NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

237

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration For* (National Register Bulletin 16A). Complete each item by marking "X" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name: Hardenburgh Avenue Bridge

other names/site number: 020009A

2. Location

street and number: Hardenburgh Avenue over the Tenakill Brook N/A not for publication

city or town: Demarest Borough N/A vicinity

state: New Jersey county: Bergen County zip code: 07003

3. State/Federal/Tribal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this X nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant nationally X statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 1/25/01

Assistant Commissioner, Natural & Historic Resources/DSHPO

State or Federal agency and bureau — American Indian Tribe

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date

State or Federal agency and bureau — American Indian Tribe

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper — Date of Action

- ☑ entered in the National Register. — Edson H. Beall — 3/12/01
  - ☐ See continuation sheet.
- ☐ determined eligible for the National Register.
  - ☐ See continuation sheet.
- ☐ determined not eligible for the National Register.
- ☐ removed from the National Register.
- ☐ other. (explain:) _____

5. Classification

Ownership of Property
(Check as many boxes as apply)

- [ ] private
- [X] public-local
- [ ] public-State
- [ ] public-Federal

Category of Property
(Check only one box)

- [ ] building(s)
- [ ] district
- [ ] site
- [X] structure
- [ ] object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

Transportation

Historic Subfunctions
(Enter subcategories from instructions)

Road-Related

Current Functions
(Enter categories from instructions)

Transportation

Current Subfunctions
(Enter subcategories from instructions)

Road-Related

7. Description

Architectural Classification
(Enter categories from instructions)

Other

Materials
(Enter categories from instructions)

Other
Brick
Concrete
Steel
Stone

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B Property is associated with the lives of persons significant in our past.
- X C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is

- A owned by religious institution or used for religious purposes..
- B removed from its original location.
- C a birthplace or grave.
- D a cemetery.
- E a reconstructed building, object, or structure.
- F a commemorative property.
- G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Engineering
Transportation

Period of Significance

ca. 1875-1911

Significant Dates

Circa 1875
1911

Significant Person

(Complete if criterion B is marked above)

N/A

Cultural Affiliation

Architect/Builder

Ralph Earle Jr. (1911 widening)
unknown

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS:)

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested.
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey
- ☐ recorded by Historic American Engineering Record

☐ See continuation sheet for additional HABS/HAER documentation.

Primary location of additional data:

- X State Historic Preservation Office
- X Other (Repository Name: County of Bergen)

10. Geographical Data

Acreage of Property: 0.14

UTM References

(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	18	587244	4534255
2			
3			
4			

☐ See continuation sheet

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title: John Terreri, R.A.., County Architect

organization: County of Bergen date: 11/6/2000

street & number: 21 Main Street, Room 201E telephone: (201) 646-2863

city or town: Hackensack state: New Jersey zip code: 07601-

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name: Bergen County Board of Chosen Freeholders

street & number: Administration Building, Court Plaza South, 21 Main Street telephone:

city or town: Hackensack state: New Jersey zip code: 07601-

DESCRIPTION

General Description

The Hardenburgh Avenue Bridge over Tenakill Brook is a hybrid masonry and steel bridge resulting from three major building campaigns: a brick arch bridge of circa 1875, widened on both sides with stringers and concrete jack arches in 1911, and which has undergone a substantial rehabilitation in 1999. Hardenburgh Avenue is a major east-west road in Demarest. The bridge carries both vehicular and pedestrian traffic. A machine traffic count showed that 9,931 automotive vehicles crossed the bridge in a single day (NJHT grant application).

The stone-faced bridge is set in picturesque Demarest Park. The park features a gently undulating topography punctuated with willows, oaks, and elms. The majority of the trees predate the Civil War. Just upstream from the bridge, a concrete spillway forms a duck pond. The 1872 Romanesque Revival Demarest train station borders the park and is in full view of the bridge. Stone work on the bridge and the stone work on the station are similar of color, type, and coursing.

The roadway width of the structure is 33 feet and 7 inches. The northern sidewalk is eleven feet wide, while the width of the southern is eleven feet nine inches. The overall width of the structure, out to out, is a little over sixty feet. The length of the span is 32 feet (NJ BS Form # 020009A). The bridge has an eight foot clearance over the streambed of Tenakill Brook (faxed communication from Ron Giamario, Lichtenstein Consulting Engineers, Inc. dated 11/15/00).

First Building Campaign – circa 1875

The first construction associated with the existing bridge took place in circa 1875. The date being used for the purposes of this nomination is different than the 1909 date used in the *New Jersey Historic Bridge Survey*. Conversations with the Bergen County Department of Public Works indicate that the 1909 date is associated with a stone arch culvert at a different location on Hardenburgh Avenue (telephone interview with Ed Ranuska, County Engineer 11/14/00). Subsequent research has not resulted in conclusive evidence dating the first building campaign. The circa 1875 date has been chosen because it relates to both adjacent development (adjacent railroad station construction in 1872) and the technology exhibited in the bridge's construction (brick arch bridge construction was most prevalent in the last quarter of the nineteenth century).

During the first building campaign, a single 32-foot span elliptical brick deck arch supported on ashlar masonry abutments was built (NJ BS form # 020009A). A brick deck arch is an arch bridge that carries traffic across the top of an arch that is constructed of several layers of interlocking bricks. Regardless of the size or material, the principle behind arch technology is constant; the arch ring is compressed together under vertical loads which must be balanced by an equal force at the abutments (NJBS p. 42). "The brick arch utilizes similar engineering principles and methods of construction as the stone arch, but the main material of the arch is several layers of mortared brick. Built primarily during the last quarter of the nineteenth century, brick arches were constructed with falsework and earth fill. They are finished with stone spandrel walls and parapets like those used for stone arch spans." (NJ BS p. 43).

Second Building Campaign – 1911

In 1911, the Hardenburgh Avenue Bridge was widened. Ralph D. Earle Jr., the Bergen County Engineer, designed the project (Plan 9-B-2-1 received by fax from the Bergen County Engineer's Office 11-15-00). The total additional width was approximately 20' 5". Four steel stringers were added to south side of the bridge, and three were added on the north side. The stringers are connected to the brick arch with ¾ inch tie rods. Concrete jack arches span the distances between the stringers. Like the original brick arch, the stringer and jack arch addition is supported on ashlar masonry abutments (rehab plans B8 of 8).

A steel stringer is a longitudinal steel beam. Stringer bridges represent the oldest form of bridge technology dating from prehistory when felled trees were laid across streams. "Whether the material is wood or metal, the principle behind the stringer bridge is the same; it relies on the bending strength of the material to resist the loads." (NJ BS p. 56).

Jack arches are small arches placed between the stringers that help to distribute the live load, and which form an integral part of the bridge deck (NJ BS form # 1463163).

The 1911 widening plans show that "the original coping stone was reused with a Cast Iron Newel post and railing similar tin design to Chester B. Albree's *Florence* pattern" (NJ BS form # 020009A). The only change in the appearance of the bridge between the 1911 widening and the third building campaign was the removal of the railing and its replacement by an ashlar masonry parapet. It is not known when this occurred.

Third Building Campaign – 1999

In 1997, Bergen County (the owner) received a $142,906.00 matching grant from the New Jersey Historic Trust to help fund a major rehabilitation in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties* of the Hardenburgh Avenue Bridge. Activities funded by the grant included: repointing of bricks on the arch and stones on the abutment; construction of a concrete relieving slab placed above the brick arch to increase the structural capacity of the bridge; in-kind replacement of the steel stringers; in-kind reconstruction of the concrete sidewalk; and dismantling of the stone parapets and construction of a reinforced concrete core faced with original stone in its original configuration (request for reimbursement, April 2000, NJHT Project No. 97.006).

The current parapets have an eight-inch reinforced concrete core, which is faced with stone veneer. The entire parapet is capped by a coping stone. The total width of the parapets vary between two feet and two feet six inches in width. (Rehabilitation plan by A.G. Lichtenstein & Associates, Inc dated 8/96, sheet B1 of 8).

Steel-backed timber guiderail was added on both quadrants of the western approach road as part of the rehabilitation project (Rehabilitation plan by A.G. Lichtenstein & Associates, Inc dated 8/96, sheet B1 of 8).

SIGNIFICANCE

Spanning the picturesque Tenakill Brook in Demarest Park, the Hardenburgh Avenue Bridge is a significant example of bridge engineering in New Jersey at the turn of the twentieth century. The Hardenburgh Avenue Bridge embodies two historically significant styles of construction: brick arch, and stringers with concrete jack arches. This bridge is the only known example in New Jersey that combines these two significant construction technologies. For these reasons it is eligible to be listed under Criterion C.

Background

The Borough of Demarest, incorporated in 1903, occupies 2.1 square miles in the eastern section of Bergen County, lying midway between the Hudson and Hackensack Rivers. Alpine Borough, Cresskill Borough, Haworth Borough, Dumont Borough, and Closter Borough border it. Demarest is defined by gently rolling topography, many small meandering brooks, ponds and marshy areas. The early architecture of the area includes several examples of stone houses, four of which are included in the thematic nomination of for the early stone houses of Bergen County.

Development in the western section of Demarest was spurred by the 1859 arrival of the Northern Railroad of New Jersey. Hardenburgh Avenue was laid out prior to 1876 (Detail from Walker's *Atlas of Bergen County* 1876, p. 90 as shown on page 3 of form # 0209-D1 of the *Bergen County Historic Sites Survey Borough of Demarest* 1981-1982), with a straight alignment as part of a grid pattern. By the end of the nineteenth century Demarest's role as a residential suburb was established. The single family home was historically the dominant building unit is Demarest, a pattern that continues today.

It seems that there should have been a predecessor structure at or near this location. Area settlement substantially predates the existing bridge. Photographs of the adjacent train station (built ca. 1874) from c. 1880 clearly show the duck pond, but do not include the bridge location. However, no evidence has been found to elucidate its type of construction, or even to confirm the existence of a predecessor (11/14/00 phone interview with Harold Collins, Trustee, Demarest Historical Society, Inc.).

Design and Significance

Research into county records, particularly freeholder minutes, done for *the New Jersey Historic Bridge Survey*, did not reveal the builder or designer of the elliptical brick arch. "Built primarily during the last quarter of the nineteenth century, brick arches were

constructed with falsework and earth fill. They were finished with stone spandrel walls and parapets like those used for stone arch spans." (NJ BS p 43). Brick arch bridges, never a common bridge type, typically date from 1850-1900. The zenith of brick arch bridge construction was in the 1870s and 1880s, due to the improvement in both bricks and artificial cement mortars, and the ease of erection compared to stone arch bridges (NJ BS p 43).

The brick arch is in and of itself significant for its type and method of construction. It is the only brick arch bridge surviving in Bergen County. Of the nine elliptical brick arch bridges included in the *New Jersey Historic Bridge Survey*, the Hardenburgh Avenue Bridge was one of only three that were recommended as eligible. A total of fourteen brick arch bridges were included in the survey, which included over 2,000 bridges built before 1945. They were located solely within Burlington (1), Bergen (1), Essex (4), Middlesex (1), Passaic (3), Somerset (1), and Union (3) counties. Of the fourteen, only six were recommended as eligible to be listed in the National Register of Historic Places (NJ BS Appendix C, pp. C-5 and C-6). One individually eligible brick arch bridge not included in the survey is known to survive in New Jersey; the Georgian Court Bridge (North Lake Drive over tributary to Lake Carasaljo) in Lakewood, Ocean County.

However, it should be noted that the 1911 alterations to the brick arch do not diminish the integrity of the structure. The additions of stringers and jack arches have gained significance over time and are character defining features of the historic resource as it exists today.

"The earliest metal stringer bridges in New Jersey date (from) the 1880s and their use (was), in part related to the expanding desire for masonry bridge decks which are supported on, initially, brick and, later, concrete jack arches set between the stringers." (NJ BS p 57). "By the end of the 1920s, (the stringer) had surpassed all other bridge types for spans up to 35 feet in length, and it went on to become by far the most common bridge type in the state prior to 1946." (NJBS p 56). 895 stringer bridges were included in the *New Jersey Historic Bridge Survey*, of which less than thirty were recommended as individually eligible for listing (email correspondence with Charles Ashton, NJDOT, 11/15/00).

Jack arches are small arches placed between stringers to help distribute live loads and they form an integral part of the bridge deck (NJ BS p 55). Introduced to bridges in the 1880s, jack arches were initially of brick (NJ BS form #1463163). However, by about 1905, concrete – with either a smooth or corrugated surface – was replacing brick (NJBS form #1463163). Concrete jack arches are an important transition point between brick

jack arches and concrete slab decks (NJBS form # 2101202). By 1914, the use of jack arches declined. (NJ BS form # 1463163). Jack arch technology was "a prolific turn-of-the-century construction technique that was eventually replaced by the reinforced

concrete deck." (NJ BS form # 020009A). 42 of the 895 stringer bridges included in the *New Jersey Historic Bridge Survey* featured jack arches. 20 were specified as having concrete jack arches, only two of which were recommended as individually eligible for listing (email correspondence with Charles Ashton, NJDOT, 11/15/00).

Conclusion

The Hardenburgh Bridge is a rare surviving example of brick arch bridge construction. But more importantly, it is the only embodiment in New Jersey of the combination of two important, if fleeting, bridge technologies of the turn of the twentieth century: brick arch and stringer with jack arches. Through this technological melange the Hardenburgh Avenue Bridge offers an important and unique perspective of our collective past.

MAJOR BIBLIOGRAPHIC REFERENCES

Diamond Anniversary, Demarest, N.J. 1903-1978. 75th Anniversary Committee, 1978.

Federal Writers Project: Bergen County Panorama. Board of Chosen Freeholders, 1941.

Hampton, Madeline W., Historic Houses in Bergen County. Teaneck: 1967, unpublished.

Harvey, Cornelius B. Genealogical History of Hudson and Bergen Counties, NJ, New York: N.J. Genealogical Publishing Co., 1900.

Reeve, Arthur, compiler. Demarest, Its People and History, Commemorating New Jersey Tercentenary, 1664-1964. 1964.

Van Valen, J.M. History of Bergen County, New Jersey New York. New Jersey Publishing Co., 1900.

Westervelt, Frances A. History of Bergen County N.J. 1630-1923. Three Vols. New York Lewis Historical Publishing Co., 1923.

Woodsward, Clayton W., compiler. History of Bergen and Passaic Counties. Philadelphia: Everts and Peck, 1882.

MAPS

1849 Sidney's Map of Twelve Miles Around New York, Philadelphia: N. Friend, 1851.

1851 Sidney's Map of Twelve Miles Around New York. Philadelphia: N. Friend, 1851.

1861 G.M. Hopkins, Map of the Counties of Bergen, Passaic, New Jersey. Philadelphia: G.H. Corey.

1867 M. and T. Hughes Map from Palisades to Paterson. Philadelphia: N. Friend, 1867.

1876 A.H. Walker, compiler, Atlas of Bergen County, 1776-1876. Reading, PA: C.C. Pease, 1876

1899 N.J. Geology and Typographic Maps. 1899 ed.

1902 D. Robinson, compiler. Map of Bergen County, New Jersey with a Portion of Passaic County and New York: E. Robinson and Co. 1902.

1912, 1913 George W. and Walter S. Bromley. Atlas of Bergen County, New Jersey. Philadelphia: G.W. Bromley and Co., Vol. 1:1912, Eastern Section. Vol. 2:1913, Western Section.

1934 N.J. Geology and Typographic Maps, 1934 ed.

Map of Villa Sites at Demarest in the Township of Harrington, Bergen County, New Jersey. New York, July 1, 1892. Filed by William E. Davies.

SURVEYS

Bergen County Historic Sites Survey: Borough of Demarest. 1981-1982, Bergen County Board of Chosen Freeholders. Bergen County Office of Cultural and Historic Affairs.

DRAWINGS

Bassett, William B. compiler, John Poppeliers, ed. Historic American Building Survey of New Jersey. Newark: The New Jersey Historical Society, 1977. (Abb:HABS)

INTERVIEWS

Ashton, Charles. New Jersey Department of Transportation. November 15, 2000

Giamario, Ron. Lichtenstein Consulting Engineers, Inc. November 15, 2000.

Ranuska, Ed. County Engineer. November 14, 2000.

MISC. FILE

The Junior League of Bergen County, Inc. A Landmark Inventory of Structures in Bergen County Built Prior to 1850. Englewood: June 1978. Research file in B.C.H.S collection in Johnson Library, uncatalogued. (abb: Junior League Inventory)

Miscellaneous File 0112: Demarest: Golden Anniversary Demarest 1903-1953 (1953).

New Jersey Department of Transportation, The New Jersey Historic Bridge Survey. Prepared by A.G. Liechtenstein & Associates Inc., 1994, No. 020009A.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 10. Geographical Data Page 10

Hardenburgh Avenue Bridge
Bergen County, New Jersey

Verbal Boundary Description

The boundary for the Hardenburgh Avenue Bridge emcompasses a site that includes the entirety of the road right-of-way and extends to the abutments on both sides.

Verbal Boundary Justification

The boundary encompasses the site occupied by the structure, as well as its respective supporting abutments and related road surfaces.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 11 Page 11

Historic Name
Hardenburgh Avenue Bridge

Date Created/Modified
November/20/2000

Content
Form Revised (11/17/2000):

Andrea Tingey
Principal Historic Preservation Specialist
New Jersey Historic Preservation Office
P.O. Box 404
Trenton, New Jersey 08625

(609) 984-0539

Photographic Identification:
Items 1-5 apply to all photographs

1. Hardenburgh Avenue Bridge
2. Bergen County
   New Jersey
3. Kinney Clark
4. November 30, 2000
5. New Jersey Historic Preservation Office

6. NE view
7. Photograph 1 of 10

6. NE view
7. Photograph 2 of 10

6. WSW view
7. Photograph 3 of 10

6. E view, sidewalk along south parapet
7. Photograph 4 of 10

6. E view, underside of bridge showing jack arches
7. Photograph 5 of 10

6. NE view, south side of bridge showing jack and brick arches
7. Photograph 6 of 10

6. SW view, north side of bridge showing jack and brick arches
7. Photograph 7 of 10

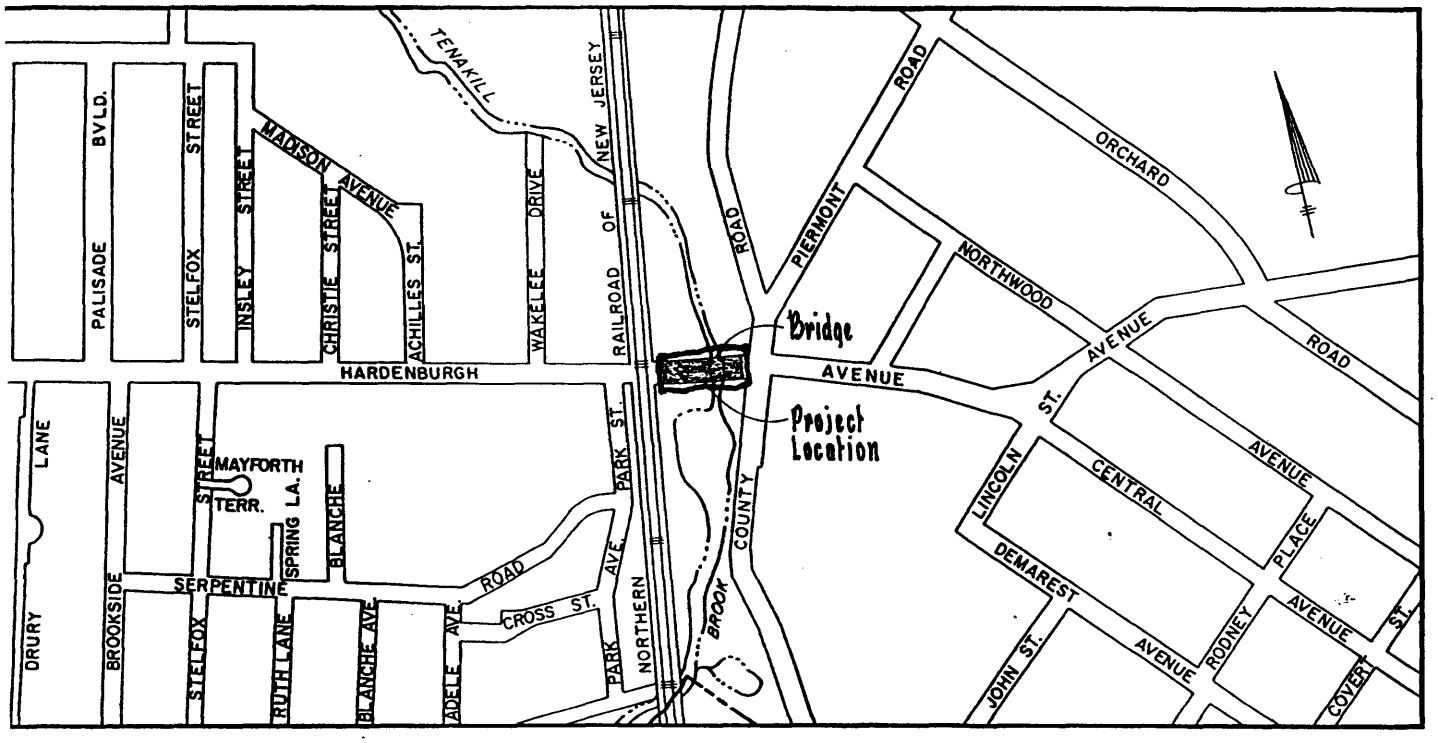
6. WSW view, underside detail of jack and brick arches
7. Photograph 8 of 10

Photograph Identification continued:

6. SW view, underside of bridge showing jack and brick arches
7. Photograph 9 of 10

6. NW view, showing width of roadway, sidewalks and parapets
7. Photograph 10 of 10

REHABILITATION OF THE
ARDENBURGH AVENUE BRIDGE
OVER THE TENAKILL BROOK
IN THE
OF DEMAREST • BERGEN COUNTY • NEW JE



KEY MAP
Scale 1"=250'

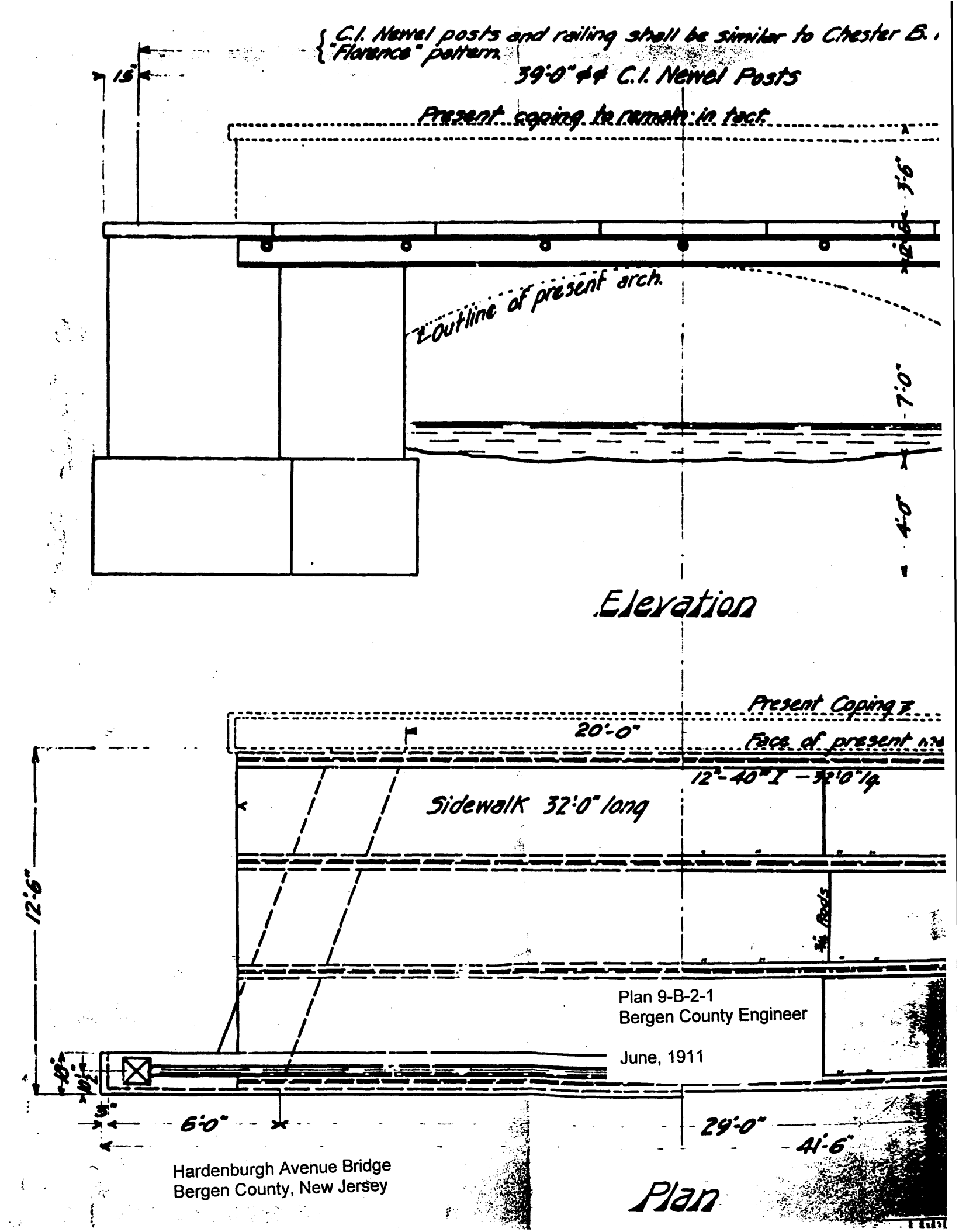
250' 125' 0 250' 500'
GRAPHIC SCALE

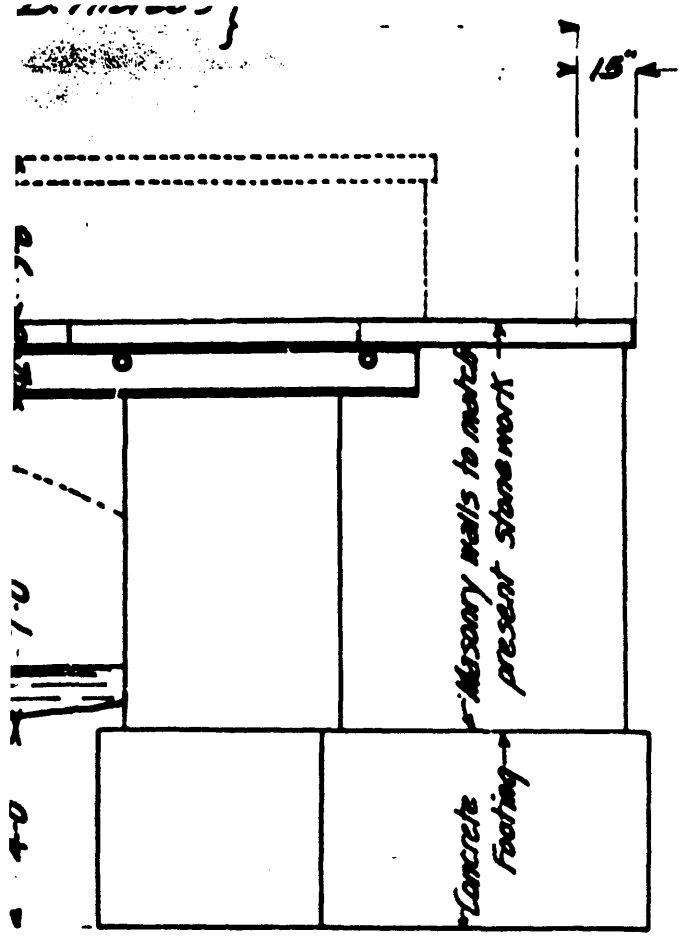
PREPARED BY

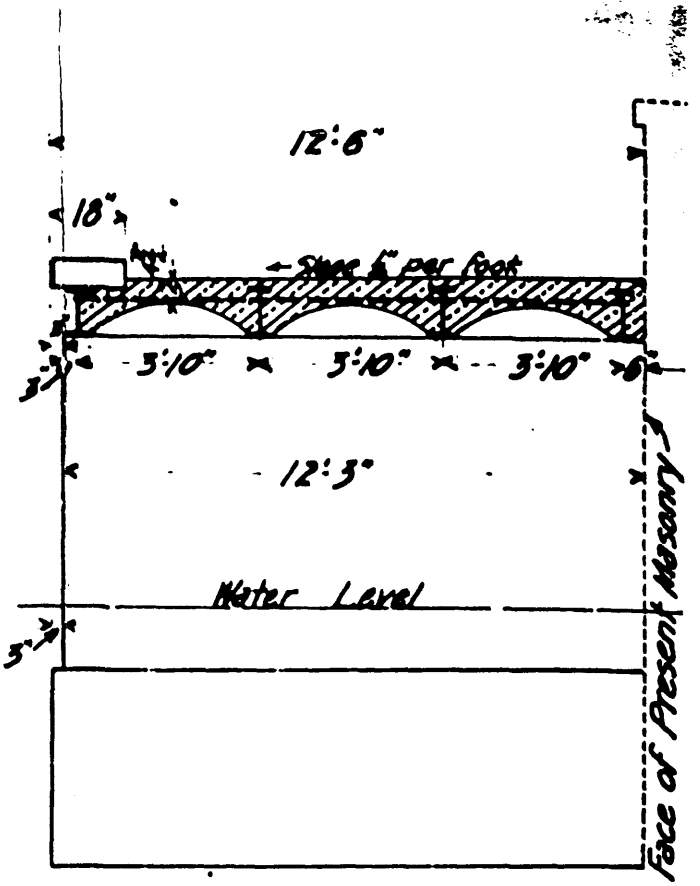
AZZOLINA & FEURY
ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-8500

DATE
JAMES A. FEURY, P.E.
PROFESSIONAL ENGINEER N.J. LIC NO 21098

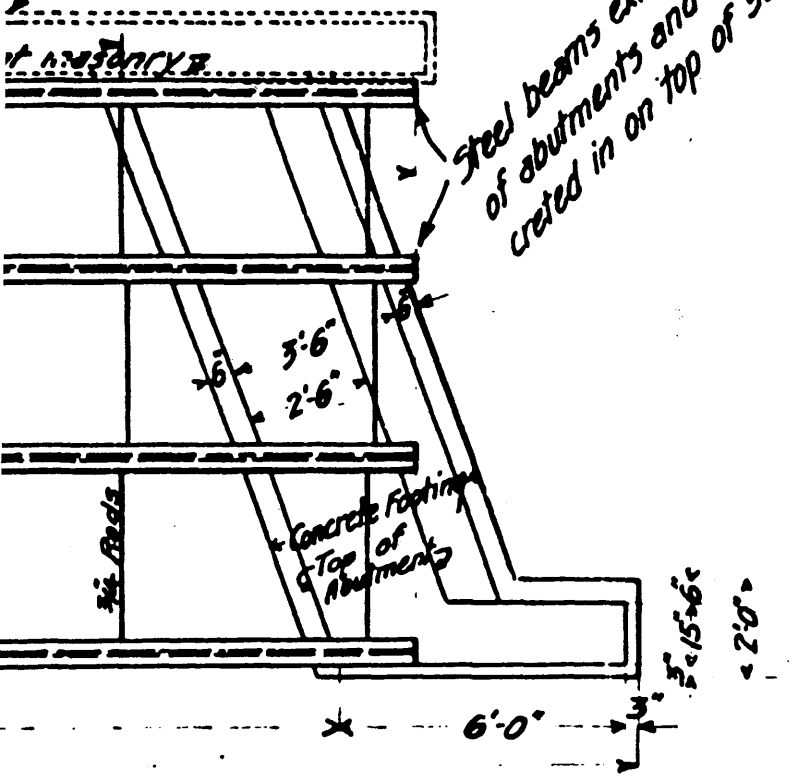
Hardenburgh Avenue Bridge
Bergen County, New Jersey


{C.I. Newel posts and railing shall be similar to Chester B. "Florence" pattern.
39'-0" # C.I. Newel Posts
Present coping to remain in tact
15"
3'-6"
Outline of present arch
7'-0"
4'-0"
Elevation
Present Coping
20'-0"
Face of present
12"-40" I - 32'0" lg
Sidewalk 32'0" long
12'-6"
Plan 9-B-2-1
Bergen County Engineer
June, 1911
6'-0"
29'-0"
41'-6"
Hardenburgh Avenue Bridge
Bergen County, New Jersey
Plan





Section



9-B-2

Plan and Details for a Sidewalk Extension to a Stone Arc on Hardenburgh Ave. Demarest, Bergen County, N

Scale 1/4"=1'-0"

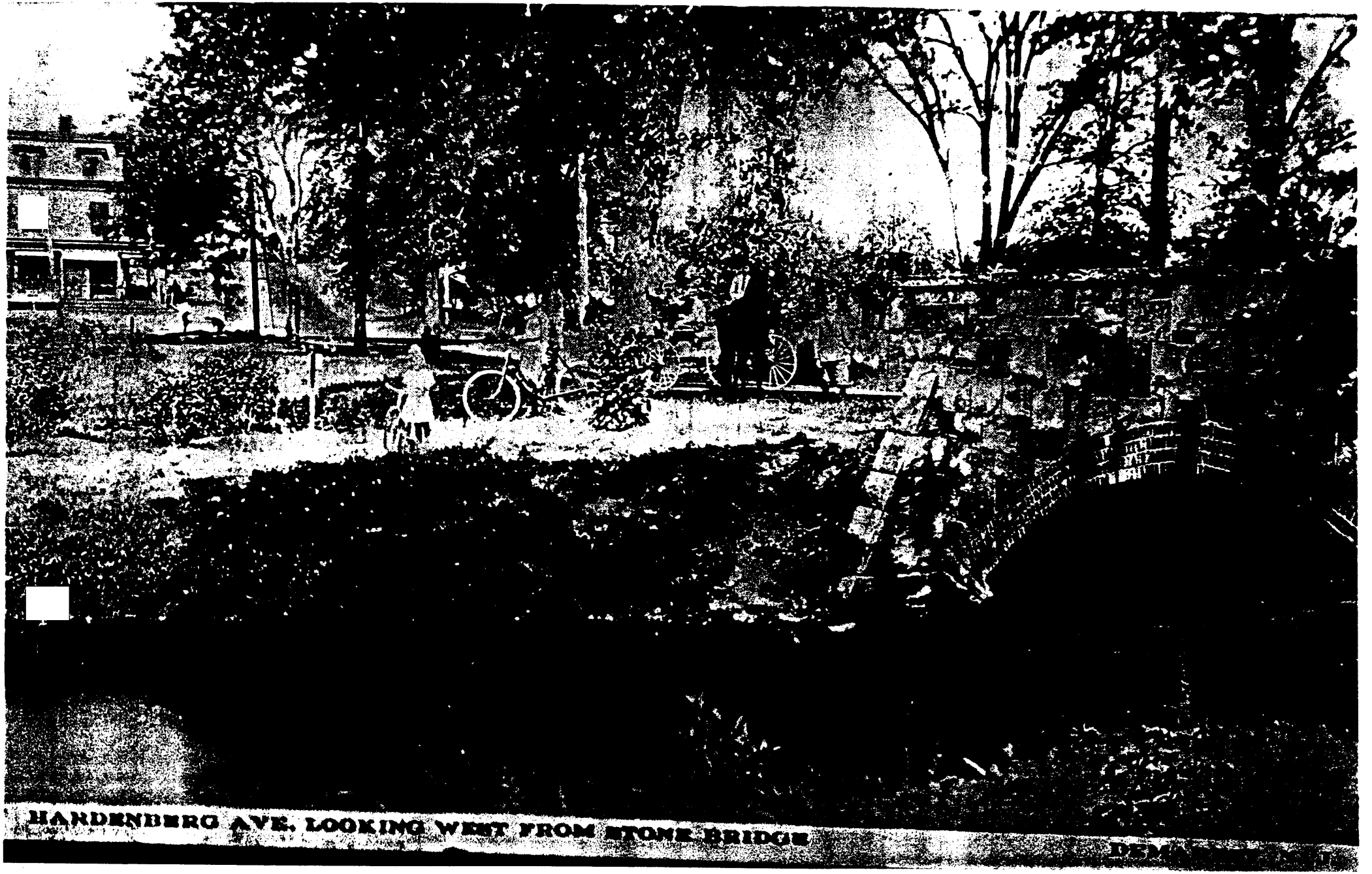
June,

Plan 9-B-2-1
Bergen County Engineer

June, 1911

Hardenburgh Avenue Bridge
Bergen County, New Jersey

Ralph
County



Local postcard
Circa 1900

Hardenburgh Avenue Bridge
Bergen County, New Jersey

Plan
Hardenburgh Avenue Bridge Improvement
Borough of Demarest

Bergen County — New Jer

SCALE: 1" = 20'	DATE: 01.03.05	DWN. BY: DDG.	CHKD. BY: G.V.V.	DWG. 3 0

AZZOLINA & FEURY ENGINEERING COMPAN
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6

Construct 150 C.Y. Bank Stabilization
50 L.F. Guide Rail

Construct 1 Unit Conc. Headwall

Hardenburgh Avenue Bridge
Bergen County, New Jersey

TENAKILL BROOK

DIRECTION OF FLOW

Exist. Bridge Opening

Graphic Scale 20' 10' 0 20' 40'

BROOK

FLOW

2'-0" PARAPET

A

EXISTING R.O.W.

CONCRETE SIDEWALK

INV. 12" CLAY PIPE

EXISTING CURBLINE

6"ø WATER

1'-0" CONCRETE TOE WALL (TYP.)

11'-0" SIDEWALK

33'-7" C/C

15" R.C.P.

B.C.S.A. M.H.

36.51

CONCRETE SIDEWALK

6"ø WATER

INV. 18" CLAY PIPE
EL. 30.43

HARDENBURGH AVENUE

ARCH RING 20'-0" SPRING LINE ARCH RING

12'-0"± (TYP.)

STONE SPANDREL WALL OF ARCH (TYP. 4 CORNERS)

8"ø GAS

EXISTING CURBLINE

CONCRETE SIDEWALK

CONC. FOOTING (TYP. 4 CORNERS)

8"ø GAS

CONCRETE SIDEWALK

EXISTING R.O.W.

15" MAPLE

TENAKILL BROOK

A

REMOVAL LIMITS OF SIDEWALK

4"

2'-

3"

CONCRETE

2'-

Hardenburgh Avenue Bridge
Bergen County, New Jersey

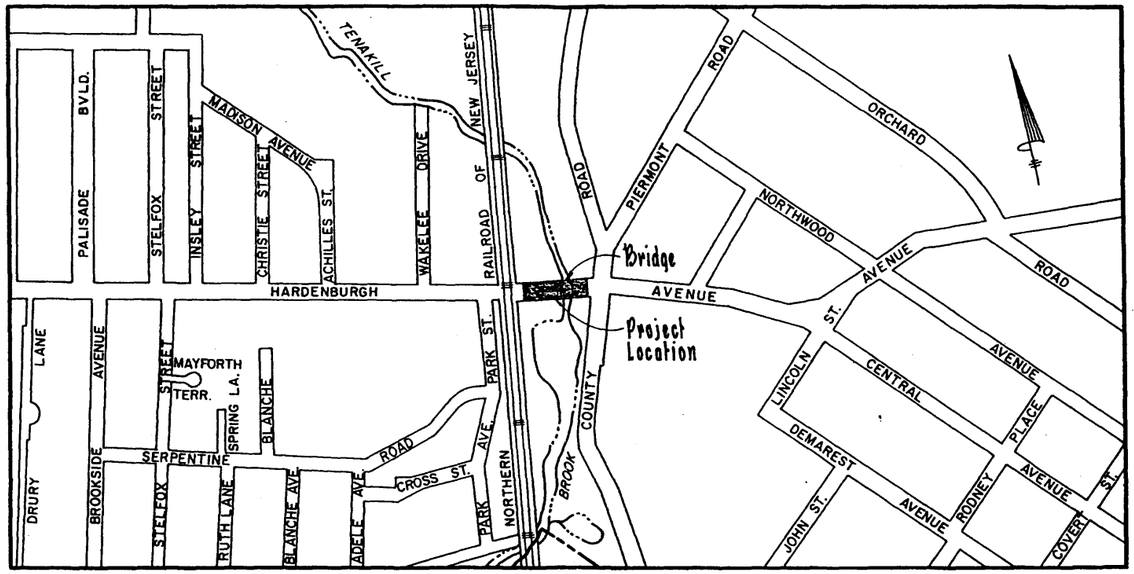
REINFORCED CONCRETE PARAPET (TYP.)

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE OVER THE TENAKILL BROOK

IN THE

BOROUGH OF DEMAREST • BERGEN COUNTY • NEW JERSEY

UTILITIES
BELL ATLANTIC OF NEW JERSEY
UNITED WATER NEW JERSEY
BERGEN COUNTY UTILITIES AUTHORITY
PUBLIC SERVICE ELECTRIC & GAS COMPANY



KEY MAP
Scale 1"=250'

250' 125' 0 250' 500'
GRAPHIC SCALE

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS/ESTIMATE OF QUANTITIES
3	PLAN-HARDENBURGH AVE IMPROVEMENTS
4	PROFILES-HARDENBURGH AVE IMPROVMENTS
5	GRADING PLAN/STRIPING PLAN
6	ROAD CROSS SECTIONS
7-11	CONSTRUCTION DETAILS
12-13	TRAFFIC CONTROL / CONSTRUCTION STAGING PLANS
B-1 thru B-8	BRIDGE PLANS AND DETAILS

PREPARED BY

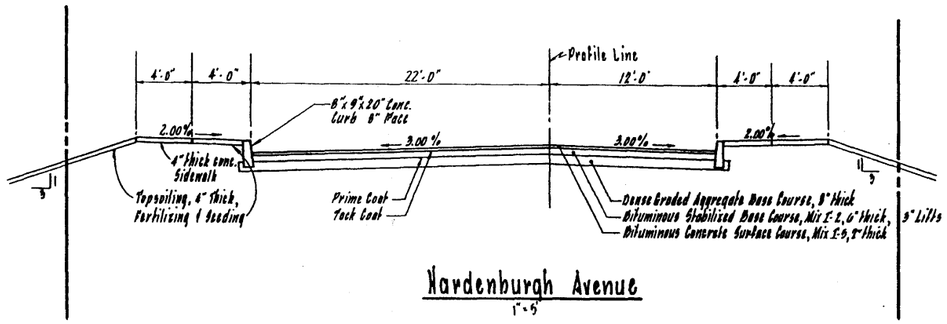
AZZOLINA & FEURY
ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-8500

DATE
JAMES A. FEURY, P.E.
PROFESSIONAL ENGINEER N.J. LIC. NO 21918

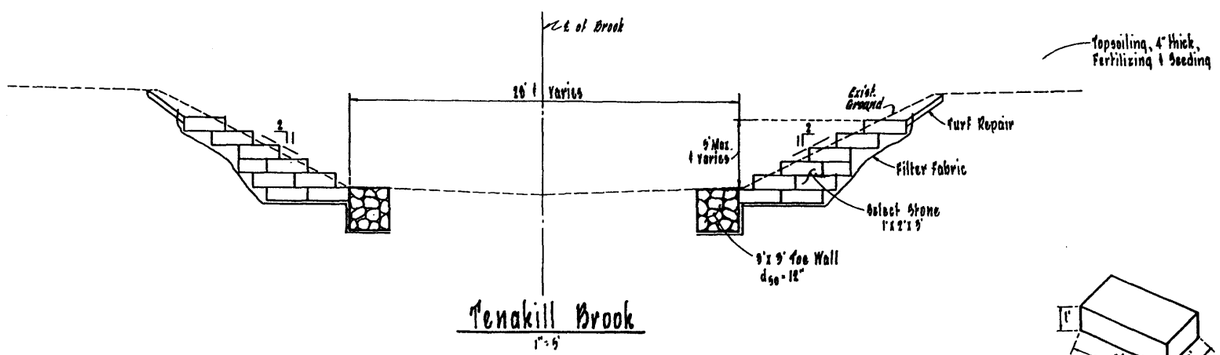
SHEET NO. 1 OF
JOB NO. DE - 295

ESTIMATE OF QUANTITIES

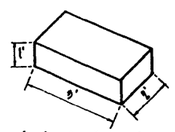
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
1	Soil Erosion and Sediment Control	L.S.	L.S.
2	Maintenance and Protection of Traffic	L.S.	L.S.
3	Clearing Site	L.S.	L.S.
4	Roadway Excavation, unclassified	950	C.Y.
5	Dense Graded Aggregate Base Course, 8" Thick	930	S.Y.
6	Bituminous Stabilized Base Course, Mix I-2	900	Tons
7	Bituminous Concrete Surface Course, Mix I-5	100	Tons
8	15" Reinforced Concrete Culvert Pipe, Class III	96	L.F.
9	18" Reinforced Concrete Culvert Pipe, Class III	100	L.F.
10	Inlet Type B	2	Unit
11	Storm Manholes	2	Unit
12	8"x9"x20" Concrete Curb	409	L.F.
13	Concrete Sidewalk, 4" Thick	186	S.Y.
14	Stone Bank Stabilization	478	C.Y.
15	Steel-Backed Wood Rail	109	L.F.
16	Traffic Stripes	640	L.F.
17	Traffic Paint	902	S.F.
18	Topsoiling, 4" Thick	970	S.Y.
19	Fertilizing and Seeding, Type D	970	S.Y.
20	Straw Mulching	970	S.Y.
21	Concrete Headwall	1	Unit
22	Earth Excavation for Test Pit	10	C.Y.
23	No Item		
24	Clearing Site, Bridge	L.S.	L.S.
25	Foundation Excavation	110	CY
26	Concrete in Structures, Footings	25	CY
27	Concrete in Structures, Retaining Walls	11	CY
28	Concrete in Structures, Relief Slab	45	CY
29	Concrete in Superstructure, Sidewalks	52	CY
30	Concrete in Superstructure, Parapets	11	CY
31	Reinforcement Steel in Structures	6,100	lbs.
32	Reinforcement Steel in Structures, Epoxy Coated	17,550	LB
33	Coring and Grouting	282	LF
34	Structural Steel (20,900 lbs.)	LS	LS
35	Stonework	1000	SF
36	Repointing, Stone	400	LF
37	Repointing, Brick	5,600	LF
38	Temporary Sheeting	1450	SF
39	Arch Centering	LS	LS
40	Miscellaneous Concrete Repairs	275	CF



Hardenburgh Avenue
1"=5'



Tenakill Brook
1"=5'



Typical Stone for Bank Stabilization

0 5 10
Graphic Scale in Feet

NO.	DATE	DWN.	CHK'D.	REVISION

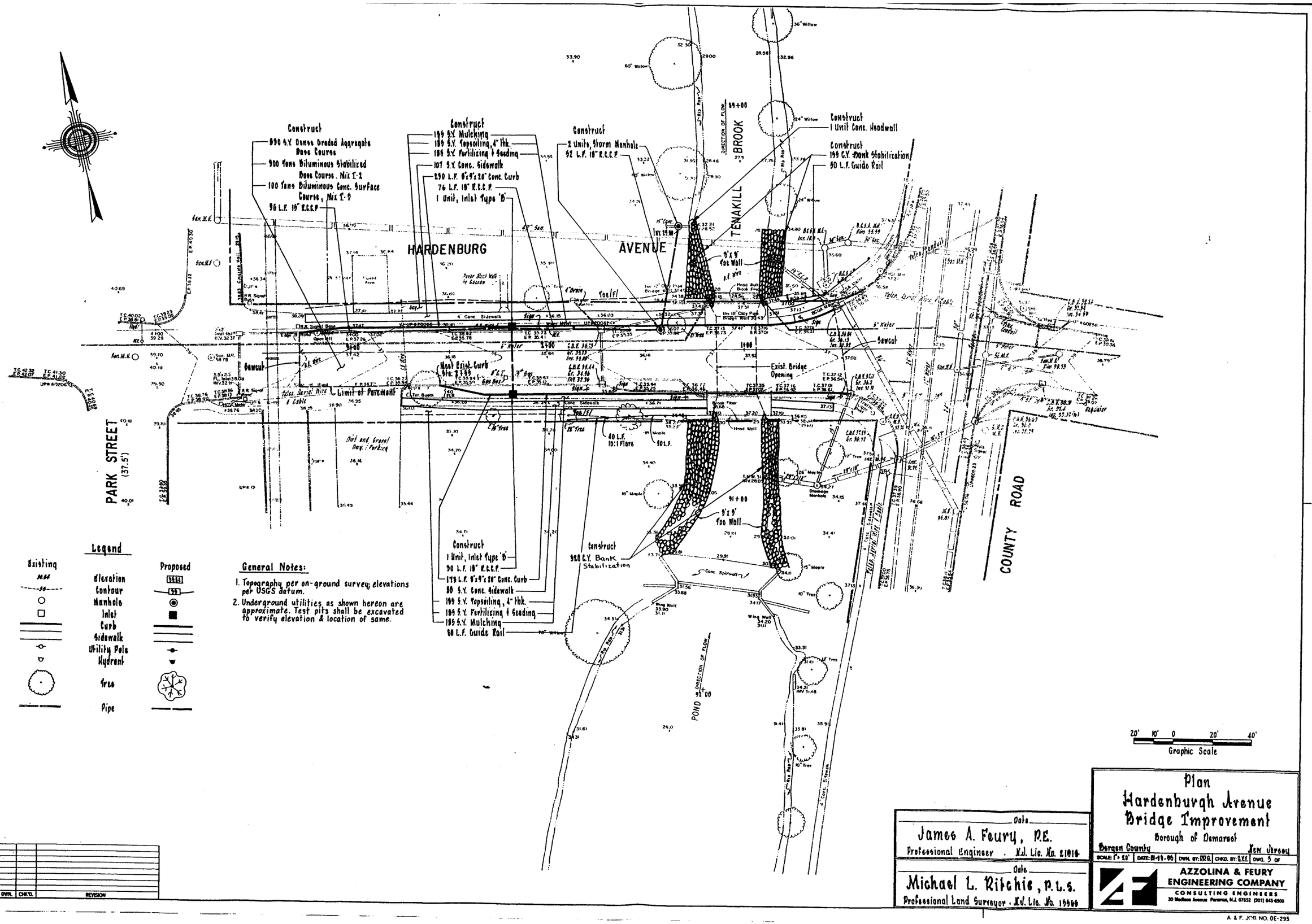
Typical Sections
for
Hardenburgh Avenue
Bridge Improvements
Borough of Demarest
Bergen County New Jersey

SCALE: As shown | DATE: 09-04-96 | DWN. BY: AJR | CHKD. BY: GVV | DWG. 2 OF

Date
JAMES A. FEURY, P.E.
PROFESSIONAL ENGINEER - N.J. LIC. NO. 21918

AZZOLINA & FEURY
ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-8500

A.A.F. JOB NO. 95-256



General Notes:

1. Topography per on-ground survey; elevations per USGS datum.
2. Underground utilities as shown hereon are approximate. Test pits shall be excavated to verify elevation & location of same.

NO.	DATE	DWN.	CHK'D.	REVISION

20' 10' 0 20' 40'
Graphic Scale

Date
James A. Feury, P.E.
Professional Engineer . N.J. Lic. No. 21016

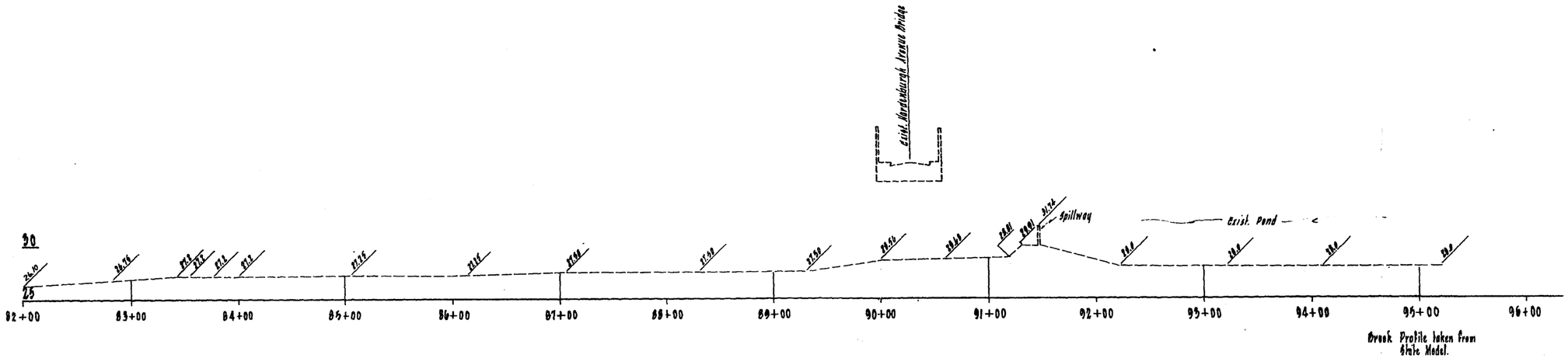
Date
Michael L. Ritchie, P.L.S.
Professional Land Surveyor . N.J. Lic. No. 19666

Plan
Hardenburgh Avenue Bridge Improvement
Borough of Demarest
Bergen County New Jersey

SCALE: 1"= 20' | DATE: 11-19-96 | DWN. BY: DDG | CHK'D. BY: DFF | DWG. 3 OF

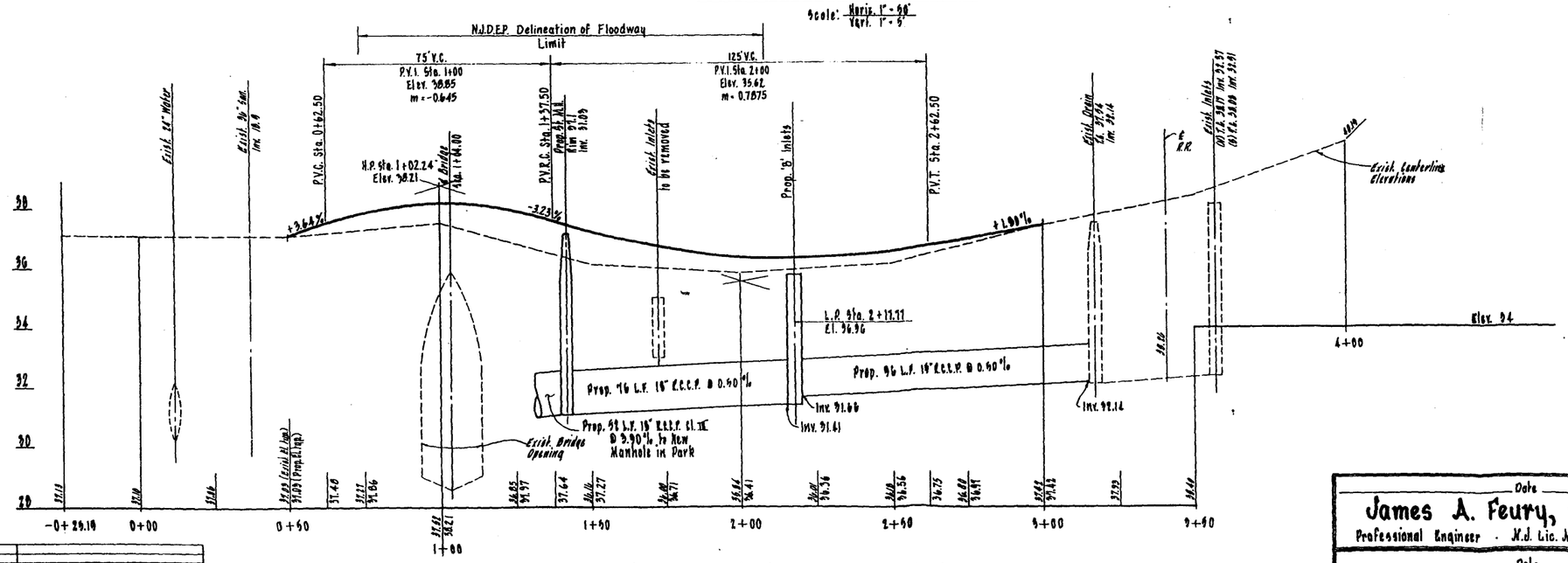
AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6500

A & F. JOB NO. DE-295



Tenakill Brook Profile

Scale: Horiz. 1" = 40'
Vert. 1" = 5'



Hardenburgh Avenue - Road Profile

Scale: Horiz. 1" = 20'
Vert. 1" = 2'

NO.	DATE	DWN.	CHK'D.	REVISION

Date
James A. Feury, P.E.
Professional Engineer · N.J. Lic. No. 21918

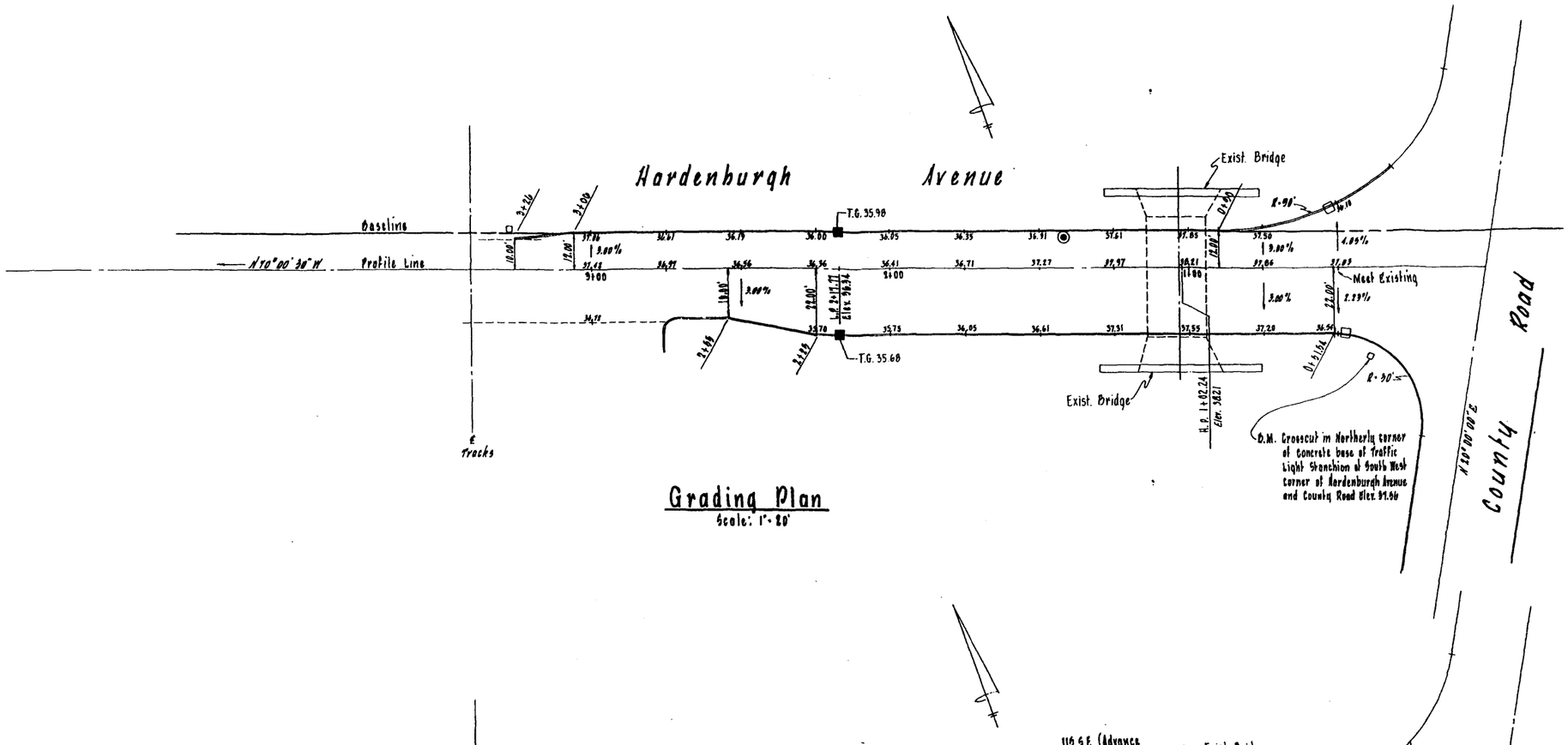
Date
Michael L. Ritchie, P.L.S.
Professional Land Surveyor · N.J. Lic. No. 14965

Profiles
Hardenburgh Avenue and Tenakill Brook
Borough of Demarest
Bergen County New Jersey

SCALE: As shown | DATE: 11-09-94 | DWN. BY: J.D.H. | CHK'D. BY: G.T.F. | DWG. 4 OF

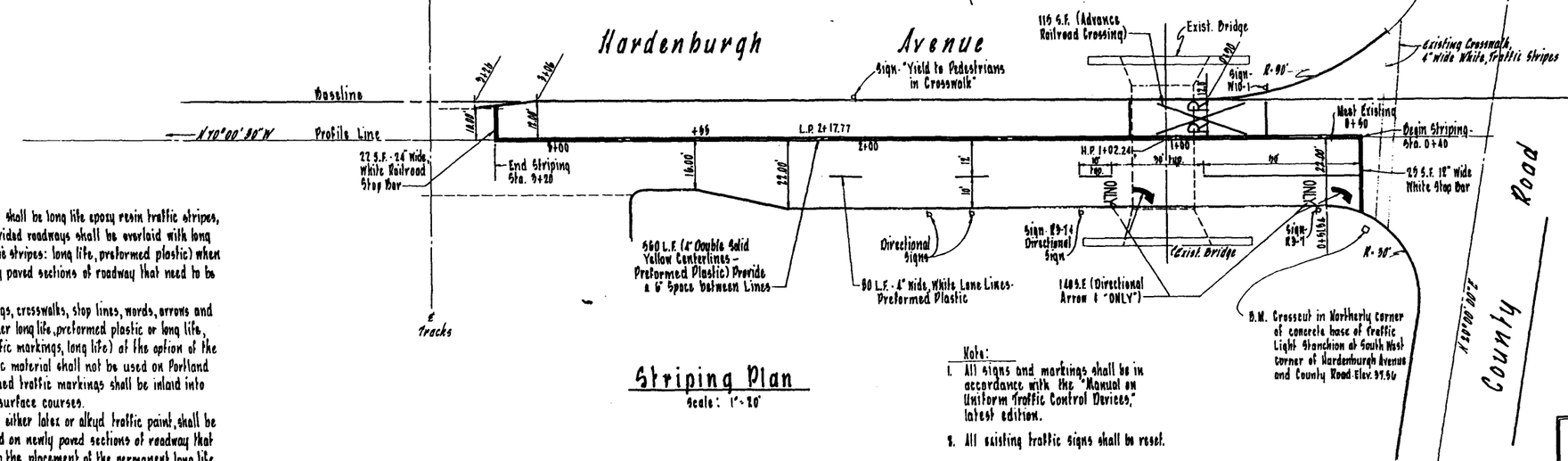
AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6500

A. & F. JOB NO. DE-295



Grading Plan

Scale: 1"=20'



Striping Plan

Scale: 1"=20'

Graphic Scale in Feet

General Notes:

1. All permanent longitudinal center lines shall be long life epoxy resin traffic stripes, except that the center lines on undivided roadways shall be overlaid with long life, preformed plastic stripes (traffic stripes: long life, preformed plastic) when the centerlines are required on newly paved sections of roadway that need to be opened to traffic each day.
2. All permanent diagonal gore markings, crosswalks, stop lines, words, arrows and other pavement symbols shall be either long life, preformed plastic or long life, thermoplastic traffic markings (traffic markings, long life) at the option of the contractor except that thermoplastic material shall not be used on Portland Cement concrete surfaces. Preformed traffic markings shall be inlaid into newly paved bituminous concrete surface courses.
3. Interim broken line striping, using either latex or alkyd traffic paint, shall be used when broken lines are required on newly paved sections of roadway that need to be opened to traffic prior to the placement of the permanent, long life, broken lines. Permanent broken lines shall be striped within 14 days of paving.
4. Traffic stripes and traffic markings of different materials shall not be overlapped.

Note:

1. All signs and markings shall be in accordance with the "Manual on Uniform Traffic Control Devices," latest edition.
2. All existing traffic signs shall be reset.

NO.	DATE	DWN.	CHK'D.	REVISION

Date

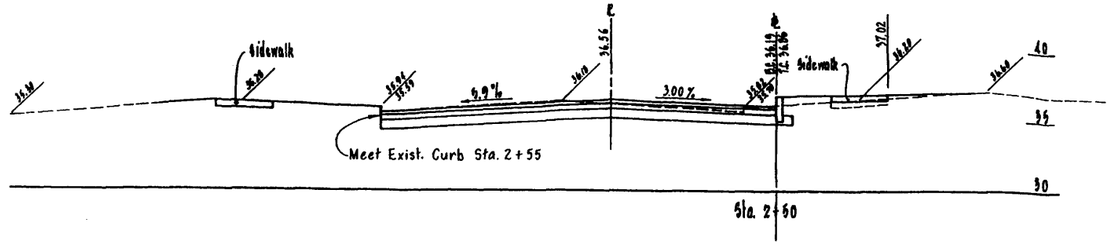
James A. Feury, P.E.
Professional Engineer . N.J. Lic. No. 21918

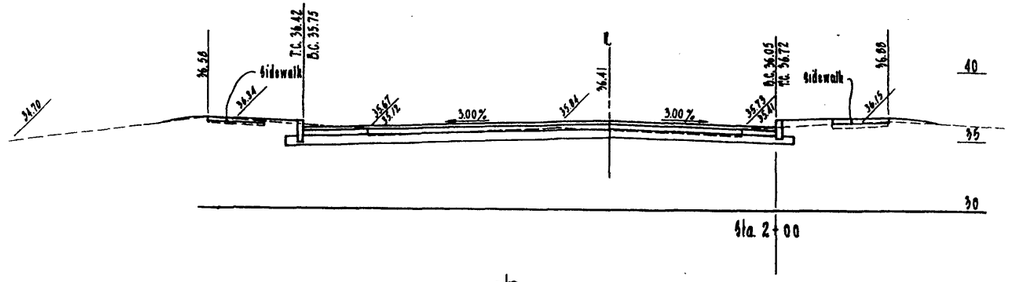
Grading Plan / Striping Plan
for
Hardenburgh Avenue
Bridge Improvements
Borough of Demarest
Bergen County New Jersey

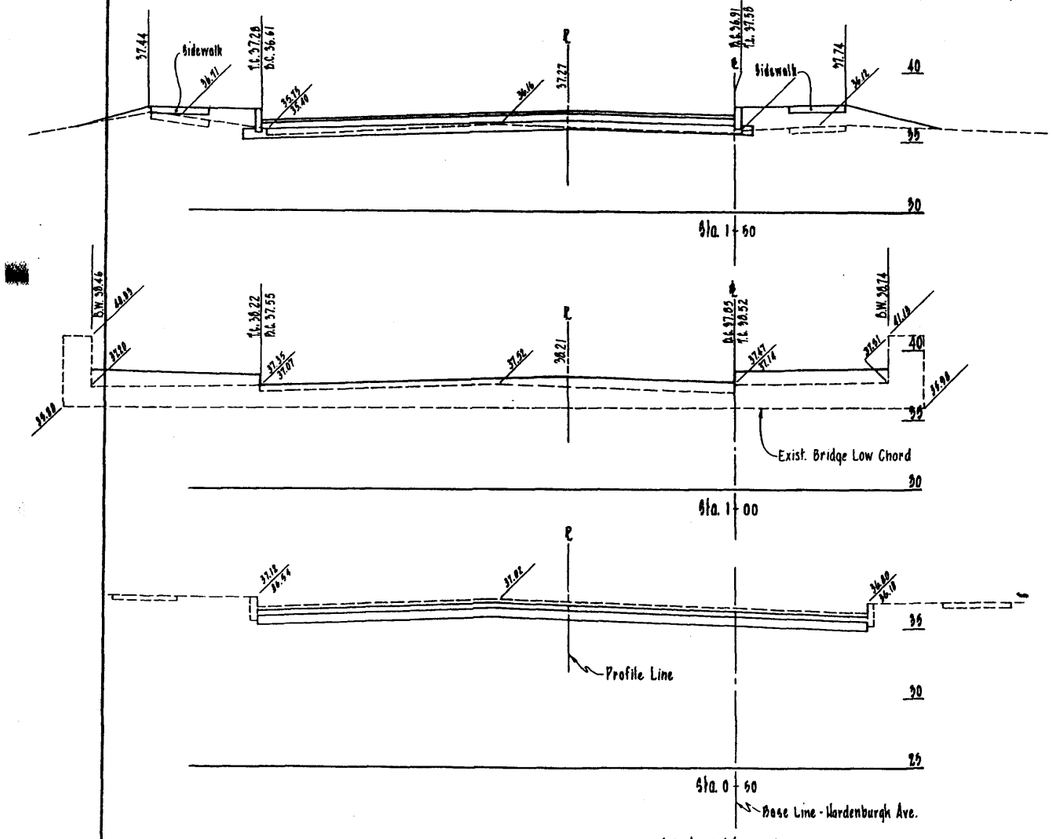
SCALE: 1"= 20' | DATE: 05-04-95 | DWN. BY: J.D.R. | CHK'D. BY: G.V.E. | DWG. 5 OF

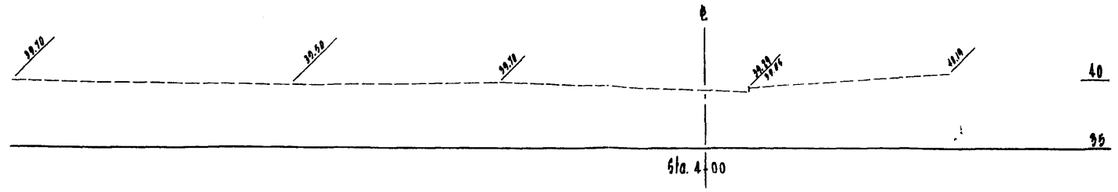
AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6500

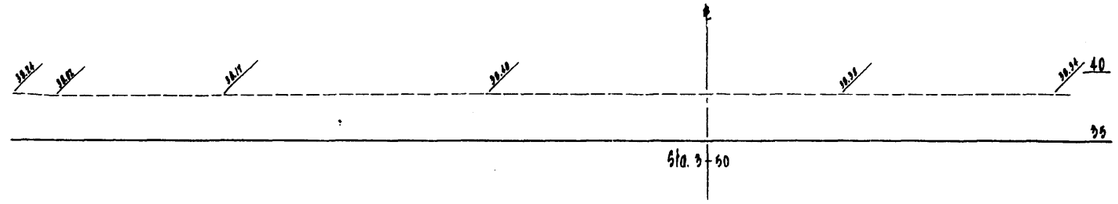
A & F JOB NO. 01-295

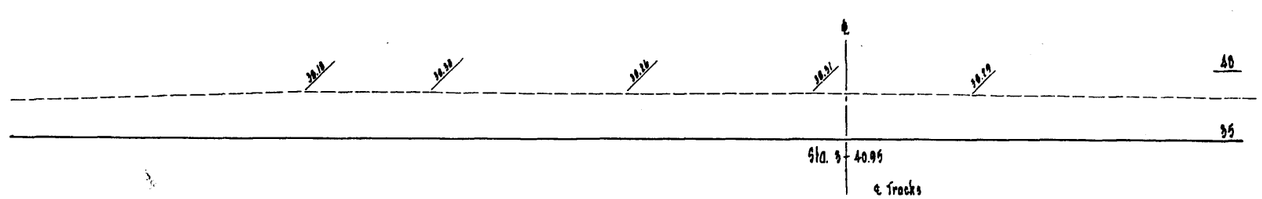




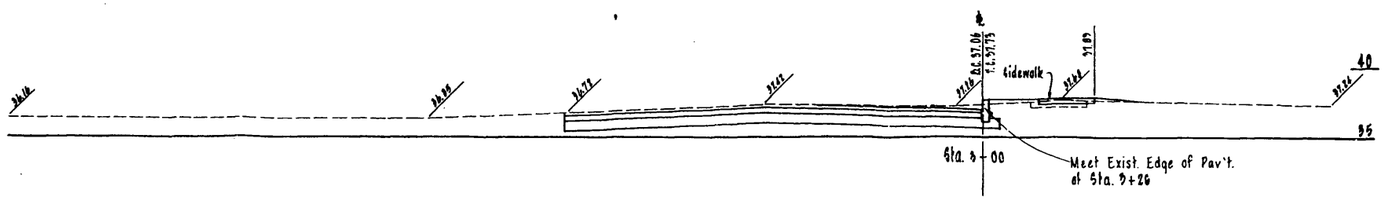








Meet Exist. Grades at Sta. 3+26



Cross Sections taken looking Westerly.

Scale: Horiz. 1"=5'
Vert. 1"=5'

NO.	DATE	DWN.	CHK'D.	REVISION

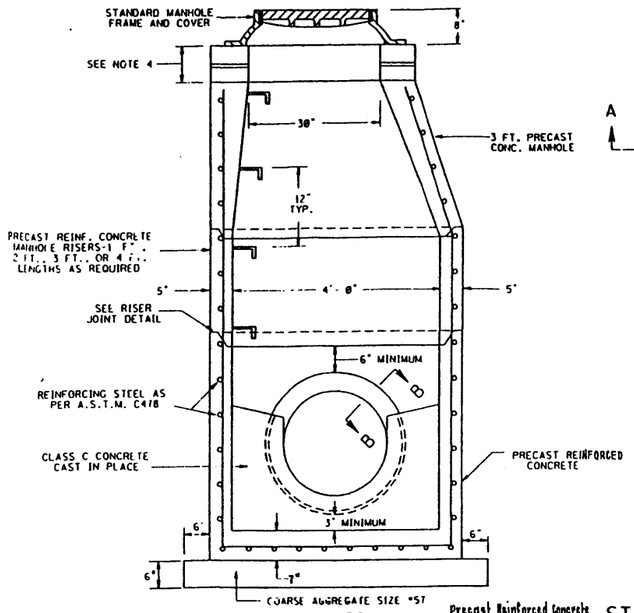
Date
James A. Feury, P.E.
Professional Engineer . N.J. Lic. No. 21910

Road Cross-Sections
Hardenburgh Avenue
Borough of Demarest
Bergen County New Jersey

SCALE: As shown | DATE: 11-21-94 | DWN. BY: A.E.F. | CHK'D. BY: E.V.F. | DWG. 6 OF

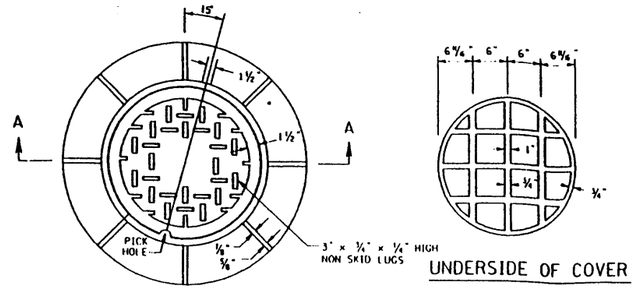
AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6300

A.& F. JOB NO. 92-285



MANHOLES

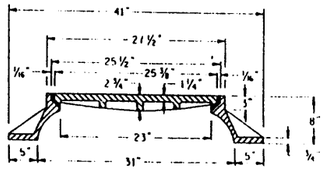
N.T.S.



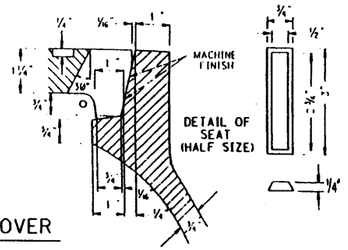
UNDERSIDE OF COVER

MINIMUM WEIGHTS
WEIGHT OF FRAME = 265#
WEIGHT OF COVER = 175#

N.T.S.



SECTION A-A



Precast Reinforced Concrete Manhole Sections shall conform to AASHTO M199, ASTM C478.

STANDARD MANHOLE FRAME AND COVER

N.T.S.

GENERAL NOTES

1. MANHOLES MAY BE CONSTRUCTED OF BRICK, CONCRETE, CONCRETE BLOCK OR PRECAST CONCRETE.

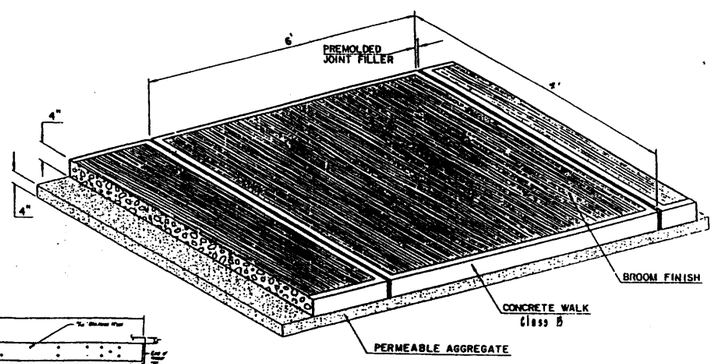
2. WHEN THE DEPTH OF A MANHOLE EXCEEDS 10 FT. AS MEASURED FROM TOP OF COVER TO INVERT, WALLS OF BRICK, CONCRETE OR CONCRETE BLOCK BELOW A DEPTH OF 8 FT. SHALL BE 12" THICK. THE OVERALL HORIZONTAL DIMENSIONS SHALL BE INCREASED 12" AND THE DEPTH OF THE FOUNDATION INCREASED TO 12". WHEN ROCK IS ENCOUNTERED THE HORIZONTAL DIMENSION AND DEPTH OF THE THE FOUNDATION SHALL NOT BE INCREASED. THE THICKNESS OF PRECAST CONCRETE MANHOLE WALLS DOES NOT HAVE TO BE INCREASED IF THE DEPTH OF THE MANHOLE EXCEEDS 10 FEET.

3. CASTINGS OF PRECAST MANHOLES SHALL BE ADJUSTED TO GRADE WITH COURSES OF BRICK OR CONCRETE BLOCK, AS REQUIRED, 12" MAXIMUM.

4. AS AN ALTERNATE TO THE STANDARD MANHOLE FRAME AND COVER A 39" DIAMETER FRAME WITH 4" FLANGE MAY BE FURNISHED WITH ALL OTHER DIMENSIONS AND WEIGHTS REMAINING THE SAME.

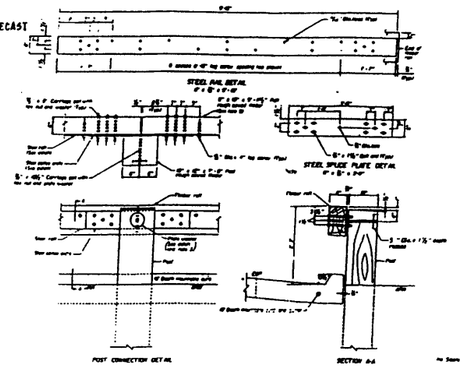
5. IN BRICK, CONCRETE OR CONCRETE BLOCK MANHOLES, INVERTS SHALL BE CONSTRUCTED IN TWO STAGES.

6. AS AN ALTERNATE, COPOLYMER POLYPROPYLENE PLASTIC LADDER RUNGS MAY BE FURNISHED IN PRECAST MANHOLES AND INLETS.



SIDEWALK DETAIL

NOT TO SCALE

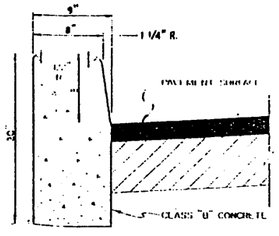


AASHTO Designation: None

Post Type	10" x 12" wood
Post Spacing	6'
Beam Type	6" x 10" wood with steel plate backing
Nominal Barrier Height	27"
Maximum Dynamic Deflection	

Steel-Backed Wood Rail Detail

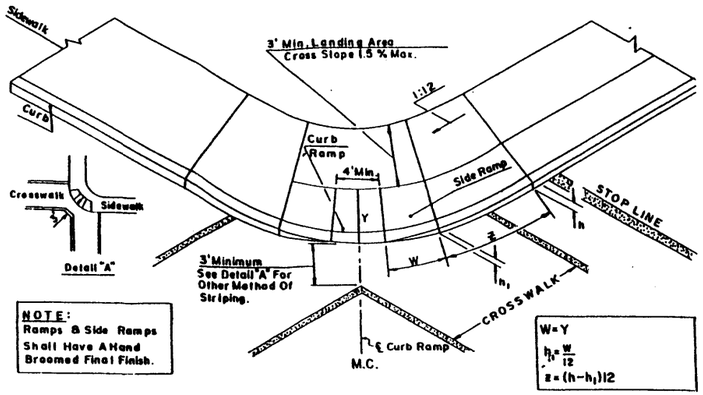
N.T.S.

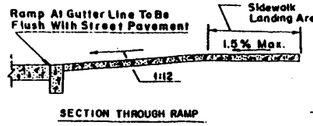


NOTE: TRANSVERSE JOINTS 1/2" WIDE SHALL BE INSTALLED 10' 0" APART & SHALL BE FILLED WITH PREFORMED BITUMINOUS JOINT FILLER AASHO DESIGNATION M 213 RECESSED 1/4" FROM TOP AND FACE

9"X 20" CONCRETE VERTICAL CURB

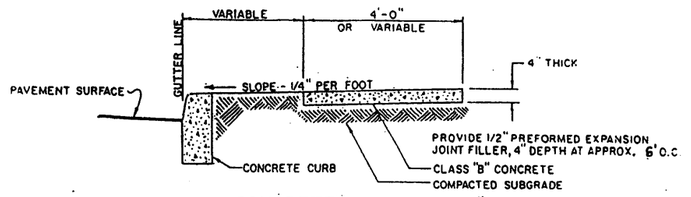
NOT TO SCALE





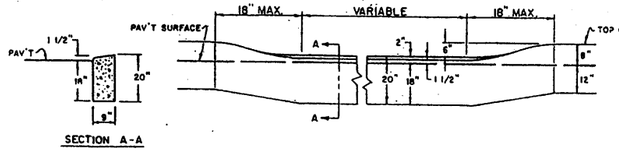
SECTION THROUGH RAMP

NEW JERSEY DEPARTMENT OF TRANSPORTATION ALTERNATE DESIGN STANDARDS FOR CURB RAMPS FOR THE PHYSICALLY HANDICAPPED



CONCRETE SIDEWALK, 4" THICK

NOT TO SCALE



DEPRESSED CURB DETAIL AT DRIVEWAYS

NOT TO SCALE

NO.	DATE	DWN.	CH'D.	REVISION

Date

James A. Feury, P.E.
Professional Engineer · N.J. Lic. No. 21916

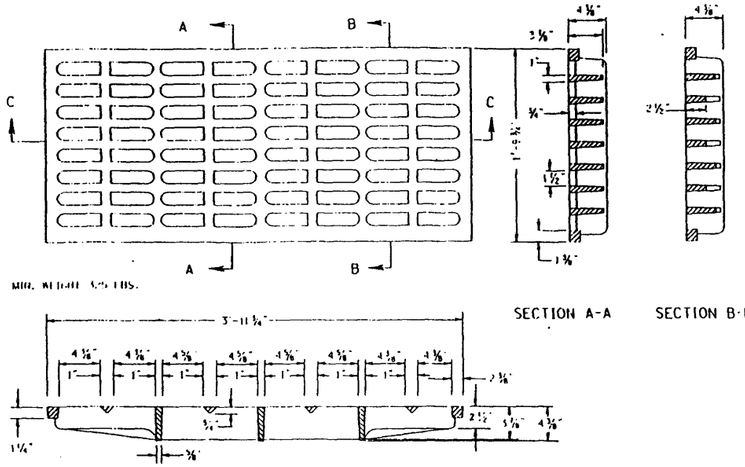
Construction Details for Hardenburgh Avenue Bridge Improvements

Borough of Demarest
Bergen County New Jersey

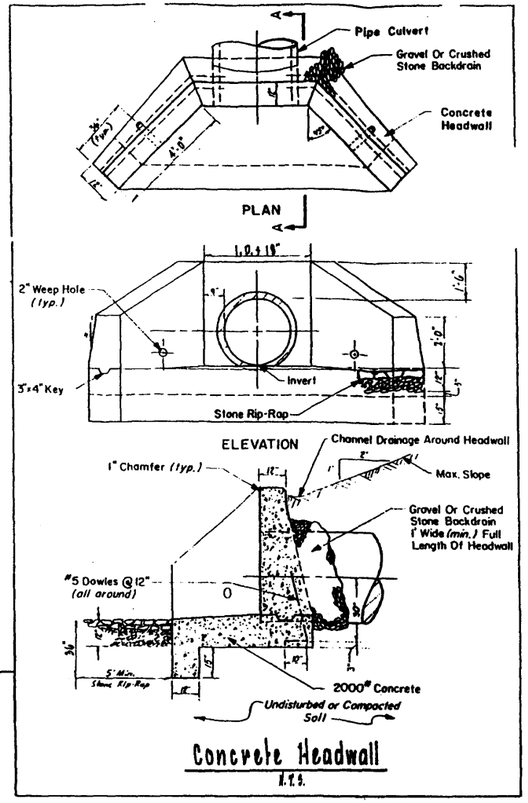
SCALE: As Shown | DATE: 05-04-99 | DWN. BY: LDH | CH'D. BY: GEK | DWG. 7 OF

AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6500

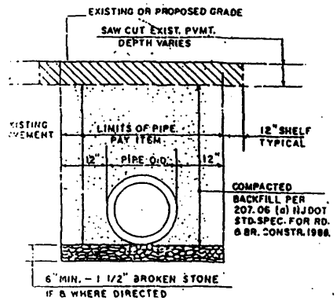
A. & F. JOB NO. 01-096



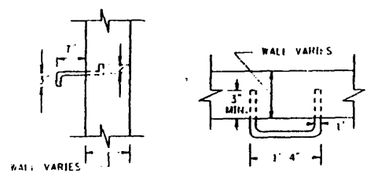
BICYCLE SAFE GRATE
(CAST IRON)
N.T.S.



Concrete Headwall
N.T.S.



TYPICAL TRENCH SECTION
FOR PIPE



NOTE:
LADDER RUNGS FACING TRAFFIC
12" C TO C

LADDER RUNG DETAIL
N.T.S.

General Notes:

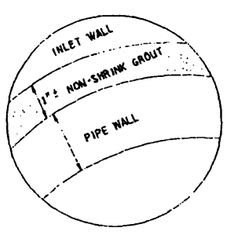
1. Inlets may be constructed of brick, concrete, concrete block or precast concrete. Walls shall be 8" thick if brick and 6" thick if concrete, concrete block or precast concrete. Inlet foundations and inverts shall be Class C concrete.
2. Corbelling of inlet walls will be permitted at the rate of 1/2" per 8" of height; maximum corbel 6" per wall.
3. Except for inlets Types A and C, foundations and inverts shall be constructed in two stages, and the bottom of the lookings shall be 8" below the outer wall of the lowest pipe in the inlet.
4. When the depth of an inlet, that is not precast, exceeds 10' as measured from the top of grate to invert, walls below a depth of 8' shall be 12" thick and the depth of foundation increased to 12". When rock is encountered the depth of the foundation shall not be increased.
5. Inlet foundations which are precast shall be placed on a 6" thick bed of compacted coarse aggregate size no. 57. The coarse aggregate shall extend 6" beyond the horizontal limits of the inlet foundation.
6. Casting for precast inlets shall be adjusted to grade with courses of brick, as required, 12" maximum.
7. When the depth of a precast inlet exceeds 10' as measured from the top of grate to invert, the foundation shall be increased to 12". When rock is encountered the depth of the foundation shall not be increased.
8. Minimum wall reinforcement for precast inlets Type A, B, C, E, O-1 and O modified:

Depth below top of Grate	Horizontal Reinf.	Vertical Reinf.	Wall Thk.
0' to 10'-0"	#4 @ 10" C.C.	#4 @ 18" C.C.	6"
10'-1" to 15'-0"	#4 @ 8" C.C.	#4 @ 18" C.C.	6"
15'-1" to 20'-0"	#4 @ 6" C.C.	#4 @ 18" C.C.	8"

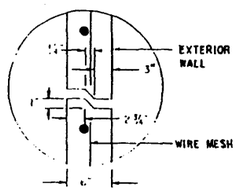
Reinforcing shown for precast inlets is the minimum required. Additional reinforcing for handling is the responsibility of the contractor.

WWF Reinforcement

Depth below top of Grate	
0' to 10'-0"	WWF 3x6 W6 Wires spaced at 3" to run horizontal in all cases.
10'-1" to 15'-0"	WWF 3x6 W6 Add #3 Bar at 18" horizontal.
15'-1" to 20'-0"	WWF 3x6 W6 Add #3 Bar at 9" horizontal; or Add #4 Bar at 15" horizontal.

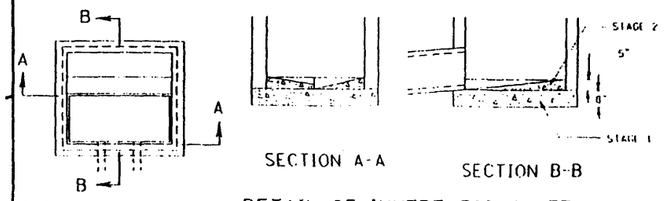


CONNECTION OF PIPE AND INLET FOR PRECAST INLET



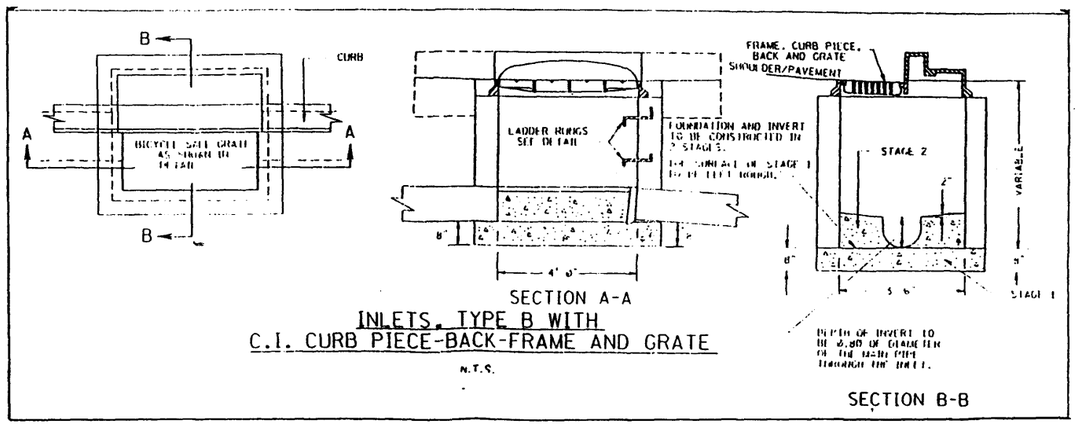
RISER JOINT DETAIL FOR PRECAST INLETS
N.T.S.

NOTE:
JOINT TO BE SECURELY MORTARED BY CONTRACTOR



NOTE:
FOUNDATION AND INVERT TO BE CONSTRUCTED IN 2 STAGES. THE CONCRETE IN STAGE 1 TO BE LEFT ROUGH.

DETAIL OF INVERT FOR INLET WITHOUT CONTINUOUS PIPE
N.T.S.



INLETS, TYPE B WITH C.I. CURB PIECE-BACK-FRAME AND GRATE
N.T.S.

NO.	DATE	DWN.	CHK'D.	REVISION

Construction Details
for
Hardenburgh Avenue
Bridge Improvements
Borough of Demarest
Bergen County New Jersey

SCALE: As shown | DATE: 06-04-96 | DWN. BY: A.N.F. | CHKD. BY: A.F.F. | DWG. 8 OF

Date
James A. Feury, P.E.
Professional Engineer N.J. Lic. No. 21018

AZZOLINA & FEURY
ENGINEERING COMPANY
CONSULTING ENGINEERS
20 Madison Avenue Paramus, N.J. 07652 (201) 845-6300

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. All soil erosion and sediment control practices will be installed in accordance with the NJ Standards for Soil Erosion and Sediment Control, and will be installed in proper sequence and maintained until permanent protection is established.

2. Any disturbed area that will be left exposed for more than thirty (30) days and not subject to construction traffic shall immediately receive a temporary seeding. If the season prohibits temporary seeding, the disturbed area will be mulched with salt hay or equivalent and bound in accordance with the NJ Standards (i.e. peg and twine, mulch netting, or liquid mulch binder).

3. Immediately following initial disturbance or rough grading, all critical areas subject to erosion will receive a temporary seeding in combination with straw mulch or a suitable equivalent, at a rate of 2 tons per acre, according to the NJ Standards.

4. Stabilization Specifications:
   A. Temporary Seeding and Mulching:
   -Lime - 90 lbs/1,000 sf ground limestone; Fertilizer - 14 lbs/1,000 sf; 10-20-10 or equivalent worked into soil a minimum of 4".

   - Seed - Annual Ryegrass 40 lbs/acre or other approved seeds; plant between March 1 and May 15 or between August 15 and October 1.

   - Mulch - Salt hay or small grain straw at a rate of 70 to 90 lbs/1,000 sf, to be applied according to the NJ Standards. Mulch shall be secured by approved methods (i.e. peg and twine, mulch netting, or liquid mulch binder).

   B. Permanent Seeding and Mulching:
   - Lime - 90 lbs/1,000 sf ground limestone; Fertilizer - 14 lbs/1,000 sf; 10-20-10 or equivalent worked into soil a minimum of 4".

   - Seed - Perennial Ryegrass 40 lbs/acre or other approved seeds; plant between March 1 and May 15 or between August 15 and October 1.

   - Mulch - Salt hay or small grain straw at a rate of 70 to 90 lbs/1,000 sf; to be applied according to the NJ Standards. Mulch shall be secured by approved methods (i.e. peg and twine, mulch netting, or liquid mulch binding).

5. Temporary berms are to be installed on all cleared roadways and easement areas in accordance with Section 4.21 of the NJ Standards.

6. The site shall at all times be graded and maintained such that all storm-water run-off is diverted to soil erosion and sediment control facilities.

7. All sedimentation structures will be inspected and maintained on a regular basis.

8. Stockpiles are not to be located within 50' of a floodplain, slope, roadway, or drainage facility. The base of all stockpiles should be protected by a hay bale barrier or sediment fence.

9. A crushed stone, vehicle wheel-cleaning blanket will be installed wherever a construction access road intersects any paved roadway. Said blanket will be composed of 2½" crushed stone, 6" thick, will be at least 30' X 100' and should be underlain with a suitable synthetic sediment filter fabric and maintained.

10. Maximum side slopes of all exposed surfaces shall not exceed 3:1 unless otherwise approved by the District.

11. All driveways must be stabilized with 2½" crushed stone or subbase prior to individual lot construction.

12. Paved roadways must be kept clean at all times.

13. All catch basin inlets will be protected with a crushed stone or fabric filter (filter details appear on the plan).

14. All storm drainage outlets will be stabilized, as required, before the discharge points become operational.

15. All dewatering operations must discharge directly into a sediment filter area. The sediment filter should be composed of a suitable sediment filter fabric (see detail).

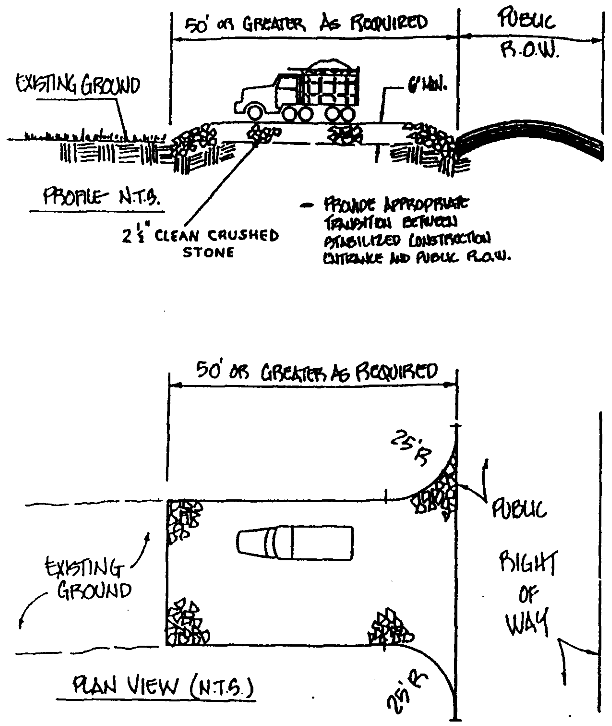
16. The Bergen County Soil Conservation District must be notified, in writing, at least 48 hours prior to any land disturbance.

17. The Bergen County Soil Conservation District may request additional measures to minimize on or off-site erosion problems during construction.

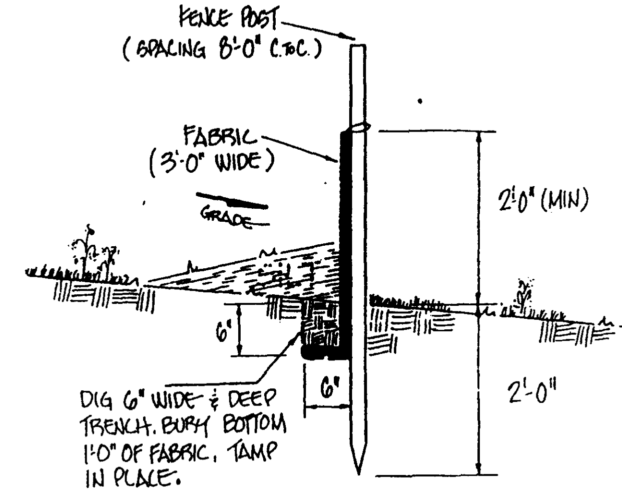
Construction Sequence for Soil Erosion and Sediment Control

1. Place temporary blaze-orange construction fence at limits of disturbance, except at paved areas.
2. Place silt fence.
3. Construct temporary stone deck dam.
4. Begin road construction and bridge restoration work along south side of site; construct inlet filters.
5. Construct stone bank stabilization on south side of site.
6. Stabilize disturbed areas on south area after south area construction is completed.
7. Perform construction work in center of roadway.
8. Repeat steps 4,5 and 6 along north side of construction area.
9. Perform construction work at west end of construction area.
10. Remove erosion control devices after all disturbed areas have been stabilized.

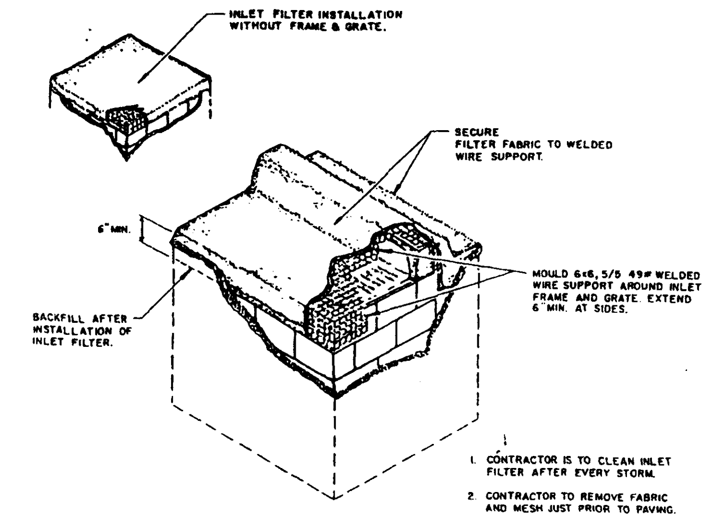
NO.	DATE	DWN.	CHK'D.	REVISION



STABILIZED CONSTRUCTION ENTRANCE

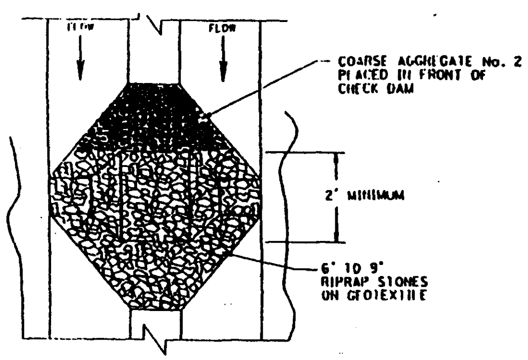


SILT FENCE DETAIL

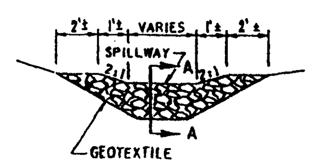


1. CONTRACTOR IS TO CLEAN INLET FILTER AFTER EVERY STORM.
2. CONTRACTOR TO REMOVE FABRIC AND MESH JUST PRIOR TO PAVING.

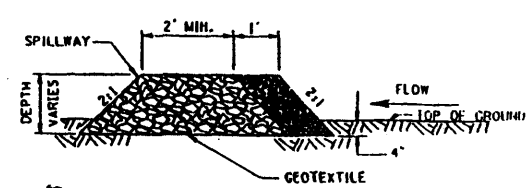
INLET FILTER DETAIL
N.T.S.



PLAN

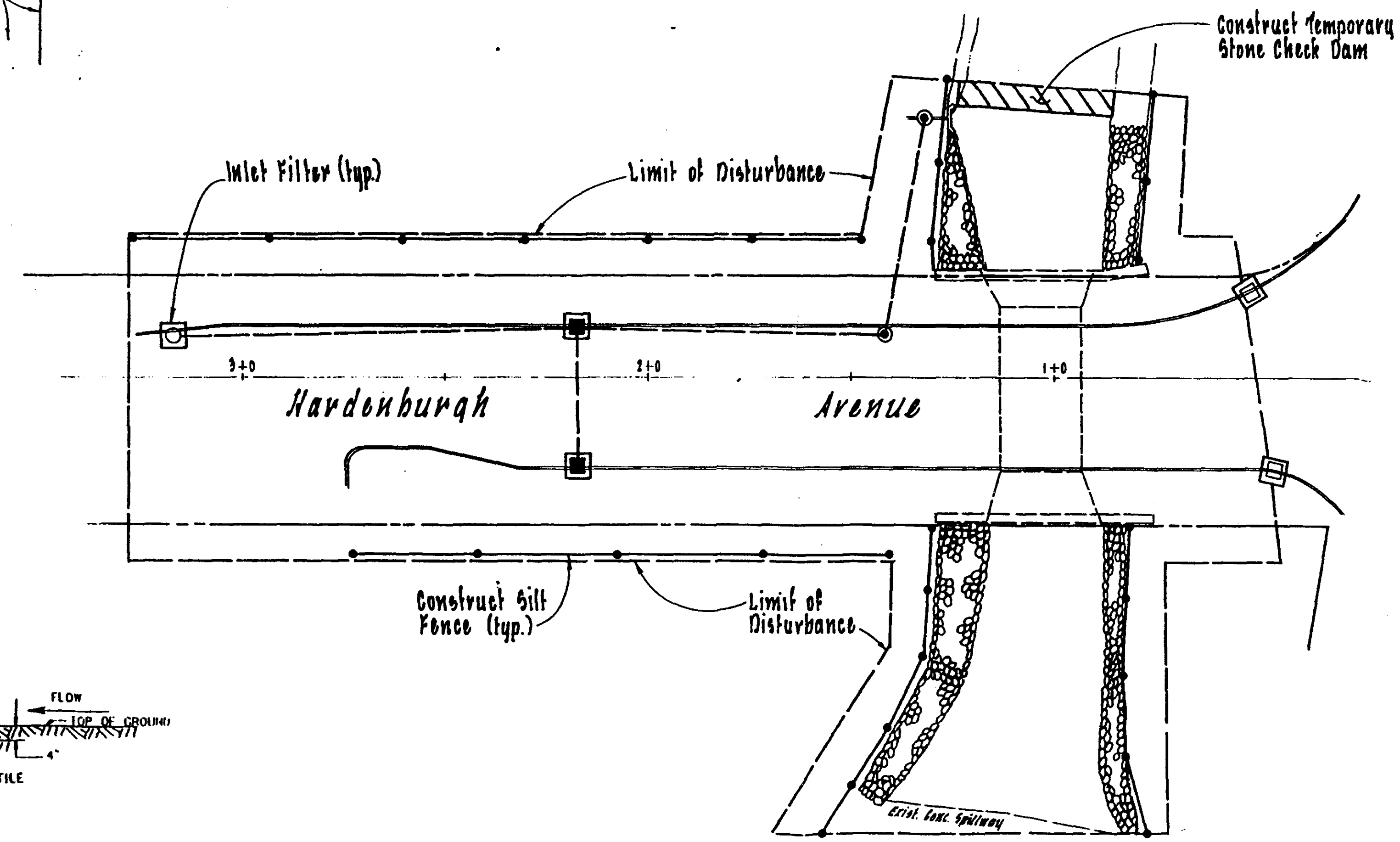


ELEVATION



SECTION A-A

TEMPORARY STONE CHECK DAM
N.T.S.



Plan
1" = 20'

Soil Erosion & Sediment Control

Construction Plan & Details
for
Hardenburgh Avenue
Bridge Improvements
Borough of Demarest
Bergen County New Jersey

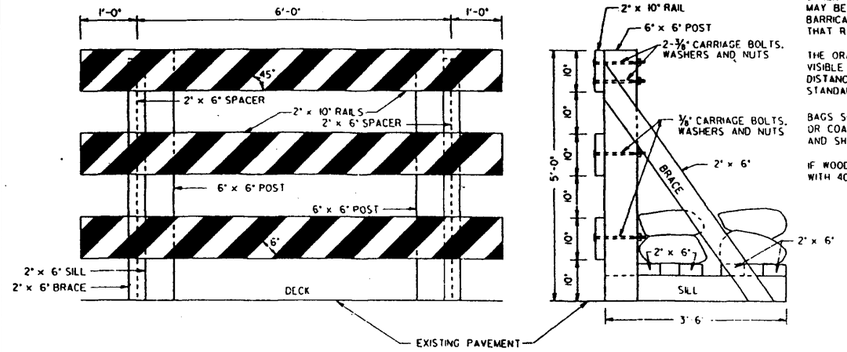
SCALE: As shown | DATE: [illegible] | DWN. BY: [illegible] | CHKD. BY: [illegible] | DWG. 9 OF

Date

James A. Feury, P.E.
Professional Engineer . N.J. Lic. No. 21919

AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-8500

A. & F. JOB NO. DE-295



BARRICADE, TYPE III A

1' 6' 0 1' 2'

LUMBER USED SHALL BE YELLOW PINE OR FIR NO. 1 COMMON S4S, EXCEPT 12" x 12" TIMBERS.
RAILS ARE TO BE PAINTED ALTERNATE ORANGE AND WHITE STRIPES 6" WIDE OTHER PARTS TO BE PAINTED WHITE 3 COATS, OR REFLECTORIZED SHEETING, TYPE II. MAY BE UTILIZED MEETING REQUIREMENTS SPECIFIED FOR CONSTRUCTION SIGNS. BARRICADE, TYPE III A SHALL BE FABRICATED OF WOOD OR METAL EXCEPT THAT RAILS MAY BE CONSTRUCTED OF WOOD, METAL OR PLASTIC.

THE ORANGE AND WHITE STRIPES SHALL BE REFLECTORIZED SO AS TO BE VISIBLE UNDER NORMAL ATMOSPHERIC CONDITIONS FROM A MINIMUM DISTANCE OF 1,000 FEET WHEN ILLUMINATED BY THE LOW BEAMS OF STANDARD AUTOMOBILE HEADLIGHTS.

BAGS SHALL BE FILLED WITH SAND AND SHALL BE OF CLOTH, BURLAP OR COARSE FIBER AND SHALL BE OF A QUALITY APPROVED BY THE ENGINEER. AND SHALL HAVE A MINIMUM CAPACITY OF ONE (1) CUBIC FOOT.

IF WOOD IS USED, SPACERS, BRACES, SILL AND DECK TO BE FASTENED WITH 40D SPIKES. HOLES TO BE BORED IN PLANKS FOR ALL SPIKES.

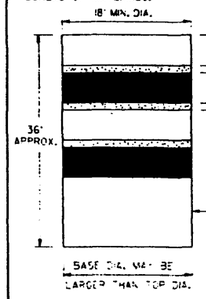
IMPORTANT

NOTE: BARRICADE TYPE III A SHALL NOT BE USED IN ANY AREA WHERE CONTACT WITH PUBLIC VEHICULAR TRAFFIC IS POSSIBLE. OPEN EXCAVATION AREAS AND OTHER SIMILAR SITUATIONS MAY REQUIRE BARRICADES TYPE III A AND THEIR USE SHALL BE ONLY UPON DIRECTION.

DRUMS SHALL BE MADE OF ORANGE PLASTIC WITH A MINIMUM OF FOUR ALTERNATE ORANGE AND WHITE REFLECTORIZED STRIPES. IF THERE ARE NON-REFLECTORIZED SPACES BETWEEN THE STRIPES, THEY SHALL BE NO MORE THAN 2" WIDE. STRIPES SHALL BE REFLECTIVE SHEETING, TYPE II. THE TOP OF THE DRUM SHALL NOT BE OPEN.

DRUMS SHALL BE CONSTRUCTED TO INHIBIT ROLLING IF KNOCKED OVER.

THE REFLECTORIZED AREA OF DRUMS SHALL BE ROUND EXCEPT THAT OTHER SHAPES, WHICH PROVIDE THE SAME VISIBILITY AS AN 18" DIAMETER ROUND DRUM REGARDLESS OF ORIENTATION, MAY BE USED IF APPROVED BY THE BUREAU OF MATERIALS.



WHEN BALLAST IS REQUIRED BY THE ENGINEER, SAND SHALL BE USED. THE MAXIMUM WEIGHT OF THE BALLAST SHALL BE FILLED AND BE LOCATED APPROXIMATELY AT GROUND LEVEL.

DRUMS

N.T.S.

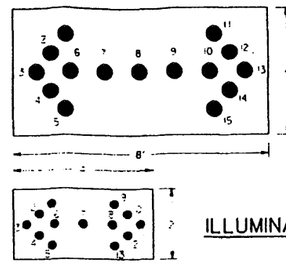
4" x 8" BOARD

FLASHING MESSAGES TO LIGHT AS FOLLOWS

RIGHT ARROW	3,6,7,8,9,10,12,13,14 & 15
LEFT ARROW	1,2,3,4,5,7,8,9,10 & 13
DOUBLE ARROW	1,2,3,4,5,7,8,9,10,12,13 & 15
WARNING BAR	MINIMUM OF 5 HORIZONTAL LIGHTS SUGGESTED AS 6, 7, 8, 9 & 10

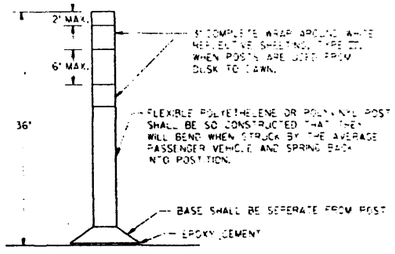
2" x 4" BOARD

RIGHT ARROW	3,6,7,8,10,12 & 13
LEFT ARROW	1,2,3,4,5,7,8 & 9
DOUBLE ARROW	1,2,3,4,5,7,8,9,10,12 & 13
WARNING BAR	3,6,7,8 & 11



ILLUMINATED FLASHING ARROWS

N.T.S.



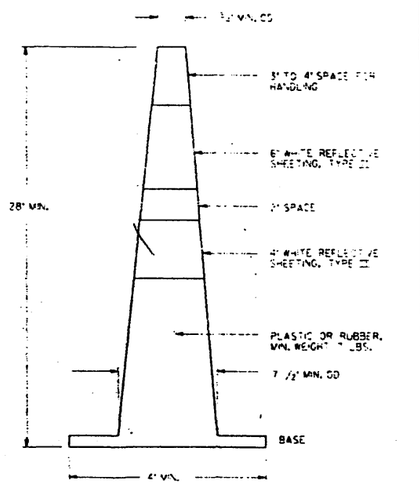
THE BASE SHALL BE REMOVED FROM THE PAVEMENT WHEN THE POST IS NO LONGER NEEDED.

DELINEATOR GUIDE POSTS

N.T.S.

MINOR MANUFACTURERS VARIATIONS MAY BE ACCEPTABLE, UPON APPROVAL OF THE ENGINEER.

TRAFFIC CONES SHALL BE PREDOMINATELY ORANGE IN COLOR.



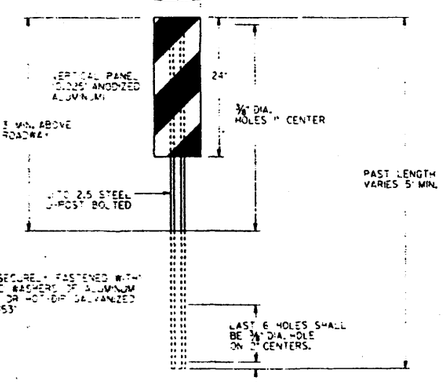
BASES MAY BE OF BREAKAWAY BALLASTED TYPE.

MINOR MANUFACTURER'S VARIATIONS MAY BE ACCEPTABLE UPON APPROVAL OF THE ENGINEER.

TRAFFIC CONES

N.T.S.

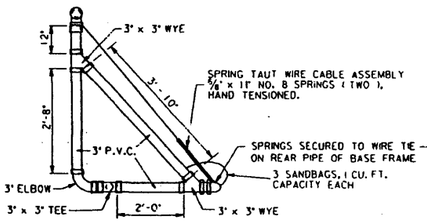
ALTERNATE ORANGE AND WHITE STRIPES SHALL BE REFLECTIVE SHEETING, TYPE II. 6" WIDE SLOPING DOWNWARD AT AN ANGLE OF 45°, IN THE DIRECTION TRAFFIC IS TO PASS.



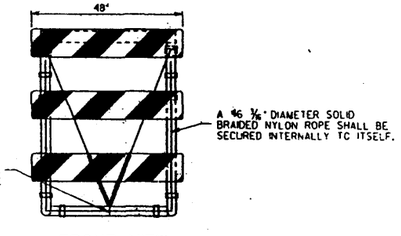
MINOR MANUFACTURER'S VARIATIONS MAY BE ACCEPTABLE UPON APPROVAL OF THE ENGINEER.

VERTICAL PANELS

N.T.S.

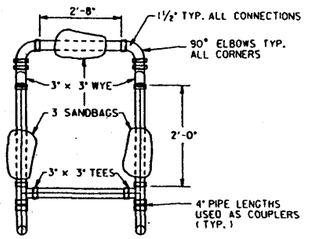


SIDE VIEW



FRONT VIEW

NOTE: SANDBAG PLACEMENT MAY BE ADJUSTED AT THE DIRECTION OF THE ENGINEER. ALL DIMENSIONS ON FULL PIPE LENGTH.

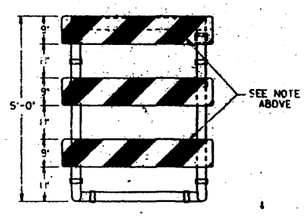


TOP VIEW OF BASE

NOTE: MINOR MANUFACTURER'S VARIATIONS MAY BE ACCEPTABLE UPON APPROVAL OF THE ENGINEER.

NOTE: ORANGE AND WHITE STRIPES SHALL BE REFLECTIVE SHEETING, TYPE II, AS SHOWN FOR CONSTRUCTION SIGNS.

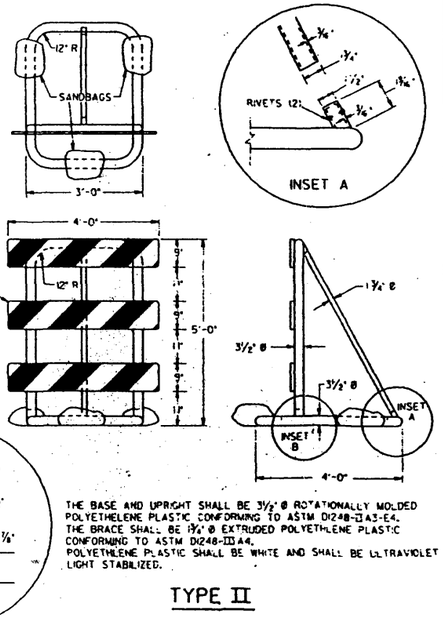
ALTERNATE ORANGE AND WHITE STRIPES 6" WIDE SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS.



PIPE SHALL BE WHITE PVC SCHEDULE 40 ASTM 1785 OR PVC. SDR-26 ASTM 2241 FITTINGS SHALL BE WHITE PVC OR ABS OF MATCHING WALL THICKNESS AND INSIDE DIAMETER AND MEETING THE MATERIALS, REQUIREMENTS AND TESTING SECTIONS OF ASTM D-2466 FOR PVC AND ASTM D-2468 FOR ABS. ALL JOINTS SHALL BE SLIP FIT AND NOT THREADED OR CEMENTED. PVC FITTINGS MEETING ASTM D-2665 WILL ALSO BE ACCEPTABLE.

THE 9" x 48" BARRICADE RAILS SHALL BE FABRICATED FROM 0.024" ANODIZED ALUMINUM OR 0.125" MAX. PLASTIC SHEETING AND SHALL BE ATTACHED, 4 PER RAIL, WITH 1 INCH NO. 14 PAN HEAD METAL SCREWS OR PLASTIC RIVETS. ALL CORNERS SHALL BE ROUNDED.

TYPE I



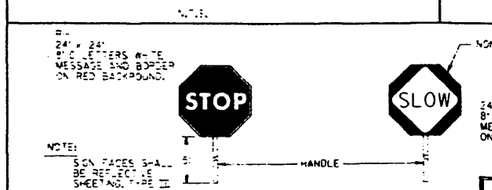
THE BASE AND UPRIGHT SHALL BE 3½" ø ROTATIONALLY MOLDED POLYETHELENE PLASTIC CONFORMING TO ASTM D1248-III A3-E4. THE BRACE SHALL BE ¾" ø EXTRUDED POLYETHLENE PLASTIC CONFORMING TO ASTM D1248-III A4, POLYETHLENE PLASTIC SHALL BE WHITE AND SHALL BE ULTRAVIOLET LIGHT STABILIZED.

TYPE II

BREAKAWAY BARRICADES

NOTE: EITHER TYPE I OR TYPE II MAY BE USED AT THE OPTION OF THE CONTRACTOR.

N.T.S.



STOP VIEW SLOW VIEW

STOP/SLOW PADDLE

N.T.S.

Construction Details for Hardenburgh Avenue Bridge Improvements

Borough of Demarest
Bergen County New Jersey

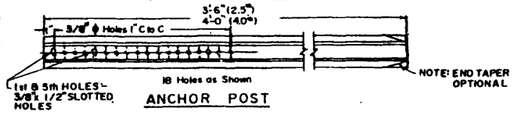
SCALE: As shown	DATE: 09-09-96	DWN. BY: ADH	CHKD. BY: GVV	DWG. 10 OF

James A. Feury, P.E.
Professional Engineer - N.J. Lic. No. 21918
Date

AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-6500

A. & F. JOB NO. 96-849

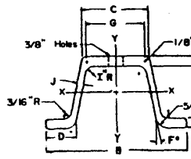
SIGN POST



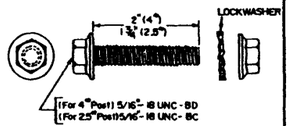
ANCHOR POST

FLANGED CHANNEL					
WEIGHT LBS/FT	DIMENSIONS				
	A	B	C	D	E
2.50	1.562	3.125	1.250	0.625	0.164
4.00	1.750	3.500	1.671	0.718	0.280

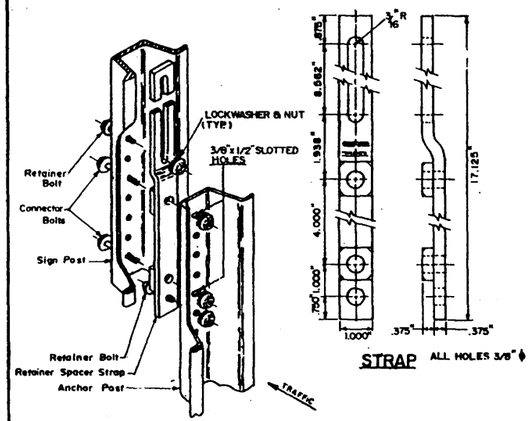
	F	G	H	I	J
12½"	1.063	0.149	1/8" R	1/8" R	0.132
11½"	1.406	0.230	3/16" R	3/16" R	0.175



4.00 Lb. POST		2.5 Lb. POST	
S.M.(in³)	X-X .560	X-X	.31
	Y-Y .69	Y-Y	.35
I (in⁴)	X-X .800	X-X	.24
	Y-Y 1.22	Y-Y	.35
AREA (in²)	1.24		.74



CONNECTOR-RETAINER BOLT

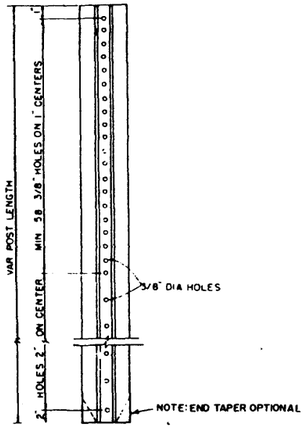


STRAP ALL HOLES 3/8" ϕ

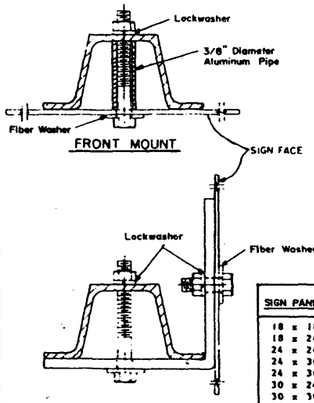
TWO PIECE STEEL U-POSTS

GENERAL NOTES:

1. DRIVE THE ANCHOR POST INTO THE GROUND (UTILIZING A DRIVE CAP) UNTIL 10-12" OF ANCHOR POST IS REMAINING ABOVE GROUND LEVEL..
2. ALIGN THE COMM. HOLE CLOSEST TO THE LONG SLOT IN THE RETAINER SPACER STRAP WITH THE TOP HOLE IN THE ANCHOR POST. THE STRAP IS THEN ATTACHED BY MAKING A BOLTED CONNECTION THROUGH THE BOTTOM HOLE IN THE STRAP AND THE HOLE IT ALIGNS WITH IN THE ANCHOR POST.
3. ROTATE THE STRAP 90° TO THE LEFT AND DRIVE THE ANCHOR POST INTO THE GROUND UNTIL ONLY 4" REMAIN ABOVE GROUND LEVEL. THIS 4" MUST BE ADHERED TO FOR SAFETY REASONS TO ENHANCE THE BREAKAWAY FEATURES OF THE SIGN IN ACCORDANCE WITH CURRENT FEDERAL AND STATE SAFETY STANDARDS. EXCAVATE AS REQUIRED TO TIGHTEN BOLTS.
4. ROTATE THE STRAP BACK TO VERTICAL POSITION.
5. PLACE THE SIGN POST AGAINST THE ANCHOR POST AND THE STRAP. ALIGN THE BOTTOM HOLE IN THE SIGN POST WITH THE COMM. HOLE IN THE LOWER END OF THE STRAP. INSERT TWO (2) CONNECTOR BOLTS THROUGH THE COMMON HOLES IN THE SIGN POST, STRAP AND ANCHOR POST.
6. COMPLETE THE CONSTRUCTION BY ATTACHING THE STRAP TO THE SIGN POST WITH A BOLT AND NUT. THIS CONNECTION SHALL BE MADE AT THE BOTTOM OF THE LONG SLOT IN THE STRAP.
7. TWO PIECE STEEL U-POST IS A PATENTED DEVICE. THE PATENT NO. IS 4126403.

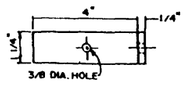


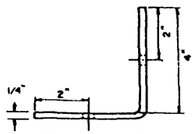
U POST



FRONT MOUNT

SIDE MOUNTING BRACKET



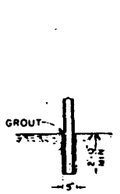


DETAIL OF BRACKET FOR SIDE MOUNTED SIGNS

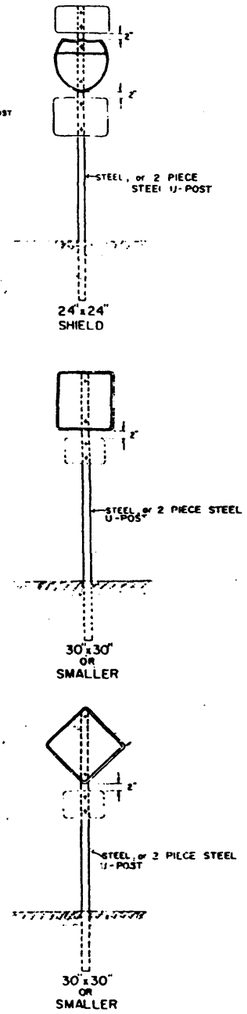
SIGN PANEL SIZE	LEGEND CODE	SIGN PANEL SIZE	LEGEND CODE
18 x 18	A	30 x 36	B
18 x 24		36 x 36	C-E
24 x 24		36 x 48	
24 x 30		45 x 36	
24 x 36		48 x 24	
30 x 24		48 x 36	
30 x 30		48 x 48	D-L
36 x 12		18 x 64 x 64	C-E
36x36x36	A	60 x 36	C-D
		48 x 60	D-E
		60 x 30	D-E

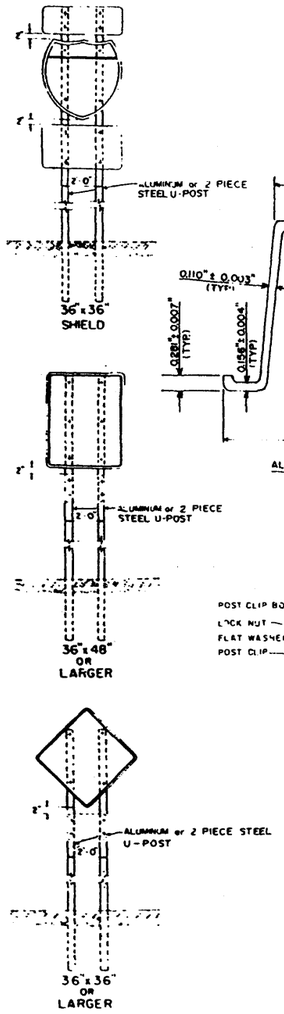
LEGEND CODE	NO. POSTS	WEIGHT LBS/FT.	MATERIAL
A	1	2.5	1 Piece or 2 Piece Steel
B	1	4.0	1 Piece or 2 Piece Steel
C	2	2.5	2 Piece Steel
D	2	4.0	2 Piece Steel
E	2	4.0	Aluminum

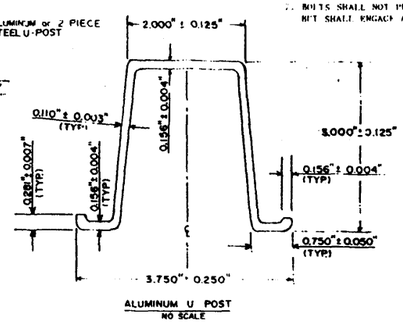
CONCRETE INSTALLATION



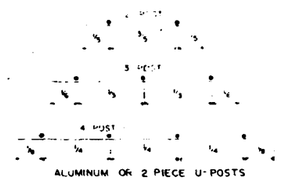
ROCK INSTALLATION



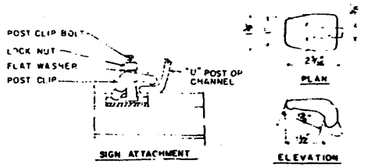




ALUMINUM U POST
NO SCALE



ALUMINUM OR 2 PIECE U-POSTS
"U" POST SPACING
NO SCALE



POST CLIP - FOR USE ON DIRECTIONAL SIGNS UTILIZING BENUAWAY SUPPORTS

GENERAL NOTES:

1. ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION AS STATED IN THE CURRENT "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS".
2. TWO PIECE STEEL POST SHALL BE EMBEDDED 4'-2" MIN. ONE PIECE ALUM. OR STEEL POST SHALL BE EMBEDDED 1'-6" MAX.
3. ALL STEEL POSTS AND BRACKETS SHALL BE CUT, BENT AND HOLES PUNCHED AND DRILLED BEFORE GALVANIZING. GALVANIZING SHALL BE IN CONFORMANCE WITH CURRENT A.S.T.M. SPECIFICATIONS A 123.
4. POSTS MAY BE STEEL, ALUMINUM OR 2 PIECE U-POST IN CONFORMANCE WITH THE NOTES BELOW.
5. SIGN PANEL SIZES SHALL DETERMINE POST TYPE AND NUMBER AS SHOWN ON THIS DETAIL.
6. ADJACENT STEEL POSTS SHALL NOT BE CLOSER THAN 8 FT. APART. ADJACENT POSTS CLOSER THAN 8 FT. APART SHALL BE ALUMINUM OR 2 PIECE STEEL T POSTS. NO MORE THAN 3 ALUMINUM OR 3 TWO PIECE STEEL U-POSTS WILL BE PERMITTED WITHIN 8 FT.
7. BOLTS SHALL NOT PROTRUDE MORE THAN 1/4" BEYOND THE NUT WHEN TIGHT BUT SHALL ENGAGE ALL THREADS IN THE NUT.

STEEL AND ALUMINUM POSTS, POST CLIPS, SPACING ETC
AND
TWO PIECE STEEL U - POSTS

U-POST SIGN SUPPORTS

N.T.S.

Date

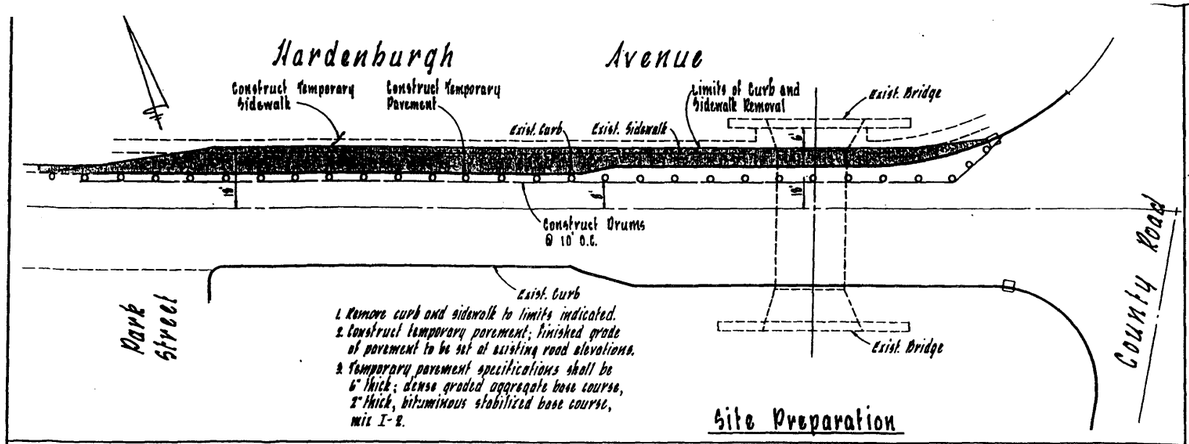
James A. Feury, P.E.
Professional Engineer N.J. Lic. No. 21916

Construction Details for
Hardenburgh Avenue Bridge Improvements
Borough of Demarest
Bergen County New Jersey

SCALE: AS shown | DATE: 09-03-96 | DWN. BY: ADN | CHKD. BY: GVV | DWG. 11 OF

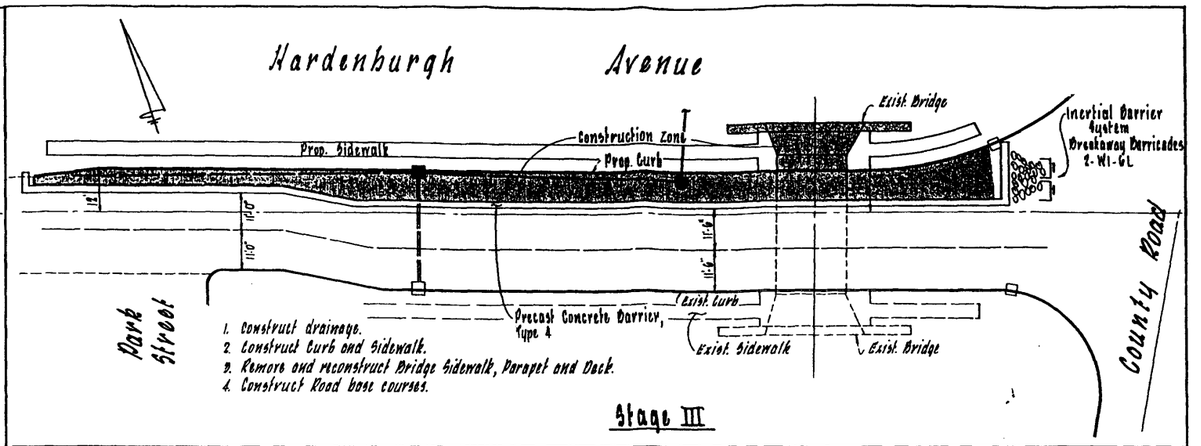
AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-1500

A. & F. JOB NO. DE-296



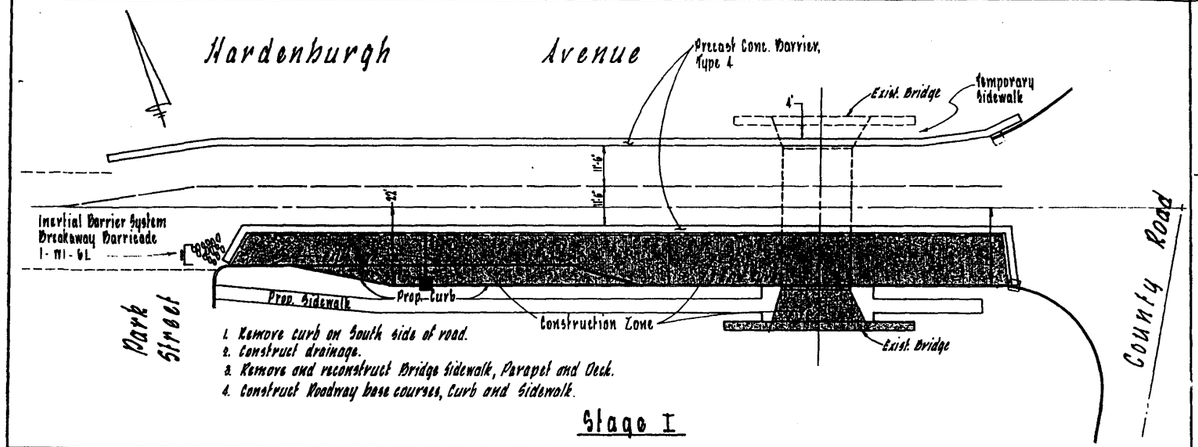
1. Remove curb and sidewalk to limits indicated.
2. Construct temporary pavement; finished grade of pavement to be set at existing road elevations.
3. Temporary pavement specifications shall be 6" thick; dense graded aggregate base course, 2" thick, bituminous stabilized base course, mix I-2.

Site Preparation



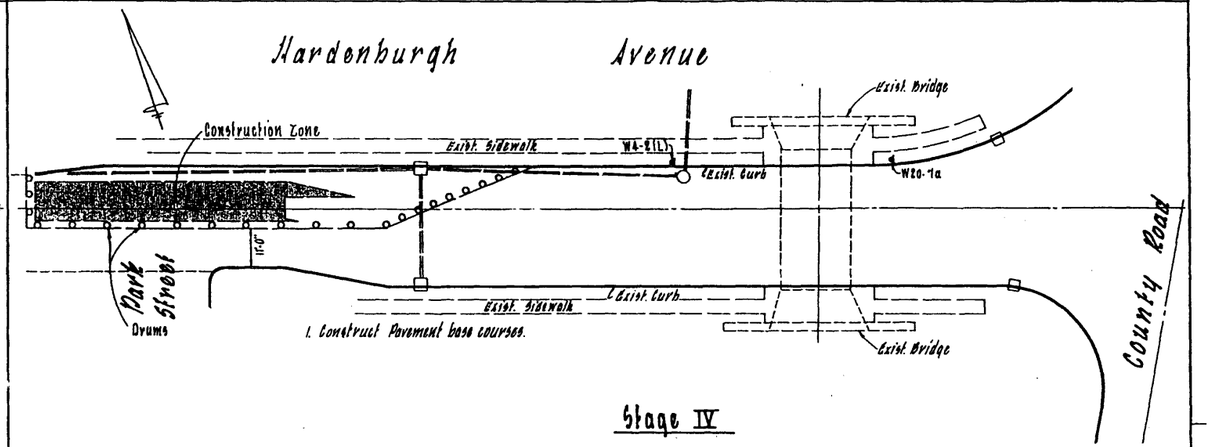
1. Construct drainage.
2. Construct Curb and Sidewalk.
3. Remove and reconstruct Bridge Sidewalk, Parapet and Deck.
4. Construct Road base courses.

Stage III



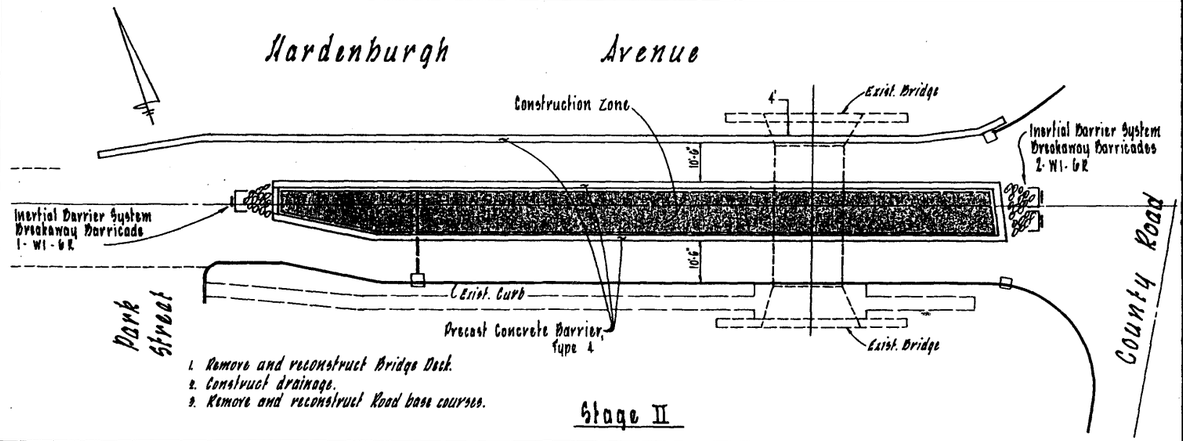
1. Remove curb on South side of road.
2. Construct drainage.
3. Remove and reconstruct Bridge Sidewalk, Parapet and Deck.
4. Construct Roadway base courses, Curb and Sidewalk.

Stage I



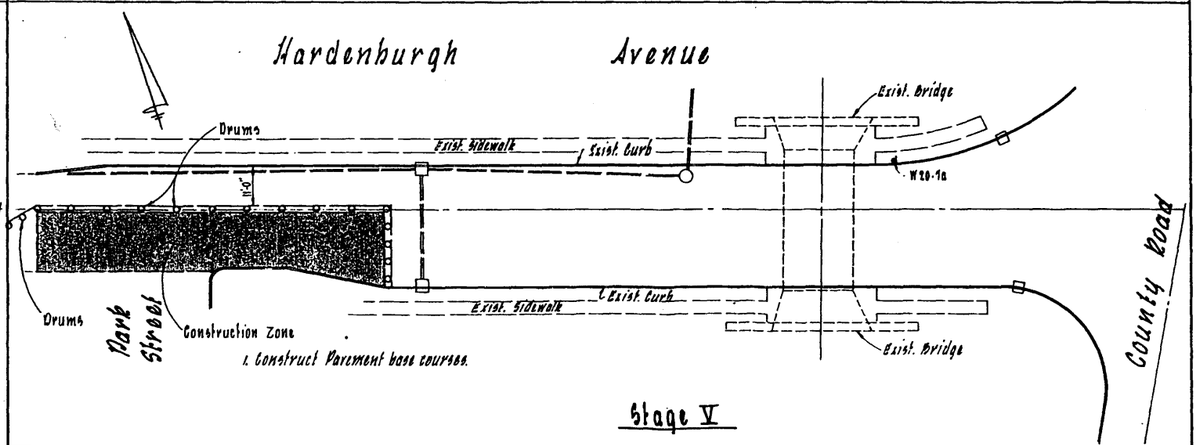
1. Construct Pavement base courses.

Stage IV



1. Remove and reconstruct Bridge Deck.
2. Construct drainage.
3. Remove and reconstruct Road base courses.

Stage II



1. Construct Pavement base courses.

Stage V

NO.	DATE	DWN.	CHK'D.	REVISION

Construction Staging for Hardenburgh Avenue Bridge Improvements

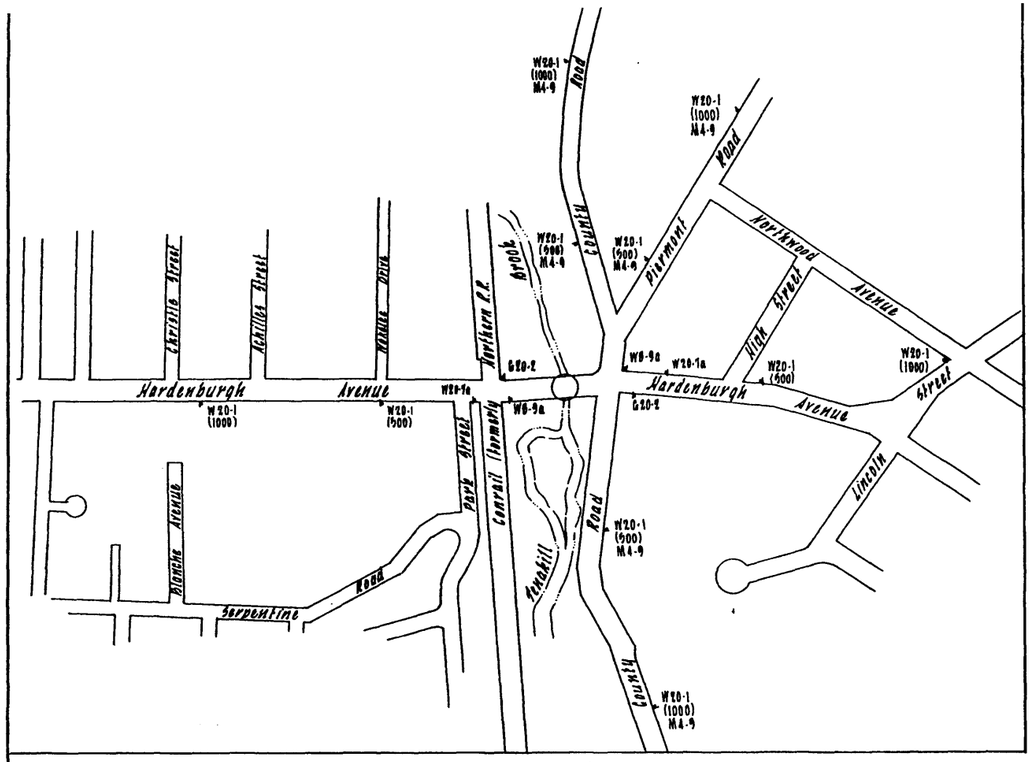
Borough of Demarest
Bergen County New Jersey

SCALE: 1"= 50' | DATE: 07-30-96 | DWN. BY: LEE | CHKD. BY: GVV | DWG. 12 OF

Date

James A. Feury, P.E.
Professional Engineer N.J. Lic. No. 21918

AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 845-8500



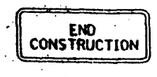
Traffic Control Plan / Signage

1" = 200'

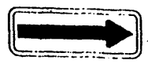
W99 - 2
48" x 48"

NOTE: THE BORDER, THE WORDS "GIVE US A","SLOW DOWN!", AND THE BRAKE PEDAL ARE BLACK; LEAVING THE WORD "BRAKE" ORANGE.

W20 - 7a (S)
48" x 48"



G20 - 2
60" x 24"



(L OR R)
W1- 6
48" x 24"

W1 - 6 (S)
60" x 30"

(L OR R)
W4 - 2 (S)
48" x 48"

W8 - 9a
48" x 48"

W20 - 7b
48" x 48"

W20 - 1
48" x 48"

W4 - 9N
30" x 12" MIN.
(SIZE WILL VARY WITH LENGTH OF STREET NAME)

STREET NAME SIGN TO BE USED IN CONJUNCTION WITH W4 - 9 SIGNS BLACK ON ORANGE

GENERAL NOTES:

1. INSTALLATION, DIMENSIONS, COLORS AND DETAILS OF VARIOUS SIZE SIGNS, AND ACCESSORY PANELS TO FOLLOW STANDARDS IN THE CURRENT "STANDARD HIGHWAY SIGN PUBLICATION" AND THE CURRENT "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS".
2. (S) REPRESENTS A SPECIAL SIZE SIGN.
3. LETTERS AND NUMERALS SHALL CONFORM TO THE CURRENT MANUAL, "STANDARD ALPHABETS FOR HIGHWAY SIGNS" U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.
4. THE CONTRACTOR SHALL OBTAIN THE APPROVAL OF THE ENGINEER FOR THE DISTANCE TO BE USED ON THE ADVANCE WARNING SIGNS, AND FOR THE SPEED LIMIT TO BE USED ON THE R2-1 SIGN.
5. DISTANCE LEGEND

SIGN NUMBER FOLLOWED BY LETTER	DISTANCE
A	1500'
B	1000'
C	500'
D	1 MILE
E	1/2 MILES AHEAD
F	1/4 MILES AHEAD

BACKING MATERIAL

1. ALUMINUM SHALL BE FLAT SHEET OF 6061-T6 ALLOY, .100" GAUGE.

TEMPORARY SIGN SUPPORTS

1. SIGN SUPPORTS SHALL BE OF WELL SEASONED LUMBER, S4S, FREE OF SPLITS, KNOTS AND WARPS OR, OF STEEL OR ALUMINUM COMPONENTS.
2. WOOD POSTS SHALL HAVE A UNIFORM CROSS-SECTION AND SHALL NOT EXCEED THE FOLLOWING DIMENSIONS FOR:
   - SINGLE POST = 4" x 6" ;
   - TWO POSTS = 3" x 6" OR 4" x 5" ;
   - THREE POSTS = 3" x 5" OR 4" x 4"
3. NO BRACING IS PERMITTED. VERTICAL CLEARANCES FOR SIGNS MOUNTED ON WOOD SUPPORTS SHALL BE 7' DESIRABLE, 6' MINIMUM. EMBEDMENT DEPTH FOR THE WOOD POST SHALL NOT EXCEED 3.5'.
4. STEEL OR ALUMINUM POSTS SHALL BE IN ACCORDANCE WITH THE STANDARD DETAIL FOR "SELECTIVE DIRECTIONAL SIGNS, CONSTRUCTION AND "W", "W" AND "R" BENDAWAY SIGN SUPPORTS".
5. TEMPORARY SIGN SUPPORTS NOT MEETING THIS CRITERIA SHALL BE SHIELDED BY A LONGITUDINAL BARRIER OR CRASH CUSHION.

SIGN FACES

1. SIGN FACES SHALL BE REFLECTIVE SHEETING, TYPE II.

FASTENING

1. ALL SIGNS SHALL BE SECURELY FASTENED TO THEIR SUPPORTS WITH BOLTS, NUTS AND WASHERS OF ALUMINUM (2024-T4 ALLOY) OR HOT-DIP GALVANIZED STEEL (A.S.T.M. 153).

NO.	DATE	DWN.	CHK'D.	REVISION

Date

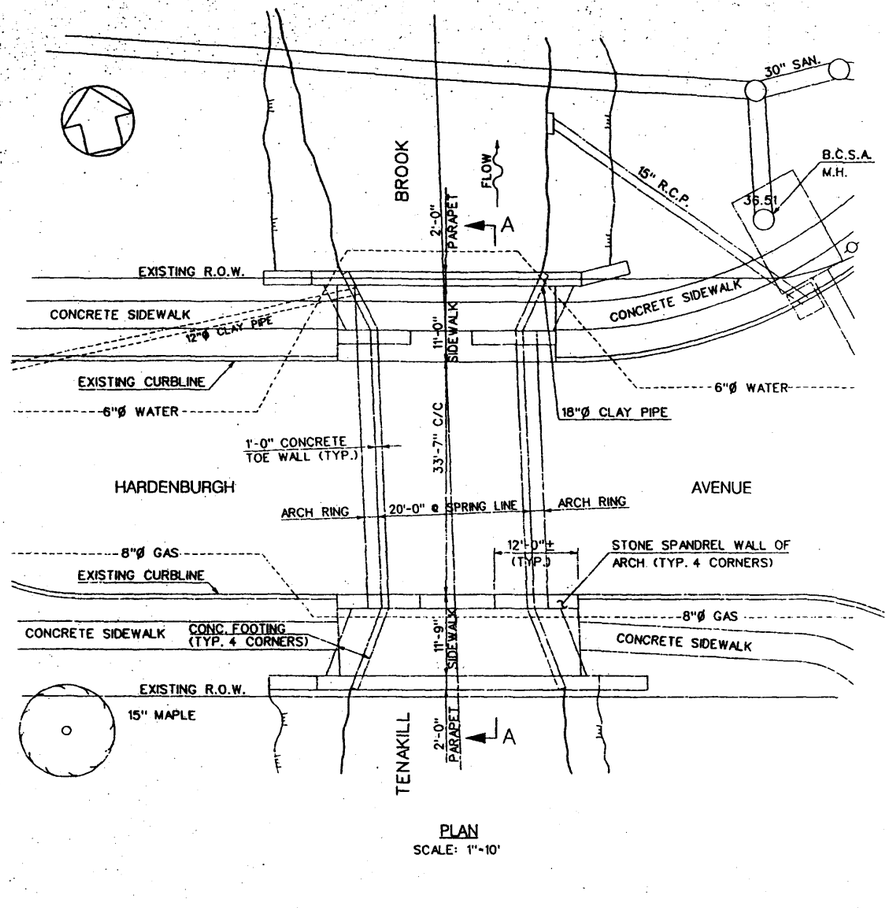
James A. Feury, P.E.
Professional Engineer N.J. Lic. No. 21918

Traffic Control Plan & Details
for
Hardenburgh Avenue Bridge Improvements
Borough of Demarest
Bergen County New Jersey

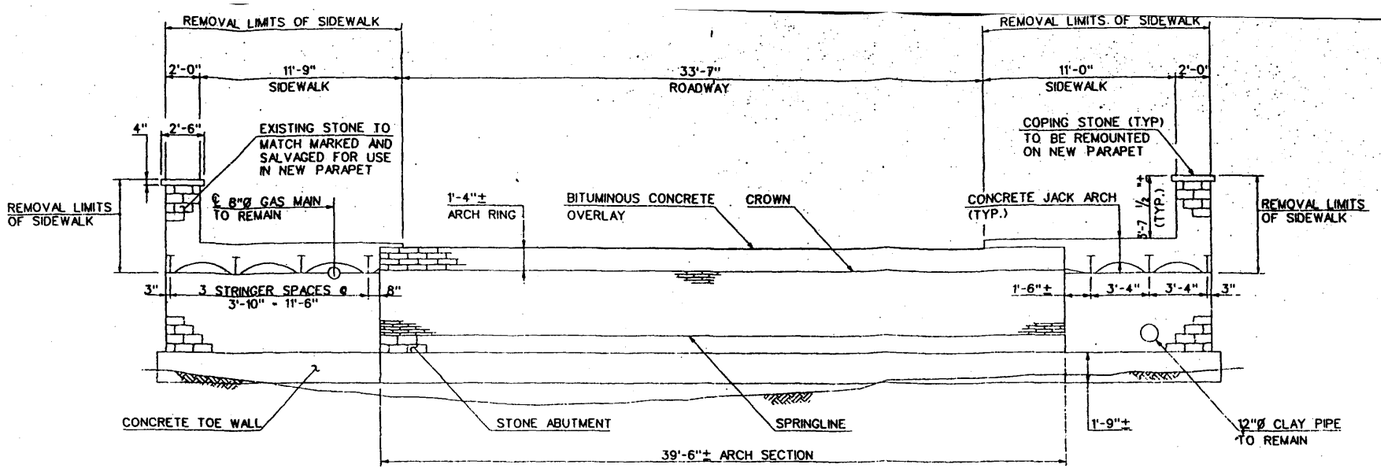
SCALE: As shown | DATE: 09-09-96 | DWN. BY: APH | CHK'D. BY: GYV | DWG. 19 OF

AZZOLINA & FEURY ENGINEERING COMPANY
CONSULTING ENGINEERS
30 Madison Avenue Paramus, N.J. 07652 (201) 843-6500

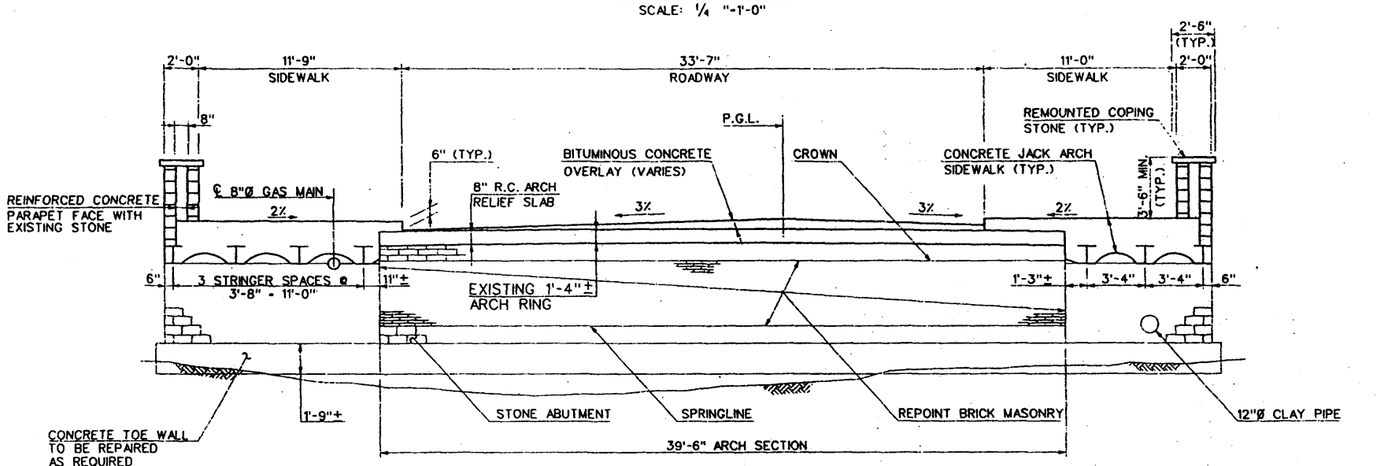
A. & F. JOB NO. DE-295



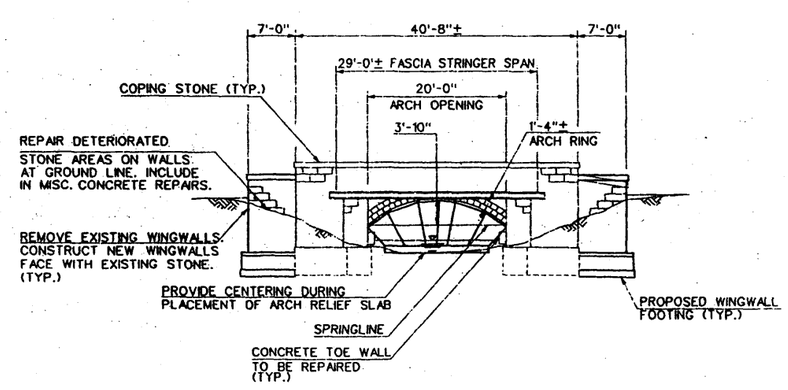
PLAN
SCALE: 1"=10'



EXISTING SECTION A-A
SCALE: ¼ "=1'-0"



PROPOSED SECTION A-A
SCALE: ¼ "=1'-0"



ELEVATION
SCALE: 1"=10'

ESTIMATE OF QUANTITIES		
DESCRIPTION	UNIT	CONTRACT QUANTITY
CLEARING SITE, BRIDGE	L.S.	1
FOUNDATION EXCAVATION	C.Y.	110
CONCRETE IN STRUCTURES, FOOTINGS	C.Y.	25
CONCRETE IN STRUCTURES, RETAINING WALLS	C.Y.	11
CONCRETE IN STRUCTURES, RELIEF SLAB	C.Y.	45
CONCRETE IN SUPERSTRUCTURE, SIDEWALKS	C.Y.	52
CONCRETE IN SUPERSTRUCTURE, PARAPETS	C.Y.	11
REINFORCEMENT STEEL IN STRUCTURES	LBS.	6,100
REINFORCEMENT IN STRUCTURES, EPOXY COATED	LBS.	17,550
CORING AND GROUTING	L.F.	242
STRUCTURAL STEEL (20,500 LBS.)	L.S.	1
STONEWORK	S.F.	1000
REPOINTING, STONE	L.F.	400
REPOINTING, BRICK	L.F.	5,600
TEMPORARY SHEETING	S.F.	1,450
ARCH CENTERING	L.S.	1
MISCELLANEOUS CONCRETE REPAIRS	C.F.	275

INDEX OF DRAWINGS	
NO.	TITLE
B1	GENERAL PLAN AND ELEVATION
B2	GENERAL NOTES AND STONE PARAPET DETAILS
B3	CONSTRUCTION STAGING
B4	WINGWALLS
B5	ABUTMENT WALLS AND MISCELLANEOUS DETAILS
B6	DECK PLAN AND SUPERSTRUCTURE DETAILS
B7	SUPERSTRUCTURE DETAILS AND SECTIONS
B8	RELIEF SLAB DETAILS

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

GENERAL PLAN & ELEVATION

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

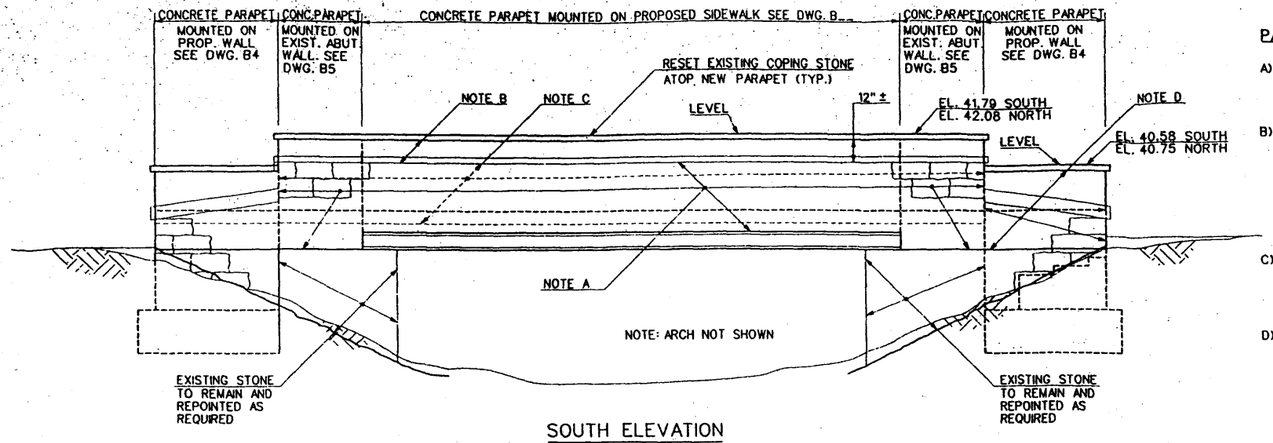
A.G. LICHTENSTEIN & ASSOC., INC.

8/96

RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

SCALE: AS SHOWN

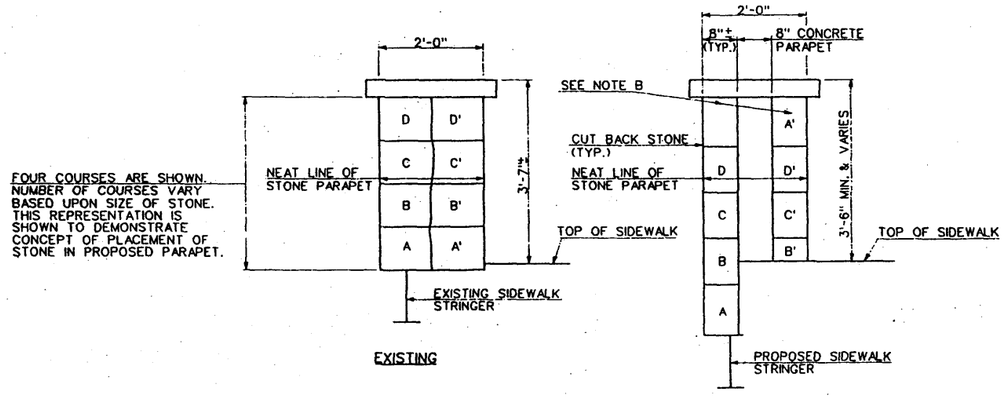
BRIDGE
SHEET NO. B1 OF B8



SOUTH ELEVATION

(NORTH ELEVATION SIMILAR)

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



DETAIL A

N.T.S.

PARAPET NOTES

A) EXISTING STONE TO BE REMOVED WITHIN LIMITS SHOWN. PRIOR TO REMOVING, STONES MUST BE MATCH MARKED AND PHOTOGRAPHED TO ENSURE THAT THEY ARE REPLACED IN THEIR ORIGNAL LOCATIONS.

B) INCREASED HEIGHT OF PARAPET ON THE OUTSIDE FACE TO BE MADE UP WITH THE REMAINS OF EXISTING STONE THAT HAVE BEEN CUT BACK TO ALLOW FOR THE CONSTRUCTION OF THE CONCRETE PARAPET. STONES USED IN THIS STRIP SHALL MATCH THE SIZE AND PATTERN AS THOSE IN THE OTHER PORTION OF THE PARAPET. ON THE INSIDE OF THE PARAPET, THIS STRIP SHALL BE CONSTRUCTED WITH STONE WHICH WAS ORIGINALLY LOCATED AT THE SIDEWALK LEVEL. SEE DETAIL A.

C) THE STONES OF THE INSIDE FACE OF THE PARAPET SHALL BE MATCH MARKED AND PHOTOGRAPHED TO ENSURE THAT THEY ARE PLACED IN THEIR ORIGINAL LOCATION. THE STONES OF THE INSIDE FACE SHALL BE PLACED AT THE SAME ELEVATION RELATIVE TO THEIR OUTSIDE FACE COUNTERPART. SEE DETAIL A.

D) STONES OF THE WINGWALLS SHALL BE MATCH MARKED AND PHOTOGRAPHED PRIOR TO REMOVAL. UPON REPLACEMENT, THE STONES SHALL BE REPLACED SUCH THAT THE TOP COURSE OF THE EXISTING IS THE TOP COURSE OF THE PROPOSED. SHOULD ADDITIONAL STONES BE REQUIRED, THEY SHALL BE PLACED AT THE LOWER LEVELS OF THE WALL AND BE TAKEN FROM EXISTING STONES THAT HAVE BEEN CUT TO ALLOW THE CONSTRUCTION OF THE CONCRETE PARAPET.

E) MORTAR JOINTS TO BE TOOL FINISHED TO MATCH THE EXISTING JOINT APPEARANCE.

GENERAL NOTES

1. DESIGN SPECIFICATIONS:
   1992 (15TH EDITION) AASHTO STANDARD SPECIFICITIONS FOR HIGHWAY BRIDGES (WITH INTERIMS) AS MODIFIED BY SECTION 3 OF NJDOT DESIGN MANUAL FOR BRIDGES AND STRUCTURES.

2. CONSTRUCTION SPECIFICATIONS:
   1989 NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AS MODIFIED BY THE SUPPLEMENTARY SPECIFICATIONS.

3. HISTORIC RESOURCES:
   THE HARDENBURGH AVENUE BRIDGE HAS BEEN RECOMMENDED FOR INCLUSION IN THE NATIONAL REGISTER OF HISTORIC PLACES. AS SUCH, EXTREME CARE SHALL BE EXERCISED BY THE CONTRACTOR SO AS TO NOT CAUSE DAMAGE TO ANY COMPONENTS WHICH ARE TO REMAIN. ALL WORK PERFORMED ON THE BRIDGE SHALL BE IN ACCORDANCE WITH THE SECRETARY OF THE INTERIOR STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES. IN PARTICULAR, THE FOLLOWING IS NOTED:

   A) THE COPING STONES WHICH TOP THE EXISTING PARAPETS AND WINGWALLS SHALL BE REMOVED AND REINSTALLED ATOP THE RECONSTRUCTED PARAPETS AND WINGWALLS.

   B) THE EXISTING STONE SHALL BE CUT BACK TO THE PROPER THICKNESS IN ORDER TO BE RESET AGAINST THE NEWLY CONSTRUCTED CONCRETE PARAPETS AND WINGWALLS. THE STONES SHALL BE CUT IN SUCH A MANNER THAT WILL NOT DAMAGE THE EXTERIOR VISIBLE SURFACES.

   C) MASONRY CONSTRUCTION SHALL BE PERFORMED BY MASONS EXPERIENCED IN THE REHABILITATION OF HISTORIC STONE STRUCTURES. MORTAR USED IN THE REHABILITATION INCLUDING REPOINTING THE BRICK ARCH SHALL BE A MORTAR CONSISTING OF LIME, SAND AND WATER. PORTLAND CEMENT SHALL NOT BE USED IN THE MORTAR MIX.

4. LIVE LOAD
   A) AASHTO HS 20-44.

5. CONCRETE DESIGN STRESSES
   A) SPECIFIED DESIGN COMPRESSIVE STRENGTH (f'c)

CLASS A	4,000 P.S.I.
CLASS B	3,000 P.S.I.

   B) ALLOWABLE STRENGTHS, EXTREME FIBER IN COMPRESSION

CLASS A	1,600 P.S.I.
CLASS B	1,200 P.S.I.

6. REINFORCEMENT STEEL
   A) ASTM A615 (GRADE 60) (fs)=24,000 P.S.I.

7. STRUCTURAL STEEL
   AASHTO M270 GRADE 36 (ASTM A709, GRADE 36)

8. UTILITIES
   A) EXISTING 8" DIAMETER GAS MAIN UNDER SOUTH SIDEWALK TO REMAIN.

9. MAINTENANCE AND PROTECTION OF TRAFFIC
   TRAFFIC TO BE MAINTAINED DURING CONSTRUCTION VIA STAGED CONSTRUCTION.

10. EXISTING DIMENSIONS SHOWN ON THE PLANS ARE IN ACCORDANCE WITH AVAILABLE INFORMATION ALL OF WHICH COULD NOT BE FIELD VERIFIED. THE INFORMATION CONTAINED HEREIN IS PRESENTED IN SUFFICIENT DETAIL FOR THE CONTRACTOR TO PREPARE A BID. AS THIS IS A REHABILITATION OF AN EXISTING STRUCTURE, VARIATIONS IN DIMENSIONS, SKEWS, LIMITS OF REPAIR ARE TO BE EXPECTED. THE CONTRACTOR IS RESPONSIBLE FOR THE FIELD VERIFICATION OF THESE ELEMENTS AND SHALL CONTACT THE ENGINEER IMMEDIATELY IF VARIATIONS ARE FOUND.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

GENERAL NOTES AND STONE PARAPET DETAILS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

A.G. LICHTENSTEIN & ASSOC., INC.

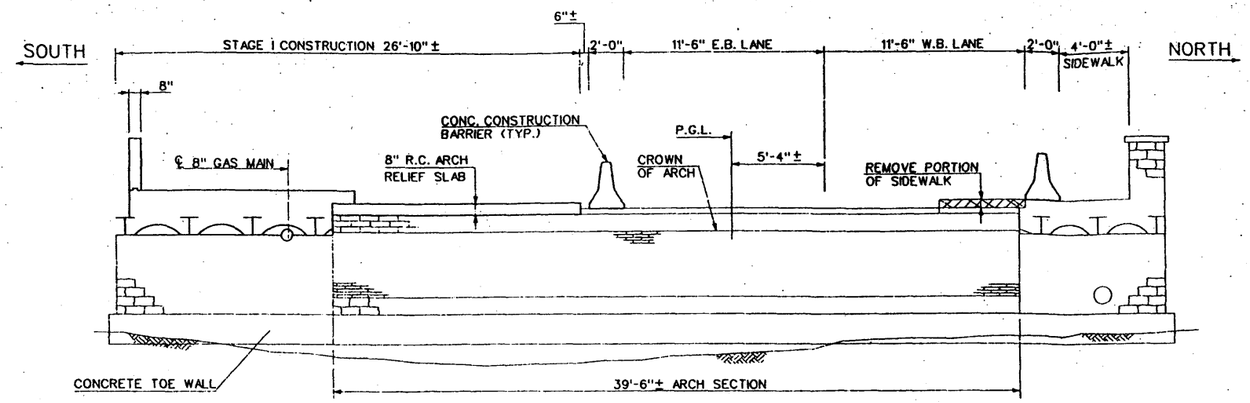
8/96

RICHARD C. KREPPEL

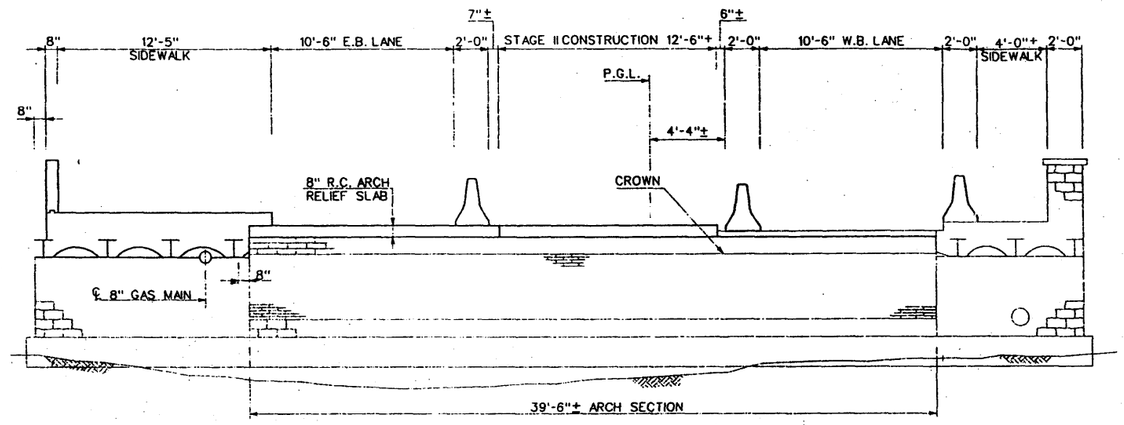
N.J. P.E. LICENSE #24794

SCALE: AS SHOWN

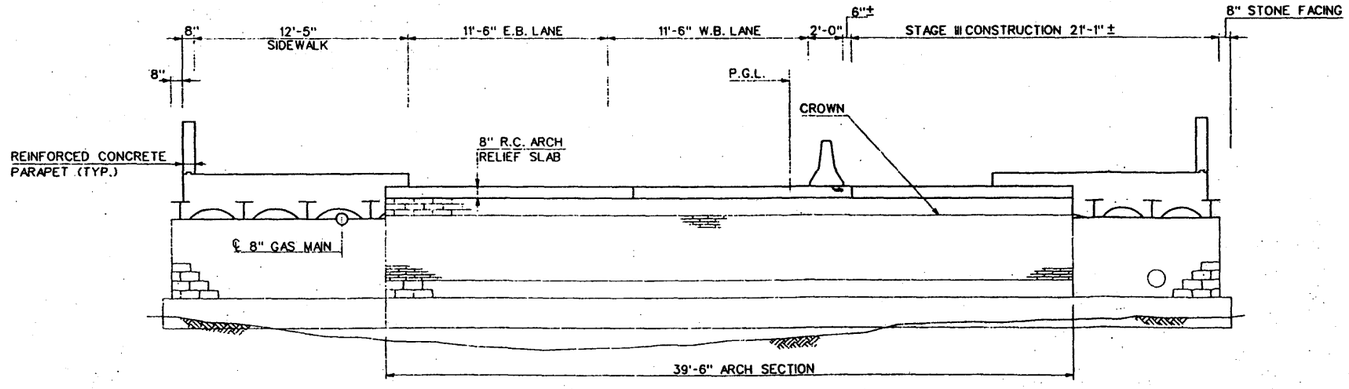
BRIDGE SHEET NO. B2 OF B8



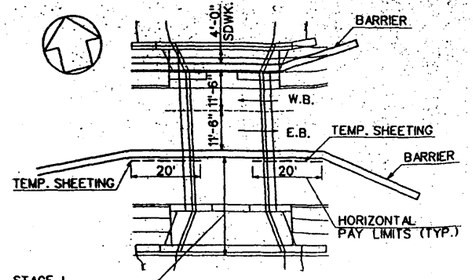
STAGE I
SCALE: 1/4"-1'-0"



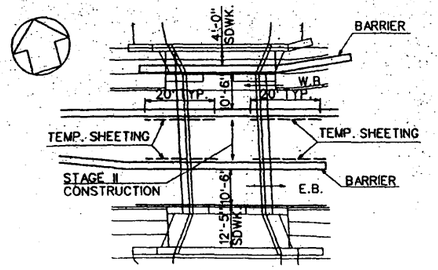
STAGE II
SCALE: 1/4"-1'-0"



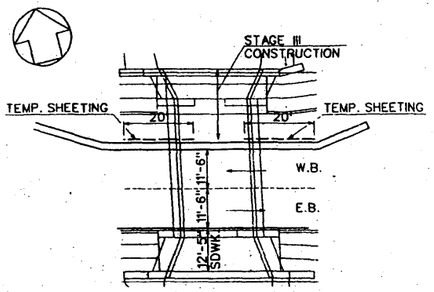
STAGE III
SCALE: 1/4"-1'-0"



PLAN STAGE I
SCALE: 1" = 20'



PLAN STAGE II
SCALE: 1" = 20'



PLAN STAGE III
SCALE: 1" = 20'

NOTE:

1) W.B. REPRESENTS WESTBOUND LANE, E.B. REPRESENTS EASTBOUND LANE.

2) FOR TEMP. SHEETING, SEE DWG. B-5.

SEQUENCE OF CONSTRUCTION:

1. PRIOR TO INITIATING STAGED TRAFFIC CONSTRUCTION (STAGES I TO IV), THE CONTRACTOR SHALL REPOINT THE ABUTMENTS AND ARCH RING AND THEN INSTALL THE ARCH CENTERING. STAGED TRAFFIC CONSTRUCTION SHALL NOT COMMENCE UNTIL ARCH CENTERING IS IN PLACE AND ACCEPTED BY THE ENGINEER.

2. STAGE I CONSTRUCTION SHALL CONSIST OF THE REMOVAL OF THE SOUTH SIDEWALK AND ITS SUBSEQUENT REPLACEMENT. A PORTION OF THE REINFORCED CONCRETE AND RELIEF SLAB WILL ALSO BE CONSTRUCTED. THE SOUTHEAST AND SOUTHWEST WINGWALLS WILL ALSO BE RECONSTRUCTED DURING THIS STAGE. TO REDUCE THE TIME PERIOD OF STAGED TRAFFIC CONSTRUCTION, REPLACEMENT OF THE STONE FACING WILL NOT BE PERFORMED UNTIL THE FULL ROADWAY WIDTH IS REOPENED TO TRAFFIC.

3. STAGE II CONSTRUCTION SHALL CONSIST OF THE CONSTRUCTION OF THE CENTRAL PORTION OF THE REINFORCED CONCRETE ARCH RELIEF SLAB.

4. STAGE III CONSTRUCTION SHALL CONSIST OF THE REMOVAL OF THE NORTH SIDEWALK AND ITS SUBSEQUENT REPLACEMENT. A PORTION OF THE REINFORCED CONCRETE AND RELIEF SLAB WILL ALSO BE CONSTRUCTED. THE NORTHEAST AND NORTHWEST WINGWALLS WILL BE CONSTRUCTED DURING THIS STAGE.

5. REINSTALLATION OF THE STONE FACING MAY COMMENCE WHEN THE ROADWAY IS RETURNED TO ITS FULL WIDTH

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

CONSTRUCTION STAGING

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

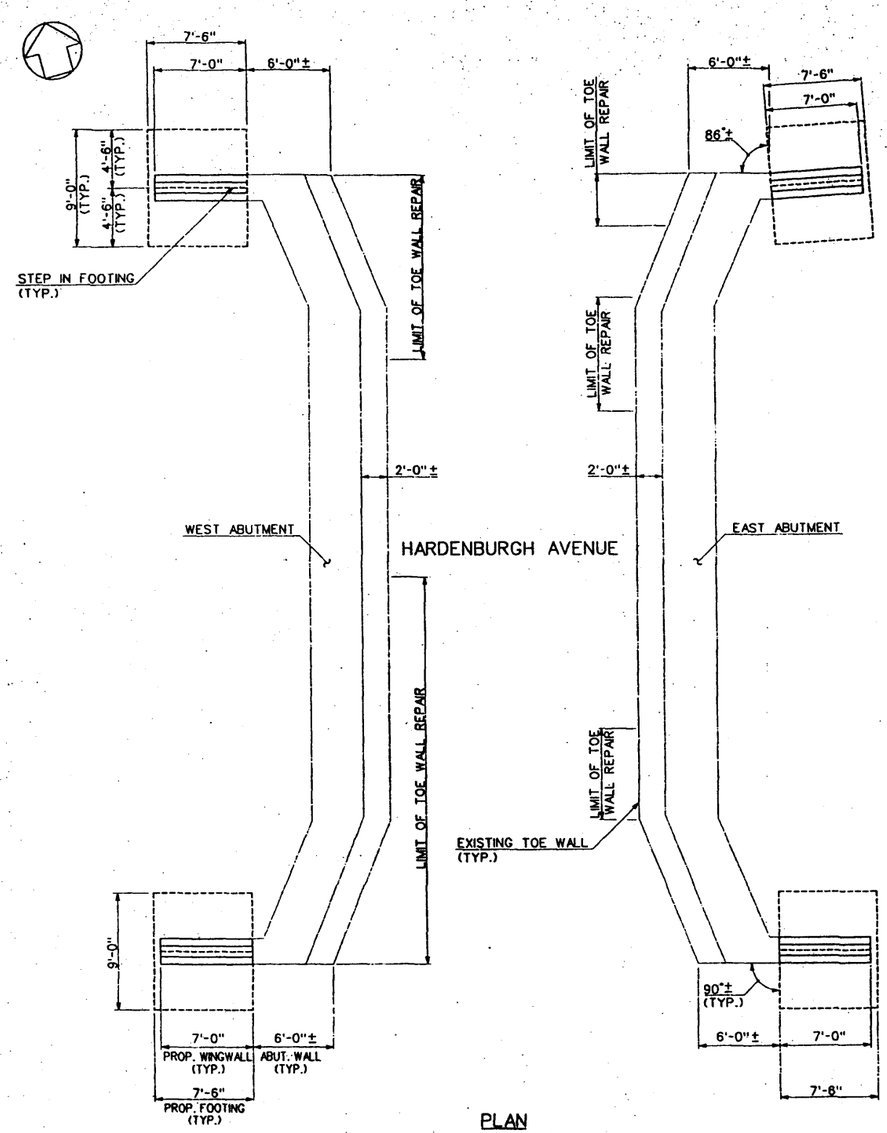
A.G. LICHTENSTEIN & ASSOC., INC.

8/96

RICHARD C. KREPPEL
N.J.P.E. LICENSE #24794

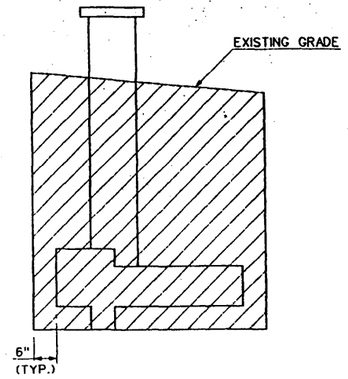
SCALE: AS SHOWN

BRIDGE
SHEET NO. B3 OF B8

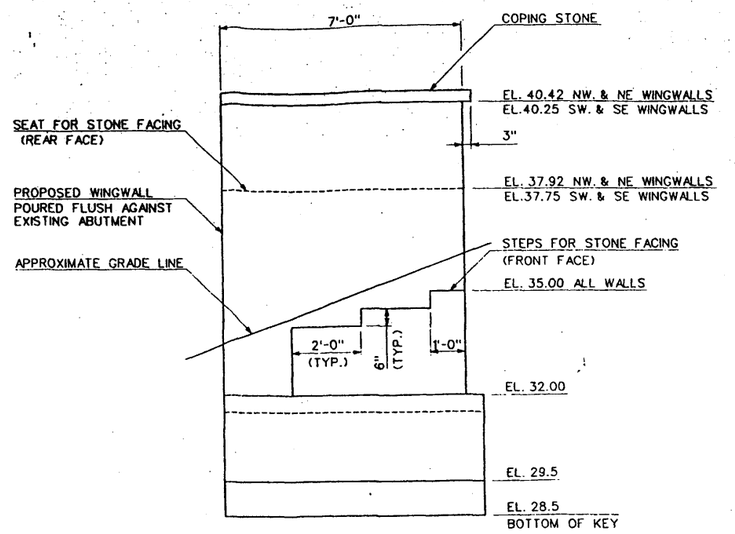


PLAN
SCALE: 3/16"-1'-0"

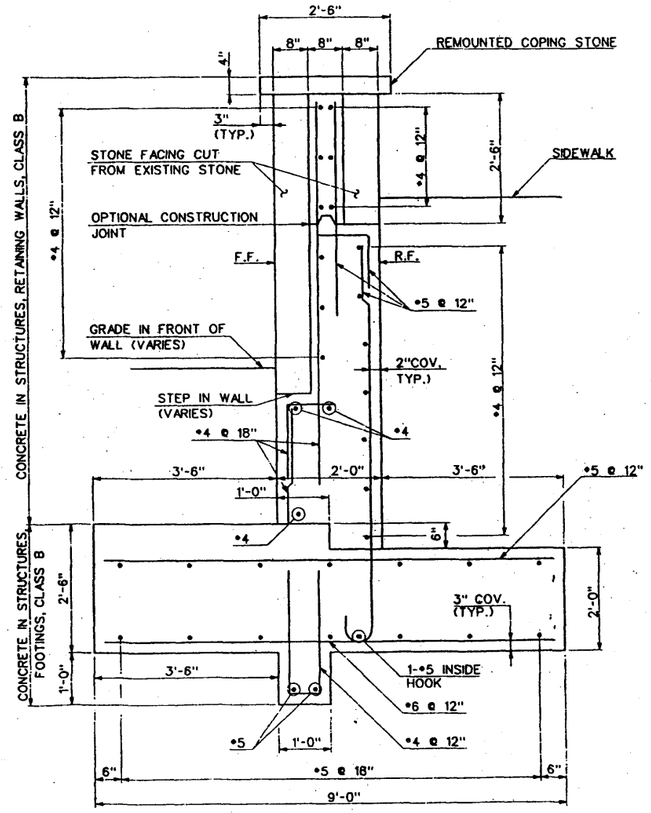
LEGEND:
LIMITS OF FOUNDATION EXCAVATION



EXCAVATION DETAILS
N.T.S.



ELEVATION
SCALE: ½"-1'-0"



SECTION
SCALE: ¾"-1'-0"

NOTES:

1. TOE WALL REPAIRS TO BE INCLUDED FOR PAYMENT UNDER MISCELLANEOUS CONCRETE REPAIRS.
2. TOE WALL REPAIRS TO BE MADE WITH CLASS B CONCRETE.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

WINGWALLS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

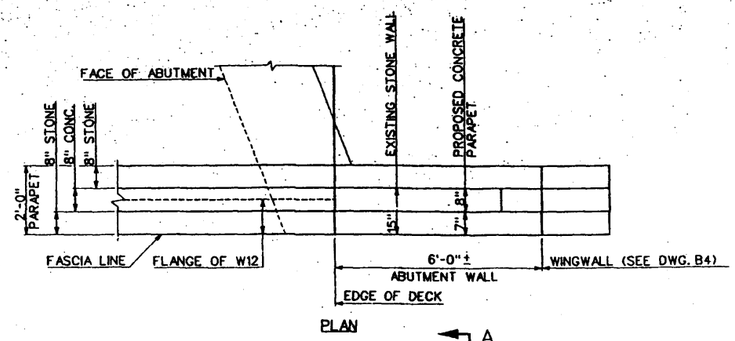
A.G. LICHTENSTEIN & ASSOC., INC.

8/96

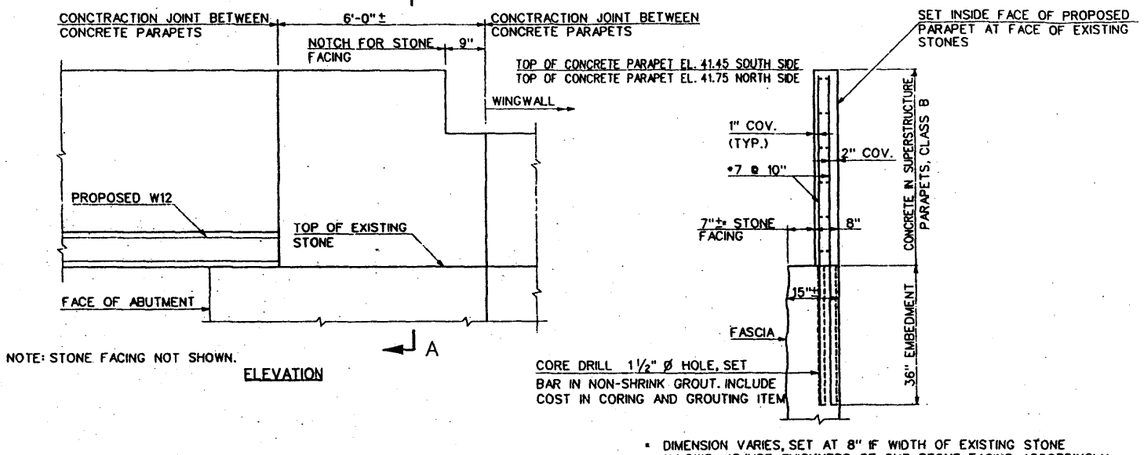
RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

SCALE: AS SHOWN

BRIDGE SHEET NO. B4 OF B8



PLAN

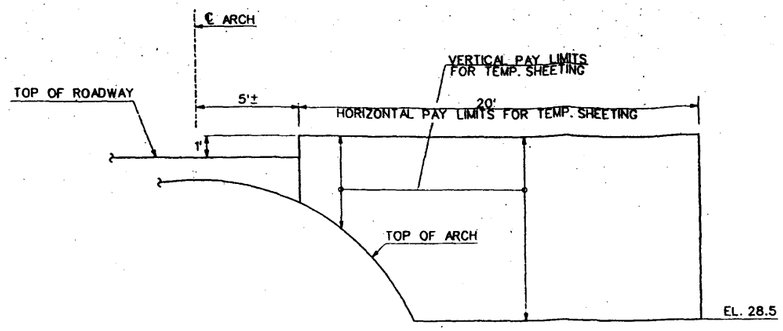


ELEVATION

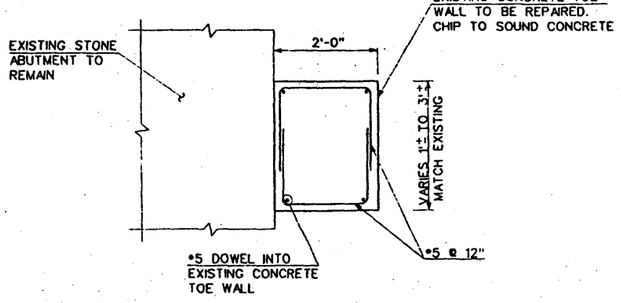
* DIMENSION VARIES, SET AT 8" IF WIDTH OF EXISTING STONE ALLOWS. ADJUST THICKNESS OF CUT STONE FACING ACCORDINGLY.

SECTION A-A

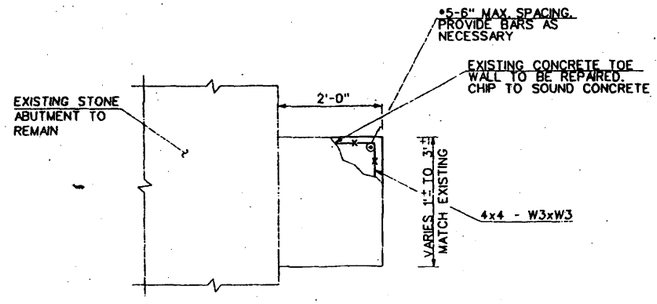
PARAPET MOUNTED ON ABUTMENT WALL DETAIL
SCALE: ¾"=1'-0"



TEMP. SHEETING PAY LIMITS
N.T.S.



TOE WALL REPAIR DETAIL
N.T.S.



TOE WALL SPALL REPAIR DETAIL
N.T.S.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

ABUTMENT WALLS AND MISCELLANEOUS DETAILS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

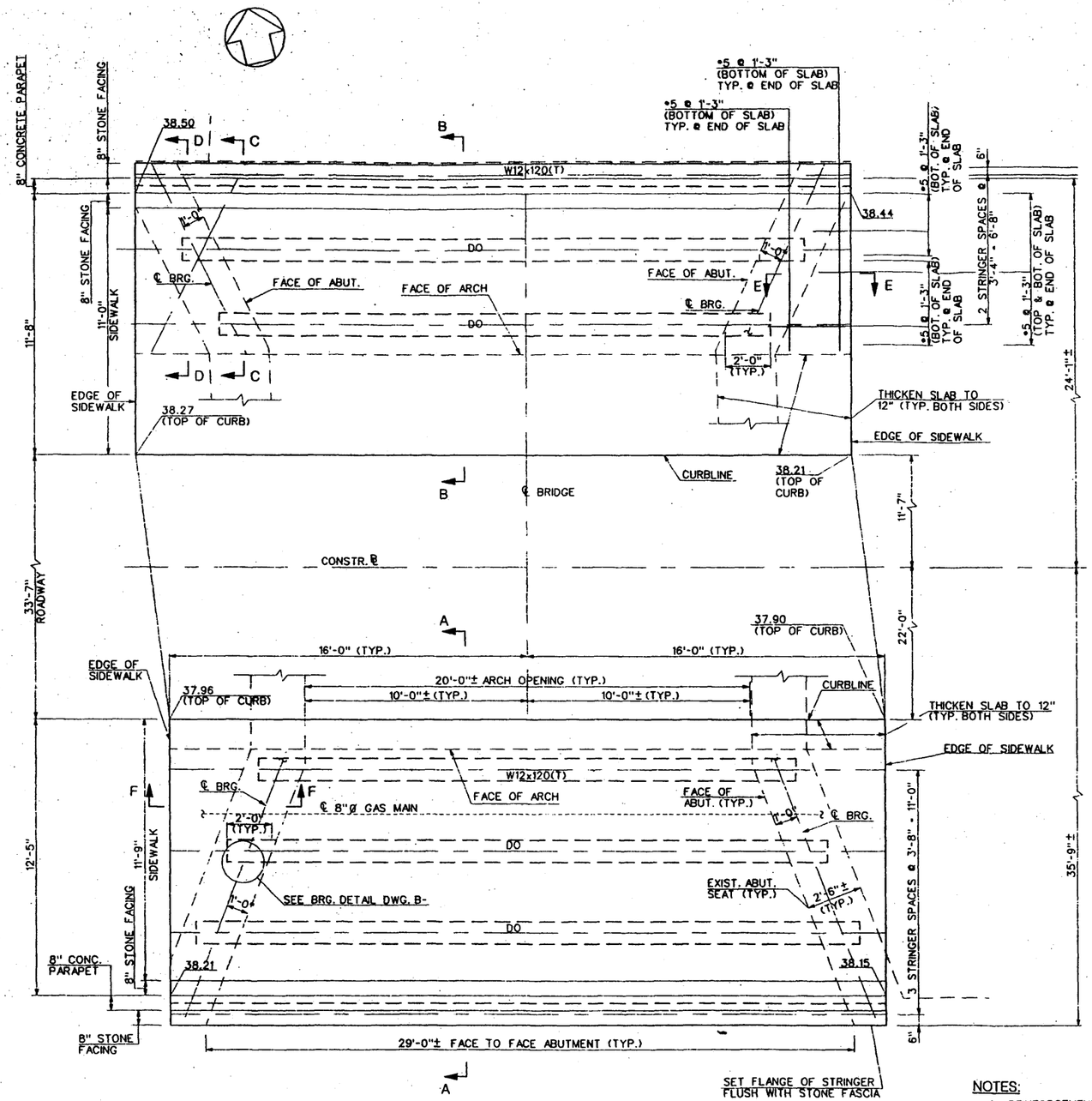
A.G. LICHTENSTEIN & ASSOC., INC.

RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

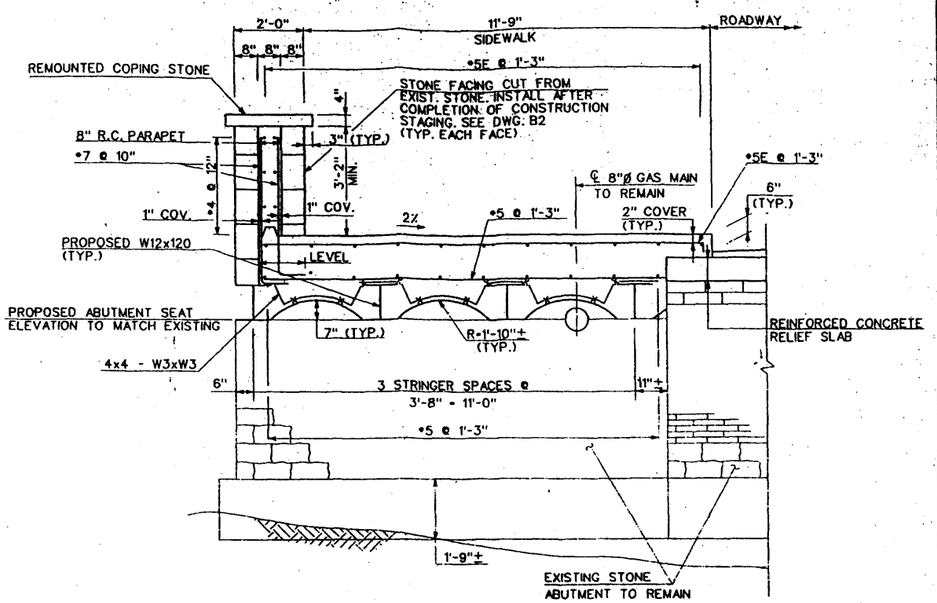
8/96

SCALE: AS SHOWN

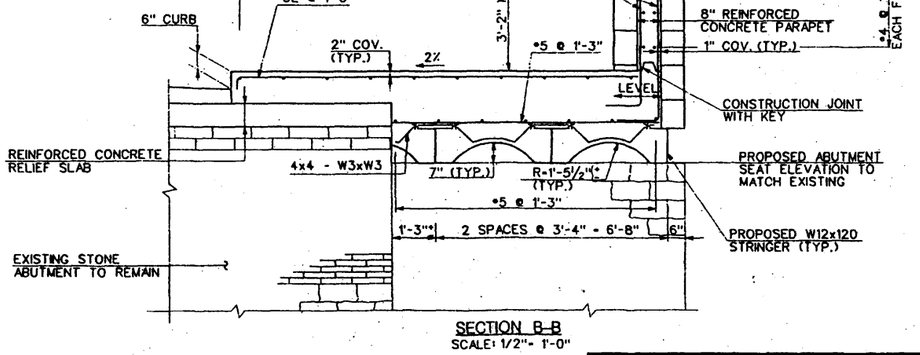
BRIDGE SHEET NO. B5 OF B8



SIDEWALK PLAN
SCALE: 3/8"=1'-0"



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



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

NOTES:

1. REINFORCEMENT IN SIDEWALKS SHOWN IN PLAN FOR EDGE OF SIDEWALK AT ABUTMENTS, SEE SECTIONS A-A & B-B FOR ADDITIONAL REINFORGEMENT.
2. SEE SEQUENCE OF CONSTRUCTION AND STAGING PLANS. DWG. B-3.
3. STONE COPING NOT SHOWN IN PLAN FOR CLARITY.
4. FOR SECTIONS C-C, D-D, E-E, AND F-F SEE SHEET B7.
5. E DENOTES EPOXY COATED.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

DECK PLAN AND SUPERSTRUCTURE DETAILS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

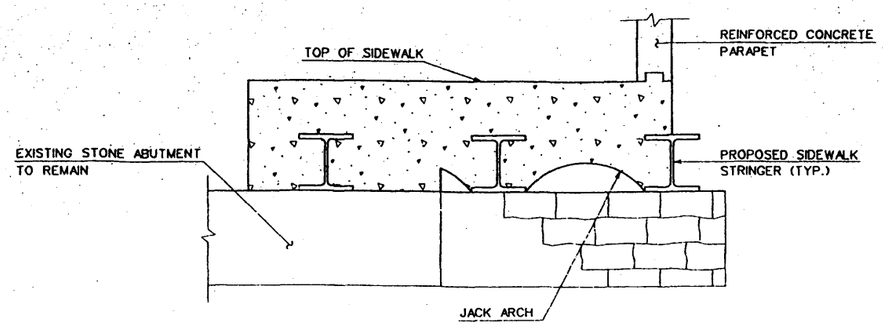
A.G. LICHTENSTEIN & ASSOC., INC.

8/96

RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

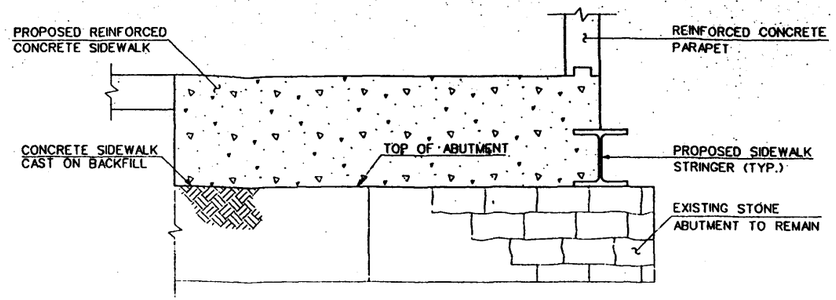
SCALE: AS SHOWN

BRIDGE SHEET NO. B6 OF B8



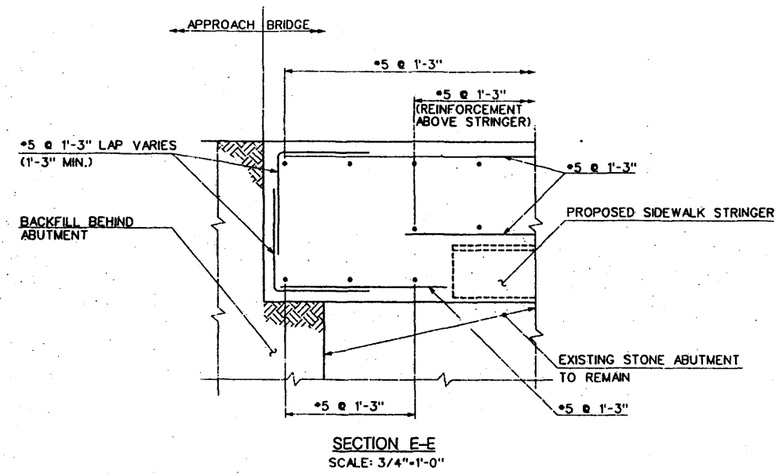
SECTION C-C
SCALE: 3/4"=1'-0"

NOTES:
1. REINFORCEMENT NOT SHOWN FOR CLARITY.
2. SOUTH SIDEWALK SIMILAR.

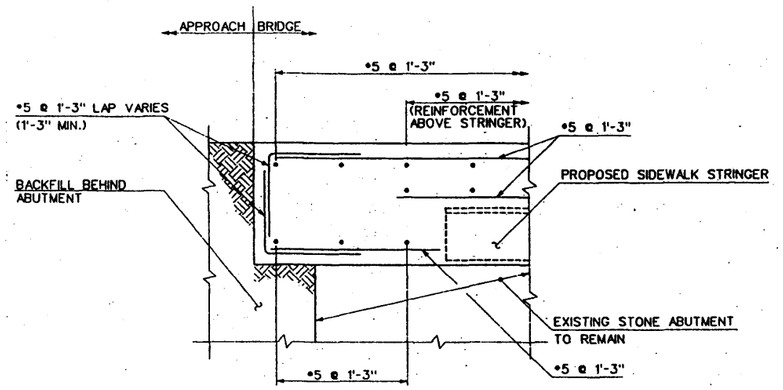


SECTION D-D
SCALE: 3/4"=1'-0"

NOTES:
1. REINFORCEMENT NOT SHOWN FOR CLARITY.
2. SOUTH SIDEWALK SIMILAR.



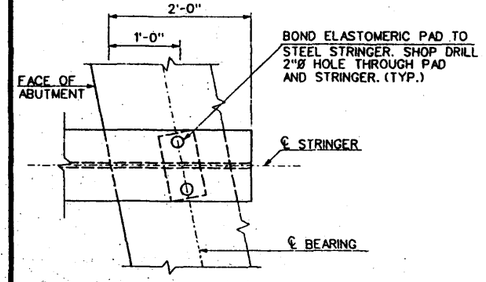
SECTION E-E
SCALE: 3/4"=1'-0"



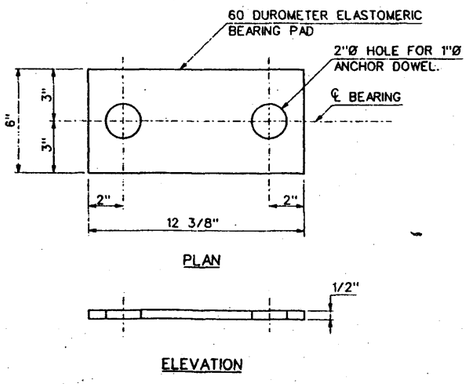
SECTION F-F
SCALE: 3/4"=1'-0"

STRUCTURAL STEEL NOTES:

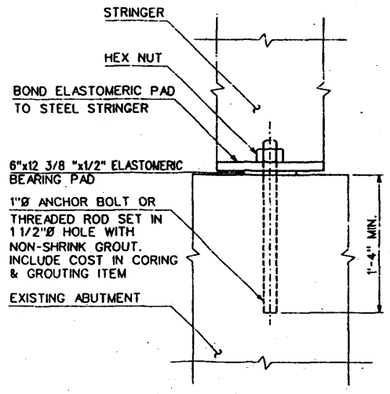
1. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A-709 GRADE 36 AASHTO DESIGNATION M270 WITH SUPPLEMENTARY REQUIREMENTS FOR NOTCH TOUGHNESS FOR ALL COMPONENTS MARKED (T).
2. ALL BOLTS SHALL CONFORM TO ASTM A-325 AND BE 7/8"Ø UNLESS OTHERWISE NOTED.
3. PAINTING OF STRUCTURAL STEEL
   A) COATING SYSTEM IEU
   B) FINAL COAT COLOR: BROWN



BEARING PAD END PLAN
N.T.S.



BEARING PAD
SCALE: 3"=1'-0"



ANCHOR BOLT DETAIL
SCALE: 1 1/2"=1'-0"

NOTES:

1. FOR LOCTION OF SECTION C-C, D-D, E-E, AND F-F SEE DWG. B6.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

SUPERSTRUCTURE DETAILS AND SECTIONS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

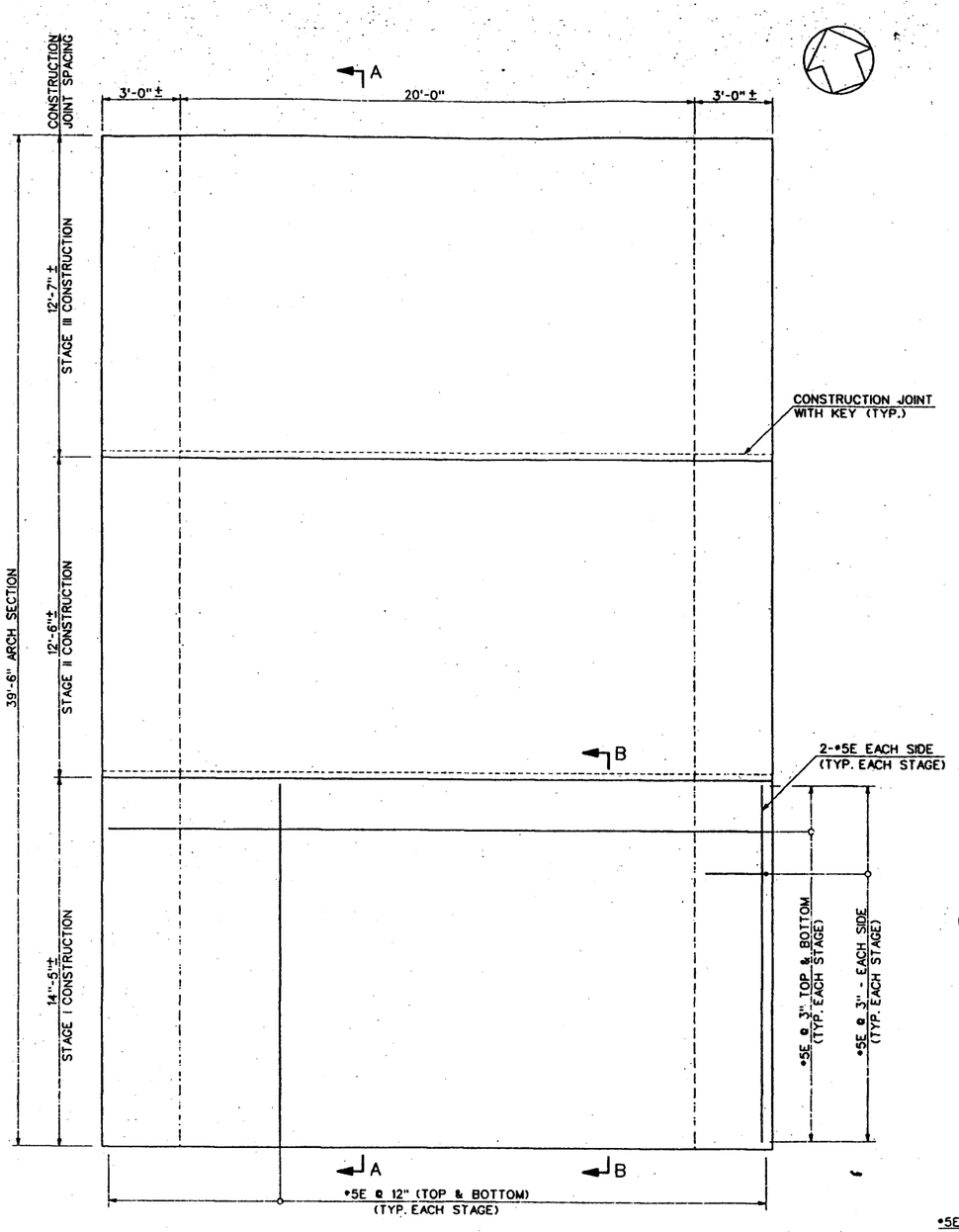
A.G. LICHTENSTEIN & ASSOC., INC.

8/96

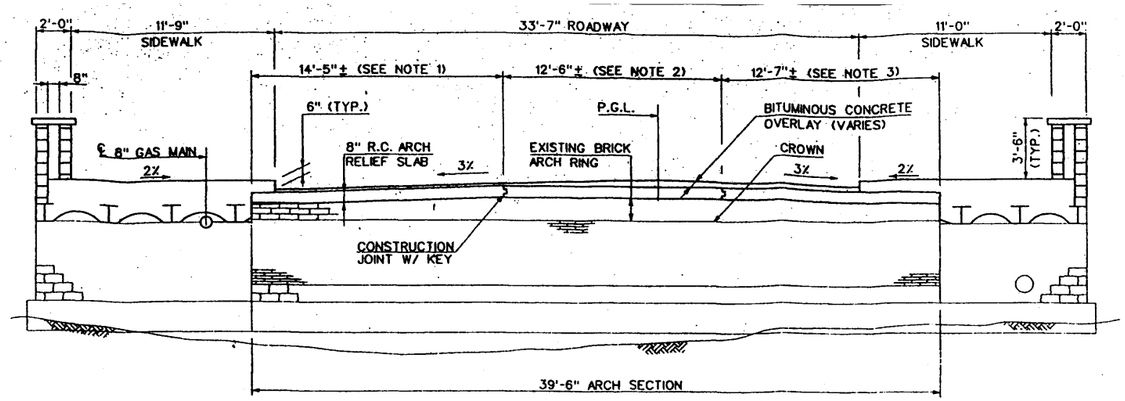
SCALE: AS SHOWN

RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

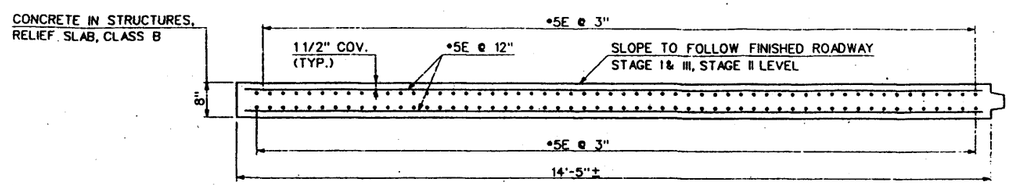
BRIDGE SHEET NO. B7 OF B8



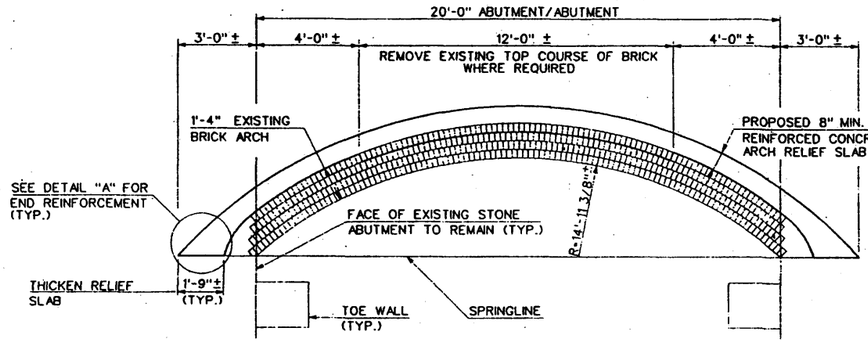
PLAN
SCALE: 3/8"=1'-0"



SECTION A-A
SCALE: 1/4"=1'-0"

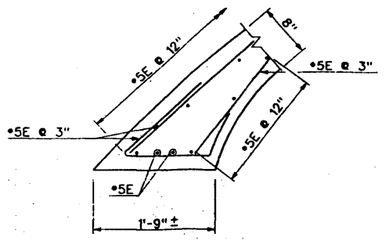


SECTION B-B
SCALE: 3/4"=1'-0"



ELEVATION
SCALE: 3/8"=1'-0"

NOTE: E DENOTES EPOXY COATED



DETAIL A
SCALE: 1"=1'-0"

NOTES:

1. THE PORTION OF SLAB CONSTRUCTED DURING STAGE I TO FOLLOW CROSS SLOPE OF ROADWAY AND THE TOP SURFACE SET AT THE CROWN TO ALLOW A MINIMUM 2" OF ASPHALT OVERLAY. REMOVAL OF SOME OF THE TOP LAYER OF BRICK MAY BE REQUIRED TO OBTAIN 8" SLAB THICKNESS. REMOVAL OF BRICK SHALL BE KEPT TO A MINIMUM AND ONLY WITHIN THE LIMITS SHOWN IN THE ELEVATION VIEW. THE CONTRACTOR SHALL TAKE SURVEY SHOTS ATOP THE EXPOSED BRICK AND ARCH RING TO DETERMINE THE REMOVAL LIMITS OF THE BRICK.
2. THE PORTION OF SLAB CONSTRUCTED DURING STAGE II TO BE PLACED LEVEL. REMOVAL OF BRICKS NOT REQUIRED.
3. THIS PORTION OF SLAB CONSTRUCTED DURING STAGE III FOLLOWS PROCEDURES IN NOTE 1.

REVISION	BY	CK'D.	DATE

BOROUGH OF DEMAREST

RELIEF SLAB DETAILS

REHABILITATION OF THE HARDENBURGH AVENUE BRIDGE

A.G. LICHTENSTEIN & ASSOC., INC.

8/96

RICHARD C. KREPPEL
N.J. P.E. LICENSE #24794

SCALE: AS SHOWN

BRIDGE SHEET NO. B8 OF B8