

OHIO DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

1007 (85) ~~120~~ L2D

FHWA REGION	STATE	FEDERAL PROJECT	
5	OHIO		

1
36

PLAN NO. 105

PART	COUNTY	ROUTE	SECTIONS	PROJECT TERMINI		NET LENGTH MILES	TOWNSHIP	CITY	VILLAGE
				BEGIN	END				
1	LOR	511	(0.00-2.58) (4.55-11.96)	0.00	13.55	12.67			
2	LOR	511	(3.67)	3.67	4.55	0.88			Rochester

The Standard 1985 Specifications of the State of Ohio, Department of Transportation, including changes and Supplemental Specifications listed in the plans and proposal shall govern these improvements.

I hereby approve these plans and declare that the making of these improvements will require the closing of the highways to traffic on Parts No. 1 & 2 and that detours will be provided by State forces. The closing to traffic of the highways will not be required on Parts No. and provisions for the maintenance and safety of traffic will be as indicated in the proposal.

Approved Date 7/12/85 Harry W. Pinn
District Deputy Director of Transportation

Approved Date 8-23-85 Walter J. Jestrings
Engineer of Bridges

Approved Date _____
Engineer of Maintenance

Approved Date 10/1/85 James R. Longenecker
Chief Engineer, Operations

Approved Date _____
Assistant Deputy Director, Program Development

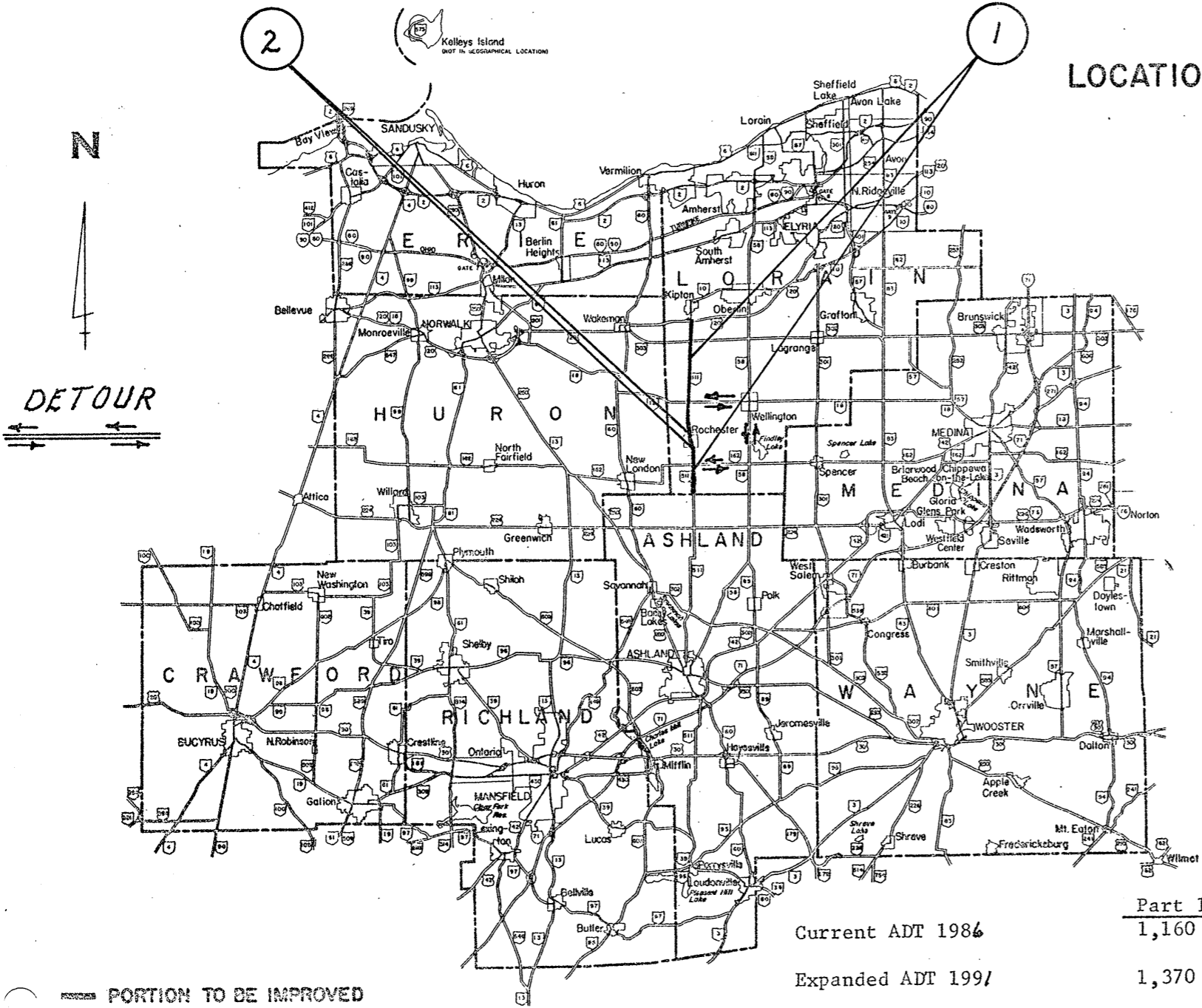
Approved Date _____
Chief Engineer, Construction

Approved Date _____
Chief Engineer, Design

Approved Date _____
Assistant Director, Department of Transportation

Approved Date 10-11-85 Wanda J. Smith
Director, Department of Transportation

LOCATION MAP



Current ADT 1984	Part 1 1,160	Part 2 1,160
Expanded ADT 1991	1,370	1,370

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR _____ DATE _____

STANDARD DRAWINGS		SUPPLEMENTAL SPECIFICATIONS	
BP-5	01-11-85	SS-847	10-17-83
TC-35.10	08-29-84	SS-947	10-17-83
TC-71.10	04-09-79	SS-824	10-08-82
GR-2B	02-05-82	SS-956	6-26-78
GR-3	01-21-85	SS-853	6-26-78
GR-4	02-05-82		
GR-1	1-11-85		

1007

12-17-85

ASPHALT CONCRETE

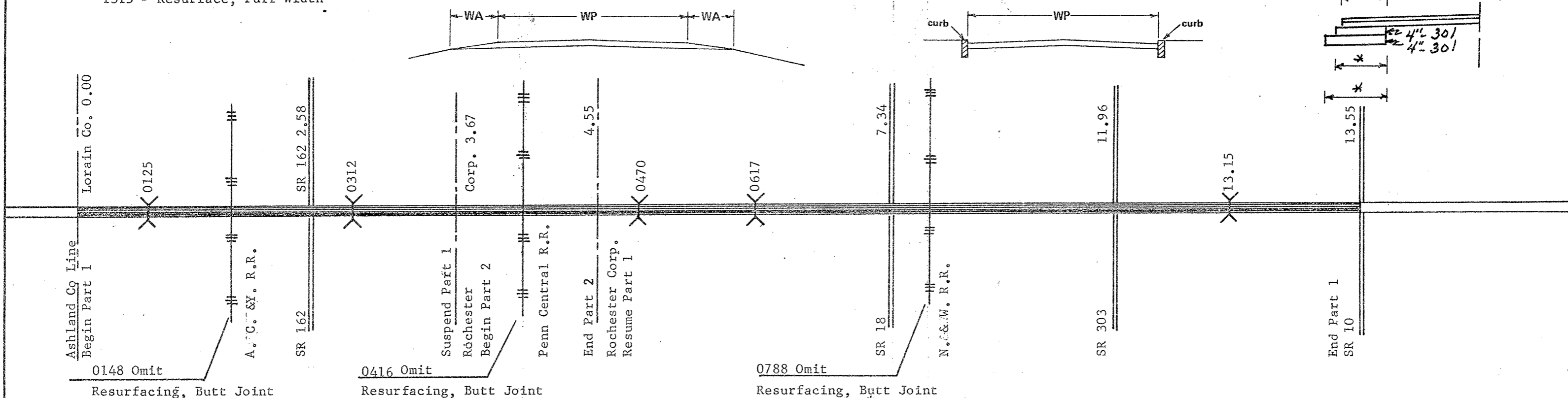
PLAN NO.
105

2
36

- LOR 511 Structures
- 0125 - Resurface, Full Width
 - 0312 - Omit Resurfacing, Butt Joint
 - 0470 - Resurface, Full Width
 - 0617 - Omit Resurfacing, Butt Joint
 - 1315 - Resurface, Full Width

TYPICAL 1

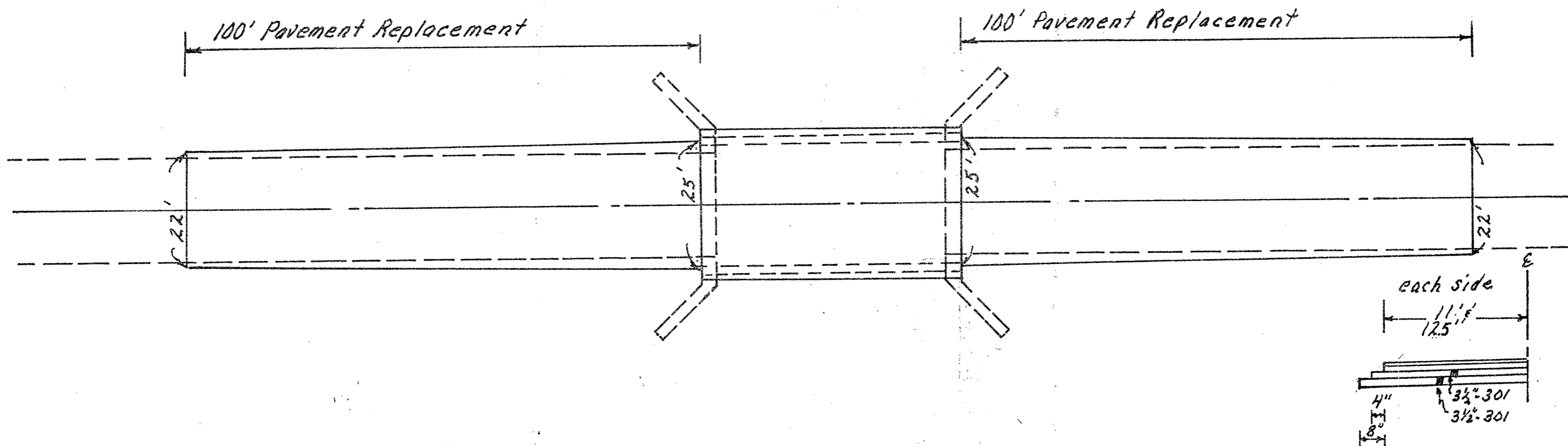
TYPICAL 2



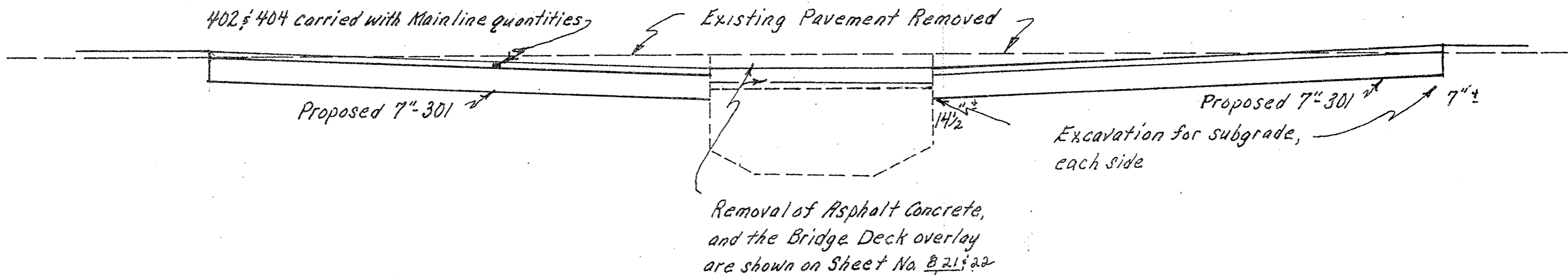
PAVEMENT DATA

PART	ROUTE	LOG POINT TO LOG POINT	LENGTH		WP FEET	TYPICAL	EXISTING TYPE PAVEMENT	PAVEMENT AREA SQ. YDS.	PROPOSED PAVEMENT						Special Pavement Planing Bituminous Without Heating Sq. Yds.		
			MILES	LIN. FT.					407		ASPHALT CONCRETE						
									TACK COAT @ .05 gal./s.y. GALS.	COVER AGGR. @ .4 lbs./s.y. TONS	ITEM 402 THICK INCHES	ITEM 404 THICK INCHES	ITEM THICK INCHES				
									1 1/2" Av. CU. YDS.	CU. YDS.	CU. YDS.	CU. YDS.					
1	511	0.00 - 2.58	2.58	13,622	19	1	404										
		(0.00 - 2.58)	(2.58)	(13,622)	2@1 1/2	1	617										
		2.58 - 3.67	1.09	5,755	20	1	404										
		(2.58 - 3.67)	(1.09)	(5,755)	2@1	1	617										
		4.55 - 10.95	6.40	33,792	20	1	404										
		(4.55 - 10.95)	(6.40)	(33,792)	2@1	1	617										
		10.95 - 11.96	1.01	5,333	18	1	404										
		(10.95 - 11.96)	(1.01)	(5,333)	2@2	1	617										
		11.96 - 13.55	1.59	8,395	20	1	404										
		(11.96 - 13.55)	(1.59)	(8,395)	2@1	1	617										
							EA for Inter and Drives	2,473									
		Total Part 1	12.67	66,897				166,000	8,300	332	6,917	1"	4,611			400	
2	511	3.67 - 4.55	0.88	4,646	20	1	404										
		(3.67 - 4.55)	(0.88)	(4,646)	2@1	1	617										
								EA for Inter and Drives	644								
		Total Part 2	0.88	4,646				12,000	600	24	500	1"	333			100	

STR LOR-511 0312



Note: The 301 Bituminous Aggregate Base shall be completed while the detour is in place, maximum lifts of 3 1/2".



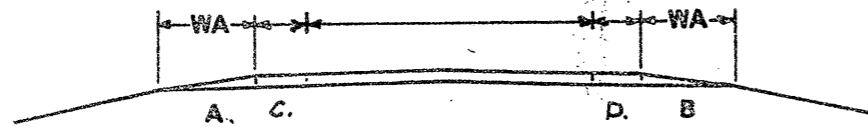
Estimated Quantities carried to Sheet No. 35

202 Pavement Removed	444 Sq. Yds.
203 Excavation not including Emb. Const.	116 Cu. Yds.
301 Bituminous Aggregate Base	106 Cu. Yds.

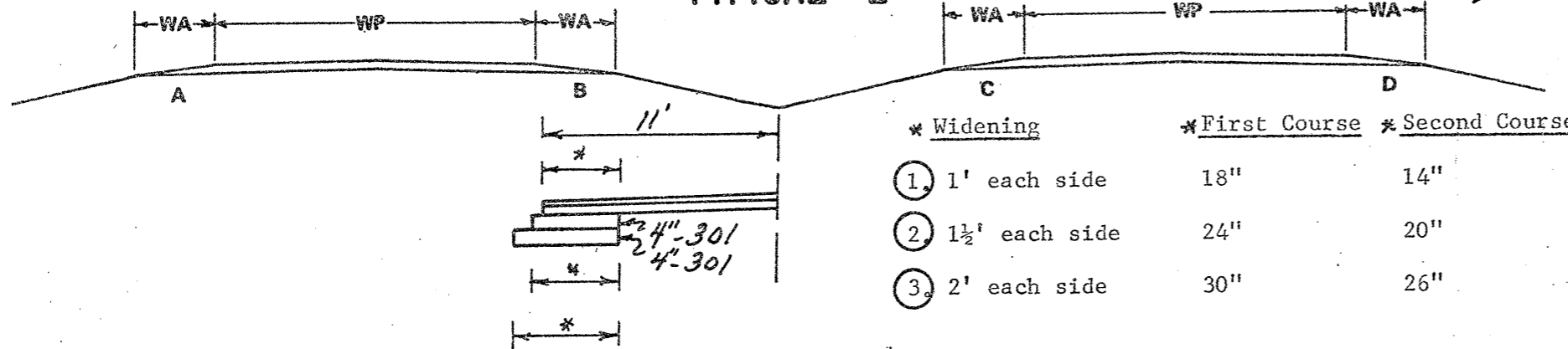
PAVED SHOULDERS

*NOTES

TYPICAL 1



TYPICAL 2



	* Widening	* First Course	* Second Course
1.	1' each side	18"	14"
2.	1 1/2' each side	24"	20"
3.	2' each side	30"	26"

** One station equals 100 lin. ft. Stations shall be measured along each edge of pavement.

ITEM 411 - STABILIZED CRUSHED AGGREGATE: Whenever 411 stabilized crushed aggregate is stipulated, the first paragraph of 411.03 is waived and subgrade compaction shall be to the satisfaction of the Engineer.

1. **ITEM 203 LINEAR GRADING:** This work shall consist of preparing a subgrade for the shoulder paving 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. The unsound or broken edge of bituminous pavements shall first be trimmed to a line established by the Engineer. The existing shoulder then shall be excavated and the subgrade shaped and compacted. Compaction shall be carried out to the satisfaction of the Engineer by means of a trench roller, 401.11. Areas graded in excess of depths specified or directed by the Engineer shall be backfilled to desired grade using 617 Compacted Aggregate at the contractor's expense. Excavated material shall be disposed of as indicated in the plan.

- a. Used to back up shoulders where required; the balance to be disposed of as directed by the Engineer.
- b. Disposed of by the Contractor at his own responsibility outside the limits of the right-of-way.
- c. Wasted adjacent to the pavement and within the right-of-way as directed by the Engineer.

2. **ITEM 402 ASPHALT CONCRETE:** Prior to placing a bituminous mixture for shoulder paving, the edge of the existing pavement, for the full depth of the trench, shall be coated with bituminous material in accordance with 401.12.

3. **ITEM 301 BITUMINOUS AGGREGATE BASE** may be used in lieu of Item 402 Asphalt Concrete.

4. **ITEM 617 COMPACTED AGGREGATE:** A quantity of Item 617 Compacted Aggregate has been provided for areas where the shoulders were low prior to grading and/or low areas caused by removal of unsuitable material.

5. **ITEM 408 BITUMINOUS PRIME COAT:** After application of the Prime Coat, no further treatment shall be performed until so directed by the Engineer.

6. **SHIELD:** The contractor shall provide a shield to prevent the spraying or drifting of liquid bituminous material onto the edge of the pavement or edgelines. The attention of the contractor is directed to 107.12 of the Specifications.

7. Item 301, Bituminous Aggregate Base, shall be completed prior to placing 402.

PAVED SHOULDER DATA

PART	ROUTE	LOG POINT TO LOG POINT	LENGTH		TYPICAL	PROPOSED WIDTH (FT.)				SHOULDER AREA SQ. YDS.	203		402		411		408	409		617	605	301 Bituminous Aggregate Base	Base Widening	NOTES			
			MILES	LIN. FT.		LINEAR GRADING	ASPHALT CONCRETE	STABILIZED CRUSHED AGGREGATE	PRIME		SEAL		COMPACTED AGGREGATE	AGGREGATE DRAINS													
			DEPTH INCHES	AVG. THICK INCHES		AVG. THICK INCHES	Bit. Matl.	Bit. Matl.	Aggr.		CU. YDS.	CU. YDS.	CU. YDS.	CU. YDS.	LIN. FT.	Cu. Yds.	Sq. Yds.										
1	511	0.00 - 2.58	2.58	13,622	1			1 1/2	1 1/2																		
		2.58 - 3.67	1.09	5,755	1			1	1																		
		4.55 - 10.95	6.40	33,792	1			1	1																		
		10.95 - 11.96	1.01	5,333	1			2	2																		
		11.96 - 13.55	1.59	8,395	1			1	1																		
		Total Part 1	12.67	66,899						7"	1,338											4,993	22,470			1,7	
2	511	3.67 - 4.55	0.88	4,646	1			1	1																		
		Total Part 2	0.88	4,646							7"	93											305	1,373			1,7

BERM AND BASE WIDENING AT INTERSECTIONS AND DRIVES:

Pavement and berm quantities are calculated through all intersections and drives. Any portion may be non-performed if so directed by the Engineer.

TRENCH FOR WIDENING:

Trench excavation for base and berm widening shall be performed only on one side of the pavement at a time. The open trench shall be adequately maintained and protected at all times with drums or barricades, with Type "C" steady burn lights attached after working hours.

Placement of proposed base material shall follow as closely as possible behind the excavation operation. The length of widening trench which is open at any one time shall be held to a minimum and shall at all times be subject to approval by the Engineer.

TACK MATERIAL:

The amount of tack material required to coat the existing pavement edges prior to 301 or 402 operations shall be included in the Unit Price Bid for Item 402, Asphalt Concrete or Item 301, Bituminous Aggregate Base.

BASE AND BERM WIDENING:

The Cubic Yard of asphalt concrete shall be paid by ticket weight conversion, within a tolerance of plus or minus 5% of the required calculated weight per unit of area, as per 401.16. The above final quantity shall be calculated within the tolerance on a daily basis.

ITEM 407, TACK COAT:

As per 407.5, the application rate shall be 0.05 gallons per Sq. Yd., a complete pavement surface coverage shall be required. Areas of tack stripped by construction equipment or traffic shall be recoated prior to placing asphalt concrete. Item 407.06 shall be followed unless waived by the Engineer.

ROUTINE MAINTENANCE:

Between the time that bids are taken and the start of construction, the maintaining agency may enter upon the project and perform routine maintenance such as crack sealing, patching, and berm and shoulder repair. The effects, if any, of the performance of routine maintenance shall be considered as inherent in work of the character provided for in the contract and the resulting conditions shall not be considered as differing materially from those existing at the time bids were taken.

INTERSECTIONS:

Rural - Intersections shall be paved to end of radii or as directed by the Engineer to provide a smooth transition between the two highways. Urban - Intersections shall be paved to back of crosswalks or as directed by the Engineer. Drives - Paved drives and paved mailbox approaches shall be resurfaced as directed by the Engineer. Care shall be taken to eliminate water pockets in curbed sections.

PAVEMENT CONTROL:

An automatic screed control having a 30 ft. minimum ski-arm shall be used for placing the 402 Pre-level and 404 course on existing pavement widths of 20 ft. and over.

Special attention shall be given to superelevated curves. The superelevation shall be maintained and/or restored, if necessary, as directed by the Engineer.

ITEM 404:

In addition to Item 404.12, the surface of feathered areas shall be uniformly coated with a 6" wide band of A.C. at the junction with the existing pavement, to be included within the cost of Item 404.

Under Item 401.15 (all cold joints on surface courses) shall be sealed by coating the vertical face. The coating of the finished surface with A.C., 6" wide will not be allowed.

ITEM SPECIAL, PAVEMENT PLANING, BITUMINOUS WITHOUT HEATING:

Planing is to be performed as directed and in areas designated by the Engineer. Removal of existing pavement surface may be required to eliminate adverse surface distortion which in the judgement of the Engineer cannot be satisfactorily corrected in the paving courses.

These areas may include material displaced by rutting or shoving, asphalt surface patches, concrete patches and transverse bumps at joints or joints with structures, adjoining pavements, railroads or castings, etc.

CRACK SEALING:

All open cracks on the existing Asphalt Concrete Pavement shall be cleaned and sealed. This work shall commence just prior to the application of the 407 Tack Coat for Resurfacing.

The cracks shall be cleaned by forced air using a minimum of 100 P.S.I. pressure to remove all loose material from the cracks. Immediately after cleaning, the cracks shall be sealed using AC-20. The joint sealer shall be protected from traffic by methods approved by the Engineer.

Payment for all of the above shall be included in the Unit Price Bid per gallon for Item Special, Crack Sealing, As Per Plan. The following estimated quantity is provided in the Summary to be used as directed by the Engineer on the project.

CRACK SEALING, AC-20, AS PER PLAN:

6,800 Gallons

ITEM 202, RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN:

Raised pavement markers shall be removed in a manner that prevents damage to the castings. All depressions caused by removal of the markers shall be tacked and filled with compacted 404 to level of existing road surface at the time they are removed. Removed markers are to be stored on the Right-of-Way within the project limits by the contractor, as directed by the Engineer. All costs to be included in the Contract Price Bid for Item 202-Raised Pavement Markers Removed for Storage, As Per Plan.

ITEM SPECIAL, PAVEMENT REPAIR:

This item of work shall consist of the removal of the existing pavement or paved berm which may be asphalt, brick, concrete or a combination of each, in areas exhibiting severe pavement failure.

The Engineer shall designate the locations and limits of the areas to be repaired. The repair areas shall be roughly rectangular in shape and cut or sawed to a neat line. The pavement shall be removed within the designated areas by methods which will not damage the adjacent pavement. The depth of removal, as directed by the Engineer, shall be sufficient to remove all deteriorated pavement (estimated depth may vary from 2" to maximum 12".) The materials so removed shall be disposed of in accordance with 203.05.

Replacement material shall be 402 or 301 material and shall be placed and compacted to finish flush with the adjacent pavement surface. The repair areas shall be painted with bituminous material (sides and bottom.) All compaction shall be achieved by mechanical methods to satisfaction of the Engineer, maximum lift thickness (3".)

Payment shall include all labor, equipment and materials necessary to complete the pavement repair. The following estimated quantity is provided in the Summary to be used as directed by the Engineer. Payment will be made at contract price per Cu. Yd., by ticket weight conversion, Item Special, Pavement Repair.

125 Cu. Yds.

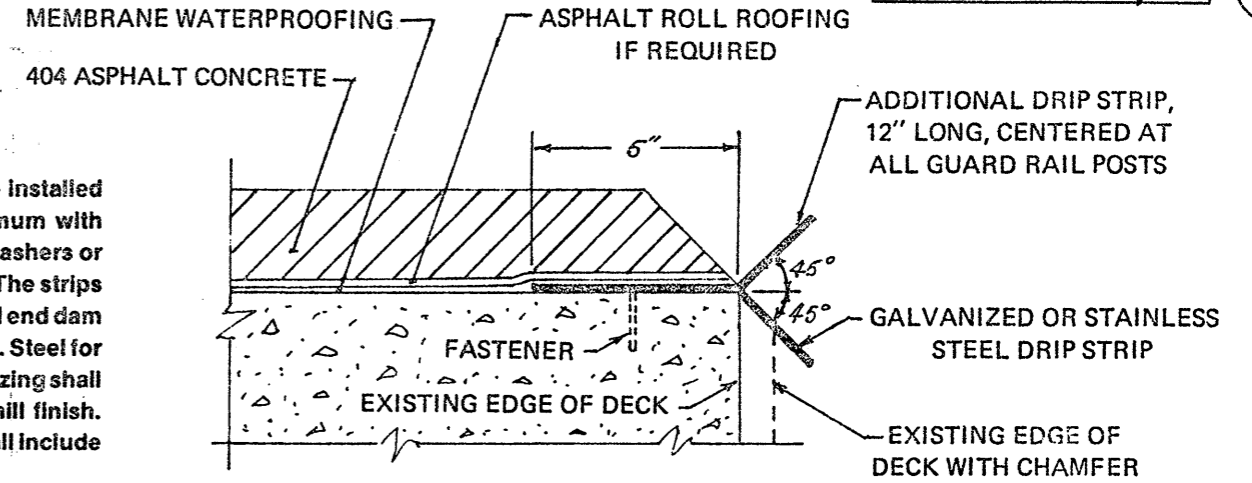
BRIDGE DECK TREATMENT

PROTECTIVE COURSE FOR MEMBRANE WATERPROOFING

MEMBRANE WATERPROOFING, Sheet Type 1: A minimum of 1-1/2 inches of 404 Asphalt Concrete shall be placed over the membrane.

MEMBRANE WATERPROOFING: A minimum of 2-1/2 inches of 404 Asphalt Concrete shall be placed over the membrane.

DRIP STRIP: Prior to applying deck membrane waterproofing, a bent drip strip shall be installed along the edges of the deck as shown. The strips shall be fastened at 1'-6" c/c maximum with 1-1/4" x 5/32" x 1/4" (Length x Shank diameter x Head diameter) flat head drive pins and washers or No. 10 galvanized screws and expansion anchors, subject to the approval of the Engineer. The strips shall be placed the full length of the deck, ending at the face of the abutment wingwall or steel end dam angle. Where splices are required a 3" (Min.) lap shall be used with a fastener through the lap. Steel for galvanized strips shall be 8" x 0.105" and shall meet the requirements of ASTM A568. Galvanizing shall be in accordance with 711.02. Stainless steel shall be 20 gauge ASTM A167, Type 304, mill finish. Payment shall be at the contract price bid for Item Special, Sq. Ft., Steel Drip Strip, which shall include all materials, labor, tools and incidentals necessary to complete item.



TYP. SEC. DRIP STRIP

BRIDGE DECK DATA

PART	COUNTY, ROUTE, BRIDGE NO.	LENGTH (BRIDGE LIMITS) L.F.	WIDTH L.F.	BRIDGE DECK AREA S.Y.	202 WEARING COURSE REMOVED DEPTH S.Y.	BRIDGE DECK REPAIR			SAWING AND SEALING BITUMINOUS CONCRETE JOINTS L.Ft.	STEEL DRIP STRIP S.F.	SPECIAL		516 VERT. EXT. OF STR. EXP. JOINTS, as per Plan L.F.	ASPHALT CONCRETE		Existing Wearing Surface	SPECIAL Pavement Planing, Bit. Without Heat S.Y.	Pavement Width Ft.	
						SUPERPLASTICIZED DENSE CONCRETE (See Proposal Note)		VARIABLE THICKNESS OVERLAY C.Y.			FULL-DEPTH REPAIR C.Y.	DECK WATERPROOFING		THICK INS.	404 C.Y.				
						1 3/4" THICK OVERLAY S.Y.	4" THICK OVERLAY S.Y.					RUBBERIZED SEAL S.Y.							TYPE D WATERPROOFING, as per Plan S.Y.
1	LOR-511-0125	26.0	31.0	90							95					Asphalt	***512	19	
1	LOR-511-0312	50.5	29.0	163			163	12	# 6							Asphalt	*129	20	
1	LOR-511-0470	90.0	33.2	332						67		332				Asphalt	***776	20	
1	LOR-511-0617	185.5	32.0	660		660		34	1				92			Asphalt	**1104	20	
1	LOR-511-1315	81.0	36.3	327						73		327				Asphalt	***771	20	
TOTAL PART 1						660	163	46	7	140		95	659	92				3292	

* Plane Bridge Deck
 ** Plane 100' on each approach the same time the bridge is planed.
 *** Plane a maximum of 2" from the bridge full width and 100' on each approach the same time the bridge is planed. Remove all dirt and loose material. Fill any large holes with Item 404, Asphalt Concrete before placing Rubberized Seal.
 **** Plane to within 1/2" of prestressed beams and 100' on each approach the same time the bridge is planed. The last 1/2" of asphalt on the prestressed beams shall be removed by hand. Care should be taken not to damage the beams. Payment for all of the above shall be included in the cost of Pavement Planing, Bituminous Without Heat. See Sheet No. 26 for traffic control details on LOR-511-0617. Traffic shall be detoured for LOR-511-0312.
 # Full depth repair shall be used for deck extensions.

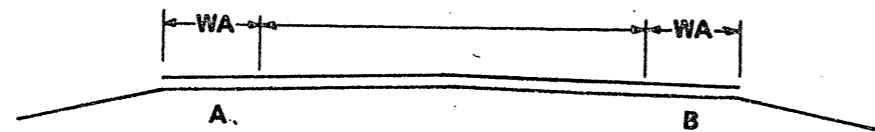
PAVED SHOULDERS

PLAN NO. 105

9/36

*NOTES

TYPICAL 1



TYPICAL 2



ITEM 411 - STABILIZED CRUSHED AGGREGATE: Whenever 411 stabilized crushed aggregate is stipulated, the first paragraph of 411.03 is waived and subgrade compaction shall be to the satisfaction of the Engineer.

** One station equals 100 lin. ft. Stations shall be measured along each edge of pavement.

1. **ITEM 203 LINEAR GRADING:** This work shall consist of preparing a subgrade for the shoulder paving 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. The unsound or broken edge of bituminous pavements shall first be trimmed to a line established by the Engineer. The existing shoulder then shall be excavated and the subgrade shaped and compacted. Compaction shall be carried out to the satisfaction of the Engineer by means of a trench roller, 401.11. Areas graded in excess of depths specified or directed by the Engineer shall be backfilled to desired grade using 617 Compacted Aggregate at the contractor's expense. Excavated material shall be disposed of as indicated in the plan.

- a. Used to back up shoulders where required; the balance to be disposed of as directed by the Engineer.
- b. Disposed of by the Contractor at his own responsibility outside the limits of the right-of way.
- c. Wasted adjacent to the pavement and within the right-of-way as directed by the Engineer.

2. **ITEM 402 ASPHALT CONCRETE:** Prior to placing a bituminous mixture for shoulder paving, the edges of the existing pavement, for the full depth of the trench, shall be coated with bituminous material in accordance with 401.12.

3. **ITEM 301 BITUMINOUS AGGREGATE BASE** may be used in lieu of Item 402 Asphalt Concrete.

4. **ITEM 617 COMPACTED AGGREGATE:** A quantity of Item 617 Compacted Aggregate has been provided for areas where the shoulders were low prior to grading and/or low areas caused by removal of unsuitable material.

5. **ITEM 408 BITUMINOUS PRIME COAT:** After application of the Prime Coat, no further treatment shall be performed until so directed by the Engineer.

6. **SHIELD:** The contractor shall provide a shield to prevent the spraying or drifting of liquid bituminous material onto the edge of the pavement or edgelines. The attention of the contractor is directed to 107.12 of the Specifications.

PAVED SHOULDER DATA

PART	ROUTE	LOG POINT TO LOG POINT	LENGTH		TYPICAL	PROPOSED WIDTH (FT.)				SHOULDER AREA SQ. YDS.	203		402		411		408	409		617	605	* NOTES	
			MILES	LIN. FT.		A	B	C	D		LINEAR GRADING		ASPHALT CONCRETE		STABILIZED CRUSHED AGGREGATE		PRIME	SEAL		COMPACTED AGGREGATE	AGGREGATE DRAINS		
											DEPTH INCHES	**STA.	AVG. THICK INCHES	CU. YDS.	AVG. THICK INCHES	CU. YDS.	Bit. Matl.	Bit. Matl.	Aggr.				
1	511	6.15 to 6.17	0.02	100	1	6	6			133	8	2	8	30									
1	511	6.20 to 6.22	0.02	100	1	6	6			133	8	2	8	30									
		Total Part 1										4		60									1a,3

GENERAL NOTES

PLAN NO.
105

VERIFICATION:

Details and dimensions shown on these plans pertaining to the existing structure have been obtained from plans of the existing structure and/or from field observation and measurements. Consequently, they are indicative of the existing structure and the proposed work but they shall be considered tentative and approximate. The original construction plans of the existing bridge are available upon request at the District 3 office of The Ohio Department of Transportation, Ashland, Ohio.

Contract bid prices shall be based upon actual details and dimensions which have been verified by the Contractor in the field.

WORK LIMITATIONS:

No concrete deck overlays shall be placed before April 15.

The Contractor shall schedule the work so that all deck overlays are placed before October 15. If for some unforeseen circumstances the deck overlays or portions of deck overlay are not placed by October 15, regardless of the work remaining, the full depth repairs shall be completed as per 511 and the unfinished deck shall be resurfaced with Item 404 Asphalt Concrete and opened to traffic. The Contractor shall place and maintain at his expense the asphalt wearing surface until removed at his expense the following spring when the deck overlay can be placed after April 15.

TEMPORARY WEDGE:

After the concrete overlay has been placed and before the bridge is opened to traffic, a temporary wedge will be installed to maintain traffic if the permanent asphalt is not in place. The temporary wedge will be 404 Asphalt Concrete built as per Standard Drawing BP-5, except no tack coat will be required. The temporary wedge will be feathered at one inch per twenty-five feet or as directed by the Engineer. The temporary wedge will be completely removed just before any new roadway asphalt is installed and in no case shall traffic be allowed to cross an end dam without an approved temporary wedge.

TEMPORARY WEDGE (Contd.):

Payment for all of the above shall be included in the lump sum price bid for Item 614, Maintaining Traffic, which shall include all labor, equipment, materials, and incidentals necessary to complete the above work.

PLACING ASPHALT CONCRETE FEATHERING ON APPROACHES TO BRIDGES:

Special care shall be taken, when placing the asphalt concrete feathering, to effect a smooth transition from the existing approach pavement to the bridge deck. The Contractor's attention is called to Section 404.16 of the CMS and to Standard Drawing BP-5 Dated 7-16-81 for required tolerances.

ITEM SPECIAL, PAVEMENT PLANING, BITUMINOUS WITHOUT HEATING:

All asphalt, seals, and waterproofing shall be planed from the bridge before any deck overlay work may begin. The concrete deck shall not be scarified at the same time as the asphalt is planed. The asphalt on the bridge shall not be planed until the Contractor is ready to begin deck work on the bridge within three (3) days.

For all pavement planing requirements see General Note on Sheet No. 8.

Payment for all the above shall be included in the unit price bid per square yard for Item Special, Pavement Planing, Bituminous Without Heating, which shall include all labor, equipment, materials and incidentals necessary to complete the above work.

GENERAL NOTES

PLAN NO.
105

ITEM 203, EMBANKMENT, AS PER PLAN:

Embankment quantity has been provided in the plan to fill in the areas for guard-rail installation.

Areas where embankment materials are to be placed shall be scalped. The requirements for moisture, density control and benching shall be waived. The depth of layers in which the embankments are placed and their compaction shall, in lieu of the requirements of Item 203, conform to acceptable construction practices as determined by the Engineer. The method of measurement for embankment material furnished and placed shall be the number of cubic yards measured by loose volume in the carrier at the work site, in lieu of the requirements of 203.15. The amount of the earth work required at each location shall be as directed by the Engineer.

Payment for all of the above shall be at the unit price bid per cubic yard for Item 203, Embankment, as per plan, which shall include all labor, equipment, materials and incidentals necessary to complete the above work.

ITEM 202, GUARDRAIL REMOVED FOR REUSE OR STORAGE, AS PER PLAN:

Guardrail designated for removal shall be carefully dismantled as necessary in such a manner so as not to damage the posts or rail. Rail elements shall be stored for either reuse by the Contractor on the project or shall become the property of the State of Ohio. All post bolts, splice bolts and miscellaneous hardware removed and all rail elements not reused shall become the property of the State of Ohio. The rail elements determined by the Engineer to be in the better condition shall be those reused.

Payment for all of the above shall be at the unit price bid for Item 202, Guard-rail Removed for Reuse or Storage, as per Plan, measured by the linear foot center to center of posts, including the length across the bridges and shall include all labor, equipment, materials and incidentals necessary to complete the above work.

ITEM 202, PORTIONS OF STRUCTURES REMOVED, RAILING, AS PER PLAN:

This item shall consist of the removal of the existing concrete bridge railing as shown in the detail on Sheet No. 22. All exposed steel shall be cut or burned off ^{Proposed} 2" below the finished surface. Care shall be exercised by the Contractor to leave the concrete beams undamaged, and in case of damage, the repair or replacement shall be at the Contractor's expense.

A hoe ram will not be permitted to do any of this work. Jack hammers shall not be heavier than the normal sixty (60) pound class; except final finish work shall be limited to fifteen (15) pound class hammers.

Payment for all of the above shall be at the unit price bid per linear foot for Item 202, Portions of Structures Removed, Railing, as per Plan, which shall include all labor, equipment, materials and incidentals necessary to complete the above work.

ITEM 517, RAILING (SINGLE DEEP BEAM WITH STEEL TUBULAR BACKUP) TYPE 2 POST AND BOLTS, AS PER PLAN:

The single deep beam rail with steel tubular backup and Type 2 posts shall be mounted on bolts, as per detail on Sheet No. 19.

The 1 1/2" diameter bolts shall conform to ASTM A325, except that minimum elongation shall be 10% and chemical properties are waived. The bolts and the 5"x5"x1" plate shall be galvanized in accordance with ASTM A123. The swedged bolts shall be installed in drilled holes using non-shrinking epoxy mortar as per SS-956, following procedures per SS-853, or they shall be installed using celtite polyester resin anchoring grout, or an approved alternate, according to the manufacturer's instructions.

Payment for all of the above shall be at the unit price bid per linear foot for Item 517, Railing (Single Deep Beam with Steel Tubular Backup) Type 2 Post and Bolts, as per Plan, which shall include all labor, equipment, materials and incidentals necessary to complete the above work.

GENERAL NOTES

PLAN NO.
105

ITEM 659, SEEDING AND MULCHING:

The Loffelstein Blocks shall be seeded with a mixture of Crown Vetch as per 659.09.

ITEM SPECIAL, LOFFELSTEIN BLOCKS:

This item shall consist of building wingwalls using Loffelstein Blocks. The blocks shall be precast concrete masonry units having a unit weight of at least 114 pounds. The units shall be made of air entrained concrete having a minimum compressive strength of 2500 PSI at 28 days. The design of each unit shall conform essentially to the Loffelstein Block. The units shall be designed to interlock when installed so as to form a flexible, stable, and cohesive wall. The first row of units is to be set to line and grade on a six inch deep crushed aggregate base. Each unit is to be spaced evenly with a maximum space between units of $7\frac{1}{2}$ inches. The second course and each additional course shall be staggered so that each unit is supported by the side units of the units under it. A minimum tolerance of $\frac{1}{2}$ inch shall be provided between the side rails and the indentations on the bottom of each unit. Each course shall be backfilled prior to installing the next course with approved backfill.

The Loffelstein Blocks shall be as manufactured by Matterhorn Concrete Systems Co., P.O. Box 238, North Ridge Road E., Lorain, Ohio 44052, telephone (216) 277-0604. Further information on this material shall be in accordance with the manufacturer's recommendations.

Payment for all of the above shall be at the unit price bid per each for Item Special, Loffelstein Blocks, which shall include all labor, equipment, materials and incidentals necessary to complete the above work.

DETOUR LIMITATIONS:

The Contractor shall schedule and prosecute the work on LOR-511-0312 so the detour will not be in effect longer than 28 consecutive calendar days. For each additional calendar day the detour remains in effect beyond the above stated detour period, or any other agreed upon period due to conditions beyond the Contractor's control, the Contractor shall be assessed liquidated damages as per 108.07.

GENERAL NOTES

PLAN NO.
105

ITEM 512, TYPE "D" WATERPROOFING, AS PER PLAN:

Item 512.07 shall be modified by adding granulated crumb rubber to the following materials:

- 1). The asphalt cement for filling joints and irregularities.
- 2). The three coats of bituminous material.

The galvanized crumb rubber shall be 100 percent vulcanized and meet the following granulation requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 8	100
No. 10	98-100
No. 30	0-10
No. 40	0-4

The sieves shall comply with the requirements of AASHTO M92 (ASTM E11).

The granulated rubber, irrespective of diameter, shall not be greater than 1/2 inch in length and contain no more than two percent moisture.

The specific gravity of the rubber material shall be 1.15 ± 0.02 and shall be free of excess fabric (0.5 percent by weight), wire or other contaminating materials, except that up to four percent calcium carbonate may be included to prevent the rubber particles from sticking together.

Granulated crumb rubber shall be accepted by certification from the rubber supplier in accordance with the requirements of 101.061.

The percentage of crumb vulcanized rubber shall be 25 ± 4 percent by weight of the asphalt cement.

The temperature of the asphalt shall be between 350F. and 425F. before addition of the crumb vulcanized rubber. The materials shall be carefully combined and mixed and reacted for a period of time. The temperature of the asphalt-rubber mixture shall be above 325F. during the reaction period.

If a job delay results after the full reaction has occurred, the asphalt-rubber material may be allowed to cool and be slowly reheated to an acceptable spraying temperature just prior to application. However, because of the Polymer Reversion that can occur when crumb rubber is held at prolonged high temperatures, the asphalt-rubber materials shall not be reheated to temperatures above 325F.

The asphalt-rubber mixing equipment shall be a hot oil, double boiler tar kettle type with mechanical agitation capable of combining the asphalt and rubber into a homogenized mix.

An approved premixed crumb rubber material may be used as an alternate.

Instead of 1/3 Gal. of asphalt per square yard, the final layer of waterproofing fabric shall be covered with not less than 0.75 Gal./Sq.Yd. of bituminous material.

After the bituminous material has been sprayed on the bridge, sand shall be applied in the wheel tracks of the paving machine and trucks. Sufficient amount of sand shall be placed to prevent the paver from damaging the waterproofing materials. If damaged, the waterproofing material shall be repaired at the Contractor's expense to the satisfaction of the District Construction Engineer.

Payment for all of the above shall be included in the unit price bid per square yard for Item 512, Type "D" Waterproofing, as per Plan, which shall include all labor, material, equipment, and incidentals necessary to complete the above work.

ITEM 516 VERTICAL EXTENSION OF STRUCTURAL EXPANSION JOINTS,
AS PER PLAN

This item shall include all the work required to remove portions of structures in curbs, remove existing vertical extension bars, as required, trim existing angles, provide all anchors, studs, steel extrusions, steel bars, neoprene extrusion, preformed expansion joint filler and replacement concrete in accordance with details on sheet No's. 24.

The steel extrusion shall be either type "E" with S300E neoprene extrusion or type "A" with S 300 E neoprene extrusion as manufactured by Watson Bowman Associated, Inc., 1280 Niagra Street, Buffalo, New York, 14213.

The steel extrusion shall be provided in maximum lengths possible to allow for traffic maintenance and shall be welded together to form a watertight joint. The neoprene extrusion shall be one continuous piece. The neoprene shall not be installed until all other work is complete upon the structure. An adhesive shall be used to facilitate placement of the neoprene extrusion. The contractor shall verify all dimension prior to fabrication.

PHYSICAL PROPERTIES:

- A. The steel extrusion shall conform to ASTM A242, A36, or A588.
- B. Adhesives shall be one-part moisture curing polyurethane and hydrocarbon mixtures as distributed under the trade name Bonalastic by Watson Bowman Associates, Inc., of Buffalo, New York; or an approved equivalent.
- C. The neoprene extrusion shall conform to the physical properties specified for AASHO M220 except for the recovery test.
- D. Set screws for fastening of split extrusion shall be stainless steel

Alternate designed - These details and provisions are based on Wabo-Maurer Strip seal by Watson Bowman Associates, Inc., of Buffalo, New York.

PLAN NO.
107

Acme Type "E" extrusion with AS-3LP seal or Acme Type "A" extrusion with AS-300 seal, by Acme Highway Products, Inc., 33 Chandler Street, Buffalo, New York, will be accepted as an alternate. The D.S. Brown Company, P.O. Box 158, North Baltimore, Ohio 45872, will also be accepted as an alternate. The steel extrusion shall be Type "SS-E" with SS 300. The contractor shall furnish material specification, certified material test results, certification that the product meets specifications, appropriate installation procedures necessary to accommodate the alternate design.

The approval of an alternate joint seal design and the issuance of revised project plans shall be based on the understanding that such project modifications will be done without cost to the State.

Payment for all of the above shall be at the unit price bid per lineal foot for Item 516, Vertical Extension of Structural Expansion Joints, as per plan, which shall include all the labor, equipment, materials and incidentals necessary to complete the above work, for all the various modifications of the Type "A", Type "E", and Type "SS-E" extrusions as detailed.

ITEM SPECIAL, RUBBERIZED SEAL:

THE RUBBERIZED SEAL SHALL EXTEND ONE FOOT BEYOND THE BRIDGE LIMITS, APPLIED AT 0.75 GAL./SQ. YD.

THE RUBBERIZED SEAL SHALL BE BITUMINOUS MATERIAL AS PER 702.01 (AC-5 OR AC-10) WITH THE ADDITION OF GRANULATED CRUMB RUBBER. THE GRANULATED CRUMB RUBBER SHALL BE 100 PERCENT VULCANIZED AND MEET THE FOLLOWING GRADATION REQUIREMENTS:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
NO. 8	100
NO. 10	95-100
NO. 30	0-10
NO. 40	0-4

THE SIEVES SHALL COMPLY WITH THE REQUIREMENTS OF AASHTO M92 (ASTM E11).

THE GRANULATED RUBBER IRRESPECTIVE OF DIAMETER, SHALL NOT BE GREATER THAN 1/2 INCH IN LENGTH AND CONTAIN NO MORE THAN 2 PERCENT MOISTURE.

THE SPECIFIC GRAVITY OF THE RUBBER MATERIAL SHALL BE 1.15 ± 0.02 AND SHALL BE FREE OF EXCESS FABRIC (0.5 PERCENT BY WEIGHT), WIRE OR OTHER CONTAMINATING MATERIALS, EXCEPT THAT UP TO 4 PERCENT CALCIUM CARBONATE MAY BE INCLUDED TO PREVENT THE RUBBER PARTICLES FROM STICKING TOGETHER.

GRANULATED CRUMB RUBBER SHALL BE ACCEPTED BY CERTIFICATION FROM THE RUBBER SUPPLIER IN ACCORDANCE WITH THE REQUIREMENTS OF 101.061.

ASPHALT-RUBBER MATERIAL MIXING: THE PERCENTAGE OF CRUMB VULCANIZED RUBBER SHALL BE 25 ± 4 PERCENT BY WEIGHT OF THE ASPHALT CEMENT.

AS AN ALTERNATIVE TO THE ABOVE, THE CRUMB RUBBER MAY BE PREMIXED AS PER ASTM-D-3405.

THE TEMPERATURE OF THE ASPHALT SHALL BE BETWEEN 350F. AND 425F. BEFORE ADDITION OF THE CRUMB VULCANIZED RUBBER. THE MATERIALS SHALL BE CAREFULLY COMBINED AND MIXED AND REACTED FOR A PERIOD OF TIME. THE TEMPERATURE OF THE ASPHALT-RUBBER MIXTURE SHALL BE ABOVE 325F. DURING THE REACTION PERIOD.

IF A JOB DELAY RESULTS AFTER THE FULL REACTION HAS OCCURED, THE ASPHALT-RUBBER MATERIAL MAY BE ALLOWED TO COOL AND BE SLOWLY REHEATED TO AN ACCEPTABLE SPRAYING TEMPERATURE JUST PRIOR TO APPLICATION. HOWEVER, BECAUSE OF THE POLYMER REVERSION THAT CAN OCCUR WHEN CRUMB RUBBER IS HELD AT PROLONGED HIGH TEMPERATURES, THE ASPHALT-RUBBER MATERIAL SHALL NOT BE REHEATED TO TEMPERATURES ABOVE 325F.

THE ASPHALT-RUBBER MIXING EQUIPMENT SHALL BE A HOT OIL, DOUBLE BOILER TAR KETTLE TYPE WITH MECHANICAL AGITATION CAPABLE OF COMBINING THE ASPHALT AND RUBBER INTO A HOMOGENIZED MIX.

IMMEDIATELY AFTER THE ASPHALT-RUBBER HAS BEEN SPRAYED ON THE BRIDGE, LIMESTONE (703.05 QUALITY) SHALL BE APPLIED AT THE RATE OF 40 LBS./SQ. YD. WHEN PLACED, THE TEMPERATURE OF THE LIMESTONE SHALL BE ABOVE 275F. THE LIMESTONE SHALL BE NO.8 BEFORE HEATING IN THE ASPHALT PLANT. THE LIMESTONE SHALL BE RELATIVELY DUST FREE.

ROLLERS SHALL BE AS PER 409.05 AND SURFACE PREPARATION AS PER 409.06.

PAYMENT FOR ALL OF THE ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID PER SQUARE YARD FOR ITEM SPECIAL RUBBERIZED SEAL WHICH SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS NECESSARY TO COMPLETE THE ABOVE WORK.

ITEM SPECIAL - SAWING AND SEALING BITUMINOUS CONCRETE JOINTS:

1) Description:

This work shall consist of saw cutting and sealing transverse joints on the new bituminous concrete overlay as shown in detail on Sheet No. 23. Bituminous concrete joints shall be constructed directly over, and in line with, the existing underlying transverse beam end joint.

2) Materials:

Joint Sealant - the joint sealant shall meet the requirements of ASTM Specification D3405, joint sealant, hot poured for concrete and asphalt pavements or Nitril rubber as distributed by W. J. Ruscoe Co., Akron, Ohio. Sealant will be accepted on the basis of the manufacturer's Certification that it conforms to the requirements of these specifications.

3) Construction Details:

A) General: The Contractor shall conduct his operation so that saw cutting of transverse joints, cleaning, and sealing is a continuous operation. Saw cutting, cleaning and sealing shall be done as soon as practical after the paving but within four (4) days after placement of the surface course of asphalt concrete. Traffic shall not be allowed to knead together or damage the sawed joints prior to sealing.

B) Sawcutting of Transverse Joints: The Contractor shall saw cut or rout transverse joints to the dimensions shown in the plan details Sheet No. 23. The saw cut joints shall be directly over each existing beam end joint. The saw cut shall be premarked on the new asphalt surface by a chalk line or other acceptable method. Details of the method for locating and accurately marking the proposed saw cuts shall be subject to the approval of the Engineer prior to starting any resurfacing operations.

The blade or blades shall be of such size that the full width and depth of the saw cut can be made with one pass. Dry or wet cutting will be allowed. The transverse saw cut joints shall extend the full width of the bridge.

C) Cleaning Joints: Dry sawed joints shall be thoroughly cleaned with sufficient amount of compressed air to remove any dirt, dust, or deleterious matter. Wet sawed joints shall be thoroughly cleaned with water blast to remove any sawing slurry, dirt, or deleterious matter. The sawed joints shall be blown with compressed air to provide dry joint surfaces prior to sealing. The air compressor shall have a minimum rated capacity of 90 P.S.I. and shall have sufficient hose for continuing cleaning operations.

D) Sealing Joints: Hot poured joint sealant material shall be heated in a kettle or melter constructed as a double boiler, with the space between the inner and outer shells filled with oil or other heat transfer medium. Positive temperature control and mechanical agitation shall be provided. Heating must be in strict accordance with the manufacturer's recommendation. After cleaning, the joints shall be immediately sealed with the hot poured sealant applied through a nozzle which must project into the sawed joint filling from the bottom up. The seal shall completely fill the joint such that after cooling, the level of the sealer will not be greater than 1/8" below the pavement surface. Any depression in the seal greater than 3/16" shall be brought up to the specified limit by further addition of hot-poured sealant. Care shall be taken in the sealing of the joints so that the final appearance will present a neat fine line.

ITEM SPECIAL - SAWING AND SEALING BITUMINOUS CONCRETE JOINTS: D) Sealing Joints (Contd.)

The joint sealer material shall never be heated at the pouring temperature for more than four hours and shall never be reheated. Sealer left in the applicator at the end of a day's work shall be removed and discarded.

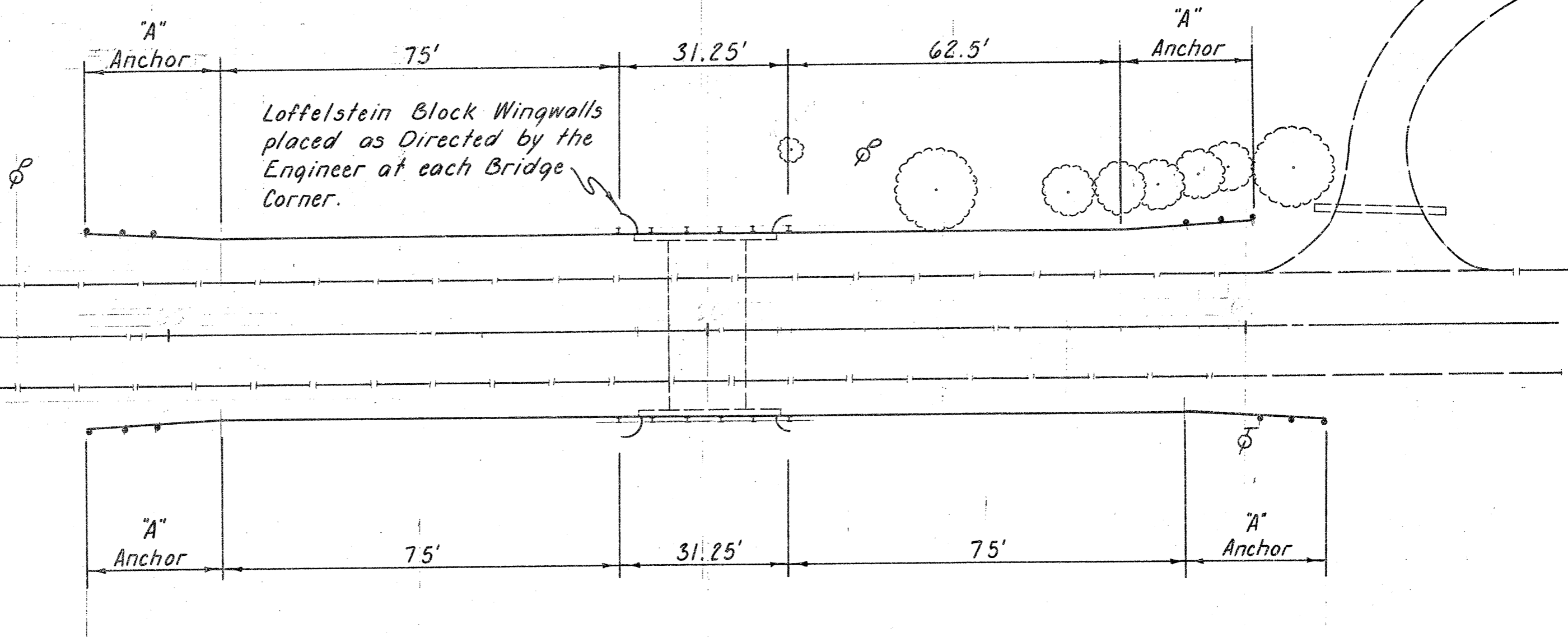
The cold applied sealant materials (nitrile rubber or silicone) shall be installed as per manufacturer's recommendations, which may require a light sandblasting of the joint surfaces or the use of a primer. The sealant shall be installed when the ambient temperature 40^o F or higher. Traffic shall not be allowed on the joint for one hour after application of the sealant.

4) Method of Measurement:

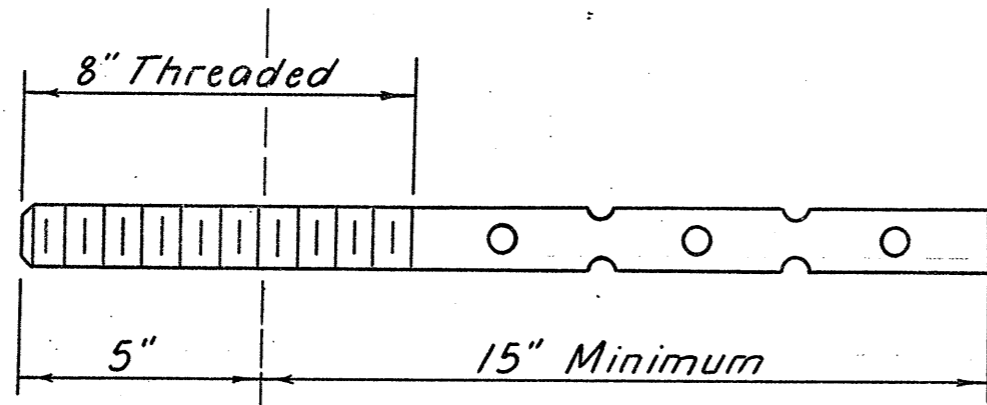
The quantity to be paid for under this item will be the number of linear feet of joints sawed and sealed as per the above requirements.

5) Basis of Payment:

The unit price per linear foot for item special - "Sawing and Sealing Bituminous Concrete Joints" shall include the cost of all labor, materials and equipment necessary to complete the work, including the furnishing and placing of the joint sealer material.

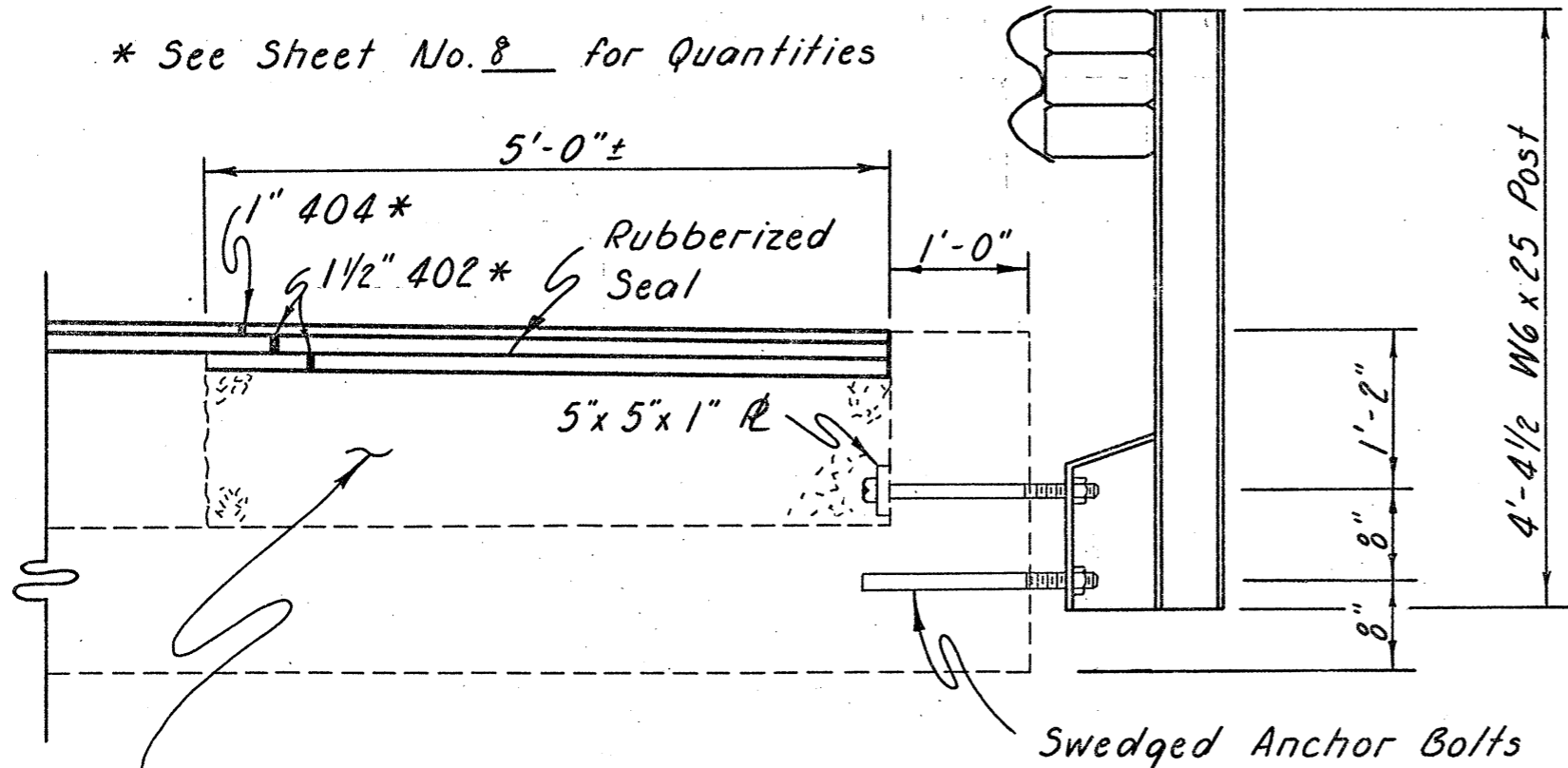


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Face of Existing Concrete Deck

* See Sheet No. 8 for Quantities



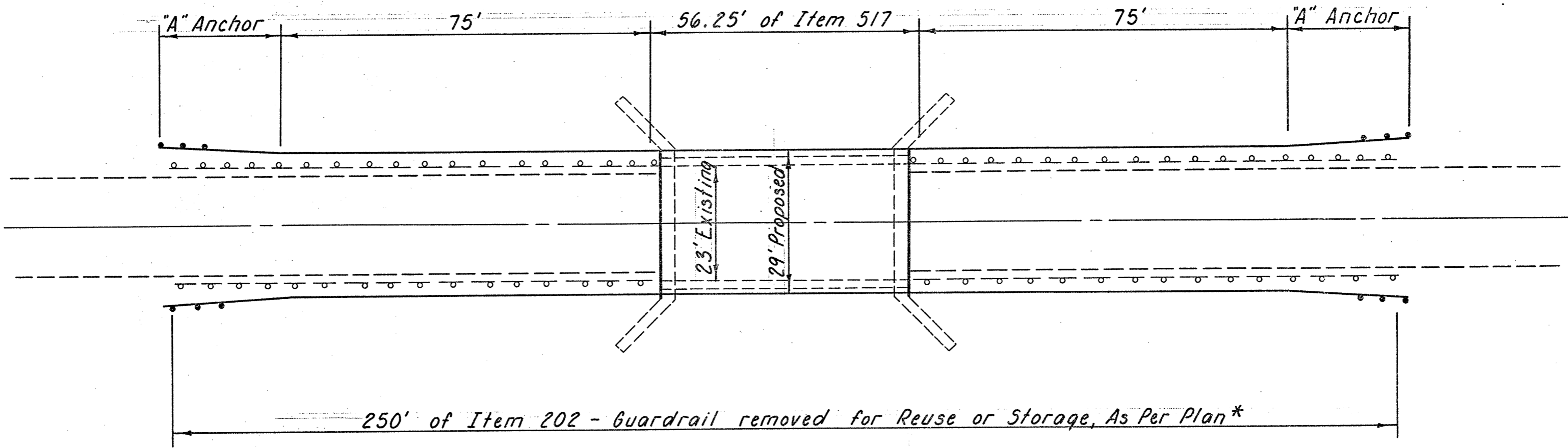
Existing Dirt to remain except for placement of Guardrail Post Anchor Bolt.

ESTIMATED QUANTITIES

ITEM	QUANTITY	UNIT	DESCRIPTION
203	222	Cu. Yd.	Embankment, As Per Plan
517	62.5	Lin. Ft.	Railing (Single Deep Beam with Steel Tubular Back-up) Type 2 Post and Bolts, As Per Plan.
606	4	Each	Bridge Terminal Assembly, Type B
606	287.5	Lin. Ft.	Guardrail, Type 5
606	4	Each	Anchor Assembly, Type A
659	457	Sq. Yd.	Seeding and Mulching
659	0.004	Ton	Commercial Fertilizer
659	0.05	M-Gal	Water
Special	104	Each	Loffelstein Blocks

PART DECK CROSS SECTION

NOTE: Approach Pavement shall be replaced.
See Sheet No. 3 for Quantities.



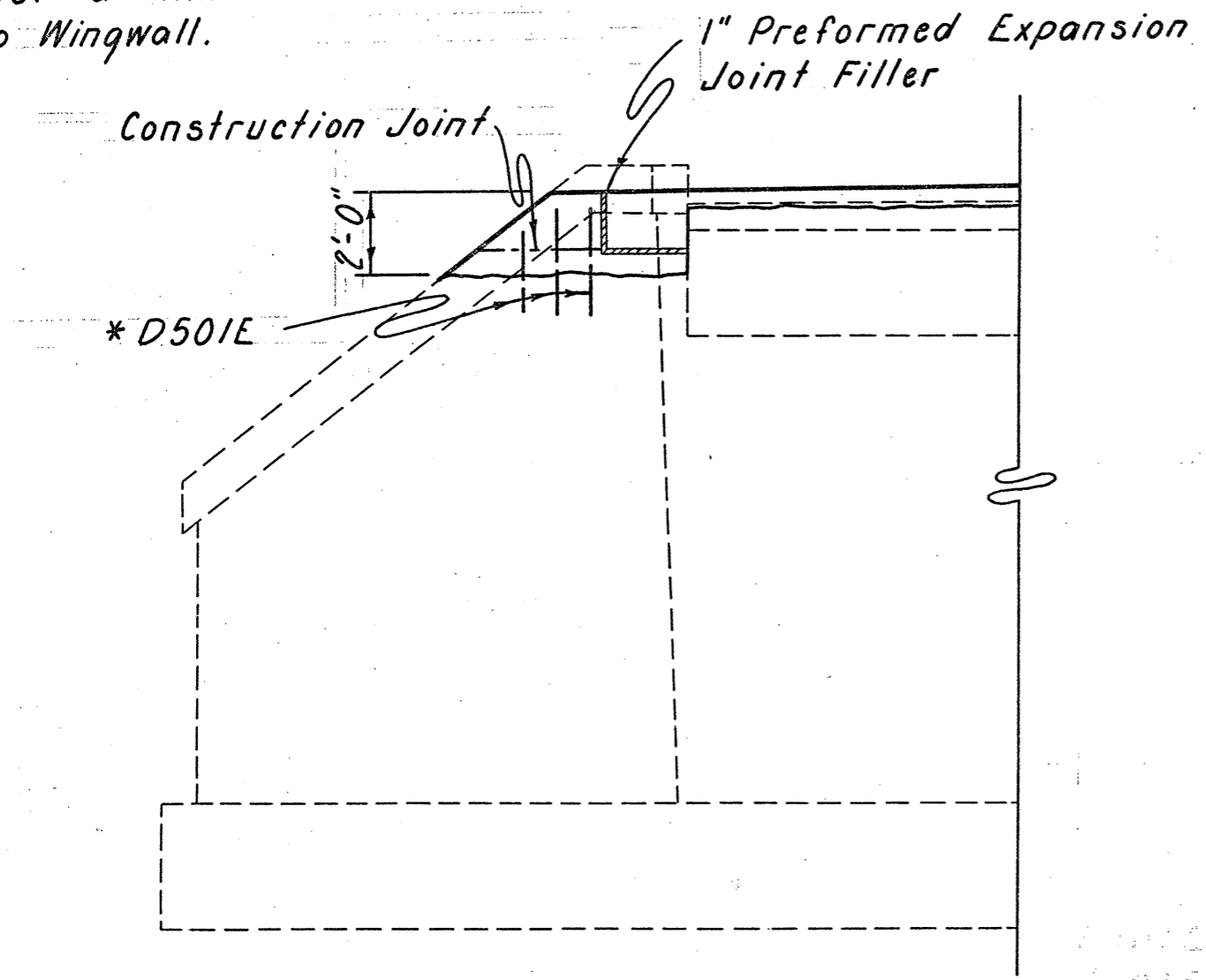
SITE PLAN

* Includes removal of Four Type A Anchor Assemblies.

ESTIMATED QUANTITIES

NOTE: The Concrete Removal and 1" Preformed Expansion Joint Filler shall be included in the cost of Item 511, Class C Concrete, Abutment, As Per Plan.

*Dowel a minimum of 12" into Wingwall.

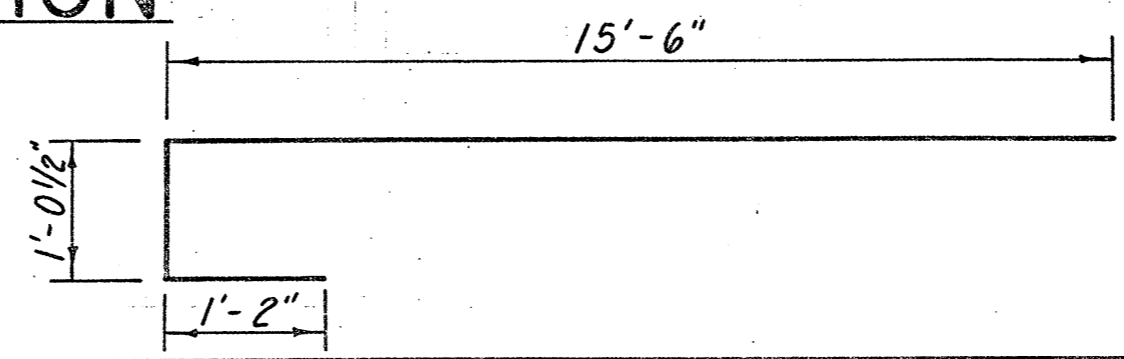


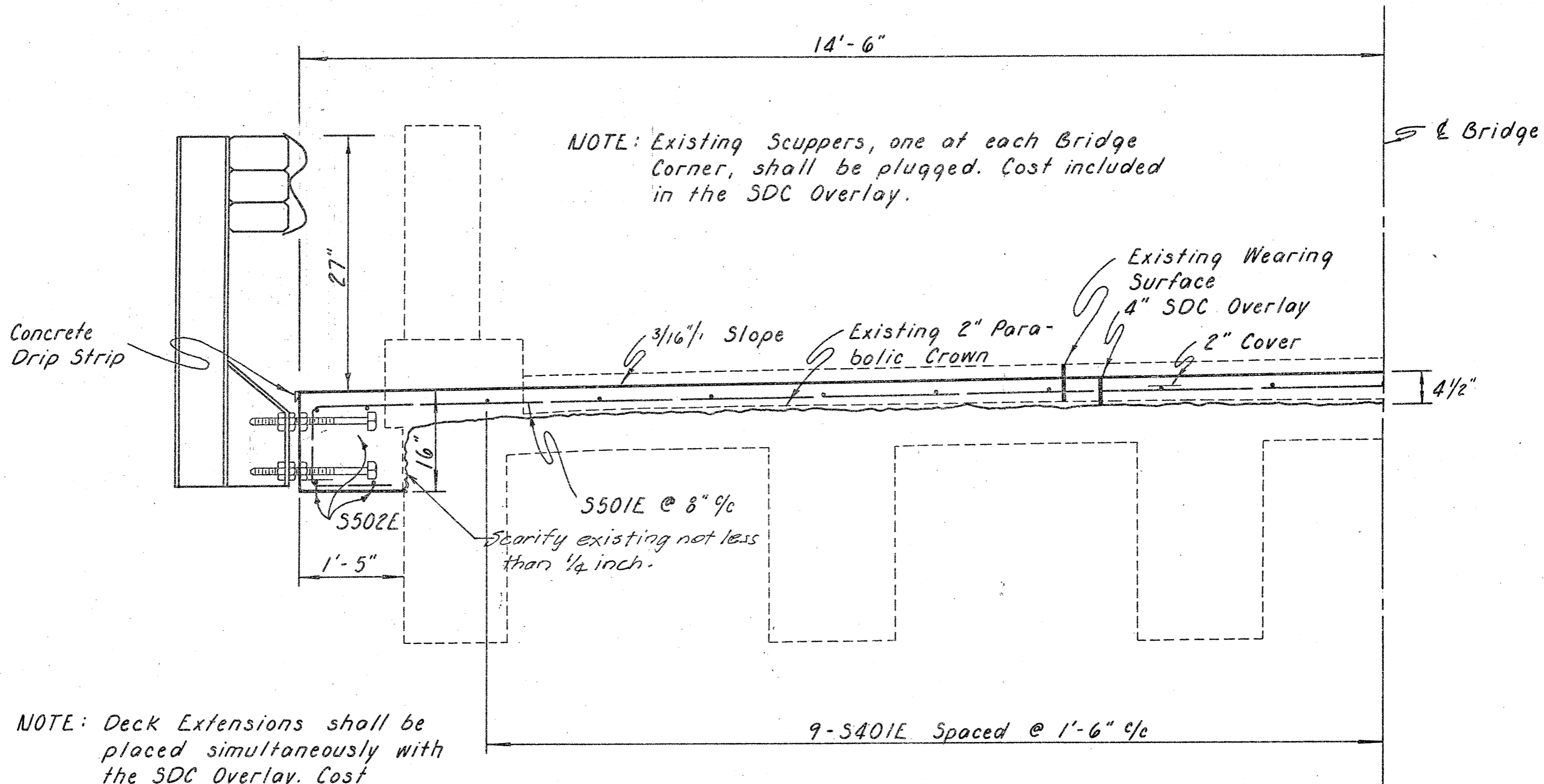
ABUTMENT ELEVATION

ITEM	QUANTITY	UNIT	DESCRIPTION
202	101	Lin. Ft.	Portions of Structures Removed, Railing, As Per Plan.
202	500	Lin. Ft.	Guardrail Removed for Reuse or Storage, As Per Plan
203	185	Cu. Yd.	Embankment, As Per Plan
510	12	Each	Dowel Holes
511	1	Cu. Yd.	Class C Concrete, Abutment, As Per Plan
517	112.50	Lin. Ft.	Railing (Single Deep Beam with Steel Tubular Backup) Type 2 Posts & Bolts
606	4	Each	Bridge Terminal Assembly, Type B
606	300	Lin. Ft.	Guardrail, Type 5
606	4	Each	Anchor Assembly, Type A
659	333	Sq. Yd.	Seeding and Mulching
659	0.004	Ton	Commercial Fertilizer
659	0.04	M-Gal.	Water
824	3757	Lb.	Epoxy Coated Reinforcing Steel

REINFORCING STEEL

MARK	NO.	LENGTH	SHAPE	WEIGHT
S401E	34	26'-0"	S	591
S501E	148	17'-6"	B	2701
S502E	16	26'-0"	S	434
D501E	12	2'-6"	S	31
Total				3757





NOTE: Existing Scuppers, one at each Bridge Corner, shall be plugged. Cost included in the SDC Overlay.

Concrete Drip Strip

Bridge

Existing Wearing Surface
4" SDC Overlay
2" Cover

3/16" Slope

Existing 2" Parabolic Crown

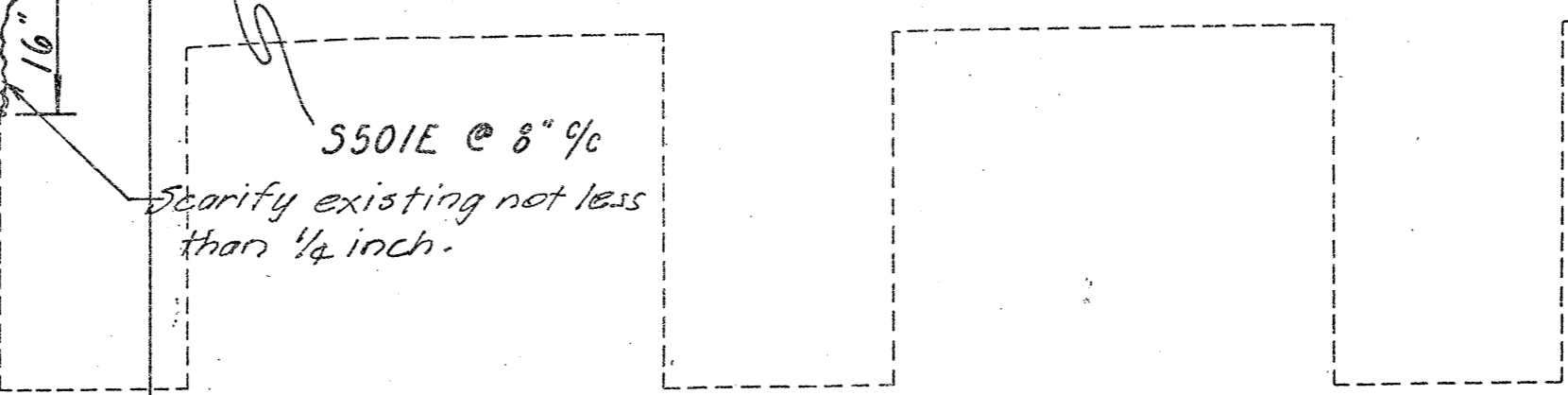
4 1/2"

5502E

5501E @ 8" c/c

Scarify existing not less than 1/4 inch.

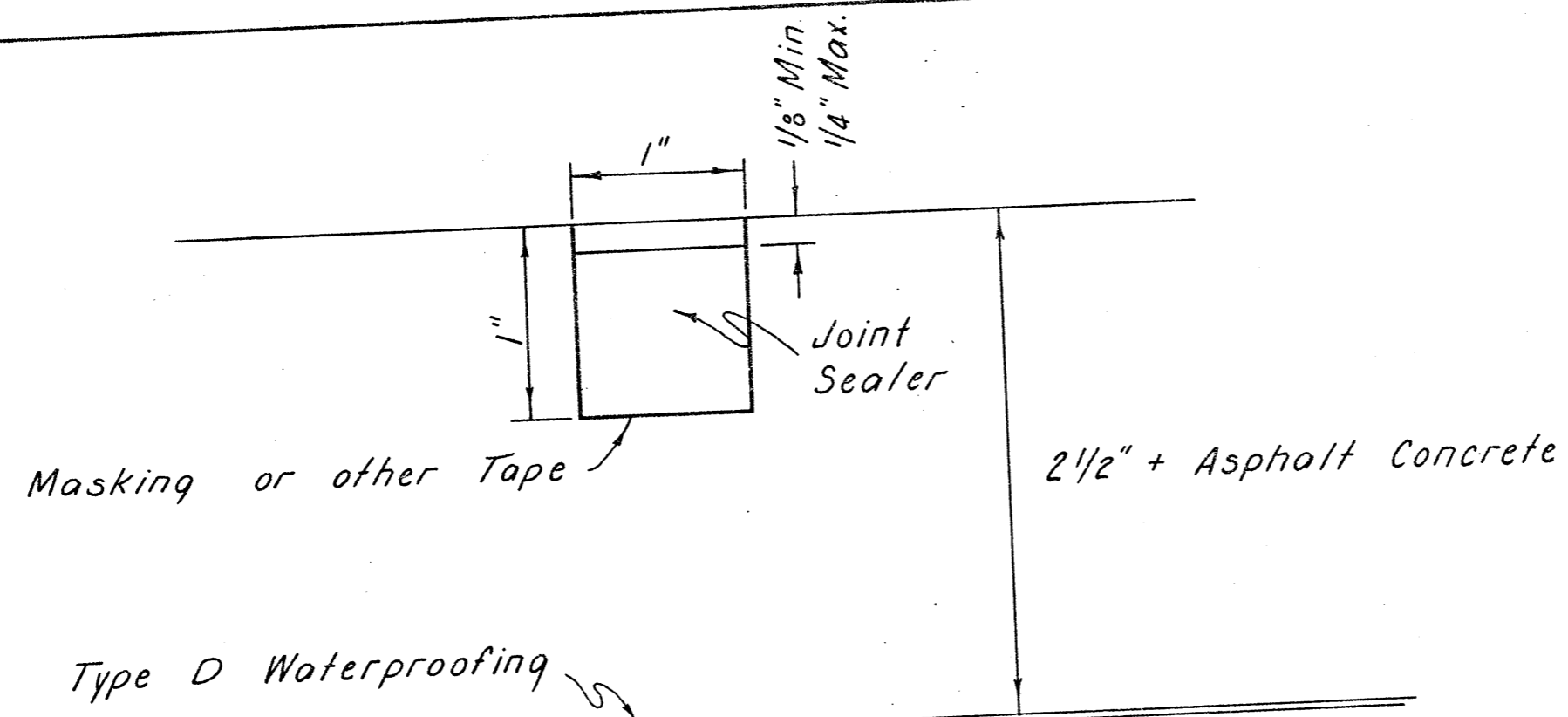
1'-5"



9-5401E Spaced @ 1'-6" c/c

NOTE: Deck Extensions shall be placed simultaneously with the SDC Overlay. Cost included in Full Depth Repair.

HALF DECK CROSS SECTION



Type D Waterproofing

2" Joint Sealer (Remove Concrete and Preformed Expansion Joint Filler Material by Saw Cut.)

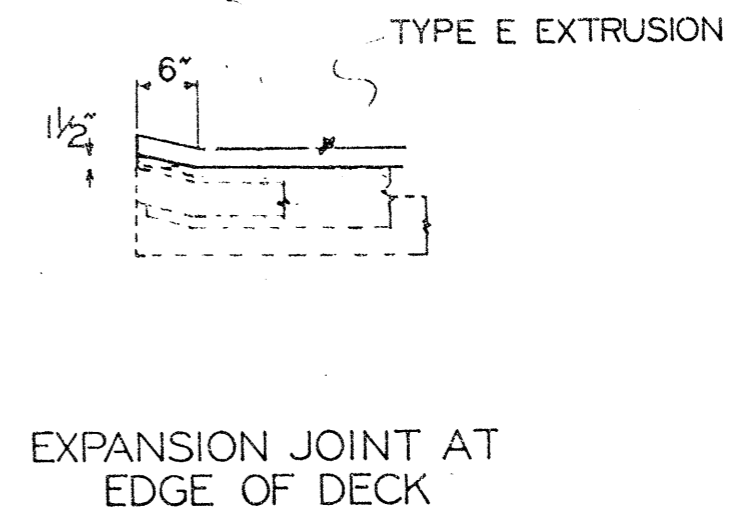
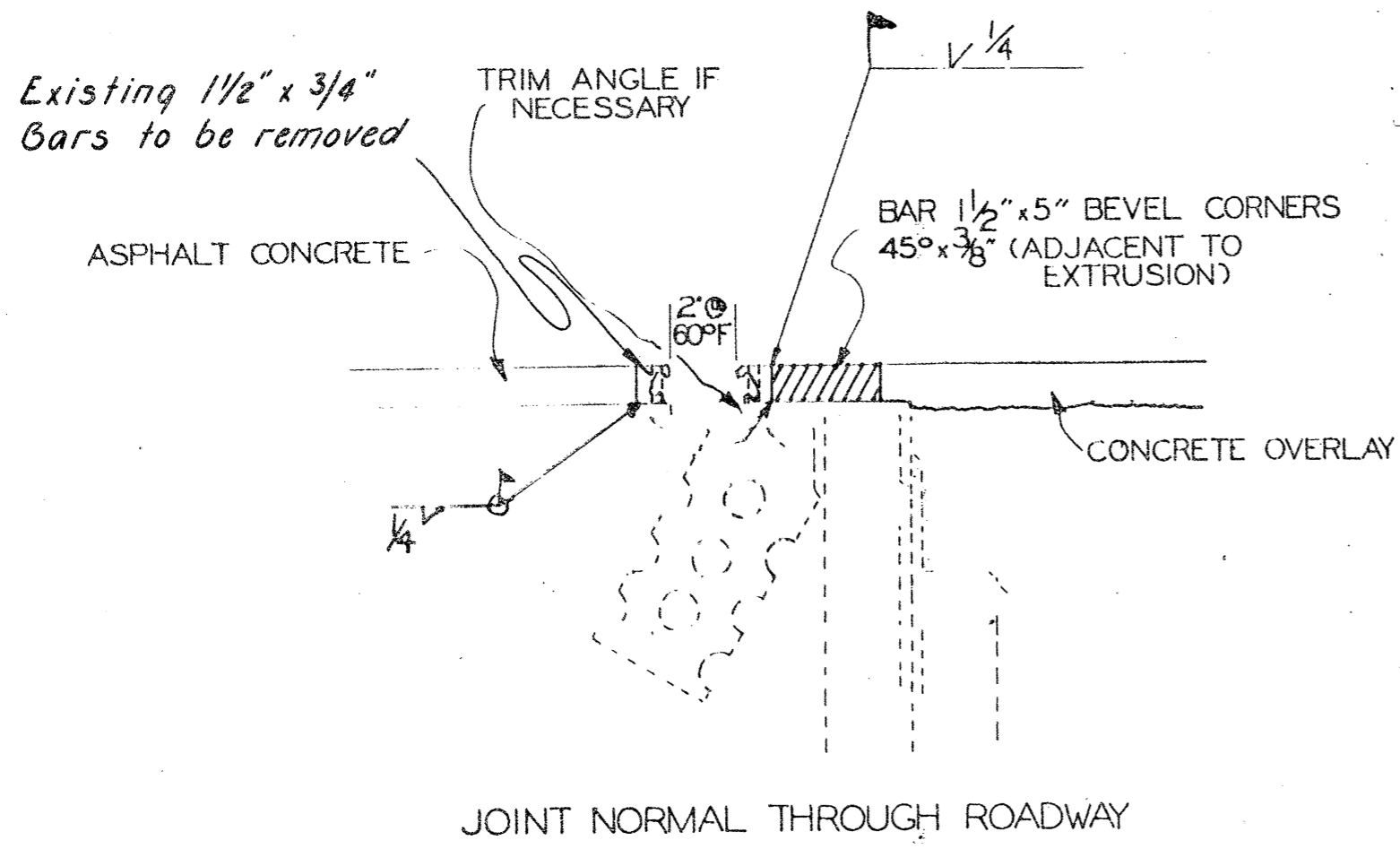
Existing Concrete Approach Slab or Backwall

Existing Prestressed Concrete Box Beam

Existing Preformed Expansion Joint Filler

1"

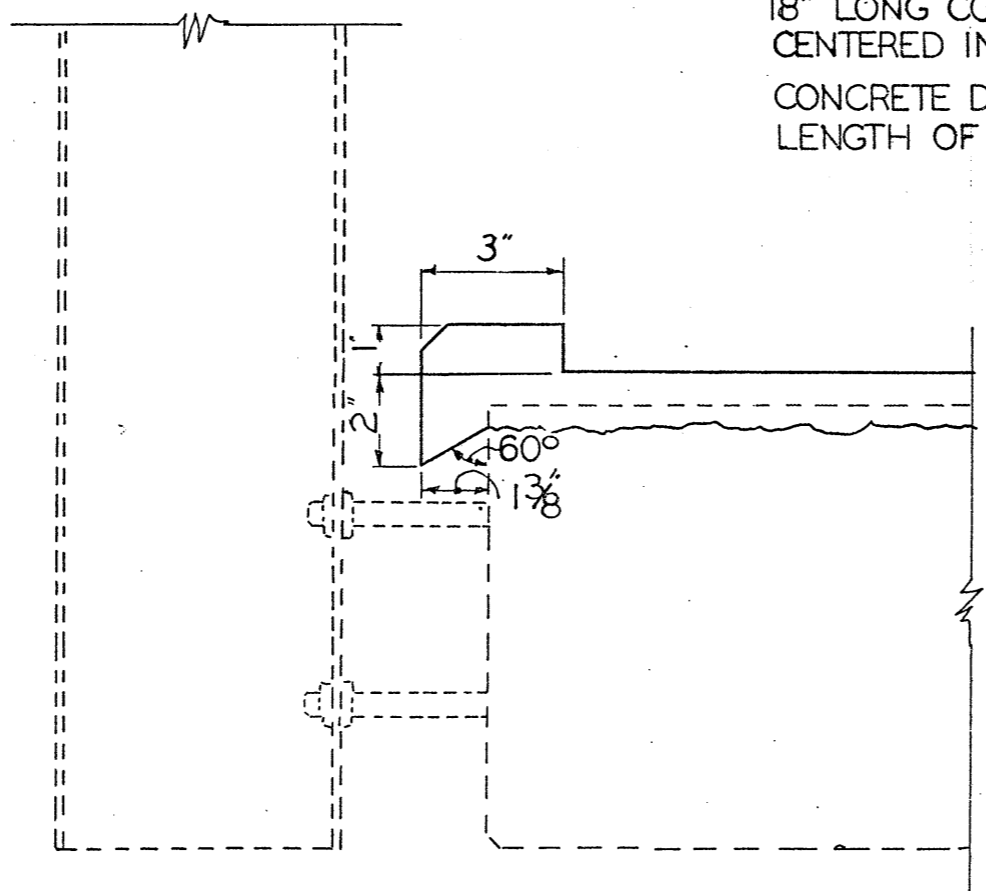
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LOR - 511 - 1315



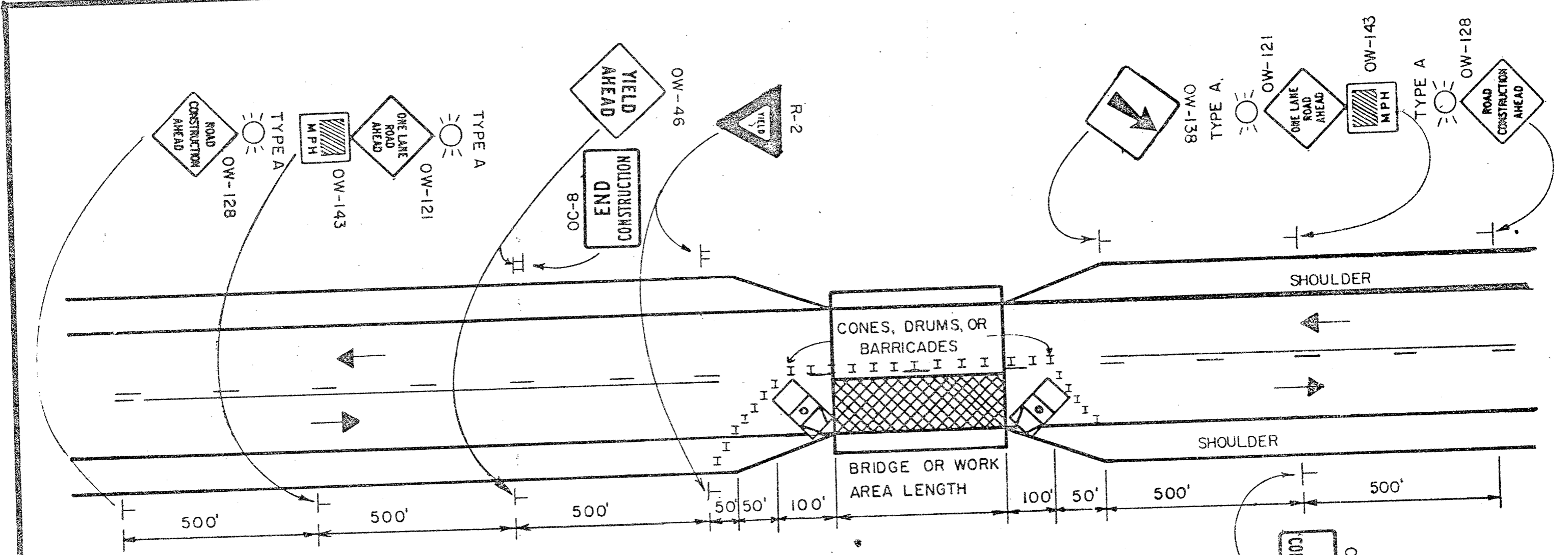
LOR - 511 - 0617

EXPANSION
JOINT
DETAILS

18" LONG CONCRETE HUMP TO BE
CENTERED IN FRONT OF GUARDRAIL POSTS.
CONCRETE DRIP STRIP TO EXTEND FULL
LENGTH OF BRIDGE ON BOTH SIDES.



TYPICAL EDGE DETAIL FOR
CONCRETE SLAB DECK



GENERAL NOTES:

1. This work area traffic control application may be used as an alternate traffic control plan to either the "Signalized Closing 1 of a 2 Lane Highway" or "Flaggers Closing 1 Lane of a 2 Lane Highway" when the following conditions exist.
 - a. Highway volume does not exceed 4,000 ADT.
 - b. Maximum bridge or work area length does not exceed 100 feet.
 - c. Sight distance across the work site must be adequate enough for a vehicle with very poor acceleration performance operated by driver at night with marginal driving skills to proceed from a complete stop position from a point 100 feet in advance of the Yield sign towards the work area and to maneuver his vehicle along the advance taper through the work area, along the return taper and back to right hand lane of the highway, prior to the driver of an oncoming vehicle reaching the near end of the near taper in his direction of travel.
2. The "Yield" Signs (R-2) and "Yield Ahead" Signs (OW-46) may be covered and flaggers used during daylight working hours at the option of the Engineer to control the flow of traffic through the work area. When flaggers are used, the "Flagman Ahead" Signs (OW-125) shall be used in place of the Yield Ahead Signs (OW-46). The flaggers shall communicate with each other at all times as described in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) in Section 7H: Control of Traffic Through Work Area.
3. 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.
4. Cones, drums or barricades shall be spaced approximately 20' to 25' center to center from 100' before to 100' beyond bridge or work area. Cones, drums or barricades on the advance and return tapers shall be spaced at 10' center to center. Cones may be substituted for barricades or drums for short term lane closures. Cones shall be reflectorized, delineated or internally illuminated for short term night lane closures.
5. The work vehicles shown at the beginning and end of the work area shall be in place and unoccupied whenever workers are in the work area. These work vehicles shall be removed from the pavement whenever workers are not in the work area. Other protective devices may be used in lieu of the work vehicles shown when approved by the Engineer. The vehicles shall be equipped with a 360° rotating or flashing amber beacon clearly visible a minimum of a 1/2 mile.
6. The Type A flashing barricade warning lights shown on the "Road Construction Ahead" and the "One Lane Road Ahead" signs are required whenever a night lane closure is necessary.
7. Type C steady burning barricade warning lights shall be erected on drums or barricades for night lane closures. The maximum spacing shall be identical to the channelizing device spacing requirements described in Note 4.
8. Temporary no passing lines shall be installed and maintained where no passing lines are not already in place. Removable pavement markings may be used. Existing conflicting pavement markings between the work area and the Yield Signs (R-2) shall be removed. After completion of the work, temporary markings shall be removed in accordance with 621.134.

OHIO DEPARTMENT OF TRANSPORTATION	
YIELD SIGN CLOSING 1 LANE OF A 2 LANE HIGHWAY	
DATE	2/82

LOR - 511 - 0617

SCALE		OHIO	27
BY		FHWA	36
DATE		REGION	5

614 WORK ZONE PAVEMENT MARKINGS

GENERAL

THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN AND WHEN NECESSARY, REMOVE WORK ZONE RETROREFLECTIVE PAVEMENT MARKINGS ON EXISTING, RECONSTRUCTED, RESURFACED OR TEMPORARY ROADS WITHIN THE WORK LIMITS, IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS.

THE MARKINGS SHALL BE MAINTAINED IN GOOD CONDITION TO PROVIDE DAY AND NIGHT VISIBILITY. THE MARKINGS SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER TO MAINTAIN REQUIRED VISUAL EFFECTIVENESS AND NIGHT VISIBILITY AT NO ADDITIONAL COST TO THE STATE.

THE CONTRACTOR SHALL, IN ADVANCE OF ANY SECTION OF ROADWAY LACKING OMTCD FULL PATTERN STANDARD DIMENSION EDGE LINE OR CENTER LINE MARKINGS, ERECT A "NO EDGE LINES" (OW-167) SIGN OR "UNMARKED NO PASSING ZONES" (OW-168) SIGN OR BOTH AS MAY BE APPROPRIATE. THESE SIGNS SHALL BE IN PLACE PRIOR TO EXPOSING THE ROADWAY TO TRAFFIC. THESE SIGNS SHALL BE REPEATED EVERY 1 TO 2 MILES AND AT OTHER LOCATIONS AS NECESSARY. THESE SIGNS SHALL BE REMOVED WHEN THEY NO LONGER APPLY. THE COST FOR FURNISHING AND ERECTING AND SUBSEQUENTLY REMOVING THESE SIGNS SHALL BE INCLUDED IN 614 MAINTAINING TRAFFIC, UNLESS SPECIFICALLY ITEMIZED.

TEMPORARY PAVEMENT MARKING MATERIALS

UNLESS OTHERWISE INDICATED ON THE PLANS, TEMPORARY PAVEMENT MARKINGS MAY BE EITHER 621.02 PAINT OR 947.03 TYPE B OR C PREFORMED MATERIAL. *

PAINT

PAINTED MARKINGS SHALL BE IN ACCORDANCE WITH 621 EXCEPT THAT THE INCREASE OF 25 PERCENT IN THE APPLICATION RATE FOR NEW BITUMINOUS PAVEMENT AND PARAGRAPH 621.14 SHALL NOT APPLY.

TYPE B AND TYPE C PREFORMED MATERIAL

PREFORMED MATERIAL SHALL COMPLY WITH 947.03 EXCEPT THAT NO PREFORMED MATERIAL CONTAINING METAL SHALL BE PLACED ON ANY SURFACE UNLESS IT WILL BE REMOVED LATER BY THE CONTRACTOR. TEMPORARY PAVEMENT MARKINGS OF 947.03 PREFORMED MATERIAL SHALL BE REMOVED PRIOR TO PLACEMENT OF 621 OR 847 SURFACE COURSE MARKINGS AT THAT LOCATION. PREFORMED MATERIAL SHALL BE APPLIED IN ACCORDANCE WITH 847 EXCEPT AS MODIFIED HEREIN.

PLACEMENT

TEMPORARY MARKINGS SHALL BE COMPLETE AND IN PLACE ON ALL PAVEMENT PRIOR TO EXPOSING IT TO TRAFFIC. WHEN TEMPORARY MARKINGS CONFLICT WITH THE TRAFFIC PATTERN, THEY SHALL BE REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH 621.134.

TEMPORARY MARKING CLASSES

CLASS I MARKINGS

CLASS I MARKINGS SHALL BE APPLIED TO THE FULL DIMENSIONS AS DEFINED IN 621 WITH THE FOLLOWING ADDITIONS OR EXCEPTIONS:

- 1) LANE LINES SHALL BE 4-INCHES IN WIDTH.
- 2) TRANSVERSE LINES SHALL BE 8-INCHES IN WIDTH.
- 3) STOP LINES SHALL BE 12-INCHES IN WIDTH.
- 4) CROSS WALK LINES SHALL BE 8-INCHES IN WIDTH.

*Where pavement markings are not liable to be tracked, either conventional or fast dry paint may be used for 621.02.

CLASS II MARKINGS

CLASS II MARKINGS (ABBREVIATED) SHALL BE DEFINED AS FOLLOWS:

CENTER LINES SHALL CONSIST OF SINGLE, YELLOW 4-INCH WIDE BY A MINIMUM OF 48-INCH LONG DASHES SPACED AT A MAXIMUM OF 40-FOOT INTERVALS.

LANE LINES SHALL CONSIST OF WHITE 4-INCH WIDE BY A MINIMUM OF 48-INCH LONG DASHES SPACED AT A MAXIMUM OF 40-FOOT INTERVALS.

GORE MARKINGS SHALL BE TWO CONTINUOUS, WHITE 4-INCH LINES PLACED AT THE THEORETICAL GORE OF AN EXIT RAMP OR DIVERGING ROADWAYS.

THE PAINT APPLICATION RATE SHALL BE NOT LESS THAN 1.6 GALLONS PER MILE FOR LANE LINE AND CENTER LINE AND 16 GALLONS PER MILE FOR GORE MARKINGS.

CONFLICTING EXISTING MARKINGS

THE CONTRACTOR SHALL, PRIOR TO PLACING TEMPORARY MARKINGS, REMOVE ALL CONFLICTING EXISTING MARKINGS VISIBLE TO THE TRAVELING PUBLIC DURING DAYLIGHT OR NIGHTTIME HOURS IN ACCORDANCE WITH 621.134. THE COST FOR REMOVAL OF CONFLICTING MARKINGS SHALL BE INCLUDED IN 614 MAINTAINING TRAFFIC UNLESS SPECIFICALLY ITEMIZED.

THE CONTRACTOR SHALL ALSO REMOVE THE PRISMATIC RETRO-REFLECTOR WITHIN ANY RAISED PAVEMENT MARKER (RPM) WHICH IS IN CONFLICT WITH THE TEMPORARY PAVEMENT MARKINGS. WHEN THE TEMPORARY PAVEMENT MARKINGS ARE REMOVED AND THE RPM IS NO LONGER IN CONFLICT, THE CONTRACTOR SHALL THOROUGHLY CLEAN THE RECESSED REFLECTOR ATTACHMENT AREA OF THE CASTING AND INSTALL A NEW PRISMATIC RETRO-REFLECTOR OF THE SAME KIND AND COLOR. THE COST FOR THIS WORK SHALL BE INCIDENTAL TO THE VARIOUS PAY ITEMS.

INTERIM MARKINGS

WITHIN 21 CALENDAR DAYS AFTER OPENING ANY LENGTH OF PAVEMENT TO TRAFFIC, THE 621 OR 847 PAVEMENT MARKINGS CALLED FOR IN THE PLANS OR EQUIVALENT 614 CLASS I, PAINT MARKINGS SHALL BE APPLIED. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO PLACE AND MAINTAIN 614 CLASS I PAINT MARKINGS AS PART OF THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC.

FOR EACH CALENDAR DAY BEYOND 21 DAYS THAT THIS WORK SHALL REMAIN UNCOMPLETED, THE PROVISIONS OF 108.07 WILL BE INVOKED, EXCEPT THAT BETWEEN NOVEMBER 15 AND APRIL 15 WEATHER CONDITIONS SHALL NOT BE AN ACCEPTABLE REASON FOR EXTENSION.

METHOD OF MEASUREMENT

TEMPORARY PAVEMENT MARKINGS WILL BE MEASURED COMPLETE IN PLACE, BY CLASS AND MATERIAL, IN THE UNITS DESIGNATED. LINE QUANTITIES WILL BE THE LENGTH OF THE COMPLETED STRIPE, INCLUDING GAPS, INTERSECTIONS, AND OTHER SECTIONS OF PAVEMENT NOT NORMALLY MARKED, IN ACCORDANCE WITH 621.15.

TEMPORARY PAVEMENT MARKINGS WILL INCLUDE THE LAYOUT, APPLICATION AND REMOVAL OF THE MARKINGS, WHEN REQUIRED.

BASIS OF PAYMENT

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 PLACEMENT, MAINTENANCE AND NECESSARY REMOVAL OF THE MARKINGS.

ITEM	UNIT	DESCRIPTION
614	MILES	TEMPORARY LANE LINES, CLASS _____, *
614	MILES	TEMPORARY CENTER LINES, CLASS II, *
614	LIN. FT.	TEMPORARY CHANNELIZING LINES, CLASS I, *
614	MILES	TEMPORARY EDGE LINES, CLASS I, *
614	LIN. FT.	TEMPORARY GORE MARKINGS, CLASS II, *
614	LIN. FT.	TEMPORARY STOP LINES, CLASS I, *
614	LIN. FT.	TEMPORARY CROSSWALK LINES, CLASS I, *
614	EACH	TEMPORARY LANE ARROWS, CLASS I, *
614	EACH	TEMPORARY RAILROAD SYMBOL MARKINGS, CLASS I, *
614	EACH	TEMPORARY WORD "ONLY" ON PAVEMENT, 72-INCH, CLASS I, *
614	LIN. FT.	TEMPORARY TRANSVERSE LINES, CLASS I, *
614	LIN. FT.	TEMPORARY DOTTED LINES, CLASS I, *
		*621 PAINT, 947.03 TYPE B OR 947.03 TYPE C
fh4		

* Sub-Summary:

Part 1	25.34 miles
Part 2	1.76 miles

PAVEMENT MARKING SUB-SUMMARY

FED. RD. DIVISION	STATE	PROJECT	
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PLAN NO. 105

CO.	ROUTE	FROM		TO		621 QUANTITIES			PARTICIPATION	621 CENTER LINE
		S.L.M.		S.L.M.		CENTER LINES MILES				
						TOTAL	DASHED	SOLID		
LOR	SR 511	0.00	Ashland Co. Line	3.67	Rochester S. Corp.	3.67	3.58	1.53		Part 1
LOR	SR 511	3.67	Rochester S. Corp.	4.55	Rochester N. Corp.	0.88	0.34	1.42		Part 2
LOR	SR 511	4.55	Rochester N. Corp.	13.55	SR 10	9.00	7.73	4.96		Part 1
CENTER LINE TOTAL						13.55	11.65	7.91		

CO.	ROUTE	FROM		TO		621 QUANTITIES			PARTICIPATION	621 LANE LINE
		S.L.M.		S.L.M.		4" LANE LINES MILES				
						TOTAL	DASHED	SOLID		
LANE LINE TOTAL										

CO.	ROUTE	FROM		TO		WHITE EDGE LINE QUANTITIES				YELLOW EDGE LINE QUANTITIES				621 EDGE LINE
		S.L.M.		S.L.M.		TOTAL MILES	HIGHWAY MILES	RAMP MILES	PART.	TOTAL MILES	HIGHWAY MILES	RAMP MILES	PART.	
LOR	SR 511	0.00	Ashland Co. Line	3.67	Rochester S. Corp.	7.34			1					
LOR	SR 511	3.67	Rochester S. Corp.	4.55	Rochester N. Corp.	1.76			2					
LOR	SR 511	4.55	Rochester N. Corp.	13.55	US 20	18.00			1					
EDGE LINE TOTAL						27.10								

CO.	ROUTE	FROM		TO		621 QUANTITIES		PARTICIPATION	621 CHANNELIZING LINE
		S.L.M.		S.L.M.		8" CHANNELIZING LINES			
						MILES	LIN. FT.		
CHANNELIZING LINE TOTAL									

847 AUXILIARY MARKING (947.03 TYPE A) INLAID																	
CO.	ROUTE	S.L.M.		24" TRANSVERSE LINES		STOP LINE	12" CROSSWALK LINES	WORD ON PAVEMENT		LANE ARROWS				RAILROAD SYMBOL ON PAVEMENT	DOTTED LINES		REMARKS
		FROM	TO	WHITE LIN. FT.	YELLOW LIN. FT.	24" LIN. FT.	WHITE LIN. FT.	ONLY 95" EACH	SCHOOL 56" EACH	TURN		THRU. EACH	COMB. EACH	EACH	WHITE LIN. FT.	YELLOW LIN. FT.	
										LEFT EACH	RIGHT EACH						
LOR	SR 511	0.00	3.67			40							2			Part 1	
LOR	SR 511	3.67	4.55			152										Part 2 (No Markings)	
LOR	SR 511	4.55	13.55										2			Part 1	
AUXILIARY MARKING TOTALS						192							4				

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INITIAL PAVEMENT MARKINGS FOR RESURFACED SECTIONS

GENERAL NOTES

PLAN NO. 105

In addition to the requirements of 621 and 847 the following shall apply:

621 Materials

Glass beads shall be kept dry during storage and prior to use.

621 SPECIAL EQUIPMENT

The Contractor's striper shall be equipped with an odometer graduated to 1/100 of a mile. The Engineer will determine the degree of accuracy of the Contractor's odometer and establish an adjustment factor as may be required to accurately determine the pay item quantities. The Engineer will periodically check the odometer's operation to assure maintenance of accurate measurements.

Failure of the odometer to function properly shall be cause to stop the work until the odometer is made to function properly. On short projects the Engineer may approve alternate methods to accurately measure the length of the various types of markings applied. If measurement of the work has to be done by the Department, the cost of the Department labor and equipment plus 10 percent shall be deducted from payment due the Contractor for the work. When measuring lane, edge and center line marking the odometer shall be started at the first marked line and remain in operation, until the end of the section being marked, where it shall be shut off and the reading of the odometer recorded.

Electrical foot counters shall be provided and installed in the striper. The counters shall individually tabulate the amount of footage applied by each striping gun on the center line carriage and lane line carriage, whether solid or dashed. The counters shall be 6 digit type with a reset feature.

The pavement marking equipment shall be equipped with a pressure regulated air jet which shall remove all debris from the pavement in advance of the applicator gun. The air jet shall operate when marking material is being applied and shall be synchronized with marking material application or remain "on" at all times.

The Contractor shall use an accurate dashing mechanism, capable of being easily adjusted

Provision for the above special equipment by the Contractor shall be incidental to the application.

847 LAYOUT AND PREMARKING

In addition to the requirements of 847 premarking for auxiliary markings shall be located from schematic forms provided at the pre-construction conference.

621 MATERIAL QUANTITY MEASUREMENT

The quantity of marking material or glass beads per unit of measurement will be computed by the Engineer at the end of each day's work. A day's applied mileage of less than 2 miles may be included in the next day's applied markings for the purpose of computing marking material and bead application rates.

The Contractor shall provide a calibrated measuring device acceptable to the Engineer for measuring material in the striper tanks.

The quantity of marking material used shall be determined by measuring the marking material in the tanks before and after marking material is applied. The Contractor shall cooperate with the Engineer in providing measurements whenever requested. The marking material application rate shall be determined by dividing the total gallons used by the appropriate marking length as determined from the foot counter as described within the Special Equipment Section of these notes. Any determination of pay deduction resulting from shortages in marking quantities shall be based on the measurements obtained by this method. The amount of glass beads applied will be ascertained by the Engineer by observation and from information supplied by the Contractor as to quantity used.

847 AUXILIARY PAVEMENT MARKING

For this project auxiliary markings shall be defined as: stop lines, crosswalk lines, transverse lines, railroad symbol markings, lane arrows, word on pavement and dotted lines except when used to extend edge lines.

STANDARD CONSTRUCTION DRAWING TC 71.10

The dimensions shown on Standard Construction Drawing TC 71.10 are nominal. Letters, numerals and symbols conforming to the requirements of section 3B-17 of the 1978 National Manual On Uniform Traffic Control Devices may also be used. Any of the following standards for letters, numeral or symbol dimensioning may be used; A.) Standard dimensions shown on this detail or B.) Standard dimensions (either metric or their hard converted English unit equivalents) in accord with the 1977 Metric Edition Standard Alphabets For Highway Signs and Pavement Marking with Errata or C.) Standard dimensions shown in figures 3-17, 3-18, 7-2, 7-3, 8-2 or 9-6 of the 1978 National Manual On Uniform Traffic Control Devices.

TRAFFIC CONTROL FOR LONG LINE PAVEMENT MARKING OPERATIONS

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 device requirements are not achieving the necessary safety and marking protection, additional traffic control devices shall be implemented in accordance with 104.02.

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.

LEAD VEHICLE

A lead vehicle is to be used to warn opposing traffic of the approach of centerline 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 should 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 400 feet to 600 feet.

A lead vehicle shall be equipped and operated with the following traffic control devices:

1. A 360° rotating or flashing amber beacon clearly visible a minimum of $\frac{1}{2}$ mile.
2. Lighted head lights and tail lights, and
3. A KEEP RIGHT sign (OC-31R-48) and WET PAINT sign (OC-52-48) mounted a minimum of 5' 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 (Item 621.04) with the following traffic control devices:

1. A 360° rotating or flashing amber beacon clearly visible a minimum of $\frac{1}{2}$ mile.
2. Lighted head lights and tail lights, and
3. A flashing arrow panel 54" x 30" (Type B) visible to the rear mounted a minimum of 7' 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 a minimum of $\frac{1}{2}$ mile mounted a minimum of 7' 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 54" x 30" (Type B) displayed to the rear mounted a minimum of 7' above the road surface measured to the bottom of the panel and used only on multilane highways, or
(b) A DO NOT PASS sign (R-33A-48) visible to the rear during centerline marking on two lane, two way roadways and mounted a minimum of 7' 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 in use carriage side of the vehicle. OC-50-24 and OC-51-48 signs shall be mounted a minimum of 1' above the road surface.
4. A KEEP RIGHT sign (OC-31R-48) and WET PAINT sign (OC-52-48) mounted a minimum of 5' above the road surface measured to the bottom of the sign and 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 16" square and fastened to staffs of sufficient length so as to permit the flags 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. An additional trail vehicle shall be used when applying lane lines of fast dry material (i.e. \leq 2 min. dry) to protect the wet line between the line marking machine and the track free end of the wet line. All pavement marking application, protection and support equipment following the line marking machine shall be equipped with the traffic control of a trail vehicle.

Trail vehicles shall be equipped and operated with the following traffic control equipment:

1. A 360° rotating or flashing amber beacon clearly visible a minimum of $\frac{1}{2}$ mile.
2. (a) A flashing arrow panel 54" x 30" (Type B) visible to the rear mounted at a minimum height of 7' 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 centerline marking on two lane, two way roadways, and mounted a minimum of 7' 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. When used, OC-50-24 shall be mounted a minimum of 4'6" above the road surface and OC-51-48 shall be mounted a minimum of 5'0" above the road surface, both measured to the bottom of the sign.

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 two minutes. These devices shall not be removed until the line has dried to a track free condition. Retrieval equipment shall have traffic control of a trail vehicle. Cones shall have a minimum height of 18". They shall be spaced to protect the wet line, normally between 120' and 200'. In areas of traffic congestion, on curves and at other locations where tracking of the wet line is expected, spacings as close as 20' 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 one mile.

DATE
3-82
12-5

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 roadway. 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 roadway 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 travelling 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 are considered to be stationary operations and traffic control shall be in accordance with plan details shown on Sheet(s) 32, 33 & 34 and Part 7, Ohio Manual of Uniform Traffic Control Devices (OMUTCD).

LAYOUT AND PREMARKING

The vehicle used in layout and premarking (Item 621.051) shall be equipped and operated with the following equipment:

1. A 360° rotating or flashing amber beacon clearly visible a minimum of 1/2 mile.
2. Lighted head lights and tail lights, and
3. A KEEP RIGHT sign (OC-31R-48) mounted a minimum of 5' 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 one thousand feet.

During nighttime conditions the following additional 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, those types of traffic control equipment which shall be furnished when directed by the Engineer are indicated.

EQUIPMENT	PAVEMENT MARKING LINE TYPE ¹					
	CENTER LINE		EDGE LINE		LANE LINE ² CHANNELIZING LINE	
	> 2 MIN. DRY	≤ 2 MIN. DRY	> 2 MIN. DRY	≤ 2 MIN. DRY	> 2 MIN. DRY	≤ 2 MIN. DRY
LEAD VEHICLE	Required	Required	Not Required	Not Required	Not Required	Not Required
POWER BROOM EQUIPMENT	Required	Required	Required	Required	Required	Required
LINE MARKING MACHINE	Required	Required	Required	Required	Required	Required
TRAIL VEHICLE	Not Required	Required	Required	Required	Not Required	Required
TRAIL VEHICLE (ADDITIONAL)	Required	Required	Required	Required	Required	Required
TRAIL VEHICLE (SIGN & CONE RETRIEVAL)	Required	Not Required	Required	Not Required	Required	Not Required

1. For equipment requirements for auxiliary operations see plan sheet(s) _____ and Part 7, OMUTCD.
2. Includes both dashed and solid lane lines.

-  Required Equipment
-  Equipment Required When Directed by the Engineer
-  Not Required

TRAFFIC CONTROL FOR LONG LINE PAVEMENT MARKING OPERATIONS

DATE
9-02
12-82

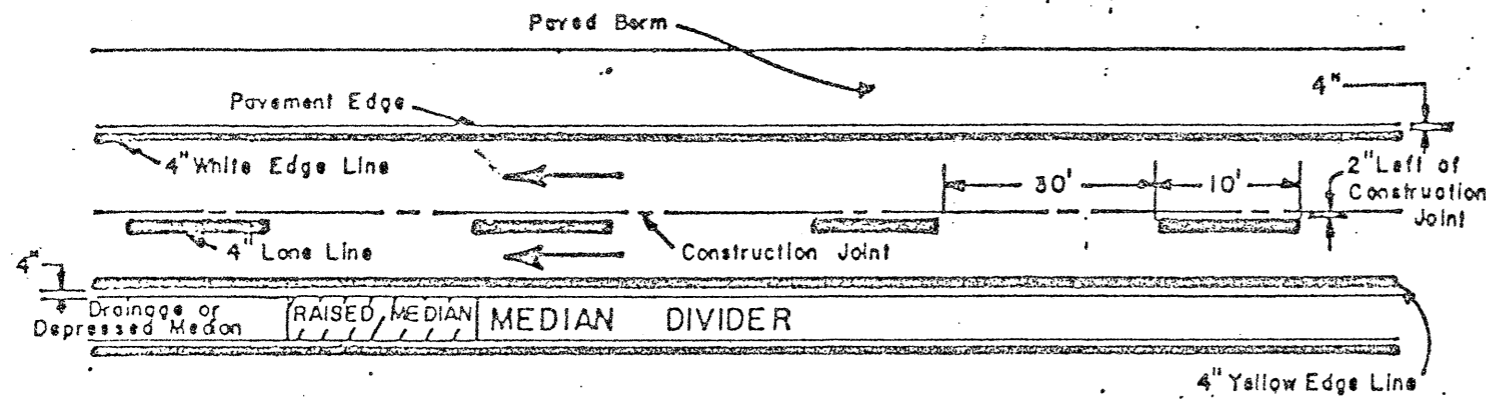
PAVEMENT MARKING TYPICAL DETAILS

FED. RD. DIV.	STATE	PROJECT	
5	OHIO		

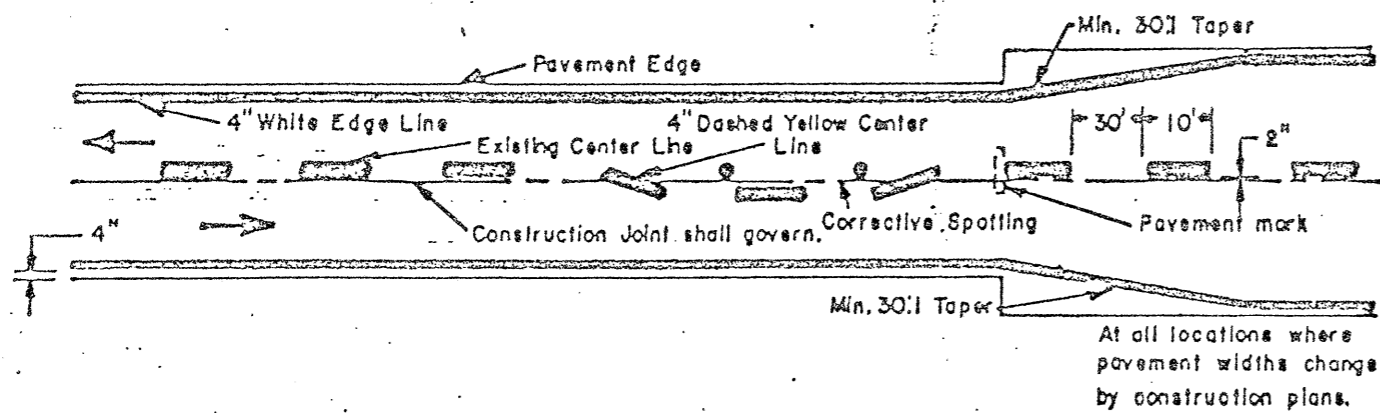
32
36

PLAN NO. 105

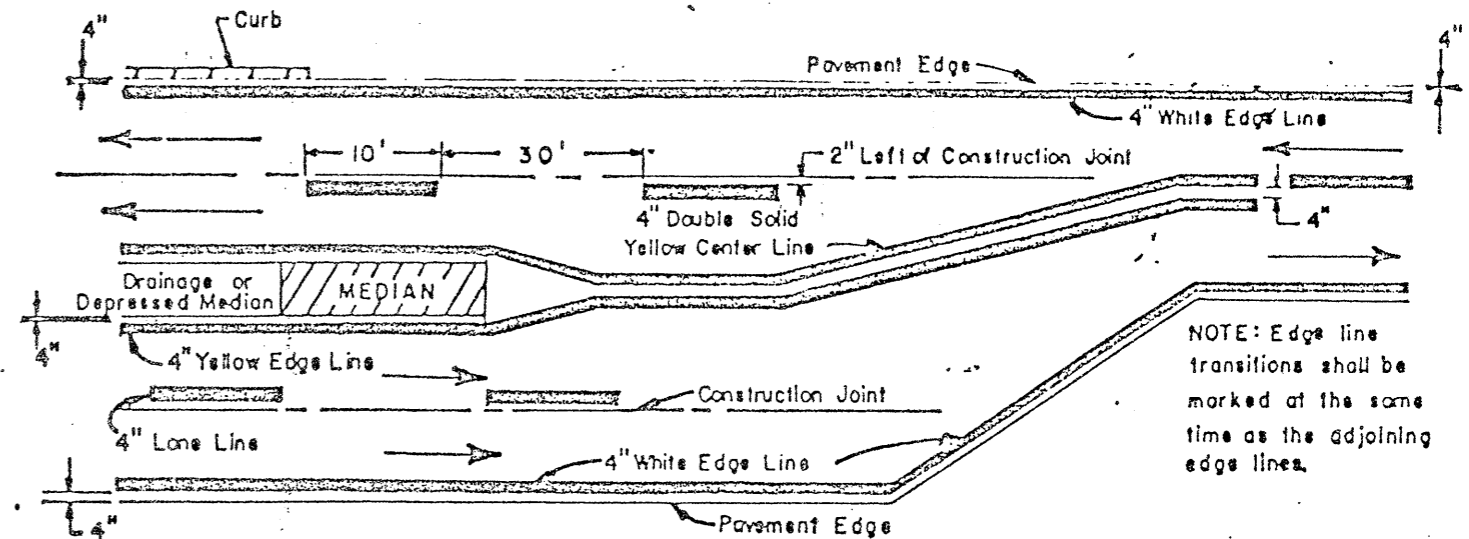
FREEWAY & EXPRESSWAY MAINLINE MARKINGS



TWO LANE MARKINGS



MULTILANE DIVIDED & UNDIVIDED HIGHWAY MARKINGS



NOTES:

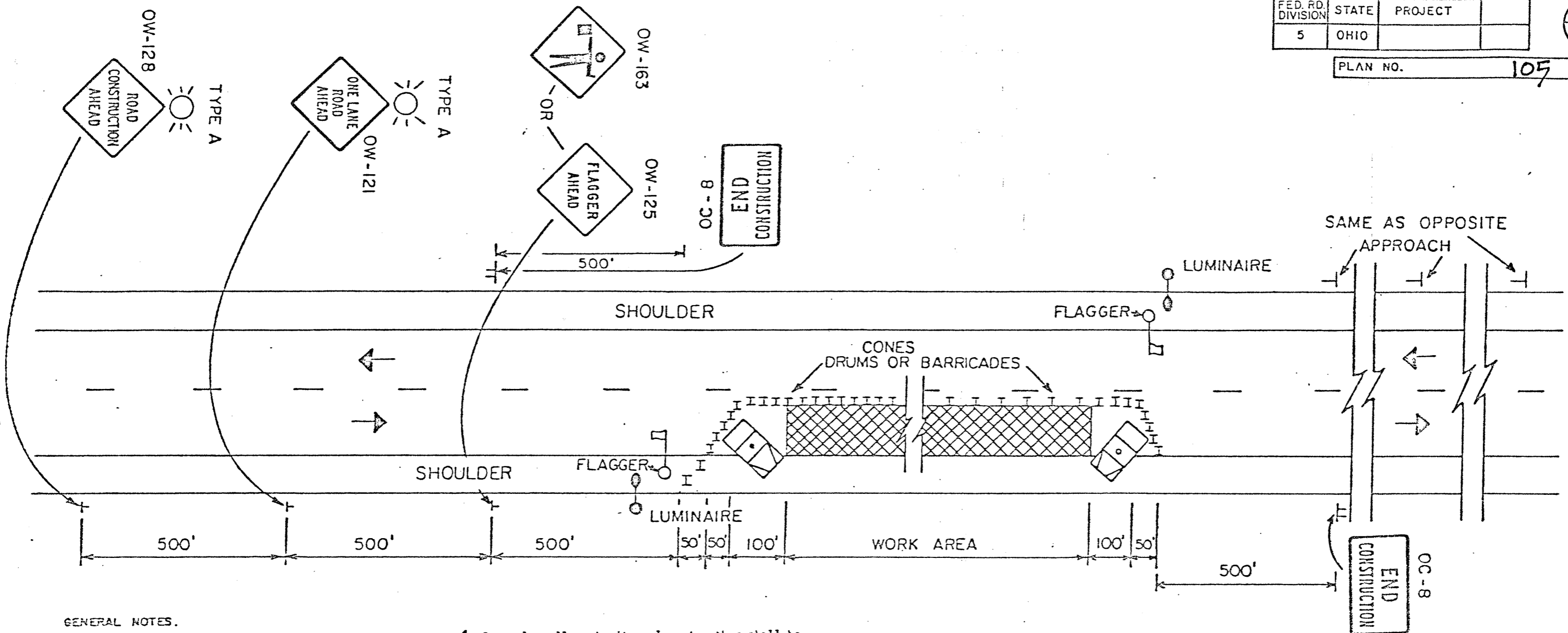
1. THE DISTANCE FROM THE PAVEMENT EDGE TO THE NEAR SIDE EDGE OF THE EDGELINE MAY BE INCREASED WITH THE APPROVAL OF THE ENGINEER IN ORDER TO MAINTAIN UNIFORM LANE WIDTH.
2. SEE TC 72.20 FOR PAVEMENT ENTRANCE AND EXIT RAMP TERMINALS.

DEPARTMENT OF TRANSPORTATION	
PAVEMENT MARKING TYPICAL DETAILS	DATE 11/80
JDL. CDR.	
12/81	

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PLAN NO. 105



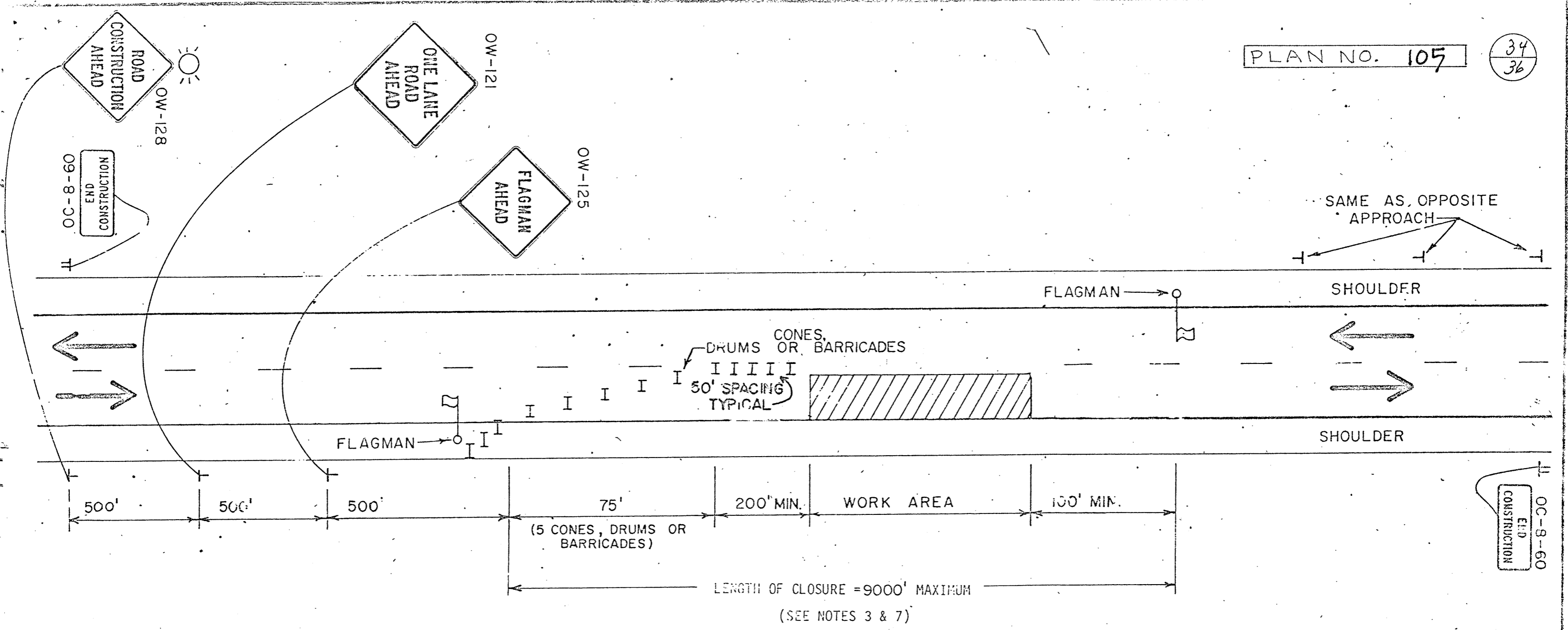
GENERAL NOTES.

- 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.
- Flaggers shall be used to control traffic continuously for as long as a one lane operation is in effect. The flaggers shall communicate with each other at all times as described in the Ohio Manual of Uniform Traffic Control Devices (MUTCD) in Section 7H: Control of Traffic Through Work Areas.
- Cones drums or barricades shall be spaced at approximately 50' to 60' center to center for the first 1000 feet of the work area and at a maximum of 100' to 120' center to center for the balance of the work area. Cones, drums or barricades on the advance and return tapers shall be spaced at 10' center to center. Cones may be substituted for barricades or drums for lane closures during daylight hours only.
- Several small work sites close together shall be combined into one work area to make a closure not more than 2000 feet long including tapers. Closures of more than 2000 feet may be approved by the Engineer. The minimum length between closures shall be 2000 feet. Only one side of the road shall be closed in any one work area.
- The work vehicles shown at the beginning and end of the work area shall be in place and unoccupied whenever workers are in the work area. These work vehicles shall be removed from the pavement whenever workers are not in the work area. Other protective devices may be used in lieu of the work vehicles shown when approved by the Engineer. The vehicles shall be equipped with a 360° rotating or flashing amber beacon clearly visible a minimum of 1/2 mile.
- The Type A flashing barricade warning lights shown on the "Road Construction Ahead" and the "One Lane Road Ahead" signs are required whenever a night lane closure is necessary.
- Type C steady burning barricade warning lights shall be erected on drums or barricades for night lane closures. The maximum spacing shall be identical to the channelizing device spacing requirements described in Note 3.
- Adequate area illumination to clearly identify the flagger station at night for long term operations shall be provided 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 temporary luminaires shall be a minimum of 27 feet above the pavement and the overhead conductor clearance shall be 20 feet above the pavement.

OHIO DEPARTMENT OF TRANSPORTATION

FLAGGERS CLOSING
1 LANE OF A 2 LANE
HIGHWAY

DATE
12/82



GENERAL NOTES

1. FLAGMEN SHALL BE USED TO CONTROL TRAFFIC CONTINUOUSLY FOR AS LONG AS ONE LANE OPERATION IS IN EFFECT. FLAGMEN SHALL BE ABLE TO COMMUNICATE WITH EACH OTHER AT ALL TIMES EITHER VERBALLY OR BY MEANS OF RADIO OR FIELD TELEPHONES. FLAGMAN STATIONS SHALL BE ADEQUATELY ILLUMINATED FOR NIGHT TIME OPERATIONS BY USE OF A 175 WATT MINIMUM LUMINAIRE.
2. CONES MAY BE SUBSTITUTED FOR BARRICADES OR DRUMS FOR THE LANE CLOSURES DURING DAYLIGHT HOURS ONLY.
3. WHEN THE AMBIENT TEMPERATURE EXCEEDS 80 DEGREES F, THE ENGINEER MAY INCREASE THE LENGTH OF CLOSURE TO ALLOW FOR SUFFICIENT COOLING OF THE NEW PAVEMENT.
4. THE TYPE B HIGH INTENSITY BARRICADE WARNING LIGHT SHOWN ON THE ROAD CONSTRUCTION AHEAD SIGN IS REQUIRED WHENEVER NIGHT LANE CLOSURE IS NECESSARY.
5. TYPE C STEADY BURNING BARRICADE WARNING LIGHTS SHALL BE ERECTED ON DRUMS OR BARRICADES FOR NIGHT LANE CLOSURES.
6. THE ADVANCE WARNING SIGNS "OW-128" "OW-121" AND "OW-125" SHALL BE MOVED BACK AS REQUIRED BY THE QUEUING OF STOPPED VEHICLES.
7. 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 ENGINEER MAY SHORTEN THE MAXIMUM ALLOWABLE LENGTH OF CLOSURE TO RELIEVE EXCESSIVE TRAFFIC BACKUPS.

ALL TRAFFIC CONTROL SIGNS, CHANNELIZING DEVICES, AND FLAGMEN SHALL BE MOVED FORWARD BEFORE THE CLOSURE REACHES THE MAXIMUM ALLOWABLE LENGTH. ONLY ONE SIDE OF THE ROAD SHALL BE CLOSED AT ANY TIME IN A WORK AREA.

OHIO DEPARTMENT OF TRANSPORTATION	
FLAGMEN CLOSING 1 LANE OF A 2 LANE HIGHWAY	DATE 12/80
PAVING OPERATIONS	
DR	CK

GENERAL SUMMARY						
ITEM	Part 1 YAS/ State	Part 2 YAS/ State		GRAND TOTAL Parts 1 & 2	UNIT	DESCRIPTION
407	8,300	600		8,900	Gal.	Tack Coat, as per plan
407	332	24		356	Ton	Cover Aggregate
402	6,977	500		7,477	Cu. Yd.	Asphalt Concrete AC-20
404	4,611	333		4,944	Cu. Yd.	Asphalt Concrete AC-20, as per plan
301	5,099	305		5,404	Cu. Yd.	Bituminous Aggregate Base AC-20 or RT(11 or 12)
203	1,342	93		1,435	Sta.	Linear Grading
Special	6,360	440		6,800	Gallon	Crack Sealing, AC-20, as per plan
Special	3,692	100		3,792	Sq. Yd.	Pavement Planing, Bituminous, Without Heating
621	12.67	0.88		13.55	Mile	Centerlines
621	25.34	1.76		27.10	Miles	Edgelines
847	192			192	Lin. Ft.	Stop Line, 947.03, Type A ₁ , Inlaid
847	4			4	Each	Railroad Symbol on Pavement, 947.03, Type A ₁ , Inlaid
617	59	44		63	M. Gal.	Water
614	25.34	1.76		27.10	Mile	Temporary Center Lines, Class II
624	Lump	Lump		Lump	Lump	Mobilization
617	29,732	2,065		31,797	Sq. Yd.	Shoulder Preparation
617	2,478	172		2,650	Cu. Yd.	Compacted Aggregate
614	Lump	Lump		Lump	Lump	Maintaining Traffic

GENERAL NOTES

TRAFFIC:

Traffic shall be maintained at all times. The length of restricted traffic zones shall be kept to a minimum consistent with the specification requirements for protection of completed courses.

RAILROAD CROSSINGS:

The new surface course shall be feathered or butt jointed to meet the rail grades as specified.

ALIGNMENT AND PROFILE:

The work proposed by this project is for the resurfacing of the existing pavement. The alignment of the existing pavement will not be changed, and the profile of the proposed surface will be similar to that of the existing pavement except that it will be raised an amount equal to the thickness of the resurfacing course or courses specified in these plans.

INTERMEDIATE COURSE, SPOT LEVELING AND PATCHING:

This material shall be placed in a separate operation where and as directed by the engineer.

TACK COAT:

The tack coat operation shall be as determined at a pre-construction conference as per 407.05, and application rates shall not exceed 0.10 gal. per sq. yd.

COVER AGGREGATE:

Cover aggregate shall conform to 703.06.

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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GENERAL SUMMARY

PLAN NO. 105

ITEM	Part 1 FON/State	Part 2 FON/State							GRAND TOTAL <i>PARTS 1 & 2</i>	UNIT	DESCRIPTION
202	444								444	Sq. Yds.	Pavement Removed
202	101								101	Lin. Ft.	Portions of Structures Removed, Railing, As Per Plan.
202	500								500	Lin. Ft.	Guardrail Removed for Reuse or Storage, As Per Plan.
203	116								116	Cu. Yd.	Excavation Not Including Embankment Construction
203	407								407	Cu. Yd.	Embankment, As Per Plan
510	12								12	Each	Dowel Holes
511	1								1	Cu. Yd.	Class C Concrete, Abutment, As Per Plan
517	175								175	Lin. Ft.	Railing (Single Deep Beam with Steel Tubular Backup) Type 2 Posts and Bolts.
606	8								8	Each	Bridge Terminal Assembly, Type B
606	587.5								587.5	Lin. Ft.	Guardrail, Type 5
606	8								8	Each	Anchor Assembly, Type A
659	790								790	Sq. Yd.	Seeding and Mulching
659	0.0085								0.008	Tonn	Commercial Fertilizer
659	0.09								0.09	M. Gal.	Water
824	3,757								3,757	Lb.	Epoxy Coated Reinforcing Steel
Special	104								104	Each	Loffelstein Blocks
Special	660								660	Sq. Yd.	Superplasticized Dense Concrete Overlay (1 3/4" Thick)
Special	163								163	Sq. Yd.	Superplasticized Dense Concrete Overlay (4" Thick)
Special	46								46	Cu. Yd.	Superplasticized Dense Concrete Overlay (Variable Thickness)
Special	7								7	Cu. Yd.	Full-Depth Repair, as per plan
Special	140								140	Lin. Ft.	Sawing and Sealing Bituminous Concrete Joints
Special	95								95	Sq. Yd.	Rubberized Seal
512	659								659	Sq. Yd.	Type D Waterproofing, As Per Plan
516	92								92	Lin. Ft.	Vertical Extension of Structural Expansion Joints, As Per Plan
Special	125								125	Cu. Yd.	Pavement Repair
619	Lump	Lump							Lump	Lump	Field Office