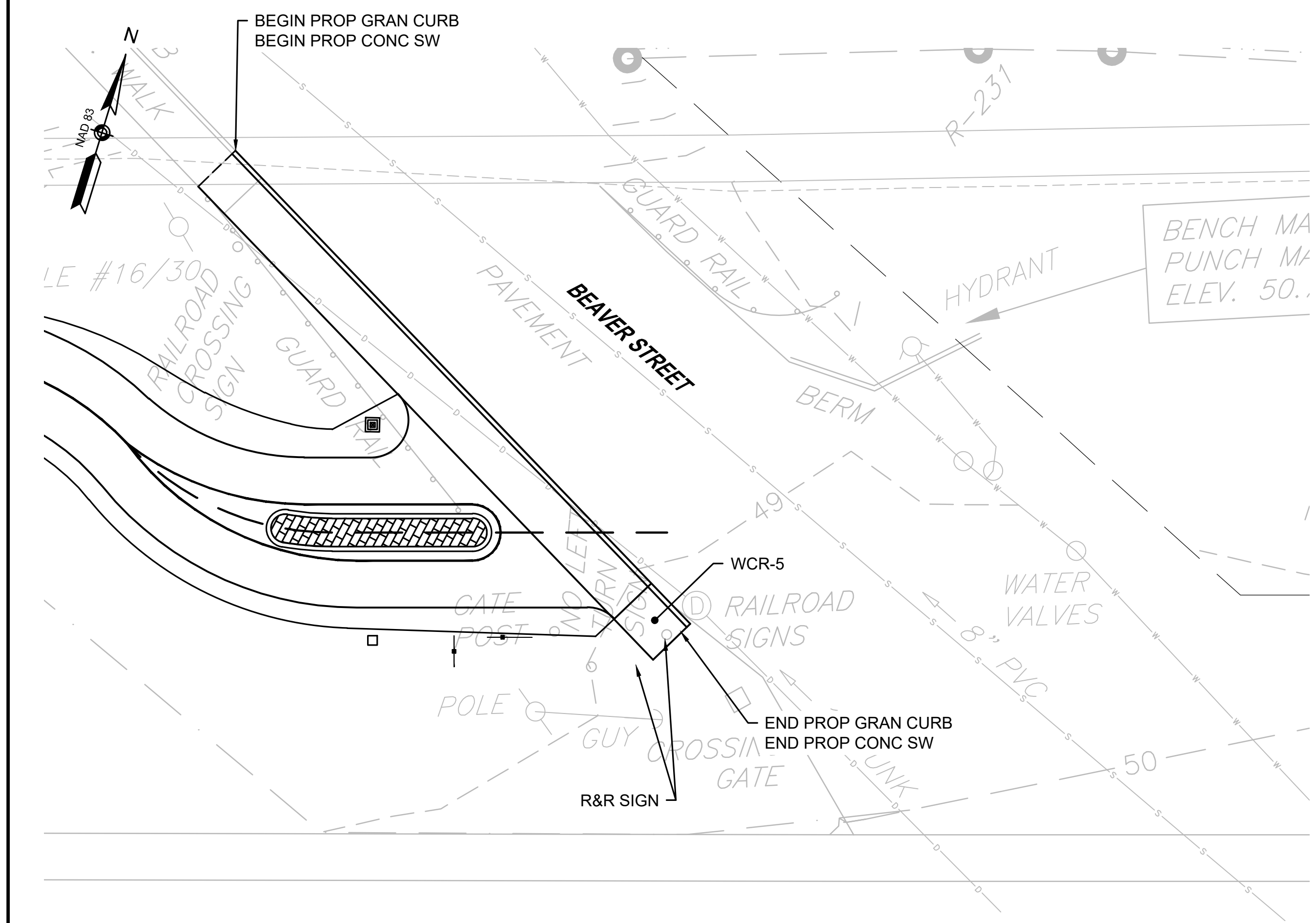
**DETAILS - 6**



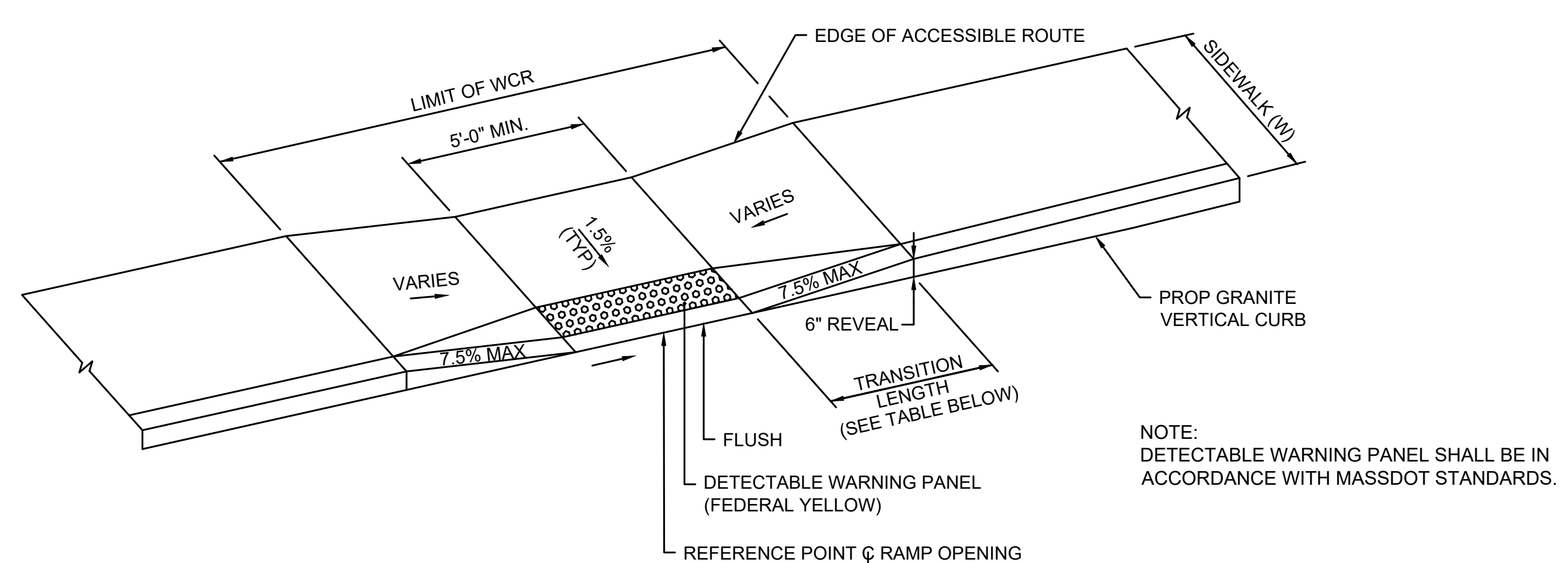
**LYMAN STREET ROAD CROSSING**



**MIDDLESEX CIRCLE ROAD CROSSING**



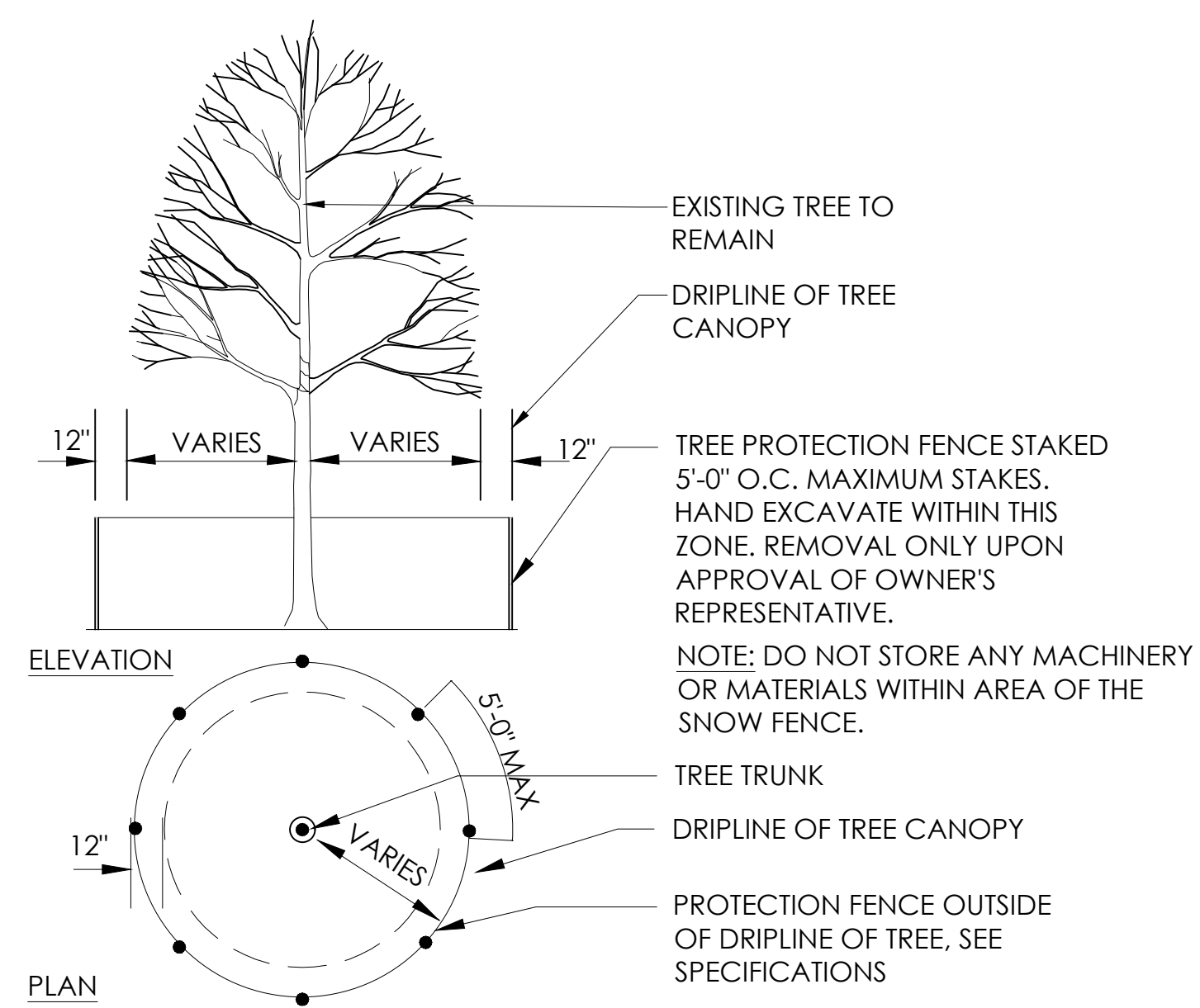
**BEAVER STREET ROAD CROSSING**



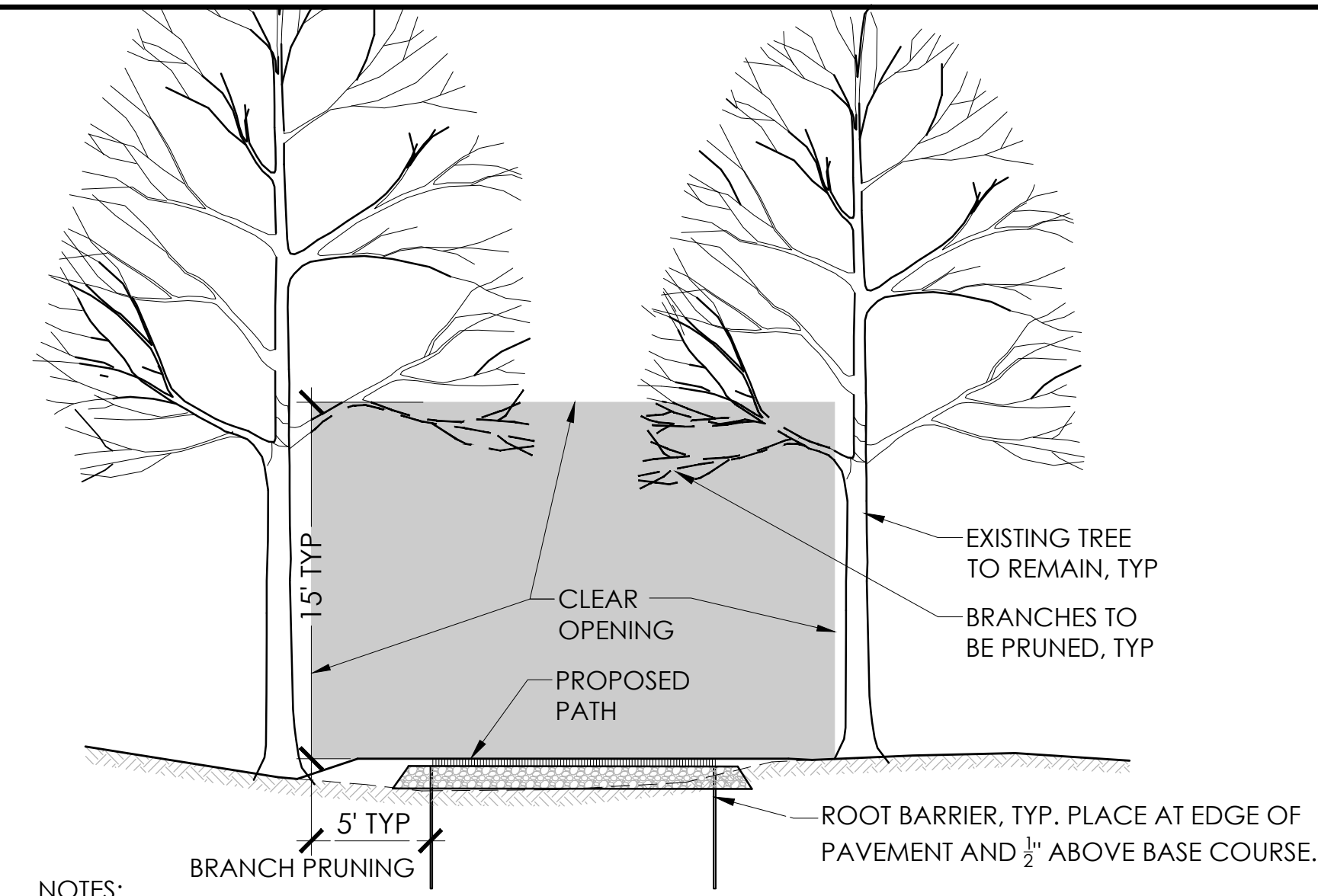
WCR #	RAMP REFERENCE POINT		WIDTH OF SIDEWALK (W)	WIDTH OF RAMP ENTRANCE 5.0' (MIN.)	ROADWAY GUTTER SLOPE	TRANSITION LENGTH	
	STATION	OFFSET				LEFT SIDE	RIGHT SIDE
1	188+44.32	31.44' LT	7.0'	6.0'	-3.50%	9.0'	14.0'
2	200+66.81	16.23' LT	7.5'	6.0'	3.00%	7.0'	6.5'
3	216+71.65	-	7.0'	16.0'	-2.50%	6.5'	11.0'
4	217+07.59	-	7.0'	16.0'	-2.50%	11.0'	5.0'
5	295+87.18	11.90' RT	5.5'	5.0'	2.70%	-	6.5'

**WHEELCHAIR RAMP DETAIL**  
NOT TO SCALE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	53	114
PROJECT FILE NO.		17112.00	

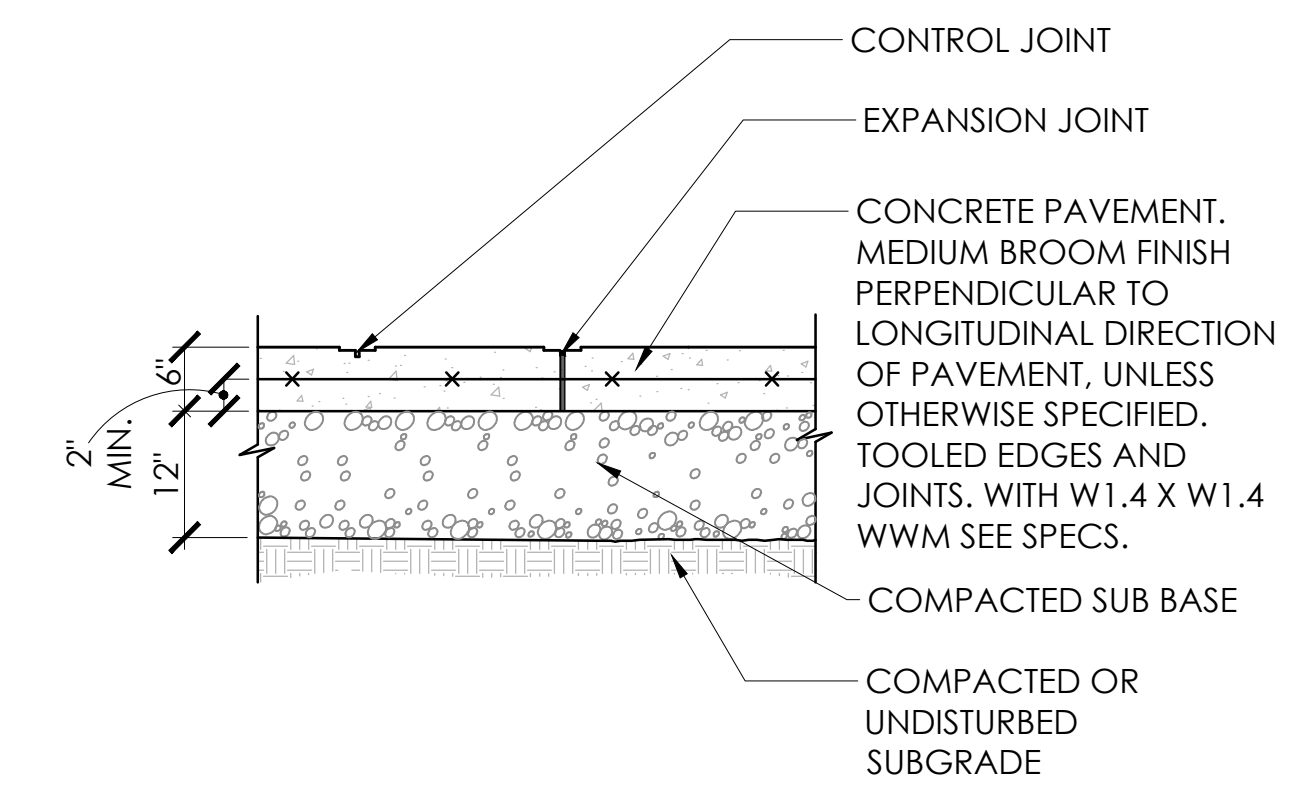


1 TREE PROTECTION

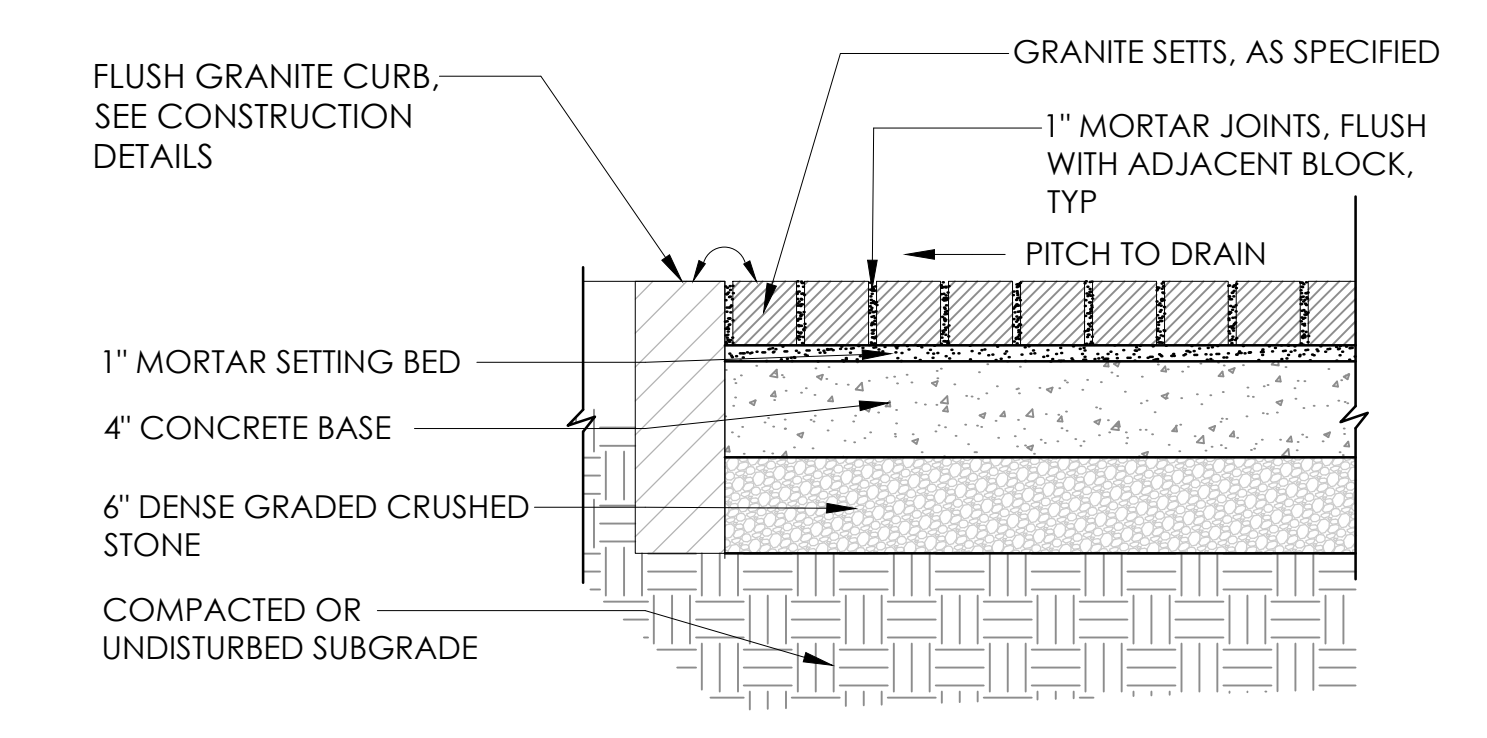


- NOTES:
1. REMOVE ALL EXISTING TREES WITHIN GRADING LIMIT.
  2. BRANCH PRUNING FOR CLEAR OPENING SHALL BE 15' HT AND 5' OFF BOTH SIDES OF PATH, REGARDLESS OF GRADING LIMIT LINE.
  3. STAKE ALL TREES, GREATER THAN 14" CAL, TO BE REMOVED FOR REVIEW BY OWNER'S REPRESENTATIVE PRIOR TO DEMOLITION.
  4. PROVIDE ROOT BARRIER ON BOTH SIDES FOR THE LENGTH OF THE PATH.

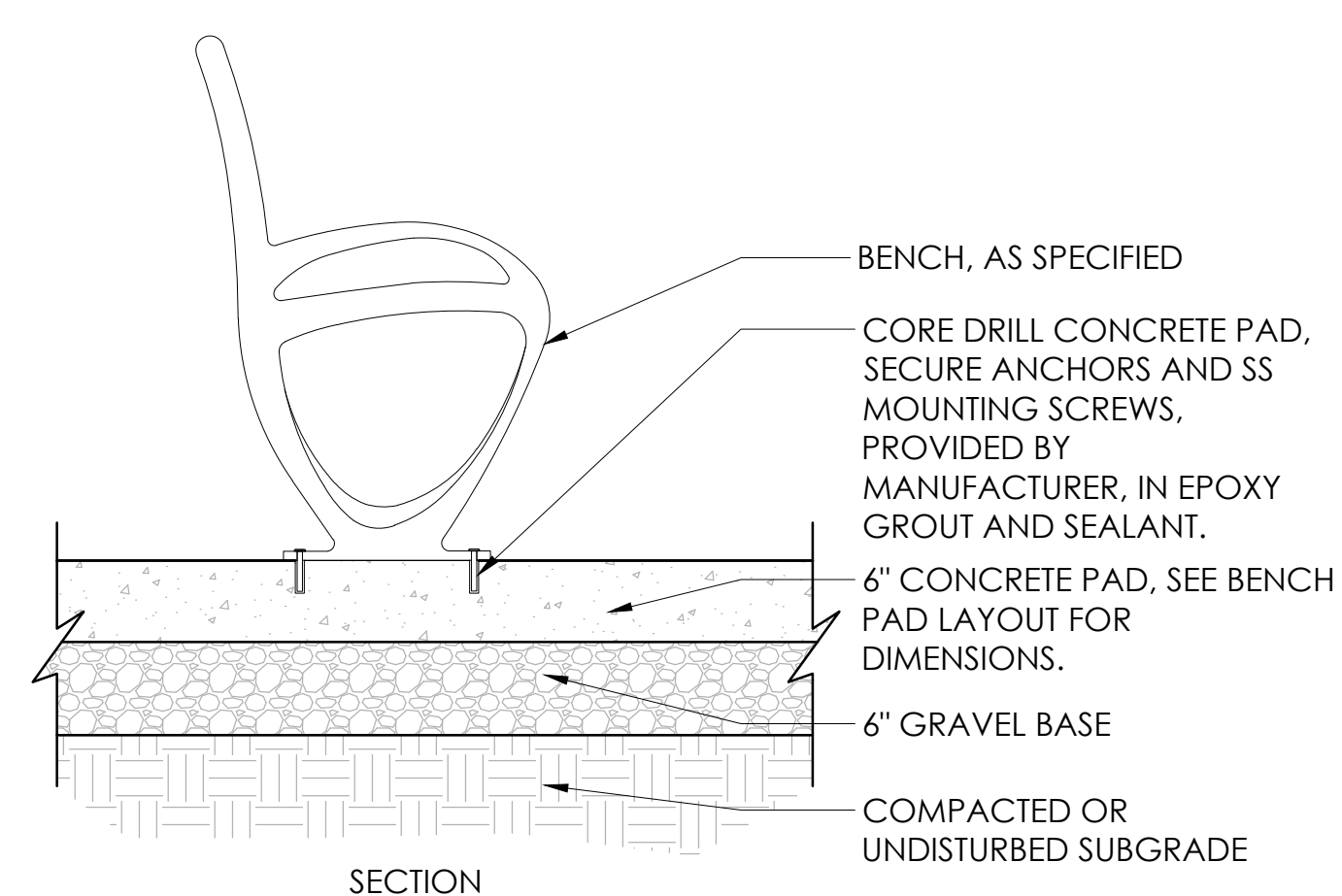
2 CLEARING/PRUNING OF EXISTING TREES



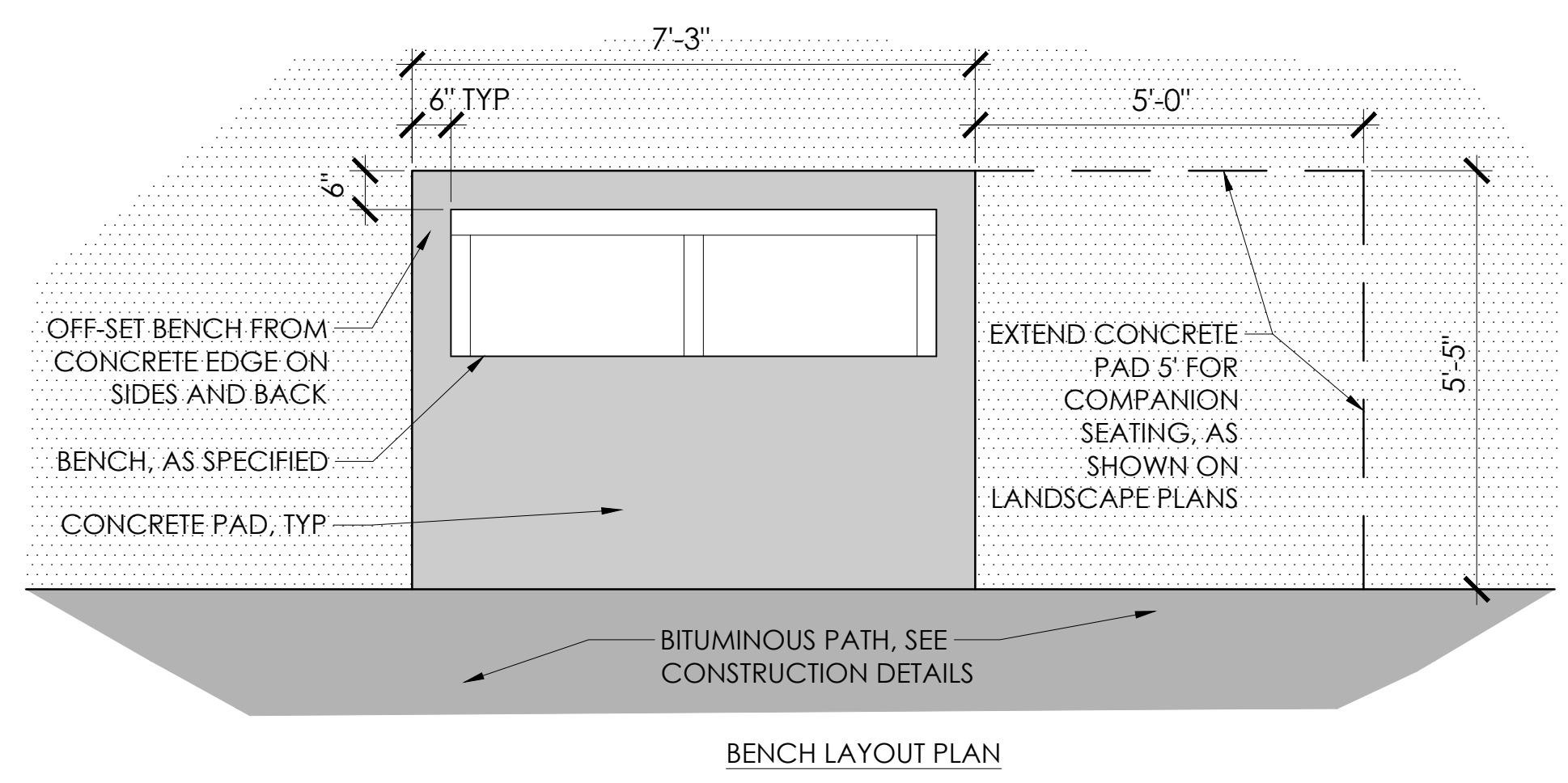
3 CONCRETE PAVING



4 GRANITE SET PAVERS

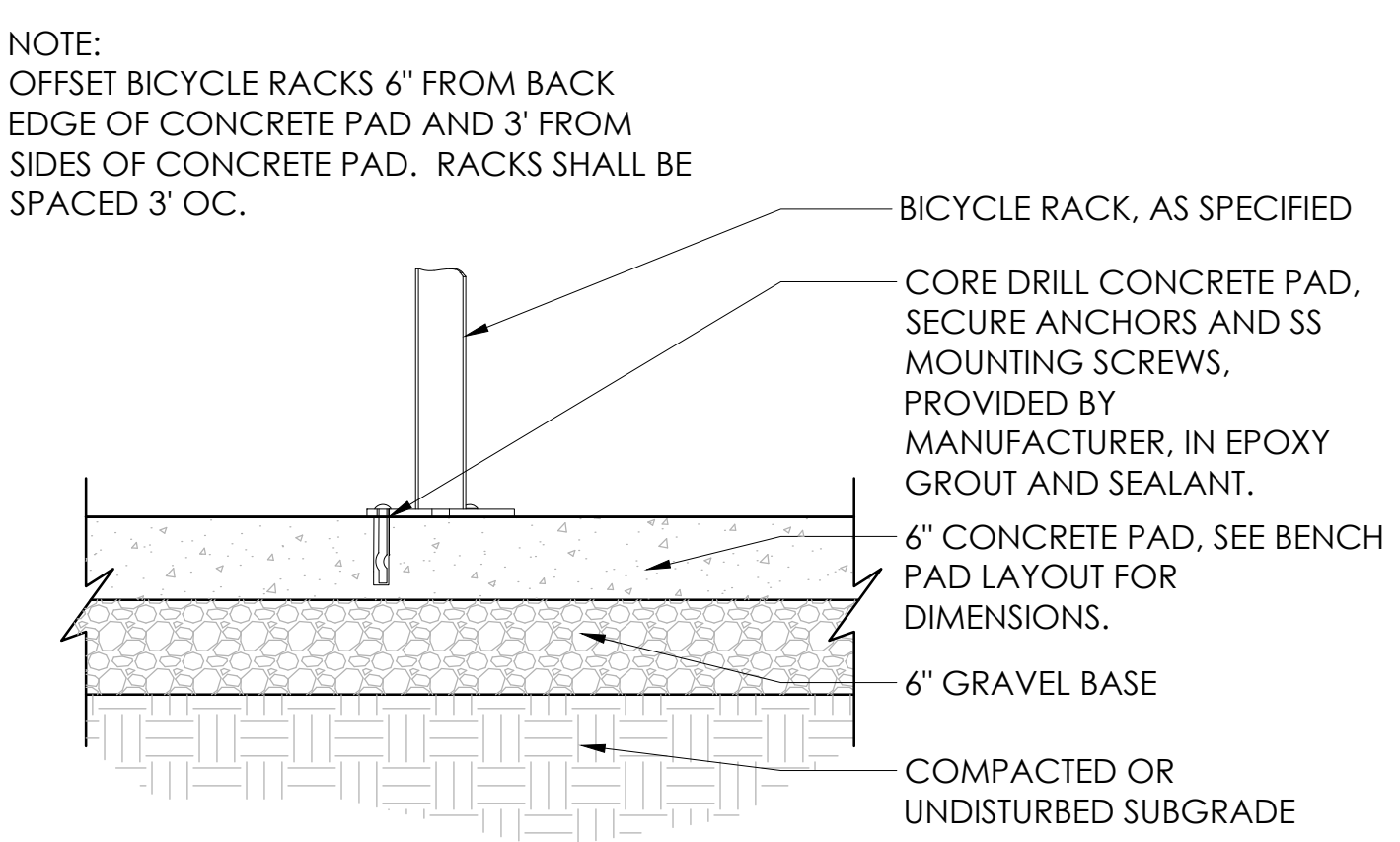


5 SITE BENCH



BENCH SCHEDULE:

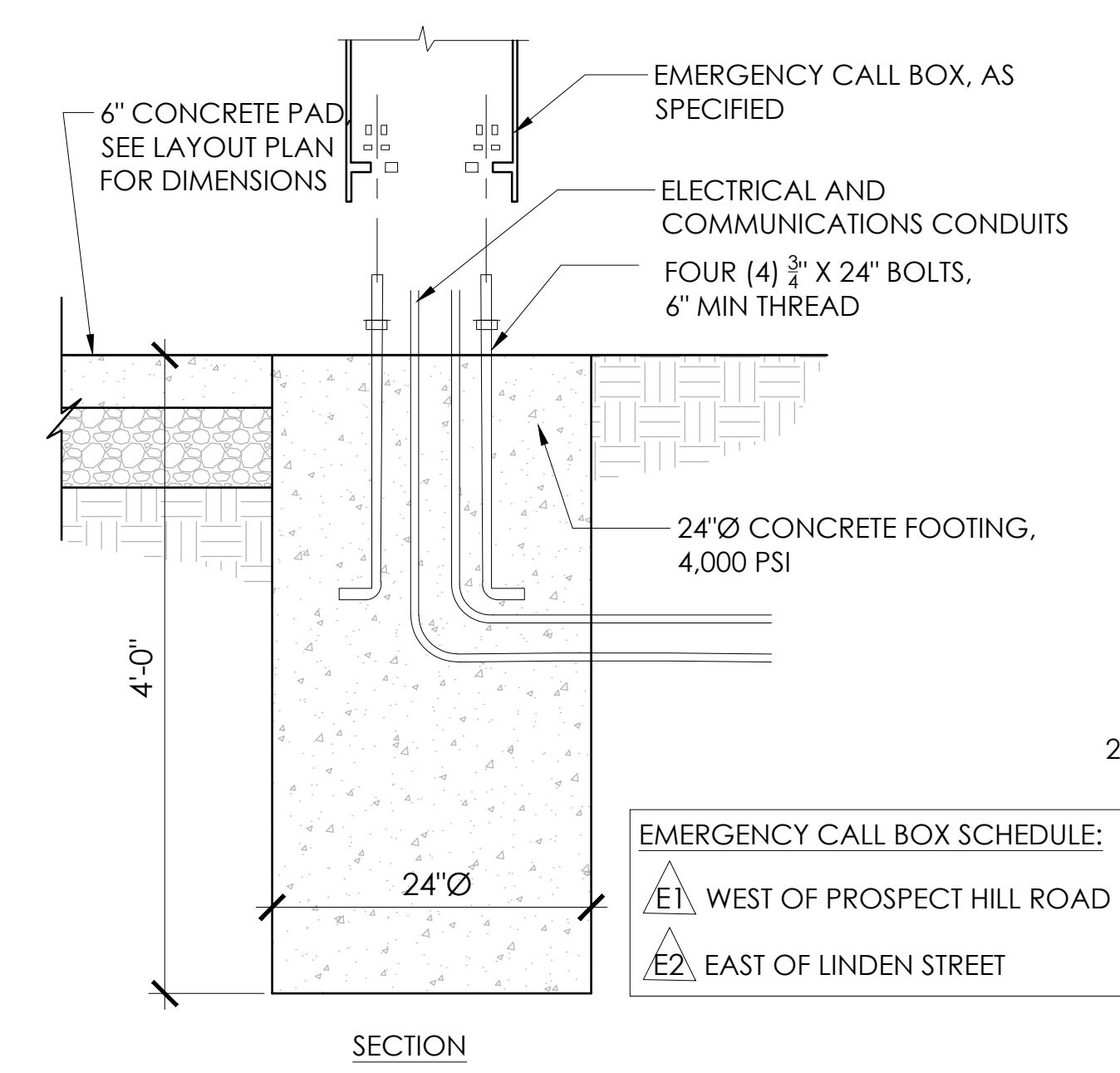
B1 WEST OF PROSPECT HILL ROAD	B9 LYMAN STREET
B2 WEST OF PROSPECT HILL ROAD	B10 MIDDLESEX CIRCLE
B3 PROSPECT HILL ROAD	B11 LINDEN STREET
B4 HAMMOND STREET	B12 EAST OF LINDEN STREET
B5 BACON STREET	B13 WEST BEAVER STREET
B6 EAST OF BACON STREET	B14 BEAVER STREET
B7 LEXINGTON STREET	
B8 EAST OF LEXINGTON STREET	



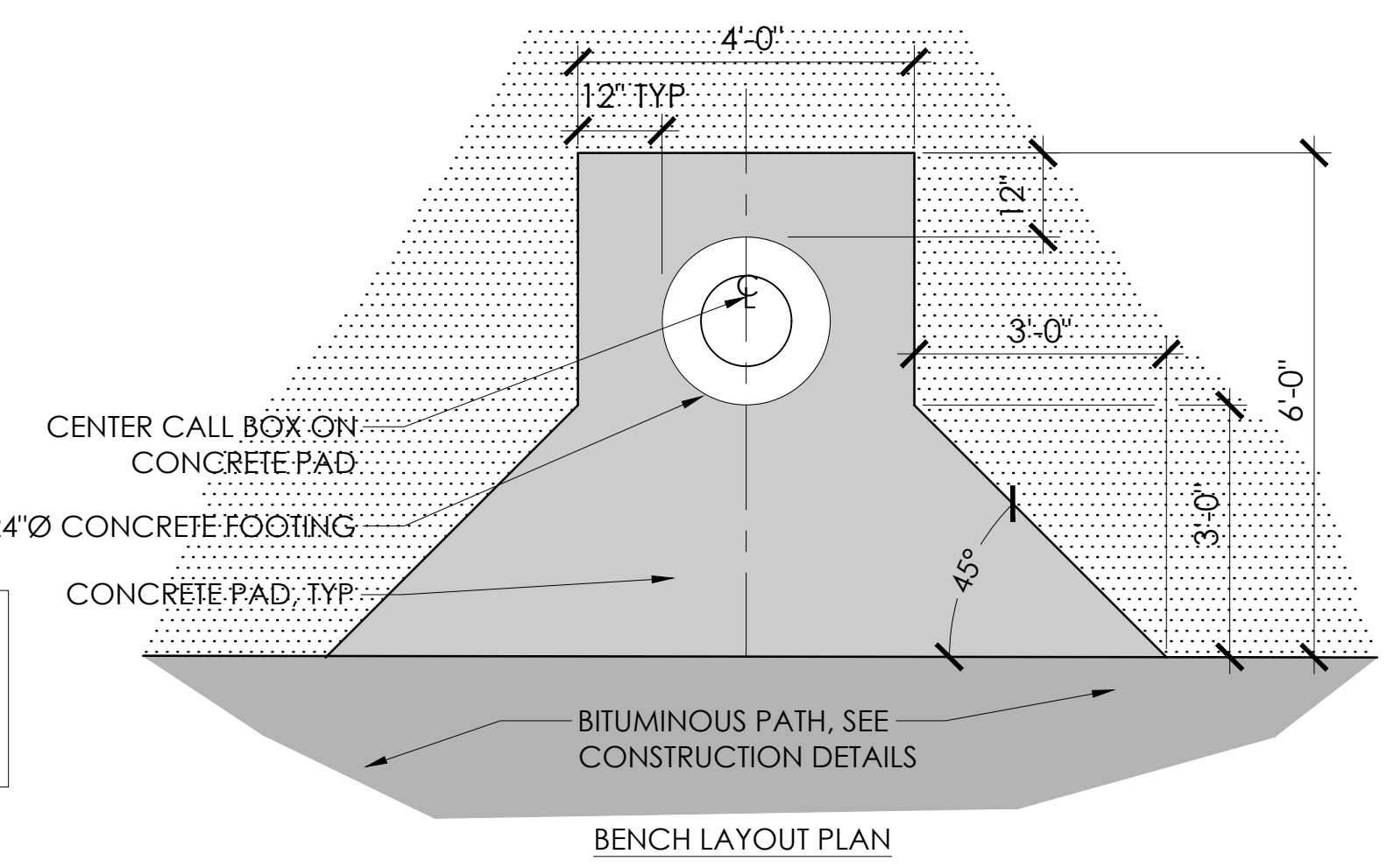
6 BICYCLE RACK

BICYCLE RACK SCHEDULE:

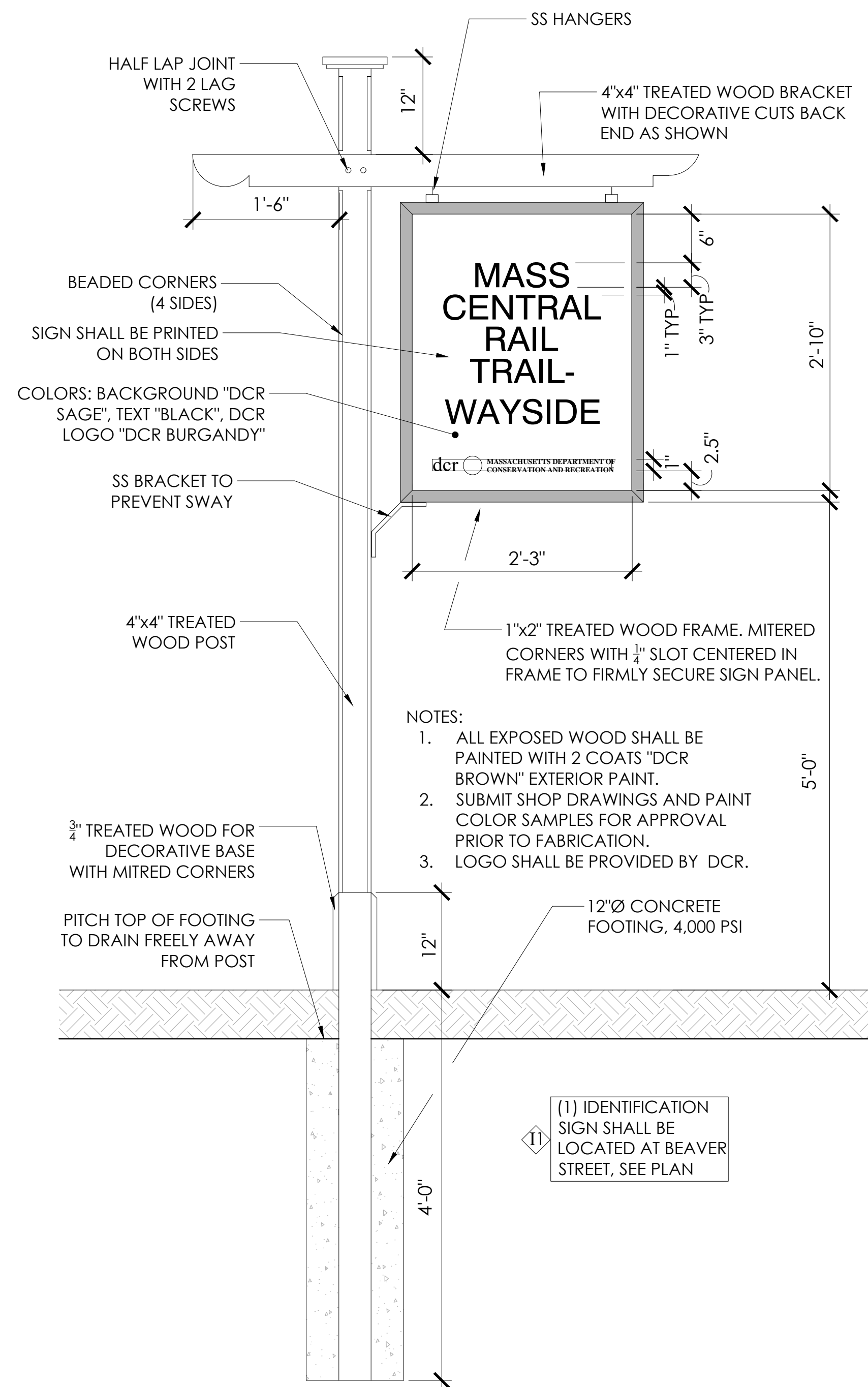
R1 HAMMOND STREET
R2 LEXINGTON STREET
R3 MIDDLESEX CIRCLE



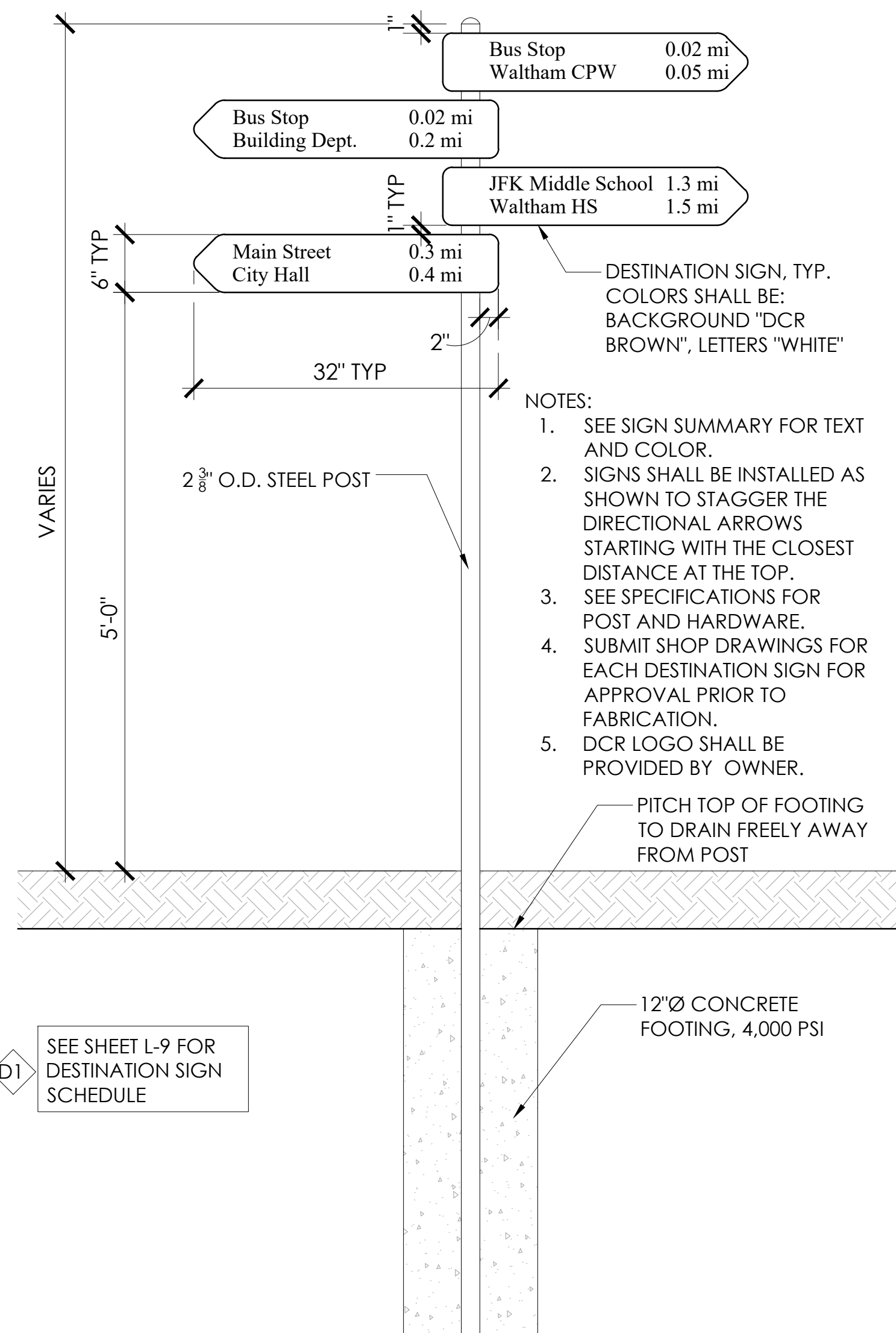
7 EMERGENCY CALL BOX



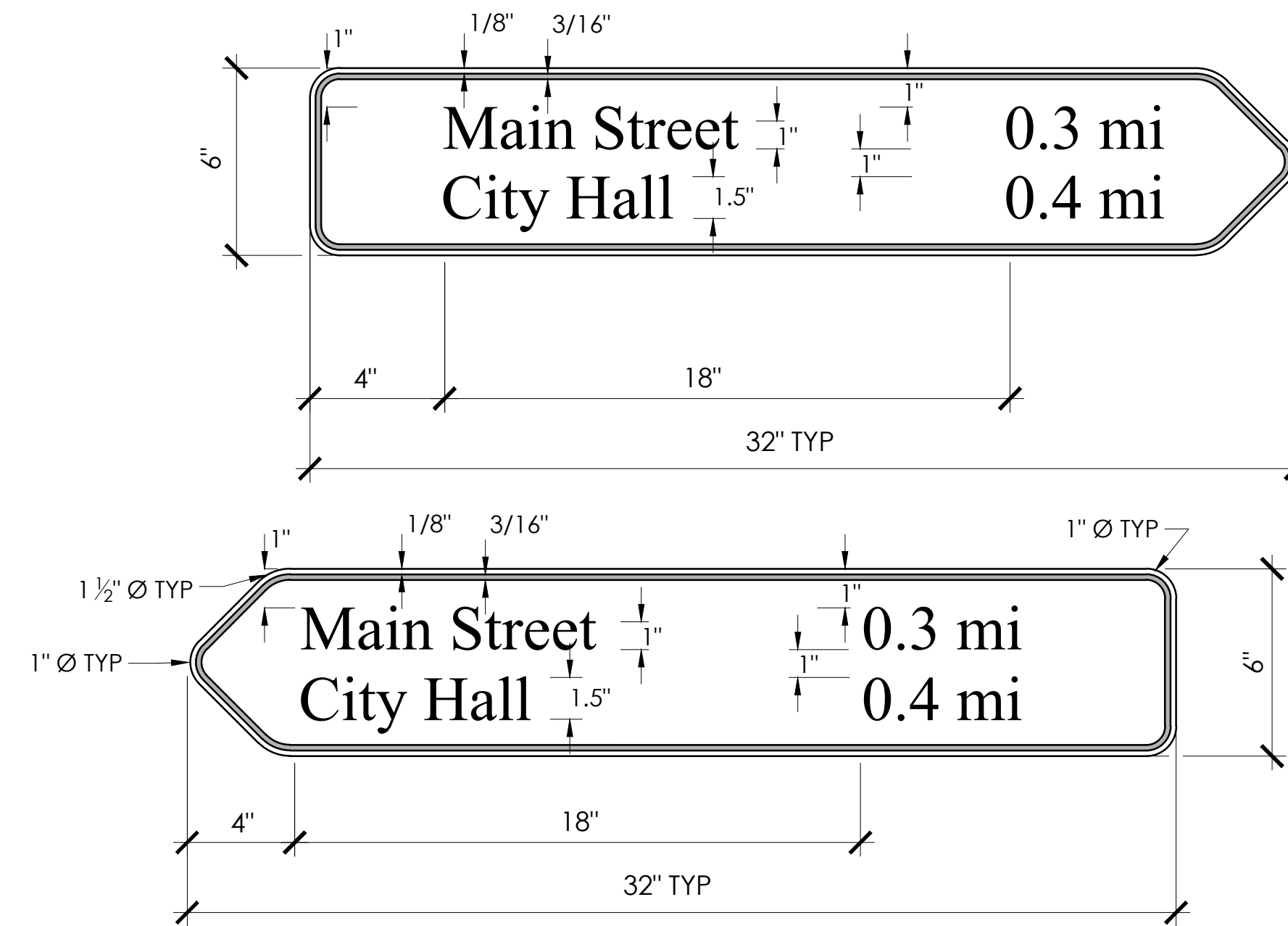
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	54	114
PROJECT FILE NO. 17112.00			



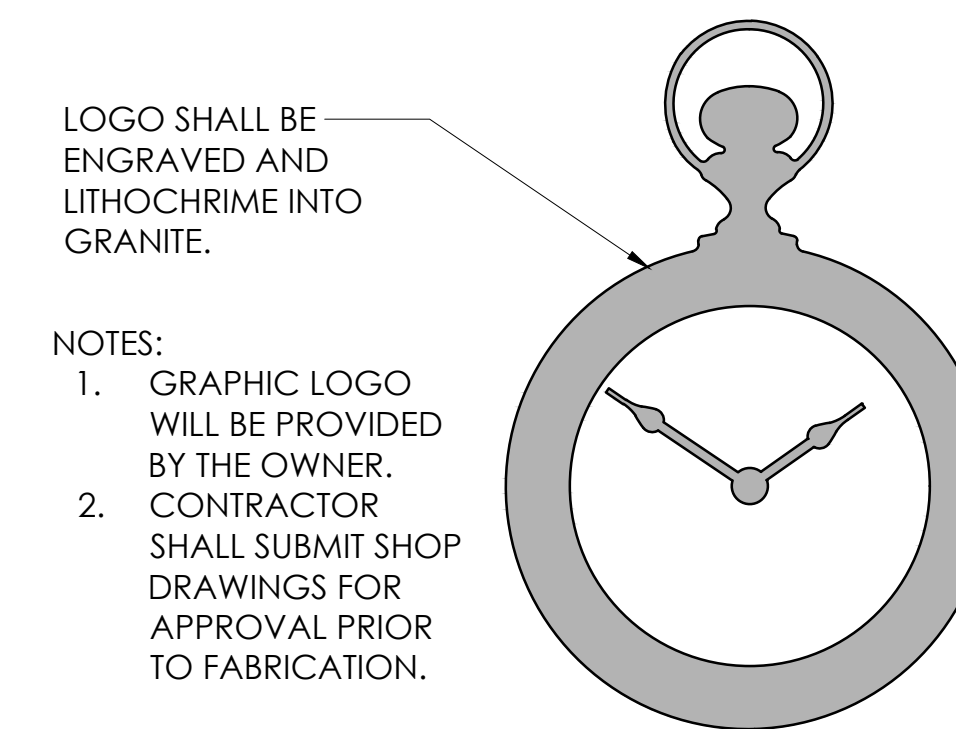
8 IDENTIFICATION SIGN



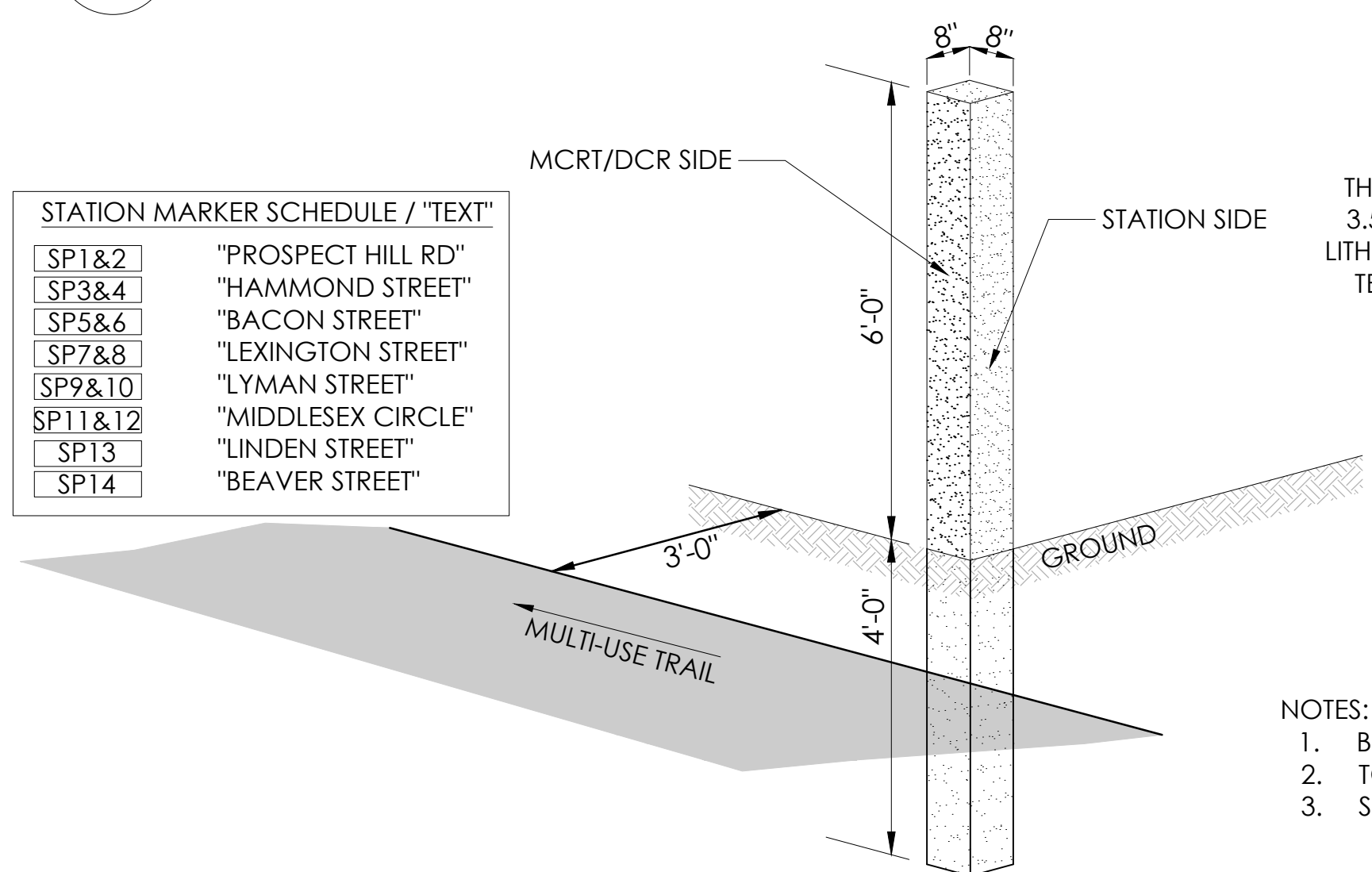
9 DESTINATION SIGN



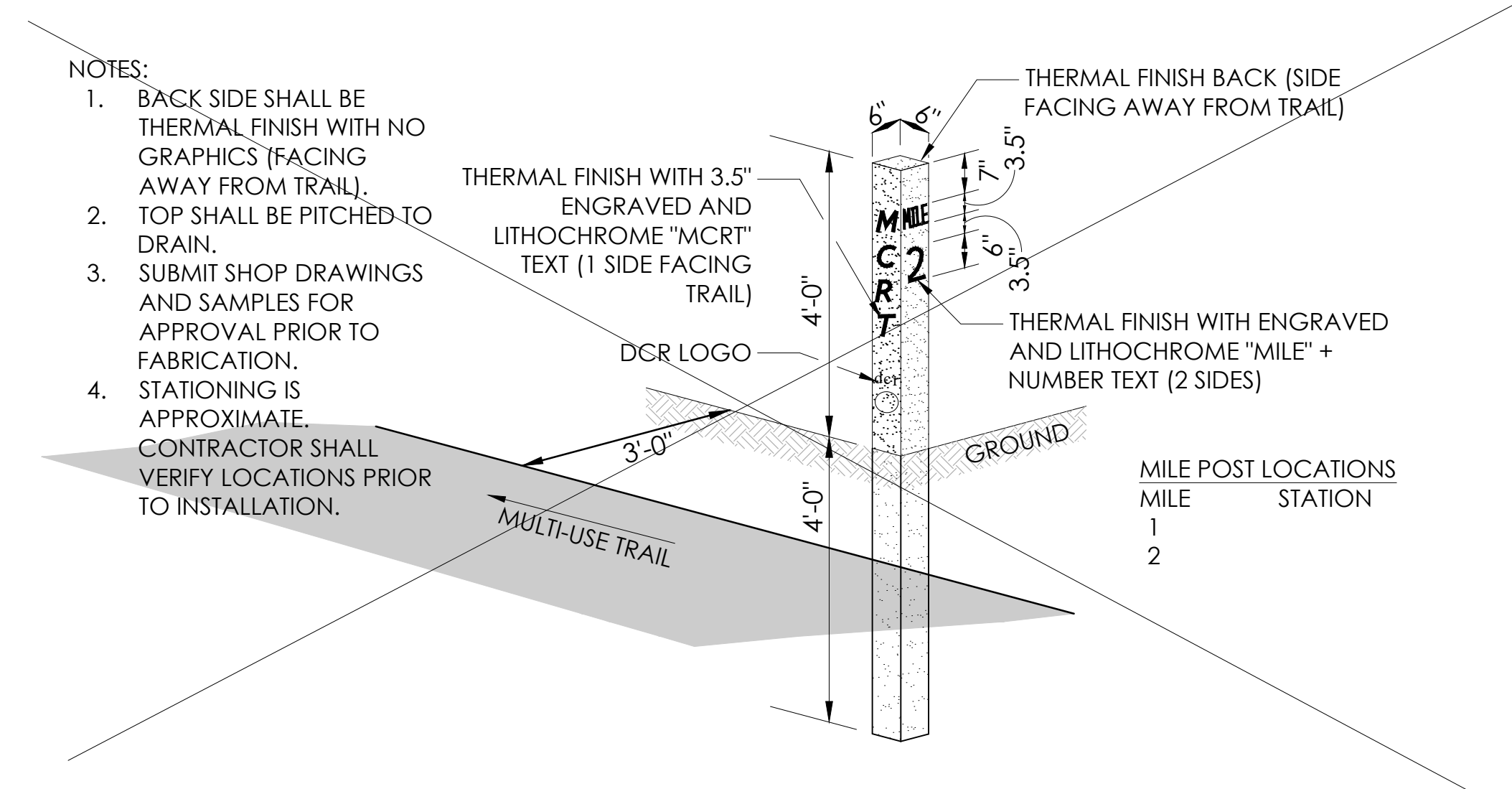
DESTINATION SIGN DIMENSIONS



10 WALTHAM TRAIL LOGO



11 GRANITE STATION PILLAR



12 GRANITE MILE POST - N.I.C.

### PLANT LIST

DECIDUOUS TREES						
QNTY	CODE	LATIN NAME	COMMON NAME	SIZE	ROOTBALL	COMMENTS
32	AcRu	Acer rubrum	Red Maple	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
15	AcPe	Acer pensylvanicum	Striped Maple	1 1/2"-2" CALIPER	B&B	6' BRANCHING HT
16	AcSa	Acer saccharum	Sugar Maple	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
8	BeNi	Betula nigra 'Heritage'	Heritage River Birch	10'-12' HT	B&B	MULTI-STEM
7	BePo	Betula populifolia	Gray Birch	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
4	CaCa	Carpinus caroliniana	American Hornbeam	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
8	FaGr	Fagus grandifolia	American Beech	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
5	LiSt	Liquidambar styraciflua	Sweet Gum	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
11	LiTu	Liriodendron tulipifera	Tulip Tree	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
20	NySy	Nyssa sylvatica	Black Gum	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
3	OsVi	Ostrya virginiana	American Hop Hornbeam	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
3	PlOc	Platanus occidentalis	Sycamore	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
5	PrSe	Prunus serotina	Black Cherry	2"-2 1/2" CALIPER	B&B	6' BRANCHING HT
4	QuAl	Quercus alba	White Oak	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
3	QuPa	Quercus palustris	Pin Oak	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
1	QuRu	Quercus rubra	Northern Red Oak	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
15	SaAl	Sassafras albinum	Sassafras	2 1/2"-3" CALIPER	B&B	6' BRANCHING HT
EVERGREEN TREES						
7	AbFr	Abies fraseri	Fraser Fir	8'-10' HT	B&B	FULL TO GROUND
1	JuVi	Juniperus virginiana	Eastern Red Cedar	8'-10' HT	B&B	FULL TO GROUND
3	PiGl	Picea glauca	White Spruce	8'-10' HT	B&B	FULL TO GROUND
1	PiMa	Picea mariana	Black Spruce	8'-10' HT	B&B	FULL TO GROUND
19	PiSt	Pinus strobus	White Pine	8'-10' HT	B&B	FULL TO GROUND
19	ThOc	Thuja occidentalis	Eastern arbovitae	8'-10' HT	B&B	FULL TO GROUND
FLOWERING TREES						
15	AmCa	Amelanchier canadensis	Shadbush	8'-10' HT	B&B	MULTI-STEM
5	CeCa	Cercis canadensis	Eastern Redbud	8'-10' HT	B&B	MULTI-STEM
27	CoFl	Cornus florida	Flowering Dogwood	8'-10' HT	B&B	
BIORETENTION AREA PLANTS						
16	CiAl	Clethra alnifolia 'Hummingbird'	Hummingbird Sweet Pepperbush	18"-24" HT.	CONT.	COMPACT FORM
19	CoSe	Cornus sericea 'Farrow'	Farrow Redosier Dogwood	18"-24" HT	CONT.	COMPACT FORM
9	FaGa	Fothergilla gardenii	Dwarf Fothergilla	18"-24" HT	CONT.	COMPACT FORM
7	IIGl	Ilex glabra 'Compacta'	Compact Inkberry	24"-30" HT	CONT.	COMPACT FORM
7	KaLa	Kalmia latifolia	Mountain Laurel	24"-30" HT	CONT.	COMPACT FORM
12	RoVa	Rhododendron vaseyi	Pinkshell Azalea	24"-30" HT	CONT.	
BIORETENTION AREA PLANTS						
13	AnPD	Aster novae-angliae 'Purple Dome'	Purple Dome Aster	#2	CONT.	MATURE SIZE: 18" HT x 36" SPD
16	BeNi	Betula nigra 'Heritage'	Heritage River Birch	10'-12' HT	B&B	MULTI-STEM
9	CaHu	Clethra alnifolia 'Hummingbird'	Hummingbird Sweet Pepperbush	18"-24" HT	CONT.	COMPACT FORM
30	CsFa	Cornus sericea 'Farrow'	Farrow Redosier Dogwood	18"-24" HT	CONT.	COMPACT FORM
15	IgCo	Ilex glabra 'Compacta'	Compact Inkberry	24"-30" HT	CONT.	COMPACT FORM
125	LsKo	Liatris spicata 'Kobold'	Kobold Marsh Blazing Star	#1	CONT.	MATURE SIZE: 12" HT x 12" SPD
45	LoCa	Loebelia cardinalis	Cardinal Flower	#2	CONT.	MATURE SIZE: 24" HT x 24" SPD
31	PaRR	Panicum virgatum 'Ruby Ribbons'	Ruby Ribbons Switch Grass	#2	CONT.	MATURE SIZE: 36" HT x 30" SPD
7	ScSc	Schizachyrium scoparium	Little Bluestem	#2	CONT.	

SMALL TREES SHALL BE A MIX OF THE FOLLOWING CONSERVATION-GRADE TREES. SIZE: 3'-4' HT, ROOTBALL: #2 CONTAINER, AS AVAILABLE FROM NEW ENGLAND WETLAND PLANTS, INC.

**SHADE SLOPES**  
 Abies balsamea Balsam Fir  
 Acer saccharum Sugar Maple  
 Nyssa sylvatica Black Gum  
 Picea mariana Black Spruce  
 Pinus strobus White Pine  
 Quercus bicolor Swamp White Oak  
 Quercus prinus Chestnut Oak  
 Quercus rubra Red Oak

**SUN SLOPES**  
 Betula populifolia Gray Birch  
 Juniperus virginiana Eastern Red Cedar  
 Liriodendron tulipifera Tulip Tree  
 Platanus occidentalis Sycamore  
 Populus deltoides Cottonwood  
 Populus tremuloides Quaking Aspen  
 Prunus serotina Black Cherry  
 Quercus palustris Pin Oak  
 Sorbus americana Mountain Ash

### SEED MIXES

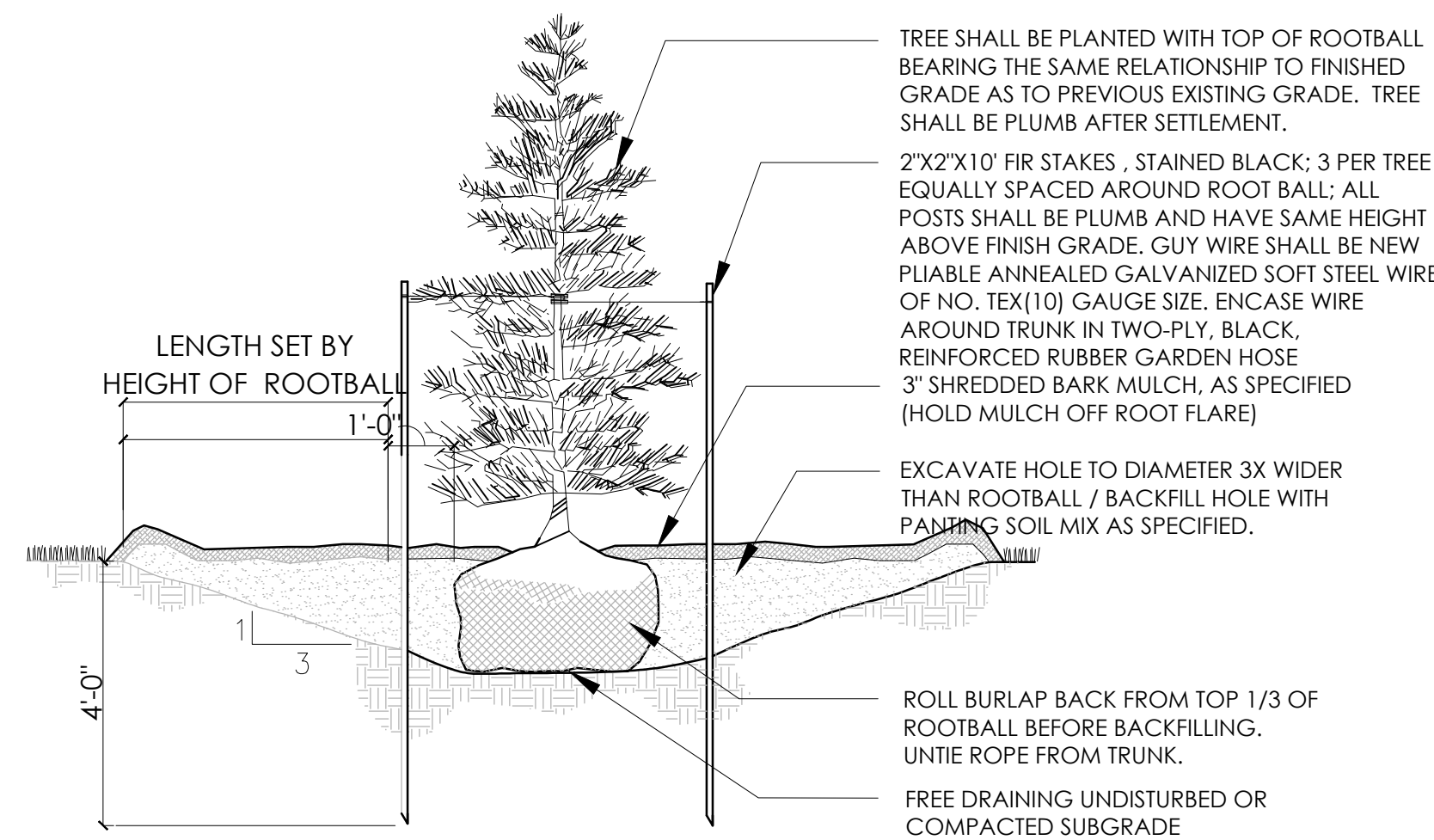
**WOODLAND SEED MIX** SHALL BE: New England Roadside Matrix Upland Seed Mix, as available through New England Wetland Plants, Inc., or approved equal.

**FOREBAY SEED MIX** SHALL BE: Retention Basin Floor Mix - Low Maintenance, as available through Ernst Seed, or approved equal.

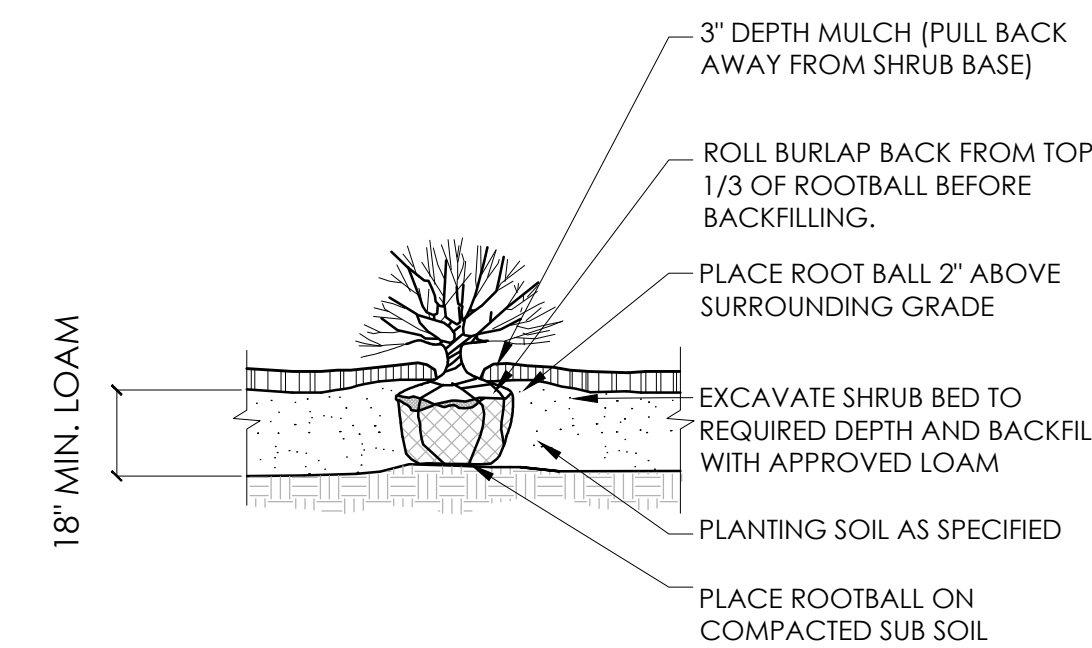
### DESTINATION SIGNAGE SCHEDULE

FINAL TEXT SHALL BE CHOSEN BY THE OWNER DURING SHOP DRAWING REVIEW

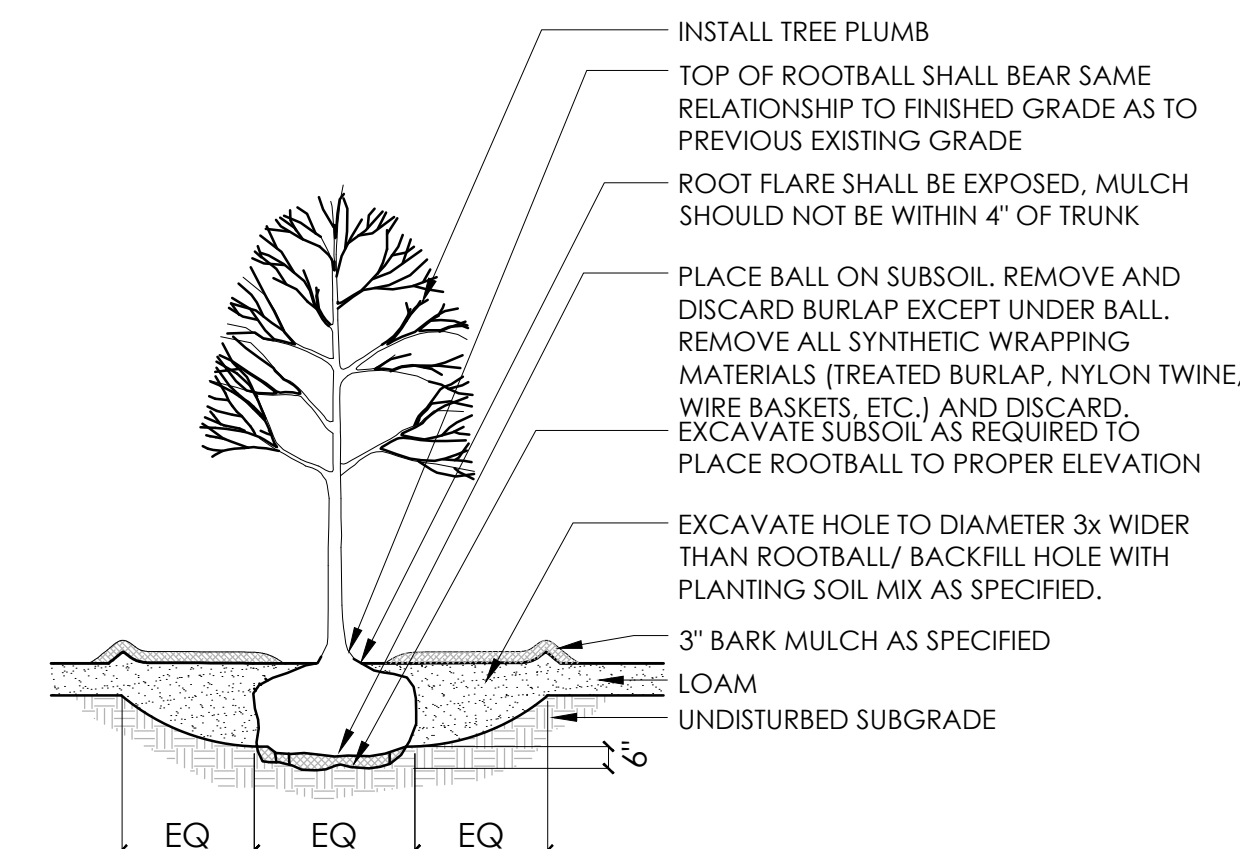
STATION/ CROSSING	DIRECTION FROM TRAIL	"TEXT" (LINE 1 AND LINE 2) PER PANEL	
157+90	north	"Berry Park	0.3 mi"
	south	"Prospect Hill Park "Main Street"	0.4 mi" 0.1 mi"
PROSPECT HILL ROAD	north	"Bus Stop"	0.04 mi"
	south	"Bus Stop"	0.07 mi"
HAMMOND STREET	north	"Bus Stop"	0.04 mi"
	south	"Main Street"	0.2 mi"
BACON STREET	north	"Bus Stop"	0.08 mi"
	north	"Plympton School "Leary Field"	0.1 mi" 0.1 mi"
	north	"Chester Brook Grnwyr "JFK School"	1.4 mi" 1.4 mi"
	north	"Waltham HS "Bus Stop"	1.5 mi" 0.04 mi"
	south	"Main Street"	0.3 mi"
LEXINGTON STREET	north	"CPW"	0.05 mi"
	north	"Bus Stop"	0.1 mi"
	north	"JFK School"	1.3 mi"
	north	"Waltham HS "Bus Stop"	1.5 mi" 0.02 mi"
	south	"Building Dept "Main Street"	0.2 mi" 0.3 mi"
	south	"City Hall"	0.4 mi"
LYMAN STREET	north	"Bus Stop"	0.2 mi"
	north	"Lyman Estate "Western Grnwyr Trail"	0.3 mi" 0.4 mi"
	north	"Stonehurst "McDevitt School"	0.6 mi" 0.3 mi"
	south	"Charles River"	0.3 mi"
LINDEN STREET (top of ramp) (bottom of ramp)	north	"Linden Street"	0.4 mi"
	north	"Bus Stop"	0.4 mi"
	north	"Beaver Street "Bentley University "District Court"	0.5 mi" 0.2 mi" 0.2 mi"
	south	"Main Street "Charles River"	0.3 mi" 0.9 mi"
BEAVER STREET	north	"Soc Sec Admin "Bus Stop"	0.04 mi" 0.1 mi"
	north	"UMass College of Ag "MA Farmers Market "Girl Scouts East MA"	0.3 mi" 0.3 mi" 0.3 mi"
	north	"Fernald School "Cedar Hill Res "Beaver Brook Res "Bus Stop"	0.3 mi" 0.7 mi" 0.8 mi" 0.3 mi"
	south	"Fitzgerald School"	0.3 mi"



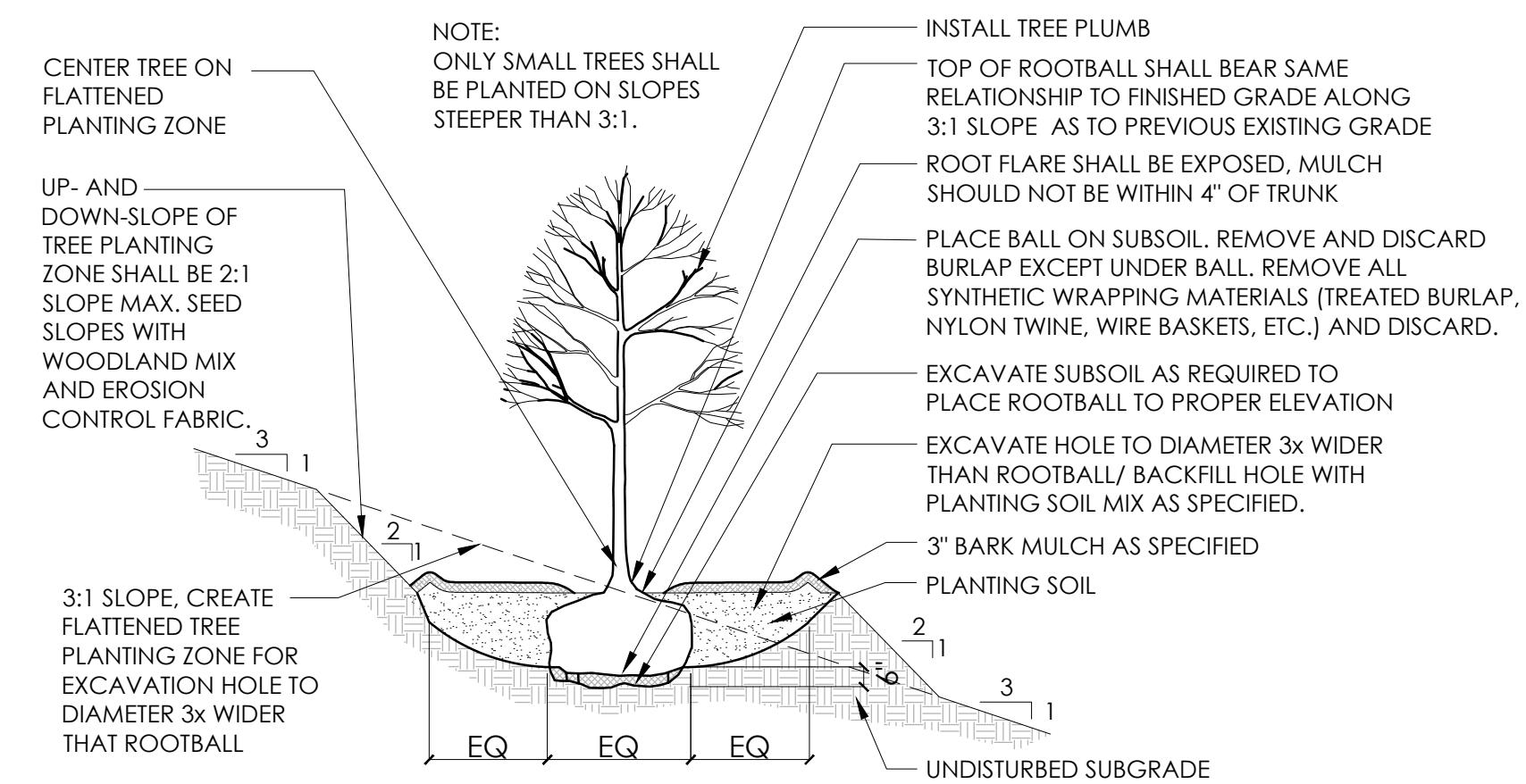
16 EVERGREEN PLANTING



13 SHRUB PLANTING



14 TREE PLANTING



15 TREE PLANTING ON 3:1 SLOPES

### CITY OF WALTHAM WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	55	114
PROJECT FILE NO.		17112.00	

DETAILS - 9

## GENERAL NOTES

- ALL CONSTRUCTION INDICATED ON THESE PLANS SHALL BE IN ACCORDANCE WITH:
  - THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2020.
  - THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020, INCLUDING THE LATEST INTERIM REVISIONS.
  - THE SPECIFICATIONS ACCOMPANYING AND CONTAINED WITHIN THESE PLANS.
- ALL ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NGVD 88).
- HORIZONTAL DATUM IS THE MASSACHUSETTS STATE PLANE.
- THE SUITABILITY OF FOUNDATION MATERIAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF THE REINFORCED SOIL FOUNDATION (RSF) AND DRILLED SHAFTS.
- ALL ABUTMENTS AND WALLS ARE DRAWN LOOKING AT THE EXPOSED FACES.
- INFORMATION CONCERNING THE LOCATIONS OF THE STRUCTURES, THEIR CONDITION, AND DIMENSIONS IS FURNISHED SOLELY FOR THE INFORMATION AND CONVENIENCE OF THE CONTRACTOR, AND SHALL BE FIELD VERIFIED. THE CONTRACTOR SHALL CONDUCT ITS OWN INDEPENDENT EXAMINATION AND MEASUREMENTS OF THE SITES AND STRUCTURES' CONDITIONS FOR THE PURPOSE OF BIDDING, FABRICATION, AND CONSTRUCTION ASSOCIATED WITH THIS CONTRACT. ANY RELIANCE UPON INFORMATION MADE AVAILABLE BY THE TOWN OR THE ENGINEER SHALL BE AT THE CONTRACTOR'S RISK.

## DESIGN

- DESIGN SPECIFICATIONS:
  - AASHTO LRFD GUIDE SPECIFICATIONS SPECIFICATIONS FOR THE DESIGN OF PEDESTRIAN BRIDGES, 2ND EDITION, 2014, INCLUDING ALL INTERIM REVISIONS.
  - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, 2017.
  - THE 2015 EDITION OF THE NATIONAL DESIGN SPECIFICATION (NDS) FOR WOOD CONSTRUCTION INCLUDING THE 2015 EDITION SUPPLEMENT.
  - MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT) LRFD BRIDGE MANUAL, 2013 EDITION, INCLUDING ALL REVISIONS TO DATE.
  - FEDERAL HIGHWAY ADMINISTRATION (FHWA) GEOSYNTHETIC REINFORCED SOIL INTEGRATED BRIDGE SYSTEM INTERIM IMPLEMENTATION GUIDE (PUBLICATION NO. FHWA-HRT-11-026), JUNE 2012.
- DESIGN LOADING:
  - PEDESTRIAN LIVE LOAD: 90 PSF
  - VEHICLE LIVE LOAD: H-10 TRUCK
  - LINDEN STREET ACCESS RAMP - PEDESTRIAN LOAD ONLY

## STRUCTURAL STEEL NOTES

- ALL NEW STEEL SHAPES AND PLATES SHALL CONFORM TO THE LATEST PROVISIONS OF AASHTO DESIGNATION M 270 (ASTM DESIGNATION A 709) GRADE 36 OR 50.
- ALL STEEL COMPONENTS, FABRICATIONS, AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 960 OF THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, INCLUDING THE LATEST SUPPLEMENTAL AND INTERIM SPECIFICATIONS.
- ALL STRUCTURAL STEEL COMPONENTS AND FASTENING HARDWARE SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE MASSDOT STANDARD SPECIFICATIONS.
- ALL BOLTED CONNECTIONS SHALL UTILIZE HIGH STRENGTH BOLTS CONFORMING TO AASHTO M164 (ASTM A325).
- WASHERS MEETING AASHTO M293 (ASTM F436) ARE TO BE USED OVER ALL HOLES THAT ARE MORE THAN 1/16 INCH IN DIAMETER GREATER THAN THE BOLT DIAMETER AND UNDER ALL PARTS TURNED DURING ASSEMBLY.
- PRIOR TO FABRICATION, ALL MATERIALS SHALL BE BLAST-CLEANED TO AT LEAST SSPC-SP6 TO REMOVE ALL OIL, DIRT, GREASE, MILL SCALE AND OTHER DELETERIOUS MATERIALS FROM THE SURFACES OF THE STEEL TO BE FABRICATED.
- PRIOR TO SHOP COATING, ALL CORNERS AND EDGES OF STEEL WHICH HAVE BEEN FLAME CUT OR OTHERWISE HARDENED SHALL BE SOFTENED BY GRINDING OR BLAST-CLEANING TO PROVIDE A SURFACE SUITABLE FOR APPLICATION OF THE SPECIFIED PAINT SYSTEM.
- WHEN STEEL DIE STAMPS ARE TO BE USED TO IDENTIFY PIECES AND MEMBERS, FABRICATORS SHALL UTILIZE LOW STRESS STAMPS.
- WELDING SHALL BE IN ACCORDANCE WITH THE LATEST STRUCTURAL WELDING CODE ANSI/AASHTO/AWS D1.5 (INCLUDING ALL INTERIMS TO DATE) AND APPLICABLE SUPPLEMENTAL AWS PUBLICATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY SHORING AND BRACING TO MAINTAIN THE STRUCTURAL STABILITY OF STRUCTURES DURING CONSTRUCTION.
- PRIOR TO ERECTION, ALL EXISTING STEEL MEMBER SURFACES THAT WILL BE IN DIRECT CONTACT WITH ANY NEW FABRICATED STEEL SHALL BE CLEANED TO AT LEAST SSPC-SP3.

## TIMBER NOTES

- SAWN LUMBER AND TIMBER SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL TIMBER, LUMBER, AND PILING, AASHTO M 168 AND SHALL BE AASHTO DESIGNATION SOUTHERN PINE NO. 1 OR EQUIVALENT.
- STRUCTURAL GLUED LAMINATED TIMBER SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD ANSI/AITC A-190.1, SPECIFICATION FOR STRUCTURAL GLUED LAMINATED TIMBER AND SHALL BE AASHTO IDENTIFICATION NUMBER 47 FOR VISUALLY GRADED SOUTHERN PINE.
- ALL SAWN LUMBER SHALL BE SOUTHERN YELLOW PINE, PRESSURE TREATED TO A MINIMUM NET RETENTION OF 0.60 POUNDS PER CUBIC FOOT OF ALKALINE COPPER QUATERNARY (ACQ) PRESERVATIVE, CONFORMING TO THE REQUIREMENTS OF THE AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA) STANDARD OR AS NOTED ELSEWHERE. ACQ SHALL BE APPLIED BY A STANDARD PRESSURE PROCESS AND SHALL CONFORM TO THE RECOMMENDED PRACTICES OF THE AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA). EACH PIECE SHALL BEAR THE AMERICAN WOOD PRESERVERS BUREAU (AWPB) QUALITY MARK INDICATING COMPLIANCE WITH AWPB STANDARD LP-22.  
  
TIMBER BRIDGE RAILS AND EXPOSED TIMBER PLANKING SHALL BE TREATED WITH WATERBORNE PRESERVATIVES OR OIL-BORNE PRESERVATIVES IN LIGHT PETROLEUM SOLVENT PER AASHTO M 133.
- GLUED LAMINATED TIMBER DECKS SHALL BE TREATED WITH A PENTACHLOROPHENOL TYPE A OIL PRESERVATIVE CONFORMING TO AWPA STANDARD C-28 AND P-9. RETENTION LEVEL SHALL BE 0.5 PCF AS PER AWPA STANDARD C-28.
- PRESERVATION TREATMENT SHALL BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH AASHTO M 133 AND AWPA STANDARD M2.
- ALL TREATED TIMBER MATERIALS SHALL FOLLOW POST-TREATMENT REQUIREMENTS SUMMARIZED IN BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS (WWPI 1996) TO ENSURE ALL SURFACES ARE FREE OF EXCESS PRESERVATIVE AND CHEMICALS ARE FIXATED IN THE WOOD.
- TIMBER SHALL BE DRIED TO A MOISTURE CONTENT OF 19% OR LESS AFTER TREATMENT.
- ALL FIELD CUTS AND HOLES SHALL BE TREATED WITH COPPER NAPHTHENATE IN ACCORDANCE WITH AWPA STANDARD M4.
- THREADS ON ALL HARDWARE SHALL BE PEENED OVER AFTER TIGHTENING. TOUCH UP GALVANIZING AFTER PEENING.
- ALL HARDWARE INCLUDING FASTENERS FOR TIMBER CONNECTIONS SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A-123 OR ASTM A-153, AS APPLICABLE.
- PRE-DRILLING IS REQUIRED FOR ALL LAG, BOLT, AND DOWEL INSTALLATIONS. HOLES FOR DOWELS IN DECK SHALL BE SIZED TO PROVIDE A TIGHT FIT.
- ALL GLULAM SHALL BE CUT, DRILLED, AND COMPLETELY FABRICATED PRIOR TO PRESSURE TREATMENT WITH PRESERVATIVES.
- ALL WOOD AND METAL COMPONENTS SHALL BE HANDLED AND STORED CAREFULLY SO AS NOT TO DAMAGE THE MATERIAL. IF DAMAGE DOES OCCUR, EXPOSED UNTREATED WOOD SHALL BE FIELD TREATED IN ACCORDANCE WITH AASHTO M 133.
- HARDWARE SHALL BE COUNTERSUNK WHERE NOTED, WITH THREADED BOLT ENDS AND NUTS PLACED ON THE OUTSIDE OF WALKWAY.
- TIMBER SURFACES AND EDGES SHALL BE PLANED AND SANDED SMOOTH.
- WATERPROOFING MEMBRANE SHALL BE COMPATIBLE WITH THE WOOD PRESERVATIVE.
- LIVE LOAD DEFLECTION (SERVICE LOAD) FOR LONGITUDINAL GLULAM DECKS, TIMBER STRINGERS, AND TIMBER PILE CAPS SHALL NOT EXCEED L/360. LIVE LOAD DEFLECTION (SERVICE LOAD) FOR TRANSVERSE GLULAM DECKS AND TIMBER PLANKING SHALL NOT EXCEED 0.1 INCH.

## CONCRETE NOTES

- THE FOLLOWING ELEMENTS ARE PRECAST: POSTS AND PANELS AT HAMMOND STREET AND PROSPECT HILL ROAD RETAINING WALLS.
- MASSDOT 4000 PSI, 3/4 IN., 610 CEMENT CONCRETE SHALL BE USED FOR THE FOLLOWING:
  - TIMBER BRIDGE: GRS ABUTMENT BEAM SEATS, PILE REPAIRS
  - LINDEN BRIDGE: CURBS, BACKWALLS, TIMBER DECK SUPPORTS
- MASSDOT 4000 PSI, 3/8 IN., 660 CEMENT CONCRETE SHALL BE USED FOR THE FOLLOWING:
  - LINDEN ACCESS RAMP: DRILLED SHAFTS
  - HAMMOND STREET RETAINING WALL: DRILLED SHAFTS
  - PROSPECT HILL ROAD RETAINING WALL: DRILLED SHAFTS
- MASSDOT 3000 PSI, 1 1/2 IN., 470 CEMENT CONCRETE SHALL BE USED FOR THE FOLLOWING:
  - TIMBER CULVERT: BEAM SEATS
- MASSDOT 5000 PSI 3/4 IN., 685 HP CEMENT CONCRETE SHALL BE USED FOR THE FOLLOWING:
  - HAMMOND STREET RETAINING WALL: POSTS, PANELS
  - PROSPECT HILL ROAD RETAINING WALL: POSTS, PANELS
- ALL EXPOSED EDGES AND REENTRANT CORNERS NOT OTHERWISE DETAILED ON THE PLANS SHALL HAVE A MINIMUM OF 3/4" CHAMFER.
- EPOXY BONDING COMPOUND USE FOR CONCRETE REPAIRS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHALL CONFORM TO THE REQUIREMENTS OF THE SUPPLEMENTAL SPECIFICATIONS, SUBSECTION 901.68C AND M4.05.5 AND SHALL BE ON THE MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST.
- ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO ASTM F1554, GRADE 105 AND SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M232.
- ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED, UNLESS NOTED OTHERWISE.

## REINFORCING STEEL

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BAR	29"	36"
3. COATED BARS, COVER < 3DB, OR CLEAR SPACING < 6DB	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"

IF THE ABOVE BARS ARE SPACED 6" OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

ALL REINFORCING STEEL SHALL BE EPOXY COATED.

## CLEANING

- ALL EXISTING BRIDGE STRUCTURES SHALL BE CLEANED OF ALL LOOSE DEBRIS. CLEANING METHODS SHALL BE LIMITED TO CLEAN COMPRESSED AIR WITH NO ABRASIVES OR SOLVENTS. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO CONTAIN POTENTIAL CONTAMINANTS (e.g. BIRD GUANO).
- THE CONTRACTOR SHALL PROVIDE PROTECTIVE DEVICES AS REQUIRED TO PREVENT ANY DAMAGE TO THE WORK AND TO OTHER PROPERTY OR PERSONS UNDER OR AROUND THE BRIDGE STRUCTURES DURING CLEANING AND CONSTRUCTION OPERATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT NO DEBRIS FALLS INTO ANY PROPERTY OR WATERCOURSE DURING WORK ON THE BRIDGE. THE USE OF SUSPENDED NETS OR TARPES TO CATCH FALLING DEBRIS SHALL BE EMPLOYED. ANY MATERIAL THAT DOES ENTER ANY PROPERTY OR WATERCOURSE SHALL BE REMOVED BY THE CONTRACTOR, USING HAND METHODS OR ROPES AND/OR CHAINS ATTACHED TO EQUIPMENT THAT CAN BE OPERATED FROM OUTSIDE ANY WETLAND AREA.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING THE EXISTING PAINT FOR LEAD CONTENT PRIOR TO PERFORMING ANY WORK. THE LEAD PAINT TEST SHALL BE PERFORMED BY A CERTIFIED LEAD PAINT TESTING COMPANY. IF LEAD IS PRESENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MITIGATION NECESSARY FOR THE PROPOSED WORK IN ACCORDANCE WITH STATE AND FEDERAL REQUIREMENTS.

## SHIELDING NOTES

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT NO DEBRIS FALLS INTO ANY WATERCOURSE DURING ANY PHASE OF CONSTRUCTION ON THE STRUCTURES OR ONTO THE ROADWAY BELOW THE LINDEN STREET BRIDGE. THE METHOD FOR SHIELDING SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR APPROVAL.
- ANY MATERIAL THAT DOES ENTER ANY WATERCOURSE SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR.
- NO CONSTRUCTION MACHINERY SHALL BE PLACED IN ANY WATERCOURSE.

## FOUNDATIONS

- FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.
- ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURES, AS DIRECTED BY THE ENGINEER.

## C.I.P. CONCRETE DRILLED SHAFTS (LINDEN STREET ACCESS RAMP)

- THE FACTORED GEOTECHNICAL RESISTANCE OF THE DRILLED SHAFT IS BASED ON A FACTORED BEARING CAPACITY OF THE SOIL BELOW THE TIP OF 6 KSF AND IS THE PRODUCT OF THE NOMINAL SOIL BEARING CAPACITY OF 12 KSF AND A RESISTANCE FACTOR OF 0.50. THE FACTORED DESIGN AXIAL LOAD PER SHAFT VARIES PER PIER AND IS BASED ON THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
- CENTERING DEVICES SHALL BE CONSTRUCTED OF AN APPROVED NON-METALLIC DURABLE MATERIAL.
- THE NON-METALLIC CENTERING DEVICES SHALL BE OF ADEQUATE SIZE TO INSURE A MINIMUM 3" ANNULAR SPACE BETWEEN THE OUTSIDE OF THE REINFORCEMENT CAGE AND THE SIDES OF THE EXCAVATED HOLE OR INSIDE OF CASING.
- THERE SHALL BE A MINIMUM OF 3 GROUPS OF NON-METALLIC CENTERING DEVICES FOR SHAFTS LESS THAN 26'-0" IN LENGTH.
- NON-METALLIC CENTERING DEVICES SHALL BE PLACED AT A MAXIMUM SPACING OF 2'-6" AROUND THE CIRCUMFERENCE OF THE SHAFT.
- EACH LONGITUDINAL BAR SHALL BE SUPPORTED BY A 3" HIGH BOLSTER OF APPROVED NON-METALLIC DURABLE MATERIAL.
- SPLICES OF LONGITUDINAL REINFORCEMENT SHALL BE ARRANGED IN GROUPS OF TWO DIAGONALLY OPPOSITE PAIRS THAT ARE STAGGERED VERTICALLY AT LEAST 12" ON CENTER.
- IF SPLICING OF SPIRAL REINFORCEMENT IS NECESSARY, A MINIMUM OF 2" CLEARANCE SHALL BE PROVIDED BETWEEN THE OUTSIDE SURFACE OF MECHANICAL REINFORCING BAR SPLICERS AND THE DRILLED SHAFT CASING OR EXCAVATED SURFACE.
- WELDING OF THE REINFORCEMENT BARS IS NOT PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. WELDING OF LONGITUDINAL REINFORCEMENT IS NOT PERMITTED.

## WALTHAM WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	56	114
PROJECT FILE NO.		17112.00	

## STRUCTURAL NOTES - 1



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	57	114
PROJECT FILE NO.		17112.00	

**STRUCTURAL NOTES - 2**

**GRS ABUTMENT GENERAL NOTES**

- SITE LAYOUT/SURVEY: CONSTRUCT THE BASE OF THE GRS ABUTMENT AND WINGWALLS WITHIN 1" OF THE STAKED ELEVATIONS. CONSTRUCT THE EXTERNAL GRS ABUTMENT AND WINGWALLS TO WITHIN ±1/2" OF THE SURVEYED STAKE DIMENSIONS.
- EXCAVATION: COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AS WELL AS STATE AND LOCAL REGULATIONS FOR ALL EXCAVATIONS.
- COMPACTION: COMPACT BACKFILL TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY ACCORDING TO AASHTO-T-99 AND ± 2 PERCENT OPTIMUM MOISTURE CONTENT IN THE BEARING REINFORCEMENT ZONE. COMPACT TO 100% OF THE MAXIMUM DRY DENSITY ACCORDING TO AASHTO-T-99. ONLY HAND-OPERATED COMPACTION EQUIPMENT IS ALLOWED WITHIN 3 FEET OF THE WALL FACE. REINFORCEMENT SHALL EXTEND DIRECTLY BENEATH EACH LAYER OF CMU BLOCKS, COVERING ≥ 85% OF THE FULL WIDTH OF THE BLOCK TO THE FRONT FACE OF THE WALL.
- GEOSYNTHETIC REINFORCEMENT PLACEMENT: PULL THE GEOSYNTHETIC TAUGHT TO REMOVE ANY WRINKLES AND LAY FLAT PRIOR TO PLACING AND COMPACTING THE BACKFILL MATERIAL. SPLICES SHOULD BE STAGGERED AT LEAST 24" APART AND SPLICES ARE NOT ALLOWED IN THE BEARING REINFORCEMENT ZONE. NO EQUIPMENT IS ALLOWED DIRECTLY ON THE GEOSYNTHETIC. PLACE A MINIMUM 6" LAYER OF GRANULAR FILL PRIOR TO OPERATING ONLY RUBBER-TIRED EQUIPMENT OVER THE GEOSYNTHETIC AT SPEEDS LESS THAN 5 MPH WITH NO SUDDEN BRAKING OR SHARP TURNING.
- REINFORCED SOIL FOUNDATION (RSF) CONSTRUCTION: THE RSF SHOULD BE ENCAPSULATED IN GEOTEXTILE REINFORCEMENT ON ALL SIDES WITH MINIMUM OVERLAPS OF 3 FEET TO PREVENT WATER INFILTRATION. WRAPPED CORNERS NEED TO BE TIGHT WITHOUT EXPOSED SOIL. COMPACT BACKFILL MATERIAL IN LIFTS LESS THAN 6" IN COMPACTED HEIGHT. GRADE AND LEVEL THE TOP OF THE RSF PRIOR TO FINAL ENCAPSULATION, AS THIS WILL SERVE AS THE LEVELING PAD FOR THE CMU BLOCKS OF THE GRS ABUTMENT.
- GRS WALL FACE ALIGNMENT: CHECK FOR LEVEL ALIGNMENT OF THE CMU BLOCK ROW AT LEAST EVERY OTHER LAYER OF THE GRS ABUTMENT. CORRECT ANY ALIGNMENT DEVIATIONS GREATER THAN 1/4".
- BEAM SEAT PLACEMENT: REINFORCED CONCRETE BEAM SEAT SHALL BE AS SPECIFIED IN THE CONCRETE NOTES, CONSTRUCTED TO THE DIMENSIONS AND LOCATIONS SHOWN ON THE PLANS. PLACE PRECUT 4" THICK FOAM BOARD ON THE TOP OF THE BEARING BED REINFORCEMENT BUTT AGAINST THE BACK FACE OF THE CMU BLOCK. SET HALF-HEIGHT OR FULL HEIGHT (DEPENDING ON WALL HEIGHT AND REQUIRED CLEAR SPACE) SOLID CMU BLOCKS ON TOP OF THE FOAM BOARD.
- SUPERSTRUCTURE PLACEMENT: THE CRANE USED FOR THE PLACEMENT OF THE SUPERSTRUCTURE CAN BE POSITIONED ON THE GRS ABUTMENT PROVIDED THE OUTRIGGER PADS ARE SIZED FOR LESS THAN 4,000 PSF NEAR THE FACE OF THE ABUTMENT WALL.
- SET BEAMS SQUARE AND LEVEL WITHOUT DRAGGING ACROSS THE BEAM SEAT SURFACE.
- INTEGRATED APPROACH BACKFILL PLACEMENT: FOLLOWING THE PLACEMENT OF THE SUPERSTRUCTURE, GEOTEXTILE REINFORCEMENT LAYERS ARE PLACED ALONG THE BACK OF THE SUPERSTRUCTURE, BUILT IN MAXIMUM LIFT HEIGHTS OF 6" (MAXIMUM VERTICAL SPACING OF REINFORCEMENT ≤ 6"). THE TOP OF THE FINAL WRAP SHOULD BE APPROXIMATELY 2" BELOW THE TOP OF THE SUPERSTRUCTURE TO ALLOW AT LEAST 2" OF AGGREGATE BASE COVER OVER THE GEOSYNTHETIC TO PROTECT IT FROM HOT MIX ASPHALT.

**GRS ABUTMENT MATERIALS**

- GEOSYNTHETIC REINFORCEMENT:
  - GEOTEXTILE FABRIC SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 4,800 LB/FT IN ACCORDANCE WITH ASTM D 4595-11. TENSILE STRENGTH AT 2% STRAIN SHALL BE A MINIMUM OF 1,370 LB/FT.
- CMU BLOCK:
  - FURNISH FACING ELEMENTS CONSISTING OF SPLIT-FACE CMU SHOULD MEET ASTM C90-11B REQUIREMENTS, WITH A MINIMUM REQUIRED COMPRESSIVE STRENGTH OF 4,000 PSI AND A MAXIMUM WATER ABSORPTION RATE OF 5% AFTER 24 HOURS.
  - CMU BLOCK UNITS SHALL BE TESTED FOR FREEZE-THAW DURABILITY IN ACCORDANCE WITH ASTM C1262-10.
  - SPECIMENS USED FOR ABSORPTION TESTING SHALL NOT SUBSEQUENTLY BE USED FOR FREEZE-THAW TESTING.
  - CMU BLOCKS SHALL BE FURNISHED WITHIN THE FOLLOWING TOLERANCES:
    - THE HEIGHT OF EACH INDIVIDUAL BLOCK SHALL BE WITHIN 1/16" OF THE SPECIFIED DIMENSION.
    - THE LENGTH AND WIDTH OF EACH INDIVIDUAL BLOCK SHALL BE WITHIN 1/8" OF THE SPECIFIED DIMENSION.
    - HOLLOW CMU UNITS SHALL HAVE A MINIMUM FACE SHELL THICKNESS OF 1/4" AND A WEB THICKNESS OF 3/4".
  - THE CMU UNITS SHALL BE RANDOMLY SAMPLED AND TESTED IN ACCORDANCE WITH ASTM C140-12.
- BACKFILL MATERIAL NOTES:
  - FURNISH CRUSHED DURABLE PARTICLES, FRAGMENTS OF STONE GRAVEL FREE FROM ORGANIC MATTER OR OTHER DELETERIOUS MATERIAL FOR THE ABUTMENT, RSF, AND INTEGRATED APPROACH.
  - GRS, RSF, AND INTEGRATED APPROACH BACKFILL MATERIAL SHALL MEET THE FOLLOWING REQUIREMENTS:
    - AASHTO NO. 89 OPEN-GRADED BACKFILL GRADATION (AASHTO M-43):

US SIEVE SIZE	% PASSING
1/2 INCH	100
3/8 INCH	90-100
NO. 4	20-55
NO. 8	5-30
NO. 16	0-10
NO. 50	0-5
    - PLASTICITY INDEX (PI) (AASHTO T-90): PI ≤ 6
  - SOUNDNESS (AASHTO T-104): THE BACKFILL SHALL BE SUBSTANTIALLY FREE OF SHALE OR OTHER POOR DURABILITY PARTICLES. THE MATERIAL SHALL HAVE A MAGNESIUM SULFATE LOSS OF LESS THAN 30 PERCENT AFTER FOUR CYCLES OR A SODIUM VALUE LESS THAN 15 PERCENT AFTER FIVE CYCLES (AASHTO T 104-99).
  - THE AMOUNT OF FINES PASSING THE NO. 200 SIEVE SHOULD BE AS CLOSE TO 0 PERCENT AS POSSIBLE AND NO MORE THAN 5 PERCENT.
  - ANGLE OF INTERNAL FRICTION SHALL BE A MINIMUM OF 38 DEGREES.
- POLYSTYRENE FOAM BOARD NOTES:
  - AASHTO DESIGNATION M230 TYPE VI. FOAM BOARDS SHALL BE EXPANDED POLYSTYRENE FILLER OR EQUIVALENT, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 10 PSI.
- REINFORCING STEEL:
  - DEFORMED BARS - AASHTO M31 (ASTM A615) GRADE 60
- CONCRETE NOTES:
  - MASSDOT 4000 PSI, 3/4 IN., 610 CEMENT CONCRETE
- ASPHALTIC COATING:
  - AN ASPHALTIC COATING SHALL BE APPLIED TO THE TIMBER BEAMS WHEN EMBEDDED BETWEEN THE GRS ABUTMENT AND THE WINGWALL TO SEAL THE EMBEDDED TIMBER. THE COATING SHALL BE COMPATIBLE WITH THE BEAM MATERIAL AND PRESERVATIVE TREATMENT, AND SHALL BE APPLIED ACCORDING TO THE ASPHALTIC COATING AND TIMBER PRESERVATIVE MANUFACTURERS' GUIDELINES.

**GRS ABUTMENT CONSTRUCTION**

**EXCAVATION NOTES:**

- EXCAVATION SHALL INCLUDE PROVISIONS FOR DRAINAGE WITH A SLOPED CUT TO FACILITATE THE MOVEMENT OF WATER DOWNSTREAM AND AWAY FROM THE WALL.
- ANY OVER-EXCAVATION THAT FORMS A PIT SHALL BE BACKFILLED WITH SUITABLE FREE DRAINING MATERIAL AND COMPACTED.

**REINFORCED SOIL FOUNDATION NOTES:**

- THE BASE OF THE RSF SHALL BE CUT SMOOTH AND EXCAVATED TO UNIFORM DEPTH, AND ALL LOOSE, SOFT, WET, FROZEN, ORGANIC, AND UNSUITABLE MATERIAL SHALL BE REMOVED FROM THE BASE AND SIDES OF THE EXCAVATION.
- THE BASE OF THE RSF SHALL BE GRADED LEVEL FOR THE ENTIRE AREA OF THE BASE OF SUCH BACKFILL PLUS ADDITIONAL 1' ON ALL SIDES OR TO THE LIMITS SHOWN IN THE PLANS.
- EXCAVATION SHALL BE BACKFILLED AS SOON AS POSSIBLE TO AVOID ADVERSE WEATHER DELAYS. IF THIS CANNOT BE ACHIEVED, THE EXCAVATION SHALL BE GRADED TO ONE END TO FACILITATE THE REMOVAL OF ANY WATER. IF EXCAVATION IS FLOODED, ALL WATER SHALL BE REMOVED ALONG WITH SOFT SATURATED SOILS.
- THE RSF SHALL BE CONSTRUCTED WITH WELL-GRADED BACKFILL MATERIAL PLACED FROM THE FACE TO THE BACK TO ROLL FOLDS OR WRINKLE TO THE FREE END OF THE REINFORCEMENT LAYER. IT SHALL BE COMPACTED IN 6" THICK LIFTS IN ACCORDANCE WITH PLACEMENT OF BACKFILL AND COMPACTION NOTES.
- THE FILL MATERIAL SHALL BE GRADED, LEVELED, AND COMPACTED BEFORE ENCAPSULATING THE RSF.
- THE RSF SHALL BE ENCAPSULATED IN THE GEOTEXTILE REINFORCEMENT AND PLACED PERPENDICULAR TO THE ABUTMENT FACE TO PROTECT IT FROM POSSIBLE EROSION. THE GEOTEXTILE SHALL BE SIZED TO FULLY ENCLOSE THE RSF ON THE FACE AND THE WING WALLS SIDES.
- THE FIRST LAYER OF THE REINFORCEMENT SHALL BE PLACED ON THE UPSTREAM SIDE OF THE ABUTMENT WITH SUBSEQUENT LAYERS, IF NEEDED, OVERLAPPED A MINIMUM OF 3' ON THE TOP OF THE PRECEDING LAYER.
- THE REINFORCEMENT SHEET SHALL OVERLAP A MINIMUM OF 3'. ALL OVERLAP SECTIONS IN THE AREA OF THE RSF SHALL BE ORIENTED TO PREVENT RUNNING WATER FROM PENETRATING LAYERS OF REINFORCEMENT.
- THE WRAPPED CORNERS OF THE RSF NEED TO BE TIGHT AND WITHOUT EXPOSED SOIL WITHIN THE RSF TO COMPLETE THE ENCAPSULATION.

**PLACEMENT OF BACKFILL AND COMPACTION NOTES:**

- FOR WELL-GRADED FILLS, THE BACKFILL MATERIAL SHALL BE COMPACTED TO AT LEAST 95% MAXIMUM DRY DENSITY ACCORDING TO AASHTO T-99-10.
- FOR WELL-GRADED FILLS, ADJUST THE MOISTURE CONTENT OF THE COMPACTED BACKFILL MATERIALS TO WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT.
- THE GRS MASS SHALL BE CONSTRUCTED USING COMPACTED LIFTS OF 8", WHICH ARE EQUAL TO THE FACING BLOCK SIZE.
- FOR OPEN-GRADED FILLS, COMPACT EACH LAYER USING A SUITABLE COMPACTOR CAPABLE OF COMPACTING 8" OF FILL UNTIL THERE IS NO VISIBLE EVIDENCE OF FURTHER COMPRESSION. A MINIMUM OF FOUR PASSES SHALL BE APPLIED PER LIFT.
- COMPACTION DIRECTLY BEHIND THE CMU BLOCK SHOULD BE PERFORMED IN A MANNER THAT MAINTAINS WALL ALIGNMENT WHILE IMPROVING THE DENSITY OF FILL BEHIND THE BLOCK. THIS CAN BE ACHIEVED IN THE FOLLOWING WAYS:
  - PLACING A FILL LIFT DIRECTLY BEHIND THE CMU BLOCK FACE AND RODDING OR FOOT TAMPING ALONG THE ROW OF CMU BLOCK WHILE EXERTING DOWNWARD PRESSURE ON THE BLOCK TO PREVENT LATERAL MOVEMENT. FOR MULTIPLE LIFTS, THE TOP LIFT HEIGHT IS SLIGHTLY HIGHER THAN THE BLOCK TO COMPENSATE FOR COMPRESSION OF THE FILL DURING COMPACTION.
  - USING A LIGHTWEIGHT VIBRATORY PLATE COMPACTOR DIRECTLY BEHIND THE CMU BLOCK WHILE EXERTING DOWNWARD PRESSURE ON THE BLOCK TO PREVENT LATERAL MOVEMENT.
  - USING LARGER VIBRATORY COMPACTORS FOR THE REMAINDER OF THE FILL AREA 3' FROM THE FACE OF THE GRS WALL. CHECK FOR OUTWARD BLOCK MOVEMENT AND ADJUST ACCORDINGLY.
- HAND-OPERATED COMPACTION EQUIPMENT, SUCH AS LIGHTWEIGHT MECHANICAL TAMPERS, PLATES, OR ROLLERS, IS REQUIRED WITHIN 3' OF THE FRONT OF THE WALL FACE SO AS NOT TO DAMAGE OR DISLOCATE THE FACING BLOCKS.
- COMPACTION BEYOND 3' FROM THE FRONT OF THE WALL FACE MAY BE PERFORMED USING VIBRATORY ROLLER COMPACTION EQUIPMENT OR OTHER SIMILAR METHODS.
- THE TOP 5' OF THE ABUTMENT SHALL BE COMPACTED TO 100% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH AASHTO T-99-10.

**PLACEMENT OF GEOSYNTHETIC REINFORCEMENT NOTES:**

- GEOSYNTHETIC REINFORCEMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SITE-SPECIFIC WALL ERECTION INSTRUCTION.
- THE GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED SO THAT THE STRONGEST DIRECTION (I.E., CROSS MACHINE DIRECTION) IS PERPENDICULAR TO THE ABUTMENT FACING.
- REINFORCEMENT COVERAGE SHALL BE 100% OF THE EMBEDMENT AREA UNLESS OTHERWISE SHOWN IN THE WORKING DRAWINGS.
- ADJACENT SECTIONS OF THE GEOSYNTHETIC REINFORCEMENT DO NOT NEED TO BE OVERLAPPED EXCEPT WHEN EXPOSED IN THE WRAP-AROUND FACE SYSTEM, AT WHICH TIME, THE REINFORCEMENTS ROLLS SHALL BE OVERLAPPED OR MECHANICALLY CONNECTED PER THE MANUFACTURER'S REQUIREMENTS.
- GEOSYNTHETIC REINFORCEMENT SHALL BE LAID SO THAT IT IS TAUT AND FREE OF WRINKLES PRIOR TO BACKFILLING.
- GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED DIRECTLY ON THE COMPACTED HORIZONTAL FILL SURFACE. THE REINFORCEMENT SHALL BEAR UNIFORMLY ON THE COMPACTED REINFORCED SOIL FROM THE CONNECTION TO THE WALL TO THE FREE END OF THE REINFORCING ELEMENTS.
- THE GEOSYNTHETIC REINFORCEMENT SHALL EXTEND BETWEEN THE LAYERS OF THE CMU BLOCK.
- THE GEOSYNTHETIC REINFORCEMENT SHALL COVER A MINIMUM OF 85% OF THE TOP SURFACE OF THE CMU BLOCK. ANY EXCESS REINFORCEMENT MATERIAL SHOWING THROUGH THE FACE SHALL BE REMOVED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS.
- A MINIMUM BACKFILL LAYER OF 6" SHALL BE PLACED ON THE GEOSYNTHETIC PRIOR TO OPERATING ANY VEHICLE OVER IT.
- BEARING REINFORCEMENT BEDS SHALL BE PLACED BEHIND THE CMU BLOCK AT 4" SPACINGS IN THE TOP FIVE LAYERS OF THE GRS ABUTMENT OR AS DETERMINED BY THE DESIGN.

**WALL FACING NOTES:**

- CMU SHALL BE USED FOR THE GRS WALL FACING.
- THE CMU BLOCK CONSTRUCTION SHALL BEGIN AT THE LOWEST PORTION OF THE EXCAVATION WITH EACH LAYER PLACED HORIZONTALLY.
- EACH CMU BLOCK SHALL BE PLACED TIGHTLY AGAINST THE ADJOINING BLOCK WITHOUT ANY GAPS.
- EACH CMU LAYER SHALL BE COMPLETELY CONSTRUCTED AND CLEANED OF ANY DEBRIS AND FILL MATERIAL PRIOR TO PLACING THE NEXT LAYER OF GEOSYNTHETIC REINFORCEMENT AND CMU.
- A STRETCHER OR RUNNING BOND SHALL BE MAINTAINED BETWEEN COURSES OF BLOCKS TO ENSURE THAT THE JOINTS BETWEEN THE BLOCKS ARE OFFSET WITH EACH ROW.
- IF A SCOUR COUNTERMEASURE, SUCH AS RIPRAP, IS USED, A GEOTEXTILE FILTER FABRIC SHALL BE PLACED UNDER THE COUNTERMEASURE AND ANCHORED BETWEEN THE FIRST AND SECOND COURSE OF THE CMU BLOCK.
- CMU BLOCKS DISPLACED OUT OF REQUIRED ALIGNMENT DURING CONSTRUCTION SHALL BE CAREFULLY MOVED BACK INTO POSITION BY METHODS THAT WILL NOT CAUSE DAMAGE TO THE CMU BLOCKS OR OTHER WORK.
- ANY DAMAGED CMU BLOCKS SHALL BE REPLACED TO RETAIN THE NEW WALL INTEGRITY.
- BATTERED WALL ALIGNMENT SHALL BE MAINTAINED FOLLOWING THE SAME PROCEDURES AS FOR VERTICAL WALLS.
- DETAIL FACING TO ACCOUNT FOR WALL BATTER AND CORNERS.
- ALL CUTS SHALL BE PERFORMED TO MAINTAIN THE STANDARD RUNNING OR STRETCHER BOND BETWEEN THE ROWS OF THE DRY-STACKED BLOCKS, WITH THE VERTICAL JOINTS OF EACH COURSE MIDWAY BETWEEN THOSE OF ADJOINING COURSES.
- IN SUPERELEVATIONS, THE TOP COURSE OF CMU BENEATH THE SUPERSTRUCTURE SHALL BE TRIMMED TO MATCH THE ELEVATION DIFFERENCE AND CLEAR SPACE ACROSS THE ABUTMENT.
- FACING WALL AND WING WALL COURSES SHALL BE STAGGERED TO FORM A TIGHT INTERLOCKING STABLE CORNER.
- CORNER DETAILS SHALL BE SUBMITTED TO ACCOMMODATE CORNERS OTHER THAN RIGHT ANGLES.
- THE TOP THREE COURSES OF CMU BLOCKS SHALL BE FILLED WITH CONCRETE WALL FILL, PINNED WITH NO. 4 REINFORCING STEEL BARS, AND EMBEDDED WITH A MINIMUM OF 2" COVER.

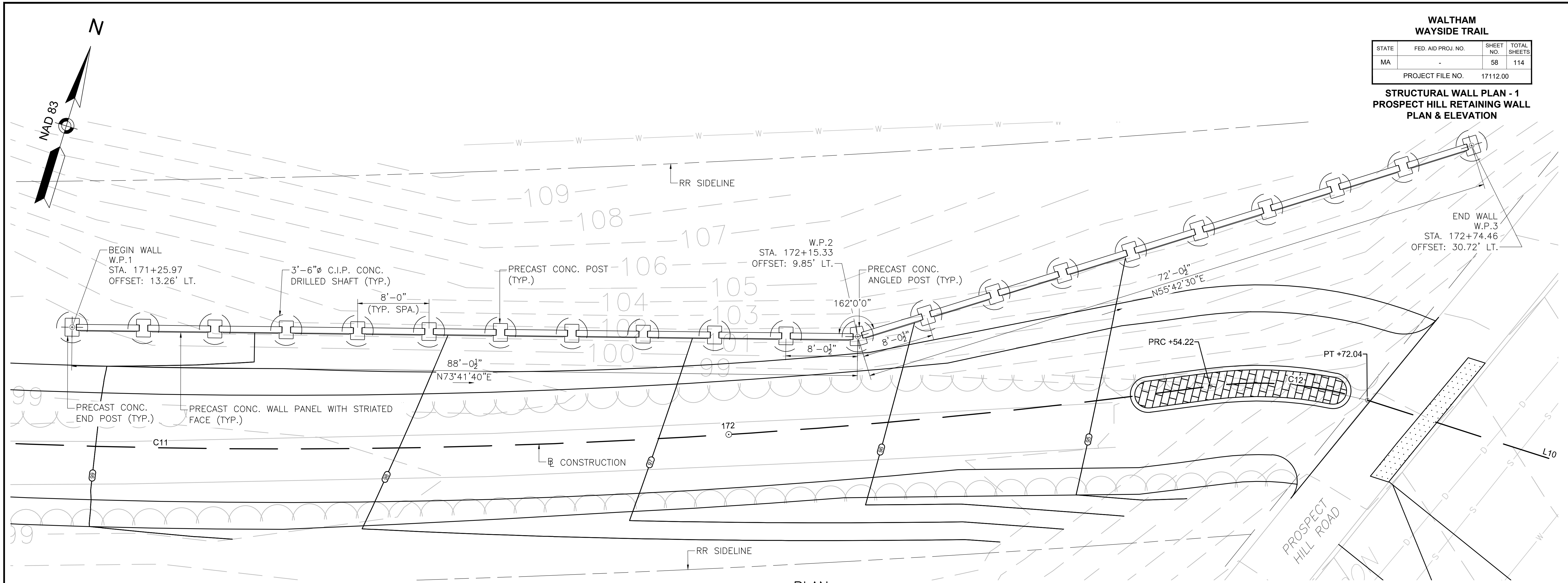
**LEVELING COURSE NOTES:**

- THE FIRST COURSE OF THE FACING BLOCK SHALL BE SET LEVEL AND TO GRADE.
- A THIN LEVELING LAYER OF FINE AGGREGATE, WHICH SHALL NOT EXCEED 1/2", MAY BE USED ON THE TOP OF THE RSF TO FACILITATE CONSTRUCTION OF THE FIRST COURSE OF THE FACING BLOCK. IF THE LEVELING LAYER REQUIRED EXCEEDS 1/2", A MORTAR OR GROUT SHALL BE PLACED IN THE GAP BETWEEN THE RSF AND THE FIRST CMU BLOCK COURSE.

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	58	114
PROJECT FILE NO.		17112.00	

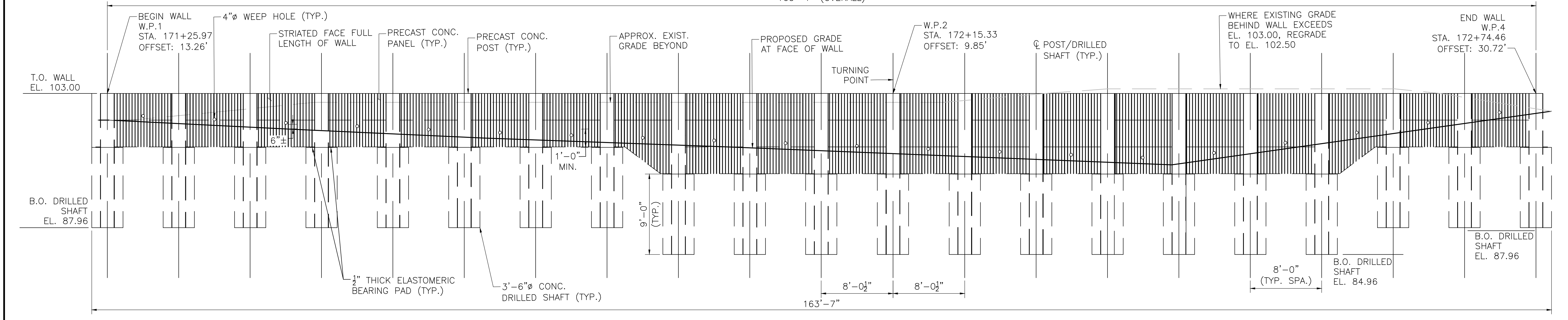
**STRUCTURAL WALL PLAN - 1  
PROSPECT HILL RETAINING WALL  
PLAN & ELEVATION**



**PLAN  
RETAINING WALL AT PROSPECT HILL ROAD**

SCALE: 3/16"=1'-0"

160'-1" (OVERALL)



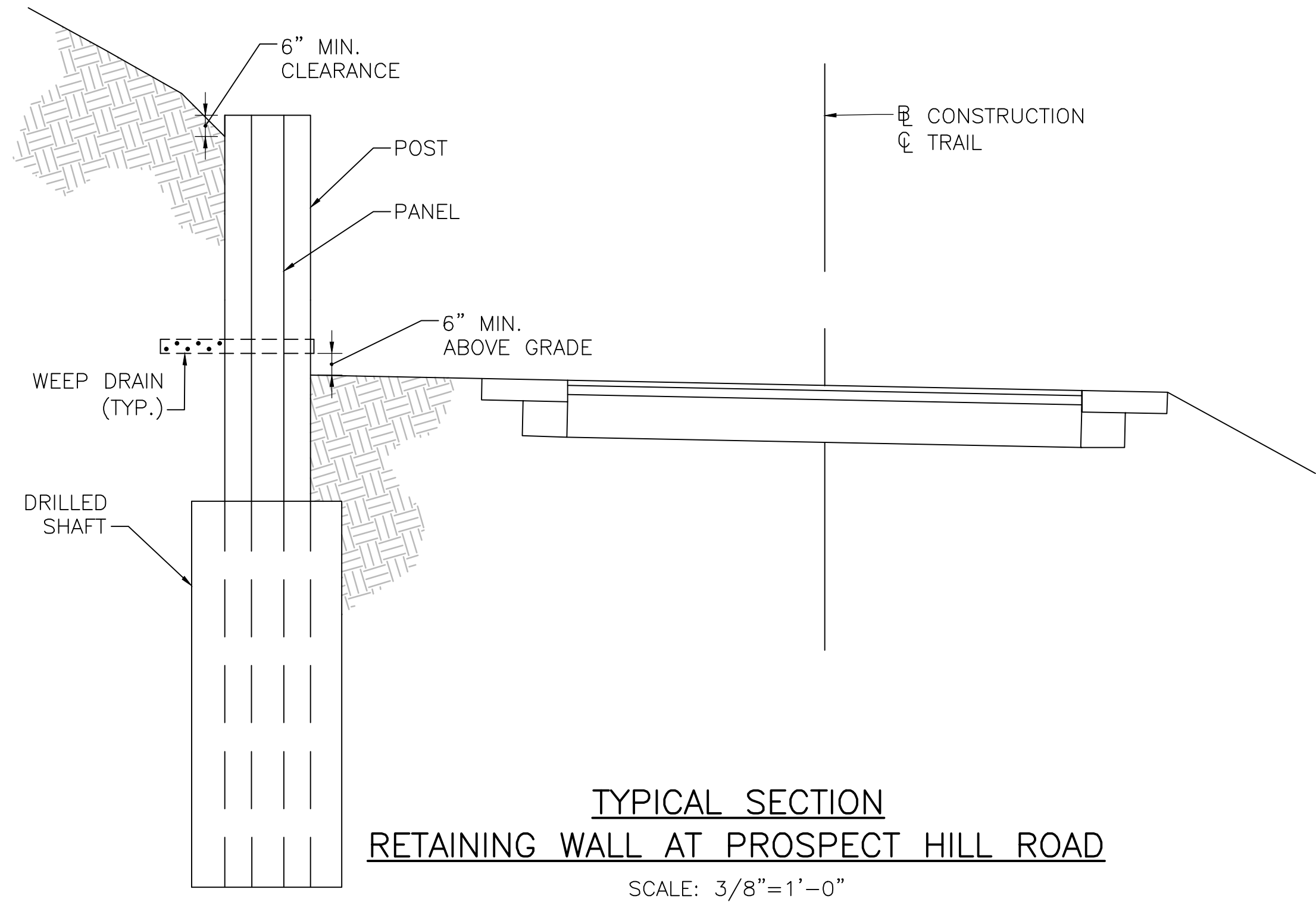
**ELEVATION  
RETAINING WALL AT PROSPECT HILL ROAD**

SCALE: 3/16"=1'-0"

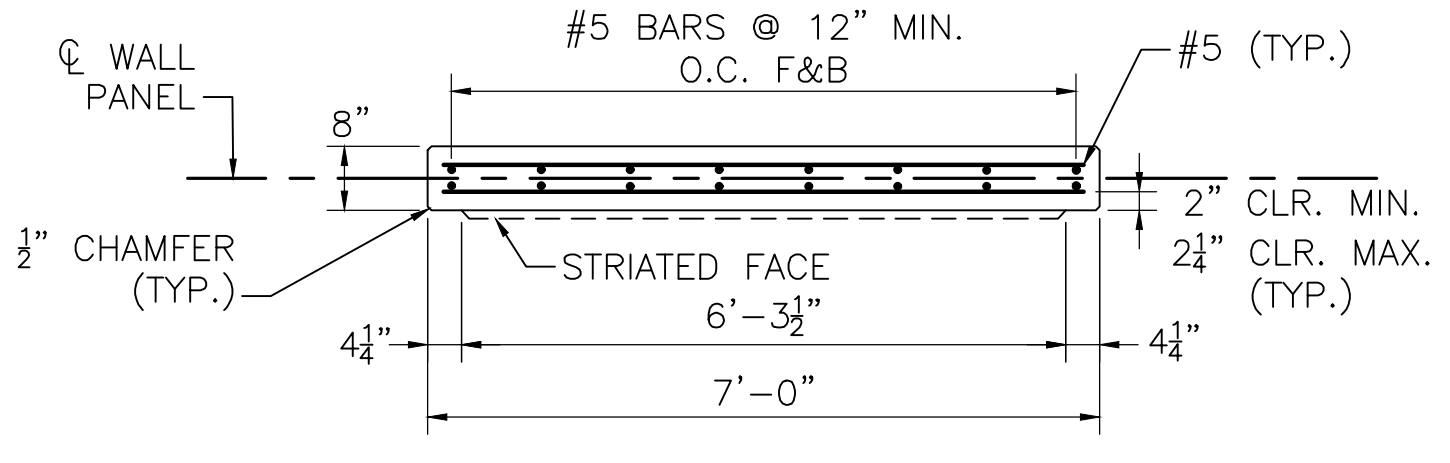
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	59	114
PROJECT FILE NO.		17112.00	

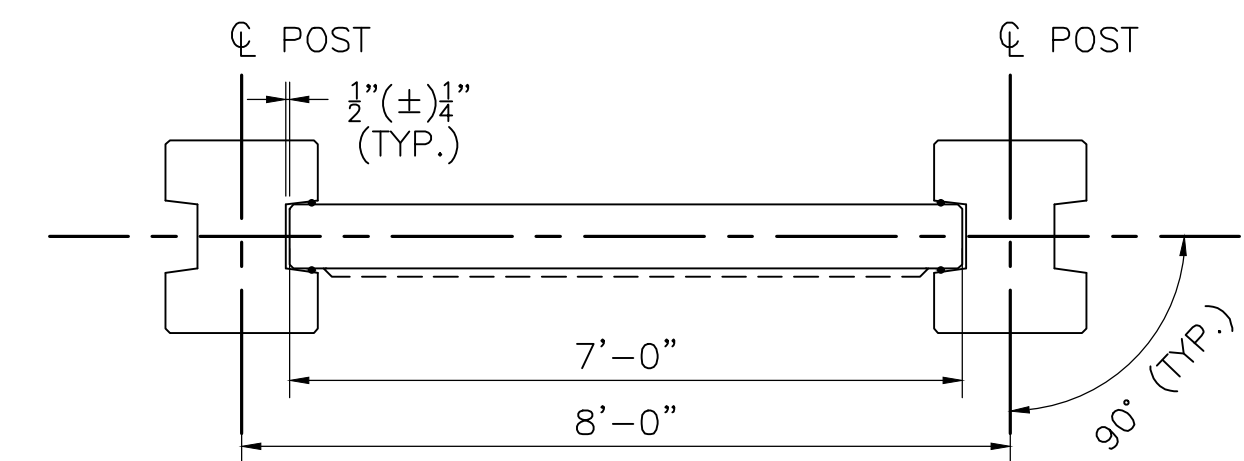
**STRUCTURAL WALL PLAN - 2  
PROSPECT HILL ROAD RETAINING WALL DETAILS**



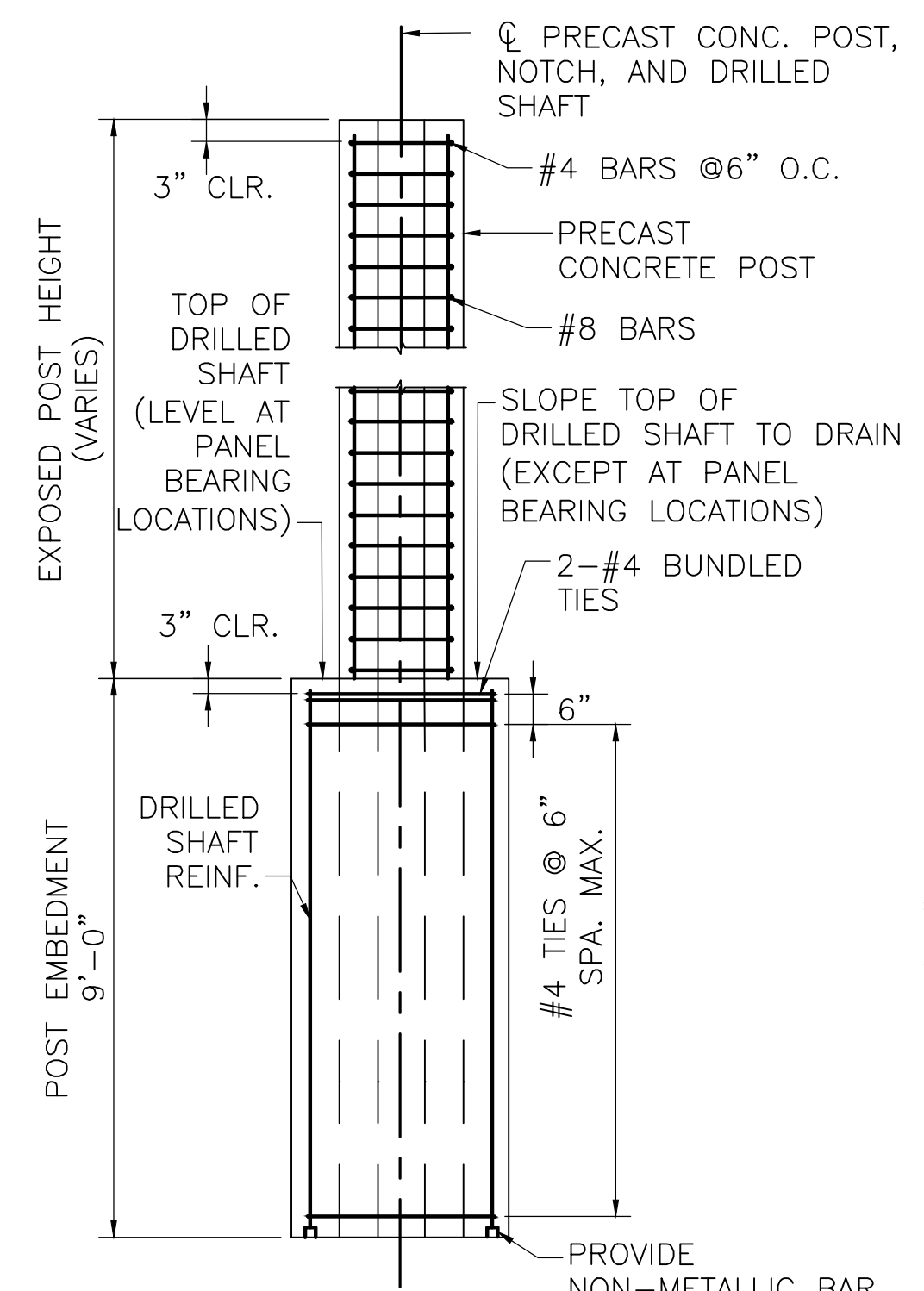
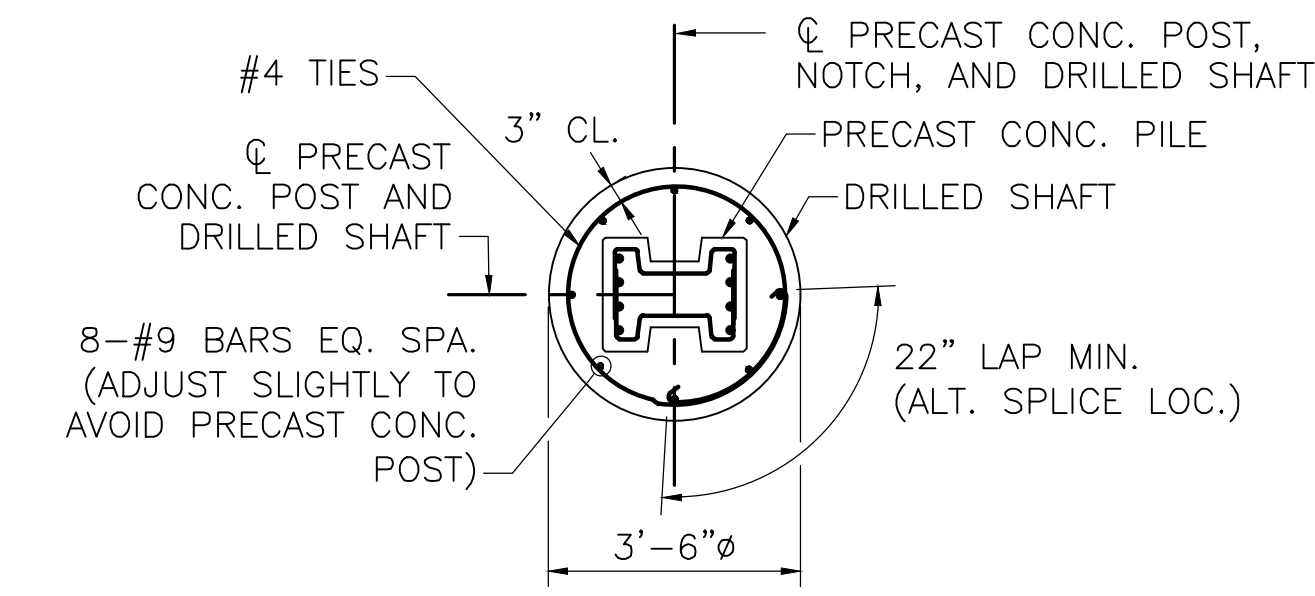
**TYPICAL SECTION  
RETAINING WALL AT PROSPECT HILL ROAD**  
SCALE: 3/8"=1'-0"



**PANEL PLAN DETAIL**  
SCALE: 1/2"=1'-0"



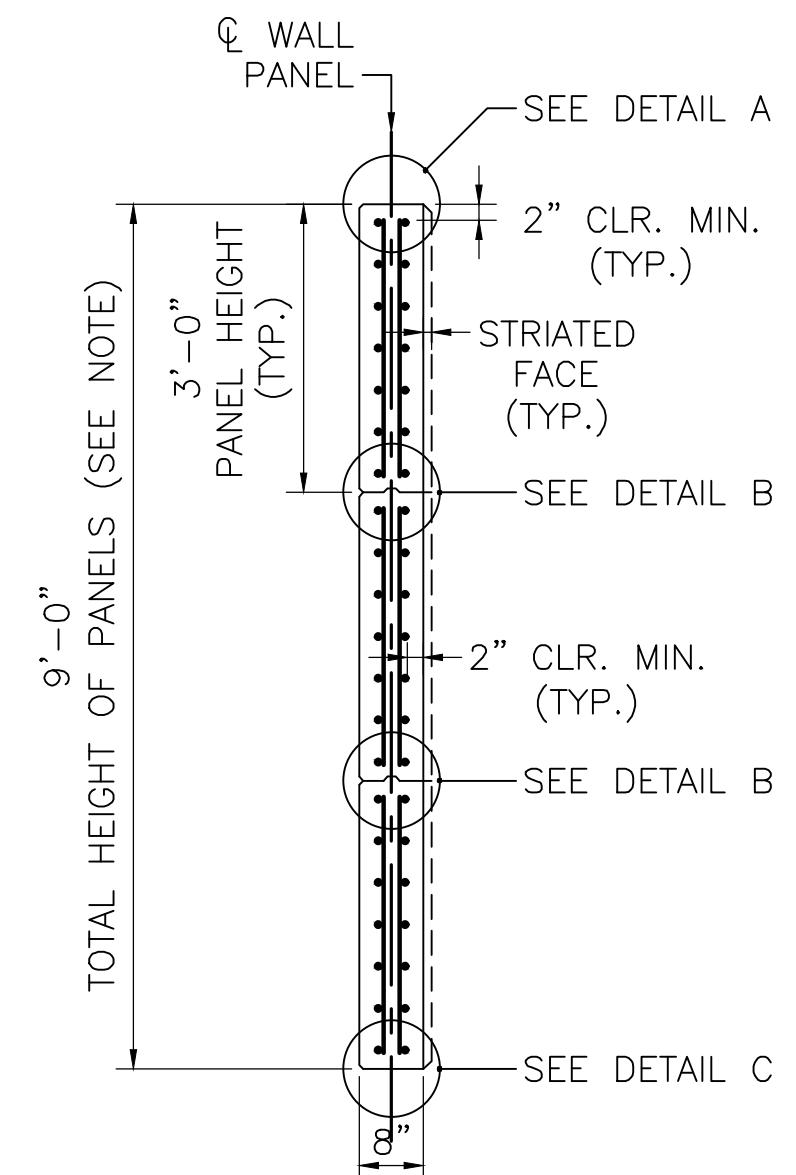
**PANEL PLAN**  
SCALE: 1/2"=1'-0"



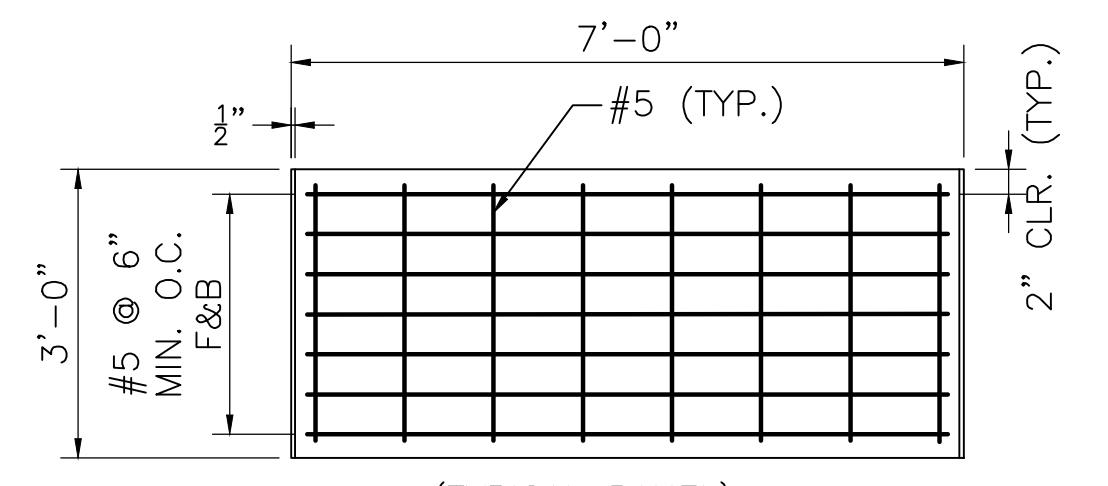
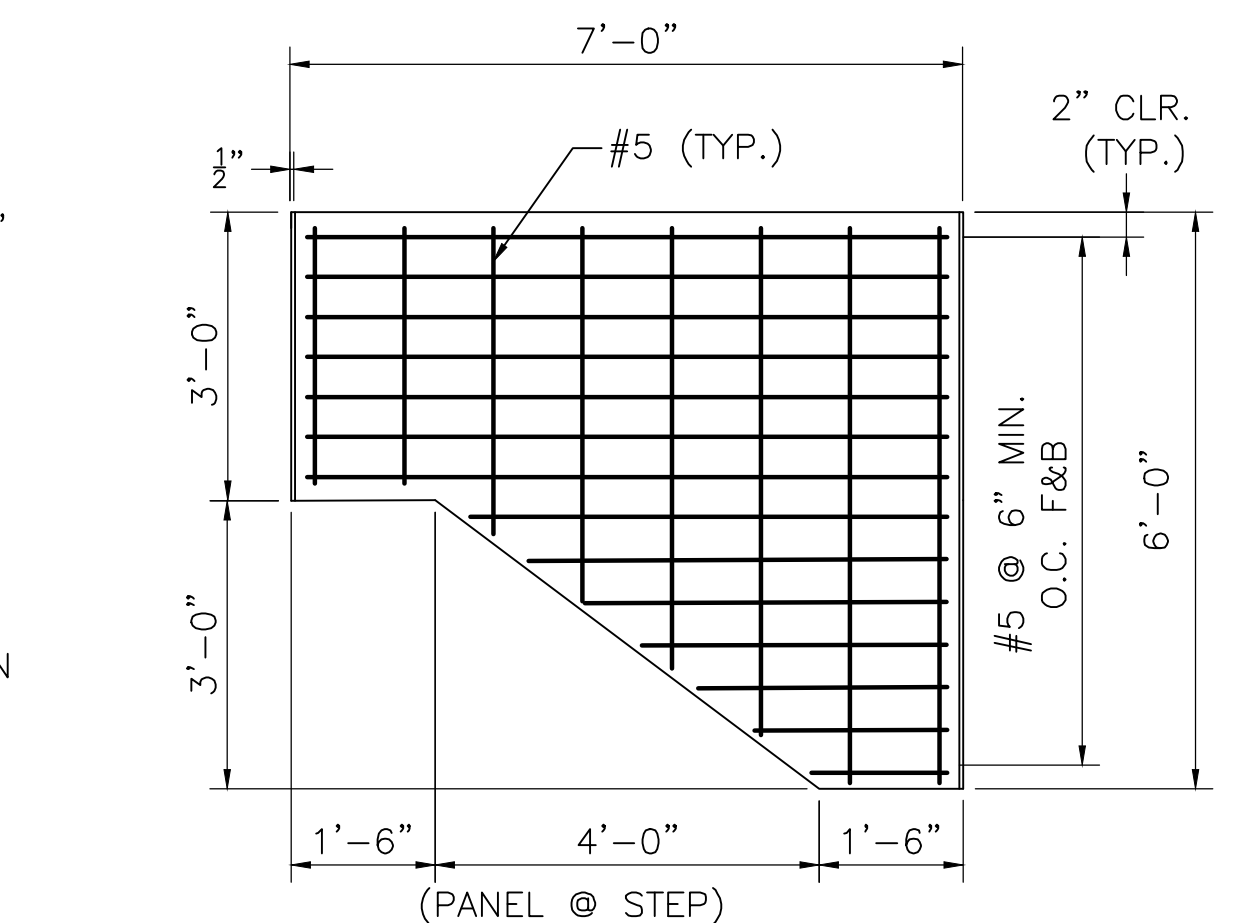
**NOTE:**  
LOWER WALL PANELS SHALL BEAR ON 5"X5"X1/2" THICK ELASTOMERIC BEARING PADS (SHEAR MODULUS G=160 PSI) AT TOP OF DRILLED SHAFT.

**DRILLED SHAFT DETAILS**

SCALE: 3/8"=1'-0"

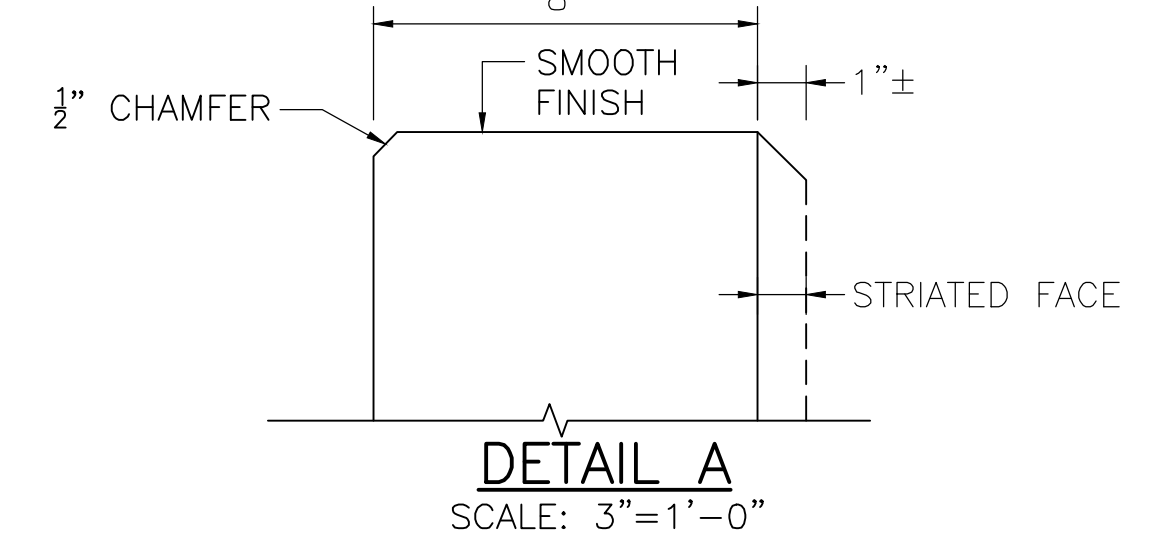


**PANEL WALL SECTION**  
SCALE: 1/2"=1'-0"

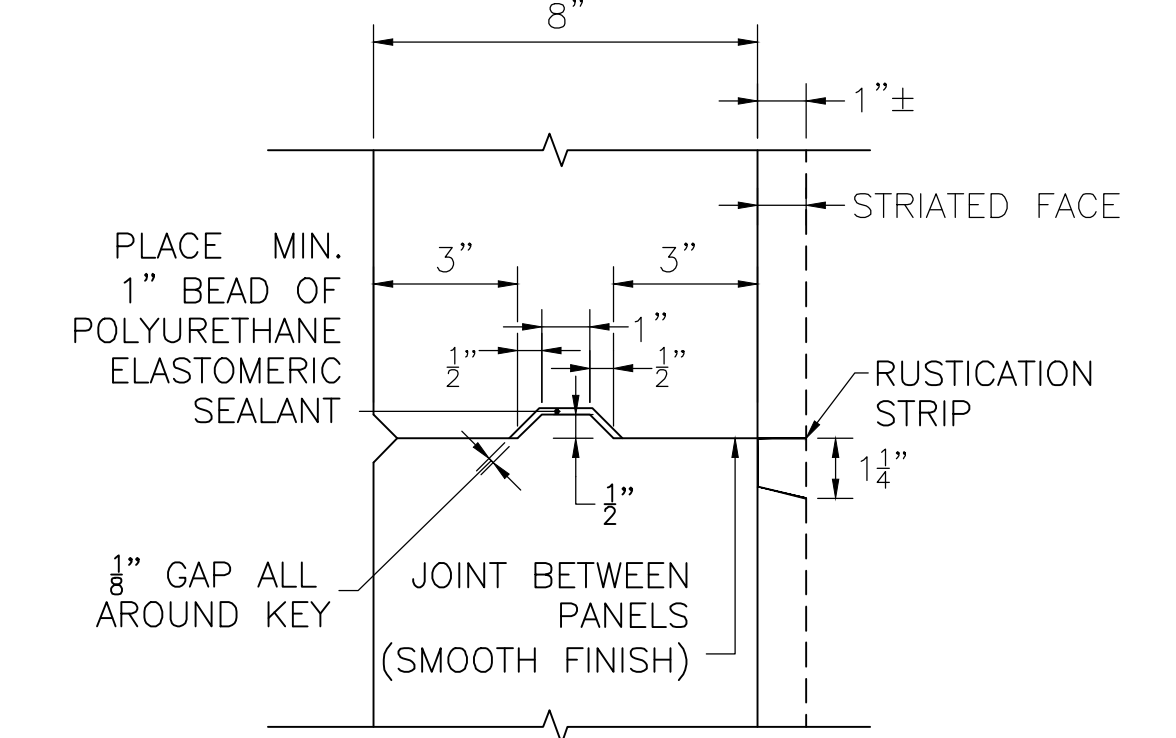


**PANEL ELEVATIONS**

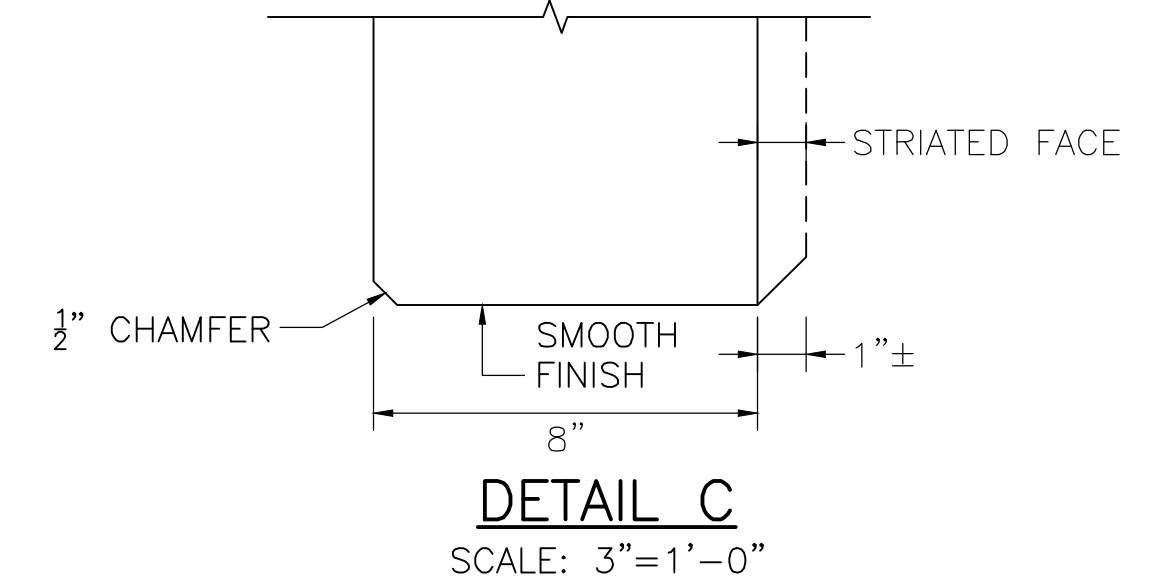
SCALE: 1/2"=1'-0"



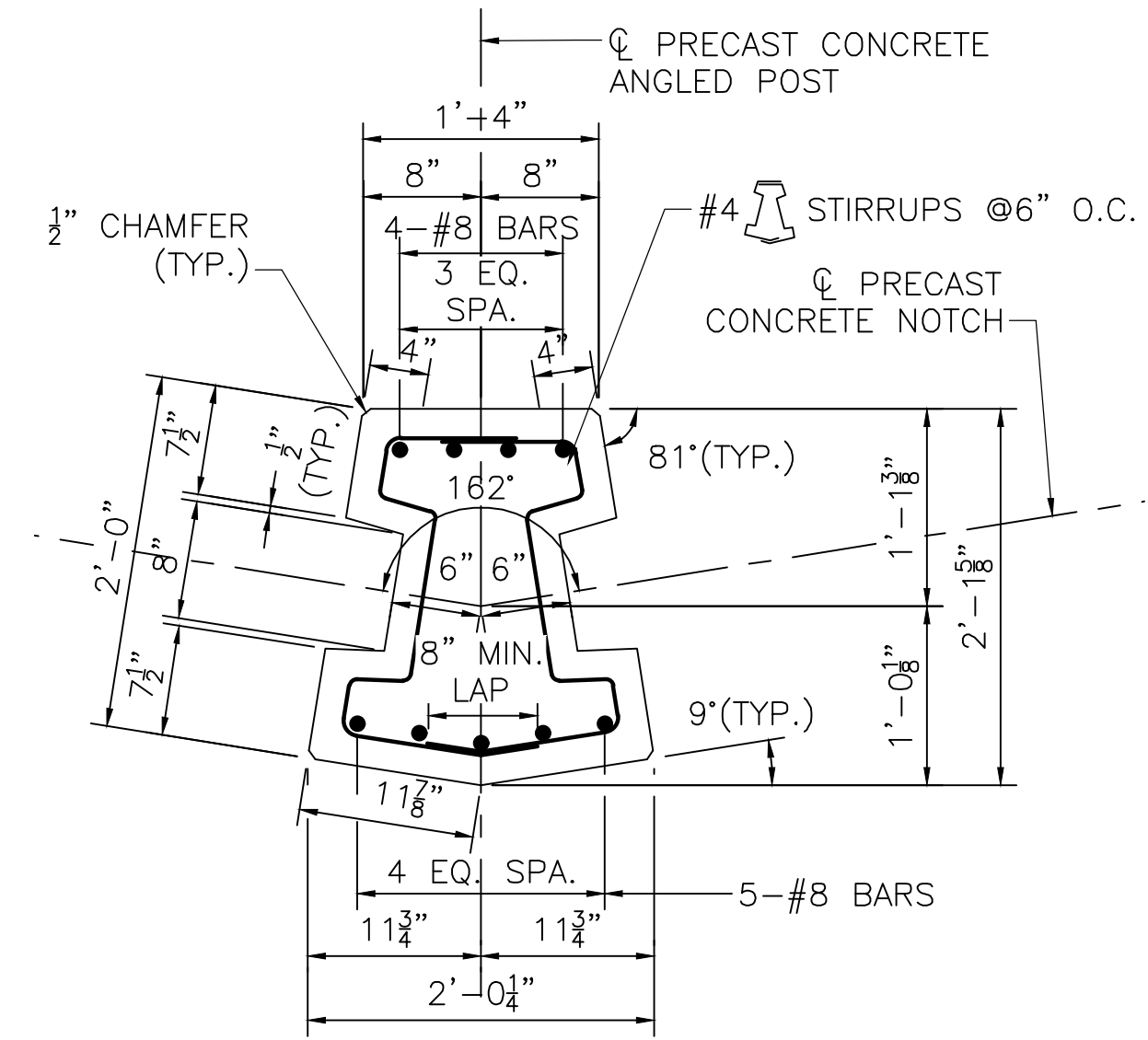
**DETAIL A**  
SCALE: 3"=1'-0"



**DETAIL B**  
SCALE: 3"=1'-0"

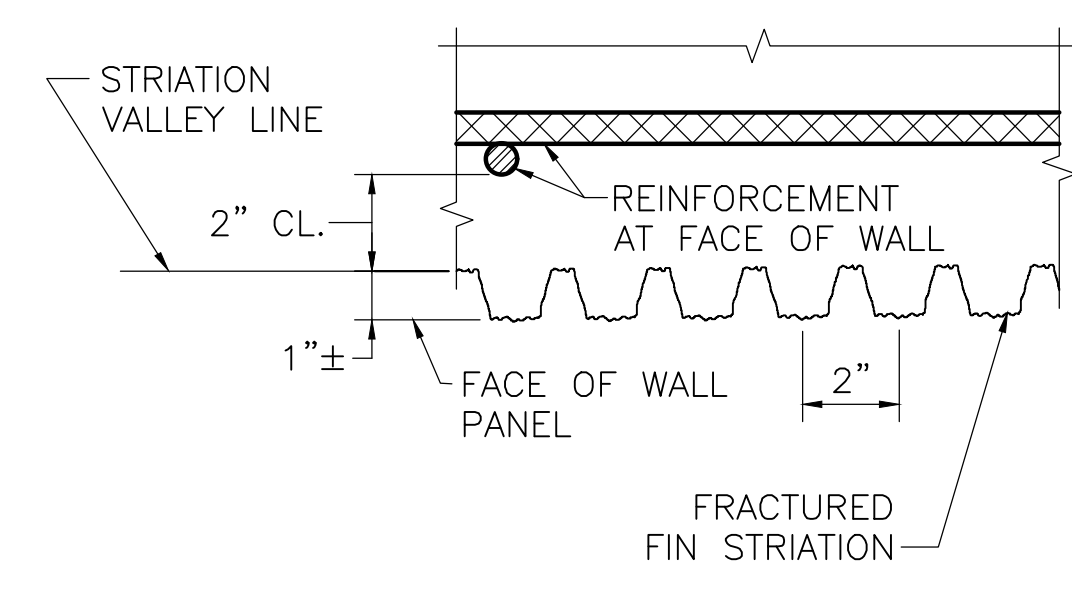


**DETAIL C**  
SCALE: 3"=1'-0"



**ANGLED IN-LINE  
CONCRETE POST SECTION**

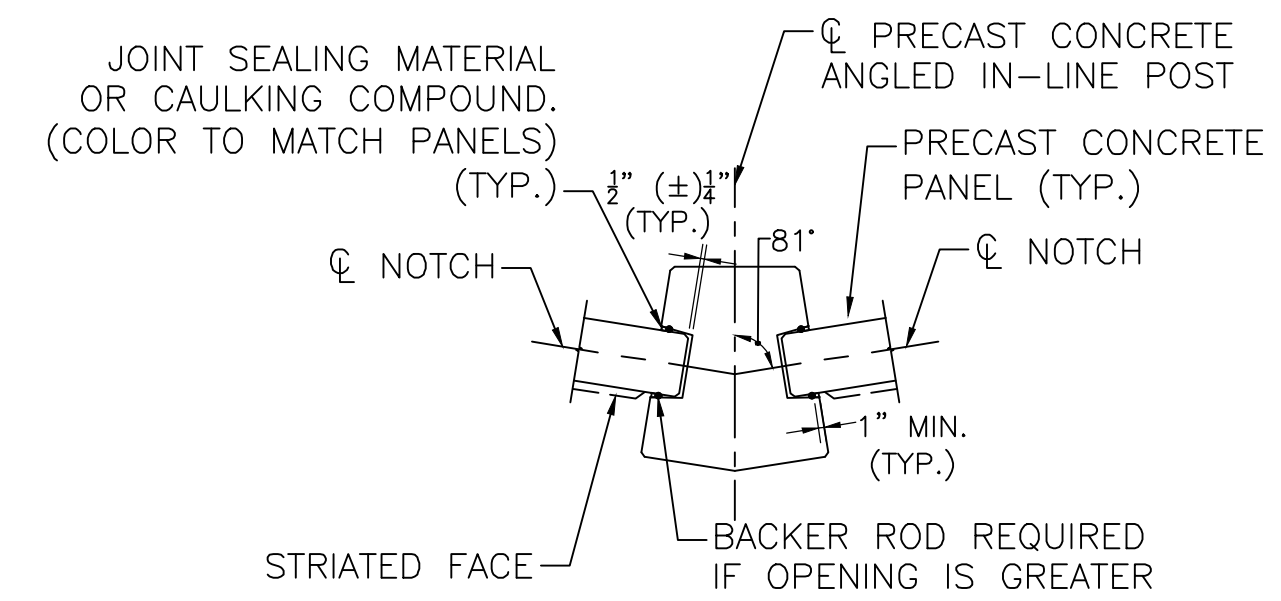
SCALE: 1"=1'-0"



**NOTE:**  
THE CONTRACTOR SHALL MAKE SURE THAT THE STRIATION FINS ARE PLUMB AND LINED UP VERTICALLY FROM PANEL TO PANEL FOR THE FULL HEIGHT OF THE WALL.

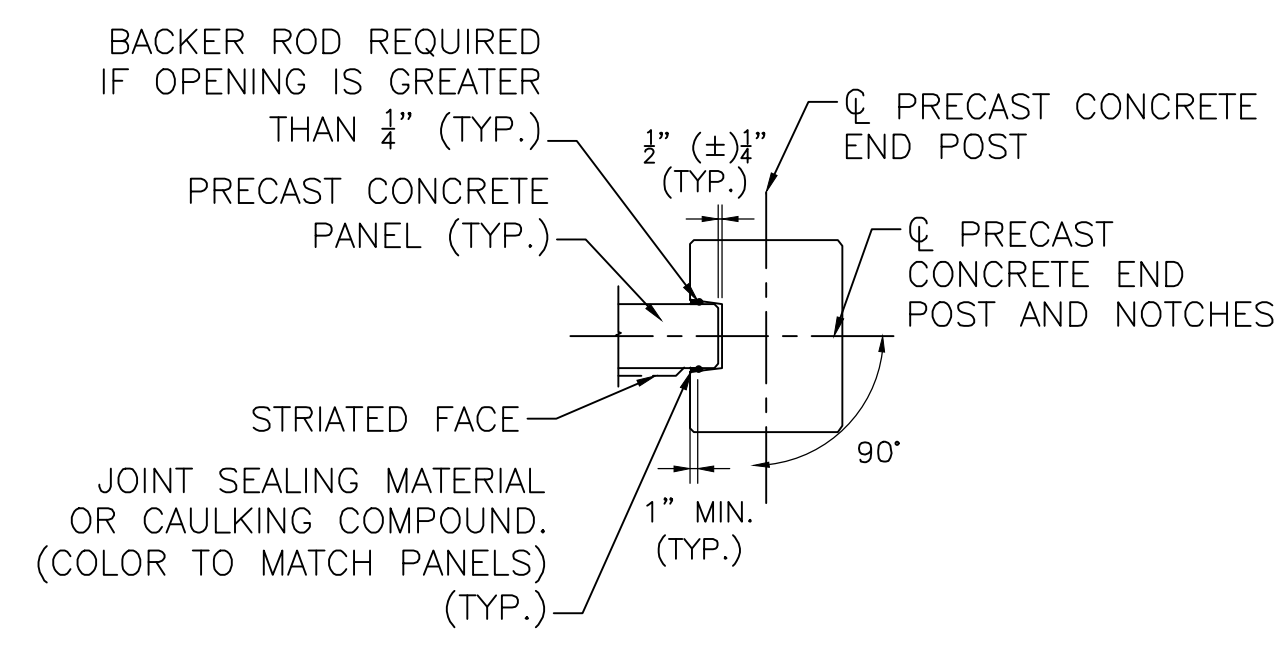
**TYPICAL STRIATION DETAIL**

SCALE: 3"=1'-0"



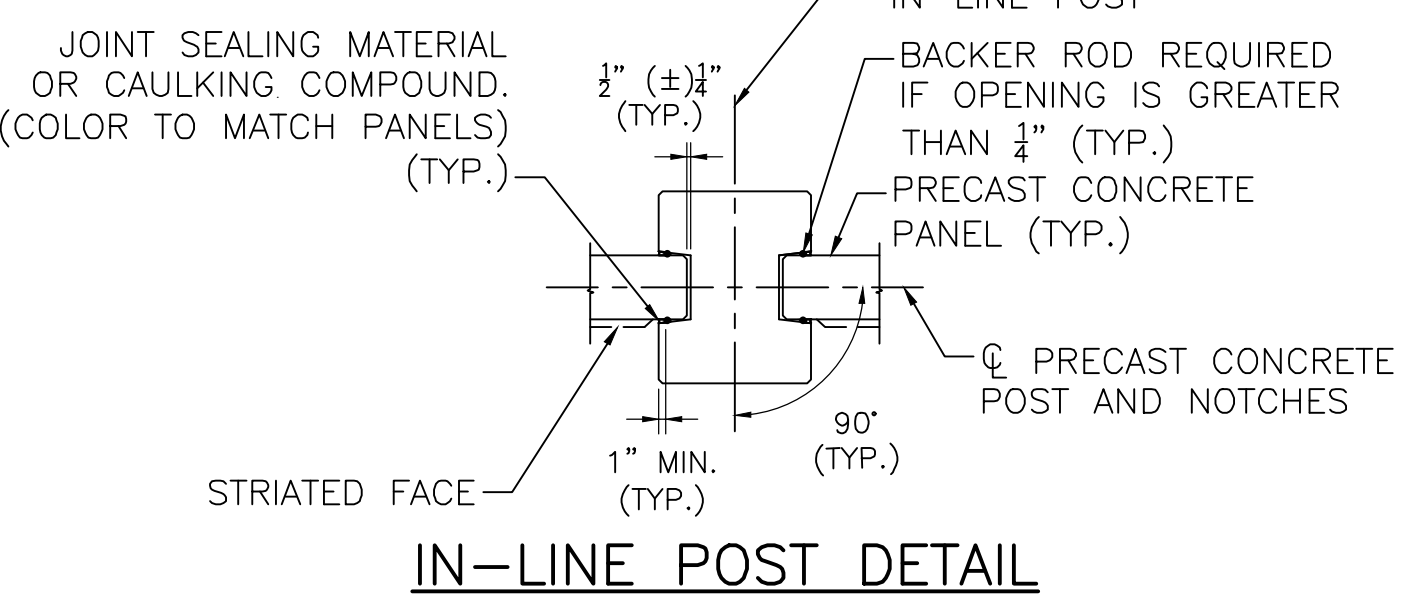
**ANGLED IN-LINE POST DETAIL**

SCALE: 1/2"=1'-0"



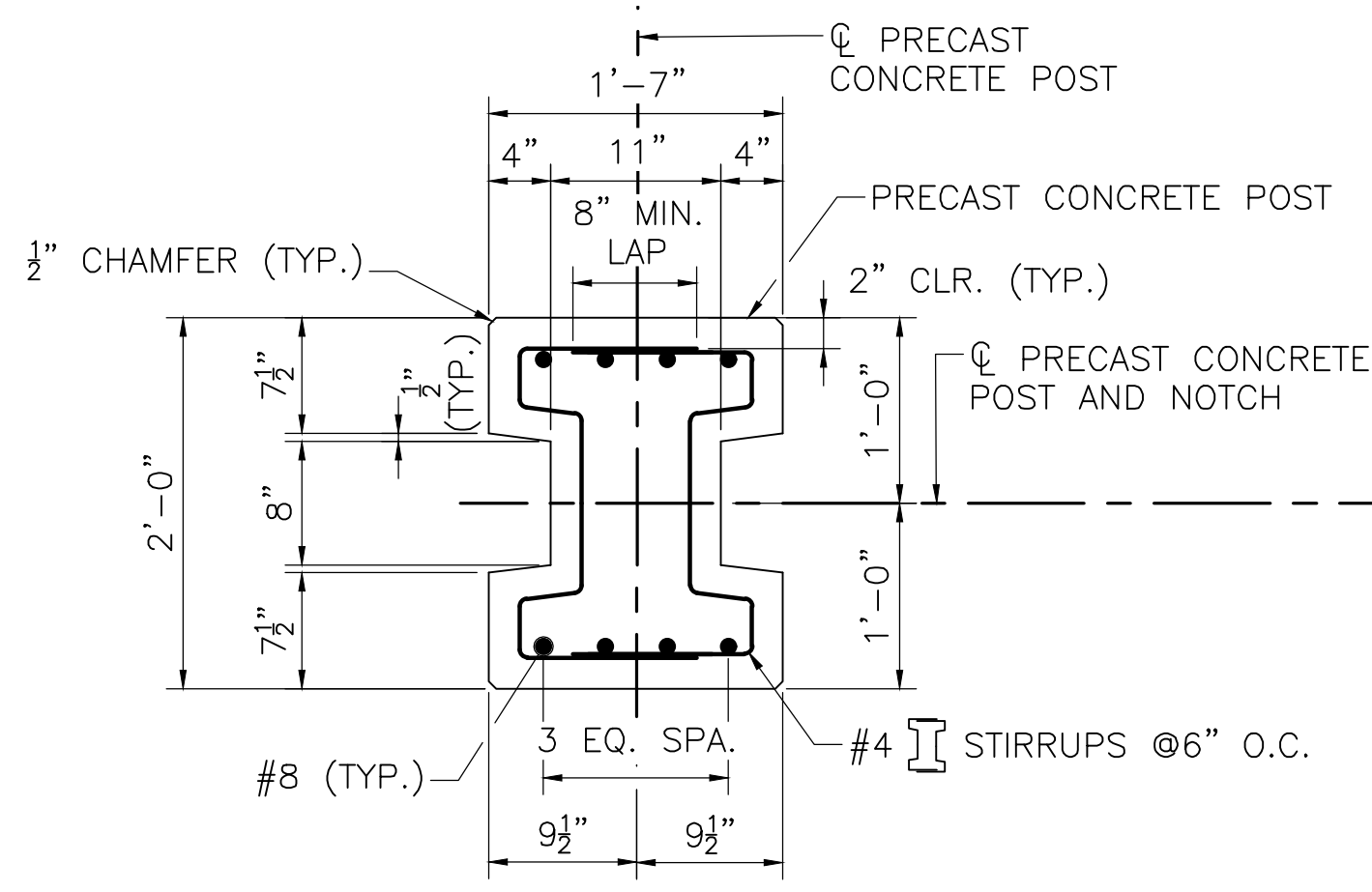
**END POST DETAIL**

SCALE: 1/2"=1'-0"



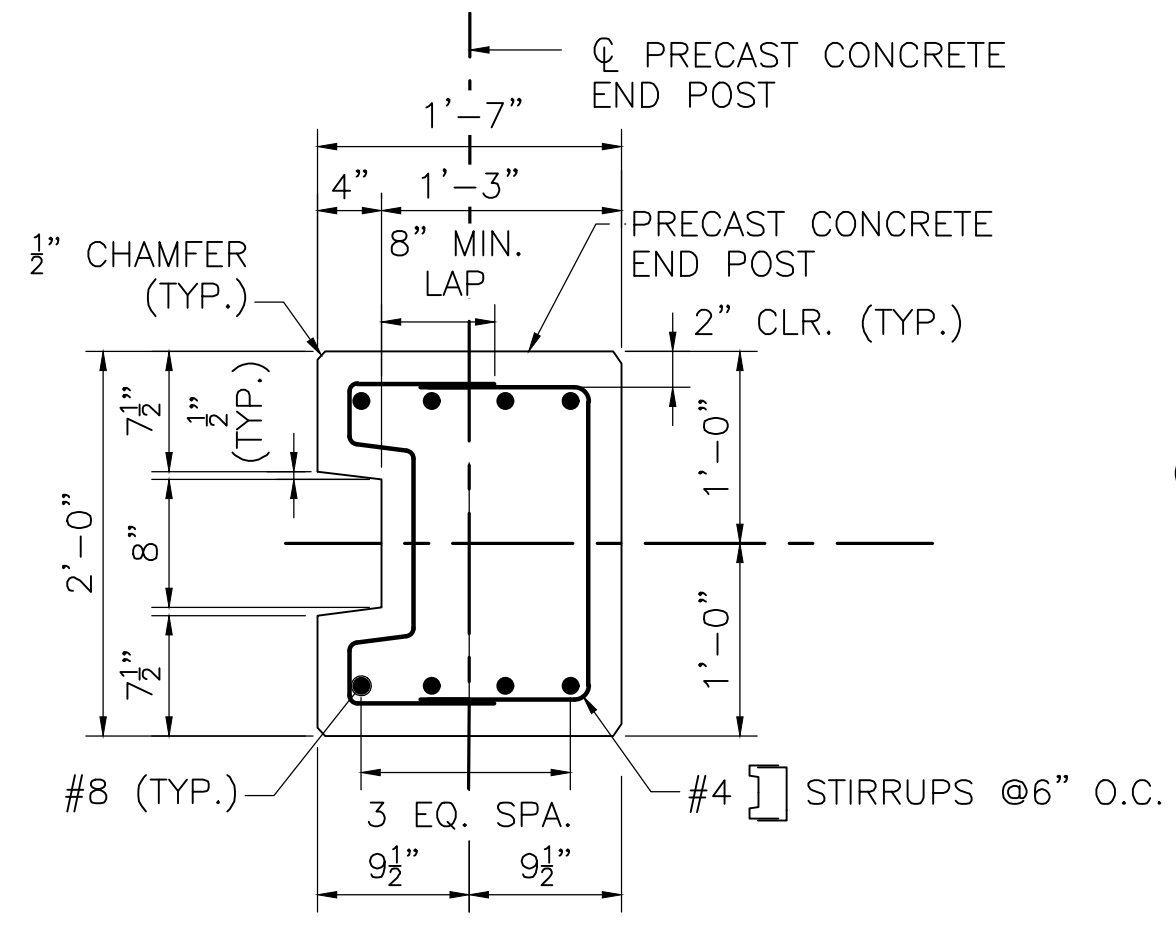
**IN-LINE POST DETAIL**

SCALE: 1/2"=1'-0"



**IN-LINE  
CONCRETE POST SECTION**

SCALE: 1"=1'-0"



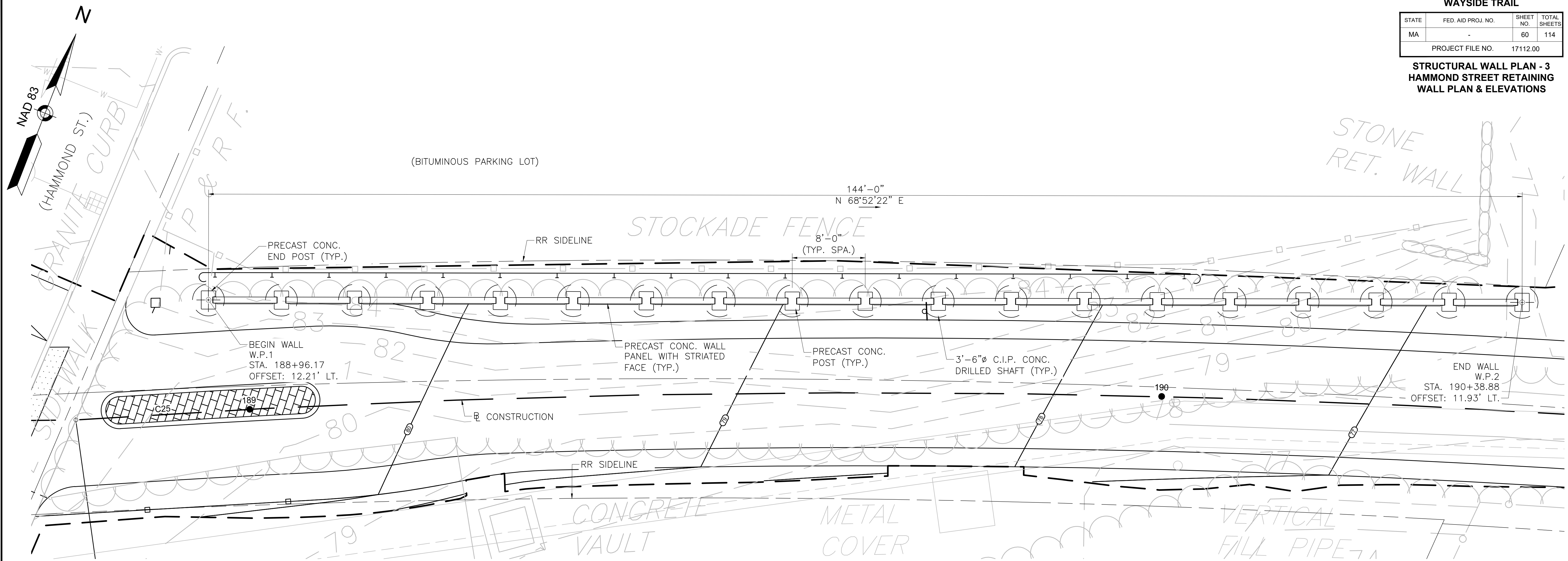
**END  
CONCRETE POST SECTION**

SCALE: 1"=1'-0"

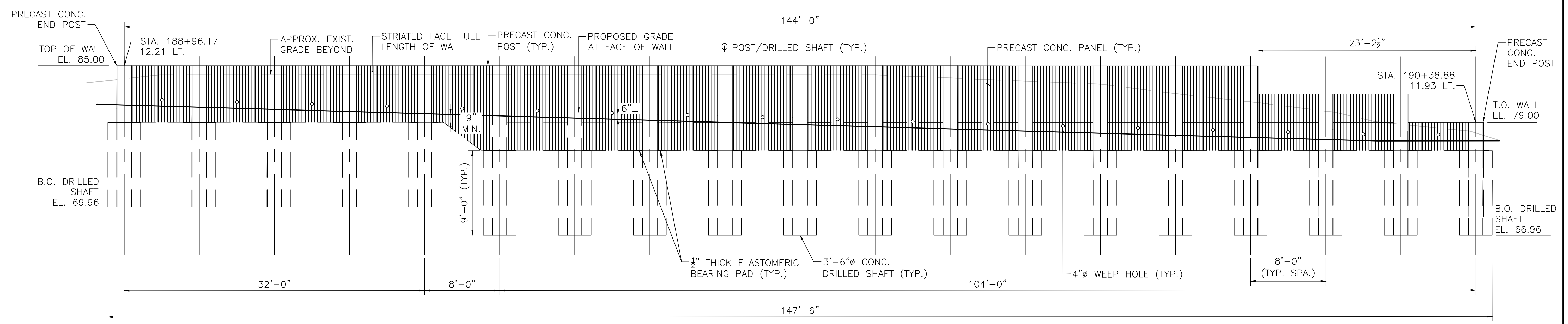
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	60	114
PROJECT FILE NO.		17112.00	

**STRUCTURAL WALL PLAN - 3  
HAMMOND STREET RETAINING  
WALL PLAN & ELEVATIONS**



**PLAN**  
**RETAINING WALL AT HAMMOND STREET**  
SCALE: 3/16"=1'-0"

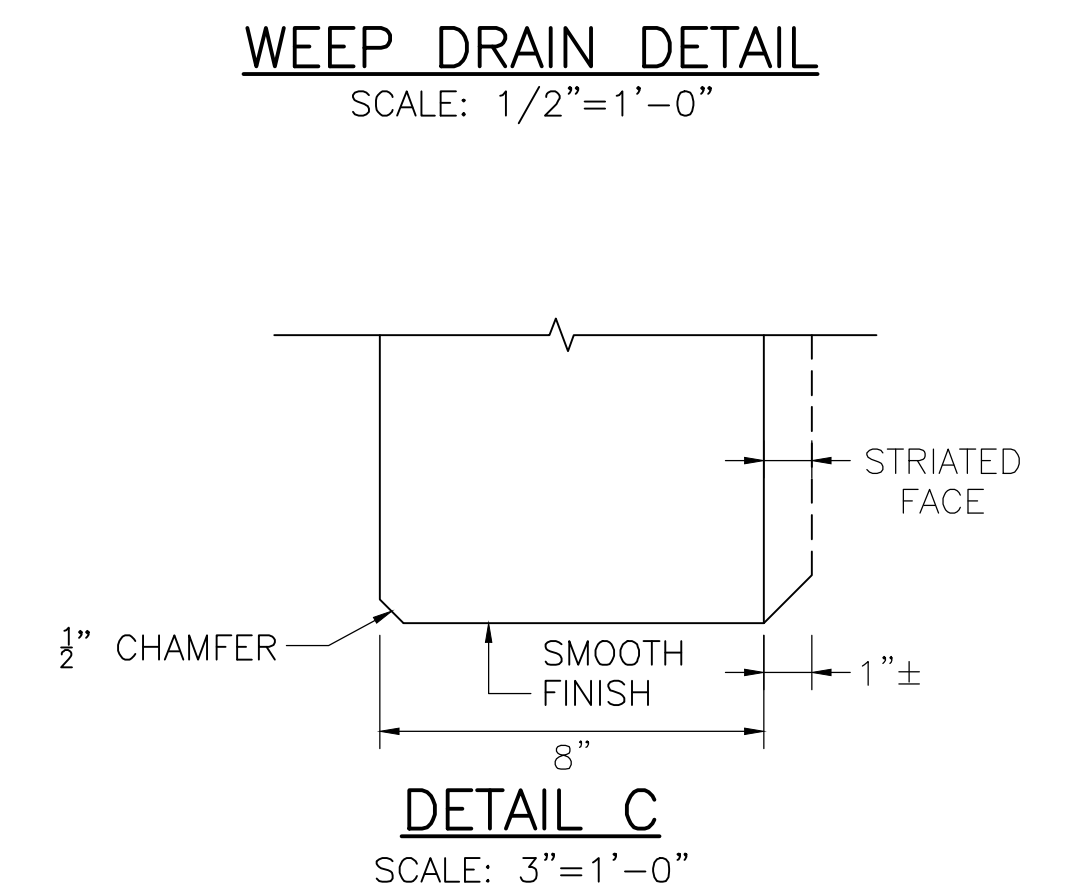
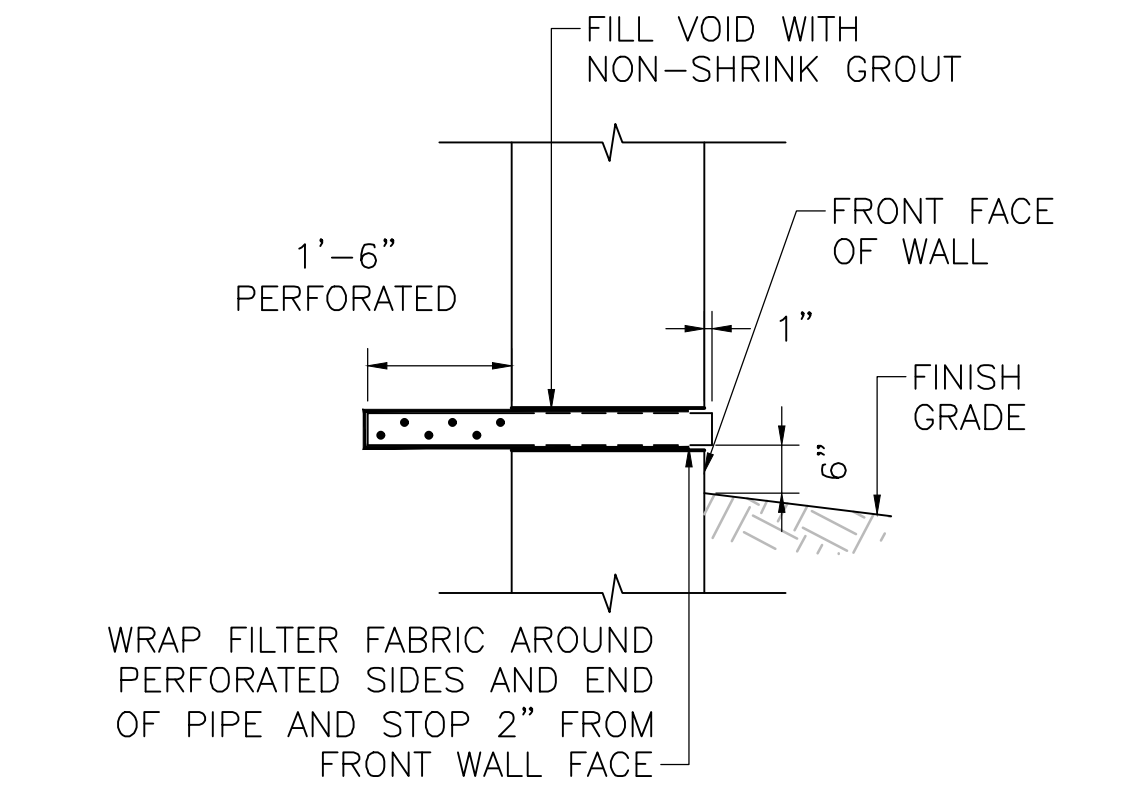
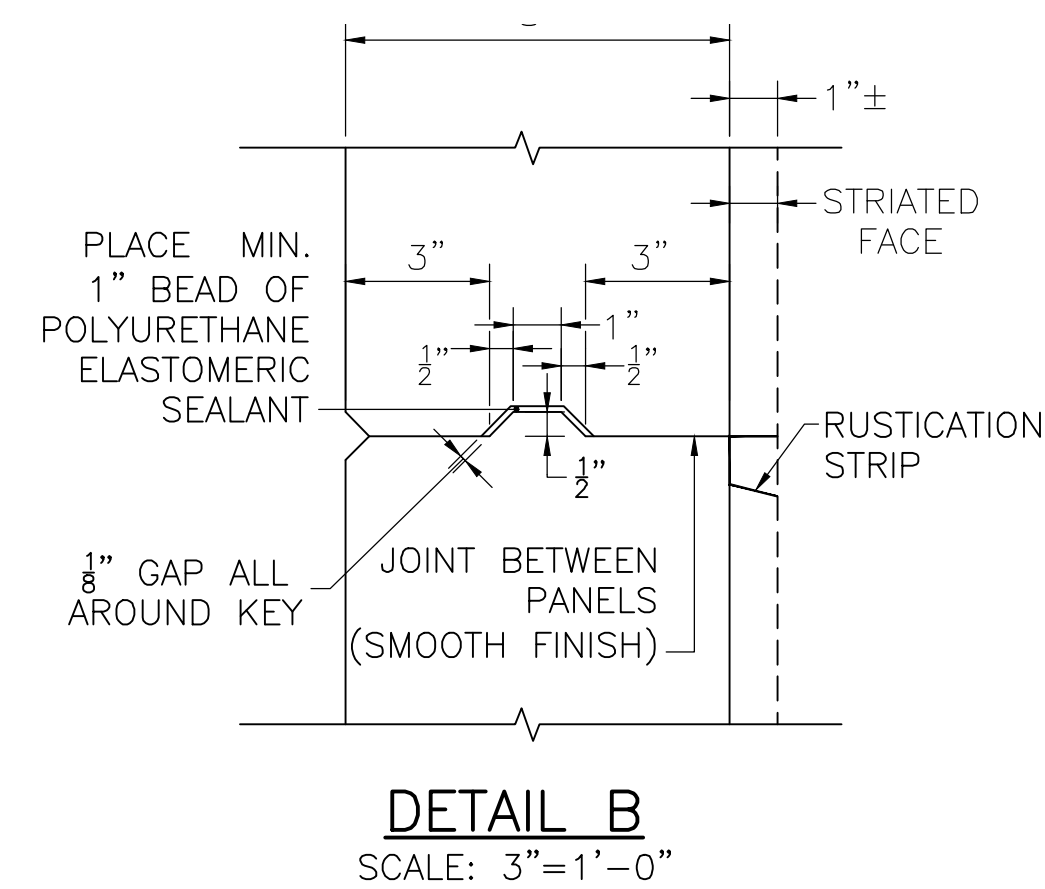
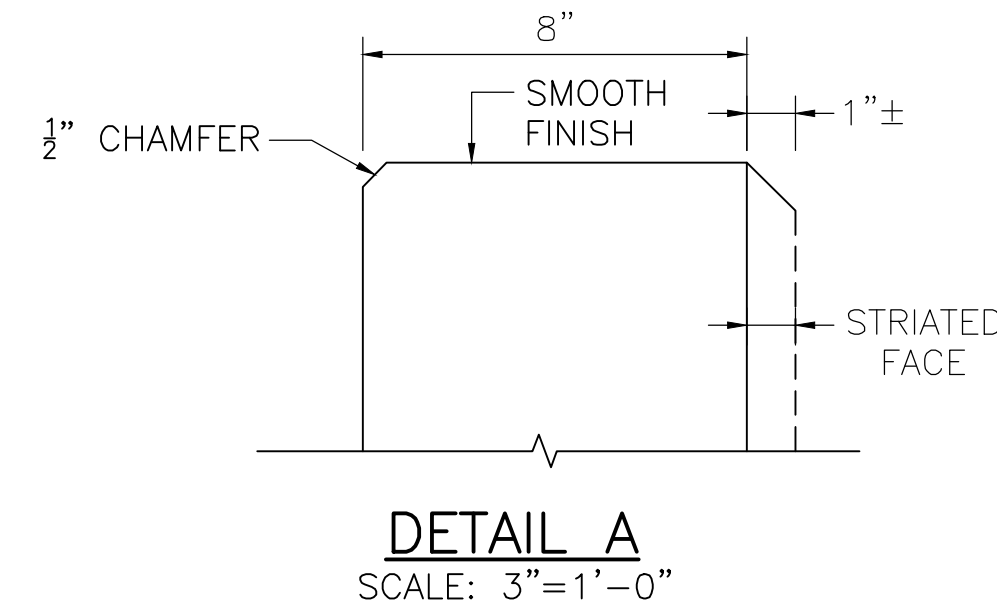
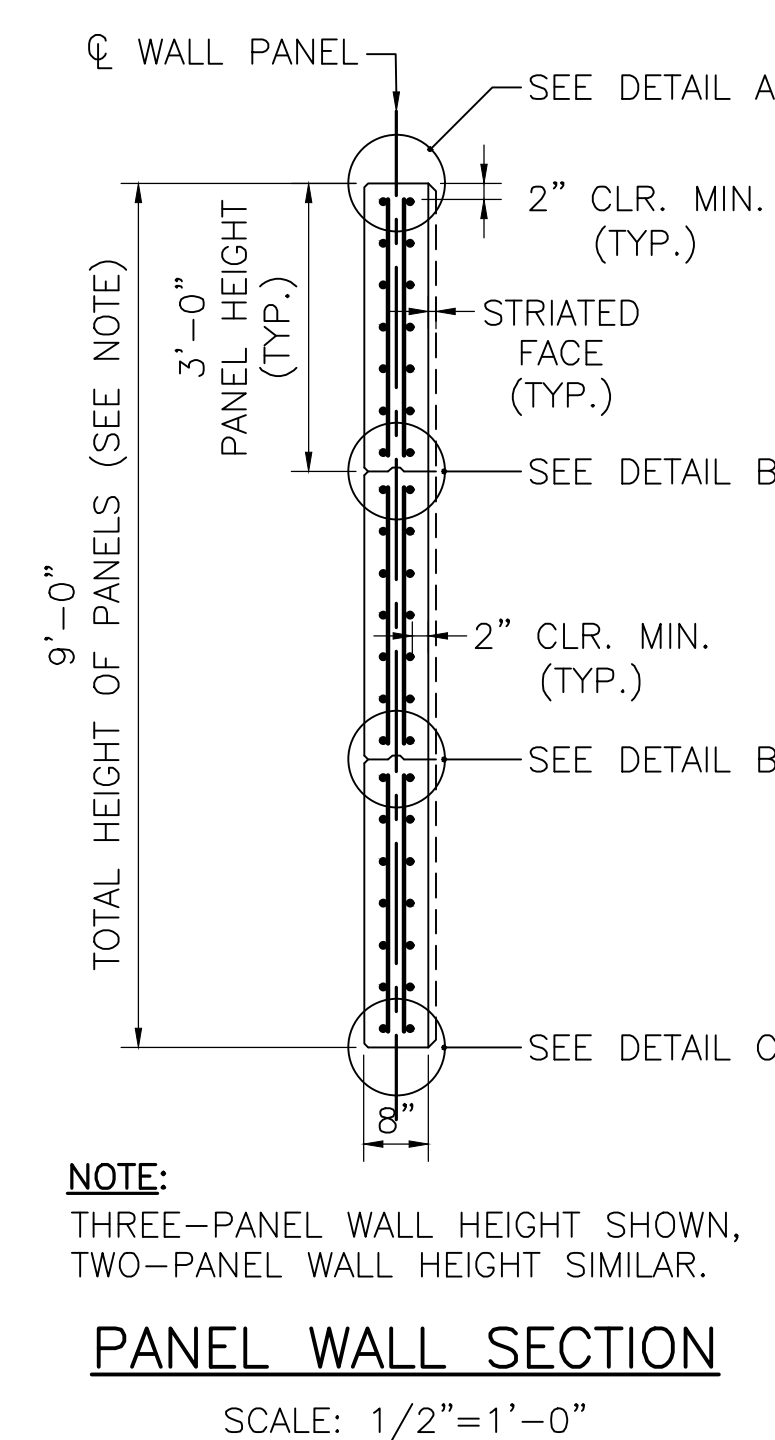
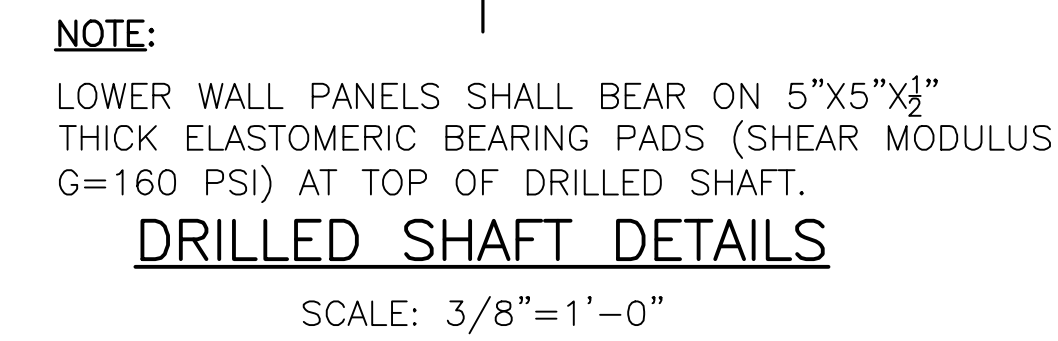
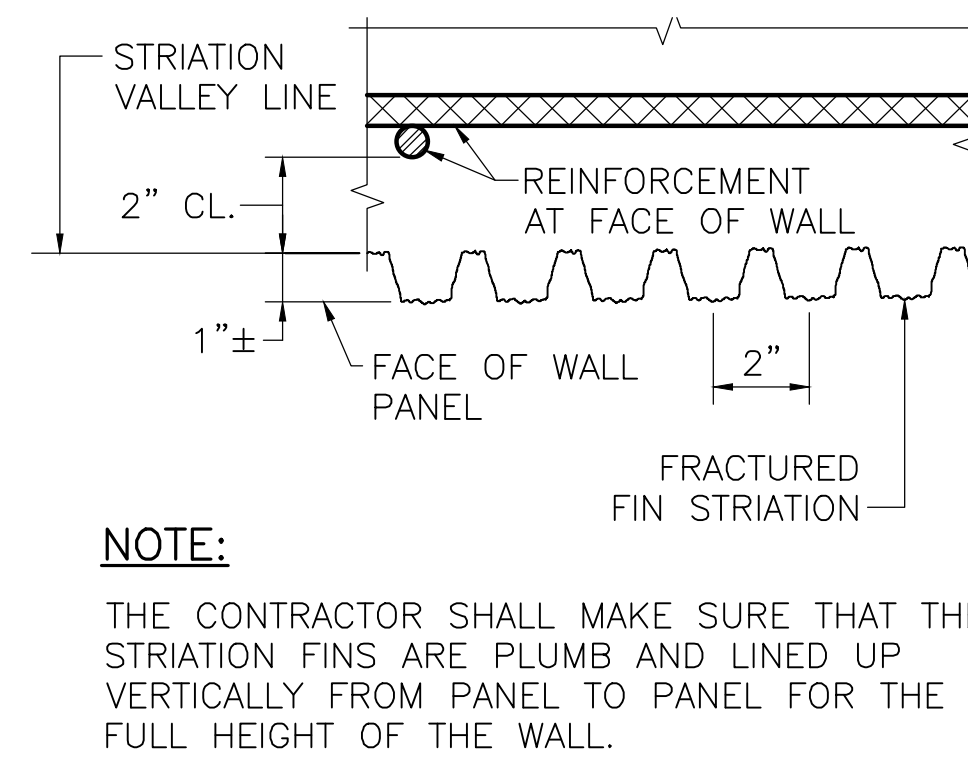
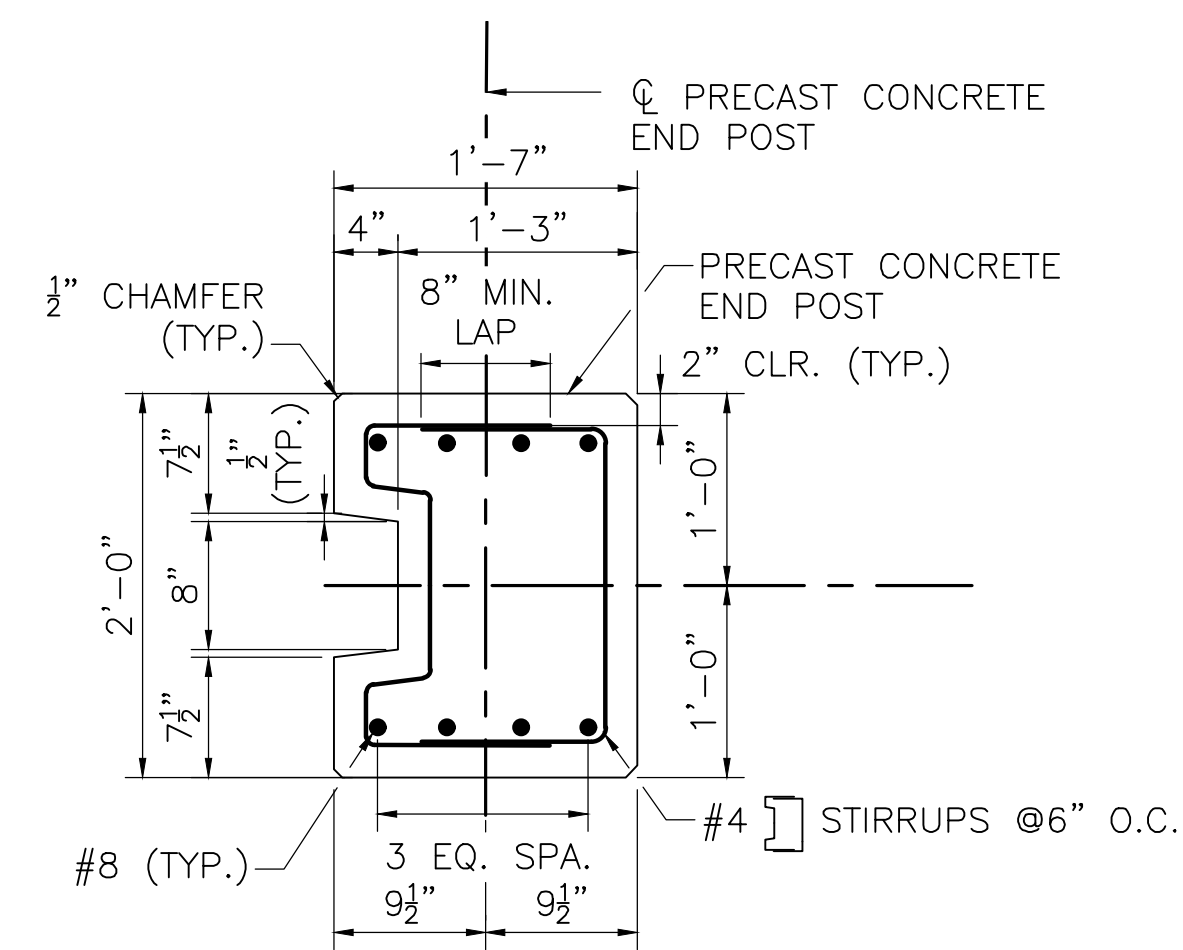
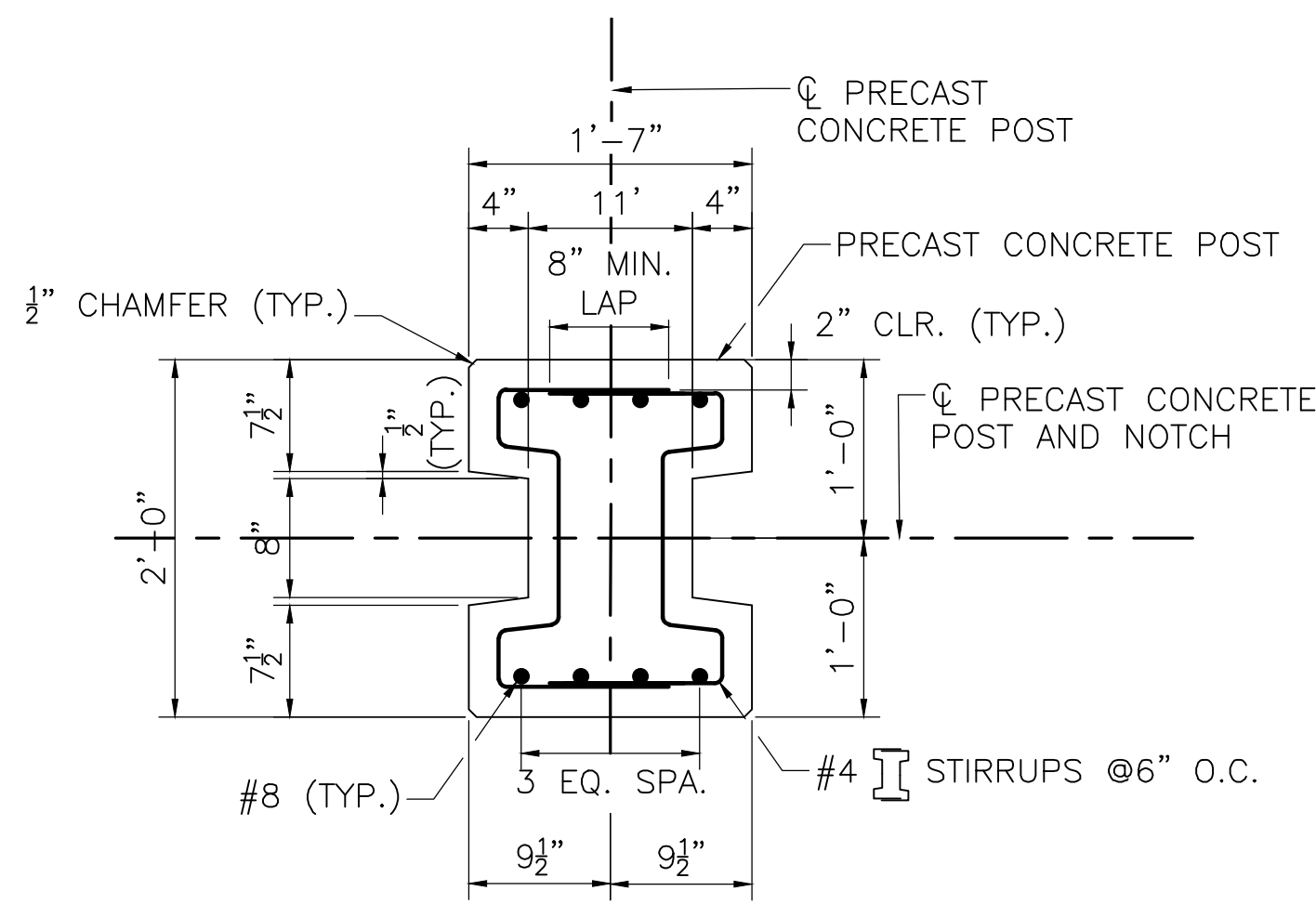
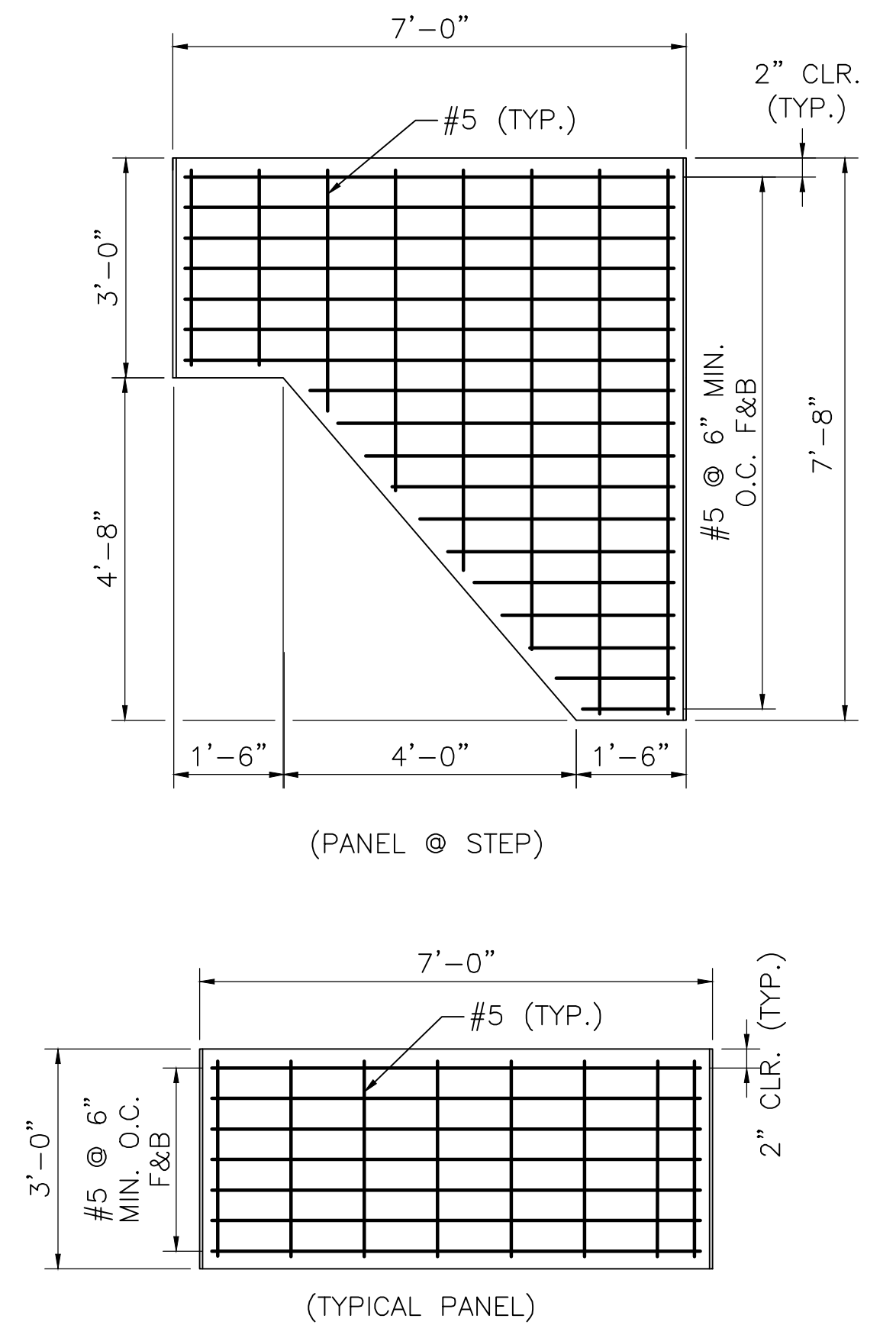
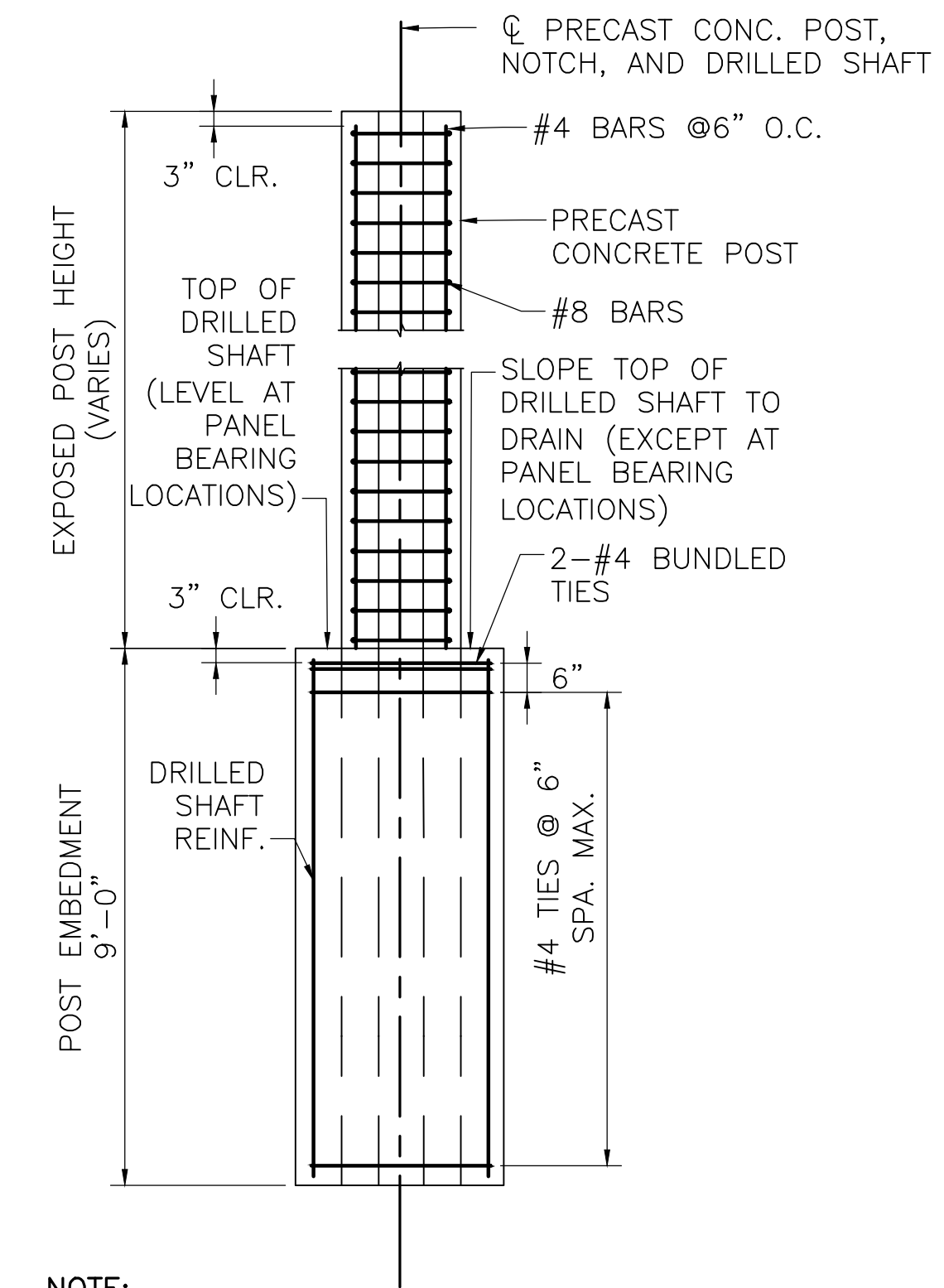
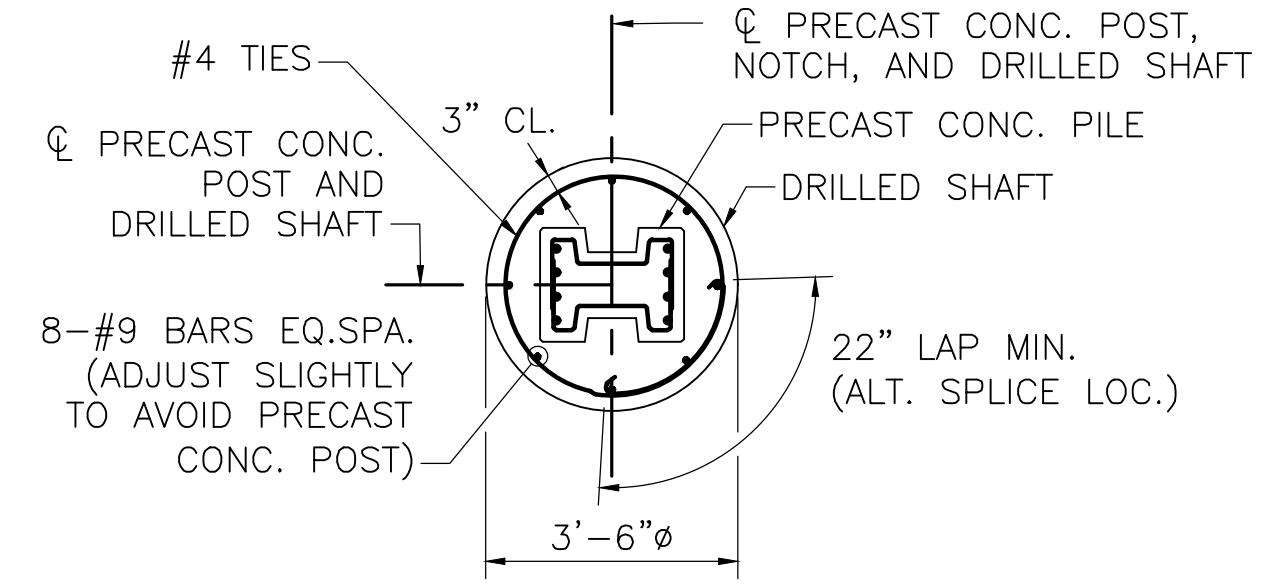
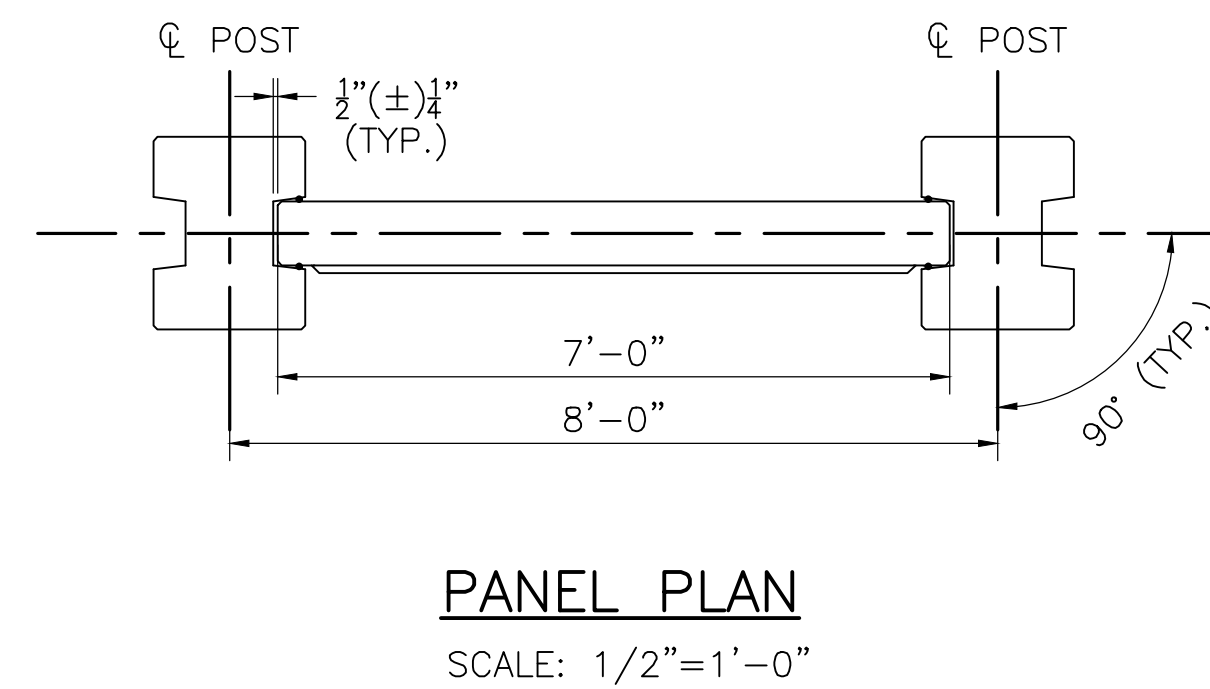
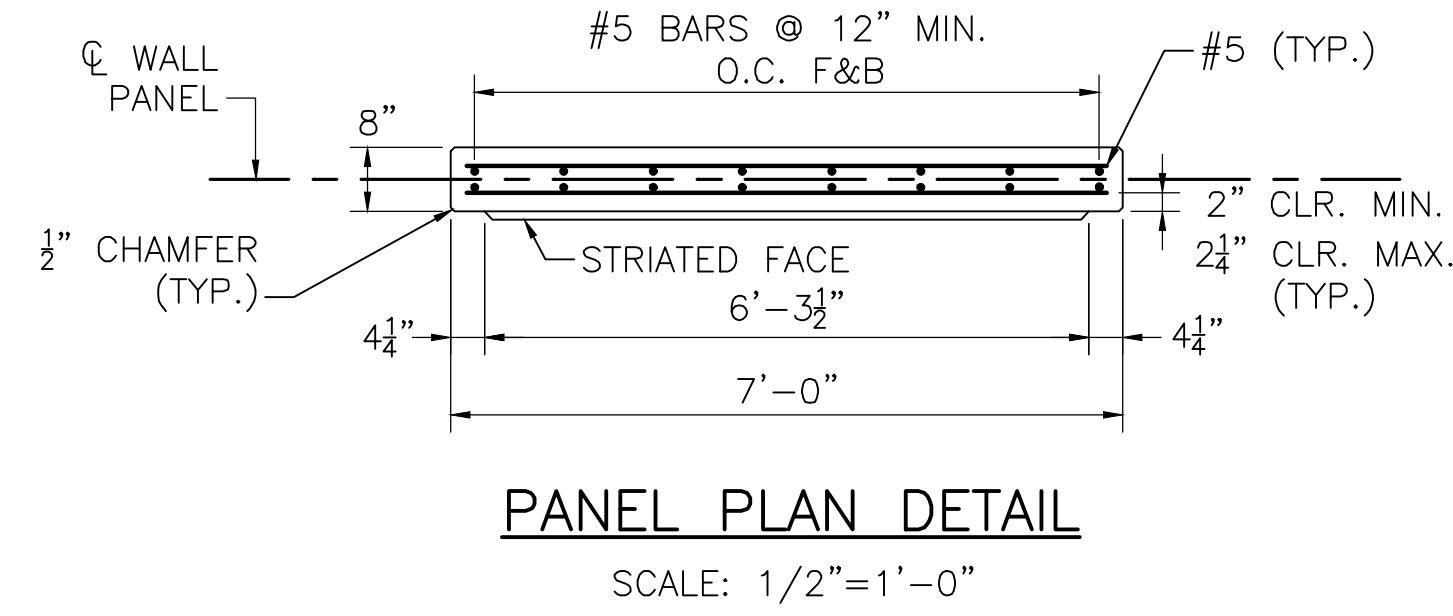
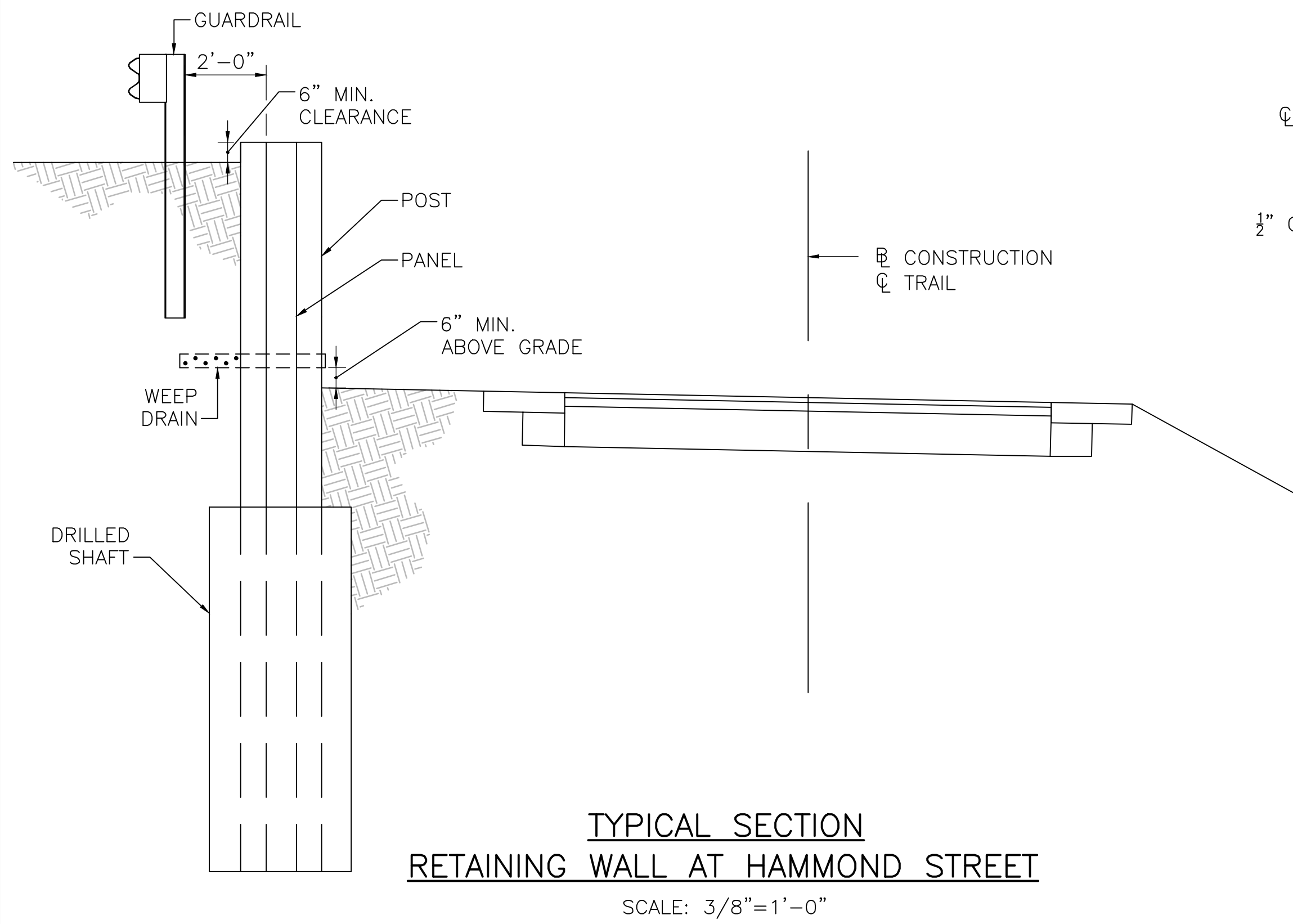


**ELEVATION**  
**RETAINING WALL AT HAMMOND STREET**  
SCALE: 3/16"=1'-0"

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	61	114
PROJECT FILE NO.		17112.00	

**STRUCTURAL WALL PLAN - 4  
HAMMOND STREET RETAINING WALL DETAILS**



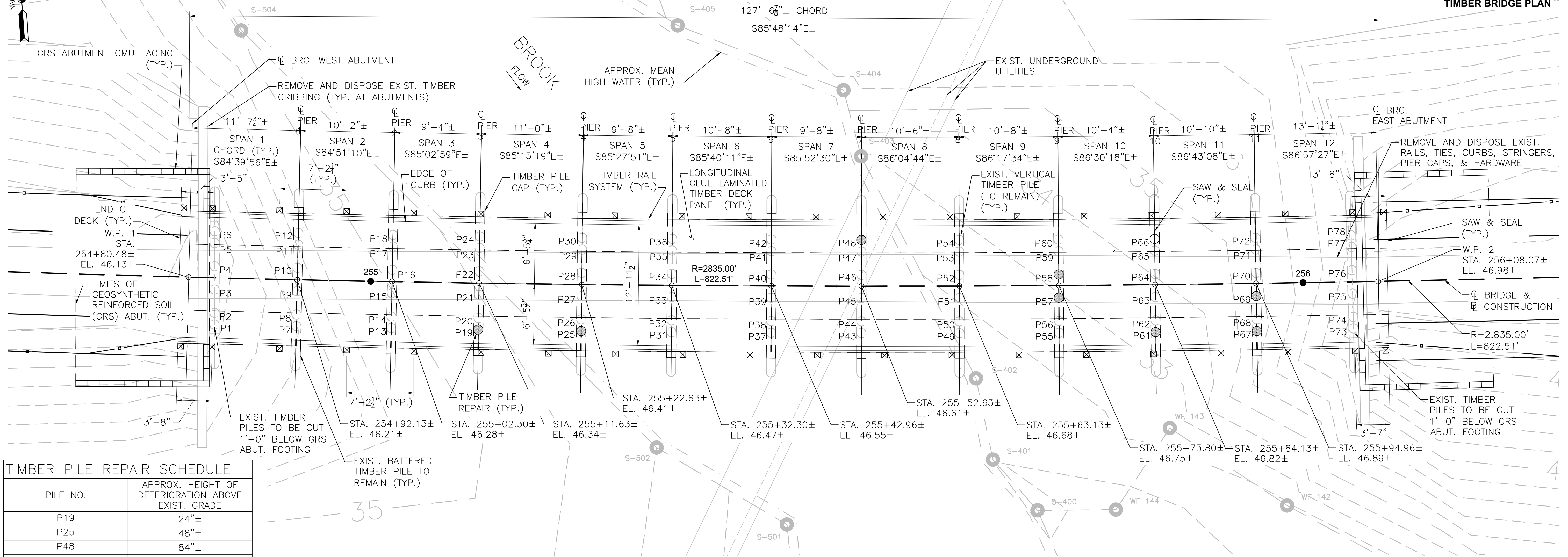
**NOTE:**

1. BRIDGE ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY AND HAVE BEEN APPROXIMATED THROUGH LIMITED FIELD MEASUREMENTS AND NOT ENTIRELY BASED ON SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING SUBSTRUCTURE ELEMENTS AND FOR THE FINAL GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS FOR THE PROPOSED STRUCTURE.

**WAYSIDE TRAIL**

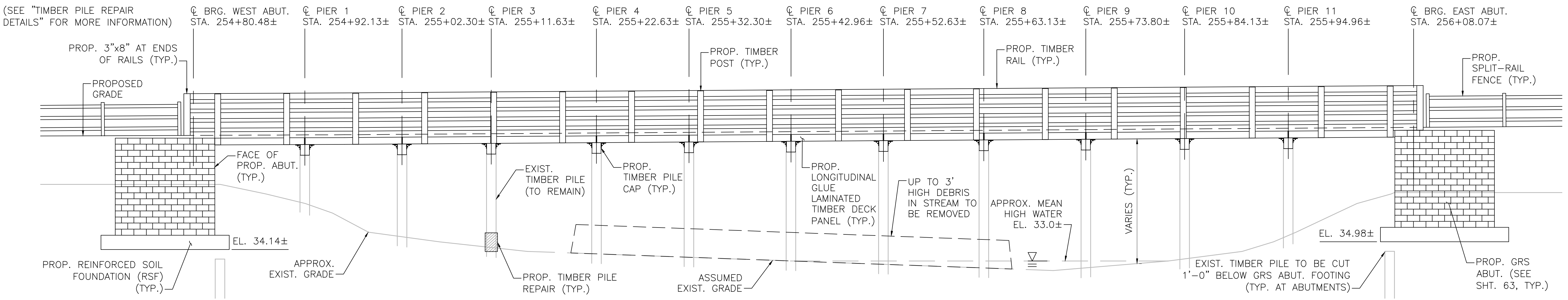
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	62	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 1  
BRIDGE No. 114  
TIMBER BRIDGE PLAN**



PILE NO.	APPROX. HEIGHT OF DETERIORATION ABOVE EXIST. GRADE
P19	24"±
P25	48"±
P48	84"±
P57	36"±
P58	36"±
P61	12"±
P66	36"±
P67	6"±
P69	36"±

**PLAN VIEW**  
SCALE: 3/16" = 1"=0'



**ELEVATION**  
SCALE: 3/16" = 1"=0'

**WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	63	114
PROJECT FILE NO.		17112.00	

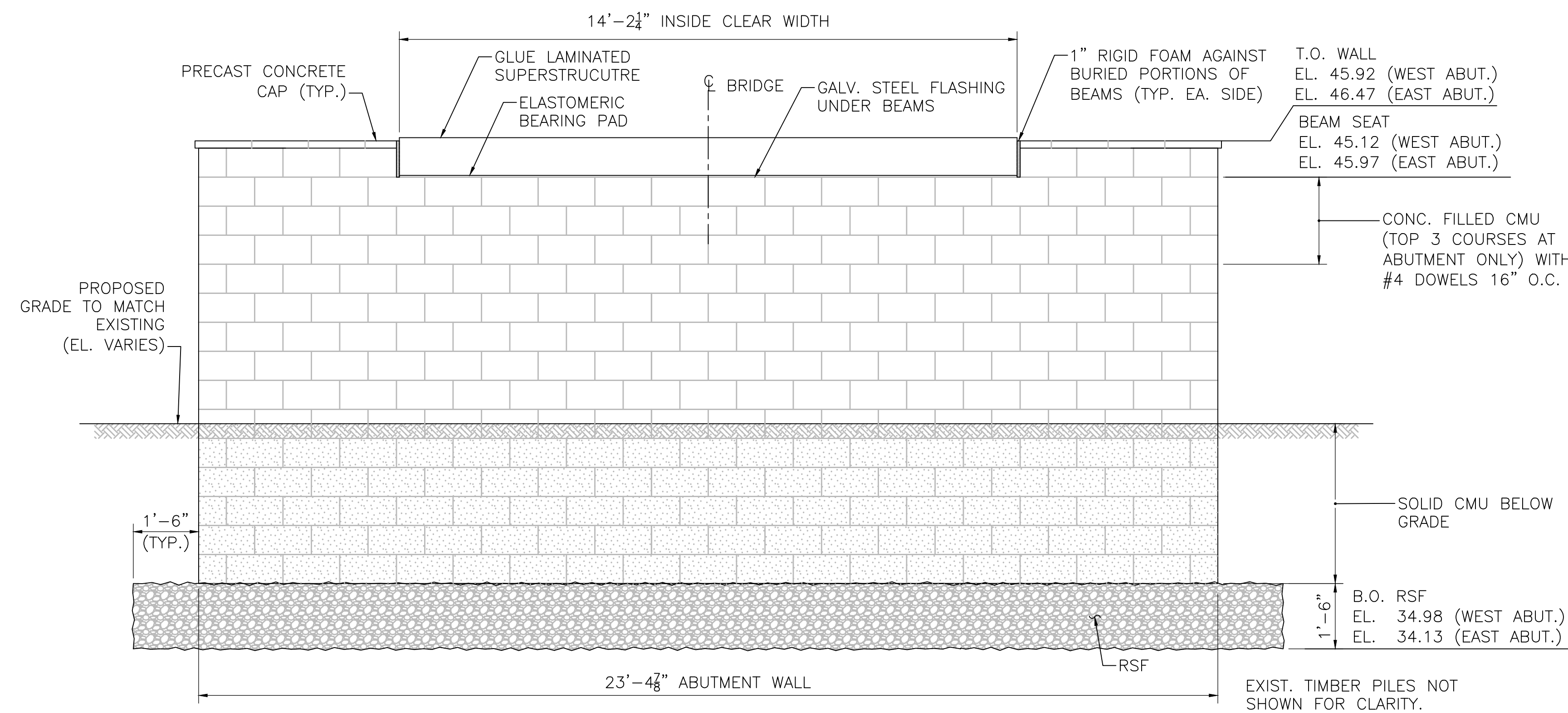
**BRIDGE PLAN - 2  
BRIDGE No. 114  
TIMBER BRIDGE GRS ABUTMENTS**

**ABBREVIATIONS:**

- RSF - REINFORCED SOIL FOUNDATION
- CMU - CONCRETE MASONRY UNIT
- SRS - GEOSYNTHETIC REINFORCED SOIL
- MSE - MECHANICALLY STABILIZED EARTH
- B.O. - BOTTOM OF
- T.O. - TOP OF
- EL. - ELEVATION

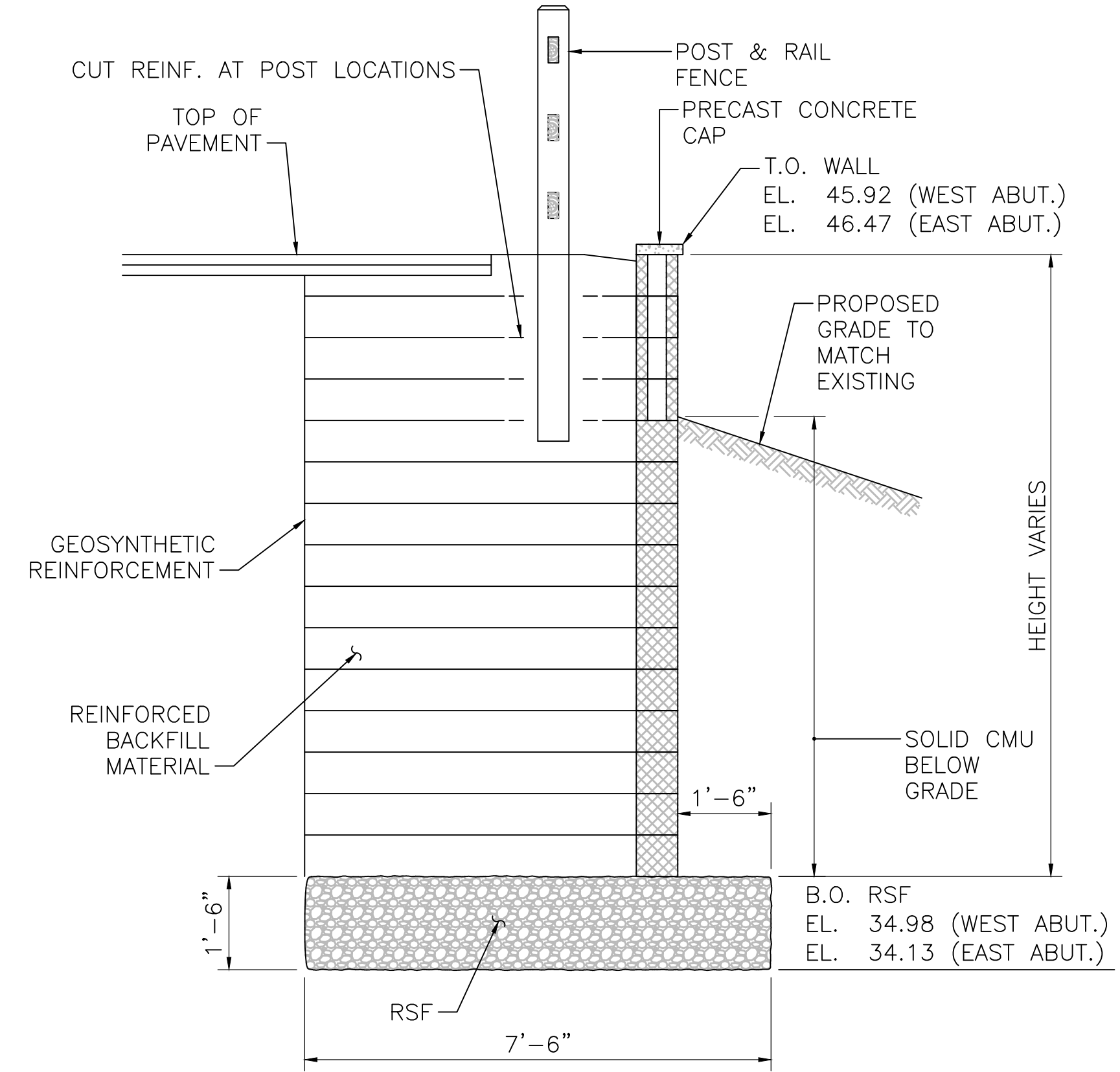
**NOTE:**

FOR NOTES, SEE "GRS ABUTMENT/WALL NOTES" SHEET.



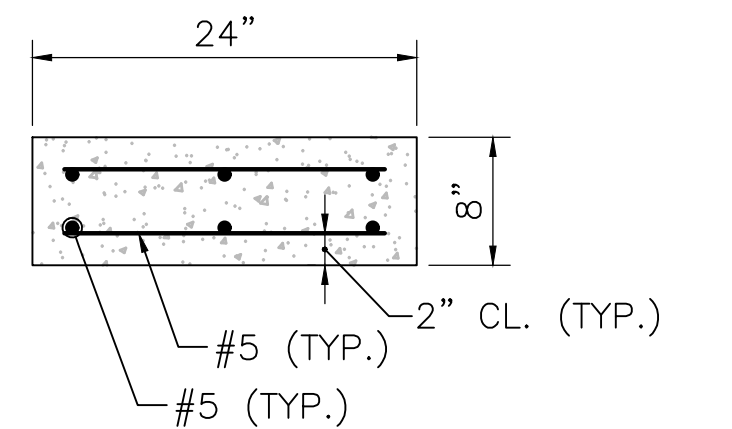
**TYPICAL GRS ABUTMENT ELEVATION**

SCALE: 1/2" = 1'-0"



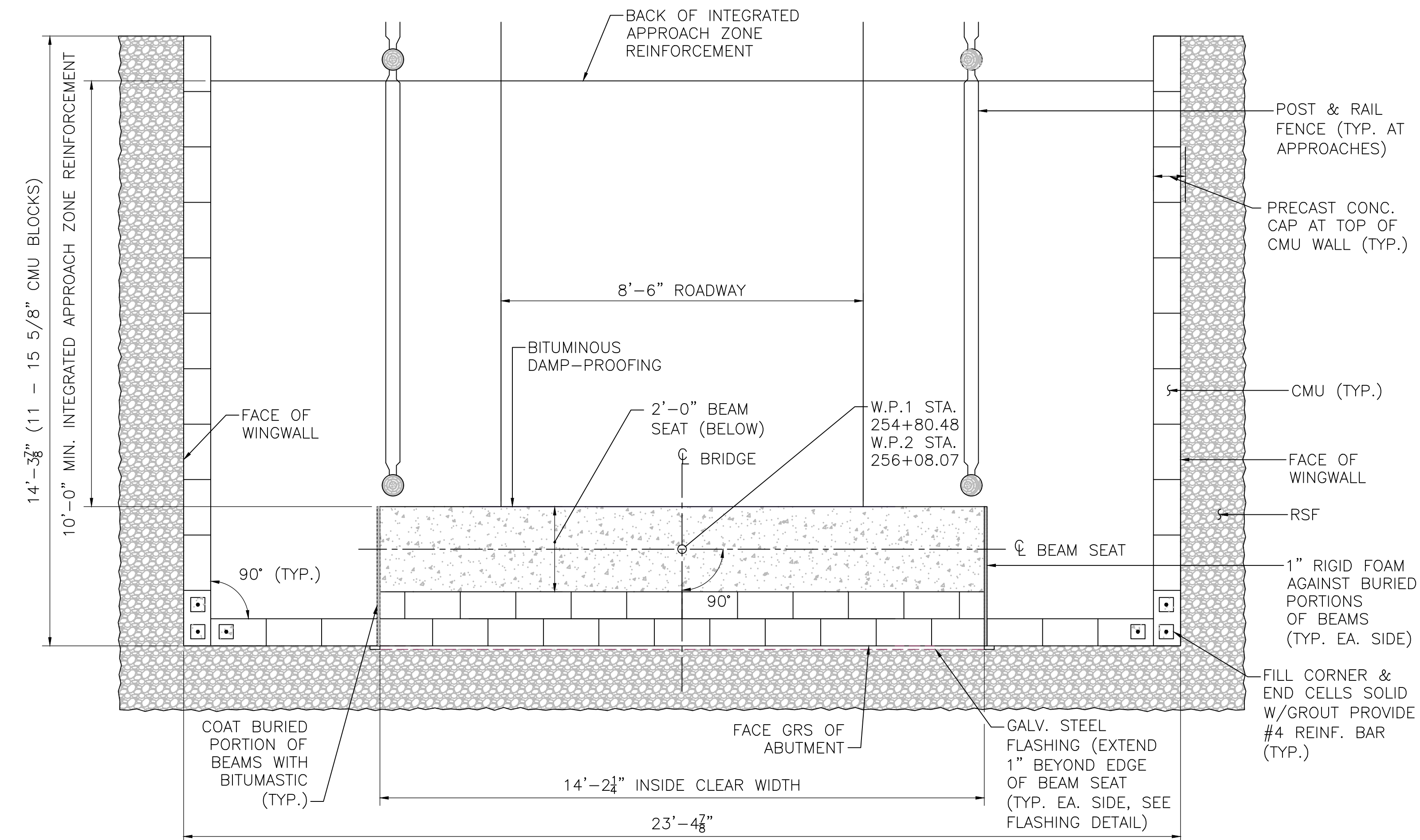
**TYPICAL WINGWALL/  
RETAINING WALL SECTION**

SCALE: 1/2" = 1'-0"



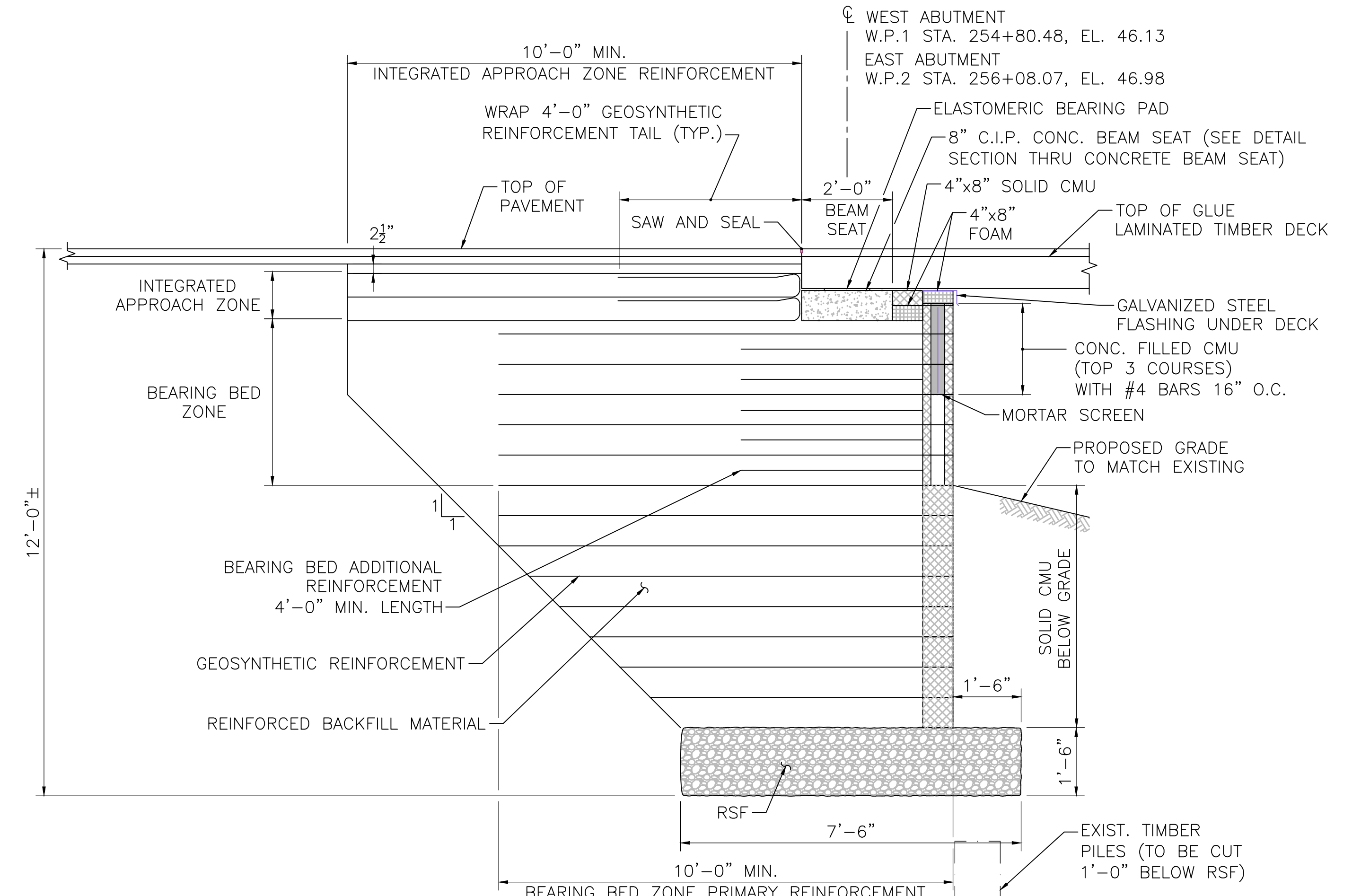
**C.I.P. CONCRETE  
BEAM SEAT DETAIL**

SCALE: 1" = 1'-0"



**TYPICAL ABUTMENT PLAN**

SCALE: 1/2" = 1'-0"



**TYPICAL ABUTMENT SECTION**

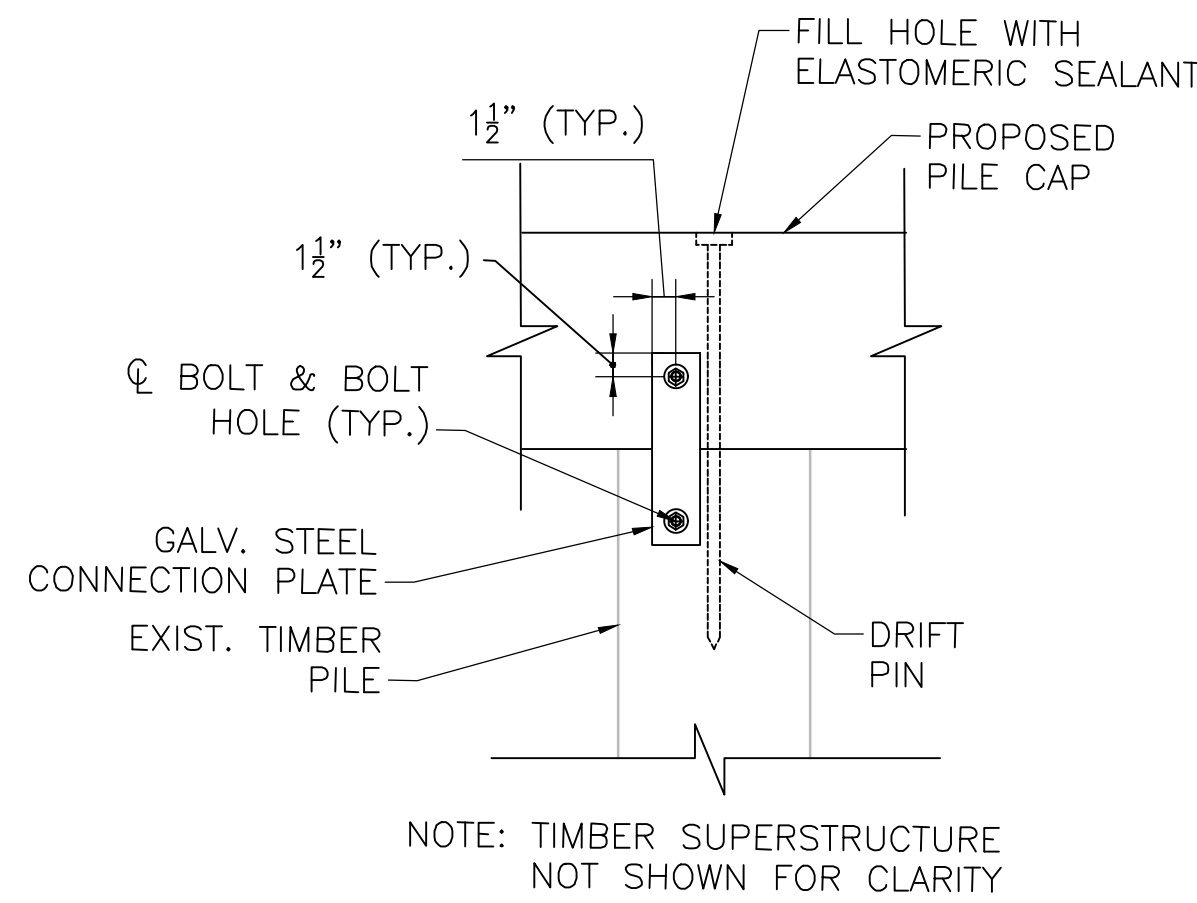
SCALE: 1/2" = 1'-0"

**NOT FOR CONSTRUCTION**

WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	64	114
PROJECT FILE NO.		17112.00	

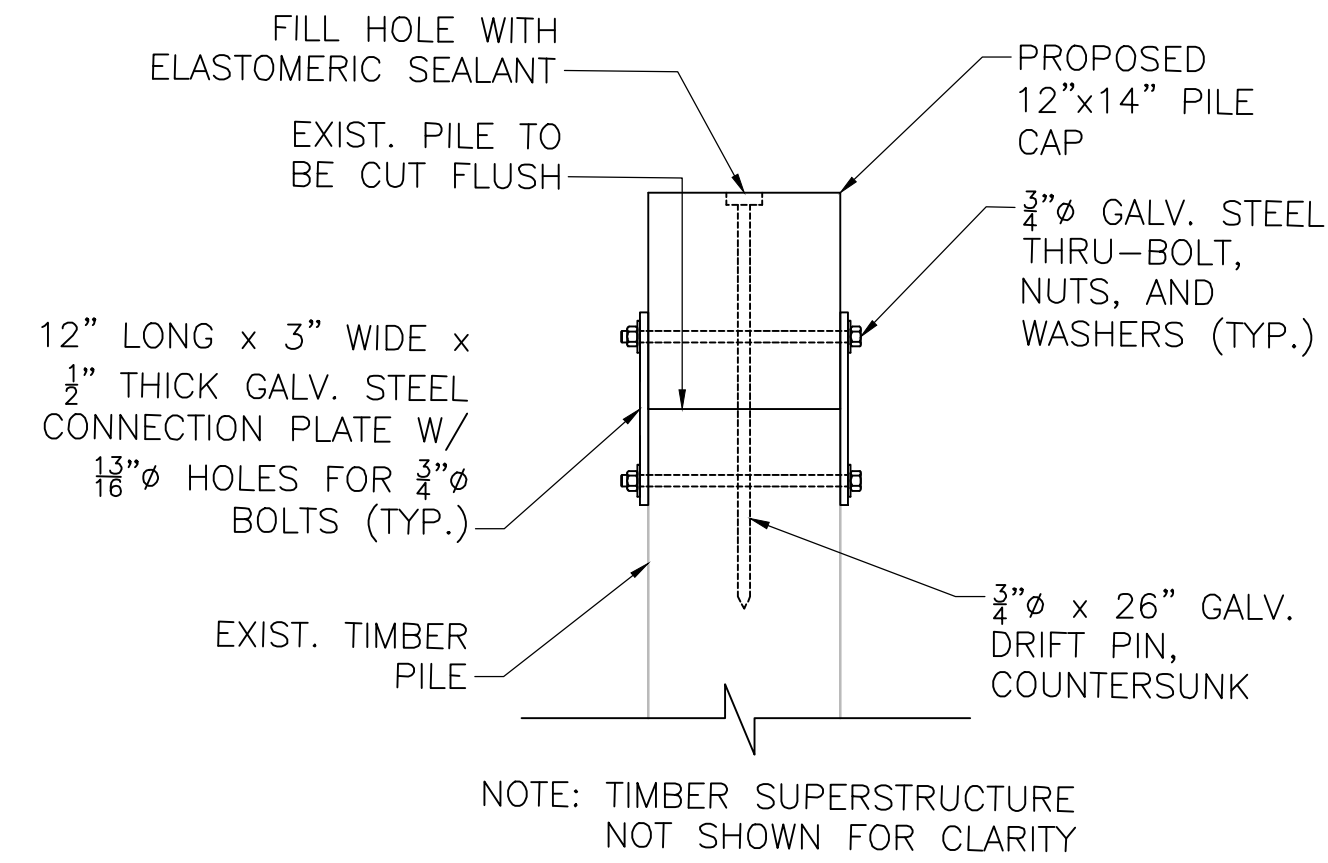
BRIDGE PLAN - 3  
BRIDGE No. 114  
TIMBER BRIDGE DETAILS



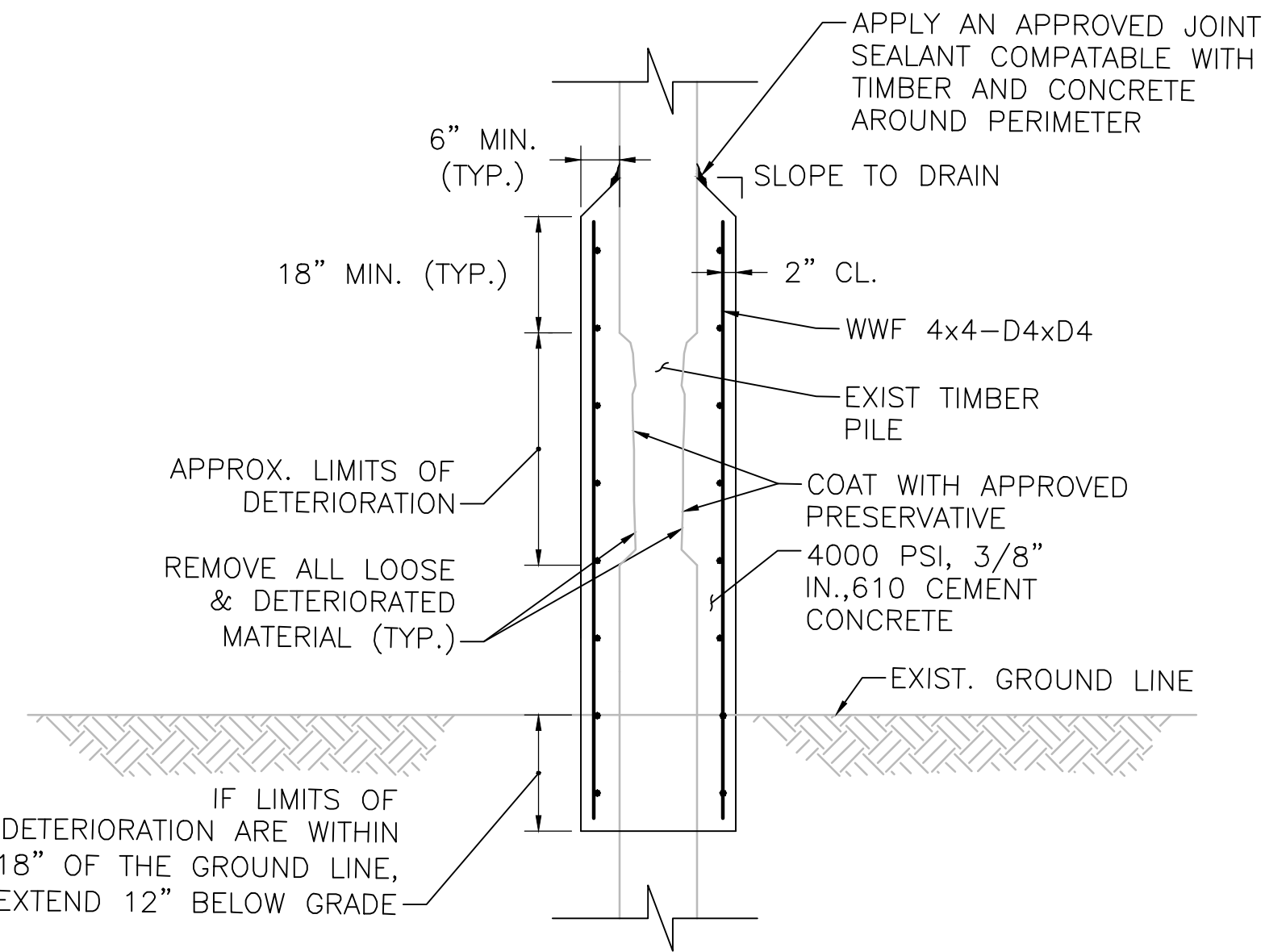
(ELEVATION)

PILE CAP TO EXISTING PILE CONNECTION DETAIL

SCALE: 1" = 1'-0"

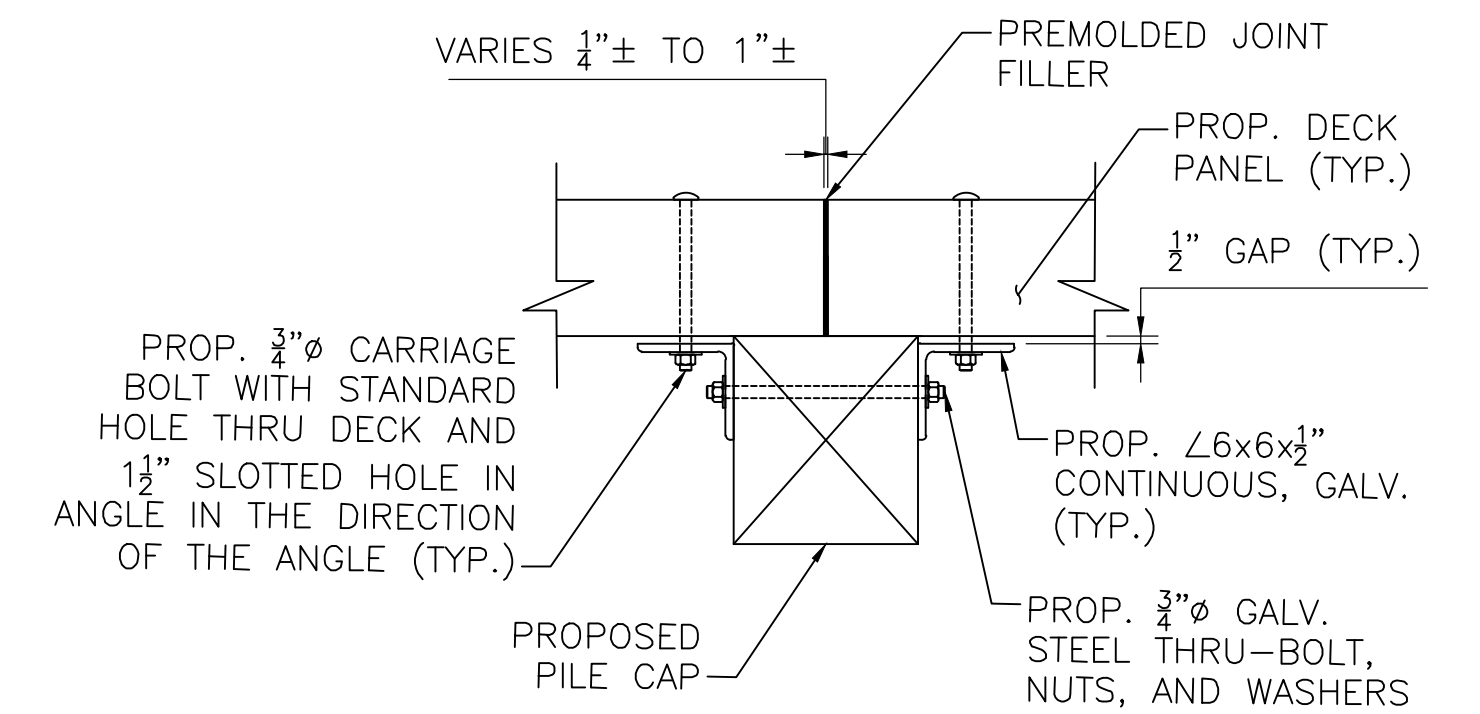


(SECTION)



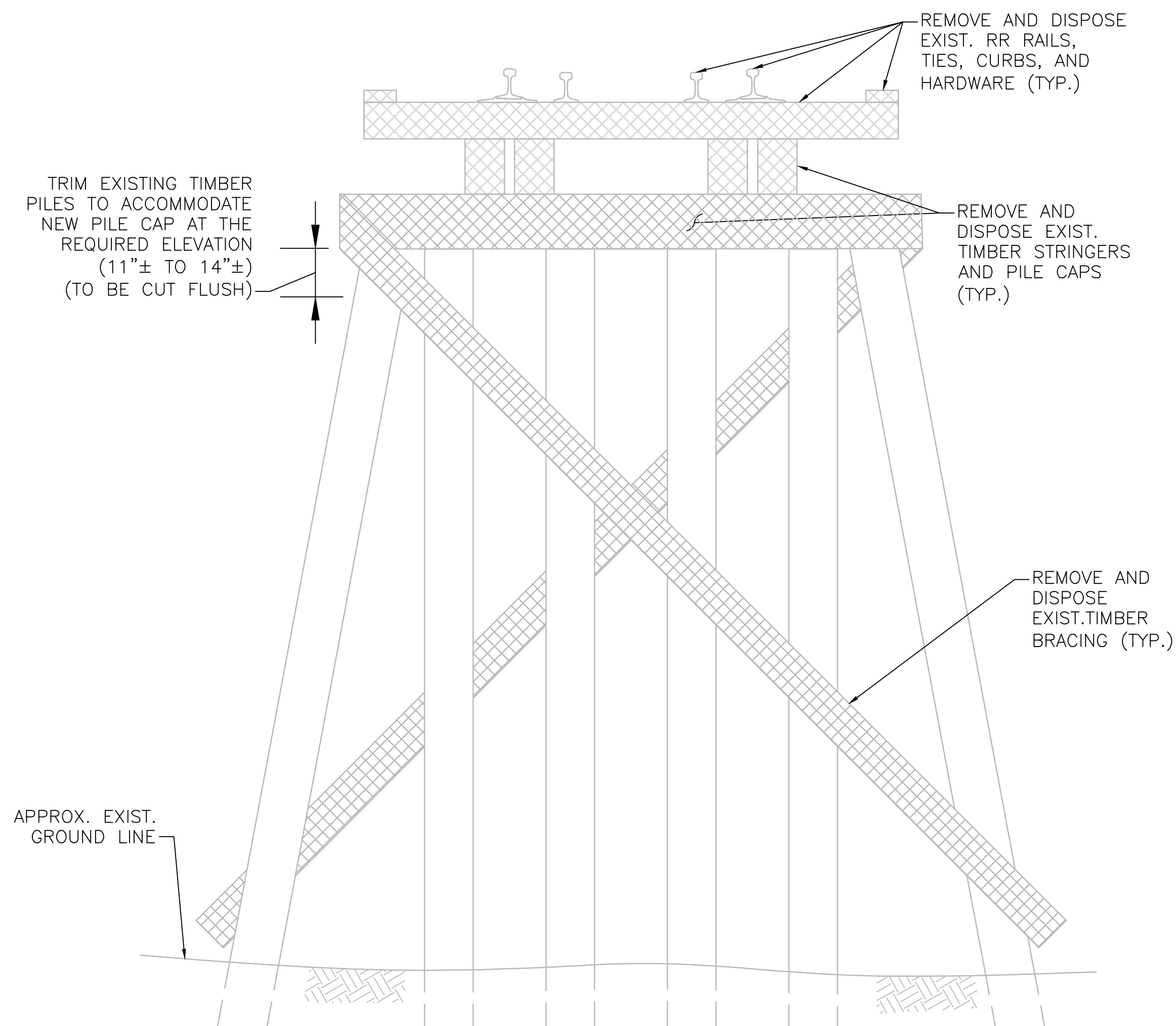
TIMBER PILE REPAIR DETAIL

SCALE: 1/2" = 1'-0"



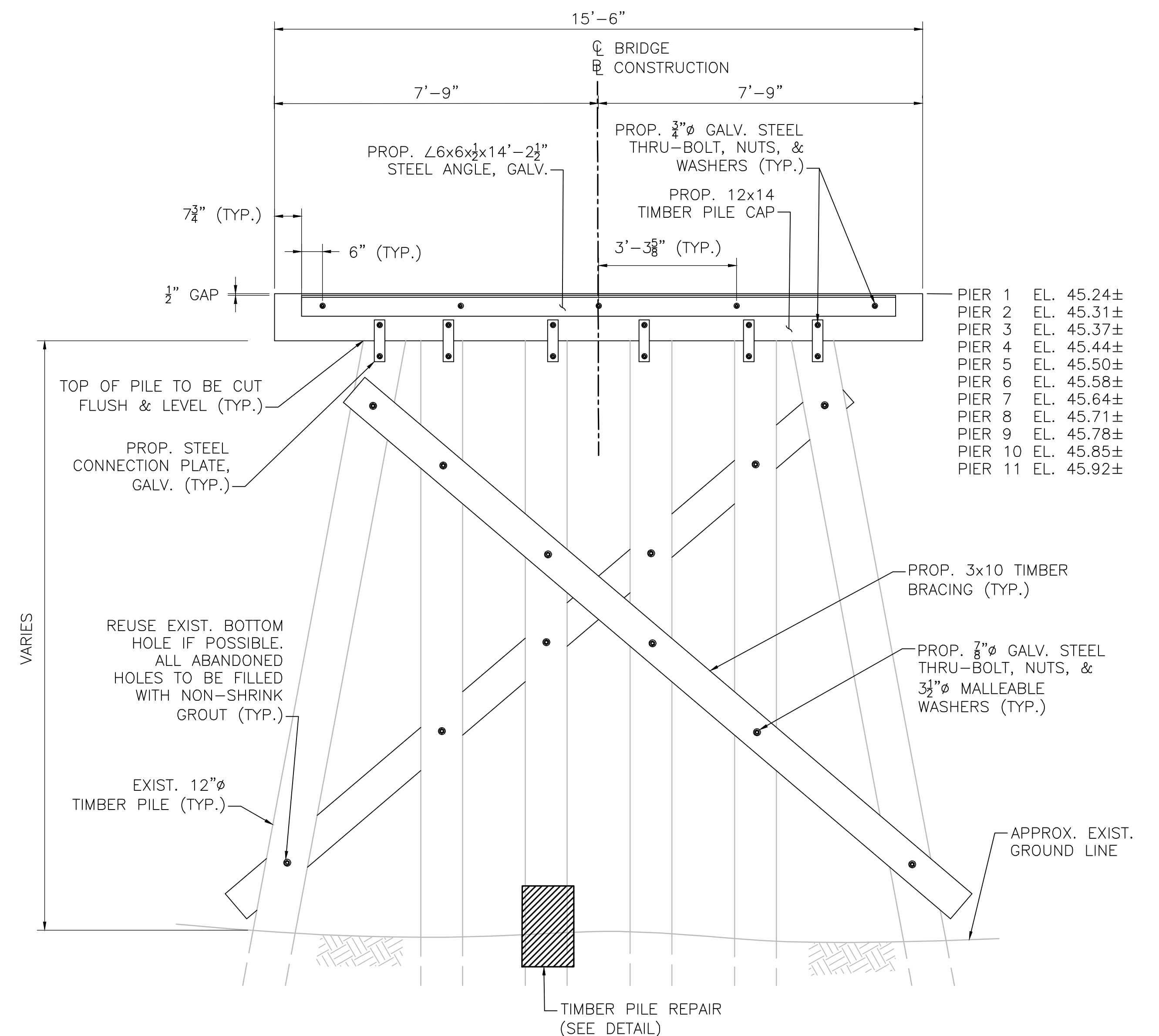
DECK PANEL TO PILE CAP  
CONNECTION DETAIL-SECTION

SCALE: 1" = 1'-0"



TYPICAL DEMOLITION SECTION

SCALE: 1/2" = 1'-0"



TYPICAL PIER ELEVATION

SCALE: 1/2" = 1'-0"

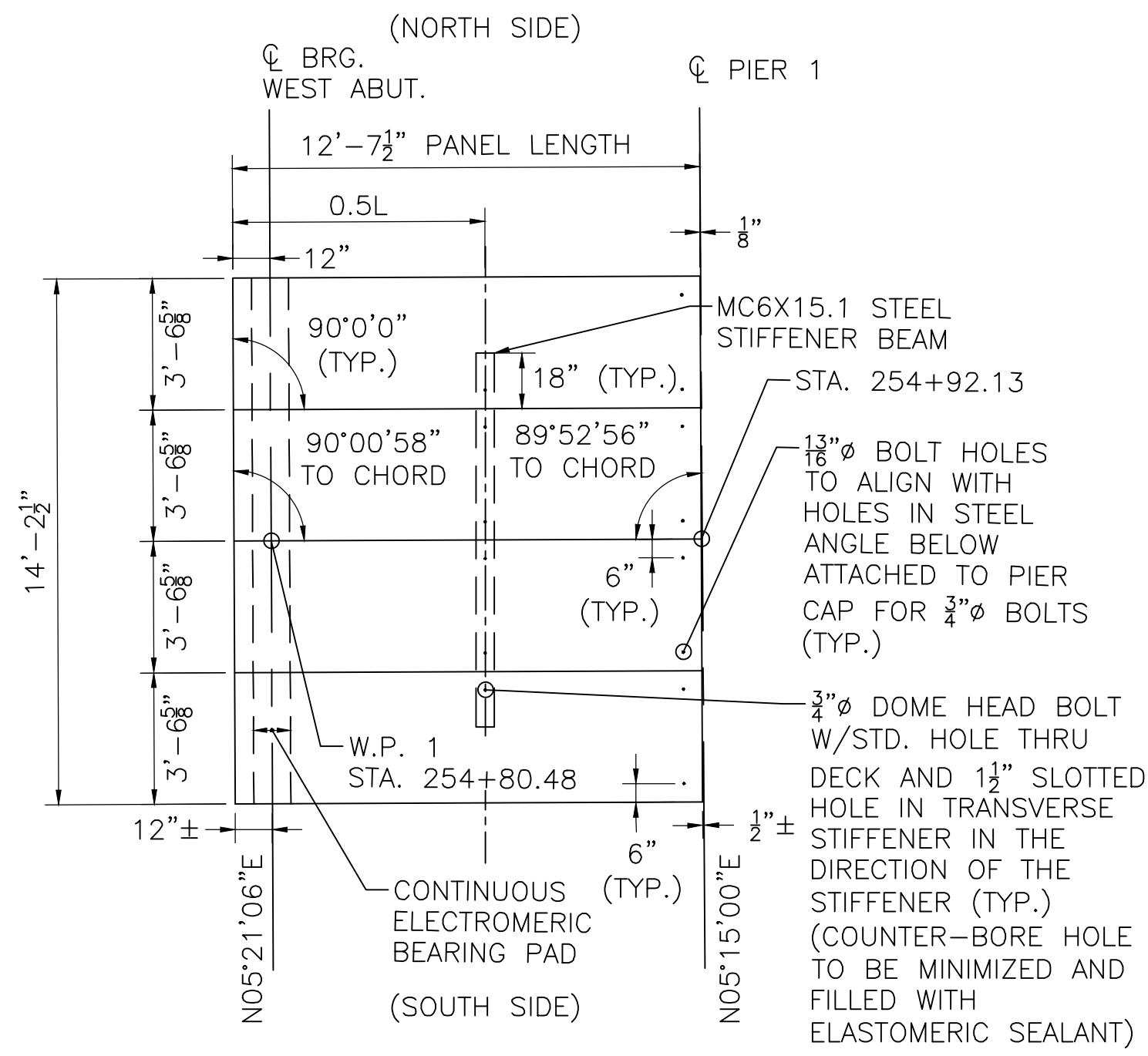
NOT FOR CONSTRUCTION



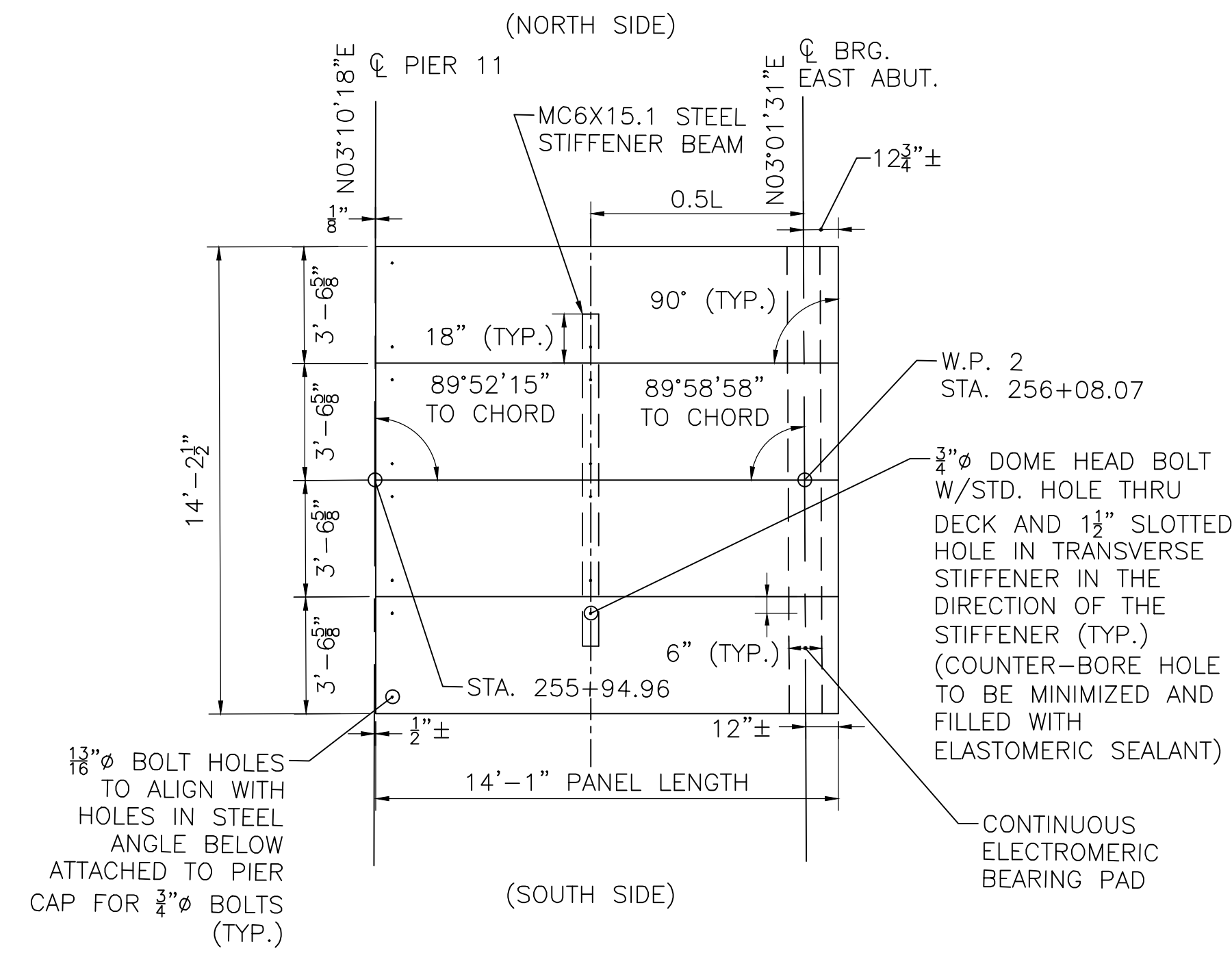
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	65	114
PROJECT FILE NO.		17112.00	

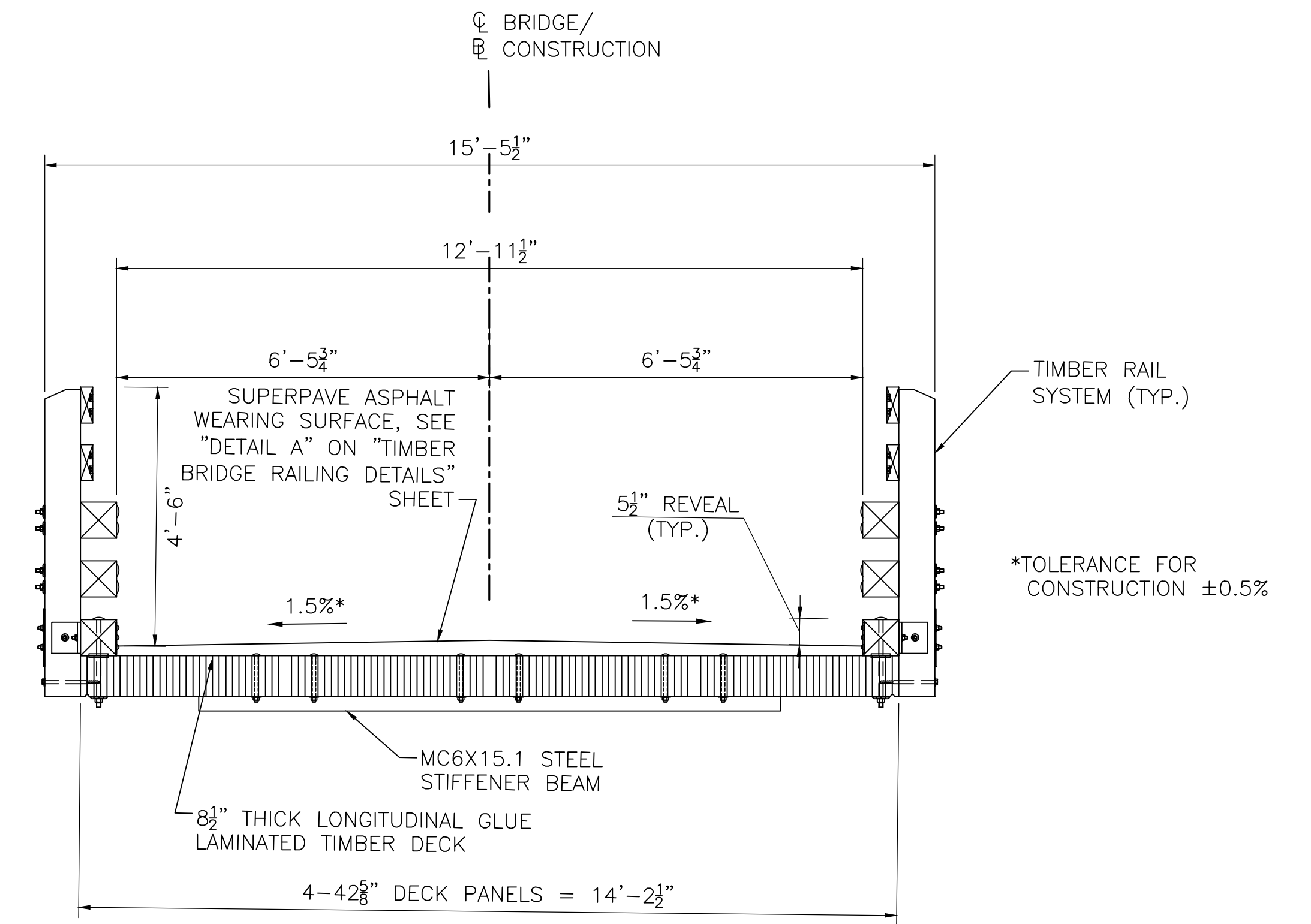
**BRIDGE PLAN - 4  
BRIDGE No. 114  
TIMBER BRIDGE DECK DETAILS**



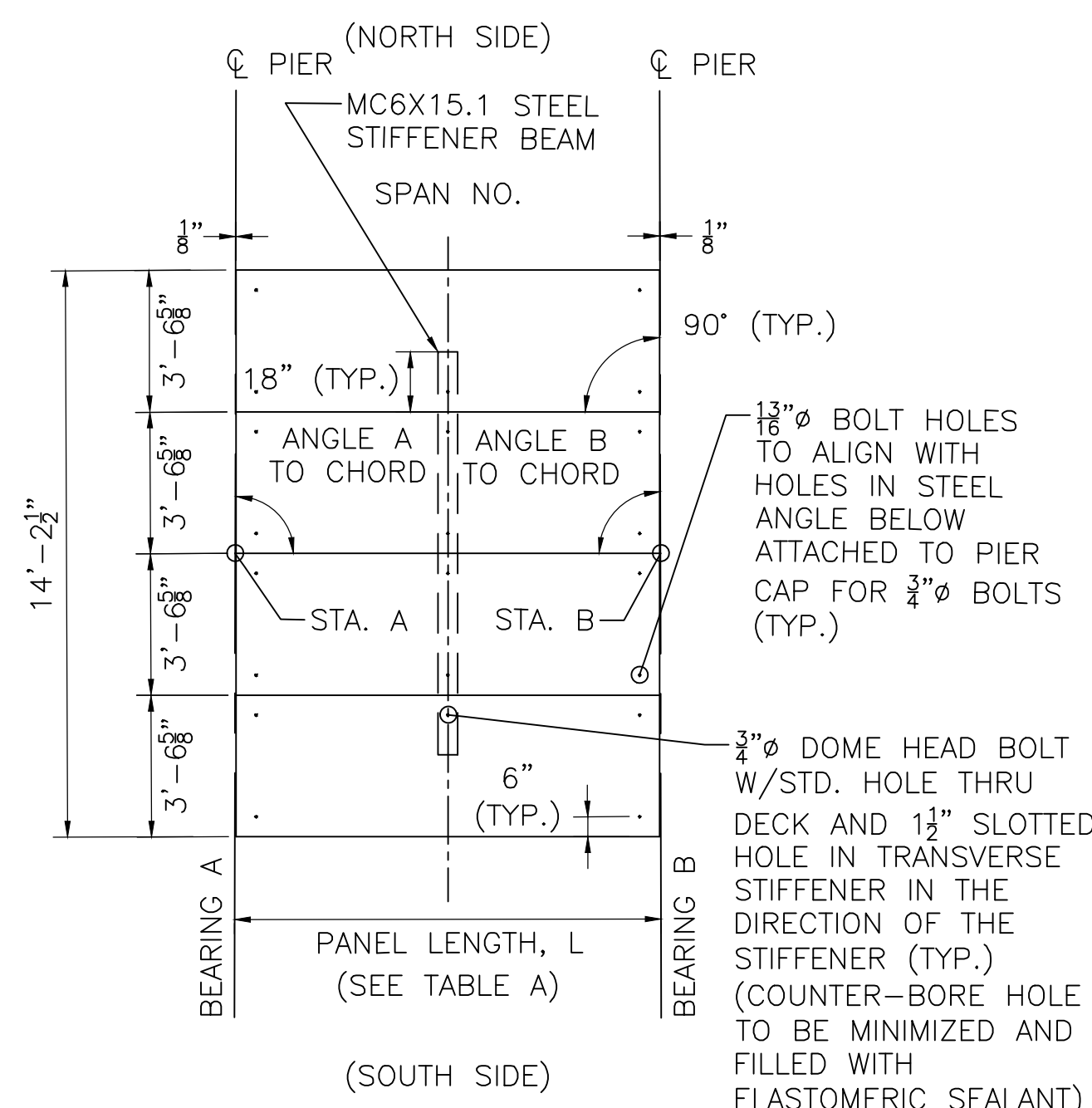
**SPAN 1 DECK PLAN**  
SCALE: 1/4" = 1'-0"



**SPAN 12 DECK PLAN**  
SCALE: 1/4" = 1'-0"

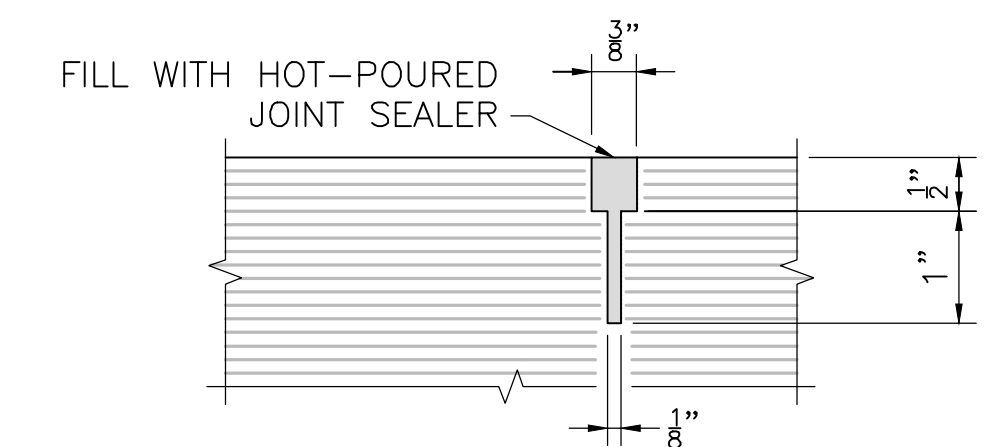


**TYPICAL SECTION TIMBER BRIDGE**  
SCALE: 1/2" = 1'-0"



**SPAN 2-11 DECK PLAN**  
SCALE: 1/4" = 1'-0"

TABLE A						
SPAN NO.	STA. A (±)	STA. B (±)	ANGLE A = B (±)	BEARING A (±)	BEARING B (±)	PANEL LENGTH, L (±)
2	254+92.13	255+02.30	89°53'50"	N05°15'00"E	N05°02'40"E	10'-1 1/2"
3	255+02.30	255+11.63	89°54'20"	N05°02'40"E	N04°51'21"E	9'-3 1/2"
4	255+11.63	255+22.63	89°53'20"	N04°51'21"E	N04°38'01"E	10'-11 3/8"
5	255+22.63	255+32.30	89°54'08"	N04°38'01"E	N04°26'17"E	9'-7 1/2"
6	255+32.30	255+42.96	89°53'32"	N04°26'17"E	N04°13'21"E	10'-7 3/8"
7	255+42.96	255+52.63	89°54'08"	N04°13'21"E	N04°01'38"E	9'-7 1/2"
8	255+52.63	255+63.13	89°53'38"	N04°01'38"E	N03°48'54"E	10'-5 3/8"
9	255+63.13	255+73.80	89°53'32"	N03°48'54"E	N03°35'58"E	10'-7 3/8"
10	255+73.80	255+84.13	89°53'44"	N03°35'58"E	N03°23'26"E	10'-3 1/2"
11	255+84.13	255+94.96	89°53'26"	N03°23'26"E	N03°10'18"E	10'-9 3/8"

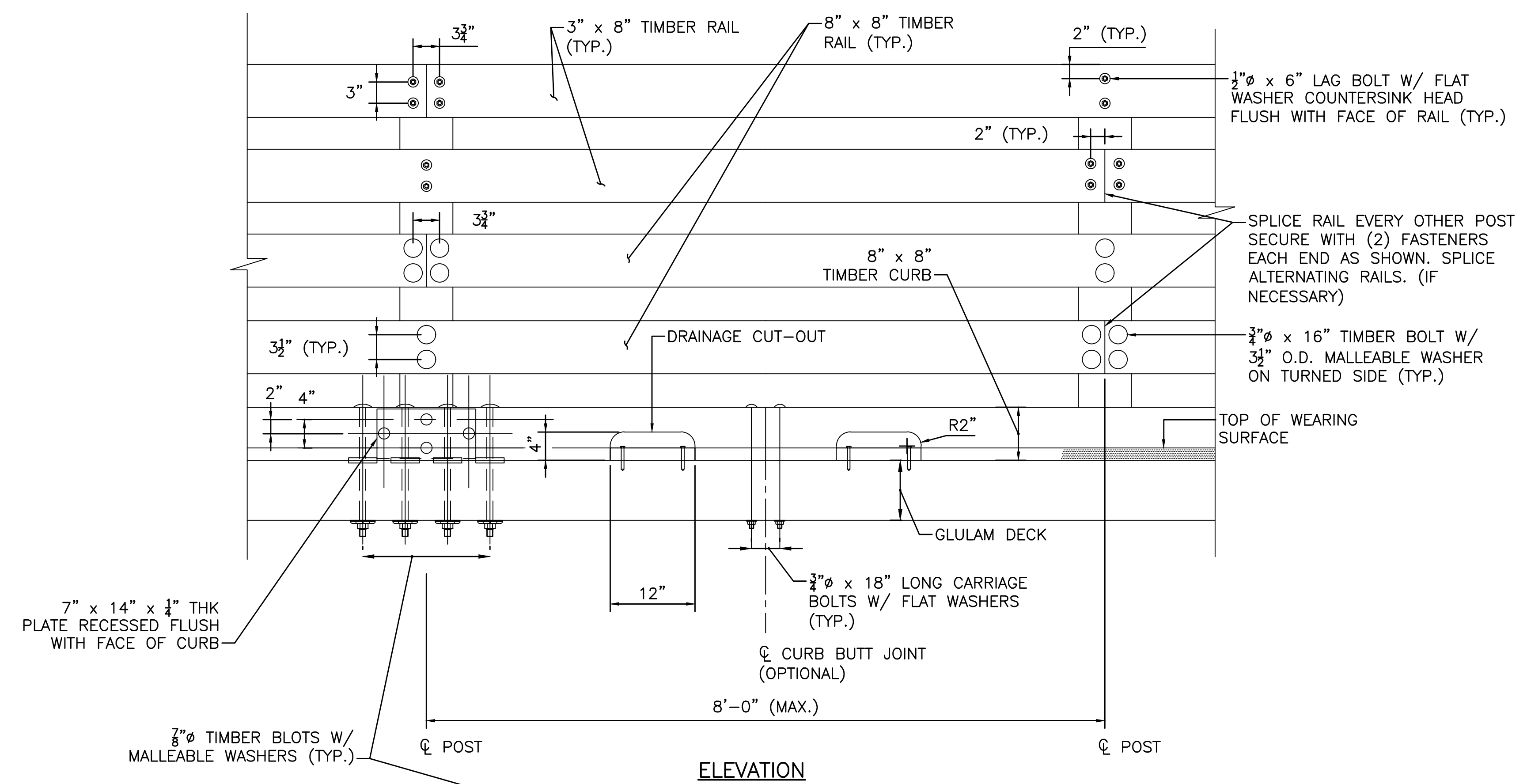


**PAVEMENT SAWCUT DETAIL**  
SCALE: 1" = 1'-0"

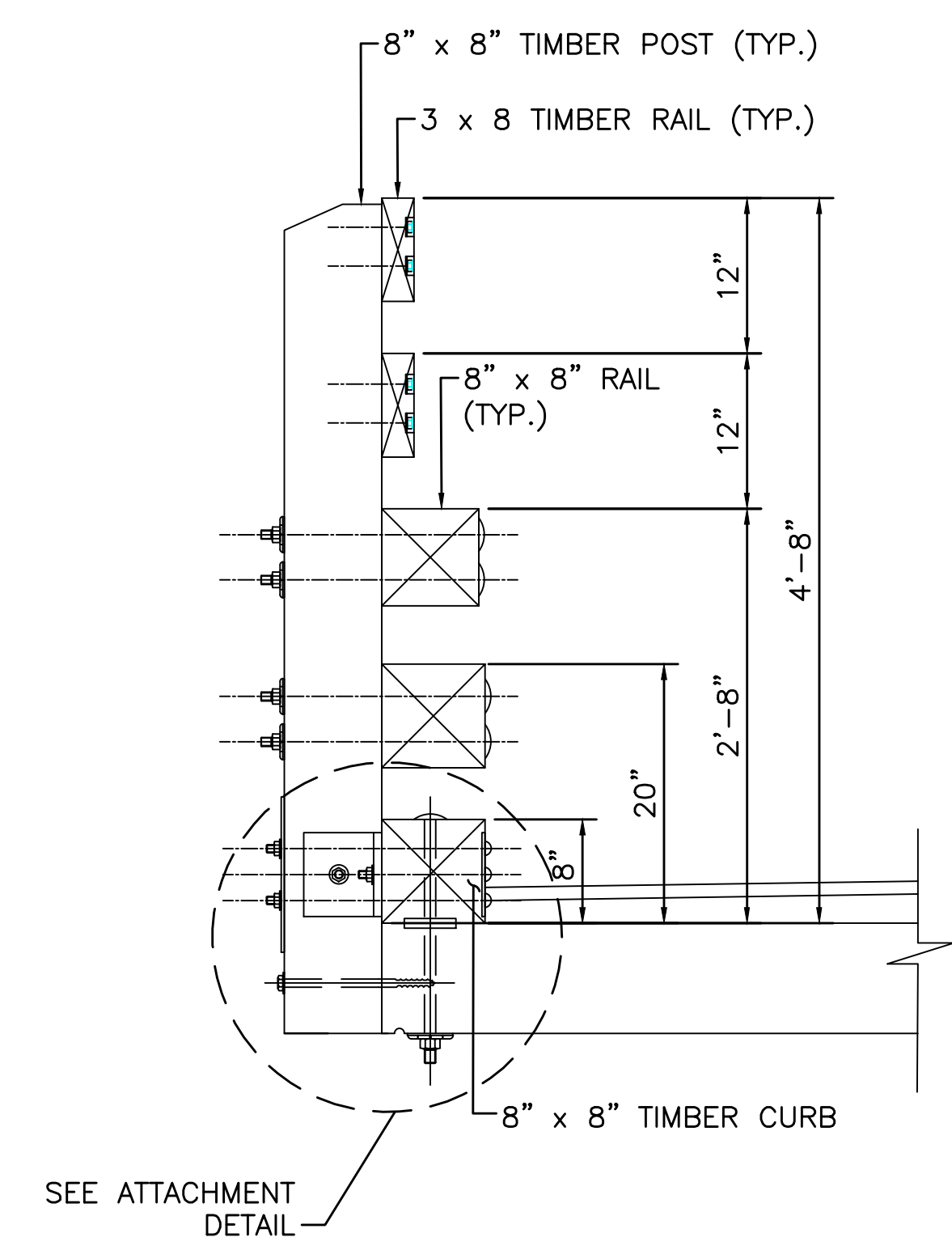
**NOT FOR CONSTRUCTION**

WALTHAM WAYSIDE TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	66	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 5  
BRIDGE No. 114  
TIMBER BRIDGE RAILING DETAILS**

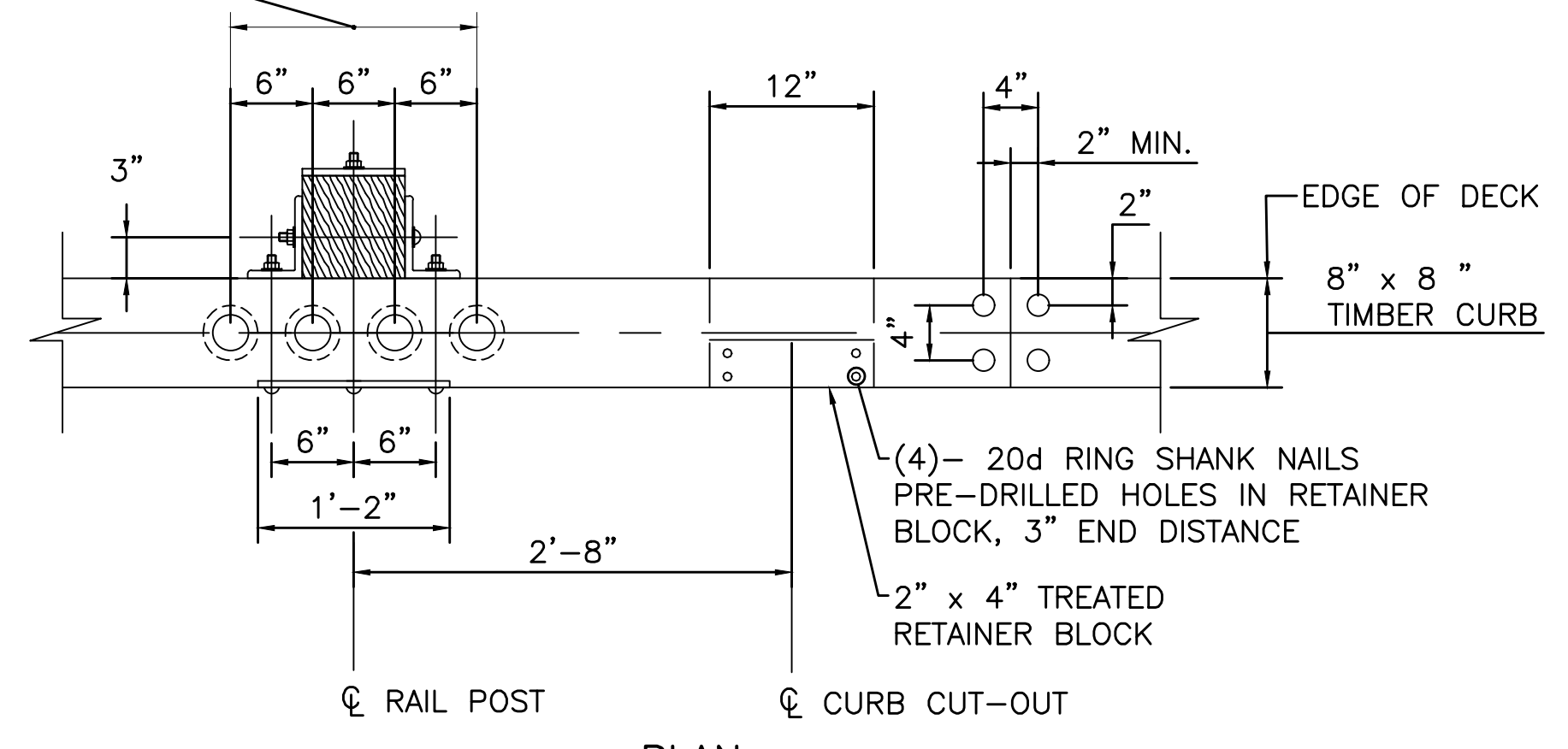


**ELEVATION**



**RAIL DETAIL**

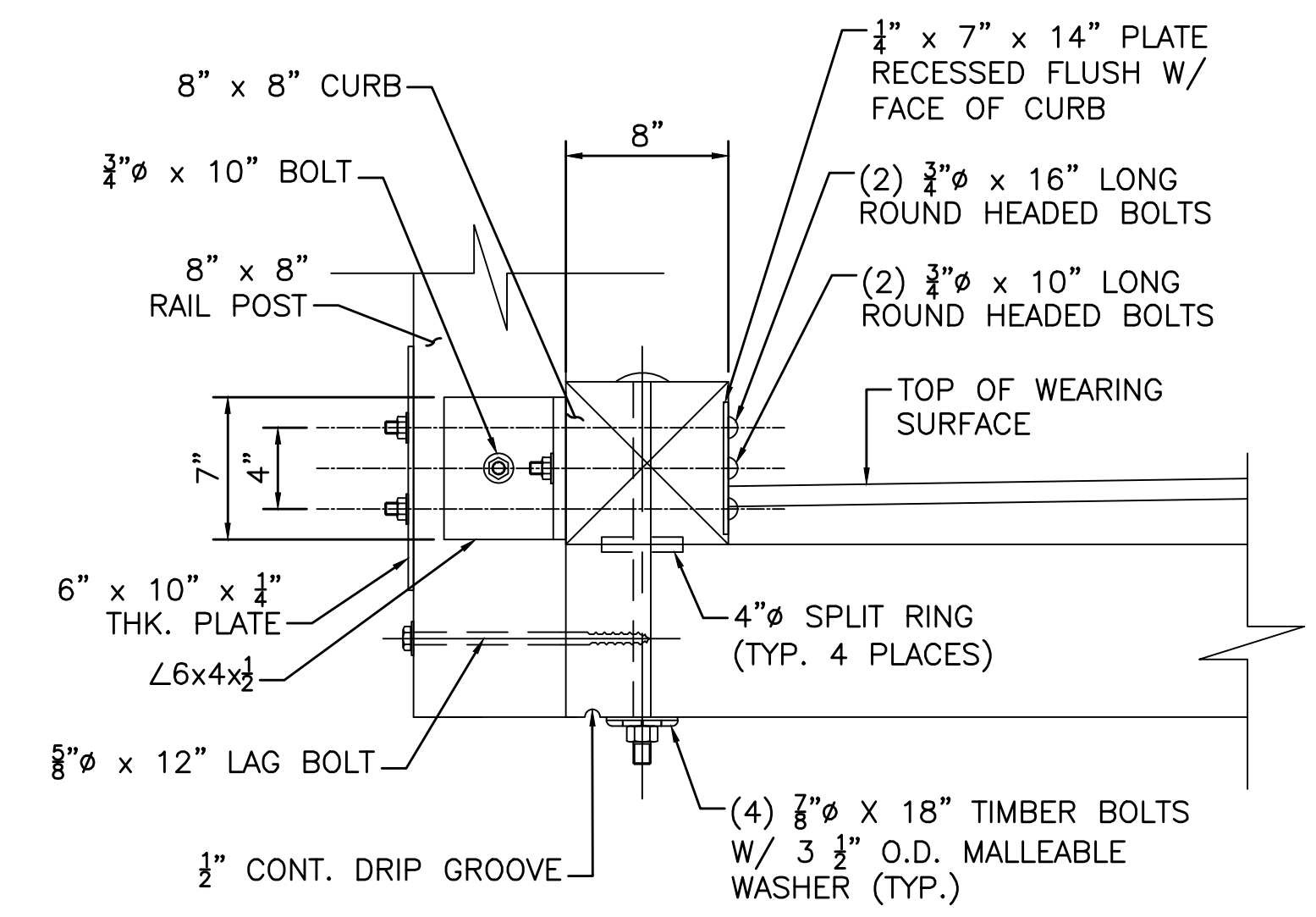
SCALE: 1" = 1'-0"



**PLAN**

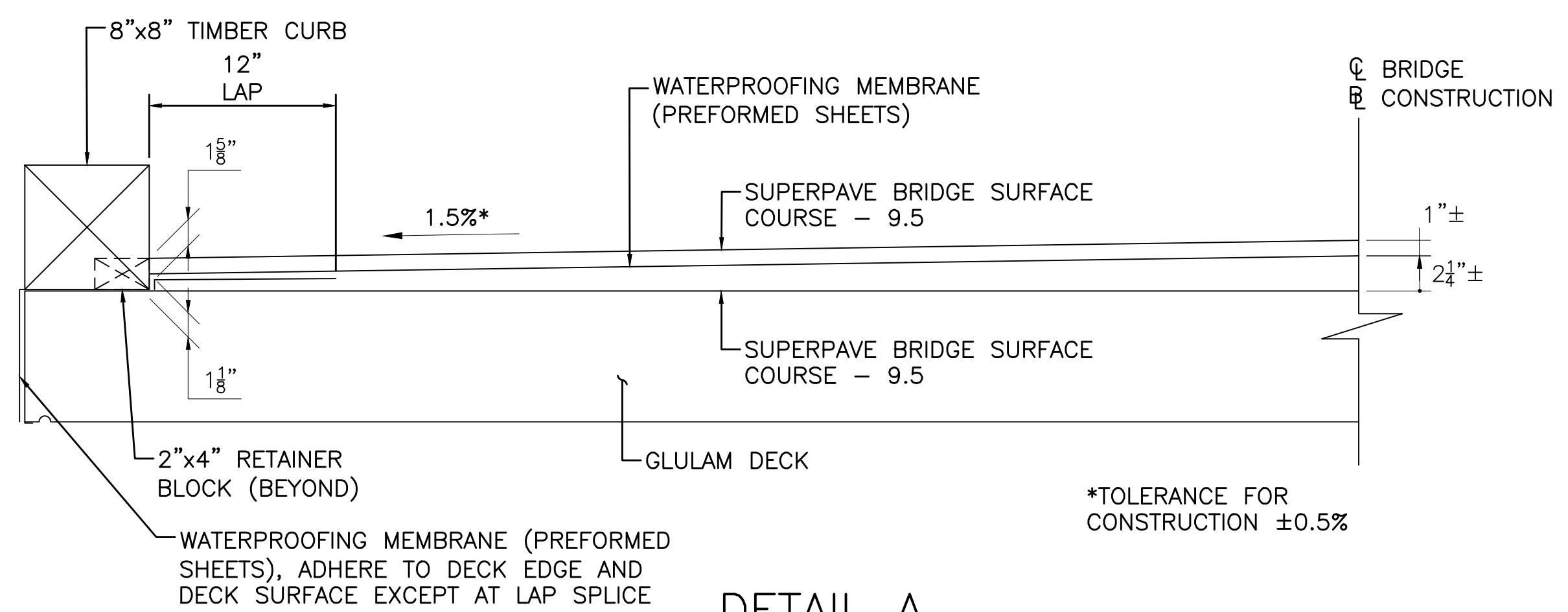
**CURB AND RAIL POST ATTACHMENT DETAIL**

SCALE: 1" = 1'-0"



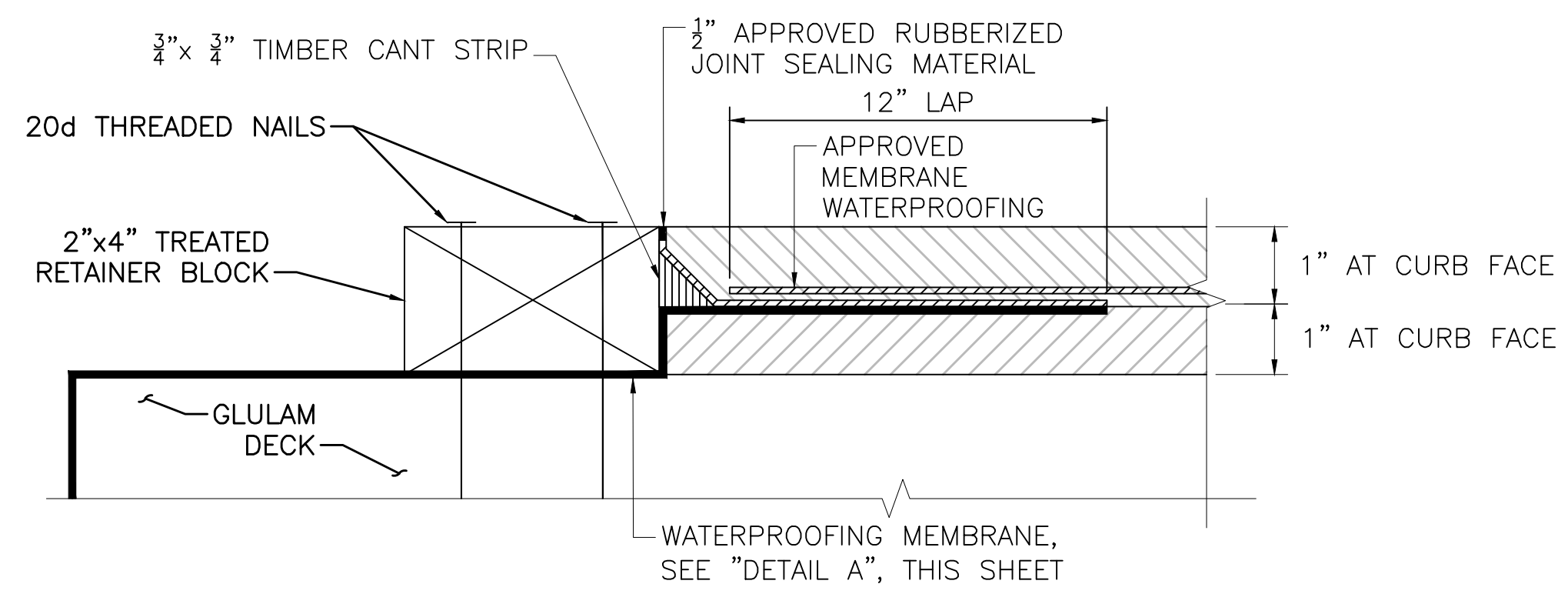
**ATTACHMENT DETAIL**

SCALE: 1 1/2" = 1'-0"



**DETAIL A**

SCALE: 1 1/2" = 1'-0"



**DETAIL B**

NOT TO SCALE

**NOTES:**

1. ALLOW FIRST BRIDGE SURFACE COURSE TO COOL SUFFICIENTLY SO WATERPROOFING MEMBRANE DOES NOT TEAR WHEN APPLYING THE SECOND BRIDGE SURFACE COURSE.
2. SEE "DETAIL B", THIS SHEET.

**NOT FOR CONSTRUCTION**

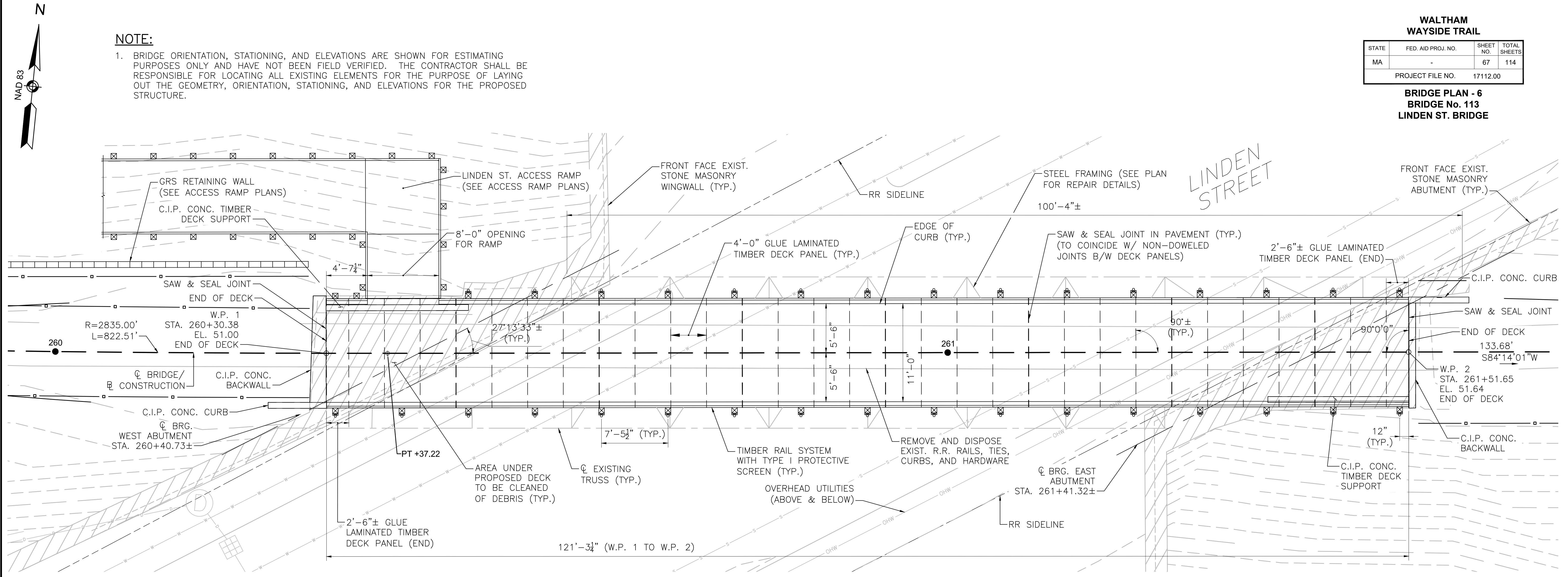
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	67	114
PROJECT FILE NO.		17112.00	

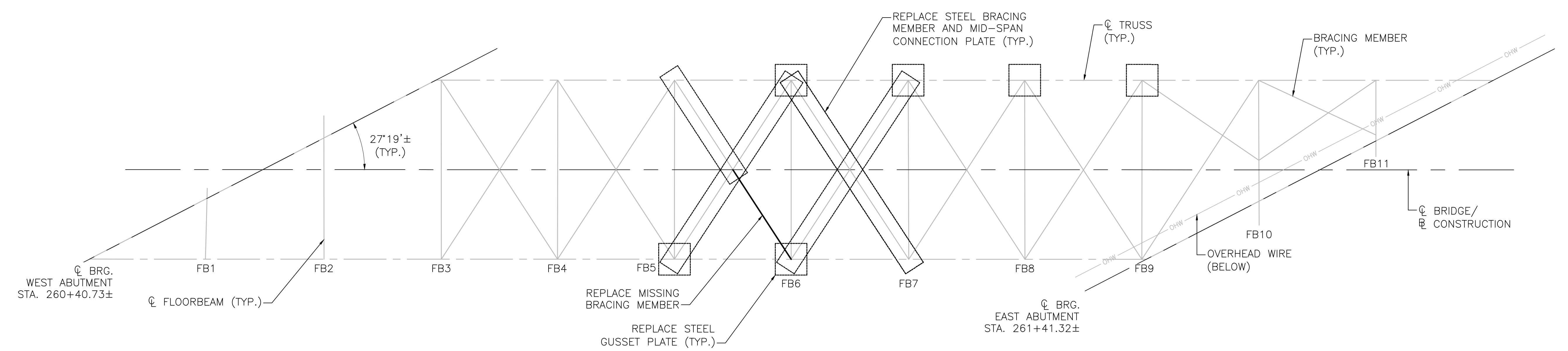
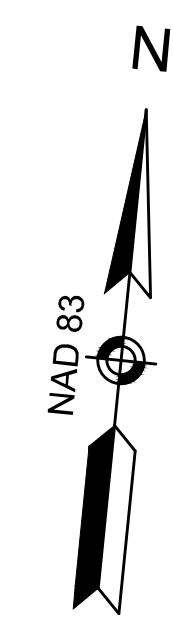
**BRIDGE PLAN - 6  
BRIDGE No. 113  
LINDEN ST. BRIDGE**

**NOTE:**

1. BRIDGE ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY AND HAVE NOT BEEN FIELD VERIFIED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING ELEMENTS FOR THE PURPOSE OF LAYING OUT THE GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS FOR THE PROPOSED STRUCTURE.

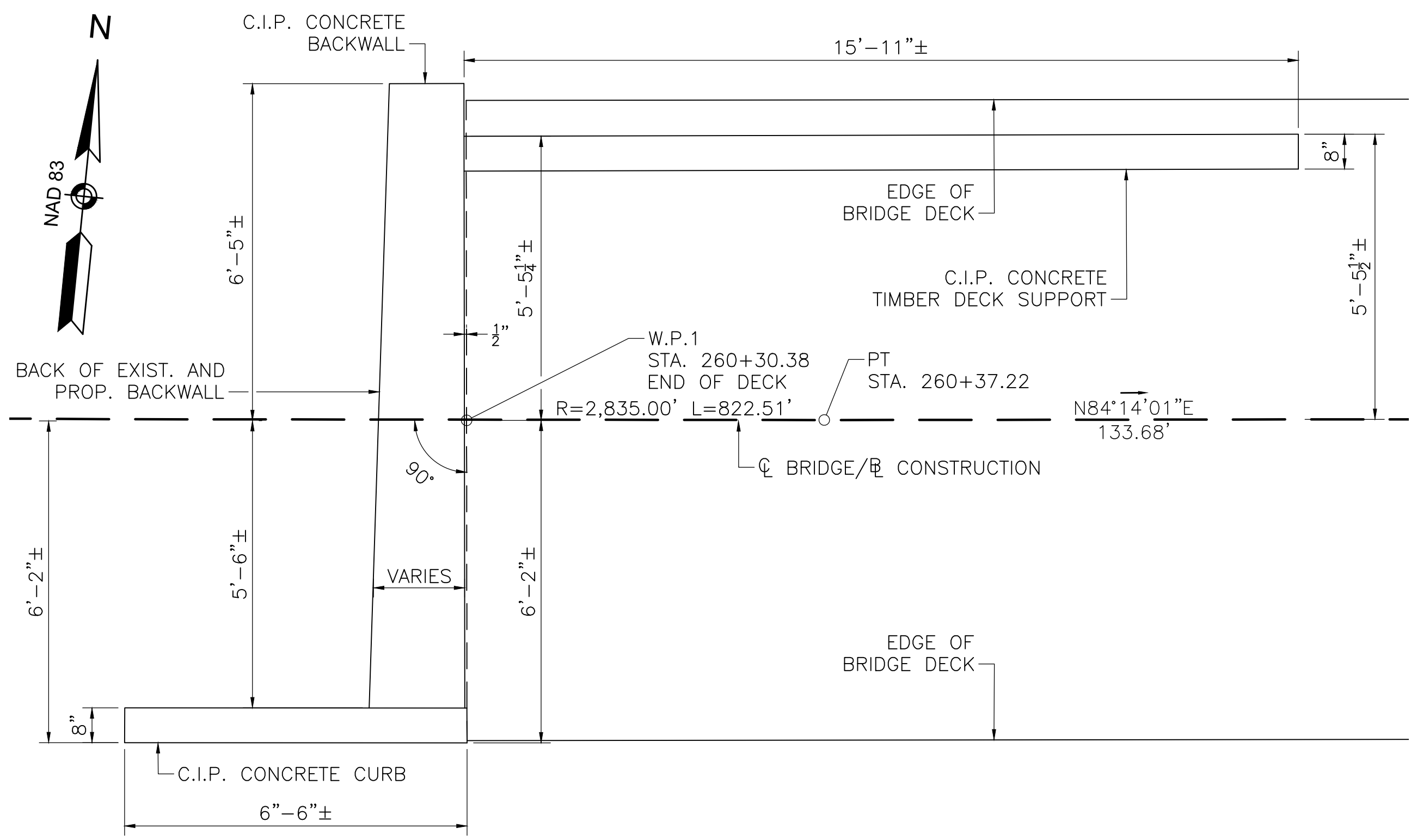


**PLAN VIEW**  
SCALE: 3/16" = 1'-0"



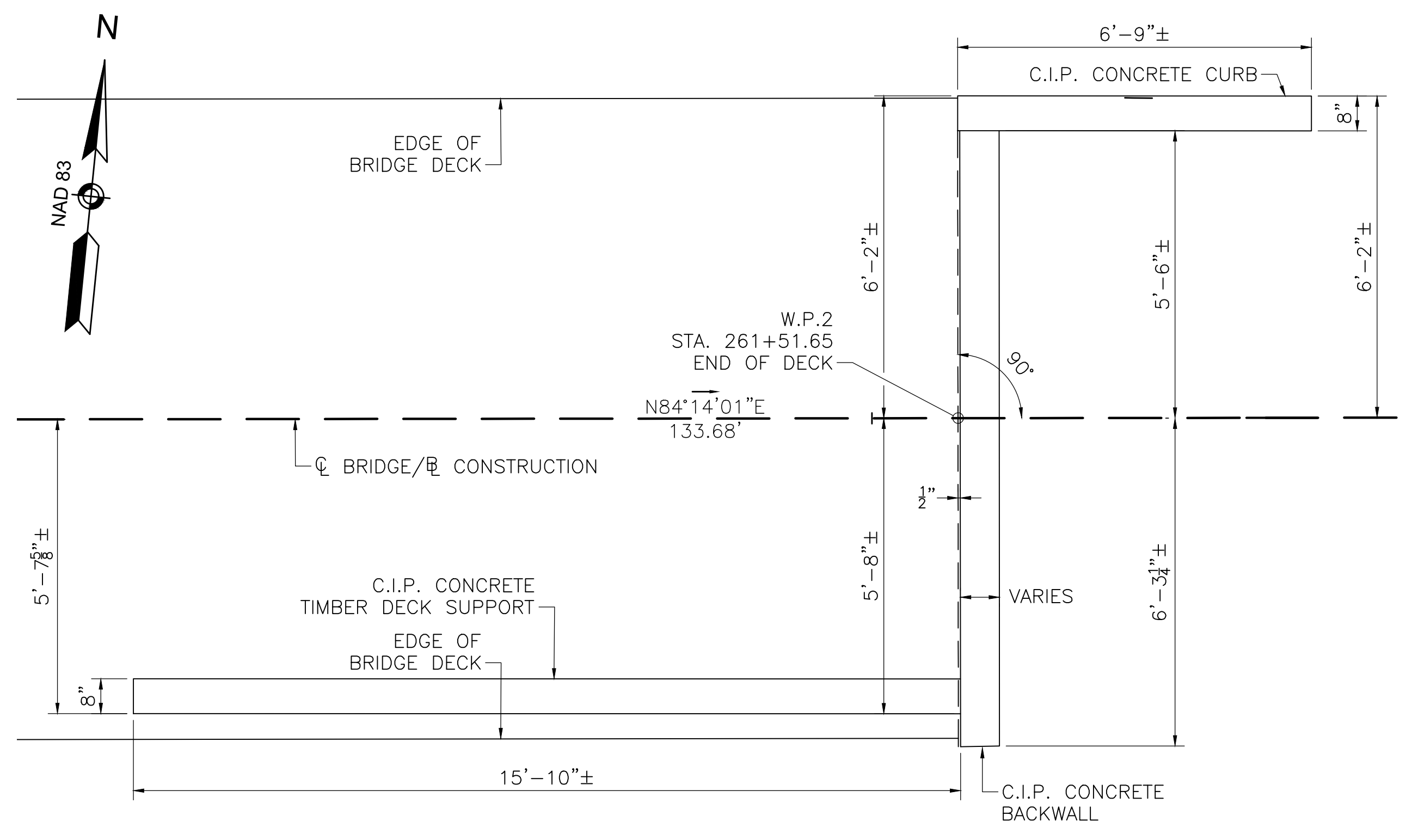
**FRAMING PLAN—LOWER BRACING (REPAIRS)**  
SCALE: 3/16" = 1'-0"

**NOT FOR CONSTRUCTION**



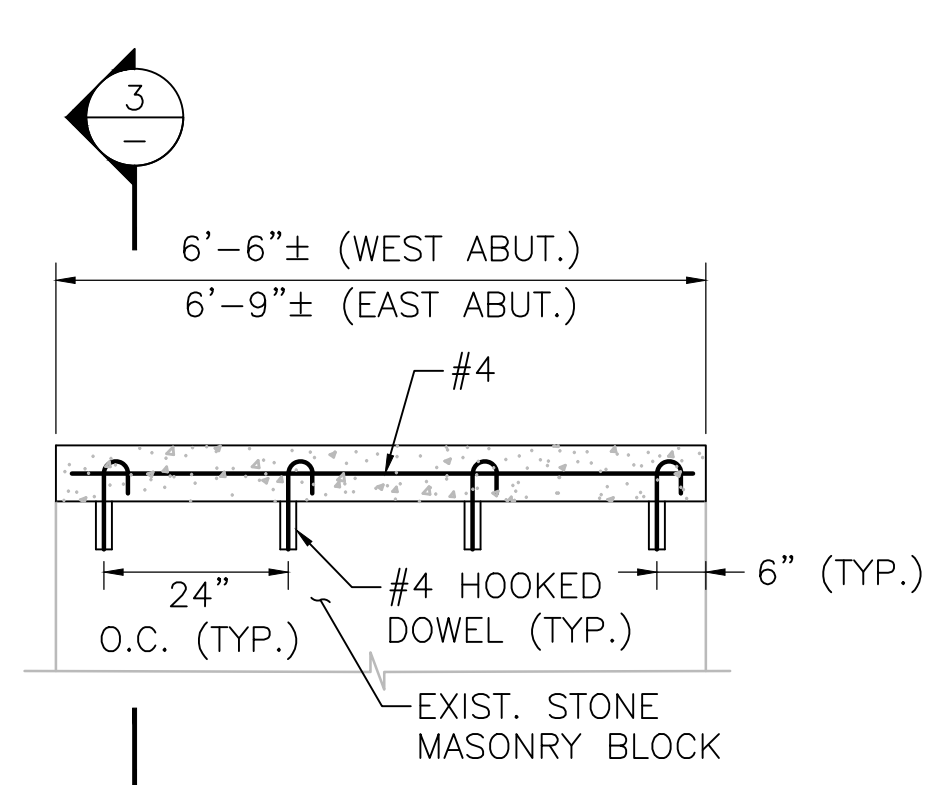
**WEST ABUTMENT C.I.P. CONCRETE LAYOUT**

SCALE: 1/2" = 1'-0"



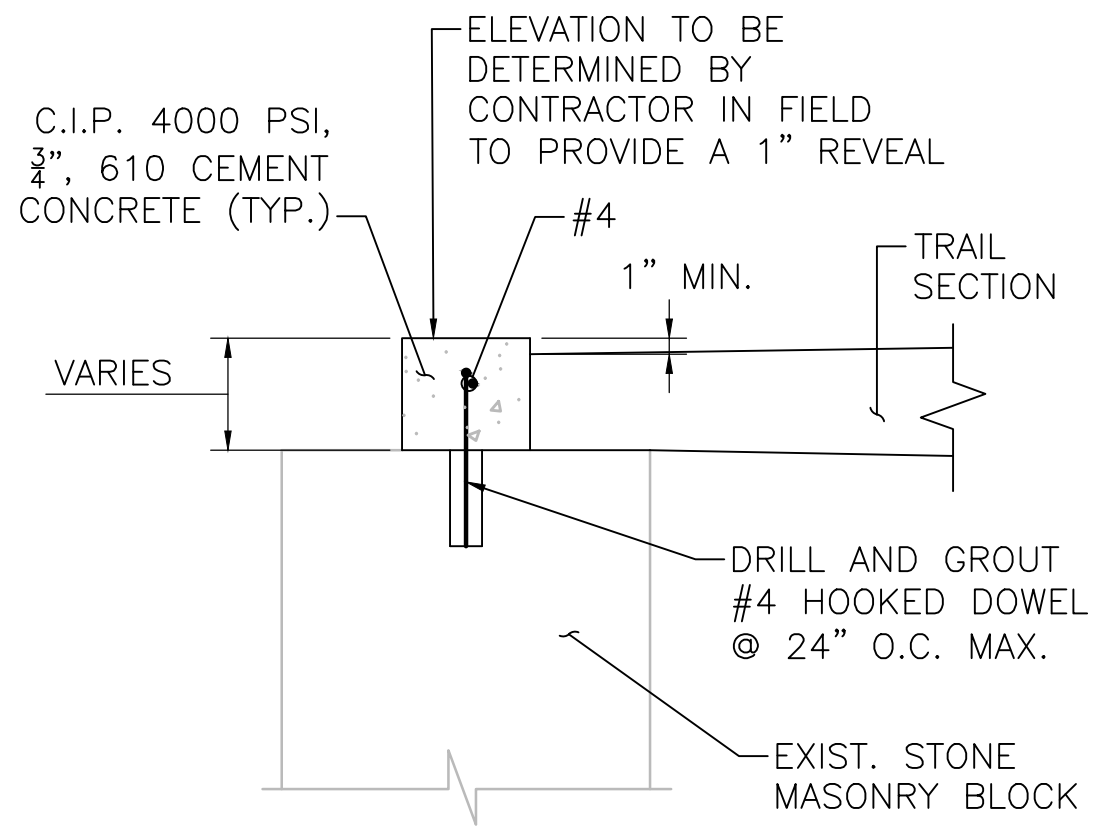
**EAST ABUTMENT C.I.P. CONCRETE LAYOUT**

SCALE: 1/2" = 1'-0"



**ELEVATION**

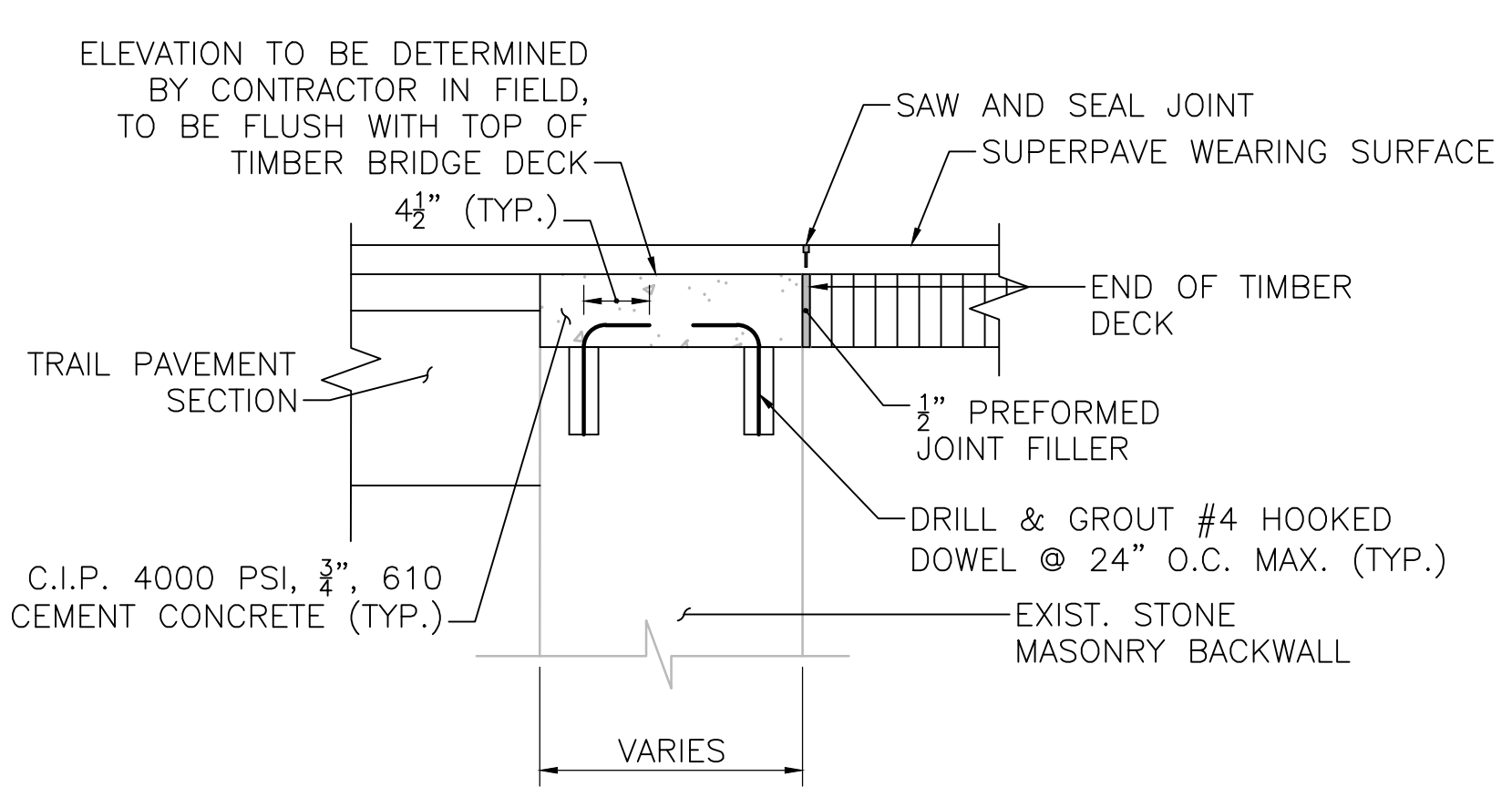
SCALE: 1/2" = 1'-0"



**SECTION 3**

SCALE: 1" = 1'-0"

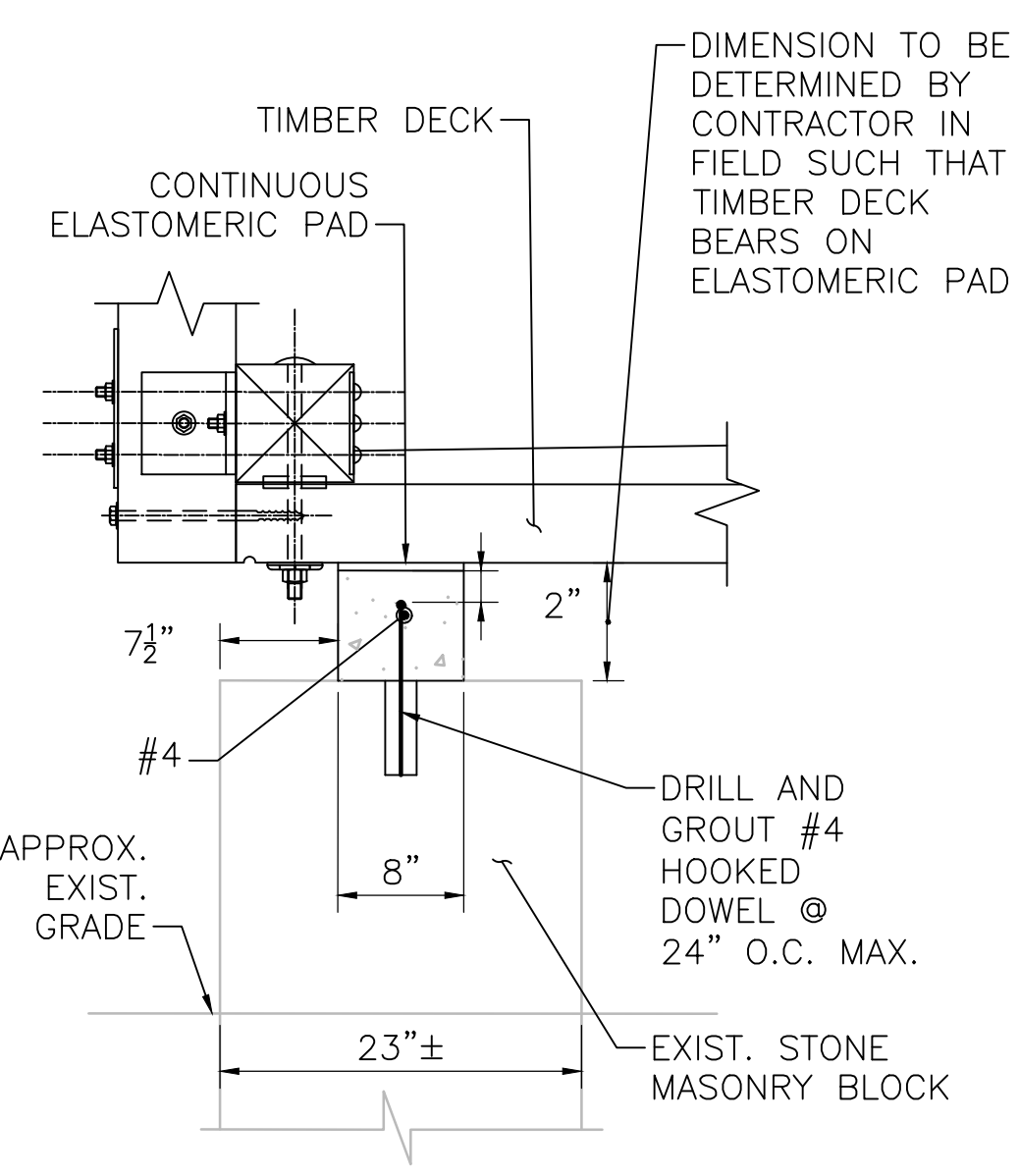
**C.I.P. CONCRETE CURB DETAIL**



**C.I.P. CONCRETE BACKWALL DETAIL**

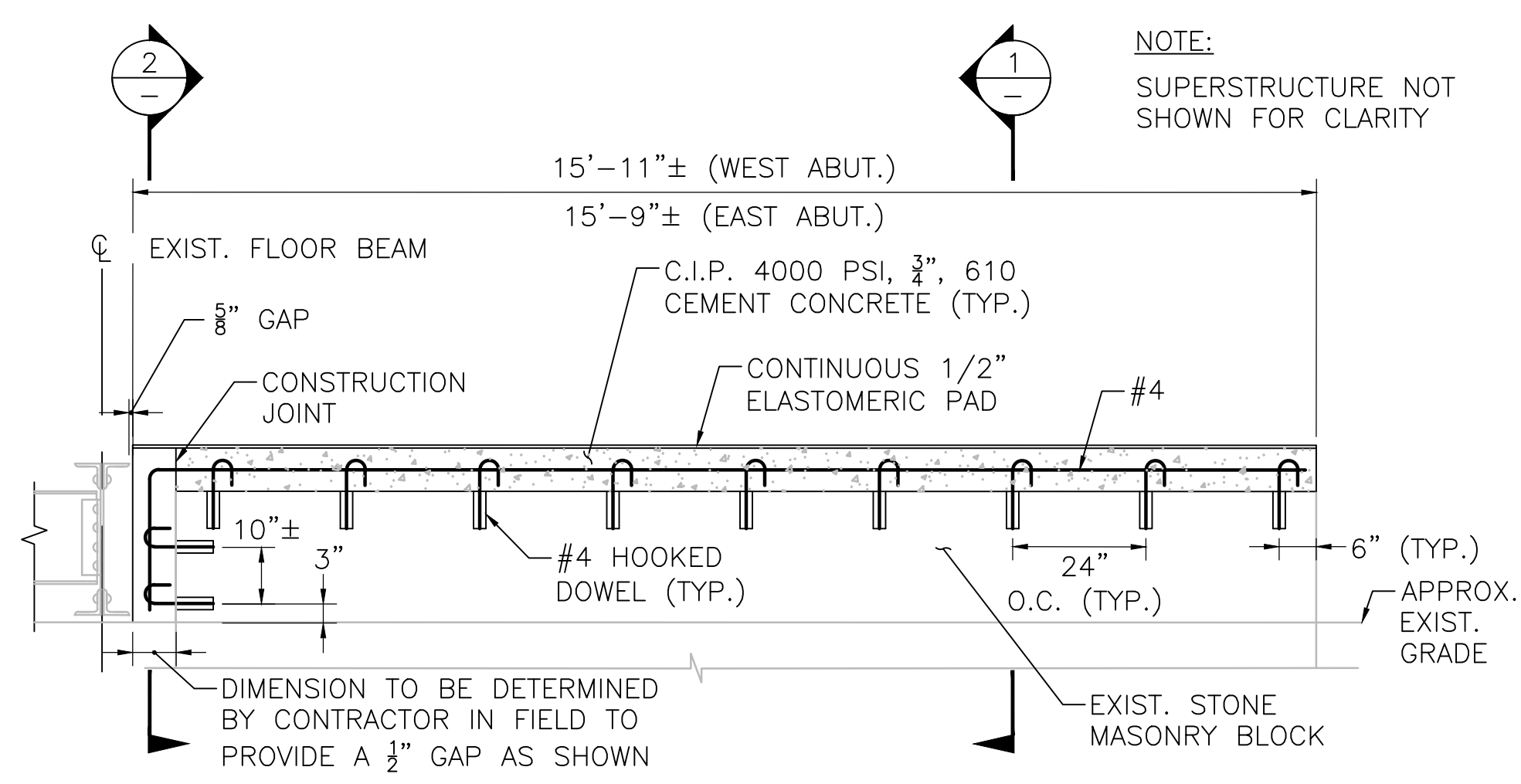
(IF LESS THAN 12" WIDE, PROVIDE ONE (1) #4 DOWEL, OTHERWISE PROVIDE AS SHOWN)

SCALE: 1" = 1'-0"



**SECTION 1**

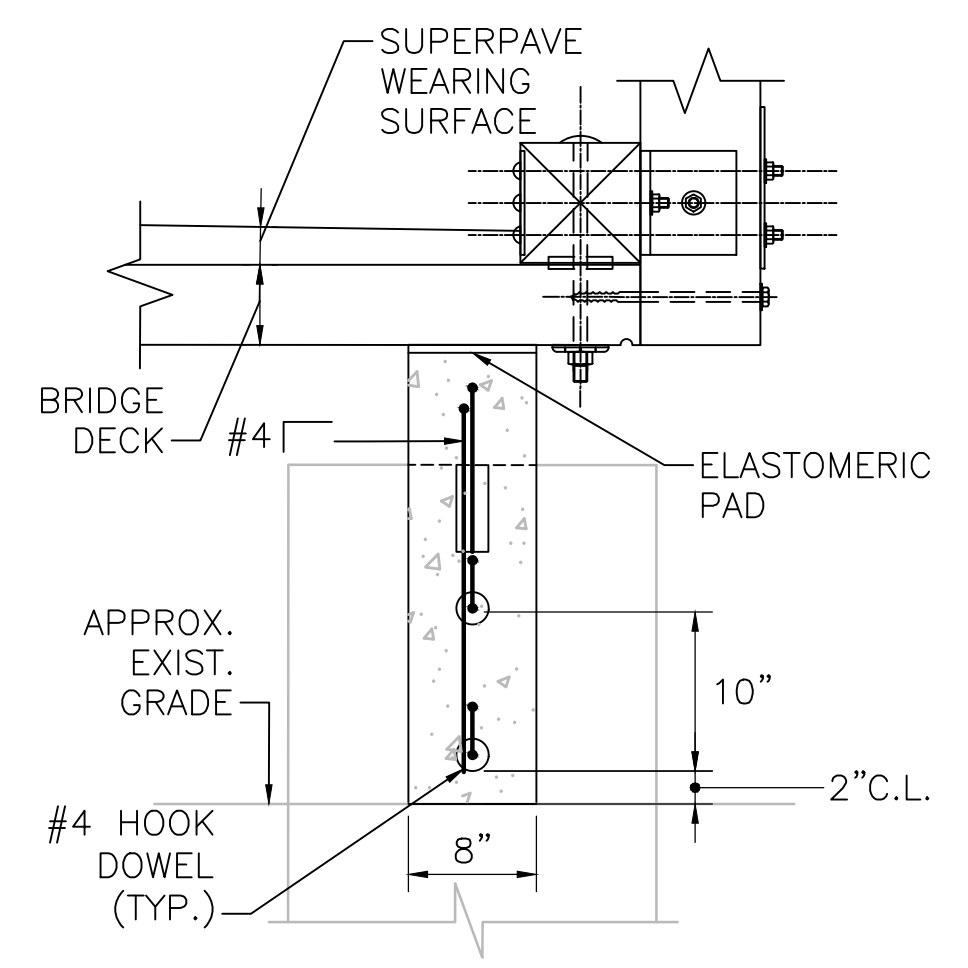
SCALE: 1" = 1'-0"



**ELEVATION**

**C.I.P. CONCRETE TIMBER DECK SUPPORT DETAIL**

SCALE: 1/2" = 1'-0"



**SECTION 2**

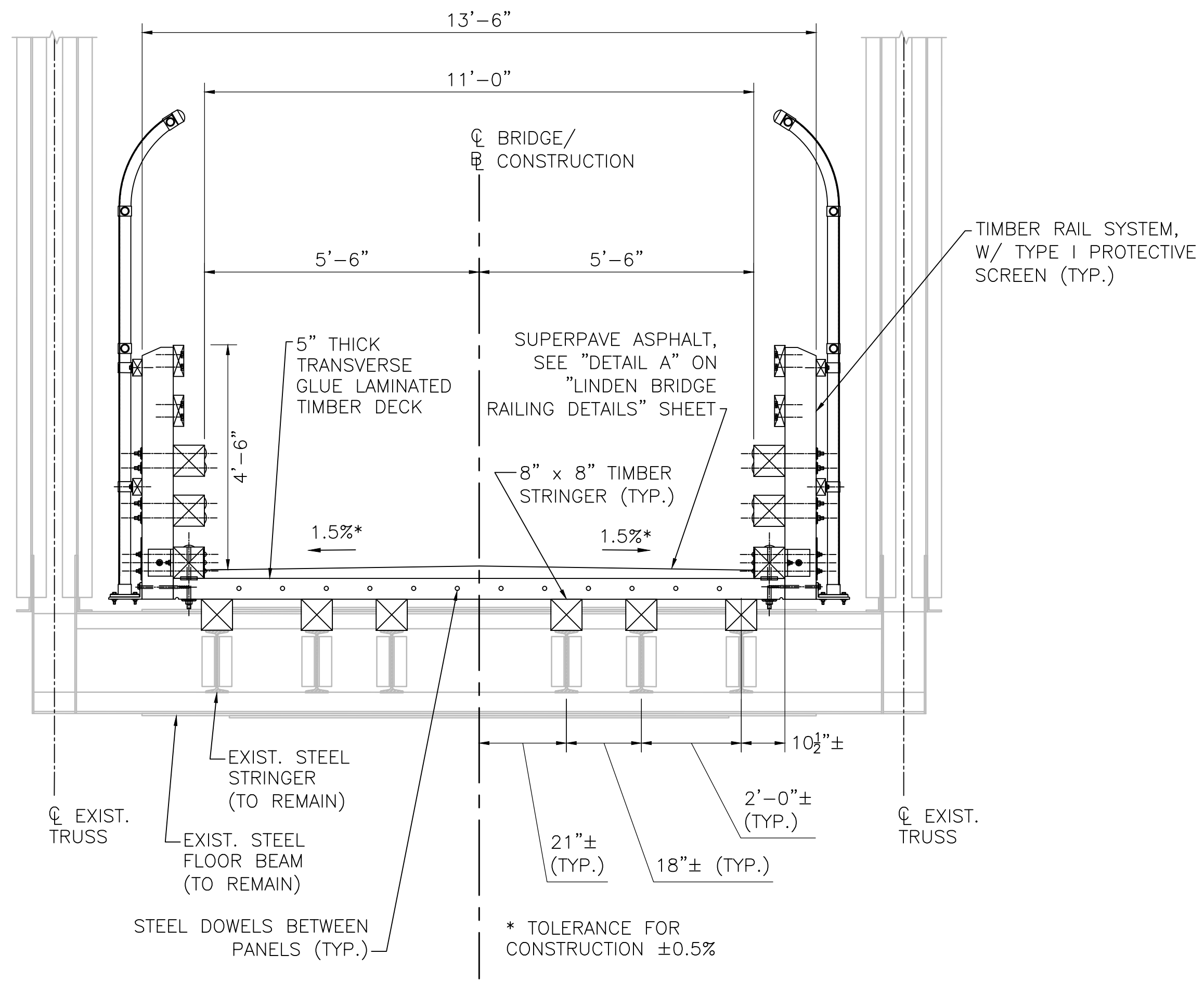
SCALE: 1" = 1'-0"

**NOT FOR CONSTRUCTION**

WALTHAM  
WAYSIDE TRAIL

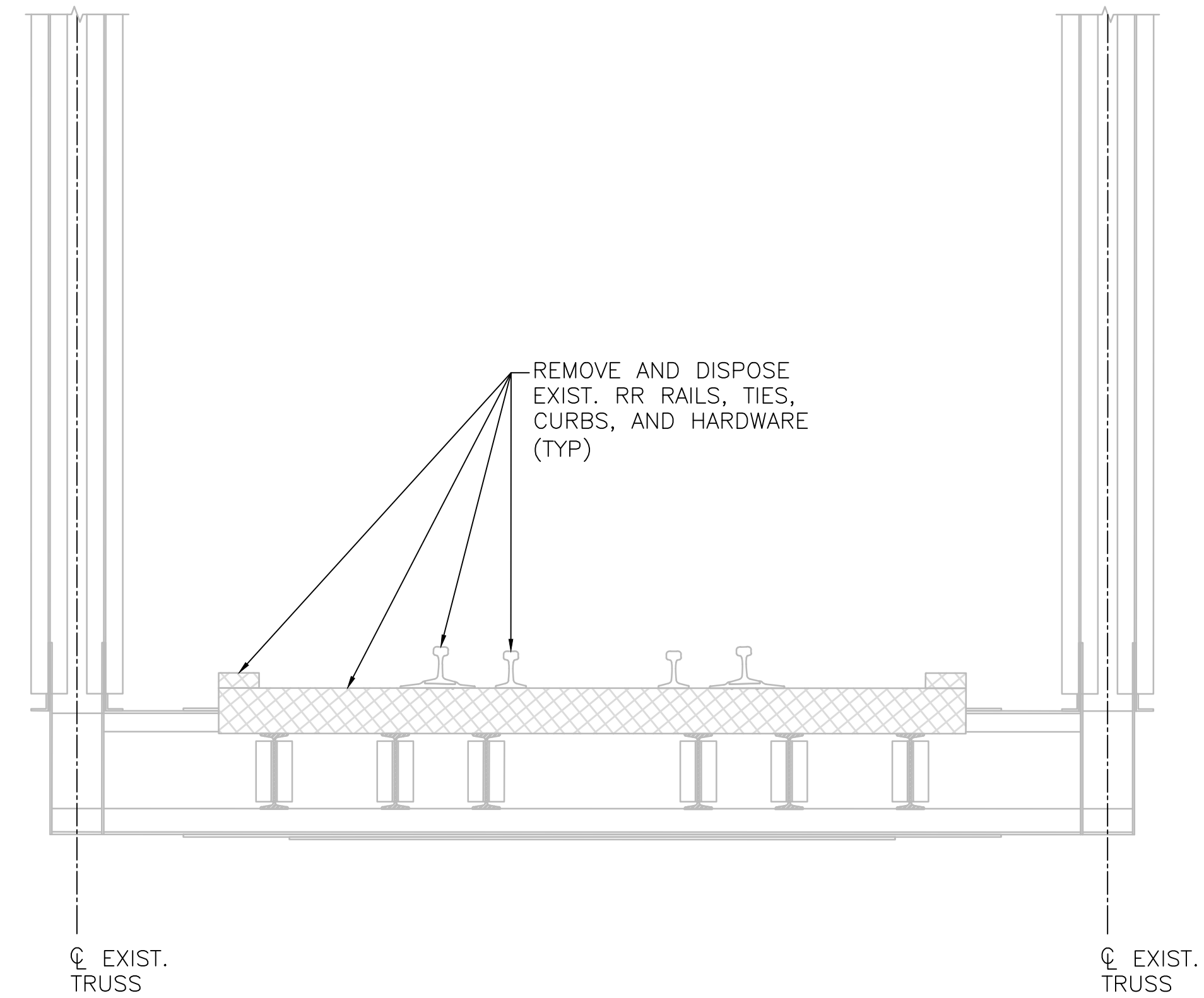
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	69	114
PROJECT FILE NO.		17112.00	

BRIDGE PLAN - 8  
BRIDGE No. 113  
LINDEN BRIDGE DETAILS



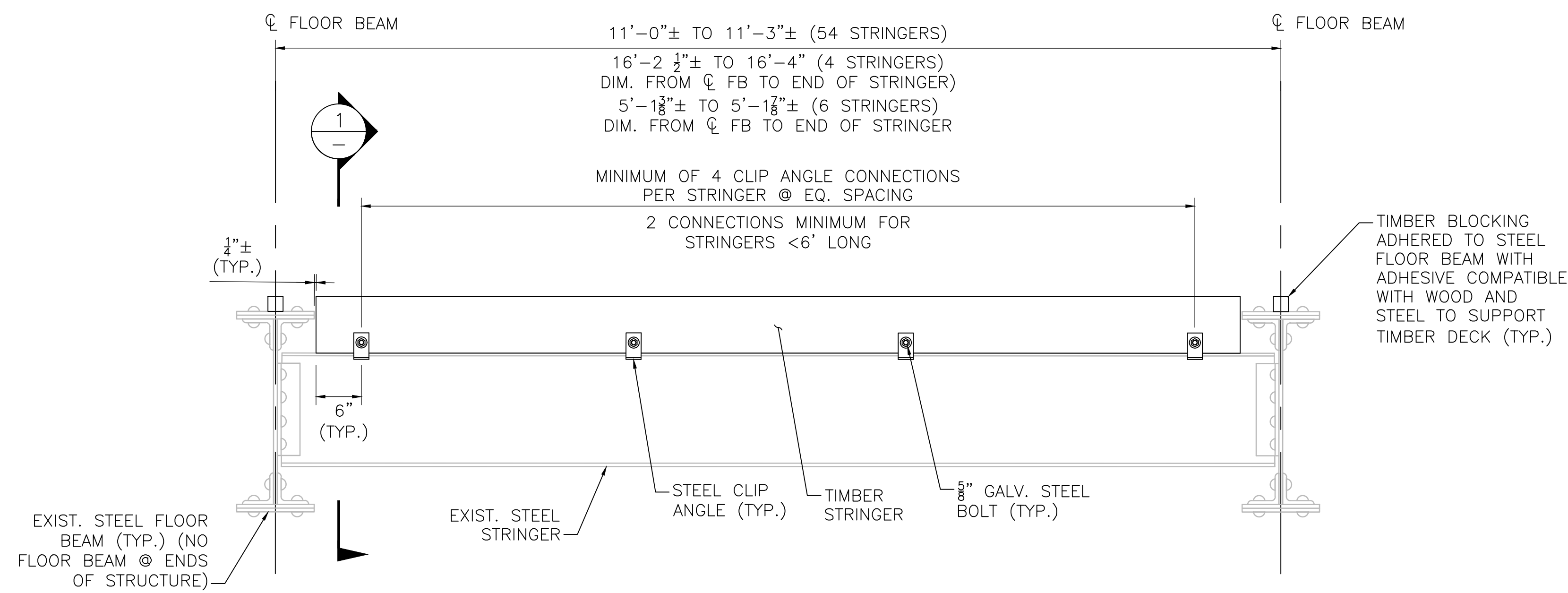
TYPICAL BRIDGE SECTION

SCALE: 1/2" = 1'



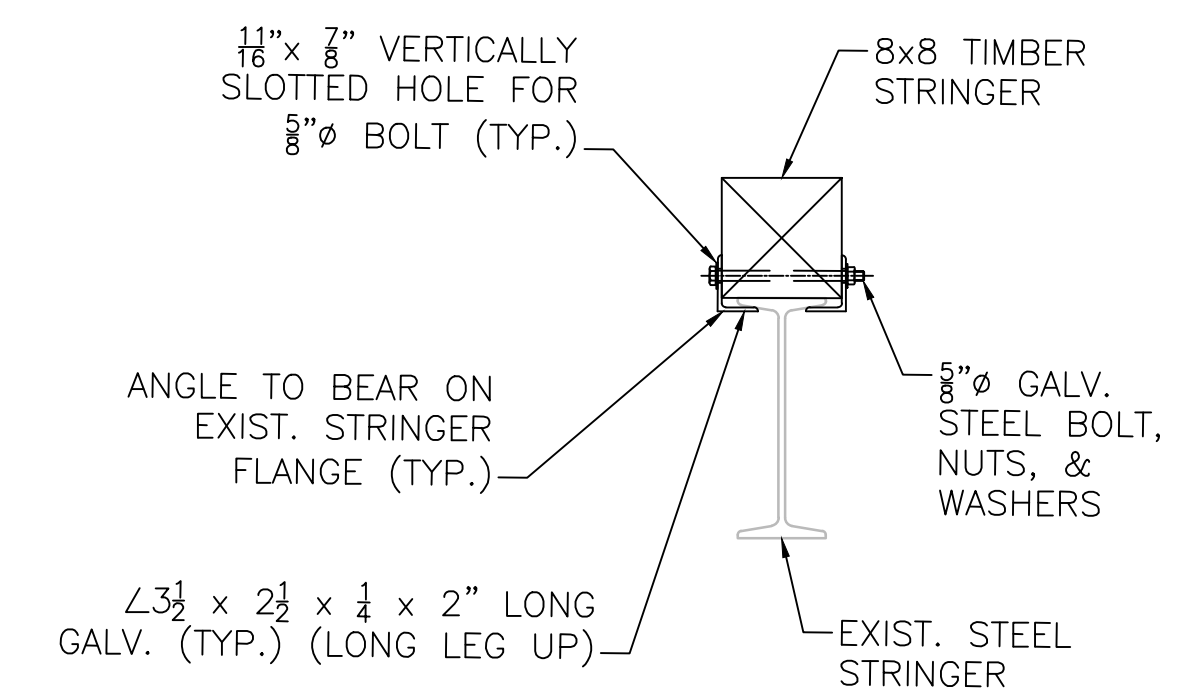
EXISTING DEMOLITION SECTION

SCALE: 1/2" = 1'



TYPICAL TIMBER STRINGER TO STEEL STRINGER CONNECTION

SCALE: 1" = 1'-0"



SECTION 1

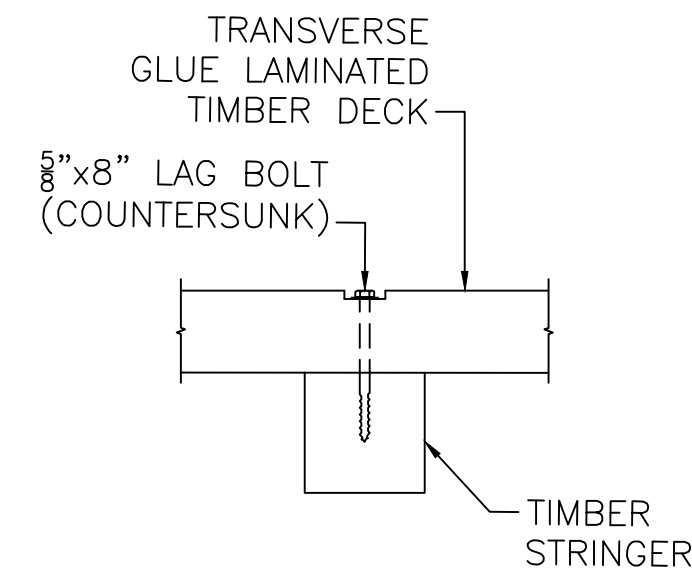
SCALE: 1" = 1'-0"

NOT FOR CONSTRUCTION

WALTHAM  
WAYSIDE TRAIL

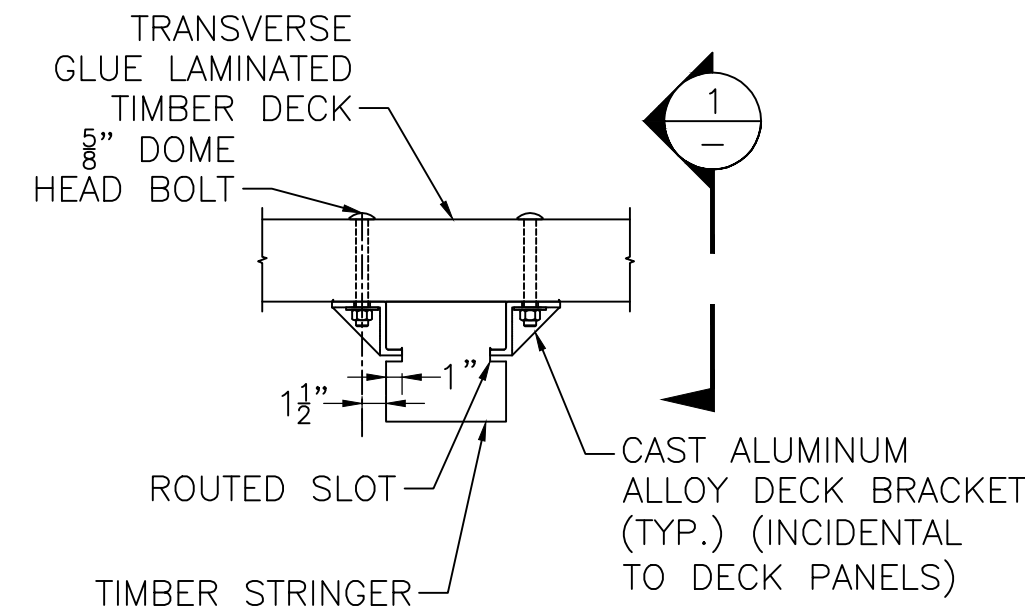
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	70	114
PROJECT FILE NO.		17112.00	

BRIDGE PLAN - 9  
BRIDGE No. 113  
LINDEN BRIDGE DECK DETAILS



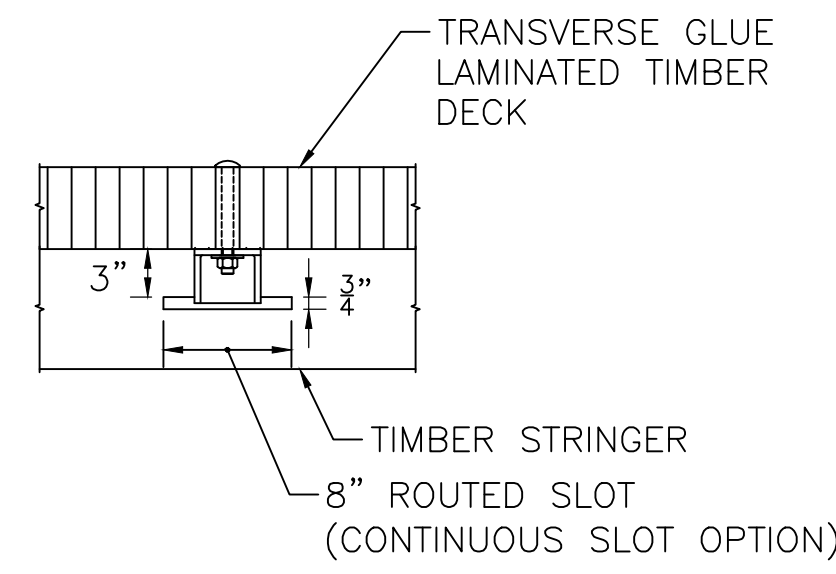
DECK PANEL CONNECTION  
DETAIL-ALTERNATE

(ONLY TO BE USED WHERE TYPICAL DECK PANEL CONNECTION  
DETAIL CANNOT BE MADE DUE TO ACCESS RESTRICTIONS)  
SCALE: 1" = 1'-0"



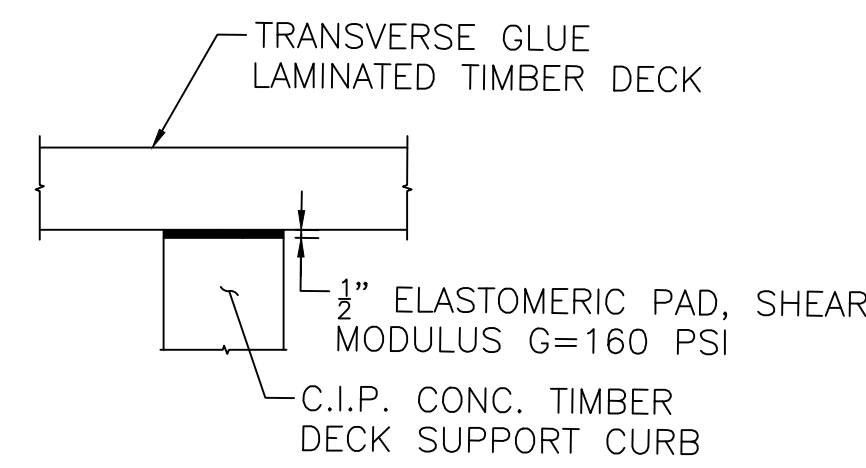
TYPICAL DECK PANEL  
CONNECTION DETAIL

SCALE: 1" = 1'-0"



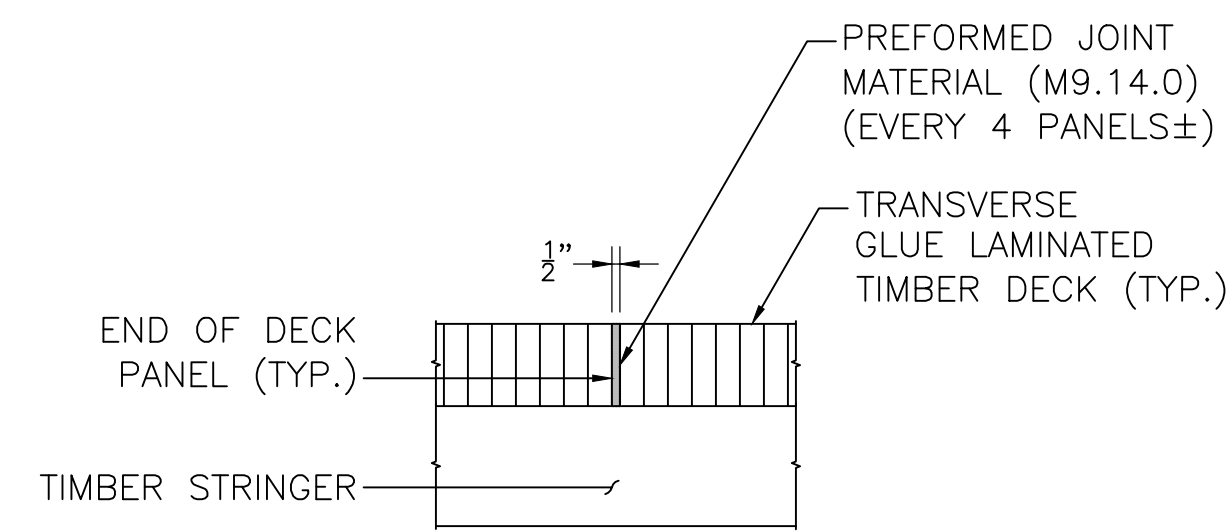
SECTION 1

SCALE: 1" = 1'-0"



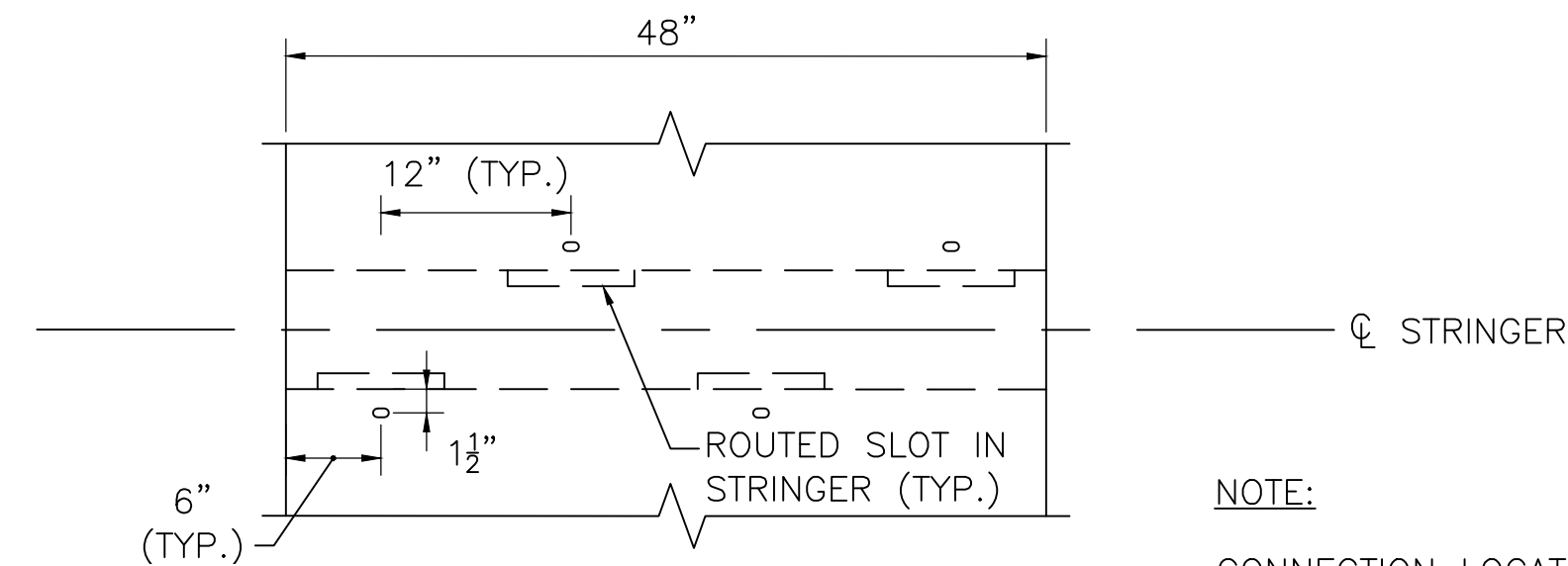
DECK PANEL OVER  
CONCRETE CURB DETAIL

SCALE: 1" = 1'-0"



DECK JOINT DETAIL

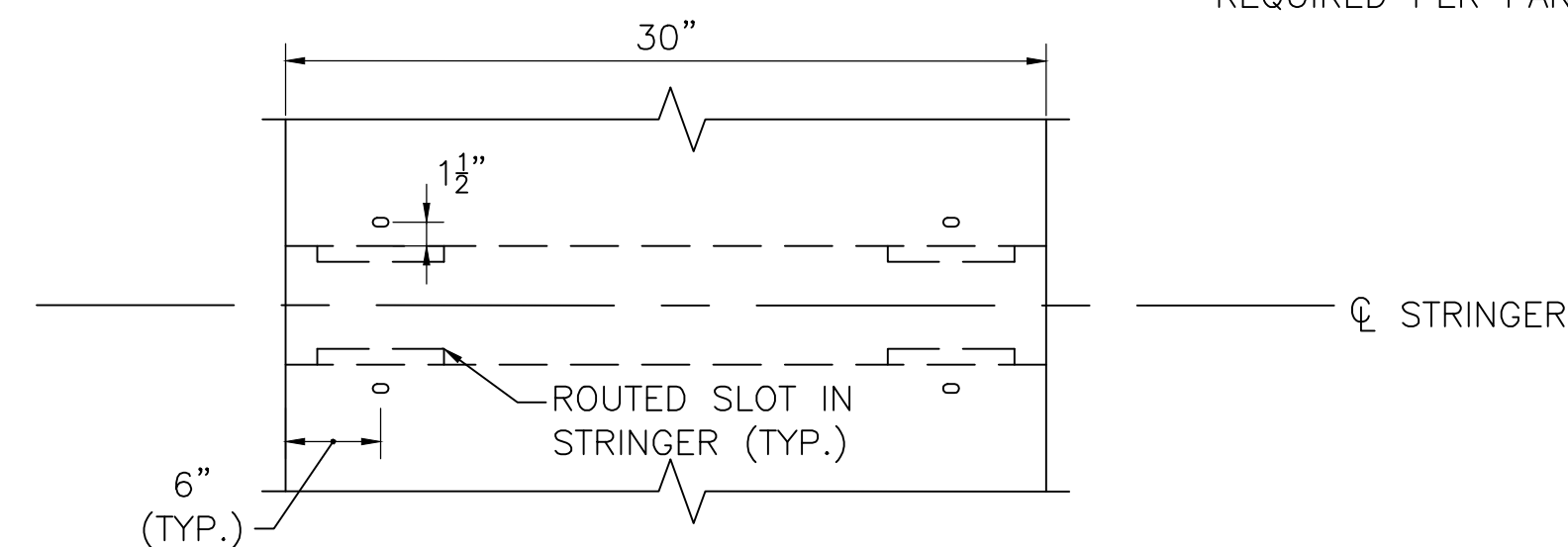
SCALE: 1" = 1'-0"



PLAN - INTERIOR PANEL

NOTE:

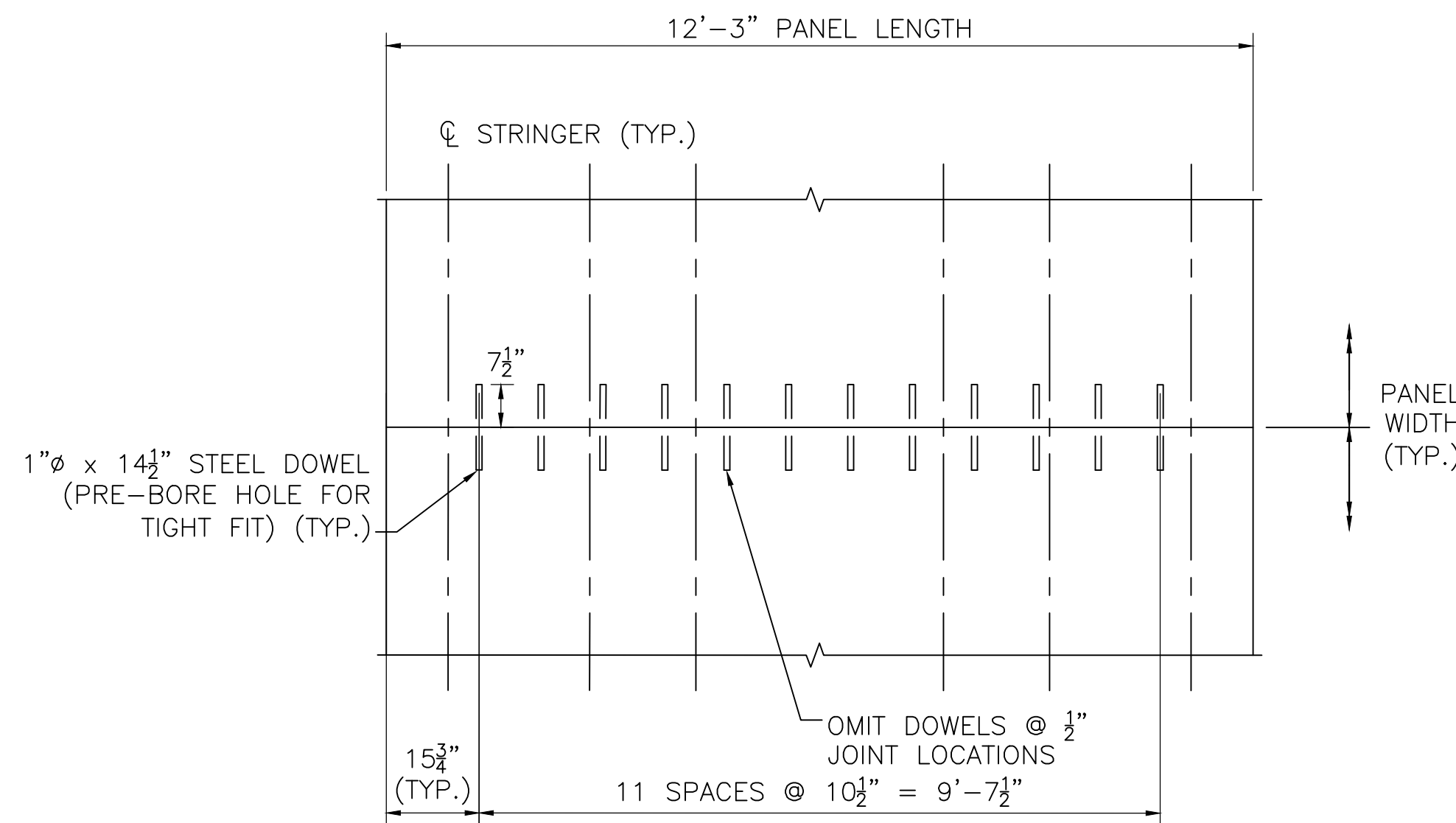
CONNECTION LOCATIONS TO BE  
ADJUSTED AS NECESSARY WHEN  
LOCATED OVER FLOOR BEAMS.  
MINIMUM 4 CONNECTIONS ARE  
REQUIRED PER PANEL.



PLAN - END PANEL

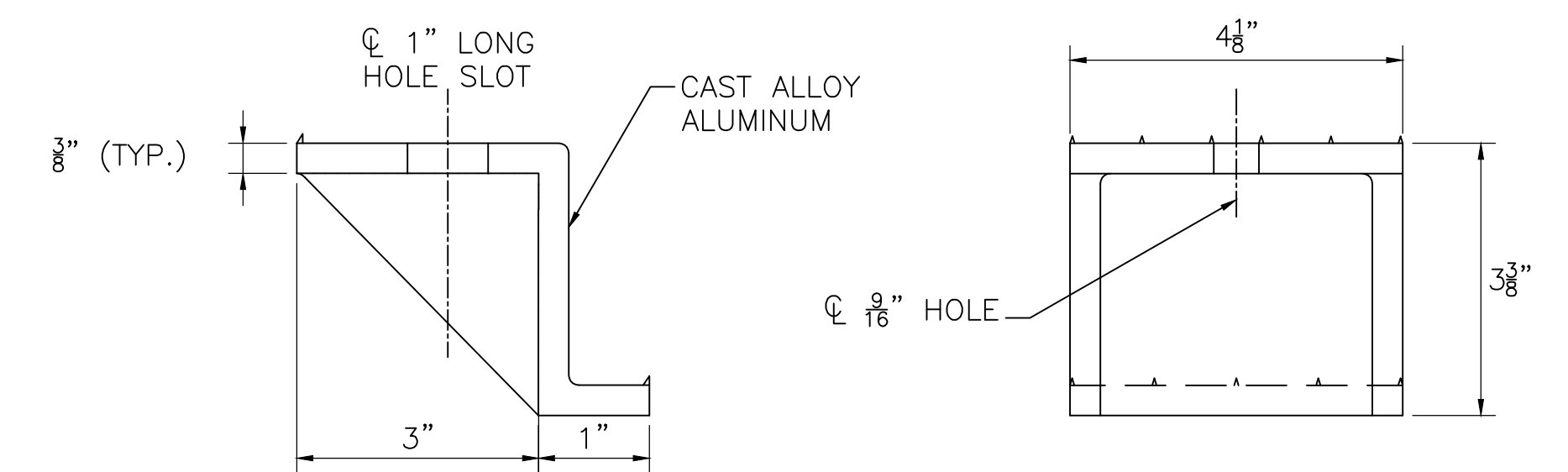
DECK PANEL CONNECTION PLACEMENT

SCALE: 1" = 1'-0"



DECK DOWEL CONNECTION DETAIL

SCALE: 1/2" = 1'-0"



DECK BRACKET DETAIL

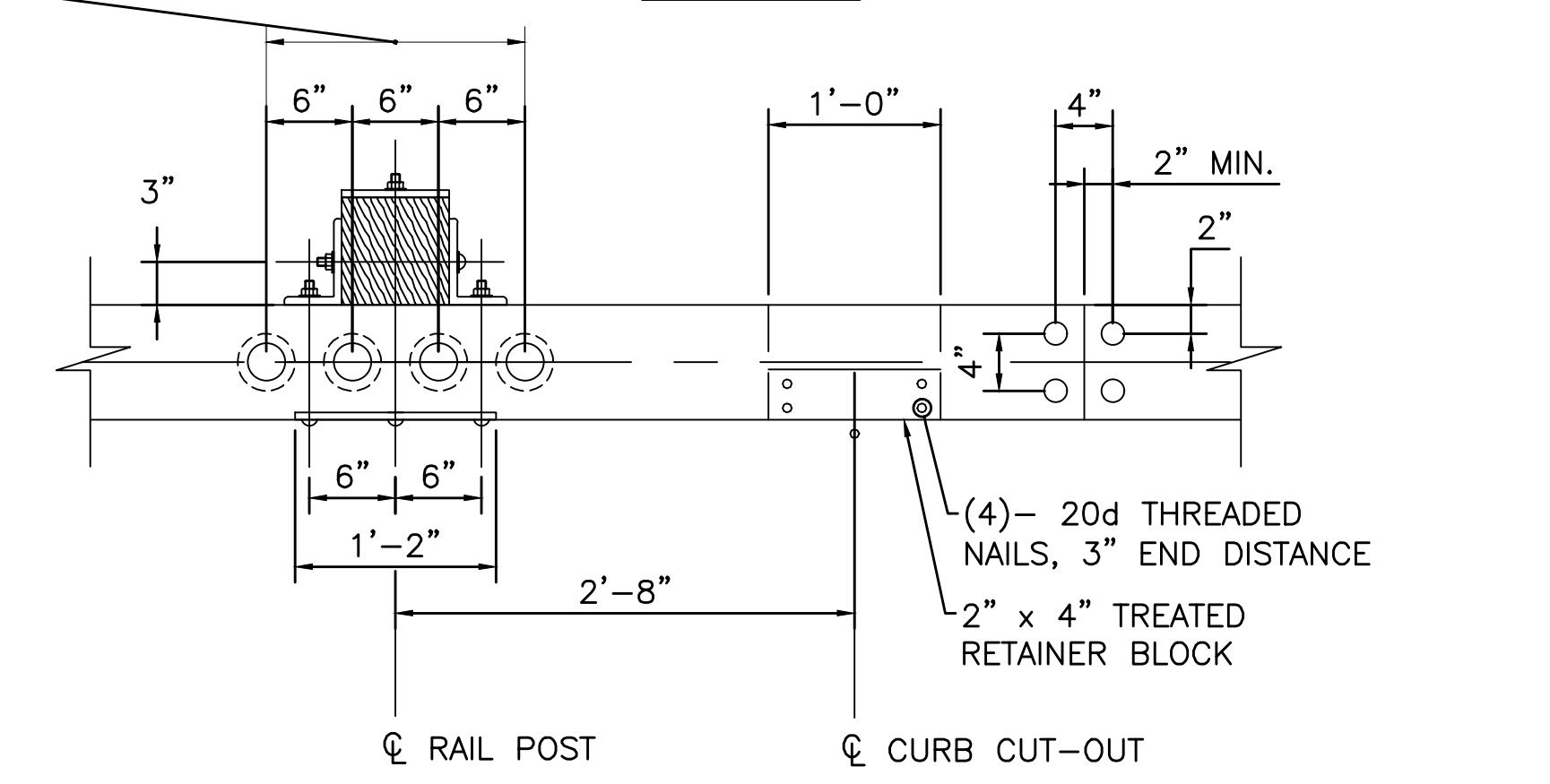
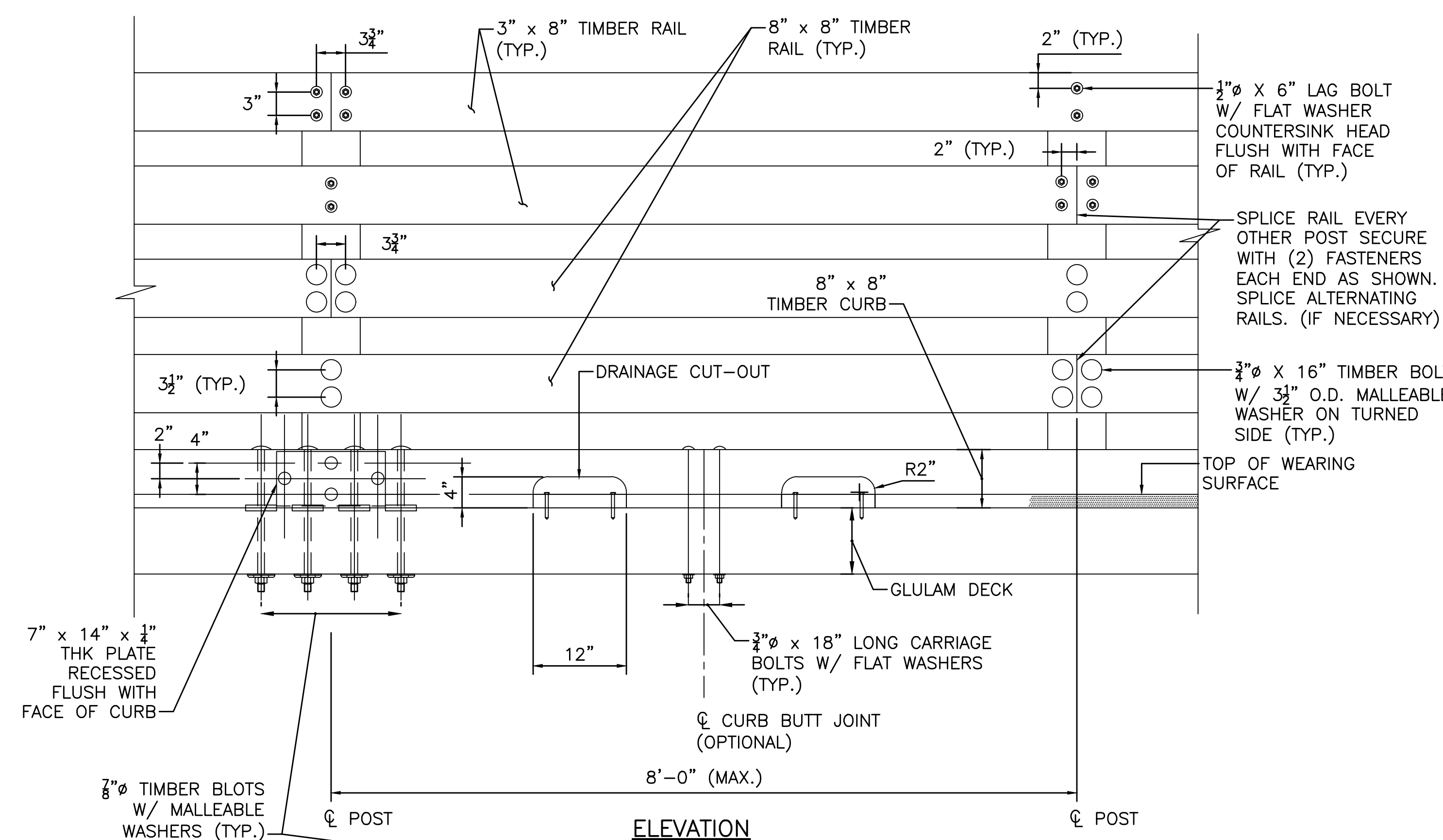
SCALE: N.T.S.

NOT FOR CONSTRUCTION

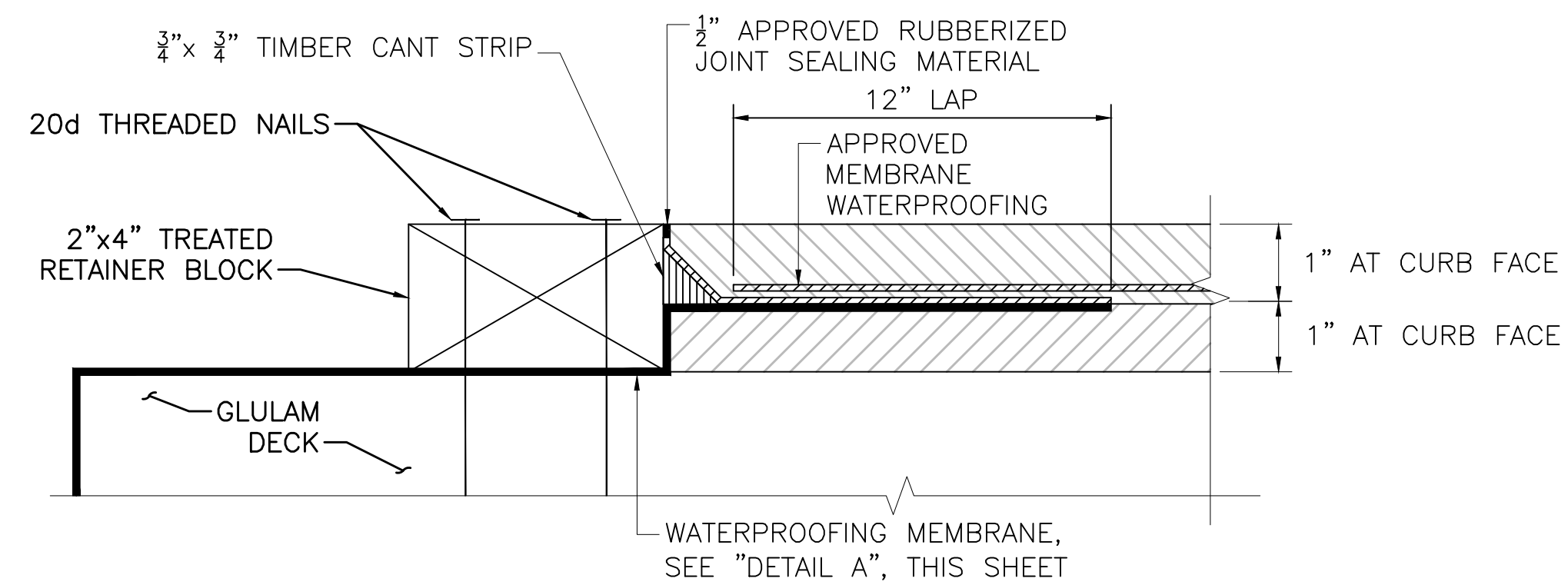
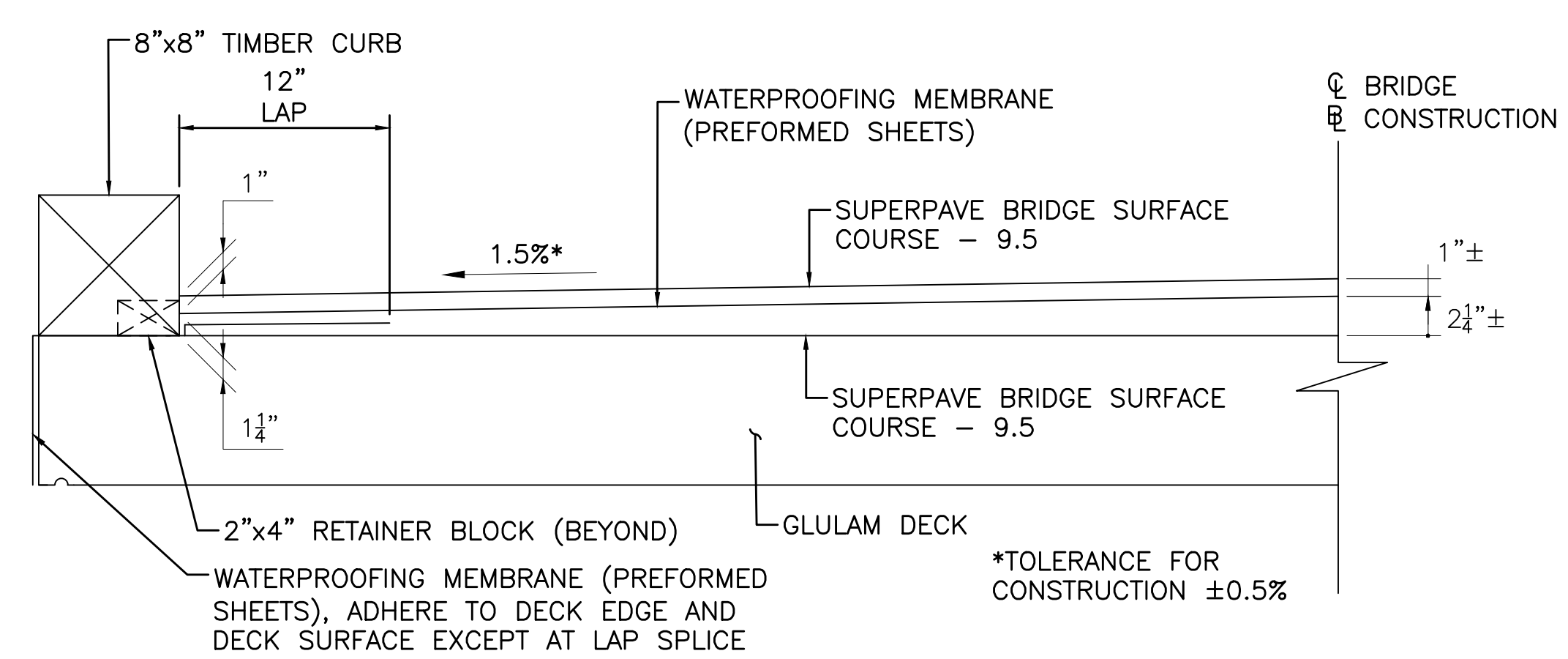
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	71	114
PROJECT FILE NO.		17112.00	

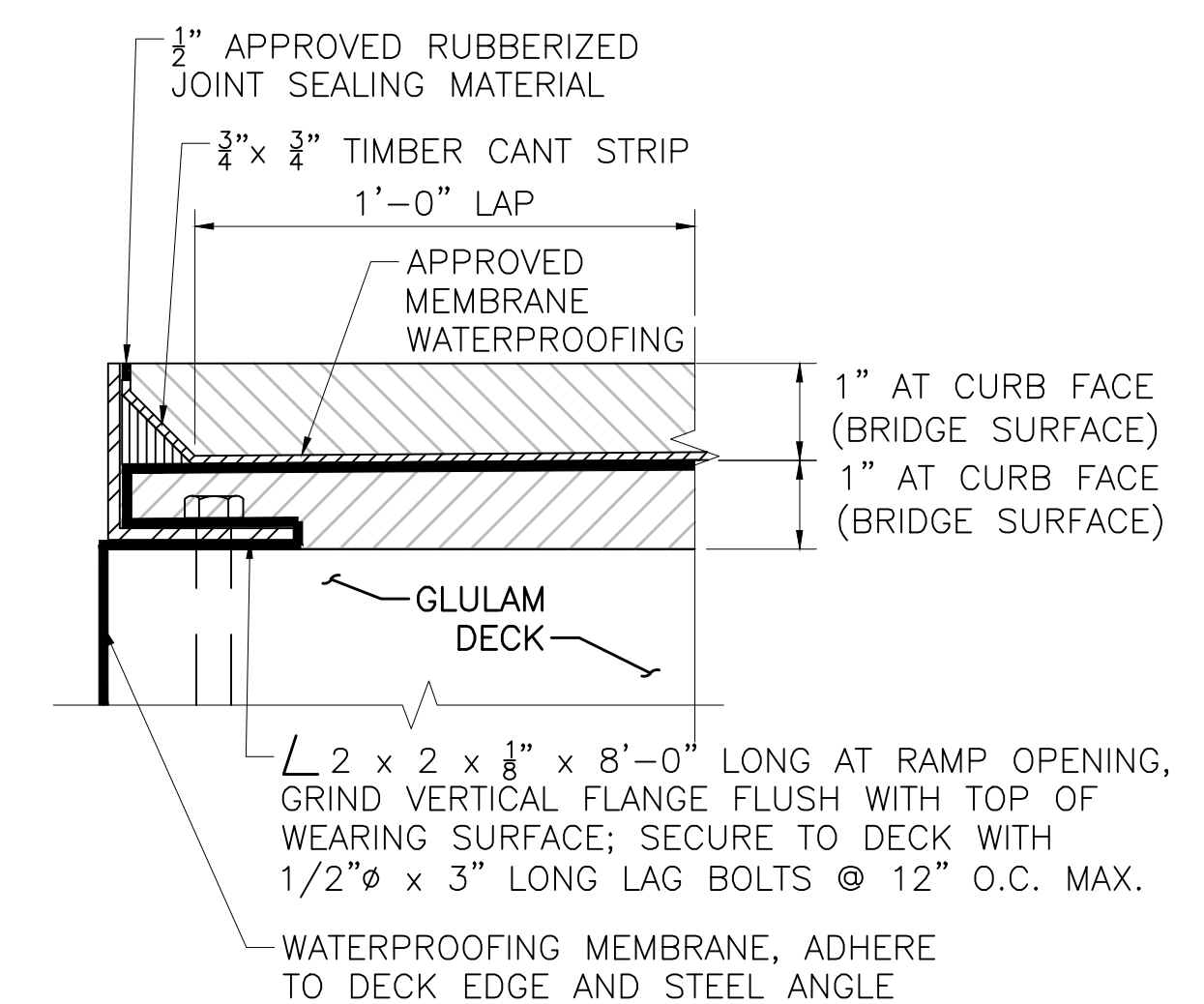
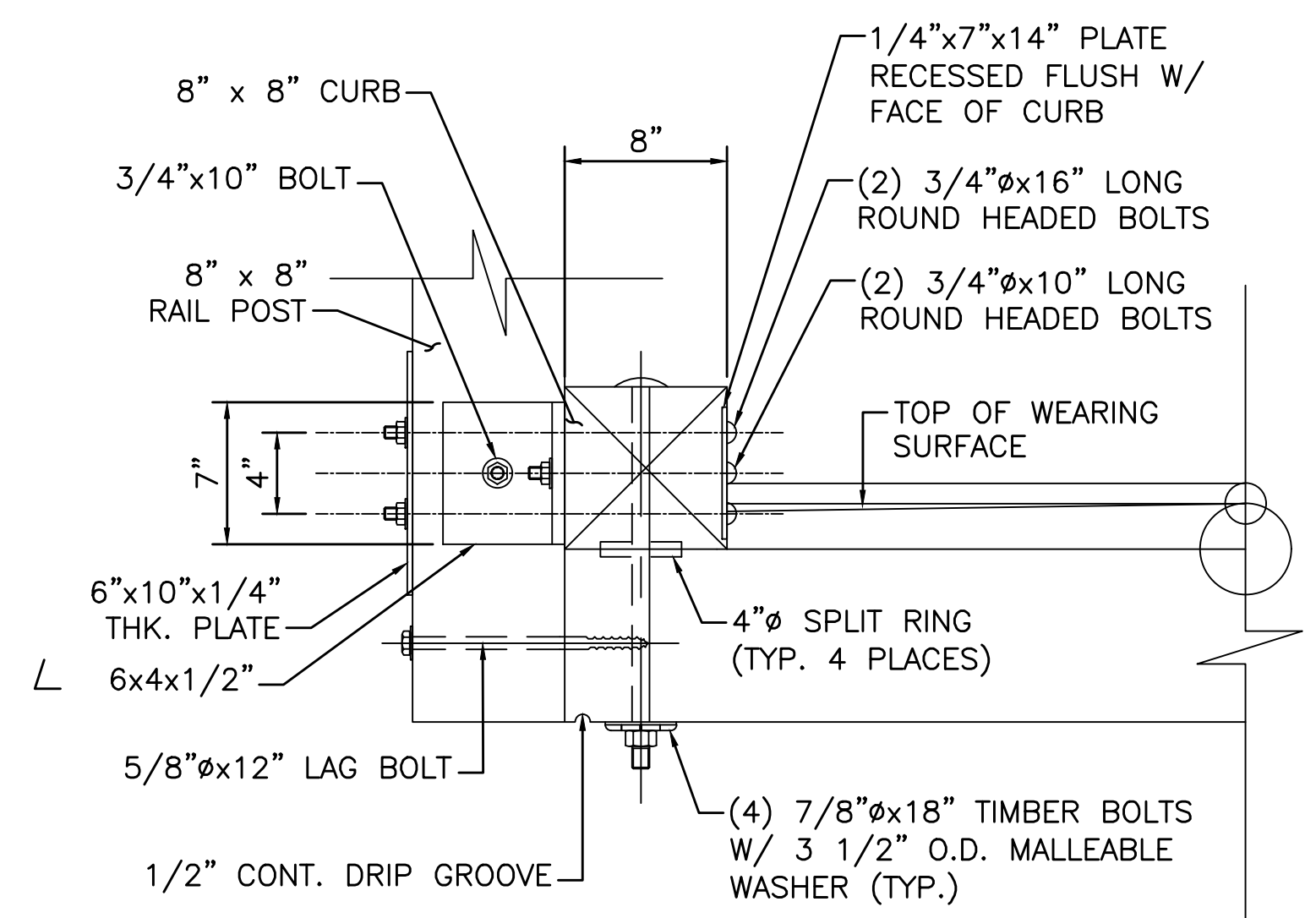
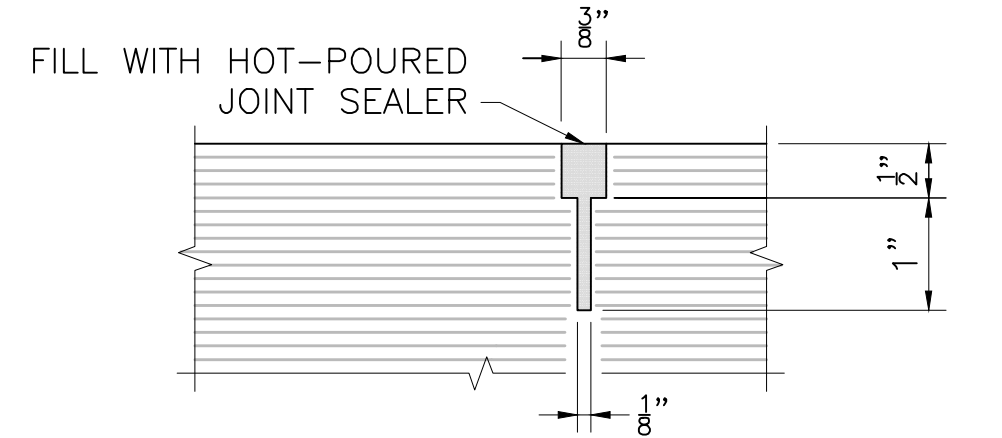
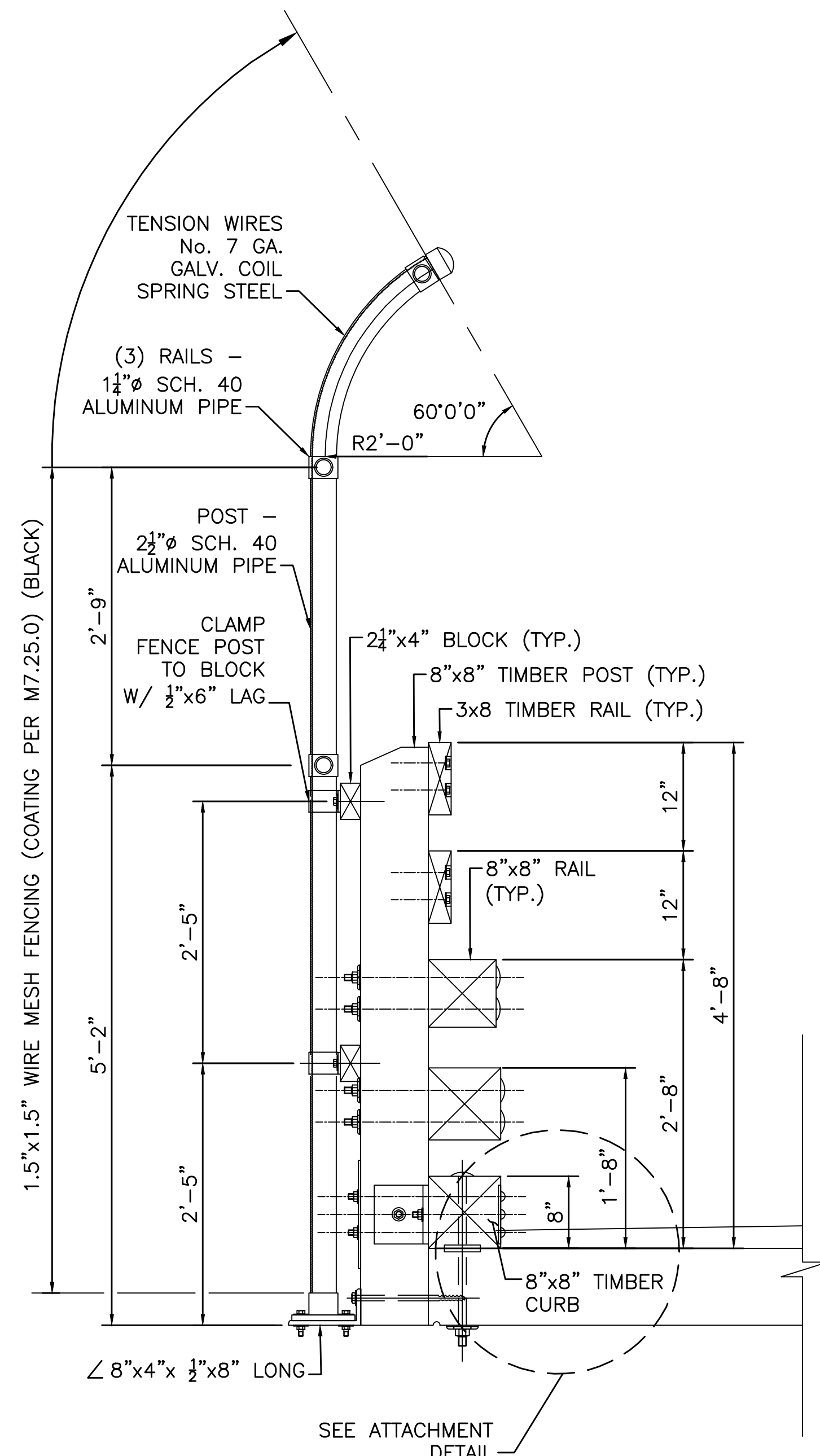
**BRIDGE PLAN - 10  
BRIDGE No. 113  
LINDEN BRIDGE RAILING - DETAILS**



**CURB AND RAIL POST ATTACHMENT DETAIL**  
SCALE: 1" = 1'-0"



**RAIL DETAIL**  
SCALE: 1" = 1'-0"



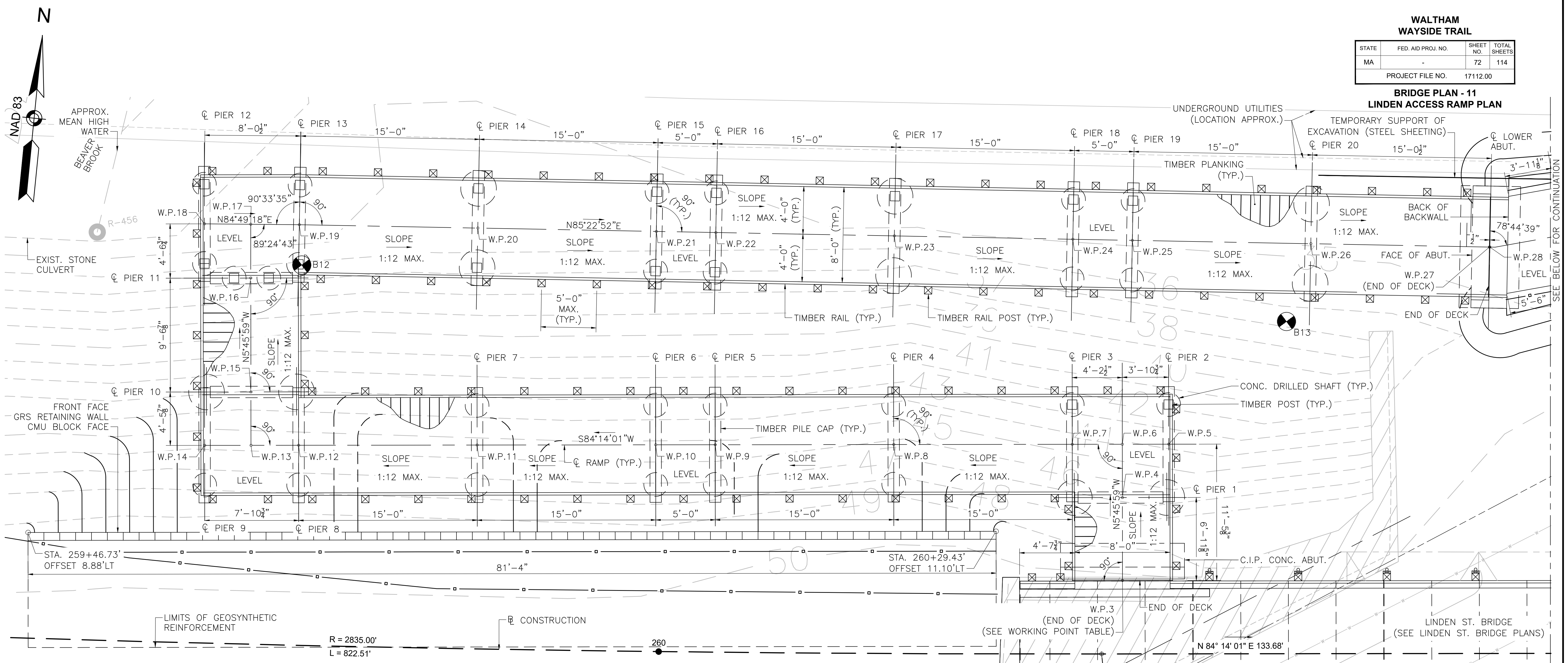
- NOTES:**
- ALLOW FIRST BRIDGE SURFACE COURSE TO COOL SUFFICIENTLY SO WATERPROOFING MEMBRANE DOES NOT TEAR WHEN APPLYING THE SECOND BRIDGE SURFACE COURSE.
  - SEE "DETAIL B" AND "DETAIL C", THIS SHEET.

**NOT FOR CONSTRUCTION**

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	72	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 11  
LINDEN ACCESS RAMP PLAN**



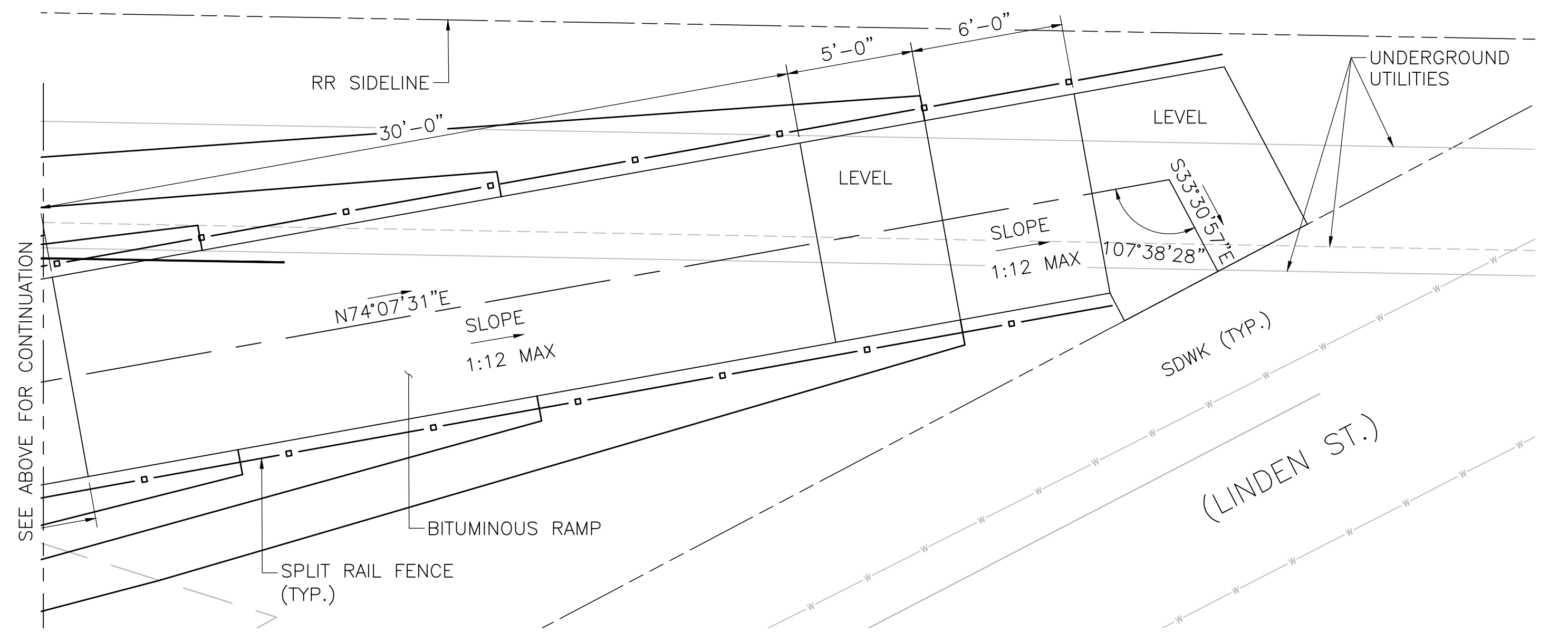
**TIMBER ACCESS RAMP**

SCALE: 1/4" = 1'-0"

WORKING POINT TABLE				
W.P.	STATION	OFFSET	ELEVATION	DESCRIPTION
3	260+38.98	6.17' LT.	51.50	END OF DECK
4	260+38.98	13.13' LT.	50.92	CL PIER 1
5	260+42.88	17.62' LT.	50.90'	CL PIER 2
6	260+38.98	17.62' LT.	50.90'	INTERSECTION OF RAMP CL
7	260+34.76	17.62' LT.	50.90'	CL PIER 3
8	260+19.66	17.57' LT.	49.65'	CL PIER 4
9	260+04.57	17.43' LT.	48.40'	CL PIER 5
10	259+99.54	17.37' LT.	48.40'	CL PIER 6
11	259+84.45	17.13' LT.	47.15'	CL PIER 7
12	259+69.36	16.81' LT.	45.90'	CL PIER 8
13	259+65.34	16.71' LT.	45.90'	INTERSECTION OF RAMP CL
14	259+61.42	16.61' LT.	45.90'	CL PIER 9
15	259+65.23	21.2' LT.	45.88'	CL PIER 10
16	259+64.98	30.76' LT.	45.08'	CL PIER 11
17	259+64.86	35.28' LT.	45.06'	INTERSECTION OF RAMP CL
18	259+60.93	35.22' LT.	45.06'	CL PIER 12
19	259+69.00	35.34' LT.	45.06'	CL PIER 13
20	260+84.19	35.36' LT.	43.81'	CL PIER 14
21	259+99.38	35.3' LT.	42.56'	CL PIER 15
22	260+04.44	35.26' LT.	42.56'	CL PIER 16
23	260+19.63	35.1' LT.	41.31'	CL PIER 17
24	260+34.81	34.85' LT.	40.06'	CL PIER 18
25	260+39.84	34.75' LT.	40.06'	CL PIER 19
26	260+54.84	34.45' LT.	38.81'	CL PIER 20
27	260+69.83	34.14' LT.	37.56'	END OF DECK
28	260+69.88	34.15' LT.	37.56'	CL ABUTMENT

**NOTES:**

- BRIDGE GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY. FINAL LAYOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR BASED ON FIELD MEASUREMENTS.
- FOR MORE INFORMATION, SEE BRIDGE GENERAL NOTES SHEETS.
- WORKING POINTS ARE GIVEN AT THE TOP OF THE TIMBER PLANKING.



**BITUMINOUS ACCESS RAMP**

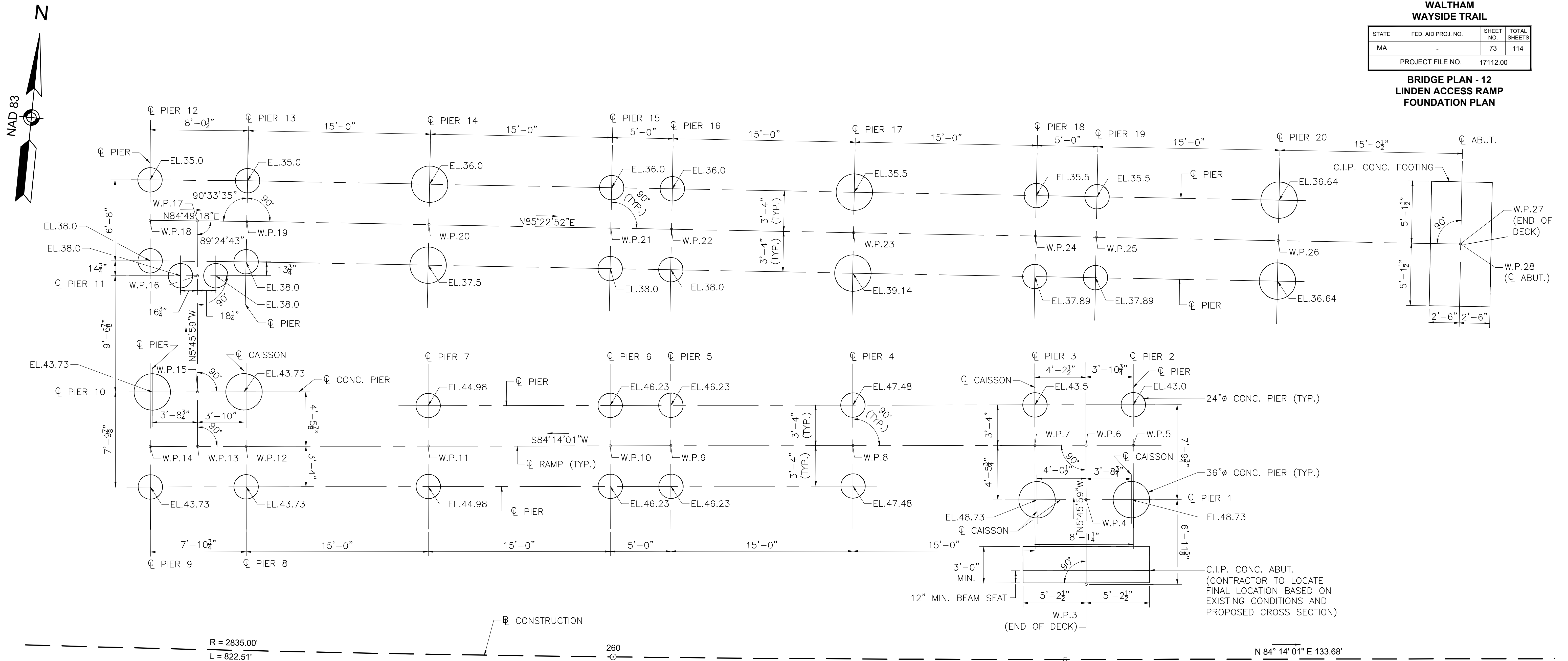
SCALE: 1/4" = 1'-0"



**WALTHAM  
WAYSIDE TRAIL**

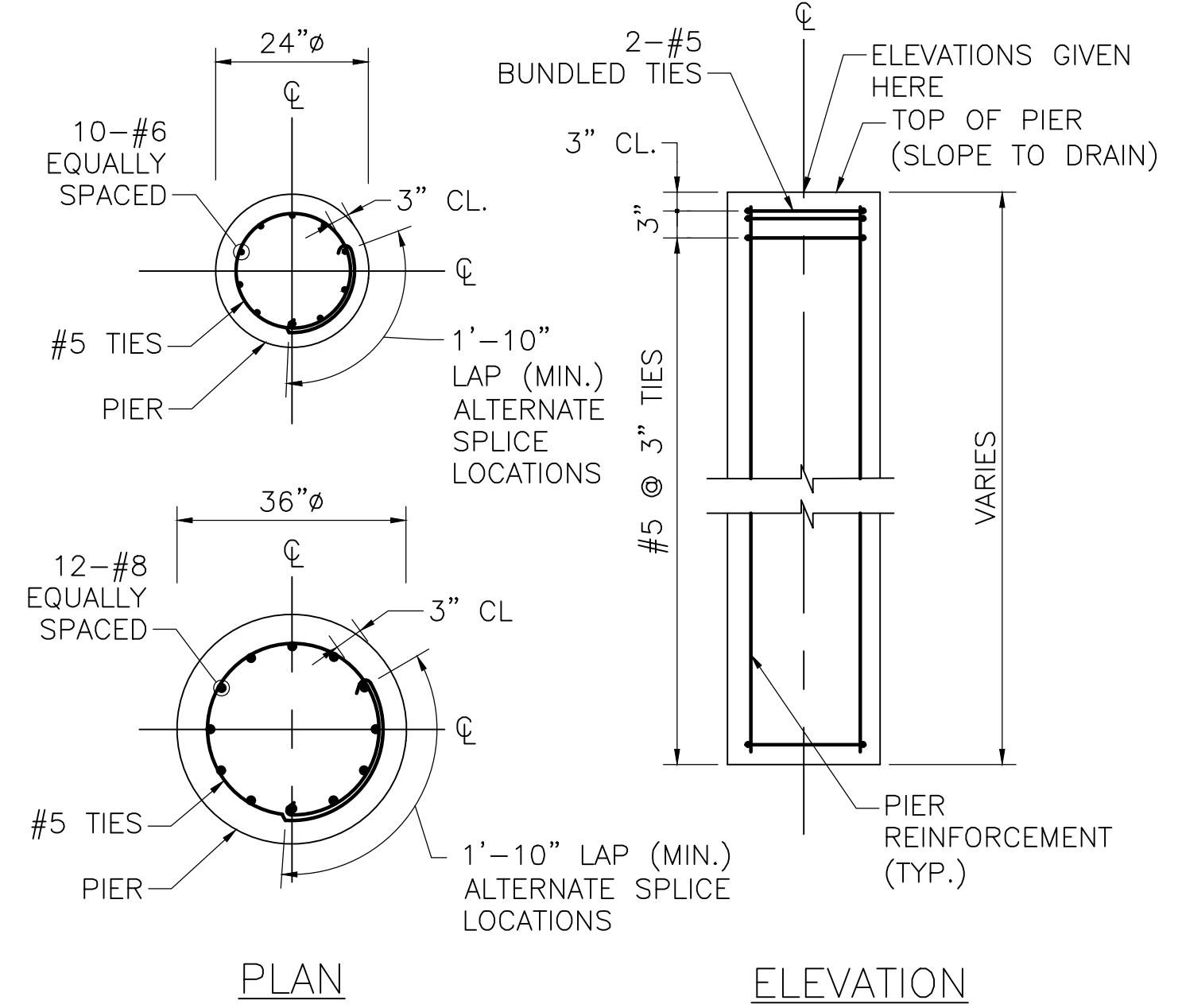
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	73	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 12  
LINDEN ACCESS RAMP  
FOUNDATION PLAN**



**TIMBER ACCESS RAMP  
FOUNDATION PLAN**

SCALE: 1/4" = 1'-0"



**CONCRETE PIER DETAILS**

SCALE: 1/2" = 1'-0"

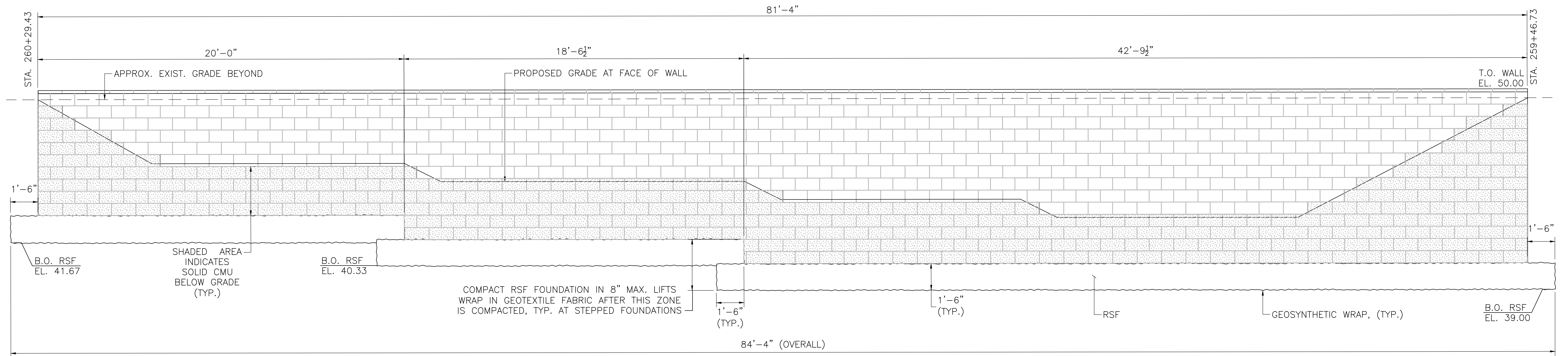
**NOTES:**

1. SEE LINDEN ACCESS RAMP PLAN FOR WORKING POINT INFORMATION.
2. ELEVATIONS SHOWN ARE AT TOP OF THE CONCRETE PIERS.
3. FOR BOTTOM OF PIER ELEVATIONS, SEE LINDEN ACCESS RAMP PIER ELEVATION DETAILS - 1 & 2 SHEETS.

**WALTHAM  
WAYSIDE TRAIL**

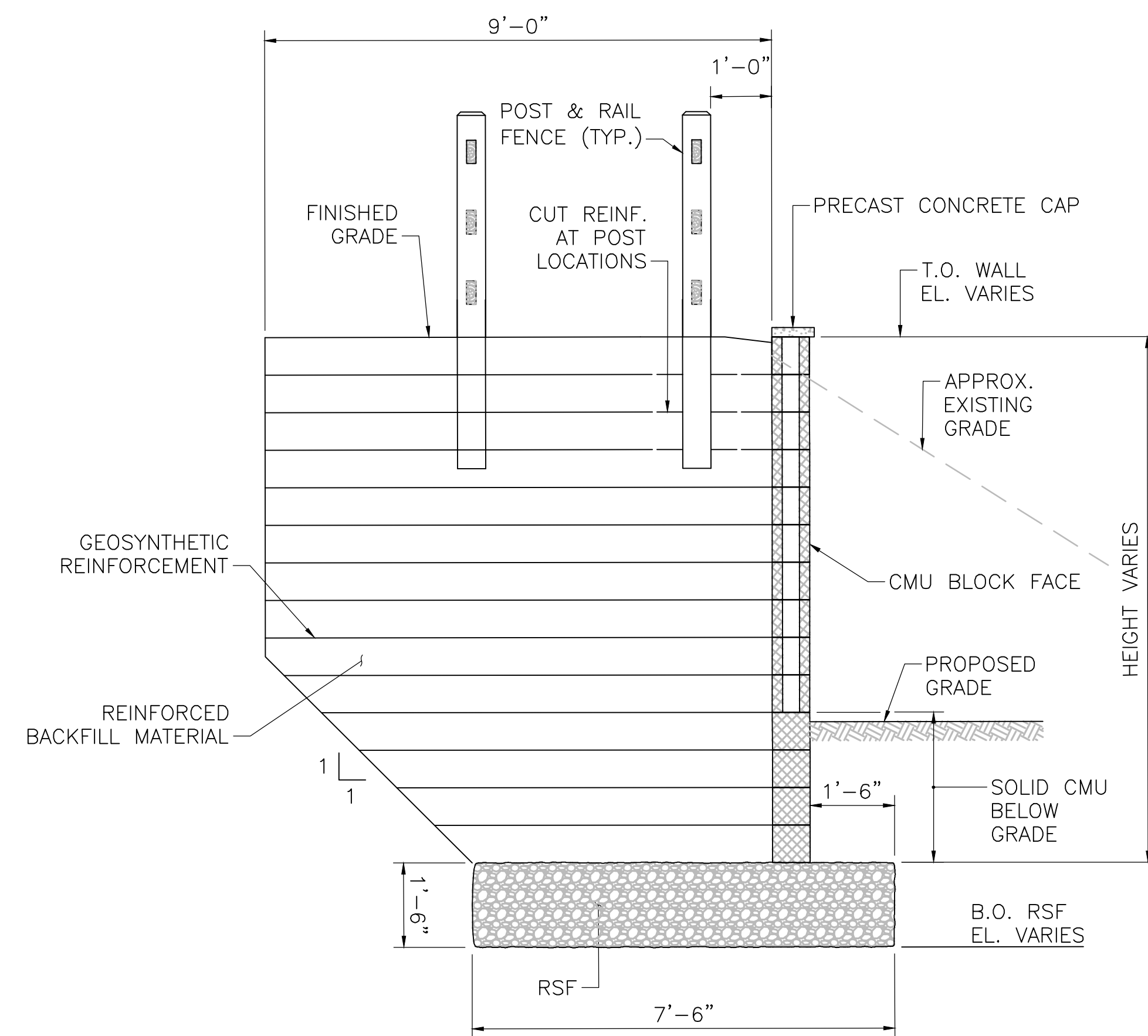
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	74	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 13  
LINDEN ACCESS RAMP PIER  
GRS RETAINING WALL PLAN**



**GRS RETAINING WALL ELEVATION**

SCALE: 3/8" = 1'



**TYPICAL RETAINING WALL SECTION**

SCALE: 1/2" = 1'

**EXISTING CONCRETE CULVERT - STA. 285+19**

SCALE: 1/2" = 1'-0"

**ABBREVIATIONS:**

- RSF - REINFORCED SOIL FOUNDATION
- CMU - CONCRETE MASONRY UNIT
- GRS - GEOSYNTHETIC REINFORCED SOIL
- MSE - MECHANICALLY STABILIZED EARTH
- B.O. - BOTTOM OF
- T.O. - TOP OF
- EL. - ELEVATION

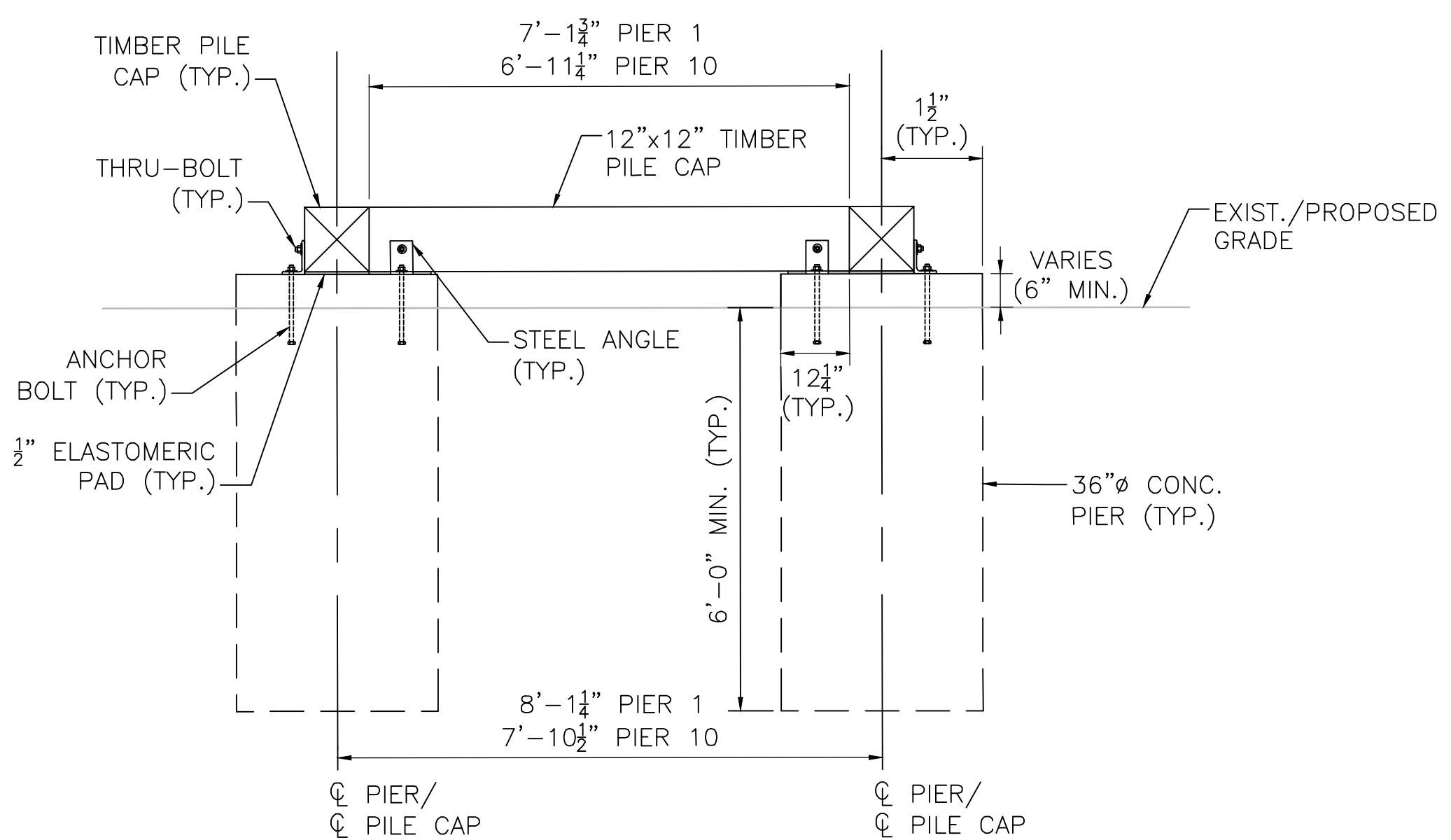
**NOTE:**

FOR NOTES SEE "GRS ABUTMENT/WALL NOTES" SHEET.

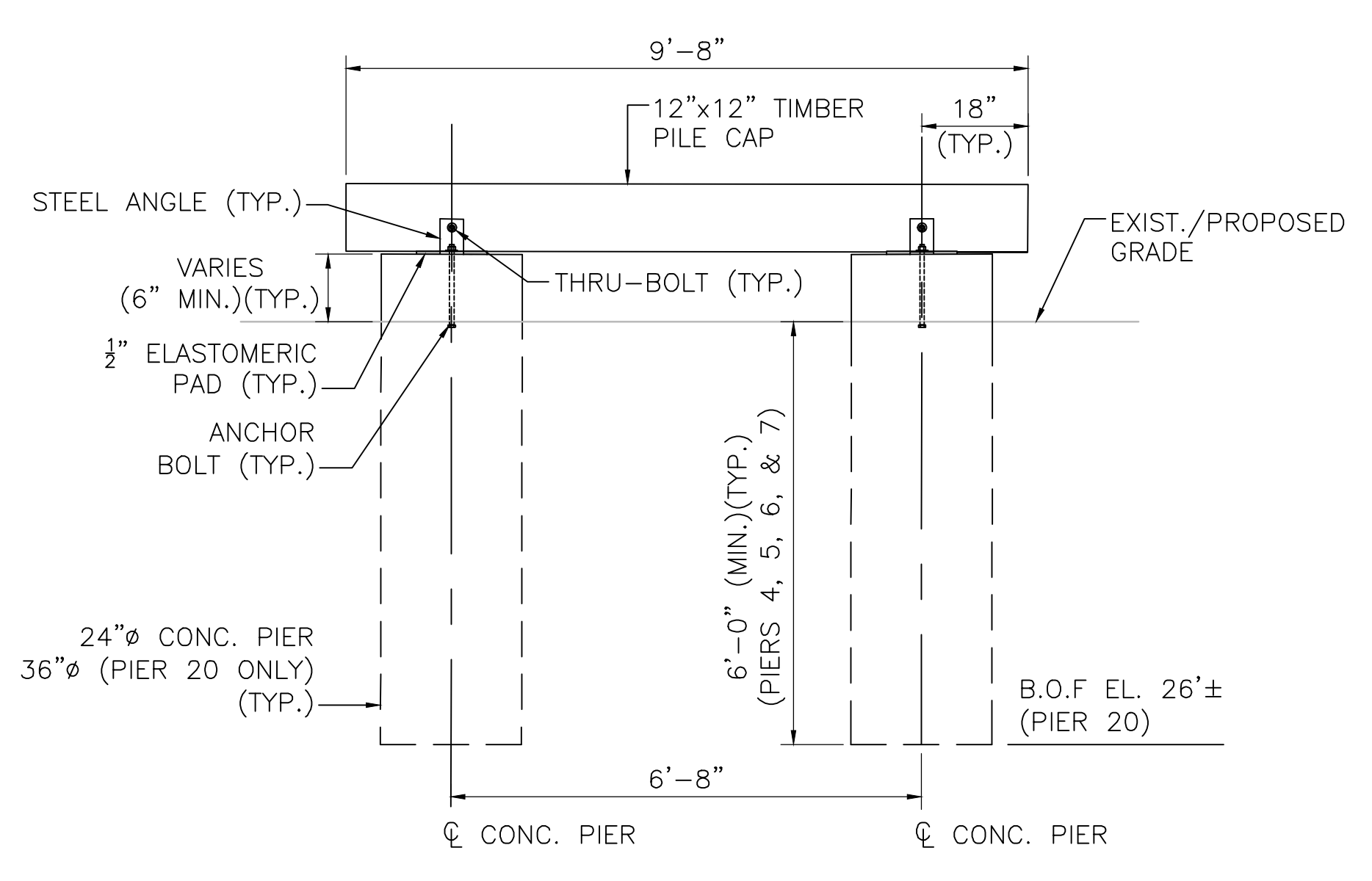
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	75	114
PROJECT FILE NO.		17112.00	

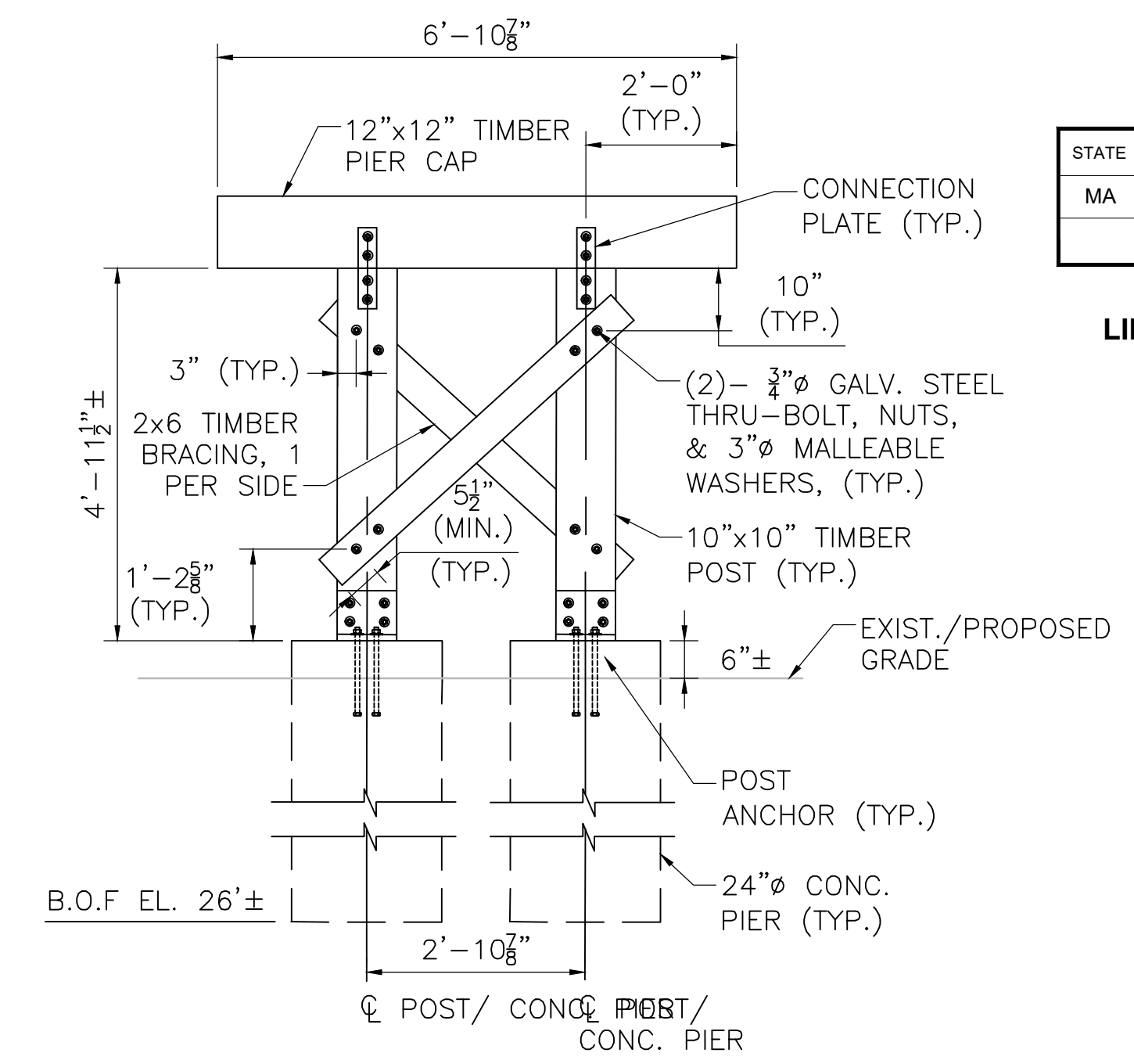
**BRIDGE PLAN - 14  
LINDEN ACCESS RAMP PIER  
ELEVATION DETAILS - 1**



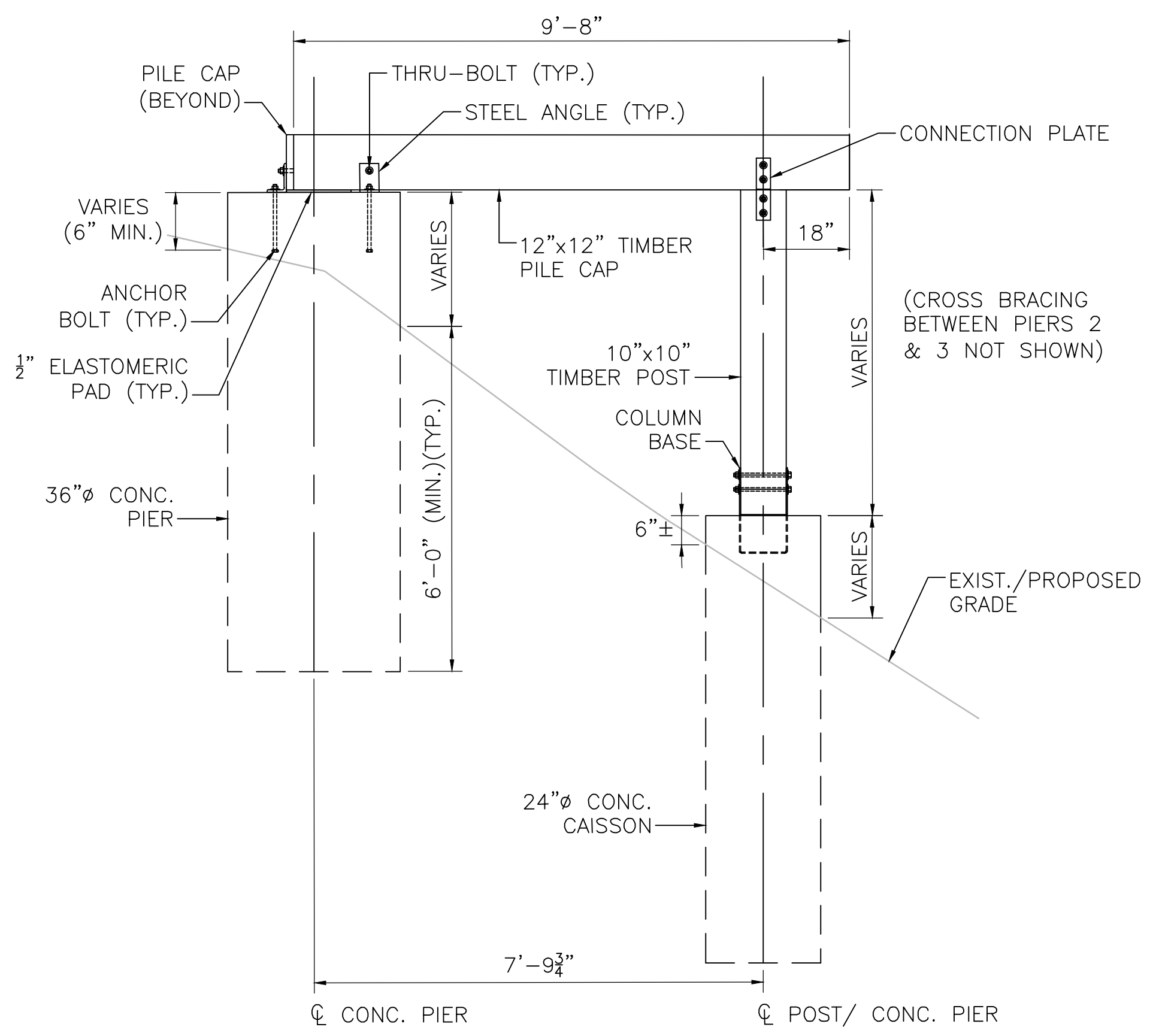
**ELEVATION - PIER 1 & 10**  
(SOUTH ELEVATION)  
SCALE: 1/2" = 1'



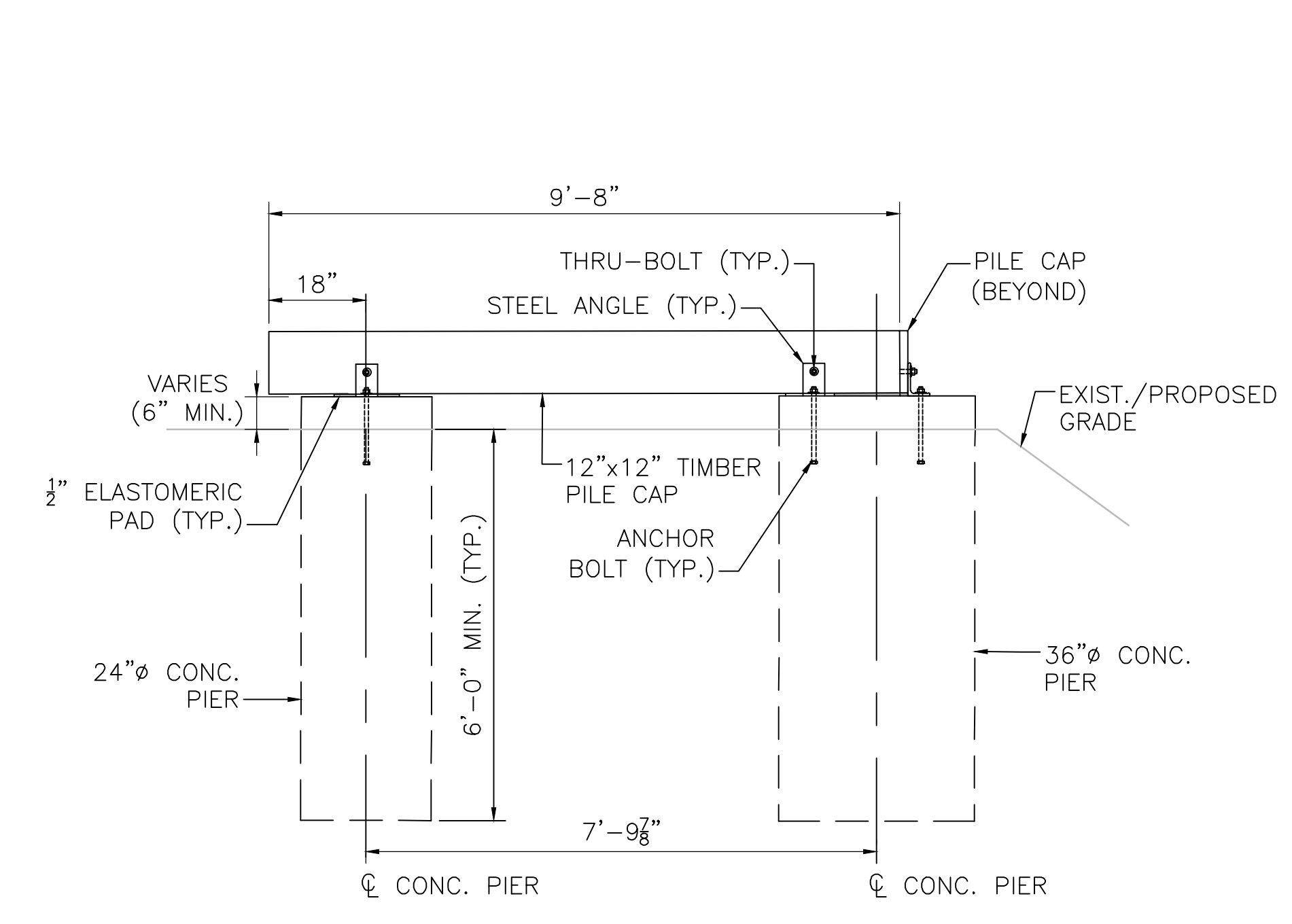
**ELEVATION - PIER 4, 5, 6, 7, & 20**  
(EAST ELEVATION)  
SCALE: 1/2" = 1'



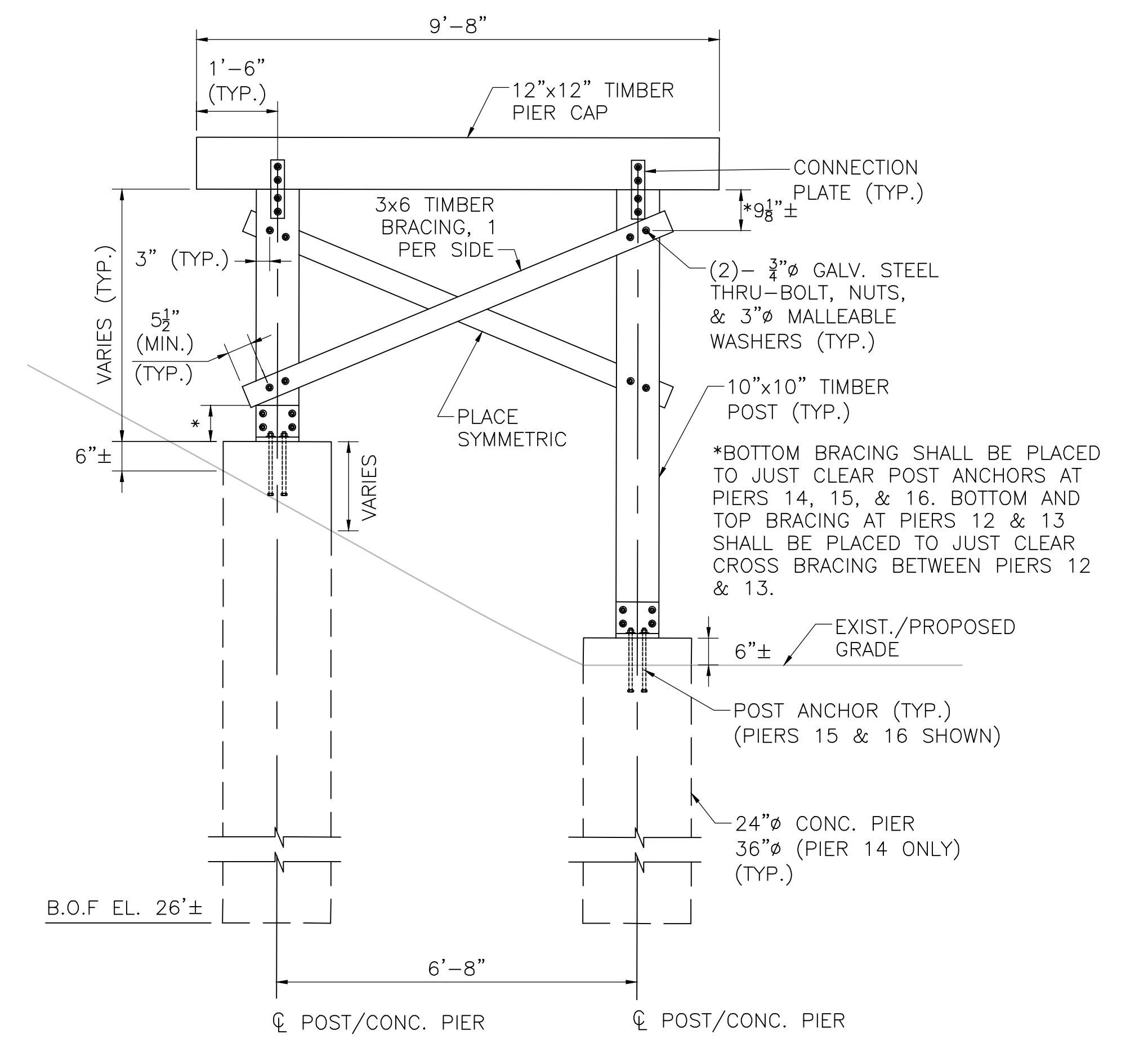
**ELEVATION - PIER 11**  
(SOUTH ELEVATION)  
SCALE: 1/2" = 1'



**ELEVATION - PIER 2 & 3**  
(EAST ELEVATION)  
SCALE: 1/2" = 1'



**ELEVATION - PIER 8**  
(EAST ELEVATION)  
(PIER 9 TYPICAL, OPPOSITE HAND)  
SCALE: 1/2" = 1'



**ELEVATION - PIER 12, 13, 14, 15, & 16**  
(EAST ELEVATION)  
SCALE: 1/2" = 1'

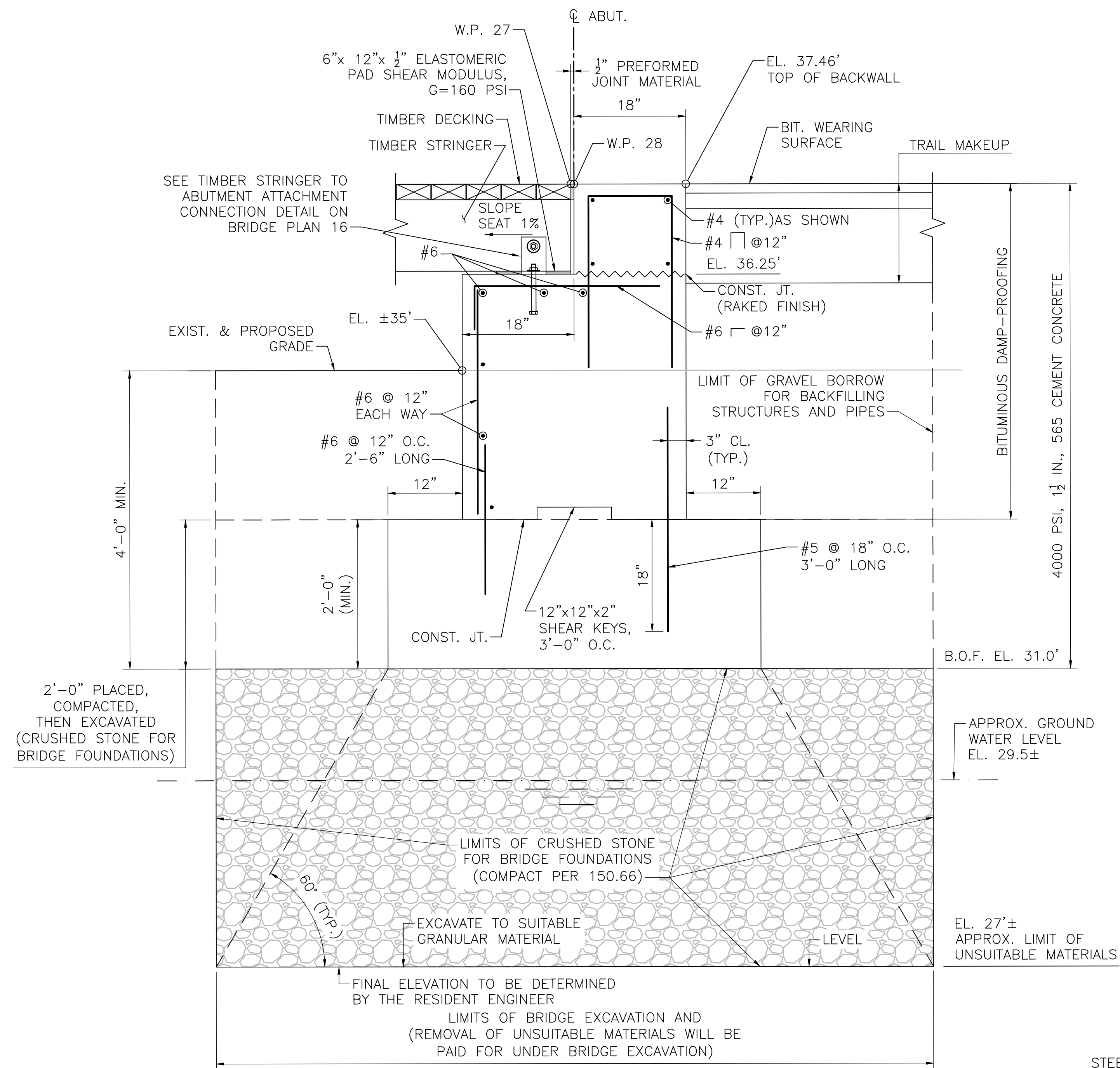
**NOTES:**

1. FOR CONNECTION DETAILS, SEE "LINDEN ACCESS RAMP PIER CONNECTION DETAILS" SHEET.
2. FOR CAISSON DETAILS, SEE "LINDEN ACCESS RAMP FOUNDATION PLAN" SHEET.
3. FOR MORE INFORMATION, SEE "BRIDGE GENERAL NOTES" SHEET.

**WALTHAM  
WAYSIDE TRAIL**

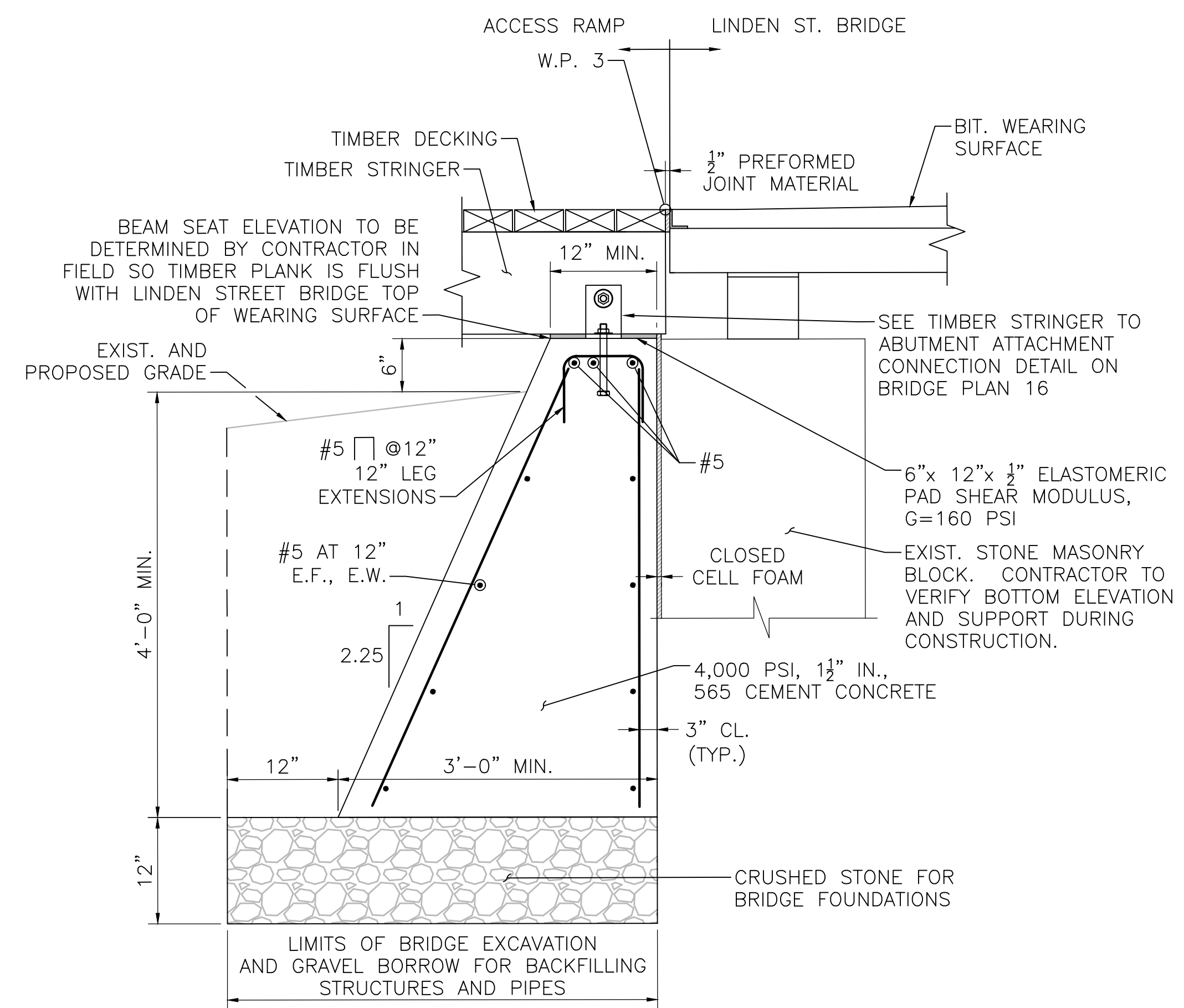
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	76	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 15  
LINDEN ACCESS RAMP PIER  
ELEVATION DETAILS - 2**



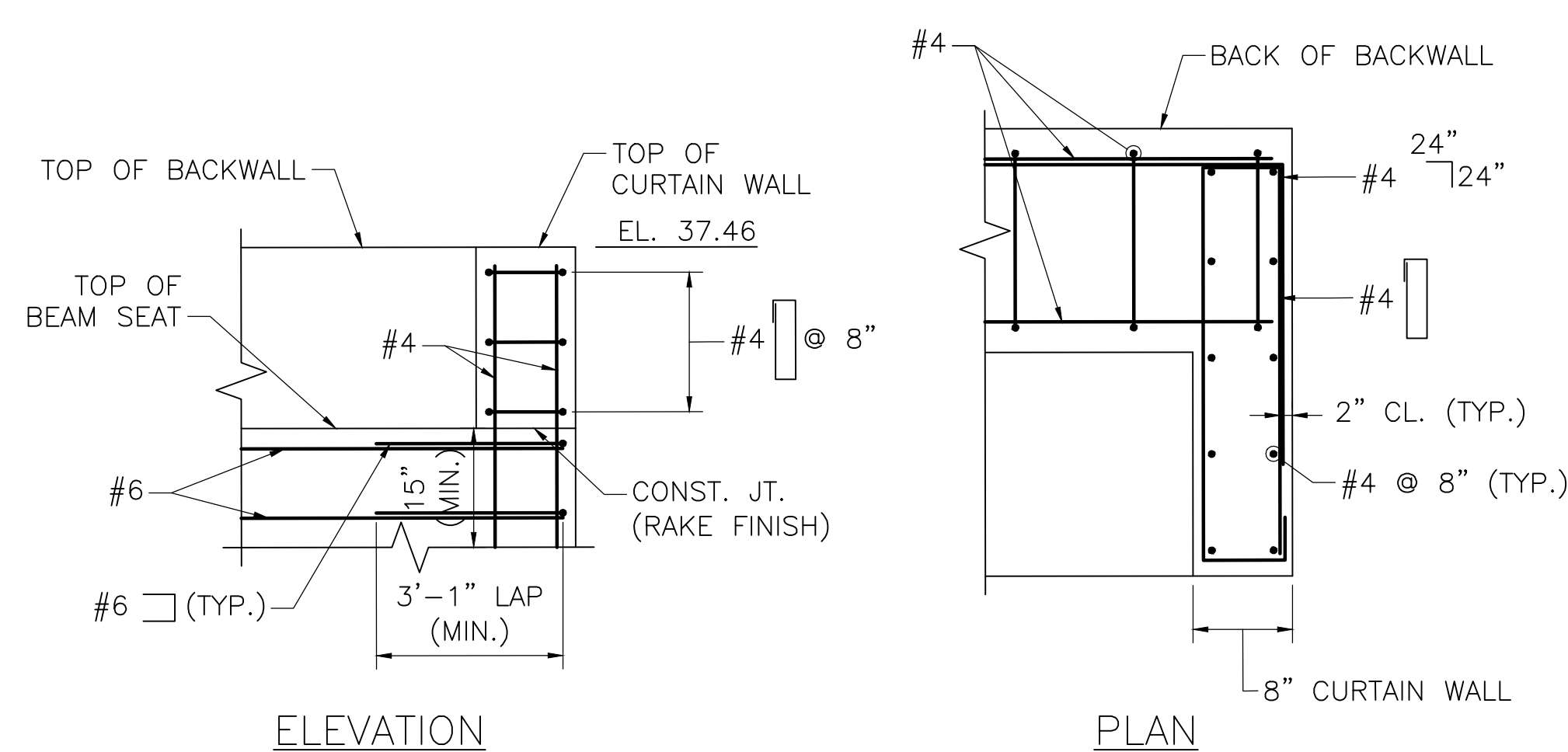
**UPPER ABUTMENT SECTION**

SCALE: 1" = 1'



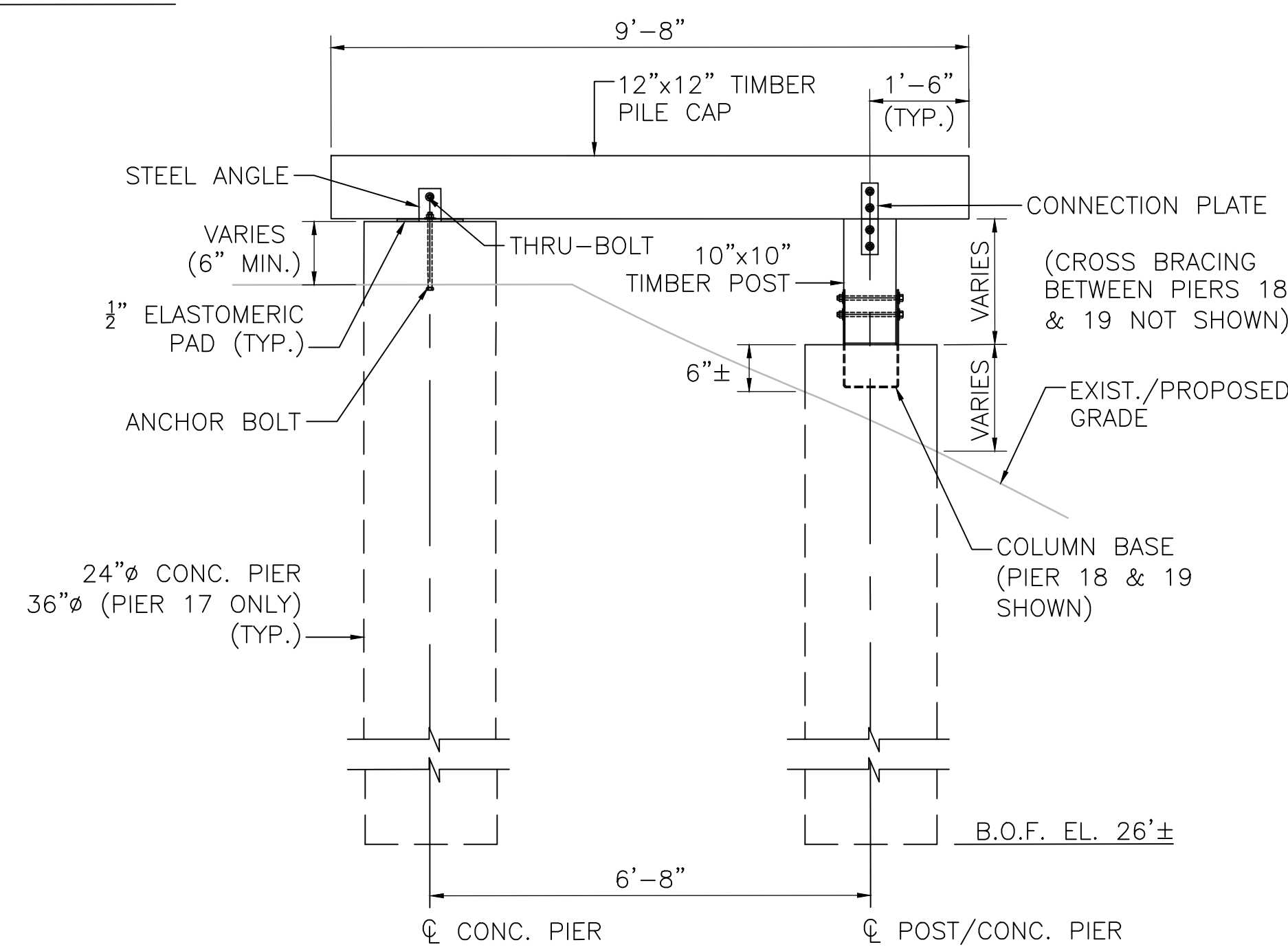
**LOWER ABUTMENT SECTION**

SCALE: 1" = 1'



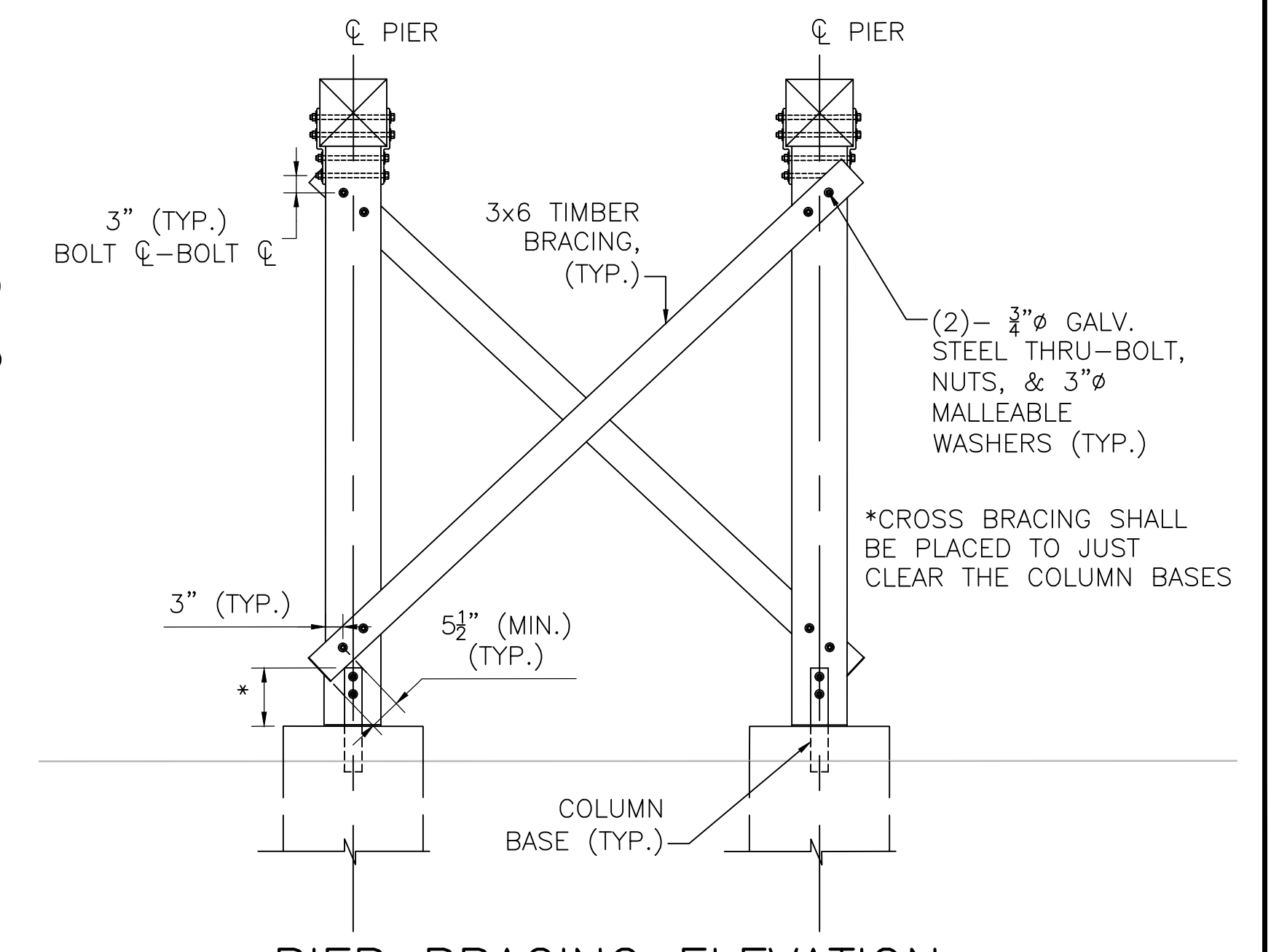
**CURTAIN WALL DETAILS**

SCALE: 1" = 1'



**ELEVATION - PIER 17, 18, & 19**

(EAST ELEVATION)  
SCALE: 1/2" = 1'



**PIER BRACING ELEVATION  
TYPICAL BETWEEN PIER 2 & 3, PIER 12  
& 13, AND PIER 18 & 19**

SCALE: 1/2" = 1'

**NOTES:**

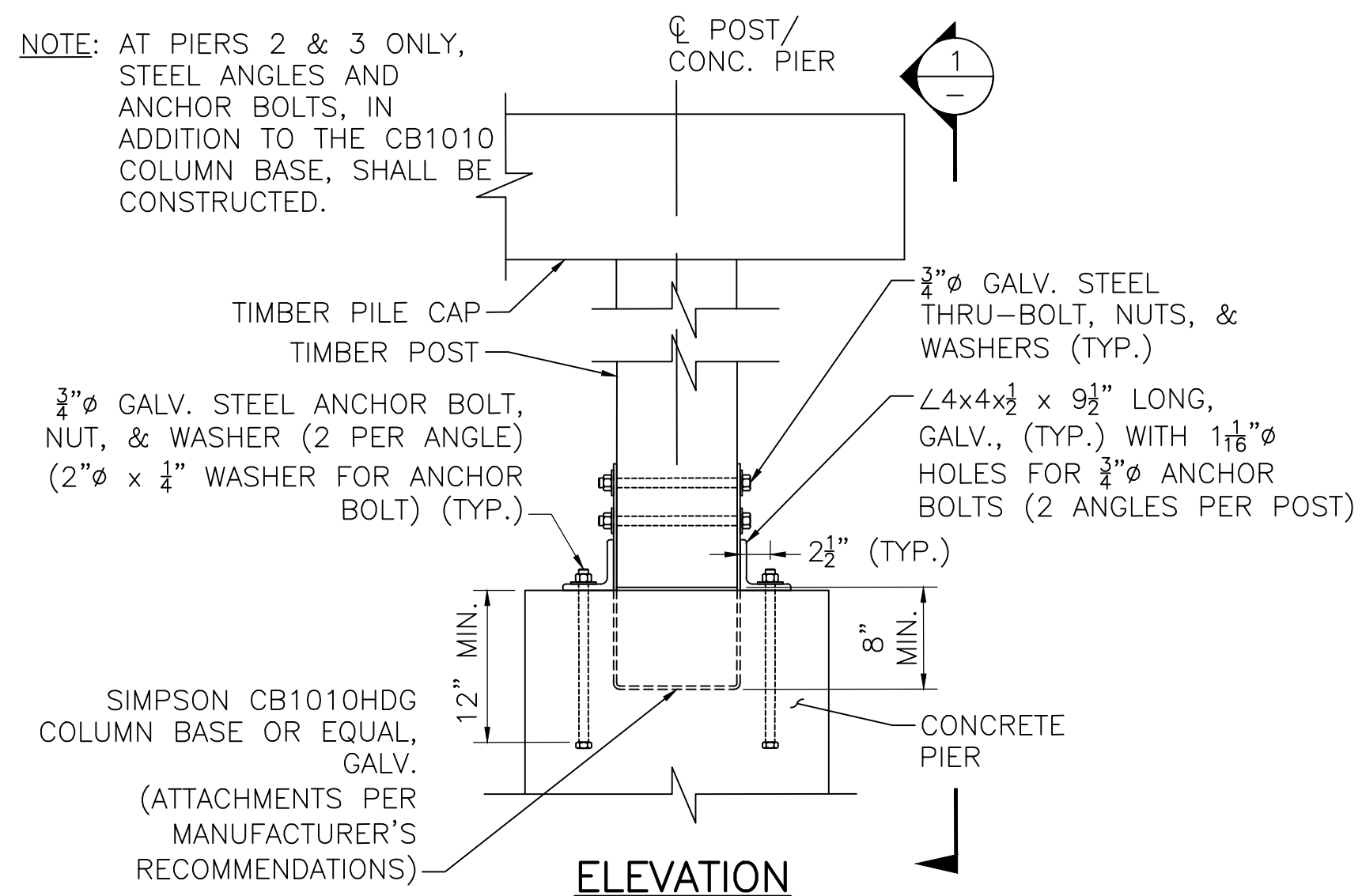
1. FOR CONNECTION DETAILS, SEE "LINDEN ACCESS RAMP PIER CONNECTION DETAILS" SHEET.
2. FOR CAISSON DETAILS, SEE "LINDEN ACCESS RAMP FOUNDATION PLAN" SHEET.
3. FOR MORE INFORMATION, SEE "BRIDGE GENERAL NOTES" SHEET.

**WALTHAM  
WAYSIDE TRAIL**

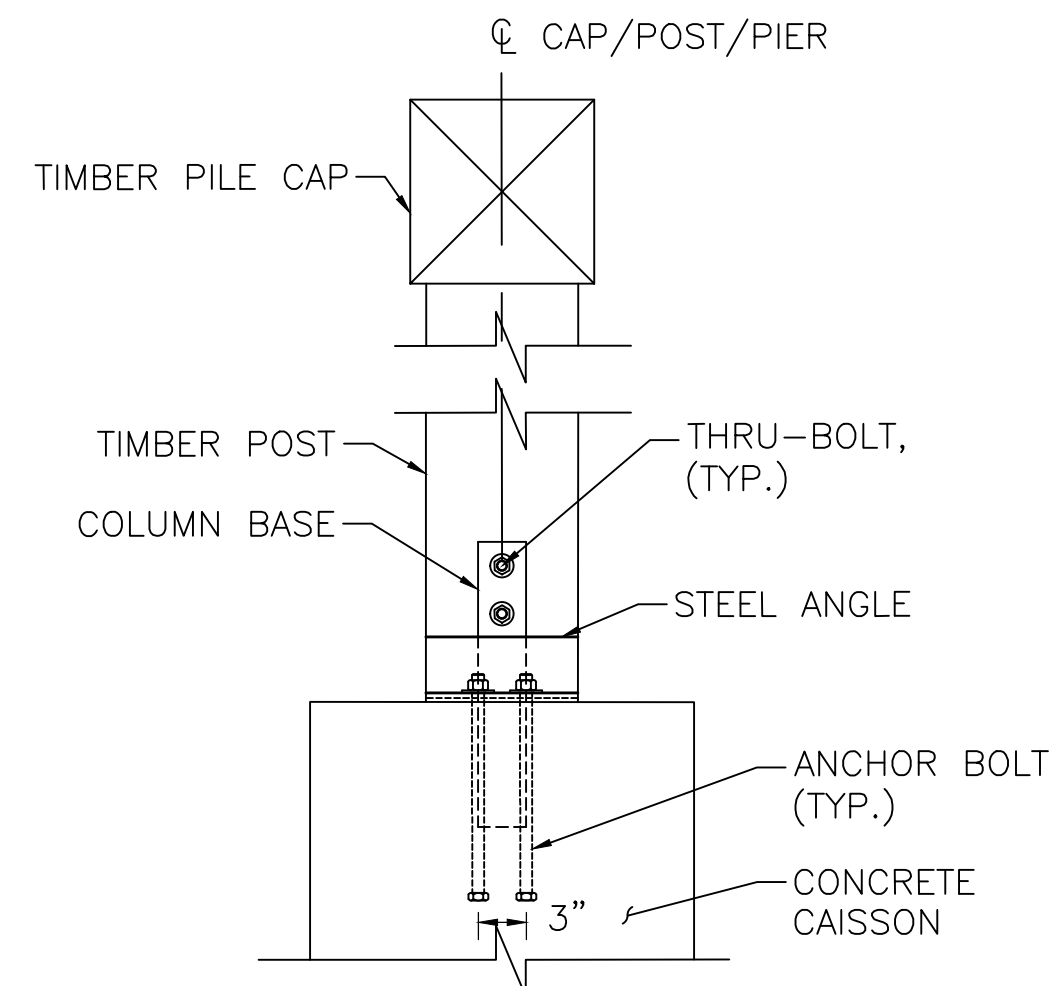
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	77	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 16  
LINDEN ACCESS RAMP PIER  
CONNECTION DETAILS**

NOTE: AT PIERS 2 & 3 ONLY, STEEL ANGLES AND ANCHOR BOLTS, IN ADDITION TO THE CB1010 COLUMN BASE, SHALL BE CONSTRUCTED.



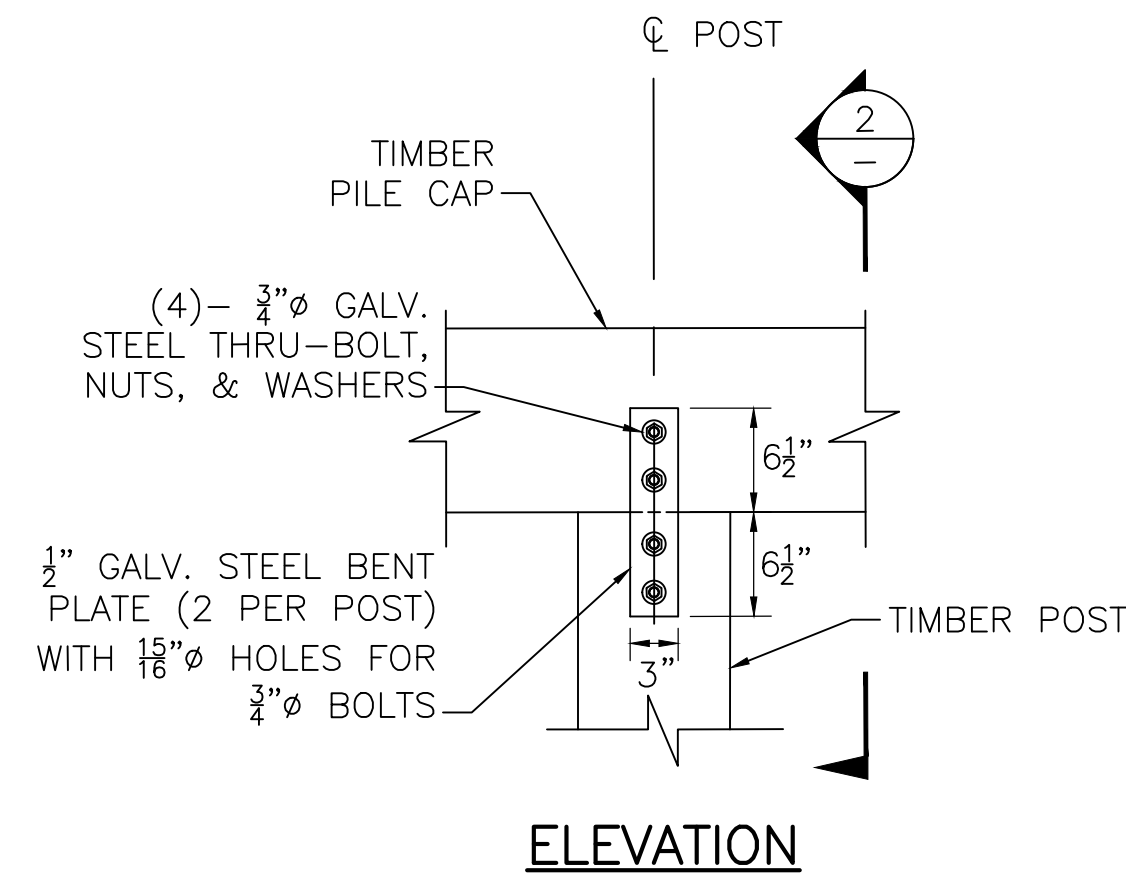
**ELEVATION**



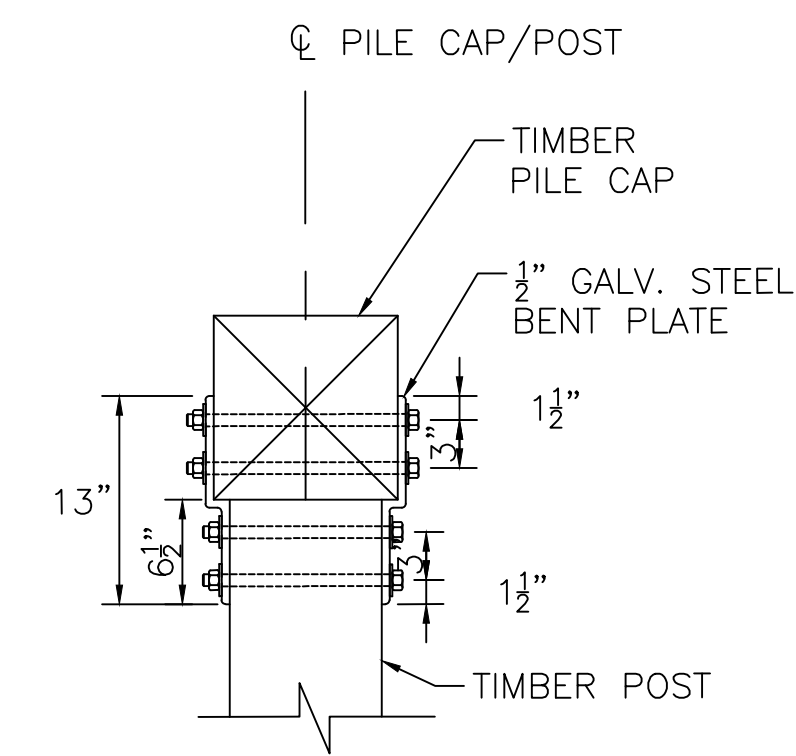
**SECTION 1**

**TIMBER POST TO CONCRETE CAISSON  
CONNECTION DETAIL 1**

(USE AT PIERS 2, 3, 12, 13, 18, & 19)  
SCALE: 1" = 1'



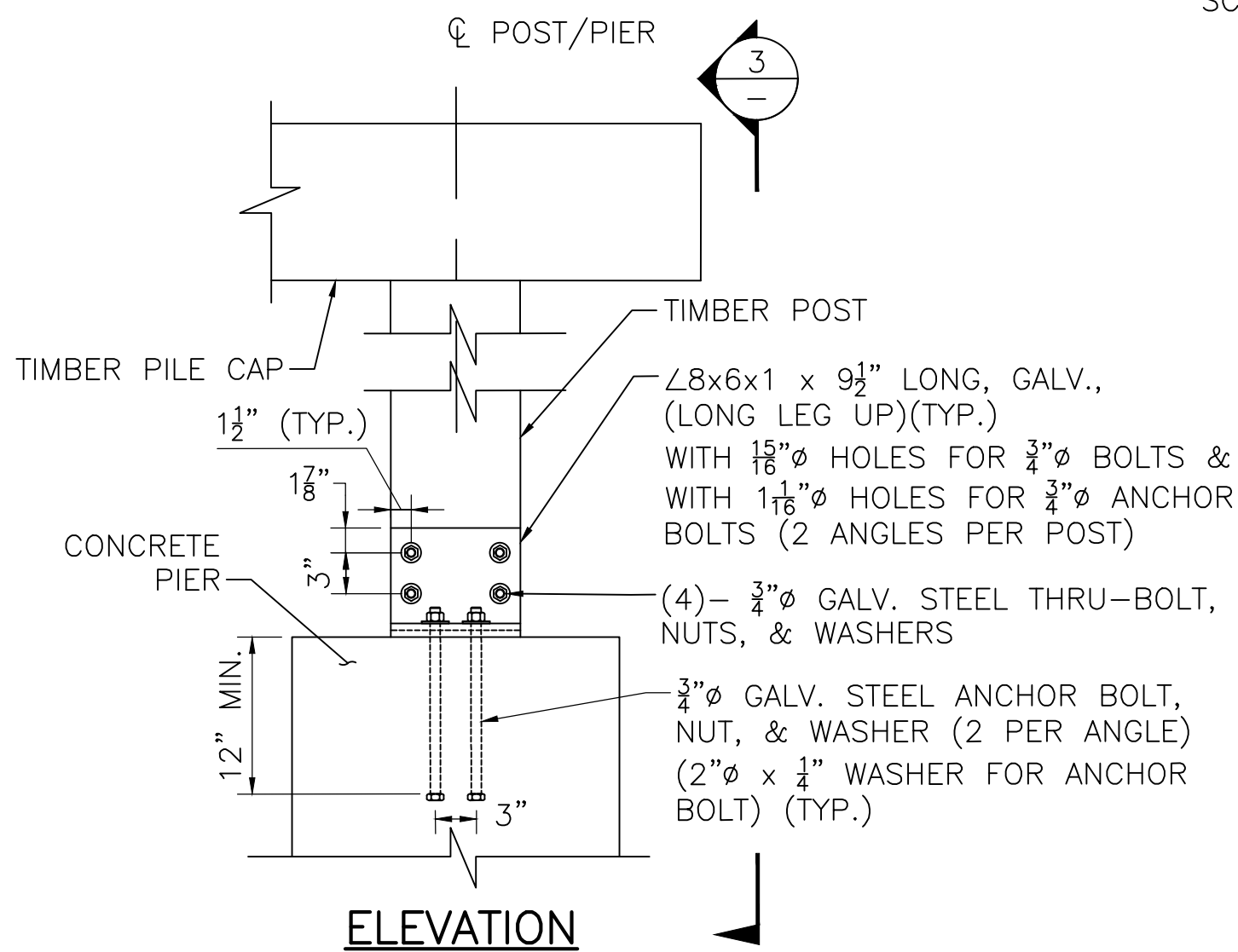
**ELEVATION**



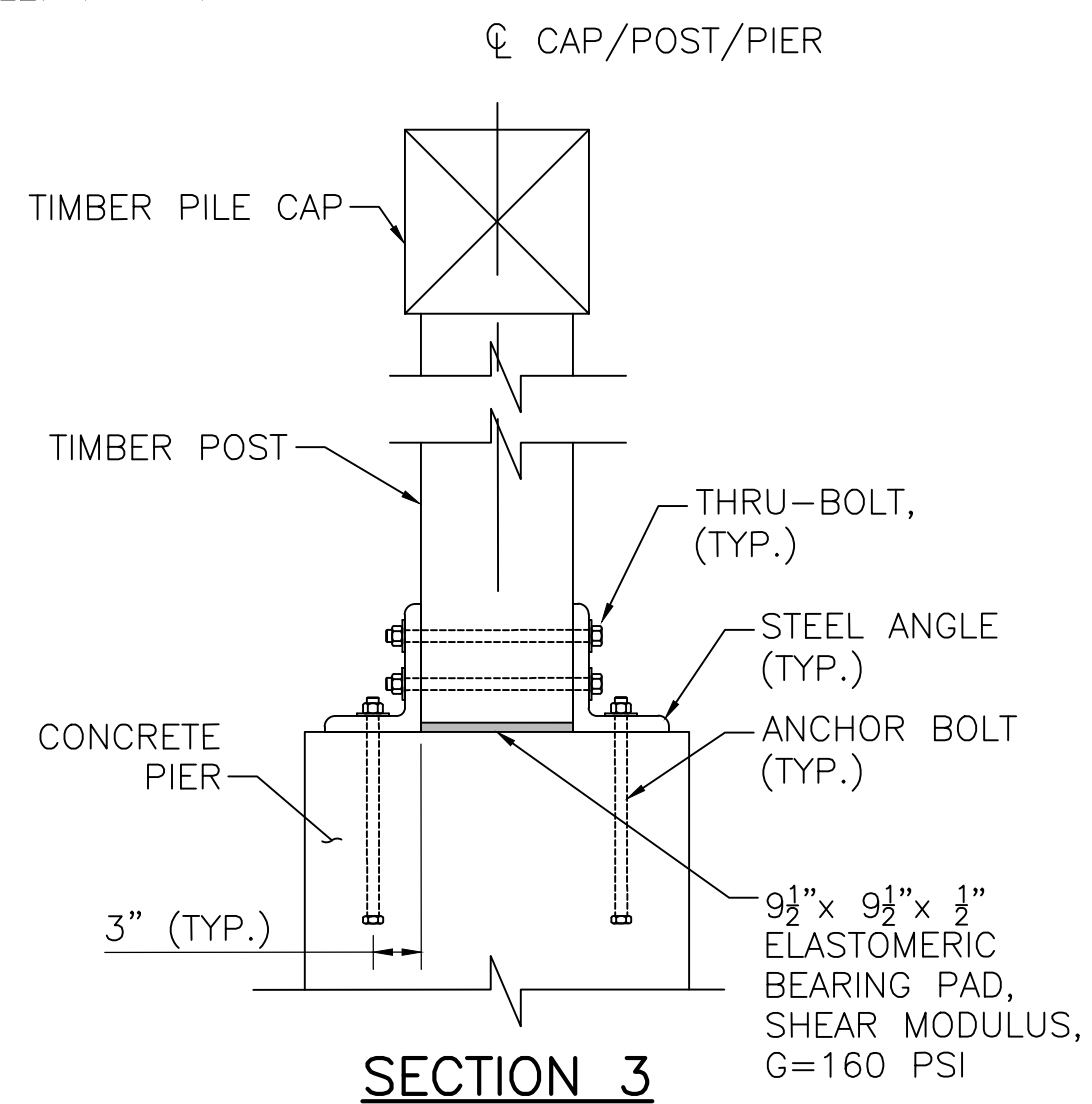
**SECTION 2**

**TIMBER PILE CAP TO POST CONNECTION DETAIL**

SCALE: 1" = 1'



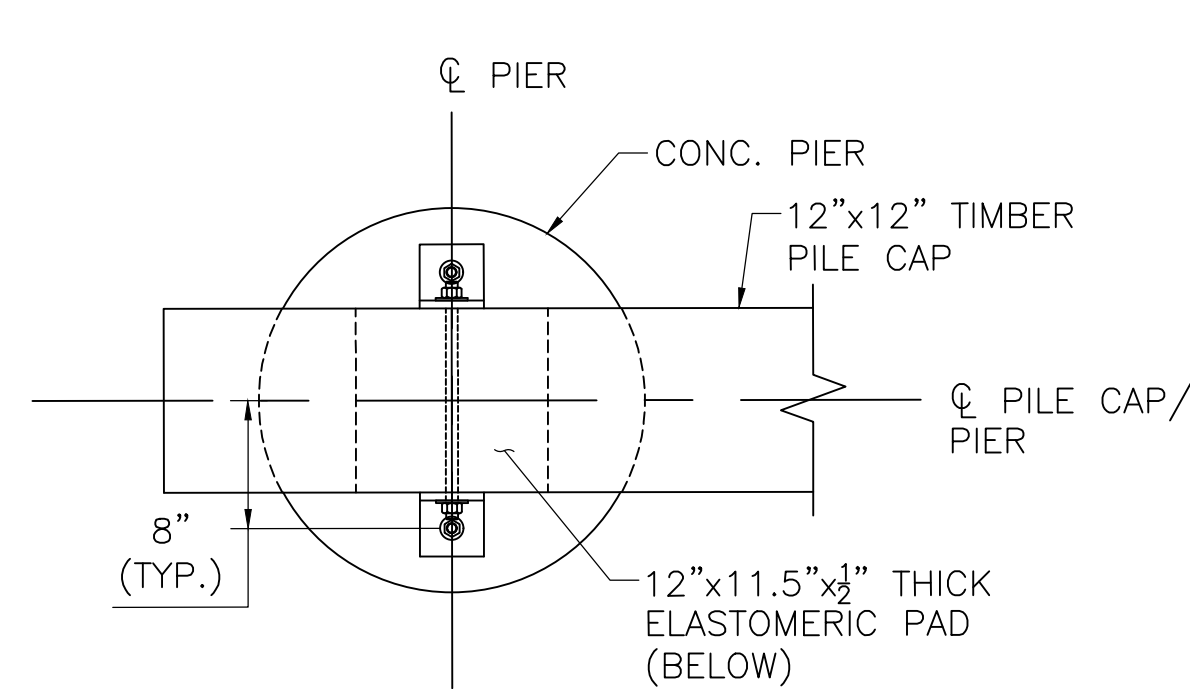
**ELEVATION**



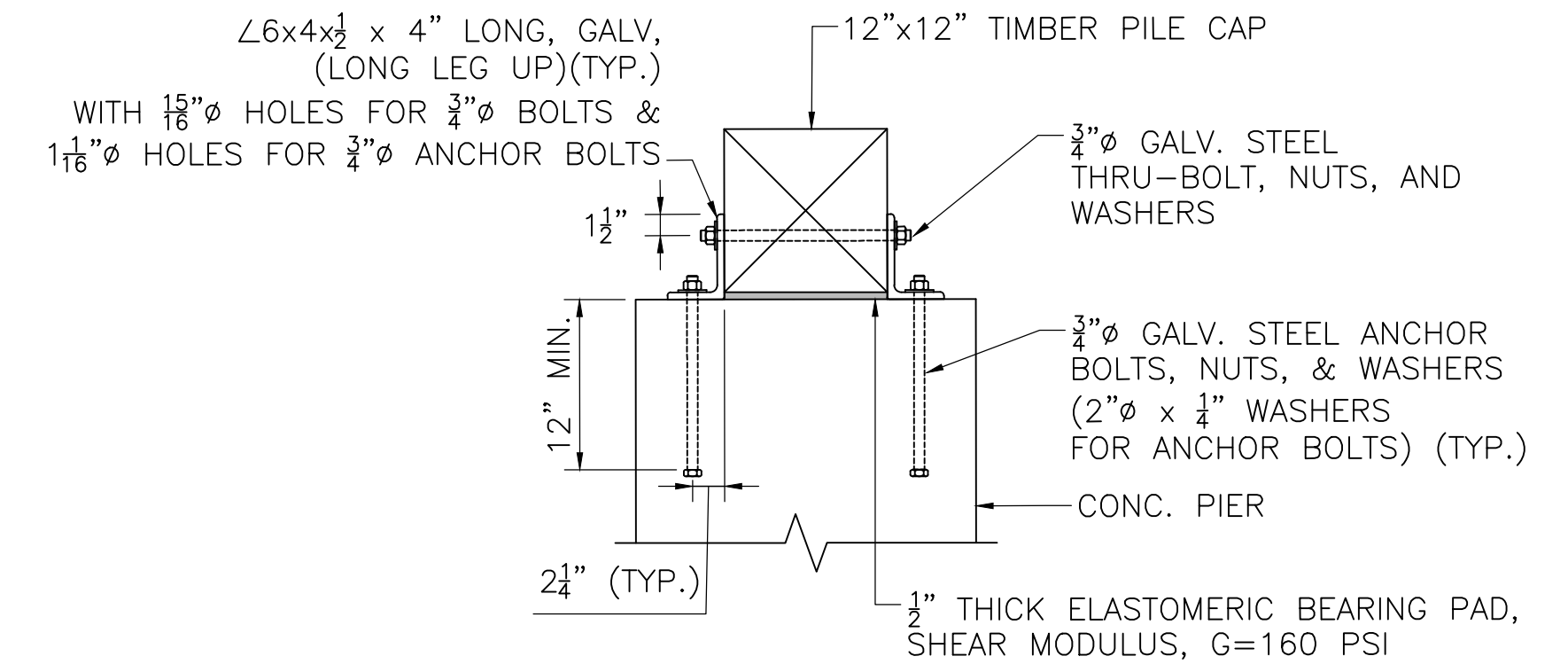
**SECTION 3**

**TIMBER POST TO CONCRETE CAISSON  
CONNECTION DETAIL 2**

(USE AT PIERS 11, 15, & 16)  
SCALE: 1" = 1'



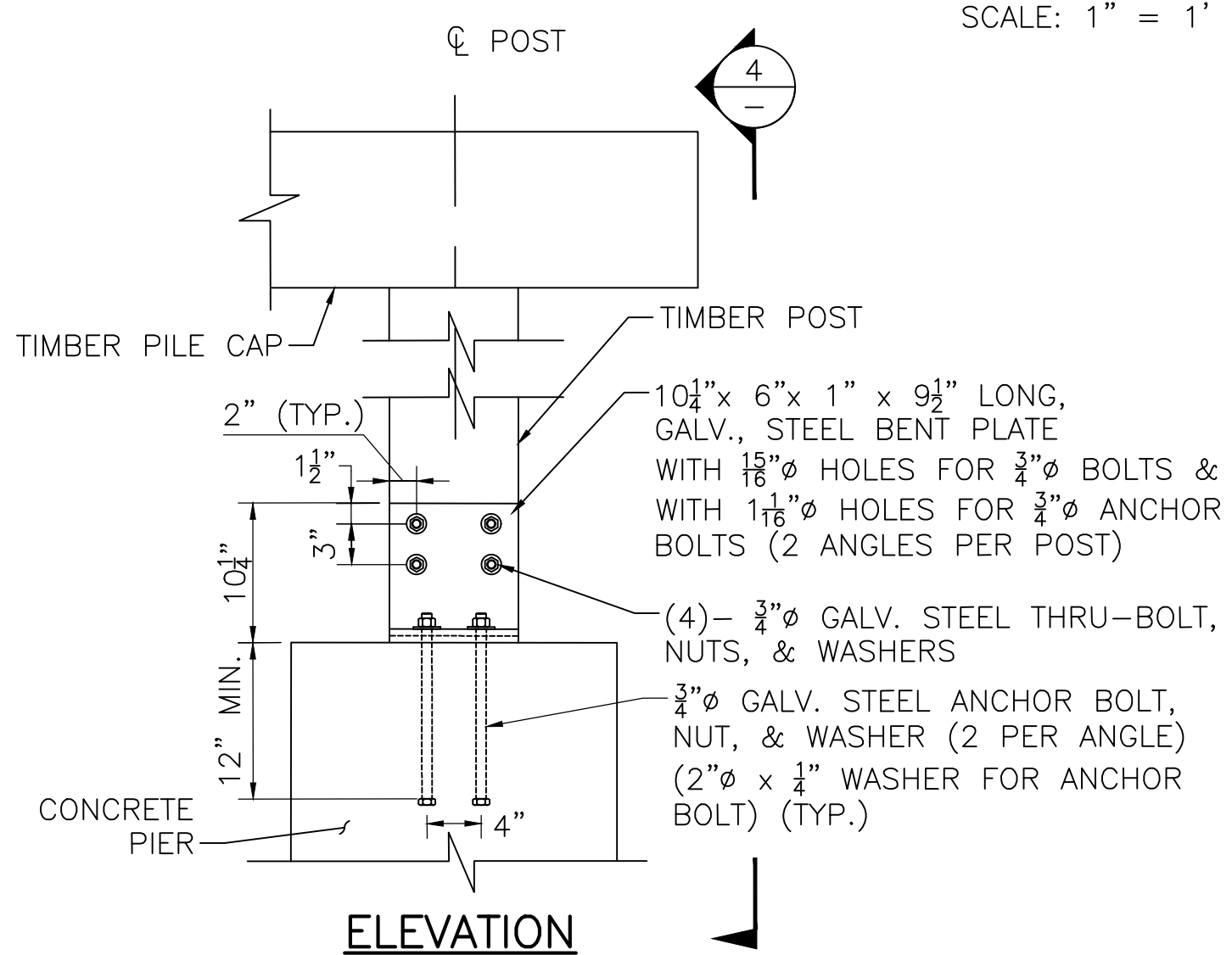
**PLAN**



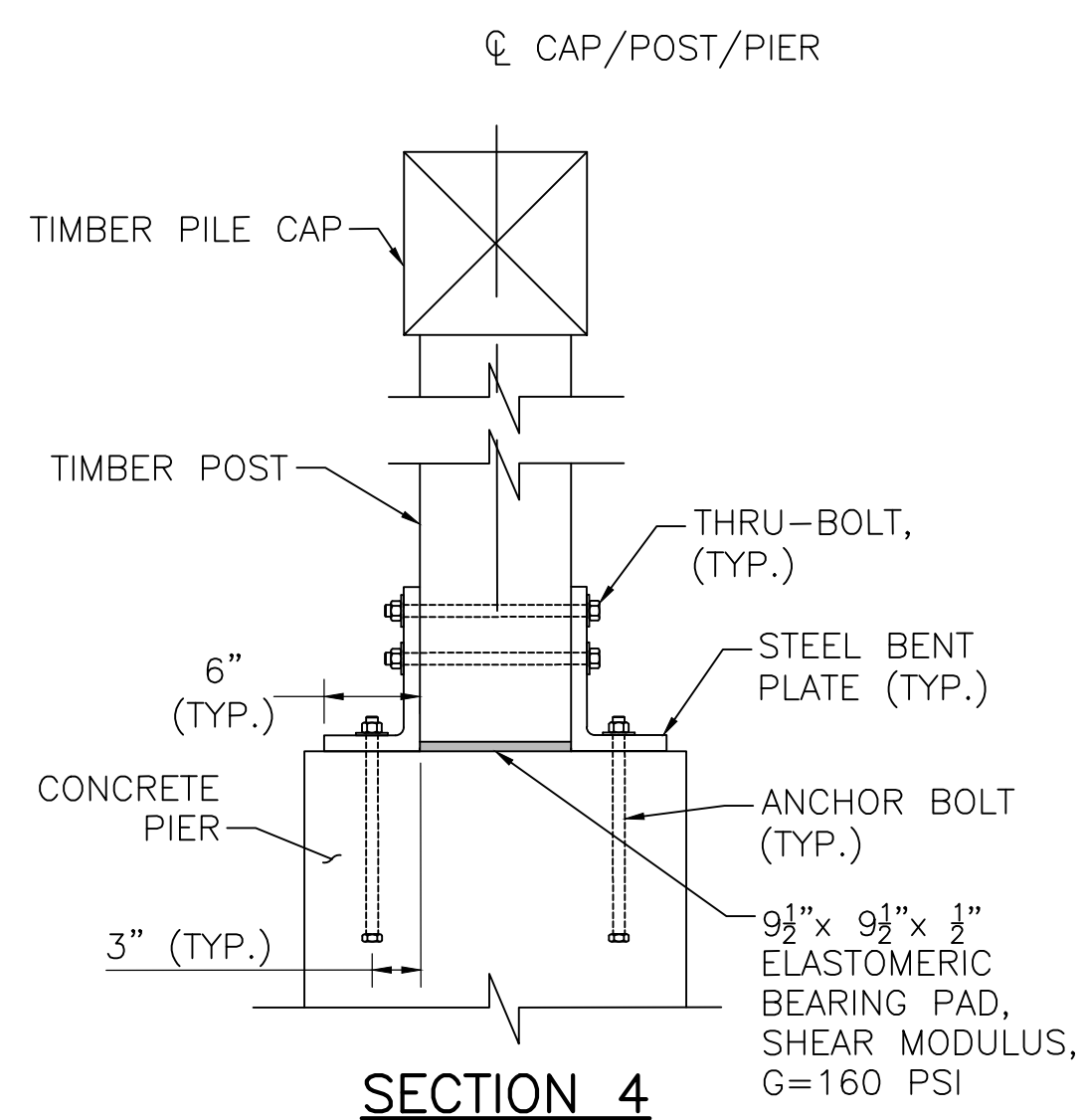
**SECTION**

**PILE CAP TO 24"Ø CONC. PIER CONNECTION DETAILS**

SCALE: (USE AT PIERS 4, 5, 6, 7, 8, & 9)  
SCALE: 1" = 1'



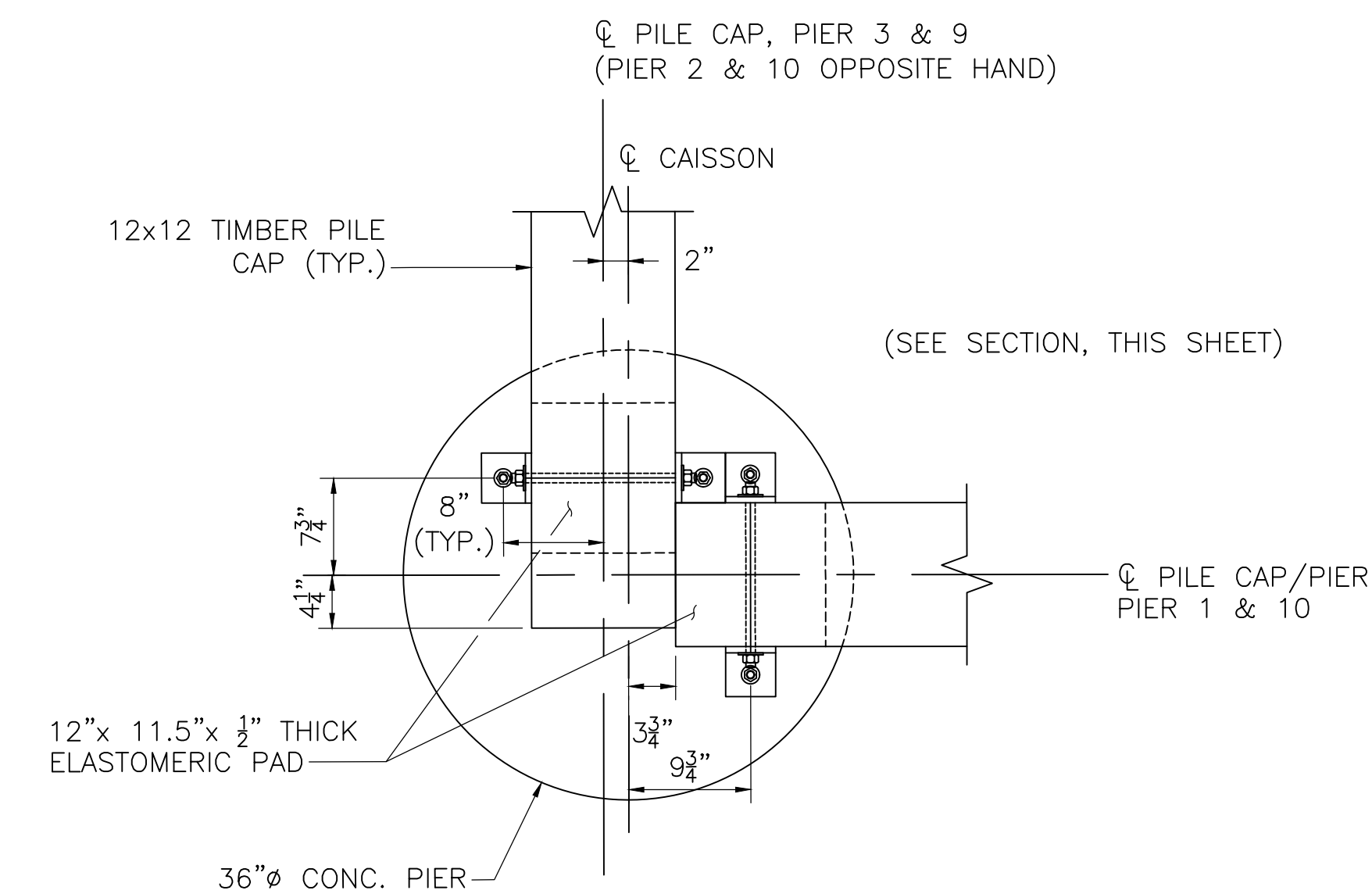
**ELEVATION**



**SECTION 4**

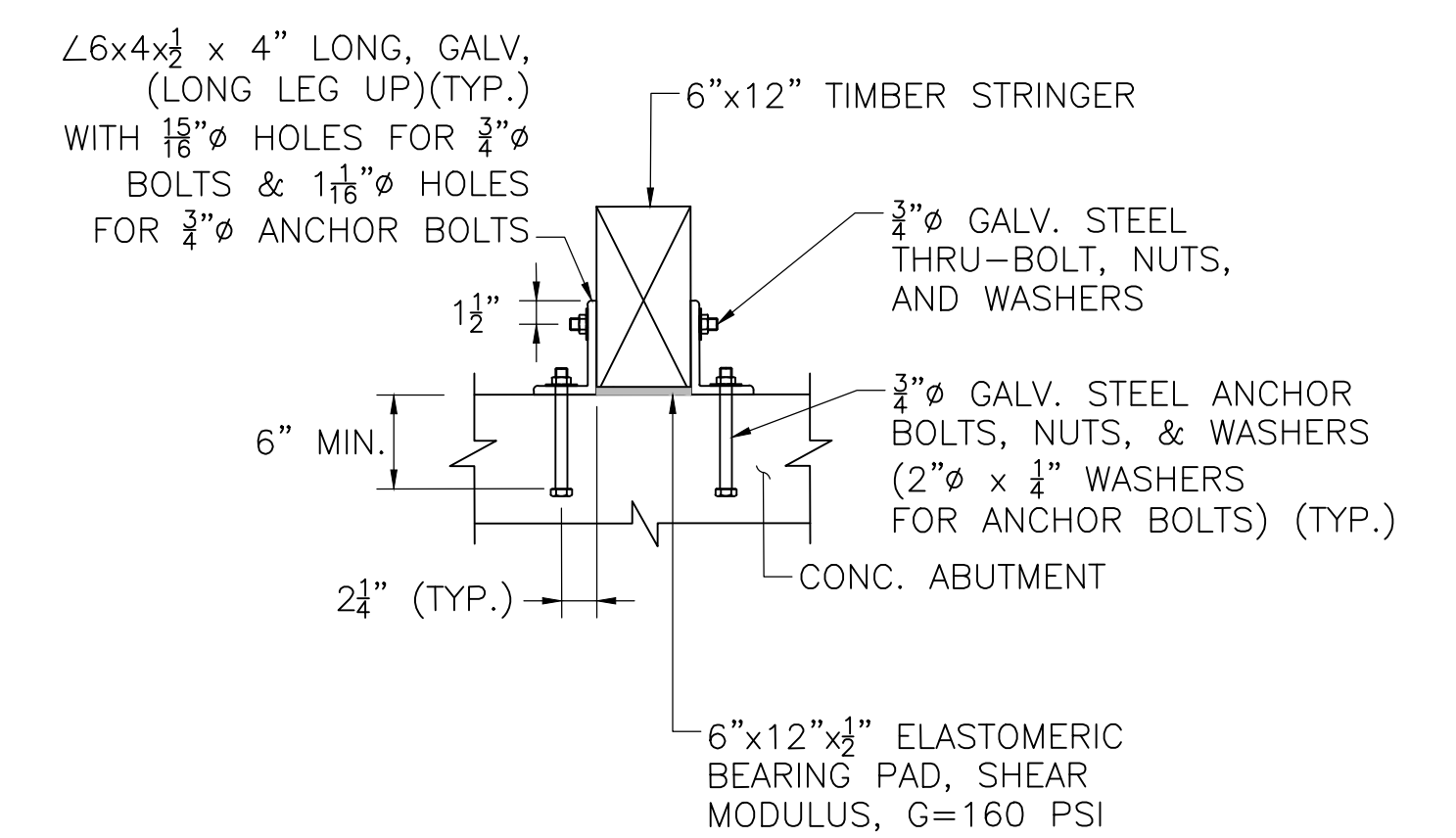
**TIMBER POST TO CONCRETE CAISSON  
CONNECTION DETAIL 3**

(USE AT PIERS 14 & 17)  
SCALE: 1" = 1'



**PILE CAP TO 36"Ø CONC. PIER CONNECTION DETAILS  
PIER 1 & 10**

SCALE: 1" = 1'



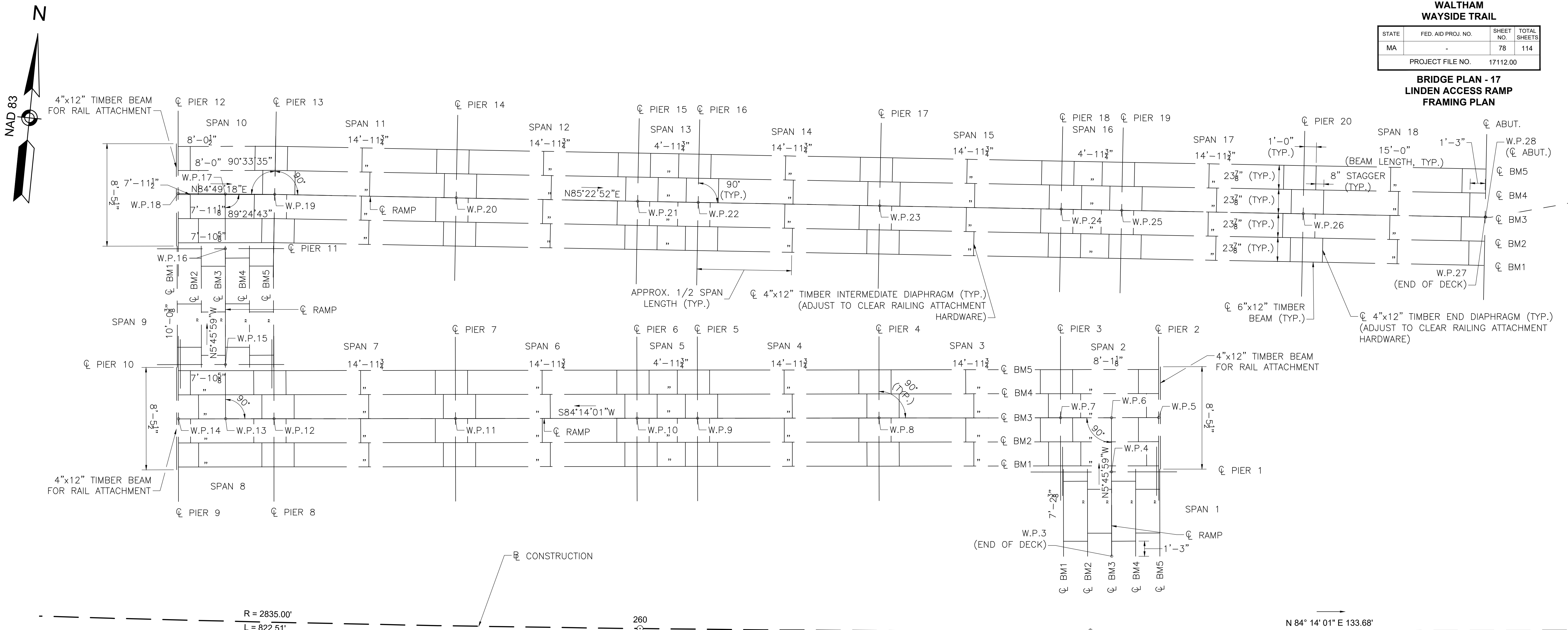
**TIMBER STRINGER TO  
ABUTMENT CONNECTION DETAIL**

SCALE: 1" = 1'

**WALTHAM  
WAYSIDE TRAIL**

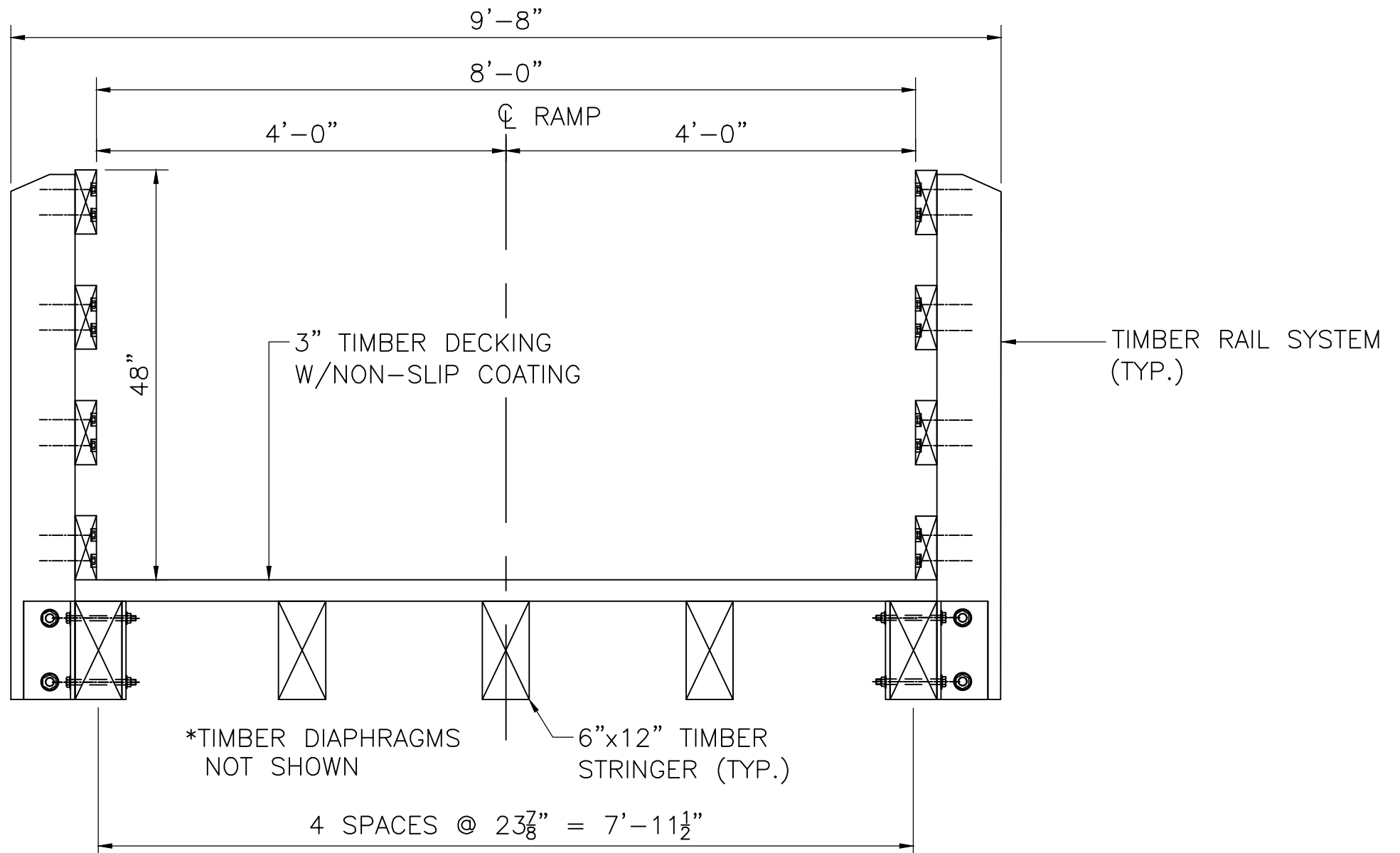
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	78	114
PROJECT FILE NO.		17112.00	

**BRIDGE PLAN - 17  
LINDEN ACCESS RAMP  
FRAMING PLAN**



**TIMBER ACCESS RAMP FRAMING PLAN**  
SCALE: 1/4" = 1'-0"

**EXISTING CONCRETE CULVERT - STA. 285+19**  
SCALE: 1/2" = 1'-0"



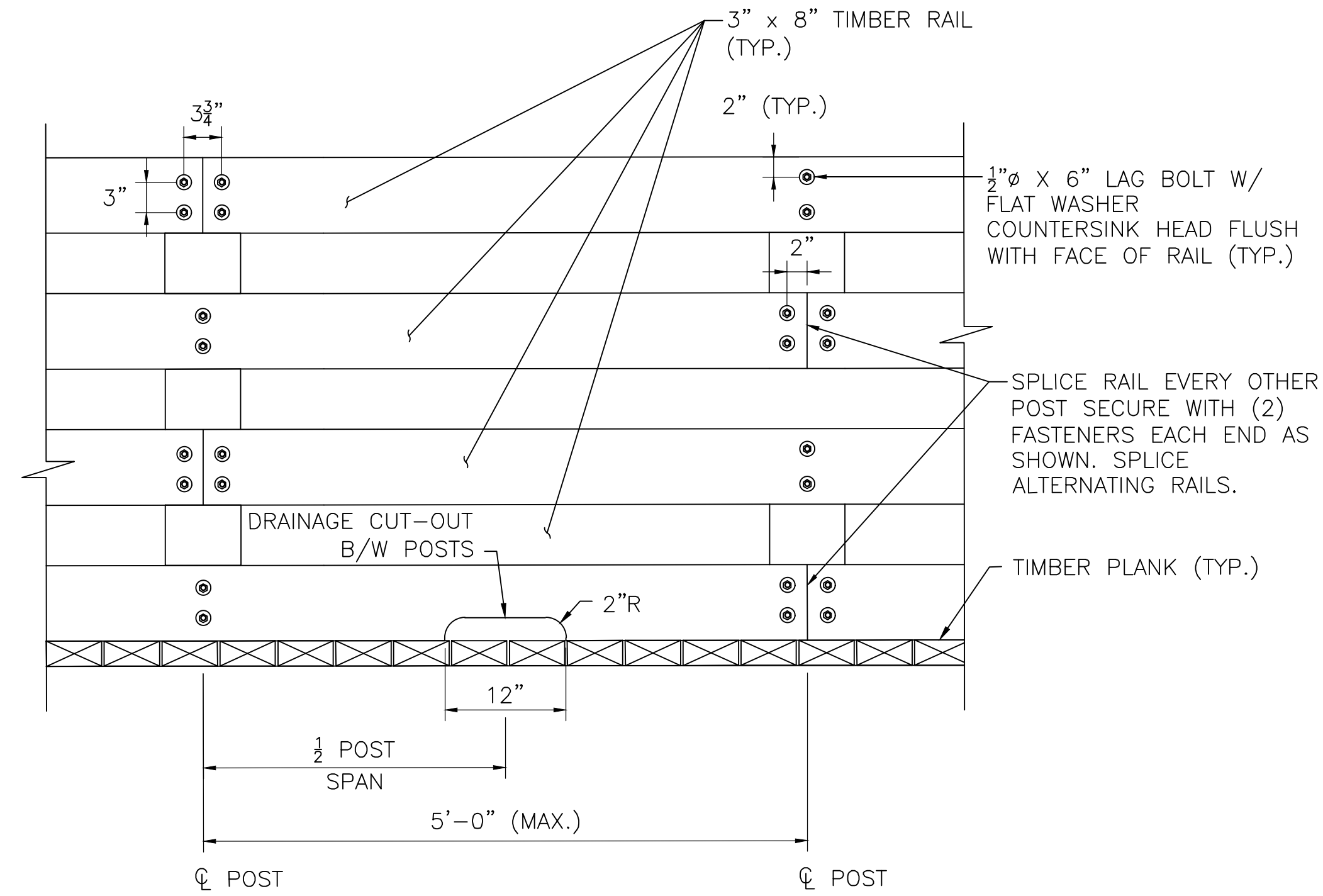
**TRANSVERSE SECTION**  
SCALE: 3/4" = 1'-0"

**NOTE:**  
1. SEE LINDEN ACCESS RAMP PLAN FOR WORKING POINT INFORMATION.

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	79	114
PROJECT FILE NO.		17112.00	

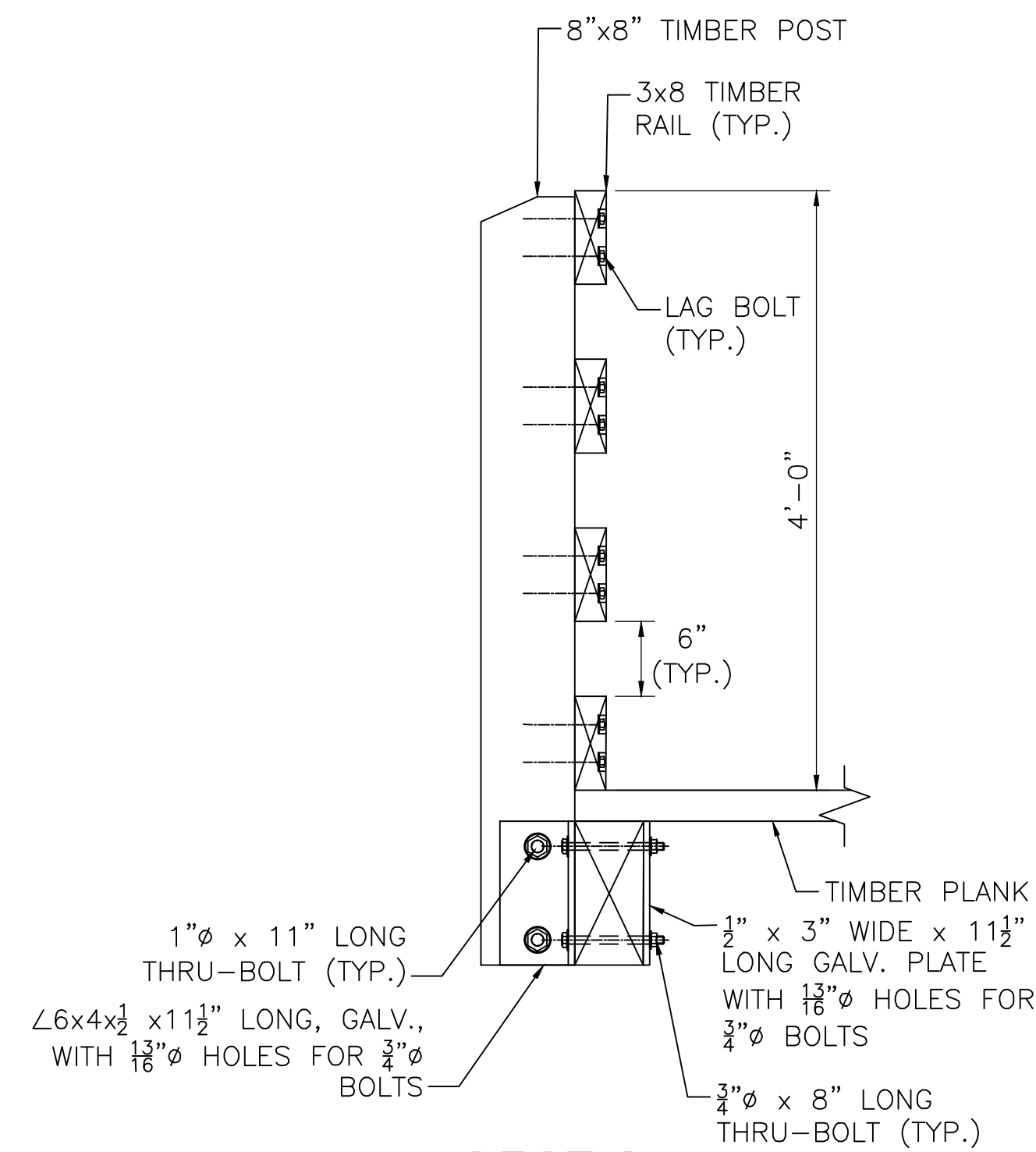
**BRIDGE PLAN - 18  
LINDEN ACCESS RAMP  
SUPERSTRUCTURE CONNECTION  
& RAIL DETAILS**



**ELEVATION**

**TIMBER RAIL DETAIL**

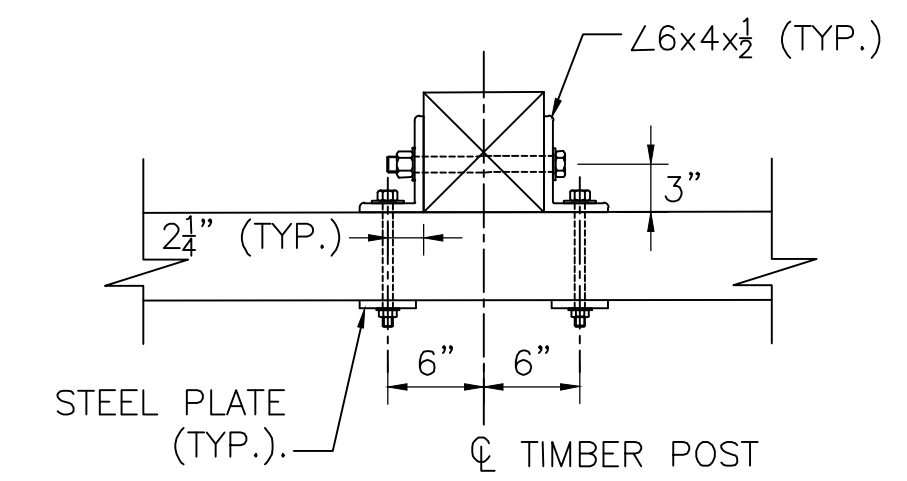
SCALE: 1" = 1'



**SECTION**

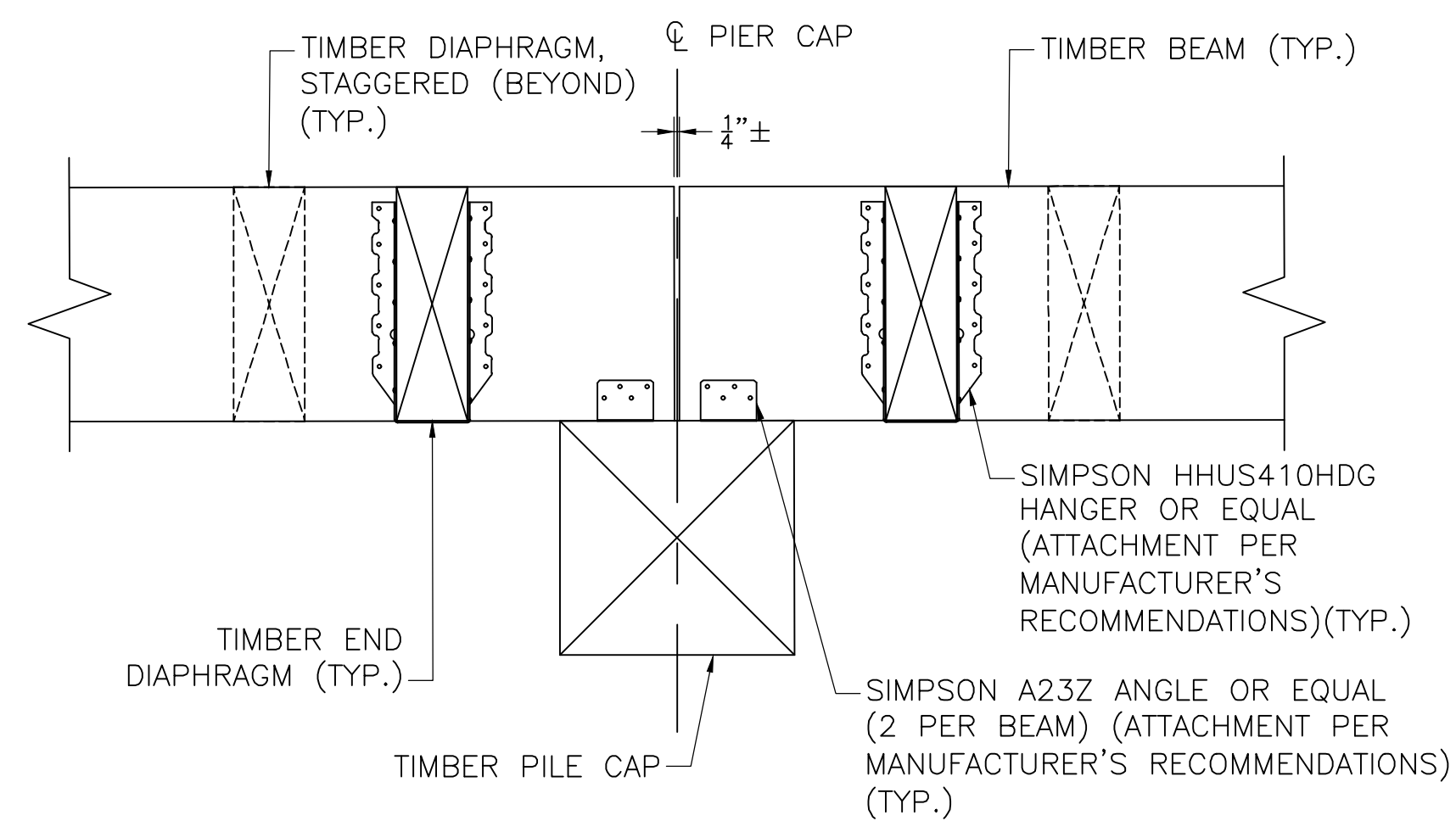
**TIMBER RAIL DETAIL**

SCALE: 1" = 1'



**POST ATTACHMENT DETAIL**

SCALE: 1" = 1'

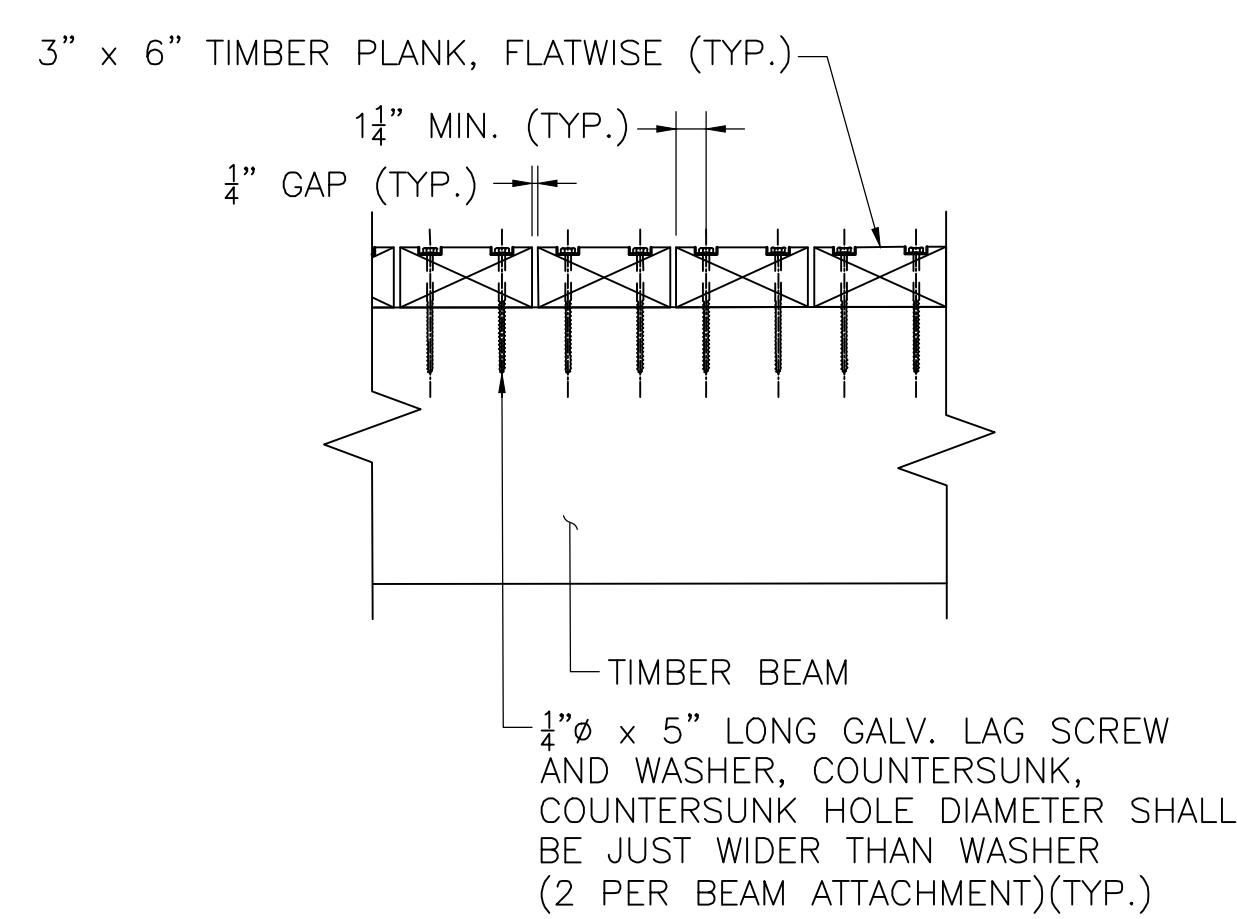


**TIMBER BEAM TO TIMBER PILE CAP  
CONNECTION DETAIL**

SCALE: 1-1/2" = 1'-0"

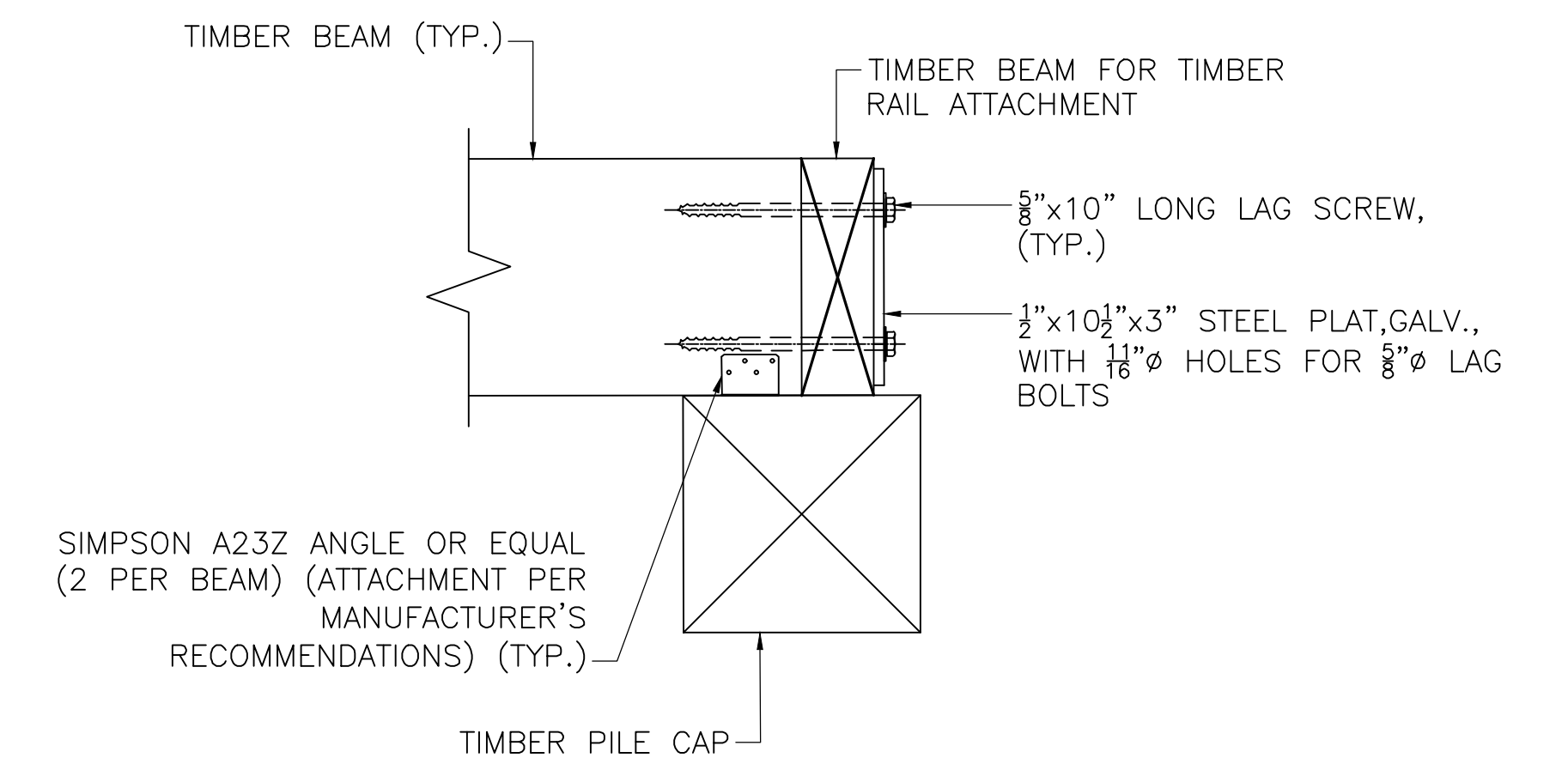
**NOTE:**

1. BOTTOM OF TIMBER BEAMS TO SIT FLUSH WITH PILE CAP. WHERE BEAMS ARE SLOPED, NO CUTTING OF THE PILE CAP WILL BE ALLOWED. ELASTOMERIC PADS OR PROPERLY PRESSURE TREATED BLOCKING MAY BE USED AS SHIMS IF NECESSARY.



**TIMBER DECK PLANK  
CONNECTION DETAIL**

SCALE: 1-1/2" = 1'-0"



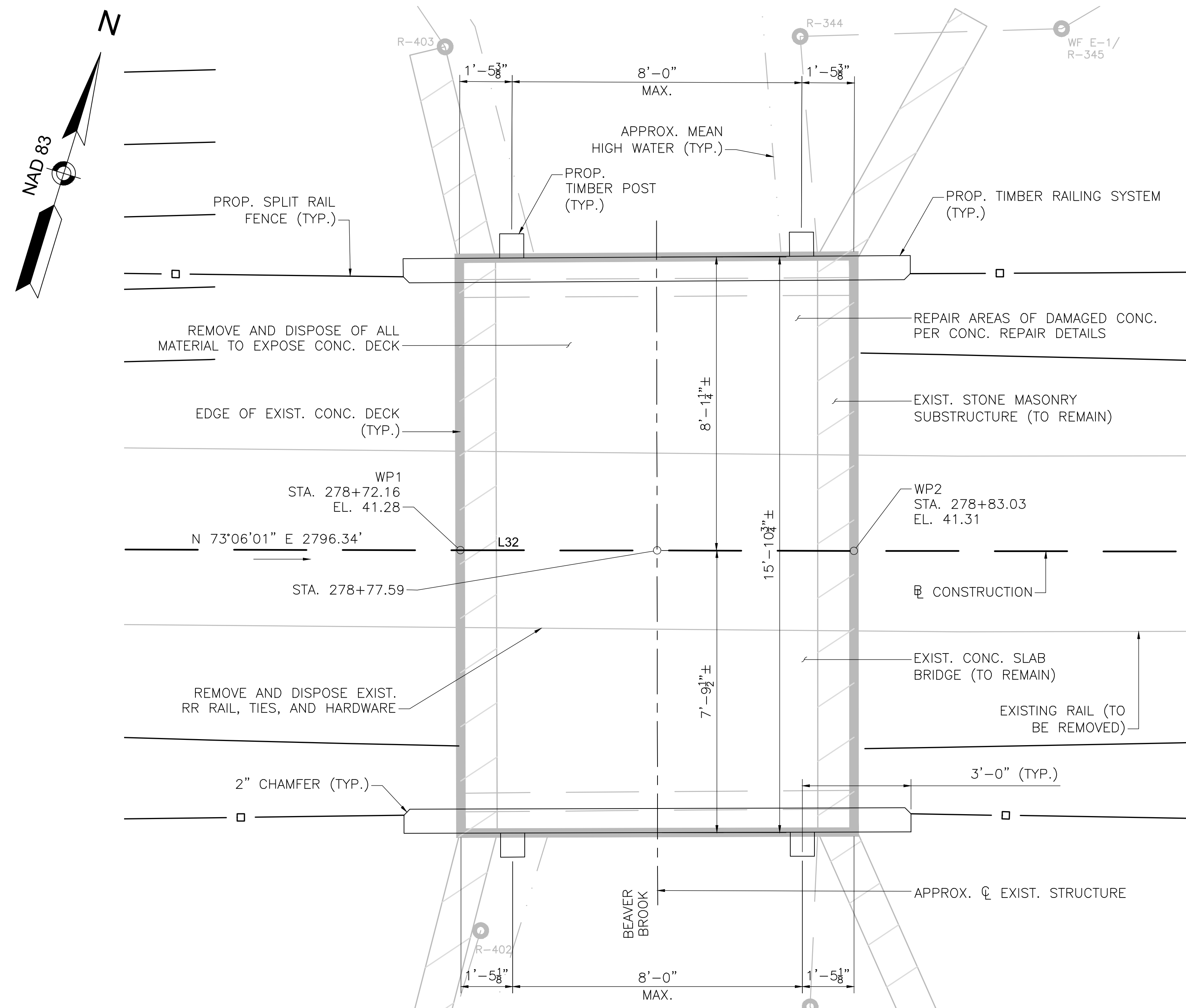
**TIMBER BEAM TO TIMBER PILE CAP CONNECTION  
DETAIL @ PIER 2, PIER 9, & PIER 12**

SCALE: 1-1/2" = 1'-0"

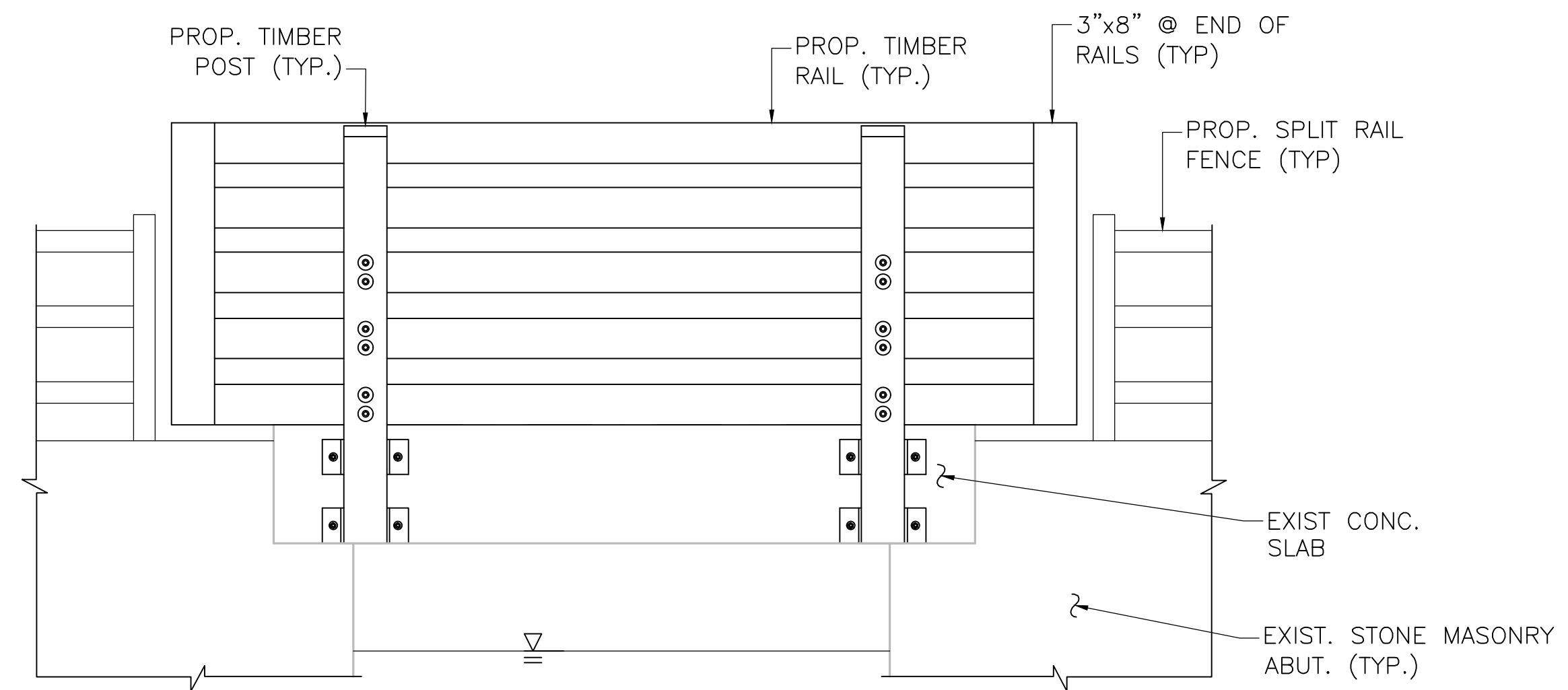
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	80	114
PROJECT FILE NO.		17112.00	

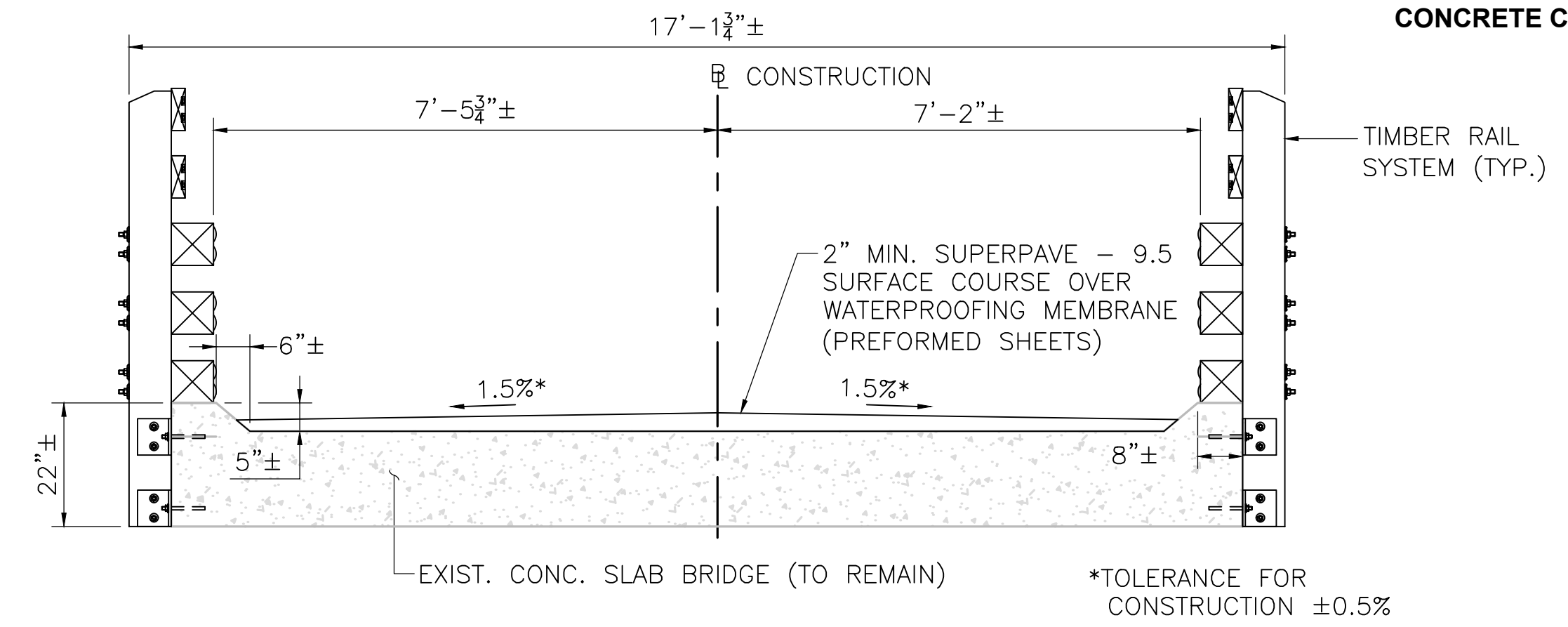
**CULVERT PLAN - 1  
BRIDGE NO. 8.92  
CONCRETE CULVERT STA. 278+77**



**PLAN  
EXISTING CONCRETE CULVERT  
STA. 278+77**  
SCALE: 1/2"=1'-0"



**ELEVATION  
EXISTING CONCRETE CULVERT - STA. 278+77**  
SCALE: 1/2"=1'-0"



**TYPICAL SECTION  
EXISTING CONCRETE CULVERT - STA. 278+77**  
SCALE: 1/2"=1'-0"

**NOTES:**

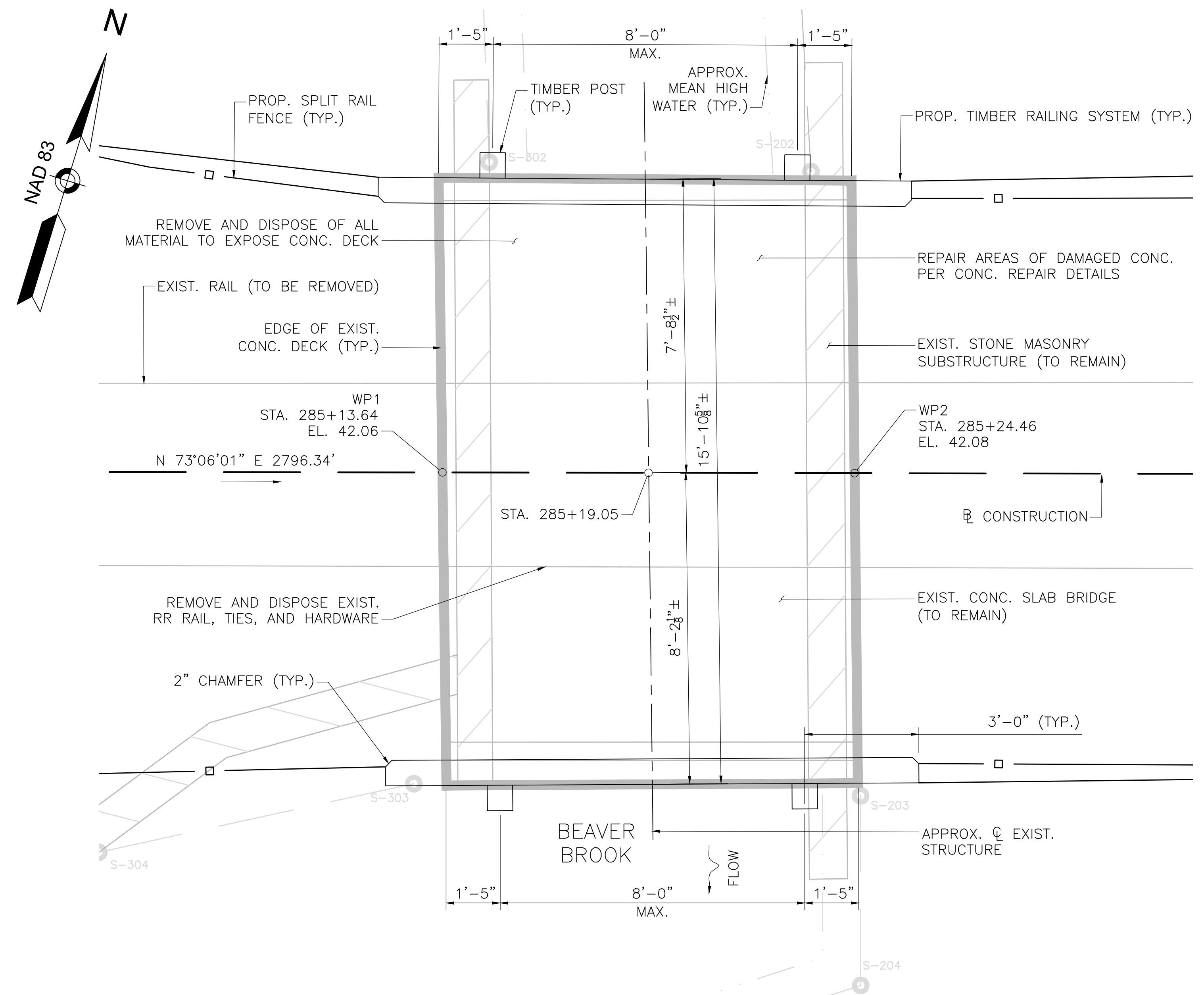
- BRIDGE GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY. FINAL LAYOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR BASED ON FIELD MEASUREMENTS.
- FOR TIMBER BRIDGE RAIL DETAILS, SEE "CONCRETE CULVERT DETAILS" SHEET.
- FOR MORE INFORMATION, SEE "BRIDGE GENERAL NOTES" SHEETS.



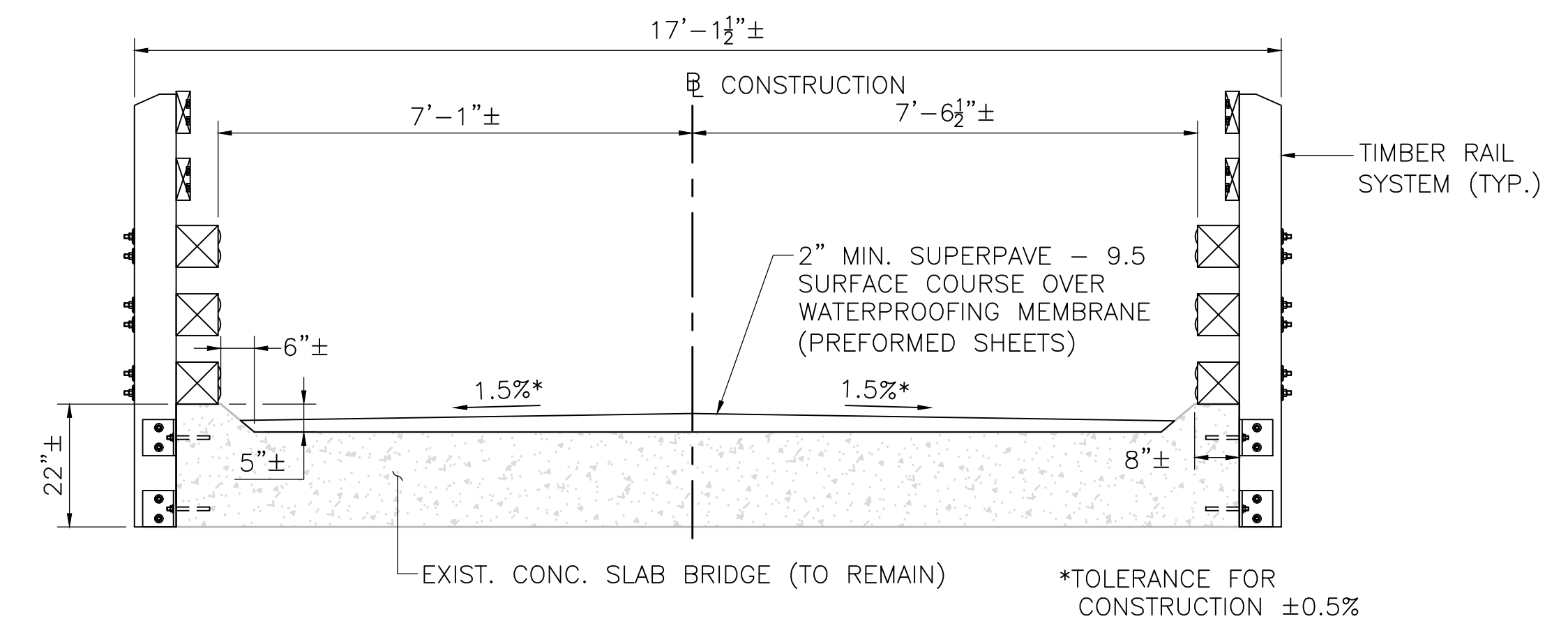
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	81	114
PROJECT FILE NO.		17112.00	

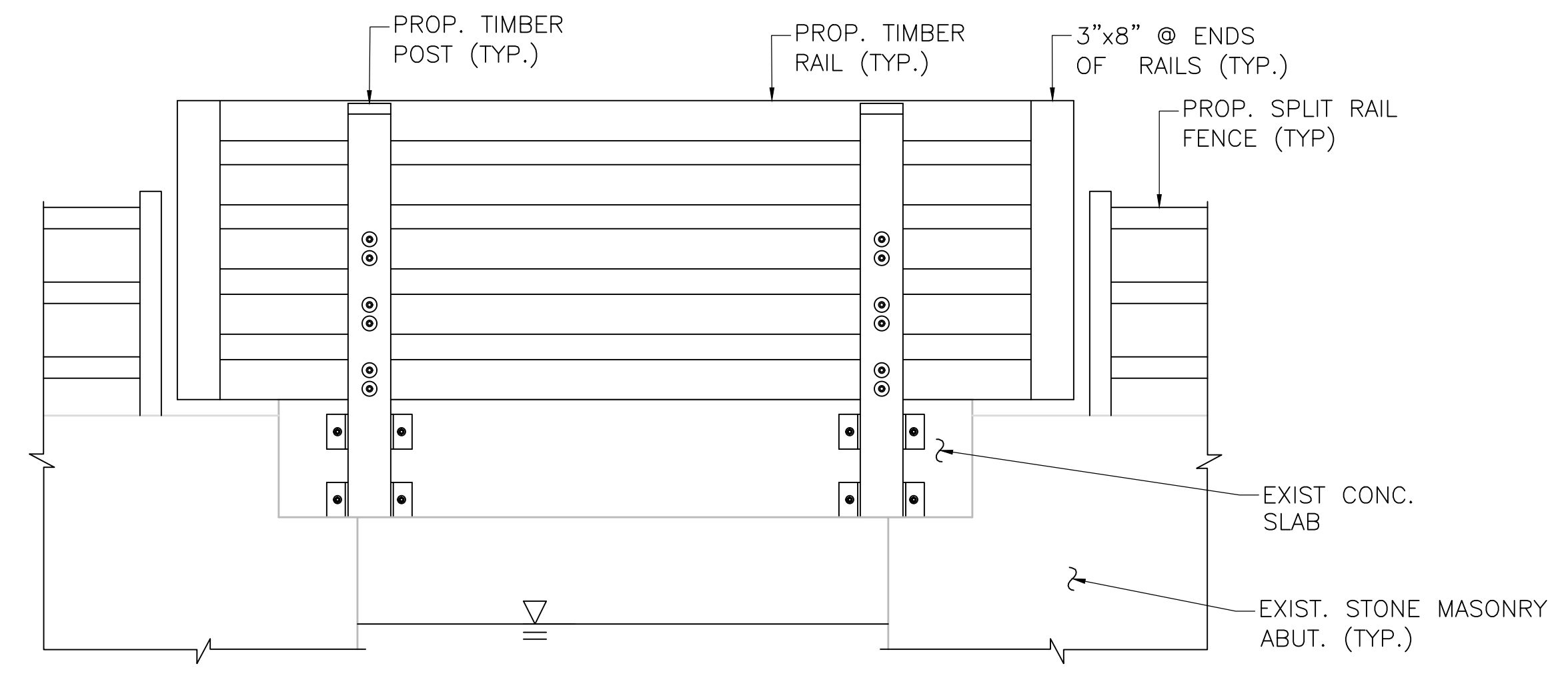
**CULVERT PLAN - 2  
BRIDGE No. 8.80  
CONCRETE CULVERT STA. 285+19**



**PLAN  
EXISTING CONCRETE CULVERT - STA. 285+19**  
SCALE: 1/2"=1'-0"



**TYPICAL SECTION  
EXISTING CONCRETE CULVERT - STA. 285+19**  
SCALE: 1/2"=1'-0"



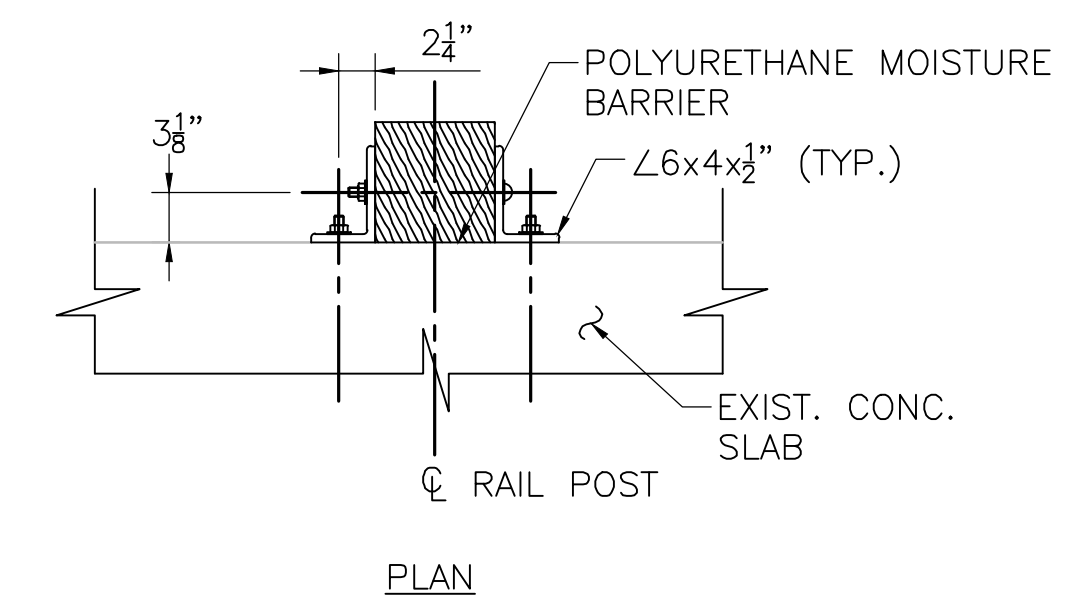
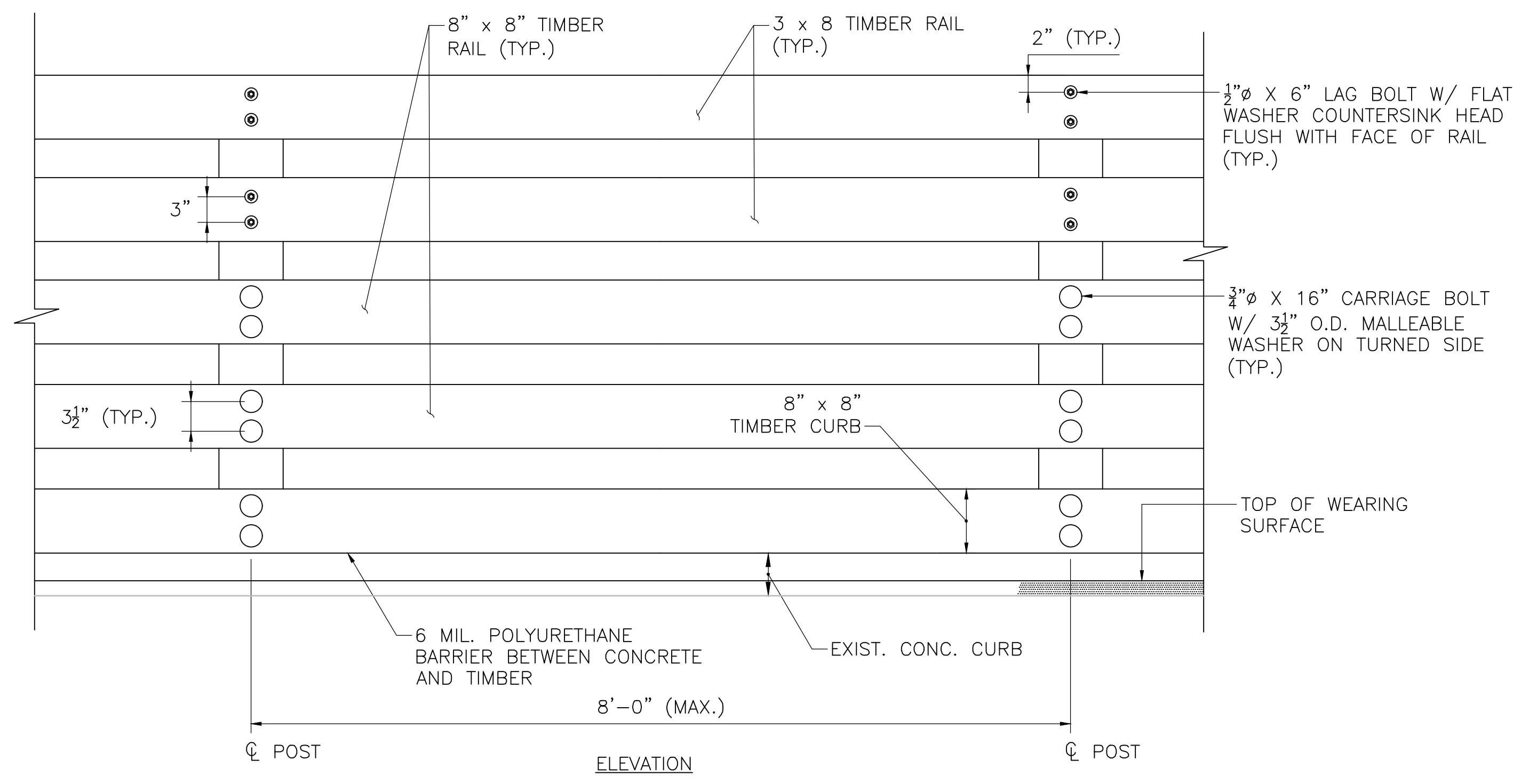
**ELEVATION  
EXISTING CONCRETE CULVERT - STA. 285+19**  
SCALE: 1/2"=1'-0"

- NOTES:**
- BRIDGE GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY. FINAL LAYOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR BASED ON FIELD MEASUREMENTS.
  - FOR TIMBER BRIDGE RAIL DETAILS, SEE "CONCRETE CULVERT DETAILS" SHEET.
  - FOR MORE INFORMATION, SEE "BRIDGE GENERAL NOTES" SHEETS.

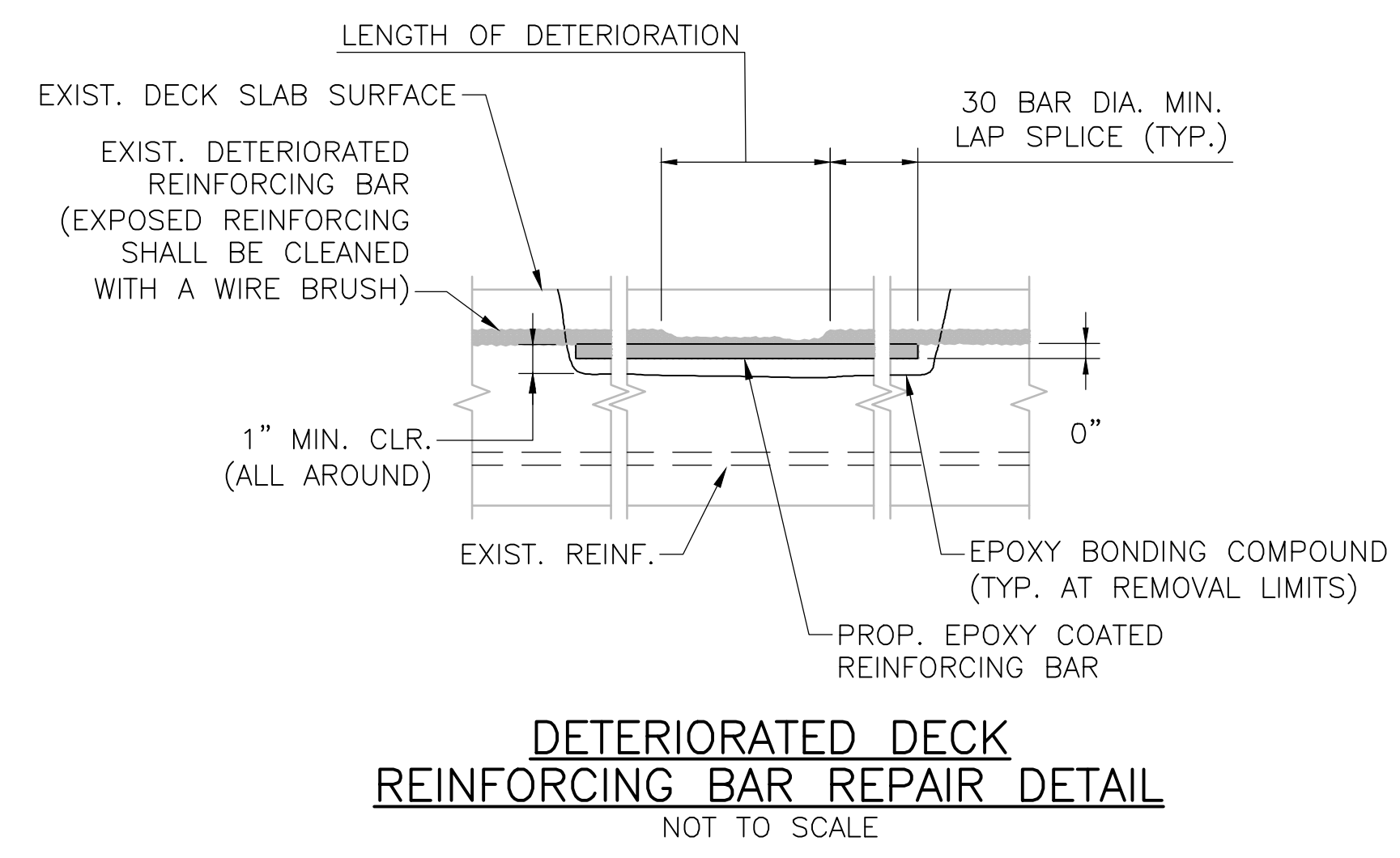
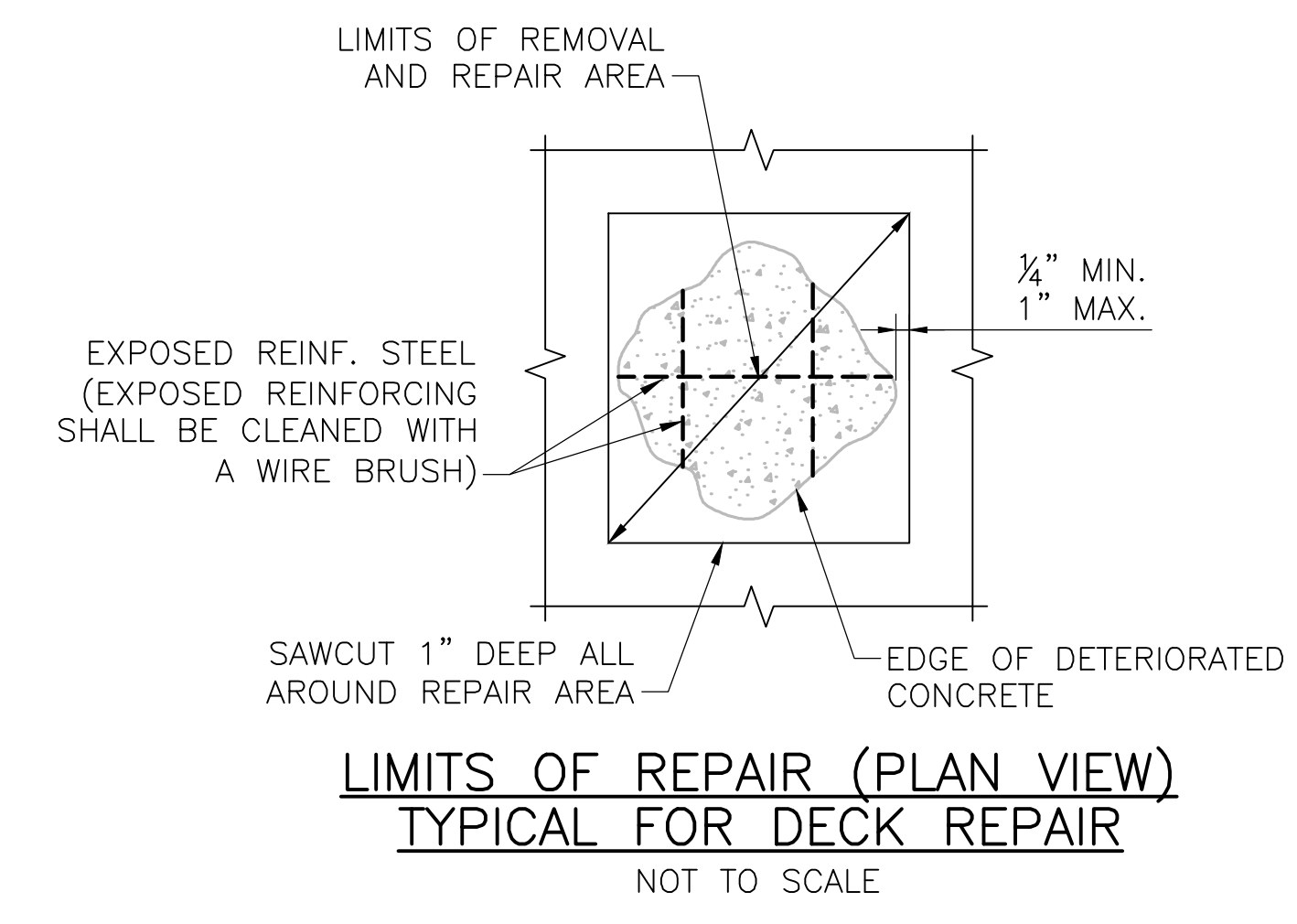
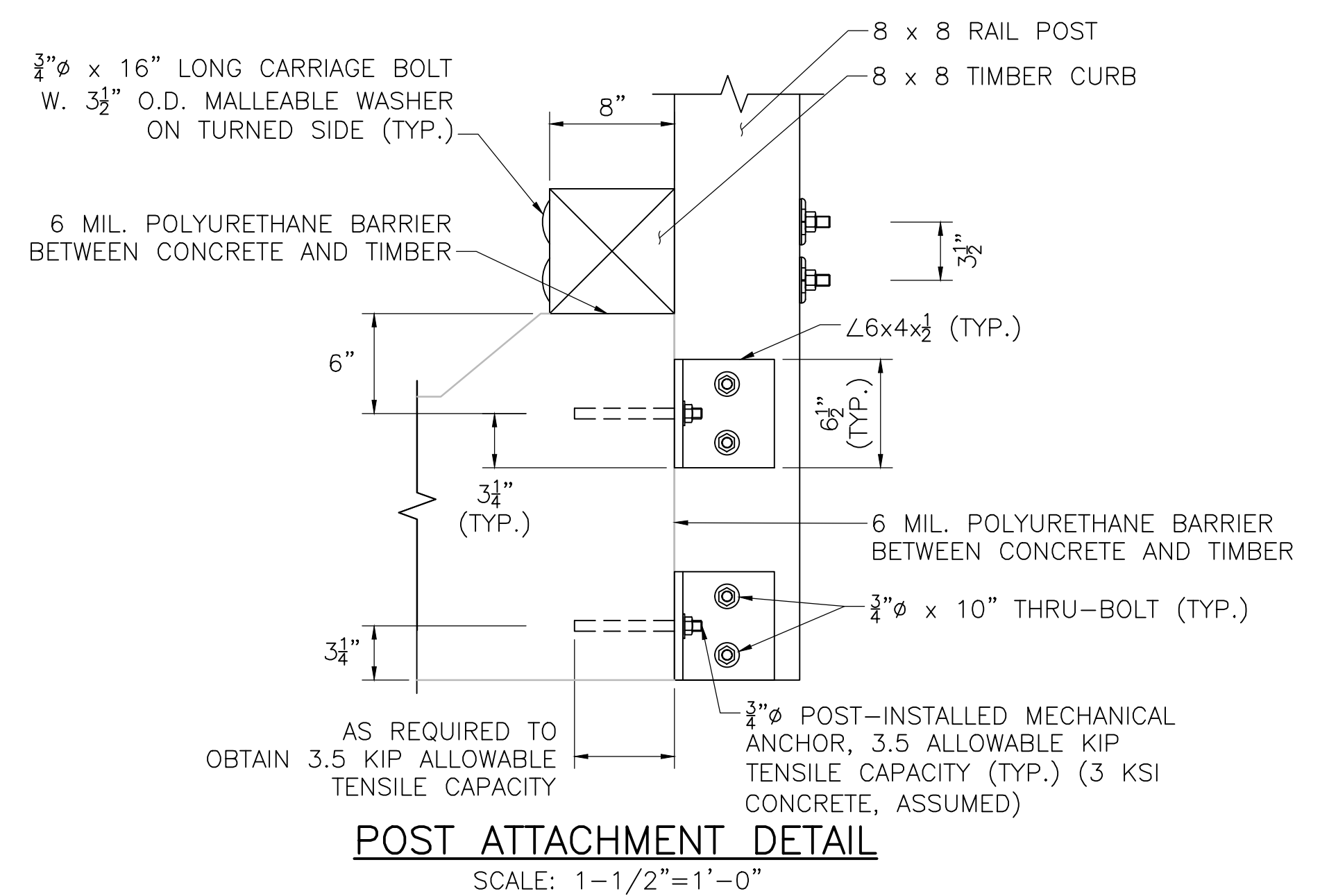
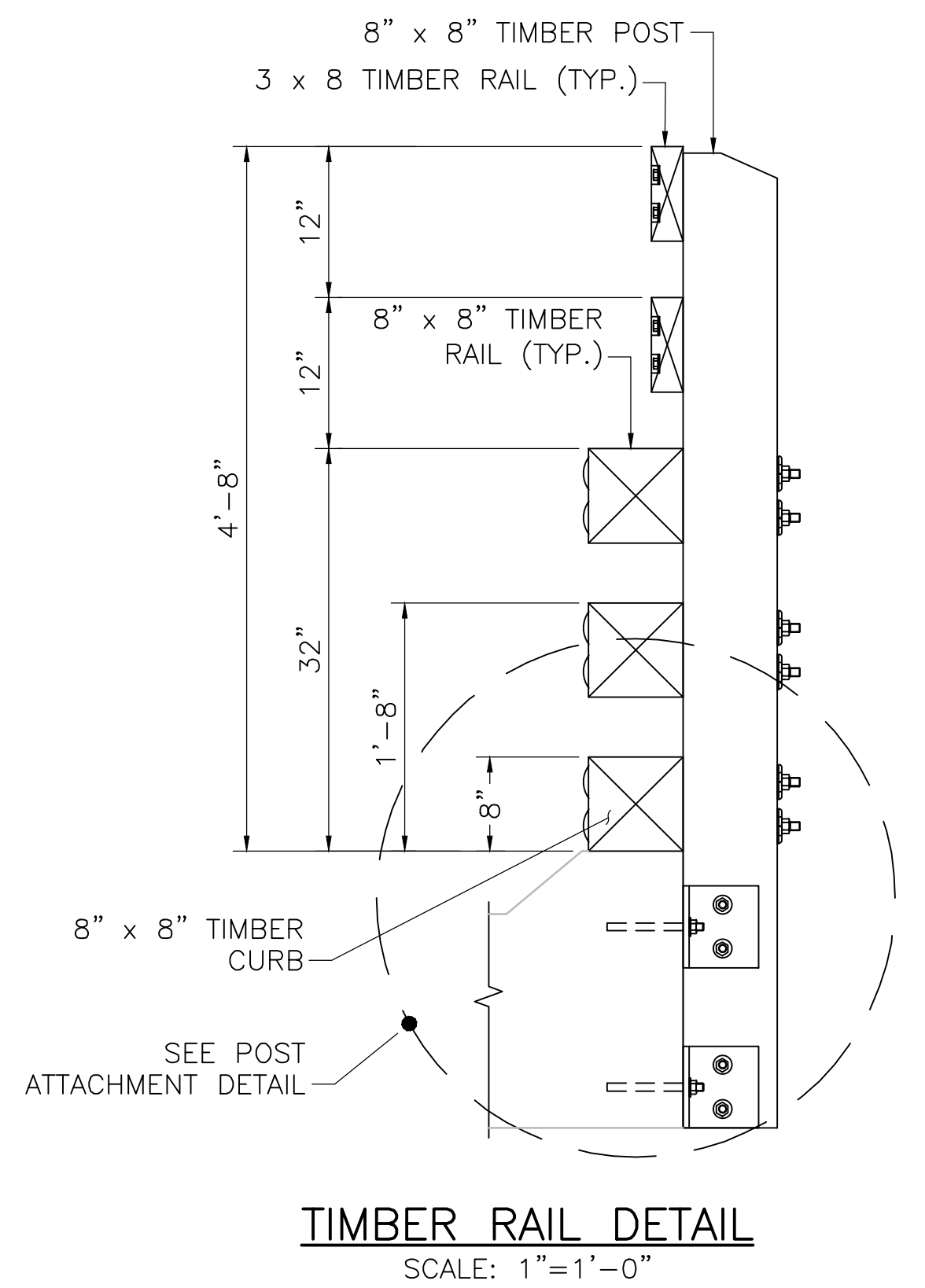
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	82	114
PROJECT FILE NO.		17112.00	

**CULVERT PLAN - 3  
CONCRETE CULVERT DETAILS**



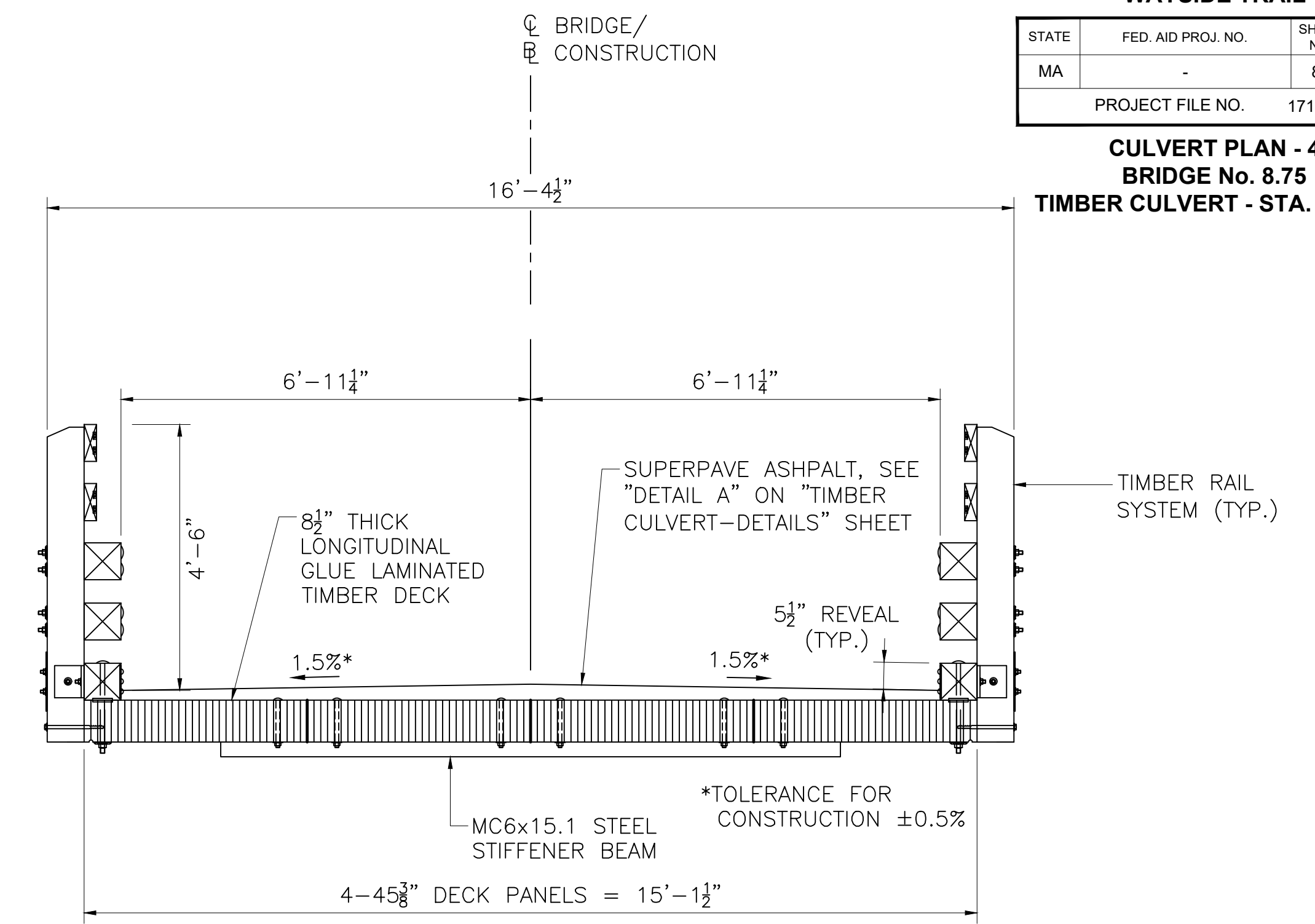
**TIMBER RAIL AND POST ATTACHMENT DETAIL**  
SCALE: 1"=1'-0"



**WALTHAM  
WAYSIDE TRAIL**

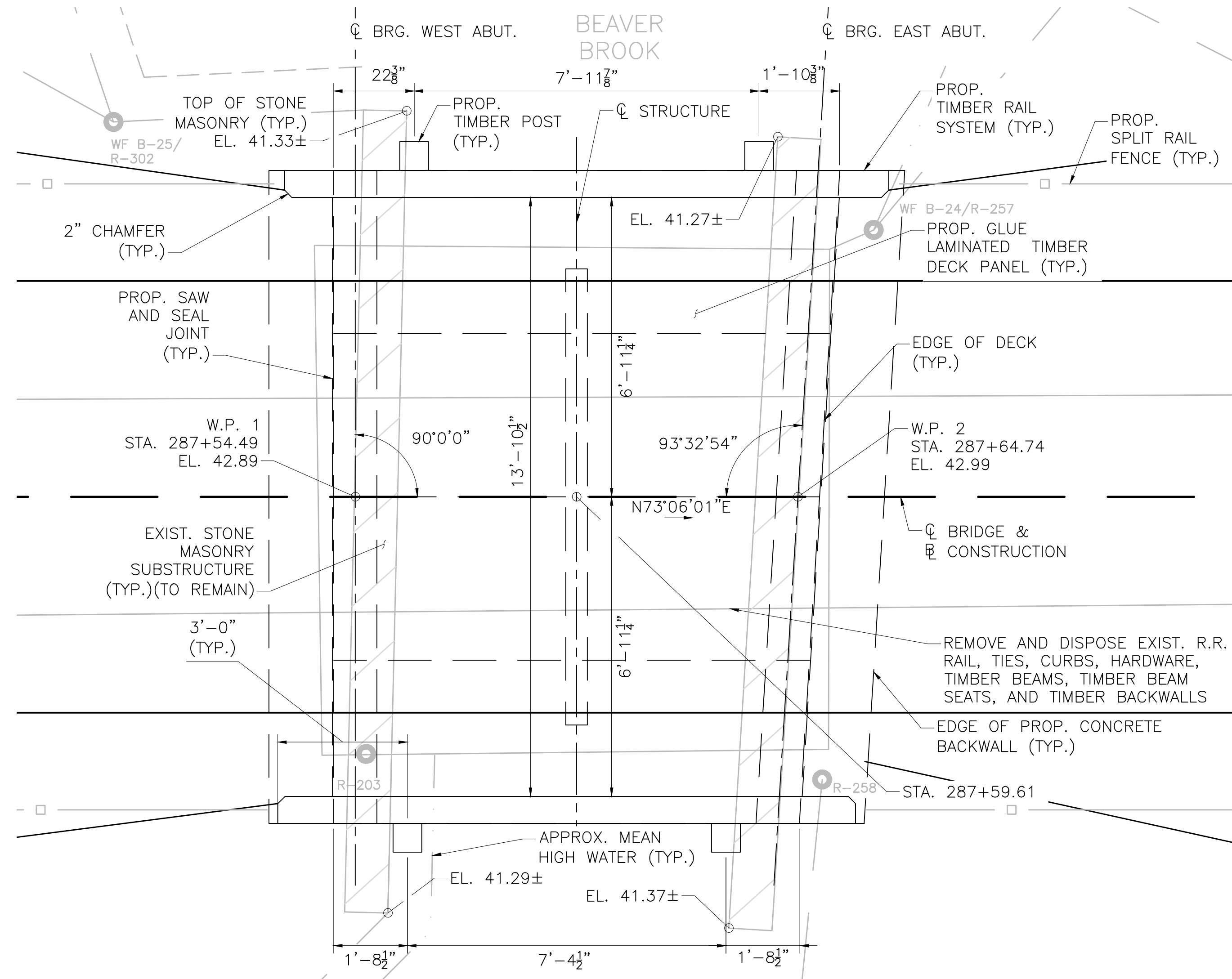
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	83	114
PROJECT FILE NO.		17112.00	

**CULVERT PLAN - 4  
BRIDGE No. 8.75  
TIMBER CULVERT - STA. 287+59**



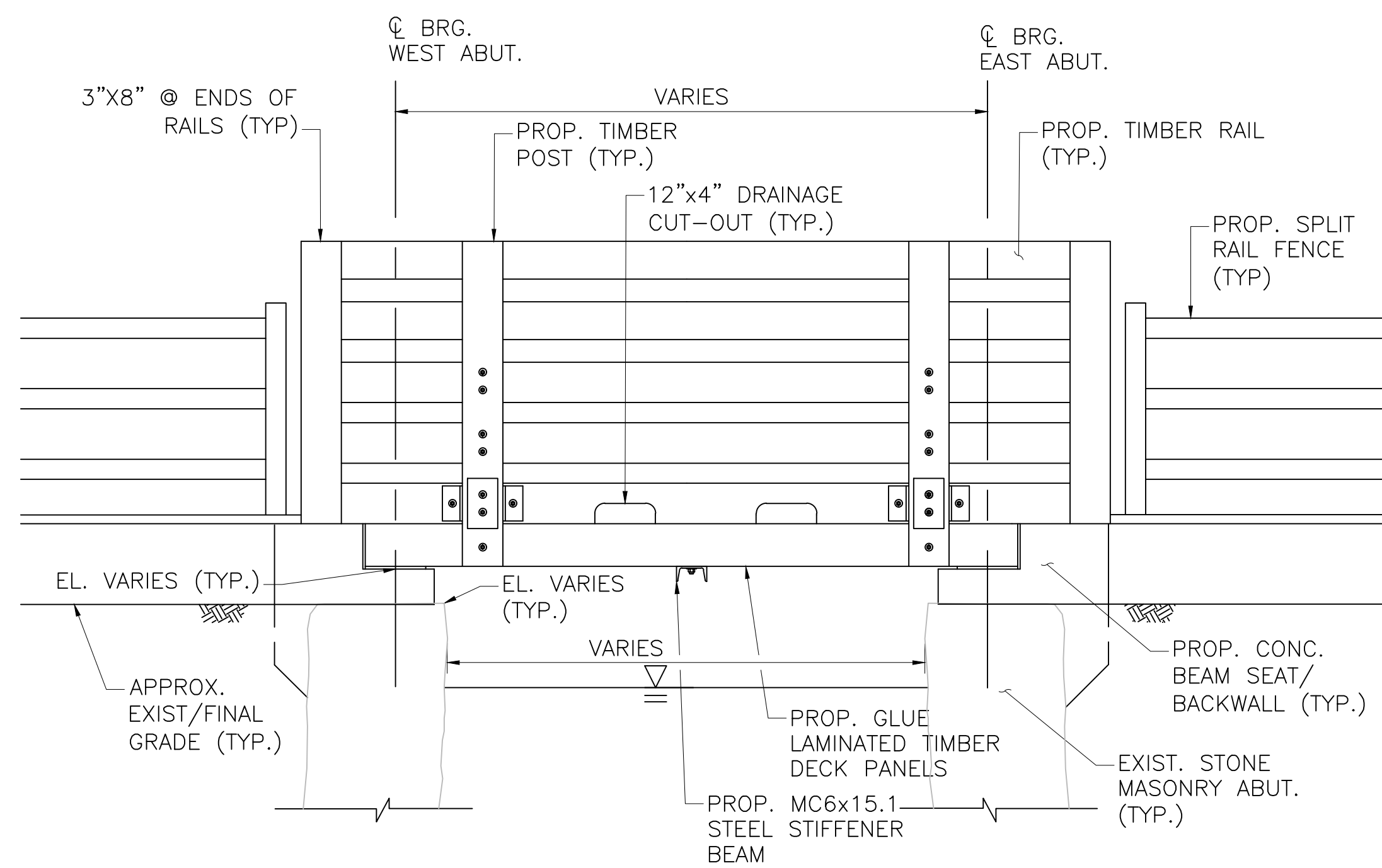
**TYPICAL SECTION TIMBER CULVERT**

SCALE: 1/2"=1'-0"



**CULVERT PLAN**

SCALE: 1/2"=1'-0"

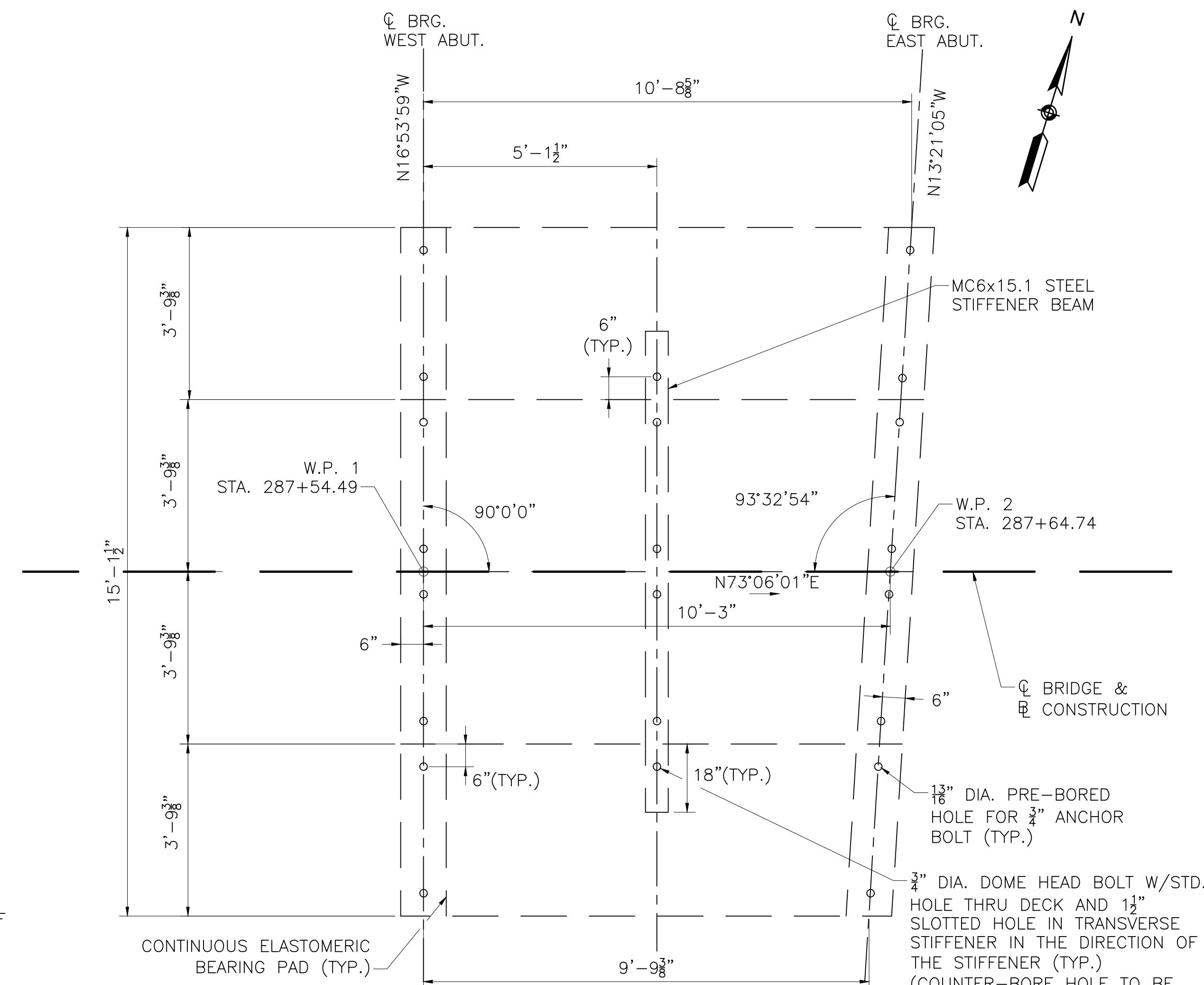


**CULVERT ELEVATION**

SCALE: 1/2"=1'-0"

**NOTES:**

- BRIDGE GEOMETRY, ORIENTATION, STATIONING, AND ELEVATIONS ARE SHOWN FOR ESTIMATING PURPOSES ONLY. FINAL LAYOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR BASED ON FIELD MEASUREMENTS.
- FOR MORE INFORMATION, SEE "TIMBER CULVERT-DETAILS" AND "BRIDGE GENERAL NOTES" SHEETS.



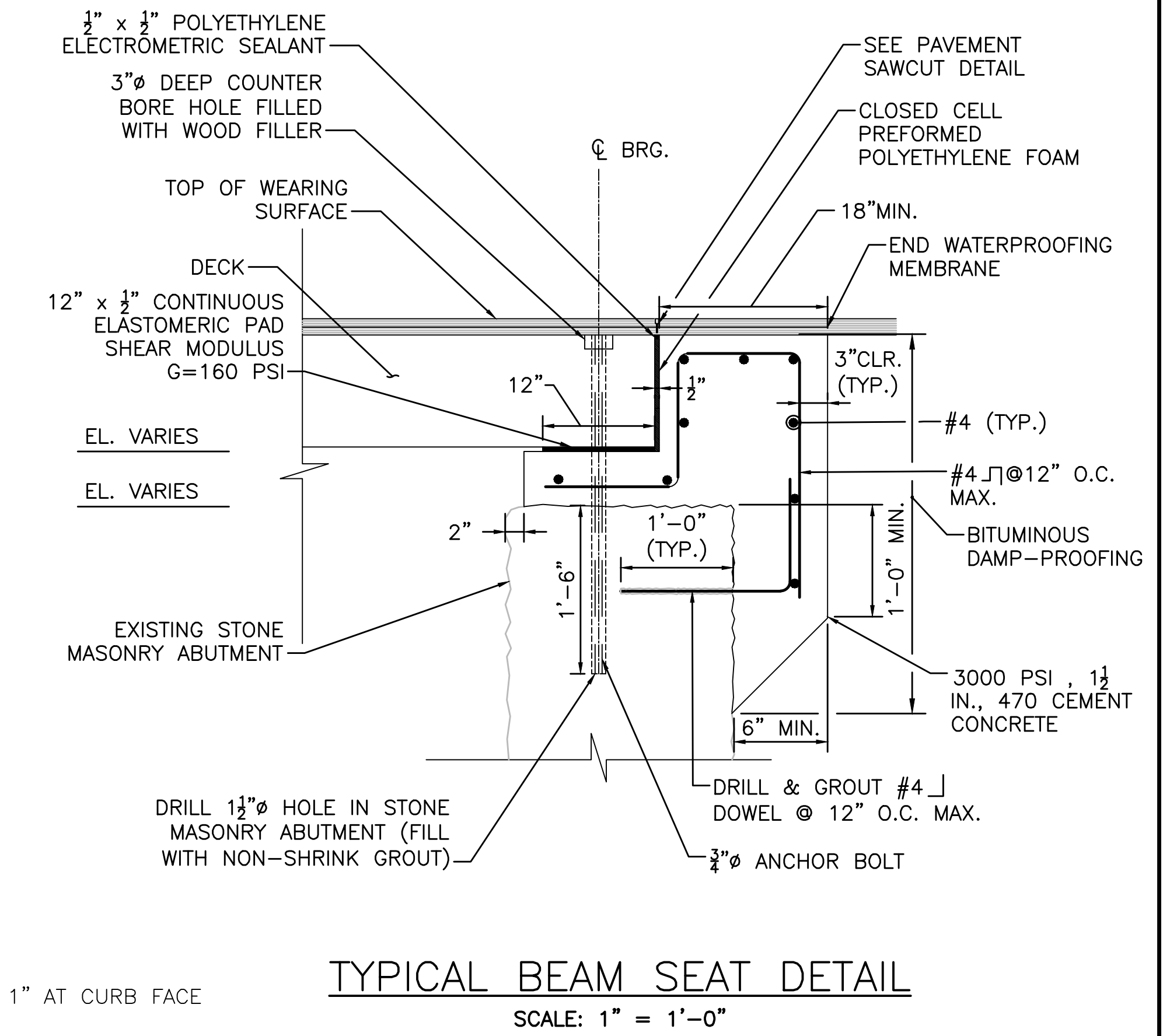
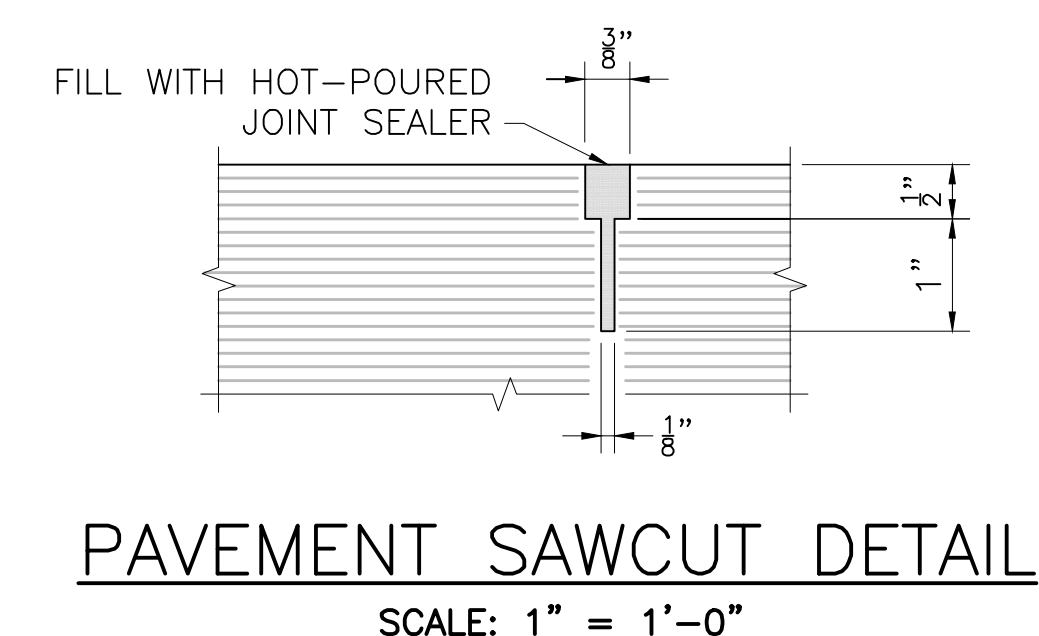
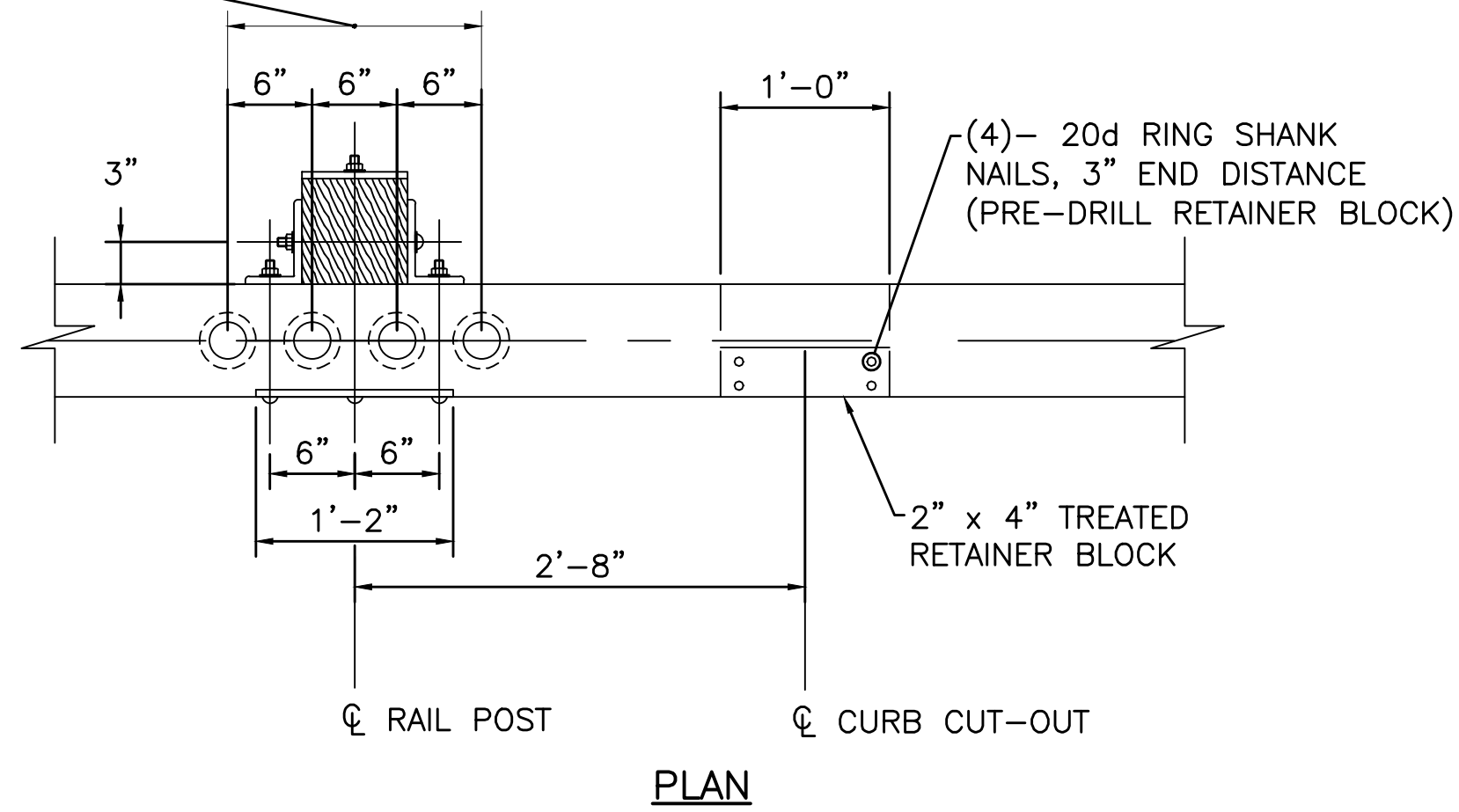
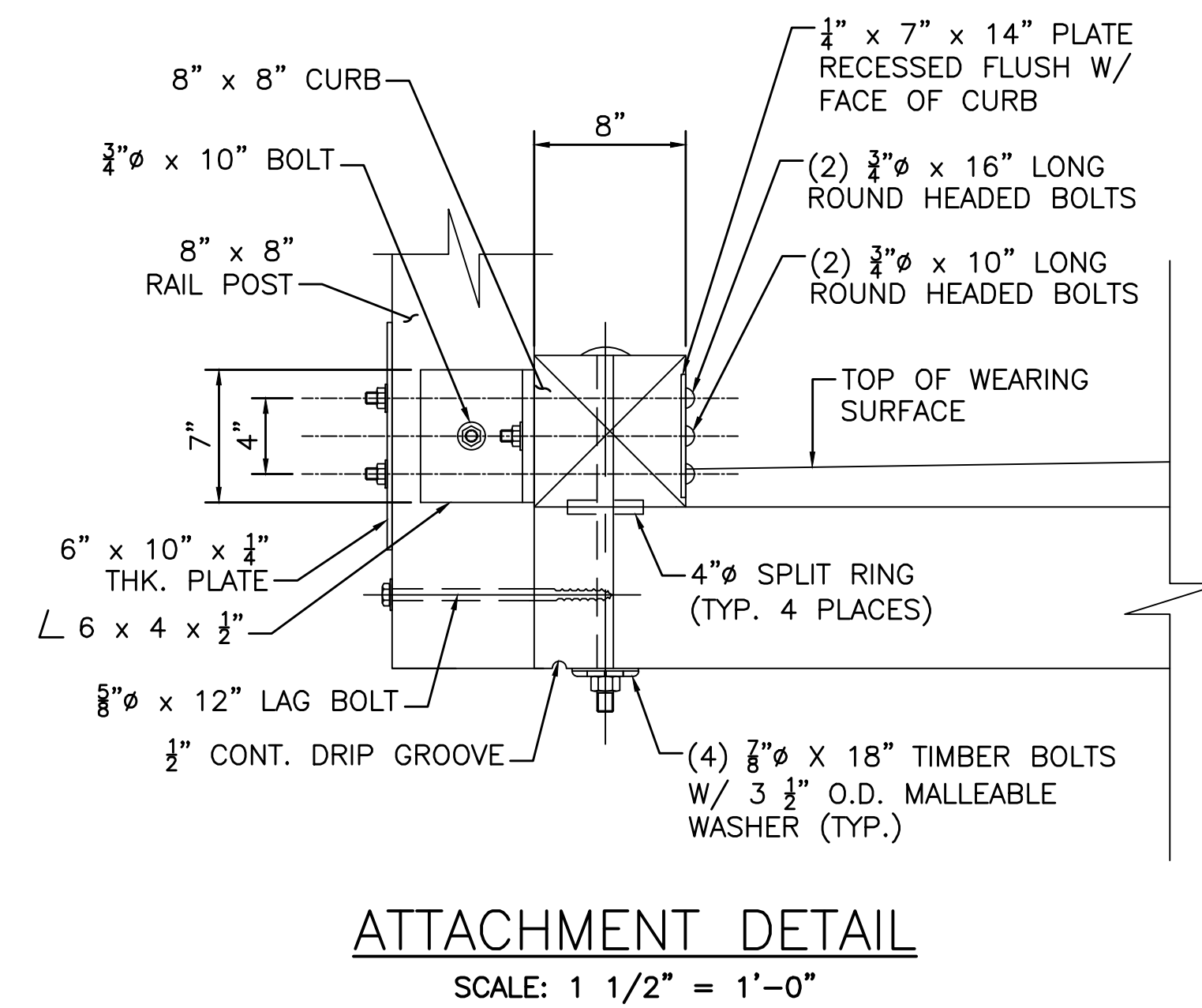
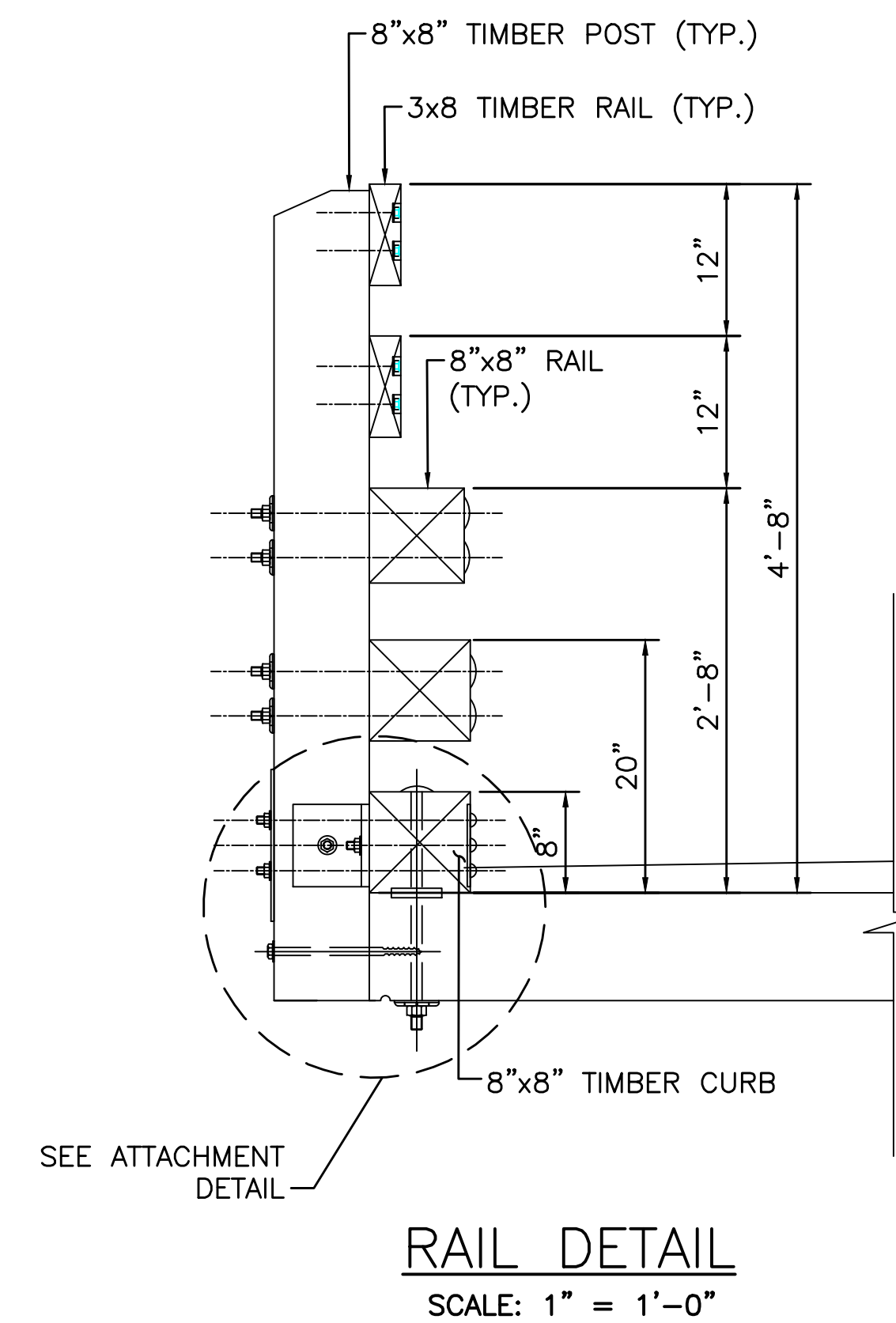
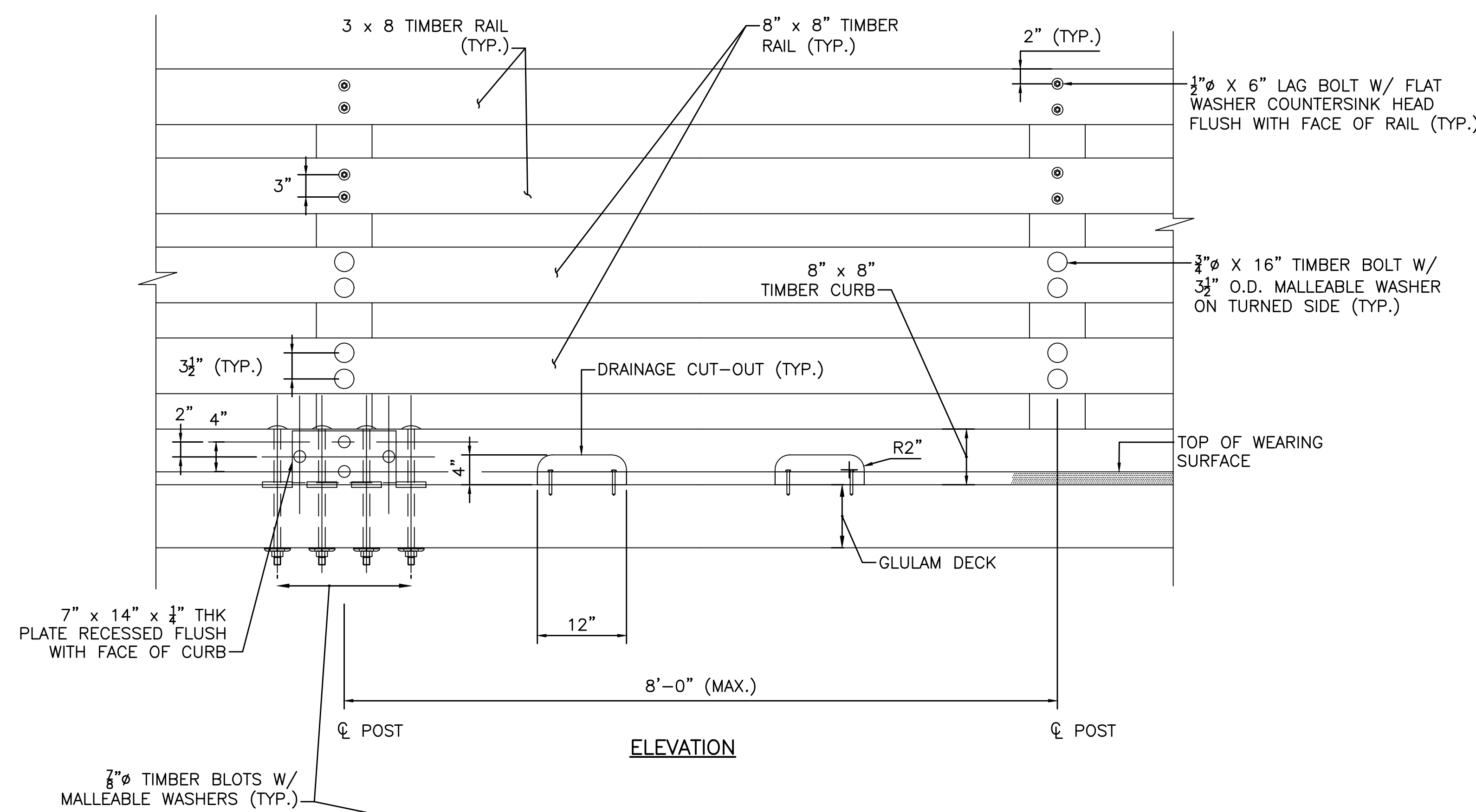
**DECK PLAN**

SCALE: 1/2"=1'-0"

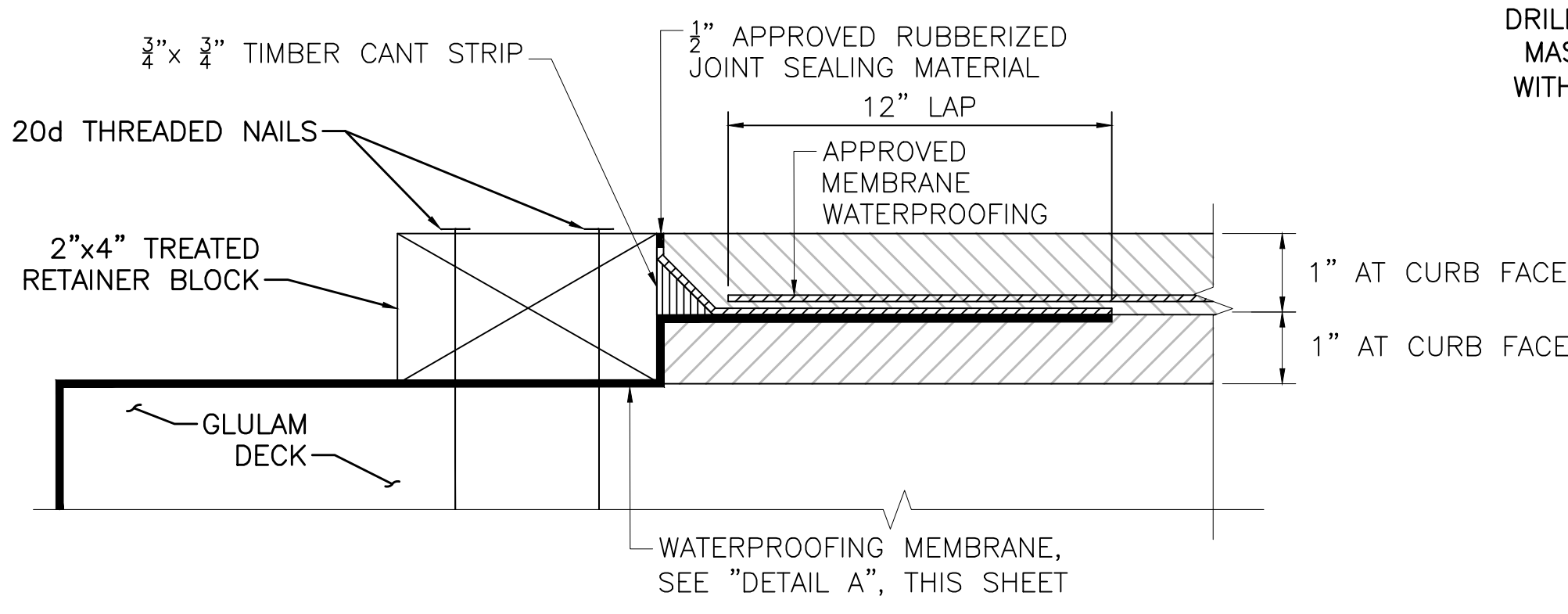
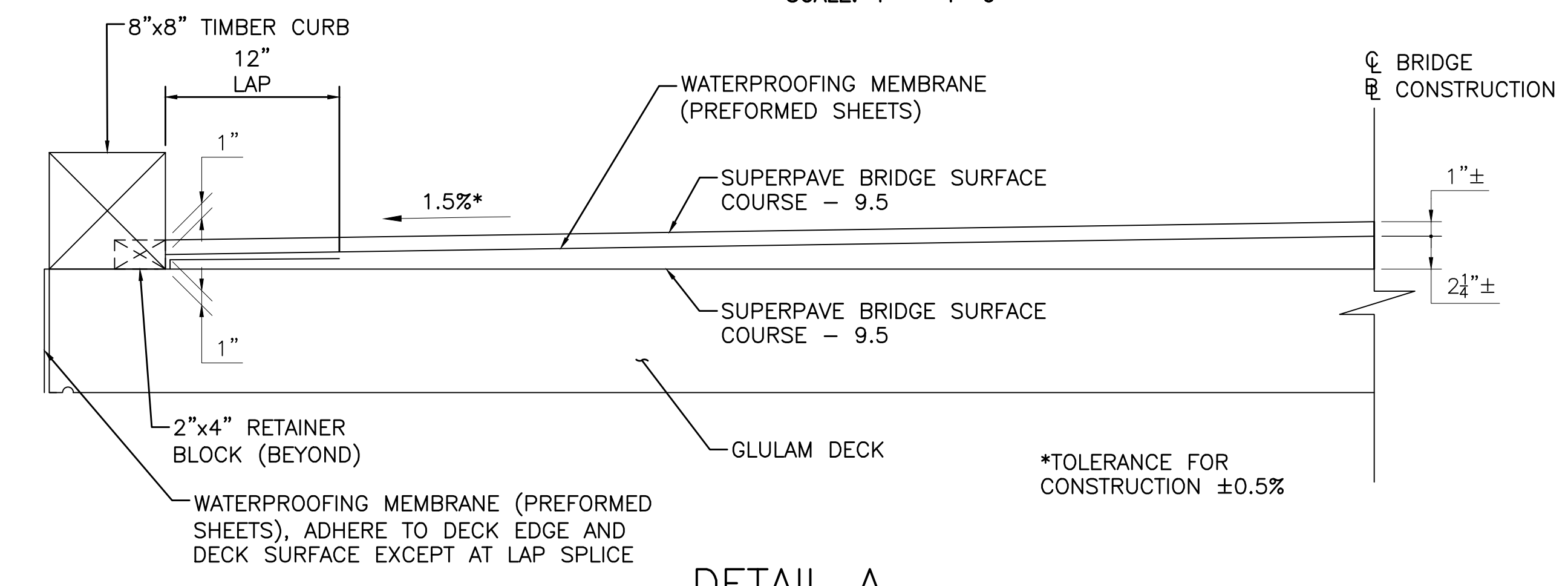
**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	84	114
PROJECT FILE NO. 17112.00			

**CULVERT PLAN - 5  
BRIDGE No. 8.75  
TIMBER CULVERT - DETAILS**



**CURB AND RAIL POST ATTACHMENT DETAIL**

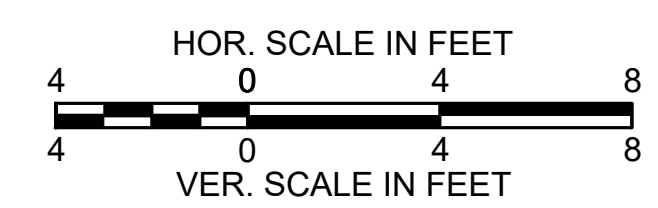
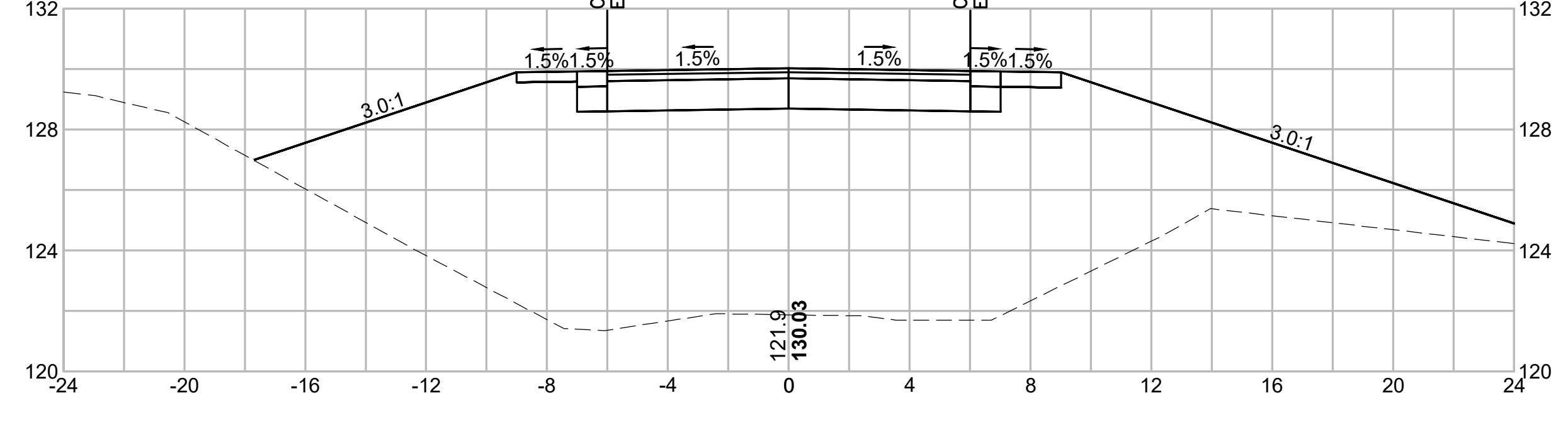
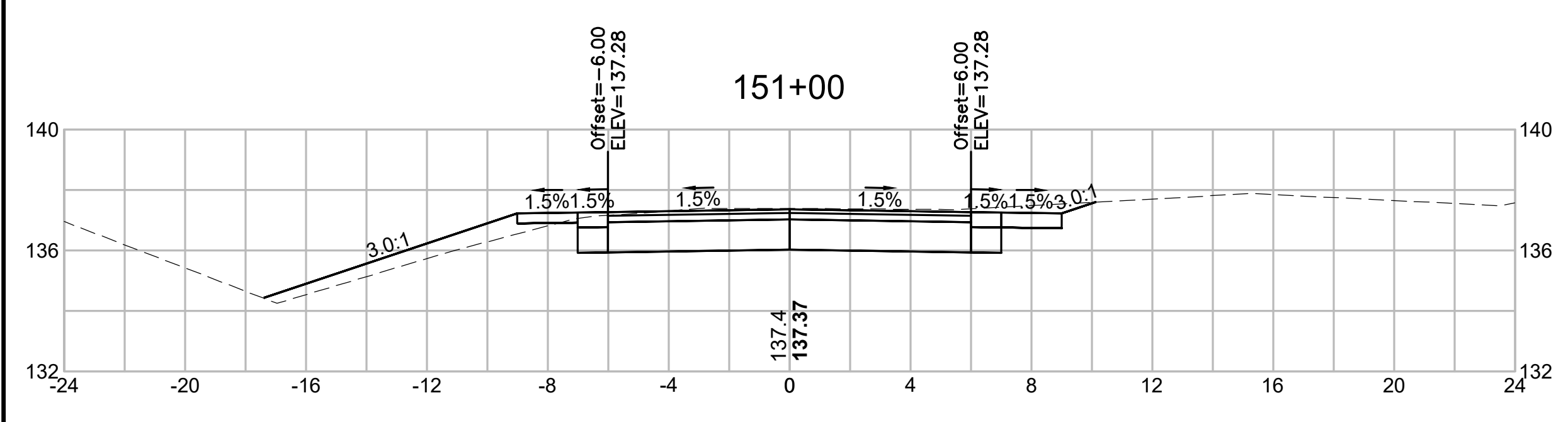
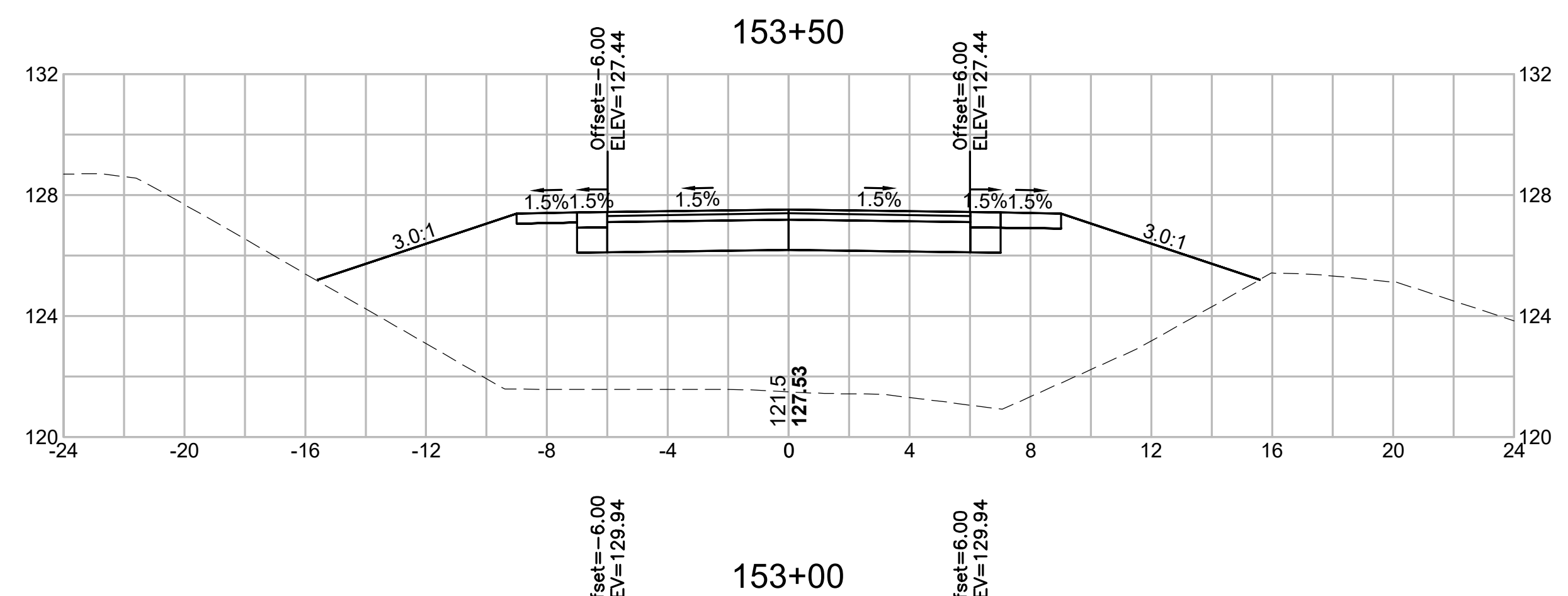
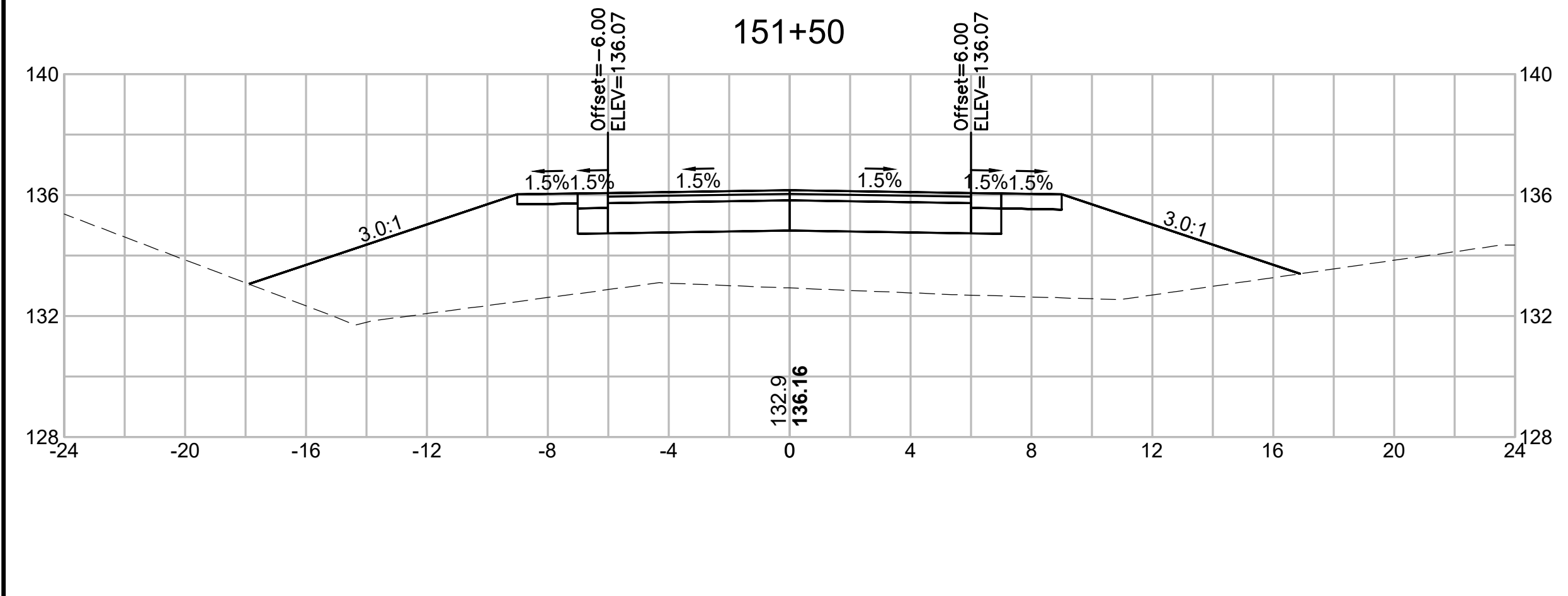
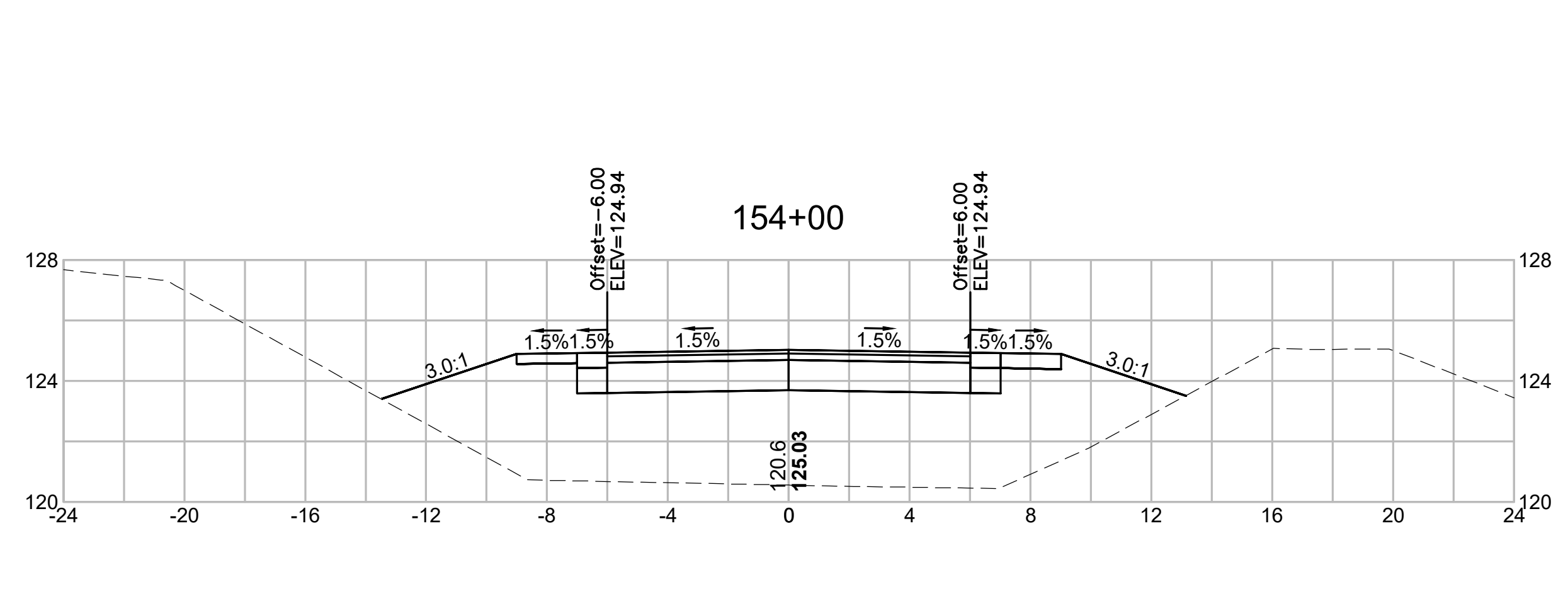
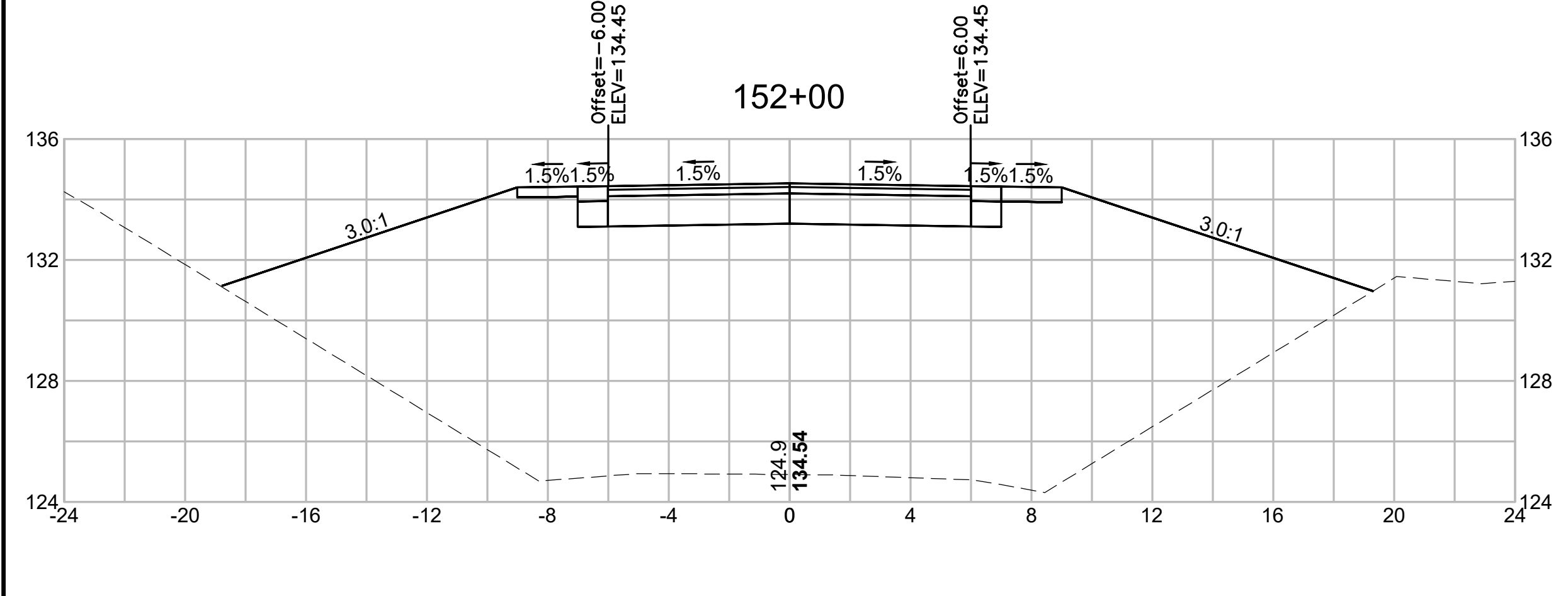
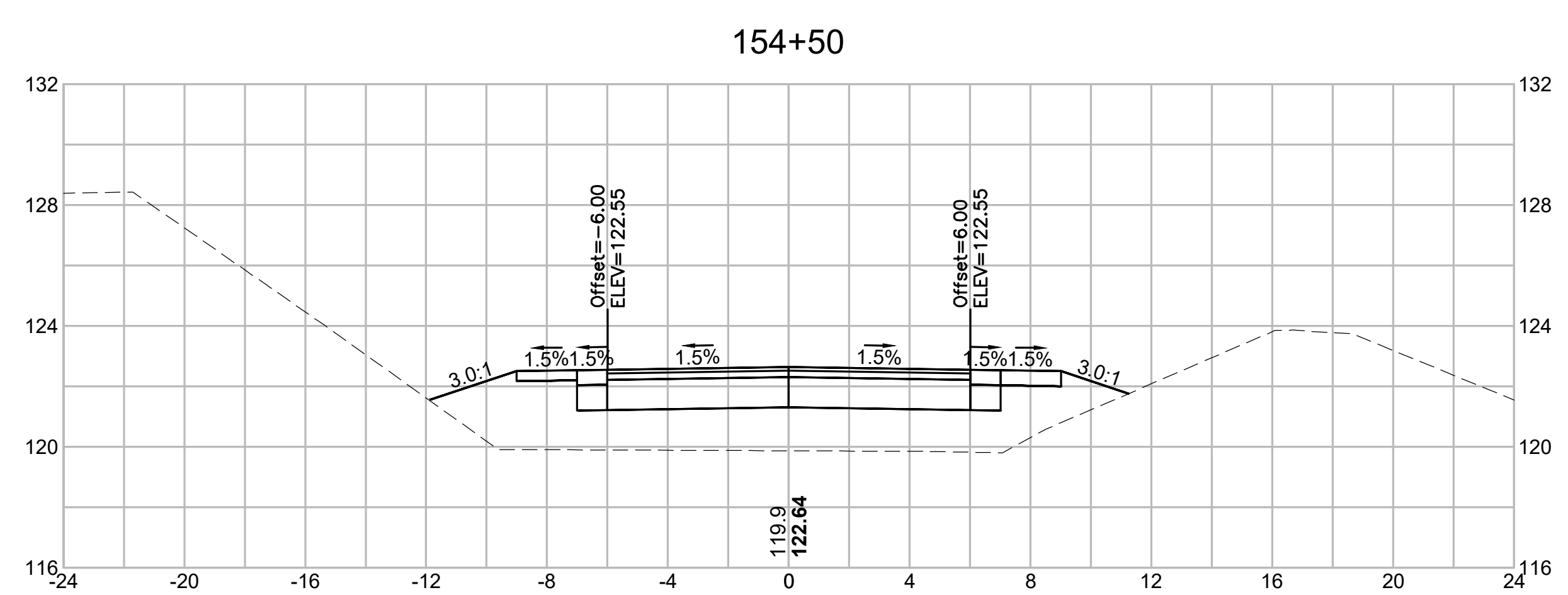
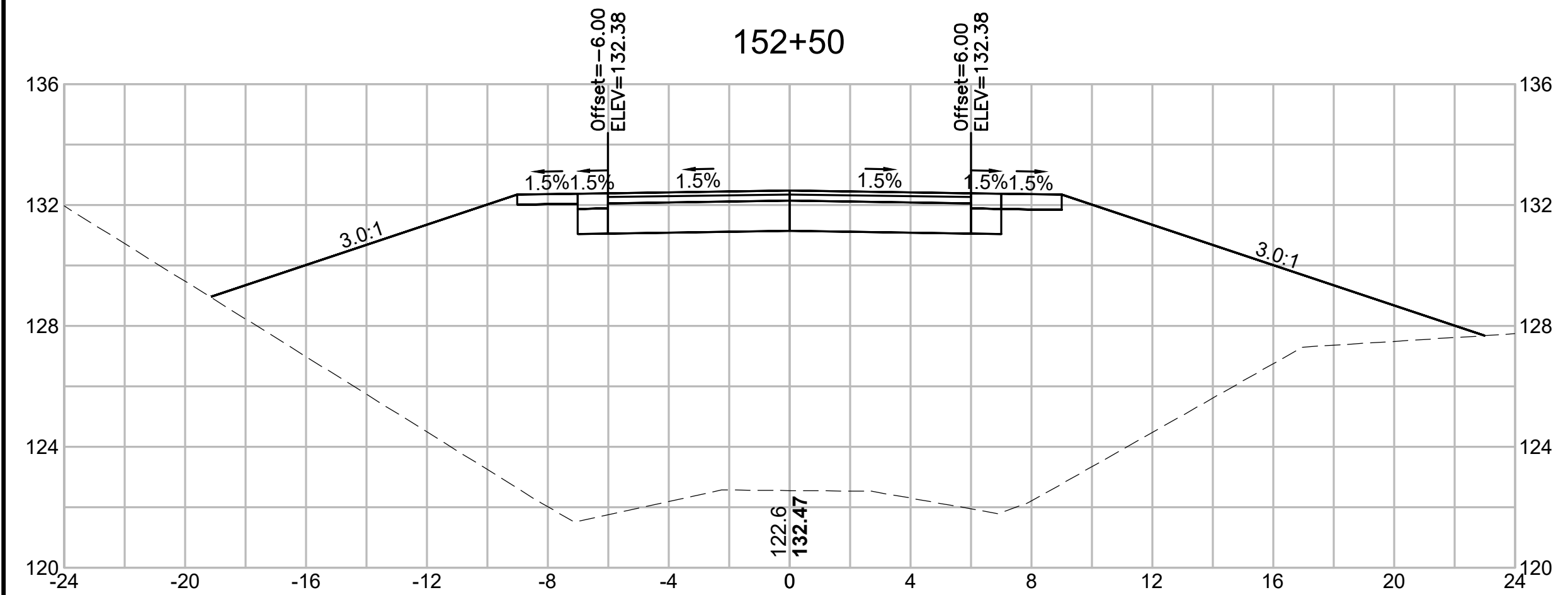


- NOTES:**
- ALLOW FIRST BRIDGE SURFACE COURSE TO COOL SUFFICIENTLY SO WATERPROOFING MEMBRANE DOES NOT TEAR WHEN APPLYING THE SECOND BRIDGE SURFACE COURSE.
  - SEE "DETAIL B", THIS SHEET.

**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	85	114
PROJECT FILE NO. 17112.00			

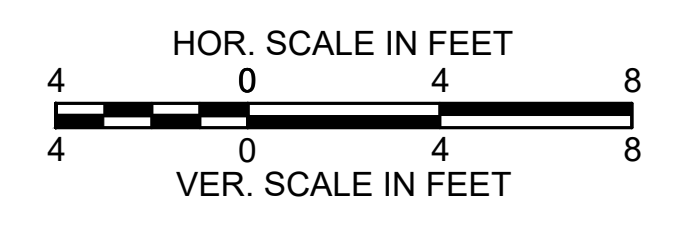
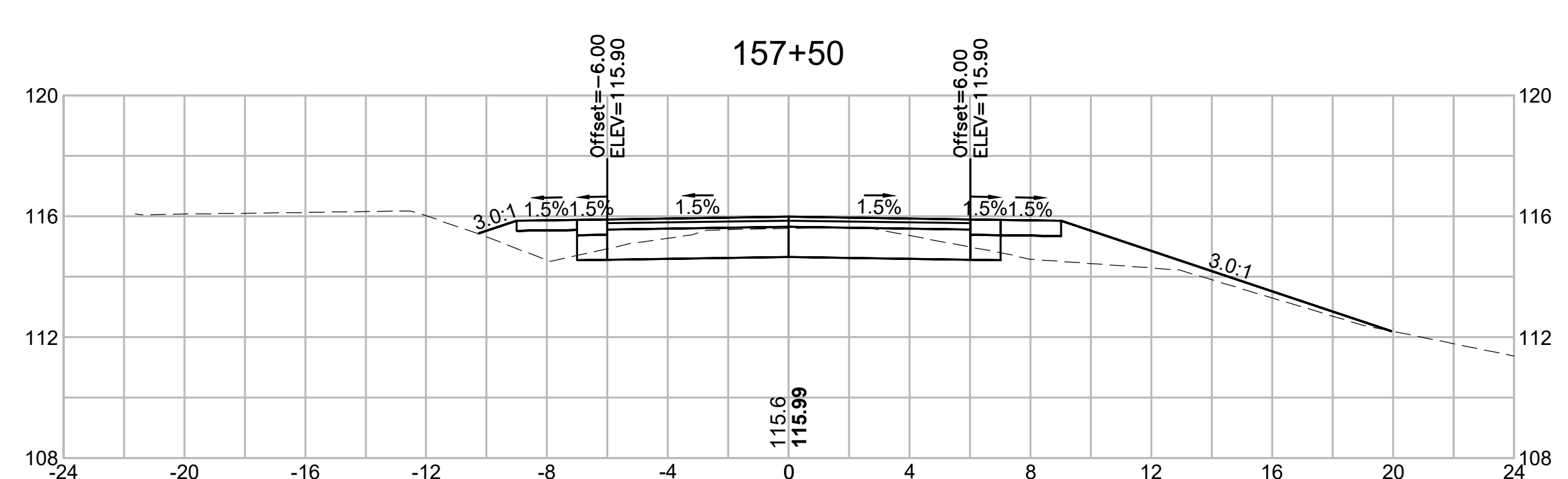
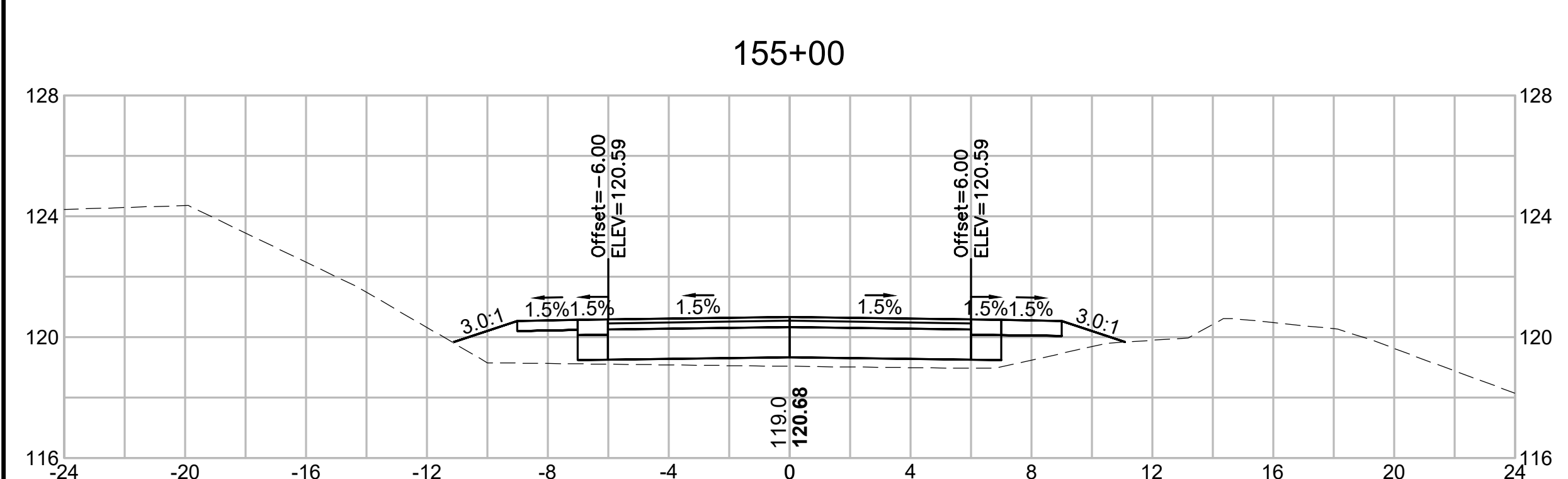
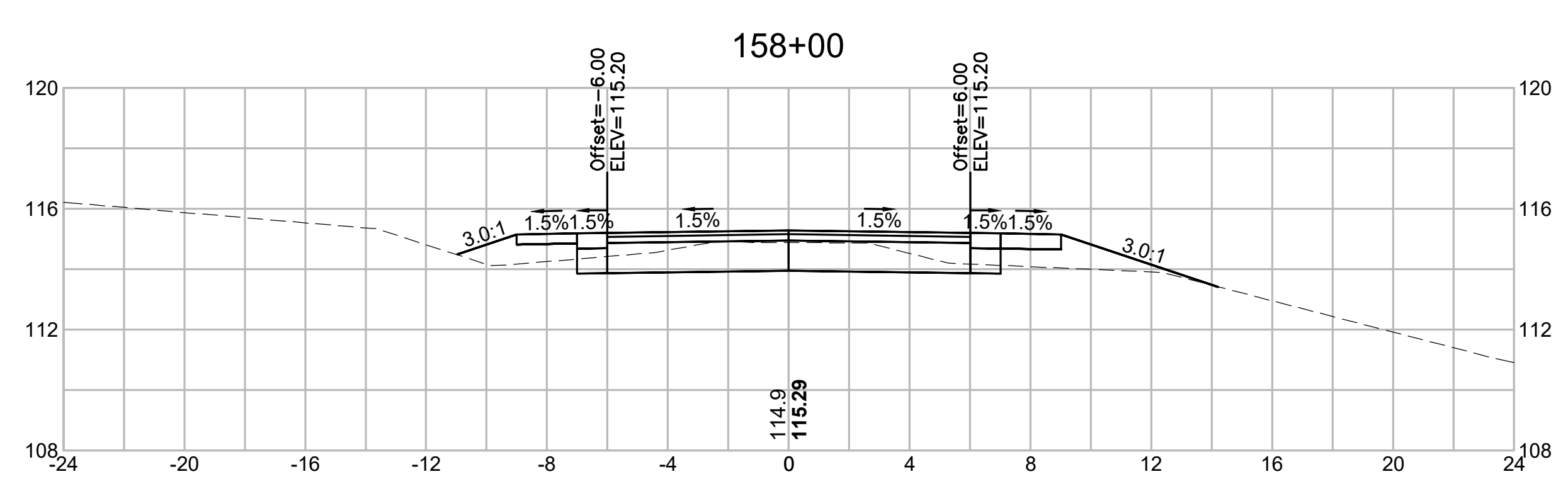
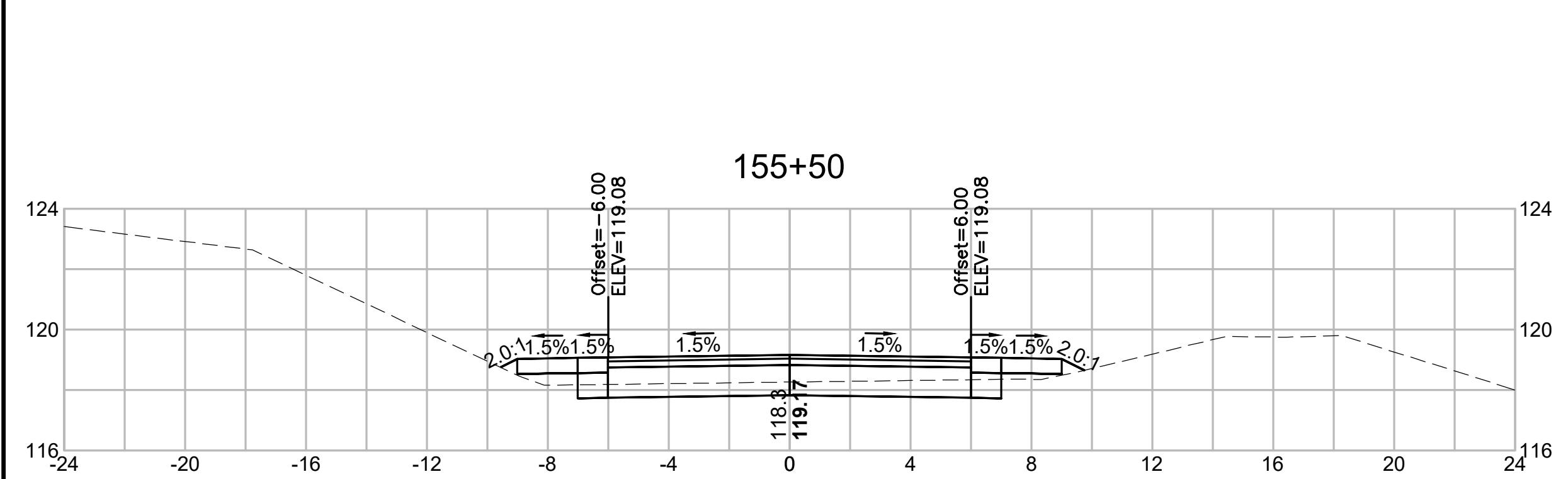
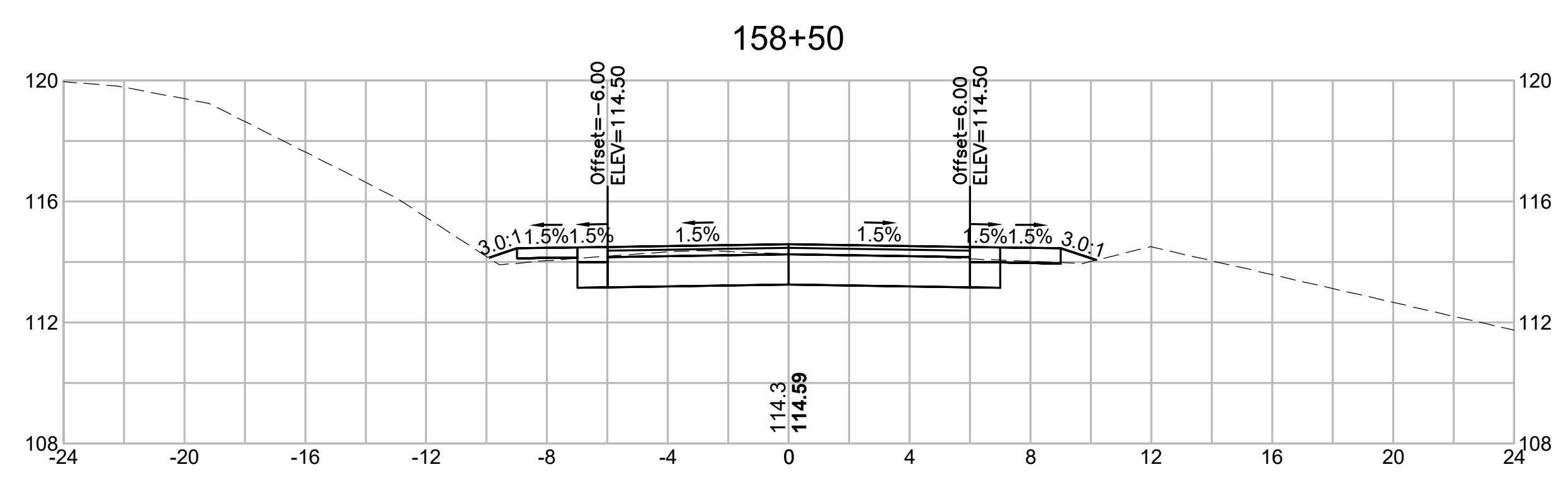
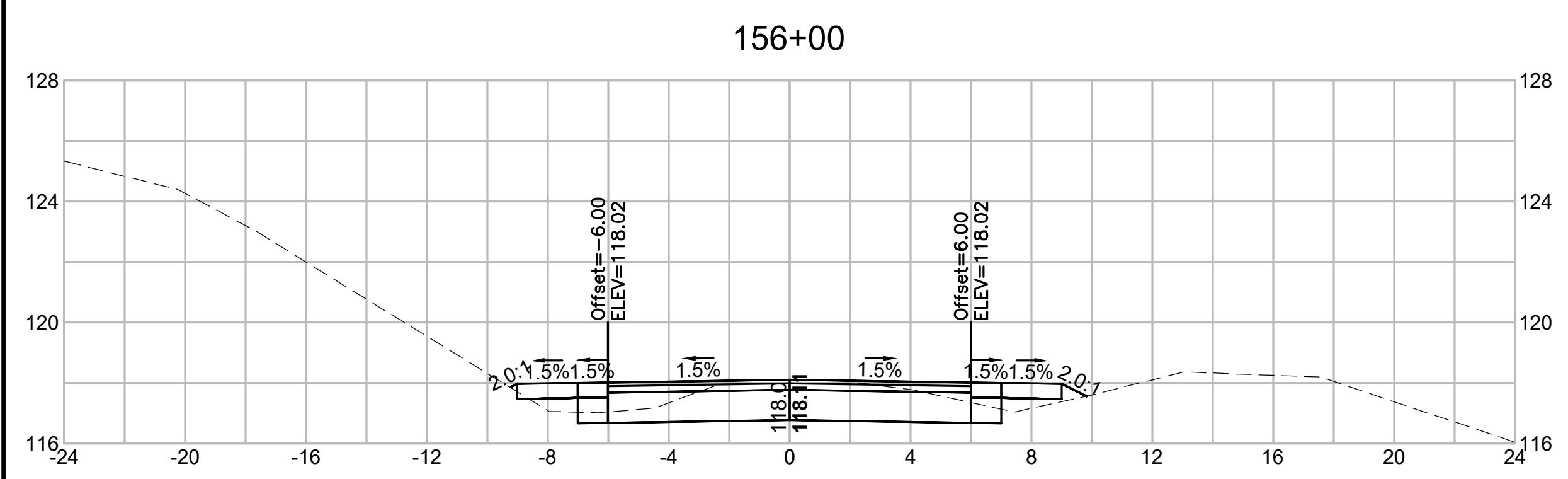
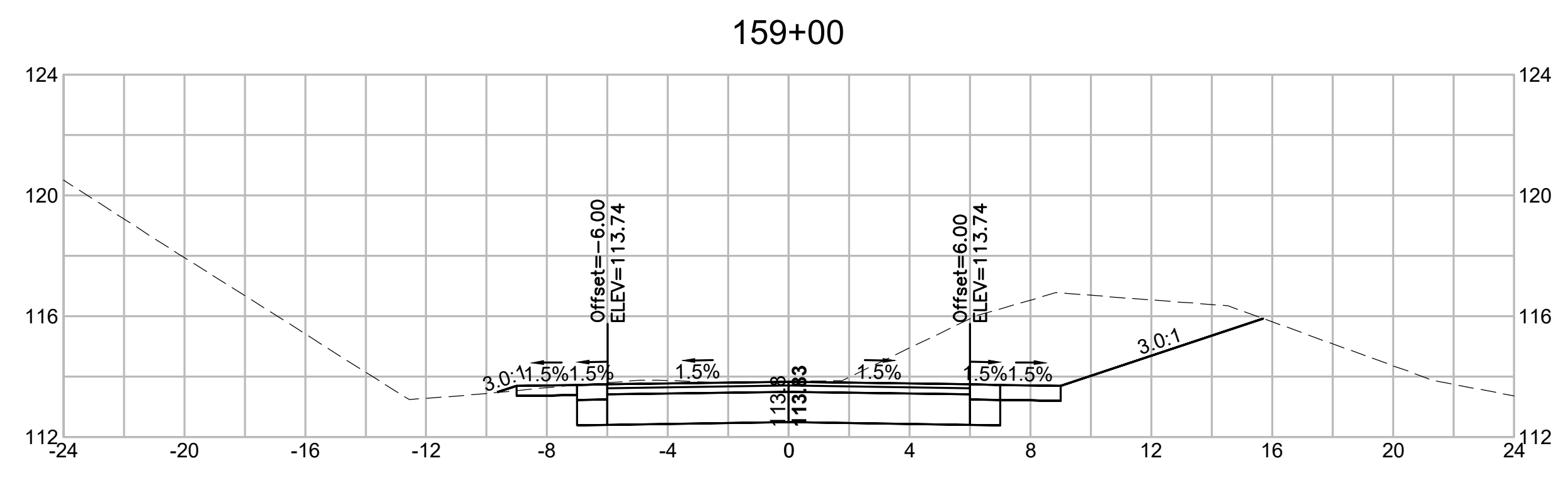
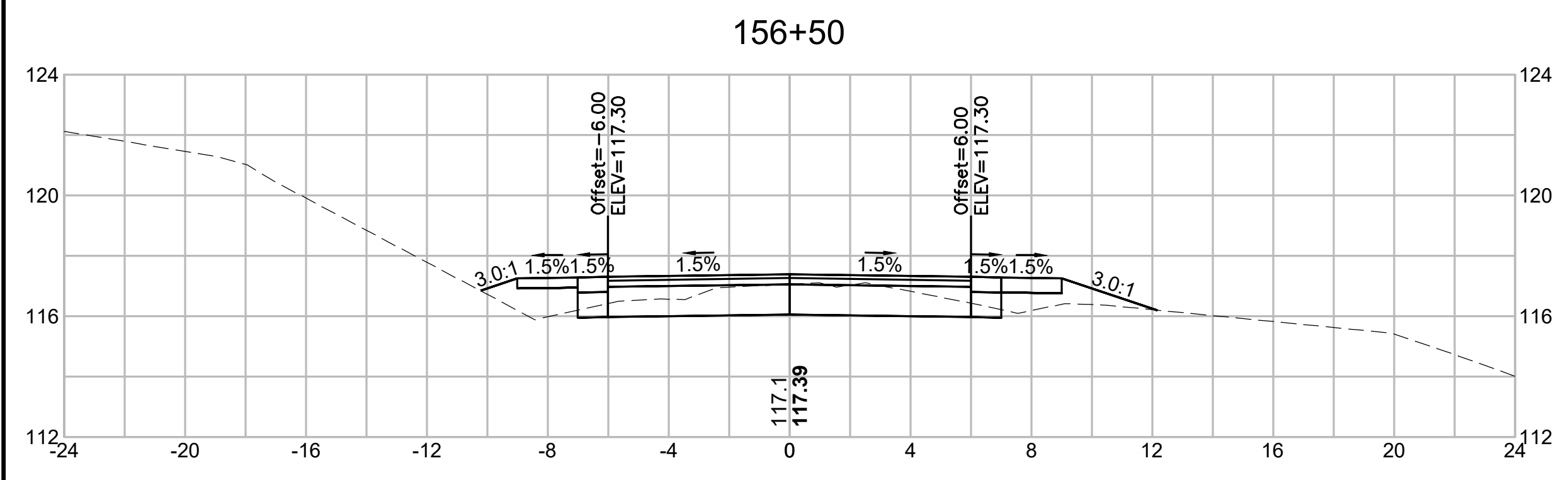
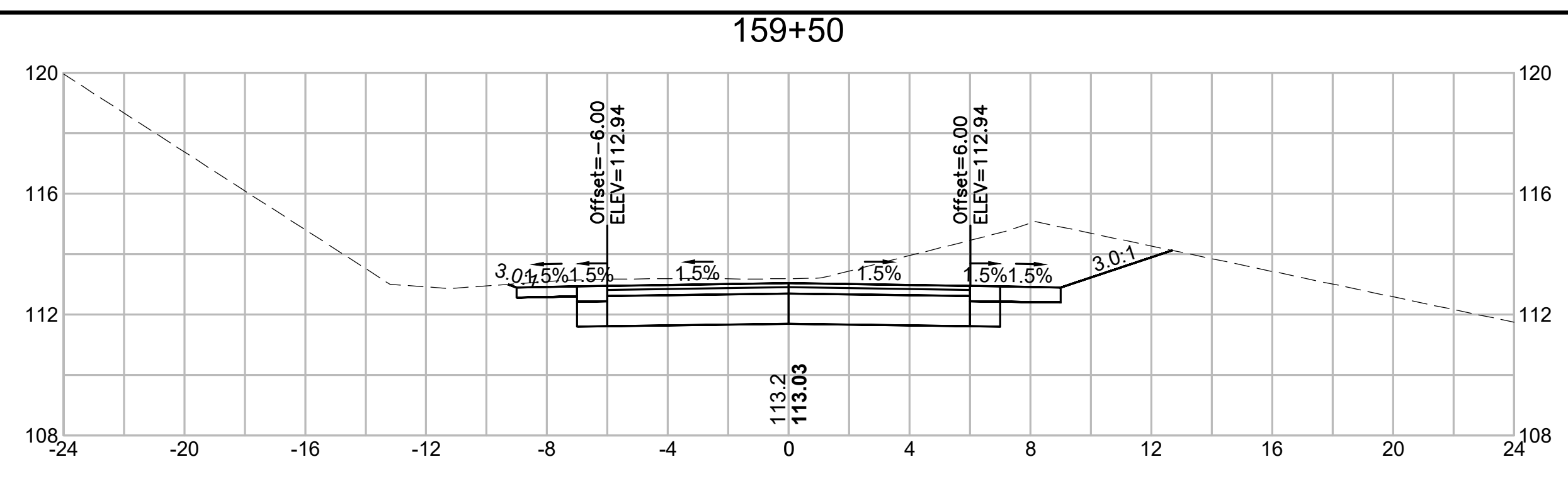
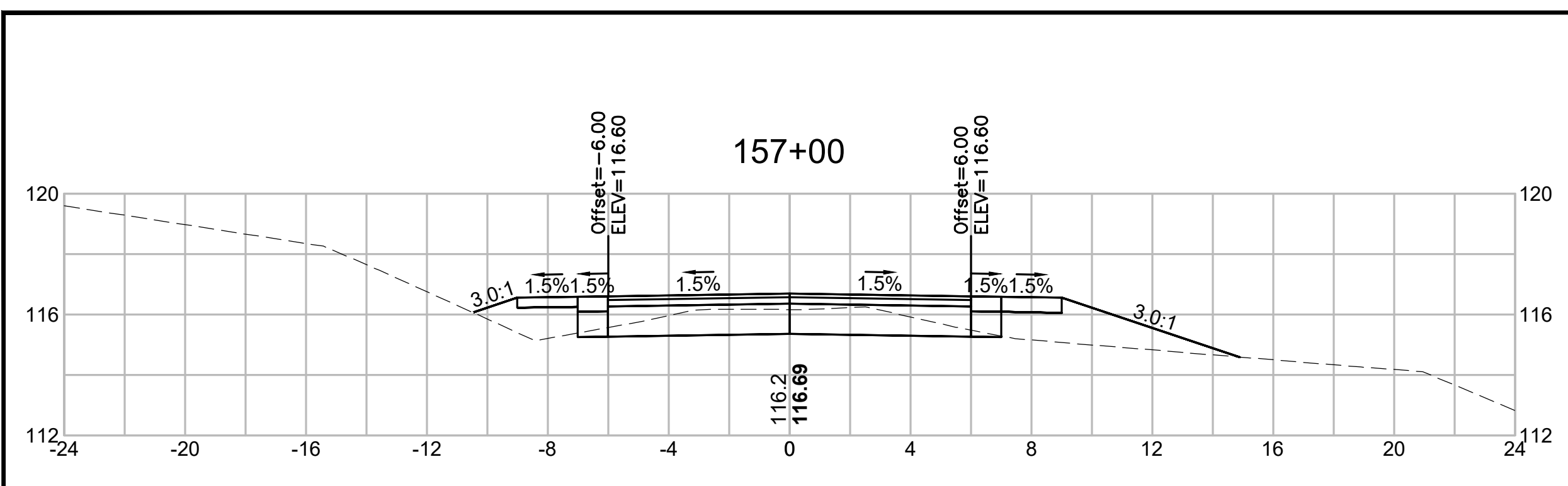
**CROSS SECTIONS - 1**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	86	114
PROJECT FILE NO.		17112.00	

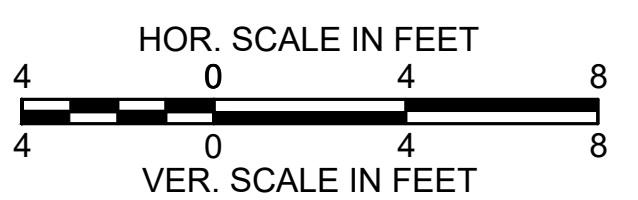
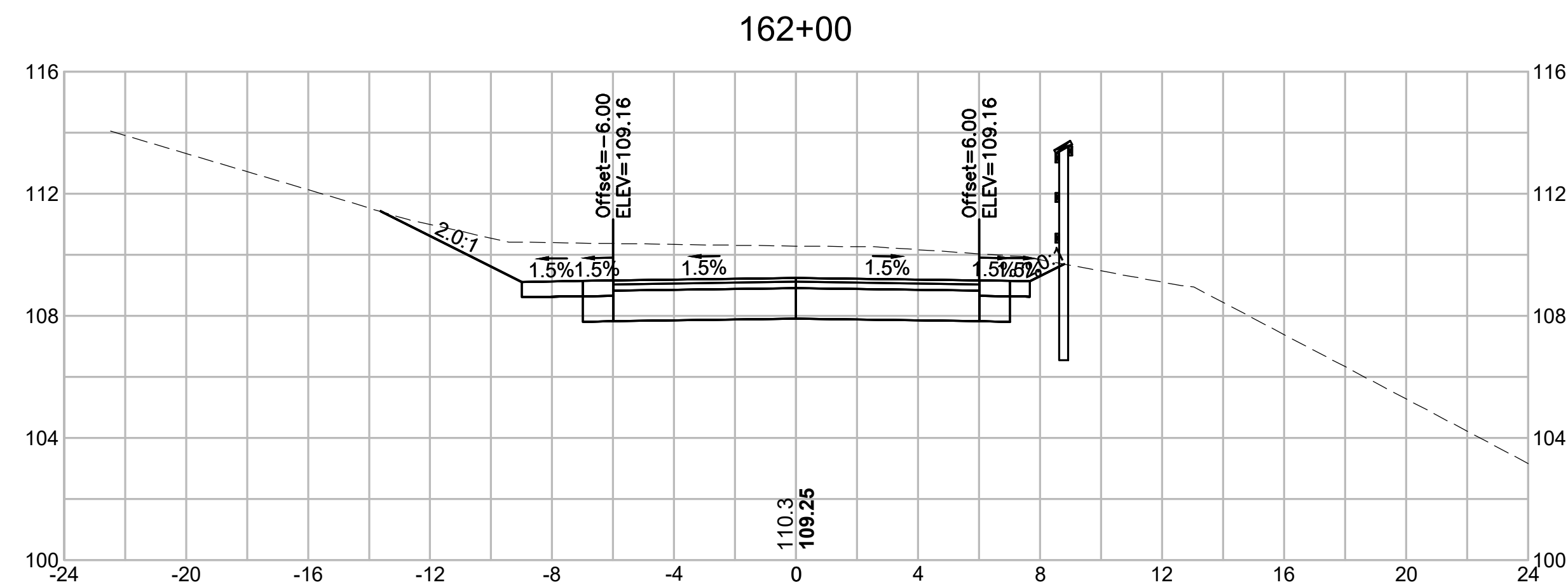
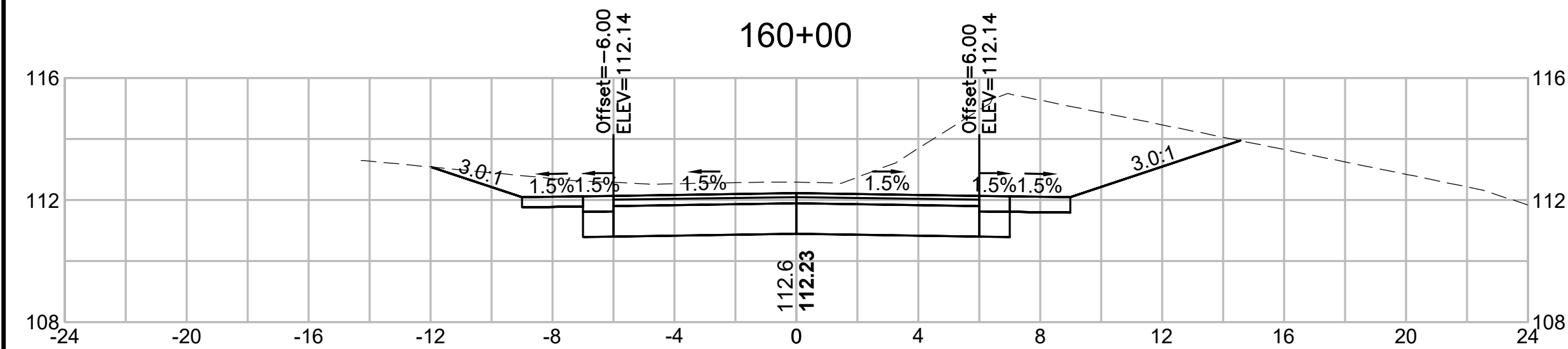
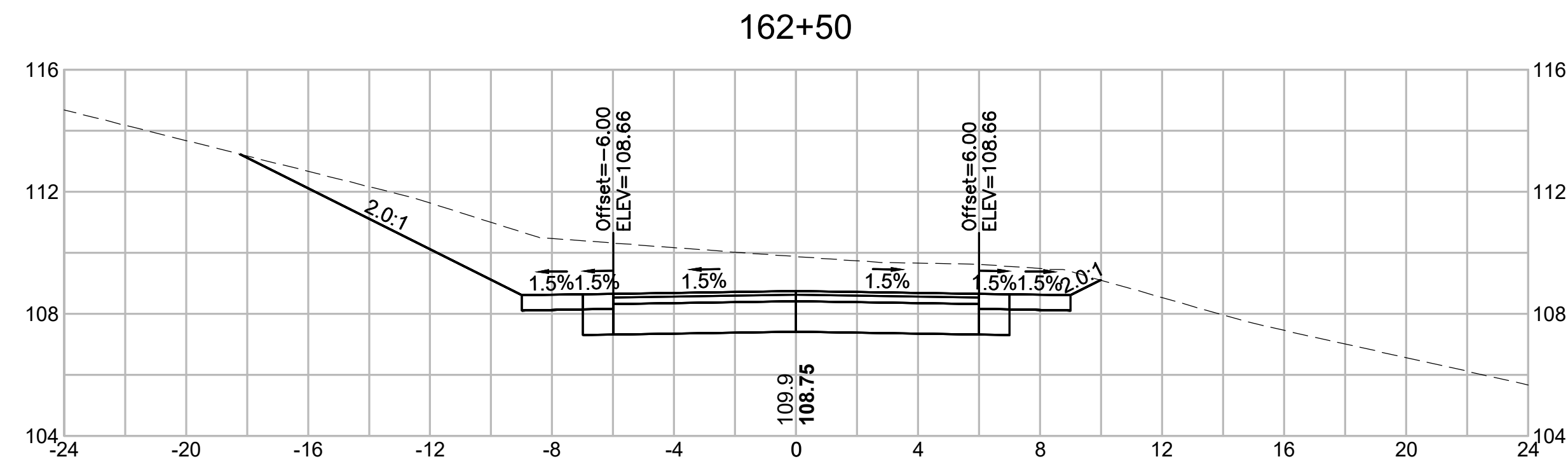
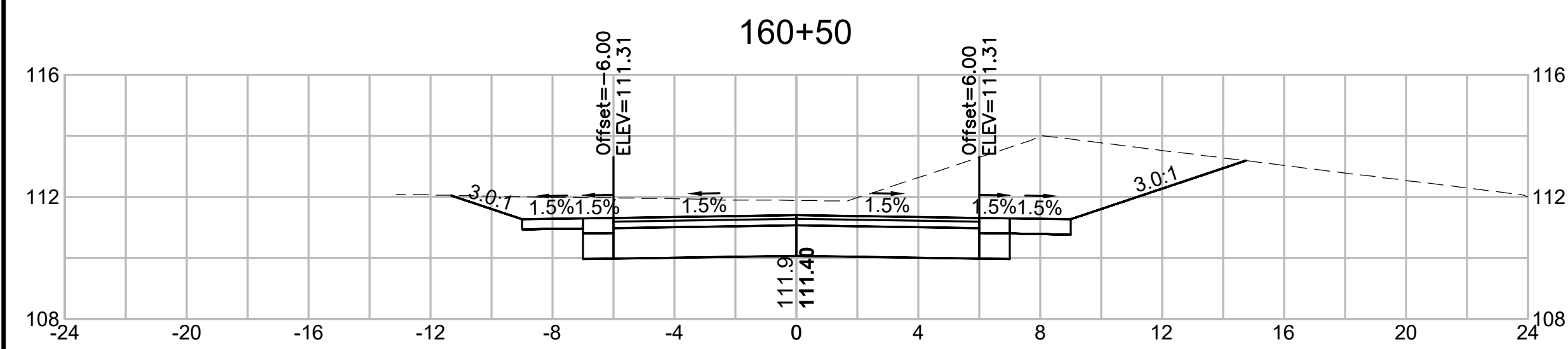
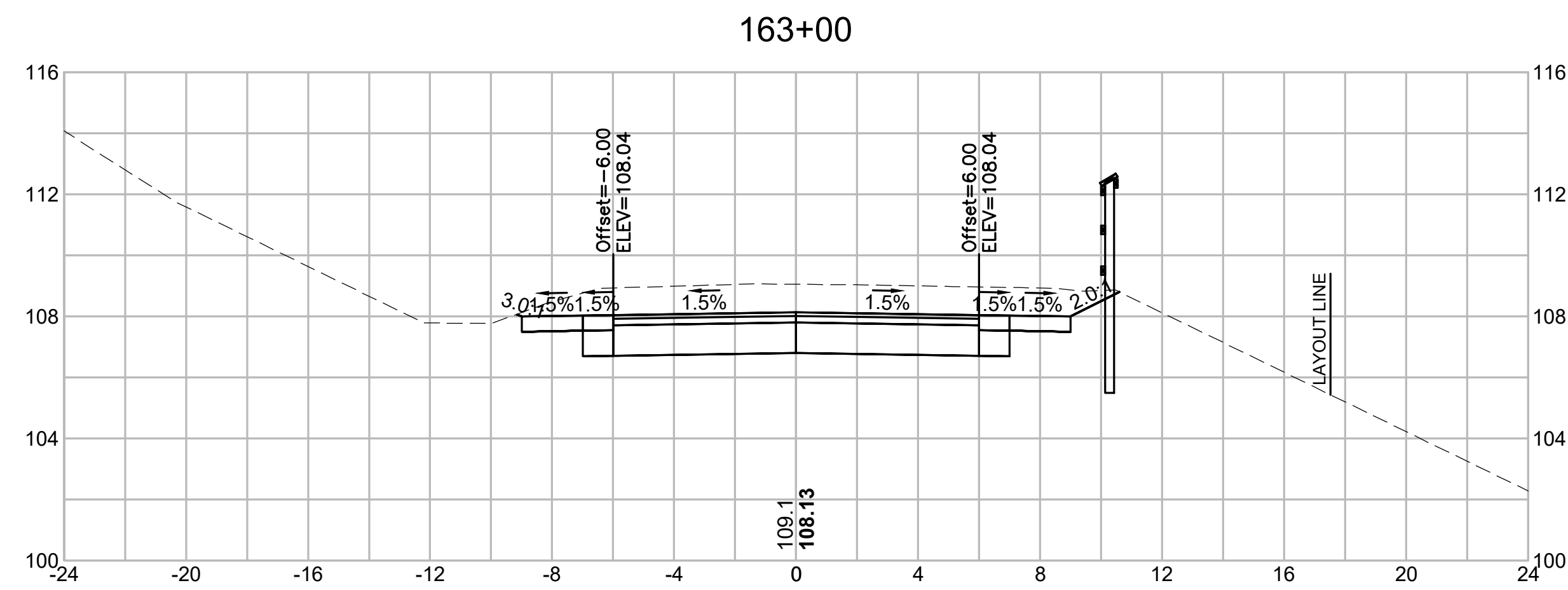
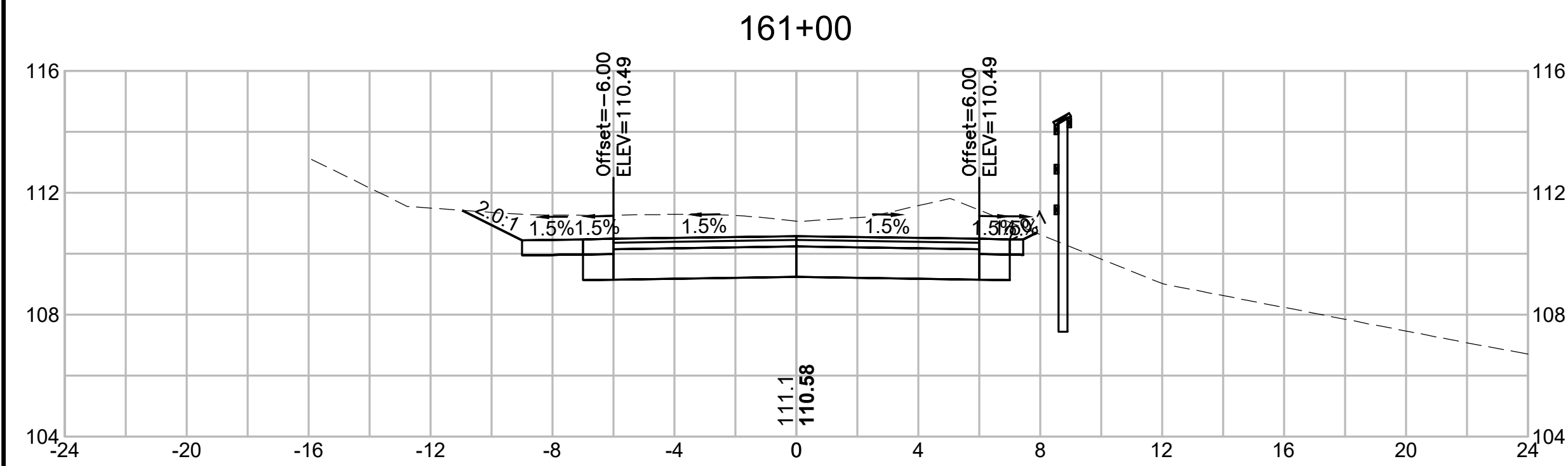
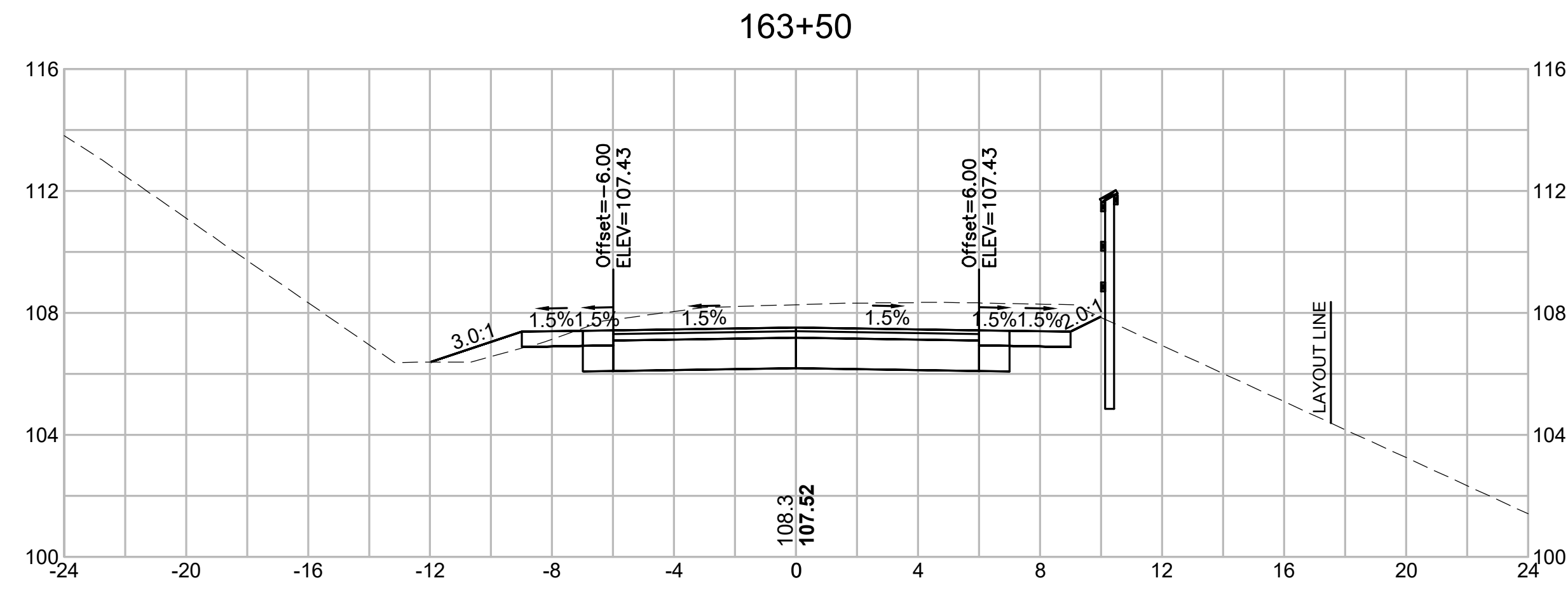
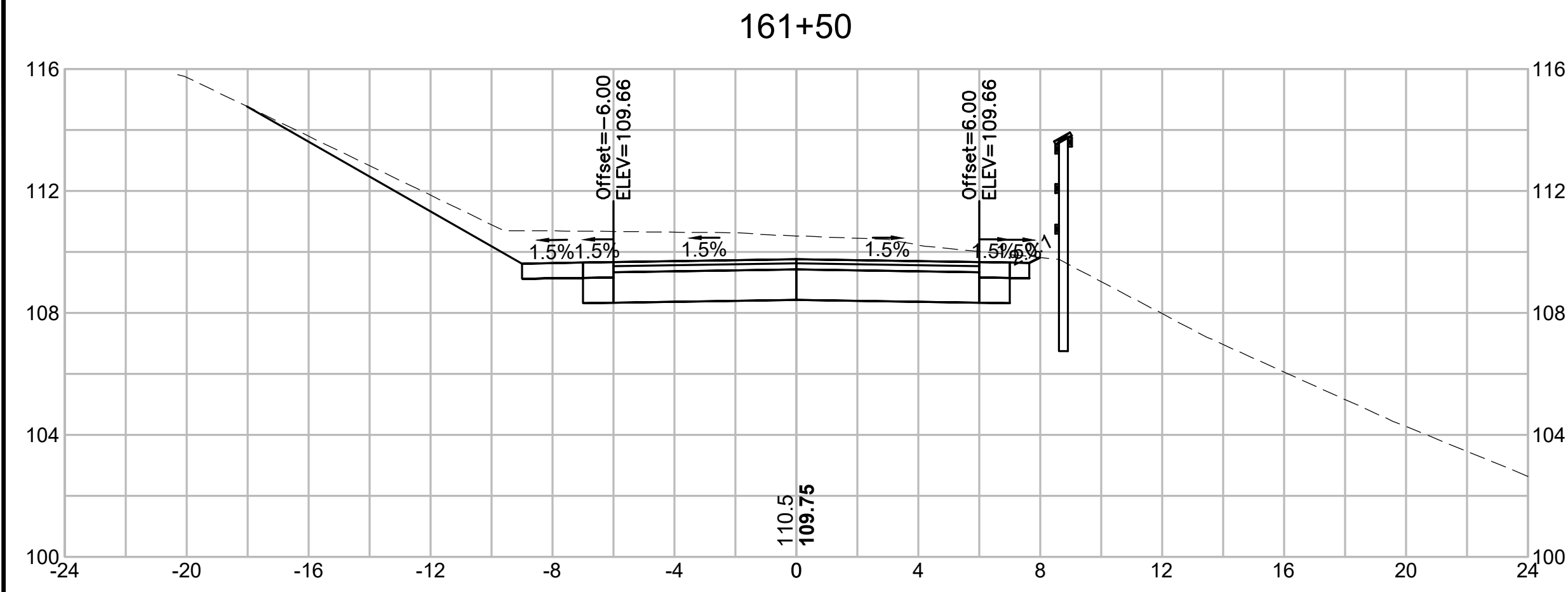
**CROSS SECTIONS - 2**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	87	114
PROJECT FILE NO.		17112.00	

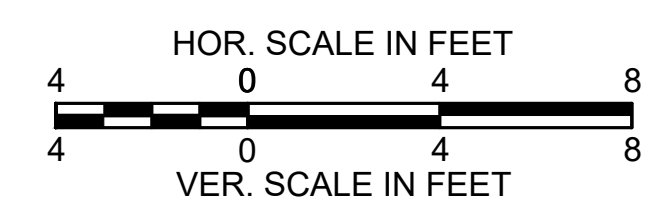
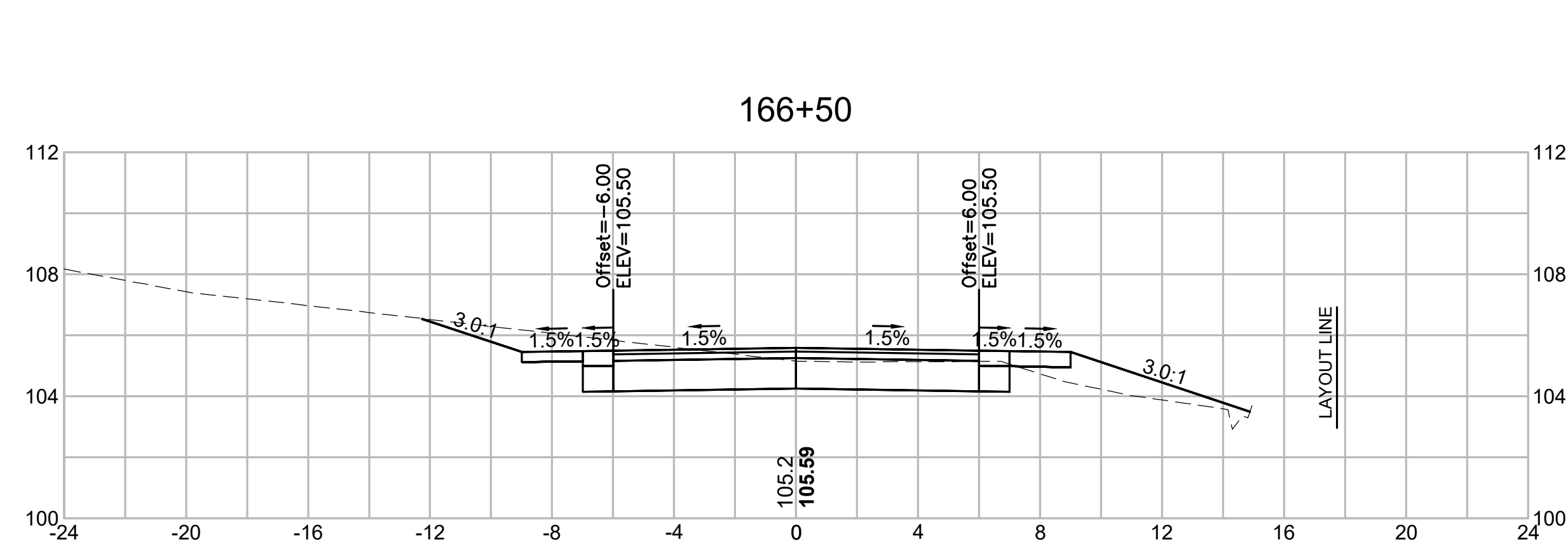
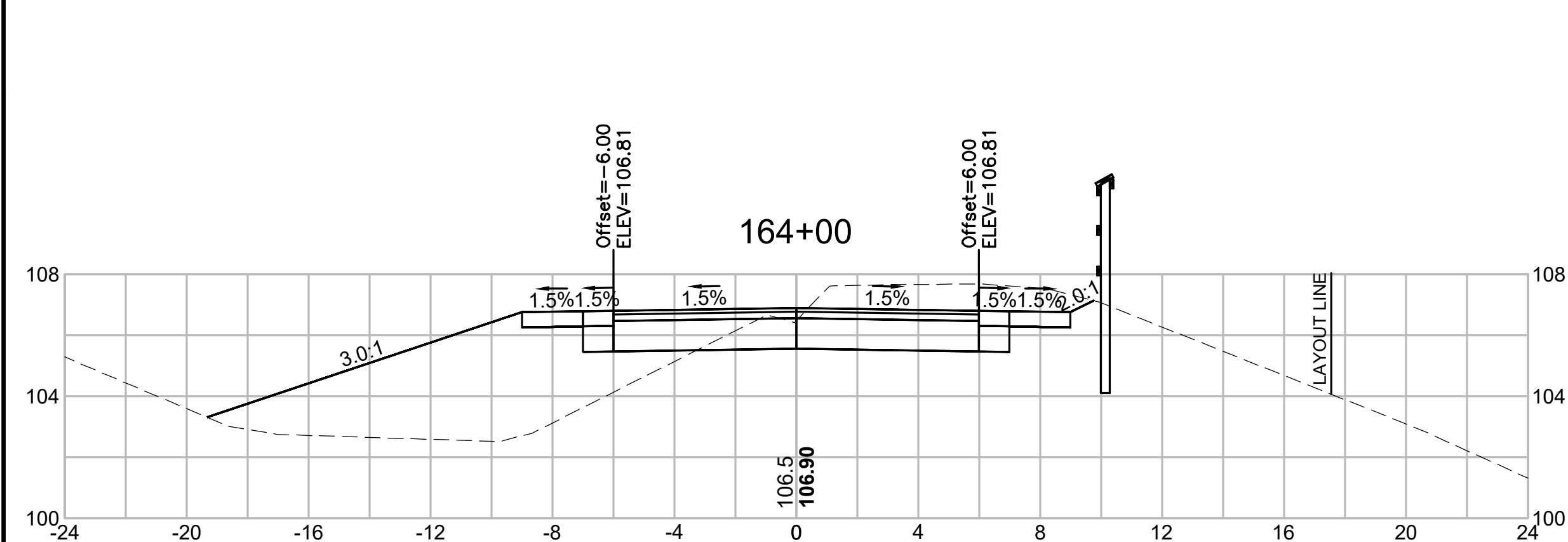
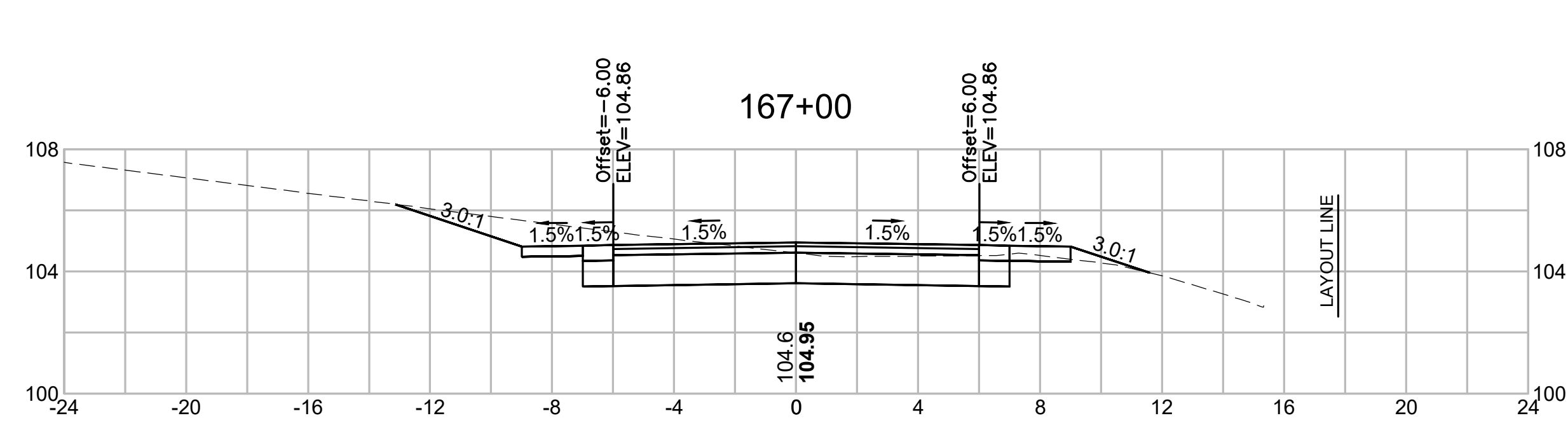
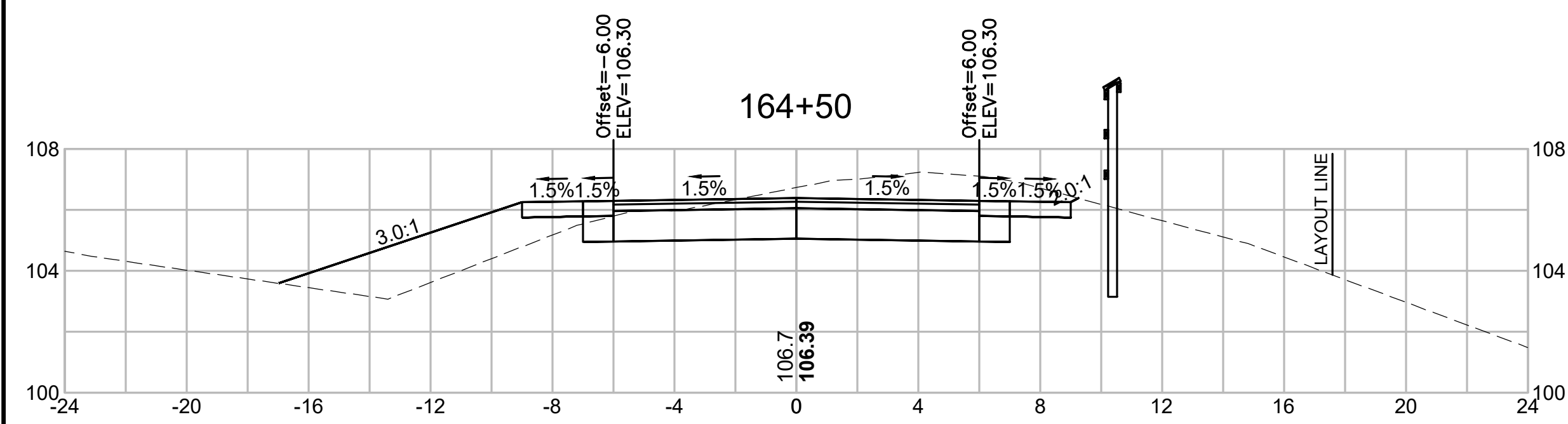
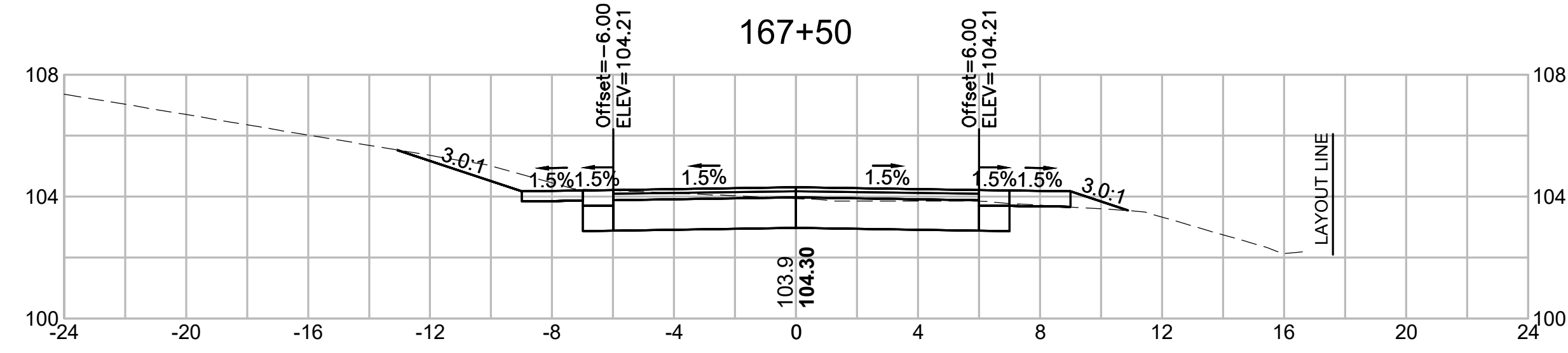
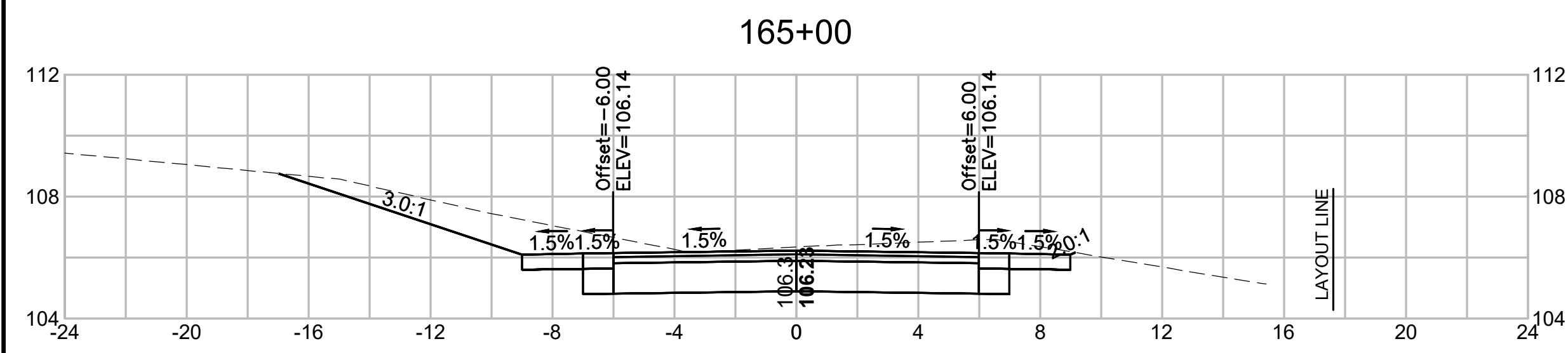
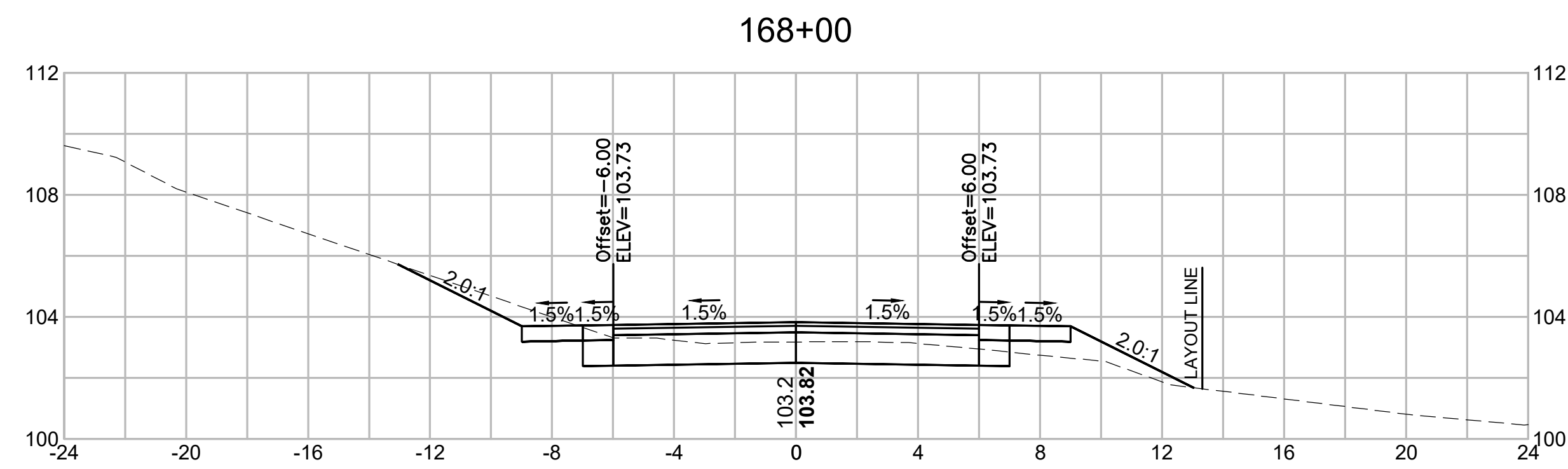
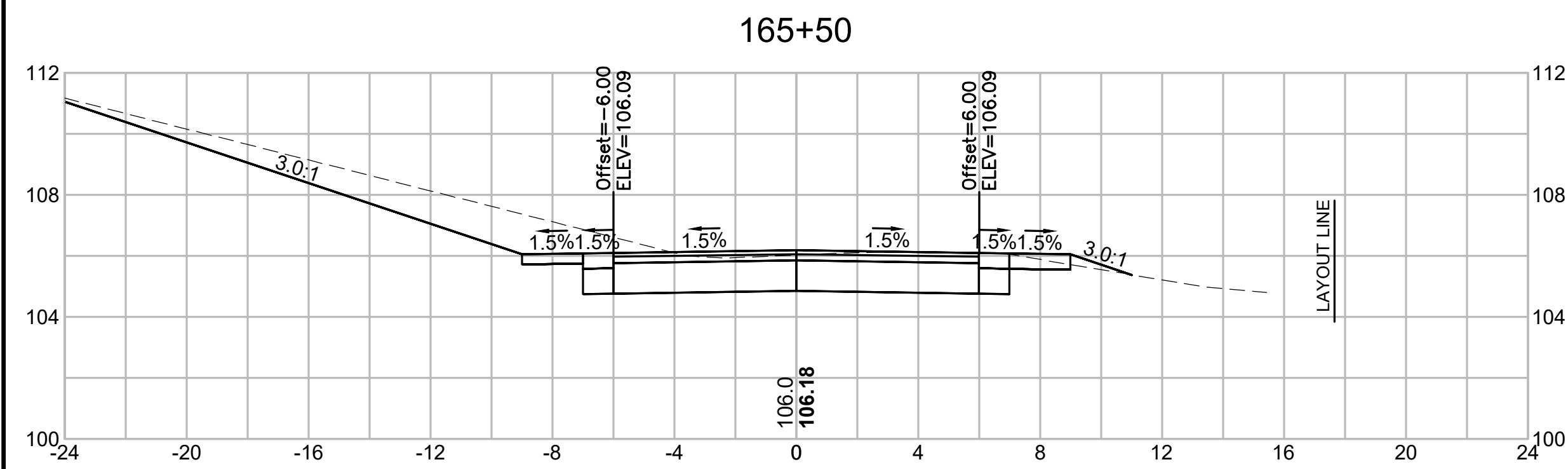
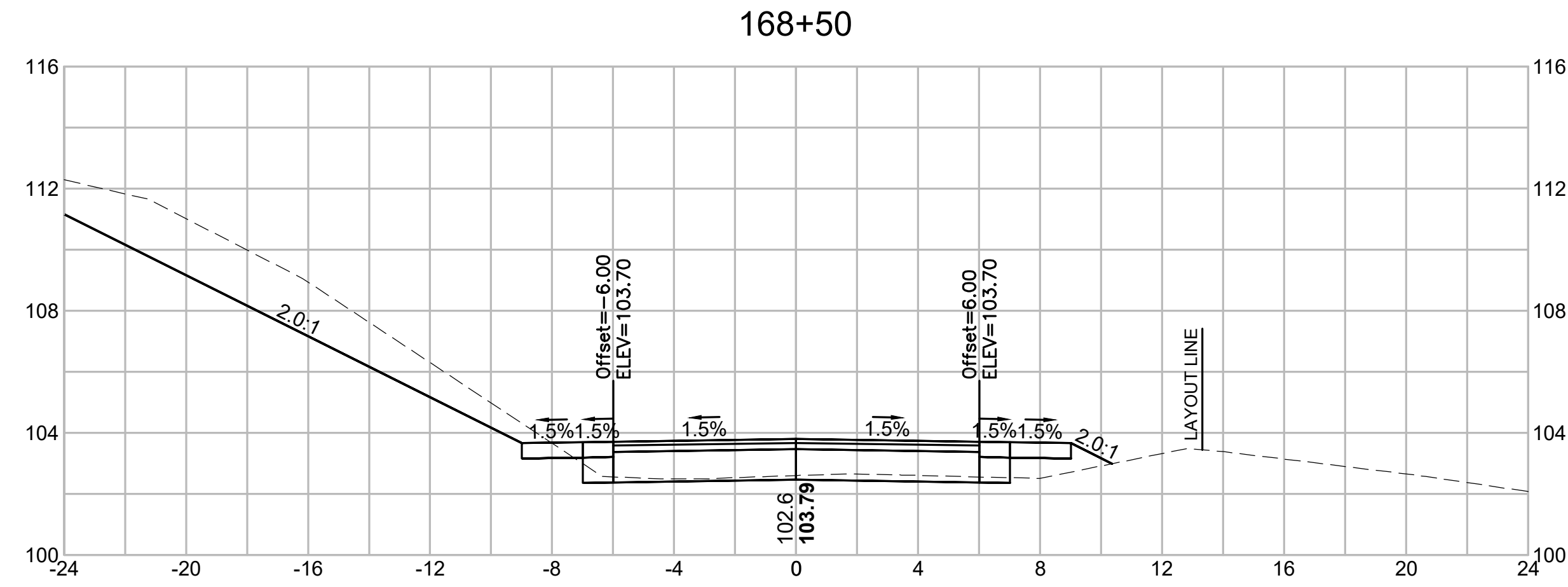
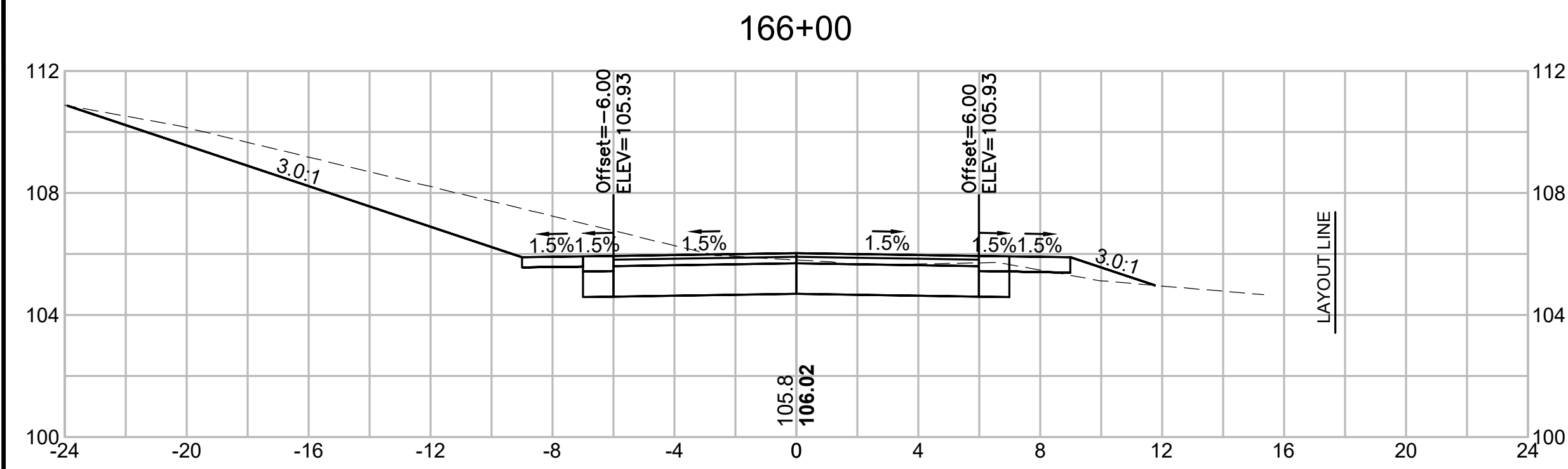
**CROSS SECTIONS - 3**



**WALTHAM  
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STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	88	114
PROJECT FILE NO.		17112.00	

**CROSS SECTIONS - 4**

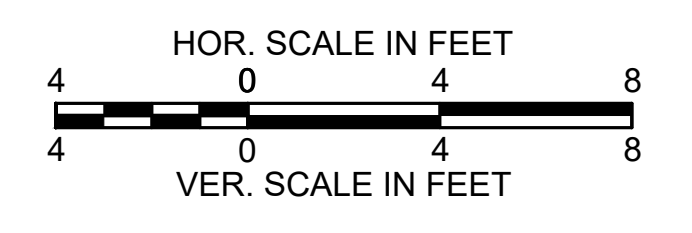
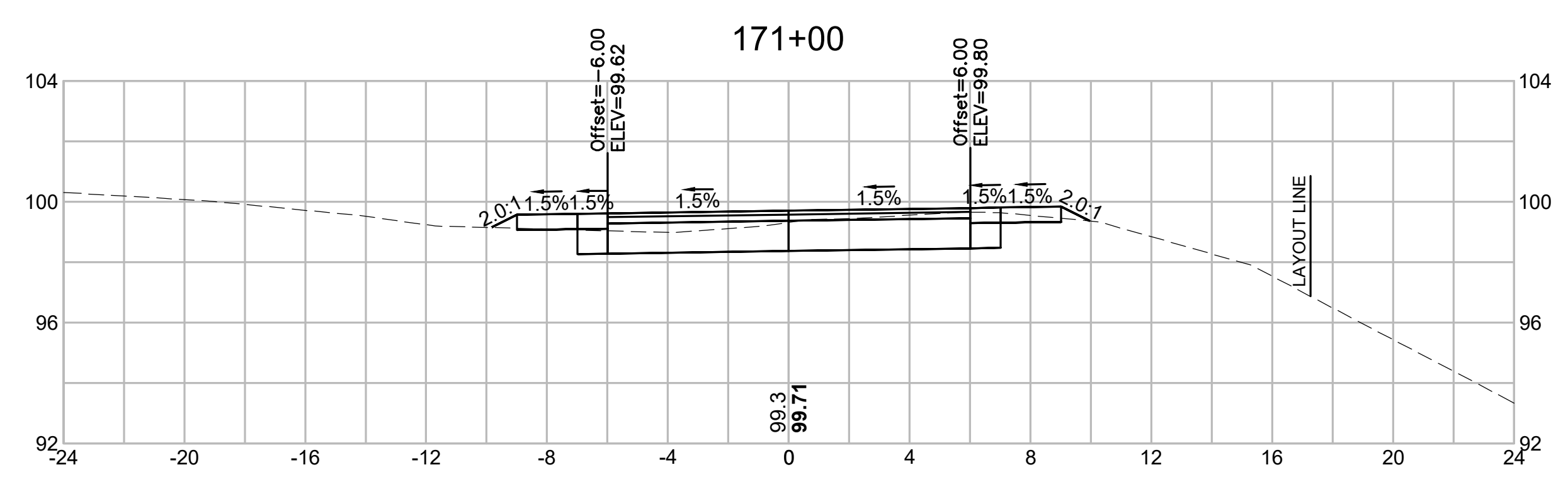
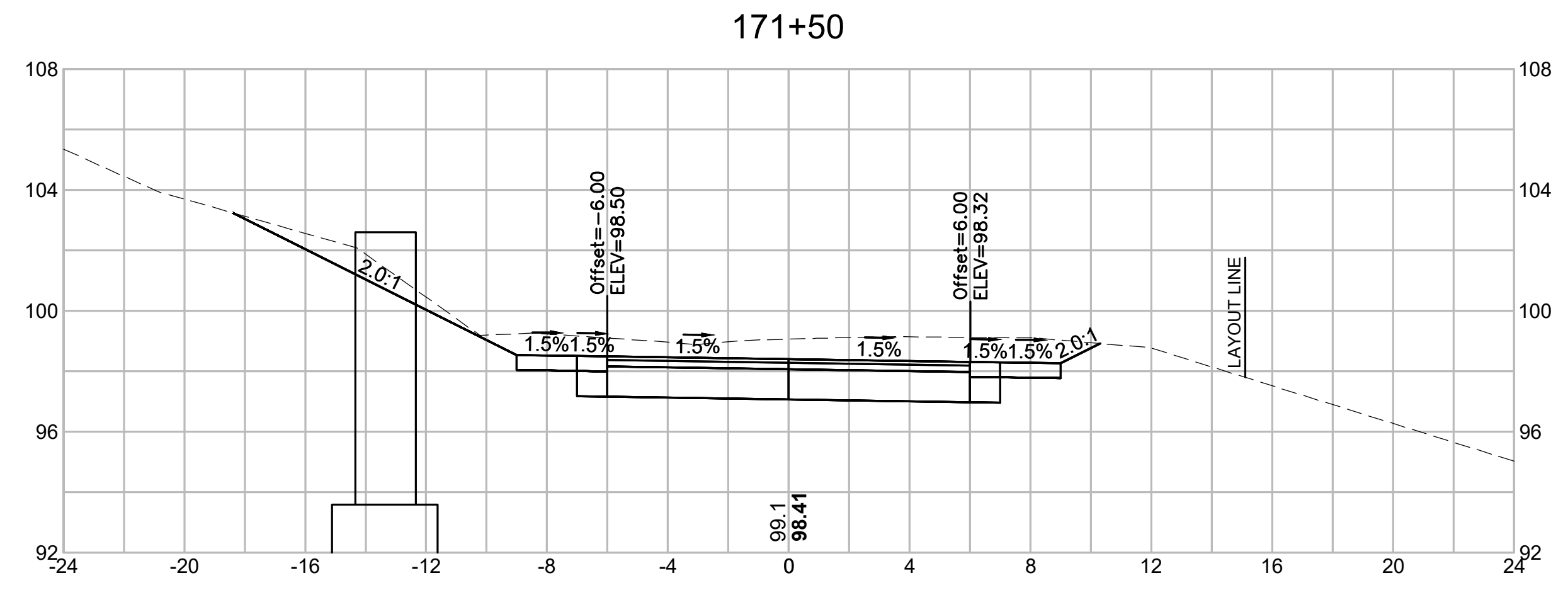
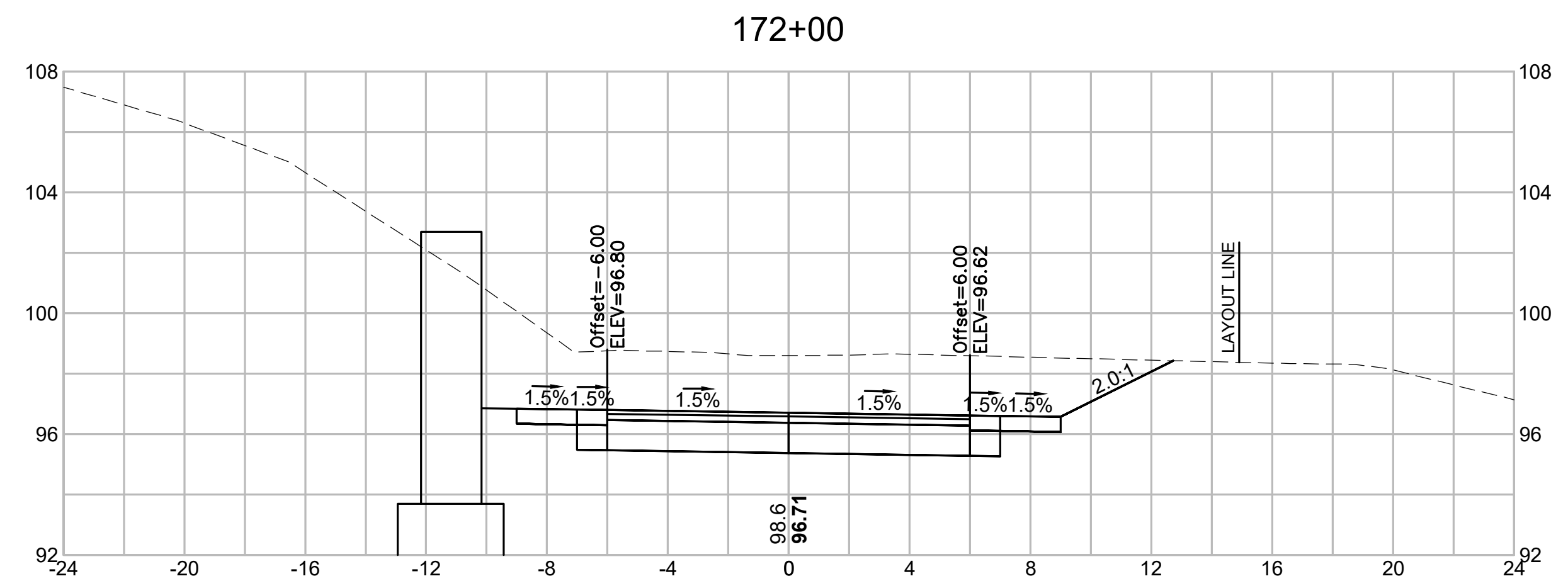
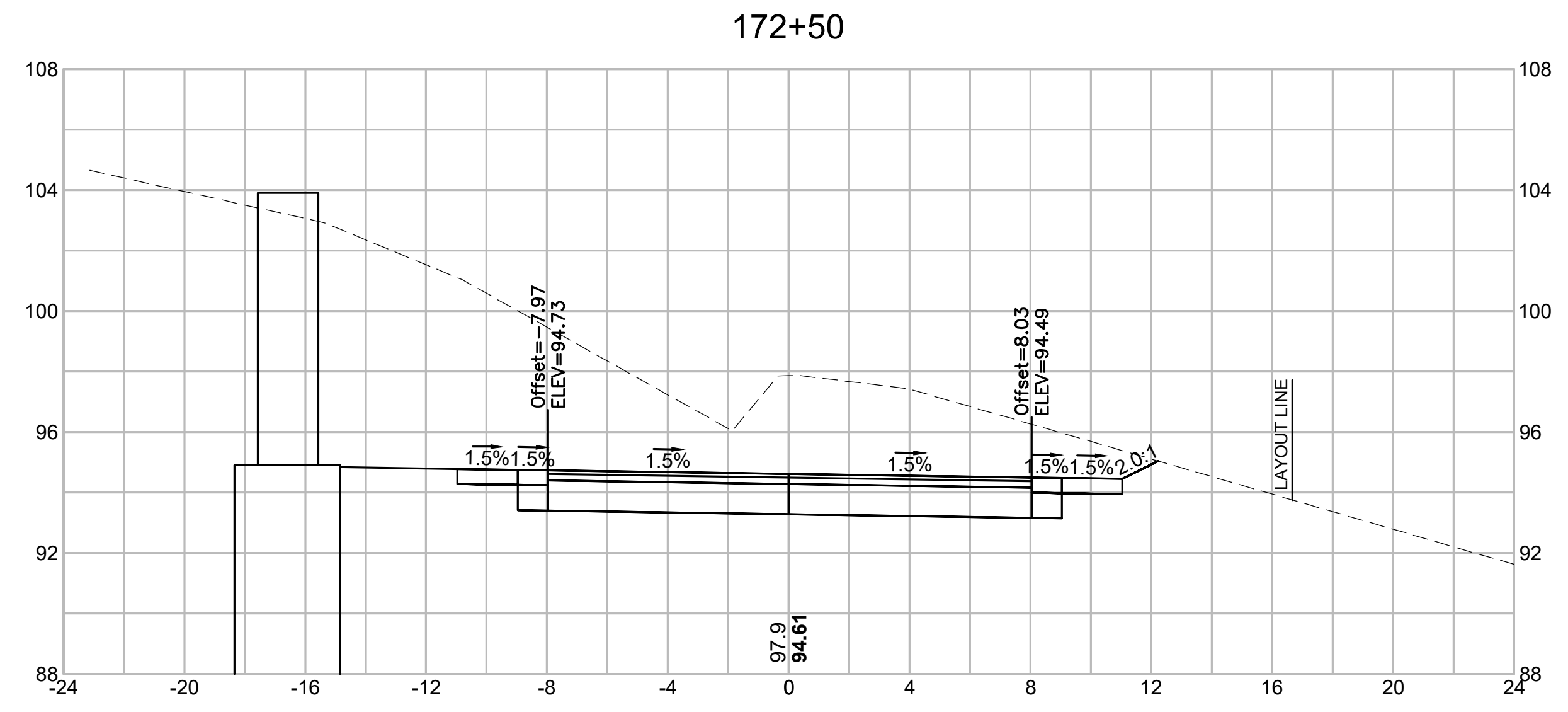
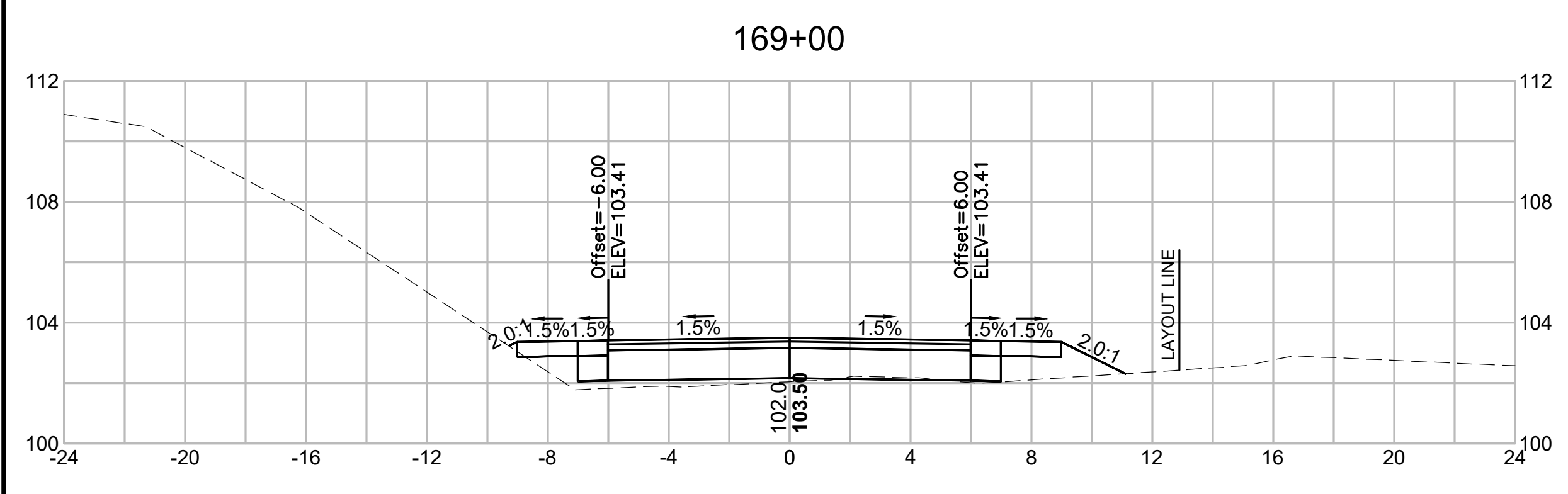
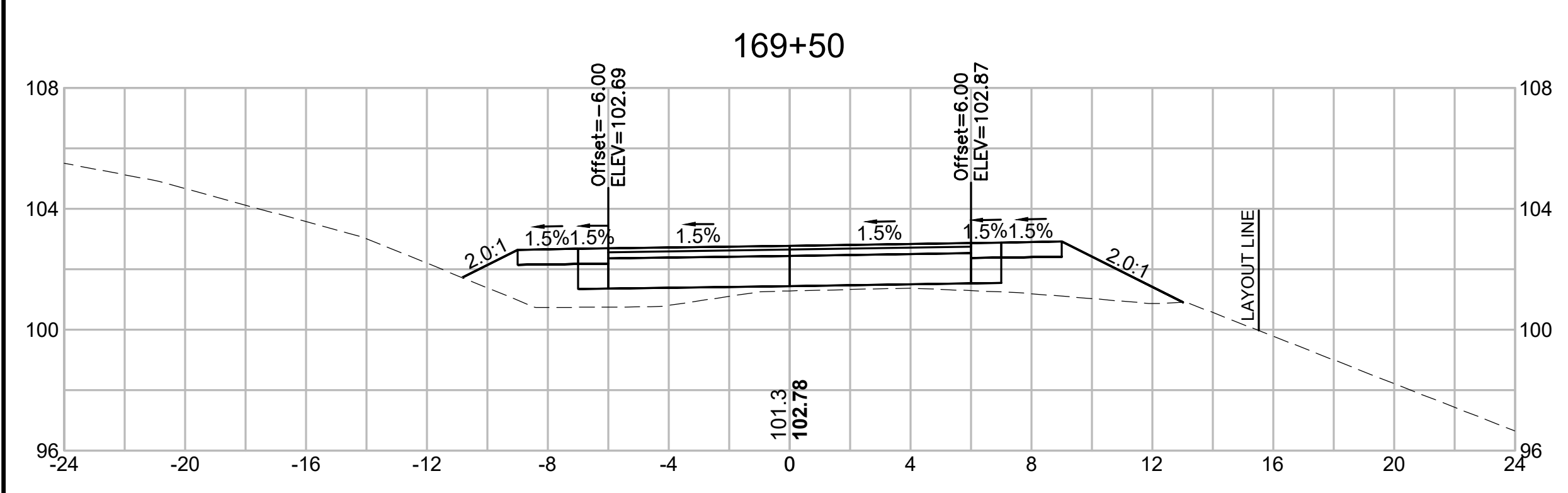
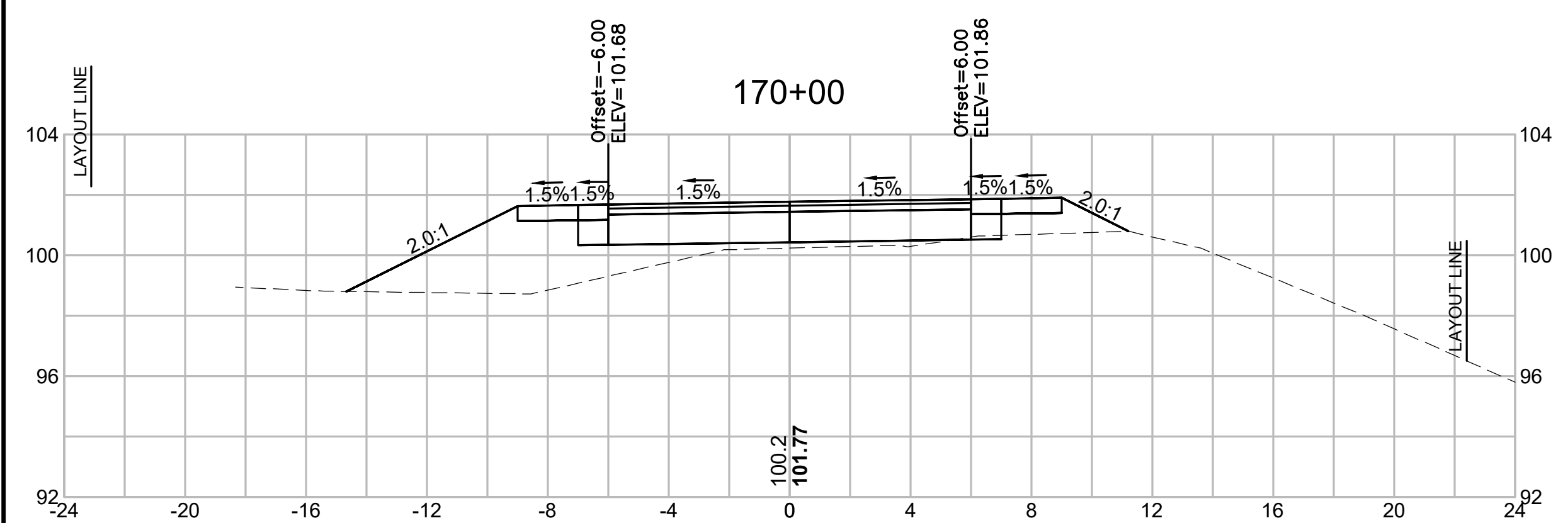
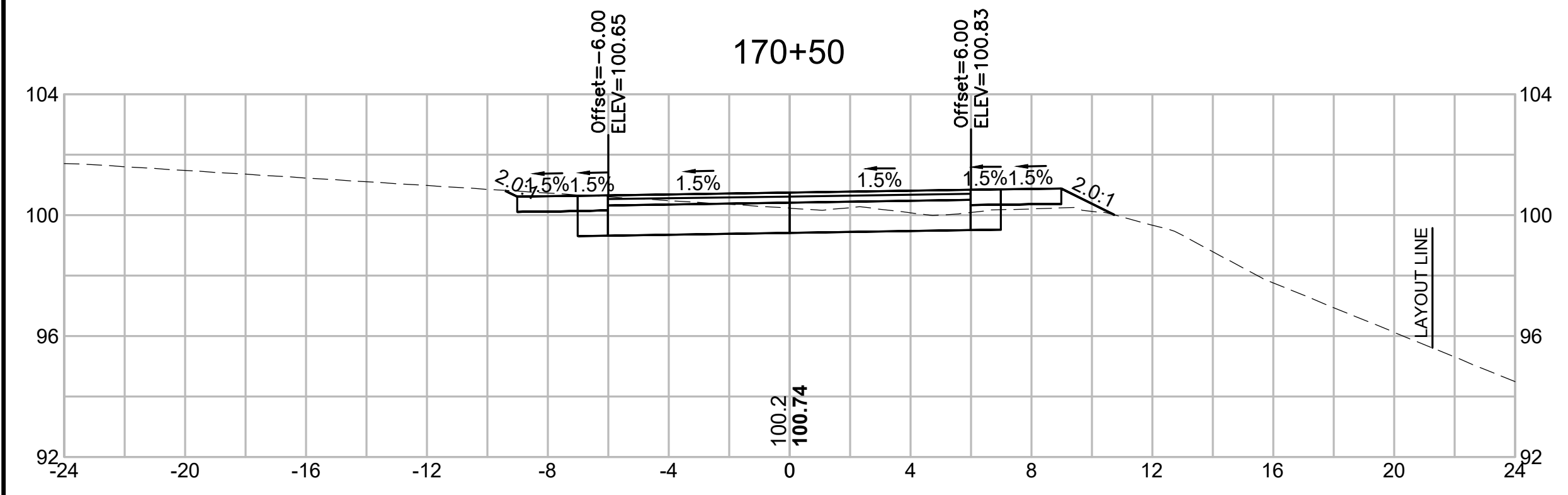




**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	89	114
PROJECT FILE NO.		17112.00	

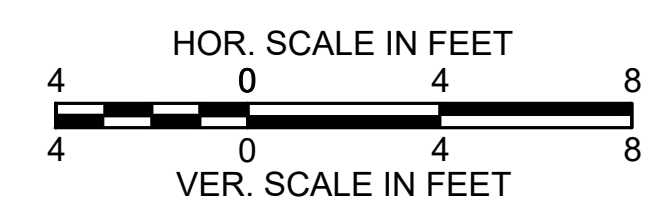
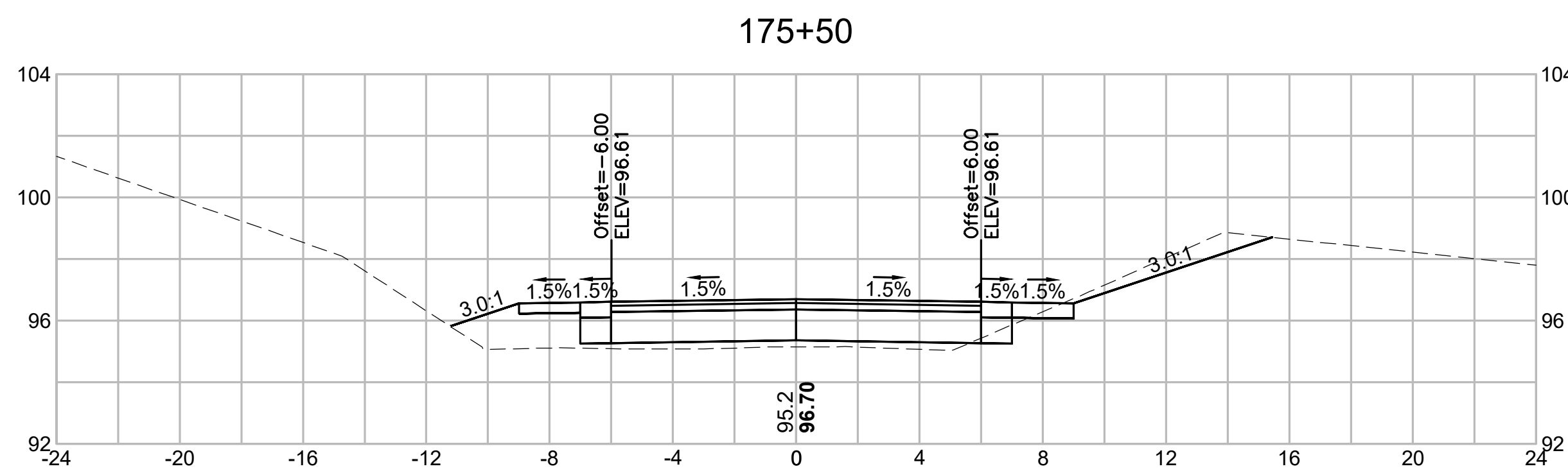
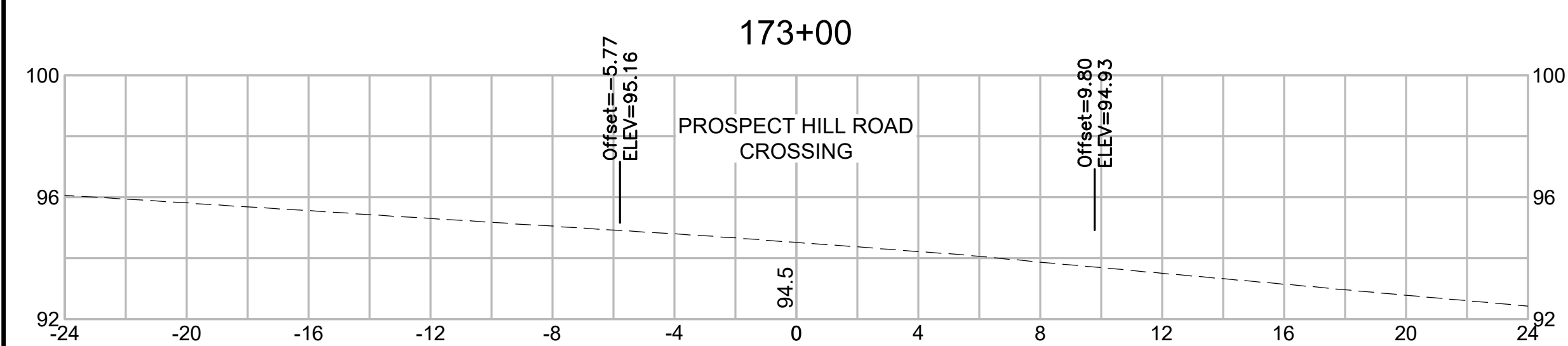
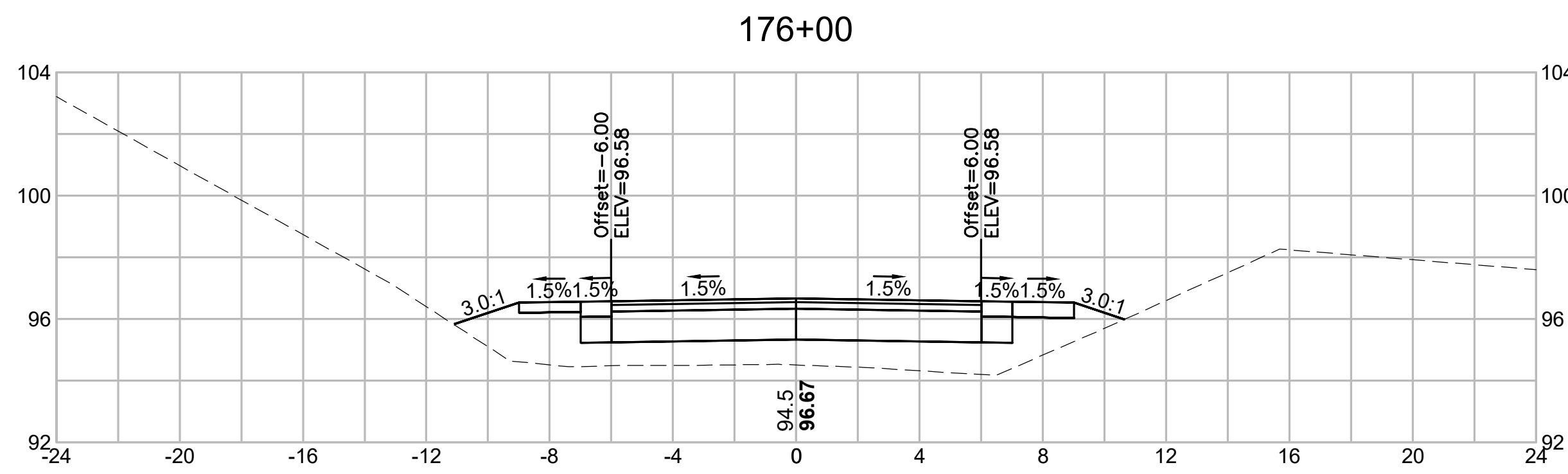
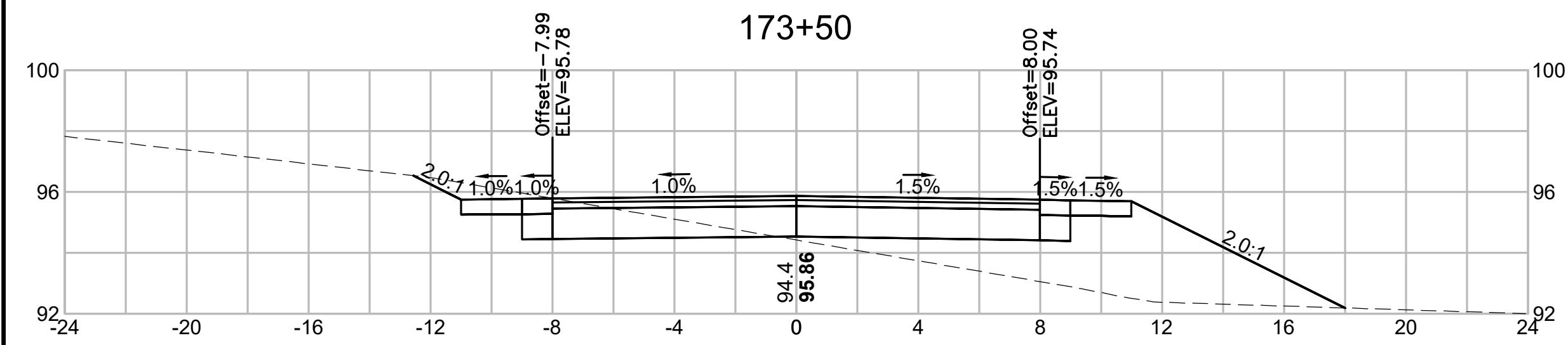
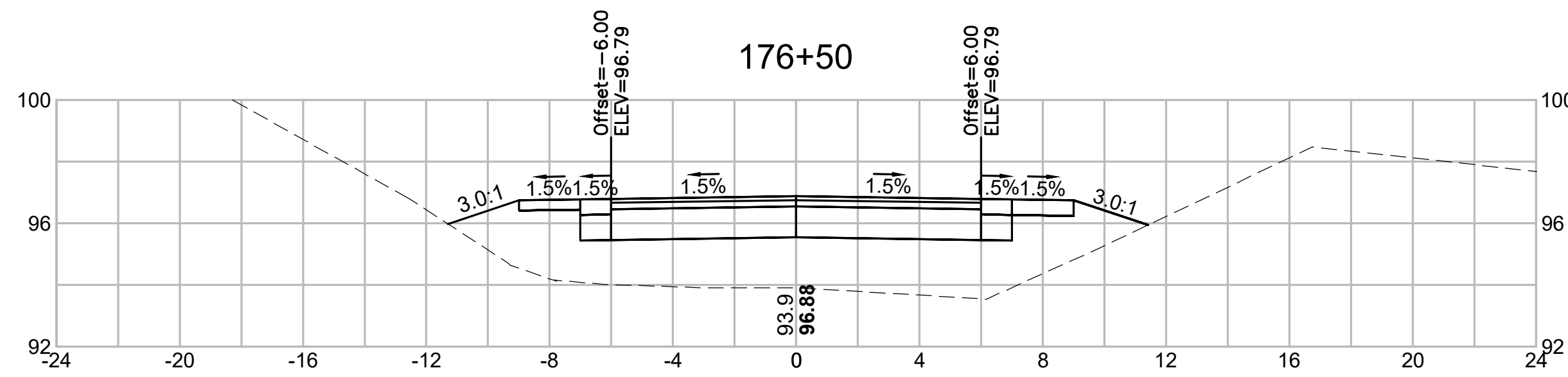
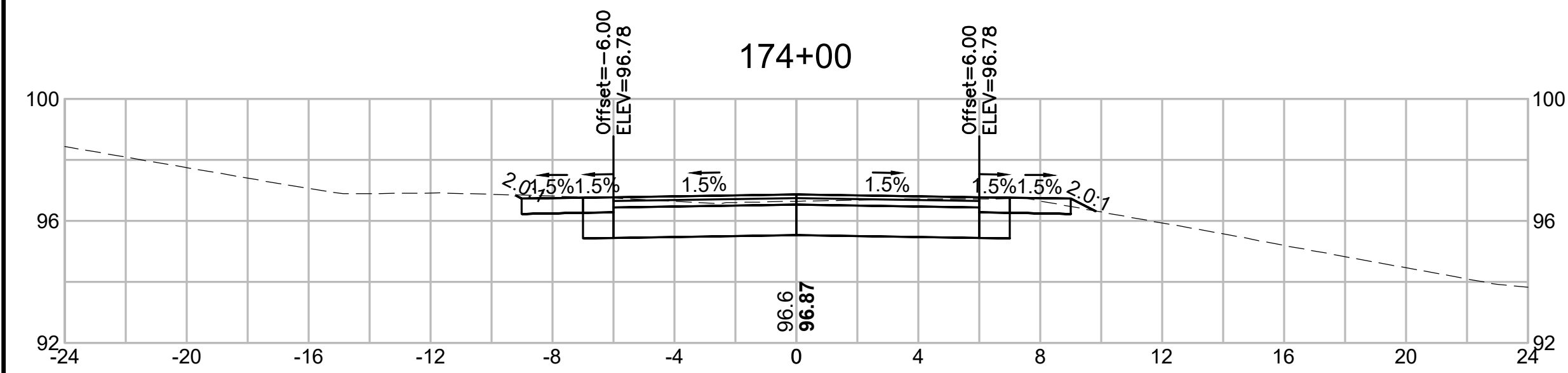
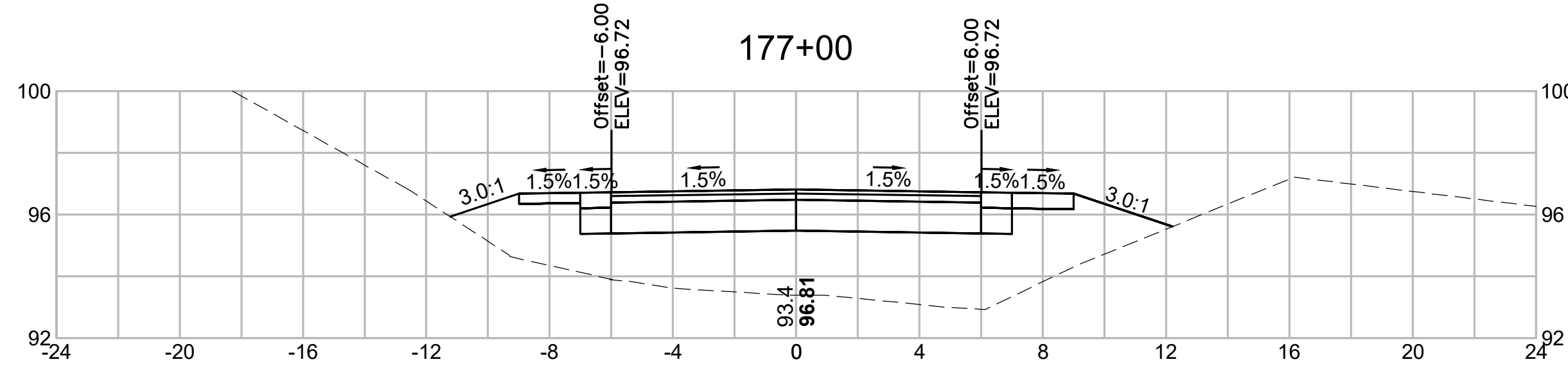
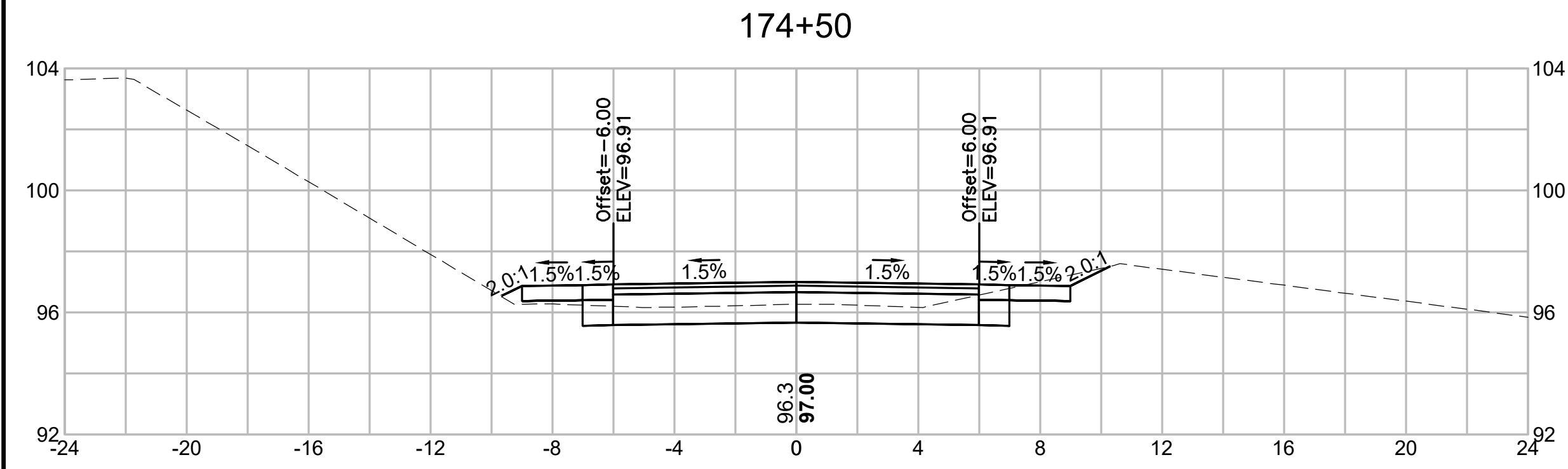
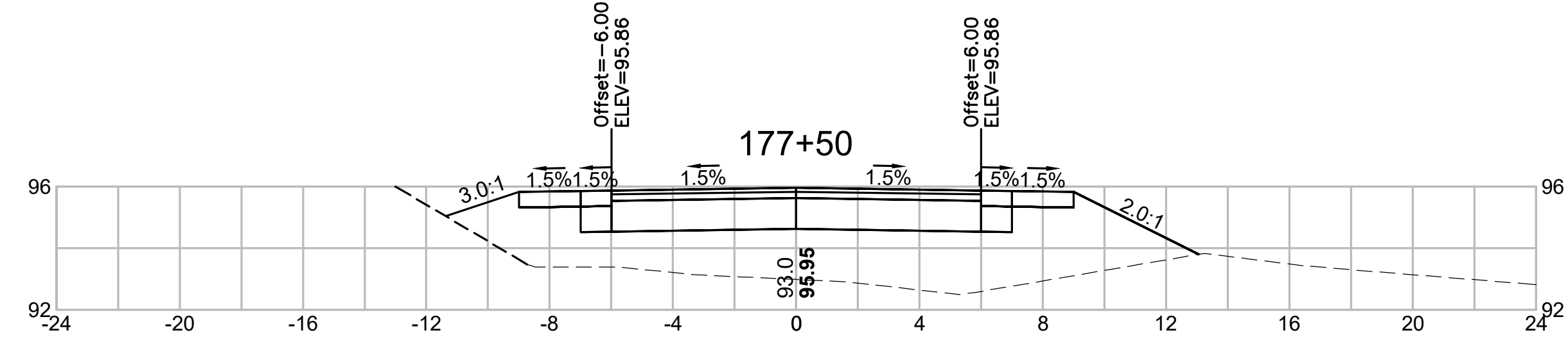
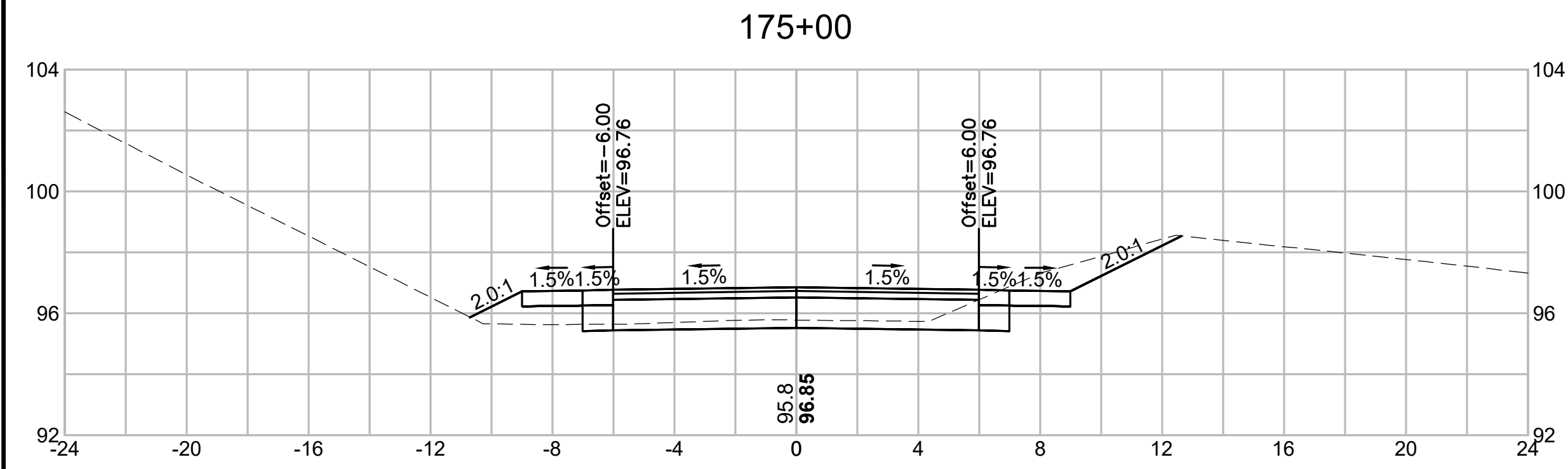
**CROSS SECTIONS - 5**



**WALTHAM  
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STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	90	114
PROJECT FILE NO.		17112.00	

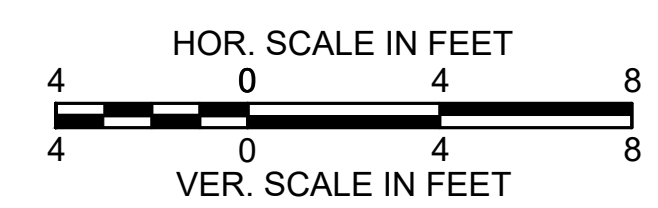
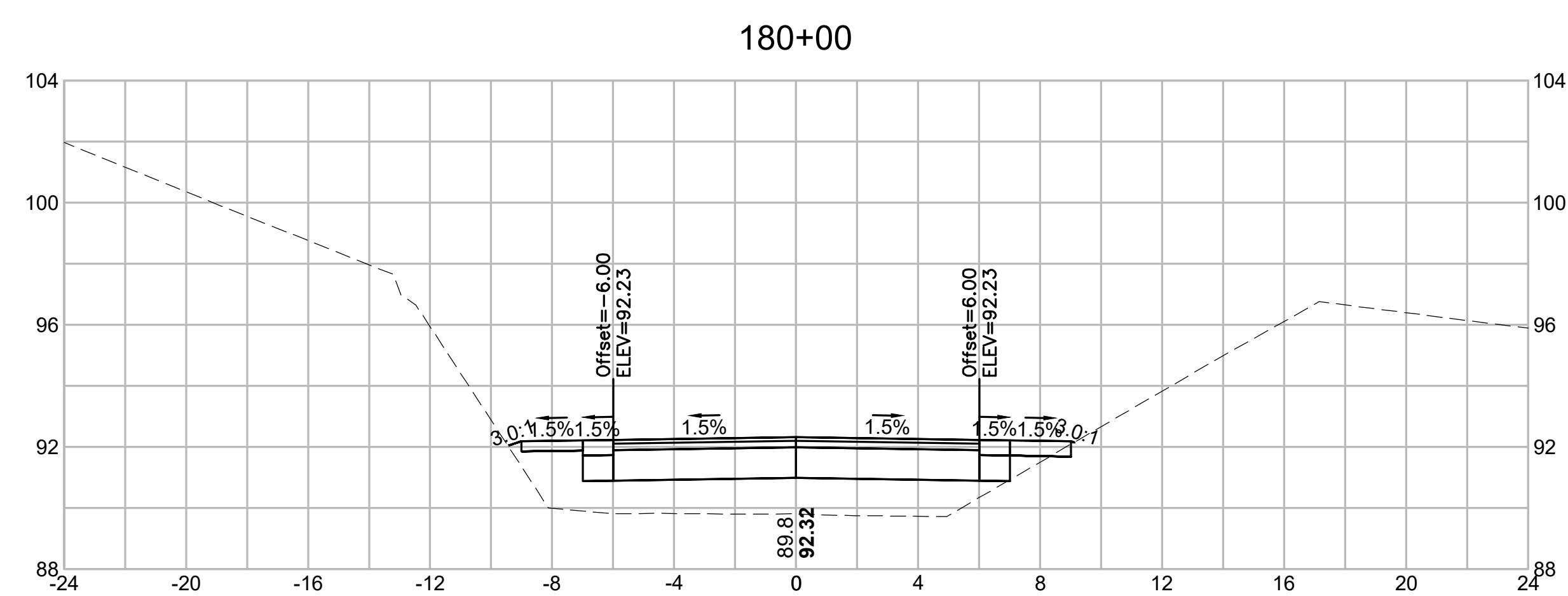
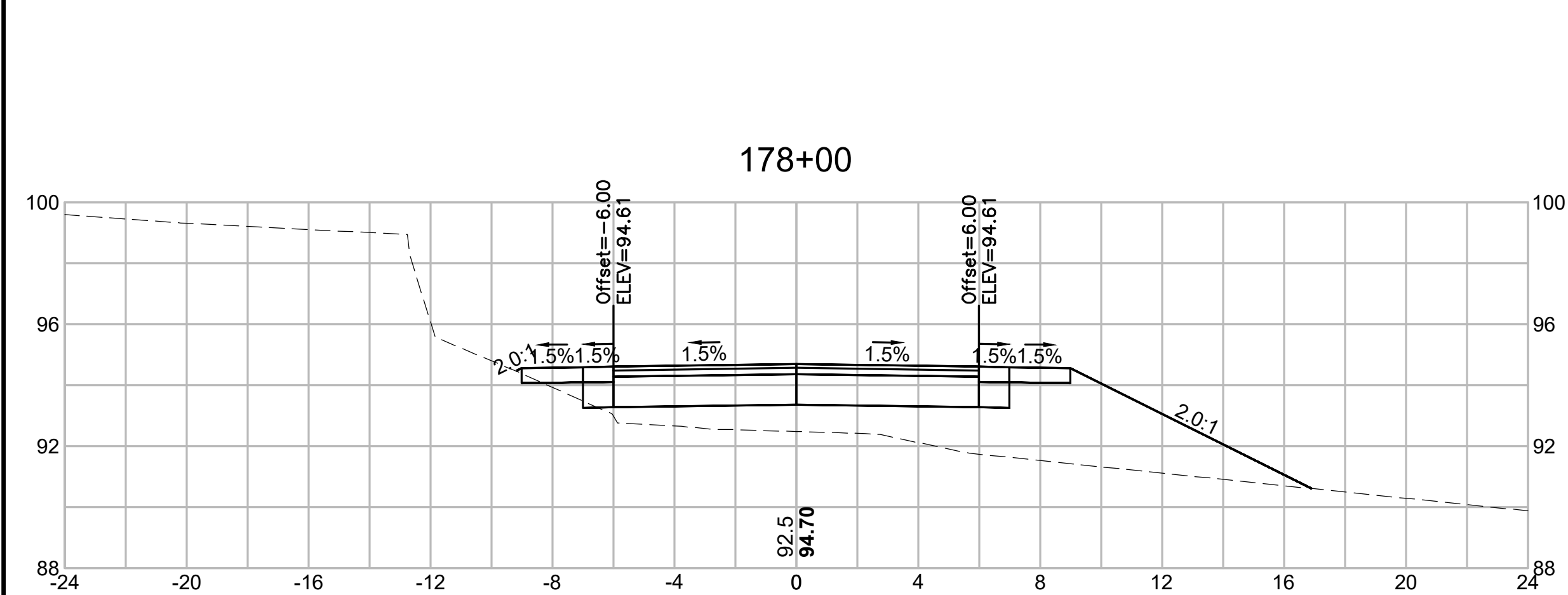
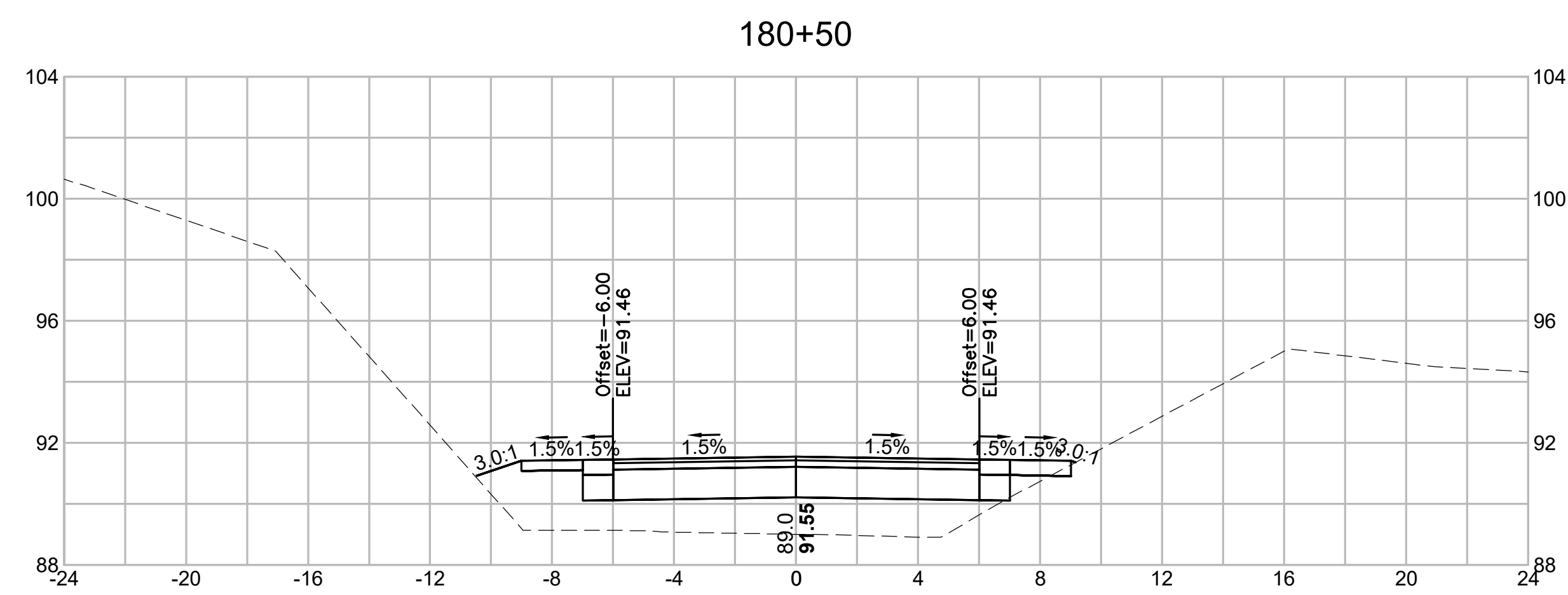
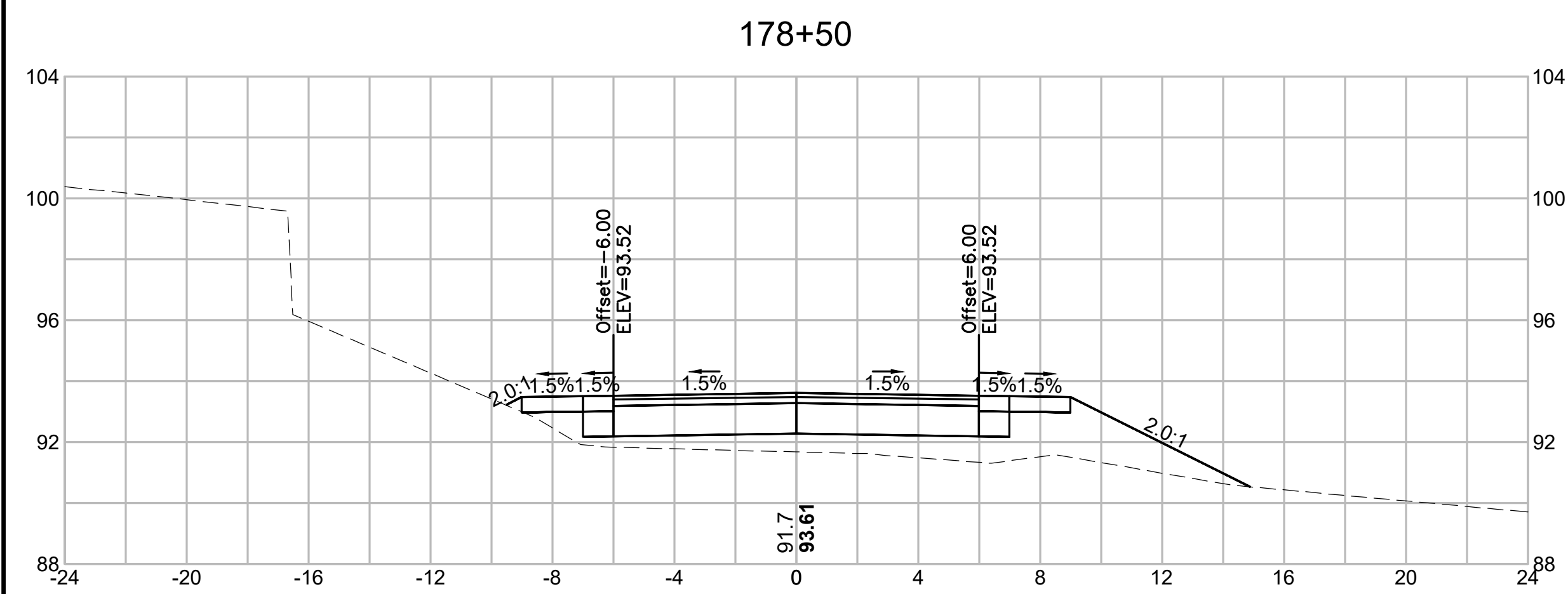
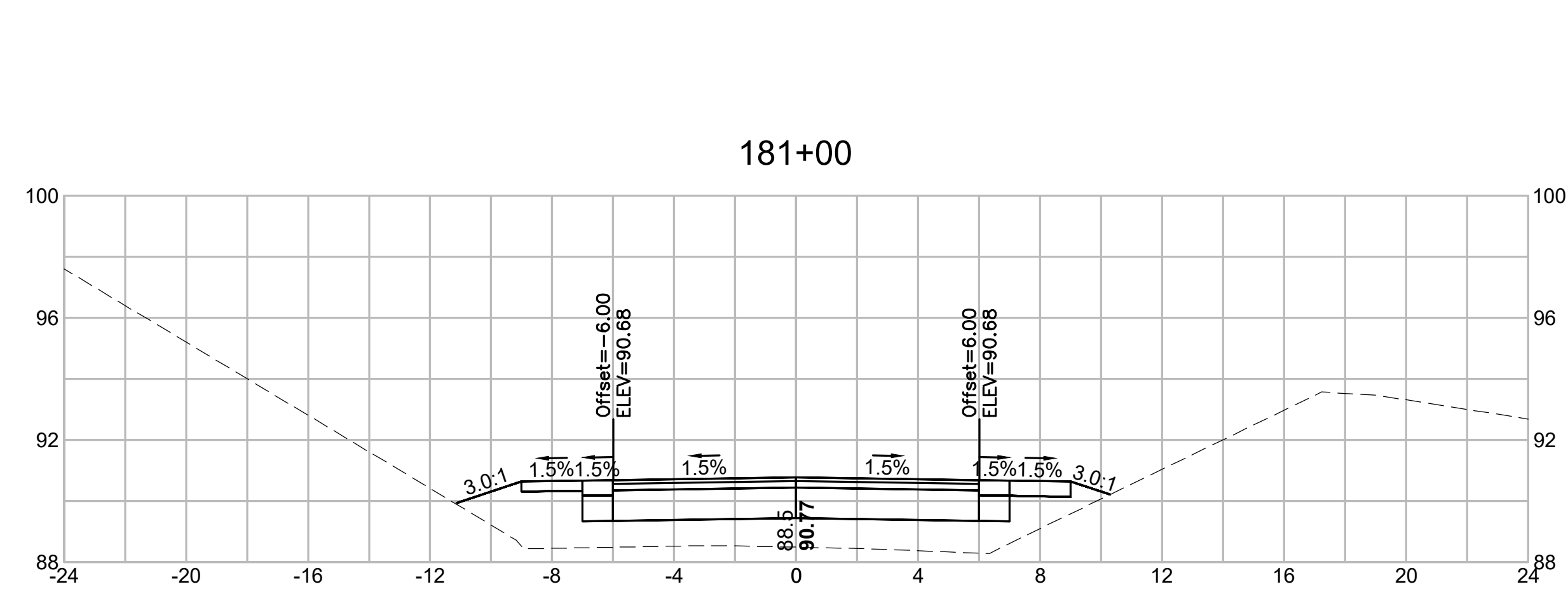
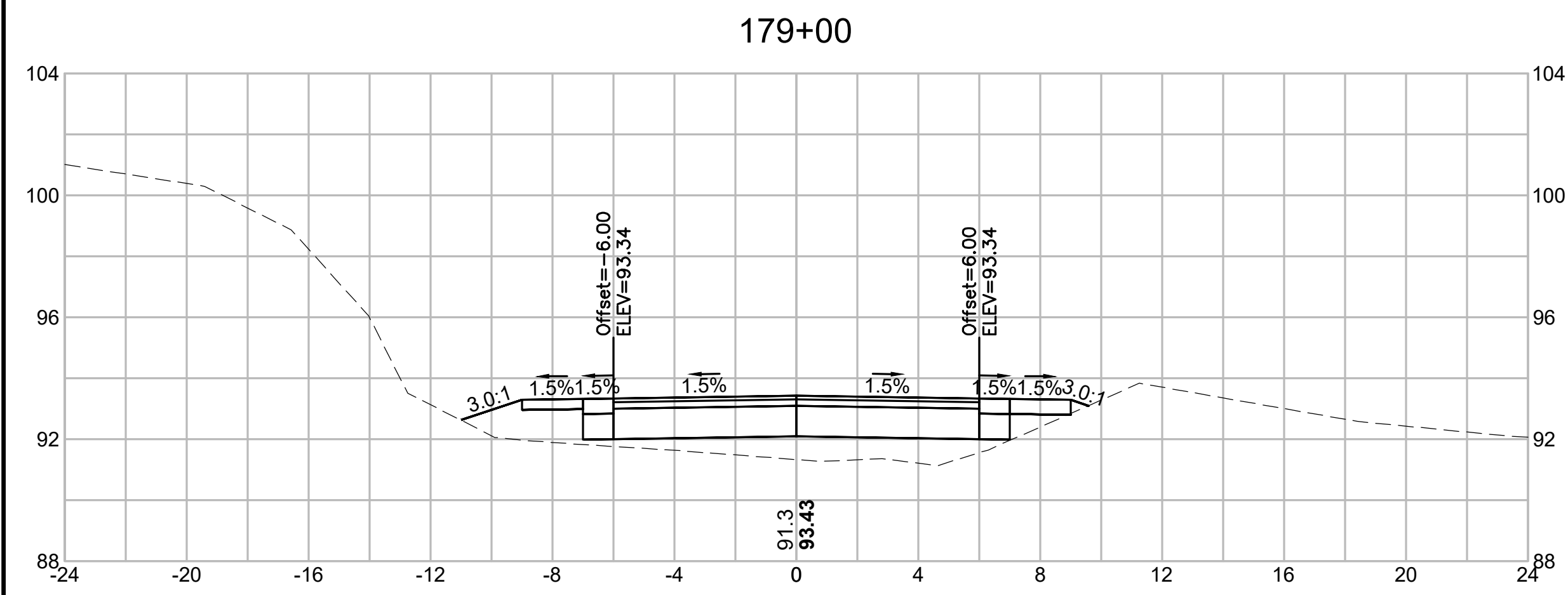
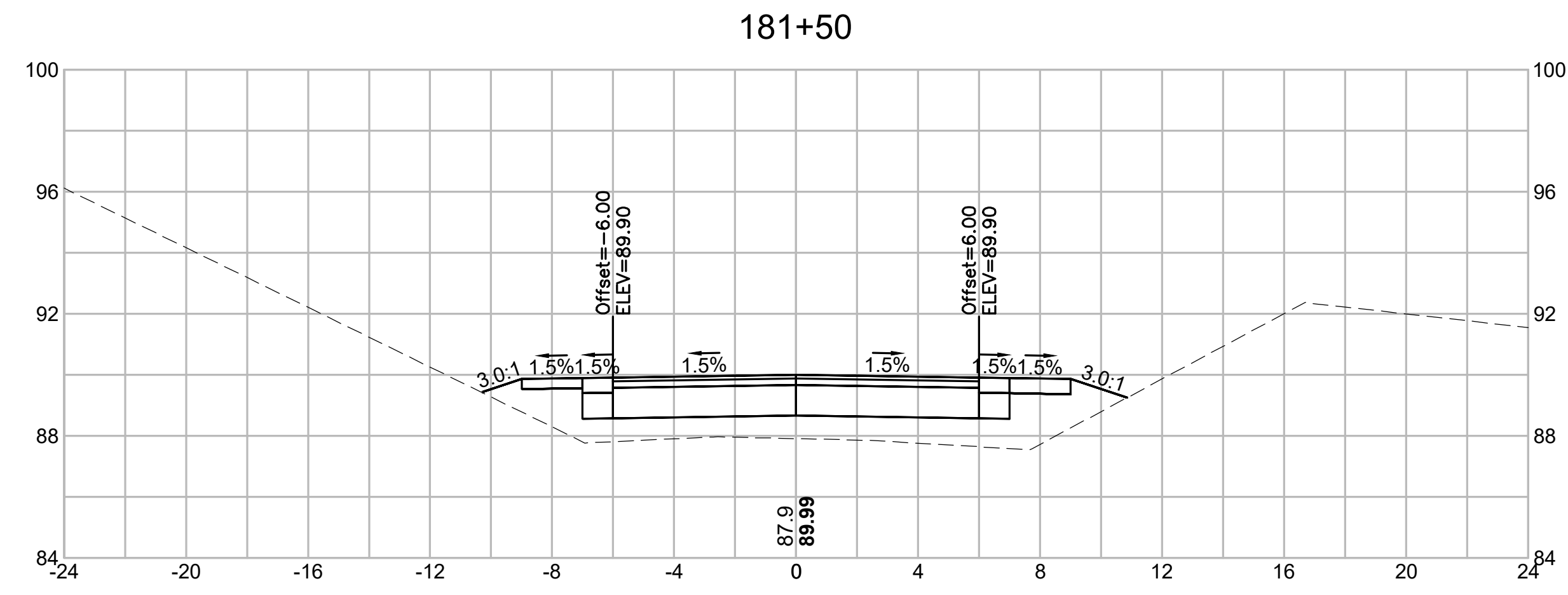
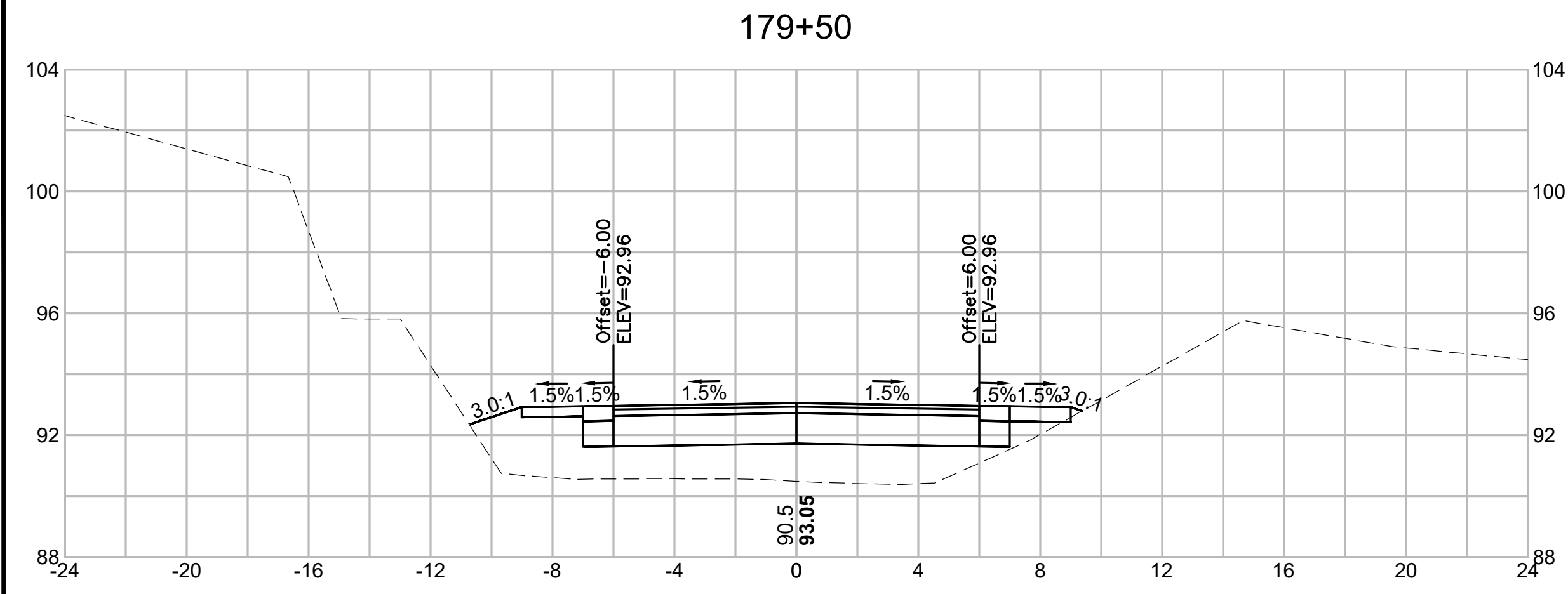
**CROSS SECTIONS - 6**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	91	114
PROJECT FILE NO.		17112.00	

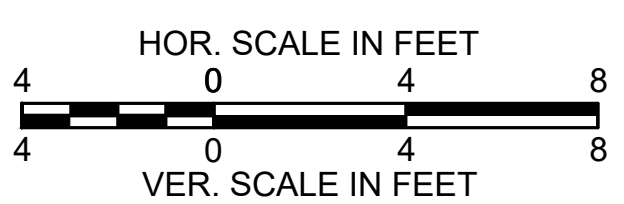
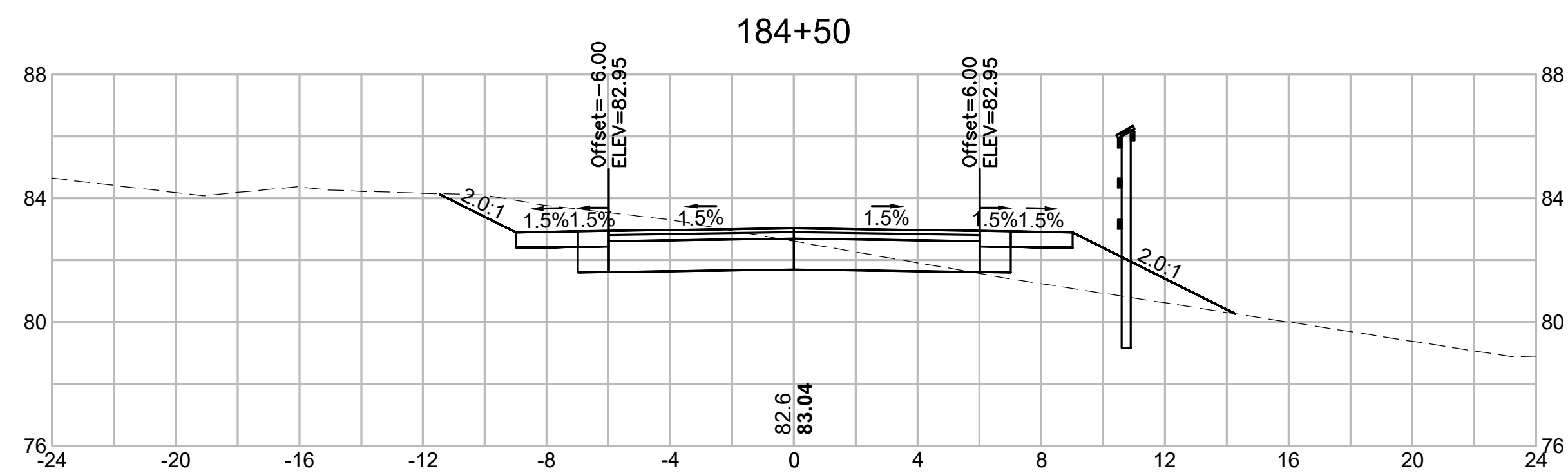
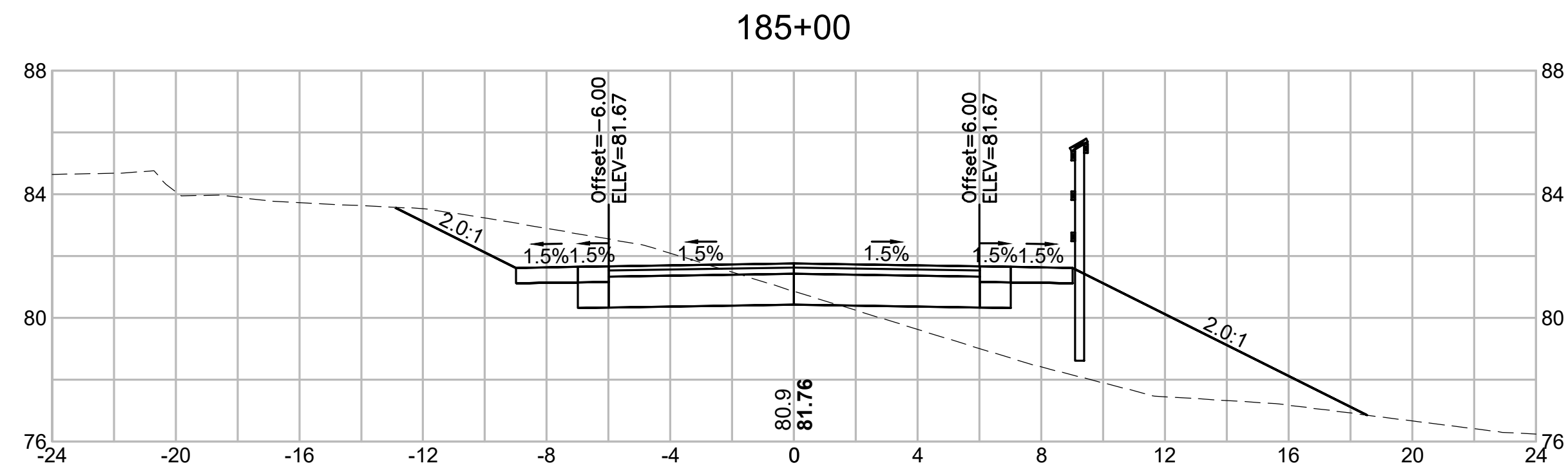
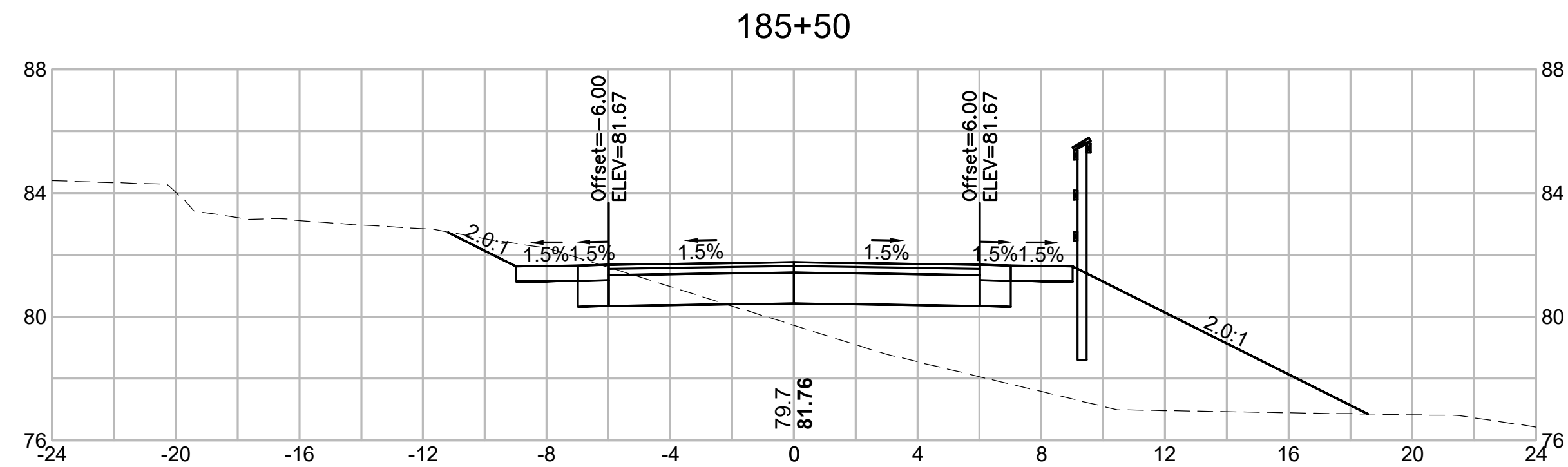
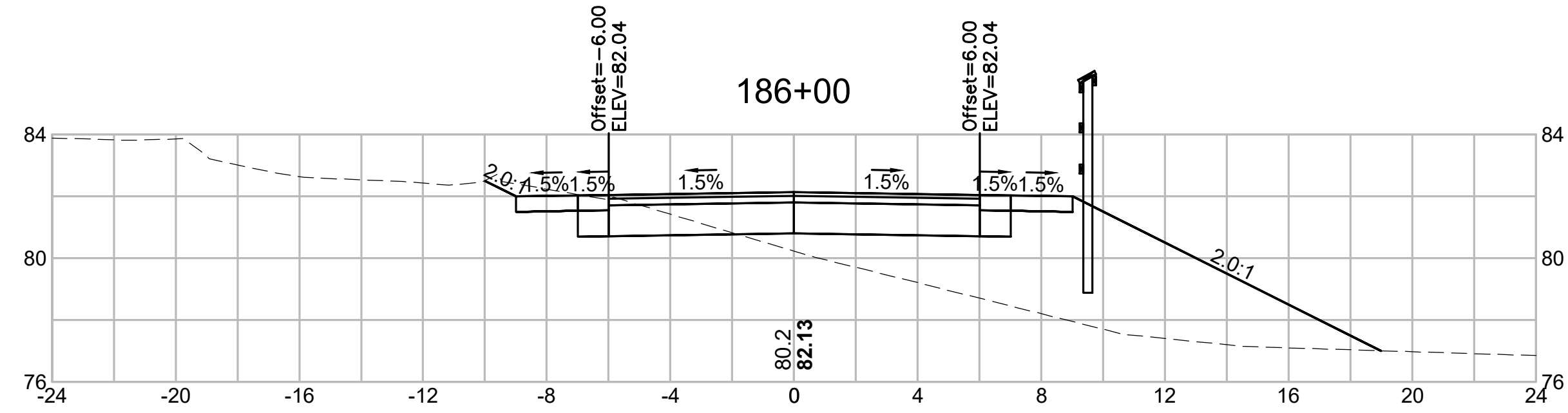
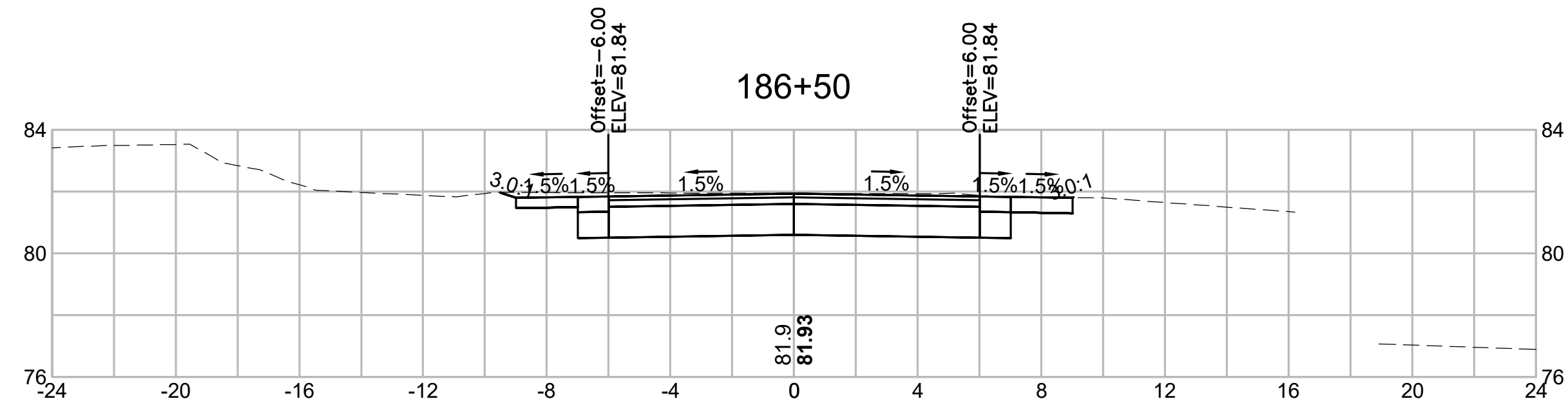
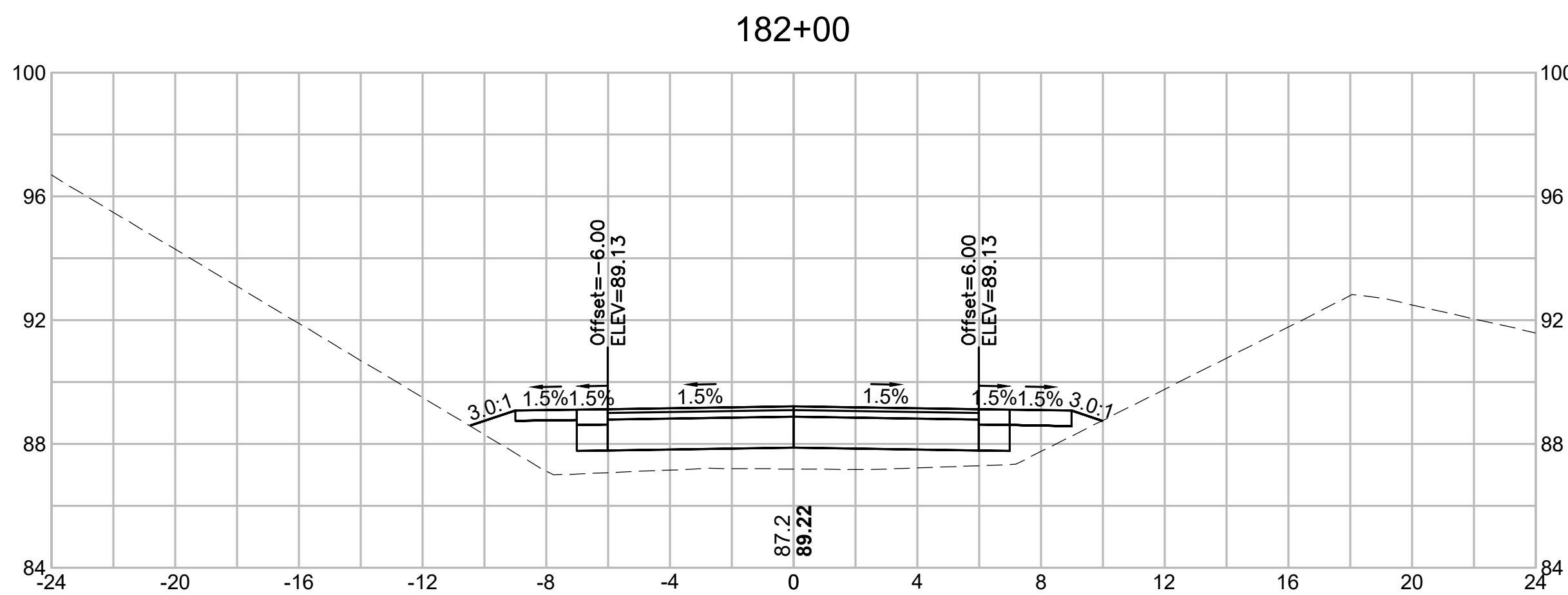
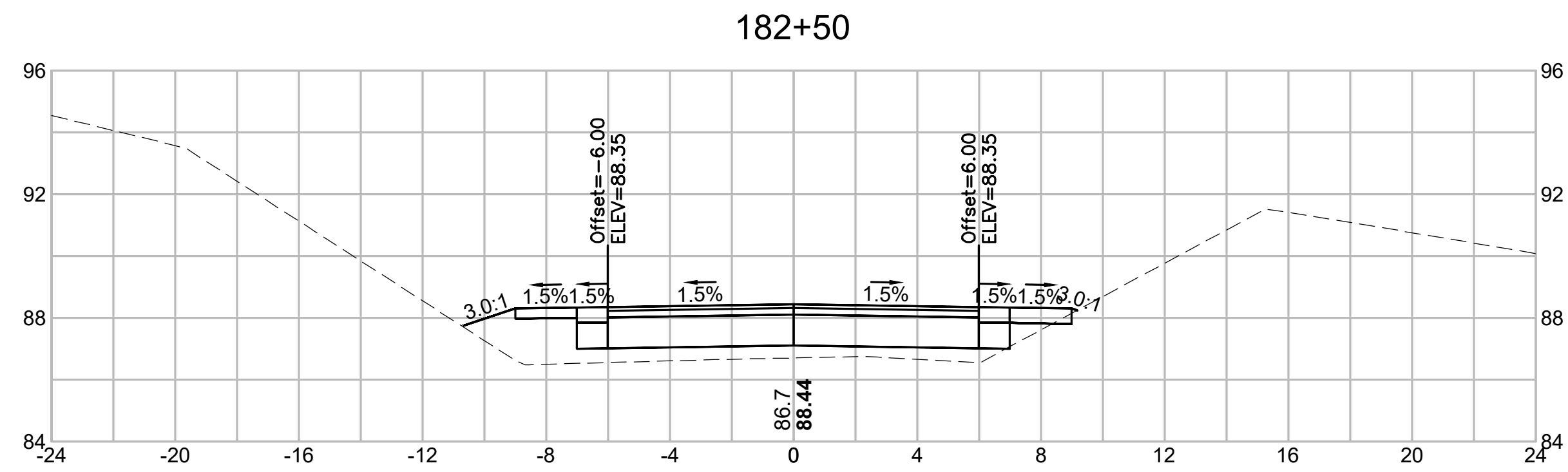
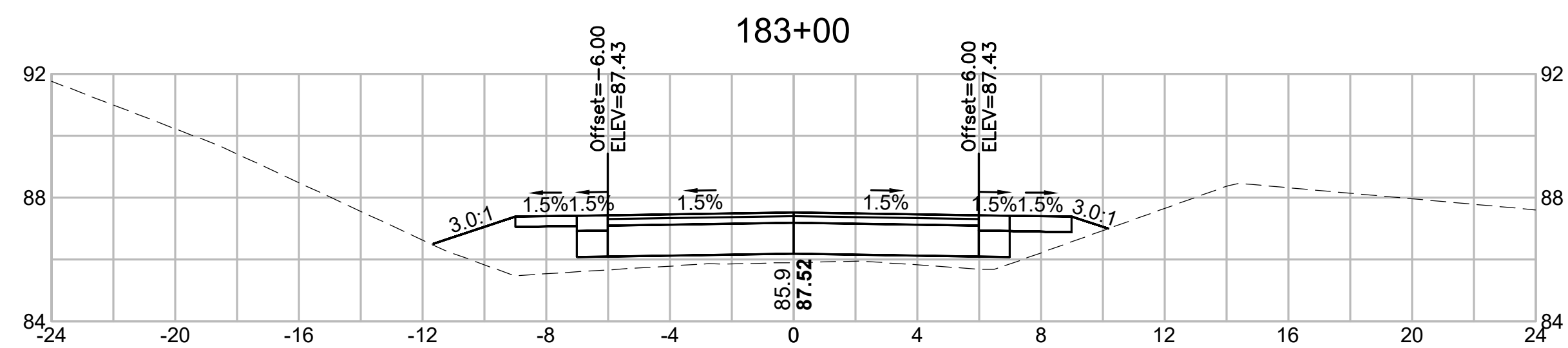
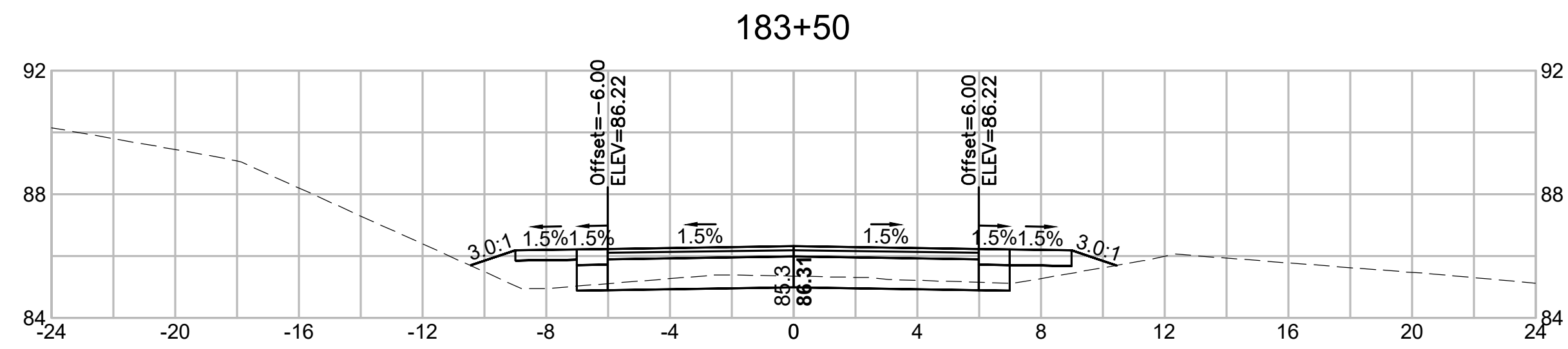
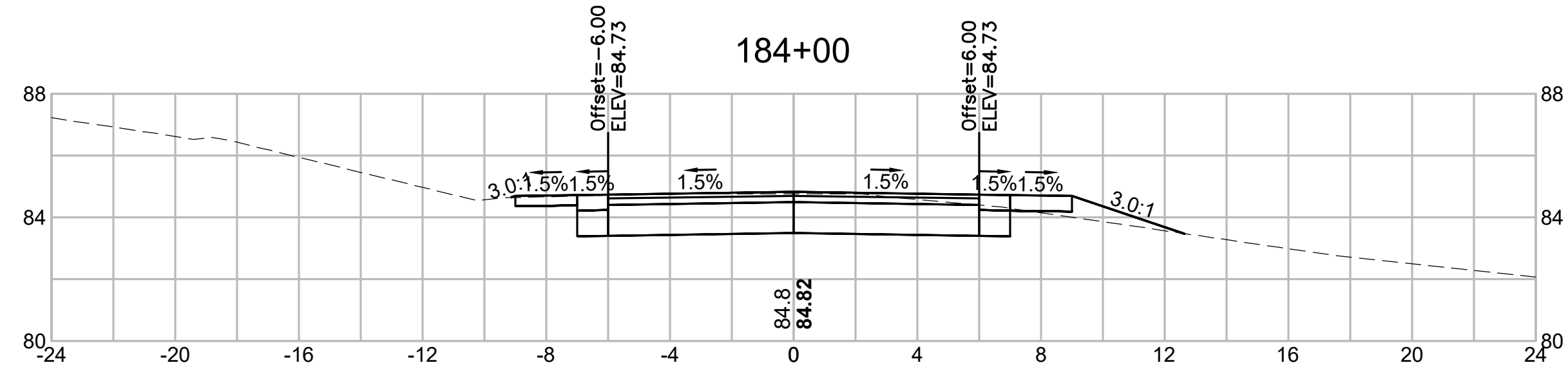
**CROSS SECTIONS - 7**



WALTHAM  
WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	92	114
PROJECT FILE NO. 17112.00			

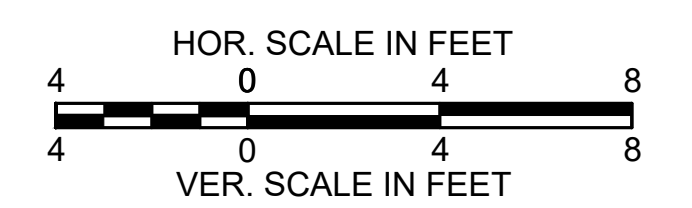
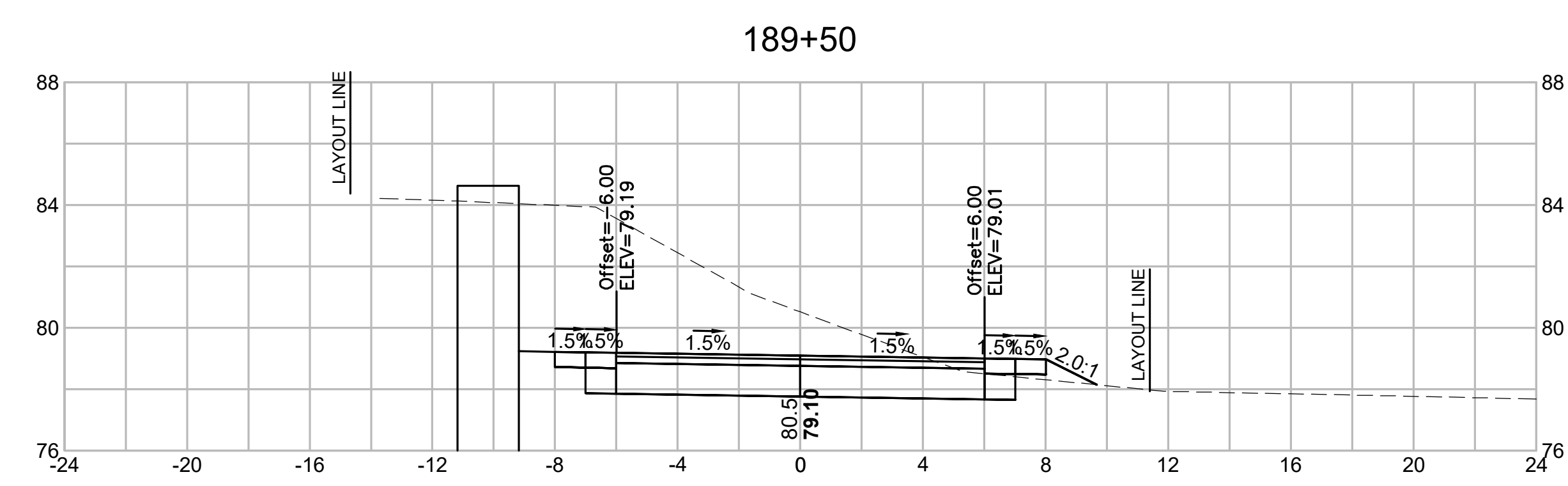
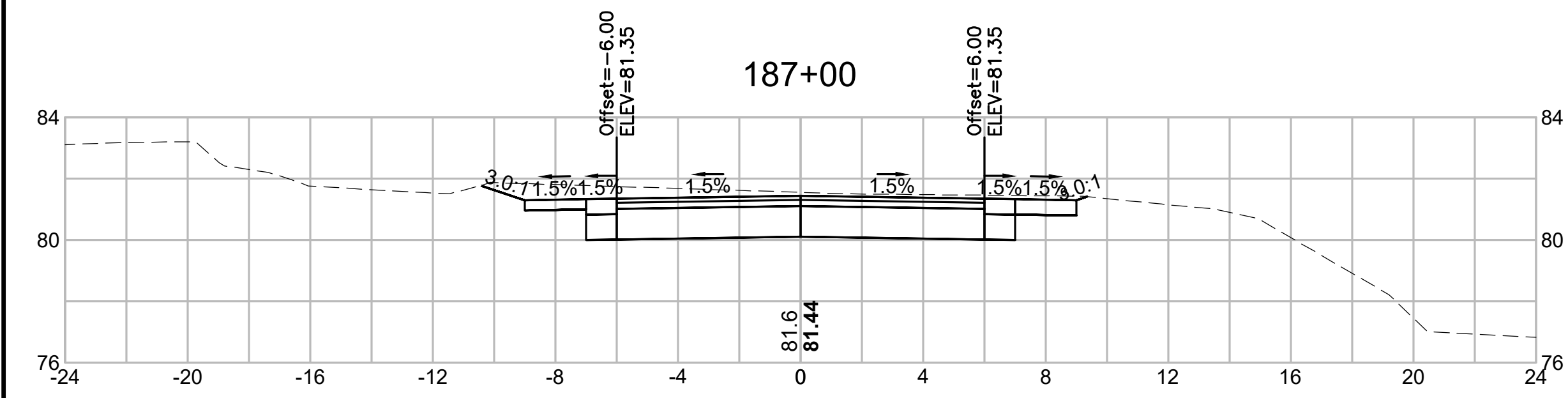
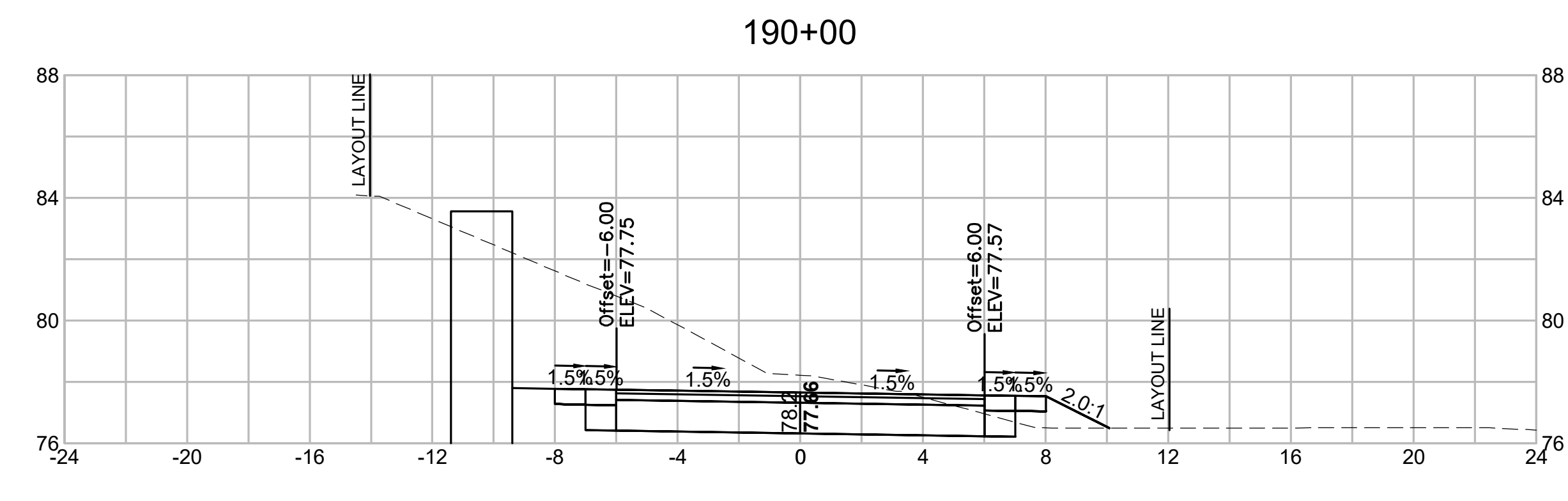
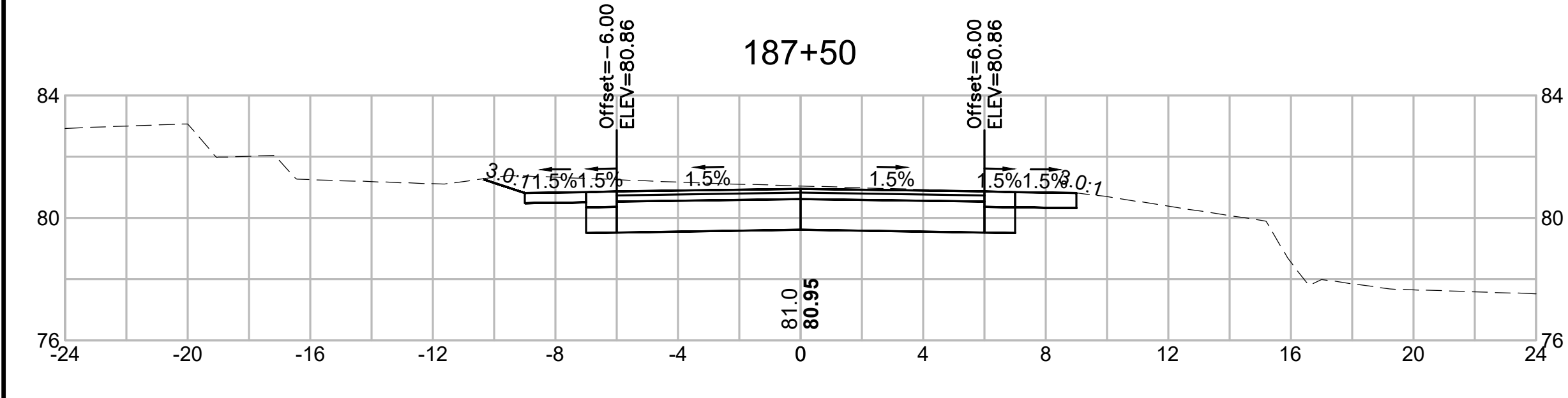
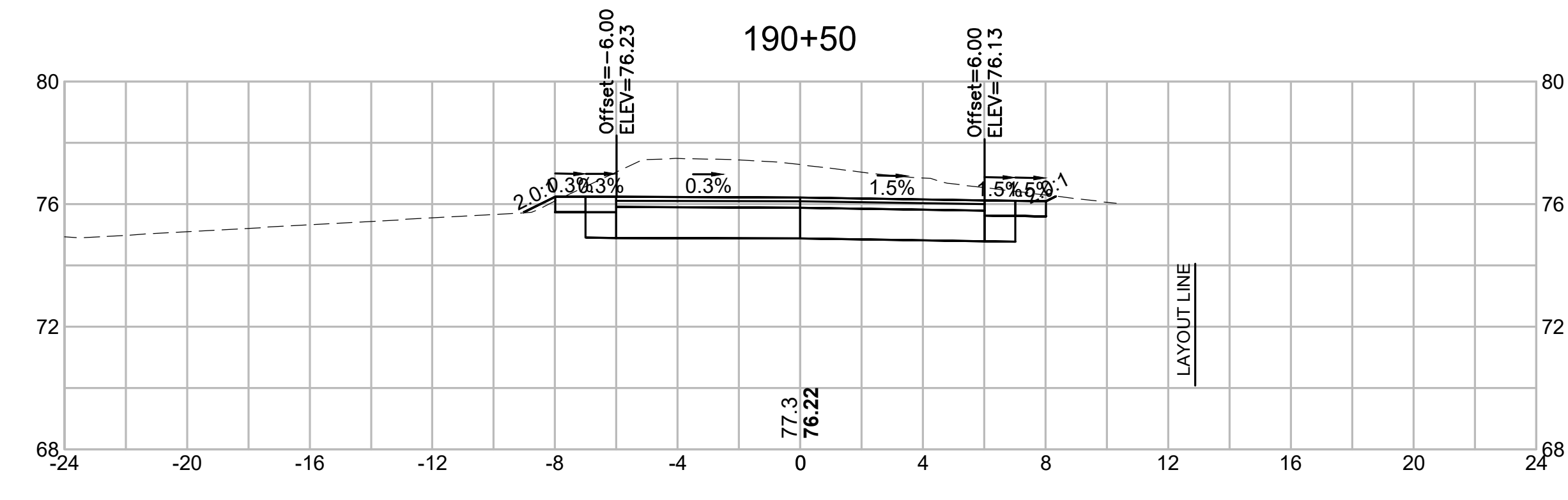
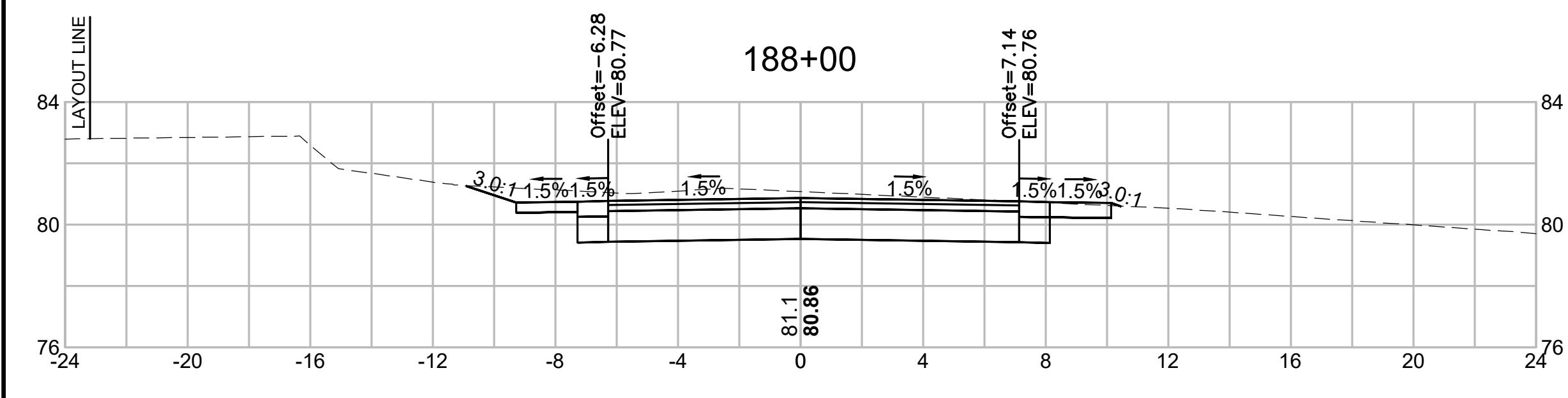
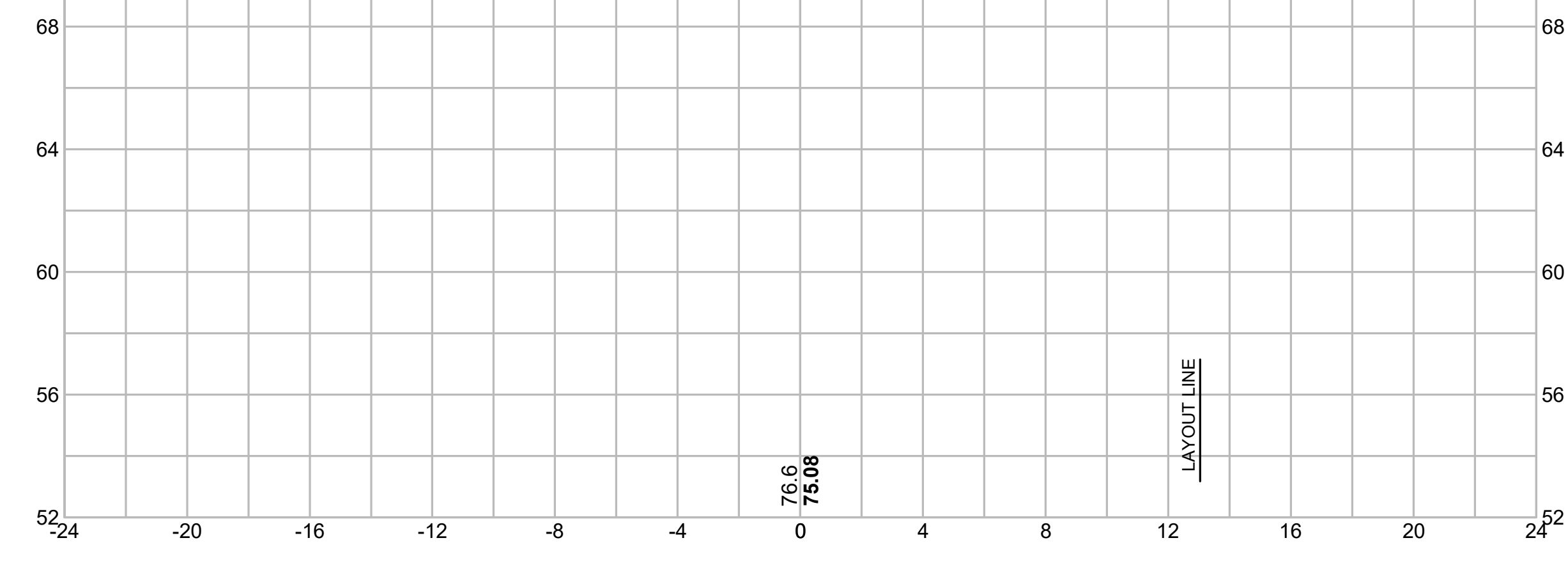
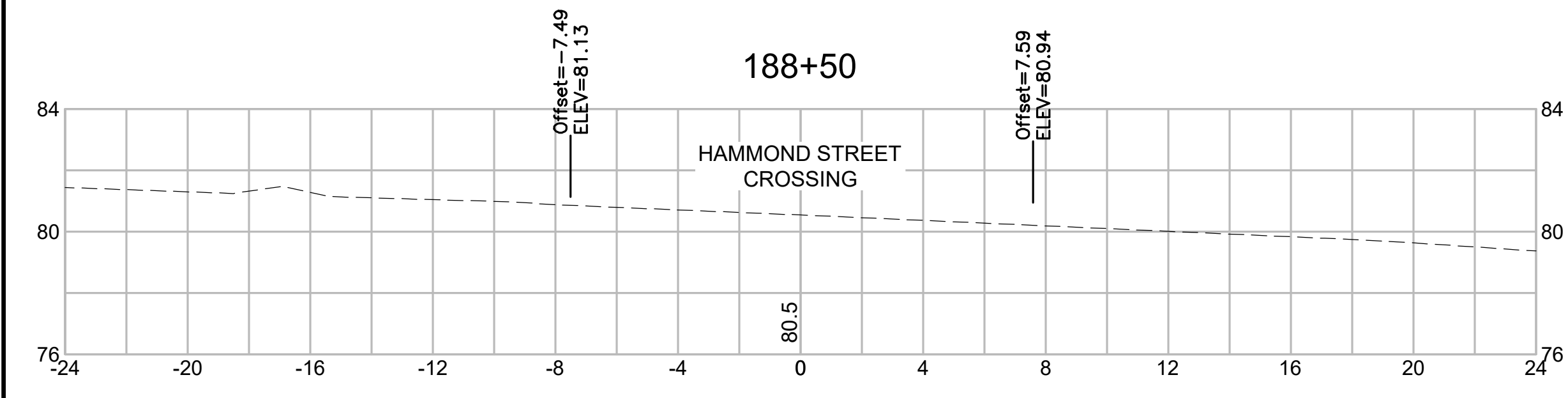
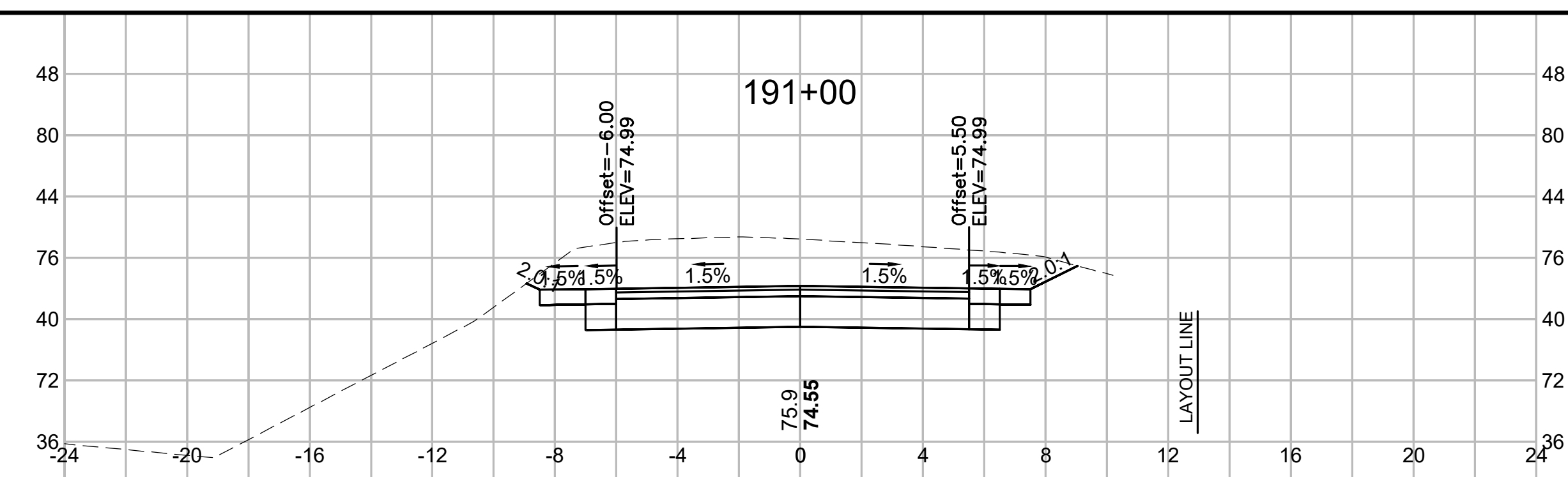
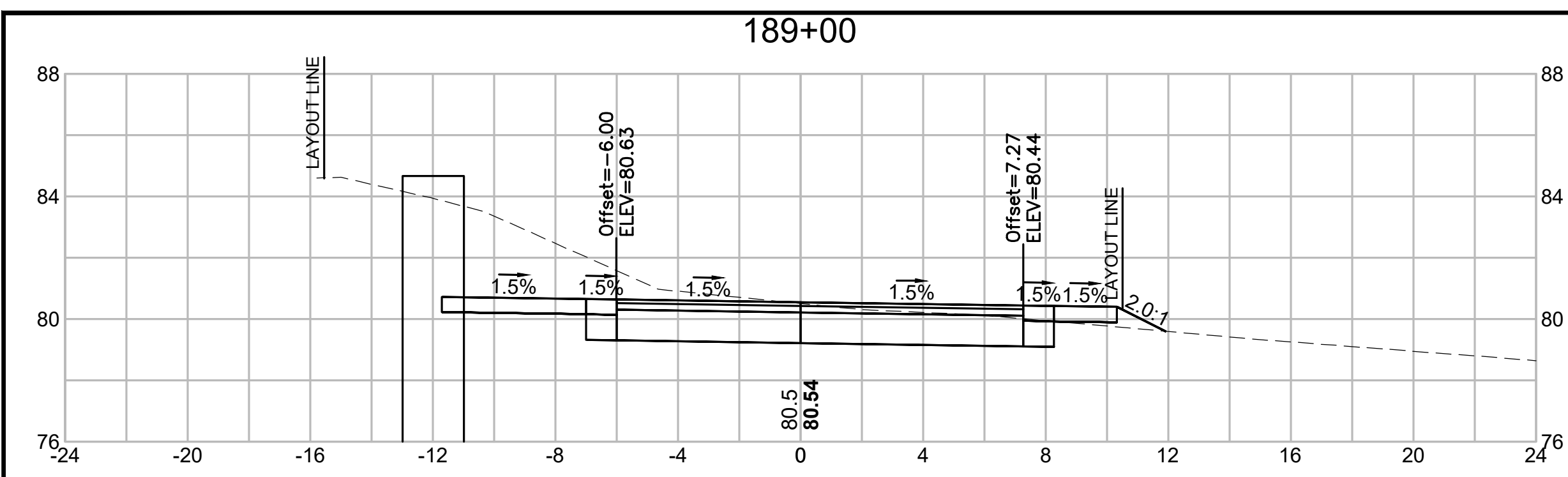
CROSS SECTIONS - 8



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	93	114
PROJECT FILE NO.		17112.00	

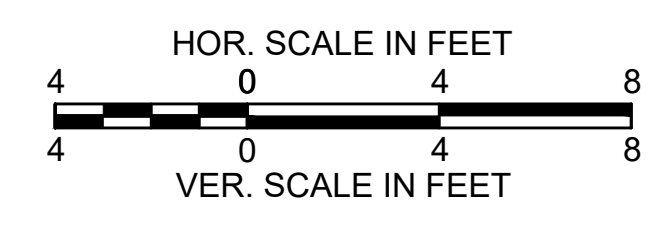
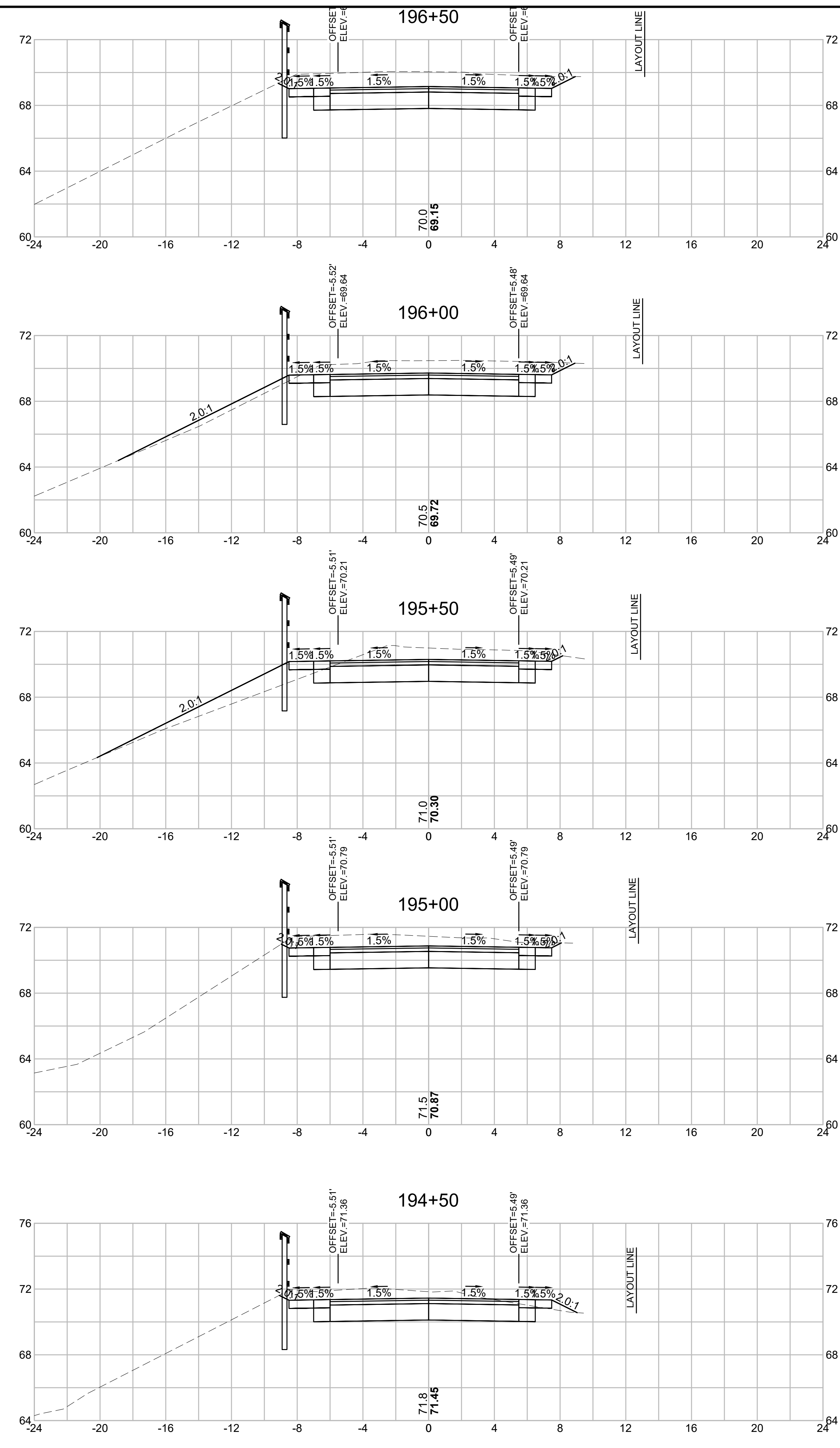
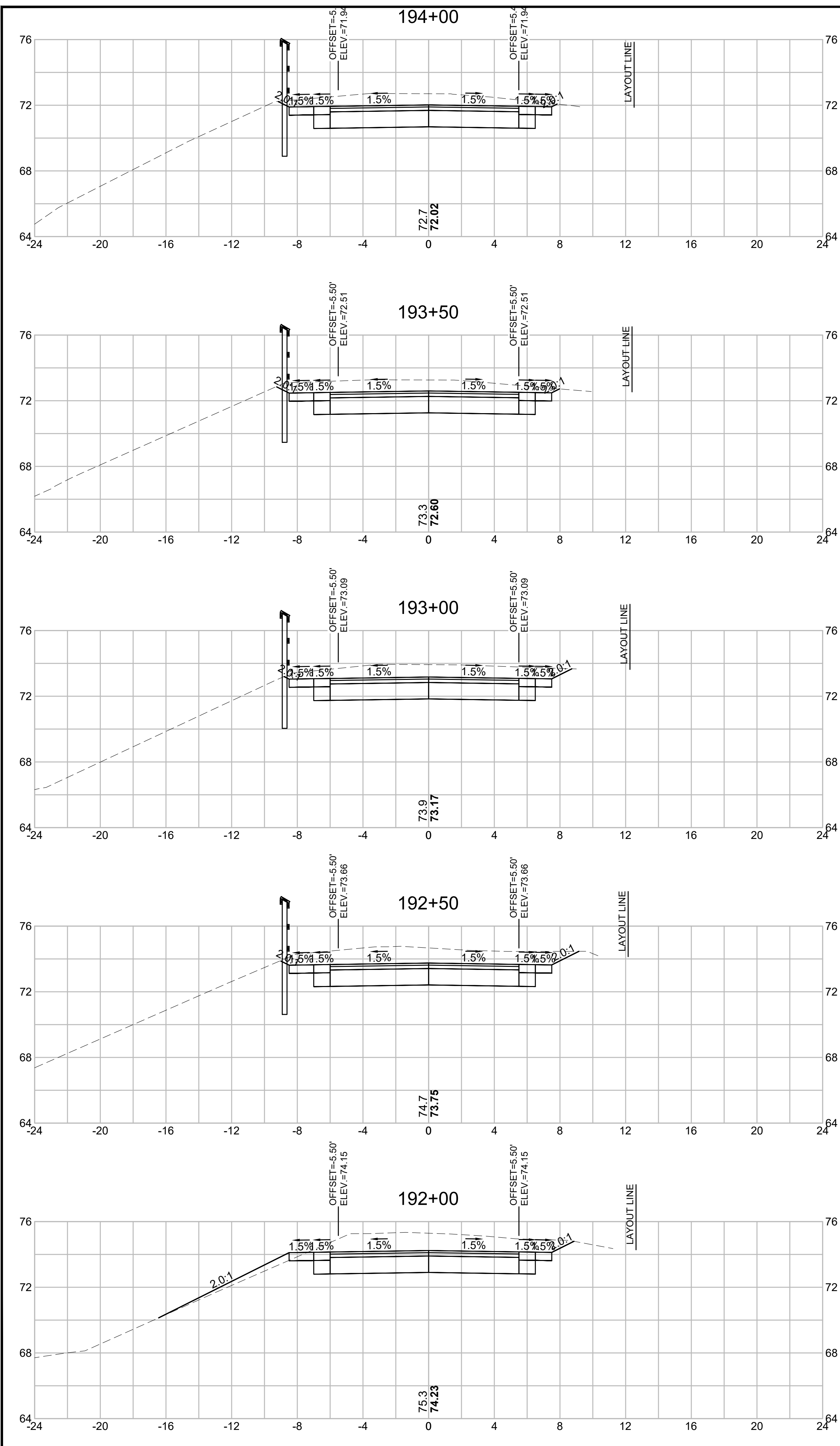
**CROSS SECTIONS - 9**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	94	114
PROJECT FILE NO. XXXXXX			

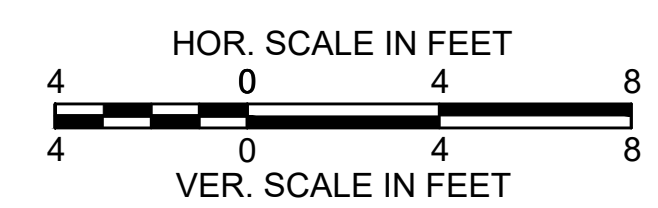
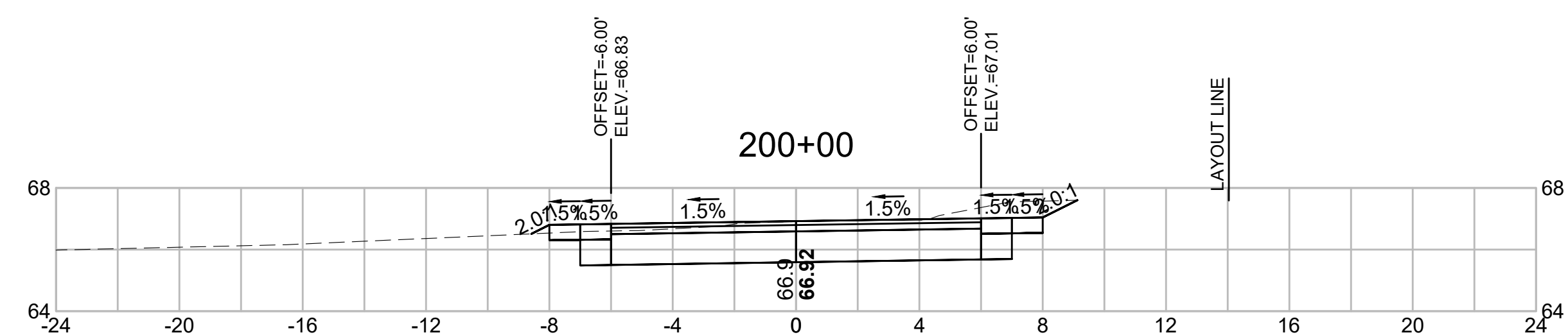
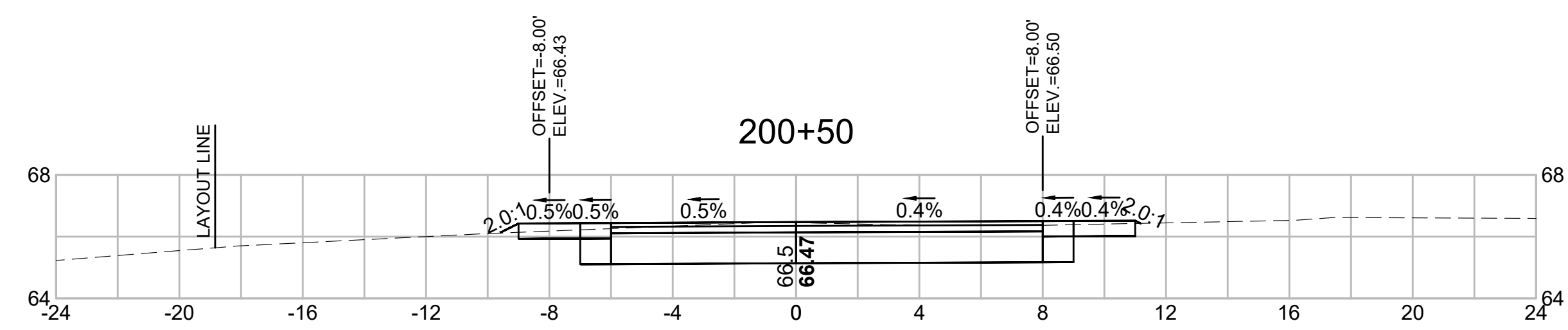
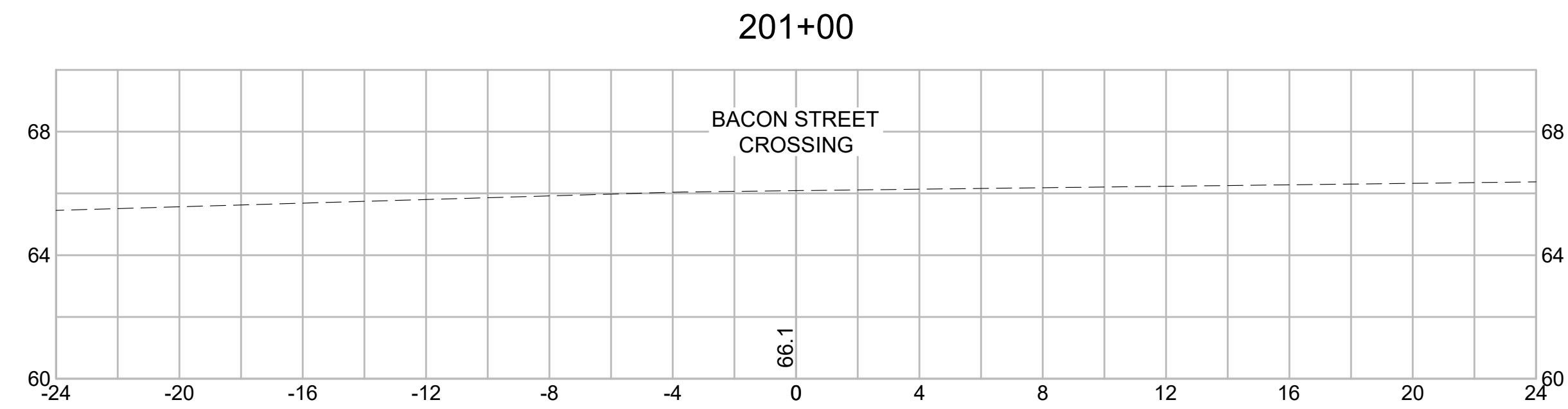
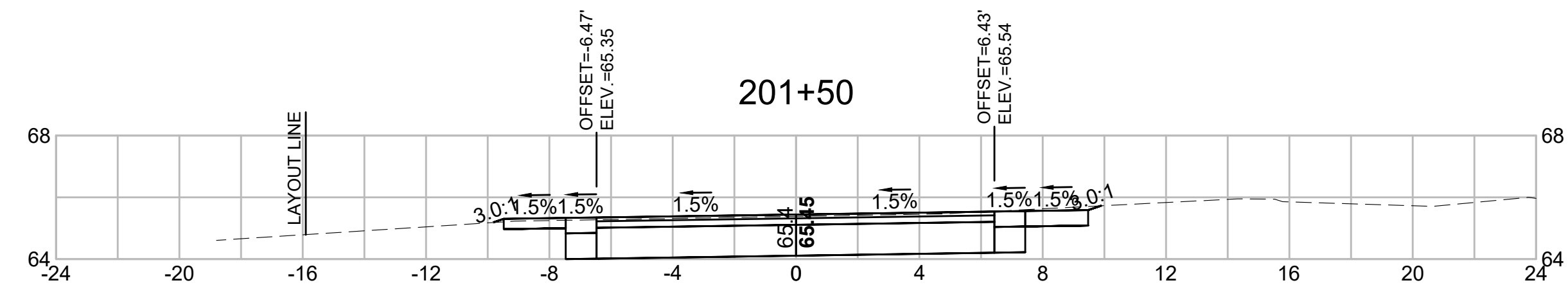
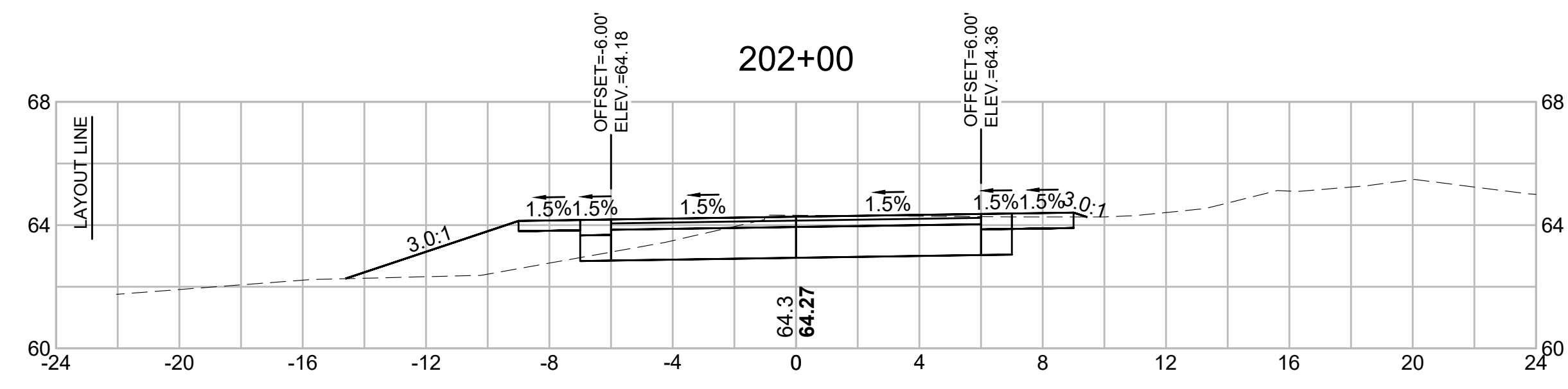
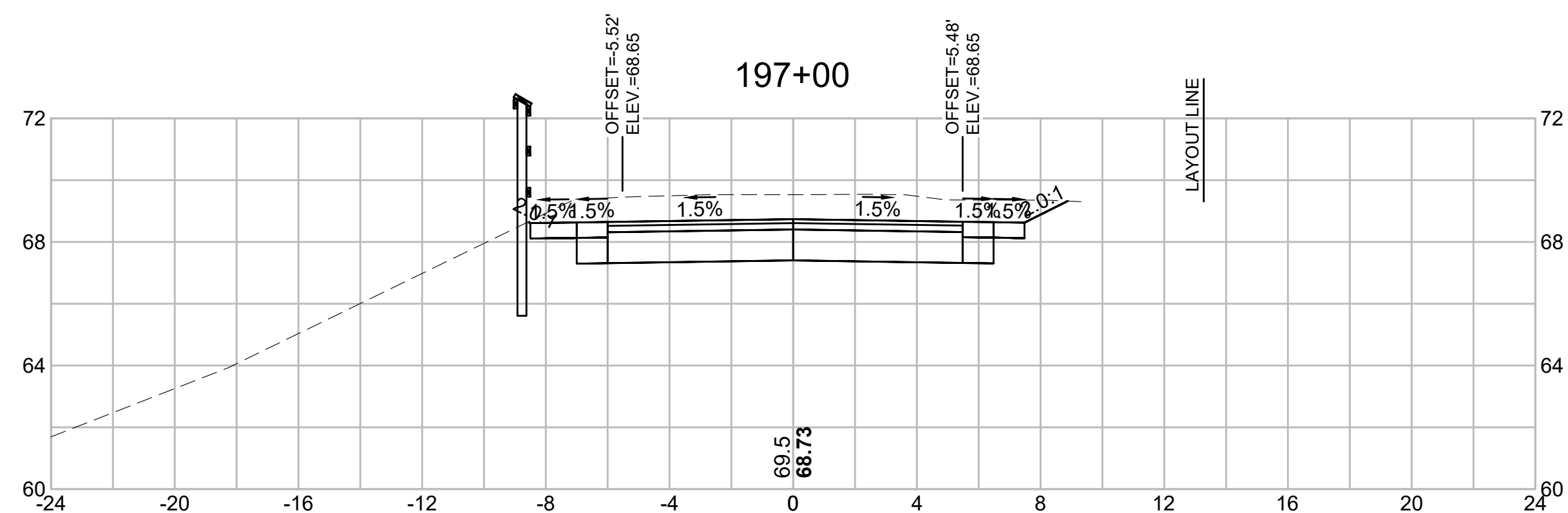
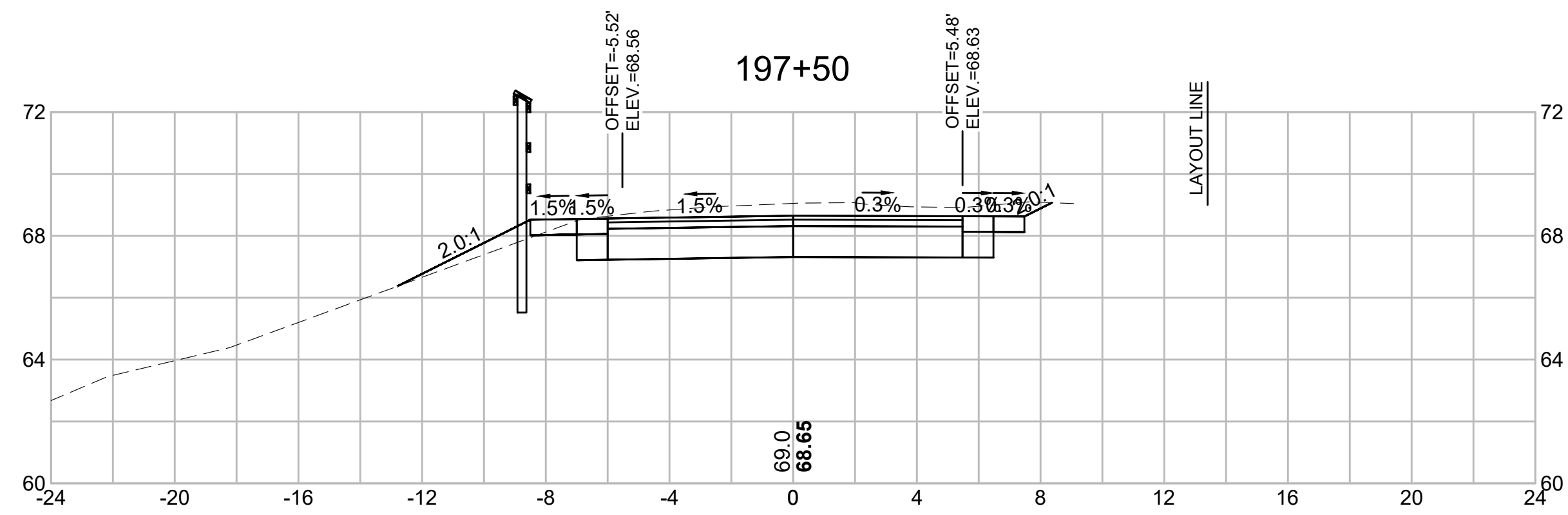
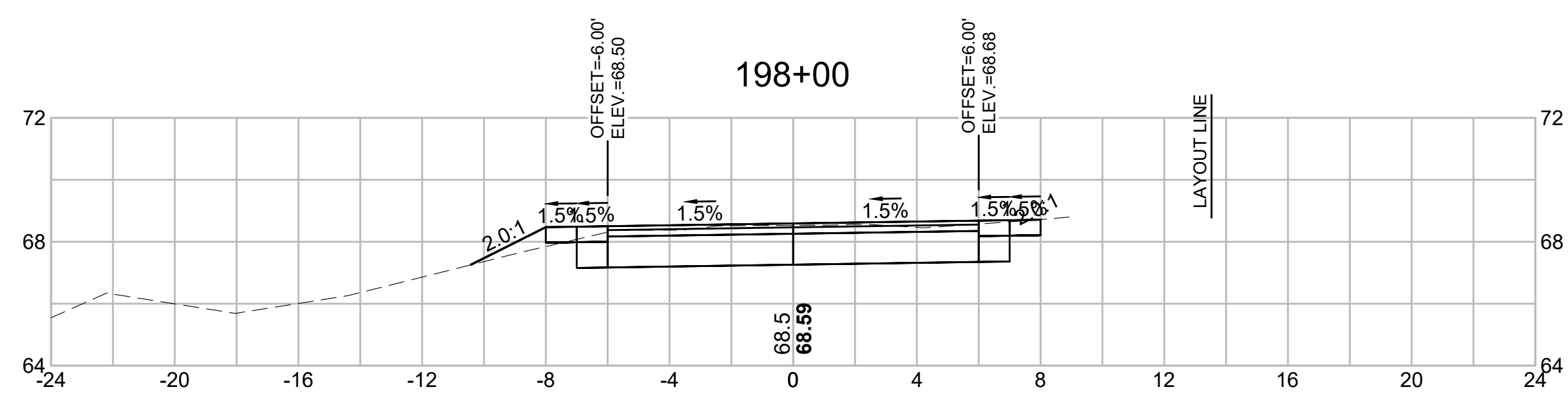
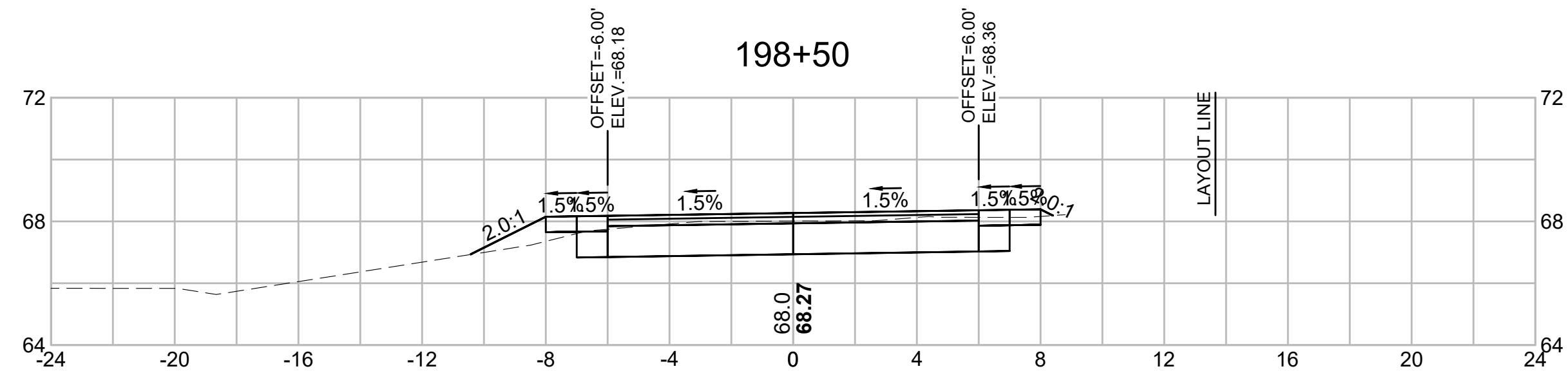
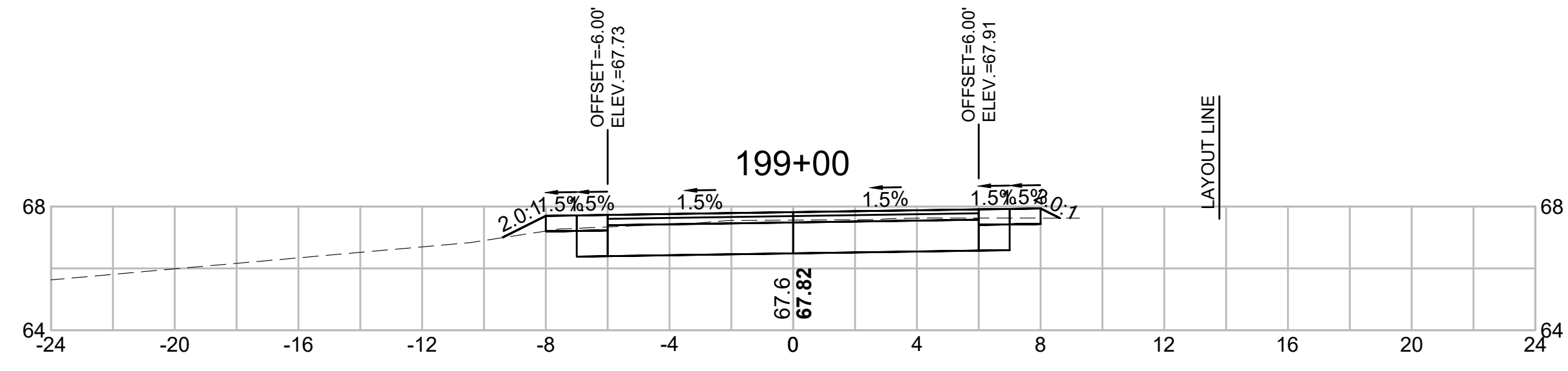
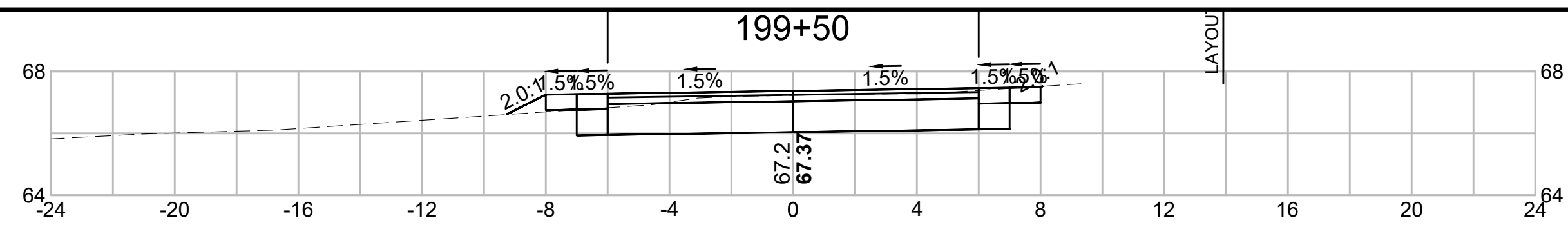
**CROSS SECTIONS - 10**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	95	114
PROJECT FILE NO.		XXXXXX	

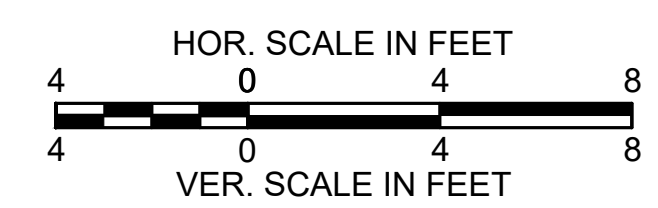
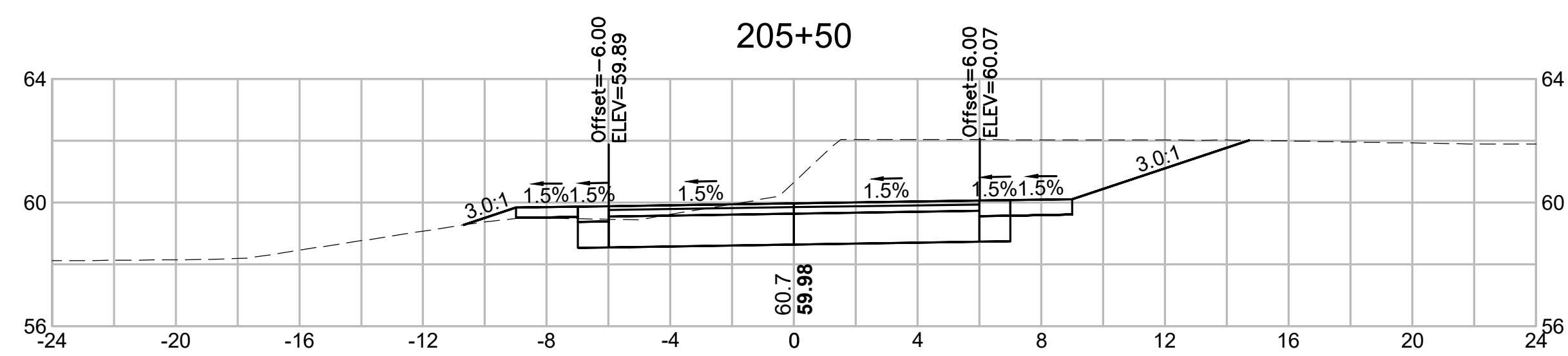
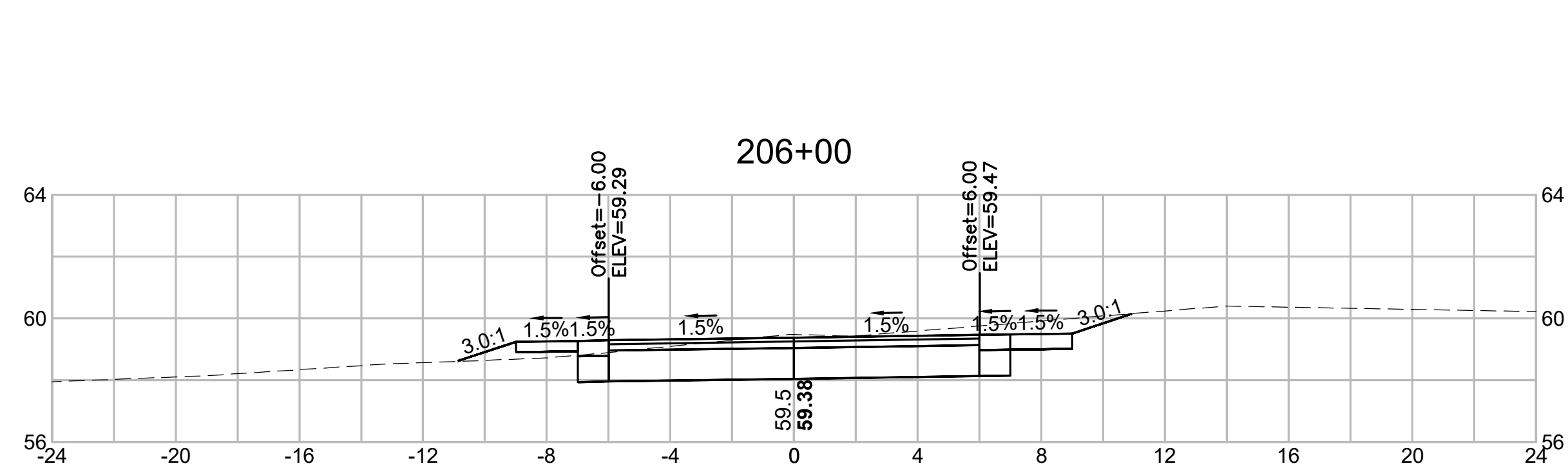
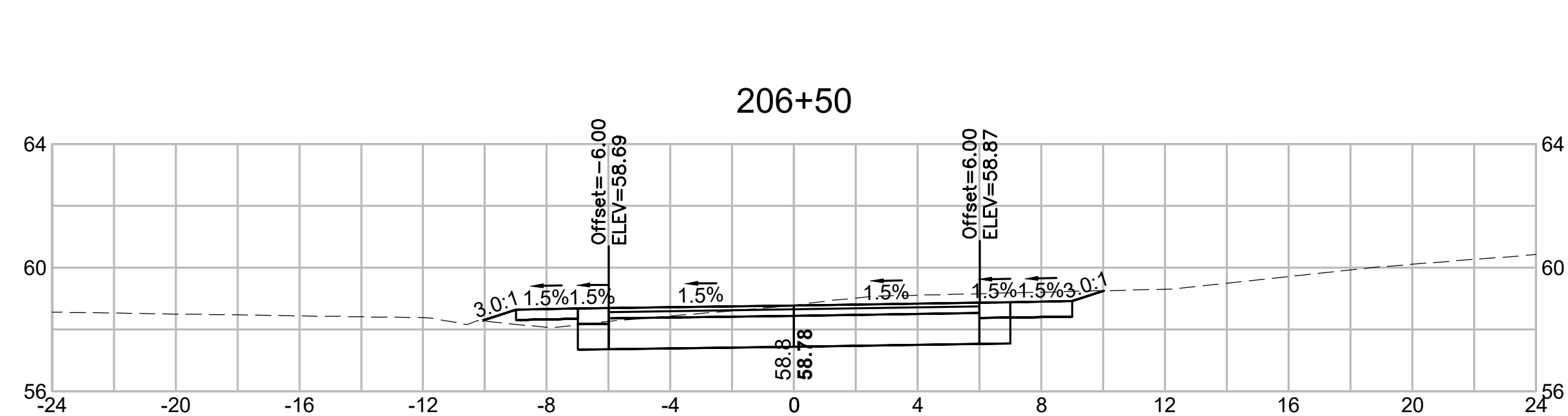
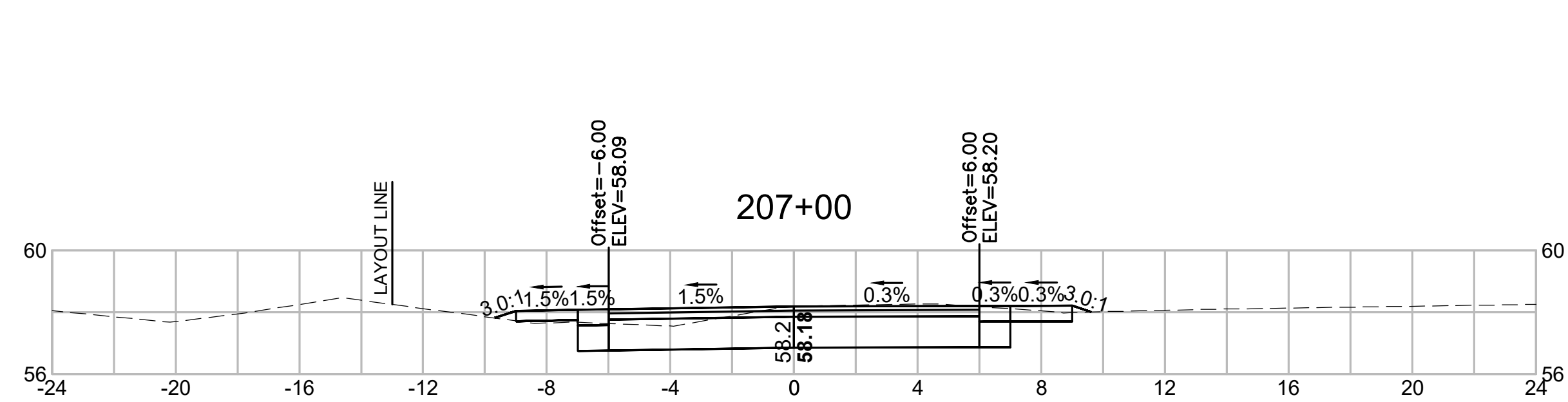
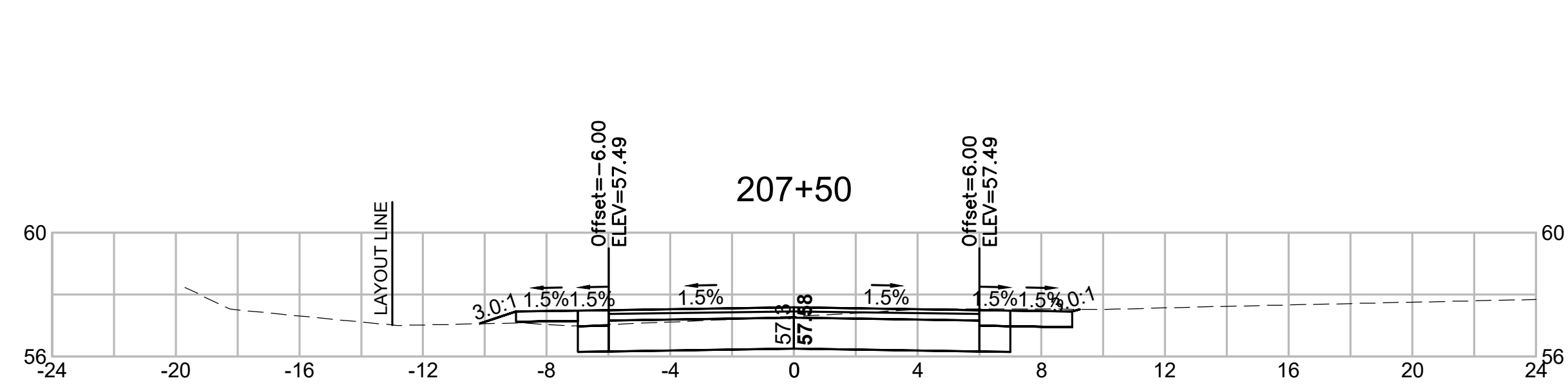
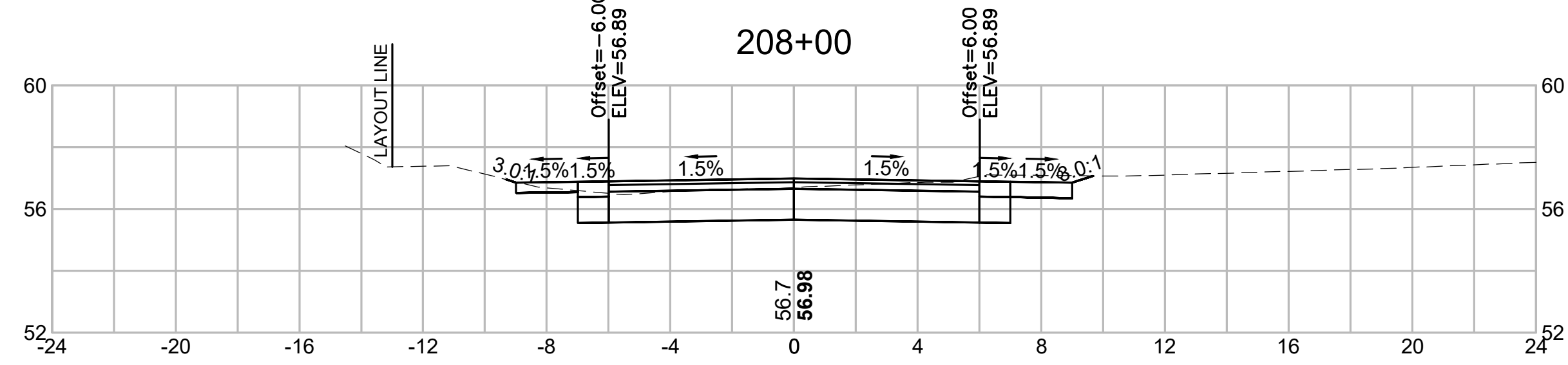
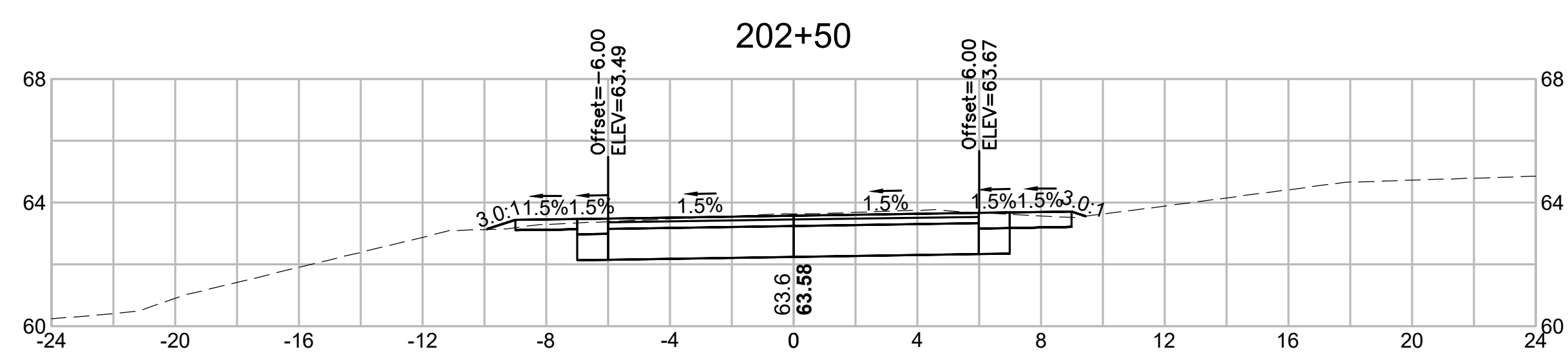
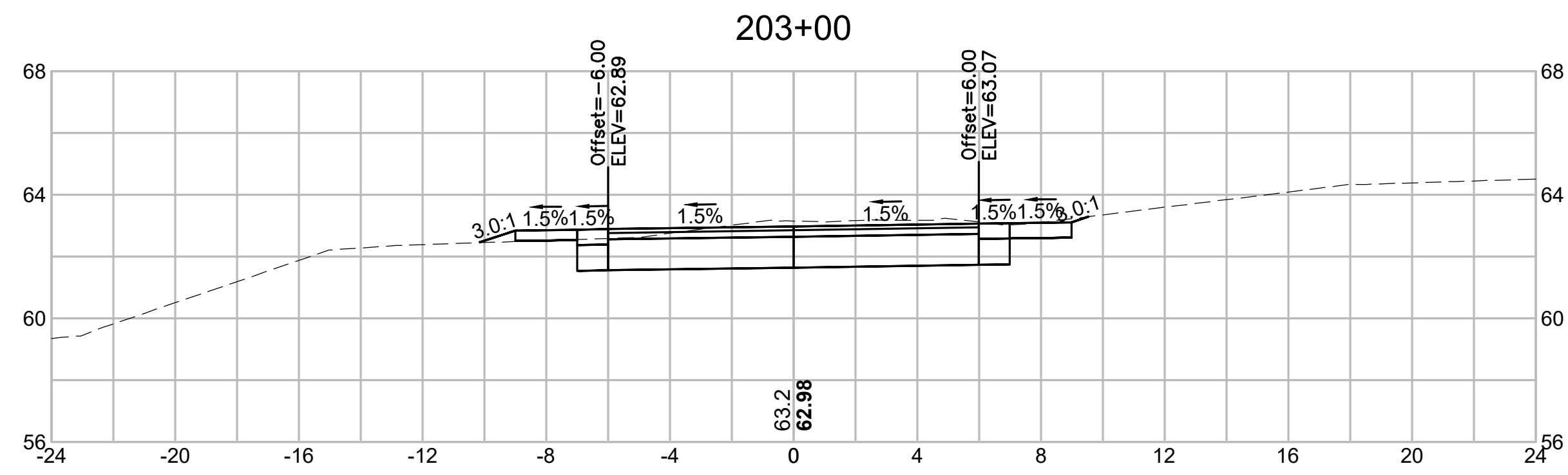
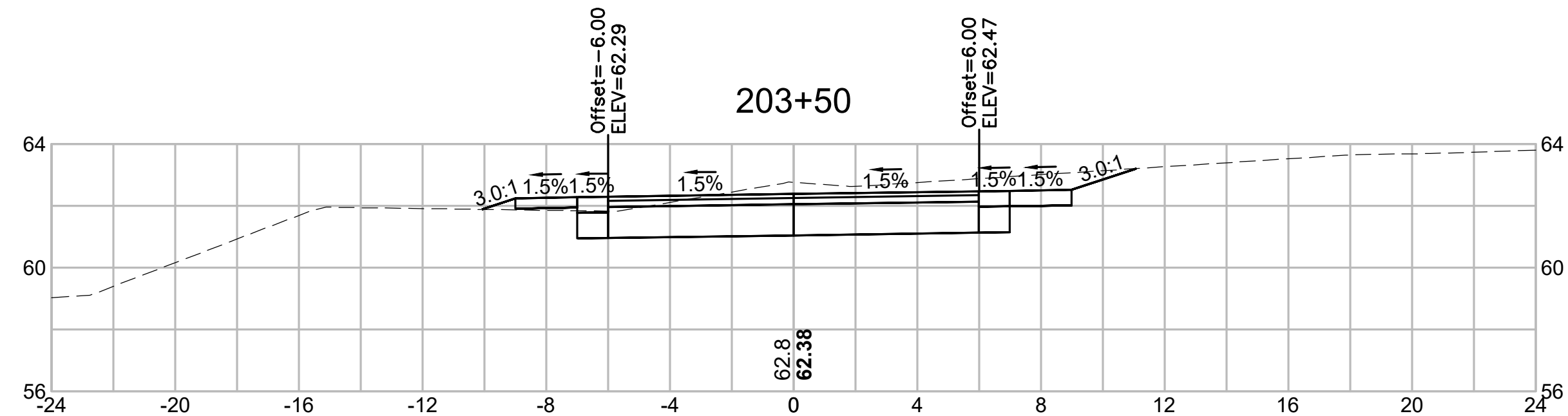
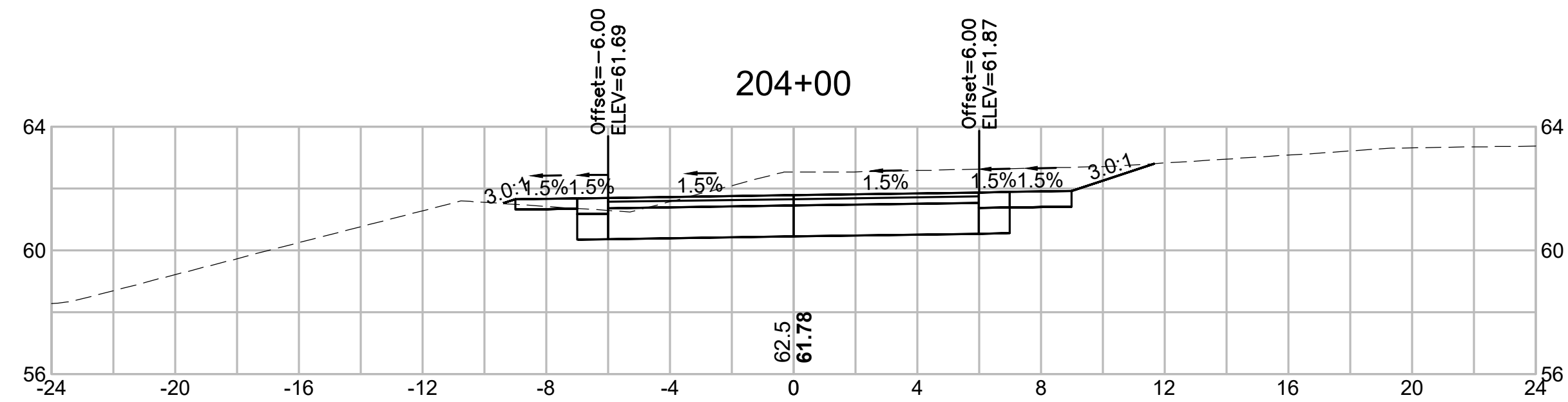
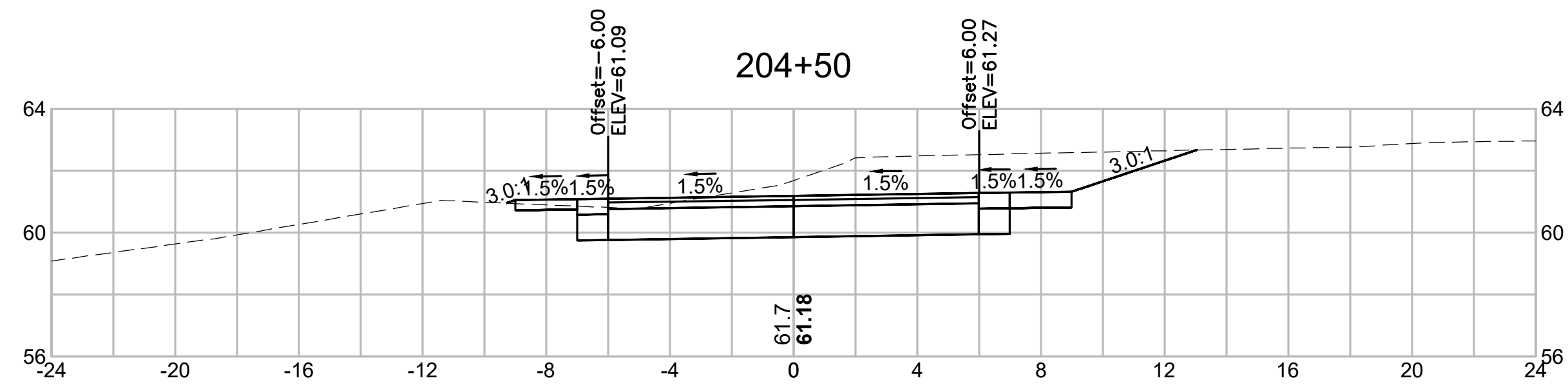
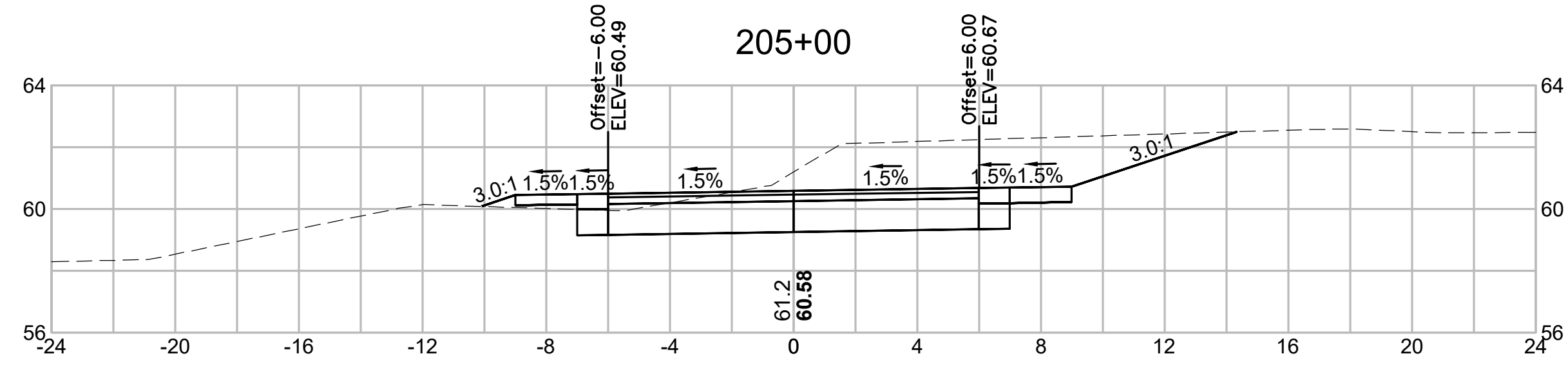
**CROSS SECTIONS - 11**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	96	114
PROJECT FILE NO.		17112.00	

**CROSS SECTIONS - 12**

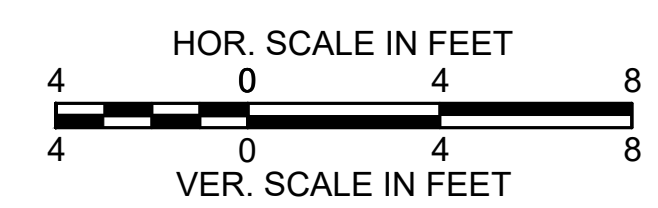
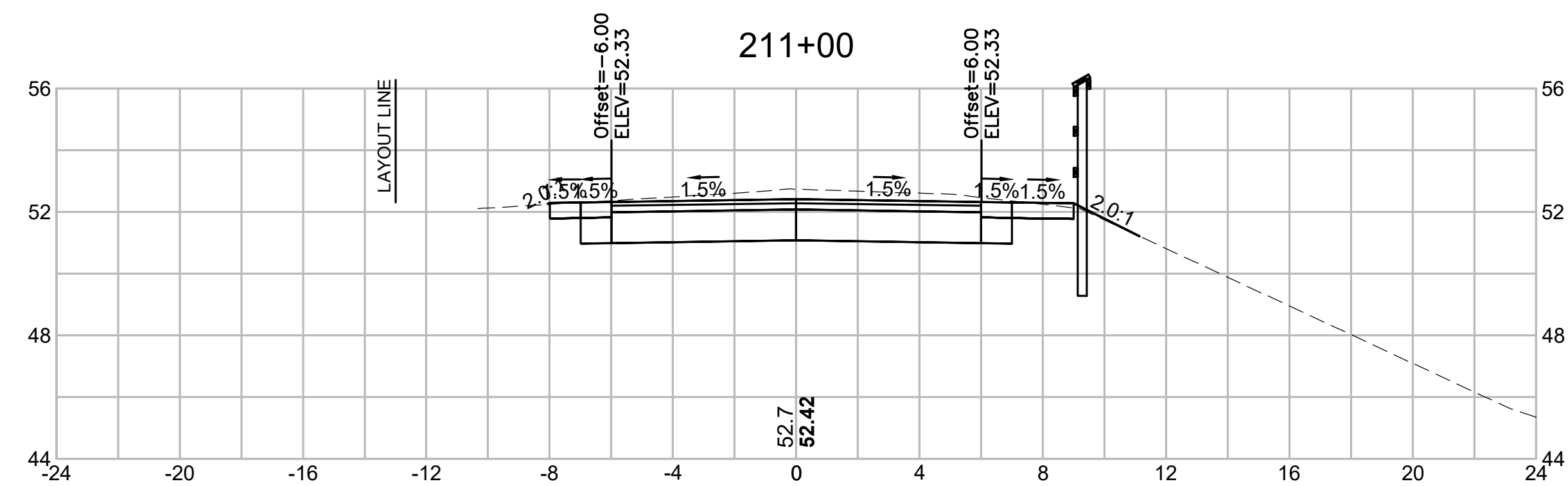
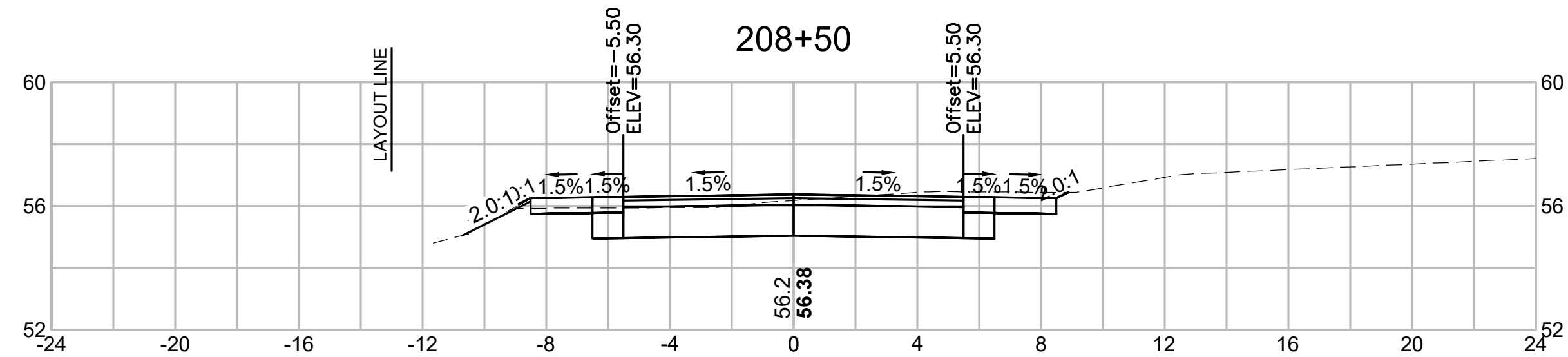
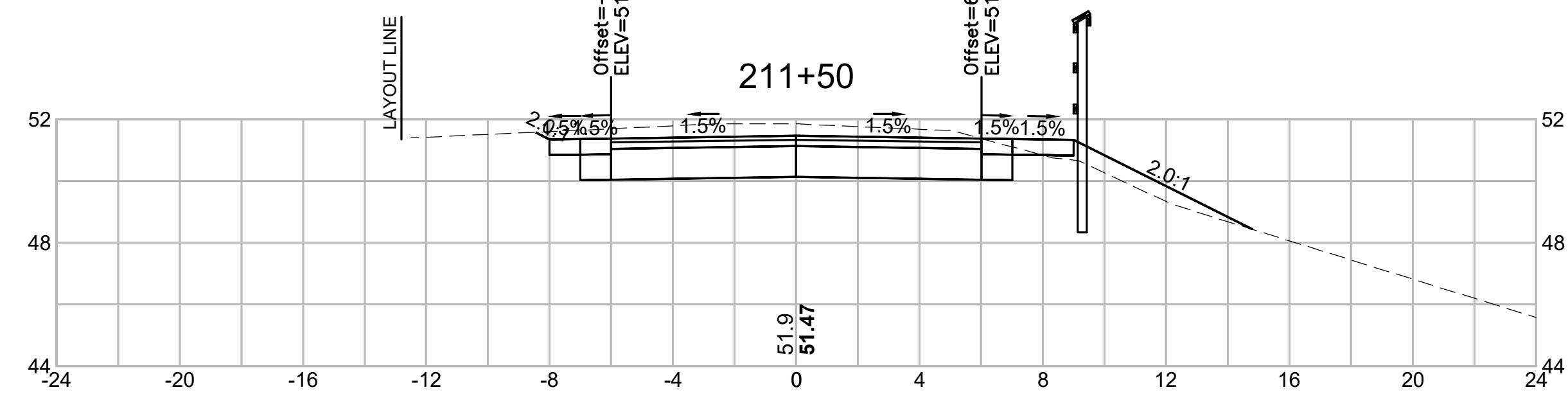
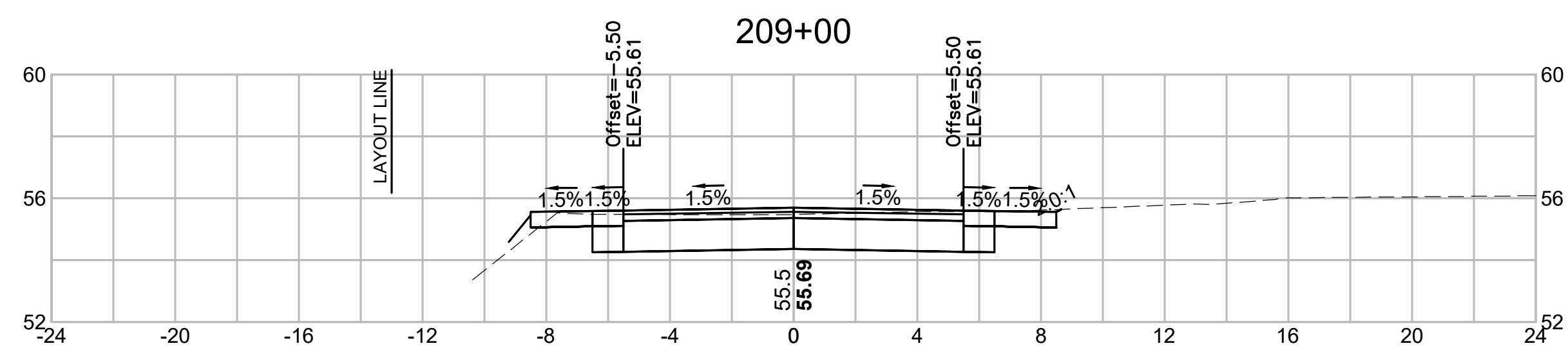
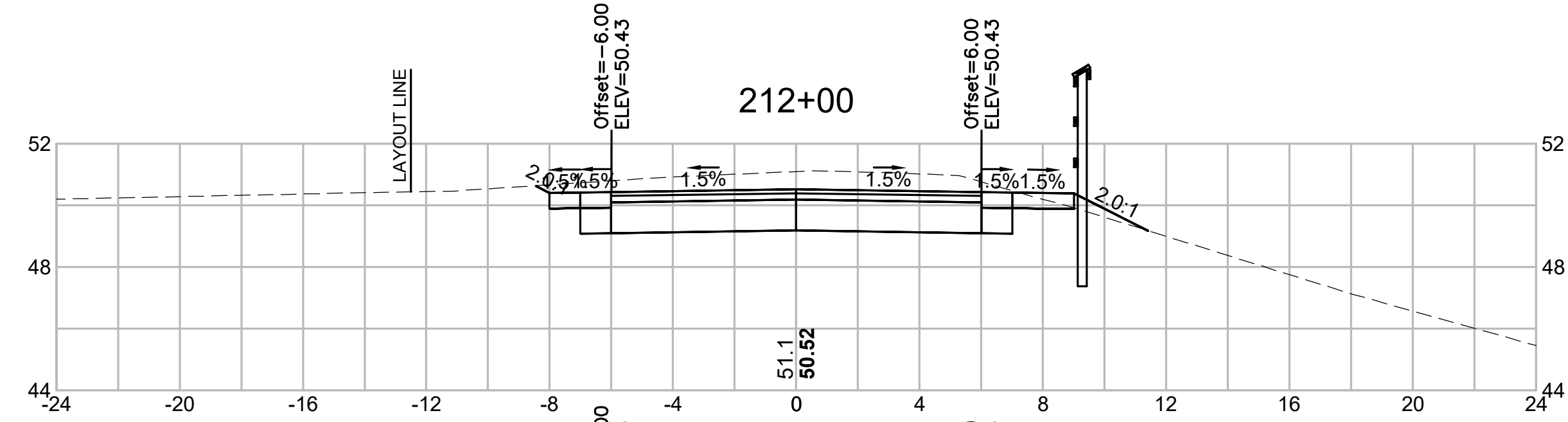
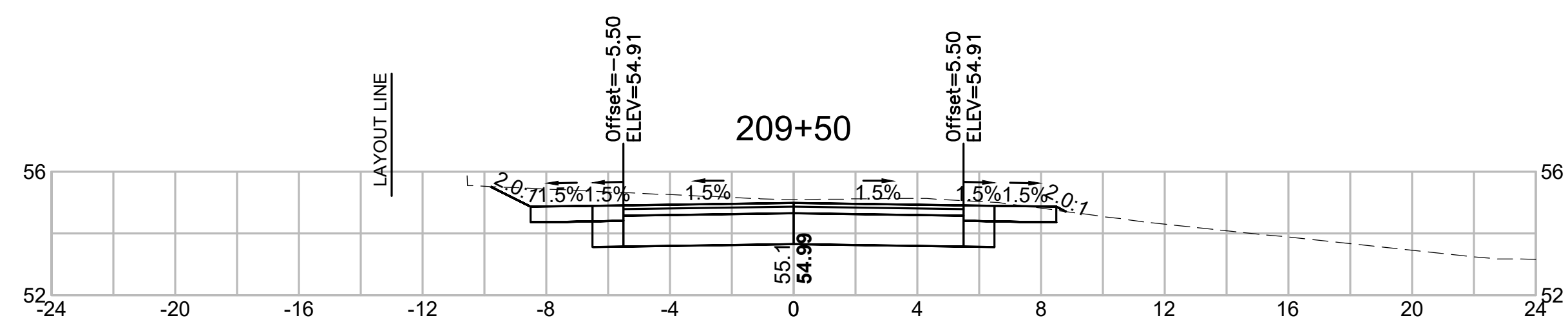
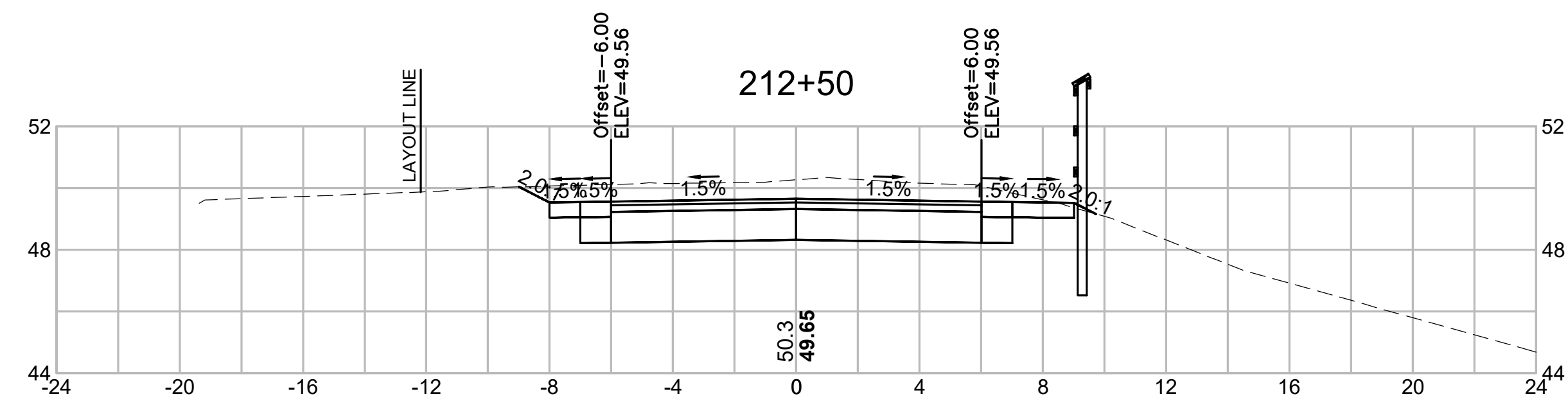
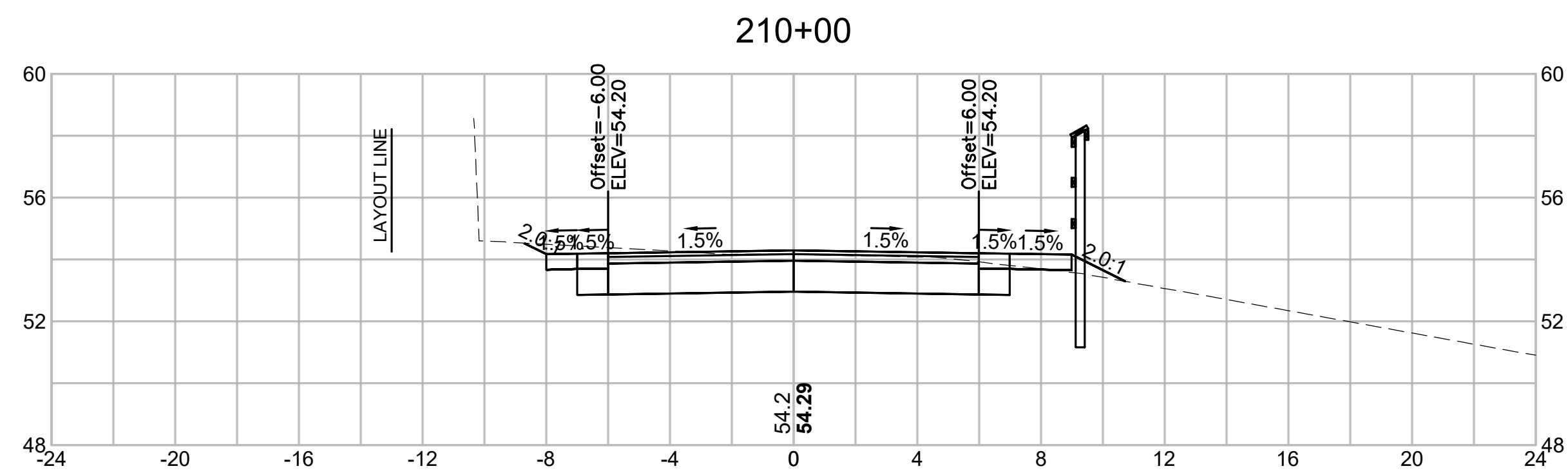
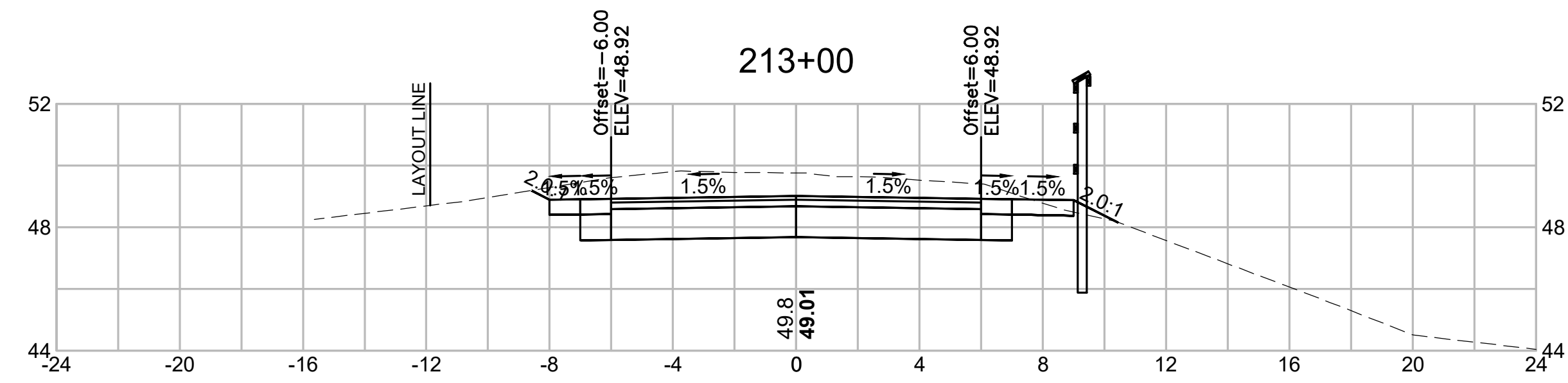
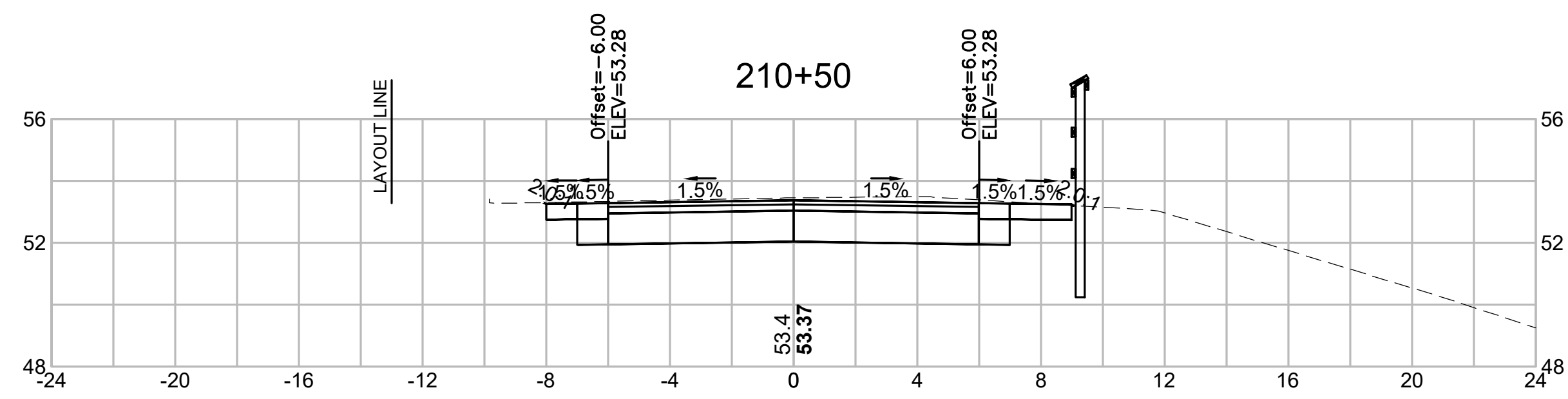




WALTHAM  
WAYSIDE TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	97	114
PROJECT FILE NO.		17112.00	

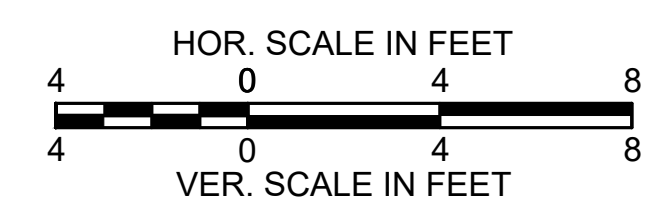
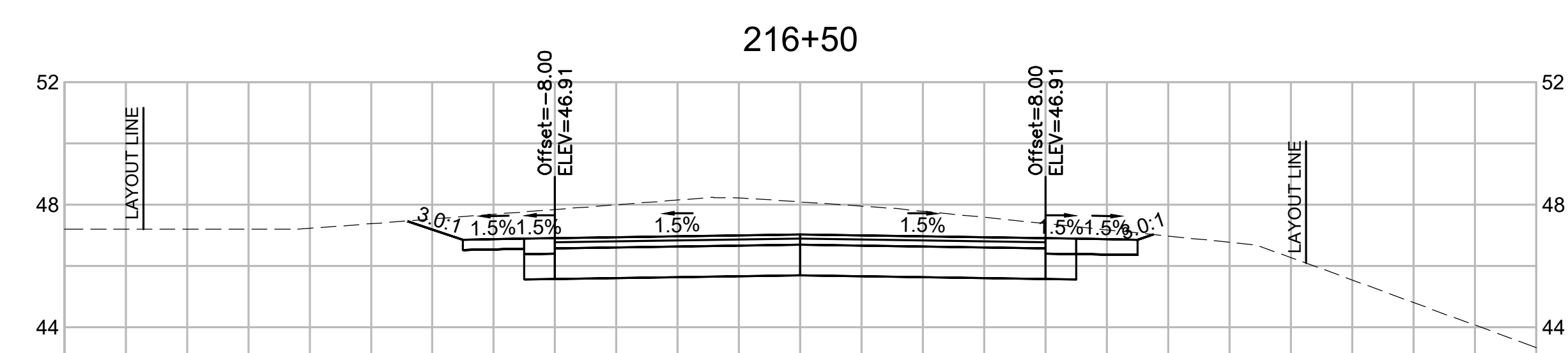
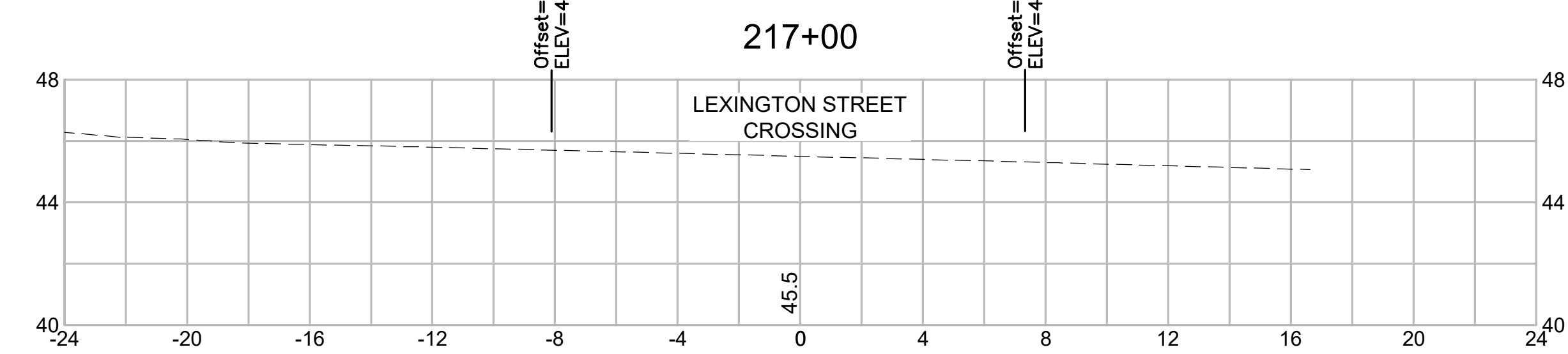
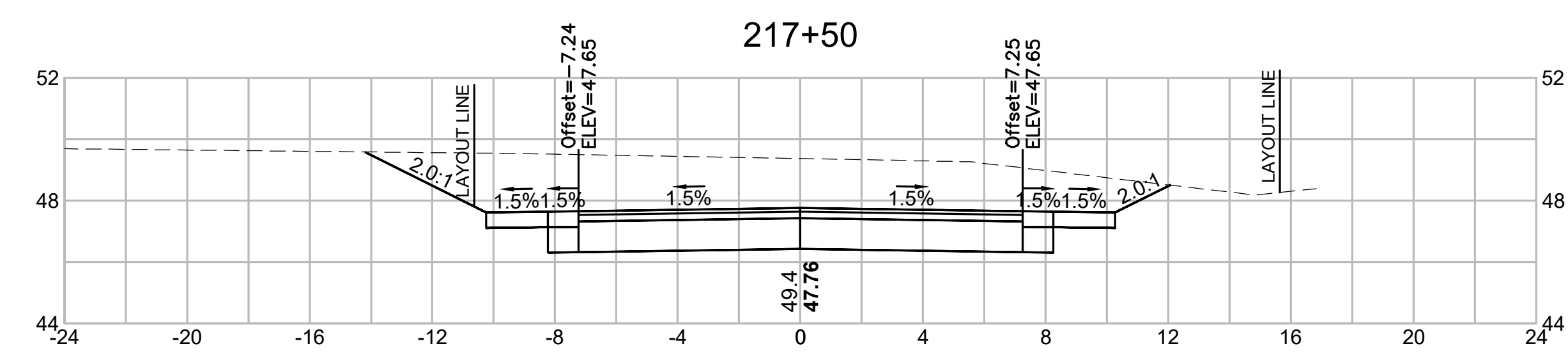
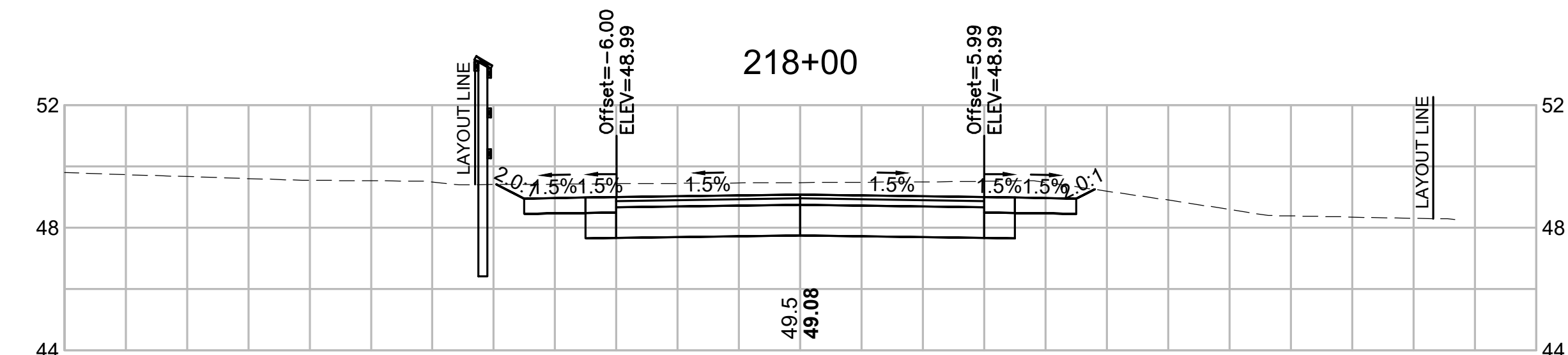
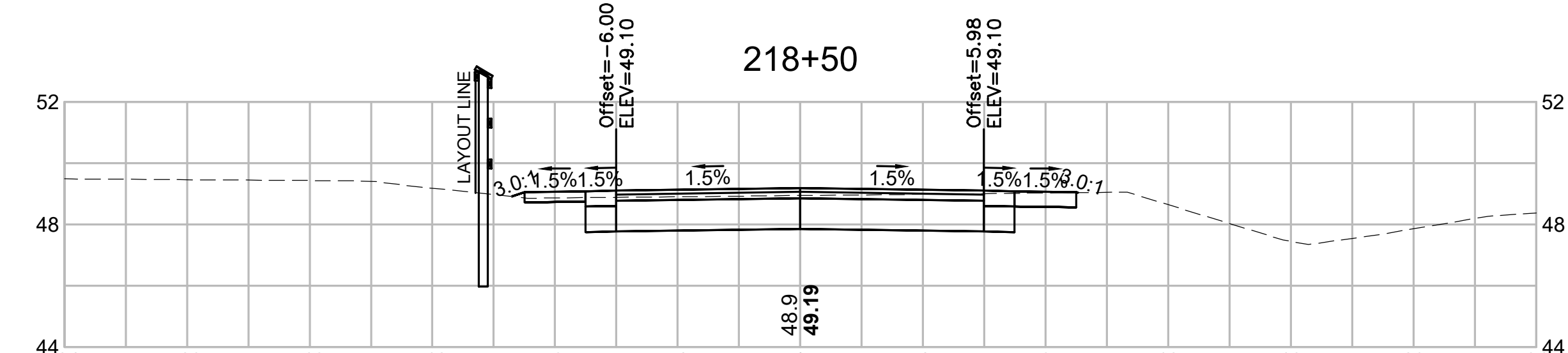
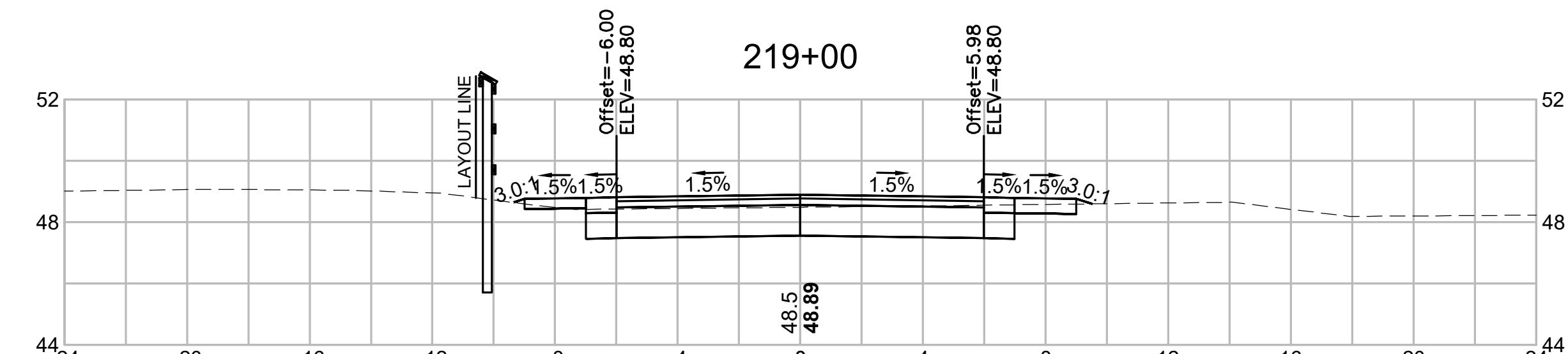
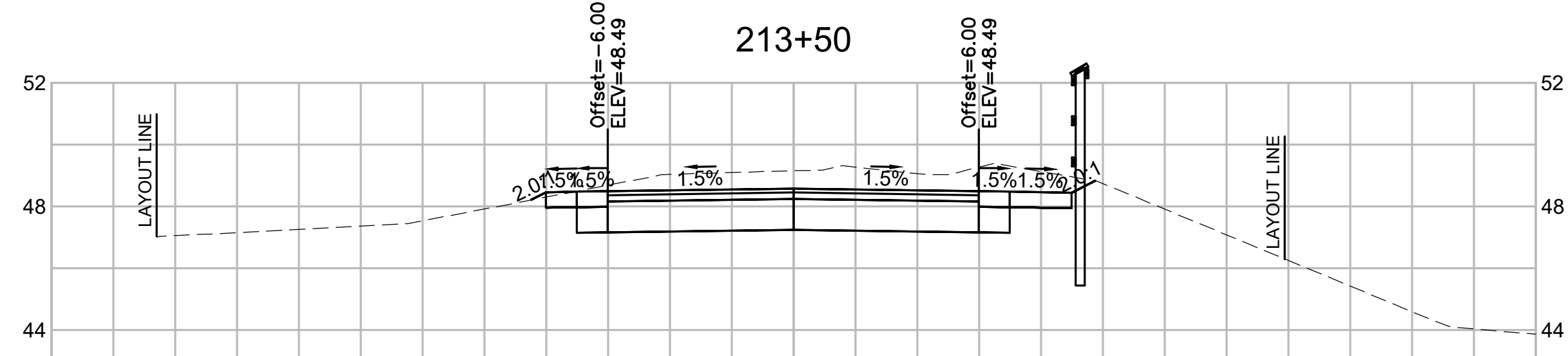
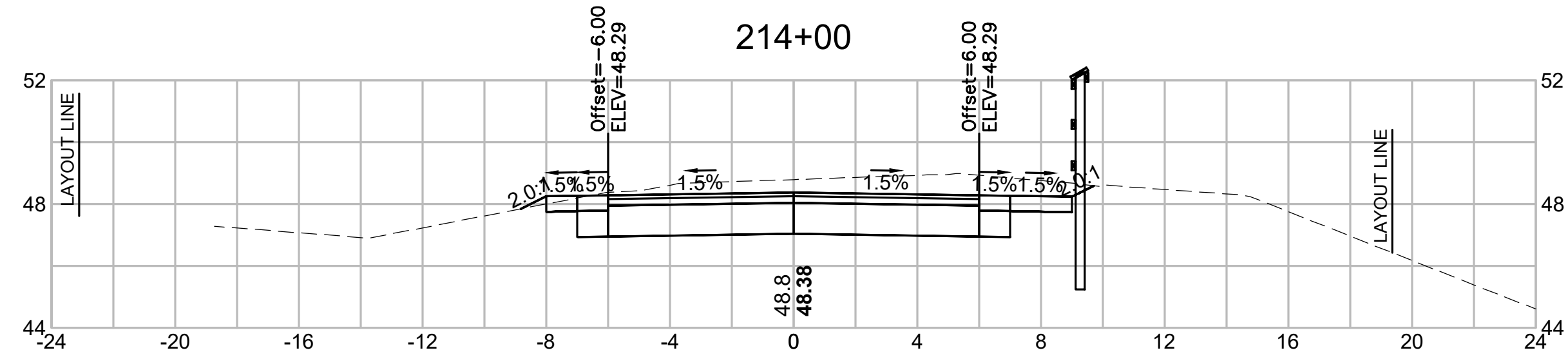
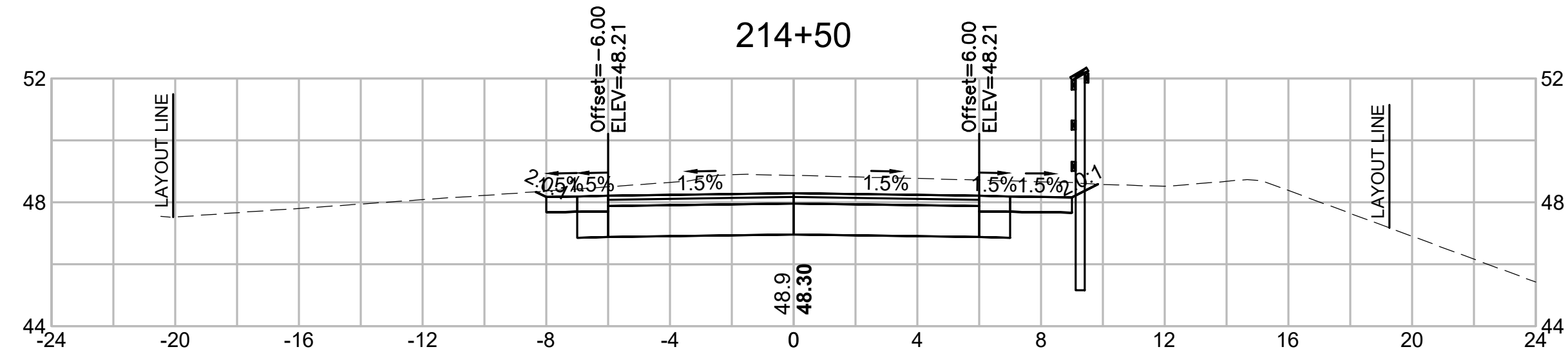
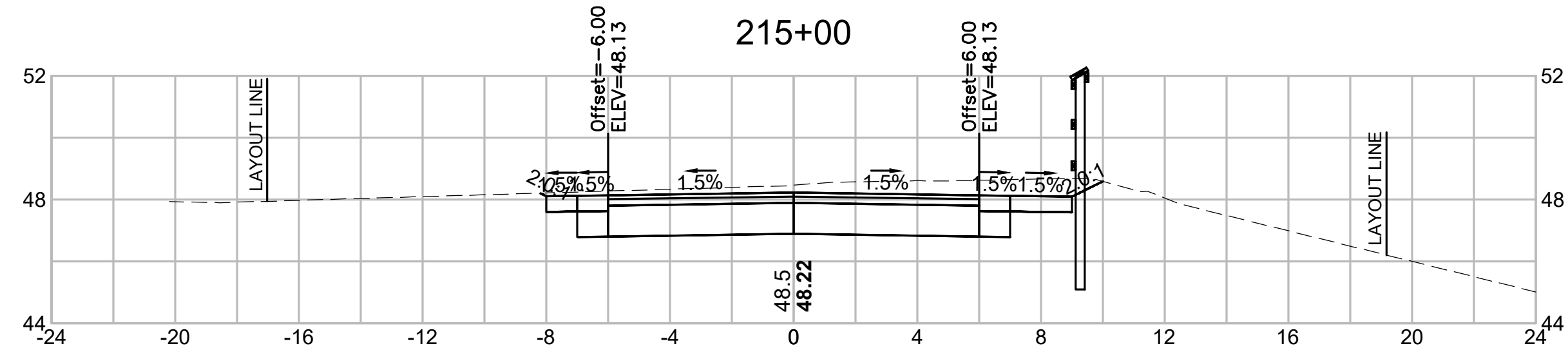
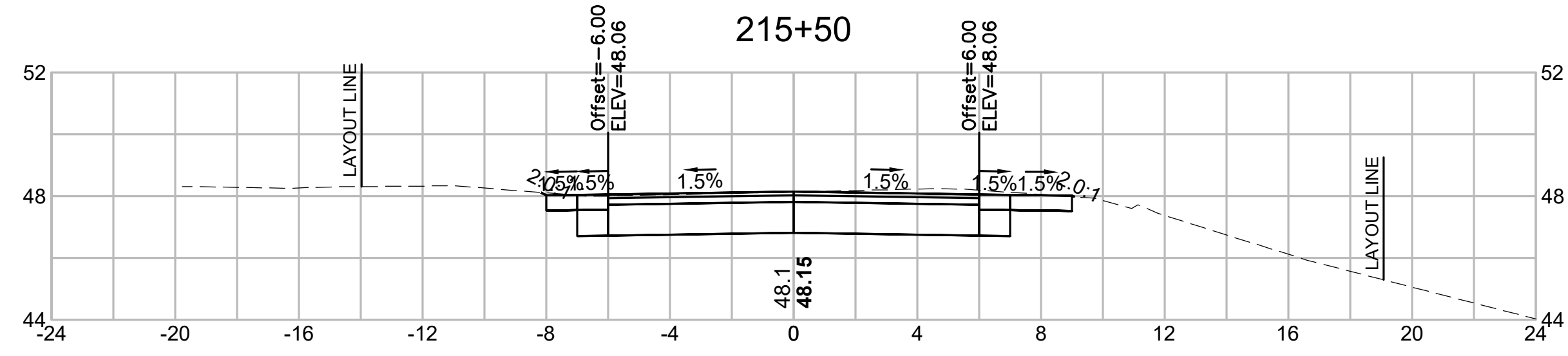
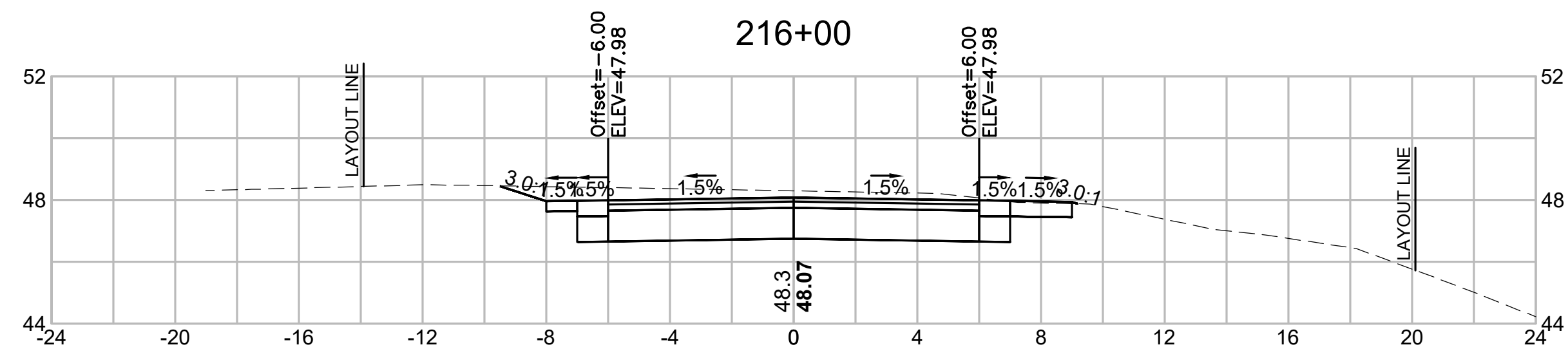
CROSS SECTIONS - 13



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	98	114
PROJECT FILE NO. 17112.00			

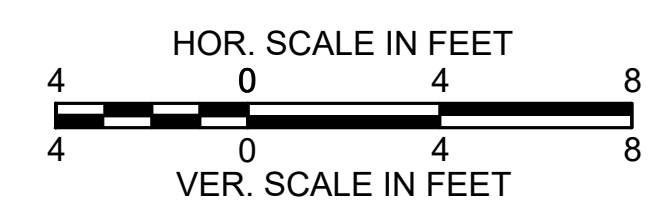
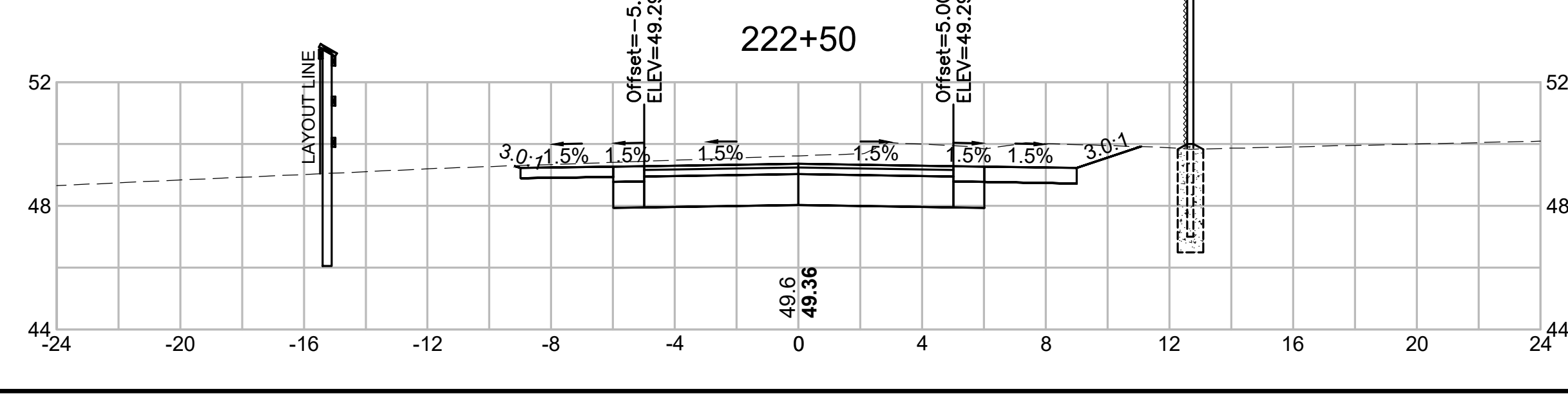
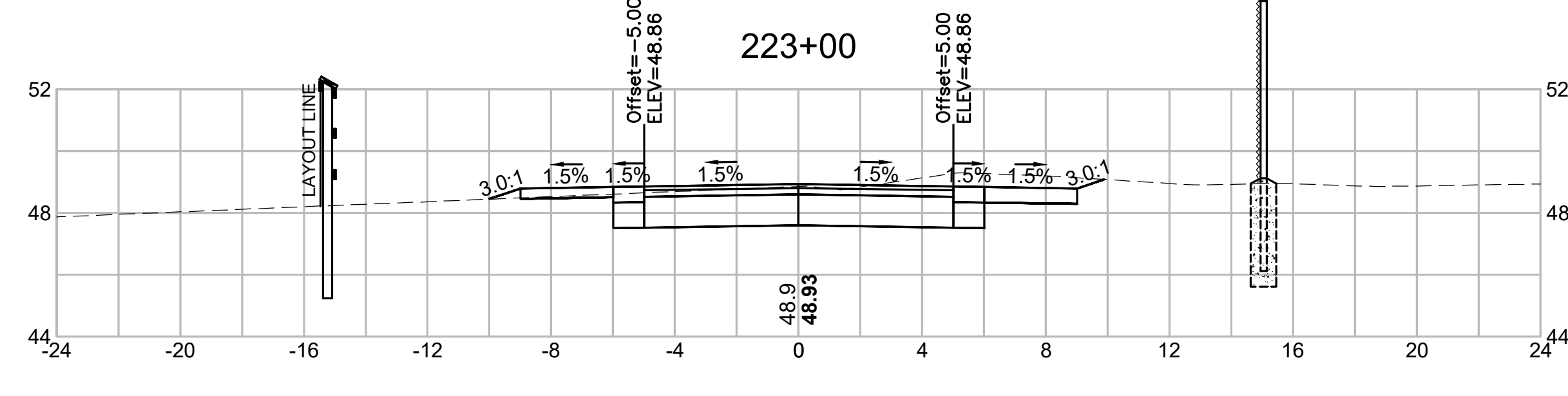
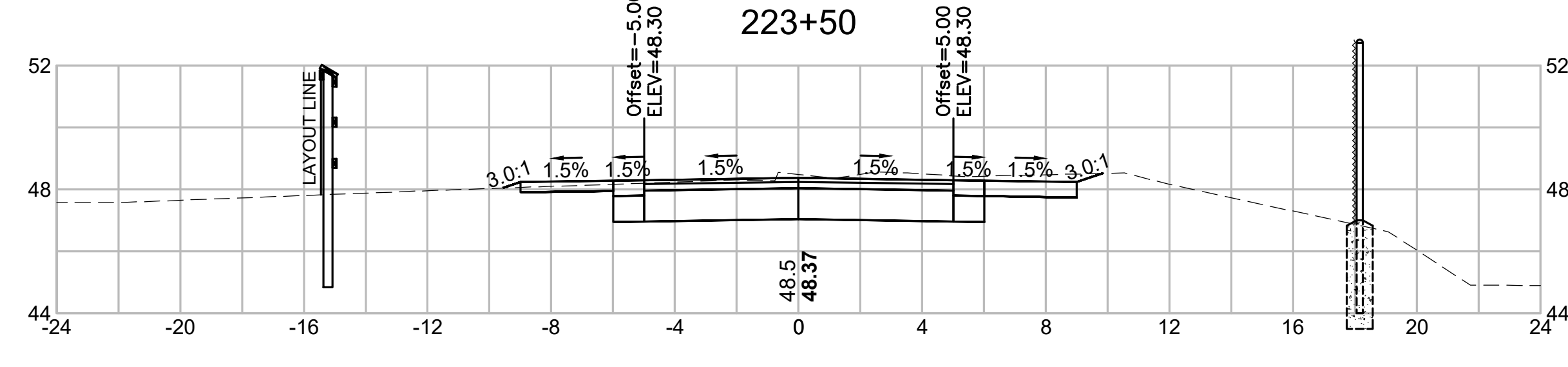
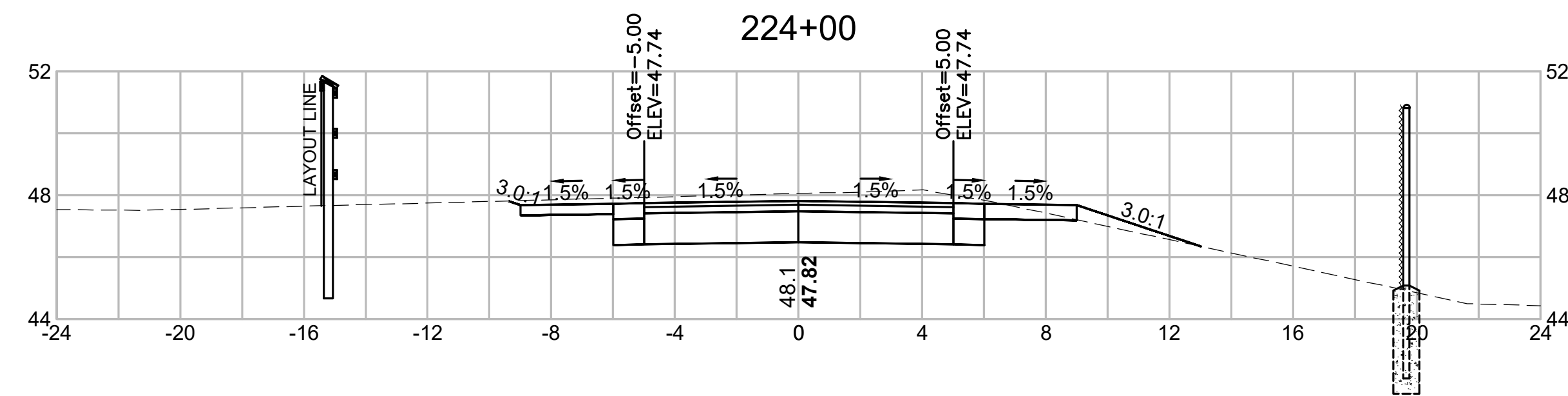
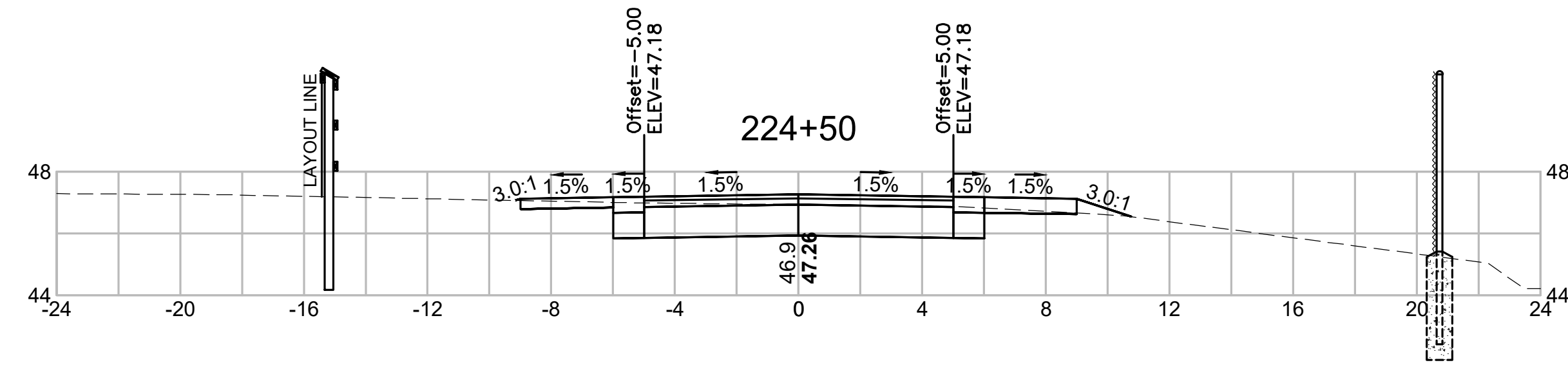
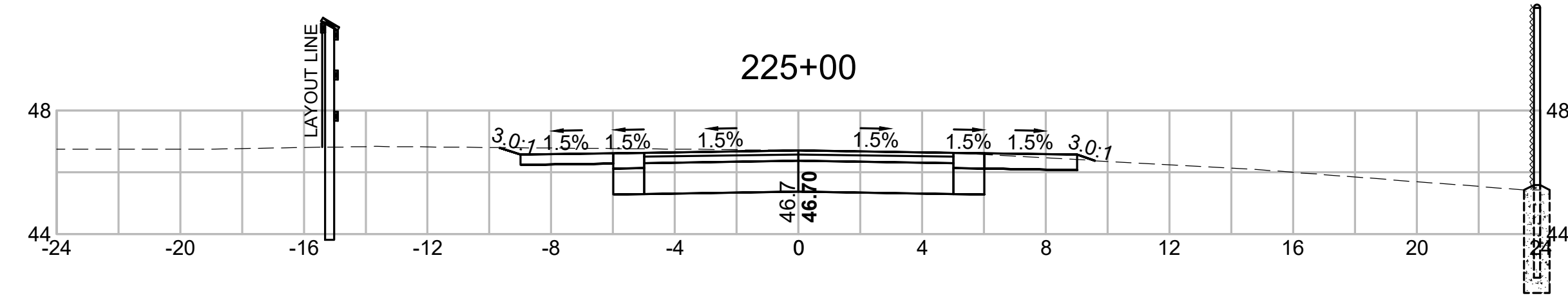
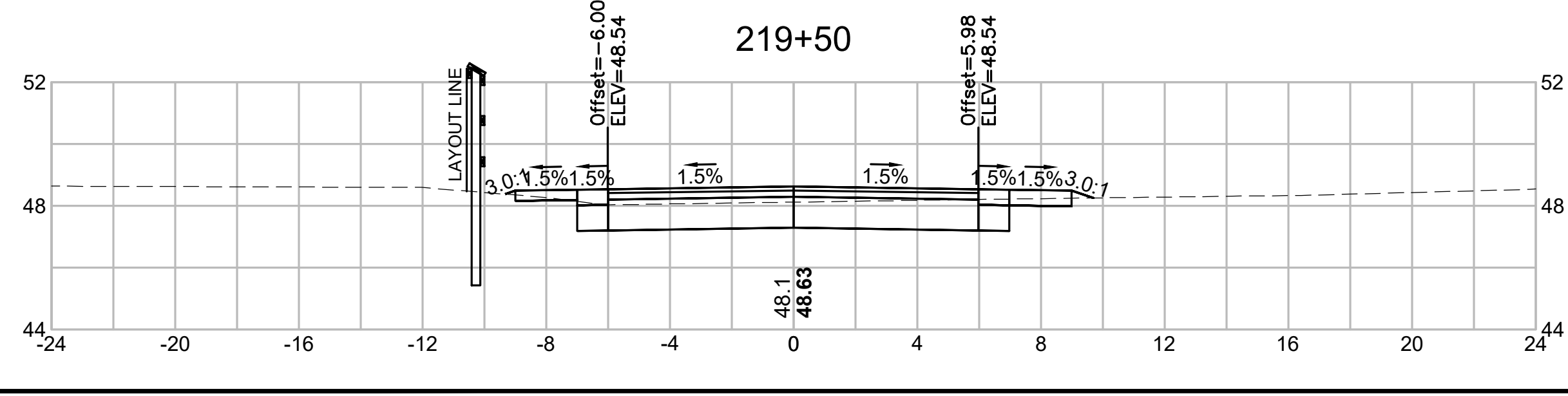
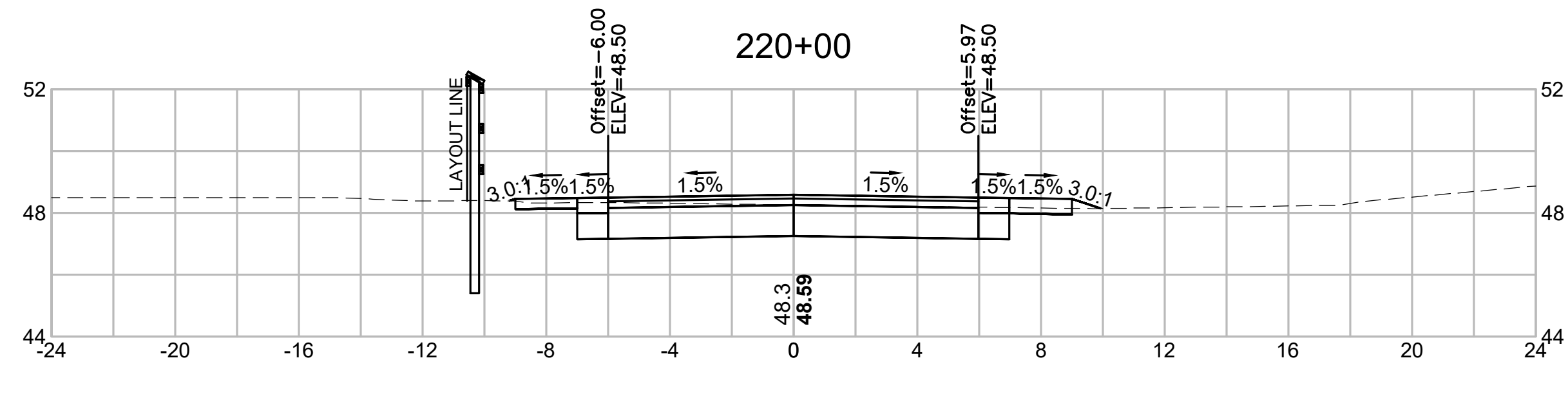
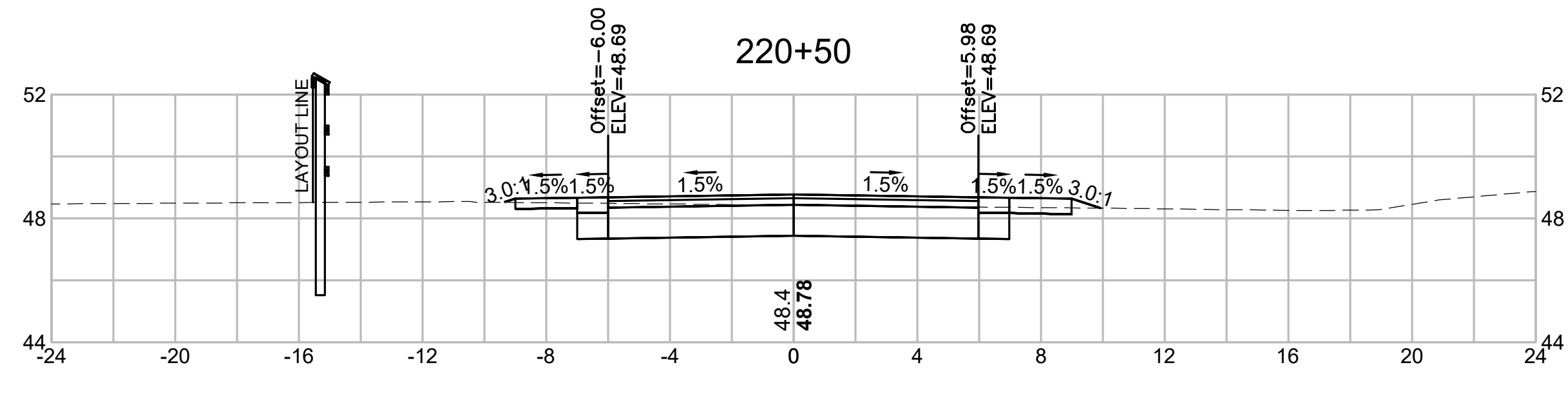
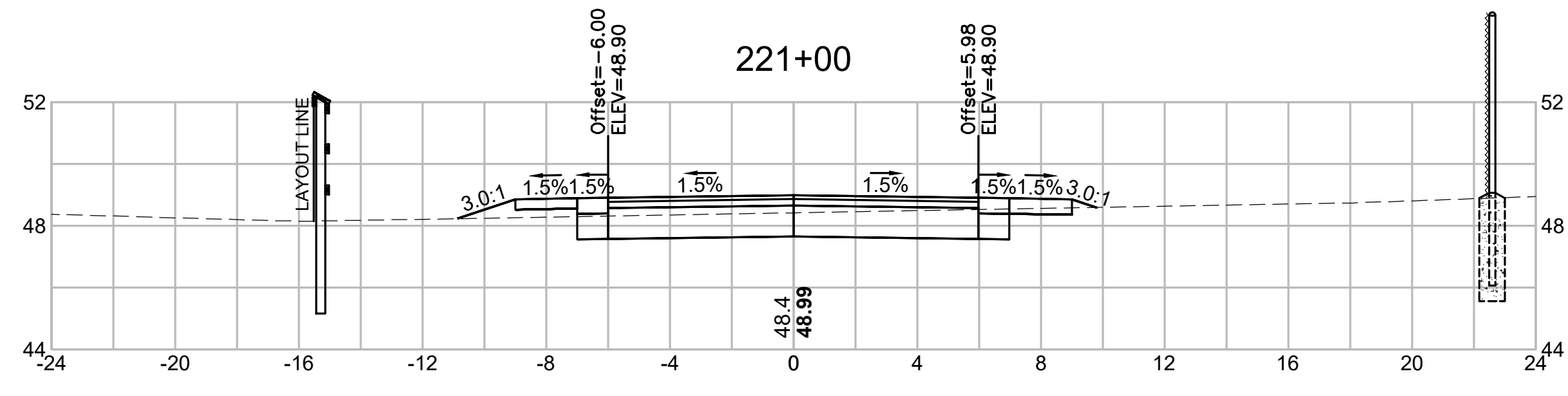
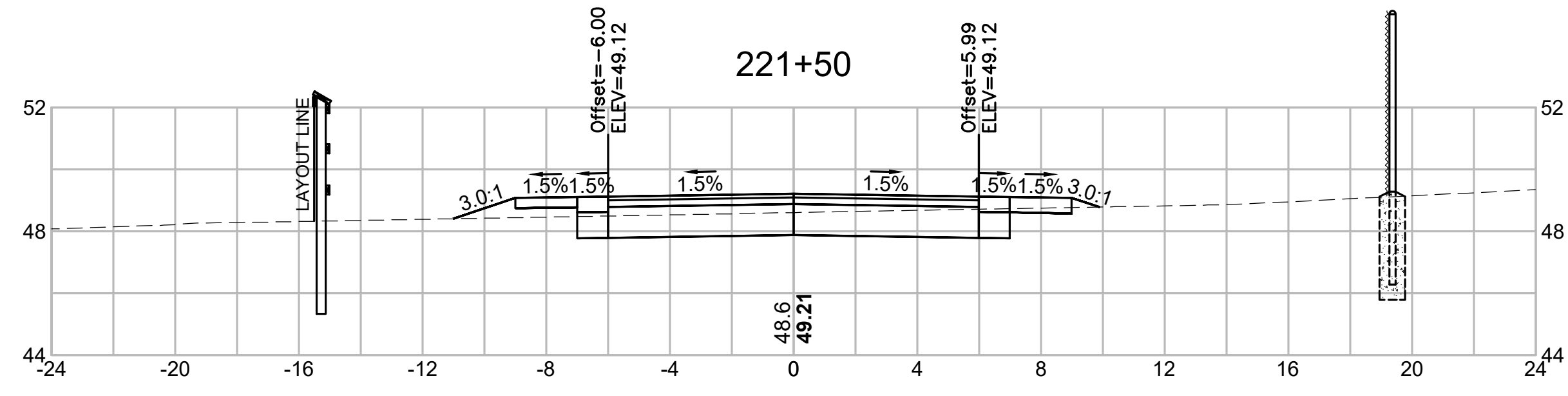
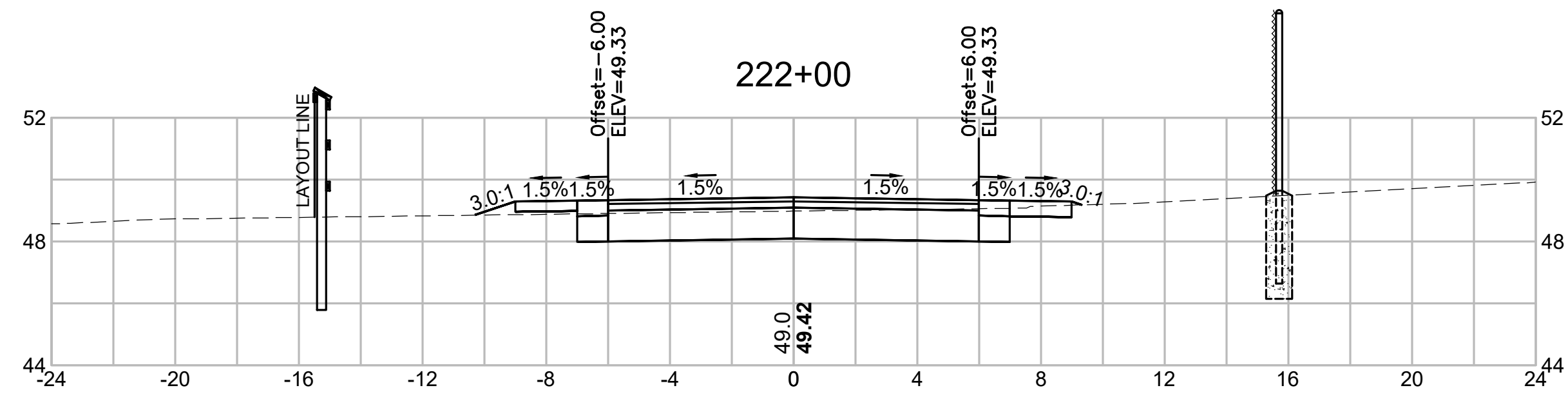
**CROSS SECTIONS - 14**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	99	114
PROJECT FILE NO.		17112.00	

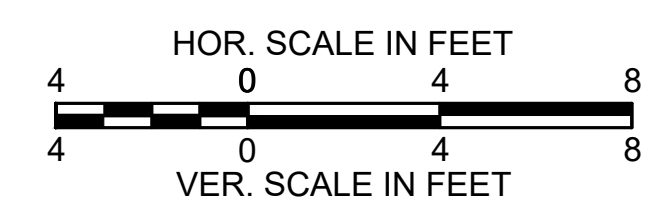
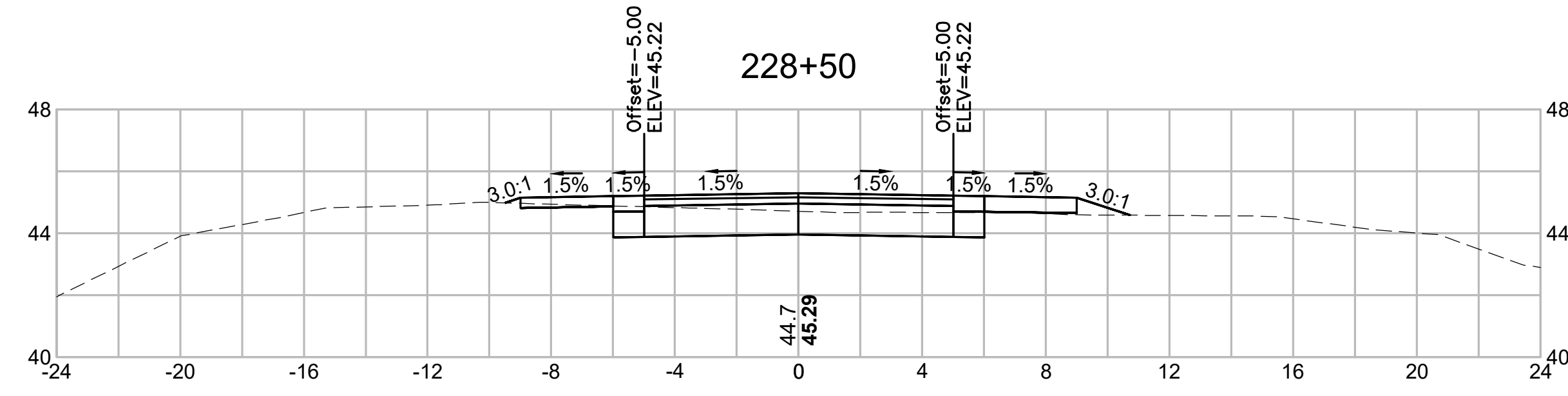
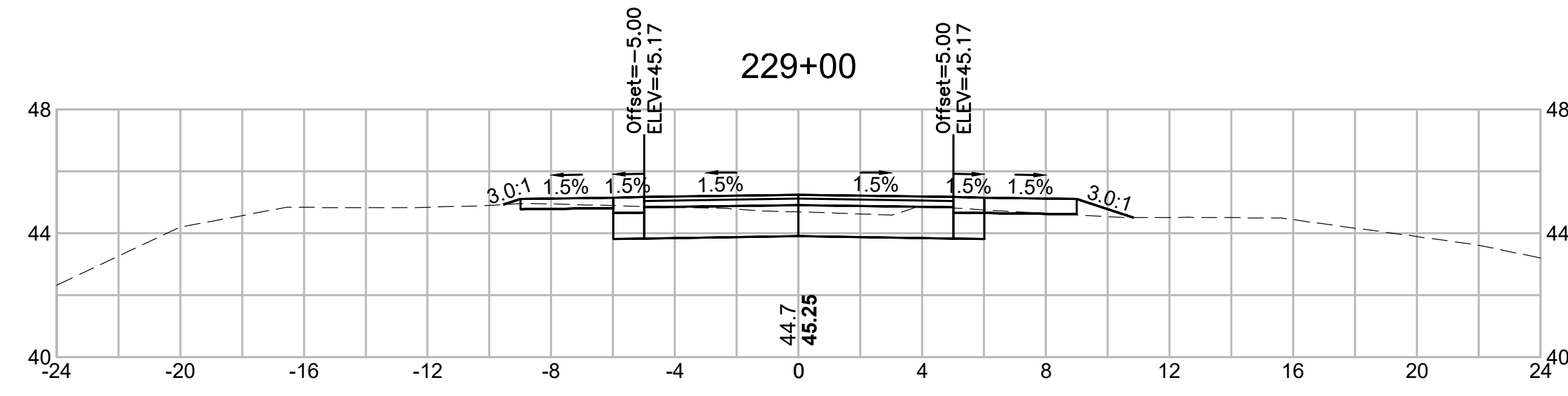
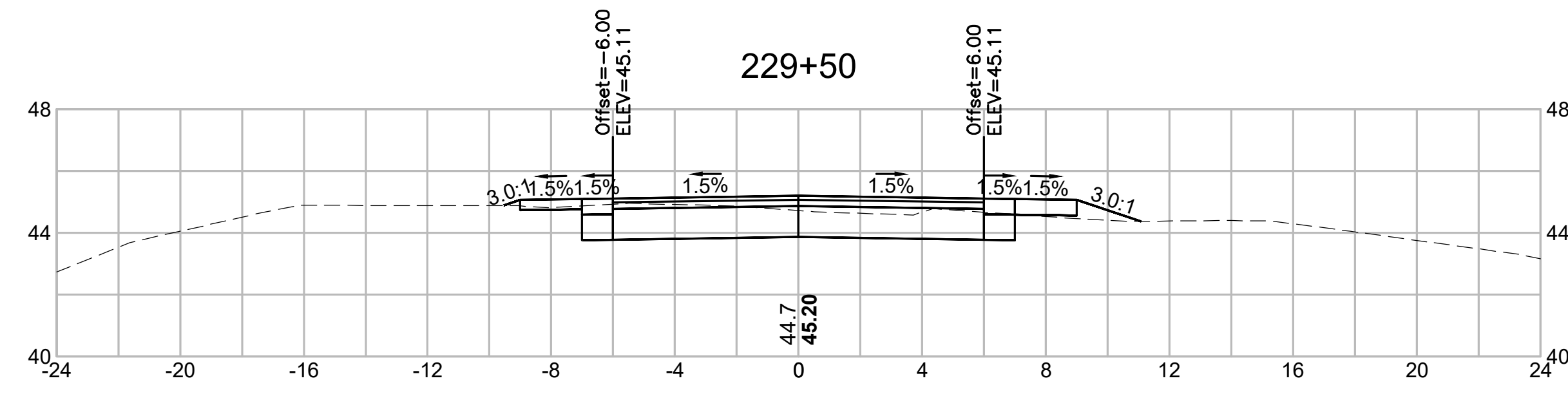
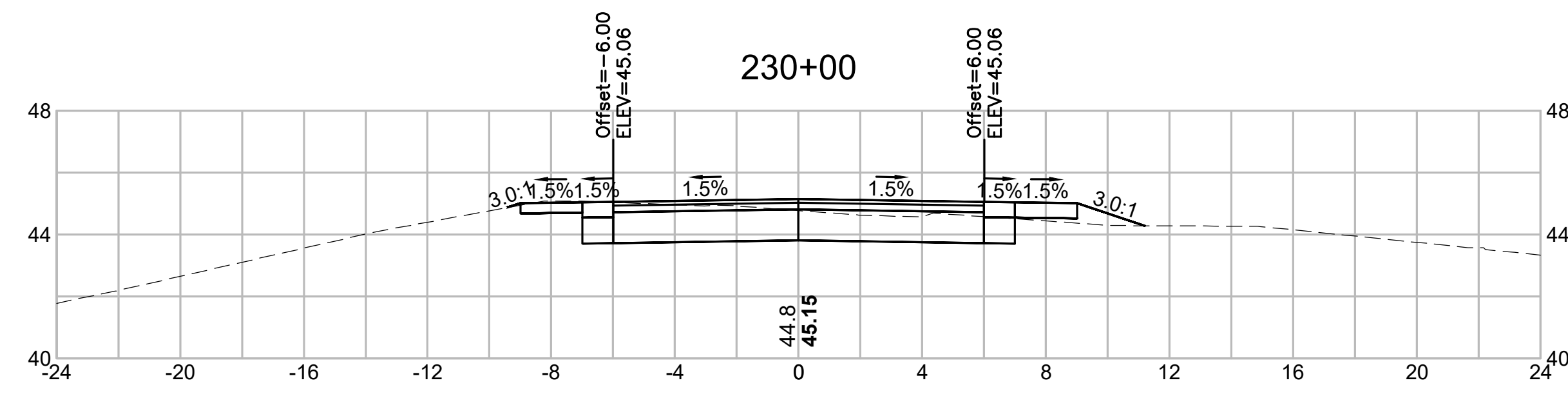
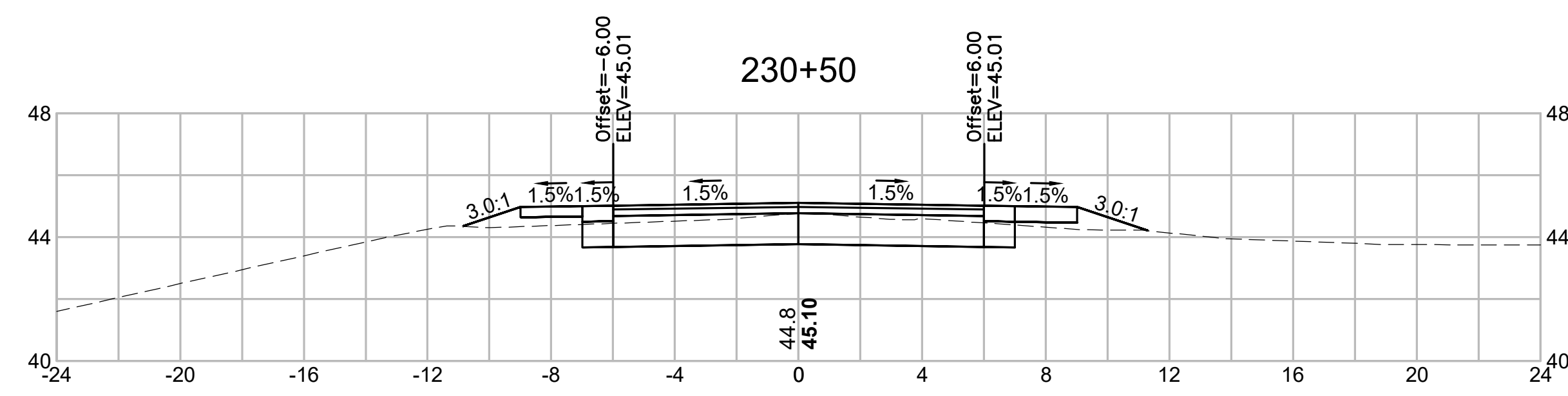
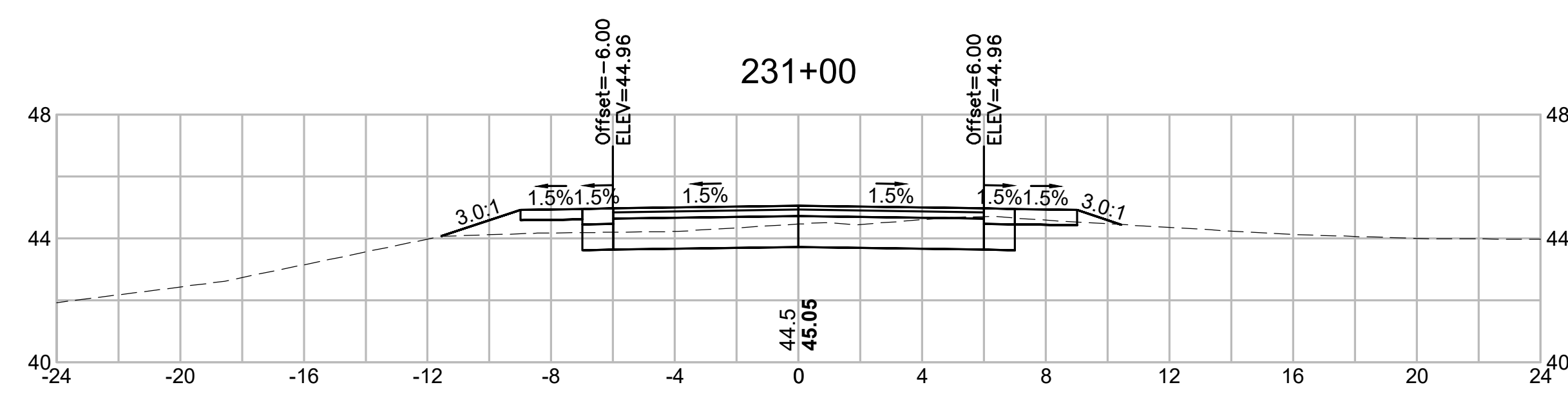
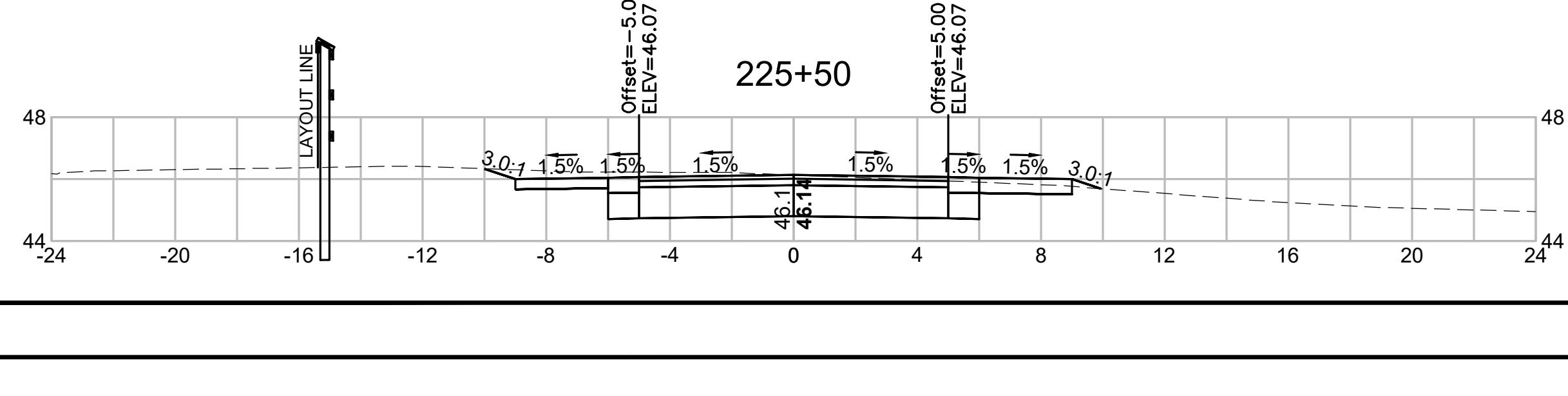
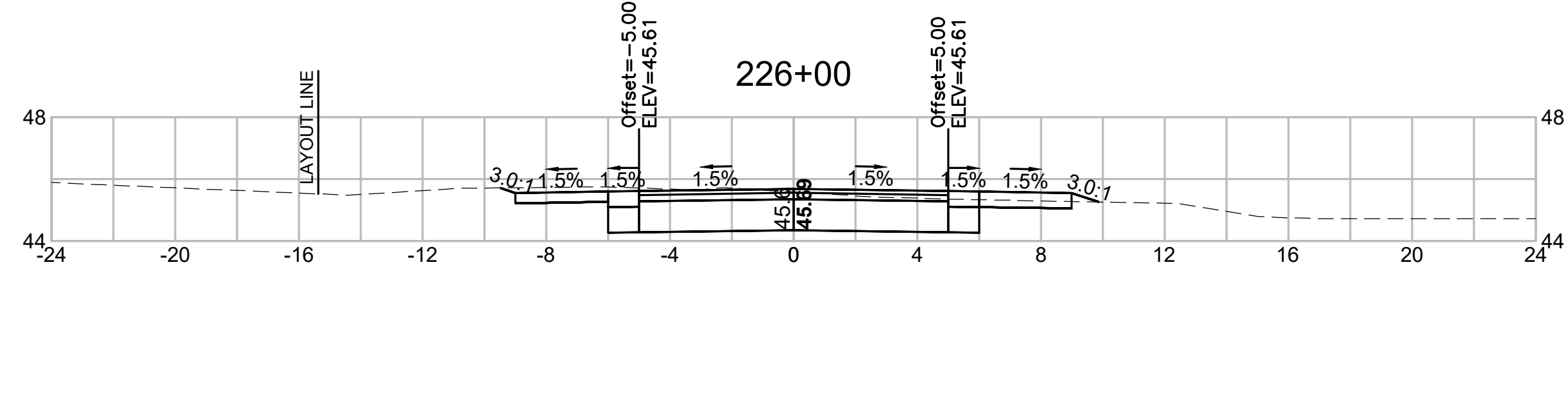
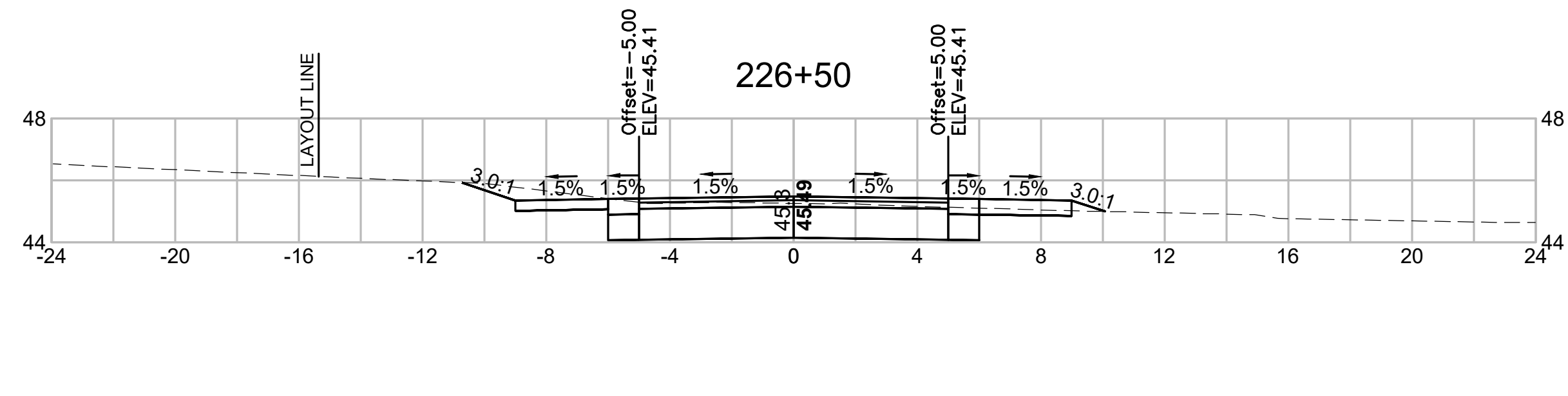
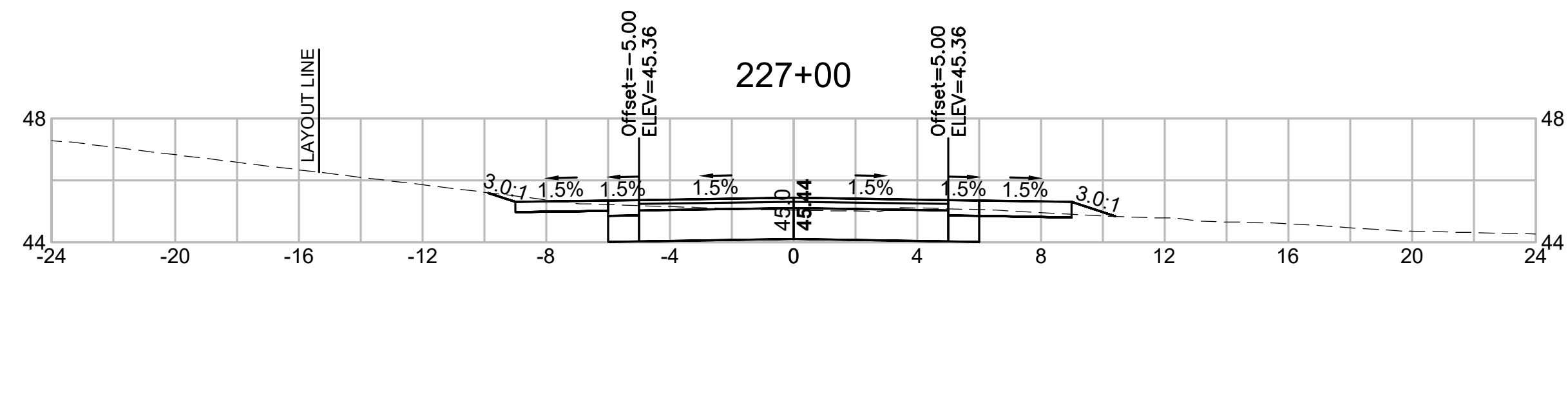
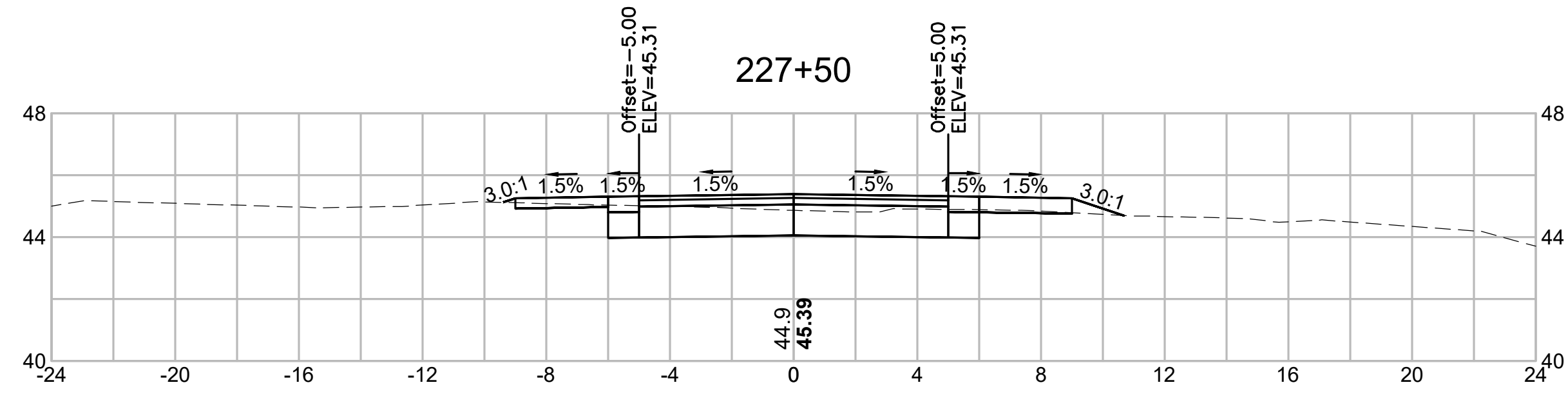
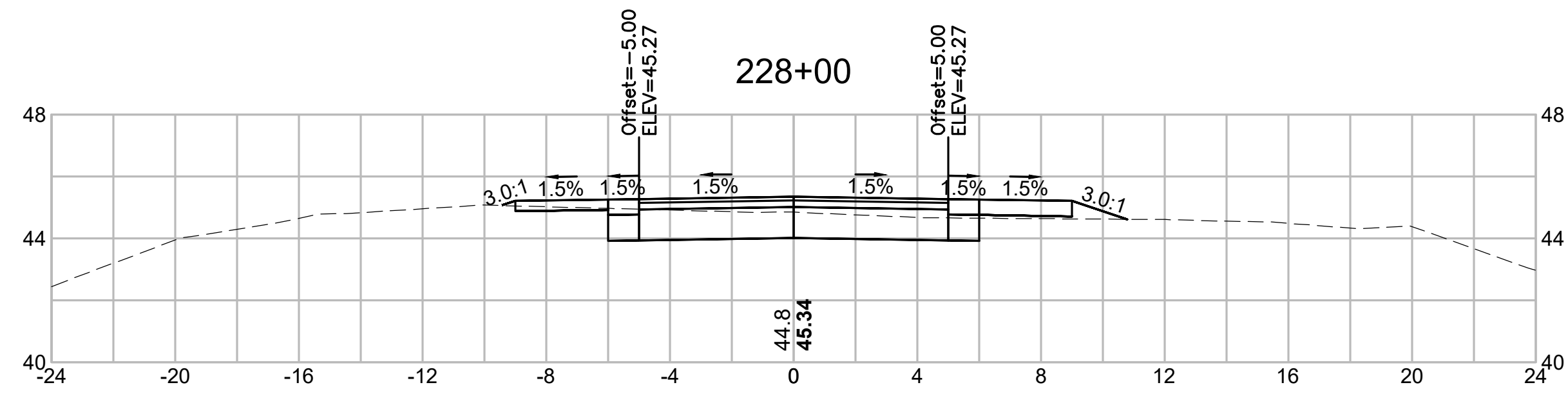
**CROSS SECTIONS - 15**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	100	114
PROJECT FILE NO.		17112.00	

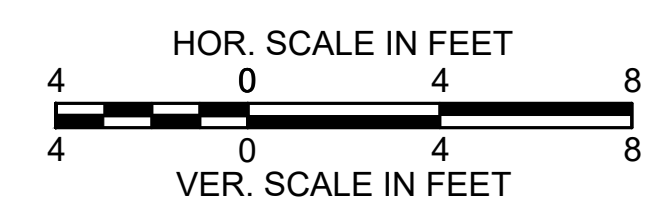
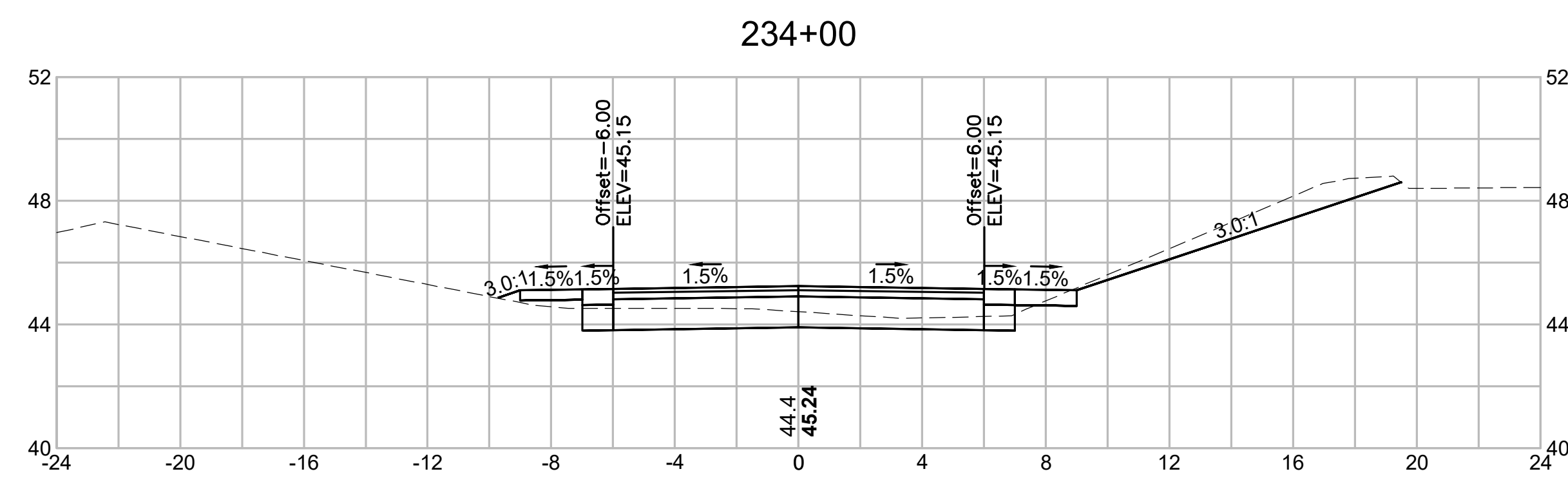
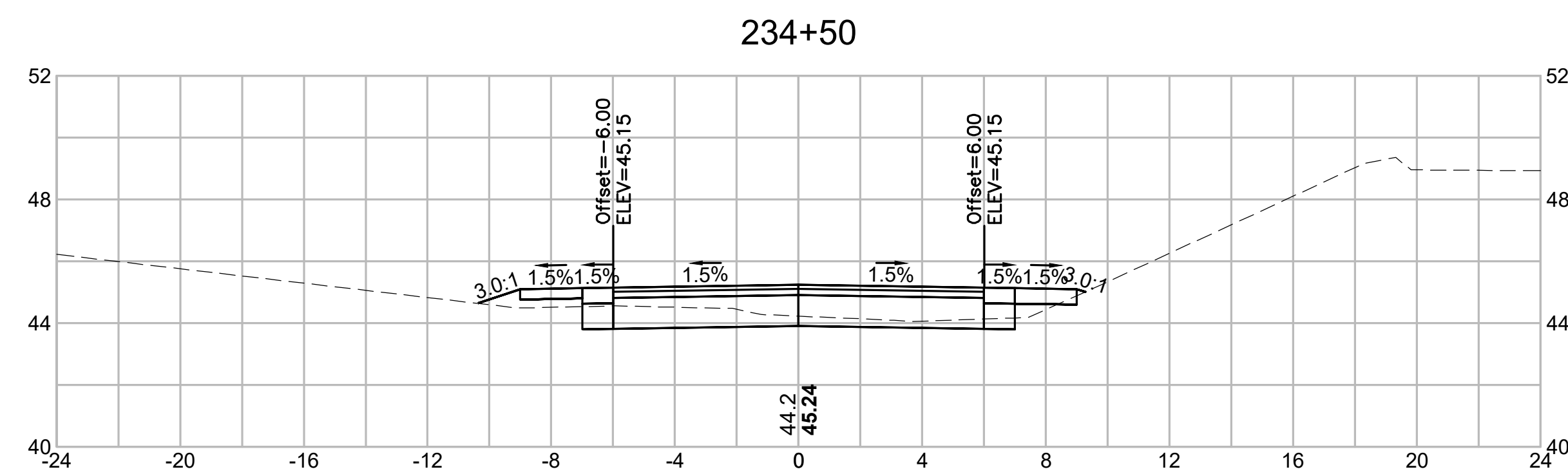
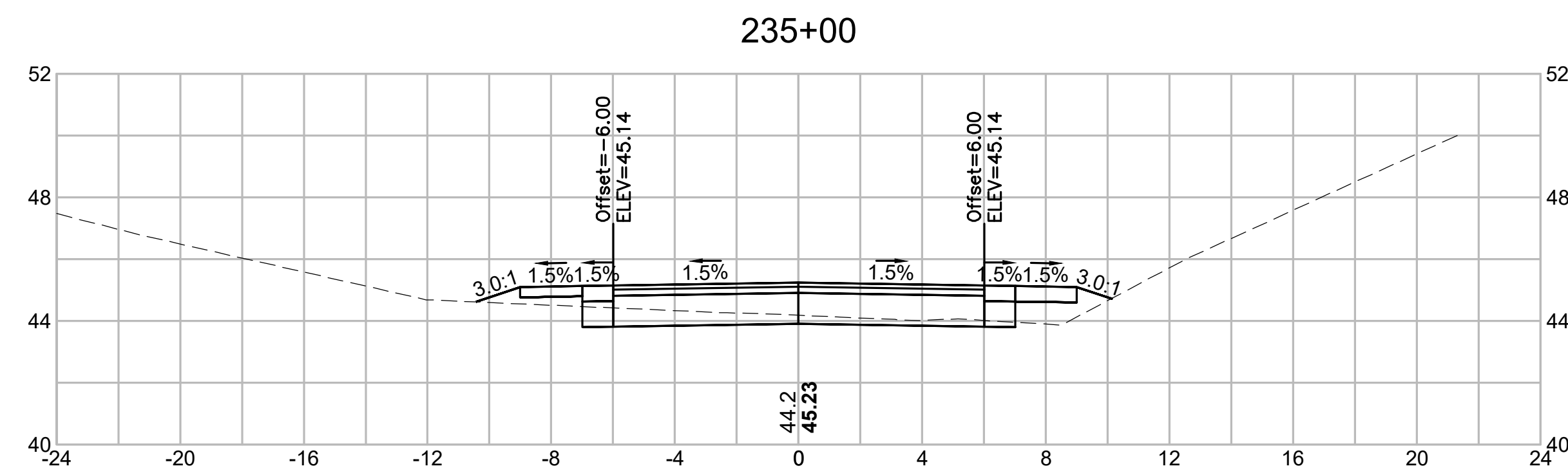
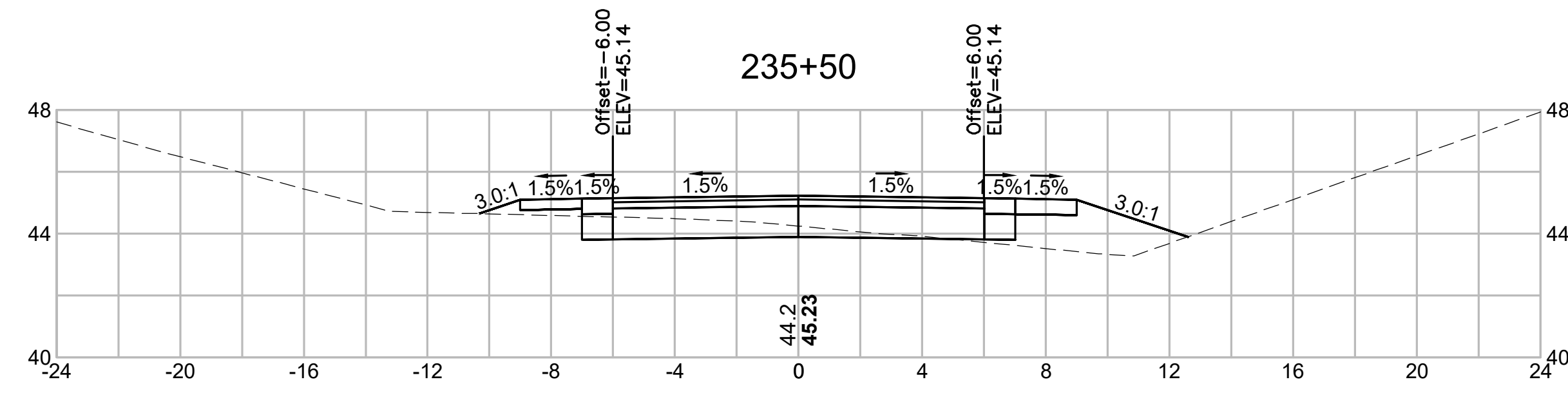
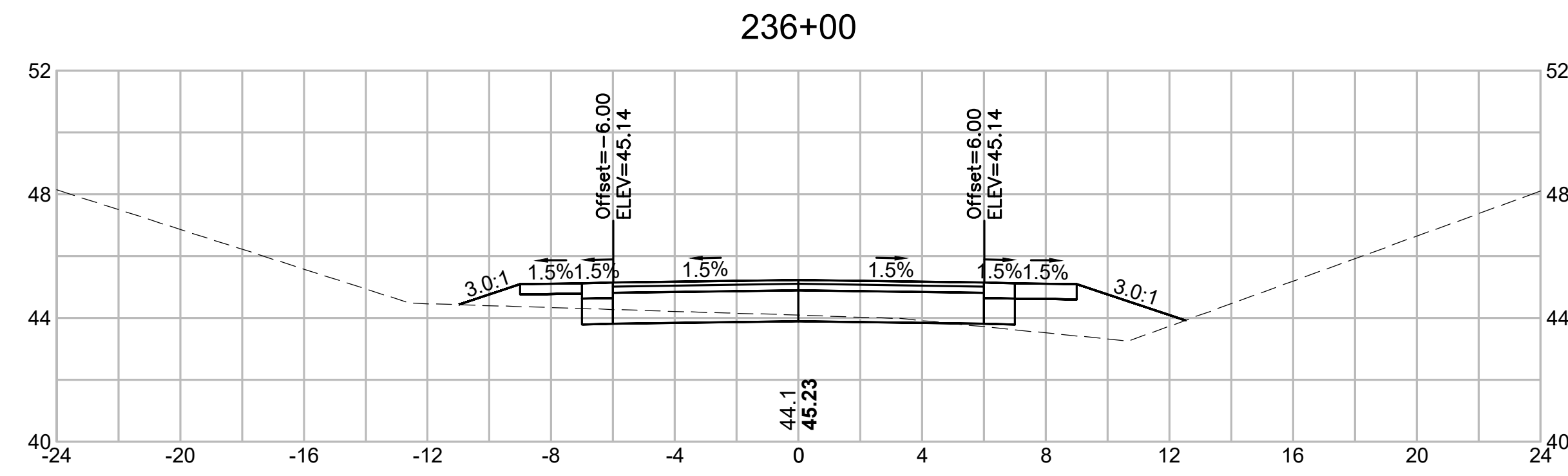
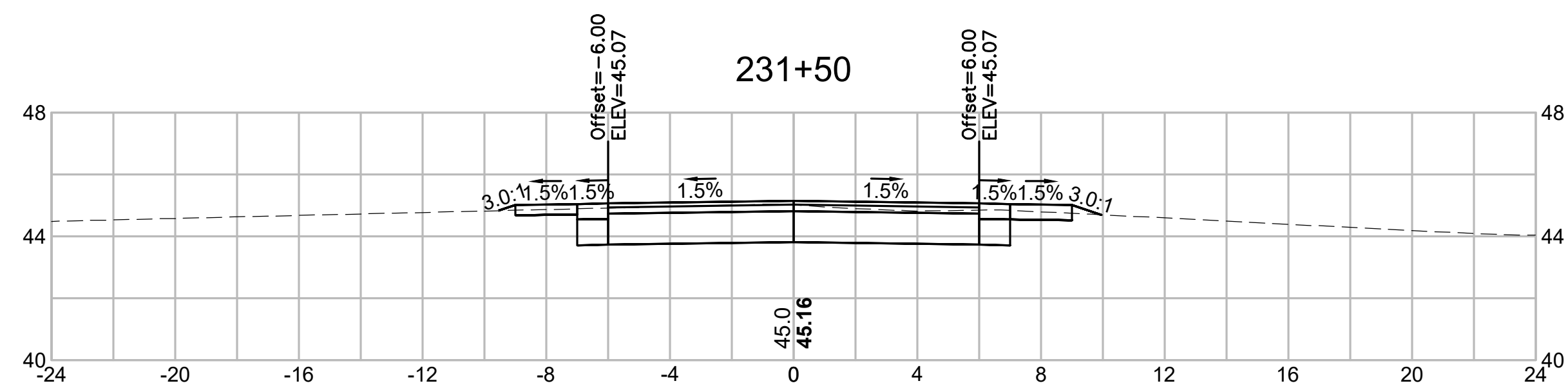
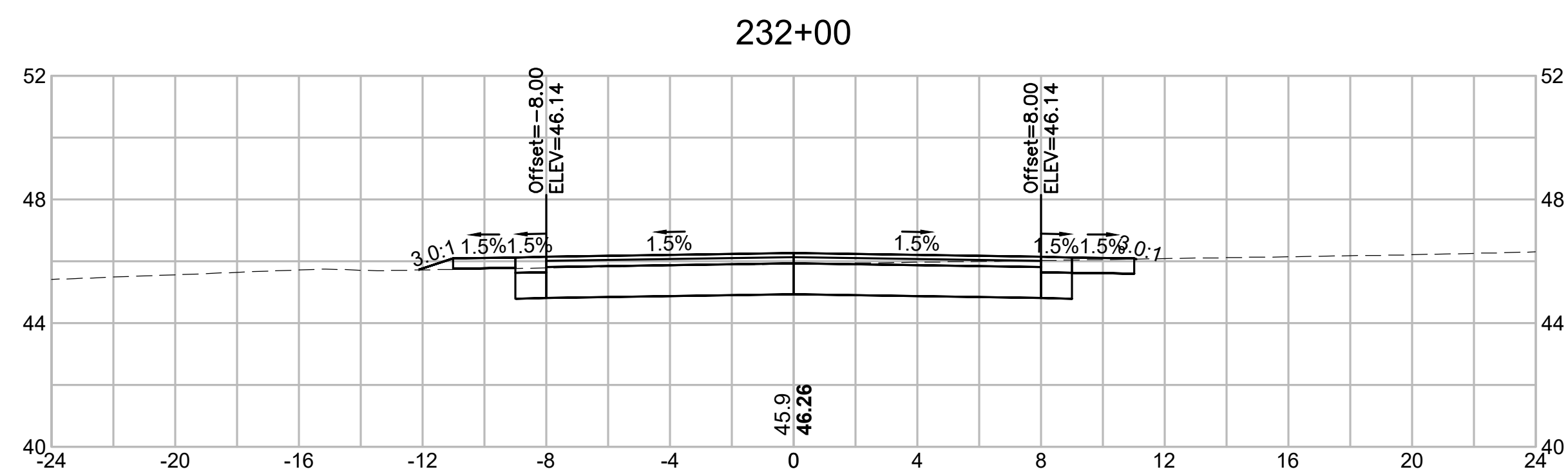
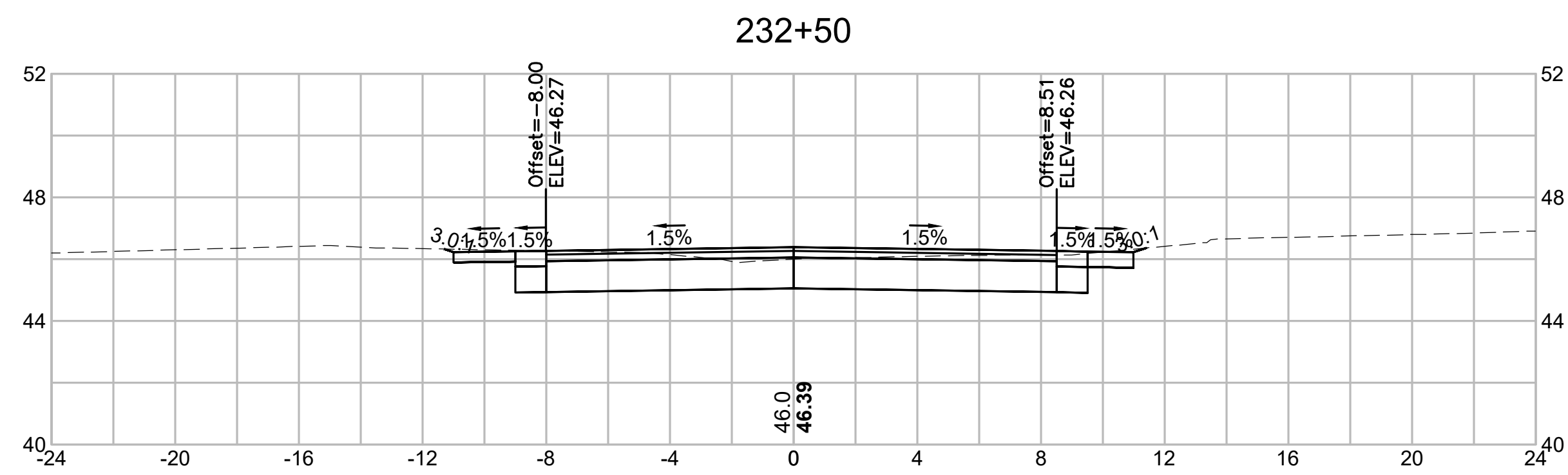
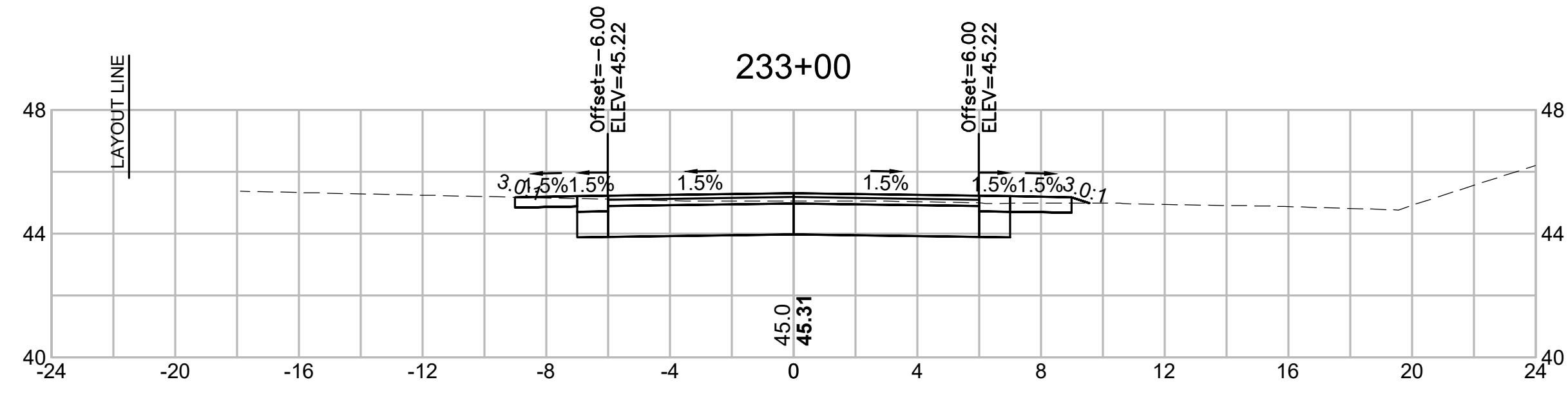
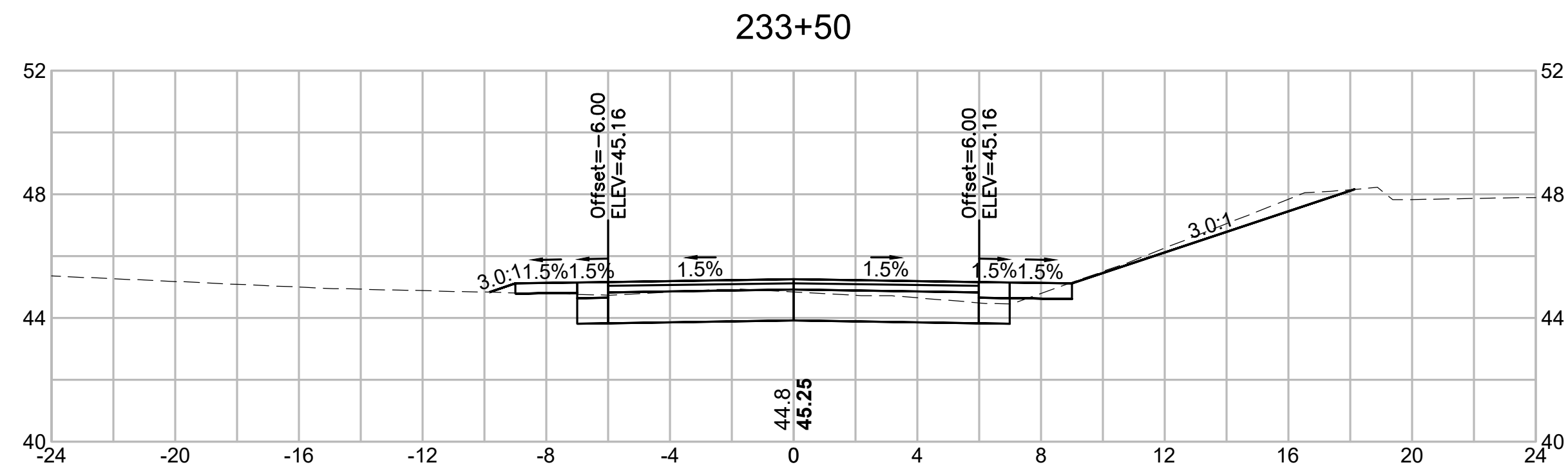
**CROSS SECTIONS - 16**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	101	114
PROJECT FILE NO.		17112.00	

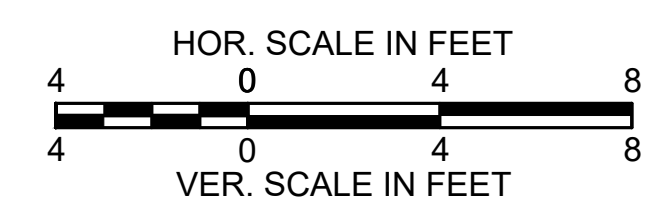
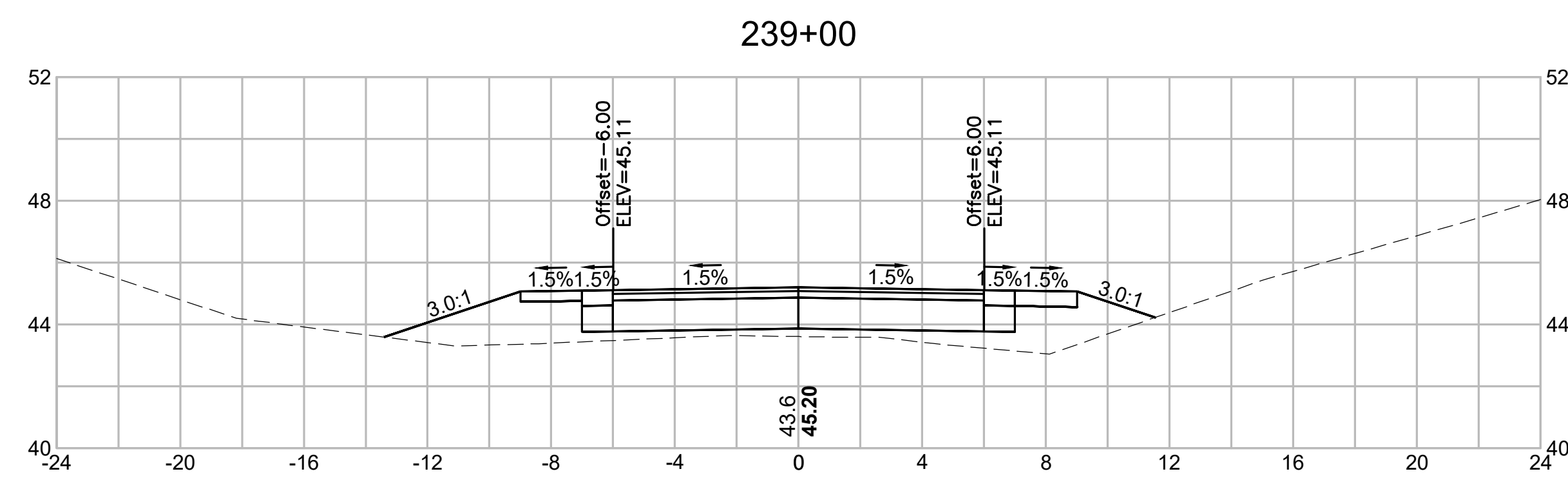
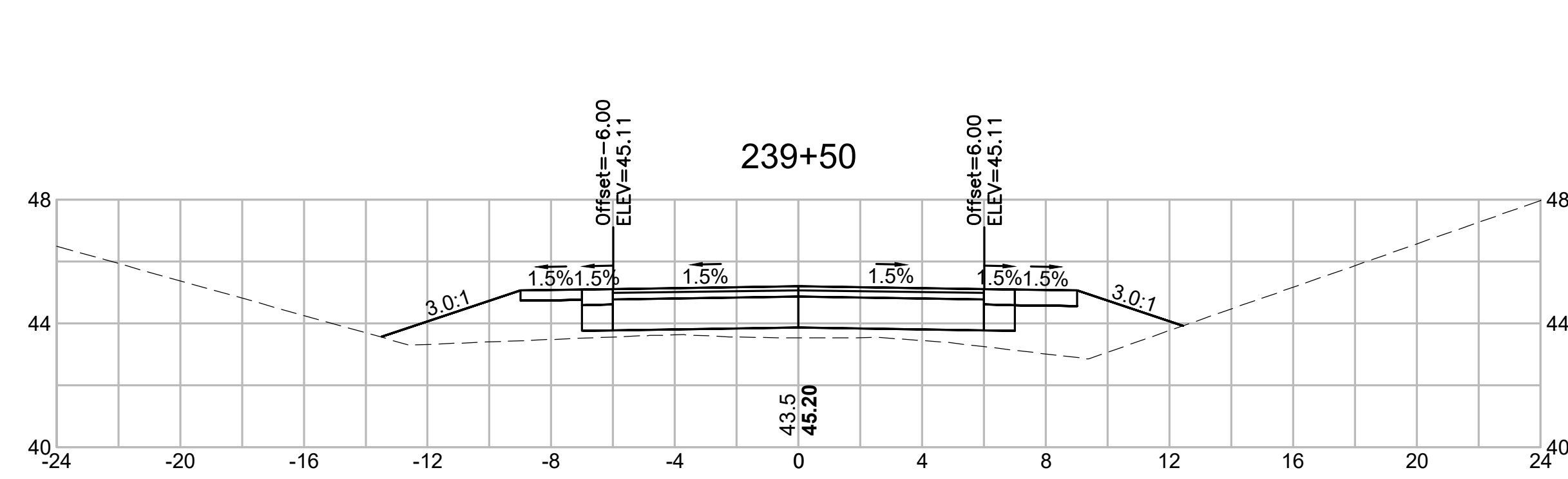
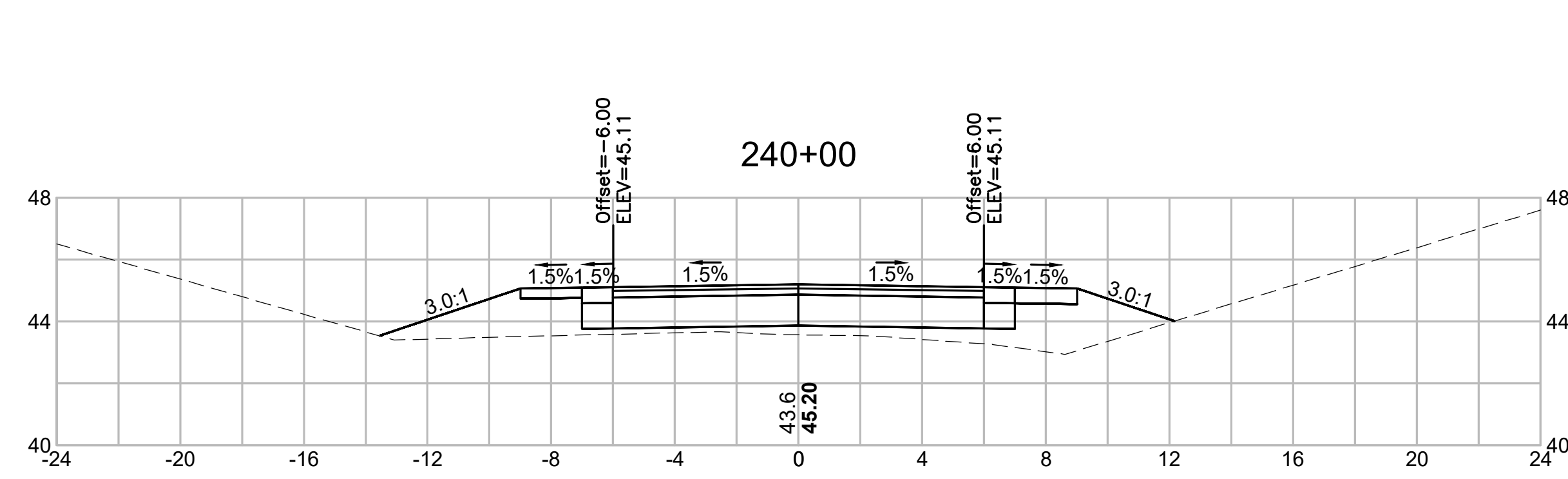
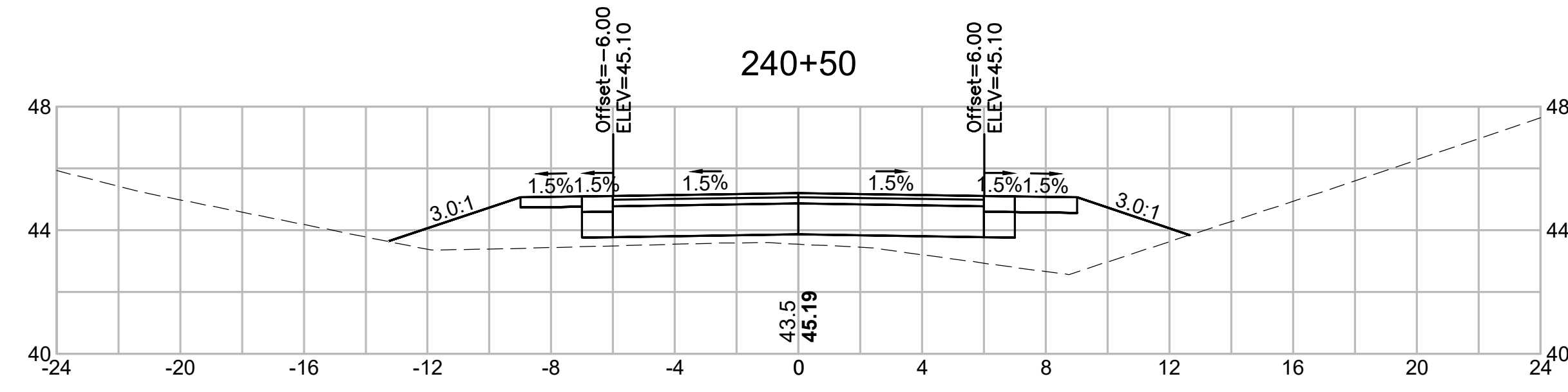
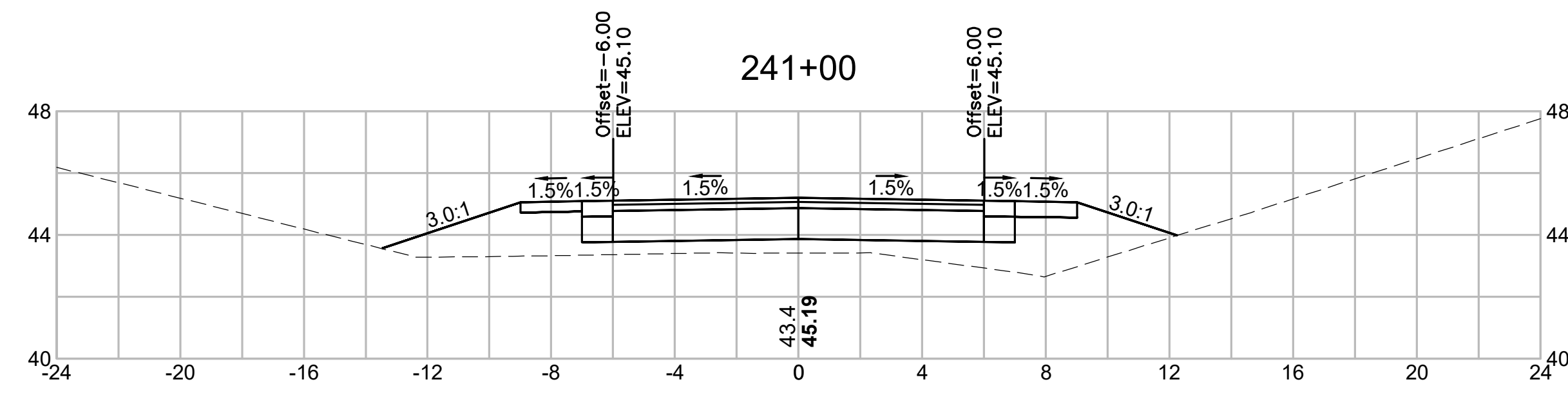
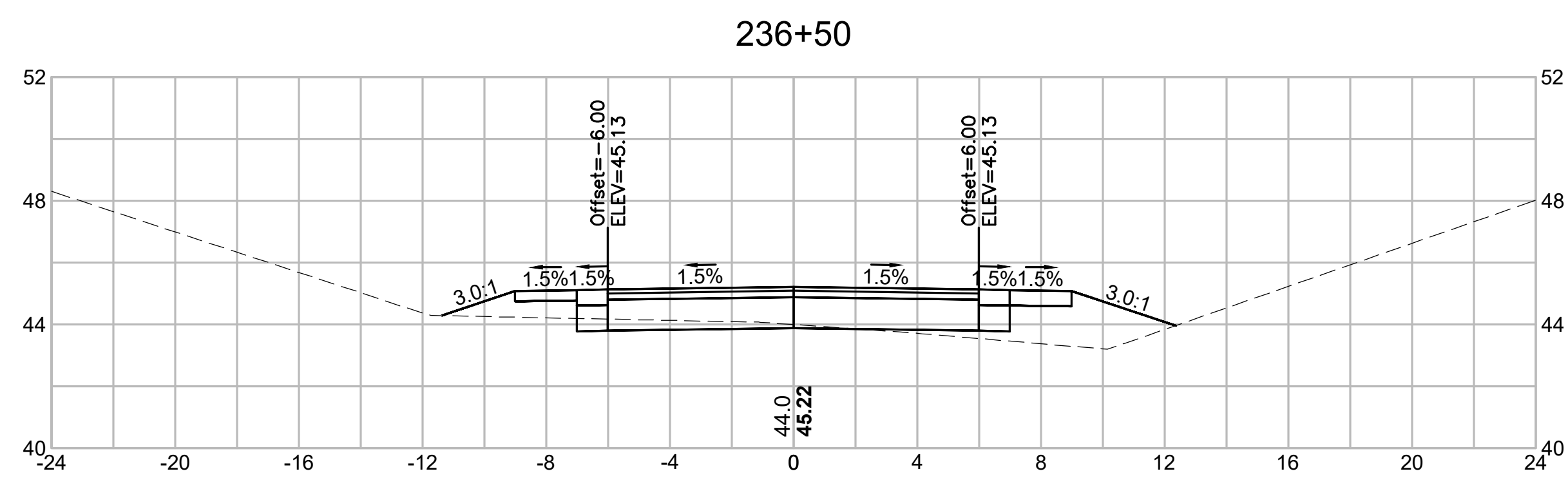
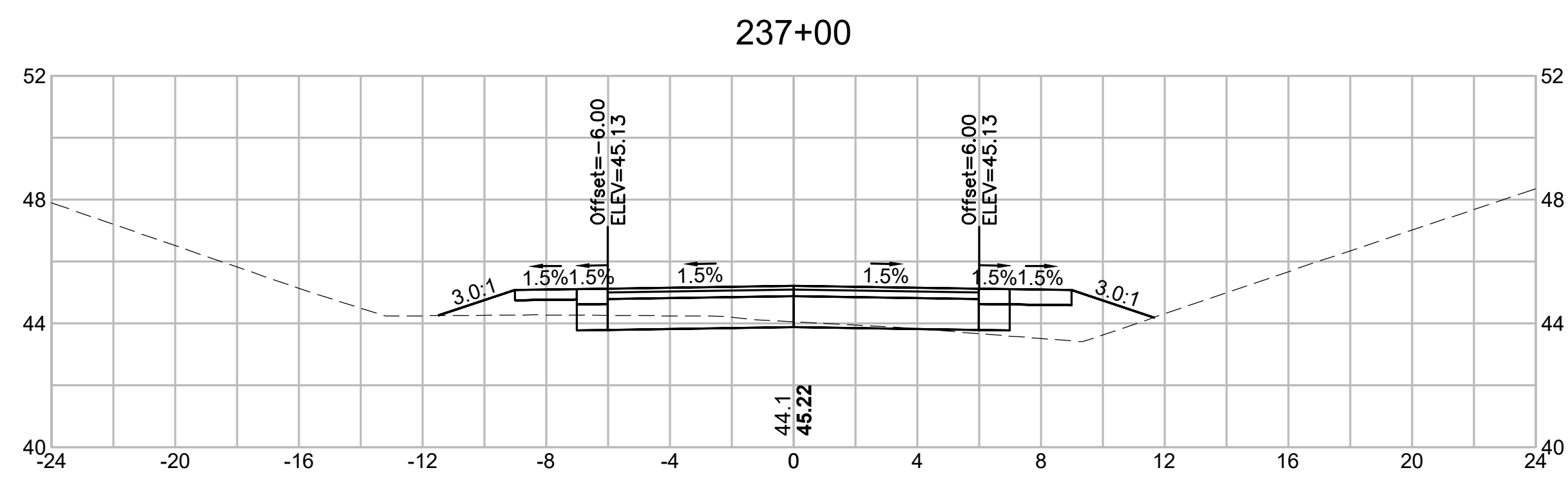
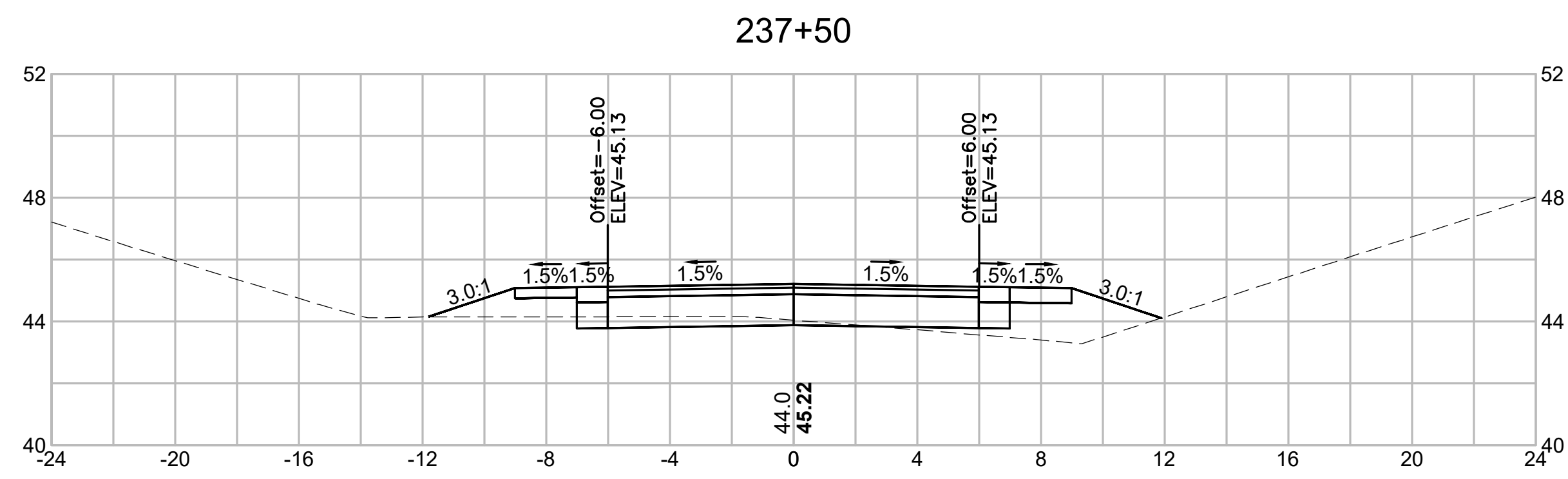
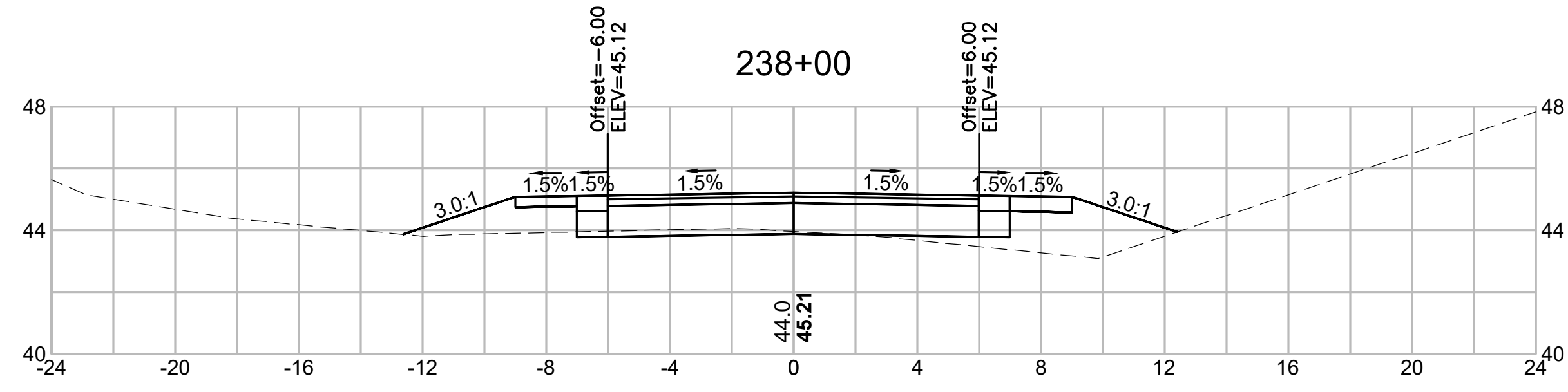
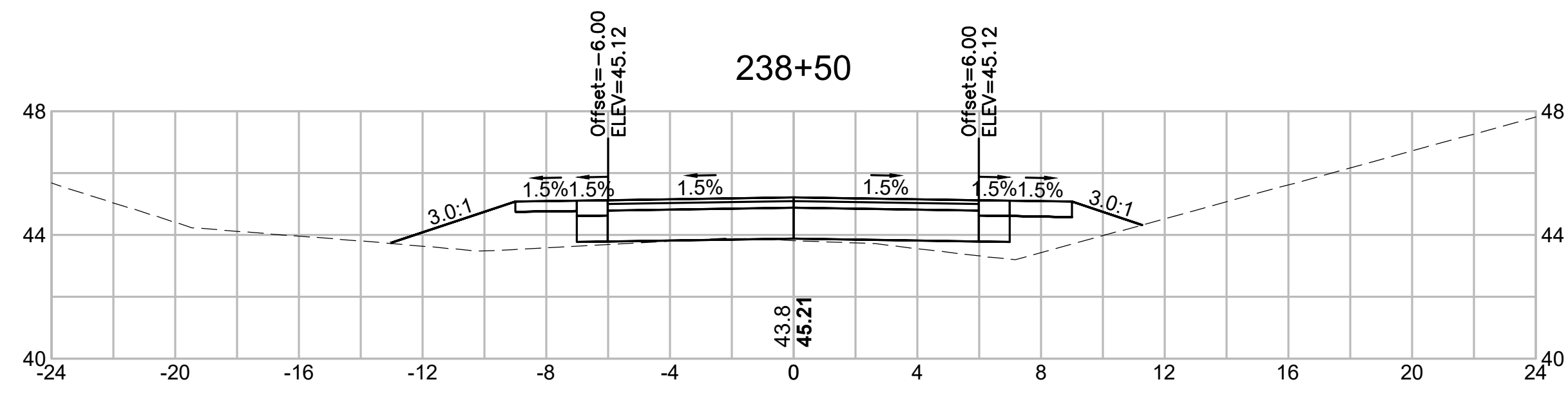
**CROSS SECTIONS - 17**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	102	114
PROJECT FILE NO.		17112.00	

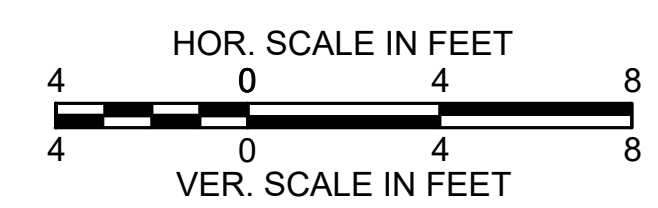
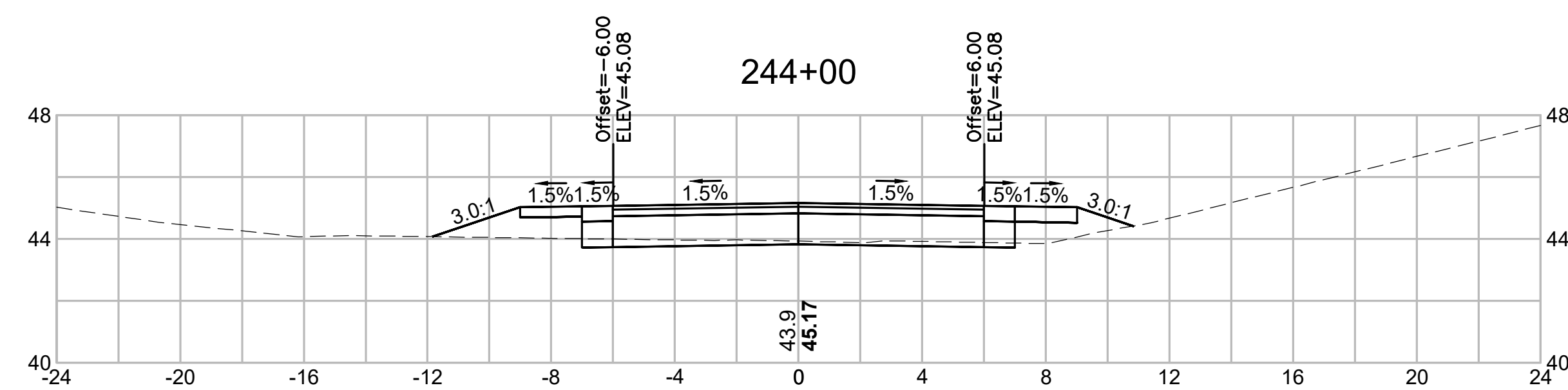
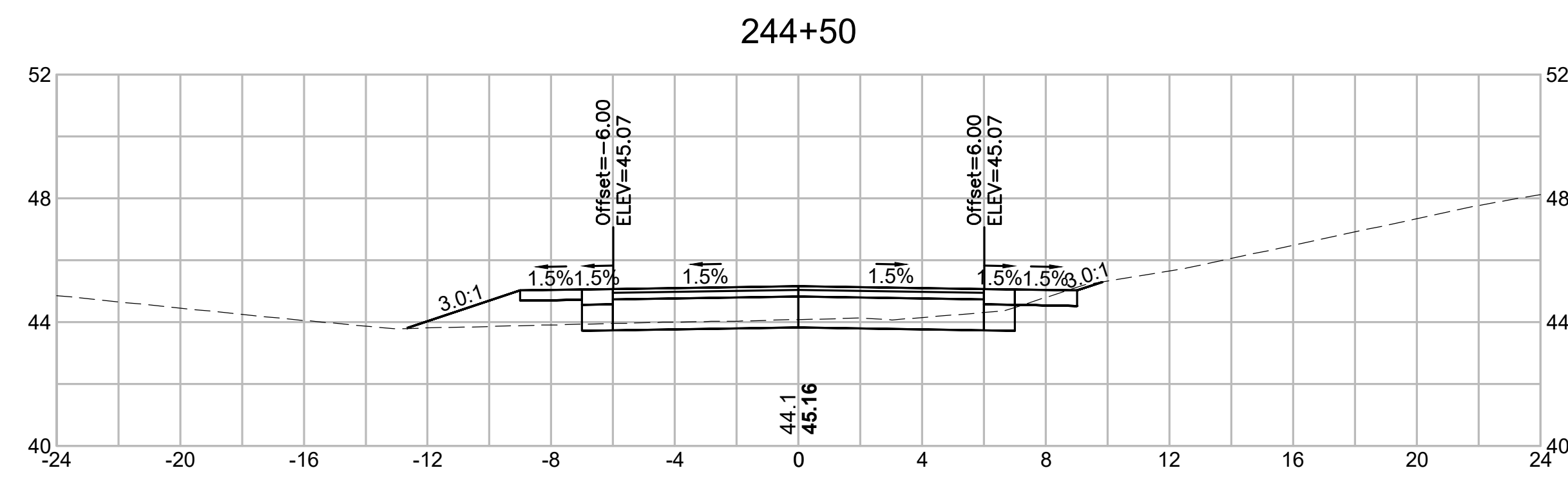
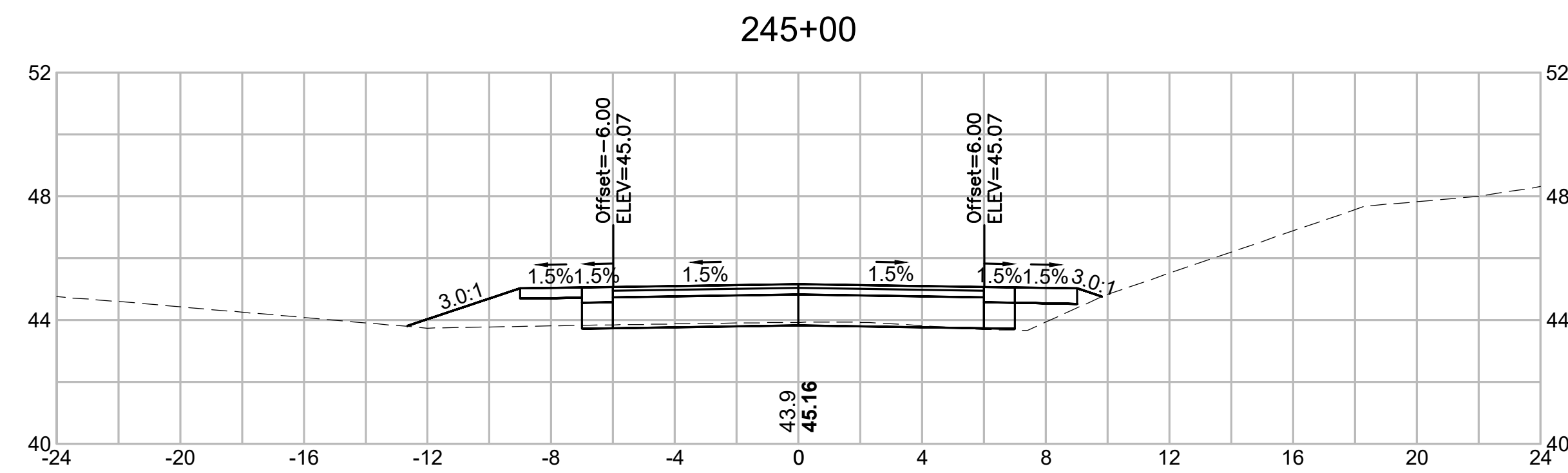
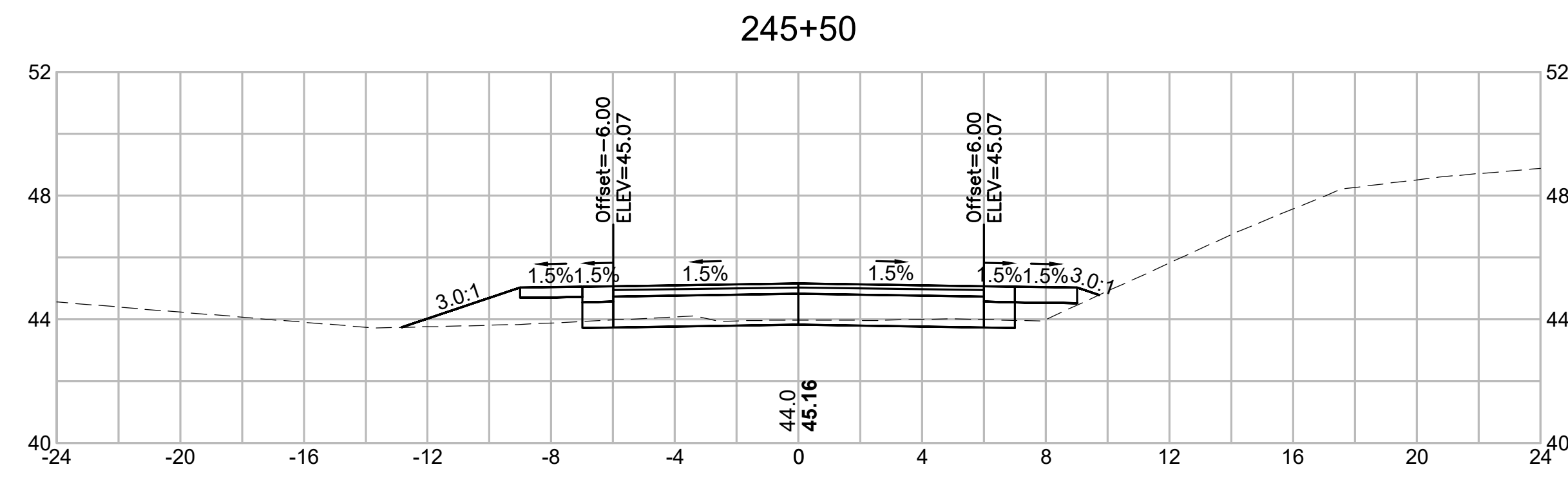
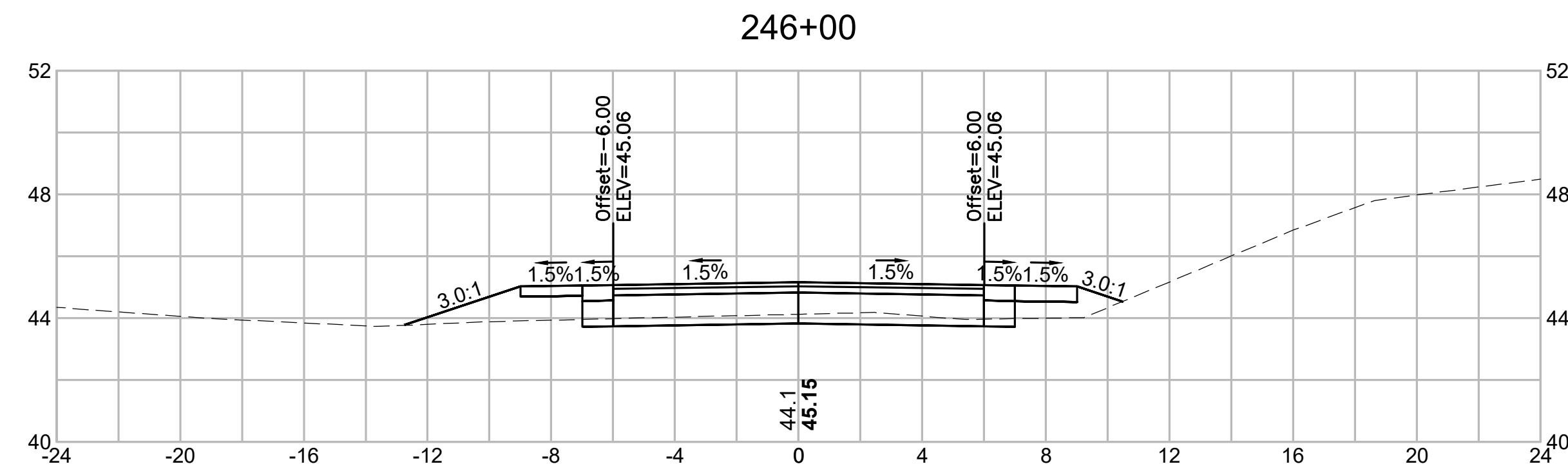
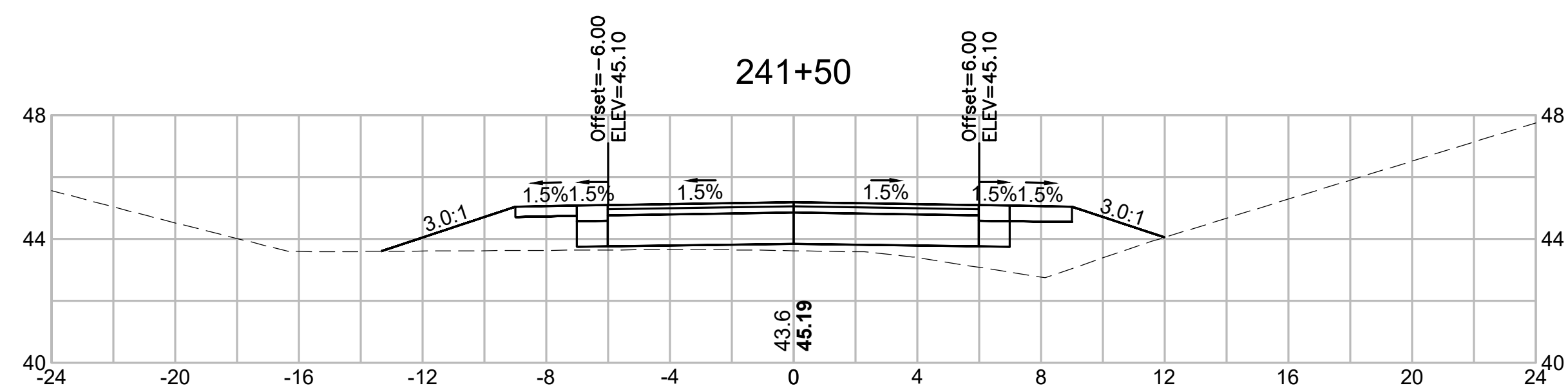
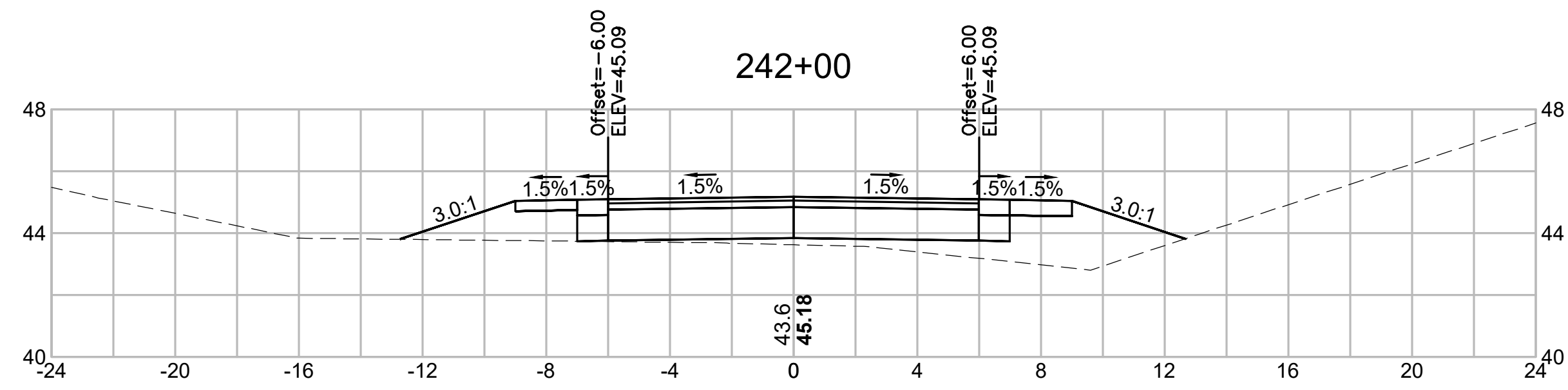
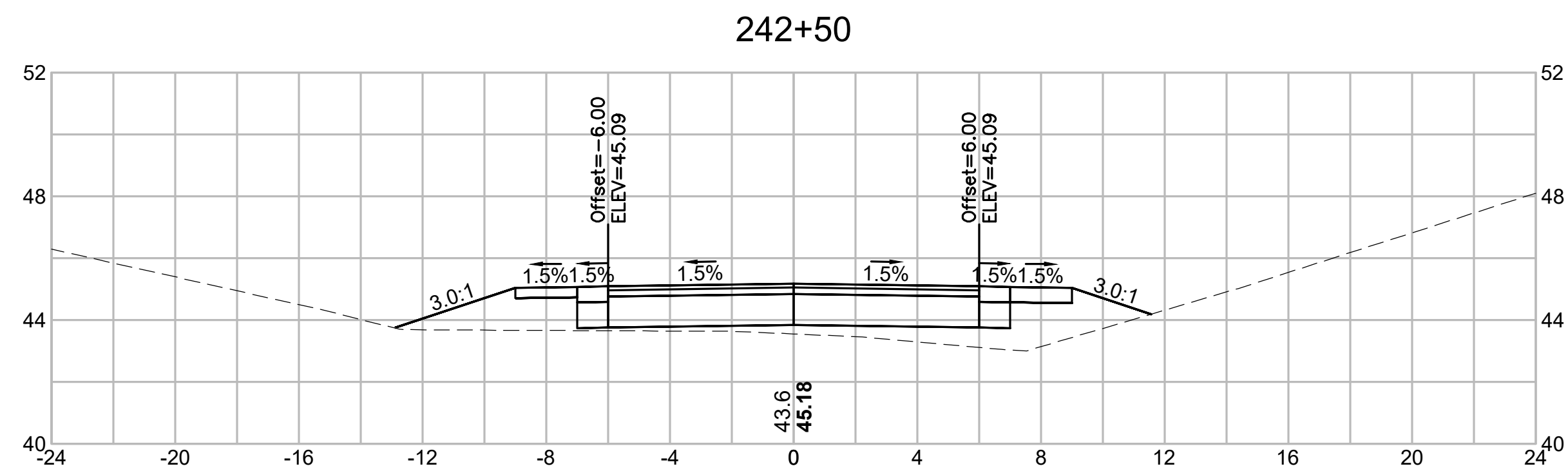
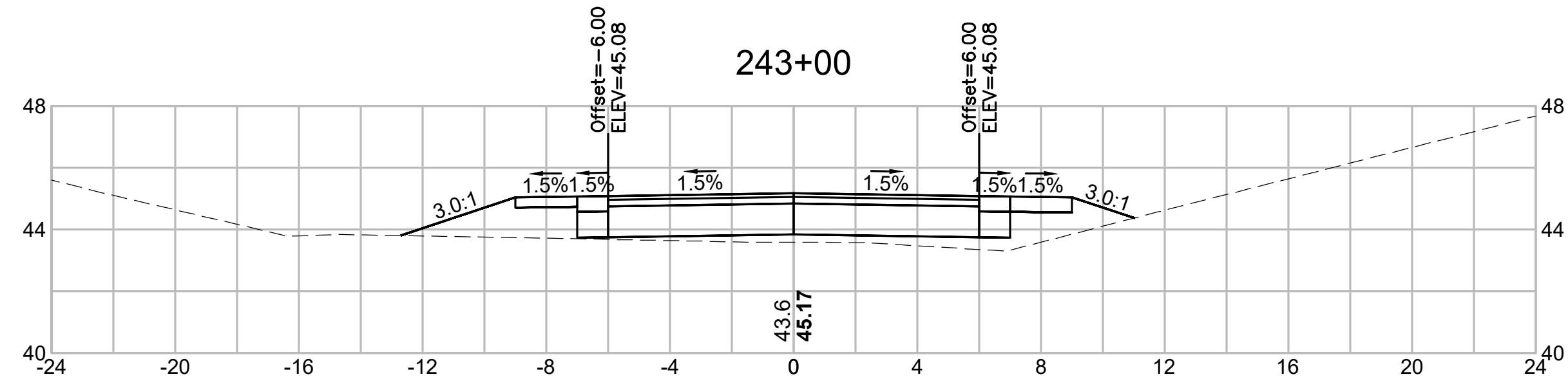
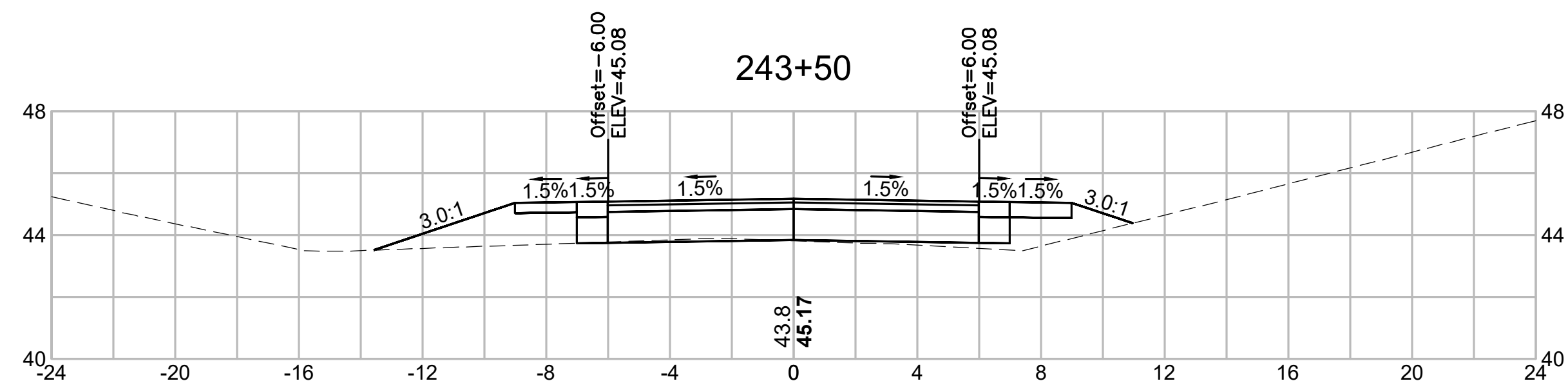
**CROSS SECTIONS - 18**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	103	114
PROJECT FILE NO.		17112.00	

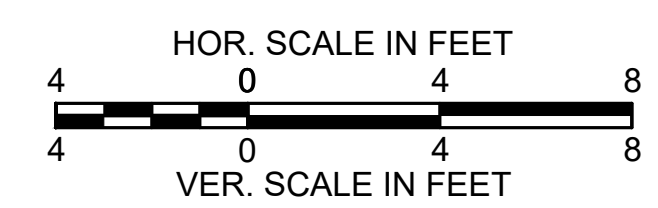
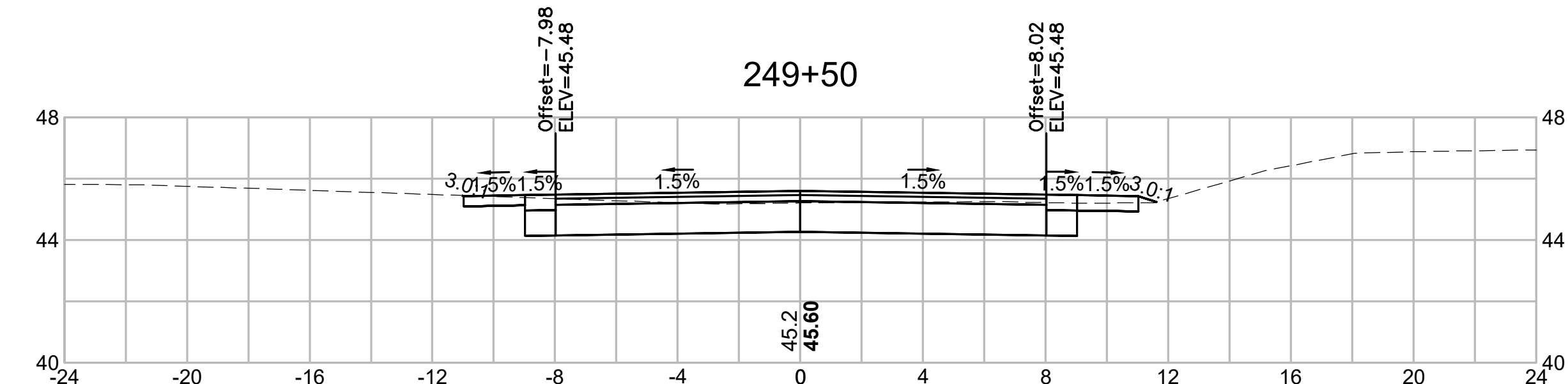
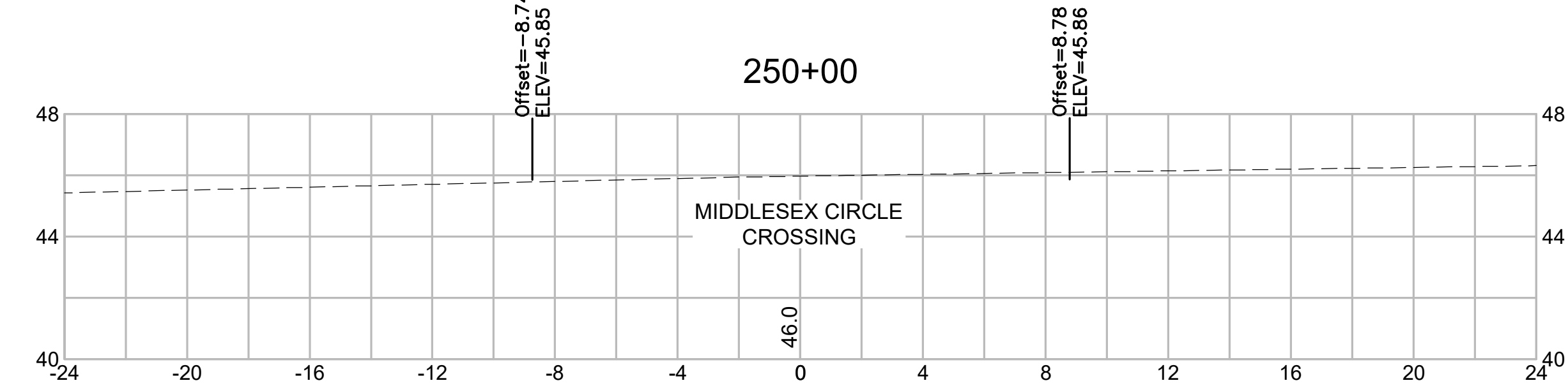
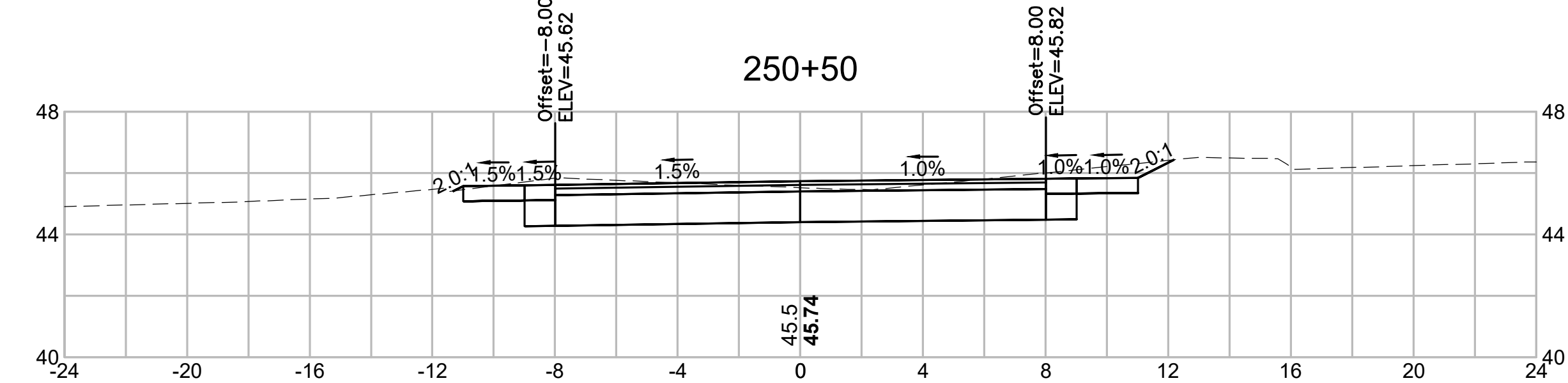
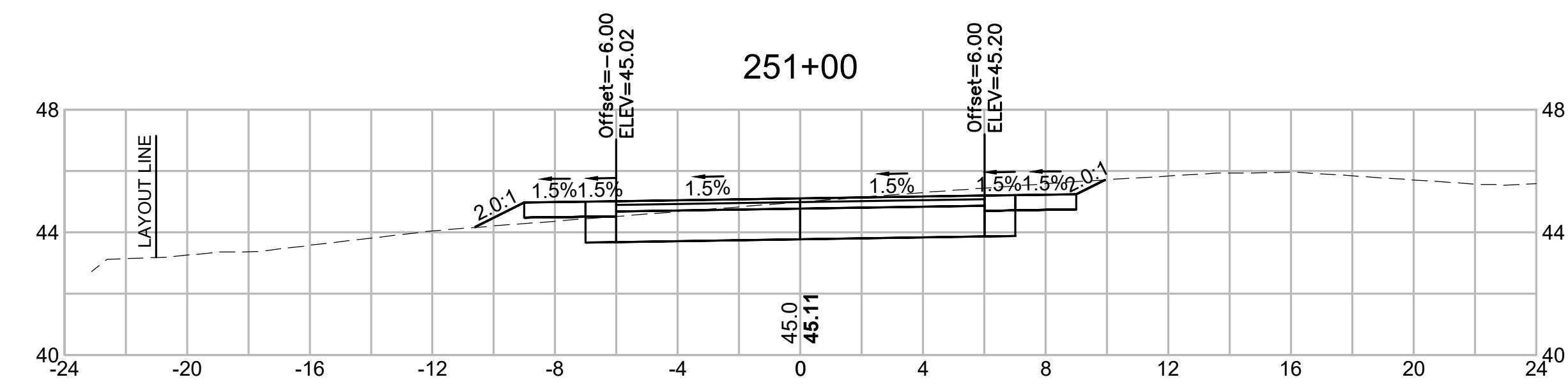
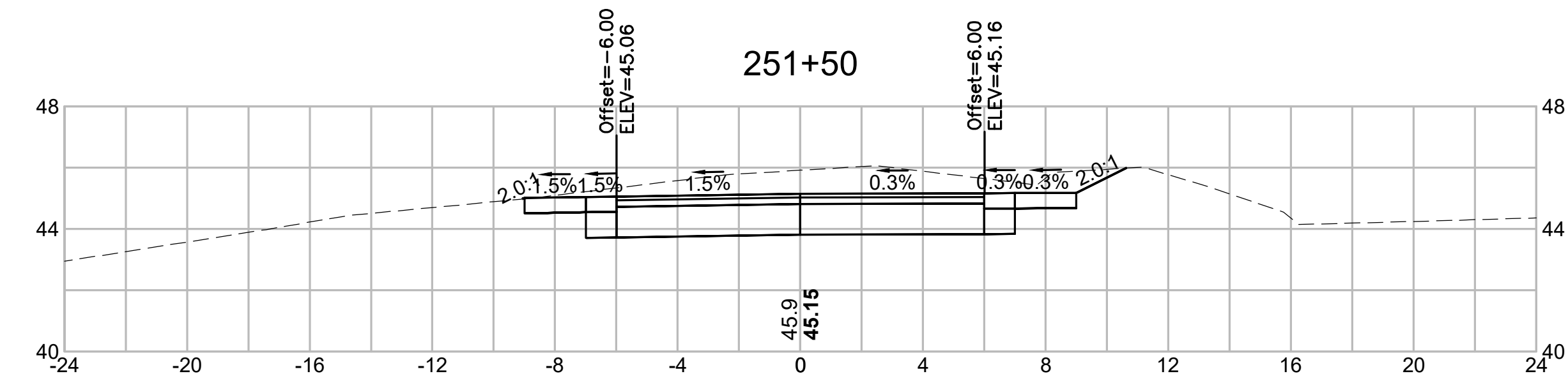
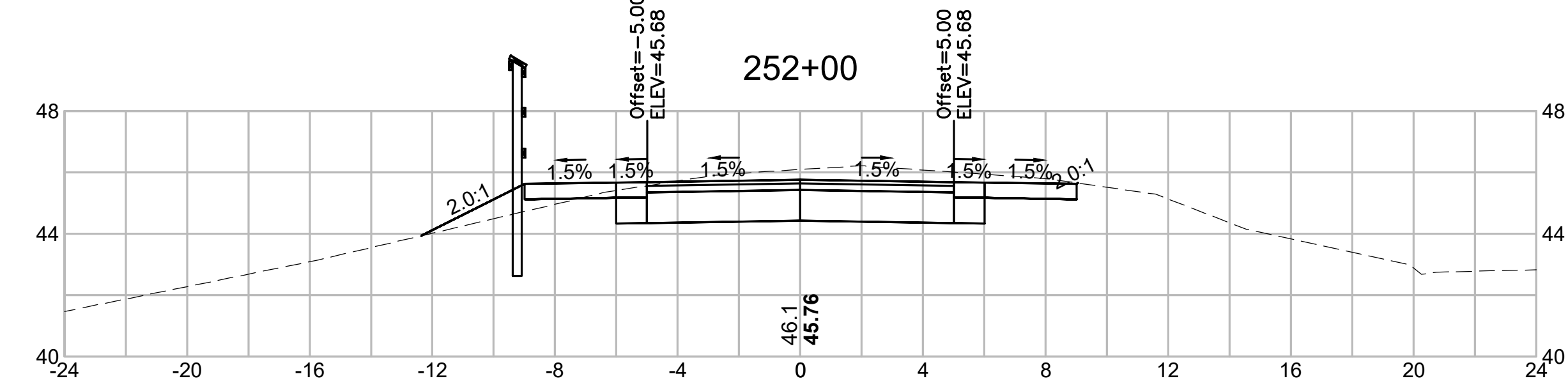
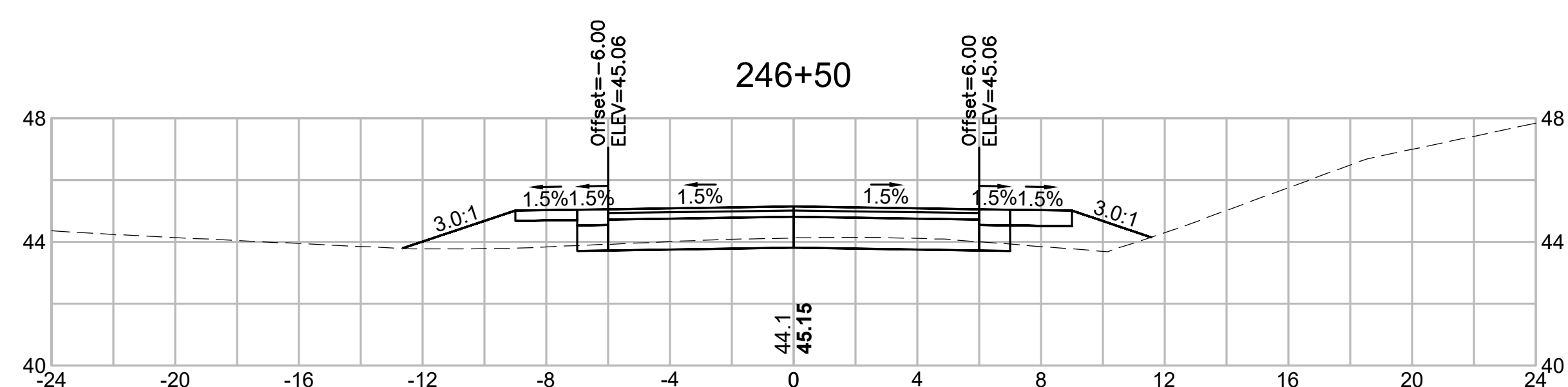
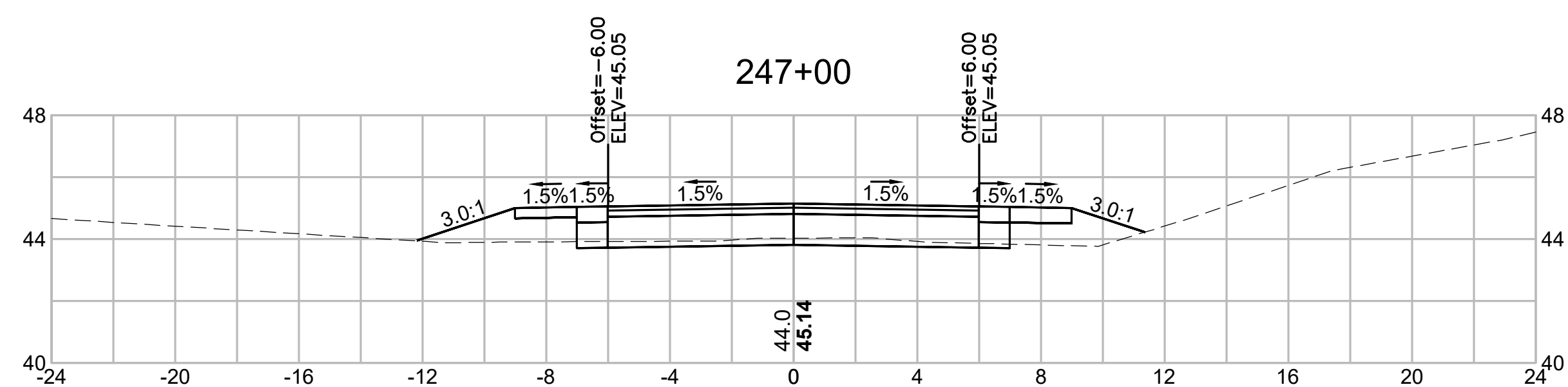
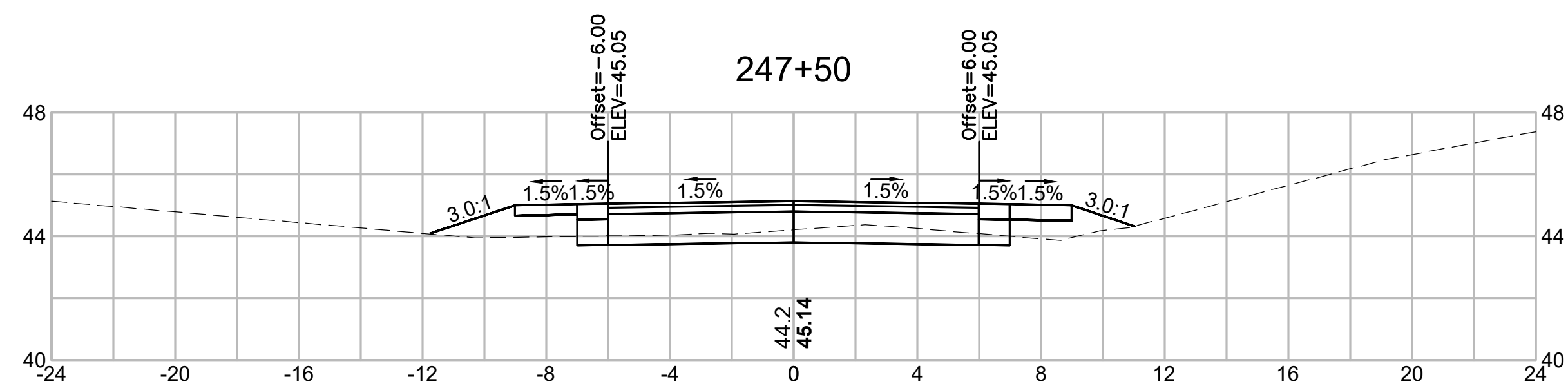
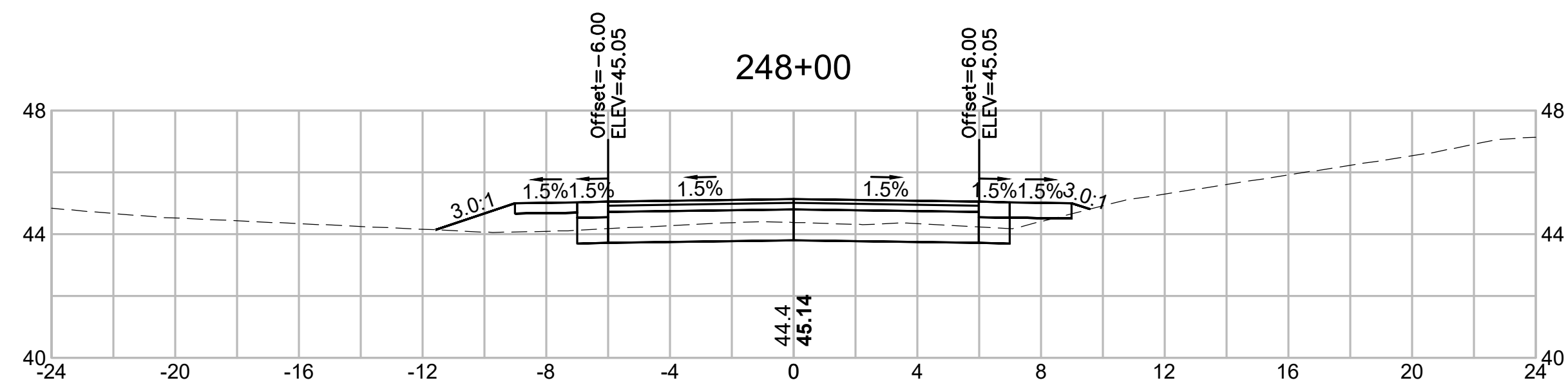
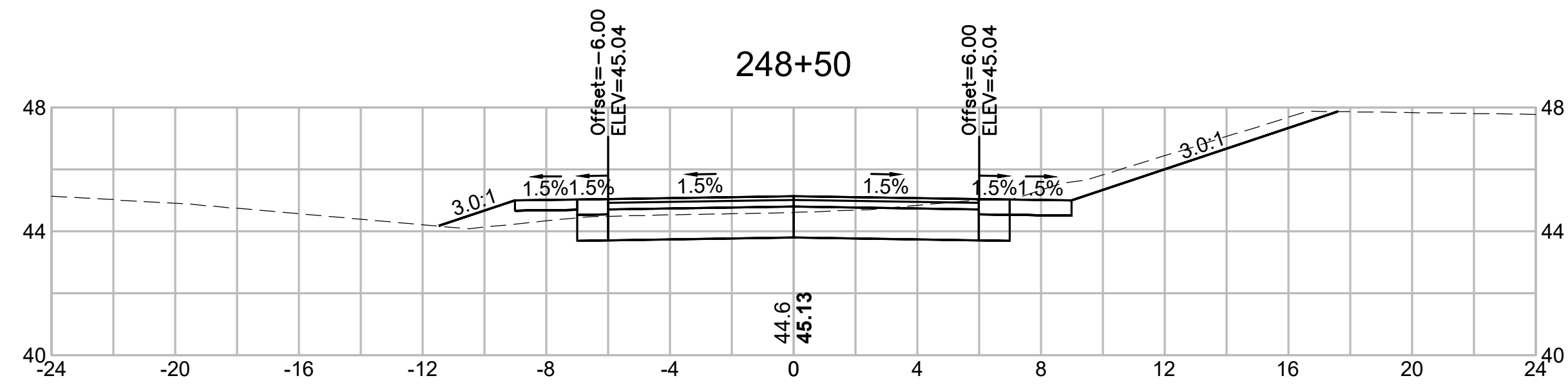
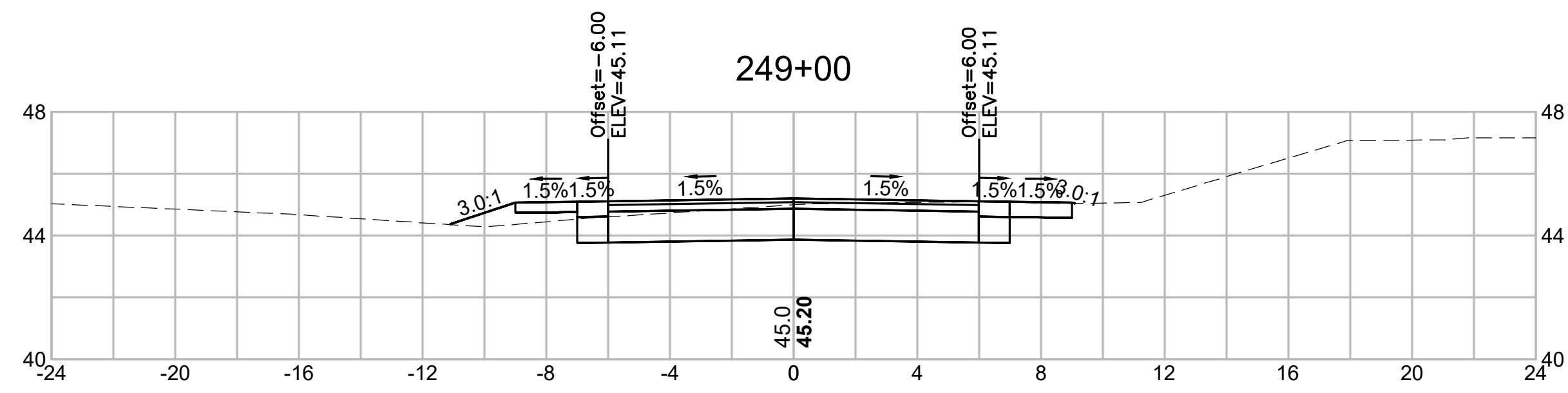
**CROSS SECTIONS - 19**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	104	114
PROJECT FILE NO.		17112.00	

**CROSS SECTIONS - 20**

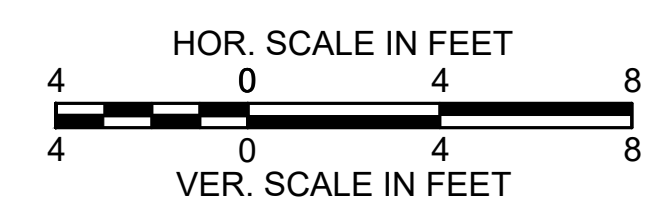
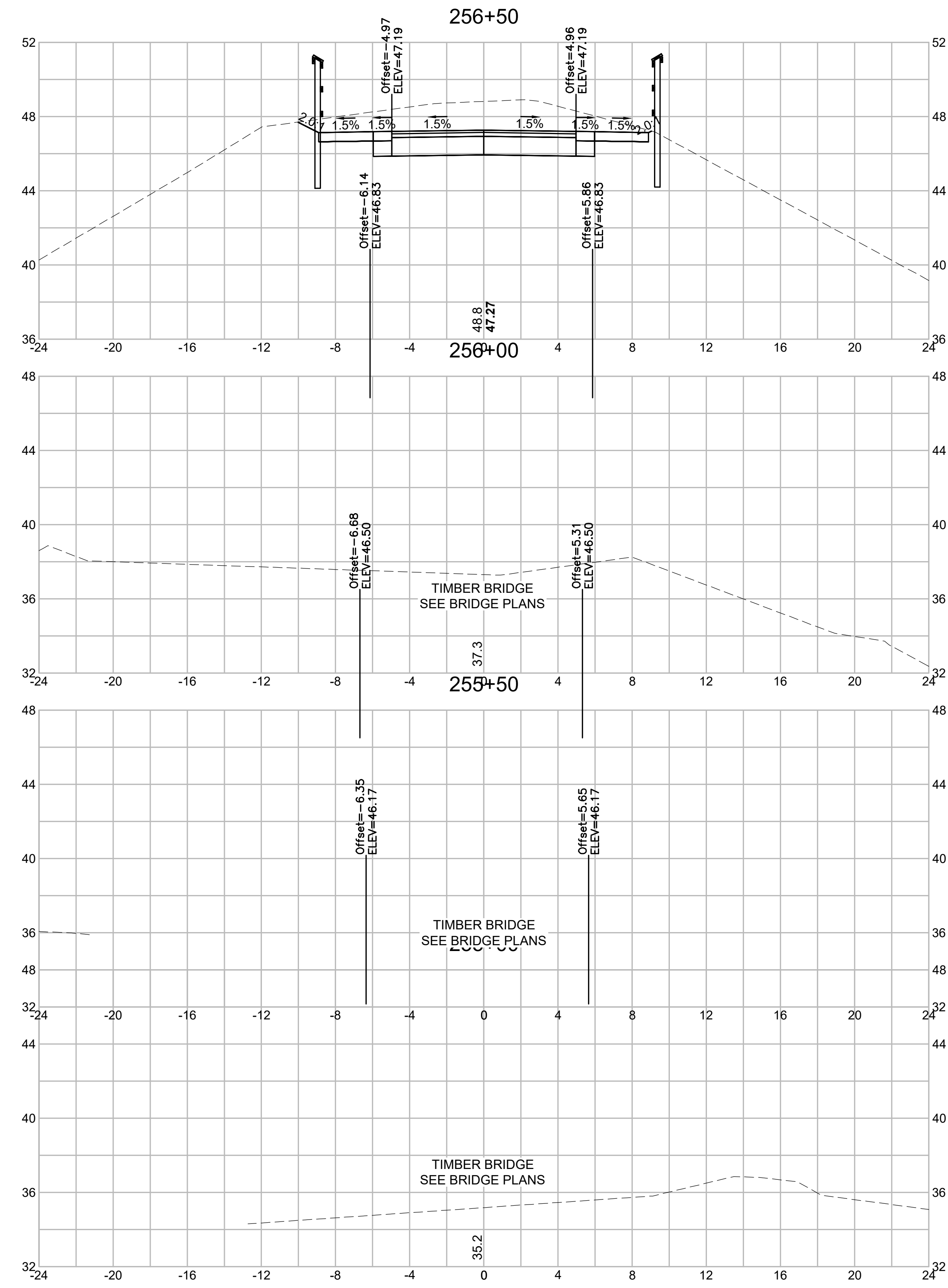
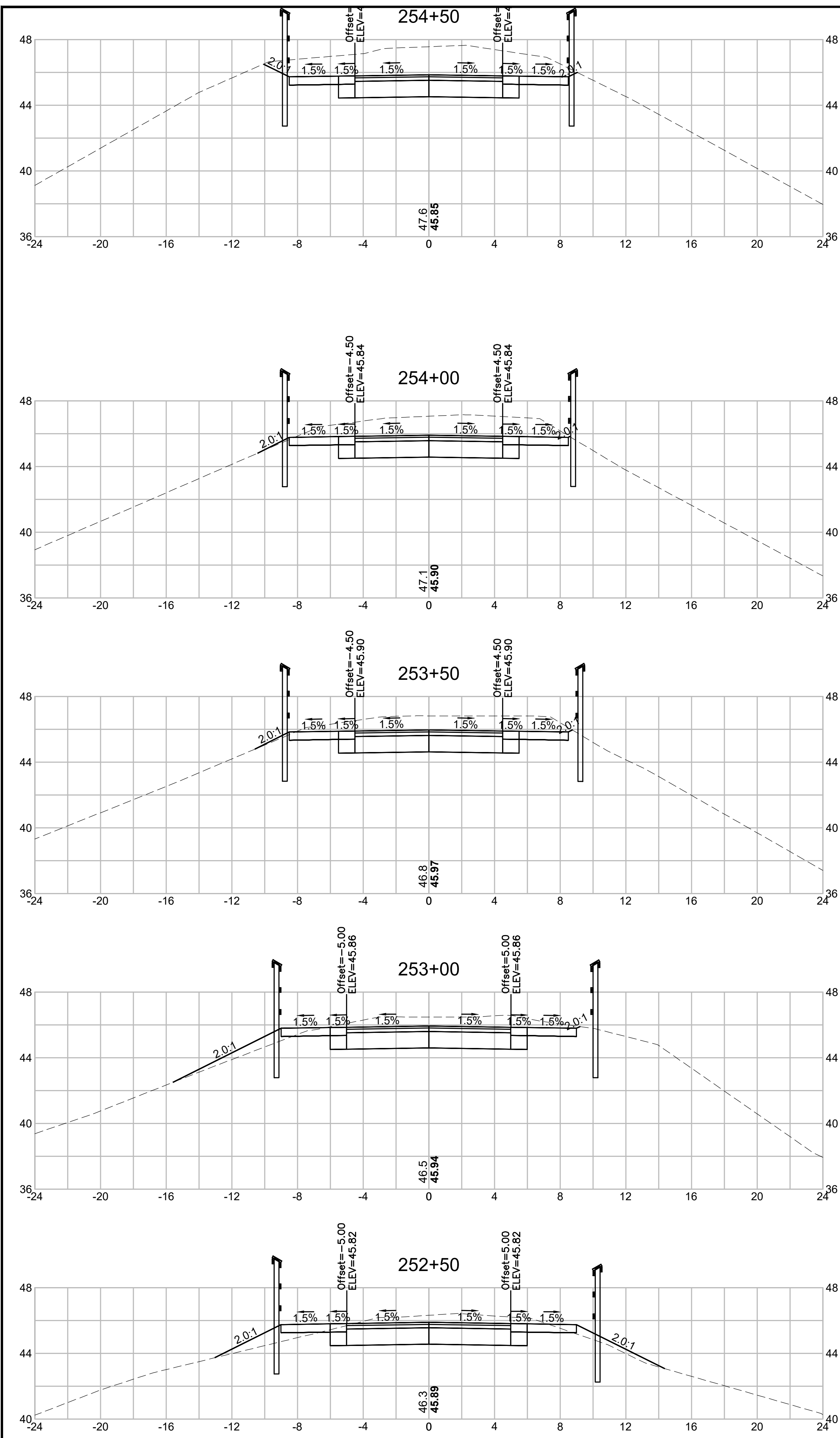




**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	105	114
PROJECT FILE NO.		17112.00	

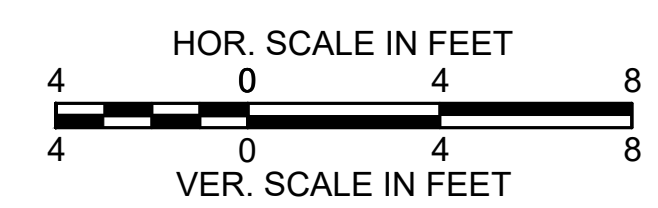
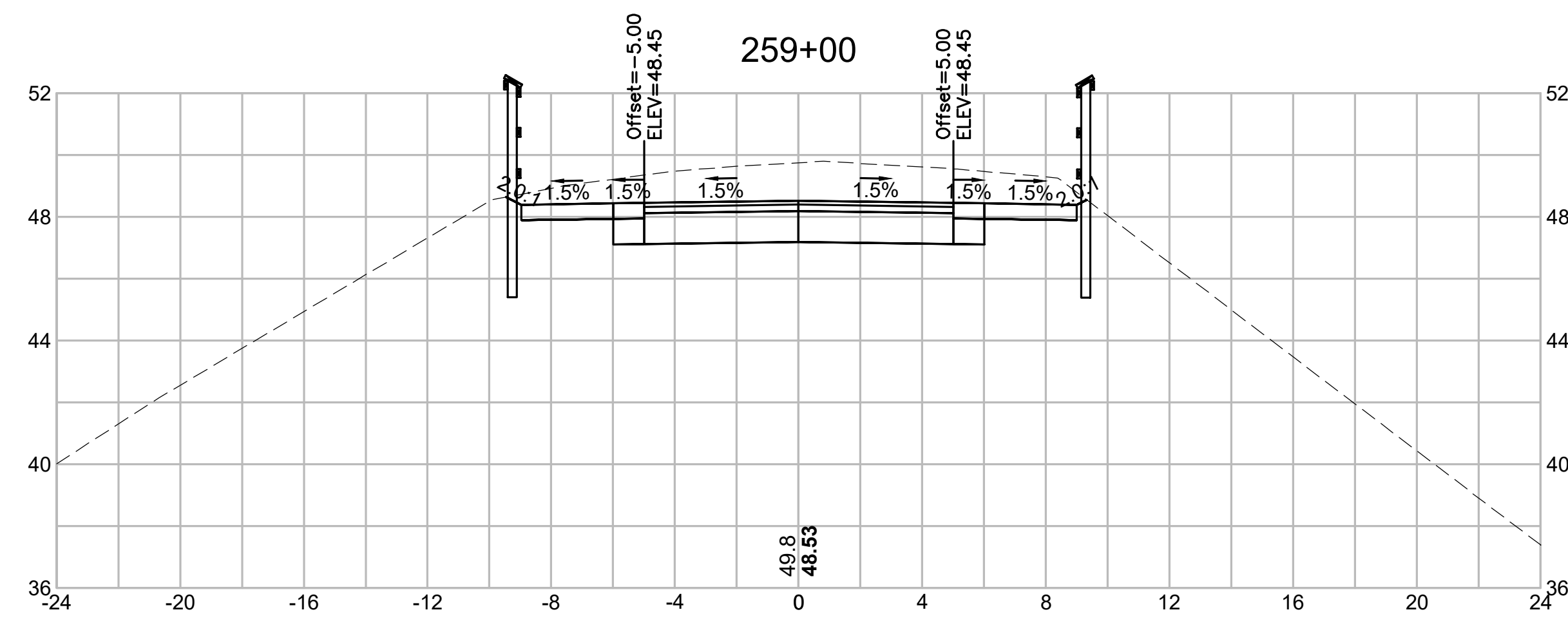
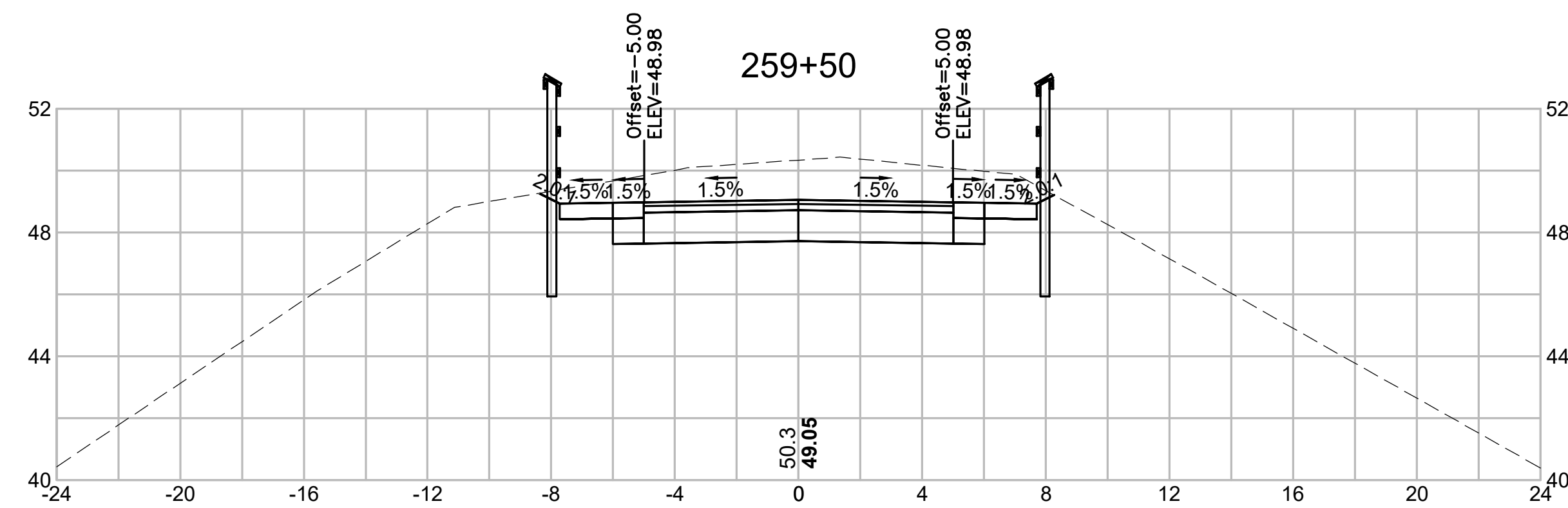
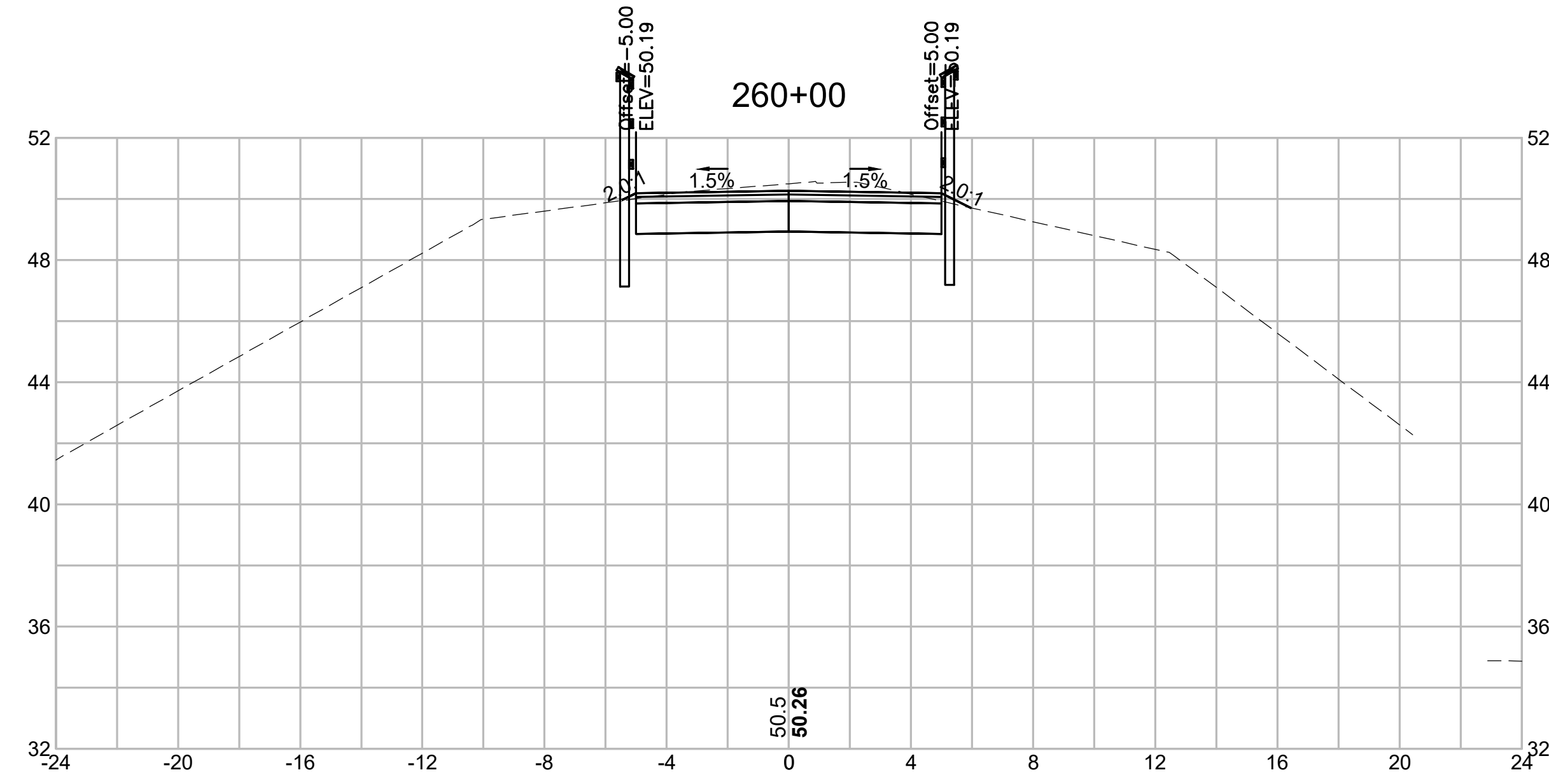
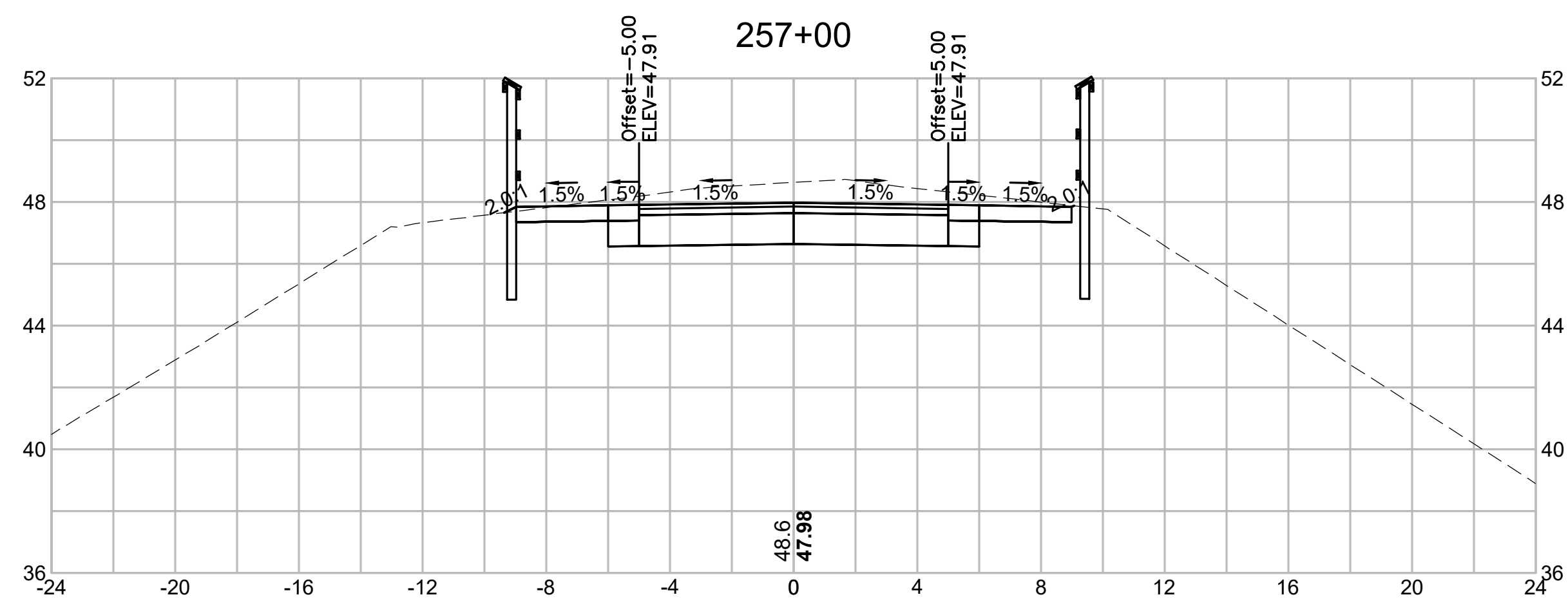
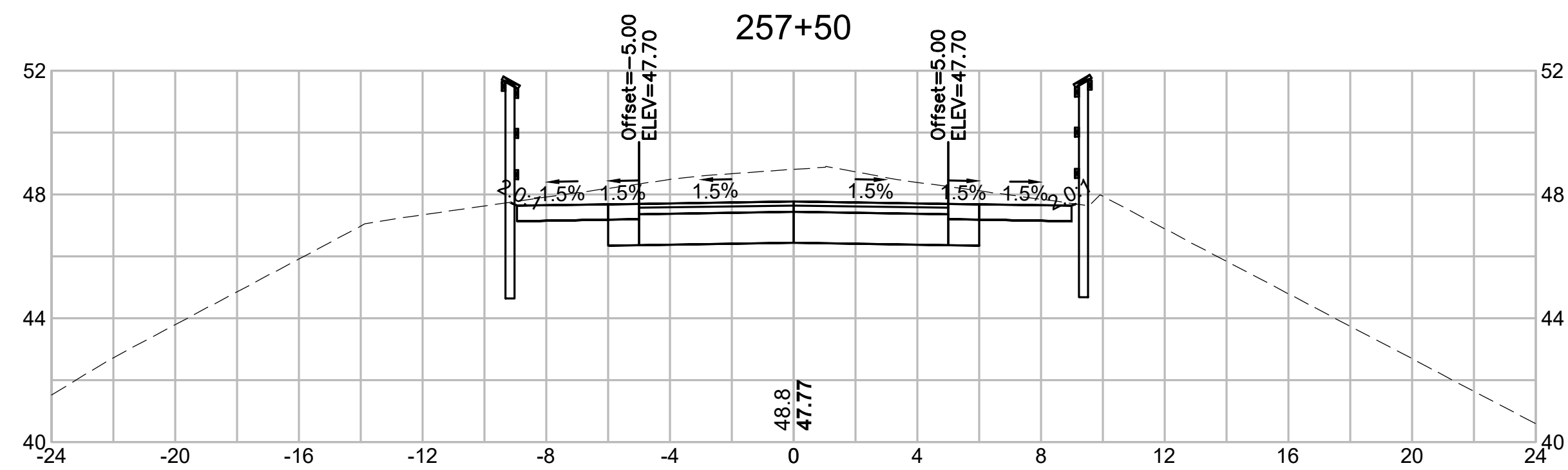
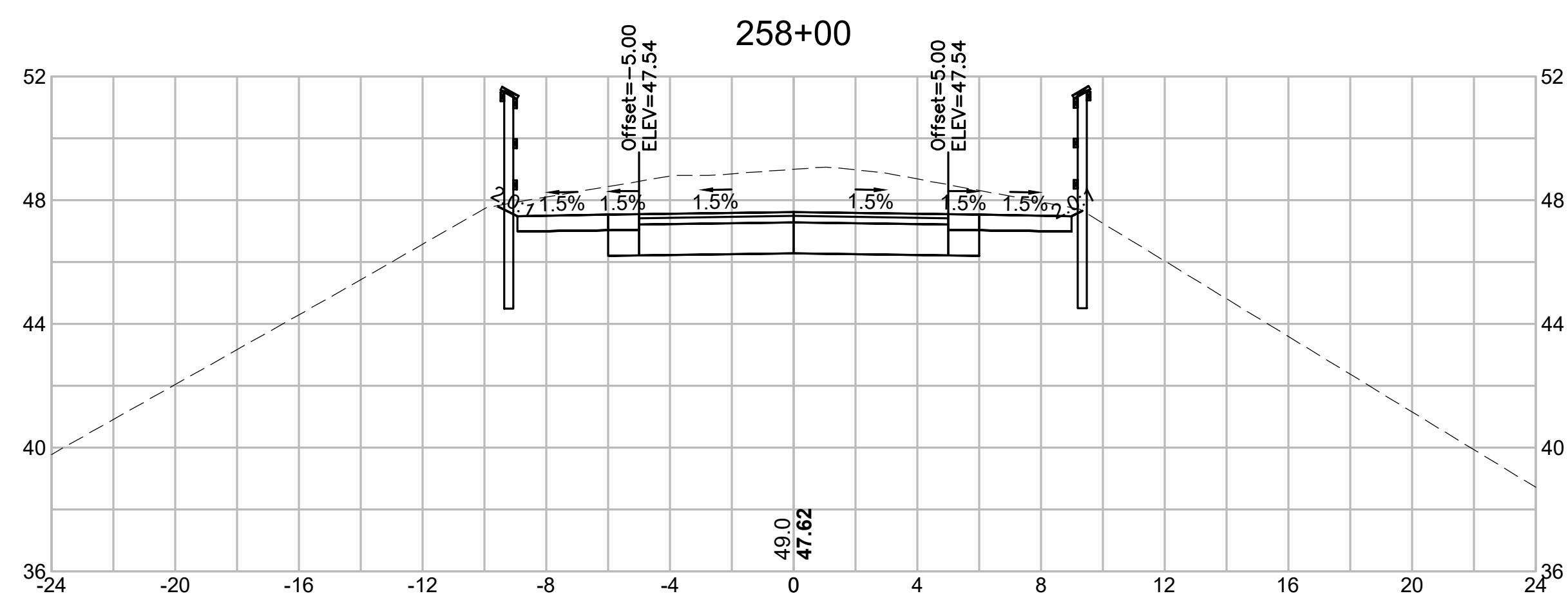
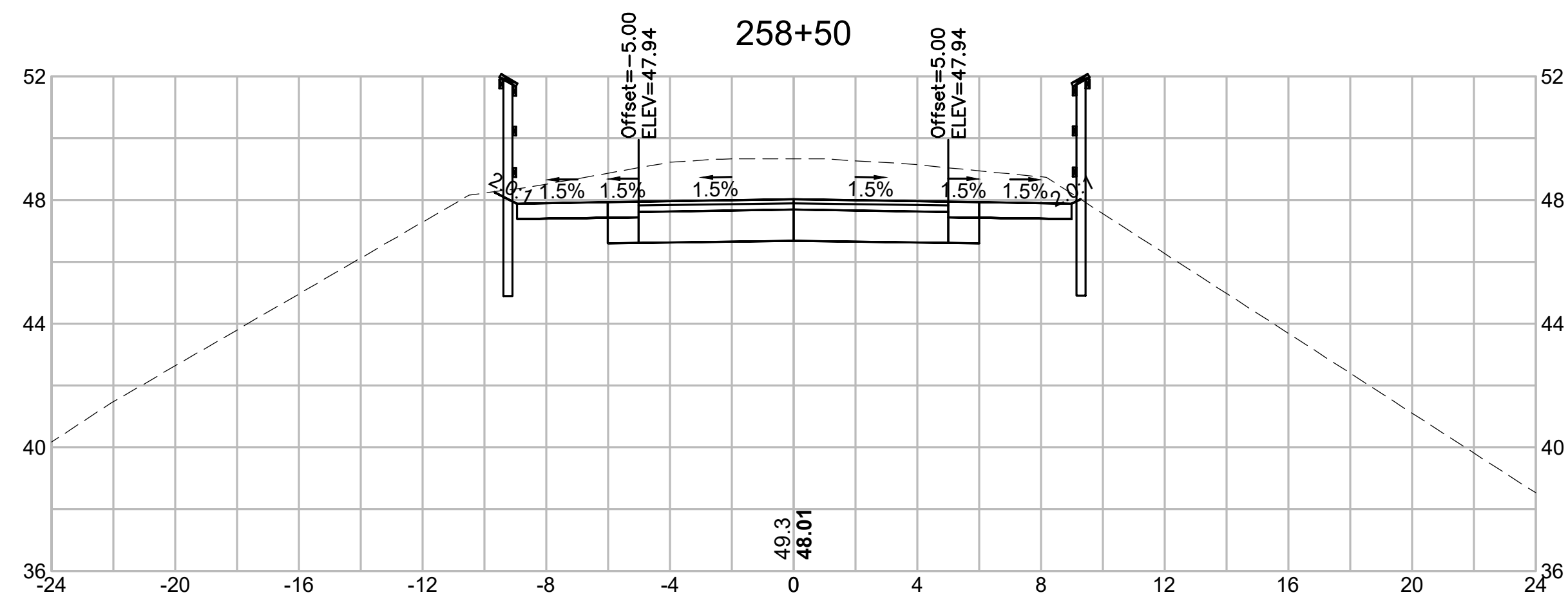
**CROSS SECTIONS - 21**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	106	114
PROJECT FILE NO.		17112.00	

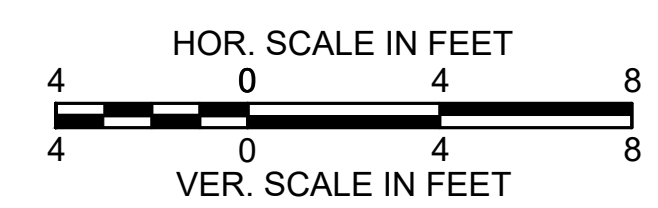
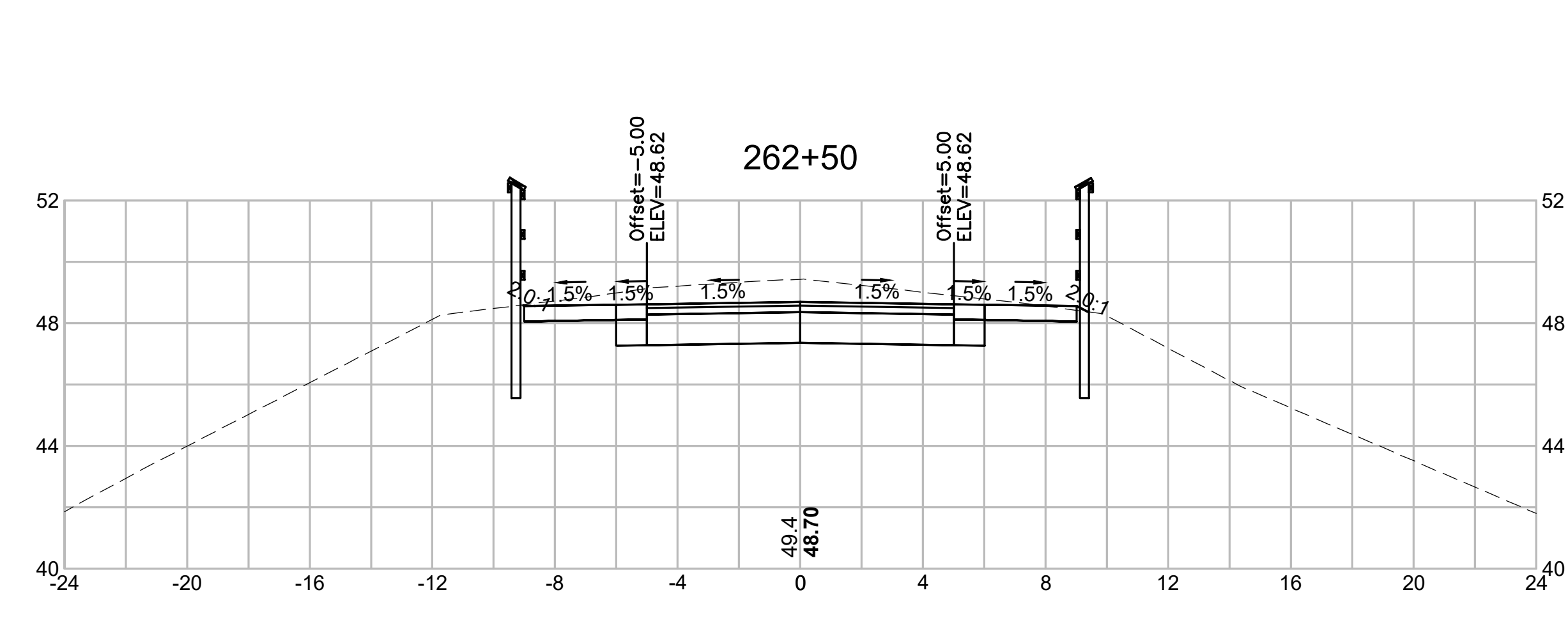
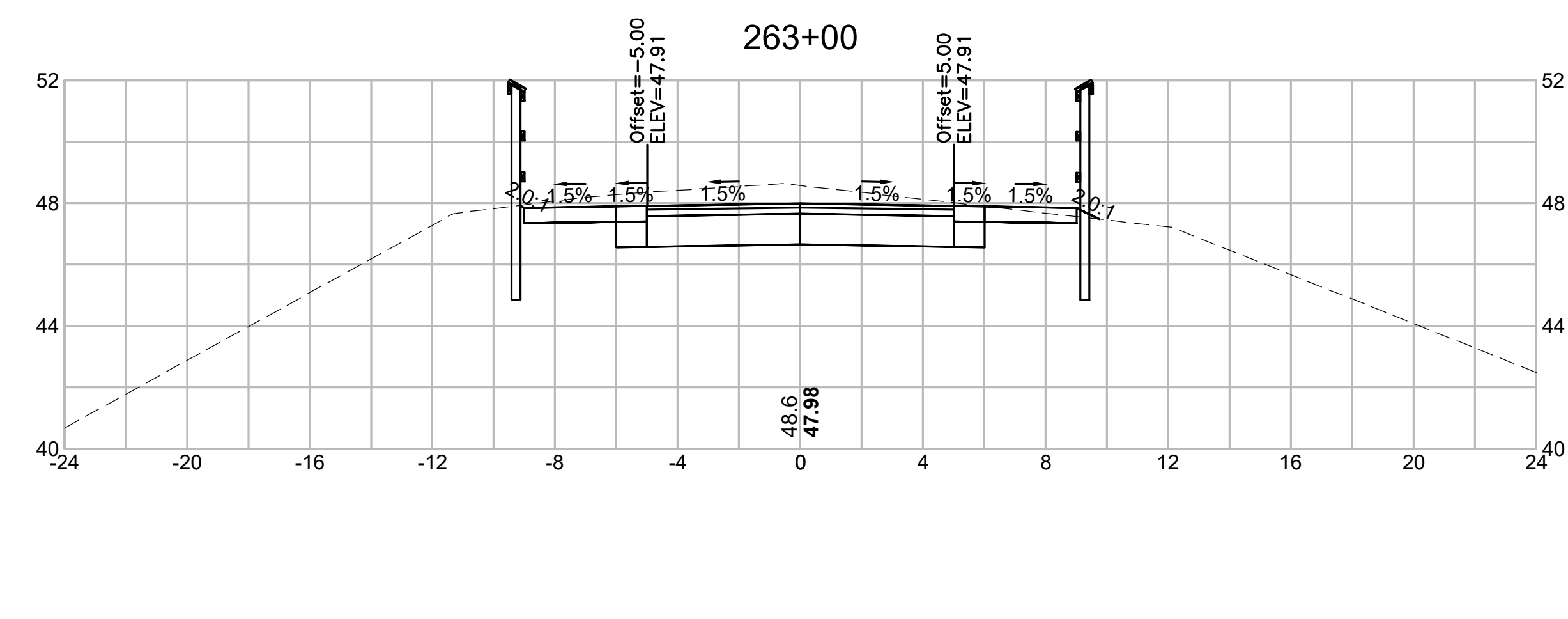
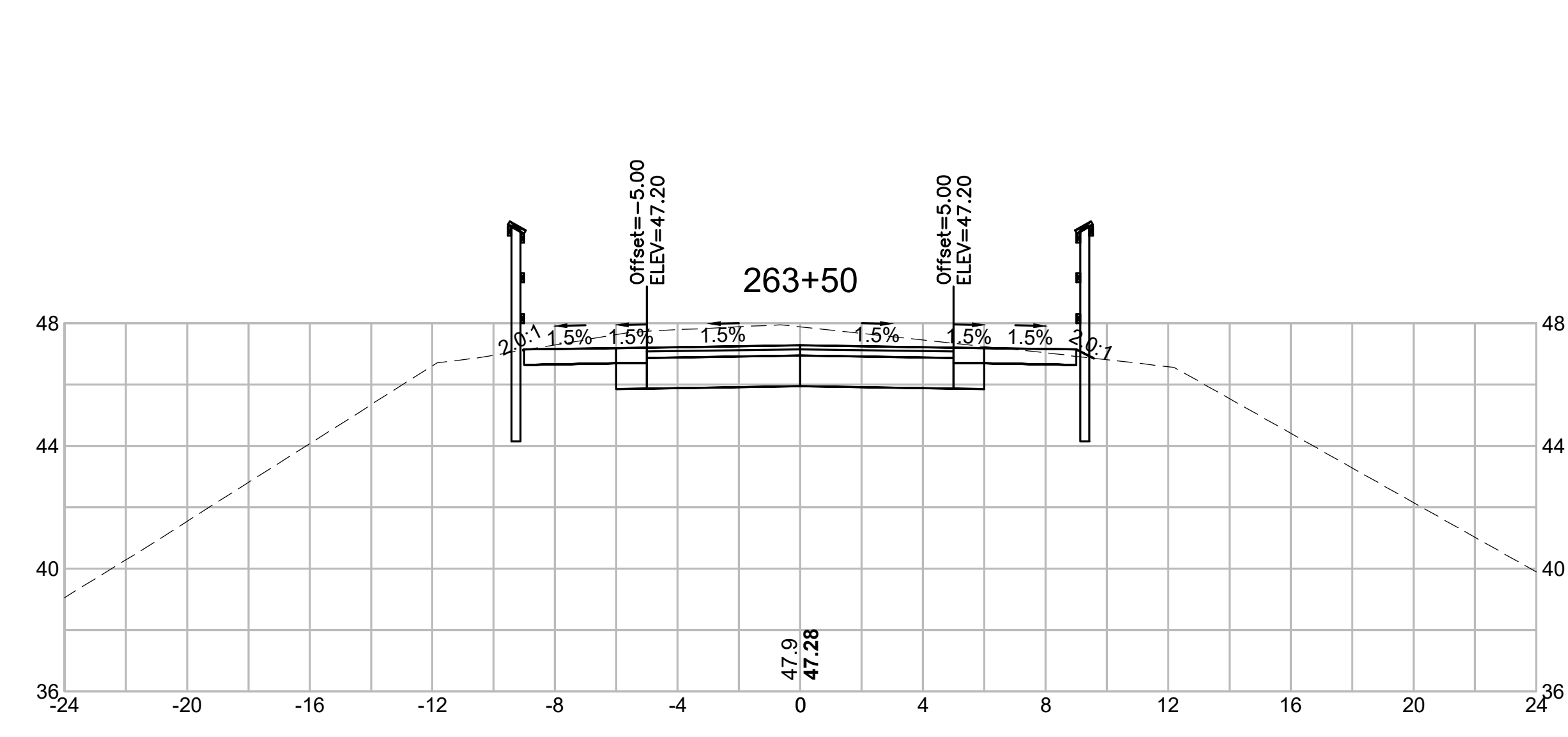
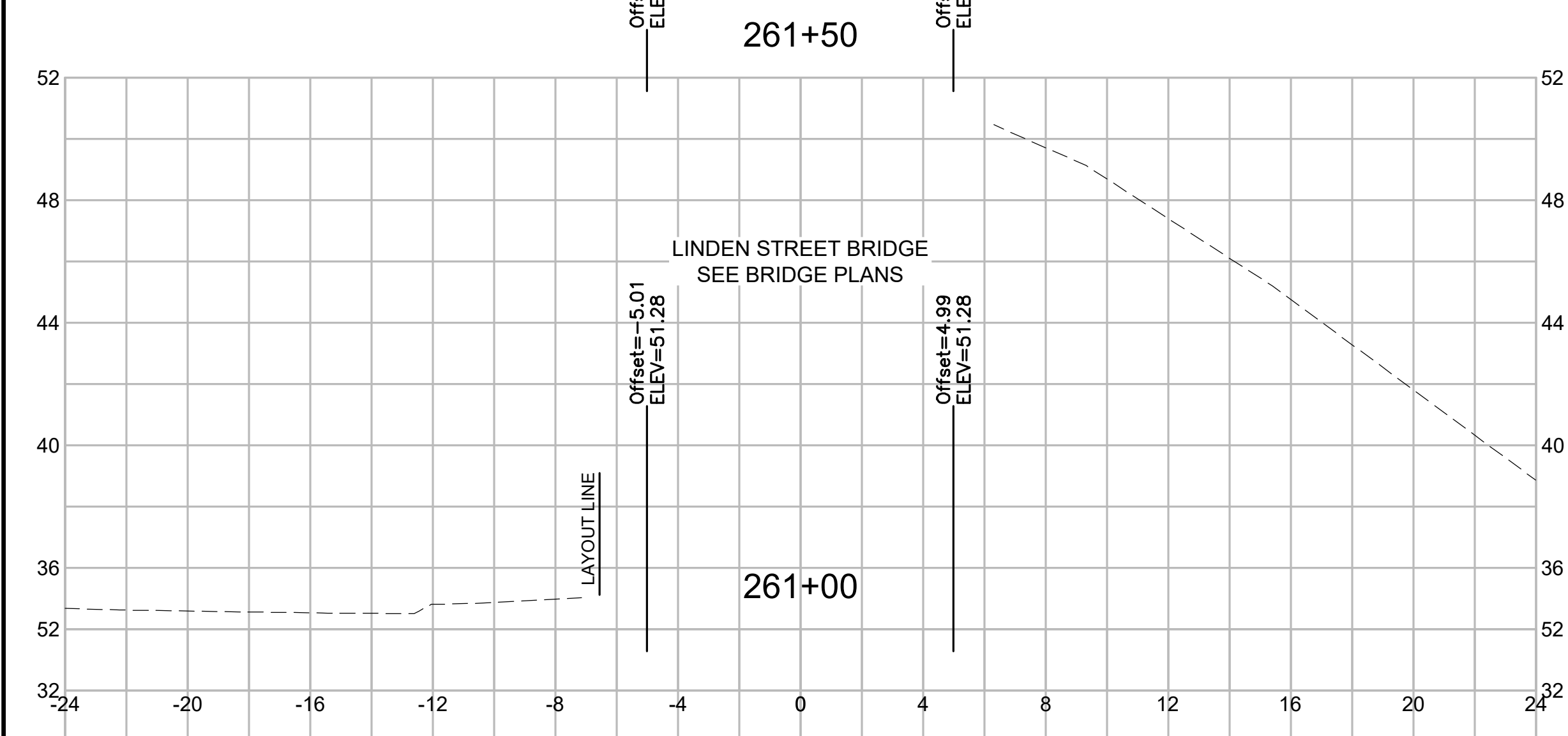
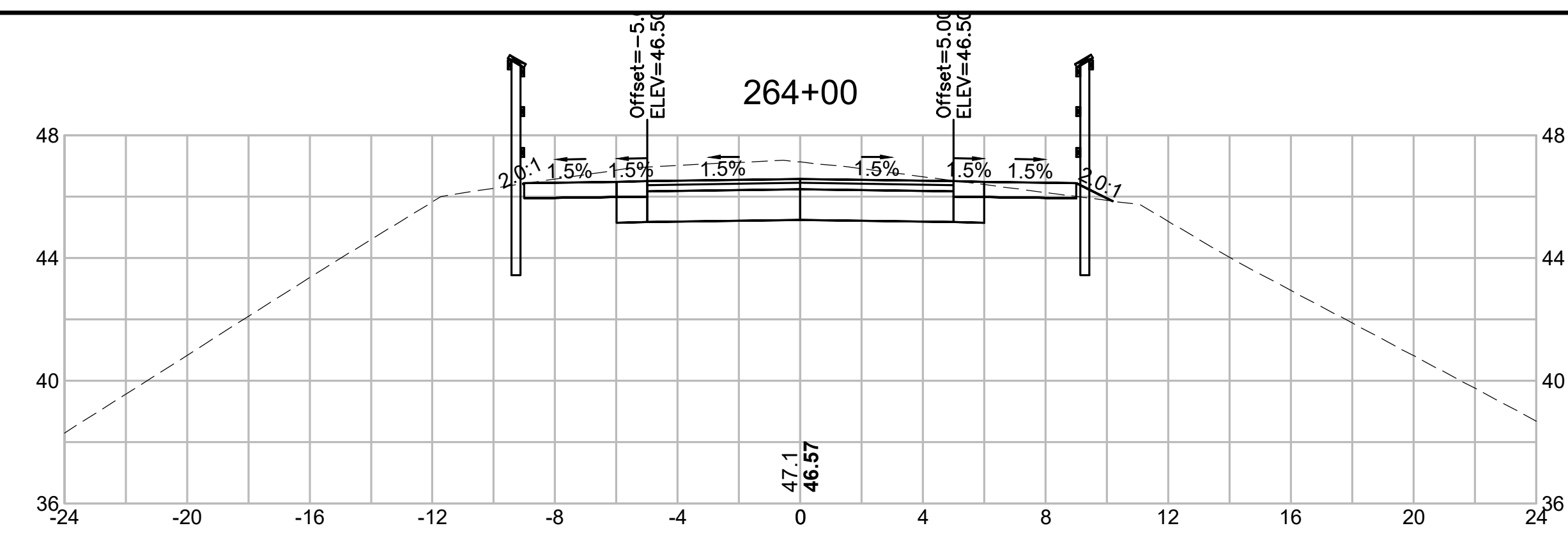
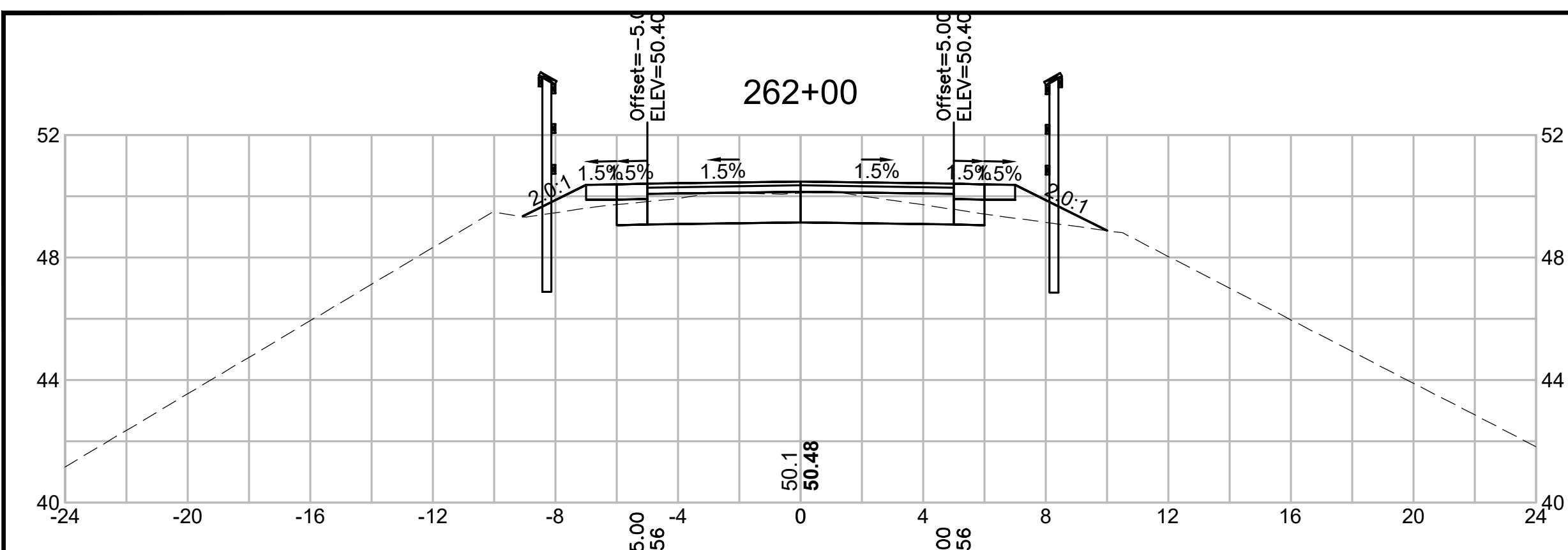
**CROSS SECTIONS - 22**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	107	114
PROJECT FILE NO.		17112.00	

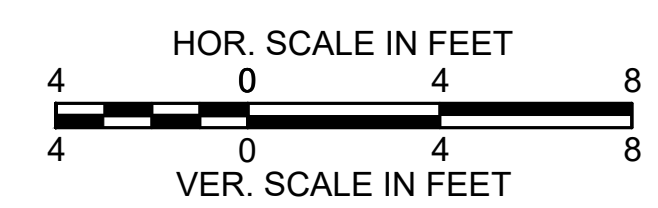
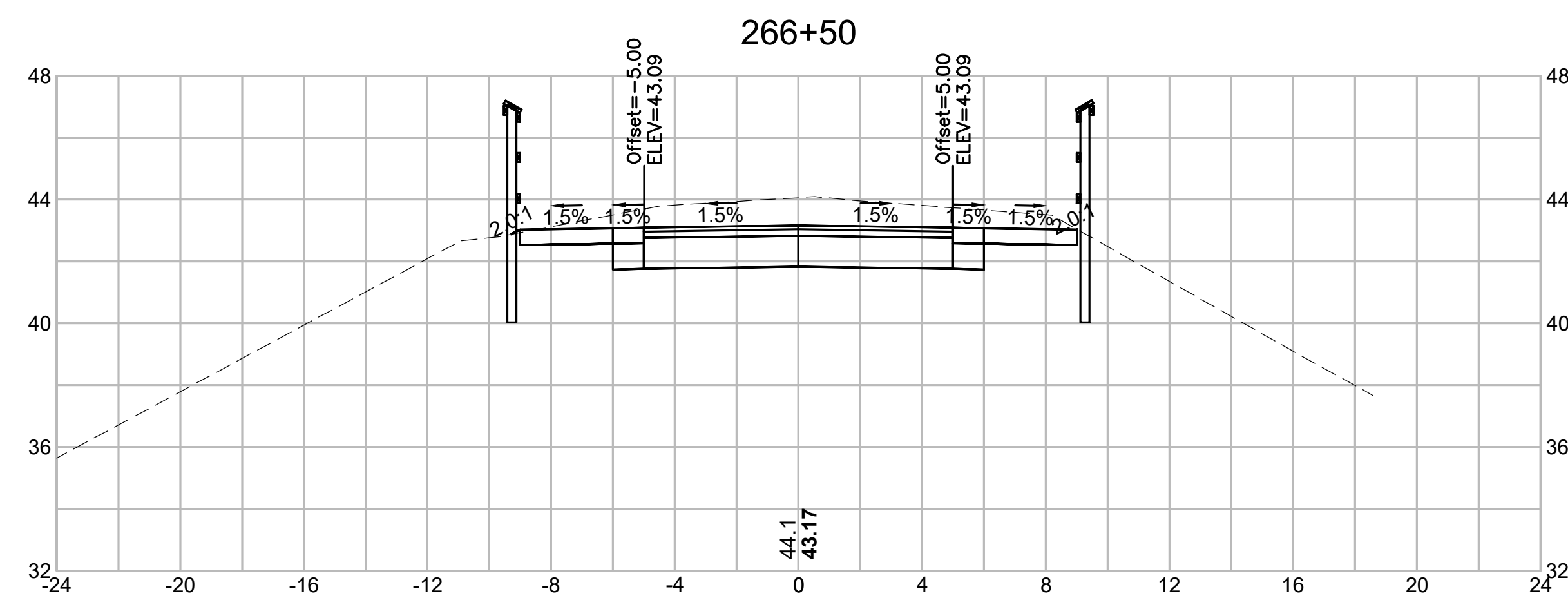
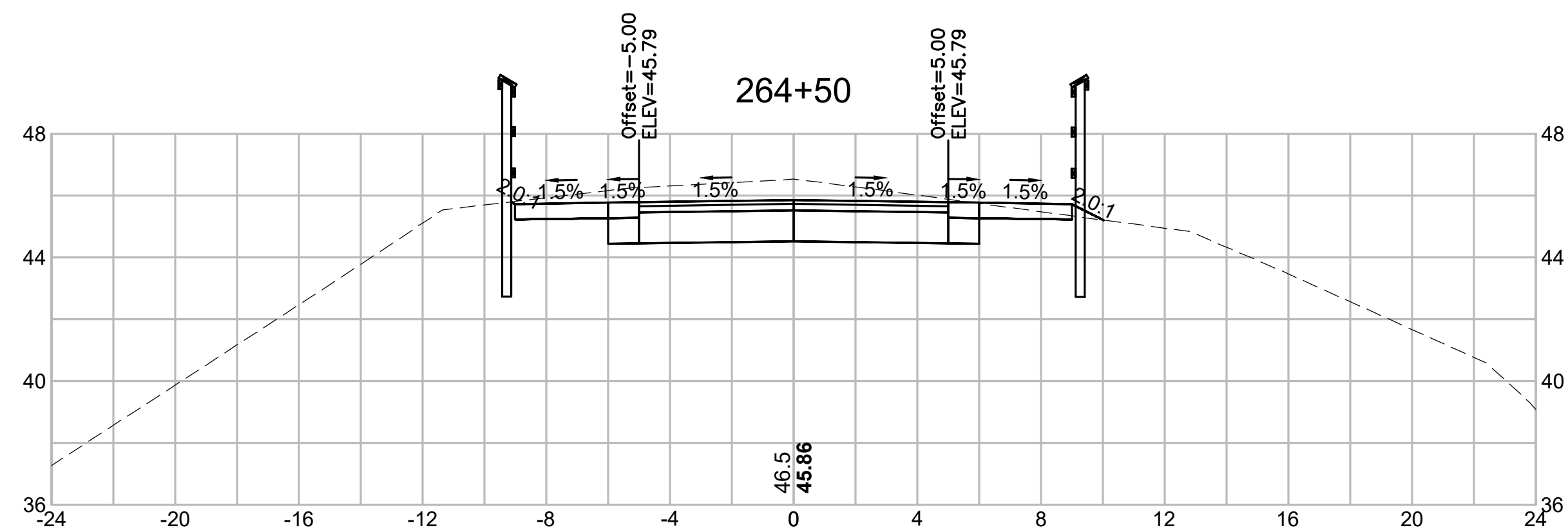
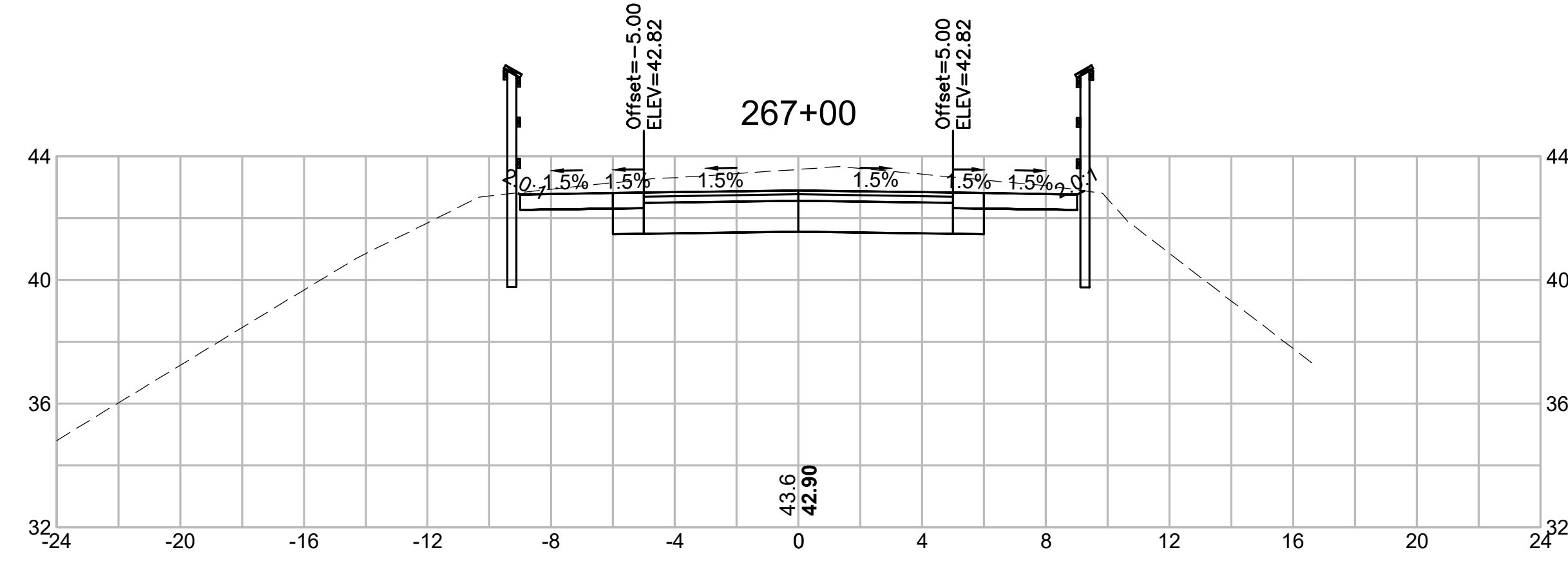
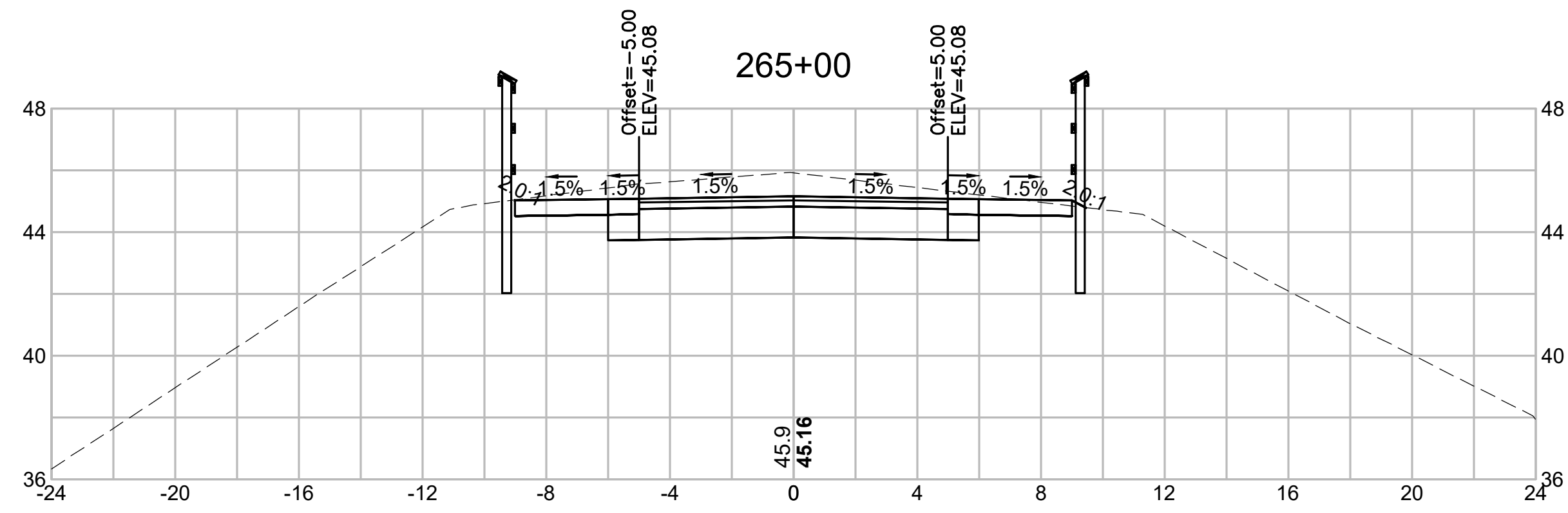
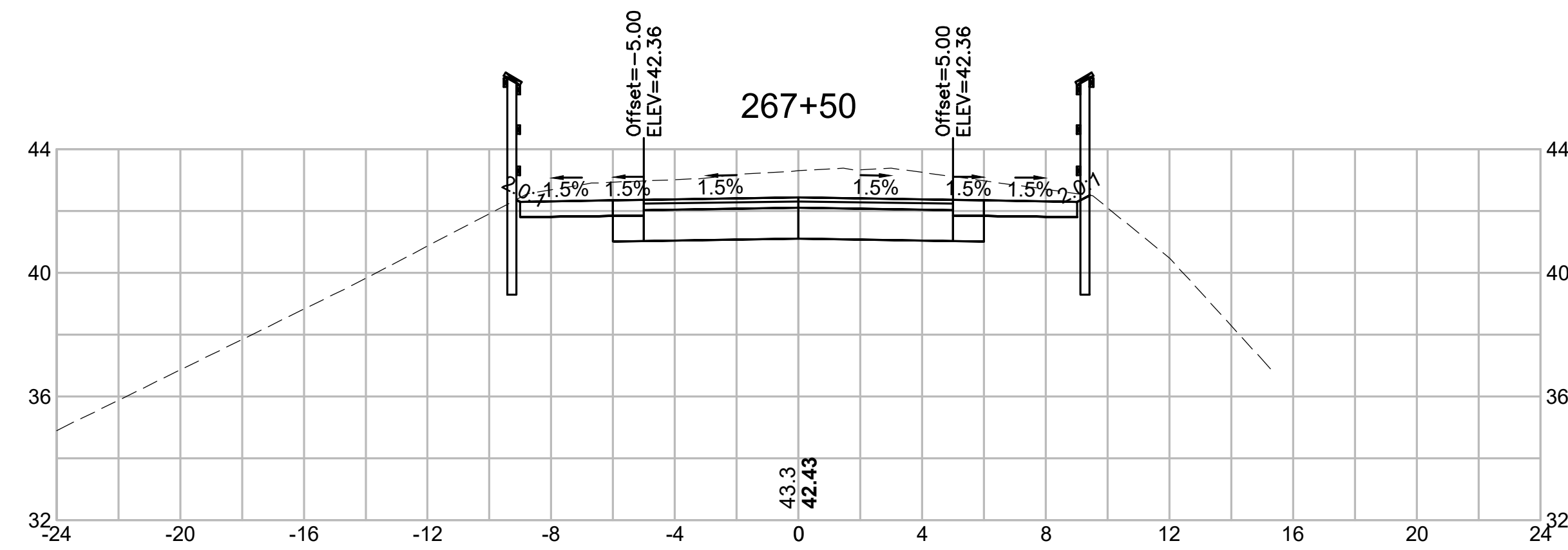
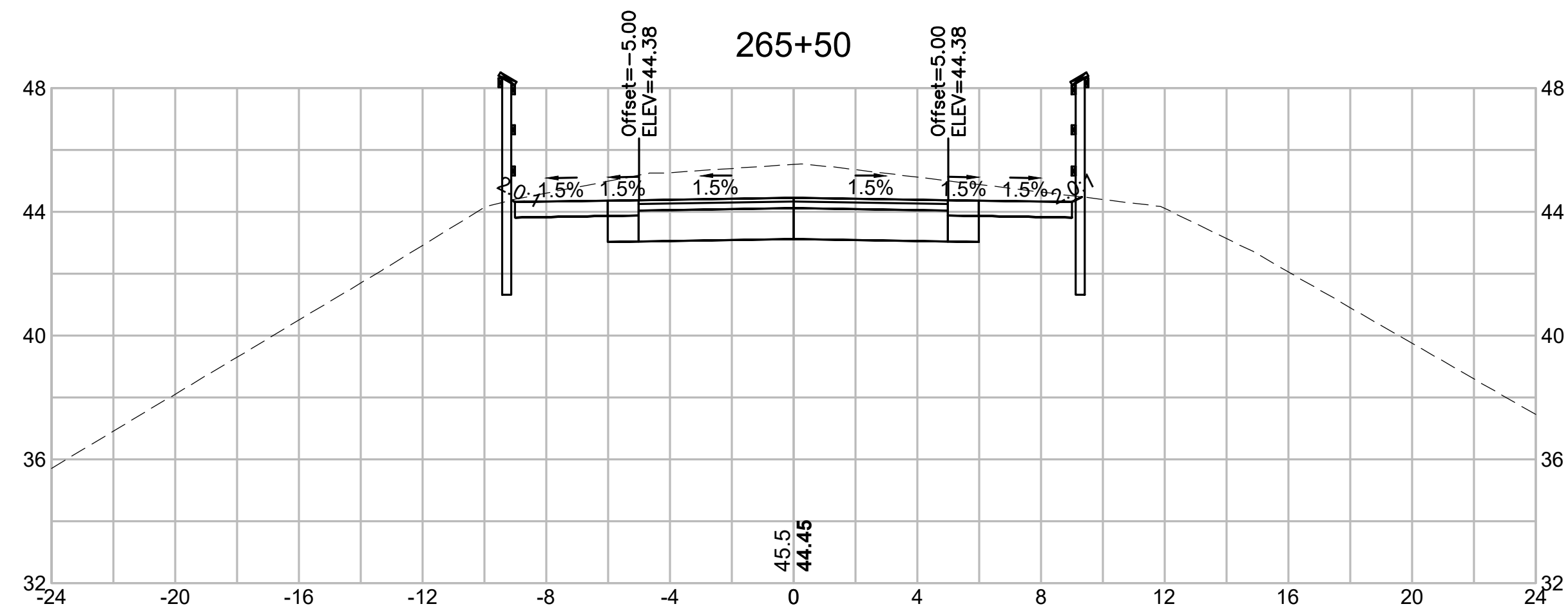
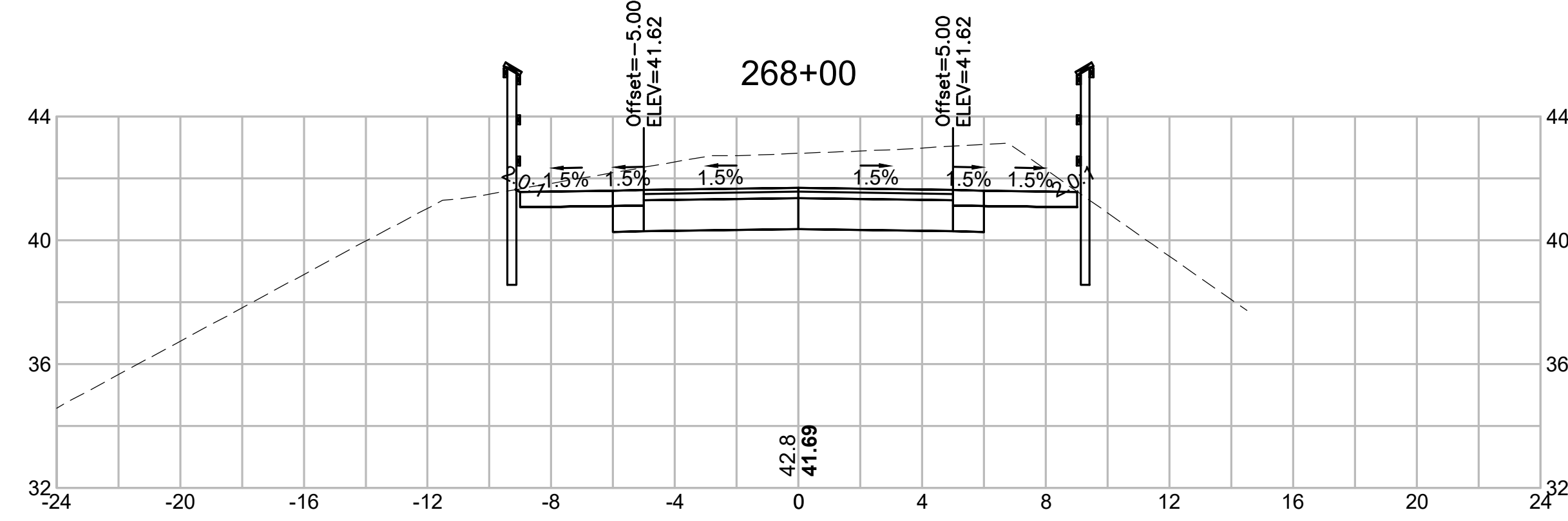
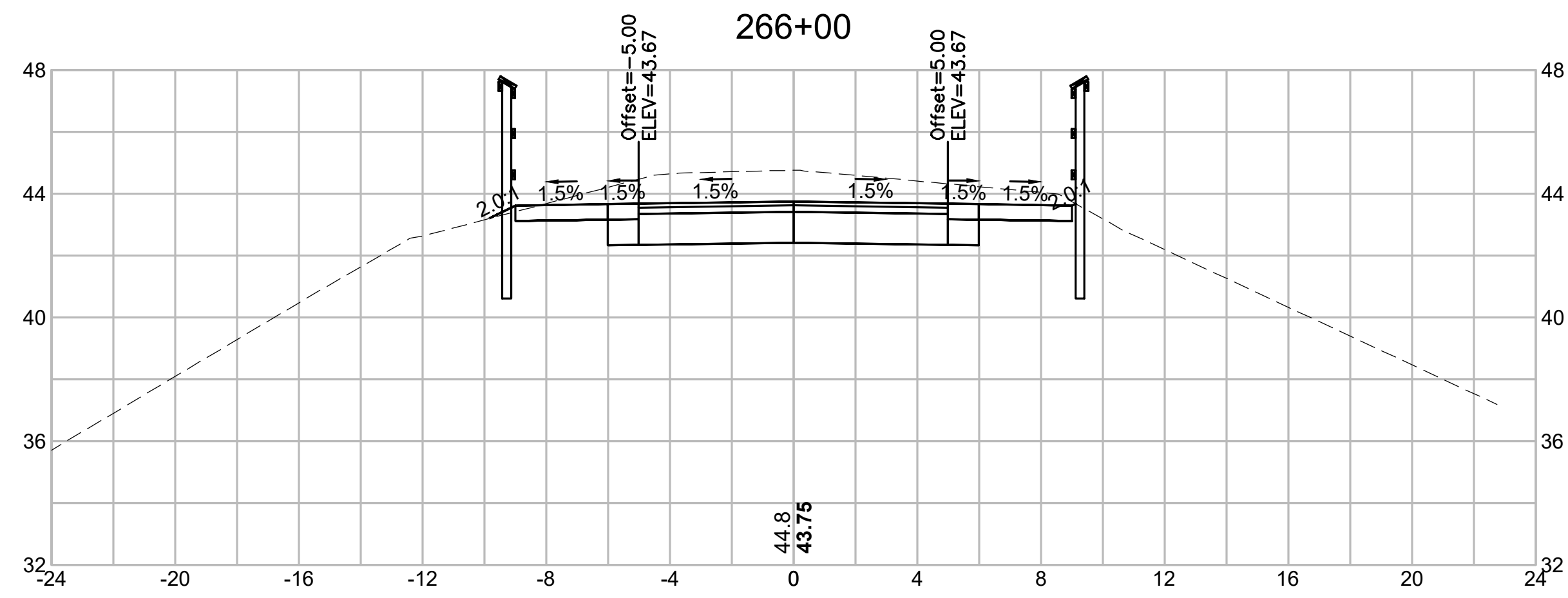
**CROSS SECTIONS - 23**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	108	114
PROJECT FILE NO.		17112.00	

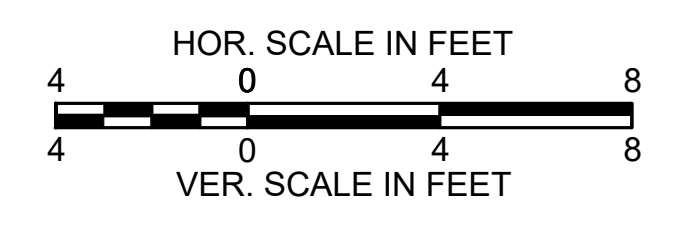
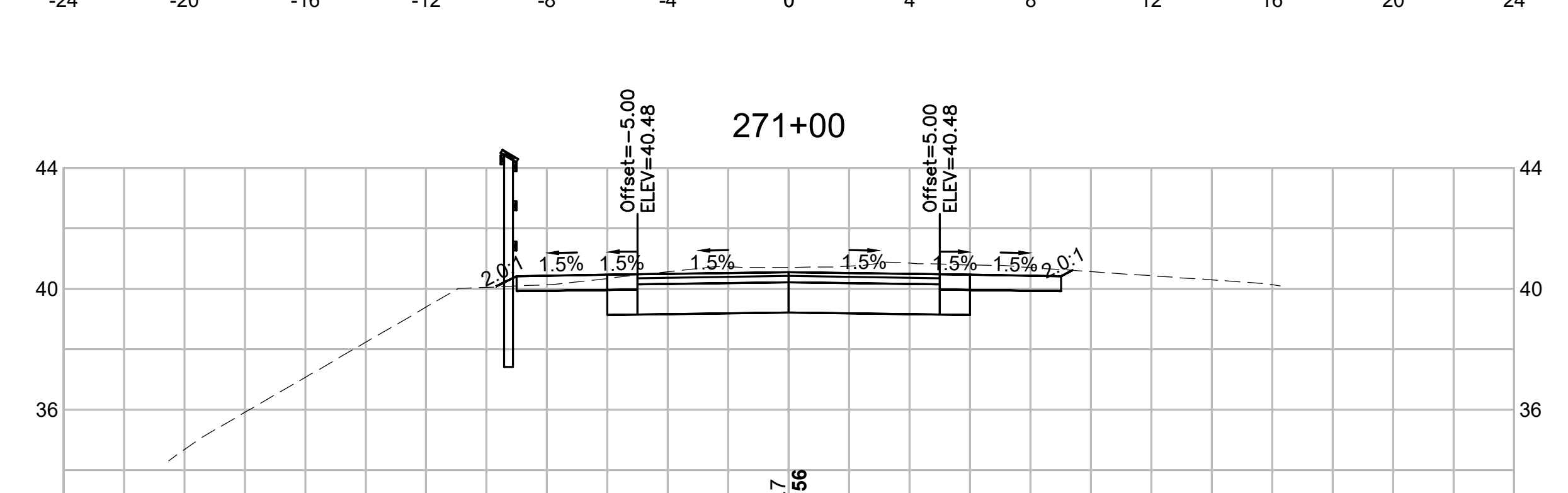
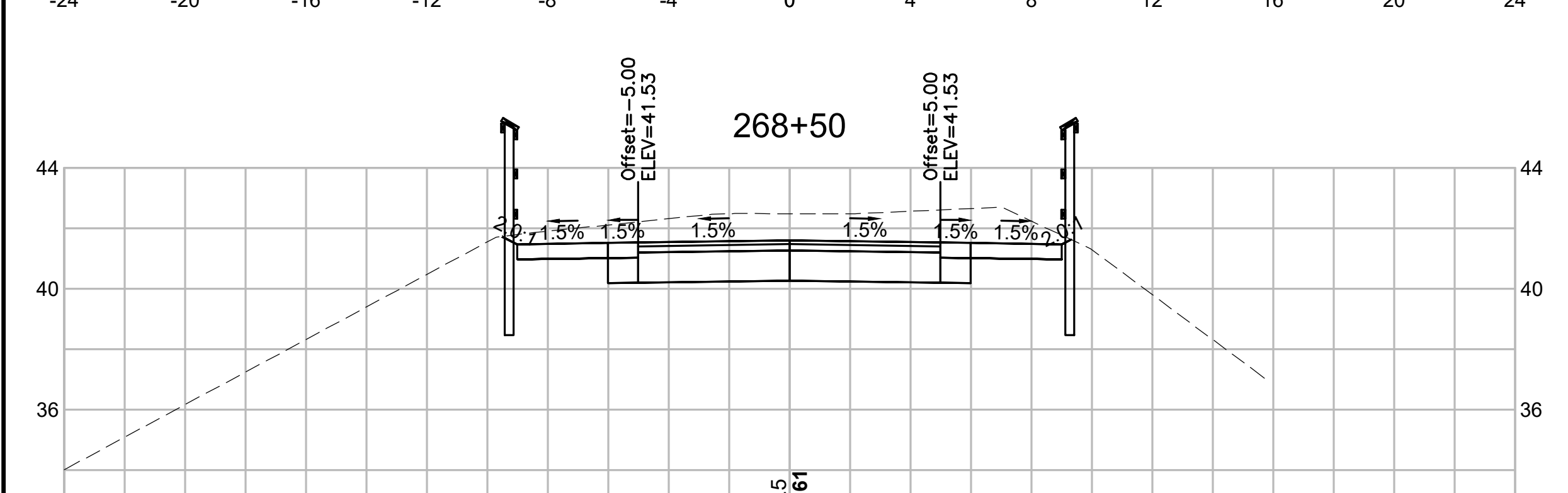
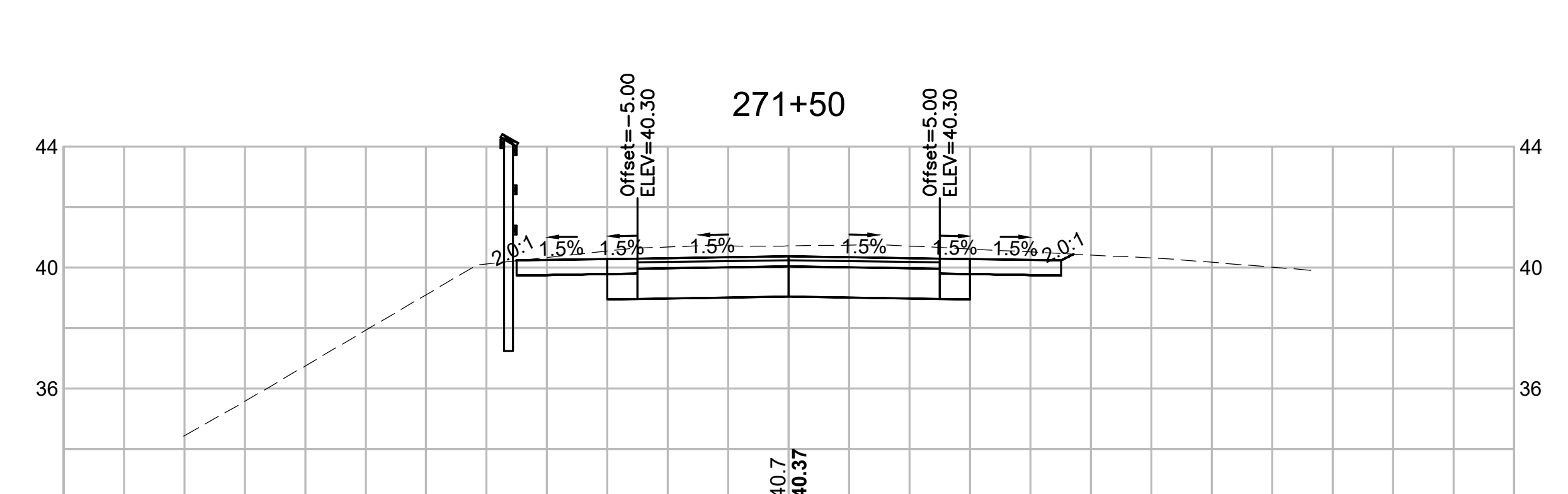
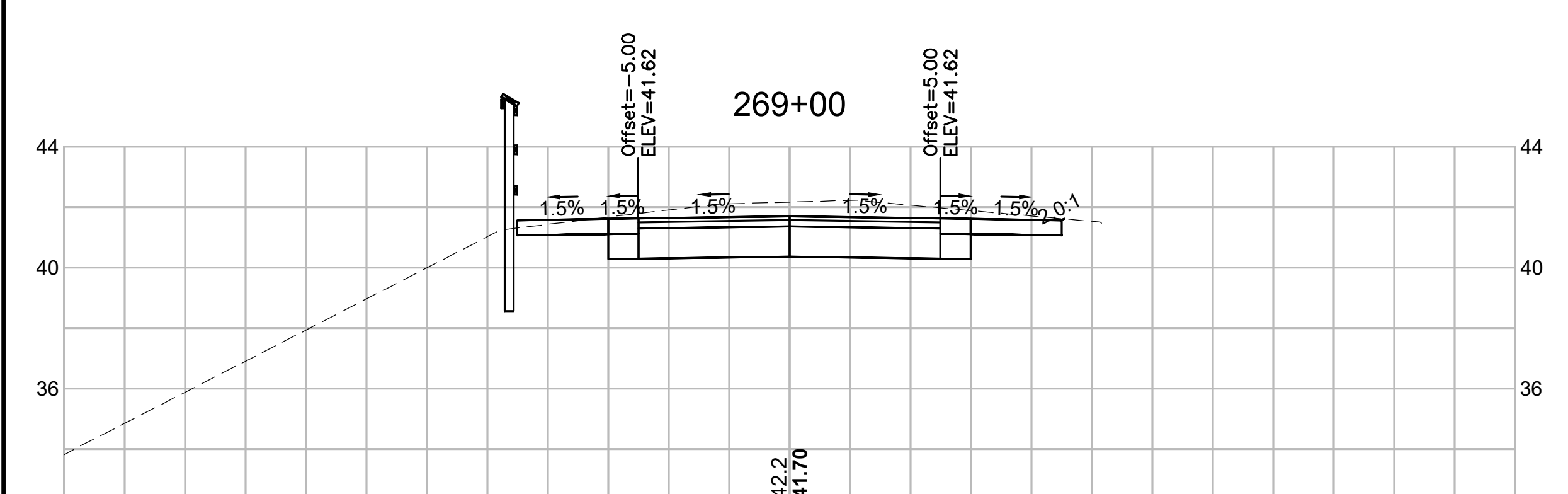
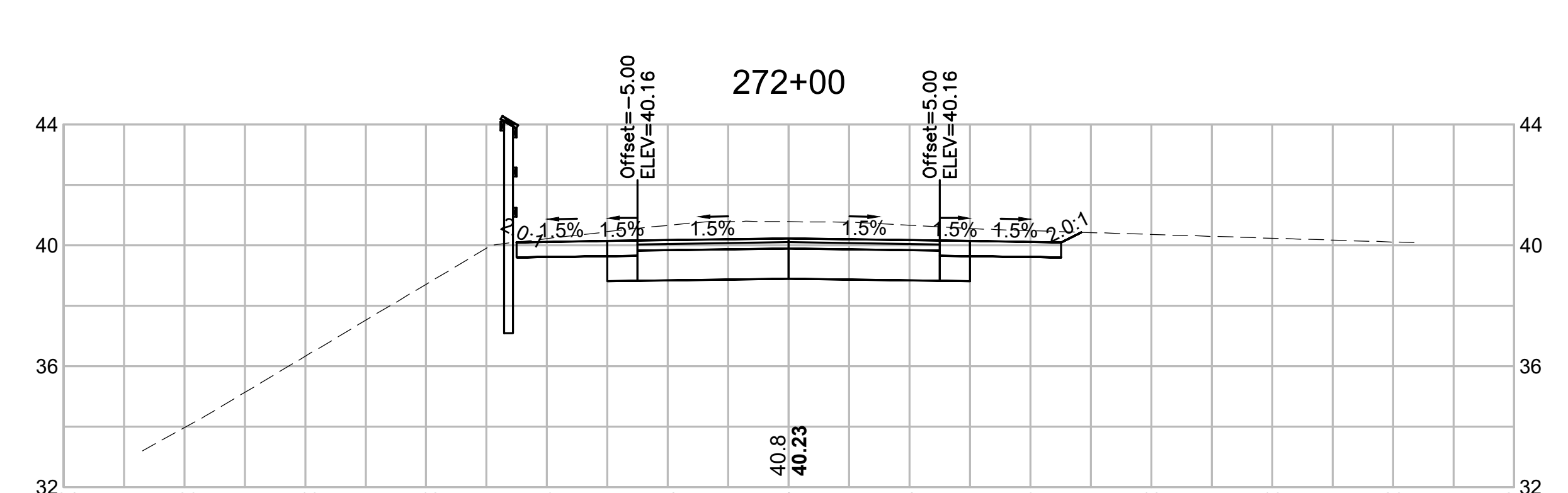
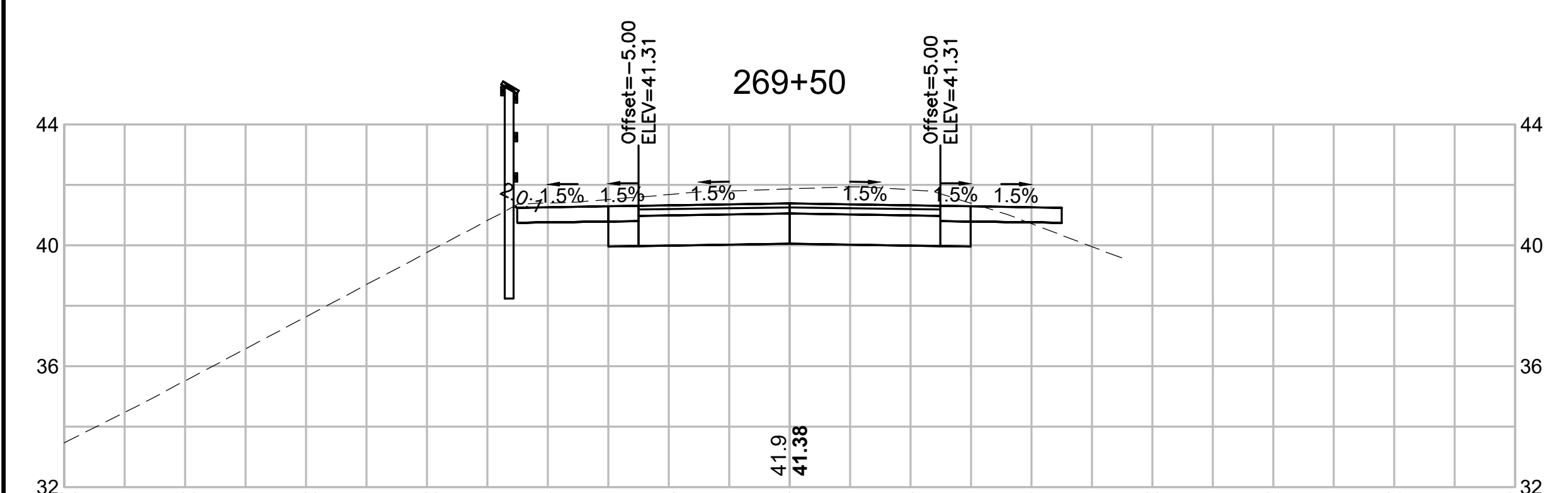
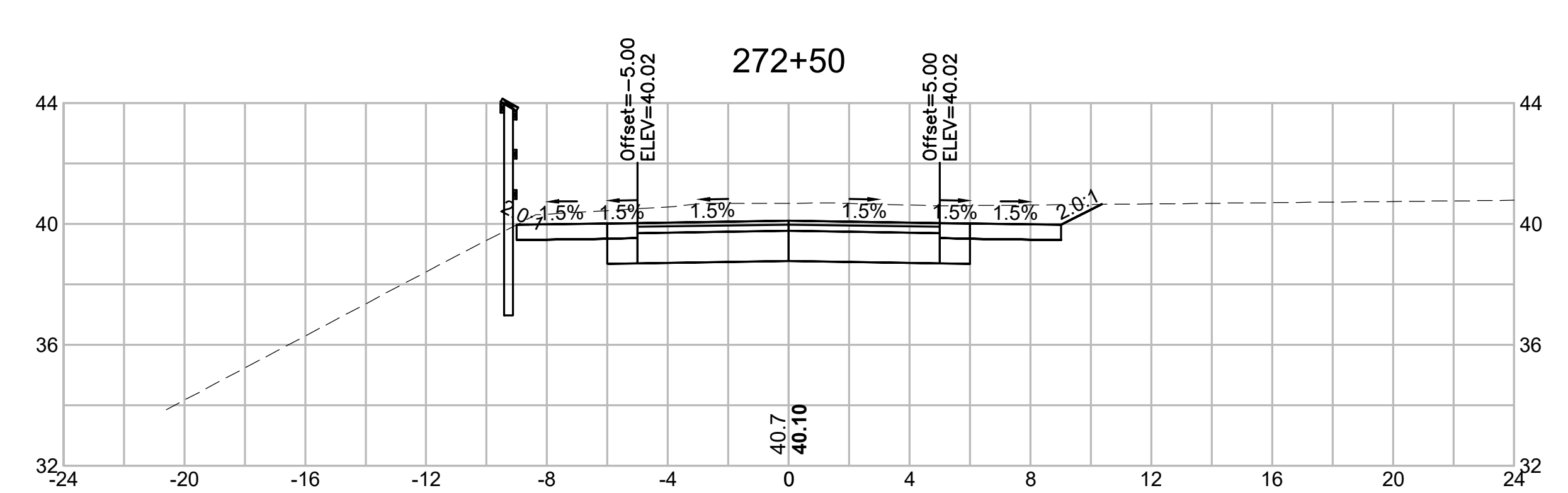
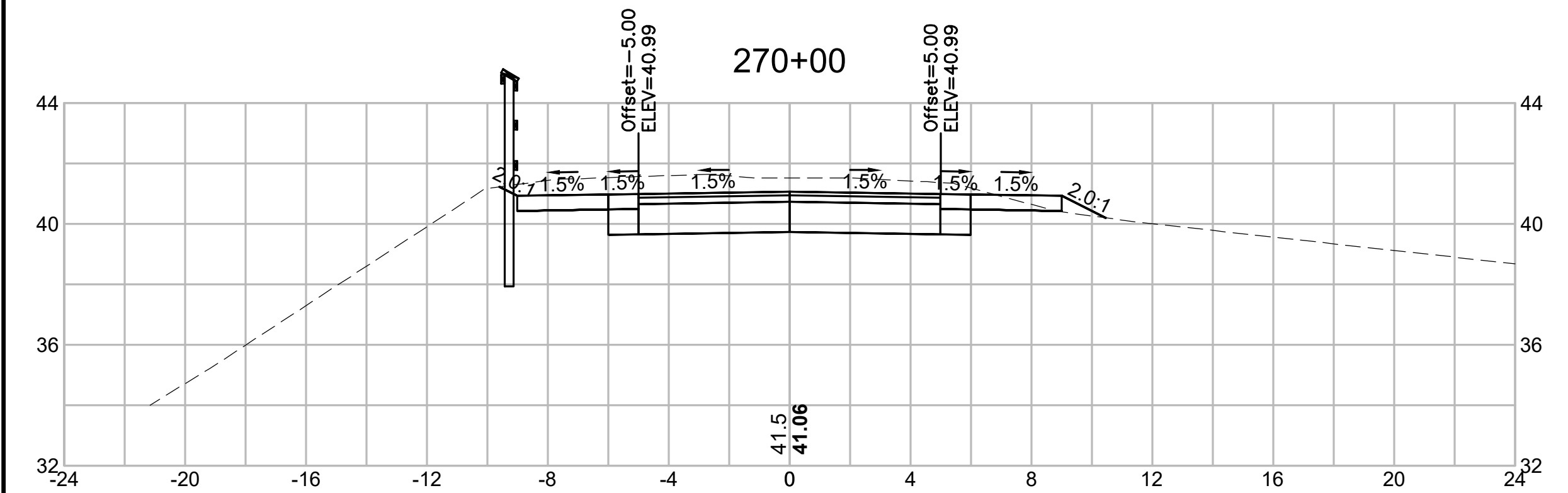
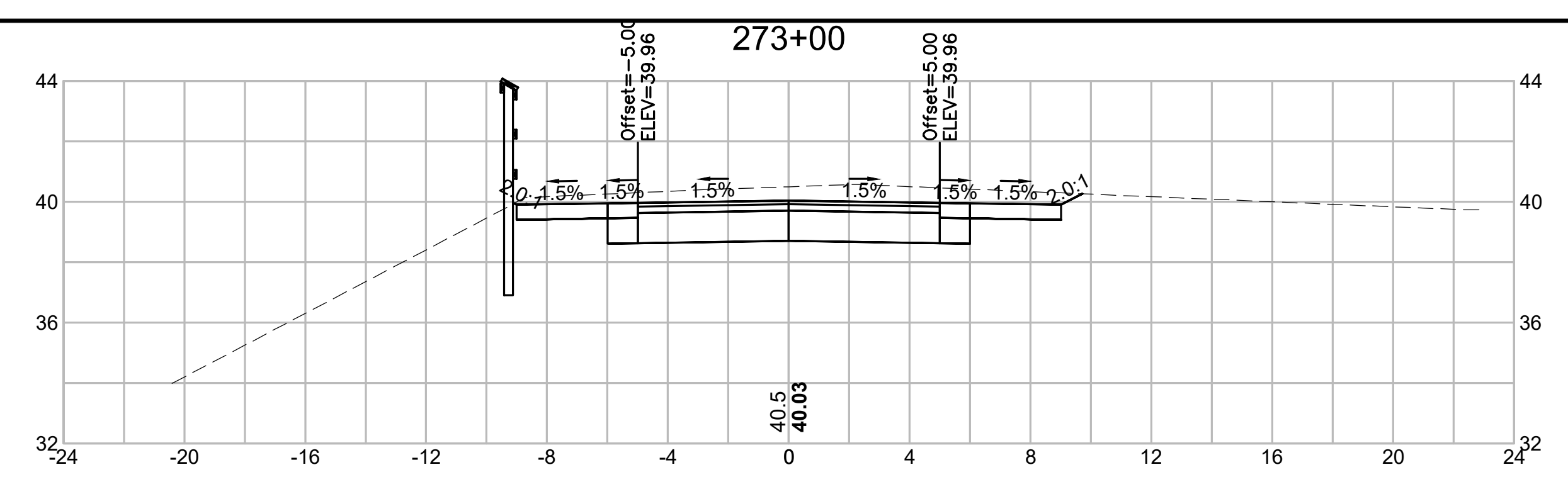
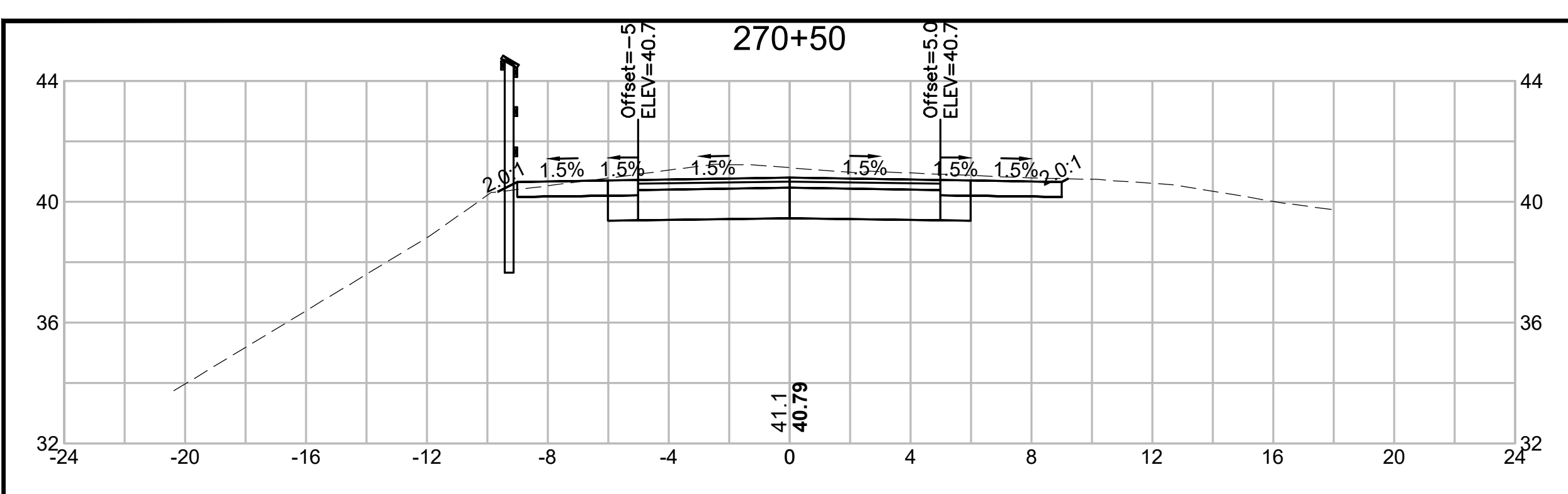
**CROSS SECTIONS - 24**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	109	114
PROJECT FILE NO.		17112.00	

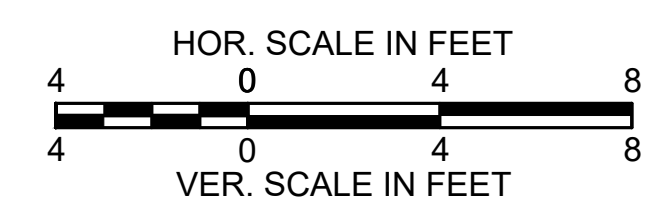
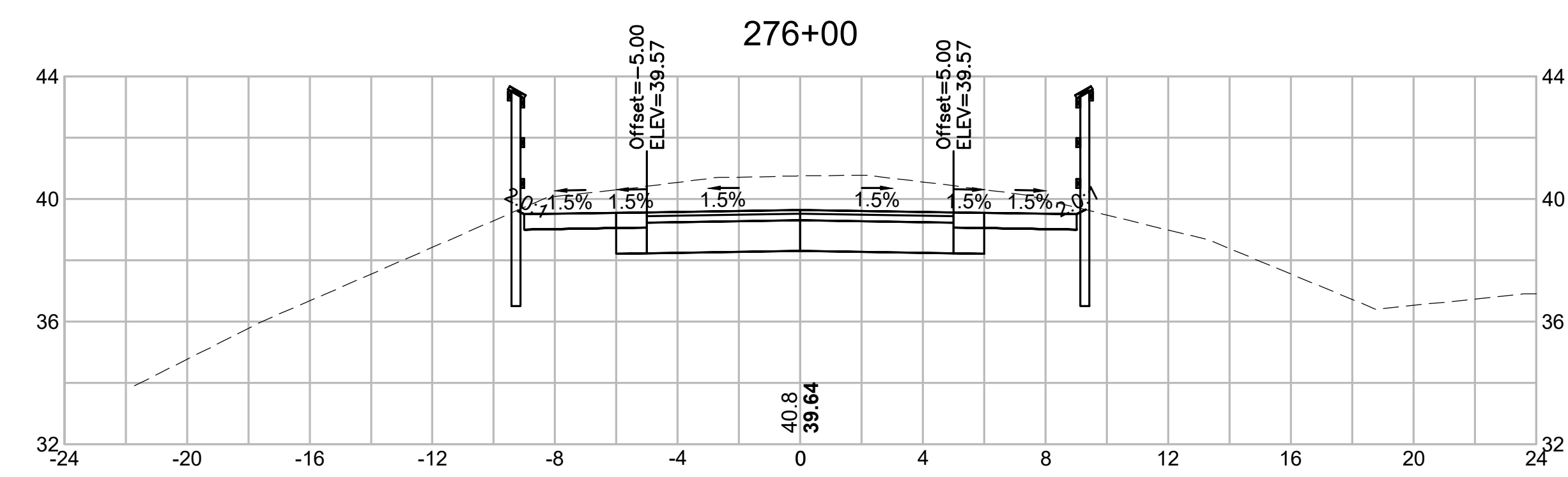
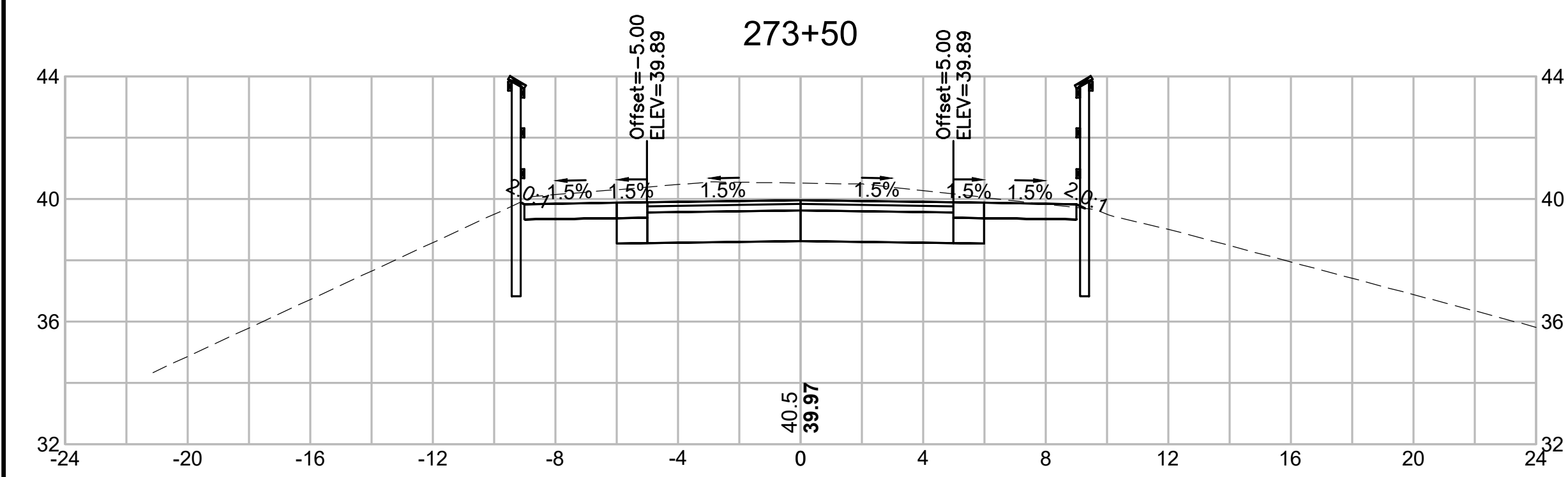
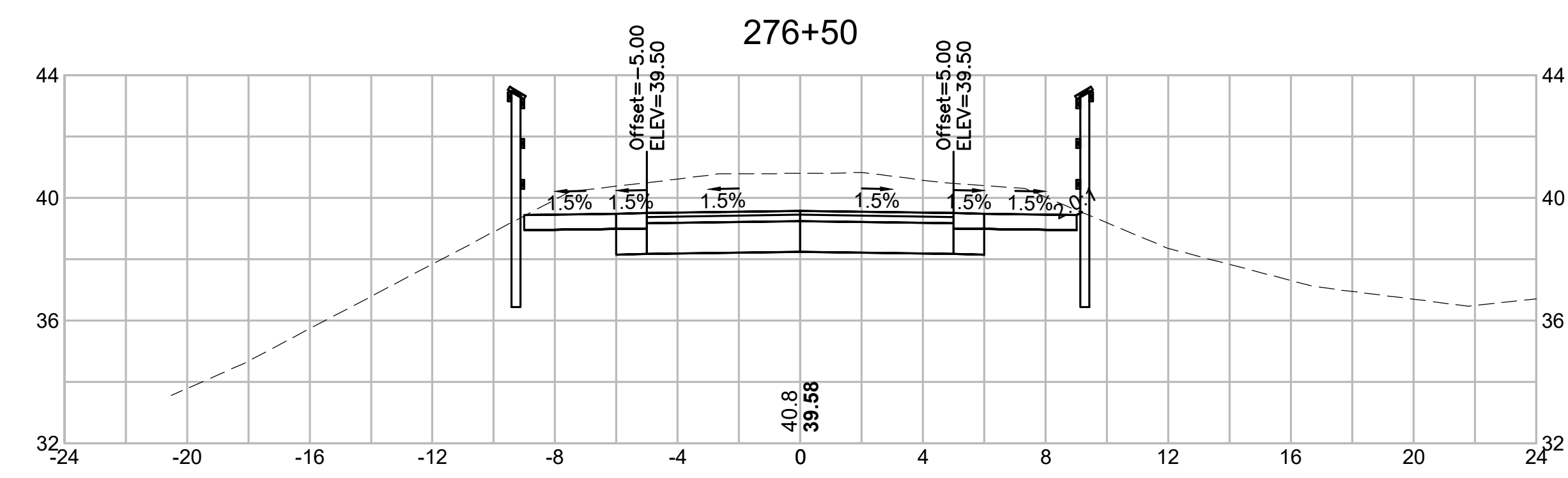
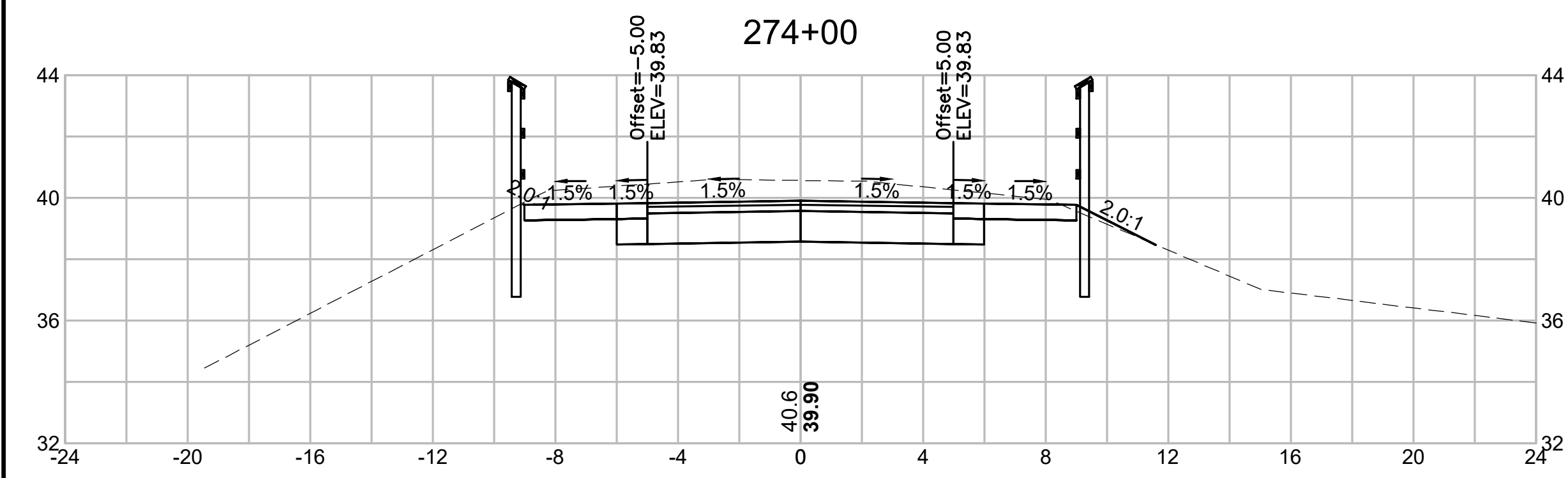
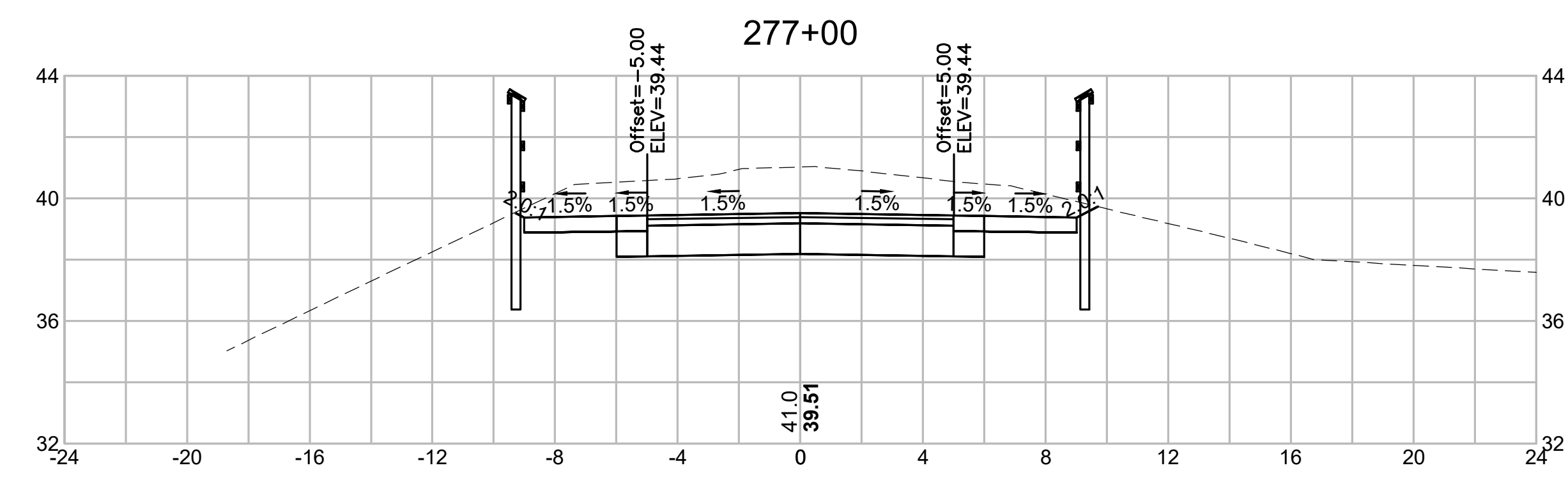
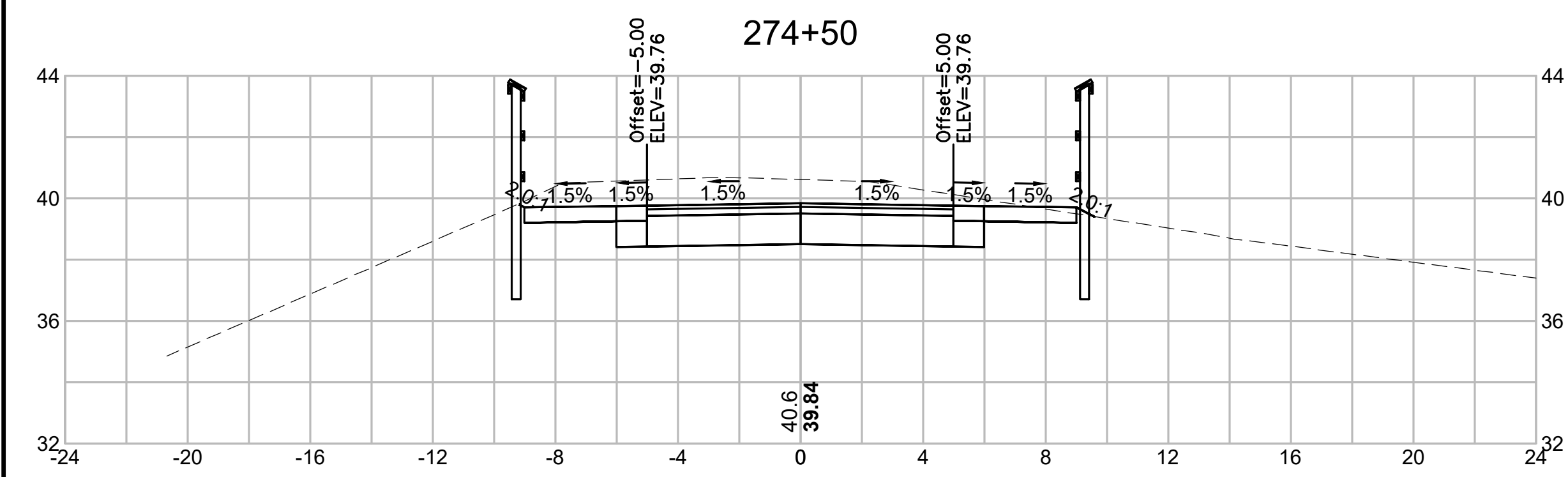
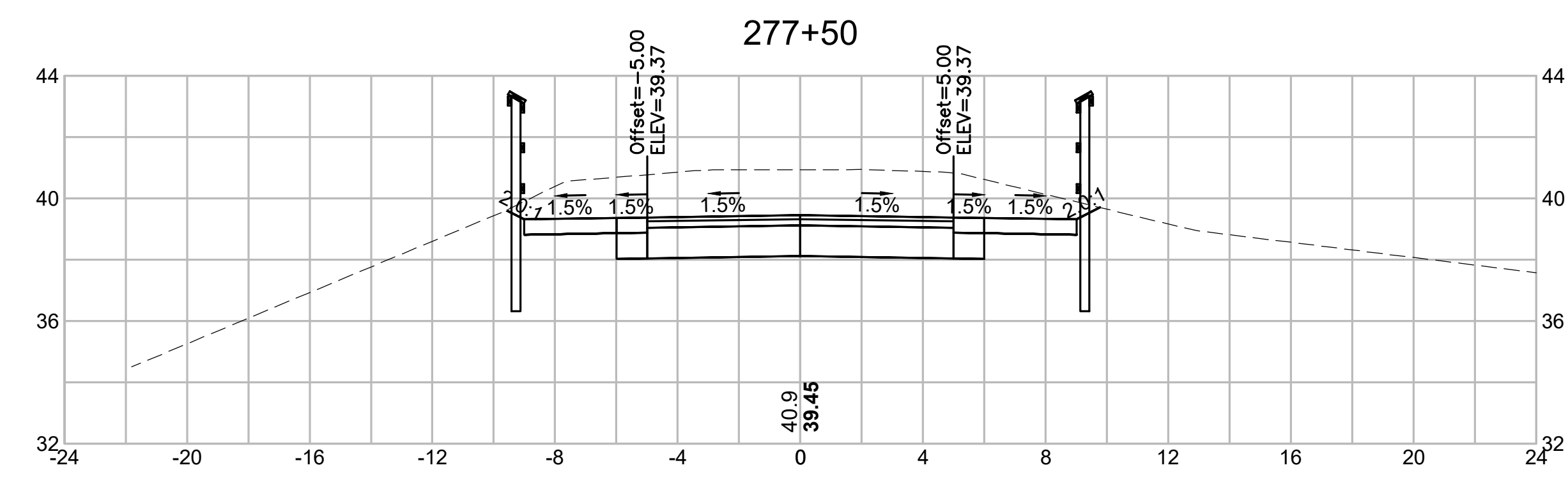
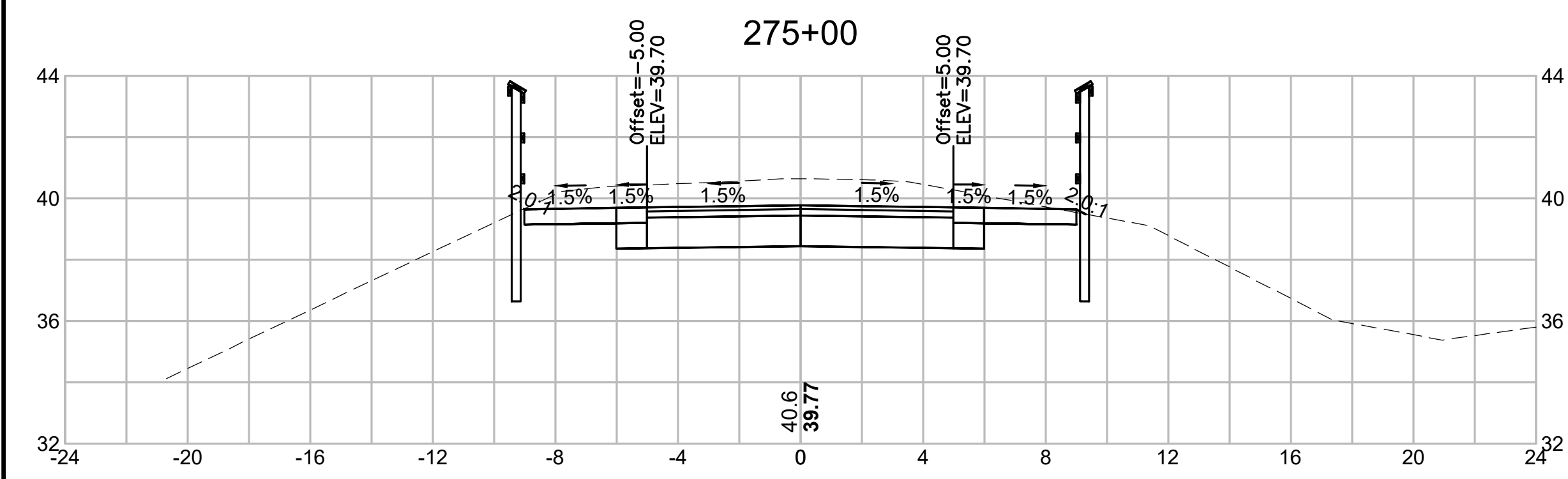
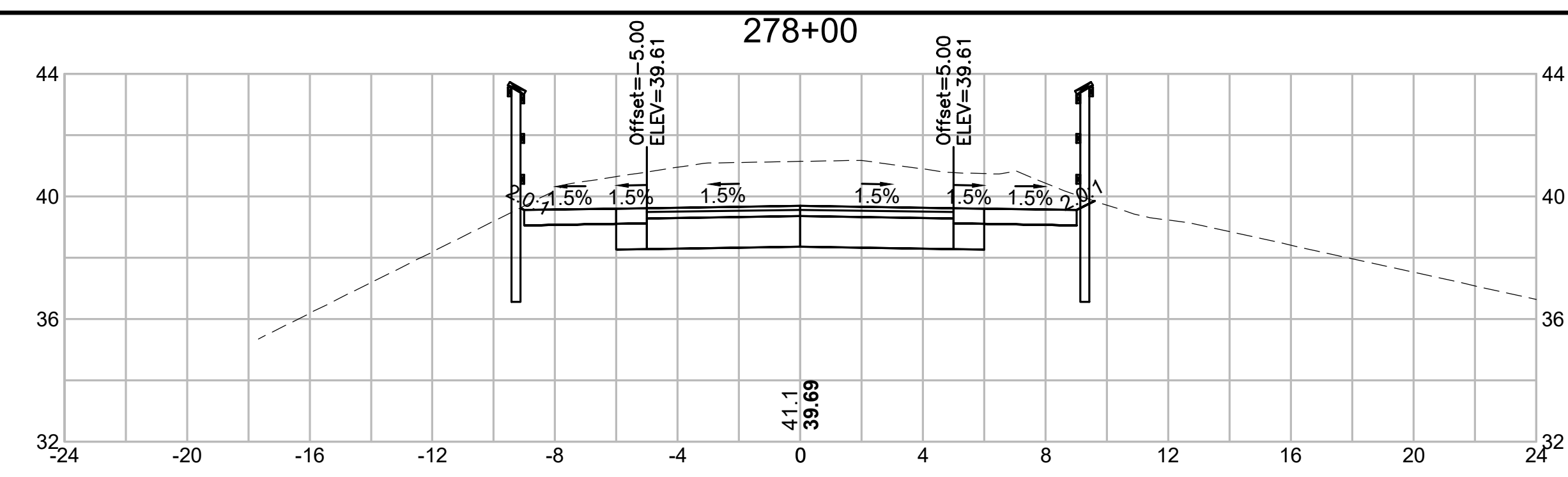
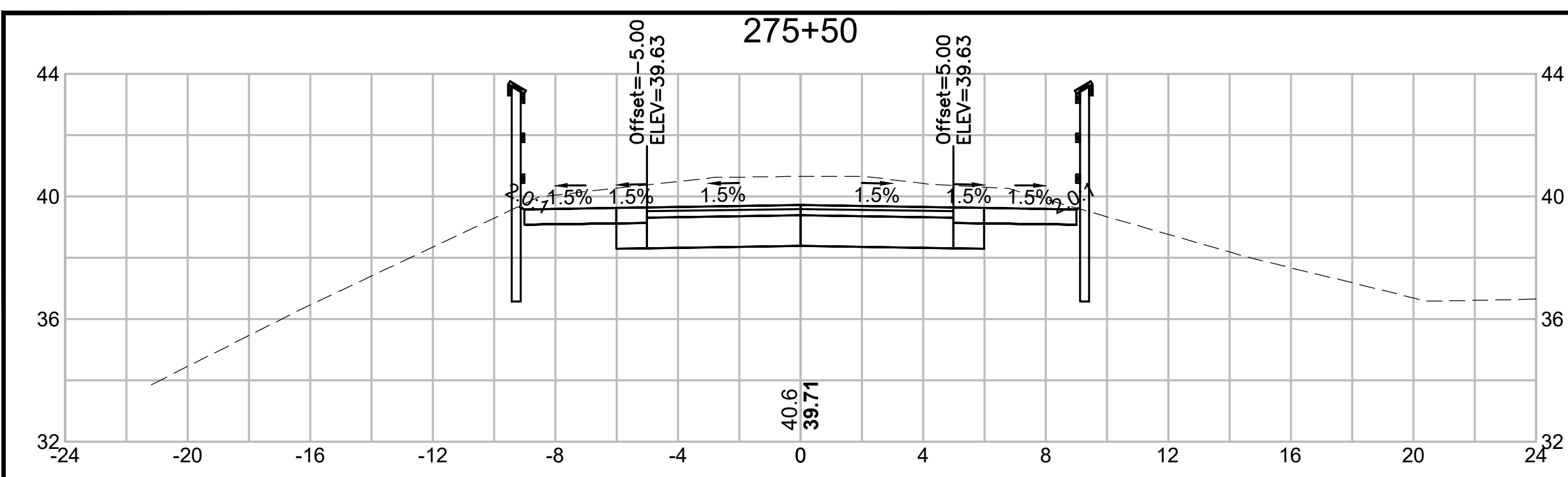
**CROSS SECTIONS - 25**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	110	114
PROJECT FILE NO.		17112.00	

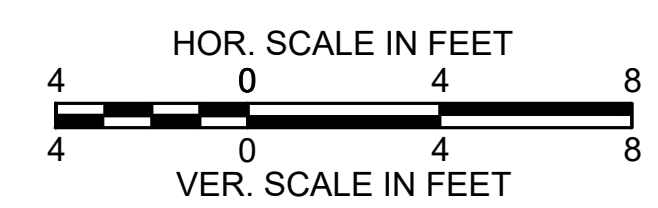
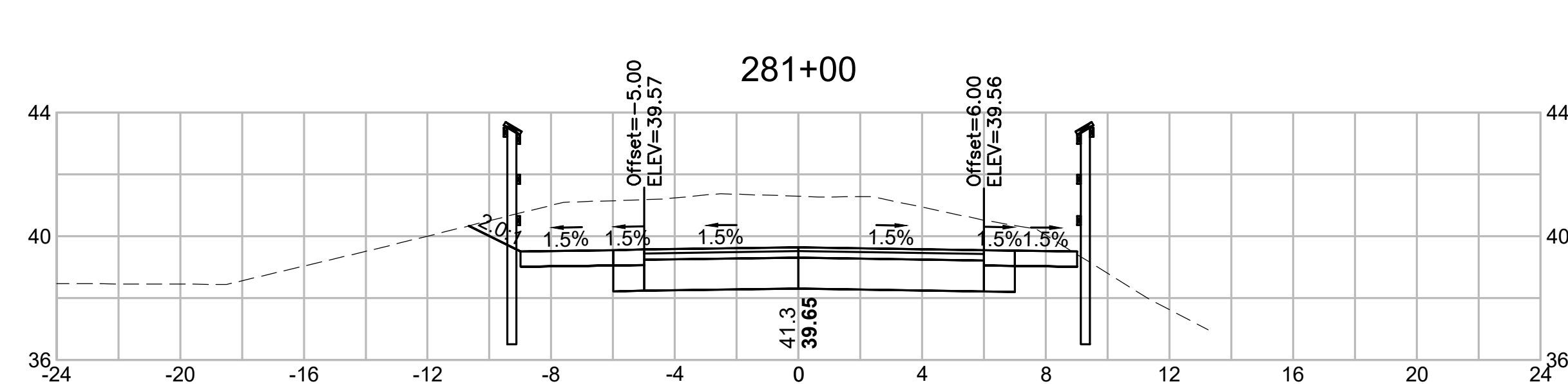
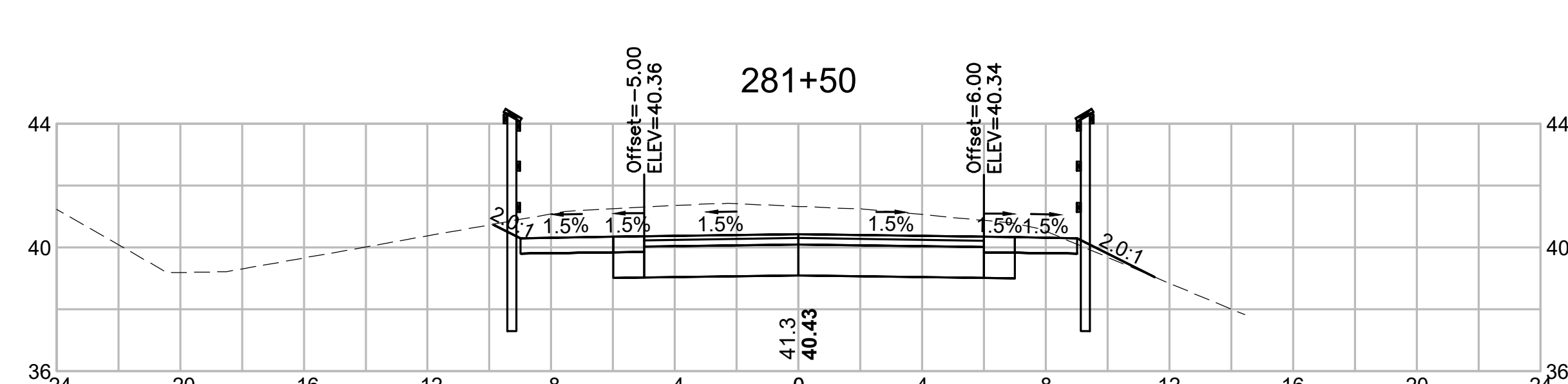
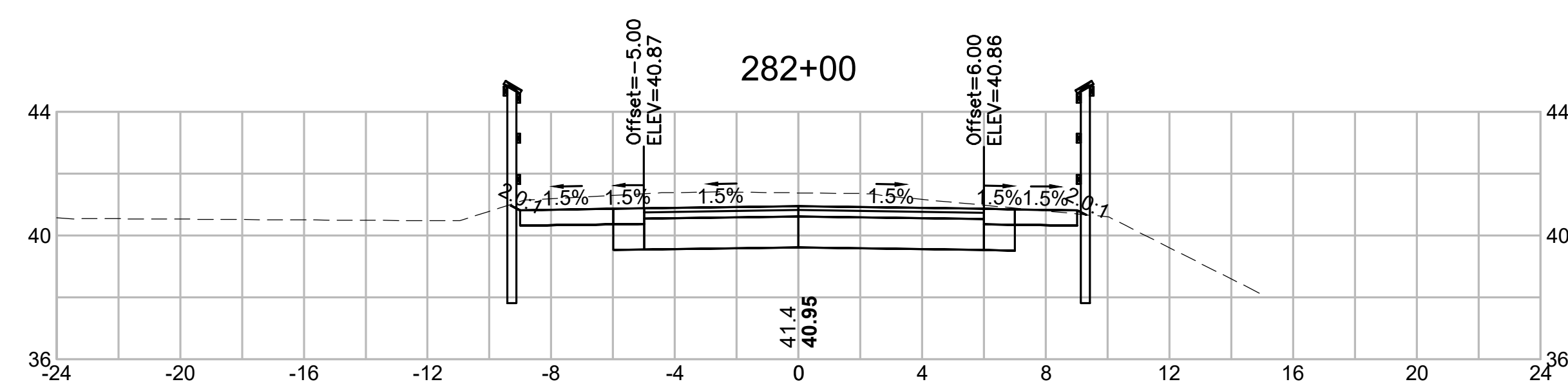
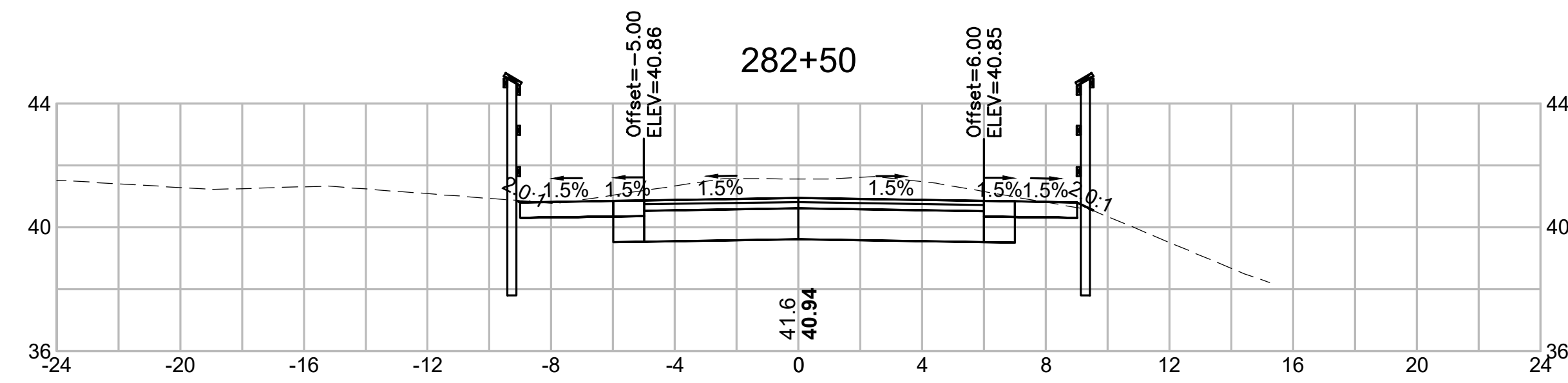
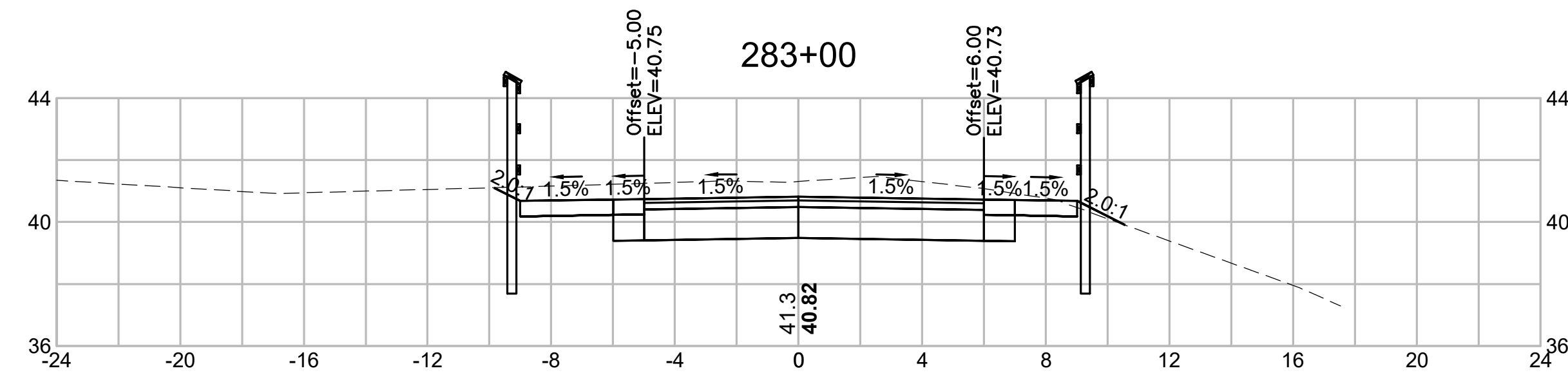
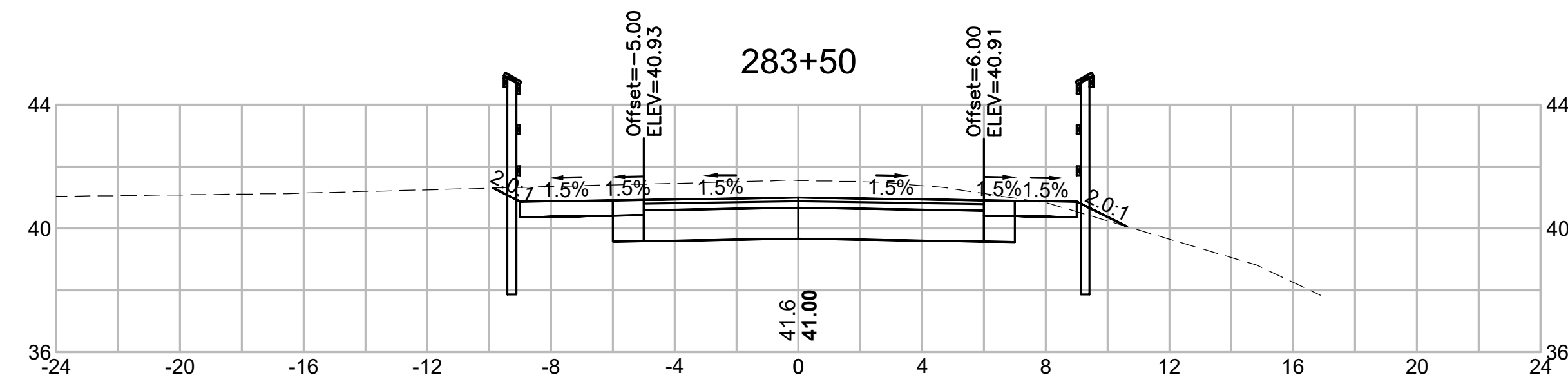
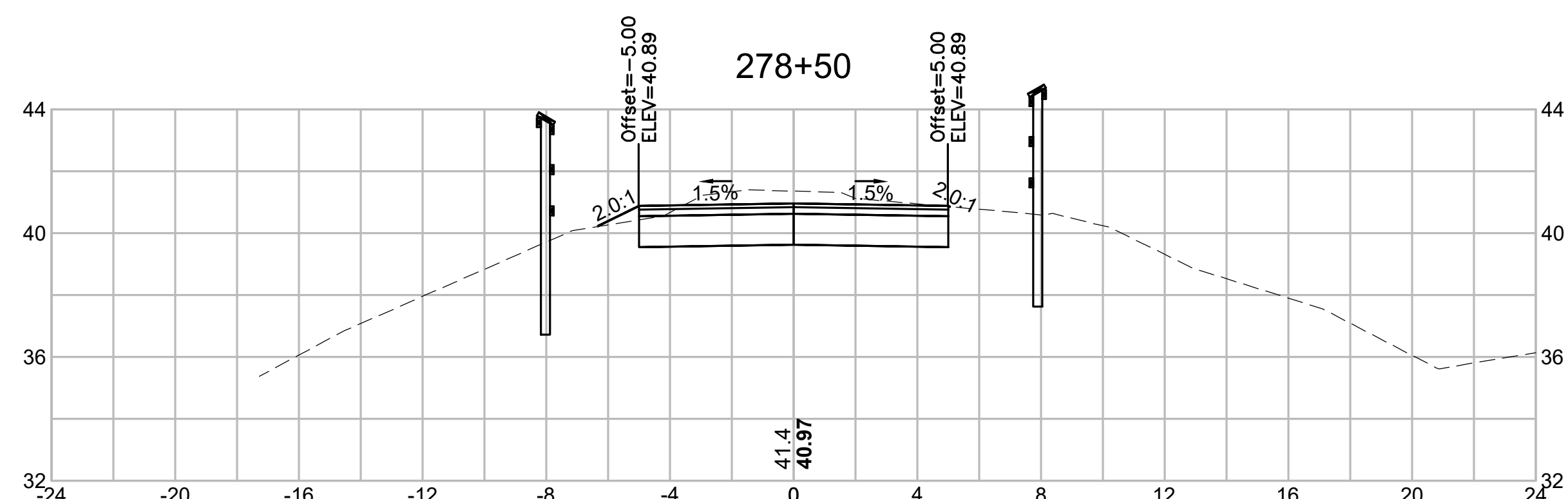
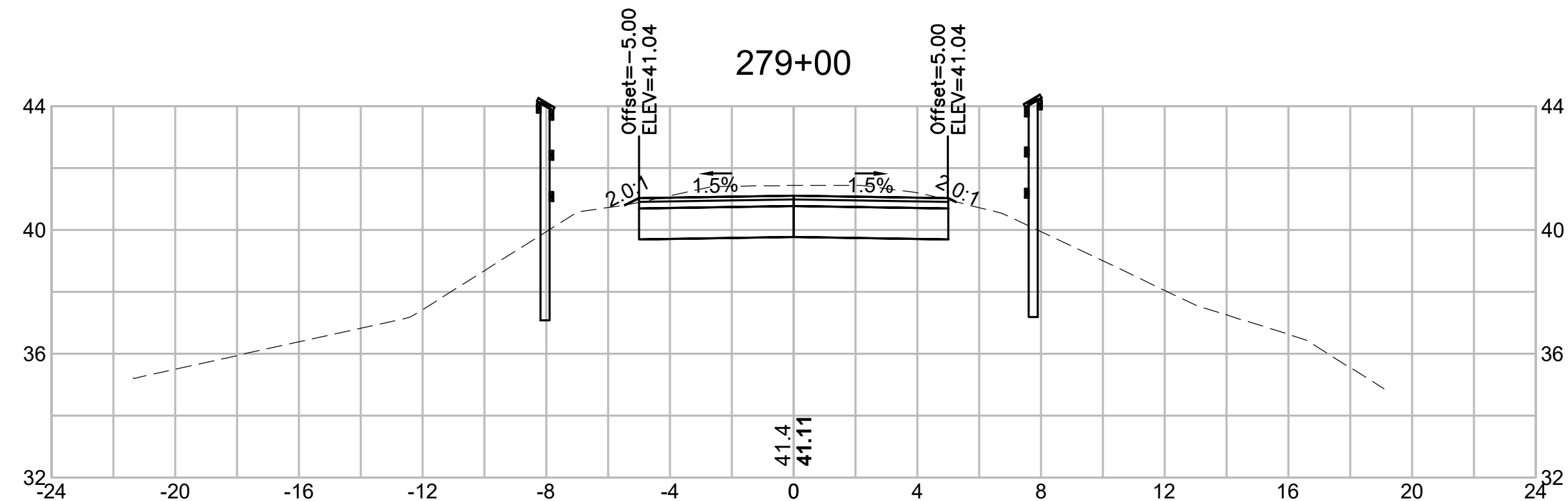
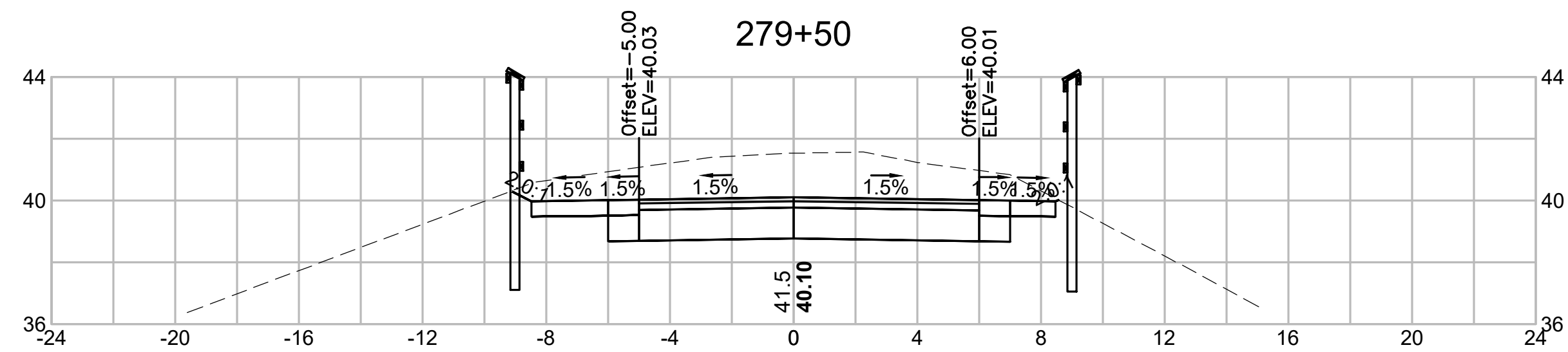
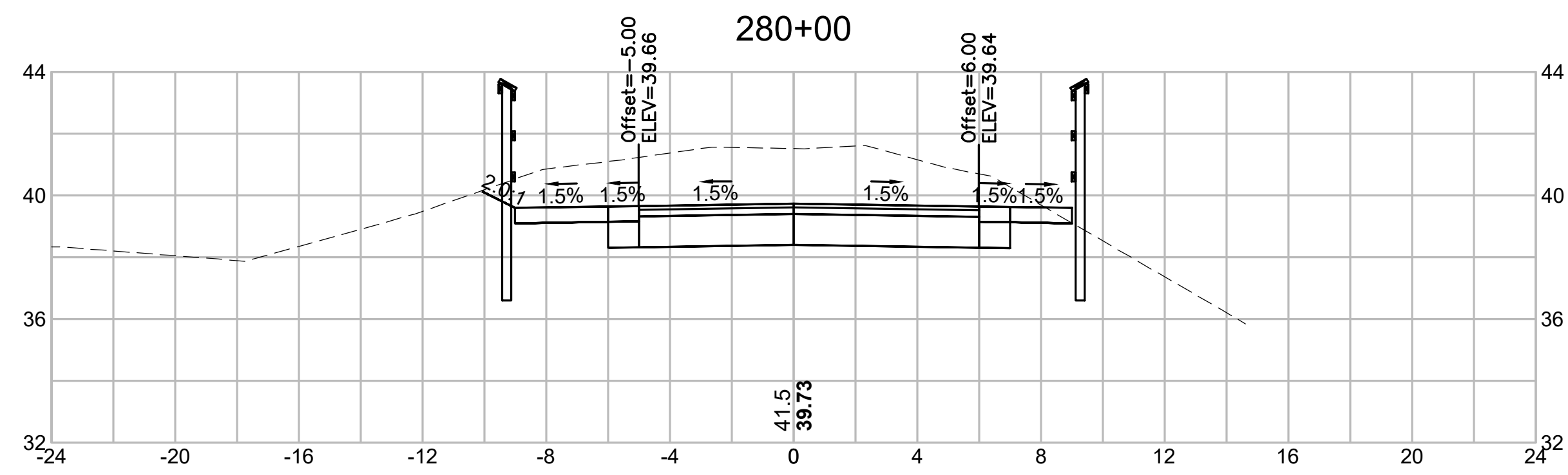
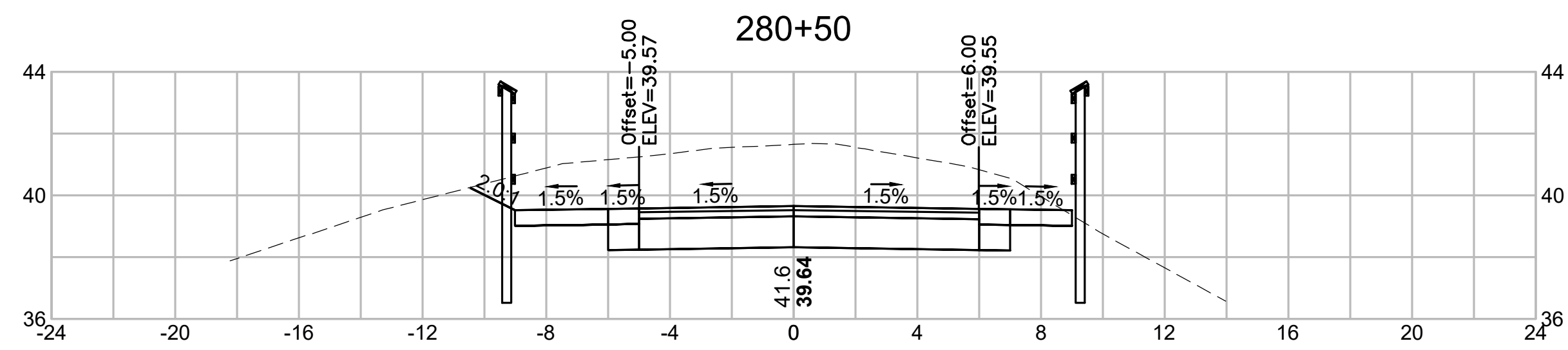
**CROSS SECTIONS - 26**



**WALTHAM  
WAYSIDE TRAIL**

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MA	-	111	114
PROJECT FILE NO.		17112.00	

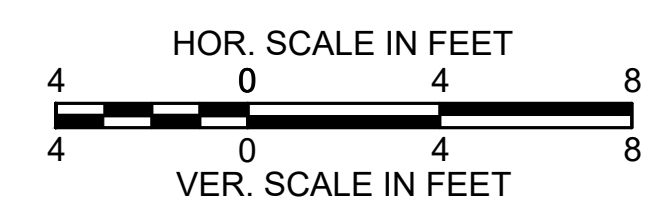
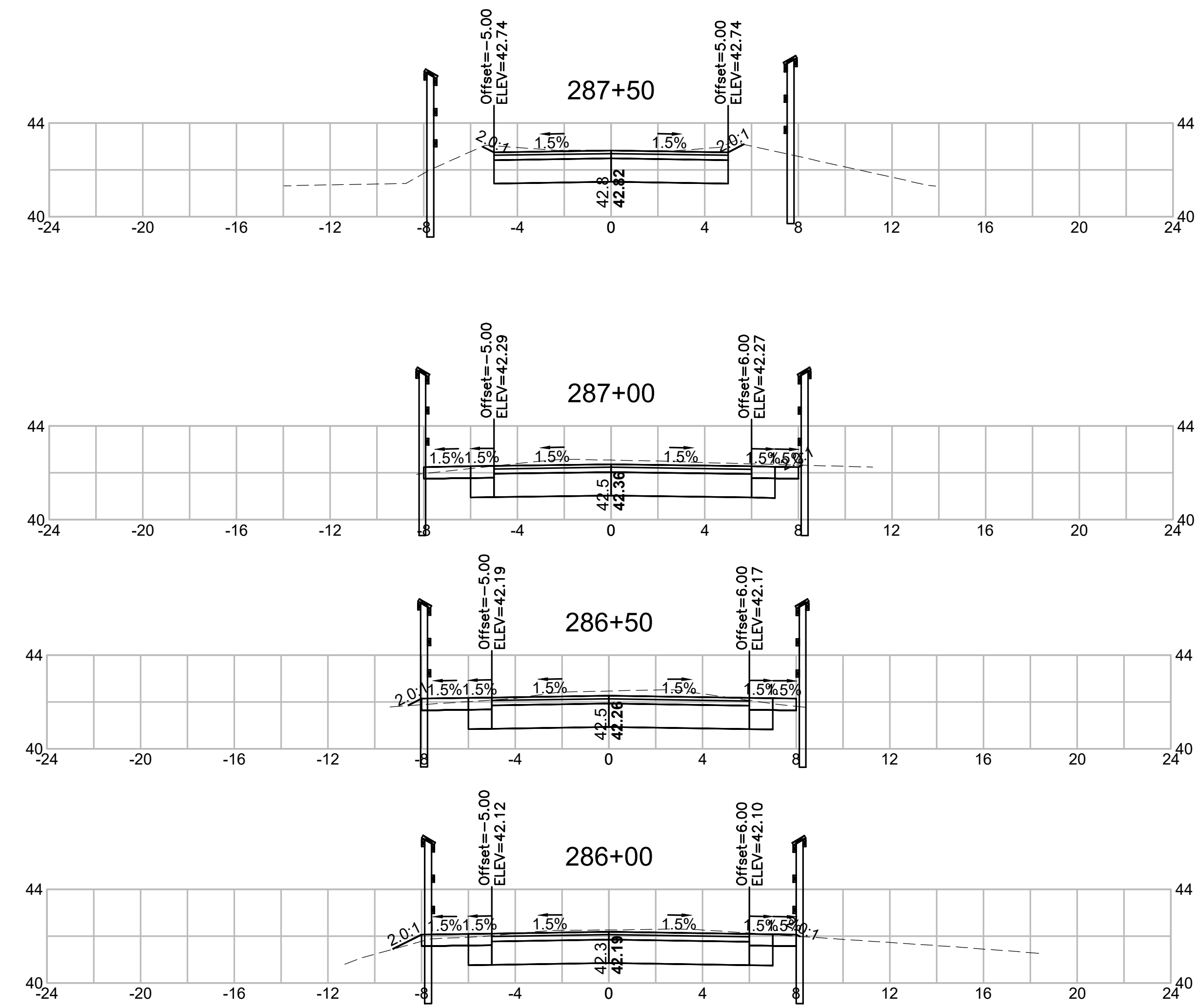
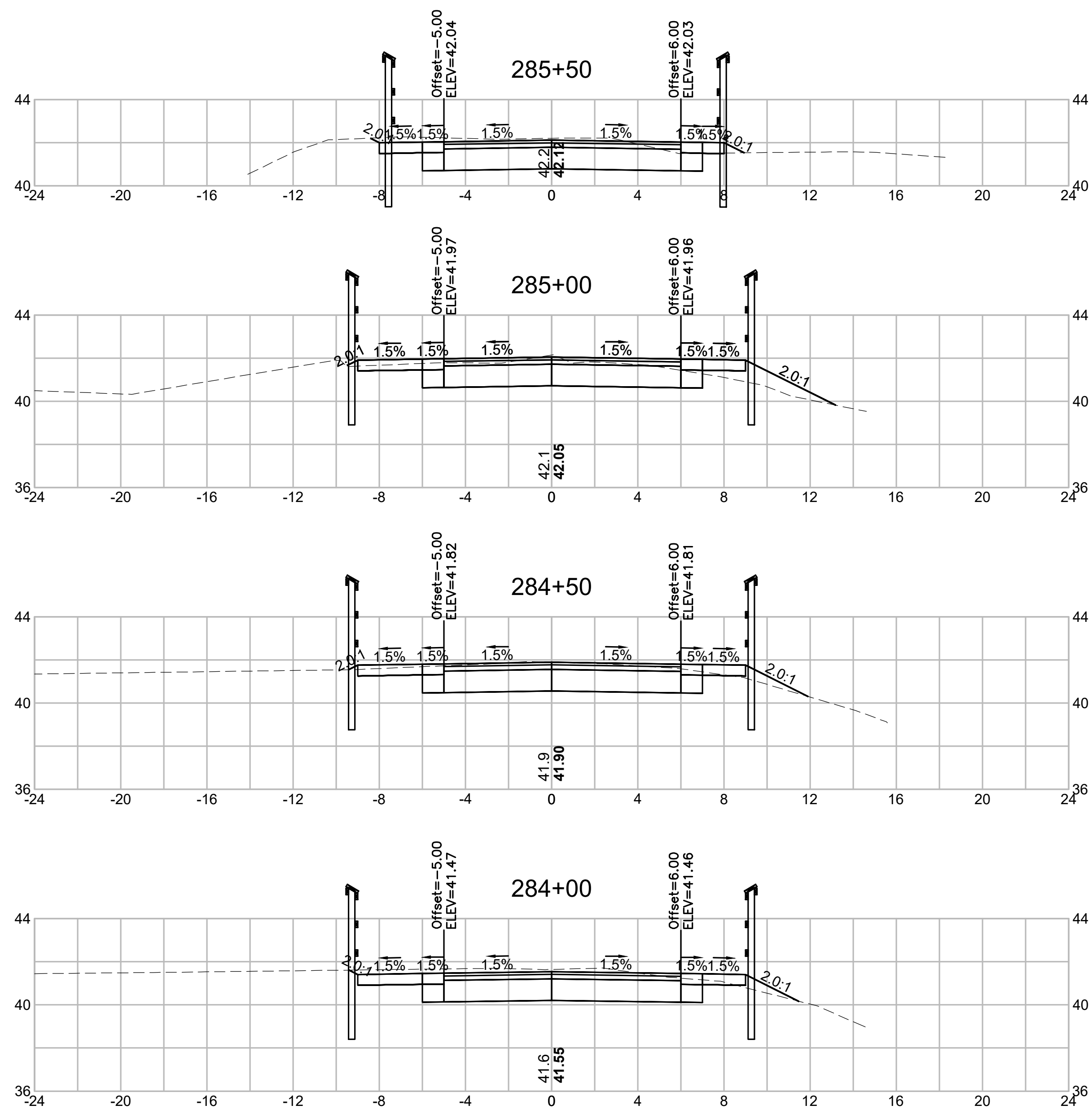
**CROSS SECTIONS - 27**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	112	114
PROJECT FILE NO.		17112.00	

**CROSS SECTIONS - 28**

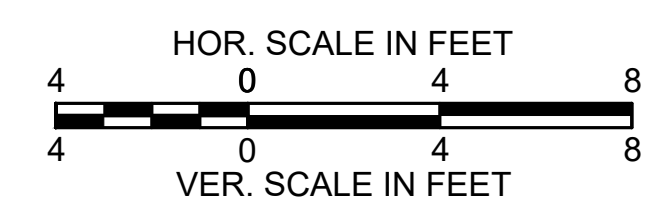
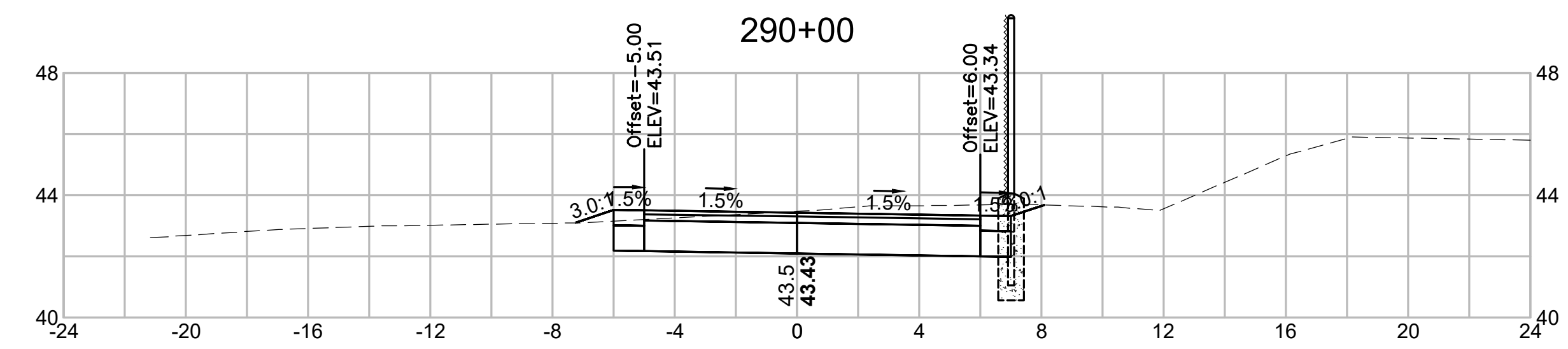
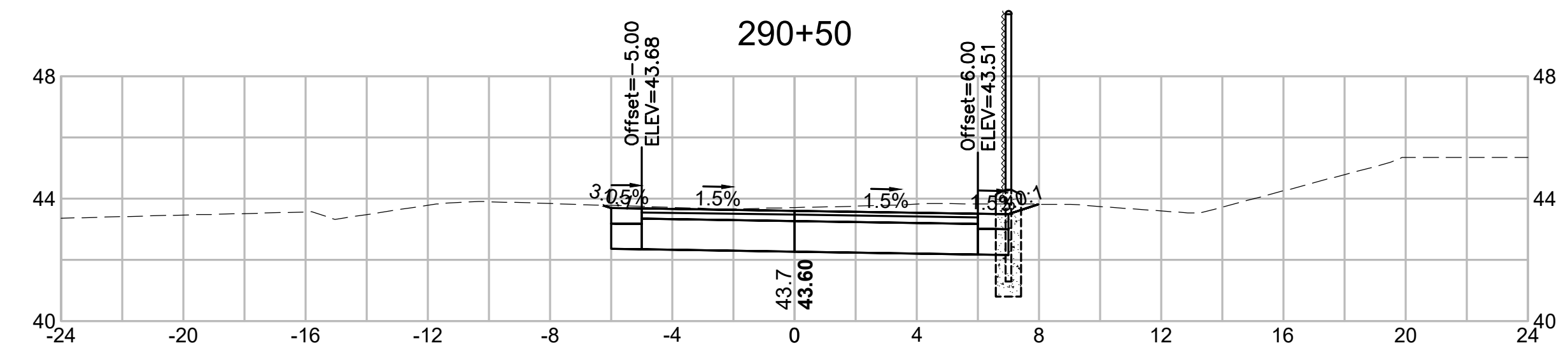
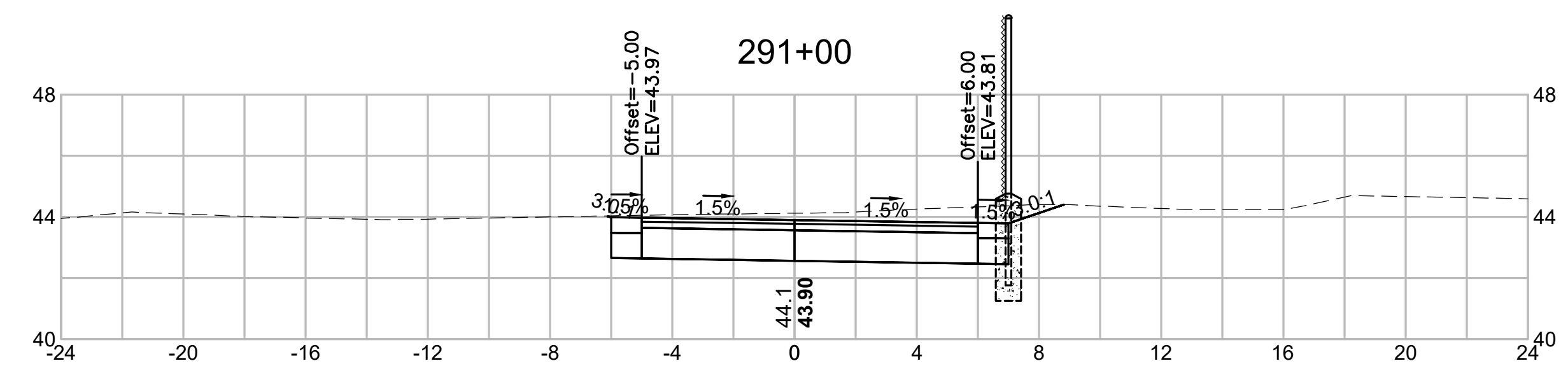
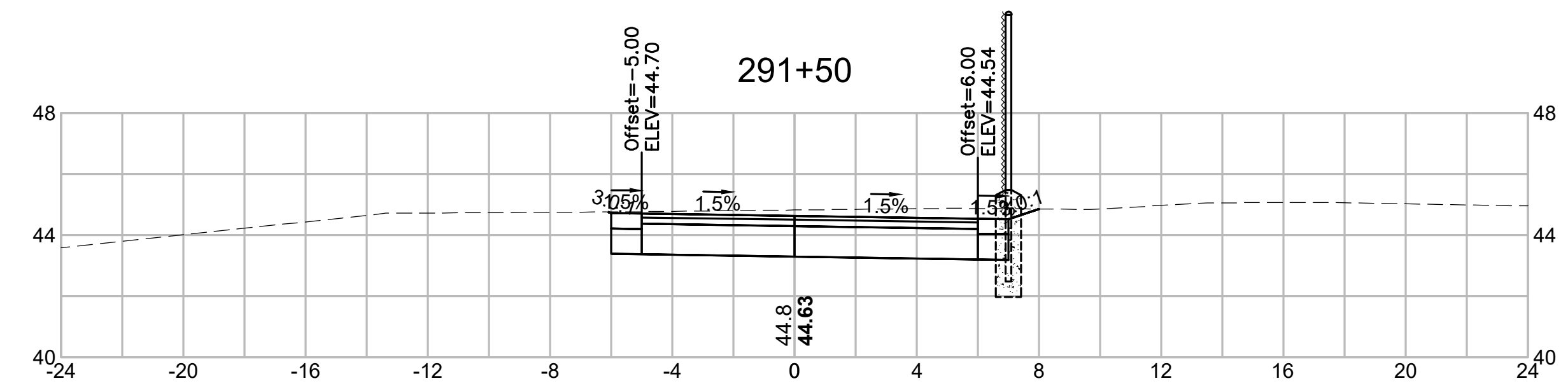
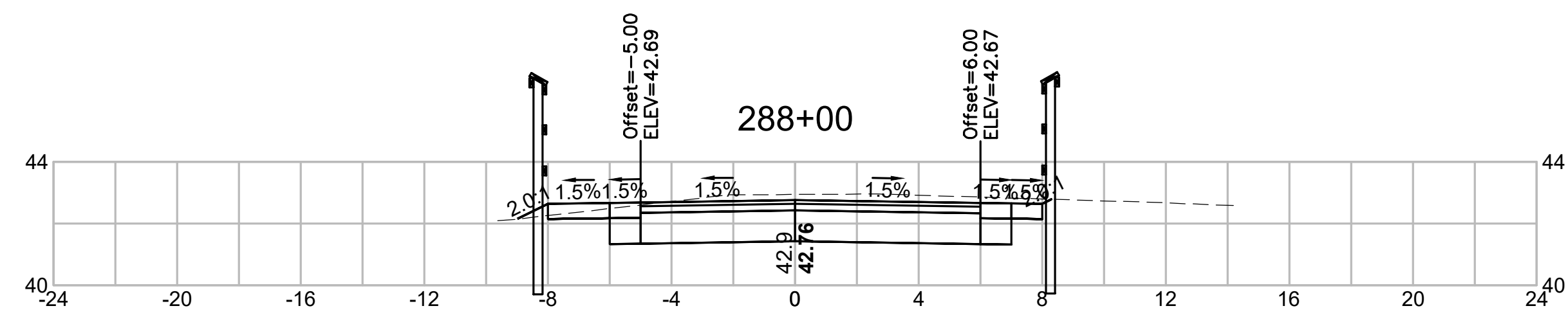
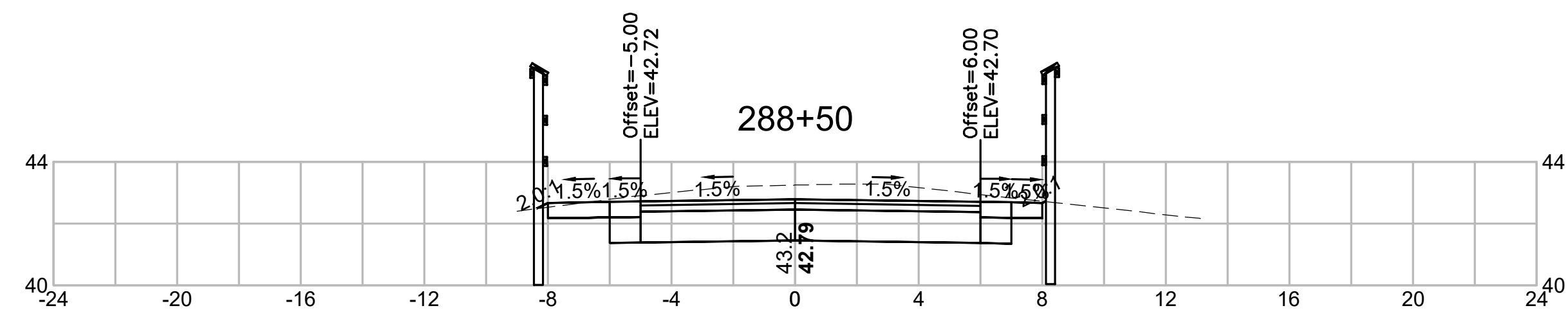
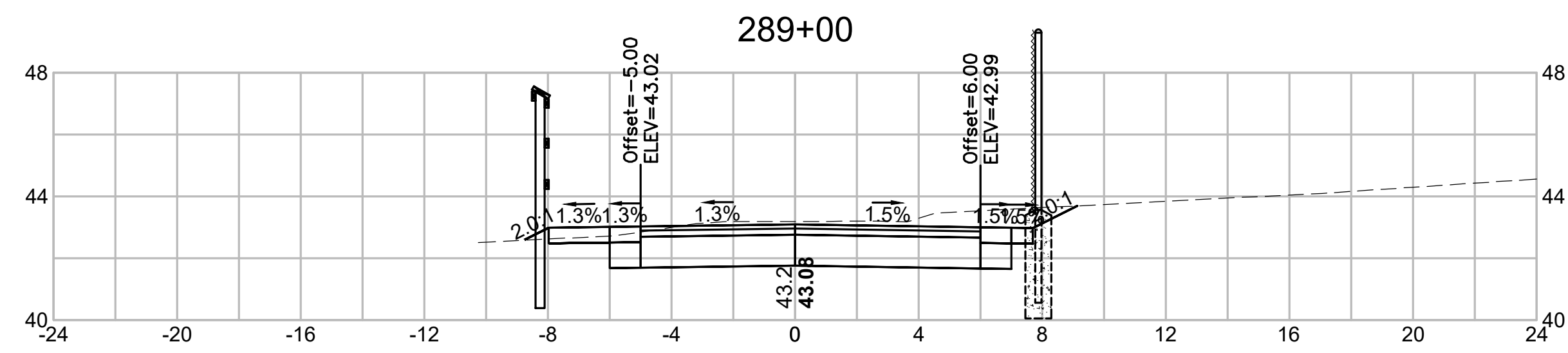
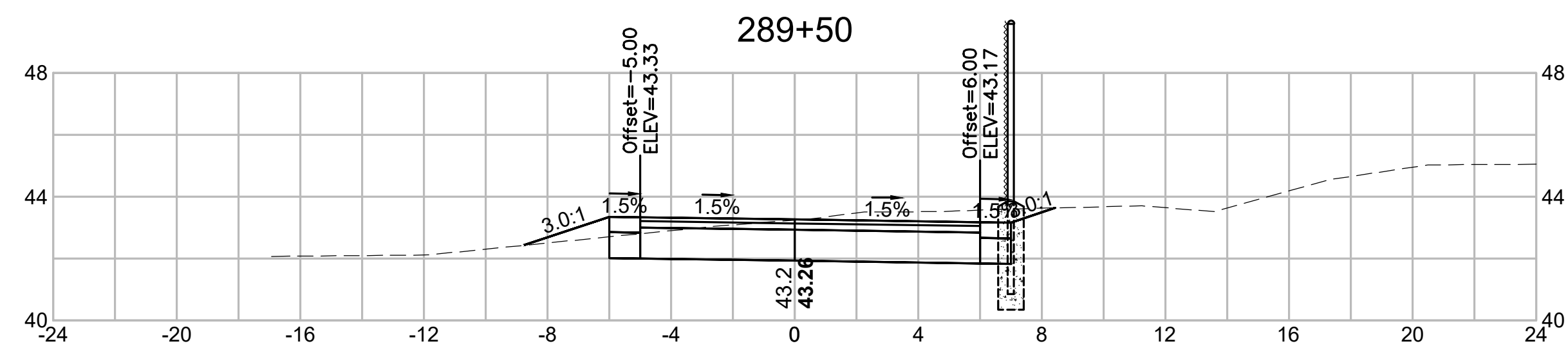




**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	113	114
PROJECT FILE NO.		17112.00	

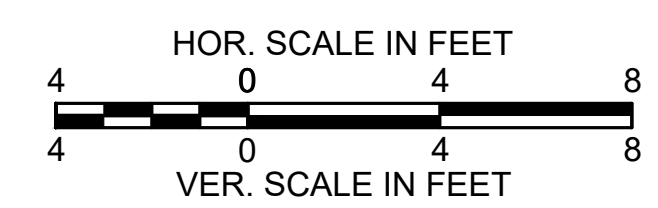
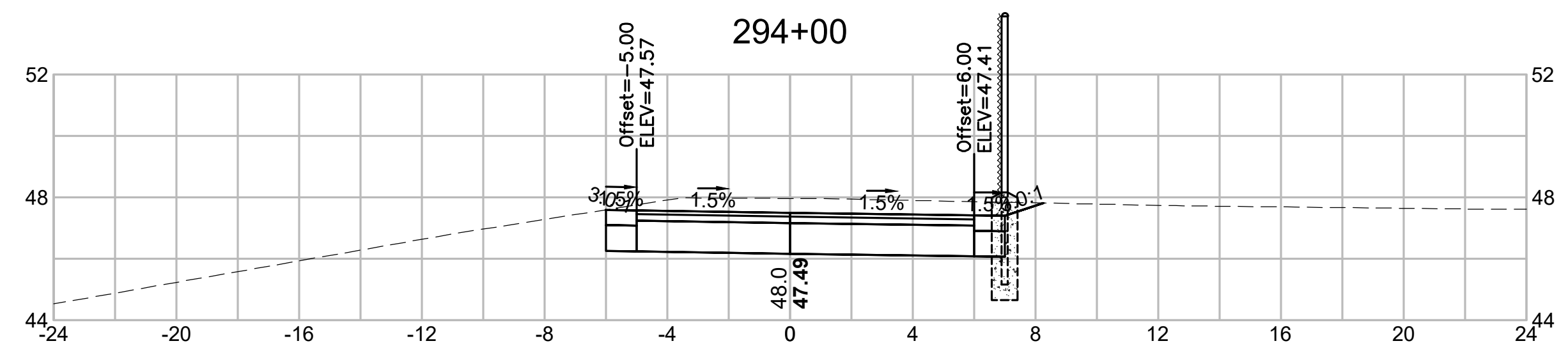
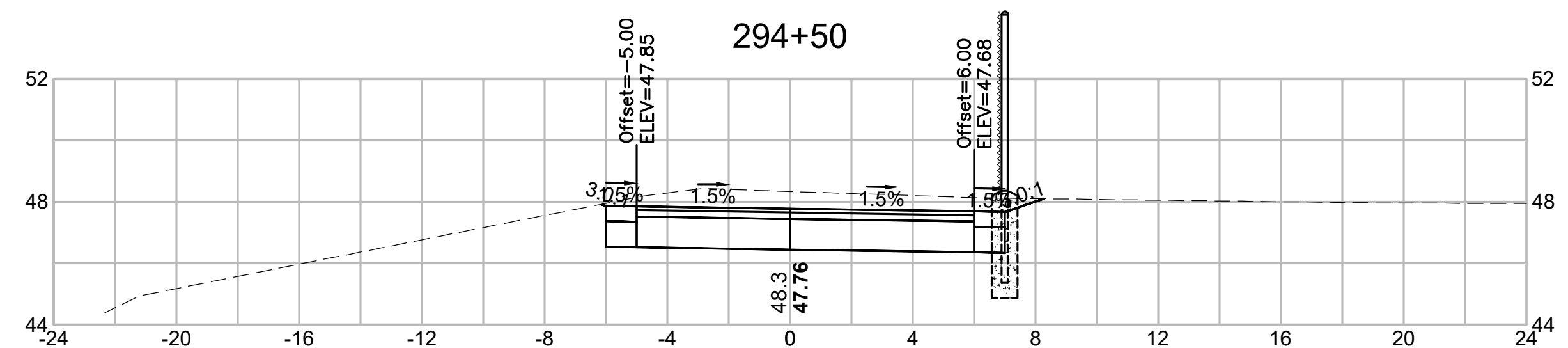
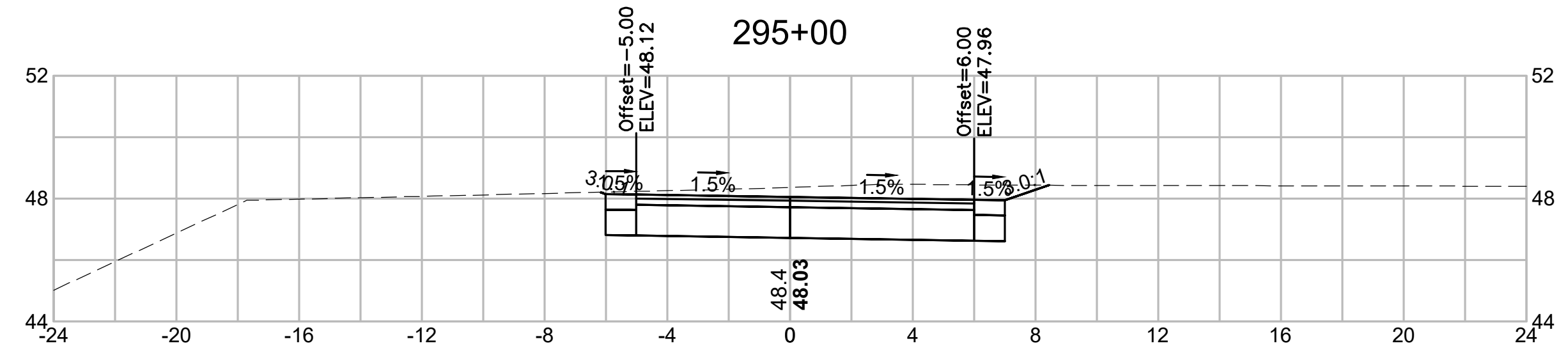
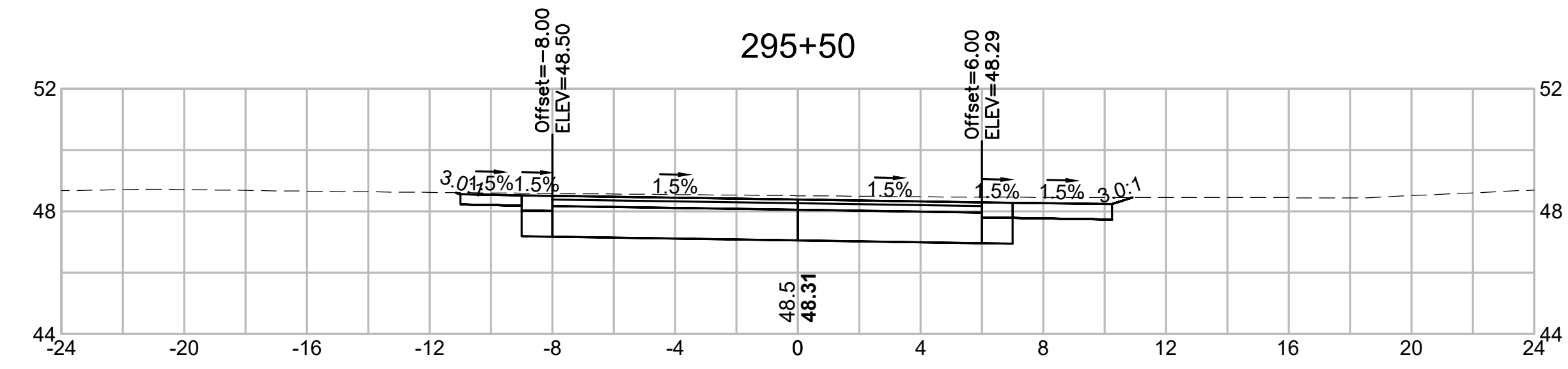
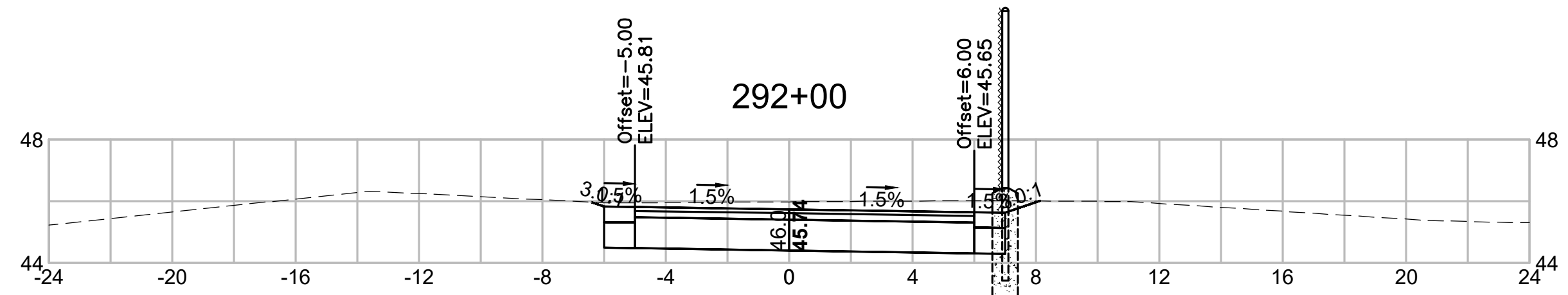
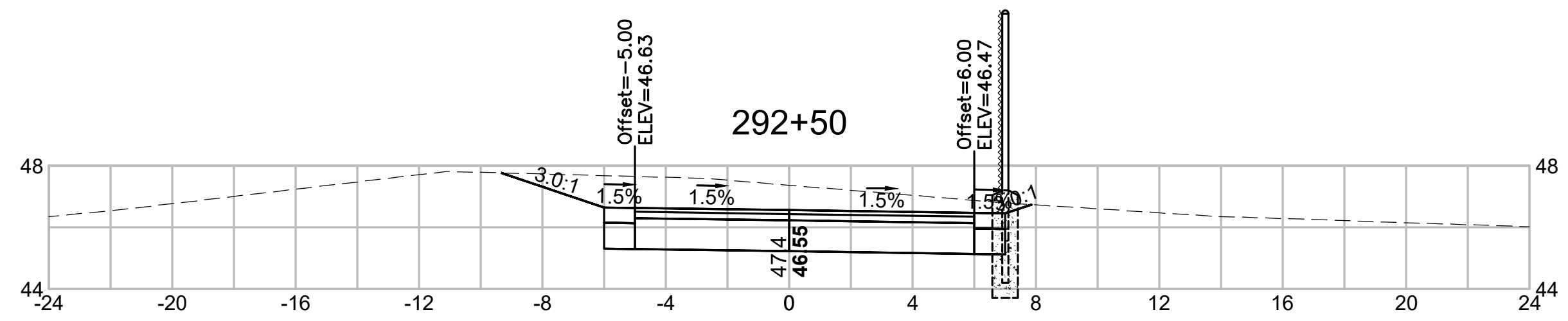
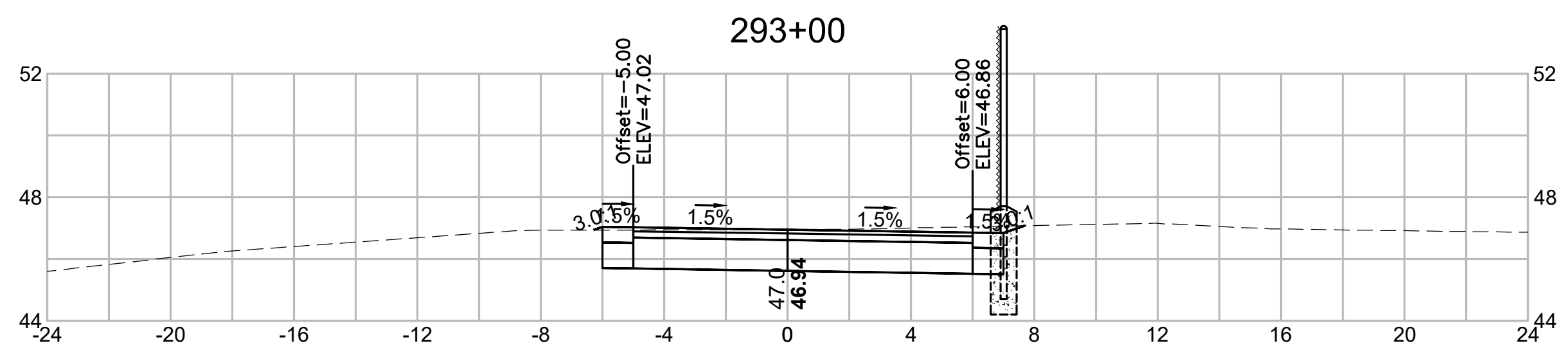
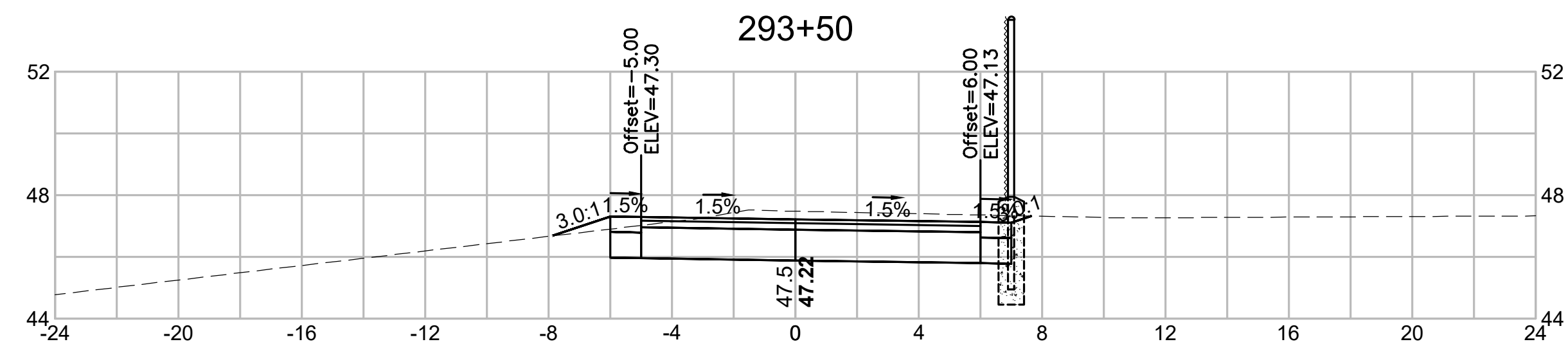
**CROSS SECTIONS - 29**



**WALTHAM  
WAYSIDE TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	114	114
PROJECT FILE NO.		17112.00	

**CROSS SECTIONS - 30**



# **ORDER OF CONDITIONS**



**Massachusetts Department of Environmental Protection**  
 Bureau of Water Resources - Wetlands  
**Extension Permit for Superseding Orders of Conditions**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:  
 316-0744  
 Provided by DEP

**A. General Information**



2021 00258819

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 Page: 1 of 2 11/30/2021 11:57 AM

**Important:**  
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



- Applicant:  
Catherine Cagle c/o City of Waltham - Planning Department  
 Name  
119 School Street, Suite 25  
 Mailing Address  
Waltham MA 02451  
 City/Town State Zip Code
- Property Owner (if different):  
Priscilla Geigis c/o Massachusetts Department of Conservation and Recreation  
 Name  
251 Causeway Street  
 Mailing Address  
Boston MA 02114  
 City/Town State Zip Code

**B. Authorization**

The Superseding Order of Conditions (or Extension Permit) issued to the applicant or property owner listed above on:

April 12, 2019 Issued by: Northeast  
 Date MassDEP Regional Office

for work at: 1265 Main St. to Beaver St. N/A N/A  
 Street Address City Assessor's Map/Plat Number Parcel/Lot Number

recorded at the Registry of Deeds for:  
Middlesex South 72475 191  
 County Book Page

Certificate (if registered land)

is hereby extended until: April 12, 2025 \_\_\_\_\_  
 Date Date the Superseding Order was last extended (if applicable)

This date can be no more than 3 years from the expiration date of the Superseding Order of Conditions or the latest extension. Only unexpired Superseding Orders of Conditions or Extension may be extended.

The applicant must send a copy of this Extension Permit to the Conservation Commission and the property owner, if applicable.

Issued by Massachusetts Department of Environmental Protection Northeast  
 Section Chief, Wetlands Program Signature Jill Provencal Regional Office  
Jill Provencal November 19, 2021  
 Section Chief, Wetlands Program Printed Name Date

*Catherine Cagle, Planning Director*  
 610 main st. - CITY HALL  
 Planning Dept.  
 WALTHAM, MA 02452



**Massachusetts Department of Environmental Protection**

Bureau of Water Resources - Wetlands

**Extension Permit for Superseding Orders of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

316-0744

Provided by DEP

**C. Recording Confirmation**

The applicant shall record this document in accordance with General Condition 9 of the Superseding Order of Conditions (see below), complete the form attached to this Extension Permit, have it stamped by the Registry of Deeds, and return it to the MassDEP Regional Office.

Note: General Condition 9 of the Superseding Order of Conditions requires the applicant, prior to commencement of work, to record the final Order (or in this case, the Extension Permit for the Superseding Order of Conditions) in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, it shall be noted in the Registry's Granter Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, it shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done.

Detach this page and submit it to the MassDEP Regional Office prior to the expiration of the Superseding Order of Conditions subject to this Extension Permit.

To:

Northeast  
MassDEP Regional Office

Please be advised that the Extension Permit to the Superseding Order of Conditions for the project at:

1265 Main St. to Beaver St., Waltham, MA  
Project Location

316-0744  
DEP File Number

has been recorded at the Registry of Deeds of:

Middlesex South  
County

for:

Property Owner

and has been noted in the chain of title of the affected property in accordance with General Condition 8 of the original Superseding Order of Conditions on:

Date

Book

Page

If recorded land the instrument number which identifies this transaction is:

Instrument Number

If registered land, the document number which identifies this transaction is:

Document Number

Signature of Applicant

815

RECEIVED

APR 24 2019

PLANNING DEPARTMENT



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Page: 1 of 15 04/18/2019 02:34 PM



**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection – Wetlands Program  
**Superseding Order of Conditions**  
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

MassDEP File #

316-0744

**A. General Information**

1. From: Northeast Regional Office  
Massachusetts Department of Environmental Protection (MassDEP/the Department)

2. This issuance is for (check one):  
a.  Superseding Order of Conditions  
b.  Amended Superseding Order of Conditions

3. To: Applicant:

Catherine Cagle

a. First Name, Last Name

b. Company

71765-96

c/o City of Waltham – Planning Department

c. Organization

19 School Street, Suite 25

d. Mailing Address Line 1

Waltham

e. City/Town

MA

f. State

02451

g. Zip Code

4. Property Owner (if different from applicant):

Priscilla

a. First Name

Geigis

b. Last Name

Massachusetts Department of Conservation and Recreation

c. Organization

251 Causeway Street

d. Mailing Address Line 1

Boston

e. City/Town

MA

f. State

02114

g. Zip Code

5. Project Location:

1265 Main Street to Beaver Street

a. Street Address

Waltham

b. City/Town

N/A (MA Central Railroad right of way)

c. Assessors Map/Plat Number

N/A (MA Central Railroad right of way)

d. Parcel/Lot Number

Latitude and Longitude, if known:

e. Latitude

f. Longitude



**A. General Information (cont'd)**

6. Property recorded at the Registry of Deeds (attach additional information if more than one parcel):

<u>Middlesex South</u>	
a. County	b. Certificate (if registered land)
<u>13156</u>	<u>34</u>
c. Book	d. Page

7. Dates: August 22, 2018      October 3, 2018      November 28, 2018  
 a. Date NOI Received      b. Date Local Order Issued      c. Date of SOC Site Visit

8. Final Approved Plans and Other Documents (attach additional plans or document references):

<u>"City of Waltham, Plan and Profile of Wayside Trail in the City of Waltham"</u>	
a. Plan Title	
<u>PARE Corporation</u>	<u>Amy J. Archer, P.E. No. 50439</u>
b. Prepared By	c. Signed and Stamped By
<u>March 31, 2019</u>	<u>Various</u>
d. Final Revision Date	e. Scale
<u>See Condition #20</u>	
f. Additional Plan or Document Title	g. Date

**B. Findings**

1. Findings pursuant to the Massachusetts Wetlands Protection Act - Following the review of the above-referenced Notice of Intent and based on the information provided in this application, the Department finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act. Check all that apply:

- |   |  |   |
|---|--|---|
| a. <input checked="" type="checkbox"/> Public Water Supply  | b. <input type="checkbox"/> Land Containing Shellfish          | c. <input checked="" type="checkbox"/> Prevention of Pollution        |
| d. <input checked="" type="checkbox"/> Private Water Supply | e. <input checked="" type="checkbox"/> Fisheries               | f. <input checked="" type="checkbox"/> Protection of Wildlife Habitat |
| g. <input checked="" type="checkbox"/> Groundwater Supply   | h. <input checked="" type="checkbox"/> Storm Damage Prevention | i. <input checked="" type="checkbox"/> Flood Control                  |

2. This Department hereby finds the project, as proposed, is (check one):

**Approved** subject to:

- a.  the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. The Department orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



**B. Findings (cont'd)**

**Inland Resource Area Impacts:** Check all that apply below. (For Approvals Only)

3.  Buffer Zone Impacts: Shortest distance between limit of project disturbance and wetland boundary (if available) \_\_\_\_\_ a. linear feet

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	_____ a. linear feet	_____ b. linear feet	_____ c. linear feet	_____ d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
6. <input checked="" type="checkbox"/> Land Under Waterbodies and Waterways	4 Perm/735 temporary _____ e. c/y dredged	4 Perm/735 temporary _____ f. c/y dredged	_____ c. square feet	_____ d. square feet
7. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding Cubic Feet Flood Storage	_____ a. square feet 3139.83 _____ e. cubic feet	_____ b. square feet 3139.83 _____ f. cubic feet	_____ c. square feet 15708.33 _____ g. cubic feet	_____ d. square feet 15708.33 _____ h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding Cubic Feet Flood Storage	_____ a. square feet _____ c. cubic feet	_____ b. square feet _____ d. cubic feet	_____ e. cubic feet	_____ f. cubic feet
9. <input checked="" type="checkbox"/> Riverfront area	119,525 A. total sq. feet 83,255 _____ c. square feet 36,270 _____ g. square feet	_____ b. total sq. feet 83,255 _____ d. square feet 36,270 _____ h. square feet	_____ e. square feet	_____ f. square feet _____ i. square feet _____ j. square feet

**Coastal Resource Area Impacts:** Check all that apply below. (For Approvals Only)

10.  Buffer Zone Impacts: Shortest distance between limit of project disturbance and wetland boundary (if available) \_\_\_\_\_ a. linear feet

11.  Designated Port Areas - Indicate size under Land Under the Ocean, below

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
12. <input type="checkbox"/> Land Under the Ocean	_____ a. square feet _____ c. c/y dredged	_____ b. square feet _____ d. c/y dredged		

13.  Barrier Beaches - Indicate size under Coastal Beaches and/or Coastal Dunes below.





**B. Findings (cont'd)**

- |  |                             |                             |                             |                             |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 14. <input type="checkbox"/> Coastal Beaches   | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | a. square feet              | b. square feet              | c. c/y                      | d. c/y nourish.             |
| 15. <input type="checkbox"/> Coastal Dunes   | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | a. square feet              | b. square feet              | c. c/y                      | d. c/y nourish.             |
| 16. <input type="checkbox"/> Coastal Banks   | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. linear feet              | b. linear feet              |                             |                             |
| 17. <input type="checkbox"/> Rocky Intertidal Shores   | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. square feet              | b. square feet              |                             |                             |
| 18. <input type="checkbox"/> Salt Marshes  | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | a. square feet              | b. square feet              | c. square                   | d. square feet              |
| 19. <input type="checkbox"/> Land Under Salt Ponds   | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. square feet              | b. square feet              |                             |                             |
|  | <u>                    </u> | <u>                    </u> |                             |                             |
|  | c. c/y dredged              | d. c/y dredged              |                             |                             |
| 20. <input type="checkbox"/> Land Containing Shellfish   | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | a. square feet              | b. square feet              | c. square                   | d. square feet              |
| 21. <input type="checkbox"/> Fish Runs - Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. c/y dredged              | b. c/y dredged              |                             |                             |
| 22. <input type="checkbox"/> Land Subject to Coastal Storm Flowage   | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. square feet              | b. square feet              |                             |                             |
| 23. <input type="checkbox"/> Riverfront area   | <u>                    </u> | <u>                    </u> |                             |                             |
|  | a. total sq. feet           | b. total sq. feet           |                             |                             |
| Sq feet within 100 feet  | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | c. square feet              | d. square feet              | e. square                   | f. square feet              |
| Sq feet between 100-200 feet   | <u>                    </u> | <u>                    </u> | <u>                    </u> | <u>                    </u> |
|  | g. square feet              | h. square feet              | i. square                   | j. square feet              |

**C. General Conditions Under Massachusetts Wetlands Protection Act**

**Brief Project Description of Permitted Activities:**

The construction of an approximately 2.74 mile paved shared use path.



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

(only applicable to approved projects)

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
  - a. the work is a maintenance dredging project as provided for in the Act; or
  - b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Superseding Order of Conditions, this Amended Superseding Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Superseding Order will expire on \_\_\_\_\_ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Department on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,  
"Massachusetts Department of Environmental Protection" [or, "MA DEP"]  
"File Number 316-0744 "



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before DEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Department of Environmental Protection.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Department in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.
17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Department.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Department, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

**NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS**

19. **The work associated with this Order (the “Project”) is (1)  is not (2)  subject to the Massachusetts Stormwater Standards. If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**
  - a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
- i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
  - ii.* as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
  - iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;
  - iv.* all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
  - v.* any vegetation associated with post-construction BMPs is suitably established to withstand erosion.
- c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 19(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMPs Operation and Maintenance Plan ("O&M Plan") and certifying the following: *i.*) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and *ii.*) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.
- d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.
- e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, and acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 19(f) through 19(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 19(f) through 19(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.
- f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
  1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

**Special Conditions (See attached sheet(s) or below for additional Special Conditions numbered 20 through 41.**

See attached

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### D. Findings Under Municipal Wetlands Bylaw or Ordinance

To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no jurisdiction to supersede the local by-law order.

### E. Issuance

This Order is valid for three years from the date of issuance, unless otherwise specified as a special condition pursuant to General Conditions # 4 or # 6.

Issued by: **Massachusetts Department of Environmental Protection:**

Northeast  
 MassDEP Regional Office  
*Rachel Freed*  
 Deputy Regional Director Signature  
 Rachel Freed  
 Deputy Regional Director Printed Name

*April 12, 2019*  
 Date

This Order is issued to the applicant as follows:

by Hand delivery on

by certified mail on:

Date

*4.12.19*  
 Date – Certified Mail #



## F. Appeal Rights and Time Limits

The applicant, the landowner, the conservation commission, any person aggrieved by the Superseding Order, Determination or other Reviewable Decision as defined at 310 CMR 10.04, who previously participated in the proceedings leading to this Reviewable Decision, the conservation commission, or any ten (10) residents of the city or town where the land is located if at least one resident was previously a participant in the permit proceeding, are hereby notified of their right to appeal this Reviewable Decision pursuant to M.G.L. c.30A, § 10, provided the request is made by certified mail or hand delivery to the Department, along with the appropriate filing fee and a MassDEP Fee Transmittal Form within ten (10) business days of the date of issuance of this Superseding Order or Determination, and addressed to:

Case Administrator  
Office of Appeals and Dispute Resolution  
Massachusetts Department of Environmental Protection  
One Winter Street, 2<sup>nd</sup> Floor  
Boston, MA 02108

A copy of the request (hereinafter also referred to as Appeal Notice) shall at the same time be sent by certified mail or hand delivery to the Conservation Commission, the applicant, the person that requested the Superseding Order or Determination, and the issuing office of the MassDEP at:

MassDEP – Northeast Region  
Wetlands Program  
205B Lowell Street  
Wilmington, MA 01887

In the event that a ten-resident group requested the Superseding Order or Determination, the Appeal Notice shall be served on the designated representative of the ten resident group, whose name and contact information is included in this Reviewable Decision (when relevant).

### Contents of Appeal Notice

An Appeal Notice shall comply with the Department's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6) and 310 CMR 10.05(7)(j), and shall contain the following information:

- a) the MassDEP Wetlands File Number, name of the applicant, landowner if different from applicant, and address of the project;
- b) the complete name, mailing address, email address, and fax and telephone numbers of the party filing the Appeal Notice; if represented by consultant or counsel, the name, fax and telephone numbers, email address, and mailing address of the representative; if a ten residents group, the same information for the group's designated representative;
- c) if the Appeal Notice is filed by a ten (10) resident group, then a demonstration of participation by at least one resident in the previous proceedings that led to this Reviewable Decision;
- d) if the Appeal Notice is filed by an aggrieved person, then a demonstration of participation in the previous proceeding that lead to this Reviewable Decision and sufficient written facts to demonstrate status as a person aggrieved;
- e) the names, telephone and fax numbers, email addresses, and mailing addresses of all other interested parties, if known;



## **F. Appeal Rights and Time Limits (cont.)**

- f) a clear and concise statement of the alleged errors contained in the Department's decision and how each alleged error is inconsistent with 310 CMR 10.00 and does not contribute to the protection of the interests identified in the Wetlands Protection Act, M.G.L. c.131, § 40, including reference to the statutory or regulatory provisions that the party filing the Appeal Notice alleges has been violated by the Department's Decision, and the relief sought, including any specific desired changes to the Department's decision;
- g) a copy of the Department's Reviewable Decision that is being appealed and a copy of the underlying Conservation Commission decision if the Reviewable Decision affirms the Conservation Commission decision;
- h) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant and the conservation commission; and
- i) if asserting a matter that is Major and Complex, as defined at 310 CMR 10.04(1), a statement requesting that the Presiding Officer make a designation of Major and Complex, with specific reasons supporting the request.

### **Filing Fee and Address**

A copy of the Appeal Notice along with a MassDEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100) must be mailed to:

Commonwealth of Massachusetts  
Department of Environmental Protection  
Commonwealth Master Lockbox  
P.O. Box 4062  
Boston, Massachusetts 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority. The Department may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.





**SUPERSEDING ORDER OF CONDITIONS**  
**DEP File Number 316-0744**

**Special Conditions**

20. All work shall conform with the following plans, reports and special conditions:

- a) "City of Waltham, Plan and Profile of Wayside Trail in the City of Waltham," prepared by PARE Corporation, signed and stamped by Amy J. Archer, P.E., final revision date March 31, 2019.
- b) "Long Term Pollution Prevention Plan, Wayside Trail, Waltham, Massachusetts," prepared by PARE Corporation, dated August 2018.
- c) "Operation and Maintenance Manual, Wayside Trail, Waltham, Massachusetts," prepared by PARE Corporation, dated August 2018.
- d) "Stormwater Management Report, Wayside Trail, Waltham, Massachusetts," prepared by PARE Corporation, dated August 2018.

21. This Superseding Order supersedes all previous Orders issued for this project, DEP File#316-0744. All work shall conform to the Notice of Intent and plans and documentation referenced above unless otherwise specified in this Superseding Order. In case of a conflict, the Conditions of this Superseding Order shall prevail.

22. A copy of this Superseding Order shall be included in all construction contracts and shall supersede any conflicting requirements.

23. A copy of this Superseding Order as well as the plans and reports referenced in Condition #20 shall be available on site while activities regulated by this Order are being performed. In addition to the owners, all contractors and subcontractors shall be held responsible for compliance with this Superseding Order.

24. No work shall commence on-site until all appeal periods have elapsed and this Superseding Order of Conditions has been recorded with the Registry of Deeds and MassDEP has been formally notified via the form provided at the end of this Order.

25. This Superseding Order shall apply to any successor or assigns in interest or control and any other party engaging in activity on the property identified in the Notice of Intent.

26. Any proposed or executed change in the plans approved under this Superseding Order shall require the applicant to file a new Notice of Intent with the conservation commission or to inquire of MassDEP in writing whether the change is substantial enough to require a new filing. A copy shall be sent at the same time to the Waltham Conservation Commission. Any errors in the plans or information submitted by the applicant shall be considered changes and the above procedures shall be followed.

27. Members and agents of MassDEP and the Waltham Conservation Commission shall have the right to enter and inspect the premises to evaluate compliance with the conditions contained in this Superseding Order, and may require the submittal of any data deemed necessary by MassDEP for that evaluation.

28. The applicant shall employ an Environmental Monitor (EM) to oversee all activities located on the project site, including but not limited to supervision of the maintenance and replacement of all erosion controls and stormwater management BMP. The Environmental Monitor shall be responsible for ensuring compliance with this SOC during construction. The applicant shall provide MassDEP and the Waltham Conservation Commission with the name(s), address(es) and telephone number(s) of the Environmental Monitor and his or her alternate prior to the start of work.
29. The Environmental Monitor shall inspect erosion controls on a weekly basis and after any storm events and shall have the authority to modify existing controls or require additional controls if he or she deems it necessary. The Environmental Monitor shall immediately control any erosion problems that occur on the site and shall immediately notify MassDEP and the Waltham Conservation Commission if any sediment discharges to a wetland resource area. MassDEP reserves the right to require additional erosion control.
30. The Environmental Monitor shall report in writing to MassDEP and the Waltham Conservation Commission once every month while construction is underway within the 100-foot buffer zone, Land Under Water and Bordering Land Subject to Flooding to confirm that all activities are in compliance with the conditions of this SOC. The status report shall at a minimum include a description of any erosion control problems, progress on construction and grading, changes in construction schedule, actions taken to address problems and any other recommendations for site management.
31. Prior to the start of work, the applicant shall submit a construction sequence to MassDEP and the Waltham Conservation Commission for approval by MassDEP. The construction sequence shall include a plan showing the location of any material stockpile areas and any temporary, construction period, stormwater BMPs.
32. Prior to the start of work, erosion controls consisting of silt fence and staked haybales shall be installed between the limits of work and the wetland resource areas. These barriers shall serve as the limit of disturbance and shall be installed as close to the work area as possible. Erosion controls shall remain in place until MassDEP approves their removal.
33. No soil or other materials shall be stockpiled within 100 feet of wetland resource areas.
34. Upon completion of construction, all exposed soils shall be seeded with appropriate vegetation or otherwise stabilized by a method acceptable to MassDEP and Waltham Conservation Commission.
35. At no time during or after construction shall fill or other materials be placed, slump into or fall beyond the limit of grading as shown on the plan. The Environmental Monitor shall be responsible for inspecting and maintaining all slopes and shall immediately notify MassDEP and the Waltham Conservation Commission if slumping, erosion or encroachment occurs.
36. Excess soil, rock and debris excavated or generated during the course of this project shall be removed from the site and disposed of in a legal manner. Records of the destination of all materials, including excess fill and loam, to be removed from the site shall be kept on file and shall be provided to the MassDEP and the Waltham Conservation Commission upon request.

37. Storing, servicing or cleaning of equipment, including but not limited to fueling, changing, adding or applying lubricants or hydraulic fluids, or washing/rinsing of trucks or equipment, shall be performed outside the 100-foot buffer zone.
38. During work on this project, there shall be no discharge or spillage of fuel, oil or other pollutants, including sediments, onto any part of the site. The applicant shall take all reasonable precautions to prevent the release of pollutants by ignorance, accident or vandalism.
39. The stormwater management BMP shall be managed and maintained in accordance with the project's Operation and Maintenance Plan (referenced in Condition #20) and the conditions contained in this Superseding Order. This Condition shall remain in effect in perpetuity and shall be recorded on the Certificate of Compliance.
40. The application of sand or de-icing materials is prohibited along sections of the shared use path within areas located within the buffer zone to Bordering Vegetated Wetlands and Inland Bank, Riverfront Area and Bordering Land Subject to Flooding.
41. Upon completion of the project, the applicant shall request a Certificate of Compliance from MassDEP and shall submit the following information with the request:
- a) A written statement by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts certifying compliance with the approved plans referenced above and this Superseding Order of Conditions and setting forth deviations, if any exist;
  - b) An as-built site plan prepared by a registered land surveyor or registered professional engineer showing location and grades of the project, including but not limited to: the constructed shared-use path, stormwater BMP, and site grading on the project site.

# **APPENDIX A**

## TECHNICAL SHEET

# ECO-DISPLAY COMPACT

The Eco-DISPLAY Compact is a real-time bike and pedestrian count data display that can be connected to any Eco-Counter Sensor\*. Pedestrians and/or cyclists counts can be displayed in addition to dynamic text. Two lines of information can be displayed on each side. For example, cumulative daily, monthly and yearly counts can be displayed, alternating with dynamic text messages. Both sides are fully customizable.

- + Lightweight & versatile
- + Customizable display
- + Robust and vandal-proof



## Material Characteristics

<b>Dimensions</b>	<ul style="list-style-type: none"><li>+ Front panels: 61.5 x 61.5cm (24.20" x 24.20")</li><li>+ Display with front panels and mounting bracket: 72 x 61.5 x 15.5cm (28.5" x 24.20" x 6")</li></ul>
<b>Weight</b>	<ul style="list-style-type: none"><li>+ ≈ 16.5kg (36.35lbs) with front panels</li><li>+ ≈ 12kg (26.5lbs) without front panels</li></ul>
<b>Display Surface</b>	<ul style="list-style-type: none"><li>+ RGB LED lights - 16 colors</li><li>+ Pixel pitch: 5mm (0.2")</li><li>+ Automatic adjustment to ambient light levels</li><li>+ Display surface size: 48 x 16cm (19" x 6,30")</li></ul>
<b>Temperature Resistance</b>	- 30 °C / + 50 °C (-22 °F to 120 °F)
<b>Waterproofness</b>	IP41
<b>Power Supply</b>	Client must provide 230/110VAC power supply
<b>Power Consumption</b>	<ul style="list-style-type: none"><li>+ Single-sided: Max. 45W</li><li>+ Double-sided: Max. 90W</li></ul>
<b>Communication</b>	TCP/IP (Cellular 3G/4G or Ethernet 100 Mbps), API REST, OPCUA server



## General Characteristics

<b>Installation</b>	Installation on flat surface or post
<b>Counter compatibility</b>	Compatible with any Eco-Counter sensor*
<b>Connection to the Sensor</b>	Wired connection to the sensor - CAN protocol
<b>Wind Resistance</b>	Zone 5 according to NV65 standard
<b>Frame Color</b>	RAL 9005
<b>Design</b>	Fully customizable
<b>Settings</b>	Embedded web server for maintenance and sensor calibration on site or remotely (through WiFi or Ethernet connection)

\* Except CITIX-IR

Eco-DISPLAY Compact on a post



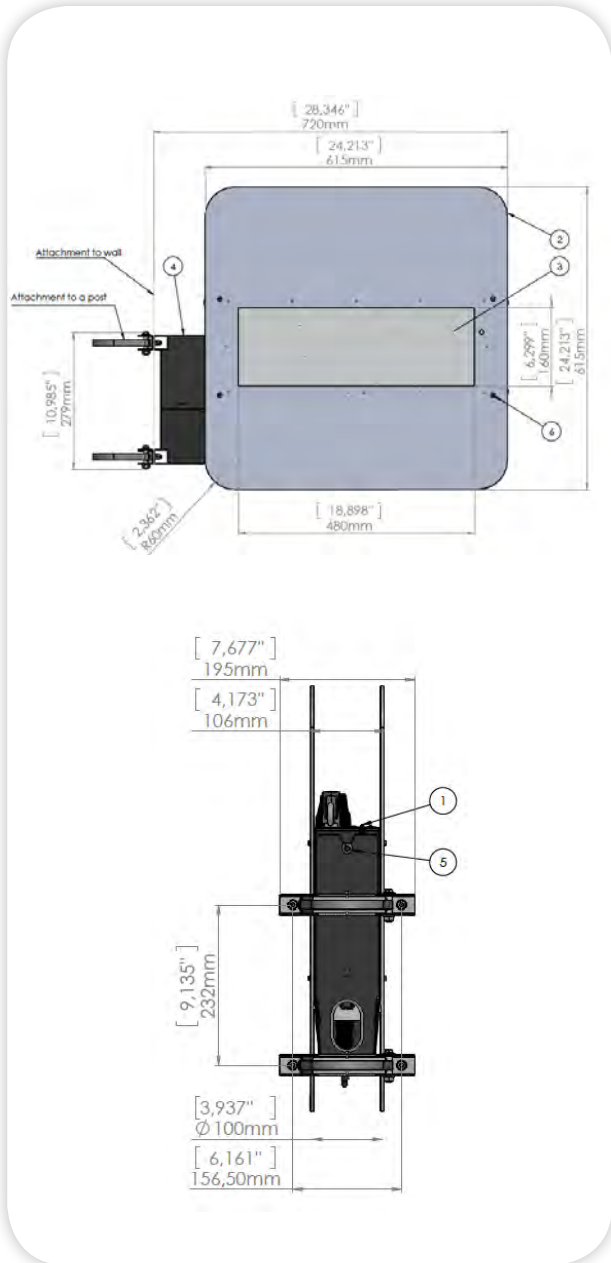
Eco-DISPLAY Compact on a wall



TECHNICAL SHEET

# ECO-DISPLAY COMPACT

## Dimensions



## Installation Examples



Europe | Worldwide  
4 rue Charles Bourseul | 22300 Lannion, France  
+33 2 96 48 48 81

North America  
604-3981 Boul. St-Laurent | Montréal, QC | H2W 1Y5, Canada  
Direct: +1-514-849-9779 | Toll free: 1-866-518-4404

[www.eco-counter.com](http://www.eco-counter.com)

# **APPENDIX B**



## APPENDIX B

Preservation of Historic Resources along Waltham Community Path  
Waltham Historical Commission  
November 24, 2021

There are many historic resources along the proposed route of the Waltham Community Path, which are related to its history as the route of the Massachusetts Central Railroad. In addition to the Linden Street truss bridge and the Chester Brook timber trestle, which must be preserved, there are many other resources that deserve to be protected and preserved, and even, when possible, rehabilitated, so that they may function as exhibits of interest along the route. Some of these resources lie on the tracks, and should be carefully moved to the side, if they cannot be incorporated in the path, itself, while others lie off the tracks and need to be protected from inadvertent damage by heavy equipment. The resources have been marked with green tape, and have been listed in a complete inventory, along with their gps coordinates and pictures, which is available from the Waltham Historical Commission upon request. Members of the Commission are also available to walk the route with applicants to point out the resources, and applicants are strongly encouraged to do this. The most important resources are as follows (distances given are approximate):

- Rail Rest (3 concrete bases in a row, about 10 feet apart) - 683 yards east of Linden St. (410 yards west of Beaver St.), north side – Leave in place and protect (add rail across top, if possible)
- "R" Post (concrete post) - 683 yds. east of Linden St., south side – Leave in place and protect
- "XC" Post (concrete post) - 553 yds. east of Linden St., south side – Leave in place and protect
- Boundary Marker Post (concrete post) - 500 yds. east of Linden St. by brook, north side – Leave in place and protect
- Tell-tail (tall metal post and overhead boom) - 31 yds. east of east end of Linden St. bridge, north side – Leave in place and protect (extra care needed overhead)
- Tell-tail (tall metal post and overhead boom) - 35 yds. west of west end of Linden St. bridge, south side – Leave in place and protect (extra care needed overhead)
- Signal Light Tower Pole - 92 yds. west of Linden St. bridge, south side – Leave in place and protect
- "XC" Post (concrete post) - 20 yds. west of Middlesex circle road, north side – Leave in place and protect
- Switch Apparatus (vertical metal shaft and handle) and siding - 35 yds. west of Lyman St., north side – Leave in place and protect, or carefully separate from tracks and move to side; leave all the siding rails in place, if possible.
- "XC" Post (concrete post) – opposite east end of City yard, south side – Leave in place and protect
- "XC" Post (concrete post) – west end of City yard, north side – Leave in place and protect

## APPENDIX B

- Bumper Stop – just east of Bacon St. – Leave in place and protect, or carefully separate from tacks and move to side. There is a rail section to remain on site. (sheet #9.)  
Approximately 30' of track east of Bacon Street that has an bumper stop. The Contractor shall Preserve and Protect the bumper stops East of Bacon Street off the existing rails and ties
- "XC" Post (concrete post) - 130 yds. west of Hammond Street, on north – Leave in place and protect
- "XC" Post (concrete post) - 10 yds. east of Prospect Hill Road, on south – Leave in place and protect
- Rail Rest (3 concrete bases in a row, about 10 feet apart) - 53 yds. west of Prospect Hill Road, north side, among fallen logs – Leave in place and protect all three concrete bases, expose more of the sides of the bases and add rail across tops, if possible
- Cattle Pass (granite-block sided culvert under tracks packed with gravel and debris) - 70 yds. west of Prospect Hill Road, exposed on south side – Leave in place, but be careful not to crush, expose more of granite block walls, if possible (Be careful not to crush active culvert that carries Masters Brook under it)
- Speed Limit Sign Post (concrete post with sign) - 55 yds. west of Lunda St., south side – Leave in place and protect
- "R" Post (concrete post) - 77 yds. west of Lunda St., south side – Leave in place and protect
- "XC" Post (concrete post) - 250 yds. west of Lunda St., south side – Leave in place and protect