

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

COL-11-(9.44)(13.76)

ELKRUN TOWNSHIP
MADISON TOWNSHIP
COLUMBIANA COUNTY

PROJECT DESCRIPTION

This project includes the rehabilitation of the existing twin structures over West Fork Little Beaver Creek & W.B. US30 (9.46) and the rehabilitation of the existing twin structures over SR 154 (13.78) by replacement of the bridge decks and approach slabs, including minor approach pavement work. The project is approximately 600 feet long at COL-11-0946 and approximately 300 feet long at COL-11-1378, for a total project length of 900 feet.

LIMITED ACCESS

This improvement is especially designed for through traffic and has been declared a limited access highway or freeway by action of the Director in accordance with the provisions of Section 5511.02 of the Ohio Revised Code.

1997 SPECIFICATIONS

The Standard Specifications of the State of Ohio, Department of Transportation, including changes and supplemental specifications listed in the proposal, shall govern this improvement.

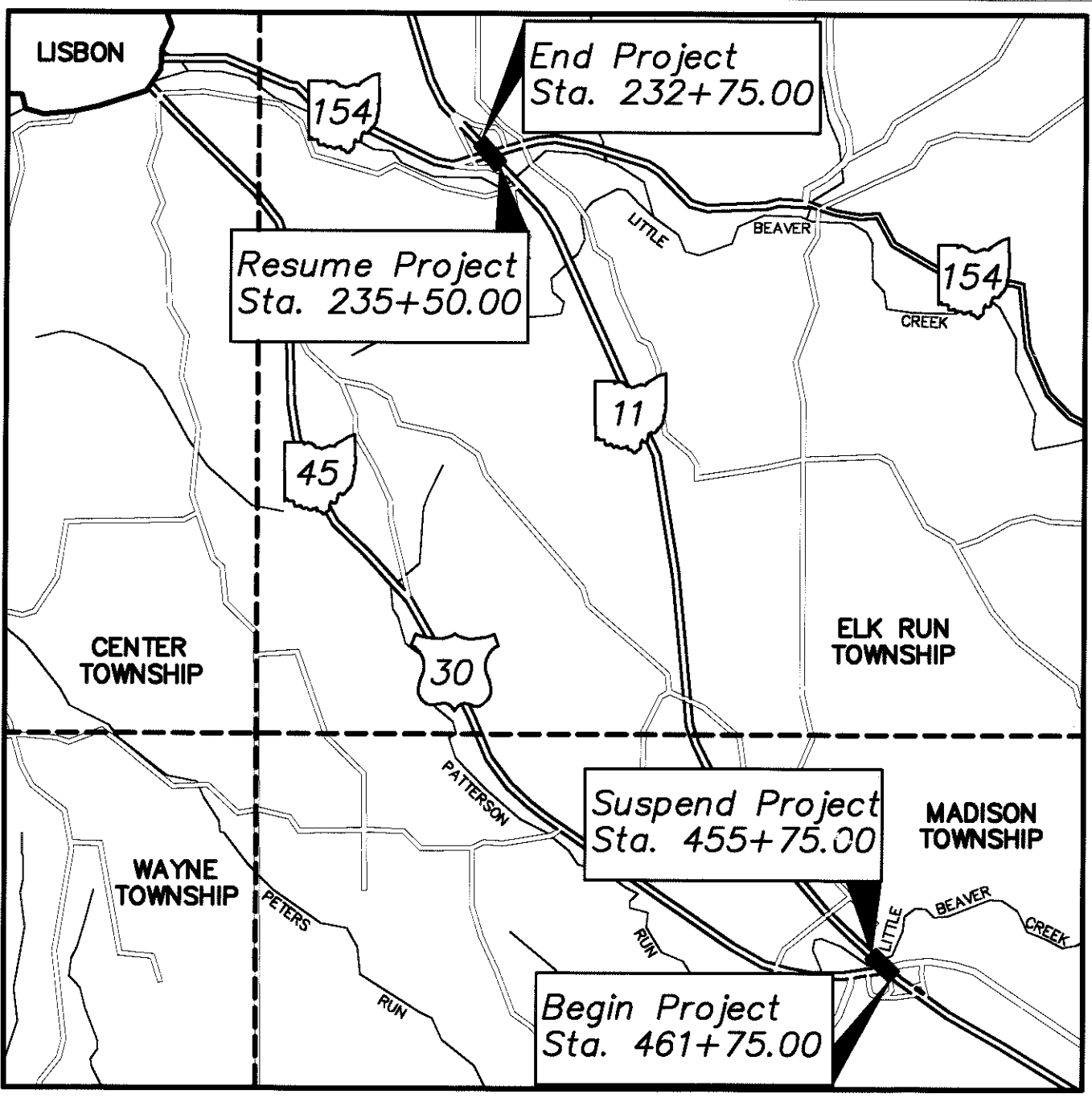
PRIMA FACIE SPEED LIMIT

Under authority of Section 4511.21, Division (I) of the Ohio Revised Code, the revised prima facie speed limits as indicated herein are determined to be reasonable and safe, and are hereby established for the duration of this project. The prima facie speed limit or limits hereby established shall become effective when appropriate signs giving notice thereof are erected.

I hereby approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenance and safety of traffic will be as set forth on the plans and estimates.

Approved, *[Signature]*
Date *07/19/01* District Deputy Director

Approved *[Signature]*
Date *8-23-01* Director, Department of Transportation



LOCATION MAP

Latitude: N 40°42'35" Longitude: W 80°41'35" COL-11-(9.44)
N 40°45'55" W 80°43'35" COL-11-(13.76)

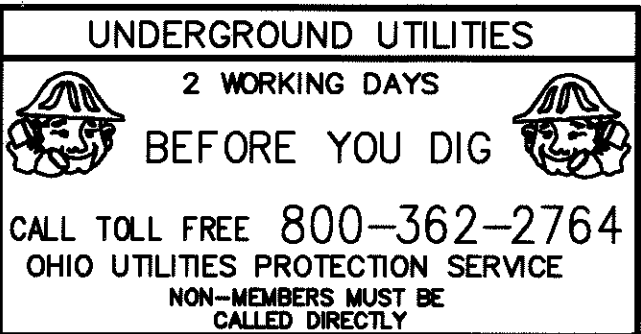


Portion to be Improved _____
State & Federal Routes _____
Other Roads _____

DESIGN DESIGNATION

Current ADT (2001) 11500
Design Year ADT (2021) 13700
Design Hourly Volume (2021) 1370
Directional Distribution 55%
Trucks (24 Hour B&C) 18%
Design Speed 65 MPH
Legal Speed 65 MPH

Design Functional Classification - Rural Arterial
Design Exceptions - None Required



PLANS PREPARED BY:
WDA&E
Wolfgang Doerschlag Architects & Engineers
1201 Dublin Road, Columbus, Ohio 43215

Engineers Seal
STATE OF OHIO
GREGORY THOMAS BOYER
REGISTERED PROFESSIONAL ENGINEER
54301
Signed: *[Signature]*
Date: *10/09/00*

INDEX OF SHEETS

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STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS
BP-3.1	07-28-00	MT-35.10	04-20-01	TC-41.10M	03-31-94	SS806 09-09-97
BP-9.1	07-28-00			TC-41.20	01-19-01	SS814 06-02-98
		MT-95.40M	04-25-94	TC-42.10	01-19-01	SS815 02-22-00
F-2.1	07-28-00	MT-97.10M	04-25-94	TC-42.20	04-20-01	SS830 10-21-98
F-3.1	07-28-00	MT-98.12M	06-24-93	TC-52.20	04-20-01	SS842 01-06-99
		MT-98.13M	06-24-93	TC-65.10M	11-01-95	SS844 01-06-99
GR-1.1M	10-21-97	MT-98.14M	06-24-93	TC-65.11M	11-01-95	SS846 09-09-97
GR-1.2M	01-03-96	MT-98.16M	06-24-93	TC-72.20	01-19-01	SS870 03-27-01
GR-1.3M	11-30-94	MT-98.17M	04-25-94			SS877 04-13-99
GR-2.1M	04-14-98	MT-98.18M	04-25-94	AS-1-81	04-20-01	SS899 10-21-98
GR-3.1M	10-21-97	MT-98.19M	03-01-96	BR-1	01-06-99	SS905 04-01-98
GR-3.2M	10-21-97	MT-99.20M	01-30-95	EXJ-4-87	04-20-01	SS906 05-05-98
GR-4.2M	10-21-97	MT-100.00M	04-25-94	GSD-1-96	04-20-01	SS907 10-21-98
		MT-102.20M	01-30-95	PCB-91	07-06-99	SS908 11-07-00
DM-4.1M	6-30-95	MT-105.10M	04-25-94	SICD-1-96	04-20-01	SS910 07-11-00
DM-4.3	4-29-99	MT-105.11M	04-25-94			SS911 07-10-97
DM-4.4	4-29-99					SS954 09-09-97
RM-4.2M	10-21-97					

FEDERAL PROJECT NO.
TE21-G000(639)

PID NO.
19442

CONSTRUCTION PROJECT NO.

RAILROAD INVOLVEMENT
NONE

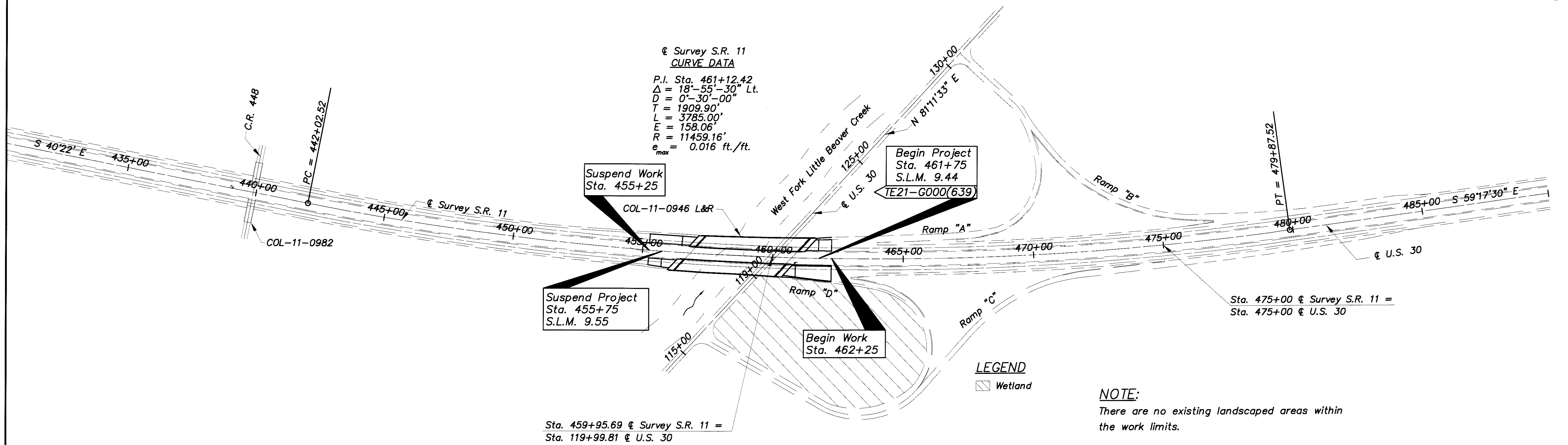
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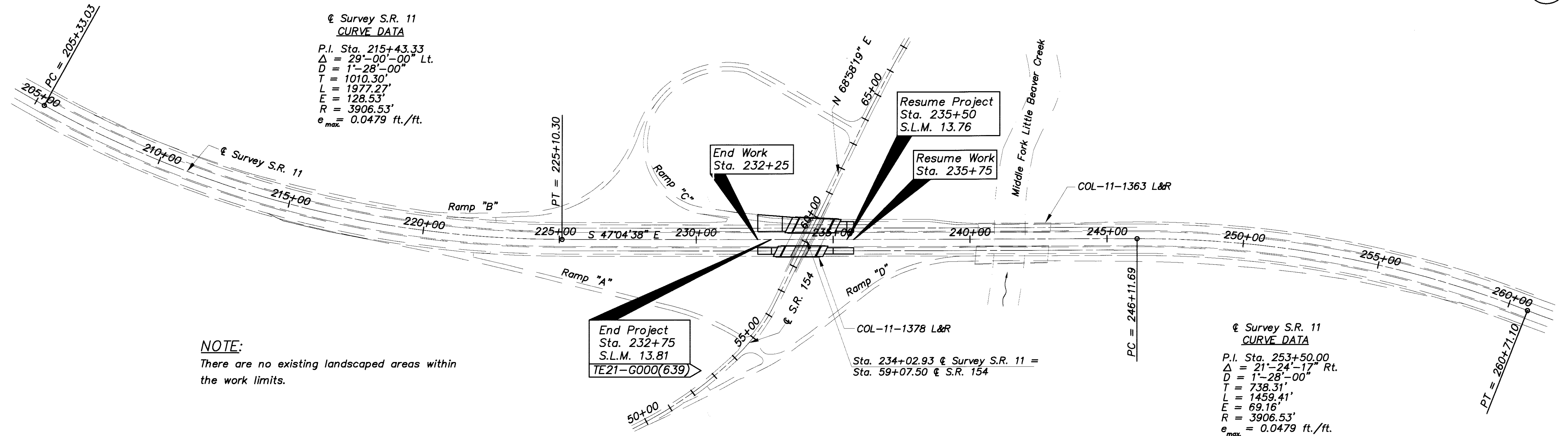
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Dist 11 10/17/01

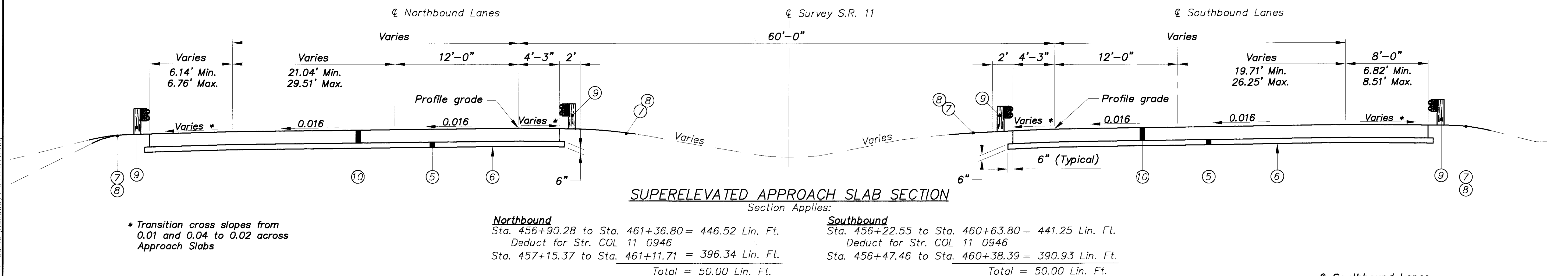
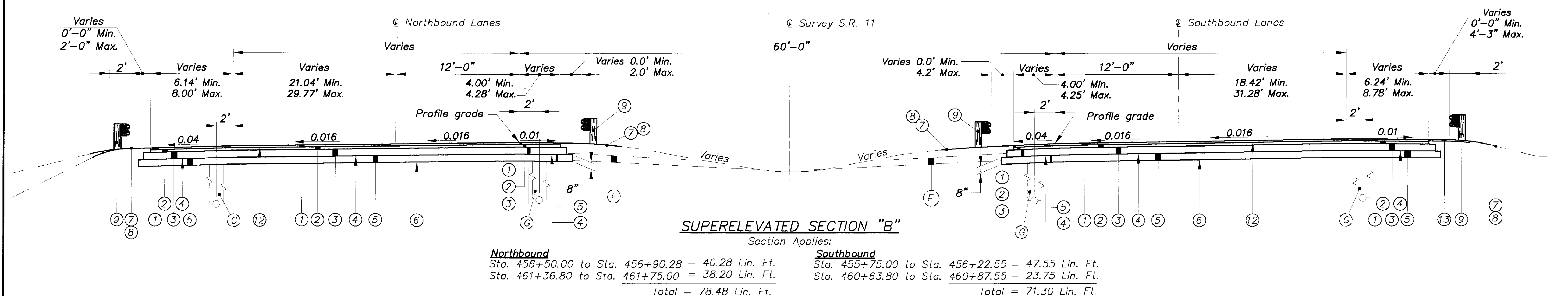
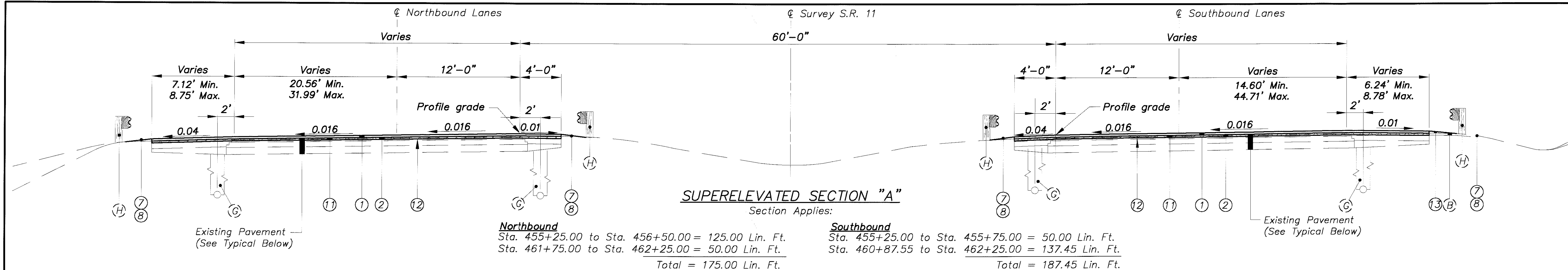
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COL-11-(9.44)



COL-11-(13.76)

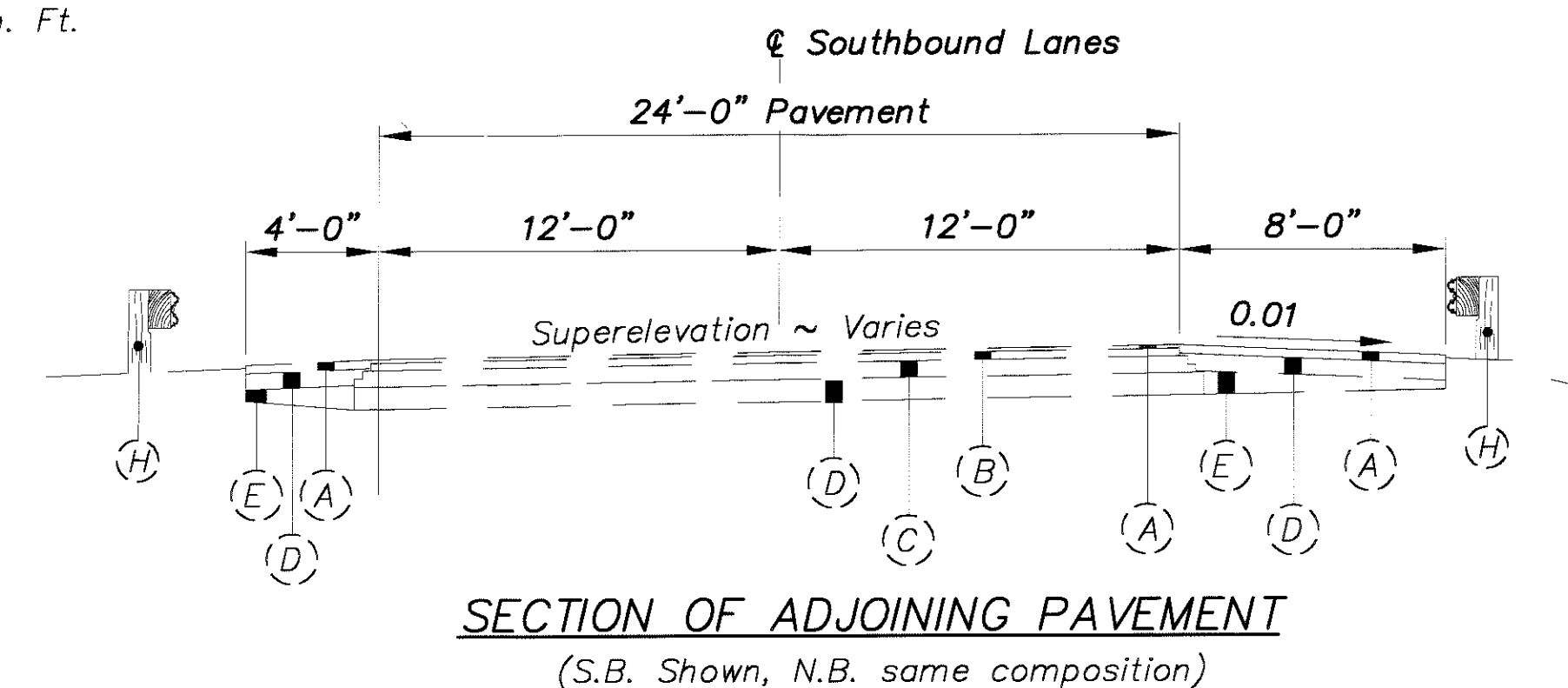
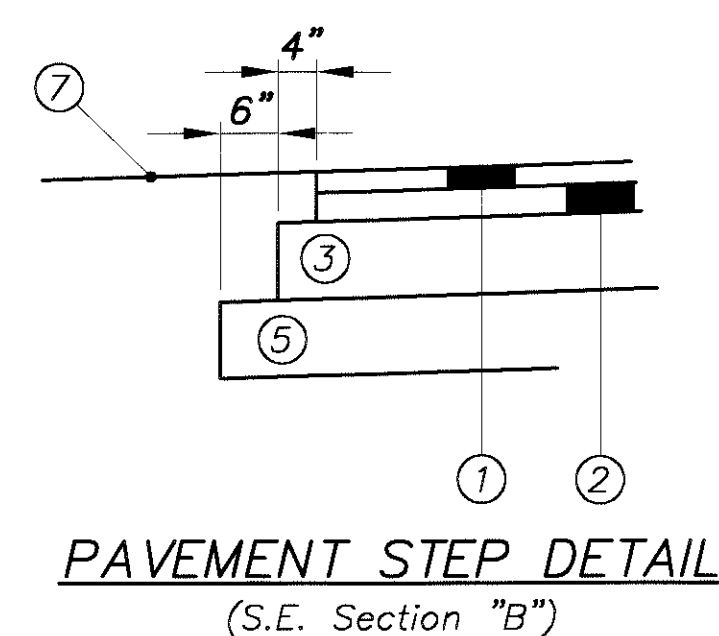


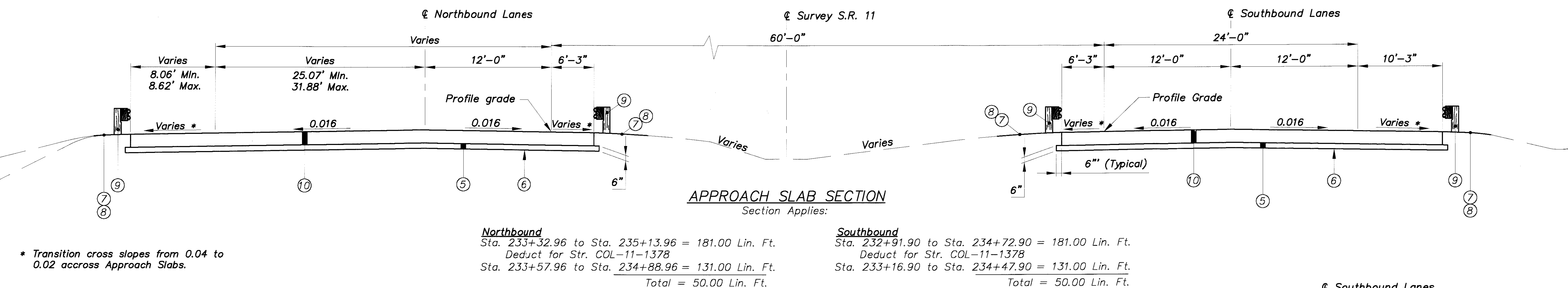
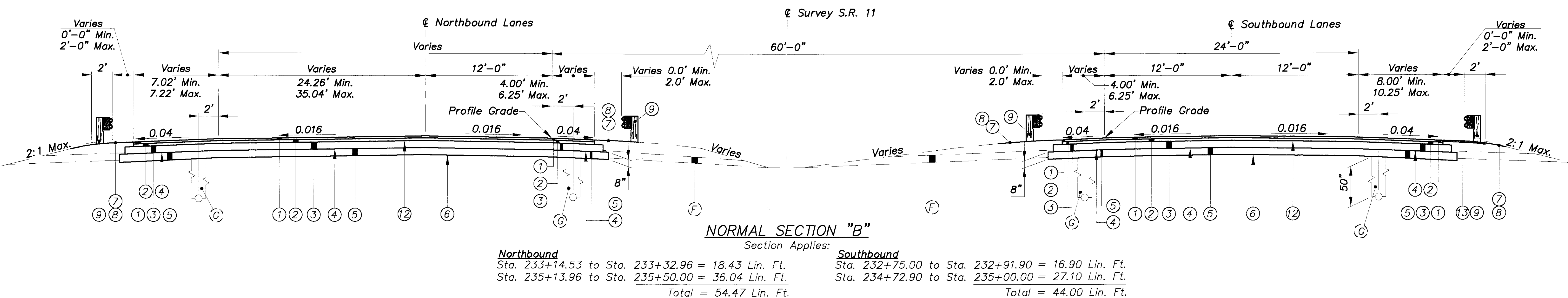
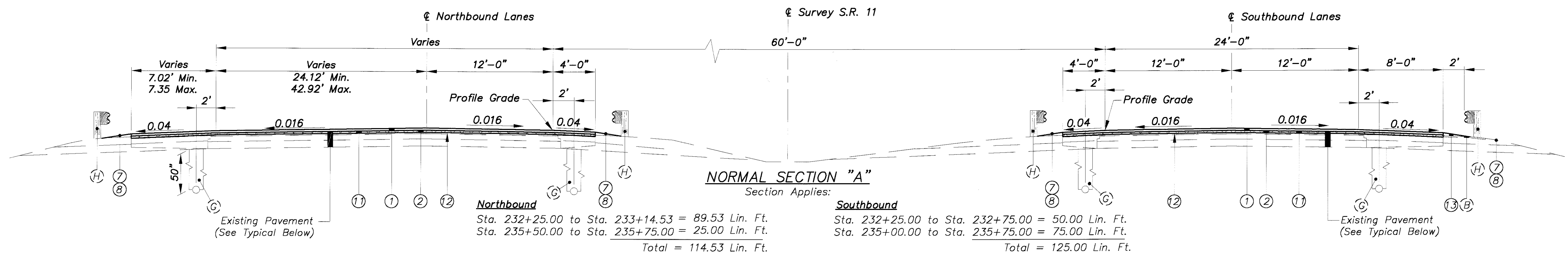


* Transition cross slopes from 0.01 and 0.04 to 0.02 across Approach Slabs

LEGEND

- | | |
|---|--|
| ① Item 446 1 1/2" Asphalt Concrete Surface Course, Type 1, PG64-22, As Per Plan | ⑩ Item 611 Reinforced Concrete Approach Slab (T=15") |
| ② Item 446 2 1/2" Asphalt Concrete Intermediate Course, Type 2, PG64-22 | ⑪ Item 254 Pavement Planing, Bituminous (3" Nominal) |
| ③ Item 302 8" Bituminous Aggregate Base, PG64-22 | ⑫ Item 407 Tack Coat for Intermediate Course |
| ④ Item 408 Prime Coat, 0.40 Gal./S.Y. | ⑬ Item 448 2" Asphalt Concrete, Intermediate Course, Type 1, PG64-22 (Under Guardrail) |
| ⑤ Item 304 Aggregate Base | Ⓐ Asphalt Overlay |
| ⑥ Item 203 Subgrade Compaction | Ⓔ Subbase |
| ⑦ Item 203 Linear Grading | Ⓑ Asphalt Pavement |
| ⑧ Item 870 Seeding and Mulching | Ⓕ Aggregate Drains |
| ⑨ Item 606 Guardrail, Type 5 | Ⓒ Asphalt Base |
| | Ⓖ 4" Pipe Underdrain |
| | Ⓓ Aggregate Base |
| | Ⓗ Existing Guardrail |

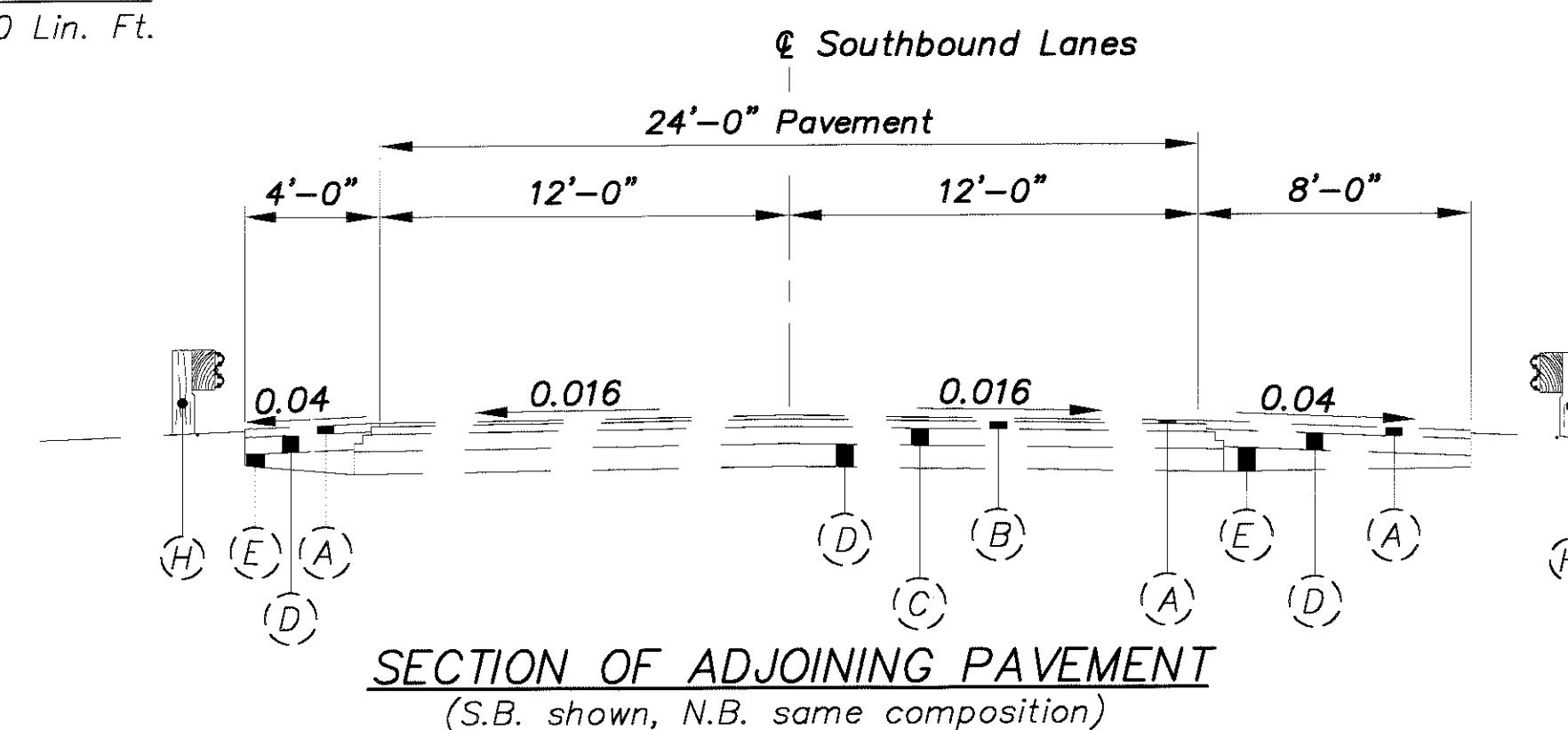
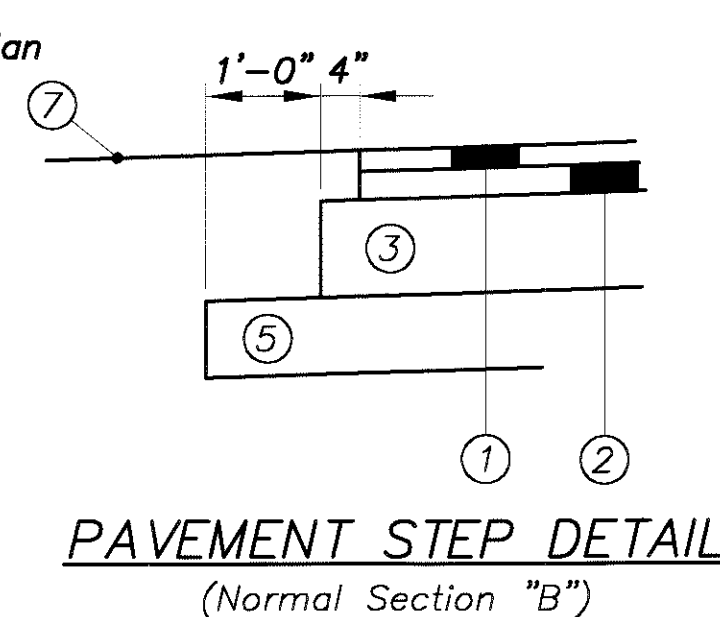




* Transition cross slopes from 0.04 to 0.02 across Approach Slabs.

LEGEND

- | | |
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| ⑧ Item 870 Seeding and Mulching | ⑰ Aggregate Drains |
| ⑨ Item 606 Guardrail, Type 5 | ⑱ Asphalt Base |
| | ⑲ 4" Pipe Underdrain |
| | ⑳ Aggregate Base |
| | ㉑ Existing Guardrail |



ELEVATION DATUM

All elevations are based on U.S.G.S. Datum.

UTILITY OWNERSHIP

The following utilities and owners are located within the work limits of this project:

PETROLEUM:	MARATHON ASHLAND PIPE LINE, LLC 245 MILL STREET LEXINGTON, OHIO 44904 1-800-537-6644 CONTACT: GREG NEWMAN
ELECTRIC:	OHIO EDISON P. O. BOX 570 YOUNGSTOWN, OHIO 44501 (330) 740-7635 CONTACT: BILL SPEECE
TELEPHONE:	AMERITECH 2933 SALT SPRINGS ROAD YOUNGSTOWN, OHIO 44509 (330) 270-8833 CONTACT: TOM TORBA

The location of the underground utilities shown on the plans are as obtained from the owners as required by section 153.64 O.R.C.

CONTINGENCY QUANTITIES

The contractor shall not order materials or perform work for items designated by plan note to be used "as directed by the engineer" unless authorized by the engineer. The actual work locations and quantities used for such items shall be incorporated into the final change order governing completion of this project.

WORK LIMITS

The work limits shown on these plans are for physical construction only. The installation and operation of all traffic control and traffic control devices required by the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways latest edition, shall be provided by the contractor whether inside or outside these work limits.

CONVERSION OF STANDARD CONSTRUCTION DRAWINGS

The metric standard drawings referenced in this plan shall be converted to English units using the SI (metric) to English conversion factors provided in section 109.011 of the 1997 Construction and Materials Specifications. The appendix of ASTM E 380 shall be utilized for any additional conversion factors required. Conversions shall be appropriately precise and shall reflect standard industry English values where suitable.

CLEARING AND GRUBBING

Although there are no trees or stumps specifically marked for removal within the limits of the project, a Lump Sum quantity has been included in the General Summary for Item 201, Clearing and Grubbing. All provisions as set forth in the Specifications under this item shall be included in the Lump Sum price bid for Item 201, Clearing and Grubbing.

DEMOLITION DEBRIS

The contractor shall take precautions to avoid and/or limit demolition debris from entering the stream while working on the COL-11-(9.44) structure. Any material that does fall into the stream shall be removed as soon as possible.

INSTREAM WORK

Instream work will be limited where practicable and only clean non-erodible material will be used for fords or cofferdams. This temporary placed material will be removed and the stream bottom restored to near natural conditions when the work is completed.

STREAM CHANNEL EXCAVATION

The contractor shall take all precautions necessary to prevent any incidental discharges associated with the excavation and hauling of material from the stream channel. This pertains to any excavation operations such as foundation, pier or abutment excavation, channel clean out, excavation for rock channel protection and removal of any temporary fill associated with construction operations.

PART-WIDTH CONSTRUCTION

Because of the necessity to build this project under traffic and to construct the full pavement width in stages, extreme care shall be taken to prevent the construction of a butt joint in the base courses. Longitudinal joints shall be lapped as shown on Standard Construction Drawing BP-3.1.

ITEM 203, LINEAR GRADING

Graded shoulders at locations where the Typical Sections indicate the shoulder is to be regraded, shall be reshaped as directed by the Engineer to insure a smooth drainable surface free of all irregularities. Excess excavation resulting from reshaping shoulders shall be disposed of as directed by the Engineer. There shall be 2 methods of Linear Grading that may occur and the limits of each shall be specified by the Engineer. Payment for reshaping graded shoulders as described in any of the methods below, shall be included in the contract price per Station, both Left and Right of one direction of traffic, for Item 203, Linear Grading. See Sheets 67 and 69 for calculation.

METHOD A

This work shall consist of preparing a subgrade for the shoulder paving (on both sides) of a roadway by excavating the existing shoulder material to the depth shown in the plan, or as directed by the Engineer, to remove any unstable material and by shaping and compacting the subgrade.

Unsound or broken edges of bituminous pavements shall first be trimmed to a line established by the Engineer. The existing shoulder shall then be excavated and the subgrade shaped and compacted. Compacting shall be carried out to the satisfaction of the Engineer by means of a trench roller, in accordance with Specification 401.11. Areas graded in excess of depths specified or directed by the Engineer shall be back filled to grade using Item 617, Compacted Aggregate at the contractor's expense. Excavated material shall be disposed of as directed by the Engineer.

METHOD B

Graded shoulders at locations where existing guardrail is removed, or where new guardrail is to be erected, shall be reshaped as directed by the Engineer to insure a smooth drainable surface free of all irregularities. Excess excavation resulting from reshaping shoulders shall be disposed of as directed by the Engineer. Payment for reshaping graded shoulders as described shall be included in the contract price per station for Item 203, Linear Grading

PAVING UNDER GUARDRAIL

This operation shall include preparation of the graded shoulder using Item 203, Linear Grading, and paving under the guardrail using 448 Asphalt Concrete Intermediate Course, Type 1, (Under Guardrail) PG64-22.

Item 203, Linear Grading, shall consist of excavating topsoil, placing granular material and applying herbicide as specified in the plans and in accordance with the following:

All collected debris and topsoil, including rhizomes, roots and other vegetative plant material shall be removed and disposed of as specified in 203.05.

The removed material shall be replaced with compactable granular material conforming to 203.02 placed to grade as detailed on the Typical Section or as approved by the Engineer.

Herbicide shall be Trefton E. C., Spike or an approved equal and shall be applied to the prepared area after final leveling and grading has been completed. The application shall be just prior to paving and shall Strictly adhere to the manufacturer's instructions.

Each successful bidder must be licensed by the Ohio Department of Agriculture as a Commercial Applicator and all persons involved in the actual spraying shall be licensed as Commercial Operators in the appropriate spray category. Appropriate licenses shall be submitted to the project supervisor, prior to commencing work for verification.

All equipment, materials and labor required to perform the work outlined above shall be included for payment under Item 203, Linear Grading.

Paving under guardrail shall consist of placing Item 448, to the depth specified using one of the following methods:

Method A: 1) Set guardrail posts

2) Place Item 448

Method B: 1) Place Item 448

2) Bore asphalt at post locations (may be omitted if steel posts are used)

3) Set guardrail posts

4) Patch around posts. The materials used for patching shall be a bituminous concrete approved by the engineer. Patched areas shall be compacted using either hand or mechanical methods. Finished surfaces shall be smooth and sloped to drain away from the posts.

All equipment, materials and labor required to perform the work outlined above, with the exception of setting guardrail posts, shall be included for payment under Item 448, Asphalt Concrete, Intermediate Course, Type 1, Under Guardrail, PG64-22. The following estimated quantity has been carried to the General Summary for use with Item 203, Linear Grading, Method C, Paving Under Guardrail,

Item 448, Asphalt Concrete, Intermediate Course, Type 1, PG64-22 (Under Guardrail) 25 Cu. Yd.

ITEM 203, EXCAVATION, NOT INCLUDING EMBANKMENT CONSTRUCTION
ITEM 203, EMBANKMENT

Due to the limited areas of full depth pavement, and the extensive use of linear grading, the quantity of earthwork required has been estimated. All earthwork shall be as directed by the Engineer, and shall include, but not be limited to, excavation of the existing roadbed where within the limits of full depth pavement and the reshaping of the graded shoulders in accordance with Item 203, Linear Grading. The following quantities for Item 203, Excavation Not Including Embankment Construction, and Item 203, Embankment, have been estimated from the plan and carried to the General Summary.

Item 203, Excavation Not Including Embankment Construction 1200 Cu. Yd.
Item 203, Embankment 200 Cu. Yd.

ITEM 407, TACK COAT FOR INTERMEDIATE COURSE

The rate of application of the 407 Tack Coat shall be subject to adjustment as directed by the engineer. Plan quantities indicate an average application rate of 0.04 Gallons per Square Yard of Tack Coat for estimating purposes only.

ITEM 446, ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22, AS PER PLAN

Materials furnished for fine and course aggregate used in this item shall exclude all stone and crushed carbinate stone.

ITEM 611 REINFORCED CONCRETE APPROACH SLAB, T = 15", AS PER PLAN

Concrete for this item shall be Class SS 844, High Performance Concrete.

CONNECTION BETWEEN EXISTING AND PROPOSED GUARDRAIL

When it is necessary to splice proposed guardrail to existing guardrail, only the existing guardrail shall be cut, drilled, or punched. The connection shall be made using a "W-beam rail splice" as shown in AASHTO M 180. Payment shall be included in the contract price for the respective guardrail items.

ITEM 870, SEEDING AND MULCHING

Seeding and mulching shall be applied to all areas of exposed soil between the right-of-way lines, and within the construction limits. The following estimated quantities are based on these limits, and have been carried to the General Summary.

Item 870, Seeding and Mulching
COL-11-(9.44) 4000 Sq. Yd.
COL-11-(13.76) 3000 Sq. Yd.
Total = 7,000 Sq. Yd.

870, Soil Analysis Test 4 Each
870, Placing Topsoil 390 Cu. Yd.
870, Commercial Fertilizer 0.94 Ton
870, Agricultural Lime 2.90 Ton
870, Water 38 M Gal.

TEMPORARY SOIL EROSION AND SEDIMENT CONTROL

The following estimated quantities are to be placed by the contractor with the Engineer's concurrence for temporary erosion and sediment control measures:

877, Temporary Seeding and Mulching 1400 Sq. Yd.
877, Temporary Perimeter Filter Fabric Fence 200 Lin. Ft.
877, Temporary Inlet Protection Filter Fabric Fence 120 Lin. Ft.
870, Commercial Fertilizer 0.06 Ton
870, Repair Seeding and Mulching 350 Sq. Yd.
870, Water 3 M. Gal.

EROSION CONTROL

Item 660 is provided in the plans for erosion control. Rock of a stable nature shall not be removed in order to place any of these items and turf of a stable nature shall not be removed in order to place 660. The engineer shall check and non-perform quantities or adjust locations and quantities of these items where indicated by field conditions during construction. In addition, these items shall meet the requirement of 108.04.

PAVEMENT MARKINGS

Existing pavement markings removed for maintenance of traffic operations shall be restored as required by the standard construction drawings. Payment for replacement of existing pavement markings removed for maintenance of traffic shall be included in the Lump Sum bid price for Item 614, Maintaining Traffic.

The following quantities have been included in the plan for information only:

ITEM 642, EDGE LINE, TYPE 1, YELLOW	2.25 Mile
ITEM 642, EDGE LINE, TYPE 1, WHITE	2.25 Mile
ITEM 642, LANE LINE, TYPE 1	2.60 Mile
ITEM 642, CHANNELIZING LINE, TYPE 1	530 Linear Feet
ITEM 642, TRANSVERSE LINE, TYPE 1	490 Linear Feet

WETLAND PLAN NOTE

A wetland area has been identified within the infield loop of the west ramp of the US 30/SR 11 intersection. This area is identified on plan sheet 2. The contractor shall exercise caution to assure that no impacts occur to this wetland area. Any activities occurring in this wetland area would require special permits from the US Army Corp of Engineers and/or the Ohio EPA. Obtaining such permits would be the responsibility of the contractor.

Any other site proposed by the contractor for off project ancillary construction (staging areas, waste locations, and/or borrow locations) shall first be investigated by the contractor for environmental sensitivity. Any sites that are determined to be sensitive in nature shall not be disturbed unless clearance is acquired from the appropriate controlling agency/office and all federal, state, and local laws are complied with, including but not limited to the Clean Water Act. The contractor is responsible for engaging an environmental consulting firm acceptable to the Department to field survey, evaluate, and clear the environmentally sensitive site with the appropriate controlling agency/office.

This does not set a precedence that the Department will always put this notice in all environmentally sensitive projects. Environmental documentation is always available upon request.

REVIEW OF DRAINAGE FACILITIES

Before any work is started on the project and again before final acceptance by the state, representatives of the state and the contractor, along with local representatives, shall make an inspection of all existing sewers which are to remain in service and which may be affected by the work. The condition of the existing conduits and their appurtenance shall be determined from field observations. Records of the inspection shall be kept in writing by the state.

All new conduits, inlets, catch basins, and manholes constructed as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the state.

All existing sewers inspected initially by the above mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. Any change in the condition resulting from the contractor's operations shall be corrected by the contractor to the satisfaction of the Engineer.

Payment for all operations described above shall be included in the contract price for the pertinent 603 conduit items.

ITEM 202-RAISED PAVEMENT MARKERS REMOVED FOR STORAGE

All existing raised pavement markers within the project limits shall be removed for storage.

The following quantity of Raised Pavement Markers Removed for Storage has been carried to the General Summary:

COL-11-9.44	S.B.	8 Each
COL-11-9.44	N.B.	19 Each
COL-11-13.76	S.B.	15 Each
COL-11-13.76	N.B.	6 Each
		Total = 48 Each

ITEM 607-FENCE, TYPE 47, AS PER PLAN

The unit price bid for Item 607, Fence, Type 47, As Per Plan shall include removal of existing woven fence and either re-erection or replacement of the fence, including attachment to the bridge substructure, where required to construct proposed improvements on the project.

Actual removal extents shall be as approved by the Engineer. The existing fence materials shall be re-erected in the same or similar location at the completion of the work for which the fence interferes. New fence materials in accordance with Item 607 of the Construction and Materials Specifications and Standard Construction Drawing F-2.1 may be utilized at the discretion of the Contractor at no additional cost. The fence shall be reattached to the bridge in accordance with Standard Construction Drawing F-3.1.

All labor, equipment and materials required to perform the above work shall be included in the unit price bid for Item: 607, Fence, Type 47, As Per Plan. The following estimated quantity has been carried to the General Summary:

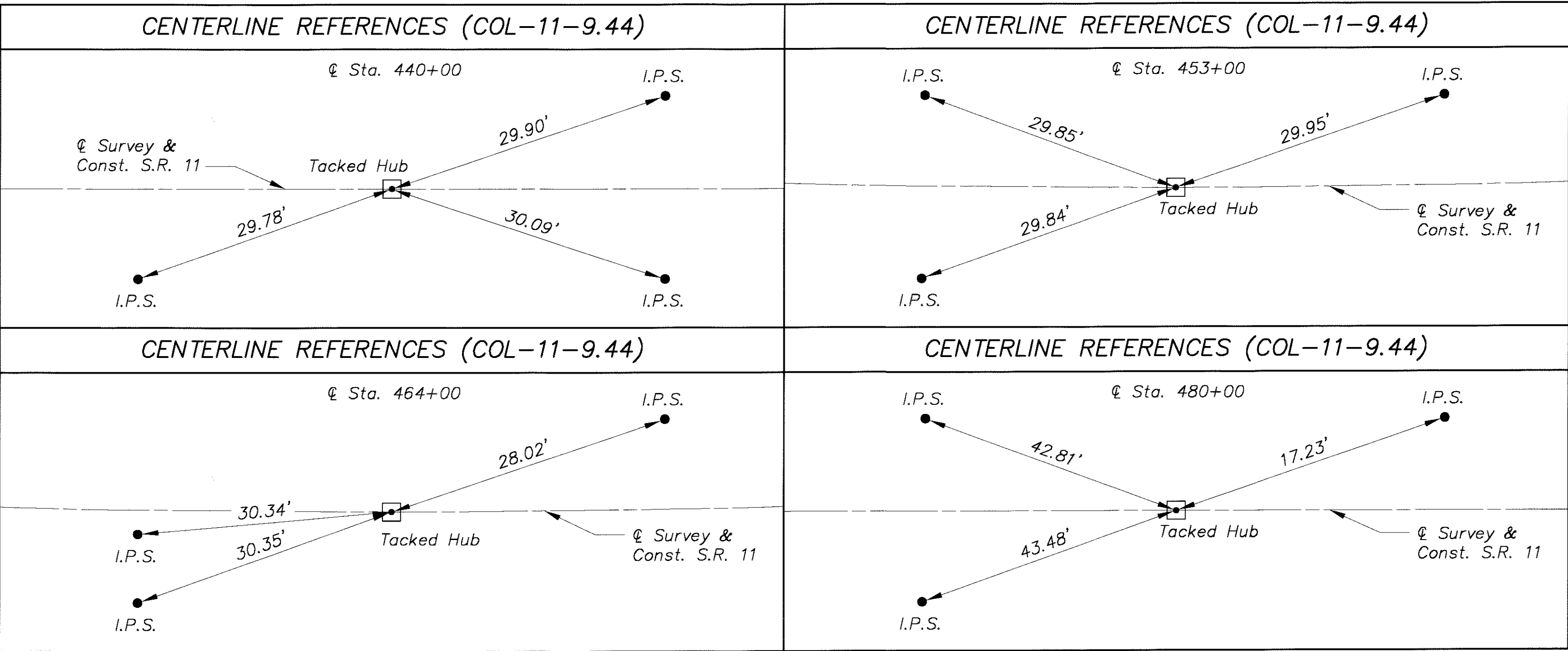
Item 607 Fence, Type 47, As Per Plan 100 Lin. Ft.

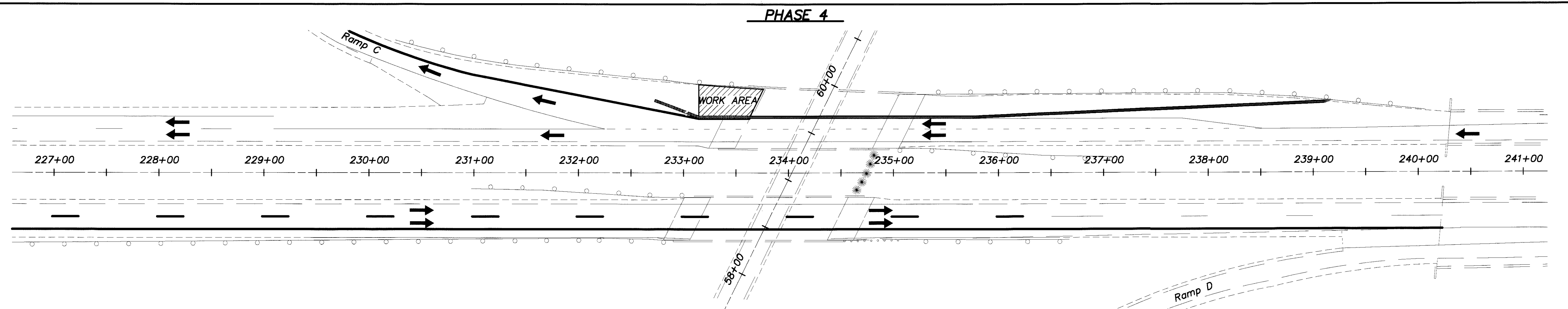
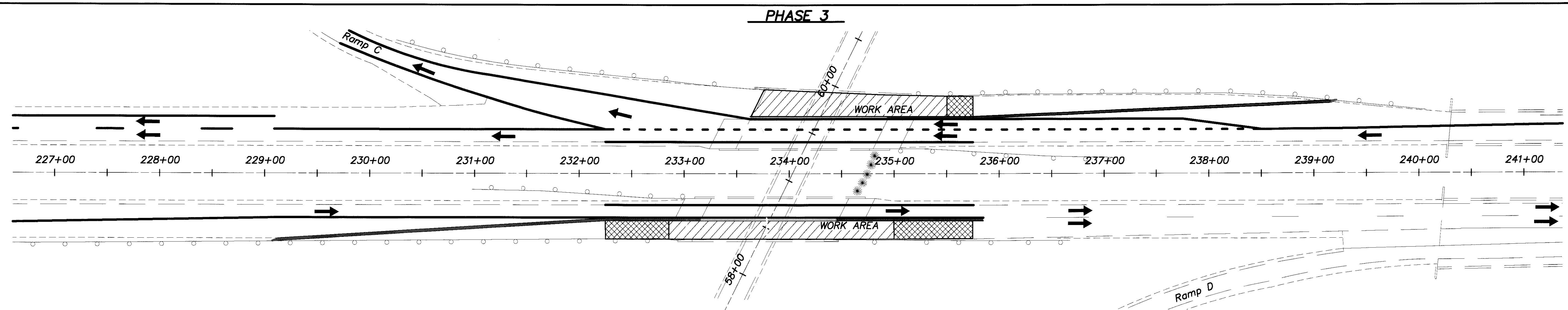
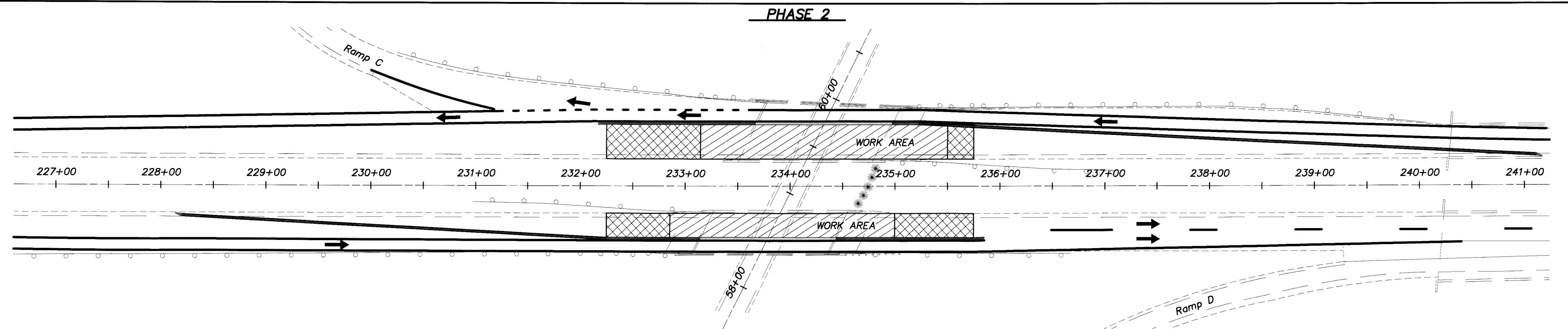
ITEM 618-RUMBLE STRIPS, TYPE 2 (ASPHALT)

Type 2 Rumble Strips shall be constructed with Standard Construction Drawing BP-9.1 at all locations where shoulders are reconstructed or paved. Rumble strips shall be installed on a shoulder segment until all construction phases, utilizing that shoulder to maintain traffic are completed. The following estimate of quantities has been included in the General Summary for installation of Type 2 Rumble Strips:

COL-11-9.44	
S.B.	Sta. 445+56 to Sta. 456+00 = 1044 Lin. Ft.
	Sta. 461+00 to Sta. 468+85 = 785 Lin. Ft.
	Sta. 455+25 to Sta. 456+34 = 109 Lin. Ft.
	Sta. 460+75 to Sta. 462+25 = 150 Lin. Ft.
N.B.	Sta. 449+18 to Sta. 456+12 = 694 Lin. Ft.
	Sta. 456+05 to Sta. 465+87 = 982 Lin. Ft.
	Sta. 455+25 to Sta. 456+78 = 153 Lin. Ft.
	Sta. 461+23 to Sta. 462+25 = 102 Lin. Ft.

COL-11-13.76	
S.B.	Sta. 223+00 to Sta. 223+14 = 1014 Lin. Ft.
	Sta. 234+36 to Sta. 239+96 = 560 Lin. Ft.
	Sta. 232+25 to Sta. 232+97 = 72 Lin. Ft.
	Sta. 234+80 to Sta. 235+75 = 95 Lin. Ft.
N.B.	Sta. 221+77 to Sta. 232+94 = 1117 Lin. Ft.
	Sta. 235+00 to Sta. 237+88 = 288 Lin. Ft.
	Sta. 238+79 to Sta. 240+30 = 151 Lin. Ft.
	Sta. 232+25 to Sta. 233+27 = 102 Lin. Ft.
	Sta. 235+08 to Sta. 235+75 = 67 Lin. Ft.
Total Carried to General Summary = 7485 Lin. Ft.	



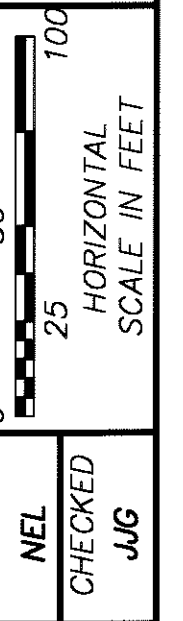
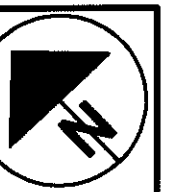


PHASE 1

The work zone in Phase 1 will be the outside shoulder of both the Northbound and Southbound Lanes from approximately Station 221+50 to Station 241+00. The contractor shall have the option to close the right lane to traffic during daytime hours. See Phasing Descriptions on Sheet 9 and Sheets 37-43 for Phase 1 details.

PHASE 5

The work zone in Phase 5 will be the planing and resurfacing work in the northbound rear approach area of Structure COL-11-1378. All ramps will remain open. See Sheet 9 for a detailed description of Phase 5 activities.



MAINTENANCE OF TRAFFIC SCHEMATIC PLAN COL-11=(13.76)

COL-11-(9.44)(13.76)

3
26

ITEM 614. MAINTAINING TRAFFIC

The length and duration of lane closures and restrictions shall be at the approval of the Engineer. It is the intent to minimize the impact to the traveling public. Lane closures or restrictions over segments of the project in which no work is anticipated within a reasonable time frame, as determined by the Engineer, shall not be permitted. The level of utilization of maintenance of traffic devices shall be commensurate with the work in progress.

The Contractor shall, prior to placing temporary markings, remove all existing conflicting pavement markings and raised pavement marker reflectors visible to the traveling public during daylight or nighttime hours in accordance with 641.10. These markings will be reinstalled when they are again required to control traffic. They will be reinstalled with new materials of the type used in the final traffic control plan. The cost for removal of conflicting markings and their reinstallation shall be included under the Lump Sum contract price for Item 614, Maintaining Traffic.

A minimum of one lane of traffic in each direction shall be maintained at all times by use of the existing pavement, the completed pavement, and Item 615, Temporary Pavement. All drums shall be spaced at 40’ center-to-center unless otherwise noted in the plans.

The lane closures at both the COL-11-0946 and COL-11-1378 structures shall be the same lane (same side of the roadway) in any one direction. When drivers experiences a lane closure on the first structure they cross on this project, the next structure shall have no closure or will have a lane closure on the same side of the roadway as the first crossed structure. If there is no closure on the first structure crossed, either side of the roadway can be closed on the second structure. At no time will a driver experience a closure on the first structure they cross and then experience the opposite side of the roadway closed at the second structure. For example, if in the northbound direction the inside lane is closed at structure COL-11-0946, the inside lane or no lane shall be closed at structure COL-11-1378; an outside lane closure will not be allowed at that time.

The following estimated quantities have been included in the Maintenance of Traffic Subsummary for use as directed by the Engineer for the maintenance of traffic.

614, Bituminous Concrete for Maintaining Traffic 20 Cu. Yd.

All work and traffic control devices shall be in accordance with 614 and other applicable portions of the Specifications, as well as the Ohio Manual of Uniform Traffic Control Devices. Payment for all labor, equipment, and materials shall be included in the Lump Sum contract price for Item 614, Maintaining Traffic, unless separately itemized in the plan.

TRENCH FOR WIDENING

The open trench shall be adequately maintained and protected with drums or barricades at all times. Placement of proposed subbase and base material shall follow as closely as possible behind excavation operations. The length of the widening trench which is open at any one time shall be held to a minimum and shall at all times be subject to approval of the Engineer.

OVERNIGHT TRENCH CLOSING

The base widening shall be completed to a depth of no more than 4 inches below the existing pavement by the end of each workday. No trench shall be left open overnight except for a short length (25 feet or less) of a work section at the end of the trench. In case work must be suspended because of inclement weather or other reasons, the trench for the uncompleted base widening shall be backfilled at the direction of the Engineer.

FLOODLIGHTING

Floodlighting of the work site for operations conducted during nighttime periods shall be accomplished so that the lights do not cause glare to the drivers on the roadway. To ensure the adequacy of the floodlight placement, the Contractor and the Engineer shall drive through the work site each night when the lighting is in place and operative prior to commencing any work. If glare is detected, the light placement and shielding shall be adjusted to the satisfaction of the Engineer before work proceeds.

DUST CONTROL

Payment for all labor, equipment, and materials shall be included in the Lump Sum contract price for Item 614, Maintaining Traffic.

The Contractor shall furnish and apply water and calcium chloride for dust control as directed by the Engineer. The following contingency quantities have been included for dust control purposes and have been included in the Maintenance of Traffic Subsummary:

616, Water 5 M. Gal.

616, Calcium Chloride 0.5 Tons

CONSTRUCTION SEQUENCE

PHASE 1

The outside shoulders of S.R. 11 at both the COL-11-0946 and COL-11-1378 structures shall be closed using the details shown on Sheets 13 through 20, Sheets 37 through 43 and Standard Construction Drawing MT-102.20M, (or at the Contractors option and with the Engineer’s approval close one lane and maintain traffic using MT-95.30M, MT-98.12M, MT-98.14M and Dropoffs in Work Zone insert sheet.) This will allow the Contractor to remove the existing shoulders and install the temporary pavement in the areas shown on Sheets 14 through 19 for COL-11-0946 and Sheets 39 through 42 for COL-11-1378. This temporary pavement will be used to maintain ramp and mainline traffic during later phases.

PHASE 2

The inside lanes of S.R. 11 at both the COL-11-0946 and COL-11-1378 structures shall be closed using the details shown on Sheets 21 through 28 and Sheets 44 through 51. Traffic will be shifted onto the temporary pavement placed during Phase 1.

Phase 2 shall occur prior to Phase 3. This will allow ramp traffic to become aware of the complexities of exiting and entering the freeway under construction before the exit/entrance ramp openings are modified in Phase 3.

Signing for this phase shall be as detailed in Standard Construction Drawing MT-95.40M.

PHASE 3

The outside lanes of S.R. 11 at both the COL-11-0946 and COL-11-1378 structures shall be closed using the details shown on Sheets 29 through 34 and Sheets 52 through 59. Traffic will be shifted onto the inside lanes completed during Phase 2.

Work shall not occur in the northbound rear approach area of structure COL-11-1378 and the southbound forward approach area of structure COL-11-0946. These two areas are not protected by portable concrete barrier in this phase due to their close proximity to exit ramp openings.

Signing for this phase shall be as detailed in Standard Construction Drawing MT-95.40M.

PHASE 4

This phase will allow the Contractor to extend the portable concrete barrier to protect the approach slab and full depth pavement work at the northbound rear approach area on structure COL-11-1378 and the southbound forward approach area on structure COL-11-0946 using the details shown on Sheets 35 through 36 and Sheets 60 through 61. This will allow for the completion of these items.

Phase 4 shall occur immediately after the completion of Phase 3 operations. Phase 5 will begin immediately after the completion of this phase.

PHASE 5

During this phase, the planing and resurfacing work shall be completed in the northbound rear approach area of structure COL-11-1378 and the southbound forward approach area of structure COL-11-0946.

Maintenance of traffic details for this phase shall follow Standard Construction Drawings MT-98.12M, MT-98.13M, and MT-98.14M and be paid for under the Lump Sum contract price for Item 614, Maintaining Traffic.

TEMPORARY WORK ZONE MARKINGS

All temporary pavement markings shall be tape. Tape shall be installed strictly by the manufacturer’s recommendations. Any tape that becomes unbonded from the pavement surface will be immediately replaced and all labor, materials, equipment, incidentals, etc. shall be paid for under the Lump Sum contract price for Item 614, Maintaining Traffic.

The following estimated quantities have been added to the Maintenance of Traffic Subsummary for use as directed by the Engineer for additional temporary work zone pavement markings per the requirement 614.10. These quantities shall not be used for the replacement of unbonded tape.

614, Temporary Edge Line, Class I, 740.06, Type I 2.0 Mi.

614, Temporary Lane Line, 740.06, Type I 1.0 Mi.

LAW ENFORCEMENT OFFICER WITH PATROL CAR

In addition to the requirements of 614 and the Ohio Manual of Uniform Traffic Control Devices, a uniformed law enforcement officer and official patrol car with working top mounted emergency flashing lights shall be provided for controlling traffic for the following tasks:

For lane closures during initial setup periods, tear down periods, substantial shifts of a closure point, or when new lane closure arrangements are initiated.

Law enforcement officers should not be used where the Ohio Manual of Uniform Traffic Control Devices intends that flaggers be used. The law enforcement officers are considered to be employed by the Contractor and the Contractor shall be responsible for their actions. Although they are employed by the Contractor, the Engineer shall have control over their placement. The official patrol car shall be a public safety vehicle as required by the Ohio revised code.

The Contractor shall arrange for these services with:

Ohio State Highway Patrol
Lisbon Patrol Post
9423 State Route 45
Lisbon, OH 44432-9505
Phone: (330) 424-7783

Law enforcement officer with patrol car required by the traffic maintenance tasks above shall be paid for on a unit price (hourly) basis under Item 614, Law Enforcement Officer with Patrol Car. The following estimated quantities have been carried to the Maintenance of Traffic Subsummary:

614, Law Enforcement Officer with Patrol Car 150 Hours

The hours paid shall include minimum show-up time required by the law enforcement agency involved.

If Contractors wish to utilize Law Enforcement Officers for flagging and traffic control other than for that required in these plans, they may do so at their own expense. Payment for the excess above the contract requirements will be included under the Lump Sum contract price for Item 614, Maintaining Traffic.

TEMPORARY WORK ZONE LIGHTING

The Contractor shall furnish, install, maintain, and remove temporary work zone lighting at the locations shown on the plans. The temporary lighting shall be as per Standard Construction Drawing MT-96.20M, unless otherwise approved by the Engineer. The Contractor shall be responsible for procurement of and payment for electrical power for the lighting. Any malfunctions shall be corrected without delay. Temporary lighting will be required during all phases. Payment shall include all cost incurred to provide the temporary lighting and shall be paid for at the contract price per each.

NOTIFICATION OF WORK ZONE LANE RESTRICTIONS

The Contractor shall notify the Engineer at least eighteen (18) days prior to implementing any work zone restrictions that will reduce the width of vertical clearance of any lane on which traffic will be maintained during construction.

The Engineer shall immediately notify the District Roadway Services Manager to advise the Office of Highway Management of the restrictions.

ITEM 614. PORTABLE CHANGEABLE MESSAGE SIGN

The Contractor shall furnish, install, maintain and remove, when no longer needed, three changeable message signs, on site, for the duration of Phases 2, 3, and 4. The sign shall be of a type shown on a list of approved PCMS units maintained by the Director. The list currently contains Class III, II, and I units with minimum legibility distances of 650 ft., 850 ft. and 1250 ft. respectively.

Each sign shall be trailer mounted and equipped with a functional dimming mechanism to dim the sign during darkness and a tamper and vandal proof enclosure. Each sign shall be provided with appropriate training and operation instructions to enable on-site personnel to operate and troubleshoot the unit. The sign shall also be capable of being powered by an electrical service drop from a local utility company.

PCMS signs shall be placed only to warn motorists of exit ramp speed conditions in Phases 2, 3, 4, and the reverse curve advisory speed condition from station 241+21 to 235+29 of Phase 2, (Section 13.76), or as directed by the Engineer. Placement, operation, maintenance and all activation of the signs by the Contractor shall be as directed by the Engineer. The PCMS shall be located in a highly visible position yet protected from traffic. The Contractor shall, at the direction of the Engineer, relocate the PCMS to improve visibility or accommodate changed conditions. When not in use, the PCMS will be off, facing away from all traffic and shall display one or more high intensity yellow reflective sheeting surfaces of 9-inch by 15-inch minimum size facing traffic.

The Engineer shall be provided access to each sign unit and shall be provided with appropriate training and operation instructions to enable ODOT personnel to operate and troubleshoot the unit and to revise sign messages, if necessary.

All messages to be displayed on the sign will be provided by the Engineer. A list of all required preprogrammed messages will be given to the Contractor at the project preconstruction conference. The sign shall have the capability to store up to 99 messages. Message memory or preprogrammed displays shall not be lost as a result of power failures to the on board computer. The sign legend shall be capable of being changed in the field. Three-line presentation formats with up to six message phases shall be supported, but normally, not more than two message phases should be employed, although three phases may be used in unusual conditions. PCMS format shall permit the complete messages for each phase to be read at least once.

The PCMS shall contain an accurate clock and programming logic which will allow the sign to be activated, deactivated or messages changed automatically at different times of the day for different days of the week.

The PCMS unit shall be maintained in good working order by the Contractor in accordance with provisions of 614.03 (c). The Contractor shall, prior to activating the unit make arrangements with an authorized service agent for the PCMS to assure prompt service in the event of failure. Any failure shall not result in the sign being out of service for more than 12 hours including weekends. Failure to comply may result in an order to stop work and open all traffic lanes and/or in the Department taking appropriate action to safely control traffic and the entire cost to control traffic accrued by the Department will be deducted from moneys due, or to become due the Contractor on his contract.

The Contractor shall be responsible for 24 hours per day operation and maintenance of these signs on the project for the duration of the phases when the plan requires their use.

The requirement to furnish, install, maintain and remove a PCMS unit on this project shall not in any way relieve the Contractor of his responsibilities as outlines in 104.04.

Payment for the above described item shall be at the contract unit price bid per Sign-Month for Item 614 Portable Changeable Message Sign and shall include all labor, materials, equipment, fuels, lubricating oils, software, hardware and incidentals to perform the above described work.

The following estimated quantity has been carried to the Maintenance of Traffic Subsummary:

614, Portable Changeable Message Sign 6 Sign-Month

ITEM 615. TEMPORARY PAVEMENT. CLASS A
ITEM 615. TEMPORARY PAVEMENT. CLASS A, AS PER PLAN

There are two temporary pavement designs for this project. Design 1 is used primarily in the gore areas of the exit ramps and on small shoulder areas (shown on Sheets 17 through 18 and Sheets 39 through 40) and will be paid for under Item 615, Temporary Pavement, Class A. This temporary pavement shall be removed when no longer required to control traffic. Design 2 is used for most of the shoulder reconstruction (shown on Sheets 14 through 19 and sheets 39 through 42) and shall be the flexible composition per 615.05 and paid for under Item 615, Temporary Pavement, Class A, As Per Plan. This temporary pavement shall remain in place.

ITEM SPECIAL. REPLACEMENT SIGN

Flat sheet signs furnished by the Contractor in accordance with the requirements of the plans, specifications and proposal that become damaged by traffic for reasons beyond the control to the Contractor shall be replaced in kind when ordered by the Engineer. Replacement signs shall be new. Other materials may be in used but good condition subject to approval by the Engineer.

Payment for the new signs shall be made at the contract price per Square Feet for Item Special, Replacement Sign, and shall include the cost of removing and disposing of damaged signs, hardware and supports, and providing the necessary replacement hardware, supports, etc.

An estimated quantity of 75 Sq. Ft. has been provided in the Maintenance of Traffic Subsummary.

ITEM SPECIAL. REPLACEMENT DRUM

Drums furnished by the Contractor in accordance with the requirements of the plans, specifications and proposal, which become damaged by traffic for reasons beyond the control of the Contractor, shall be replaced in kind when ordered by the Engineer. Replacement drums shall be new.

Payment for the new drums shall be made at the contract price per Each for Item Special, Replacement Drum, and shall include the cost of removing and disposing of the damaged drum, and providing and maintaining the replacement drum in accordance with the contract requirements for the original drum.

An estimated quantity of 10 Each has been provided in the Maintenance of Traffic Subsummary.

WORK ZONE SPEED LIMIT SIGNS

The Contractor shall furnish, install, maintain, cover during suspension of work, and subsequently remove work zone speed limit signs and supports (R-10, 55 mph) within the work limits in accordance with the following requirements.

The Contractor shall cover or remove any existing speed limit or minimum speed signs within the reduced speed zone. These signs shall be restored during suspension or termination of the reduced speed limit. The expense of covering or removal and restoration of existing speed limit or minimum speed signs shall be included in the pay item for the work zone speed limit signs.

The work zone speed limit signs may be erected or uncovered no more than 4 hours before the actual start of work. The signs shall be removed or covered no later than 4 hours following restoration of all lanes to traffic with no restrictions or sooner as directed by the Engineer.

The Contractor shall erect a work zone speed limit sign in advance of any lane restriction expected to last at least 30 days, or as directed by the Engineer. The sign shall be mounted on both sides of divided highways, 500 feet in advance of the lane reduction taper. The sign shall be repeated, on the side nearest traffic, every 1 mile for 55 mph zones and every 1/2 mile for 45 mph zones. These signs shall also be erected immediately after each open entrance ramp within the zone.

Signs to indicate the resumption of the statutory speed limit shall be erected at the end of any reduced speed zone. R-10 (65 mph) and R-9A signs (55 mph) shall be used on divided roadways. The R-10 and R-9A signs shall be mounted side-by-side on separate supports.

The Contractor may use signs and supports in used but good condition provided the signs meet current ODOT specifications. Sign faces shall be reflectorized with Type G sheeting complying with the requirements of 730.19 and U.S. Department of Transportation Supplemental Specification for Type III-C sheeting, FP-85. Work zone speed limit signs shall be mounted on two Item 630 Ground Mounted Supports, No. 3 Posts. Work zone speed limit signs and supports will be measured as the number of sign installations, including the signs and necessary supports. If a sign and support combination is removed and re-erected at another location within the project due to changes in the speed zone directed by the Engineer, it shall be considered another unit.

Payment for accepted quantities, complete in place, will be made at the contract unit price. Payment shall be full compensation for all materials, labor, incidentals and equipment for furnishing, erecting, maintaining, covering during suspension of work, and removing the signs and supports.

The following estimated quantity has been carried to the Maintenance of Traffic Subsummary:

614, Work Zone Speed Limit Sign 18 Each

BARRIER REFLECTORS AND OBJECT MARKERS

Barrier reflectors and object markers shall be installed on all portable concrete barrier used for traffic control, the bridge parapets along the decks under reconstruction, and all parapet walls on the bridges including those at station 240+21 to 243+15, COL-11-13.76. Barrier reflectors, object markers and their installation shall conform to the appropriate proposal note and Item 626 except that the spacing shall be 25 feet. An estimated quantity of 415 Each of Item 614, Barrier Reflector, Type B and 286 Each of Item 614, Object Markers has been carried to the Maintenance of Traffic Subsummary.

BRIDGE PAINTING

During bridge painting operations, traffic will be maintained at all times. When a lane closure is necessary below a bridge, this shall be accomplished following Standard Construction Drawing MT-97.10M. All lane closures for bridge painting will be at the approval of the Engineer. Special attention shall also be given to the safety of traffic entering and exiting ramps near the bridge painting operations.

GUARDRAIL REPLACEMENT

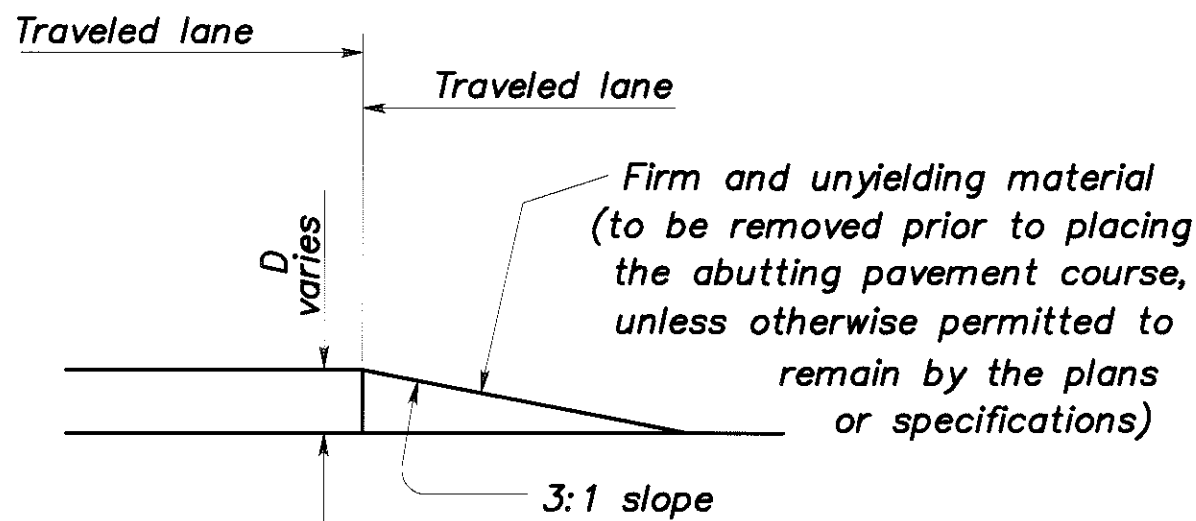
No hazard shall be left unprotected except for the actual time necessary to remove the existing guardrail, prepare the site, and install the guardrail in a continuous operation. The removal of all guardrail shall at all times be as directed by the Engineer. No guardrail shall be removed until the replacement material is on the site, ready for installation. Failure to comply with this requirement shall be deemed sufficient cause to order work suspended until such time as the Engineer is assured of compliance.

GENERAL NOTES

1. It is intended that this drawing be used for treatment of drop-offs that develop during construction operations, and that are not otherwise provided for in the construction plans. Where the plans do not provide specific items for labor, equipment, or materials to implement the drop-off treatments specified hereon, they shall be included for payment in the lump sum bid for Item 614 - Maintaining Traffic.
2. While the need for certain advisory signing is noted hereon, it is not intended that this be indicative of all signing that may be required to advise or warn motorists, and all requirements of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) must be fulfilled.
3. In urban or otherwise heavily developed areas where pedestrians and/or bicyclists may be present in significant numbers, additional signing and protective measures other than those shown hereon may be required.
4. The drop-off treatment selected for use at any given location shall be as appropriate for the prevailing conditions at the site.
5. Where concrete barrier is specified, it shall be in accordance with Standard Construction Drawing RM-4.3M and Item 622.
6. When drums are specified for a dropoff condition, a minimum number of four drums shall be used. Spacing shall be as indicated in the plans or as specified in the OMUTCD.
7. When OW-151 (Low Shoulder) signs or OW-171 (Uneven Lanes) and OWP-171 signs are required, they shall be placed 750' in advance of the condition, on all intersecting entrance ramps within the limits of the condition and immediately beyond all intersecting roadways within the limits of the condition. When the dropoff condition extends more than one-half mile, additional signs should be erected at intervals of one mile or less.
8. For locations, such as at ramps, lane shifts, lane closures, etc., where traffic is required to negotiate any difference in elevation between pavements, a 3:1 slope treatment similar to the Optional Wedge Treatment shall be provided.
9. Portable concrete barrier shall be placed on the same level as the traffic surface and shall not encroach on lane width(s) designated as the minimum required for traffic use. Where drums are used, and their presence would reduce traveled lane widths to less than 10', drums may be placed on the opposite level from that of traffic provided the dropoff depth does not exceed 5" and approval is granted by the Project Engineer.
10. Pavement Repairs (or similar work):
- a. Lengths greater than 60 feet - utilize appropriate treatment from Condition I.
- b. Lengths of 60 feet or less - repairs shall be effected in accordance with 255.08. Drums may be used as a separator adjacent to the traveled lane.

OPTIONAL WEDGE TREATMENT
(MILLING OR RESURFACING)

1. This treatment may be used when permitted for Condition I only.
2. OW-171 and OWP-171 signs required.

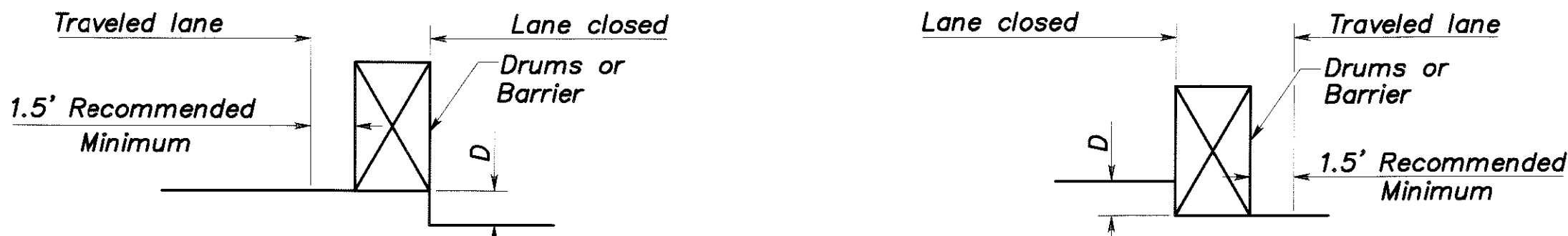


CONDITION I
DROPOFFS BETWEEN TRAVELED LANES

1. These treatments are to be used for resurfacing, pavement planing, excavation, etc. between or within traveled lanes.

D (In.)	Treatment
≤1 1/2	Erect OW-171 and OWP-171 signs.
>1 1/2 -3	* 1) Lane closure utilizing drums as shown below OR 2) Optional Wedge Treatment
>3-5	Lane closure utilizing drums as shown below.
>5	Lane closure utilizing portable concrete barrier as shown below.

* Cones may be used for daytime only conditions.

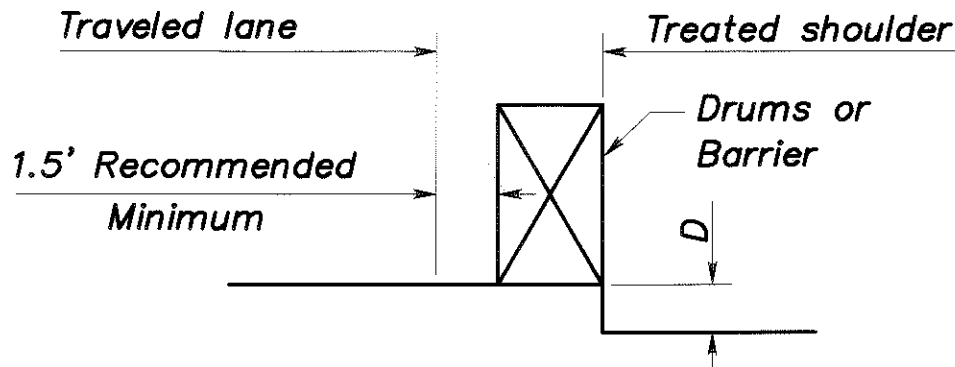


CONDITION II
DROPOFFS WITHIN GRADED SHOULDER AREA

1. The treatments indicated below are for use in conjunction with resurfacing, planing, or excavations within the graded shoulder area.
2. The graded shoulder area is that flat or gradually sloping area between the edge of a normally traveled lane and the more steeply sloping ditch foreslope or embankment slope. Its surface may be soil or turf, and/or it may be inclusive of a "treated" area (improved with aggregates, asphaltic materials, or concrete). For the purposes herein, its maximum width shall be considered to be twelve (12) feet.

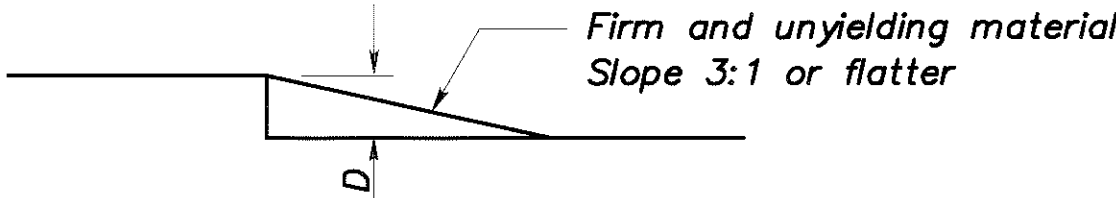
D (In.)	Treatment
≤1 1/2	1) If edgelines are present, no treatment necessary OR 2) Erect OW-171 and OWP-171 signs.
>1 1/2 -5	*1) If min. lane width requirements can be met, maintain lanes utilizing drums as shown below *OR 2) If min. lane width requirements cannot be met, close adjacent lane utilizing drums OR 3) Optional Shoulder Treatment.
>5-12 Daylight only	* If min. lane width requirements can be met, maintain lanes utilizing drums as shown below.
>5-24	*1) If min. lane width requirements can be met, maintain lanes utilizing portable concrete barrier as shown below. *OR 2) If min. lane width requirements cannot be met, close adjacent lane utilizing drums.
>24	Lane closure utilizing portable concrete barrier as shown below.

* Minimum lane widths shall be 10' unless otherwise specified in the plans.



OPTIONAL SHOULDER TREATMENT

1. This treatment may not be used within a bituminous shoulder where a hot longitudinal joint per 401.15 is required.
2. OW-151 signs required.

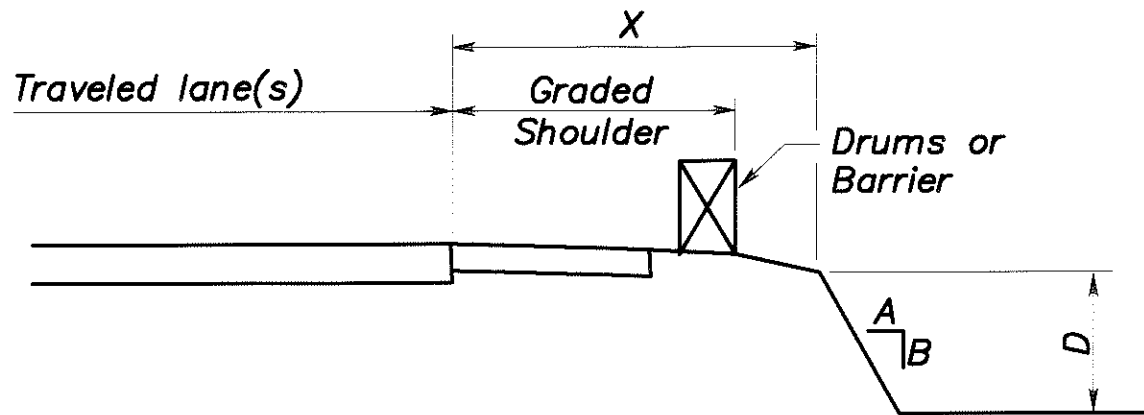


CONDITION III
DROPOFFS BEYOND GRADED SHOULDER OR BACK OF CURB

1. See Note 2 under Condition II.
2. Use Chart A or B below, as applicable.

CHART A

- USE FOR:
1. Uncurbed Facilities.
2. Curbed Facilities, where:
- a. Curbs are less than 6" in height.
- b. Curbs are 6" or greater in height and the legal speed is greater than 40 mph.

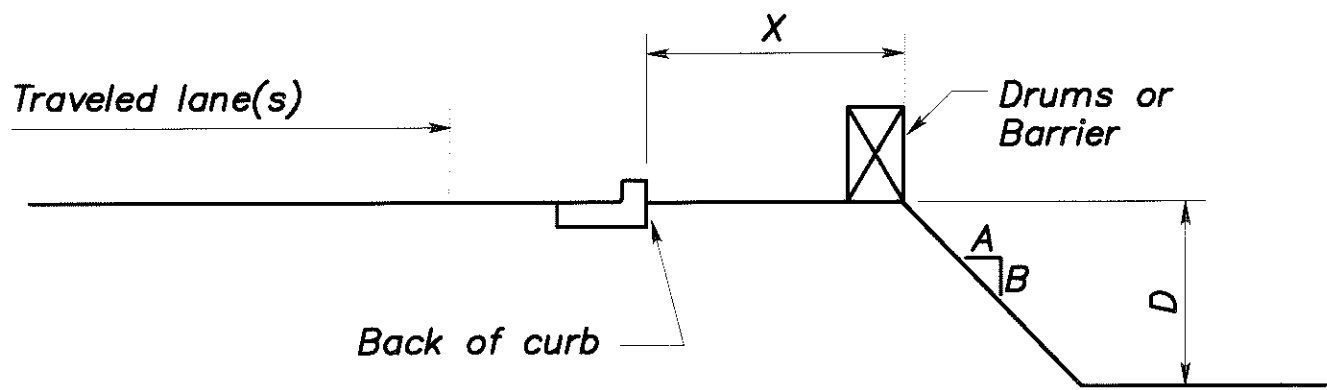


X (Ft.)	D (In.)	A/B	Treatment Required	
			Day	Night
0-4	Any	Any	(a)	(a)
4-30	Any	3:1 or Flatter	None	None
4-12	≤3	Steeper than 3:1	None	None
4-12	>3-≤12	Steeper than 3:1	Drums	Drums
4-12	>12	Steeper than 3:1	Drums	Barrier
>12-20	≤12	Steeper than 3:1	None	None
>12-20	>12-≤24	Steeper than 3:1	Drums	Drums
>12-20	>24	Steeper than 3:1	Drums	Barrier
>20-30	≤24	Steeper than 3:1	None	Drums
>20-30	>24	Steeper than 3:1	Drums	Barrier
>30	Any	Any	None	None

(a) Use treatment specified under Condition II.

CHART B

- USE FOR: Curbed facilities, where the curb is 6" or greater in height and the legal speed is 40 mph or less.



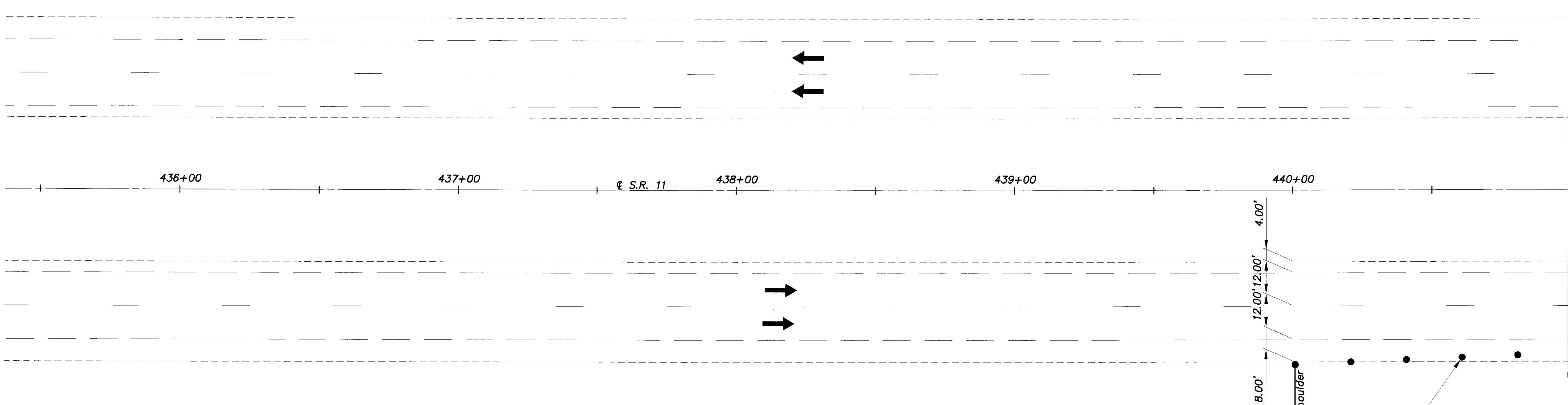
X (Ft.)	D (In.)	A/B	Treatment Required	
			Day	Night
0-10	<12	Any	None	Drums
0-10	>12	Any	Drums	Drums
>10	Any	Any	None	None

CALCULATED
JUG
CHECKED
BLG

DROPOFFS IN WORK ZONES

COL-11-(9.44)(13.76)

11
126



Match Line Sta. 441+00
See Sheet 14

NOTE:
Signing shall be placed as per SCD MT-102.20M except
signs OC-39AL/BL and OC-49R/L which shall be omitted.



CALCULATED 0		NEL	CHECKED	JUG
0				
20				
40				
HORIZONTAL SCALE IN FEET				

MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 1
Sta. 435+40 to Sta. 441+00

COL-11-(9.44)(13.76)

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

EST. QUANTITIES PHASE 1 - Sta. 441+00 to Sta. 451+00

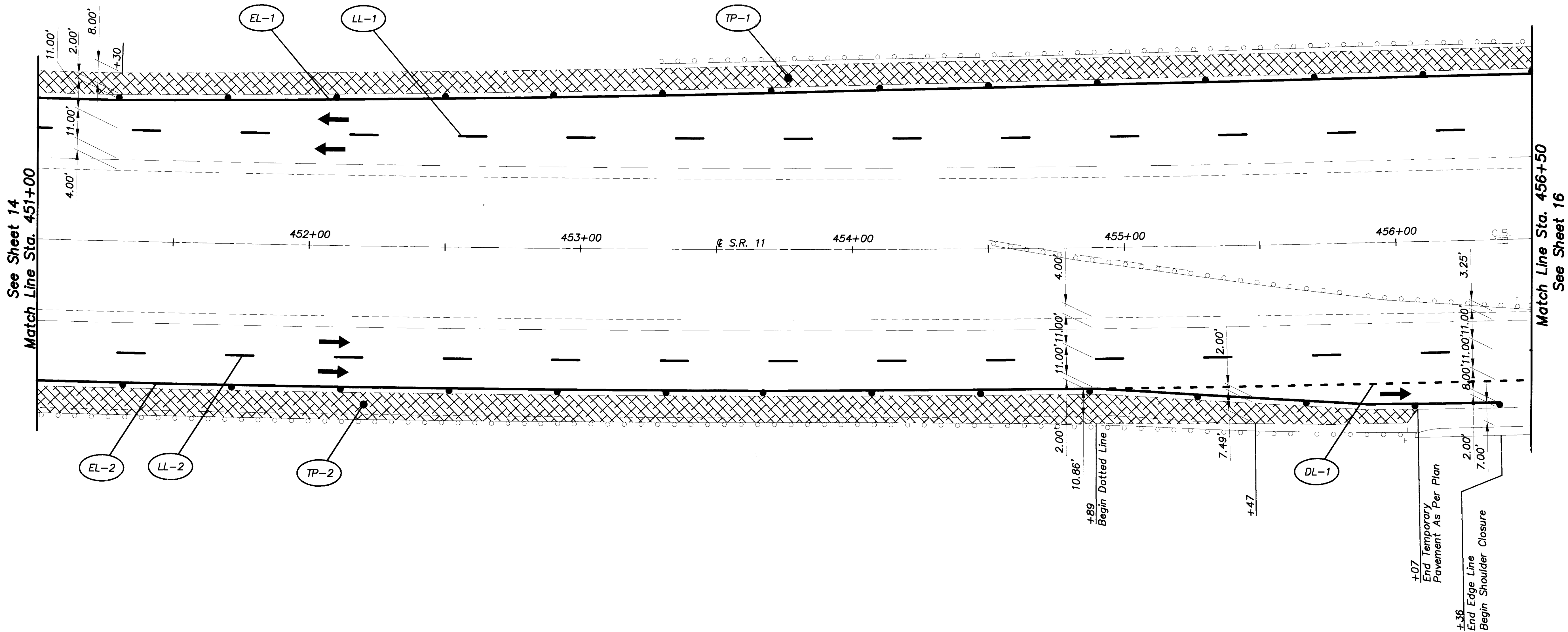
Reference Number	Station to Station		Side	614		615
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A, As Per Plan
				Mile	Mile	Square Yards
EL-1	442+01	445+01	S.B.	0.06		
EL-2	442+01	445+50	S.B.	0.07		
EL-3	445+50	451+00	S.B.	0.10		
EL-4	446+18	451+00	N.B.	0.09		
EL-5	446+18	449+18	N.B.	0.06		
LL-1	445+01	445+50	S.B.		0.01	
LL-2	445+50	451+00	S.B.		0.10	
LL-3	449+18	451+00	N.B.		0.03	
TP-1	445+56	451+00	S.B.			530
TP-2	449+18	451+00	N.B.			161
Totals Carried to Sub-Summary				0.38	0.14	691

LEGEND

 Temporary Pavement, Class A, As Per Plan

NOTE:

Signing shall be placed as per SCD MT-102.20M except signs OC-39AL/BL and OC-49R/L which shall be omitted.



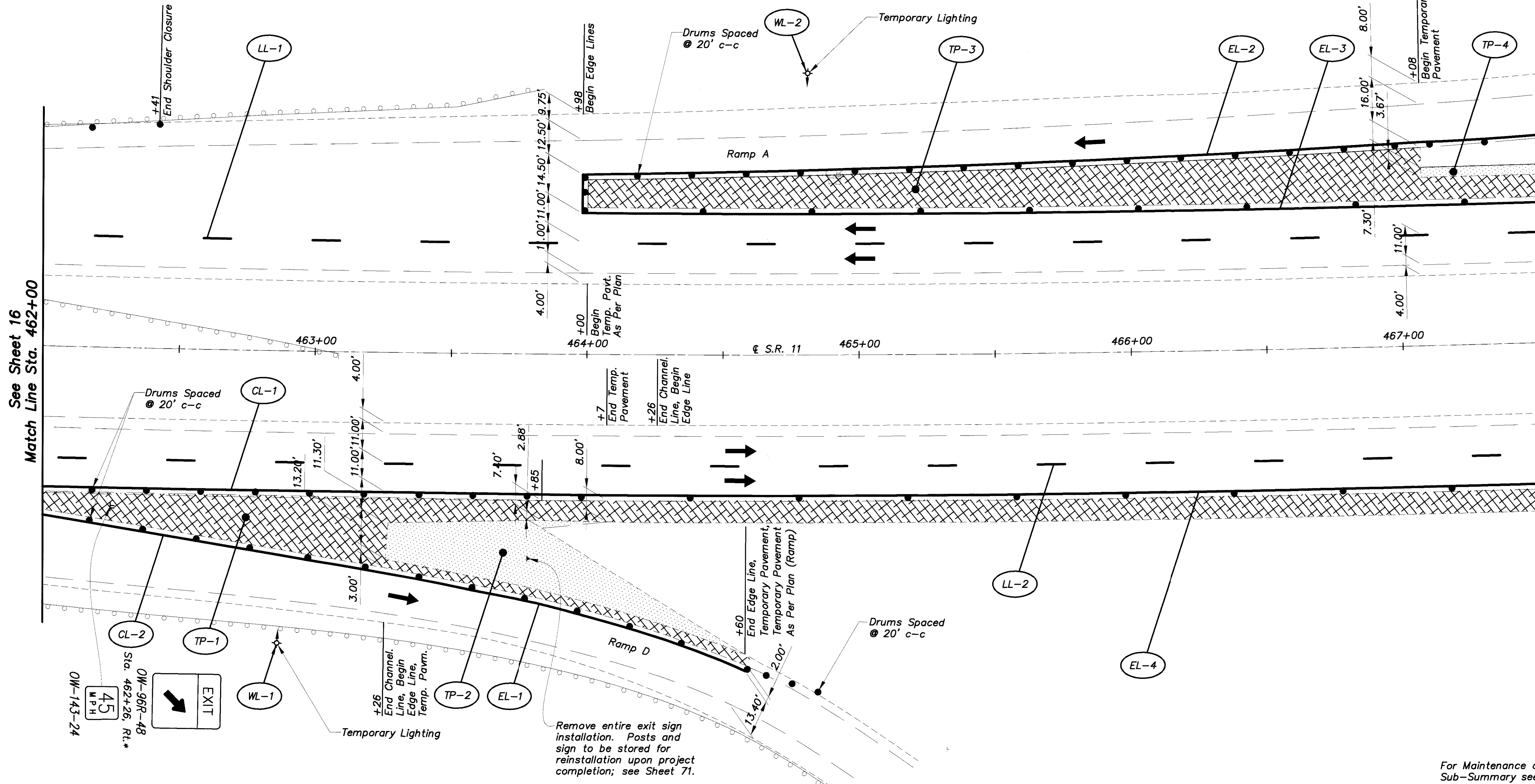
LEGEND
 Temporary Pavement, Class A, As Per Plan

For Maintenance of Traffic
 Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 1 – Sta. 451+00 to Sta. 456+00							
Reference Number	Station to Station		Side	614			615
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A, As Per Plan
				Linear Feet	Mile	Mile	Square Yards
DL-1	454+89	456+50	S.B.	161			
EL-1	451+00	456+50	N.B.		0.10		
EL-2	451+00	456+36	S.B.		0.10		
LL-1	451+00	456+50	N.B.			0.10	
LL-2	451+00	456+50	S.B.			0.10	
TP-1	451+00	456+50	N.B.				485
TP-2	451+00	456+07	S.B.				535
Totals Carried to Sub-Summary				161	0.20	0.20	1020

See Sheet 16
Match Line Sta. 462+00

Match Line Sta. 467+50
See Sheet 18



NOTE:

* The Exit Sign shall be relocated periodically as per Standard Construction Drawing MT-105.10M and MT-105.11M to avoid being in conflict with ongoing construction. The sign shall at all times be clearly visible to the traveling public and within the protected gore area in a location approved by the Engineer.

NOTE:

All conflicting gore markings to be removed.

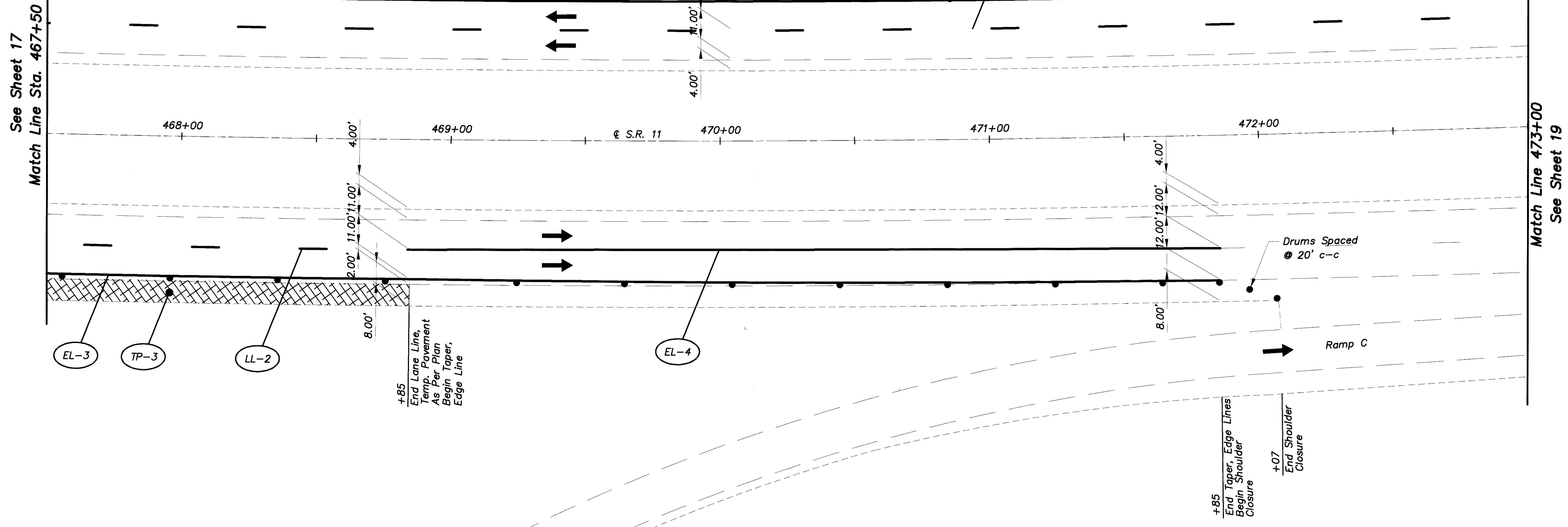
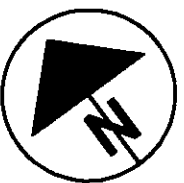
LEGEND

- Temporary Pavement, Class A, As Per Plan
- Temporary Pavement, Class A

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 1 – Sta. 462+00 to Sta. 467+50

Reference Number	Station to Station		Side	614				615	
				Temporary Channelizing Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Work Zone Lighting	Temporary Pavement, Class A
				Linear Feet	Mile	Mile	Mile	Each	Square Yards
CL-1	462+00	464+26	S.B.	226					
CL-2	462+00	463+26	S.B.	126					
EL-1	463+26	464+60	S.B.			0.03			
EL-2	463+98	467+50	N.B.			0.07			
EL-3	463+98	467+50	N.B.		0.07				
EL-4	464+26	467+50	S.B.		0.06				
LL-1	462+00	467+50	N.B.				0.10		
LL-2	462+00	467+50	S.B.				0.10		
TP-1	462+00	467+50	S.B.						607
TP-2	463+26	464+60	S.B.						216
TP-3	464+00	467+50	N.B.						524
TP-4	467+08	467+50	N.B.						17
WL-1	462+90		S.B.					1	
WL-2	464+80		N.B.					1	
Totals Carried to Sub-Summary				352	0.13	0.10	0.20	2	1131



For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

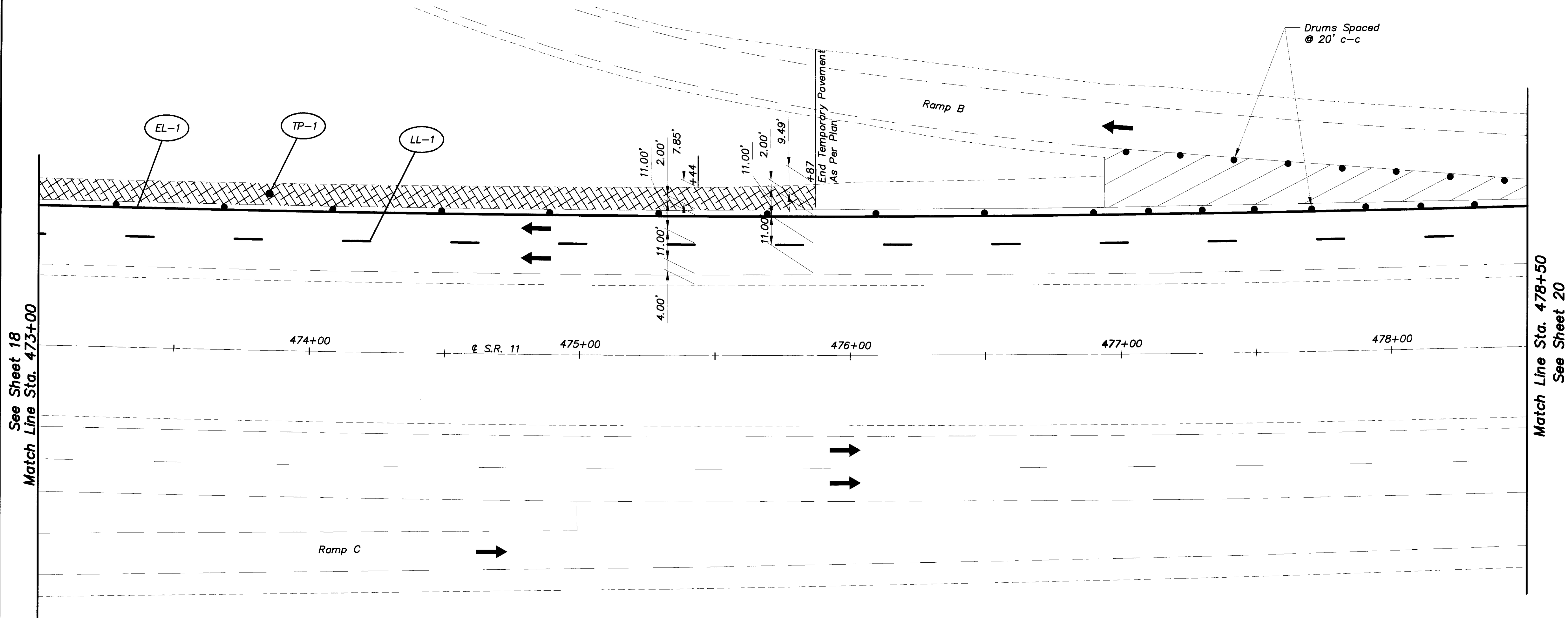
NOTE:
Signing shall be placed as per SCD MT-102.20M except
signs OC-39AL/BL and OC-49R/L which shall be omitted.

LEGEND

- Temporary Pavement, Class A, As Per Plan
- Temporary Pavement, Class A

ESTIMATED QUANTITIES PHASE 1 - Sta. 467+50 to Sta. 473+00

Reference Number	Station to Station		Side	614			615	
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A	Temporary Pavement, Class A, As Per Plan
				Mile	Mile	Mile	Square Yards	Square Yards
EL-1	467+50	468+18	N.B.		0.01			
EL-2	467+50	473+00	N.B.	0.10				
EL-3	467+50	471+85	N.B.	0.08				
EL-4	468+85	471+85	S.B.	0.06				
LL-1	467+50	473+00	N.B.			0.10		
LL-2	467+50	468+85	S.B.			0.03		
TP-1	467+50	472+35	N.B.				152	
TP-2	467+50	473+00	N.B.					489
TP-3	467+50	468+85	S.B.					120
Totals Carried to Sub-Summary				0.24	0.01	0.13	152	609

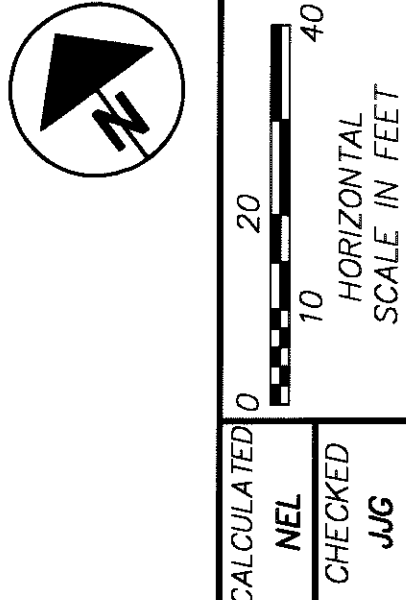


NOTE:
All conflicting gore markings to be removed.

LEGEND
 Temporary Pavement, Class A, As Per Plan

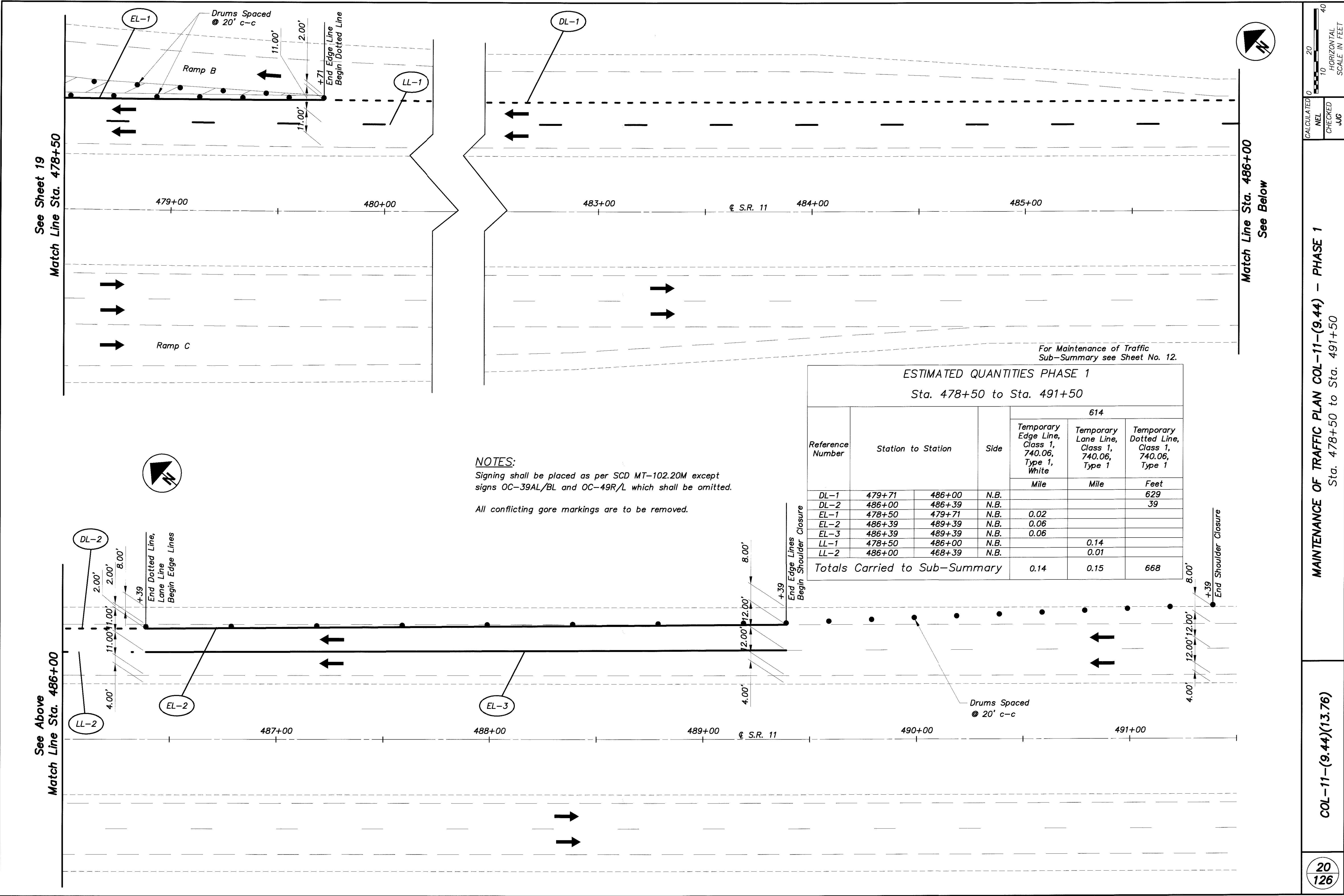
For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

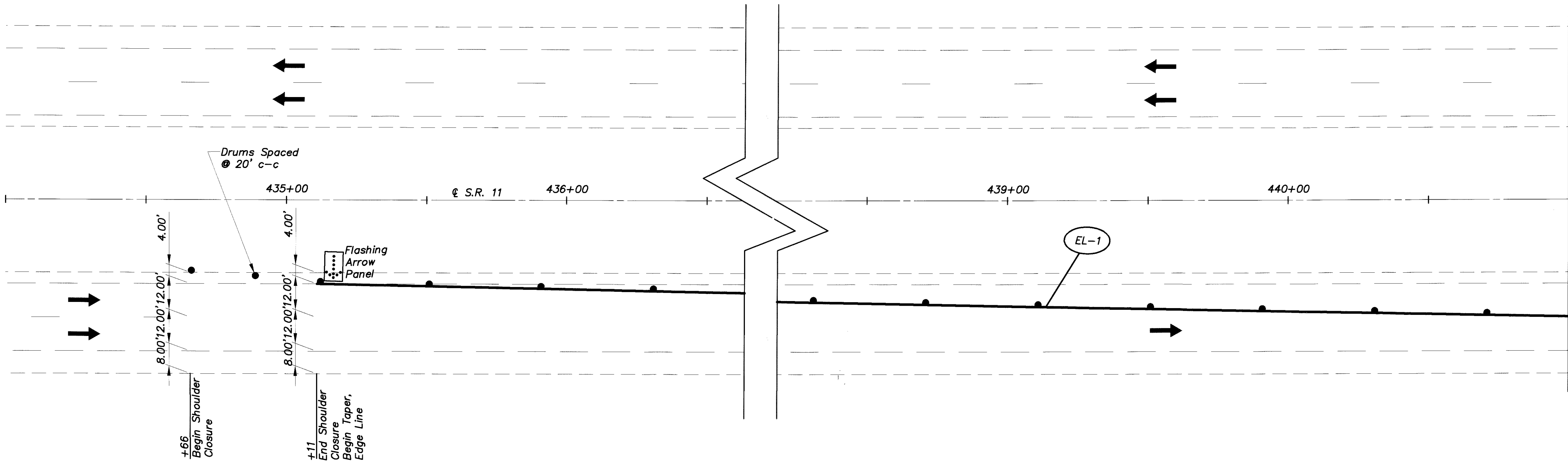
ESTIMATED QUANTITIES PHASE 1 Sta. 473+00 to Sta. 478+50					
Reference Number	Station to Station		Side	614	615
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Lane Line, Class 1, 740.06, Type 1
				Mile	Square Yards
EL-1	473+00	478+50	N.B.	0.10	
LL-1	473+00	478+50	N.B.		0.10
TP-1	473+00	475+87	N.B.		258
Totals Carried to Sub-Summary				0.10	258



MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 1
Sta. 473+00 to Sta. 478+50

COL-11-(9.44)(13.76)



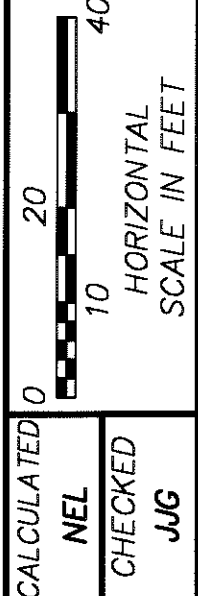


NOTE:
Signing shall be placed as per SCD MT-95.40M.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2				
Sta. 434+00 to Sta. 441+00				
Reference Number	Station to Station		Side	614
				Temporary Edge Line, Class 1, 740.06, Type 1, Yellow
				Mile
EL-1	435+11	441+00	S.B.	0.11
Totals Carried to Sub-Summary				0.11

Match Line Sta. 441+00
See Sheet 22



MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 2
Sta. 434+00 to Sta. 441+00

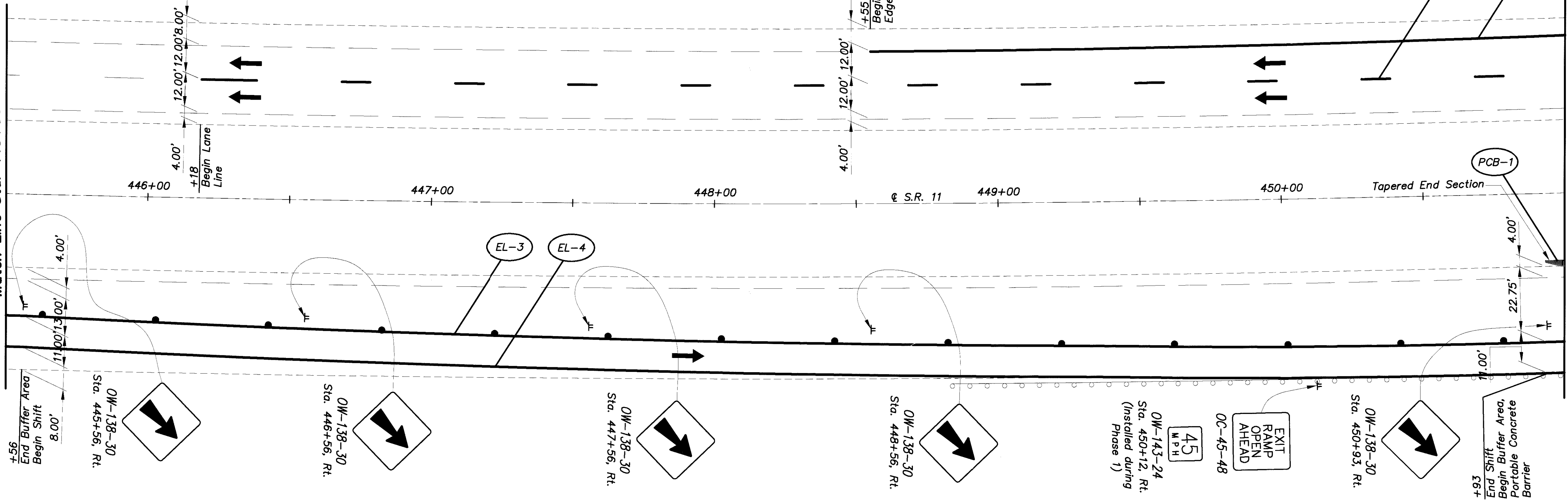
COL-11-(9.44)(13.76)

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 – Sta. 441+00 to Sta. 451+00

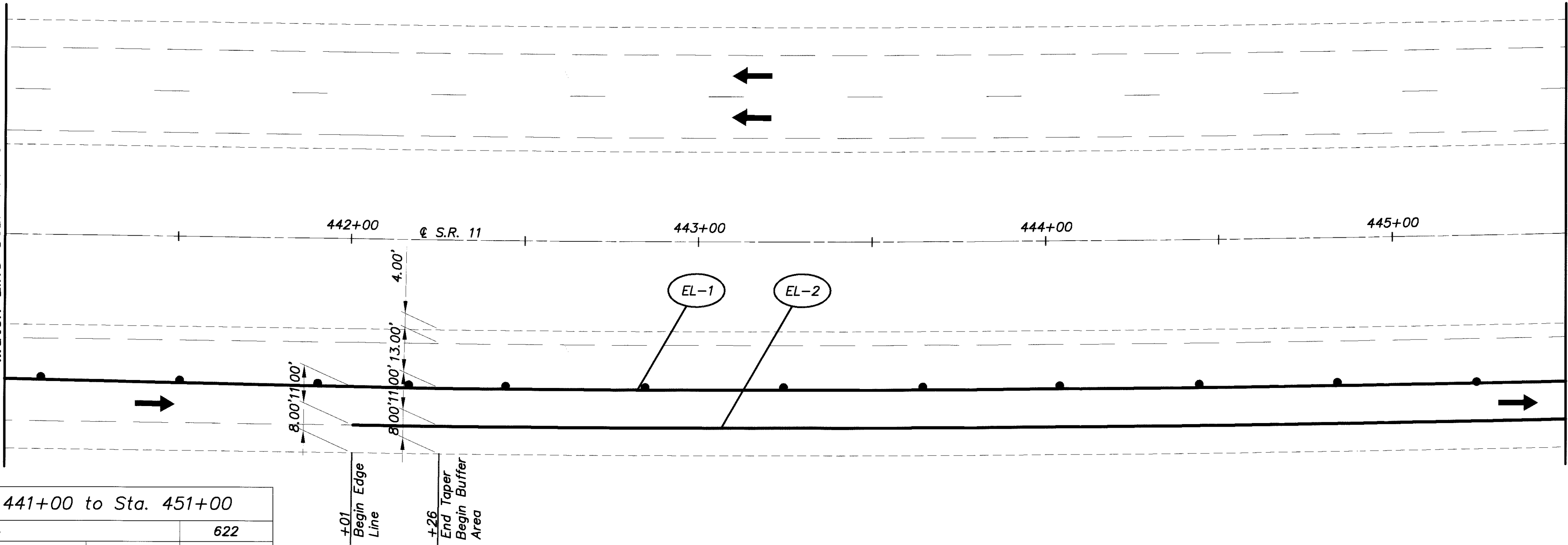
Reference Number	Station to Station		Side	614			622
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"
				Mile	Mile	Mile	Linear Feet
EL-1	441+00	445+50	S.B.		0.09		
EL-2	442+01	445+50	S.B.	0.07			
EL-3	445+50	451+00	S.B.		0.10		
EL-4	445+50	451+00	S.B.	0.10			
EL-5	448+55	451+00	N.B.	0.05			
LL-1	446+18	451+00	N.B.			0.09	
PCB-1	450+93	451+00	S.B.				7
Totals Carried to Sub-Summary				0.22	0.19	0.09	7

See Above
Match Line Sta. 445+50



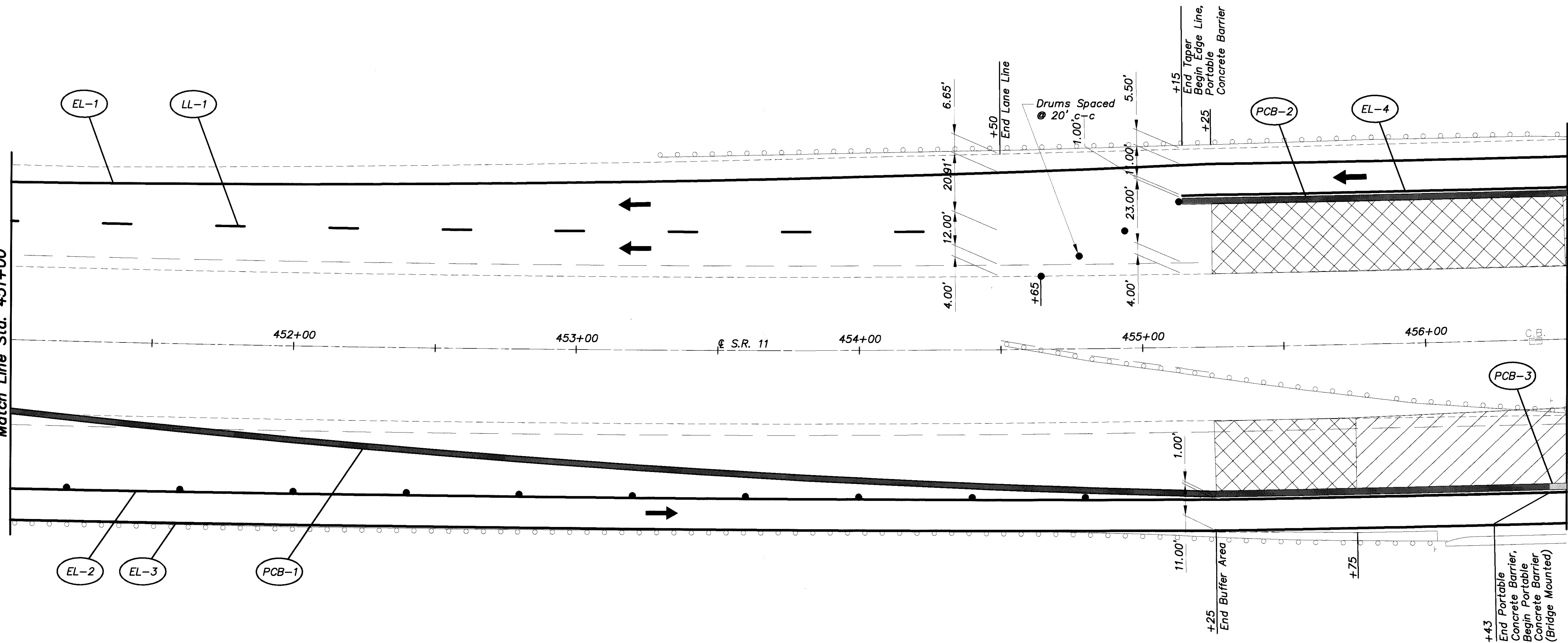
Match Line Sta. 451+00
See Sheet 23

See Sheet 21
Match Line Sta. 441+00



Match Line Sta. 445+50
See Below

See Sheet 22
Match Line Sta. 451+00

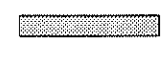
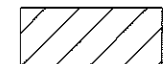


Match Line Sta. 456+50
See Sheet 24

NOTE:

For typical-section of lane
set up through work area
see Sheets 76 & 77.

LEGEND

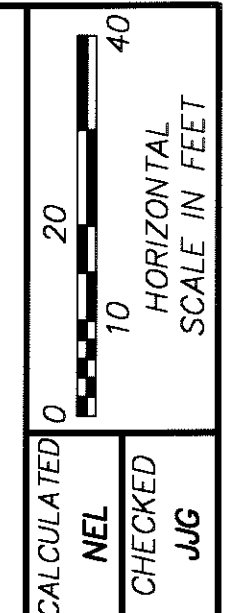
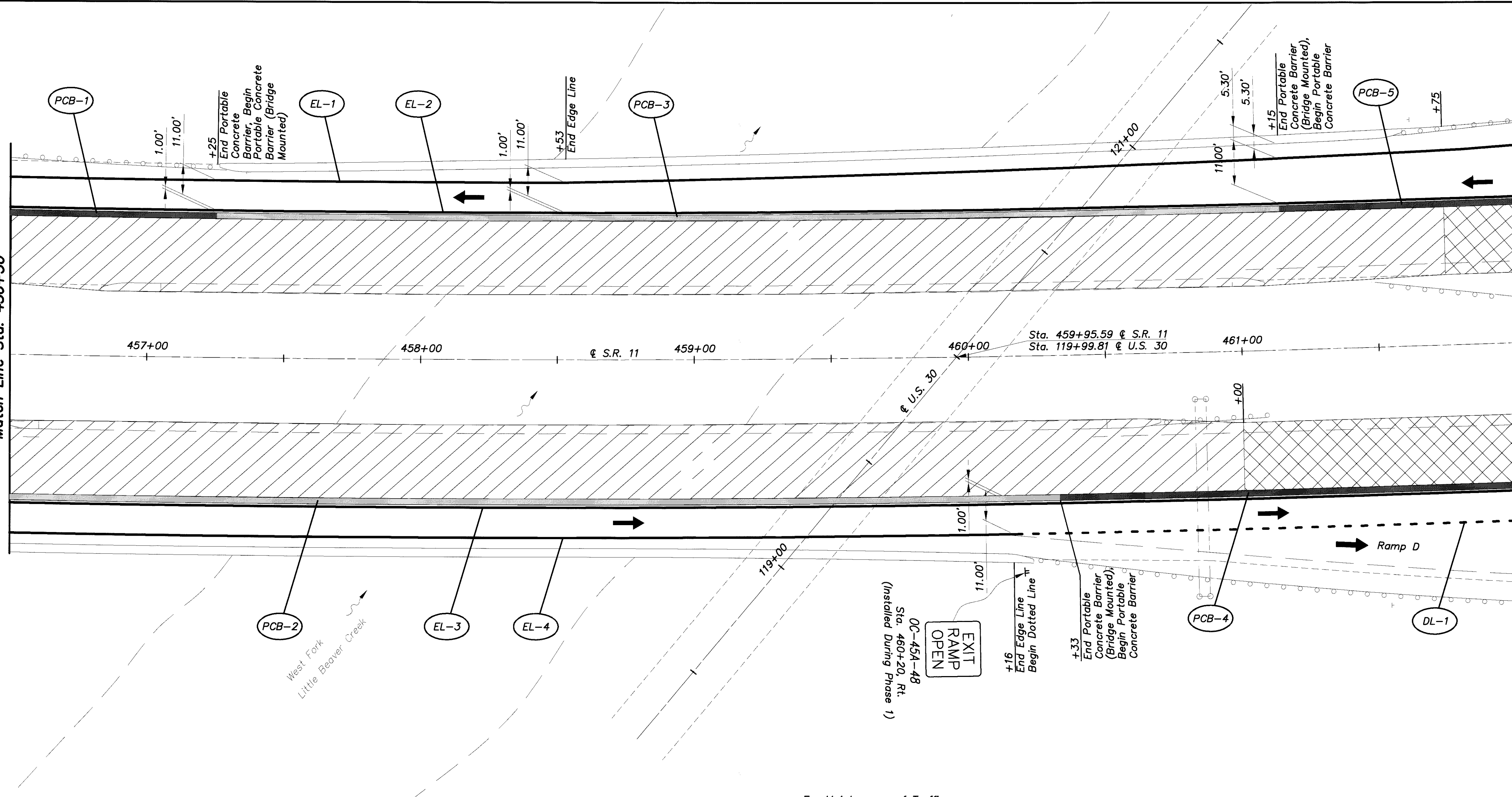
-  622, Portable Concrete Barrier, 32", Bridge Mounted
-  622, Portable Concrete Barrier, 32"
-  Bridge, Approach Slab, and Full Depth Work Area
-  Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 – Sta. 451+00 to Sta. 456+50								
Reference Number	Station to Station		Side	614			622	
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"	Portable Concrete Barrier, 32", Bridge Mounted
				Mile	Mile	Mile	Linear Feet	Linear Feet
EL-1	451+00	456+50	N.B.	0.10				
EL-2	451+00	456+50	S.B.		0.10			
EL-3	451+00	456+50	S.B.	0.10				
EL-4	455+15	456+50	N.B.		0.03			
LL-1	451+00	454+50	N.B.			0.07		
PCB-1	451+00	456+43	S.B.				543	
PCB-2	455+15	456+50	N.B.				135	
PCB-3	451+43	456+50	S.B.					7
Totals Carried to Sub-Summary				0.20	0.13	0.07	678	7

See Sheet 23
Match Line Sta. 456+50

Match Line Sta. 462+00
See Sheet 25



NOTE:

For typical-section of lane set up through work area see Sheets 76 & 77.

All conflicting gore markings to be removed.

LEGEND

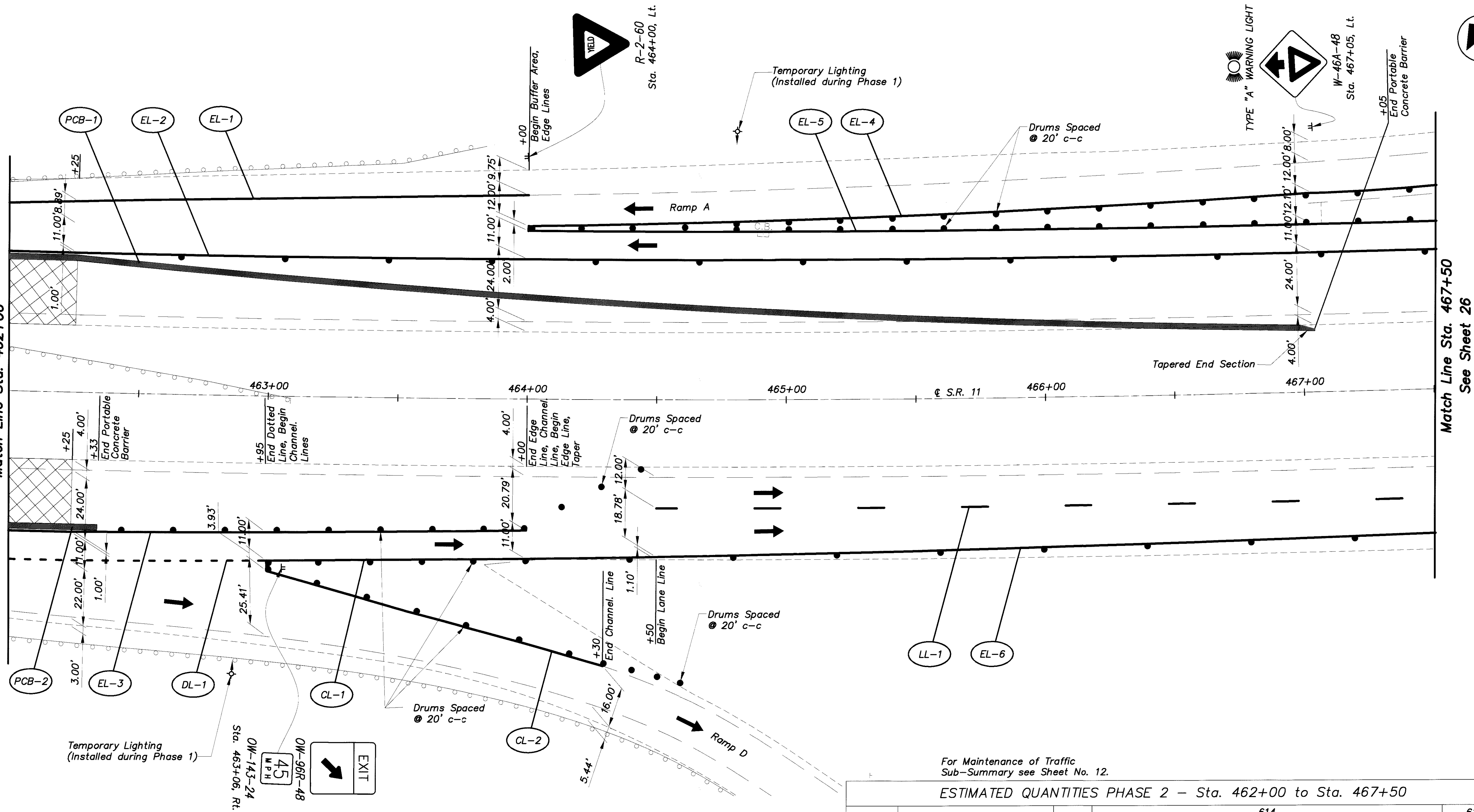
- 622, Portable Concrete Barrier, 32", Bridge Mounted
- 622, Portable Concrete Barrier, 32"
- Bridge, Approach Slab, and Full Depth Work Area
- Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 - Sta. 456+50 to Sta. 462+00

Reference Number	Station to Station		Side	614			622	
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Portable Concrete Barrier, 32"	Portable Concrete Barrier, 32", Bridge Mounted
				Linear Feet	Mile	Mile	Linear Feet	Linear Feet
DL-1	460+16	462+00	S.B.	184				
EL-1	456+50	462+00	N.B.		0.10			
EL-2	456+50	462+00	N.B.			0.10		
EL-3	456+50	462+00	S.B.			0.10		
EL-4	456+50	460+16	S.B.		0.07			
PCB-1	456+50	457+25	N.B.				75	
PCB-2	456+50	460+33	S.B.					383
PCB-3	457+25	461+15	N.B.					390
PCB-4	460+33	462+00	S.B.				167	
PCB-5	461+15	462+00	N.B.				85	
Totals Carried to Sub-Summary				184	0.17	0.20	327	773

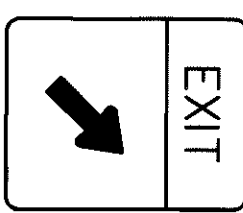
See Sheet 24
Match Line Sta. 462+00



Temporary Lighting
(Installed during Phase 1)

OW-143-24
Sta. 463+06, Rt.

OW-96R-48



NOTES:

For typical section of lane setup through the work area, see Sheets 76 & 77.

All conflicting gore markings to be removed.

LEGEND

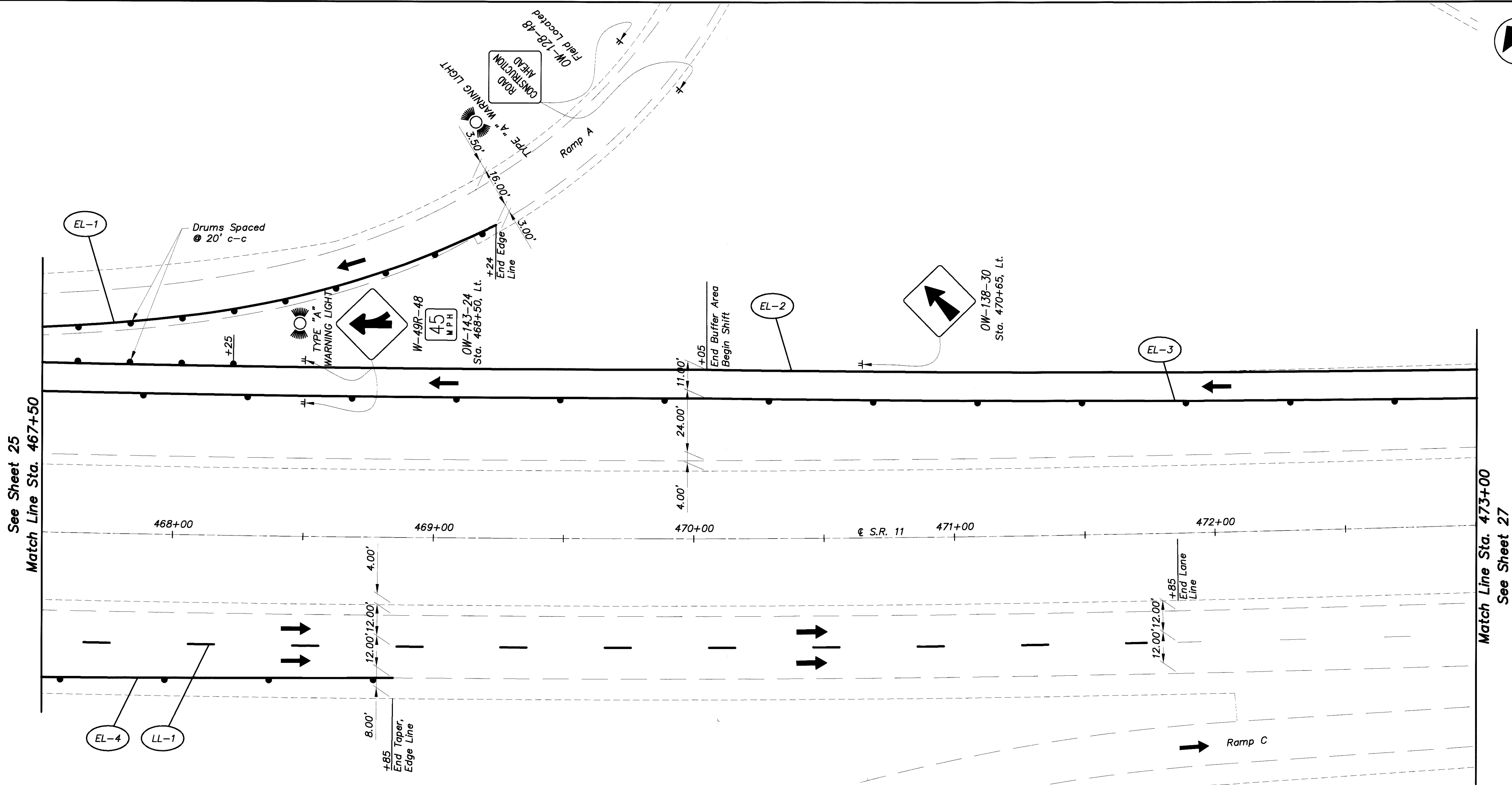
622, Portable Concrete Barrier, 32"

Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 - Sta. 462+00 to Sta. 467+50

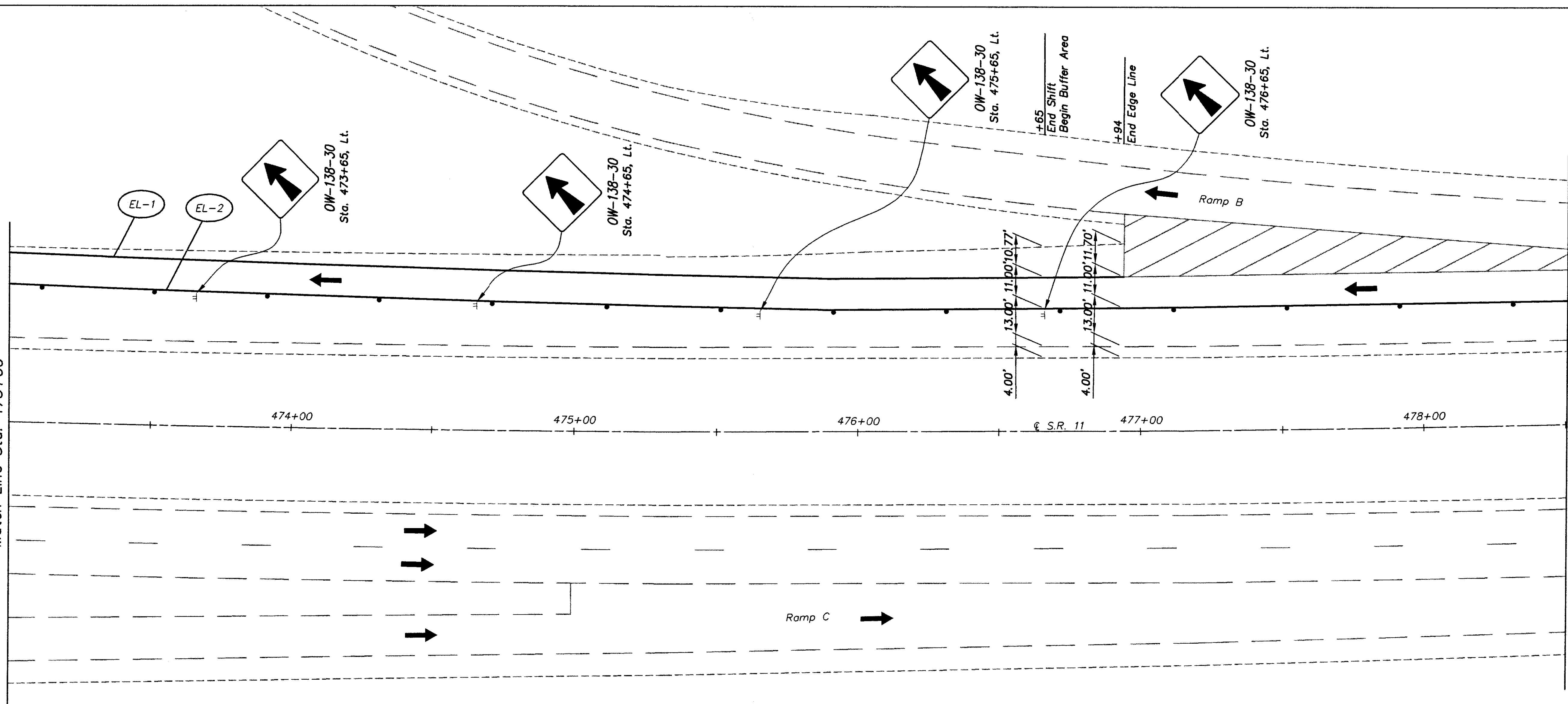
Ref. No.	Station to Station		Side	614					622
				Temporary Channelizing Line, Class 1, 740.06, Type 1	Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"
				Linear Feet	Linear Feet	Mile	Mile	Mile	Linear Feet
CL-1	462+95	464+00	S.B.	105					
CL-2	462+95	464+30	S.B.	135					
DL-1	462+00	462+95	S.B.		95				
EL-1	462+00	464+00	N.B.			0.04			
EL-2	462+00	467+50	N.B.				0.10		
EL-3	462+00	464+00	S.B.				0.04		
EL-4	464+00	467+50	N.B.				0.07		
EL-5	464+00	467+50	N.B.			0.07			
EL-6	464+00	467+50	S.B.			0.07			
LL-1	464+50	467+50	S.B.					0.06	
PCB-1	462+00	467+04	N.B.						504
PCB-2	462+00	462+35	S.B.						35
Totals Carried to Sub-Summary				240	95	0.18	0.21	0.06	539



For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

EST. QUANTITIES PHASE 2 – Sta. 467+50 to Sta. 473+00						
Reference Number	Station to Station		Side	614		
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Lane Line, Class 1, 740.06, Type 1
				Mile	Mile	Mile
EL-1	467+50	469+24	N.B.		0.03	
EL-2	467+50	473+00	N.B.	0.10		
EL-3	467+50	473+00	N.B.		0.10	
EL-4	467+50	468+85	S.B.	0.03		
LL-1	467+50	471+85	S.B.			0.08
Totals Carried to Sub-Summary				0.13	0.13	0.08

See Sheet 26
Match Line Sta. 473+00



Match Line Sta. 478+50
See Sheet 28

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 Sta. 473+00 to Sta. 478+50					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow
				Mile	Mile
EL-1	473+00	476+94	N.B.	0.07	
EL-2	473+00	478+50	N.B.		0.10
Totals Carried to Sub-Summary				0.07	0.10

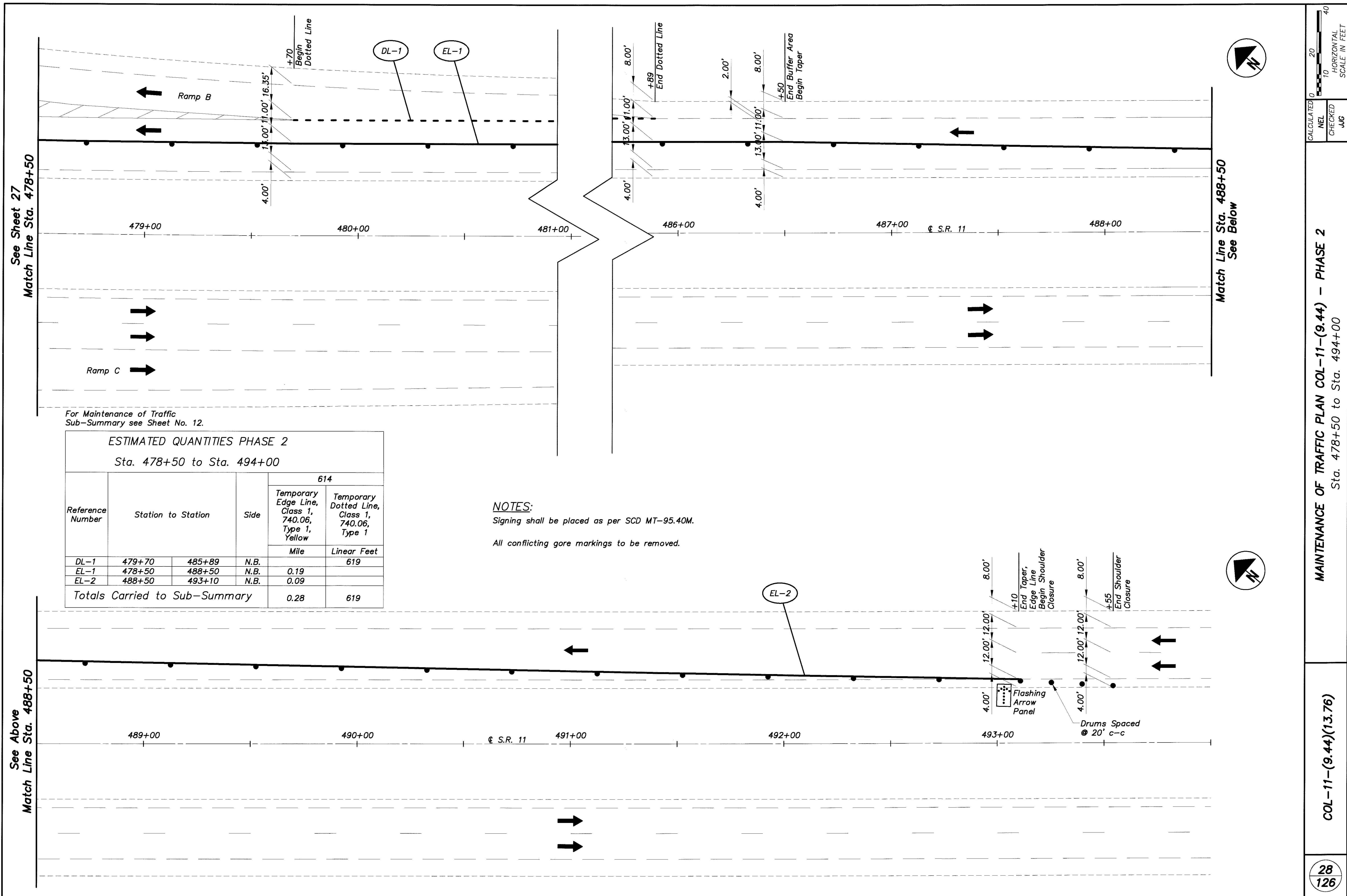
NOTE:
All conflicting gore markings to be removed.

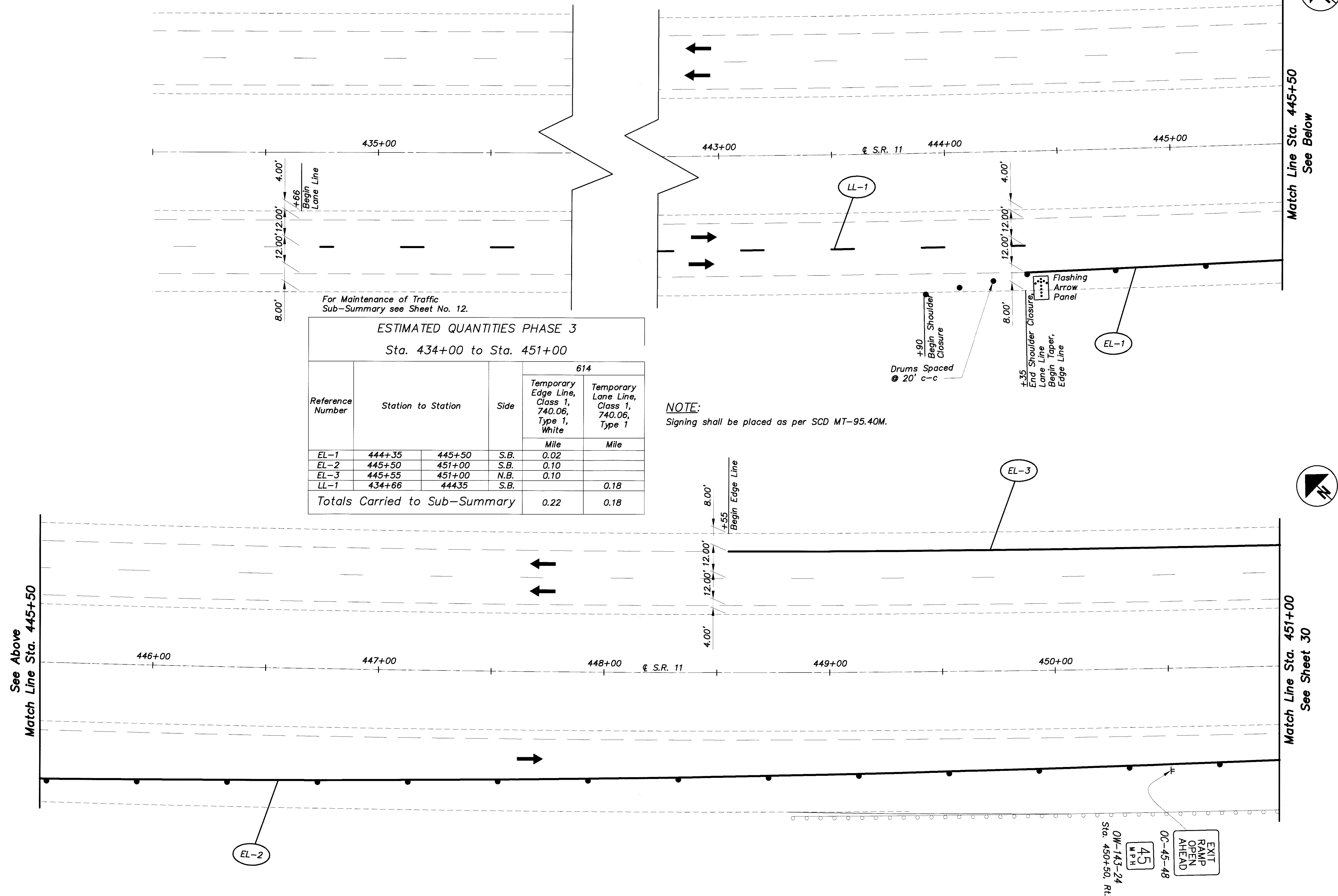
MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 2
Sta. 473+00 to Sta. 478+50

COL-11-(9.44)(13.76)

27
126

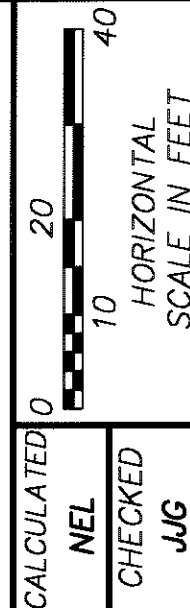
CALCULATED 0
NEL
CHECKED
JUG
HORIZONTAL
SCALE IN FEET
0 20 40

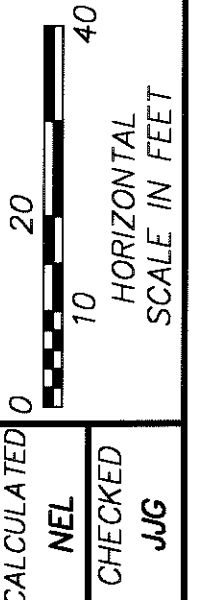
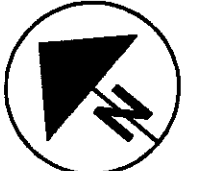
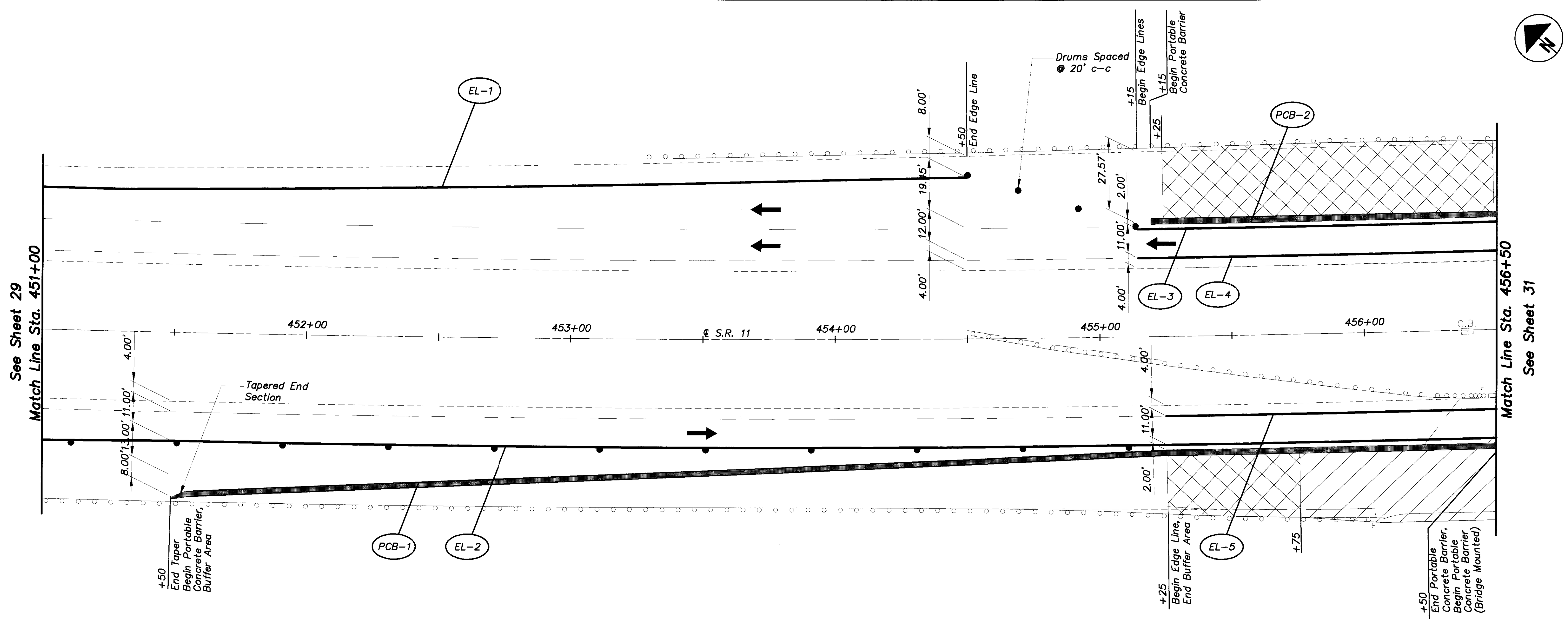




NOTE:
Signing shall be placed as per SCD MT-95.40M.

ESTIMATED QUANTITIES PHASE 3					
Sta. 434+00 to Sta. 451+00					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Lane Line, Class 1, 740.06, Type 1
				Mile	Mile
EL-1	444+35	445+50	S.B.	0.02	
EL-2	445+50	451+00	S.B.	0.10	
EL-3	445+55	451+00	N.B.	0.10	
LL-1	434+66	44435	S.B.		0.18
Totals Carried to Sub-Summary				0.22	0.18





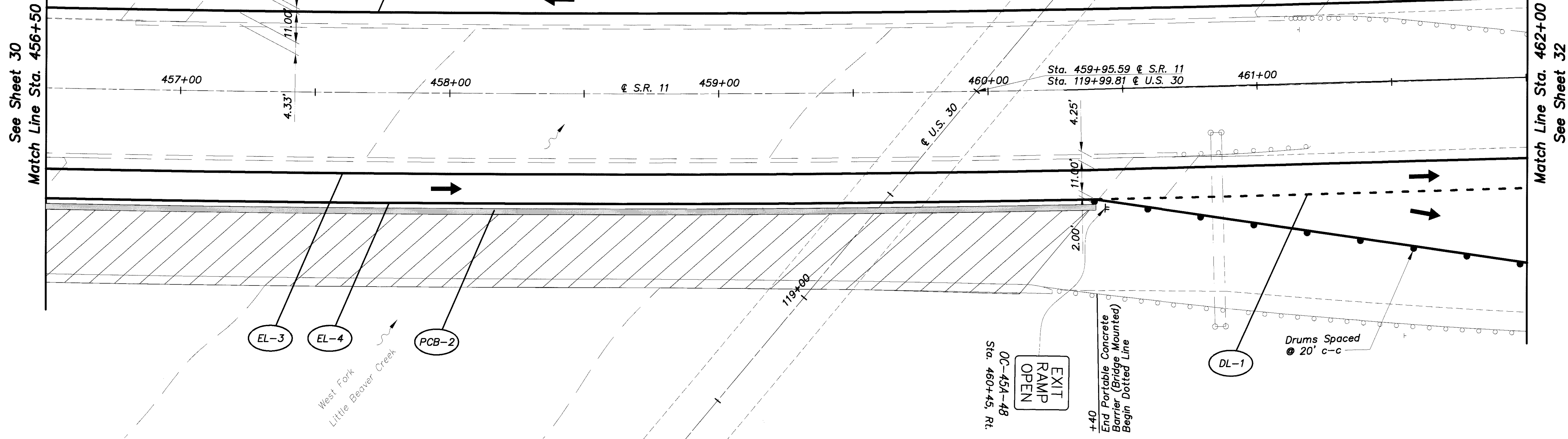
NOTE:
For typical-section of lane set up through work area see Sheet 76 & 77.

LEGEND

	622, Portable Concrete Barrier, 32"
	Bridge, Approach Slab, and Full Depth Work Area
	Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

EST. QUANTITIES PHASE 3 – Sta. 451+00 to Sta. 456+50						
Reference Number	Station to Station		Side	614		Portable Concrete Barrier, 32"
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	
				Mile	Mile	Linear Feet
EL-1	451+00	454+50	N.B.	0.07		
EL-2	451+00	456+50	S.B.	0.10		
EL-3	455+15	456+50	N.B.	0.03		
EL-4	455+15	456+50	N.B.		0.03	
EL-5	455+25	456+50	S.B.		0.02	
PCB-1	451+50	456+48	S.B.			498
PCB-2	455+20	456+50	N.B.			130
Totals Carried to Sub-Summary				0.20	0.05	628



NOTE:

For typical-section of lane set up through work area see Sheet 76 & 77.

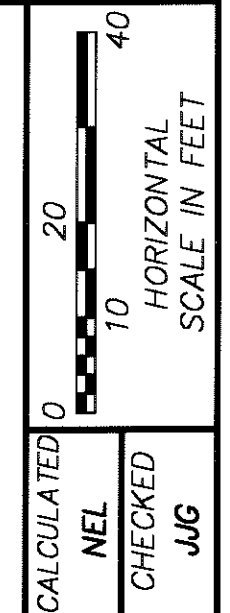
LEGEND

- 622, Portable Concrete Barrier, 32", Bridge Mounted
- 622, Portable Concrete Barrier, 32"
- Bridge, Approach Slab, and Full Depth Work Area
- Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 - Sta. 456+50 to Sta. 462+00

Reference Number	Station to Station		Side	614			622	
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Portable Concrete Barrier, 32"	Portable Concrete Barrier, 32", Bridge Mounted
				Linear Feet	Mile	Mile	Linear Feet	Linear Feet
DL-1	460+40	462+00	S.B.	160				
EL-1	456+50	462+00	N.B.		0.10			
EL-2	456+50	462+00	N.B.			0.10		
EL-3	456+50	462+00	S.B.			0.10		
EL-4	456+50	460+40	S.B.		0.07			
PCB-1	456+50	457+20	N.B.				70	
PCB-2	456+50	460+40	S.B.					390
PCB-3	457+20	461+10	N.B.					390
PCB-4	461+10	462+00	N.B.				90	
Totals Carried to Sub-Summary				160	0.17	0.20	160	780



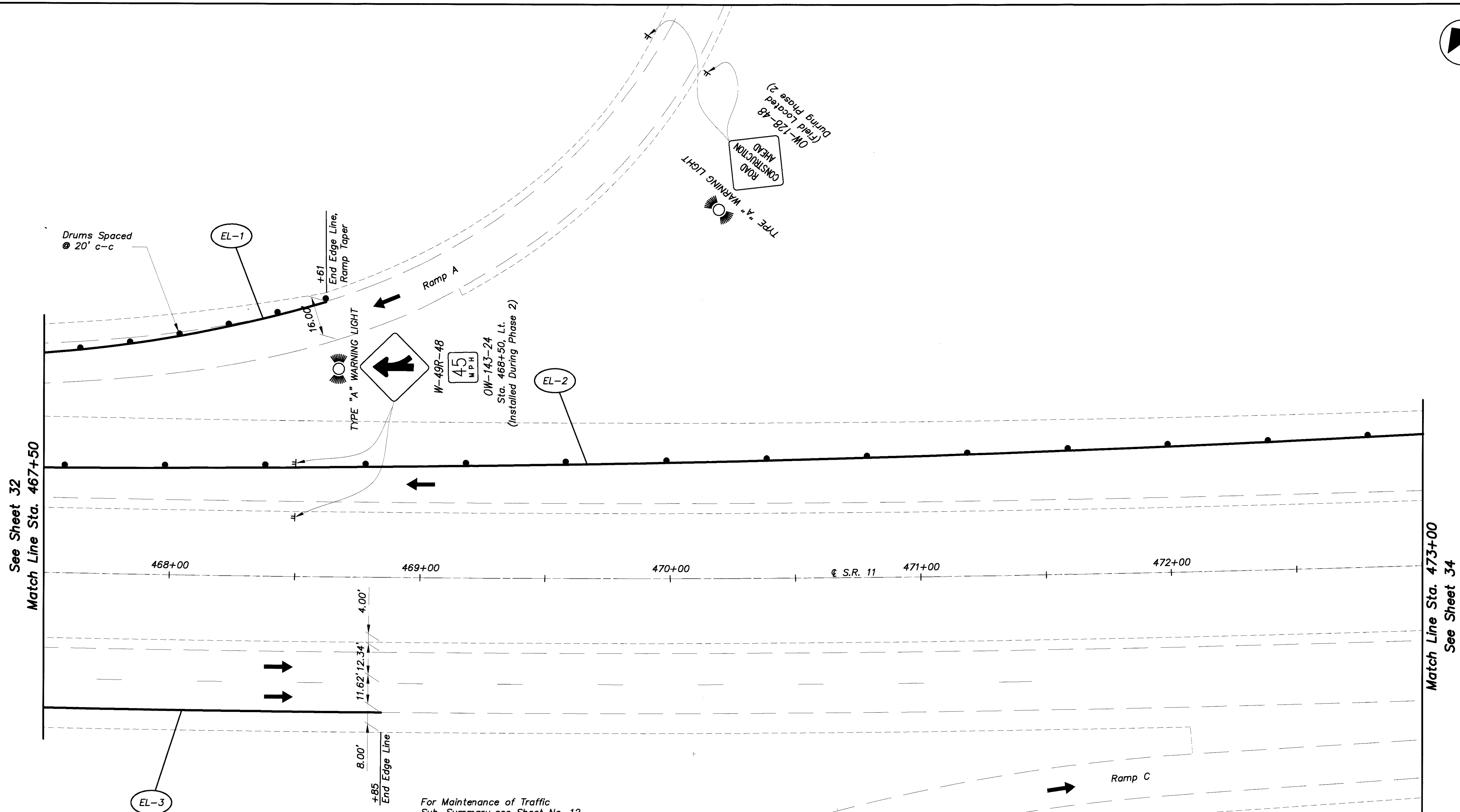
COL-11-(9.44)(13.76)

32
126

LEGEND

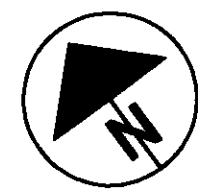
	622, Portable Concrete Barrier, 32"
	Planing & Paving Work Area

Reference Number	Station to Station		Side	614					622
				Temporary Channelizing Line, Class 1, 740.06, Type 1	Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Edge Line, Class 1, 740.06, Type 1, Yellow	Temporary Stop Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"
				Linear Feet	Linear Feet	Mile	Mile	Linear Feet	Linear Feet
CL-1	463+00	464+50	S.B.	150					
CL-2	463+00	464+32	S.B.	132					
DL-1	462+00	463+00	S.B.		100				
EL-1	462+00	467+50	N.B.			0.10			
EL-2	462+00	462+25	N.B.				0.01		
EL-3	462+00	462+25	S.B.				0.01		
EL-4	462+00	463+89	S.B.			0.04			
EL-5	464+50	467+50	S.B.			0.06			
EL-6	465+00	467+08	N.B.				0.04		
EL-7	465+00	467+50	N.B.			0.05			
PCB-1	462+00	466+00	N.B.						400
SL-1	465+33		N.B.					17	
Totals Carried to Sub-Summary				282	100	0.25	0.06	17	400



For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

Estimated Quantities Phase 3				
Sta. 467+50 to Sta. 473+00				
Reference Number	Station to Station		Side	614
				Temporary Edge Line, Class 1, 740.06, Type 1, White
				Mile
EL-1	467+50	468+61	N.B.	0.02
EL-2	467+50	473+00	N.B.	0.10
EL-3	467+50	468+85	S.B.	0.03
Totals Carried to Sub-Summary				0.15

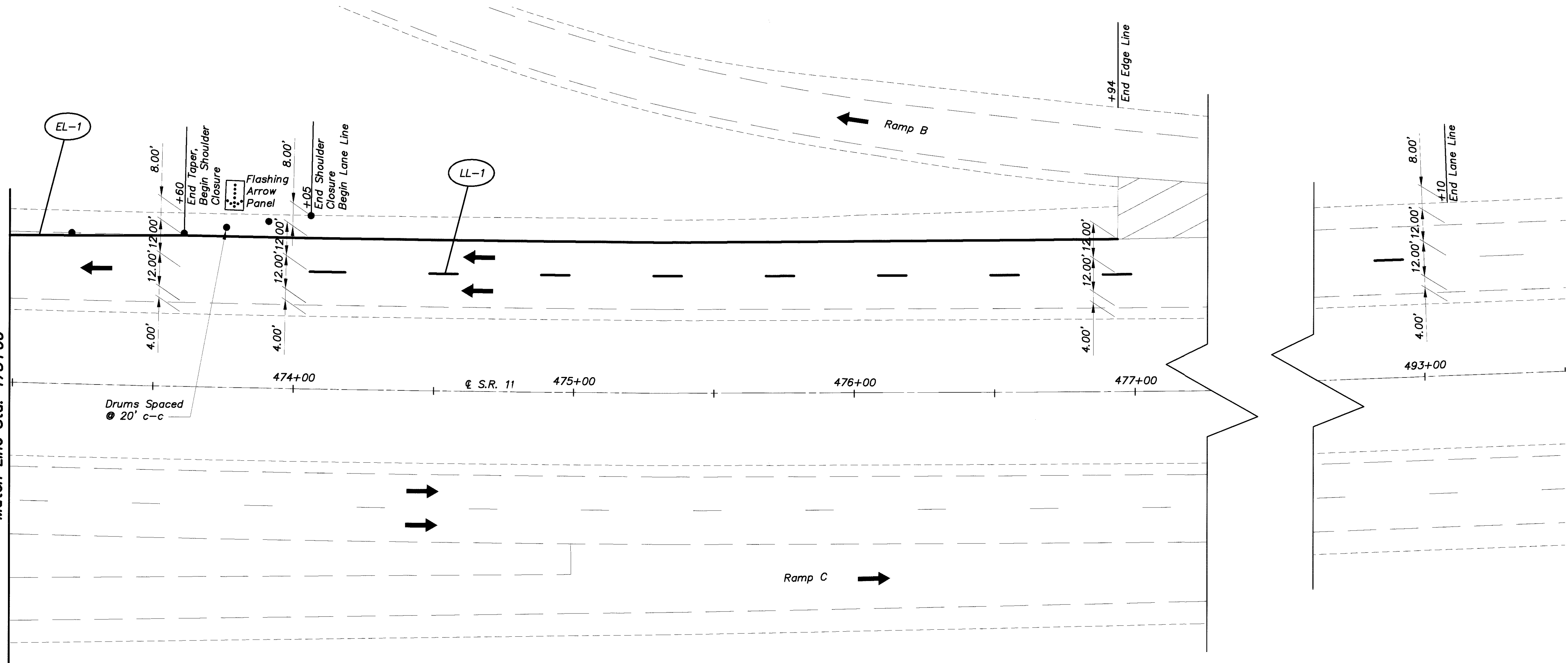


CALCULATED	NEL	CHECKED	JUG

MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 3
Sta. 467+50 to Sta. 473+00

COL-11-(9.44)(13.76)

See Sheet 33
Match Line Sta. 473+00

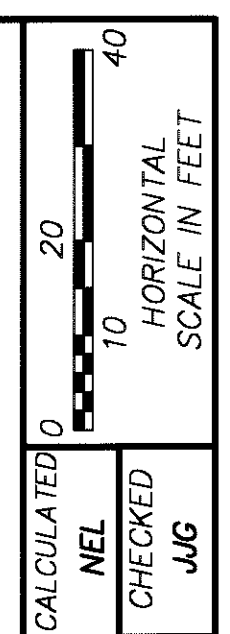
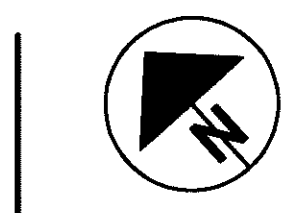


NOTE:
Signing shall be placed as per SCD MT-95.40M. Sign spacing shall be adjusted as to not conflict with Exit Ramp B.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

Estimated Quantities Phase 3 Sta. 473+00 to Sta. 493+50					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Temporary Lane Line, Class 1, 740.06, Type 1,
				Mile	Mile
EL-1	473+00	476+94	N.B.	0.07	
LL-1	474+05	493+10	N.B.		0.36
Totals Carried to Sub-Summary				0.07	0.36

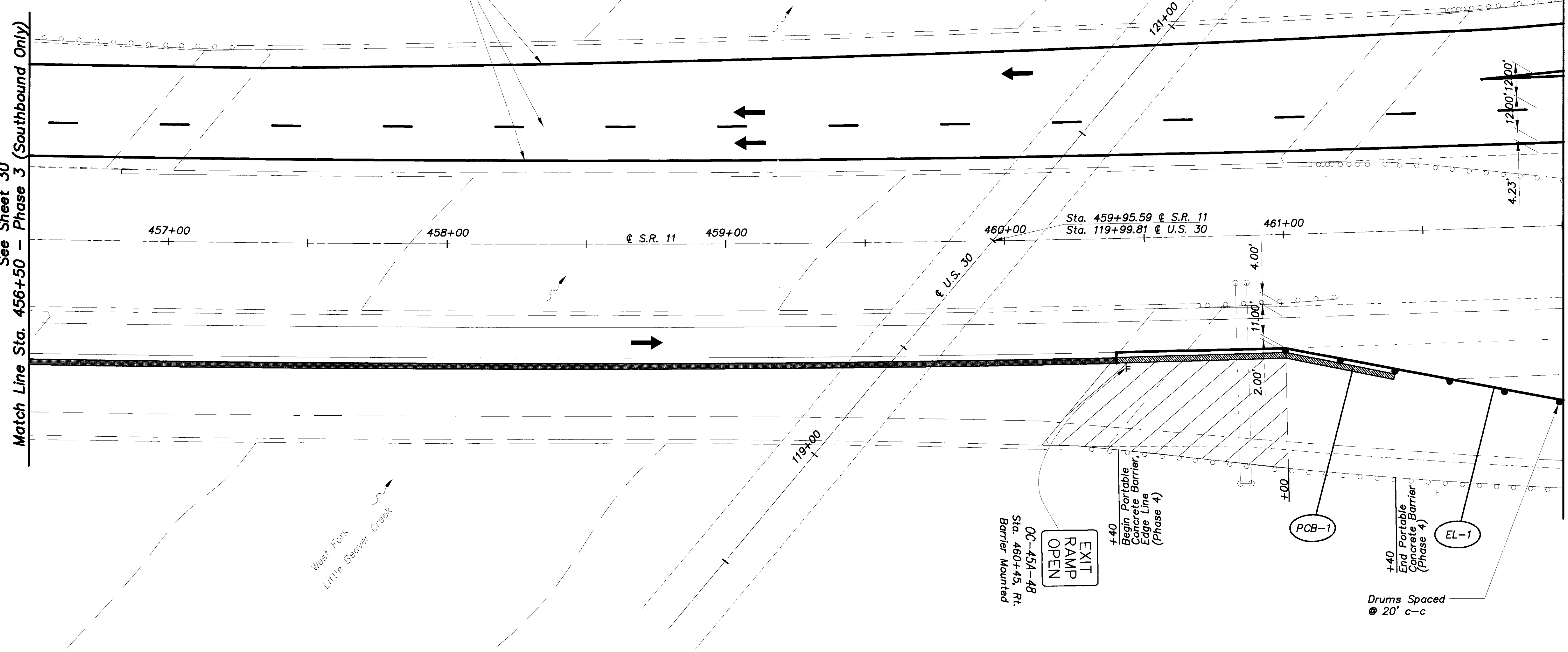
See Sheet 30
Match Line Sta. 456+50 - Phase 3 (Southbound Only)



MAINTENANCE OF TRAFFIC PLAN COL-11-(9.44) - PHASE 4
Sta. 456+50 to Sta. 462+00

COL-11-(9.44)(13.76)

See Sheet 71 for final
traffic control layout



NOTE:

The lane closure layout for Southbound Lanes will remain the same for Phase 4, as it was in Phase 3, with the exception of the Portable Concrete Barrier at the Southbound exit ramp.

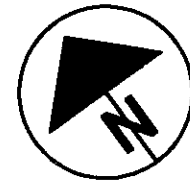
All conflicting gore markings to be removed.

LEGEND

- 622, Portable Concrete Barrier, 32", From Phase 3
- 622, Portable Concrete Barrier, 32", Phase 4
- Bridge, Approach Slab, and Full Depth Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

Estimated Quantities Phase 4 Sta. 456+50 to Sta. 462+00					
Reference Number	Station to Station		Side	614	622
				Temporary Edge Line, Class 1, 740.06, Type 1, White	Portable Concrete Barrier, 32"
				Mile	Linear Feet
EL-1	460+40	462+00	S.B.	0.03	
PCB-1	460+40	461+40	S.B.		100
Totals Carried to Sub-Summary				0.03	100



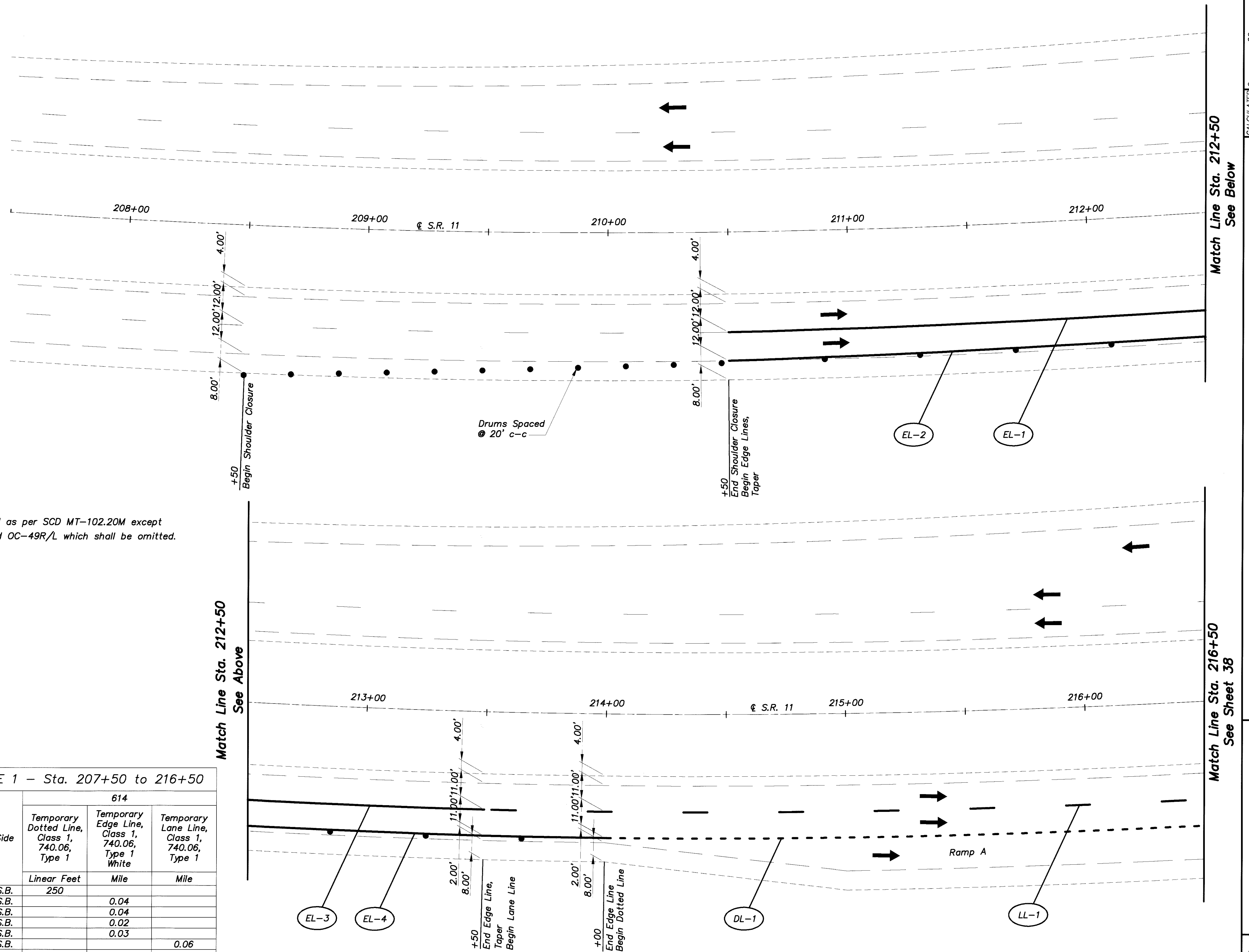
NOTE:

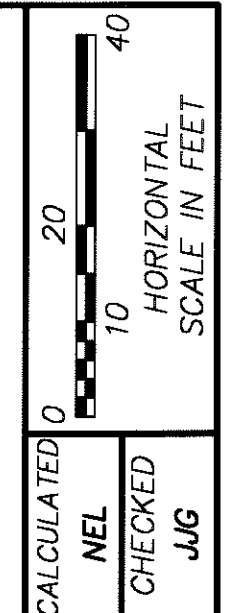
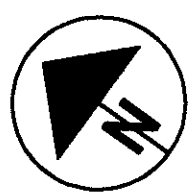
Signing shall be placed as per SCD MT-102.20M except signs OC-39AL/BL and OC-49R/L which shall be omitted.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

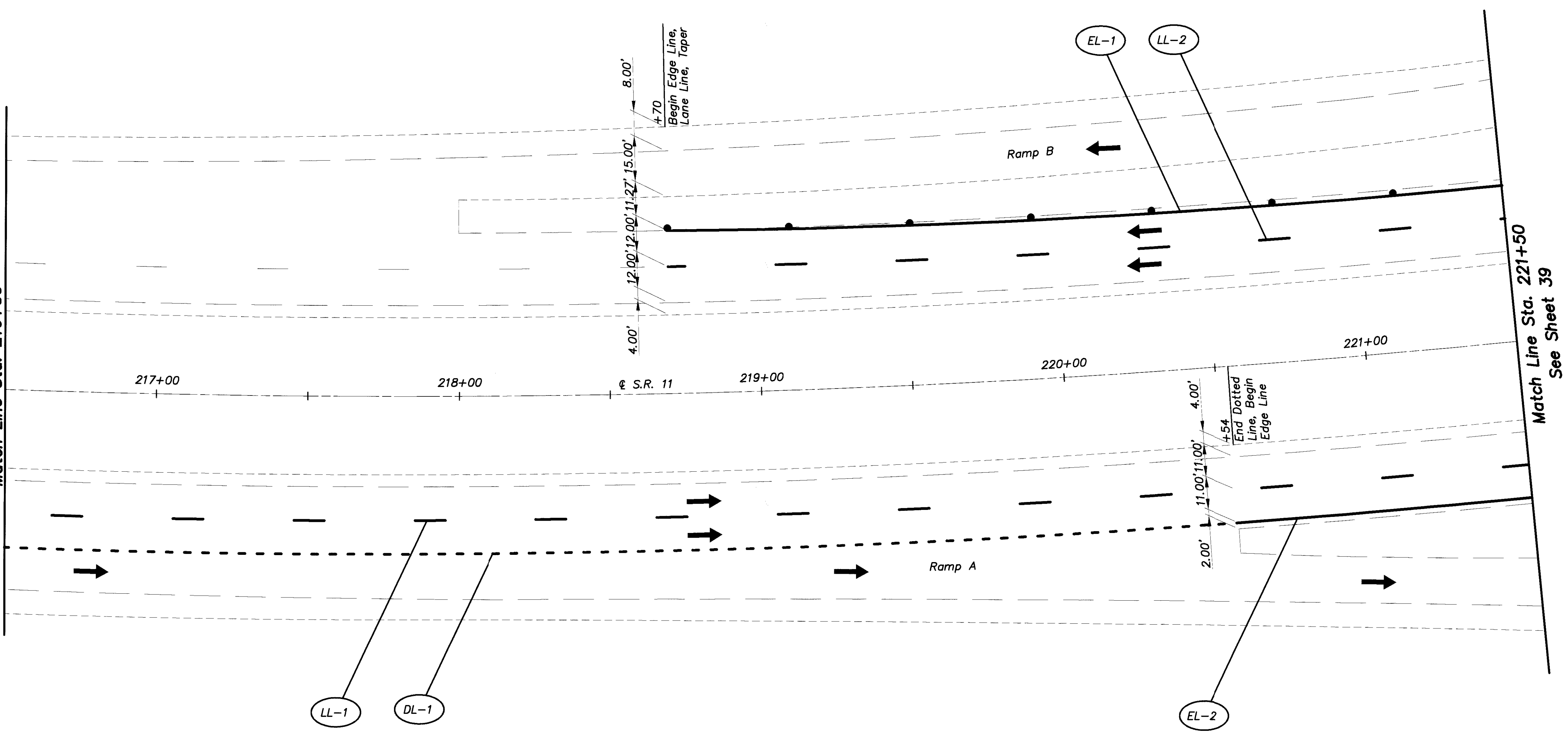
ESTIMATED QUANTITIES PHASE 1 – Sta. 207+50 to 216+50

Reference Number	Station to Station		Side	614		
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1
				Linear Feet	Mile	Mile
DL-1	214+00	216+50	S.B.	250		
EL-1	210+50	212+50	S.B.		0.04	
EL-2	210+50	212+50	S.B.		0.04	
EL-3	212+50	213+50	S.B.		0.02	
EL-4	212+50	214+00	S.B.		0.03	
LL-1	213+50	216+50	S.B.			0.06
Totals Carried to Sub-Summary				250	0.13	0.06





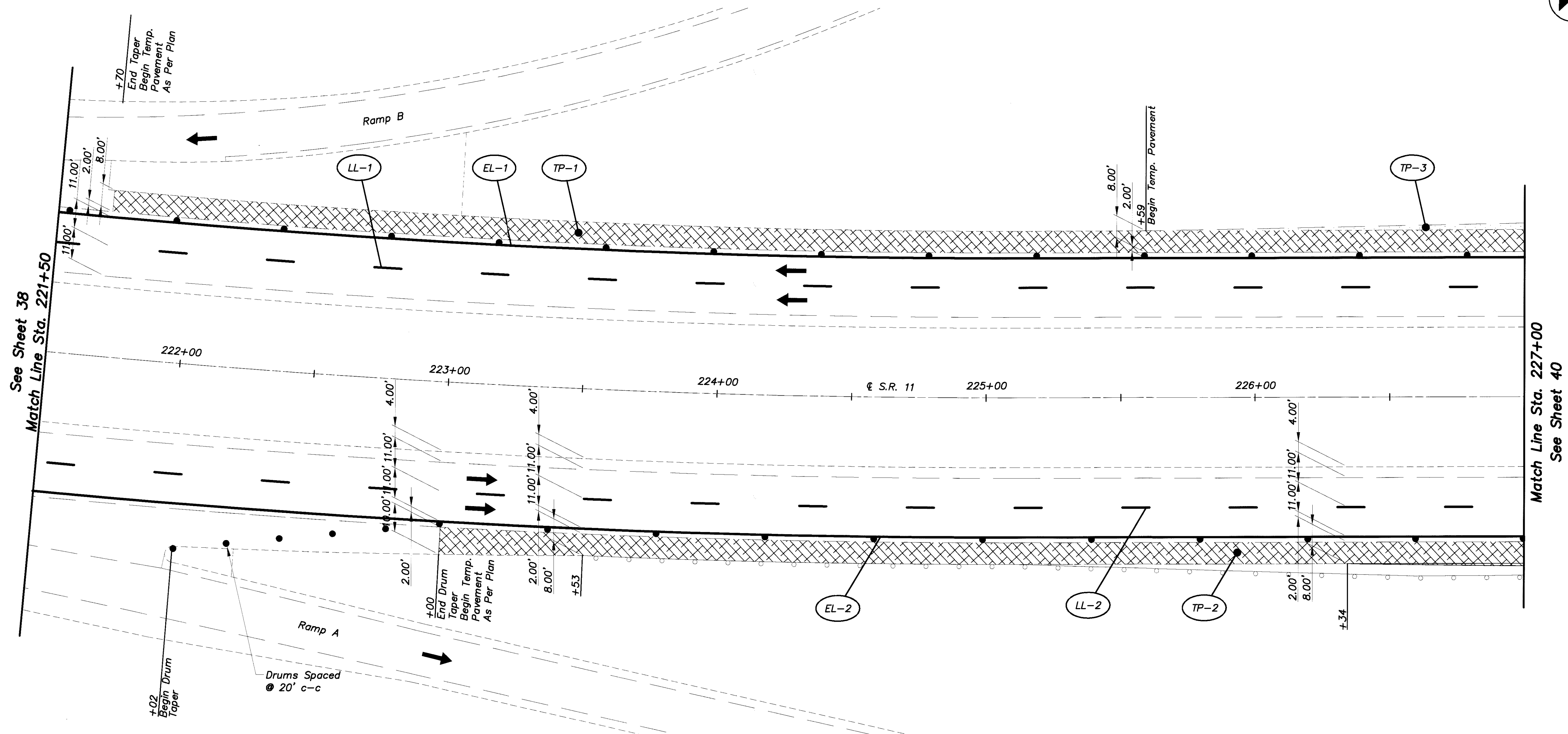
See Sheet 37
Match Line Sta. 216+50



For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

EST. QUANTITIES PHASE 1 – Sta. 216+50 to Sta. 221+50						
Reference Number	Station to Station		Side	614		
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1
				Linear Feet	Mile	Mile
DL-1	216+50	220+54	S.B.	404		
EL-1	218+70	221+50	N.B.		0.05	
EL-2	220+54	221+50	S.B.		0.02	
LL-1	216+50	221+50	S.B.			0.09
LL-2	218+70	221+50	N.B.			0.05
Totals Carried to Sub-Summary				404	0.07	0.14

NOTE:
All conflicting gore markings
are to be removed.



NOTE:
All conflicting gore markings
are to be removed.

LEGEND

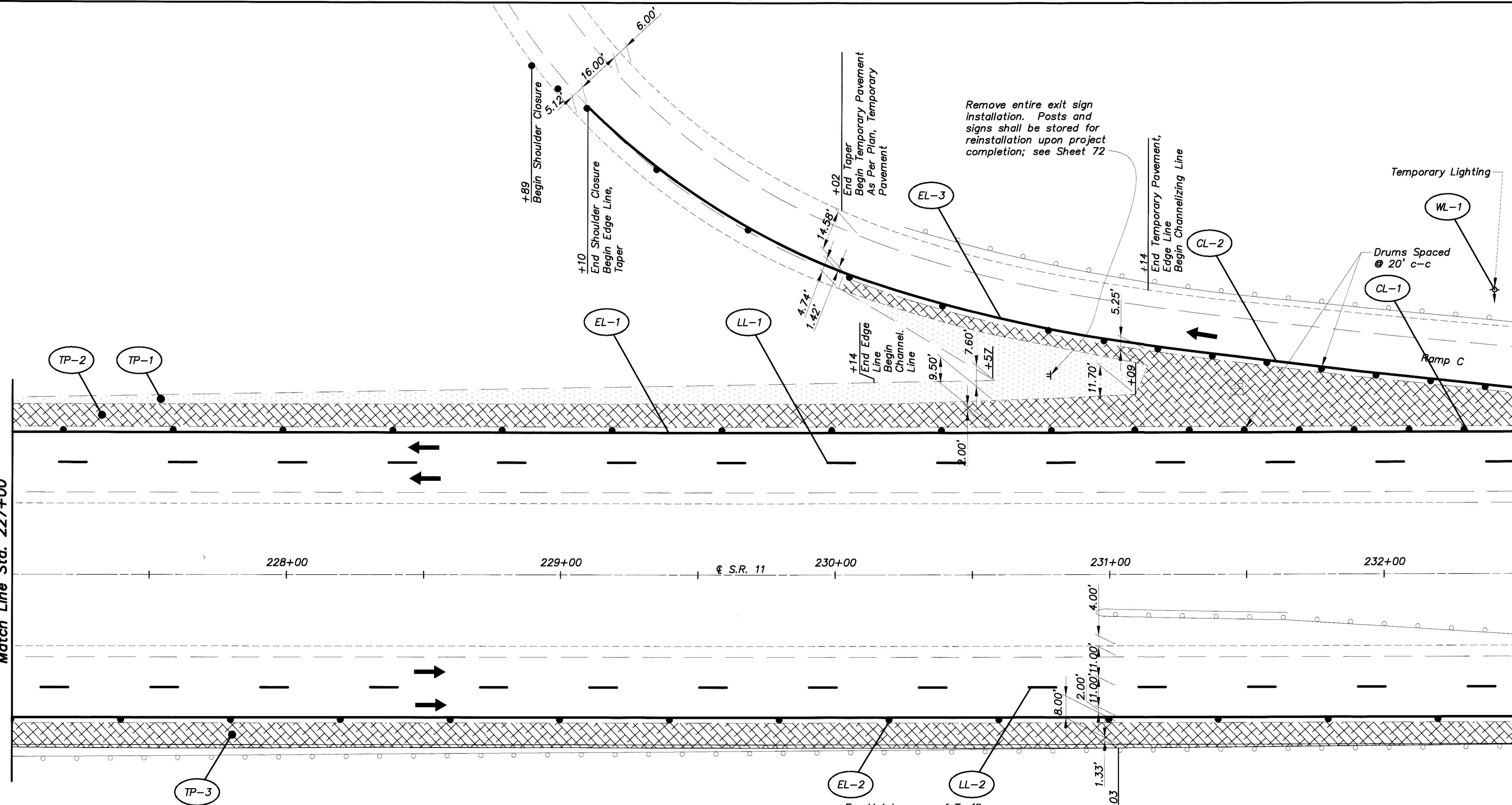
	Temporary Pavement, Class A, As Per Plan
	Temporary Pavement, Class A

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 1 – Sta. 221+50 to Sta. 227+00						
Reference Number	Station to Station		Side	614	615	
				Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A
				Mile	Mile	Square Yards
EL-1	221+50	227+00	N.B.	0.10		
EL-2	221+50	227+00	S.B.	0.10		
LL-1	221+50	227+00	N.B.		0.10	
LL-2	221+50	227+00	S.B.		0.10	
TP-1	221+70	227+00	N.B.			471
TP-2	223+00	227+00	S.B.			369
TP-3	225+59	227+00	N.B.			18
Totals Carried to Sub-Summary				0.20	0.20	840

See Sheet 39
Match Line Sta. 227+00

Match Line Sta. 232+50
See Sheet 41



NOTE:

All conflicting gore markings
are to be removed.

LEGEND

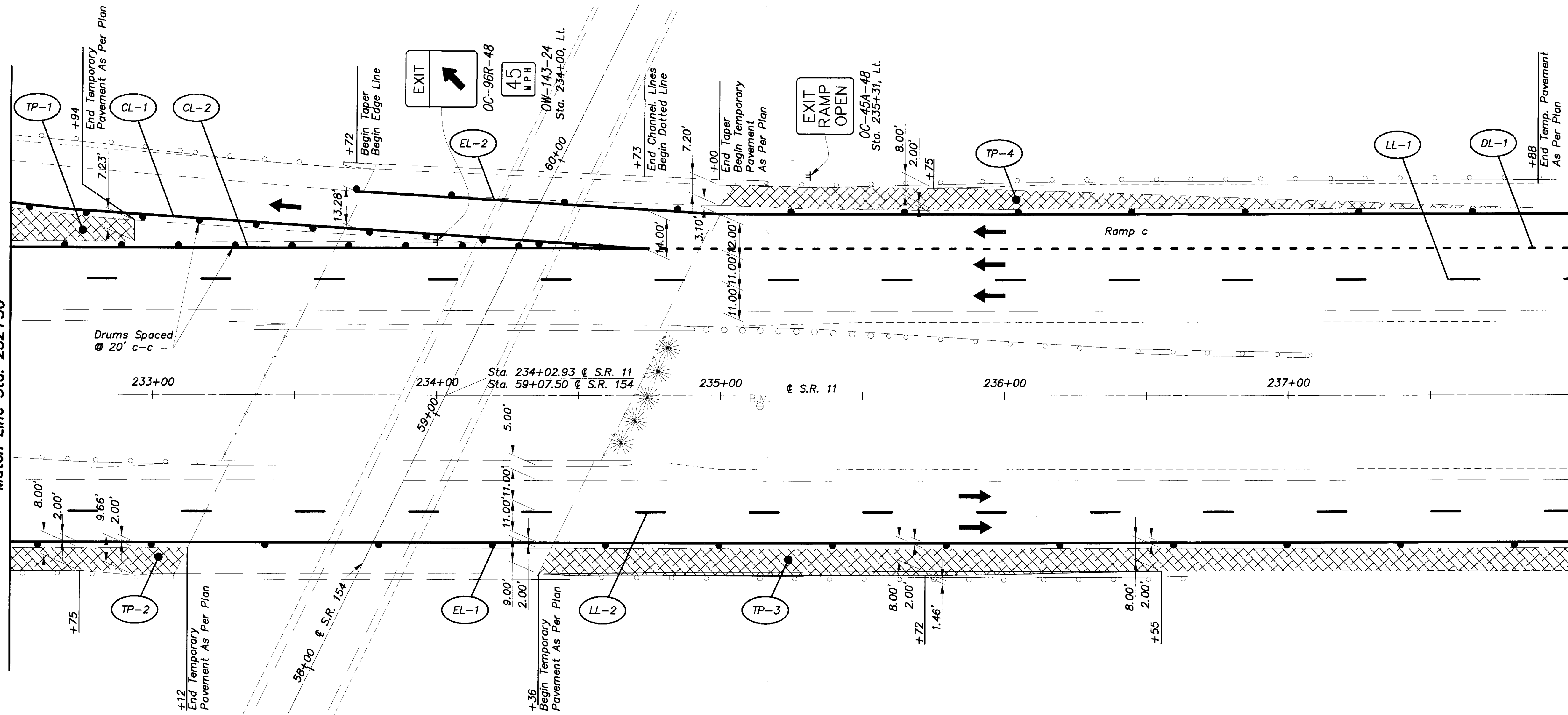
- Temporary Pavement, Class A, As Per Plan
Temporary Pavement, Class A

ESTIMATED QUANTITIES PHASE 1 – Sta. 227+00 to Sta. 232+50

Reference Number	Station to Station		Side	614					615	
				Temporary Channelizing Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Work Zone Lighting	Temporary Pavement, Class A	Temporary Pavement, Class A, As Per Plan
				Linear Feet	Mile	Mile	Mile	Each	Square Yards	Square Yards
CL-1	230+14	232+50	N.B.	236						
CL-2	231+14	232+50	N.B.	136						
EL-1	227+00	230+14	N.B.		0.06					
EL-2	227+00	232+50	S.B.		0.10					
EL-3	229+10	231+14	N.B.			0.04				
LL-1	227+00	232+50	N.B.				0.10			
LL-2	227+00	232+50	S.B.				0.10			
TP-1	227+00	231+14	N.B.						357	
TP-2	227+00	232+50	N.B.							749
TP-3	227+00	232+50	S.B.							554
WL-1	232+40		N.B.					1		
Totals Carried to Sub-Summary				372	0.16	0.04	0.20	1	357	1303

See Sheet 40
Match Line Sta. 232+50

Match Line Sta. 238+00
See Sheet 42



NOTE:

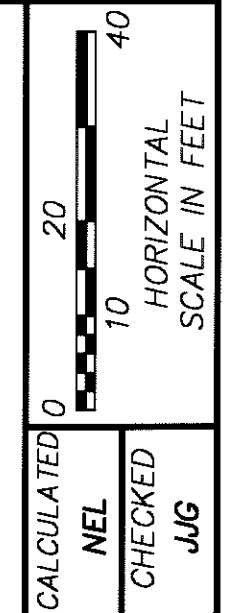
All conflicting gore markings
are to be removed.

LEGEND

 Temporary Pavement, Class A, As Per Plan

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

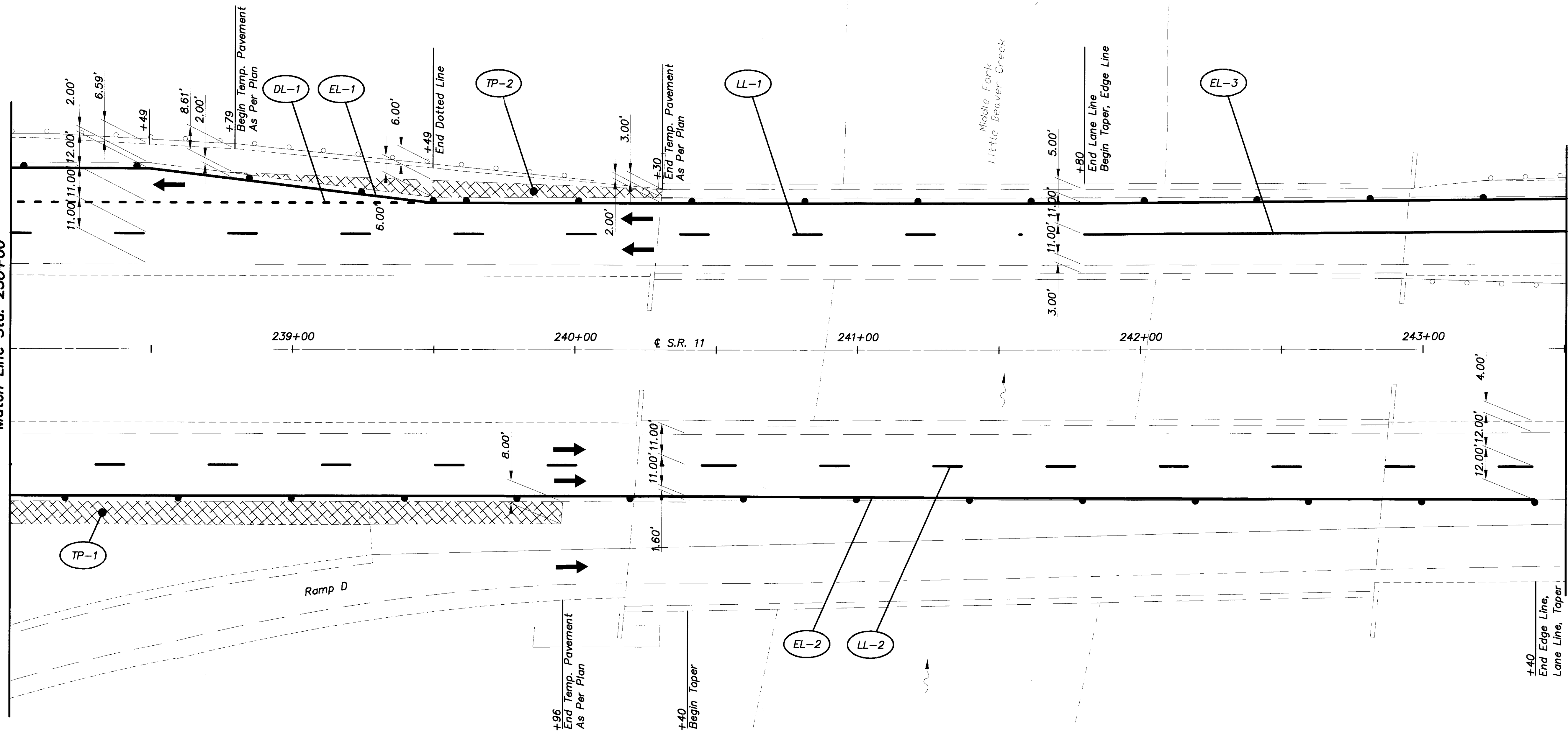
ESTIMATED QUANTITIES PHASE 1 – Sta. 232+50 to Sta. 238+00								
Reference Number	Station to Station		Side	614				615
				Temporary Channelizing Line, Class 1, 740.06, Type 1	Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A, As Per Plan
				Linear Feet	Linear Feet	Mile	Mile	Square Yards
CL–1	232+50	234+73	N.B.	223				
CL–2	232+50	234+73	N.B.	223				
DL–1	234+73	238+00	N.B.		327			
EL–1	232+50	238+00	S.B.			0.10		
EL–2	233+72	238+00	N.B.			0.08		
LL–1	232+50	238+00	N.B.				0.10	
LL–2	232+50	238+00	S.B.				0.10	
TP–1	232+50	232+94	N.B.					45
TP–2	232+50	233+12	S.B.					57
TP–3	234+36	238+00	S.B.					362
TP–4	235+00	237+88	N.B.					155
Totals Carried to Sub–Summary				446	327	0.18	0.20	619



MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) – PHASE 1
Sta. 232+50 to Sta. 238+00

COL-11-(9.44)(13.76)

See Sheet 41
Match Line Sta. 238+00



Match Line Sta. 243+50
See Sheet 43

NOTES:

Signing shall be placed as per SCD MT-102.20M except signs OC-39AL/BL and OC-49R/L which shall be omitted.

All conflicting gore markings are to be removed.

LEGEND

 Temporary Pavement, Class A, As Per Plan

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 1 – Sta. 238+00 to Sta. 243+50

Reference Number	Station to Station		Side	614			615
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1	Temporary Pavement, Class A, As Per Plan
				Linear Feet	Mile	Mile	Square Yards
DL-1	238+00	239+49	N.B.	149			
EL-1	238+00	243+50	N.B.		0.10		
EL-2	238+00	243+40	S.B.		0.10		
EL-3	241+80	243+50	N.B.		0.03		
LL-1	238+00	241+80	N.B.			0.07	
LL-2	238+00	243+50	S.B.			0.10	
TP-1	238+00	239+96	S.B.				185
TP-2	238+79	240+30	N.B.				65
Totals Carried to Sub-Summary				149	0.23	0.17	250



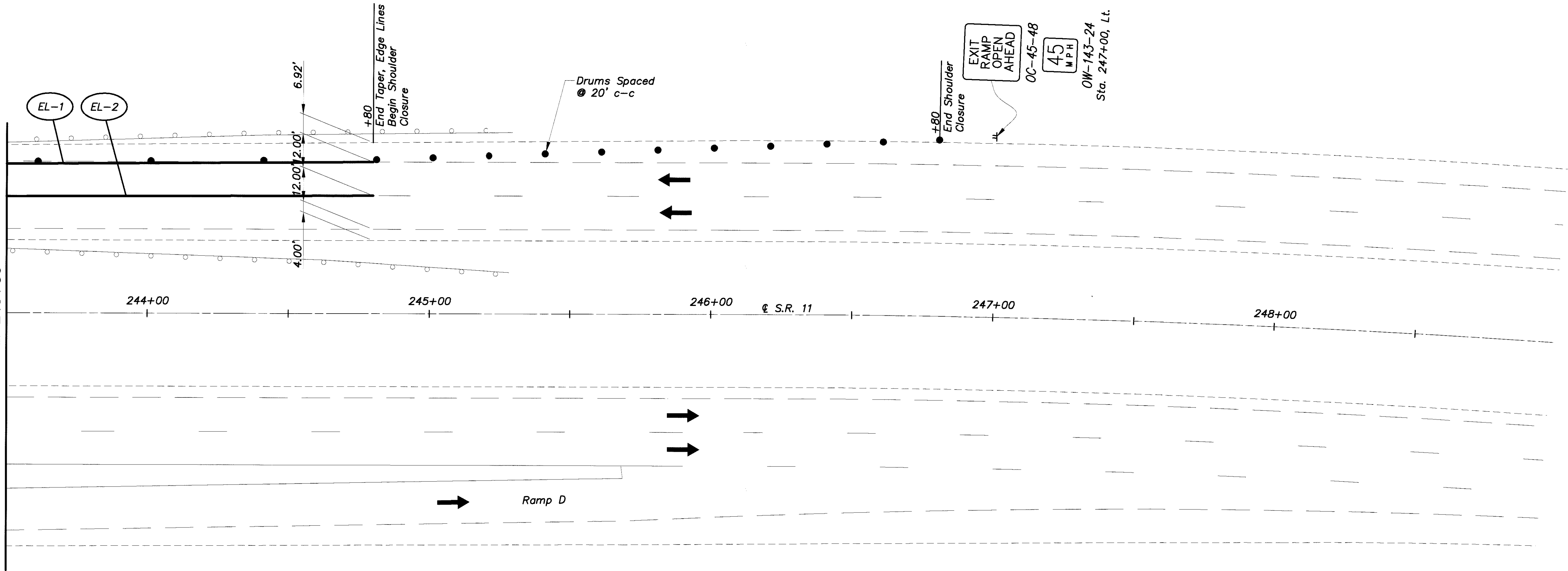
CALCULATED BY
NEL
CHECKED
JUG
SCALE IN FEET
0 10 20 40
HORIZONTAL

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) – PHASE 1
Sta. 238+00 to Sta. 243+50

COL-11-(9.44)(13.76)

42
126

See Sheet 42
Match Line Sta. 243+50



NOTE:
Signing shall be placed as per SCD MT-102.20M except signs OC-39AL/BL and OC-49R/L which shall be omitted.

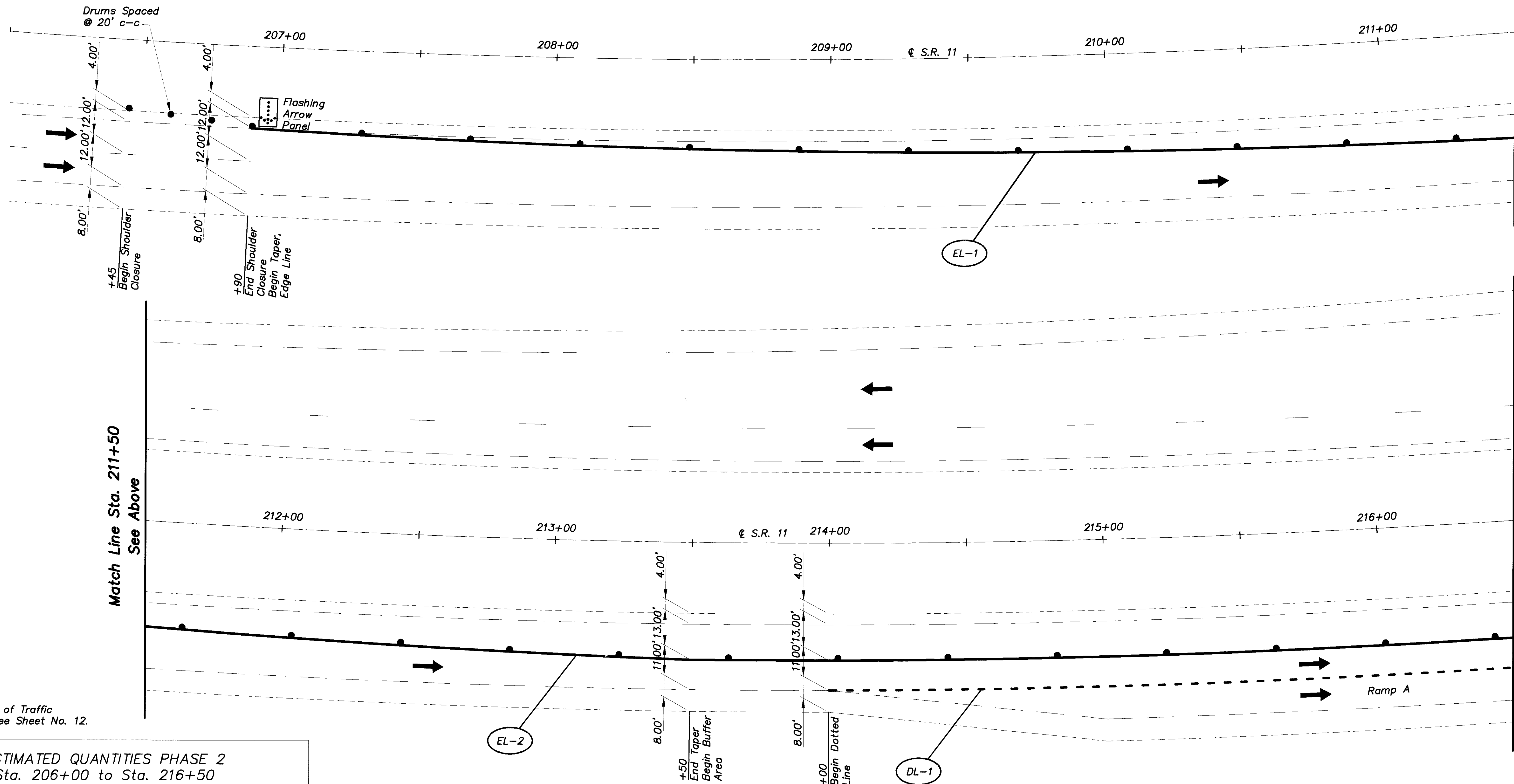
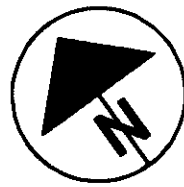
For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 1 Sta. 243+50 to 249+00				
Reference Number	Station to Station		Side	614
				Temporary Edge Line, Class 1, 740.06, Type 1 White
				Mile
EL-1	243+50	244+80	N.B.	0.02
EL-2	243+50	244+80	N.B.	0.02
Totals Carried to Sub-Summary				0.04



MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 1
Sta. 243+50 to Sta. 249+00

COL-11-(9.44)(13.76)



For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2
Sta. 206+00 to Sta. 216+50

Reference Number	Station to Station		Side	614	
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow
				Linear Feet	Mile
DL-1	214+00	216+50	S.B.	250	
EL-1	206+90	211+50	S.B.		0.09
EL-2	211+50	216+50	S.B.		0.09
Totals Carried to Sub-Summary				250	0.18

Match Line Sta. 211+50
See Below

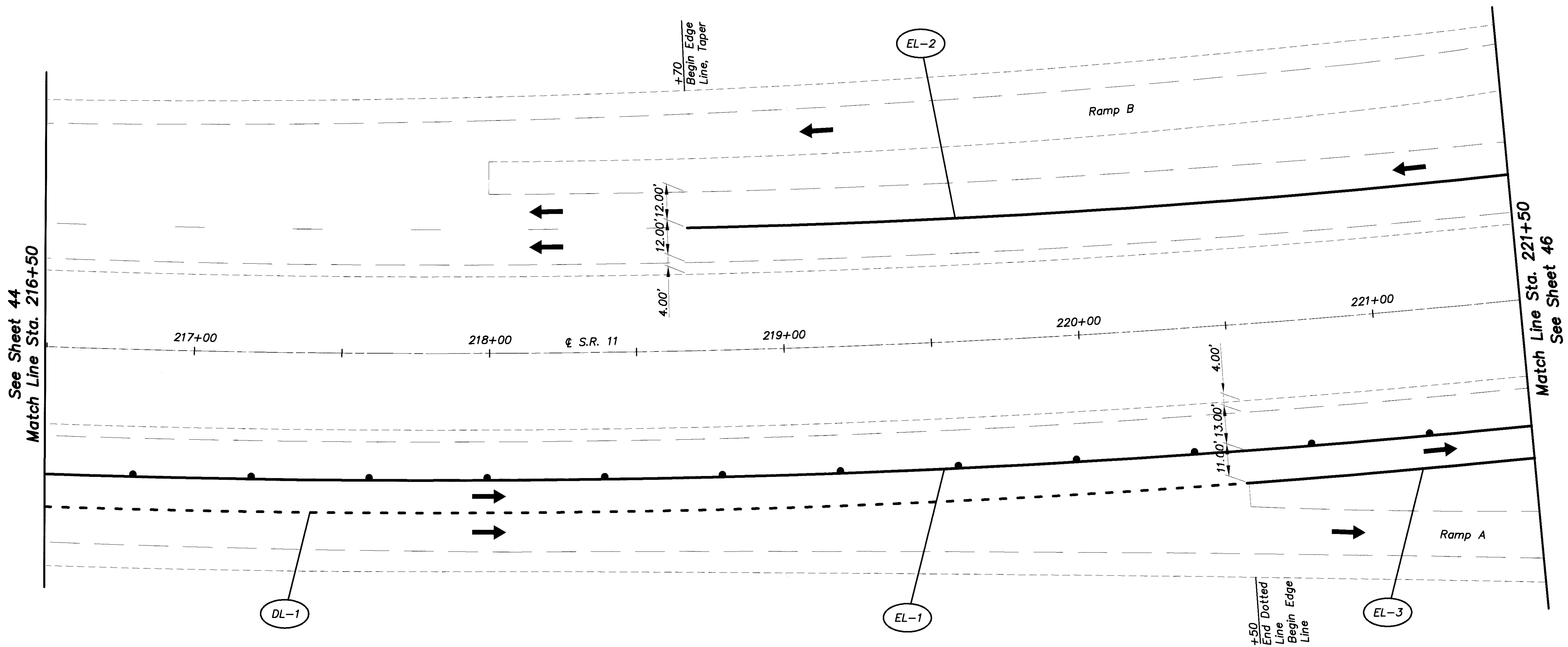
Match Line Sta. 216+50
See Sheet 45

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 2
Sta. 206+00 to Sta. 216+50

COL-11-(9.44)(13.76)

44
126





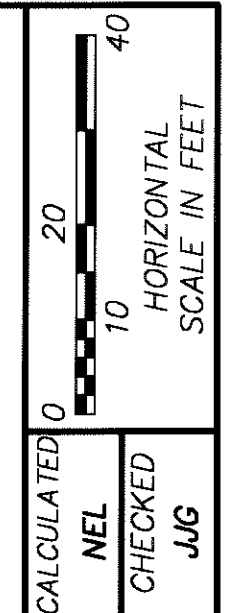
See Sheet 44
Match Line Sta. 216+50

Match Line Sta. 221+50
See Sheet 46

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

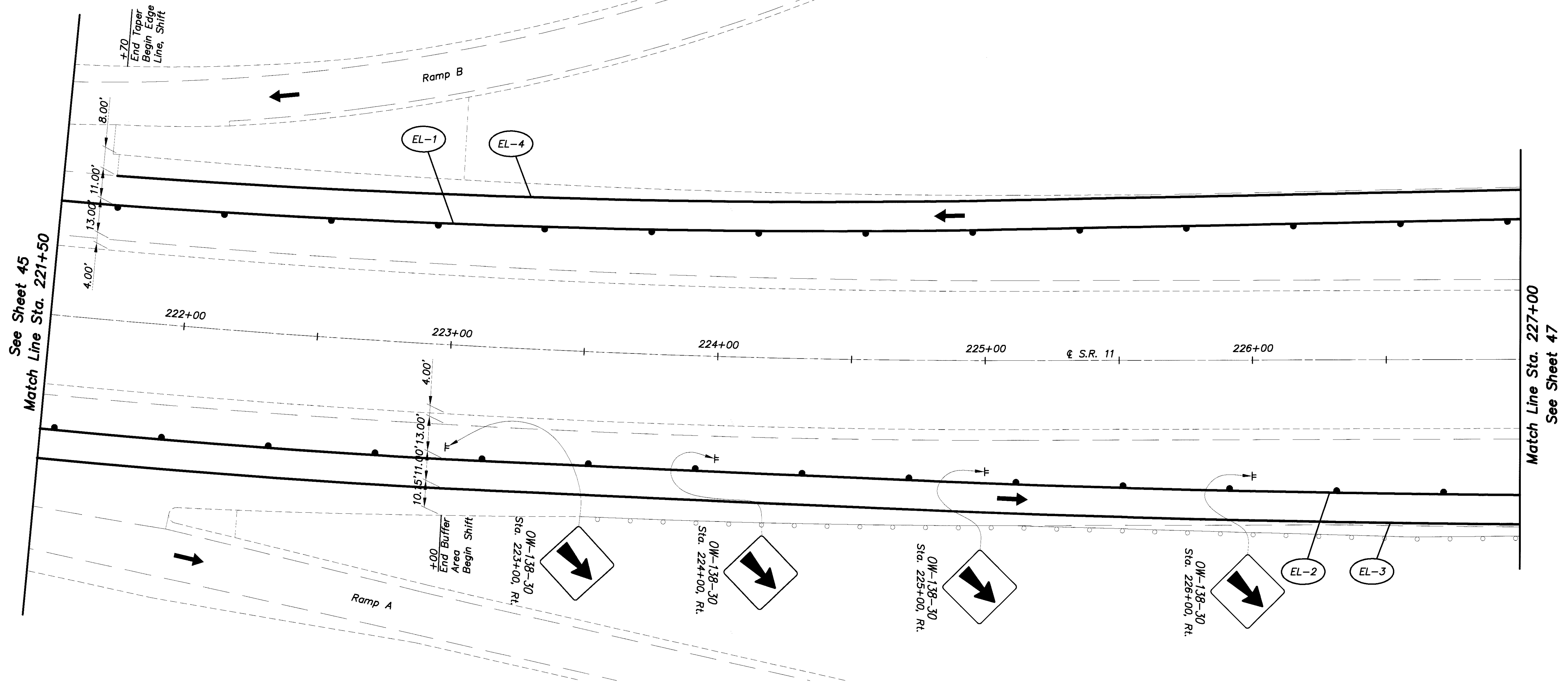
NOTE:
All conflicting gore markings
are to be removed.

ESTIMATED QUANTITIES PHASE 2 Sta. 216+50 to Sta. 221+50						
Reference Number	Station to Station		Side	614		
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow
				Linear Feet	Mile	Mile
DL-1	216+50	220+50	S.B.	400		
EL-1	216+50	221+50	S.B.			0.09
EL-2	218+70	221+50	N.B.			0.05
EL-3	220+50	221+50	S.B.		0.03	
Totals Carried to Sub-Summary				400	0.03	0.14



MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 2
Sta. 216+50 to Sta. 221+50

COL-11-(9.44)(13.76)



CALCULATED	NEL	CHECKED
0	JUG	JUG

0

20

40

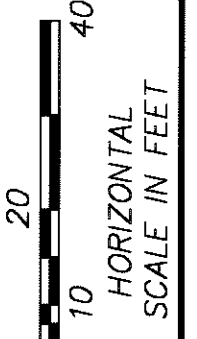
HORIZONTAL
SCALE IN FEET

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 2
Sta. 221+50 to Sta. 227+00

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 Sta. 221+50 to 227+00					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow
				Mile	Mile
EL-1	221+50	227+00	N.B.		0.10
EL-2	221+50	227+00	S.B.		0.10
EL-3	221+50	227+00	S.B.	0.10	
EL-4	221+70	227+00	N.B.	0.10	
Totals Carried to Sub-Summary				0.20	0.20

NOTE:
All conflicting gore markings
are to be removed.



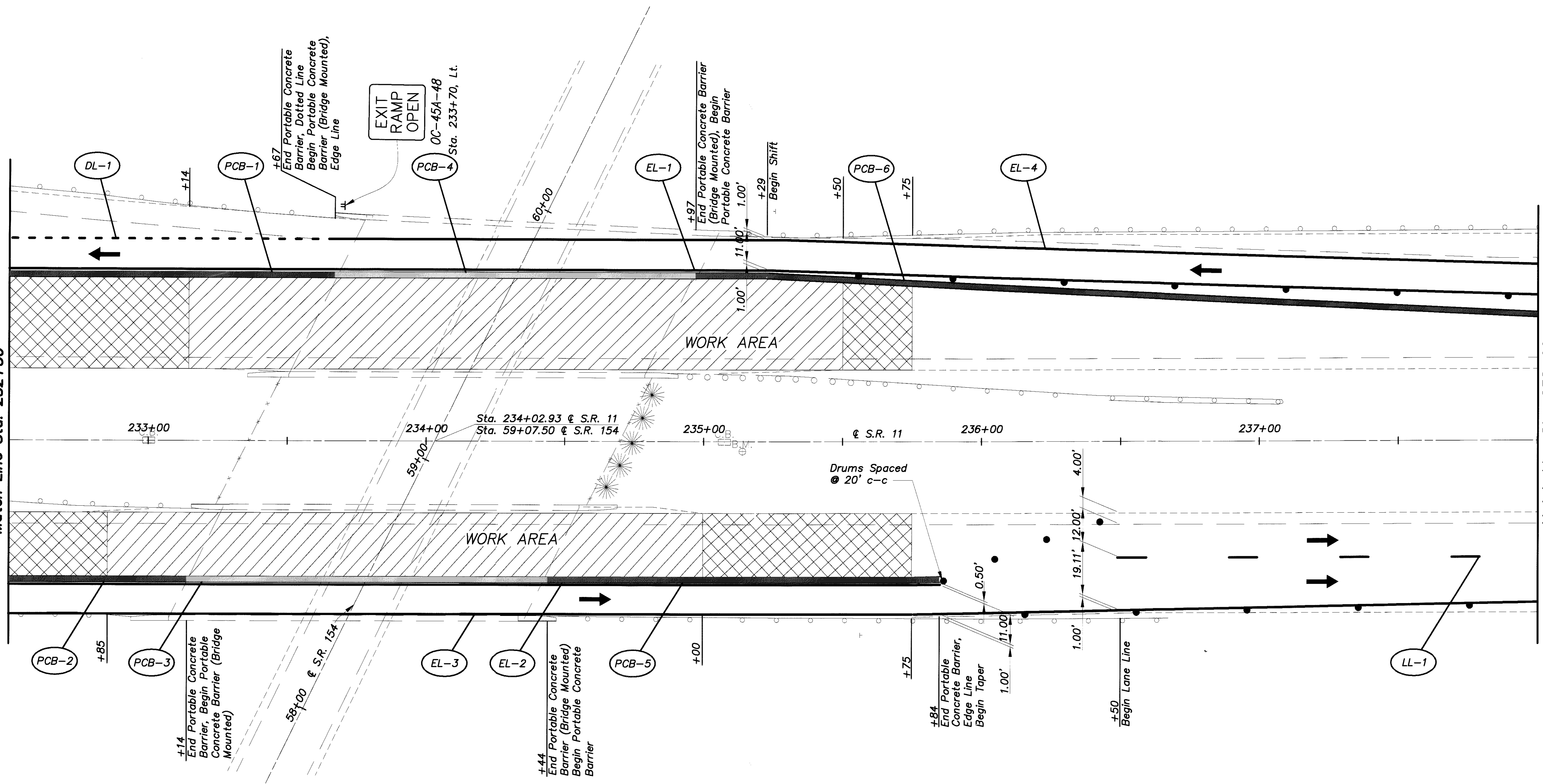
CALCULATED BY
NEL
CHECKED
JUG

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 2
Sta. 232+50 to Sta. 238+00

COL-11-(9.44)(13.76)

See Sheet 47
Match Line Sta. 232+50

Match Line Sta. 238+00
See Sheet 49



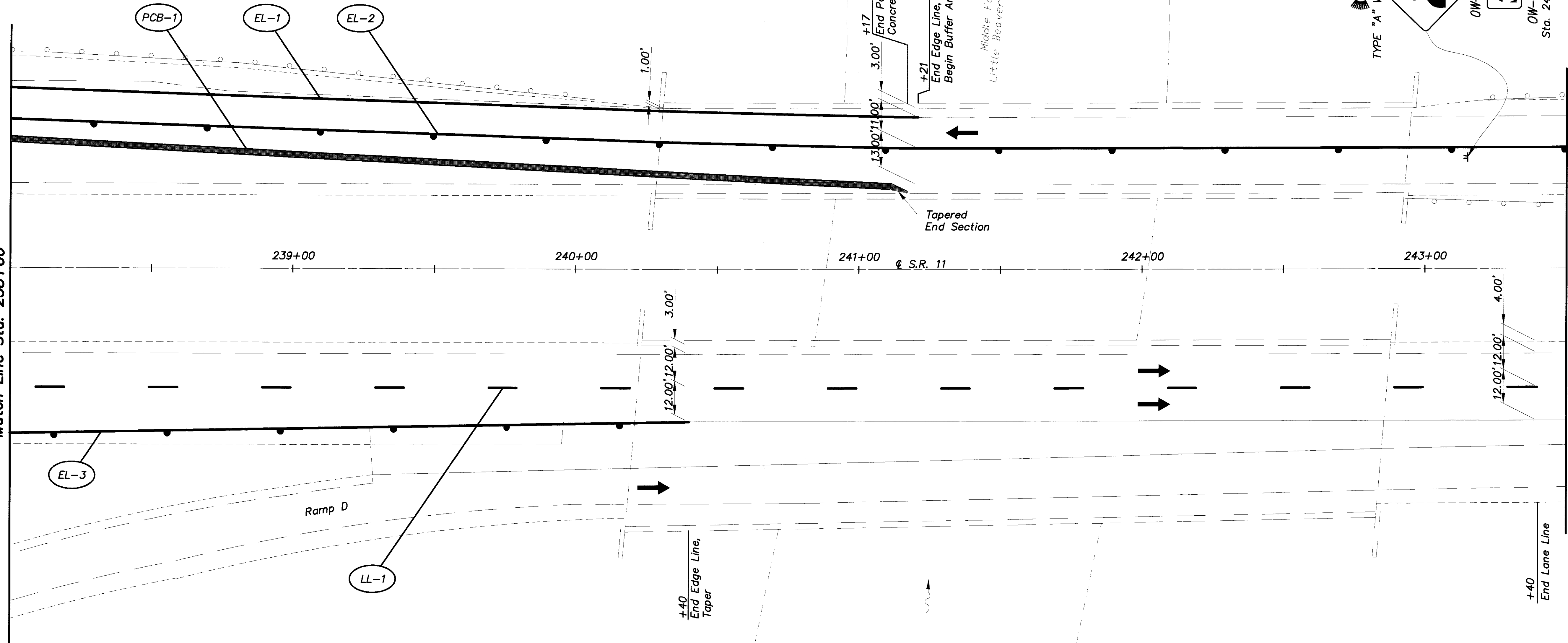
For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

NOTES:
All conflicting gore markings
are to be removed.
For typical-section of lane
set up through work area
see Sheets 103 & 104.

- LEGEND**
- 622, Portable Concrete Barrier, 32", Bridge Mounted
 - 622, Portable Concrete Barrier, 32"
 - Bridge, Approach Slab,
and Full Depth Work Area
 - Planing & Paving Work Area

ESTIMATED QUANTITIES PHASE 2 - Sta. 232+50 to 238+00									
Reference Number	Station to Station		Side	614				622	
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"	Portable Concrete Barrier, 32", Bridge Mounted
				Linear Feet	Mile	Mile	Mile	Linear Feet	Linear Feet
DL-1	232+50	233+67	N.B.	117					
EL-1	232+50	238+00	N.B.			0.10			
EL-2	232+50	235+84	S.B.			0.06			
EL-3	232+50	238+00	S.B.		0.10				
EL-4	233+67	238+00	N.B.		0.08				
LL-1	236+50	238+00	S.B.				0.03		
PCB-1	232+50	233+67	N.B.					117	
PCB-2	232+50	233+14	S.B.					64	
PCB-3	233+14	234+44	S.B.						130
PCB-4	233+67	234+97	N.B.						130
PCB-5	234+44	235+84	S.B.					140	
PCB-6	234+97	238+00	N.B.					303	
Totals Carried to Sub-Summary				117	0.18	0.16	0.03	624	260

See Sheet 48
Match Line Sta. 238+00



Match Line Sta. 243+50
See Sheet 50

NOTE:
All conflicting gore markings
are to be removed.

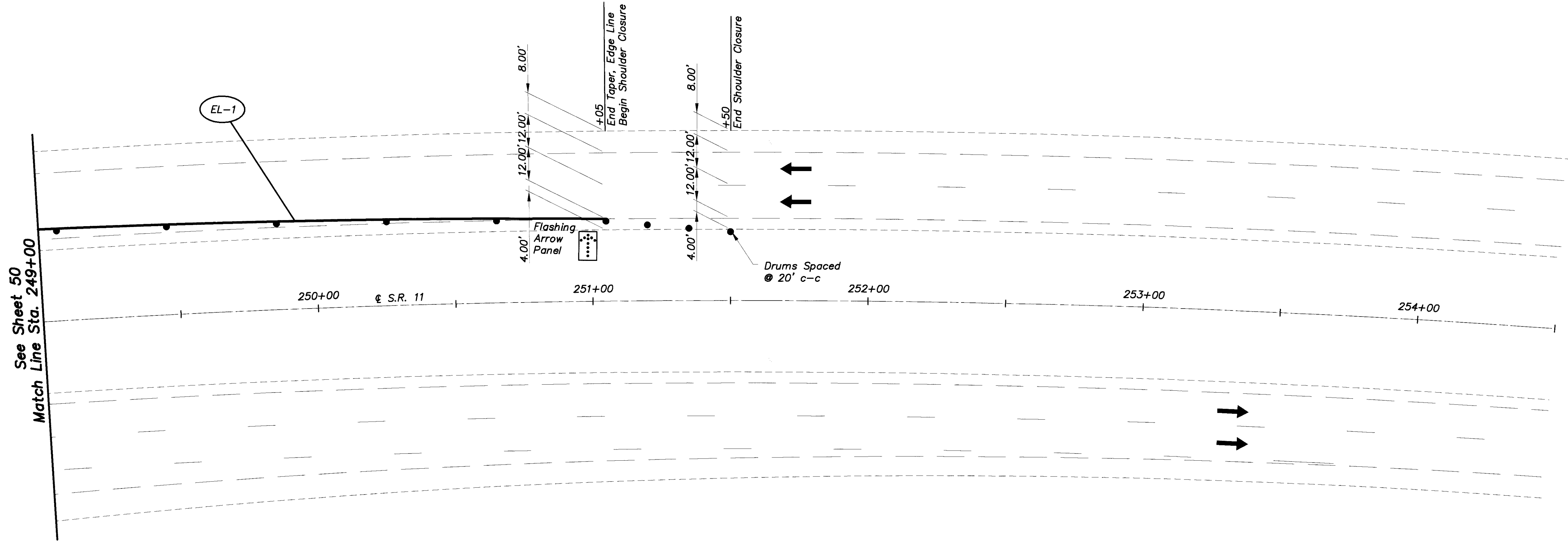
LEGEND

 622, Portable Concrete Barrier, 32"

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 – Sta. 238+00 to Sta. 243+50

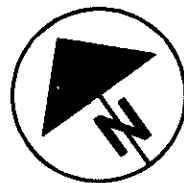
Reference Number	Station to Station		Side	614			622
				Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow	Temporary Lane Line, Class 1, 740.06, Type 1	Portable Concrete Barrier, 32"
				Mile	Mile	Mile	Linear Feet
EL-1	238+00	241+21	N.B.	0.06			
EL-2	238+00	243+50	N.B.		0.10		
EL-3	238+00	240+40	S.B.	0.05			
LL-1	238+00	243+50	S.B.			0.10	
PCB-1	238+00	241+17	N.B.				317
Totals Carried to Sub-Summary				0.11	0.10	0.10	317



NOTE:
Signing shall be placed as per SCD MT-85.40M.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 2 Sta. 249+00 to Sta. 254+50				
Reference Number	Station to Station		Side	614
				Temporary Edge Line, Class 1, 740.06, Type 1 Yellow
				Mile
EL-1	249+00	251+05	N.B.	0.04
Totals Carried to Sub-Summary				0.04



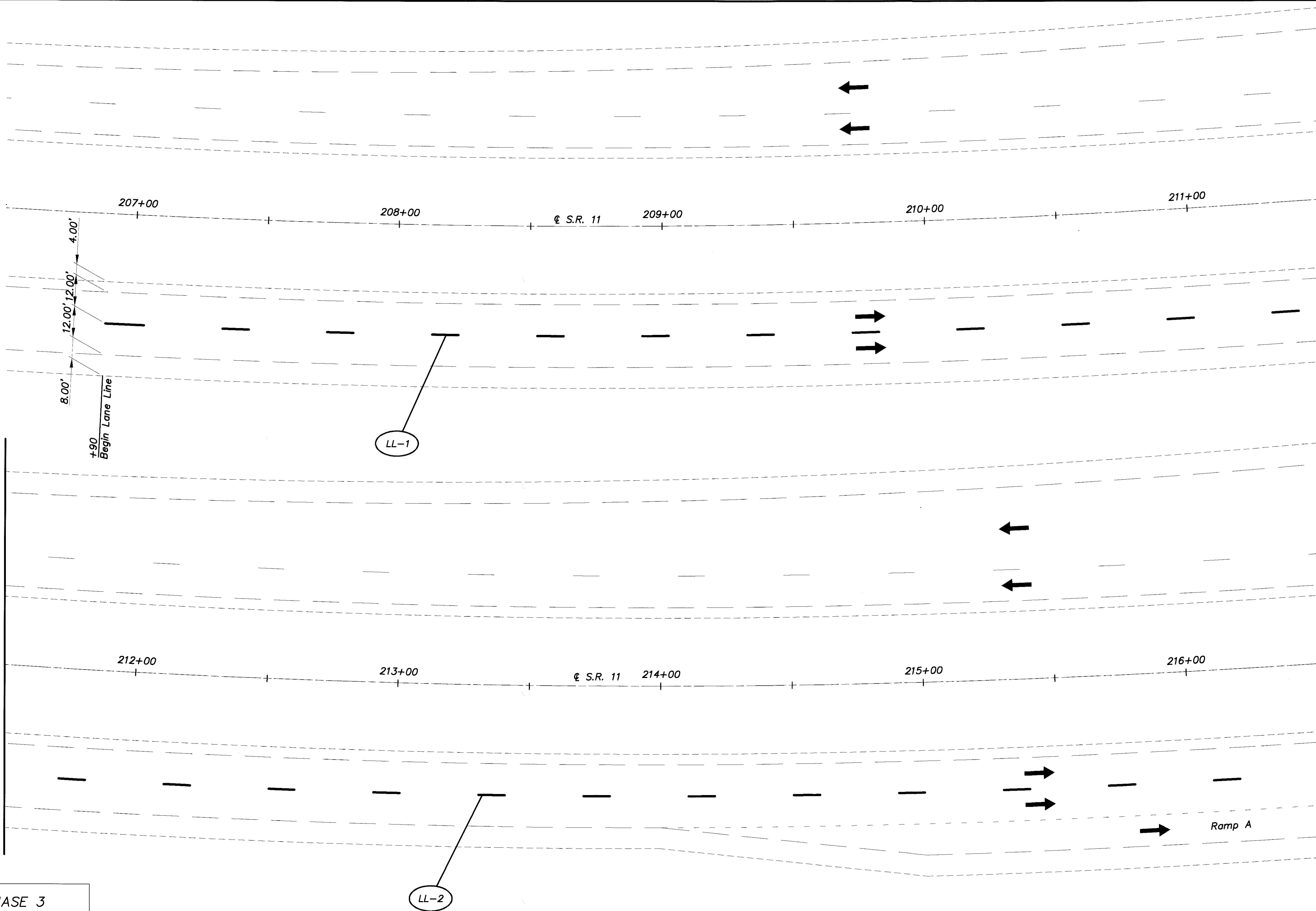
Match Line Sta. 211+50
See Above

Match Line Sta. 211+50
See Below

Match Line Sta. 216+50
See Sheet 53

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

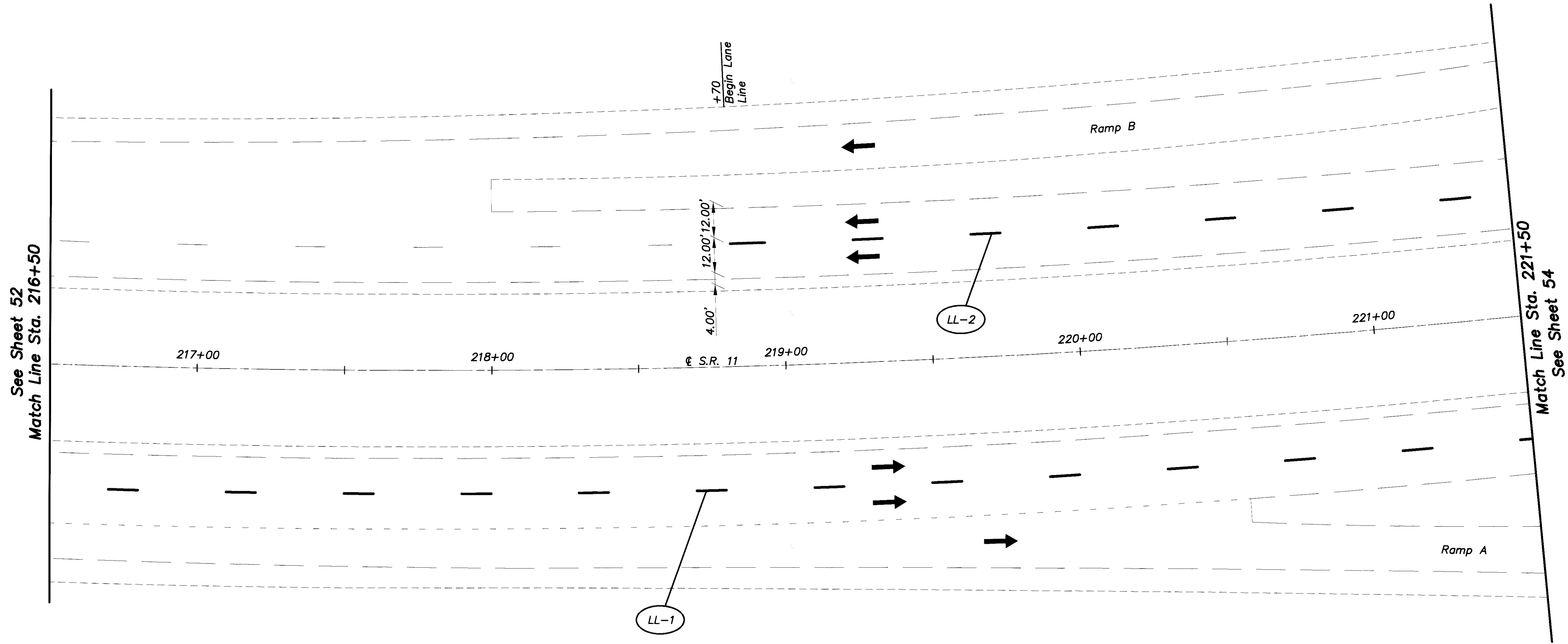
ESTIMATED QUANTITIES PHASE 3 Sta. 206+50 to Sta. 216+50				
Reference Number	Station to Station		Side	614
				Temporary Lane Line, Class 1, 740.06, Type 1
				Mile
LL-1	206+90	211+50	S.B.	0.09
LL-2	211+50	216+50	N.B.	0.09
Totals Carried to Sub-Summary				0.18



CALCULATED	0
NEL	
CHECKED	
JUG	

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 3
Sta. 206+50 to Sta. 216+50

COL-11-(9.44)(13.76)



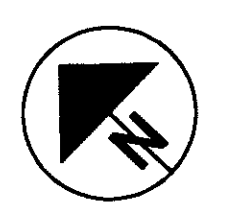
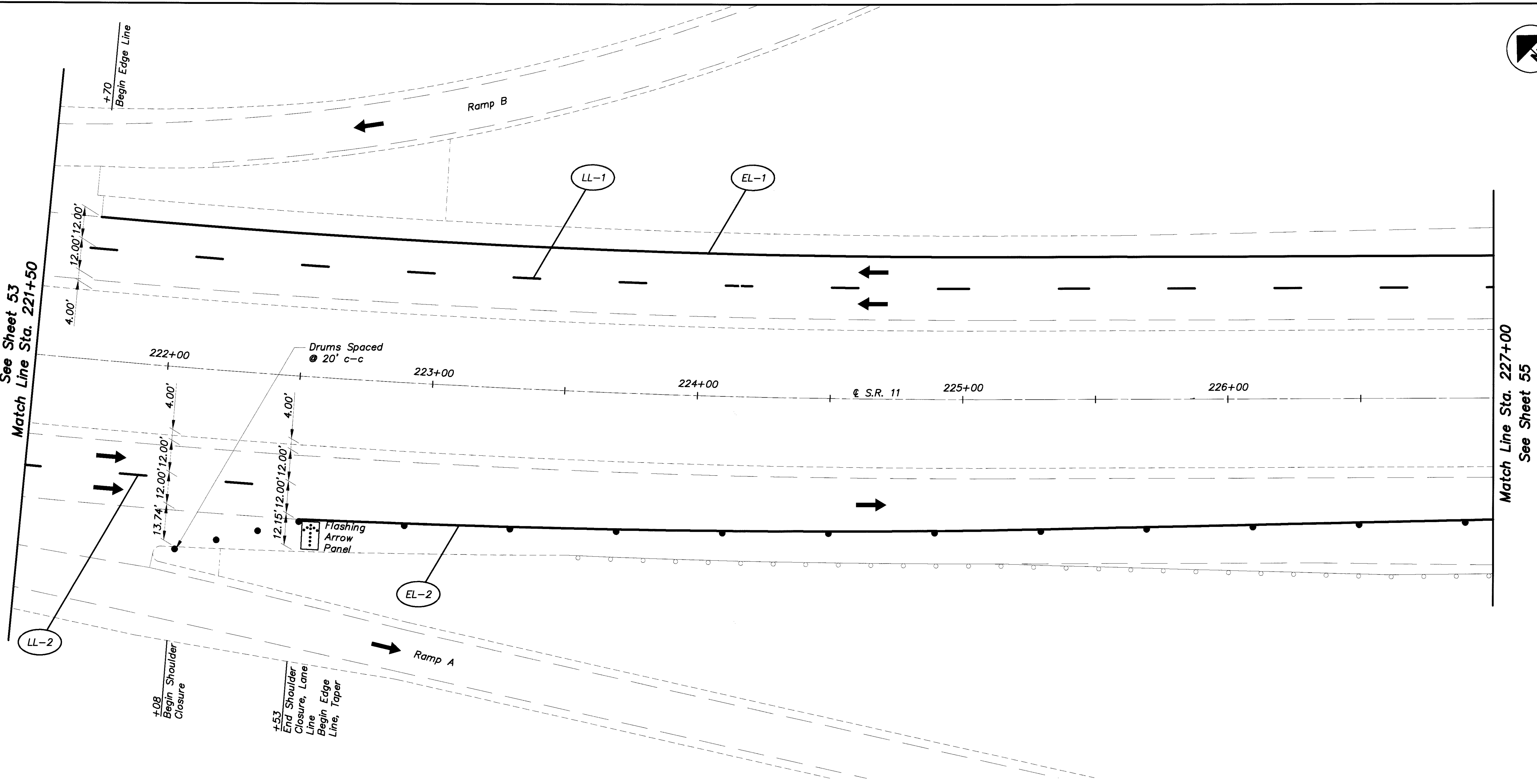
NOTES:
Signing shall be placed as per SCD MT-95.40M. Sign spacing shall be adjusted as to not conflict with exit Ramp A.

All conflicting gore markings are to be removed.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 Sta. 216+50 to Sta. 221+50				
Reference Number	Station to Station		Side	614
				Temporary Lane Line, Class 1, 740.06, Type 1
				Mile
LL-1	216+50	221+50	S.B.	0.09
LL-2	218+70	221+50	N.B.	0.05
Totals Carried to Sub-Summary				0.14

See Sheet 53
Match Line Sta. 221+50



CALCULATED
NEL

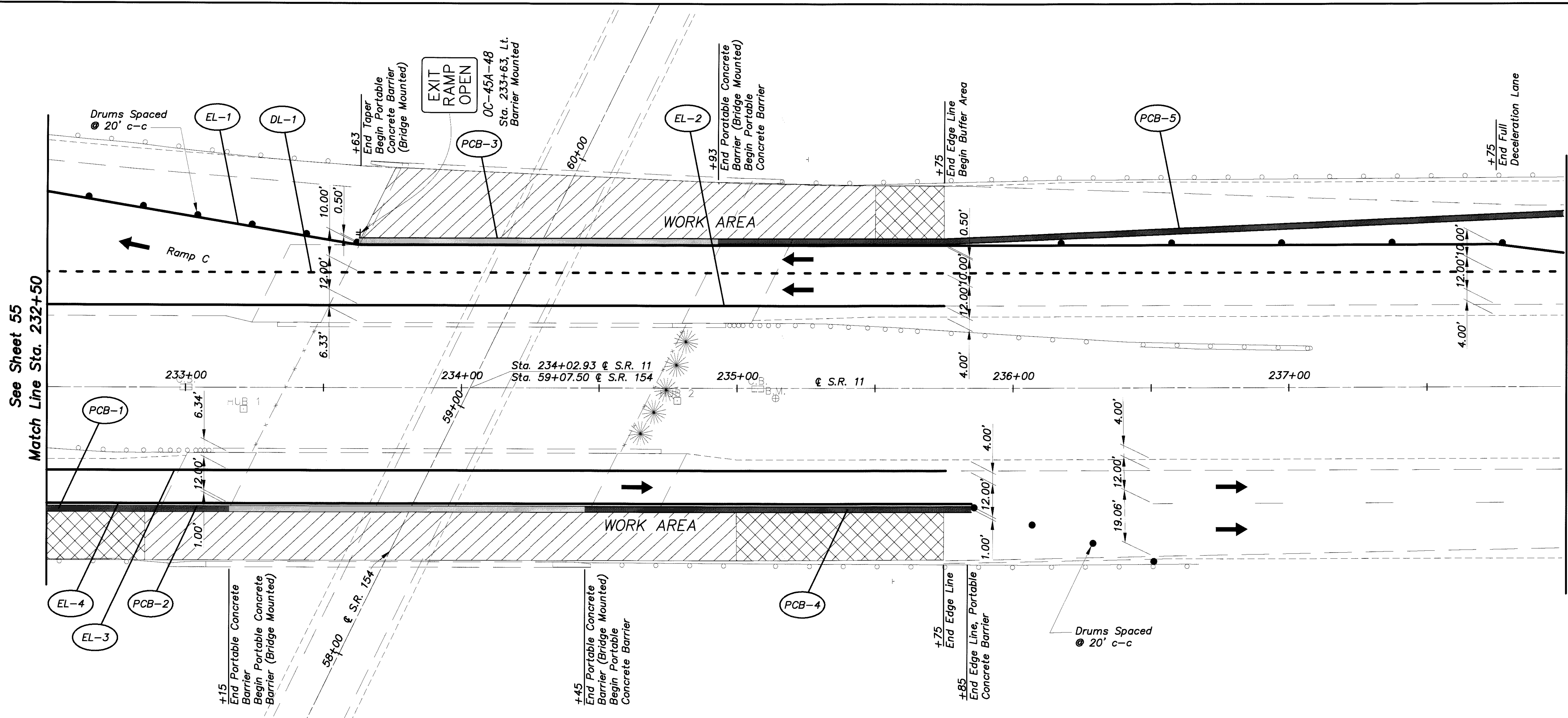
CHECKED
JUG

0 10 20 40
HORIZONTAL
SCALE IN FEET

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 Sta. 221+50 to Sta. 227+00					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1
				Mile	Mile
EL-1	221+70	227+00	N.B.	0.10	
EL-2	222+53	227+00	S.B.	0.08	
LL-1	221+50	227+00	N.B.		0.10
LL-2	221+50	222+53	S.B.		0.02
Totals Carried to Sub-Summary				0.18	0.12

NOTE:
All conflicting gore markings
are to be removed.



NOTES:

All conflicting gore markings are to be removed.

For typical-section of lane set up through the work area see Sheets 103 & 104.

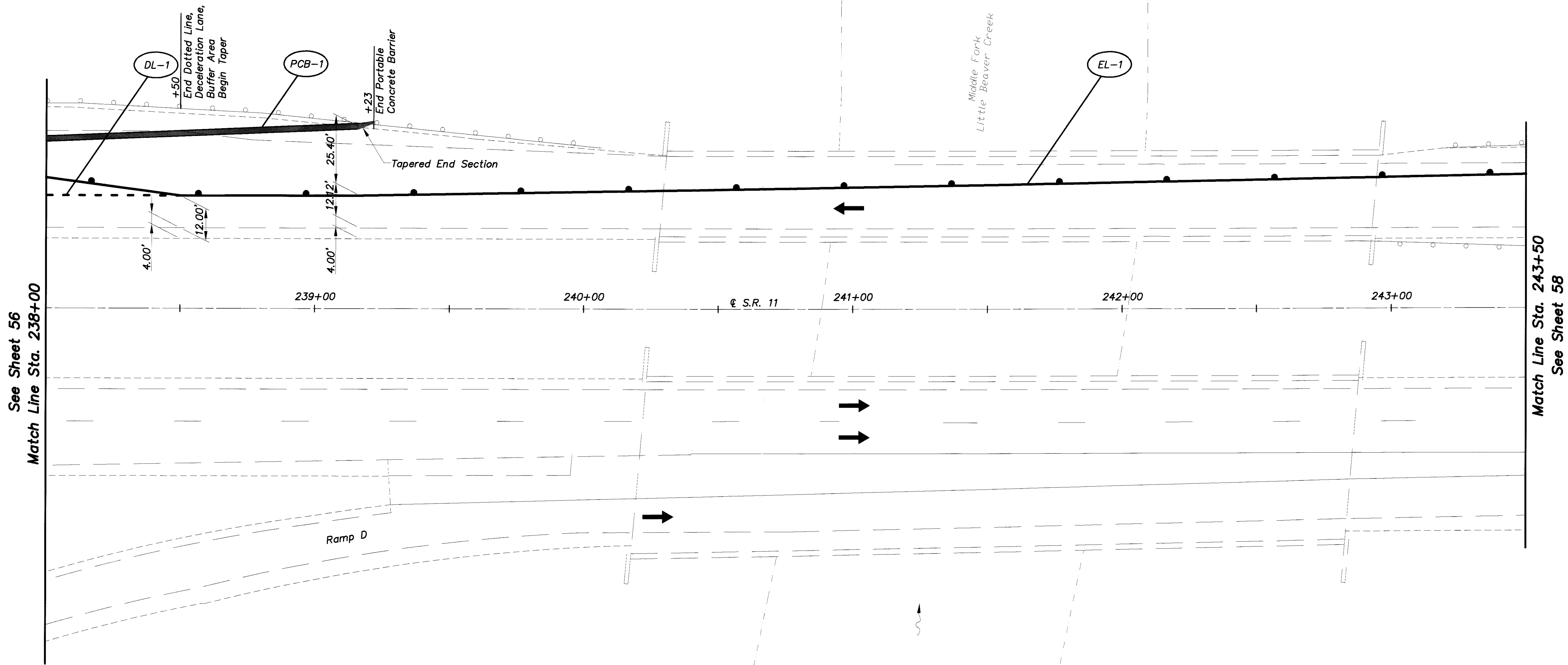
LEGEND

- 622, Portable Concrete Barrier, 32"
- 622, Portable Concrete Barrier, 32", Bridge Mounted
- Bridge, Approach Slab, and Full Depth Work Area
- Planing & Paving Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 – Sta. 232+50 to Sta. 238+00

Reference Number	Station to Station		Side	614			622	
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Edge Line, Class 1, 740.06, Type 1 Yellow	Portable Concrete Barrier, 32"	Portable Concrete Barrier, 32" Bridge Mounted
				Linear Feet	Mile	Mile	Linear Feet	Linear Feet
DL-1	232+50	238+00	N.B.	550				
EL-1	232+50	238+00	N.B.		0.10			
EL-2	232+50	235+75	N.B.			0.06		
EL-3	232+50	235+75	S.B.			0.06		
EL-4	232+50	235+85	S.B.		0.06			
PCB-1	232+50	233+16	S.B.				66	
PCB-2	233+15	234+45	S.B.					130
PCB-3	233+63	234+93	N.B.					130
PCB-4	234+45	235+85	S.B.				140	
PCB-5	234+93	238+00	N.B.				307	
Totals Carried to Sub-Summary				550	0.16	0.12	513	260



CALCULATED 0 20 40

NEL

CHECKED JJS

0 10 20 40

HORIZONTAL SCALE IN FEET

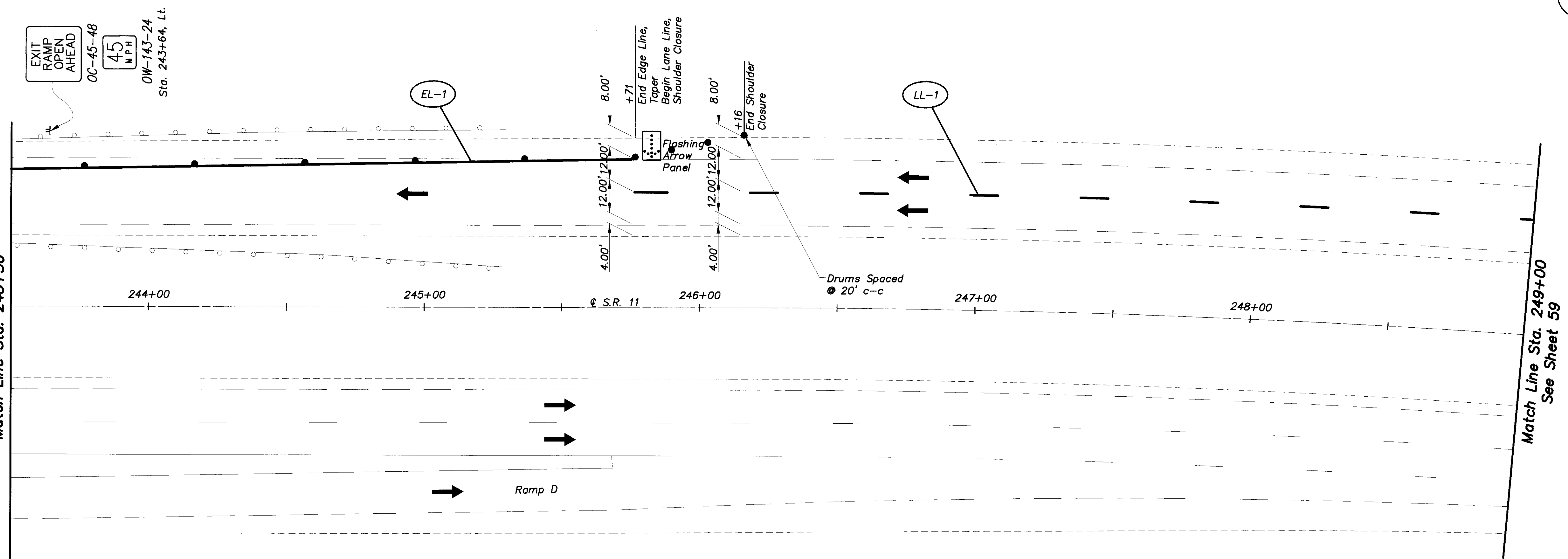
NOTE:
All conflicting gore markings
are to be removed.

LEGEND
 622, Portable Concrete Barrier, 32"

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 - Sta. 238+00 to 243+50						
Reference Number	Station to Station		Side	614		622
				Temporary Dotted Line, Class 1, 740.06, Type 1	Temporary Edge Line, Class 1, 740.06, Type 1 White	Portable Concrete Barrier, 32"
				Linear Feet	Mile	Linear Feet
DL-1	238+00	238+50	N.B.	50		
EL-1	238+00	243+50	N.B.		0.10	
PCB-1	238+00	239+23	N.B.			123
Totals Carried to Sub-Summary				50	0.10	123

See Sheet 57
Match Line Sta. 243+50



EXIT
RAMP
OPEN
AHEAD
00-45-48
45
M.P.H.
OW-143-24
Sta. 243+64, Lt.

CALCULATED
NEL
CHECKED
JUG

0 20 40

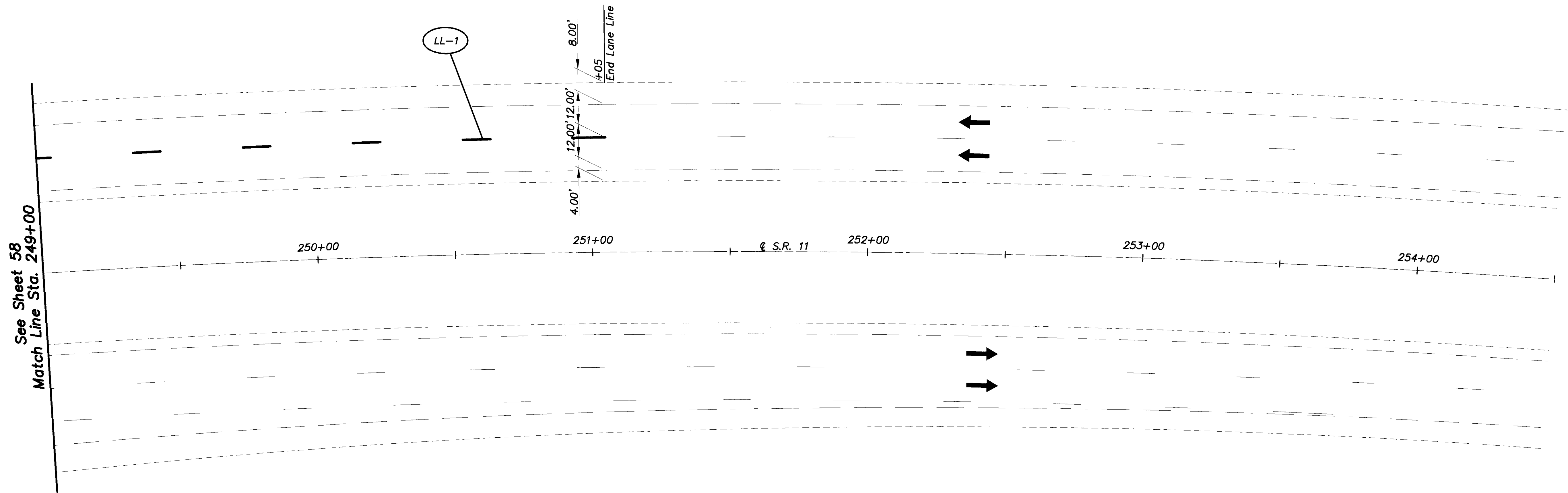
HORIZONTAL
SCALE IN FEET

NOTE:
Signing shall be placed as per SCD MT-95.40M.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 3 Sta. 243+50 to Sta. 249+00					
Reference Number	Station to Station		Side	614	
				Temporary Edge Line, Class 1, 740.06, Type 1 White	Temporary Lane Line, Class 1, 740.06, Type 1
				Mile	Mile
EL-1	243+50	245+71	N.B.	0.04	
LL-1	245+71	249+00	N.B.		0.06
Totals Carried to Sub-Summary				0.04	0.06

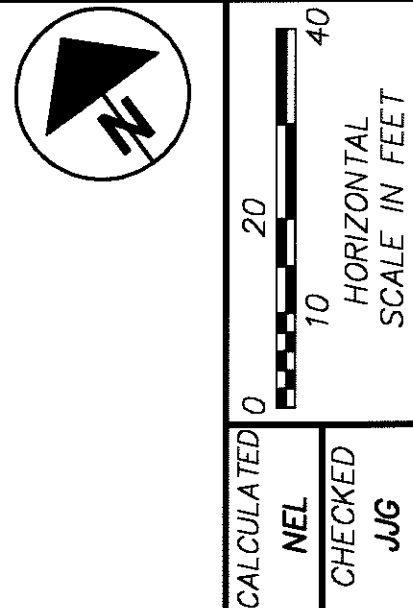
MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 3
Sta. 243+50 to Sta. 249+00



NOTE:
Signing shall be placed as per SCD MT-95.40M.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

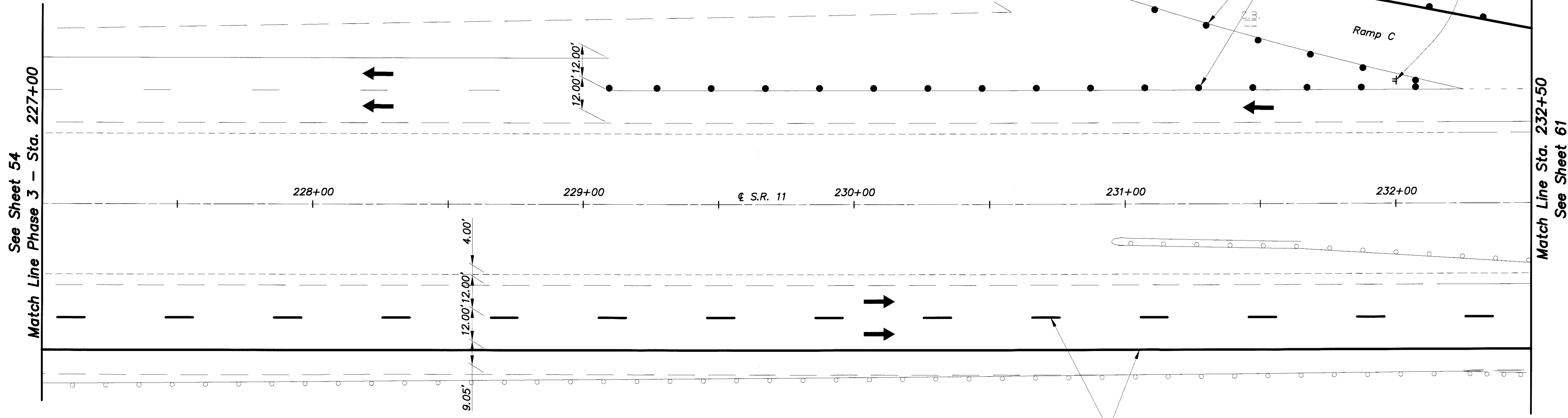
ESTIMATED QUANTITIES PHASE 3 Sta. 249+00 to Sta. 254+50				
Reference Number	Station to Station		Side	614
				Temporary Lane Line, Class 1, 740.06, Type 1
				Mile
LL-1	249+00	251+05	N.B.	0.04
Totals Carried to Sub-Summary				0.04



CALCULATED	0
NEL	
CHECKED	JUG

MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) – PHASE 3
Sta. 249+00 to Sta. 254+50

COL-11-(9.44)(13.76)



See Sheet 54
Match Line Phase 3 - Sta. 227+00

Match Line Sta. 232+50
See Sheet 61

NOTES:
The lane closure layout for Northbound Lanes will remain the same, as in Phase 3, with the exception of EL-1 at the Northbound exit ramp.
All conflicting gore markings are to be removed.

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 4				
Sta. 227+00 to Sta. 232+50				
Reference Number	Station to Station		Side	614
				Temporary Edge Line, Class 1, 740.06, Type 1 White
				Mile
EL-1	229+81	232+50	N.B.	0.05
Totals Carried to Sub-Summary				0.05

CALCULATED

NEL

CHECKED

JUG

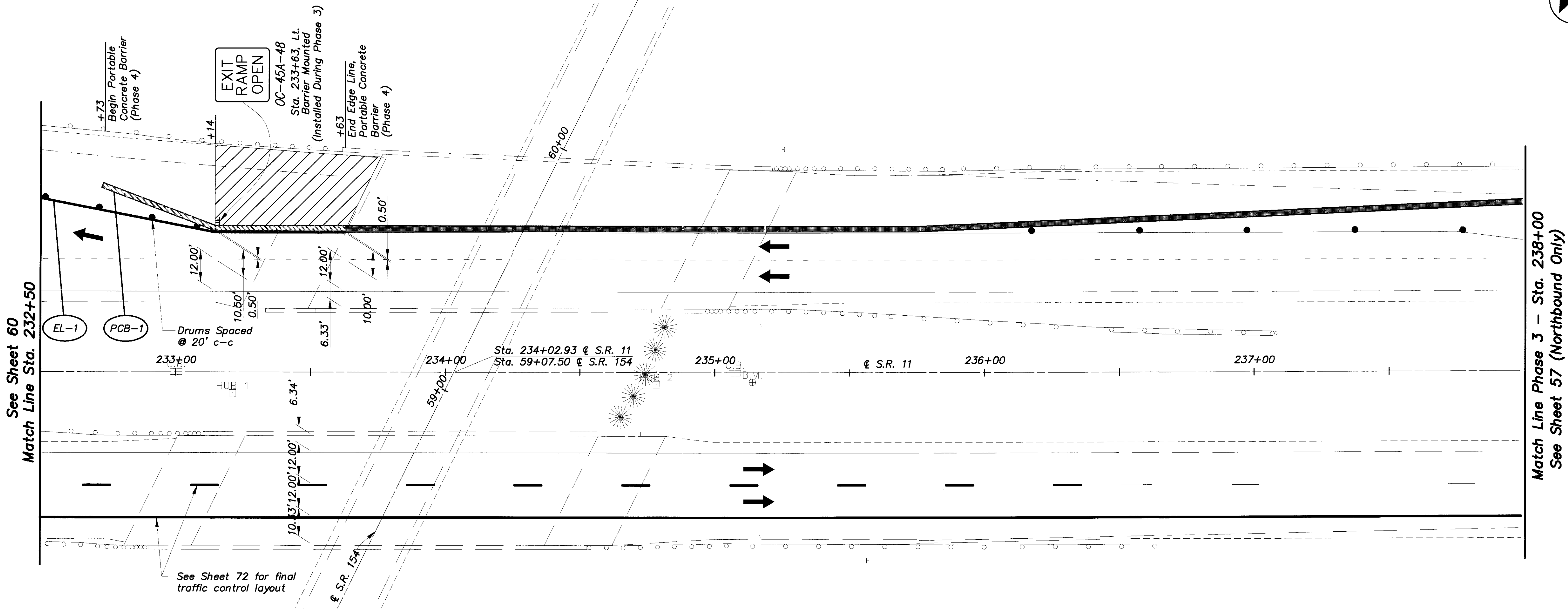
0

10

20

40

HORIZONTAL SCALE IN FEET



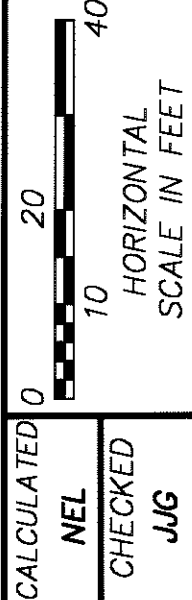
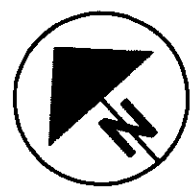
NOTES:
The lane closure layout for Northbound Lanes will remain the same for Phase 4, as it was in Phase 3, with the exception of the Portable Concrete Barrier and EL-1 at the Northbound exit ramp.

All conflicting gore markings are to be removed.

LEGEND	
	622, Portable Concrete Barrier, 32", Installed During Phase 3
	622, Portable Concrete Barrier, 32", Phase 4
	Bridge, Approach Slab, and Full Depth Work Area

For Maintenance of Traffic
Sub-Summary see Sheet No. 12.

ESTIMATED QUANTITIES PHASE 4 Sta. 232+50 to Sta. 238+00					
Reference Number	Station to Station		Side	Temporary Edge Line, Class 1, 740.06, Type 1 White	Portable Concrete Barrier, 32"
				Mile	Linear Feet
EL-1	232+50	233+63	N.B.	0.02	
PCB-1	232+73	233+63	N.B.		90
Totals Carried to Sub-Summary				0.02	90



MAINTENANCE OF TRAFFIC PLAN COL-11-(13.76) - PHASE 4

Sta. 232+50 to Sta. 238+00

COL-11-(9.44)(13.76)

[illegible]

ITEM 203 – SUBGRADE COMPACTION

NORTHBOUND

Sta. 456+50.00 to Sta. 456+90.28
= {1984.19 Sq. Ft.}
1984.19 Sq. Ft./9 = 220.46 Sq. Yd.

Sta. 456+90.28 to Sta. 457+15.37
= {1161.03 Sq. Ft.}
1161.03 Sq. Ft. /9 = 129.00 Sq. Yd.

Sta. 461+11.71 to Sta. 461+36.80
= {1400.21 Sq. Ft.}
1400.21 Sq. Ft. /9 = 155.58 Sq. Yd.

Sta. 461+36.80 to Sta. 461+75.00
= {1531.15 Sq. Ft.}
1531.15 Sq. Ft. / 9 = 170.13 Sq. Yd.

SOUTHBOUND

Sta. 455+75.00 to Sta. 456+22.55
= {1845.92 Sq. Ft.}
1845.92 Sq. Ft. /9 = 205.10 Sq. Yd.

Sta. 456+22.55 to Sta. 456+47.46
= {1185.47 Sq. Ft.}
1185.47 Sq. Ft. /9 = 131.72 Sq. Yd.

Sta. 460+38.39 to Sta. 460+63.80
= {1298.45 Sq. Ft.}
1298.45 Sq. Ft. / 9 = 144.27 Sq. Yd.

Sta. 460+63.80 to Sta. 460+87.55
= {1559.78 Sq. Ft.}
1559.78 Sq. Ft. / 9 = 173.31 Sq. Yd.

Total = 1329.57 Sq. Yd.

USE 1330 Sq. Yd.

ITEM 203 – LINEAR GRADING

NORTHBOUND

Sta. 455+75.00 to Sta. 462+25.00
650 L.F. / 100 Ft. = 6.5 Stations
Deduct for Structure COL-11-0944 = 3.9 Stations

SOUTHBOUND

Sta. 455+75.00 to Sta. 462+25.00
650 L.F. / 100 Ft. = 6.5 Stations
Deduct for Structure COL-11-0944 = 3.9 Stations

Total = 5.2 Stations

USE 6 Stations

ITEM 254 – PAVEMENT PLANING, BITUMINOUS, 3" NOMINAL

NORTHBOUND

Sta. 455+25.00 to Sta. 456+50.00
125.00 L.F. x [(44.56 + 45.06)/2] ft. = 5601.25 Sq. Ft.
5601.25 Sq. Ft./9 = 622.36 Sq. Yd.

Sta. 461+75.00 to Sta. 462+25.00
50.00 L.F. x [(48.89 + 52.74)/2] ft. = 2540.75 Sq. Ft.
2531.60 Sq. Ft./9 = 281.29 Sq. Yd.

SOUTHBOUND

Sta. 455+25.00 to Sta. 455+75.00
50.18 L.F. x [(38.45 + 40.66)/2] ft. = 1977.75 Sq. Ft.
1977.75 Sq. Ft./9 = 219.75 Sq. Yd.

Sta. 460+87.55 to Sta. 462+25.00
137.45 L.F. x [(50.28 + 63.71)/2] ft. = 7833.96 Sq. Ft.
7833.96 Sq. Ft./9 = 870.44 Sq. Yd.

Total = 1993.84 Sq. Yd.

USE 1994 Sq. Yd.

ITEM 302 – 8" BITUMINOUS AGGREGATE BASE, PG64-22

NORTHBOUND

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.} + [4"/12"/ft. x (30.46 + 57.06)ft.] = 2013.36 Sq. Ft.
2013.36 Sq. Ft. x 8"/12"/ft. = 1342.24 Cu. Ft.
1342.24 Cu. Ft./27 = 49.71 Cu. Yd.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.} + [4"/12"/ft. x (52.12 + 6.01)ft.] = 1550.53 Sq. Ft.
1550.53 Sq. Ft. x 8"/12"/ft. = 1033.68 Cu. Ft.
1033.68 Cu. Ft./27 = 38.28 Cu. Yd.

SOUTHBOUND

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.} + [4"/12"/ft. x (25.49 + 60.46)ft.] = 1874.57 Sq. Ft.
1874.57 Sq. Ft. x 8"/12"/ft. = 1249.71 Cu. Ft.
1249.71 Cu. Ft./27 = 46.29 Cu. Yd.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.} + [4"/12"/ft. x (52.37 + 9.94)ft.] = 1580.55 Sq. Ft.
1580.55 Sq. Ft. x 8"/12"/ft. = 1053.70 Cu. Ft.
1053.70 Cu. Ft./27 = 39.03 Cu. Yd.

Total = 173.31 Cu. Yd.

USE 173 Cu. Yd.

ITEM 304 – AGGREGATE BASE

NORTHBOUND

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.} + [10"/12"/ft. x (30.46 + 57.06)ft.] = 2057.12 Sq. Ft.
2057.12 Sq. Ft. x 8"/12"/ft. = 1371.42 Cu. Ft.
1371.42 Cu. Ft./27 = 50.79 Cu. Yd.

Sta. 456+90.28 to Sta. 457+15.37
{1161.03 Sq. Ft.} + [25 L.F. x (0.5 + 0.5) ft.] = 1186.03 Sq. Ft.
1186.03 Sq. Ft. x 8"/12"/ft. = 790.69 Cu. Ft.
790.69 Cu. Ft./27 = 29.28 Cu. Yd.

Sta. 461+11.71 to Sta. 461+36.80
{1400.21 Sq. Ft.} + [25 L.F. x (0.5 + 0.5) ft.] = 1425.21 Sq. Ft.
1425.21 Sq. Ft. x 8"/12"/ft. = 950.14 Cu. Ft.
950.14 Cu. Ft./27 = 35.19 Cu. Yd.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.} + [10"/12"/ft. x (52.12 + 6.01)ft.] = 1579.59 Sq. Ft.
1579.59 Sq. Ft. x 8"/12"/ft. = 1053.06 Cu. Ft.
1053.06 Cu. Ft./27 = 39.00 Cu. Yd.

SOUTHBOUND

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.} + [10"/12"/ft. x (25.49 + 60.46)ft.] = 1917.55 Sq. Ft.
1917.55 Sq. Ft. x 8"/12"/ft. = 1278.36 Cu. Ft.
1278.36 Cu. Ft./27 = 47.35 Cu. Yd.

Sta. 456+22.55 to Sta. 456+47.46
{1185.47 Sq. Ft.} + [25 L.F. x (0.5 + 0.5) ft.] = 1210.47 Sq. Ft.
1210.47 Sq. Ft. x 8"/12"/ft. = 806.98 Cu. Ft.
806.98 Cu. Ft./27 = 29.89 Cu. Yd.

Sta. 460+38.39 to Sta. 460+63.80
{1298.45 Sq. Ft.} + [25 L.F. x (0.5 + 0.5) ft.] = 1323.45 Sq. Ft.
1323.45 Sq. Ft. x 8"/12"/ft. = 882.30 Cu. Ft.
882.30 Cu. Ft./27 = 32.68 Cu. Yd.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.} + [10"/12"/ft. x (52.37 + 9.94)ft.] = 1611.71 Sq. Ft.
1611.71 Sq. Ft. x 8"/12"/ft. = 1074.47 Cu. Ft.
1074.47 Cu. Ft./27 = 39.80 Cu. Yd.

Total = 303.98 Cu. Yd.

USE 304 Cu. Yd.

NOTE:

Brackets { }, indicate areas derived through CAD measurement.

PAVEMENT CALCULATIONS – COL-11-(9.44)

COL-11-(9.44)(13.76)

64
126

ITEM 407– TACK COAT, APPLIED @ 0.04 Gal./Sq. Yd.

NORTHBOUND

Sta. 455+25.00 to Sta. 456+50.00
125.00 L.F. x [(44.56 + 45.06)/2] ft. = 5601.25 Sq. Ft.
5601.25 Sq. Ft./9 = 622.36 Sq. Yd.
622.36 Sq. Yd. x 0.04 Gal./Sq. Yd. = 24.89 Gal.

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.}/9 = 220.47 Sq. Yd.
220.47 Sq. Yd. x 0.04 Gal./Sq. Yd. = 8.82 Gal.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.}/9 = 170.13 Sq. Yd.
170.13 Sq. Yd. x 0.04 Gal./Sq. Yd. = 6.81 Gal.

Sta. 461+75.00 to Sta. 462+25.00
50.00 L.F. x [(48.89 + 52.74)/2] ft. = 2540.75 Sq. Ft.
{2540.75 Sq. Ft.}/9 = 282.31 Sq. Yd.
282.31 Sq. Yd. x 0.04 Gal./Sq. Yd. = 11.29 Gal.

SOUTHBOUND

Sta. 455+25.00 to Sta. 455+75.00
50.00 L.F. x [(38.45 + 40.66)/2] ft. = 1977.75 Sq. Ft.
{1977.75 Sq. Ft.}/9 = 219.75 Sq. Yd.
219.75 Sq. Yd. x 0.04 Gal./Sq. Yd. = 8.79 Gal.

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.}/9 = 205.10 Sq. Yd.
205.10 Sq. Yd. x 0.04 Gal./Sq. Yd. = 8.20 Gal.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.}/9 = 173.31 Sq. Yd.
173.31 Sq. Yd. x 0.04 Gal./Sq. Yd. = 6.93 Gal.

Sta. 460+87.55 to Sta. 462+25.00
137.45 L.F. x [(50.28 + 63.71)/2] ft. = 7833.96 Sq. Ft.
{7833.96Sq. Ft.}/9 = 870.44 Sq. Yd.
870.44 Sq. Yd. x 0.04 Gal./Sq. Yd. = 34.82 Gal.

Total = 110.55 Gal.

USE 111 Gal.

ITEM 408 – PRIME COAT, APPLIED @ 0.4 Gal./Sq. Yd.

NORTHBOUND

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.}/9 = 220.47 Sq. Yd.
220.47 Sq. Yd. x 0.4 Gal./Sq. Yd. = 88.18 Gal.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.}/9 = 170.13 Sq. Yd.
170.13 Sq. Yd. x 0.4 Gal./Sq. Yd. = 68.05 Gal.

SOUTHBOUND

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.}/9 = 205.10 Sq. Yd.
205.10 Sq. Yd. x 0.4 Gal./Sq. Yd. = 82.04 Gal.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.}/9 = 173.31 Sq. Yd.
173.31 Sq. Yd. x 0.4 Gal./Sq. Yd. = 69.32 Gal.

Total = 307.59 Gal.

USE 308 Gal.

ITEM 446 – 1 1/2” ASPHALT CONCRETE
SURFACE COURSE, TYPE 1, PG64–22, AS PER PLAN

NORTHBOUND

Sta. 455+25.00 to Sta. 456+50.00
125.00 L.F. x [(44.56 + 45.06)/2] ft. = 5601.25 Sq. Ft.
5601.25 Sq. Ft. x (1 1/2”)/12”/ft. = 700.16 Cu. Ft.
700.16 Cu. Ft./27 = 25.93 Cu. Yd.

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.} x (1 1/2”)/12”/ft. = 248.02 Cu. Ft.
248.02 Cu. Ft./27 = 9.19 Cu. Yd.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.} x (1 1/2”)/12”/ft. = 191.39 Cu. Ft.
191.39 Cu. Ft./27 = 7.09 Cu. Yd.

Sta. 461+75.00 to Sta. 462+25.00
50.00 L.F. x [(48.89 + 52.74)/2] ft. = 2540.75 Sq. Ft.
2540.75 Sq. Ft. x (1 1/2”)/12”/ft. = 317.59 Cu. Ft.
317.59 Cu. Ft./27 = 11.76 Cu. Yd.

SOUTHBOUND

Sta. 455+25.00 to Sta. 455+75.00
50.00 L.F. x [(38.45 + 40.66)/2] ft. = 1977.75 Sq. Ft.
1977.75 Sq. Ft. x (1 1/2”)/12”/ft. = 247.22 Cu. Ft.
247.22 Cu. Ft./27 = 9.16 Cu. Yd.

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.} x (1 1/2”)/12”/ft. = 230.74 Cu. Ft.
230.74 Cu. Ft./27 = 8.55 Cu. Yd.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.} x (1 1/2”)/12”/ft. = 194.97 Cu. Ft.
194.97 Cu. Ft./27 = 7.22 Cu. Yd.

Sta. 460+87.55 to Sta. 462+25.00
137.45 L.F. x [(50.28 + 63.71)/2] ft. = 7833.96 Sq. Ft.
7833.96 Sq. Ft. x (1 1/2”)/12”/ft. = 979.25 Cu. Ft.
979.25 Cu. Ft./27 = 36.27 Cu. Yd.

Total = 115.17 Cu. Yd.

USE 115 Cu. Yd.

ITEM 611– REINFORCED CONCRETE APPROACH SLAB, (T=15”)

NORTHBOUND

Sta. 465+90.28 to Sta. 457+15.37
= {1161.03 Sq. Ft.}
1161.03 Sq. Ft. /9 = 129.00 Sq. Yd.

Sta. 461+11.71 to Sta. 461+36.80
= {1400.21 Sq. Ft.}
1400.21 Sq. Ft. /9 = 155.58 Sq. Yd.

SOUTHBOUND

Sta. 456+22.55 to Sta. 456+47.46
= {1185.47 Sq. Ft.}
1185.47 Sq. Ft. /9 = 131.72 Sq. Yd.

Sta. 460+38.39 to Sta. 460+63.80
= {1298.45 Sq. Ft.}
1298.45 Sq. Ft. /9 = 144.27 Sq. Yd.

Total = 560.57 Sq. Yd.

USE 561 Sq. Yd.

ITEM 446 – 2 1/2” ASPHALT CONCRETE
INTERMEDIATE COURSE, TYPE 2, PG64–22

NORTHBOUND

Sta. 455+25.00 to Sta. 456+50.00
125.00 L.F. x [(44.56 + 45.06)/2] ft. = 5601.25 Sq. Ft.
5601.25 Sq. Ft. x (2 1/2”)/12”/ft. = 1166.93 Cu. Ft.
1166.93 Cu. Ft./27 = 43.22 Cu. Yd.

Sta. 456+50.00 to Sta. 456+90.28
{1984.19 Sq. Ft.} x (2 1/2”)/12”/ft. = 413.37 Cu. Ft.
413.37 Cu. Ft./27 = 15.31 Cu. Yd.

Sta. 461+36.80 to Sta. 461+75.00
{1531.15 Sq. Ft.} x (2 1/2”)/12”/ft. = 318.99 Cu. Ft.
318.99 Cu. Ft./27 = 11.81 Cu. Yd.

Sta. 461+75.00 to Sta. 462+25.00
50.00 L.F. x [(48.89 + 52.74)/2] ft. = 2540.75 Sq. Ft.
2540.75 Sq. Ft. x (2 1/2”)/12”/ft. = 529.32 Cu. Ft.
529.32 Cu. Ft./27 = 19.60 Cu. Yd.

SOUTHBOUND

Sta. 455+25.00 to Sta. 455+75.00
50.00 L.F. x [(38.45 + 40.66)/2] ft. = 1977.75 Sq. Ft.
1977.75 Sq. Ft. x (2 1/2”)/12”/ft. = 412.03 Cu. Ft.
412.03 Cu. Ft./27 = 15.26 Cu. Yd.

Sta. 455+75.00 to Sta. 456+22.55
{1845.92 Sq. Ft.} x (2 1/2”)/12”/ft. = 384.57 Cu. Ft.
384.57 Cu. Ft./27 = 14.24 Cu. Yd.

Sta. 460+63.80 to Sta. 460+87.55
{1559.78 Sq. Ft.} x (2 1/2”)/12”/ft. = 324.95 Cu. Ft.
324.95 Cu. Ft./27 = 12.04 Cu. Yd.

Sta. 460+87.55 to Sta. 462+25.00
137.45 L.F. x [(50.28 + 63.71)/2] ft. = 7833.96 Sq. Ft.
7833.96 Sq. Ft. x (2 1/2”)/12”/ft. = 1632.08 Cu. Ft.
1632.08 Cu. Ft./27 = 60.45 Cu. Yd.

Total = 191.93 Cu. Yd.

USE 192 Cu. Yd.

ITEM 626 – BARRIER REFLECTORS

TYPE A

NORTHBOUND

Rt. Sta. 461+10.81 to Sta. 461+48.31 = 2 Each
Lt. Sta. 456+48.74 to Sta. 457+23.74 = 2 Each
Sta. 461+60.41 to Sta. 461+85.41 = 2 Each

SOUTHBOUND

Rt. Sta. 455+68.31 to Sta. 456+05.81 = 2 Each
Sta. 460+24.82 to Sta. 460+87.32 = 2 Each
Lt. Sta. 455+83.95 to Sta. 456+46.45 = 2 Each
Sta. 460+69.94 to Sta. 461+19.94 = 2 Each

Total Type A = 14 Each

TYPE B

NORTHBOUND

Rt. Sta. 456+82.50 to Sta. 461+10.81 = 5 Each
Lt. Sta. 457+23.74 to Sta. 461+60.41 = 5 Each

SOUTHBOUND

Rt. Sta. 456+05.81 to Sta. 460+24.82 = 5 Each
Lt. Sta. 456+46.45 to Sta. 460+69.94 = 5 Each

Total Type B = 20 Each

NOTE:

Brackets { }, indicate areas derived through CAD measurement.

ITEM 203 – SUBGRADE COMPACTION

NORTHBOUND

Sta. 233+14.53 to Sta. 233+32.96
= {1421.44 Sq. Ft.} (CAD MEASURED)
1421.44 Sq. Ft./9 = 157.94 Sq. Yd.

Sta. 233+32.96 to Sta. 233+57.96
= {1450.06 Sq. Ft.} (CAD MEASURED)
1450.06 Sq. Ft. /9 = 161.12 Sq. Yd.

Sta. 234+88.96 to Sta. 235+13.96
= {1285.46 Sq. Ft.} (CAD MEASURED)
1285.46 Sq. Ft. /9 = 142.83 Sq. Yd.

Sta. 235+13.96 to Sta. 235+50.00
= {1573.06 Sq. Ft.} (CAD MEASURED)
1573.06 Sq. Ft. / 9 = 174.78 Sq. Yd.

SOUTHBOUND

Sta. 232+75.00 to Sta. 232+91.90
= {592.99 Sq. Ft.} (CAD MEASURED)
592.99 Sq. Ft. /9 = 65.89 Sq. Yd.

Sta. 232+91.90 to Sta. 233+16.90
= {1012.48 Sq. Ft.} (CAD MEASURED)
1012.48 Sq. Ft. /9 = 112.50 Sq. Yd.

Sta. 234+47.90 to Sta. 234+72.90
= {1012.48 Sq. Ft.} (CAD MEASURED)
1012.48 Sq. Ft. / 9 = 112.50 Sq. Yd.

Sta. 234+72.90 to Sta. 235+00.00
= {1073.81 Sq. Ft.} (CAD MEASURED)
1073.81 Sq. Ft. / 9 = 119.31 Sq. Yd.

Total = 1046.87 Sq. Yd.

USE 1047 Sq. Yd.

ITEM 203 – LINEAR GRADING

NORTHBOUND

Sta. 232+25.00 to Sta. 235+75.00
350 L.F. / 100 Ft. = 3.5 Stations
Deduct for Structure COL-11-1378 = 1.3 Stations

SOUTHBOUND

Sta. 232+25.00 to Sta. 235+75.00
350 L.F. / 100 Ft. = 3.5 Stations
Deduct for Structure COL-11-1378 = 1.3 Stations

Total = 4.4 Stations

USE 5 Stations

NOTE:

Brackets { }, indicate areas derived through CAD measurement.

ITEM 254 – PAVEMENT PLANING, BITUMINOUS, 3” NOMINAL

NORTHBOUND

Sta. 232+25.00 to Sta. 233+14.53
89.53 L.F. x [(65.99 + 58.06)/2] Ft. = 5553.10 Sq. Ft.
5553.10 Sq. Ft. / 9 = 617.01 Sq. Yd.

Sta. 235+50.00 to Sta. 235+75.00
25.00 L.F. x [(47.48 + 47.47)/2] Ft. = 1186.88 Sq. Ft.
1186.88 Sq. Ft. / 9 = 131.88 Sq. Yd.

SOUTHBOUND

Sta. 232+25.00 to Sta. 232+75.00
50.00 L.F. x 36.00 Ft. = 1800.00 Sq. Ft.
1800.00 Sq. Ft. / 9 = 200.00 Sq. Yd.

Sta. 235+00.00 to Sta. 235+75.00
75.00 L.F. x 36.00 Ft. = 2700.00 Sq. Ft.
2700.00 Sq. Ft. / 9 = 300.00 Sq. Yd.

Total = 1248.89 Sq. Yd.

USE 1249 Sq. Yd.

ITEM 302 – 10” BITUMINOUS AGGREGATE BASE PG64-22

NORTHBOUND

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} + 4”/12”/ft.(38.26 + 9.77) Ft. = 1437.45 Sq. Ft.
1437.45 Sq. Ft. x 10”/12”/ft. = 1197.88 Cu. Ft.
1197.88 Cu. Ft. / 27 = 44.37 Cu. Yd.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} + 4”/12”/ft.(19.97 + 44.48) Ft. = 1594.54 Sq. Ft.
1594.54 Sq. Ft. x 10”/12”/ft. = 1328.78 Cu. Ft.
1328.78 Cu. Ft. / 27 = 49.21 Cu. Yd.

SOUTHBOUND

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} + 4”/12”/ft.(25.36 + 6.63) Ft. = 540.65 Sq. Ft.
540.65 Sq. Ft. x 10”/12”/ft. = 450.54 Cu. Ft.
450.54 Cu. Ft. / 27 = 16.69 Cu. Yd.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} + 4”/12”/ft.(18.32 + 38.04) Ft. = 1092.60 Sq. Ft.
1092.60 Sq. Ft. x 10”/12”/ft. = 910.50 Cu. Ft.
910.50 Cu. Ft. / 27 = 33.72 Cu. Yd.

Total = 143.99 Cu. Yd.

USE 144 Cu. Yd.

ITEM 304 – AGGREGATE BASE

NORTHBOUND

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} + 16”/12”/ft.(38.26 + 9.77) Ft. = 1485.48 Sq. Ft.
1485.48 Sq. Ft. x 8”/12”/ft. = 990.32 Cu. Ft.
990.32 Cu. Ft. / 27 = 36.68 Cu. Yd.

Sta. 233+32.96 to Sta. 233+57.96
{1450.06 Sq. Ft.} + 6”/12”/ft.(24.32 + 25.00) Ft. = 1474.72 Sq. Ft.
1474.72 Sq. Ft. x 6”/12”/ft. = 737.36 Cu. Ft.
737.36 Cu. Ft. / 27 = 27.31 Cu. Yd.

Sta. 234+88.96 to Sta. 235+13.96
{1285.46 Sq. Ft.} + 6”/12”/ft.(24.71 + 25.00) Ft. = 1310.32 Sq. Ft.
1310.32 Sq. Ft. x 8”/12”/ft. = 873.55 Cu. Ft.
873.55 Cu. Ft. / 27 = 32.35 Cu. Yd.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} + 16”/12”/ft.(19.97 + 44.48) Ft. = 1658.99 Sq. Ft.
1658.99 Sq. Ft. x 8”/12”/ft. = 1105.99 Cu. Ft.
1105.99 Cu. Ft. / 27 = 40.96 Cu. Yd.

SOUTHBOUND

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} + 16”/12”/ft.(25.36 + 6.63) Ft. = 635.64 Sq. Ft.
635.64 Sq. Ft. x 8”/12”/ft. = 423.76 Cu. Ft.
423.76 Cu. Ft. / 27 = 15.69 Cu. Yd.

Sta. 232+91.90 to Sta. 233+16.90
{1012.48 Sq. Ft.} + 6”/12”/ft.(25.00 + 25.00) Ft. = 1037.48 Sq. Ft.
1037.48 Sq. Ft. x 6”/12”/ft. = 518.74 Cu. Ft.
518.74 Cu. Ft. / 27 = 19.21 Cu. Yd.

Sta. 234+47.90 to Sta. 234+72.90
{1012.48 Sq. Ft.} + 6”/12”/ft.(25.00 + 25.00) Ft. = 1037.48 Sq. Ft.
1037.48 Sq. Ft. x 8”/12”/ft. = 691.65 Cu. Ft.
691.65 Cu. Ft. / 27 = 25.62 Cu. Yd.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} + 16”/12”/ft.(18.32 + 38.04) Ft. = 1148.96 Sq. Ft.
1148.96 Sq. Ft. x 8”/12”/ft. = 765.97 Cu. Ft.
765.97 Cu. Ft. / 27 = 28.37 Cu. Yd.

Total = 226.19 Cu. Yd.

USE 226 Cu. Yd.

ITEM 408 – PRIME COAT, APPLIED AT 0.4 GAL/SQ. YD.

NORTHBOUND

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} / 9 = 157.94 Sq. Yd.
157.94 Sq. Yd. x 0.4 Gal./Sq. Yd. = 63.18 Gal.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} / 9 = 174.78 Sq. Yd.
174.78 Sq. Yd. x 0.4 Gal./Sq. Yd. = 69.91 Gal.

SOUTHBOUND

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} / 9 = 65.89 Sq. Yd.
65.89 Sq. Yd. x 0.4 Gal./Sq. Yd. = 26.36 Gal.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} / 9 = 119.31 Sq. Yd.
119.31 Sq. Yd. x 0.4 Gal./Sq. Yd. = 47.72 Gal.

Total = 207.17 Gal.

USE 203 Gal.

CALCULATED	SMG	CHECKED	NEL
PAVEMENT CALCULATIONS – COL-11-(13.76)			
COL-11-(9.44)(13.76)			
66 126			

ITEM 407 – TACK COAT, APPLIED AT 0.04 GAL/SQ. YD.

NORTHBOUND

Sta. 232+25.00 to Sta. 233+14.53
89.53 L.F. x [(65.99 + 58.06)/2] Ft. = 5553.10 Sq. Ft.
5553.10 Sq. Ft. / 9 = 617.01 Sq. Yd.
617.01 Sq. Yd. x 0.04 Gal./Sq. Yd. = 24.68 Gal.

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} / 9 = 157.94 Sq. Yd.
157.94 Sq. Yd. x 0.04 Gal./Sq. Yd. = 6.32 Gal.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} / 9 = 174.78 Sq. Yd.
174.78 Sq. Yd. x 0.04 Gal./Sq. Yd. = 6.99 Gal.

Sta. 235+50.00 to Sta. 235+75.00
25.00 L.F. x [(47.48 + 47.47)/2] Ft. = 1186.88 Sq. Ft.
1186.88 Sq. Ft. / 9 = 131.88 Sq. Yd.
131.88 Sq. Yd. x 0.04 Gal./Sq. Yd. = 5.28 Gal.

SOUTHBOUND

Sta. 232+25.00 to Sta. 232+75.00
50.00 L.F. x 36.00 Ft. = 1800.00 Sq. Ft.
1800.00 Sq. Ft. / 9 = 200.00 Sq. Yd.
200.00 Sq. Yd. x 0.04 Gal./Sq. Yd. = 8.00 Gal.

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} / 9 = 65.89 Sq. Yd.
65.89 Sq. Yd. x 0.04 Gal./Sq. Yd. = 2.64 Gal.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} / 9 = 119.31 Sq. Yd.
119.31 Sq. Yd. x 0.04 Gal./Sq. Yd. = 4.77 Gal.

Sta. 235+00.00 to Sta. 235+75.00
75.00 L.F. x 36.00 Ft. = 2700.00 Sq. Ft.
2700.00 Sq. Ft. / 9 = 300.00 Sq. Yd.
300.00 Sq. Yd. x 0.04 Gal./Sq. Yd. = 12.00 Gal.

Total = 70.68 Gal.

USE 71 Gal.

ITEM 611 – REINFORCED CONCRETE APPROACH SLAB (T = 15”), AS PER PLAN

NORTHBOUND

Sta. 233+32.96 to Sta. 233+57.96
1450.06 Sq. Ft. / 9 = 161.12 Sq. Yd.

Sta. 234+88.96 to Sta. 235+13.96
1285.46 Sq. Ft. / 9 = 142.83 Sq. Yd.

SOUTHBOUND

Sta. 232+91.90 to Sta. 233+16.90
1012.48 Sq. Ft. / 9 = 112.50 Sq. Yd.

Sta. 234+47.90 to Sta. 234+72.90
1012.48 Sq. Ft. / 9 = 112.50 Sq. Yd.

Total = 528.95 Sq. Yd.

USE 529 Sq. Yd.

NOTE:

Brackets { }, indicate areas derived through CAD measurement.

ITEM 446 – 1 1/2” ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64–22, AS PER PLAN

NORTHBOUND

Sta. 232+25.00 to Sta. 233+14.53
89.53 L.F. x [(65.99 + 58.06)/2] Ft. = 5553.10 Sq. Ft.
5553.10 Sq. Ft. x 1 1/2”/12”/ft. = 694.14 Cu. Ft.
694.14 Cu. Ft. / 27 = 25.71 Cu. Yd.

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} x 1 1/2”/12”/ft. = 177.68 Cu. Ft.
177.68 Cu. Ft. / 27 = 6.58 Cu. Yd.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} x 1 1/2”/12”/ft. = 196.63 Cu. Ft.
196.63 Cu. Ft. / 27 = 7.28 Cu. Yd.

Sta. 235+50.00 to Sta. 235+75.00
25.00 L.F. x [(47.48 + 47.47)/2] Ft. = 1186.88 Sq. Ft.
1186.88 Sq. Ft. x 1 1/2”/12”/ft. = 148.36 Cu. Ft.
148.36 Cu. Ft. / 27 = 5.49 Cu. Yd.

SOUTHBOUND

Sta. 232+25.00 to Sta. 232+75.00
50.00 L.F. x 36.00 Ft. = 1800.00 Sq. Ft.
1800.00 Sq. Ft. x 1 1/2”/12”/ft. = 225.00 Cu. Ft.
225.00 Cu. Ft. / 27 = 8.33 Cu. Yd.

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} x 1 1/2”/12”/ft. = 74.12 Cu. Ft.
74.12 Cu. Ft. / 27 = 2.74Cu. Yd.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} x 1 1/2”/12”/ft. = 134.23 Cu. Ft.
134.23 Cu. Ft. / 27 = 4.97 Cu. Yd.

Sta. 235+00.00 to Sta. 235+75.00
75.00 L.F. x 36.00 Ft. = 2700.00 Sq. Ft.
2700.00 Sq. Ft. x 1 1/2”/12”/ft. = 337.50 Cu. Ft.
337.50 Cu. Ft. / 27 = 12.50 Cu. Yd.

Total = 73.60 Cu. Yd.

USE 74 Cu. Yd.

ITEM 626 – BARRIER REFLECTORS

TYPE A

NORTHBOUND

Rt. Sta. 234+95.88 to Sta. 235+58.38 = 2 Each
Lt. Sta. 233+11.40 to Sta. 233+61.40 = 2 Each
Sta. 235+21.16 to Sta. 235+83.66 = 2 Each

SOUTHBOUND

Rt. Sta. 232+52.76 to Sta. 232+90.26 = 2 Each
Sta. 234+52.73 to Sta. 235+02.73 = 2 Each
Lt. Sta. 232+72.62 to Sta. 233+10.12 = 2 Each

Total Type A = 12 Each

TYPE B

NORTHBOUND

Rt. Sta. 233+32.84 to Sta. 234+95.88 = 2 Each
Lt. Sta. 233+61.40 to Sta. 235+21.16 = 2 Each

SOUTHBOUND

Rt. Sta. 232+90.26 to Sta. 234+52.73 = 2 Each
Lt. Sta. 233+10.12 to Sta. 234+73.12 = 2 Each

Total Type B = 8 Each

ITEM 446 – 2 1/2” ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG64–22

NORTHBOUND

Sta. 232+25.00 to Sta. 233+14.53
89.53 L.F. x [(65.99 + 58.06)/2] Ft. = 5553.10 Sq. Ft.
5553.10 Sq. Ft. x 2 1/2”/12”/ft. = 1156.90 Cu. Ft.
1156.90 Cu. Ft. / 27 = 42.85 Cu. Yd.

Sta. 233+14.53 to Sta. 233+32.96
{1421.44 Sq. Ft.} x 2 1/2”/12”/ft. = 296.13 Cu. Ft.
296.13 Cu. Ft. / 27 = 10.97 Cu. Yd.

Sta. 235+13.96 to Sta. 235+50.00
{1573.06 Sq. Ft.} x 2 1/2”/12”/ft. = 327.72 Cu. Ft.
327.72 Cu. Ft. / 27 = 12.14 Cu. Yd.

Sta. 235+50.00 to Sta. 235+75.00
25.00 L.F. x [(47.48 + 47.47)/2] Ft. = 1186.88 Sq. Ft.
1186.88 Sq. Ft. x 2 1/2”/12”/ft. = 247.27 Cu. Ft.
247.27 Cu. Ft. / 27 = 9.16 Cu. Yd.

SOUTHBOUND

Sta. 232+25.00 to Sta. 232+75.00
50.00 L.F. x 36.00 Ft. = 1800.00 Sq. Ft.
1800.00 Sq. Ft. x 2 1/2”/12”/ft. = 375.00 Cu. Ft.
375.00 Cu. Ft. / 27 = 13.89 Cu. Yd.

Sta. 232+75.00 to Sta. 232+91.90
{592.99 Sq. Ft.} x 2 1/2”/12”/ft. = 123.54 Cu. Ft.
123.54 Cu. Ft. / 27 = 4.58 Cu. Yd.

Sta. 234+72.90 to Sta. 235+00.00
{1073.81 Sq. Ft.} x 2 1/2”/12”/ft. = 223.71 Cu. Ft.
223.71 Cu. Ft. / 27 = 8.29 Cu. Yd.

Sta. 235+00.00 to Sta. 235+75.00
75.00 L.F. x 36.00 Ft. = 2700.00 Sq. Ft.
2700.00 Sq. Ft. x 2 1/2”/12”/ft. = 562.50 Cu. Ft.
562.50 Cu. Ft. / 27 = 20.83 Cu. Yd.

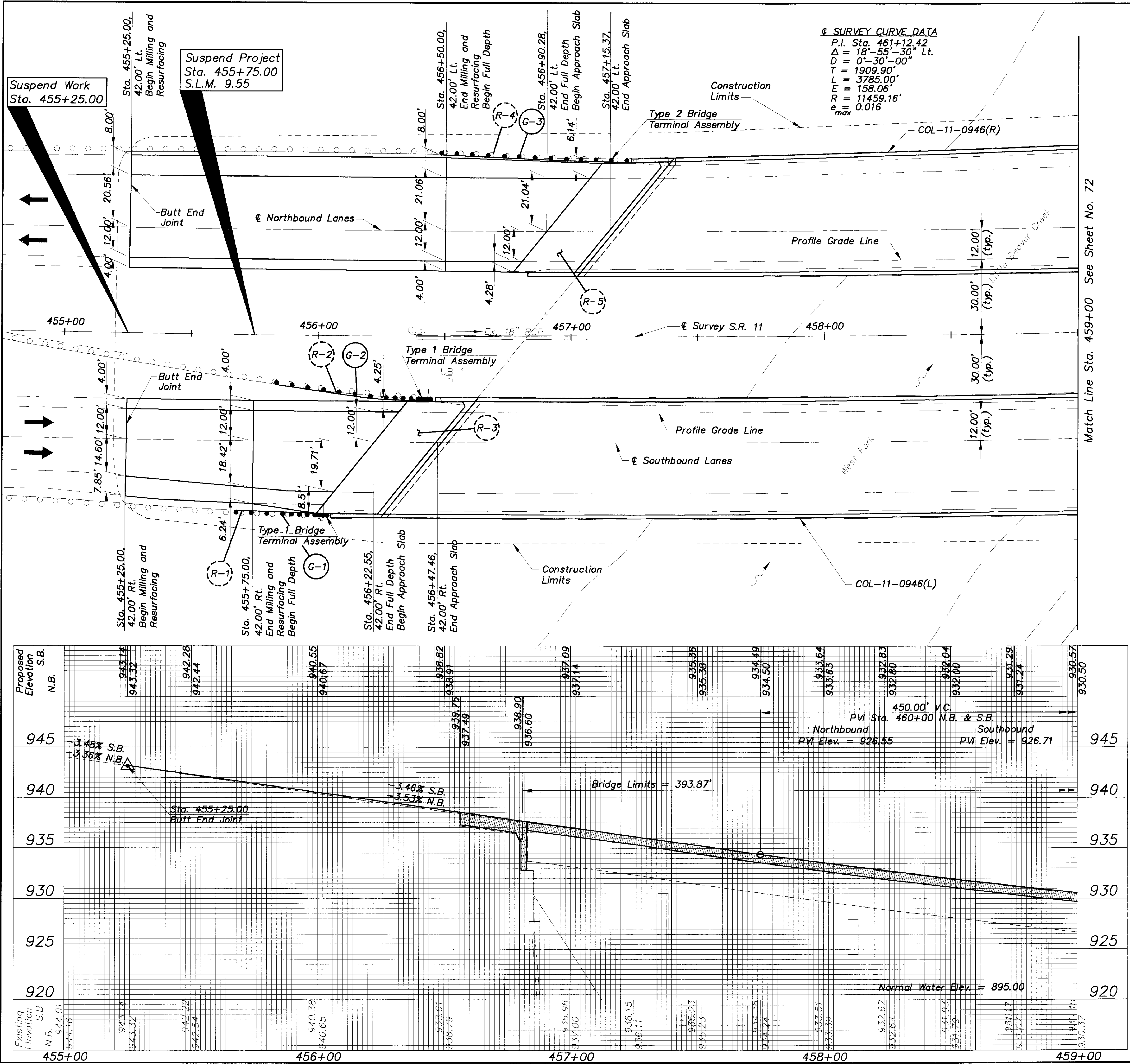
Total = 122.71 Cu. Yd.

USE 123 Cu. Yd.

PAVEMENT CALCULATIONS – COL–11–(13.76)

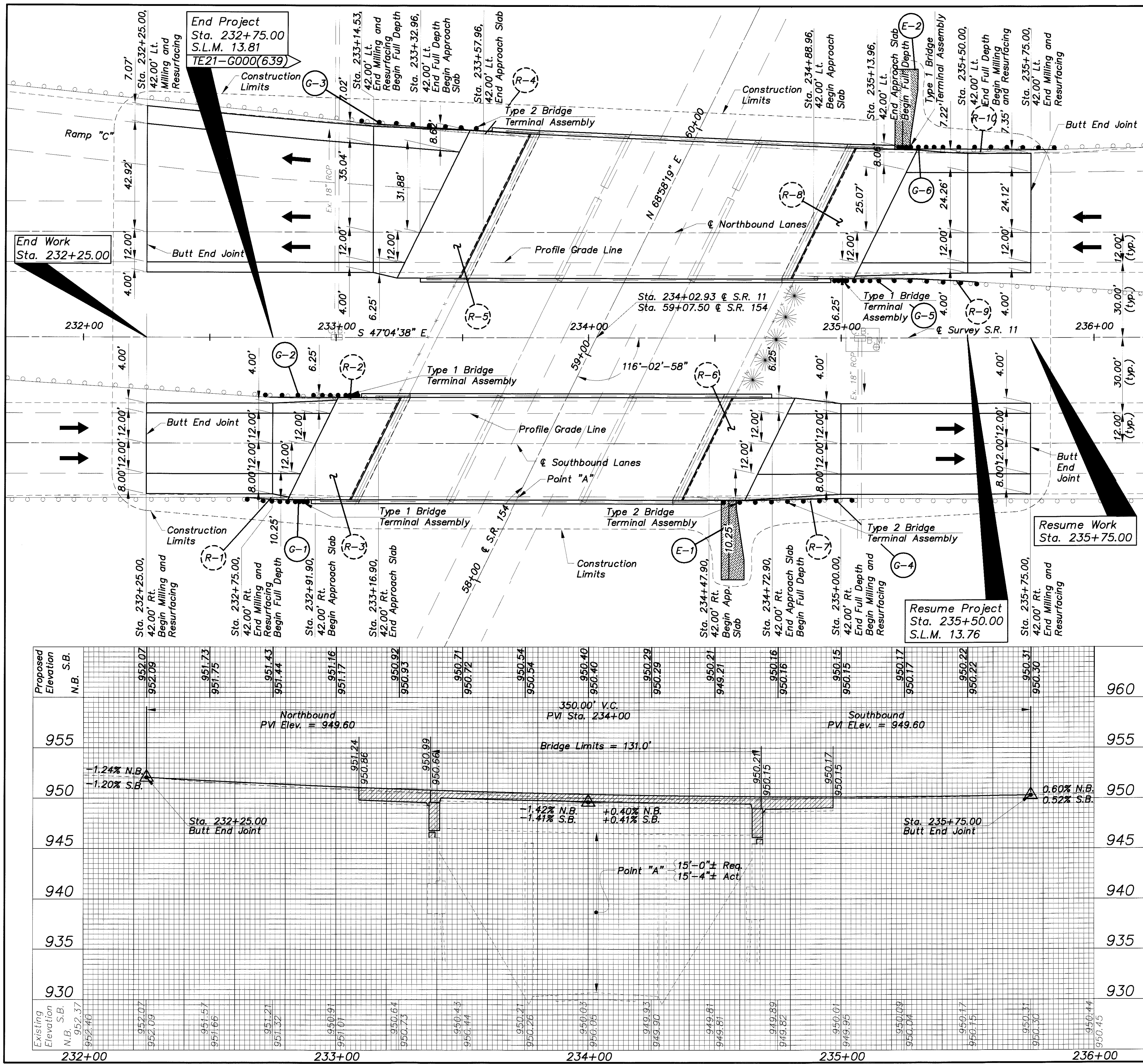
COL–11–(9.44)(13.76)

67
126



NOTE:
See Sheet 6/126 for Centerline References.

Ref. No.	Station From	Station To	Side		Approach Slab Removed	Guard-rail		Bridge Terminal Assembly, Type 1	Bridge Terminal Assembly, Type 2	
			Sq. Yd.	Lin. Ft.	Sq. Yd.	Lin. Ft.	Each	Each	Each	Each
R-1	455+68.31	456+05.81								
R-2	455+83.95	456+46.45								
R-3	456+22.15	457+47.46								
R-4	456+48.74	457+23.74								
R-5	456+90.28	457+15.37								
G-1	455+68.31	456+05.81								
G-2	455+83.95	456+46.45								
G-3	456+48.74	457+23.74								
Totals Carried to General Summary			245	175				2	1	

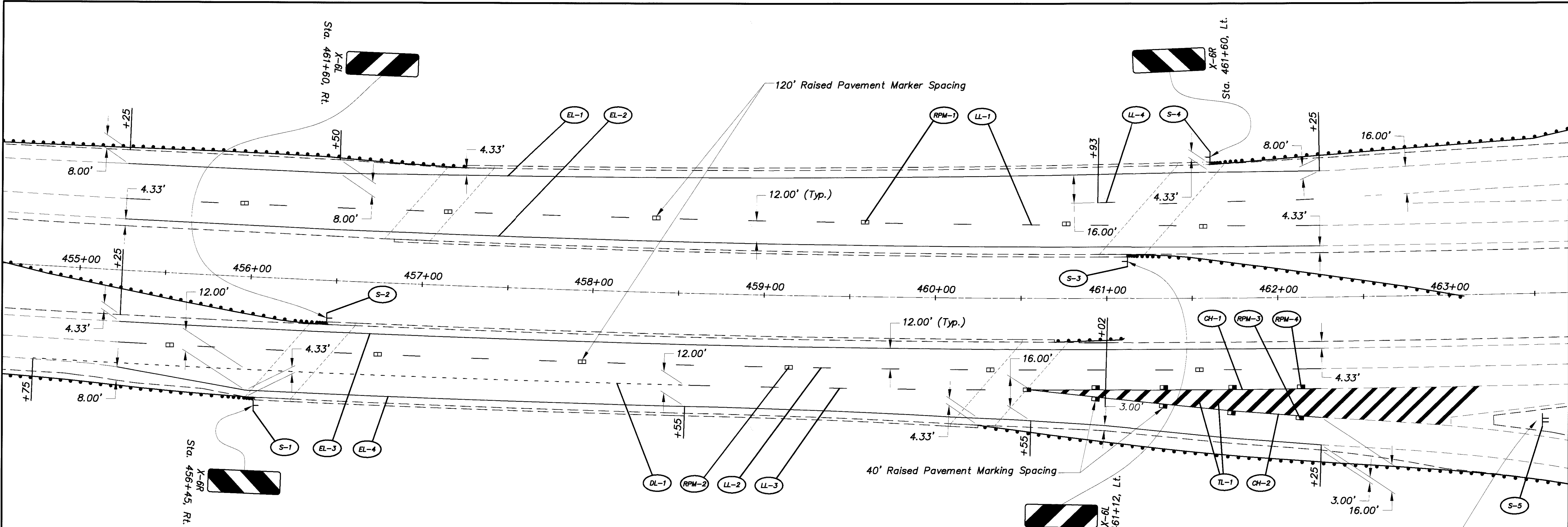


BENCHMARKS

Chiseled square at southwest corner of concrete pad Sta. 235+14.17, 3.53' Rt. Elev. = 946.99

NOTE:
See Sheet 6/126 for Centerline References.

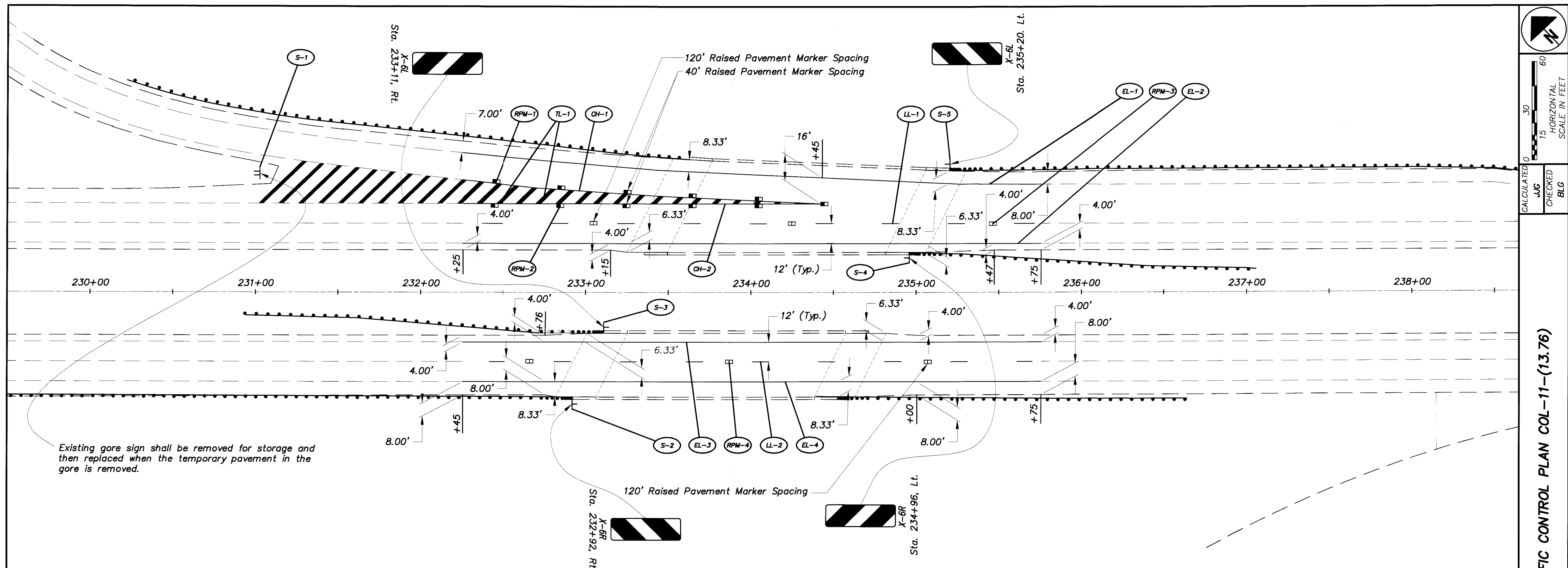
Ref. No.	Station From	Station To	Side		Approach Slab Removed	Guard-rail Removed	202		Guard-rail, Type 5	606		Bridge Terminal Assembly, Type 1	Bridge Terminal Assembly, Type 2	Sodding Reinf.	660
							Sq. Yd.	Lin. Ft.		Lin. Ft.	Each				
R-1	232+52.76	232+90.26	Rt.												
R-2	232+72.62	233+10.12	Rt.				37.5								
R-3	232+91.90	233+16.90	Rt.				67								
R-4	233+11.40	233+61.40	Lt.					50							
R-5	233+32.96	233+57.96	Lt.				119								
R-6	234+47.90	234+72.90	Rt.				67								
R-7	234+52.73	235+02.73	Rt.				103								
R-8	234+88.96	235+13.96	Lt.					50							
R-9	234+95.88	235+58.38	Lt.				62.5								
R-10	235+21.16	235+83.66	Lt.				62.5								
G-1	232+52.76	232+90.26	Rt.												
G-2	232+72.62	233+10.12	Rt.												
G-3	233+11.40	233+61.40	Lt.												
G-4	234+52.73	235+02.73	Rt.												
G-5	234+95.88	235+58.38	Lt.												
G-6	235+21.16	235+83.66	Lt.												
E-1	234+63.00		Rt.												
E-2	235+32.00		Lt.												
Totals Carried to General Summary							356	300	300	4	2			42.5	81



Estimated Quantities																			
Ref. No.	Station to Station		Side	621		630								642, Type 1					
				Raised Pavement Markers		Ground Mounted Support No. 2 Post	Sign, Flat Sheet, Type G		Ground Mounted Support, S4X7.7 Beam	Ground Mounted Beam Support Foundation	Removal of Ground Mounted Sign and Disposal	Removal of Ground Mounted Post Support and Disposal	Removal of Ground Mounted Major Sign and Reerection	4" Edge Line		4" White Lane Line	4" White Dotted Line	6" White Channelizing Line	24" White Transverse Line
				One-Way White	Two-Way White/Red		X-6L	X-6R						White	Yellow				
CH-1	460+50	462+25	S.B.															175	
CH-2	460+50	462+25	S.B.															175	
DL-1	454+75	458+55	S.B.														380		
EL-1	455+25	462+25	N.B.											0.13					
EL-2	455+25	462+25	N.B.												0.13				
EL-3	455+25	462+25	S.B.											0.13					
EL-4	455+25	462+25	S.B.																
LL-1	455+25	462+25	N.B.													0.13			
LL-2	455+25	462+25	S.B.													0.13			
LL-3	458+55	460+50	S.B.													0.04			
LL-4	460+93	462+25	N.B.													0.03			
RPM-1	455+25	462+25	N.B.	6															
RPM-2	455+25	462+25	S.B.	6															
RPM-3	460+50	462+25	S.B.		4														
RPM-4	460+50	462+25	S.B.		5														
S-1	456+00		S.B.			12	3					1	1						
S-2	456+45		S.B.			12		3				1	1						
S-3	461+12		N.B.			12		3				1	1						
S-4	461+60		N.B.			12	3					1	1						
S-5	463+50		S.B.						22	2			2	1					
TL-1	460+50	462+25	S.B.															180	
Totals Carried to General Summary				21		48	12		22	2	4	6	1	0.52		0.32	380	350	180

Existing gore sign shall be removed for storage and then replaced when the temporary pavement in the gore is removed.

All Pavement Markings and Raised Pavement Markers (RPMs) shall match the existing markings in alignment and spacing. Pavement Markings and RPMs shall be installed according to TC-65.10M, TC-65.11M, and TC-72.20M. Removal and reinstallation of conflicting pavement markings during construction will be included under the Lump Sum Item 614.



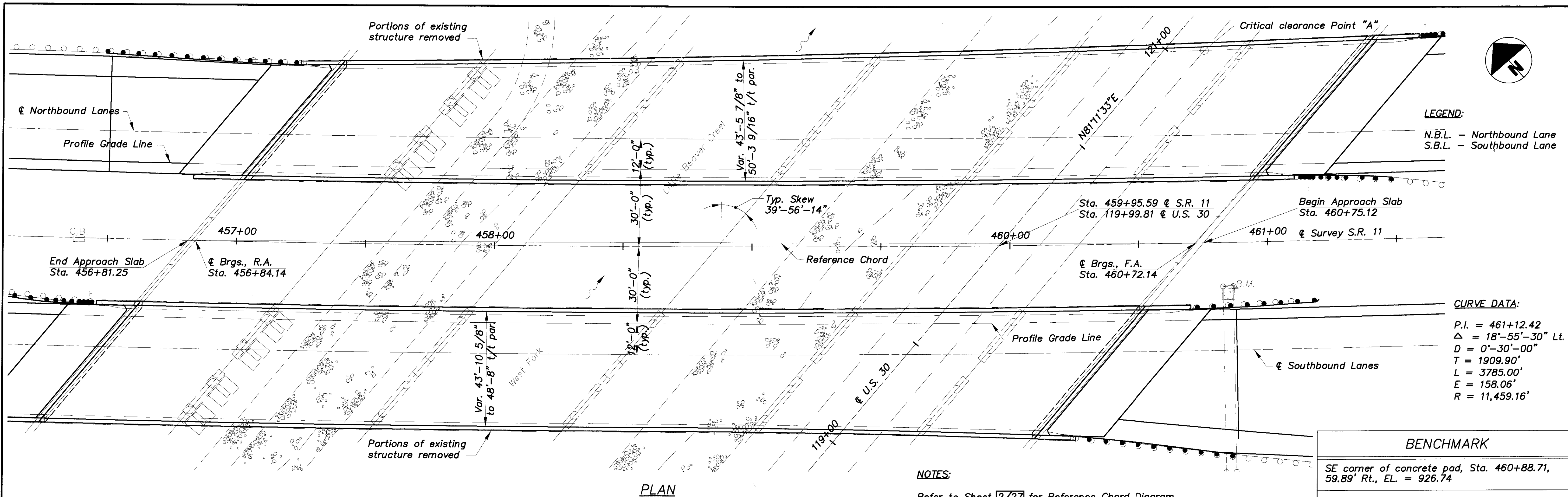
TRAFFIC CONTROL PLAN COL-11-(13.76)

Estimated Quantities																		
Ref. No.	Station to Station		Side	621		Ground Mounted Support No. 2 Post	Sign, Flat Sheet, Type G		630					642, Type 1				
				Raised Pavement Markers			X-6L	X-6R	Ground Mounted Support, S 4X7.7 Beam	Ground Mounted Beam Support Foundation	Removal of Ground Mounted Sign and Disposal	Removal of Ground Mounted Post Support and Disposal	Removal of Ground Mounted Major Sign and Rerection	4" Edge Line		4" White Lane Line	6" White Channelizing Line	24" White Transverse Line
				One-Way White	Two-Way White/Red									White	Yellow			
CH-1	232+25	234+45	N.B.														220	
CH-2	232+25	234+45	N.B.														220	
EL-1	232+25	235+75	N.B.											0.07				
EL-2	232+25	235+75	N.B.												0.07			
EL-3	232+25	235+75	S.B.												0.07			
EL-4	232+25	235+75	S.B.															
LL-1	232+25	235+75	N.B.														0.07	
LL-2	232+25	235+75	S.B.														0.07	
RPM-1	232+25	234+45	N.B.		6													
RPM-2	232+25	234+45	N.B.		5													
RPM-3	232+25	235+75	N.B.	3														
RPM-4	232+25	235+75	S.B.	3														
S-1	231+03		N.B.						22	2		2	1					
S-2	232+82		S.B.			12	3				1	1						
S-3	233+11		S.B.			12		3			1	1						
S-4	234+96		N.B.			12		3			1	1						
S-5	235+20		N.B.			12	3				1	1						
TL-1	232+25	234+45	N.B.															150
Totals Carried to General Summary				17		48	12		22	2	4	6	1	0.28		0.14	440	150

All Pavement Markings and Raised Pavement Markers (RPMs) shall match the existing markings in alignment and spacing. Pavement Markings and RPMs shall be installed according to TC-65.10M, TC-65.11M, and TC-72.20M. Removal and reinstallation of conflicting pavement markings during construction will be included under the Lump Sum Item 614.

COL-11-(9.44)(13.76)

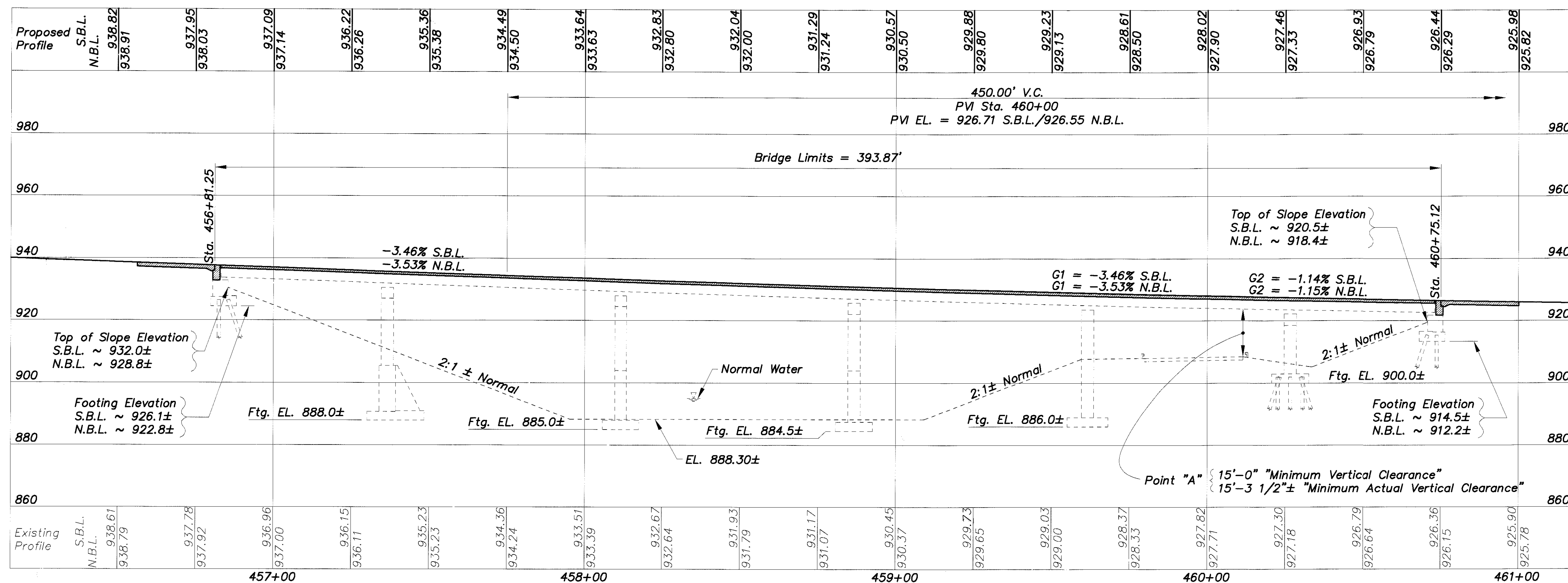
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xref #2 = k: \Data\Dist11\COL-11-(9.46)\13.78\Drawings\COL 11-9.46\shared\abase.dwg
k: \Data\Dist11\COL-11-(9.46)\13.78\Drawings\COL-11-9.46\Shared Bridge\Siteplan.dwg



LEGEND:
N.B.L. - Northbound Lane
S.B.L. - Southbound Lane

CURVE DATA:
P.I. = 461+12.42
 $\Delta = 18^\circ-55'-30''$ Lt.
D = 0'-30'-00"
T = 1909.90'
L = 3785.00'
E = 158.06'
R = 11,459.16'

NOTES:
Refer to Sheet 2/27 for Reference Chord Diagram.
Drainage Area = 100 mi²



NOTE:
Existing piles are 10BP42

BENCHMARK	
SE corner of concrete pad, Sta. 460+88.71, 59.89' Rt., EL. = 926.74	
TRAFFIC DATA	
CURRENT YEAR ADT (2001) = 11500 DESIGN YEAR ADT (2021) = 13700 DESIGN YEAR ADTT (2021) = 18%	
EXISTING STRUCTURE	
TYPE: Continuous steel beams with reinforced concrete deck and substructure. SPANS: 52.5'-3 @ 75'-65'-45.5' c/c bearings ROADWAY: S.B.L. ~ Variable width f/f parapet & N.B.L. ~ Variable width f/f parapet with 2'-0" safety curb LOADING: CF 2000 (57) SKEW: 40'-31'-30" L.F. Tan. @ Sta. 459+95.69 WEARING SURFACE: 1" Monolithic APPROACH SLABS: AS-1-54 modified 25' long ALIGNMENT: 0'-30'-00" Curve Left DATE BUILT: 1969 STRUCTURE FILE NUMBER: 1500570/1500600	
PROPOSED STRUCTURE	
PROPOSED WORK: New composite reinforced concrete deck and backwalls on existing abutments and piers. SPANS: 53.14'-75.57'-75.16'-74.75'-64.44'- 44.93' c/c bearings along Reference Chord ROADWAY: S.B.L. ~ Varies 43'-10 5/8" t/t parapet to 48'-8" t/t parapet N.B.L. ~ Varies 43'-5 7/8" t/t parapet to 50'-3 9/16" t/t parapet LOADING: HS20-44, Case II and the alternate military loading SKEW: 39'-56'-14" L.F. w/respect to Reference Chord WEARING SURFACE: Monolithic concrete APPROACH SLABS: AS-1-81 (25' long) ALIGNMENT: 0'-30'-00" Curve Left SUPERELEVATION: 3/16" per foot LATITUDE: 40'-42'-35" N LONGITUDE: 80'-41'-35" W	

REFERENCE shall be made to Standard Drawing(s):

AS-1-81 (revised) 04-20-01
BR-1 (revised) 01-06-99
EXJ-4-87 (revised) 04-20-01
GSD-1-96 Dated 04-20-01
PCB-91 Dated 07-06-99

and Supplemental Specification(s):

815 Dated 02-22-00
844 Dated 01-06-99
846 Dated 09-09-97
910 Dated 07-11-00
911 Dated 07-10-97
954 Dated 09-09-97

DESIGN SPECIFICATIONS: This structure conforms to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation Officials, 1996 including the 1997 and 1998 Interim Specifications and the ODOT Bridge Design Manual.

DESIGN LOADING: HS20-44, Case II and the Alternate Military Loading.
Future Wearing Surface (FWS) of 60 psi.

DESIGN DATA:

High Performance Concrete-compressive strength 4500 p.s.i. (superstructure)

High Performance Concrete-compressive strength 4000 p.s.i. (substructure)

Reinforcing steel-ASTM A615, A616 or A617
Grade 60 minimum yield strength 60,000 p.s.i.

Existing Structural Steel
ASTM A36-yield strength 36,000 p.s.i.

DECK PROTECTION METHOD:

Epoxy coated reinforcing steel

2 1/2" concrete cover

MONOLITHIC WEARING SURFACE is assumed, for design purposes, to be 1" thick.

PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

DESCRIPTION: This work shall consist of the removal of concrete decks including sidewalks, parapets, railing, deck joints and other appurtenances from steel supporting systems (beams, girders, cross frames, etc.). Care shall be taken during deck removals to protect portions of such systems that are to be salvaged and incorporated into the proposed structure. In this respect, the use of explosives, headache balls and/or hoe ram type of equipment is prohibited.

PROTECTION OF TRAFFIC: Prior to demolition of any portions of the existing superstructure, the Contractor shall submit plans for the protection of traffic (vehicular, pedestrian, boat, etc.) adjacent to and/or under the structure to the Director for approval. These plans shall include provisions for any devices and structures that may be necessary to ensure such protection. Temporary vertical clearances specified on the plans or in the proposal shall be maintained at all times except as otherwise approved by the Director.

PROTECTION OF STEEL SUPPORT SYSTEMS: Before deck slab cutting is permitted, the outline of primary steel members in contact with the bottom of the deck shall be drawn on the surface of the deck. Small diameter pilot holes shall be drilled 2 inches outside these lines to confirm the location of these flange edges. Deck cuts over or within 2 inches of flange edges shall not extend lower than the bottom layer of deck slab reinforcing steel. Cuts made outside 2 inches of flange edges may extend the full depth of the deck. During cutting of the deck slab, care shall be taken not to damage steel members that are to be incorporated in the proposed structure.

REMOVAL METHODS: Concrete may be removed by cutting and by means of hand operated pneumatic hammers employing pointed or blunted chisel type tools. For removals above steel members, a hammer heavier than 35 pounds but not to exceed 90 pounds may be used at the approval of the Engineer, to ensure adequate depth control and to prevent nicking or gouging the primary steel members.

DECK REMOVALS: Due to the possible presence of welded attachments to existing structural steel (finishing machine, scupper and form supports, etc.), care shall be taken during deck removal to avoid damaging stringers which are to remain. Stringers damaged by the Contractor's removal operations shall, at no cost to the project, be replaced or repaired. Proposed repairs, developed by a registered professional engineer, shall be submitted in writing for review and approved by the Director.

EXTRANEOUS MEMBERS: Existing extraneous members (i.e., finishing machine and form supports, etc., and the support for scuppers and bulb angles which are to be removed) attached by welded connections to portions of the top flanges designated "tension" shall be removed and the flange surfaces ground smooth. Grinding shall be carefully done and parallel to the flanges.

LOADING LIMITATIONS: No part of the structure shall be subjected to unit stresses that exceed 136.5% of the allowable unit stresses given in AASHTO Standard Specifications for Highway Bridges due either to demolition, erection or construction methods, or to the use of movement of demolition or erection equipment on or across the structure. Structural analysis computations, by a registered professional engineer, showing the allowable stresses and the maximum stresses produced by the Contractor's methods or equipment shall be submitted to the Director for review and approval at least two weeks prior to the start of work.

PAYMENT: This work will be paid for at the contract lump sum price bid, which price and payment shall be full compensation for all labor, equipment, materials and incidentals necessary to complete the work in conformance with these requirements, with pertinent provisions of 202, and to the satisfaction of the Engineer.

CUT LINE CONSTRUCTION JOINT PREPARATION: Saw cut boundaries of proposed concrete removals 1" deep. Remove concrete to a rough surface. Where practicable, the existing reinforcing steel where required in the plans shall be left in place. Install dowel bars if specified. Prior to concrete placement abrasively clean joint surface and exposed reinforcement to remove loose and disintegrated concrete and loose rust. The joint surface and exposed reinforcement shall be thoroughly cleaned of all dirt, dust, or other foreign material by use of water, air under pressure, or other methods that produce satisfactory results. Concrete bonding surfaces shall be wet without free water as concrete is placed.

SUBSTRUCTURE CONCRETE REMOVAL shall be by means of approved pneumatic hammers employing pointed and blunt chisel tools. Hydraulic hoe-ram type hammers will not be permitted. The weight of the hammer shall not be more than 35 pounds for removal within 18 inches of portions to be preserved. Outside the 18 inch limit, a hammer heavier than 35 pounds, but not to exceed 90 pounds, may be used at the approval of the Engineer. Pneumatic hammers shall not be placed in direct contact with reinforcing steel that is to be retained in the rebuilt structure.

ITEM 503, UNCLASSIFIED EXCAVATION, AS PER PLAN: Unclassified excavation shall be in accordance with 503 except that the backfill material behind the abutments shall be in 203 material placed in 6 inch lifts.

EXISTING STRUCTURE VERIFICATION: Details and dimensions shown on these plans pertaining to the existing structure have been obtained from plans of the existing structure and from field observations and measurements. Consequently, they are indicative of the existing structure and the proposed work but they shall be considered tentative and approximate. The Contractor is referred to CMS Sections 102.05, 105.02, and 513.02.

Contract bid prices shall be based upon a recognition of the uncertainties described above and upon a prebid examination of the existing structure by the Contractor. However, all project work shall be based upon actual details and dimensions which have been verified by the Contractor in the field.

ITEM 516, JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN: This item shall consist of furnishing all necessary labor, materials, and equipment to raise or reposition any existing structures to the dimensions and requirements defined in the project plans.

The Contractor shall be responsible for the design, installation and operation of an adequate jacking system, including any temporary or permanent supports necessary to perform work described in the project plans. Three (3) sets of jacking plans, which include the information described in this note, shall be submitted to the Director for approval at least thirty (30) days before actual work is to begin. The plans shall be prepared and stamped by a registered professional engineer.

Jacking submittals shall include at least the following:

- The signature and number, or professional seal, of the registered professional engineer who prepared the submittal.
- Calculations and analysis of the structure to determine and define the actual loading applied at the Contractor's selection jacking points.
- A drawing showing the physical and dimensional position of the jacks with respect to the structure including clearances and center of lift.
- A schematic layout of jacks, check valves, pumps with 3 way retractor valve, pressure gages, flow control valves, etc. in accordance with manufactures recommendations. All jacks for each abutment or pier shall be connected together. All jacks at each abutment or pier shall be the same size.
- Analysis and calculations of the stresses induced or created in the structure and any temporary or permanent supports. Design calculations for any temporary or permanent supports.
- Physical dimensions, materials, and fabrication details of any temporary or permanent supports. Horizontal and vertical movement restraint shall be provided.
- A step by step procedure detailing all steps in the jacking operation.
- Method of attachment to structural members. Welding to tension areas will not be permitted.

The entire system including jacks shall have 20% more capacity than required based on calculated loads.

For lifts greater than 1", jacks shall have locking nuts to positively lock and support the structure during the lift.

Jacks shall have a swivel load cap, a domed piston head or some other device to protect against the effects of side load on the jack.

ITEM 516, JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN (CONT.)

Jacks alone shall not be used to support loads except during the actual jacking operation. Temporary supports, blocking or other methods approved by the Director shall be used.

Single acting rams with no over-travel protection system shall not be used.

Spare equipment shall be available on site for the required structure raising to proceed in the event of a breakdown. A list of spare equipment shall be provided to the Engineer.

At a minimum, a jacking operation shall lift all beams at one abutment or pier simultaneously. The only exception is the situation where the work involves replacing or rehabilitating individual bearings; no permanent shimming is required and the height of the lift shall not exceed 1/4".

Maximum differential jacking height between adjacent abutments or piers shall be 1" or less.

The Contractor shall demonstrate to the Engineer that the bridge bearings are fully seated between all contact areas. If full seating is not attained, suitable means of repair, subject to the approval of the Engineer, will be required at the Contractor's expense.

The jacking operation shall be directed by a Professional Engineer employed by the Contractor. Failure to have a Professional Engineer present shall be cause for ceasing jacking operations.

Payment shall be made at a lump sum price bid for Item 516, Jacking and Temporary Support of Superstructure, As Per Plan and shall include all necessary tools, labor, equipment and materials necessary to complete this item of work.

INSPECTION OF STRUCTURAL STEEL: The Engineer shall visually inspect all existing butt-welded splices and/or top flange cover plates fillet welds to ensure they are free of defects. The deck slab haunch forms immediately adjacent to such welds shall not be erected until after the Engineer has completed this inspection. This inspection shall not take place until after the top flanges are cleaned as specified in 511.08, but it shall be done before the deck slab reinforcement is installed. The cost associated with this inspection shall be included with Item 844, High Performance Concrete Superstructure (Deck) for Payment. Any cracks found should be reported to the Office of Structural Engineering, Bridge Construction Specialist, along with the specific information on the location of the cracks, length, and depth so an evaluation and repair or replacement recommendation can be made.

ITEM SPECIAL DOWEL HOLES

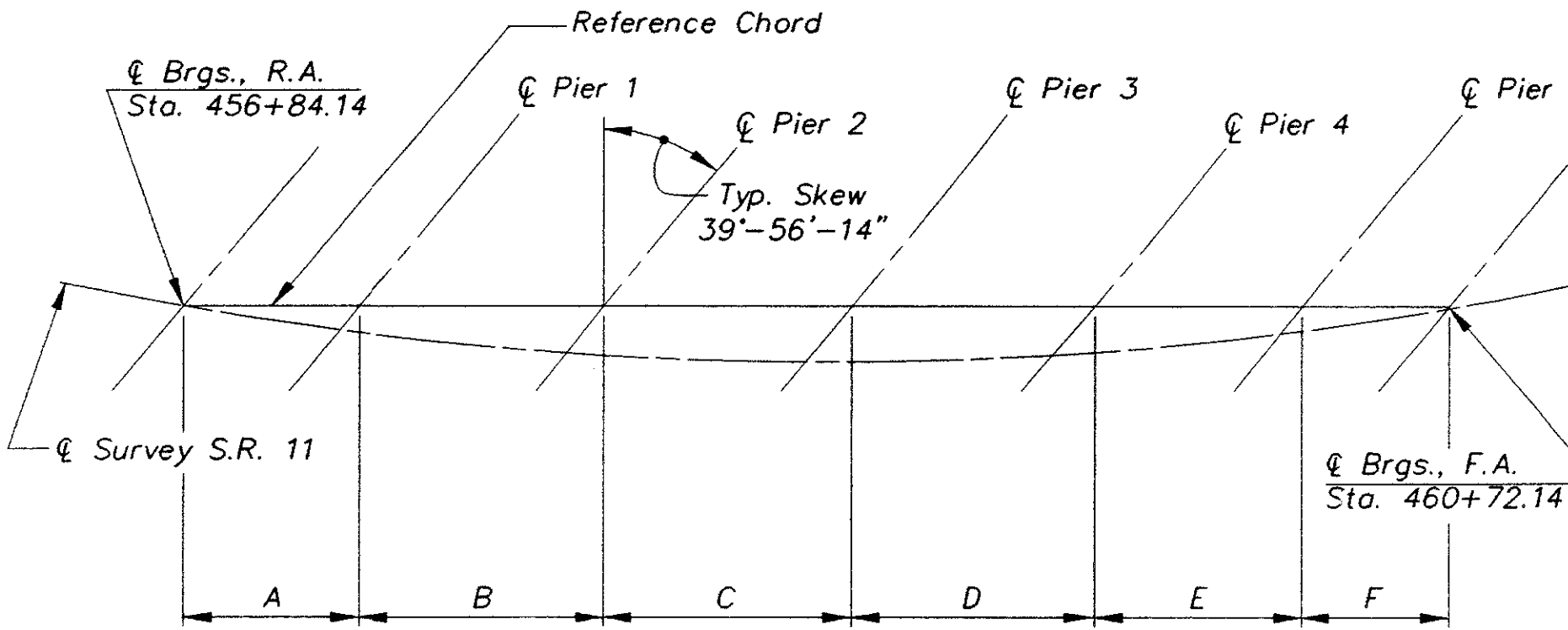
This item shall include the drilling or forming of holes into concrete or masonry and the furnishing and placing of grout into the holes. Non-shrink epoxy grout shall be used in accordance with CMS 510 and CMS 705.20. Depth of holes shall be as shown in plans.

Payment for drilling or forming holes and furnishing and placing materials shall be included in the contract prices for Item 844 High Performance Concrete Substructure.

ITEM 519, PATCHING CONCRETE STRUCTURE

All surfaces to be patched and the exposed reinforcing steel within shall be thoroughly cleaned by abrasive blasting prior to cleaning specified by 519.04. Cleaning shall precede application of the patching material or erection of the forms by not more than 24 hours.

BACKWALL CONCRETE: In addition to CMS 511.08, backwall concrete above the optional construction joint at the approach slab seat shall not be placed until after the deck concrete in the span adjacent to the abutment has been placed.



REFERENCE CHORD DIAGRAM

LEGEND:

A = 53'-1 5/8"
B = 75'-6 13/16"
C = 75'-1 7/8"
D = 74'-9"
E = 64'-5 5/16"
F = 44'-11 1/8"

GENERAL NOTES

Bridge No. COL-11-0946 S.B.L.
over West Fork Little Beaver Creek & W.B. US 30

COL-11-(9.44)(13.76)

2/27

74
126

DESIGN AGENCY

WDA&F
1201 Dublin Road
Columbus, Ohio

DATE

6-12-00

REVIEWED

BLG
STRUCTURE FILE NUMBER

1500600

DRAWN

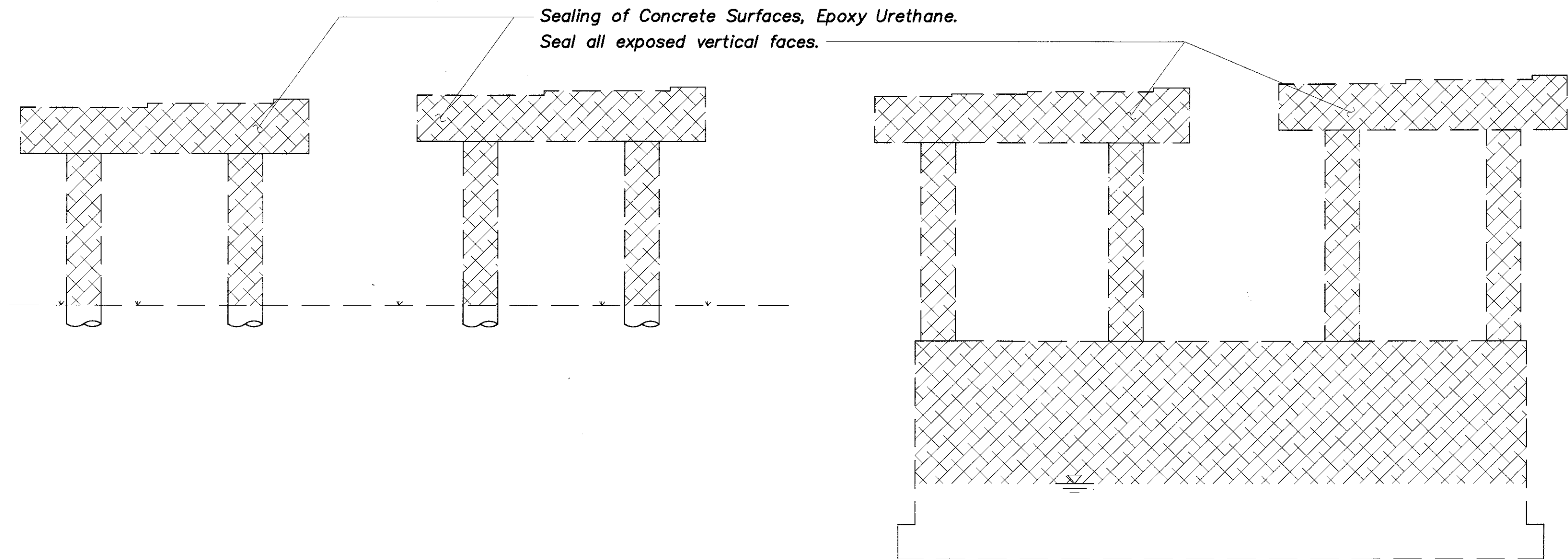
WHM
CHECKED

DESIGNED

WHM
GTB

K:\0001\00111\COL-11-(9.46)\Drawings\COL-11-9.46\Shared Bridge\Est. avar.dwg

ESTIMATED QUANTITIES TABLE												CALC. BY GTB DATE: 05/25/00	CHECK BY WHM DATE: 06/08/00
		N.B.L.	S.B.L.			COL-11-0946 (N.B.L.)				COL-11-0946 (S.B.L.)			
ITEM	ITEM EXTENSION	TOTAL	TOTAL	UNIT	DESCRIPTION	ABUTMENTS	PIERS	SUPER- STRUCTURE	GENERAL	ABUTMENTS	PIERS	SUPER- STRUCTURE	GENERAL
202	11203	LUMP	LUMP		PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN				LUMP				LUMP
503	11100	LUMP	LUMP		COFFERDAMS, CRIBS, AND SHEETING				LUMP				LUMP
503	21301	LUMP	LUMP		UNCLASSIFIED EXCAVATION, AS PER PLAN				LUMP				LUMP
512	44400	3	3	SQ YD	TYPE B WATERPROOFING	3				3			
SPECIAL	51267510	2065	2060	SQ YD	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) (SEE PROPOSAL NOTE)	226	893	946		224	908	928	
516	11210	130	128	LIN FT	STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL			130				128	
516	47001	LUMP	LUMP		JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN				LUMP				LUMP
518	12200	4	3	EACH	SCUPPER INCLUDING SUPPORTS			4				3	
518	21230	LUMP	LUMP		POROUS BACKFILL WITH FILTER FABRIC	LUMP				LUMP			
519	11100	51	19	SQ FT	PATCHING CONCRETE STRUCTURE	51				19			
815	00100	LUMP	LUMP		SURFACE PREPARATION OF EXISTING STEEL, SYSTEM OZEU			LUMP				LUMP	
815	00200	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, PRIME COAT, SYSTEM OZEU			LUMP				LUMP	
815	00300	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, INTERMEDIATE COAT, SYSTEM OZEU			LUMP				LUMP	
815	00400	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, FINISH COAT, SYSTEM OZEU			LUMP				LUMP	
844	48000	598	572	CU YD	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE (DECK)			598				572	
844	48020	111	110	CU YD	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE (PARAPET)			111				110	
844	48040	62	61	CU YD	HIGH PERFORMANCE CONCRETE SUBSTRUCTURE	62				61			
844	49000	LUMP	LUMP		HIGH PERFORMANCE CONCRETE TRIAL MIX			LUMP				LUMP	
844	49010	LUMP	LUMP		HIGH PERFORMANCE CONCRETE TESTING			LUMP				LUMP	
863	20000	5016	4434	EACH	WELDED STUD SHEAR CONNECTORS			5016				4434	



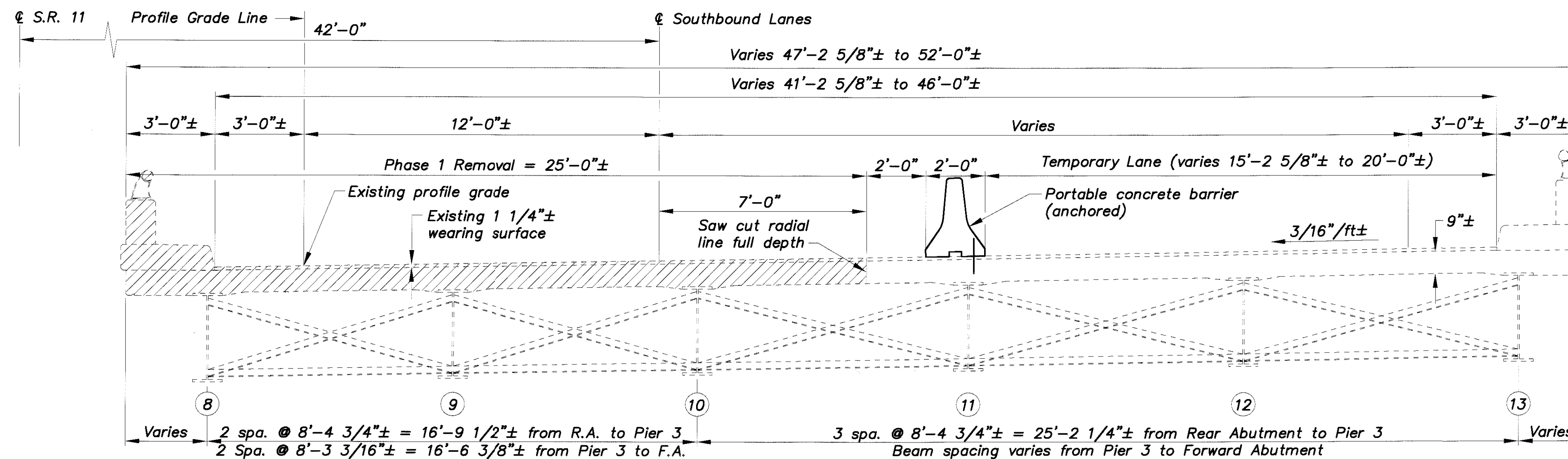
PIER SEALING LIMITS (1, 4 & 5)

PIER SEALING LIMITS (2 & 3)

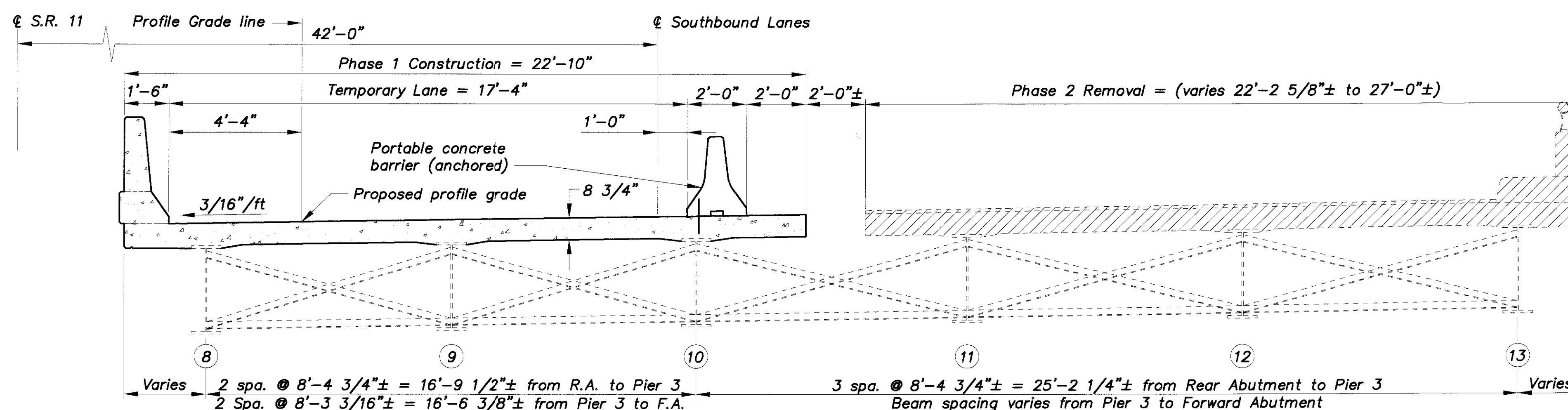
Sealing of Concrete Surfaces			
SOUTHBOUND			
Location	Caps	Columns	Wall
Pier 1	54 Sq.Yd.	69 Sq.Yd.	N/A
Pier 2	54 Sq.Yd.	88 Sq.Yd.	142 Sq.Yd.
Pier 3	54 Sq.Yd.	78 Sq.Yd.	142 Sq.Yd.
Pier 4	56 Sq.Yd.	61 Sq.Yd.	N/A
Pier 5	56 Sq.Yd.	54 Sq.Yd.	N/A
NORTHBOUND			
Location	Caps	Columns	Wall
Pier 1	54 Sq.Yd.	69 Sq.Yd.	N/A
Pier 2	56 Sq.Yd.	75 Sq.Yd.	146 Sq.Yd.
Pier 3	58 Sq.Yd.	66 Sq.Yd.	153 Sq.Yd.
Pier 4	61 Sq.Yd.	49 Sq.Yd.	N/A
Pier 5	62 Sq.Yd.	44 Sq.Yd.	N/A

NOTE:

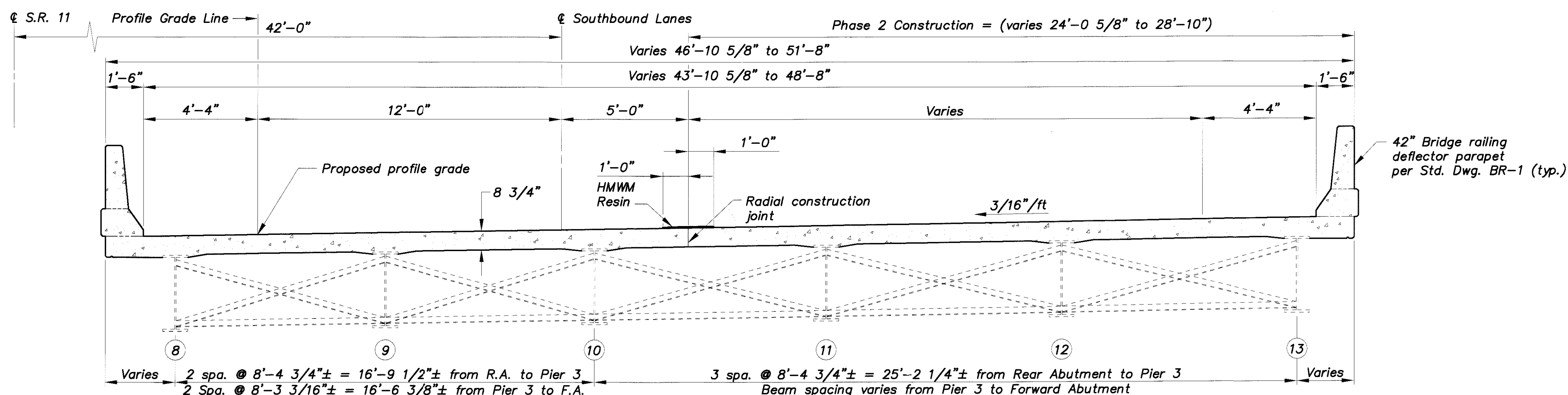
Quantities for concrete sealing shown above were calculated from dimensions shown on the original construction contract plans.



PHASE 1 REMOVAL



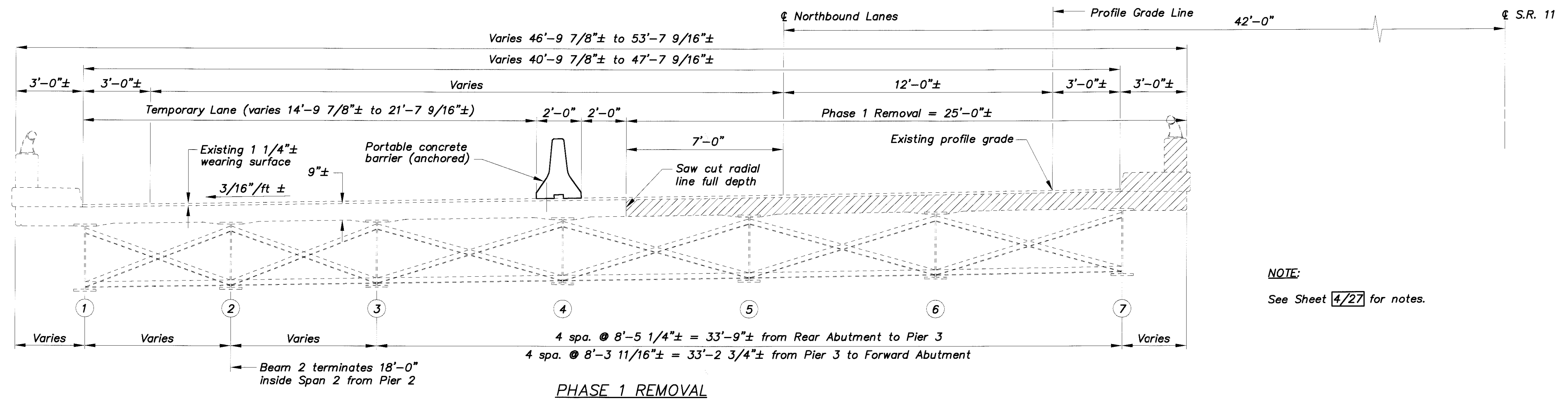
PHASE 1 CONSTRUCTION & PHASE 2 REMOVAL



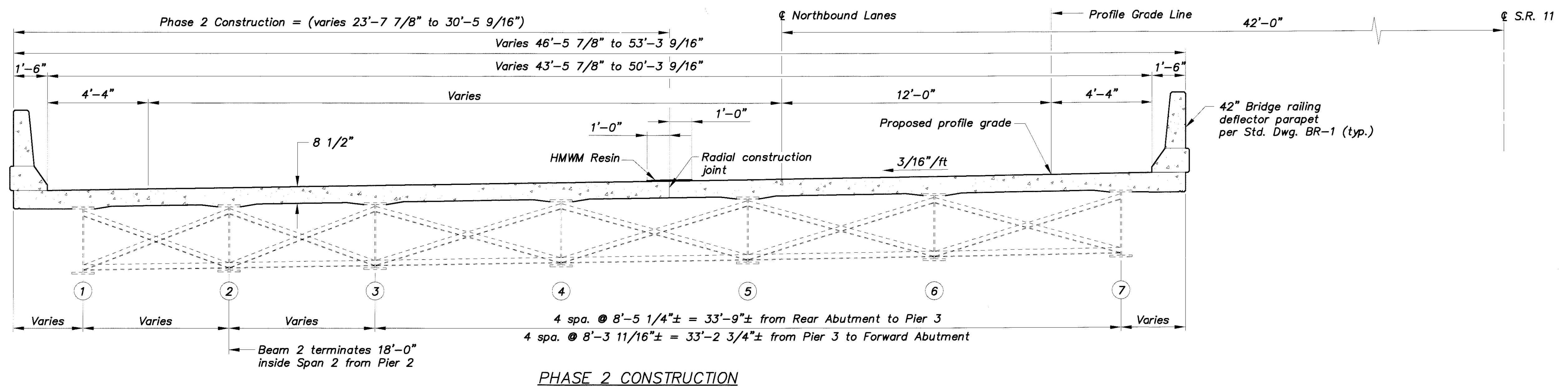
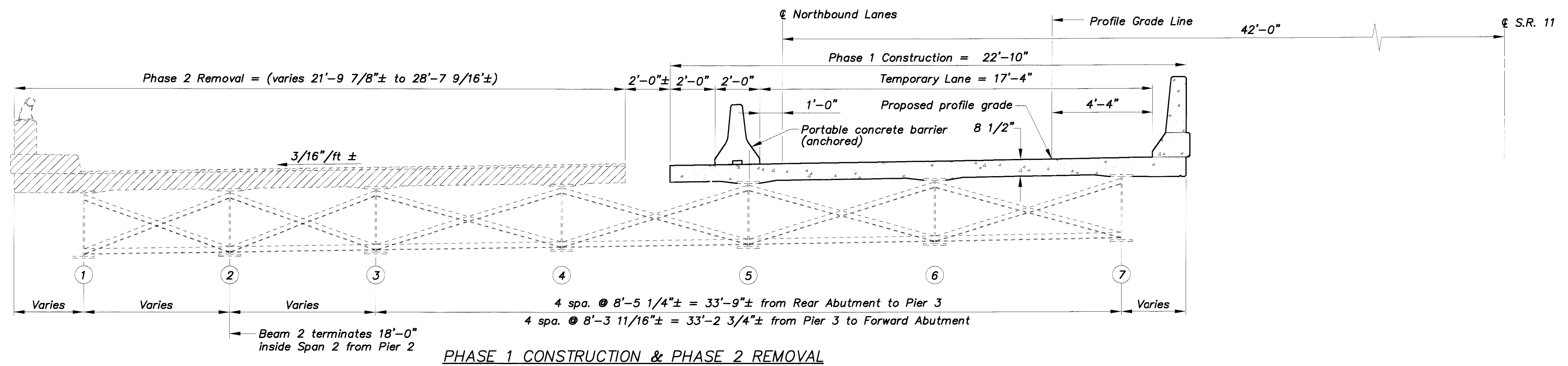
PHASE 2 CONSTRUCTION

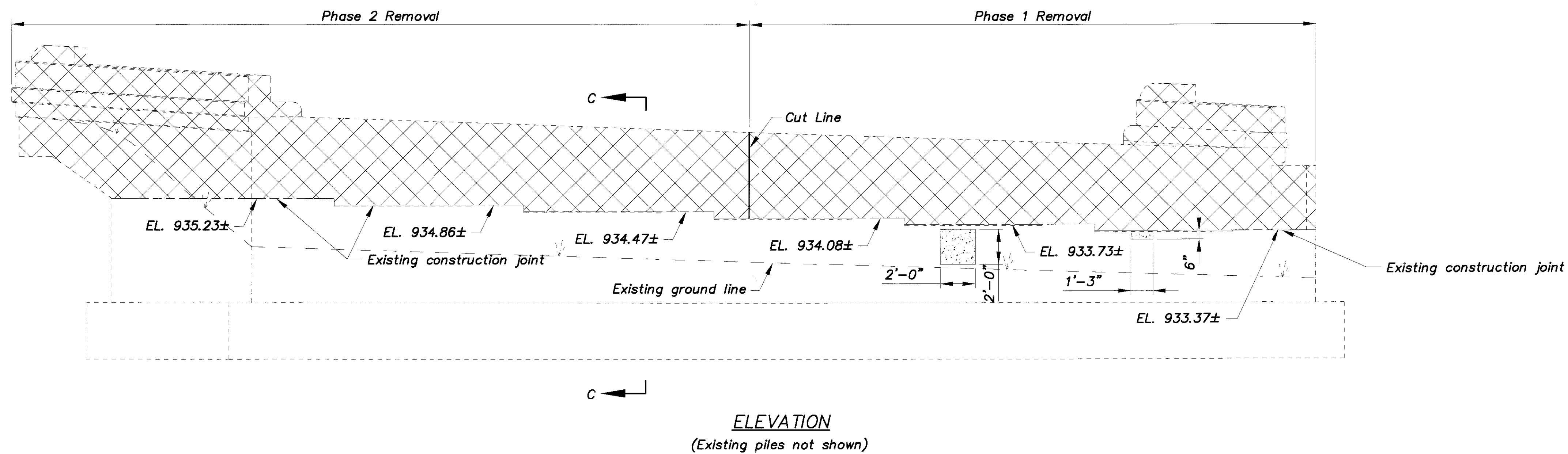
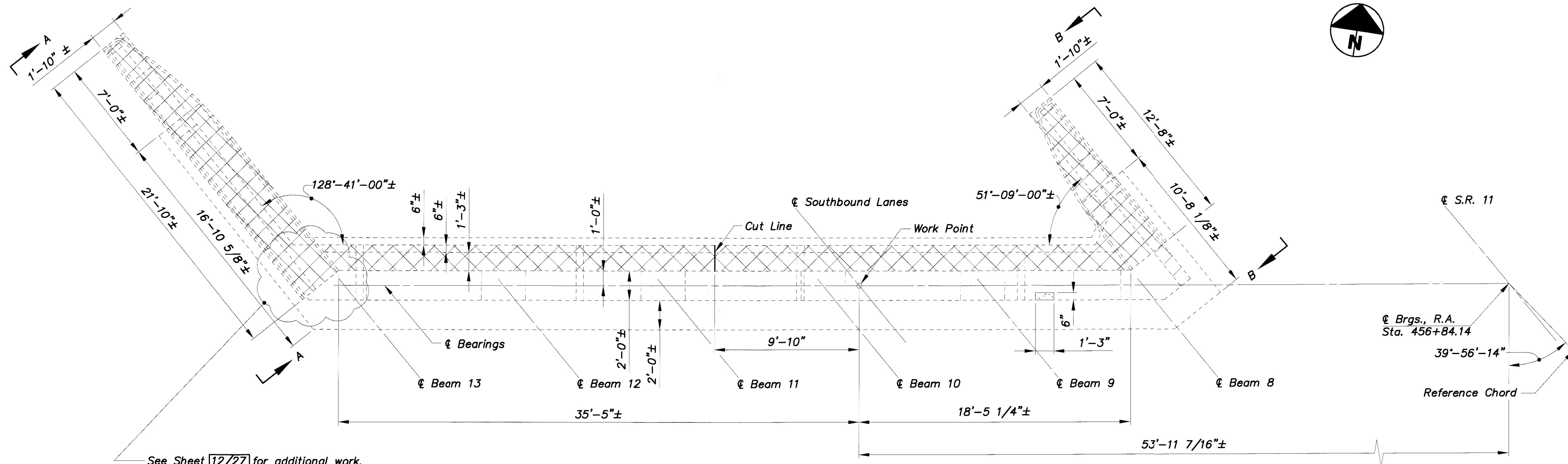
NOTE:

All Bridge Mounted barrier segments shall be fastened to the bridge deck using 1" diameter high strength approved partial depth resin bonded anchors. The Contractor shall locate and mark the deck reinforcing steel prior to placing anchors. Resin anchors must be embedded a minimum of 6 1/2". Two anchors shall be provided for each 10'-0" segment. Anchors shall be placed on the traffic side with anchor pattern symmetrical about the center of each 10'-0" segment. Resin anchors shall be removed as directed by the Engineer. Upon removal of anchors, holes shall be filled with an epoxy non-shrink grout. For details not shown, see Standard Construction Drawing PCB-91. Payment for above shall be included with Item 622-Portable Concrete Barrier, Bridge Mounted.



NOTE:
See Sheet 4/27 for notes.





NOTE:

See Sheet 8/27 for Section C-C, View A-A & View B-B.

LEGEND:

Portion of existing structure to be removed.

Area of delamination to be repaired by concrete patching.
Total patching quantity this sheet = 5.25 sq. ft. + 4.05 sq. ft.
= 9.30 sq. ft.

EXISTING REAR ABUTMENT REMOVAL & REPAIR

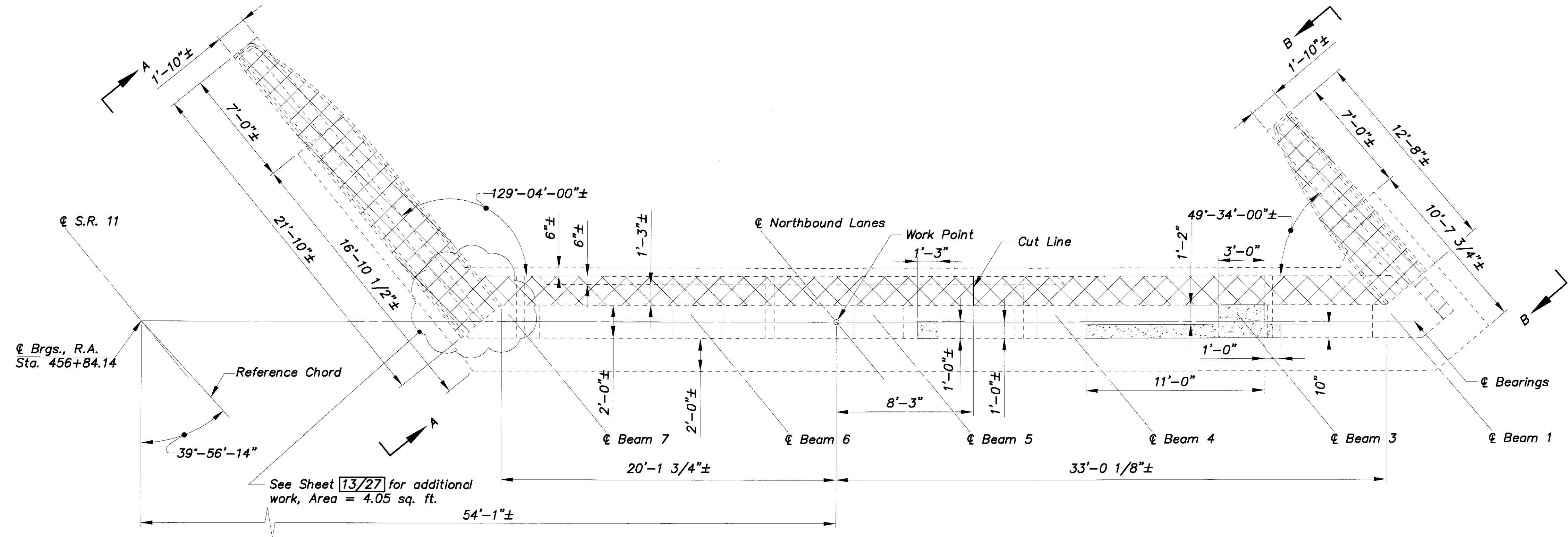
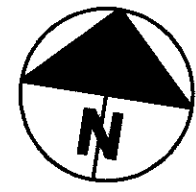
Bridge No. COL-11-0946 S.B.L.
over West Fork Little Beaver Creek & W.B. US 30

COL-11-(9.44)(13.76)

6/27

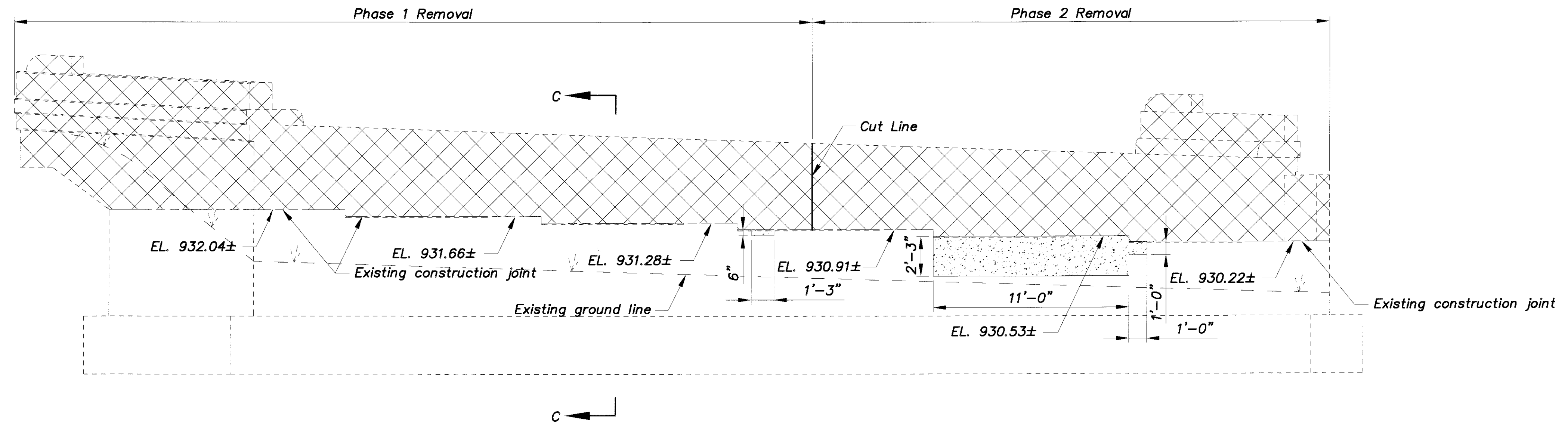
78
126

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-12-00
CHECKED	REVIS	STRUCTURE FILE NUMBER	1500600
GTB			



PLAN

(Existing approach slab and porous backfill not shown)



ELEVATION

(Existing piles not shown)

NOTE:

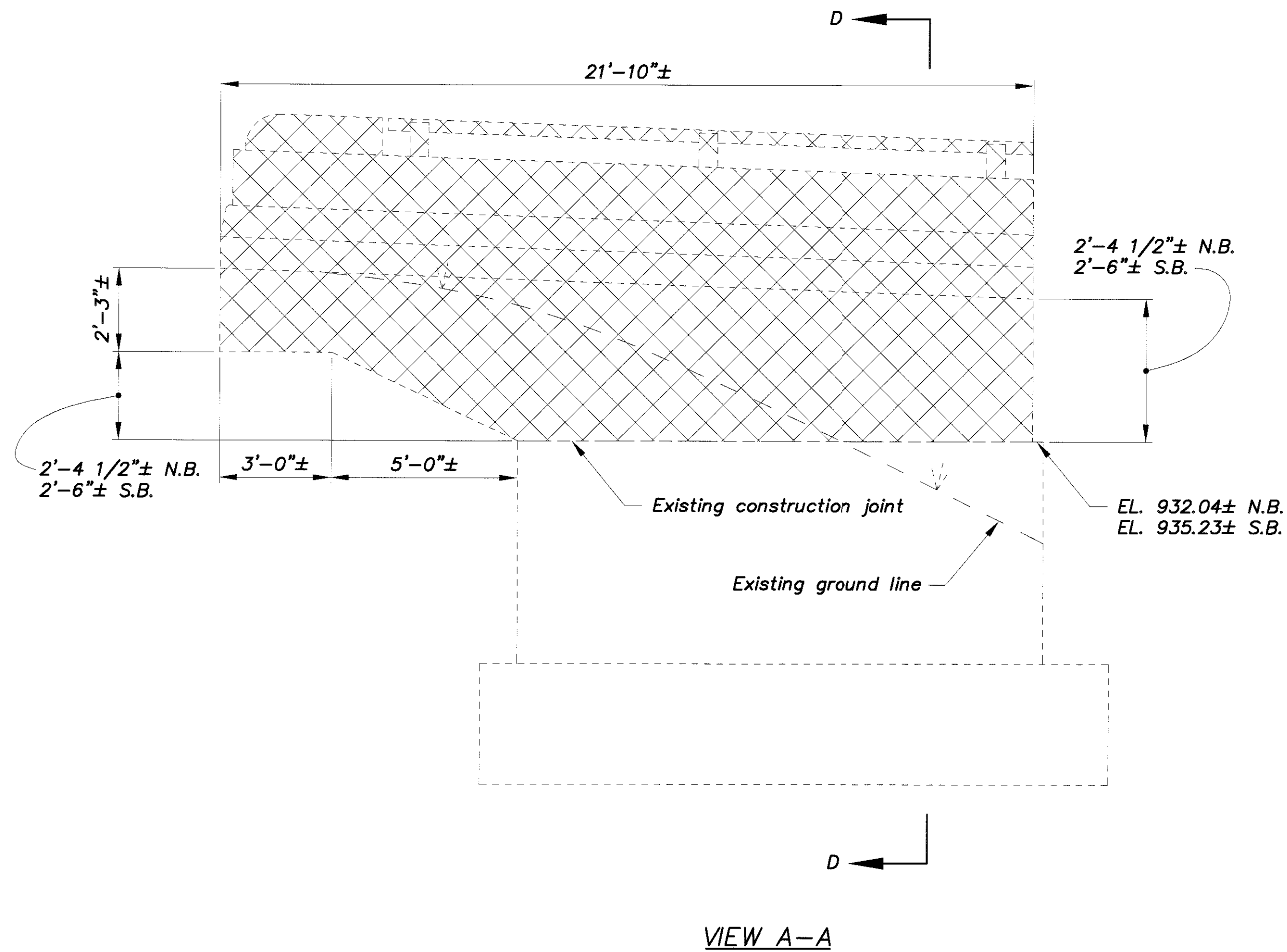
See Sheet 8/27 for Section C-C, View A-A & View B-B.

LEGEND:

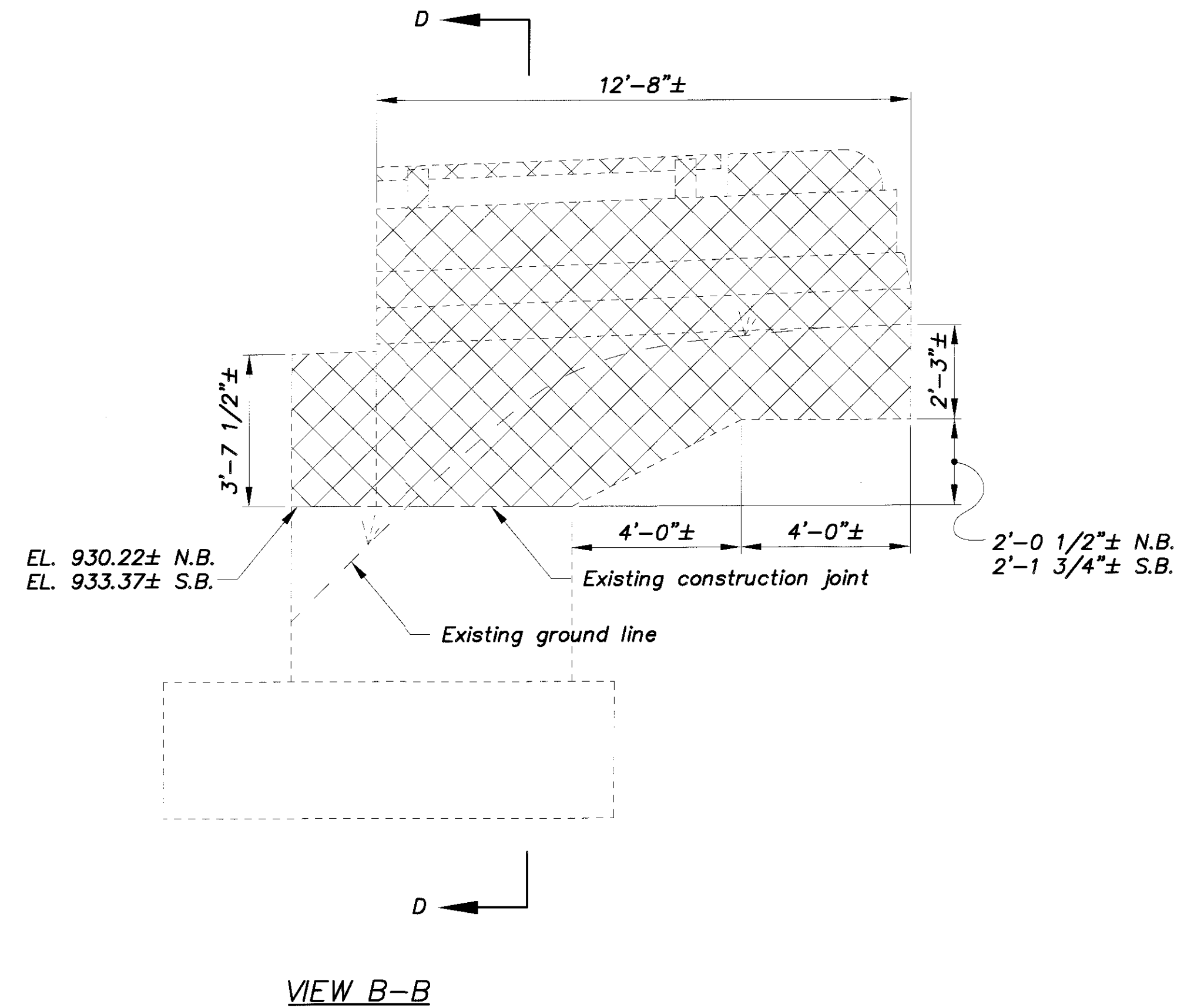
Portion of existing structure to be removed.

Area of delamination to be repaired by concrete patching.
Total patching quantity this sheet = 41 sq. ft. + 4.05 sq. ft.
= 45.05 sq. ft.

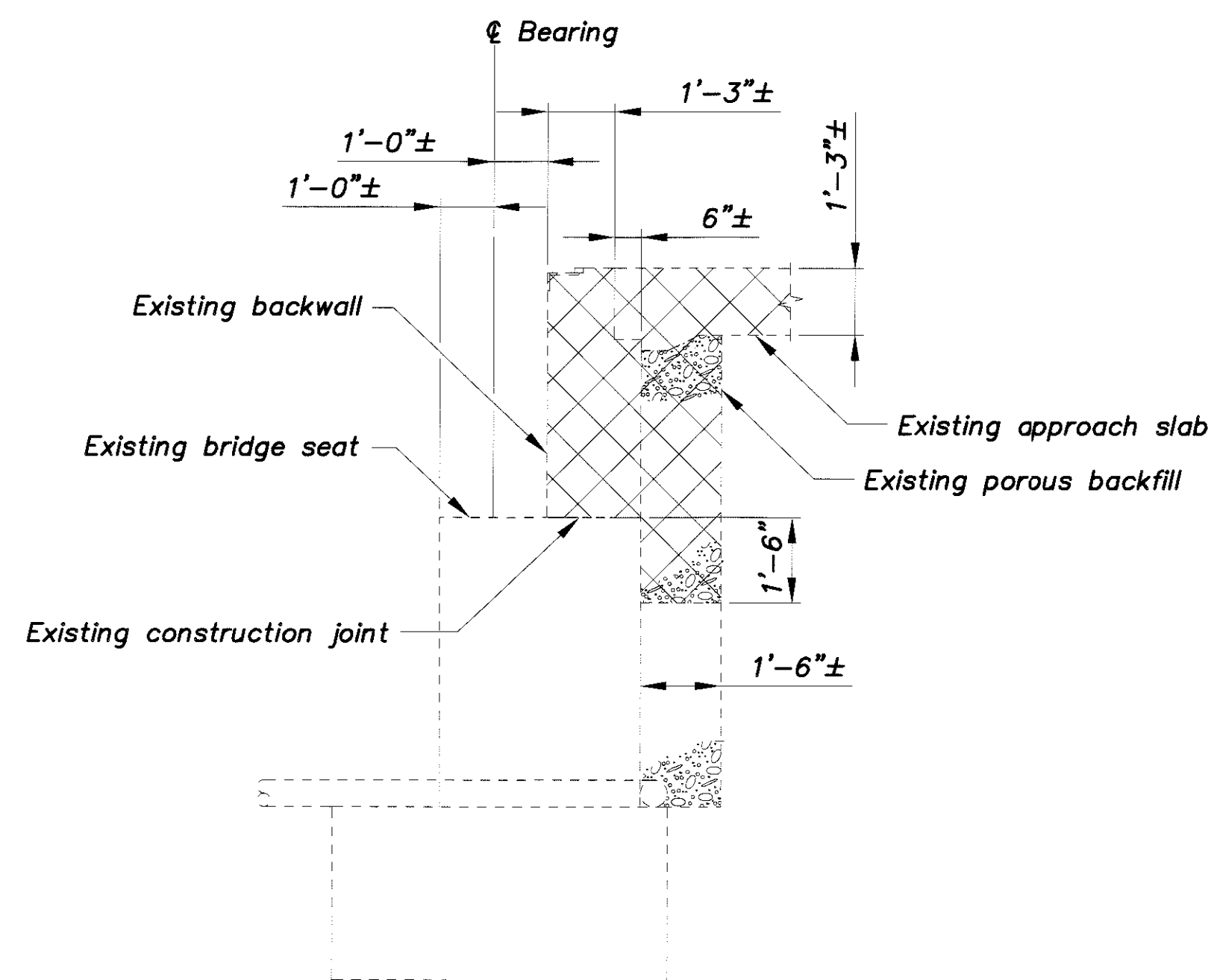
K:\Data\Dist11\COL-11-(9.46)\13.78\Drawings\COL-11-(9.46)\Shared Bridge\vearexistabul_xsections.dwg



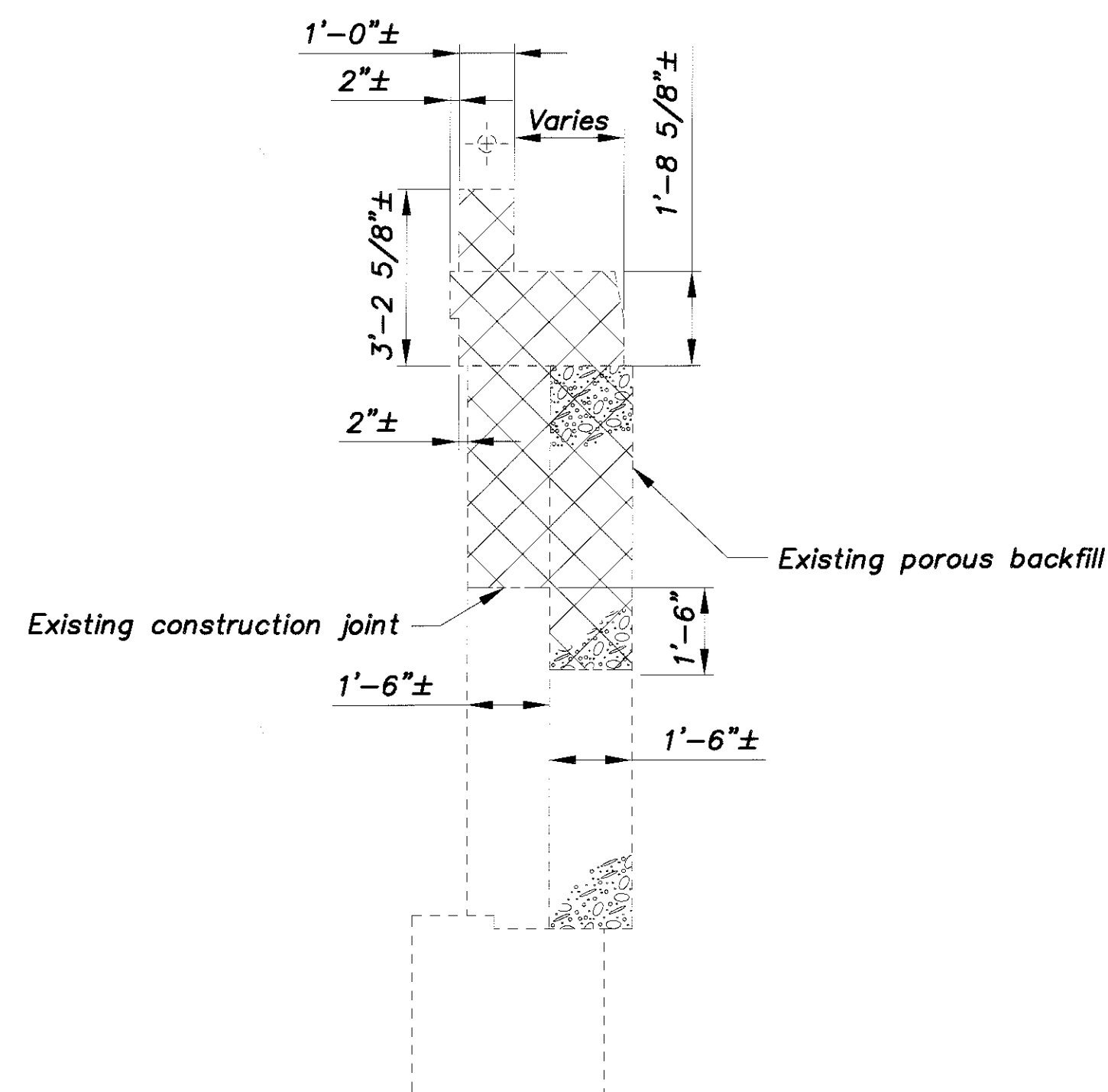
VIEW A-A



VIEW B-B



SECTION C-C



SECTION D-D

NOTES:

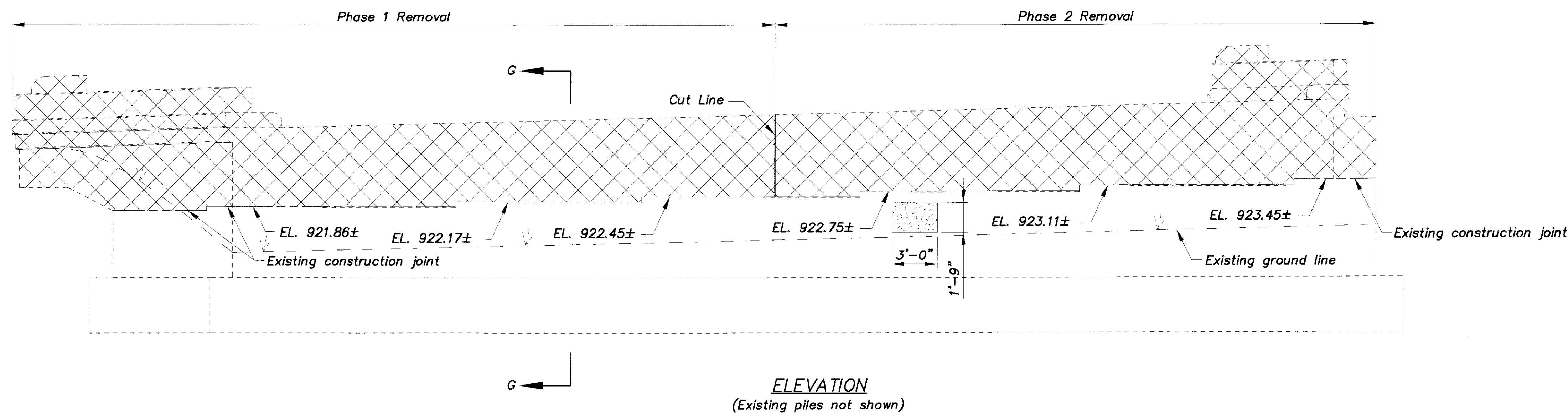
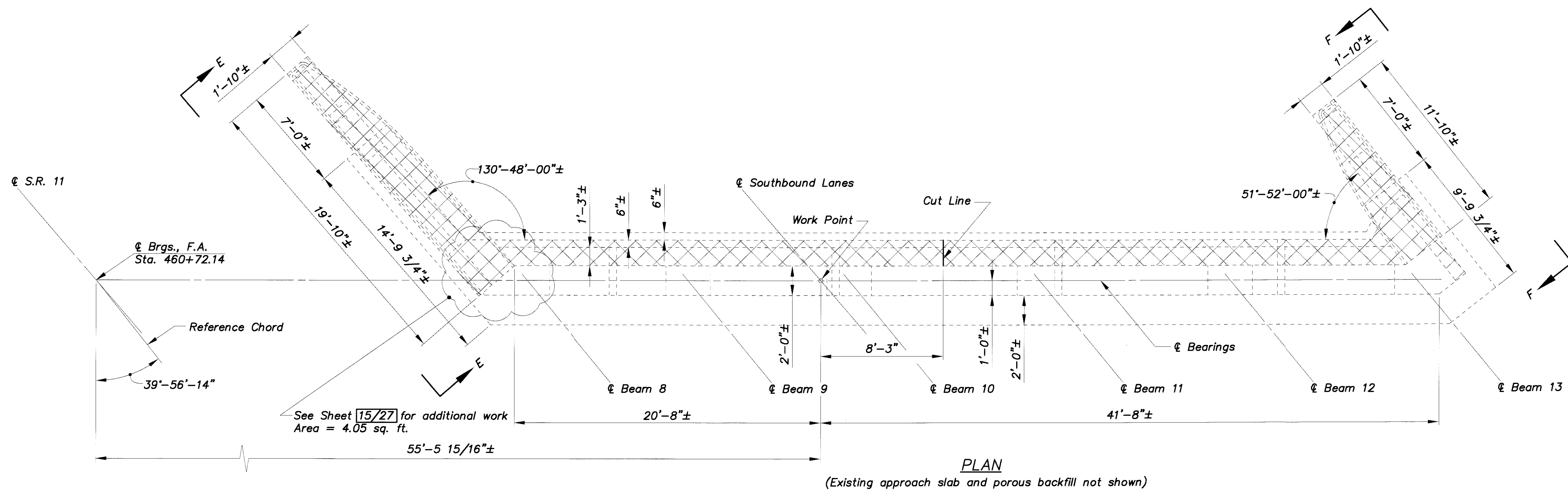
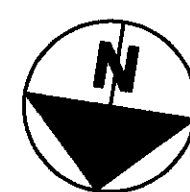
Refer to Sheets **6/27** & **7/27** for locations of Section C-C, View A-A & View B-B.

Existing piles not shown in all Views & Sections.

LEGEND:

 Portion of existing structure to be removed.

N.B. - Northbound
S.B. - Southbound

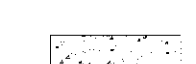


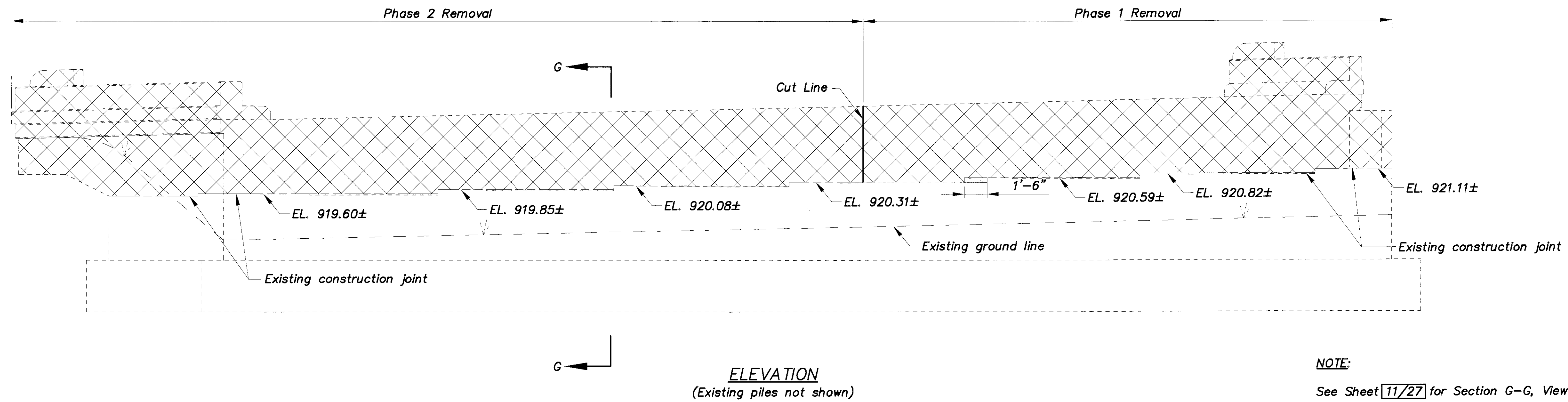
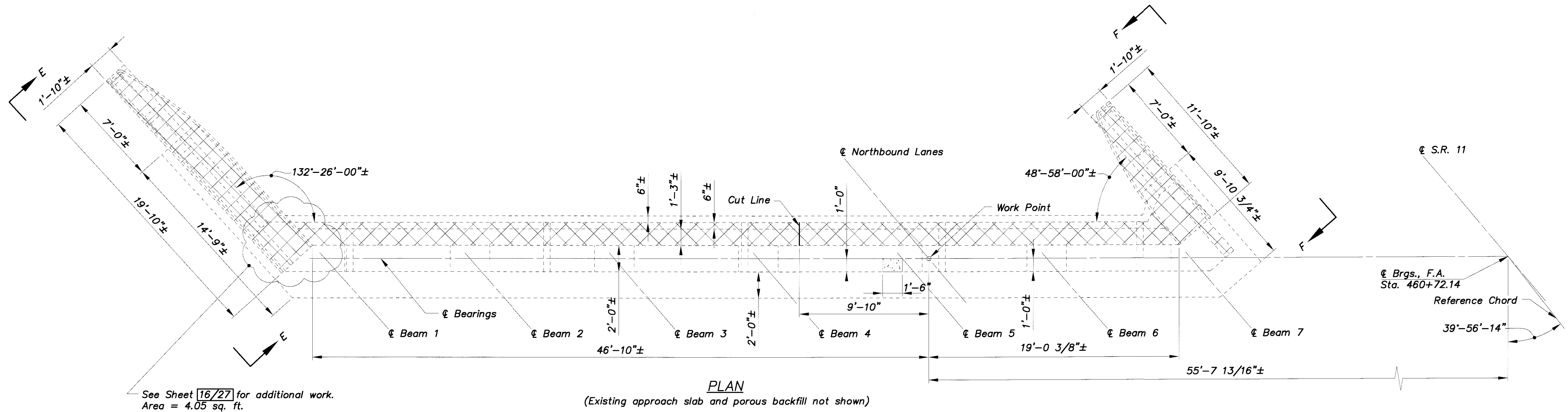
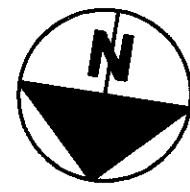
NOTE:

See Sheet **11/27** for Section G-G, View E-E & View F-F.

LEGEND:

 Portion of existing structure to be removed.

 Area of delamination to be repaired by concrete patching.
Total patching quantity this sheet = 5.25 sq.ft. + 4.05 sq. ft.
= 9.30 sq. ft.

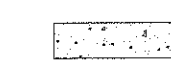


NOTE:

See Sheet 11/27 for Section G-G, View E-E & View F-F.

LEGEND:

 Portion of existing structure to be removed.

 Area of spall to be repaired by concrete patching.
Total patching quantity this sheet = 1.92 sq. ft. + 4.05 sq. ft.
= 5.97 sq. ft.

EXISTING FORWARD ABUTMENT REMOVAL & REPAIR

Bridge No. COL-11-0946 N.B.L.
over West Fork Little Beaver Creek & W.B. US 30

COL-11-(9.44)(13.76)

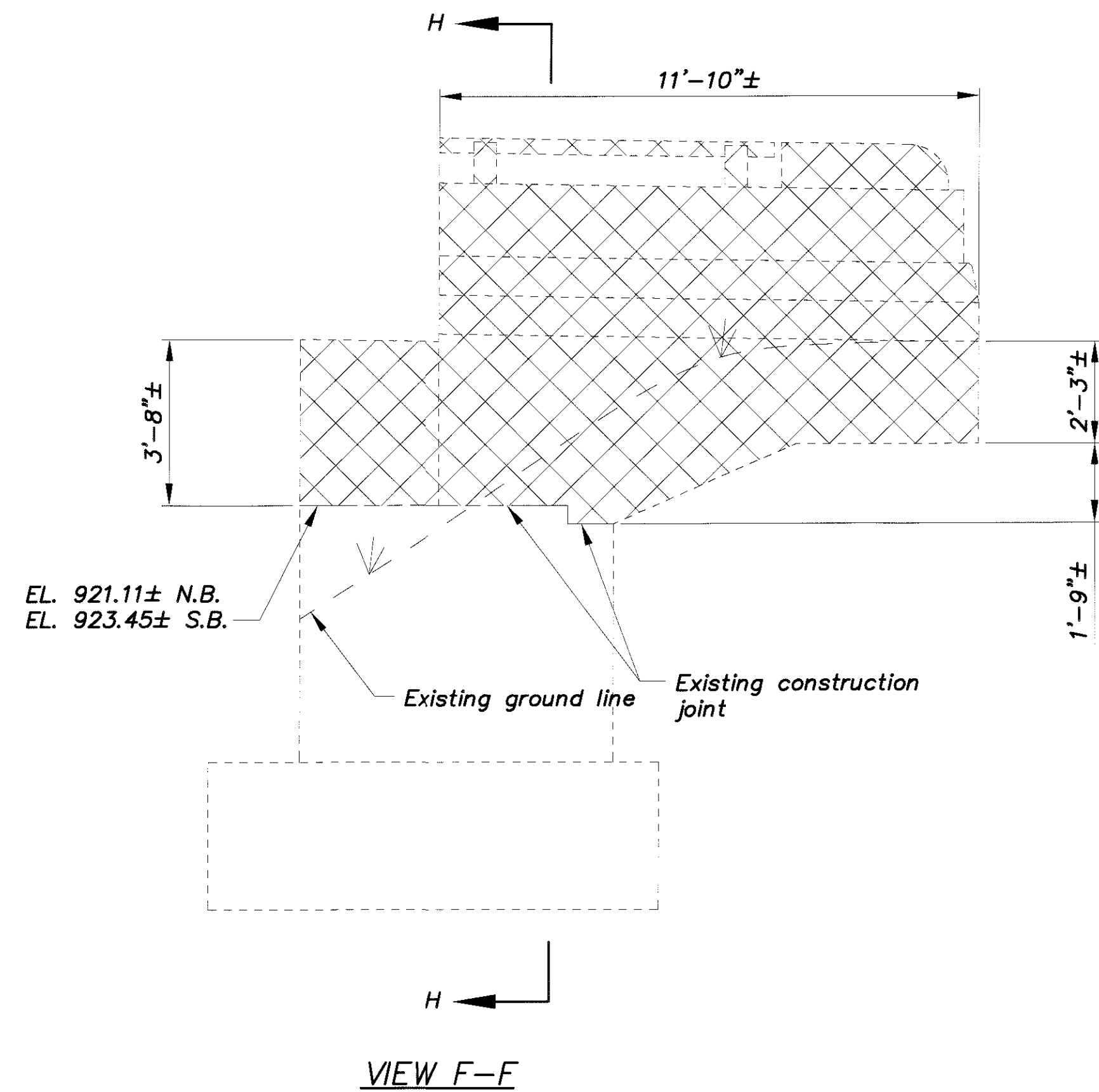
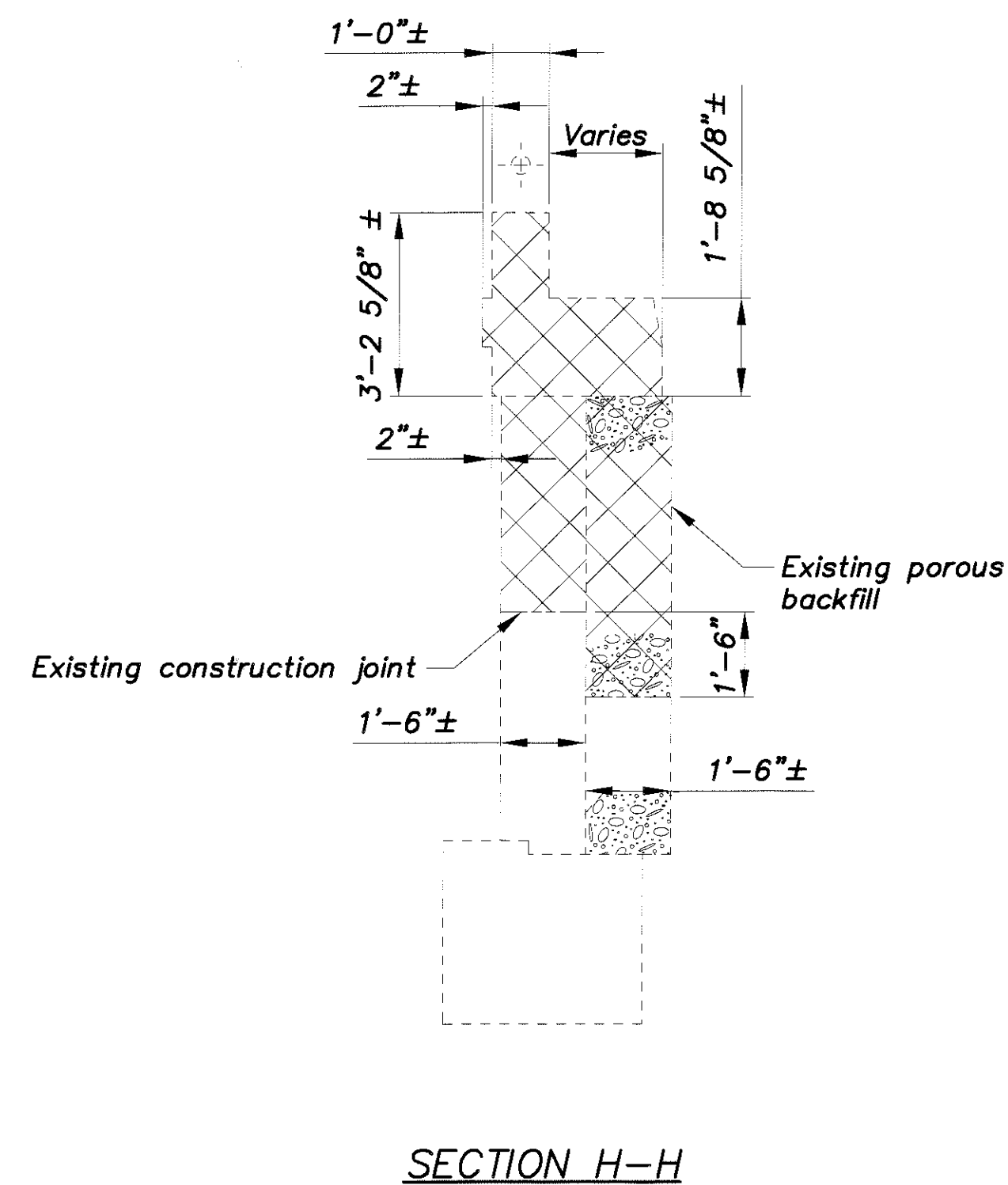
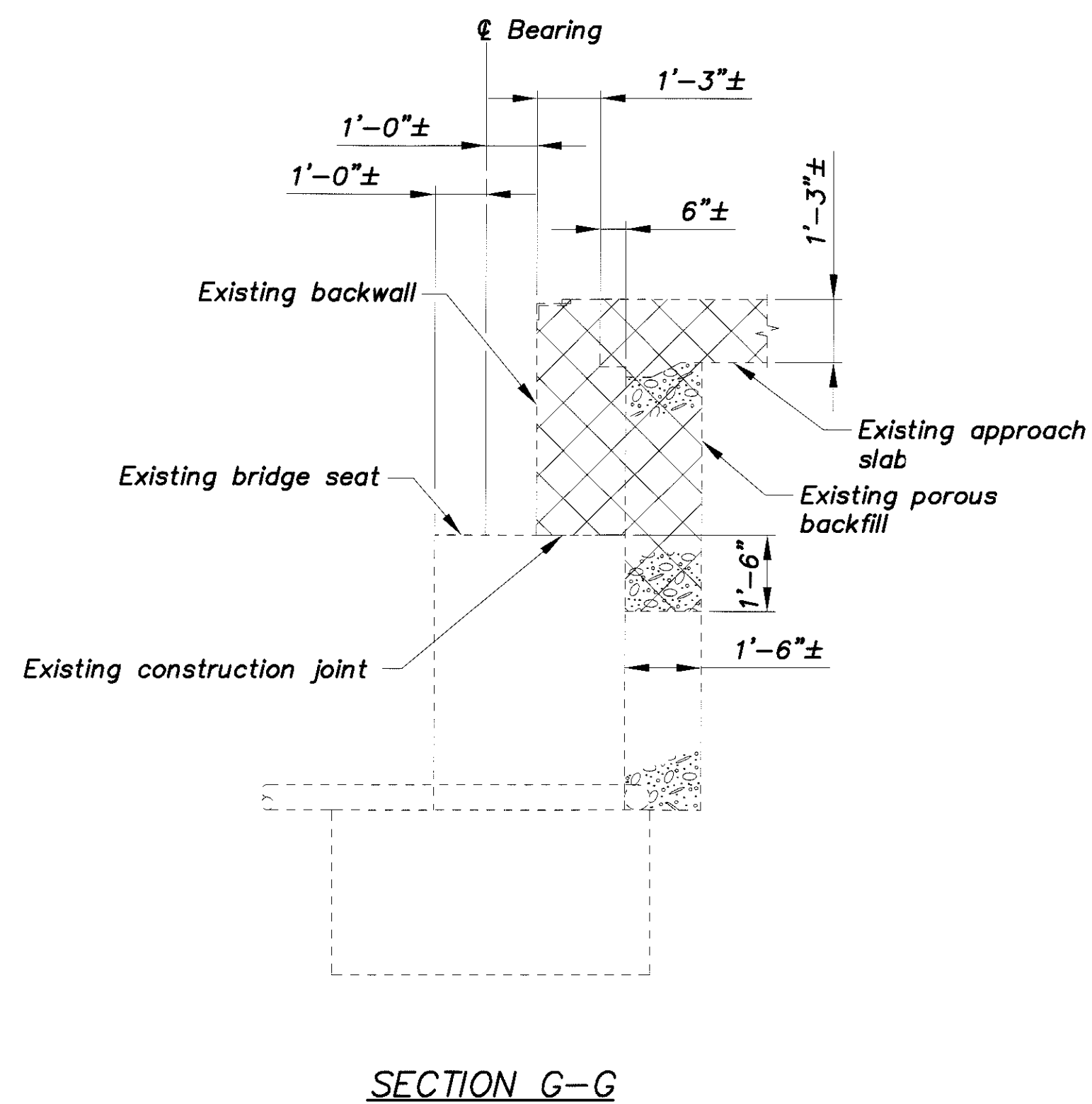
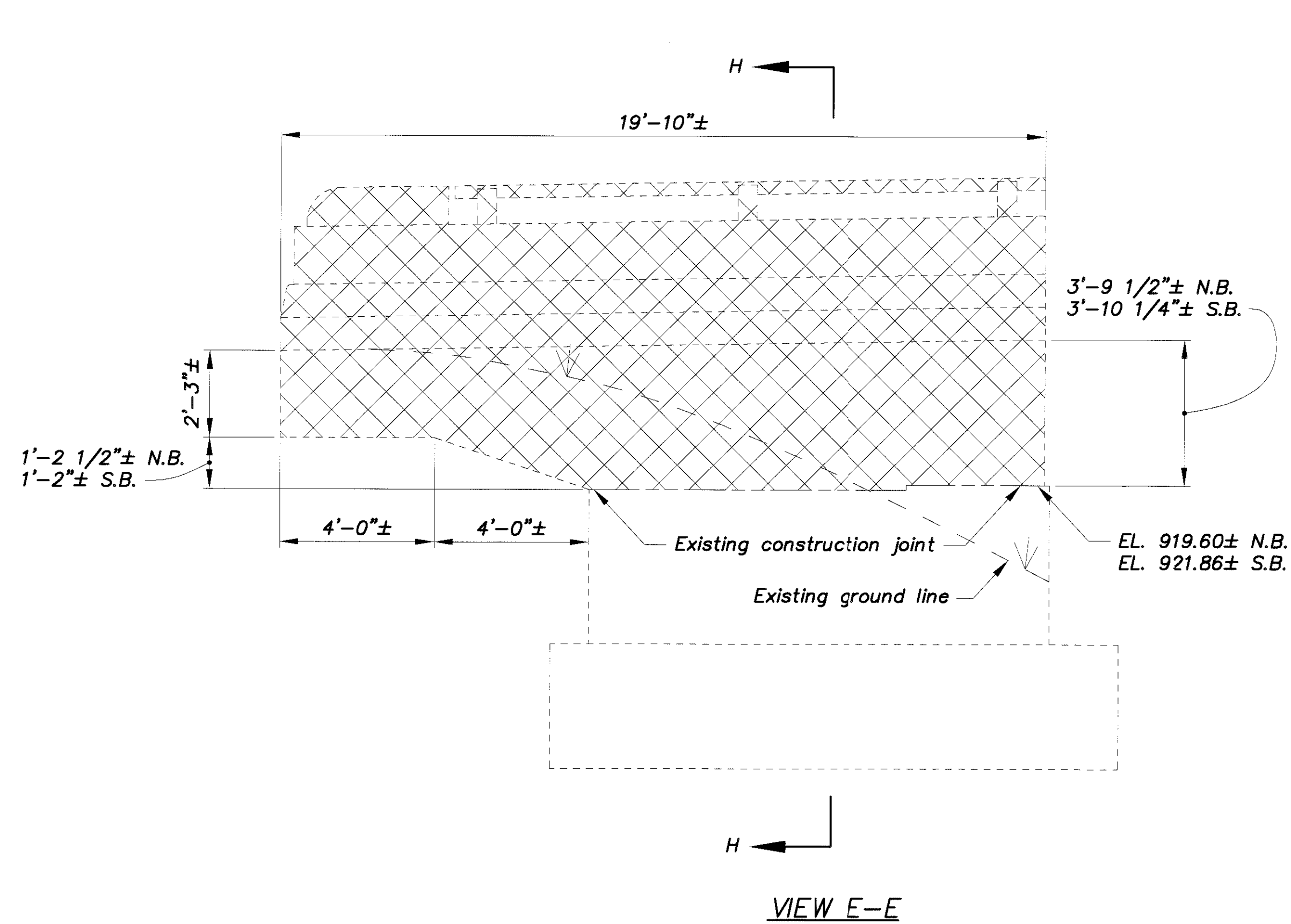
10/27

82
126

DESIGNED	CHECKED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	BLG	6-12-00
GTB	GTB	STRUCTURE	STRUCTURE	FILE NUMBER
				1500570

WDA&E
DESIGN AGENCY
1201 Dublin Road
Columbus, Ohio

K:\odotat\Dist1\COL-11 (9.46)\1\Drawings\COL-11-9.46\Shared Bridge\forexistabut_xsections.dwg



NOTES:

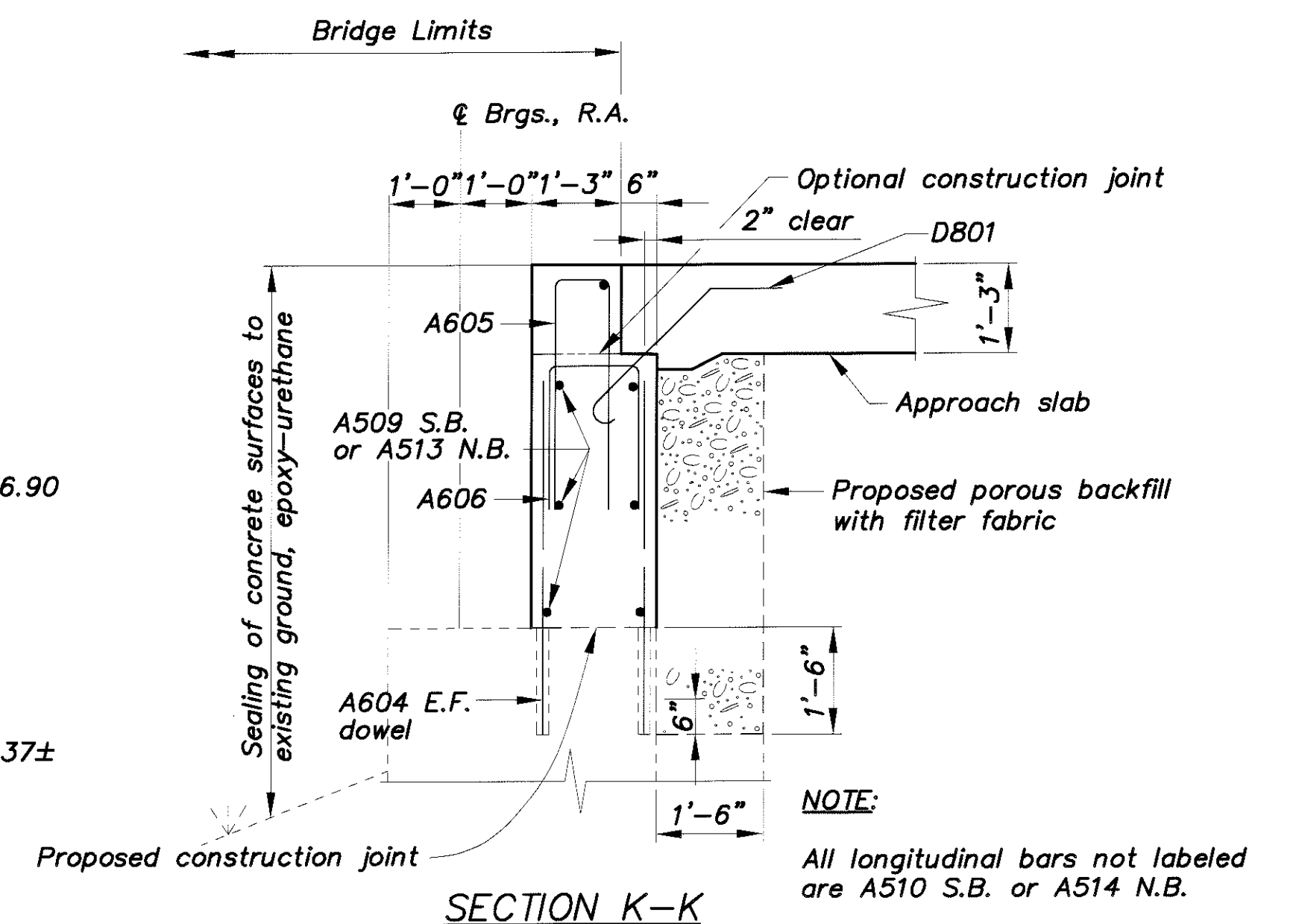
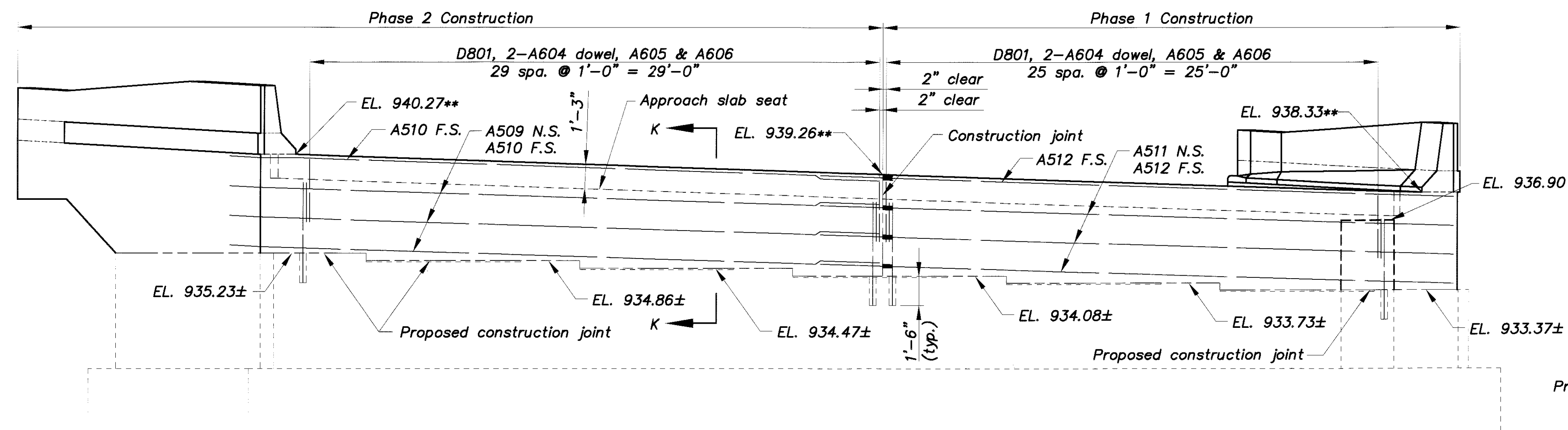
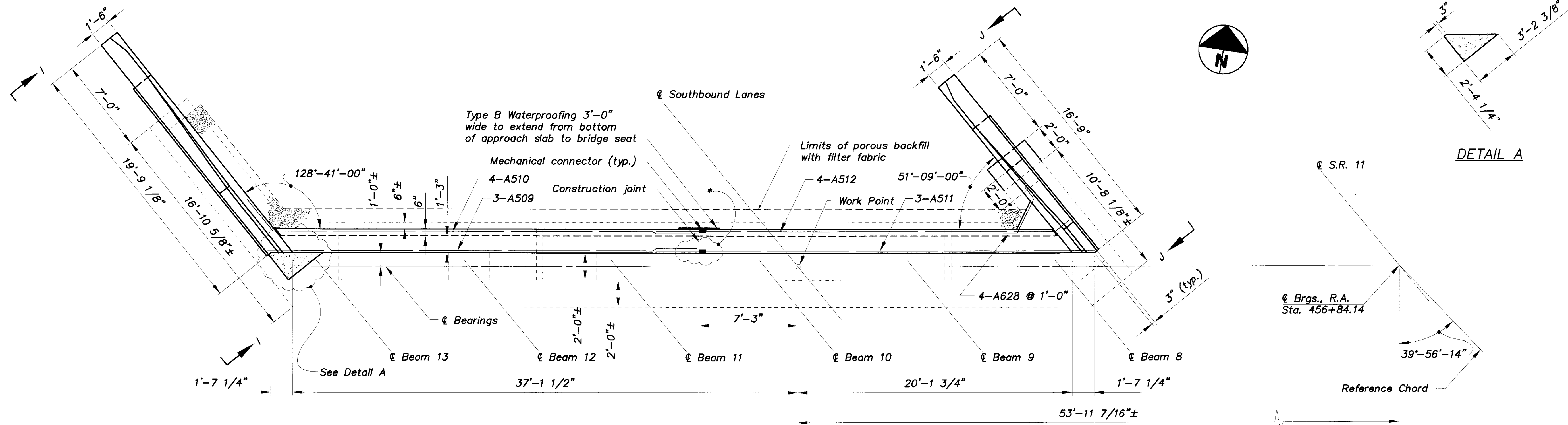
Refer to Sheets 9/27 & 10/27 for locations of Section G-G, View E-E & View F-F.

Existing piles not shown in all Views & Sections.

LEGEND:

XXXX Portion of existing structure to be removed.

N.B. - Northbound
S.B. - Southbound



NOTES:

See Sheet **14/27** for View I-I & View J-J.

Lap length for #5 bar = 2'-6" minimum

LEGEND:

N.S. - Near Side

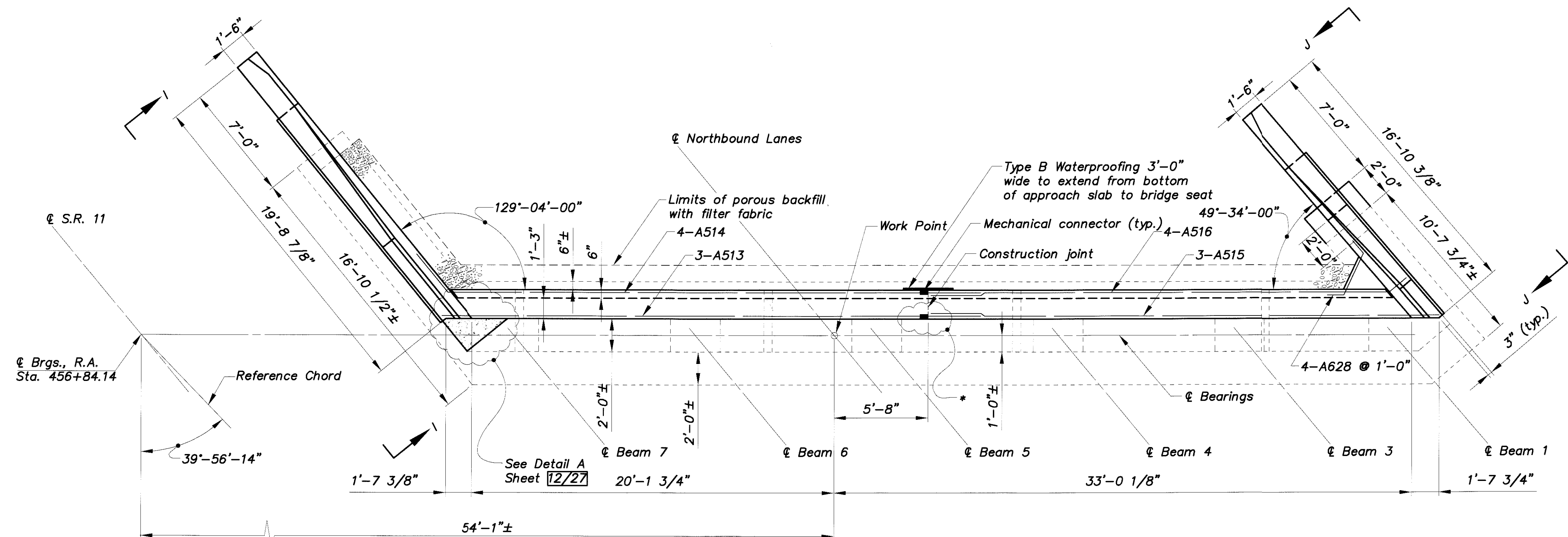
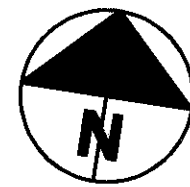
F.S. - Far Side

E.F. - Each Face

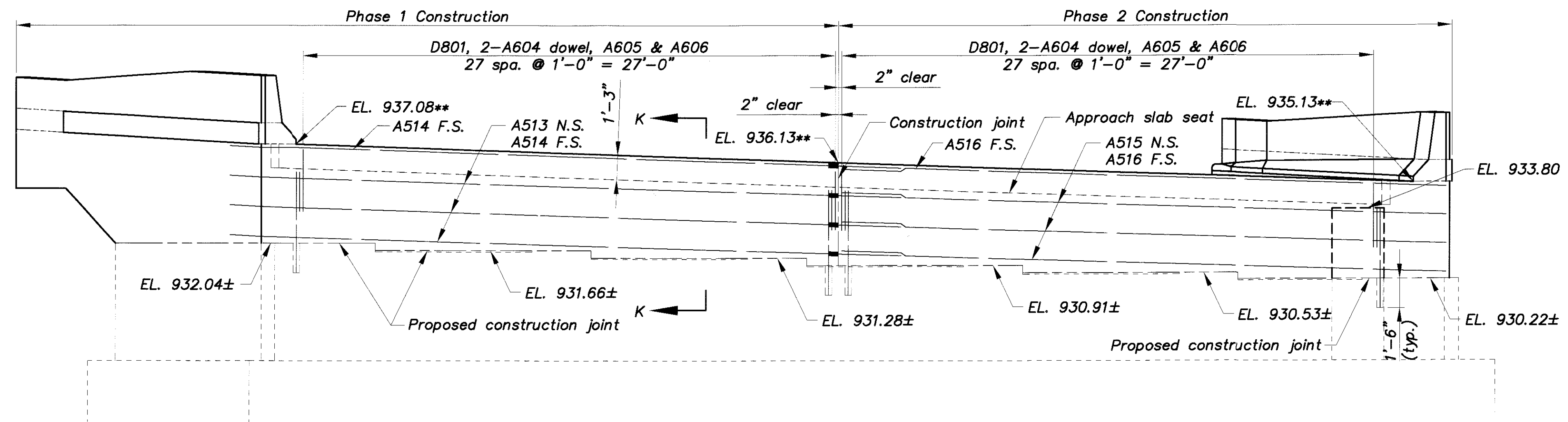
* - See Sheet **23/27** for End Dam Field Splice Detail.

** - Elevation taken at face of backwall.

Remove existing concrete below existing bridge seat and clean surface of concrete and rebar and finish smooth with Item 519, Concrete Patching.



PLAN
(Proposed approach slab not shown)



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet **12/27** for Section K-K and Sheet **14/27** for View I-I & View J-J.

Lap length for #5 bar = 2'-6" minimum

LEGEND:

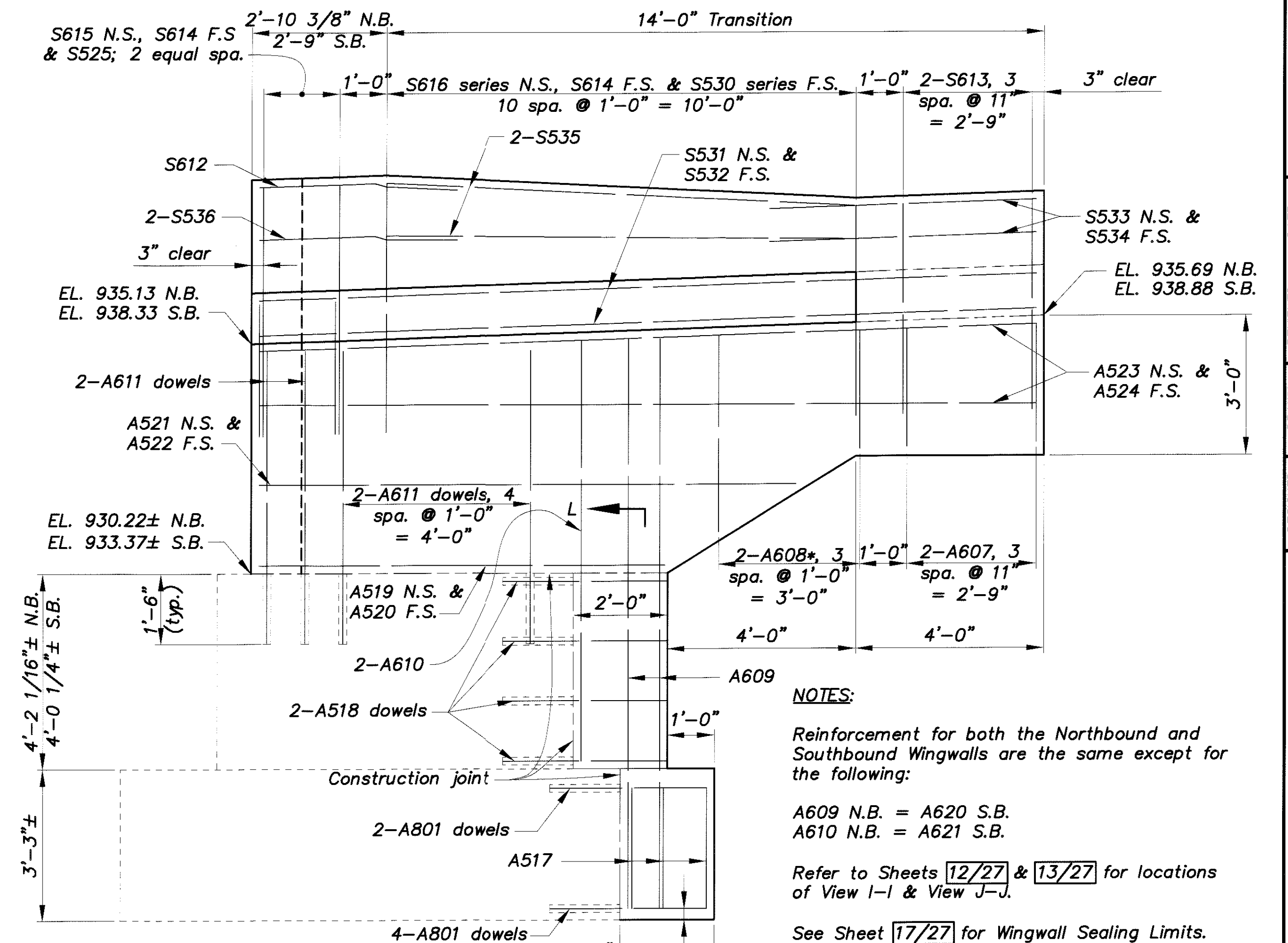
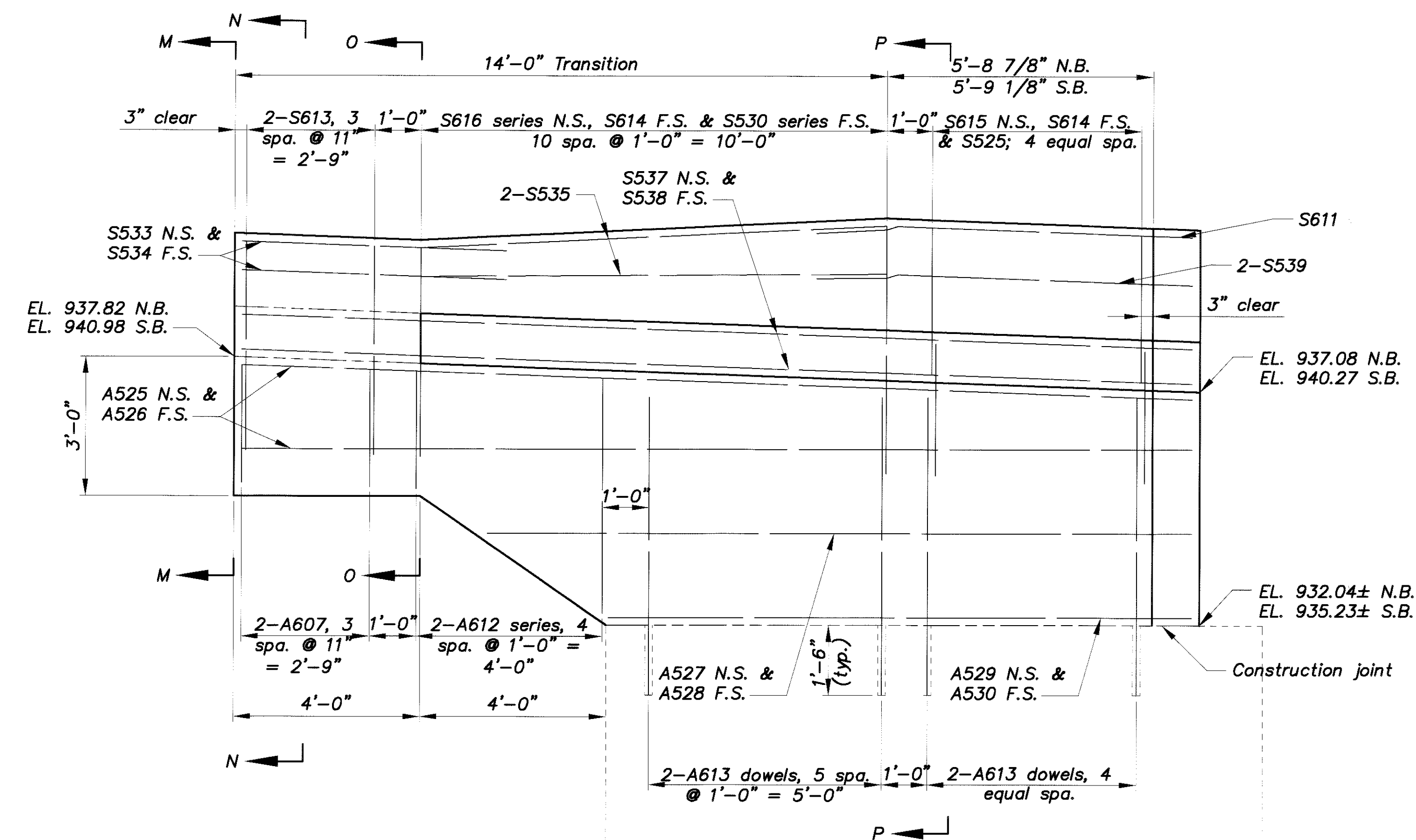
N.S. - Near Side

F.S. - Far Side

* - See Sheet **23/27** for End Dam Field Splice Detail.

** - Elevations taken at face of backwall.

Remove existing concrete below existing bridge seat and clean surface of concrete and rebar and finish smooth with Item 519, Concrete Patching.



NOTES:

Reinforcement for both the Northbound and Southbound Wingwalls are the same except for the following:

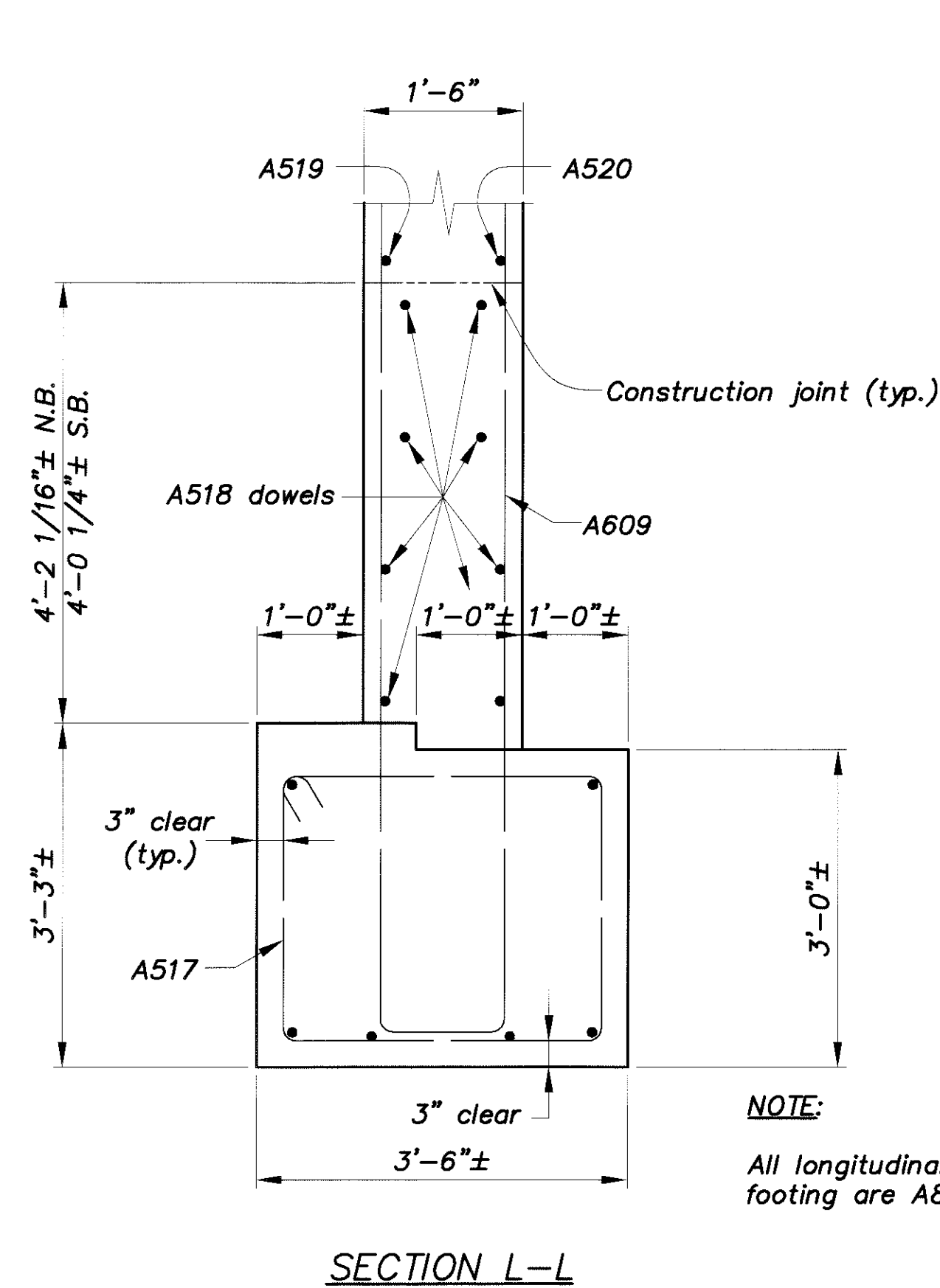
A609 N.B. = A620 S.B.
A610 N.B. = A621 S.B.

Refer to Sheets **12/27** & **13/27** for locations
of View I-I & View J-J.

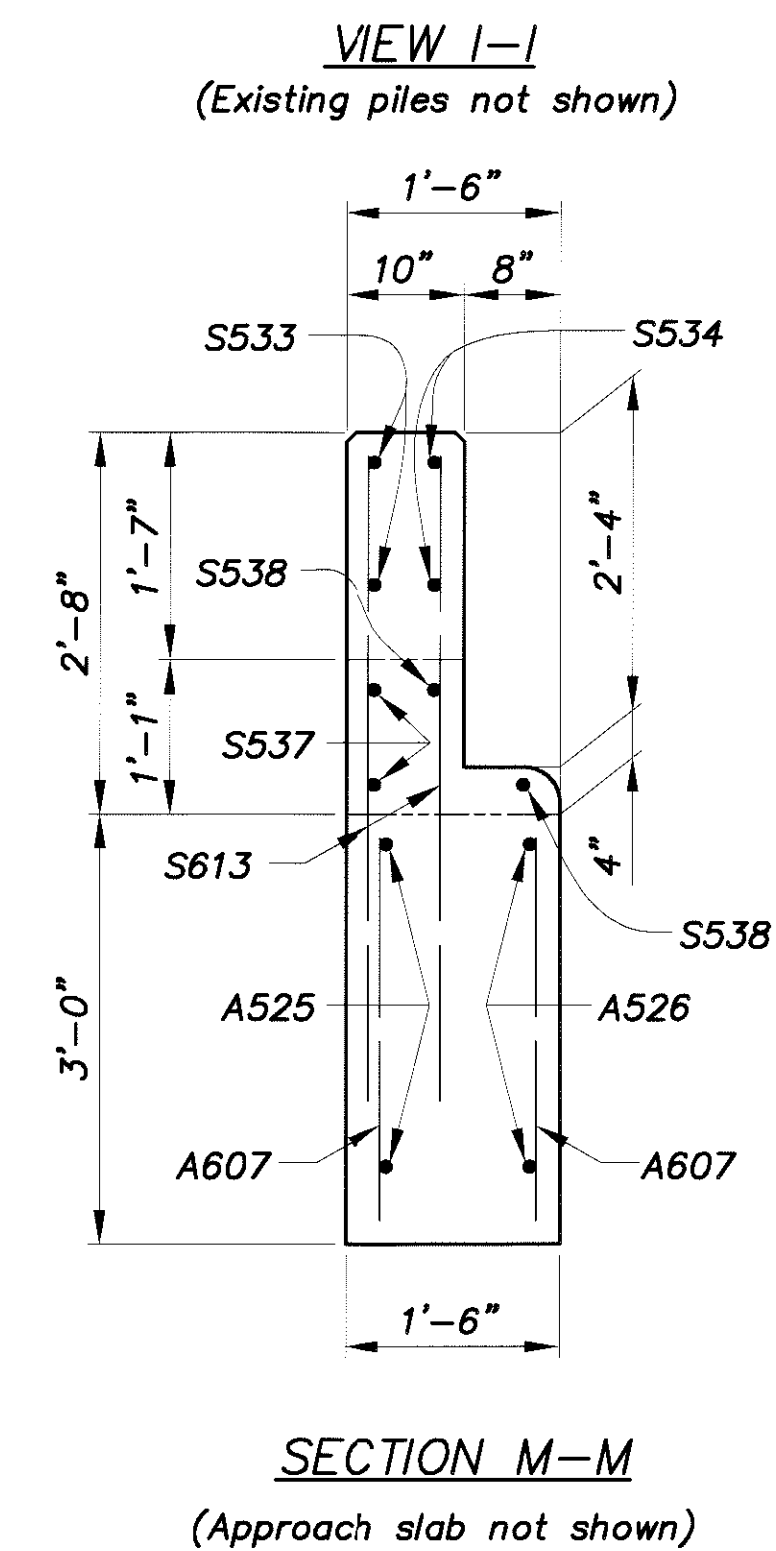
See Sheet **17/27** for Wingwall Sealing Limits.

LEGEND:

N.B. – Northbound
S.B. – Southbound
N.S. – Near Side
F.S. – Far Side
* – Series

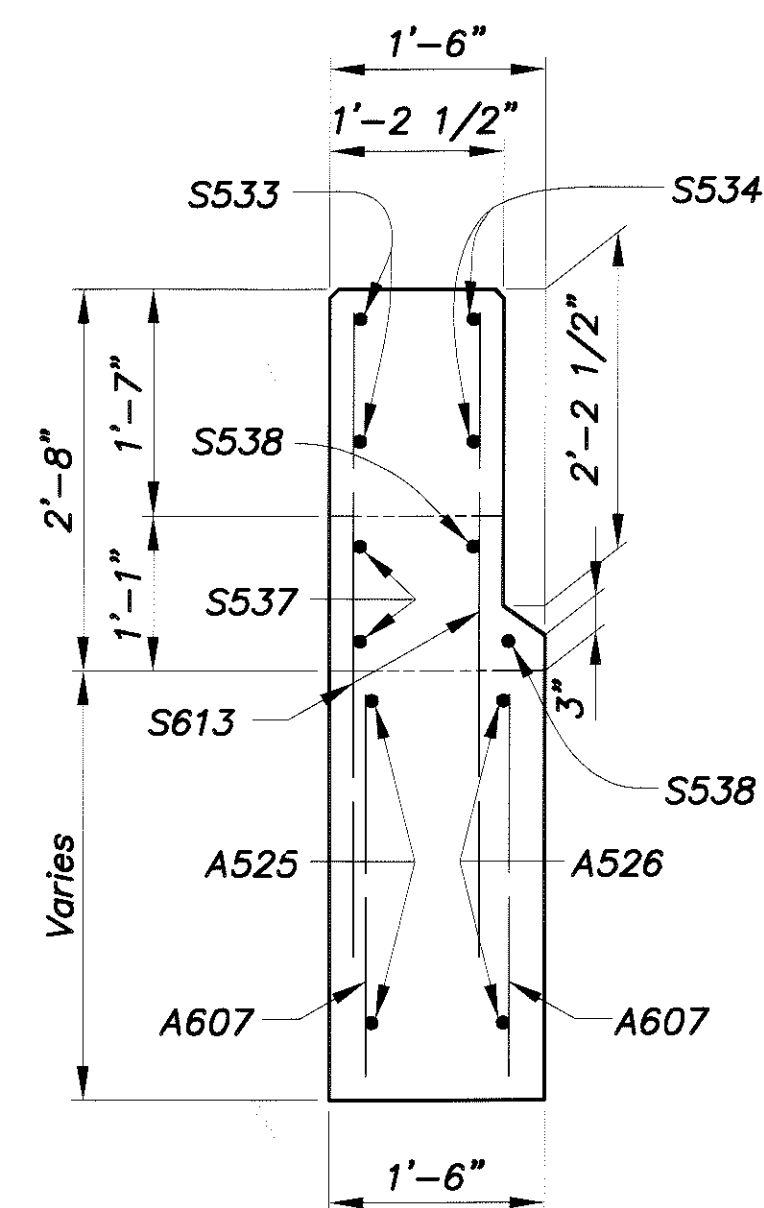


SECTION L-L



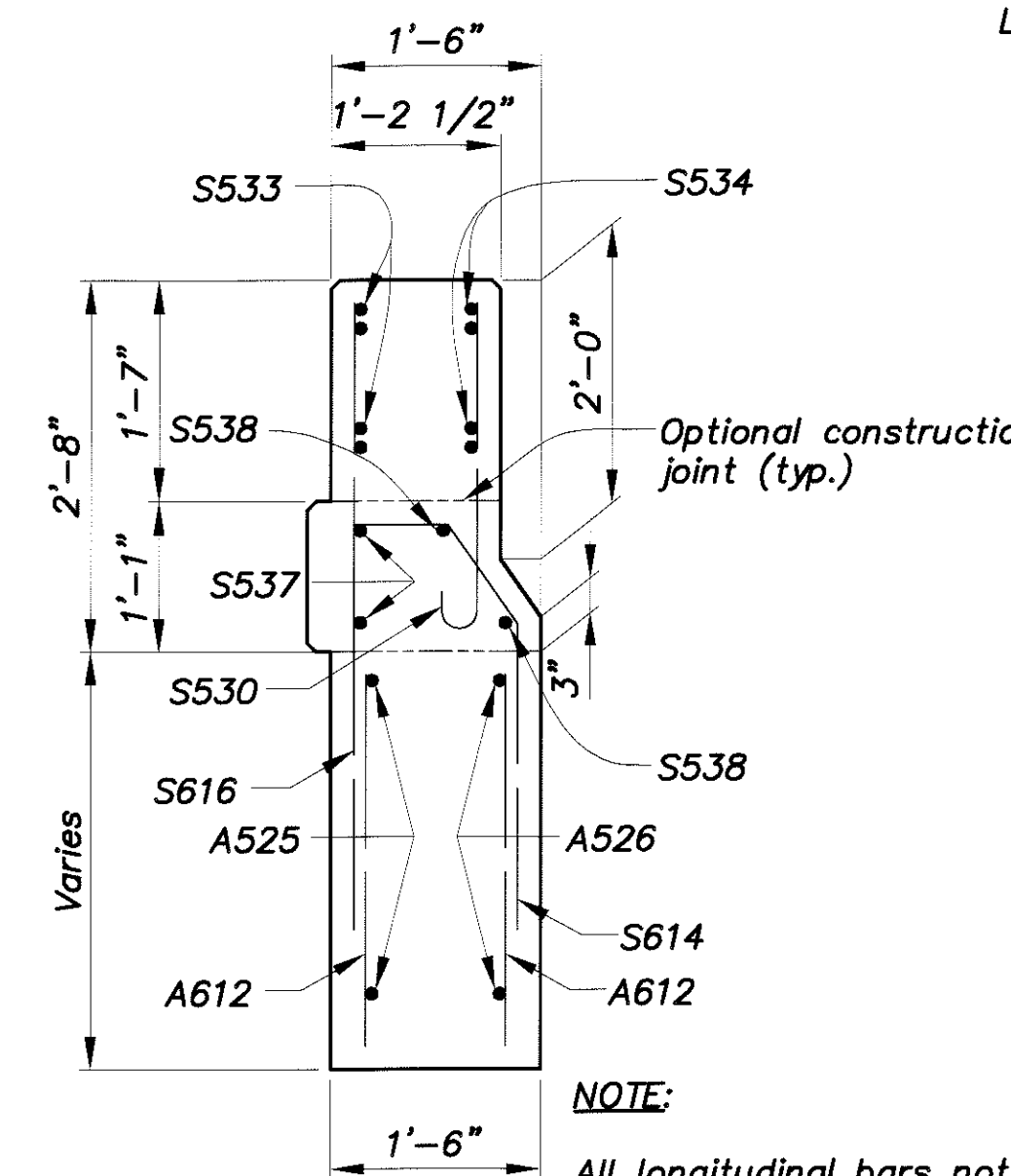
SECTION M-M

(Approach slab not shown)



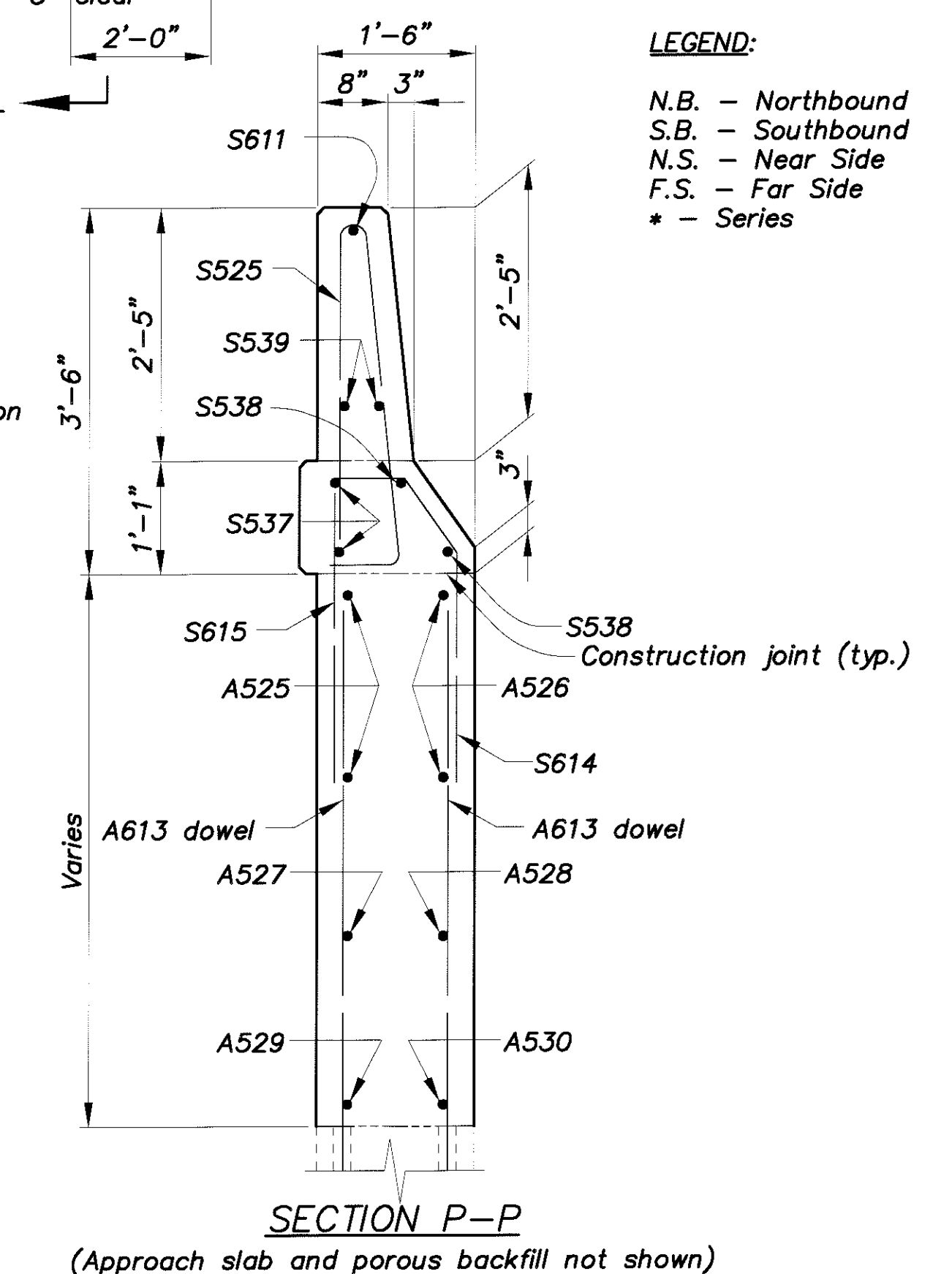
SECTION N-N

(Approach slab not shown)



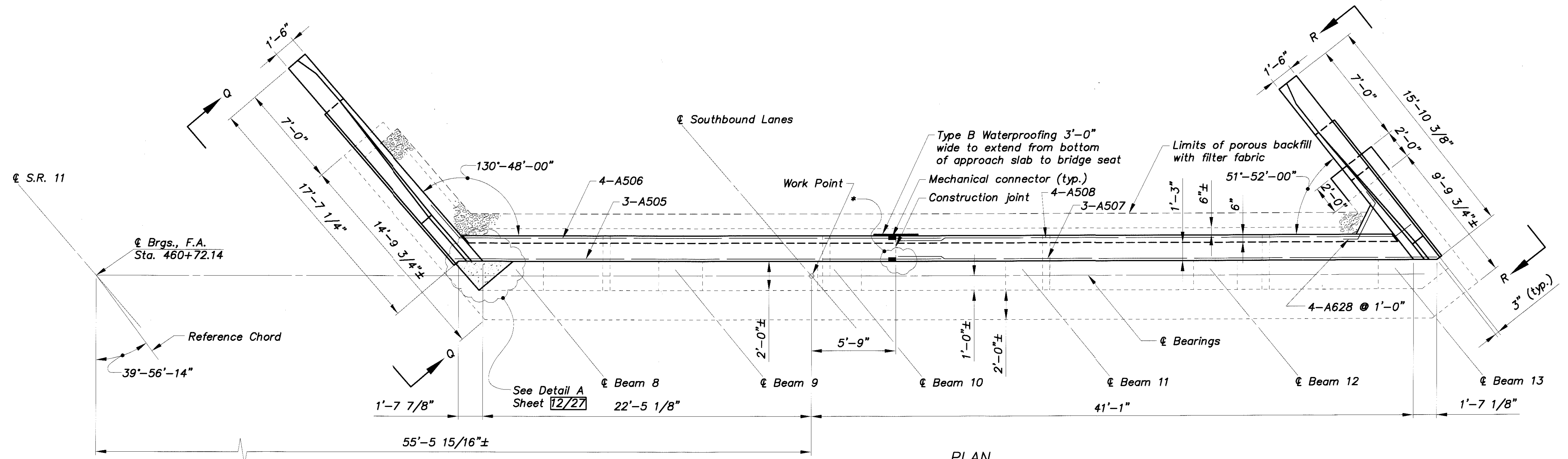
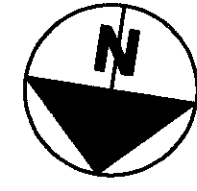
SECTION 0-0

(Approach slab not shown)

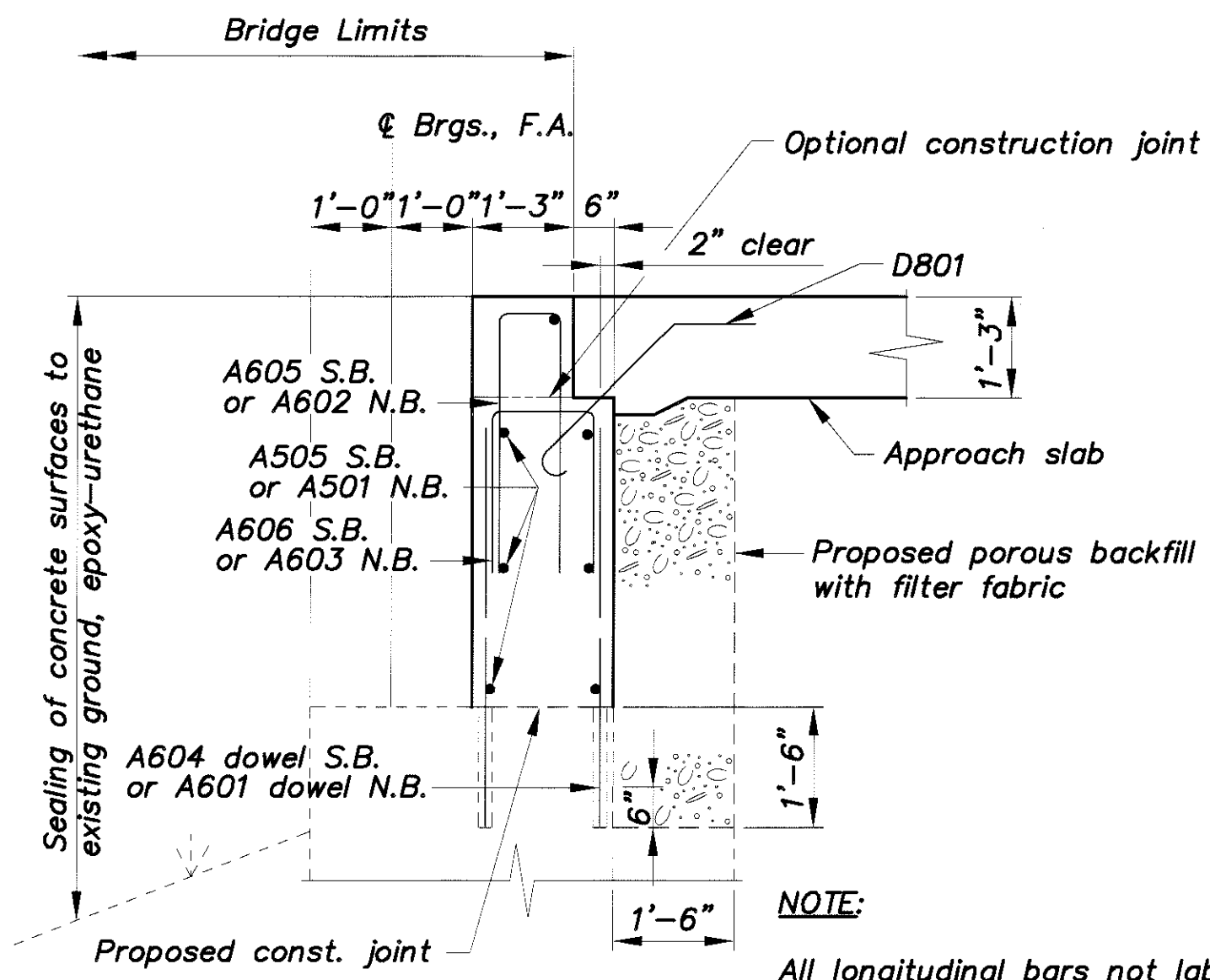


SECTION P-P

(Approach slab and porous backfill not shown)

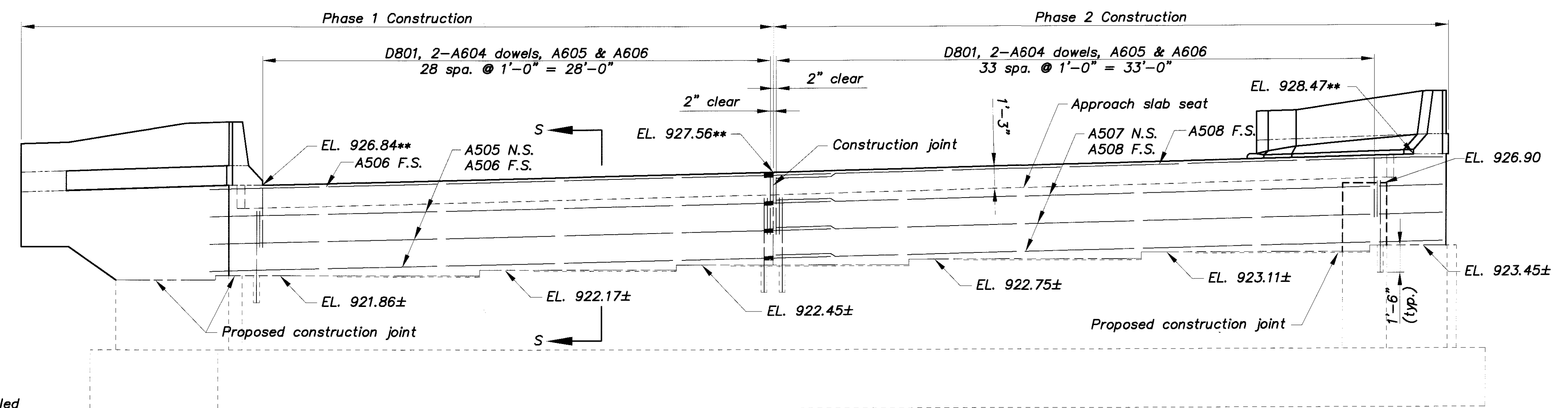


PLAN
(Proposed approach slab not shown)



SECTION S-S

NOTE:
All longitudinal bars not labeled
are A506 S.B. or A502 N.B.

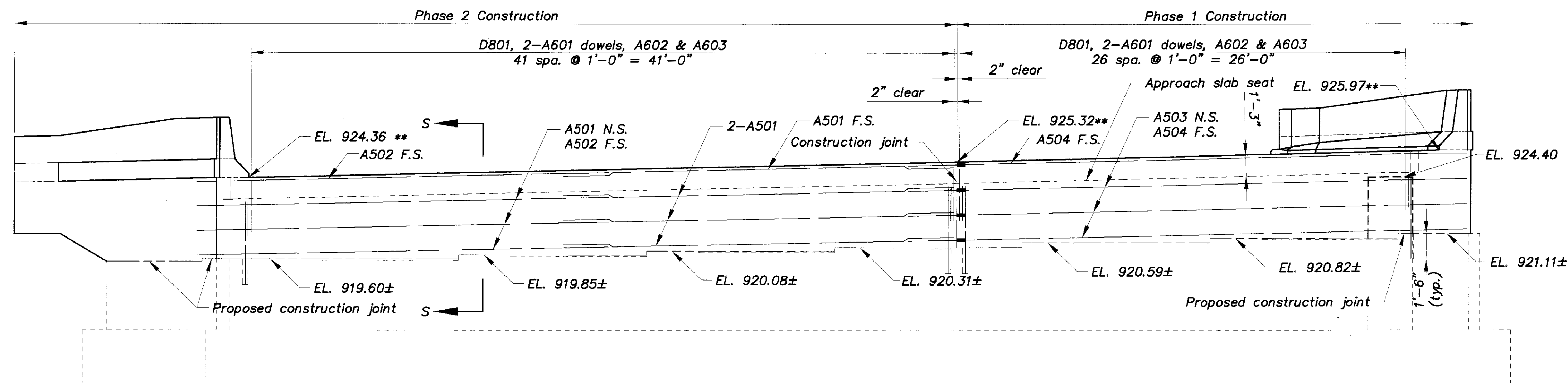
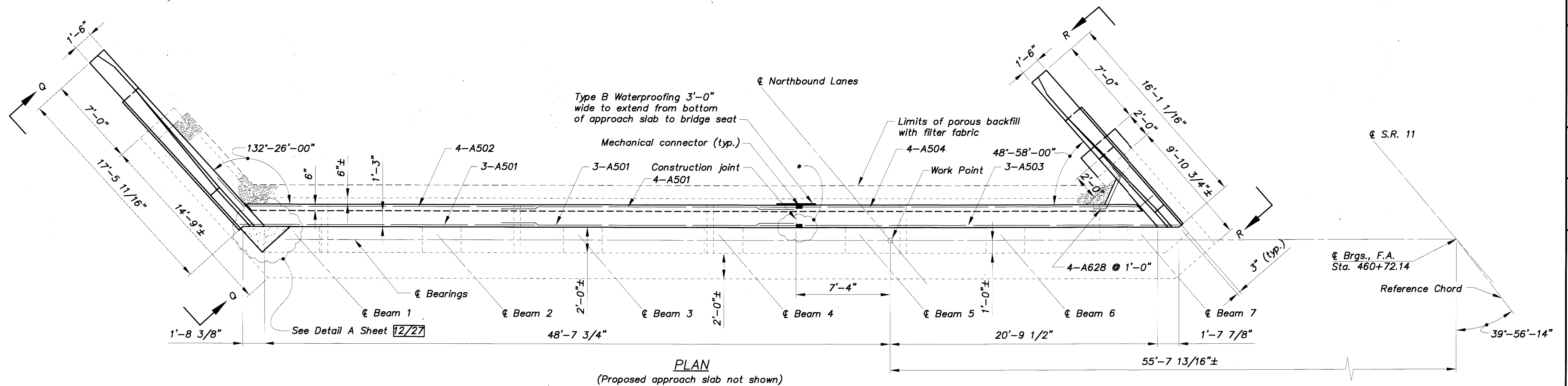
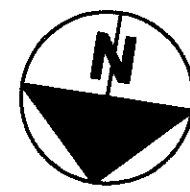


ELEVATION
(Existing piles not shown)

NOTES:
See Sheet 17/27 for View Q-Q & View R-R.
Lap length for #5 bar = 2'-6" minimum

LEGEND:
N.S. - Near Side
F.S. - Far Side
* - See Sheet 23/27 for End Dam Field Splice Detail.
** - Elevations taken at face of backwall.

Remove existing concrete below existing bridge seat and clean surface of concrete and rebar and finish smooth with Item 519, Concrete Patching.



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet **15/27** for Section S-S and Sheet **17/27** for View Q-Q & View R-R.

Lap length for #5 bar = 2'-6" minimum

LEGEND:

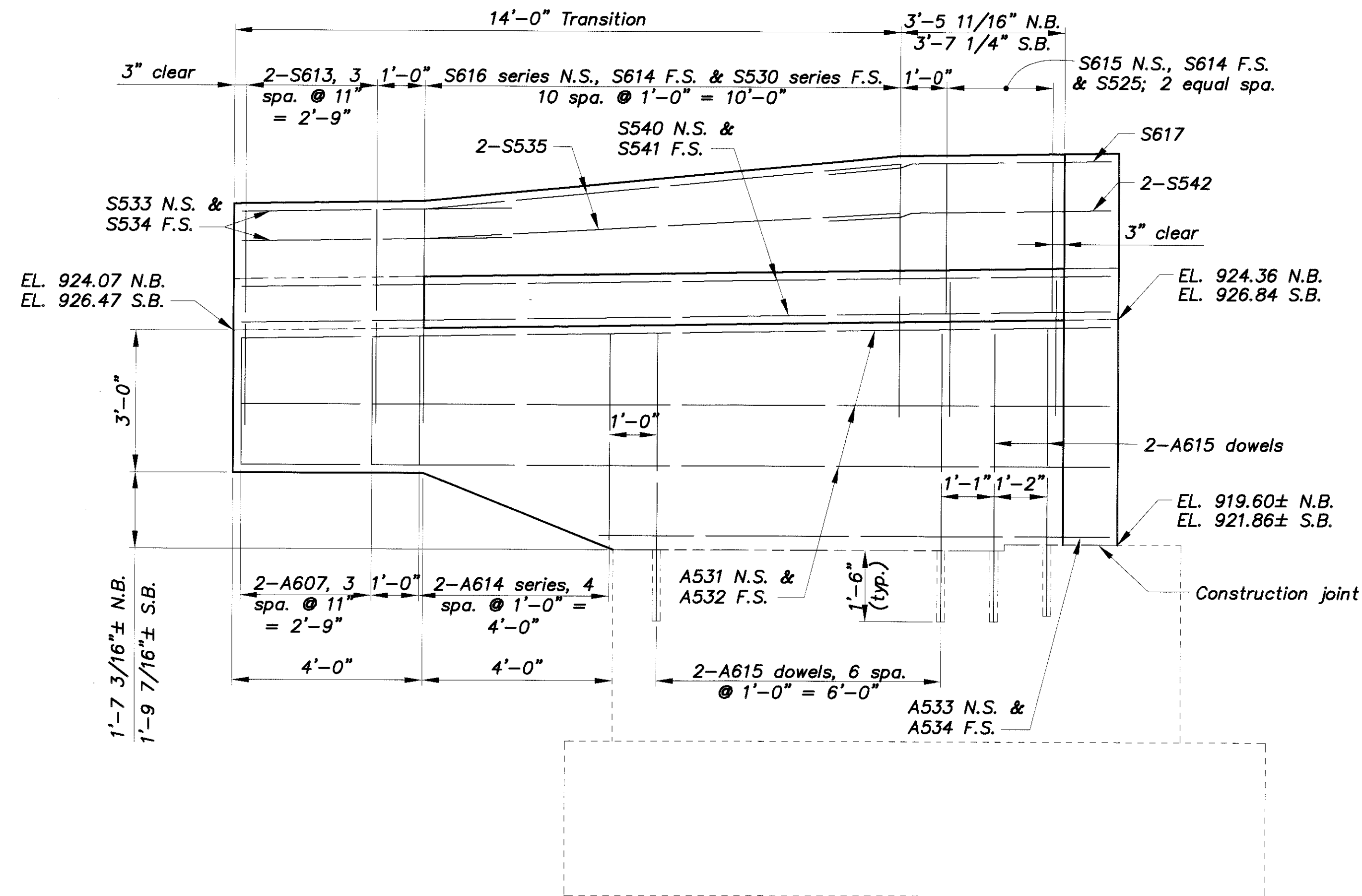
N.S. - Near Side
F.S. - Far Side

* - See Sheet **23/27** for End Dam Field Splice Detail.

** - Elevations taken at face of backwall.

Remove existing concrete below existing bridge seat and clean surface of concrete and rebar and finish smooth with Item 519, Concrete Patching.

K:\Odor\Dist1\COL-11-(9.46)(13.78)\Drawings\COL-11-9.46\COL-11-9.46(Shared Bridge)\Vortecopw.dwg



VIEW Q-Q

NOTES:

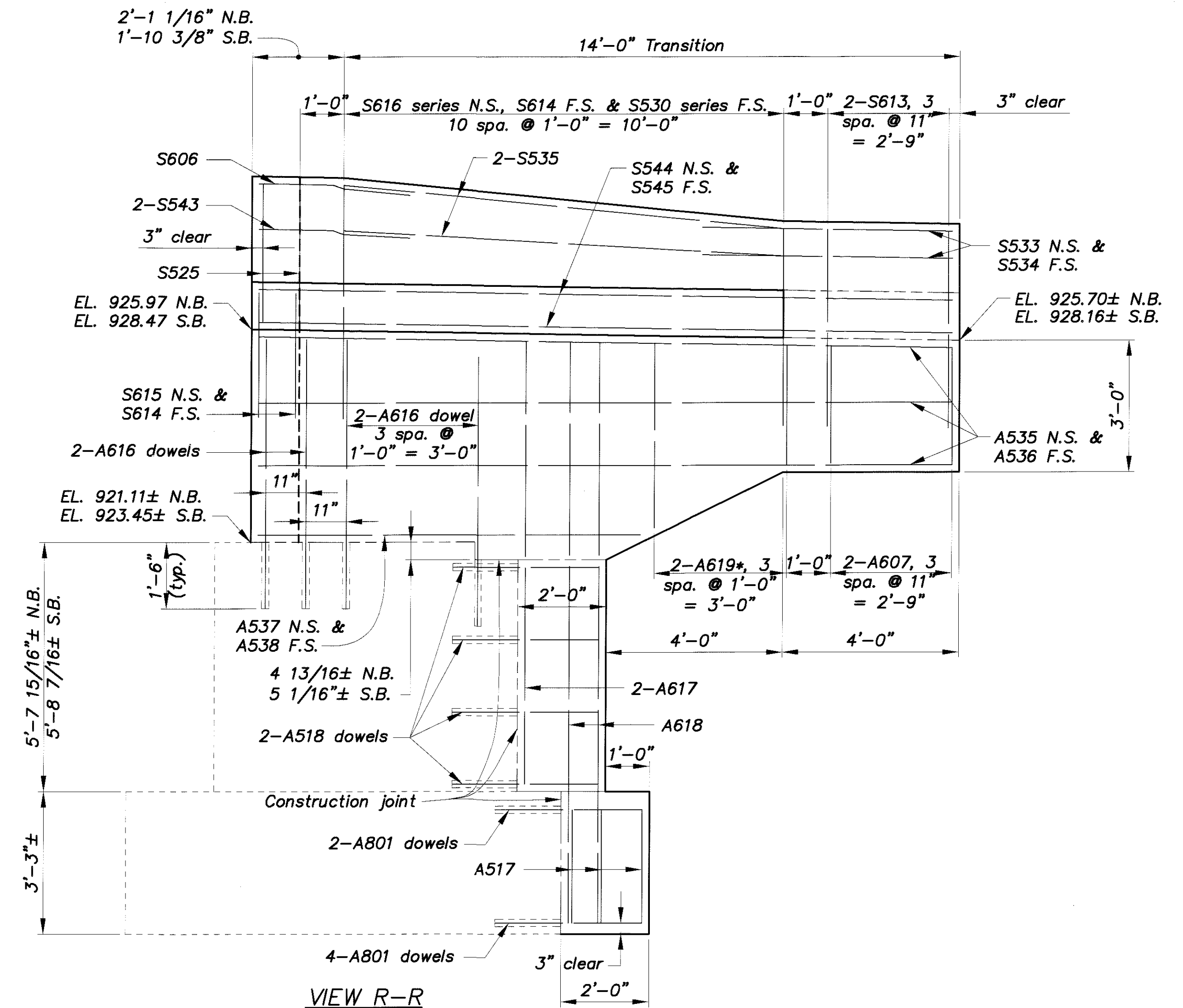
Reinforcement for both the Northbound and Southbound Wingwalls is the same except for the following:

A614 N.B. = A622 S.B.
A615 N.B. = A623 S.B.

Refer to Sheets **15/27** & **16/27** for locations of View Q-Q & View R-R.

LEGEND:

N.B. - Northbound
S.B. - Southbound
N.S. - Near Side
F.S. - Far Side
* - Series

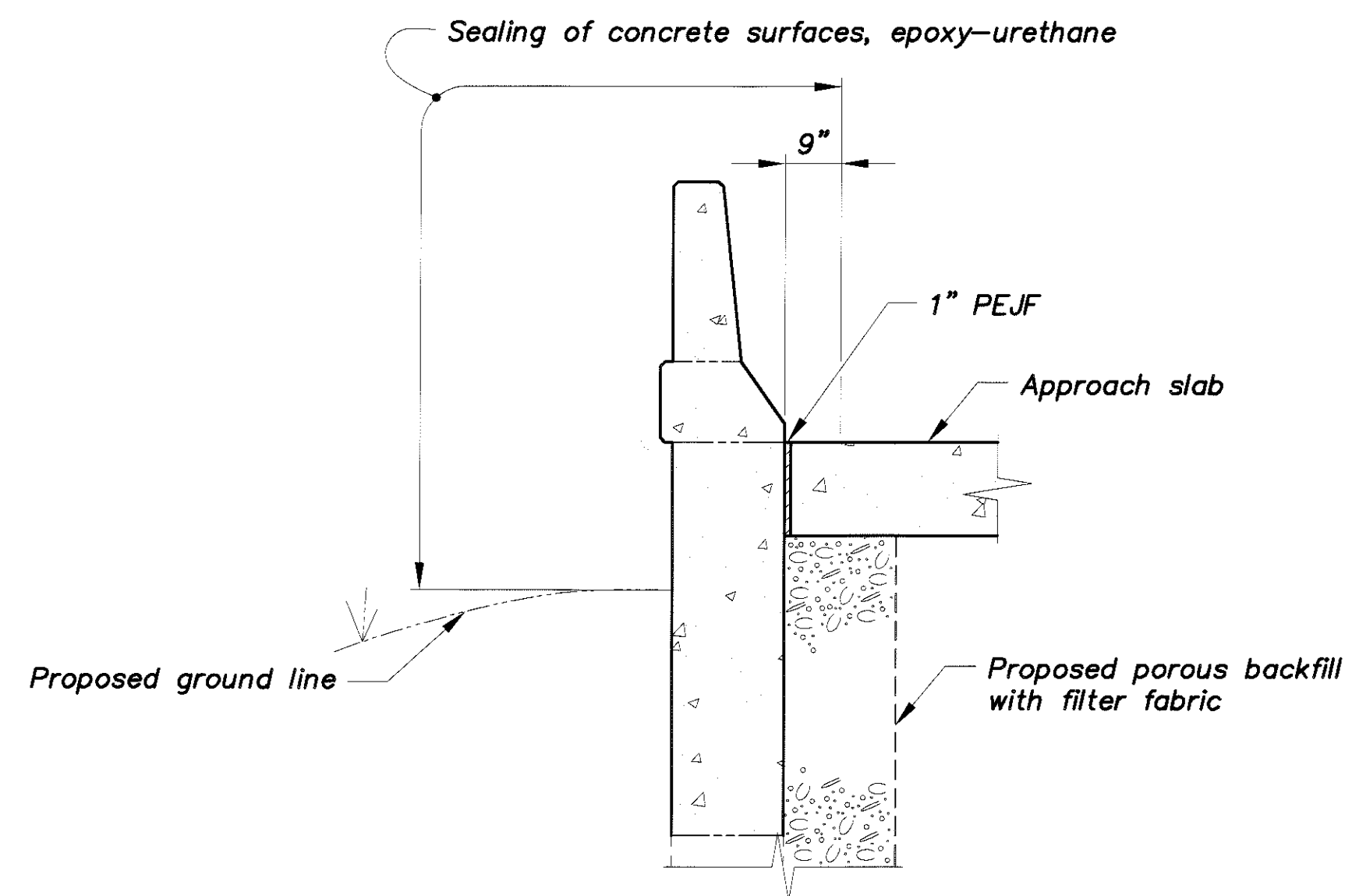


VIEW R-R

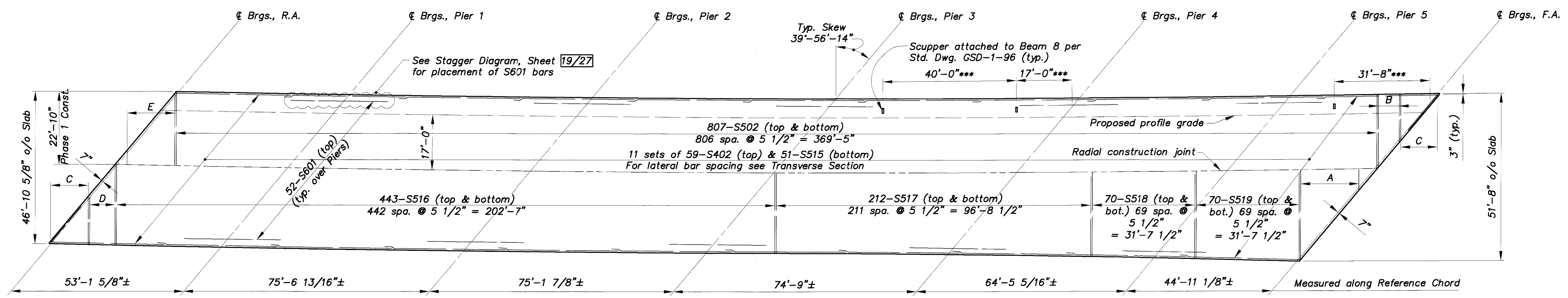
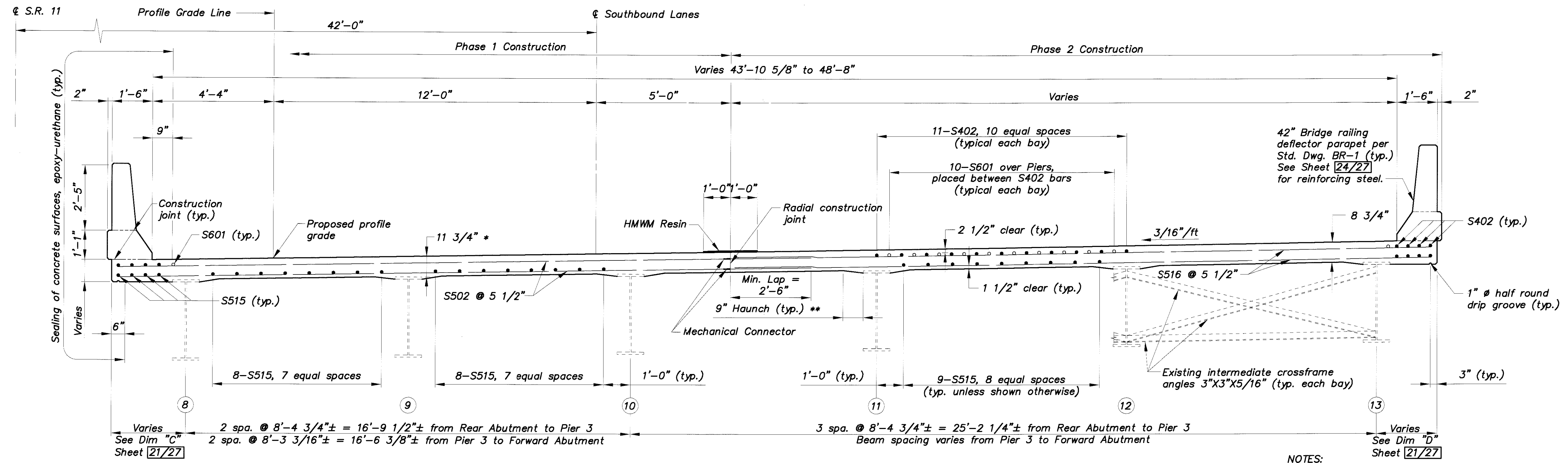
NOTE:

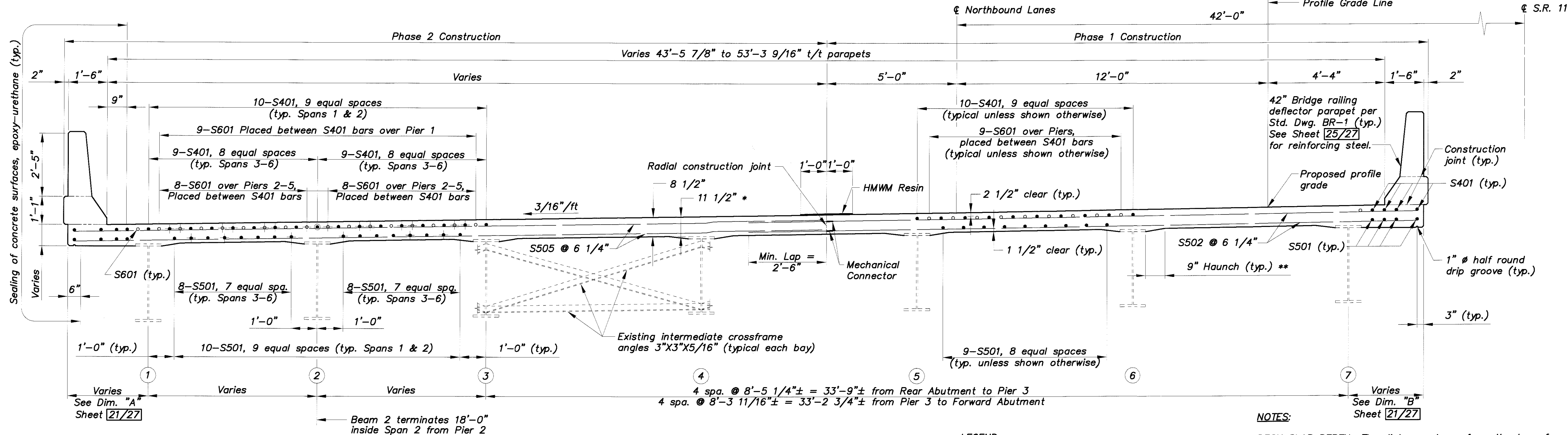
Reinforcement for both the Northbound and Southbound Wingwalls is the same except for the following:

S544 N.B. = S546 S.B.
S545 N.B. = S547 S.B.
A535 N.B. = A539 S.B.
A536 N.B. = A540 S.B.
A537 N.B. = A541 S.B.
A538 N.B. = A542 S.B.
A616 N.B. = A624 S.B.
A617 N.B. = A625 S.B.
A618 N.B. = A626 S.B.
A619 N.B. = A627 S.B.



WINGWALL SEALING LIMITS





TRANSVERSE SECTION
(Shear connector not shown)

LEGEND:

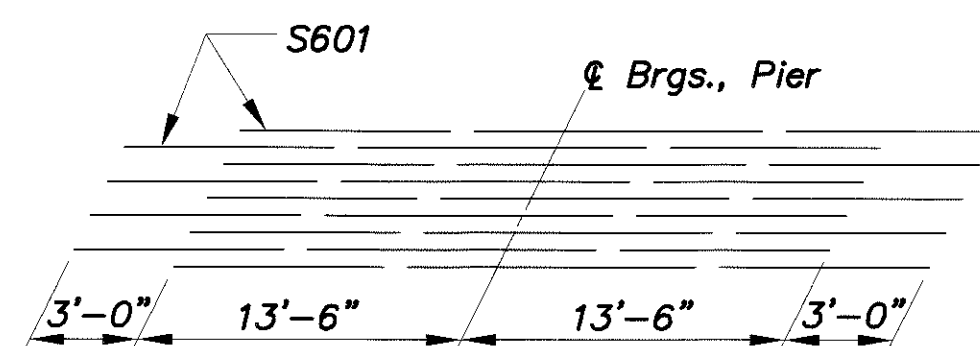
- + S401 bar to be terminated 18'-0" inside Span 2 from Pier 2
- + S601 bars to be included above all Piers except Pier 1
- S601 bar above Pier 1, S401 bar to be terminated 18'-0" inside Span 2 from Pier 2

NOTES:

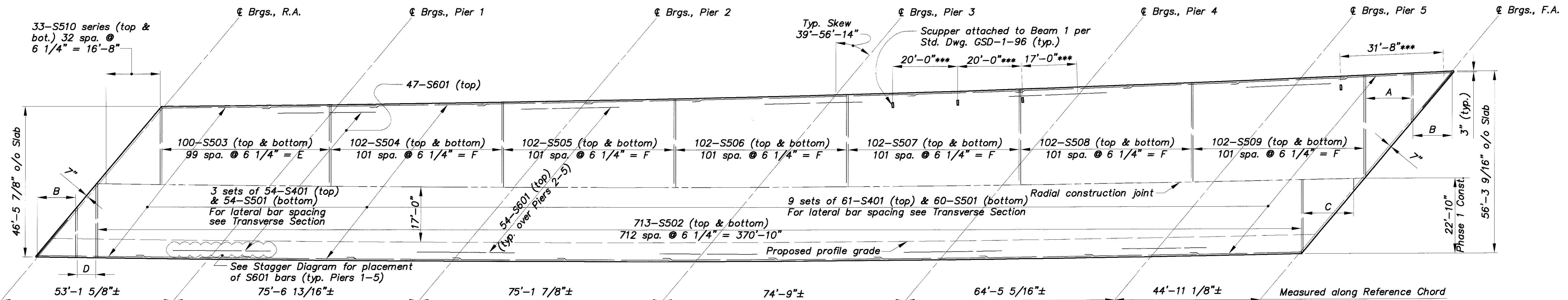
- * DECK SLAB DEPTH: The distance shown from the top of the deck slab to the top of steel beam is the theoretical design dimension including an average design haunch thickness of 3 inches. The quantity of deck concrete to be paid for shall be based upon this dimension, minus the design haunch thickness, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or conformation required to place it parallel to finished grade.
- ** A HAUNCH WIDTH of 9 inches shall be used for computing quantity of concrete. However, the haunch width may vary between 6 and 12 inches.

See Sheet 22/27 for existing beam sizes.

HMWM Resin to be included under Item 844 High Performance Concrete Superstructure (Deck) for payment.



STAGGER DIAGRAM



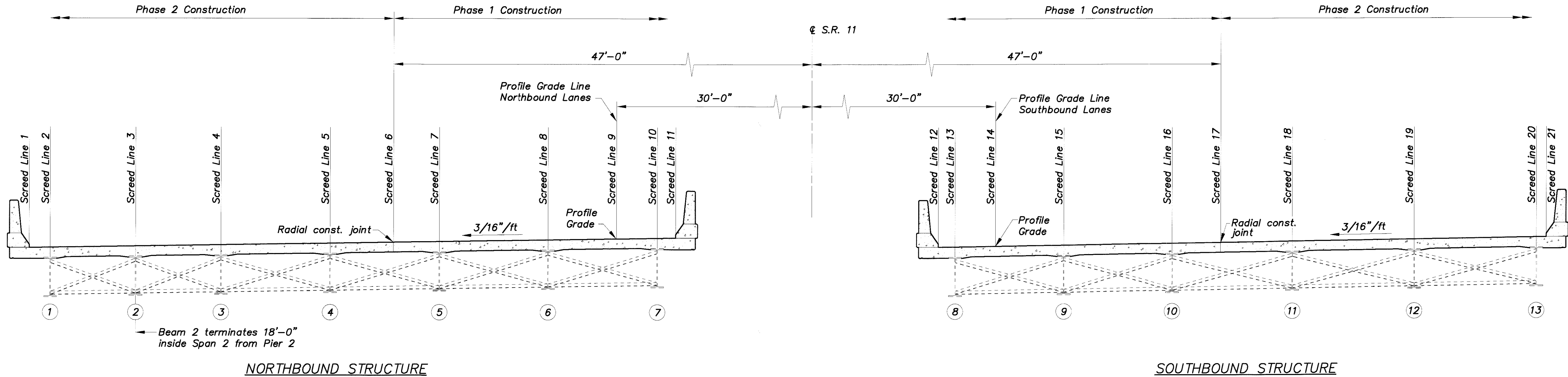
K:\odot\Dist1\COL-11-(9.46)(13.76)\Drawings\COL-11-13.76\COL-11_9.46(Shared Bridge)\sdl.dwg

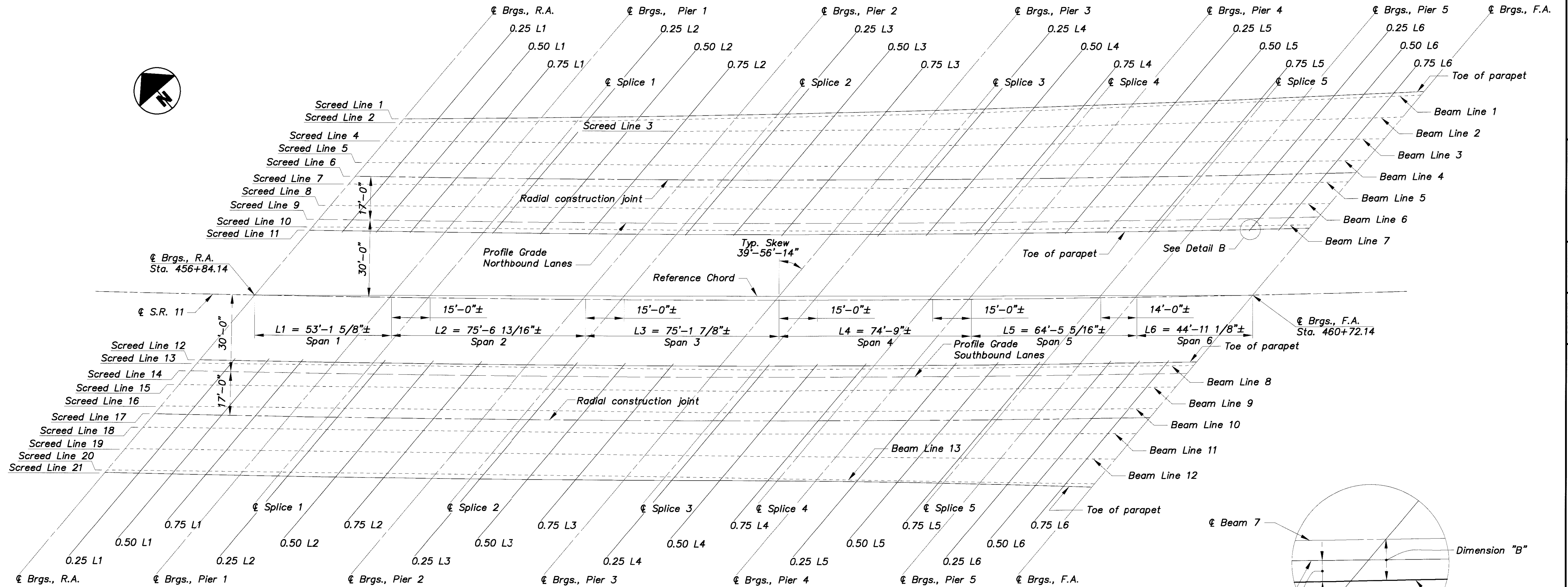
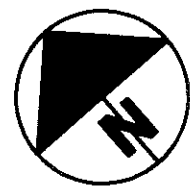
SCREED ELEVATION TABLE

LOCATION	SCREED LINE 1	SCREED LINE 2	SCREED LINE 3	SCREED LINE 4	SCREED LINE 5	SCREED LINE 6	SCREED LINE 7	SCREED LINE 8	SCREED LINE 9	SCREED LINE 10	SCREED LINE 11	SCREED LINE 12	SCREED LINE 13	SCREED LINE 14	SCREED LINE 15	SCREED LINE 16	SCREED LINE 17	SCREED LINE 18	SCREED LINE 19	SCREED LINE 20	SCREED LINE 21	DEFLECTION ADJUSTMENT
℄ Brgs., R.A.	935.08	935.15		935.47	935.85	936.09	936.23	936.60	936.85	936.98	937.04	938.29	938.35	938.48	938.71	939.10	939.21	939.45	939.81	940.18	940.22	0"
0.25 Span 1	934.62	934.68		935.02	935.39	935.64	935.77	936.15	936.40	936.53	936.59	937.85	937.91	938.04	938.27	938.64	938.78	939.01	939.37	939.79	939.79	3/16"
0.50 Span 1	934.14	934.20		934.55	934.92	935.18	935.30	935.68	935.93	936.06	936.13	937.40	937.45	937.59	937.82	938.19	938.33	938.55	938.92	939.29	939.34	3/16"
0.75 Span 1	933.65	933.71		934.07	934.44	934.70	934.82	935.20	935.46	935.58	935.65	936.94	936.99	937.13	937.35	937.72	937.87	938.09	938.45	938.82	938.88	1/16"
℄ PIER 1	933.17	933.24		933.59	933.97	934.23	934.35	934.73	934.99	935.10	935.18	936.48	936.52	936.67	936.89	937.26	937.41	937.63	937.99	938.36	938.43	0"
℄ SPLICE 1	932.67	932.74		933.10	933.47	933.73	933.84	934.22	934.48	934.60	934.67	935.99	936.03	936.18	936.40	936.77	936.92	937.13	937.50	937.87	937.94	1/4"
0.25 Span 2	932.54	932.60		932.97	933.34	933.59	933.71	934.08	934.34	934.46	934.54	935.86	935.90	936.05	936.27	936.63	936.79	937.00	937.37	937.74	937.81	1/4"
0.50 Span 2	931.92	931.97		932.36	932.72	932.97	933.09	933.45	933.71	933.82	933.90	935.23	935.27	935.42	935.63	936.00	936.16	936.37	936.74	937.11	937.18	7/16"
0.75 Span 2	931.28	931.34		931.74	932.09	932.34	932.45	932.81	933.06	933.17	933.25	934.57	934.60	934.76	934.97	935.34	935.50	935.71	936.08	936.45	936.52	1/4"
℄ PIER 2	930.66	930.71	930.92	931.13	931.48	931.71	931.83	932.18	932.43	932.54	932.61	933.89	933.93	934.08	934.30	934.67	934.84	935.04	935.41	935.78	935.86	0"
℄ SPLICE 2	930.21	930.26	930.47	930.69	931.03	931.26	931.37	931.72	931.96	932.07	932.14	933.41	933.45	933.59	933.81	934.17	934.33	934.54	934.90	935.28	935.36	1/8"
0.25 Span 3	930.10	930.15	930.36	930.57	930.91	931.14	931.26	931.61	931.85	931.96	932.03	933.28	933.33	933.47	933.68	934.04	934.20	934.41	934.77	935.15	935.23	1/8"
0.50 Span 3	929.55	929.60	929.82	930.04	930.38	930.60	930.72	931.06	931.29	931.40	931.46	932.70	932.74	932.88	933.09	933.45	933.60	933.80	934.16	934.52	934.60	5/16"
0.75 Span 3	929.00	929.06	929.28	929.51	929.83	930.04	930.16	930.50	930.72	930.83	930.89	932.10	932.15	932.28	932.49	932.84	932.99	933.19	933.54	933.90	933.97	3/16"
℄ PIER 3	928.47	928.52	928.75	928.98	929.30	929.50	929.63	929.95	930.16	930.28	930.34	931.51	931.57	931.69	931.91	932.25	932.39	932.59	932.94	933.29	933.36	0"
℄ SPLICE 3	928.08	928.14	928.37	928.61	928.92	929.11	929.24	929.56	929.76	929.88	929.93	931.09	931.15	931.26	931.48	931.82	931.95	932.16	932.50	932.84	932.90	3/16"
0.25 Span 4	927.98	928.04	928.27	928.51	928.82	929.01	929.14	929.46	929.66	929.78	929.83	930.98	931.04	931.15	931.37	931.71	931.84	932.04	932.39	932.73	932.79	3/16"
0.50 Span 4	927.53	927.57	927.81	928.05	928.36	928.55	928.67	928.98	929.18	929.30	929.35	930.47	930.52	930.64	930.85	931.18	931.31	931.52	931.86	932.20	932.25	7/16"
0.75 Span 4	927.04	927.09	927.33	927.57	927.87	928.06	928.17	928.48	928.68	928.79	928.84	929.93	929.98	930.10	930.30	930.62	930.76	930.96	931.30	931.65	931.68	3/16"
℄ SPLICE 4	926.95	927.00	927.24	927.48	927.78	927.97	928.08	928.39	928.59	928.69	928.75	929.83	929.88	930.00	930.20	930.52	930.66	930.86	931.20	931.54	931.58	3/16"
℄ PIER 4	926.59	926.63	926.87	927.11	927.41	927.59	927.70	928.00	928.20	928.30	928.36	929.42	929.46	929.58	929.78	930.09	930.23	930.43	930.77	931.11	931.14	0"
0.25 Span 5	926.23	926.27	926.51	926.76	927.05	927.23	927.34	927.63	927.83	927.91	927.98	929.02	929.06	929.18	929.37	929.68	929.81	930.01	930.35	930.69	930.72	1/8"
0.50 Span 5	925.89	925.93	926.17	926.42	926.70	926.88	926.98	927.27	927.46	927.56	927.62	928.63	928.67	928.78	928.97	929.27	929.41	929.61	929.95	930.29	930.31	1/4"
0.75 Span 5	925.54	925.58	925.82	926.07	926.35	926.52	926.63	926.91	927.10	927.19	927.24	928.23	928.27	928.38	928.56	928.86	929.00	929.20	929.54	929.87	929.90	1/8"
℄ SPLICE 5	925.50	925.54	925.79	926.03	926.31	926.48	926.59	926.87	927.05	927.15	927.20	928.18	928.22	928.34	928.52	928.81	928.95	929.15	929.49	929.83	929.85	1/8"
℄ PIER 5	925.21	925.25	925.49	925.74	926.01	926.18	926.28	926.56	926.74	926.84	926.89	927.84	927.88	927.99	928.17	928.46	928.60	928.80	929.14	929.47	929.50	0"
0.25 Span 6	925.00	925.03	925.28	925.53	925.80	925.96	926.07	926.34	926.51	926.61	926.66	927.59	927.63	927.74	927.92	928.21	928.34	928.54	928.88	929.21	929.24	1/16"
0.50 Span 6	924.79	924.83	925.08	925.33	925.59	925.75	925.85	926.12	926.29	926.39	926.44	927.35	927.39	927.50	927.67	927.96	928.09	928.29	928.63	928.96	929.00	1/8"
0.75 Span 6	924.59	924.63	924.88	925.13	925.39	925.54	925.64	925.91	926.08	926.17	926.22	927.11	927.15	927.25	927.43	927.71	927.83	928.04	928.38	928.71	928.75	1/8"
℄ Brgs., F.A.	924.39	924.43	924.67	924.92	925.18	925.32	925.43	925.69	925.85	925.95	925.99	926.86	926.91	927.01	927.18	927.46	927.58	927.79	928.12	928.45	928.50	0"

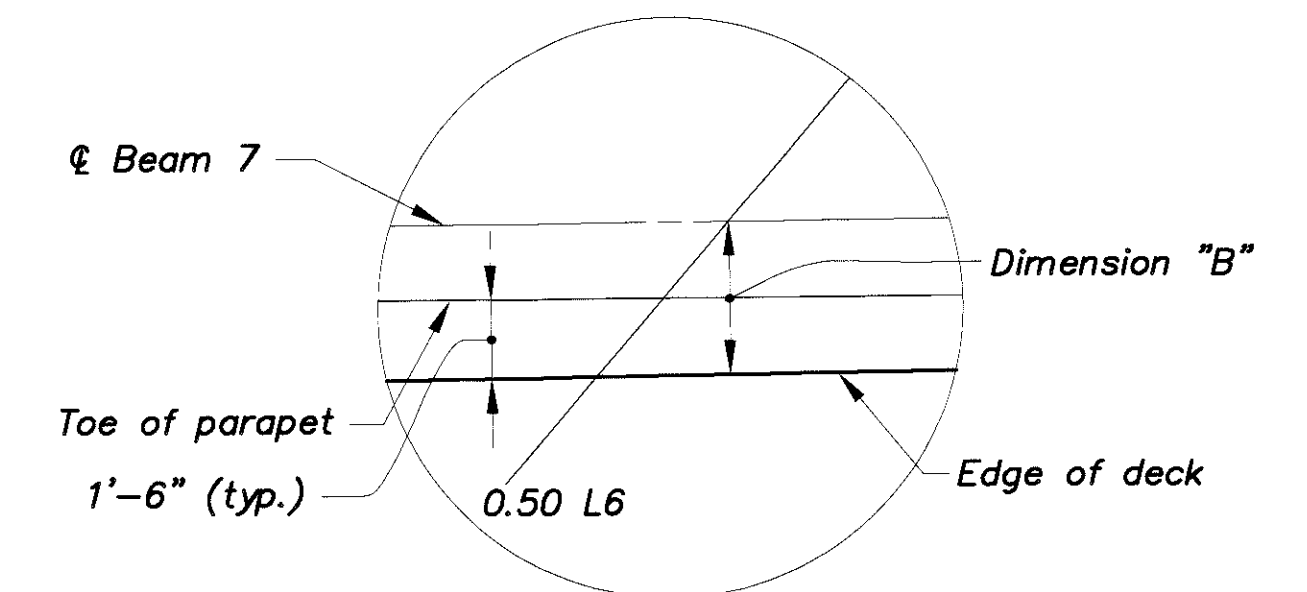
NOTE:

SCREED ELEVATIONS shown are for the deck slab prior to concrete placement. Allowance has been made for anticipated calculated dead load deflection.





SCREED LINE PLAN

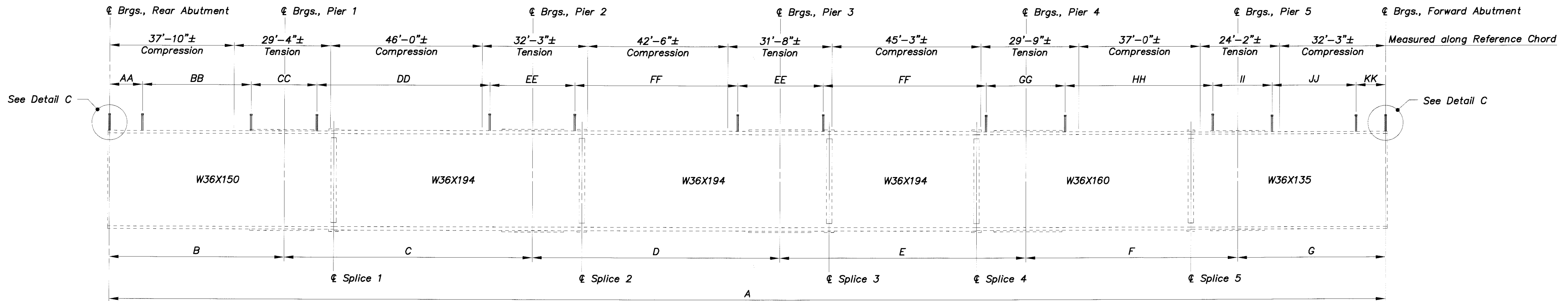


DETAIL B

DECK OVERHANG DIMENSIONS													
LOCATION	℄ Brgs., R.A.	0.25 L1	0.50 L1	0.75 L1	℄ Brgs., Pier 1	0.25 L2	0.50 L2	0.75 L2	℄ Brgs., Pier 2	0.25 L3	0.50 L3	0.75 L3	℄ Brgs., Pier 3
Dimension "A"	—	2'-11 3/8"	2'-11 1/4"	2'-11 1/4"	2'-11 1/2"	2'-11 1/2"	2'-10 1/4"	2'-9 3/8"	2'-8 7/8"	2'-8 5/8"	2'-8 7/8"	2'-9 1/2"	2'-10 5/8"
Dimension "B"	2'-10"	2'-11 1/4"	3'-0 3/8"	3'-1 3/8"	3'-2 1/8"	3'-2 7/8"	3'-3 3/8"	3'-3 3/8"	3'-3"	3'-2 3/8"	3'-1 1/4"	2'-11 3/4"	2'-10"
Dimension "C"	—	2'-8 3/4"	2'-7 5/8"	2'-6 5/8"	2'-5 7/8"	2'-5 1/8"	2'-4 3/4"	2'-4 5/8"	2'-5"	2'-5 3/4"	2'-6 3/4"	2'-8 1/4"	2'-10"
Dimension "D"	2'-6"	2'-7 3/4"	2'-9 3/8"	2'-10 3/4"	3'-0"	3'-1 1/2"	3'-2 1/2"	3'-3 1/4"	3'-3 5/8"	3'-3 1/2"	3'-3 1/8"	3'-2 3/8"	3'-1 1/4"
LOCATION	0.25 L4	0.50 L4	0.75 L4	℄ Brgs., Pier 4	0.25 L5	0.50 L5	0.75 L5	℄ Brgs., Pier 5	0.25 L6	0.50 L6	0.75 L6	℄ Brgs., F.A.	
Dimension "A"	2'-11 1/8"	2'-9 1/2"	2'-8 1/4"	2'-7 3/8"	2'-6 7/8"	2'-6 3/4"	2'-6 7/8"	2'-7 1/4"	2'-7 3/4"	2'-8 3/8"	2'-9 1/8"	2'-10 1/8"	
Dimension "B"	2'-8 7/8"	2'-10 3/8"	2'-11 5/8"	3'-0 3/8"	3'-0 7/8"	3'-1"	3'-0 7/8"	3'-0 1/2"	3'-0 1/8"	2'-11 5/8"	2'-10 7/8"		
Dimension "C"	2'-11 1/8"	2'-9 5/8"	2'-8 3/8"	2'-7 1/8"	2'-7 1/8"	2'-7"	2'-7 1/8"	2'-7 1/2"	2'-7 7/8"	2'-8 1/2"	2'-9 1/8"	2'-10"	
Dimension "D"	2'-11 3/8"	2'-8 1/2"	2'-6 1/4"	2'-4 3/4"	2'-4"	2'-3 3/4"	2'-4 1/8"	2'-5"	2'-5 7/8"	2'-7"	2'-8 1/2"		

NOTES:

Dimension "A" = ℄ Beam 1 to edge of deck
Dimension "B" = ℄ Beam 7 to edge of deck
Dimension "C" = ℄ Beam 8 to edge of deck
Dimension "D" = ℄ Beam 13 to edge of deck

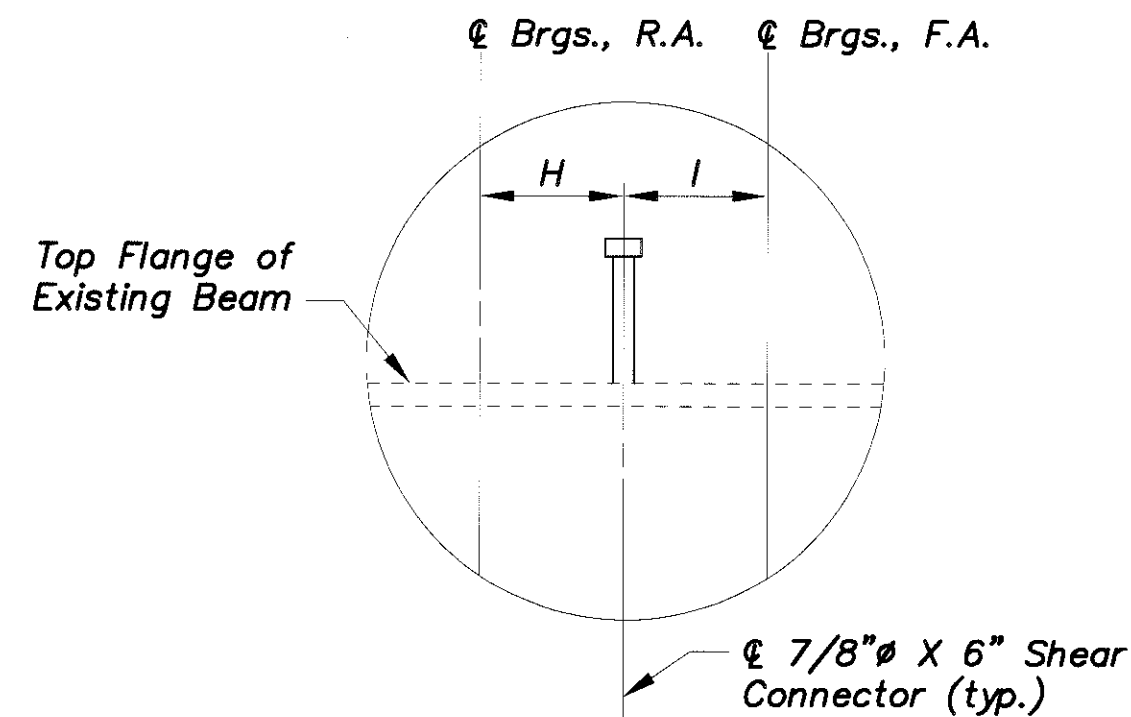


TYPICAL BEAM ELEVATION

NOTES:

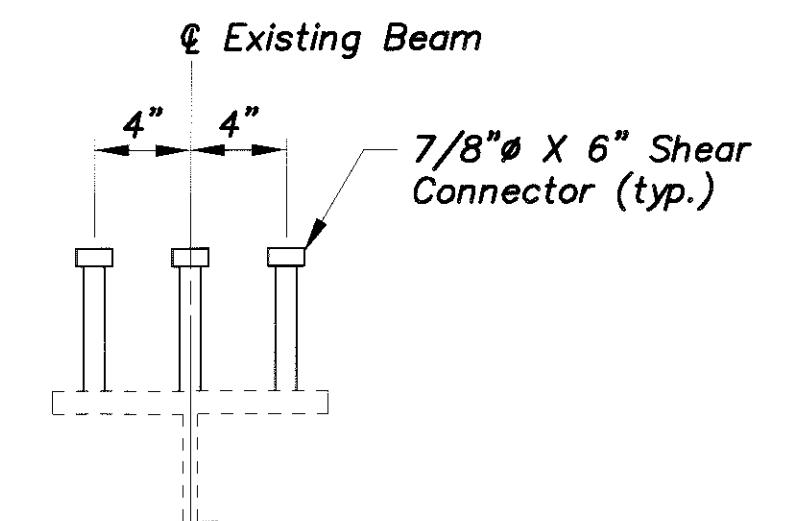
Move shear connectors when necessary to clear field splice bolts.

WELDED ATTACHMENT of supports for concrete deck finishing may be made to areas of the fascia stringer flanges designated "Compression". Attachments shall not be made to areas designated "Tension". Fillet welds to compression flanges shall be not closer than 1" from edge of flange, be not more than 2" long, and be not smaller than the minimum size required by AASHTO.



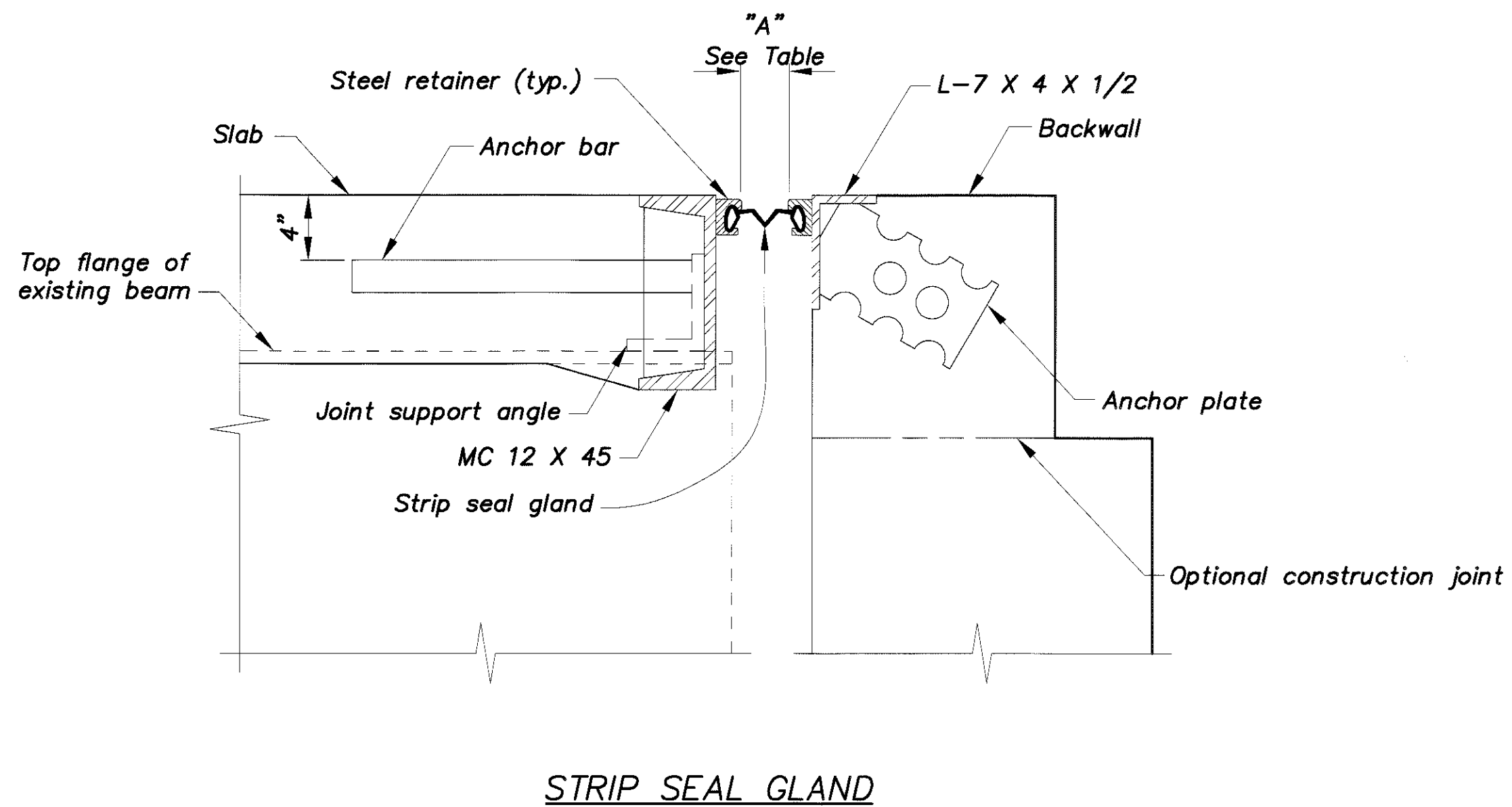
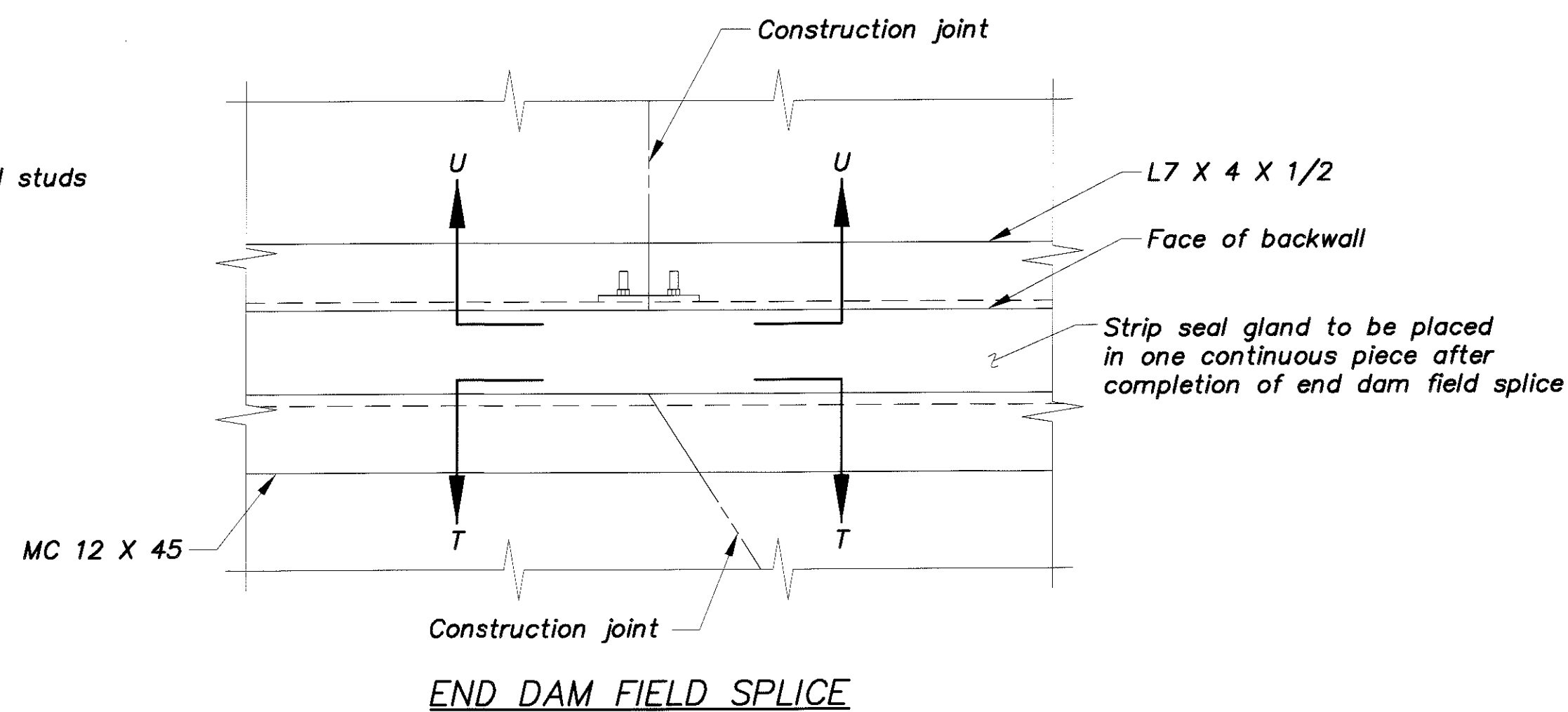
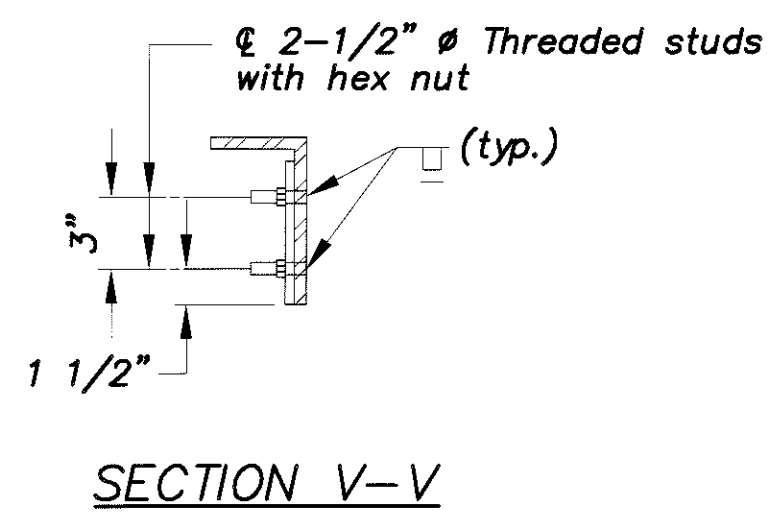
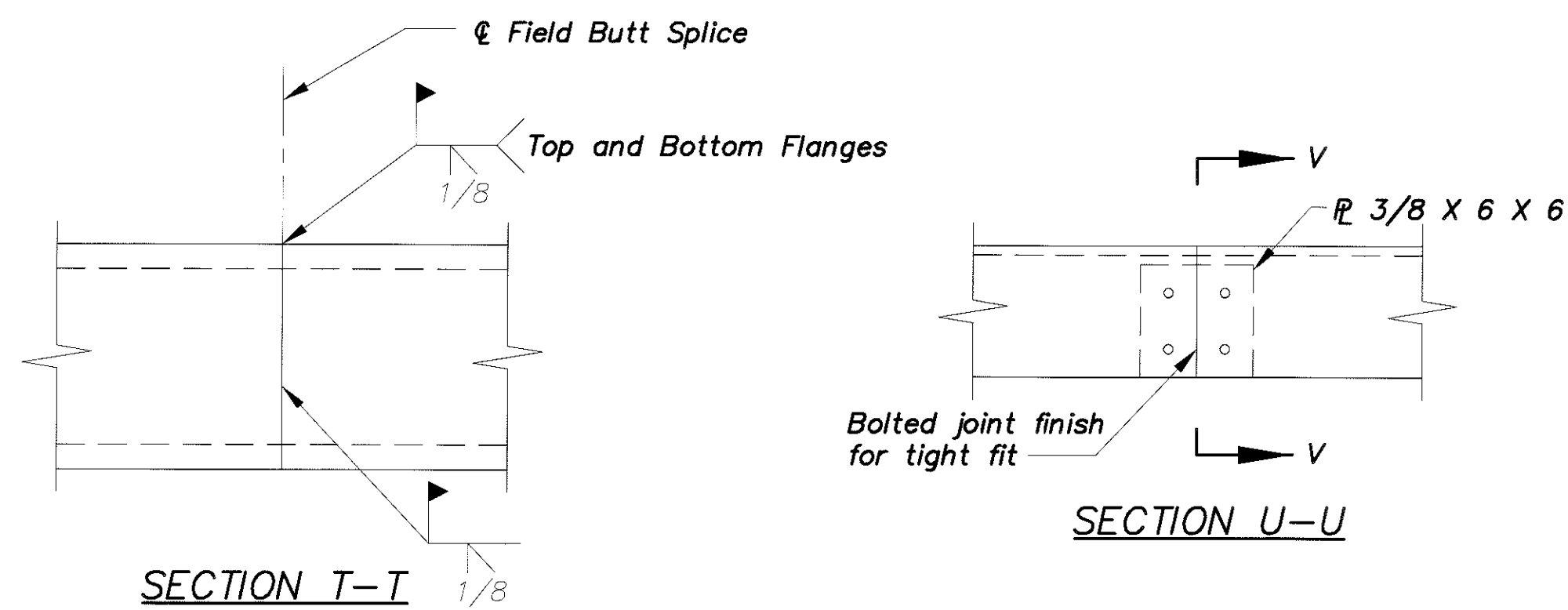
DETAIL C

EXISTING BEAM DIMENSIONS						
BEAM NO.	A	B	C	D	E	F
1	396'-11 3/16"	53'-7 5/8"	76'-10 1/8"	76'-6 13/16"	76'-11 5/8"	66'-6 7/16"
2	281'-6 1/16"		18'-0"	75'-8"	76'-1 9/16"	65'-9 7/8"
3	388'-7 5/8"	52'-10 3/8"	75'-2 3/16"	74'-9 5/16"	75'-3 9/16"	65'-1 7/16"
4	388'-7 5/8"	52'-10 3/8"	75'-2 3/16"	74'-9 5/16"	75'-3 9/16"	65'-1 7/16"
5	388'-7 5/8"	52'-10 3/8"	75'-2 3/16"	74'-9 5/16"	75'-3 9/16"	65'-1 7/16"
6	388'-7 5/8"	52'-10 3/8"	75'-2 3/16"	74'-9 5/16"	75'-3 9/16"	65'-1 7/16"
7	388'-7 5/8"	52'-10 3/8"	75'-2 3/16"	74'-9 5/16"	75'-3 9/16"	65'-1 7/16"
8	387'-4 3/8"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	75'-0 9/16"	64'-10 3/4"
9	387'-4 3/8"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	75'-0 9/16"	64'-10 3/4"
10	387'-4 3/8"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	75'-0 9/16"	64'-10 3/4"
11	386'-1"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	74'-7 1/8"	64'-4 15/16"
12	384'-10"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	74'-1 13/16"	63'-11 3/16"
13	383'-8 13/16"	52'-8 3/8"	74'-11 5/16"	74'-6 7/16"	73'-9 1/8"	63'-6 3/16"



SHEAR CONNECTOR DIAGRAM

SHEAR CONNECTOR SPACING							
BEAM NO.	H	I	AA	BB	CC	DD	EE
1	2 1/2"	2 11/16"	12 spa. @ 1'-0" = 12'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	36 spa. @ 1'-6" = 54'-0"	13 spa. @ 2'-0" = 26'-0"
2		3 1/16"				5 spa. @ 1'-0" = 5'-0"	13 spa. @ 2'-0" = 26'-0"
3	1"	5/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
4	1"	5/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
5	1"	5/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
6	1"	5/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
7	1"	5/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
8	2 1/4"	2 1/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	34 spa. @ 1'-6" = 51'-0"	13 spa. @ 2'-0" = 26'-0"
9	2 1/4"	2 1/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	34 spa. @ 1'-6" = 51'-0"	13 spa. @ 2'-0" = 26'-0"
10	2 1/4"	2 1/8"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	34 spa. @ 1'-6" = 51'-0"	13 spa. @ 2'-0" = 26'-0"
11	1"	0"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	35 spa. @ 1'-6" = 52'-6"	13 spa. @ 2'-0" = 26'-0"
12	2"	2"	10 spa. @ 1'-0" = 10'-0"	22 spa. @ 1'-6" = 33'-0"	10 spa. @ 2'-0" = 20'-0"	34 spa. @ 1'-6" = 51'-0"	13 spa. @ 2'-0" = 26'-0"
13	1"	1 13/16"	12 spa. @ 1'-0" = 12'-0"	22 spa. @ 1'-6" = 33'-0"	9 spa. @ 2'-0" = 18'-0"	34 spa. @ 1'-6" = 51'-0"	13 spa. @ 2'-0" = 26'-0"
BEAM NO.	FF	GG	HH	II	JJ	KK	
1	34 spa. @ 1'-6" = 51'-0"	12 spa. @ 2'-0" = 24'-0"	31 spa. @ 1'-6" = 46'-6"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
2	34 spa. @ 1'-6" = 51'-0"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
3	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
4	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
5	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
6	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
7	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
8	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
9	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
10	33 spa. @ 1'-6" = 49'-6"	12 spa. @ 2'-0" = 24'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	16 spa. @ 1'-6" = 24'-0"	11 spa. @ 1'-0" = 11'-0"	
11	33 spa. @ 1'-6" = 49'-6"	11 spa. @ 2'-0" = 22'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	17 spa. @ 1'-6" = 25'-6"	9 spa. @ 1'-0" = 9'-0"	
12	33 spa. @ 1'-6" = 49'-6"	11 spa. @ 2'-0" = 22'-0"	30 spa. @ 1'-6" = 45'-0"	9 spa. @ 2'-0" = 18'-0"	17 spa. @ 1'-6" = 25'-6"	9 spa. @ 1'-0" = 9'-0"	
13	33 spa. @ 1'-6" = 49'-6"	11 spa. @ 2'-0" = 22'-0"	30 spa. @ 1'-6" = 45'-0"	8 spa. @ 2'-0" = 16'-0"	17 spa. @ 1'-6" = 25'-6"	10 spa. @ 1'-0" = 10'-0"	



AMBIENT TEMPERATURE F°	DIMENSION A
30°	2 7/16"
40°	2 5/16"
50°	2 3/16"
60°	2 1/8"
70°	1 15/16"
80°	1 13/16"
90°	1 11/16"

NOTES:

INSTALLATION OF SEAL: During installation of the support/armor for the superstructure side of the expansion joint seal, the seating of beams on bearing shall be carefully observed to assure that positive bearing is maintained. Proper vertical fit of the support/armor on the beams shall be achieved by postioning of the bevel fill plates rather than by clamping force.

The strip seal gland size shall be 4 inches.

For additional details and notes refer to Std. Dwg. EXJ-4-87.

SUPERSTRUCTURE DETAILS
 Bridge No. COL-11-0946 N.B.L. & S.B.L.
 over West Fork Little Beaver Creek & W.B. US 30

COL-11-(9.44)(13.76)

23/27

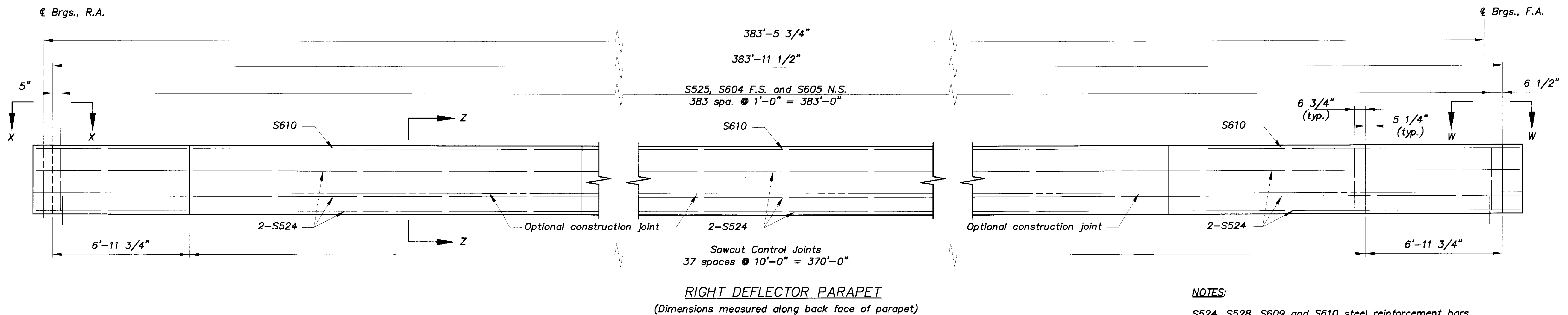
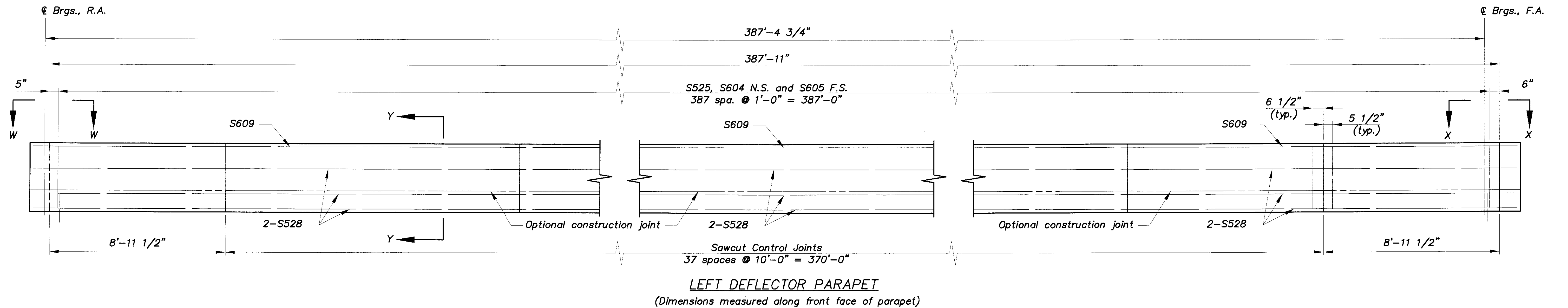
95
126

WDA&E
 DESIGN AGENCY
 1201 Dublin Road
 Columbus, Ohio

DATE 6-12-00
 BLG
 STRUCTURE FILE NUMBER 1500570/1500600

DRAWN WHM
 CHECKED WHM
 DESIGNED GTB

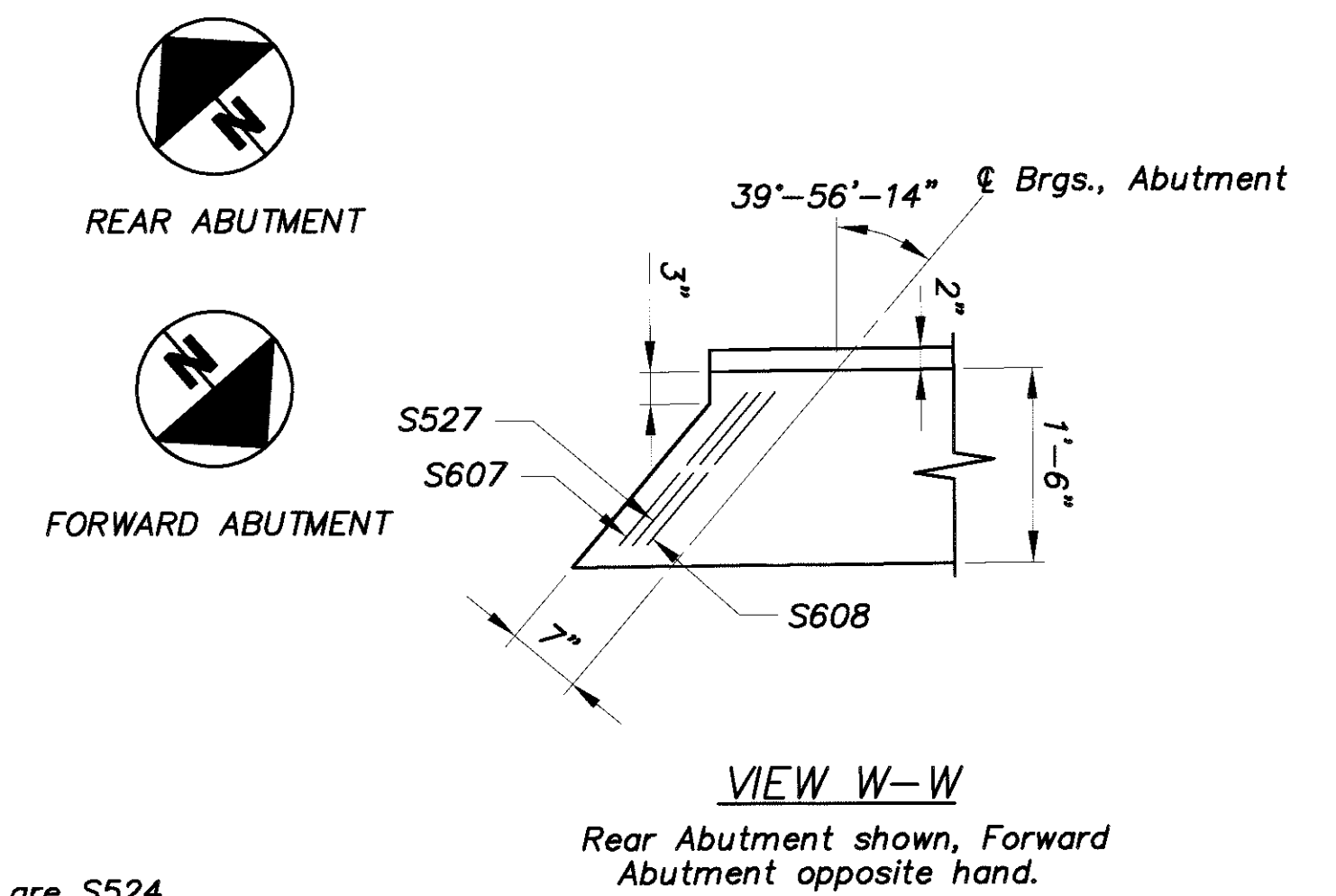
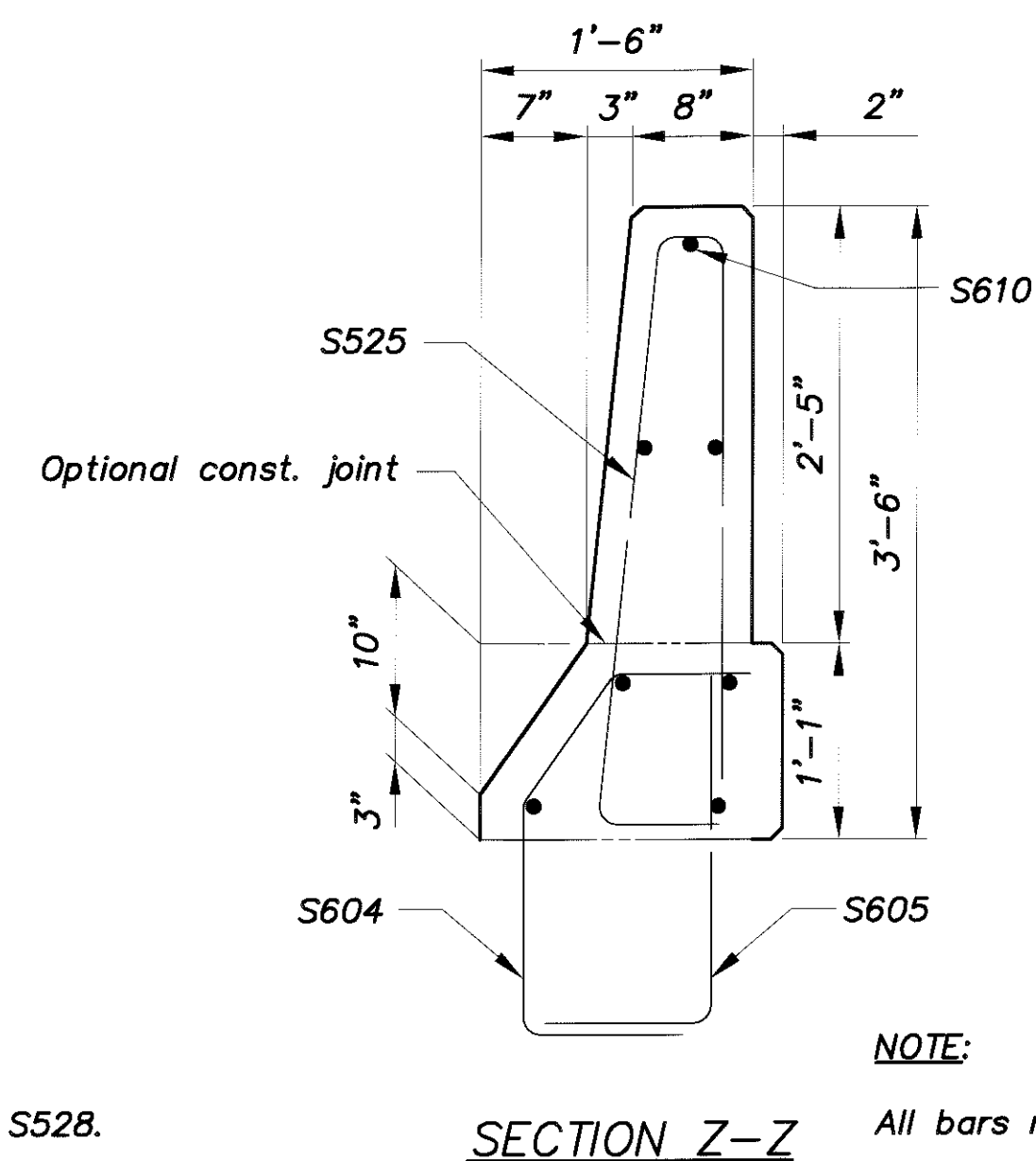
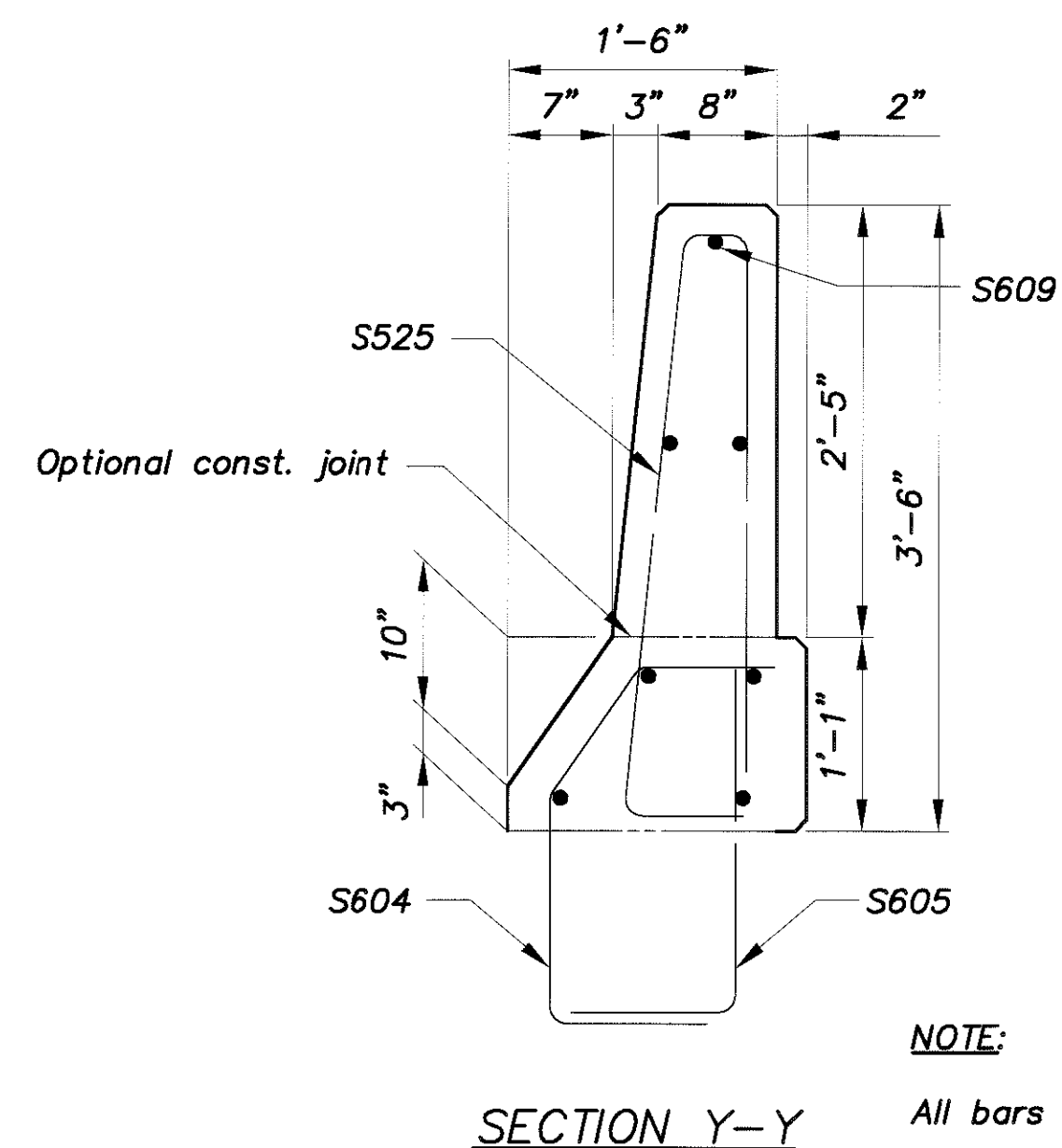
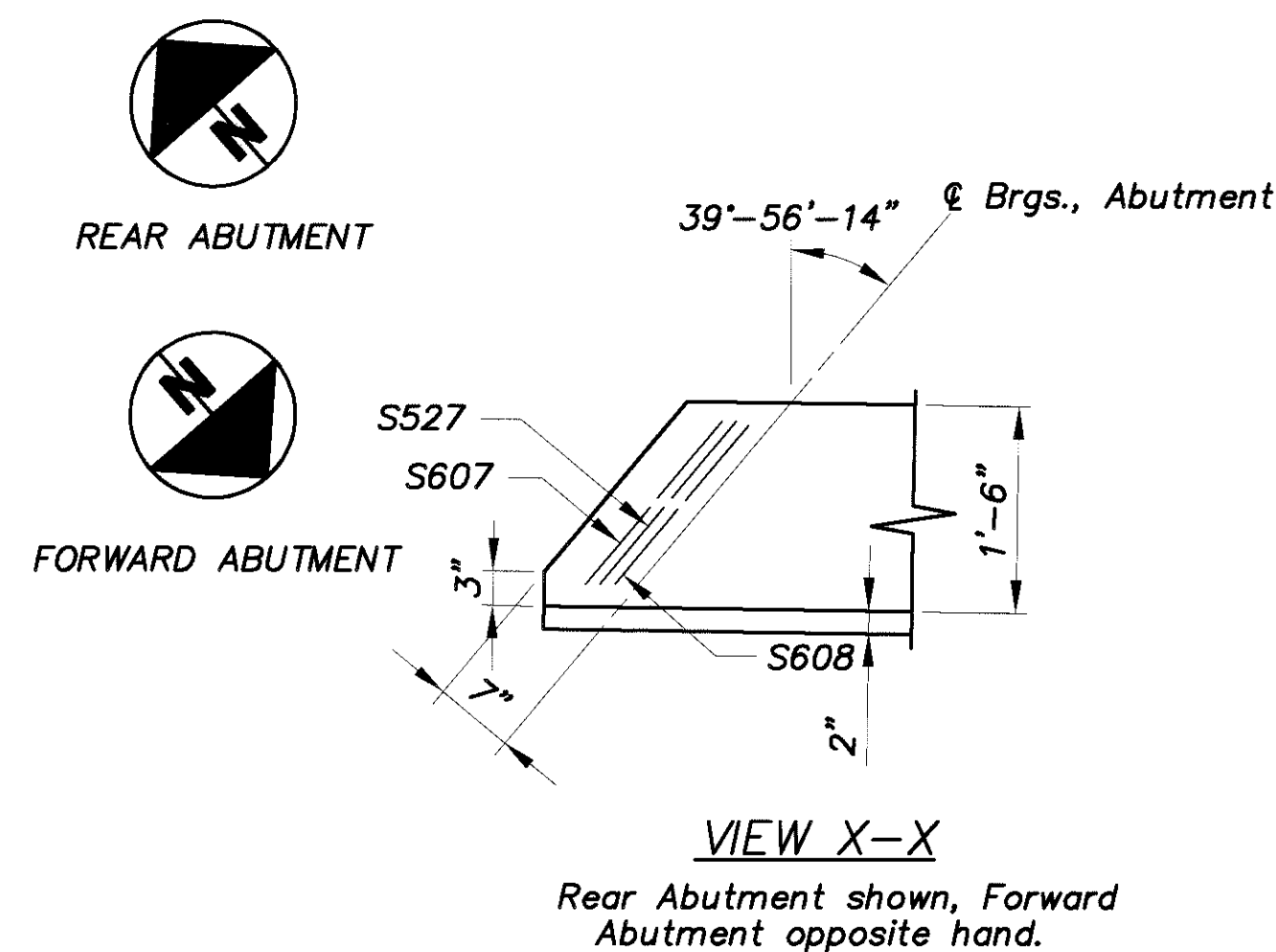
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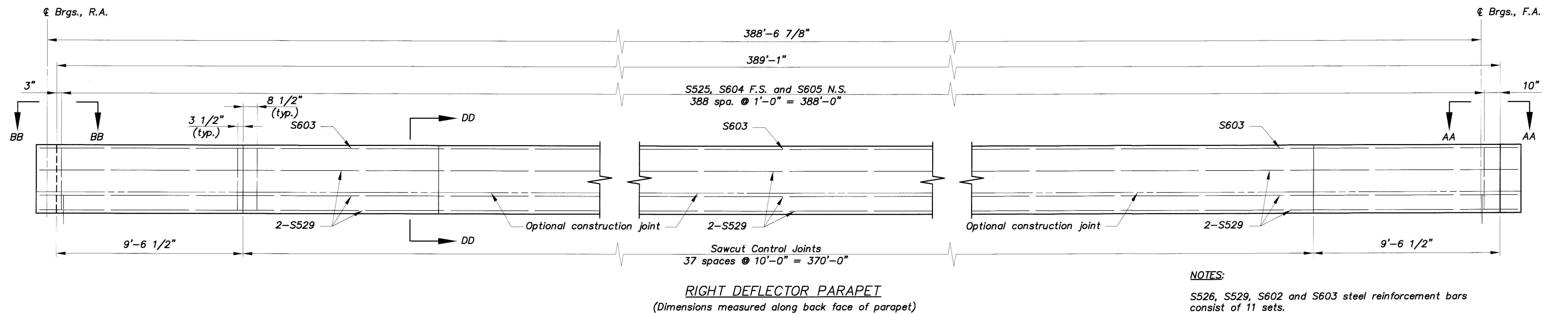
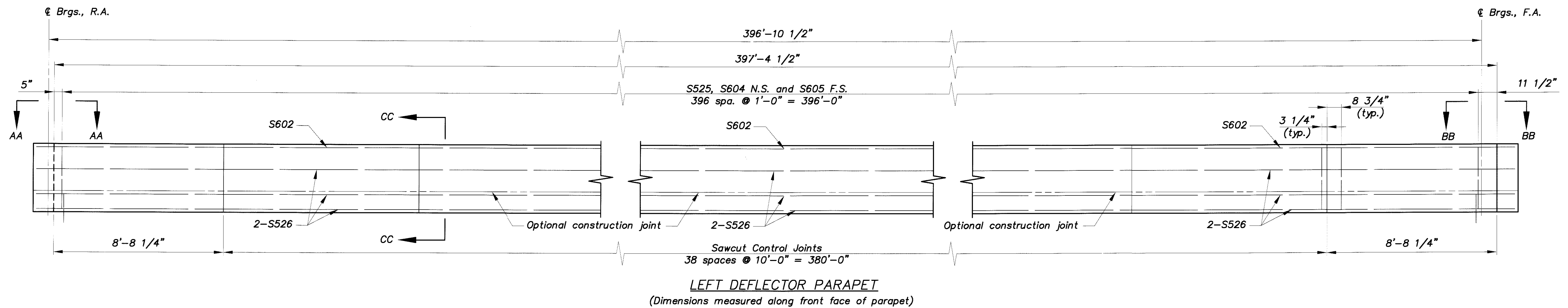
NOTES:

S524, S528, S609 and S610 steel reinforcement bars consist of 11 sets.

Slip forming of concrete parapets shall be prohibited.



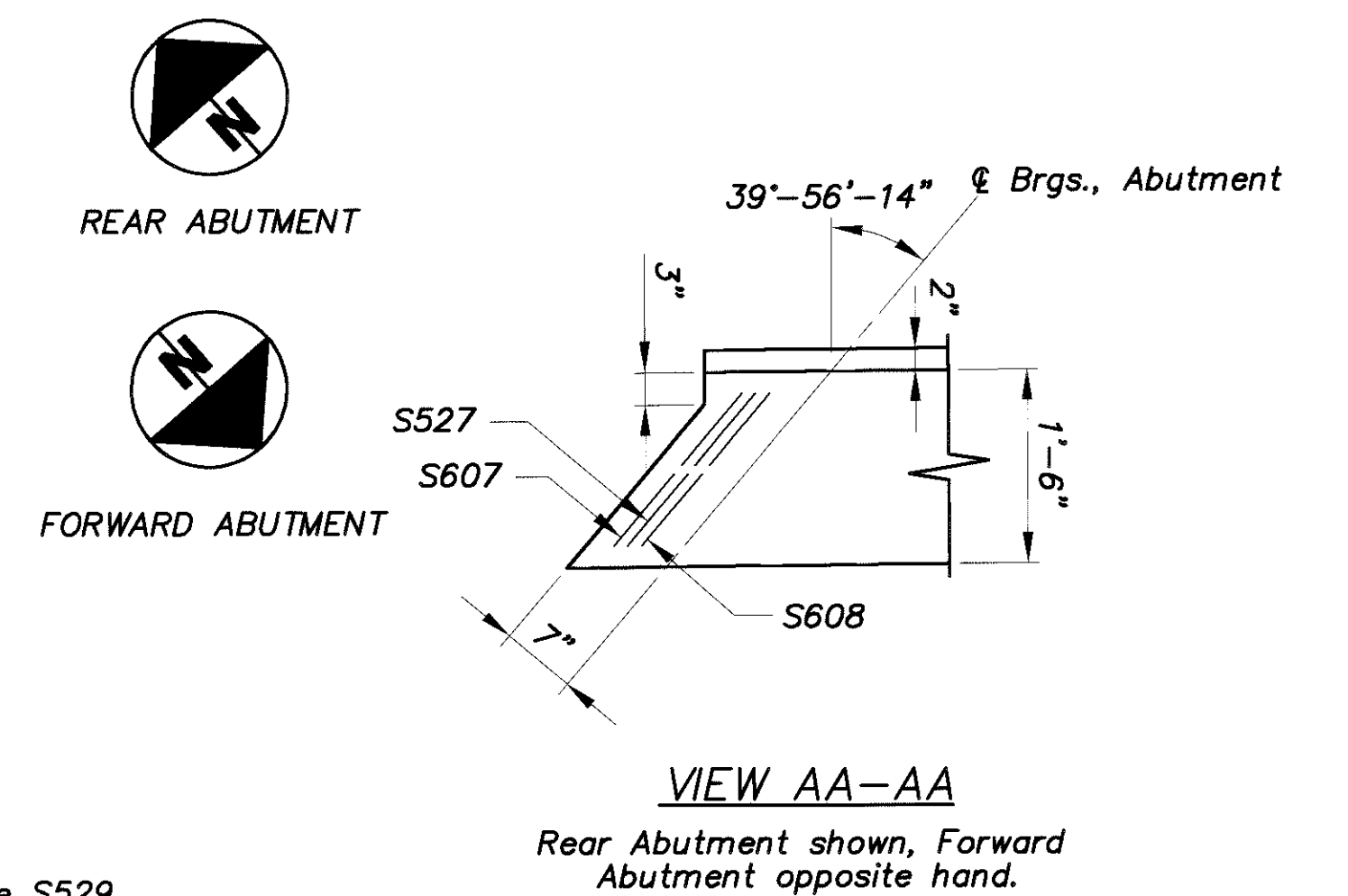
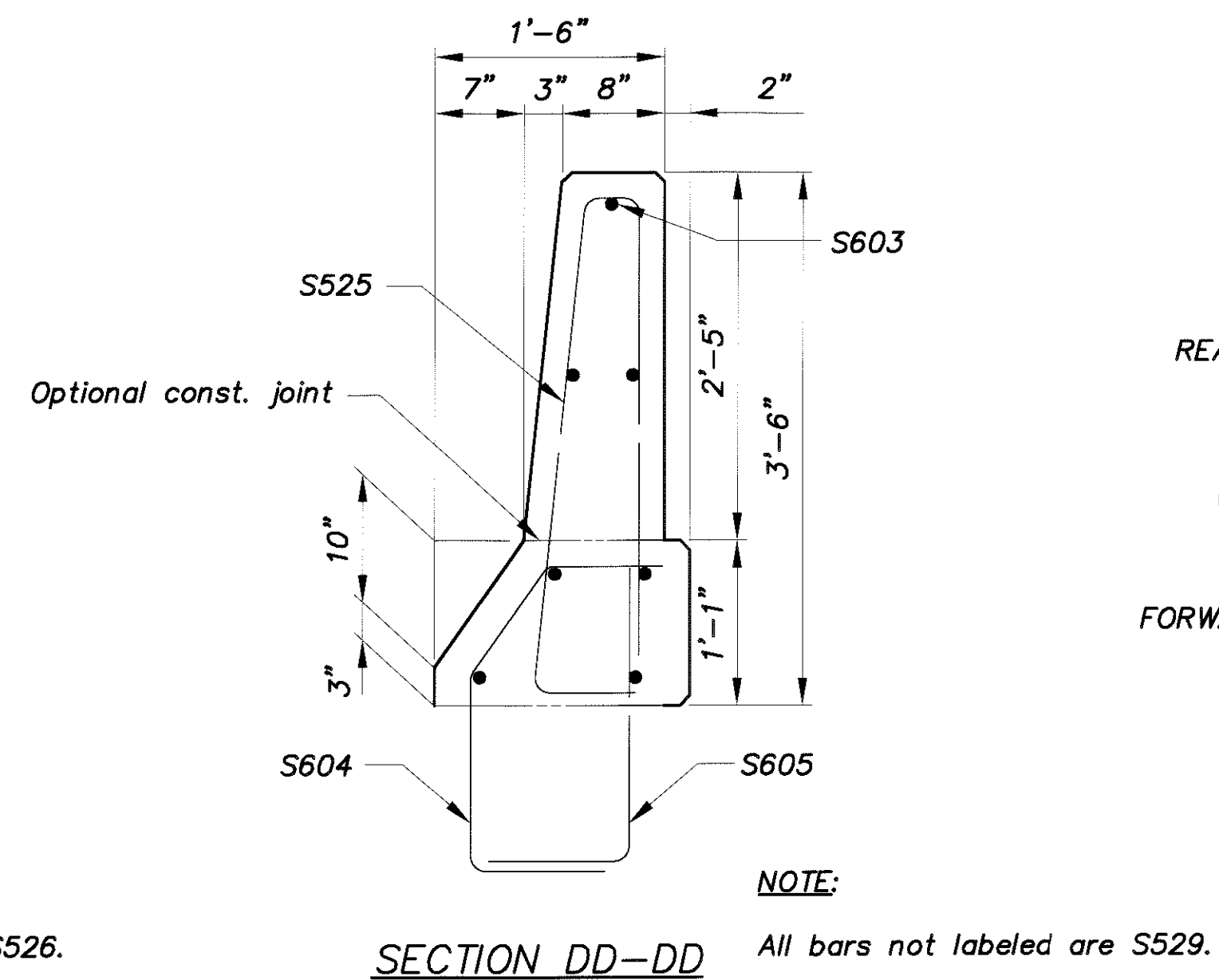
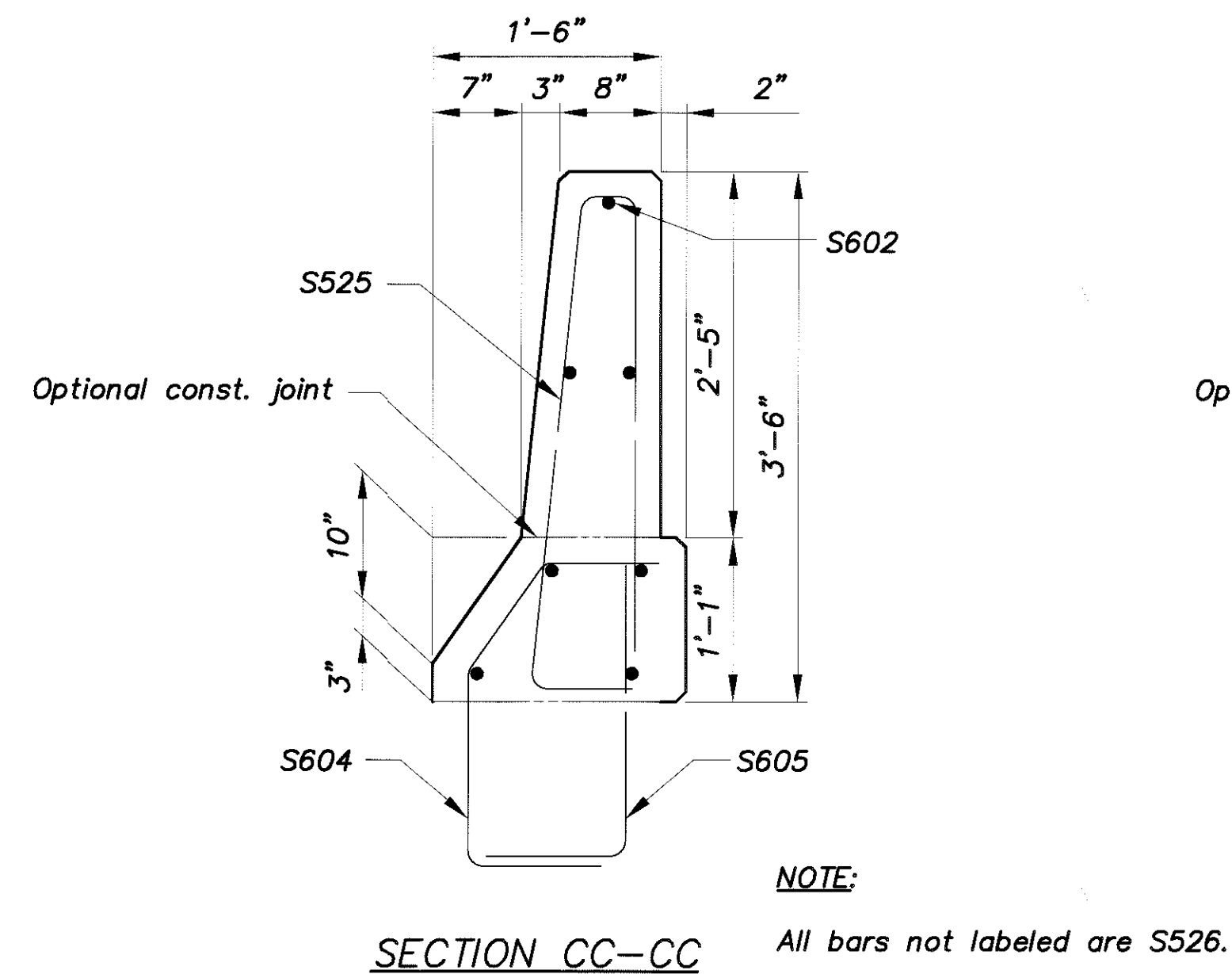
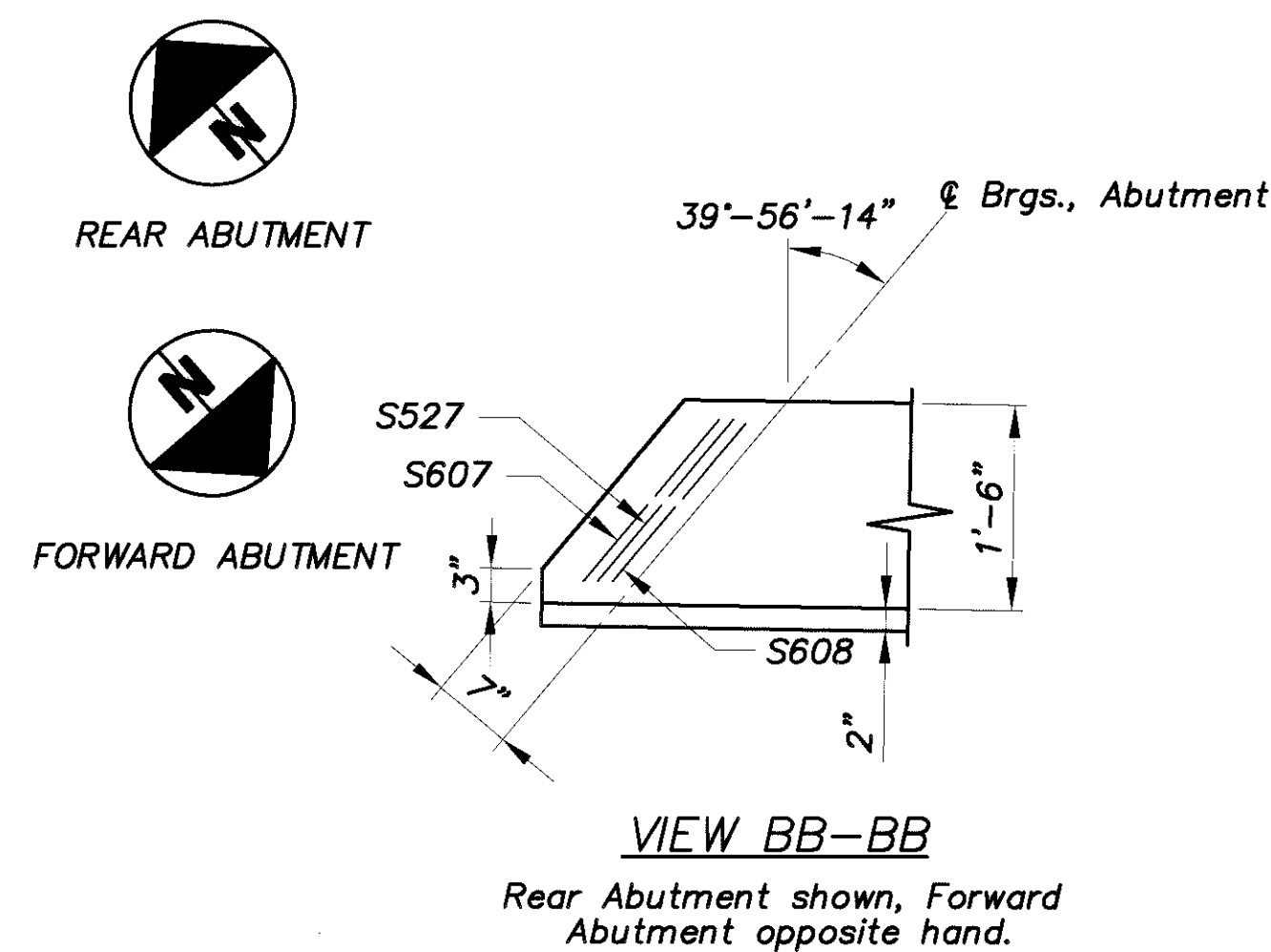
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NOTES:

S526, S529, S602 and S603 steel reinforcement bars consist of 11 sets.

Slip forming of concrete parapets shall be prohibited.

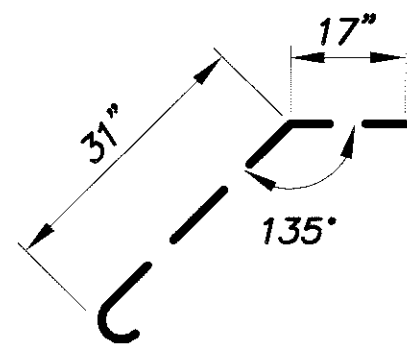


K:\Data\Dist11\COL-11-(9.46)(13.76)\Drawings\COL-11-9.46\Shared Bridge\scd4.dwg

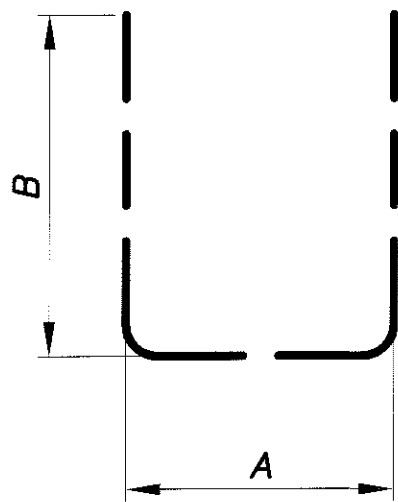
MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		SUBSTRUCTURE							
A501				10	10	23'-0"	242	STR.				
A502				4	4	25'-7"	107	4	3'-0"	15'-4"	16'-9"	
A503*				3	3	29'-9"	93	STR.				
A504*				4	4	27'-11"	116	4	1'-4"	20'-2"	17'-6"	
A505*		3			3	30'-1"	95	STR.				
A506*		4			4	32'-7"	136	4	3'-0"	19'-9"	22'-6"	
A507		3			3	36'-9"	116	STR.				
A508		4			4	35'-1"	146	4	1'-4"	26'-8"	20'-11"	
A509	3				3	31'-6"	100	STR.				
A510	4				4	34'-0"	142	4	3'-0"	19'-6"	24'-4"	
A511*	3				3	29'-0"	92	STR.				
A512*	4				4	27'-3"	114	4	1'-4"	20'-3"	16'-4"	
A513*			3		3	29'-4"	93	STR.				
A514*			4		4	31'-10"	133	4	3'-0"	18'-3"	22'-6"	
A515			3		3	30'-10"	97	STR.				
A516			4		4	29'-0"	121	4	1'-4"	21'-2"	18'-0"	
A517	3	3	3	3	12	12'-2"	152	3	3'-2"	2'-8"		
A518	8	8	8	8	32	3'-4"	111	STR.				
A519	1		1		2	8'-5"	18	STR.				
A520	1		1		2	7'-4"	15	STR.				
A521	1		1		2	11'-3"	23	STR.				
A522	1		1		2	10'-2"	21	STR.				
A523	2		2		4	16'-4"	68	STR.				
A524	2		2		4	15'-3"	64	STR.				
A525	2		2		4	19'-4"	81	STR.				
A526	2		2		4	20'-5"	85	STR.				
A527	1		1		2	14'-1"	29	STR.				
A528	1		1		2	15'-2"	32	STR.				
A529	1		1		2	11'-5"	24	STR.				
A530	1		1		2	12'-6"	26	STR.				
A531		3		3	6	17'-1"	107	STR.				
A532		3		3	6	18'-3"	114	STR.				
A533		1		1	2	9'-7"	20	STR.				
A534		1		1	2	10'-9"	22	STR.				
A535			3	3	3	15'-9"	49	STR.				
A536			3	3	3	14'-8"	46	STR.				
A537			1	1	1	8'-8"	9	STR.				
A538			1	1	1	7'-7"	8	STR.				
A539		3			3	15'-6"	48	STR.				
A540		3			3	14'-5"	45	STR.				
A541		1			1	8'-5"	9	STR.				
A542		1			1	7'-4"	8	STR.				
A601				138	138	4'-10"	1002	STR.				
A602				69	69	7'-9"	803	2	11"	3'-7"		
A603				69	69	5'-9"	596	2	1'-5"	2'-4"		
A604	112	126	112		350	5'-0"	2629	STR.				
A605	56	63	56		175	7'-7"	1993	2	11"	3'-6"		
A606	56	63	56		175	5'-7"	1468	2	1'-5"	2'-3"		
A607	16	16	16	16	64	2'-8"	256	STR.				
A608	2 Ser. of 4		2 Ser. of 4		4 Ser. of 4	2'-6" to 4'-2"	80	STR.				6 1/2" (-)
A609			2		2	25'-2"	76	2	1'-2"	12'-2"		
A610			2		2	9'-0"	27	STR.				
A611	14		14		28	6'-3"	263	STR.				
A612	2 Ser. of 5		2 Ser. of 5		4 Ser. of 5	2'-6" to 5'-1"	114	STR.				7 3/4"
A613	22		22		44	6'-5"	424	STR.				
A614				2 Ser. of 5	2 Ser. of 5	2'-9" to 4'-4"	53	STR.				4 3/4"
A615				18	18	6'-1"	164	STR.				
A616				12	12	6'-2"	111	STR.				
A617				2	2	10'-1"	30	STR.				
A618				2	2	27'-2"	82	2	1'-2"	13'-2"		
A619				2 Ser. of 4	2 Ser. of 4	2'-9" to 4'-2"	42	STR.				5 3/4" (+)
A620	2				2	24'-10"	75	2	1'-2"	12'-0"		
A621	2				2	8'-10"	27	STR.				
A622		2 Ser. of 5			2 Ser. of 5	2'-11" to 4'-6"	56	STR.				4 3/4"
A623		18			18	6'-3"	169	STR.				
A624		12			12	6'-4"	114	STR.				
A625		2			2	10'-3"	31	STR.				
A626		2			2	27'-6"	83	2	1'-2"	13'-4"		

MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		ABUTMENTS (CONTINUED)							
A627		2 Ser. of 4			2 Ser. of 4	2'-11" to 4'-4"	44	STR.				5 3/4" (+)
A628	4	4	4	4	16	28'-6"	685	5	11 1/2"	5 1/2"	3'-0"	
A801	6	6	6	6	24	3'-4"	214	STR.				
D801	56	63	56	69	244	4'-11"	3203	1				
				SUB-TOTAL (ABUTMENTS) =			18091					

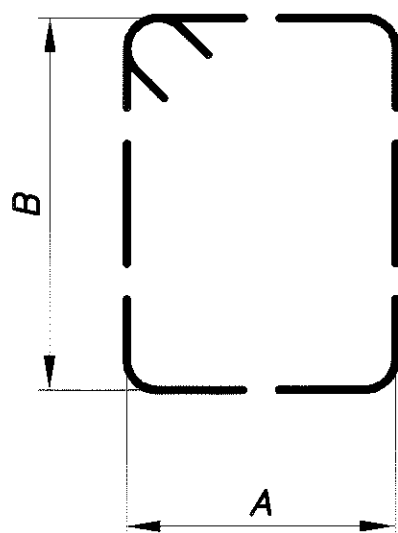
BENDING DIAGRAM



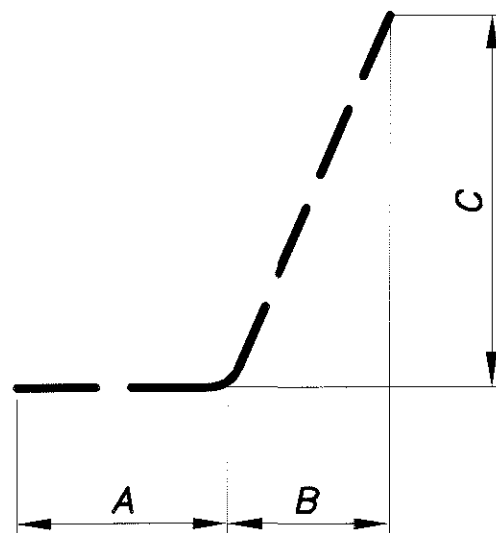
TYPE 1



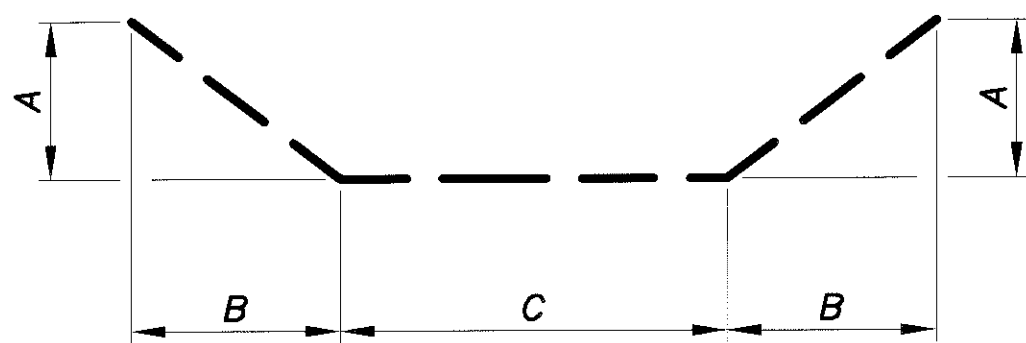
TYPE 2



TYPE 3



TYPE 4



TYPE 5

NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

#5 Reinforcing bar L = 2'-8"

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

All bars, connectors and dowel bar extensions shall be epoxy coated. Coating for both connectors and bars shall conform to the same specifications. Coatings which have been damaged or which otherwise do not meet specifications with respect to color, continuity and uniformity may be repaired as directed by the Engineer or shall be replaced by material which meets specifications.

Refer to C.M.S. Section 509.05 for standard bend dimensions.

All dimensions are out to out.

SUPERSTRUCTURE DETAILS (SUBSTRUCTURE)

Bridge No. COL-11-0946 N.B.L. & S.B.L.
over West Fork Little Beaver Creek & W.B. US 30

COL-11-(9.44)(13.76)

26/27

98
126

DESIGN AGENCY
WDA&E
1201 Dublin Road Columbus, Ohio

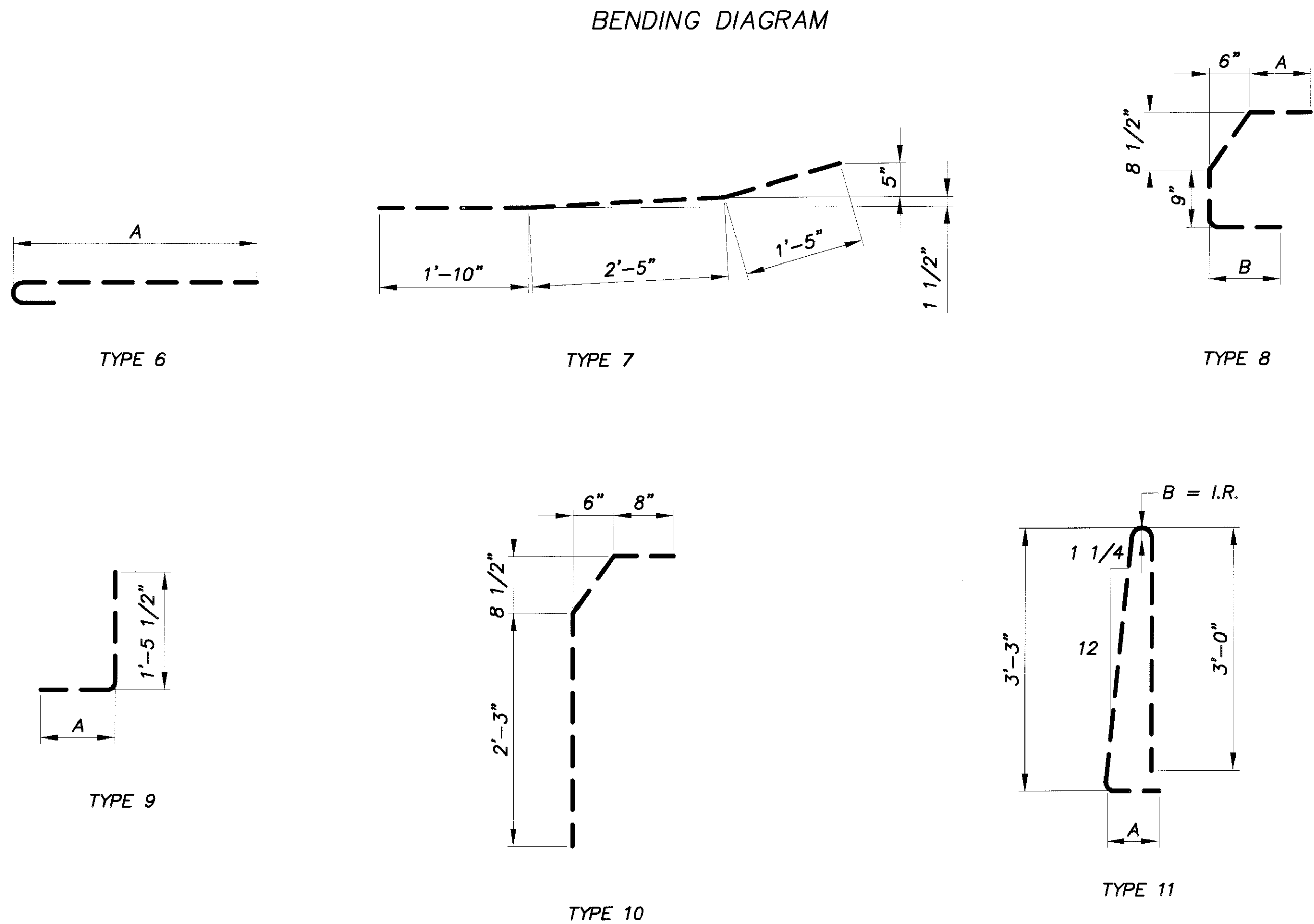
DATE
6-12-00
BLG
STRUCTURE FILE NUMBER
1500570/1500600

DRAWN
WHM
CHECKED
WHM
REVIEWED
GTB

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MARK				LENGTH	WEIGHT	TYPE	DIMENSIONS			
	S.B.L.	N.B.L.	TOTAL				A	B	C	INC.
SUPERSRUCTURE										
S401		711	711	35'-3"	16742	STR.				
S402	649		649	37'-4"	16185	STR.				
S501		702	702	35'-10"	26237	STR.				
S502*	1614	1426	3040	22'-8"	71870	STR.				
S503		200	200	23'-9"	4954	STR.				
S504		204	204	24'-10"	5284	STR.				
S505		204	204	25'-10"	5497	STR.				
S506		204	204	27'-0"	5745	STR.				
S507		204	204	28'-2"	5993	STR.				
S508		204	204	29'-3"	6224	STR.				
S509		204	204	30'-4"	6454	STR.				
S510		2 Ser. of 33	2 Ser. of 33	3'-1" to 23'-2"	1807	STR.				7 1/2" (+)
S511		2 Ser. of 28	2 Ser. of 28	14'-10" to 31'-0"	2677	STR.				7 1/4" (+)
S512	72	72	144	14'-1"	2115	STR.				
S513*		2 Ser. of 31	2 Ser. of 31	3'-8" to 22'-0"	1660	STR.				7 1/4" (-)
S514		2 Ser. of 12	2 Ser. of 12	15'-2" to 22'-1"	932	STR.				7 1/2" (+)
S515	561		561	37'-9"	22088	STR.				
S516	886		886	24'-6"	22640	STR.				
S517	424		424	24'-6"	10835	STR.				
S518	140		140	25'-11"	3784	STR.				
S519	140		140	26'-10"	3918	STR.				
S520	2 Ser. of 40		2 Ser. of 40	6'-3" to 27'-6"	1408	STR.				6 1/2" (+)
S521	2 Ser. of 15		2 Ser. of 15	14'-5" to 22'-0"	570	STR.				6 1/2"
S522	2 Ser. of 18		2 Ser. of 18	14'-5" to 24'-5"	729	STR.				7" (-)
S523*	2 Ser. of 33		2 Ser. of 33	4'-2" to 22'-0"	901	STR.				6 3/4" (+)
S524	66		66	37'-8"	2384	STR.				
S525	772	786	1558	7'-0"	11375	11	8"	1 1/2"		
S526		66	66	38'-10"	2673	STR.				
S527	4	4	8	7'-3"	60	11	10"	2 1/2"		
S528	66		66	38'-0"	2616	STR.				
S529		66	66	38'-1"	2621	STR.				
S530	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	3'-0" to 3'-10"	314	6	2'-5" to 3'-3"			1"
S531	2	2	4	16'-4"	68	STR.				
S532	2	2	4	15'-3"	64	STR.				
S533	8	8	16	5'-8"	95	STR.				
S534	8	8	16	5'-8"	95	7				
S535	16	16	32	10'-0"	334	STR.				
S536	2	2	4	4'-3"	18	STR.				
S537	2	2	4	19'-4"	81	STR.				
S538	2	2	4	20'-5"	85	STR.				
S539	2	2	4	8'-2"	34	STR.				
S540	2	2	4	17'-1"	71	STR.				
S541	2	2	4	18'-3"	76	STR.				
S542	2	2	4	6'-1"	25	STR.				
S543	2	2	4	3'-5"	14	STR.				
S544	1	1	2	15'-9"	33	STR.				
S545	1	1	2	14'-8"	31	STR.				
S546	1	1	2	15'-6"	32	STR.				
S547	1	1	2	14'-5"	30	STR.				
S601	260	263	523	30'-0"	23566	STR.				
S602		11	11	39'-4"	650	STR.				
S603		11	11	38'-6"	636	STR.				
S604	772	786	1558	3'-7"	8385	8	9"	10 1/2"		
S605	772	786	1558	2'-2"	5070	9	11"			
S606	1	1	2	3'-5"	10	STR.				
S607	4	4	8	3'-2"	38	8	11"	1'-0 1/2"		
S608	4	4	8	2'-4"	28	9	1'-1"			
S609	11		11	38'-5"	635	STR.				
S610	11		11	38'-1"	629	STR.				
S611	1	1	2	8'-2"	25	STR.				
S612	1	1	2	4'-3"	13	STR.				
S613	32	32	64	4'-6"	433	STR.				

MARK				LENGTH	WEIGHT	TYPE	DIMENSIONS			
	S.B.L.	N.B.L.	TOTAL				A	B	C	INC.
SUPERSRUCTURE (CONTINUED)										
S614	57	57	114	3'-9"	642	10				
S615	13	13	26	2'-8"	104	STR.				
S616	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	4'-6" to 5'-4"	650	STR.				1"
S617	1	1	2	6'-1"	18	STR.				
S618	1	1	2	3'-5"	10	STR.				
	SUB-TOTAL (SUPERSTRUCTURE) =				311303					



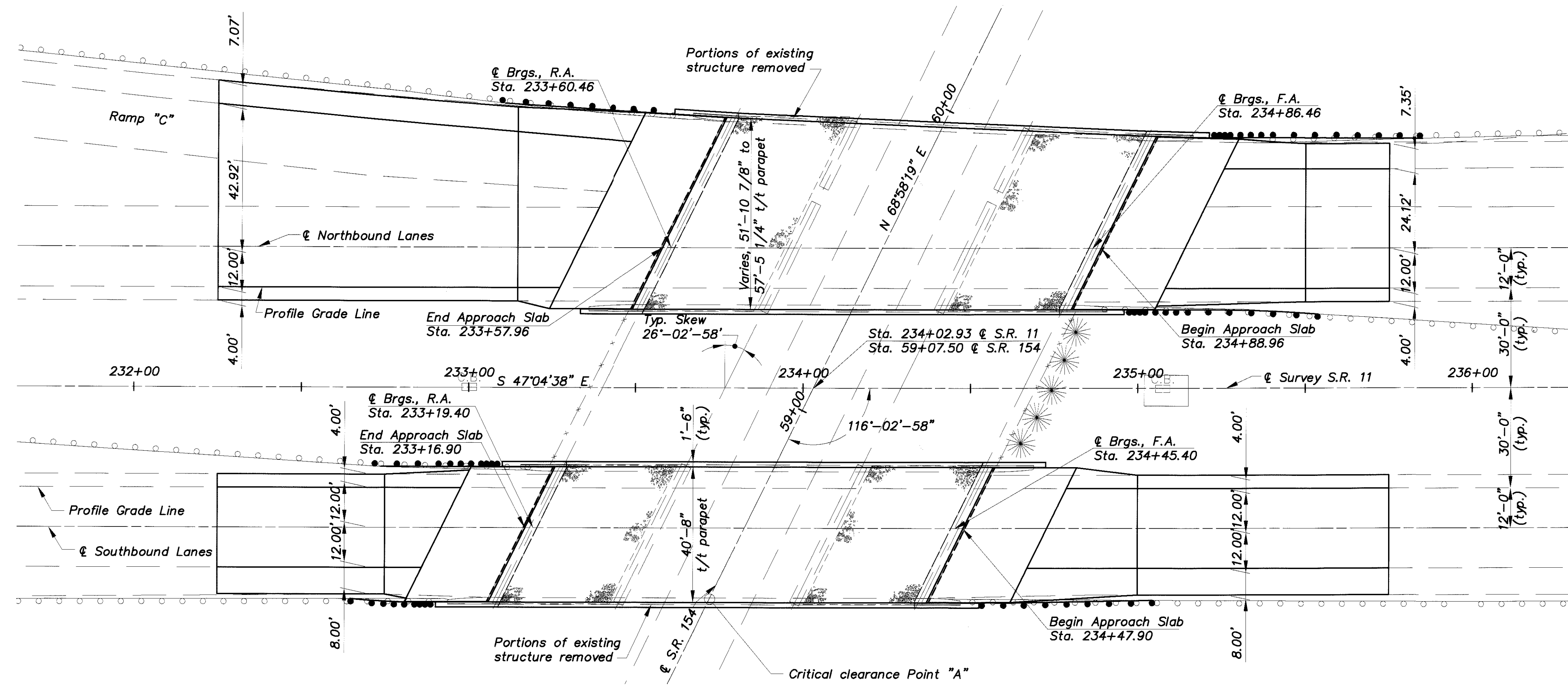
NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

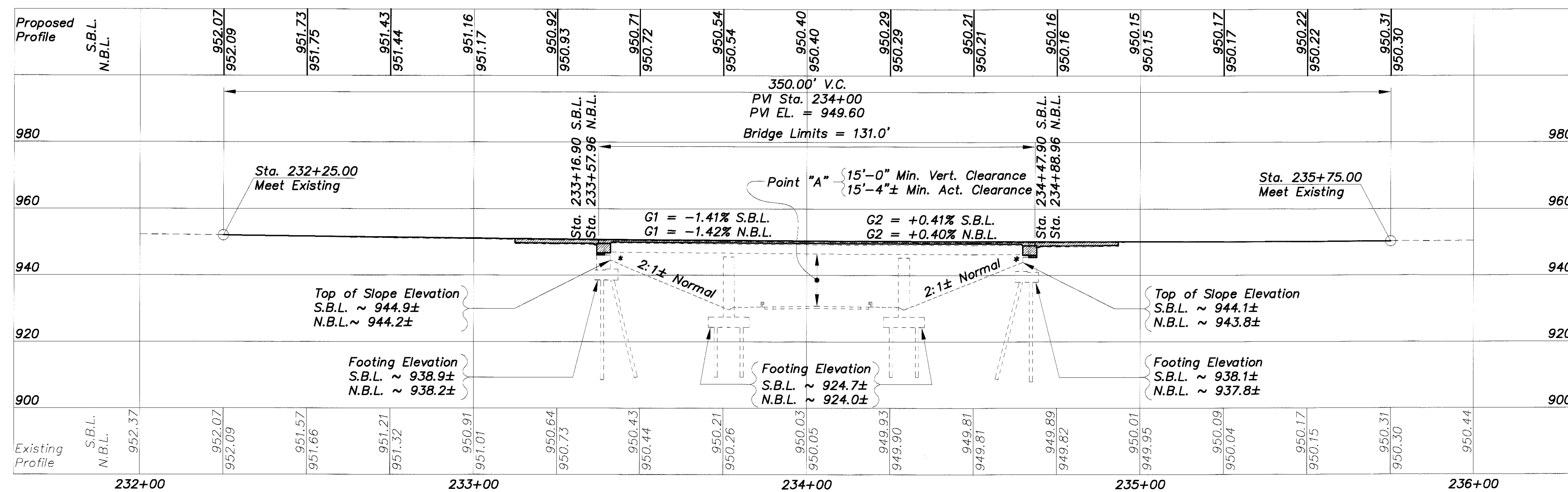
#5 Reinforcing bar L = 4'-1" S.B.L. & 3'-10" N.B.L.

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

See Sheet 26/27 for additional notes.



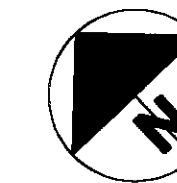
PLAN



PROFILE

NOTE:

Existing piles are 10BP42



LEGEND:

* - Semi-integral
N.B.L. - Northbound Lane
S.B.L. - Southbound Lane

BENCHMARK		COLUMBIANA	Sta. 233+57	Sta. 234+88
Southwest corner of concrete pad Sta. 235+14.17, 3.53' Rt. E.L. = 946.99			Sta.	Sta.
TRAFFIC DATA		COLUMBIANA COUNTY	S.B.L.	S.B.L.
CURRENT YEAR ADT (2001) = 11500 DESIGN YEAR ADT (2021) = 13700 DESIGN YEAR ADTT (2021) = 18%			Sta. 233+16.90	Sta. 234+47.90
EXISTING STRUCTURE		SITE PLAN	N.B.L.	
TYPE: Continuous steel beams with reinforced concrete deck and substructure. SPANS: 36.75'-52.5'-36.75' c/c bearings ROADWAY: S.B.L. ~ 40'-0" f/f parapet and N.B.L. ~ Varies from 52'± to 58'± f/f parapet with 1'-0" safety curb LOADING: CF 2000 (57) SKEW: 26'-02'-58" L.F. WEARING SURFACE: 1" Monolithic APPROACH SLABS: AS-1-54 modified 25' long ALIGNMENT: Tangent DATE BUILT: 1969 STRUCTURE FILE NUMBER: 1500783/1500813			Bridge No. COL-11-1378 N.B.L. & S.B.L. over S.R. 154	
PROPOSED STRUCTURE		COL-11-(9.44)(13.76)		
PROPOSED WORK: New composite reinforced concrete deck and semi-integral abutments on existing piers. SPANS: 36.75'-52.5'-36.75' c/c bearings ROADWAY: S.B.L. ~ 40'-8" t/t parapet and N.B.L. ~ Varies from 51'-10 7/8"± to 57'-5 1/4"± t/t parapet. LOADING: HS20-44, Case II and the alternate military loading SKEW: 26'-02'-58" L.F. WEARING SURFACE: Monolithic concrete APPROACH SLABS: AS-1-81 (25' long) ALIGNMENT: Tangent CROWN: 3/16" per foot LATITUDE: 40'-45'-55" N LONGITUDE: 80'-43'-35" W		1/27		
		100 126		

REFERENCE shall be made to Standard Drawing(s):

AS-1-81 (revised) 04-20-01
BR-1 (revised) 01-06-99
GSD-1-96 Dated 04-20-01
PCB-91 Dated 07-06-99
SICD-1-96(M) Dated 04-20-01

and Supplemental Specification(s):

815 Dated 02-22-00
844 Dated 01-06-99
846 Dated 09-09-97
910 Dated 07-11-00
911 Dated 07-10-97
954 Dated 09-09-97

DESIGN SPECIFICATIONS: This structure conforms to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation Officials, 1996 including the 1997 and 1998 Interim Specifications and the ODOT Bridge Design Manual.

DESIGN LOADING: HS20-44, Case II and the Alternate Military Loading.
Future Wearing Surface (FWS) of 60 psi.

DESIGN DATA:

High Performance Concrete-compressive strength 4500 p.s.i. (superstructure)

High Performance Concrete-compressive strength 4000 p.s.i. (substructure)

Reinforcing steel-ASTM A615, A616 or A617
Grade 60 minimum yield strength 60,000 p.s.i.

Existing Structural Steel
ASTM A36-yield strength 36,000 p.s.i.

DECK PROTECTION METHOD:

Epoxy coated reinforcing steel

2 1/2" concrete cover

MONOLITHIC WEARING SURFACE is assumed, for design purposes, to be 1" thick.

ITEM 519, PATCHING CONCRETE STRUCTURE:

All surfaces to be patched and the exposed reinforcing steel within shall be thoroughly cleaned by abrasive blasting prior to cleaning specified by 519.04. Cleaning shall precede application of the patching material or erection of the forms by not more than 24 hours.

PORTIONS OF STRUCTURE REMOVED, AS PER PLAN

DESCRIPTION: This work shall consist of the removal of concrete decks including sidewalks, parapets, railing, deck joints and other appurtenances from steel supporting systems (beams, girders, cross frames, etc.). Care shall be taken during deck removals to protect portions of such systems that are to be salvaged and incorporated into the proposed structure. In this respect, the use of explosives, headache balls and/or hoe ram type of equipment is prohibited.

PROTECTION OF TRAFFIC: Prior to demolition of any portions of the existing superstructure, the Contractor shall submit plans for the protection of traffic (vehicular, pedestrian, boat, etc.) adjacent to and/or under the structure to the Director for approval. These plans shall include provisions for any devices and structures that may be necessary to ensure such protection. Temporary vertical clearances specified on the plans or in the proposal shall be maintained at all times except as otherwise approved by the Director.

PROTECTION OF STEEL SUPPORT SYSTEMS: Before deck slab cutting is permitted, the outline of primary steel members in contact with the bottom of the deck shall be drawn on the surface of the deck. Small diameter pilot holes shall be drilled 2 inches outside these lines to confirm the location of these flange edges. Deck cuts over or within 2 inches of flange edges shall not extend lower than the bottom layer of deck slab reinforcing steel. Cuts made outside 2 inches of flange edges may extend the full depth of the deck. During cutting of the deck slab, care shall be taken not to damage steel members that are to be incorporated in the proposed structure.

REMOVAL METHODS: Concrete may be removed by cutting and by means of hand operated pneumatic hammers employing pointed or blunted chisel type tools. For removals above steel members, a hammer heavier than 35 pounds but not to exceed 90 pounds may be used at the approval of the Engineer, to ensure adequate depth control and to prevent nicking or gouging the primary steel members.

DECK REMOVALS: Due to the possible presence of welded attachments to existing structural steel (finishing machine, scupper and form supports, etc.), care shall be taken during deck removal to avoid damaging stringers which are to remain. Stringers damaged by the Contractor's removal operations shall, at no cost to the project, be replaced or repaired. Proposed repairs, developed by a registered professional engineer, shall be submitted in writing for review and approved by the Director.

EXTRANEIOUS MEMBERS: Existing extraneous members (i.e., finishing machine and form supports, etc., and the support for scuppers and bulb angles which are to be removed) attached by welded connections to portions of the top flanges designated "tension" shall be removed and the flange surfaces ground smooth. Grinding shall be carefully done and parallel to the flanges.

LOADING LIMITATIONS: No part of the structure shall be subjected to unit stresses that exceed 136.5% of the allowable unit stresses given in AASHTO Standard Specifications for Highway Bridges due either to demolition, erection or construction methods, or to the use of movement of demolition or erection equipment on or across the structure. Structural analysis computations, by a registered professional engineer, showing the allowable stresses and the maximum stresses produced by the Contractor's methods or equipment shall be submitted to the Director for review and approval at least two weeks prior to the start of work.

PAYMENT: This work will be paid for at the contract lump sum price bid, which price and payment shall be full compensation for all labor, equipment, materials and incidentals necessary to complete the work in conformance with these requirements, with pertinent provisions of 202, and to the satisfaction of the Engineer.

CUT LINE CONSTRUCTION JOINT PREPARATION: Saw cut boundaries of proposed concrete removals 1" deep. Remove concrete to a rough surface. Where practicable, the existing reinforcing steel where required in the plans shall be left in place. Install dowel bars if specified. Prior to concrete placement abrasively clean joint surface and exposed reinforcement to remove loose and disintegrated concrete and loose rust. The joint surface and exposed reinforcement shall be thoroughly cleaned of all dirt, dust, or other foreign material by use of water, air under pressure, or other methods that produce satisfactory results. Concrete bonding surfaces shall be wet without free water as concrete is placed.

SUBSTRUCTURE CONCRETE REMOVAL shall be by means of approved pneumatic hammers employing pointed and blunt chisel tools. Hydraulic hoe-ram type hammers will not be permitted. The weight of the hammer shall not be more than 35 pounds for removal within 18 inches of portions to be preserved. Outside the 18 inch limit, a hammer heavier than 35 pounds, but not to exceed 90 pounds, may be used at the approval of the Engineer. Pneumatic hammers shall not be placed in direct contact with reinforcing steel that is to be retained in the rebuilt structure.

ITEM 503, UNCLASSIFIED EXCAVATION, AS PER PLAN: Unclassified excavation shall be in accordance with 503 except that the backfill material behind the abutments shall be in 203 material placed in 6 inch lifts.

EXISTING STRUCTURE VERIFICATION: Details and dimensions shown on these plans pertaining to the existing structure have been obtained from plans of the existing structure and from field observations and measurements. Consequently, they are indicative of the existing structure and the proposed work but they shall be considered tentative and approximate. The Contractor is referred to CMS Sections 102.05, 105.02, and 513.02.

Contract bid prices shall be based upon a recognition of the uncertainties described above and upon a pre bid examination of the existing structure by the Contractor. However, all project work shall be based upon actual details and dimensions which have been verified by the Contractor in the field.

ITEM 516, JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN: This item shall consist of furnishing all necessary labor, materials, and equipment to raise or reposition any existing structures to the dimensions and requirements defined in the project plans.

The Contractor shall be responsible for the design, installation and operation of an adequate jacking system, including any temporary or permanent supports necessary to perform work described in the project plans. Three (3) sets of jacking plans, which include the information described in this note, shall be submitted to the Director for approval at least thirty (30) days before actual work is to begin. The plans shall be prepared and stamped by a registered professional engineer.

Jacking submittals shall include at least the following:

1. The signature and number, or professional seal, of the registered professional engineer who prepared the submittal.
2. Calculations and analysis of the structure to determine and define the actual loading applied at the Contractor's selection jacking points.
3. A drawing showing the physical and dimensional position of the jacks with respect to the structure including clearances and center of lift.
4. A schematic layout of jacks, check valves, pumps with 3 way retractor valve, pressure gages, flow control valves, etc. in accordance with manufactures recommendations. All jacks for each abutment or pier shall be connected together. All jacks at each abutment or pier shall be the same size.
5. Analysis and calculations of the stresses induced or created in the structure and any temporary or permanent supports. Design calculations for any temporary or permanent supports.
6. Physical dimensions, materials, and fabrication details of any temporary or permanent supports. Horizontal and vertical movement restraint shall be provided.
7. A step by step procedure detailing all steps in the jacking operation.
8. Method of attachment to structural members. Welding to tension areas will not be permitted.

The entire system including jacks shall have 20% more capacity than required based on calculated loads.

For lifts greater than 1", jacks shall have locking nuts to positively lock and support the structure during the lift.

Jacks shall have a swivel load cap, a domed piston head or some other device to protect against the effects of side load on the jack.

ITEM 516, JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN (CONT.)

Jacks alone shall not be used to support loads except during the actual jacking operation. Temporary supports, blocking or other methods approved by the Director shall be used.

Single acting rams with no over-travel protection system shall not be used.

Spare equipment shall be available on site for the required structure raising to proceed in the event of a breakdown. A list of spare equipment shall be provided to the Engineer.

At a minimum, a jacking operation shall lift all beams at one abutment or pier simultaneously. The only exception is the situation where the work involves replacing or rehabilitating individual bearings; no permanent shimming is required and the height of the lift shall not exceed 1/4".

Maximum differential jacking height between adjacent abutments or piers shall be 1" or less.

The Contractor shall demonstrate to the Engineer that the bridge bearings are fully seated between all contact areas. If full seating is not attained, suitable means of repair, subject to the approval of the Engineer, will be required at the Contractor's expense.

The jacking operation shall be directed by a Professional Engineer employed by the Contractor. Failure to have a Professional Engineer present shall be cause for ceasing jacking operations.

Payment shall be made at a lump sum price bid for Item 516, Jacking and Temporary Support of Superstructure, As Per Plan and shall include all necessary tools, labor, equipment and materials necessary to complete this item of work.

INSPECTION OF STRUCTURAL STEEL: The Engineer shall visually inspect all existing butt-welded splices and/or top flange cover plates fillet welds to ensure they are free of defects. The deck slab haunch forms immediately adjacent to such welds shall not be erected until after the Engineer has completed this inspection. This inspection shall not take place until after the top flanges are cleaned as specified in 511.08, but it shall be done before the deck slab reinforcement is installed. The cost associated with this inspection shall be included with Item 844, High Performance Concrete Superstructure (Deck) for Payment. Any cracks found should be reported to the Office of Structural Engineering, Bridge Construction Specialist, along with the specific information on the location of the cracks, length, and depth so an evaluation and repair or replacement recommendation can be made.

ITEM SPECIAL DOWEL HOLES

This item shall include the drilling or forming of holes into concrete or masonry and the furnishing and placing of grout into the holes. Non-shrink epoxy grout shall be used in accordance with CMS 510 and CMS 705.20. Depth of holes shall be as shown in plans.

Payment for drilling or forming holes and furnishing and placing materials shall be included in the contract prices for Item 844 High Performance Concrete Substructure.

BACKWALL CONCRETE: In addition to CMS 511.08, backwall concrete above the optional construction joint at the approach slab seat shall not be placed until after the deck concrete in the span adjacent to the abutment has been placed.

ITEM SPECIAL, HIGH PERFORMANCE CONCRETE, SUBSTRUCTURE, AS PER PLAN: Install a 3 foot wide strip, 3/32 inch thick, general purpose, heavy duty neoprene sheet with nylon fabric reinforcement at locations shown in the plans. Secure the 3 foot wide neoprene sheeting to the concrete with 1 1/4" x 3/32" (length x shank diameter) #10 galvanized button head spike through a 1 inch outside diameter, #10 gage galvanized washer. Maximum fastener spacing is 9 inches. Other similar galvanized devices that will not damage either the neoprene or the concrete may be used subject to the approval of the Engineer.

Center the neoprene strips on all joints. For horizontal joints, secure the horizontal neoprene strip by using a single line of fasteners, starting at 6 inches (+/-) from the top of the neoprene strip. For the vertical joints secure the vertical neoprene strip by using a single vertical line of fasteners, starting at 6 inches (+/-) from the vertical edge of the neoprene strip nearest to the centerline of roadway. For vertical joints, install 2 additional fasteners, at 6 inches center to center, across the top of the neoprene strip on the same side of the vertical joint as where the single vertical row of fasteners is located.

The vertical neoprene strips should completely overlap the horizontal strips. Laps in the length of the horizontal strips due to material manufacturing shall be at least one foot in length, if not vulcanized or adhesive bonded, or 6 inches in length if the lap is vulcanized or adhesive bonded. No laps are acceptable in the vertically installed neoprene strips.

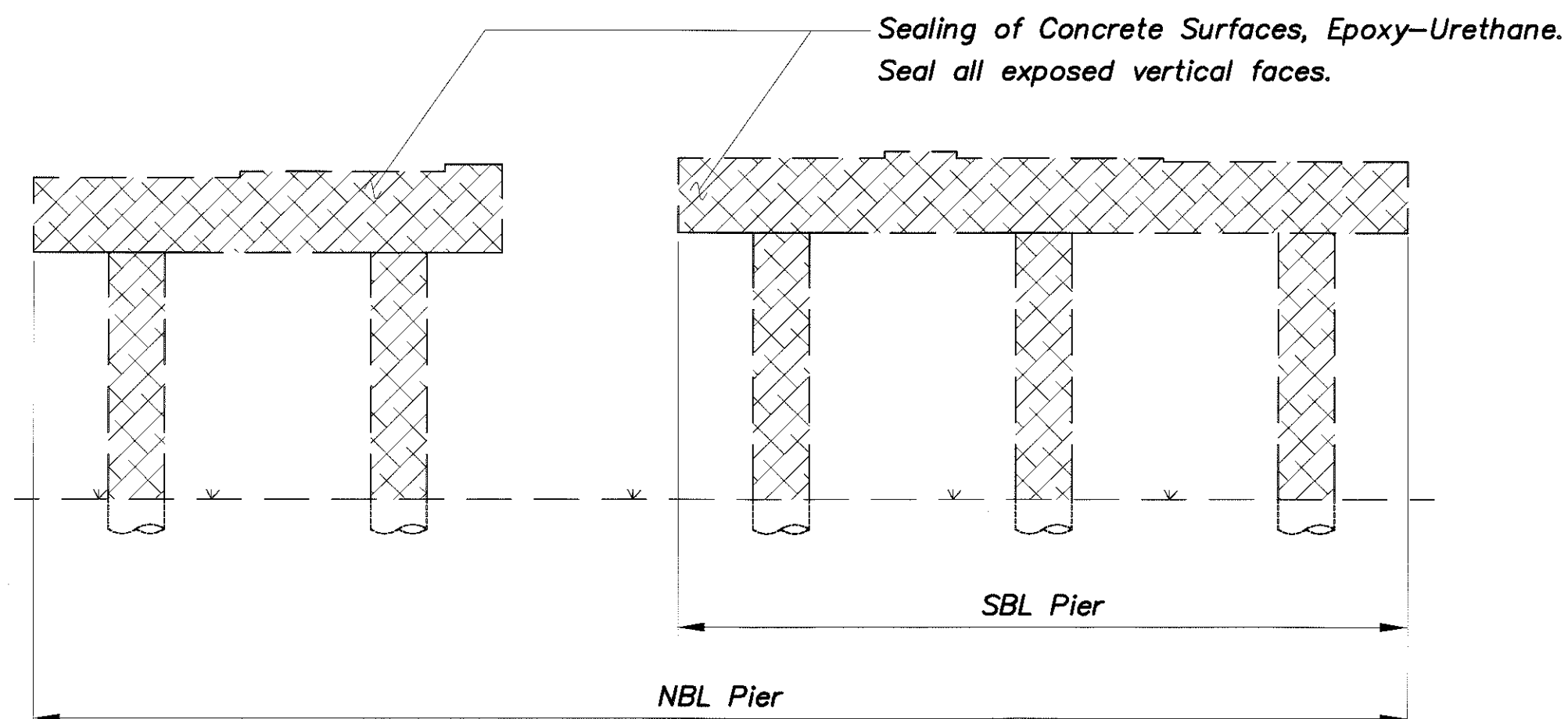
The neoprene sheeting shall be 3/32 inch thick general purpose, heavy duty neoprene sheet with nylon fabric reinforcement. The sheeting shall be "Fairprene Number NN-0003", by E. I. Dupont De Nemours and Company, Inc., "Wingprene" by the Goodyear Tire and Rubber Company, or an approved alternative. The neoprene sheeting shall conform to the following:

Description of Test	ASTM Method	Requirement
Thickness, inches	D751	0.094 +/- .01
Breaking strength, grab WXF, lbs, minimum	D751	700 x 700
Adhesive 1" strip, 2" minimum, lbs, minimum	D751	9
Burst strength (mullen) psi, minimum	D751	1400
Heat aging 70 hours T 212F, 180 bend without Cracking	D2136	No Cracking of Coating
Low temperature brittleness 1 hour at -40F, bend around 1/4 inch mandrel	D2136	No Cracking of Coating

Payment for labor, materials and installation of these items shall be included in Item 844 High Performance Concrete, Substructure, As Per Plan.

K:\Data\Drawings\COL-11-1378\Drawings\COL-11-1378\COL-11-1378(Shared Bridge)\est_quant.dwg

ESTIMATED QUANTITIES TABLE												CALC. BY GTB DATE: 05/25/00	CHECK BY WHM DATE: 06/08/00
		N.B.L.	S.B.L.			COL-11-1378 (N.B.L.)				COL-11-1378 (S.B.L.)			
ITEM	ITEM EXTENSION	TOTAL	TOTAL	UNIT	DESCRIPTION	ABUTMENTS	PIERS	SUPER- STRUCTURE	GENERAL	ABUTMENTS	PIERS	SUPER- STRUCTURE	GENERAL
202	11203	LUMP	LUMP		PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN				LUMP				LUMP
503	11100	LUMP	LUMP		COFFERDAMS, CRIBS, AND SHEETING				LUMP				LUMP
503	21301	LUMP	LUMP		UNCLASSIFIED EXCAVATION, AS PER PLAN				LUMP				LUMP
SPECIAL	51267510	739	635	SQ YD	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) (SEE PROPOSAL NOTE)	186	240	313		158	161	316	
516	47001	LUMP	LUMP		JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN				LUMP				LUMP
518	12200	5	0	EACH	SCUPPER INCLUDING SUPPORTS			5				0	
518	21230	LUMP	LUMP		POROUS BACKFILL WITH FILTER FABRIC	LUMP				LUMP			
519	11100	1	0	SQ FT	PATCHING CONCRETE STRUCTURE	1				0			
SPECIAL	51912600	5	0	LIN FT	CONCRETE REPAIR BY EPOXY INJECTION	5				0			
815	00100	LUMP	LUMP		SURFACE PREPARATION OF EXISTING STEEL, SYSTEM OZEU			LUMP				LUMP	
815	00200	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, PRIME COAT, SYSTEM OZEU			LUMP				LUMP	
815	00300	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, INTERMEDIATE COAT, SYSTEM OZEU			LUMP				LUMP	
815	00400	LUMP	LUMP		FIELD PAINTING OF EXISTING STEEL, FINISH COAT, SYSTEM OZEU			LUMP				LUMP	
844	48000	277	210	CU YD	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE (DECK)			277				210	
844	48020	42	42	CU YD	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE (PARAPET)			42				42	
844	48041	88	71	CU YD	HIGH PERFORMANCE CONCRETE SUBSTRUCTURE, AS PER PLAN	88				71			
844	49000	LUMP	LUMP		HIGH PERFORMANCE CONCRETE TRIAL MIX			LUMP				LUMP	
844	49010	LUMP	LUMP		HIGH PERFORMANCE CONCRETE TESTING			LUMP				LUMP	
863	20000	2025	1455	EACH	WELDED STUD SHEAR CONNECTORS			2025				1455	

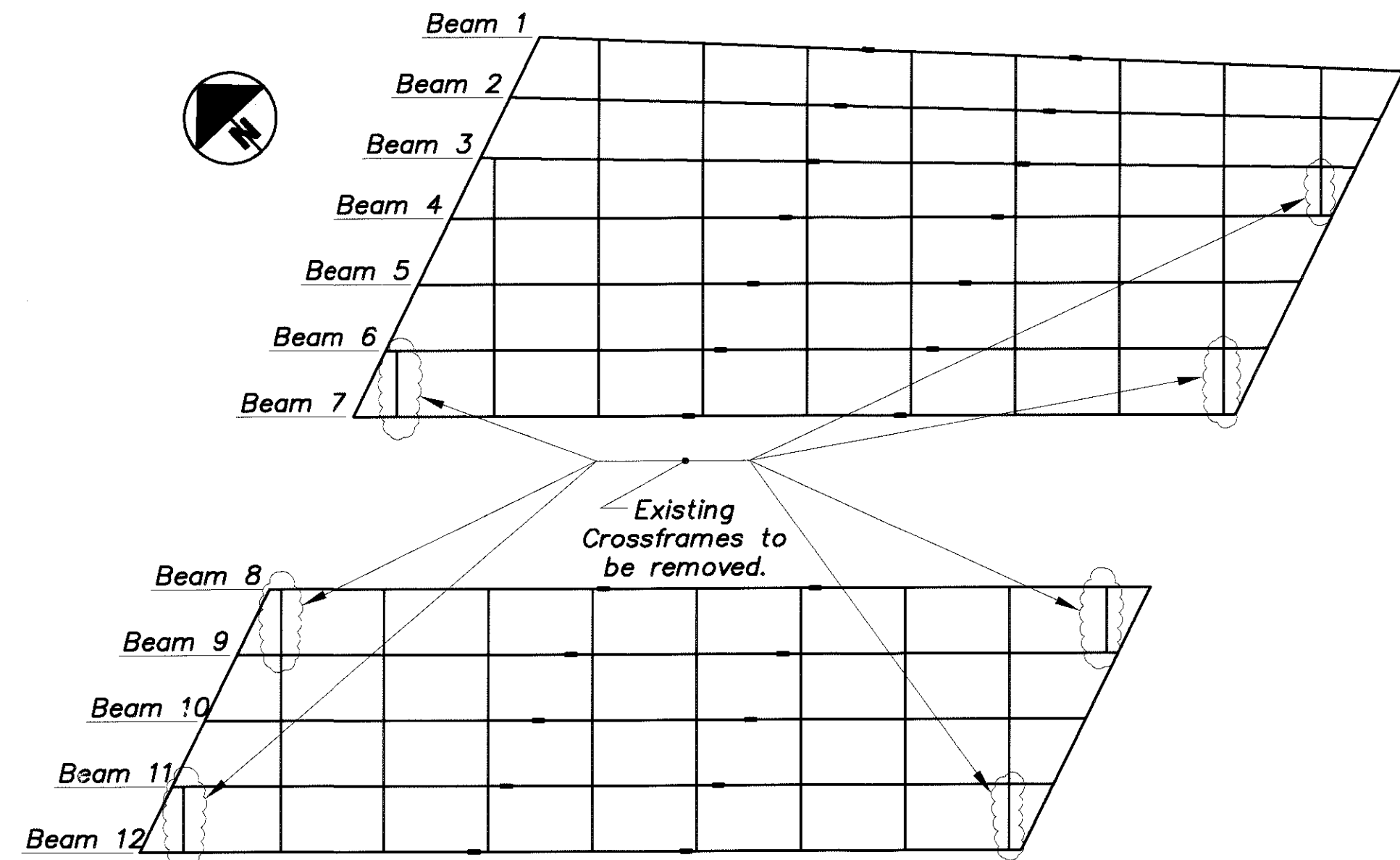


PIER SEALING LIMITS

Sealing of Concrete Surfaces			
SOUTHBOUND			
Location	Caps	Columns	Total
Pier 1	44 Sq.Yd.	36.5 Sq.Yd.	80.5 Sq.Yd.
Pier 2	44 Sq.Yd.	36.5 Sq.Yd.	80.5 Sq.Yd.
Grand Total =			161 Sq.Yd.
NORTHBOUND			
Location	Caps	Columns	Total
Pier 1	57 Sq.Yd.	64 Sq.Yd.	121 Sq.Yd.
Pier 2	56 Sq.Yd.	63 Sq.Yd.	119 Sq.Yd.
Grand Total =			240 Sq.Yd.

NOTE:

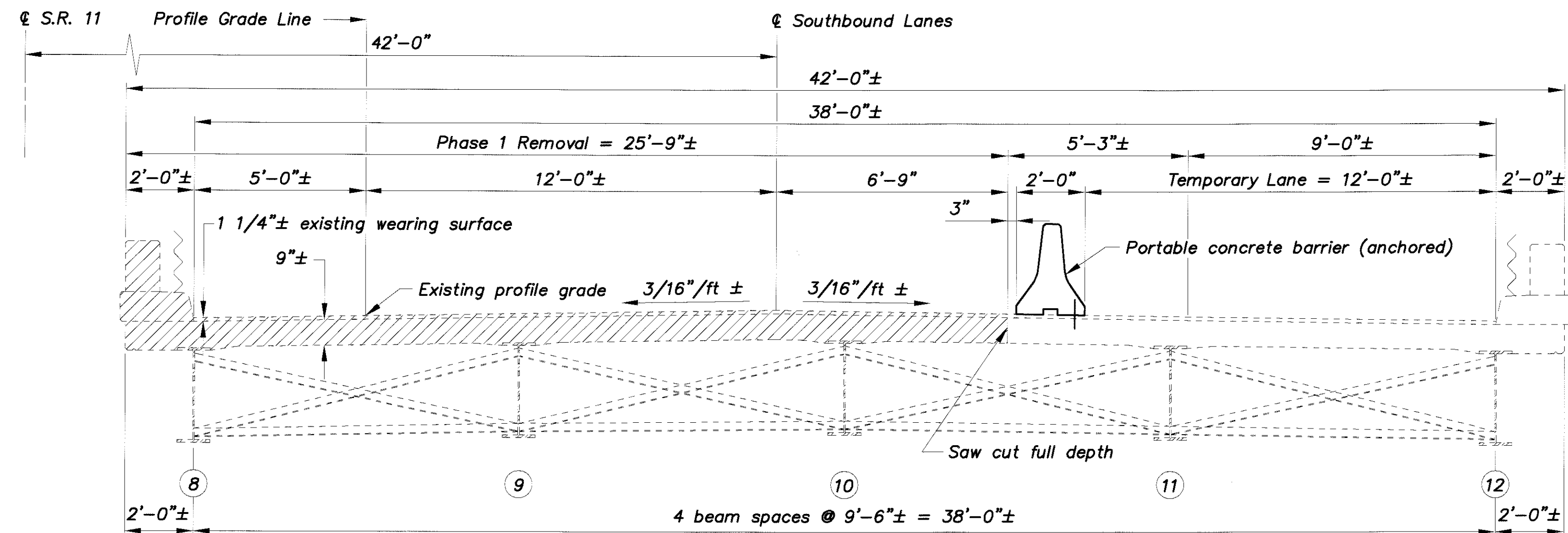
Quantities for concrete sealing shown above were calculated from dimensions shown on the original construction contract plans.



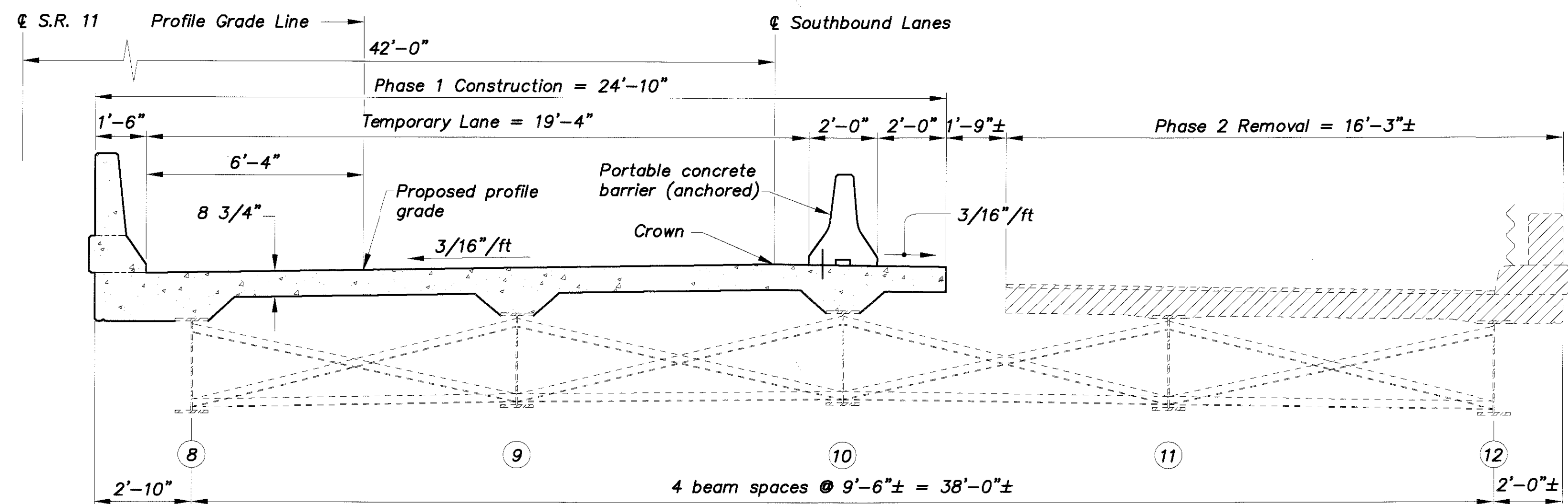
FRAMING PLAN

NOTE:

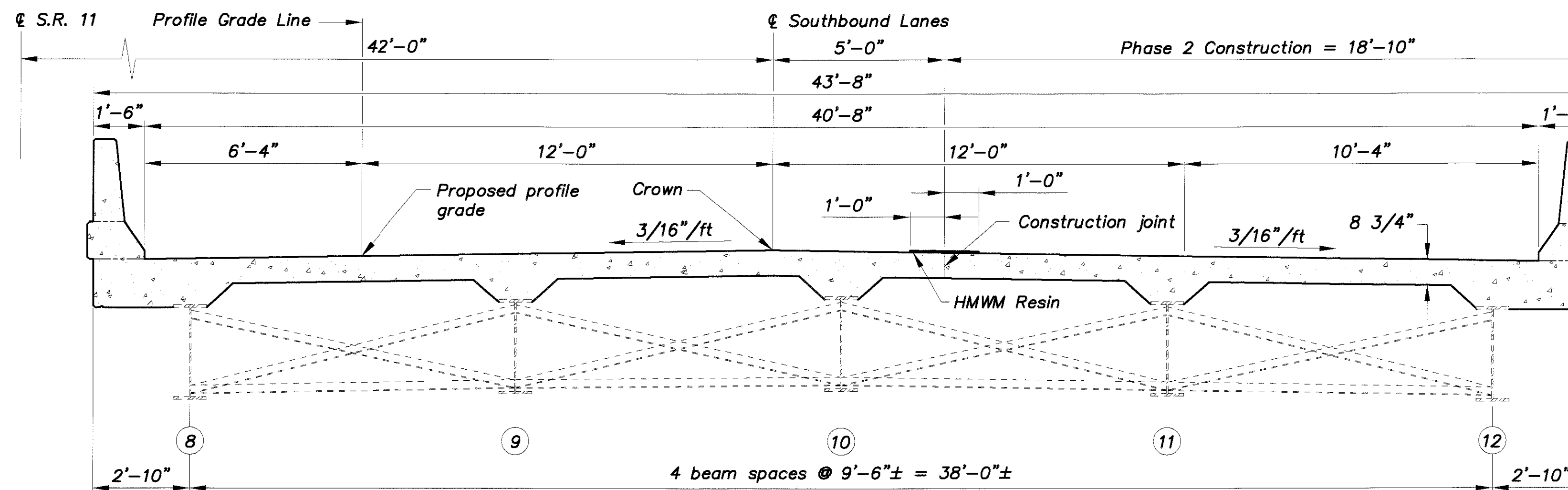
The existing crossframes shown above shall be removed as necessary to allow room for the construction of the proposed concrete diaphragm. The cost associated for the removal shall be included with Item 202, Portions of Existing Structure Removed, over 20 Foot Span, As Per Plan.



PHASE 1 REMOVAL



PHASE 1 CONSTRUCTION & PHASE 2 REMOVAL

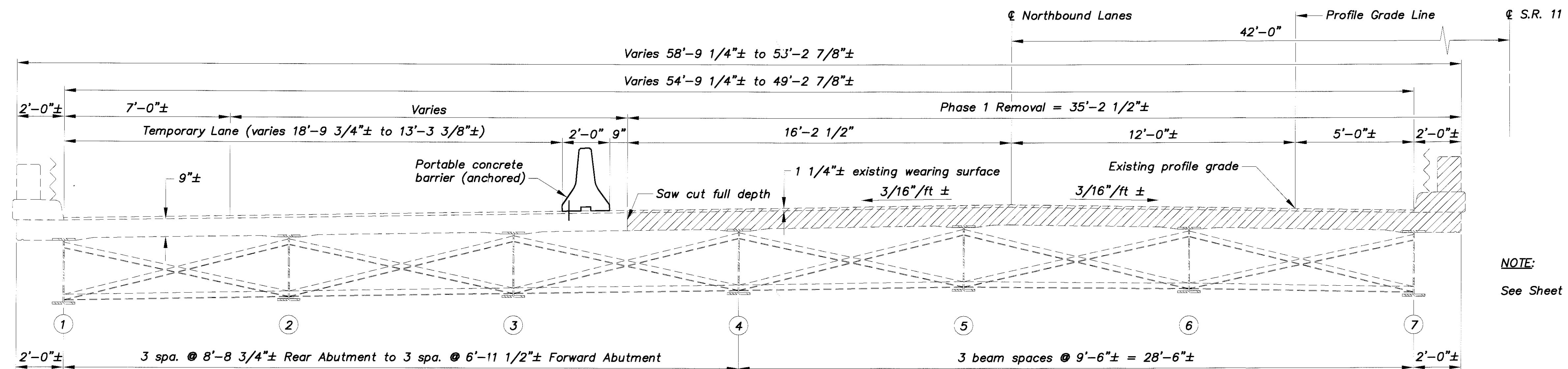


PHASE 2 CONSTRUCTION

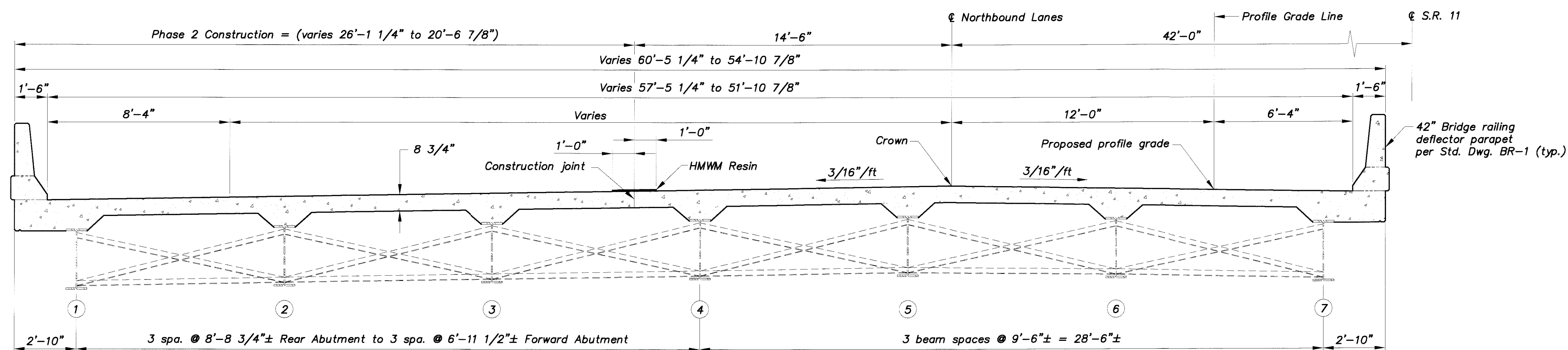
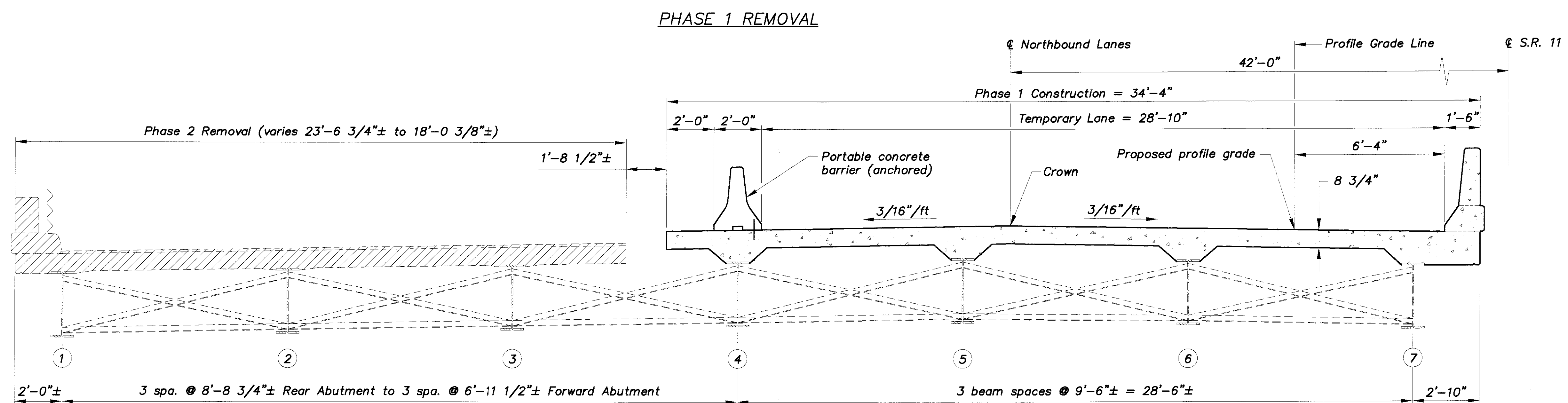
NOTE:

All Bridge Mounted barrier segments shall be fastened to the bridge deck using 1" diameter high strength approved partial depth resin bonded anchors. The Contractor shall locate and mark the deck reinforcing steel prior to placing anchors. Resin anchors must be embedded a minimum of 6 1/2". Two anchors shall be provided for each 10'-0" segment. Anchors shall be placed on the traffic side with anchor pattern symmetrical about the center of each 10'-0" segment. Resin anchors shall be removed as directed by the Engineer. Upon removal of anchors, holes shall be filled with an epoxy non-shrink grout. For details not shown, see Standard Construction Drawing PCB-91. Payment for above shall be included with Item 622-Portable Concrete Barrier, Bridge Mounted.

42" Bridge railing deflector parapet per Std. Dwg. BR-1 (typ.)

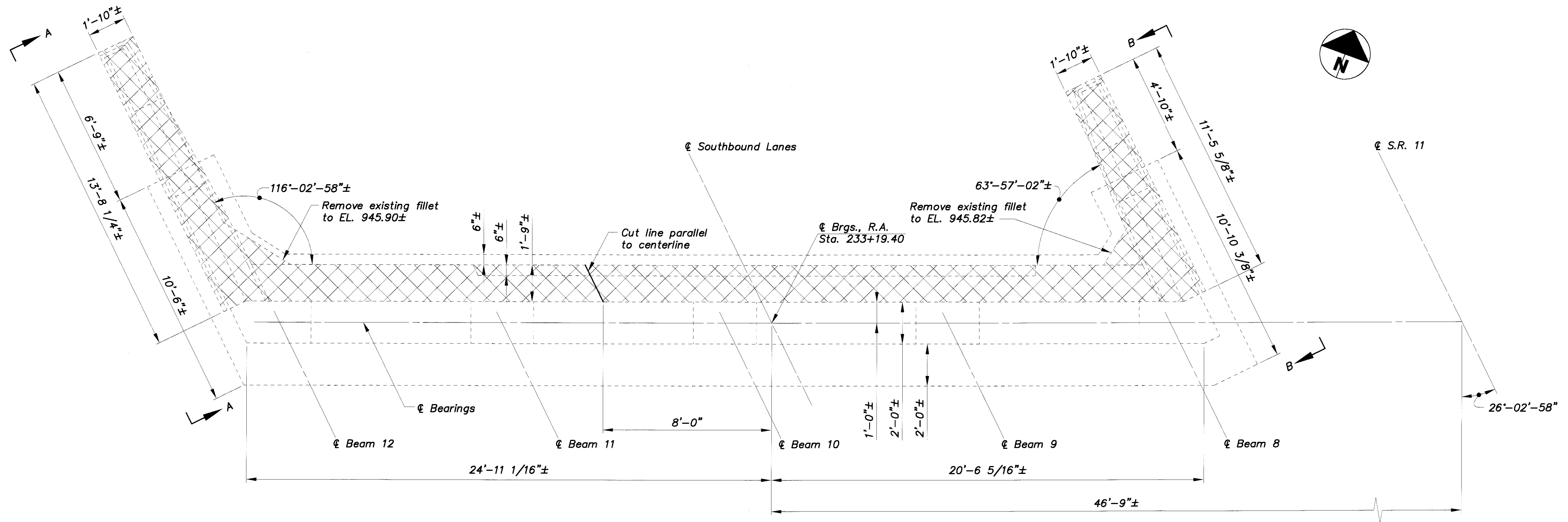


NOTE:
See Sheet 4/27 for notes.

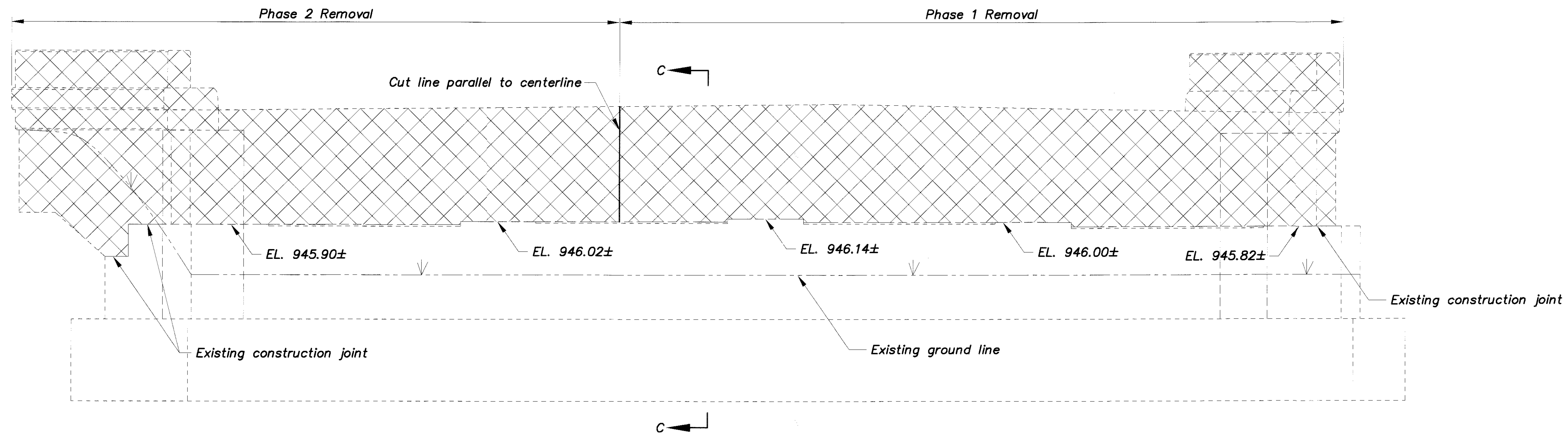


PHASE 2 CONSTRUCTION

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PLAN
(Existing approach slab and porous backfill not shown)

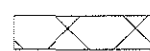


ELEVATION
(Existing piles not shown)

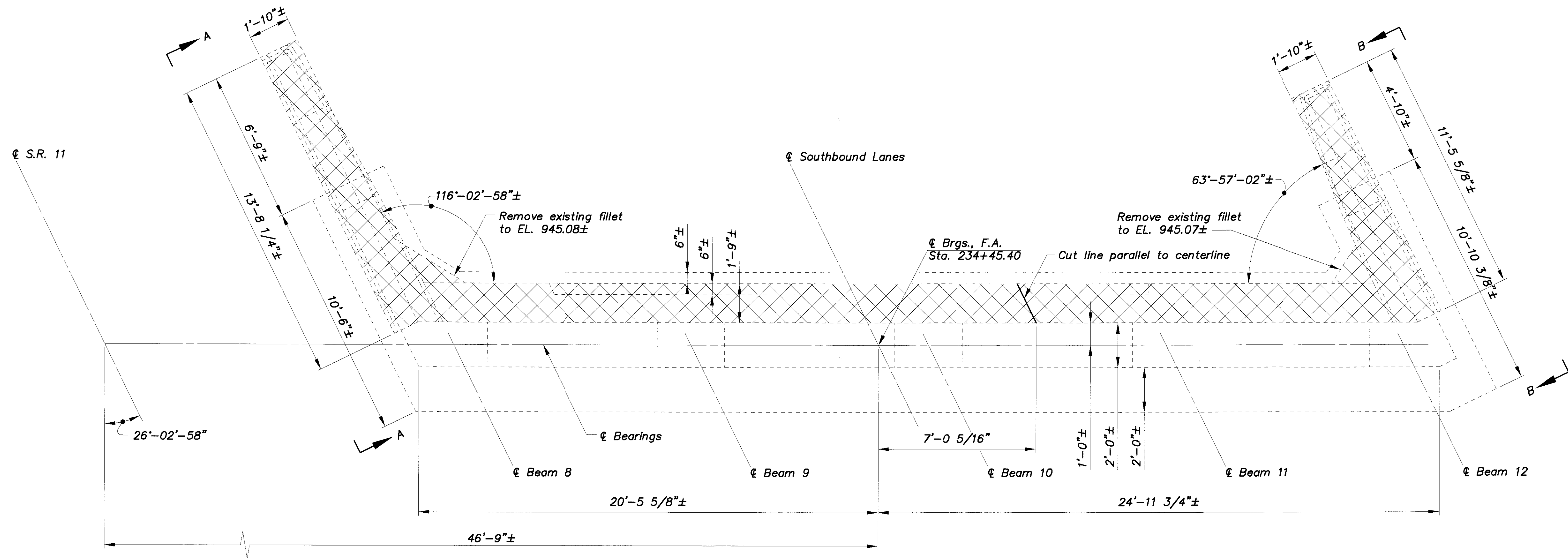
NOTE:

See Sheet **8/27** for Section C-C, View A-A & View B-B.

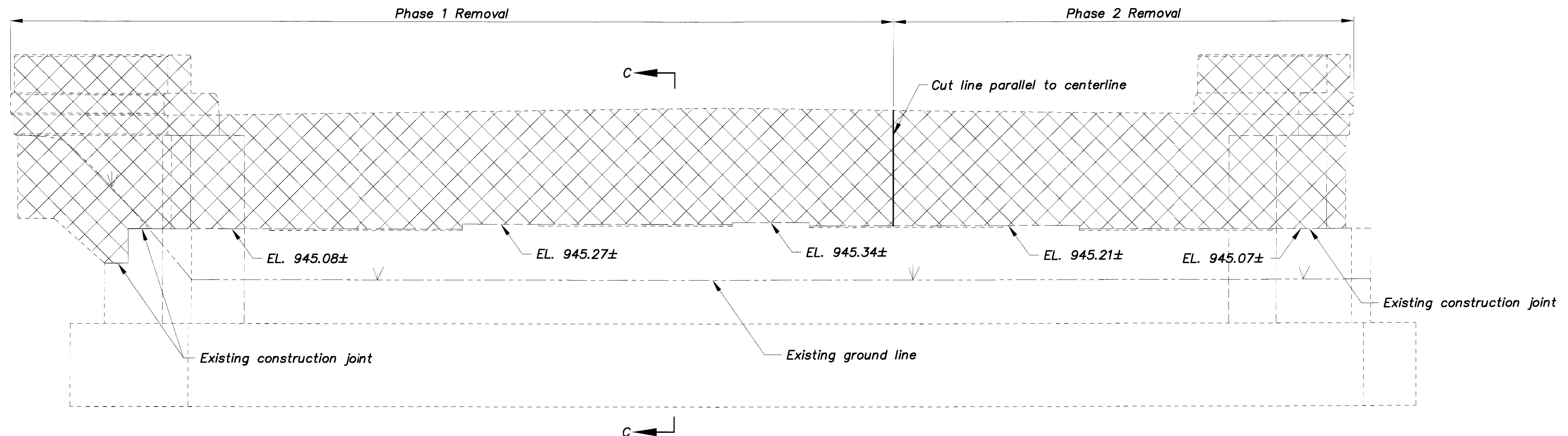
LEGEND:

 Portion of existing structure to be removed.

k:\06dot\Dist\11\COL-11-(9.44)(13.76)\Drawings\COL-11-13.76\Right Bridge\forexistabut.dwg



PLAN
(Existing approach slab and porous backfill not shown)

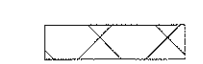


ELEVATION
(Existing piles not shown)

NOTE:

See Sheet **8/27** for Section C-C, View A-A & View B-B.

LEGEND:

 Portion of existing structure to be removed.

COL-11-(9.44)(13.76)

7/27

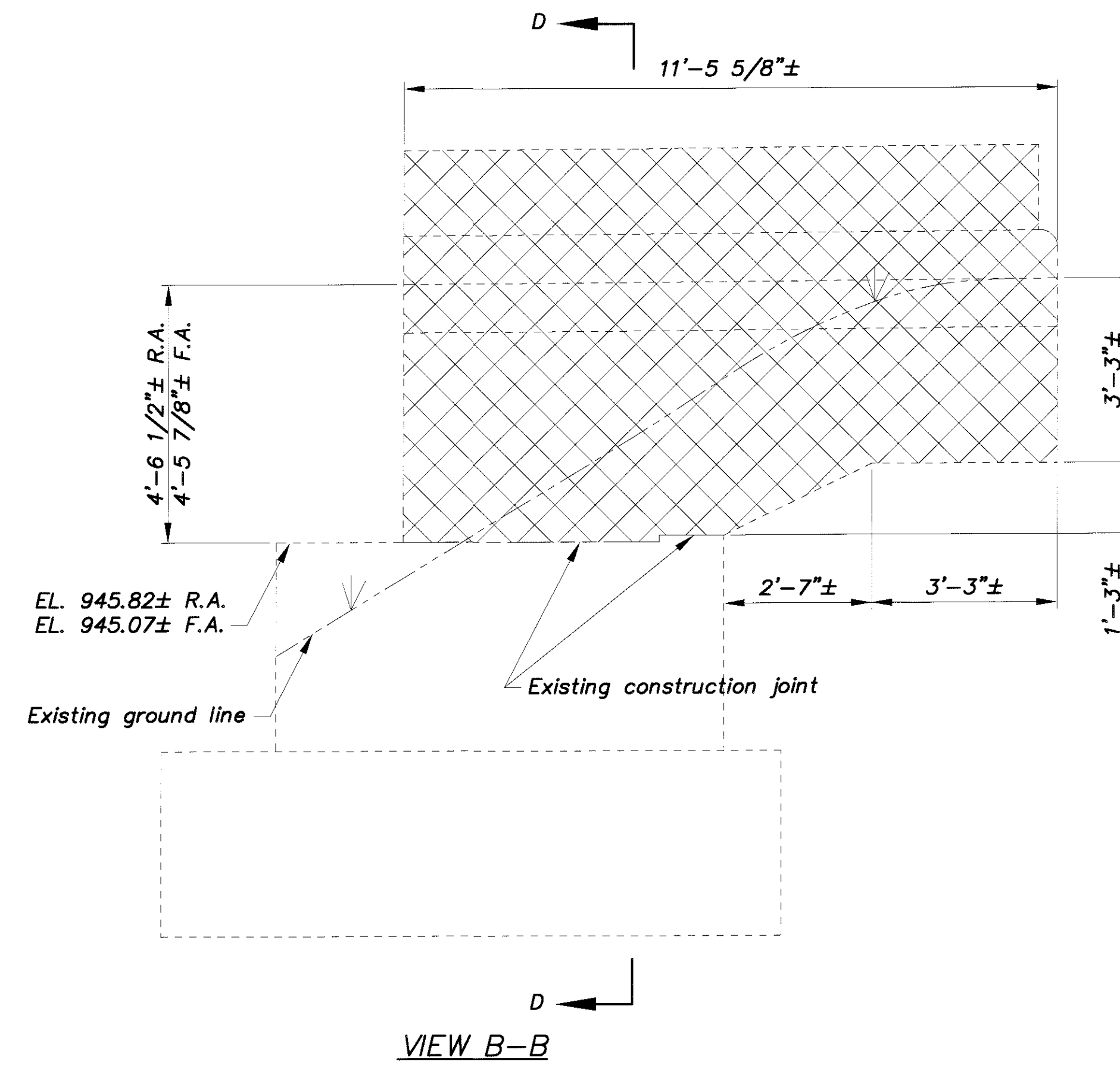
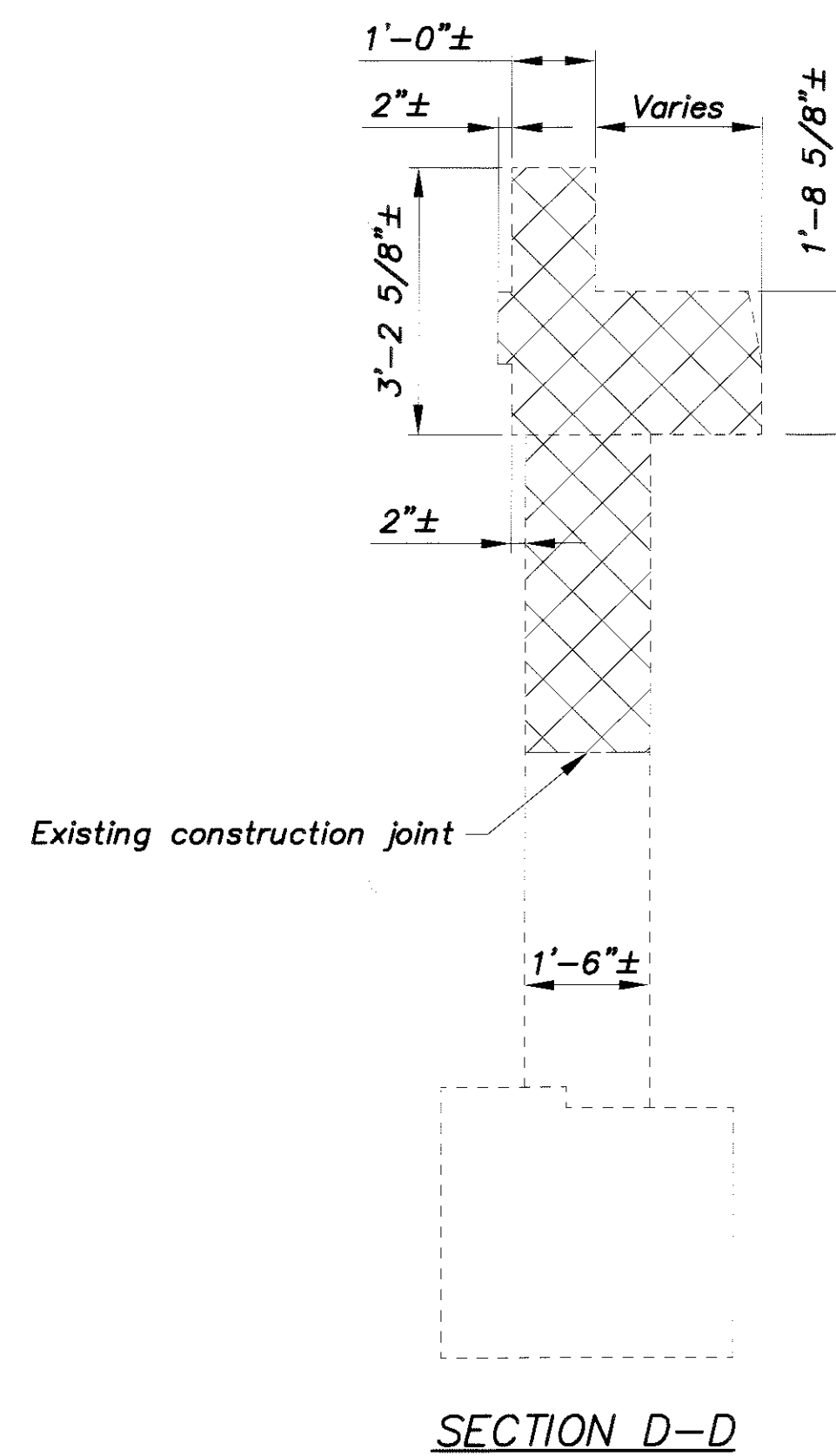
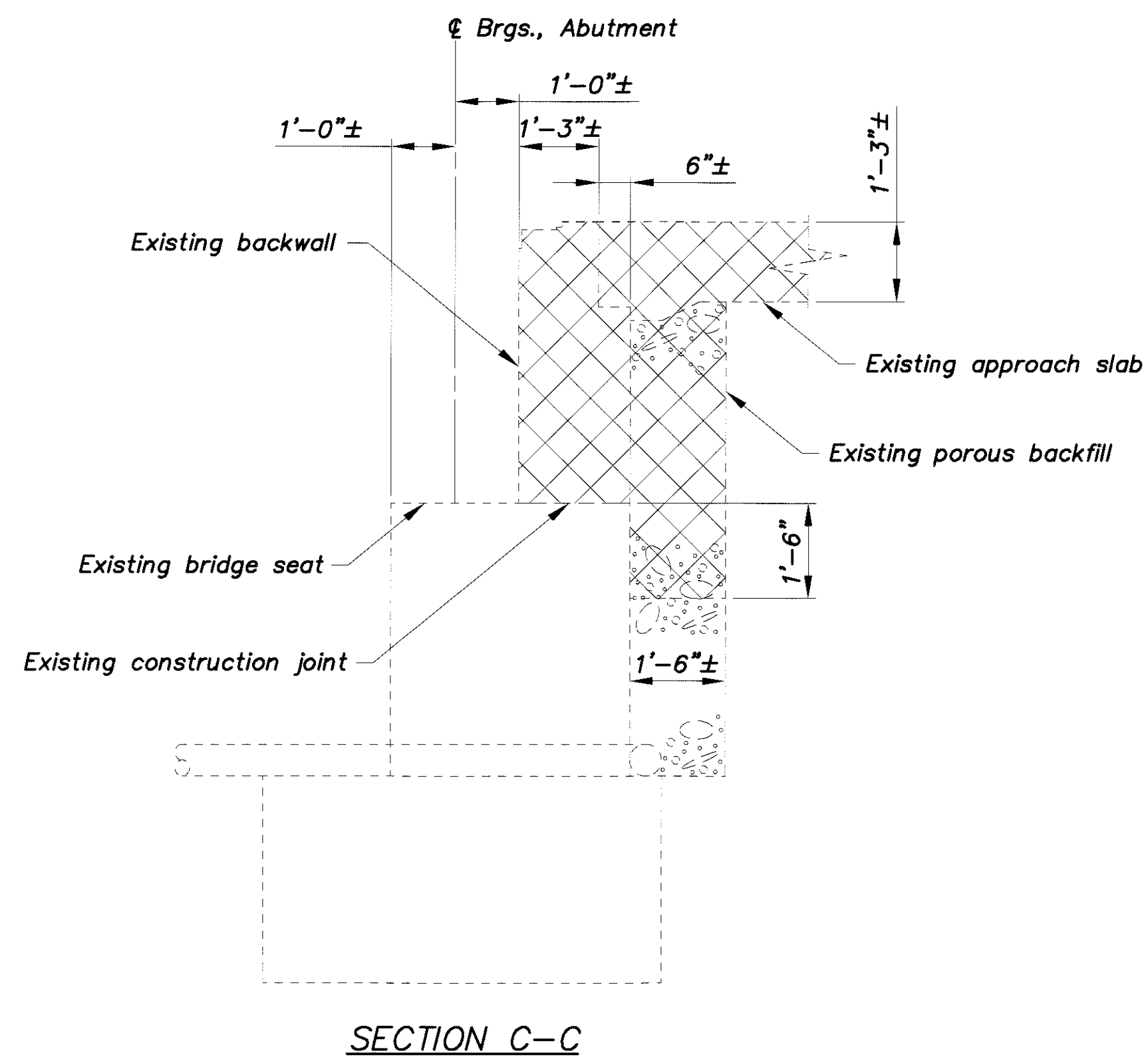
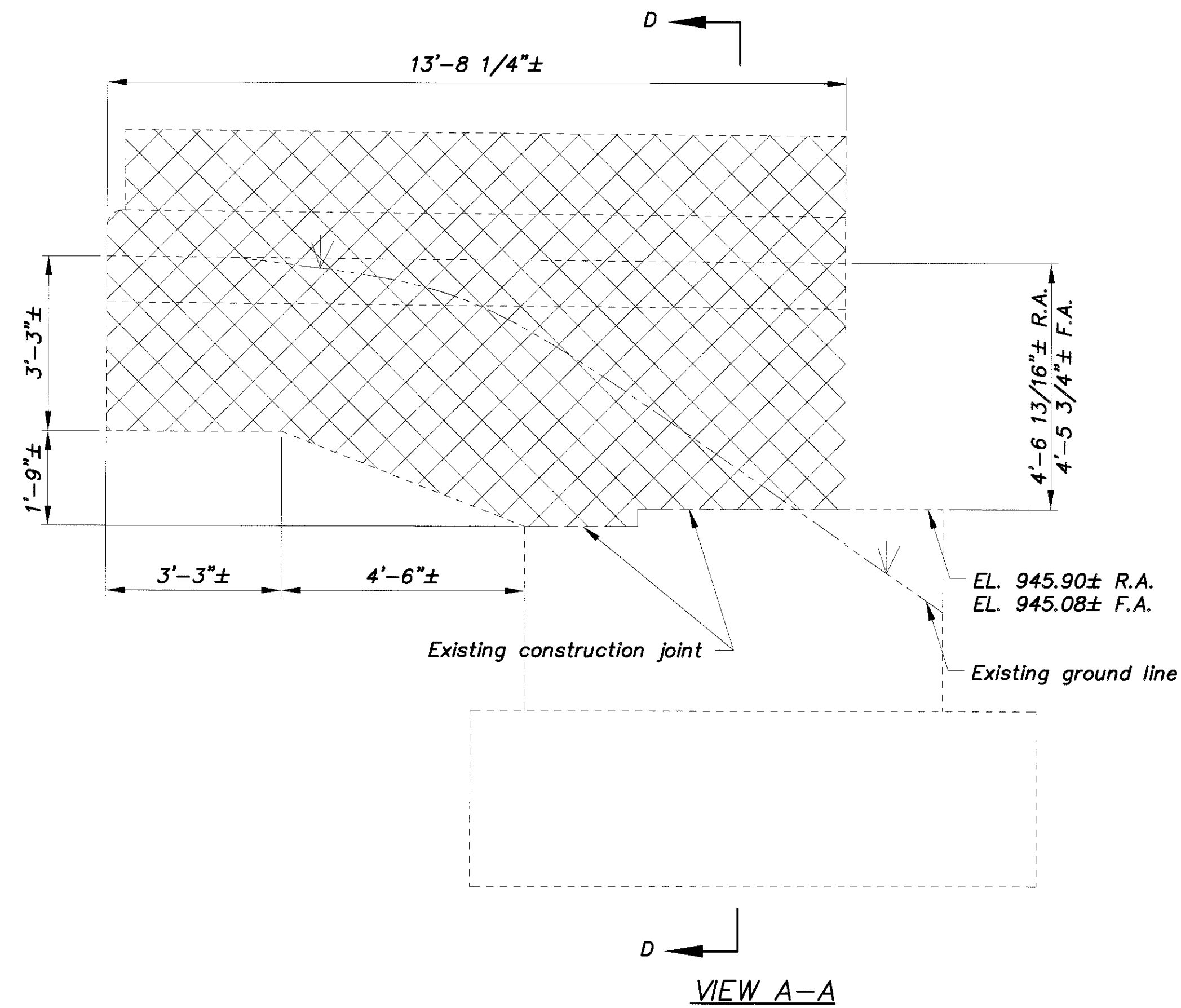
106
126

EXISTING FORWARD ABUTMENT REMOVAL & REPAIR
Bridge No. COL-11-1378 S.B.L.
over S.R. 154

DESIGNED **WHM** **CHECKED** **GTB**
DRAWN **WHM** **REVIEWED** **BLG** **DATE** **6-14-00**
STRUCTURE FILE NUMBER **1500813**

WD&E
DESIGN AGENCY
1201 Dublin Road
Columbus, Ohio

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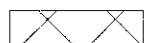


NOTES:

Refer to Sheets **6/27** & **7/27** for locations of Section C-C, View A-A & View B-B.

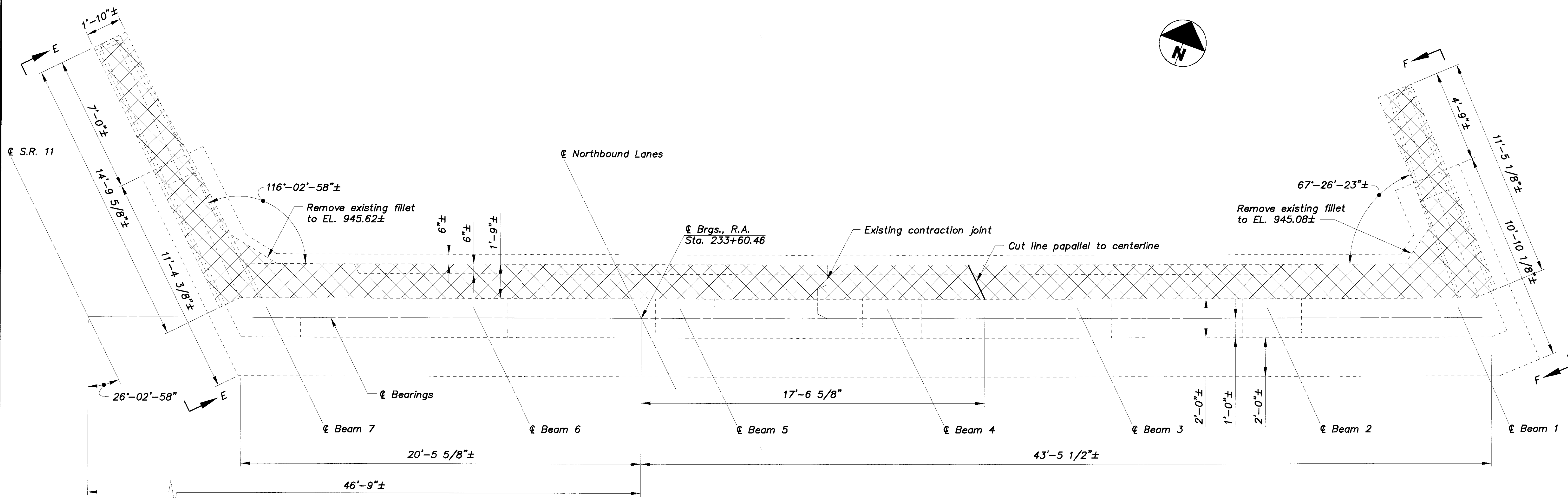
Existing piles not shown in all Views & Sections.

LEGEND:

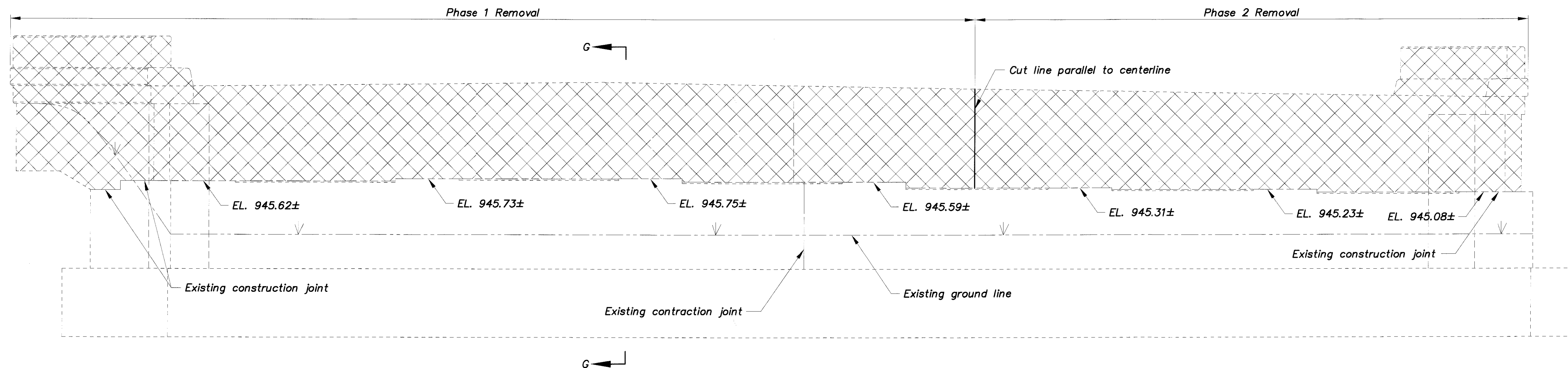
 Portion of existing structure to be removed.

R.A. - Rear Abutment
F.A. - Forward Abutment

K:\Data\Dist11\COL-11-(9.44)(13.76)\Drawings\COL-11-13.78\Left Bridge\ceexistabut.dwg



PLAN
(Existing approach slab and porous backfill not shown)



ELEVATION
(Existing piles not shown)

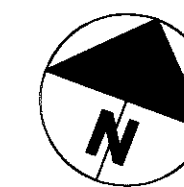
NOTES:

See Sheet **11/27** for Section G-G, View E-E & View F-F.

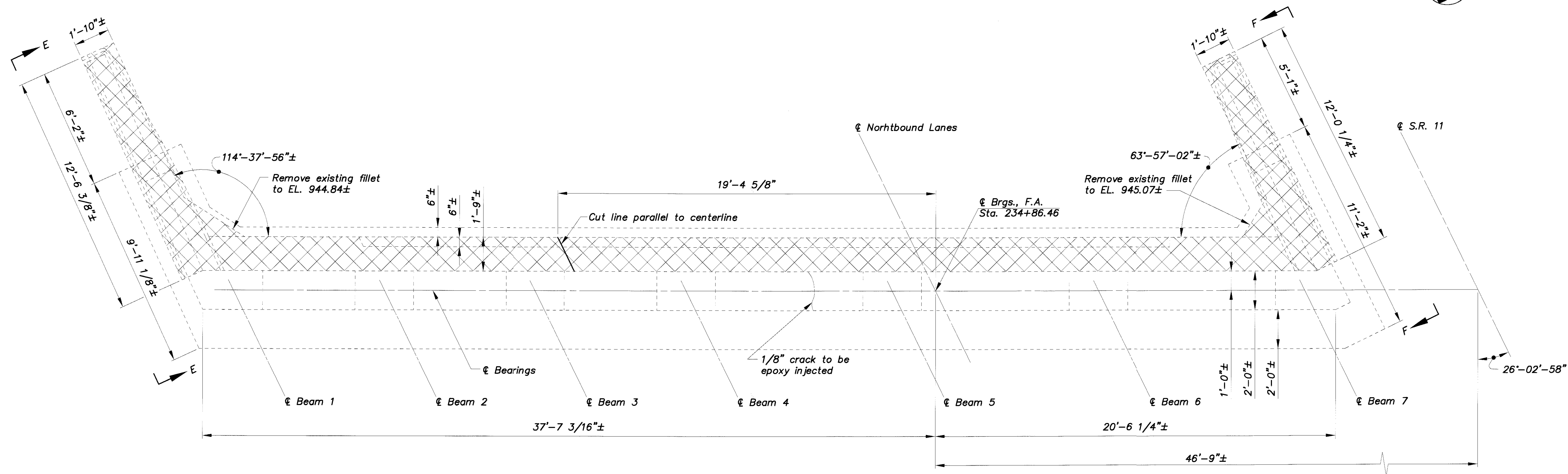
Bearing at Beam 1 shall be reset.

LEGEND:

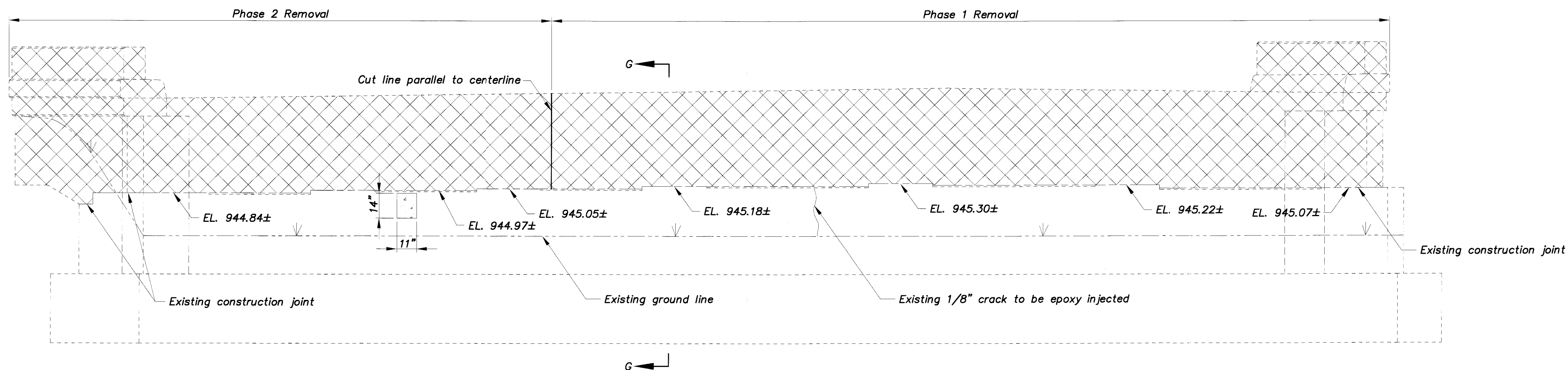
Portion of existing structure to be removed.



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PLAN
(Existing approach slab and porous backfill not shown)

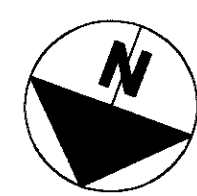


ELEVATION
(Existing piles not shown)

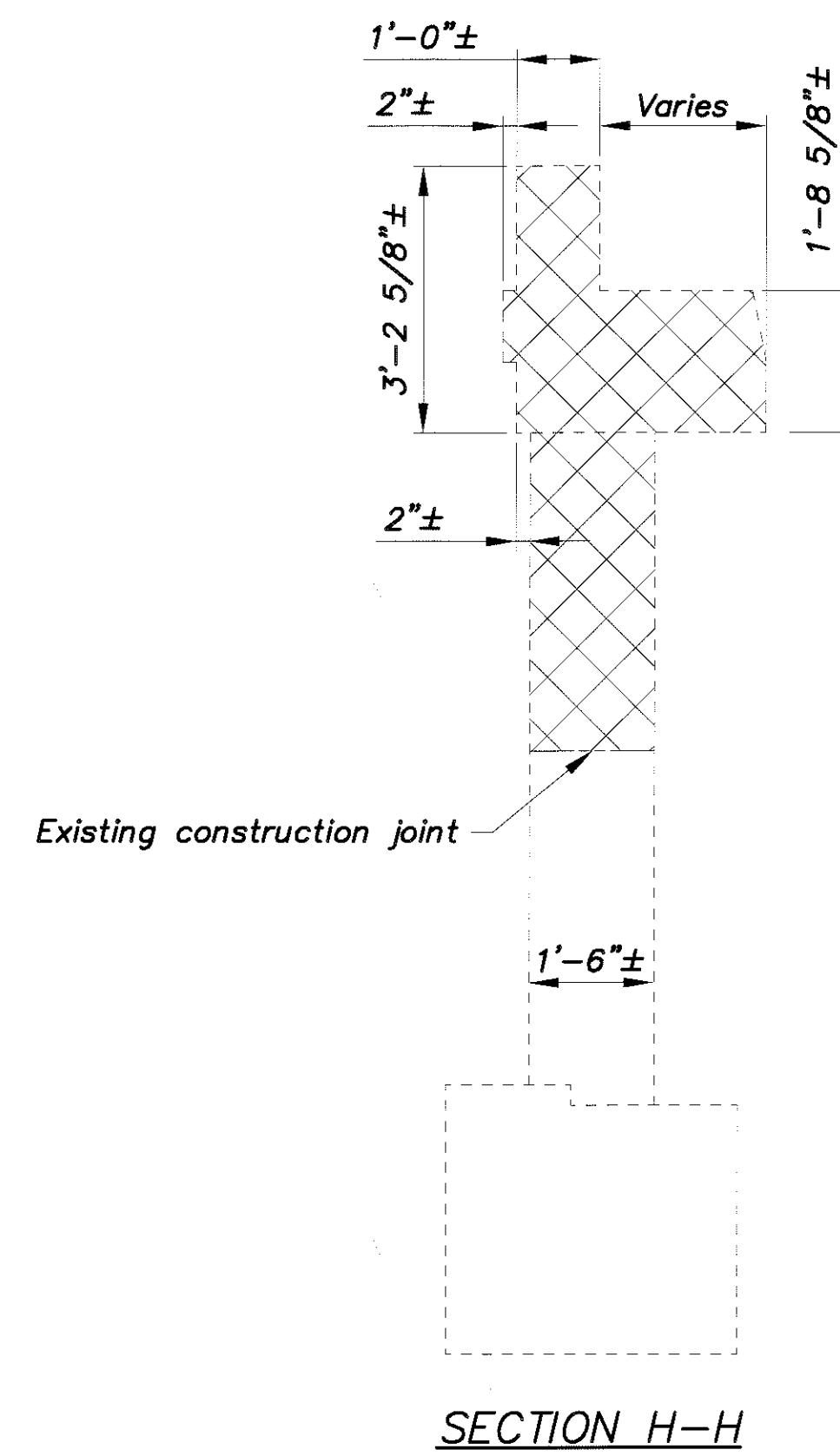
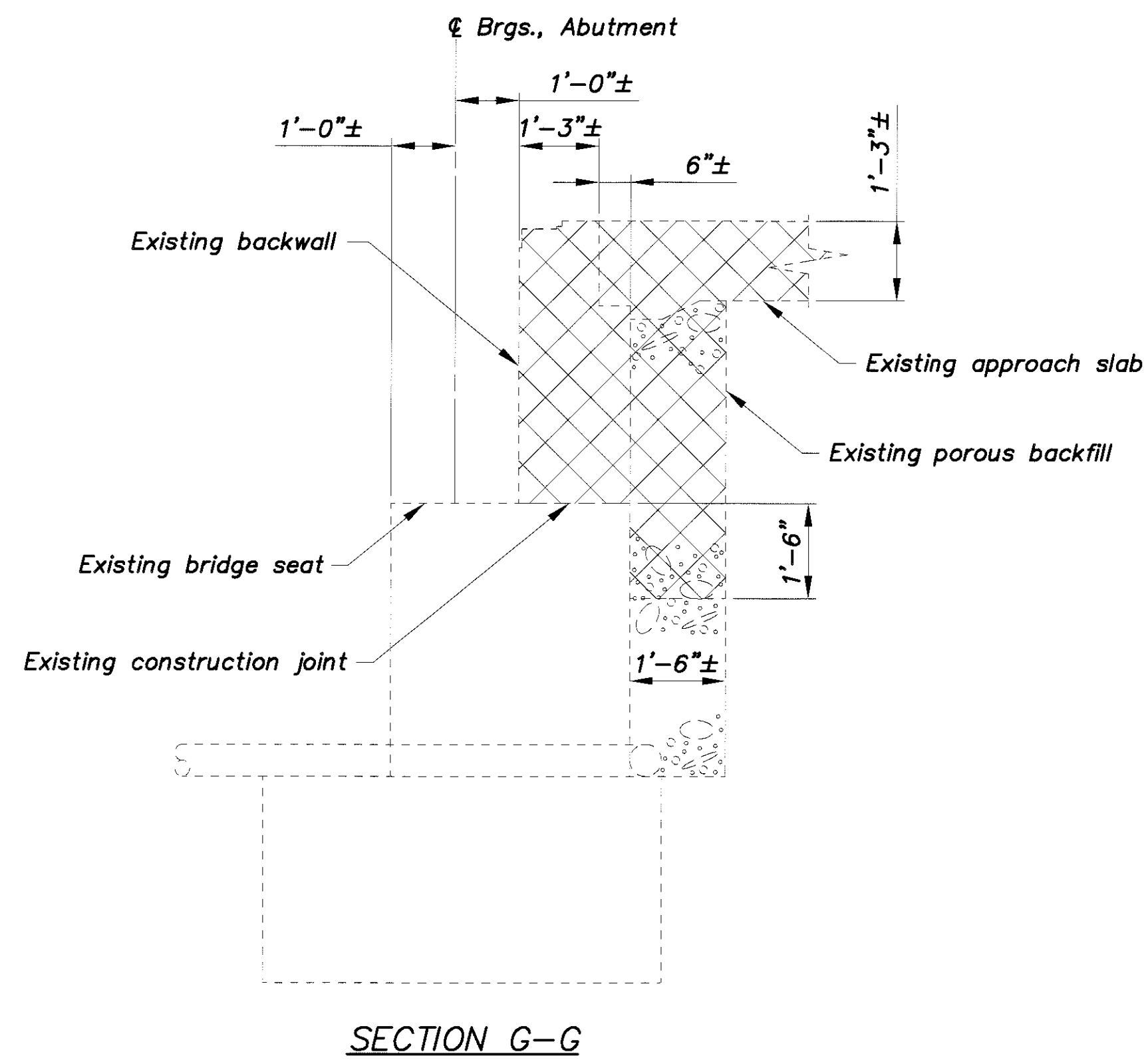
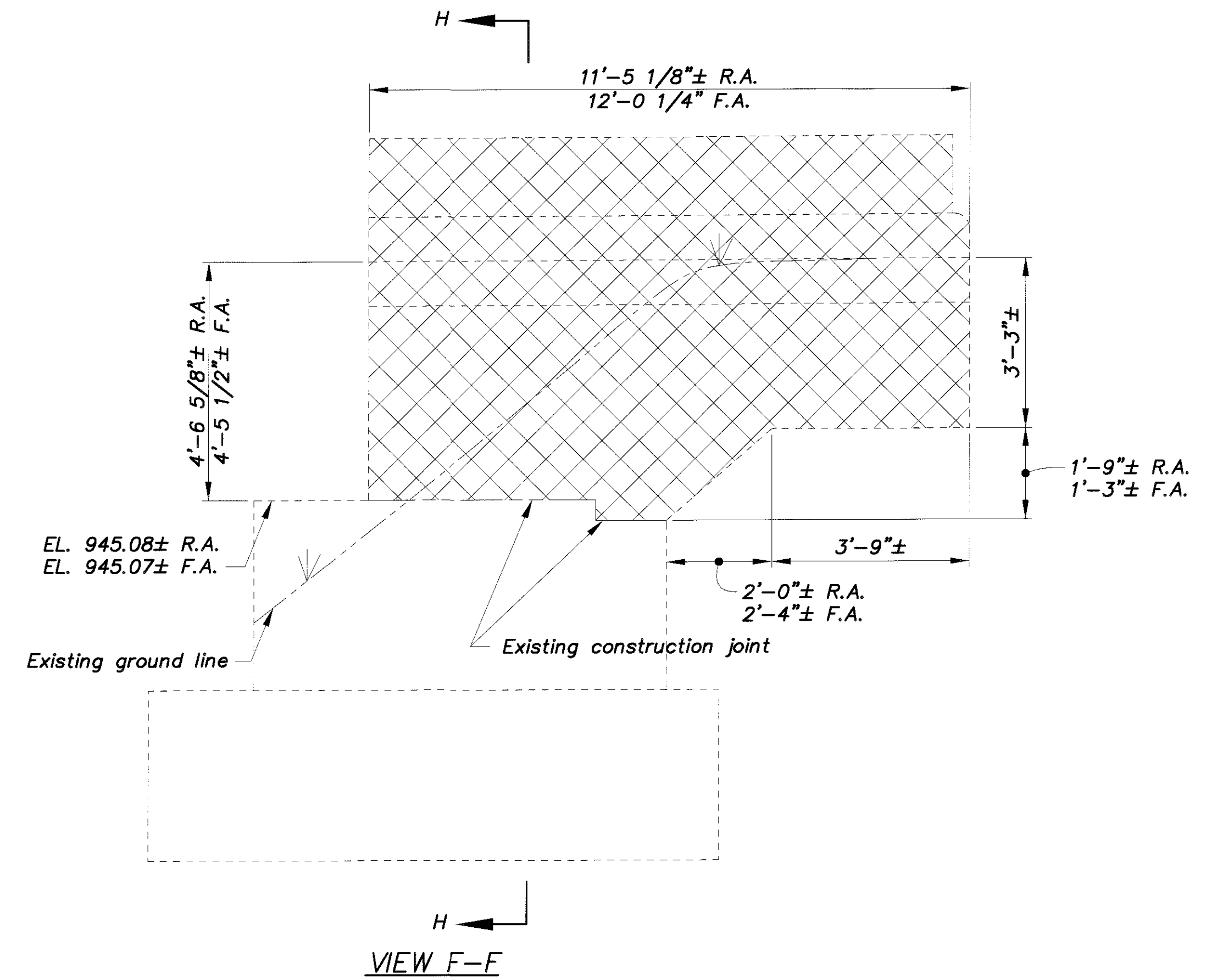
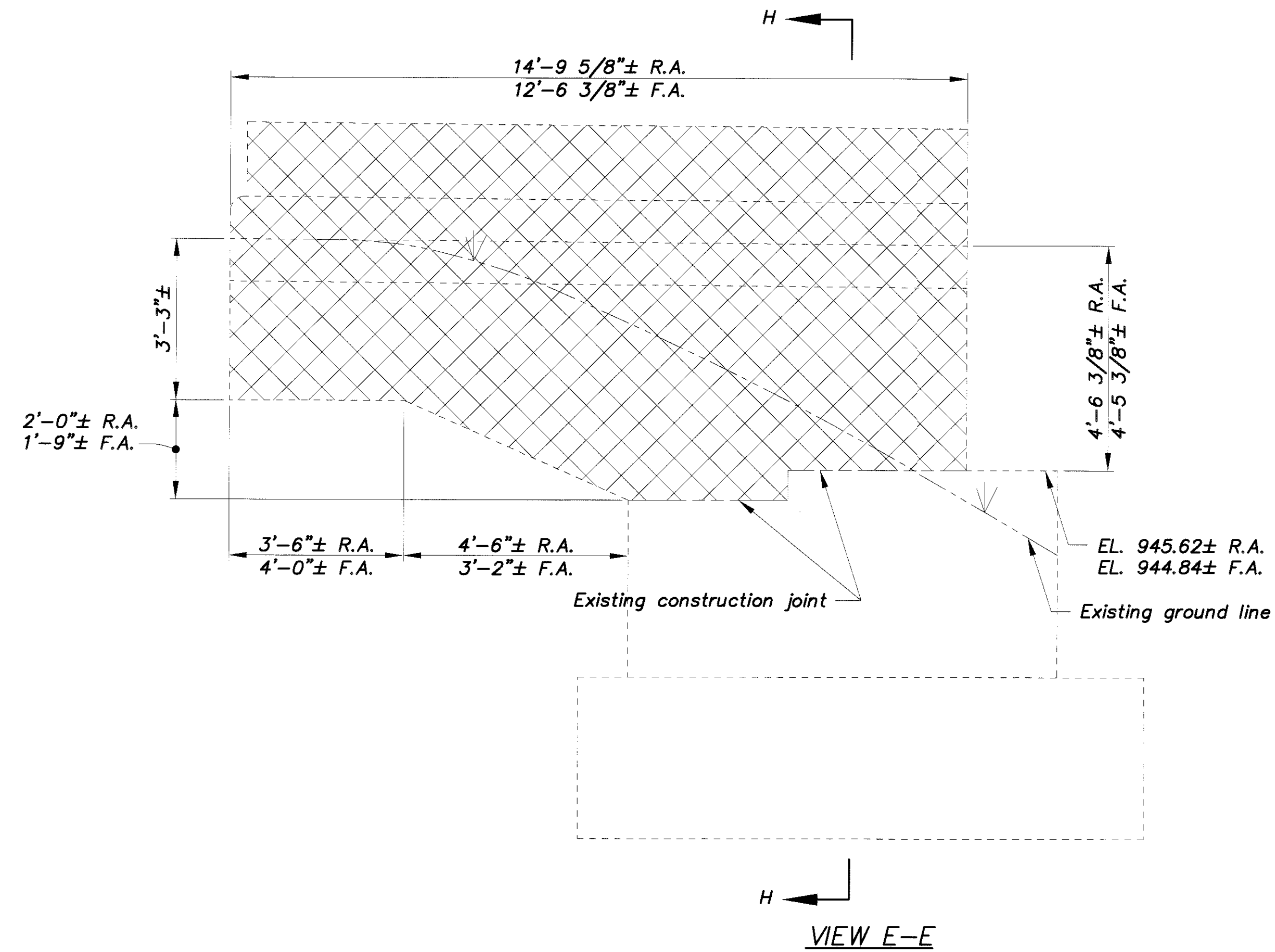
NOTES:
See Sheet 11/27 for Section G-G, View E-E & View F-F.

LEGEND:

- Portion of existing structure to be removed.
- Area of Delamination to be repaired by concrete patching. Total quantity this sheet = 1.0 sq. ft.



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NOTES:

Refer to Sheets **9/27** & **10/27** for locations of Section G-G, View E-E & View F-F.

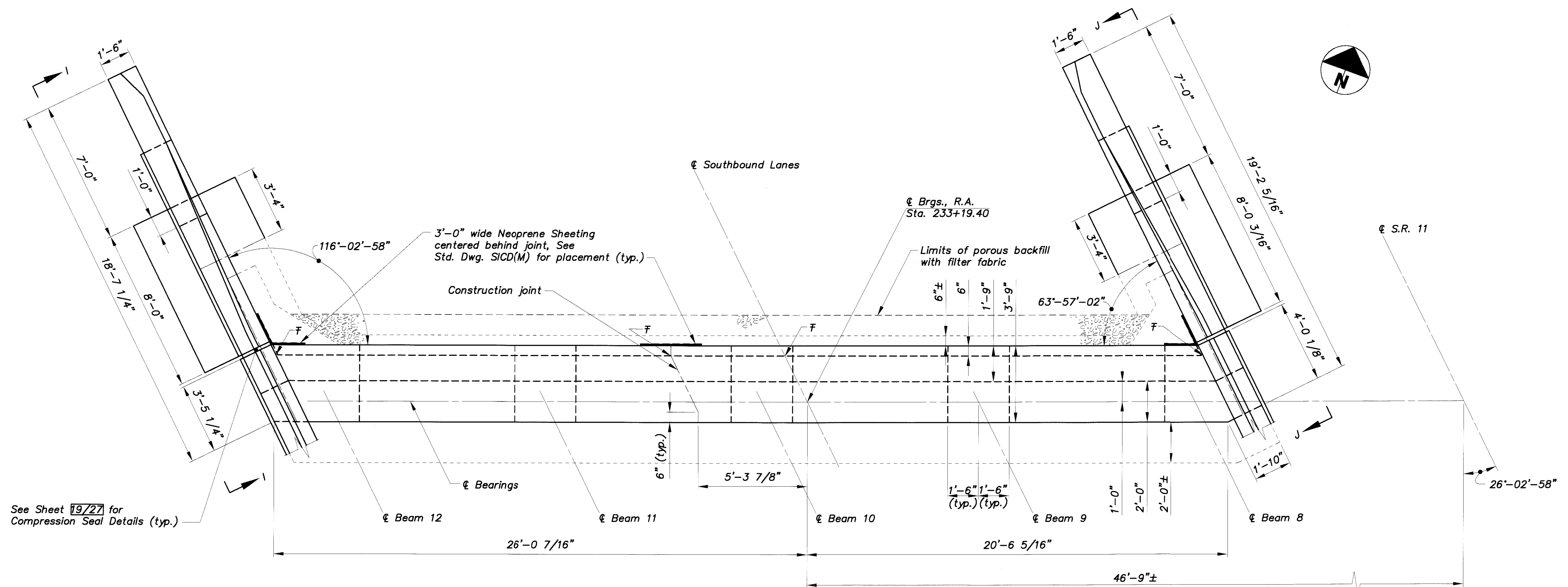
Existing piles not shown in all Views & Sections.

LEGEND:

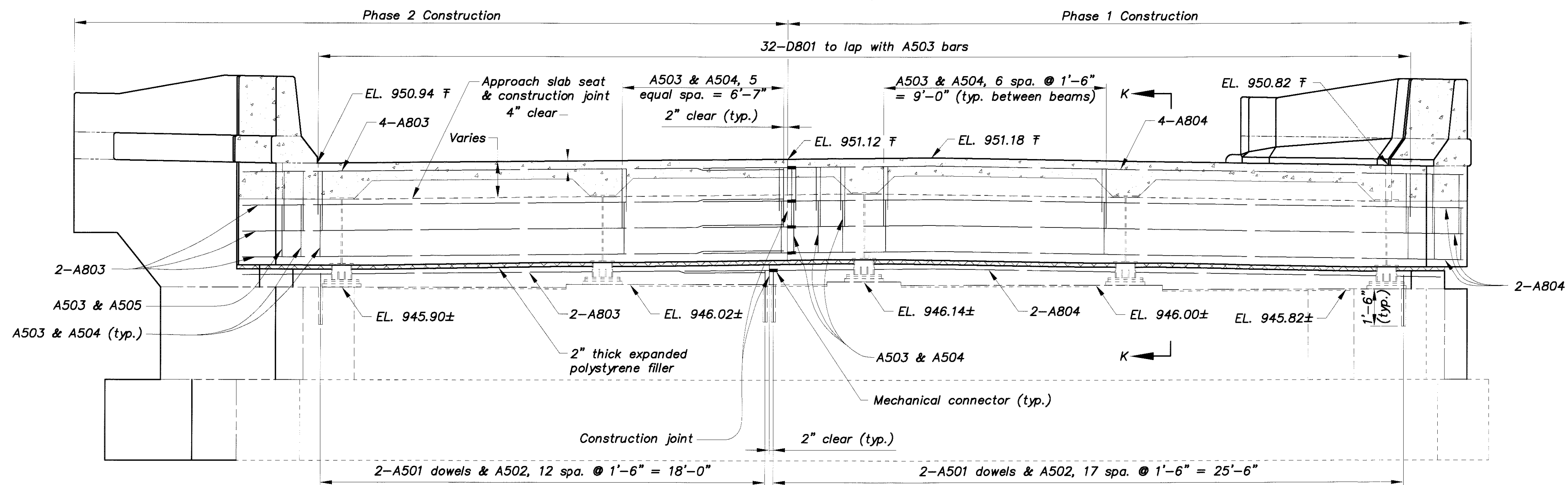
Portion of existing structure to be removed.

R.A. - Rear Abutment
F.A. - Forward Abutment

K:\Data\Dist1\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78\COL-11-13.78(Right Bridge)\rear.abut.dwg



PLAN



ELEVATION
(Existing piles not shown)

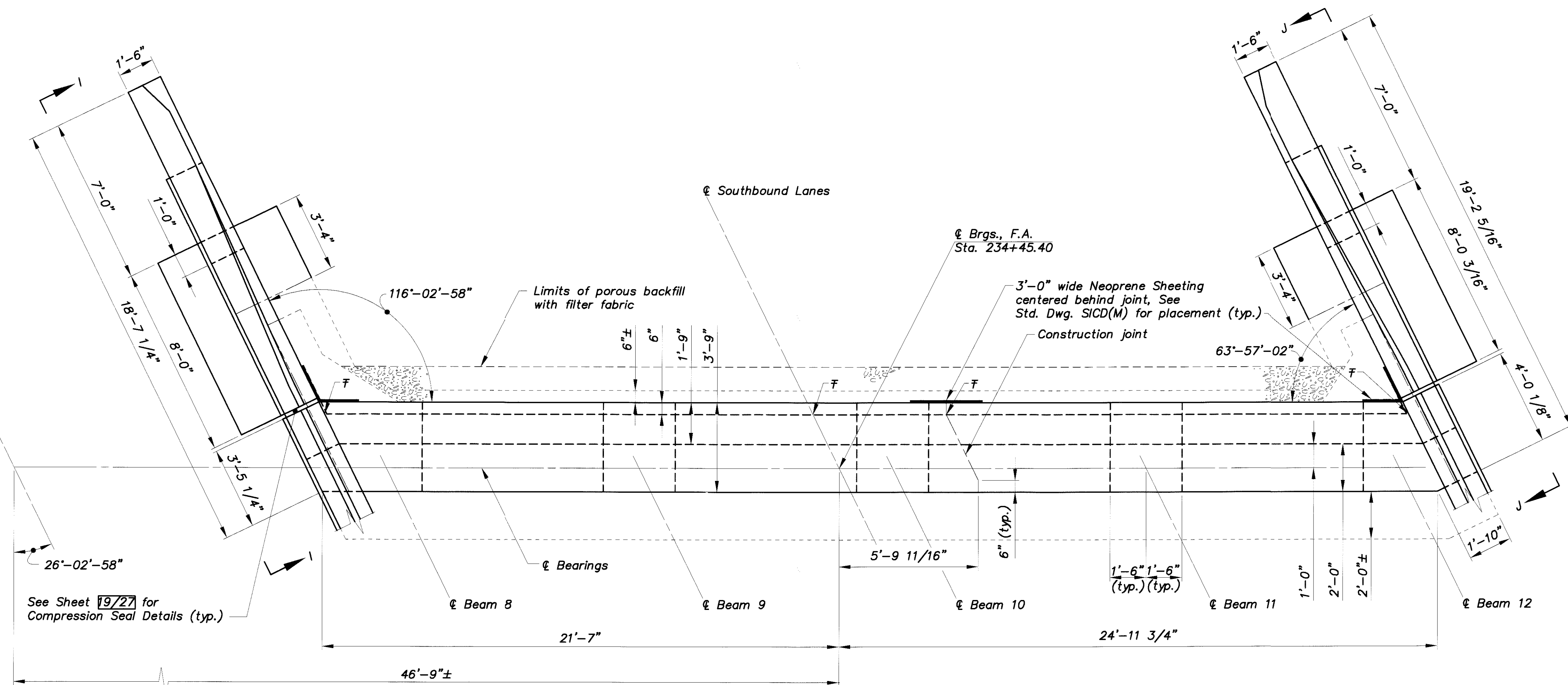
NOTES:

See Sheet 14/27 for Section K-K, View I-I & View J-J.

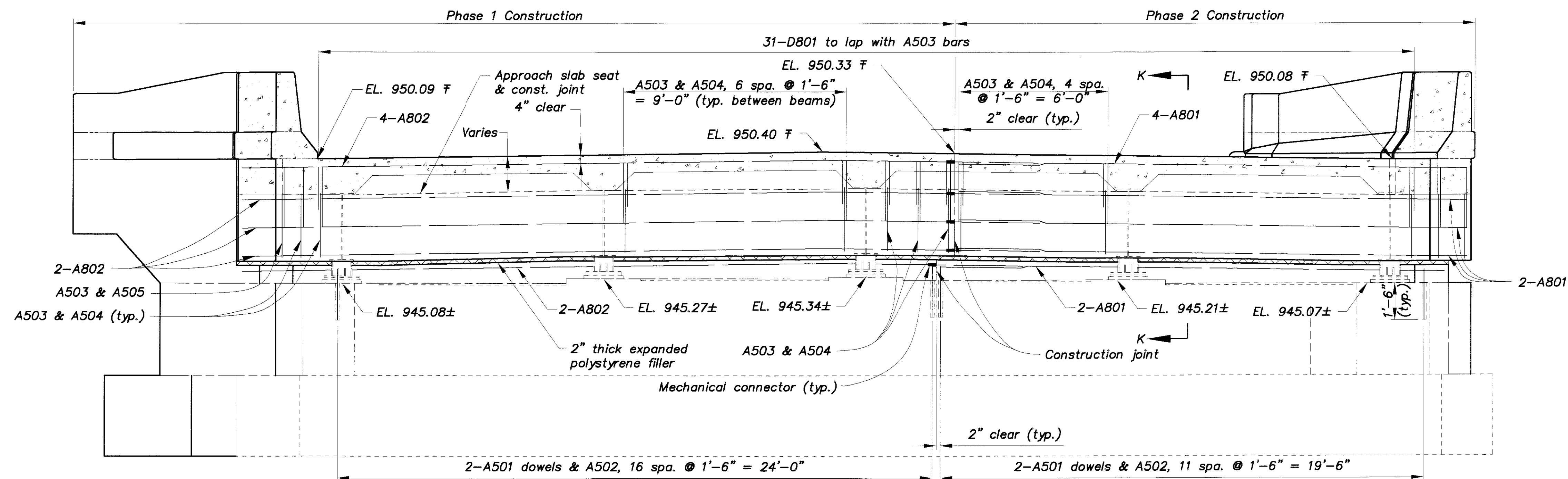
Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Southbound Lanes.

K:\00001\Dist11\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78(Right Bridge)\forpropabul.dwg

℄ S.R. 11



PLAN



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet **14/27** for Section K-K, View I-I & View J-J.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Southbound Lanes.

PROPOSED FORWARD ABUTMENT

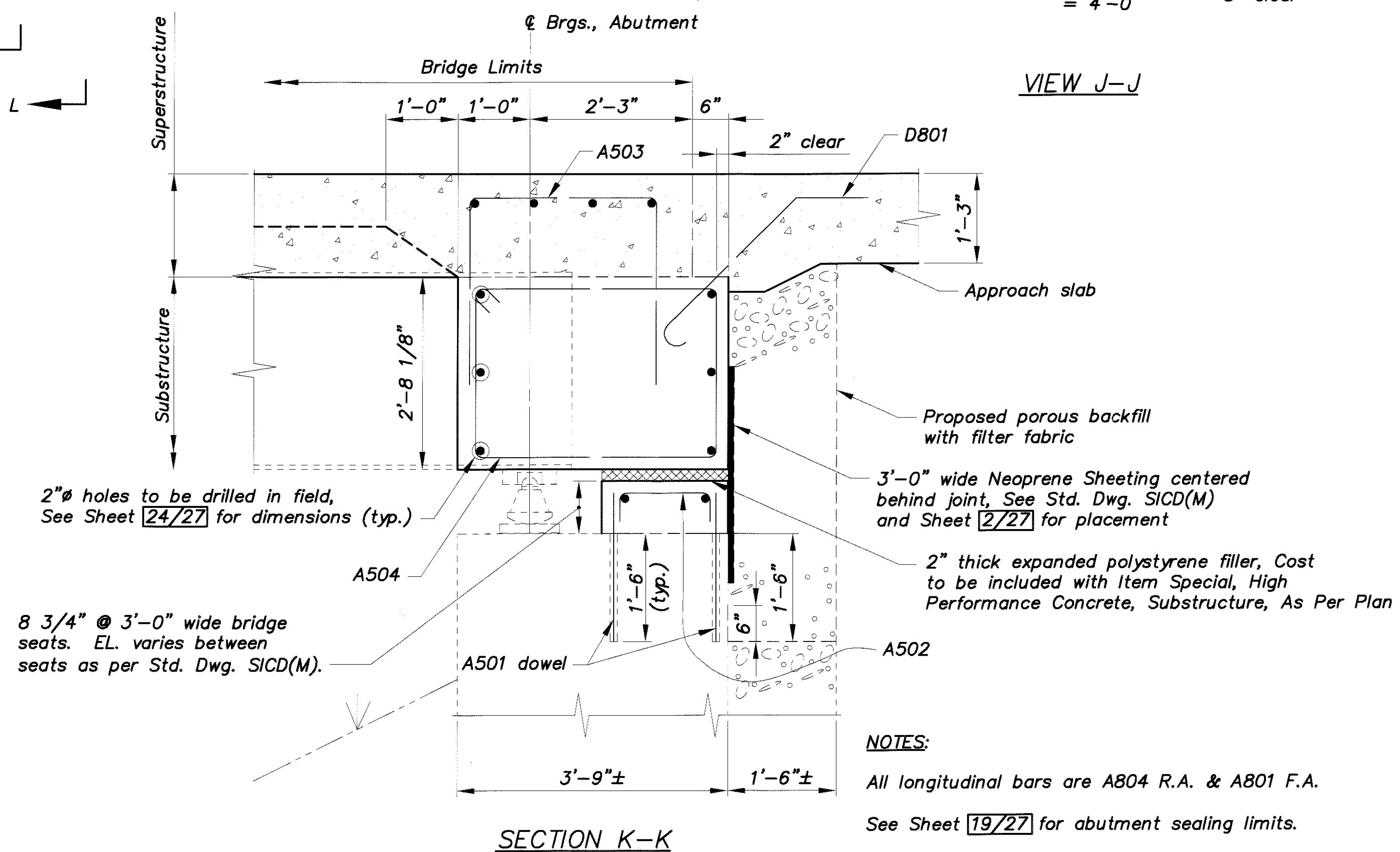
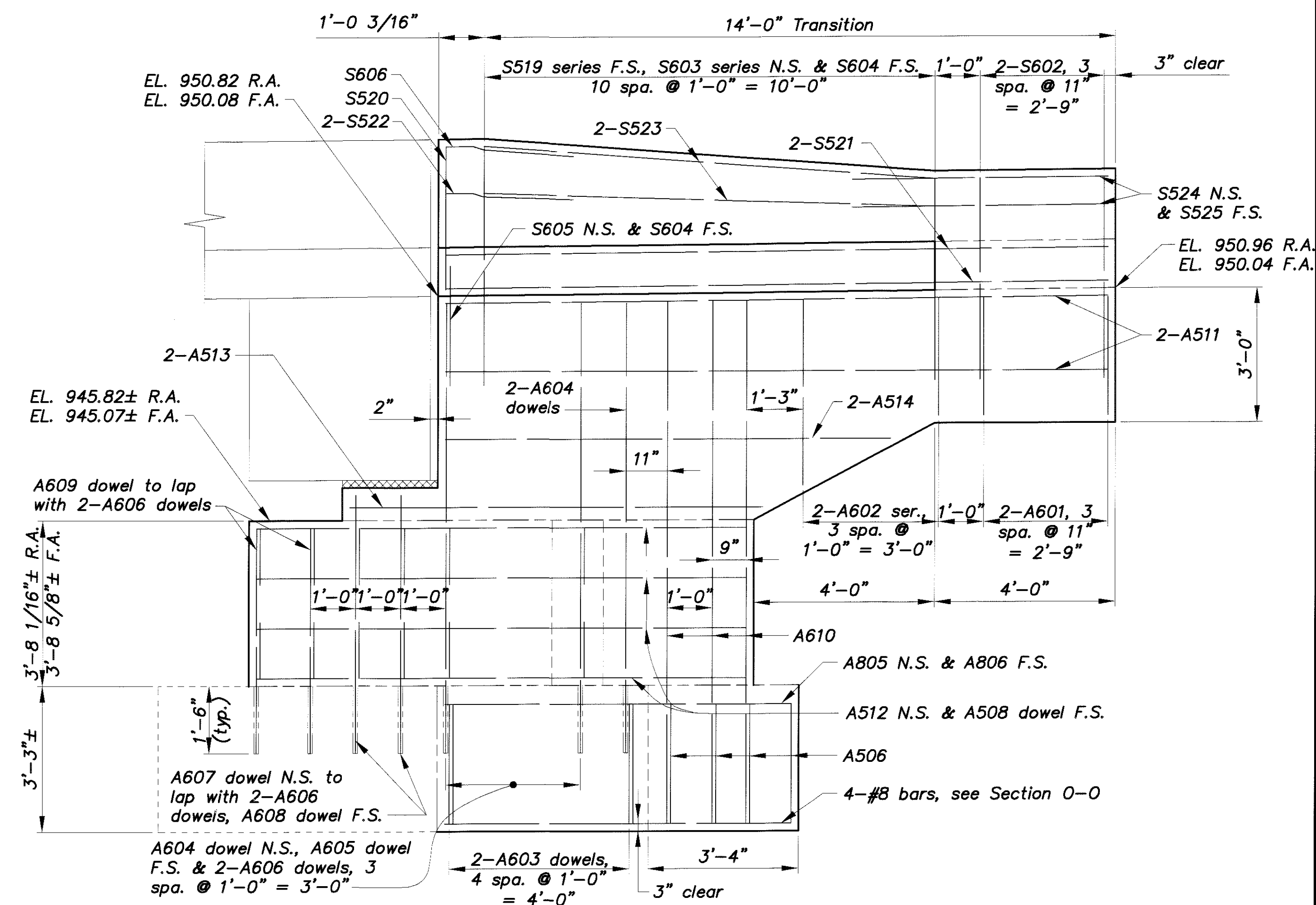
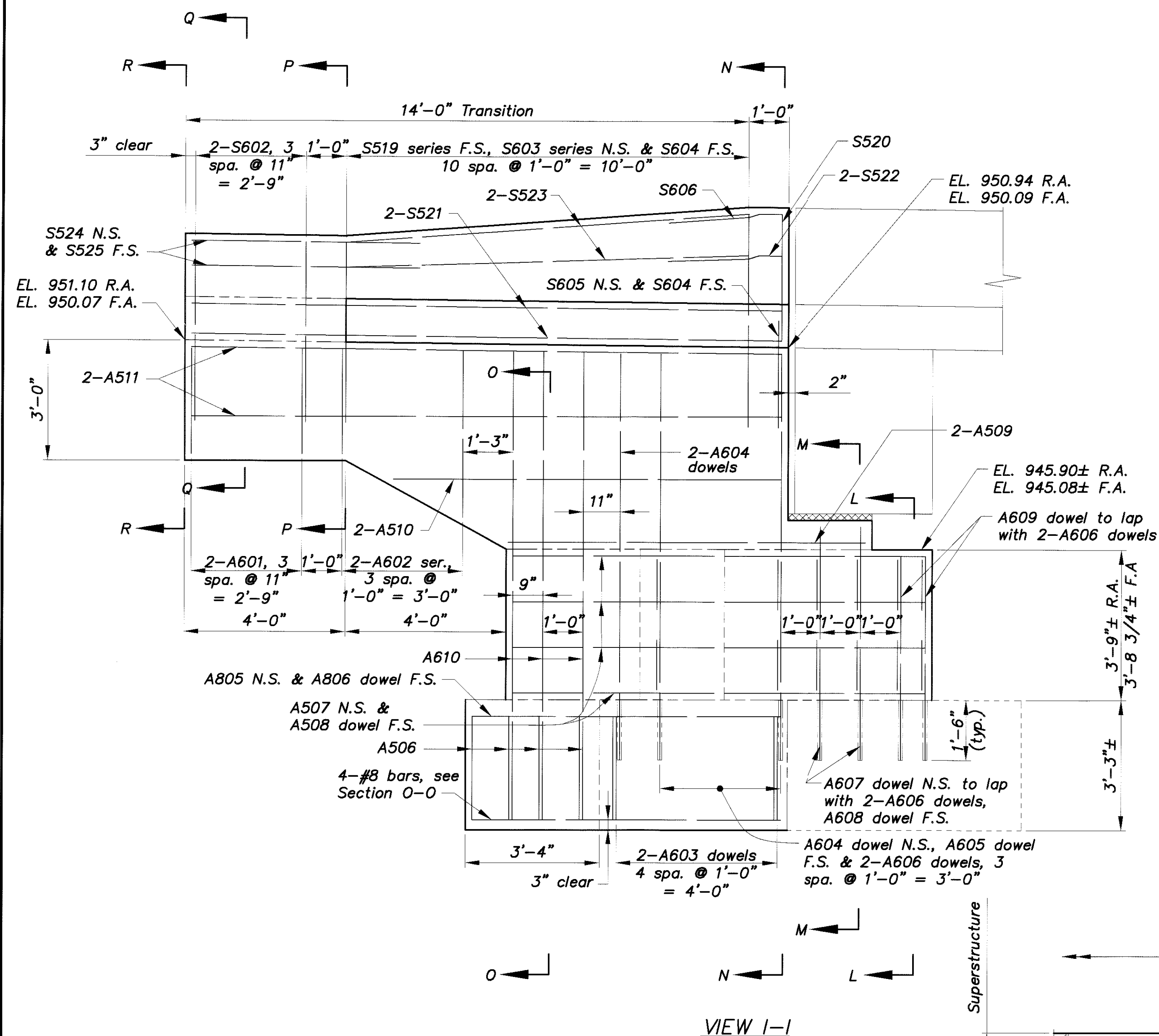
Bridge No. COL-11-1378 S.B.L.

over S.R. 154

COL-11-(9.44)(13.76)

13/27

112
126



NOTES:

Refer to Sheets 12/27 & 13/27 for locations of Section K-K, View I-I, and View J-J.

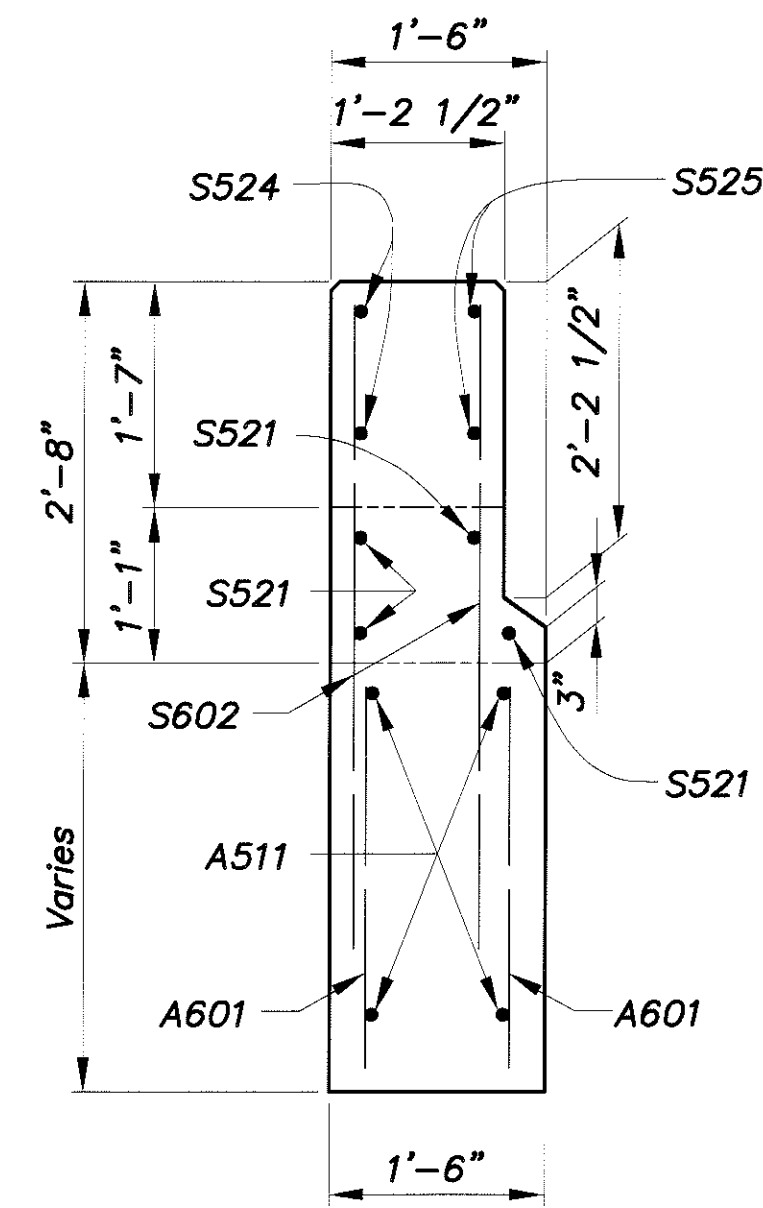
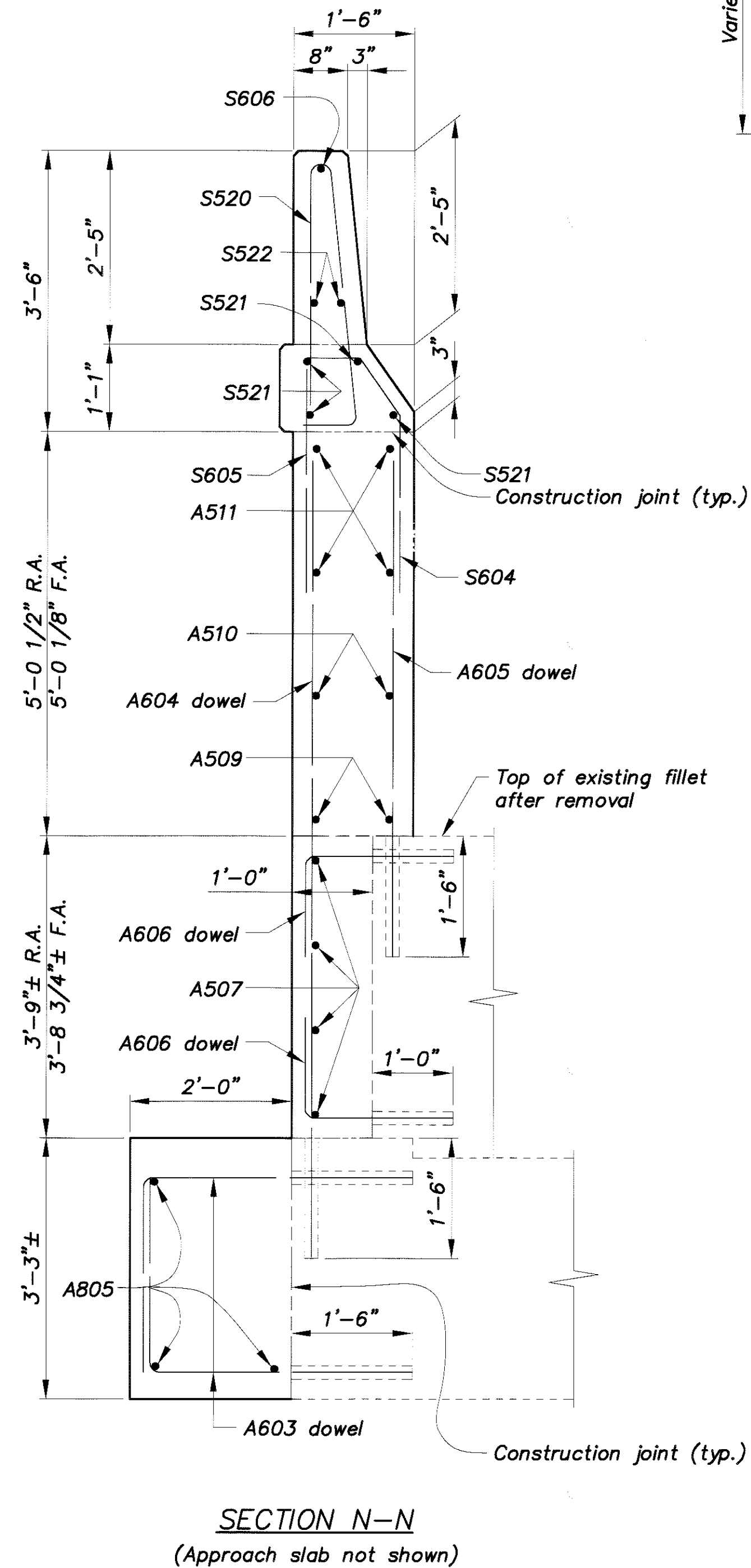
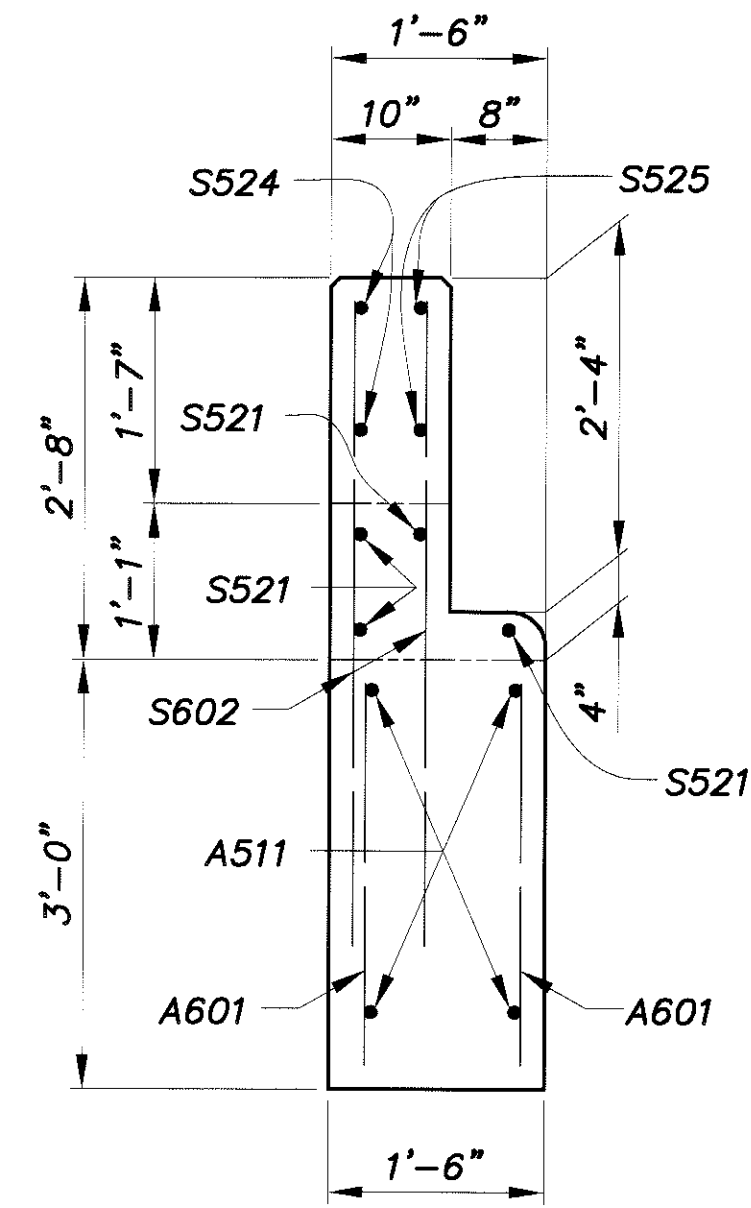
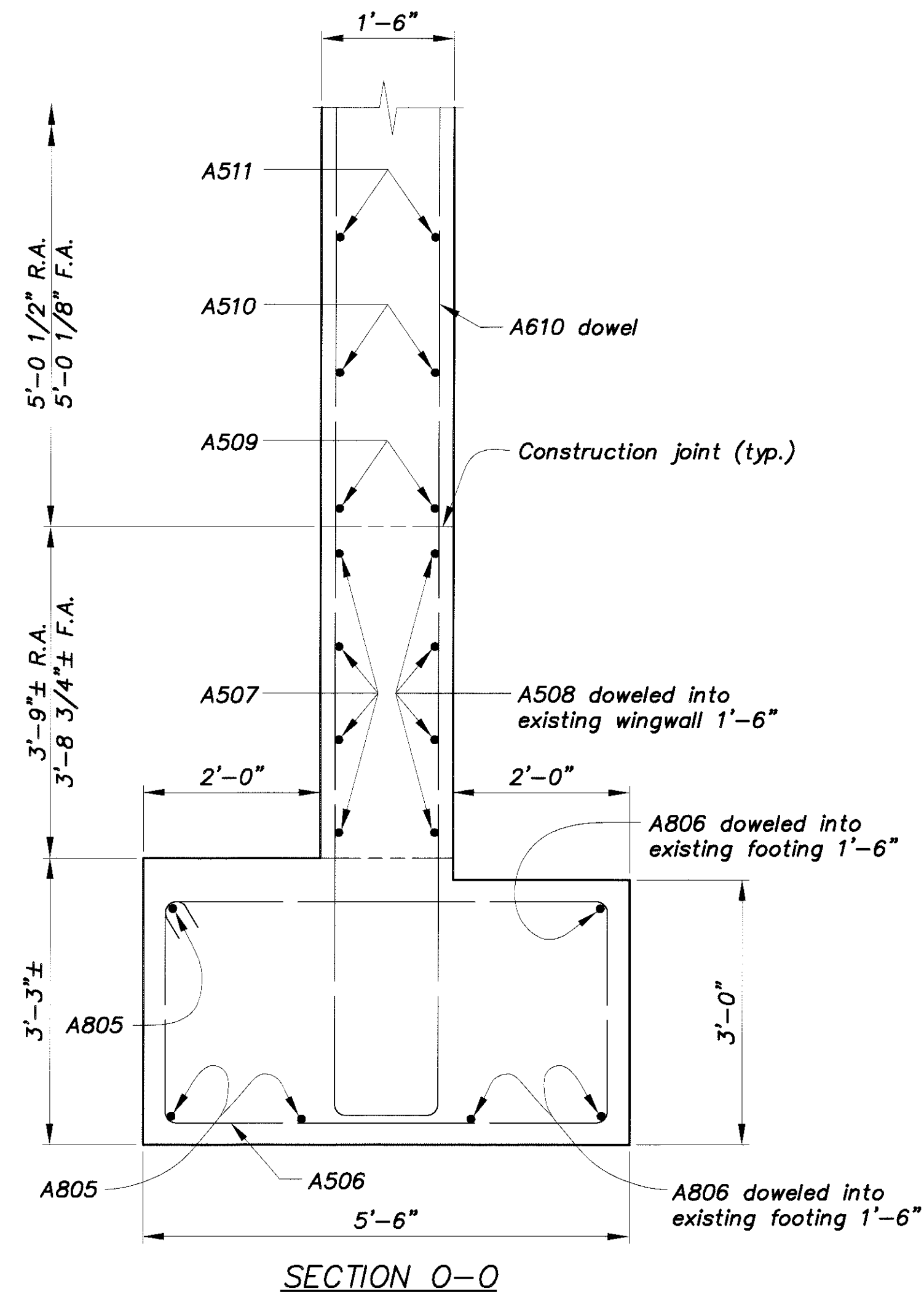
Refer to Sheet 19/27 for abutment sealing limits.

See Sheet **15/27** for Sections L-L, M-M, N-N, O-O, P-P, Q-Q & R-R.

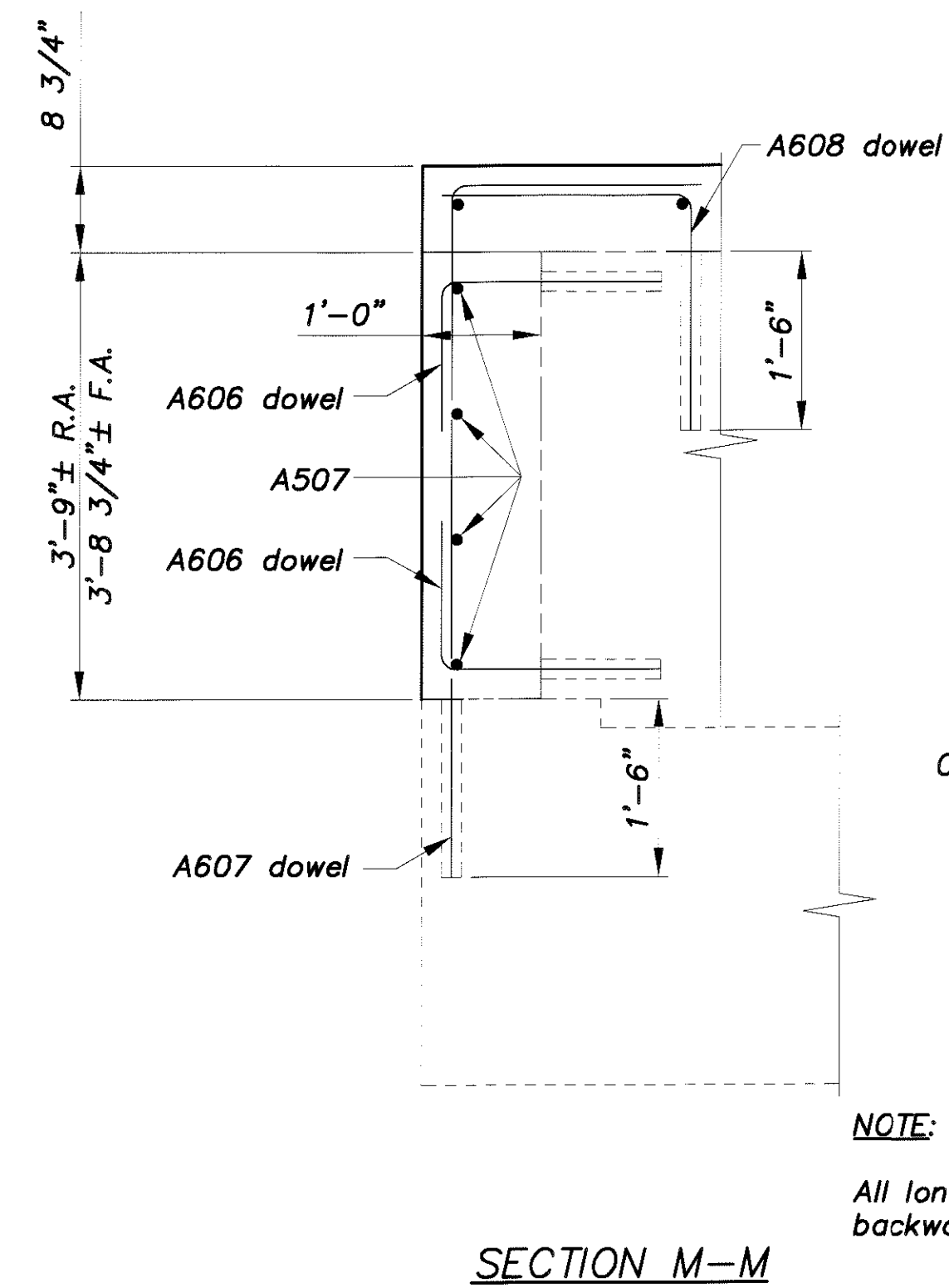
LEGEND:

R.A. - Rear Abutment
F.A. - Forward Abutment
N.S. - Near Side
F.S. - Far Side

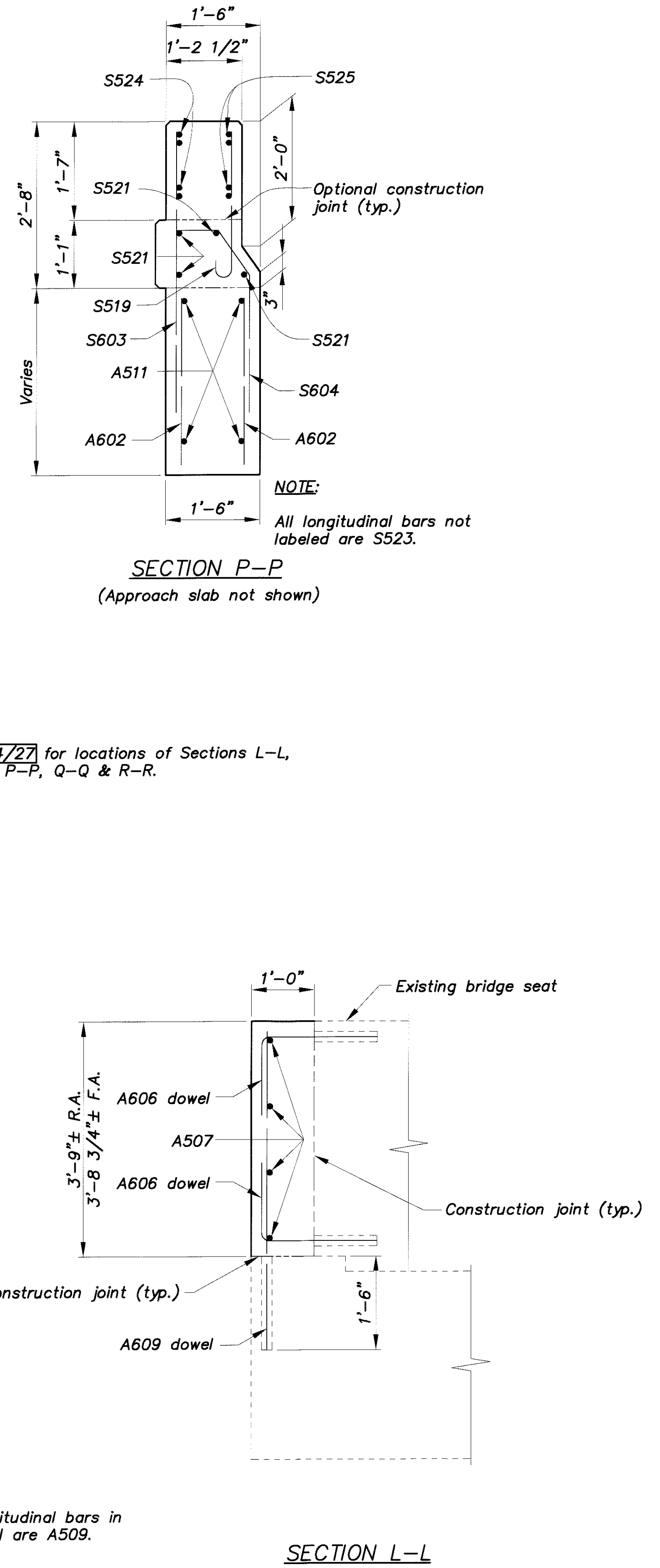
K:\Odeol\Dist11\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78(Right Bridge)\wwwtop1.dwg

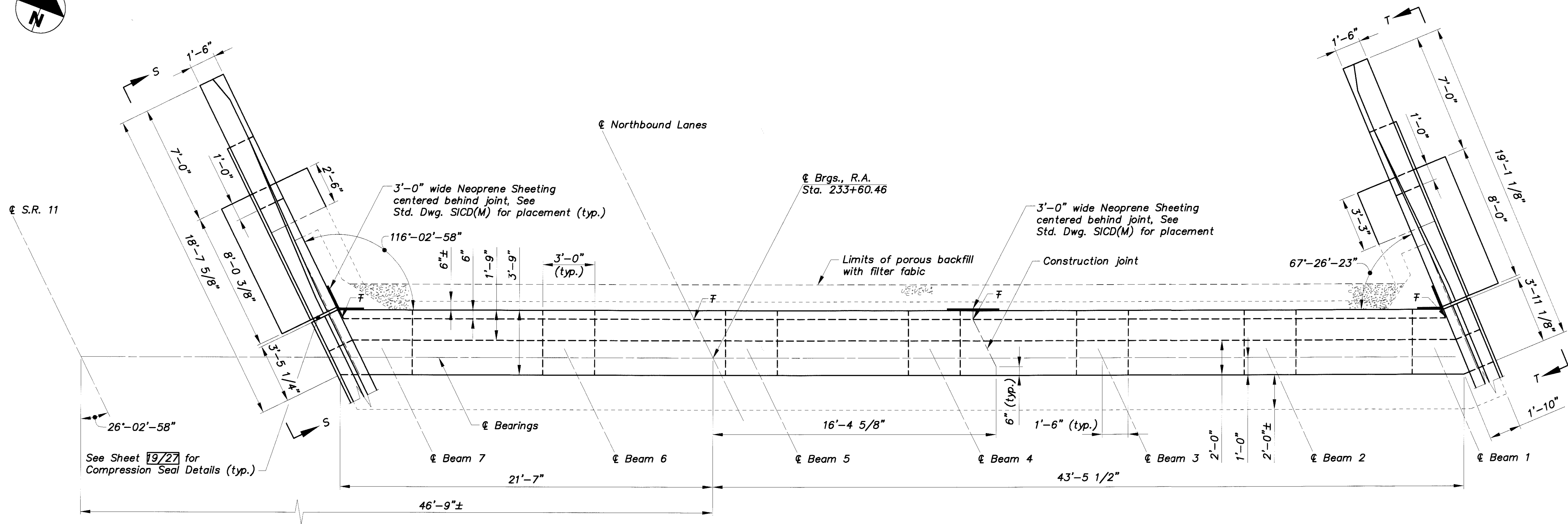
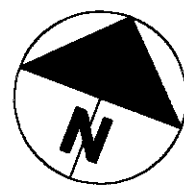


NOTE:
Refer to Sheet 14/27 for locations of Sections L-L, M-M, N-N, O-O, P-P, Q-Q & R-R.

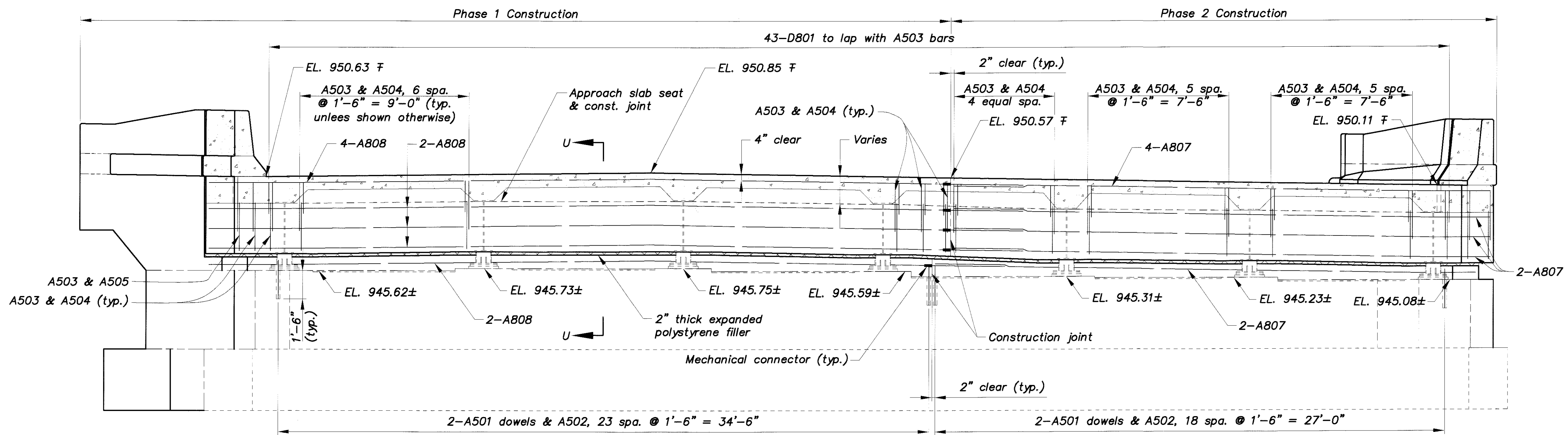


NOTE:
All longitudinal bars in backwall are A509.





PLAN



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet 18/27 for Section U-U, View S-S & View T-T.
Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Northbound Lanes.

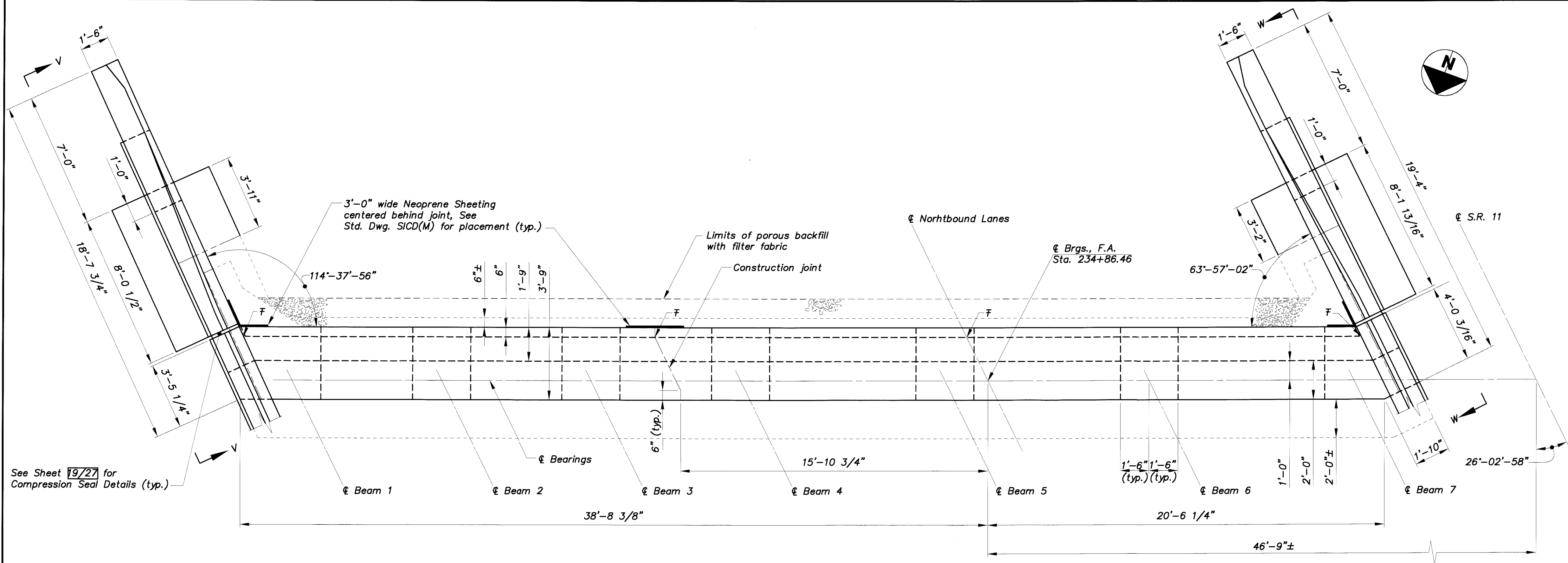
PROPOSED REAR ABUTMENT
Bridge No. COL-11-1378 N.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

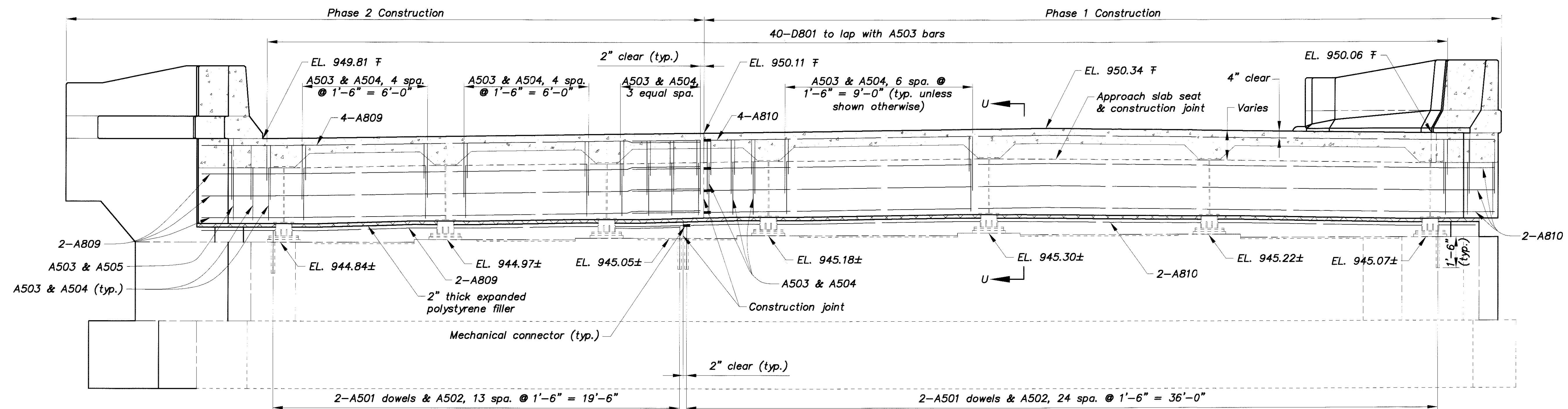
16/27

115
126

K:\Data\Dist11\COL-11-09-46\13.78\Drawings\COL-11-13.78\Left Bridge\Proposed.abut.dwg



PLAN



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet 18/27 for Section U-U.

See Sheet 19/27 for View V-V & View W-W.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Northbound Lanes.

PROPOSED FORWARD ABUTMENT
Bridge No. COL-11-1378 N.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

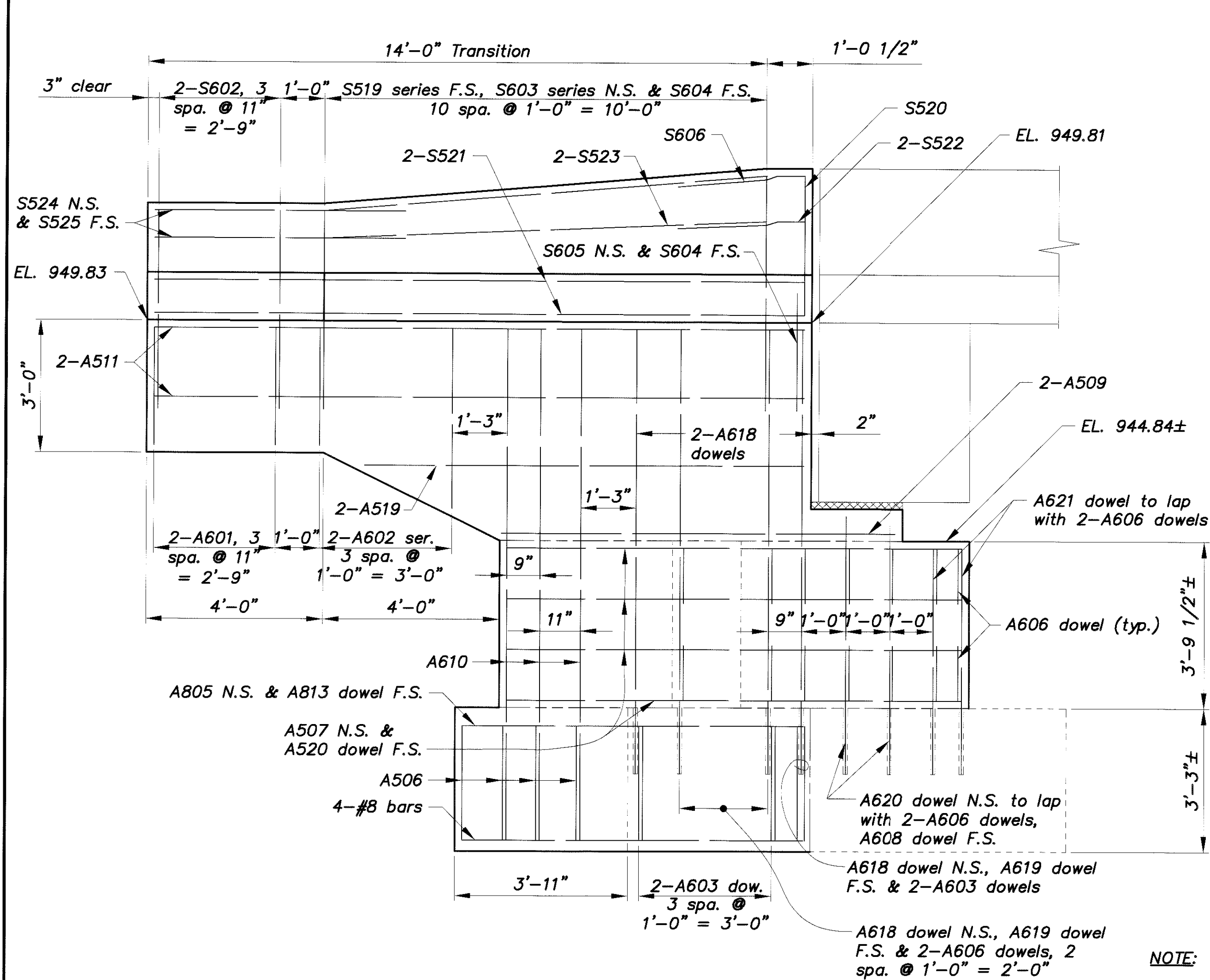
17/27

116
126

DESIGN AGENCY
WDA&E
1201 Dublin Road Columbus, Ohio

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIEWED	STRUCTURE FILE NUMBER	
GTB		1500783	

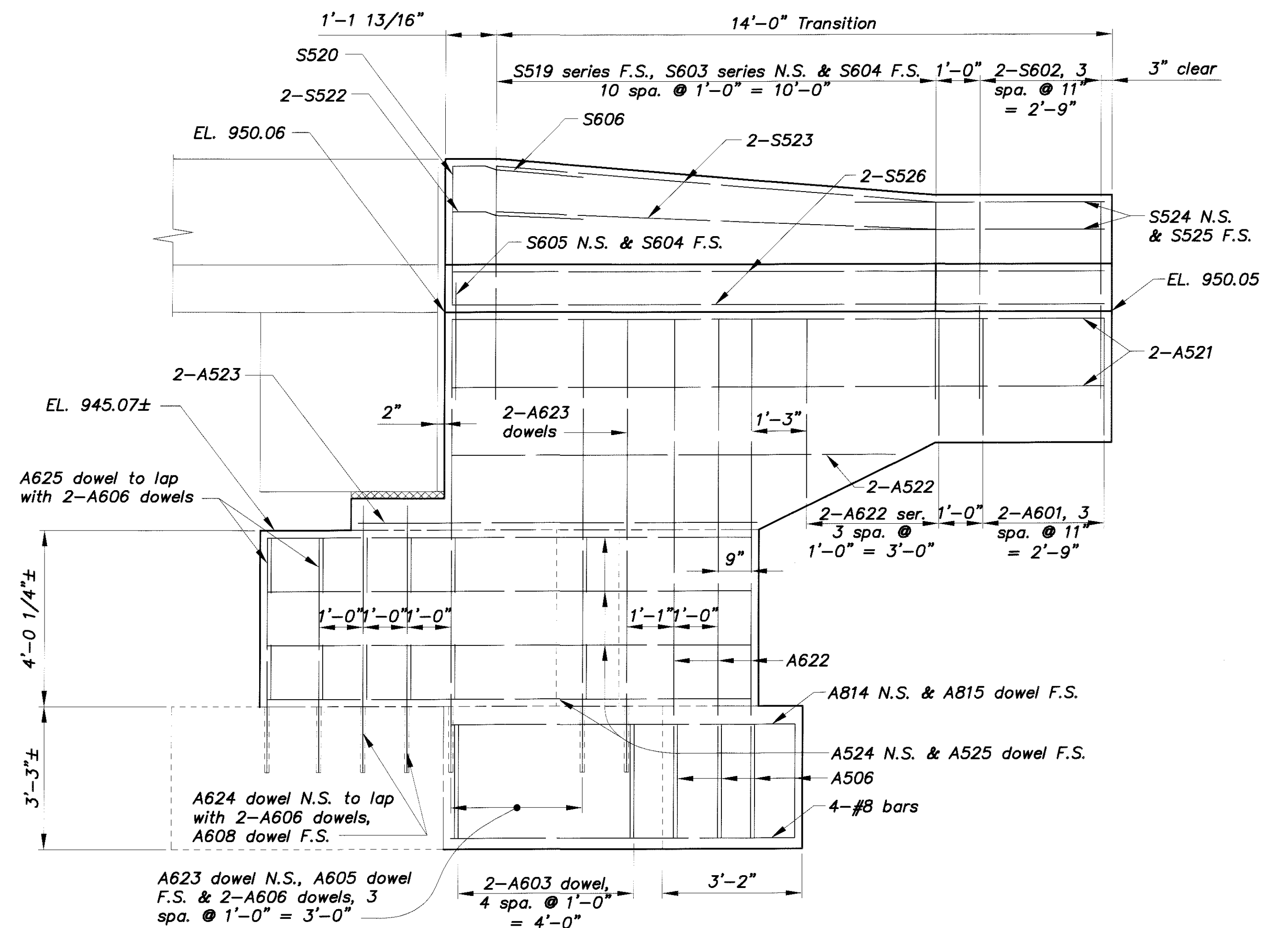
K:\0001\Dist11\COL-11-(9.44)(13.78)\Drawings\COL-11-13.78\COL-11-13.78(Left Bridge)\w\foriscop.dwg



VIEW V-V

NOTE:

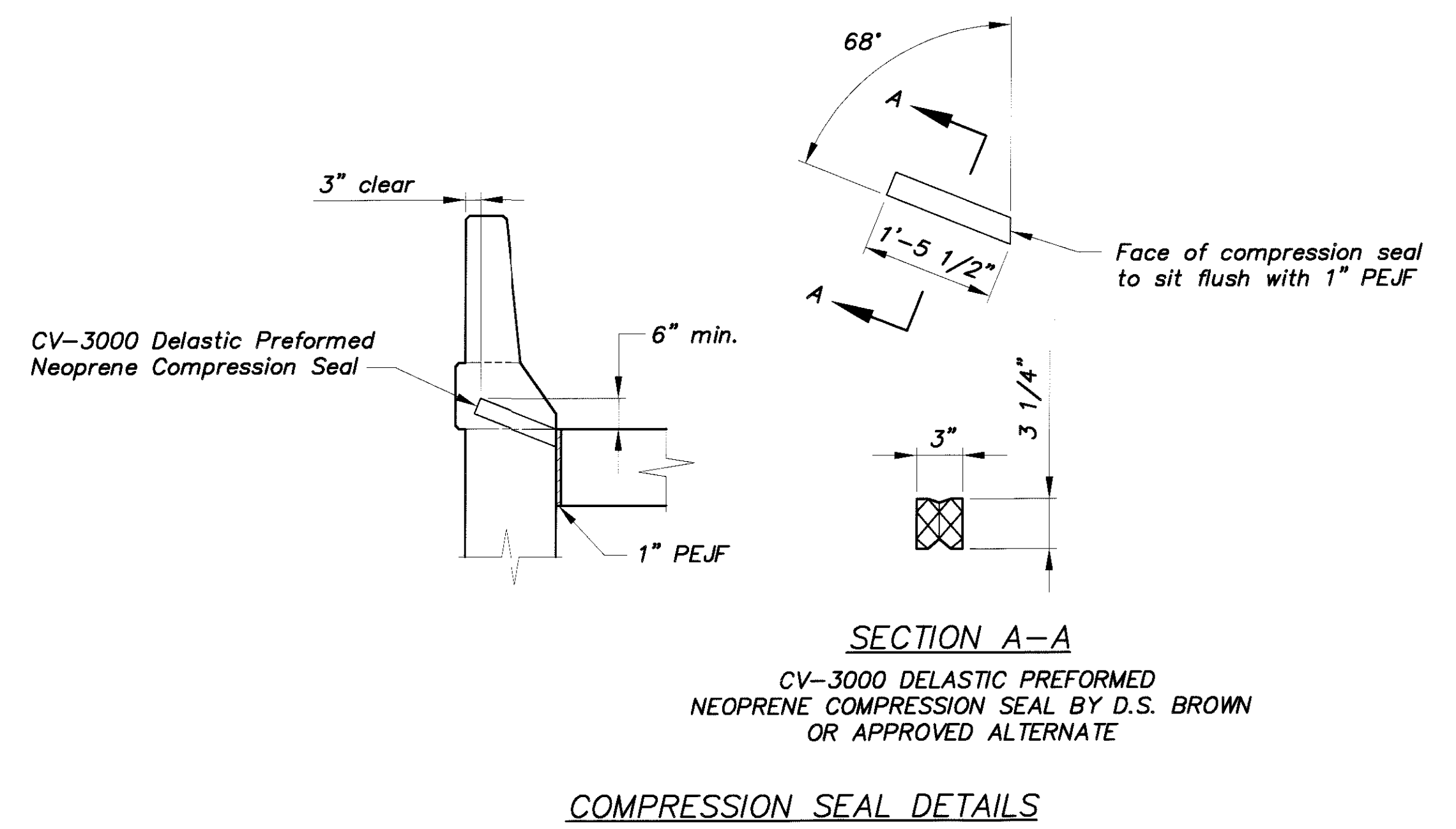
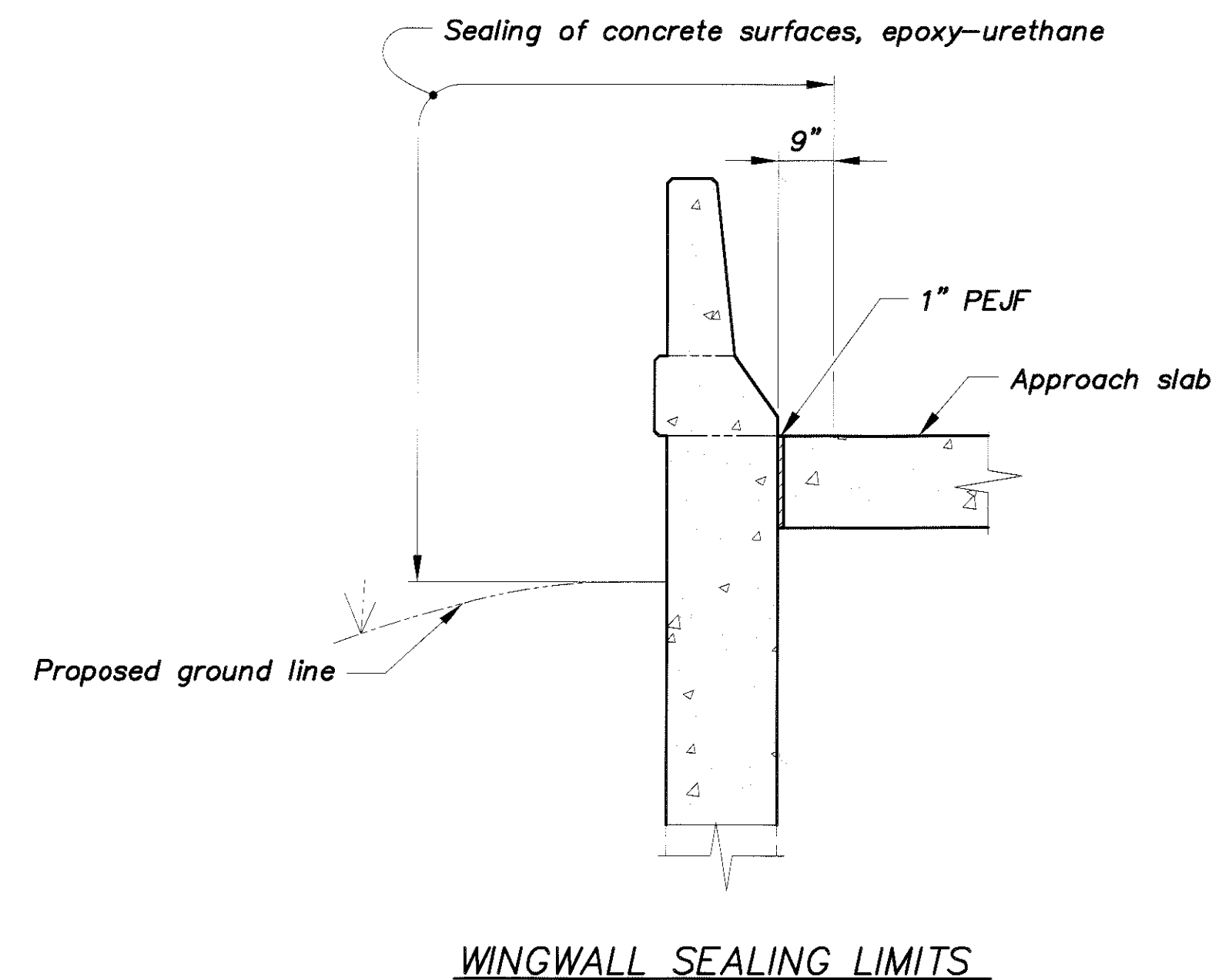
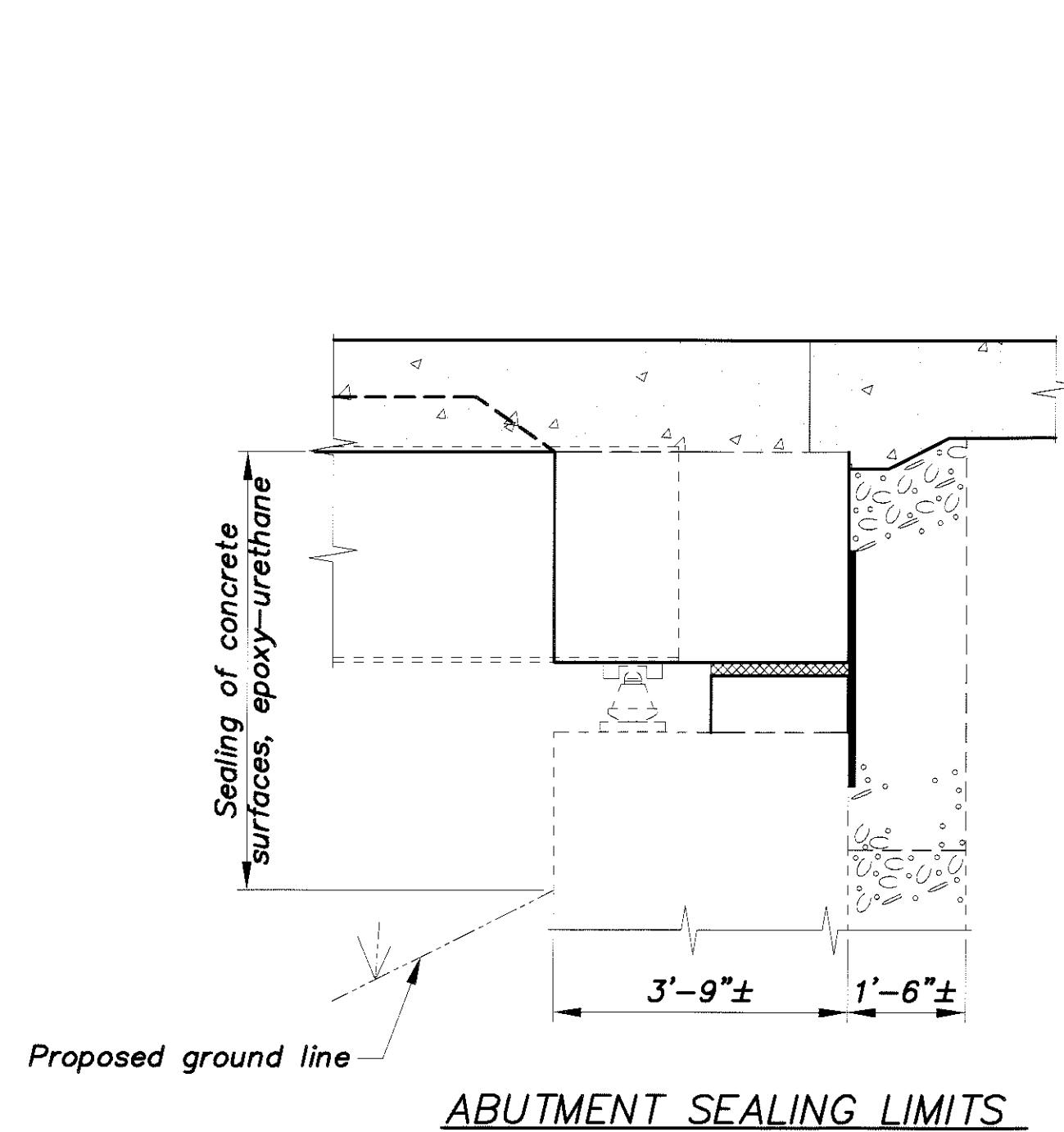
Refer to Sheet 17/27 for locations of View V-V & View W-W.

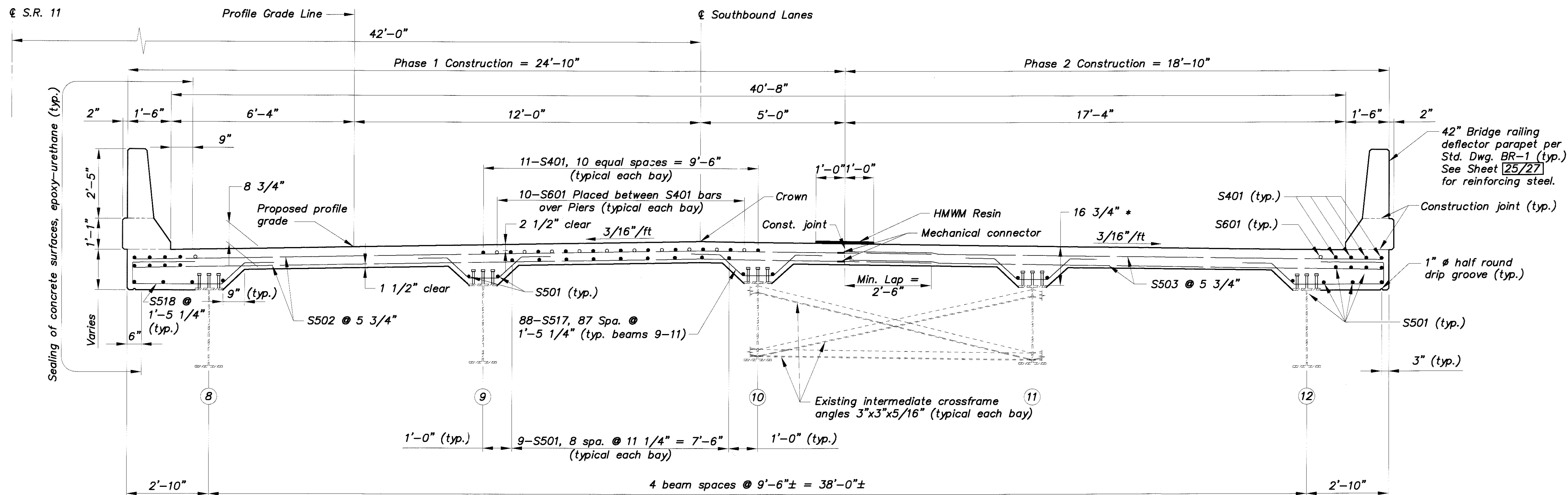


VIEW W-W

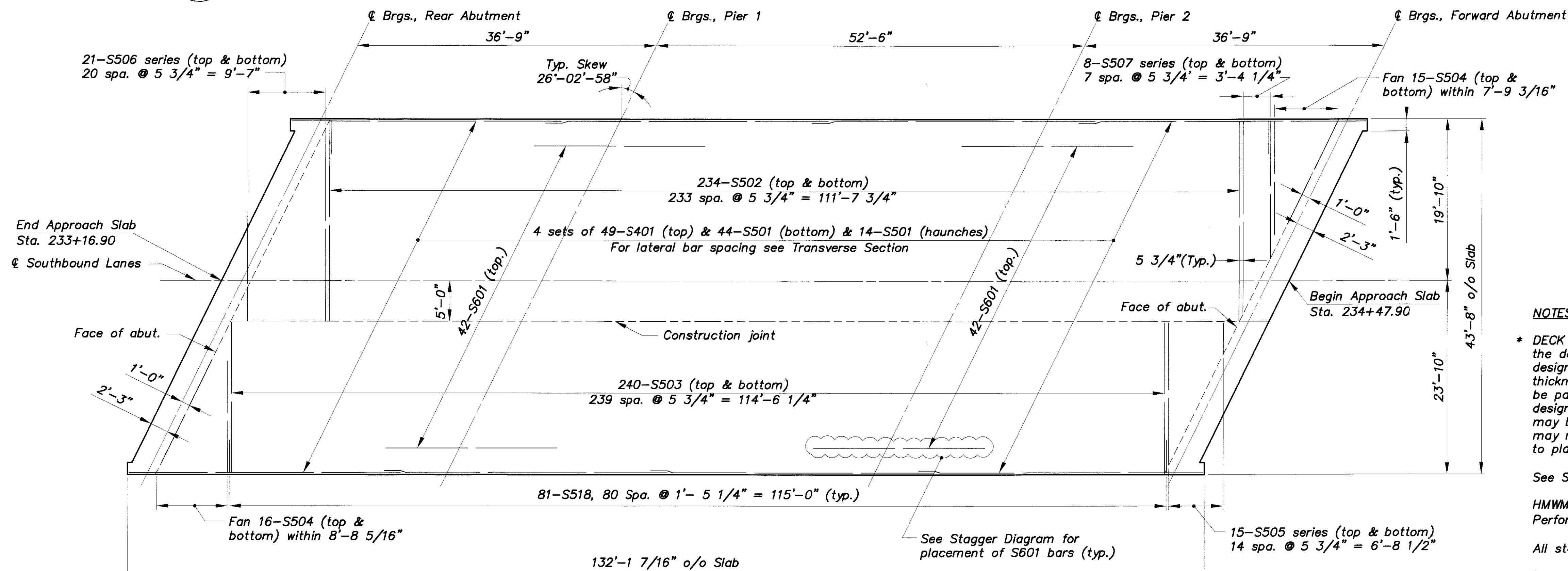
NOTE:

Vertical faces of the joint must be clean and free of loose concrete. In addition, installation of the seal shall occur between temperatures ranging from 35°F to 85°F.

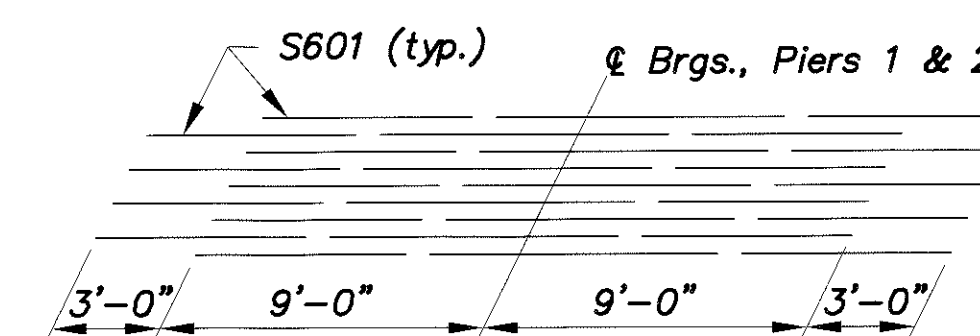




TRANSVERSE SECTION



SLAB REINFORCEMENT PLAN



STAGGER DIAGRAM FOR S601 OVER PIERS 1 & 2

NOTES:

* DECK SLAB DEPTH: The distance shown from the top of the deck slab to the top of steel beam is the theoretical design dimension including an average design haunch thickness of 8 inches. The quantity of deck concrete to be paid for shall be based upon this dimension, minus the design haunch thickness, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or conformation required to place it parallel to finished grade.

See Sheet [24/27] for existing beam sizes.

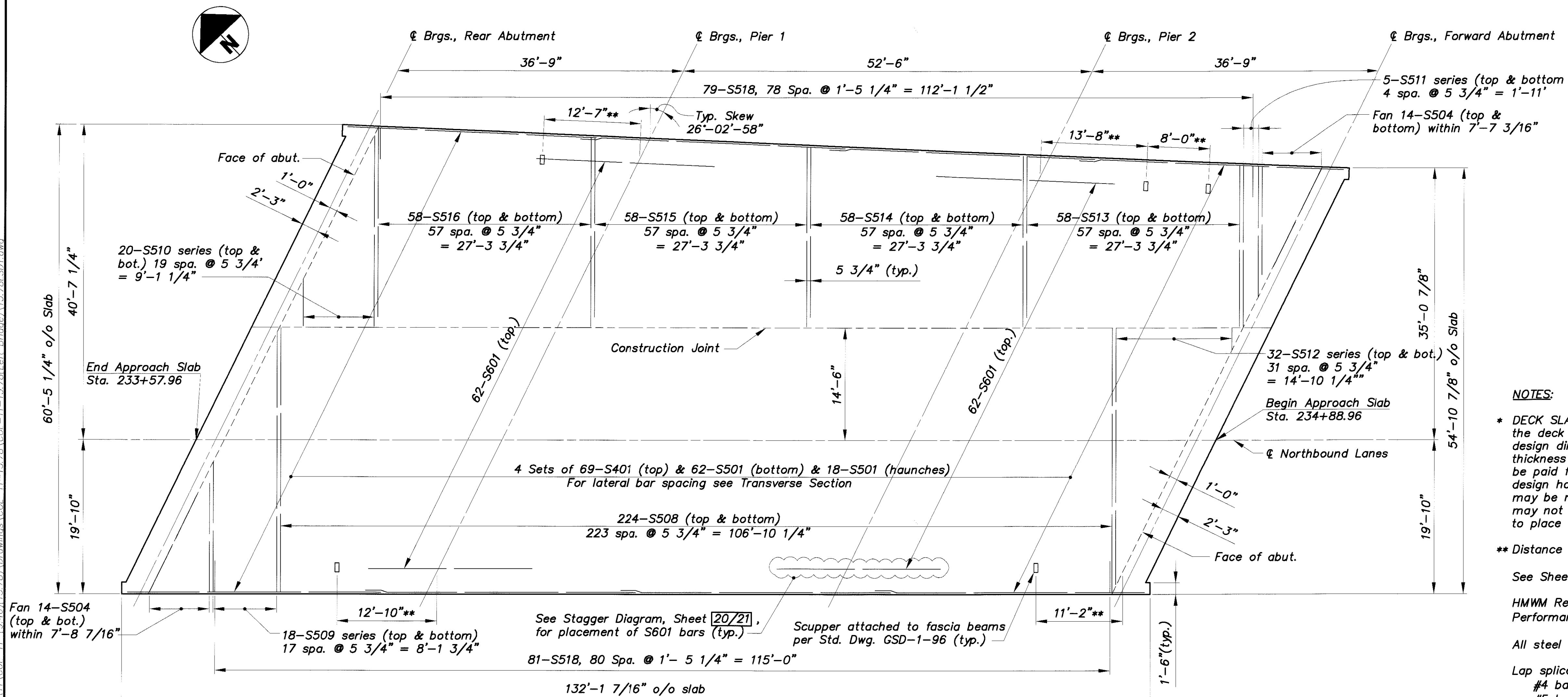
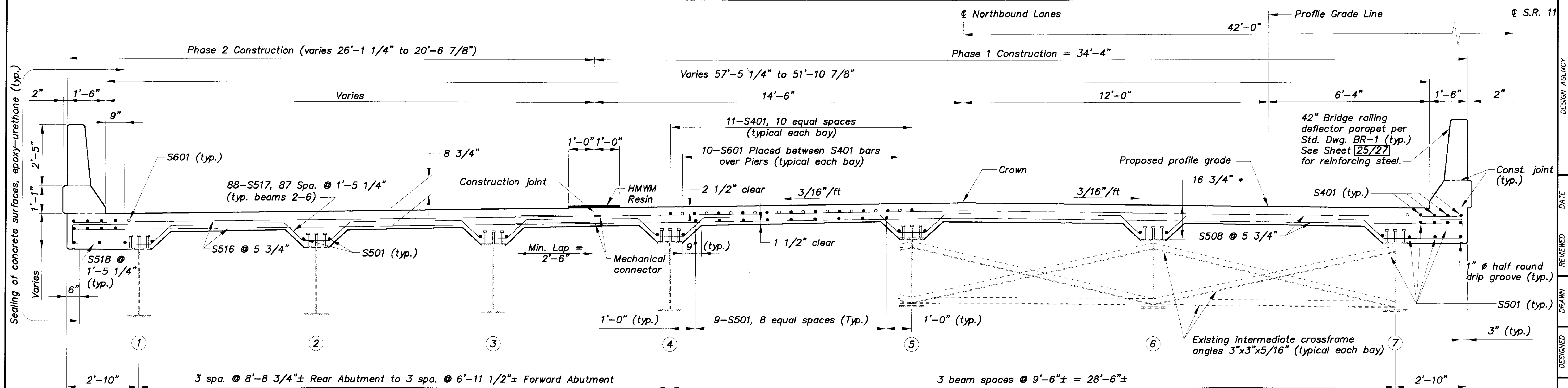
HMWM Resin to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.

All steel clearances are 2" unless shown otherwise.

Lap splice lengths:

#4 bars = 2'-0" minimum

#5 bars = 2'-6" minimum



NOTES:

* **DECK SLAB DEPTH:** The distance shown from the top of the deck slab to the top of steel beam is the theoretical design dimension including an average design haunch thickness of 8 inches. The quantity of deck concrete to be paid for shall be based upon this dimension, minus the design haunch thickness, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or conformation required to place it parallel to finished grade.

**** Distance measured along centerline of fascia beam.**

See Sheet 24/27 for existing beam sizes.

HMWM Resin to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.

All steel clearances are 2" unless shown otherwise.

Lap splice length:

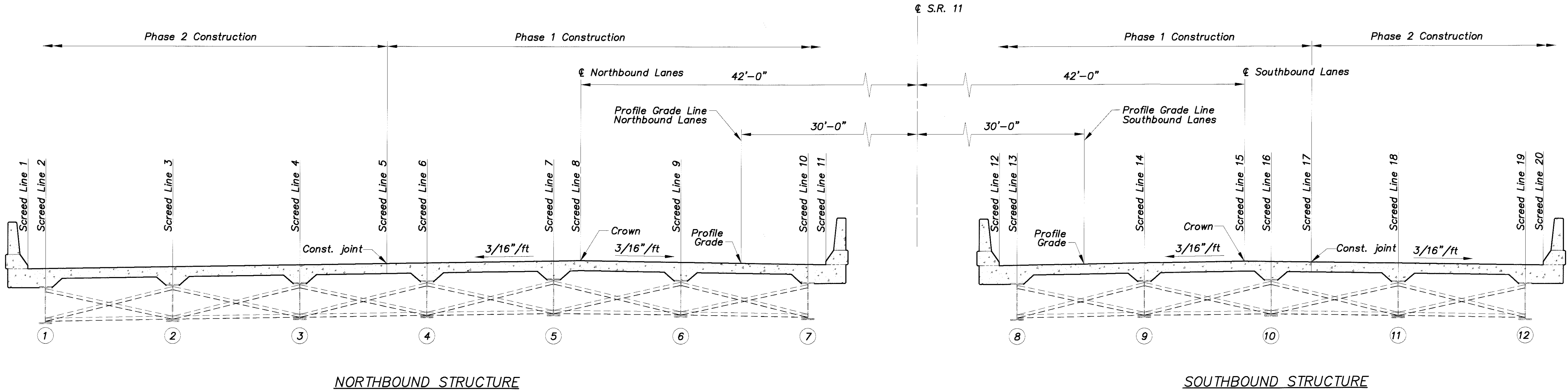
#4 bars = 2'-0" minimum
#5 bars = 2'-6" minimum

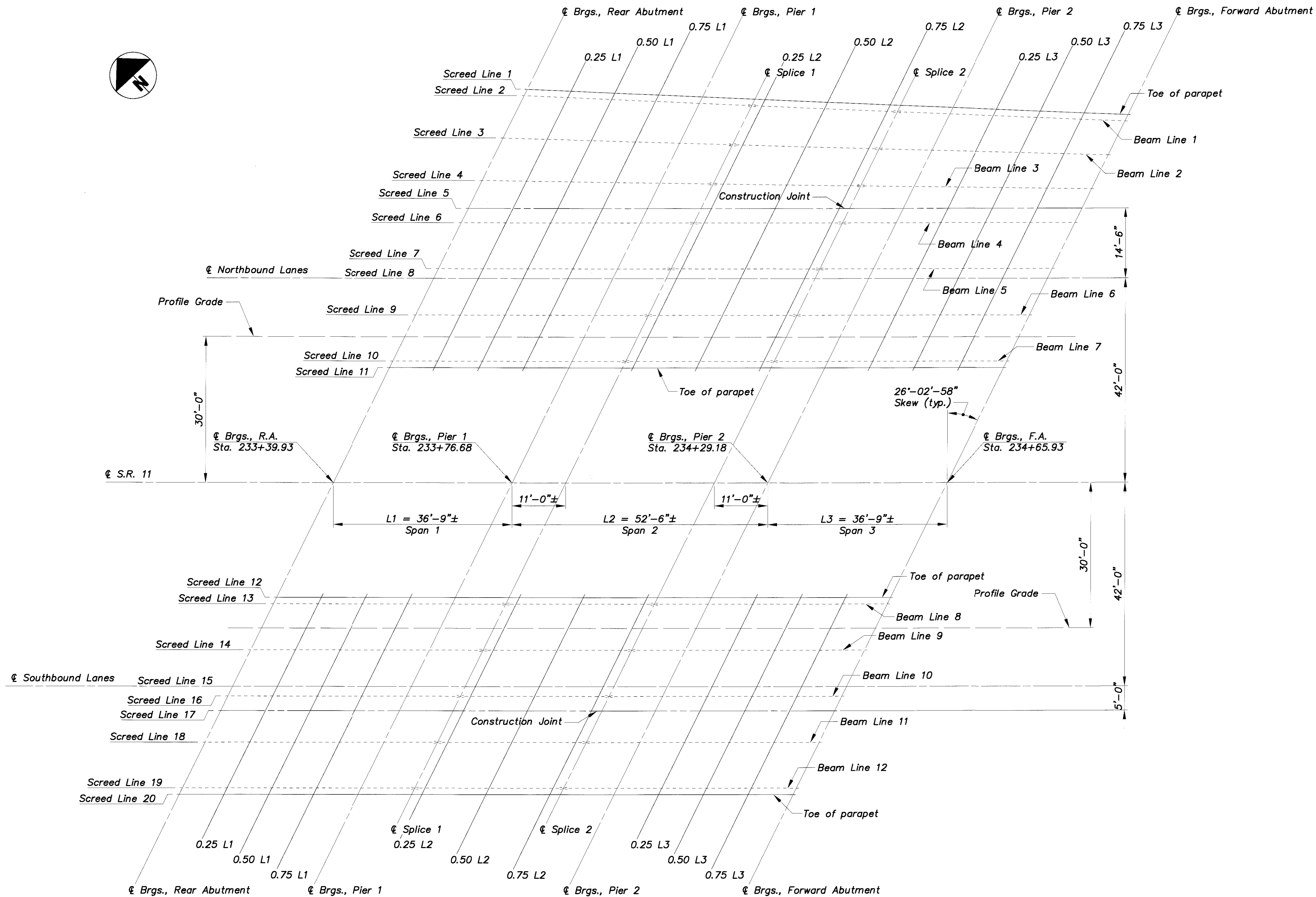
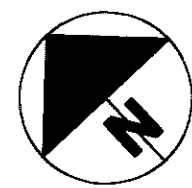
K:\Data\Dist11\Col-11-(9.44)\Drawings\COL-11-13.78\COL-11-13.78(Shared Bridge)\sdl.dwg

SCREED ELEVATION TABLE																					
	SCREED LINE 1		SCREED LINE 2		SCREED LINE 3		SCREED LINE 4		SCREED LINE 5		SCREED LINE 6		SCREED LINE 7		SCREED LINE 8		SCREED LINE 9		SCREED LINE 10		
LOCATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	DEFLECTION ADJUSTMENT
℄ Brgs., R.A.	233+79.52	950.09	233+78.88	950.12	233+74.62	950.28	233+70.35	950.44	233+67.55	950.55	233+66.08	950.61	233+61.44	950.79	233+60.46	950.83	233+56.79	950.74	233+52.15	950.62	0"
0.25 Span 1	233+88.52	950.05	233+87.88	950.07	233+83.68	950.23	233+79.47	950.39	233+76.73	950.50	233+75.27	950.55	233+70.62	950.73	233+69.65	950.77	233+65.98	950.68	233+61.34	950.56	1/16"
0.50 Span 1	233+97.52	950.01	233+96.88	950.03	233+92.74	950.18	233+88.60	950.34	233+85.92	950.44	233+84.46	950.50	233+79.81	950.67	233+78.83	950.71	233+75.17	950.62	233+70.53	950.50	1/16"
0.75 Span 1	234+06.52	949.96	234+05.88	949.99	234+01.80	950.14	233+97.72	950.29	233+95.11	950.38	233+93.64	950.44	233+89.00	950.61	233+88.02	950.65	233+84.36	950.55	233+79.71	950.43	0"
℄ Pier 1	234+15.51	949.93	234+14.87	949.95	234+10.86	950.10	234+06.84	950.24	234+04.30	950.34	234+02.83	950.39	233+98.19	950.56	233+97.21	950.60	233+93.54	950.50	233+88.90	950.38	0"
℄ Splice 1	234+26.29	949.90	234+25.65	949.92	234+21.71	950.07	234+17.77	950.21	234+15.30	950.30	234+13.83	950.35	234+09.19	950.52	234+08.21	950.56	234+04.54	950.46	233+99.90	950.33	1/8"
0.25 Span 2	234+28.37	949.90	234+27.73	949.92	234+23.80	950.06	234+19.88	950.20	234+17.42	950.29	234+15.96	950.34	234+11.31	950.51	234+10.33	950.55	234+06.67	950.45	234+02.03	950.32	1/8"
0.50 Span 2	234+41.22	949.87	234+40.58	949.89	234+36.75	950.03	234+32.91	950.16	234+30.55	950.25	234+29.08	950.30	234+24.44	950.47	234+23.46	950.50	234+19.79	950.40	234+15.15	950.27	1/4"
0.75 Span 2	234+54.08	949.84	234+53.44	949.86	234+49.69	949.99	234+45.95	950.12	234+43.67	950.20	234+42.21	950.25	234+37.56	950.41	234+36.58	950.44	234+32.92	950.34	234+28.28	950.21	1/8"
℄ Splice 2	234+56.16	949.83	234+55.52	949.85	234+51.79	949.98	234+48.06	950.11	234+45.80	950.19	234+44.33	950.24	234+39.69	950.40	234+38.71	950.44	234+35.04	950.33	234+30.40	950.20	1/8"
℄ Pier 2	234+66.93	949.81	234+66.29	949.83	234+62.64	949.95	234+58.98	950.08	234+56.80	950.15	234+55.33	950.20	234+50.69	950.36	234+49.71	950.40	234+46.04	950.29	234+41.40	950.15	0"
0.25 Span 3	234+75.93	949.80	234+75.29	949.82	234+71.70	949.94	234+68.11	950.06	234+65.98	950.13	234+64.52	950.18	234+59.87	950.34	234+58.89	950.37	234+55.23	950.26	234+50.59	950.13	0"
0.50 Span 3	234+84.93	949.81	234+84.29	949.83	234+80.76	949.94	234+77.23	950.06	234+75.17	950.13	234+73.71	950.18	234+69.06	950.33	234+68.08	950.36	234+64.42	950.25	234+59.78	950.11	1/16"
0.75 Span 3	234+93.92	949.81	234+93.28	949.83	234+89.82	949.94	234+86.36	950.05	234+84.36	950.12	234+82.89	950.17	234+78.25	950.32	234+77.26	950.35	234+73.61	950.24	234+68.96	950.10	1/16"
℄ Brgs., F.A.	235+02.92	949.81	235+02.28	949.83	234+98.88	949.94	234+95.48	950.05	234+93.55	950.11	234+92.08	950.16	234+87.44	950.31	234+86.45	950.34	234+82.79	950.22	234+78.15	950.08	0"
	SCREED LINE 11		SCREED LINE 12		SCREED LINE 13		SCREED LINE 14		SCREED LINE 15		SCREED LINE 16		SCREED LINE 17		SCREED LINE 18		SCREED LINE 19		SCREED LINE 20		
LOCATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	DEFLECTION ADJUSTMENT
℄ Brgs., R.A.	233+51.50	950.61	233+28.36	950.79	233+27.71	950.82	233+23.07	951.01	233+19.40	951.16	233+18.42	951.13	233+16.96	951.10	233+13.78	951.03	233+09.14	950.93	233+08.48	950.91	0"
0.25 Span 1	233+60.69	950.55	233+37.55	950.72	233+36.90	950.74	233+32.25	950.93	233+28.59	951.08	233+27.61	951.06	233+26.14	951.02	233+22.97	950.95	233+18.32	950.84	233+17.67	950.83	1/16"
0.50 Span 1	233+69.87	950.48	233+46.74	950.64	233+46.08	950.67	233+41.44	950.85	233+37.78	951.00	233+36.80	950.98	233+35.33	950.94	233+32.15	950.87	233+27.51	950.76	233+26.86	950.75	1/16"
0.75 Span 1	233+79.06	950.42	233+55.92	950.57	233+55.27	950.59	233+50.63	950.78	233+46.96	950.92	233+45.99	950.90	233+44.52	950.86	233+41.34	950.79	233+36.70	950.68	233+36.05	950.66	0"
℄ Pier 1	233+88.25	950.36	233+65.11	950.50	233+64.46	950.53	233+59.82	950.71	233+56.15	950.85	233+55.17	950.83	233+53.71	950.79	233+50.53	950.72	233+45.89	950.60	233+45.23	950.59	0"
℄ Splice 1	233+99.25	950.30	233+76.11	950.44	233+75.46	950.47	233+70.82	950.64	233+67.15	950.79	233+66.17	950.76	233+64.71	950.72	233+61.53	950.65	233+56.89	950.53	233+56.23	950.51	1/8"
0.25 Span 2	234+01.37	950.30	233+78.24	950.43	233+77.58	950.45	233+72.94	950.63	233+69.28	950.77	233+68.30	950.75	233+66.83	950.71	233+63.65	950.63	233+59.01	950.51	233+58.36	950.50	1/8"
0.50 Span 2	234+14.50	950.25	233+91.36	950.36	233+90.71	950.39	233+86.07	950.56	233+82.40	950.70	233+81.42	950.67	233+79.96	950.64	233+76.78	950.55	233+72.14	950.44	233+71.48	950.42	1/4"
0.75 Span 2	234+27.62	950.19	234+04.49	950.28	234+03.83	950.31	233+99.19	950.48	233+95.53	950.62	233+94.55	950.59	233+93.08	950.55	233+89.90	950.47	233+85.26	950.34	233+84.61	950.33	1/8"
℄ Splice 2	234+29.75	950.18	234+06.61	950.27	234+05.96	950.30	234+01.32	950.47	233+97.65	950.60	233+96.67	950.58	233+95.21	950.54	233+92.03	950.45	233+87.39	950.33	233+86.73	950.32	1/8"
℄ Pier 2	234+40.75	950.13	234+17.61	950.22	234+16.96	950.24	234+12.32	950.41	234+08.65	950.54	234+07.67	950.51	234+06.21	950.47	234+03.03	950.39	233+98.39	950.26	233+97.73	950.25	0"
0.25 Span 3	234+49.94	950.11	234+26.80	950.18	234+26.15	950.20	234+21.50	950.37	234+17.84	950.50	234+16.86	950.47	234+15.39	950.43	234+12.22	950.35	234+07.57	950.22	234+06.92	950.20	0"
0.50 Span 3	234+59.12	950.09	234+35.99	950.15	234+35.33	950.18	234+30.69	950.34	234+27.03	950.47	234+26.05	950.44	234+24.58	950.40	234+21.40	950.31	234+16.76	950.18	234+16.11	950.16	1/16"
0.75 Span 3	234+68.31	950.08	234+45.17	950.13	234+44.52	950.15	234+39.88	950.31	234+36.21	950.44	234+35.24	950.41	234+33.77	950.37	234+30.59	950.28	234+25.95	950.15	234+25.30	950.13	1/16"
℄ Brgs., F.A.	234+77.50	950.06	234+54.36	950.10	234+53.71	950.12	234+49.07	950.28	234+45.40	950.41	234+44.42	950.38	234+42.96	950.34	234+39.78	950.24	234+35.14	950.11	234+34.48	950.09	0"

NOTE:

SCREED ELEVATIONS shown are for the deck slab prior to concrete placement. Allowance has been made for anticipated calculated dead load deflection.





SCREED LINE PLAN

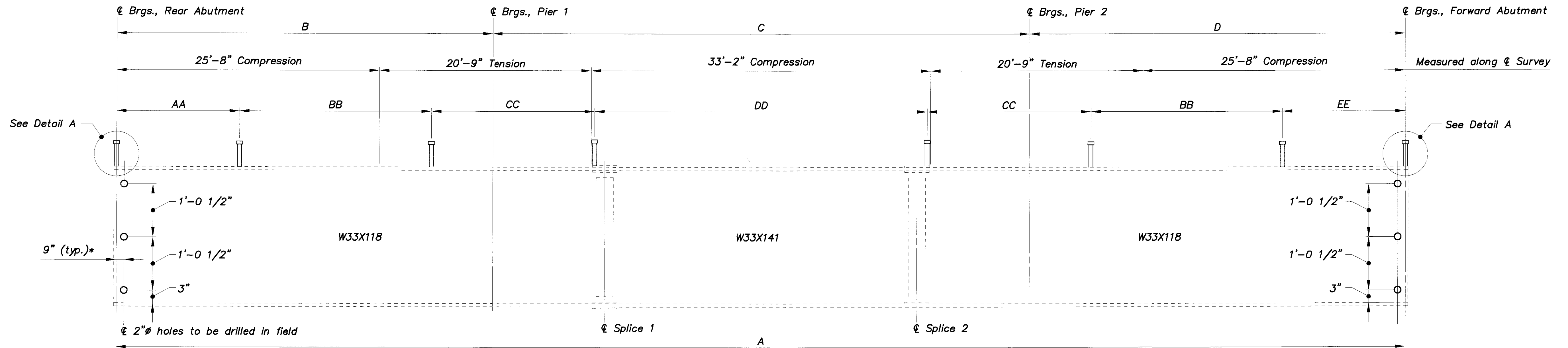
K:\Odeh\Dist11\COL-11-(9.46)(13.76)\Drawings\COL-11-13.76\Shared Bridge\sd2.dwg

SUPERSTRUCTURE DETAILS
Bridge No. COL-11-1378 N.B.L. & S.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

23/27

122
126

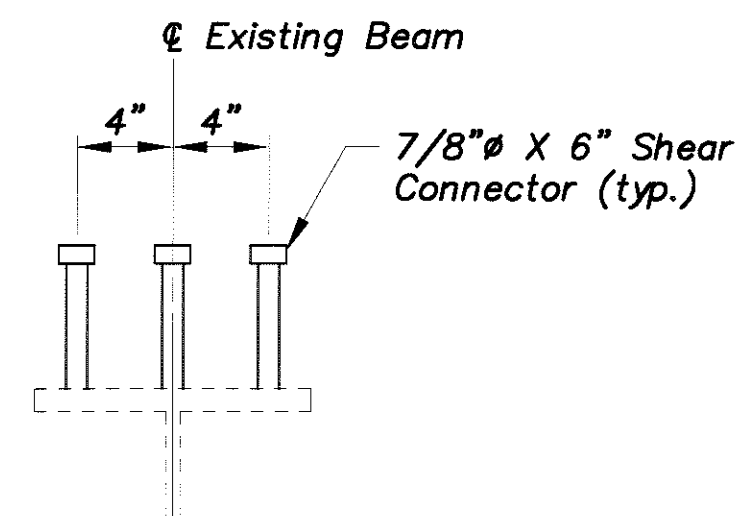


TYPICAL BEAM ELEVATION

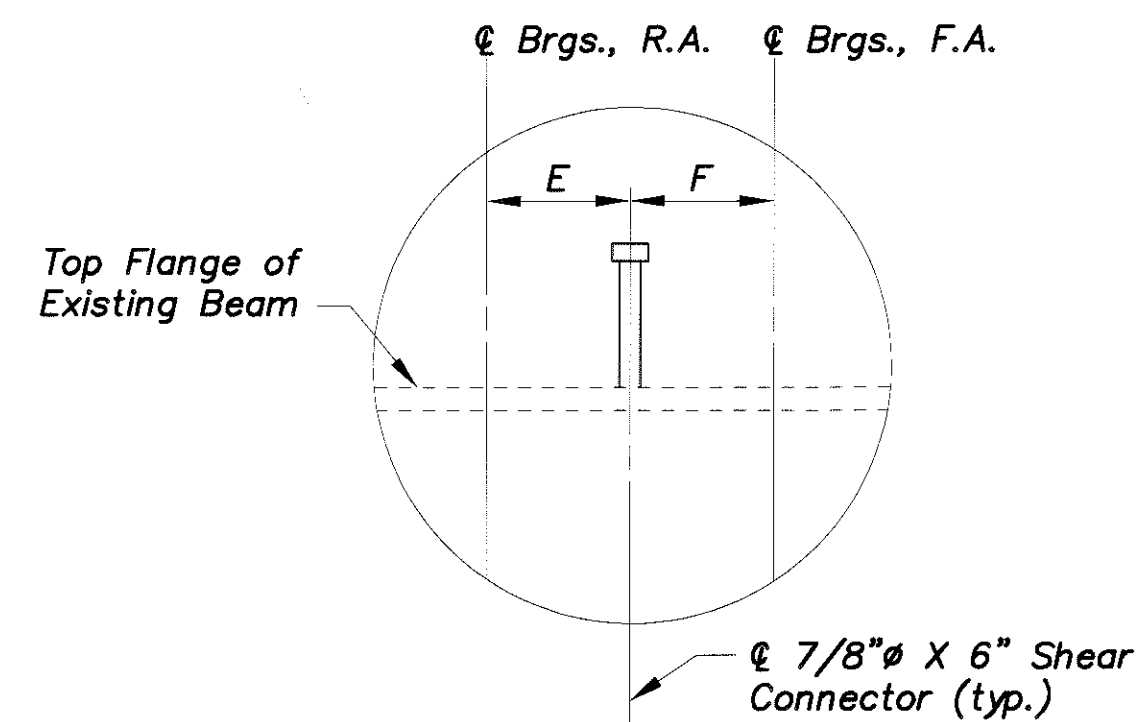
LEGEND:

* Dimension to be verified by Engineer in field.

EXISTING BEAM DIMENSIONS					SHEAR CONNECTOR SPACING						
BEAM NO.	A	B	C	D	E	F	AA	BB	CC	DD	EE
1	123'-6 3/16"	36'-0 5/16"	51'-5 9/16"	36'-0 5/16"	2"	1 3/16"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	7 spa. @ 2'-0" = 14'-0"	27 spa. @ 1'-3" = 33'-9"	12 spa. @ 1'-0" = 12'-0"
2	124'-3 3/16"	36'-3 1/8"	51'-9 9/16"	36'-3 1/8"	2"	1 3/16"	11 spa. @ 1'-0" = 11'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	11 spa. @ 1'-0" = 11'-0"
3	125'-1 3/4"	36'-6"	51'-9 9/16"	36'-6"	1"	3/4"	11 spa. @ 1'-0" = 11'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
4	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
5	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
6	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
7	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
8	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
9	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
10	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
11	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
12	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"



SHEAR CONNECTOR DIAGRAM



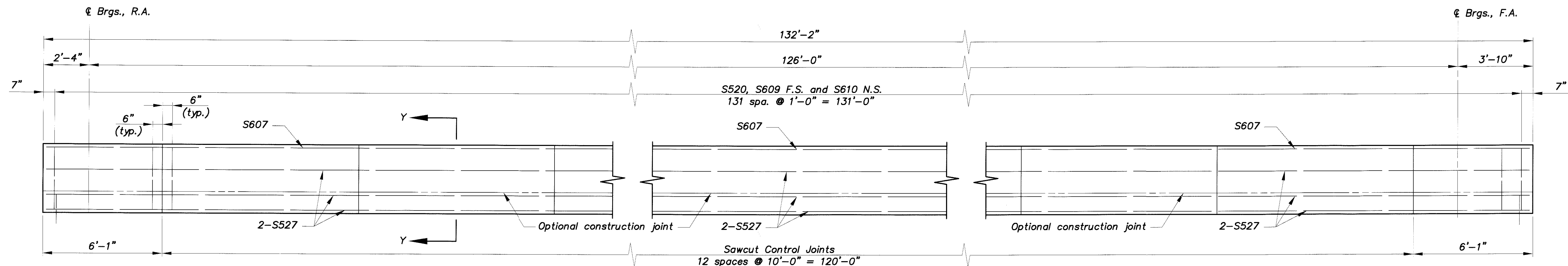
DETAIL A

NOTES:

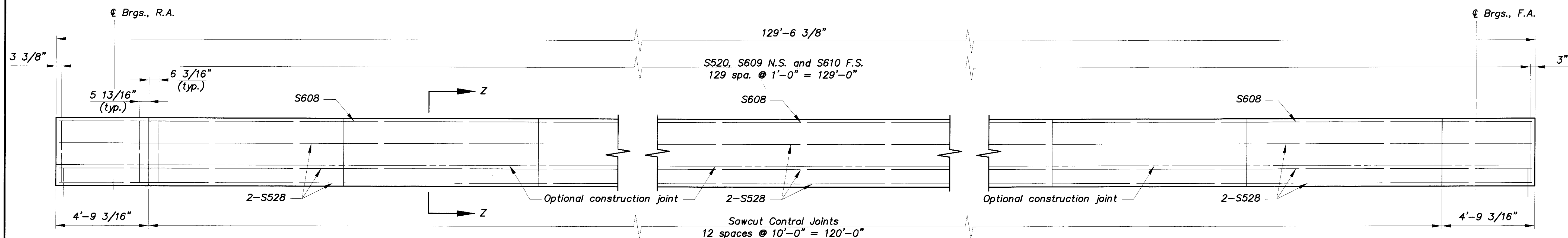
Move shear connectors when necessary to clear field splice bolts.

WELDED ATTACHMENT of supports for concrete deck finishing may be made to areas of the fascia stringer flanges designated "Compression". Attachments shall not be made to areas designated "Tension". Fillet welds to compression flanges shall be not closer than 1" from edge of flange, be not more than 2" long, and be not smaller than the minimum size required by AASHTO.

2" holes drilled in field to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.



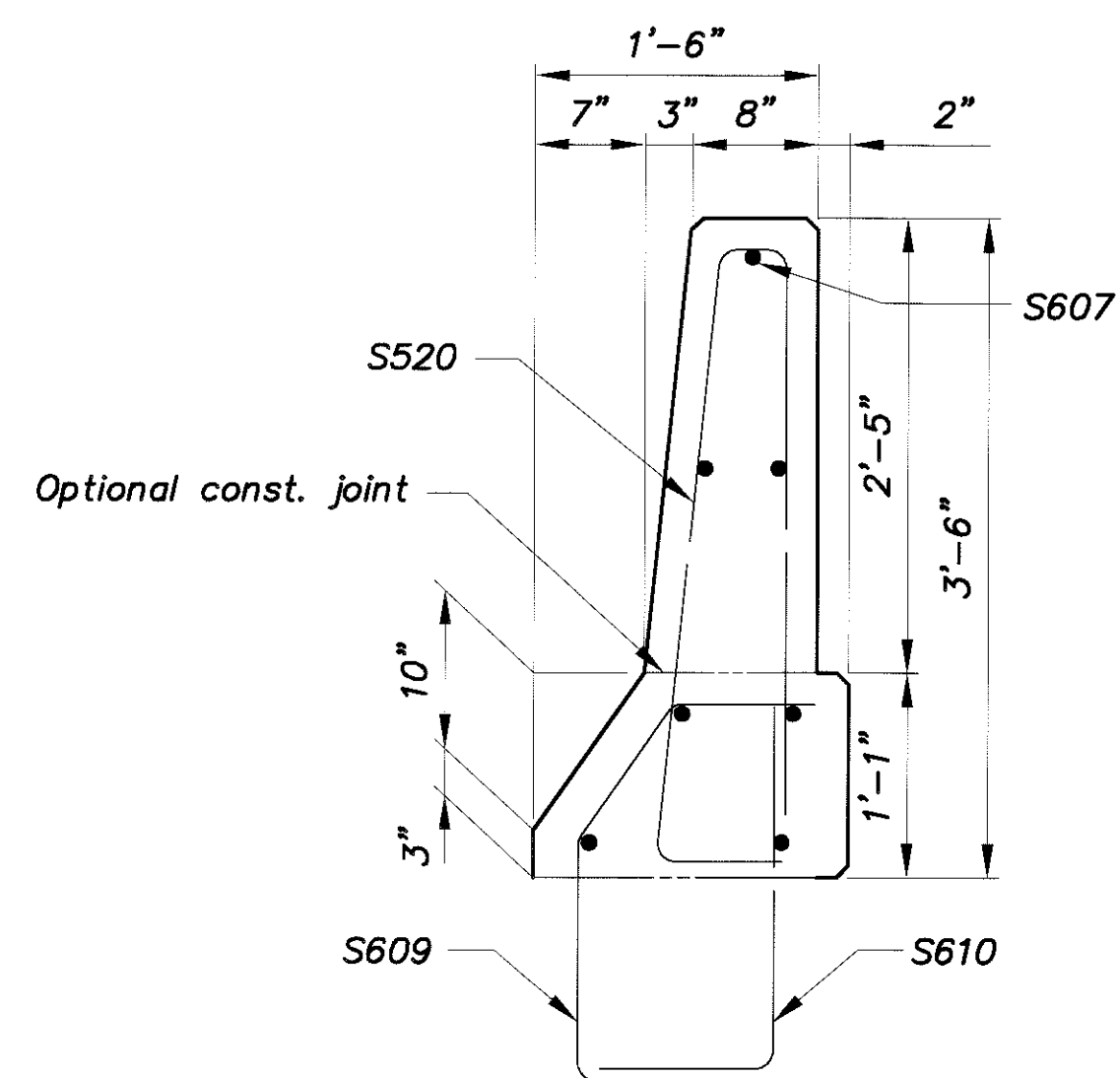
TYPICAL DEFLECTOR PARAPET
(Viewed along back face of parapet)



LEFT DEFLECTOR PARAPET (NORTHBOUND STRUCTURE)
(Viewed along front face of parapet)

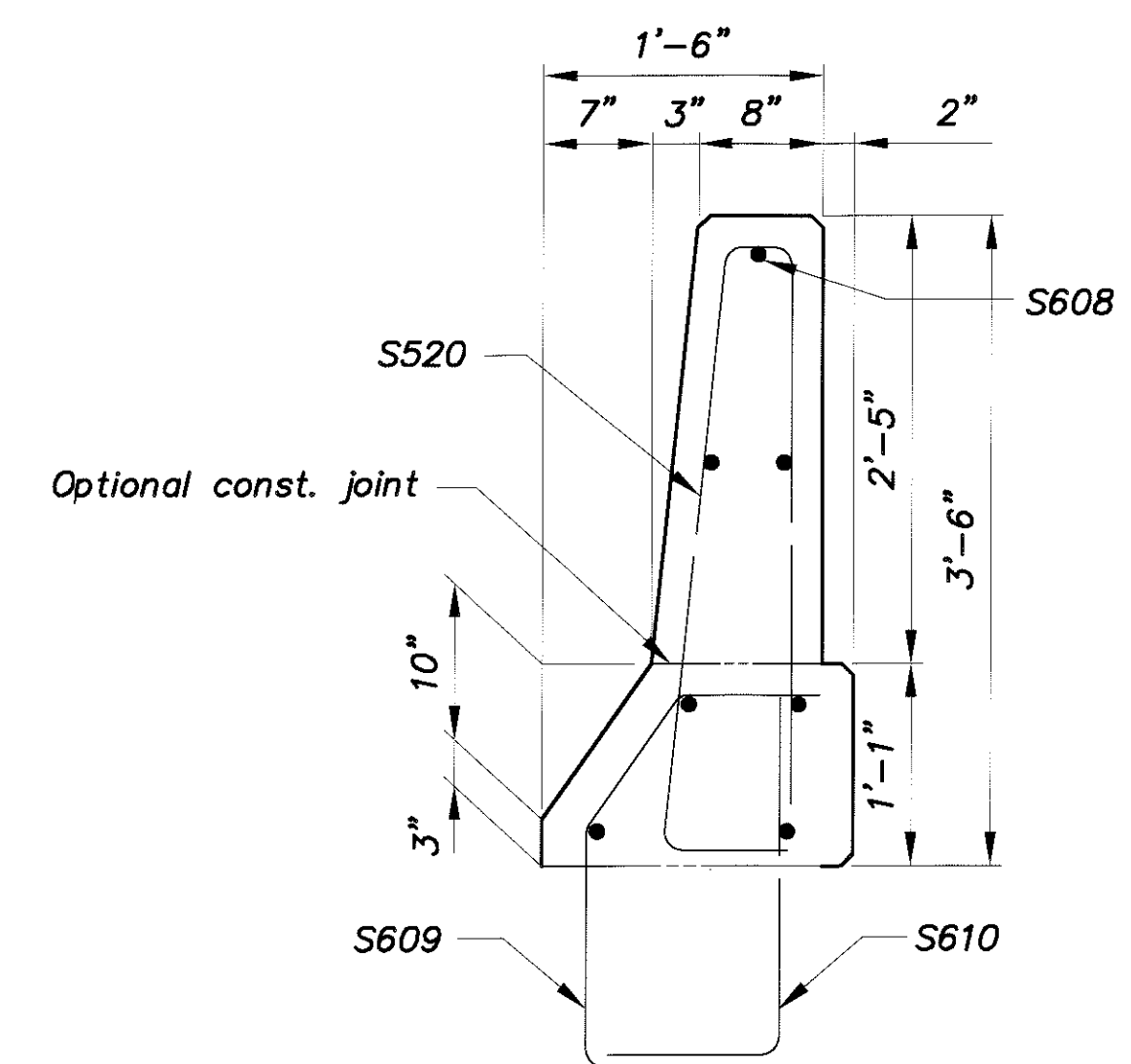
NOTES:

- S607, S608, S527 & S528 steel reinforcement bars consist of 4 sets.
- Slip forming of concrete parapets shall be prohibited.



SECTION Y-Y

NOTE:
All bars not labeled are S527.



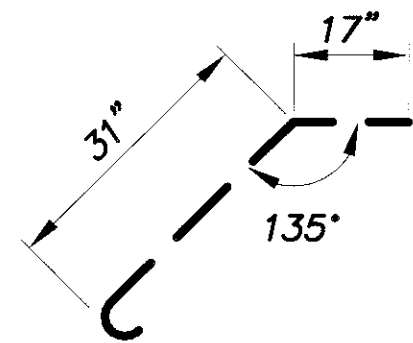
SECTION Z-Z

NOTE:
All bars not labeled are S528.

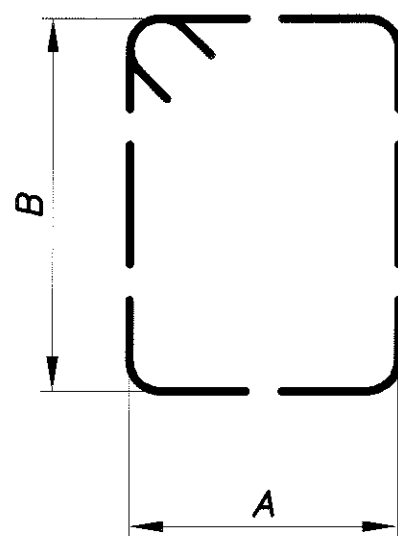
k:\00dot\dist\1\COL-11-(9.44)(13.76)\Drawings\COL-11-13.78\COL-11-13.78\Shared\Bridges\scd5.dwg

MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		SUBSTRUCTURE							
A501	62	58	86	78	284	2'-2"	642	STR.				
A502	31	29	43	39	142	1'-10"	272	2	1'-5"	4"		
A503	36	35	47	44	162	7'-2"	1211	2	2'-7"	2'-5"		
A504	35	34	46	43	158	12'-0"	1978	4	3'-5"	2'-4"		
A505	1	1	1	1	4	11'-4"	47	4	3'-1"	2'-4"		
A506	8	8	7	8	31	16'-0"	517	4	5'-2"	2'-7"		
A507	4	4	4	4	16	10'-3"	171	STR.				
A508	8	8			16	4'-8"	78	STR.				
A509	2	2	4	2	10	8'-10"	92	STR.				
A510	2	2			4	9'-7"	40	STR.				
A511	8	8	8	4	28	14'-8"	428	STR.				
A512	4	4			8	10'-10"	90	STR.				
A513	2	2			4	9'-1"	38	STR.				
A514	2	2			4	9'-10"	41	STR.				
A515			4		4	3'-10"	16	STR.				
A516			4		4	9'-8"	40	STR.				
A517			4		4	10'-9"	45	STR.				
A518			4		4	4'-7"	19	STR.				
A519				2	2	9'-11"	21	STR.				
A520				4	4	5'-3"	22	STR.				
A521				4	4	14'-10"	62	STR.				
A522				2	2	10'-1"	21	STR.				
A523				2	2	9'-0"	19	STR.				
A524				4	4	11'-0"	46	STR.				
A525				4	4	4'-6"	19	STR.				
A601	16	16	16	16	64	2'-7"	248	STR.				
A602	4 Ser. of 4	4 Ser. of 4	4 Ser. of 4	4 Ser. of 4	16 Ser. of 4	2'-7" to 4'-0"	316	STR.				
A603	20	20	22	20	82	5'-9"	708	3	3'-4"	2'-7"		
A604	12	12	6		30	10'-0"	451	STR.				
A605	8	8	9	4	29	6'-4"	276	STR.				
A606	32	32	34	32	130	2'-11"	570	3	1'-10"	1'-3"		
A607	4	4			8	7'-9"	93	3	5'-9"	2'-2"		
A608	4	4	4	4	16	4'-0"	96	3	2'-0"	2'-2"		
A609	4	4			8	3'-4"	40	STR.				
A610	6	6		3	15	24'-0"	541	2	1'-2"	11'-7"		
A611			2		2	24'-10"	75	2	1'-2"	12'-0"		
A612			7		7	10'-6"	110	STR.				
A613			2		2	8'-3"	25	3	6'-3"	2'-2"		
A614			2		2	5'-6"	17	STR.				
A615			3		3	23'-10"	107	2	1'-2"	11'-6"		
A616			2		2	7'-8"	23	3	5'-8"	2'-2"		
A617			2		2	4'-11"	15	STR.				
A618				6	6	10'-1"	91	STR.				
A619				4	4	6'-3"	38	STR.				
A620				2	2	7'-10"	24	3	5'-10"	2'-2"		
A621				2	2	5'-1"	15	STR.				
A622				3	3	25'-2"	113	2	2'-2"	11'-8"		
A623				6	6	10'-4"	93	STR.				
A624				2	2	8'-1"	24	3	6'-1"	2'-2"		
A625				2	2	5'-4"	16	STR.				

MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		ABUTMENTS (CONTINUED)							
A801		12			12	20'-6"	657	5	19'-2"	1'-2 1/2"	7"	
A802*		12			12	27'-2"	870	STR.				
A803	12				12	20'-4"	651	STR.				
A804*	12				12	27'-2"	870	5	25'-10"	1'-2 1/2"	7"	
A805	6	6	6	3	21	7'-8"	430	STR.				
A806	6	6			12	4'-8"	150	STR.				
A807			12		12	28'-2"	902	5	26'-10"	1'-2 3/4"	6"	
A808*			12		12	37'-7"	1204	STR.				
A809				12	12	22'-5"	718	STR.				
A810*				12	12	37'-9"	1210	5	36'-5"	1'-2 1/2"	7"	
A811			3		3	3'-10"	31	STR.				
A812			3		3	4'-7"	37	STR.				
A813				3	3	5'-3"	42	STR.				
A814				3	3	7'-9"	62	STR.				
A815				3	3	4'-6"	36	STR.				
D801	32	31	43	40	146	4'-11"	1917	1				
				SUB-TOTAL (ABUTMENTS) =			19887					

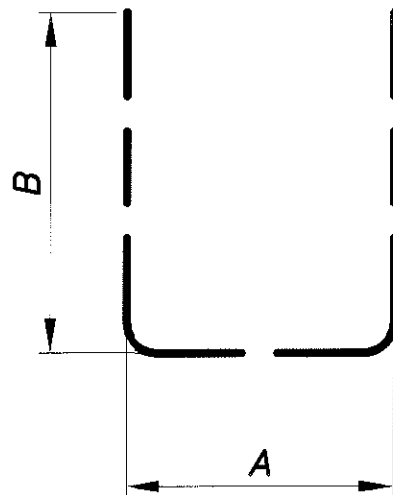


TYPE 1

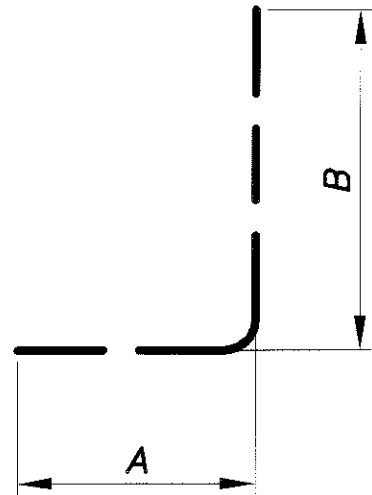


TYPE 4

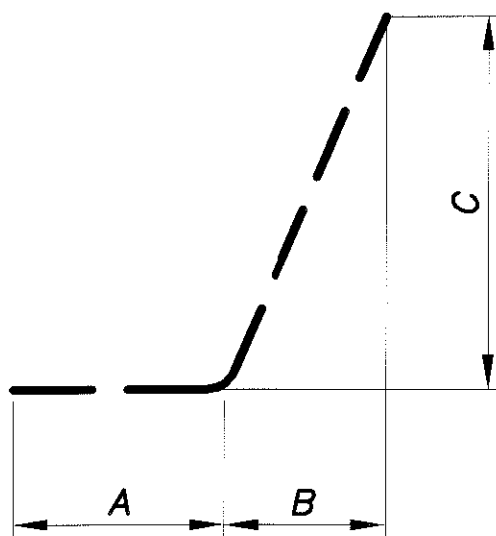
BENDING DIAGRAM



TYPE 2



TYPE 3



TYPE 5

NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

#8 Reinforcing bar L = 4'-0"

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

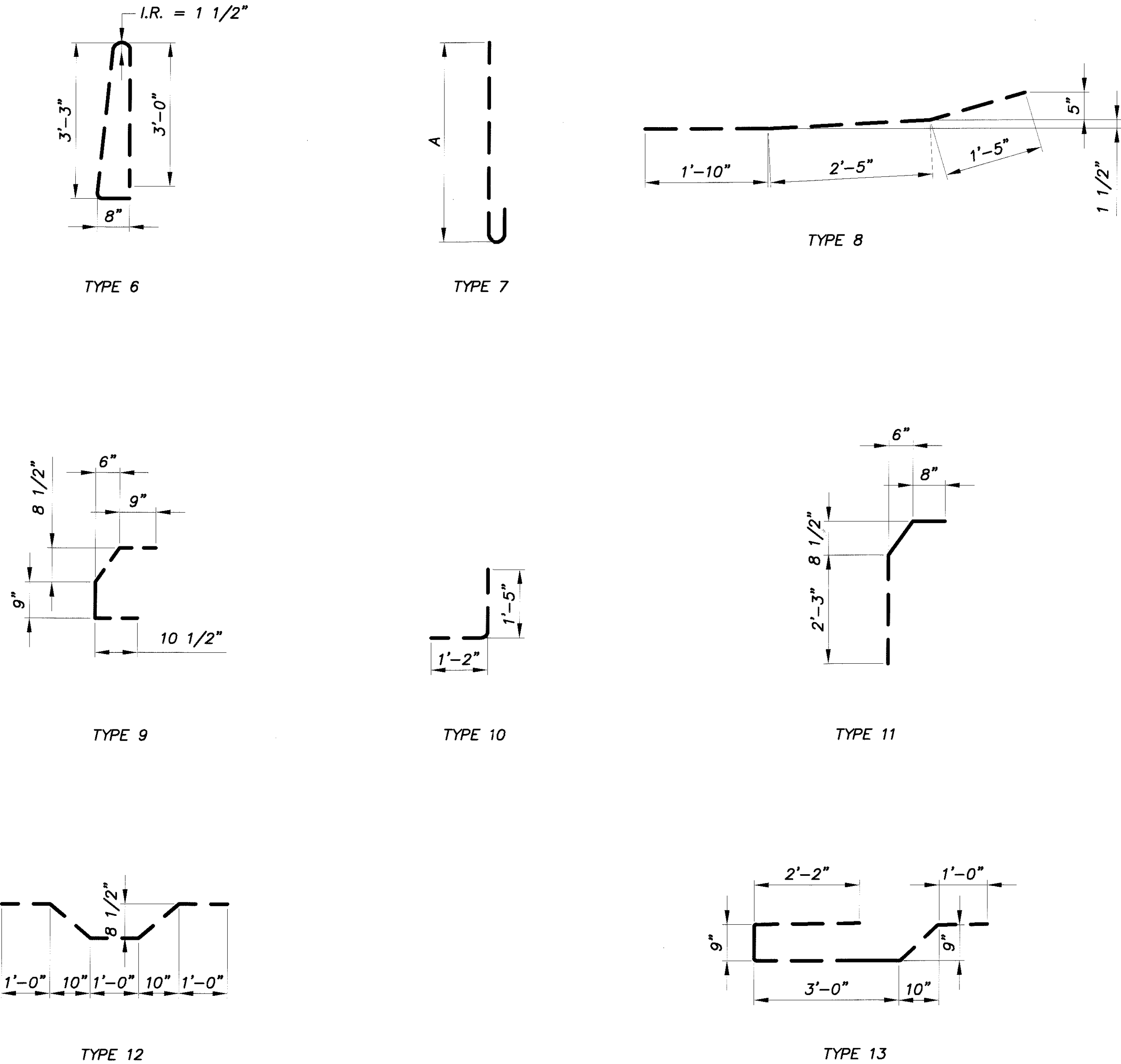
All bars, connectors and dowel bar extensions shall be epoxy coated. Coating for both connectors and bars shall conform to the same specifications. Coatings which have been damaged or which otherwise do not meet specifications with respect to color, continuity and uniformity may be repaired as directed by the Engineer or shall be replaced by material which meets specifications.

Refer to C.M.S. Section 509.05 for standard bend dimensions.

All dimensions are out to out.

MARK	NUMBER			LENGTH	WEIGHT	TYPE	DIMENSIONS			
	S.B.L.	N.B.L.	TOTAL				A	B	C	INC.
SUPERSTRUCTURE										
S401	196	276	472	34'-5"	10851	STR.				
S501	232	320	552	34'-10"	20055	STR.				
S502*	468		468	24'-8"	12040	STR.				
S503	480		480	18'-6"	9262	STR.				
S504	62	56	118	14'-0"	1723	STR.				
S505	2 Ser. of 15		2 Ser. of 15	3'-10" to 17'-7"	335	STR.				11 3/4" (+)
S506*	2 Ser. of 21		2 Ser. of 21	4'-1" to 23'-8"	608	STR.				11 3/4"
S507	2 Ser. of 8		2 Ser. of 8	16'-11" to 23'-10"	340	STR.				11 3/4" (+)
S508*		448	448	34'-2"	15965	STR.				
S509		2 Ser. of 18	2 Ser. of 18	16'-10" to 33'-6"	945	STR.				11 3/4" (+)
S510		2 Ser. of 20	2 Ser. of 20	6'-0" to 24'-6"	636	STR.				11 5/8" (+)
S511		2 Ser. of 5	2 Ser. of 5	16'-11" to 20'-9"	196	STR.				11 1/2"
S512*		2 Ser. of 32	2 Ser. of 32	2'-11" to 33'-1"	1202	STR.				11 5/8" (+)
S513		116	116	20'-9"	2511	STR.				
S514		116	116	21'-11"	2652	STR.				
S515		116	116	23'-3"	2813	STR.				
S516		116	116	24'-5"	2954	STR.				
S517	264	440	704	5'-1"	3733	12				
S518	162	160	302	7'-8"	2415	13				
S519	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	3'-0" to 3'-10"	314	7	2'-5" to 3'-3"			1"
S520	268	266	534	7'-0"	3899	6				
S521	16	12	28	14'-8"	428	STR.				
S522	8	8	16	3'-6"	58	STR.				
S523	16	16	32	10'-0"	334	STR.				
S524	8	8	16	5'-8"	95	STR.				
S525	8	8	16	5'-8"	95	8				
S526		4	4	14'-10"	62	STR.				
S527	48	24	72	34'-10"	2616	STR.				
S528		24	24	34'-2"	855	STR.				
S601	84	62	146	21'-0"	4605	STR.				
S602	32	32	64	4'-6"	433	STR.				
S603	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	4'-6" to 5'-4"	650	STR.				1"
S604	48	48	96	3'-5"	493	11				
S605	4	4	8	2'-8"	32	STR.				
S606	4	4	8	4'-0"	48	STR.				
S607	8	4	12	35'-2"	634	STR.				
S608		4	4	34'-7"	208	STR.				
S609	264	262	526	3'-7"	2831	9				
S610	264	262	526	2'-5"	1909	10				
SUB-TOTAL (SUPERSTRUCTURE) =					111835					

BENDING DIAGRAM



NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

#5 Reinforcing bar L = 4'-1" S.B.L. & 3'-10" N.B.L.

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

See Sheet 26/27 for additional notes.

SPECIAL PROVISIONS

WATERWAY PERMITS FOR

CRS: COL-11-9.44/13.76

PID: 19442

U.S. ARMY CORPS OF ENGINEERS
PERMIT NUMBER: NWP #3

OHIO EPA
PERMIT NUMBER: NA

DATE: 8/18/00

NATIONWIDE PERMIT #3 - MAINTENANCE

Activities related to:

(i) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards which are necessary to make repair, rehabilitation, or replacement, are permitted, provided the adverse environmental effects resulting from such repair, rehabilitation, or replacement are minimal. Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. This NWP authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the District Engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(ii) Discharges of dredged or fill material, including excavation, into all waters of the United States to remove accumulated sediments and debris in the vicinity of, and within, existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) And the placement of new or additional rip rap to protect the structure, provided the permittee notifies the District Engineer in accordance with General Condition 13. The removal of sediment is limited to the minimum necessary to restore the waterway in the immediate vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend further than 200 feet in any direction from the structure. The placement of rip rap must be the minimum necessary to protect the structure or to ensure the safety of the structure. All excavated materials must be deposited and retained in an upland area unless otherwise specifically approved by the District Engineer under separate authorization. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the District Engineer.

(iii) Discharges of dredged or fill material, including excavation, into all waters of the United States for activities associated with the restoration of upland areas damaged by a storm, flood, or other discrete event, including the construction, placement, or installation of upland protection structures and minor dredging to remove obstructions in water of the United States. (Uplands lost as a result of a storm, flood, or other discrete event can be replaced without a Section 404 permit provided the uplands are restored to their original pre-event location. This NWP is for the activities in waters of the United States associated with the replacements of the uplands.) The permittee must notify the District Engineer, in accordance with General Condition 13, within 12 months of the date of the damage and the work must commence, or be under contract to commence, within two years of the date of the damage. The permittee should provide evidence, such as a recent topographic survey or

photographs, to justify the extent of the proposed restoration. The restoration of the damaged areas cannot exceed the contours, or ordinary high water mark, that existed prior to the damage. The District Engineer retains the right to determine the extent of the pre-existing conditions and the extent of any restoration work authorized by this permit. Minor dredging to remove obstructions for the adjacent waterbody is limited to 50 cubic yards below the plane of the ordinary high water mark, and is limited to the amount necessary to restore the pre-existing bottom contours of the waterbody. The dredging may not be done primarily to obtain fill for any restoration activities. The discharge of dredged or fill material and all related work needed to restore the upland must be part of a single and complete project. This permit cannot be used in conjunction with NWP 18 or NWP 19 to restore damaged upland areas. This permit does not authorize the replacement of lands lost through gradual erosion processes.

Maintenance dredging for the primary purpose of navigation and beach restoration are not authorized by this permit. This permit does not authorize new stream channelization or stream relocation projects. Any work authorized by this permit must not cause more than minimal degradation of water quality, more than minimal changes to the flow characteristics of the stream, or increase flooding (See General Conditions 9 and 21). (Sections 10 and 404)

Note: This NWP authorizes the minimal impact repair, rehabilitation, or replacement of any previously authorized structure of fill that does not qualify for the Section 404(f) exemption for maintenance.

Nationwide 3 Specific Regional Conditions

- i. (Maintenance) Notification required prior to the use of vertical sheet piling and closed structures in the special habitat waters of Lake Erie (See General Conditions, Critical Resource waters (1)).
- ii. (Discharges of dredged or fill material associated with removal of accumulated sediment and debris in the vicinity of existing structure) Limited to 50 feet upstream and/or 50 feet downstream of structure.

Regional General Conditions apply to this Nationwide Permit.

For activities involving a discharge, the Ohio State Certification General Conditions apply to this nationwide permit.

Ohio State Certification Special Conditions and Limitations:

Total surface water and vegetation impacts on either side of the replacement structure shall be limited to the greater of 25 feet beyond the structure, or 25 feet beyond the toe of the slope of the structure's approach embankment. [Where the use of a crane is necessary to conduct a maintenance activity, total impacts shall not exceed 50 feet on either side of the structure or approach embankment]. In either case, total impacts, including the structure, shall not exceed 200 feet [except for stabilization project]. Width shall be measured at the structure's narrowest point as it crosses the waterbody, and be measured parallel to stream flow.

Culvert replacement:

This Certification shall only authorize minor deviations from the existing structure's centerline and minor deviations in culvert dimensions, unless these deviations are necessary to follow current safety standards.

Bridge Replacement:

This Certification shall only authorize minor deviations from the existing structure's centerline, unless these deviations are necessary to follow current safety standards. Bridge replacements shall not result in additional lanes unless necessary to follow current safety standards.

Maintenance or repair of existing fills (stabilization projects):

Impacts from maintenance or repair of existing fills shall not exceed the dimensions of the fill prior to the damage.

Removal of accumulated sediment:

Removal of accumulated sediment shall occur only once per year, except in cases of emergency situations which threaten life of property. Removal of accumulated sediments shall be limited to low-flow conditions whenever practicable, except in cases of emergency situations which threaten life or property.

NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS:

The following general conditions must be followed in order for any authorization by a NWP to be valid:

- 1. Navigation.** No activity may cause more than a minimal adverse effect on navigation.
- 2. Proper maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
- 3. Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.
- 4. Aquatic Life Movements.** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e) and with any case specific conditions added by the Corps or by the State or tribe in its section 401 water quality certification and Coastal Zone management Act consistency determination.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

8. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water Quality.

(a) In certain States and tribal lands an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

(b) For NWP 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the State or tribal 401 certification (either generically or individually) does not require or approve a water quality management plan, the permittee must include design criteria and techniques that will ensure that the authorized work does not result in more than minimal degradation of water quality. An important component of a water quality management plan includes stormwater management that minimizes degradation of the downstream aquatic system, including water quality. Refer to General Condition 21 for stormwater management requirements. Another important component of a water quality management plan is the establishment and maintenance of vegetated buffers next to open waters, including streams. Refer to General Condition 19 for vegetated buffer requirements for the NWPs.

10. Coastal Zone Management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).

11. Endangered Species.

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the

District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS, the District Engineer may add species-specific regional endangered species conditions to the NWPs.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their World Wide Web pages at <http://www.fws.gov/r9endspp/endspp.html> and http://www.nfms.gov/ptot_res/esahome.html, respectively.

12. Historic properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National NWP-Cond: 2/10

Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

13. Notification.

(a) **Timing:** Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a pre-construction notification (PCN) as early as possible. The District Engineer must determine if the PCN is complete within 30 days of the date of receipt and can request the additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

- (1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or
- (2) If notified in writing by the District or Division Engineer that an individual permit is required; or
- (3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

- (1) Name, address and telephone numbers of the prospective permittee;
- (2) Location of the proposed project;
- (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and
- (4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));
- (5) For NWP 7, Outfall Structures and Maintenance, the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed.
- (6) For NWP 14, Linear Transportation Crossings, the PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the United States and a statement describing how temporary losses of waters of the United States will be minimized to the maximum extent practicable.
- (7) For NWP 21, Surface Coal Mining Activities, the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan.
- (8) For NWP 27, Stream and Wetland Restoration, the PCN must include documentation of the prior condition of the site that will be reverted by the permittee.
- (9) For NWP 29, Single-Family Housing, the PCN must also include:
 - (i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;
 - (ii) A statement that the single-family housing activity is for a personal residence of the permittee;
 - (iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 1/4 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of

wetlands that exists on the property. For parcels greater than 1/4 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(10) For NWP 31, Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

- (i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;
- (ii) A delineation of any affected special aquatic sites, including wetlands; and,
- (iii) Location of the dredged material disposal site.

(11) For NWP 33, Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic sources.

(12) For NWPs 39, 43, and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization of losses of waters of the United States were achieved on the project site.

(13) For NWP 39, Residential, Commercial, and Institutional Developments, and NWP 42, Recreational Facilities, the PCN must include a compensatory mitigation proposal that offsets unavoidable losses of waters of the United States or justification explaining why compensatory mitigation should not be required.

(14) For NWP 40, Agricultural Activities, the PCN must include a compensatory mitigation proposal to offset losses of waters of the United States.

(15) For NWP 43, Stormwater Management Facilities, the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with State and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the United States.

(16) For NWP 44, Mining Activities, the PCN must include a description of all waters of the United States adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the United States, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities).

(17) For activities that may adversely affect Federally-listed endangered or

threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work.

(18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

(19) For NWP 12, 14, 29, 39, 40, 42, 43, and 44, where the proposed work involves discharges of dredged or fill material into waters of the United States resulting in permanent, above-grade fills within 100-year floodplains (as identified on FEMA's Flood Insurance Rate Maps or FEMA-approved local floodplain maps), the notification must include documentation demonstrating that the proposed work complies with the appropriate FEMA or FEMA-approved local floodplain construction requirements.

(c) Form of Notification: The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(19) of General Condition 13. A letter containing the requisite information may also be used.

(d) District Engineer's Decision: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the PCN to expedite the process and the District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. Any compensatory mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either:

(1) That the project does not qualify for authorization under the NWP and instruct the

applicant on the procedures to seek authorization under an individual permit;

(2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or

(3) that the project is authorized under the NWP with specific modifications or conditions.

Where the District Engineer determines that mitigation is required in order to ensure no more than minimal adverse effects on the aquatic environment, the activity will be authorized within the 45-day PCN period, including the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the United States will occur until the District Engineer has approved a specific mitigation plan.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse effects on the aquatic environment to a minimal level. For activities requiring notification to the District Engineer that result in the loss of greater than ½ acre of waters of the United States, the District Engineer will, upon receipt of a notification, provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner), a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, State Historic Preservation Office (SHPO), and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provide below. The District Engineer will indicate in the administrative record associated with each NWP-Cond: 6/10

notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to National Marine Fisheries Service within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(f) Wetland Delineations: Wetland Delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(9)(iii) for parcels less than 1/4 acre in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

14. Compliance Certification. Every permittee who has received a Nationwide permit verification

from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter. The certification will include:

- (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;
- (b) A statement that any required mitigation was completed in accordance with the permit conditions; and
- (c) The signature of the permittee certifying the completion of the work and mitigation .

15. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWP does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3 acre.

16. Water Supply Intakes. No activity, including structures and work in navigable waters of the United States or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

17. Shellfish Beds. No activity, including structures and work in navigable waters of the United States or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.

18. Suitable Material. No activity, including structures and work in navigable waters of the United States discharges of dredged or fill material, may consist of unsuitable material (e.g. trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

19. Mitigation. The project must be designed and constructed to avoid and minimize adverse effects to waters of the United States to the maximum extent practicable at the project site (i.e. on-site). Mitigation will be required when necessary to ensure that the adverse effects to the aquatic environment are minimal. The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.

(a) Compensatory mitigation at a minimum 1:1 ratio will be required for all wetland impacts requiring a PCN. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands to meet the minimum compensatory mitigation ratio, with preservation used only in exceptional circumstances.

(b) To be practicable, the mitigation must be available and capable of being done considering

costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed;

(c) The District Engineer will require restoration, creation, enhancement, or preservation of other aquatic resources in order to offset the authorized impacts to the extent necessary to ensure that the adverse effects on the aquatic environment are minimal. An important element of any compensatory mitigation plan for projects in or near streams or other open waters is the establishment and maintenance, to the maximum extent practicable, of vegetated buffers next to open waters on the project site. The vegetated buffer should consist of native species. The District Engineer will determine the appropriate width of the vegetated buffer and in which cases it will be required. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineer may require wider vegetated buffers to address documented water quality concerns. If there are open waters on the project site and the District Engineer requires compensatory mitigation for wetland impacts to ensure that the net adverse effects on the aquatic environment are minimal, any vegetated buffer will comprise no more than 1/3 of the remaining compensatory mitigation acreage after the permanently filled wetlands have been replaced on a one-to-one acreage basis. In addition, compensatory mitigation must address adverse effects on wetland functions and values and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWP's (e.g., for NWP 39, 1/4 acre of wetlands cannot be created to change a 1/2 acre loss of wetlands to a 1/4 acre loss; however, 1/2 acre of created wetlands can be used to reduce the impacts of a 1/3 acre loss of wetlands). If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal must be either conceptual or detailed.

(d) To the extent appropriate, permittees should consider mitigation banking and other appropriate forms of compensatory mitigation. If the District Engineer determines that compensatory mitigation is necessary to offset losses of waters of the United States and ensure that the net adverse effects of the authorized work on the aquatic environment are minimal, consolidated mitigation approaches, such as mitigation banks, will be the preferred method of providing compensatory mitigation, unless the District Engineer determines that activity-specific compensatory mitigation is more appropriate, based on which is best for the aquatic environment. These types of mitigation are preferred because they involve larger blocks of protected aquatic environment, are more likely to meet the mitigation goals, and are more easily checked for compliance. If a mitigation bank or other consolidated mitigation approach is not available in the watershed, the District Engineer will consider other appropriate forms of compensatory mitigation to offset the losses of waters of the United States to ensure that the net adverse effects of the authorized work on the aquatic environment are minimal.

20. Spawning Areas. Activities, including structures and work in navigable waters of the United States or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not

authorized.

21. Management of Water Flows. To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and must not increase water flows from the project site, relocate water, or redirect water flow beyond preconstruction conditions. In addition, the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows.

22. Adverse Effects From Impoundments. If the activity, including structures and work in navigable waters of the United States or discharge of dredged or fill material, creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

23. Waterfowl Breeding Areas. Activities, including structures and work in navigable waters of the United States or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

24. Removal of Temporary Fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

25. Designated Critical Resource Waters. Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, State natural heritage sites, and outstanding national resource waters or other waters officially designated by a State as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Except as noted below, discharges of dredged or fill material into waters of the United States are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the United States may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the U.S. Fish and Wildlife Service or the National Marine Fisheries Service has concurred in a determination of compliance with this condition.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after he determines that the impacts to the critical resource waters will be no more than minimal.

26. Fills Within 100-Year Floodplains. For purposes of this general condition, 100-year floodplains will be identified through the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.

(a) Discharges Below Headwaters. Discharges of dredged or fill material into waters of the United States resulting in permanent, above-grade fills within the 100-year floodplain at or below the point on a stream where the average annual flow is five cubic feet per second (i.e., below headwaters) are not authorized by NWPs 29, 39, 40, 42, 43, and 44. For NWPs 12 and 14, the prospective permittee must notify the District Engineer in accordance with General Condition 13 and the notification must include documentation that any permanent, above-grade fills in waters of the United States within the 100-year floodplain below headwaters comply with FEMA or FEMA-approved local floodplain construction requirements.

(b) Discharges in Headwaters (i.e., above the point on a stream where the average annual flow is five cubic feet per second).

(1) Flood Fringe. Discharges of dredged or fill material into waters of the United States resulting in permanent, above-grade fills within the flood fringe of the 100-year floodplain of headwaters are not authorized by NWPs 12, 14, 29, 39, 40, 42, 43, and 44, unless the prospective permittee notifies the District Engineer in accordance with General Condition 13. The notification must include documentation that such discharges comply with FEMA or FEMA-approved local floodplain construction requirements.

(2) Floodway. Discharges of dredged or fill material into waters of the United States resulting in permanent, above-grade fills within the floodway of the 100-year floodplain of headwaters are not authorized by NWPs 29, 39, 40, 42, 43, and 44. For NWPs 12 and 14, the permittee must notify the District Engineer in accordance with General Condition 13 and the notification must include documentation that any permanent, above-grade fills proposed in the floodway comply with FEMA or FEMA approved local floodplain construction requirements.

REGIONAL GENERAL CONDITIONS

1. Notifications for all Nationwide permits should include a location map (USGS topographical map) and project drawings on 8.5" x 11" paper.
2. Nationwide Permits shall not authorize any activity which impact bogs and/or fens.
3. No Nationwide permit may be used in Lake Erie for purposes of diverting water from the Great

Lakes.

4. In order to determine if a project meets the terms and conditions of the Ohio EPA's 401 water quality certification, the following information is necessary:

(a) All wetland delineations must include the latest approved version of the Ohio Rapid Assessment Method (ORAM) for wetland evaluation, long form. (This will assist OEPA in determining the category of wetland the applicant proposes to impact.)

(b) Photographs of the wetland.

NOTE: This information is in addition to the required information listed under General Condition 13 (Notification) of the NWP.

5. Notification is required for all work in Critical Resource Waters.

The following are designated as **Critical Resource Waters**:

(a) Special habitat waters of Lake Erie including the shoreline, off shore islands, rock outcrops, and adjacent waters within the boundaries defined as 82 22' 30" West Longitude, 83 07' 30" West Longitude, 41 33' 00" North Latitude and 42 00' 00" North Latitude.

(b) Big and Little Darby Creeks (National Wild and Scenic River System): Big Darby Creek from Champaign-Union County line downstream to the Conrail railroad trestle and from the confluence with the Little Darby Creek downstream to the Scioto River. Little Darby Creek from the Lafayette-Plain City Road Bridge downstream to within 0.8 mile from the confluence with Big Darby Creek. Total designation is approximately 82 miles.

(c) Little Beaver Creek (National Wild and Scenic River System): Little Beaver Creek main stem, from the confluence of West Fork with Middle Fork near Williamsport to mouth; North Fork from confluence of Brush Run and North Fork to confluence of North Fork with main stem at Fredericktown; Middle Fork from vicinity of Co. Rd. 901 (Elkton Road) bridge crossing to confluence of Middle Fork with West Fork near Williamsport; West Fork from vicinity of Co. Rd. 914 (Y-Camp Road) bridge crossing east to confluence of West Fork with Middle Fork near Williamsport. Total designation is 33 miles

(d) Little Miami (Scenic component of the National System from Clifton to Foster) The portion from Foster to the Ohio River was designated a Recreational component of the National System. Total designation is 92 miles.

6. Notification is required for all activities in state Wild and Scenic Rivers (see list below).

The following are **State Wild and Scenic Rivers**:

(a) Little Miami River - Clermont County line at Loveland to headwaters, including North Fork, Clermont County line at Loveland to confluence with East Fork and from the confluence with East Fork to Ohio River. Miles designated (approximate): 105

(b) Sandusky River - US Rt. 30 in Upper Sandusky to Roger Young Memorial Park in Fremont. Miles designated (approximate): 65

(c) Olentangy River - Delaware Dam to Old Wilson Road in Worthington. Miles designated (approximate): 22

(d) Little Beaver Creek

Wild segments - West Fork from 1/4 mile downstream from Twp. Rd. 914 to confluence with Middle Fork. North Fork from Twp. Rd. 952 to confluence with Little Beaver Creek. Little Beaver Creek from confluence of West and Middle Forks downstream to 3/4 mile north of Grimm's Bridge.

Scenic segments - North Fork from Ohio-Pennsylvania line downstream to Jackman Road. Middle Fork from Elkton Rd. (Twp. Rd. 901) downstream to confluence with West Fork. Little Beaver Creek from 3/4 mile north of Grimm's Bridge downstream to the Ohio-Pennsylvania line. Miles designated (approximate): Wild 20, Scenic 16

(e) Grand River

Wild segment - from Harpersfield covered bridge downstream to Norfolk and Western Railroad trestle south of Painesville.

Scenic segment - from St. Rt. 322 bridge in Ashtabula County downstream to Harpersfield covered bridge. Miles designated (approximate): Scenic 33, Wild 23

(f) Upper Cuyagoga River - Troy-Burton Township line in Geauga County to US Rt. 14. Miles designated (approximate): 25

(g) Maumee River - Scenic segment - Ohio-Indiana line to St. Rt. 24 bridge west of Defiance.

Recreational segment - St. Rt. 24 bridge west of Defiance to US Rt. 25 bridge near Perrysburg. Miles designated (approximate): Scenic 43, Recreational 53

(h) Stillwater River System - Recreational segment - Englewood dam to confluence with Great Miami River.

Scenic segments - Stillwater River from Riffle Road bridge in Darke Co. to Englewood dam. Greenville Creek from the Ohio-Indiana state line to the confluence with the Stillwater.

Miles designated (approximate): Scenic 83, Recreational 10

(i) Chagrin River - Aurora Branch from St. Rt. 82 bridge downstream to confluence with Chagrin. Chagrin River from confluence with Aurora Branch downstream to St. Rt. 6 bridge. East Branch from Heath Road bridge downstream to confluence with Chagrin. Miles designated (approximate): 49

(j) Big and Little Darby Creeks - Big Darby Creek from the Champaign-Union County line downstream to the U.S. Rt. 40 Bridge, from the northern boundary of Battelle-Darby Creek Metro Park to the confluence with the Little Darby Creek downstream to the Scioto River. Little Darby Creek from the Lafayette-Plain City Road Bridge downstream to the confluence with Big Darby Creek. Miles designated (approximate): 84

(k) Kokosing River - Knox/Morrow County line to confluence with Mohican River. North Branch of Kokosing from confluence with East Branch downstream to confluence with main stem. Miles designated (approximate): 48

OHIO STATE CERTIFICATION GENERAL CONDITIONS FOR NATIONWIDE PERMITS.

The following general conditions apply to Nationwide Permits 4, 5, 6, 13, 15, 16, 18, 19, 20, 22, 23, 25, 29, 30, 31, 32, 33, 34, 36, 37, and 38.

- A) Steps shall be taken, upon completion of the projects, to ensure bank stability. This may include, but is not limited to, the placement of riprap or bank seeding.
- B) Any damages to the immediate environment of the project by equipment needed for construction or hauling will be repaired immediately.
- C) Care must be employed throughout the course of this project to avoid the creation of unnecessary turbidity which may degrade water quality or adversely affect aquatic life outside the project areas.
- D) For Nationwide Permits 21, 29, 33, 37, and 38, that require Agency coordination, in accordance with the Nationwide Permit General Condition entitled "Notification", Number 13(e), the Corps shall submit a pre-construction notification to Ohio EPA for review and comment.

The following general conditions apply to Nationwide Permits 3, 7, 12, 14, 27, 39, 40, 41, 42, and 43.

- A) Stream limitations:
 - 1) Temporary or permanent impacts to intermittent and perennial streams for any single and complete project are limited to a maximum of two hundred (200) linear feet [except for NWP 12 & 27].
 - 2) Temporary or permanent impacts to ephemeral streams for any single and complete project are limited to a maximum of three hundred (300) linear feet [except for NWP 12 & 27].
 - 3) Temporary or permanent impacts to Exceptional Warmwater Habitat (EWH), Cold Water Habitat (CWH), Seasonal Salmonid (SS) or equivalent stream designation are prohibited [except for NWP 3 and maintenance activities covered under NWP 12].
 - 4) Temporary or permanent impacts to the designated portions of national or state scenic rivers are prohibited [except for NWP 3 and maintenance activities under NWP 12].
 - 5) Stream reconstruction activities shall adhere to natural channel design techniques.

B) Wetland Limitations

- 1) Temporary or permanent impacts to Category 3 wetlands are prohibited.
- 2) Temporary or permanent impacts to Category 1 and 2 wetlands for any single and complete project are limited to a maximum total of ½ acre [except for NWP 27].
- 3) Wetland mitigation shall adhere to the requirements set forth in Ohio EPA's Wetland Water Quality Standards (OAC 3745-1-50 through 54). [In the event that suitable mitigation cannot be located within the watershed, mitigation may be located outside of the watershed if there are significant ecological reasons to do so].

C) General limitations:

- 1) Impacts shall be measured linearly from upstream to downstream, including the length of stream impoundments, when calculating the total length of stream impacts [except for NWP 12, for which impacts shall be measured bank-to-bank].
- 2) NWP 12 cannot be combined to increase any of the aforementioned limitations.
- 3) The Best Management Practices (BMPs) listed in D of this certification shall be utilized with all NWP 12s when applicable.
- 4) For any real estate subdivision which is exempted by the Corps of Engineers from the ½ acre threshold, the aggregate total loss of waters of the state in such subdivision shall not exceed one (1) acre of temporary or permanent impacts to wetlands or two hundred (200)

feet of temporary or permanent impacts to streams.

5) Authorization under this Certification does not relieve the permittee from the responsibility of obtaining any other federal, state, or local permits, approvals, or authorizations required by law, including without limitation, National Pollutant Discharge Elimination System (NPDES) permits or Permits to install (PTIs).

D) Best Management Practices (BMPs)

1) Steps shall be taken, upon completion of the projects, to ensure bank stability. This may include, but is not limited to, the placement of riprap or bank seeding.

2) Vegetated buffer strips extending to the top of both stream banks and beyond as stipulated by the Corps or Ohio EPA, using native tree and shrub species with rapid growth characteristics shall be planted as soon as practicable after impacting stream channel slopes.

3) Impacts to riparian vegetation shall be minimized to the maximum extent practicable. Entry to stream channels shall be through a single point of access per stream bank whenever practicable to minimize disturbance to the riparian corridor.

4) Excavating equipment shall not be placed below the Ordinary High Water Mark of any surface water, except when no other alternative is practicable.

5) Chemicals, fuel, lubricants, sewage and waste materials shall not be discharged to waters of the state.

6) In-stream activities shall not result in the destabilization of the stream banks or stream bed so that aquatic habitat is degraded or adversely affected by turbidity, erosion or scouring.

7) Any fill used for bank stabilization shall be limited to that amount necessary to provide erosion protection.

8) Asphalt and rubber tires may not be used as fill below the Ordinary High Water Mark or as bank protection.

9) In-stream work shall be conducted during low-flow conditions whenever practicable in order to minimize adverse impacts to water quality away from the project site, except in cases of emergency situations which threaten life or property.

10) All dredged material placed at an upland site shall be controlled so that sediment runoff to the waterway is minimized to the maximum extent practicable.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 806**

**FIELD OFFICE
September 9, 1997**

806.01 Description
806.02 General
806.03 Computer Equipment for Field Office
806.04 Basis of Payment

806.01 Description. This item shall consist of providing, maintaining and subsequently removing a field office for the exclusive use of the Department for the duration of the contract at a location approved by the Engineer. The field office will be designated as Type A, B or C.

806.02 General. The field office shall be available and completely functional at a time directed by the Engineer. The office shall have a minimum ceiling height of 2.1 m (7 feet) and have provisions for maintaining room temperature between 20 and 27 C (68 and 80 F). The Type C field office shall have a separate enclosed room for the Engineer. The Contractor shall provide and maintain telephone and electric service. One phone shall be connected to a recorded answering device. One speaker phone shall be required for Type B or Type C facilities. All field office types shall have one copying machine ;the copier shall be provided with all necessary maintenance and paper supplies, and be capable of producing multiple copies of documents up to 216 by 356 mm (8 1/2 by 14-inch) in size. The Type B and Type C field offices shall have a facsimile machine.

The office shall be provided with potable hot and cold water. The office shall also have neat, sanitary, enclosed toilet accommodations; associated lavatory and sanitary supplies shall be furnished. Portable facilities may be provided with the approval of the Engineer.

On all projects requiring moisture and density control of construction materials, the field office shall contain a storage box for a nuclear density gauge in accordance with drawings on file with the Director.

Additional requirements for field office and office equipment are as specified in the following table:

FIELD OFFICE			
Item	Type A	Type B	Type C
Floor Space, m ² (sq. ft.).....	14 (150)	46 (500)	93 (1000)
Telephone	2	4	4
Base Radio & 4-Hand Held Units ¹	--	--	1
10 Column Electronic Calculator with Tape	1	2	3
Desk and Chair Set	1	3	5
Work Tables, 750 by 1800 mm (30 by 72-inch)	1	2	3
4 Drawer, Legal Size, Lockable Metal File Cabinet	--	1	2
2 Drawer, Metal File Cabinet ...	1	2	2
Portable Fire Extinguishers - Type 2A10BC-5#	1	1	2
All Weather Parking Spaces ...	4	8	10
Plan Rack ²	1	1	2

1. Units shall be capable of transmitting and receiving voice communication between office and any area on the project site.

2. Capable of handling the breakdown of 559x864 mm (22x34 inch) sized plans in to 10 sections.

The preceding requirements for the field office may be modified only upon written approval of the Engineer.

806.03 Computer Equipment for Field Office. Where required, the Contractor shall furnish, install, and maintain the following computer hardware and software in the field office required by this item for the life of the contract. All computer hardware and software furnished shall be for the exclusive use of the Engineer and staff and shall be operable at the same time as the field office.

This system shall not experience down time exceeding 48 hours from notification by the Engineer. The Contractor shall replace stolen, vandalized, or units otherwise inoperable within 48 hours after notification by the Engineer. Upon completion of the contract, the hardware and software furnished by the Contractor shall remain the property of the Contractor.

Computer Hardware

- (1) One IBM PC compatible computer with an Intel Pentium processor (or equal) operating at a minimum 200 MHz. The computer shall be provided with the following **minimum** requirements:
 - a. 2.1 Gigabyte hard disk
 - b. 32 Megabytes RAM

- c. one 3.5 inch., 1.44 MB floppy drive
- d. one 8x CD-ROM drive
- e. 101 key keyboard
- f. 15 inch Hi-Res Super VGA Color Monitor 1024 X 768 resolution with .28 dot pitch and Hi-Res Super VGA Card with 2 Megabytes of Video RAM.
- g. 2 Button Microsoft compatible mouse with appropriate software, compatible with required software.
- h. At least 1 parallel port and 1 serial interface port and 1 mouse port.
- i. one 56K firmware upgradeable 3Com compatible modem

(2) Hewlett Packard LaserJet compatible (PCL3 emulation) 6 page per minute printer or approved equal and parallel printer cable.

(3) Surge Protector. 15 amp six outlet with circuit breaker control, phone line circuit surge protection and a surge indicator light.

Computer Software

The Contractor shall furnish, load, and maintain the following software on the computers provided in the field offices: Microsoft Windows 95 (with games removed) and the Corel Professional Edition Office Suite Version 8.

All computer hardware and software shall be maintained by the Contractor during the life of the contract. Information for proposed "equal" equipment shall be submitted to the Engineer and be approved prior to use.

Along with the furniture under 806.02, the Contractor shall also provide the necessary stands, tables, etc. to accommodate the computer system.

806.04 Basis of Payment. The field office will be paid for at the contract price bid, which price shall be full compensation for furnishing, maintaining and subsequently removing the field office and all incidentals necessary to complete this item. The field office and any required computer equipment shall be paid on a monthly basis. The contract bid price shall be full compensation for furnishing, setting up, maintaining, and subsequently removing the specified computer hardware and software from the field office.

Item	Unit	Description
806	Month	Field office, Type _____
806	Month	Computer equipment for field office

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 814**

EMBANKMENT CONSTRUCTION USING PETROLEUM CONTAMINATED SOIL

June 2, 1998

- 814.01 Description**
- 814.02 Restrictions on Usage**
- 814.03 Materials**
- 814.04 Construction Requirements**
- 814.05 Method of Measurement**
- 814.06 Basis of Payment**

814.01 Description: This work shall consist of using Petroleum Contaminated Soil (PCS) material, and/or constructing a mixture of PCS material and embankment material in accordance with these specifications and in reasonably close conformity with the lines shown on the plans or established by the Engineer; mixed, spread, compacted, shaped and finished.

The Contractor may elect to use PCS material as embankment material or may excavate PCS material detailed in the contract or found in the work. It is not a requirement of this specification to use the PCS material in the embankment. The use of PCS material may be allowed as per this specification.

Item 203, Roadway Excavation and Embankment shall apply: deviations from these are as follows.

814.02 Restrictions of Usage. The Contractor shall certify to the Engineer that the PCS material does not exceed the petroleum constituent concentrations stated in OAC 1301: 7-9-16(I)(1)(c)(ii)(b). These values are provided below:

Benzene	35 parts per million
Toluene	109 parts per million
Ethylbenzene	32 parts per million
Total Xylenes	165 parts per million

This certification shall include test results from an independent environmental consultant approved by the Department. The consultant shall perform BTEX testing by using United States Environmental Protection Agency (USEPA) test method SW 846 method 8020 or equivalent method. These tests shall be performed on every 90 metric tons (100 tons) of PCS used on the project.

The Contractor shall submit this certification and information in a suitable format to the Engineer 10 working days prior to the intended usage.

PCS shall not be allowed within the top 1.0 m (3 feet) of the final subgrade elevation or within 1.5

m (5 feet) from any exposed surface.

The final PCS material shall produce a stable embankment. The source, materials, construction and compaction techniques shall be approved by the Engineer.

814.03 Materials. The PCS material shall meet the requirements of Item 203 and the following additional requirements:

The PCS material shall be classified by an independent soils consultant approved by the Department as per Section 4.3 of the Department's "Specifications for Subsurface Investigation Manual". The soils consultant shall determine the suitability of the material under Item 203 Embankment Materials.

The soils consultant shall make a moisture density curve in accordance with AASHTO T 99 for every 225 metric tons (250 tons) of PCS material.

The soils consultant shall submit the above information in a suitable format to the Engineer at least 7 working days prior to the proposed work. This report shall be written and sealed by a Registered Professional Engineer.

814.04 Construction Requirements. The outer soil cover shall be raised uniformly with the PCS material. At no time shall the PCS material be dumped or spread on soft areas, in jurisdictional wetland, or in standing water.

The layers of PCS material shall be alternated with other Department approved soil layers (other than PCS material) .

PCS material shall be spread on the embankment or subgrade in 200 mm (8 inch) loose lifts.

Compaction shall be performed with a sheeps foot roller, self propelled roller or other approved equipment. The compaction operation shall be coordinated with the spreading operation to minimize the amount of PCS material spread out on the embankment. In no case shall the PCS material be left spread out and uncompacted overnight.

The PCS material shall be compacted at a moisture content to obtain the required density and embankment stability. The PCS mixture shall be compacted to a density required under 203.12 or to a density determined by 203.09(b). Any water needed to bring the material to the specified moisture shall be uniformly mixed throughout the lift.

814.05 Method of Measurement. The PCS material shall be paid as per the 203 Items in the contract documents.

814.06 Basis of Payment. The contract unit price per cubic meter(cubic yard) for the 203 Items in the contract documents shall include full compensation for furnishing all testing and certification documentation, labor, materials and incidentals for doing all work involved with the PCS material.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 815

FIELD PAINTING OF EXISTING STEEL, SYSTEM OZEU

May 30, 1996

- 815.01 Description
- 815.02 Materials
- 815.03 Quality Control
- 815.04 Surface Preparation
- 815.05 Test Equipment
- 815.06 Handling
- 815.07 Mixing and Thinning
- 815.08 Coating Application
- 815.09 Caulking
- 815.10 Safety Requirements and Precautions
- 815.11 Inspection Access
- 815.12 Protection of Persons and Property
- 815.13 Pollution Control
- 815.14 Work Limitations
- 815.15 Method of Measurement
- 815.16 Basis of Payment

815.01 DESCRIPTION. This item shall consist of furnishing all necessary labor, materials, and equipment to clean and paint all existing steel surfaces as specified herein.

815.02 MATERIALS. A three coat paint system consisting of: Organic Zinc Prime Coat, Epoxy Intermediate Coat and a Urethane Finish Coat. The Contractor shall select a coating system meeting the requirements of Supplemental Specification 910 entitled OZEU Structural Steel Paint. The approved list of coatings meeting this specification is on file at the Office of Materials Management and District Office.

815.03 QUALITY CONTROL Quality control will consist of the following items:

A. Contractor Quality Control Specialist. Before any work begins, the Contractor shall designate one individual on each project as a Quality Control Specialist (only one person per project will be necessary unless the Contractor is working at more than 3 sites simultaneously). In which case, it will be necessary to provide an additional Quality Control Specialist for each additional three (or portion of three) sites being painted simultaneously. This person will not be a Foreman or member of the Contractor's production staff (ie. he will not abrasive blast, paint, recover spent abrasives, etc.). He will not be involved in any other miscellaneous tasks (ie. mixing paint, running errands, running or working on equipment, etc.) while any production work is taking place. Documentation that personnel performing quality control related functions are qualified shall be submitted to the Engineer prior to allowing the Quality Control Specialist (QCS) to begin work. Documentation/verification shall be provided to the Engineer that the QCS has received formal training from one of the following: KTA Tator, S. G. Pinney, or Corrosion Control Consultants. He shall be equipped with material safety data sheets, product data sheets, tools and equipment to provide quality control on all facets of the work and shall have a thorough understanding of the plans and specifications pertaining to this project. He shall be responsible for inspecting the equipment at the specified intervals, the abrasives, and the work, at all quality control points. He shall also be responsible for verifying that all work is done within the specified work limitations. He shall cooperate with the Inspector and compare and document quality control readings. He shall have the authority to stop work and the responsibility to inform the Contractor's Foreman of nonconforming work.

B. Quality Control Points. Quality control points (QCP) are points in time when one phase of the work is complete and ready for inspection by both the Contractor and the Engineer prior to continuing with the next operational step. At these points: The Contractor shall afford access to inspect all affected surfaces. If inspection indicates a deficiency, that phase of the work shall be corrected in accordance with these specifications prior to beginning the next phase of work. Discovery of defective work or material after a Quality Control Point is past or failure of the final product before final acceptance, shall not in any way prevent rejection or obligate the State of Ohio to final acceptance.

Quality Control Points (QCP)	PURPOSE
1. Solvent Cleaning	Remove asphaltic cement, oil, grease, salt, dirt, etc. followed by washdown
2. Grinding Flange Edges	Remove sharp corners, as detailed on plans
3. Containment/Waste Disposal	Contain, collect & dispose of abrasive blasting debris

4. Abrasive Blasting	Blasted surface to receive paint
5. Prime Coat Application	Check surface cleanliness; apply prime coat; check coating thickness
6. Removing Fins, Tears, slivers	Remove surface defects and slivers
7. Caulking	Caulk areas detailed on plans
8. Intermediate Coat Application	Check surface cleanliness; apply intermediate coat, check coating thickness
9. Finish Coat Application	Check surface cleanliness, apply finish coat, check coating thickness
10. Final Review	Visual inspection of system for Acceptance and check total system thickness.

815.04 SURFACE PREPARATION. This item shall also consist of solvent cleaning (if required), abrasive blasting, and providing a wash facility for the Engineer and Inspectors.

A. Solvent Cleaning (QCP #1) If specifically required by plan note, the bridge shall be solvent cleaned to remove all traces of asphaltic cement, oil, grease, diesel fuel deposits, and other soluble contaminants, (QCP #1) (see SSPC-SP 1 Solvent Cleaning for recommended practices). Under no circumstances shall any abrasive blasting be done to areas with asphaltic cement, oil, grease, or diesel fuel deposits. All solvent cleaned areas shall be subsequently washed before abrasive blasting as detailed below.

Washing shall be accomplished with potable water having a nozzle pressure of at least 7 MPa(1,000 PSI)and a delivery rate of not less than 15 L (4 gallon) per minute. The Contractor, shall provide equipment specifications to verify the above. The equipment shall also be equipped with gauges to verify the pressure. The nozzle shall be held at a maximum of 300 mm (12 inches) from the surface being washed.

B. Grinding Flange Edges (QCP #2) . If a pay item for this work is shown on the plans, all exposed bottom flange edges of longitudinal rolled and welded beams in areas designated on the plans shall be rounded to a radius of 3 mm plus or minus 1.5 mm (1/8 inch plus or minus 1/16 inch) before abrasive blasting. This work may be done without weather and temperature restrictions.

C. Containment/Waste Disposal (QCP #3). Waste material generated by abrasive blasting operations is a solid waste and shall be handled as follows: (1) Contained, (2) Collected, (3) Stored, (4) Evaluated, (5) Properly disposed.

All equipment shall be parked on ground covers free of cuts, tears or holes to prevent contamination of pavement or soil and to protect area under and around equipment.

The Contractor shall erect an enclosure to completely surround (around and under) the blasting operations. The ground cannot be used as the bottom of the enclosure unless completely covered with plastic or tarps.

The enclosure shall be constructed of flexible materials such as tarpaulins or containment screens (specifically designed for this purpose), or of rigid materials such as plywood. All materials shall be maintained free of tears, cuts or holes; however, flexible material used for the sides of the enclosure only may be weaved to contain a maximum of 15 percent holes and a minimum of 85 percent material. All seams shall be overlapped a minimum of 150 mm (6 inches) and fastened together at 300 mm (12 inch) centers, or fastened and overlapped in a manner that insures a seal which does not allow openings between the screens in the containment. The vertical sides of the enclosure shall extend completely up to the bottom of the deck on a steel beam bridge. All blasting operations on a truss type bridge shall be completely enclosed, including top side. Bulkheads shall be used between beams to enclose the blasting area.

Vacuum blasting may be used in lieu of containment, providing that the vacuum blasting equipment is manufactured and marketed for this purpose and is equipped with controls which automatically shut down the blasting operation if the blast head brushes are not held in contact with the surface being cleaned.

All debris collected by these operations, removed from equipment or filters, or that has fallen to the ground, shall be collected and stored at the bridge site, if practical, for testing, evaluation and disposal. If not practical, an alternate location shall be mutually agreed upon by the Engineer and Contractor. Additionally, centralized cleaning stations for recyclable steel, ferric oxide, or aluminum oxide grit (if used) shall be set up at a location mutually agreed upon by the Contractor and Engineer. Storage shall be in steel containers and shall have lids which shall be locked at the end of each workday.

The Contractor shall obtain the services of a testing laboratory to obtain directly from the project site and evaluate a composite representative sample of the abrasive blasting debris for each bridge site. The person taking the sample will be an employee of the testing laboratory.

The composite sample shall consist of individual samples taken from all containers which are on the site at the time of the sampling. These individual samples shall be blended together to comprise one composite sample. The individual samples shall be of equal size. There shall be one individual sample taken from each drum and four randomly spaced individual samples taken from each container other than drums.

The individual samples shall be taken with stainless steel tools and placed into either clean glass or plastic containers. All sampling shall be done in the presence of the Engineer. In addition to the above mentioned requirements, the sampling shall also comply with the requirements of U.S. EPA Publication SW 846.

A Chain of Custody must also accompany all composite samples. Included in this document shall be in the name of the person taking the sample, the Company for which he works, the date and time which the sample was taken, the bridge from which it was taken, the Township and Municipality where the bridge is located and signatures of all persons involved in the Chain of Custody, including dates of possession.

The sampling shall be done within the first week of production blasting at each bridge. If the sampling is not done within the time allotted above, all blasting and painting operations on the bridge from which waste was generated, shall promptly cease.

The composite sample shall be tested for lead and chromium in accordance with U.S. EPA Publication SW 846. The test results and Chain of Custody records shall immediately be forwarded to the Director. If the material is hazardous, the Contractor shall also forward the names of the hauler and treatment facility to the Director. Any additional testing required by the hauler, treatment facility, or landfill will be paid for by Contractor.

All federal, state and local environmental protection laws, regulations and ordinances including, but not limited to, air quality, waste containment and waste removal must be observed during the performance of this contract.

In respect to enforcement of the above mentioned laws, bidders are advised that various governmental bodies have this responsibility. It is the responsibility of the bidders to comply with those laws as enforced by those various governmental bodies.

The existing paint being removed from these bridges may contain lead or chromium. The Contractor is responsible to assure that workers take proper safety precautions when working in this environment (see bid proposal note entitled "Safety").

Hazardous Waste: If the tests reveal that the maximum concentration of either lead or chromium exceeds 5.0 milligrams per liter, the waste shall be treated as a hazardous waste and the steel containers shall be labeled as a hazardous waste. The Director will then obtain a generator number assigned to the State.

All containers of waste material which have been classified as hazardous shall be stored in a secured location until proper disposal. The storage site shall be surrounded with 1.5 m (5 foot) high chain link fence fabric supported by traffic sign drive posts at 3 m (10 foot) center to center. Drive posts shall be embedded into the ground at least 0.6 m (2 feet) deep. The fencing shall be secured with padlocks at the end of each day. Signs shall be posted in obvious locations on the enclosure warning of the hazardous material.

The Contractor shall then arrange for hauling, treating and disposal of all hazardous waste. All hazardous waste shall be disposed of after the Director has obtained a generator number. In every case, any and all hazardous waste shall be disposed of within 60 days after it is generated. Failure to comply with the 60 day disposal requirement shall be considered by the Department as a breach of contract by the Contractor and all abrasive blasting and painting of structural steel on the project shall immediately cease until the hazardous waste is properly disposed. Upon such breach, the Department shall cease processing all pay estimates and notification of the breach shall be sent to the Contractor's surety. Further, any fines or liens assessed by any governmental agency which has jurisdiction over the disposal of this material shall be the responsibility of the Contractor. The hauling and disposal shall be by a firm licensed by U.S. EPA and who shall also be responsible for providing the Uniform Hazardous Waste Manifest (EPA Form 8700-22A).

The Contractor shall decontaminate or dispose of all collection/containment equipment in accordance with EPA guidelines.

Non-Hazardous Solid Waste: If the waste is determined to be non-hazardous as verified by test results which have been reviewed by the Director, it shall be hauled and disposed of at a facility which is licensed to accept non-hazardous solid waste. Prior to disposal of any material, the Contractor shall submit the test results and documentation that the disposal facility is licensed by the EPA to accept non-hazardous solid waste, to the Engineer. The Contractor shall obtain and provide the Engineer with a receipt documenting disposal of waste material at the approved landfill.

D. Abrasive Blasting (QCP #4), Prior to any abrasive blasting, all dirt, sand, bird nestings, bird droppings and other debris shall be completely removed from the scuppers, bulb angles, pier and abutment seats.

All steel to be painted shall be blast cleaned according to SSPC-SP10 and as shown SSPC-Vis 1-89 (pictorial surface preparation standards for painting steel surfaces). Steel shall be maintained in a blast cleaned condition until it has received a prime coat of paint.

The back side of end cross frame assemblies which are 75 mm (3 inches) or closer to backwalls may be commercial blast cleaned according to SSPC-SP6.

Galvanized steel (including corrugated steel bridge flooring), adjacent concrete which has been coated or sealed, and other surfaces not intended to be painted, shall be covered and protected to prevent damage from blasting and painting operations. Any adjacent coatings damaged during the blasting operation shall be repaired at the Contractor's expense.

The abrasive shall be a recyclable steel, ferric oxide, or aluminum oxide grit. After each use and prior to reuse, the grit shall be cleaned of paint chips, rust, mill scale and other foreign material by equipment specifically designed for such cleaning. The Contractor is responsible for assuring recycling and cleaning equipment is capable of operating with the chosen blasting media.

Abrasives shall also be checked for oil contamination before use. A small sample of abrasives shall be added to ordinary tap water. Any detection of an oil film on the surface of the water shall be cause for rejection. This test shall be conducted on each load of abrasives delivered to the job site.

The resultant surface profile shall be a minimum of 40 µm (1.5 mils) and a maximum of 90 µm (3.5 mils). Abrasives of a size suitable to develop the required surface profile shall be used. Any abrasive blasting which is done when the steel temperature is less than 3° C(5° F) above the dew point shall be reblasted when the steel temperature is at least 3° C(5° F) above the dew point. Dew point shall be defined as the temperature at which moisture condenses on the steel surfaces.

All abrasives and residue shall be removed from all surfaces to be painted. All steel blast cleaned in any one day shall be kept dust free and prime coated the same day. Failure to prime coat the same day will require reblasting before prime coating. No dust or abrasives from adjacent work shall be left on the finish coat. The Quality Control Specialist shall perform the following test (and the Inspector will verify) to insure that the air is not contaminated: blow air from the nozzle for 30 seconds onto a white cloth or blotter held in a rigid frame. If any oil or other contaminants are present on the cloth or blotter, abrasive blasting shall be suspended until the problem is corrected and the operation is verified by another test. This test shall be done at the start of each shift and at 4 hour intervals. The abrasive shall be tested for oil contamination at the same time.

Abrasive blasting and painting may take place simultaneously on any one bridge as long as abrasive blasting debris and/or dust by the blowing operation does not come in contact with freshly painted surfaces.

The Material Safety Data Sheet (MSDS) shall be provided at the preconstruction meeting for all abrasives to be used on this project. No work shall start until the MSDS has been submitted.

The Contractor shall provide the Engineer and Inspectors a wash facility with running water to permit washing of face and hands during the surface

preparation operation. It shall at all times contain an adequate supply of potable water, soap and towels. The Contractor shall be responsible to properly contain, test and dispose of the waste water. The wash facility shall be located at each bridge site in an area that will not be contaminated by the blasting debris.

E. Prime, Intermediate and Finish Coat Application (QCP #5, #8, & #9). Each coat of paint shall be in a proper state of cure or dryness before the application of succeeding coats. Paint shall be considered ready for overcoating when an additional coat can be applied without the development of any detrimental film irregularities, such as lifting, wrinkling or loss of adhesion of the undercoat. The time interval between coating applications shall be in compliance with manufacturer's written instructions and no more than 30 days between the prime and intermediate coats and 13 days between the intermediate and finish coats. These maximum recoat times include weather related days. No additional time for weather delays will be allowed. Any coat which has cured more than the above allotted time without overcoating shall be removed and the steel reblasted to SP 10.

The completion date (month and year) of the finish coat and the letters OZEU shall be stenciled on the steel in 100 mm (4 inch) letters with a black urethane paint. This date shall be applied at four locations near the end of each outside beam on the outside web visible from the road or as directed by the Engineer.

F. Removing Fins, Tears, Slivers (QCP #6). All fins, tears, slivers or any other burred or sharp edges that become evident after priming, shall be removed by grinding. All ground surfaces shall be retextured to produce a profile of 40 to 90 µm (1.5 to 3.5 mils) and reprimed prior to application of the intermediate coat. The Contractor may also begin removing fins, tears and slivers after blasting and prior to priming.

Temperature and weather restrictions do not apply to this item. Reapplying primer shall comply with weather restrictions.

G. Caulking (QCP #7). Caulking (if a pay item) will be performed in areas of the bridge where depicted/described in the plans.

H. Job Site Visual Standards. Job site visual standards include preparation of test section, subsequent test section, and photographs of approved test section. Job site visual standards shall be used in addition to the SSPC-Vis-1-89 standard for blasting. Before any abrasive blasting is started, the Contractor will prepare a test section on the first bridge to be painted. The test section will be a representative area to be blast cleaned [approximately 2 - 3 m² (20-30 square feet)]. The test section area shall be photographed and the steel surface checked for the proper profile after the Engineer and the Contractor agree that the area has been blast cleaned according to plan requirements. Only after a test section area has been approved and documented by photographs and replica tape, may the Contractor proceed with his blast cleaning operations. The job site visual standards (photographs) shall be used in addition to plan specifications to determine acceptance of blast cleaning procedures, but in all cases of dispute, the SSPC-Vis-1-89 standard shall govern. If, in the opinion of the Contractor or Engineer, a subsequent bridge is not indicative of the bridge on which the test section was performed, he may request another test section.

815.05 TESTING EQUIPMENT. The Contractor shall provide the Engineer the following testing equipment in good working order, for the duration of the project. When the Contractor's people are working at different locations simultaneously, additional test equipment shall be provided for each crew for the type of work being performed. When no test equipment is available, no work shall be performed.

1. A camera with the following features and 5 (unless otherwise specified on plans) rolls of color film: A) Uses self developing color print film, B) Lens with auto focus system, C) Focuses from 0.6 m (2 feet) to infinity, D) Built-in fill flash.
2. One Spring micrometer and 3 rolls of extra-coarse replica tape.
3. One Positector 2000 or 6000, Quanix 2200, or Elcometer A345FBI1; and the calibration plates, 38-200 µm and 250-625 µm (1.5 -8 mils and 10-25 mils) as per the NBS calibration standards in accordance with ASTM D 1186.
4. One Sling Psychrometer including Psychometric tables - Used to relative humidity and dew point temperature.
5. Two steel surface thermometers accurate within 1° C(2° F) or One portable infrared thermometer available from:

Model:	Raynger ST Series (-18° C to 400°C)
Manufacturer:	Raytek Inc. Santa Cruz, Ca. (800)227-8074

or approved equal to the portable infrared thermometer

6. Flashlight 2-D cell
7. SSPC Visual Standard for Abrasive Blast Cleaned Steel SSPC-Vis 1-89
8. One Recorder Thermometer capable of recording the date, time, and temperature over a period of at least 12 hours.

815.06 HANDLING. All paint and thinner shall be delivered to the project site in original, unopened containers with labels intact. Minor damage to containers is acceptable provided the container has not been punctured. Thinner containers shall be a maximum of 19 L (5 gallons).

Paint shall be stored at the temperature recommended by the manufacturer to prevent paint deterioration.

Each container of paint and thinner shall be clearly marked or labeled to show paint identification, component, color, lot number, stock number, date of manufacture, and information and warnings as may be required by Federal and State laws.

All containers of paint and thinner shall remain unopened until required for use. The label information shall be legible and shall be checked at the time of use. Solvent used for cleaning equipment is exempt from the above requirements.

Paint which has livered, gelled or otherwise deteriorated during storage shall not be used: However, thixotropic materials which can be stirred to attain normal consistency may be used. The oldest paint of each kind shall be used first. No paint shall be used which has surpassed its shelf life.

Paint may be considered as eligible for payment for material on hand as specified in 109.07. However, only paint which the Contractor can prove to

the Engineer will be used during the construction season shall be eligible for payment. The Contractor shall provide the Engineer calculations indicating the total m² (square feet) of steel to be painted during the construction season. He shall also provide calculations showing the total number of liters (gallons) required. The Contractor shall be responsible to store the paint on the project in such manner to prevent theft and adverse temperatures. He shall provide thermometers capable of monitoring the maximum high and low temperatures within the storage facility. The Contractor is responsible for properly disposing of all unused paint and paint containers.

The Contractor shall furnish shipping invoices for all materials used on the project to the Engineer, prior to use.

815.07 MIXING AND THINNING. All ingredients in any container of paint shall be thoroughly mixed immediately before use and shall be agitated often enough during application to maintain a uniform composition; however, the primer shall be continuously mixed by an automated agitation system (hand held mixers not allowed). Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. The paint shall be mixed with a high shear mixer (such as a Jiffy Mixer). Paddle mixers or paint shakers are not allowed. Paint shall not be mixed or kept in suspension by means of an air stream bubbling under the paint surface.

All paint shall be strained after mixing. Strainers shall be of a type to remove only skins and undesirable matter, but not pigment.

No thinner shall be added to the paint without the Engineer's approval, and only if necessary for proper application as recommended by the manufacturer. When the use of thinner is permissible, thinner shall be added slowly to the paint during the mixing process. All thinning shall be done under supervision of the Engineer. In no case shall more thinner be added than that recommended by the manufacturer's printed instructions. Only thinners recommended and supplied by the paint manufacturer may be added to the paint. No other additives shall be added to the paint.

Catalysts, curing agents, or hardeners which are in separate packages shall be added to the base paint only after the base paint has been thoroughly mixed. The proper volume of catalyst shall then be slowly poured into the required volume of base with constant agitation. Liquid which has separated from the pigment shall not be poured off prior to mixing. The mixture shall be used within the pot life specified by the manufacturer. Therefore only enough paint shall be catalyzed for prompt use. Most mixed, catalyzed paints cannot be stored, and unused portions of these shall be discarded at the end of each working day.

815.08 COATING APPLICATION. Coating application will be as follows.

A. General All structural steel, scuppers, expansion joints (except top surface), steel railing, exposed steel piling, drain troughs and other areas as indicated in the plans shall be painted. Galvanized surfaces shall not be painted unless otherwise noted on plans.

The following methods of application are permitted for use by this specification, as long as they are compatible with the paint being used: brush, spray, or any combination of these methods unless specified differently in the plans. Daubers, small diameter rollers or sheepskins may be used for places of difficult access when no other method is practical and in all cases shall be used where cross-frame angles are located within 50 mm (2 inches) of the bottom flange and where end cross frames are within 150 mm (6 inches) of the backwall and bottom of bottom flanges around bearings less than 150 mm (6 inches) in height.

If the surface is degraded or contaminated after surface preparation and before painting, the surface shall be restored before painting application. In order to prevent degradation or contamination of cleaned surface, the prime coat of paint shall be applied the same day of blast cleaning as required in surface preparation above.

Cleaning and painting shall be so programmed that dust or other contaminants do not fall on wet, newly-painted surfaces. Surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Overspray and pigeon droppings shall be removed with a stiff bristle brush, wire screen, or a water wash with sufficient pressure to remove overspray without damaging the paint. The overspray must be removed before applying the next coat. All abrasives and residue shall be removed from painted surfaces, before recoating, with a vacuum system equipped with a brush type cleaning tool.

No visible abrasives from adjacent work shall be left on the finish coat. Abrasives on the finish coat shall be removed.

If brush application of the coating is used, it shall produce a smooth coat. Care shall be taken to work the paint into all crevices, corners, and around all bolt and rivet heads.

B. Spray Application (General). All spray application of paint shall be in accordance with the following:

Primer ingredients shall be kept uniformly mixed in the spray pot or container during application by continuous, automated mechanical agitation (hand held mixers not allowed).

Spray equipment shall be kept clean so that dirt, dried paint and other foreign materials are not deposited in the paint film. Any solvent left in the equipment shall be completely removed before using.

Paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern. The border of the spray pattern shall be painted first; with the painting of the interior of the spray pattern to follow, before moving to the next spray pattern area. A spray pattern area is such that the gun shall be held perpendicular to the surface and at a distance which will ensure that a wet layer of paint is deposited on the surface. The trigger of the gun should be released at the end of each stroke. All bolts and rivet heads shall be sprayed from at least 2 directions or brushed to assure coverage.

Each spray operator shall demonstrate to the Engineer his ability to apply the paint as specified. Any operator who does not demonstrate this ability shall not spray.

If mud cracking occurs, the affected area shall be cleaned to bare metal in accordance with surface preparation above and repainted.

All gaps and crevices 3 mm (1/8 inch) or less shall be filled with primer.

All spray equipment used shall be suitable for use with the specified paint. Paint manufacturer's equipment recommendations shall be followed to avoid paint application problems.

If air spray is used, traps or separators shall be provided to remove oil and condensed water from the air. The traps or separators must be of adequate size and must be drained periodically during operations. The following test shall be made by the Contractor and verified by the Engineer to insure that the traps or separators are working properly.

Air shall be blown from the spray gun for 30 seconds onto a white cloth or blotter held in a rigid frame. If any oil, water or other contaminants are

present on the cloth or blotter, painting shall be suspended until the problem is corrected and the operation is verified by repeating this test.

This test shall be made at the start of each shift and at 4 hour intervals. This is not required for an airless sprayer.

Spray application of all coats shall not be used unless the operation is totally enclosed to prevent overspray damage to the ground, public and private property, any and all vegetation, streams, lakes, etc. This containment shall be accomplished with tarps, plywood or other shields. If brush is used, more than one coat may be necessary to produce the required thickness.

C. Application Approval. The beginning of the application of each of the three different coats shall be subject to inspection and approval to detect any defects which might result from the Contractor's methods. If defects are discovered, the Contractor shall make all necessary adjustments to his method of application to eliminate them before proceeding with coat application.

D. Temperature. Paint shall not be applied when the temperature of the air, steel, or paint is below 10° C (50° F). Paint shall not be applied when the steel surface temperature is expected to drop below 10° C (50° F) before the paint has cured for the minimum times specified below:

	10° C (50° F)	16° C (60° F)	21° C (70° F)
Primer	4 hrs.	3 hrs.	2 hrs.
Intermediate	6 hrs.	5 hrs.	4 hrs.
Finish	8 hrs.	6 hrs.	4 hrs.

The above temperatures and times shall be monitored with the recording thermometer.

A heated enclosure may be used. The heat within the enclosure may be supplied by any means which will maintain the required temperature continuously and uniformly in all parts of the enclosure. The heat will be supplied as required to maintain the required minimum temperature until the coating has cured.

If combustion type heating units are used, they will be vented away from the enclosure, and exhaust fumes will not be permitted to enter the enclosure. No open combustion of any kind will be permitted in the enclosure.

E. Moisture. Paint shall not be applied when the steel surface temperature is less than 3° C (5° F) above the dew point. Paint shall not be applied to wet or damp surfaces or on frosted or ice-coated surfaces. Paint shall not be applied when the relative humidity is greater than 85%. Paint shall not be applied during rain, fog or mist unless the above moisture criteria is met.

F. Repair Procedures. Damaged areas, and areas which do not comply with the requirements of this specification, shall have the paint removed and all defects corrected. The steel should then be retextured to a near white condition to produce a profile of between 40 to 90 µm (1.5 to 3.5 mils). This profile should be measured immediately prior to the application of the prime coat to insure that the profile is not destroyed during the feathering procedure.

The existing paint should be feathered to expose a minimum of 13 mm (½ inch) of each coat.

During the reapplication of the paint, care shall be used to insure that each paint coat is applied only within the following areas. The prime coat shall only be applied to the surface of the bare steel and the existing prime coat which has been exposed by feathering. The prime coat shall not be applied to the adjacent intermediate coat. The intermediate coat shall only be applied to the new prime coat and the existing feathered intermediate coat. The intermediate coat shall not be applied to the adjacent finish coat. The finish coat shall only be applied to the new intermediate coat and the existing finish coat which has been feathered or lightly sanded. The finish coat shall not extend beyond the areas which have been feathered or lightly sanded.

At the perimeter of the repair area, the first two coats shall be applied by brush. The finish coat shall be applied by either brush or spray.

It may be necessary to make several applications in order to achieve the proper thickness for each coat.

During the application of the prime coat, the paint shall be continuously mixed.

All surface preparation and painting shall still be done in accordance with the specifications. In lieu of abrasive blasting, alternate methods of surface preparation may be allowed.

All repairs shall be made in a manner to blend the patched area with the adjacent coating. The finished surface of the patched area shall have a smooth, even profile with the adjacent surface.

The Contractor shall submit his method of correcting runs in writing to the Director for approval.

G. Continuity. Each coat of paint shall be applied as a continuous film of uniform thickness free of all defects such as holidays, runs, sags, etc. All thin spots or areas missed shall be repainted and permitted to dry before the next coat of paint is applied.

H. Dry Film Thickness. Prime thickness, cumulative prime and intermediate thickness, and cumulative prime, intermediate and finish thickness shall be determined by use of Type 2 magnetic gage in accordance with the following:

Five separate spot measurements shall be made, spaced evenly over each 9 m² (100 square feet)of area to be measured. These measurements shall be taken on flanges, webs, cross bracing, stiffeners, etc. Three gage readings shall be made for each spot measurement of either the substrate or the paint. The probe shall be moved a distance of 25 to 75 mm (1 to 3 inches) for each new gage reading. Any unusually high or low gage reading that cannot be repeated consistently shall be discarded. The average (mean) of the 3 gage readings shall be used as the spot measurement. The average of five spot measurements for each such 9 m² (100 square foot) area shall not be less that the specified thickness. No single spot measurement in any 9 m² (100 square foot) area shall be less than 80% of the specified minimum thickness nor greater than 150% of the maximum specified thickness. Any one of 3 readings which are averaged to produce each spot measurement, may under run or overrun by a greater amount. The 5 spot measurements shall be made for each 9 m² (100 square feet) of area as follows:

1. For structures not exceeding 27 m² (300 square feet) in area, each 9 m² (100 square foot) area shall be measured.
2. For structures not exceeding 90 m² (1,000 square feet) in area, three 9 m² (100 square foot) areas shall be randomly selected and measured.
3. For structures exceeding 90 m² (1,000 square feet) in area, the first 90 m² (1,000 square feet) shall be measured as stated in section 2 and for each additional 90 m² (1,000 square feet), or increment thereof, one 9 m² (100 square foot) area shall be randomly selected and measured.

4. If the dry film thickness for any 9 m² (100 square foot) area (sections 2 & 3) is not in compliance with the requirements of paragraph 1 of this section, then each 9 m² (100 square foot) area shall be measured.

5. Other size areas or number of spot measurements as specified in the contract plans shall be measured.
Each coat of paint shall have the following thickness measured above the peaks:

	Min. Spec. Thickness	Max. Spec. Thickness	Min. Spot	Max. Spot
Prime	75 µm (3.0 mil)	125 µm (5.0 mil)	60 µm (2.4mil)	188 µm (7.5mil)
Intermediate	125 µm (5.0 mil)	175 µm (7.0 mil)	100 µm (4.0 mil)	263 µm (10.5 mil)
Sub Total	200 µm (8.0 mil)	300 µm (12.0 mil)	160 µm (6.4 mil)	450 µm (18.0 mil)
Finish	50 µm (2.0 mil)	100 µm (4.0 mil)	40 µm (1.6 mil)	150 µm (6.0 mil)
Total	250 µm (10.0 mil)	400 µm (16.0 mil)	200 µm (8.0 mil)	600 µm (24.0 mil)

Film thicknesses greater than the maximum specified thicknesses that do not exhibit defects (such as runs, sags, bubbles, mudcracking, etc.) and for which the Contractor has received a written statement from the coating manufacturer stating that this excessive thickness is not detrimental, may remain in place at the discretion of the Director.

For any spot or maximum average thickness over 600 µm (24 mils) it will be necessary for the Contractor to prove to the Department that the excess thickness will not be detrimental to the coating system. This shall be accomplished by providing the Director, for approval, certified test data proving that the excessive thickness will adequately bond to the steel when subjected to thermal expansion and contraction. This thermal expansion and contraction test shall take place over five 5 cycles of a temperature ranges from -29⁰ C to 49⁰ C (-20⁰ F to 120⁰ F). After the thermal contraction and expansion cycles have taken place, the tested system shall be subjected to pull off tests and the results compared to the results of pull off tests which have been performed on a paint system with the proper thicknesses. In addition to the certified test results, it will also be necessary for the Contractor to provide the Director a written statement from the paint manufacturer stating that this excessive thickness is not detrimental.

If the Director does not approve the excessive coating thicknesses or the Contractor elects not to provide the required written statement from the paint manufacturer and the certified test results when required, the Contractor, at his own expense, shall remove and replace the coating. The removal and replacement of the coating shall be done as specified in 815.08 F Repair Procedures.

815.09 CAULKING QCP #7. The material shall be a two component, 100% solids epoxy and shall be one of the following: MANUFACTURER	
Mark 270 Poly-Carb Solon, OH 216-248-1223	KOP-COAT A-788 Splash Zone Compound Carboline Company Hamilton, OH 513-896-1919
Sikadur Injection Gel Sika Chemical Corp. Lyndhurst, N.J. 201-933-8801	OR Other Commercially Available, 100% Solid, Non-Sag, Non-Shrink Epoxy Based System Capable Of Filling Voids Up To 25 mm (1 inch) Wide

815.10 SAFETY REQUIREMENTS AND PRECAUTIONS. The Contractor shall meet the applicable safety requirements of the Ohio Industrial Commission and the Occupational Safety and Health Administration (OSHA), in addition to the scaffolding requirements specified below.
The Material Safety Data Sheets (MSDS) shall be provided at the preconstruction meeting for all paints, thinners and abrasives used on this project. No work shall start until the MSDS has been submitted.

815.11 INSPECTION ACCESS. In addition to the requirements of 105.11, the Contractor shall furnish, erect, and move scaffolding and other appropriate equipment, to permit the Inspector the opportunity to closely observe all affected surfaces. This opportunity shall be provided to the Inspector during all phases of the work and continue for a period of at least 10 working days after each structure has been completely painted.
When scaffolding, or the hangers attached to the scaffolding are supported by horizontal wire ropes, or when scaffolding is placed directly under the

surface to be painted, the following requirements shall be complied with:

A. When scaffolding is suspended 1092 mm (43 inches) or more below the surface to be painted, two guardrails shall be placed on all sides of the scaffolding. One guardrail shall be placed at 1067 mm (42 inches) above the scaffolding and the other guardrail at 508 mm (20 inches) above the scaffolding.

B. When the scaffolding is suspended at least 533 mm (21 inches) but less than 1092 mm (43 inches) below the surface to be painted, one guardrail shall be placed on all sides of the scaffolding at 508 mm (20 inches) above the scaffolding.

C. Two guardrails shall be placed on all sides of scaffolding not previously mentioned. The guardrails shall be placed at 1067 mm (42 inches) and 508 mm (20 inches) above scaffolding, as previously mentioned.

D. All scaffolding must be at least 610 mm (24 inches) wide when guardrail is used and 711 mm (28 inches) wide when the scaffolding is suspended less than 533 mm (21 inches) below the surface to be painted and guardrail is not used. If 2 or more scaffolding are laid parallel to achieve the proper width, they must be rigidly attached to each other to preclude any differential movement.

E. All guardrail shall be constructed as a substantial barrier which is securely fastened in place and is free from protruding objects such as nails, screws and bolts. There shall be an opening in the guardrail, properly located, to allow the Inspector access onto the scaffolding.

F. The rails and uprights shall be either metal or wood. If pipe railing is used, the railing shall have a nominal diameter of no less than 38 mm (1.5 inches). If structural steel railing is used, the rails shall be 50x50x9 mm (2x2x3/8 inch) steel angles or other metal shapes of equal or greater strength. If wood railing is used, the railing shall be 50x100 mm (2x4 inches) (nominal) stock. All uprights shall be spaced at no more than 2.4 m (8 feet) on center. If wood uprights are used, the uprights shall be 50x100 mm (2x4 inches) (nominal) stock.

G. When the surface to be inspected is more than 4.57 m (15 feet) above the ground or water, and the scaffolding is supported from the structure being painted, the Contractor shall provide the Inspector with a safety harness (not a safety belt) and lifeline. The lifeline shall not allow a fall greater than 1.8 m (6 feet). The Contractor shall provide a method of attaching the lifeline to the structure independent of the scaffolding, cables, or brackets supporting the scaffolding.

H. When scaffolding is more than 762 mm (2.5 feet) above the ground, the Contractor shall provide a ladder for access onto the scaffolding. The ladder and any equipment used to attach the ladder to the structure shall be capable of supporting 113 kg (250 pounds) with a safety factor of at least four. All rungs, steps, cleats, or treads shall have uniform spacing and shall not exceed 305 mm (12 inches) on center. At least one side rail shall extend at least 914 mm (36 inches) above the landing near the top of the ladder.

I. An additional landing shall be required when the distance from the ladder to the point where the scaffolding may be accessed, exceeds 305 mm (12 inches). The landing shall be a minimum of at least 610 mm (24 inches) wide and 610 mm (24 inches) long. It shall also be of adequate size and shape so that the distance from the landing to the point where the scaffolding is accessed does not exceed 305 mm (12 inches). The landing shall be rigid and firmly attached to the ladder; however, it shall not be supported by the ladder. The scaffolding shall be capable of supporting a minimum of 454 kg (1000 pounds).

J. In addition to the aforementioned requirements, the Contractor shall be responsible to observe and comply with all Federal, State and local laws, ordinances, regulations, orders and decrees.

K. The Contractor shall furnish all necessary traffic control to permit inspection during and after all phases of the project.

815.12 PROTECTION OF PERSONS AND PROPERTY. The Contractor shall collect, remove and dispose of all buckets, rags or other discarded materials and shall leave the job site in a clean condition.

The Contractor shall protect all portions of the structure, which are not to be painted, against damage or disfigurement by splashes, spatters, and smirches of paint. Deck bottoms and backwalls are exempt from this requirement.

When or where any direct or indirect damage or injury is done to public or private property, the Contractor shall restore, at his own expense, such property, to a condition similar or equal to that existing before such damage or injury was done.

815.13 POLLUTION CONTROL The Contractor shall take all necessary precautions to comply with pollution control laws, rules or regulations of Federal, State or local agencies and as required in this specification.

815.14 WORK LIMITATIONS. Abrasive blasting and painting shall be done between April 1 and October 31. Even though the Contractor is permitted to work prior to May 1, April is considered a winter month and no extension due to adverse weather conditions will be granted for this period. Additional work limitations on specific bridges/projects may be required by plan note.

815.15 METHOD OF MEASUREMENT. Field painting of structural steel is based on a square meter (square foot) pay item. All field painting will include 3 coats of paint; prime coat, intermediate coat, and finish coat.

On steel beam and steel girder bridges, the surface area is based on a nominal measurement of the beams; ie. 2 times the beam depth plus 3 times the flange width. In addition to this nominal measurement, a percentage is added to account for incidentals such as cross frames, bearing assemblies, stiffeners, expansion joints, scuppers, etc. Thus, it is not necessary for the Inspector to field measure every detail of the bridge to verify quantities. Some extremely complex bridges, such as trusses, will be paid for as lump sum. In the case of a quantity dispute, exact field measurements of all painted surfaces and/or calculations will govern.

Grinding fins, tears, slivers is based on the manhours expended only by the workmen who are actually doing the grinding and will include all the time when the workmen are performing grinding and repairing prime coat and not limited to the actual grinding duration (ie. all hours of the workmen when assigned to grinding regardless of actual grinding time).

Grinding of flange edges: This pay item includes all labor and equipment to grind the bottom flange edges denoted in the plans. Each meter (one linear foot) of beam represents 4 m (4 linear feet) of edge grinding.

Caulking: Includes all labor, materials and equipment to caulk areas described in the plans. Each meter (linear foot) of caulk (regardless of width or

thickness) shall be measured for payment.

Surface Preparation: This lump sum or m² (square feet) item includes all labor, materials and equipment necessary to: contain, collect, store, evaluate, ship, treat and dispose of all waste materials generated by this project and to prepare the surface as required by these specifications, prior to applying the prime coat.

815.16 BASIS OF PAYMENT. Payment for field painting will be made at the contract prices for:

Item	Unit	Description
815	Square meter (square foot), lump sum	Surface preparation of existing steel, System OZEU
815	Square meter (square foot), lump sum	Field painting of existing steel, prime coat, System OZEU
815	Square mete, (square foot), Lump sum	Field Painting of existing steel, Intermediate coat, System OZEU
815	Square meter (square foot), Lump sum	Field Painting of existing steel, Finish coat, System OZEU
815	Man Hour	Grinding Fins, Tears, Slivers
815	Meter (Linear foot)	Grinding Flange Edges
815	Meter (Linear foot)	Caulking

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 830
CURBING, CONCRETE MEDIANS AND TRAFFIC ISLANDS

October 21, 1998

830.01 Description

830.02 Materials

830.03 Stone Curb

830.04 Cast in Place Concrete Curb and Combination Curb and Gutter

830.05 Asphalt Concrete Curb

830.06 Concrete Median and Traffic Island

830.07 Method of Measurement

830.08 Basis of Payment

830.01 Description. This work shall consist of furnishing and constructing curb, combination curb and gutter, medians and islands of the specified materials and types, in reasonably close conformity with the lines, grades and cross sections shown on the plans or established by the Engineer. This item shall also include necessary excavation and backfill, furnishing and installing joint materials, and the disposal of surplus excavation and discarded materials in accordance with 203.

830.02 Materials. Materials shall be:

Concrete (Class C)	499
Tie bar steel, epoxy coated	709.00, 709.01, 709.03, 709.05
Joint sealer	705.11, 705.04
Preformed filler	705.03
Coated dowel bars.	709.13

Sandstone shall be the best quality of Berea or Amherst gray sandstone, or sandstone of equal quality.

Asphalt curb shall meet 448 Intermediate Course, Type 1, designed for medium traffic, PG 64-22.

If a 448 mix is used, the asphalt concrete shall meet the composition requirements of 441 with the fine aggregate content set at the maximum permitted under this composition. Mineral filler meeting the requirements of 703.07 may be added provided the composition requirements of 441 are met. The method of introducing mineral filler shall be approved by the Laboratory.

830.03 Stone Curb. New sandstone curbs shall be as follows:

(a) Cutting and Dressing. Ninety-five percent of all straight curb shall be at least 5 feet (1.5

m) in length, with no piece less than 42 inches (1.1 m) except an occasional stone as short as 30 inches (0.8 m) may be used for closure. On curves of 50 feet (15 m) or greater radius, straight curb jointed radially may be used, in which case the lengths may be shorter than 42 inches (1.1 m) but not less than 36 inches (0.9 m). For curves and corners less than 50 feet (15 m) radius, the lengths shall be not less than 36 inches (0.9 m) and shall be dressed, jointed and set to the radii called for. All curb used for curves and corners shall be approximately uniform in length.

All curb shall be dressed to a straight edge on top and on the exposed face and ends to a depth below the gutter elevation of at least 6 inches (150 mm). The ends shall be dressed at right angles to the face for straight curb and radially for curb on curves. No slack or hollow joints shall be permitted. No projections shall remain after dressing the ends, which under expansion, would create contact with the end of the adjacent curb to cause spalling. The edge next to the gutter shall be cut to a 3 inch (75 mm) radius and the top dressed to a 1/4 inch (6 mm) bevel rising from the exposed face. All hand dressed curb shall be brought to the width called for by means of a pitching tool used on the edge at the back.

(b) Setting. The curb shall be set with a backward batter or incline from the vertical of 1 in 20 and on a thoroughly compacted subgrade. In clay soils or soils of a character that do not permit free drainage, a firm bed of porous material a minimum of 3 inches (75 mm) deep shall be placed as a foundation for curb. The curb shall be settled into place with a heavy rammer, and backed to a minimum width of 4 inches (100 mm) with porous backing to within 6 inches (150 mm) of the top. The balance of the backfill shall be brought to the level of the top of the curb for a distance of 2 feet (0.6 m) back, with soil or other acceptable material. Backing shall be thoroughly tamped in layers not exceeding 6 inches (150 mm) in thickness, loose measurement, with an approved tamper or rammer. As much of the backfilling and tamping as is consistent with alignment of the curb shall be done at the time the stone is first set. Circular curb shall be set in 499 Class C concrete when called for on the plans, 6 inches (150 mm) deep. The concrete shall be in a plastic state when the curb is placed. The concrete shall extend the width of the curb plus 6 inches (150 mm) behind the curb and shall be brought up behind the curb to within 4 inches (100 mm) of the top.

(c) Joints. The space between ends of adjacent sections of curbing below the dressed portion shall not be less than 1/8 inch (3 mm) at any point and shall not exceed 4 inches (100 mm). The joints between the dressed portion of adjacent sections of curbing shall be cushioned with 1/8-inch (3 mm) thick expansion joint material trimmed flush with the curbing on all edges.

If sandstone curb is placed after the pavement is placed, any joint remaining shall be filled with dry sand to within 2 inches (50 mm) of the surface of the pavement and the upper 2 inches (50 mm) shall be filled with bituminous material. Care shall be exercised in filling this joint so that no bituminous material comes in contact with the exposed surface of the curb.

(d) Resetting Curb. When specifically permitted by the plan, acceptable stone curb removed from the work under 202 may be used, to the extent available, in lieu of the furnishing of new stone curb. Such Salvaged curb shall be used continuously at locations designated by the Engineer. Interspersing of salvaged and new curb will not be permitted. Necessary storing and hauling of salvaged curb shall be a responsibility of the Contractor. All provisions for cutting and dressing, setting, and joints shall apply to salvaged curb.

830.04 Cast-in-Place Concrete Curb and Combination Curb and Gutter. These items

shall be as follows:

(a) Forms and joints. Curb forms shall be approved metal forms. They shall be securely braced and held to line and grade specified. Approved flexible forms of steel or wood may be used for construction of circular curb where radius is 200 feet (60 m), or less. The inner surface of the forms shall be clean and coated with a form release agent immediately before the concrete is placed.

All curb and combination curb and gutter not constructed integral with, or tied to, the base or pavement shall have 1/4-inch (6 mm) contraction joints constructed at 10 foot (3.0 m) intervals. The joint may be constructed with the use of metal separator plates, by the use of a grooving tool, or sawed in accordance with 451. The depth of joint shall average 2 inches (50 mm) or more for combination curb and gutter, and for curb shall average 1/5 or more of the curb height. Where expansion joints occur in the abutting pavement, they shall be provided for by separation of the section being placed with 1 inch (25 mm) 705.03 preformed filler.

When the curb is integral with, or tied to, the base or pavement, joints of the type used in the pavement shall be constructed in the curb and sealed with the same material. The joints shall be spaced identically with the joints in the base or pavement.

Curb forms shall be left in place for such length of time that the removal of same does not crack, shatter or otherwise injure the concrete.

Where the curbs built under this item are to later serve as a support for a finishing machine in the placing of a surface course, the alignment of the supporting edges shall be such that the distance between the curbs shall nowhere vary more than 1/2 inch (13 mm) from that specified.

(b) Placing. The concrete shall be placed in the forms, prepared as above described, and vibrated in such a manner as to eliminate all voids.

Concrete for curb which is to be integral with the concrete base or pavement shall be placed while the concrete is plastic, except when the presence of finishing equipment on the forms at the end of the day's run makes this impossible. When this condition prevails No. 5 (No. 15M) tie bars shall be placed vertically in the pavement at 1 foot (0.3 m) intervals and in a line 3 inches (75 mm) inside of and parallel to the edge forms. These tie bars shall extend to within 1 1/2-inches (38 mm) of the subgrade or subbase and 2 inches (50 mm) above the pavement surface when placed. Immediately before the concrete curb is placed, the surface of the pavement or base on which the concrete curb is to be placed shall be flushed with mortar which contains one part cement to two parts sand. The mortar shall be worked into the surface cavities by brushing.

(c) Curb Machine. Concrete curb or curb and gutter may be placed with a self-propelled machine. The proper density and cross section shall be obtained by forcing the concrete through a mold of the proper cross section. Where a track is used the track on which the machine operates shall be set and held to the exact line and grade given by the Engineer. The concrete shall be of such consistency that it that it can be molded into the desired shape and then will remain as placed without slumping of the vertical faces.

(d) Finishing. The top of the curb shall be floated in such a manner to thoroughly compact the concrete and produce a smooth and even surface. The addition of extra mortar to secure this result will not be permitted. The edge of the curb shall be rounded by the use of a tool especially designed for the purpose. The exposed face of the curb shall be rubbed with a float immediately after removing the forms. Unnecessary tool marks shall be eliminated. The finished surface shall be free of irregularities and waves and shall be uniform in texture.

(e) Protection. Concrete curb, and combination curb and gutter shall be cured in accordance with 451 except that membrane cure shall be applied at a rate of not less than 1 gallon per 200 square feet (1 L/5m²) of surface.

830.05 Asphalt Concrete Curb. The specified asphalt concrete material shall be furnished and placed to form a curb of the required cross section by one of the following methods or by any other method approved by the Engineer.

Method 1. After completion of the surface course, the area to be occupied by the curb shall be painted or sprayed with bituminous material meeting the requirements of 407.02 and applied at the rate of 0.15 gallons per square yard (0.7 L/m²). Only the area to be occupied by the curb shall be so treated. The curb shall then be placed with a hand-operated or self-propelled machine consisting of a hopper and power-driven screw which forces the material through a tube by an extrusion method. The proper density and cross section of the curb shall be obtained by forcing the material through a die attached to the end of the extrusion tube.

Method 2. The material for the curb shall be placed as an independent operation preceding the final rolling of the surface course upon which the curb is to be placed. Loose material of sufficient height shall be placed and shaped by hand methods using suitable templates or by other means that will produce the specified cross section. The loose material shall then be compacted to final cross section dimensions by use of a hand-operated mechanical vibrating tamper equipped with a compacting shoe of such shape that will produce the specified cross section of the curb.

830.06 Concrete Median and Traffic Island. Concrete medians and traffic islands shall be constructed on the accepted, prepared subgrade, subbase or the completed and accepted base course or old pavement. These items shall be as follows:

(a) Forms and Joints. Forms shall be approved metal forms. They shall be securely braced and held to line and grade specified. Approved flexible forms of metal or wood may be used for construction of radii 200 feet (60 m) and less. The inner surface of the forms shall be clean and coated with a form release agent immediately before the concrete is placed.

All medians and traffic islands not anchored to the pavement shall have 1/4-inch (6 mm) contraction joints constructed at 10 foot (3.0 m) intervals. The joint may be constructed with the use of metal separator plates, by the use of a grooving tool, or sawed in accordance with 451. The depth of joint shall average 2 inches (50 mm) or more.

When the median or island is anchored to the pavement per the standard drawings, joints of the same type used in the pavement shall be constructed in the median or island. The joints shall be spaced identically with the joints in the pavement.

Forms shall be left in place for such length of time that the removal of same does not crack, shatter or otherwise injure the concrete.

(b) Placing. When placing the median or island on subgrade or subbase, the subgrade or subbase shall be sprinkled with water at such times and in such manner as directed by the Engineer so that it will be in a thoroughly moistened condition when the concrete is deposited thereon.

The concrete shall be placed in the forms and vibrated in such a manner as to eliminate all voids.

(c) Mechanical Placement. Medians and traffic islands may be placed with a self-propelled

machine. The proper density and cross section shall be obtained by forcing the concrete through a mold of the proper cross section. Where a track is used the track on which the machine operates shall be set and held to the exact line and grade given by the Engineer. The concrete shall be of such consistency that it can be molded into the desired shape and remain as placed without slumping of the vertical faces.

(d) Finishing. The top of the median or island shall be given a broom, turf, or similar texture. The addition of extra mortar to secure this result will not be permitted. The edges shall be rounded by the use of a tool especially designed for this purpose. The exposed faces shall be rubbed with a float immediately after removing the forms. Unnecessary tool marks shall be eliminated. The finished surface shall be free of irregularities and waves and shall be uniform in texture.

(e) Protection. Concrete medians and traffic islands shall be cured in accordance with 451 except that membrane cure shall be applied at a rate of not less than 1 gallon per 200 square feet (1 L/5m²) of surface.

830.07 Method of Measurement. The length of curb or combination curb and gutter measured will be the actual number of linear feet (meters) complete in place, measured along the front face of the curb section.

The quantity of concrete median or traffic island measured shall be the number of square yards (square meters) or the number of cubic yards (cubic meters) complete in place.

830.08 Basis of Payment. Payment for accepted quantities will be made at the contract price for:

Item	Unit	Description
830	Linear foot (meter)	Sandstone curb
830	Linear foot (meter)	Curb, Type _____
830	Linear foot (meter)	Combination curb and gutter, Type _____
830	Linear foot (meter)	Asphalt concrete curb, Type _____
830	Square yard or cubic yard (square meter or cubic meter)	Concrete traffic island
830	Square yard or cubic yard (square meter or cubic meter)	Concrete median

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 842

CONCRETE FOR STRUCTURES

January 6, 1999

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842.01 Description. This item shall consist of furnishing and placing portland cement concrete including reinforcing steel in accordance with these specifications and in reasonably close conformity with the lines, grades and dimensions shown on the plans. This item shall also include all costs associated with saw cutting grooves into the surface of superstructure concrete after the concrete has cured. Falsework and forms shall be in accordance with 508.

For prestressed concrete, see Supplemental Specification 865.

Concrete for structures shall meet the requirements of Supplemental Specification 899 (Concrete - General), except as modified herein.

842.02 Materials. Materials shall conform to 899.02 except as follows:

Aggregate; all concrete above the ground line in a given substructure unit or all concrete for any given superstructure shall be made of aggregates of the same kind and colors, except upon permission of the Engineer.

Reinforcing materials; 509.02.

Curing materials; 705.05, 705.06 (white opaque), 705.07 Type 1 or 1D.
Joint filler; 1/4 inch (6 mm) gray sponge 711.28, or preformed filler 705.03.
Seals; preformed elastomeric compression joint seals, 705.11.

842.03 Proportions. Concrete for structures shall be proportioned according to 899.03, using Class C or Class S as specified.

842.04 Concrete Test Specimens. On structures over 20 foot (6.1 m) span, two test cylinders will be made from each 200 cubic yards (150 m³), or fraction thereof, of concrete that is incorporated each day in the work. On structures of 20 foot (6.1 m) span or less, not less than two cylinders will be made for each 50 cubic yards (35 m³) of concrete.

When necessary to permit early removal of falsework or to permit backfilling, concrete test beams shall be made and tested according to standard methods on file in the office of the Director.

842.05 High-Early-Strength Concrete. The use of high-early-strength concrete shall be in accordance with 899.03. Curing and loading shall be in accordance with 842.14.

842.06 Mixing of Concrete. Mixing shall be according to 899.09.

When mixed, all concrete shall have a temperature of not more than 90 °F (32 °C), and the concrete shall be maintained under this temperature until deposited in the work.

When an air temperature of 60 °F (16 °C) or higher prevails at the time of placing concrete in a bridge superstructure over 20 foot (6.1 m) span, the Contractor shall add an approved chemical admixture (705.12, Type B or D) to the concrete.

842.07 Slump. Concrete shall have a slump such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcing steel, but individual particles of coarse aggregate, when isolated, shall show a coating of mortar containing its proportionate amount of sand.

The slump of concrete placed by the vibration method shall be in accordance with 899.03, the slump being determined according to ASTM C 143.

842.08 Placing Concrete. The Contractor shall submit according to 501.06, a description of the procedures he proposes to use and notify the Engineer at least 24 hours in advance of placing concrete.

Superstructure concrete shall be placed only when the surface evaporation rate determined by using Figure 1 in ACI 308 is equal to or less than 0.2 lb./sq. ft./hour (1.0 kg/m²/hour). The Contractor shall determine and document the ambient air temperature, concrete temperature, deck surface temperature, relative humidity, and wind velocity, subject to verification by the Engineer. No superstructure concrete shall be placed if the ambient air temperature is 85 °F (30 °C) or higher or predicted to go above 85 °F (30 °C)

during the concrete placement regardless of the surface evaporation rate.

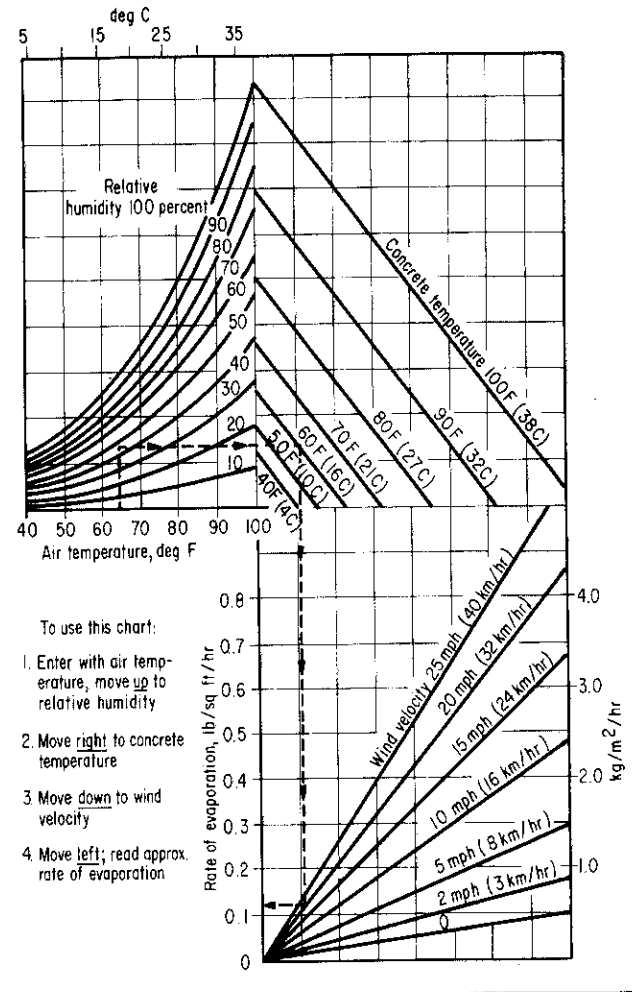
When a concrete deck is to be placed on continuous steel beams or girders, the placing of the concrete deck in any span shall not be started until all of the main beam or girder splices have been completed at least two piers beyond the pier or piers supporting the span in question.

Concrete for backwalls with steel expansion joints shall not be placed until the abutments have been backfilled to within 1 foot (0.3 m) of the bridge seat elevation and all structural steel or prestressed concrete beams have been erected, unless a different procedure is approved by the Director. The steel expansion joint shall serve as a template for the top of the backwall. If temporary bolts are used to support the backwall portion of an expansion device during the placing of the backwall concrete, these bolts shall be removed after the concrete has taken its initial set and before a change in temperature causes superstructure movement sufficient to damage the backwall.

In order that the concrete will be finished during daylight hours, the time of starting the concreting operations shall be subject to the approval of the Engineer.

The Contractor shall furnish assurance to the Engineer of an adequate and uniform source of supply of concrete to permit proper placing and finishing, and of the availability of coverings for protection in case of rain, before work will be permitted to start.

Figure1 ACI 308-81



Before placing the concrete, all forms and structural steel which will be in contact with the concrete shall be thoroughly cleaned and the space to be occupied by the concrete shall be free from all laitance, silt, dirt, shavings, sawdust, loose and built-up rust and other debris. The methods of depositing shall be such as to insure that all reinforcing steel is completely enveloped in concrete mortar and such that this condition can be verified by inspection. The method or device used for conveying the concrete from the mixer to its place in the work shall be such as to insure against separation of the coarse aggregate from the mortar. When concrete is being deposited in shallow members, such as slabs, it shall be placed with as short a vertical drop as practicable. The concrete shall be deposited so as to maintain a surface practically horizontal over the section being placed.

When a chute is used, its slope shall be such as to allow concrete of the proper consistency to flow readily without segregation. Concrete shall be deposited as near as possible to its final position.

Concrete shall not be dropped into the forms a distance of more than 5 feet (1.5 m). Drop chutes shall be used to limit free fall to 5 feet (1.5 m) and the delivery ends shall be as nearly vertical as practicable.

The use of mortar topping for concrete railing caps and other similar surfaces shall not be permitted.

The use of the vibration method of placing all concrete, in structures is required. The Contractor shall furnish and have in use sufficient vibration equipment of an approved type and size to properly compact each batch immediately after it is placed in the forms.

The vibrators shall generally be of a type that is applied directly to the concrete and have a frequency of at least 4500 impulses per minute, but where inaccessibility precludes this method of vibration, the vibrators shall be applied externally to the forms.

The concrete shall be deposited as near its final position as possible and shall not be caused to flow long distances by vibrators. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. Vibrators shall be inserted into and withdrawn from the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but not continued so as to cause segregation. Care must be used not to disturb partially hardened concrete.

Such spading as is necessary to insure smooth surfaces and dense concrete shall be done along form surfaces and in corners and locations impossible to reach with the vibrators, The Engineer shall with the collaboration of the Contractor closely observe the results obtained on the first concrete placed and such alterations shall be made in the mix, as permitted by these specifications, as are necessary to secure the best results.

The surface of the finished concrete shall be covered immediately with wet burlap.

842.081 Slipform Construction of Bridge Railing. Unless the plans eliminate the use of slipforming for this project, the Contractor is permitted the option of slipforming the bridge parapets and medians. If the Contractor elects to slipform, the finished concrete shall meet the following tolerances from plan dimensions:

Reinforcing steel cover	-½ inch (-13mm) + ½ inch (+ 13 inch)
Top width dimension	-0 + 1/4 inch (+ 6 mm)
Bottom width dimension	-0 + ½ inch (+ 13mm)
Surface flatness	1/4 inch in 10 feet (6 mm in 3 meters)
Vertical alignment	½ inch in 20 feet
(Deviation from a line parallel to the grade line)	(13 mm in 6 meters)

All reinforcing steel joints and/or splices in the bridge railing steel shall be tied. A dry run to check for reinforcing clearance and rigidity of the reinforcing cages shall be required before any concrete is placed. The Contractor shall verify reinforcing clearances and make any adjustments to the cage to establish the required clearances during the dry run. Reinforcing steel cages are to be rigid (defined as no movement during the slipforming dry run). If the Engineer determines the cages are not rigid, the Contractor must stabilize the cages before any slipforming is performed. The Contractor may add any additional diagonal reinforcing steel between the front and rear vertical reinforcing faces to establish the required rigidity. Any additional reinforcing steel required to adequately stabilize the cages shall be the Contractor's expense.

Honeycombing, cracking, tearing and other defects shall be repaired or patched immediately upon exit from the slipform equipment. Defects shall be completely filled with concrete. The use of water to smooth or close the surface is not acceptable.

Control Joints shall be constructed by sawing 1 1/4 inches (32 mm) deep into the perimeter of the parapet, after the concrete has taken its initial set but before any shrinkage cracks develop. Generally initial set is within 6 hours of batching of the concrete. All joints shall be sawed within 24 hours of placement. Joints shall be sawed by using an edge guide, fence or jig to insure that the joint is straight, true and aligned on all faces of the parapet. The joint width shall be the width of the saw blade, a nominal 1/4 inch (6 mm). The control joints shall be caulked with a polyurethane or polymeric material meeting Federal Specification TT-S-00227E.

Slip formed concrete will require different slumps than those listed in 899 or other plan specified concrete. The consistency of the concrete should be such that the concrete exiting the slipform does not pull but is stiff enough to prevent waviness and sags in the finished surfaces. Method A, Water Curing, 842.14 is required. As slipformed concrete has a low water/cement ratio, timely application of the water cure is critical in helping control shrinkage cracks.

No water shall be added or applied to the concrete after it has left the truck.

The Contractor shall furnish all necessary platforms to protect against falling debris during the slipforming operation, to allow access for completing the finishing operation and to allow the inspector access.

The Engineer will inspect the slipformed surface for horizontal cracking no earlier than 21 days after completion of the slipforming operation. All horizontal cracks shall be repaired by epoxy injection. If a concrete sealer has been applied, any damage to the sealer shall be repaired after the epoxy injection has been completed. The aforementioned repairs shall be made at no additional cost to the State.

842.09 Construction Joints. When construction joints are shown on the plans, all concrete between consecutive joints shall be placed in a continuous operation. Concrete shall not be placed against the side of any joint for at least 12 hours, or as required by 842.14.

Approval of the Director must be obtained for placing any construction joint not shown on the plans or permitted by 842.08 and 842.16.

The plans on which a day's work is to terminate shall be predetermined before depositing of concrete begins. They shall in general be perpendicular to the lines of principal stress and in regions of small shear. Horizontal joints will not be permitted in concrete girders and beams. Slabs acting with concrete beams or girders shall be deposited continuously with them unless composite construction is specified.

All construction joints shall be made with bulkheads provided with keys which clear all exposed surfaces approximately one-third the thickness of the joint.

Horizontal joints in piers, abutments and retaining walls generally shall be avoided and, when they are used, shall not be located within 2 feet (0.6 m) of the normal water level.

Construction joints not shown on the plans and above ordinary low water, in abutments, and in retaining walls that retain earth fills shall be waterproofed on the back with a 36 inch (1 m) strip of Type B waterproofing according to 512 at the Contractor's expense.

Joints in cantilevered members shall be avoided.

Horizontal construction joints shall have the surface of the concrete below the joint dampened immediately prior to placing adjoining concrete.

Horizontal construction joints between bridge slabs and superimposed curbs, parapets, sidewalks and median strips, shall be placed and protected the same as the remainder of the slab. They shall be cured in accordance with 842.14.

Care shall be exercised to avoid disturbing the bond of curb reinforcing steel protruding from the concrete. If the curb areas are used by workers when placing the deck concrete, the reinforcing steel shall be tied and/or braced to prevent its movement.

Where walls or columns support slabs or beams, the concrete in the vertical member shall be deposited up to the bottom of the supported member and a period of at least 2 hours shall elapse for settlement before placing concrete in the horizontal member.

842.10 Emergency. When the work is unexpectedly interrupted by break-downs, storms or other causes and the concrete as placed would produce an improper construction joint, the Contractor shall rearrange the freshly deposited concrete to provide a suitable construction joint. When such a joint occurs at a section on which there is shearing stress, he shall provide an adequate mechanical bond across the joint by forming a key, inserting reinforcing steel or by some other means satisfactory to the Engineer, which will prevent a plane of weakness.

842.11 Depositing Concrete Under Water. No concrete except for cofferdam seals shall be deposited under water, unless by special permission of the Director. If such permission is granted, care shall be exercised to prevent the formation of laitance.

Concrete shall not be deposited until any laitance, which may have formed on concrete previously placed, has been removed. Pumping shall be discontinued while depositing foundation concrete if it results in a flow of water inside of forms. If concrete other than cofferdam seals is deposited under water, the proportion of cement used shall be increased at least 10 percent at no extra expense to the State, to compensate for losses due to water. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket or other approved method and shall not be disturbed after being deposited.

842.12 Depositing and Curing Concrete During Cold Weather. When an atmospheric temperature of 32 °F (0 °C) or less exists at the time concrete is placed, or is predicted by weather forecasts to occur during the curing period, the following procedures shall apply:

The water or aggregate or both shall be heated as necessary to make the temperature of the concrete not less than 50 °F (10 °C) nor more than 70 °F (21 °C) when placed.

Concrete shall not be placed in contact with materials having a temperature of less than 32 °F (0 °C). If necessary, the forms, reinforcing steel and foundation materials shall be heated before the concrete is placed.

The concrete shall be protected from freezing and specified temperatures for curing shall be maintained by a heated enclosure, insulated forms or by either of these used in combination with flooding, except that insulation alone may not be used to protect and cure deck slabs less than 10 inches (250 mm) thick.

The heated enclosure shall surround the top, sides and bottom of the concrete to be placed during cold weather except that concrete surfaces which have been flooded need not be enclosed.

The concrete shall be cured by maintaining the surface temperature between 50 °F and 100 °F (10 °C and 38 °C) for a period of not less than five days except as modified below for concrete flooded with water. At the end of this curing period, the temperature shall be reduced at a rate not to exceed 20 °F (11 °C) in 24 hours until it is within 20 °F (11 °C) of atmospheric temperature.

Sufficient high-low thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. For deck slabs, the surface temperature shall include deck bottoms, deck facia and deck top surfaces.

Removal of falsework and opening to traffic shall be not earlier than specified by 842.14.

(a) When a heated enclosure is used. The enclosure and heating devices shall be as nearly complete before any concrete is placed as the placing will permit. Throughout the entire concreting operation, the completion of enclosures and the application of heat shall follow the placing of concrete as closely as possible.

Heat may be supplied by any method which will maintain the required temperature continuously with a reasonable degree of uniformity in all parts of the enclosure without discoloring the concrete.

Combustion-type heating units shall be vented from the enclosure.

If dry heat, other than free steam, is used with method (a) curing, all exposed concrete shall be covered with two thicknesses of burlap as soon after placing the concrete as it can be done without marring the surface. The burlap shall be wetted and kept continuously wet and shall not be removed during the heating period, except as required for rubbing. Wood forms without liners, left in place more than two days after the placing of concrete, shall be thoroughly wet at least once each day for the remainder of the heating period. If forms are removed during the heating period, the concrete shall be thoroughly drenched with water and covered with burlap as noted above for the remainder of the heating period.

Enclosures shall be strong and wind proof, and provide adequate space to allow free circulation of air around the forms and deposited concrete.

(b) When insulation is used. Sufficient thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. Whenever the surface temperature, as indicated by the thermometer readings, approaches 100 °F (38 °C), the forms or insulation shall be loosened or otherwise vented to keep the surface temperature within the specified limits. If the thermometer readings indicate that the minimum required temperature is not maintained, the structure shall be promptly enclosed and heated as provided above or flooded as specified below.

The insulating material shall be wind and water resistant. Precautions shall be taken at edges and corners to insure that such points of extreme exposure are adequately protected. The top surface of the concrete shall be protected by a tarpaulin, or other approved waterproof cover, placed over the insulation.

(c) When the concrete is to be flooded with water. The concrete may be flooded as soon as it can be done without damaging it. Flooding water shall be heated to a temperature of not less than 50 °F (10 °C) nor more than 100 °F (38 °C). The heated flood water may be discontinued after 48 hours if the concrete remains flooded to a depth of 1 foot (0.3 m) above its highest elevation for at least the subsequent 120-hour period.

842.13 Removal of Forms. In order to facilitate finishing, forms on vertical surfaces which are to receive a rubbed surface finish shall be removed as soon as the concrete has hardened sufficiently that it will not be damaged.

842.14 Curing and Loading. Concrete for structures shall have the falsework removed and be opened to traffic in not less time than is specified by the following table:

	Span (a)	Age of Concrete in Days	
		No Beam Test	Beam Test (b)
Removing	Over 10' (3.0 m)	14	5
Falsework	10' (3.0 m) or less and all pier caps	7	3
Traffic	Any	14	7

(a) Span in this circumstance is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.

(b) Applicable only when the average modulus of rupture for two tests is not less than 650 psi (4.5 MPa).

When the temperature of the air surrounding the concrete is above and maintained above 32 °F (0 °C) and below 50 °F (10 °C) and the provisions of 842.12 are not in force, the duration of the cure shall be based on a beam test, except that the curing time shall not be less than tabulated above.

When a beam test is not performed, the time specified above for removing falsework and opening to traffic shall be extended one day for each day the temperature of the air surrounding the concrete is below 50 °F (10 °C).

All superstructure concrete, all concrete which is to have a sealer applied, and all construction joints shall be cured in accordance with Method (a) Water Curing. All other concrete shall be cured either by Method (a) Water Curing or Method (b) Membrane Curing. However, if Method (b) is used on areas to be waterproofed, the membrane shall be removed.

Compression rings are not to be installed on pier columns or similar items of construction for the purpose of supporting falsework or subsequent construction until after a 72-hour curing period.

No load shall be applied or other work conducted that will damage new concrete or interfere with its curing. Where work is necessary on new concrete to complete a structure, such as building forms on a footing, workers and materials shall be kept off such concrete until such time as it will not be damaged by the work in progress, but in no case shall the elapsed time between placing the concrete and working on same be less than 36 hours. No work that will interfere with the curing shall be done on concrete placed during cold weather unless insulating material to retain the heat in the mix is placed during periods in the day when the presence of workers will not interfere with the normal curing procedure. When this is done, the normal protection shall be resumed immediately after work is suspended. Proper curing shall have preference and, if necessary, workers shall be kept off so that the concrete may be thoroughly wetted and kept wet until the curing is completed.

Method (a) Water Curing. All surfaces not covered by forms shall be protected immediately after brooming or final finishing with two thicknesses of wet burlap and kept wet by the continuous application of water for a period of not less than 7 days. Formed surfaces shall, after the removal of forms, be cured in like manner for the remainder of the curing period with the entire surface of the concrete being thoroughly drenched with water and covered immediately after forms are removed.

In lieu of continuous sprinkling, wet burlap covered with white polyethylene sheeting or plastic coated burlap blankets 705.06 may be used. They shall be placed wet with the burlap side against the concrete. Adjoining plastic coated blankets or polyethylene sheets used to cover wet burlap shall be lapped sufficiently and held securely in place at laps and edges so that positive moisture seal is provided. White polyethylene sheeting or plastic coated blankets containing holes or tears shall be covered with an additional covering of sheeting or blankets as directed.

Method (b) Membrane Curing. Immediately after the free water has disappeared on

surfaces not protected by forms and immediately after the removal of forms, if such are removed before the end of the 7-day curing period, the concrete shall be sealed by spraying as a fine mist a uniform application of the curing material 705.07, Type 1 or 1D, in such manner as to provide continuous, uniform, water impermeable film without marring the surface of the concrete.

The membrane curing shall be applied in one or more separate coats at the rate of at least 1 gallon per 200 square feet (1 L/5m²) of surface. To assure that the proper amount of the curing material is applied, the number of gallons (liters) of curing material in the spray container shall be noted, and the correct area for that volume laid off so that the area of concrete surface to be covered will be such that the approved application rate will be secured. Curing material shall be thoroughly agitated immediately previous to use. If the film is broken or damaged at any time during the specified curing period, the area or areas affected shall be given a complete duplicate treatment of the curing material applied at the same rate as the first treatment.

Unless adequate precautions are taken to protect the surface of the membrane, workers, materials and equipment shall be kept off the membrane for the duration of the curing period.

842.15 Surface Finish. Immediately after the removal of forms, all cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges and other defects shall be cleaned, dampened and completely filled, pointed or trued with a mortar of the same proportions as used in the concrete being finished. Exposed surfaces which are not satisfactory to the Engineer because of excessive patching and/or other corrective work, shall be grout cleaned or rubbed as required by the Engineer. Other contiguous exposed surfaces on the structure shall be finished in a similar manner to the extent required to produce a uniform appearance.

On all exposed surfaces, all fins and irregular projections shall be removed with a stone or power grinder, care being taken to avoid contrasting surface textures. Sufficient white cement shall be substituted for the regular cement in the filling of holes and other corrective work to produce finished patches of the same color as the surrounding concrete.

Grout Cleaning. Where grout cleaning is called for on the plans or is necessary for corrective work, the surface, after wetting, shall be uniformly covered with a grout consisting of one part cement to 1 1/2 parts fine sand, 703.03 and sufficient water to produce a consistency of thick paint. White portland cement shall be used for all or part of the cement in the grout, as directed by the Engineer, to give the color required to match the concrete. The grout shall be uniformly applied with brushes or a spray gun, and all air bubbles and holes shall be completely filled. Immediately after the application of the grout, the surface shall be vigorously scoured with a cork or other suitable float. While the grout is still plastic the surface shall be finished with a sponge rubber or other suitable float removing all excess grout. The finishing shall be done at the time when grout will not be pulled from the holes or depressions. After being allowed to thoroughly dry, the surface shall be vigorously rubbed with a dry burlap to completely remove any dried grout. There shall be no visible film of grout remaining on the surface after this rubbing and the entire cleaning operations of any area must be completed on the day it is started. If any dark spots or streaks remain after this operation, they shall be removed with a fine grained

silicon carbide stone, but the rubbing shall not be sufficient to change the texture of the surface. Unless otherwise directed by the Engineer, grout cleaning shall be delayed until the final clean up of the project.

Rubbed Finish. Forms shall be removed, if possible, within two days after concrete is placed. Corrections shall be made as outlined above. Rubbing of concrete shall be started as soon as the conditions will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of two hours. Sufficient time shall have elapsed before wetting down to allow the mortar used in pointing insert holes and defects to be thoroughly set. Surfaces to be finished shall be rubbed with a medium coarse silicon carbide stone until all form marks, projections and irregularities have been removed, all voids filled and a uniform surface has been attained. The paste produced by rubbing shall be left in place at this time. No additional material other than water shall be applied to the surface. After all concrete above the surface being finished has been placed, the final finish shall be obtained by rubbing with a fine silicon carbide stone and water. This rubbing shall be continued until the entire surface is of a smooth texture and uniform in color. Any surfaces which have been given a rubbed finish, shall be protected from subsequent construction operations. Any surfaces which are not protected shall be cleaned and again rubbed, if necessary, to secure a uniform and satisfactory surface.

No extra payment will be made for any type of surface finish, the cost being considered as included in the price bid for concrete.

842.16 Roadway Finish. Concrete deck slabs shall be finished in accordance with the requirements of 451.12 except that construction joints shall not be edged, and a strip of surface 9 to 12 inches (220 to 300 mm) wide adjacent to curbs and barriers shall not be grooved. The use of a broom drag on concrete deck slabs may be in the longitudinal or transverse direction. The requirement for use of a finishing machine may be waived by the Engineer for small bridges where their use is impractical.

The finishing machine shall be approved by the Engineer. It shall be self-propelled and equipped with forward and reverse drive mechanisms that enable precision velocity control of the machine while moving in either direction. It shall be equipped with one or more rotating rollers, leveling augers and either a vibrating pan or vibrating rollers. Vibrating frequency for pans or rollers shall be variable from 1500 to 5000 pulses per minute. The Contractor shall furnish the necessary verification of these frequencies. The finishing machine shall be capable of finishing transversely while traveling in either direction across the deck. Screeds shall have provisions for raising them above the concrete surface. The finishing machine shall be of sufficient size to finish the full width of the decks between curbs or parapet walls. The wheels of the finishing machine shall run on temporary riding rails adequately supported on structural steel or falsework. The rail and rail supports shall be made of steel and shall be arranged so that the weight of the finishing machine and the operator cause zero vertical deflection while traveling across the deck. Rail shall be straight with no sections exceeding a tolerance of 1/8 inch in 10 feet (3 mm in 3.0 m) in any direction. All support rails shall be elevated a sufficient distance above the slab to permit the simultaneous finishing by hand of any portions not finished by the machine. Any rail supports shall be fabricated and installed in such manner

as to permit their removal to at least 2 inches (50 mm) below the top of the slab. Holes formed by the removal of such supports shall be filled during the final finishing of the slab. The concrete shall be delivered and distributed at a uniform and adequate rate ahead of the finishing machine by suitable mechanical equipment. Concrete shall be placed no more than 10 feet (3m) directly in front of the finishing machine.

Bridge decks that are to be waterproofed with a membrane shall be given a burlap drag finish.

842.161 Bridge Deck Grooving. After the concrete has cured, transverse grooves shall be sawed into the deck. The grooving shall conform to the following requirements:

Grooving shall be done utilizing diamond blades, mounted on a multi blade arbor on a self-propelled machine which has been built for grooving of concrete surfaces. The groove machine shall have a depth control device which will detect variations in the pavement surface and adjust the cutting head height to maintain the depth of the groove specified. The grooving machine will be provided with devices to control alignment. Flailing or impact type grooving equipment will not be permitted.

Grooves shall begin and end approximately one foot from any curb, parapet toe or deck edge and shall be perpendicular to the bridge center line.

The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimension, and grooving of the surface.

Grooves shall run in a continuous pattern across the surface. The grooving shall be terminated a minimum of 1 foot (300mm) from any device in place in a bridge deck, such as scuppers or expansion joints. The grooves shall be a random pattern spaced at 3/8 to 1 3/4 inch (10 to 45 mm), with 50 percent of spacings being less than 1 inch (25 mm). The grooves shall be approximately 0.15 inches (4 mm) deep and 0.10 inches (3 mm) wide.

At the beginning of each work shift, all grooving machines shall be equipped with a full complement of grooving blades that are capable of cutting grooves of the specified width, depth and spacing.

If during the course of work, a single grooving blade on any individual grooving machine becomes incapable of cutting a groove, work will be permitted to continue for the remainder of the work shift and the Contractor will not be required to otherwise cut the groove omitted because of the failed blade. Should two or more grooving blades on any individual grooving machine become incapable of cutting grooves, the Contractor shall cease operating such equipment until it is repaired.

The removal of all slurry and any remaining residue resulting from the grooving operation shall be continuous. The bridge deck surface shall be left in clean condition, free of all slurry and residue. Residue from grooving operations shall not be permitted to flow across shoulders or lanes occupied by public traffic or flow into gutters or other drainage facilities. Solid residue, resulting from grooving operations, shall be removed from the surface before such residue is blown by the action of traffic or wind.

The Contractor shall be responsible for providing water as necessary to perform the specified grooving in accordance with the specifications.

842.17 Sidewalk Finish. The concrete shall be struck off after placing with a template and finished with a float to produce a sandy texture.

842.18 Method of Measurement. The volume shall be the number of cubic yards (cubic meters) determined by calculations from plan dimensions, in place, completed and accepted.

Reinforcing steel, supports, mechanical connectors, and tie wires shall be incidental in the price bid for structural concrete.

No deduction will be made for the volume of the reinforcing steel, conduits or structural steel other than beam flanges embedded in deck slabs. No deduction will be made for the volume of any embedded timber or concrete piles.

Superstructure concrete includes the concrete in defluctive parapets not having a metallic railing.

Deck concrete may be measured by either volume or area. The area of concrete shall be based on plan dimensions.

842.19 Basis of Payment. Payment will be made at contract prices for:

Item	Unit	Description
842	Cubic yard (cubic meter)	Class ____ concrete, _____
842	Cubic yard (Cubic meter), Square yard (square meter)	Class ____ concrete, bridge deck

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 844

HIGH PERFORMANCE CONCRETE FOR STRUCTURES

January 6, 1999

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844.12	Method of Measurement
844.13	Basis of Payment

844.01 DESCRIPTION. This item consists of supplying, placing, curing, broom texturing, sealing joints and cracks and diamond grinding a high performance concrete that is workable, finishable, and when necessary, pumpable.

The probability of higher than normal dosage rates of Type F or G admixtures is likely. The need for chemical admixtures or aggregates or both, different from the Contractor's normal sources is a distinct possibility.

All provisions of Supplemental Specification 899 (Concrete - General) and Supplemental Specification 842 (Concrete for Structures) shall apply, except as modified herein.

844.02 MATERIAL. The maximum sodium sulfate soundness loss for coarse aggregate will be 10 percent.

Fly ash will meet 705.13 Class C.

Ground granulated blast furnace (GGBF) slag will meet ASTM C 989, grade 100 minimum (manufacturer's certification is required). The one day cube strength results of ASTM C 1073 may be used in lieu of the 7 and 28 day cube strengths required by ASTM C 989.

Only one source of fly ash or GGBF slag will be used in any one structure, unless otherwise authorized by the Engineer. Bulk fly ash or GGBF slag will be stored in waterproof bins.

Micro-silica admixture will meet ASTM C 1240 and be from a source approved

by the Office of Materials Management, 1600 W. Broad Street, Columbus, Ohio.

Cement will be Type 1 only (701.04); only one brand, grade or kind shall be used in any given superstructure except upon permission of the Engineer.

High molecular weight methacrylate resin sealer shall meet the requirements of Supplemental Specification 954.

The Contractor will obtain a written statement from the manufacturers of the chemical admixtures verifying the compatibility of the combination of materials and the sequence in which they are combined. The manufacturers will further designate a technical representative from its company or the ready-mix supplier to be in charge of the dispensing of the admixture products. The technical representatives will act in an advisory capacity and will report to the Contractor and the Engineer any operations and procedures which are considered by the representative as being detrimental to the integrity of the placement. The manufacturer's technical representative will be present during concrete placement unless his presence is waived by the Engineer.

844.03 PROPORTIONING. The proportioning options of 899.04 will not be permitted.

At least 3 days prior to placing the test slab, the Contractor will submit in writing the specific mix design and batching sequence for the project. This design is for the Engineer's information and review and only subject to approval for meeting the specification proportions.

If any proportioning or batching sequence modifications are needed, the Contractor will submit a revised mix design or batching sequence to the Engineer and perform another test slab at no additional cost to the State. A successful test slab pour, as determined by the Engineer, must be completed before any concrete is placed.

844.031 PROPORTIONING, SLIPFORMING. The Contractor is allowed the option of slipforming bridge parapets. A mix will be developed and a 20 foot (6m) section of parapet will be slipformed as a test section. Up to two thirds of the No. 8 Size coarse aggregate may be replaced with No. 57 Size coarse aggregate. The Engineer will approve the test section before any additional parapet concrete is allowed to be slipformed. The approved slipform concrete mix design will be submitted to The Office of Materials Management for record purposes.

Dimensional Tolerances and Acceptance Criteria.

Dimensions will not be in excess of the construction tolerances listed below:

Reinforcing steel cover	- ½ inch (- 13 mm) + ½ inch (+ 13 mm)
Top width dimension	-0 + 1/4 inch (+ 6 mm)
Bottom width dimension	-0 + ½ inch (+ 13 mm)
Surface flatness	1/4 inch in 10 feet(6 mm in 3 meters)
Vertical alignment	½ inch in 20 feet
(Deviation from a line parallel to the grade line)	(13 mm in 6 meters)

All reinforcing steel joints and/or splices in the bridge railing steel shall be tied. A dry run to check for reinforcing clearance and rigidity of the reinforcing cages shall be required before any concrete is placed. The Contractor shall verify reinforcing clearances and make any adjustments to the cage to establish the required clearances during the dry run. Reinforcing steel cages are to be rigid (defined as no movement during the slipforming dry run). If the Engineer determines the cages are not rigid, the Contractor must stabilize the cages before any slipforming is performed. The Contractor may add any additional diagonal reinforcing steel between the front and rear vertical reinforcing faces to establish the required rigidity. Any additional reinforcing steel required to adequately stabilize the cages shall be the Contractor's expense.

Honeycombing, cracking, tearing and other defects shall be repaired or patched immediately upon exit from the slipform equipment. Defects shall be completely filled with concrete.

Control joints shall be constructed by sawing 1 1/4 inches (32 mm) deep the perimeter of the parapet, after the concrete has taken its initial set but before any shrinkage cracks develop. Generally initial set is within 6 hours of batching of the concrete. All joints shall be sawed within 24 hours of placement. Joints shall be sawed by using an edge guide, fence or jig to insure that the joint is straight, true and aligned on all faces of the parapet. The joint width shall be the width of the saw blade, a nominal 1/4 inch (6 mm).

Slip formed concrete will require different slumps than those listed in 899 or other plan specified concrete. The consistency of the concrete should be such that the concrete exiting the slipform does not pull but is stiff enough to prevent waviness and sags in the finished surfaces. Method A, Water Curing, 842.14 is required. As slipformed concrete has a low water-cement ratio, timely application of the water cure is critical in helping control shrinkage cracks.

No water shall be added or applied to the concrete after it has left the truck. The Contractor shall furnish all necessary platforms to protect against falling debris during the slipforming operation, to allow access for completing the finishing operation and to allow the inspector access.

Concrete control joints will be sawed 1 1/2 inch (35mm) into the concrete by use of an edge guide, fence or jig to assure the cut joint is straight, true and aligned on all faces of the parapet. the Joint will be a saw blade wide, (nominal 1/4 inch (6mm)). The perimeter of the control joint will be caulked with a polyurethane or polymeric material meeting Federal Specification TT-S-00227E.

The Engineer will inspect the slipformed surface for horizontal cracking no earlier than 21 days after completion of the slipforming operation. All horizontal cracks shall be repaired by epoxy injection. If a concrete sealer has been applied, any damage to the sealer shall be repaired after the epoxy injection has been completed. The aforementioned repairs shall be made at no additional cost to the State.

844.04 MIX OPTIONS. Unless specific concrete mixes are specified in the pay item descriptions, the following provisions will apply:

All superstructure concrete except for parapet concrete will consist of mix 3 or mix 4. If mix 3 is used for the deck, then all other concrete will be mix 1 or mix 3 concrete. If mix 4 is used for the deck, then all other concrete will be mix 2 or mix 4 concrete.

Any 899 calendar time restrictions regarding the use of fly ash will be waived for this concrete.
The following proportions will used as a starting mix design.

CONCRETE TABLE								
Quantities Per Cubic Yard								
Aggregates (SSD)								
Mix 1 (Fly Ash)								
Aggregate Type	Fine Aggregate (lb)	#8 Coarse Aggregate (lb)	Total (lb)	Cement Content (lb)	Fly Ash (lb)	Water to Cementitious Ratio Max	Air Content +/-2%	
Gravel	1320	1480	2800	530	170	0.38	7	
Limestone	1320	1495	2815	530	170	0.38	7	
Slag	1320	1300	2620	530	170	0.38	7	
Mix 2 (GGBF Slag)								
Aggregate Type	Fine Aggregate (lb)	#8 Coarse Aggregate (lb)	Total (lb)	Cement Content (lb)	GGBF Slag (lb)	Water to Cementitious Ratio Max	Air Content +/-2%	
Gravel	1335	1480	2815	490	210	0.38	7	
Limestone	1335	1495	2830	490	210	0.38	7	
Slag	1335	1295	2630	490	210	0.38	7	
Mix 3 (Fly Ash + Microsilica)								
Aggregate Type	Fine Aggregate (lb)	#8 Coarse Aggregate (lb)	Total (lb)	Cement Content (lb)	Fly Ash (lb)	Micro-Silica (lb)	Water to Cementitious Ratio Max	Air Content +/-2%
Gravel	1355	1475	2830	480	150	30	0.40	7
Limestone	1355	1490	2845	480	150	30	0.40	7
Slag	1355	1295	2650	480	150	30	0.40	7
Mix 4 (GGBF Slag + Microsilica)								
Aggregate Type	Fine Aggregate (lb)	#8 Coarse Aggregate (lb)	Total (lb)	Cement Content (lb)	GGBF Slag (lb)	Micro-Silica (lb)	Water to Cementitious Ratio Max	Air Content +/-2%
Gravel	1370	1475	2845	440	190	30	0.40	7
Limestone	1370	1490	2860	440	190	30	0.40	7
Slag	1370	1295	2665	440	190	30	0.40	7

8 inch maximum slump at placement for all mixes.

CONCRETE TABLE
Quantities Per Cubic Meter
Aggregates (SSD)

Aggregate Type	Fine Aggregate (kg)	#8 Coarse Aggregate (kg)	Total (kg)	Mix 1 (Fly Ash)			Water to Cementitious Ratio Max	Air Content +/-2%
				Cement Content (kg)	Fly Ash (kg)			
Gravel	783	878	1661	314	101		0.38	7
Limestone	783	887	1670	314	101		0.38	7
Slag	783	771	1554	314	101		0.38	7

Aggregate Type	Fine Aggregate (kg)	#8 Coarse Aggregate (kg)	Total (kg)	Mix 2 (GGBF Slag)		Water to Cementitious Ratio Max	Air Content +/-2%
				Cement Content (kg)	GGBF Slag (kg)		
Gravel	792	878	1670	291	125	0.38	7
Limestone	792	887	1679	291	125	0.38	7
Slag	792	768	1560	291	125	0.38	7

Aggregate Type	Fine Aggregate (kg)	#8 Coarse Aggregate (kg)	Total (kg)	Mix 3 (Fly Ash + Microsilica)			Water to Cementitious Ratio Max	Air Content +/-2%
				Cement Content (kg)	Fly Ash (kg)	Micro-Silica (kg)		
Gravel	804	875	1679	285	89	18	0.40	7
Limestone	804	884	1688	285	89	18	0.40	7
Slag	804	768	1572	285	89	18	0.40	7

Aggregate Type	Fine Aggregate (kg)	#8 Coarse Aggregate (kg)	Total (kg)	Mix 4 (GGBF Slag + Microsilica)			Water to Cementitious Ratio Max	Air Content +/-2%
				Cement Content (kg)	GGBF Slag (kg)	Micro-Silica (kg)		
Gravel	813	875	1688	261	113	18	0.40	7
Limestone	813	884	1697	261	113	18	0.40	7
Slag	813	768	1581	261	113	18	0.40	7

200mm maximum slump at placement for all mixes.

The weights specified in the concrete table were calculated for materials of the following bulk specific gravities (SSD): natural sand and gravel 2.62, limestone sand 2.68, limestone 2.65, slag 2.30, fly ash 2.65, GGBF slag 2.90, Microsilica solids 2.20, and Portland cement 3.15. For aggregates of specific gravities differing more than plus or minus 0.02 from these, the weights in the table will be corrected.

If, during the progress of work, the specific gravity of one or both of the aggregates changes, the batch weight will be adjusted to conform to the new specific gravity.

The water cement ratio will be calculated based upon the total cementitious material. Cementitious material will include Portland cement, fly ash, GGBF slag and Microsilica (solids).

The proportions of coarse and fine aggregate will be adjusted to provide the maximum amount of coarse aggregate possible and still provide a workable and finishable mix. The Contractor may modify the mixes shown by adjusting the coarse and fine aggregates up to 100 pounds (50 kg) each, unless otherwise approved by the Engineer.

844.05 PROVISIONS. An approved high range water reducer (Type F or G) will be used to achieve the desired workability level at the specified water cementitious ratio. These chemical admixtures will conform to 705.12 (ASTM C 494) Type F or G and be approved by the Office of Materials Management. The majority of these admixtures will be added at the plant.

Type A or D chemical admixture conforming to 705.12 (ASTM C494) will be added to the concrete at the plant. The addition of these admixtures will supersede the concrete temperature requirements under items 899.03 and 842.06. The trial batch, as specified below, will be repeated until the mix exhibits the necessary finishability characteristics.

The moisture content of the coarse aggregate will be above the saturated surface dry (SSD) condition immediately prior to being incorporated into the mix.

The cementitious content will be maintained and the maximum water cementitious ratio will not be exceeded. The Type F or G admixture will be added and mixed in accordance with the manufacturer's recommendations. The Contractor will furnish a volumetric dispenser for the Type F or G or have a gage on each truck-mounted Type F or G dispensing tank. After discharging concrete and prior to reloading, all wash water will be removed, by reversing each truck drum at the plant.

If Type F or G admixture is added at the job site, the load will be mixed a minimum of 5 minutes at mixing speed.

If during discharge any mechanical balling or microsilica balling whatsoever is observed, the load shall be rejected and the mixing process revised to prevent further balling.

If slump loss occurs before placement of the concrete, the concrete may be "replasticized" with the admixture to restore plasticity. The slump range and air content will be rechecked to ensure conformance to the specifications. If the consistency of the load after "replasticizing" is such as to cause segregation of the components, this will be cause for rejection of the load. Discharge will be complete within 90 minutes after the combining of the water and the cementitious material.

The Contractor will perform sufficient advance testing to ensure conformance with these specifications prior to placement of the concrete.

Sampling and testing for entrained air content and slump will be measured at the point of placement. For deck pours, this will be at the point of placement on the deck.

The Contractor will make one or more trial batches of concrete meeting these specifications, of the size to be hauled, at least four days before the deck concrete is to be placed. The Contractor will cast one or more test slabs, 8 feet (2.4m) x 4 feet (1.2m) x 4 inches (0.1m), finished and textured in accordance with these requirements. The

Contractor will not be required to saw the texture unless the deck texture is required to be sawn. If the workability of the trial batch is not acceptable, the Contractor will modify the mix design or batching sequence and retest as per 844.03. Payment for the trial batch or batches and test slabs will be at the lump sum price bid for High Performance Concrete Trial Mix.

844.06 PLACEMENT LIMITATION. Concrete deck pours will begin only when favorable atmospheric conditions exist and are predicted to stay favorable for the duration of the pour.

Favorable atmospheric conditions exist when the surface evaporation rate, as affected by the ambient air temperature, concrete temperature, relative humidity, and wind velocity is 0.1 pounds per square foot per hour (0.49 kg per square meter per hour) or less. Figure 1 ACI 308 (see Item 842.08) will be used to determine graphically the surface evaporation rate.

To meet favorable atmospheric conditions, the Contractor may be required to place concrete at night. Actual measurement of data required in Figure 1 will be within 10 feet (3 m) of the area where the concrete is to be placed. For piers, abutments, and poured parapets, Figure 1 will not apply. Figure 1 will apply for slip formed parapets.

If placement is to be made at night, the Contractor will submit a plan which provides adequate lighting for the work area at least 15 calendar days in advance, and receive written approval from the Engineer before placing the concrete. The lights will be so directed that they do not affect or distract approaching traffic.

The Contractor will ensure that concrete pumping lines do not displace reinforcing steel during placement.

844.07 EQUIPMENT FOR BRIDGE DECKS. Concrete will be mixed in a central mixing plant or by a ready-mixed truck capable of discharging concrete having a maximum water cementitious ratio of 0.38. Mixing equipment will meet the requirements of 899.06(b). Admixtures will be introduced into the concrete in such a manner as to facilitate dispersion throughout entire load. Batch plants will meet the requirements of 899.06(a) and will be located such that the maximum time required from start of mixing to completion of discharge of the concrete at the site will not exceed 90 minutes.

An approved self-propelled finishing machine will be used. The finishing machine will be equipped with forward and reverse drive mechanisms that enable precise velocity control of the machine while it is moving in either direction. It will be equipped with two or more rotating rollers. It will be equipped with augers and either a vibrating pan or vibrating rollers. Vibrating frequency for pan or rollers will vary from 1500 to 5000 pulses per minute. The Contractor will furnish the necessary verification of these vibration frequencies. Screeds will have provisions for raising above the finished concrete surface. Roller tampers attached to finishing machines which have fins protruding more than 1/4 inch (6mm) from the roller are not allowed.

Concrete shall be placed no more than 10 feet (3.1 m) directly in front of the finishing machine.

Standard hand vibration equipment shall be used. Because high performance concretes are more cohesive, more vibration is required for proper consolidation than for

Class C and S mixes. Vibration, often between each rebar, will be required to adequately consolidate a bridge deck even though the surface appears well consolidated.

Finishing machines will be supported by rail and supports made of steel. Rail will be furnished in sections not less than 10 feet (3.1 m) in length and be sufficient cross-section so that the weight of the finishing machine causes zero vertical deflection while in motion. Rail will be straight with no sections exceeding a tolerance of 1/8 inch in 10 feet (3 mm in 3.1 m) in any direction. Rail supports will be screw-type adjustable saddles and will be of sufficient number under the rail so that zero vertical deflection occurs under the weight of the finishing machine.

A flexible blue steel blade with rounded edges is recommended for finishing.

844.08 SUPERSTRUCTURE DECK CURING AND TEXTURING. After the concrete is placed, finished and bullfloated if necessary, the surface of the concrete shall immediately receive a broom finish. Immediately after the completed brooming, the finished surface will be covered with a single layer of clean wet burlap. The burlap will be kept wet by a continuous flow of water through soaker hoses and covered with a 4 mils (100 μ m) white opaque polyethylene film or a wet burlap - white opaque polyethylene sheet for 7 days. At the end of 7 days, the deck will be allowed to surface dry. After the deck has air dried but within 12 hours, the surface shall be membrane cured as per 842.14 method(b).

When pouring under provision of 842.12, the deck will be kept continuously wet with hoses and the curing will be 7 days with the surface being maintained between 50 °F (10 °C) and 100 °F (38 °C) as specified. At the end of 7 days, the deck will be allowed to surface dry. After the deck has air dried but within 12 hours, the surface shall be membrane cured as per 842.14 method(b).

After the water curing is completed, and prior to the application of the curing compound, the Contractor shall saw transverse grooves into the deck. In lieu of sawing the grooves into the deck prior to the application of the curing compound, the Contractor may elect to saw the grooves into the deck some period after the curing compound is placed. However, in every case it will be necessary to saw the deck prior to opening the bridge to traffic. If the Contractor does elect to saw the deck after the curing compound has been applied, it will be necessary, at no additional costs, to reapply the curing compound immediately after the surface of the deck has air dried but within 12 hours after the sawing operation.

The grooving shall conform to the following requirements: Grooving shall be done utilizing diamond blades, mounted on a multi blade arbor on a self-propelled machine which has been built for grooving of concrete surfaces. The groove machine shall have a depth control device which will detect variations in the pavement surface and adjust the cutting head height to maintain the depth of the groove specified. The grooving machine will be provided with devices to control alignment. Flailing or impact type grooving equipment will not be permitted.

Grooves shall begin and end approximately one foot from any curb, parapet toe or deck edge and shall be perpendicular to the bridge center line.

The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimension, and grooving of the surface.

Grooves shall run in a continuous pattern across the surface. The grooving shall be terminated a minimum of 1 foot (0.3 m) from any device in place in a bridge deck, such as scuppers or expansion joints. The grooves shall be a random pattern spaced at 3/8 to 1 3/4 inch (10 to 45 mm), with 50 percent of spacings being less than 1 inch (25 mm). The grooves shall be approximately 0.15 inches (4 mm) deep and 0.10 inches (3 mm) wide.

At the beginning of each work shift, all grooving machines shall be equipped with a full complement of grooving blades that are capable of cutting grooves of the specified width, depth and spacing.

If during the course of work, a single grooving blade on any individual grooving machine becomes incapable of cutting a groove, work will be permitted to continue for the remainder of the work shift and the Contractor will not be required to otherwise cut the groove omitted because of the failed blade. Should two or more grooving blades on any individual grooving machine become incapable of cutting grooves, the Contractor shall cease operating such equipment until it is repaired.

The removal of all slurry and any remaining residue resulting from the grooving operation shall be continuous. The bridge deck surface shall be left in clean condition, free of all slurry and residue. Residue from grooving operations shall not be permitted to flow across shoulders or lanes occupied by public traffic or flow into gutters or other drainage facilities. Solid residue, resulting from grooving operations, shall be removed from the surface before such residue is blown by the action of traffic or wind.

The Contractor shall be responsible for providing water as necessary to perform the specified grooving in accordance with the specifications.

844.09 CURING AND LOADING. Curing and loading will be per 842.14, except that the deck will not be opened to traffic until the 7 day water cure is completed and the membrane curing compound has been applied and allowed to dry for the minimum time recommended by the manufacturer. Superstructure deck concrete placed between October 15 and March 15 will not be opened to traffic for a minimum of 30 days after placement.

844.10 SEALING JOINTS AND CRACKS. After the application of the membrane cure, and the deck has thoroughly dried, the following areas will be sealed with a high molecular weight methacrylate (HMWM) sealer meeting Supplemental Specification 954 prior to opening the deck to traffic: transverse joints in the deck; joints between the concrete deck and steel end dams; longitudinal joints in the deck; longitudinal joints between the deck and safety curb, barriers, and parapets, etc.; and, cracks which are discovered in the deck which will be checked on the top and bottom surface before opening the deck to traffic.

All costs for sealing in accordance with above, will be included with the appropriate concrete item. No separate payment for sealing will be made.

844.11 CHLORIDE RESISTANCE, DRYING SHRINKAGE, AND HEAT OF HYDRATION TESTING. When included as a separate pay item, the Contractor will perform rapid chloride permeability tests (AASHTO T 227) for every bridge deck placed

using this concrete. A minimum of 3 tests will be made for decks containing less than 100 cubic yards (75 cubic meters) of superstructure concrete. For all other decks, 6 tests will be required. These tests will be made on the deck superstructure concrete samples obtained from the actual concrete used. The same number of drying shrinkage tests will be performed as per ASTM C 157.

Results of rapid chloride permeability tests will be shown at 28, 56 and 90 days. Results of drying shrinkage tests will be shown at 4, 7, 14, 28, 56 and 90 days.

Concrete heat of hydration testing will be performed to determine the potential for length change due to thermal expansion and contraction. Starting immediately after the placement of the deck, concrete temperatures will be taken and tabulated. A location will be chosen on the deck which is accessible for hourly readings and representative of the overall deck pour. The temperatures will be taken by installing three thermometers into the fresh concrete. The bulb of the thermometers will be located at 1 inch (25mm) below the surface of the concrete, at approximately mid-slab and at 1 inch (25mm) above the bottom deck form. The thermometers will be left in place throughout the testing time. Thermometers may be lubricated and placed in a thin plastic sheath to facilitate eventual removal. After removal, the holes remaining will be drilled out and filled as approved by the Engineer.

The following temperature intervals will be used:

<u>Test Intervals</u>	<u>Time</u>
2 hour	first 12 hours
3 hours	second 12 hours
4 hours	second day
8 hours	third thru fifth day

Ambient air temperatures will also be noted when each concrete temperature is taken. All testing will be performed by a testing laboratory regularly inspected by the "Cement and Concrete Reference Laboratories" (CCRL). A copy of the last CCRL inspection report will be furnished to the Engineer prior to the test slab pour.

If the Contractor uses Mix 1 or Mix 2 concrete for the parapets or substructures, the Contractor will make an additional 3 chloride permeability and drying shrinkage tests for that concrete. If used for the parapets, the Contractor will also test for heat of hydration as described above with one thermometer located at 1 inch (25mm) below the top of the parapet and second thermometer located 19 inches (500mm) below the top of the parapet, approximately midway between the front and back faces of the parapet. For units constructed with the same concrete mix option as the deck, no additional testing will be required.

The results of all tests shall be tabulated on the attached form and forwarded to the following address no later than 10 days following the completion of the tests:

The Office of Structural Engineering
Ohio Department of Transportation, 3rd Floor
1980 W. Broad Street
Columbus, Ohio 43223

All costs of testing as outlined above will be paid for under the lump sum bid price for High Performance Concrete Testing.

844.12 METHOD OF MEASUREMENT. The volume will be measured as per 842.18. The area of high performance concrete will be based on plan dimensions. The above items will include all labor, material, equipment and incidentals necessary to complete these items of work. The above items will also include all costs associated with sealing joints and cracks and sawing grooves into the deck.

Payment for high performance concrete testing will not be made until the Office of Structural Engineering has received the results of all tests.

844.13 BASIS OF PAYMENT. Payment for the above completed and accepted quantities will be made at the contract bid price for:

Item	Units	Description
844	Cubic yard (cubic meter)	High performance concrete superstructure (deck)
844	Square yard (square meter)	High performance concrete superstructure (deck)
844	Cubic yard (cubic meter)	High performance concrete superstructure (parapet)
844	Cubic yard (cubic meter)	High performance concrete substructure
844	Lump sum	High performance concrete trial mix
844	Lump sum	High performance concrete testing

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 846**

**TREATING CONCRETE BRIDGE DECKS WITH HMWM RESIN
September 9, 1997**

- 846.01 Description**
- 846.02 Material**
- 846.03 Limitations**
- 846.04 Surface Preparation**
- 846.05 Installation**
- 846.06 Method of Measurement**
- 846.07 Basis of Payment**

846.01 DESCRIPTION. This work shall consist of preparing and treating the concrete wearing surfaces of bridge deck with a penetrating sealer in accordance with these specifications, in reasonably close conformity with the plans and the manufacturer's recommendation and as directed by the Engineer.

846.02 MATERIAL. The material used for treating the concrete shall meet Supplemental Specification 954, High Molecular Weight Methacrylate (HMWM) Resin.

846.03 LIMITATIONS. This work item shall not be performed during the period beginning November 1st and ending March 31st.

846.04 SURFACE PREPARATION. Roadway dirt and debris shall first be removed from the area of the deck to be treated. Surfaces to which the sealer is to be applied shall be swept, sandblasted then manual or power broom swept and blown with compressed air so that they shall be dry and free of dust and dirt. High pressure compressed air shall be used to blow all loose material from visible cracks. The cleaning equipment shall be fitted with suitable traps, filters, drip pans, driers and other devices to prevent oil and other foreign material from being deposited on the surface. Traffic shall not be allowed on the clean surface prior to application of the sealer. Existing pavement markings shall be removed according to Section 641.10 of the Specifications. All traces of asphalt or petroleum products and concrete curing seals shall be removed by the abrasive blasting prior to air sweeping.

846.05 INSTALLATION. A compatible promoter/initiator system capable of providing the same physical qualities of the hardened resin as if promoted/initiated with 2% cobalt naphthanate (6%) and 2% cumene hydroperoxide shall also be provided. Materials shall be stored at 18-27 °C (65-80°F). The system shall provide a resin gel time of not less than 40 minutes to not more than 1½ hours at the time and temperature of application.

The gel time shall be adjusted to compensate for the change in temperature throughout the day. The temperature of the surfaces to be treated may range from 10 °C (50°F) to 49°C (120 °F). The Contractor shall arrange to have a technical representative on site to provide mixing proportions equipment suitability, and safety advice to the Contractor and Engineer. Any conflict these provisions and representative's advice shall be resolved at the job site. The technical representative shall remain at the job site until such time as he and the Engineer agree that the Contractor is qualified in all aspects of the application of the sealer.

The promoter and initiator, if supplied separate from the resin, shall not contact each other directly. Containers of promoter or initiators shall not be stored together in a manner that will allow leakage or spillage from one to contact the containers or materials of the other.

Machine application of the resin may be performed by using a two-part resin system utilizing a promoted resin for one part and an initiated resin for the other part. This two-part resin system may be combined at a spray bar through positive displacement atomization of the resin. Compressed air shall not be used to produce the spray.

Cleaning and flushing of equipment, tools, etc., shall be done with an appropriate solvent, as approved by the Engineer, in such a manner to minimize personal and environmental hazards. Workman should be advised the resin will soften gum rubber soles, and a face-mask should be used to protect from accidental splashes. Clothing and leather saturated with resin will harden and become useless.

The surface to be treated shall be visibly dry and its temperature between 10 °C (120°F) prior to resin application. The resin may not be applied within 24 hours after a rain or when rain is forecast within 12 hours or when the ambient air temperature is below 10 °C (50 °F). The deck shall be pre-marked to control mixed material usage and to provide a rate of application of approximately 2.45m²/l (100 square feet per gallon). The exact rate shall be determined by the Engineer prior to commencing full-scale deck treatment operations.

Before using the material the Contractor shall submit to the Director copies of the manufacturer certified test data showing that material complies with the qualitative and qualitative requirements of this specification. The test data shall be developed by an independent approved testing laboratory, and shall include the brand name of the material, name of manufacturer, number of the lot tested and date of manufacture. When the material has been approved by the Director, further testing by the manufacturer will not be required unless the formulation of manufacturing process has been changed, in which case new certified test results will be required. The manufacturer shall certify that the formulation is the same as that for which data has been submitted. The state reserves the right to sample and test delivered lots for compliance.

The deck surfaces shall be flooded with resin, allowing penetration into the concrete and filling of all cracks. The initiated mix of promoted resin shall be limited to 19l (5 gallons) at a time for manual application. A significant increase in viscosity shall be cause for rejection. The treatment shall be applied within 5 minutes after complete mixing. Excess material shall be redistributed by squeegee or brooms within 10 minutes after application.

The Contractor shall take all steps necessary to prevent the resin from flowing into lanes open to traffic. The entire treated area of the bridge deck shall have sand broadcast by mechanical means to effect a uniform coverage of 0.43 kg/m² to 0.65 kg/m² (0.80 to 1.2 pounds per square yard). The sand shall be uniformly graded aggregate conforming to the quality requirements of 703 and shall conform to the following limits for grading:

<u>Sieve Size%</u>	<u>Passing Max.</u>
4.75mm (No. 4)	100
2.36mm (No. 8)	90-100
850 μm (No. 20)	5-15
300 μm (No. 50)	0-5

It is the intention of the specification to allow the use of commercially available blast sands applied by a common lawn broadcast type seeder/spreader. Sand shall be placed between 10 to 15 minutes behind the resin spreading front and before any jelling of the resin occurs. If the surface contains large deep cracks, the low-viscosity liquid could run completely through the concrete slab. In these areas, a second coat will be required after the first coat has started to cure.

Before the monomer hardens, imperfections or spalls with standing liquid shall be filled with commercial quality concrete or sandblast sand, and finished to a uniform surface. The sand shall have a maximum moisture content of 0.5 of the percent of absorption when tested in accordance to a California Test 226.

Traffic and equipment shall not be permitted on the tested deck until it is tack free and a minimum of 6 hours have elapsed since treatment and the sand cover adheres sufficiently to resist brushing by hand. The treatment shall be protected from moisture for not less than 4 hours after placement.

846.06 METHOD OF MEASUREMENT. The area under this item will be the number of square meter (square yards) of concrete bridge deck which are prepared, treated with high molecular weight methacrylate resin and are complete in place and accepted.

The accepted quantities of deck treatment will be paid for at the contract unit price per square meter (square yard), which price and payment shall be full compensation for furnishing all labor, materials including catalysts, tools, equipment and incidentals, and for performing all the work involved in preparing and treating the concrete surfaces

according to specifications.

846.07 BASIS OF PAYMENT. Payment for the above completed and accepted quantities will be made at the contract bid price for:

Item	Units	Description
846	Square meter (square yard)	Treating concrete bridge decks with HMWM resin

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 870
SEEDING AND MULCHING

August 10, 1999

870.01	Description
870.02	Testing of Soil
870.03	Agricultural Lime
870.04	Testing of Agricultural Liming Materials
870.05	Lime Application Rates
870.06	Commercial Fertilizer
870.07	Topsoil
870.08	Compost
870.09	Seeds
870.10	Legumes
870.11	Native Grasses and Wildflowers
870.12	Site Preparation
870.13	Placing Topsoil
870.14	Seeding Methods
870.15	Mulching Operation
870.16	Wood Fiber Mulch
870.17	Compost
870.18	Watering
870.19	Maintenance
870.20	Mowing
870.21	Fertilization: 2 nd Application
870.22	Repair Seeding and Mulching
870.23	Inter-seeding
870.24	Method of Measurement
870.25	Performance
870.26	Basis of Payment

870.01 Description. This work shall consist of placing topsoil, preparing the seed bed, furnishing all seed, agricultural lime, commercial fertilizer, mulching material and placing and incorporating as specified. Seeding and mulching shall be performed in stages as per Supplemental Specification 877.

The Contractor shall place the seed and mulch within 7 days of obtaining final grade. If it is anticipated that the areas will be disturbed by future work, the area shall be temporary seeded (Class 7) and mulched as per Supplemental Specification 877.

Areas to be seeded shall include all areas within the right of way and as described in the plans. All areas outside the specified limits where the vegetation has been disturbed or destroyed by the Contractor including those defined in CMS 104.06 shall be restored and seeded in accordance with these specifications by the Contractor at no additional cost to the Department.

870.02 Testing of Soil. Contractor shall have a Standard Test performed of the soil. This test measures soil acidity or alkalinity and will indicate if additional lime is required above the standard. The tests should be taken near final grade but prior to seeding. There shall be at least one test per 20 acres (8.1 hectares).

How to Take a Soil Sample: In a random pattern, 15-20 cores should be taken at a depth of 6 to 7 inches (150 to 180 mm). Cores should be mixed together with one pint retained for testing. Large sites having different soil conditions may require more than one test. Test results shall be made available to the Engineer. Corrections to any deficiencies in nutrients or pH shall be made by following the test report recommendations.

Ohio County Extension offices can provide the Contractor with a soil sample kit and testing locations.

870.03 Agricultural Lime. Agricultural lime shall be obtained by the Contractor from a dealer or manufacturer whose brands and grades are registered or licensed by the State of Ohio, Department of Agriculture.

870.04 Testing of Agricultural Liming Materials. Liming materials shall be tested in accordance with Supplement 1007.

870.05 Lime Application Rates. For the basis of quality control agricultural ground limestone, having a minimum total neutralizing power (TNP) of 90+ percent, at least 40 percent passing a No. 100 (150 µm) sieve and 95 percent passing a No. 8 (2.36 mm) sieve, 100 percent of Ag-ground shall be applied. Application shall be at 92 pounds per 1000 sq ft (2 ton/acre). This rate shall be standard grade.

Other available forms of liming materials may be applied depending on their potential to neutralize soil acidity. An increase or decrease in the application rates, depending on the form used, are determined from the Table 7-2 "Equivalent Amounts of Liming Materials" found in Bulletin 472, "Ohio Agronomy Guide", published by the Cooperative Extension Service, The Ohio State University.

Changes to the lime requirements will be determined by the pH test, as indicated on the soil analysis results. A slightly acid soil (pH 6.5) is recommended. Agricultural lime shall be applied to the surface.

870.06 Commercial Fertilizer. Commercial fertilizer shall be obtained by the Contractor from a dealer or manufacturer whose brands and grades are registered or licensed by the State of Ohio, Department of Agriculture.

Fertilizer may be dry or liquid in analysis specified or in the same ratio as specified. The standard application rate shall be 20 pounds per 1000 sq ft (0.1 kg/m²) of 10-20-10. Another analysis in the same ratio (1:2:1) may be used by varying the application rate. The soil test results will recommend corrective fertilizer application rates if needed above and beyond the standard. Fertilizer shall be

applied in an even pattern over all areas.

870.07 Topsoil. Topsoil shall consist of loose, friable, loamy topsoil without admixture of subsoil or refuse. For topsoil to be considered loamy, Topsoil should be screened through a 3/4 inch to 1½ inch (19.0 to 37.5 mm) harp screen and shall contain no more than 40 percent clay.

Acceptable topsoil shall contain not less than 3 percent or more than 20 percent organic matter as determined by loss on ignition of samples oven dried to constant weight at 212° F (100° C).

870.08 Compost. Acceptable compost shall include Ohio EPA rated Class IV compost, EQS biosolids compost or approved equal. Compost shall have a Nitrogen content of 1.4 percent or above. Compost shall be obtained from an Ohio EPA approved facility. Contractor shall provide the Engineer with the facility name and location prior to delivery.

870.09 Seeds. All grass seed shall be obtained by the Contractor from a dealer or grower who is registered or licensed by the State of Ohio, Department of Agriculture.

All grass seed specified shall meet the current specifications on file with the Department as to percentage purity, weed seed and germination. All grass seed to be used under this item shall be on an approved list kept on file at the Laboratory, and shall meet the requirements of these specifications. Minimum germination rates for cool season turfgrass species are listed in Table 1.

GERMINATION RATES: TABLE 1

Species	Minimum Percent	High Quality Percent
Kentucky Bluegrass	80	85
Fine Fescue	85	90
Perennial Ryegrass	85	90
Annual Ryegrass	85	90
Tall Fescue	85	90
Creeping Red Fescue	85	90

Seed shall be dated within the last 9 months of testing. No seed will be accepted with a date of test exceeding 9 months prior to the date of sowing. The Department reserves the right to test, reject or approve all seed after delivery. All seeds are to be furnished as separate species and cultivars, packaged or bagged separately, and labeled, tagged or marked in accordance with ORC 907.03.

Cool season turf Classes 1, 2, and 3 as listed in Table 2 shall be composed of no less than two and no more than four cultivars of the same species. Newer improved cultivars should be used when possible.

870.10 Legumes. All leguminous seeds shall be inoculated or treated with the proper amount of pure nitrogen-fixing bacteria selected for maximum vitality, not more than one year old, and mixed with sufficient water to thoroughly wet the seed. All culture shall be subject to approval.

If sown hydraulically, the inoculant shall be 4 times the rate specified by the inoculant manufacturer. Inoculant and sticking agent shall be placed directly into the slurry and thoroughly mixed immediately before seeding. Seed shall be sown as soon as possible after inoculation. Seed left standing more than 24 hours shall be re-inoculated before sowing. All seed shall be mixed on the project.

Preinoculated seed will be considered as inoculated at not more than one time the rate specified by the inoculant manufacturer. Additional inoculation will be required on preinoculated seed to comply with the above specifications.

870.11 Native Grasses and Wildflowers. The seed quantities indicated per 1000 square feet (m²) as listed in Table 2, Classes 4, 5 and 6 shall be the amounts of pure live seed (PLS) for each species listed. Seed which has actual pure live seed (PLS) yield according to tests less than the intended yield, will have the specified quantity adjusted to meet the intended PLS yields.

All seed supplied under Classes 4, 5 and 6 shall only be that which is grown from an approved midwest or northern grower. The states where seed may be obtained from are Ohio, Michigan, Illinois, Wisconsin, Indiana, Minnesota, Iowa, North Dakota or South Dakota. Native seed may be obtained outside this area with the Engineer’s approval. Annual seed listed in Class 5A may be obtained from any commercial grower or dealer and shall have been produced within the continental US. If the listed varieties are not available, other varieties may be substituted only with prior approval from the Engineer.

Sixty days prior to seeding, the Contractor shall provide for approval, a written description for the Class 4, 5 and 6 mixtures showing the percentage by weight (mass) of each kind of seed. This description shall also include the following:

- a. Name and location of the seed supplier.
- b. Origin and date of harvest of each kind of seed.
- c. A statement of the purity and germination of the seed.

SEED MIXTURES: TABLE 2

CLASS - TYPE	SEEDS	Lbs/1000 Sq Ft	Kg/1000 m ²
1 Lawn Mixture	Kentucky Bluegrass (<i>Poa pratensis</i>)	1.5	7.32
	Creeping Red Fescue (<i>Festuca rubra</i>)	1.5	7.32
	Annual Ryegrass (<i>Lolium multiflorum</i>)	1.0	4.88
	Perennial Ryegrass, turf type (<i>Lolium perenne</i>)	1.0	4.88
2 Roadside Mixture	Kentucky Bluegrass (<i>Poa pratensis</i>)	1.5	7.32
	Kentucky 31 Fescue (<i>Festuca arundinacea</i> var. KY 31)	2.0	9.76
	Perennial Ryegrass (<i>Lolium perenne</i>)	1.5	7.32
3A Slope Mixture (flatter than or equal to 3:1)	Use Mixtures 2, 3B, 3C or 4B.		
3B Low Growing Slope Mixture (steeper than 3:1)	Hard Fescue (<i>Festuca longifolia</i>)	1.3	6.35
	Creeping Red Fescue (<i>Festuca rubra</i>)	0.8	3.90
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.23	1.12
3C Crown Vetch Mixture (steeper than 3:1)	Crown Vetch (<i>Coronilla varia</i>)	0.9	4.39
	Perennial Ryegrass (<i>Lolium perenne</i>)	1.8	8.79
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.3	1.46
4A Native Grass Mixture	Big Blue Stem (<i>Andropogon gennadii</i>)	0.07	0.34
	Indian Grass (<i>Sorghastrum nutans</i>)	0.09	0.44
	Switch Grass (<i>Panicum virgatum</i>)	0.02	0.097
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.11 (spring) 0.34 (fall)	0.54 (spring) 1.66 (fall)
4B Low Growing Native Grass	Little Blue Stem (<i>Andropogon scoparius</i>)	0.18	0.88
	Side-Oats Gramma (<i>Bouteloua curtipendula</i>)	0.04	0.19
	Prairie Dropseed (<i>Sporobolus heterolepis</i>)	0.04	0.19
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.11 (spring) 0.34 (fall)	0.54 (spring) 1.66 (fall)
5A Annual and Perennial Wildflower Mixture	Annual Mixture (below)	0.07	0.34
	Perennial Wildflower Mixture (below)	0.28	1.37
	Annuals Mixture - not exceeding 25% by weight of any one species of the following: Corn Poppy (<i>Papaver rhoeas</i>) Cosmos (<i>Cosmos bipinnatus</i>) Yellow Cosmos (<i>Cosmos sulphureus</i>) Cornflower (<i>Centaurea cyanus</i>) Rocket Larkspur (<i>Delphinium ajacis</i>) Indian Blanket (<i>Gaillardia pulchella</i>)		
	Perennial Wildflower Mixture - not exceeding 5% by weight PLS of any one species of the following: Black-eyed Susan (<i>Rudbeckia hirta</i>) Purple Coneflower (<i>Echinacea purpurea</i>) Lance-leaved Coreopsis (<i>Coreopsis lanceolata</i>)		

CLASS - TYPE	SEEDS	Lbs/1000 Sq Ft	Kg/1000 m ²
5B Native Wildflower and Grass Mixture	Native Wildflower Mixture - not exceeding 5% by weight PLS of any one species of the following: Butterflyweed (<i>Asclepias tuberosa</i>) New England Aster (<i>Aster novae-angliae</i>) Partridge Pea (<i>Cassia fasciculata</i>) Purple Coneflower (<i>Echinacea purpurea</i>) Rattlesnake Master (<i>Eryngium yuccifolium</i>) Ox-eye Sunflower (<i>Heliopsis helianthoides</i>) Bergamot (<i>Monarda fistulosa</i>) Grey-headed Coneflower (<i>Ratibida pinnata</i>) Orange Coneflower (<i>Rudbeckia fulgida</i>) Prairie Dock (<i>Silphium terebinthin</i>) Whorled Rosinweed (<i>Silphium trifolium</i>) Stiff Goldenrod (<i>Solidago rigida</i>)	0.34	1.66
6 Wildlife Mixture	Grass Mixture Big Blue Stem (<i>Andropogon gerardii</i>) Little Blue Stem (<i>Schizachyrium scoparium</i>) Indian Grass (<i>Sorghastrum nutans</i>) Annual Ryegrass (<i>Lolium multiflorum</i>)		
		0.046	0.224
		0.069	0.337
		0.023	0.112
		0.92	4.49
7 Temporary Erosion Control Mixture	Big Blue Stem (<i>Andropogon gennadii</i>) Little Blue Stem (<i>Andropogon scoparius</i>) Indian Grass (<i>Sorghastrum nutans</i>) Ox-eye Sunflower (<i>Heliopsis helianthoides</i>) Prairie Dock (<i>Silphium terebinthinaceum</i>) Purple Coneflower (<i>Echinacea purpurea</i>) Whorled Rosinweed (<i>Silphium trifolium</i>) Downy Sunflower (<i>Helianthus mollis</i>) New England Aster (<i>Aster novae-angliae</i>) Annual Ryegrass (<i>Lolium multiflorum</i>)	0.13	0.63
		0.18	0.88
		0.13	0.63
		0.18	0.88
		0.18	0.88
		0.18	0.88
		0.11	0.54
		0.07	0.34
		0.07	0.34
		0.11 (spring) 0.34 (fall)	0.54 (spring) 1.66 (fall)

870.12 Site Preparation. The Contractor shall complete all grading within the areas to be covered with the topsoil under this item necessary to bring the surface of the proposed grade to the lines indicated on the plans, and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of 3 inches (75 mm) or greater in any dimension, except for shale cuts.

870.13 Placing Topsoil. Topsoil shall be placed and spread over all the areas to a minimum depth of 2 inches. It should be incorporated into the existing soil at a depth of 2 to 4 inches (50 to 100 mm). Staging areas, temporary roads or heavily compacted areas are to be disked to a depth of 4 to 6 inches (100 to 150 mm). The area shall be made smooth and uniform and shall be in accordance with the finished grade and cross section shown in the plans or otherwise designated. Such loosening will be required to ensure a bond of the topsoil with the surface on which it is put and to form a uniform blend. Soil shall not be tilled if wet or overtilled to achieve desired seed bed.

Fertilizer, lime or other soil amendments shall be applied separately to the site after the soil test results have been forwarded to the Engineer. Amendments may be incorporated by disk, harrow or rake, at a depth of 2 to 4 inches, in the same operation.

The prepared surface of topsoil and soil shall be free of gullies, rivulets, crusting, caking and satisfactorily shaped and finished as provided in 203. This work shall be performed prior to seeding.

All seed bed areas, including slopes flatter than 2 to 1 shall be free of rock and other foreign material 2 inches (50 mm) or greater in any dimension. All seed bed areas with 2 to 1 slopes or steeper shall be free of rock and other foreign material 3 inches (75 mm) or greater in any dimension but shall not be fine graded. After topsoil is placed, the area shall be tracked back and forth to achieve good contact between soil and slope surface. Surface shall be raked smooth prior to seeding.

All seed bed areas in front of residences, commercial properties, etc. between curb and sidewalks or as indicated on the plans, shall be free of all stones 1 inch (25 mm) or greater in any dimension. Seed bed shall have a smooth surface. Hand raking will be required if site is inaccessible to machines or if machines do not provide results equivalent to hand raking.

Topsoil is not required for shale cuts steeper than 2:1. Shale cuts steeper than 2:1 shall be allowed to deteriorate to a soil type surface texture prior to seeding.

870.14 Seeding Methods. Seeding operation shall not be performed unless the area is properly prepared. Except with permission of the Engineer, the Contractor shall seed cool season grasses between August 15 to October 30. If permanent seeding is necessary prior to these months, seeding rates shall be increased by 10 percent. All seeding performed between October 15 and March 15 shall be temporary seeding in accordance with Supplemental Specification 877. Permanent seeding may be performed with permission for projects completed within the same calendar year.

Seeding shall be done prior to or concurrently with 660, 667, 668 or 670.

Crown vetch seeding shall not be permitted during September or October.

Wildflower classes 5 and 6 shall be seeded in the fall (September - October). Spring seeding may be allowed with approval. Class 4 shall be seeded during the spring (March - May) when possible.

Seeding native grasses and wildflowers in Classes 4, 5 and 6 shall be done with a rangeland type or native seed grass drill. Seeding natives shall be performed as a split rate application with no less than two passes in different directions. Broadcast seeding shall only be allowed with approval of the Engineer. Cultipacking or rolling will be required when broadcast seeding.

All seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rates listed in Table 2. No seed shall be sown during high winds. Equipment shall be operated in a manner to ensure complete coverage of the entire area to be seeded. Immediately after sowing, the area shall receive a light raking followed by rolling on flat surfaces or tracking by dozer on slopes to

insure good seed soil-contact.

Seed and fertilizer mixtures in Classes 1, 2, 3 and 7 shall be applied with a hydraulic seeder between March 1 and October 15.

870.15 Mulching Operation. Materials used for mulching shall be straw, wood fiber, organic compost, or biosolids compost. Materials shall be reasonably free of weed seed, foreign materials, or other injurious materials that would prohibit seed germination.

Within 24 hours after any given area is seeded, straw mulch shall be evenly placed over all seeded areas at the following rates:

Seeding from March 15 to October 15:	2 tons per acre (0.5 t/1000 m ²)
Seeding from October 15 to March 15:	3 tons per acre (0.7 t/1000 m ²)

Mulching materials shall be kept in place with asphalt emulsion applied at a minimum rate of 60 gallons per ton (250 L/t) of mulch or with tackifiers per the manufacturer's recommendations. An additional application at a rate of 30 gallons per ton (125 L/t) of mulch shall be applied to the shoulder area, starting at the berm edge and extending out for a distance of 10 feet (3m). Asphalt emulsion for vegetative mulch shall conform to 702.04. Emulsion shall be nontoxic to plants and shall be so prepared that will not change in transportation or storage.

Displaced mulch shall be replaced at once but only after all work proceeding the seeding operation or that which was damaged during the mulching operation has been acceptably repaired.

870.16 Wood Fiber Mulch. Fiber mulch shall consist of pure wood fibers manufactured expressly from clean wood chips. The chips shall be processed in such a manner as to contain no lead paint, varnish, printing ink, petroleum based compounds or seed germination inhibitors. Fiber shall not be produced from unknown origin recycled material such as sawdust, paper, cardboard or residue from chlorine bleached pulp and paper mills.

The cellulose wood fiber mulch must maintain uniform suspension in water under agitation and shall blend with grass seed, fertilizer and other additives to form a homogeneous slurry. Tackifiers shall be manufacturer approved.

Using standard hydraulic mulching equipment, pure wood fiber mulch, tackifier, seed and fertilizer slurry shall be applied evenly over the soil surface in a one-step operation. Hydraulic application shall occur from March 1 to October 15 only. Applications rates are as follows:

Flat surfaces:	35 pounds per 1000 sq ft (170 kg/1000 m ²)
Slopes 3:1 or less:	46 pounds per 1000 sq ft (225 kg/1000 m ²)

All slopes subject to windy conditions shall be seeded and mulched by hydraulic methods only.

870.17 Compost. Compost may be applied as a mulch instead of straw or wood fiber. Grass seed shall be thoroughly mixed with the compost and distributed over the prepared seed bed area using pneumatic equipment. Compost/seed mixture shall be applied to a minimum 1/4 inch (6 mm)

depth. Mulch covering with tackifier is not needed when using compost in this method. No additional compensation will be made for this substitution.

870.18 Watering. For permanent seeded areas (Classes 1 to 6) and all sodded areas, they shall be thoroughly watered, after seed has germinated, at the rate of 300 gallons per 1000 square feet (12.2 m³/1000 m²). The water shall be applied by means of a hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the mulch material. A second water application shall be made between 7 and 10 days after the first application, providing ½ inch (13 mm) or greater rainfall has not occurred within 7 days after the first application. When ½ inch (13 mm) or greater of rainfall has occurred within the first 7 day period, the second application may be delayed or omitted entirely, depending on weather conditions. Water shall be paid for and measured separately.

870.19 Maintenance. The Contractor shall maintain all seeded and mulched areas until final inspection. Damaged areas shall be repaired to the original condition and grade.

870.20 Mowing. Mowing may be required prior to permanent seeding and any time during the growing season following permanent seeding. The Contractor will be notified by the Engineer to begin mowing.

The Contractor shall use suitable equipment for mowing. Mowers shall be of the rotary, flail, disk or sickle type. Bunching or wind-rowing of mowed vegetation will not be permitted. The final cutting height shall be no less than 6 inches (150 mm). More than one pass may be required for each mowing.

870.21 Fertilization: 2nd Application. Permanently seeded areas shall be fertilized with an application of 12-12-12 no less than 3 months after installation. Fertilizer shall be broadcast evenly over the surface without incorporation at a rate of 10 pounds per 1000 sq ft (0.05 kg/m²). This shall be performed after all repair seeding and mulching or inter-seeding has been completed.

870.22 Repair Seeding and Mulching. The Contractor shall repair all damage or erosion of the seeded and mulched areas. The Department will pay for these repairs.

The repairs shall be made prior to completion of the project by reworking or reshaping to grade. Reworking or reshaping of the slopes shall include bringing in additional material, if necessary and using whatever equipment that is necessary to restore slopes to grade. Area shall then be fertilized, seeded, and mulched as per the specifications. Such work will be measured and paid for as "Repair Seeding and Mulching."

When damage or erosion of these areas occurs as a result of fault or negligence of the Contractor, the areas shall be satisfactorily repaired, fertilized, seeded and mulched at no additional cost to the Department.

870.23 Inter-seeding. Inter-seeding is the practice of seeding existing thin and spotty growing turf with a slit or drill type seeder. This work shall only be performed from March 15 to May 15 and

September 1 to October 15. Mowing may be required prior to seeding to achieve good seed soil contact. Cut material shall not be wind-rowed or left in a bunched condition.

A slit or drill type seeder shall be used. Exceptions may be when seeding steep slopes or inaccessible areas. Broadcast or hydraulic seeding methods may be used in these instances. Commercial fertilizer of 12-12-12 shall be broadcast over affected areas as specified. Water shall be applied at the rate specified in these areas to aid in seed/soil contact.

870.24 Method of Measurement. Topsoil, organic compost or other approved equal required to meet the specification shall be paid for by the number of cubic yards (cubic meters) furnished and placed. The quantity will be paid based on the amount shown in the plans. In the measurement of topsoil, organic compost, etc., no adjustment of the plan quantities or recalculation of the volumes shall be made for any volumes found different by less than five percent from the plan quantity. The Contractor shall accept the plan quantity with authorized changes as payment in full unless revised by the Engineer. The burden of proof of a plan discrepancy greater than five percent is on the Contractor. The Contractor shall submit supporting documentation concerning the possible changes.

The quantity of commercial fertilizer and agricultural lime will be the number of tons (kilograms) of each quantity of furnished, spread and incorporated.

Seeding and mulching will be the number of square yards (square meters) of the area seeded and mulched in accordance with these specifications. In the measurement of seeding and mulching, no adjustment of the plan quantities or recalculation of the areas shall be made for any areas found different by less than five percent from the plan quantity. The Contractor shall accept the plan quantity with authorized changes as payment in full unless revised by the Engineer. The burden of proof of a plan discrepancy greater than five percent is on the Contractor. The Contractor shall submit supporting documentation concerning the possible changes.

The quantity of repair seeding and mulching will be the number of square yards (square meters) of damaged or eroded areas reshaped, seeded and mulched.

The quantity of water shall be the amount in thousands of gallons (cubic meters) applied in accordance with the requirements of this item and measured in tanks, tank wagons or trucks of predetermined capacity, or by means of meters of a type satisfactory to the Engineer and furnished and installed by the contractor at his own expense, or determined by weight conversion.

The quantity of inter-seeding will be the number of square yards (square meters) of the seeded area.

Mowing satisfactorily performed will be measured in 1000 square foot units (square meters).

The quantity of soil analysis tests will be the number of tests submitted to the Engineer.

870.25 Performance. The Department will inspect all seeded areas no earlier than six months and no later than 12 months after final seeding. The Contractor shall repair, regrade, overseed, and

fertilize any area this inspection identifies without a uniform density of at least 70 percent grass cover.

Seeded areas damaged by traffic or erosion, due to no fault or negligence of the Contractor, shall also be regraded, refertilized, reseeded and remulched.

The Contractor shall be compensated for the above work and mobilization and demobilization by supplemental agreement.

870.26 Basis of Payment. Payment for accepted quantities will be made at contract prices for:

Item	Unit	Description
870	Each	Soil analysis test
870	Cubic yard (cubic meter)	Placing topsoil
870	Ton (kilogram)	Commercial fertilizer
870	Ton (kilogram)	Agricultural lime
870	Square yard (square meter)	Seeding and mulching
870	Square yard (square meter)	Repair seeding and mulching
870	M Gallons (cubic meters)	Water
870	Square yard (square meter)	Inter-seeding
870	M Square feet (square meter)	Mowing

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 877
TEMPORARY SEDIMENT AND EROSION CONTROL**

April 13, 1999

877.01 Description
877.02 Materials
877.03 Construction Requirements
877.04 Maintenance
877.05 Performance
877.06 Method of Measurement
877.07 Basis of Payment

877.01 Description. This work shall consist of temporary control measures as detailed in the plans and/or general notes during the life of the contract to control sediment and erosion through the use of straw or hay bales, dikes, slope protection, sediment pits, basins and dams, slope drains, coarse aggregate, mulches, grasses, filter fabrics, ditch lining, inlet protection and other erosion control devices or methods.

The permanent control provisions contained in the contract shall be coordinated with the temporary erosion control features to the extent practical to assure economical, effective and continuous erosion control throughout the construction and post-construction period.

Temporary controls are required for construction work outside the right-of-way in areas such as borrow pit operations, haul roads, equipment and material storage sites, waste areas, and temporary plant sites. This work will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor, with costs included in the contract prices bid for the items to which they apply.

877.02 Materials. Commercial fertilizer shall be (10-20-10) and shall conform to Item 659.

Temporary seeding and mulching shall consist of annual ryegrass (*Lolium multifolium*). Seed and mulching materials shall be applied in accordance with Item 659.

Temporary filter fabric ditch checks shall consist of 30 inch [0.8m] wide filter fabric with sound wood supports with maximum spacing of 10 feet [3.0m] on centers. Temporary inlet filter barriers shall consist of 18 inch [0.5m] wide filter fabric fence with a securely nailed 2 x 4 wood frame.

Temporary bale filter dikes and perimeter filter fabric fence shall consist of straw or hay bales, or 30 inch [0.8m] wide filter fabric fence with sound wood supports with a maximum

spacing of 10 feet [3.0m] on centers. All the above filter fabric fence shall meet the requirements of 712.09, Type C.

Temporary dikes shall consist of suitable 203 material.

Temporary slope drains shall consist of pipe, pipe caps, coarse aggregate, riprap, rock channel protection, or other materials. Sediment pits are not paid for separately but are included as part of slope drain construction.

Pipe caps shall be included in the unit bid price for the pipe. Pipe caps shall have a minimum diameter of 1/4 inch (6.4mm) holes and be specifically designed to connect to the pipe. There will be a minimum of one hole per square inch (645 mm²) of the cross sectional end area of the pipe cap.

Temporary sediment basins and dams shall be constructed by methods described in Item 203 Excavation and Embankment and Item 601 Rock Channel Protection, Type C or D with filter.

Temporary rock check dams shall be constructed of Item 601 Rock Channel Protection, Type C or D without filter.

Temporary ditch and slope protection shall meet the requirements of Item 670.

877.03 Construction Requirements. The Storm Water Pollution Prevention Plan (SWPPP) details the placement, location and description of the temporary and permanent erosion control items. The following descriptions shall be used to supplement the plan. The Contractor shall rearrange and modify the plan quantities to meet the field conditions and the National Pollutant Discharge Elimination System (NPDES) Permit.

When the plan does not have a SWPPP, the Contractor shall submit a plan detailing control feature locations and quantities at the pre-construction meeting.

In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal or State or local agencies, the more restrictive laws, rules, or regulations shall apply.

(A) Clearing and Grubbing. The Contractor shall limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, and borrow and fill operations as determined by the project conditions. The Contractor shall preserve existing vegetation where attainable and temporarily seed and mulch disturbed idle areas as stated.

Inactive cleared and grubbed areas that are scheduled to remain idle for more than 45 days shall be stabilized with vegetation (i.e. temporary seed and mulch) within 7 days following the clearing and grubbing operations. If an area is within 50 feet [15 m] of any water body (i.e. stream, river, pond, etc.), then it shall be vegetated within 2 days following

the clearing and grubbing operations.

(B) Installation of Control Features. Temporary erosion and sediment control items shall be installed as detailed and are to remain functional until the upper slope drainage areas are fully stabilized.

Temporary perimeter, ditch check or inlet filter fabric fence shall be constructed in accordance with Standard Drawing DM-4.4.

1. Temporary Perimeter Controls: Temporary perimeter filter fabric fence shall protect the following from sheet flow runoff: off right of way locations; off construction limit locations; around water bodies, wet lands or around other significant items designated on the plan.

Dikes shall be used to prevent flow from coming on to the project and to barren areas on the project.

The Contractor shall install perimeter filter fabric fence and dikes concurrent with the clearing and grubbing operations.

2. Inlet Protection: The Contractor shall use an 18 inch [0.5m] wide filter fabric fence supported around a storm drain inlet or manhole with securely nailed 2 x 4 inch (50 X 100 mm) lumber. The Contractor shall excavate a six inch (150 mm) trench around the inlet, and drive the posts six inches (150 mm) below the excavated trench bottom. The fabric shall be stretched around the frame, placing six inches of fabric in the trench and secure tightly. The fabric shall overlap on one side of the inlet so that the fabric ends are not attached to the same post. Backfill the excavated soil onto the fabric and compact tightly.

The Contractor shall construct the inlet protection as soon as the inlet is completed.

3. Temporary and Permanent Seeding: Use seed and mulch liberally during and after construction and before or during winter shut down. Temporary seeding areas shall be fertilized at one-half the specified rate of application in Item 659. Temporary seeding shall be annual ryegrass sown at 2 pounds per 1000 square feet [1 kg/100 m²] and mulched in accordance with Item 659. When project conditions prevent the incorporation of fertilizer into the soil and preparation of the seed bed cannot be performed in accordance with Item 659, these requirements may be waived. Temporary seed shall not be placed on frozen ground.

The Contractor shall place the permanent seed on all barren areas within 7 days of obtaining final grade. The Contractor shall place the temporary seed and mulch as stated under clearing and grubbing.

4. Slopes: Dikes, slope drains and ditches shall be installed to divert water from bare soil and to protect cut and fill slopes. The Contractor shall place dikes at the top of fill slopes to protect the sides slopes from erosion.

The Contractor shall install dikes and slope drains when no filling activity occurs for three or more weeks and when slope height is greater than 8 feet [2.5m].

The Contractor shall construct a ditch at the top of cut slopes prior to the cutting of the slope to reduce runoff potential.

5. Ditch Checks: Filter fabric fence or rock checks are placed to protect ditches from erosion and to filter sediment from flowing water. The checks are placed across the width of the ditch.

Filter fabric fences are installed for 2 acres (8,000 m²) or less of drainage area. Rock ditch checks are installed for 2 to 5 acres (8,000 to 20,000 m²) of drainage area. When no rock quantities are denoted for rock checks, use the calculated rock quantities from basins for the rock checks.

Ditch checks shall be installed in conjunction with sediment basins and dams when the above drainage areas are not exceeded.

The Contractor shall place the ditch checks as soon as the ditch is cut.

6. Bale Filter Dikes: Bale filter dikes shall be installed a few feet (meters) from the toe of a slope to filter and/or divert sediment to an appropriate control before it enters a water body on or off the project limits.

It is used to collect sediment for a maximum of:

- a) less than 1/4 acre [1,000 m²] without an outlet
- b) slope length of less than 100 feet [30 m] at a maximum slope of 2:1.
- c) use outlet or pit every 100 feet [30 m] for a 2:1 slope. Use a greater spacing for flatter slopes.

Bale filter dikes shall be constructed in accordance with Standard Drawing DM- 4.3. When filter fabric is used for the bale filter dike, the location is accordance with Standard Drawing DM-4.3 and the construction details shown in Standard Drawing DM-4.4 are used.

The Contractor shall construct the bale filter dikes concurrent with the grubbing operations.

7. Sediment Dams or Basins: Basins and dams are placed and used at concentrated and critical flow locations to settle sediment out before leaving the project. Use basins at the bottom of a ravine, at a culvert inlet or outlet, along or at the end of the ditch and at any concentrated sediment exit point of the project. Use a basin quantity of 67 cubic yards for every acre of drainage area (125 m³ per 10,000 m²).

The Contractor shall construct sediment dams and basins at the first step of grading and within 7 days of commencing grubbing operations.

8. River, Stream and Water Body Protection: Protect all streams or water bodies passing through or on the project. Use filter fabric or bale filter dikes to line the water edges. Divert project sediment flow by using dike and slope protection. A combination of the above or other control features can be used.

The Contractor shall construct the above features concurrent with the grubbing operations.

a) Stream Relocation: Fully stabilize the new stream channel prior to diverting flow into the new channel.

b) Stream and River Crossing: Provide a means for construction equipment to cross water courses without causing erosion of streambanks or deposits in the channel. Plan and locate crossings well in advance of needing them. Disturbance to water bodies shall be kept to a minimum. Crossings shall be kept to a minimum and as narrow as practical. Crossings shall be made in shallow areas rather than deep pools where possible. Clearing, grubbing and excavation of streambanks, bed and approach sections shall be kept to a minimum.

The provisions for conveyance shall anticipate high flows and shall not impede the movement of aquatic life.

If culverts are used, the following minimums shall apply: Place culverts on the existing stream bed to avoid a drop in waterfall at the downstream end of the pipe. Culvert diameter shall be at least three times the depth of normal stream flow at the point of the crossing. The minimum size culvert to be used shall be 18 inches [0.5m]. There shall be sufficient number of culverts to completely cross the channel from stream bank to stream bank with no more than 12 inches [0.3m] between each culvert.

All fill and surface material placed in the channel, around the culverts or on the surface of the crossing shall be clean non toxic dump rock fill Type B, C, or D. Extend placed rock up slope from original stream bank to catch and remove erodible material from equipment.

Aggregate used does not need to be removed. Care should be taken to avoid any impoundment or restriction to fish passage. All pipes must be removed upon project completion.

The stream crossing work will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor, with costs included in the contract bid prices for the items to which they apply.

When the normal water elevation is shown on the plan, the Contractor shall construct crossings to accommodate a water elevation at least one foot (0.3m) above the stated normal water elevation. Fording in accordance with 107.21 is not allowed.

877.04 Maintenance. Temporary erosion control features shall be properly maintained.

The Contractor shall maintain these items with the concurrence of the Engineer. When the Contractor properly places the erosion control items in the contract in accordance with the contract documents, then the Department will pay for the additional cost to maintain or replace these items of work by the unit bid prices, agreed unit prices or by 109.04. Silt removed from erosion control features shall be disposed of in accordance with 203.05.

The Engineer or appointed inspector will check the temporary and permanent erosion control features every 7 days or within 24 hours of any rainfall of more than ½-inch (10 mm).

(A) Temporary Perimeter, Ditch Checks, Inlet Protection Filter Fabric Fence, Dikes and Bale Filter Dikes. Trapped sediment shall be removed and cleaned when it reaches half the height of the lowest section. The Contractor shall make the appropriate corrections when the above fail or become non functional. The Contractor shall maintain the items until the up slope permanent grass coverage is 70 percent or better. The Contractor shall remove the items when the up slope permanent grass coverage is 70 percent or better.

(B) Temporary and Permanent Seed: The seed bed shall be thoroughly watered in accordance with the requirements of Item 659. The quantity of water will be measured and paid for as Item 659 water. Seeded areas shall be maintained until 70 percent or better cover is established. Temporary seeded areas shall be mowed and paid for in accordance with Item 659.

(C) Sediment Dams and Basins: Deposited sediment shall be removed when the initial volume has been reduced one-half. The Contractor shall make the appropriate corrections when these items fail or non functional. The Contractor shall remove the dams and basins when the permanent seed and mulch is placed on the entire project.

877.05 Performance. The Contractor shall install additional erosion control features, make adjustments to meet the field conditions, anticipated future work or corrections based on the weekly storm water inspections with the concurrence of the Engineer. The type and quantity will be paid by the unit bid prices, agreed unit prices or by 109.04.

In the event that the Contractor or its agents refuse or fail to adhere to the requirements of the 404 Permit, the 401 Water Quality Certification and/or the NPDES Storm Water Permit and as a result an assessment or fine is made or levied against the Ohio Department of Transportation, the Contractor shall reimburse the Department within ten (10) calendar days of the assessment or fine or the Department may withhold the amount of the fine from the Contractor's next pay estimate and deliver that sum to the permitting agencies issuing the assessment or fine.

These fines are not to be construed as a penalty but are liquidated damages to recover costs assessed against the Department due to the Contractor's refusal or failure to comply with the permit requirements.

If proper sediment and erosion controls are not being provided by the Contractor, progress estimates shall be withheld until proper controls are placed.

All temporary erosion control items shall be removed before the project is accepted. Removed materials shall become the property of the Contractor and shall be disposed of in accordance with Item 203.

877.06 Method of Measurement. Temporary erosion and sediment control work, completed and accepted, will be measured as follows:

- (A) All fertilized areas will be measured and paid for as Item 659 Commercial Fertilizer.
- (B) Temporary seeding and mulching will be measured by the square yard (square meter) of seeded and mulched area completed in accordance with these specifications.
- (C) Temporary slope drains will be measured by the linear foot (meter) complete in place.
- (D) Temporary Perimeter, Inlet Protection, Ditch Check, Filter Fabric Fence will be measured per linear foot (meter) in place. Bale filter dike will be paid under temporary perimeter fabric fence.
- (E) Rock required will be paid for under Item 601 Rock Channel Protection, Type C or D with or without filter.
- (F) Temporary sediment dams, and basins will be measured by the cubic yard (cubic meter) of excavation and embankment complete in place.
- (G) Temporary dikes will be measured by the cubic yard(cubic meter), of excavation and embankment complete in place.
- (H) Temporary slope or ditch protection will be measured by the square yard (square meter), complete in place.
- (I) Sediment Removal will be measured in cubic yards(cubic meters) completed in place. The sediment removed from dams, basins, inlet protection, ditch checks, perimeter filter fabric, bale filter dikes and all other types of filter fabrics, straw or hay bales or any other temporary sediment control items will be paid under this item.

In the event that temporary erosion and sediment control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled, such temporary work shall be performed by the Contractor at his expense.

877.07 Basis of Payment: Accepted quantities of temporary sediment and erosion control

work placed and measured as provided above, will be paid for under:

Item	Unit	Description
877	Square yard (square meter)	Temporary seeding and mulching
877	Linear foot (meter)	Temporary slope drains
877	Cubic yard (cubic meter)	Temporary sediment basins and dams
877	Linear foot (meter)	Temporary perimeter, ditch check or inlet protection filter fabric fence
877	Linear foot (meter)	Temporary perimeter filter fabric fence
877	Linear foot (meter)	Temporary ditch check filter fabric fence
877	Linear foot (meter)	Temporary inlet protection filter fabric fence
877	Cubic yard (cubic meter)	Temporary dikes
877	Square yard (square meter)	Temporary ditch protection
877	Square yard (square meter)	Temporary slope protection
877	Cubic yard (cubic meter)	Sediment removal

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 899

CONCRETE - GENERAL

October 21, 1998

899.01	Description
899.02	Materials
899.03	Proportioning
899.04	Proportioning Options
899.05	Additional Classes of Concrete for Rigid Replacement
899.06	Equipment
899.07	Handling, Measuring, and Batching Materials
899.08	Batch Plant Tickets
899.09	Mixing Concrete

899.01 Description. This work shall consist of proportioning and mixing portland cement concrete.

899.02 Materials. Materials shall be:

Fine aggregate*	703.02
Fly ash	705.13
Coarse aggregate	703.02, 703.13***
Portland cement	701.01, 701.02, 701.03
	701.04, 701.05****
Ground granulated blast furnace slag	ASTM C 989, grade 100 or 120
Air entraining admixture.	705.10
Chemical admixture for concrete.	705.12**

*703.02 natural sand is required in 255, 451, 452, 453, 611, and 511 deck slabs.

**Admixtures shall contain no more than 50 parts per million chloride ions by weight of cement.

*** Applies only to 451, 452 and 453.

**** Use of Slag-Modified Portland Cement meeting ASTM C 595M, Type I(SM) is permitted; acceptance shall be in accordance with 701 and Supplement 1028. Type I(SM) may be used only between April 1 to October 1, and when 705.10 Air-Entraining Admixture is added at the mixer. Type I(SM) may not be used with Options 1 and 3.

Water used in concrete shall be free from sewage, oil, acid, strong alkalies or vegetable matter, and also shall be free from clay and loam. Water which is potable is satisfactory for use in concrete.

899.03 Proportioning. Proportioning shall be based on pre-determined cement content. Except as otherwise provided herein, each cubic yard (cubic meter) of concrete shall contain the specified weight of cement as determined by the yield calculation. The yield shall be within ± 1 percent of the theoretical yield of 27.00 cubic feet (1 m³). The water-cement ratio shall not exceed the maximum specified. Below this limit, the quantity of water shall be adjusted to meet the slump requirements.

Concrete shall contain 6 $\pm$ 2 percent of total air, except as noted herein.

Slump shall be maintained within the range shown as nominal slump in the following table. No concrete shall be used in the work that has a slump greater than that shown as maximum in the table. When the slump is found to exceed the limit of nominal slump but is within the maximum limit, occasional loads of concrete may be used, provided an immediate adjustment is made in the mixture to reduce the slump of succeeding loads to within the nominal range shown.

Type of Work	Nom. Slump inch (mm)*	Max. Slump inch (mm)**
Concrete pavement (305, 451, 452, 453, 611, 615)	1-3 (25-75)	4 (100)
Structural Concrete (511, 610, 622)	1-4 (25-100)	5 (125)
Superstructure concrete (511)	2-4 (50-100)	4 (100)
Non-reinforced concrete (601, 602 603, 604, 608, 609, 612, 622)	1-4 (25-100)	5 (125)

*This slump may be increased to 6 inches (150 mm) provided the increase is achieved by the addition of a chemical admixture meeting the requirements of 705.12, Type F or G.

**This slump may be increased to 7 inches (180 mm) provided the increase is achieved by the addition of a chemical admixture meeting the requirements of 705.12, Type F or G.

Tests on the plastic concrete for pavement shall be made at the paving site or at a location designated by the Engineer. Tests for structure concrete shall be made at the site of the work at the point of placement.

The weights of fine and coarse aggregate shall be determined by the Engineer from the weights given in the Concrete Table. If high early strength concrete is specified, the Contractor may use high-early strength cement, additional cement, approved chemical admixtures, or a combination of these materials to achieve a modulus of rupture of 600 psi (4.2 MPa) in three days or less. If high-early-strength concrete is not specified, but is desirable to expedite the work, the Contractor may use these same materials at no additional cost to the state.

The weights specified in the Concrete Table were calculated for aggregates of the following bulk specific gravities: natural sand and gravel 2.62, limestone sand 2.68, limestone 2.65, and slag 2.30. The assumed specific gravities of fly ash and ground granulated blast furnace slag are 2.30 and 2.90, respectively. For aggregates of specific gravities differing more than plus or minus 0.02 from these, the weights in the table shall be corrected as indicated in paragraph (c).

CONCRETE TABLE					
Quantities Per Cubic Yard (Meter)					
Type of Coarse Aggre- gate	Dry Aggregates			Cement Content lb (kg)	Water- Cement Ratio Maxi- mum
	Fine Aggre- gate	Coarse Aggre- gate	Total		
	lb (kg)	lb (kg)			
CLASS C (Using No. 57 or No. 67 Size)					
Gravel	1160 (688)	1735(1029)	2895(1717)	600 (356)	0.5
Limestone	1285(762)	1630(967)	2915(1729)	600(356)	0.5
Slag	1350(801)	1360(807)	2710(1608)	600(356)	0.5
CLASS F (Using No. 57 or No. 67 Size)					
Gravel	1270(753)	1810(1074)	3080(1827)	470(288)	0.55
Limestone	1345(798)	1730(1026)	3075(1824)	470(288)	0.55
Slag	1380(819)	1470(872)	2850(1691)	470(288)	0.55
CLASS S (Using No. 57 or No. 67 Size)					
Gravel	1125(667)	1735(1029)	2860(1697)	715(424)	0.44
Limestone	1260(747)	1530(908)	2790(1655)	715(424)	0.44
Slag	1280(759)	1370(813)	2650(1572)	715(424)	0.44

On projects specifying 451, 452, or 453, the following requirements shall apply. If No. 57 or 67 Size is approved, the quantities per cubic yard (cubic meter) will be in accordance with the above concrete table. If sizes No. 7, 78, or 8 are approved, the concrete shall contain 8 plus or minus 2 percent air, and the quantities will be in accordance with the following table:

Quantities Per Cubic Yard (Meter)					
Type of Coarse Aggre- gate	Dry Aggregates			Cement Content lb (kg)	Water- Cement Ratio Maxi- mum
	Fine	Coarse	Total		
	Aggre- gate	Aggre- gate			
	lb (kg)	lb (kg)			
CLASS C (Using No. 7, 78, or No. 8 Size)					
Gravel	1320(783)	1460(866)	2780(1649)	600(356)	0.5
Limestone	1380(819)	1410(837)	2790(1656)	600(356)	0.5

At any time during the construction period, the relative weights of fine and coarse aggregate as determined from the above table may be varied by the Engineer in order to insure a workable mix within the slump range and to control the yield. However, the total weight of aggregate per cubic yard (cubic meter) shall not be changed except as provided in the preceding paragraph as for the following conditions or both.

(a) For batch weights, the weights determined as described above shall be corrected to compensate for moisture contained in the aggregates at the time of use.

(b) If it is found impossible to prepare concrete of the proper consistency without exceeding the maximum water/cement ratio specified, a water reducing admixture conforming to requirements of 705.12 shall be used or the cement content shall be increased. However, the Contractor shall not be compensated for the admixture or additional cement which may be required by reason of such adjustment.

(c) If, during the progress of the work, the specific gravity of one or both of the aggregates changes, the batch weight shall be adjusted to conform to the new specific gravity.

(d) Unit weight determinations shall be made and the yield shall be calculated and maintained in accordance with ASTM C 138. Based on these determinations, the batch weights will be adjusted when necessary. However, the specified cement content shall be maintained within a tolerance of ± 1 percent and the maximum water-cement ratio shall not be exceeded.

(e) The amount of mixing water shall be adjusted for the moisture contained in the aggregate and for the moisture which they will absorb, in order to determine the amount of water to be added at the mixer.

(f) An approved set retarding admixture meeting the requirements of 705.12, Type B or Type D shall be required for concrete when the concrete temperature exceeds a nominal temperature of 75° F (24° C).

899.04 Proportioning Options. The Contractor may substitute one of the following options for all concrete items: The dry weights specified in these tables were calculated using the same specific gravities used in 899.03. The specific gravity used for ground granulated blast furnace (GGBF) slag is 2.90. Adjustments shall be made to the mix design due to specific gravities differing by more than 0.02. Other adjustments may be made as allowed in 899.03 and approved by the Engineer.

The requirements for Proportioning Option 1 are as follows. The cement content may be reduced as much as 15 per cent by weight with the substitution of an equivalent weight of fly ash meeting the requirements of 705.13. The water/cement ratio shall be based on the combined weight of cement and fly ash. Proportioning Option 1 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter)						
Type of Coarse Aggregate	Dry Aggregates			Cement Content lb (kg)	Fly Ash lb (kg)	Water-CM Ratio Maximum
Fine Aggregate lb (kg)	Coarse Aggregate lb (kg)	Total lb (kg)				
CLASS C Option 1 (Using No. 57 or No. 67 Size)						
Gravel	1140(676)	1700(1009)	2840(1685)	510(303)	90(53)	0.50
Limestone	1260(748)	1595(946)	2855(1694)	510(303)	90(53)	0.50
Slag	1320(783)	1330(789)	2650(1572)	510(303)	90(53)	0.50
CLASS F Option 1 (Using No. 57 or No. 67 Size)						
Gravel	1260(748)	1800(1068)	3060(1815)	400(237)	70(42)	0.55
Limestone	1350(801)	1730(1026)	3080(1827)	400(237)	70(42)	0.55
Slag	1380(819)	1475(875)	2855(1694)	400(237)	70(42)	0.55
CLASS S Option 1 (Using No. 57 or No. 67 Size)						
Gravel	1060(629)	1640(973)	2700(1602)	608(361)	107(63)	0.44
Limestone	1230(730)	1490(884)	2720(1614)	608(361)	107(63)	0.44
Slag	1220(724)	1300(771)	2520(1495)	608(361)	107(63)	0.44

CLASS C Option 1 (Using No. 7, 78 or 8 Size)						
Gravel	1310(777)	1440(854)	2750(1631)	510(303)	90(53)	0.50
Limestone	1350(801)	1410(837)	2760(1638)	510(303)	90(53)	0.50

The requirements for Proportioning Option 2 are as follows. The cement content may be reduced as much as 50 pounds per cubic yard(30 kg/ m3), with the substitution of an equivalent volume of aggregate, provided the Contractor uses an approved water reducing admixture meeting the requirements of 705.12; Type A or Type D. Proportioning Option 2 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter).					
Type of Coarse Aggregate	Dry Aggregates			Cement Content lb (kg)	Water- Cement Ratio Maxi- mum
	Fine Aggre- gate lb (kg)	Coarse Aggre- gate lb (kg)	Total lb (kg)		
CLASS C Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1190(706)	1785(1059)	2975(1765)	550(326)	0.50
Limestone	1320(783)	1675(994)	2995(1777)	550(326)	0.50
Slag	1385(822)	1395(828)	2780(1649)	550(326)	0.50
CLASS F Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1315(780)	1880(1115)	3195(1896)	420(249)	0.55
Limestone	1410(837)	1810(1074)	3220(1910)	420(249)	0.55
Slag	1445(857)	1540(914)	2985(1771)	420(249)	0.55
CLASS S Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1120(664)	1710(1015)	2830(1679)	665(395)	0.44
Limestone	1290(765)	1560(926)	2850(1691)	665(395)	0.44
Slag	1270(753)	1370(813)	2640(1566)	655(395)	0.44

CLASS C Option 2 (Using No. 7, 78 or No. 8 Size)					
Gravel	1370(813)	1510(896)	2880(1709)	550(326)	0.50
Limestone	1420(842)	1480(878)	2900(1720)	550(326)	0.50

The requirements for Proportioning Option 3 are as follows. The Portland cement content may be reduced as much as 50 pounds per cubic yard(30 kg/m3) with the substitution of an equivalent volume of aggregate, provided the Contractor uses an approved water-reducing admixture meeting the requirements of 705.12, Type A or D. The cementitious materials content shall consist of a combination, by weight, of a minimum of 70 percent Type I or Type IA Portland cement (701.04 or 701.01), and a maximum of 30 percent ground granulated blast furnace slag, ASTM C 989, grade 100 or 120. Proportioning Option 3 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter).						
Type of Coarse Aggregate	Dry Aggregates			Cement Content lb (kg)	GGBF Slag lb (kg)	Water-CM Ratio Maximum
	Fine Aggregate lb (kg)	Coarse Aggregate lb (kg)	Total lb (kg)			
CLASS C Option 3 (Using No. 57 or No. 67 Size)						
Gravel	1185(703)	1775(1053)	2960(1756)	385(228)	165(98)	0.50
Limestone	1310(777)	1670(991)	2980(1768)	385(228)	165(98)	0.50
Slag	1385(822)	1385(822)	2770(1644)	385(228)	165(98)	0.50
CLASS F Option 3(Using No. 57 or No. 67 Size)						
Gravel	1320(783)	1870(1109)	3190(1892)	294(174)	126(75)	0.55
Limestone	1400(831)	1810(1074)	3210(1905)	294(174)	126(75)	0.55
Slag	1440(854)	1535(911)	2975(1765)	294(174)	126(75)	0.55

CLASS S Option 3 (Using No. 57 or No. 67 Size)						
Gravel	1105(656)	1715(1017)	2820(1673)	465(276)	200(119)	0.44
Limestone	1280(759)	1555(923)	2835(1682)	465(276)	200(119)	0.44
Slag	1270(753)	1360(807)	2630(1560)	465(276)	200(119)	0.44

CLASS C Option 3 (Using No. 7, 78 or No. 8 Size)						
Gravel	1370(813)	1500(890)	2870(1703)	385(228)	165(98)	0.50
Limestone	1410(837)	1480(878)	2890(1715)	385(228)	165(98)	0.50

GGBF = ground granulated blast furnace slag; CM = cementitious material.

The use of coarse aggregate in Portland cement concrete pavements is restricted by 703.13, as modified by the proposal.

Approval of Optional Mix Designs. A request to use any option design must be submitted to the Engineer for approval.

All admixtures used in the concrete mixture must be compatible and shall be dispensed in accordance with the manufacturer's recommendations.

If Portland cement with fly ash as an additive is used as described under Option 1 or ground granulated blast furnace slag is used under Option 3, the mix design shall be used only between April 1 and October 15, unless otherwise authorized by the Director. If Option 1 is used, an approved set retarding admixture meeting the requirements of 705.12, Type B or Type D shall be used if the concrete temperature exceeds a nominal temperature of 75° F (24° C) . If Option 2 or 3 is used, an approved water reducing set retarding admixture meeting the requirements of 705.12, Type D shall be used if the concrete temperature exceeds a nominal temperature of 75° F (24° C).

The proportioning adjustments under Options 1, 2 or 3 shall be the responsibility of the Contractor, and shall be in accordance with the ACI Standard "Recommended Practice for Selecting Proportions for Normal Weight Concrete" (ACI 211.1). The proportioning shall be based on developing an average compressive strength at 28 days of 4000 psi (28.0 MPa) for Class C, 3000 psi (21.0 Mpa) for Class F or 4500 psi (31.0 MPa) for Class S.

Optional mixes are not permitted with concrete bridge deck overlays using microsilica. For mixes used in latex modified and superplasticized dense concrete bridge deck overlays (Supplemental Specifications 847 and 848), and using Option 1 and 2, certified test data shall be provided for all requirements in accordance with Supplement 1045. Option 3 may not be used with concrete bridge deck overlays (Supplemental Specifications 847 and 848). The testing for Absorption, Scaling Resistance, and Volume Change will not be required for mixes used in dense concrete bridge deck overlays.

Only one source of fly ash shall be used in any one structure unless otherwise authorized by the Director. Bulk fly ash shall be stored in waterproof bins.

No option mixes shall be permitted in concrete mixes designed or intended to obtain high early strength.

899.05 Additional Classes of Concrete for Rigid Replacement.

Class FS. This mixture is a fast-setting Portland cement concrete

for accelerated setting and strength development. The minimum cement content shall be 900 pounds per cubic yard (534 kg/m³) and the maximum water — cement ratio shall be 0.40. The rigid replacement may be opened to traffic after four hours provided test beams have attained a modulus of rupture of 400 psi (2.8 MPa).

The concrete shall be kept plastic by means of a Type B or D admixture until the surface has been textured. The Type B or D admixture shall be used in accordance with the manufacturer's recommendations.

Calcium chloride shall be added and mixed with each batch of concrete just prior to placement. If calcium chloride with 94-97 percent purity is used, the addition rate shall be 1.6 percent by weight of the cement. If calcium chloride with 70-80 percent purity is used, the addition rate shall be 2.0 percent by weight of the cement. When calcium chloride in a water solution is used, the water used shall be considered as part of the concrete mixing water and appropriate adjustments shall be made for its inclusion in the total concrete mixture.

Any other approved accelerating admixture may be used at the rate recommended by the manufacturer, provided it will produce the required strength in the allotted time.

Immediately after the curing compound has been applied, the replacements shall be

covered with polyethylene sheeting and further covered with building board as specified in ASTM C 208. The building board shall be wrapped in a black polyethylene sheeting and placed tight against the surrounding concrete and weighted down to protect the fresh concrete from the weather.

Class MS. This mixture is a moderate-setting portland cement

concrete for accelerated strength development. The rigid replacement may be opened to traffic after 24 hours provided test beams have attained a modulus of rupture of 400 psi (2.8 MPa). The minimum cement content shall be 800 pounds per cubic yard (475 kg/m3) and the maximum water-cement ratio shall be 0.43.

The proportioning of the concrete materials to meet the requirements of each class of rigid replacement concrete specified shall be the responsibility of the Contractor. The coarse aggregate may be any one of the following sizes: No. 57, No. 6, No. 67, or No. 8. When No. 8 size is used, the entrained air content shall be 8 ±2 percent. Otherwise, the entrained air content shall be 6 ±2 percent.

The Engineer's approval of the concrete mix design will be based on the Contractor's submitted proportions and the foregoing information.

899.06 Equipment. Equipment shall be as follows:

(a) Batching Plants. Each plant shall be constructed and operated so that no intermingling of materials occurs prior to batching. The plant shall have weighing mechanisms which provide either a visible means of checking weights or a printed record. Dispensing mechanisms for water and admixtures shall have a visible means of checking quantities or shall produce a printed record.

Weighing mechanisms used for cement and aggregates shall weigh to an accuracy such that the weight indicated on the scale or printed ticket is within ± 0.5 percent of the correct weight. Devices for weighing or metering water shall measure to an accuracy of ± 1.0 percent throughout the range used.

All weighing and metering devices shall have been checked and their accuracy attested to within the 12-month period immediately prior to their use. This service may be performed by the Sealer of Weights and Measures or a scale servicing company. In lieu of the preceeding requirements, the concrete batch facilities may be approved if a Certificate of Performance has been issued by the National Ready Mixed Concrete Association.

To reach a capacity of 500 pounds (227 kg), ten standard test weights or the services of a scale servicing company shall be readily available for testing the weighing devices at the batch plant. All weights used in testing the weighing devices shall be sealed every 3 years by the Ohio Department of Agriculture.

Weighing and dispensing devices shall be tested as often as the Engineer may deem necessary to assure their continued accuracy.

(b) Mixers. Mixers and agitators shall conform to paragraphs 10, 11.2, 11.5 and 11.6 of AASHTO M 157, except that mechanical counters are permitted.

When a truck mixer is used for complete mixing, each batch of concrete shall be mixed for not less than 70 revolutions of the drum or blades at the rate of rotation designated on the metal plate on the mixer as mixing speed.

Bodies of nonagitating hauling equipment for concrete shall be smooth, mortartight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when required by the Engineer. Trucks having dump bodies with rounded corners and no internal ribs or projections will be permitted for nonagitating hauling.

899.07 Handling, Measuring and Batching Materials. Aggregates from different sources and of different gradings shall not be stockpiled together. Aggregates that have become segregated, or mixed with earth or foreign material, shall be reworked or cleaned as directed by the Engineer, or rejected. Coarse aggregate shall be maintained with a uniform moisture content.

The fine aggregate and coarse aggregate shall be separately weighed in the respective amounts set by the Engineer as outlined in 899.03. Separate weighing devices shall be used for weighing the cement.

Batching shall be so conducted as to result in the weights of each material required within a tolerance of ± 1.0 percent for cement and ± 2.0 percent for aggregates. Water shall be measured by weight or volume to within a tolerance of ± 1.0 percent. Admixtures shall be dispensed to within ± 3.0 percent of the desired amount.

Methods and equipment for adding air-entraining agent or other admixture into the batch, when required, shall be approved by the Engineer.

899.08 Concrete Batch Plant Tickets. The Contractor shall furnish the Engineer a concrete batch

plant ticket for each load of concrete delivered for use on the project. Batch tickets may be computer-generated, handwritten, or a combination. The ticket shall include, at a minimum, the information listed in Table I:

TABLE I - EVERY BATCH TICKET	
Name of ready-mix batch plant	
Batch Plant No	
Batch Plant Location	
Serial number of ticket	
Date	
Truck Number	
Class of Concrete	
JMF#	
Time the load was batched	
Size of Batch [cu yd (cu m)]	
Actual weights of cementitious material:	
Cement [lbs(kg)]	
Fly ash [lbs(kg)]	
Ground granulated blast furnace slag [lbs(kg)]	
Micro-silica [lbs(kg)]	
Other	
Actual weights of aggregates:	
Coarse [lbs(kg)]	
Fine [lbs(kg)]	
Other	
Actual weight of water [lbs(kg)]	
Actual volume of admixtures:	
Air entrainer [fl. oz. (mL)]	
Superplasticizer [fl. oz. (mL)]	
Water reducer [fl. oz. (mL)]	
Retarder [fl. oz. (mL)]	
Other	
Aggregate moisture contents (%):	
Coarse Aggregate	
Fine Aggregate	
Water Cement Ratio, leaving the plant	

Batch tickets for each day's first load of concrete, for each JMF, shall also include the information in Table II below. The Table II information may be either included on the batch ticket or furnished on a separate form. The separate form may be computer-generated or handwritten, but the form must be physically attached to the batch ticket.

If during the concrete manufacturing process any of the information listed in Table II changes, the information in Table II shall be resubmitted with the first concrete batch ticket supplied with the changed concrete.

TABLE II - FIRST TICKET EACH DAY, EACH JMF	
Cementitious Sources and Grade or Type:	
Cement	
Micro - Silica	
Ground granulated Blast Furnace slag	
Fly Ash	
Other	
Admixtures - Brand and Type:	
Air entrainer	
Retarder	
Water reducer	
Superplasticizer	
Other	

Concrete batch ticket information conforms to ASTM C 94, section 13. Supporting data may be required by the Engineer to validate the basis for the furnished aggregate moisture contents. Cost for generating and supplying the information and the concrete batch tickets shall be included in the individual concrete items.

899.09 Mixing Concrete. The concrete may be mixed in a central mix plant or in truck mixers. The mixer shall be of an approved type.

When mixed in central mixers, the mixing time shall not be less than 60 seconds. Mixing time begins when all materials are in the drum and ends when the discharge begins. Transfer time in multiple drum mixers is included in mixing time. The contents of an individual mixer drum shall be removed before a succeeding batch is emptied therein.

Ready-mixed concrete shall be mixed and delivered in accordance with 899.04(b). Mixed concrete from the central mixers shall be transported in truck mixers, truck agitators, or trucks having nonagitating bodies. The concrete shall be delivered to the site of the work and discharge shall be completed within one hour after the combining of the water and the cement. If an approved set-retarding (705.12, Type B) or a water-reducing and set-retarding (705.12, Type D or G) admixture is used at the Contractor's expense, discharge shall be completed within 90 minutes after the combining of the water and the cement.

When concrete is delivered in transit mixers or agitators, additional water within the limits specified may be added and sufficient mixing performed to adjust the slump and to regenerate the specified air content throughout the batch, provided all these operations are performed prior to discharging any of the batch and within the above time limitations. When making these adjustments, the concrete shall be mixed a minimum of 30 revolutions at mixing speed.

Retempering after the start of discharge is permitted by the use of approved admixtures (705.12, Type F or G) when approved by the Engineer.

Admixtures containing more than 50 parts per million chloride by weight of cement will be permitted only when provided for in the contract, or upon written permission of the Director.

The procedure for making and testing of concrete beams shall be in accordance with the requirements of Supplement 1023 on file in the Office of the Director.

When mixed, all concrete shall have a temperature of not more than 90° F (32° C), and the concrete shall be maintained under this temperature until deposited in the work.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENTAL SPECIFICATION 905
OPEN HEARTH AND BASIC OXYGEN FURNACE STEEL SLAG AGGREGATE
USED FOR ITEMS 203, 304, 306, 307, 410, 411, 617, 503 OR 603**

April 1, 1998

Open Hearth (OH) or Basic Oxygen Furnace (BOF) slag shall not be used for Aggregate or Soil for Item 603 Bedding or Backfill, for Items 306 Cement Treated Free Draining Base or 307 Non-Stabilized Drainage Base, Item 503.10 Backfill; or under, around or within 15 meters (50 feet) of any structure.

OH and BOF slag may be used in Item 203 Embankment, as defined in 203.02, if the OH or BOF slag is blended in a 3:1 mixture (3 parts natural soil and 1 part OH or BOF slag). The 3:1 mixture shall be placed at least 0.3m (1.0 ft) below the flow line of the underdrains or other drainage items susceptible to runoff as per 203.08. Aging and stock piling requirements of this specification are required.

OH and BOF slag may be used for surface course applications in Items 617, 410 and 411, if the OH and BOF slag meets the above specifications, and meets the aging and stock piling, deleterious substances, and crushing requirements of this specification.

BOF slag shall not be allowed for non-surface course applications in Items 304, 410, 411 or 617.

Recycled OH or BOF slag from Department or non-Department projects may be used in Item 203, or surface course applications in Items 617, 410 or 411, if the material meets the requirements of this specification.

OH slag may be used for Item 304 and for a non-surface course application in Items 617, 410 and 411, if the OH slag meets the above specifications and all the additions and deletions listed below;

Recycled OH or BOF slag from Department or non-Department projects shall not be allowed.

Deleterious substances (soft pieces) shall include soft lime, lime oxide or magnesia agglomerations or any foreign materials prone to rapid disintegration under construction processing and weathering conditions.

Deleterious substances (soft pieces) in accordance with Supplement 1029 (hand crushing of soft pieces) shall be less than 3 percent by weight.

Material passing the 75 μ m(200 sieve) shall be less than 10 percent by weight.

No crushing of OH or BOF slag shall be allowed.

Identification of OH Slag. Clear, definitive and undisputable identification of the OH slag is required for OH slag used for Item 304 or for a non-surface course application in Items 617, 410 or 411.

The producer shall show the Department evidence that the material supplied is open hearth slag. This information shall consist of but not be limited to the following:

Steel producer, production dates, production rates, stockpiling dates, type of steel produced, and all known Department and non-Department projects where the material was previously used.

This identification of OH slag may be supplemented by other information approved by the Department or by using 10 years of good performance data. The producer shall submit to the Department projects where the OH slag has been used without expansion or tufa problems. The Department will review the above projects as part of the identification approval process.

All OH slag not identified as open hearth slag shall be considered basic oxygen furnace slag unless identified otherwise.

Tufa Performance Verified. Tufa is a precipitate form of calcium carbonate that can clog up the underdrain systems. Some OH slag sources clog up underdrain systems and some do not. Tufa performance verification will be based on field performance and Department's inspection of the underdrain systems.

Tufa performance verification is required for OH slag used for Item 304, or when OH slag is used for a non-surface course applications in Items 617, 410 or 411.

The producer shall submit to the Department past projects that are at least 10 years old that used the proposed OH slag source. The producer shall supply the Department with construction plans with the underdrains and underdrain outlets marked on the plans, or other suitable method, approved by the Department, showing the underdrain system. The producer shall mark the underdrain outlets in the field for inspection. The Department will inspect the underdrain systems for tufa deposits. If tufa deposits are found in the outlets or in the underdrain system, the OH slag source shall be rejected.

The following sources have previously been evaluated for tufa performance: Standard-Lafarge's Cuyahoga Heights and McDonald plants. Tufa performance verification is not required for these sources.

Aging and Stockpiling Requirements. All OH and BOF slag shall be stockpiled and aged as follows:

The material shall be graded and stockpiled into maximum size piles of 23,000 Metric ton (25,000 ton). Prior to and during the stock piling operation, these materials shall have water added to provide a uniform moisture content not less than their absorbed moisture. The stockpile shall be maintained in a moist condition during the required stock piling period.

The producer shall mix the stockpile when the outside surface of the pile has crusted over. The Department will inspect the stock pile every 2 months to ensure no crusting occurs. Frozen stockpile material shall not be mixed. The aging period shall be suspended when the stockpile is frozen for more than one month.

This aging period shall be at least 6 months in duration and shall start over if any new material is added to the pile during the aging period.

Expansion Testing. After the aging and stock piling requirements have been met, expansion testing is required for OH slag used for Item 304 or when OH slag is used for a non surface course applications in Item 617, Item 410 or Item 411.

Expansion Testing shall be performed in accordance with Pennsylvania Department of Transportation PTM No. 130, the ODOT equivalent to this test or expansion testing acceptable to ODOT.

The producer shall hire an independent AASHTO accredited and ODOT approved laboratory to perform at least half of the expansion testing. At the producer's option, up to half of the required expansion testing may be performed by the producer's lab. The Office of Materials Management shall observe the expansion testing and approve each independent and producer laboratory.

The expansion testing shall be performed for every 2300 metric tons (2500 tons) or fraction thereof of the material supplied.

The maximum allowable total expansion for each test shall be less than 0.50 percent. If any one test fails in the stockpile, the entire stockpile shall be rejected.

When sampling for expansion, the producer shall notify the Department at least 48 hours prior to the sampling. The Department will verify that the sample came from the correct stock pile and take independent spit samples , if required.

The expansion test data and a suitably presented summary of the expansion test data shall be submitted to the Department for approval. The Department reserves the right to perform independent testing to verify the laboratory results at any time.

The Department expansion test data shall take precedence over the producer or independent laboratory expansion testing results in the event of a conflict. The Department shall make the final determination on all conflicting data.

If the material fails the expansion testing, the material shall be stock piled for a minimum of 2 additional months from the date of last sampling and retested for expansion. No materials shall be approved for use until the material passes the expansion test.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 906**

ANTISTRIP ADDITIVE FOR ASPHALT CONCRETE

May 5, 1998

On this project, if any gravel coarse aggregate or more than 25 percent natural sand or more than 20 percent reclaimed materials containing gravel coarse aggregate is used in any bituminous aggregate base designed in accordance with Supplement 1044 or any asphalt concrete designed in accordance with 441, then the Contractor shall perform the following additional tests:

1. Moisture damage potential test in accordance with Supplement 1051.
2. Washed gradation in accordance with AASHTO T 11 as modified by Supplement 1004.
3. Adherent fines test for each component in accordance with ASTM D 5711.

If the results of the moisture damage potential test show the Tensile Strength Ratio (TSR) of the bituminous aggregate base mix or asphalt concrete mix to be less than 0.70, then the mix shall be modified by one of the following antistrip additives:

Liquid Antistrip Material - The mix shall include liquid antistrip material at a rate of 0.50 to 1.00 percent by weight of the asphalt cement. The TSR of the bituminous aggregate base mix or asphalt concrete mix shall be greater than or equal to 0.80 after the addition of the liquid antistrip material.

Hydrated Lime - The mix shall include hydrated lime in the dry form at a rate of 1.0 percent by the dry weight of aggregate for asphalt concrete and 0.75 percent by the dry weight of aggregate for bituminous aggregate base. The hydrated lime shall meet the requirements of AASHTO M 303, Type 1. A list of approved sources of hydrated lime will be maintained by the Laboratory. To become an approved source, a source shall submit certified test data to the Laboratory showing their hydrated lime meets the requirements of AASHTO M 303, Type 1. Annual submittal of certified test data by January 1 each year will be necessary to maintain approval. The following information shall be provided to the Engineer for each shipment of hydrated lime: (1.) letter of certification; (2.) production date; (3.) shipment date; (4.) shipment destination; (5.) batch or lot number (6.) net weight.

The antistrip additive shall be included in the Contractors' mix design established in accordance with 441 or Supplement 1044. The following shall be submitted to the Laboratory with the proposed JMF:

1. All TSR data (before and after the addition of the antistrip additive).
2. Rate of addition of the liquid antistrip material, if used.
3. Product information, recent supplier State project information using the liquid antistrip material, and letter of certification (only for liquid antistrip material, if used).
4. Results of the washed gradation test of the individual components of the mix used in determining the combined gradation.
5. Results of the adherent fines testing for each component.

The Laboratory may perform additional tests in accordance with Supplements 1051, 1052, and 1004. These tests may be performed on material conforming to a proposed JMF or on material obtained during production of an approved JMF. If a change in the aggregate production is suspected, the District/Laboratory may require the Contractor to perform washed gradations on components and calculate adherent fines to determine the need for additional TSR review. The Laboratory may obtain samples of the hydrated lime at any time to verify quality. If the quality of the hydrated lime is in question, the Laboratory may require independent laboratory testing for the hydrated lime supplier.

Antistrip additives shall be stored and introduced into the mix in accordance with Supplement 1053. Prior to the start of production, the Laboratory shall approve the antistrip additive storage and feed systems. During production, if the antistrip additive is not being properly dispersed into the mix, the Laboratory may require modifications in the method of introducing the antistrip additive into the mix.

At the end of the project and at the end of each construction year on a multiple year project, the Contractor shall provide delivery tickets to the Engineer verifying the number of pounds of antistrip additive used is within 10 percent of the calculated amount of antistrip additive required for the total pounds of bitumen, based on the JMF, used in the bituminous aggregate base or asphalt concrete.

The cost of this additional testing and the addition of any antistrip additive shall be included in the contract price for the bituminous aggregate base or asphalt concrete.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

SUPPLEMENTAL SPECIFICATION 907

**Sulphur Leachate Test for Air Cooled Blast Furnace Slag for Acceptance
of Items 203, 304, 306, 307, 503, 603 and S.S.855 (Asphalt Treated Free Draining Base)**

October 21, 1998

907.01 Description

907.02 Sampling Procedure

907.03 Sulphur Leachate Test Procedure and Criteria

907.01 Description. Air cooled blast furnace slag used in Items 203, 304, 306, 307, 503, 603, and S.S.855 (Asphalt Treated Free Draining Base) must meet the requirements of this specification. This specification contains the required sampling procedure; sulphur leachate test procedure; and, the criteria that must be met for the material to be incorporated into the work.

907.02 Sampling Procedure. The following sampling method for obtaining samples of air cooled blast furnace slag for leachate tests shall be used:

1. Sampling: The material to be used should be sampled as the stockpile is being built.
2. When obtaining the sample after the stockpile is built: The sample may be taken by shovel or hand. The sample shall be selected randomly from both the exterior and interior of the stockpile. The producer shall use a heavy equipment for the excavation of the interior material.
3. Sampling Frequency: Each sample is to be taken in random increments over each 5200 tons (4720 metric tons) stockpiled.
4. Sample size and sample reduction: The field sample should be 80 to 100 pounds (35 to 45 kg). From this field sample, a test sample of 20 to 25 pounds (9 to 11 kg) shall be quartered out.
5. Documentation : Stockpile location and test results shall be maintained at the plant and shall be available upon request.

6. The Producer shall certify that this test has been performed prior to acceptance.

907.03 Sulphur Leachate Test Procedure and Criteria. The test procedure involves soaking the slag material in water for a specified period of time and then observing the color of the water. A greenish-yellow coloration indicates a problem. The smell of hydrogen sulfide(rotten eggs) usually accompanies the observation of colored water.

1. Equipment Needed:

- A. A five-gallon (19-liter) bucket for soaking the sample.
- B. Filter paper for filtering the water.
- C. A funnel through which to filter the water.
- D. A glass container for observing the water.
- E. A rock color chart. This chart is used for color comparisons and is distributed by the Geological Society of America
- F. Water shall be distilled or tap water let set in a bucket for a minimum of 12 hours.

2. Test Procedures.

A. Prepare a test sample of approximately 20 to 25 pounds (9 to 11 kg) from a field sample of approximately 100 pounds (45 kg).

B. For Item 306, Type 3 granular material in Item 603, and S.S.855(Asphalt Treated Free Draining Base), the test sample should then be rinsed over a No. 4 (4.75mm) sieve to remove any fines that may be clinging to the larger particles.

C. Place the test sample in bucket and fill with water until the sample is covered by at least ½ inch (13 mm) of water. Allow the sample to soak for 24 hours.

D. After soaking for 24 hours, thoroughly mix the water and collect a water sample of approximately 3.4 fl. oz. (100 mL).

E. Filter the water sample to remove the suspended solids which may interfere with the color observation.

F. If the color of the filtered water is equal to or darker than the moderate greenish- yellow color from the rock chart (hue 10Y), the material fails. If the water appears clear or lighter than the moderate greenish-yellow color from the rock chart (hue 10Y), then allow the sample to soak for another 24 hours and repeat steps “D” through “F”.

G. If, after 48 hours, the water appears clear or less than the moderate greenish-yellow color from the rock chart (hue 10Y), then the material is acceptable.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

SUPPLEMENTAL SPECIFICATION 908

PERFORMANCE GRADE (PG) BINDER REQUIREMENTS

March 28, 2000

908.01	Performance Grade Binder Specifications
908.02	Contractor Storage Requirements
908.03	Contractor Sampling Requirements

908.01 Performance Grade Binder Specifications. The requirements of 702.01 shall be replaced with AASHTO Provisional Standard MP1-93, 1997 AASHTO Provisional Standard version for Performance Graded (PG) binders as modified below:

PG 64-22 shall meet: Penetration, 77°F (25°C), 3.53 oz (100g), 5s -	55 - 75
PG 58-28 shall meet: Viscosity, poise, 140°F (60°C)-	800 min

The Materials and Manufacture section 5 shall be modified for all performance grades (PG) as follows:

- 5.1 The performance grade binder shall be an asphalt cement from the refining of crude petroleum, or combination of asphalt cements from the refining of crude petroleum, or asphalt cements and suitable liquid from the refining of crude petroleum, and possible organic modifiers for performance enhancement. Material from the crude refining stream will be considered neat. Liquid from crude refining may be used for adjustments but shall not be used for the purpose of substitution of crude refined asphalt cement in a performance grade asphalt binder. In the event of a failure investigation where binders exhibit unusual properties a supplier may be requested by the Office of Materials Management to supply information about the makeup of a PG binder. Failure to cooperate will mean removal from certification.
- 5.2 A modifier may be any organic material of suitable manufacture that is proven compatible with asphalt cement (does not separate appreciably in routine storage), and that is dissolved, dispersed or reacted in asphalt cement to improve its performance. Performance enhancement is defined as a decrease in the temperature susceptibility of the asphalt cement while maintaining or improving desirable properties in a neat asphalt cement such as coatability, adhesiveness and cohesiveness. The use of modifiers shall be limited to 6.0 percent by performance grade binder weight.
- 5.3 The use of previously used materials must be approved by the Department. Since no standard test procedures exist for reprocessed materials (and original tests were not

developed with the use of such materials in mind), appropriate test methods may be chosen by the Department for review. Department approval does not relieve the performance grade binder supplier from full responsibility for content and use of any previously used material nor guarantee suitable performance enhancement as defined above. The detected presence in a performance grade binder sample of any unapproved previously used material will mean immediate removal from certification. Approved reprocessed materials will be limited to 6.0 percent by performance grade binder weight.

- 5.4 The performance grade asphalt binder shall be homogeneous, free from water and deleterious materials, and shall not foam when heated to 350°F (175°C). The asphalt binder (before modification or after modification if liquid modifier used) shall be proven fully compatible with a negative result by means of the Spot Test per AASHTO T 102 using standard naphtha solvent. If standard naphtha shows a positive result, a retest using 35 percent Xylene/ 65 percent Heptane (volume) may be used.
- 5.5 The performance grade asphalt binder shall be at least 99.0 percent soluble as determined by ASTM D 5546 or D 2042. Any insoluble component shall be substantially free of fibers and have discrete particles less than 75µm.

908.02 Contractor Storage Requirements. Storage of a performance grade binder shall be in accordance with 750.01, with the following additions:

1. If a Contractor is providing a binder other than a performance grade binder to customers other than the Department (excepting winter carryover work), a separate storage tank shall be used.
2. When the Contractor switches between different performance grade binders because of alternating mix types, a separate storage tank shall be used.
3. When the Contractor switches from any asphalt cement or other performance grade binder to a different performance grade binder using the same storage tank, the storage tank shall be at least 90 percent empty by tank height.

The Monitoring Team shall be notified before the delivery of the first load of each type of performance grade binder, with sufficient lead time to allow for verification of the condition of the storage tank. The Monitoring Team may sample the first storage tank load or give the Contractor permission to proceed with no tank verification, at their discretion.

908.03 Contractor Sampling Requirements. The Contractor shall take two 1 quart (1 liter) samples from the first transport truck load of performance grade binder before incorporation into the storage tank. The Contractor will label and date the samples and retain them in the plant laboratory for future reference by the Department, if necessary.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 910
OZEU STRUCTURAL STEEL PAINT

July 28, 1998

910.01	Description
910.02	Organic Zinc Prime Coat
910.03	Epoxy Intermediate Coat
910.04	Urethane Finish Coat
910.05	Performance Requirements
910.06	Prequalification
910.07	Sampling

910.01 Description. This specification covers the formulation and testing of a three coat structural steel paint system consisting of an organic zinc prime coat, an epoxy intermediate coat and a urethane finish coat (OZEU). Material requirements for the respective coats shall be as follows.

910.02 Organic Zinc Prime Coat. The organic zinc prime coat shall consist of a zinc dust filled, two or three-component epoxy polyamide, and selected additives as required:

A. Physical Requirements.	Minimum
Total Solids, % by weight of paint, ASTM D 2369	70
Pigment, % by weight of total solids, ASTM D 2371	83
Total zinc dust, % by weight of pigment	93
Total zinc, % by weight, of total solids, by calculation	77
Total solids, % by volume, ASTM D 2697	45
Color, greenish gray, approximating FS-595B-34159, Visual comparison	
Pot Life at 25° C (77° F) and 50% Relative Humidity (R.H.), hours	6
By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.	

- B. Qualitative Requirements.
- Mixing shall conform to Section 5.2, SSPC-Paint 20 using only a high shear (Jiffy) mixer.
- Storage life - Section 5.4, SSPC-Paint 20
- Mudcracking - Section 5.7, SSPC-Paint 20

C. Material Quality Assurance : Analysis for each component.

1. Three-component systems.

a. Resin	
Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup
b. Hardener	
Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup
c. Zinc	
Total Zinc metal, % by weight	± 2

2. Two-component systems.

a. Zinc/Resin Component	
Total Zinc metal, % by weight	± 2
Density	± 2%
Viscosity	Dependent on test
Nonvolatiles, % by weight	± 2
b. Hardener Component	Variance*
Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup

* Variance within the mean of the tests of the previously submitted sample for qualification.

910.03 Epoxy Intermediate Coat. The epoxy intermediate coat shall be a two-part product composed of a base component and a curing agent suitable for application over the epoxy-polyamide zinc rich primer.

The base component shall contain an epoxy resin together with color pigments, mineral fillers, gellant, leveling agent, and volatile solvents. The curing agent component shall contain a liquid polyamide resin and volatile solvent. The coating shall also meet the following:

- A. Physical Requirements
1. Color: White, meeting or exceeding, FS-595B-37875 as per ASTM E 1347
 2. Components: Two, mixed prior to application
 3. Volume solids, ASTM D 2697: 50.0% minimum

4. Pot life: 6 hours, minimum @ 25°C (77°F)
By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.
5. Curing Time:
- a. Set-to-touch, ASTM D 1640: 4 hours Maximum @ 25°C (77°F)
 - b. Dry To recoat, ASTM D 1640: 24 hours Maximum @ 25°C (77°F)
 - c. Full cure: 7 days @ 10°C (50°F), Maximum
No pick-up when rubbed with a cloth soaked in Methyl Ethyl Ketone
6. Fineness of Grind, ASTM D 1210: Hegman 3 minimum
7. Volatile Organic Compounds, maximum, ASTM D 3960:
0.419 g/mL (3.5 lbs./gal.), as applied.

Gray FS-595B - 16440 - Use for the gloss test
Green FS-595B - 14260
Blue FS-595B - 15450
**Contractor's choice unless specified on plans.

B. Material Quality Assurance: Analysis for each component.

TEST	VARIANCE*
Density	± 2%
Viscosity,	Dependent on test
Total Solids, by Weight	± 2%
Pigment, by Weight	± 2%
Nonvolatile Vehicle, by weight	± 2%

*Variance shall be within the noted range based upon the test average of the previously submitted sample.

910.05 Performance Requirements. The coating system, which consists of the organic zinc prime coat, the epoxy intermediate coat, and the urethane topcoat, shall be tested prior to use.

Three panels for each of the specified tests shall be prepared to the requirements of the ASTM D 609 except that the thickness shall be 3 mm (1/8 inch) minimum and the steel shall be ASTM A 36/A 36 M hot rolled steel. The surface shall be blast cleaned (using coal slag abrasive) to equal, as nearly as is practical, the standard Sa 2-1/2 of ASTM D 2200 (Steel Structures Painting Council SSPC-SP10 meets this requirement), and the surface shall have a nominal height of profile of 25 to 88 µm (1 to 3.5) mils verified by using appropriate replica tape. The panels shall be coated and permitted to cure in accordance with the manufacturer's printed instructions. The dry film coating thickness in the system to be tested shall be as follows:

Organic Zinc:	75 - 125 µm (3.0 - 5.0 Mils)
Epoxy:	125 - 175 µm (5.0 - 7.0 Mils)
Urethane:	50 - 100 µm (2.0 - 4.0 Mils)

The coating system shall pass each of the following tests:

A. Fresh water resistance test (ASTM D 870). The panels shall be scribed as per ASTM D 1654 to the depth of the base metal in the form of an "X" having at least 50 mm (2-inch) legs and then immersed in fresh tap water at 25 ± 3°C (75 ± 5°F). After 30 days of immersion, the panels shall show no rusting nor shall the coating show any blistering, softening or discoloration. Blistering shall be rated by ASTM D 714.

B. Salt water resistance test (ASTM D 870). The panel shall be scribed as specified in "A" above and then immersed in a water solution of 5 percent sodium chloride at 25 ±

B. Material Quality Assurance for each component.

TEST	VARIANCE*
Density	± 2%
Viscosity	Dependent on test
Total Solids, % by weight	± 2
Pigment, % by weight	± 2
Nonvolatile Vehicle, % by weight	± 2

*Variance shall be within the noted range based upon the test average of the previously submitted sample.

910.04 Urethane Finish Coat. The urethane finish coat shall be a two-component polyester and/or acrylic aliphatic urethane and shall be suitable for use as a finish coat over the white epoxy polyamide intermediate coat.

A. Physical Requirements.

- 1. Finish: Specular Gloss, 60 degree, ASTM D 523: 85% minimum;
70% minimum after 3000 hours weathering resistance
- 2. Volume Solids, ASTM D 2697: 42% minimum
- 3. Cure (Dry) Time at 25°C (77°F) and 50% RH
Set to touch ASTM D 1640: 30 Minutes, minimum
4 Hours, maximum
- 4. Pot Life: 4 hours minimum at 25°C (77°F)
By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.
- 5. Volatile Organic Compounds, ASTM D 3960: maximum, 0.419 g/mL (3.5 lbs./gal.), as applied.
- 6. Colors**

3°C (75 ± 5°F). The panels shall show no rust nor shall the coating exhibit any blistering or softening after 7, 14, and 30 days. Blistering shall be rated by ASTM D 714. The sodium chloride solution shall be replaced with a fresh solution after examination at 7 and 14 days.

C. Weathering resistance test. The panels shall be tested in accordance with ASTM D 4587 Method D, utilizing Ultra Violet A 340 bulbs. The panels shall be placed on test at the beginning of a wet cycle. After 3000 hours continuous exposure, the coating shall show no blistering or loss of adhesion, nor shall the panels show any rusting. The 60 degree specular gloss measurements shall be performed on the sprayed panels utilized for this test. The three initial measurements (one per panel) will be average together. The three final measurements also will be averaged together.

D. Salt fog resistance test. The panels shall be scribed as specified in "A" above, and then tested in accordance with ASTM B 117. After 3000 hours of continuous exposure the coating shall show no loss of bond nor shall it show rusting or blistering beyond 2 mm (1/16 inch) from the center of the scribe mark. Blistering shall be rated by ASTM D 714.

E. Elcometer adhesion test, ASTM D 4541. The panels shall be tested in accordance with the following: lightly sand the coating surface and aluminum dolly and apply a quick set adhesive. Allow adhesive to cure overnight. Scribe the coating and adhesive around the dolly prior to testing. Make a minimum of four trials to failure and report the four trials. No trial shall be less than 2.8 Mpa (400 psi). Fracture at the primer-blast interface shall be caused for rejection.

910.06 Prequalification. Prior to approval, copies of the manufacturer's certified test data showing that the coating system complies with the performance requirements of this specification shall be submitted to the Engineer of Tests, 1600 W. Broad St., Columbus, Ohio 44223. The certified test data shall also state the following physical properties for each coating: Density, g/mL (lbs. per gal.); Solids, % by weight; Solids, % by volume; Viscosity; Drying time; Volatile Organic Compounds content, g/mL (lb. per gallon).

The test data shall be developed by an independent testing laboratory approved by the Lab and shall include the brand name of the paint, name of manufacturer, number of lots tested, and date of manufacture.

The following items shall also be submitted to the Lab prior to approval: manufacturer's technical data sheet for each coating; material Safety Data Sheet for each coating; enough components to produce a 4 liter (one gallon) sample of each coating; and, a one liter (one quart) sample of the thinner to be used with each coating.

When the coating has been approved by the Director, further performance testing by the manufacturer will not be required unless the formulation or manufacturing process has been changed, in which case new certified test results will be required.

910.07 Sampling. Acceptance variances shall be established by the Laboratory.

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENTAL SPECIFICATION 911
PLASTIC SUPPORTS FOR REINFORCING STEEL
July 10, 1997**

This specification covers the material requirements for plastic support chairs for reinforcing steel used with Item 509, Reinforcing Steel. All plastic chair designs shall be capable of supporting at least 150 kg(330 pounds) without any recorded deformation, breakage or damage at a temperature of at least 38 °C (110 °F). No plastic chair designs shall have sharp protrusions or edges that could damage or penetrate coatings on the reinforcing steel. All chair designs shall be capable of permitting a No. 57 coarse aggregate to flow either through or around the reinforcing steel support without binding or causing a void in the finished concrete. No plastic chair designs shall be supported on a footprint of greater than 1300 sq mm (2 sq inches). Plastic chair designs shall be manufactured from material chemically inert to concrete. Reinforcing steel support chairs that have passed the testing and acceptance procedures in Supplement 1081 shall be approved for use and included on an approved list of plastic chair supports for reinforcing steel..

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

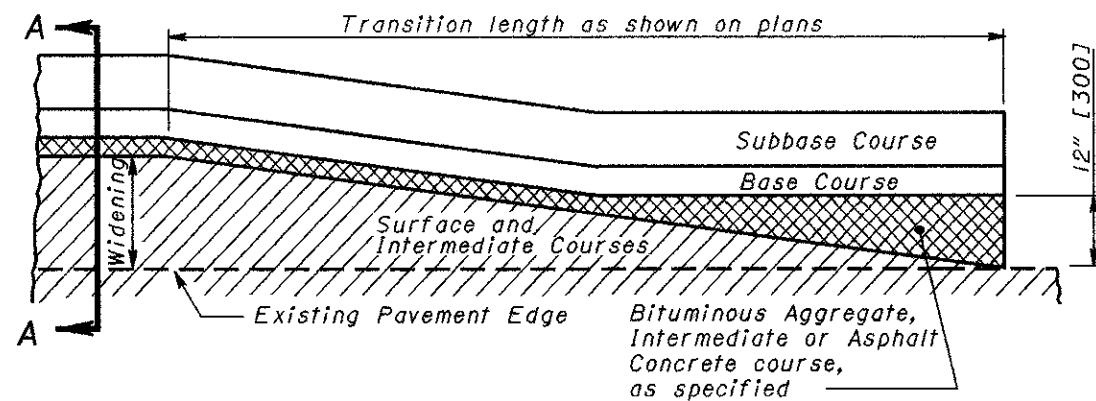
**SUPPLEMENTAL SPECIFICATION 954
HIGH MOLECULAR WEIGHT METHACRYLATE (HMWM) RESIN**

September 9, 1997

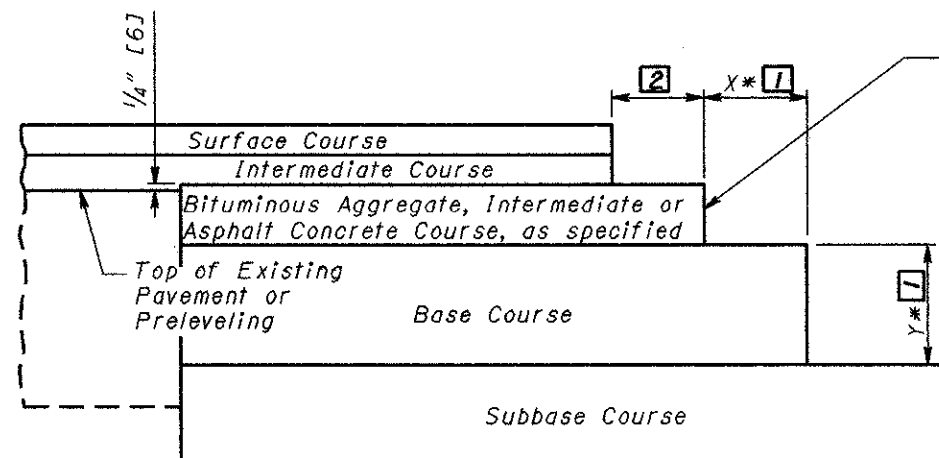
The high molecular weight methacrylate (HMWM) resin shall be low viscosity, non-fuming, conforming to the following:

Viscosity	Less than 25 cps (brookfield viscometer, Model RVT with UL adaptor or Model LVF, # spindle and UL adaptor C@ 25 °C (77 °F) (ASTM D 2849)
Density	Greater than 8.4 lbs/gal Ca 25 °C (77 °F) (ASTM D 2849)
Flash Point	Greater than 93 °C (200 °F) (PenskyMartens CC) (ASTM D 93)
Vapor Pressure	Less than 1.0 mm Hg C@ 25 °C (77 °F) (ASTM D 323)
TG (DSC)	Greater than 58 °C (135 ° F) (ASTM D3418)
Shelf Life	Must be 1 year minimum at manufacturers recommended environmental considerations.
Gel Time	Greater than 40 min - 100 g mass (ASTM D 2471) (thin film)
Percent Solids	Greater than 90% by weight
Bond Strength	Greater than 10.5MPa (1500 psi) (ASTM C 882)

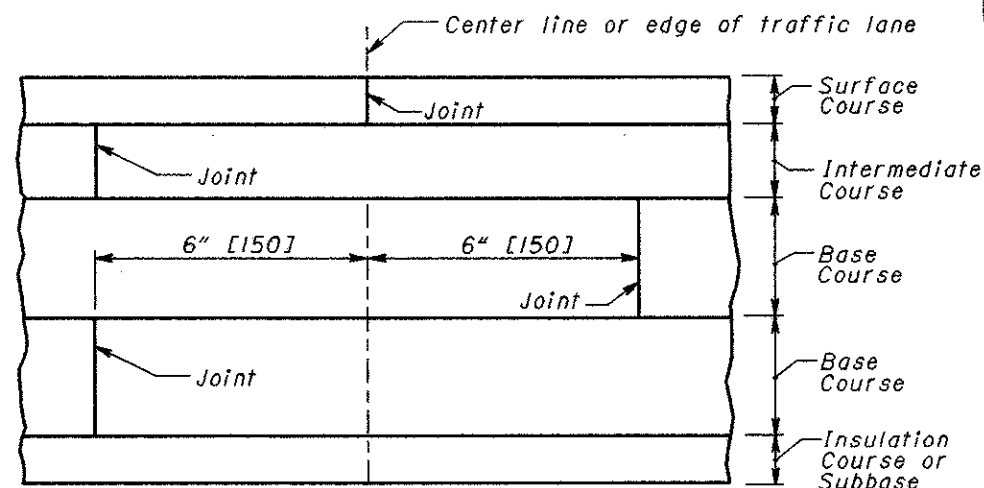
The resin shall be from the approved list in the Office of Materials Management.



MERGING EDGE OF PAVEMENT WIDENING
WITH EDGE OF EXISTING PAVEMENT



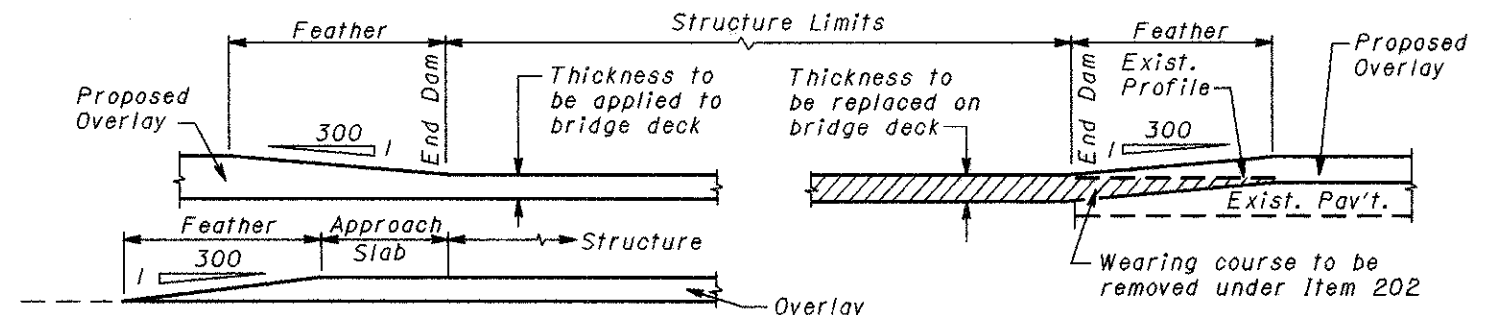
SECTION A-A
COURSE DETAIL FOR WIDENING



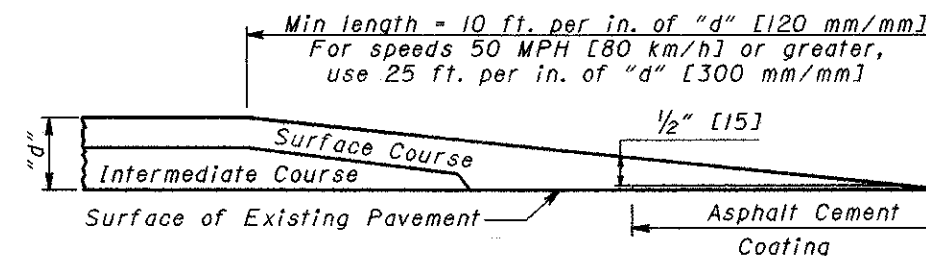
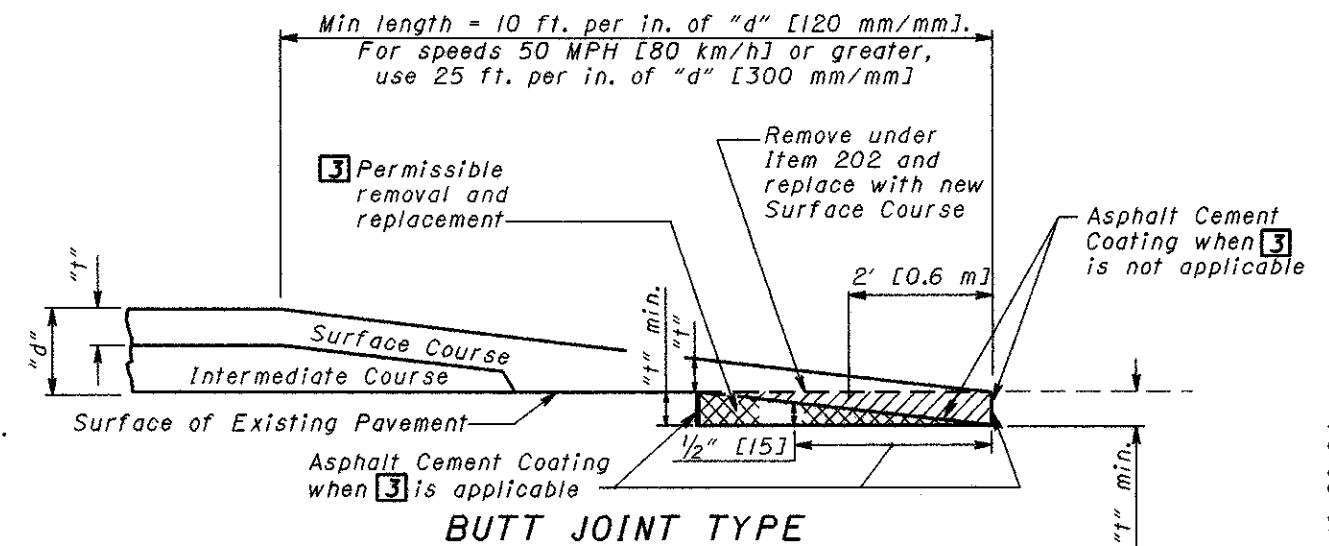
The Bituminous Aggregate in the upper part of the base widening shall finish approximately $\frac{1}{4}$ " [6] above the edge of the existing pavement where no preleveling is used. Where a preleveling (using intermediate course material) is specified it shall be placed prior to excavation of the widening trench and the upper course of the base widening shall finish approximately $\frac{1}{4}$ " [6] above the preleveling.

LEGEND

- 1 The extended width (X) of a base or subbase course shall be equal to the depth (Y) of that particular course, unless otherwise specified in the plans.
- 2 The extended width shall be equal to the thickness of the surface course plus the intermediate course, or 4 inches [100], whichever is greater.



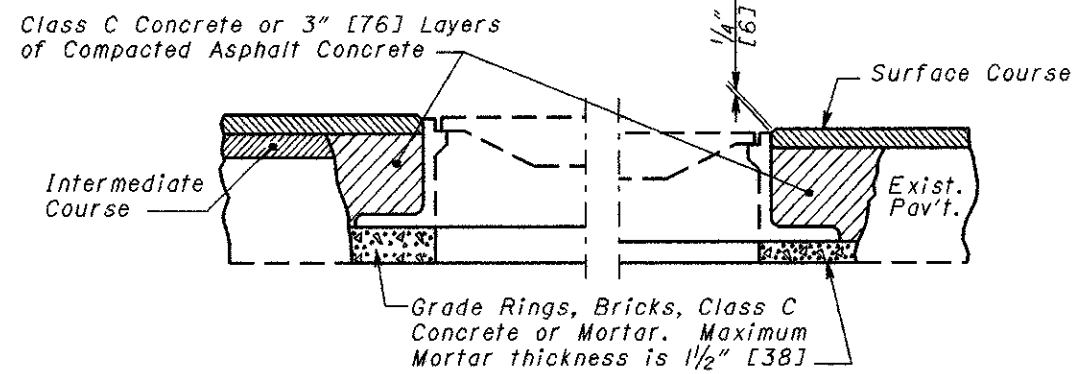
Details assume non-settled approach slabs. Smoothing of the profile for settlement is required per plan grades or as directed by the Engineer.



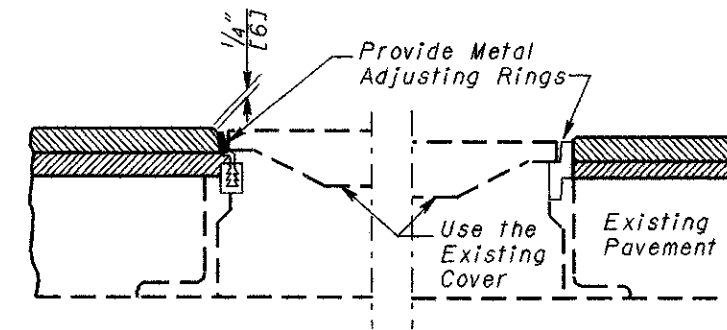
NOTE: Either butt or taper type may be used unless type is specified by the plan.

PLACING FEATHERED AREAS

Values for "t" and "d" are obtained from the plan.



USING CONCRETE OR MORTAR



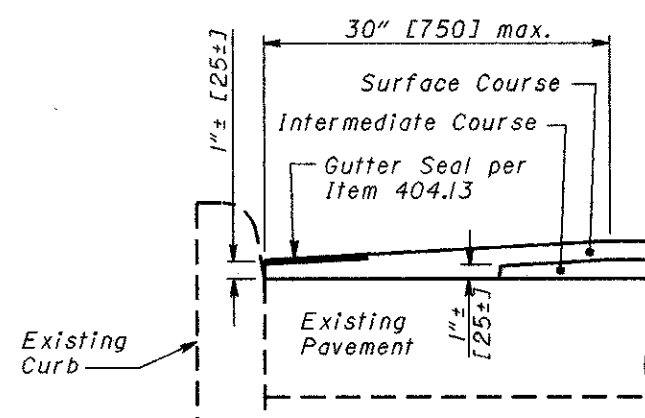
USING METAL ADJUSTING RINGS

Metal adjusting rings shall:

- (a) attach securely to the existing frame by welding or mechanical devices;
- (b) consist either of cast metal having an integral rim and seat, or be fabricated metal with a sturdy connection between the seat and rim; and
- (c) provide an even seat for the manhole cover.

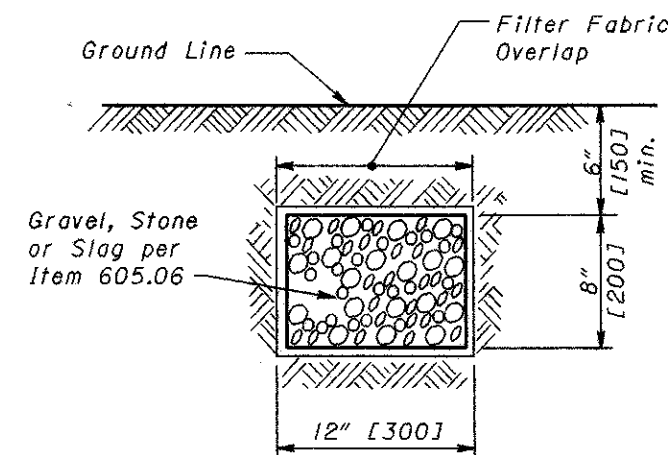
In addition, the adjusting ring type shall be a design acceptable to the local governmental agency responsible for street and sewer maintenance. Any installation unacceptable to the Engineer shall be replaced by the Contractor at his expense.

MANHOLES ADJUSTED TO GRADE



Special care shall be taken during construction to obtain maximum compaction of bituminous concrete in gutters.

GUTTER FINISH

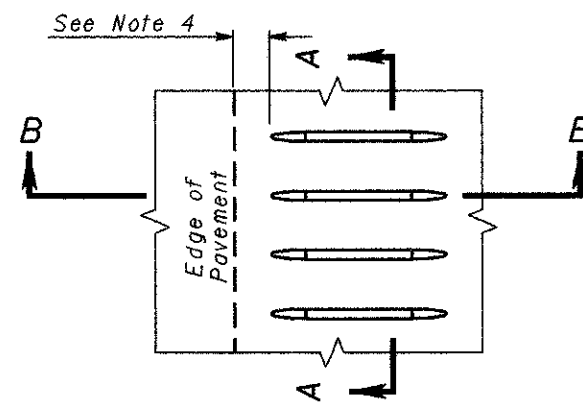


Aggregate drains to be placed where and as directed by Engineer. Provide Filter Fabric when specified as a separate pay item.

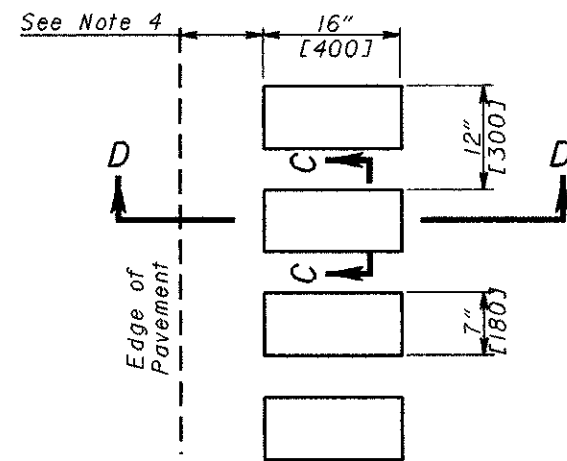
AGGREGATE DRAIN

THIS DRAWING REPLACES BP-3.1M DATED 10-28-94.

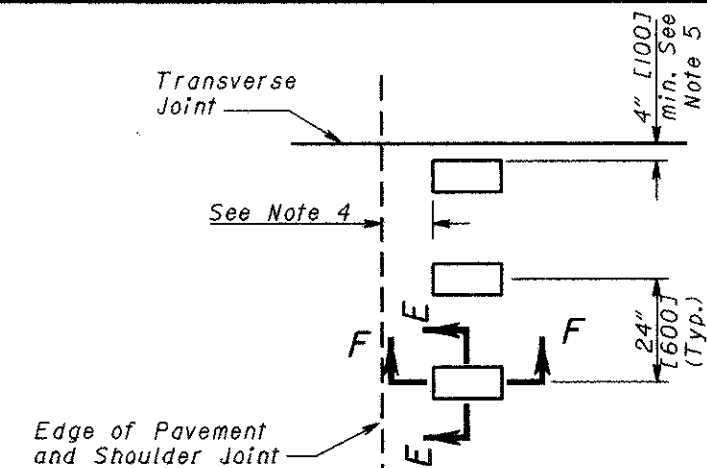
NUMBER BP-3.1	STANDARD ROADWAY CONSTRUCTION DRAWING RESURFACING	ROADWAY ENGINEERING SERVICES	All metric dimensions (in brackets []) are in millimeters unless otherwise noted.	STDS. ENGR. M. Evans DRAWN D. Focke	REVISIONS	QDD DEPARTMENT OF TRANSPORTATION Roadway Design Engineer J. H. [Signature] J-28-00 DATE



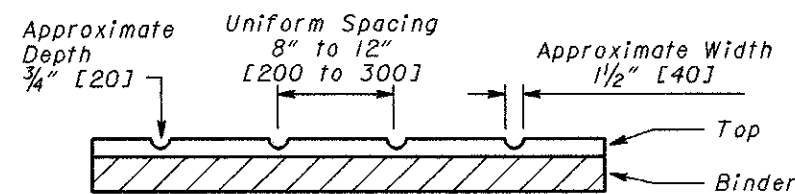
PLAN VIEW
TYPE 1



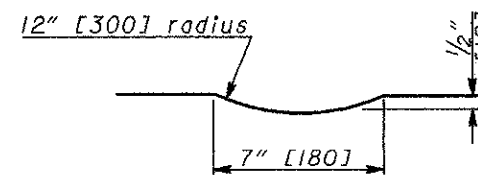
TYPICAL SPACING PLAN
TYPE 2



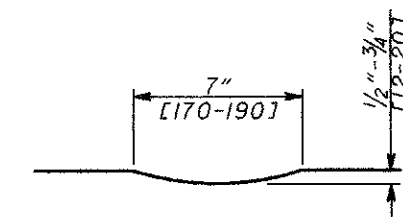
TYPICAL SPACING PLAN
TYPE 3



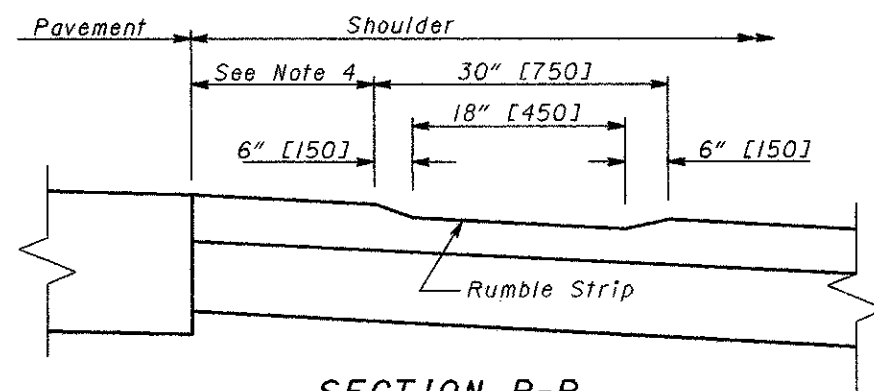
SECTION A-A



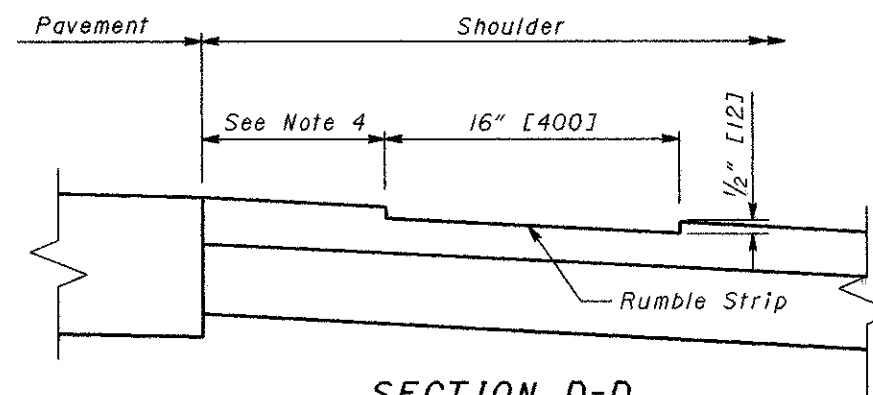
SECTION C-C



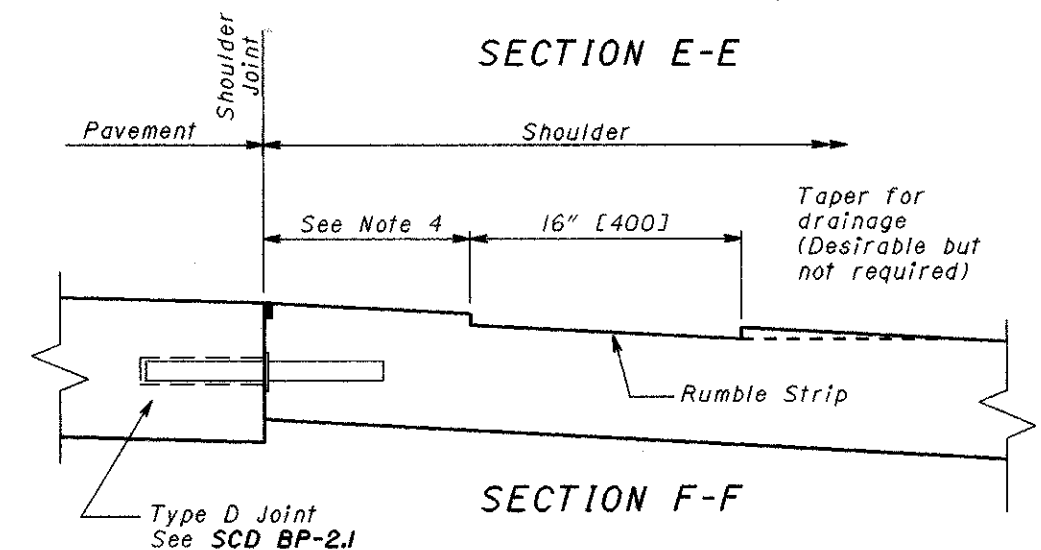
SECTION E-E



SECTION B-B



SECTION D-D



SECTION F-F

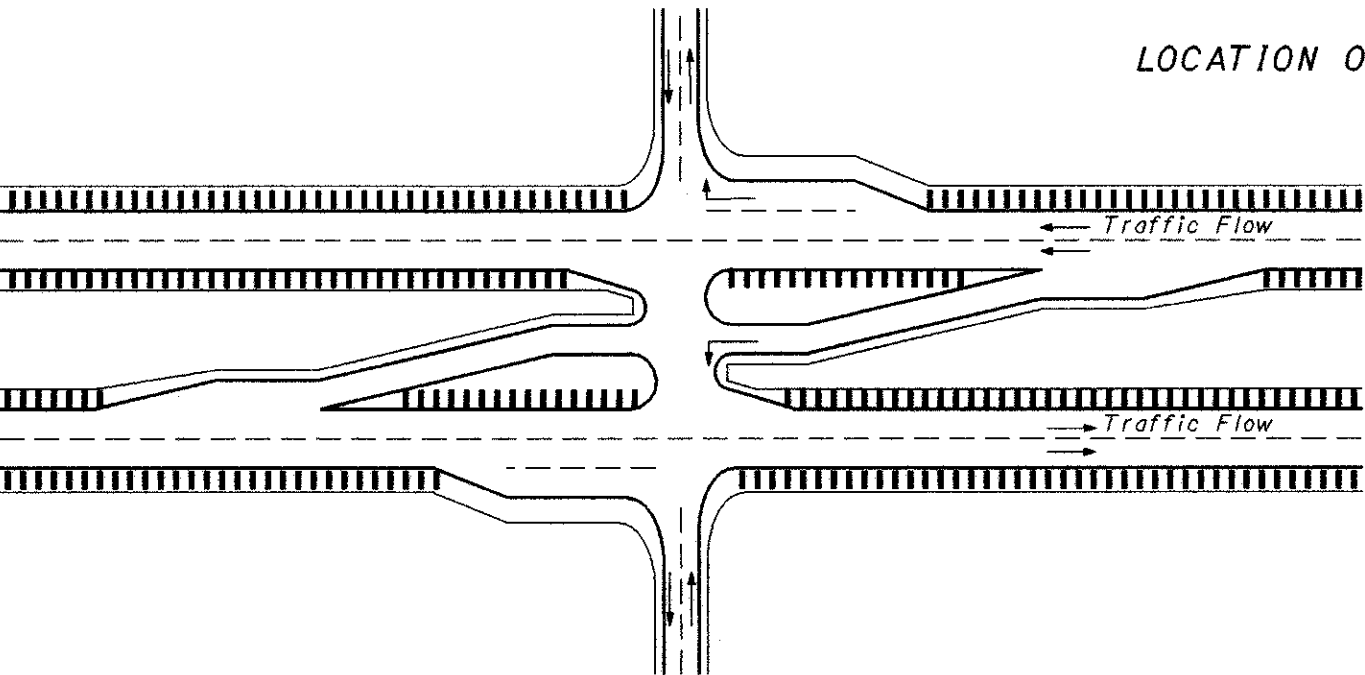
NOTES

1. Type 1 Rumble Strips are for use on freshly-paved asphalt shoulders. The pattern is designed so that the strips can be rolled or pressed into the asphalt material while it is still hot. See specifications for details.
2. Type 2 Rumble Strips are for use on new or existing asphalt or concrete shoulders. The pattern is designed so that it can be milled or ground into the shoulder material. See specifications for details.
3. Type 3 Rumble Strips are for use on freshly-paved concrete shoulders. The pattern is designed so that it may be formed into the concrete shoulder surface prior to the material hardening. See specifications for details.
4. See Sheet 2 of 2 for Offset Dimensions.
5. A rumble strip should not be closer than 4" [100] to any joint, transverse or longitudinal, in concrete shoulders.

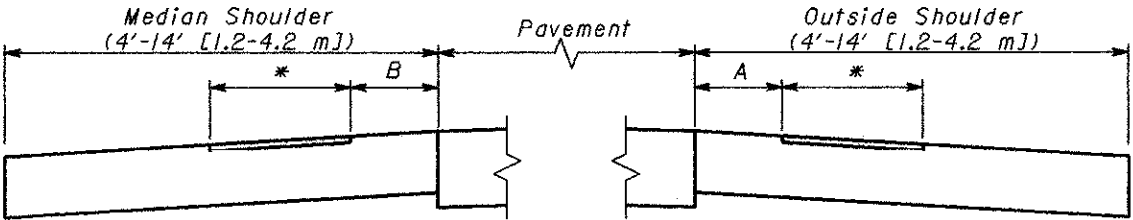
LOCATION OF RUMBLE STRIPS

NOTES

1. See Sheet 1 of 2 for Rumble Strip details.
2. On median shoulders 12 feet [3.6 m] or wider, where the shoulders have been designed for maintenance of traffic during construction, the pattern should be placed near the middle of the shoulder (see table at left for offsets). The purpose for this is so that traffic can be maintained on the median shoulder during a "Phase 1" traffic maintenance sequence and straddle the pattern. "Phase 2" traffic can be maintained on the newly-paved outside shoulder prior to placement of the new rumble strip pattern.
3. At entrance and exit terminals, the outside shoulder pattern should be extended toward the ramp juncture as far as possible, and then shifted over to the outside shoulder of the terminal area. The "nose" of an entrance or exit terminal is a logical reference point. On either terminal, extend the pattern 100' [30 m] (150' [50 m] for Class II exit terminals) into the terminal area and then transfer to the outside shoulder.
4. The AT-GRADE INTERSECTION diagram shows a typical application for divided roadways, but the patterns on the outside shoulders are also applicable to undivided roadways.
5. Where rumble strips are used on the shoulders of arterial roadways, the pattern should be interrupted across residential or commercial drives.
6. In built-up residential areas where noise may be objectionable, this dimension may be increased, but should not exceed 24" [600].
7. Rumble strips, when used in advance of critical locations, such as approaches to narrow bridges, in gore areas, and ahead of impact attenuators or other barrier end treatments, should be placed as shown.



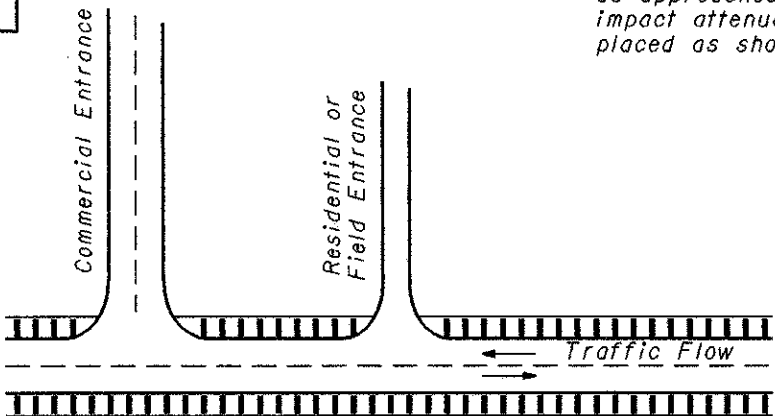
AT-GRADE INTERSECTIONS
(See Note 4.)



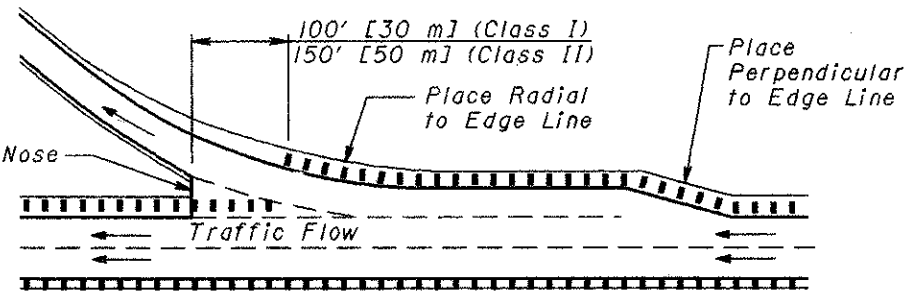
* See Sheet 1 of 2 for Rumble Strip details

OUTSIDE SHOULDER OFFSET (See Note 6.)
A = 6" [150] for 4' to 6' [1.2 to 1.8 m] shoulders
A = 10" [250] for shoulders greater than 6' [1.8 m]
MEDIAN SHOULDER OFFSET (See Note 2.)
B = 6" [150] for 4' to 6' [1.2 m to 1.8 m] shoulders
B = 10" [250] for 8' to 10' [2.4 to 3.0 m] shoulders
B = 5' [1.5 m] for 12' [3.6 m] shoulders
B = 6' [1.8 m] for 14' [4.2 m] shoulders

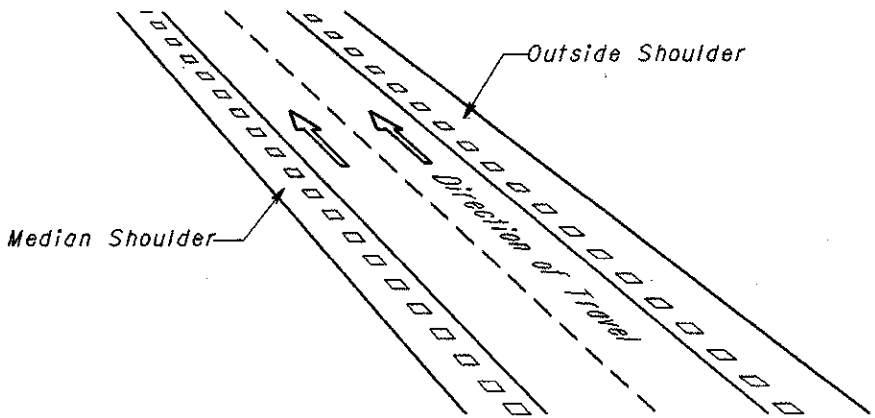
OFFSET DIMENSIONS



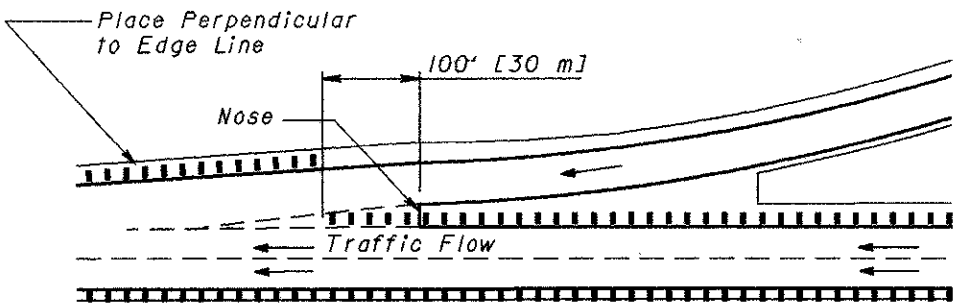
ACCESS POINTS ON ARTERIALS
(See Note 5)



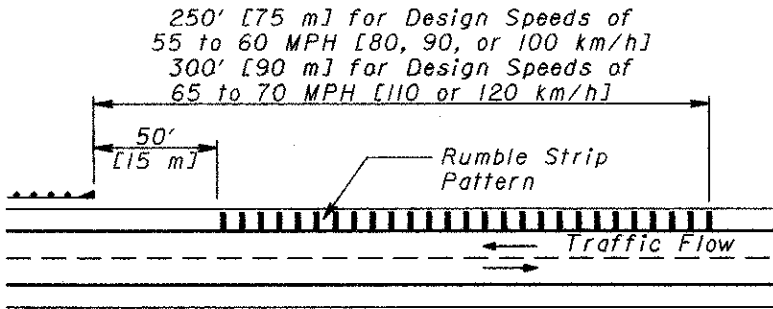
EXIT TERMINALS (See Note 3)



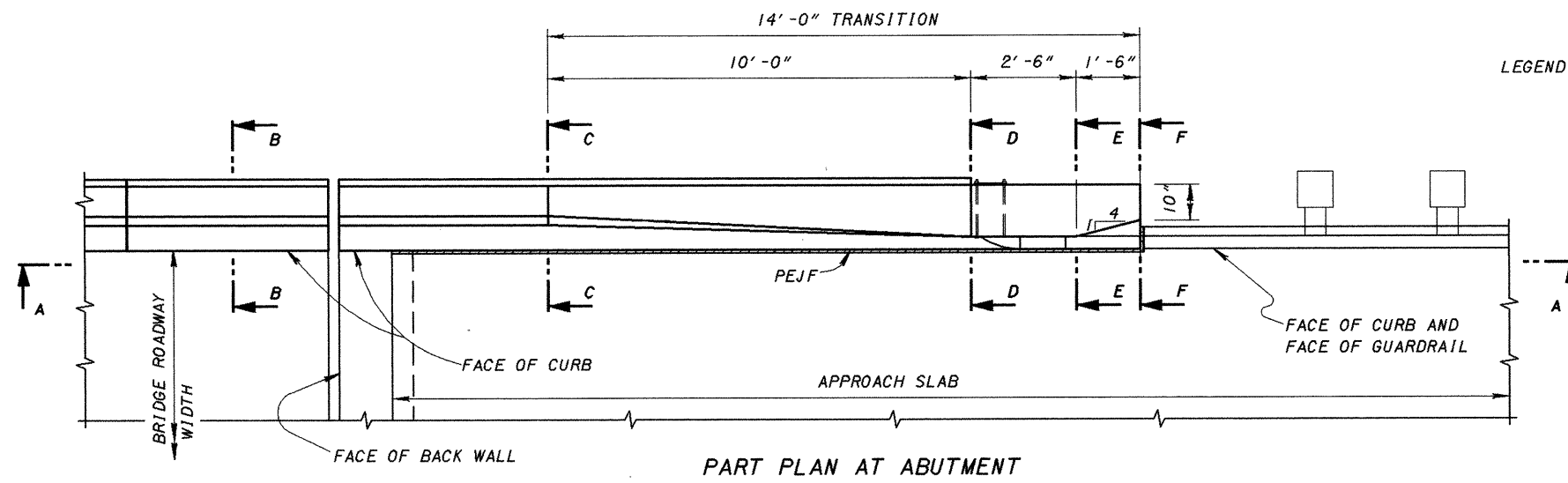
GENERAL ISOMETRIC VIEW - DIVIDED ROADWAY



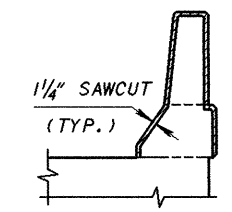
ENTRANCE TERMINALS (See Note 3)



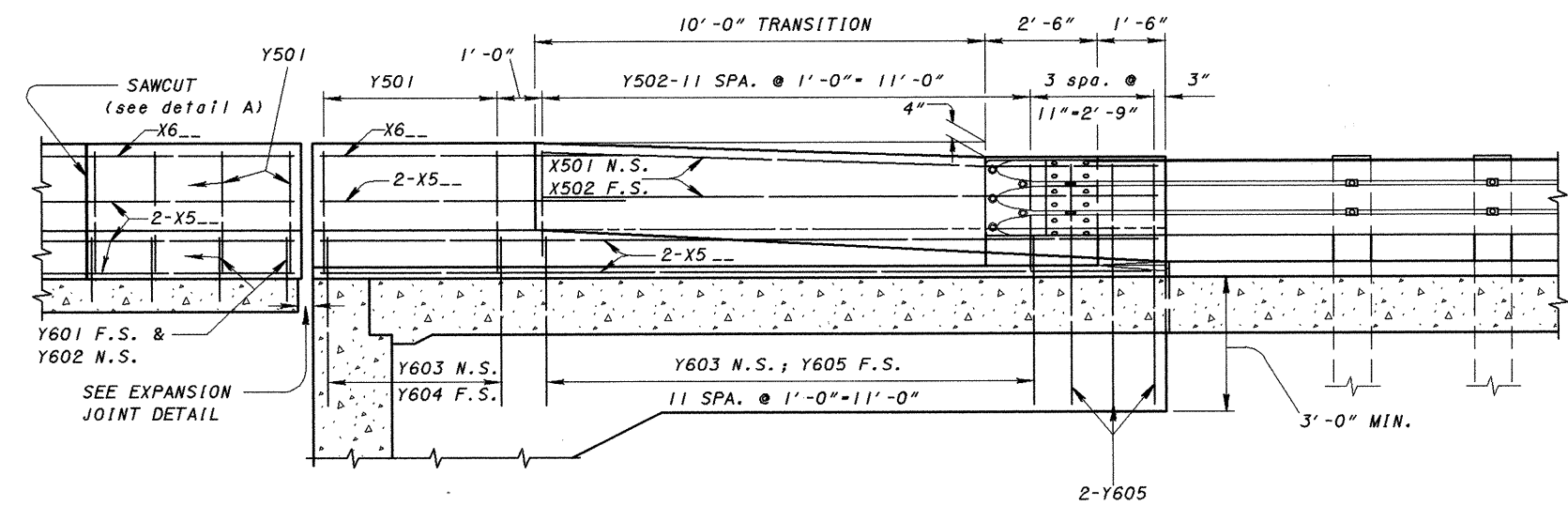
RUMBLE STRIPS LOCATIONS IN
ADVANCE OF CRITICAL LOCATIONS
(See Note 7)



LEGEND: N.S.=NEAR SIDE
F.S.=FAR SIDE



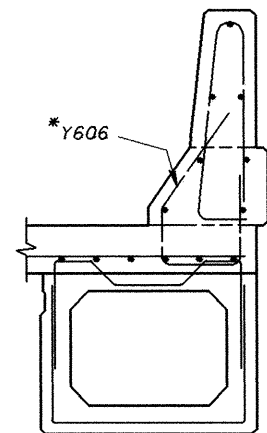
DETAIL A
(section through sawcut)
Sawcut Perimeter = 7'-1"



SECTION A-A

VERTICAL BARS SHALL BE SPACED AT 1'-0" MAXIMUM.
(see project plans)

* - BARS Y601 (DIM. B), Y604, Y606 (DIM. C) SHALL EXTEND 1'-9" TO 2'-0" ABOVE THE CONSTRUCTION JOINT BETWEEN DECK AND PARAPET.



BOX BEAM REINFORCING DETAIL
(composite deck)

DESIGN SPECIFICATIONS: "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY AASHTO, 1996, INCLUDING THE 1997 INTERIM SPECIFICATION.

DESIGN DATA: CONCRETE CLASS S f'c = 4500 PSI. REINFORCING STEEL ASTM A615, A616 OR A617 GRADE 60 fy = 60000 PSI.

CONTROL JOINTS FOR CONCRETE PARAPETS: THE JOINTS SHALL BE CONSTRUCTED BY SAWING 1/4 INCH DEEP ALONG PERIMETER OF THE PARAPET AS SOON AS THE SAW CAN BE OPERATED WITHOUT DAMAGING THE CONCRETE.

THE USE OF AN EDGE GUIDE, FENCE, OR JIG IS REQUIRED TO ENSURE THAT THE CUT JOINT IS STRAIGHT, TRUE, AND ALIGNED ON ALL FACES OF THE PARAPET. THE JOINT WIDTH SHALL BE THE WIDTH OF THE SAW BLADE, A NOMINAL WIDTH OF 1/4 INCH.

THE PERIMETER OF THE DEFLECTION CONTROL JOINT SHALL BE SEALED WITH A CAULKING MATERIAL TO A MINIMUM DEPTH OF ONE INCH CONFORMING TO FEDERAL SPECIFICATION TT-S-00227E. THE BOTTOM ONE-HALF INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE PARAPET SHOULD BE LEFT UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO ESCAPE.

SAWCUT SHALL BE PLACED AT A MINIMUM OF 6'-0" AND MAXIMUM OF 10'-0" CENTERS.

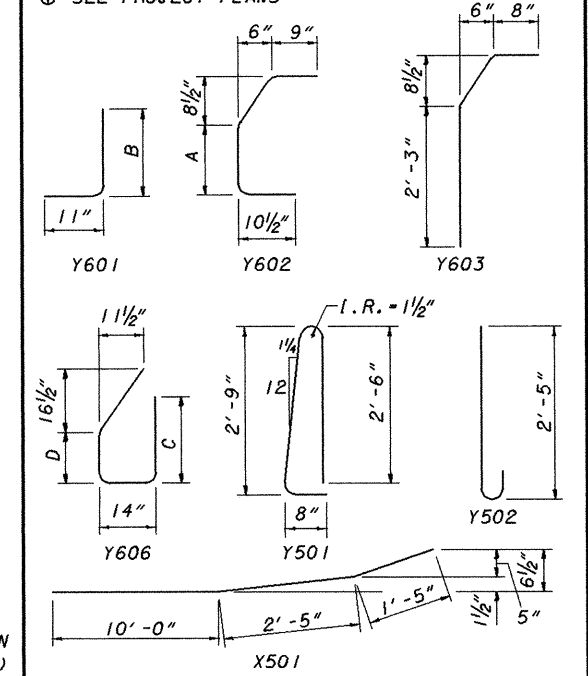
QUANTITIES OF CONCRETE, REINFORCING STEEL, DEFLECTION JOINT SAWCUT AND CAULKING MATERIAL FOR PARAPET ARE INCLUDED WITH APPROPRIATE ITEM UNDER EITHER ABUTMENTS OR SUPERSTRUCTURE FOR PAYMENTS.

FOR BRIDGE TERMINAL ASSEMBLY SEE STANDARD CONSTRUCTION DRAWING GR-3.1 AND GR-3.2.

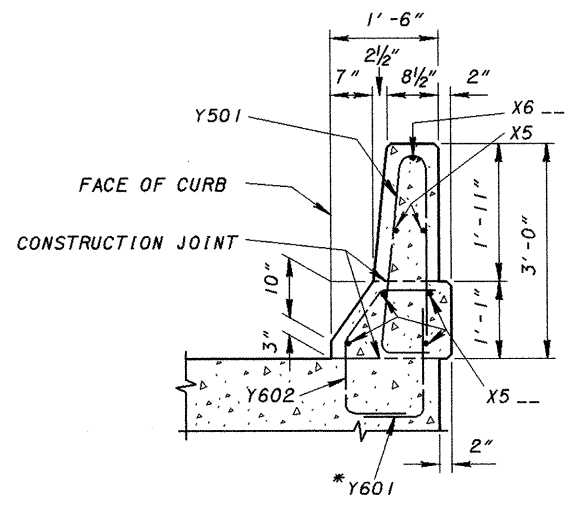
Volume of 14'-0" transition section is 1.7 Cu.Yd.

REINFORCING BAR LIST					
MARK	LENGTH	SHP.	MARK	LENGTH	SHP.
X501	13'-10"	BT.	Y601	B+9"	BT.
X502	13'-10"	STR.	Y602	A+2'-2"	BT.
X5	⊕	STR.	Y603	3'-8"	BT.
			Y604	2'-10"	STR.
X6	⊕	STR.	Y605	4'-6"	STR.
			Y606	C+D+2'-6"	BT.
Y501	6'-0"	BT.			
Y502	3'-0"	BT.			

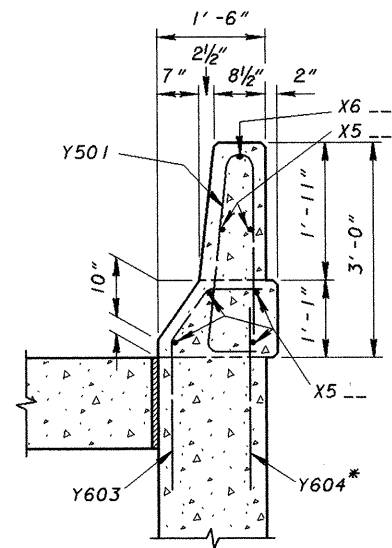
⊕ SEE PROJECT PLANS



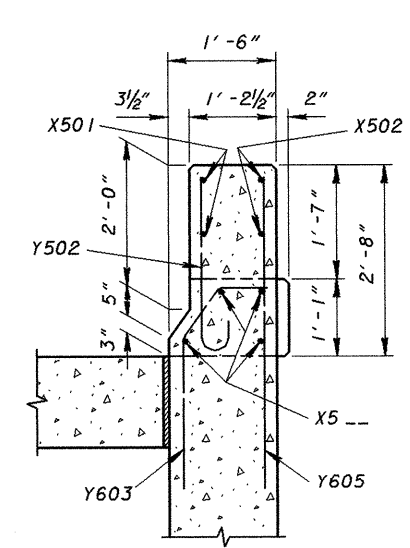
FIELD BEND BARS WHERE NECESSARY. INCLUDE BENDING DIAGRAMS ON PROJECT PLANS.



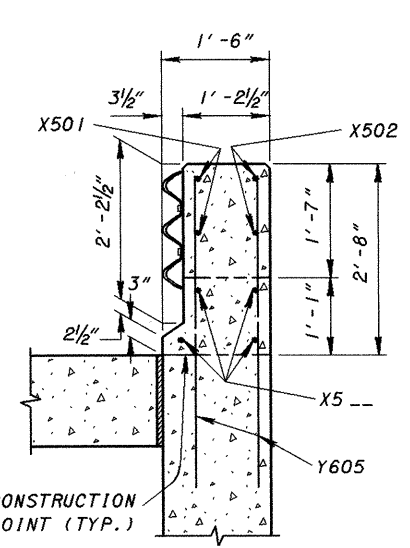
SECTION B-B
(except box beam)
Area = 449.25 Sq. In.



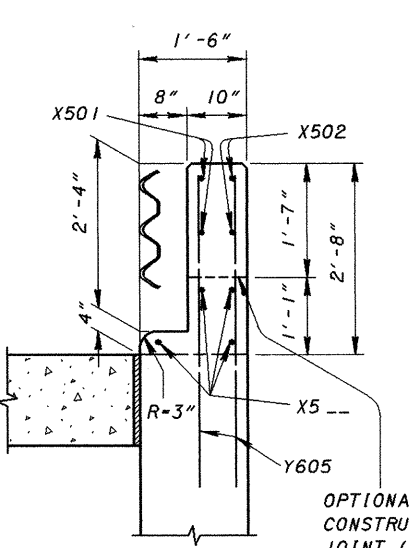
SECTION C-C



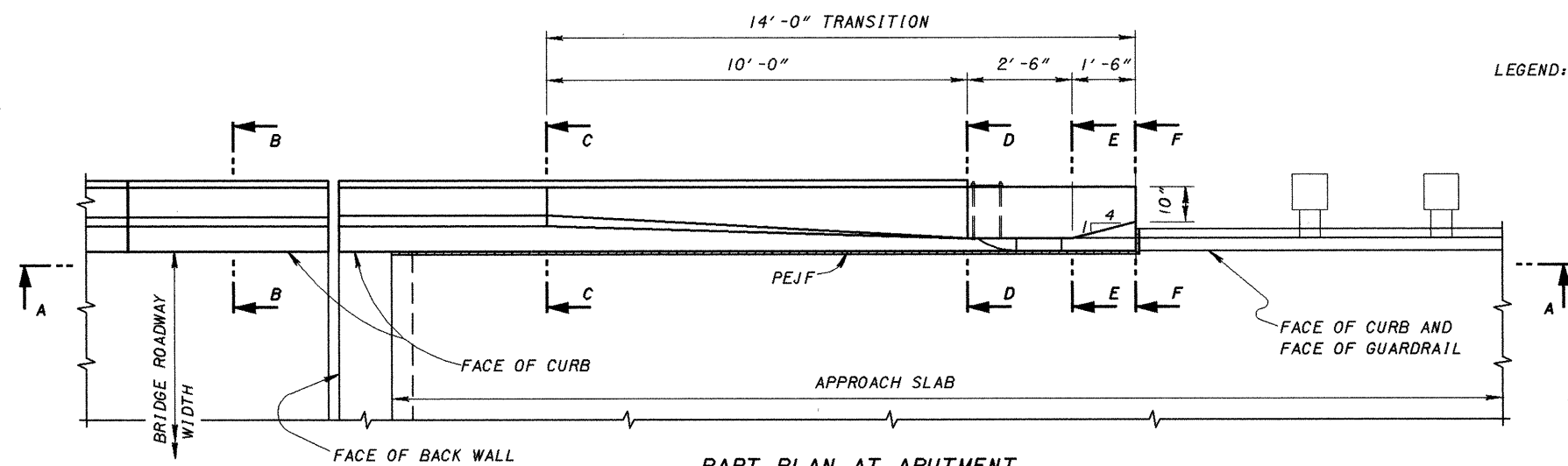
SECTION D-D



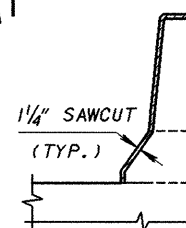
SECTION E-E



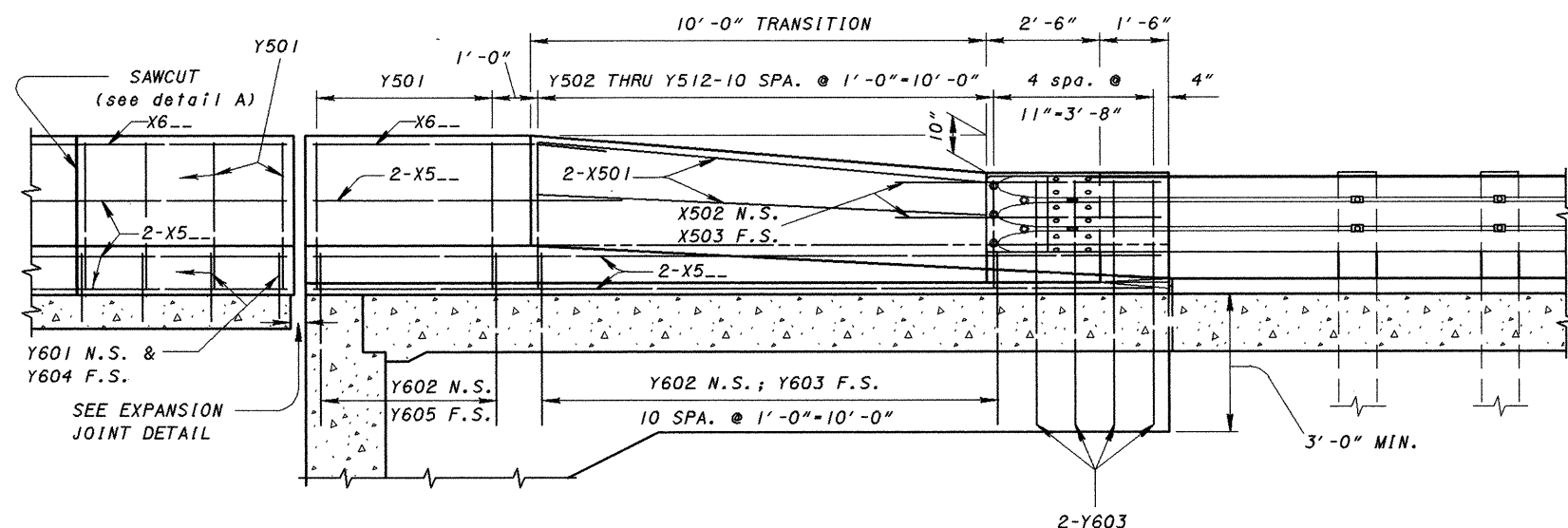
SECTION F-F



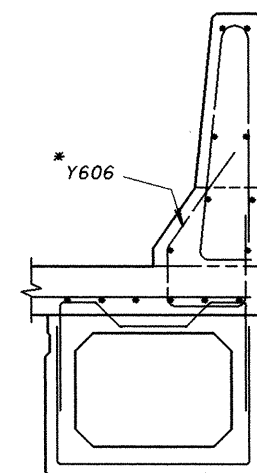
LEGEND: N.S.=NEAR SIDE
F.S.=FAR SIDE



DETAIL A
(section through sawcut)
Sawcut Perimeter = 8'-1"



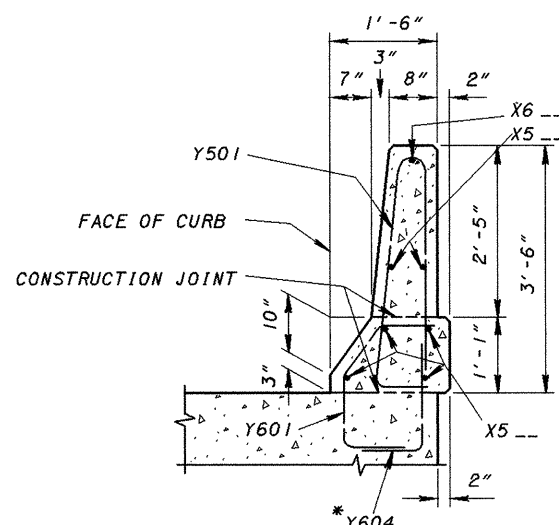
SECTION A-A



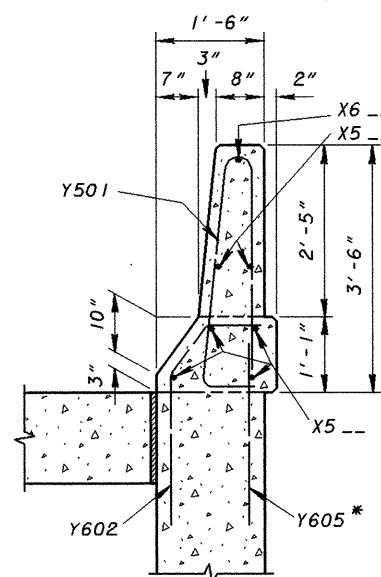
BOX BEAM REINFORCING DETAIL
(composite deck)

VERTICAL BARS SHALL BE SPACED AT 1'-0" MAXIMUM.
(see project plans)

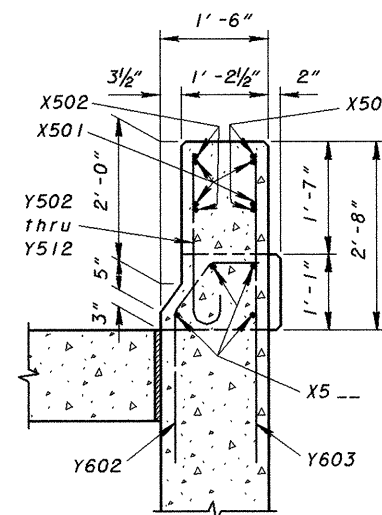
* - BARS Y604 (DIM. B), Y605, Y606 (DIM. C)
SHALL EXTEND 1'-9" TO 2'-0" ABOVE THE
CONSTRUCTION JOINT BETWEEN DECK AND PARAPET.



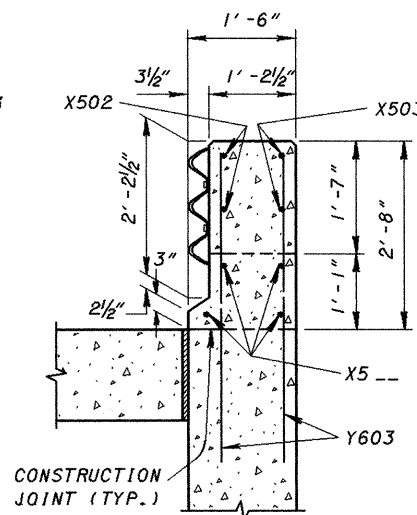
SECTION B-B
(except box beam)
Area = 500.5 Sq. In.



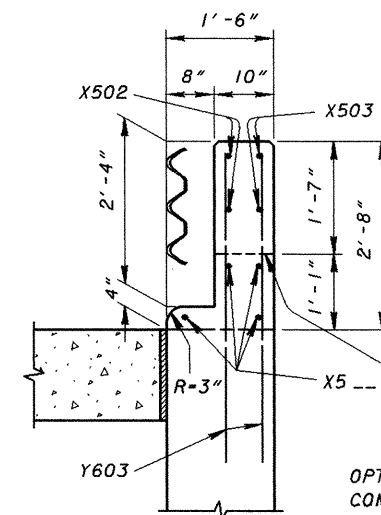
SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

DESIGN SPECIFICATIONS: "STANDARD SPECIFICATIONS FOR HIGHWAY
BRIDGES" ADOPTED BY AASHTO, 1996, INCLUDING THE 1997 INTERIM
SPECIFICATION.

DESIGN DATA: CONCRETE CLASS S f'c = 4500 PSI. REINFORCING STEEL
ASTM A615, A616 OR A617 GRADE 60 fy = 60000 PSI.

CONTROL JOINTS FOR CONCRETE PARAPETS: THE JOINTS SHALL BE
CONSTRUCTED BY SAWING 1/4 INCH DEEP ALONG PERIMETER OF THE
PARAPET AS SOON AS THE SAW CAN BE OPERATED WITHOUT DAMAGING THE
CONCRETE.

THE USE OF AN EDGE GUIDE, FENCE, OR JIG IS REQUIRED TO ENSURE
THAT THE CUT JOINT IS STRAIGHT, TRUE, AND ALIGNED ON ALL FACES
OF THE PARAPET. THE JOINT WIDTH SHALL BE THE WIDTH OF THE SAW
BLADE, A NOMINAL WIDTH OF 1/4 INCH.

THE PERIMETER OF THE DEFLECTION CONTROL JOINT SHALL BE SEALED
WITH A CAULKING MATERIAL TO A MINIMUM DEPTH OF ONE INCH CONFORM-
ING TO FEDERAL SPECIFICATION TT-S-00227E. THE BOTTOM ONE-HALF
INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE PARAPET SHOULD
BE LEFT UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO
ESCAPE.

SAWCUT SHALL BE PLACED AT A MINIMUM OF 6'-0" AND MAXIMUM OF
10'-0" CENTERS.

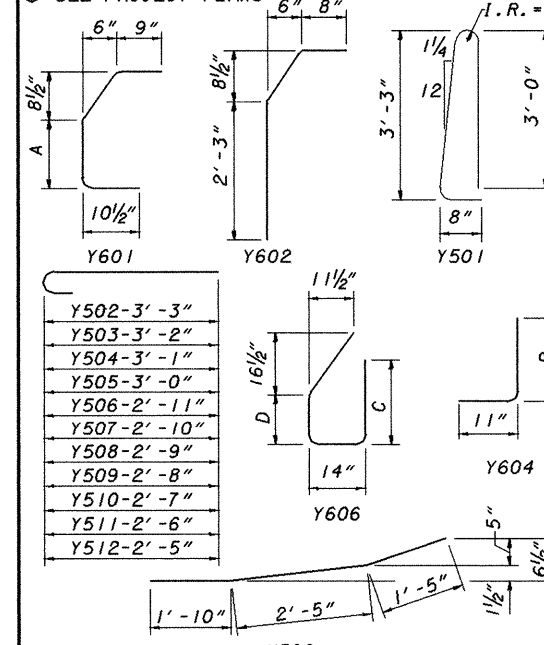
QUANTITIES OF CONCRETE, REINFORCING STEEL, DEFLECTION JOINT
SAWCUT AND CAULKING MATERIAL FOR PARAPET ARE INCLUDED WITH
APPROPRIATE ITEM UNDER EITHER ABUTMENTS OR SUPERSTRUCTURE FOR
PAYMENTS.

FOR BRIDGE TERMINAL ASSEMBLY SEE STANDARD CONSTRUCTION DRAWING
GR-3.1 AND GR-3.2.

Volume of 14'-0" transition section is 1.78 Cu.Yd.

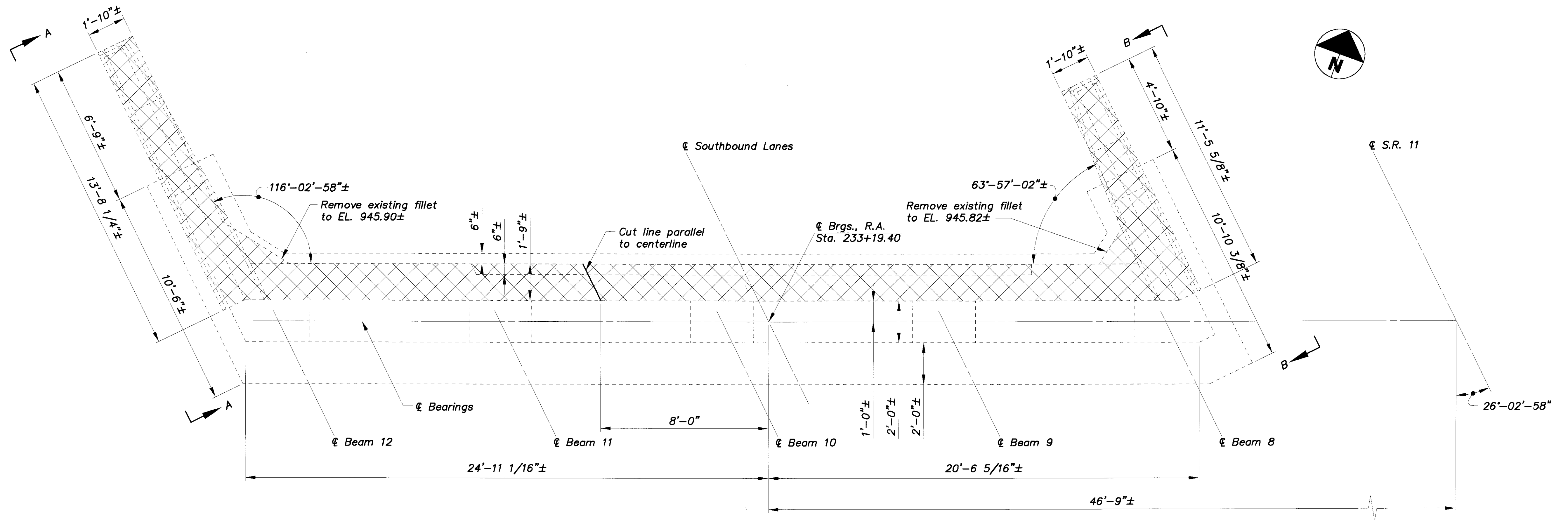
REINFORCING BAR LIST					
MARK	LENGTH	SHP.	MARK	LENGTH	SHP.
X501	10'-0"	STR.	Y501	7'-1"	BT.
X502	5'-8"	BT.	Y502	3'-10"	BT.
X503	5'-8"	STR.	Y503	3'-9"	BT.
X5	⊕	STR.	Y504	3'-8"	BT.
			Y505	3'-7"	BT.
X6	⊕	STR.	Y506	3'-6"	BT.
			Y507	3'-5"	BT.
Y601	A+2'-2"	BT.	Y508	3'-4"	BT.
Y602	3'-8"	BT.	Y509	3'-3"	BT.
Y603	4'-6"	STR.	Y510	3'-2"	BT.
Y604	B+9"	BT.	Y511	3'-1"	BT.
Y605	2'-10"	STR.	Y512	3'-0"	BT.
Y606	C+D+2'-6"	BT.			

⊕ SEE PROJECT PLANS



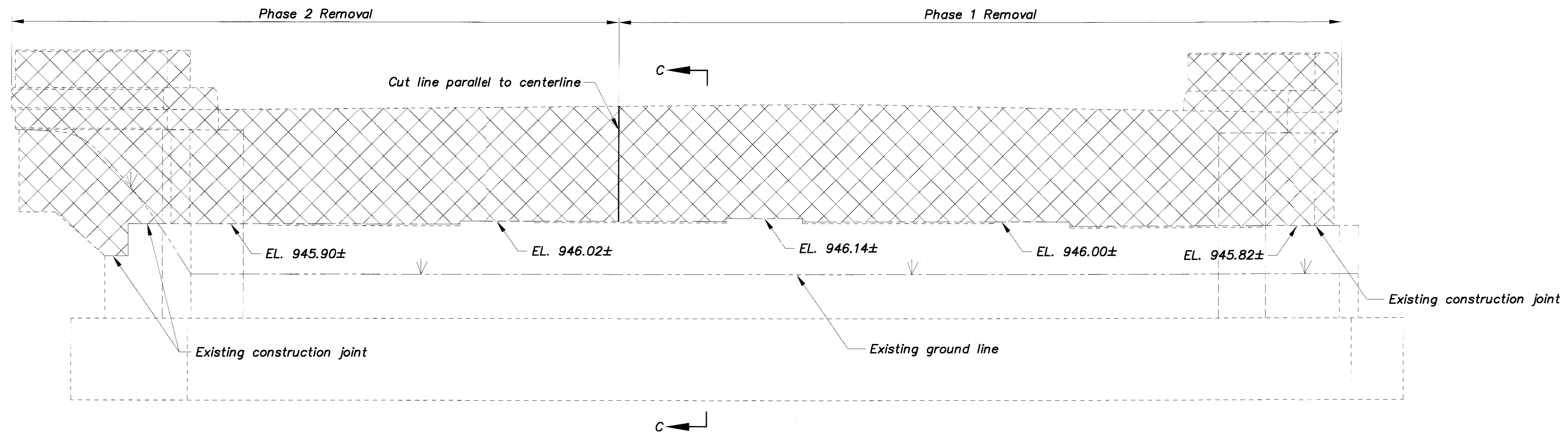
FIELD BEND BARS WHERE NECESSARY.
INCLUDE BENDING DIAGRAMS ON PROJECT PLANS.

K:\Odear\Dist11\COL-11 (9.46)(13.76)\Drawings\COL-11-13.78\COL-11-13.78(Right Bridge)\rearextabut.dwg



PLAN

(Existing approach slab and porous backfill not shown)



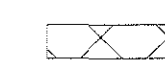
ELEVATION

(Existing piles not shown)

NOTE:

See Sheet **8/27** for Section C-C, View A-A & View B-B.

LEGEND:

 Portion of existing structure to be removed.

EXISTING REAR ABUTMENT REMOVAL & REPAIR

Bridge No. COL-11-1378 S.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

6/27

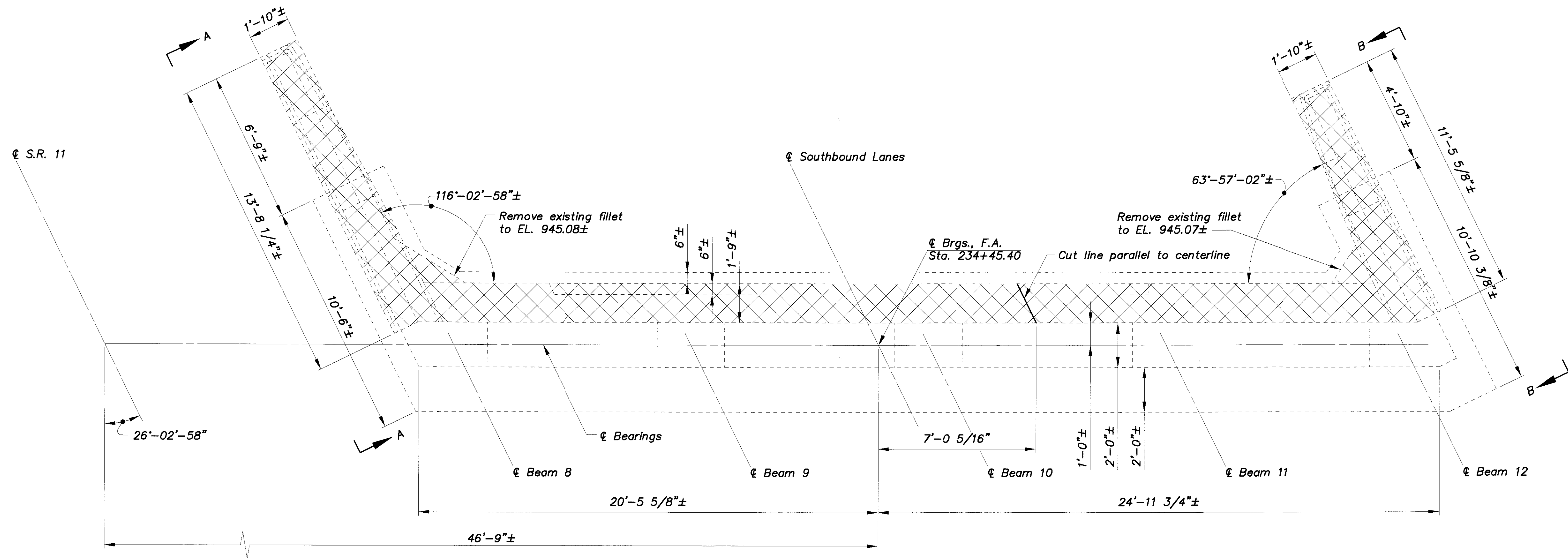
105
126

WD&E
DESIGN AGENCY
1201 Dublin Road Columbus, Ohio

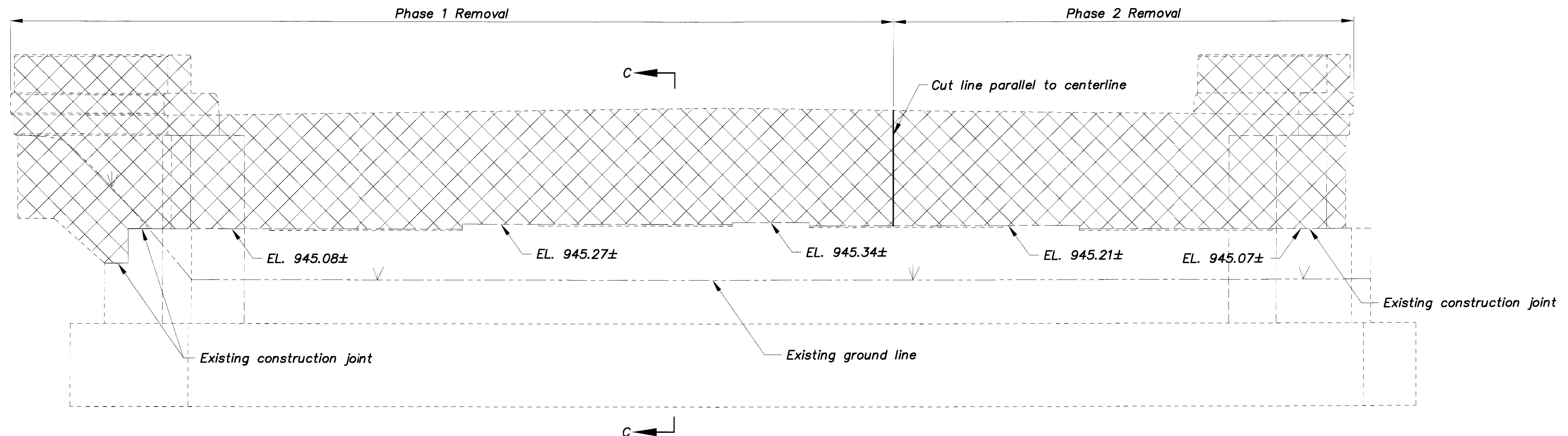
DATE
6-14-00
BLG
STRUCTURE FILE NUMBER
1500813

DRAWN
WHM
REVIEWED
WHM
GTB

k:\06dot\Dist\11\COL-11-(9.44)(13.76)\Drawings\COL-11-13.76(Right Bridge)\Forexistabut.dwg



PLAN
(Existing approach slab and porous backfill not shown)

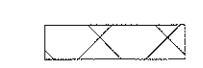


ELEVATION
(Existing piles not shown)

NOTE:

See Sheet **8/27** for Section C-C, View A-A & View B-B.

LEGEND:

 Portion of existing structure to be removed.

COL-11-(9.44)(13.76)

7/27

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126

EXISTING FORWARD ABUTMENT REMOVAL & REPAIR
Bridge No. COL-11-1378 S.B.L.
over S.R. 154

DESIGNED
WHM
CHECKED
GTB

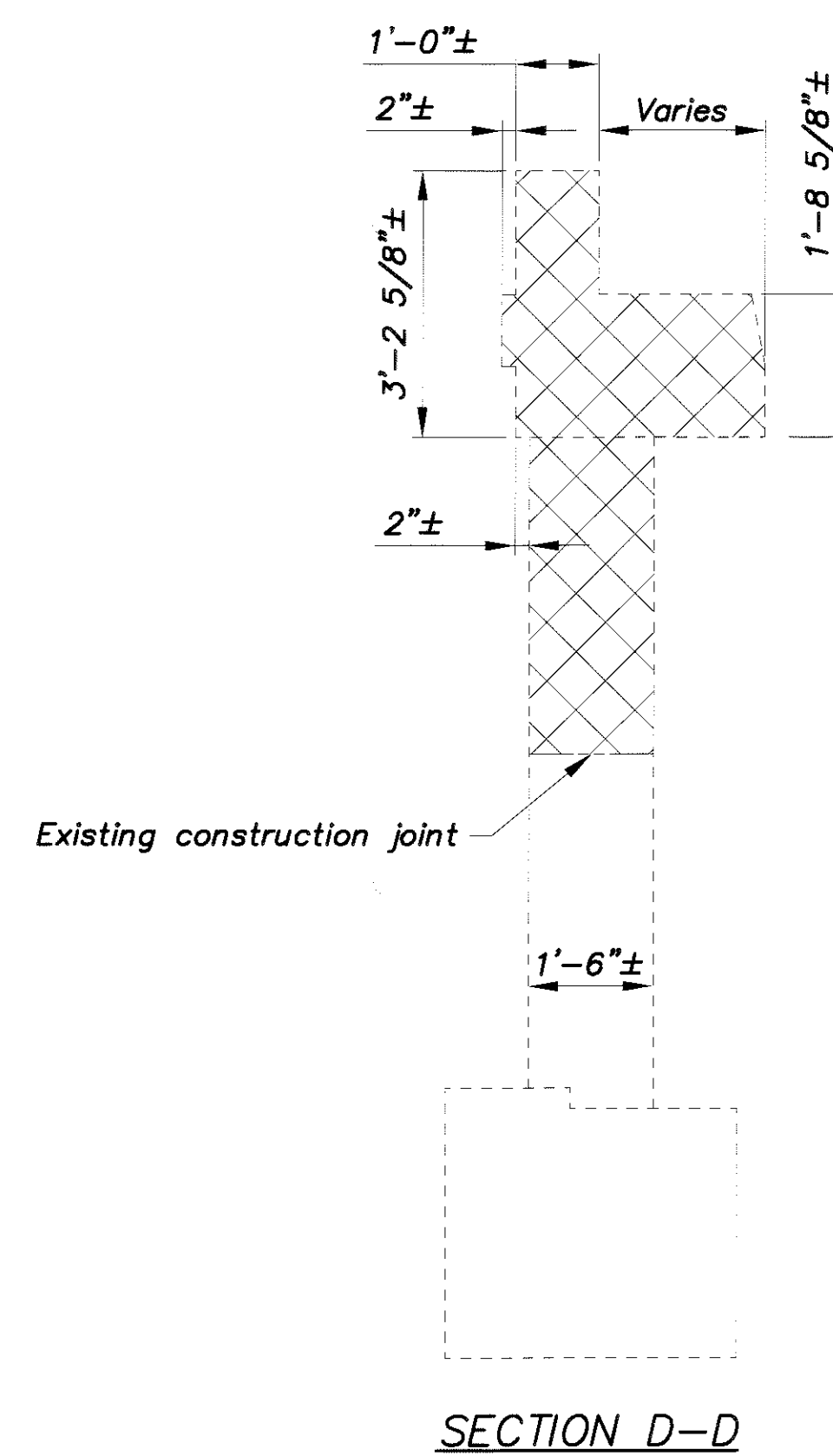
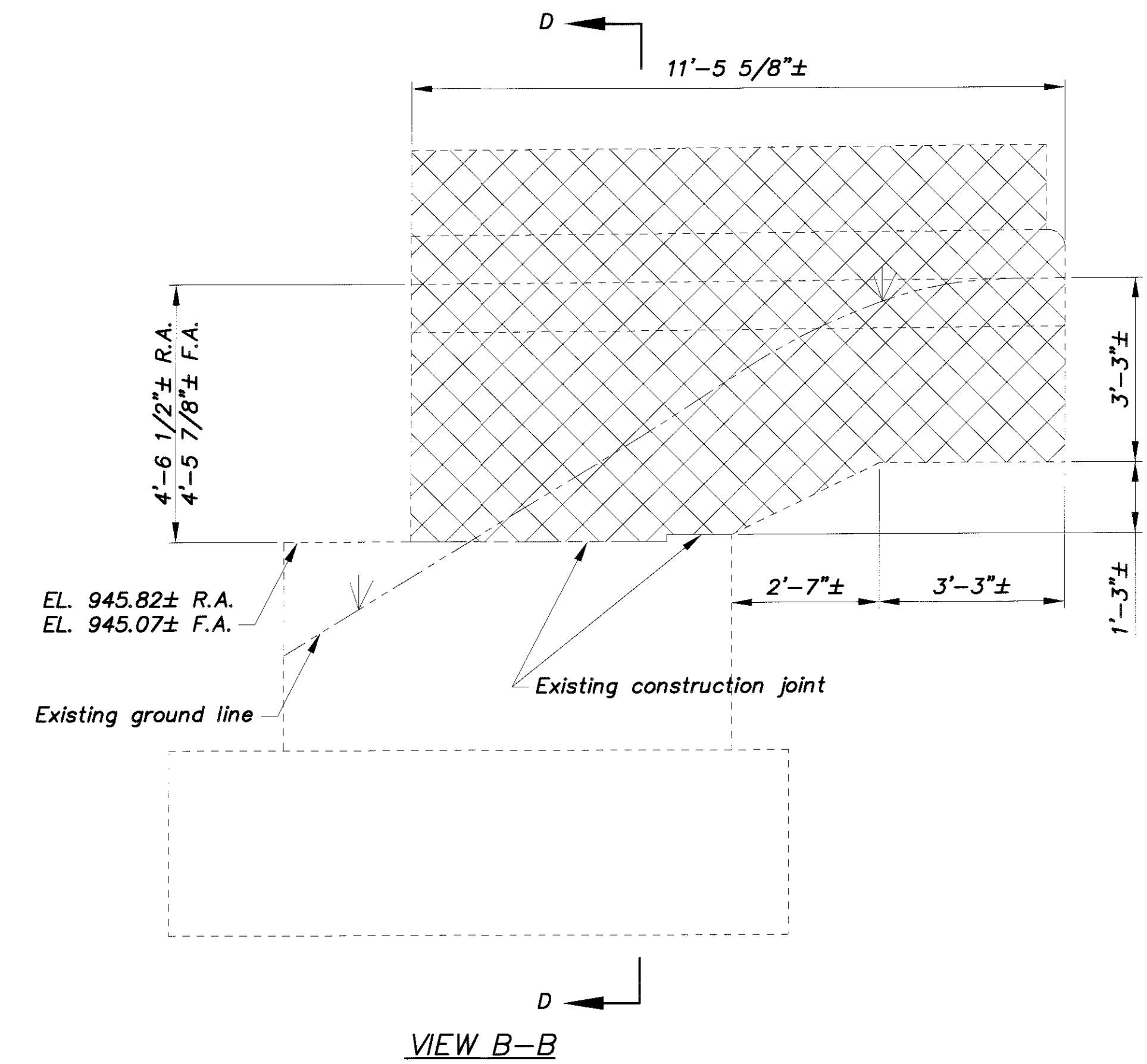
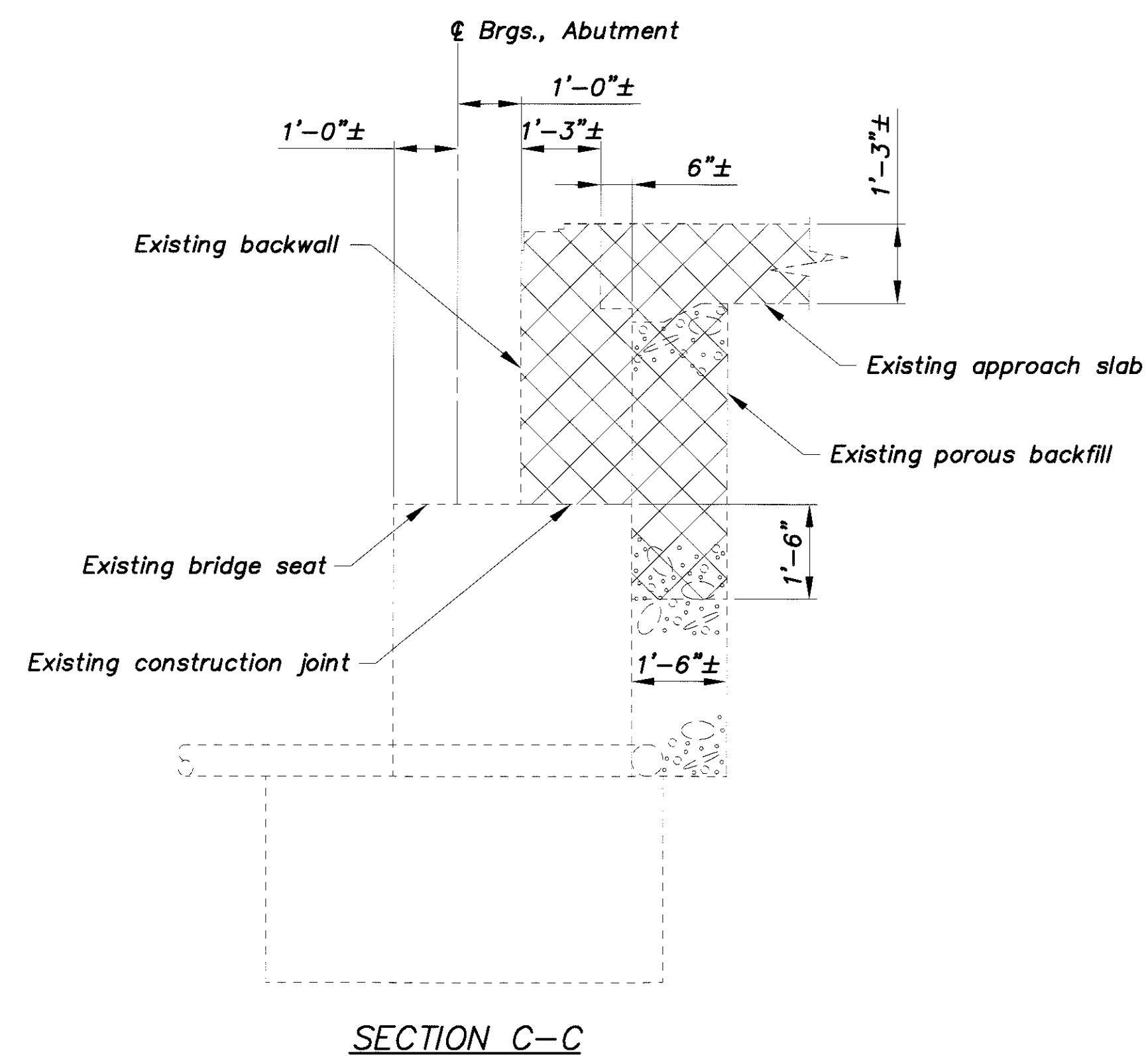
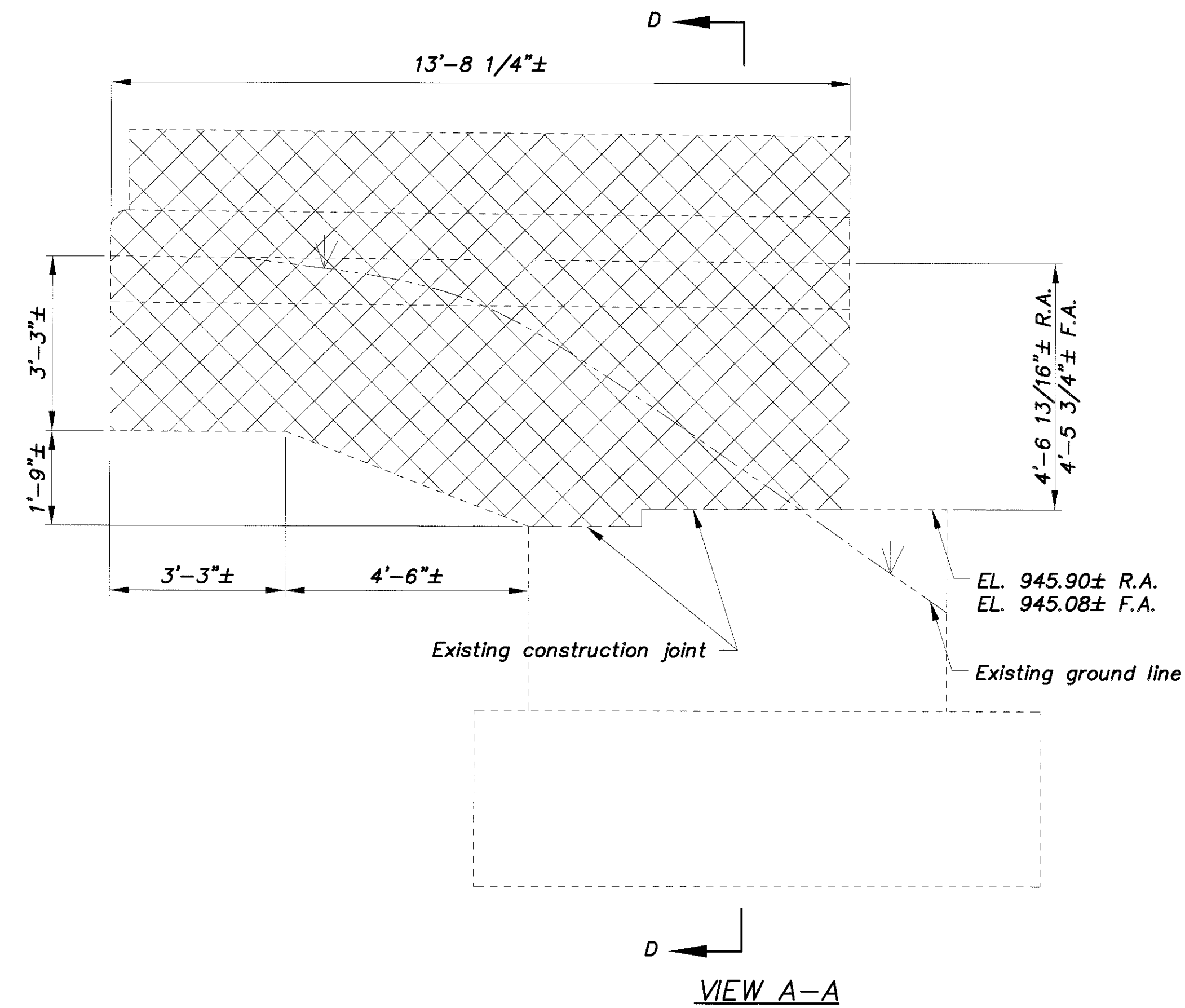
DRAWN
WHM
REVISED

REVIEWED
BLG
STRUCTURE FILE NUMBER

DATE
6-14-00
FILE NUMBER

1500813

WD&E
DESIGN AGENCY
1201 Dublin Road
Columbus, Ohio



NOTES:

Refer to Sheets 6/27 & 7/27 for locations of Section C-C, View A-A & View B-B.

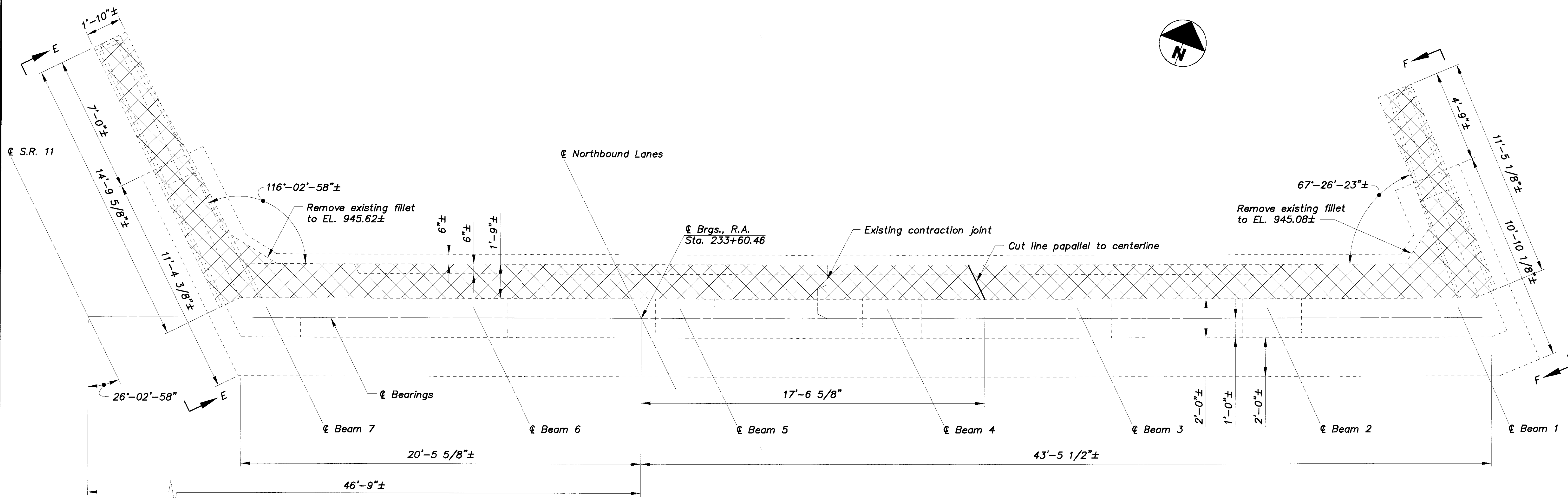
Existing piles not shown in all Views & Sections.

LEGEND:

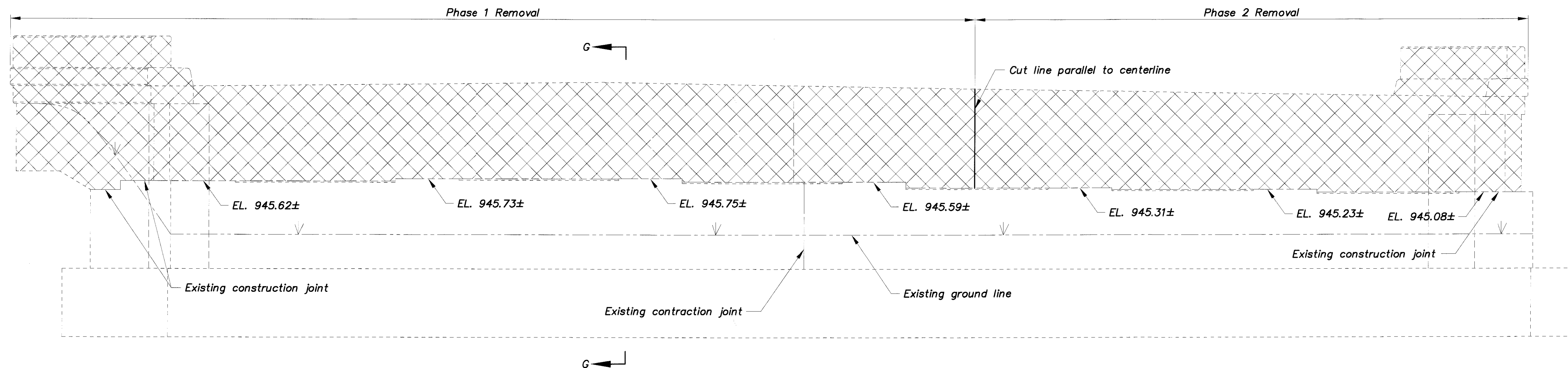
 Portion of existing structure to be removed.

R.A. - Rear Abutment
F.A. - Forward Abutment

K:\Data\Dist11\COL-11-(9.44)(13.76)\Drawings\COL-11-13.78\Left Bridge\ceexistabut.dwg



PLAN
(Existing approach slab and porous backfill not shown)



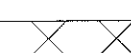
ELEVATION
(Existing piles not shown)

NOTES:

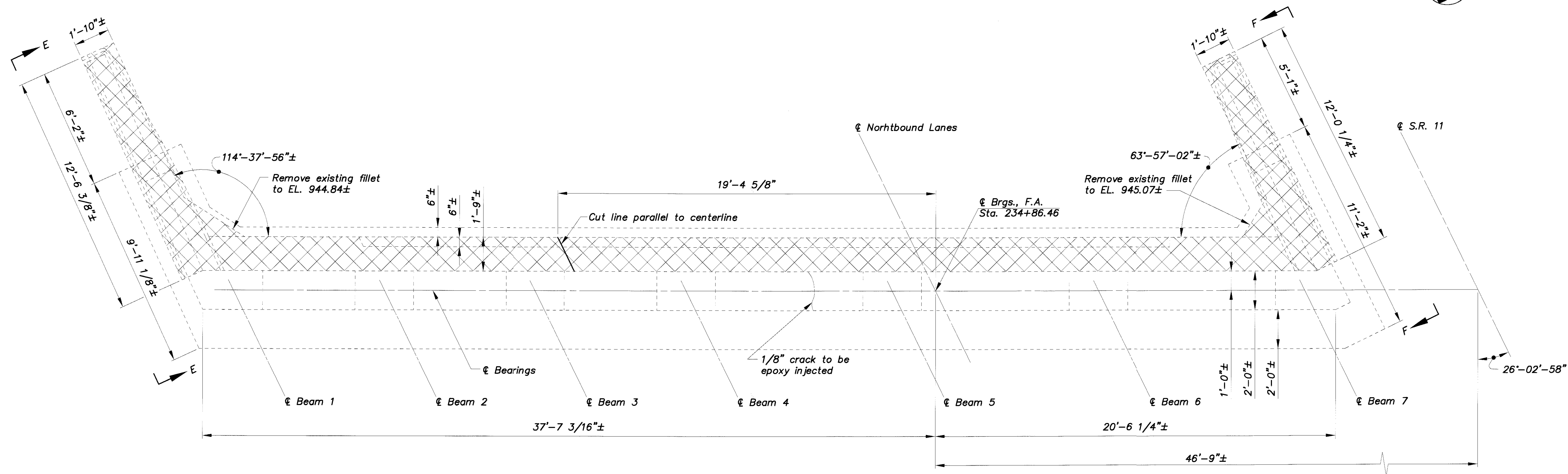
See Sheet **11/27** for Section G-G, View E-E & View F-F.

Bearing at Beam 1 shall be reset.

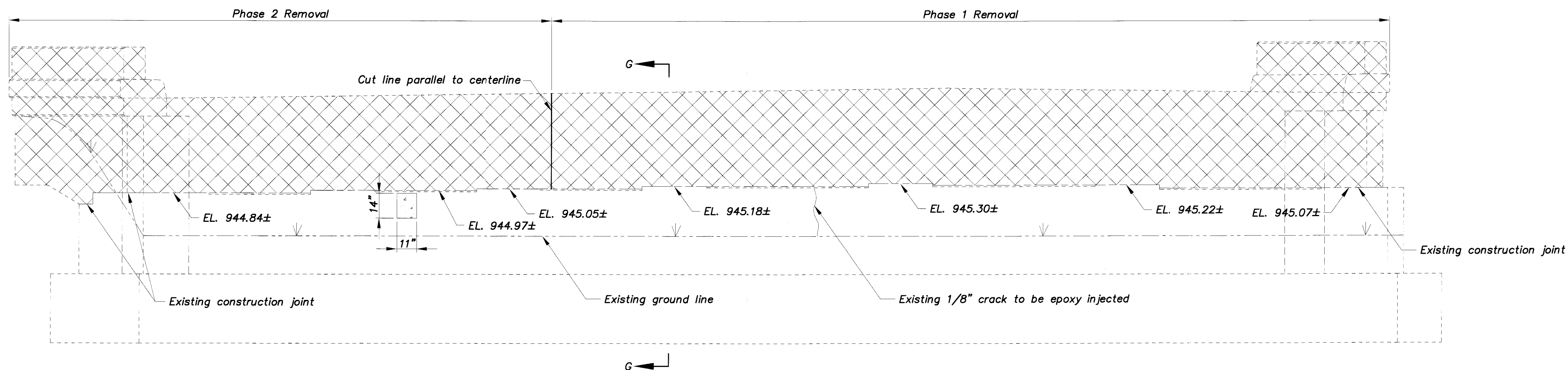
LEGEND:

 Portion of existing structure to be removed.

K:\dot\dist11\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78\left Bridge\forexistabul.dwg



PLAN
(Existing approach slab and porous backfill not shown)



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet **11/27** for Section G-G, View E-E & View F-F.

LEGEND:

- Portion of existing structure to be removed.
- Area of Delamination to be repaired by concrete patching. Total quantity this sheet = 1.0 sq. ft.

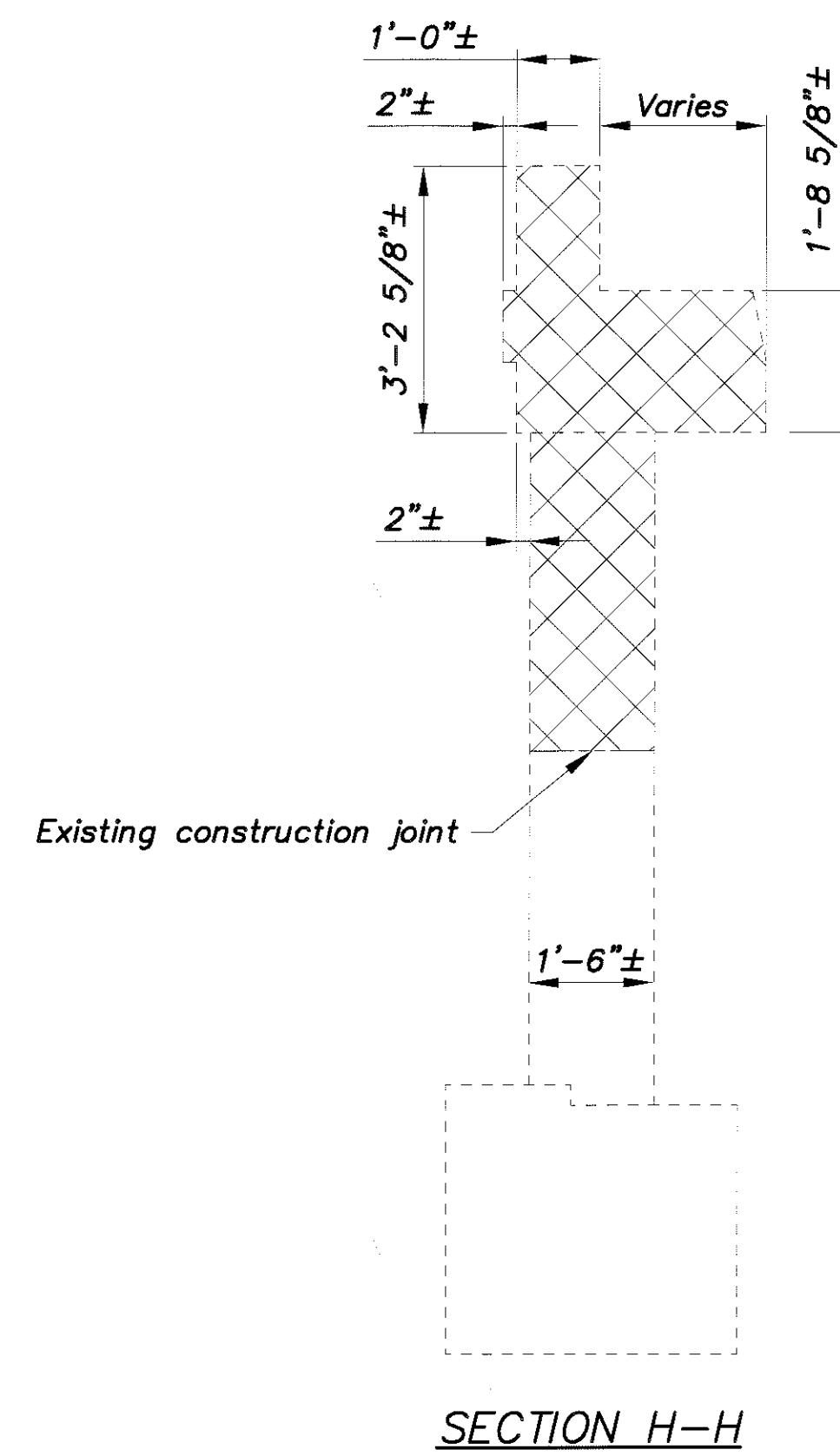
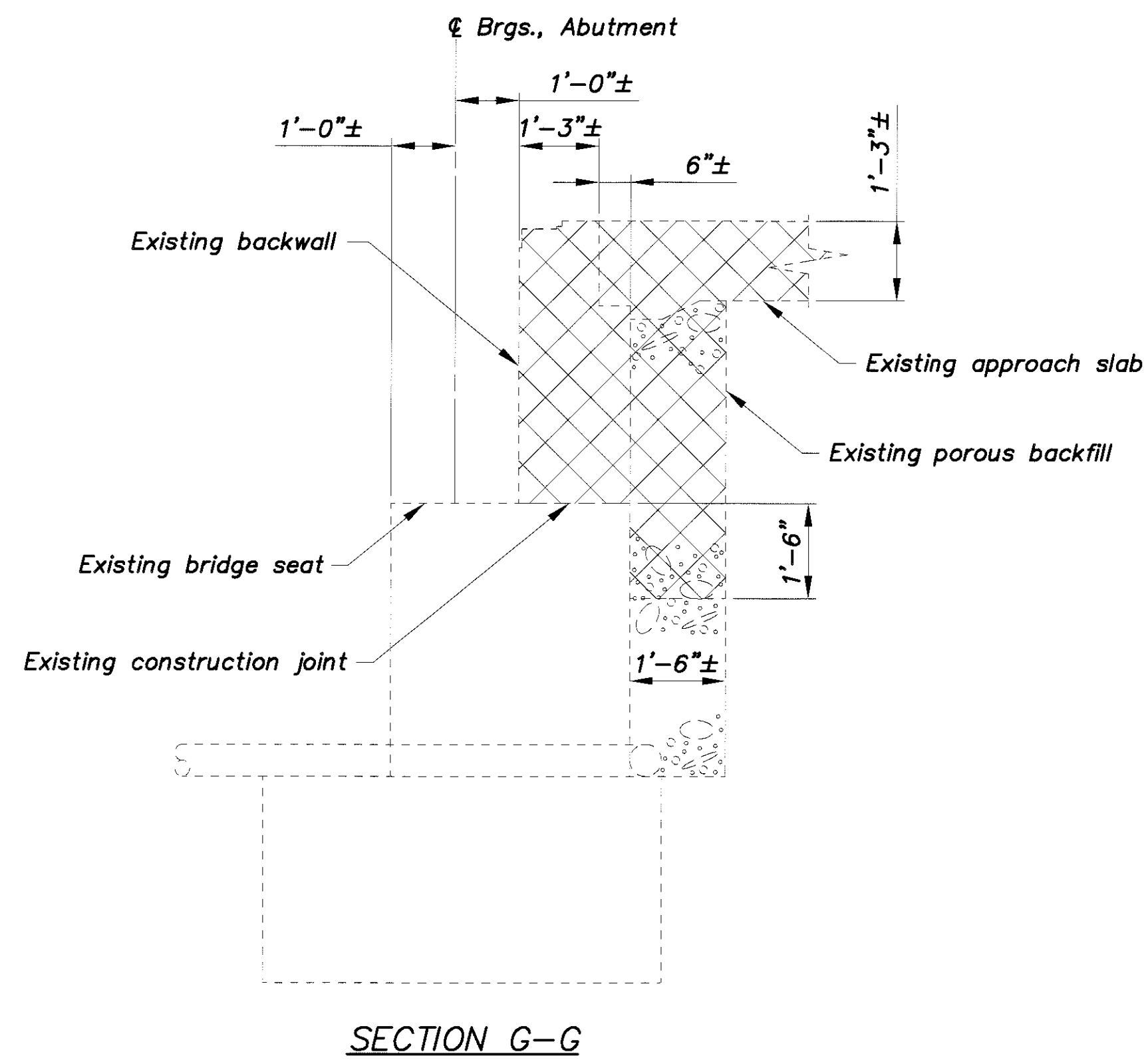
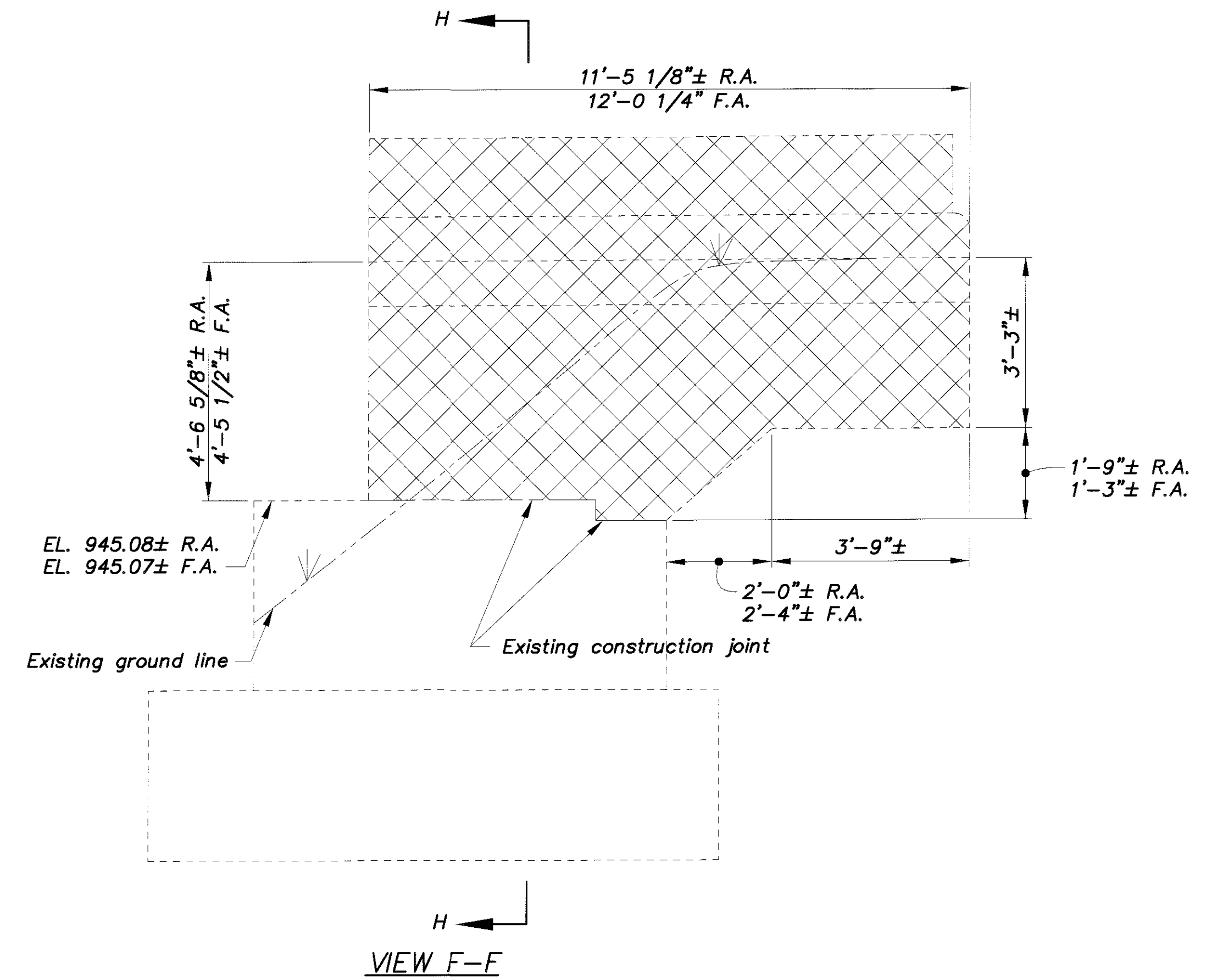
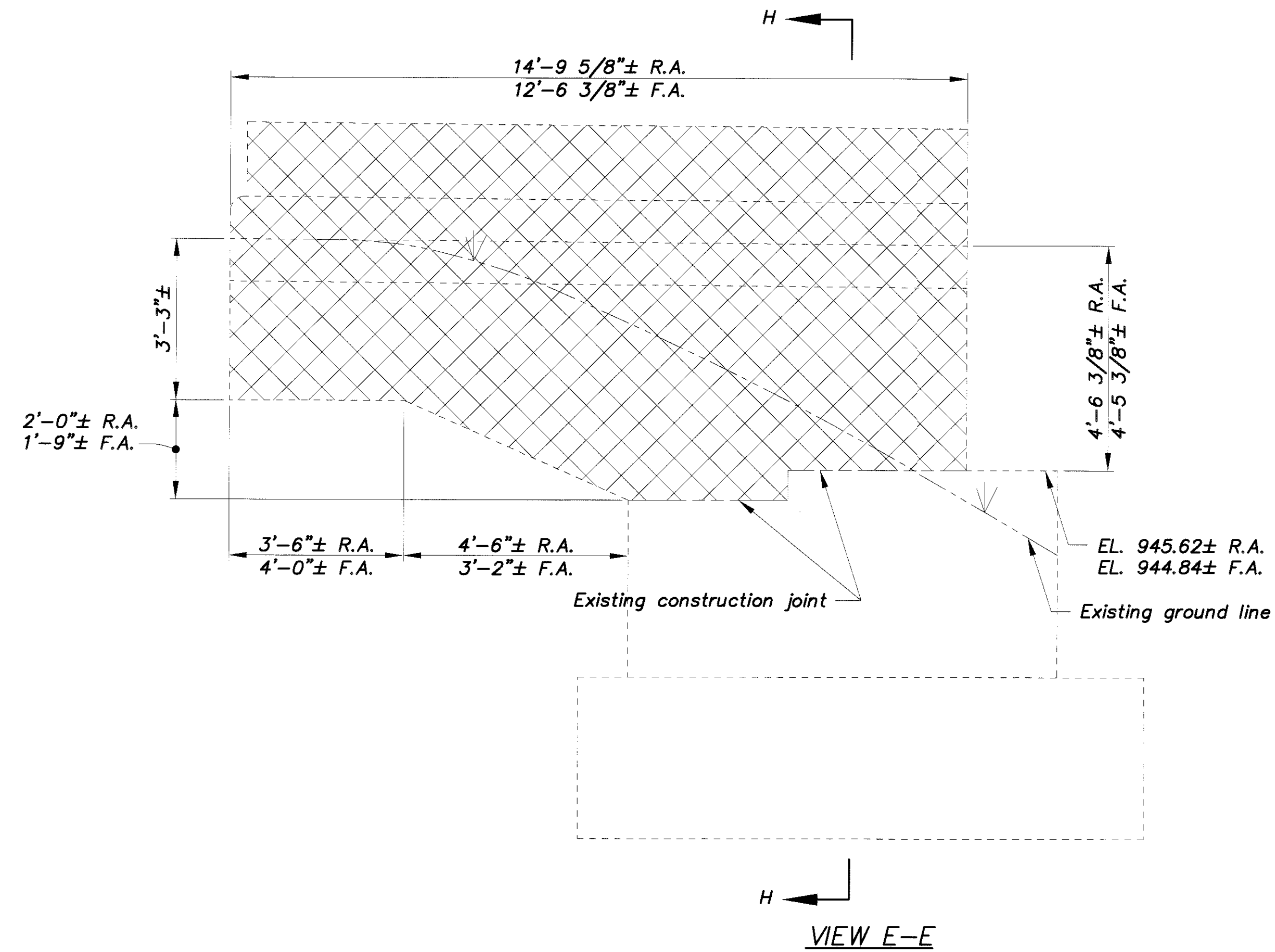
EXISTING FORWARD ABUTMENT REMOVAL & REPAIR
Bridge No. COL-11-1378 N.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

10/27

109
126

K:\odot\dist11\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78\LeL Bridge\wremoval.dwg

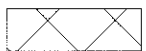


NOTES:

Refer to Sheets **9/27** & **10/27** for locations of Section G-G, View E-E & View F-F.

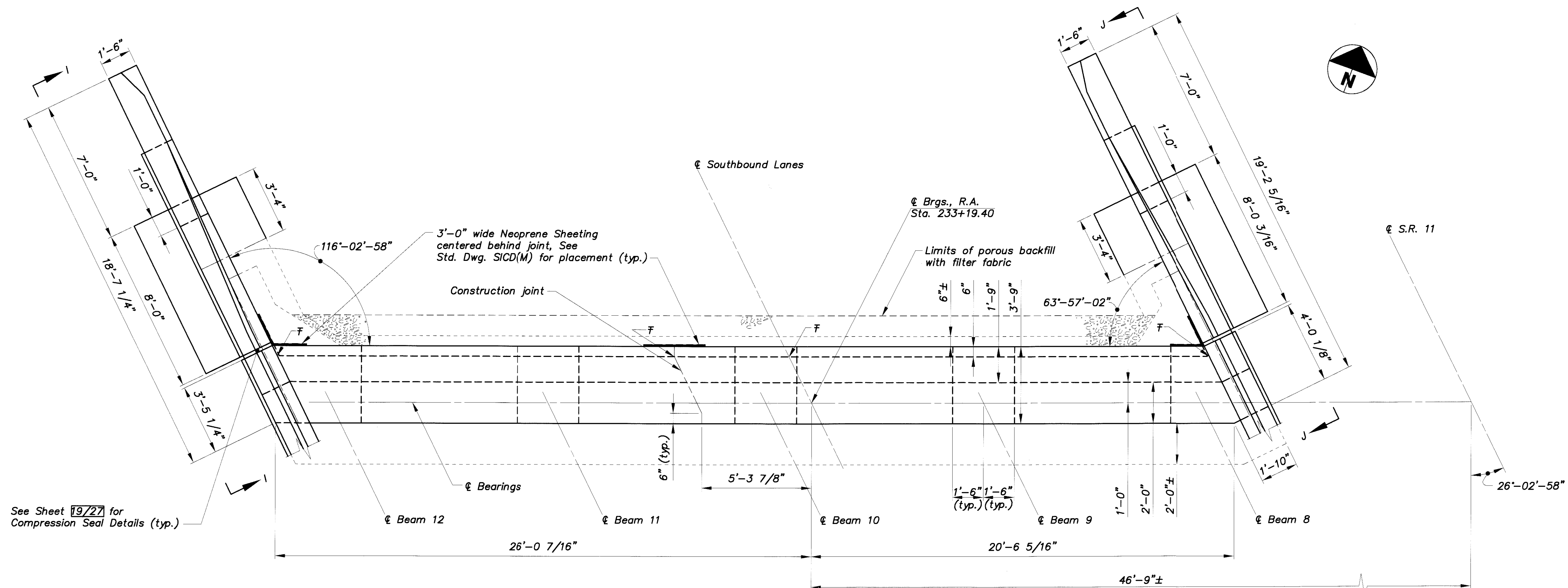
Existing piles not shown in all Views & Sections.

LEGEND:

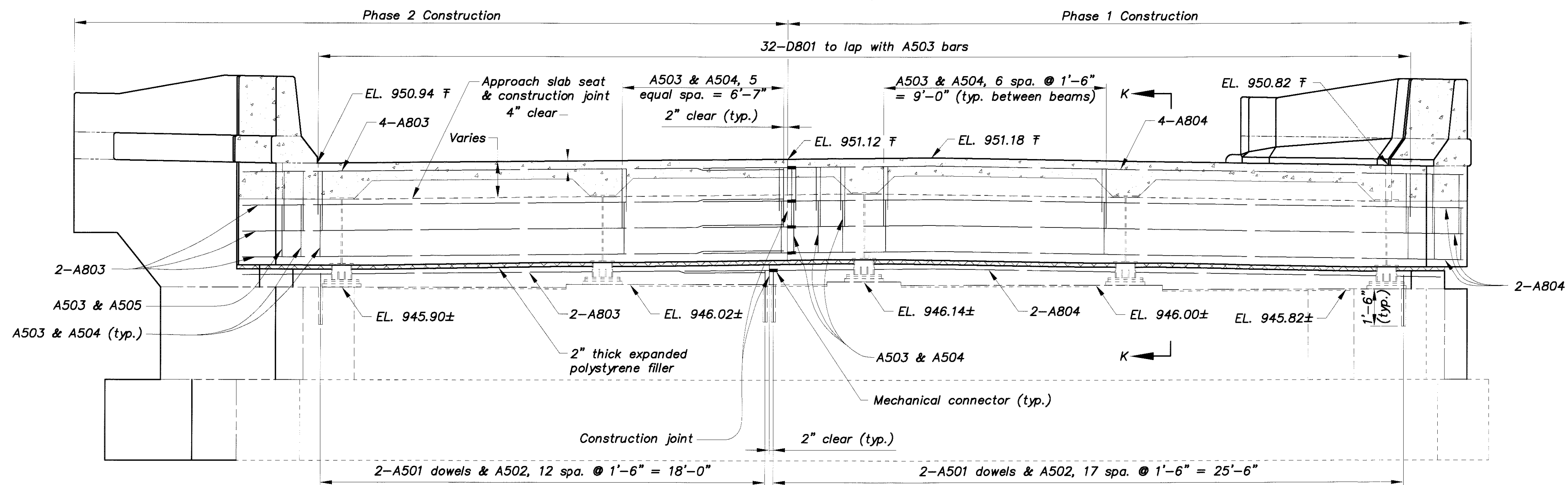
 Portion of existing structure to be removed.

R.A. - Rear Abutment
F.A. - Forward Abutment

K:\Data\Dist1\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78\COL-11-13.78(Right Bridge)\rear.abut.dwg



PLAN



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet 14/27 for Section K-K, View I-I & View J-J.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Southbound Lanes.

PROPOSED REAR ABUTMENT
Bridge No. COL-11-1378 S.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

12/27

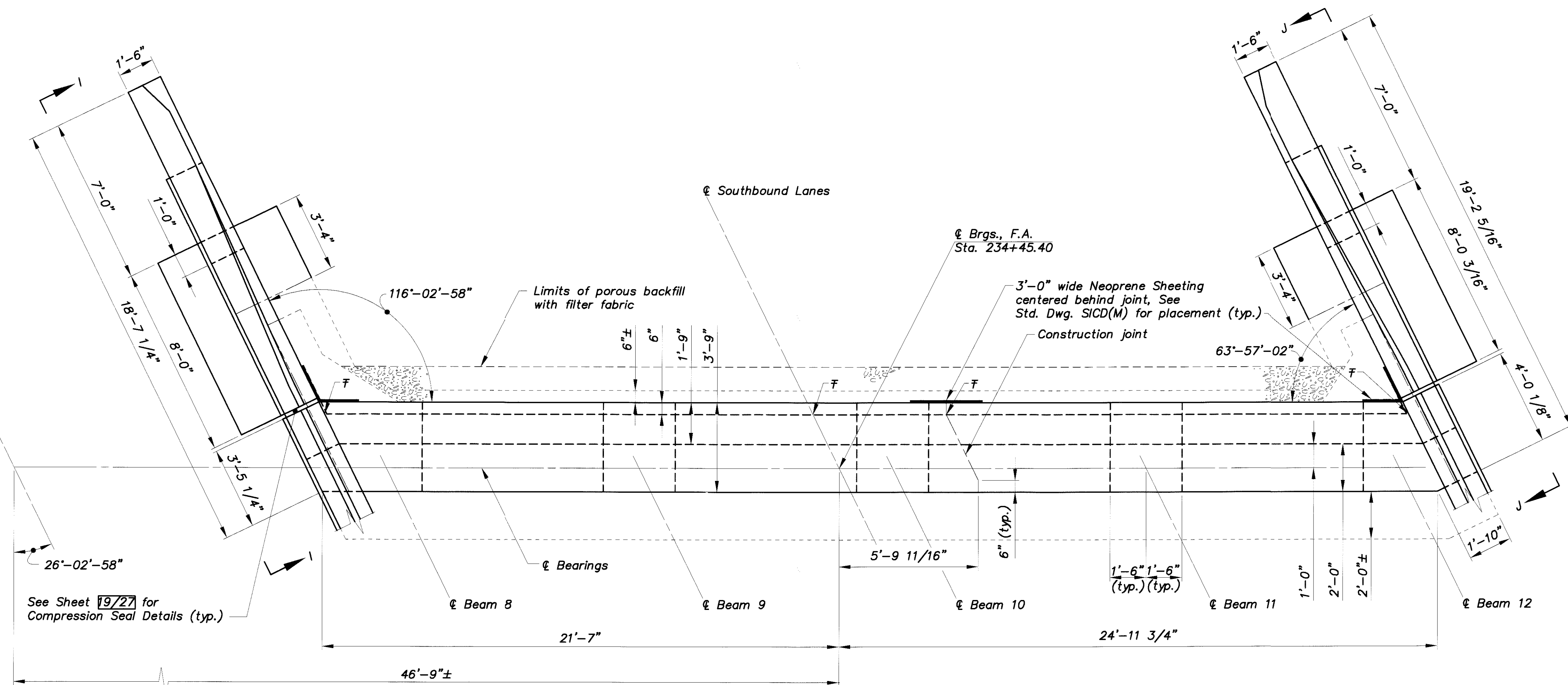
111
126

WD&A&E
DESIGN AGENCY
1201 Dublin Road Columbus, Ohio

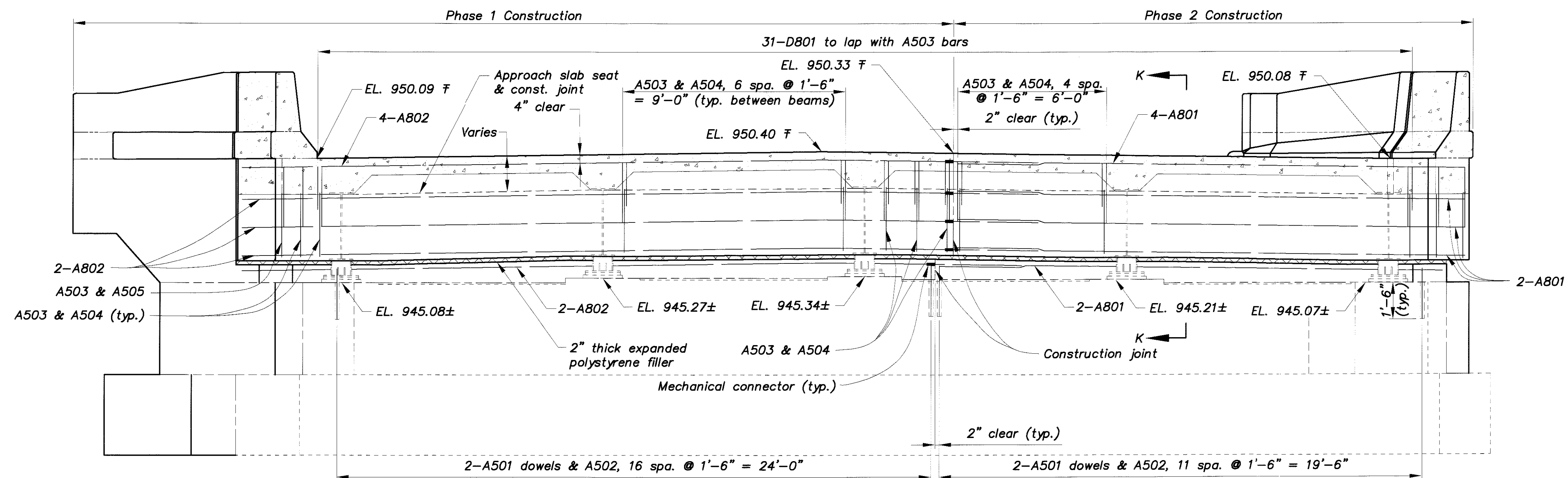
DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIEWED	STRUCTURE FILE NUMBER	1500813

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℄ S.R. 11



PLAN

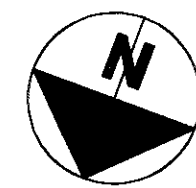


ELEVATION
(Existing piles not shown)

NOTES:

See Sheet 14/27 for Section K-K, View I-I & View J-J.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Southbound Lanes.



PROPOSED FORWARD ABUTMENT

Bridge No. COL-11-1378 S.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

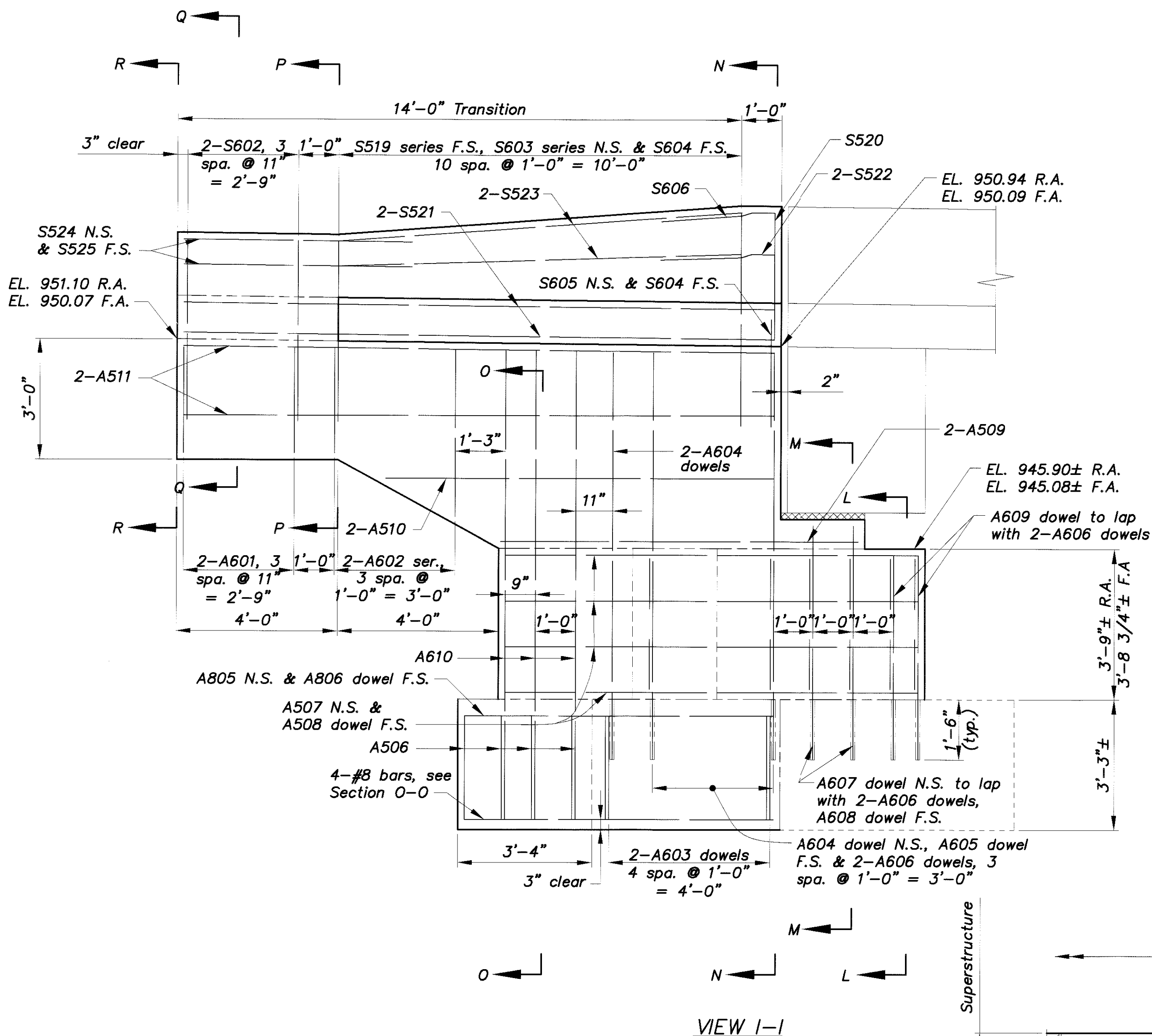
13/27

112
126

WD&E
DESIGN AGENCY
1201 Dublin Road Columbus, Ohio

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIEWED	STRUCTURE FILE NUMBER	1500813
GTB			

K:\Data\Dist1\COL-11 (9.46)\13.78\Drawings\COL-11-13.78\Right Bridge\wwrap.dwg



NOTES:

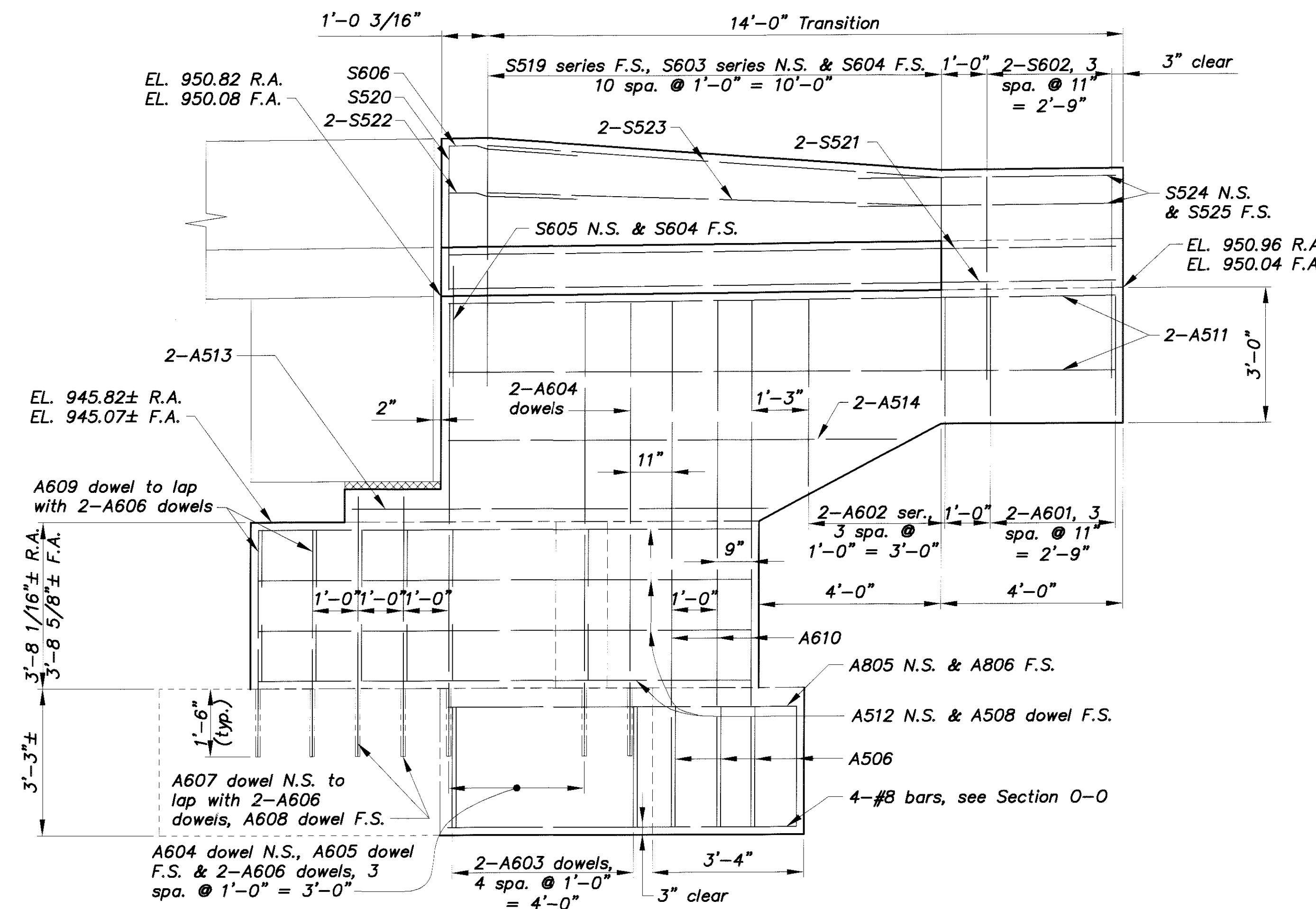
Refer to Sheets 12/27 & 13/27 for locations of Section K-K, View I-I, and View J-J.

Refer to Sheet 19/27 for abutment sealing limits.

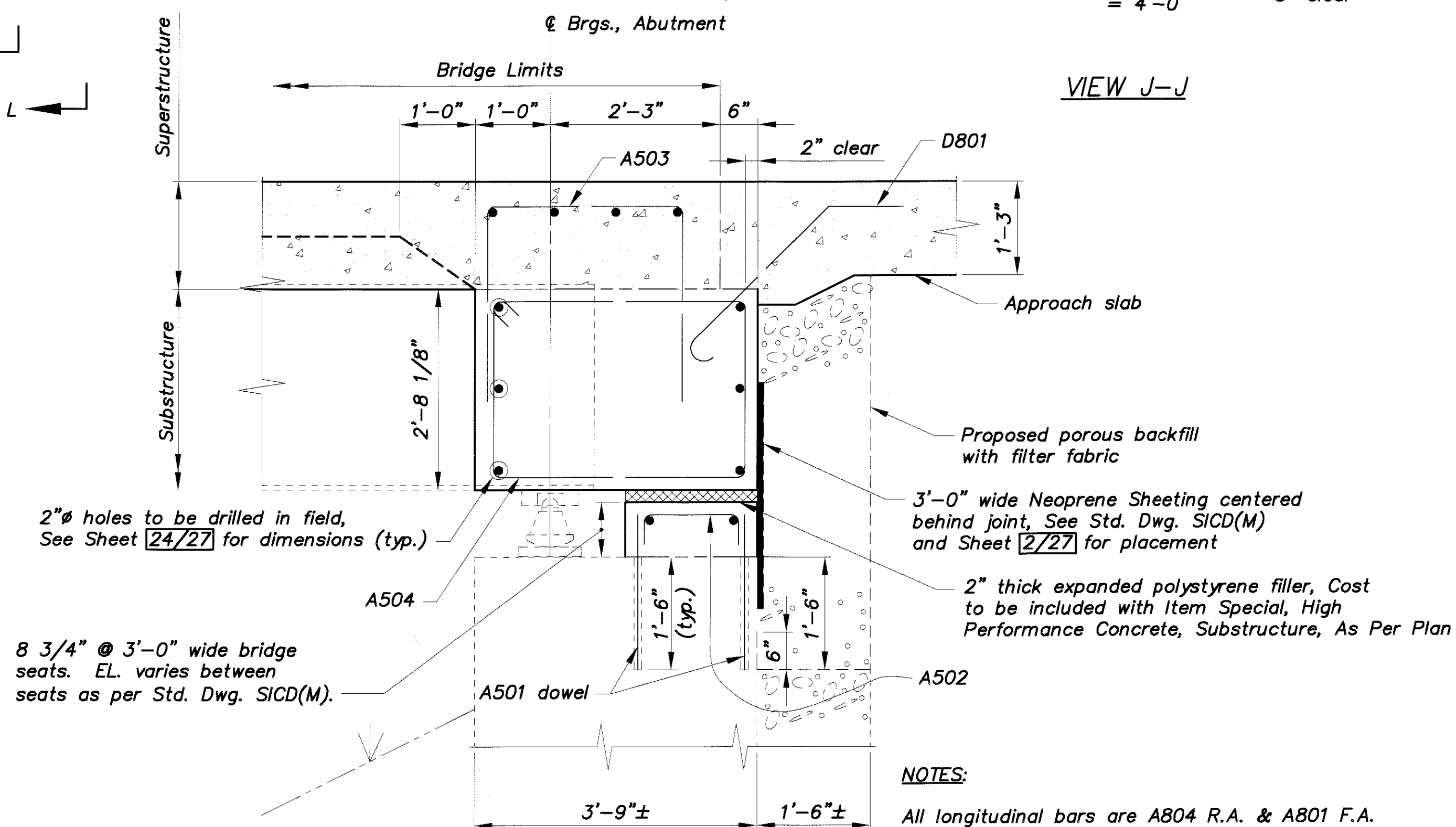
See Sheet 15/27 for Sections L-L, M-M, N-N, O-O, P-P, Q-Q & R-R.

LEGEND:

R.A. - Rear Abutment
F.A. - Forward Abutment
N.S. - Near Side
F.S. - Far Side



VIEW J-J



SECTION K-K

NOTES:

All longitudinal bars are A804 R.A. & A801 F.A.

See Sheet 19/27 for abutment sealing limits.

PROPOSED WINGWALL DETAILS (SOUTHBOUND)

Bridge No. COL-11-1378 S.B.L.

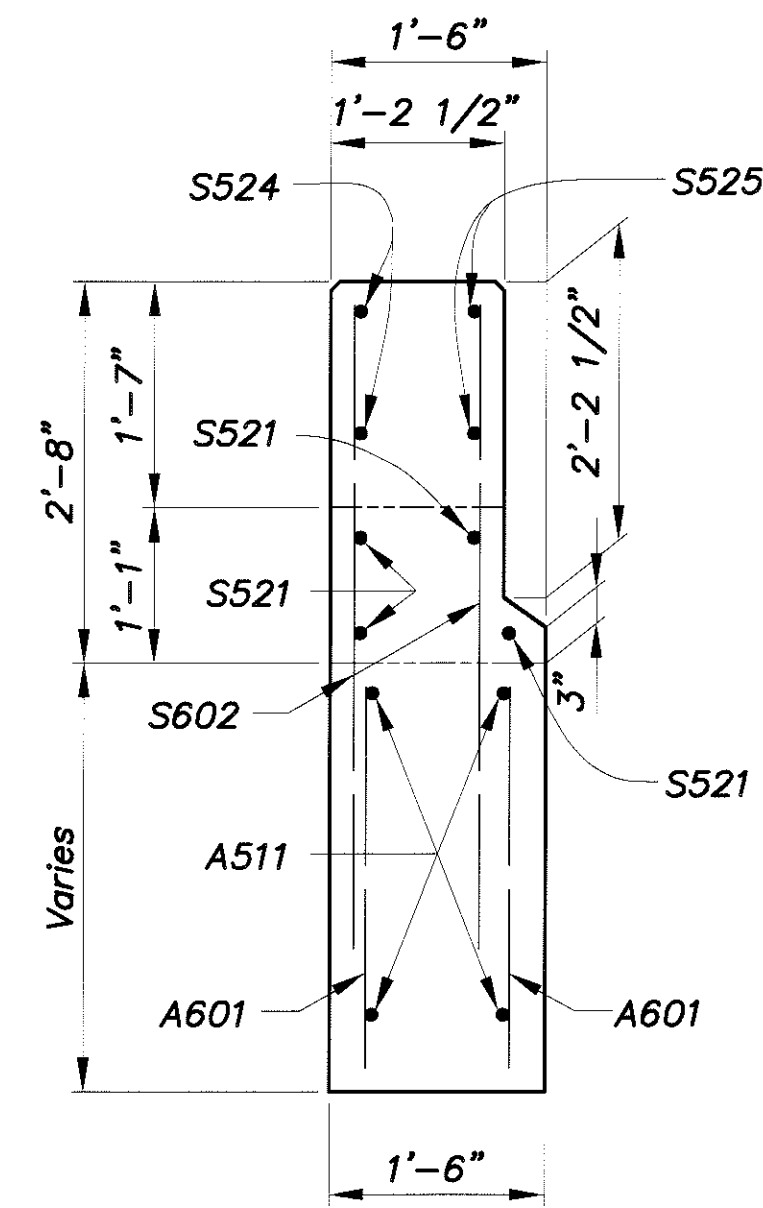
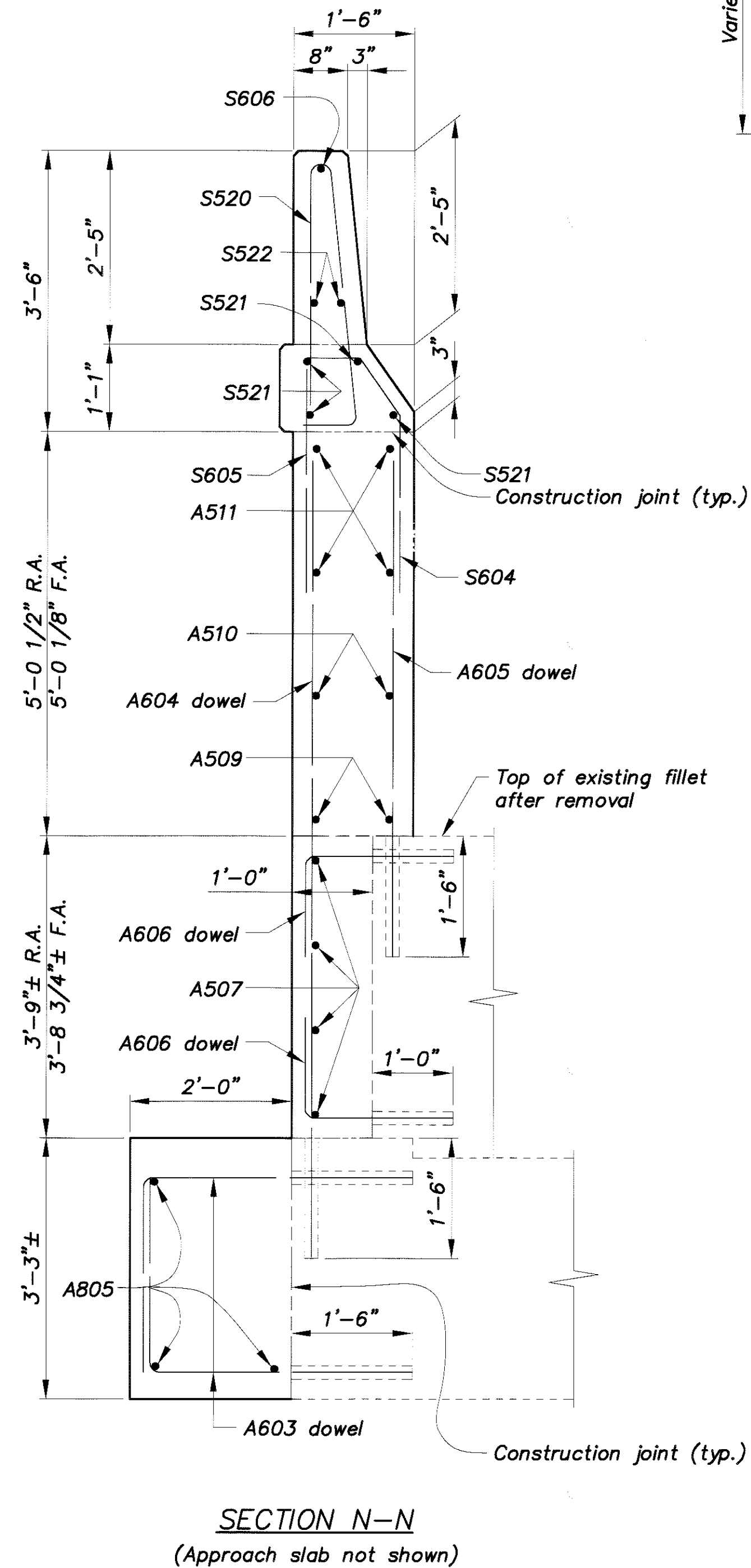
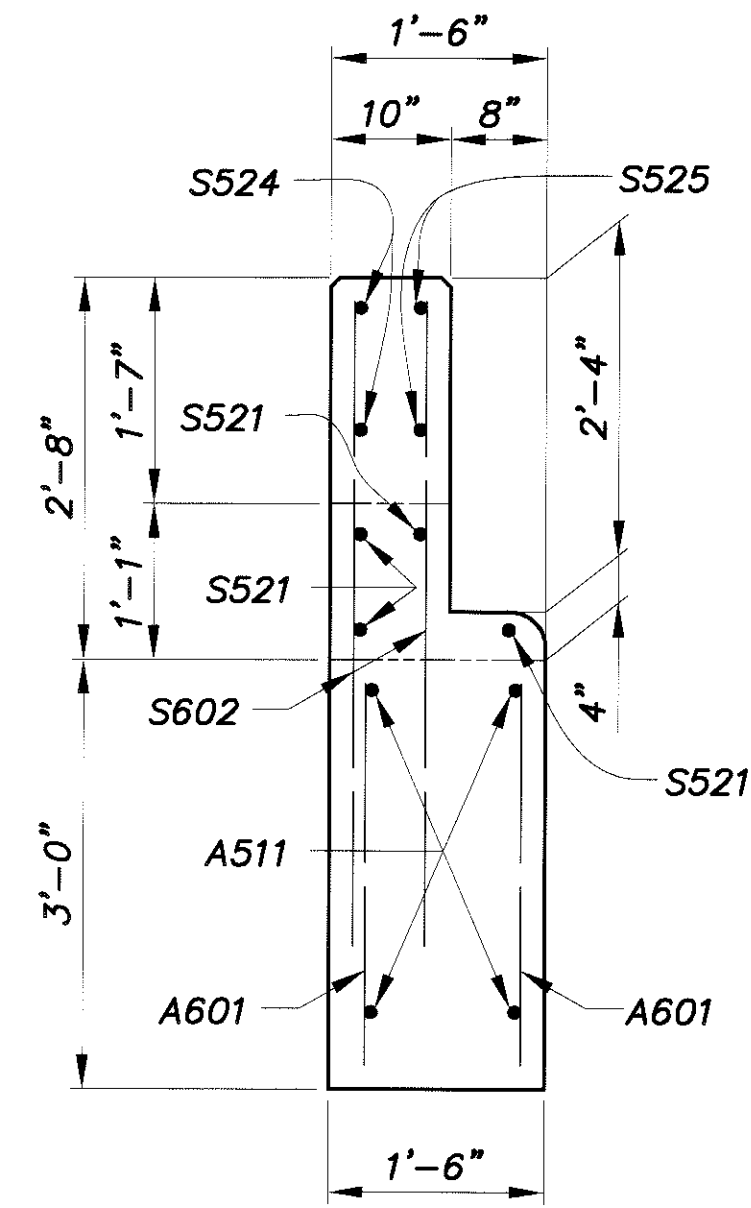
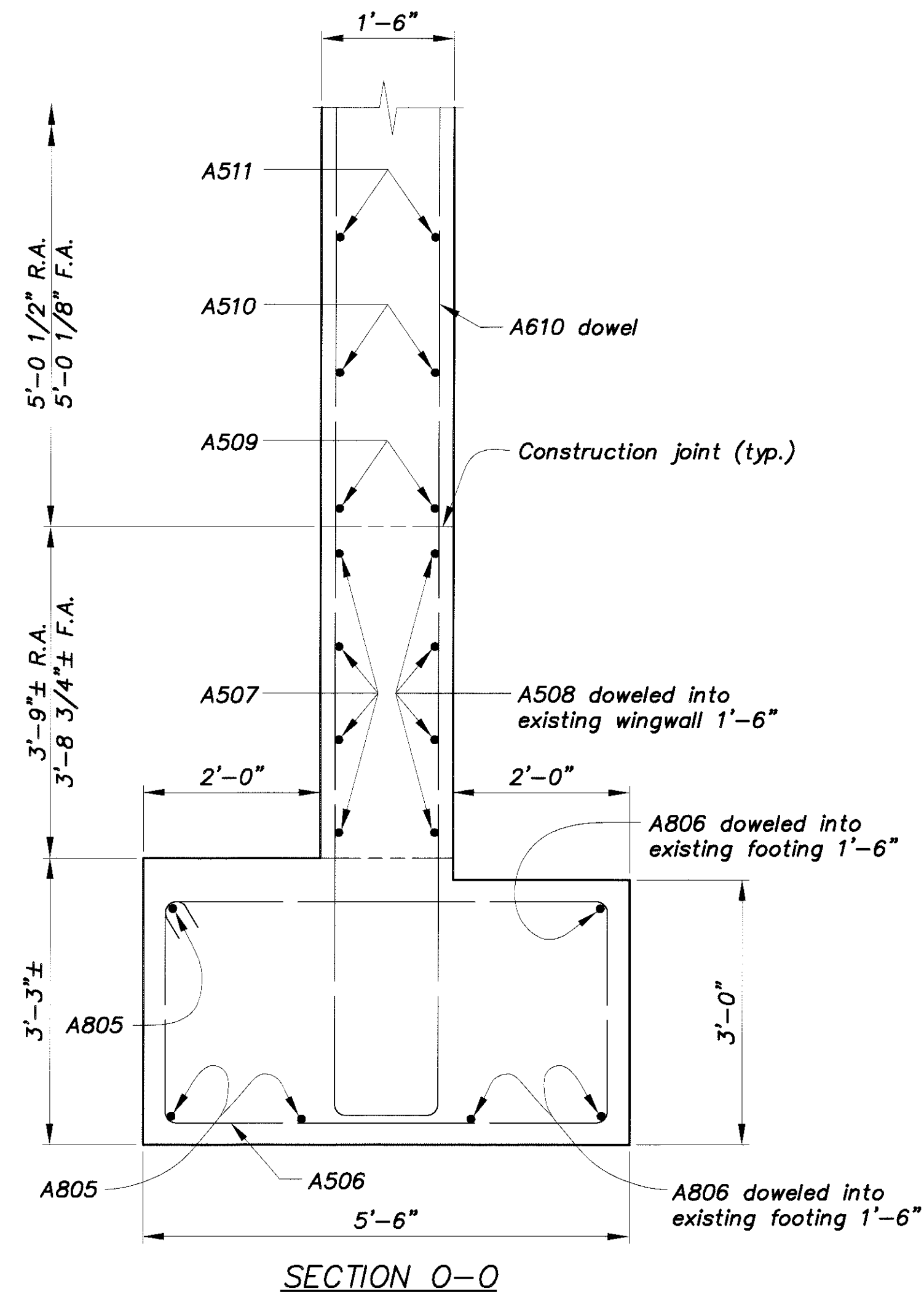
over S.R. 154

COL-11-(9.44)(13.76)

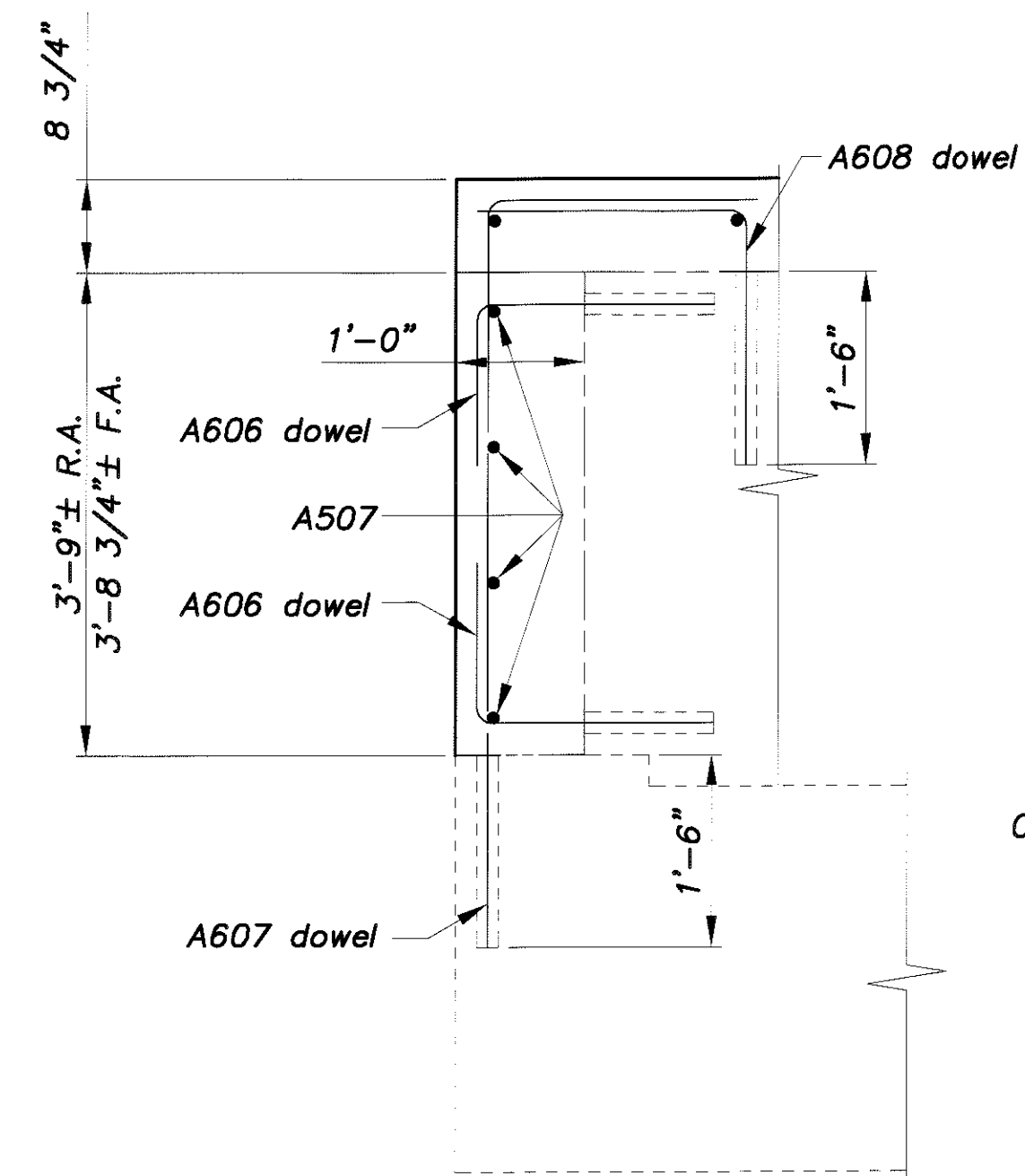
14/27

113
126

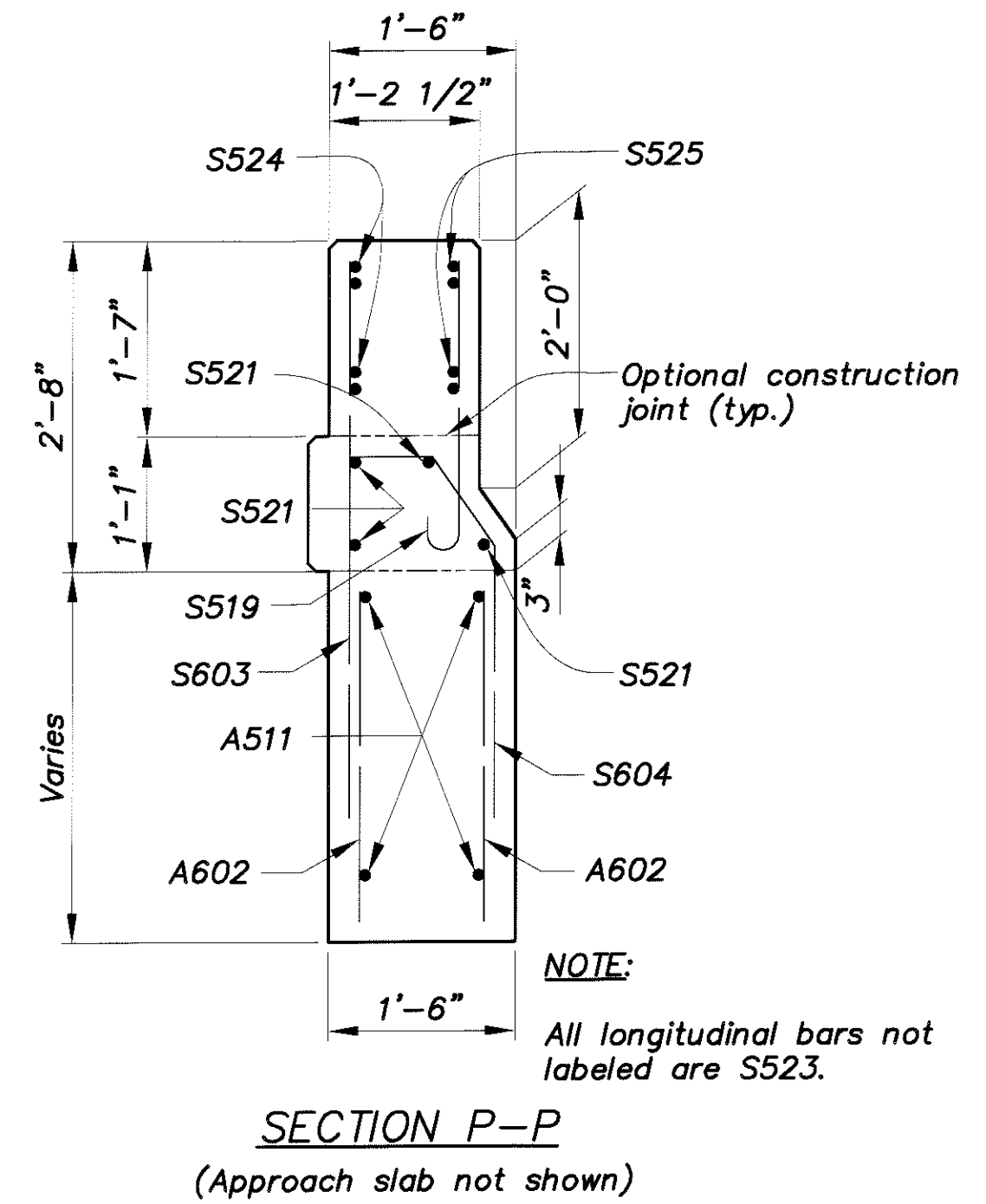
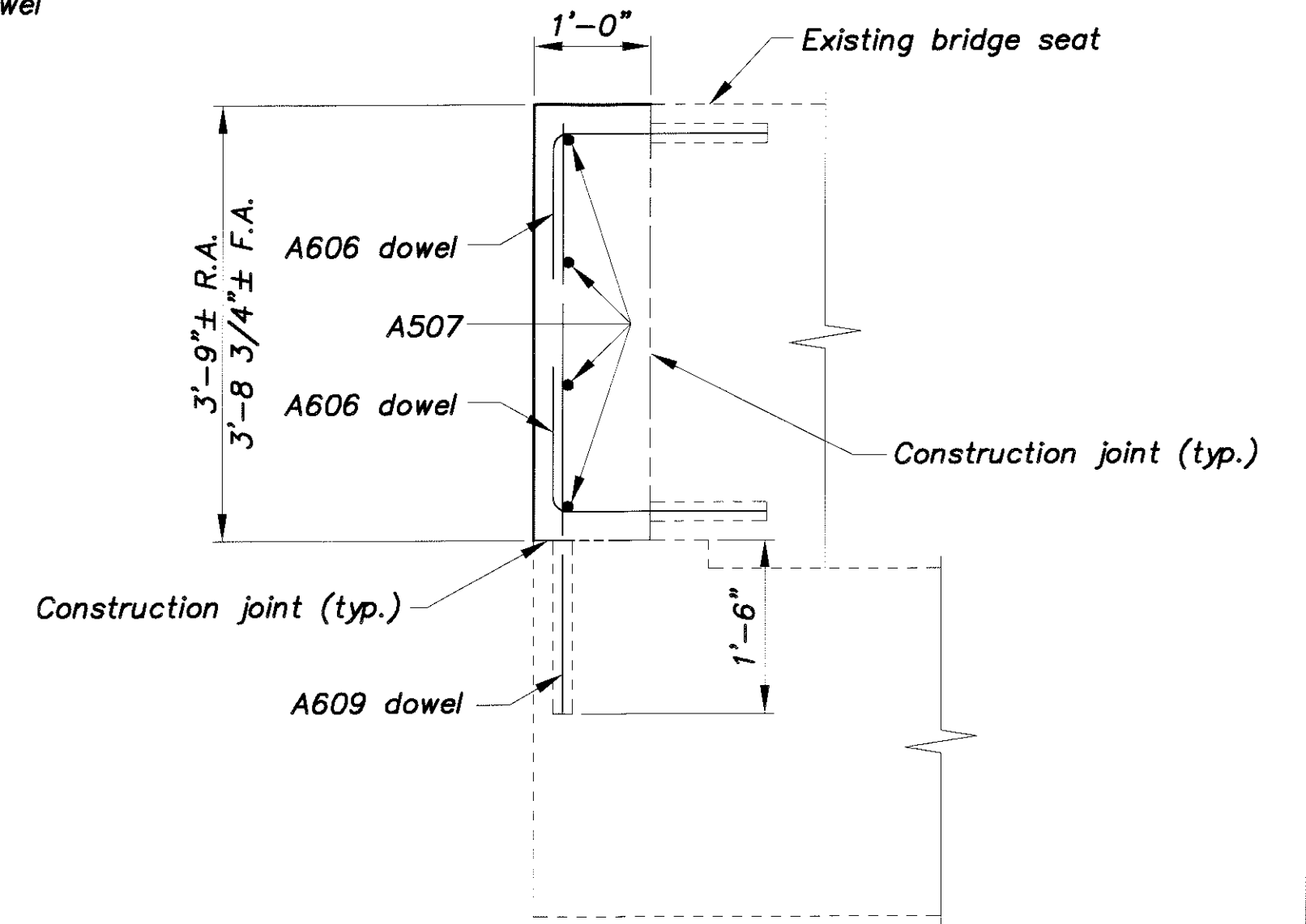
K:\Odeol\Dist11\COL-11-(9.46)(13.78)\Drawings\COL-11-13.78(Right Bridge)\wwwtop1.dwg



NOTE:
Refer to Sheet 14/27 for locations of Sections L-L, M-M, N-N, O-O, P-P, Q-Q & R-R.



NOTE:
All longitudinal bars in backwall are A509.



PROPOSED WINGWALL DETAILS (SOUTHBOUND)

Bridge No. COL-11-1378 S.B.L.
over S.R. 154

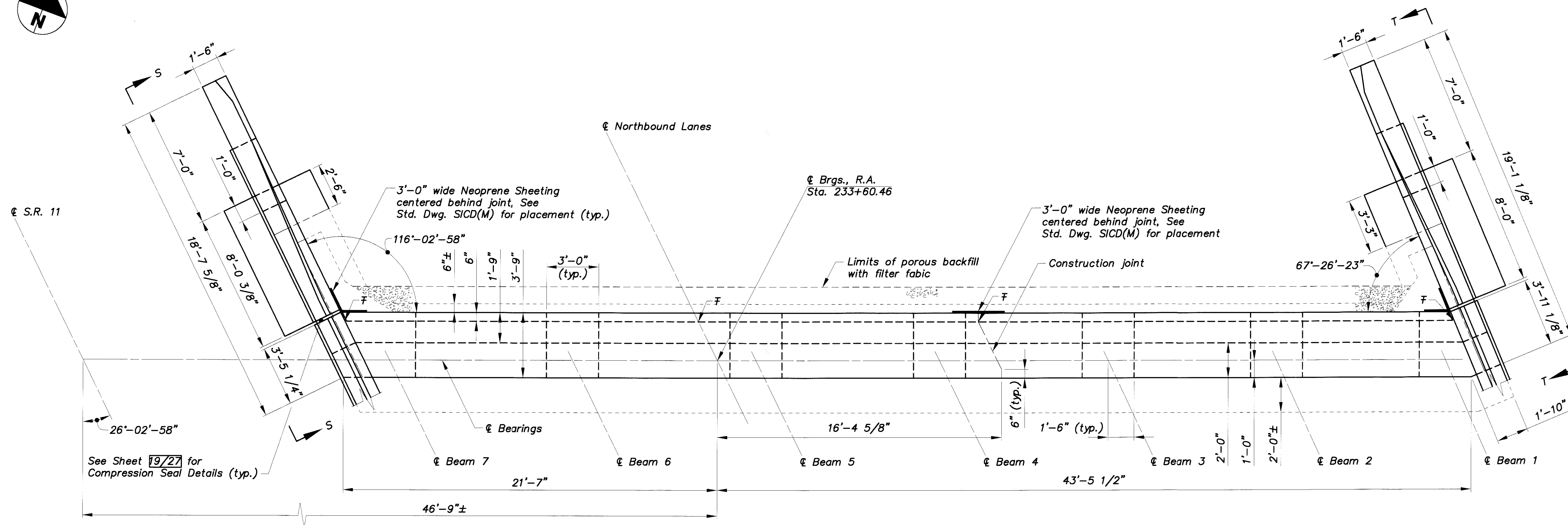
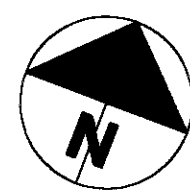
COL-11-(9.44)(13.76)

15/27

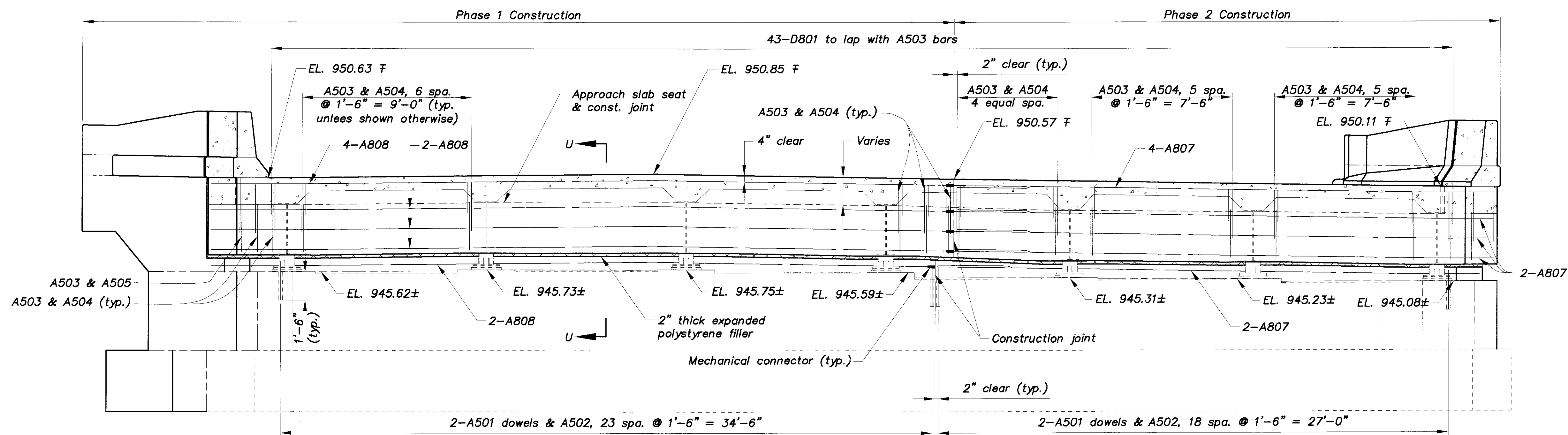
114
126

DESIGN AGENCY
WDA&E
1201 Dublin Road Columbus, Ohio

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIEWED	STRUCTURE FILE NUMBER	1500813



PLAN



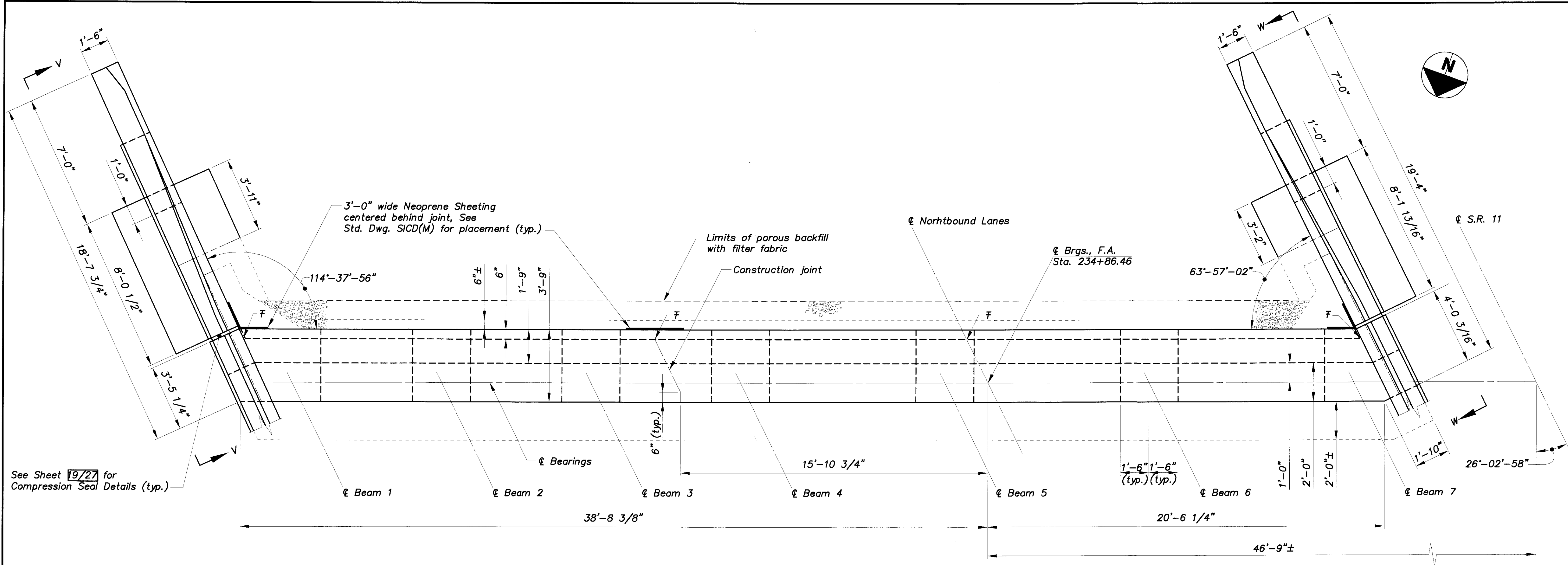
ELEVATION
(Existing piles not shown)

NOTES:

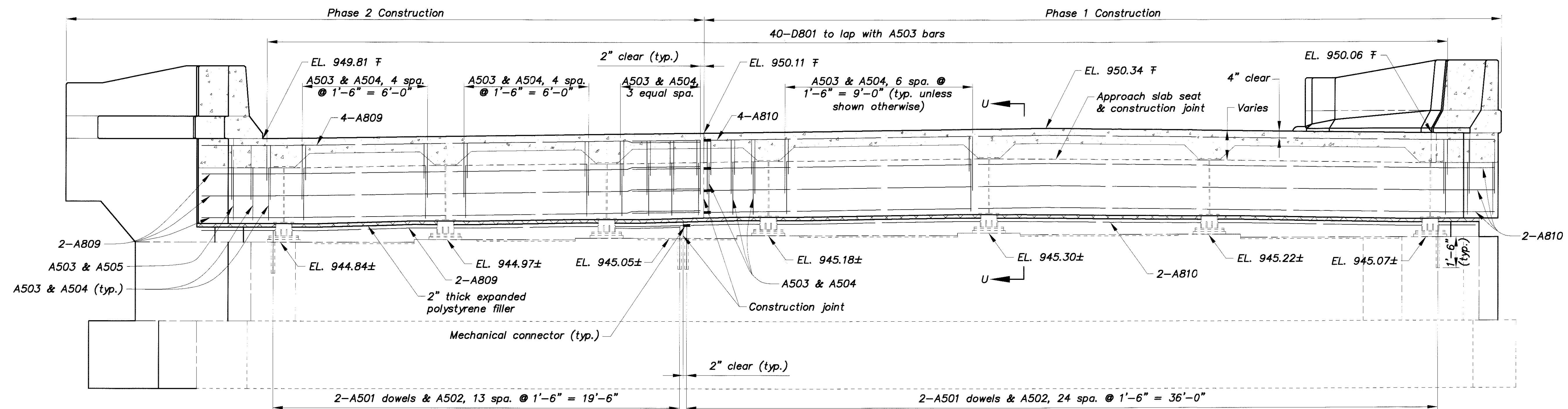
See Sheet 18/27 for Section U-U, View S-S & View T-T.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Northbound Lanes.

K:\Odot\Dist11\COL-11-09-46\13.78\Drawings\COL-11-13.78\Left Bridge\Proposed.abut.dwg



PLAN



ELEVATION
(Existing piles not shown)

NOTES:

See Sheet 18/27 for Section U-U.

See Sheet 19/27 for View V-V & View W-W.

Place D801, A501, A502, A503, A504 & A505 bars parallel to Centerline Northbound Lanes.

PROPOSED FORWARD ABUTMENT
Bridge No. COL-11-1378 N.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

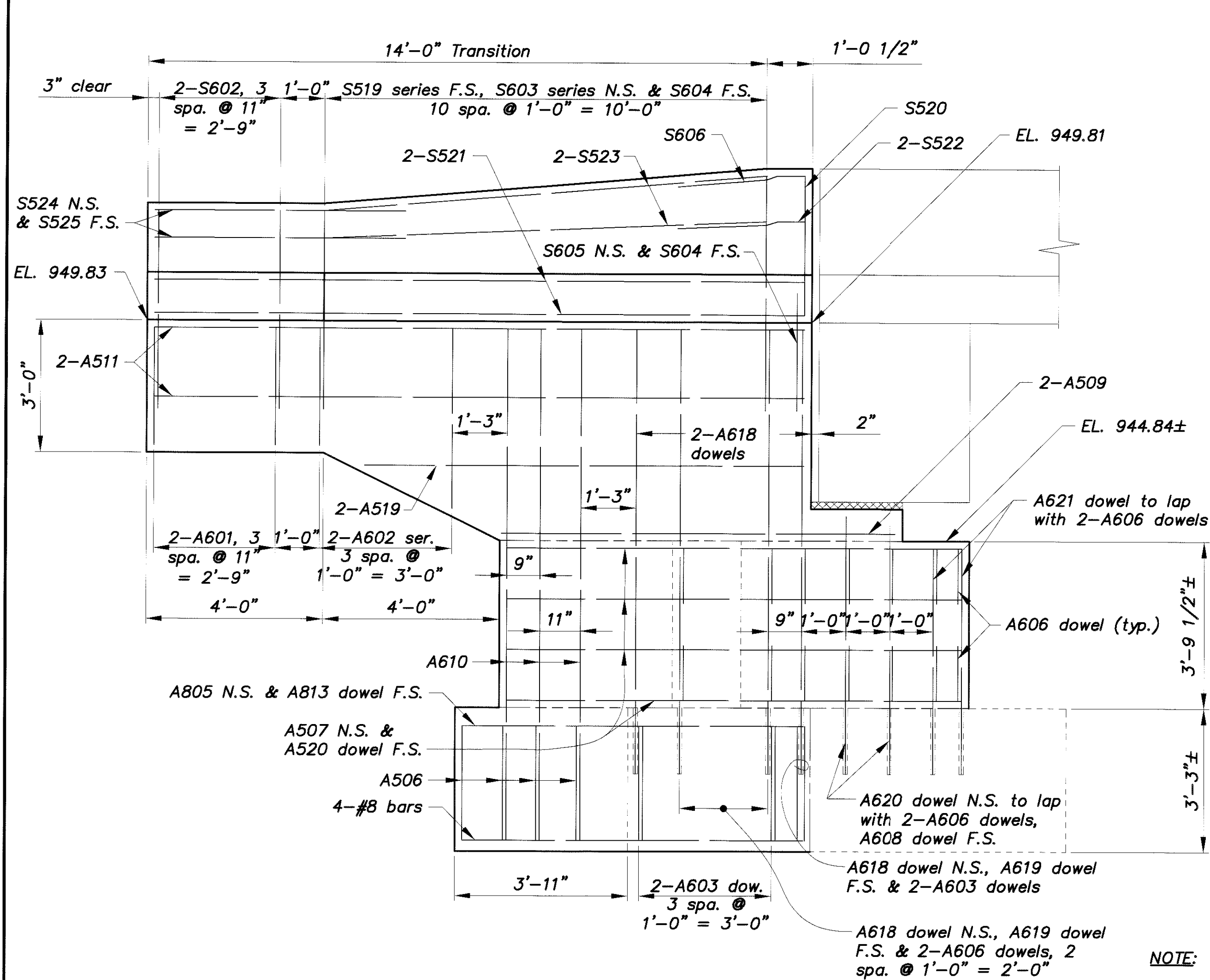
17/27

116
126

DESIGN AGENCY
WDA&E
1201 Dublin Road Columbus, Ohio

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIEWED	STRUCTURE FILE NUMBER	
GTB		1500783	

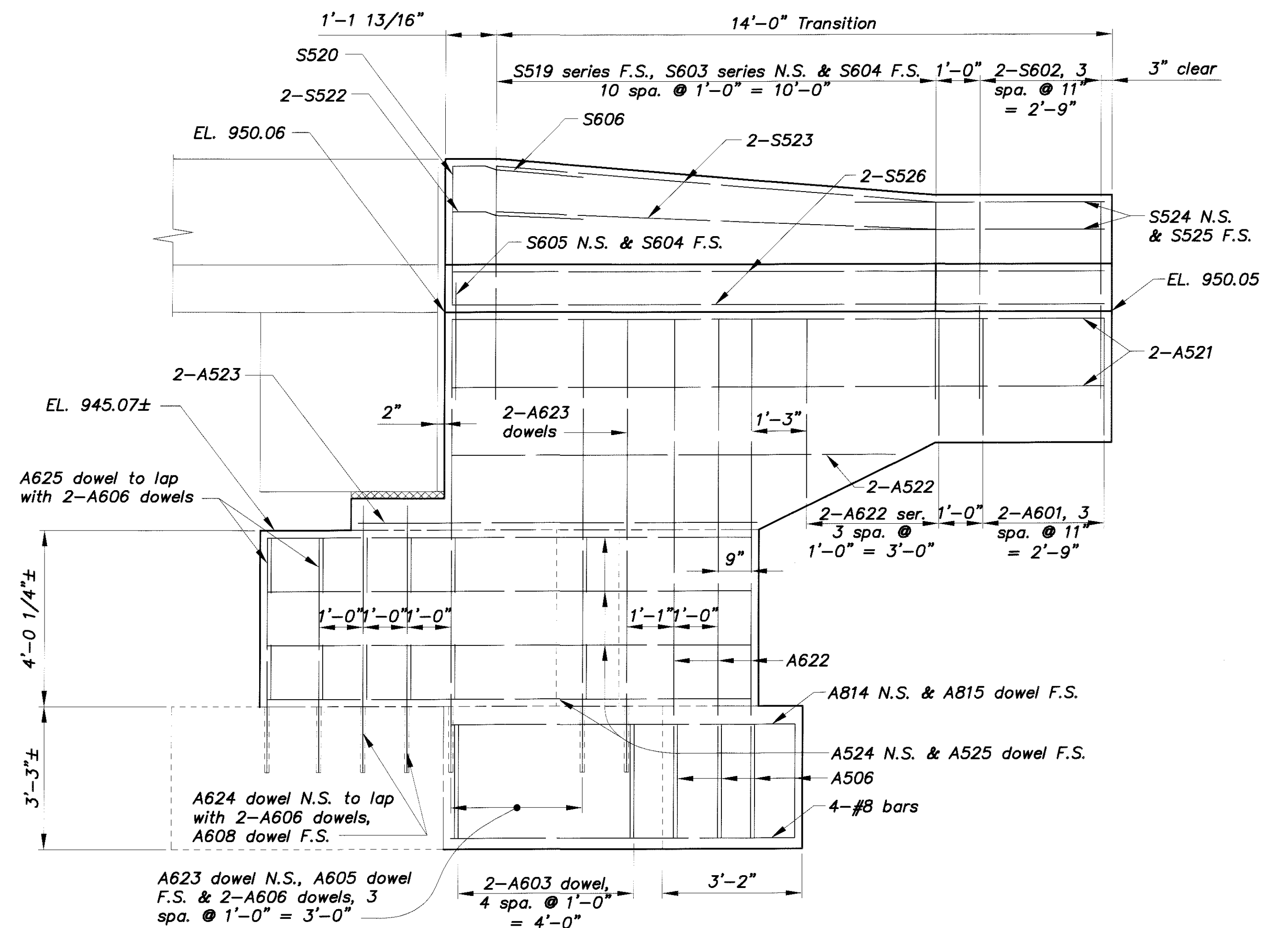
K:\000\000011\COL-11-(9.44)(13.78)\Drawings\COL-11-13.78\COL-11-13.78(Left Bridge)\w\foriscop.dwg



VIEW V-V

NOTE:

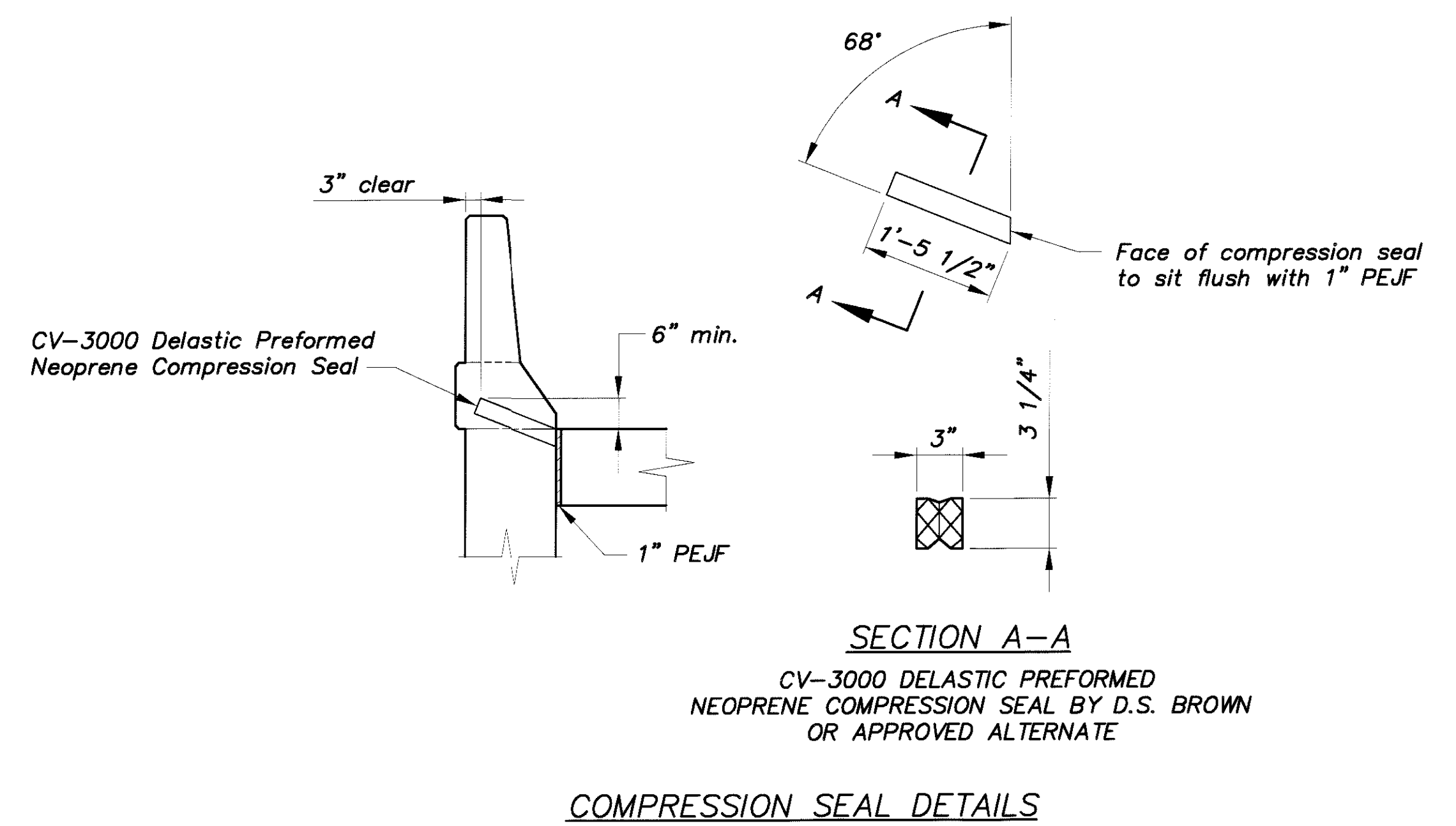
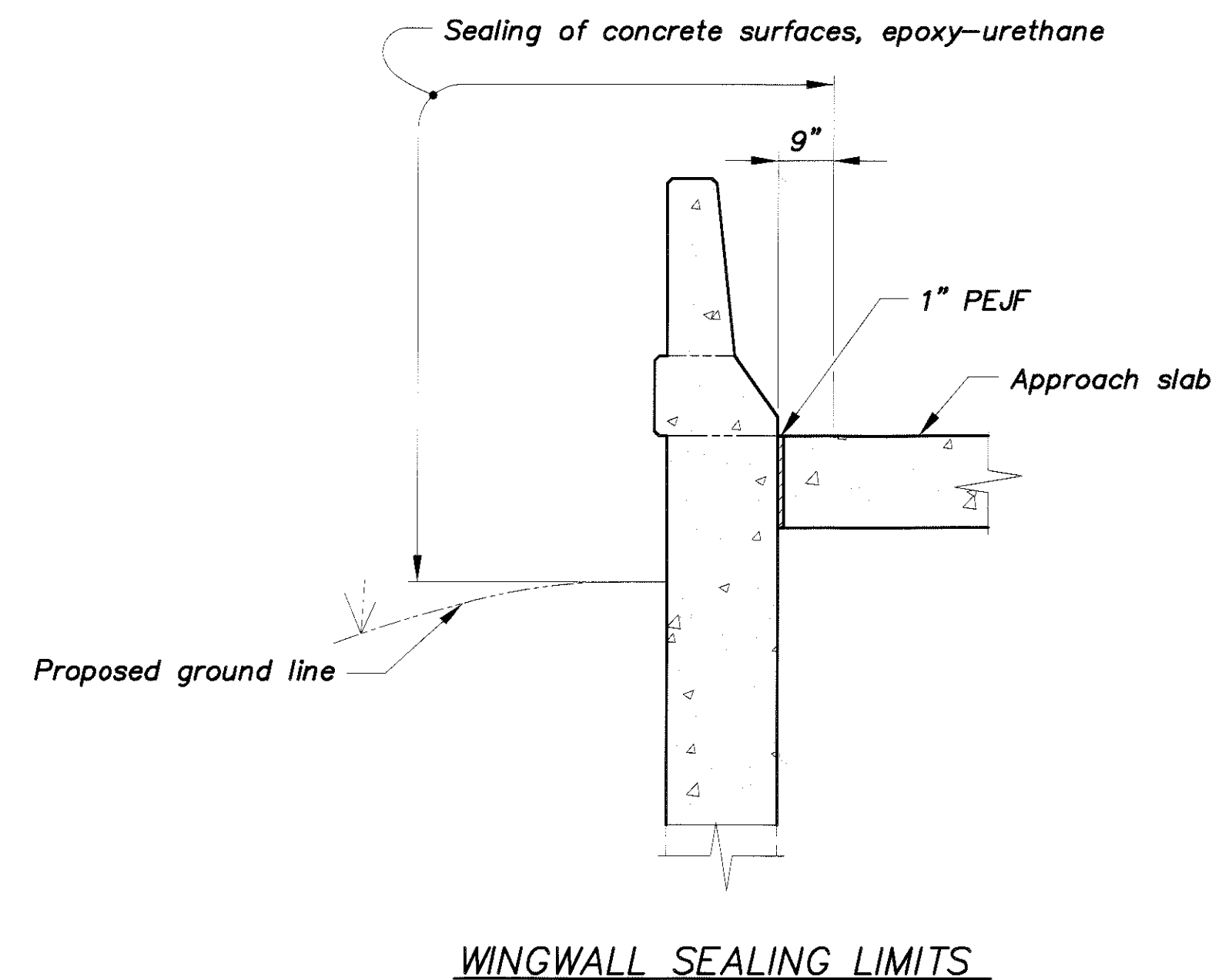
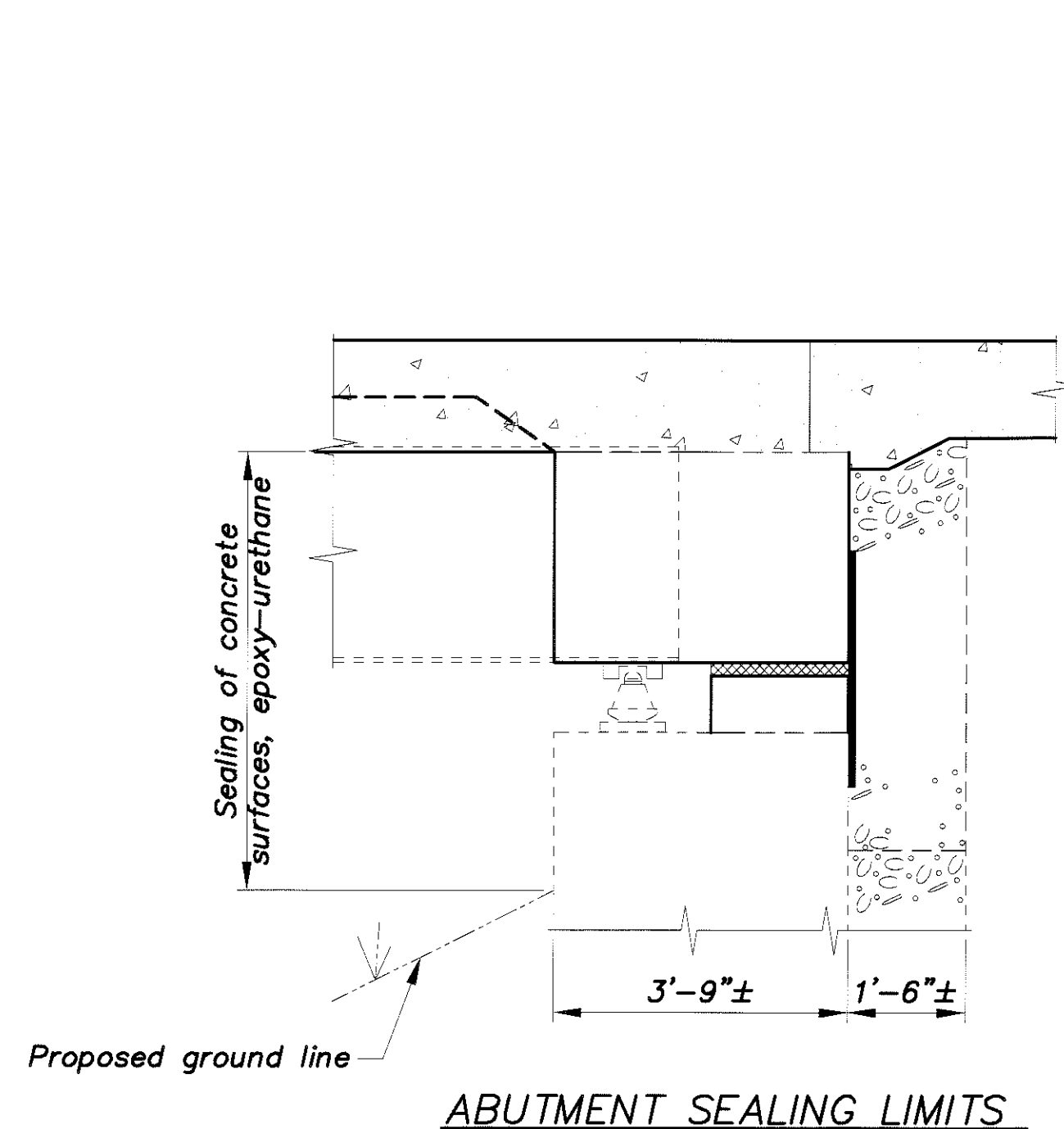
Refer to Sheet 17/27 for locations of View V-V & View W-W.

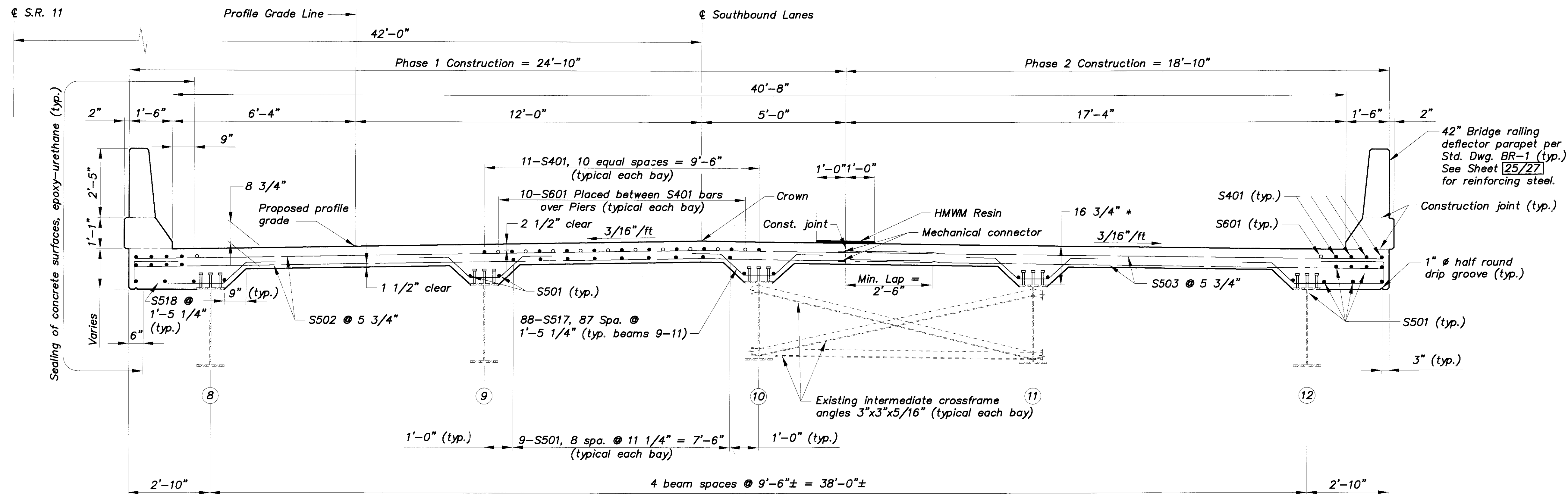


VIEW W-W

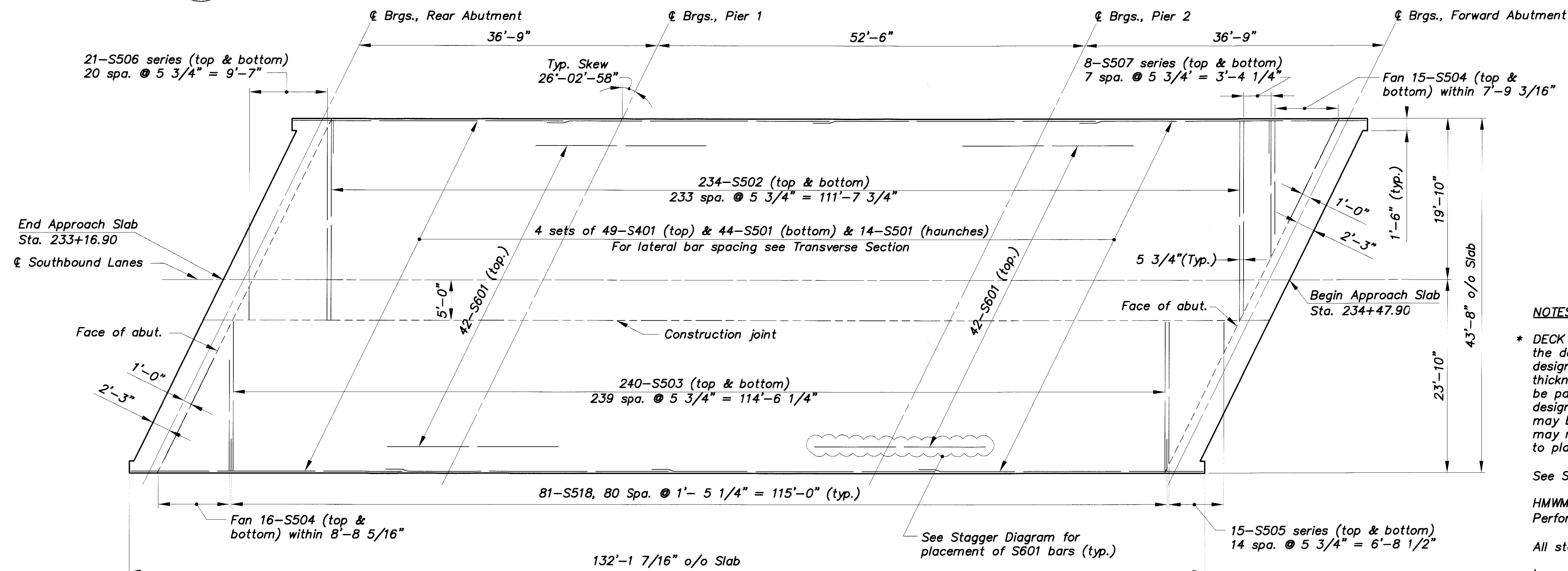
NOTE:

Vertical faces of the joint must be clean and free of loose concrete. In addition, installation of the seal shall occur between temperatures ranging from 35°F to 85°F.

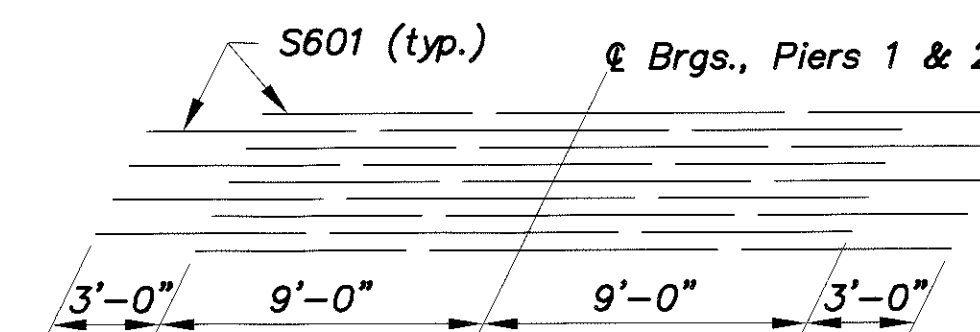




TRANSVERSE SECTION



SLAB REINFORCEMENT PLAN



NOTES:

* DECK SLAB DEPTH: The distance shown from the top of the deck slab to the top of steel beam is the theoretical design dimension including an average design haunch thickness of 8 inches. The quantity of deck concrete to be paid for shall be based upon this dimension, minus the design haunch thickness, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or conformation required to place it parallel to finished grade.

See Sheet [24/27] for existing beam sizes.

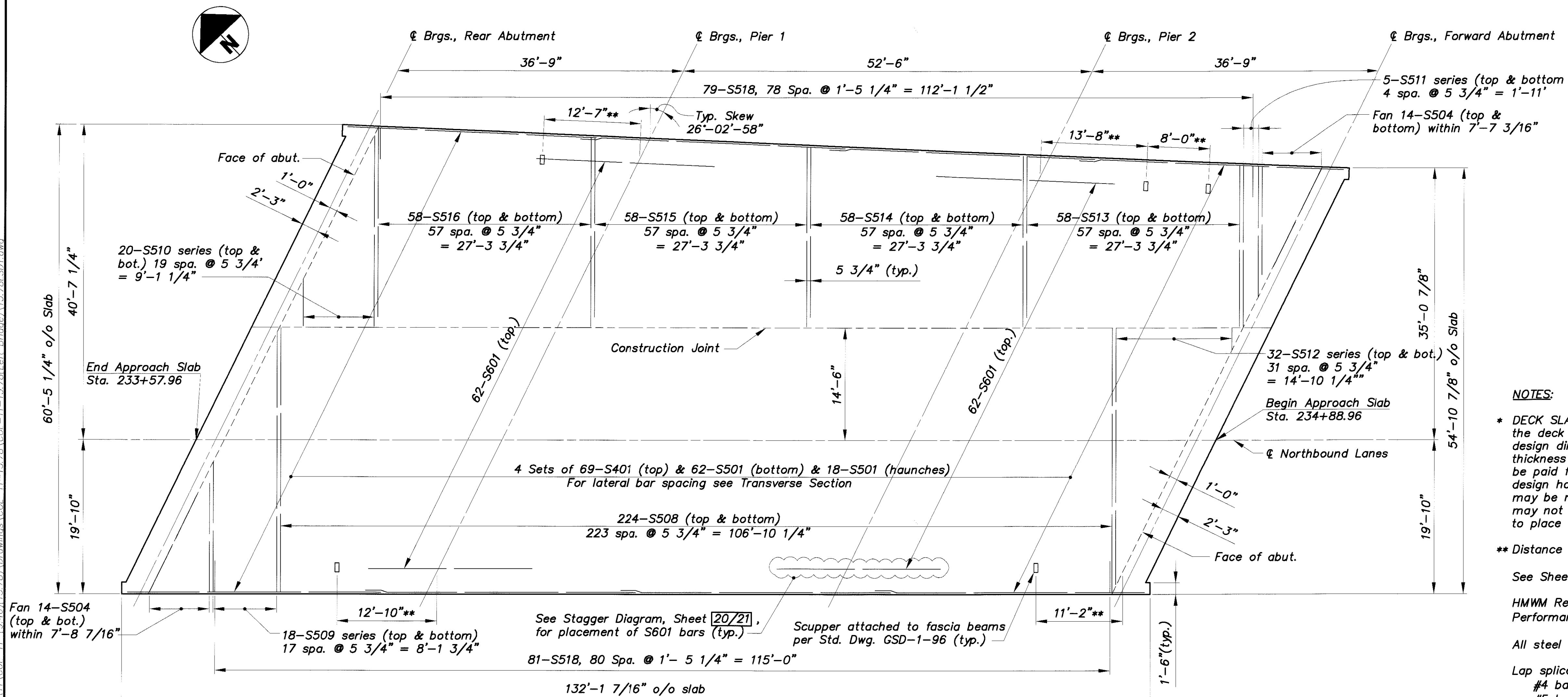
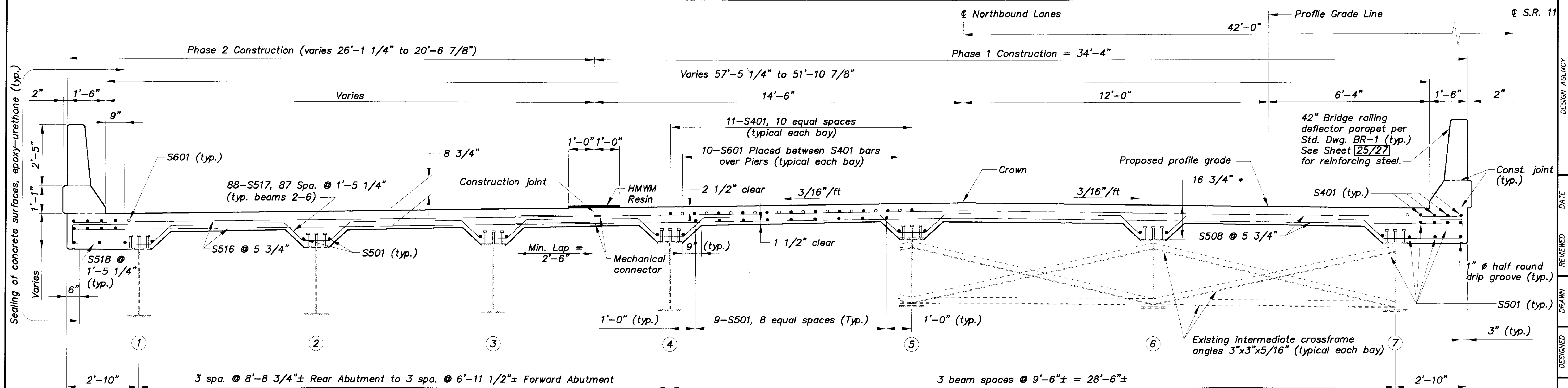
HMWM Resin to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.

All steel clearances are 2" unless shown otherwise.

Lap splice lengths:

#4 bars = 2'-0" minimum

#5 bars = 2'-6" minimum



NOTES:

* **DECK SLAB DEPTH:** The distance shown from the top of the deck slab to the top of steel beam is the theoretical design dimension including an average design haunch thickness of 8 inches. The quantity of deck concrete to be paid for shall be based upon this dimension, minus the design haunch thickness, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or conformation required to place it parallel to finished grade.

**** Distance measured along centerline of fascia beam.**

See Sheet 24/27 for existing beam sizes.

HMWM Resin to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.

All steel clearances are 2" unless shown otherwise.

Lap splice length:

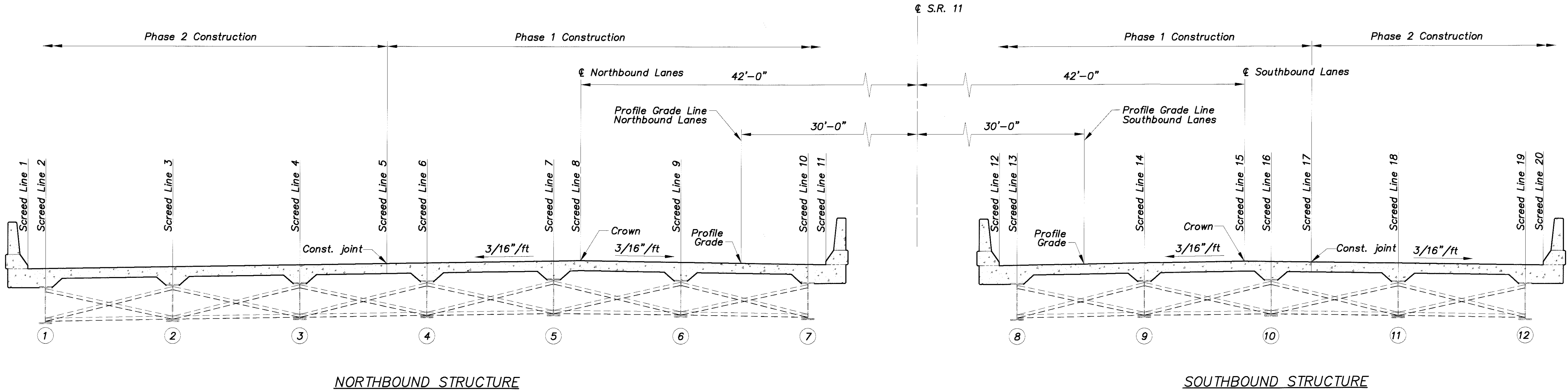
#4 bars = 2'-0" minimum
#5 bars = 2'-6" minimum

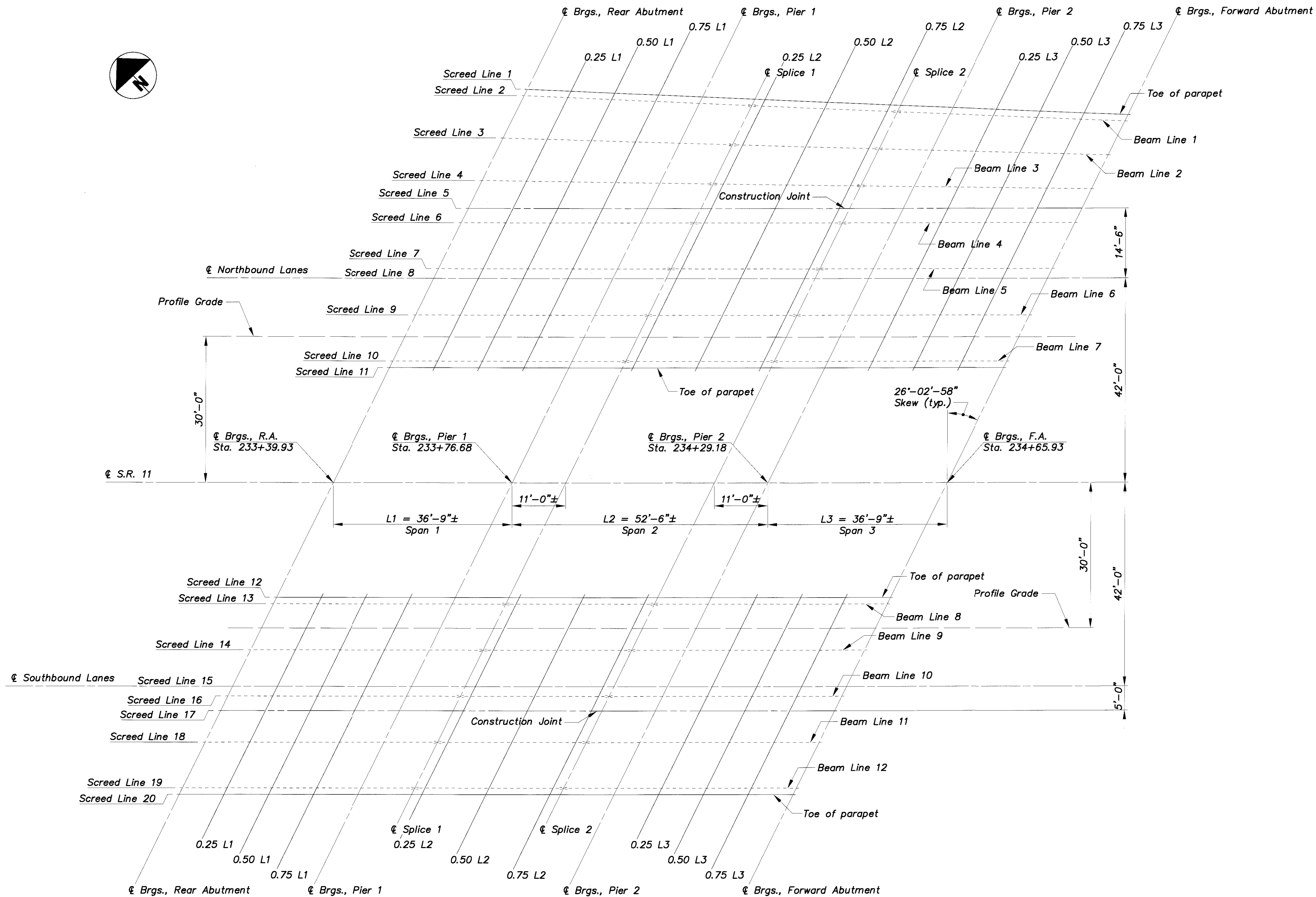
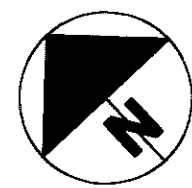
K:\Data\Dist11\Col-11-(9.44)\Drawings\COL-11-13.78\COL-11-13.78(Shared Bridge)\sdl.dwg

SCREED ELEVATION TABLE																					
	SCREED LINE 1		SCREED LINE 2		SCREED LINE 3		SCREED LINE 4		SCREED LINE 5		SCREED LINE 6		SCREED LINE 7		SCREED LINE 8		SCREED LINE 9		SCREED LINE 10		
LOCATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	DEFLECTION ADJUSTMENT
℄ Brgs., R.A.	233+79.52	950.09	233+78.88	950.12	233+74.62	950.28	233+70.35	950.44	233+67.55	950.55	233+66.08	950.61	233+61.44	950.79	233+60.46	950.83	233+56.79	950.74	233+52.15	950.62	0"
0.25 Span 1	233+88.52	950.05	233+87.88	950.07	233+83.68	950.23	233+79.47	950.39	233+76.73	950.50	233+75.27	950.55	233+70.62	950.73	233+69.65	950.77	233+65.98	950.68	233+61.34	950.56	1/16"
0.50 Span 1	233+97.52	950.01	233+96.88	950.03	233+92.74	950.18	233+88.60	950.34	233+85.92	950.44	233+84.46	950.50	233+79.81	950.67	233+78.83	950.71	233+75.17	950.62	233+70.53	950.50	1/16"
0.75 Span 1	234+06.52	949.96	234+05.88	949.99	234+01.80	950.14	233+97.72	950.29	233+95.11	950.38	233+93.64	950.44	233+89.00	950.61	233+88.02	950.65	233+84.36	950.55	233+79.71	950.43	0"
℄ Pier 1	234+15.51	949.93	234+14.87	949.95	234+10.86	950.10	234+06.84	950.24	234+04.30	950.34	234+02.83	950.39	233+98.19	950.56	233+97.21	950.60	233+93.54	950.50	233+88.90	950.38	0"
℄ Splice 1	234+26.29	949.90	234+25.65	949.92	234+21.71	950.07	234+17.77	950.21	234+15.30	950.30	234+13.83	950.35	234+09.19	950.52	234+08.21	950.56	234+04.54	950.46	233+99.90	950.33	1/8"
0.25 Span 2	234+28.37	949.90	234+27.73	949.92	234+23.80	950.06	234+19.88	950.20	234+17.42	950.29	234+15.96	950.34	234+11.31	950.51	234+10.33	950.55	234+06.67	950.45	234+02.03	950.32	1/8"
0.50 Span 2	234+41.22	949.87	234+40.58	949.89	234+36.75	950.03	234+32.91	950.16	234+30.55	950.25	234+29.08	950.30	234+24.44	950.47	234+23.46	950.50	234+19.79	950.40	234+15.15	950.27	1/4"
0.75 Span 2	234+54.08	949.84	234+53.44	949.86	234+49.69	949.99	234+45.95	950.12	234+43.67	950.20	234+42.21	950.25	234+37.56	950.41	234+36.58	950.44	234+32.92	950.34	234+28.28	950.21	1/8"
℄ Splice 2	234+56.16	949.83	234+55.52	949.85	234+51.79	949.98	234+48.06	950.11	234+45.80	950.19	234+44.33	950.24	234+39.69	950.40	234+38.71	950.44	234+35.04	950.33	234+30.40	950.20	1/8"
℄ Pier 2	234+66.93	949.81	234+66.29	949.83	234+62.64	949.95	234+58.98	950.08	234+56.80	950.15	234+55.33	950.20	234+50.69	950.36	234+49.71	950.40	234+46.04	950.29	234+41.40	950.15	0"
0.25 Span 3	234+75.93	949.80	234+75.29	949.82	234+71.70	949.94	234+68.11	950.06	234+65.98	950.13	234+64.52	950.18	234+59.87	950.34	234+58.89	950.37	234+55.23	950.26	234+50.59	950.13	0"
0.50 Span 3	234+84.93	949.81	234+84.29	949.83	234+80.76	949.94	234+77.23	950.06	234+75.17	950.13	234+73.71	950.18	234+69.06	950.33	234+68.08	950.36	234+64.42	950.25	234+59.78	950.11	1/16"
0.75 Span 3	234+93.92	949.81	234+93.28	949.83	234+89.82	949.94	234+86.36	950.05	234+84.36	950.12	234+82.89	950.17	234+78.25	950.32	234+77.26	950.35	234+73.61	950.24	234+68.96	950.10	1/16"
℄ Brgs., F.A.	235+02.92	949.81	235+02.28	949.83	234+98.88	949.94	234+95.48	950.05	234+93.55	950.11	234+92.08	950.16	234+87.44	950.31	234+86.45	950.34	234+82.79	950.22	234+78.15	950.08	0"
	SCREED LINE 11		SCREED LINE 12		SCREED LINE 13		SCREED LINE 14		SCREED LINE 15		SCREED LINE 16		SCREED LINE 17		SCREED LINE 18		SCREED LINE 19		SCREED LINE 20		
LOCATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	STATION	SCREED ELEVATION	DEFLECTION ADJUSTMENT
℄ Brgs., R.A.	233+51.50	950.61	233+28.36	950.79	233+27.71	950.82	233+23.07	951.01	233+19.40	951.16	233+18.42	951.13	233+16.96	951.10	233+13.78	951.03	233+09.14	950.93	233+08.48	950.91	0"
0.25 Span 1	233+60.69	950.55	233+37.55	950.72	233+36.90	950.74	233+32.25	950.93	233+28.59	951.08	233+27.61	951.06	233+26.14	951.02	233+22.97	950.95	233+18.32	950.84	233+17.67	950.83	1/16"
0.50 Span 1	233+69.87	950.48	233+46.74	950.64	233+46.08	950.67	233+41.44	950.85	233+37.78	951.00	233+36.80	950.98	233+35.33	950.94	233+32.15	950.87	233+27.51	950.76	233+26.86	950.75	1/16"
0.75 Span 1	233+79.06	950.42	233+55.92	950.57	233+55.27	950.59	233+50.63	950.78	233+46.96	950.92	233+45.99	950.90	233+44.52	950.86	233+41.34	950.79	233+36.70	950.68	233+36.05	950.66	0"
℄ Pier 1	233+88.25	950.36	233+65.11	950.50	233+64.46	950.53	233+59.82	950.71	233+56.15	950.85	233+55.17	950.83	233+53.71	950.79	233+50.53	950.72	233+45.89	950.60	233+45.23	950.59	0"
℄ Splice 1	233+99.25	950.30	233+76.11	950.44	233+75.46	950.47	233+70.82	950.64	233+67.15	950.79	233+66.17	950.76	233+64.71	950.72	233+61.53	950.65	233+56.89	950.53	233+56.23	950.51	1/8"
0.25 Span 2	234+01.37	950.30	233+78.24	950.43	233+77.58	950.45	233+72.94	950.63	233+69.28	950.77	233+68.30	950.75	233+66.83	950.71	233+63.65	950.63	233+59.01	950.51	233+58.36	950.50	1/8"
0.50 Span 2	234+14.50	950.25	233+91.36	950.36	233+90.71	950.39	233+86.07	950.56	233+82.40	950.70	233+81.42	950.67	233+79.96	950.64	233+76.78	950.55	233+72.14	950.44	233+71.48	950.42	1/4"
0.75 Span 2	234+27.62	950.19	234+04.49	950.28	234+03.83	950.31	233+99.19	950.48	233+95.53	950.62	233+94.55	950.59	233+93.08	950.55	233+89.90	950.47	233+85.26	950.34	233+84.61	950.33	1/8"
℄ Splice 2	234+29.75	950.18	234+06.61	950.27	234+05.96	950.30	234+01.32	950.47	233+97.65	950.60	233+96.67	950.58	233+95.21	950.54	233+92.03	950.45	233+87.39	950.33	233+86.73	950.32	1/8"
℄ Pier 2	234+40.75	950.13	234+17.61	950.22	234+16.96	950.24	234+12.32	950.41	234+08.65	950.54	234+07.67	950.51	234+06.21	950.47	234+03.03	950.39	233+98.39	950.26	233+97.73	950.25	0"
0.25 Span 3	234+49.94	950.11	234+26.80	950.18	234+26.15	950.20	234+21.50	950.37	234+17.84	950.50	234+16.86	950.47	234+15.39	950.43	234+12.22	950.35	234+07.57	950.22	234+06.92	950.20	0"
0.50 Span 3	234+59.12	950.09	234+35.99	950.15	234+35.33	950.18	234+30.69	950.34	234+27.03	950.47	234+26.05	950.44	234+24.58	950.40	234+21.40	950.31	234+16.76	950.18	234+16.11	950.16	1/16"
0.75 Span 3	234+68.31	950.08	234+45.17	950.13	234+44.52	950.15	234+39.88	950.31	234+36.21	950.44	234+35.24	950.41	234+33.77	950.37	234+30.59	950.28	234+25.95	950.15	234+25.30	950.13	1/16"
℄ Brgs., F.A.	234+77.50	950.06	234+54.36	950.10	234+53.71	950.12	234+49.07	950.28	234+45.40	950.41	234+44.42	950.38	234+42.96	950.34	234+39.78	950.24	234+35.14	950.11	234+34.48	950.09	0"

NOTE:

SCREED ELEVATIONS shown are for the deck slab prior to concrete placement. Allowance has been made for anticipated calculated dead load deflection.





SCREED LINE PLAN

SUPERSTRUCTURE DETAILS

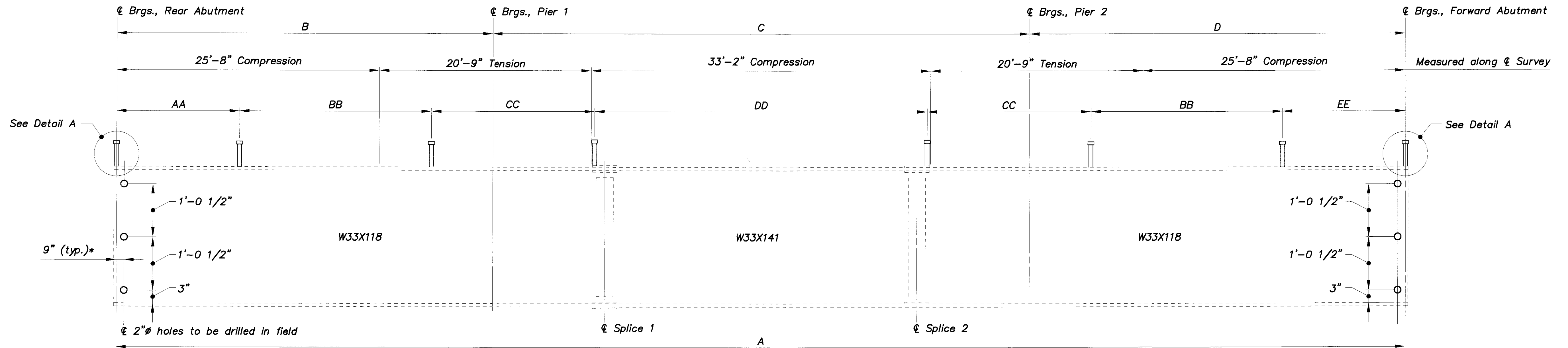
Bridge No. COL-11-1378 N.B.L. & S.B.L.
over S.R. 154

COL-11-(9.44)(13.76)

23/27

122
126

DESIGNED	DRAWN	REVIEWED	DATE
WHM	WHM	BLG	6-14-00
CHECKED	REVIS	STRUCTURE FILE NUMBER	
GTB		1500783/1500813	

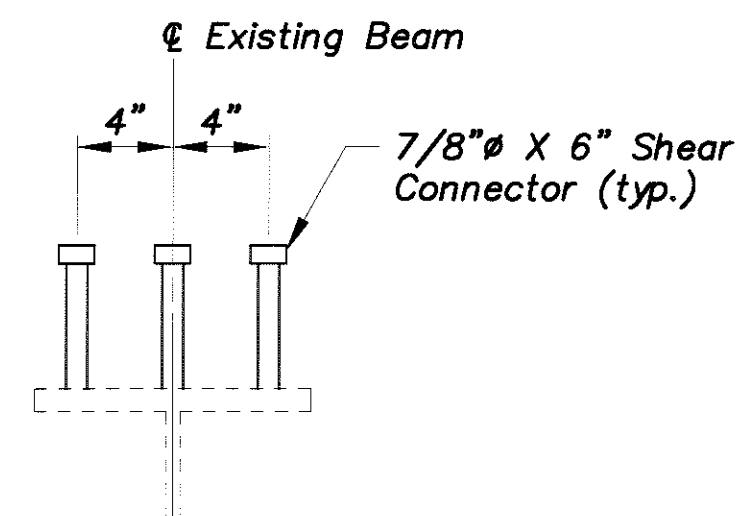


TYPICAL BEAM ELEVATION

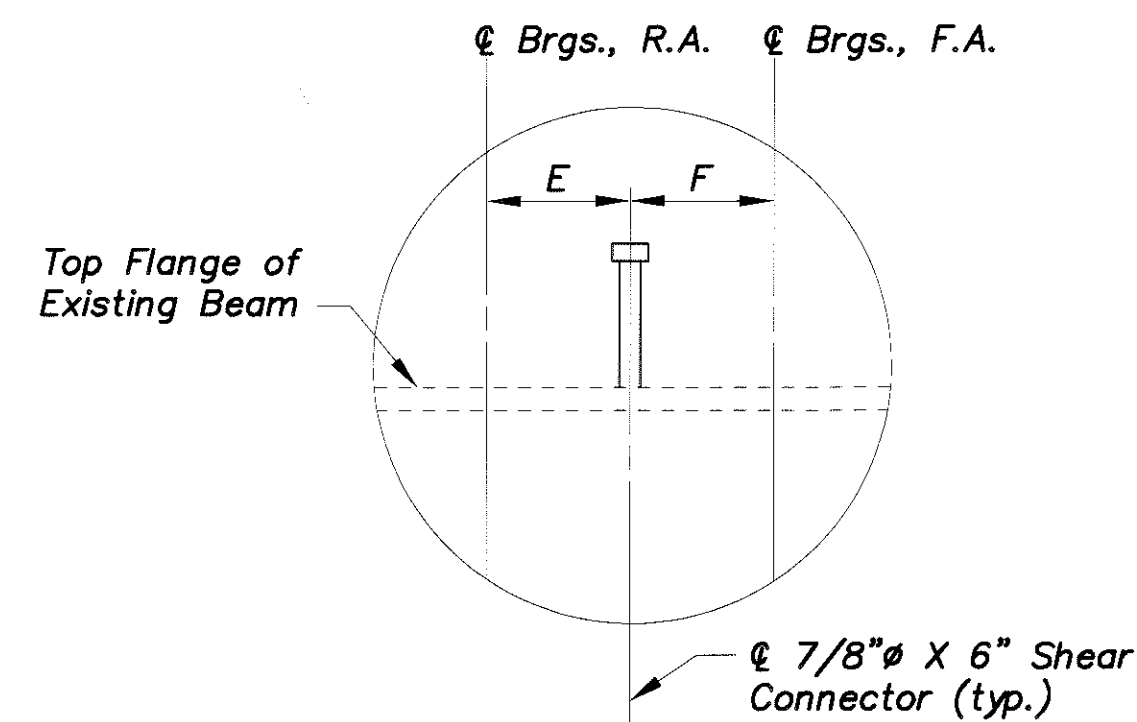
LEGEND:

* Dimension to be verified by Engineer in field.

EXISTING BEAM DIMENSIONS					SHEAR CONNECTOR SPACING						
BEAM NO.	A	B	C	D	E	F	AA	BB	CC	DD	EE
1	123'-6 3/16"	36'-0 5/16"	51'-5 9/16"	36'-0 5/16"	2"	1 3/16"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	7 spa. @ 2'-0" = 14'-0"	27 spa. @ 1'-3" = 33'-9"	12 spa. @ 1'-0" = 12'-0"
2	124'-3 3/16"	36'-3 1/8"	51'-9 9/16"	36'-3 1/8"	2"	1 3/16"	11 spa. @ 1'-0" = 11'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	11 spa. @ 1'-0" = 11'-0"
3	125'-1 3/4"	36'-6"	51'-9 9/16"	36'-6"	1"	3/4"	11 spa. @ 1'-0" = 11'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
4	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
5	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
6	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
7	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
8	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
9	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
10	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
11	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"
12	126'-0"	36'-9"	52'-6"	36'-9"	0"	0"	12 spa. @ 1'-0" = 12'-0"	15 spa. @ 1'-3" = 18'-9"	8 spa. @ 2'-0" = 16'-0"	26 spa. @ 1'-3" = 32'-6"	12 spa. @ 1'-0" = 12'-0"



SHEAR CONNECTOR DIAGRAM



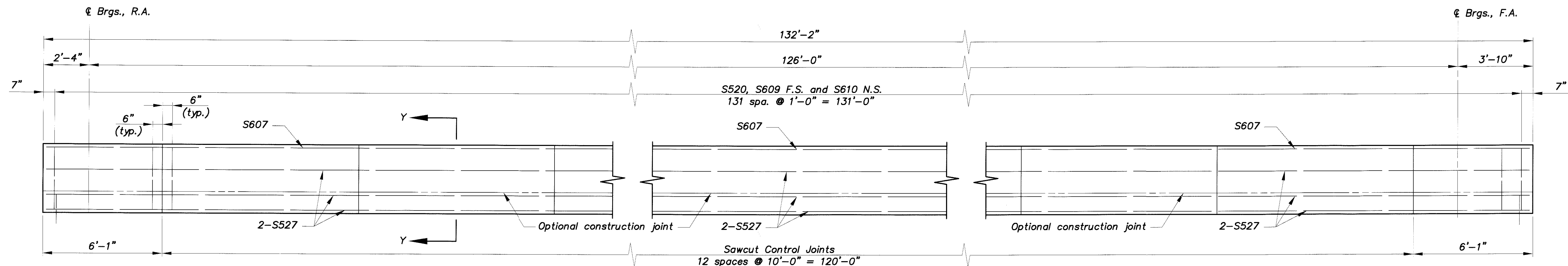
DETAIL A

NOTES:

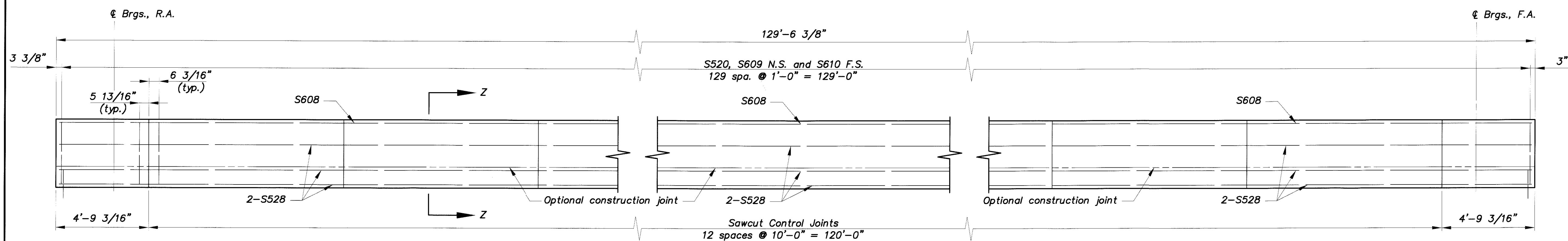
Move shear connectors when necessary to clear field splice bolts.

WELDED ATTACHMENT of supports for concrete deck finishing may be made to areas of the fascia stringer flanges designated "Compression". Attachments shall not be made to areas designated "Tension". Fillet welds to compression flanges shall be not closer than 1" from edge of flange, be not more than 2" long, and be not smaller than the minimum size required by AASHTO.

2" holes drilled in field to be included with Item 844 High Performance Concrete Superstructure (Deck) for payment.

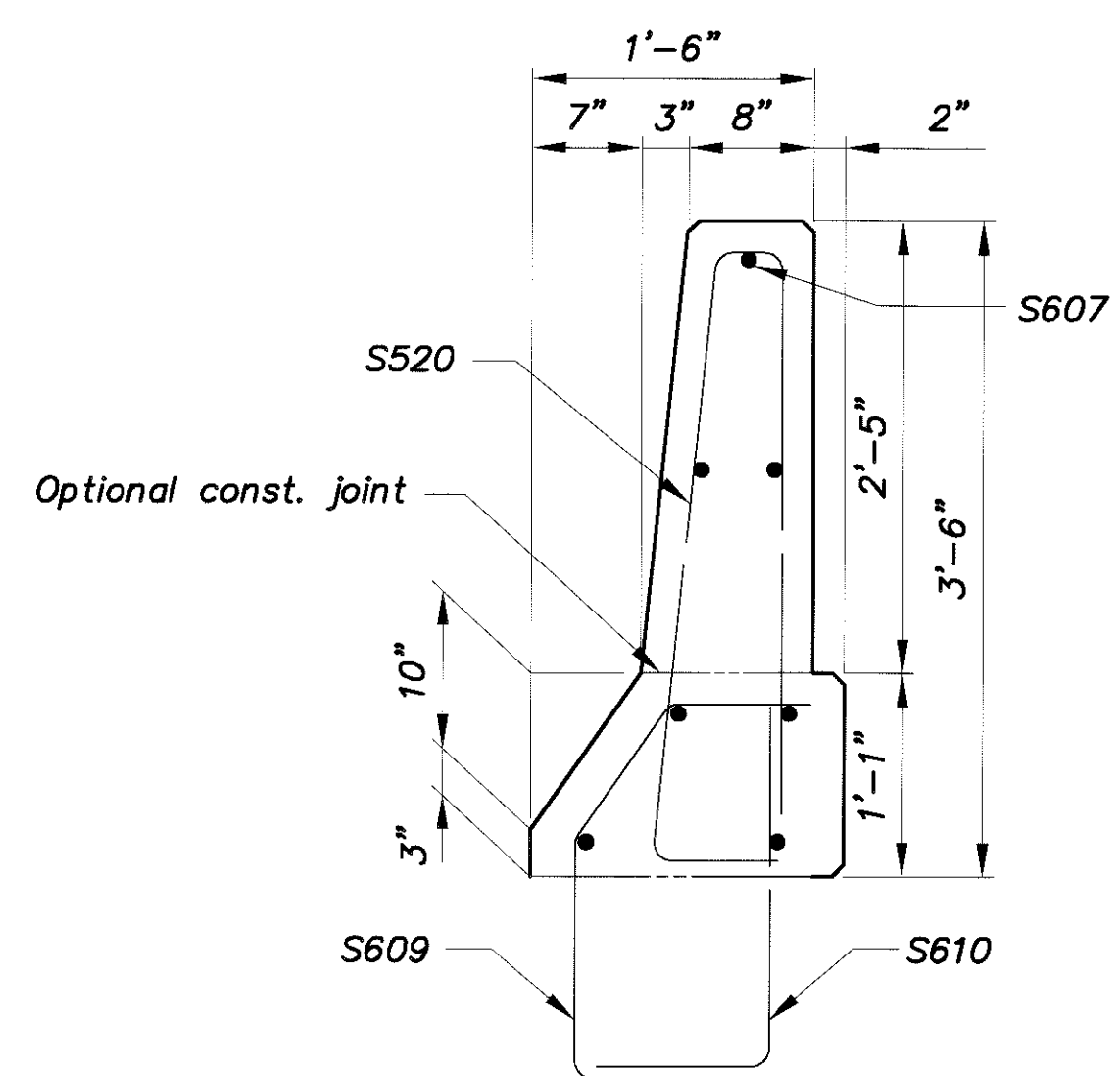


TYPICAL DEFLECTOR PARAPET
(Viewed along back face of parapet)

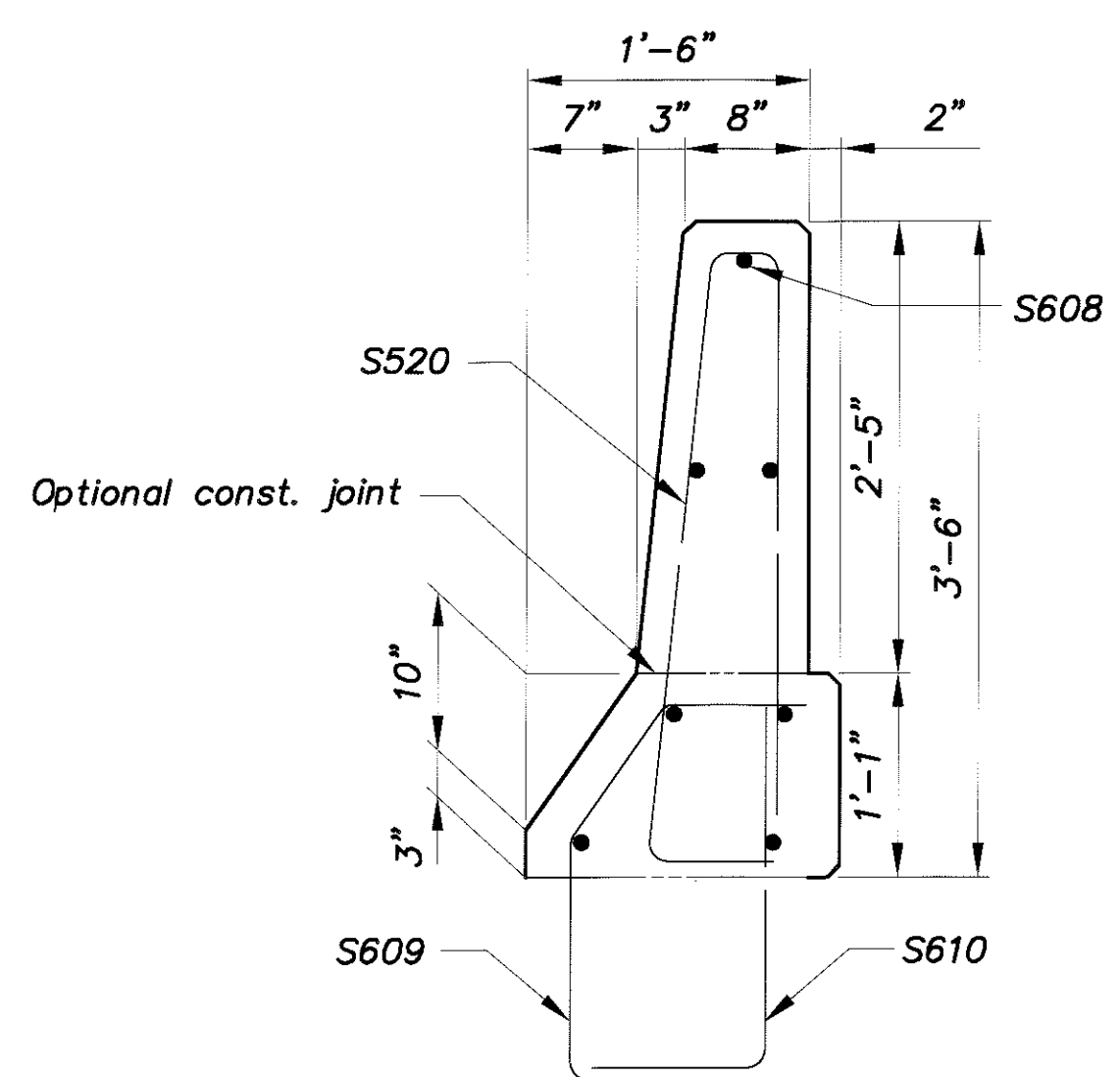


LEFT DEFLECTOR PARAPET (NORTHBOUND STRUCTURE)
(Viewed along front face of parapet)

NOTES:
S607, S608, S527 & S528 steel reinforcement bars consist of 4 sets.
Slip forming of concrete parapets shall be prohibited.



SECTION Y-Y
NOTE: All bars not labeled are S527.



SECTION Z-Z
NOTE: All bars not labeled are S528.

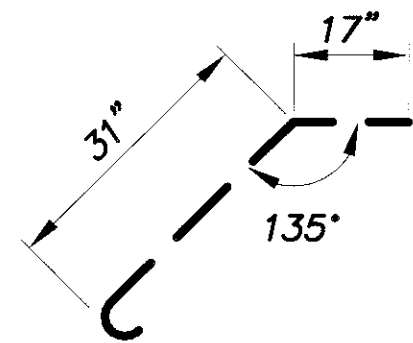
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		DESIGN AGENCY 1201 Dublin Road Columbus, Ohio	
DESIGNED WHM	CHECKED GTB	DRAWN WHM	REVIEWED BLG
DATE 6-14-00		STRUCTURE FILE NUMBER 1500783/1500813	
SUPERSTRUCTURE DETAILS Bridge No. COL-11-1378 N.B.L. & S.B.L. over S.R. 154			
COL-11-(9.44)(13.76)		25/27	
124		126	

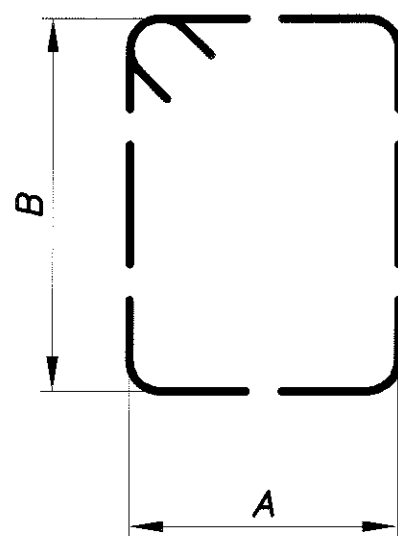
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MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		SUBSTRUCTURE							
A501	62	58	86	78	284	2'-2"	642	STR.				
A502	31	29	43	39	142	1'-10"	272	2	1'-5"	4"		
A503	36	35	47	44	162	7'-2"	1211	2	2'-7"	2'-5"		
A504	35	34	46	43	158	12'-0"	1978	4	3'-5"	2'-4"		
A505	1	1	1	1	4	11'-4"	47	4	3'-1"	2'-4"		
A506	8	8	7	8	31	16'-0"	517	4	5'-2"	2'-7"		
A507	4	4	4	4	16	10'-3"	171	STR.				
A508	8	8			16	4'-8"	78	STR.				
A509	2	2	4	2	10	8'-10"	92	STR.				
A510	2	2			4	9'-7"	40	STR.				
A511	8	8	8	4	28	14'-8"	428	STR.				
A512	4	4			8	10'-10"	90	STR.				
A513	2	2			4	9'-1"	38	STR.				
A514	2	2			4	9'-10"	41	STR.				
A515			4		4	3'-10"	16	STR.				
A516			4		4	9'-8"	40	STR.				
A517			4		4	10'-9"	45	STR.				
A518			4		4	4'-7"	19	STR.				
A519				2	2	9'-11"	21	STR.				
A520				4	4	5'-3"	22	STR.				
A521				4	4	14'-10"	62	STR.				
A522				2	2	10'-1"	21	STR.				
A523				2	2	9'-0"	19	STR.				
A524				4	4	11'-0"	46	STR.				
A525				4	4	4'-6"	19	STR.				
A601	16	16	16	16	64	2'-7"	248	STR.				
A602	4 Ser. of 4	4 Ser. of 4	4 Ser. of 4	4 Ser. of 4	16 Ser. of 4	2'-7" to 4'-0"	316	STR.				
A603	20	20	22	20	82	5'-9"	708	3	3'-4"	2'-7"		
A604	12	12	6		30	10'-0"	451	STR.				
A605	8	8	9	4	29	6'-4"	276	STR.				
A606	32	32	34	32	130	2'-11"	570	3	1'-10"	1'-3"		
A607	4	4			8	7'-9"	93	3	5'-9"	2'-2"		
A608	4	4	4	4	16	4'-0"	96	3	2'-0"	2'-2"		
A609	4	4			8	3'-4"	40	STR.				
A610	6	6		3	15	24'-0"	541	2	1'-2"	11'-7"		
A611			2		2	24'-10"	75	2	1'-2"	12'-0"		
A612			7		7	10'-6"	110	STR.				
A613			2		2	8'-3"	25	3	6'-3"	2'-2"		
A614			2		2	5'-6"	17	STR.				
A615			3		3	23'-10"	107	2	1'-2"	11'-6"		
A616			2		2	7'-8"	23	3	5'-8"	2'-2"		
A617			2		2	4'-11"	15	STR.				
A618				6	6	10'-1"	91	STR.				
A619				4	4	6'-3"	38	STR.				
A620				2	2	7'-10"	24	3	5'-10"	2'-2"		
A621				2	2	5'-1"	15	STR.				
A622				3	3	25'-2"	113	2	2'-2"	11'-8"		
A623				6	6	10'-4"	93	STR.				
A624				2	2	8'-1"	24	3	6'-1"	2'-2"		
A625				2	2	5'-4"	16	STR.				

MARK	NUMBER					LENGTH	WEIGHT	TYPE	DIMENSIONS			
	REAR	FWD.	REAR	FWD.	TOTAL				A	B	C	INC.
	S.B.L.		N.B.L.		ABUTMENTS (CONTINUED)							
A801		12			12	20'-6"	657	5	19'-2"	1'-2 1/2"	7"	
A802*		12			12	27'-2"	870	STR.				
A803	12				12	20'-4"	651	STR.				
A804*	12				12	27'-2"	870	5	25'-10"	1'-2 1/2"	7"	
A805	6	6	6	3	21	7'-8"	430	STR.				
A806	6	6			12	4'-8"	150	STR.				
A807			12		12	28'-2"	902	5	26'-10"	1'-2 3/4"	6"	
A808*			12		12	37'-7"	1204	STR.				
A809				12	12	22'-5"	718	STR.				
A810*				12	12	37'-9"	1210	5	36'-5"	1'-2 1/2"	7"	
A811			3		3	3'-10"	31	STR.				
A812			3		3	4'-7"	37	STR.				
A813				3	3	5'-3"	42	STR.				
A814				3	3	7'-9"	62	STR.				
A815				3	3	4'-6"	36	STR.				
D801	32	31	43	40	146	4'-11"	1917	1				
				SUB-TOTAL (ABUTMENTS) =			19887					

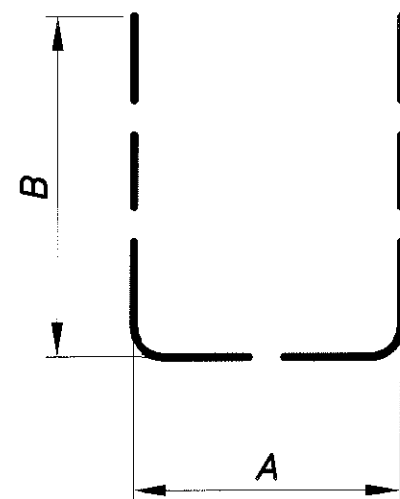


TYPE 1

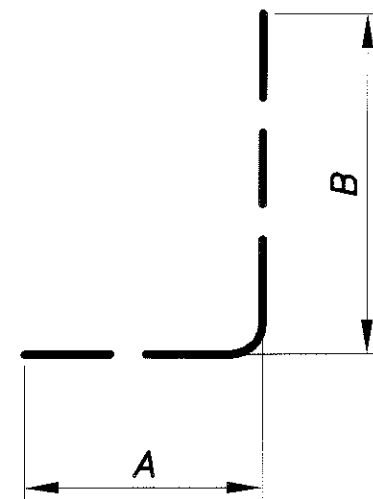


TYPE 4

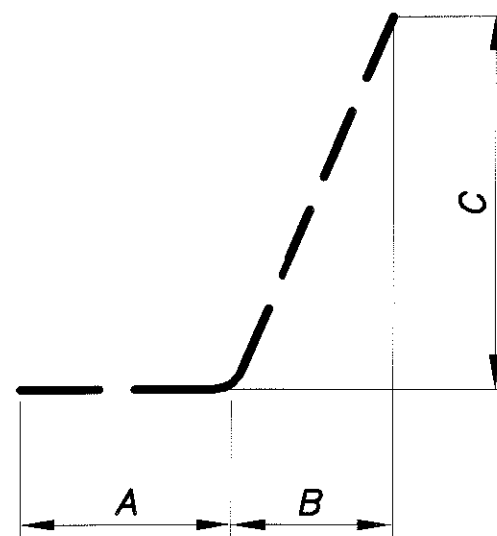
BENDING DIAGRAM



TYPE 2



TYPE 3



TYPE 5

NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

#8 Reinforcing bar L = 4'-0"

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

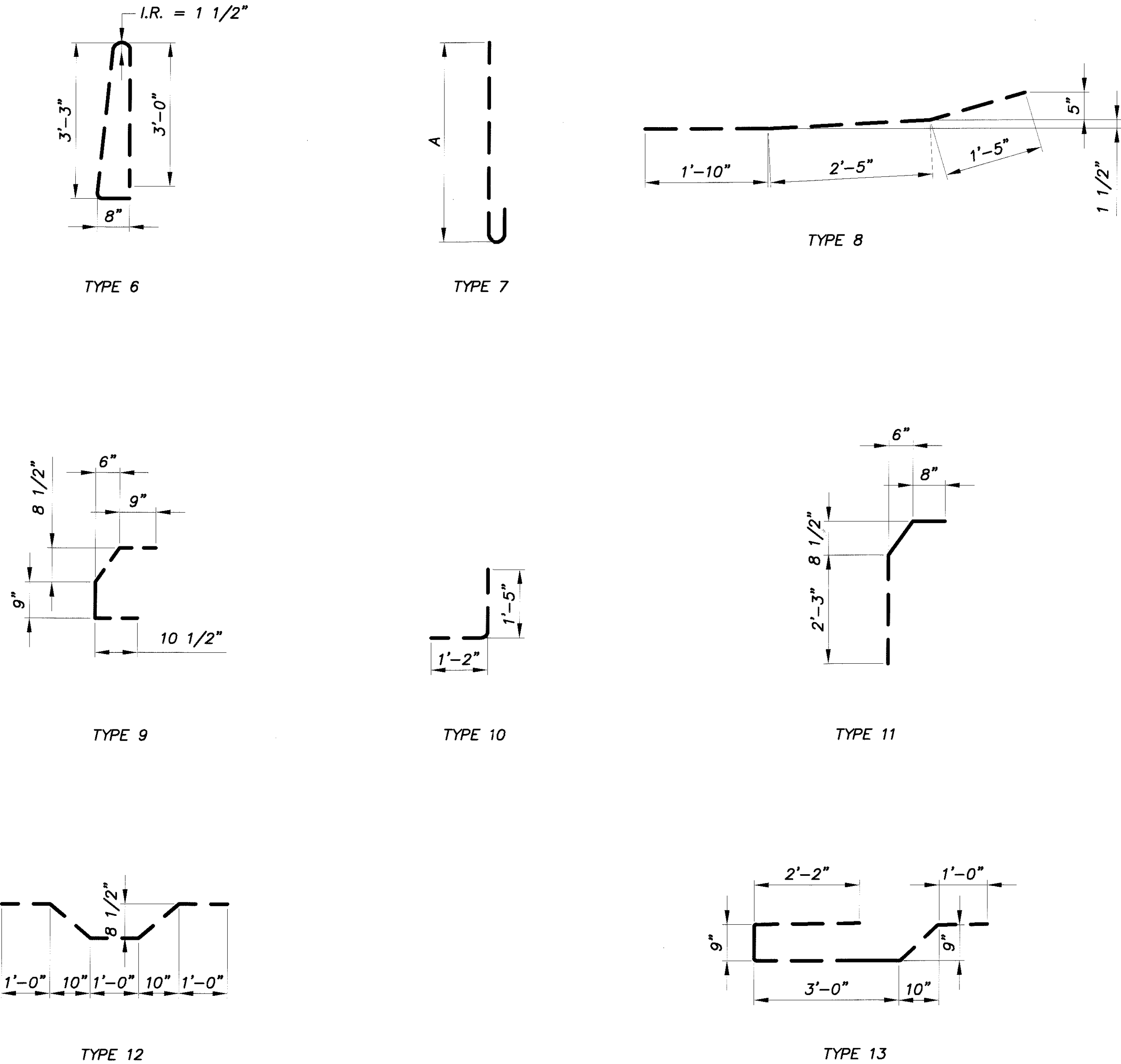
All bars, connectors and dowel bar extensions shall be epoxy coated. Coating for both connectors and bars shall conform to the same specifications. Coatings which have been damaged or which otherwise do not meet specifications with respect to color, continuity and uniformity may be repaired as directed by the Engineer or shall be replaced by material which meets specifications.

Refer to C.M.S. Section 509.05 for standard bend dimensions.

All dimensions are out to out.

MARK	NUMBER			LENGTH	WEIGHT	TYPE	DIMENSIONS			
	S.B.L.	N.B.L.	TOTAL				A	B	C	INC.
SUPERSTRUCTURE										
S401	196	276	472	34'-5"	10851	STR.				
S501	232	320	552	34'-10"	20055	STR.				
S502*	468		468	24'-8"	12040	STR.				
S503	480		480	18'-6"	9262	STR.				
S504	62	56	118	14'-0"	1723	STR.				
S505	2 Ser. of 15		2 Ser. of 15	3'-10" to 17'-7"	335	STR.				11 3/4" (+)
S506*	2 Ser. of 21		2 Ser. of 21	4'-1" to 23'-8"	608	STR.				11 3/4"
S507	2 Ser. of 8		2 Ser. of 8	16'-11" to 23'-10"	340	STR.				11 3/4" (+)
S508*		448	448	34'-2"	15965	STR.				
S509		2 Ser. of 18	2 Ser. of 18	16'-10" to 33'-6"	945	STR.				11 3/4" (+)
S510		2 Ser. of 20	2 Ser. of 20	6'-0" to 24'-6"	636	STR.				11 5/8" (+)
S511		2 Ser. of 5	2 Ser. of 5	16'-11" to 20'-9"	196	STR.				11 1/2"
S512*		2 Ser. of 32	2 Ser. of 32	2'-11" to 33'-1"	1202	STR.				11 5/8" (+)
S513		116	116	20'-9"	2511	STR.				
S514		116	116	21'-11"	2652	STR.				
S515		116	116	23'-3"	2813	STR.				
S516		116	116	24'-5"	2954	STR.				
S517	264	440	704	5'-1"	3733	12				
S518	162	160	302	7'-8"	2415	13				
S519	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	3'-0" to 3'-10"	314	7	2'-5" to 3'-3"			1"
S520	268	266	534	7'-0"	3899	6				
S521	16	12	28	14'-8"	428	STR.				
S522	8	8	16	3'-6"	58	STR.				
S523	16	16	32	10'-0"	334	STR.				
S524	8	8	16	5'-8"	95	STR.				
S525	8	8	16	5'-8"	95	8				
S526		4	4	14'-10"	62	STR.				
S527	48	24	72	34'-10"	2616	STR.				
S528		24	24	34'-2"	855	STR.				
S601	84	62	146	21'-0"	4605	STR.				
S602	32	32	64	4'-6"	433	STR.				
S603	4 Ser. of 11	4 Ser. of 11	8 Ser. of 11	4'-6" to 5'-4"	650	STR.				1"
S604	48	48	96	3'-5"	493	11				
S605	4	4	8	2'-8"	32	STR.				
S606	4	4	8	4'-0"	48	STR.				
S607	8	4	12	35'-2"	634	STR.				
S608		4	4	34'-7"	208	STR.				
S609	264	262	526	3'-7"	2831	9				
S610	264	262	526	2'-5"	1909	10				
SUB-TOTAL (SUPERSTRUCTURE) =					111835					

BENDING DIAGRAM



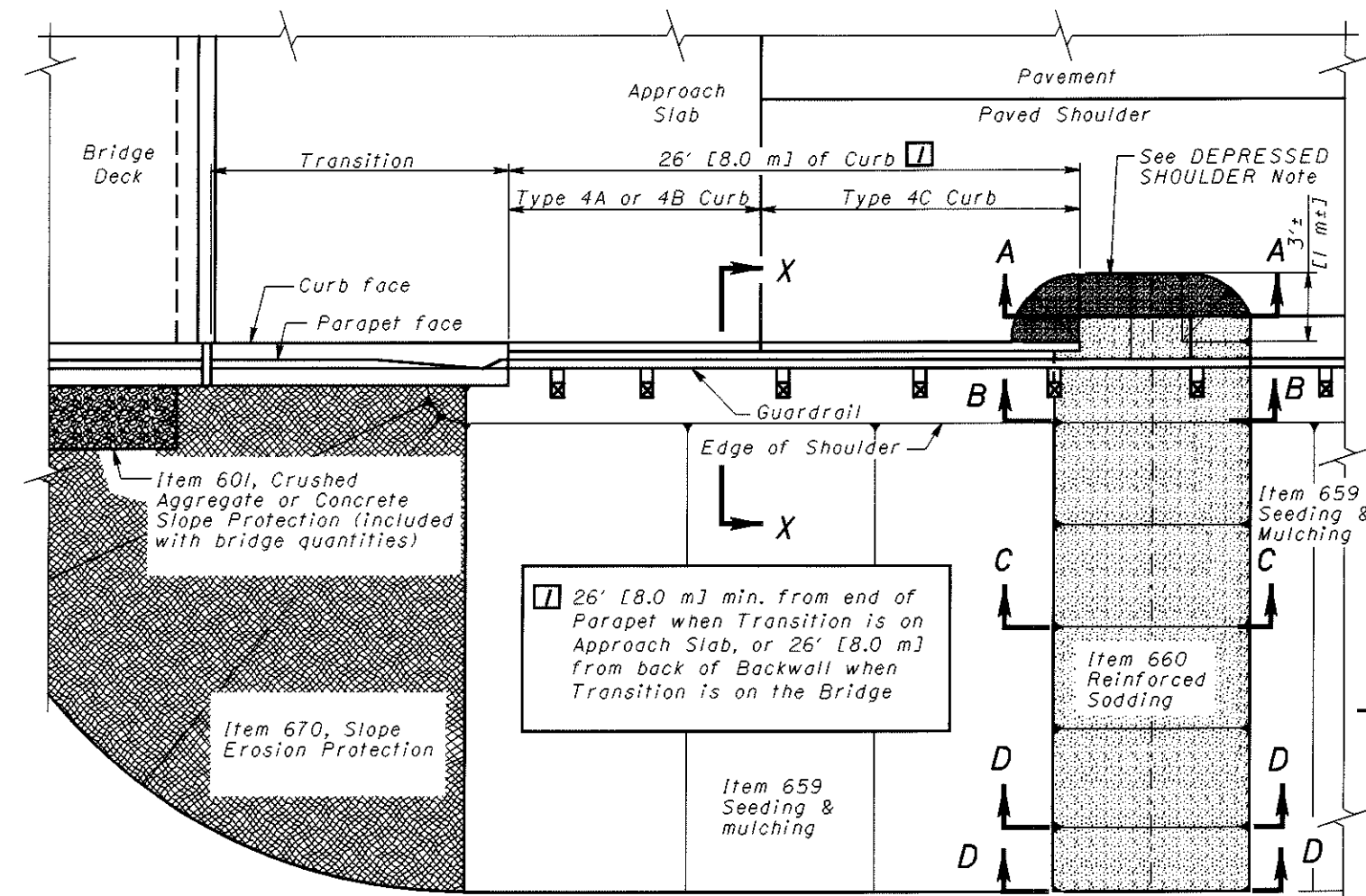
NOTES:

* Mechanical connectors: An approved type of mechanical connector for reinforcing shall be provided. Installation of connectors shall conform with recommended procedures. If a dowel bar splice type connection is furnished, the minimum dowel bar length to be included with the connector shall be given by the dimension "L" shown below:

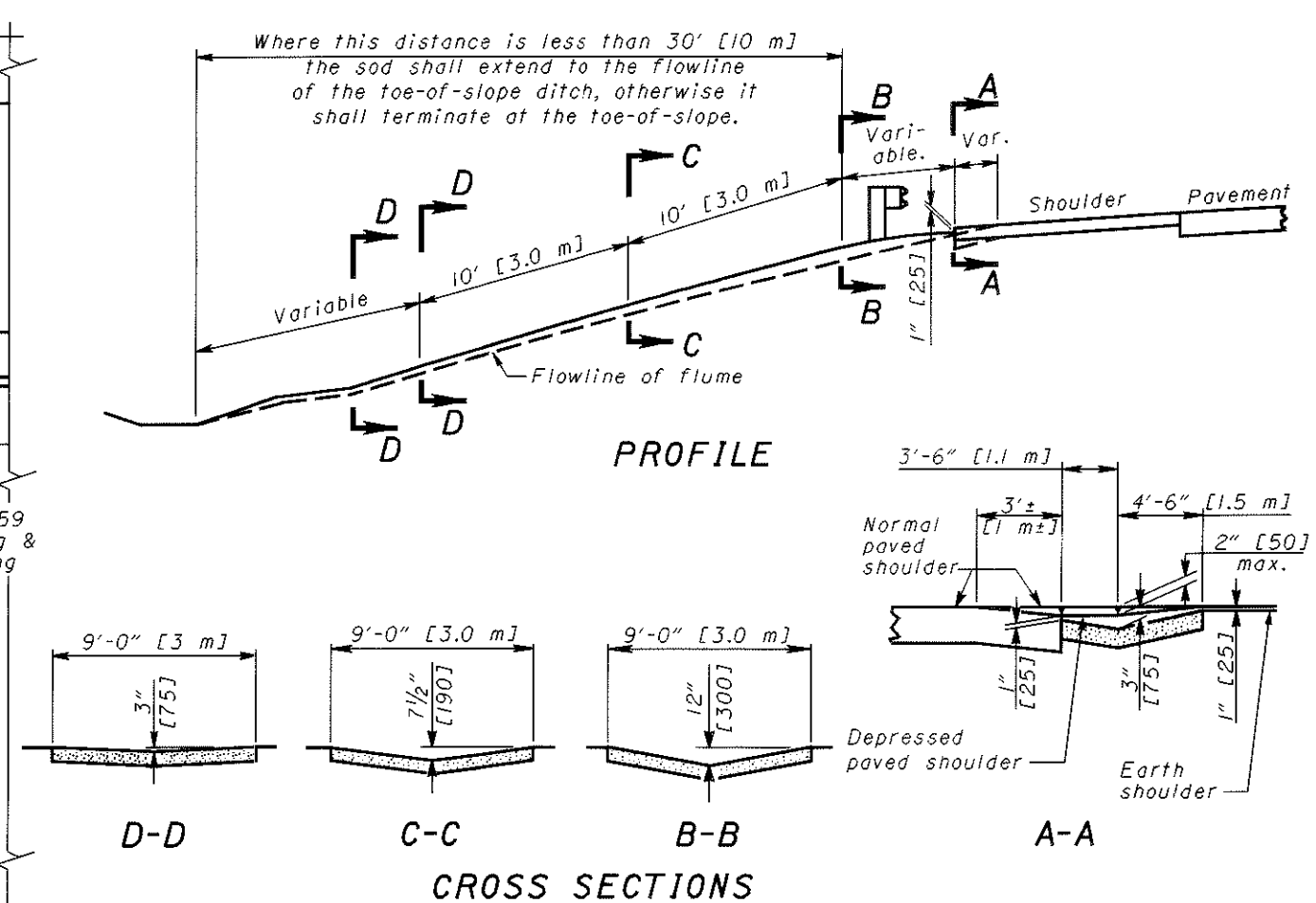
#5 Reinforcing bar L = 4'-1" S.B.L. & 3'-10" N.B.L.

The weight of the reinforcing steel shown is for informational purposes only. The cost of reinforcing steel, connectors and dowel bar extensions shall be included in their appropriate concrete items for payment.

See Sheet 26/27 for additional notes.



PLAN



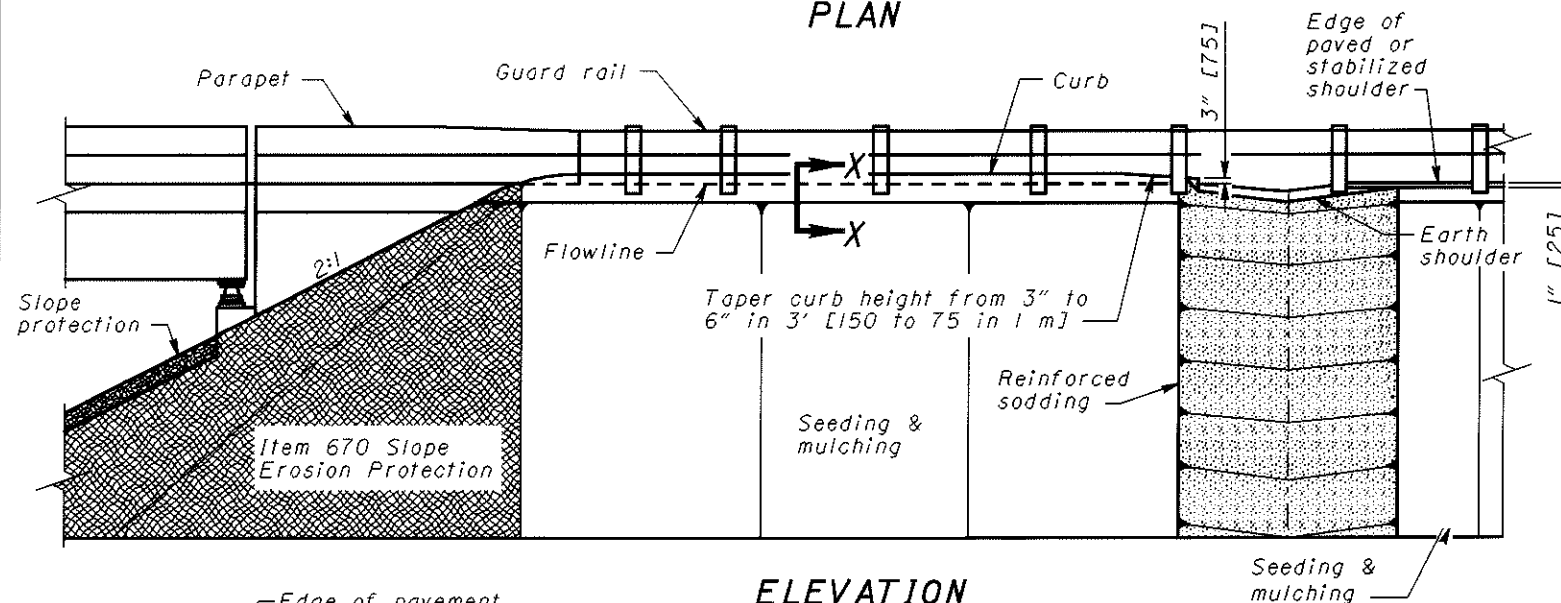
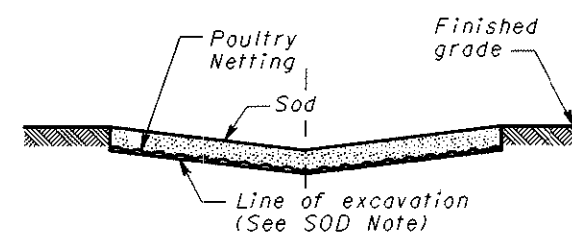
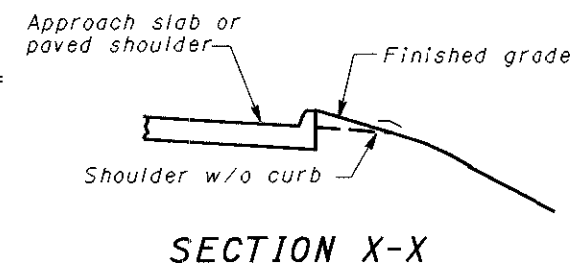
NOTES

DEPRESSED SHOULDER: This portion of the shoulder shall be depressed to ensure positive drainage into the sodded flume. It is especially important in the shoulder area to excavate and shape the subgrade according to the cross-sections.

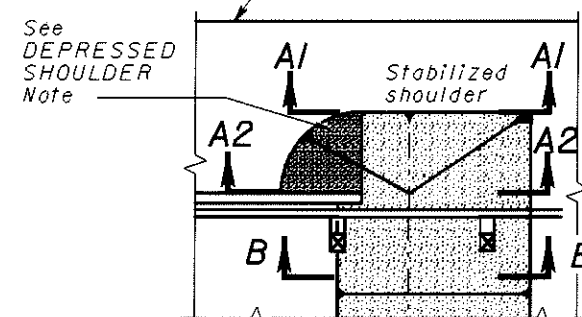
PLACING REINFORCED SODDING: Prior to placing the sod, galvanized poultry netting shall be placed on the finished subgrade. The netting shall be 4' [1.2 m] wide, poultry netting or equivalent, with 2" [50] mesh and No. 20 gage minimum wire. Each strand shall be staked securely to the subgrade by using T-shaped pins or 1"x1"x8" [25x25x200] wood stakes of the size stated in CMS 660.06. The stakes or pins shall be placed at 4' [1.2 m] intervals on the top and bottom and in rows 4' [1.2 m] apart. The poultry netting shall be fastened to the wood stakes with staples. Where the sodding is from 8' to 9' [2.5 to 3.0 m] wide, two strands of netting for a total width of 8' [2.4 m] is permitted.

SOD: Sod shall be laid in accordance with CMS 660. Special care shall be taken to excavate the sod bed to a proper depth so that the sod is flush with the surrounding grade.

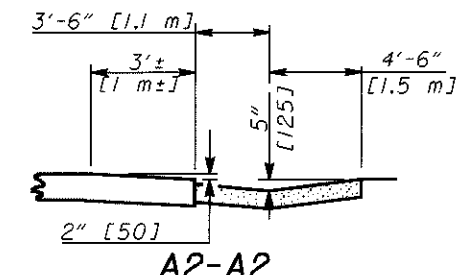
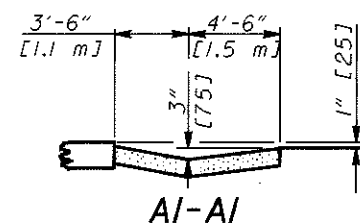
PAYMENT: Payment for all the above shall be included in the unit price bid for Item 660, Reinforced Sodding, Square Foot [Meter].



ELEVATION



STABILIZED SHOULDER DETAIL



THIS DRAWING REPLACES DM-4.1M DATED 6-30-95.

—	NUMBER	STANDARD ROADWAY CONSTRUCTION DRAWING EROSION CONTROL AT BRIDGES	ROADWAY ENGINEERING SERVICES	All metric dimensions (in brackets []) are in millimeters unless otherwise noted.	STDS. ENGR. D. Focke DRAWN D. Focke	REVISIONS	OHIO DEPARTMENT OF TRANSPORTATION <i>Lang T. Burkhead</i>	7-20-01	DATE
—									
—									

STRAW OR HAY BALES

NOTES

BALE PLACEMENT: Bales shall be tightly placed adjacently and entrenched 2" [50] to 3" [75] before staking; or a small amount of loose soil shall be lightly compacted along the upstream edge of the bales.

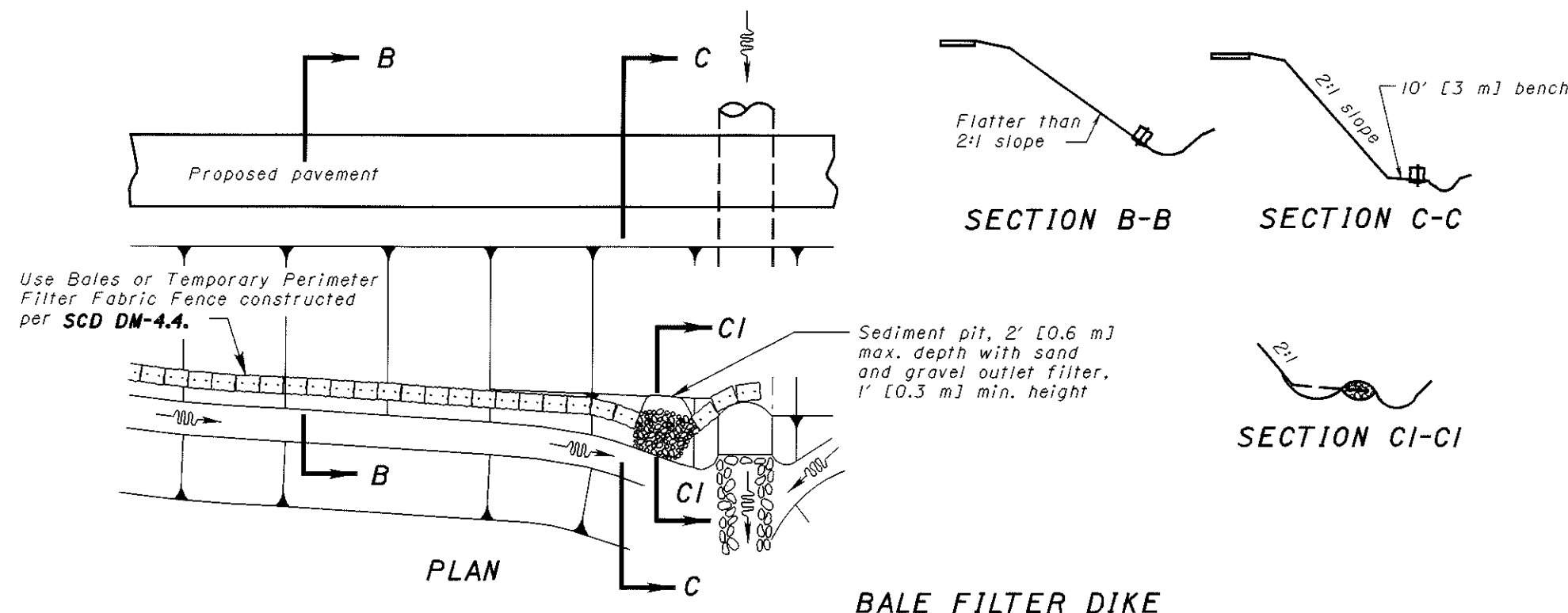
Each bale shall be firmly staked with a minimum of two stakes at least 3' [1 m] in length. Stakes shall be wooden 2"x2" [50x50], reinforcing bars, or fence posts.

Loose straw or hay shall be wedged between and under staked bales.

PITS: Sediment pits shall be provided and their cost included in the unit price bid for the adjacent SS 877 items.

MAINTENANCE: The maintenance or replacement will be paid for by the Department under unit bid prices, agreed unit price, or under CMS 109.04.

BASIS OF PAYMENT: Straw or hay bale installation shall be paid for under **Item 877 - Temporary Perimeter Filter Fabric Fence**. Cost will include placing, staking and removing.



SEDIMENT BASINS & DAMS

NOTES

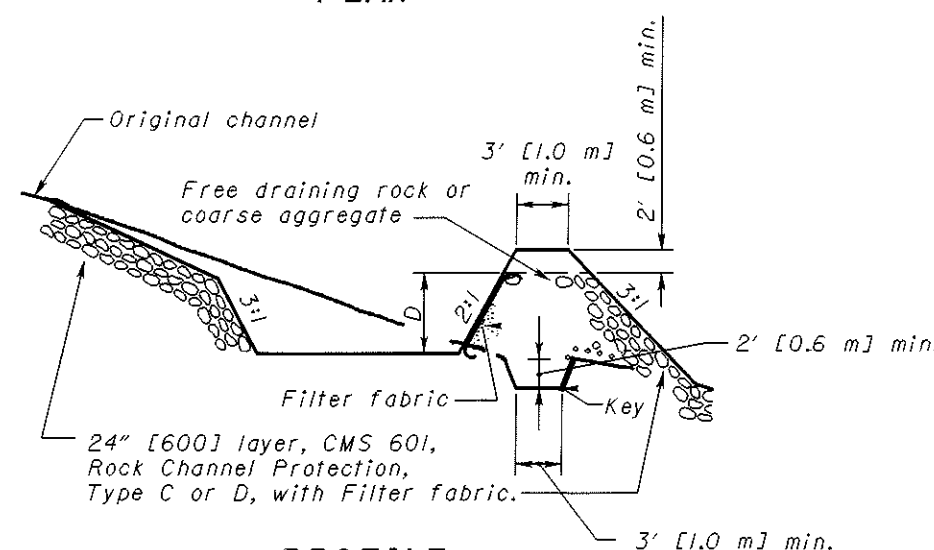
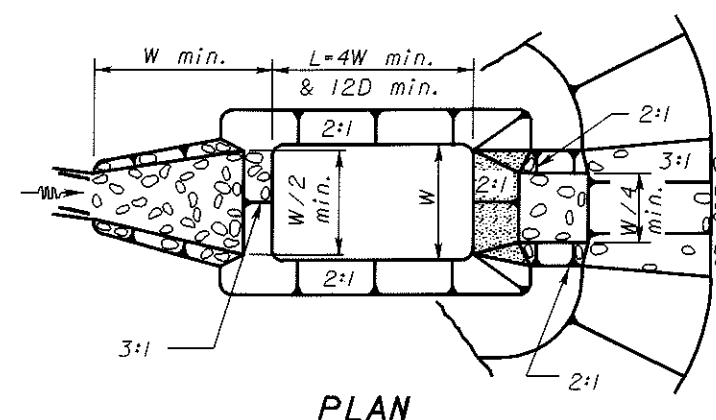
EMBANKMENT: Sediment basin embankment construction shall be per CMS 203.

FILTERS: Filter fabric shall be per CMS 601.02 and installed per CMS 601.08 or as detailed here. Such fabrics may be cleaned in lieu of replacement. The cost of all filter fabric required to construct the sediment basin or dam shall be included in the cost of Item 601, Rock Channel Protection, with Filter Fabric.

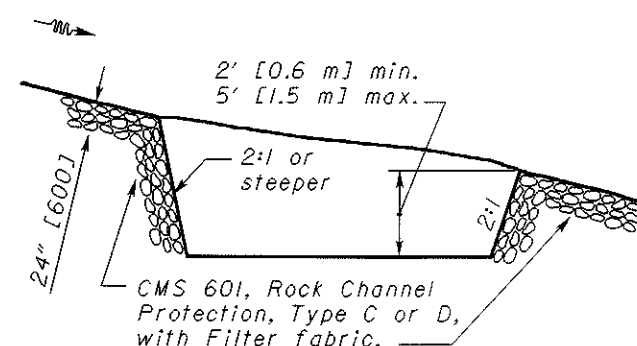
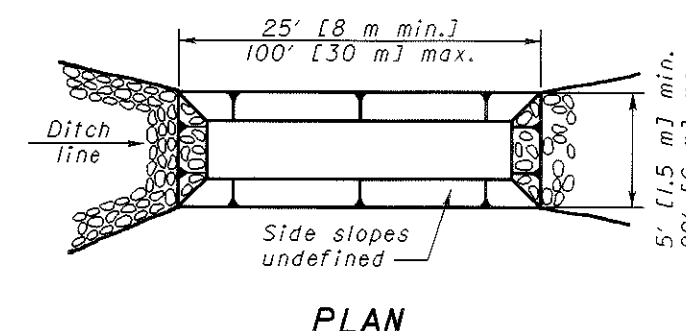
SIZE: The volume shown on the plans is the total storage volume required for the sediment basin or dam (67 cubic yards per acre [125 cubic meters per hectare]). A series of smaller basins or dams may be substituted for a larger basin or dam.

MAINTENANCE: Sediment pits, dams and basins shall be accept ably maintained. The maintenance or replacement costs will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

BASIS OF PAYMENT: Sediment Dams and Basins shall be paid for under **Item 877 - Temporary Dikes**. The pay quantity shall be the actual number of cubic yards [cubic meters] of excavation and embankment required to construct the basin or dam. Rock required shall be paid for under **Item - 601, Rock Channel Protection, Type C or D, with Filter**.



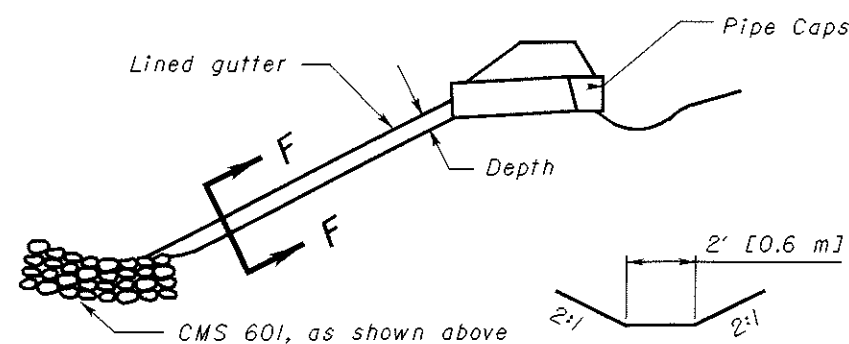
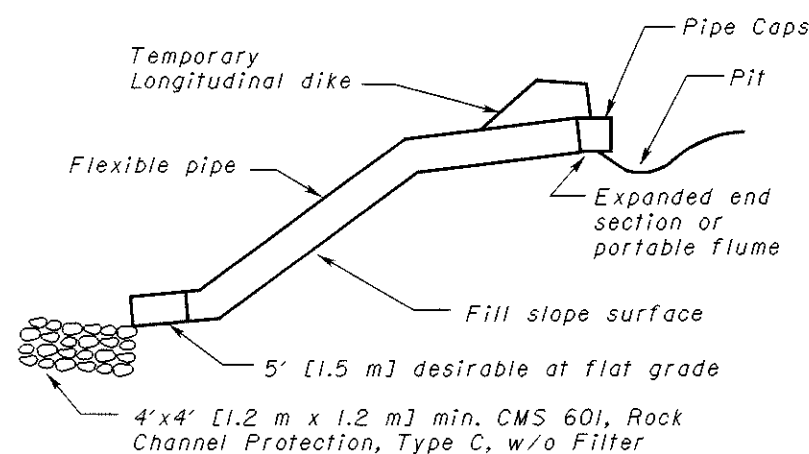
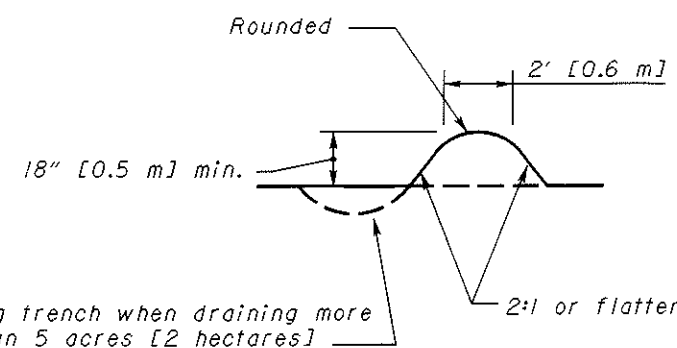
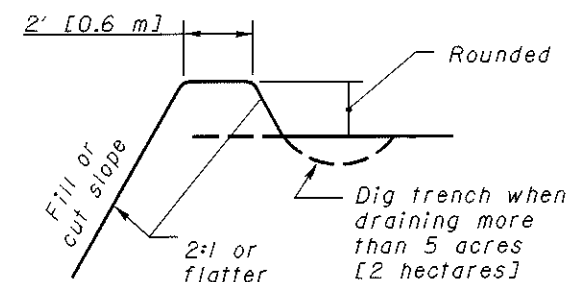
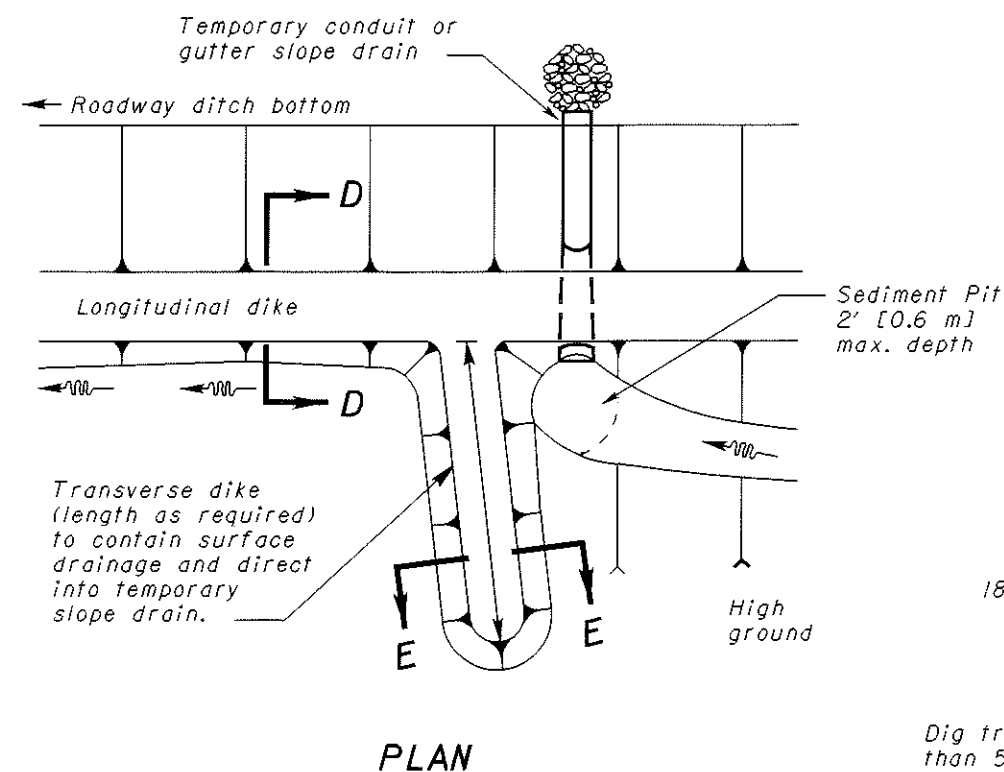
PROFILE
SEDIMENT DAM



PROFILE
SEDIMENT BASIN

STANDARD ROADWAY CONSTRUCTION DRAWING	ROADWAY ENGINEERING SERVICES	OHIO DEPARTMENT OF TRANSPORTATION
NUMBER DM-4.3	TEMPORARY EROSION CONTROL	REVISIONS 7-20-01
1/2		STDS. ENGR. D. Focke
		DRAWN D. Focke
		ROADWAY DESIGN ENGINEER
		DATE 4-29-99

DIKES AND SLOPE PROTECTION



NOTES

GENERAL: Dikes and drains shown shall be used when earthwork operations are higher than 8' [2.5 m] and fill operations are suspended for three weeks or more. Smaller dikes used at the end of a day's operation shall be considered as part of the earthwork. Temporary slope drains shall be suitably positioned and anchored to prevent movement or undermining.

LONGITUDINAL DIKES: Longitudinal dikes shall be constructed of suitable material as per CMS 203 and compacted to 85% of maximum density.

CONDUITS: Conduits for slope drains shall be corrugated steel pipe, corrugated or smooth plastic pipe, rubber conduit, or an approved equal.

GUTTERS: Gutters for slope drains shall be lined with Type C rock channel protection, crushed aggregate slope protection, portland cement concrete, bituminous concrete, plastic sheeting (on 4:1 maximum slopes), partial pipe sections or approved equal.

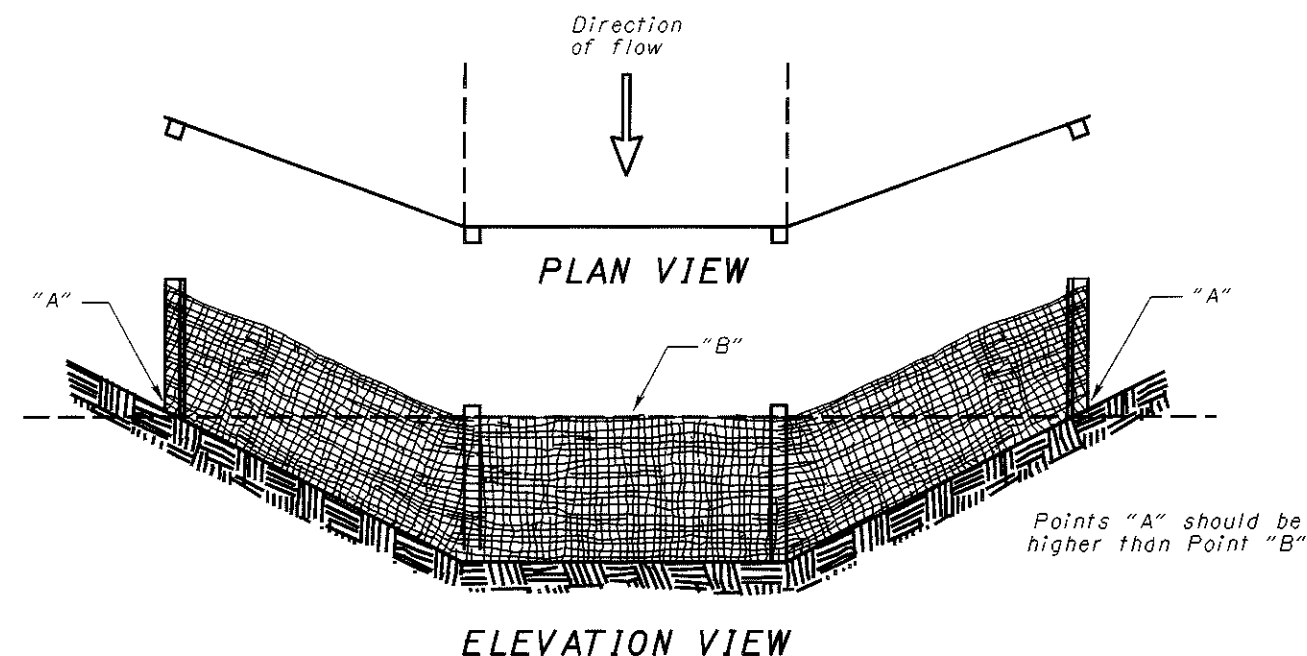
PITS: Sediment pits shall be provided and their cost included in the unit price bid for the adjacent items.

MAINTENANCE: Dikes and slope protection shall be acceptably maintained. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

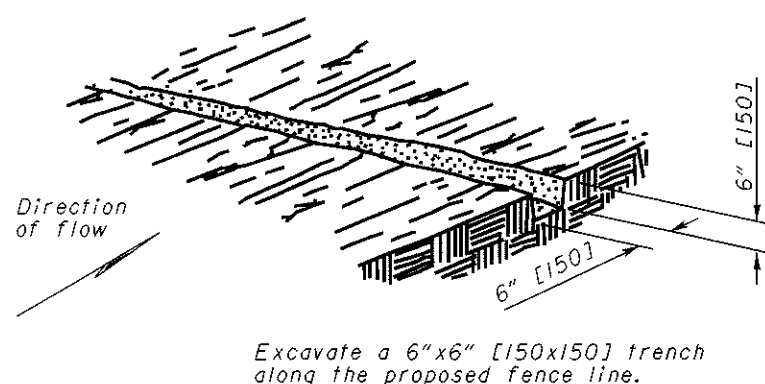
BASIS OF PAYMENT: Temporary dikes shall be paid for under **Item 877 - Temporary Dikes**. Temporary slope drains shall be paid for under **Item 877 - Temporary Slope Drains**. Rock required shall be paid for under **Item 60I - Rock Channel Protection, Type C, w/o Filter**.

TEMPORARY SLOPE DRAINS RECOMMENDED SIZES

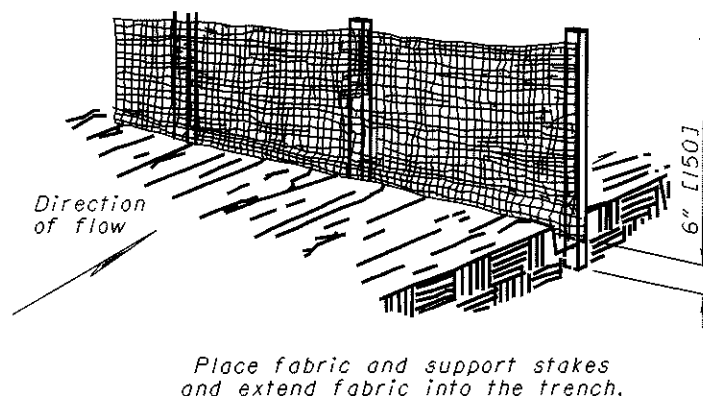
AREA In acres [hectares]	PIPE SIZES			GUTTER DEPTH
	Smooth	Corru- gated	Half- round	
0-4 [0-1.6]	6" [150]	6" [150]	18" [450]	8" [200]
4-8 [1.6-3.2]	8" [200]	12" [300]	18" [450]	8" [200]
8-12 [3.2-4.9]	10" [250]	15" [375]	21" [525]	12" [300]



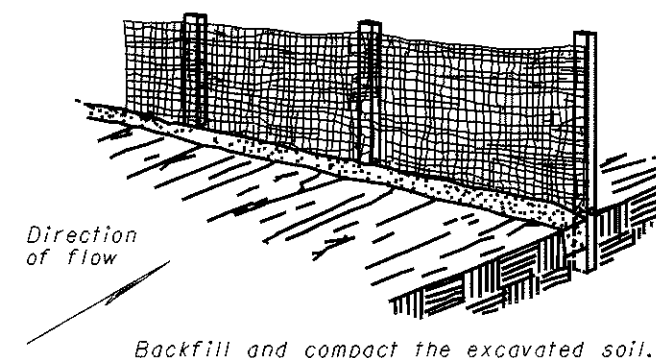
PLACEMENT AND CONSTRUCTION OF
DITCH CHECK FILTER FABRIC FENCE



STEP 1



STEP 2



STEP 3

PLACEMENT AND CONSTRUCTION OF PERIMETER FILTER FABRIC FENCE

NOTES

MATERIALS: Filter fabric shall meet the requirements of CMS 712.09, Type C. Support stakes shall be a minimum of 1 1/2" x 1 1/2" [38x38], nominal, and shall be hardwood of sound quality. The stakes shall be driven a minimum of 6" [150] below the bottom of the filter fabric. The maximum spacing between support stakes shall be 10' [3 m].

CONSTRUCTION: The bottom of the fabric shall be buried 6" [150] below the ground. The ends of adjacent sections of fence shall be overlapped with the end stake of each section wrapped together prior to installation. The ground elevation of the fence shall be held constant except that the end elevations shall be raised upslope to prevent flow around the end of the fence.

MAINTENANCE: The filter fabric fence shall be maintained to be functional. This shall include removal of trapped sediment and required cleaning, repair, and replacement of the filter fabric. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

PAYMENT: The cost of all materials, construction and removal shall be paid for under **Item 877 - Temporary Perimeter Filter Fabric Fence or Temporary Ditch Check Filter Fabric Fence, Linear Foot [Meter].**

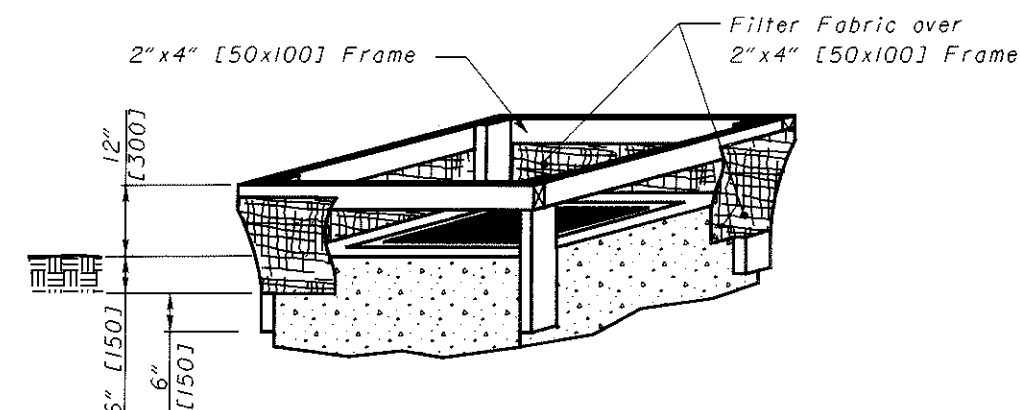
NOTES

MATERIALS: Filter Fabric shall meet the requirements of CMS 712.09, Type C. The framing wood shall be construction grade 2"x4" [50x100] lumber.

CONSTRUCTION: Excavate a 6" [150] deep trench around the inlet, then drive the 2"x4" [50x100] posts 6" [150] below the excavated trench. Construct the wooden frame using the overlap joint detail shown. The filter fabric shall be stretched around the wooden frame and securely fastened. The filter fabric shall overlap across one side of the inlet such that the ends of the filter fabric are not attached to the same post. Backfill and compact the excavated soil. Other devices may be used with the approval of the Director.

MAINTENANCE: The filter fabric shall be maintained to be functional. This shall include removal of trapped sediment and required cleaning, repair, and/or replacement of the filter fabric. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed prices, or under CMS 109.04.

PAYMENT: The cost of all materials, construction and removal shall be paid for under **Item 877 - Temporary Inlet Protection Filter Fabric Fence, Linear Foot [Meter].**



TEMPORARY INLET PROTECTION FILTER FABRIC FENCE

NO. 10	REVISIONS	STDS. ENGR.	ROADWAY ENGINEERING SERVICES	STANDARD ROADWAY CONSTRUCTION DRAWING	NUMBER
1	7-20-01	D. Focke	ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
2	4-29-99	D. Focke	ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
3			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
4			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
5			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
6			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
7			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
8			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
9			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4
10			ROADWAY ENGINEERING SERVICES	TEMPORARY EROSION CONTROL	DM-4.4

may be omitted if fence can be stretched taut without break and if omission and method of erection are approved by the Engineer.

3/4" [19] dia. Steel Rod

h/6

h/3

h/3

h/6

Bridge Abutment

6" [150] max.

h = Length of connecting rod

Technical drawing of a chain-link fence detail showing its connection to a bridge abutment. The fence is shown on the left, transitioning into a sloped section that meets a vertical wall labeled "Bridge Abutment". A horizontal dimension of 8'-0" [2.4 m] max. is indicated for the sloped section. The fence is supported by a "3/4" [19] dia. Steel Rod". The vertical spacing of the fence panels is divided into three equal sections, each labeled $h/3$, with a total height of h . The bottom of the fence is labeled "6" [150] max."

Diagram illustrating the connection of a steel connecting rod to a concrete structure using a self-drilling anchor.

Labels and Dimensions:

- $\frac{1}{2}$ " [13] eyebolt (galv.)
- $\frac{1}{2}$ " [13] dia. threaded self-drilling Anchor. Use three Anchors at each Connecting Rod.
- $\frac{3}{4}$ " [19] dia. Steel Connecting Rod (galv.)
- 6" [150] min. for abutment connections

Right-of-Way line

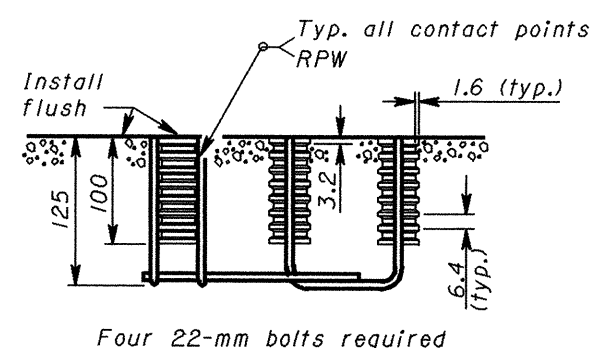
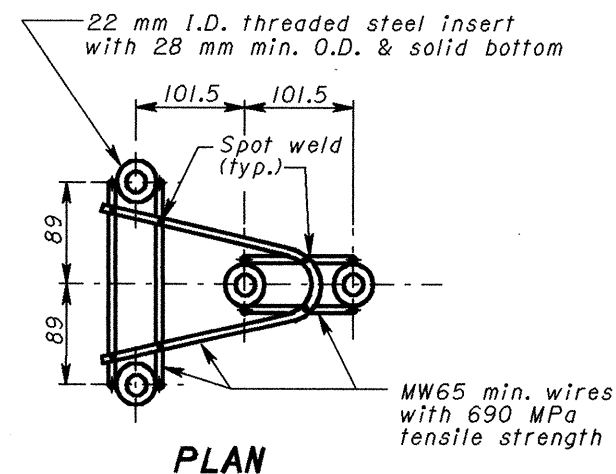
Fence

The diagram illustrates a road intersection. A horizontal road on the left meets a diagonal road on the right. A solid line with 'x' marks represents the 'Right-of-Way line'. A dashed line with 'x' marks represents the 'Fence'. The intersection area is marked with a dashed line and a solid line. A dashed line with a 'Q' at the end is also shown.

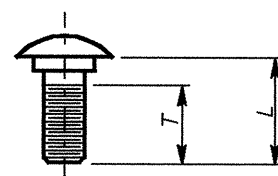
The diagram shows a road crossing a railway track. The road is represented by a solid line with a dashed center line. The railway track is represented by two parallel solid lines. A 'Right-of-Way line' is indicated by a dashed line with 'x' marks, running parallel to the road. A 'Fence' is shown as a line with 'x' marks, running parallel to the road and crossing the railway track. The diagram illustrates the relationship between the road, the railway track, and the boundary lines.

The diagram illustrates a right-of-way line and fence layout. A horizontal line at the top is labeled "Right-of-Way line" with an arrow pointing to it. Below this line, a series of 'x' marks represents a fence line. A section of the fence line is labeled "Fence" with an arrow. The fence line runs horizontally across the top of the diagram, then turns diagonally downwards to the right, and then turns horizontally again to the right. A diagonal line, possibly a road or a boundary, crosses the horizontal section of the fence line. Below the fence line, there is a horizontal rectangular area with a dashed line running through its center. At the bottom of the diagram, there is a dashed line with a small circle labeled "Q" next to it.

ROADWAY DESIGN ENGINEER *James T. Sutherland* DATE *1-28-00*



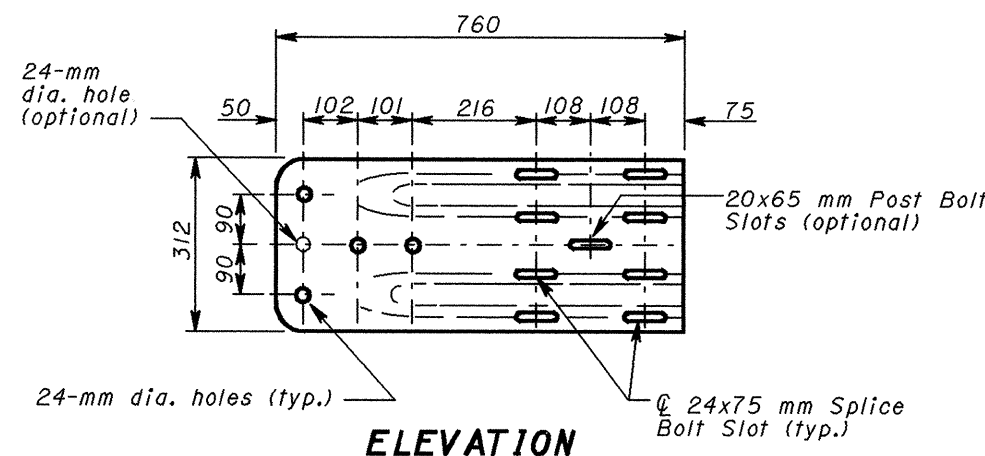
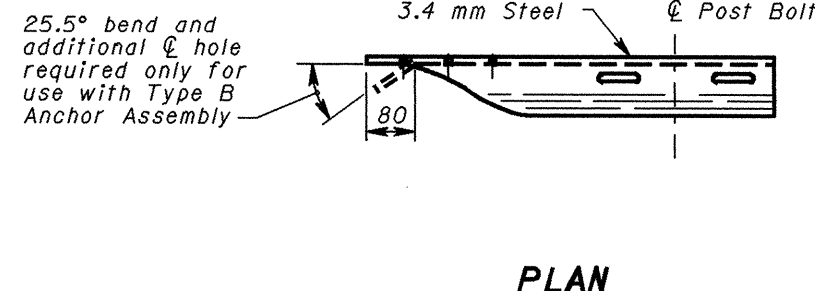
**CONCRETE INSERT ANCHOR ASSEMBLY
(W-BEAM ONLY)**



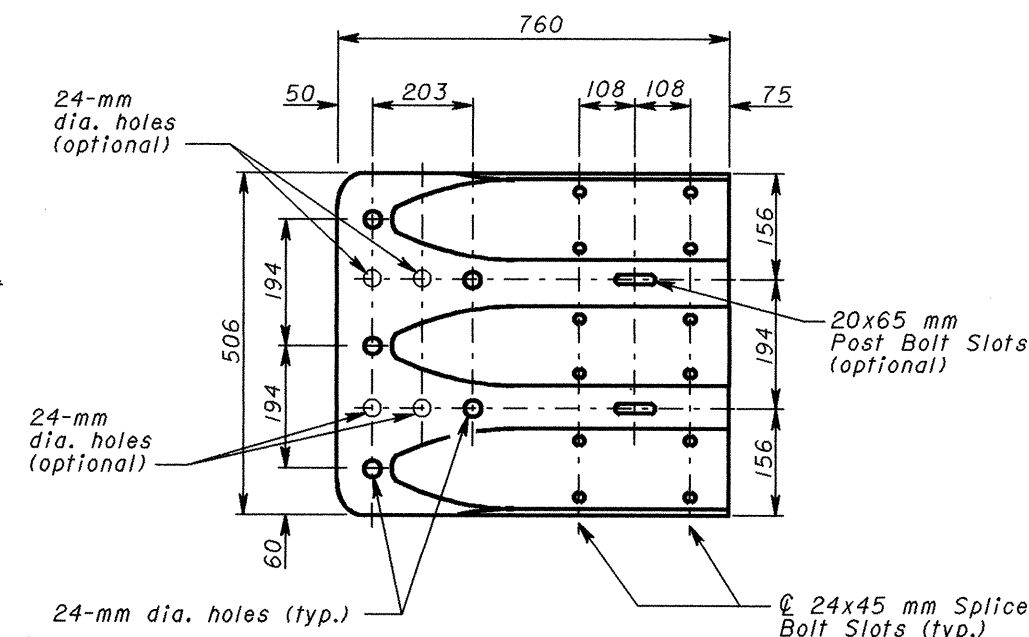
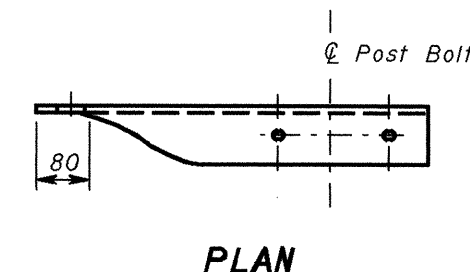
L (mm)	T min. (mm)	Bolt Use
455 (Standard Rail)	85	Type 5: WP/WB, PB
660 (Barrier Rail)	85	Type 5: WP/WB, PB
255	60	Type 4: WP Type 5: SP/WB, PB
50	35	Type 4: SP
32	Full	Splice Bolt

WP- wood post WB- wood blackout
SP- steel post PB- plastic blackout
Longer bolt may be needed for
round WP larger than 200 mm dia.

BUTTON HEAD BOLT
(For post and splice bolts)



W-BEAM TERMINAL CONNECTOR



THRIE-BEAM TERMINAL CONNECTOR

All dimensions are in millimeters
unless otherwise noted.



NOTE

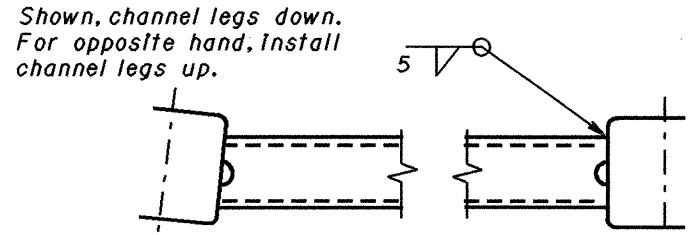
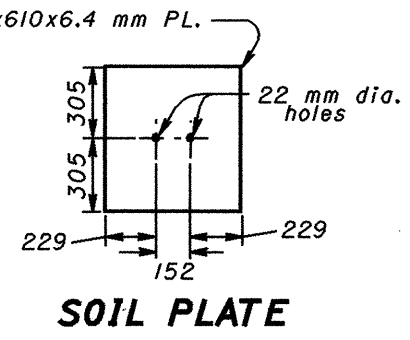
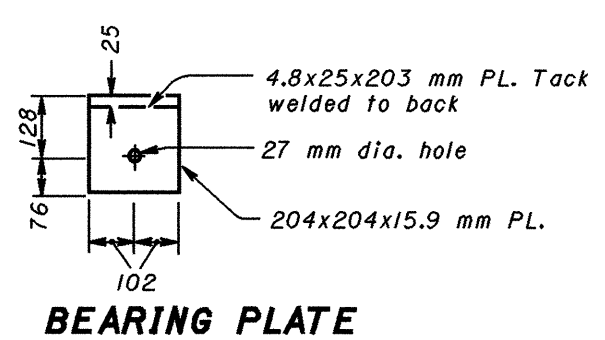
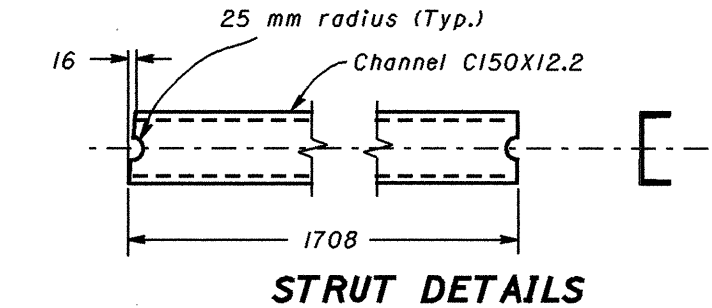
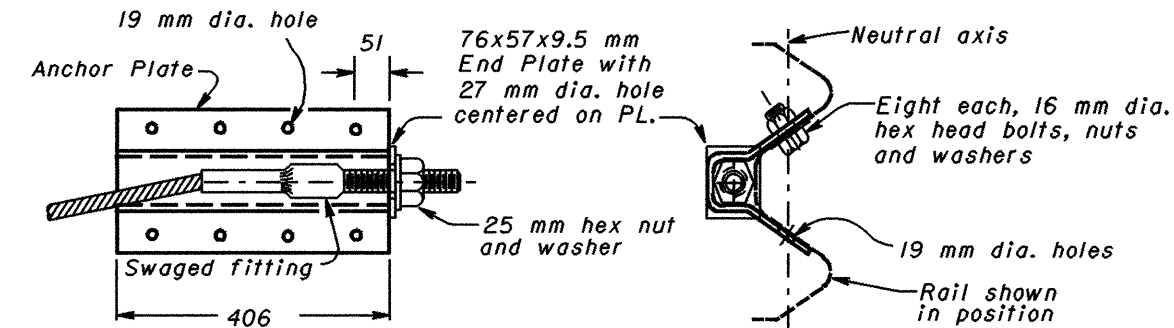
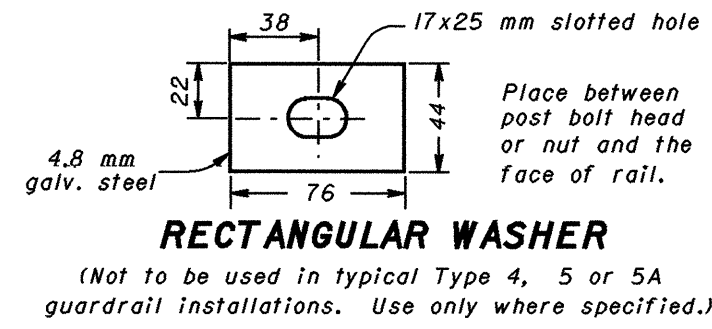
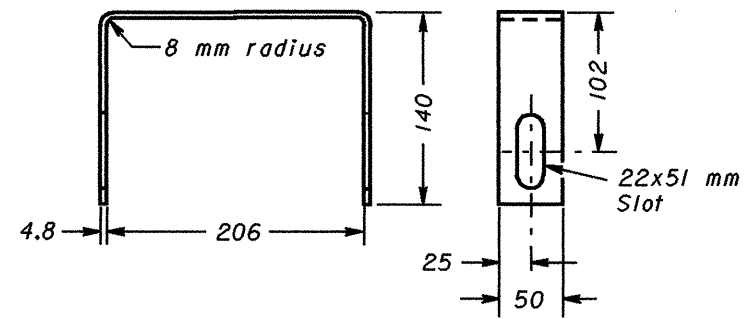
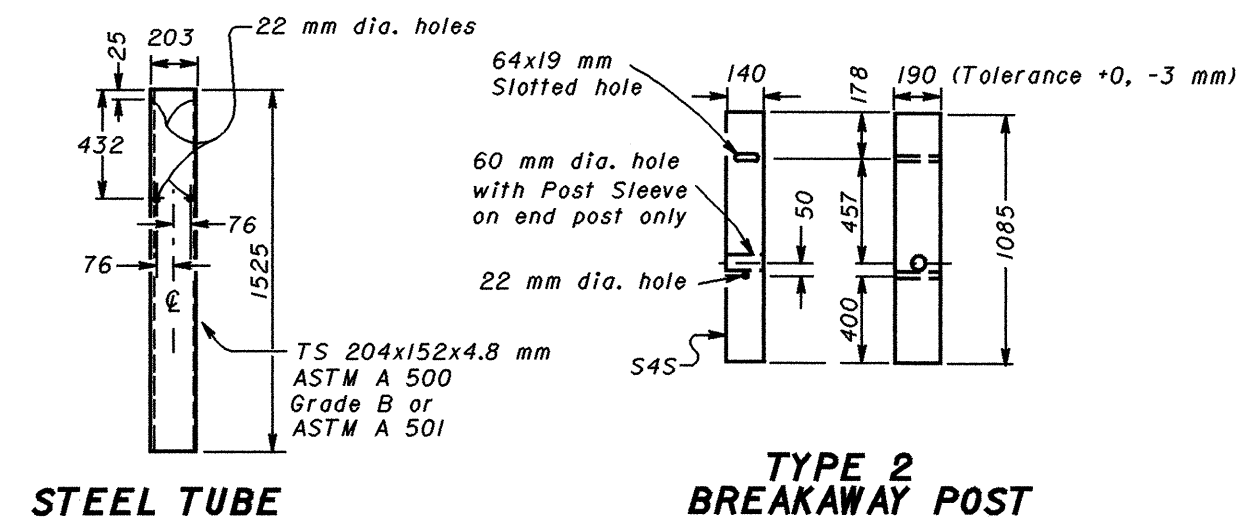
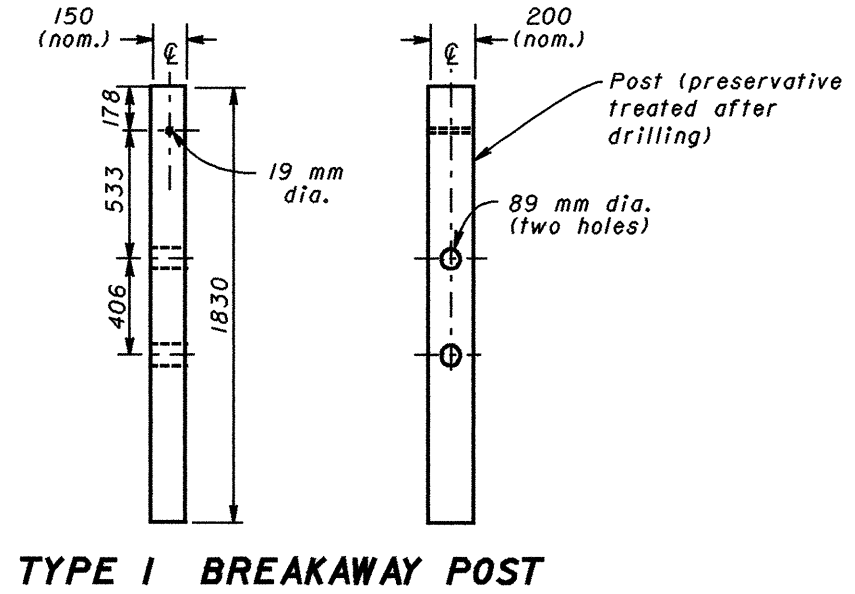
Refer to AASHTO M 180 for dimensional details of W-Beam and Thrie-Beam rail elements, related buffer and end sections, beam splices, post and splice bolts and nuts, and Type I W-Beam to Thrie-Beam Transition section.

OHIO DEPARTMENT OF TRANSPORTATION

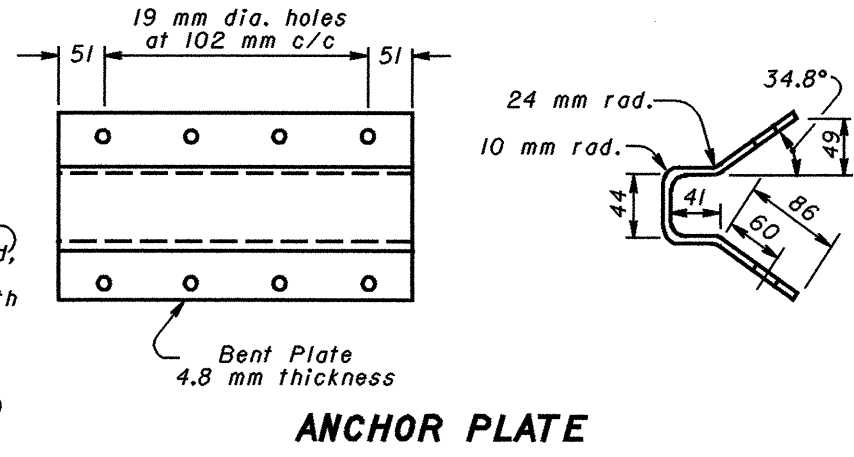
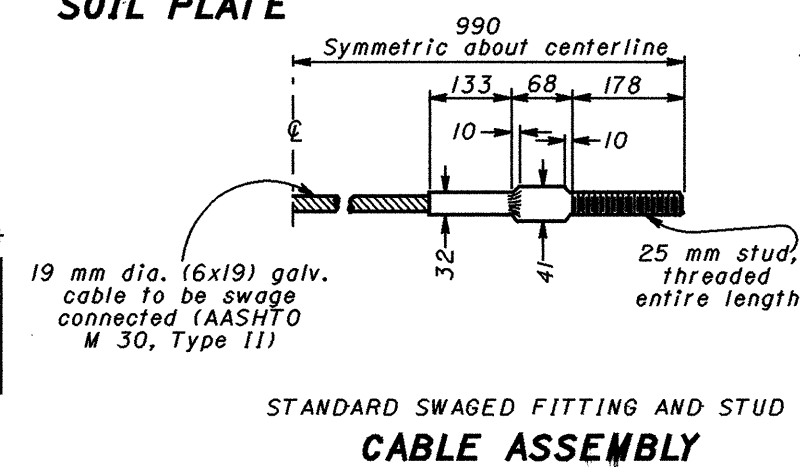
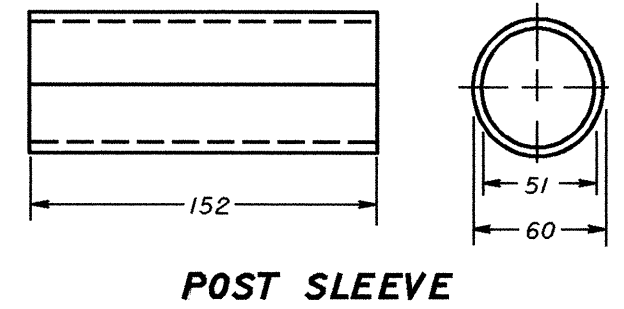
**GUARDRAIL
DETAILS**

DATE
11-30-94
10-21-97

**STANDARD
CONSTRUCTION
DRAWING** **GR-1.1M**
APPROVED *Randy T. Lathrop*



All dimensions are in millimeters unless otherwise noted.



BUREAU OF LOCATION AND DESIGN OHIO DEPARTMENT OF TRANSPORTATION	
GUARDRAIL DETAILS	
STANDARD CONSTRUCTION DRAWING	GR-1.3M
APPROVED <i>R. K. Huhman</i>	DATE 11-30-94
ENGR., L & D	

NOTES

POSTS: Posts may be round (standard single rail only) or 150x200 mm square-sawn pressure-treated wood or W150x13.5 galvanized steel. The same type post shall be used throughout the length of the project unless otherwise required by the plans or permitted by the Engineer. Round posts shall be 200 mm ± 25 mm in diameter at the top and not more than 75 mm larger at the butt with a uniform taper. Post may be set in drilled holes or may be driven to grade.

Wood posts shall be fabricated with square ends. Posts and blockouts shall be pressure-treated per CMS 710.14. Bolt holes shall be bored and the tops of posts shall be trimmed as shown, if required, after posts are set.

ALTERNATE BLOCKOUTS: Approved plastic blockouts may be used in lieu of the wood blockouts shown. The approved list is maintained by the Office of Materials Management.

WASHERS: Standard galvanized steel washers of the appropriate size shall be installed on the nut side of bolts through wood posts.

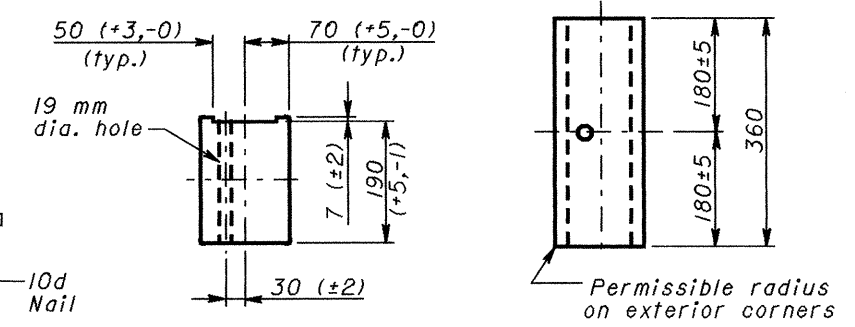
WELDED BEAMS: Welded beam guardrail posts may be used for Item 606, Guardrail, provided the web and flange sizes are as shown hereon. Welding of the web to the flanges shall conform to ASTM A 769M, Class 1 using Grade 36 steel (250 MPa yield point) with the following exceptions:

- Sec. 7.2 Test reports of tensile properties for each lot shall accompany each shipment.
- Sec. 12 Beams that have imperfections repaired by welding shall not be accepted for use in Item 606.
- Sec. 13 Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

*** POST EMBEDMENT DEPTH:** For specific depth requirements, see SCD GR-1.2M.

STEEL BEAM POSTS				
Size	Beam depth	Flange width	Flange thickness	Web thickness
Rolled W150x12.6	148 mm	100 mm	4.9 mm	4.3 mm
Rolled W150x13.5	150 mm	100 mm	5.5 mm	4.3 mm
Welded 150x12.6	152 mm	100 mm	4.9 mm	4.3 mm
Welded 150x13.5	152 mm	100 mm	5.5 mm	4.3 mm

MISCELLANEOUS: For details not shown see SCD's GR-1.1M and GR-1.2M.



PLAN
NOTCHED BLOCKOUTS FOR STEEL POSTS

OHIO DEPARTMENT OF TRANSPORTATION

DATE

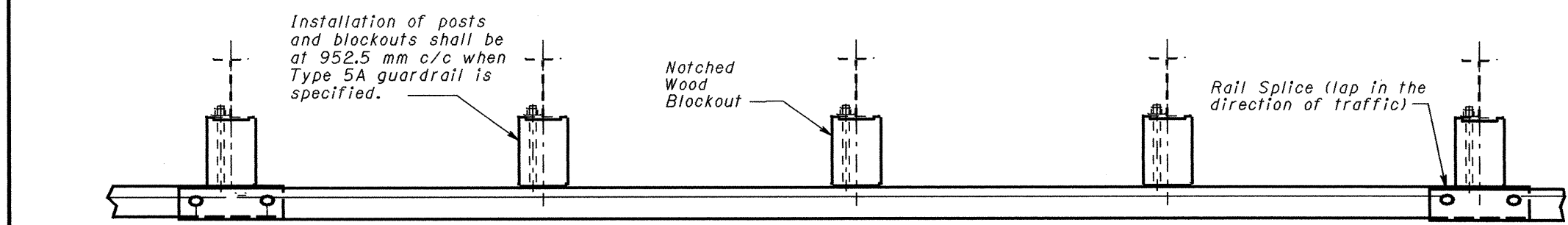
11-30-94
10-21-97
4-14-98

GUARDRAIL
TYPE 5 & 5A

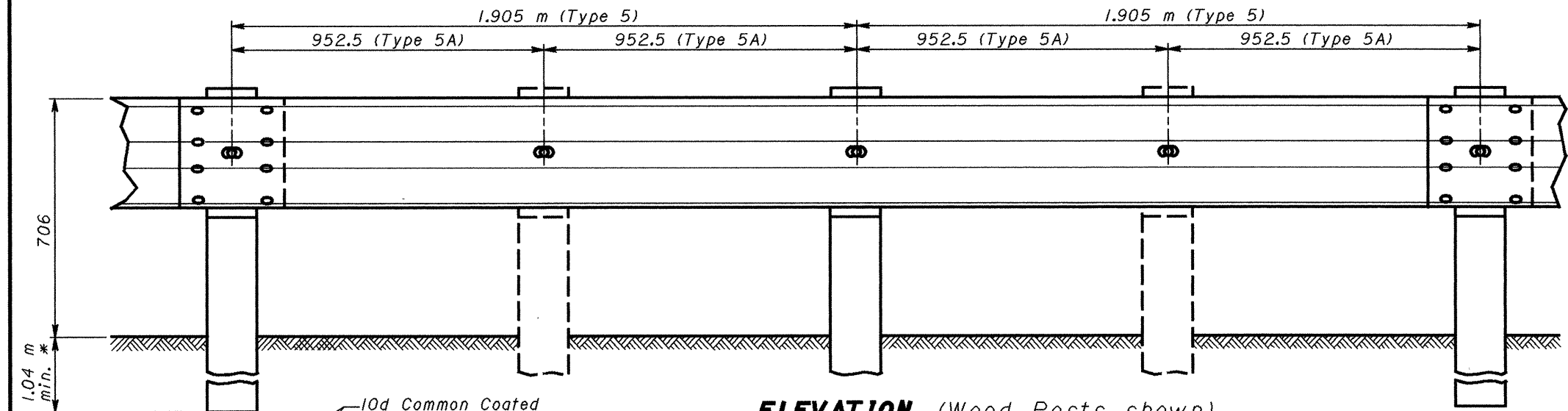
STANDARD
CONSTRUCTION
DRAWING

GR-2.1M

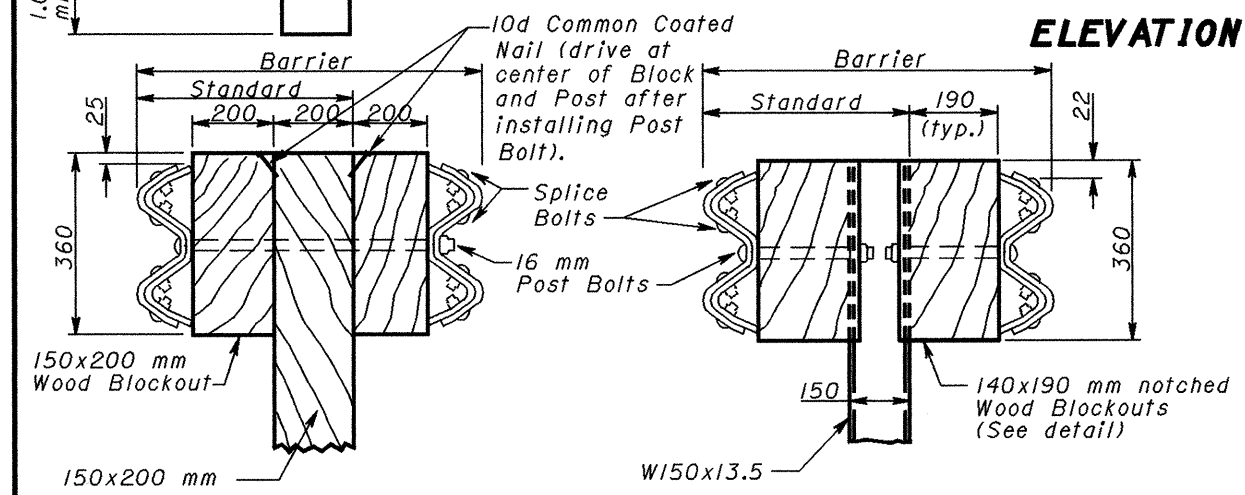
APPROVED *Louie T. Schuler*



PLAN VIEW (Steel Posts shown)

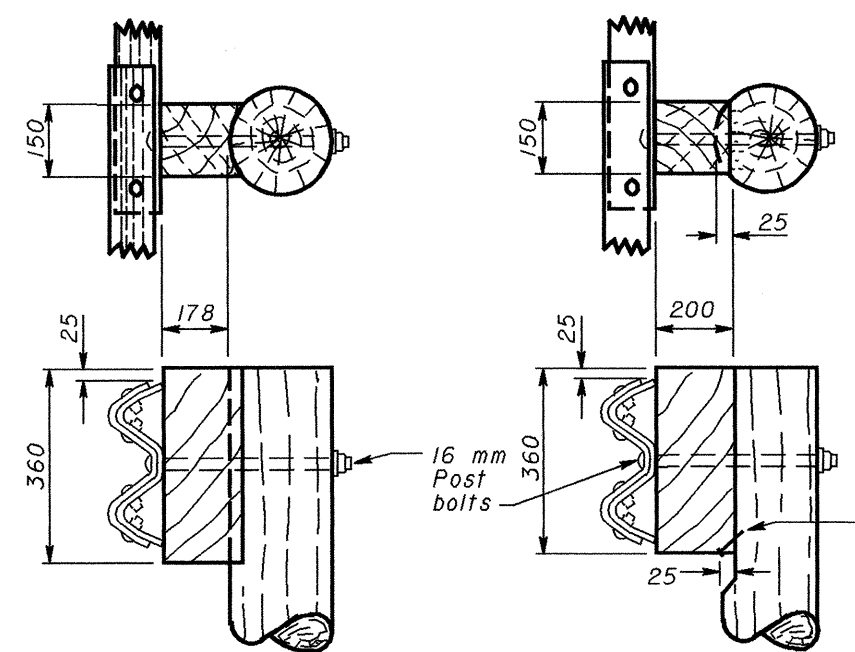


ELEVATION (Wood Posts shown)



SQUARE WOOD POST

STEEL POST

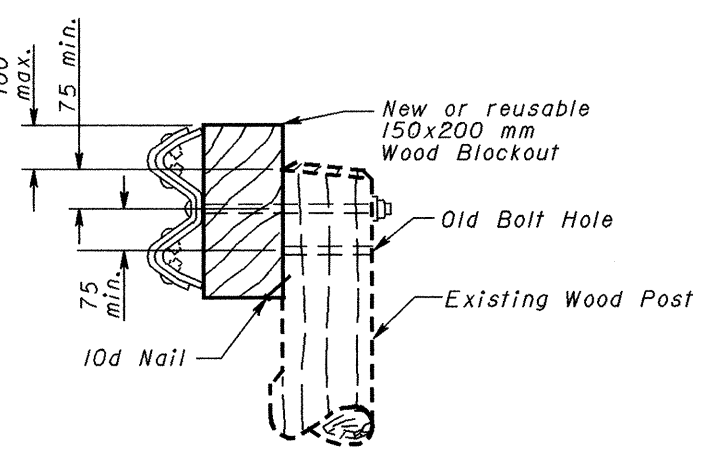


METHOD 1

METHOD 2

Alternate methods of placing the blockouts on round posts may be submitted for consideration and approved by the Engineer.

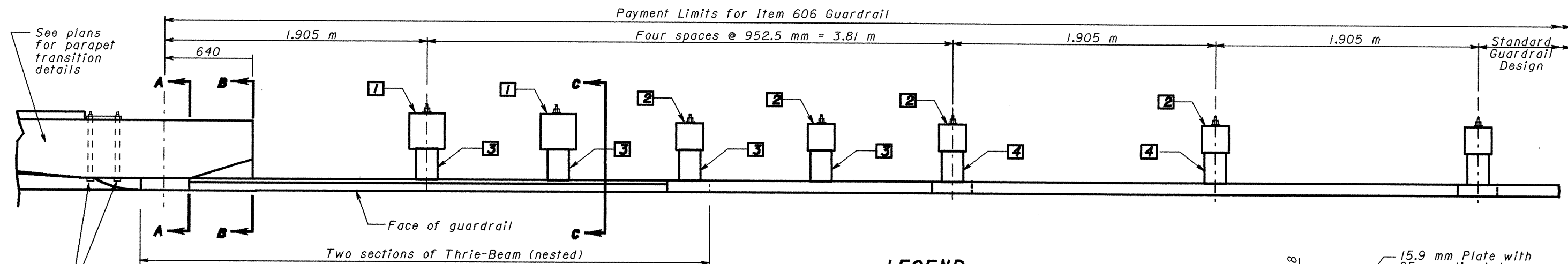
ROUND WOOD POSTS



WOOD POSTS WITH WOOD BLOCK
RAISING EXISTING GUARDRAIL HEIGHT

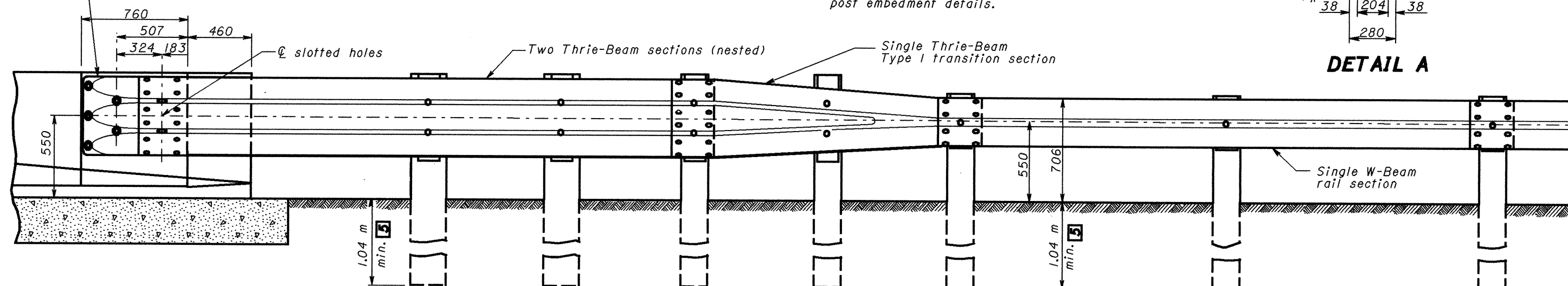
All dimensions are in millimeters unless otherwise noted.





22 mm dia. ASTM A 325M through bolts (length to be determined in field in accordance with parapet width) in 25 mm dia. holes with 464 x 280 x 15.9 mm plate with standard washers and hex nuts (See Detail A)

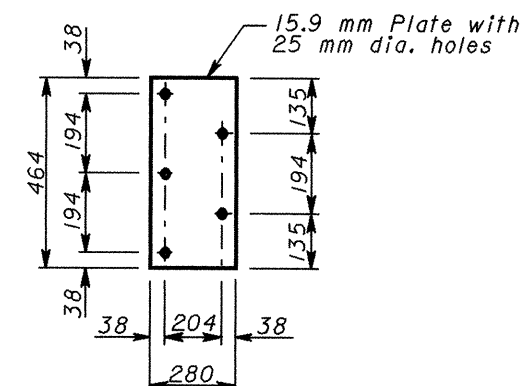
NOTE: The Thrie-Beam terminal connector shall be placed so that the lap is in the direction of traffic.



ELEVATION

LEGEND

- 1 250 x 250 mm wood post
- 2 200 x 200 mm wood post
- 3 150 x 200 x 570 mm wood blackout (See ALTERNATE POSTS AND BLOCKOUTS note)
- 4 150 x 200 x 355 mm wood blackout (See ALTERNATE POSTS AND BLOCKOUTS note)
- 5 See SCD GR-1.2M for additional post embedment details.



DETAIL A

All dimensions are in millimeters unless otherwise noted.

NOTES

GENERAL:

For additional details, see SCD's GR-1.1M, GR-1.2M and other drawings pertaining to the design of specific guardrail types.

APPLICATION:

The Type I Bridge Terminal Assembly shall be used to connect guardrail runs to bridges having concrete deflector parapet railing. It shall be used to connect guardrail runs to the approach end of bridge parapets or other concrete barrier installations and to anchor guardrail runs to the trailing end of bridge parapets or other concrete barrier installations on undivided, bidirectional highways.

POSTS:

GENERAL - Posts may be set in drilled holes or driven to grade.

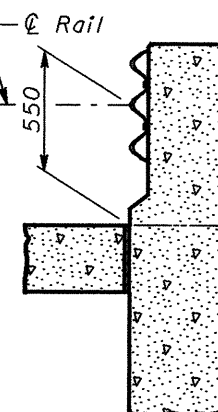
WOOD POSTS - shall be square sawed pressure treated wood as per CMS 710.14 and fabricated with square ends. Bolt holes shall be bored and tops of posts trimmed, if required, after posts are set.

ALTERNATE POSTS AND BLOCKOUTS for Type I Bridge Terminal Assemblies may be furnished according to the following chart. Plastic blockouts shall not be permitted for Type I Bridge Terminal Assemblies.

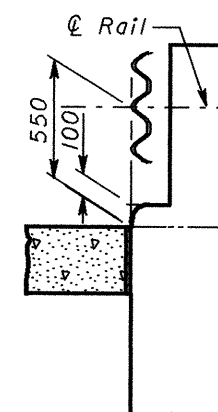
Wood Posts & Blockouts	250x250 mm	200x200 mm
Steel Posts	W200x35.9	W150x37.1
Wood Blockouts	150x200 mm	
Steel Blockouts	W150x13.5	

PAYMENT:

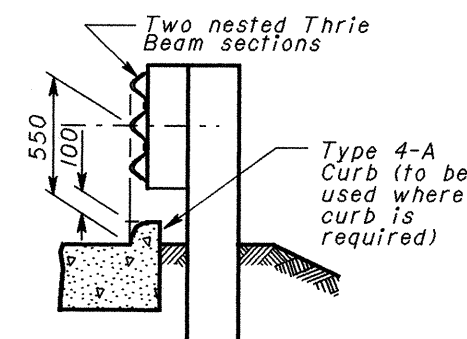
Payment for Item 606 - Each, Bridge Terminal Assembly, Type I, shall include the extra cost, in excess of normal guardrail cost, for additional and different type posts and blockouts, nested Thrie-Beam sections, terminal connector, Thrie-Beam transition section, steel plate, bolts, hex nuts, washers, and other hardware.



SECTION A - A



SECTION B - B



SECTION C - C



metric units

This Drawing Replaces GR-3.1.

OHIO DEPARTMENT OF TRANSPORTATION

BRIDGE TERMINAL ASSEMBLY, TYPE 1

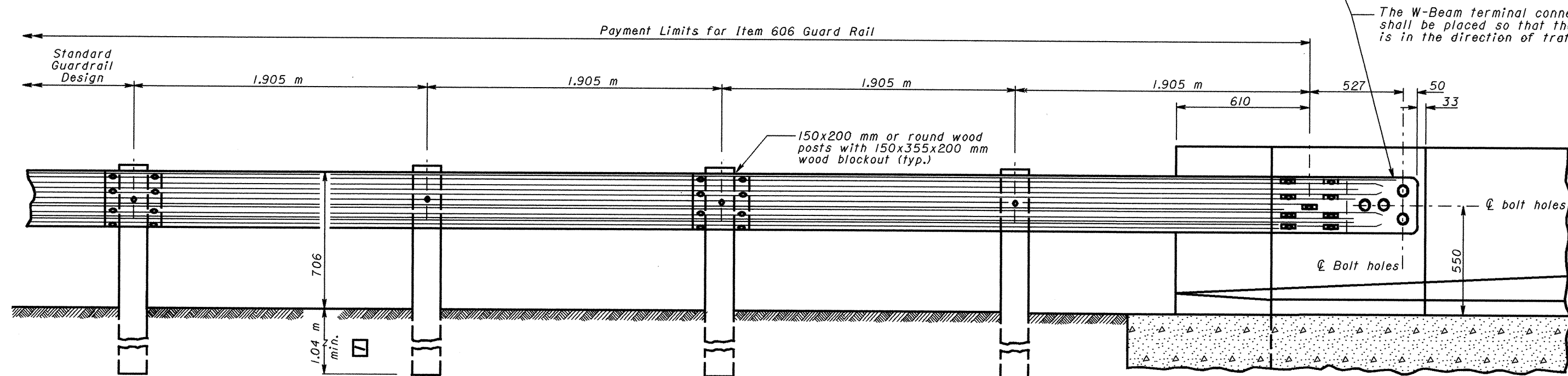
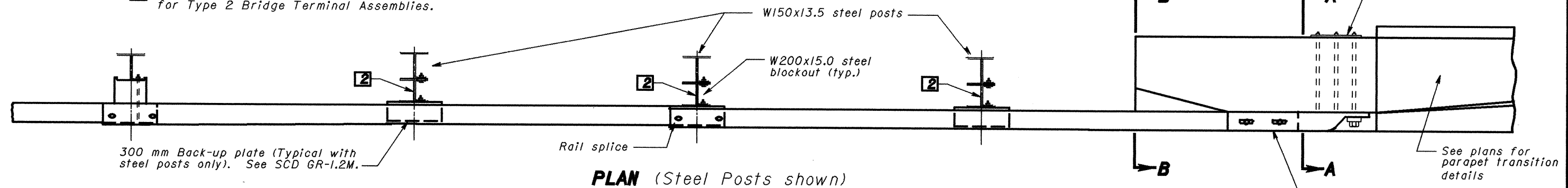
DATE
11-30-94
10-21-97

STANDARD CONSTRUCTION DRAWING GR-3.1M

APPROVED

LEGEND

- 1 See SCD GR-1.2M for additional post embedment details.
- 2 Plastic blockouts shall not be permitted for Type 2 Bridge Terminal Assemblies.



NOTES

GENERAL:

For additional details, see SCD's GR-1.1M, GR-1.2M and other drawings pertaining to the design of specific guardrail types.

APPLICATION:

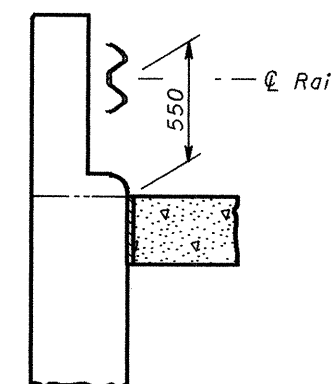
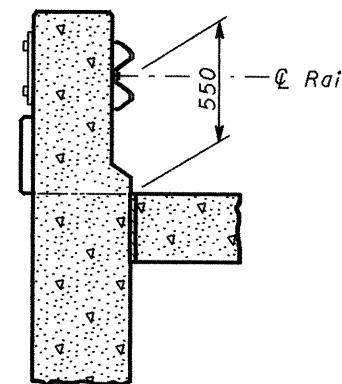
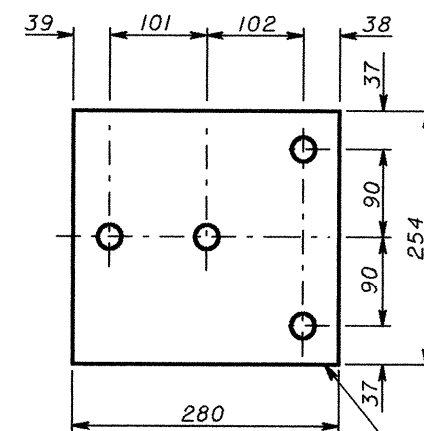
The Type 2 Bridge Terminal Assembly shall be used to connect guardrail runs to the trailing end of bridge parapets or other concrete barrier installations on one-direction roadways.

POSTS:

Posts shall be of standard size and material specified for the appropriate type of guardrail to be installed leaving the bridge or barrier.

PAYMENT:

Payment for Item 606 - Each, Bridge Terminal Assembly, Type 2 shall include the extra cost, in excess of normal guardrail cost, for the terminal connector, steel blockouts, plates, bolts, hex nuts, washers and other hardware.



All dimensions are in millimeters unless otherwise noted.



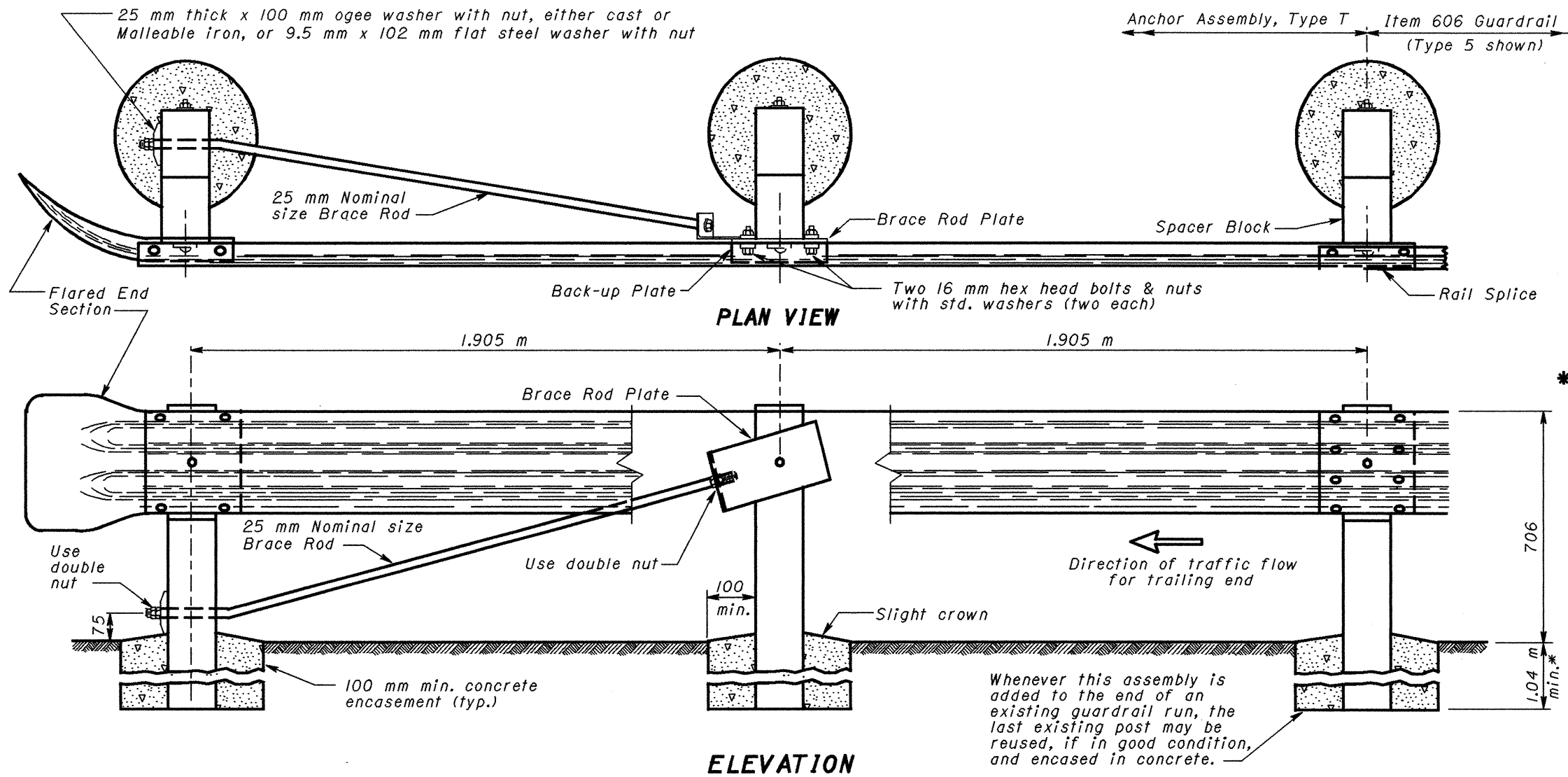
This Drawing Replaces GR-3.2.

OHIO DEPARTMENT OF TRANSPORTATION

**BRIDGE TERMINAL
ASSEMBLY, TYPE 2**

DATE
11-30-94
10-21-97

STANDARD
CONSTRUCTION
DRAWING
GR-3.2M
APPROVED *[Signature]*



NOTES

FOR DETAILS NOT SHOWN: See SCD's GR-1.1M, GR-1.2M and other Drawings pertaining to design of specific guardrail types.

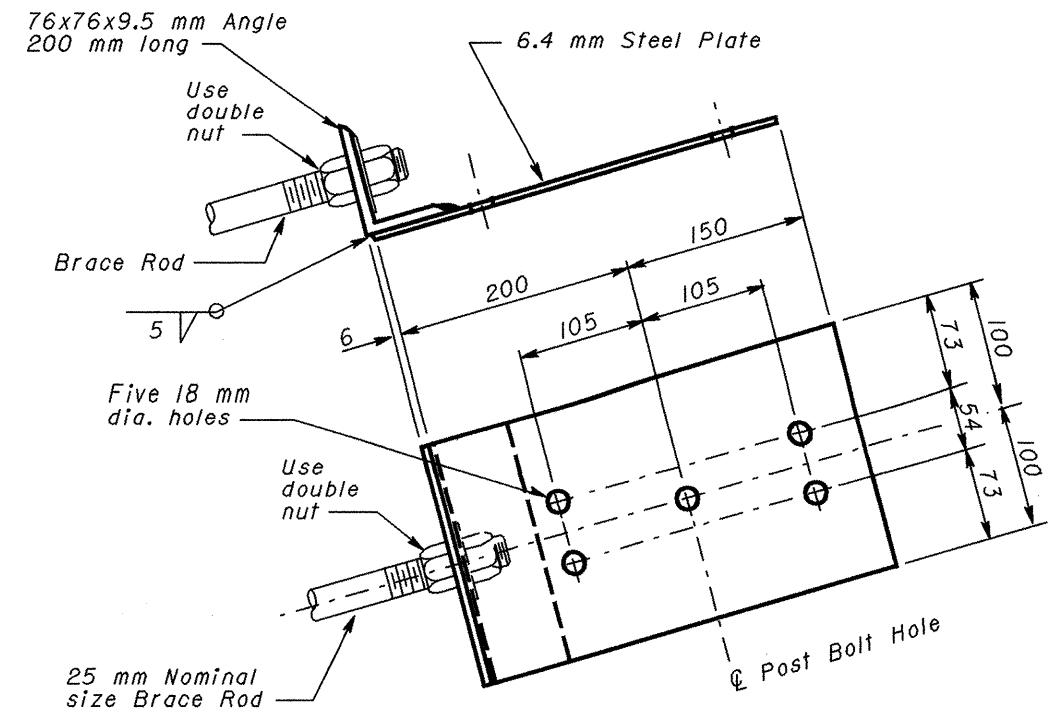
WASHERS: All washers indicated are standard galvanized steel of the appropriate size.

POSTS: Posts shall be the same as used on the adjacent guardrail, with 100 mm minimum concrete encasement.

SPACER BLOCKS: Blocks may be notched in the field, in a manner satisfactory to the Engineer, to accommodate the installation of the brace rod plate 16 mm attachment bolts.

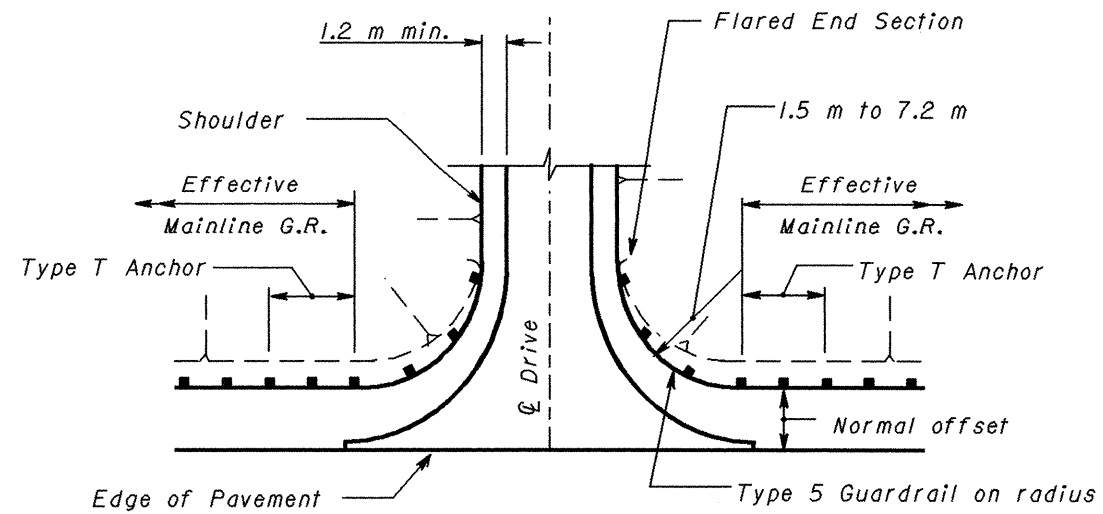
BRACE ROD ASSEMBLY: Rods shall be galvanized and develop a tensile strength of at least 178 kN.

*** FOR SPECIFIC POST EMBEDMENT:** See SCD GR-1.2M for depth requirements.



BRACE ROD PLATE

TYPE T

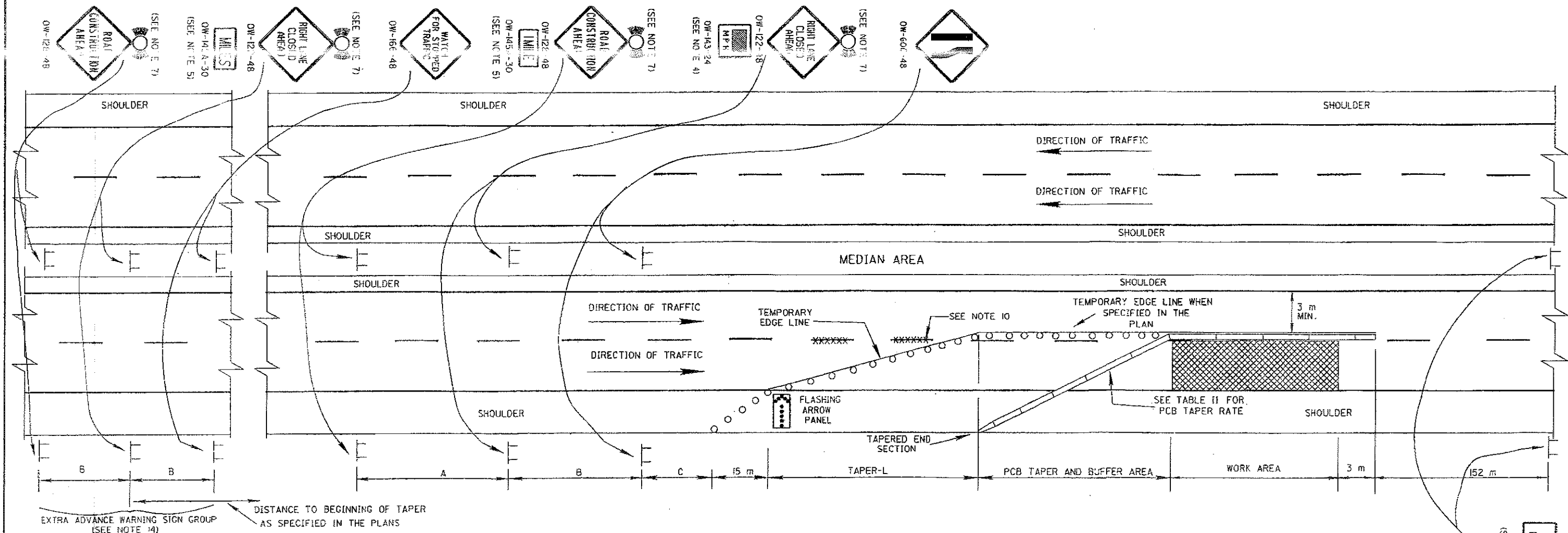


DRIVEWAY OPENING

All dimensions are in millimeters unless otherwise noted.



OHIO DEPARTMENT OF TRANSPORTATION	
TYPE T ANCHOR ASSEMBLY	DATE 4-21-95 10-21-97
STANDARD CONSTRUCTION DRAWING GR-4.2M	
APPROVED <i>[Signature]</i>	



GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.
2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61m CLEARANCE TO EXISTING SIGNS.
3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER AND THE BUFFER AREA. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.
4. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.
5. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE MERGING TAPER (L). DISTANCES LESS THAN ONE MILE MAY BE EXPRESSED IN FEET THE PLAQUE MAY BE OMITTED IF EXTRA ADVANCE SIGN GROUPS ARE NOT USED.
6. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.
7. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-122 SIGNS ARE REQUIRED.
8. WHEN WORK IS BEING PERFORMED IN THE LANE ADJACENT TO THE MEDIAN ON A DIVIDED HIGHWAY, OW-123 SIGNS SHALL BE SUBSTITUTED FOR THE OW-122 SIGNS AND OW-60C SIGNS SHALL BE SUBSTITUTED FOR THE OW-60C SIGNS.

9. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.
10. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMs) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05, TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.
11. THE OC-8 SIGNS MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
12. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C (MAX.) TOP MOUNTED OBJECT MARKERS (229 X 381 mm) @ 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C VERTICAL STRIPES ON PADDLES SIX 305 mm @ 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS @ 3.8 m C-C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381 mm) TOP MOUNTED @ EACH END
13. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMP AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

14. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERECTED AT THE DIRECTION OF THE ENGINEER.
15. THE SPEED LIMIT CHOSEN FOR DESIGN OF TAPERS SHALL BE THE NORMAL LEGAL SPEED EXCEPT WHERE THE LEGAL SPEED LIMIT IS REDUCED DUE TO THE CONSTRUCTION AND THE SUBJECT LANE CLOSURE IS NOT THE FIRST ACTIVE CONSTRUCTION AREA ENCOUNTERED BY TRAFFIC WITHIN THE PROJECT.
16. NO EQUIPMENT OR MATERIAL SHALL BE LOCATED OTHER THAN BEHIND THE PCB.

LEGEND

DRUMS	○ ○ ○ ○ ○ ○
PORTABLE CONCRETE BARRIER (PCB)	▬
REMOVE EXISTING MARKINGS	XXXXXXXXXX

TABLE I

MINIMUM DISTANCE METERS	A	B	C
MAJOR STANDARD	152	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

TABLE II

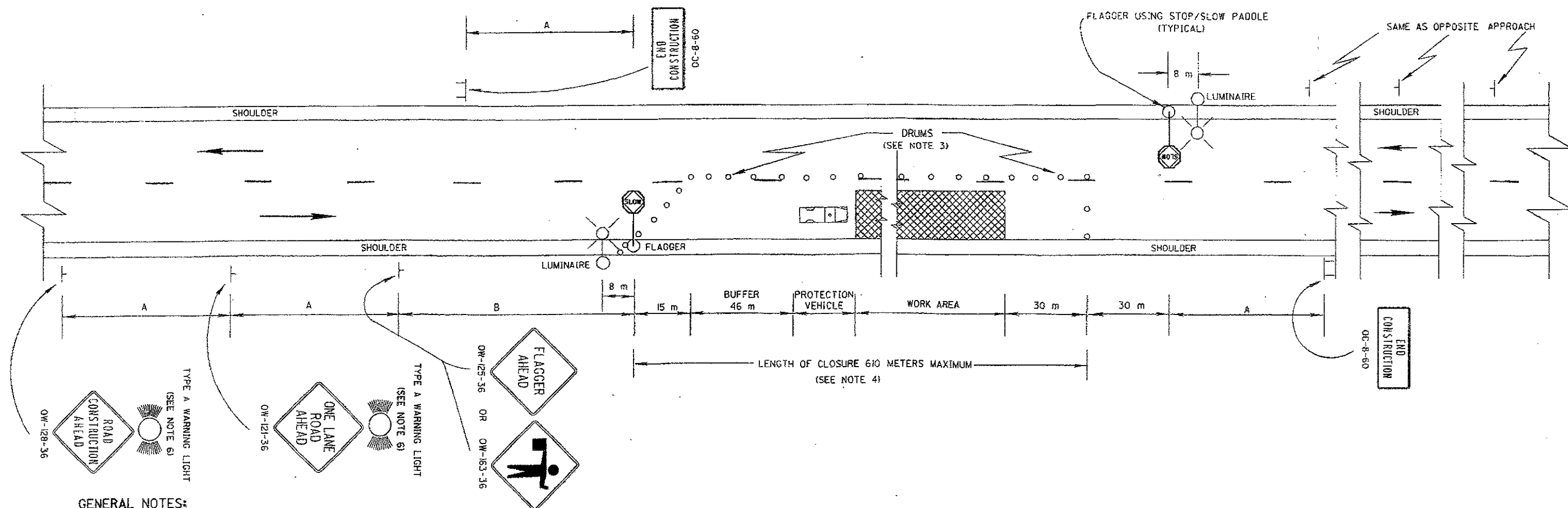
SPEED LIMIT (MPH) *	MINIMUM DRUM TAPER (L) METERS	MAXIMUM SPACING (S) OF DRUMS METERS	PCB TAPER RATE
30-40	98	12	11:1
45-55	201	12	16:1
60-65	238	18	19:1

* SEE NOTE (15)

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES DIVISION OF HIGHWAYS OHIO DEPARTMENT OF TRANSPORTATION	
MAINTENANCE OF TRAFFIC	DATE
CLOSING RIGHT OR LEFT LANE OF A MULTI-LANE DIVIDED HIGHWAY WITH PORTABLE CONCRETE BARRIER	04/25/94
STANDARD CONSTRUCTION DRAWING MT-95.40M	
APPROVED <i>John L. Ingram</i> ENGR. OF DESIGN SERVICES	



GENERAL NOTES:

1. THE LOCATION OF THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT. THE DISTANCES SHOWN ARE MINIMUMS. DISTANCE B MAY ALSO BE INCREASED, PRIOR TO IMPLEMENTATION OF THE CLOSURE OR AFTER IT IS IN EFFECT, AS DIRECTED BY THE ENGINEER FOR SUCH OCCURENCES AS LONG TRAFFIC BACKUPS.
2. FLAGGERS, ONE FOR EACH DIRECTION SHALL BE USED TO CONTROL TRAFFIC CONTINUOUSLY FOR AS LONG AS A ONE LANE OPERATION IS IN EFFECT. THE FLAGGERS SHALL BE ABLE TO COMMUNICATE WITH EACH OTHER AT ALL TIMES.
3. DRUMS SHALL BE SPACED AT 15 m CENTER TO CENTER ALONG THE CLOSURE. DRUMS ON THE ADVANCE TAPER SHALL BE SPACED AT 3 m CENTER TO CENTER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER.
4. SEVERAL SMALL WORK AREAS CLOSE TOGETHER SHALL BE COMBINED INTO ONE WORK ZONE. HOWEVER, THE CLOSURE SHALL NOT BE MORE THAN 610 m LONG UNLESS APPROVED BY THE ENGINEER. THE MINIMUM LENGTH BETWEEN CLOSURES SHALL BE 610 m. ONLY ONE SIDE OF THE ROAD SHALL BE CLOSED IN ANY ONE WORK ZONE.
5. THE PROTECTION VEHICLE SHOWN AT THE BEGINNING OF THE WORK AREA SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS PROTECTION VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHEN WORKERS ARE NOT IN THE WORK AREA. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER. THE VEHICLE SHALL BE EQUIPPED WITH A 360° ROTATION OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m.
6. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND THE OW-121 SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.
7. ADEQUATE AREA ILLUMINATION OF EACH FLAGGER STATION SHALL BE PROVIDED AT NIGHT BY USING 150 WATT MINIMUM HIGH PRESSURE SODIUM LUMINAIRES OR 250 WATT MINIMUM MERCURY LUMINAIRES. LUMINAIRES SHALL BE LOCATED ADJACENT TO ONE FLAGGER STATION FOR EACH DIRECTION OF TRAFFIC AS SHOWN ABOVE. THE MOUNTING HEIGHT FOR LUMINAIRES SHALL BE A MINIMUM OF 8.2 m ABOVE THE PAVEMENT AND MOUNTED ON A SUPPORT OF ADEQUATE STRENGTH TO PROVIDE A SATISFACTORY INSTALLATION. THE OVERHEAD CONDUCTOR CLEARANCE SHALL BE A MINIMUM OF 5.5 m ABOVE THE PAVEMENT. THE LUMINAIRE ARM SHALL BE OF SUFFICIENT LENGTH TO EXTEND TO THE EDGE OF THE PAVEMENT. POLES SHALL BE ERECTED A MINIMUM OF 1.7 m BEHIND FACE OF GUARDRAIL WHERE EXISTING, OR 3.6 m FROM THE EDGE OF PAVEMENT. WHERE POSSIBLE LOCATE BEHIND DITCH. LIGHTING MATERIAL SHALL COMPLY WITH SPECIFICATION 713.
8. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND MAJOR DRIVES AS NECESSARY TO PREVENT WRONG WAY MOVEMENTS AND TO KEEP VEHICLES OFF OF NEW PAVEMENT NOT READY FOR TRAFFIC. THE METHOD OF CONTROL SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

MINIMUM DISTANCE (METERS)	A	B
URBAN	61	61
RURAL	152	152

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCO. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCIDENTAL TO THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

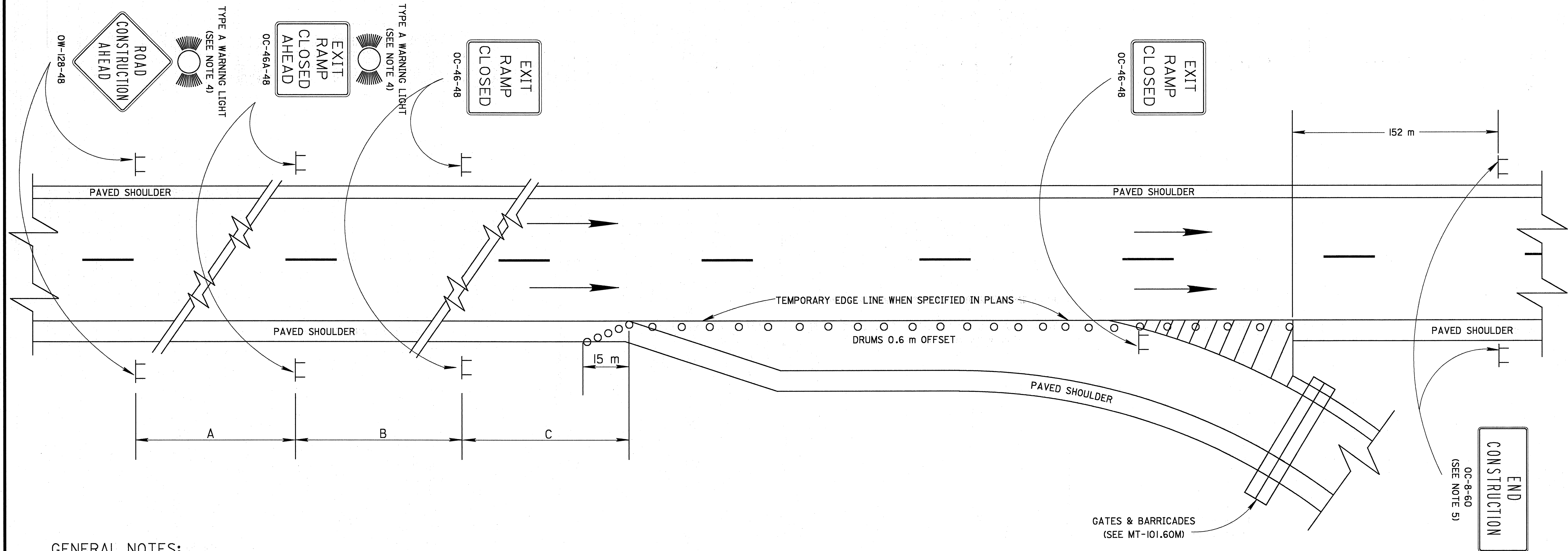
MAINTENANCE OF TRAFFIC

DATE
04/25/94

FLAGGERS CLOSING
1 LANE OF A 2 LANE HIGHWAY
STATIONARY OPERATION

STANDARD
CONSTRUCTION
DRAWING
MT-97.10M

APPROVED *Mark C. ...* ENGR. OF DESIGN SERVICES



GENERAL NOTES:

1. THE LOCATION OF THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.
2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.
3. ALONG THE CLOSURE, DRUMS SHALL BE SPACED AT 6.1 m CENTER TO CENTER. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.
4. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OC-46A SIGNS ARE REQUIRED WHENEVER A NIGHT CLOSURE IS NECESSARY.
5. THE OC-8 SIGNS ARE ONLY REQUIRED FOR RAMP CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

TABLE I

MINIMUM DISTANCE (METERS)			
	A	B	C
URBAN	152	152	152
FREEWAY & EXPRESSWAY	305	305	305
RURAL	792	488	305
FREEWAY & EXPRESSWAY			

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE
03/01/96

EXIT RAMP CLOSURE

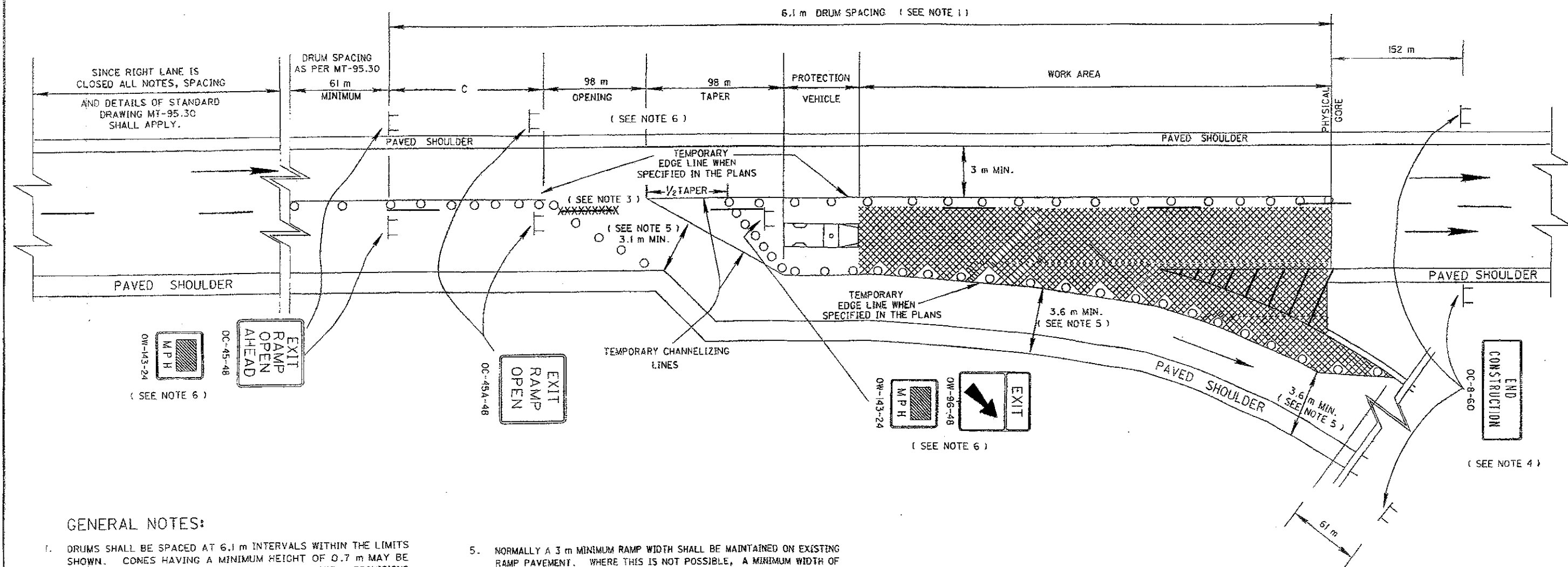
STANDARD
CONSTRUCTION
DRAWING

MT-98.19M

APPROVED *Raymond* ADMINISTRATOR



metric
units



GENERAL NOTES:

- DRUMS SHALL BE SPACED AT 6.1 m INTERVALS WITHIN THE LIMITS SHOWN. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.
- THE PROTECTION VEHICLE LOCATED CLOSE TO THE WORK SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.
- IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMs) SHALL BE REMOVED AND a) TEMPORARY CHANNELIZING LINES SHALL BE APPLIED AND b) THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED WHEN SPECIFIED IN THE PLANS. TEMPORARY CHANNELIZING LINES AND EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.
- THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
- NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD.
- THE OPENING TO THE RAMP AND THE TAPER IN ADVANCE OF THE CLOSED LANE SHOULD EACH BE 98 m OR MORE WHENEVER POSSIBLE. A LESSER OPENING AND/OR TAPER LENGTH MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. THE OPENING SHALL NEVER BE LESS THAN THE TAPER, BUT MAY BE MORE. WHEN LESSER OPENING AND/OR TAPER LENGTHS ARE PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING/TAPER	ADVISORY SPEED
88 m	80 km/h - 50 MPH
79 m	72 km/h - 45 MPH
70 m	64 km/h - 40 MPH
61 m	56 km/h - 35 MPH

IF 61 m MINIMUM DIMENSION CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 16.1 km/h OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.
- ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE 1

MINIMUM DISTANCE (METERS)	
	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305
RURAL FREEWAY & EXPRESSWAY	305

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

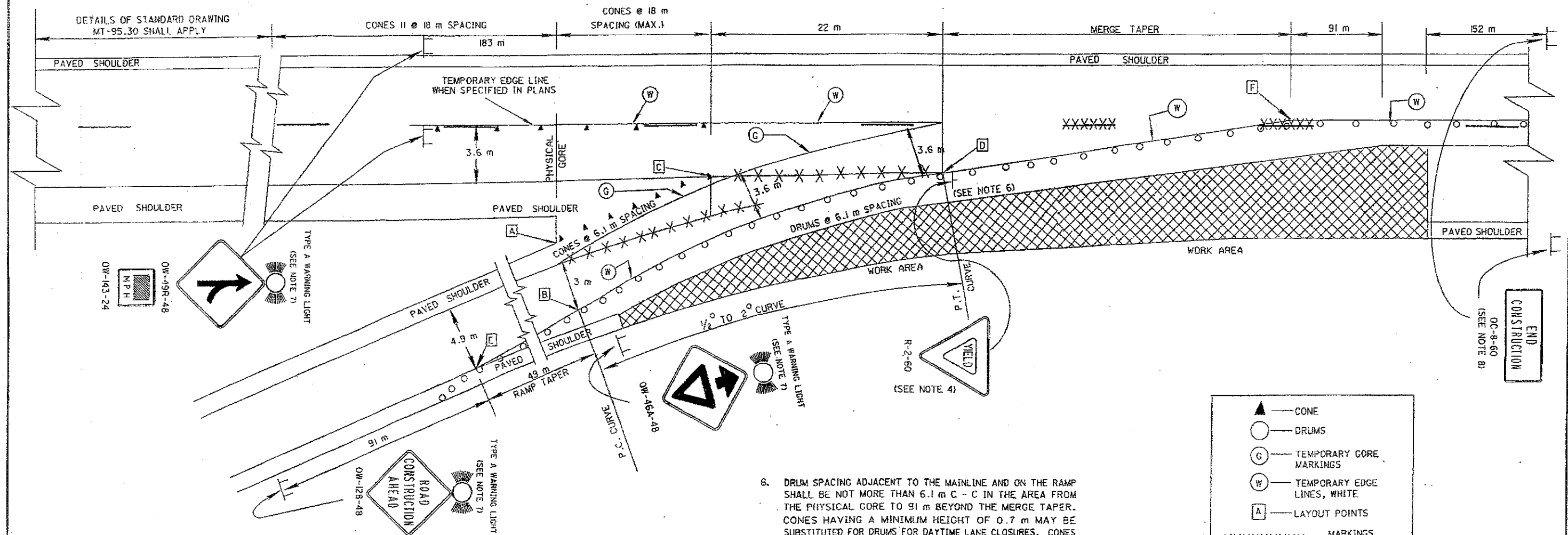
MAINTENANCE OF TRAFFIC

DATE
06/24/93

LANE CLOSURE
AT EXIT GORE

STANDARD
CONSTRUCTION
DRAWING
APPROVED *David C. [Signature]* ENGR. OF DESIGN SERVICES

MT-98.14M

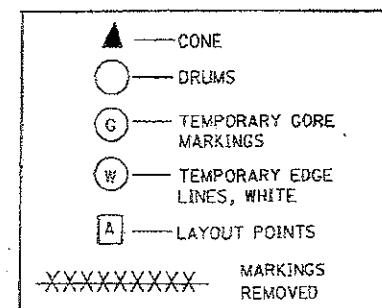


GENERAL NOTES :

1. THIS WORK AREA TRAFFIC CONTROL APPLICATION SHALL BE EMPLOYED WHEN: (1) THE LATERAL CLEARANCE BETWEEN CHANNELIZING DEVICES AT THE RIGHT EDGE OF THE WORK AREA AND THE EDGE OF PAVEMENT IS LESS THAN 3 m (3.6 m IF THE SHOULDER PAVEMENT IS USED) AS SHOWN ON DRAWING MT-98.15, AND (2) THE REQUIRED RAMP TAPERS AND CURVES CAN BE PROVIDED AS SHOWN EXCEPT AS DESCRIBED IN NOTE 4. IN THE EVENT THE WORK ZONE CONDITION WOULD PERMIT THE USE OF EITHER MT-98.15 OR MT-98.16, MT-98.15 SHALL BE USED. THIS TRAFFIC CONTROL MEASURE SHALL NOT BE PLACED IN EFFECT UNTIL IMMEDIATELY BEFORE THE CONTRACTOR IS FULLY PREPARED TO PERFORM THE WORK ON THE RAMP OR LANE ADJACENT TO IT. ONCE THIS MEASURE IS PLACED INTO EFFECT, THE CONTRACTOR SHALL EXPEDITIOUSLY PURSUE THE WORK (WORKING CONTINUOUSLY WITH FULL CREW IN THE RAMP AREA ON ALL NORMAL WORKING DAYS) UNTIL IT IS COMPLETED AND SHALL IMMEDIATELY OPEN THE AREA TO NORMAL TRAFFIC OR, AS A MINIMUM, REVERT TO THE METHODS SHOWN ON MT-98.15. IT IS THE INTENT THAT THE LONGEST MERGING TAPER LENGTH POSSIBLE SHALL BE CHOSEN, COMMENSURATE WITH THE REQUIREMENTS OF CONSTRUCTION.
2. THE RAMP TAPER SHALL DESIRABLY BE LOCATED TO PROVIDE A 3 m MINIMUM PATH BETWEEN DRUMS AND THE PAVED SHOULDER IN THE GORE. THE RAMP TRAFFIC MAY BE PLACED ON THE PAVED GORE AS SHOWN ABOVE ONLY IF: (1) THE TRAFFIC WILL USE THE PAVED SHOULDER PAVEMENT LESS THAN ONE DAY AND THE SHOULDER PAVEMENT IS IN GOOD CONDITION AND IS LEVEL AND SMOOTH OR (2) IF THE SHOULDER PAVEMENT IS ADEQUATELY STRENGTHENED, LEVELED AND SMOOTHED TO CARRY THE ANTICIPATED LOAD. A MINIMUM OF 3 DRUMS SHALL BE USED TO CLOSE THE RAMP SHOULDER.

3. WHEN THE RAMP IS NOT LONG ENOUGH TO ALLOW SIGN PLACEMENT AS SPECIFIED ABOVE, THEY MAY BE SPACED PROPORTIONATELY WITHIN THE SPACE AVAILABLE AS DETERMINED BY THE ENGINEER (A 61 m MINIMUM SPACING MUST BE MAINTAINED).
4. IT WILL BE NECESSARY TO MOVE THE LOCATION OF ANY EXISTING YIELD SIGN. IN THESE CASES, THE PERMANENT R-2 SIGN INSTALLATION SHALL BE REMOVED (AND SUBSEQUENTLY RESTORED) AND THE TEMPORARY INSTALLATION SHALL BE MOUNTED APPROPRIATELY. IF THE REQUIRED DISTANCES (RAMP TAPER, CURVE AND MERGE TAPER) CANNOT BE OBTAINED, THE ENGINEER MAY APPROVE SLIGHTLY LOWER VALUES FOR A SHORT TIME, IN WHICH CASE THE YIELD SIGN SHALL BE REMOVED AND A 1.2 m STOP SIGN PLACED APPROPRIATELY TO BE VISIBLE TO RAMP TRAFFIC BUT NOT BE OBTRUSIVE TO MAINLINE TRAFFIC.
5. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AT NO ADDITIONAL COST. THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY PAVEMENT MARKINGS WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORIGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

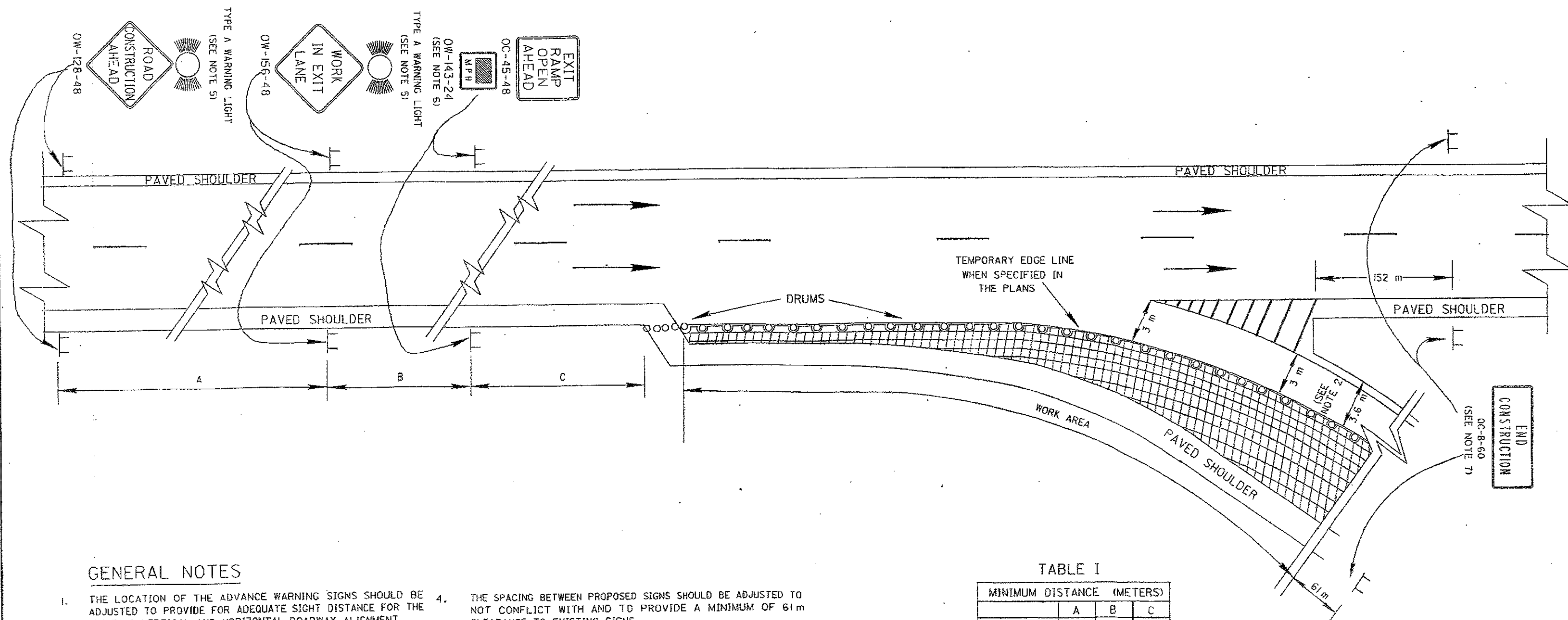
6. DRUM SPACING ADJACENT TO THE MAINLINE AND ON THE RAMP SHALL BE NOT MORE THAN 6.1 m C - C IN THE AREA FROM THE PHYSICAL GORE TO 91 m BEYOND THE MERGE TAPER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. CONES SHALL BE REFLECTORIZED AND SAFELY STABILIZED.
7. TYPE A FLASHING WARNING LIGHTS ARE REQUIRED ON THE ROAD CONSTRUCTION AHEAD (OW-128-48), MERGE (OW-49R-48) AND THE YIELD AHEAD (OW-46-48) SIGNS WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.
8. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
9. FROM THE END OF THE GORE AREA GRADED SHOULDER (POINT A), LOCATE THE PC OF THE CURVE BY MEASURING PERPENDICULAR TO THE RAMP CENTERLINE 3 m OF RAMP PAVEMENT, NOT INCLUDING PAVED SHOULDER WIDTH (POINT B). FROM THE END OF THE GORE AREA PAVED SHOULDER (POINT C), LOCATE THE PT OF THE CURVE BY MEASURING 22 m FROM POINT C ALONG THE EDGE OF PAVEMENT EXTENDED (POINT D).
10. PLACEMENT OF DRUMS SHALL BEGIN AT (POINT E) 49 m UPSTREAM FROM THE PREVIOUSLY LOCATED PC (POINT B) AND AT THE RIGHT EDGE OF RAMP PAVEMENT. FROM THIS POINT A DRUM TAPER SHALL BE PLACED TO THE PC (POINT B) AND THEN ALONG A CURVE AS SHOWN TO THE PT (POINT D) WHERE A 48:1 (MIN.) MERGE TAPER SHALL MEET MAINLINE TRAFFIC CONTROL (POINT F).
11. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.



METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES DIVISION OF HIGHWAYS OHIO DEPARTMENT OF TRANSPORTATION	
MAINTENANCE OF TRAFFIC	DATE 06/24/93
LANE CLOSURE AT ENTRANCE RAMP: PLAN B	
STANDARD CONSTRUCTION DRAWING	MT-98.16M
APPROVED <i>[Signature]</i> ENGR. OF DESIGN SERVICES	



GENERAL NOTES

1. THE LOCATION OF THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.
2. THIS WORK AREA TRAFFIC CONTROL APPLICATION SHALL ONLY APPLY WHEN WORK ALONG AN EXIT RAMP LEAVES AT LEAST ONE LANE OPEN TO RAMP TRAFFIC. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD. IF A 3 m LANE OR 3.6 m LANE INCLUDING SHOULDER AREA CANNOT BE MAINTAINED ALONG AN EXIT RAMP, IT SHALL BE CLOSED. IF THE RAMP IS CLOSED FOR MORE THAN ONE DAY, DETOUR SIGNING SHALL BE PROVIDED IN ACCORDANCE WITH OMTCD.
3. ALONG THE CLOSURE DRUMS SHALL BE SPACED AT 6 m CENTER TO CENTER. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.
4. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61m CLEARANCE TO EXISTING SIGNS.
5. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-156 SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.
6. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.
7. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
8. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

	MINIMUM DISTANCE (METERS)		
	A	B	C
URBAN	152	152	152
FREEWAY & EXPRESSWAY	305	305	305
RURAL	792	488	305
FREEWAY & EXPRESSWAY			

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

TYPICAL LANE CLOSURE IN
DECELERATION LANE AND RAMP FOR
CLOSING INSIDE PORTION OF CURVE

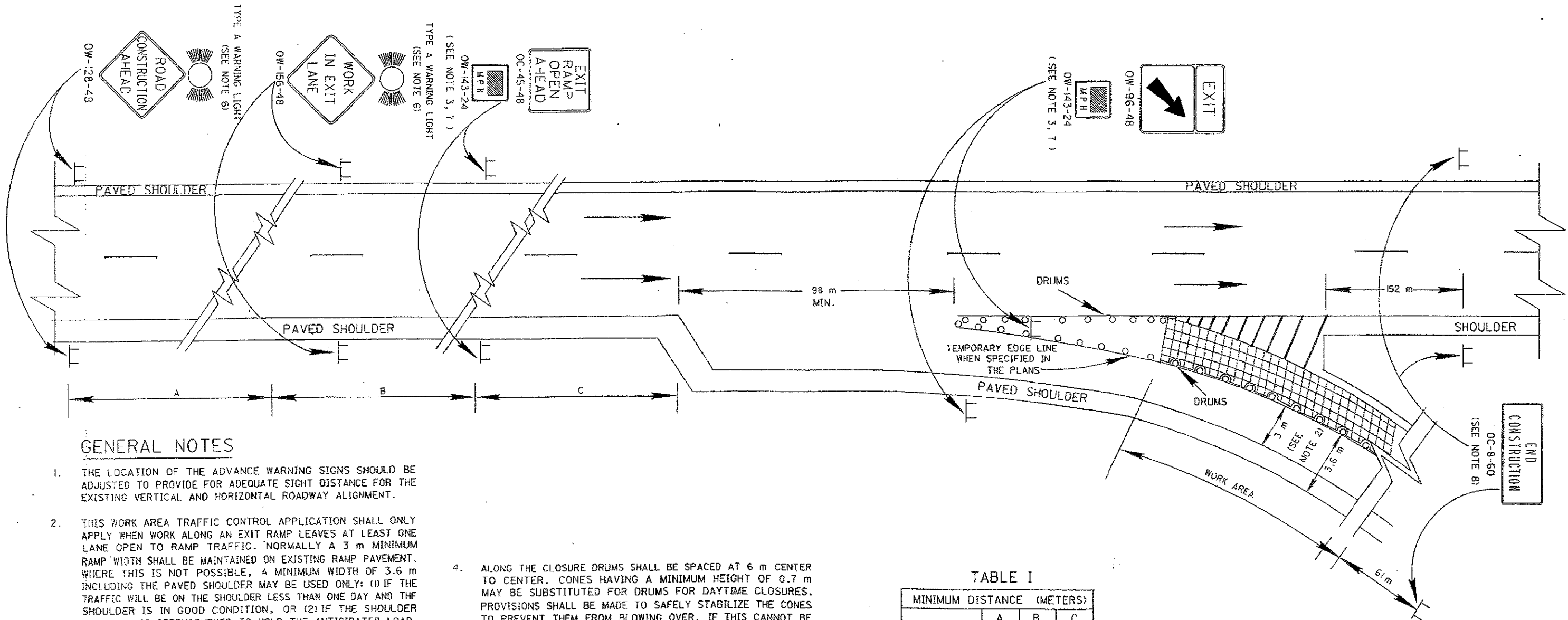
STANDARD
CONSTRUCTION
DRAWING

MT-98.17M

APPROVED *Ang P. Cooper* ENGR. OF DESIGN SERVICES

04/25/94

WCC



GENERAL NOTES

1. THE LOCATION OF THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.
2. THIS WORK AREA TRAFFIC CONTROL APPLICATION SHALL ONLY APPLY WHEN WORK ALONG AN EXIT RAMP LEAVES AT LEAST ONE LANE OPEN TO RAMP TRAFFIC. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD. IF A 3 m LANE OR 3.6 m LANE INCLUDING SHOULDER AREA CANNOT BE MAINTAINED ALONG AN EXIT RAMP, IT SHALL BE CLOSED. IF THE RAMP IS CLOSED FOR MORE THAN ONE DAY, DETOUR SIGNING SHALL BE PROVIDED IN ACCORDANCE WITH OMTCD.
3. THE OPENING TO THE RAMP SHOULD BE 98 m OR MORE WHENEVER POSSIBLE. A LESSER OPENING MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. WHEN A LESSER OPENING LENGTH IS PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING	ADVISORY SPEED
88 m	50 MPH
79 m	45 MPH
70 m	40 MPH
61 m	35 MPH

IF 61 m MINIMUM DIMENSIONS CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 10 MPH OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.

4. ALONG THE CLOSURE DRUMS SHALL BE SPACED AT 6 m CENTER TO CENTER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.
5. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.
6. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-156 SIGNS ARE REQUIRED WHENEVER A NIGHT CLOSURE IS NECESSARY.
7. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN OR AS REQUIRED IN NOTE 2.
8. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
9. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)			
	A	B	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

M E T R I C

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE

TYPICAL LANE CLOSURE IN RAMP -
FOR CLOSING OUTSIDE PORTION OF CURVE

04/25/94

STANDARD
CONSTRUCTION
DRAWING

MT-98.18M

APPROVED *[Signature]* ENGR. OF DESIGN SERVICES

GENERAL

IN ADDITION TO 614, TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

THE PURPOSE OF THE FOLLOWING REQUIREMENTS FOR TRAFFIC CONTROL FOR PAVEMENT MARKING OPERATIONS IS TO PROVIDE SAFETY FOR HIGHWAY USERS, WORKERS AND EQUIPMENT AND TO PROTECT THE MARKINGS FROM DAMAGE DURING APPLICATION. THESE REQUIREMENTS ARE THE REQUIRED MINIMUMS. IF AT ANY TIME DURING THE APPLICATION OF MARKINGS IT IS FOUND BY THE ENGINEER THAT THESE MINIMUM TRAFFIC CONTROL REQUIREMENTS ARE NOT ACHIEVING THE NECESSARY SAFETY AND MARKING PROTECTION, ADDITIONAL TRAFFIC CONTROL SHALL BE IMPLEMENTED AT NO ADDITIONAL COST.

THE ENGINEER MAY SUSPEND WORK IN ORDER TO RELIEVE TRAFFIC CONGESTION AT ANY TIME. NO WORK SHALL BE DONE DURING PEAK HOURS, AS DETERMINED BY THE ENGINEER.

VEHICLES TRANSPORTING FLAMMABLE PAVEMENT MARKING MATERIALS (MATERIAL SUPPLY VEHICLES) SHALL NOT BE UTILIZED FOR LEAD OR TRAIL VEHICLES OR FOR POWER BROOM EQUIPMENT. ALL PAVEMENT MARKING APPLICATION, PROTECTION AND SUPPORT EQUIPMENT FOLLOWING THE LINE MARKING MACHINE SHALL HAVE THE TRAFFIC CONTROL EQUIPMENT OF A TRAIL VEHICLE.

LINE MARKING MACHINES SHALL NOT BE USED FOR SIGN AND CONE PLACEMENT.

LEAD VEHICLE

A LEAD VEHICLE IS TO BE USED TO WARN OPPOSING TRAFFIC OF THE APPROACH OF CENTER LINE AND OTHER MARKING EQUIPMENT WHEN THIS EQUIPMENT EXTENDS INTO THE ADJACENT OPPOSING TRAFFIC LANE. THE LEAD VEHICLE SHALL PRECEDE THE "LEFT OF CENTER" MARKING EQUIPMENT A DISTANCE THAT WILL PROVIDE ADVANCE SAFE WARNING TO APPROACHING TRAFFIC. THE OPERATOR OF THIS UNIT SHALL DRIVE AHEAD OF THE CREST OF A VERTICAL CURVE OR AROUND A HORIZONTAL CURVE AND WAIT UNTIL THE "LEFT OF CENTER" MARKING EQUIPMENT NEARS AND THEN PROCEED, MAINTAINING AN ADVANCE LOCATION OF 122 m TO 183 m.

A LEAD VEHICLE SHALL BE EQUIPPED AND OPERATED WITH THE FOLLOWING TRAFFIC CONTROL DEVICES:

1. A 360° ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE IN ALL DIRECTIONS A MINIMUM OF 400 m.
2. LIGHTED HEADLIGHTS AND TAILLIGHTS, AND
3. A KEEP RIGHT SIGN (OC-31R-48) AND WET PAINT SIGN (OC-52-48) MOUNTED A MINIMUM OF 1.5 m ABOVE THE ROAD SURFACE MEASURED TO THE BOTTOM OF THE SIGN, AND VISIBLE TO OPPOSING TRAFFIC.

POWER BROOM EQUIPMENT

POWER BROOM EQUIPMENT SHALL BE EQUIPPED AND OPERATED DURING PAVEMENT PREPARATIONS WITH THE FOLLOWING TRAFFIC CONTROL DEVICES:

1. A 360° ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE IN ALL DIRECTIONS A MINIMUM OF 400 m.
2. LIGHTED HEADLIGHTS AND TAILLIGHTS, AND
- * 3. A FLASHING ARROW PANEL 1.4 X .76 m CONFORMING TO MT-35.10M (TYPE B) VISIBLE TO THE REAR MOUNTED A MINIMUM OF 2 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE PANEL, AND USED ONLY ON MULTI-LANE HIGHWAYS.

LINE MARKING MACHINE

ALL TRAFFIC LINE MARKING MACHINES SHALL BE EQUIPPED AND OPERATED WITH THE FOLLOWING TRAFFIC CONTROL EQUIPMENT:

1. THREE 360° ROTATING OR FLASHING AMBER BEACONS CLEARLY VISIBLE IN ALL DIRECTIONS A MINIMUM OF 400 m, MOUNTED A MINIMUM OF 2 m ABOVE THE ROAD SURFACE, ONE FORWARD, ONE ON THE RIGHT REAR AND ONE ON THE LEFT REAR OF THE VEHICLE.
- * 2. (A) A FLASHING ARROW PANEL 1.4 X .76 m CONFORMING TO MT-35.10M (TYPE B) DISPLAYED TO THE REAR MOUNTED A MINIMUM OF 2 m ABOVE THE ROAD SURFACE, MEASURED TO BOTTOM OF THE PANEL, AND USED ONLY ON MULTI-LANE HIGHWAYS, OR
(B) A DO NOT PASS SIGN (R-33A-48) VISIBLE TO THE REAR DURING CENTER LINE MARKING ON TWO-LANE, TWO-WAY ROADWAYS AND MOUNTED A MINIMUM OF 2 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE SIGN. THIS SIGN MAY BE USED TO COVER THE ARROW PANEL WHICH SHALL NOT BE USED ON TWO-LANE, TWO WAY ROADWAYS.
3. A WET PAINT WITH ARROW SIGN (OC-50-24 OR OC-51-48) SHALL FACE THE REAR. THE SIGN SHALL BE POSITIONED WITH THE ARROW POINTING TO THE WET LINE. WHEN USED, OC-50-24 SHALL BE MOUNTED ON THE SIDE OF THE VEHICLE NEAREST THE WET MARKING MATERIAL. OC-50-24 AND OC-51-48 SIGNS SHALL BE MOUNTED A MINIMUM OF 0.3 m ABOVE THE ROAD SURFACE.
4. A KEEP RIGHT SIGN (OC-31R-48) AND WET PAINT SIGN (OC-52-48) MOUNTED A MINIMUM OF 1.5 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE SIGN FACING OPPOSING TRAFFIC WHEN THIS UNIT EXTENDS INTO THE ADJACENT OPPOSING TRAFFIC LANE.
5. THE GUIDE AND SIDE MOUNTED MARKING CARRIAGES SHALL EACH BE EQUIPPED WITH A CLEAN RED FLAG NOT LESS THAN 0.4 m SQUARE AND FASTENED TO A STAFF OF SUFFICIENT LENGTH SO AS TO PERMIT THE FLAG TO MOVE FREELY OF ANY OBSTRUCTION.

TRAIL VEHICLE

WHEN REQUIRED, A TRAIL VEHICLE SHALL BE POSITIONED AT THE TRACK FREE END OF THE WET LINE.

TRAIL VEHICLES SHALL BE EQUIPPED AND OPERATED WITH THE FOLLOWING TRAFFIC CONTROL EQUIPMENT:

1. A 360° ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE IN ALL DIRECTIONS A MINIMUM OF 400 m,
- * 2. (A) A FLASHING ARROW PANEL 1.4 X .76 m CONFORMING TO MT-35.10M (TYPE B) VISIBLE TO THE REAR MOUNTED AT A MINIMUM HEIGHT OF 2 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE PANEL, AND USED ONLY ON MULTI-LANE HIGHWAYS, OR
(B) A DO NOT PASS SIGN (R-33A-48) VISIBLE TO THE REAR DURING CENTER LINE MARKING ON TWO-LANE, TWO-WAY ROADWAYS AND MOUNTED A MINIMUM OF 2 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE SIGN. THIS SIGN MAY BE USED TO COVER THE ARROW PANEL, WHICH SHALL NOT BE USED ON TWO-LANE, TWO-WAY ROADWAYS.
3. A WET PAINT WITH ARROW SIGN (OC-50-24 OR OC-51-48) SHALL FACE THE REAR. THE SIGN SHALL BE POSITIONED WITH THE ARROW POINTING TO THE WET LINE. WHEN USED, OC-50-24 SHALL BE MOUNTED ON THE SIDE OF THE VEHICLE NEAREST, THE WET MARKING MATERIAL. OC-50-24 SHALL BE MOUNTED A MINIMUM OF 1.4 m ABOVE THE ROAD SURFACE AND OC-51-48 SHALL BE MOUNTED A MINIMUM OF 1.5 m ABOVE THE ROAD SURFACE, BOTH MEASURED TO THE BOTTOM OF THE SIGN.

*

WHEN A VEHICLE IS OPERATING ON A TWO-LANE TWO-WAY ROADWAY THE FLASHING ARROW PANEL SHALL BE TILTED HORIZONTALLY OR COVERED.

CONES AND WET PAINT-KEEP OFF SIGNS

CONES AND WET PAINT-KEEP OFF SIGNS (R-87-24) SHALL BE PLACED TO PROTECT THE LINE WHENEVER THE TRACK FREE TIME EXCEEDS 2 MINUTES. THESE DEVICES SHALL NOT BE REMOVED UNTIL THE LINE HAS DRIED TO A TRACK FREE CONDITION. RETRIEVAL EQUIPMENT SHALL HAVE THE TRAFFIC CONTROL EQUIPMENT OF A TRAIL VEHICLE. CONES SHALL HAVE A MINIMUM HEIGHT OF 0.46 m. THEY SHALL BE SPACED TO PROTECT THE WET LINE NORMALLY BETWEEN 37 m AND 61 m. IN AREAS OF TRAFFIC CONGESTION, ON CURVES AND AT OTHER LOCATIONS WHERE TRACKING OF THE WET LINE IS EXPECTED SPACINGS AS CLOSE AS 6.1 m MAY BE REQUIRED. THE WET PAINT-KEEP OFF SIGNS (R-87-24) SHALL BE PLACED FACING TRAFFIC AT:

- A. THE BEGINNING AND END OF LINE APPLICATION,
- B. ALL SIDE AND CROSS ROADS, AND
- C. MAXIMUM INTERVALS OF 1.6 km.

WHEN LANE LINE MARKINGS REQUIRE GREATER THAN A TWO MINUTE DRYING TIME, THE LANE FROM WHICH THE LINE MARKING MACHINE APPLIES LANE LINE MARKINGS SHALL BE CLOSED UNTIL THE LINE HAS DRIED TO A TOTALLY TRACK FREE CONDITION.

IMMOBILE OPERATIONS

WHEN LOADING MATERIAL, CLEANING OR PERFORMING OTHER OPERATIONS IN THE FIELD, EVERY EFFORT SHALL BE MADE TO HAVE ALL EQUIPMENT COMPLETELY OFF OF THE TRAVELED WAY. WHEN IT BECOMES NECESSARY TO ENTER UPON PRIVATE PROPERTY, PERMISSION SHALL BE OBTAINED IN ADVANCE. WHEN THE CONTRACTOR CANNOT REMOVE HIS EQUIPMENT FROM THE TRAVELED WAY ALL TRAFFIC CONTROL DEVICES ON THE VEHICLES SHALL BE IN OPERATION AND FLAGGERS AND VEHICLES SHALL BE STATIONED TO PROTECT THE WORK SITE AND THE TRAVELING PUBLIC.

TWO-WAY TRAFFIC SHALL BE MAINTAINED. FLAGGERS SHALL BE EQUIPPED IN ACCORDANCE WITH ITEM 614.03.

AUXILIARY MARKINGS

PAVEMENT PREPARATION AND PLACING OF AUXILIARY MARKINGS (SEE ③) ARE CONSIDERED TO BE STATIONARY OPERATIONS AND TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH PLAN DETAILS, STANDARD CONSTRUCTION DRAWINGS AND THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD).

LAYOUT AND PREMARKING

THE VEHICLE USED IN LAYOUT AND PREMARKING SHALL BE EQUIPPED AND OPERATED WITH THE FOLLOWING EQUIPMENT:

1. A 360° ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE IN ALL DIRECTIONS A MINIMUM OF 400 m.
2. LIGHTED HEADLIGHTS AND TAILLIGHTS, AND
3. A KEEP RIGHT SIGN (OC-31R-48) MOUNTED A MINIMUM OF 1.5 m ABOVE THE ROAD SURFACE, MEASURED TO THE BOTTOM OF THE SIGN, AND VISIBLE TO OPPOSING TRAFFIC.

NIGHTTIME OPERATION

NIGHTTIME OPERATION IS DEFINED TO INCLUDE THE TIME FROM ONE-HALF HOUR AFTER SUNSET TO ONE-HALF HOUR BEFORE SUNRISE, AND AT ANY OTHER TIME WHEN THERE ARE UNFAVORABLE ATMOSPHERIC CONDITIONS OR WHEN THERE IS NOT SUFFICIENT NATURAL LIGHT TO RENDER DISCERNIBLE PERSONS, VEHICLES, AND SUBSTANTIAL OBJECTS ON THE HIGHWAY AT A DISTANCE OF 305 m.

DURING NIGHTTIME CONDITIONS THE FOLLOWING TRAFFIC CONTROL SHALL BE PROVIDED:

1. CONES SHALL BE REFLECTORIZED OR EQUIPPED WITH LIGHTING DEVICES FOR MAXIMUM VISIBILITY (SEE 7F-5, OMUTCD), AND
2. THE GUIDE AND SIDE-MOUNTED CARRIAGES SHALL BE ILLUMINATED.

THE PRESENCE OF HIGHWAY LIGHTING DOES NOT WAIVE THESE REQUIREMENTS.

MINIMUM PAVEMENT MARKING TRAFFIC CONTROL EQUIPMENT REQUIREMENTS

THIS TABLE INDICATES THE TRAFFIC CONTROL EQUIPMENT WHICH SHALL BE FURNISHED FOR EACH TYPE OF LONG LINE PAVEMENT MARKING OPERATION. IN ADDITION, THE TYPE OF TRAFFIC CONTROL EQUIPMENT WHICH SHALL BE FURNISHED WHEN DIRECTED BY THE ENGINEER IS INDICATED.

EQUIPMENT	PAVEMENT MARKING LINE TYPE ①					
	CENTER LINE		EDGE LINE		LANE LINE ② CHANNELIZING LINE ③	
	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY	LONGER THAN 2 MIN. DRY	2 MIN. OR LESS DRY
LEAD VEHICLE	A	A	C	C	C	C
POWER BROOM EQUIPMENT	B	B	A	A	B	B
LINE MARKING MACHINE	A	A	A	A	A	A
TRAIL VEHICLE	D	A	D	A	LANE CLOSURE REQUIRED (0.7 m CONES REQUIRED)	A
TRAIL VEHICLE (ADDITIONAL)	C	B	C	B		A
TRAIL VEHICLE (SIGN & CONE RETRIEVAL)	A	C	A	C		C
TRAIL VEHICLE (SHADOW FOR RETRIEVAL)	A	C	A	C		C

① FOR EQUIPMENT REQUIREMENTS FOR AUXILIARY MARKING OPERATIONS SEE THE PLANS AND PART 7, OMUTCD.

② INCLUDES BOTH DASHED AND SOLID LANE LINES.

③ CHANNELIZING LINE SEGMENTS OF 61 m OR LESS SHALL BE CONSIDERED AUXILIARY MARKINGS, EXCEPT WHEN APPLIED AS COMPONENTS OF GORE MARKINGS SPRAYED IN MOVING OPERATIONS SEPARATE FROM THE APPLICATION OF TRANSVERSE LINES.

A	REQUIRED EQUIPMENT
B	EQUIPMENT REQUIRED WHEN DIRECTED BY THE ENGINEER
C	NOT REQUIRED
D	REQUIRED EQUIPMENT FOR SIGN & CONE PLACEMENT

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

TRAFFIC CONTROL FOR LONG
LINE PAVEMENT MARKING
OPERATIONS

STANDARD
CONSTRUCTION
DRAWING
APPROVED *David C. C...* ENGR. OF DESIGN SERVICES

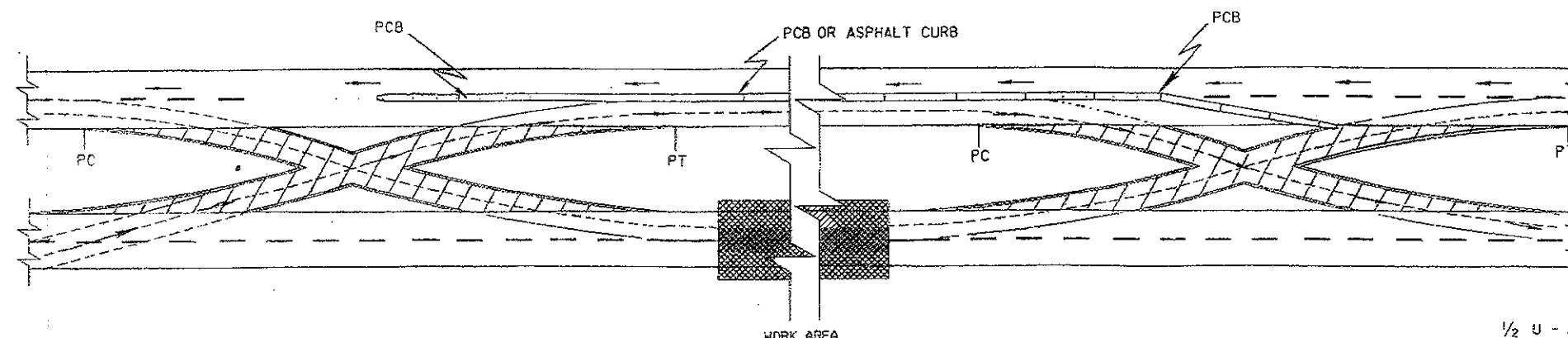
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DATE
01/30/95

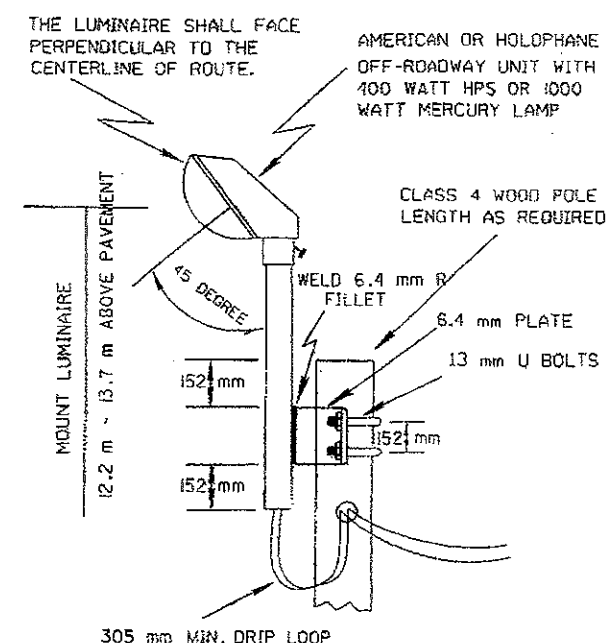
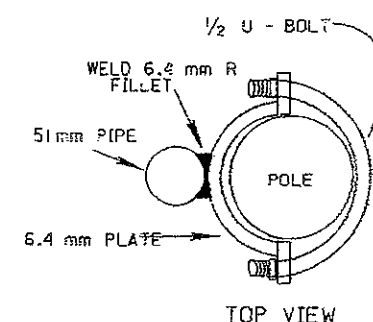
NOTES

- ALL LIGHTING EQUIPMENT USED IN THIS INSTALLATION, SUCH AS LIGHTING CABLE, OR LUMINAIRES SHALL BE IN CONFORMANCE WITH SPECIFICATION ITEMS 625 AND 713. HOWEVER, THE PERFORMANCE TEST OF 625.22E AND THE WORKING DRAWING REQUIREMENTS OF 625.04 ARE WAIVED. USED EQUIPMENT IS ACCEPTABLE.
- LIGHTING POLES NOT LOCATED BEHIND EXISTING GUARDRAIL SHALL BE SET BACK 12.2 m FROM EDGE OF THE NEAREST TRAFFIC LANE (INCLUDING ANY SHOULDER OR TEMPORARY PAVEMENT USED AS A TRAFFIC LANE). WHERE LOCAL CONDITIONS PREVENT THE 12.2 m SET BACK, IT MAY BE REDUCED TO 9 m WITH THE APPROVAL OF THE ENGINEER. WHEN LOCATED BEHIND EXISTING GUARDRAIL, LIGHT POLES SHALL BE A MINIMUM OF 0.9 m CLEAR FROM BACK OF GUARDRAIL POST TO FACE OF POLE. ANY POLES PROVIDED FOR POWER SERVICE SHALL BE SET BACK AT LEAST AS FAR AS THE LIGHTING POLES.
- A PHOTOCELL SHALL TURN ON THE LIGHTING SYSTEM WHEN AMBIENT ILLUMINATION IS BELOW 32.3 lux.
- ALL OVERHEAD WIRING SHALL BE #4 AWG MINIMUM. DOWN GUY ANCHORS SHALL BE PROVIDED AT BOTH ENDS OF OVERHEAD SPANS. ALL WIRING CROSSING THE ROADWAY SHALL HAVE A MINIMUM CLEARANCE OF 6.1 m.
- LIGHTING UNITS WILL BE SPACED AT 100 m INTERVALS. THE FIRST 100 m SPACE CENTERED ON THE PRC AND ADDITIONAL 100 m SPACES AND PAIRS OF LIGHTS WILL BE ADDED IN EACH DIRECTION TO 30 m BEYOND THE PC OR PT.
- THE WORK SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS ELECTRICAL ENERGY AND PAYMENT OF FEES NECESSARY TO ARRANGE AND INSTALL THE ELECTRICAL SERVICE, AND TO ERECT, MAINTAIN, OPERATE AND SUBSEQUENTLY REMOVE THE LIGHTING FOR EACH 614 "TEMPORARY CROSSOVER LIGHTING SYSTEM" FOR A PAIR OF CROSSOVER RAMPS. CONTINUOUS LIGHTING, IF REQUIRED, WILL BE INCLUDED IN THE ADJACENT CROSSOVER LIGHTING SYSTEMS.

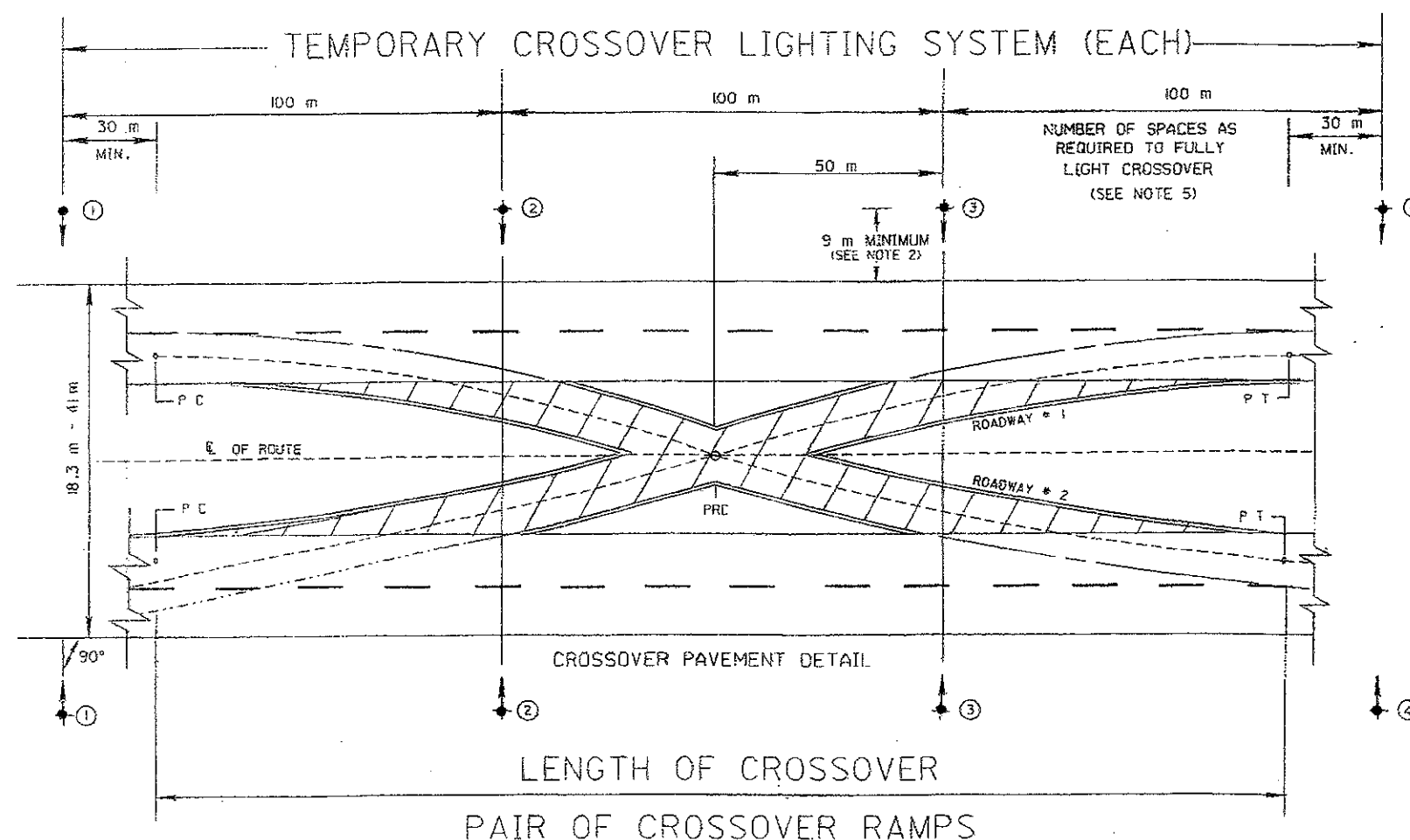
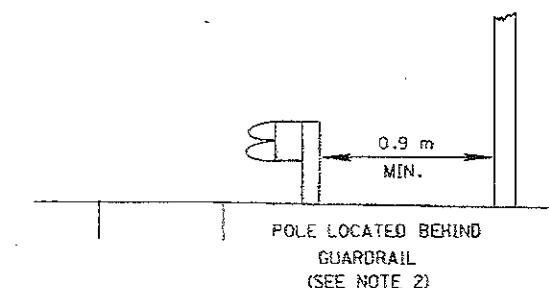
IF THE DISTANCE BETWEEN TWO ADJACENT CROSSOVER LIGHTING SYSTEMS IS LESS THAN 457 m INSTALL ADDITIONAL UNITS AS REQUIRED TO ACHIEVE FULL LIGHTING BETWEEN CROSSOVERS



TEMPORARY PAVEMENT



SIDE VIEW
MOUNTING DETAIL



METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

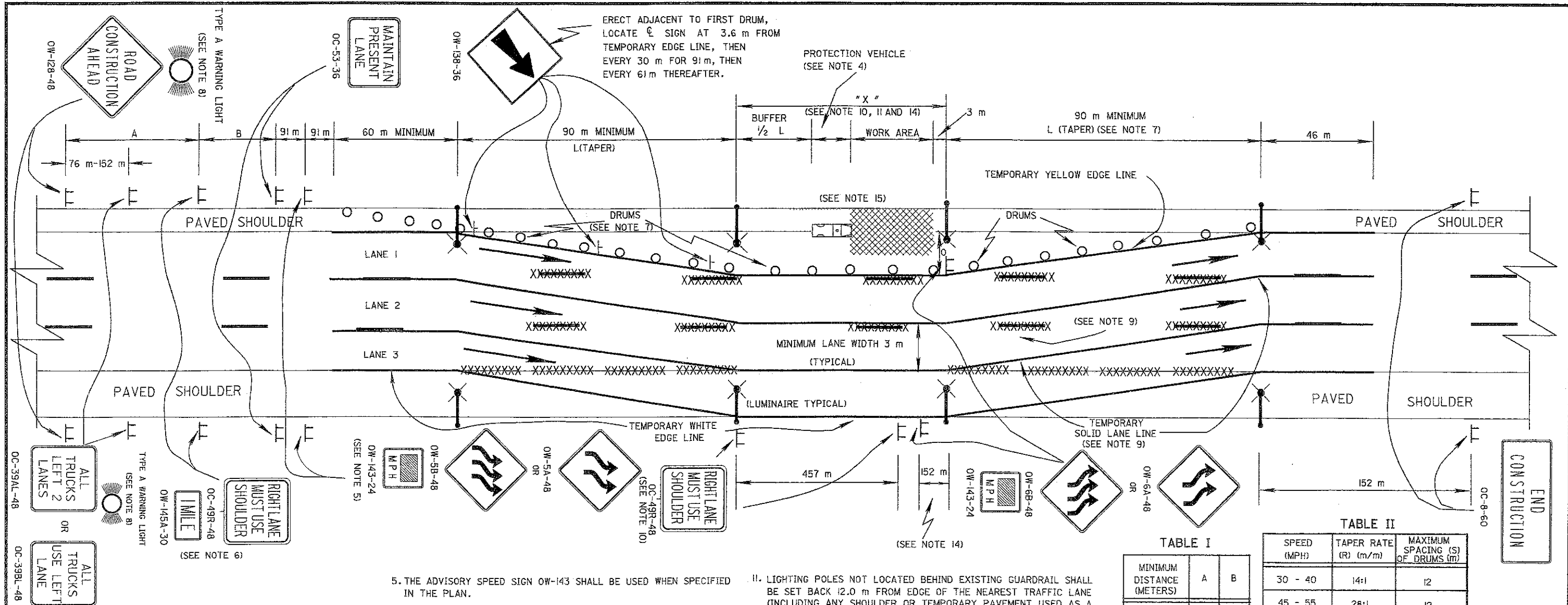
DATE

TEMPORARY CROSSOVER
LIGHTING SYSTEM

04/25/94

STANDARD
CONSTRUCTION MT-100.00M
DRAWING

APPROVED *[Signature]* ENGR. OF DESIGN SERVICES



GENERAL NOTES:

1. THE LOCATION OF THE TRANSITION TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.
2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61m CLEARANCE TO EXISTING SIGNS.
3. THIS TRAFFIC CONTROL PLAN SHOULD BE USED WHEN THE WORK AREA EXTENDS INTO EITHER THE RIGHT OR LEFT HAND LANE OF A MULTIPLE LANE DIVIDED HIGHWAY AND IT IS NOT DESIRABLE, FOR CAPACITY REASONS, TO REDUCE THE NUMBER OF AVAILABLE LANES. THE MINIMUM RESULTANT WIDTH OF ANY LANE IS 3 m. THE PLAN SHOWN IS FOR A LEFT-LANE CLOSURE. WHEN THERE IS A RIGHT-LANE CLOSURE, MAKE THE FOLLOWING SIGN SUBSTITUTIONS: AN OC-49L, FOR THE OC-49R; AN OC-39AR, FOR THE OC-39AL; AN OW-6A OR OW-6B FOR THE OW-5A OR OW-5B; AND AN OW-5A OR OW-5B FOR THE OW-6A OR OW-6B.
4. THE PROTECTION VEHICLE SHOWN AT THE BEGINNING OF THE WORK AREA SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 400 m.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.
6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE PAVEMENT TAPER (L). DISTANCES LESS THAN 1 MILE MAY BE EXPRESSED IN FEET.
7. THE TAPER RATE OF DRUMS SHALL BE BASED UPON THE AVERAGE APPROACH SPEED OR SPEED LIMIT WHICHEVER IS GREATER AND SHALL BE (R) AS SHOWN IN TABLE II. EXCEPT THAT THE RESULTING LENGTH OF TAPER SHOULD NOT BE LESS THAN 90 m MIN. THE TAPER (L) SHALL EQUAL THE TAPER RATE (R) MULTIPLIED BY THE OFFSET (O). A MINIMUM OF FIVE CHANNELIZING DEVICES SHALL BE USED TO FORM TAPER ON THE SHOULDER.
8. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON OW-128 SIGNS AND OC-39AL SIGNS ARE REQUIRED.
9. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY LINES SHALL BE APPLIED. TEMPORARY LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, TEMPORARY MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORIGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED.
10. THE MAXIMUM SPACING OF THE OC-49R, NEAR THE WORK AREA IS 457 m. WHEN THE DISTANCE "X" IS LESS THAN 518 m THE SECOND OC-49R SHOULD BE DELETED. ALSO IF IT WOULD BE WITHIN 61m OF THE OW-6A OR OW-6B SIGN THE OC-49R SIGN SHOULD BE DELETED.

11. LIGHTING POLES NOT LOCATED BEHIND EXISTING GUARDRAIL SHALL BE SET BACK 12.0 m FROM EDGE OF THE NEAREST TRAFFIC LANE (INCLUDING ANY SHOULDER OR TEMPORARY PAVEMENT USED AS A TRAFFIC LANE). WHERE LOCAL CONDITIONS PREVENT THE 12.0 m SET BACK, IT MAY BE REDUCED TO 9.0 m WITH THE APPROVAL OF THE ENGINEER. WHEN LOCATED BEHIND EXISTING GUARDRAIL, LIGHT POLES SHALL BE A MINIMUM OF .9 m CLEAR FROM BACK OF GUARDRAIL POST TO FACE OF POLE. ANY POLES PROVIDED FOR POWER SERVICE SHALL BE SET BACK AT LEAST AS FAR AS THE LIGHTING POLES. SPACING AND TYPE OF LUMINAIRES SHALL PROVIDE AN AVERAGE ILLUMINATION OF 10.8 lux TO 12.9 lux WITH MAXIMUM UNIFORMITY RATIOS OF 4:1 AVERAGE TO MINIMUM AND 10:1 MAXIMUM TO MINIMUM THROUGHOUT THE LIGHTED AREA. WHEN TAPERS ARE REQUIRED TO BE LIGHTED AND DIMENSION "X" IS LESS THAN 610 m LIGHTING SHALL BE CONTINUOUS BETWEEN TAPERS.
12. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.
13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.
14. IF DISTANCE "X" IS LESS THAN 305 m, PLACE THE OW-6A OR OW-6B SIGN AT THE MID POINT OF DISTANCE "X".
15. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	A	B
MAJOR STANDARD	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488

TABLE II

SPEED (MPH)	TAPER RATE (R) (m/m)	MAXIMUM SPACING (S) OF DRUMS (m)
30 - 40	14:1	12
45 - 55	28:1	12
60 - 65	33:1	18

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES DIVISION OF HIGHWAYS OHIO DEPARTMENT OF TRANSPORTATION	
MAINTENANCE OF TRAFFIC	DATE 01/30/95
TRANSITION PLAN FOR USE OF SHOULDER WITH DRUMS	
STANDARD CONSTRUCTION DRAWING	MT-102.20M
APPROVED <i>[Signature]</i>	ENGR. OF DESIGN SERVICES

TEMPORARY SIGN SUPPORT REQUIREMENTS

A. PLACEMENT OF SIGNS WHICH WILL REMAIN MORE THAN ONE DAY:

- 1) LATERAL PLACEMENT TO NEAREST EDGE OF SIGNS SHALL BE AS FOLLOWS:
 - a) ON THE RIGHT SIDE OF THE ROAD FOR APPROACHING TRAFFIC (EXCEPT FOR DUAL MOUNTED SIGNS AND SIGNS DESIGNATED IN THE PLANS FOR LEFT SIDE MOUNTING).
 - b) CURBED ROADWAY - MINIMUM 0.6 m BEHIND FACE OF CURB.
 - c) UNCURBED ROADWAY - 3.7 m FROM EDGE OF TRAFFIC LANE OR 1.8 m FROM EDGE OF PAVED OR USEABLE SHOULDER, WHICHEVER IS GREATER.
 - d) BEHIND GUARDRAIL OR BARRIER - PREFERABLY 0.6 m BEHIND FACE OF GUARDRAIL (MINIMUM 0.3 m) FOR SIGNS ON CLASS A SUPPORTS; 1.2 m FOR CLASS B OR C SUPPORTS; 0.3 m BEHIND FACE OF CONCRETE BARRIER UNLESS BARRIER TOP MOUNTING IS REQUIRED BY THE PLAN.
- 2) VERTICAL CLEARANCE OF SIGNS, MEASURED ABOVE ROADWAY ELEVATION, SHALL BE AS FOLLOWS:
 - a) RURAL - 1.5 m WHEN PARKED CARS, CONSTRUCTION EQUIPMENT, ETC WILL NOT OBSCURE SIGN VISIBILITY.
 - b) RURAL AREAS WITH PARKED CARS OR CONSTRUCTION EQUIPMENT - 2.1 m
 - c) URBAN - 2.1 m
 - d) CARE SHALL BE TAKEN TO ASSURE THAT SIGNS WILL NOT BE OBSCURED BY CONSTRUCTION EQUIPMENT, TREES, WEEDS OR OTHER OBSTACLES. BRUSH, WEEDS OR GRASS WITHIN THE RIGHT OF WAY SHALL BE TRIMMED AS NECESSARY. SIGNS SHALL NORMALLY BE VISIBLE TO TRAFFIC 122 m TO 183 m IN ADVANCE OF THE SIGN.
- 3) SUPPORTS FOR SIGNS WHICH WILL REMAIN IN PLACE MORE THAN ONE DAY SHALL BE FIXED RATHER THAN PORTABLE EXCEPT IN SITUATIONS WHERE THE SIGN MUST REST ON PERMANENT PAVEMENT OR OTHER SURFACE WHICH WOULD BE DAMAGED BY INSERTION OF POST TYPE SUPPORTS.

B. PLACEMENT OF SIGNS WHICH WILL REMAIN FOR ONE DAY OR LESS:

- 1) SAME AS A-1 ABOVE EXCEPT THAT SIGNS MAY BE PLACED ON THE ROADWAY ONLY IF THEY DO NOT INTRUDE INTO A TRAFFIC LANE IN USE.
- 2) MINIMUM OF 0.3 m ABOVE ROADWAY

C. CLASSES OF SUPPORTS:

ALL TEMPORARY SIGN SUPPORTS SHALL BE OF THE FOLLOWING TYPES:

1) CLASS A:

SUPPORTS SHALL BE USED FOR EXPOSED LOCATIONS ON HIGHWAYS WHERE TRAFFIC APPROACH SPEEDS OF 40 MPH AND HIGHER ARE ENCOUNTERED. THEY ARE ALSO SUITABLE FOR USE IN ALL OTHER LOCATIONS.

2) CLASS B:

SUPPORTS SHALL BE USED FOR EXPOSED LOCATIONS ON HIGHWAYS WHERE TRAFFIC APPROACH SPEEDS OF LESS THAN 40 MPH ARE ENCOUNTERED. THEY ARE ALSO SUITABLE FOR USE IN ALL APPLICATIONS DEFINED FOR CLASS C SUPPORTS.

3) CLASS C:

SUPPORTS MAY ONLY BE USED WHERE FULLY PROTECTED BY GUARDRAIL, CONCRETE BARRIER AND IN LOCATIONS POSITIVELY PROTECTED FROM TRAFFIC SUCH AS ON RETAINING WALLS OR WHERE TRAFFIC APPROACH SPEEDS ARE LESS THAN 25 MPH.

D. TRAFFIC APPROACH SPEEDS:

TRAFFIC APPROACH SPEEDS SHALL BE THE LOCALLY POSTED SPEED (NOT ADVISORY SPEED SIGNS) OR THE MEASURED ACTUAL (85TH PERCENTILE) SPEED (IF AVAILABLE) OF APPROACHING TRAFFIC, WHICHEVER IS HIGHER, ADJACENT TO THE SIGN LOCATION.

TABLE

APPROACH SPEED (MPH)	COMPLETELY PROTECTED BY GUARDRAIL OR BARRIER	PARTLY PROTECTED BY GUARDRAIL OR BARRIER *	GREATER THAN 9 m FROM EDGE OF PAVEMENT	WITHIN 9 m FROM EDGE OF PAVEMENT
40 AND HIGHER	A, B OR C	A OR B	A OR B **	A ONLY
26 TO 39	A, B OR C	A OR B	A OR B	A OR B
0 TO 25	A, B OR C	A, B OR C	A, B OR C	A, B OR C

* IF SUPPORTS ARE BEHIND GUARDRAIL BUT NOT FULLY 1.7 m BEHIND FACE OF RAIL OR IF SIGN IS NOT 0.3 m BEHIND FACE OF CONCRETE BARRIER.

** 9 m CRITERION IS BASED UPON STRAIGHT ROADWAY AND A SLOPE OF 6 TO 1 OR FLATTER. SUPPORTS ON THE OUTSIDE OF CURVES OR LOCATED DOWN A SLOPE (STEEPER THAN 6 : 1) WILL REQUIRE USE OF CLASS A SUPPORTS.

E. BALLASTING

BALLASTING OF PORTABLE SUPPORTS SHALL BE WITH SANDBAGS PLACED WITHIN 0.3 m OF THE GROUND. IN NO CASE SHALL HARD OBJECTS BE USED FOR BALLAST.

F. STRENGTH OF SIGN SUPPORTS

THE CONTRACTOR SHALL CHOOSE SIGN SUPPORTS OF ADEQUATE STRENGTH AND WITH ADEQUATE FOUNDATIONS AND ANCHORAGE TO SUPPORT THE SIGN SIZES ERECTED. PROPRIETARY DEVICES SHALL NOT BE LOADED BEYOND THE LIMITS RECOMMENDED BY THE MANUFACTURER. SLIP-BASE TYPE BREAKAWAY BEAM CONNECTIONS SHALL BE AT LEAST PARTIALLY EMBEDDED IN CONCRETE CONSISTING OF A 0.3 m DEEP BY 0.3 m DIAMETER COLLAR. SIGN SUPPORTS WHICH FAIL UNDER TYPICAL WIND LOAD CONDITIONS SHALL BE IMMEDIATELY MODIFIED OR REPLACED WITH A SUPPORT OF ADEQUATE STRENGTH.

G. PROHIBITED SUPPORTS

THE FOLLOWING SUPPORT TYPES SHALL NOT BE PERMITTED ON PROJECTS:

- 1) SUPPORTS FABRICATED FROM AUTOMOTIVE AXLE DIFFERENTIAL ASSEMBLIES AND SIMILARLY HEAVY ASSEMBLIES WHICH CANNOT BE CONSIDERED BREAKAWAY TYPE.
- 2) SUPPORTS CONSISTING OF VERTICAL POSTS WITH ANGLED BRACES MADE FROM DRIVEPOST OR OTHER RIGID ELEMENTS.

CLASS A SUPPORTS

FIXED SUPPORTS

- 1) ALL #2 AND #3 POST WHEN INSTALLED SINGLY OR IN PAIRS (SIDE BY SIDE) ACCORDING TO THE DETAILS OF TC-41.20M. THE NUMBER OF SUPPORTS SHALL BE AS SHOWN ON TC-52.10M AND TC-52.20M.
- 2) THE FOLLOWING POST TYPES, WHEN INSTALLED SINGLY, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m:
 - a) - UP TO 102 X 102 mm WOOD.
 - b) - UP TO 51 mm DIAMETER SCHEDULE 40 STEEL PIPE.
 - c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.
 - d) - UP TO 56.4 mm SQUARE, 12 GAUGE WALL, PUNCHED STEEL POST.
 - e) - UP TO 152 X 203 mm WOOD WITH BREAKAWAY HOLES SHOWN BELOW.
- 3) THE FOLLOWING POST TYPES WHEN INSTALLED IN PAIRS (SIDE BY SIDE) WITH LESS THAN 2 m BETWEEN POSTS, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m:
 - a) - UP TO 102 X 102 mm WOOD.
 - b) - UP TO 51 mm DIAMETER SCHEDULE 40 STEEL PIPE.
 - c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.
 - d) - UP TO 51 mm SQUARE, 14 GAUGE WALL, PUNCHED STEEL POST.
- 4) FIXED TYPE III BARRICADES:
- 5) ALL BREAKAWAY CONNECTION BEAM SUPPORTS, WHEN INSTALLED ACCORDING TO THE PROPER DETAILS SHOWN ON TC-41.10M WITH A MINIMUM CLEAR DISTANCE BETWEEN SUPPORTS OF 2.1 m FOR SUPPORTS LARGER THAN W6 X 9.
- 6) ANY BREAKAWAY POST OR POST AND CONNECTION WHICH HAS BEEN CRASH TESTED AND APPROVED BY THE FHWA AS SATISFYING THE BREAKAWAY CRITERIA DESCRIBED IN 630.06.

(CONTINUED ON MT-105.11M)

M E T R I C

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE
04/25/94

TEMPORARY SIGN SUPPORT

STANDARD
CONSTRUCTION
DRAWING
MT-105.10M

APPROVED *[Signature]* ENGR. OF DESIGN SERVICES

CLASS A SUPPORTS

FIXED

DIRECTION OF TRAFFIC

WOOD POST WITH BREAKAWAY HOLES

51 mm DIA HOLES, BORED THRU PERPENDICULAR TO TRAFFIC

152 mm

203 mm

305 mm

76 mm

DIMENSION TO CENTER OF HOLE

GROUND LINE

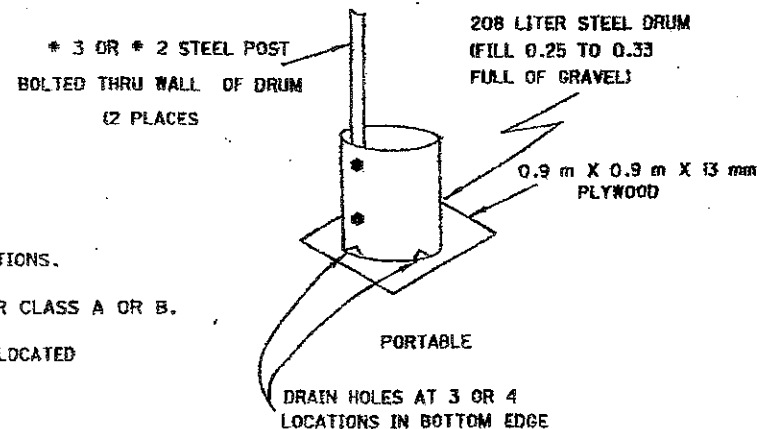
PCB

SET SCREWS

Diagram illustrating the assembly of a sign post:

- SIGN POST**
 - 102 X 102 mm WOOD
 - UP TO 76 mm DIA SCH 40 STEEL
 - 76 X 76 mm SQUARE STEEL TUBING
- FASTEN TO PAVEMENT OR TO TOP OF PCB WITH EXPANSION BOLTS, ETC. (DO NOT ATTACH INTO FINAL PAVEMENT SURFACE!)**
- METAL PLATE WITH SOCKET WELDED ON TO ACCOMMODATE POST**
- FIXED**

1. ALL BEAM TYPE SUPPORTS WITHOUT BREAKAWAY CONNECTIONS.
2. SUPPORTS SIMILAR TO BUT LARGER THAN PERMITTED FOR CLASS A OR B.
3. THE STEEL DRUM(S) SHOWN BELOW MAY BE USED ONLY WHEN LOCATED BEHIND GUARDRAIL OR BARRIER.



STUBBING STANDARD

Diagram illustrating the dimensions and components of a stubbing standard:

- BOOSTER POST**: The vertical post supporting the standard.
- DIRECTION OF TRAFFIC**: Indicated by an arrow pointing left.
- MINIMUM BOLT SPACING BETWEEN OUTER BOLTS**: 229 mm.
- BOLTS**: 8 mm diameter.
- APPROX 25 mm**: Dimension for the gap between the ground line and the base of the standard.
- GROUND LINE**: The horizontal line representing the ground level.
- STUB POST**: The horizontal post extending from the booster post.
- STUB HT.**: The height of the stub post, ranging from 305 mm TO 610 mm (MAX).
- 1.1 m**: The total height of the stubbing standard.

TOP OPTIONAL-IF USED
IT MUST BE GLUED TO
VERTICAL SUPPORTS

CONSTRUCT OF K12 SDR PVC
SEWER PIPE, DO NOT
GLUE JOINTS (EXCEPT TOP)
BUT THREAD A 6 mm
ROPE THRU ALL SECTIONS
TO TIE THEM TOGETHER

SANDBARS

1.2 m MIN.

1.8 m MIN.

PVC BREAKAWAY SIGN
SUPPORT AND TYPE III
BARRICADE

Diagram illustrating the components of an easel:

- CHAIR
- SANDRAGS
- CHA

EASEL

RAIL MATERIALS:

25 X 203 mm. OR SIX 203 mm COMMON LUMBER
203 mm X (16 mm TO 25 mm) THICK EXTERIOR PLYWOOD
EXTRUDED PLASTIC OR FORMED SHEET METAL WITH A 203 mm. WIDE
SURFACE AND OF SUFFICIENT STIFFNESS TO RESIST TYPICAL WIND
LOADS OF UP TO 147 kg/m², BUT HAVING A WEIGHT OF NOT
MORE THAN 7.5 kg/m.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE
04/25/94

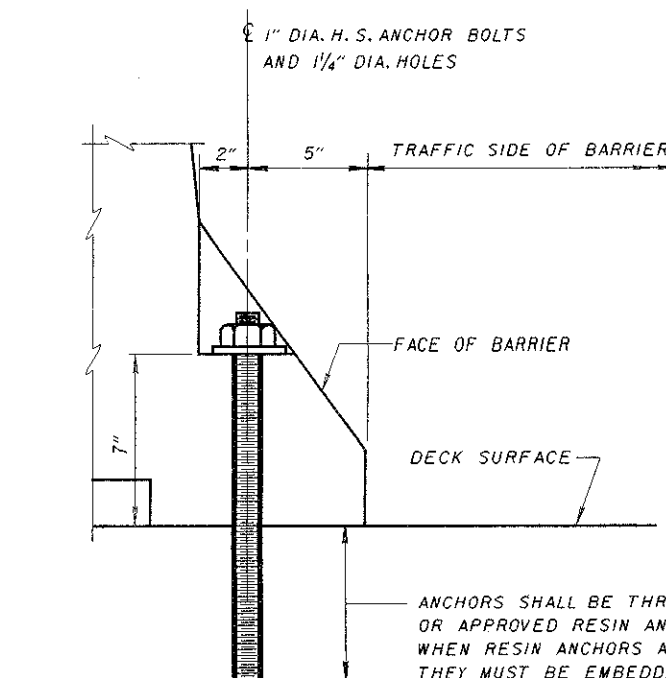
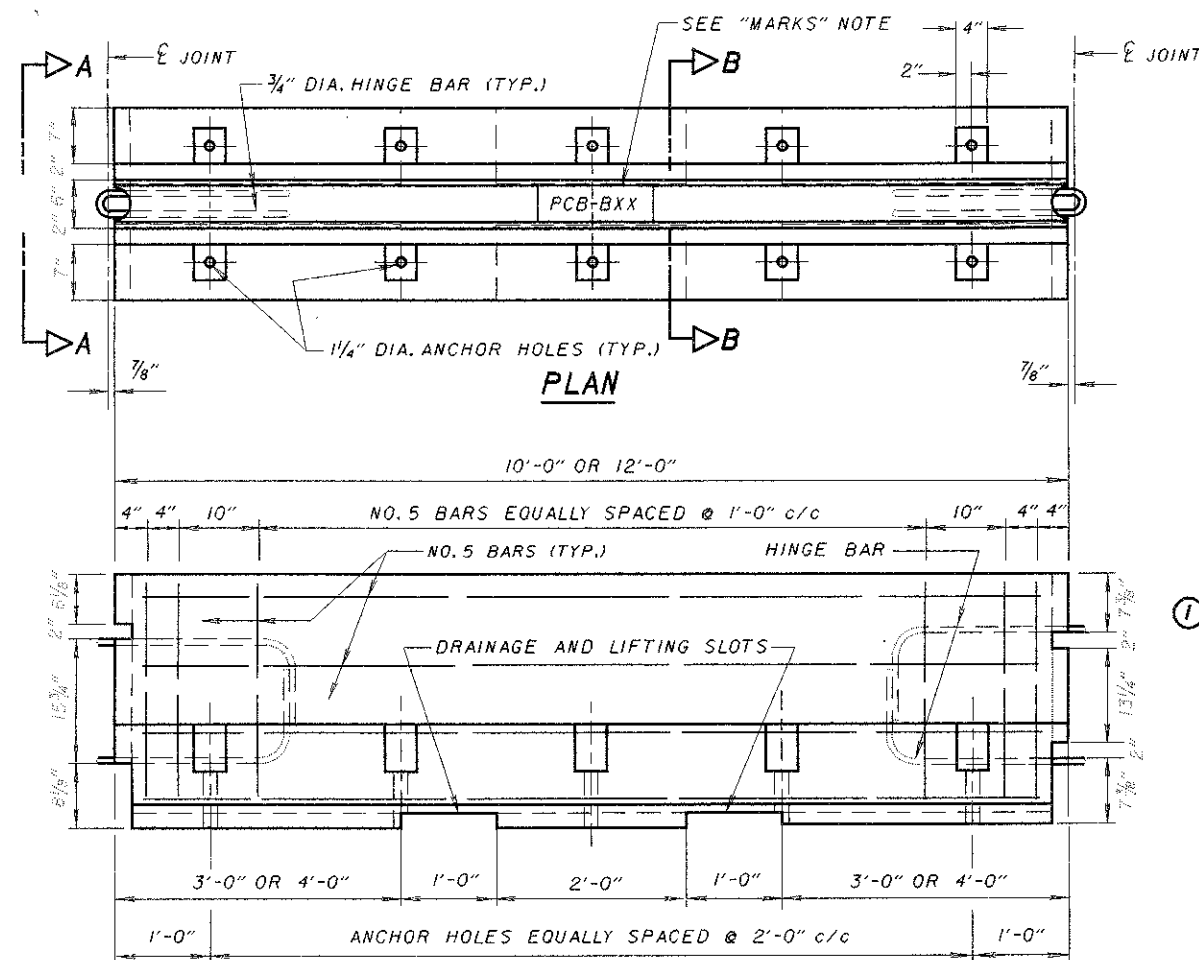
TEMPORARY SIGN SUPPORT

STANDARD
CONSTRUCTION
DRAWING.

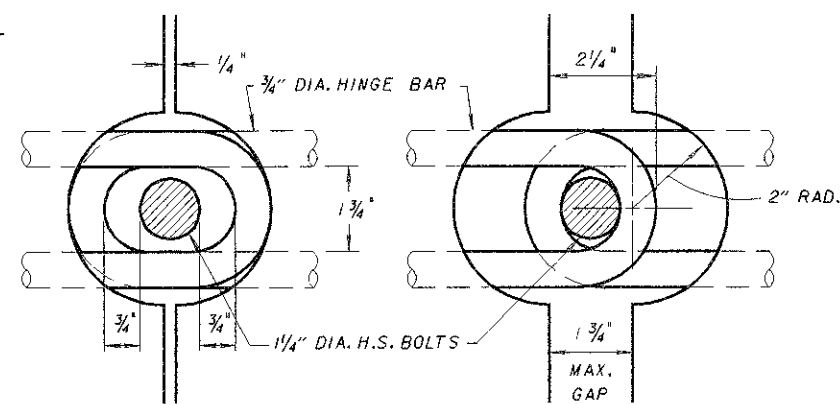
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APPROVED Long S. Cress ENGR. OF DESIGN SERVICES

M E T R I C



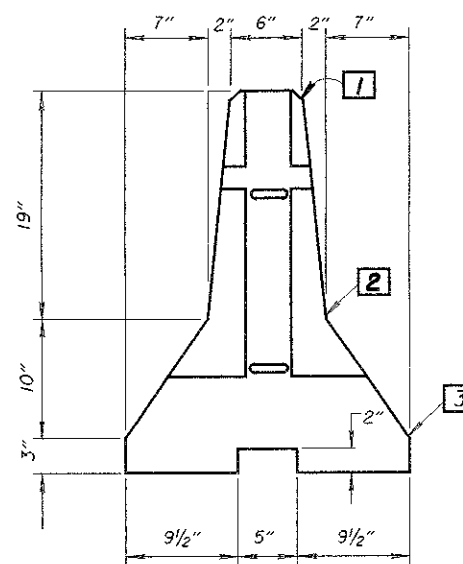
ANCHORS SHALL BE THRU BOLTS OR APPROVED RESIN ANCHORS. WHEN RESIN ANCHORS ARE USED, THEY MUST BE EMBEDDED A MINIMUM OF 6 1/2" INTO FIRM CONCRETE. WHEN NO LONGER NEEDED, ANCHORS SHALL BE REMOVED AS DIRECTED BY THE ENGINEER. WHERE DECK IS TO REMAIN, HOLES SHALL BE FILLED WITH AN EPOXY NON-SHRINK GROUT.



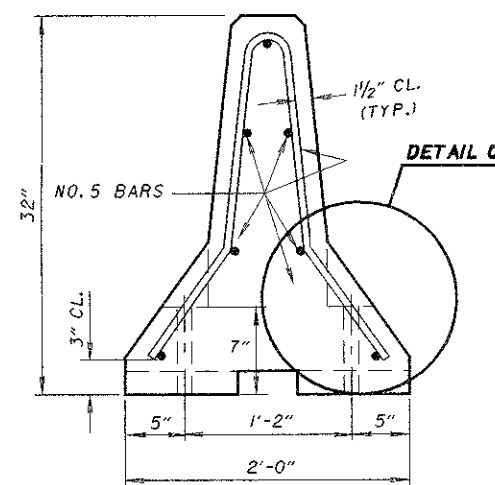
① CLOSED JOINT ② OPEN JOINT
JOINT CONNECTION DETAILS

① **BARRIERS** SHALL INITIALLY BE PLACED CLOSER TOGETHER SO BOLTS CAN BE EASILY INSERT-THROUGH HINGE BAR LOOPS.

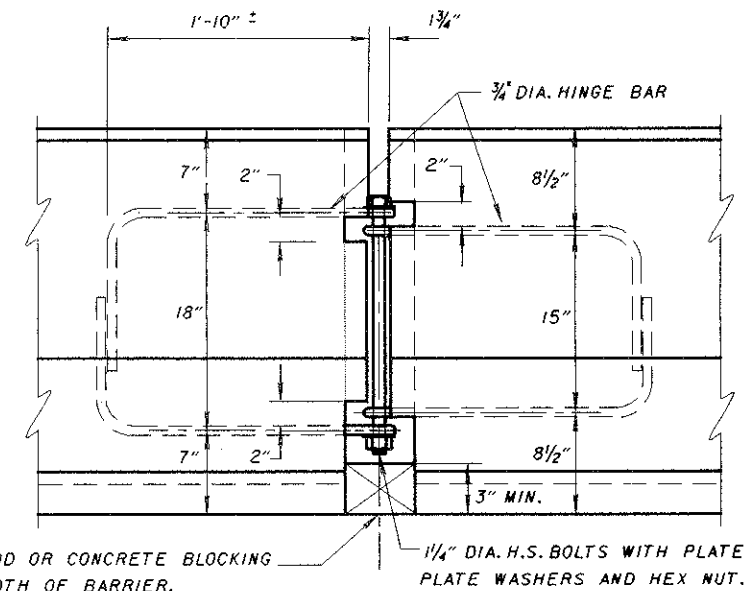
② **BARRIER JOINTS** SHALL BE FULLY OPEN BEFORE NUT IS TIGHTENED ONTO BOLT AND OPENING IS SNUGLY BLOCKED.



VIEW A-A



SECTION B-B



DETAIL AT HINGED CONNECTION

GENERAL NOTES

HARDWARE

BOLTS, DECK ANCHORING BOLTS AND ALL NUTS
AND WASHERS SHALL CONFORM TO ASTM A325.
THEY SHALL BE GALVANIZED IN ACCORDANCE
WITH CMS 711.02.

REINFORCING STEEL - ALL REINFORCING STEEL (INCLUDING THE ¾" DIA. HINGE BARS) SHALL MEET THE REQUIREMENTS OF CMS 509.02. HINGE BARS SHALL BE GALVANIZED AFTER FABRICATION.

CONCRETE - PORTABLE CONCRETE BARRIER SEGMENTS SHALL BE CONSTRUCTED OF CLASS C CONCRETE WITH A MINIMUM COMPRESSIVE STRESS OF 4,000 PSI.

BRIDGE DECK SURFACE PREPARATION:

THE SURFACE AREA ON WHICH THE PORTABLE CONCRETE BARRIERS WILL REST SHALL BE CLEAR OF ALL LOOSE SAND, GRAVEL, DIRT AND DEBRIS.

ANY IRREGULARITIES IN THE BRIDGE DECK AREAS,
UNLESS JUDGED BY THE ENGINEER TO BE INCON-
SEQUENTIAL, SHALL BE LEVELED WITH GROUT
AND/OR ASPHALT.

ASPHALT ROLL ROOFING SHALL BE PLACED ON THOSE BRIDGE DECK AREAS, AS JUDGED BY THE ENGINEER, TO HAVE A SURFACE ROUGHNESS WHICH WOULD INHIBIT FRICTION CONTACT BETWEEN BARRIER SEGMENTS AND DECK.

ANCHORS:

ONCE ALL BARRIER SECTIONS HAVE BEEN PROPERLY SECURED, ANY PORTION OF AN ANCHOR THAT PROTRUDES BEYOND THE FACE OF THE BARRIER SHALL BE REMOVED.

MARKS - ALL BARRIER SEGMENTS SHALL BE CLEARLY MARKED. WHERE "XX" IS THE YEAR IN WHICH THE BARRIER WAS CAST. EACH SEGMENT SHALL ALSO HAVE, ON IT'S TOP SURFACE, A UNIQUE IDENTIFICATION OF THE MANUFACTURER AND, SOMEWHERE ON THE BARRIER, THE DAY AND MONTH THE BARRIER WAS CAST.

ALL MARKINGS SHALL BE PERMANENTLY IMPRINTED ON THE BARRIER USING A MINIMUM OF 2" HIGH LETTERING.

HANDLING DEVICES MAY BE USED IN LIEU OF THE LIFTING SLOTS FOR MOVING THE BARRIER. THEY MAY BE OF ANY DESIGN SUFFICIENT TO HANDLE THE WEIGHT OF THE SECTION BEING LIFTED. NO REMAINING HANDLING DEVICES SHALL PROTRUDE ABOVE THE BARRIER SURFACE.

THE PROJECT PLANS SHALL INDICATE THE NUMBER OF ANCHORS PER SEGMENT, AS WELL AS THE BARRIER LOCATION ON THE BRIDGE DECK, AND ANY SPECIAL ANCHORAGE REQUIREMENTS.

"J-J HOOKS" CONNECTIONS MAY BE UTILIZED IN LIEU OF THE END CONNECTIONS DETAILED. EACH BRIDGE BARRIER SECTION USING "J-J HOOKS" SHALL REQUIRE ANCHORING AS PER DETAIL C. THE NUMBER OF ANCHORS SHALL BE THE GREATER OF TWO ANCHORS, IF THE PROJECT PLANS DO NOT SPECIFY A NUMBER OF ANCHORS PER BARRIER SECTION, OR DOUBLE THE NUMBER OF ANCHORS SPECIFIED BY THE PLANS. "J-J HOOKS" IS A TRADEMARK OF EASI-SET INDUSTRIES, P.O. BOX 300, MIDLAND, VA 22728.

NOTES

PORTABLE CONCRETE BARRIER (PCB) PCB, as shown, shall not be used on bridge deck edges. PCB, Bridge Mounted, shall be used at such locations in accordance with the Office of Structural Engineering's Standard Drawing PCB-91M.

WIRE FABRIC: Shall meet the requirements of CMS 709.10.

CONNECTING HARDWARE: Bolts, washers and hex nuts shall be galvanized after fabrication as per CMS 711.02 and shall meet the requirements of CMS 711.09 except that the Rotational Capacity test specified in ASTM A 325M shall be waived.

In lieu of the pin and loop connections detailed on this Standard Construction Drawing, barrier sections with "J-J Hooks" end connections may be utilized.

Transition barrier sections with pin and loop connections on one end and "J-J Hooks" on the other shall be used to connect runs of "J-J Hooks" barrier to other permitted barrier types. The heights of the transition sections shall be the same as the barrier runs being connected. "J-J Hooks" is a trademark of East-Sei Industries, P.O. Box 300, Midland, VA 22728, (540) 439-8911 or (800) 547-4045.

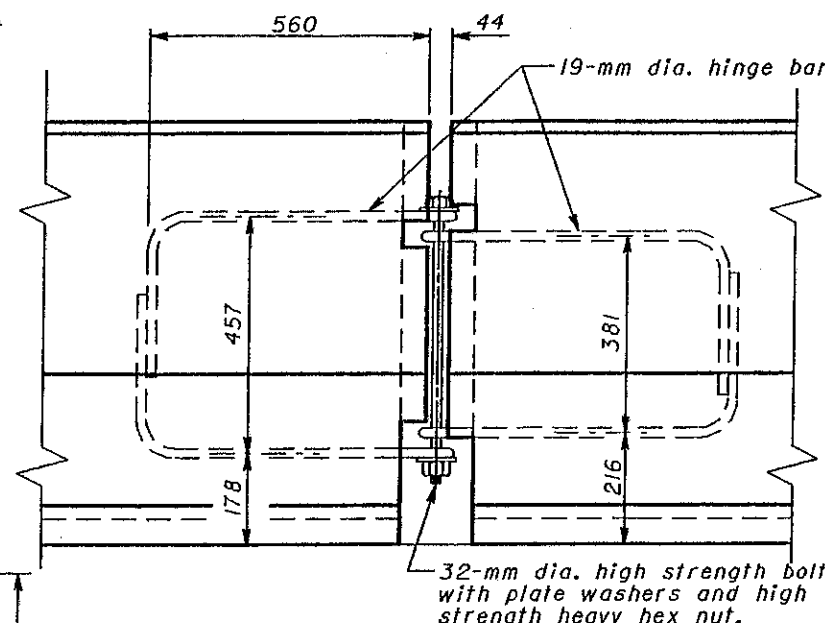
HINGE AND REINFORCING BARS: The 19-mm hinge bars and #16M reinforcing bars shall meet the requirements of CMS 509.

HANDLING DEVICES: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.

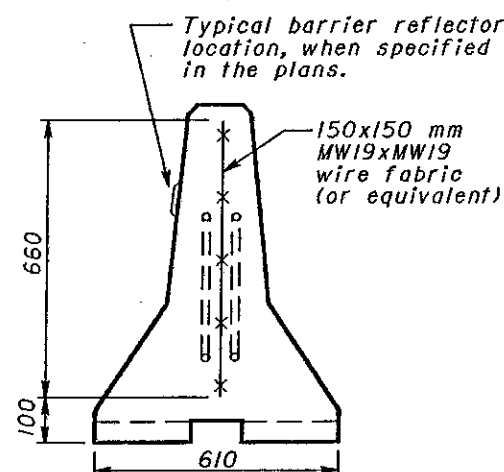
MARKING: All barrier segments shall be marked as shown, where XX indicates the year cast. These markings shall be permanently impressed in the barrier using a minimum of 50-mm high lettering.

Each segment shall have, on its top, a unique identification as to its manufacturer and, somewhere on the barrier, the day and month that the barrier was manufactured.

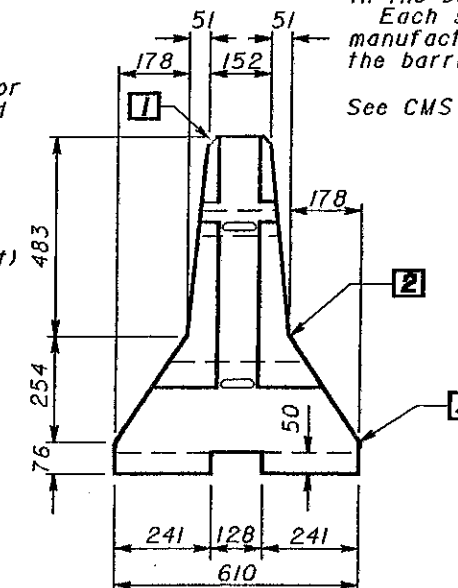
See CMS 622 for additional information.



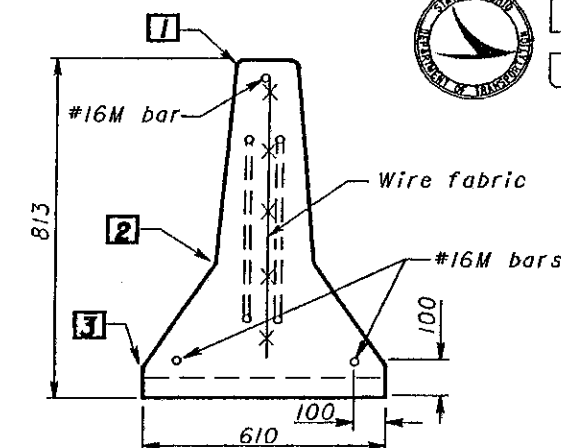
DETAIL AT HINGED CONNECTION



SECTION A-A



VIEW B-B



SECTION C-C

*All dimensions are in millimeters
unless otherwise noted.*

This Drawing Replaces MC-9.2.

OHIO DEPARTMENT OF TRANSPORTATION

**813-mm PORTABLE
CONCRETE BARRIER**

DATE _____

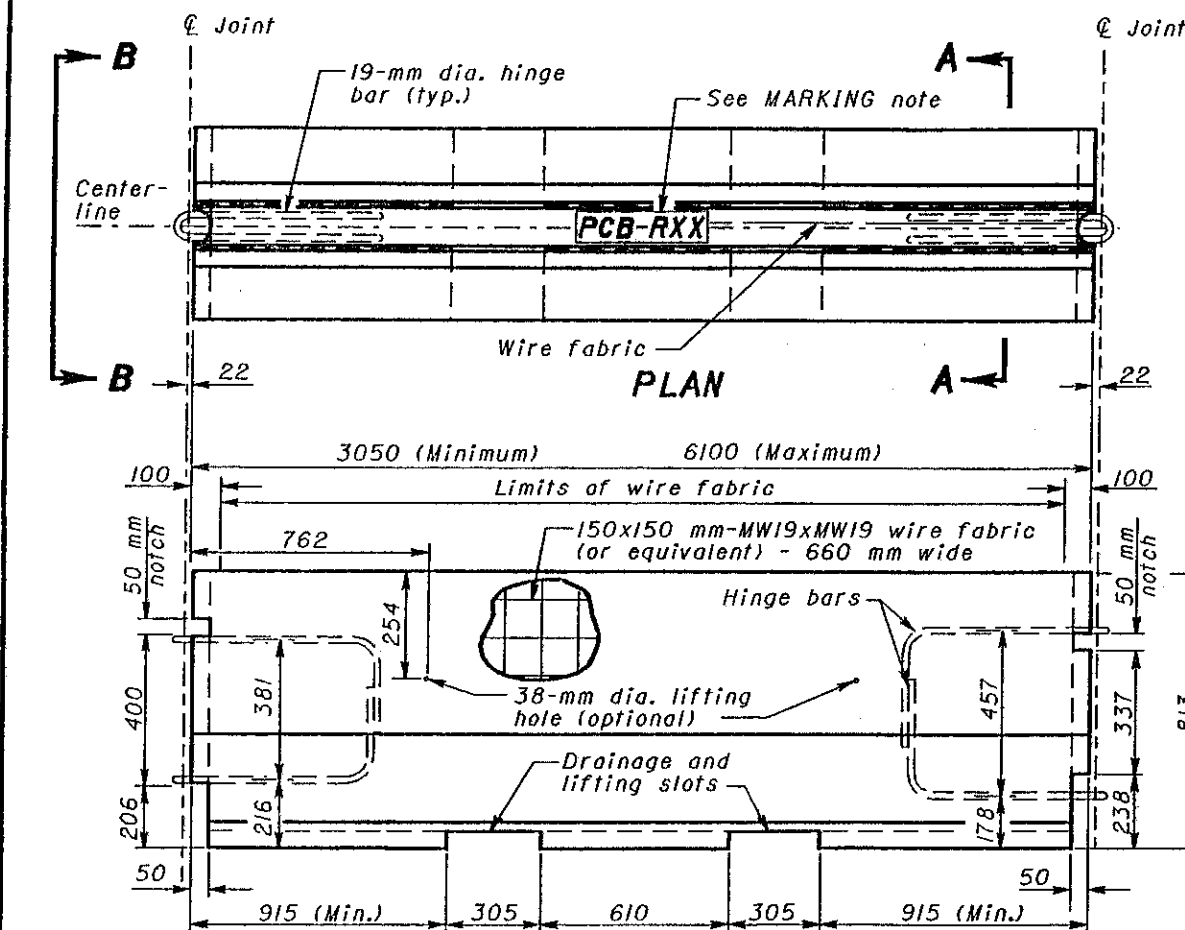
6-30-95
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STANDARD
CONSTRUCTION
DRAWING **RM-4.2M**

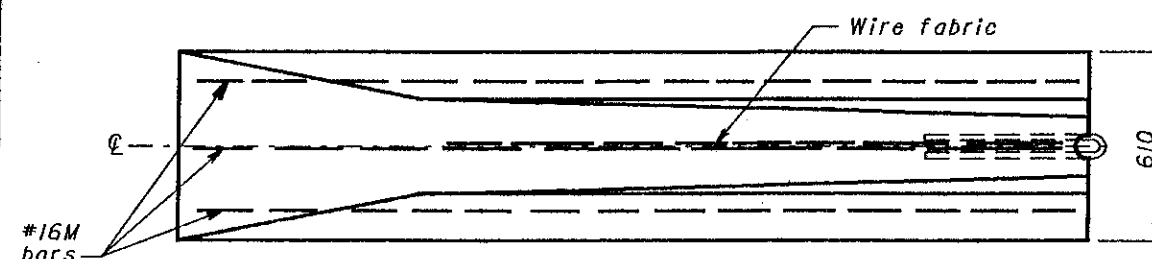
APPROVED Paul T. Sullivan

LEGEND

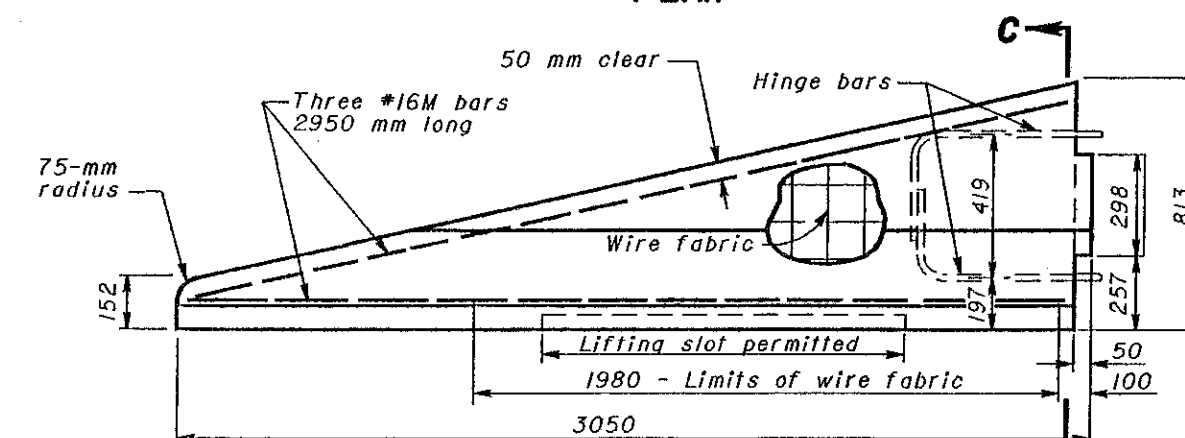
- 1** 25-mm radius or 19-mm chamfer, all top and end corners.
- 2** Permissible 250-mm radius.
- 3** Permissible 25-mm radius.



ELEVATION
BARRIER DETAILS

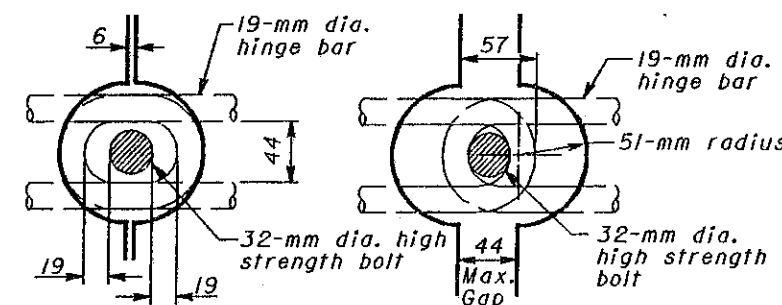


PLAN



ELEVATION

TAPERED END SECTION DETAILS



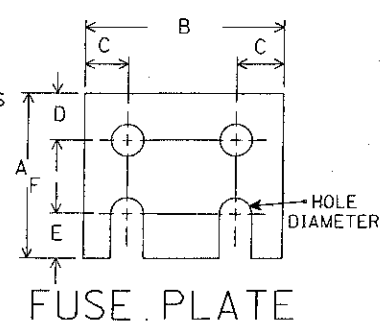
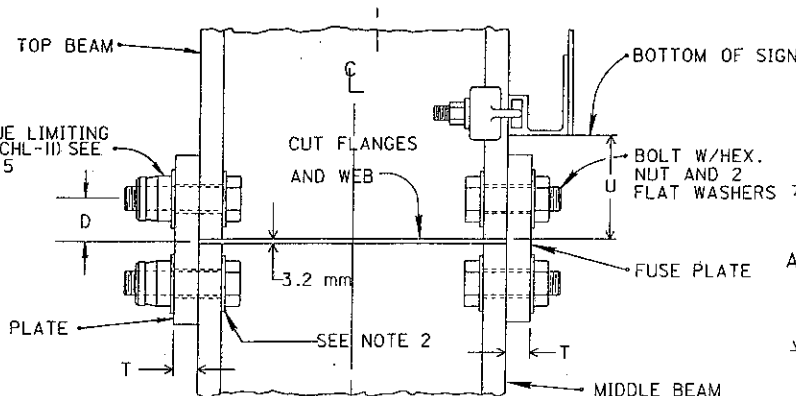
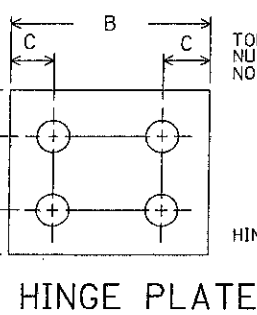
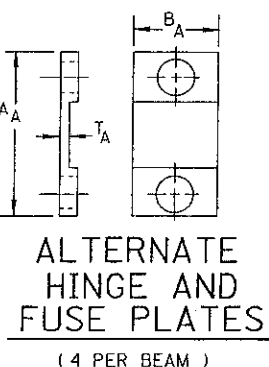
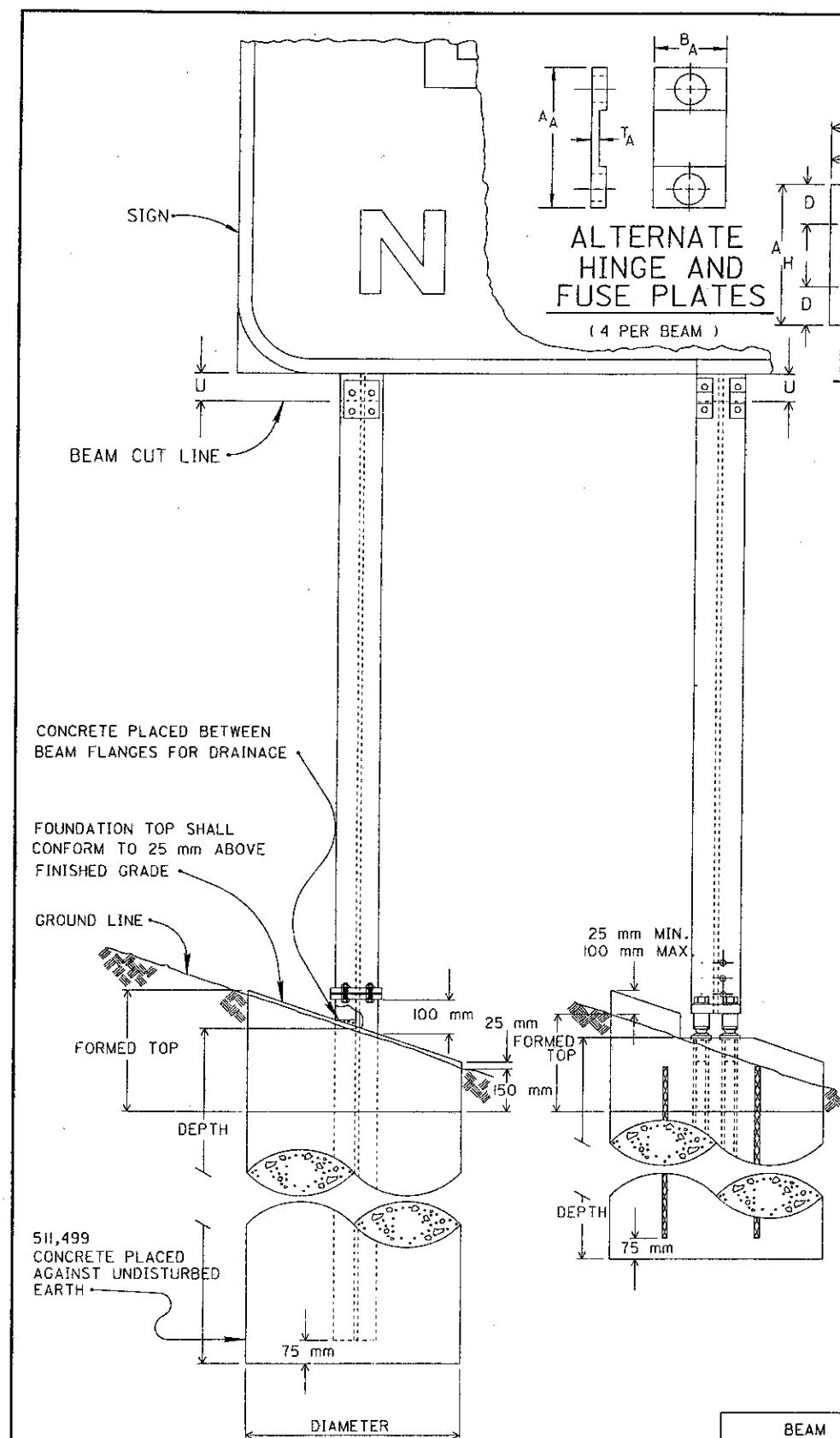
CLOSED JOINT

Barriers shall initially be placed close together so that bolts can be easily inserted through hinge bar loop.

OPEN JOINT

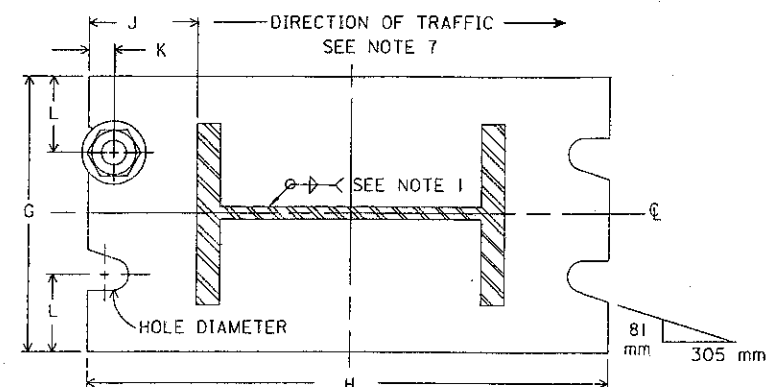
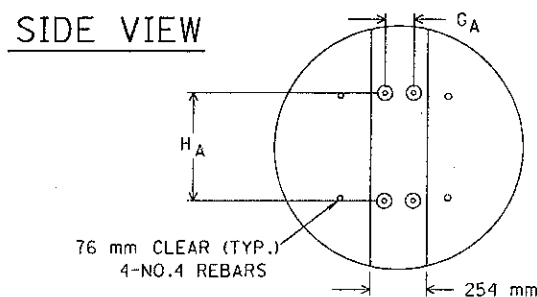
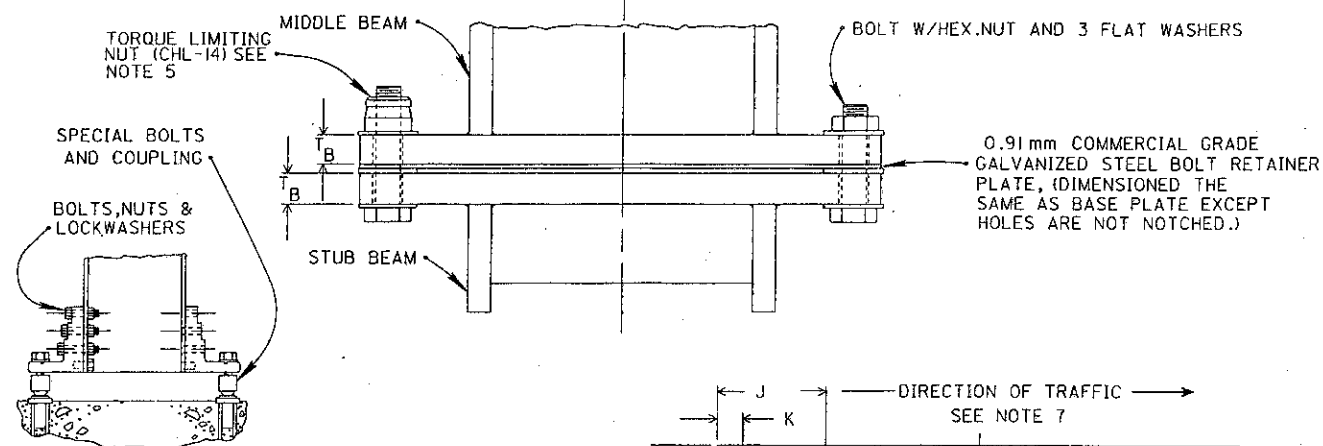
Barrier joints shall be fully open before the nut is tightened onto bolt.

JOINT CONNECTION DETAILS



ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED

BEAM		HINGE AND FUSE PLATE DIMENSIONS											ALTERNATE DESIGN SEE NOTE 8			
TYPE	SIZE	A _H	A _F	B	C	D	E	T	U	HOLE DIA.	BOLT SIZE	MIN. PRELOAD (kg)	A	B	BOLT SIZE	T
S4 X 7.7	102 x 67	105	92	67	14	25	13	4.8	64	14	13	4535	95	25	13	1.80
W6 X 9	149 x 102	105	92	102	22	25	13	4.8	64	14	13	4535	95	25	13	1.80
W10 X 12	244 x 102	156	137	102	22	38	19	4.8	90	21	19	11339	95	25	13	1.80
W8 X 18	206 x 133	181	159	133	32	45	22	6.4	102	24	22	15875	121	38	19	2.87
W10 X 22	257 x 146	206	181	146	38	51	25	8	114	27	25	20865	121	38	19	2.87
W12 X 30	314 x 165	206	181	165	38	51	25	8	114	27	25	20865	121	38	19	2.87



ALL DIMENSIONS IN MILLIMETERS, UNLESS OTHERWISE NOTED

BEAM		FOUNDATIONS			BASE PLATE DIMENSIONS									ALTERNATE DESIGN SEE NOTE 8		
		DIA. (METER)	DEPTH (METER)	CONCRETE m ³ / EA	DIMENSIONS						HOLE DIA.	BOLT SIZE	MAX. TORQUE N·m	G A	H A	BOLT SIZE
					G	H	J	K	L	T _B						
S4 X 7.7	102 X 67	0.5	1.2	0.24	102	203	51	13	25	19	14	13	22.6	108	195	13
W6 X 9	149 X 102	0.5	1.5	0.30	140	254	52	13	25	19	14	13	22.6	108	243	13
W10 X 12	244 X 102	0.8	1.8	0.91	203	368	59	19	38	19	21	19	85	108	346	13
W8 X 18	206 X 133	0.8	1.8	0.91	203	368	83	19	38	25	21	19	85	76	413	13
W10 X 22	257 X 146	0.8	2.1	1.06	203	368	59	24	51	25	27	25	150	102	465	16
W12 X 30	314 X 165	0.8	2.5	1.26	254	432	62	24	51	32	27	25	150	102	519	16

NOTES

1. BASE PLATE WELD SIZE SHALL BE EQUAL TO THE BEAM FLANGE AND WEB THICKNESS RESPECTIVELY, BUT NO LESS THAN 6.4 mm IN EITHER INSTANCE.
2. BEVELED WASHERS SHALL BE USED WITH THE S4X7.7 BEAM AND SHALL BE MALLEABLE IRON CONFORMING WITH ASTM A47 GRADE 35018.
3. FUSE AND HINGE PLATE CONNECTIONS SHALL BE TIGHTENED IN THE SHOP FOLLOWING A METHOD APPROVED BY THE ENGINEER TO PRODUCE THE MINIMUM BOLT PRELOAD SPECIFIED.
4. THE FOLLOWING PROCEDURE SHALL BE USED IN ASSEMBLING THE BREAKAWAY BASE PLATE:

AFTER ALL BOLTS, WASHERS, STANDARD NUTS AND BOLT RETAINER PLATE ARE IN PLACE, TIGHTEN ALL STANDARD NUTS SNUGLY WITH A 305 mm WRENCH. LOOSEN EACH BOLT IN TURN AND RETIGHTEN IN A SYSTEMATIC MANNER TO THE SPECIFIED MAXIMUM TORQUE. WRENCHES SHALL BE CALIBRATED AT LEAST ONCE EACH WORKING DAY FOR EACH BOLT DIAMETER BEING TORQUED. BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH.

5. IN LIEU OF THE STANDARD NUTS AND PROCEDURES OUTLINED IN 3 AND 4 ABOVE, THE SUPPORTS MAY BE ASSEMBLED USING TORQUE LIMITING NUTS. EACH NUT SHALL BE TIGHTENED WITH SUFFICIENT TORQUE APPLIED UNTIL THE UPPER WRENCHING SURFACE HAS SHEARED AWAY FROM THE STRUCTURAL BODY OF THE NUT. FUSE AND HINGE PLATES SHALL BE SHOP ASSEMBLED FOLLOWING THIS PROCEDURE. THE NUTS USED SHALL BE AS MANUFACTURED BY HI-SHEAR CORP. TORRANCE, CALIFORNIA; VOI SHAN INDUSTRIES - CULVERT CITY, CALIFORNIA; STANDARD PRESSED STEEL - JENKINTOWN, PENNSYLVANIA OR APPROVED EQUAL.

THE TORQUE LIMITING NUT PART NUMBER CHL - 14 SHALL BE USED FOR THE BASE PLATE, CHL - 11 FOR THE FUSE AND HINGE PLATES.

6. FOR BEAMS SUBJECT TO IMPACT FROM OPPOSITE DIRECTIONS (SUCH AS IN FREEWAY MEDIANS) PROVIDE FUSE PLATES ON BOTH SIDES.
7. NOTCHES SHOWN FOR INSTALLATION TO THE RIGHT OF TRAFFIC. FOR INSTALLATIONS TO THE LEFT OF TRAFFIC, FABRICATE WITH SKEWED EDGE OF NOTCHES REVERSED FROM THAT SHOWN.
8. DIMENSIONS SHOWN FOR ALTERNATE DESIGNS ARE APPROXIMATE. SPECIFIED DIMENSIONS FOR ALTERNATE DESIGNS REQUIRE PREQUALIFICATION. AN APPROVED LIST OF SUPPLIERS IS MAINTAINED BY O.D.O.T. PAYMENT FOR ALTERNATE DESIGNS WILL BE BASED ON THE PLAN QUANTITIES FOR EMBEDDED BEAMS.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

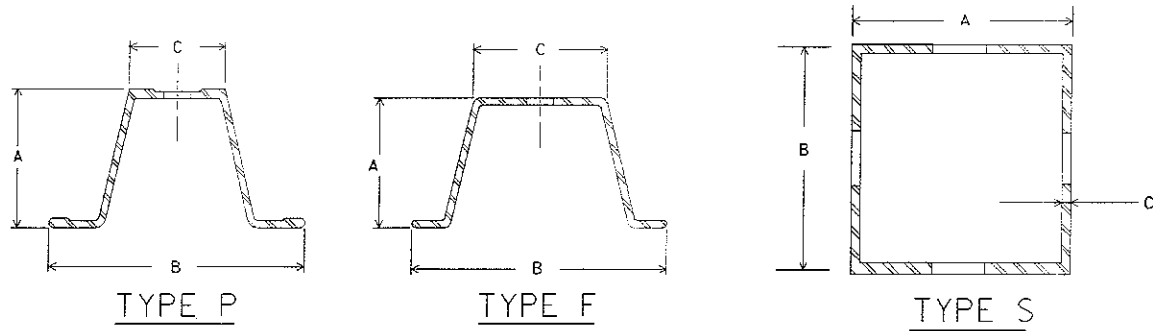
STRUCTURAL BEAM
SIGN SUPPORTS

STANDARD
CONSTRUCTION
DRAWING

TC-41.10M

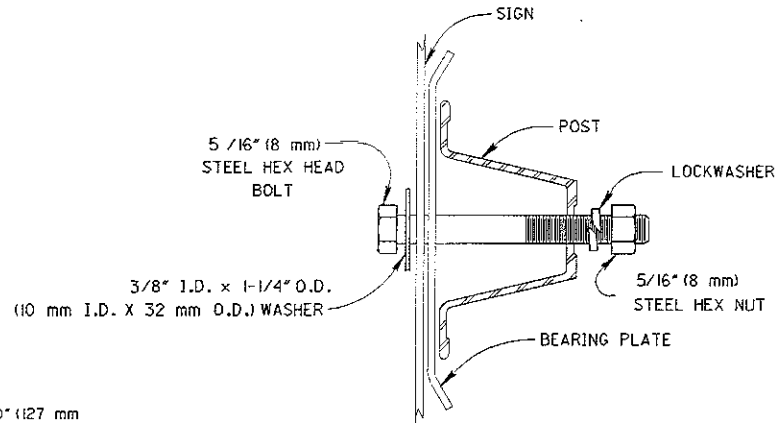
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DATE
03/31/94

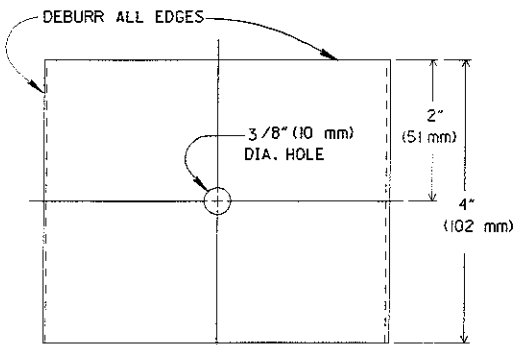
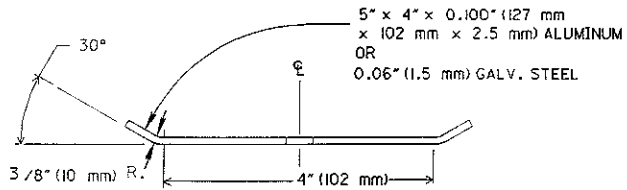


POST NO.	TYPE	LB/FT	POST DIMENSIONS (INCHES)			ANCHOR DIMENSIONS			NUMBER OF POSTS PERMITTED IN SEVEN FOOT PATH IN EXPOSED LOCATIONS
			A	B	C	A	B	C	
1	F	1.12	0.875	2.063	0.813				
	P	2.00	1.469	3.063	1.281				2
	F	2.00	1.516	3.125	1.250				2
2	S		1.750	1.750	0.083	2.000	2.000	0.105	2
	P	3.00	1.875	3.500	1.313				2
	F	3.00	1.750	3.500	1.625				2
3	S		2.00	2.00	0.083	2.250	2.250	0.105	2
	P	4.00	TWO NO.2 POST						0
	F	4.00	TWO NO.2 POST						0
4	S		2.500	2.500	0.105	3.000	3.000	0.188	1
	P	6.00	TWO NO.3 POST						0
	F	6.00	TWO NO.3 POST						0

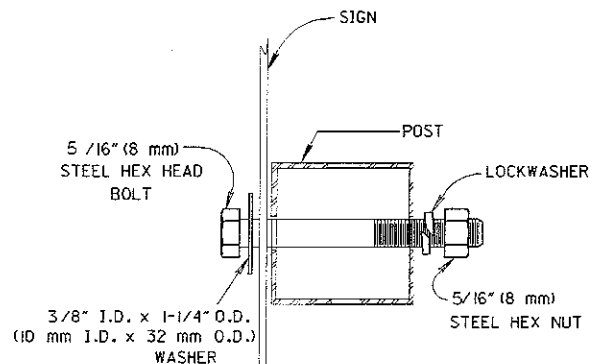
POST NO.	TYPE	Kg/m	POST DIMENSIONS (mm)			ANCHOR DIMENSIONS			NUMBER OF POSTS PERMITTED IN 2.1m PATH IN EXPOSED LOCATIONS
			A	B	C	A	B	C	
1	F	1.7	22	52	21				
	P	3.0	37	78	33				2
	F	3.0	39	79	32				2
2	S		44	44	2.1	51	51	2.7	2
	P	4.5	48	89	33				2
	F	4.5	44	89	41				2
3	S		51	51	2.1	57	57	2.7	2
	P	6.0	TWO NO.2 POST						0
	F	6.0	TWO NO.2 POST						0
4	S		63	63	2.7	76	76	4.8	1
	P	9.0	TWO NO.3 POST						0
	F	9.0	TWO NO.3 POST						0



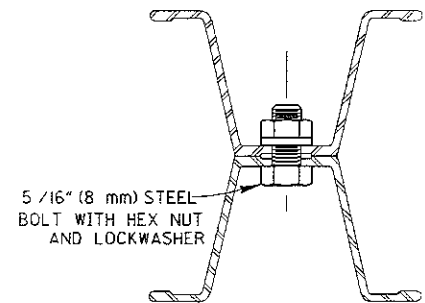
U - CHANNEL
SIGN ATTACHMENT DETAIL



BEARING PLATE



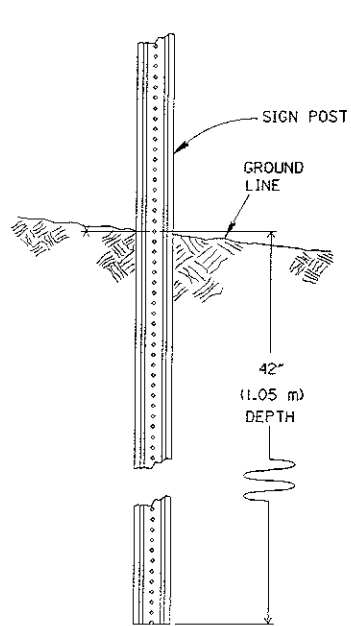
SQUARE POST
SIGN ATTACHMENT DETAIL



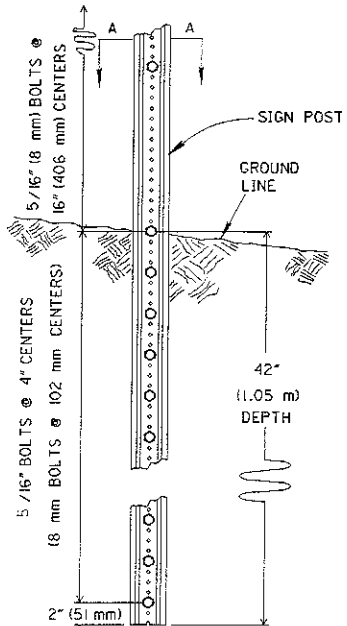
SECTION A - A

NOTES

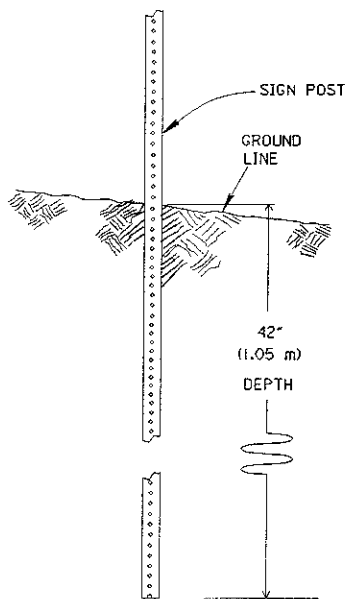
1. Install number 4 type P and F posts, and number 6 type P and F posts, only in protected locations (e.g. behind guardrail). Install two post installations of number 4 type S posts within 7 foot (2.1m) path only in protected locations.
2. Use of anchor base with No. 2 and No. 3 square post is optional. Use of anchor base with No. 4 square post is required.
3. Square post may have die-cut knockouts or open holes.



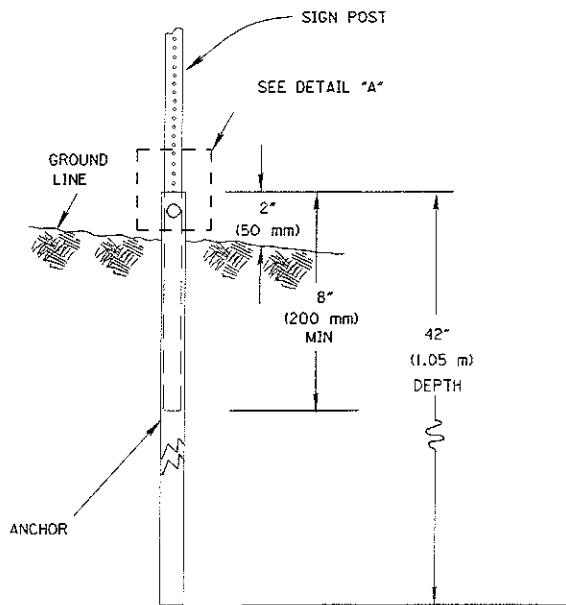
TYPICAL NO. 1, NO. 2
AND NO. 3 U - CHANNEL
DRIVEN INSTALLATION



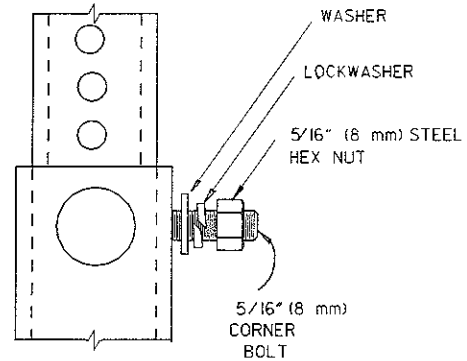
TYPICAL NO. 4 AND
NO. 6 U - CHANNEL
DRIVEN INSTALLATION



TYPICAL SQUARE POST
DRIVEN INSTALLATION

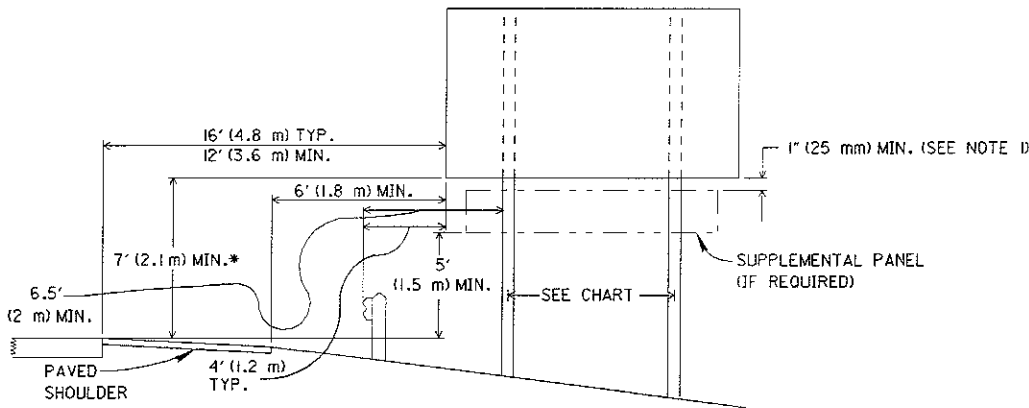


TYPICAL SQUARE POST ANCHOR
BASE INSTALLATION



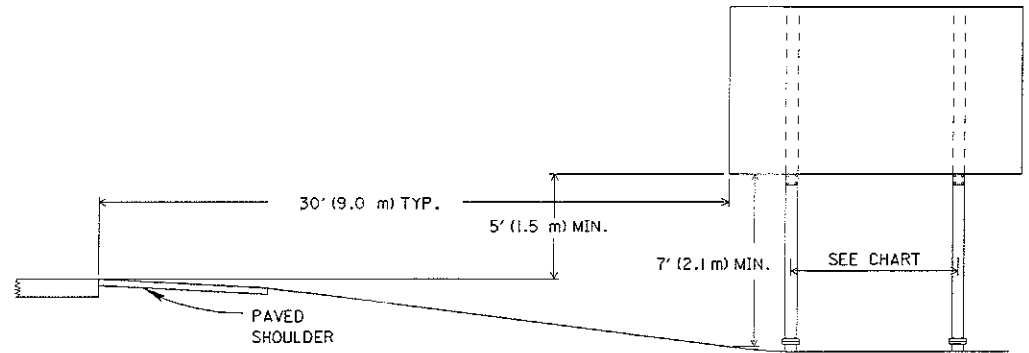
DETAIL "A"

FREEWAYS AND EXPRESSWAYS

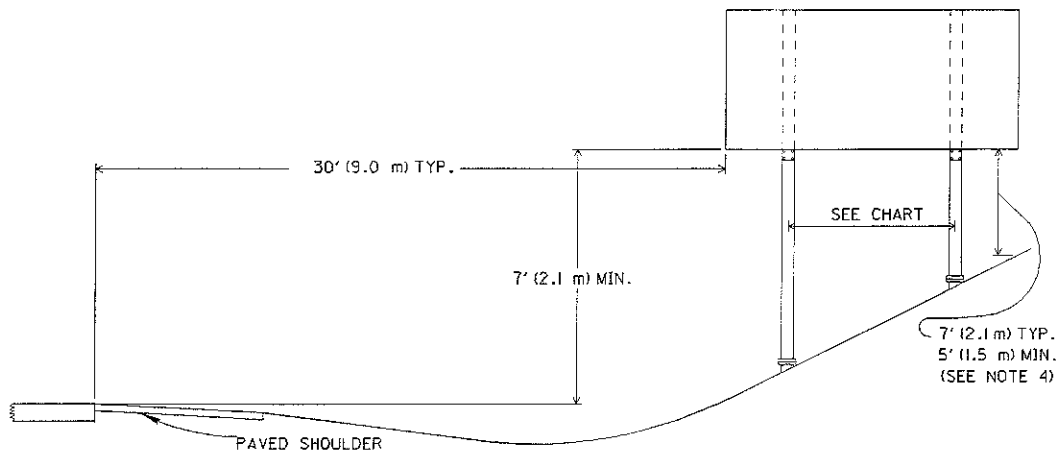


TYPICAL INSTALLATION WITH GUARDRAIL

* 8' (2.4 m) MIN. WITH SUPPLEMENTAL PANEL

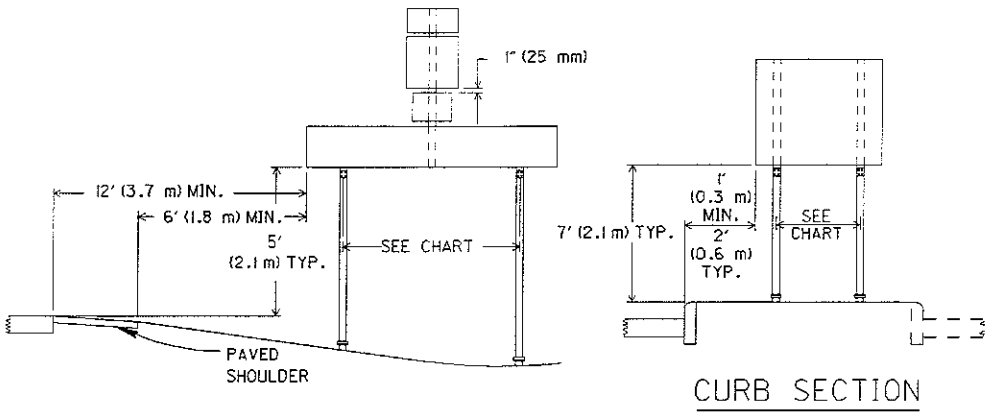


TYPICAL INSTALLATION, FILL SECTION, 30' (9.1 m) OFFSET

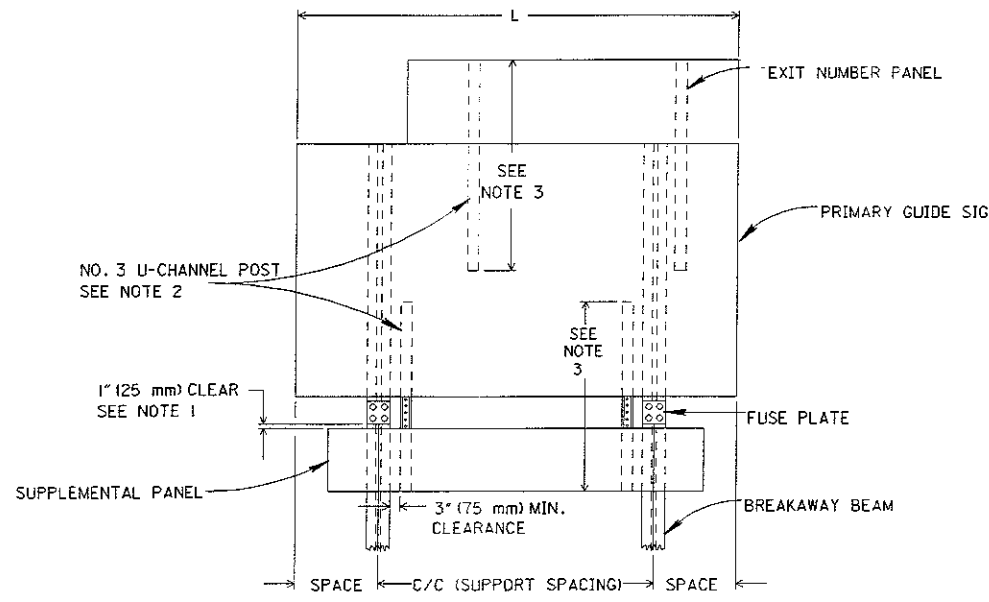


TYPICAL INSTALLATION, CUT SECTION, 30' (9.0 m) OFFSET

STREETS-RAMPS-HIGHWAYS



CURB SECTION



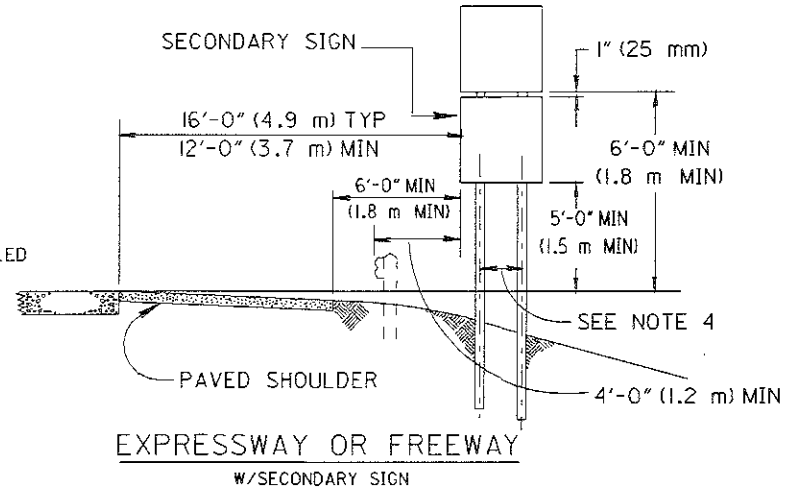
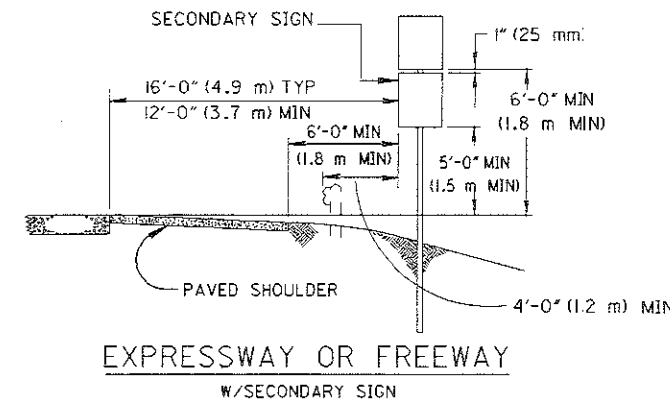
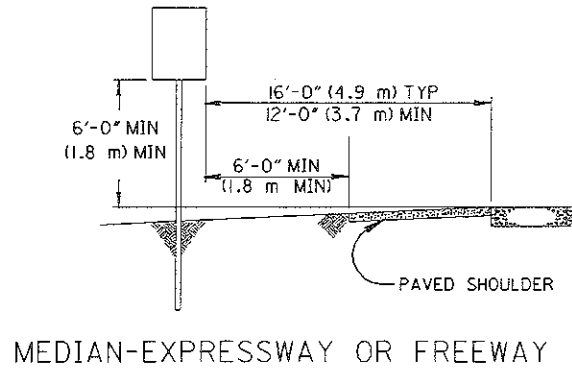
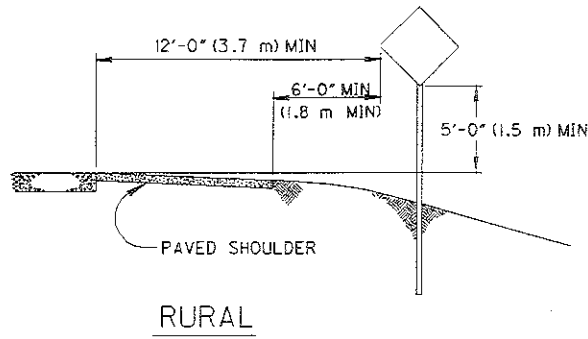
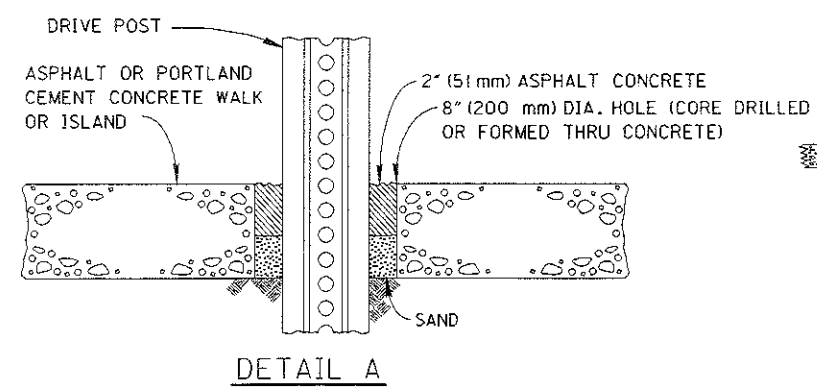
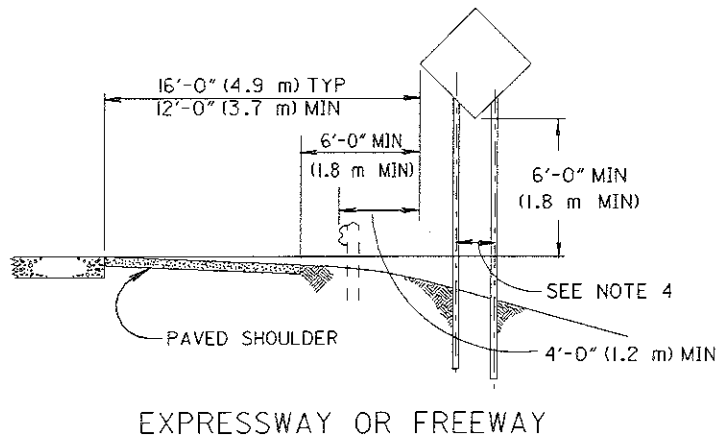
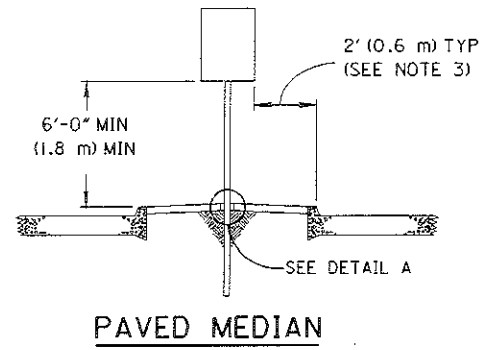
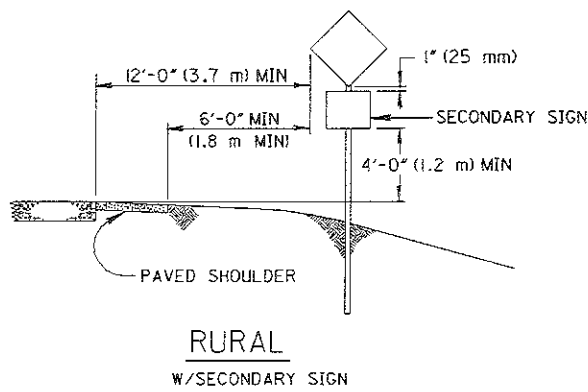
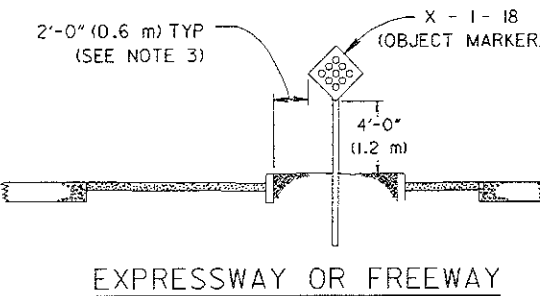
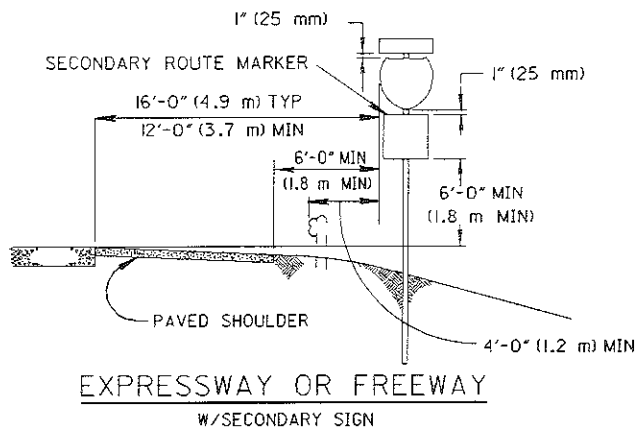
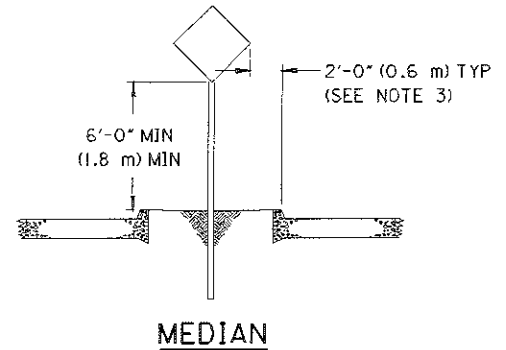
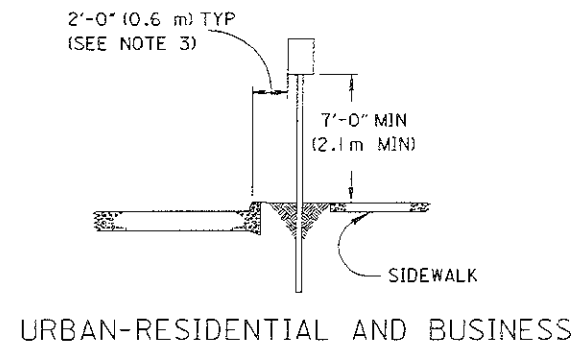
SUPPLEMENTAL PANEL ATTACHMENT

NOTES

1. Mount supplemental panels 1" (25 mm) below the fuse plate on breakaway beam installations and 1" (25 mm) minimum below the guide sign when the sign supports are rigid beams.
2. Attach No. 3 U-channel drive post to both the guide sign and the exit number or other supplemental panels by mounting clips fastened alternately at each horizontal extrusion and both sides at the top and bottom of the posts. Do not make any connections between the supplemental panel and breakaway beams.
3. Length of post shall be 2.5 times the height of the supplemental panel. The post spacing shall be as per the support spacing chart.
4. Use 5' (1.5 m) minimum mounting height above ground if back slopes are greater than 3 to 1.
5. Locate the exit number panel toward the top right edge of the sign for right exits and toward the top left edge of the sign for left exits.

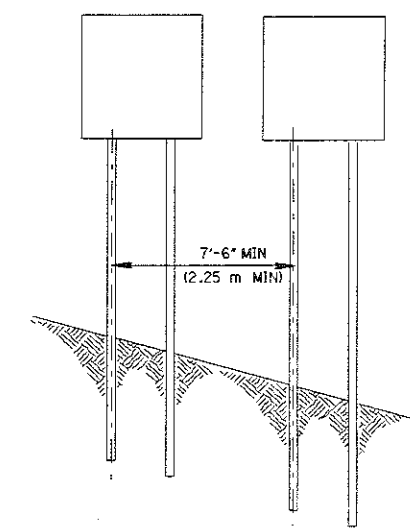
SUPPORT SPACING CHART							
2 SUPPORTS				3 SUPPORTS			
L (FEET)	SPACING (FEET)			L (FEET)	SPACING (FEET)		
	SPACE	C/c	SPACE		SPACE	C/c	SPACE
5	1.10	2.80	1.10	20	2.50	7.50	2.50
6	1.32	3.36	1.32	21	2.94	7.56	2.94
7	1.54	3.92	1.54	22	3.08	7.92	3.08
8	1.76	4.48	1.76	23	3.22	8.28	3.22
9	1.98	5.04	1.98	24	3.36	8.64	3.36
10	2.20	5.60	2.20	25	3.50	9.00	3.50
11	1.75	7.50	1.75	26	3.64	9.36	3.64
12	2.25	7.50	2.25	27	3.78	9.72	3.78
13	2.75	7.50	2.75	28	3.92	10.08	3.92
14	3.08	7.84	3.08				
15	3.30	8.40	3.30				
16	3.52	8.96	3.52				
17	3.74	9.52	3.74				
18	3.96	10.08	3.96				
19	4.18	10.64	4.18				

SUPPORT SPACING CHART							
2 SUPPORTS				3 SUPPORTS			
L (meters)	SPACING (meters)			L (meters)	SPACING (meters)		
	SPACE	C/c	SPACE		SPACE	C/c	SPACE
1.5	0.33	0.84	0.33	6.0	0.74	2.26	0.74
1.8	0.40	1.00	0.40	6.3	0.88	2.27	0.88
2.1	0.46	1.18	0.46	6.6	0.92	2.38	0.92
2.4	0.52	1.36	0.52	6.9	0.97	2.48	0.97
2.7	0.59	1.52	0.59	7.2	1.00	2.60	1.00
3.0	0.65	1.70	0.65	7.5	1.00	2.75	1.00
3.3	0.52	2.26	0.52	7.8	1.05	2.85	1.05
3.6	0.67	2.26	0.67	8.1	1.10	2.95	1.10
3.9	0.82	2.26	0.82	8.4	1.15	3.05	1.15
4.2	0.92	2.36	0.92				
4.5	0.99	2.52	0.99				
4.8	1.05	2.70	1.05				
5.1	1.10	2.90	1.10				
5.4	1.20	3.00	1.20				
5.7	1.23	3.24	1.23				



NOTES

1. See drawing TC-41.20 for details on yielding supports.
2. All signs shall be placed 90° to the roadway, except parking signs with arrow shall be set at an angle of not less than 30° nor more than 45° with a line parallel to the flow of traffic.
3. A clearance of 1 foot (0.3 m) is permissible where sidewalk width is limited or where existing poles are close to the curb.
4. See drawings TC-52.10 and TC-52.20 for dimensions between supports.

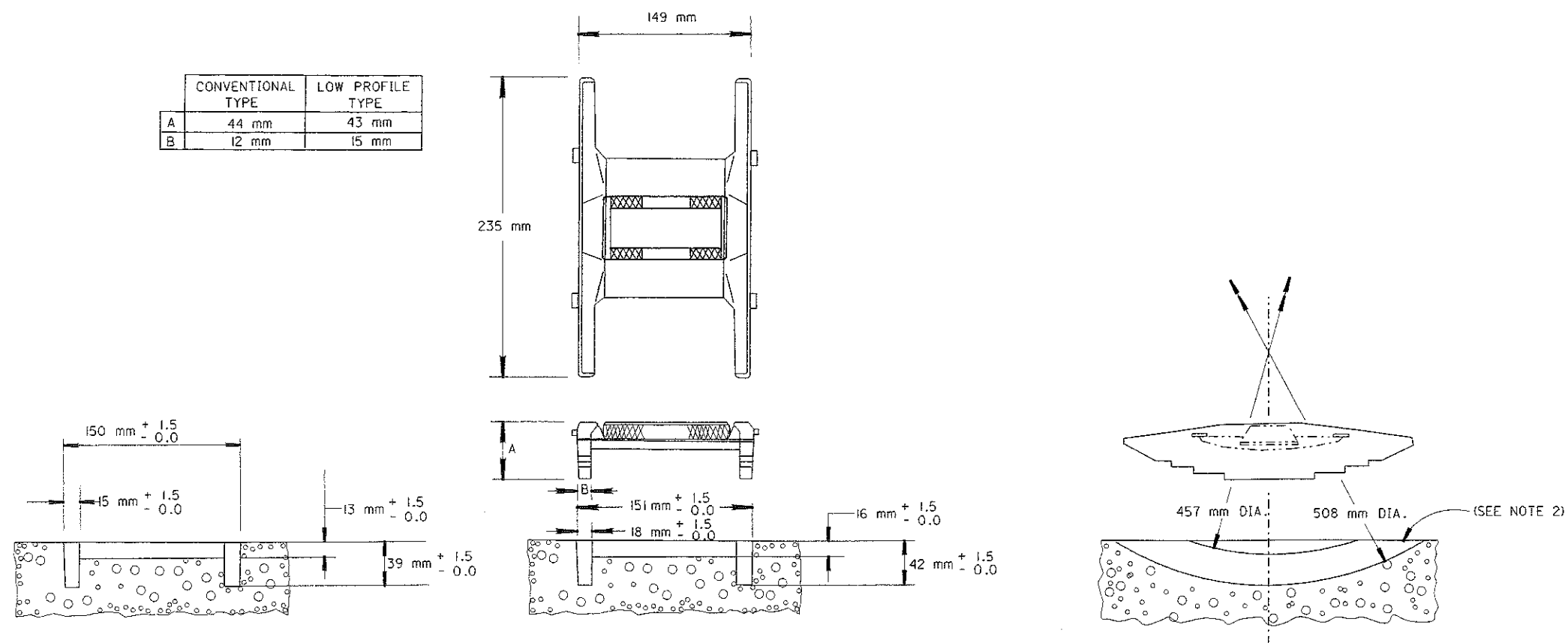


ADJACENT SIGN INSTALLATION

FOR NO. 2 AND NO. 3 YIELDING POST SUPPORTS IN EXPOSED LOCATIONS

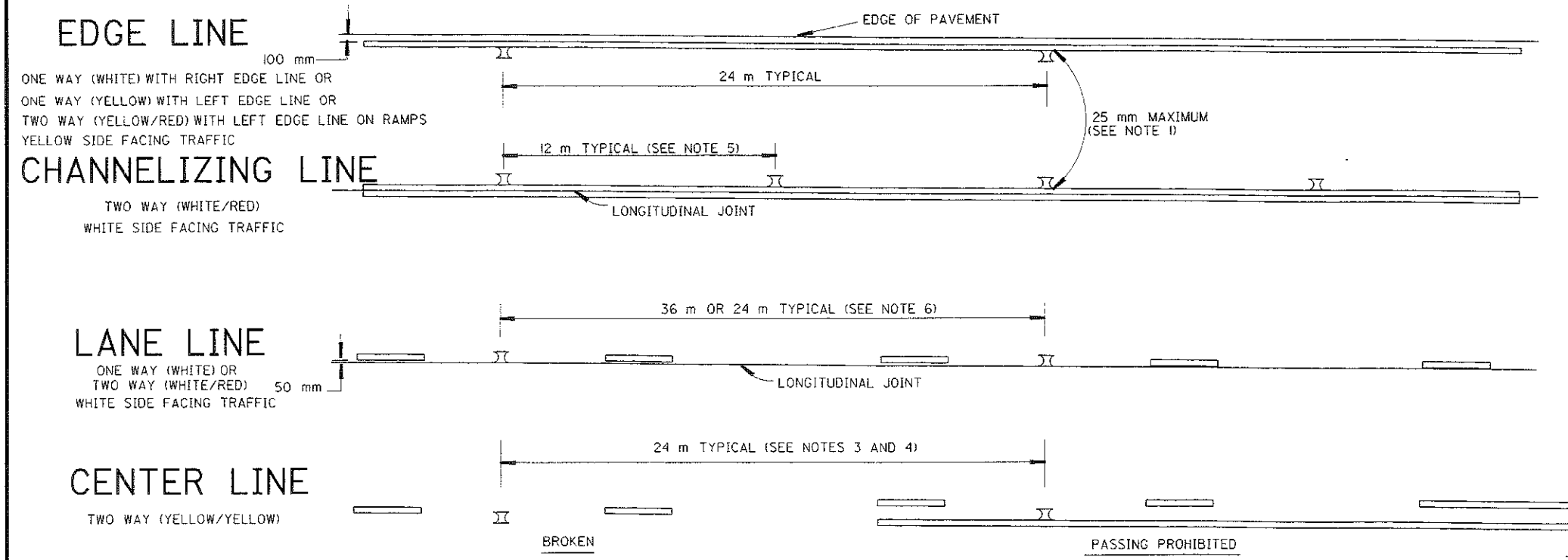
NOTES

1. CENTER LINE MARKERS SHALL BE PLACED BETWEEN THE TWO LINES. MARKERS INSTALLED ALONG AN EDGE LINE OR CHANNELIZING LINE SHALL BE PLACED SO THAT THE CASTING IS NO MORE THAN 25 mm FROM THE NEAR EDGE OF THE LINE. MARKERS INSTALLED ALONG A LANE LINE OR DASHED YELLOW CENTER LINE SHALL BE PLACED BETWEEN AND IN LINE WITH THE DASHES. MARKERS SHALL NOT BE PLACED OVER THE LINES EXCEPT WHERE THE LINES DEVIATE VISIBLY FROM THEIR CORRECT ALIGNMENT, AND THEN ONLY WITH THE APPROVAL OF THE ENGINEER.
2. TO FACILITATE THE CUTTING OF THE TWO PARALLEL SLOTS AND INTERVENING CONCAVED SURFACE SIMULTANEOUSLY, IT IS RECOMMENDED THAT AN ARBOR AND SAW BLADES ASSEMBLY BE USED. FOR ADDITIONAL DETAILS AND TOLERANCES OF THE CASTING AND ARBOR-SAW ASSEMBLY CONTACT THE CASTING MANUFACTURE.
3. FOR HORIZONTAL CURVE RADIUS OF 380 METERS OR LESS, THE SPACING OF THE CENTER LINE MARKERS SHALL BE REDUCED TO 12 m BETWEEN P.C. OR T.S. AND P.T. OR S.T.
4. FOR HORIZONTAL CURVE RADIUS OF 250 METERS OR LESS, THE SPACING OF THE CENTER LINE MARKERS MAY BE REDUCED TO 6 m BETWEEN P.C. OR T.S. AND P.T. OR S.T. WHEN USING 6m SPACING, 12 RAISED PAVEMENT MARKERS AT 12 m SPACING SHALL BE INSTALLED ON EACH END OF THE 6 m SPACING.
5. WHEN A CHANNELIZING LINE IS LESS THAN 24 m IN LENGTH, ONE RAISED PAVEMENT MARKER SHALL BE PLACED AT EACH END OF THE LINE AND ONE SHALL BE PLACED IN THE CENTER OF THE LINE.
6. RAISED PAVEMENT MARKERS ON LANE LINES ON FREEWAYS SHALL BE ONE WAY WHITE SPACED AT 36 METERS. ALL OTHER RAISED PAVEMENT MARKERS ON LANE LINES ON MULTILANE OR DIVIDED ROADWAYS SHALL BE TWO WAY RED/WHITE SPACED AT 24 METERS.



OPTIONAL FOR CONVENTIONAL TYPE

CASTING AND SAW CUT DETAILS



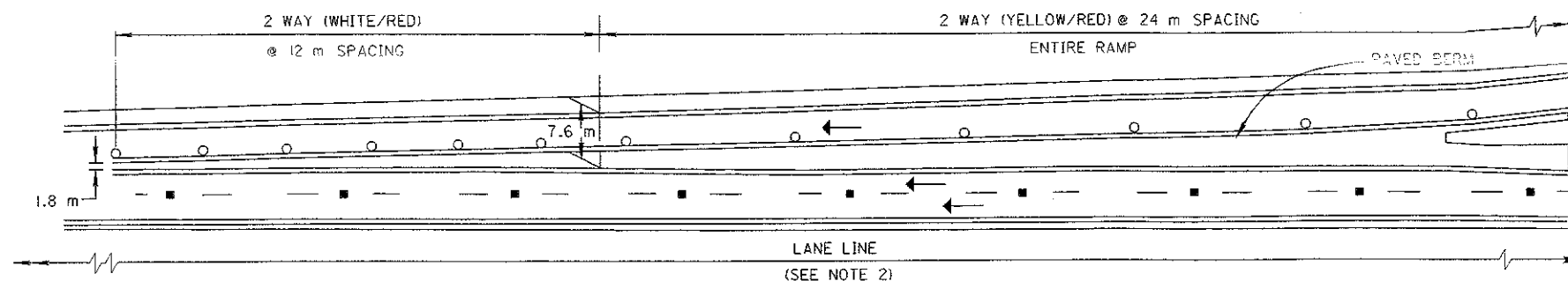
TYPICAL RAISED PAVEMENT MARKER PLACEMENT WITH LONGITUDINAL PAVEMENT MARKINGS



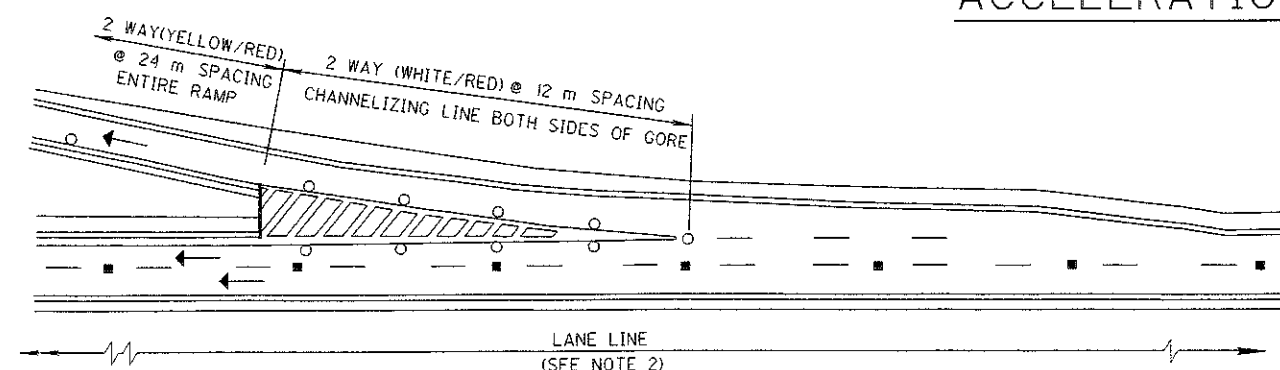
OFFICE OF TRAFFIC ENGINEERING DIVISION OF ENGINEERING POLICY OHIO DEPARTMENT OF TRANSPORTATION	
TRAFFIC CONTROL	DATE 11/03/93 11/01/95
RAISED PAVEMENT MARKER INSTALLATION DETAILS	
STANDARD CONSTRUCTION DRAWING	TC-65.10M
APPROVED <i>[Signature]</i>	ADMINISTRATOR

NOTES

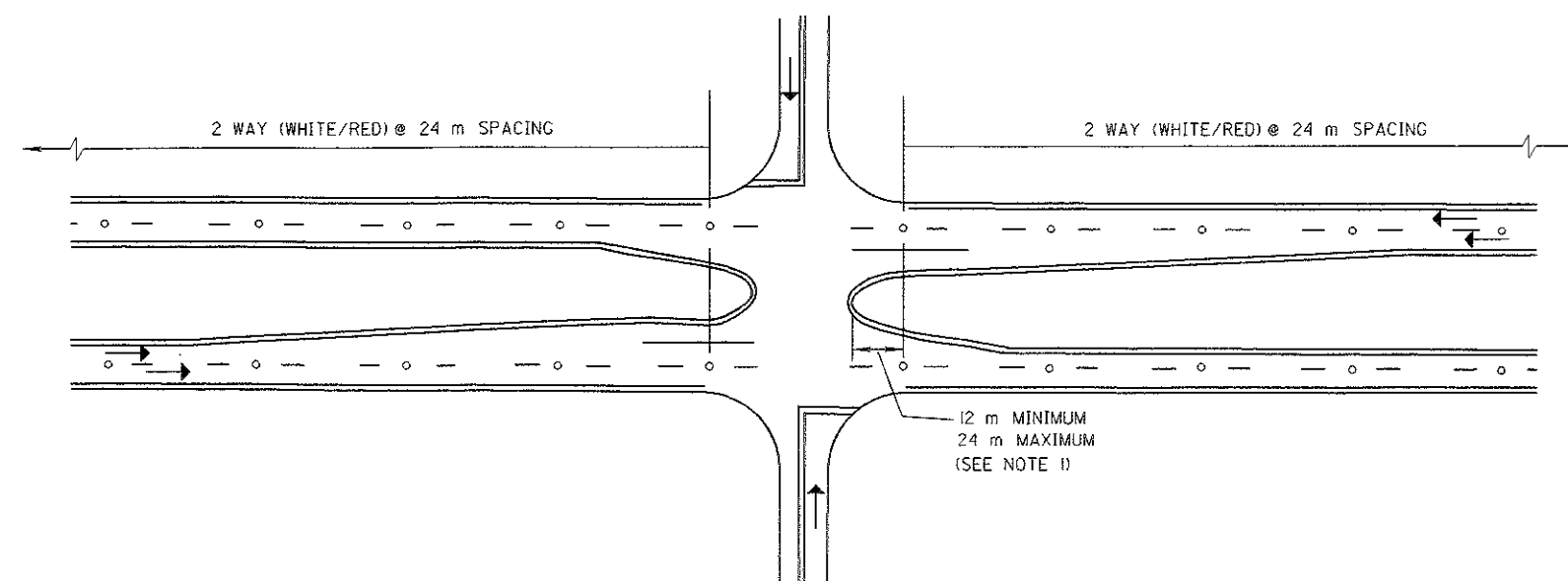
1. RAISED PAVEMENT MARKERS SHALL NOT BE PLACED IN THE DIRECTIONAL ROADWAYS WITHIN THE INTERSECTION AREA.
2. RAISED PAVEMENT MARKERS ON LANE LINES ON FREEWAYS SHALL BE ONE WAY WHITE SPACED AT 36 METERS. ALL OTHER RAISED PAVEMENT MARKERS ON LANE LINES ON MULTILANE OR DIVIDED ROADWAYS SHALL BE TWO WAY RED/WHITE SPACED AT 24 METERS.



ACCELERATION LANE

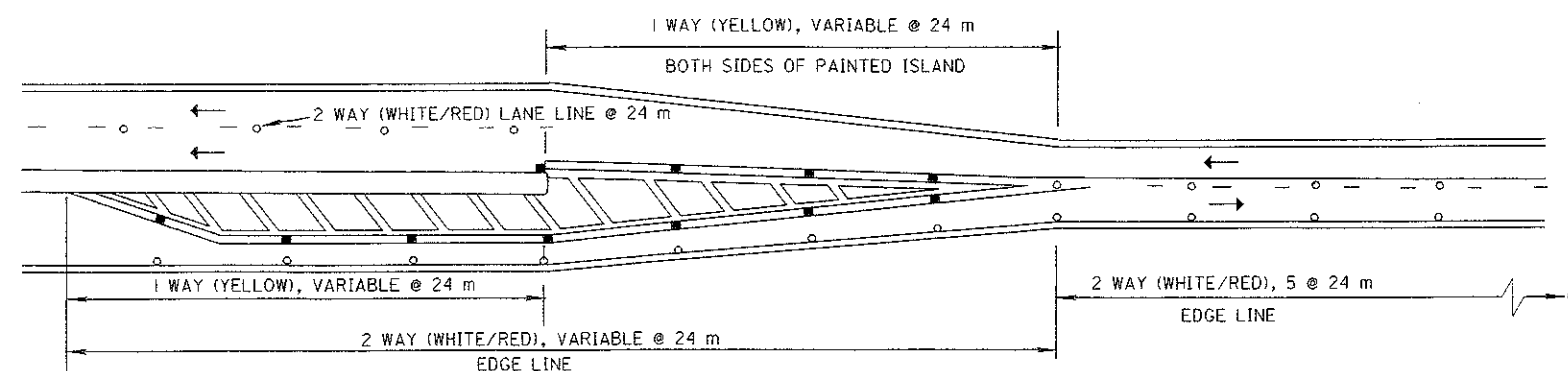


DECELERATION LANE

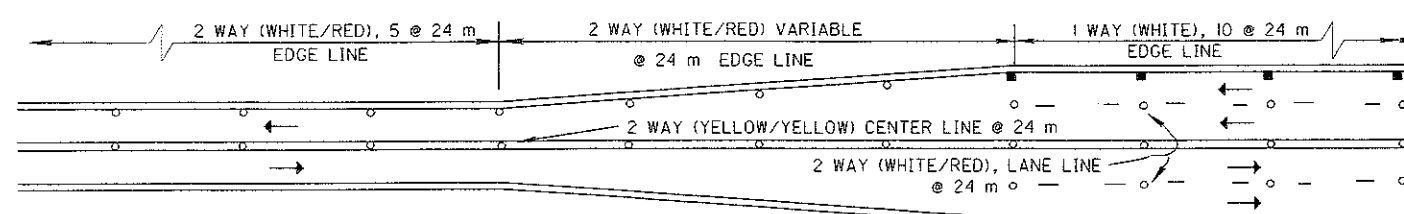


MULTILANE DIVIDED-CONTROLLED ACCESS

(SEE NOTE 2)



4 LANE DIVIDED TO 2 LANE TRANSITION



4 LANE UNDIVIDED TO 2 LANE TRANSITION

LEGEND

- 1 WAY REFLECTORS
- 2 WAY REFLECTORS



metric
units

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

RAISED PAVEMENT MARKER

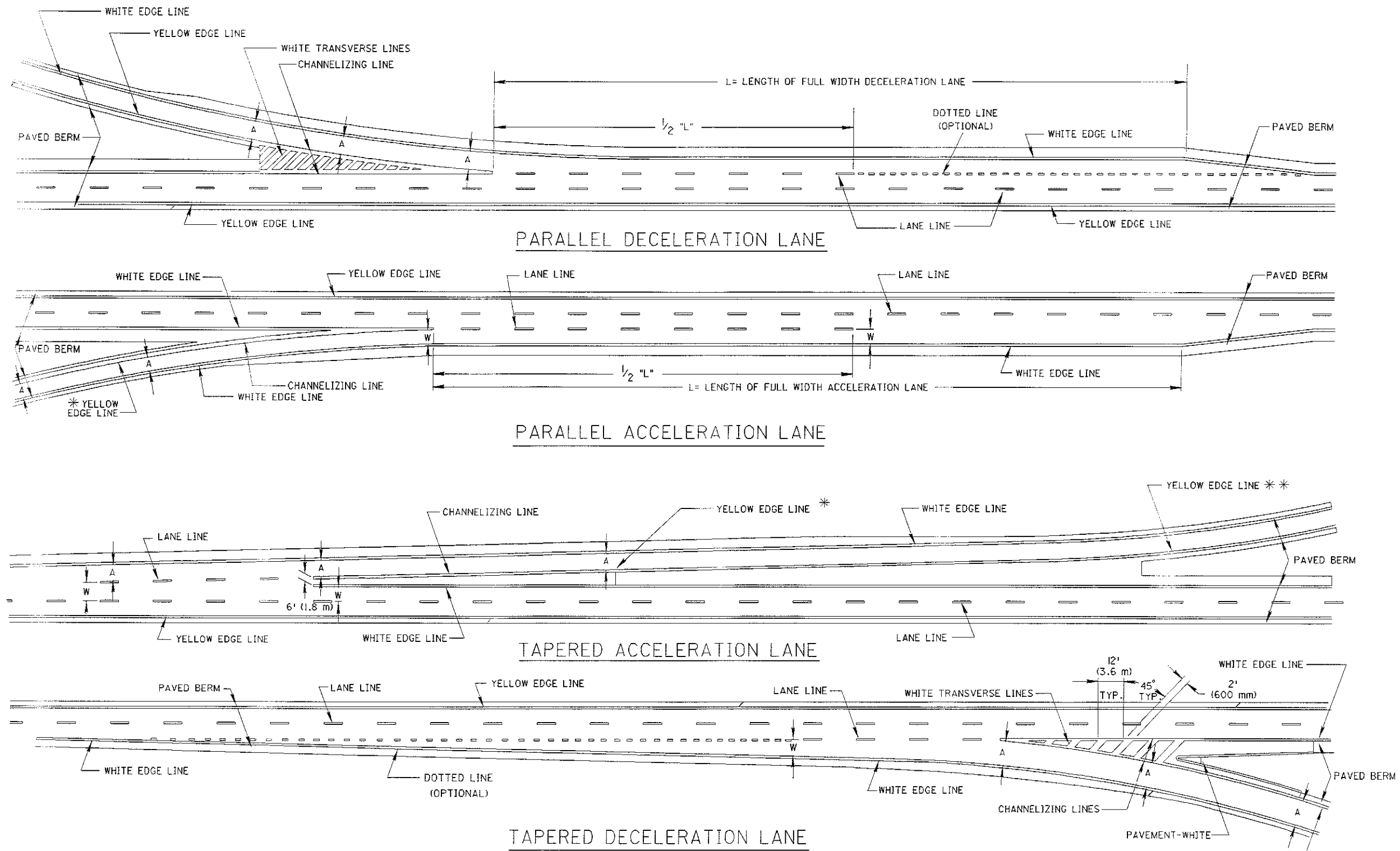
DETAILS I

STANDARD
CONSTRUCTION
DRAWING

APPROVED *signature* ADMINISTRATOR

TC-65.11M

DATE
11/03/93
11/01/95



* THE RAMP YELLOW EDGE LINE SHALL EXTEND TO WHERE THE PAVED BERM ENDS.
** ANY EXISTING CURB SHALL BE PAINTED WHITE.
A = UNIFORM RAMP WIDTH
W = LANE WIDTH