Request for Proposal

For

Professional Qualifications

For

THE

PUBLIC INVOLVEMENT AND PRELIMINARY DESIGN OF THE REHABILITATION/REPLACEMENT OF THE RIVERFRONT BOARDWALK

As described herein

Statement of Qualifications

Accepted until April 8, 2021

Office of the City Engineer

2310 Second Street

Cuyahoga Falls, Ohio 44221

REQUEST FOR PROPOSAL

For

PROFESSIONAL QUALIFICATIONS

DEVELOPMENT OF A PUBLIC INVOLVEMENT STRATAGY AND PRELIMNARY ENGINEERING FOR THE REHABILITATION/REPLACEMENT OF THE RIVERFRONT BOARDWALK

I. INTRODUCTION

The City of Cuyahoga Falls is seeking to rehabilitate the Riverfront Boardwalk, located along the west bank of the Cuyahoga River in Downtown Cuyahoga Falls. Alternatives for this project are as described in a study prepared by Palmer Engineering in February 2020.

II. BASIC SCOPE OF SERVICES

The basic scope of services shall include providing tools, materials and labor to perform the following work:

- Develop a matrix of the study options and complete a preferred alternative analysis. Factors should include, but not be limited to, feasibility of construction, costs (both initial and future maintenance), environmental impacts, ADA compliance, quality of life, social justice, etc.

- Create a public engagement strategy for the project which will encourage stakeholders to become involved and provide input.

- Present the results of the alternative analysis in a comprehensive and coherent method that can be presented to the public for input and comment.

- Preform preliminary engineering and design based on the results of the public involvement. This work will include forecasting of budget costs and schedule.

III. OBJECTIVE

The objective is to request a Statement of Qualifications (SOQ's) to select a qualified firm to complete the public involvement services required to develop a preferred alternative for the Riverfront Boardwalk project. Because the services are professional services, because qualified consulting engineering efforts could reduce the overall project cost and because the quality of the public improvements depends on the qualifications of the consultant, selection of the engineering consulting firm will be based upon a predetermined set of weighted criteria.

IV. EVALUATION CRITERIA

The following are the primary evaluation criteria the City plans to utilize to select the best-qualified firm. In addition to the evaluation criteria, the city will be looking at public involvement and engagement, and design/engineering experience in boardwalk design. Selection is very subjective in many areas and the decision of the City Administration will be final and not subject to re-evaluation by the firms submitting a Statement of Qualifications.

- Responsibility and stability – such considerations as length of time firm has been in business, length of time principals have been with firm, financial responsibility, professional liability coverage, etc.
- Experience – such considerations as other similar projects completed by the firm, similar design projects completed by key personnel of the firm, support staff abilities, range of in-house capabilities, etc.
- Location – Such consideration as location of firm's office that will be responsible for project coordination, previous work in the general geographic area, key project personnel office location, etc. Lower project costs should result if limited travel expenses are required and better communication can be maintained which should result in a higher quality project.
- Quality of work – Such considerations as adequateness of material supplied to permit evaluation, evaluation, quality of presentation, cooperation, concern, etc.
- Time schedule and anticipated man-hours to complete the project.

The City will accept SOQ's until 12:00 Noon, Thursday April 8, 2021, at the Office of the City Engineer, 2310 Second Street, Cuyahoga Falls, Ohio 44221.

Each firm shall submit a total of five (5) copies of the SOQ's in a sealed envelope clearly marked on the outside "Statement of Qualifications for Professional Services for the Public Involvement of the Riverfront Boardwalk Project Plan."

The City retains the option of rejecting or accepting any Statement of Qualifications. Should a firm be selected and the City cannot negotiate a contract with the selected firm ranked best qualified, the City shall inform the firm in writing of the termination of negotiations and enter into negotiations with the firm ranked next best qualified. If negotiations again fail, the same procedure shall be followed with each next best-qualified firm selected until a contract is negotiated. However, the City retains the right to reject all SOQ's and initiate the process of obtaining SOQ's from qualified firms at a later date.

VI. Statement of Qualifications

The specific format of the Statement of Qualifications (SOQ's) shall be per the responding firm's judgment. However, shall include the following data:

1. Two-page project summary narrative defining the firm's interpretation of the scope of the project and approach to completing the goals of the.
2. Project personnel organization.
3. Firm Profile.
4. Principal Profile.
5. Technical Expertise Profile.
6. General anticipated project schedule or time line.
7. General anticipated man-hours to complete the project based on past experience.
8. Additional pertinent information

The City requests that, in addition to a general list of representative projects, responding firms select one or two of its completed projects of similar size and scope. The selected project shall be a project that has been completed for at least three years but no more than five years. A detailed description of services rendered, the name, mailing address and phone number of the client's project manager, and the name and mailing of the general contractor.

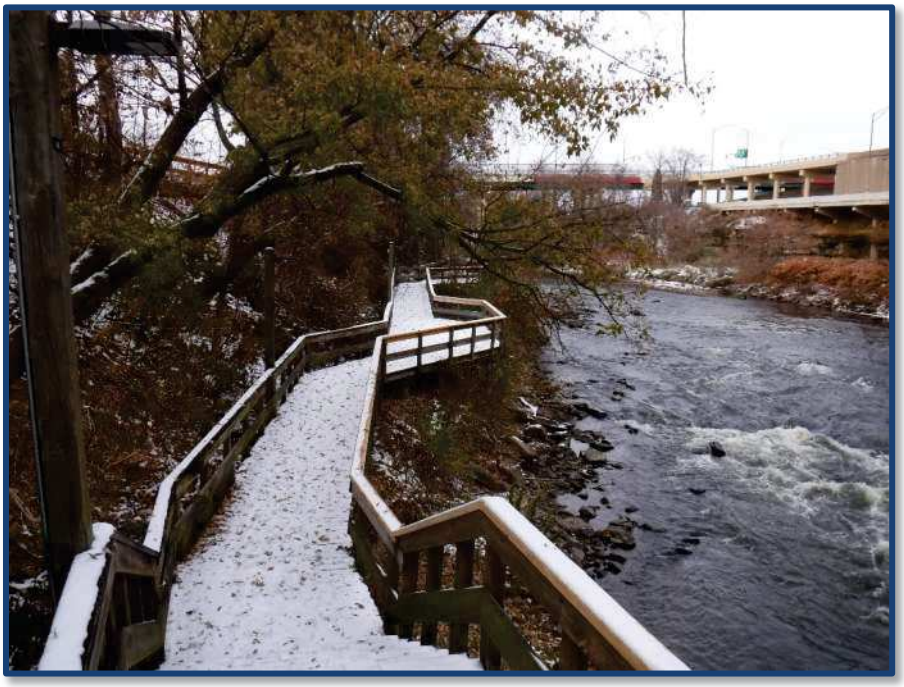
The responding firms are also requested to provide a proposed project team that will most likely work on this project. Members should include personnel from the partner down to the engineer-in-training level. Sub-professional: level employees not providing a significant role on the project do not need to be included.

A resume of each member of the team is needed and should detail relevant experience, length of service with the firm, educational background, and professional background. Sub-consultant's roles on the project should also be listed.

VII. INTERVIEWS

The City reserves the right to conduct face-to-face interviews with any, all, or none of the responding firms. In the event the City selection committee deems interviews necessary to select the best firm, the City will establish a meeting at a mutually acceptable time at City office. The City selection committee will meet key members of the firm's proposed project team. It shall be the selection committee's sole decision on whether any interviews are held and with which firms interviews are held.

CITY OF CUYAHOGA FALLS
RIVERFRONT BOARDWALK STUDY



Prepared for:

CITY OF Cuyahoga Falls
MAYOR DON WALTERS

Prepared by:

Palmer ENGINEERING

February 2020

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APPENDICES

EXECUTIVE SUMMARY

The City of Cuyahoga Falls owns and maintains a riverfront boardwalk structure running along the west bank of the Cuyahoga River, near the downtown Falls River Square area. At the request of the City, Palmer Engineering performed a field inspection of the boardwalk structure in October and November of 2019. During the inspection, pier settlement and joist hanger failures were observed which compromise the safety of the public. Due to these observations, Palmer recommended partial closure of the boardwalk in the areas of concern, and the City closed the recommended areas shortly thereafter.

Palmer also evaluated alternatives to improve the accessibility of the boardwalk for users with disabilities. Based upon this evaluation and the results of the field inspection, three conceptual alternatives were developed for consideration and potential further development. The three conceptual alternatives are briefly described below:

- **Alternative 1 – Boardwalk Rehabilitation**

  This alternative includes repair/retrofit of the settled pier foundations, slope erosion remediation, existing retaining wall stabilization, replacement of the existing decking and railings, and rebuilt stairs. In addition, the portion of the boardwalk near the amphitheater would be modified to incorporate an Americans with Disabilities Act (ADA) accessible route for approximately 200’ of the boardwalk. The estimated construction cost for this alternative is approximately $1,070,000.

- **Alternative 2 – Boardwalk Partial Replacement and Rehabilitation**

  This alternative replaces the boardwalk sections near the amphitheater with a new ADA compliant structure tying into the boardwalk sections to remain. The sections of the boardwalk remaining would be repaired as described in Alternative 1. The length of the ADA accessible portion of the boardwalk for this alternative would be approximately 285’. The estimated construction cost for this alternative is $1,206,000.

- **Alternative 3 – Boardwalk Replacement**

  This alternative replaces the full length of the existing boardwalk with a new ADA compliant structure. The estimated construction cost for this alternative is $1,641,000.

I. INTRODUCTION

The City of Cuyahoga Falls owns and maintains a riverfront boardwalk structure running for approximately 850’ along the west bank of the Cuyahoga River and extending from approximately 70’ south of Broad Boulevard to approximately 160’ south of East Portage Trail in downtown Cuyahoga Falls. An aerial view of the boardwalk location is shown below in Figure 1. The City retained Palmer Engineering to perform a field inspection of the boardwalk structure and to develop a comprehensive report based on the inspection findings and research conducted.

Figure 1 – Boardwalk Location

The purpose of this report is to document the field inspection findings, present recommended repairs for the noted deficiencies, and provide estimates of the life cycle costs associated with on-going maintenance of the boardwalk structure. The report also presents measures to offer increased accessibility to the boardwalk for users with disabilities, and compares potential rehabilitation and replacement alternatives.

II. BOARDWALK CONSTRUCTION AND HISTORY

The boardwalk was originally constructed in at least two separate phases at some point after construction of the Front Street Pedestrian Mall in 1977. Original construction plans, historic aerial imagery, and additional research were utilized to establish the age of the different boardwalk sections. Figure 2 provides a brief synopsis of the boardwalk construction and history, as well as nomenclature used throughout the rest of the report to identify the various boardwalk sections. Additional information regarding the history of the boardwalk is provided in Appendix A, while original construction plans for Sections 1 and 2 are provided in Appendix B (Note that original construction plans for the remaining sections are not available).

Figure 2 – Boardwalk Sections

LEGEND				
SECTION 1 Broad Boulevard Underpass	**SECTION 2 South Boardwalk**	**SECTION 3 Central Multi-Level Deck**	**SECTION 4 North Boardwalk**	**SECTION 5 Kayak Take-Out Platform**
Year Built: Circa 1989 (Modified 2004)	Year Built: Circa 1989	Year Built: 1980-1985	Year Built: 1980-1985	Year Built: Circa 2016
Age: 31 years	Age: 31 years	Age: 35-40 years	Age: 35-40 years	Age: 4 years
Construction: Pressure treated timber boardwalk and precast concrete double tee supported on concrete piers	Construction: Pressure treated timber boardwalk, decks, and pavilion structure on concrete piers	Construction: Pressure treated timber deck on concrete piers	Construction: Pressure treated timber boardwalk on timber piles	Construction: Pressure treated timber deck on timber piles and concrete footings

The figures below show the typical construction of each section of the existing boardwalk and the nomenclature used in discussion of the inspection findings. The concrete piers in Sections 1 and 2 are 16" in diameter and either bear directly on exposed rock or on the in-situ soils. The original construction plan detail for the footings in this area is shown in Figure 4. The plans also state that the piers for the pavilion structure are to bear in rock. The foundations for Section 3 are unknown, but it appears they consist of spread footings, based on the elevation view of Section 3 shown in the original construction plans for Sections 1 & 2. The foundations for Section 4 are also unknown, but it appears that timber piles were advanced to refusal on bedrock (A few piles are supported on concrete). The timber piles for Section 5 bear on concrete footings sitting on bedrock.

Figure 3 - Section 1 and 2 Timber Boardwalk

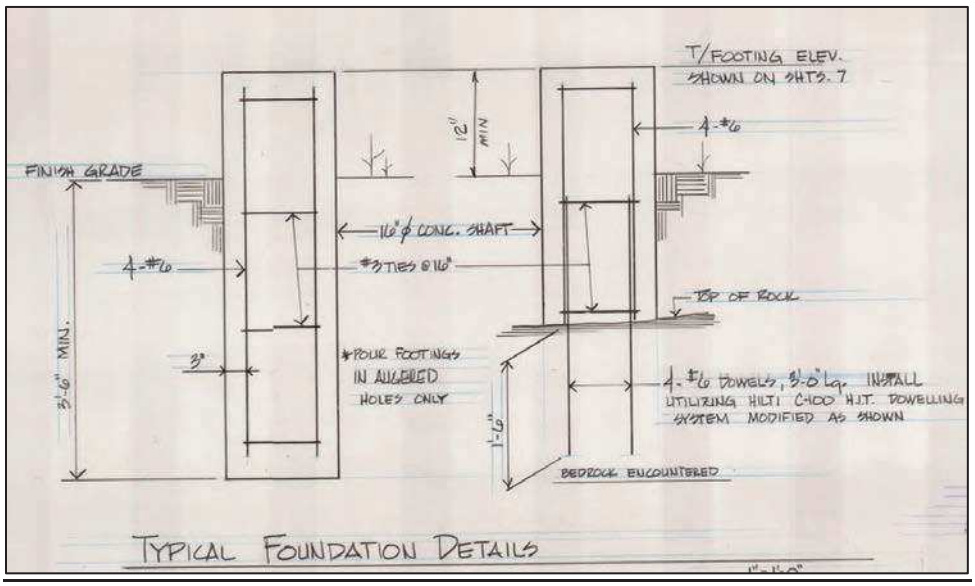


Figure 4 - Section 1 and 2 Foundation Details

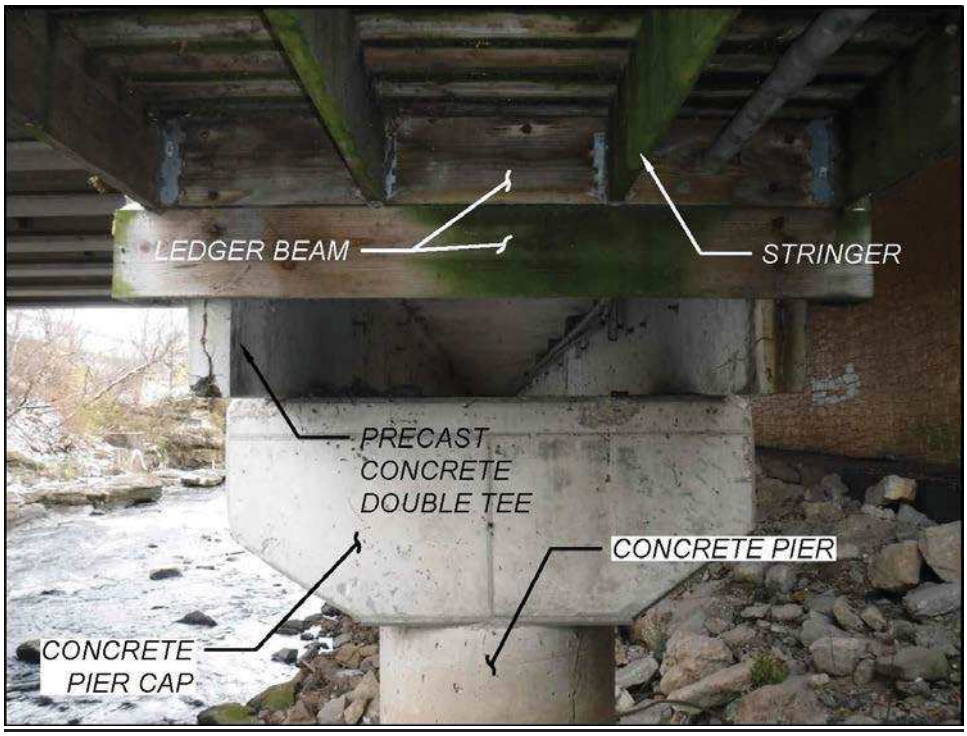


Figure 5 – Section 1 Precast Concrete Double Tee

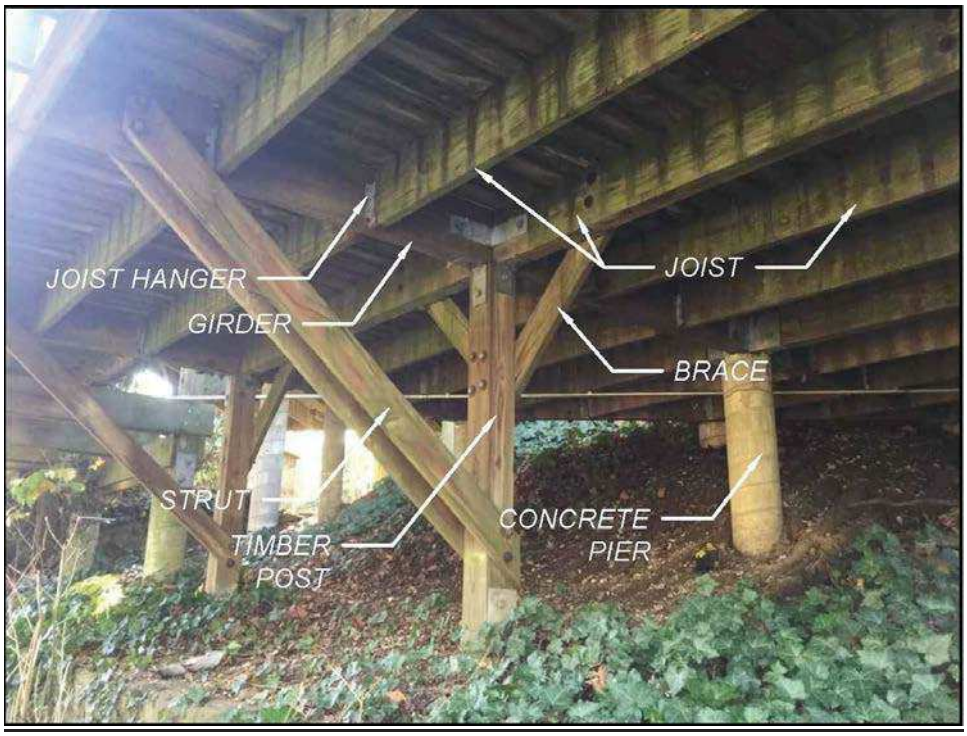


Figure 6 – Section 2 & 3 Timber Deck

Figure 7 – Section 4 Timber Boardwalk

Figure 8 – Section 5 Timber Deck

III. INSPECTION PROCEDURE

A field inspection of the boardwalk structure was performed over 5 days in October and November of 2019. The inspection included a visual review of the visible portions of the boardwalk structure (both above and below the deck), sounding and probing of accessible structural members, and limited field measurements to supplement existing plan information and develop repair quantities.

IV. INSPECTION FINDING SUMMARY

A summary of the inspection findings is presented below, while photos of each finding and additional discussion are presented in Appendix C. A critical inspection finding identifies a condition that poses a substantial threat to the safety of the public. Due to the critical findings of pier settlement, slope erosion, and joist hanger deterioration, Palmer requested the City close the entirety of Section 2 and portions of Section 3. These sections have been closed by the City as requested. Palmer recommends these sections remain closed until these conditions have been addressed. Repair and replacement alternatives to address these conditions are provided in Section VI.

Critical Findings:

- Slope erosion, existing stone retaining wall failure, and vegetative growth has compromised up to 10 pier foundations in Section 2, inducing settlement of the piers. The settlement of the piers has caused a complete loss of support for the boardwalk in two locations and compromises the safety of the boardwalk in Section 2 (Inspection Findings 1 through 6). The piers exhibiting settlement appear to bear only on the in-situ soils and do not appear to extend to bedrock.
- Rotation of existing stone retaining walls has caused the walls to contact piers in Section 2, introducing unintended lateral loading on the piers (Inspection Findings 2 and 7).
- Concrete deterioration has reduced the bearing area of a pier supporting the boardwalk near the north end of the observation deck (Inspection Finding 8).
- Corroded and completely failed joist hangers were noted throughout the structure, particularly in Sections 2 and 3. The failures compromise the safety of the boardwalk in Section 2 and portions of Section 3. (Inspection Finding 9).
- Deterioration of existing stone walls in Section 2 has compromised the stability of the walls and the uphill slopes retained by the walls (Inspection Finding 10).

Additional Findings:

- Timber railroad ties and concrete blocks appear to have been used to address slope erosion at the base of a pier column in Section 2. No discernable settlement was observed at this pier (Inspection Finding 11).

- The stair stringers throughout the structure typically exhibit cracking and checking near the connection of the front tread to the stringer, leading to loose stair treads (Inspection Finding 12).
- Anchor bolts and fasteners throughout the structure exhibit varying degrees of corrosion (Inspection Finding 13).
- In Section 3, 4 concrete piers are cracked through the entire section (Inspection Finding 14).
- In Section 3, 8 braces and 1 strut are cracked at the connection point (Inspection Finding 15).
- In Section 5, rot was observed at 4 timber piles above the tie-down connection (Inspection Finding 16).
- Splits up to 3" deep were noted in Section 2 on the pavilion structure roof framing members (Inspection Finding 17).
- Undermining of the stream bank and pavilion structure footings was observed (Inspection Finding 18).
- Spalling of concrete was observed at the precast double tee stems in Section 1 (Inspection Finding 19).
- Broken electrical conduit and corroded pull boxes for the boardwalk lighting were noted throughout the structure (Inspection Finding 20).
- Loose railing connections were noted at various locations (Inspection Finding 21).
- The deck and railing boards in Sections 1, 2, 3 & 4 are highly weathered and aged (Inspection Finding 22).
- Isolated railing boards and floor stringers exhibit rot and/or cracking (Inspection Finding 23).
- Cracked railing pickets at the anchor bolts are present at isolated locations throughout Sections 2 and 3 (Inspection Finding 24).

Overall Condition

SECTION 1 Broad Boulevard Underpass	SECTION 2 South Boardwalk	SECTION 3 Central Multi-Level Deck	SECTION 4 North Boardwalk	SECTION 5 Kayak Take-Out Platform
Foundations: Good	Foundations: Poor	Foundations: Good	Foundations: Fair	Foundations: Good
Substructure: Good	Substructure: Poor	Substructure: Fair	Substructure: Fair	Substructure: Poor
Deck Framing: Good	Deck Framing: Poor (Joist Connectors)	Deck Framing: Poor (Joist Connectors)	Deck Framing: Good	Deck Framing: Good
Deck Boards: Poor	Deck Boards: Poor	Deck Boards: Poor	Deck Boards: Poor	Deck Boards: Good
Stairs: Poor	Stairs: Poor	Stairs: Poor	Stairs: Fair	Stairs: Good

The boardwalk foundations in Sections 1, 3, 4 & 5 appear to be performing well. The observed foundation distress is concentrated in Section 2, and appears to be primarily related to slope and retaining wall stability issues. Additionally, the deck framing members (joists, stringers, girders, and crossbeams) appear to be performing well, with only a few locations of substantial cracking or rot.

The existing railings in Sections 1 & 2 consist of 2x4 pickets spaced to provide an approximate 6" max clear opening between pickets. The railings throughout the rest of the structure have openings greater than 6". The AASHTO LRFD Bridge Design Specifications requirements for pedestrian railings state that "the clear opening shall be such that a 6.0 inch diameter sphere shall not pass through" (Section 13.8.1). The Ohio Building Code requires that "guards shall have openings which allow passage of a sphere 4 inches in diameter from the walking surface to the required guard height" (Section 1013.3). Based on the requirements of the Ohio Building Code, the condition of the existing railings, and the need to replace deck boards, Palmer recommends replacing the railings throughout the structure with new code compliant railings.

V. BOARDWALK ACCESSIBILITY

The existing boardwalk structure and surrounding site was also studied to evaluate options to increase the accessibility of the facility for users with disabilities. Limited field measurements, existing plan information, and available topographic information (LIDAR survey) were analyzed to determine the approximate amount of elevation change over the boardwalk, and research was performed to identify applicable accessibility requirements for a boardwalk structure.

Applicable Accessibility Requirements

The 2010 ADA (Americans with Disabilities Act) Standards for Accessible Design do not provide specific guidance addressing outdoor recreational trails or boardwalk structures. The main criteria of the standards with the potential to impact boardwalk rehabilitation and replacement options is the requirement to provide an accessible route. As it pertains to a boardwalk structure without elevators or lifts, an accessible route includes walking surfaces with a running slope not steeper than 1:20 (vertical to horizontal) and ramps. ADA standards which are applicable to a boardwalk structure include the following items (note that this table is not all inclusive, but summarizes the requirements which present the greatest construction, site and cost impacts).

Feature	ADA Requirements
Slope of boardwalk walking surfaces	○ Running slope (longitudinally along the boardwalk) not be steeper than 1:20 (Section 403.3) ○ Cross slope not steeper than 1:48 (Section 403.3)
Ramps	○ Running slope not steeper than 1:12 (vertical/horizontal) (Section 405.2) (A slope of 1:8 is permissible, but such a ramp allows a maximum rise of only 3 inches) ○ Maximum rise of 30” (Section 405.6) ○ Ramps shall have landings at the top and bottom of each ramp run, 60” minimum in length (Section 405.7) ○ The above requirements combine to require 40’ of boardwalk to accomplish a change in elevation of 2.5’ feet.
Stairways (Not permitted to be part of the accessible route)	○ All steps on a flight of stairs shall have uniform riser heights and uniform tread depths (Section 504.2). ○ Risers are required to be a minimum of 4” high and a maximum of 7” high (Section 504.2). ○ Treads are required to be a minimum of 11” deep (Section 504.2). ○ Open risers are not permitted (Section 504.3).
Handrails	○ Required on stairs (Section 504.6) ○ Required on ramp runs with a rise greater than 6” (405.8) ○ Required on both sides of ramp/stairs (505.2) ○ Additional requirements are contained within Section 505.

Accessibility of Existing Boardwalk

The existing structure is accessed exclusively by stairs, with the exception of the upper deck level at Section 3. Stairs are not an acceptable component of an accessible route per the ADA standards, but may be included in a facility as long as an alternative accessible route is available. In addition to the lack of an accessible route to the majority of the boardwalk, other deficiencies with regards to the current ADA standards include the following:

- Stairs with treads less than 11" deep
- Stairs with non-uniform risers (due to settlement of foundations)
- Stairs with open risers
- Lack of ADA compliant handrails at stairs and sloping portions of the boardwalk.

For alternatives considering rehabilitation of the boardwalk, the ADA standards require areas which are altered to comply with the current standards. However, areas that are not altered are not required to be upgraded to current standards.

Evaluation of Potential Improvements

Addressing the current deficiencies in the stairs and installing the required handrails is relatively straightforward and could be easily accomplished within the context of the existing structure. However, providing an accessible route throughout the length of the boardwalk or a portion of the boardwalk is significantly more involved, due to the change in elevation at boardwalk entrance points and along the length of the boardwalk. The existing site was studied for ideal locations to implement ramp structures to provide an accessible route. A table evaluating the feasibility of implementing ramp structures at the existing boardwalk access points is presented on the following page.

Potential Accessible Ramp Locations

Location	Approximate Elevation Change	Approximate Ramp Length	Constraints
A	15 feet	240 feet	Adjacent bridge abutment, retaining walls, hotel/restaurant property
B	7 feet	104 feet	Existing courtyard area, mechanical/electrical equipment
C	2 feet	25 feet	No major constraints
D	0 feet (upper deck, 2.7 feet (middle deck)	36 feet	No major constraints
E	17' (Including Concrete Amphitheater Steps	270 feet	Concrete amphitheater would require reconstruction or extensive modification

As can be seen from the above table, locations (C) and (D) offer the most promise for creating accessibility to portions of the structure. These areas also have the greatest amount of unconstrained area to work with, and are located roughly at each end of the existing amphitheater. In addition, parking is adjacent to location (D). By locating ramp structures at locations (C) and (D), an accessible route could be created encompassing most of Section 2 and Section 3. Limiting the accessible route to these areas would be permissible if the remaining sections of boardwalk are unaltered. If it is desired to make the entire boardwalk accessible, additional, more extensive ramp structures would be required between Section 3 and Section 4 (approximately 17' difference in elevation) and between Section 1 and Section 2 (approximately 13' difference in elevation from the level of the observation deck area to the lowest elevation along Section 1).

Alternative access points were also considered. However, alternative points would either require significant modification of existing infrastructure (besides the boardwalk) or are less advantageous in terms of the existing topography.

VI. BOARDWALK REHABILITATION AND REPLACEMENT ALTERNATIVES

Based on the condition and age of the existing structure and accessibility considerations, three conceptual alternatives were developed for further consideration. A description of each alternative is provided below.

Alternative 1 – Rehabilitation and Accessibility Upgrades

(Link to Conceptual Plan)

Alternative 1 rehabilitates the structure to restore the original design intent and provides an accessible route from access point C to Access point D, retaining the existing structural elements and boardwalk configuration to the extent possible.

Replacement of 100% of the deck boards is recommended due to the age of the structure (30+ years old) and due to the present condition of the decking. Industry standards for service life for standard treated pine decking range from 15-20 years with annual maintenance (washing and sealing). Individual board replacement can be continued, but the amount of replacement required should be expected to rapidly increase over the next five years.

Due to the existing stringer spacing of 24" on center, composite decking is not recommended for this alternative. Most composite decking manufacturers require a stringer or joist spacing of 16" on center for boards oriented perpendicular to the joist, and 12" on center for boards oriented at an angle to the joists. An alternative to treated lumber would be ipe or another tropical hardwood with demonstrated moisture and rot resistance. Ipe has a life expectancy of 50+ years, and 5/4 boards could span 24" on center. However, ipe is considerably more expensive to install than standard treated pine decking. Due to the age of the existing framing (stringers, joists, and beams), the additional investment may not be warranted if the deck material outlasts the frame.

The expected life of treated timber framing (supporting the deck or boardwalk) varies widely, with sources quoting from 20 years to 50 years plus. As noted previously, the existing framing members appear to be in relatively good condition, but it is difficult to predict the amount of remaining life for these elements. If a 50 year life is assumed, the framing has from 10-20 years of remaining life.

The following work items would be included with Alternative 1:

Substructure:

1) Retrofit 10 existing pier foundations in Section 2 with micropiles to address observed settlement and mitigate the potential for future settlement (Inspection Findings 1-6).
2) Repair the existing slope in the area of section 2, utilizing soil nails and shotcrete (Inspection

Finding 1).
3) In conjunction with item 2), stabilize existing stone walls along Section 2 (Inspection Findings 2 & 7) utilizing soil nailing and shotcrete.
4) Remove trees that are compromising existing pier foundations (Inspection Findings 4 & 5).
5) Replace cracked or rotted timber piles in Sections 4 & 5 (Inspection Finding 16).
6) Epoxy inject cracks at piers in Section 3 and strengthen the piers with FRP (Fiber Reinforced Polymer) wrap (Inspection Finding 14).
7) Replace cracked bracing in Section 3 (Inspection Finding 15).

Boardwalk:

8) Replace all joist hangers throughout the structure (Inspection Finding 9).
9) Replace selected stringers with rot or cracking (Inspection Finding 23)
10) Rebuild all stairs to remain with new stringers meeting current ADA standards (Inspection Finding 12).
11) Replace deck boards in Sections 1, 2, 3 & 4 (Inspection Finding 22).
12) Install supplemental anchor bolts at ledger boards attached to concrete walls at access points A and E (Inspection Finding 13).
13) Replace corroded through bolts in Section 4 (Inspection Finding 13).
14) Install new railings along the length of the boardwalk meeting current Ohio Building Code standards.
15) Install ADA compliant hand rails at all ramps and stairs.

Electrical:

16) Repair conduit, pull boxes, and wiring for lighting and security cameras throughout the structure.

Accessibility Upgrades:

17) Modify the existing structure to incorporate ADA compliant ramps at access points C & D, and replace the existing steps between the observation deck and pavilion with ADA compliant ramping.

Alternative 2 – Replacement of Sections 2 & 3, Rehabilitation of Sections 1, 4, & 5

(Link to Conceptual Plan)

Alternative 2 completely replaces Sections 2 & 3 with new foundations, substructure and boardwalk structures, incorporating accessible ramps at access points C & D. The existing steps at access point B would be reconstructed to ADA standards, and the entirety of the boardwalk from the existing courtyard area to the steps leading down to Section 4 would be constructed as an accessible route. The reconstructed section of boardwalk could be designed with a different configuration if desired. The rehabilitation scope for Sections 1, 4, & 5 would be

identical to Alternative 1. This alternative was considered due to the extent of foundation and slope distress in Section 2, the age of the structure, and the additional flexibility offered by this alternative to redesign the Section 2/3 area for better accessibility. In addition, this alternative could be designed to allow for eventual replacement of Sections 1, 4 & 5. In addition to full replacement items in Sections 2 & 3, the following additional replacement or rehabilitation work items would be included:

Substructure:

1) Repair the existing slope in the area of section 2, utilizing soil nails and shotcrete.
2) In conjunction with item 2), stabilize existing stone walls along Section 2 utilizing soil nailing and shotcrete.
3) Remove trees that are compromising existing pier foundations.
4) Replace cracked or rotted timber piles in Sections 4 & 5.

Boardwalk:

5) Replace all joist hangers in Sections 1, 4, & 5
6) Replace selected stringers with rot or cracking
7) Rebuild all stairs to remain with new stringers meeting current ADA standards.
8) Replace deck boards in Sections 1 & 4.
9) Install supplemental anchor bolts at ledger boards attached to concrete walls at access points A and E.
10) Replace corroded through bolts in Section 4.
11) Install new railings in Section 4 meeting current Ohio Building Code standards.
12) Install ADA compliant hand rails at all ramps and stairs

Electrical:

13) Repair conduit, pull boxes, and wiring for lighting and security cameras throughout the structure.

Accessibility Upgrades:

14) Completely rebuild Sections 2 & 3 as an ADA accessible route, incorporating ADA compliant ramps near current access points C & D.

Alternative 3 – Complete Boardwalk Replacement

(Link to Conceptual Plan)

Alternative 3 completely replaces the existing boardwalk structure with a new ADA compliant structure. This alternative was considered due to the age of the existing structure, technical challenges associated with modifying the existing boardwalk to bring it into compliance with current ADA standards, and to allow design flexibility to accommodate the existing topography and site. This alternative would allow the greatest extent of modification to the existing boardwalk alignment (if desired). Alternative 3 would include 2 accessible access points, likely near existing access points C & D. The access points at A and E would likely be reconstructed as stairs, unless there is a desire to modify the existing concrete amphitheater structures near Portage Trail. As part of this alternative, Palmer recommends stabilizing and repairing the existing slope, storm sewer outflow, and walls along Section 2 to mitigate the potential for future slope instability.

VII. BOARDWALK ALTERNATIVE COMPARISON

Initial Construction Cost

The following table compares the estimated initial construction costs for each alternative. Additional cost information is provided in Appendix H.

	Initial Construction Cost
Alternative 1	$1,070,000
Alternative 2	$1,206,000
Alternative 3	$1,641,000

For Alternative 1, costs for slope and retaining wall stabilization, and for retrofit of existing pier foundations were developed by consulting with a specialty geotechnical contractor (GeoStabilization International) and by reviewing historical bid prices for micropile installation. Costs for replacement of the decking and railings were developed by consulting with a local contractor (RC Norman Construction), and by research of historical decking and boardwalk costs.

For Alternatives 2 & 3, costs for new boardwalk structures were developed by using the existing area of the boardwalk, and adding an approximate area for ramp structures. This square footage was multiplied by a projected cost of $110 per square foot to determine the total cost of the boardwalk, apart from stabilization of the existing slopes and retaining walls near Section 2. This number is based on research of recent boardwalk construction pricing, discussions with RC Norman, and consideration of the challenging nature (access and environmental considerations) of the site.

Expected Life and Maintenance Requirements

As previously discussed, the expected useful life of Alternative 1 is 10-20 years, based on the remaining life of the timber framing, and the expected life of new pressure treated decking. Maintenance for this alternative would consist of pressure washing and sealing the decking on a biannual cycle, in order to achieve the life expectancy of the decking.

For Alternatives 2 & 3, the expected useful life is highly dependent on a number of factors, including the foundation option chosen, and the materials used for framing, decking, and fasteners. Further refinement of these alternatives would allow for more detailed estimates of the expected life and maintenance costs.

VIII. ADDITIONAL STUDY RECOMMENDATIONS

For all of the alternatives, it is recommended to perform additional field studies as described below before development of detailed repair or design plans.

- **Geotechnical Study**

  A geotechnical study is recommended to establish foundation design recommendations for foundation retrofits (Alternative 1) and new foundations (Alternatives 2 & 3). In addition, the geotechnical study should address the stability of the slopes and existing walls along Section 2 of the boardwalk and provide recommendations for these areas.

- **Field Survey**

  A field survey is recommended to establish the location of the existing structures and facilities, and to locate existing rock ledges and overhangs. The concepts shown in Appendices E through G, analysis of accessibility alternatives, and the quantities for decking and railing were based on available original construction plans (Sections 1 & 2), limited hand measurements, aerial photos, and LIDAR.

- **Environmental Studies**

  If Alternative 2 or Alternative 3 is selected for further development or federal funding is utilized, environmental studies may be required, particularly if any work is performed below the ordinary high water mark of the Cuyahoga River.

In addition to these items, original construction plans for the Broad Boulevard bridge and the retaining walls adjacent to the Broad Boulevard bridge and amphitheater would be beneficial to aid in the field studies and future design development.

APPENDIX A

BOARDWALK HISTORY & AERIAL IMAGERY

Original Construction Plans

The City provided two sets of existing plans showing boardwalk structures along the river between Broad Boulevard and East Portage Trail, as described below:

- Plans titled *Riverfront Mall, Urban Renewal Project, Ohio R-113, Cuyahoga Falls, Ohio,* by John David Jones and Associates Inc., dated October 20, 1976.

  This set of plans detailed concrete walks between Front Street and the Cuyahoga River, and reinforced concrete and timber structures along the west bank of Cuyahoga River, extending from Broad Boulevard to north of East Portage Trail. Based on review of historic ODOT aerial imagery from the 1970's and 1980's, it appears that the vast majority of the improvements shown in this plan set were never constructed. The structures shown in these plans do not match the as-built configuration of the boardwalk.

- Plans titled *Cuyahoga Falls Riverfront Development,* by Voinovich Companies, dated April 10, 1989.

  This set of plans detailed a timber boardwalk structure extending from just south of Broad Boulevard to an existing timber structure approximately 350' north of Broad Boulevard. The improvements detailed on these plans generally match the as-built configuration of the boardwalk in this area, with some modifications. These modifications appear to be both due to field changes due to site conditions during the original construction, and modifications made after the original construction.

Historic Aerial Imagery

ODOT maintains an archive of aerial images dating back to the 1940's. In order to determine the age of the existing boardwalk structures, aerial imagery from 1970 to the present of downtown Cuyahoga Falls was reviewed. Conclusions drawn from this research are presented below.

- Aerial image taken February 22, 1970 (Image A-1970)
  - None of the current boardwalk features appear to be present at this date.
  - Four buildings were located along the west bank of the Cuyahoga River, in close proximity to the location of the current boardwalk structures.
  - Construction of the East Portage Trail bridge appears to be underway in this photo.

- Aerial image taken June 5, 1972 (Image A-1972)
  - None of the current boardwalk features appear to be present at this date.
  - The four buildings along the west bank of the Cuyahoga River present in 1970 appear to have been demolished.
  - Construction of the East Portage Trail bridge is complete.

- Aerial image taken September 14, 1979 (Image A-1979)
  - None of the current boardwalk features appear to be present at this date.
  - The pedestrian mall along Front Street appears to be complete.
  - State Route 8 construction is complete.

- Aerial image taken May 22, 1980 (Image A-1980)
  - None of the current boardwalk features appear to be present at this date.

- Aerial image taken March 10, 1985 (Image A-1985)
  - Section 3 (the multi-level deck near the north end of the current amphitheater) and Section 4 (boardwalk north of the multi-level deck) are present at this date. These elements appear to have been constructed between 1980 and 1985.
  - Concrete walks along the west side of the boardwalk have been constructed.
  - The concrete and brick amphitheaters at the north terminus of boardwalk (adjacent to East Portage Trail) have been constructed.

- Aerial image taken April 10, 1990 (Image A-1990)
  - Sections 1 and 2 (shown in the 1989 Voinovich Companies plans) are complete.
  - The pedestrian bridge adjacent to Broad Boulevard over the Cuyahoga River is complete.
  - The current hotel building to the south is present.

- Aerial image taken April 15, 1995 (Image A-1995)
  - No notable changes concerning the boardwalk structure

- Aerial image taken April 8, 2005 (Image A-2005)
  - The pedestrian bridge has been removed and the Broad Boulevard bridge has been replaced (2004).
  - The parking area for the hotel and restaurant slightly changed.
  - Section 1 of the boardwalk was modified to accommodate the new Broad Boulevard bridge and hotel property modifications.
  - Downtown amphitheater, event center, and Riverfront Parkway were constructed (2002 to 2003).
  - Concrete walks adjacent to the boardwalk reconstructed.

Google Earth imagery was also reviewed for the period from 2005 to present. The major change during this period was the removal of dams upstream and downstream of the boardwalk in 2013. The removal of the dams lowered the 100 year flood elevation along the boardwalk from approximately 996 feet to 980 feet. In addition, a small canoe/kayak takeout area (Section 5) with steps leading up to the boardwalk structure appears to have been added in 2016.

Image A-1970

Image A-1972

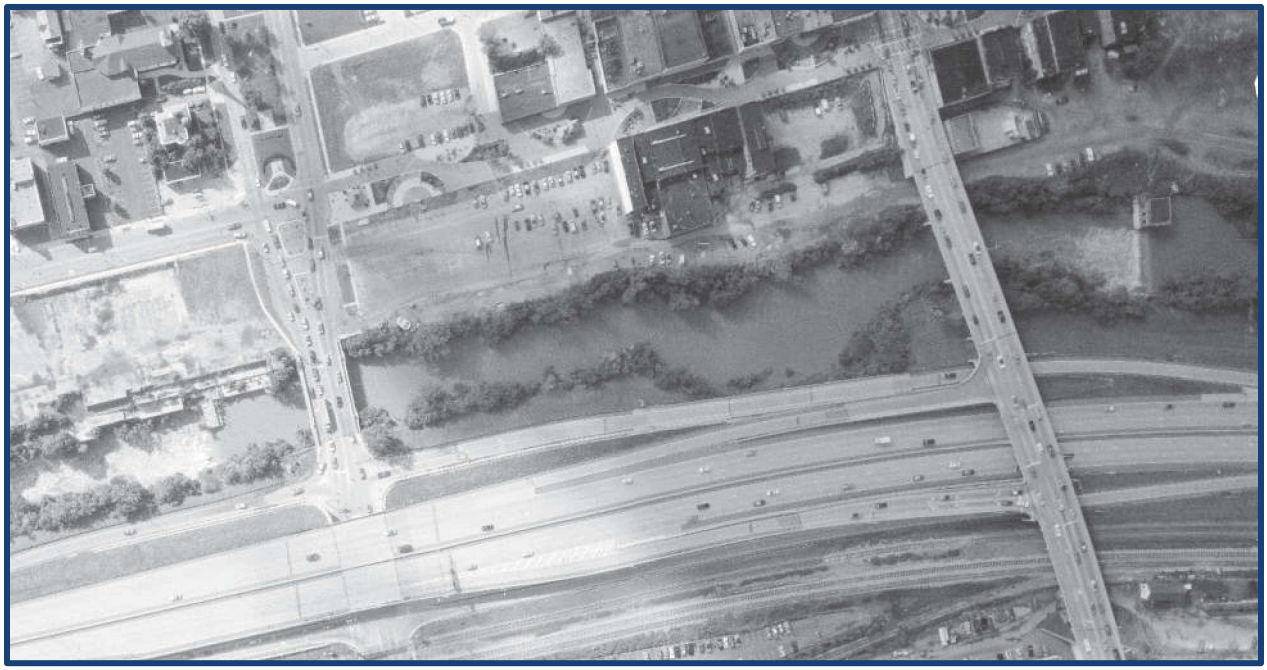


Image A-1979

Image A-1980

Image A-1985

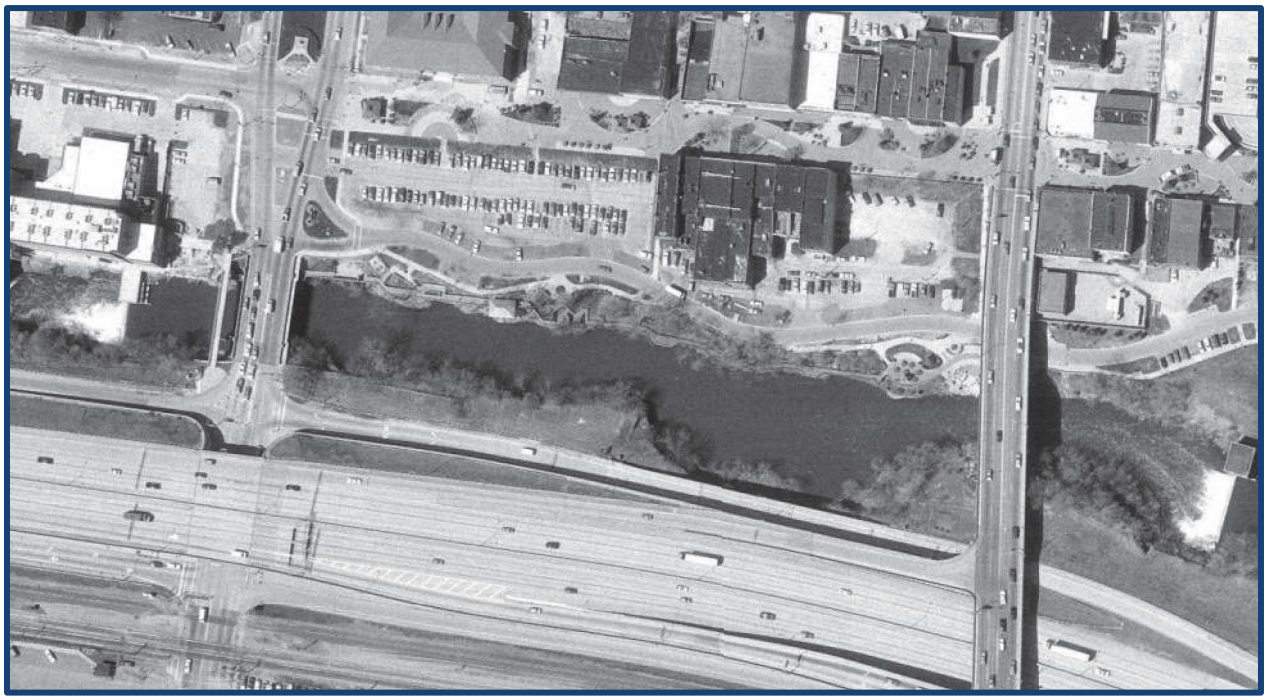


Image A-1990

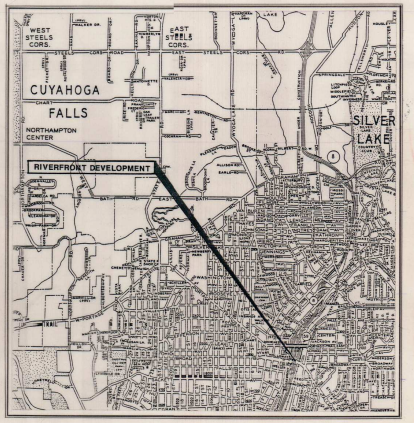
Image A-1995

Image A-2005

APPENDIX B

ORIGINAL BOARDWALK CONSTRUCTION PLANS (SECTIONS 1 & 2)

CUYAHOGA FALLS
RIVERFRONT DEVELOPMENT



MAYOR — DATE: 4/7/89

FINANCE DIRECTOR — DATE: 4/10/89

COUNCIL PRESIDENT — DATE: 4/10/89

CITY ENGINEER — DATE: 4/10/89

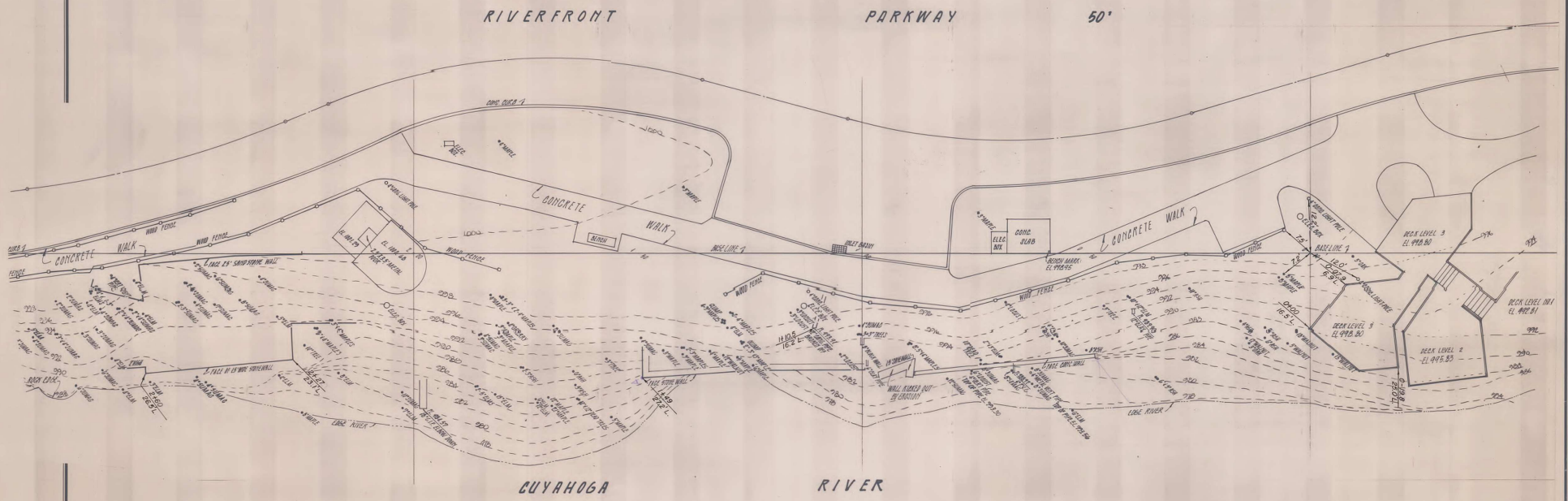
SERVICE DIRECTOR — DATE: 4/7/89

ARCHITECT: VOINOVICH COMPANIES

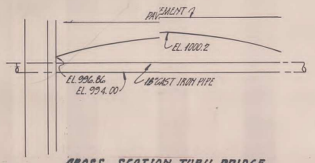
STRUCTURAL: FRANKLIN CONSULTANTS INC.

ELECTRICAL: WHITFIELD & ASSOCIATES

DRAWING INDEX



SCALE: 1" = 10'



CROSS SECTION THRU BRIDGE
(LOOKING NORTH)

SURVEYORS CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM THE NOTES OF AN ACTUAL FIELD SURVEY PERFORMED UNDER MY SUPERVISION AND THAT THE PARTICULARS SHOWN HEREON WERE IN EXISTENCE AT THE TIME OF SAID SURVEY AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

STATE OF OHIO — RICHARD BLISS 5244 — REGISTERED SURVEYOR

REGISTERED SURVEYOR NO. 5244

CUYAHOGA FALLS RIVERFRONT WALKWAY

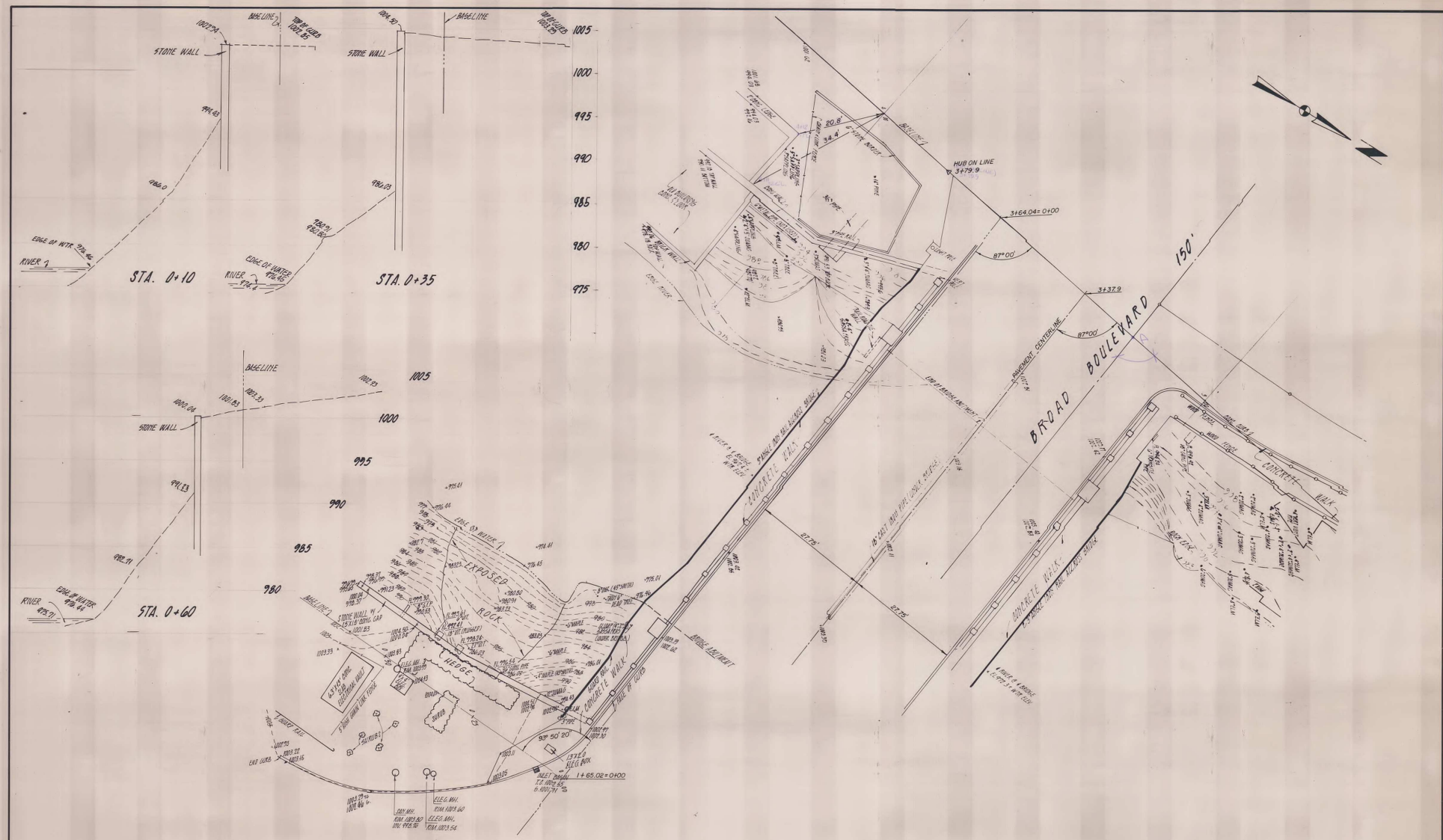
CT Consultants, Inc.
Engineers • Architects • Planners
Willoughby • Mentor • Columbus • Lorain • North Canton • Steubenville

REV. NO.	DESCRIPTION	DATE	BY	CHK'D.
1	ADDED CONTOURS	9/1/88	RB	
	ACCEPTANCE FOR BID	9/1/88		

DATE: NOV. 16, 1987
DRAWN BY: GB
CHECKED BY:
APPROVED BY:
F.B. No. 651 PG. 19-23

LOCATION PLAT MADE FOR AND AT THE INSTANCE OF:
VOINOVICH COMPANIES
2450 PROSPECT AVENUE CLEVELAND, OHIO 44115
CUYAHOGA FALLS, SUMMIT COUNTY, OHIO

SCALES
HOR. 1" = 10'
VERT. -
CONTRACT No. 88-087
SHEET NO. 1 OF



CUYAHOGA FALLS RIVERFRONT WALKWAY

CT Consultants, Inc.
Engineers • Architects • Planners
Willoughby • Mentor • North Canton • Steubenville • Lorain

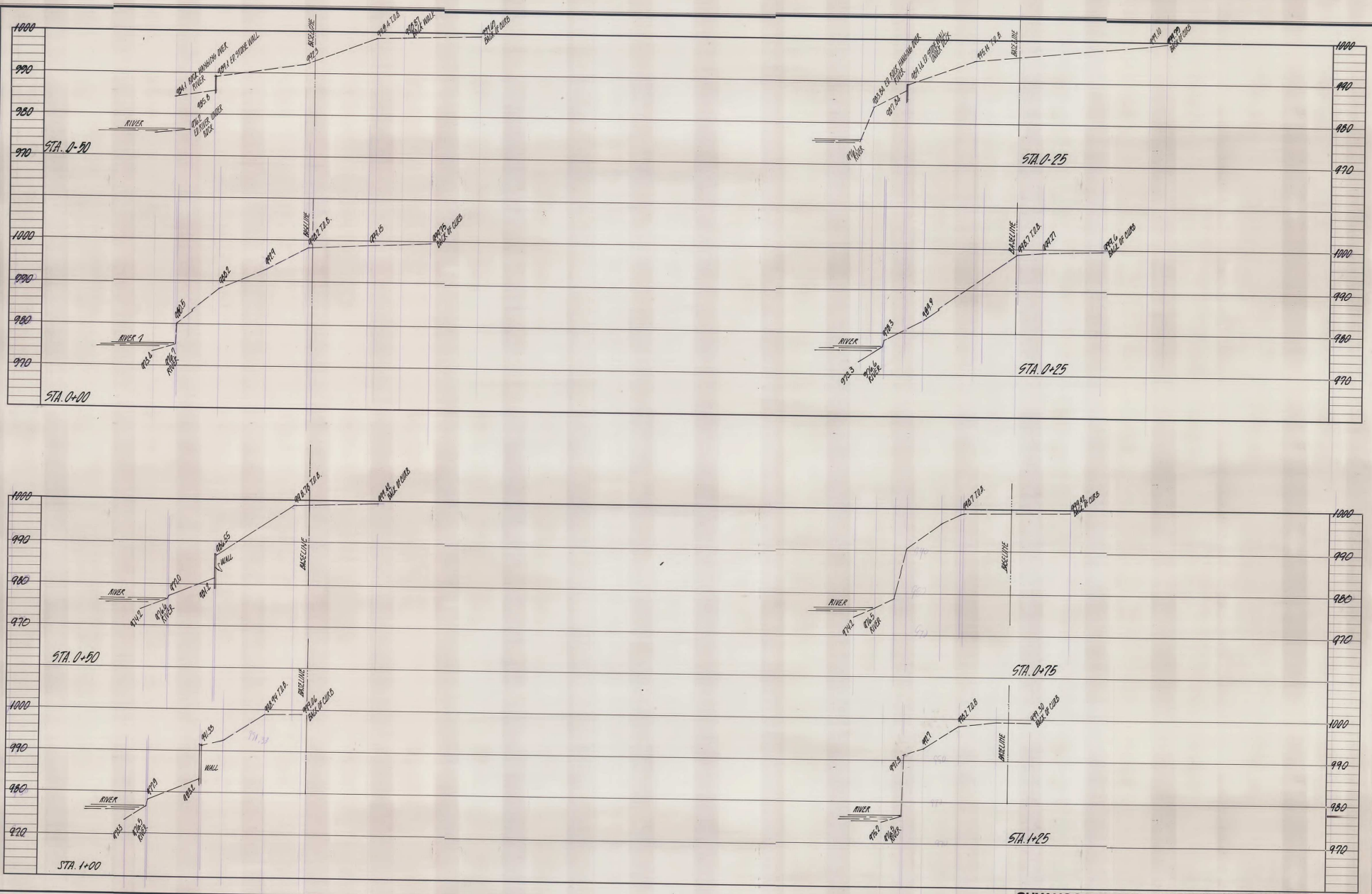
NO.	DESCRIPTION	DATE	BY	CHK'D
	ACCEPTANCE FOR BID	4-3-89		

VOINOVICH COMPANIES
2450 PROSPECT AVE. CLEVELAND, OHIO 44115

DATE: NOV. 7, 1988
DRAWN BY: LB
CHECKED BY:
APPROVED BY:
P.B. No. 688 PG. 17-31

TOPOGRAPHICAL & LOCATION SURVEY
CUYAHOGA FALLS, SUMMIT COUNTY, OHIO.

SCALES:
HOR. 1" = 10'
VERT. 1" = 5'
CONTRACT No. 88-087
SHEET NO. 2 OF



COLPETZER-THOMAS, INC.
AN ENGINEERING GROUP
WILLOUGHBY • MENTOR • NORTH CANTON • STEUBENVILLE • LORAIN

REV NO.	DESCRIPTION	DATE	BY	CHK'D
	ACCEPTANCE FOR BID	4-3-89		

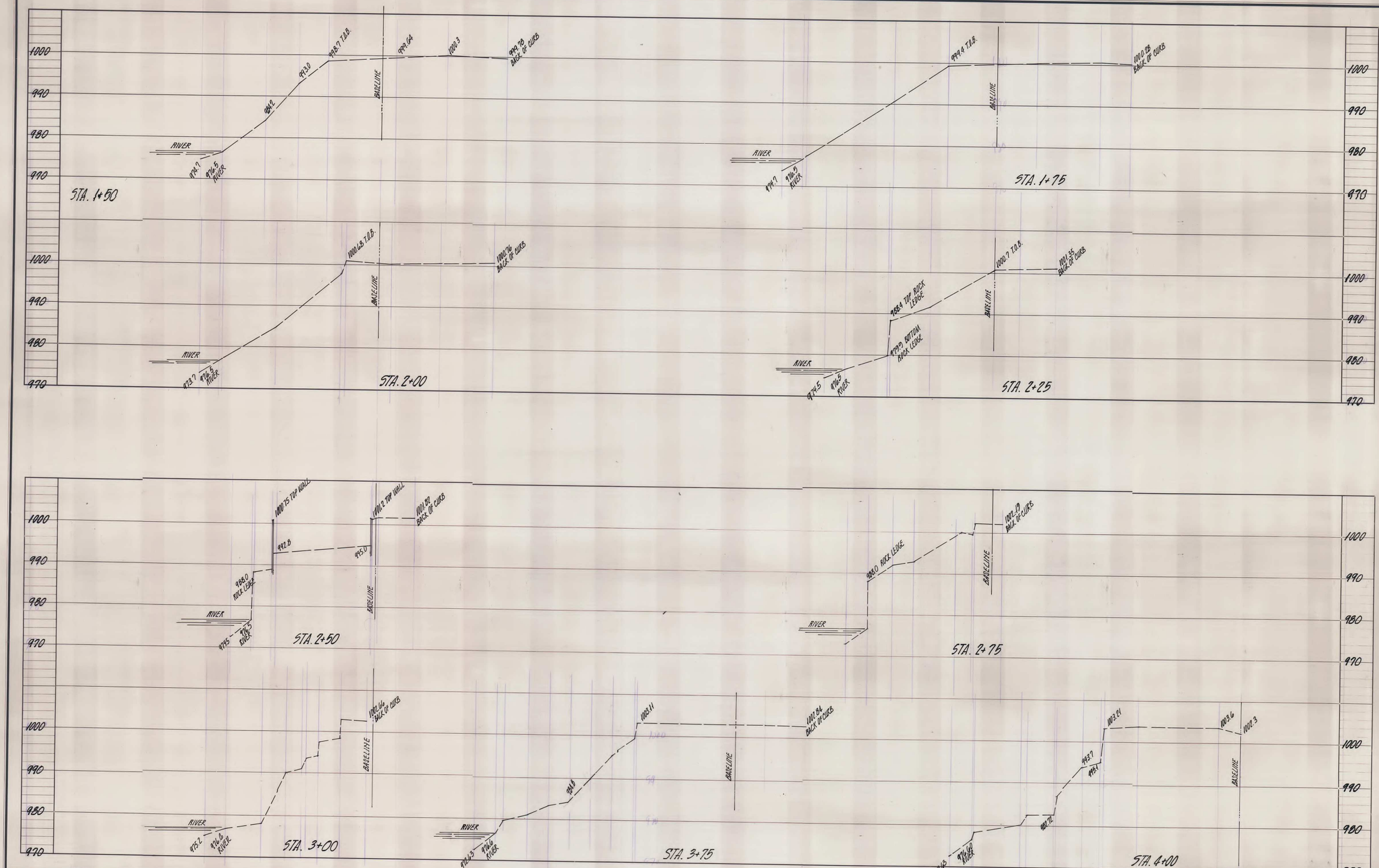
VOINOVICH COMPANIES
2450 PROSPECT AVE. CLEVELAND, OHIO 44115
CUYAHOGA FALLS, SUMMIT COUNTY, OHIO

DATE: NOV. 16, 1987
DRAWN BY: CB
CHECKED BY:
APPROVED BY:
F B No. 1621 PG. 12-13

CUYAHOGA FALLS RIVERFRONT WALKWAY 1396.03

CROSS-SECTIONS
STA. 0-50 TO STA. 1+25

SCALES
HOR. 1" = 10'
VERT. 1" = 10'
CONTRACT No. BB-087
SHEET NO. 3 OF



COLPETZER-THOMAS, INC.
AN ENGINEERING GROUP
WILLOUGHBY • MENTOR • NORTH CANTON • STEUBENVILLE • LORAIN

REV. NO.	DESCRIPTION	DATE	BY	CH'K'D
	ACCEPTANCE FOR BID	4-3-89		

VOINOVICH COMPANIES
2450 PROSPECT AVE. CLEVELAND, OHIO 44115
CUYAHOGA FALLS, SUMMIT COUNTY, OHIO

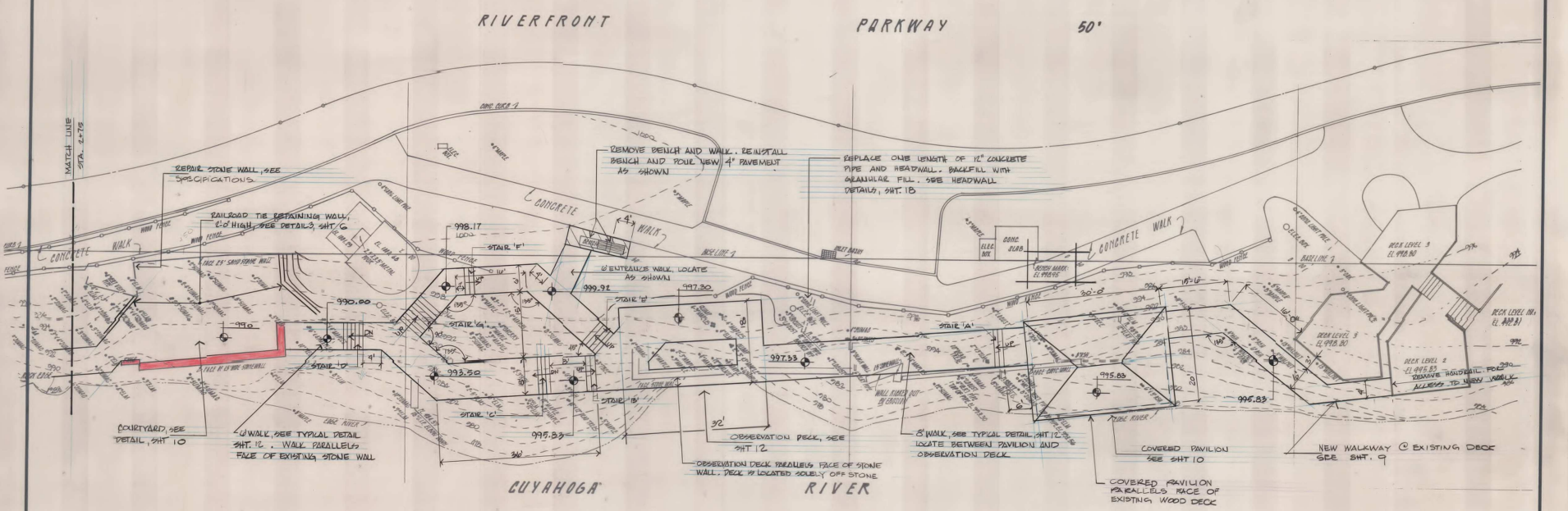
DATE: NOV. 16, 1987
DRAWN BY: G.B.
CHECKED BY:
APPROVED BY:

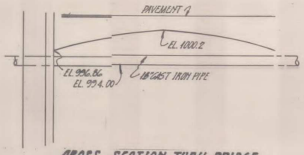
CUYAHOGA FALLS RIVERFRONT WALKWAY

1396.03

CROSS - SECTIONS
STA. 1+50 TO STA. 4+00

SCALES: HOR. 1" = 10' VERT. 1" = 10'
CONTRACT No. 88-087
SHEET NO. 4 OF





CROSS SECTION THRU BRIDGE
(LOOKING NORTH)

NOTES:

1. SEE SHEET 16 FOR STAIR SCHEDULE AND DETAILS
2. SEE SPECIFICATIONS FOR CLEARING AND GRUBBING AND OTHER SITE WORK
3. REMOVE ALL TREES IN THE WAY OF STRUCTURES, ALL ELSE TO REMAIN
4. ALL TREES ADJACENT TO WALK SHALL BE PRUNED TO A HEIGHT OF 16'-8" ABOVE WALK

SCALE: 1" = 10'

NOTES

REVISIONS

STAMPS

STATE OF OHIO PAUL A. GERTZ 49739 REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: SITE PLAN

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

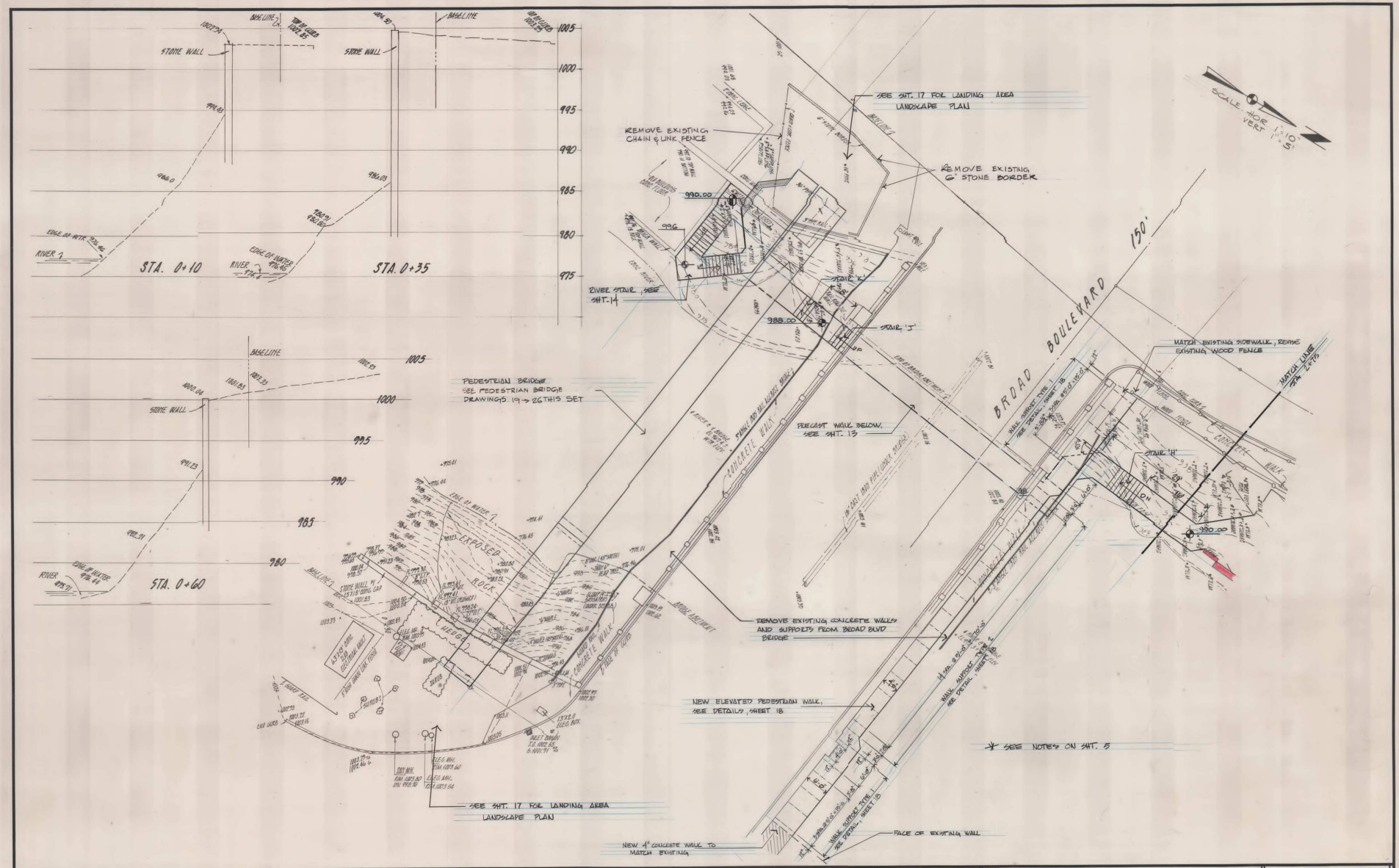
PROJECT NUMBER: 1396.03

DATE: 4-5-89

DRAWN: PG

CHECKED:

SHEET No. 5 OF



NOTES

REVISIONS

STAMPS

STATE OF OHIO — PAUL A. GERTZ 49739 — REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: SITE PLAN

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

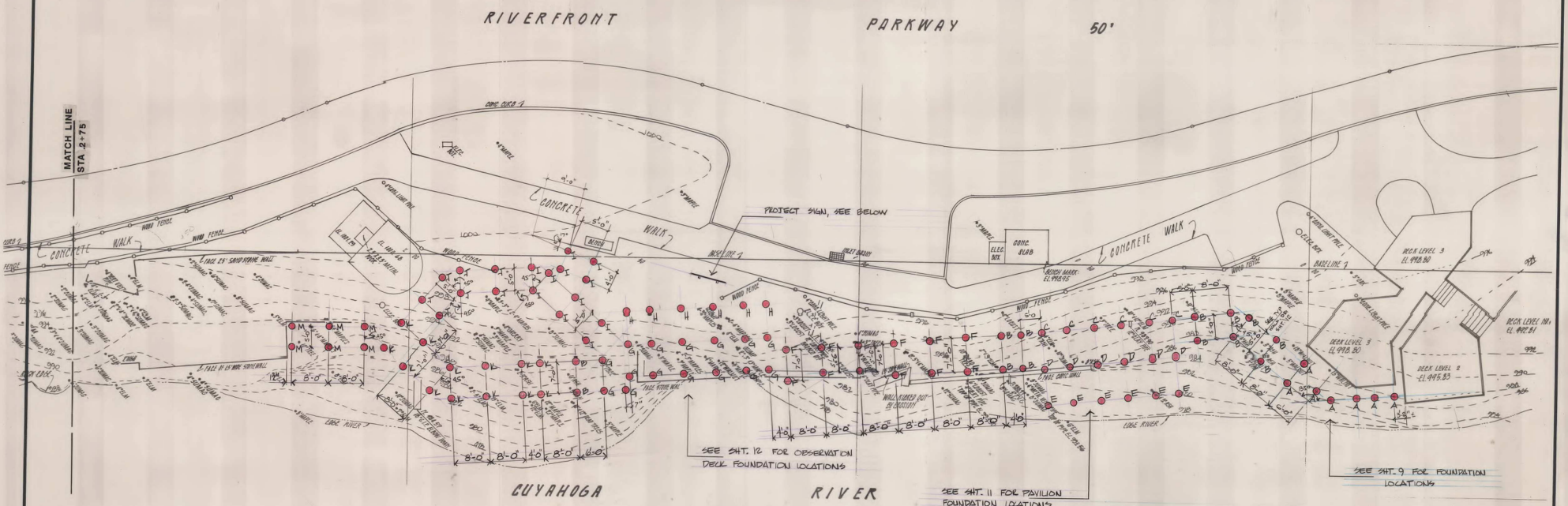
PROJECT NUMBER: 1396.03

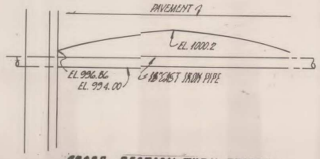
DATE: 4-3-89

DRAWN: P.G.

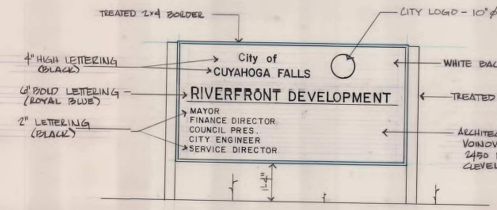
CHECKED:

SHEET No. 6 OF





CROSS SECTION THRU BRIDGE
(LOOKING NORTH)



PROJECT SIGN DETAIL
NO SCALE

	Elevation
A	992.00
B	994.16
C	994.93
D	990.93
E	986.93
F	995.66
G	994.50
H	996.43
I	998.25
J	996.30
K	991.83
L	987.83
M	980.33
N	984.33
O	986.33

SCALE: 1" = 10'

NOTES:
1. SEE TYPICAL FOUNDATION DETAILS SHT. 18
2. COORDINATE THIS SHEET WITH ALL LAYOUT AND DETAIL SHEETS

NOTES

REVISIONS

STAMPS

STATE OF OHIO
PAUL A. GERTZ
49739
REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: FOUNDATION PLAN

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

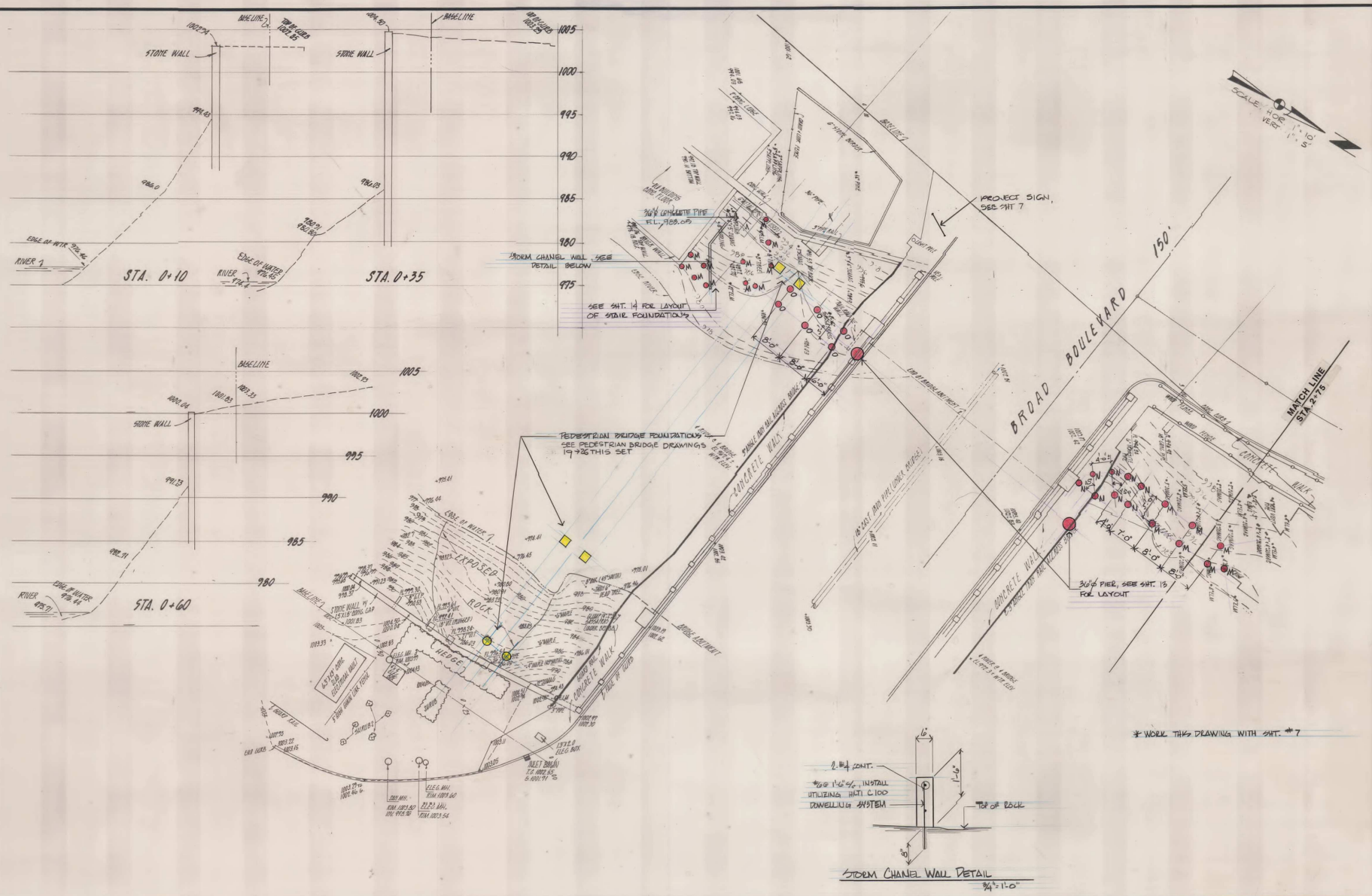
PROJECT NUMBER: 1396.03

DATE: 4-3-89

DRAWN: P.G.

CHECKED:

SHEET No. 7 OF



NOTES	REVISIONS	STAMPS
		STATE OF OHIO · PAUL A. GERTZ 49739 · REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

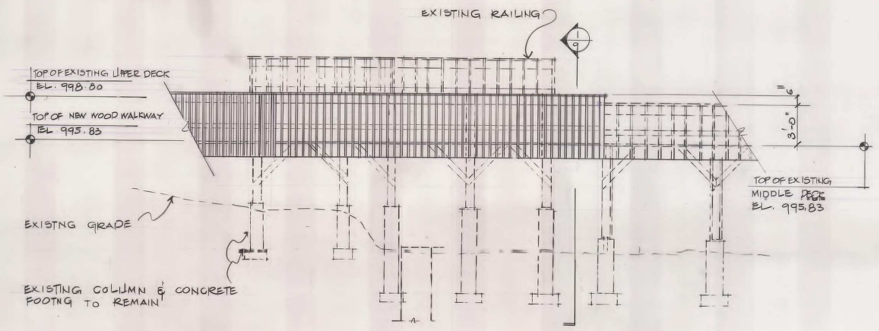
SHEET TITLE: FOUNDATION PLAN

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

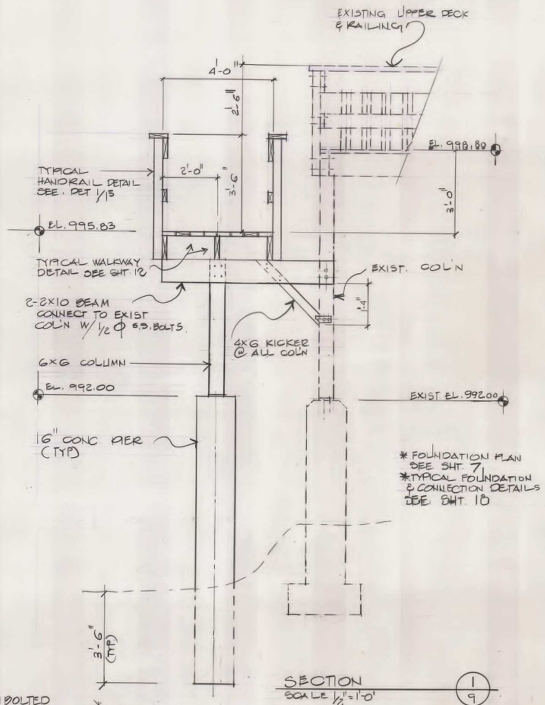
PROJECT NUMBER: 1396.03

DATE: 4/13/89
DRAWN: P.G.
CHECKED:

SHEET No. 8 OF



EAST ELEVATION
SCALE 1/4" = 1'-0"



SECTION 1/9
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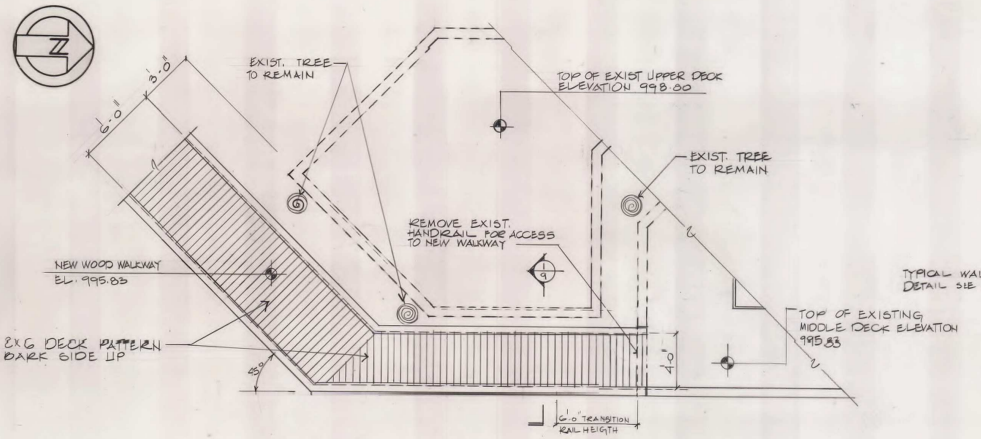
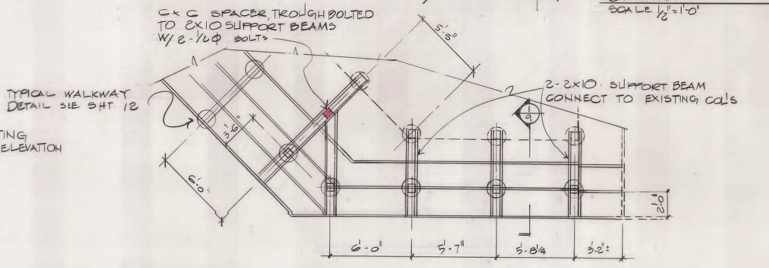


NEW WOOD WALKWAY @ EXISTING DECK
SCALE 1/4" = 1'-0"



NEW WOOD WALKWAY @ EXISTING DECK FRAMING PLAN
SCALE 1/4" = 1'-0"

NOTES

REVISIONS

STAMPS

STATE OF OHIO · PAUL A. GERTZ · 49739 · REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: NEW WOOD WALKWAY @ EXISTING DECK

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

PROJECT NUMBER: 1396.03

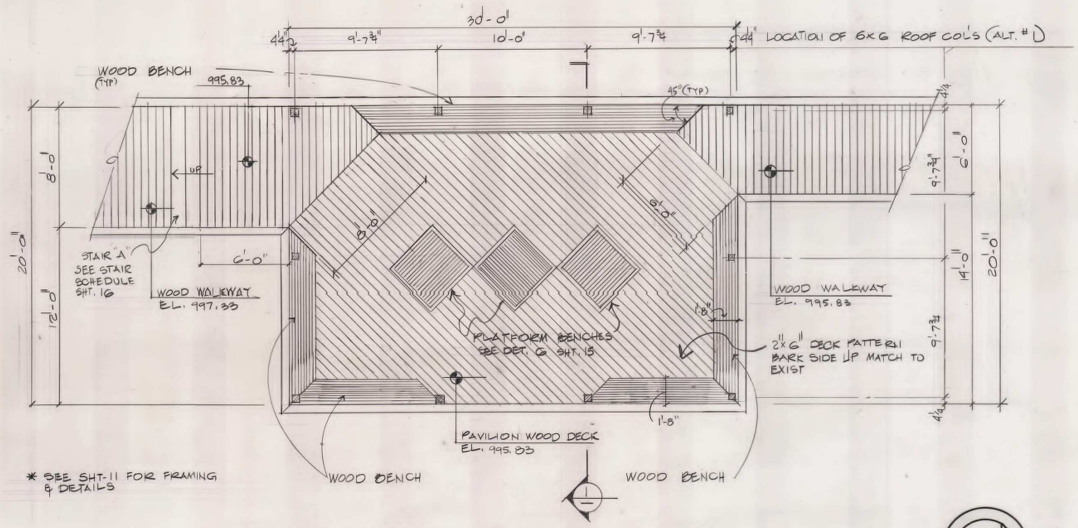
DATE: 4-3-89

DRAWN: DB

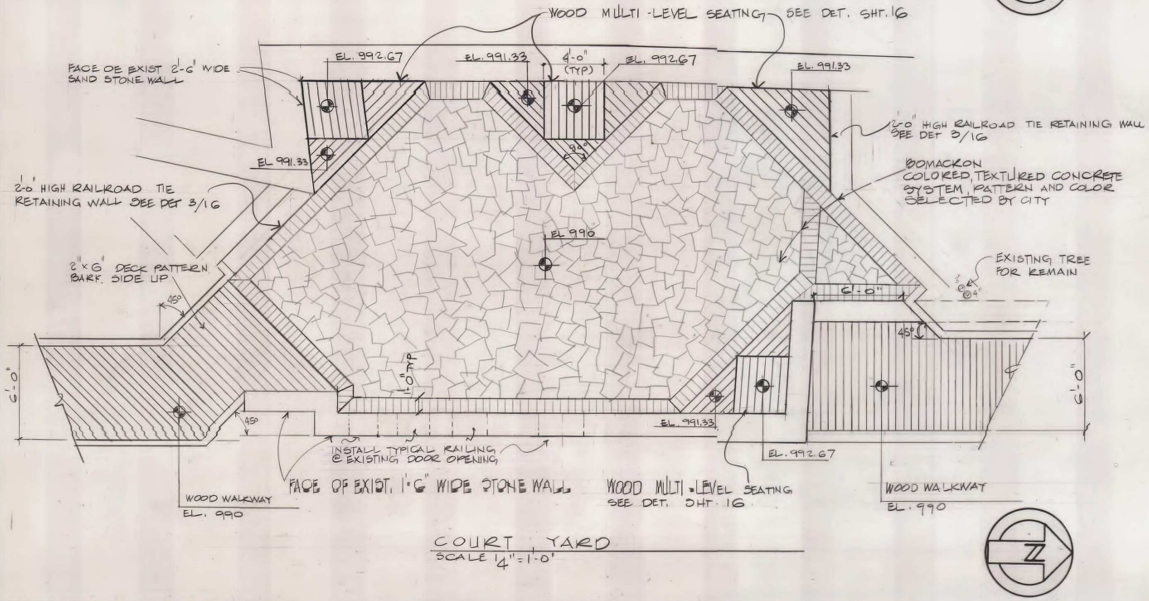
CHECKED:

SHEET No.: 9

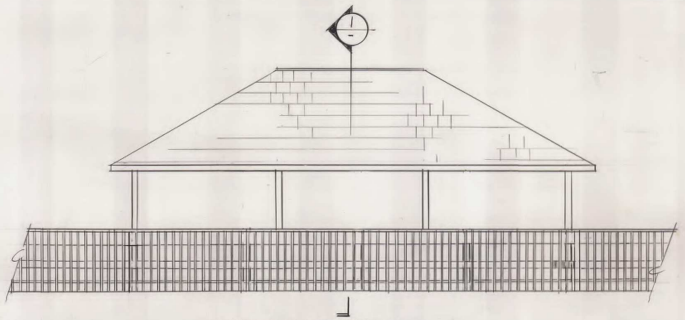
OF



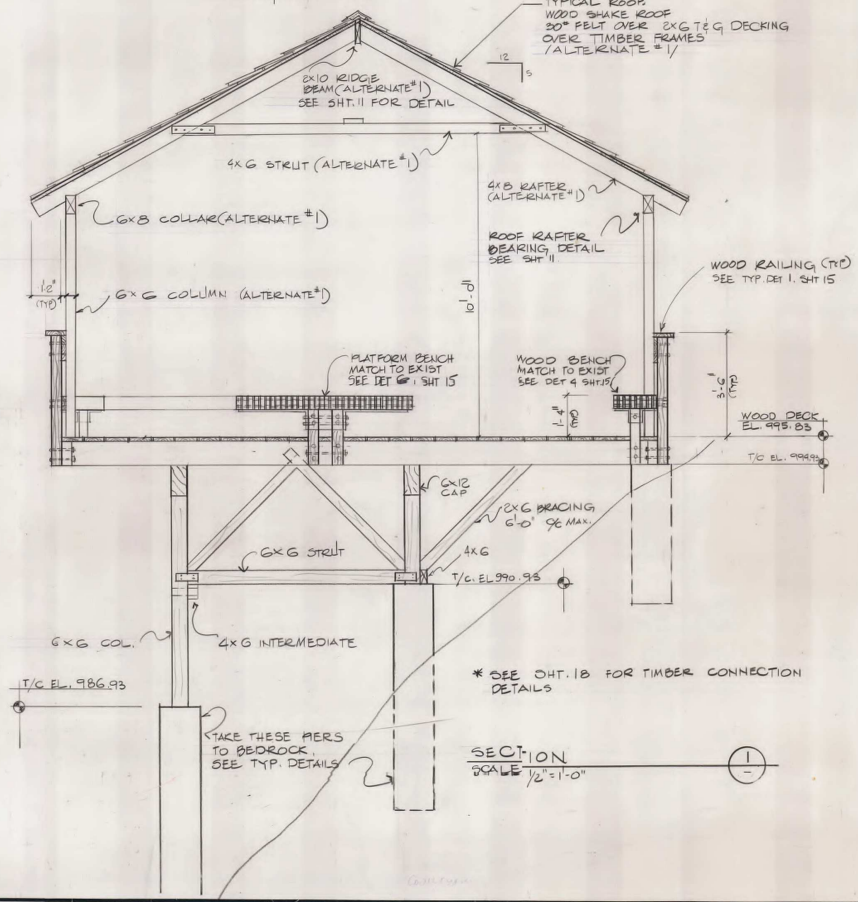
OPEN SIDE TREATED WOOD PAVILION PLAN
SCALE 1/4"=1'-0"



COURT YARD
SCALE 1/4"=1'-0"



EAST ELEVATION
SCALE 1/4"=1'-0"



SECTION
SCALE 1/2"=1'-0"

NOTES

REVISIONS

STAMPS

STATE OF OHIO — PAUL A. GERTZ 49739 — REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: COURT YARD & PAVILION PLANS & DETAILS

PROJECT NUMBER: 1396.03

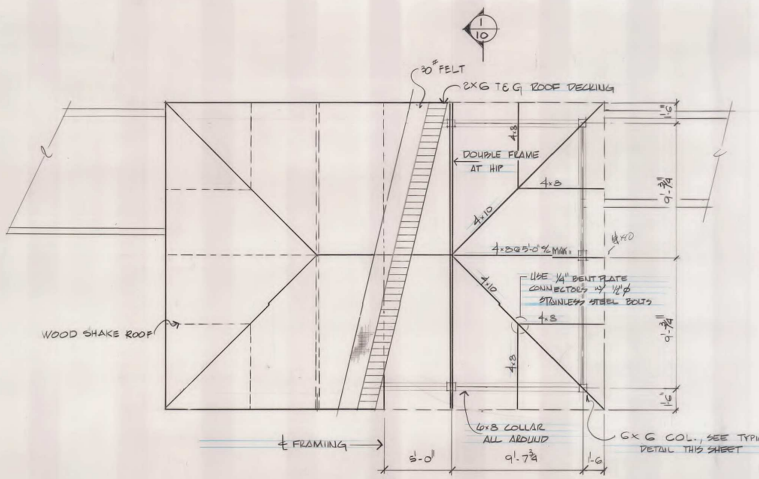
PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

DATE: 4-3-89

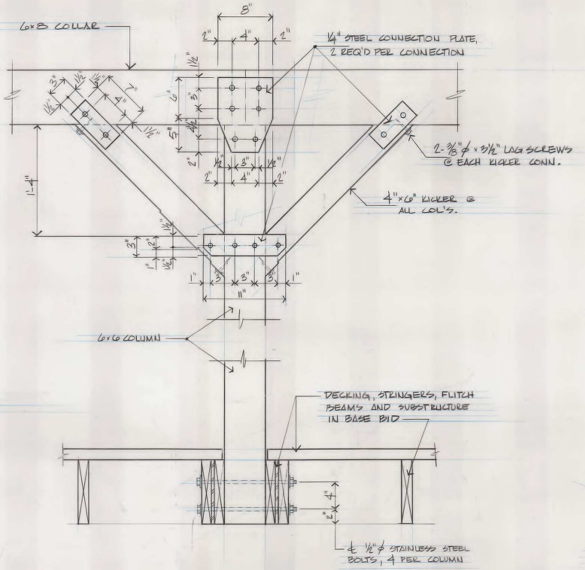
DRAWN: DB,

CHECKED:

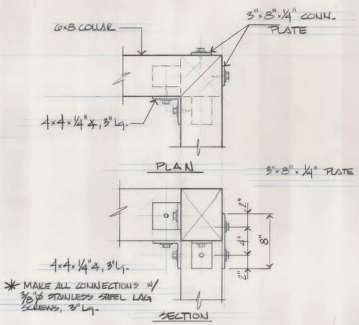
SHEET No. 10 OF



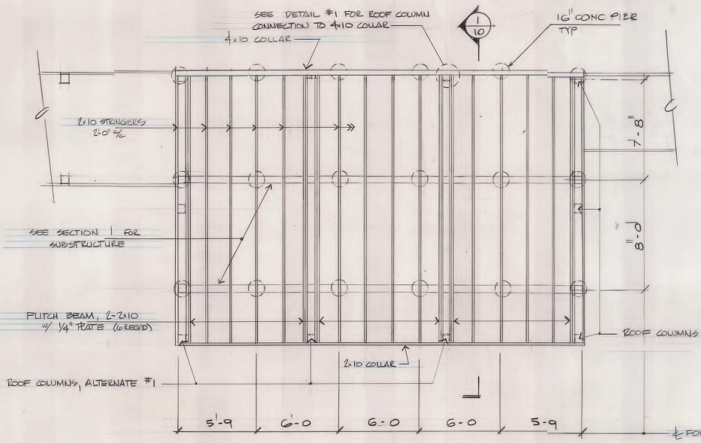
ROOF FRAMING PLAN (ALTERNATE #1)
SCALE 1/4" = 1'-0"



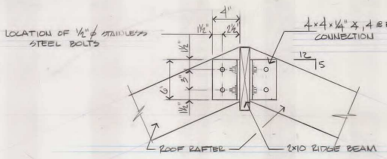
TYPICAL ROOF COLUMN (ALTERNATE #1)
1 1/2" = 1'-0"



CORNER COLUMN CONNECTION
(ALTERNATE #1) 1 1/2" = 1'-0"



PAVILION WOOD DECK FRAMING PLAN
SCALE 1/4" = 1'-0" BASE BID



RIDGE CONNECTION
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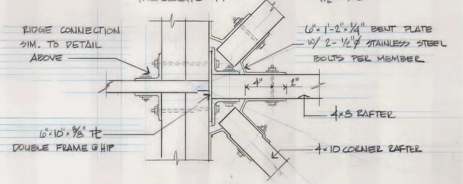
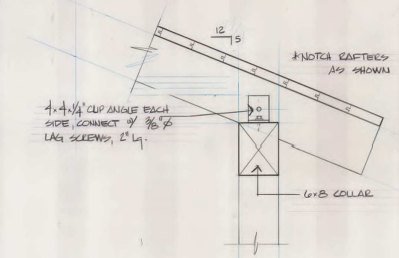
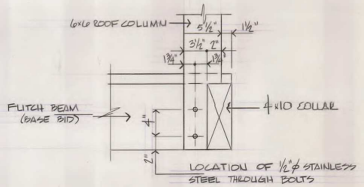


HIP CONNECTION
(ALTERNATE #1) 1 1/2" = 1'-0"



ROOF RAFTER BEARING DETAIL
(ALTERNATE #1) 1 1/2" = 1'-0"

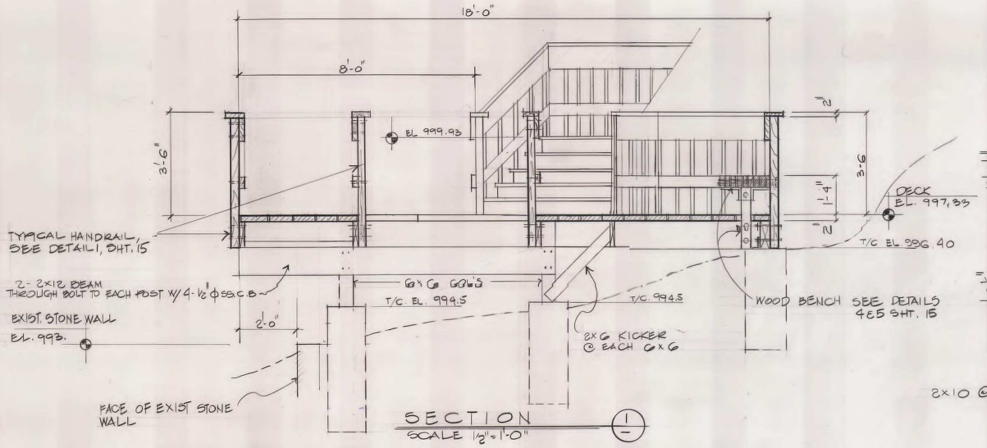


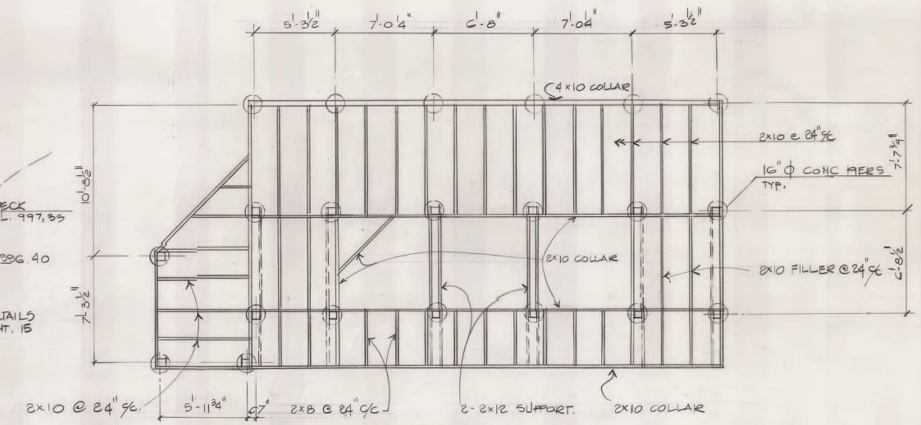
DETAIL #1
(ALTERNATE #1) 1 1/2" = 1'-0"

NOTES	REVISIONS	STAMPS
		STATE OF OHIO · PAUL A. GERTZ · 49739 · REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

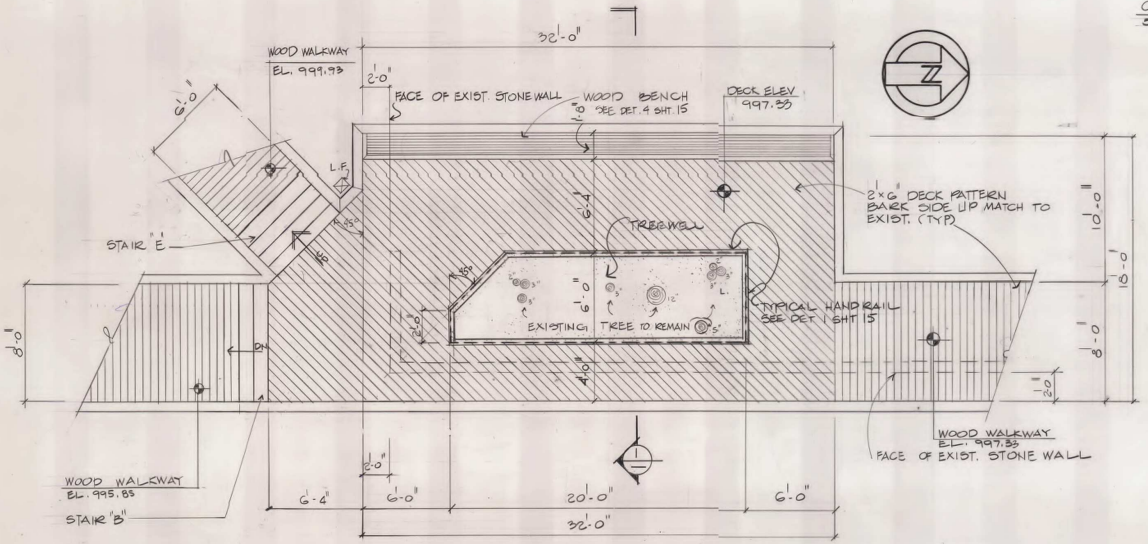
SHEET TITLE: ROOF & DECK FRAMING PLANS & DETAILS
PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY
PROJECT NUMBER: 1396.03
DATE: 4-3-89
DRAWN: D.B.
CHECKED:
SHEET No.: 11
OF





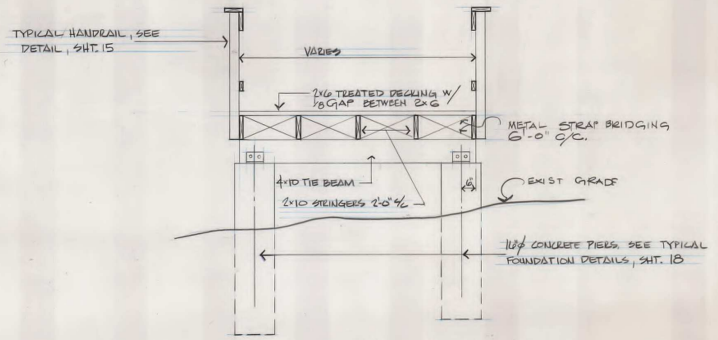
* SEE SECTION 1, THIS SHEET FOR SUB STRUCTURE

OBSERVATION DECK FRAMING PLAN
SCALE ¼"=1'-0"



OBSERVATION DECK & STEPS W/ RAILING @ EXIST STONE WALL /PLAN/
SCALE ¼"=1'-0"

* SEE SHT 18 FOR TYP. FOUNDATION & TYP. CONNECTION DETAILS



TYPICAL WALKWAY DETAIL
½"=1'-0"

NOTES

REVISIONS

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CLEVELAND, OHIO 44115

SHEET TITLE: OBSERVATION DECK & MISC. DETAILS

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

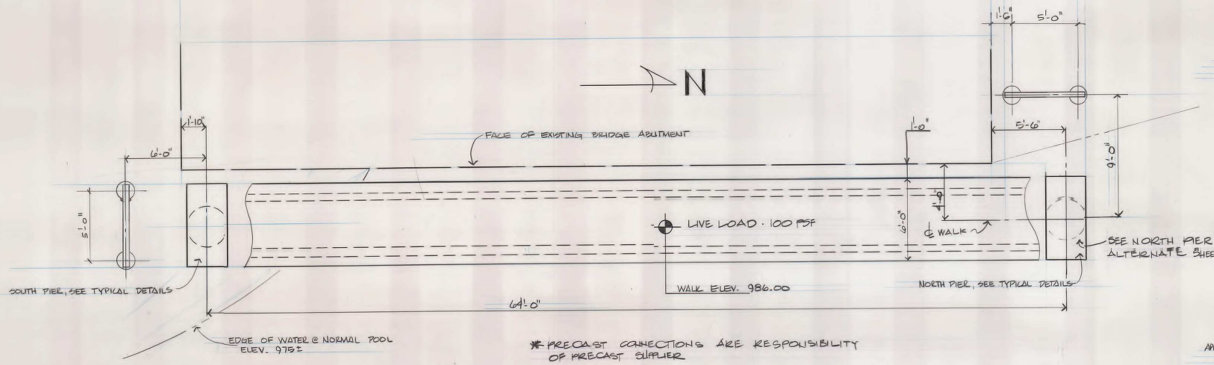
PROJECT NUMBER: 1396.03

DATE: 4-3-89

DRAWN: DB

CHECKED:

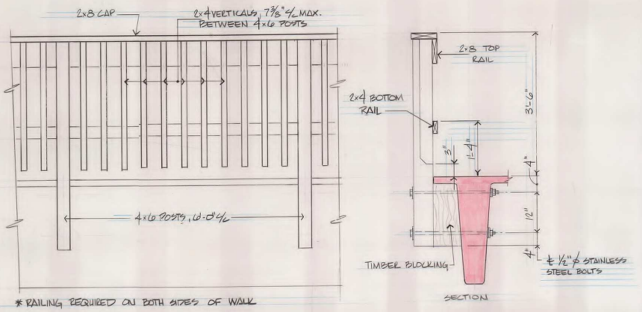
SHEET No. 12 OF



* PRECAST CONNECTIONS ARE RESPONSIBILITY OF PRECAST SUPPLIER

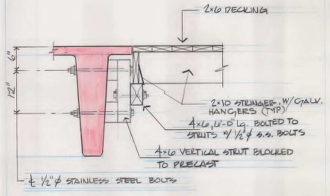
CONCRETE WALK UNDER BROAD BLVD., PLAN

1/4" = 1'-0"



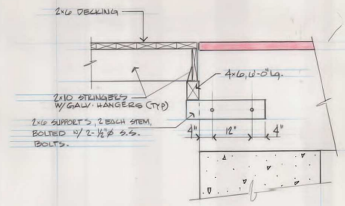
RAILING DETAIL (SEE DET. 1 SHT. 15 SIM)

3/4" = 1'-0"



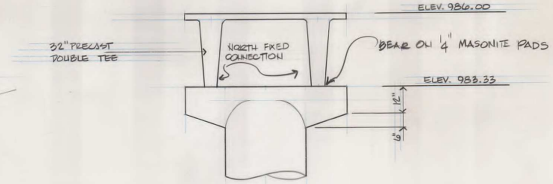
NORTH WALK CONNECTION TO PRECAST

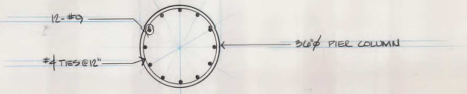
3/4" = 1'-0"

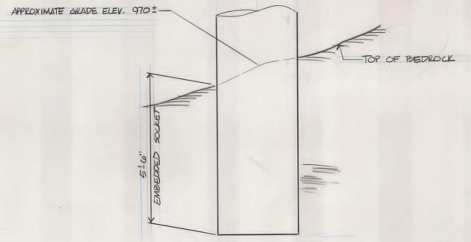


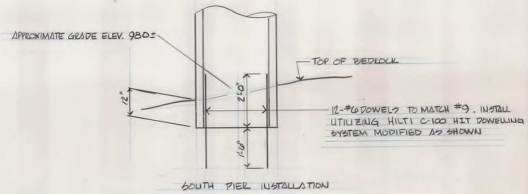
SOUTH WALK CONNECTION TO PRECAST

3/4" = 1'-0"









TYPICAL PIER DETAILS

1/2" = 1'-0"

NOTES	REVISIONS	STAMPS
		STATE OF OHIO · PAUL A. GERTZ 49739 · REGISTERED PROFESSIONAL ENGINEER

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UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: PRECAST WALK UNDER BROAD BLVD.

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

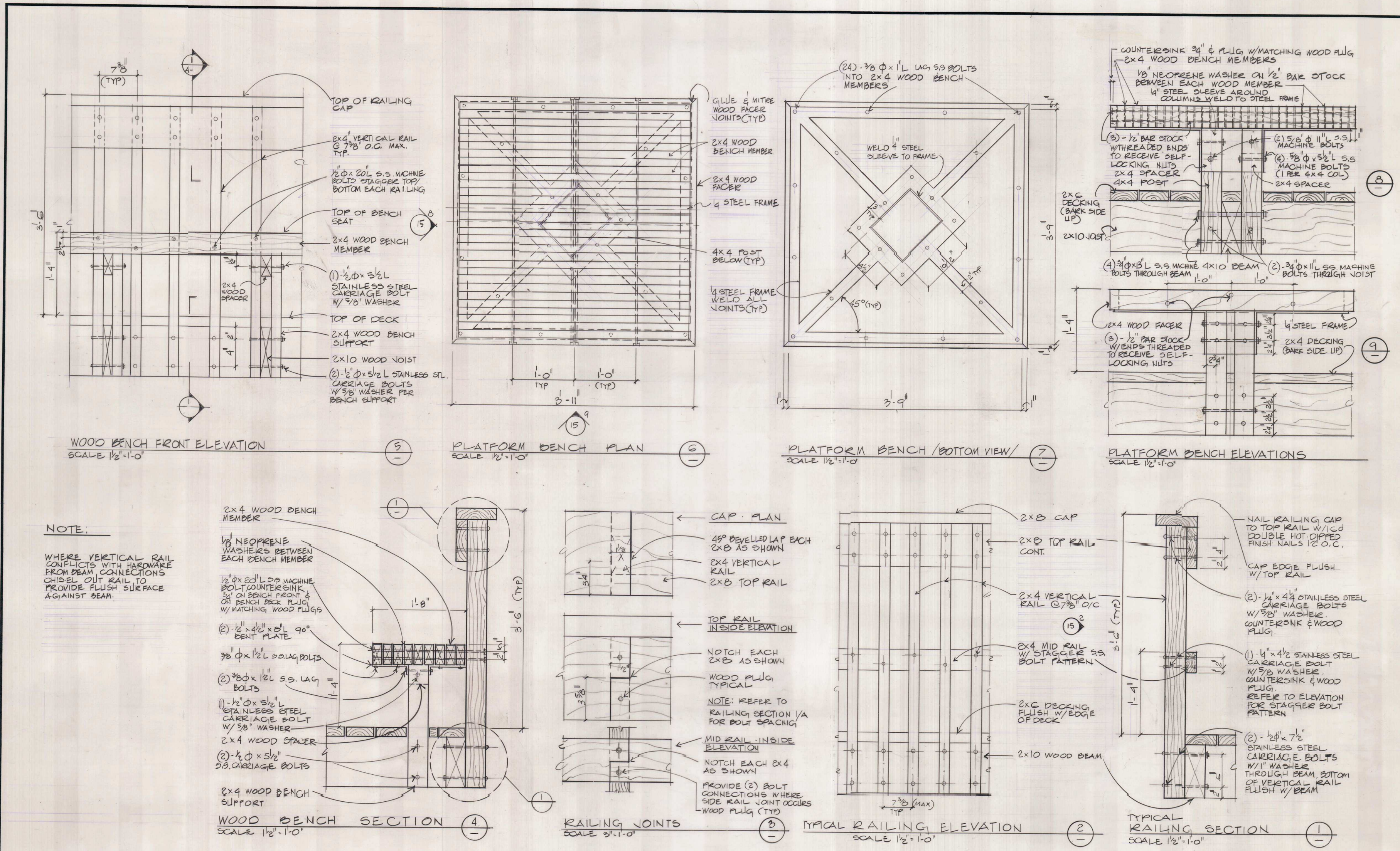
PROJECT NUMBER: 1396.03

DATE: 4/3/89

DRAWN: PG.

CHECKED: MP

SHEET No. 13 OF



NOTES

REVISIONS

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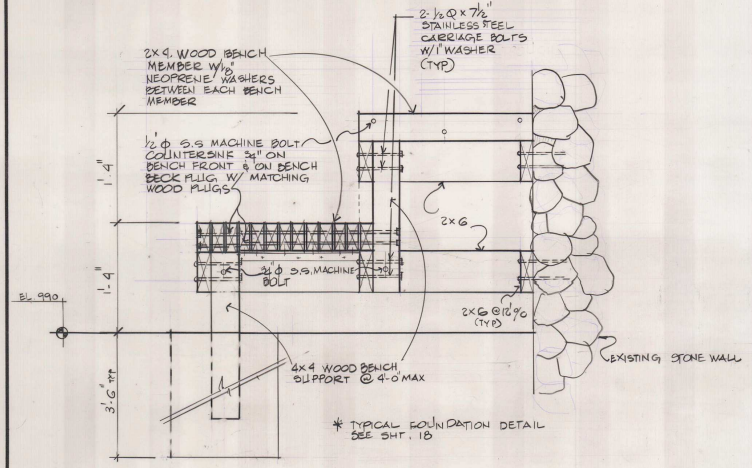
STATE OF OHIO
PAUL A. GERTZ
49739
REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

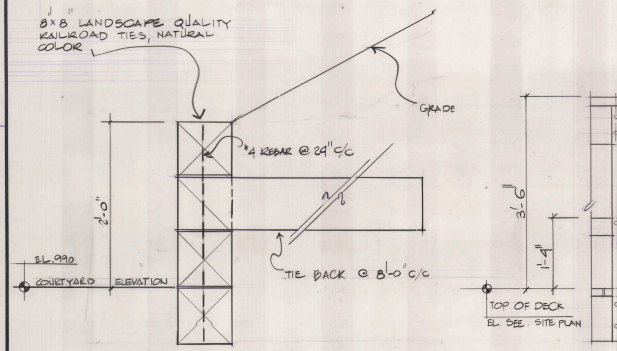
SHEET TITLE: RAILING & BENCH DETAILS
PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

PROJECT NUMBER: 1396.03
DATE: 4-3-89
DRAWN: D.B.
CHECKED
SHEET No. 15
OF

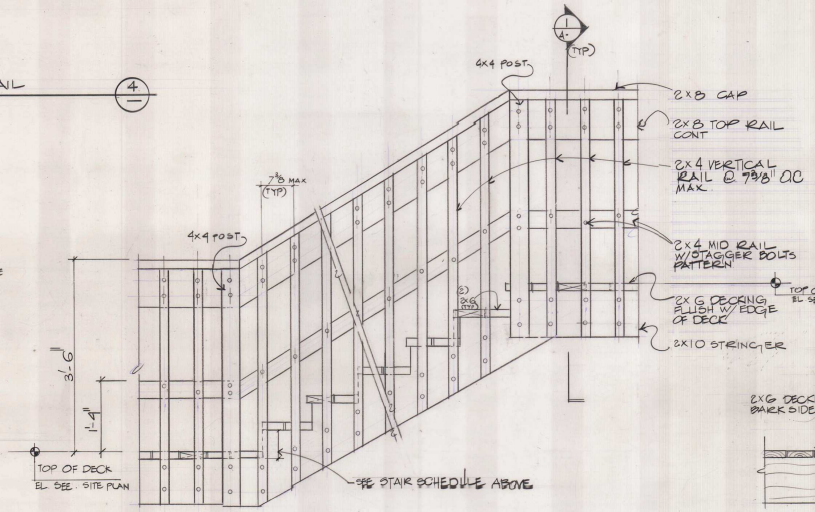


WOOD MULTI-LEVEL SEATING DETAIL 4
SCALE 1½" = 1'-0"

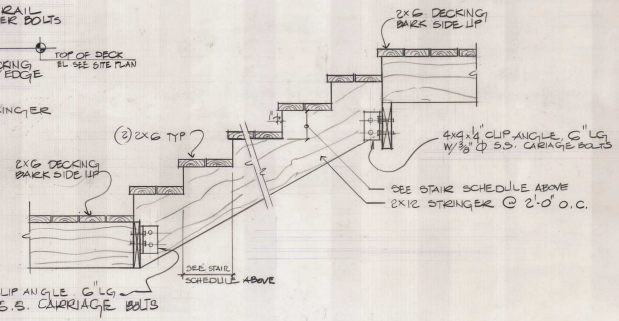
STAIR SCHEDULE				
	STAIR	TREADS	RISERS	REMARKS
1	STAIR "A"	2T @ 12" = 1'-10"	3R @ 6" = 1'-6"	
2	STAIR "B"	2T @ 12" = 1'-10"	3R @ 6" = 1'-6"	
3	STAIR "C"	3T @ 11" = 2'-9"	4R @ 7" = 2'-4"	
4	STAIR "D"	5T @ 11" = 4'-7"	6R @ 7" = 3'-6"	
5	STAIR "E"	4T @ 11½" = 3'-8"	5R @ 6¾" = 2'-7¾"	
6	STAIR "G"	7T @ 11" = 6'-5"	8R @ 7" = 4'-8"	
7	STAIR "F"	2T @ 11" = 1'-10"	3R @ 7" = 1'-9"	
8	STAIR "H"	7T @ 12" = 6'-5"	8R @ 6" = 4'-0"	
9	STAIR "I"	3T @ 12" = 2'-9"	4R @ 6" = 2'-0"	
10	STAIR "K"	3T @ 12" = 2'-9"	4R @ 6" = 2'-0"	



RAILROAD TIE RETAINING WALL DETAIL 3
SCALE ½" = 1'-0"



TYPICAL RIVER WALKWAY STAIR DETAIL 2
SCALE 1" = 1'-0"



TYPICAL MIDDLE STRINGER STAIR DETAIL 1
SCALE 1" = 1'-0"

NOTES

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UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: STAIR DETAILS & SCHEDULE

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

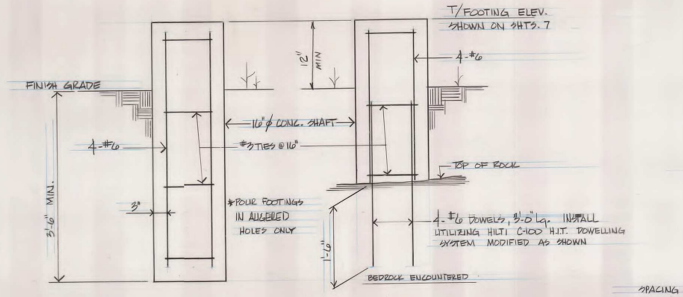
PROJECT NUMBER: 1396.03

DATE: 4/3/09

DRAWN: D.B.

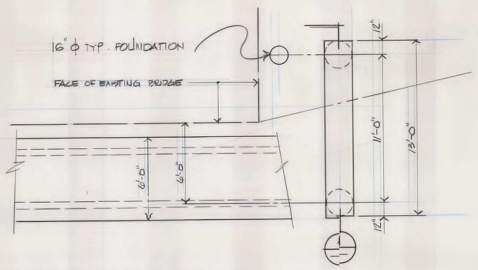
CHECKED:

SHEET No.: 16 OF



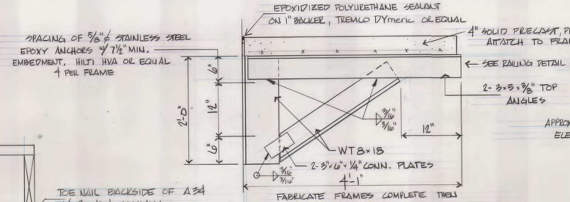
TYPICAL FOUNDATION DETAILS

1" = 1'-0"



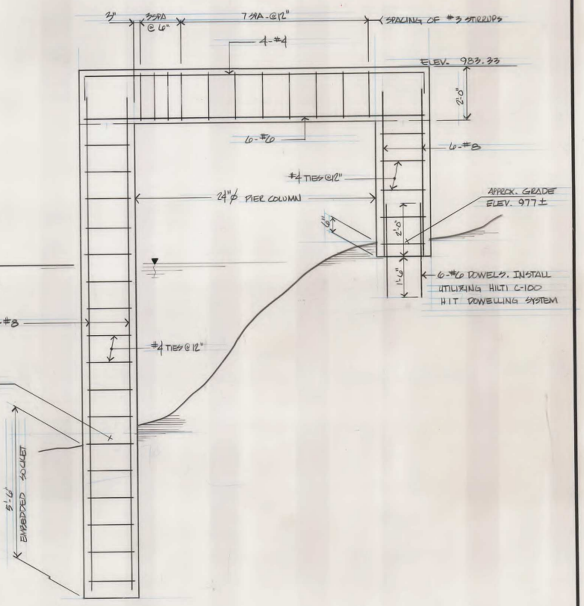
PRECAST WALK NORTH PIER ALTERNATE

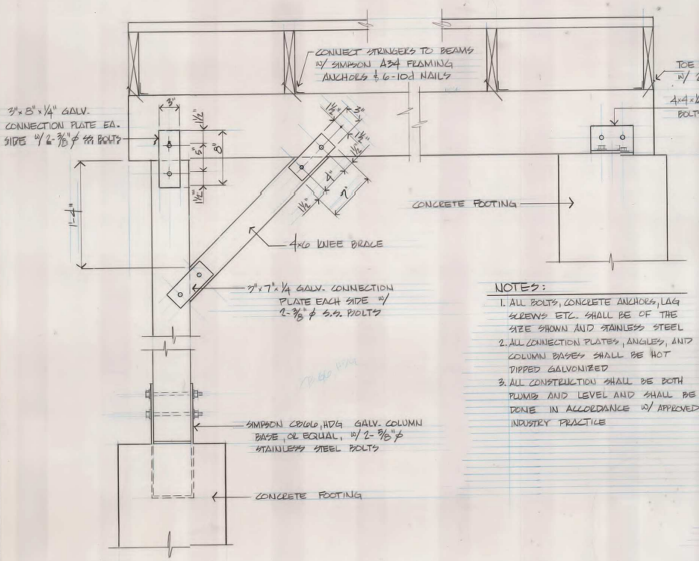
1/4" = 1'-0"



WALK SUPPORT TYPE 2

1" = 1'-0"



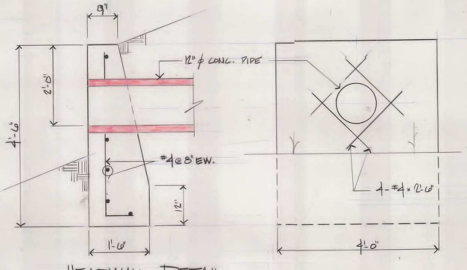


TYPICAL CONNECTION DETAILS

1 1/2" = 1'-0"

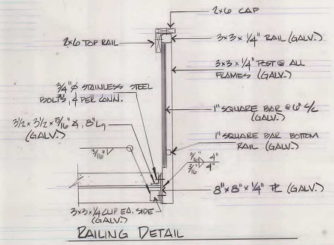
NOTES:

1. ALL BOLTS, CONCRETE ANCHORS, LAG SCREWS ETC. SHALL BE OF THE SIZE SHOWN AND STAINLESS STEEL
2. ALL CONNECTION PLATES, ANGLES, AND COLUMN BASES SHALL BE HOT DIPPED GALVONIZED
3. ALL CONSTRUCTION SHALL BE BOTH PLUMB AND LEVEL AND SHALL BE DONE IN ACCORDANCE W/ APPROVED INDUSTRY PRACTICE

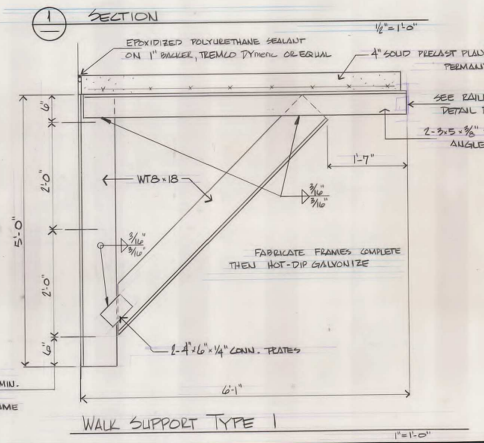


HEADWALL DETAIL

3/4" = 1'-0"



RAILING DETAIL



WALK SUPPORT TYPE 1

1" = 1'-0"

NOTES

REVISIONS

STAMPS

STATE OF OHIO
PABL A. GERTZ
49739
REGISTERED PROFESSIONAL ENGINEER

Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: SECTIONS & DETAILS

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

PROJECT NUMBER: 1396.03

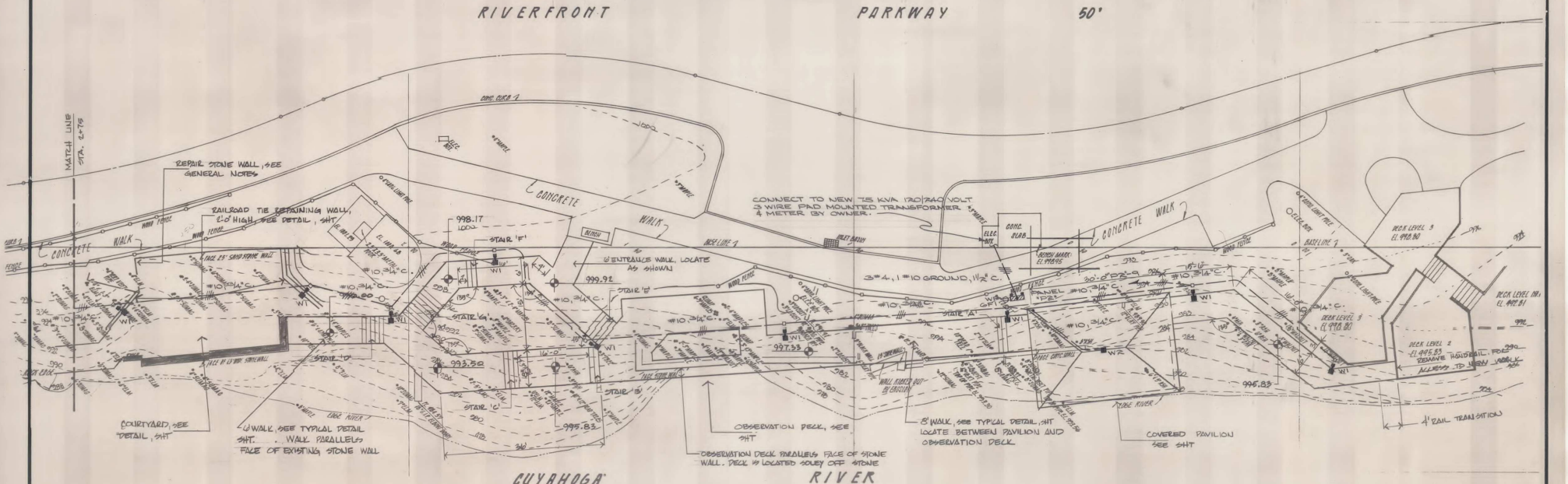
DATE: 4-5-89

DRAWN: PG.

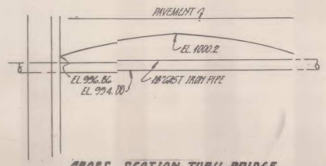
CHECKED: JCM

SHEET No. 18

OF

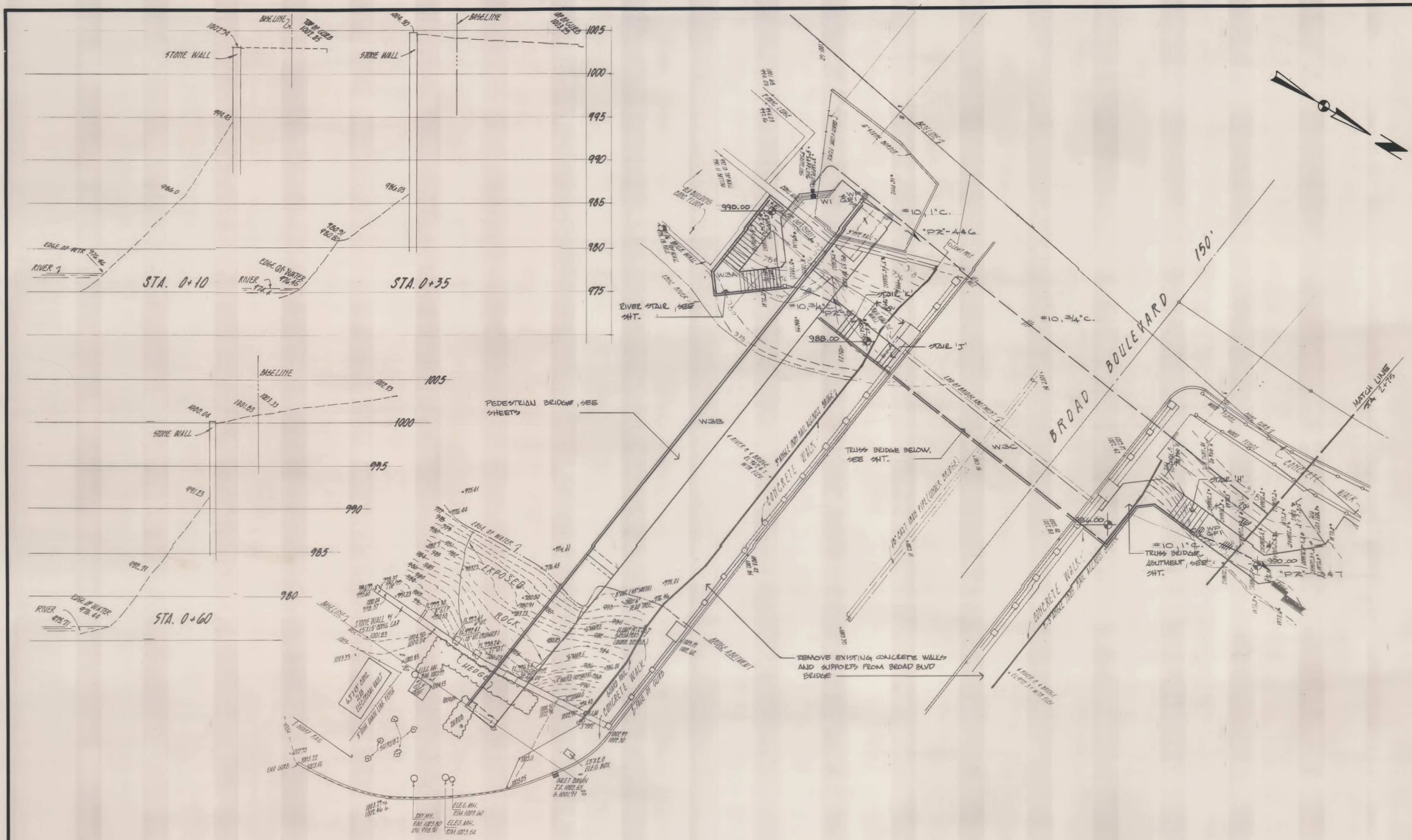


SCALE: 1" = 10'



CROSS SECTION THRU BRIDGE
(LOOKING NORTH)

NOTES	REVISIONS	STAMPS			
			Voinovich Companies UNIVERSITY SQUARE BUILDING 2450 PROSPECT AVE. CLEVELAND, OHIO 44115	SHEET TITLE: ELECTRICAL SITE PLAN PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY	PROJECT NUMBER: 1396.03 DATE: 4-3-89 DRAWN: CHECKED: SHEET No.: E1 OF



NOTES

REVISIONS

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Voinovich Companies
UNIVERSITY SQUARE BUILDING
2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: ELECTRICAL SITE PLAN

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

PROJECT NUMBER: 1396.03

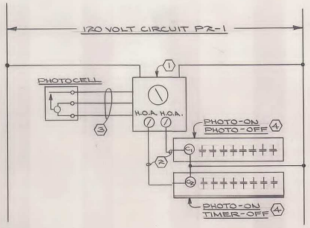
DATE: 4-3-89

DRAWN:

CHECKED:

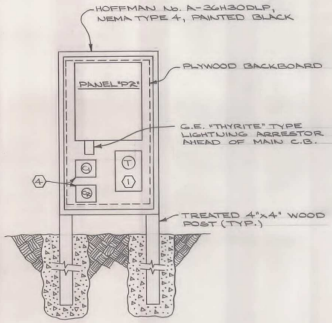
SHEET No.: E2

OF



OUTDOOR LIGHTING CONTROLS

NO SCALE

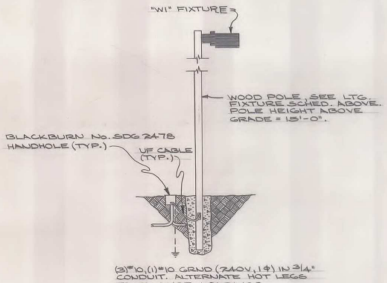


LIGHTING CONTROL ENCLOSURE

SCALE: 3/4" = 1'-0"

NOTES:

1. TORK No. T920L 2 CKT LTG. CONTROLLER - ONE CKT PHOTOCELL ON & OFF, ONE CKT PHOTOCELL ON TIMESWITCH OFF.
2. WIRING FROM CONTROLLER TO CONTACTOR.
3. TORK No. 2101 MTD ON TOP OF LIGHTING CONTROL ENCLOSURE. RUN (2) #12 THHN WIRES IN 1/2" CONDUIT.
4. SQUARE D No. LO-8P 8 POLE LIGHTING CONTACTOR. CIRCUITS WIRED THRU CONTACTS AS INDICATED.



TYPICAL "W1" FIXTURE

NO SCALE

LIGHTING FIXTURE SCHEDULE

TYPE	WATTAGE FIXT.	WATTAGE LAMPS	VOLTS	DESCRIPTION	FIXTURE MANUFACTURER	FIXTURE CAT NUMBER (SEE NOTE #1)	POLE MANUFACTURER	POLE CAT NUMBER (SEE NOTE #1)	REMARKS
W1	130	(1) LU100/D	240	12" wide x 20" long x 6-3/4" deep extruded aluminum "shoebox" w/specular aluminum reflector, extruded aluminum mounting arm, polycarbonate shield; painted black.	Devoe Lighting	PDC-100HPS-S-PCS-BLK-240	Koppers	1995-6 (19'-9")	Pole stain color to be selected by Architect.
W2	130	(1) LU100/D	240	15" square x 8" deep extruded aluminum w/specular aluminum reflector, clear tempered glass lens; painted black.	Devoe Lighting	D15-100HPS-BLK-240	N/A	N/A	Provide wooden supports to mount fixture from wooden structural system.
W3A	477	(9) 40 W F40T12	110	3-3/16" x 5" extruded aluminum illuminated handrail w/ballarc welded joints, acrylic prismatic lens w/concealed tamper proof hardware, prewired integral high power factor low energy ballasts, prewired loop wiring, and prewired power and ground circuitry; drak bronze duranodic finish.	Devoe Lighting	WRL700-148HO-Straight Thru-Integral Ballast-1109-Dark Bronze-Tamper Proof Screws	N/A	N/A	Mount fixture to vertical handrail supports with lagscrews bolted thru sides of fixture at 32" o.c. maximum spacing.
W3B	1872	(36) 40 W F40T12	110	Same as W3A.	"	"	"	"	"
W3C	1309	(25) 40 W F40T12	110	Same as W3A.	"	"	"	"	"

NOTE #1: Catalog numbers shown may not be complete. See description, wattage, voltage, and ecification Sections 16503 and 16512 to detaine complete catalog number.

PANELBOARD SCHEDULE

PANEL: P2 LOCATION: See Drawing No. E-1 MAIN CB: 100

MOUNTING: Surface CONNECTED LOAD: 6.27 KW DEMAND LOAD: 6.27 KW (26.1 Amps)

No.	Amps	Poles	KW	Designation	Lighting Contactor	No.	Amps	Poles	KW	Designation	Lighting Contactor
1	20	1	.1-C	Control Circuit		2	20	1	.3A-R	Panel Receptacle	
3	20	1	.3A-R	Truss Bridge Receptacle		4	20	1	.3A-R	Pedestrian Bridge Recept.	
5	20	1	.48-L	River Stair Lighting	C1	6	20	1	1.87-L	Pedestrian Bridge Lighting	C1
7	20	1	1.31-L	Truss Bridge Lighting	C1	8	20	1		Spare	
9	20	2	1.43-L	Walkway Lighting	C2	10	20	1		Spare	
11	/	/				12	20	1		Spare	
13	20	2		Spare		14				Space	
15	/	/				16				Space	
17				Space		18				Space	
19				Space		20				Space	
21				Space		22				Space	
23				Space		24				Space	
25						26					
27						28					
29						30					
31						32					
33						34					
35						36					
37						38					
39						40					
41						42					

Load Suffixes: C-Controls, L-Lighting, R-Receptacles, T-Transformer

NOTES

REVISIONS

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2450 PROSPECT AVE.
CLEVELAND, OHIO 44115

SHEET TITLE: DETAILS & SCHEDULES

PROJECT TITLE: CUYAHOGA FALLS RIVERFRONT WALKWAY

PROJECT NUMBER: 1396.03

DATE: 4-5-89

DRAWN

CHECKED

SHEET No.: E3

OF

APPENDIX C

DETAILED INSPECTION FINDINGS & PHOTOS

CRITICAL INSPECTION FINDINGS:

Inspection Finding Number: 1

Description: Slope erosion and undermining of two concrete piers was observed at this location. The erosion appears to be due to a storm sewer outfall directly above the piers. The erosion has caused the piers to settle by an estimated 4”-6”, as evidenced by out-of-level of the crossbeams and loss of contact between the stringers and crossbeam. In addition, there are large voids beneath one of the piers.

Location: Section 2, near north end of the observation deck

Photo(s):

Inspection Finding Number: 1

Photo(s):

Inspection Finding Number: 1

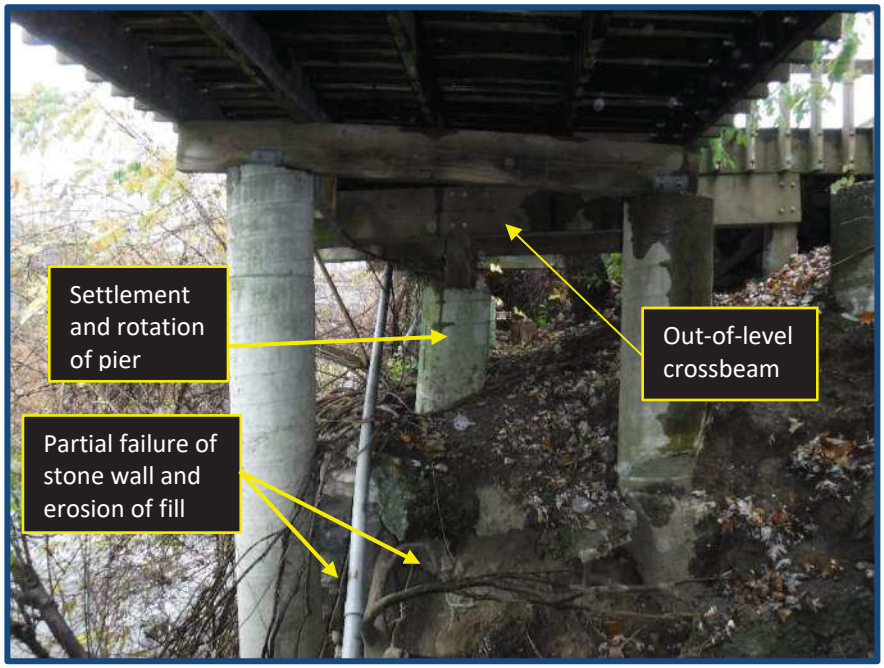
Photo(s):

Inspection Finding Number: 2

Description: Slope erosion and subsidence, and rotation and partial failure of an existing stone wall retaining fill was observed. The retained fill appears to support five piers which in turn support the east portion of the observation deck. The observed subsidence and erosion of the fill has caused settlement of the four north most piers, as evidenced by shimming required to maintain the deck in a level position. Up to approximately 3" of pier settlement has occurred at the worst location.

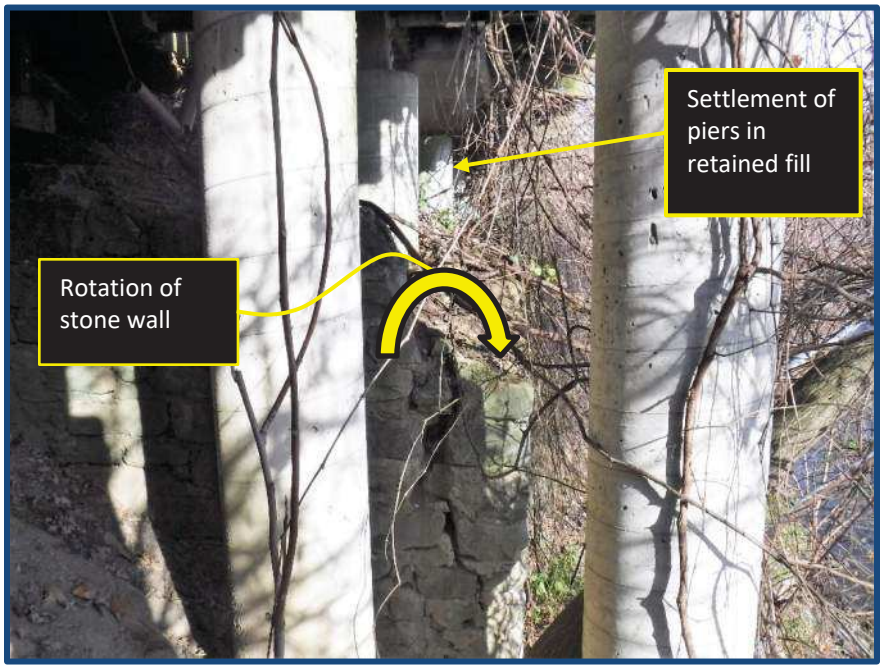
Location: Section 2, observation deck

Photo(s):



Inspection Finding Number: 2

Photo(s):



Inspection Finding Number: 3

Description: Settlement of a concrete pier was observed, as evidenced by racking of the boardwalk structure.

Location: Section 2, base of stairs near access point 'C'

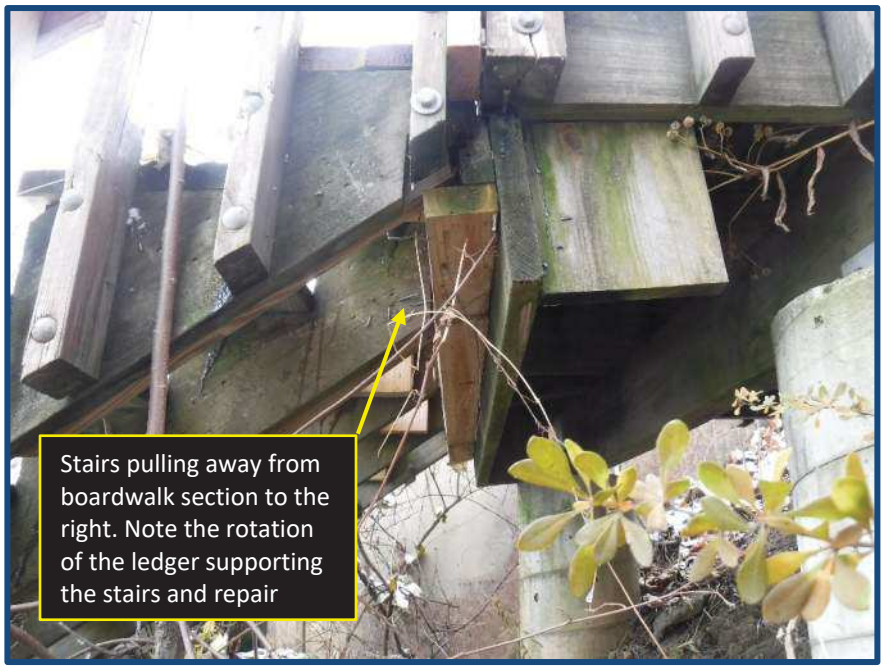
Photo(s):

Inspection Finding Number: 4

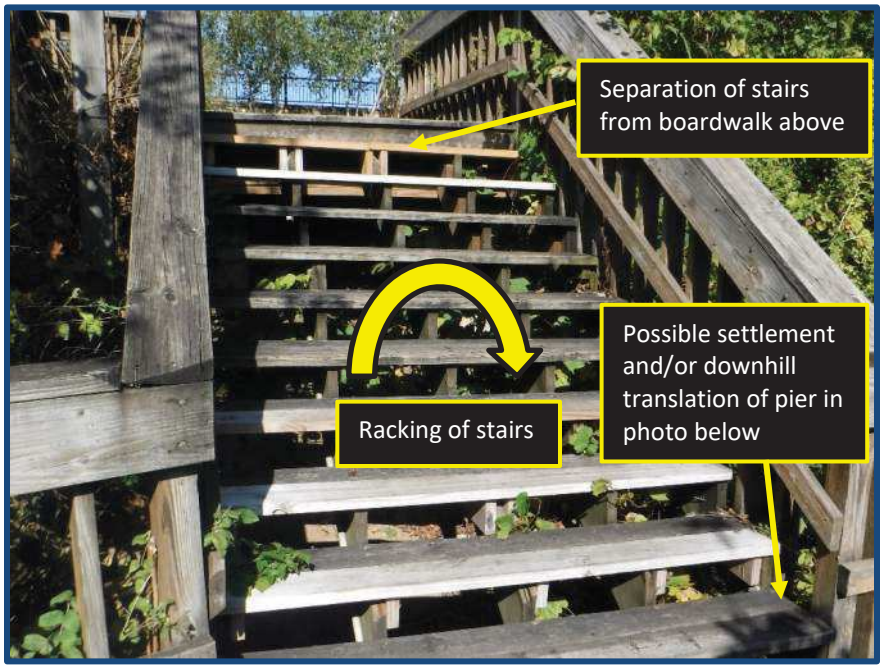
Description: Racking of the stairs, separation of the stairs from the boardwalk, and possible settlement of the pier at the base of the stairs was noted at the location described below.

Location: Section 2 at the south stairway near the courtyard area.

Photo(s):



Inspection Finding Number: 4

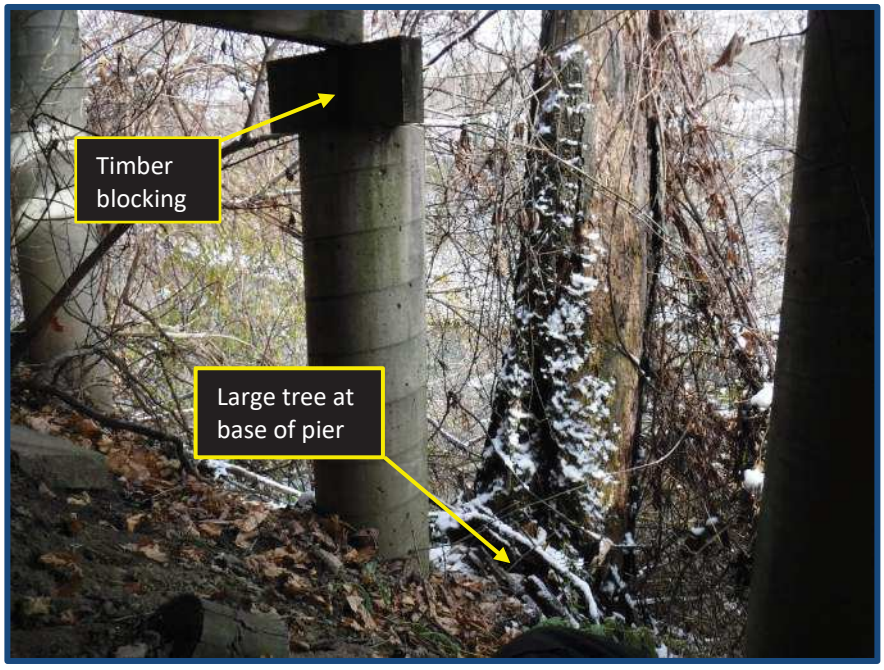


Inspection Finding Number: 5

Description: Possible settlement of a pier was noted at the location below, as evidenced by timber blocking and a large tree growing near the base of the pier.

Location: Section 2, just south of observation deck.

Photo(s):



Inspection Finding Number: 6

Description: Possible settlement of two adjacent piers was noted at the location below, based on out of level crossbeams

Location: Section 2, near bend point in boardwalk between south stairs and observation deck.

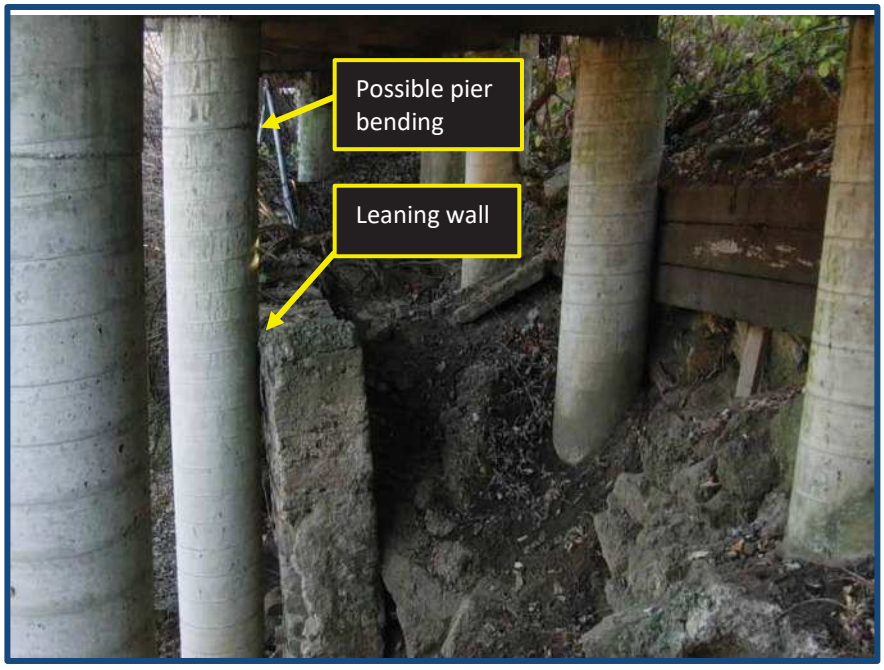
Photo(s):

Inspection Finding Number: 7

Description: A leaning wall is contacting a pier column, possibly introducing bending in the pier.

Location: Section 2, north of observation deck.

Photo(s):



Inspection Finding Number: 8

Description: Concrete deterioration was observed at the base of a pier in Section 2. The observed deterioration has reduced the bearing area of the pier and exposed reinforcing steel.

Location: Section 2, just north of observation deck.

Photo(s):

Inspection Finding Number: 8

Photo(s):

Inspection Finding Number: 9

Description: Corroded and completely failed joist hangers were noted in multiple locations. The locations with the highest number of failed hangers are the observation deck in Section 2 and the decks in Section 3. There were also other scattered locations throughout the structure where joist hangers are either corroded or completely failed in Section 1, Section 2, Section 3 and Section 4. The location of the hanger failures in Section 4 does not compromise the integrity of the structure in this location.

Location: Section 2, Section 3, and other scattered locations throughout the structure

Photo(s):

Inspection Finding Number: 10

Description: Existing stone walls along Section 2 exhibit varying degrees of deterioration. The deterioration is compromising the stability of the walls and the uphill slopes retained by the walls. Also reference inspection findings 2 and 7.

Location: Section 2 and Section 3

Photo(s):

Inspection Finding Number: 10

ADDITIONAL INSPECTION FINDINGS:

Inspection Finding Number: 11

Description: Timber railroad ties and concrete blocks appear to have been used to address slope erosion at a pier column in Section 2. No discernable settlement was observed at this pier.

Photo(s):

Inspection Finding Number: 12

Description: The stair stringers throughout the structure typically exhibit cracking and checking near the connection of the front tread to the stringer. Numerous scab repairs have been completed to re-secure the stair treads to the stringers.

Typical Photo:

Inspection Finding Number: 13

Description: Anchor bolts and fasteners throughout the structure exhibit varying degrees of surface corrosion. The stainless steel bolts and fasteners used in Sections 1 and 2 remain in good condition.

Typical Photo:

Inspection Finding Number: 14

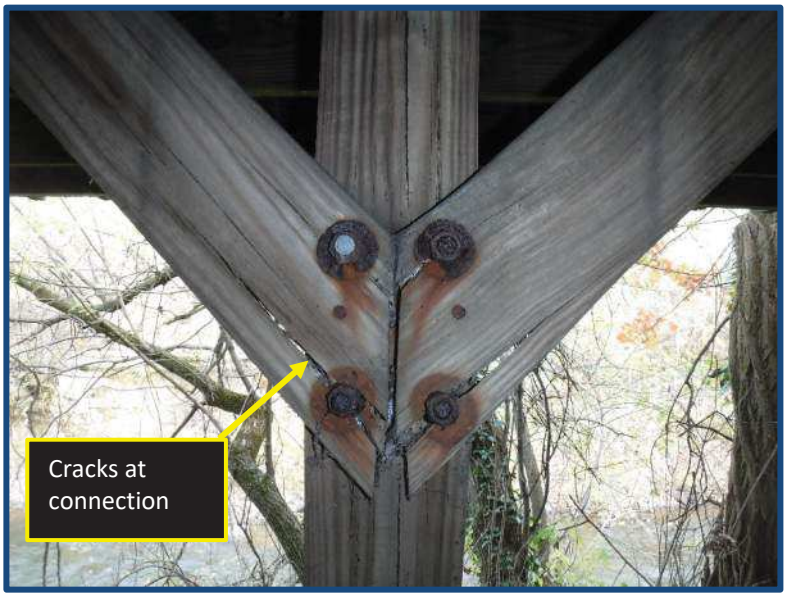
Description: In Section 3, 4 concrete piers are cracked through the entire section.

Typical Photo:

Inspection Finding Number: 15

Description: In Section 3, 9 braces are cracked at the connection point.

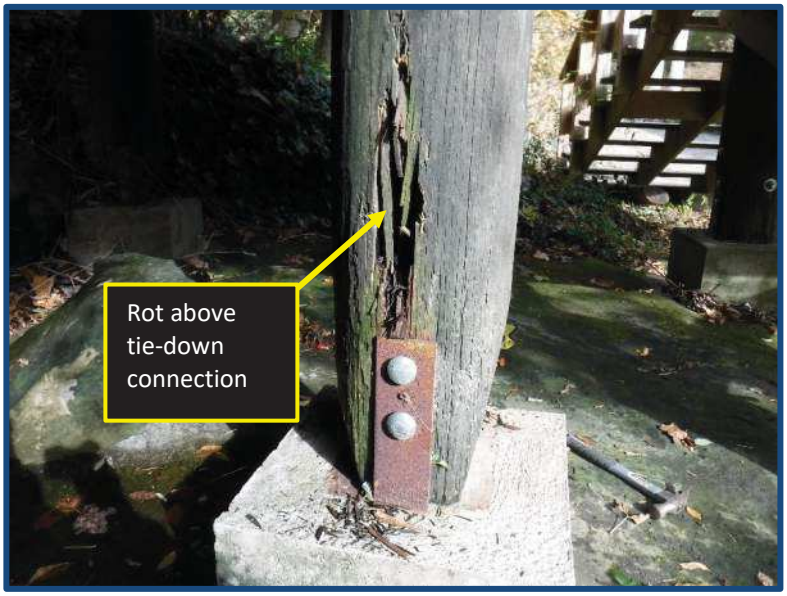
Typical Photo:



Inspection Finding Number: 16

Description: In Section 5, rot was observed at 4 timber piles above the tie-down connection.

Typical Photo:



Inspection Finding Number: 17

Description: Splits up to 3” deep were noted in Section 2 on the pavilion structure roof framing members.

Typical Photo:

Inspection Finding Number: 18

Description: Undermining of the stream bank and pavilion structure footings was observed. The fill in this area consists of a large amount of building rubble cemented together.

Typical Photo:

Inspection Finding Number: 19

Description: Spalling of concrete was observed at the precast double tee stems in Section 1.

Typical Photo:

Inspection Finding Number: 20

Description: Broken electrical conduit and corroded pole boxes for the boardwalk lighting were noted throughout the structure.

Photos:

Inspection Finding Number: 21

Description: Loose railing connections were noted at various locations

Photos:

Inspection Finding Number: 22

Description: The deck and railing boards in Sections 1, 2, 3 & 4 are highly weathered and aged in places.

Photos:

Inspection Finding Number: 23

Description: Isolated railing boards and floor stringers exhibit rot and/or cracking

Photos:

Inspection Finding Number: 24

Description: Cracked railing pickets at the anchor bolts are present at isolated locations throughout Sections 2 and 3

Photos:

APPENDIX D

PHOTOS OF EXISTING BOARDWALK ACCESS POINTS

Existing Boardwalk Access Point 'A'

Existing Boardwalk Access Point 'B'

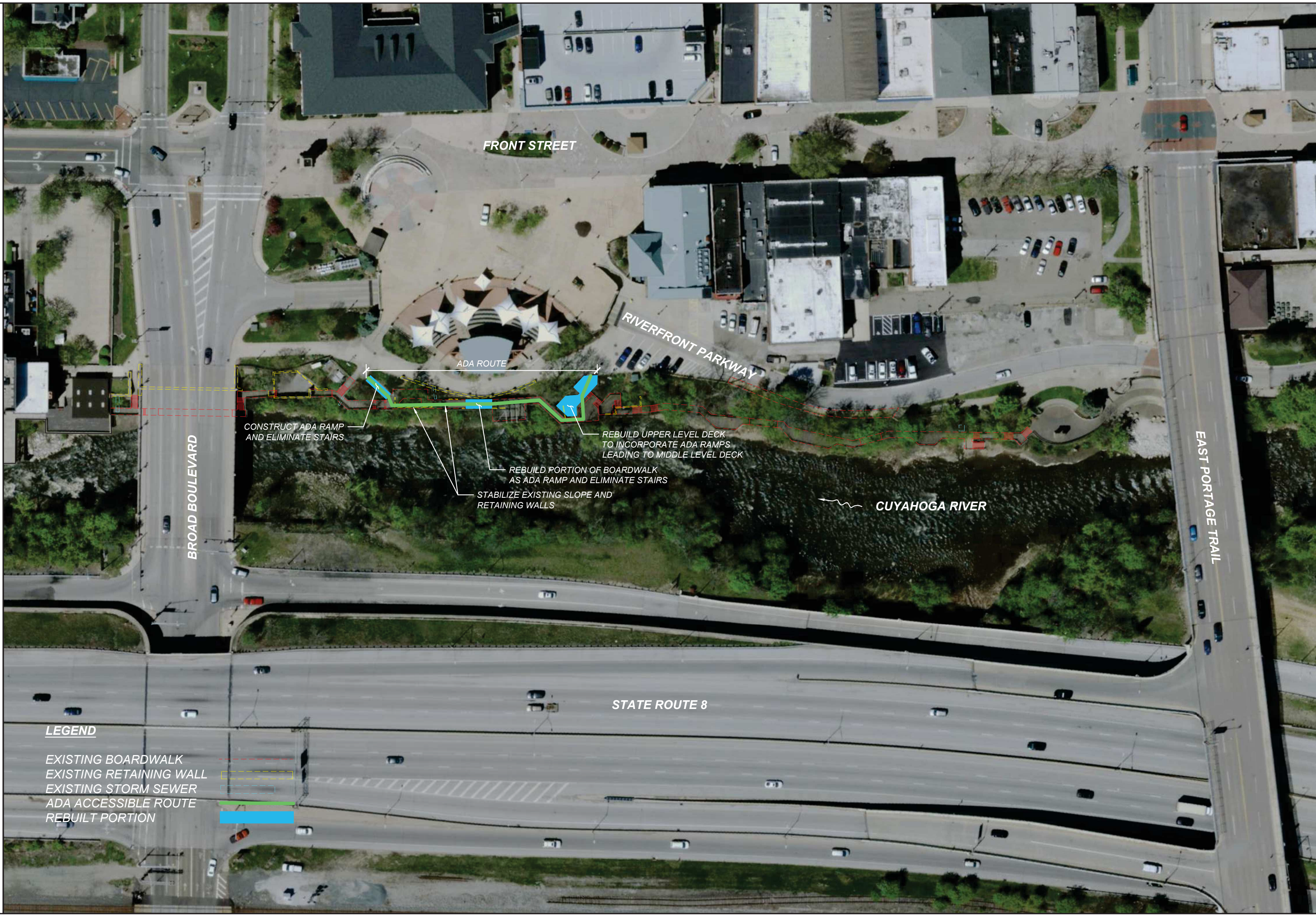
Existing Boardwalk Access Point 'C'

Existing Boardwalk Access Point 'D'

Existing Boardwalk Access Point 'E'

APPENDIX E

ALTERNATIVE 1 CONCEPT



HORIZONTAL SCALE IN FEET
0 20 40 80

ALTERNATIVE 1 CONCEPT

CUYAHOGA FALLS BOARDWALK STUDY

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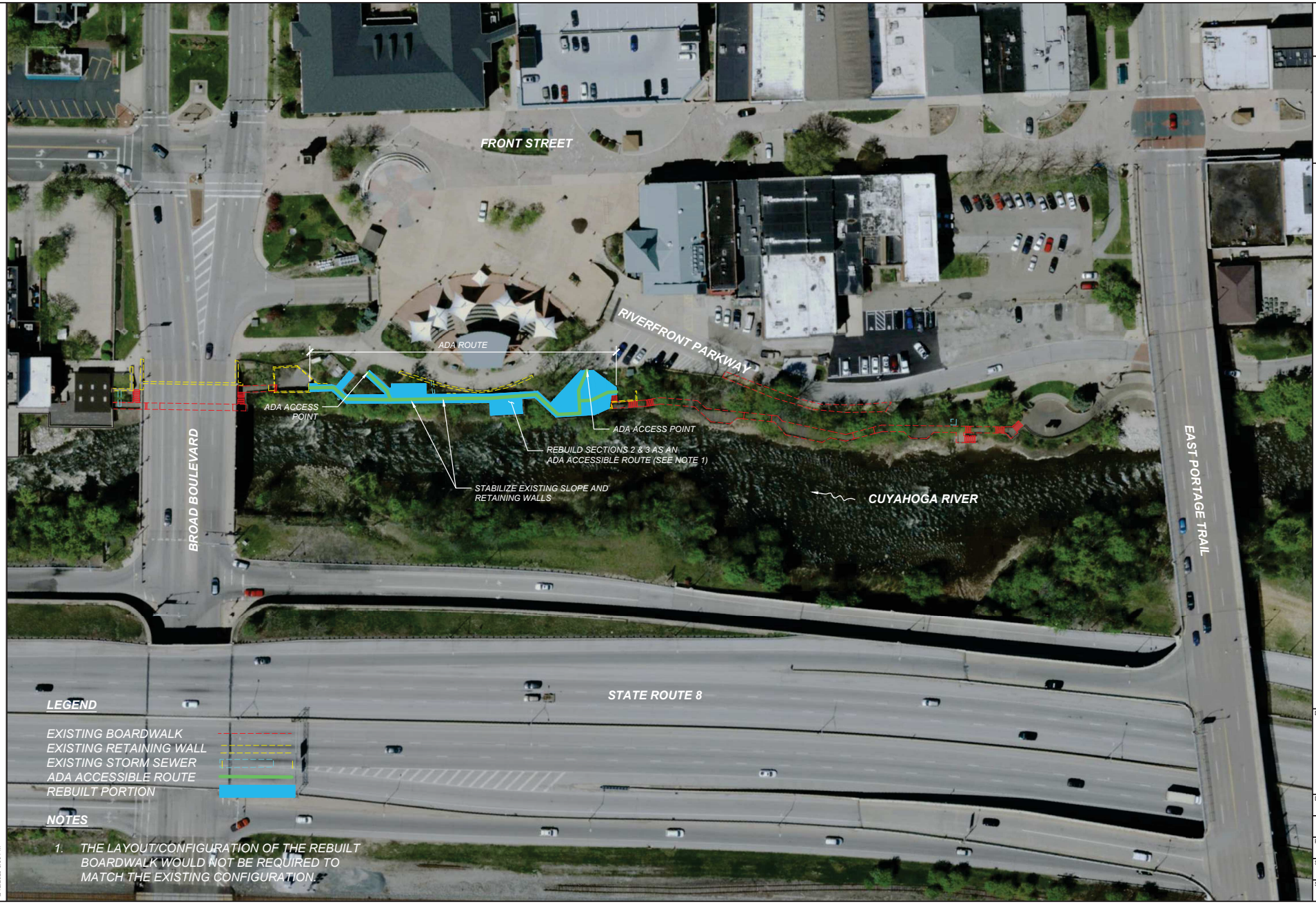
2/12/2020 5:31 PM

DESIGN AGENCY
PALMER ENGINEERING
460 WHITE POND DR.
AKRON, OH 44320
330-835-9800

DESIGNER	TES
REVIEWER	- -
PROJECT ID	CF-1
SUBSET / TOTAL	- / -
SHEET / TOTAL	- / -

APPENDIX F

ALTERNATIVE 2 CONCEPT



CUYAHOGA FALLS BOARDWALK STUDY

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2/12/2020 5:30 PM

HORIZONTAL SCALE IN FEET
0 20 40 80

ALTERNATIVE 2 CONCEPT

DESIGN AGENCY
PALMER ENGINEERING
460 WHITE POND DR.
AKRON, OH 44320
330-835-9800

DESIGNER
TES

REVIEWER
- -

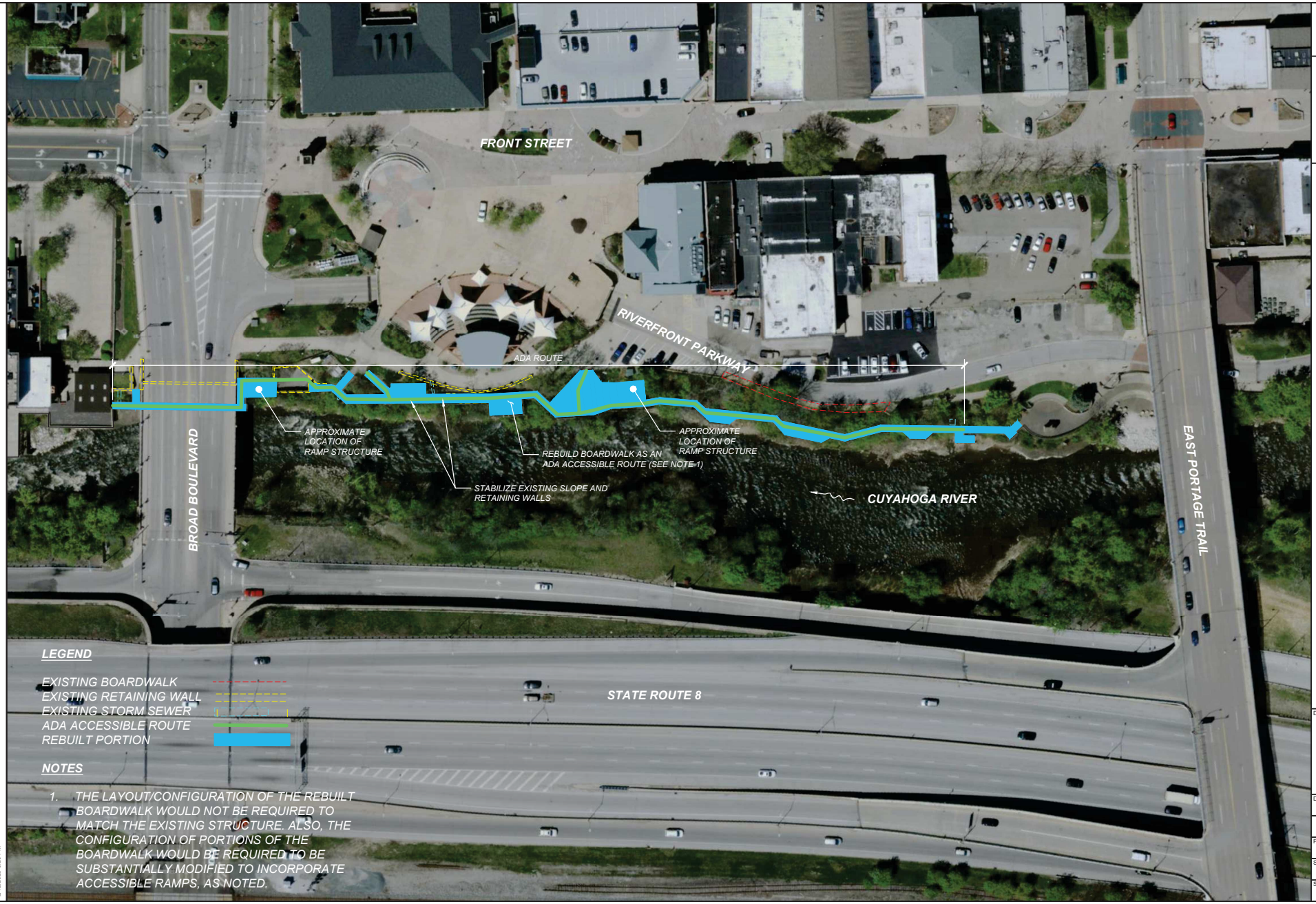
PROJECT ID
CF-1

SUBSET TOTAL
- -

SHEET TOTAL
- -

APPENDIX G

ALTERNATIVE 3 CONCEPT



CUYAHOGA FALLS BOARDWALK STUDY

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2/12/2020 5:29 PM

HORIZONTAL SCALE IN FEET
0 20 40 80

ALTERNATIVE 3 CONCEPT

DESIGN AGENCY
PALMER ENGINEERING
460 WHITE POND DR.
AKRON, OH 44320
330-835-9800

DESIGNER
TES

REVIEWER
- -

PROJECT ID
CF-1

SUBSET TOTAL
- -

SHEET TOTAL
- -

APPENDIX H

INITIAL CONSTRUCTION COSTS

ALTERNATIVE 1 (BOARDWALK REHABILITATION) ESTIMATED CONSTRUCTION COST											
ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	GENERAL	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	TOTAL QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	LS	1						1	$ 10,000.00	$ 10,000.00
202	STRUCTURE REMOVED	LS	1						1	$ 10,000.00	$ 10,000.00
203	SLOPE AND WALL STABILIZATION	LS			1				1	$ 280,000.00	$ 280,000.00
507	TIMBER PILE REPLACEMENT	FEET					60	20	80	$ 50.00	$ 4,000.00
507	MICROPILE EQUIPMENT MOBILIZATION & TESTING	LS	1						1	$ 40,000.00	$ 40,000.00
507	MICROPILES	FEET			750				750	$ 200.00	$ 150,000.00
510	DOWEL HOLES	EACH		4			4		8	$ 25.00	$ 200.00
511	MICROPILE CAP	EACH			10				10	$ 3,000.00	$ 30,000.00
516	CONCRETE REPAIR BY EPOXY INJECTION	FEET				15			15	$ 100.00	$ 1,500.00
517	BOARDWALK TIMBER RAILING	FEET		359	653	268	727	42	2049	$ 45.00	$ 92,205.00
519	COMPOSITE FIBER WRAP SYSTEM	SF				12			12	$ 150.00	$ 1,800.00
521	BRIDGE TIMBER - BOARDWALK FRAMING	SF		173	410	500	100		1183	$ 20.00	$ 23,660.00
521	BRIDGE TIMBER - BOARDWALK DECKING	SF		710	2790	1210	2910	420	8040	$ 25.00	$ 201,000.00
530	STRUCTURE MISC.: ANCHOR BOLT	EACH		4			4		8	$ 100.00	$ 800.00
530	STRUCTURE MISC.: REPLACE JOIST HANGERS	EACH		8	78	50	5	5	146	$ 10.00	$ 1,460.00
623	CONSTRUCTION LAYOUT STAKING	LS	1						1	$ 5,000.00	$ 5,000.00
624	MOBILIZATION AND DEMOBILIZATION	LS	1						1	$ 40,000.00	$ 40,000.00
									CONSTRUCTION SUBTOTAL		$ 891,625.00
									20% DESIGN CONTIGENCY		$ 178,330.00
									ESTIMATED CONSTRUCTION TOTAL		$ 1,070,000.00

ALTERNATIVE 2 (PARTIAL REPLACEMENT AND REHABILITATION) ESTIMATED CONSTRUCTION COST											
ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	GENERAL	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	TOTAL QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	LS	1						1	$ 15,000.00	$ 15,000.00
202	STRUCTURE REMOVED	LS	1						1	$ 25,000.00	$ 25,000.00
203	SLOPE AND WALL STABILIZATION	LS			1				1	$ 280,000.00	$ 280,000.00
507	TIMBER PILE REPLACEMENT	FEET					60	20	80	$ 50.00	$ 4,000.00
510	DOWEL HOLES	EACH		4			4		8	$ 25.00	$ 200.00
517	BOARDWALK TIMBER RAILING	FEET		359			727	42	1128	$ 45.00	$ 50,760.00
521	BRIDGE TIMBER - NEW BOARDWALK STRUCTURE [1]	SF		20	2800	1400	100		4320	$ 110.00	$ 475,200.00
521	BRIDGE TIMBER - BOARDWALK FRAMING	SF		20			100		120	$ 20.00	$ 2,400.00
521	BRIDGE TIMBER - BOARDWALK DECKING	SF		710			2910	420	4040	$ 25.00	$ 101,000.00
530	STRUCTURE MISC.: ANCHOR BOLT	EACH		4			4		8	$ 100.00	$ 800.00
530	STRUCTURE MISC.: REPLACE JOIST HANGERS	EACH		8			5	5	18	$ 10.00	$ 180.00
623	CONSTRUCTION LAYOUT STAKING	LS	1						1	$ 10,000.00	$ 10,000.00
624	MOBILIZATION AND DEMOBILIZATION	LS	1						1	$ 40,000.00	$ 40,000.00
									CONSTRUCTION SUBTOTAL		$ 1,004,540.00
									20% DESIGN CONTIGENCY		$ 200,910.00
									ESTIMATED CONSTRUCTION TOTAL		$ 1,206,000.00

Notes:

1) Unit pricing for this item includes foundation and substructure costs

ALTERNATIVE 3 (FULL REPLACEMENT) ESTIMATED CONSTRUCTION COST											
ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	GENERAL	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	TOTAL QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	LS	1						1	$ 15,000.00	$ 15,000.00
202	STRUCTURE REMOVED	LS	1						1	$ 40,000.00	$ 40,000.00
203	SLOPE AND WALL STABILIZATION	LS			1				1	$ 280,000.00	$ 280,000.00
521	BRIDGE TIMBER - NEW BOARDWALK STRUCTURE [1]	SF		1000	2800	1800	2910	420	8930	$ 110.00	$ 982,300.00
623	CONSTRUCTION LAYOUT STAKING	LS	1						1	$ 10,000.00	$ 10,000.00
624	MOBILIZATION AND DEMOBILIZATION	LS	1						1	$ 40,000.00	$ 40,000.00
									CONSTRUCTION SUBTOTAL		$ 1,367,300.00
									20% DESIGN CONTIGENCY		$ 273,460.00
									ESTIMATED CONSTRUCTION TOTAL		$ 1,641,000.00

Notes:

1) Unit pricing for this item includes foundation and substructure costs