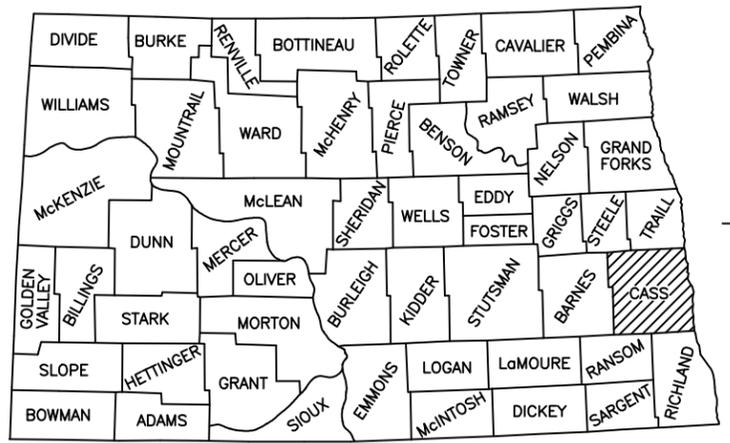


CASS COUNTY HIGHWAY DEPARTMENT PLANS

FOR THE PROPOSED IMPROVEMENT OF A COUNTY HIGHWAY PROJECT NUMBER CH1401 BITUMINOUS OVERLAY, GRADING & INCIDENTALS



SKETCH MAP OF NORTH DAKOTA
SHOWING COUNTIES

CASS CO. HWY 11; FROM CASS CO. HWY 10 TO CASS CO. HWY 22
 CASS CO. HWY 17/22; FROM CASS CO. HWY 22 TO INTERSTATE 29 EXIT 73
 CASS CO. HWY 20; FROM CASS CO. HWY 17 TO UNIVERSITY DRIVE
 CASS CO. HWY 22; FROM INTERSTATE 29 EXIT 73 TO RED RIVER
 CASS CO. HWY 22; FROM CASS CO. HWY 11 TO PROSPER, ND
 CASS CO. HWY 31; FROM CASS CO. HWY 20 TO CASS CO. HWY 22
 CASS CO. HWY 81; FROM CASS CO. HWY 20 TO 2700' NORTH

GOVERNING SPECIFICATIONS:
 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE
 CONSTRUCTION, ADOPTED BY THE NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION, OCTOBER
 2008; SHALL APPLY, STANDARD DRAWINGS CURRENTLY IN
 EFFECT; AND OTHER CONTRACT PROVISIONS
 SUBMITTED HEREIN.

DESIGN SPEED 55 MPH
 MINIMUM SIGHT DISTANCE (STOPPING) 495 FEET
 SUPERELEVATION .05 FT/FT
 HIGHWAY CROSS SLOPE 2.1%

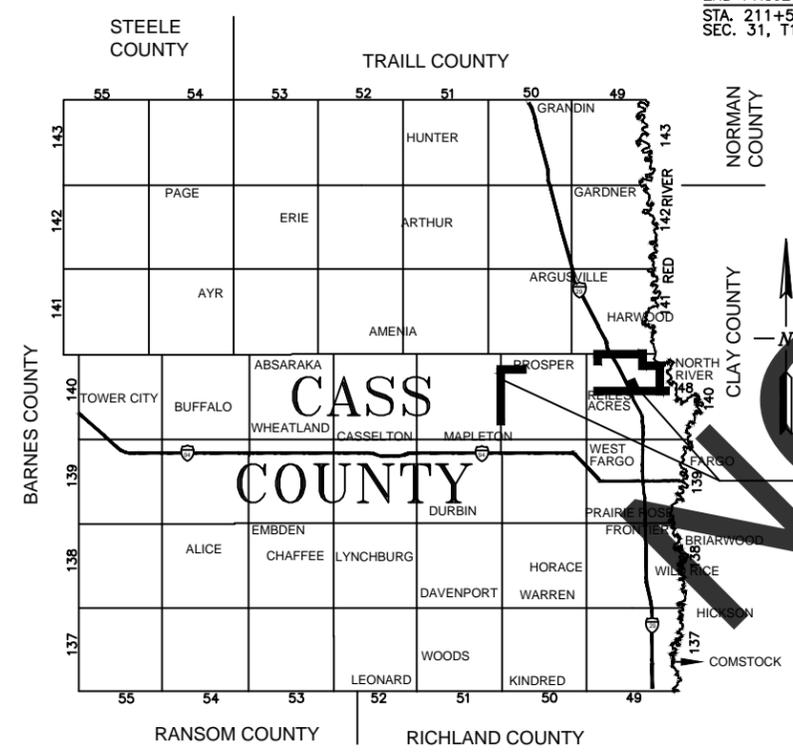
INDEX OF DRAWINGS

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37	APPROACH DETAILS
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40-43	CONSTRUCTION SIGNING

STANDARD DRAWINGS

NUMBER	TITLE
D-704-7,8,9,10,11,12,13,14,15,20,22,26,56	CONSTRUCTION SIGNING & BARRICADE DETAILS
D-714-1,4,22	CULVERT DETAILS
D-722-1A	INLET - CATCH BASIN
D-752-2	CHAIN LINK FENCE
D-762-4	PAVEMENT MARKING
D-762-6	SHORT TERM PVMT. MARKING
D-764-1	W-BEAM GUARDRAIL
D-764-6	FLARED ENERGY ABSORBING TERMINAL
D-764-10	THRIE BEAM TRANSITION

STANDARD DRAWINGS ARE NOT INCLUDED IN PLANS BUT ARE AVAILABLE AT THE COUNTY ENGINEER'S OFFICE.



BEGIN PROJECT - C22 PROSPER
 STA. 0+00.00 = N.W. CORNER
 SEC. 7, T140N, R50W.

BEGIN PROJECT - C11 SHOULDER
 STA. 0+00.00 = S.W. CORNER
 SEC. 6, T140N, R50W.

END PROJECT - C11 SHOULDER
 STA. 211+55.86 = N.W. CORNER
 SEC. 31, T140N, R50W.

END PROJECT - C22 PROSPER
 STA. 105+52.80 = N.E. CORNER
 SEC. 8, T140N, R50W.

END PROJECT - C17 SHOULDER
 STA. 87+15.35 = N.E. CORNER OF
 SEC. 7, T140N, R49W.

BEGIN PROJECT - C20 "A"
 STA. 0+00.00 = N.W. CORNER
 WEST OF THE N.W. CORNER OF
 SEC. 20, T140N, R49W.

END PROJECT - C20 "A"
 STA. 125+56.70 = A POINT 2,045.0'
 EAST OF THE N.E. CORNER OF
 SEC. 21, T140N, R49W.

BEGIN PROJECT - C20 "B"
 STA. 6+00.00 = A POINT 1,043.0'
 WEST OF THE N.W. CORNER OF
 SEC. 23, T140N, R49W.

BEGIN PROJECT - C17 SHOULDER
 STA. 0+00.00 = A POINT 1,000.1'
 WEST OF THE N.E. CORNER OF
 SEC. 5, T140N, R49W.

BEGIN PROJECT - C22 HARWOOD
 STA. 0+00.00 = A POINT 663.65'
 WEST OF THE S.W. CORNER OF
 SEC. 34, T141N, R49W.

END PROJECT - C81
 STA. 27+00.00 = A POINT 2,600'
 WEST AND 2,000' NORTH
 OF THE S.W. CORNER OF
 SEC. 14, T140N, R49W.

END PROJECT - C22 HARWOOD
 STA. 151+36.58 = A POINT 3,901.0'
 EAST OF THE S.E. CORNER OF
 SEC. 35, T141N, R49W.

END PROJECT - C31
 STA. 197+88.07 = A POINT 3,874.96'
 EAST OF THE N.W. CORNER OF
 SEC. 2, T140N, R49W.

END PROJECT - C20 "B"
 STA. 122+13.20 = N.E. CORNER
 SEC. 24, T140N, R49W.

BEGIN PROJECT - C31
 STA. 0+00.00 = A POINT 1,371'
 WEST OF THE S.E. CORNER OF
 SEC. 13, T140N, R49W.

BEGIN PROJECT - C81
 STA. 0+00.00 = A POINT 935'
 WEST OF THE S.W. CORNER OF
 SEC. 14, T140N, R49W.

LENGTH OF PROJECT

PROJECT	MILES GROSS	BRIDGE EXCEPTION	MILES NET
HWY 11	3.984	0.009	3.973
HWY 17/22	1.651	0.000	1.651
HWY 20 - "A"	2.378	0.015	2.363
HWY 20 - "B"	2.199	0.000	2.199
HWY 22 - HARWOOD	2.867	0.000	2.867
HWY 22 - PROSPER	1.998	0.021	1.977
HWY 31	3.748	0.000	3.748
HWY 81	0.511	0.000	0.511
TOTAL	19.337	0.045	19.292

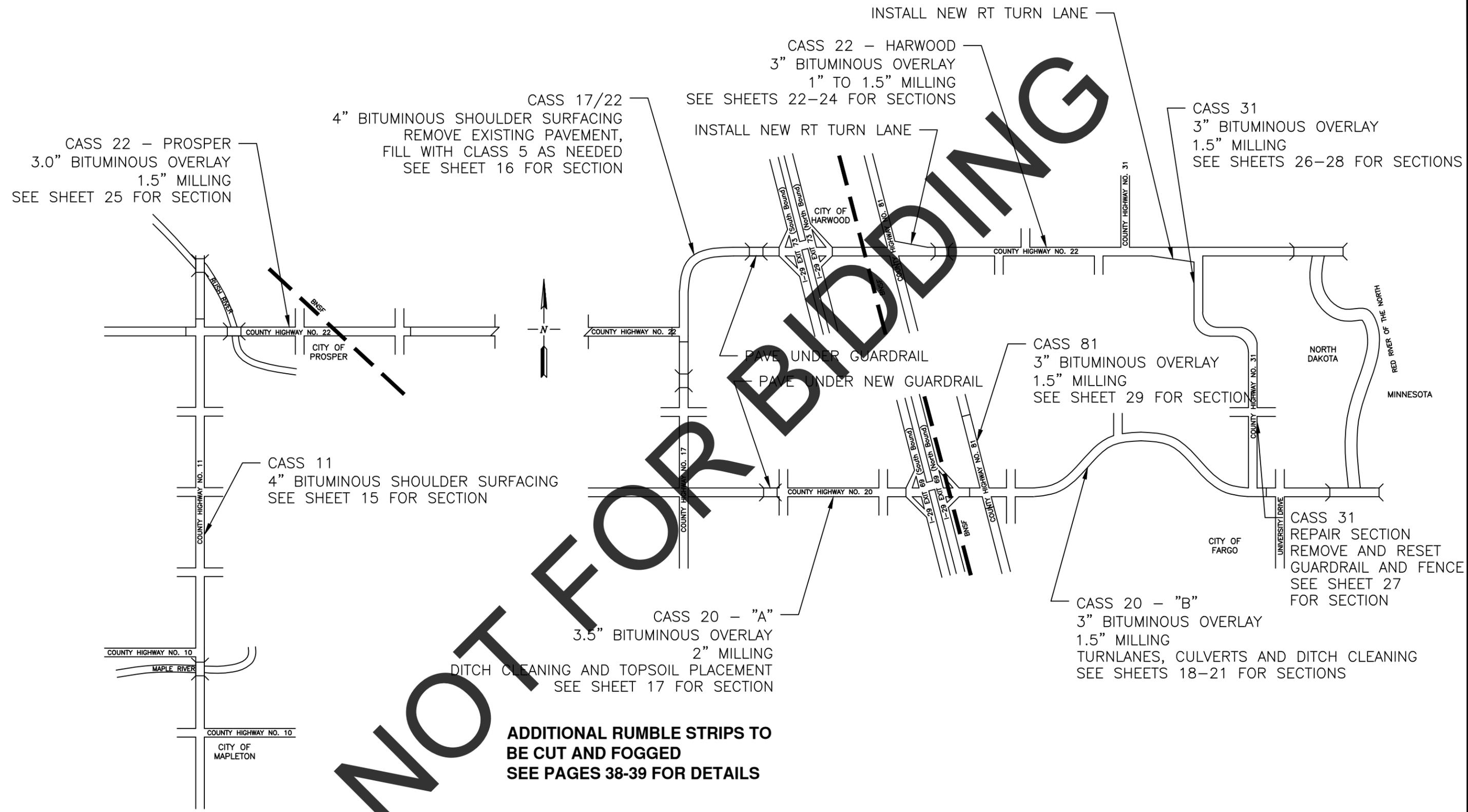
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 ON 01/24/2014 AND THE ORIGINAL
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 HIGHWAY DEPARTMENT, WEST FARGO, ND

CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

DATE: _____
JASON P. BENSON N.D. REG. NO. 7490

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	2	43



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
SCOPE OF WORK
SHEET 2 OF 43

GENERAL PROVISIONS:

Thicknesses shown on the typical sections for surfacing are approximate. It is intended that the plan tonnages provided for by the basis of estimate will be used uniformly throughout the project unless otherwise authorized by the Engineer.

The attention of the bidders is directed to M.S. 298.75 (Aggregate Material Tax), pursuant to the removal of aggregates from any deposit in Minnesota.

RAILROAD PROTECTIVE LIABILITY INSURANCE:

This project crosses the Burlington Northern Santa Fe Railway on Cass Highway 22 at crossing numbers 81-384H (Harwood) and 92-967A (Prosper). This type of work that will be performed within the railroad right of way is Hot Bituminous Paving. Inquiries for protective liability insurance should be directed to:

Bentley W. Tomlin, PE
 BNSF Railway Company
 80 - 44th Ave NE
 Minneapolis, MN 55421
 (763)-782-3492

RAILWAY NOTIFICATION:

The contractor shall notify Burlington Northern Santa Fe Railway a minimum of 10 days prior to performing work on or adjacent to the railroad right-of-way for possible flagging.

HOT BITUMINOUS PAVEMENT:

The hot bituminous pavement shall be placed per the typical sections. The hot bituminous pavement shall be placed and accepted according to NDDOT Standard Specifications (Section 410).

Cass Highway 11 and 17 shall be paved with hot bituminous pavement laid in 2 lifts.

All compaction equipment shall meet the NDDOT Standard Specification 151.02.

All hot bituminous mix and asphalt cement required for all courses shall be measured and paid for by the ton of "RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42" and "PG 58-28 ASPHALT CEMENT-WMA ADDITIVE". This shall be considered full payment for performing this work.

WARM MIX ASPHALT (WMA):

Warm Mix Asphalt (WMA) may be substituted for Hot Mix Asphalt (HMA) at the Contractor's choosing. The WMA additive or technology is at the Contractor's choosing, and to be approved by the Engineer. All costs and savings associated with WMA shall be included in the unit cost for "PG 58-28 ASPHALT CEMENT-WMA ADDITIVE."

CONTRACTOR MIX DESIGN:

The mix design will be a laboratory mix design determined by the Contractor and approved by the Engineer. The mix design will be developed according to NDDOT mix design procedures and will meet the requirements of Section 410 of the NDDOT Standard Specifications. The mix design will be developed using the aggregate source, RAP source, and asphalt cement that is to be used on the project.

HAUL ROADS:

The Contractor's attention is directed to Section 107.05 B of the Standard Specifications regarding the use of public roads for hauling materials to the project. Haul roads that will not be allowed for this project are as follows: Barnes County Highway 6 from State Highway 32, East to the Cass County line. Cass County Highway 26, from the Barnes County line East to State Highway 38. Cass County Highway 10 from Tower City East to State Highway 38. Cass County Highway 14 from Cass County Highway 15 to the Sheyenne River. Cass County Highway 6 from Cass County Highway 17 to Cass County Highway 15. Cass County Highway 8 from Cass County Highway 17 to Cass County Highway 15. Cass County Highway 4 from Cass Highway 81 to Cass County Highway 31. Cass County Highway 31 from Cass County Highway 22 to Cass County Highway 26. Reed Township portion of 25th Street between Cass Highway 31 and Cass Highway 20. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE SUITABILITY OF ROUTES WITH THE AGENCY HAVING CONTROL OF THE ROAD PRIOR TO SUBMITTING A BID.

SS-1H, CSS-1H, OR MS-1 EMULSIFIED ASPHALT:

This item shall be included in the unit cost for "RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42." The approximate quantity required for this project is: 32,575 Gallons at 0.05 GAL/SY.

The emulsified asphalt must be applied in accordance with Section 401.04 of the Standard Specifications.

Class 5 Aggregate:

All work associated with the placement, shaping, and compaction of the balance of Class 5 aggregate needed in the shoulders per the corresponding typical sections to be included in the bid item class 5. This bid item shall also include all costs associated with the placement, shaping, and compaction of Class 5 aggregate placed on section line, private drives, and field approaches.

FOG COAT:

The pavement shall receive a fog coat with CSS-1H, SS-1H or MS-1 emulsified asphalt (diluted 50/50) at a rate of 0.10 gallons per square yard. The fog coat shall be placed after the rumble strips are cut. Rumble strips fogged first @ 2' wide in one direction, then fog the pavement surface the opposite direction, staying 2' from the centerline stripe and re-shooting the 2' rumble strip.

A curtain shall be used on the tack truck to ensure that the rumble strips on the additional roads (Cass 6, 7, 15, 16, 18, 81) are coated with emulsified asphalt and protected from the wind.

This item shall be included in the unit cost for "RUMBLE STRIPS - ASPHALT SHOULDER." The approximate quantity required for this project is 28,260 Gallons.

HOT BITUMINOUS PAVEMENT:

The "RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42" shall have the following aggregate and mix design properties:

Test	Criteria	Reference
Course Aggregate Angularity	75% min	NDDOT Field Sampling/Testing Manual
Fine Aggregate Angularity	42% min	AASHTO T 304
Gyratory Effort, # Gyration	Nini=7, Ndes=75, Nmax=115	AASHTO R 35
Voids Filled with Asphalt	65-78%	AASHTO M 323, T 166
%Gmm @ Nini	90.5% max	AASHTO M 323, T 166

CULTURAL RESOURCE PRESERVATION AND CLEARANCES OF GRAVEL PITS:

In accordance with section 107.04 of the standard specifications, the contractor is required to ensure that applicable cultural resource laws and regulations have been followed for all material sources. Below is the NDDOT website of pits that been certified.

<http://www.dot.nd.gov/dotnet2/materialsource/certificatesofapproval.aspx>

All material source locations, even those opened prior to the current project, must have been subjected to class III cultural resources inventory prior to use. Inventory results will determine recommendations regarding use of a particular source. The contractor's attention is directed to section 203.02a of the standard specifications for the treatment of any cultural resources that may be uncovered within the right of way.

COMMON EXCAVATION - WASTE:

Bid item is for ditch cleaning of ditch bottoms from existing culvert outlet to existing culvert inlet. Existing ditches will require less than a foot of cut/fill to return to required grade. All material must be hauled off site to a disposal site chosen by the Contractor and approved by the Engineer. Load count will be taken of material for basis of payment. No additional topsoil will be added to ditch cleaning area.

TOPSOIL AND TOPSOIL - IMPORTED:

"TOPSOIL" bid item is for topsoil to be stripped, stockpiled and salvaged on site and to be placed on site at end of grading project. "TOPSOIL - IMPORTED" bid item is for topsoil to be imported on sections of ditch fill on Cass Highway 20 "A" and Cass Highway 20 "B" bypass and turn lanes. Load count will be taken for basis of payment of import and existing topsoil shall be paid at actual in-place quantity.

REMOVAL OF CULVERTS-ALL TYPES & SIZES:

All removed culverts become property of the contractor.

SUBGRADE PREPARATION-TYPE A-SHOULDERS:

Bid item is for preparation of shoulders on Cass 11 and Cass 17. Shoulders must be filled with Class 5 as necessary and graded to design elevation for asphalt to be placed. All costs associated with this work to be included in price bid for "SUBGRADE PREPARATION-TYPE A-SHOULDERS".

PORTABLE CHANGEABLE MESSAGE SIGN:

Bid item is for two (2) portable message signs to be placed on each end of project Cass Highway 20 - "B" while shoulder work is being completed. Bid item will be paid for each individual sign placed per day. Estimated quantity is based on 3 weeks of daily placement of two portable message signs.

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 CONSTRUCTION NOTES
 SHEET 3 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	4	43

EARTHWORK:

Forty five percent (45%) additional volume in yardage computed by the average end area method is allowed for shrinkage in the earth embankment.

Payment for "COMMON EXCAVATION - BORROW" shall be in accordance with Section 203.02E of the Standard Specification. Quantity of excavation shall be computed by load count of imported material.

2' Benching of all existing side slopes will be required prior to placement of embankment in accordance with Section 203.02F of the Standard Specification. Following excavation of the existing slopes and roadbed to the lines and grades shown in the plans, the roadbed shall be scarified and recompacted as per section 203.02C of the Standard Specification. All costs associated with scarifying and recompacting to be included in price bid for "COMMON EXCAVATION - BORROW".

CONSTRUCTION PROGRESS SCHEDULE:

Prior to the pre-construction conference, the contractor shall submit to the engineer a "bar graph, or line of balance construction" schedule and written narrative establishing the critical construction operation. The schedule shall illustrate all major construction activities including, but not limited to, any sub-contracted work, material installation, utility relocation, and any other activities that may affect the critical path. The schedule shall illustrate scheduled and actual progress. An updated schedule illustrating progress shall be submitted monthly. The cost of this item shall be incidental to the price bid for other items.

TRAFFIC CONTROL FOR RUMBLE STRIPS:

The contractor shall use Standard Drawing D-704-15 layout A or Standard Drawing D-704-56 for shoulder rumble strips.

Any other method of traffic control must be requested by the Contractor and approved by the Engineer prior to use in the field. All costs for this work shall be included in the price bid for "RUMBLE STRIPS - ASPHALT SHOULDER".

TRAFFIC CONTROL:

Lump sum "TRAFFIC CONTROL" bid item shall include all signage required for construction (See sheet 43 for device listing), flagging and pilot car. Flagging hours are estimated at 875 hours for the project, Pilot Car hours are estimated at 438 hours for the project.

RECYCLED ASPHALT PAVEMENT (RAP) and MILLING PAVEMENT SURFACE:

Contractor shall mill top of existing driving lanes and shoulders according to each typical section (Depths ranging from 1" - 4") and incorporate millings in bituminous mix using a 20%-25% RAP aggregate mixture for FAA Class 42 aggregate. If millings are less than 20% of bituminous mix amount, Contractor may add millings from own stockpile or alternate source to achieve 20% RAP mixture. All additional millings shall be approved by the Engineer prior to use. Contractor is responsible for finding a suitable location to stockpile RAP and hauling millings to plant site for mixing. Any remaining millings from the project becomes property of the Contractor. All costs and savings associated with using the RAP mixture shall be included in unit cost for "RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42."

RAP must be utilized in accordance with Section 407.04 of the Standard Specification.

PIPE CONDUIT:

The allowable materials for "PIPE CONDUIT" are the following:

- a. Reinforced concrete storm drain - Class III
- b. Spiral rib steel pipe aluminized type 2
- b.a. Manufactured by True North Steel or approved equal
- c. Corrugated polyethylene storm drain
- c.a. Ads N-12 wt. IB pipe (per ASTM F2648) manufactured by ADS or approved equal

MANHOLES, CATCH BASINS AND INLETS:

The allowable materials "MANHOLES" are the following:

- A. Precast reinforced concrete
- B. Dual wall aluminized type 2 corrugated steel pipe with concrete
- C. PVC pipe

All shop drawings for manholes and inlets are to approved by the Engineer before installation.

All labor, materials and equipment necessary to complete the work (Including final adjustments) shall be included in the bid price for the manholes.

INLET SHALLOW CATCH BASIN 6IN BEEHIVE:

Bid item is for installation of catch basin and concrete pad at locations as described on plans. 3' x 3' Concrete pad to be placed around each basin. Details of Concrete pad can be found on sheet 28.

PREFORMED PATTERNED PVT MK-MESSAGE (GROOVED):

Railroad crossing messages as detailed on Standard Drawing D-762-1 shall be installed each way from the railroad crossings on Hwy. 22 in Harwood and Prosper. The message shall be white and shall include a railroad cross, 2-R's, and 3-bands at each location. All messages shall be grooved tape 3M Series 380IES or approved equal.

INLET PROTECTION SPECIAL:

Bid item is for installation of storm water protection installation at all catch basin sites. Storm water protection for inlets must be included in Storm Water Pollution and Prevention (SWPP) Plan through the North Dakota Department of Health submitted to the Engineer for review. Contractor is responsible for implementing all phases of the SWPP plan prior to construction and make revisions/adjustments as required by the Contractor's operations. Engineer will submit the Notice of Termination (NOT) application after the project has been stabilized to 70% of pre-existing conditions.

REMOVE & RESET GUARDRAIL:

Bid item is to remove, fix, and reset existing guardrail on Cass Highway 31 at pavement repair location. Existing guardrail is a W-beam with wooden posts which shall to be lowered or raised to proper offset height based on new pavement elevations and existing post movement. Estimated length of repair section is 480 feet.

FENCE CHAIN LINK RESET:

Bid item is to remove and reset existing chain link fence on Cass Highway 31 at pavement repair location. Estimated length of repair section is 330 feet.

ROAD MAINTENANCE AND CENTERLINE CULVERT INSTALLATION:

The Contractors shall be responsible for maintaining the roadway and driveways so that they remain accessible to local residents and emergency vehicles at all times during construction. The Contractor shall provide a means of maintaining local traffic during the installation of centerline culverts. All centerline culvert trenches shall be backfilled in maximum one foot lifts using suitable compaction equipment, with backfill material at optimum moisture ±3%. Installation and backfilling to a height of safe passage of traffic must be completed prior to sundown on the same day as the installation was started. To speed the installation, the Contractor may propose the use of alternate materials for backfill in lieu of ordinary fill. Any alternate methods shall be approved by the Engineer prior to construction and shall be at no additional cost to Cass County.

WEED CONTROL:

Successful bidders as part of their supply contract will be required as part of the bid acceptance to comply with the following:

1. All noxious weeds must be controlled within the pit and extraction area each year in compliance with North Dakota State Agriculture Department recommendations for noxious weed control.
2. The county weed officer shall inspect the pit and extraction area before any materials shall be removed and shall by written letter certify operator's compliance with the North Dakota Department of Agriculture's recommendations for noxious weed control.
3. Any questions concerning the certifications of compliance for noxious weed control and the requirements thereunder is available from the County Weed Officer at (701) 298-2388.

This request is made pursuant to section 4.1-47 of the North Dakota Century Code.

THRIE BEAM GUARDRAIL:

Bid item is to furnish and install a Thrie-beam guardrail at bridge on Cass Highway 20. Price for guardrail to include installation, thrie-beam and posts. Installation details can be found on page 36.

W-BEAM GUARDRAIL END TERMINAL:

Bid item to furnish and install W-beam guardrail terminals at bridge on Cass Highway 20. Price for end terminals to include installation and any earth work around end terminal.

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 CONSTRUCTION NOTES
 SHEET 4 OF 43

PAVING TONNAGE ESTIMATE CASS 11 - SHOULDER							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
SHOULDER	0+00	210+35	20,685	10	206,850	4	5,107
TOTAL							5,107
10% OVERAGE							511
APPROACHES/INT							620
GRAND TOTAL							6,238

PAVING TONNAGE ESTIMATE CASS 17 - SHOULDER							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
SHOULDER	0+00	87+15	8,715	18	156,870	4	3,873
TOTAL							3,873
10% OVERAGE							387
APPROACHES/INT							200
GRAND TOTAL							4,460

PAVING TONNAGE ESTIMATE CASS 20 "A"							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	0+00	125+56	12,556	24	301,344	3.5	6,511
SHOULDER	0+00	125+56	12,556	7	87,892	3.5	1,899
TOTAL							8,410
10% OVERAGE							841
APPROACHES/INT							284
GRAND TOTAL							9,535

PAVING TONNAGE ESTIMATE CASS 20 "B"							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	6+00	122+13	11,613	24	278,712	3	5,161
SHOULDER	6+00	122+13	11,613	15	174,195	3	3,226
BYPASS	13+24	19+33	609	14	8,526	9	474
RTL/ACCEL	10+64	21+58	1,094	14	15,316	9	851
BYPASS	40+33	46+42	609	14	8,526	9	474
RTL/ACCEL	37+73	48+67	1,094	14	15,316	9	851
RTL	48+00	52+00	400	14	5,600	1.5	52
RTL	103+13	106+13	300	14	4,200	1.5	39
RTL	115+63	120+13	450	14	6,300	1.5	58
TOTAL							11,186
10% OVERAGE							1,119
APPROACHES/INT							284
GRAND TOTAL							12,589

PAVING TONNAGE ESTIMATE CASS 81							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
SHOULDER	0+00	27+00	2,700	33	89,100	3	1,650
TOTAL							1,650
10% OVERAGE							165
APPROACHES/INT							40
GRAND TOTAL							1,855

PAVING TONNAGE ESTIMATE CASS 22 - HARWOOD							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	0+00	13+61	15,837	32	484,384	3	8,970
MAINLINE	13+61	151+37	13,776	24	330,624	3	6,123
RTL	13+61	17+66	405	8	3,240	6	120
RTL	139+95	143+00	405	8	3,240	6	120
SHOULDER	0+00	13+61	1,361	8	10,888	3	202
SHOULDER	13+61	151+37	13,776	12	165,312	1.5	1,531
TOTAL							17,066
10% OVERAGE							1,707
APPROACHES/INT							672
GRAND TOTAL							19,445

PAVING TONNAGE ESTIMATE CASS 22 - PROSPER							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	0+00	105+52	10,552	24	253,248	3	4,690
SHOULDER	0+00	105+52	10,552	4	42,208	3	782
TOTAL							5,472
10% OVERAGE							547
APPROACHES/INT							312
GRAND TOTAL							6,331

PAVING TONNAGE ESTIMATE CASS 31							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	0+00	197+88	19,788	24	474,912	3	8,795
SHOULDER	0+00	110+53	11,053	12	132,636	1.5	1,228
SHOULDER	110+53	146+11	3,558	12	42,696	1.5	395
SHOULDER	146+11	154+13	802	12	9,624	1.5	89
SHOULDER	154+13	197+88	4,375	12	52,500	1.5	486
REPAIR			500	12	6,000	9.5	352
TOTAL							11,345
10% OVERAGE							1,135
APPROACHES/INT							1,028
GRAND TOTAL							13,508

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 BASIS OF ESTIMATE
 SHEET 5 OF 43

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 11				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
SHOULDERS	20,685	8	18,387	919
APPROACHES/INTERSECTIONS				300
TOTAL =			18,387	1,219

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 17/22				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
SHOULDERS	8,715	16	15,493	775
APPROACHES/INTERSECTIONS				72
TOTAL =			15,493	847

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 20 "A"				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	12,556	26	36,273	1,814
MAINLINE - TOP LIFT	12,556	26	36,273	1,814
APPROACHES/INTERSECTIONS				225
TOTAL =			72,546	3,853

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 20 "B"				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	24,960	26	72,107	3,605
MAINLINE - TOP LIFT	24,960	26	72,107	3,605
TURNLANES - 1ST LIFT	4,088	28	12,718	636
TURNLANES - 2ND LIFT	4,088	28	12,718	636
TURNLANES - TOP LIFT	4,088	28	12,718	636
SHOULDERS - TOP LIFT	24,960	10	27,733	1,387
APPROACHES/INTERSECTIONS				225
TOTAL =			210,101	10,750

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 22 - HARWOOD				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	15,140	26	43,738	2,187
MAINLINE - TOP LIFT	15,140	26	43,738	2,187
APPROACHES/INTERSECTIONS				335
TOTAL =			87,476	4,709

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 22 - PROSPER				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	10,440	28	32,480	1,624
MAINLINE - TOP LIFT	10,440	28	32,480	1,624
APPROACHES/INTERSECTIONS				270
TOTAL =			64,960	3,518

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 31				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	19,785	26	57,157	2,858
MAINLINE - TOP LIFT	19,785	26	57,157	2,858
SHOULDERS - TOP LIFT	19,785	10	21,983	1,099
APPROACHES/INTERSECTIONS				665
TOTAL =			136,297	7,480

EMULSIFIED ASPHALT FOR TACK COAT				
CASS HIGHWAY 81				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	2,700	28	8,400	420
MAINLINE - TOP LIFT	2,700	28	8,400	420
APPROACHES/INTERSECTIONS				225
TOTAL =			8,400	1,065

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 20 "A"				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	12,556	4	5,580	279
MAINLINE	12,556	24	33,483	1,674
SHOULDERS	12,556	10	13,951	698
TOTAL =			53,014	2,651

EMULSIFIED ASPHALT FOR FOGGING				
RUMBLE STRIPS				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	464,640	4	206,507	10,325
TOTAL =			206,507	10,325

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 20 "B"				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE	24,960	26	72,107	3,605
SHOULDERS	24,960	10	27,733	1,387
TURNLANES	4,088	28	12,718	636
TOTAL =			112,558	5,628

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 22 - HARWOOD				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	15,140	4	6,729	336
MAINLINE	15,140	36	60,560	3,028
TOTAL =			67,289	3,364

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 22 - PROSPER				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	10,440	4	4,640	232
MAINLINE	10,440	28	32,480	1,624
TOTAL =			37,120	1,856

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 31				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE	19,785	36	79,140	3,957
TOTAL =			79,140	3,957

EMULSIFIED ASPHALT FOR FOGGING				
CASS HIGHWAY 81				
LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	2,700	4	1,200	60
MAINLINE	2,700	28	8,400	420
TOTAL =			9,600	480

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 BASIS OF ESTIMATE
 SHEET 6 OF 43

BASIS OF ESTIMATE (MILLING & OVERLAYING INTERSECTIONS)														
DESCRIPTION	HWY 81 & 22		HWY 11 & 22		HWY 17 & 22W		HWY 17 & 170TH		HWY 17 & 20		HWY 31 & 20		HWY 31 & 22	
RECYCLED ASPHALT PAVEMENT - FAA 42	300	TON	300	TON	100	TON	100	TON	300	TON	100	TON	100	TON
ASPHALT CEMENT	15	TON	15	TON	5	TON	5	TON	15	TON	5	TON	5	TON
EMULS. ASPH. FOR TACK COAT	108	GAL.	108	GAL.	36	GAL.	36	GAL.	108	GAL.	36	GAL.	36	GAL.
MILLING	1200	SY	1200	SY	0	SY	0	SY	0	SY	300	SY	300	SY
INTERSECTION RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 1,300 TONS														
INTERSECTION MILLING TOTALS = 4,400 SY														

MILLING BITUMINOUS PAVEMENT					
CASS 17					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 87+15	SHOULDERS	16	4	4,275	7,600
TOTAL					7,600
CASS 20 "A"					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 125+56	MAINLINE	24	2	12,556	33,483
TOTAL					33,483
CASS 20 "B"					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
6+00 TO 122+13	MAINLINE	33	1.5	11,613	42,581
7+19 TO 27+63	SHOULDERS	12	3.5	2,044	2,725
36+28 TO 54+72	SHOULDERS	12	3.5	1,844	2,459
TOTAL					47,765
CASS 22 - HARWOOD					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 13+61	MAINLINE	32	1	1,361	4,839
13+61 TO 151+36	MAINLINE	24	1.5	13,775	36,733
TOTAL					41,572
CASS 22 - PROSPER					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 105+52	MAINLINE	26	1.5	10,552	30,484
TOTAL					30,484
CASS 31					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 197+88	MAINLINE	24	1.5	19,788	52,768
TOTAL					52,768
CASS 81					
STATION	TYPE	WIDTH (FT)	DEPTH (IN)	LENGTH (FT)	AREA (SY)
0+00 TO 27+00	MAINLINE	30	1.5	2,700	9,000
TOTAL					9,000
GRAND TOTAL					222,672

COMMON EXCAVATION - BORROW - CASS 20 "B"				
STA	LANE	END AREA (S.F.)	DISTANCE	VOLUME (CY)
12+00	LT	108	0	0
13+00	LT	106	100	396
15+00	LT	138	200	904
16+00	LT	130	100	495
19+00	LT	118	300	1,378
20+00	LT	119	100	439
21+00	LT	81	100	370
39+50	LT	167	0	0
40+50	LT	134	100	557
41+50	LT	140	100	507
12+00	RT	48	0	0
13+00	RT	30	100	144
15+00	RT	34	200	237
16+00	RT	22	100	104
19+00	RT	36	300	322
20+00	RT	32	100	126
21+00	RT	33	100	120
39+50	RT	60	0	0
40+50	RT	44	100	193
41+50	RT	37	100	150
45+50	RT	217	400	1,881
46+50	RT	196	100	765
48+00	RT	215	150	1,142
49+50	RT	200	150	1,153
TOTAL LT				5,047
TOTAL RT				6,337
45% SHRINK				5,123
GRAND TOTAL				16,507

PREFORMED PATTERNED PVMT MK-MESSAGE (GROOVED)		
CASS HIGHWAY 20 - "B"		
STATION	ARROW TYPE	SF
13+80	LEFT TURNTHROUGH	27
13+80	THROUGH	12
15+30	LEFT TURNTHROUGH	27
15+30	THROUGH	12
17+25	RIGHT TURN	16
17+25	THROUGH	12
18+25	RIGHT TURN	16
18+25	THROUGH	12
41+50	LEFT TURNTHROUGH	27
41+50	THROUGH	12
43+00	LEFT TURNTHROUGH	27
43+00	THROUGH	12
45+00	RIGHT TURN	16
45+00	THROUGH	12
46+50	RIGHT TURN	16
46+50	THROUGH	12
TOTAL		268
CASS HIGHWAY 22- HARWOOD		
STATION	ARROW TYPE	SF
14+61	RIGHT TURN	16
16+01	RIGHT TURN	16
140+45	RIGHT TURN	16
141+95	RIGHT TURN	16
TOTAL		64

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STORM STRUCTURES - CASS 20 "B"						
NUMBER	INLET TYPE	STA	LANE	CL OFFSET	RIM ELEV.	INV. ELEV.
M-1	6" BEEHIVE	13+46	LT	48'	893.40	W. 889.40 E 889.40 N. 889.40
M-2	6" BEEHIVE	13+82	LT	48'	893.40	W. 889.30 E 889.30 N. 889.40
M-3	6" BEEHIVE	15+06	LT	48'	893.10	W. 889.10 E 889.10
M-4	6" BEEHIVE	16+30	LT	48'	892.90	W. 888.90 E 888.90
M-5	6" BEEHIVE	16+85	LT	60'	892.80	W. 888.80 E 888.80 N. 888.80
M-6	6" BEEHIVE	17+91	LT	60'	892.80	W. 888.60 E 888.60 N. 888.80
M-7	6" BEEHIVE	18+30	LT	48'	892.50	W. 888.50 E 888.50
M-8	6" BEEHIVE	19+60	LT	48'	892.30	W. 888.30 E 888.30
M-9	6" BEEHIVE	39+95	LT	49'	890.70	W. 886.70 E 886.70
M-10	6" BEEHIVE	41+55	LT	49'	890.50	W. 886.50 E 886.50 N. 886.60
M-11	6" BEEHIVE	48+72	LT	40'	890.90	W. 886.90 E 886.90
M-12	6" BEEHIVE	47+67	LT	48'	890.50	W. 886.50 E 886.50
M-13	6" BEEHIVE	46+74	LT	53'	890.10	W. 886.10 E 886.10
M-14	6" BEEHIVE	45+12	LT	51'	889.50	W. 885.50 E 885.50
M-15	6" BEEHIVE	41+15	RT	46'	893.10	W. 889.10 E 889.10
M-16	6" BEEHIVE	42+25	RT	46'	892.85	W. 888.85 E 888.85

OVERLAYING APPROACHES			
CASS HIGHWAY 11			
DESCRIPTION	PRIVATE DRIVE (8 EA)	SECTION LINE (7 EA)	FIELD APPROACH (15 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 320 TONS			

OVERLAYING APPROACHES			
CASS HIGHWAY 20 "A"			
DESCRIPTION	PRIVATE DRIVE (8 EA)	SECTION LINE (5 EA)	FIELD APPROACH (3 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 284 TONS			

OVERLAYING APPROACHES			
CASS HIGHWAY 20 "B"			
DESCRIPTION	PRIVATE DRIVE (8 EA)	SECTION LINE (5 EA)	FIELD APPROACH (3 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 284 TONS			

OVERLAYING APPROACHES			
CASS HIGHWAY 22 - HARWOOD			
DESCRIPTION	PRIVATE DRIVE (10 EA)	SECTION LINE (3 EA)	FIELD APPROACH (14 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 372 TONS			

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OVERLAYING APPROACHES			
CASS HIGHWAY 22 - PROSPER			
DESCRIPTION	PRIVATE DRIVE (10 EA)	SECTION LINE (2 EA)	FIELD APPROACH (9 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 312 TONS			

OVERLAYING APPROACHES			
CASS HIGHWAY 31			
DESCRIPTION	PRIVATE DRIVE (30 EA)	SECTION LINE (7 EA)	FIELD APPROACH (11 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 828 TONS			

OVERLAYING APPROACHES			
CASS HIGHWAY 81			
DESCRIPTION	PRIVATE DRIVE (1 EA)	SECTION LINE (0 EA)	FIELD APPROACH (0 EA)
RECYCLED ASPHALT PAVEMENT - FAA 42	20 TON	20 TON	8 TON
ASPHALT CEMENT	1 TON	1 TON	0.4 TON
AGGREGATE BASE - CLASS 5	23 TON	23 TON	23 TON
EMULS. ASPH. FOR TACK COAT	15 GAL.	15 GAL.	10 GAL.
APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 20 TONS			

BASIS OF ESTIMATE	
MATERIAL	BASIS OF ESTIMATE
AGGREGATE BASE COURSE - CLASS 5	1.875 TON/CY
SHRINKAGE FOR CLASS 5	COMPACTED VOLUME IN PLACE PLUS 25%
RECYCLED ASPHALT PAVEMENT - FAA 42	2 TON/CY
ADDED ASPHALT CEMENT	5.0% OF HBP BY WEIGHT
EMULSIFIED ASPHALT FOR TACK COAT	0.05 GAL/SY
EMULSIFIED ASPHALT FOR RUMBLE STRIPS	0.10 GAL/SY
EMULSIFIED ASPHALT FOR FOG COAT	0.05 GAL/SY
WATER	
AGGREGATE BASE CLASS 5 COMPACTION	30 GAL/TON
ASPH. DUST PALLIATIVE ON HAUL ROADS	30 M GAL PER DAY OF HAULING (ESTIMATED TO BE 15 DAYS)

MAXIMUM SIZE OF AGGREGATES		
DESCRIPTION	TYPE OF AGGR.	MAXIMUM SIZE
RECYCLED ASPHALT PAVEMENT - FAA 42	CRUSHED	5/8"
AGGREGATE BASE & SHOULDERS - CLASS 5	CRUSHED	1"

COMMON EXCAVATION - WASTE						
PROJECT	STA START	STA END	LANE	LENGTH (FT)	WIDTH (FT)	VOLUME (CY)
C20 - "A"	0+00	125+56	LT	12,556	8	1,886
C20 - "A"	0+00	125+26	RT	12,556	8	1,318
C20 - "B"	34+28	54+72	LT	2,044	8	470
C20 - "B"	17+25	40+05	RT	2,280	8	150
GRAND TOTAL						3,824

TOPSOIL - CASS 20 "B"								
PROJECT	STA START	STA END	LANE	LENGTH (FT)	WIDTH (FT)	AREA (SY)	VOLUME (CY)	+45% SHRINK(CY)
C20 - "A"	0+00	125+56	LT/RT	12,556	10	13,951	1,550	2,248
C20 - "B"	7+19	27+63	LT/RT	2,044	45	10,220	1,136	1,647
C20 - "B"	34+28	54+72	LT/RT	2,044	45	10,220	1,136	1,647
C22	0+00	151+40	LT/RT	15,140	10	16,822	1,869	2,710
GRAND TOTAL							5,691	8,252

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PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 20 "A"								
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)
0+00	48+55		1,214		1,214		9,712	10,926
0+00	9+10	LT		910		910		910
43+75	57+30	RT		1,355		1,355		1,355
48+55	57+30	LT		875	1,750	875	1,750	4,375
57+30	125+56		11,124		11,124		88,992	100,116
120+11	125+56	RT		545		545		545
PER LIFT TOTAL =			12,338	545	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			37,014	1,635	14,088	3,685	100,454	118,227

PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 20 "B"												
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING				8" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE SKIP (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)	8" WHITE (L.F.)	TOTAL 8" (L.F.)	
6+00	6+50	LT/RT		100		100			100	200		0
6+50	26+05	BYP	511			2,044	100	2,044		4,188		0
6+50	26+05	RT/A				1,955	560	2,044		4,559	300	300
26+05	34+20		204		204			1,632		1,836		0
34+20	53+80	BYP	490			1,960	100	2,044		4,104		0
34+20	53+80	RT/A		1,240		1,960	560	2,044		4,564	300	300
53+80	72+85		476		476			3,808		4,284		0
64+25	89+20	RT		2,495		2,495				2,495		0
72+85	98+90	LT		2,605		2,605		3,270		5,875		0
89+20	108+00		470		470			3,760		4,230		0
105+13	106+13	RTL								0	100	100
105+10	117+35	RT		1,225		1,225				1,225		0
117+35	122+13		120		120			960		1,080		0
115+70	118+70	RTL								0	300	300
108+00	122+13			1,413		1,413		1,870		3,283		0
PER LIFT TOTAL =			2,271	9,078	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			6,813	27,234	1,270	15,757	1,320	23,576		41,923		1,000

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PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 22 - HARWOOD										
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING				8" PERMANENT MARKING	
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)	8" WHITE (L.F.)	TOTAL 8" (L.F.)
0+00	0+60	LT/RT		120		120	120	240		0
1+30	4+15	LT/RT		570		570	570	1,140		0
4+55	4+80	LT/RT		50		50	50	100		0
5+15	7+10	LT/RT		390		390	390	780		0
7+60	8+75	LT/RT		230		230	230	460		0
9+10	10+45	LT/RT		270		270	270	540		0
11+35	13+15	LT/RT		360		360	360	720		0
13+45	23+71	RTL	257			1,026	1,026	2,052	300	300
23+71	31+85		204		204		1,632	1,836		0
14+25	22+40	LT		815		815	0	815		0
27+35	32+70	RT		535		535	0	535		0
32+70	133+90		2,530		2,530		20,240	22,770		0
133+90	148+00	RTL	353			1,410	1,410	2,820	300	300
148+00	158+00	RT		1,000		1,000	0	1,000		0
151+37	158+00	LT		663		663	0	663		0
PER LIFT TOTAL =			3,344	5,003	N/A	N/A	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			10,032	15,009	2,734	1,990	1,990	36,471		600

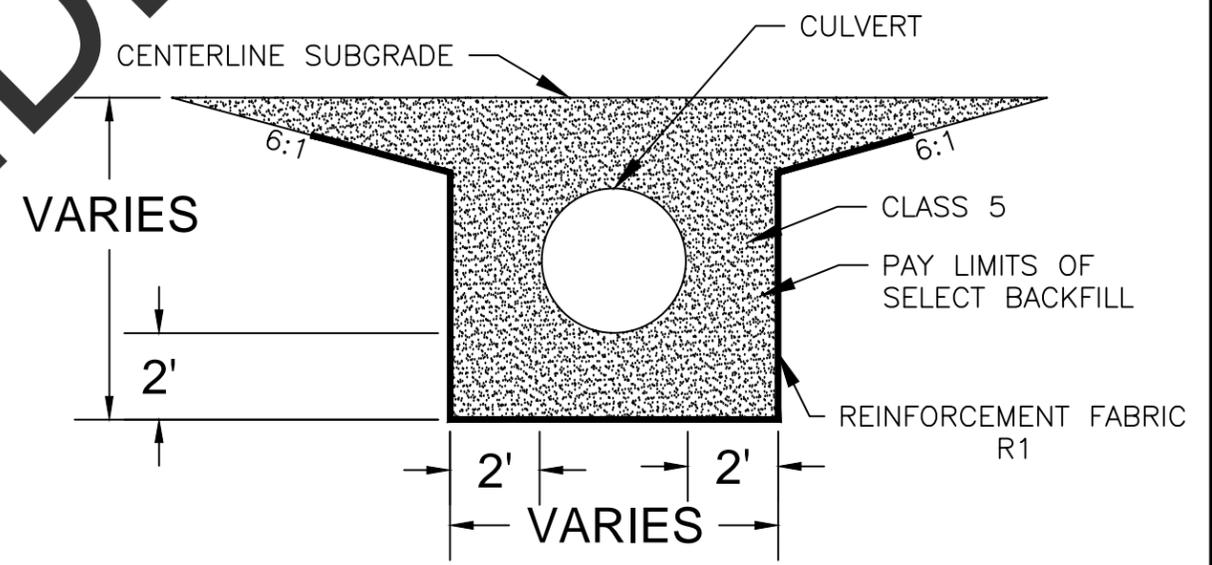
PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 22 - PROSPER									
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING				
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)	
0+50	8+75	LT/RT		825		825	825	1,650	2,475
8+75	45+85		928		928			7,424	8,352
44+00	46+75	RT		275		275	275	0	275
45+85	49+75	LT		390	0			0	0
46+75	104+80		1,451		1,451			11,608	13,059
60+00	67+25	RT		725		725	725	0	725
67+50	73+35	LT		585		585	585	585	1,170
99+40	104+80	RT		540		540	540	0	540
PER LIFT TOTAL =			2,379	3,340	N/A	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			7,137	10,020	2,379	2,950	2,950	21,267	26,596

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 BASIS OF ESTIMATE
 SHEET 11 OF 43

PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 31								
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)
0+55	30+45		748		748		5,984	6,732
0+55	8+40	LT		785		785	0	785
30+45	58+35	LT/RT		5,580		5,580	5,580	11,160
58+35	66+90		214		214		1,712	1,926
66+90	85+75	LT/RT		3,770		3,770	0	3,770
85+75	99+75		350		350		2,800	3,150
99+75	111+85	LT/RT		2,420		2,420	0	2,420
111+85	199+30		2,186		2,186		17,488	
189+55	199+30	RT		975		975	0	
PER LIFT TOTAL =			3,498	13,530	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			10,494	40,590	3,498	13,530	33,564	29,943

PAVEMENT MARKING QUANTITIES - CASS HIGHWAY 81								
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)
0+00	27+00		675		675		5,400	6,075
22+00	27+00			500		500		500
PER LIFT TOTAL =			675	500	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			2,025	1,500	675	500	5,400	6,575



CULVERT BACKFILL DETAIL
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 PROJECT NO. CH1401
 BASIS OF ESTIMATE
 SHEET 12 OF 43

NEW CULVERT LISTING - CASS 20 "B"

LOCATION	LANE	INLET ELEV	INLET STA	OUTLET ELEV	OUTLET STA	MANHOLE NO.	LENGTH (FT)	DIA (IN)	END SECT.	REMOVAL
WEST OF PRIVATE DRIVE - FIRST INLET	LT	889.70	11+30	889.40	13+46		216	30	(1) APRON	
PRIVATE DRIVE CENTERLINE	LT	889.40	13+46	889.30	13+82		36	30		(2) APRONS
PRIVATE DRIVE - NORTH (WEST SIDE)	LT	892.60	13+46	889.40	13+46	M-1	20	24	(1) APRON	
PRIVATE DRIVE - NORTH (EAST SIDE)	LT	892.50	13+82	889.40	13+82	M-2	20	24	(1) APRON	
EAST PRIVATE DRIVE INLET - WEST MIDDLE INLET	LT	889.30	13+82	889.10	15+06	M-3	124	30		
WEST MIDDLE INLET - EAST MIDDLE INLET	LT	889.10	15+06	888.90	16+30	M-4	124	30		
EAST MIDDLE INLET - 37TH STREET WEST INLET	LT	888.90	16+30	888.80	16+85		60	30		
37TH STREET - NORTH (WEST SIDE)	LT	890.50	16+85	888.80	16+85	M-5	50	24	(1) APRON	
37TH STREET CENTERLINE	LT	888.80	16+85	888.60	17+91		106	30		(2) APRONS
37TH STREET - NORTH (EAST SIDE)	LT	890.50	17+91	888.80	17+91	M-6	50	24	(1) APRON	
37TH STREET - EAST 37TH STREET INLET	LT	888.60	17+91	888.50	18+30	M-7	40	30		(1) APRON
EAST 37TH STREET INLET - MIDDLE INLET	LT	888.50	18+30	888.30	19+60	M-8	130	30		
MIDDLE INLET - EAST	LT	888.30	19+60	888.10	20+90		130	30	(1) APRON	
37TH STREET - WEST (CMP ONLY)	RT	891.00	17+06	890.40	17+74		68	24	(2) APRON	(2) APRON
33RD STREET CENTERLINE (CMP ONLY)	LT	887.20	35+08	887.10	35+98		90	24	(2) APRON	(2) APRON
WEST OF DRAIN 10 - WEST MIDDLE INLET	LT	886.90	38+35	886.70	39+95	M-9	160	30	(1) APRON	
WEST MIDDLE INLET - TRUCKING LOT INLET	LT	886.70	39+95	886.50	41+55	M-10	160	30		
TRUCKING LOT - TRUCKING LOT INLET	LT	889.14	41+55	886.60	41+55		24	15		(1) APRON
TRUCKING LOT INLET - DRAIN 10 WEST	LT	886.50	41+55	882.00	43+00		144	30		(1) APRON
FOURTH INLET EAST OF DRAIN 10 - WEST	LT	887.30	49+84	886.90	48+72	M-11	110	30	(1) APRON	(1) APRON
THIRD INLET EAST OF DRAIN 10 - WEST	LT	886.90	48+72	886.50	47+67	M-12	95	30		
SECOND INLET EAST OF DRAIN 10 - WEST	LT	886.50	47+67	886.10	46+74	M-13	95	30		
FIRST INLET EAST OF DRAIN 10 - DRAIN 10	LT	886.10	46+74	885.50	45+12	M-14	160	30		
WEST OF DRAIN 10 - MIDDLE INLET	RT	889.30	42.00	889.10	41+15	M-15	110	30	(1) APRON	
MIDDLE INLET - DRAIN 10 TIE IN INLET	RT	889.10	41+15	888.85	42+25	M-16	110	30		
DRAIN 10 TIE IN INLET TO DRAIN 10	RT	888.85	TBD	888.85	TBD		10	30		(1) APRON
TOTALS (15IN)							24	15		(1) APRON
TOTALS (24IN)							140	24	(6) APRONS	(2) APRONS
TOTALS (30IN)							2,278	30	(5) APRONS	(6) APRONS

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
BASIS OF ESTIMATE
SHEET 13 OF 43

CASS COUNTY HIGHWAY DEPARTMENT

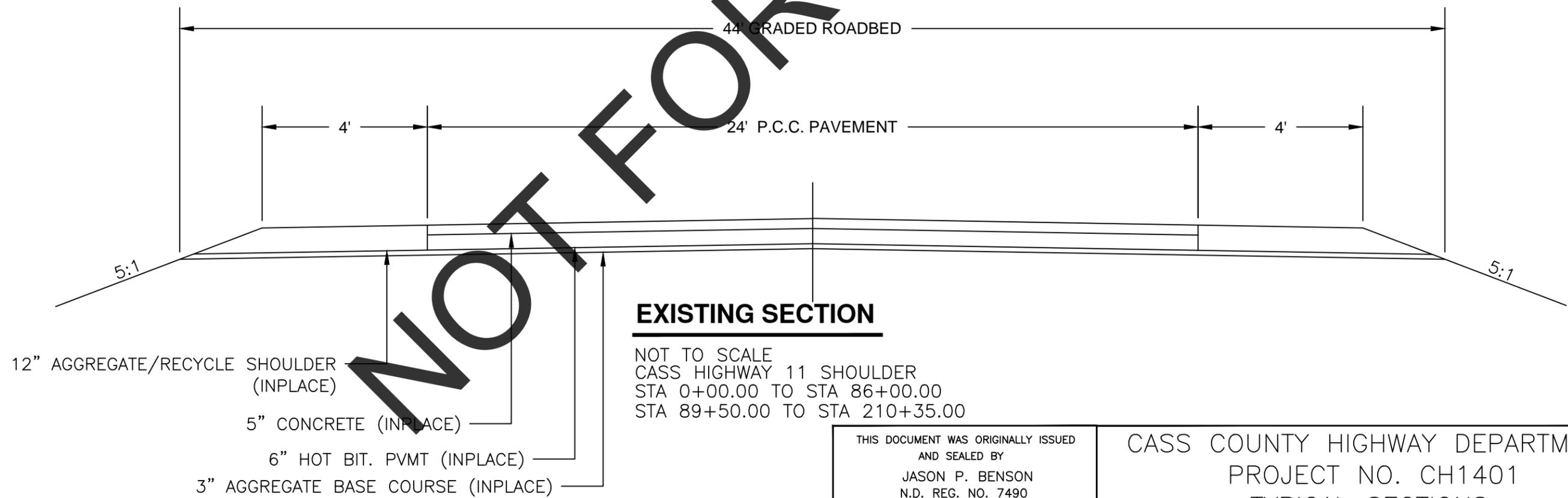
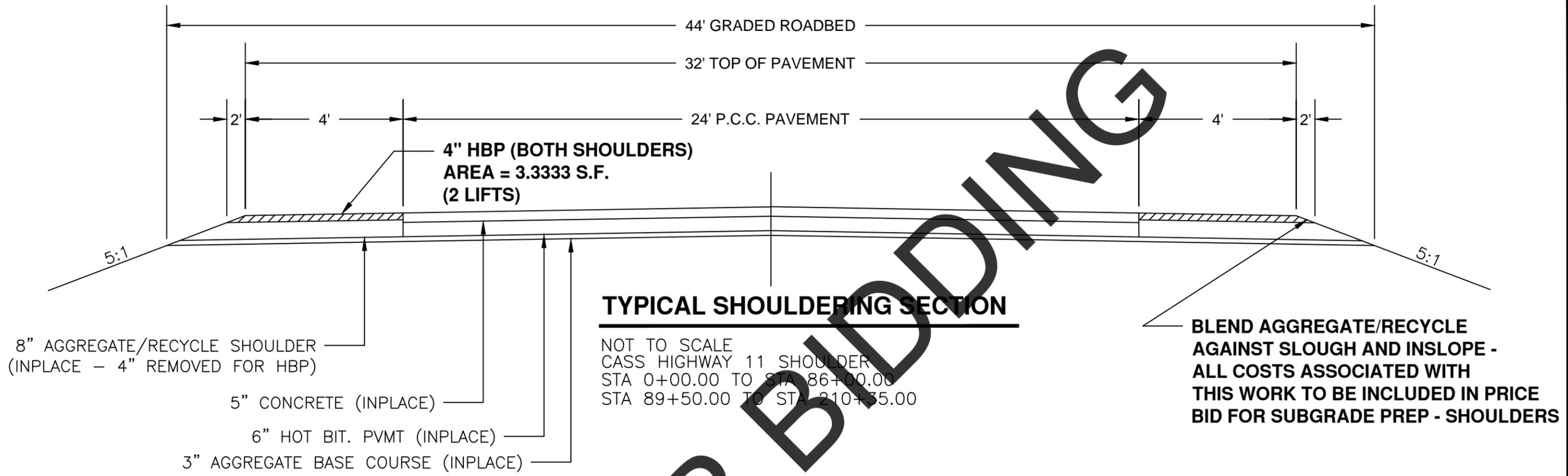
ITEM	SPEC NO.	CODE	DESCRIPTION	UNIT	EST. QUAN.	EST. QUAN.	EST. QUAN.	EST. QUAN.	EST. QUAN.	EST. QUAN.	EST. QUAN.	EST. QUAN.	TOTAL
					South Rumbles	C11 LENGTH = 21,035 FT	C17/C22 LENGTH = 8,715 FT	C20 - "A" LENGTH = 12,556 FT	C20 - "B" LENGTH = 11,613 FT	C22 - HARWOOD LENGTH = 15,140 FT	C22 - PROSPER LENGTH = 10,440 FT	C31 LENGTH = 19,788 FT	
1	103	0100	CONTRACT BOND	L SUM	0	0.125	0.125	0.125	0.125	0.125	0.125	0.125	1.00
2	107	0102	RAILWAY PROTECTIVE INSURANCE	L SUM	0	0.00	0.00	0.00	0.00	0.00	0.50	0.00	1.00
3	201	0330	CLEARING AND GRUBBING	L SUM	0	0	0	0	1	0	0	0	1
4	202	0111	REMOVAL OF CONCRETE	SY	0	0	0	0	315	0	0	0	315.00
5	202	0119	SAW CONCRETE	LF	0	0	0	0	26	0	0	0	26
6	202	0121	REMOVE & SALVAGE BITUMINOUS SURFACING	TON	0	0	0	0	50	0	0	185	235
7	202	0149	REMOVE BRIDGE RAIL	LF	0	0	0	96	0	0	0	0	96
8	202	0153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	0	0	0	0	50	0	0	500	550
9	202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	0	0	0	2	12	0	0	0	14
10	202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	0	0	0	0	110	0	0	0	110
11	203	0109	TOPSOIL	CY	0	0	0	2,248	2,738	2,710	0	0	7,696
12	203	0113	COMMON EXCAVATION - WASTE	CY	0	0	0	3,204	620	0	0	0	3,824
13	203	0119	TOPSOIL - IMPORTED	CY	0	0	0	2,138	553	0	0	0	2,694
14	203	0140	BORROW - EXCAVATION	CY	0	0	0	0	18,507	1,392	0	0	17,899
15	210	0198	SELECT BACKFILL	TON	0	0	0	0	5,124	0	0	0	5,124
16	216	0100	WATER	M GAL	0	64	63	94	174	119	60	120	694
17	230	0302	SUBGRADE PREPARATION-TYPE A-SHOULDERS	STA	0	210	87	0	0	0	0	0	297
18	302	0120	AGGREGATE BASE COURSE CL 5	TON	0	2,142	2,108	639	403	980	0	0	6,272
19	302	0309	CRUSHED CONCRETE	TON	0	0	0	0	3,412	0	0	347	3,759
20	410	0247	RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42	TON	0	6,238	4,450	9,385	12,589	19,445	6,331	13,508	73,960
21	410	0475	PG 58-28 ASPHALT CEMENT-WMA ADDITIVE	TON	0	312	223	477	629	972	317	675	3,698
22	410	9010	CORING BITUMINOUS SURFACING	EA	0	0	0	28	26	33	23	44	160
23	411	0105	MILLING PAVEMENT SURFACE	SY	0	0	7,600	33,483	47,765	42,772	31,684	53,368	225,672
24	702	0100	MOBILIZATION	L SUM	0	0.125	0.125	0.125	0.125	0.125	0.125	0.125	1.00
25	704	1067	TUBULAR MARKERS	EA	0	0	0	0	125	0	0	0	125
26	704	1100	TRAFFIC CONTROL	L SUM	0	0.125	0.125	0.125	0.125	0.125	0.125	0.125	1.00
27	704		PORTABLE CHANGEABLE MESSAGE SIGN	DAYS	0	0	0	0	42	0	0	0	42
28	706	0301	FIELD LABORATORY-TYPE C	L SUM	0	0.125	0.125	0.125	0.125	0.125	0.125	0.125	1.00
29	708	1430	FIBER ROLLS 12IN	LF	0	0	0	0	390	0	0	0	390
30	708	1540	INLET PROTECTION-SPECIAL	EA	0	0	0	0	16	0	0	0	16
31	708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	0	0	0	0	16	0	0	0	16
32	708	2280	SEEDING-TYPE B-CL V	ACRE	0	0	0	6.92	6.93	0.70	0	0	14.55
33	708	5500	MULCHING	ACRE	0	0	0	6.92	6.93	0.70	0	0	14.55
34	709	0701	GEOTEXTILE FABRIC-TYPE R1	SY	0	0	0	0	4,480	0	0	0	4,480
35	714	4097	PIPE CONDUIT 15IN-STORM DRAIN	LF	0	0	0	0	24	0	0	0	24
36	714	4107	PIPE CONDUIT 24IN-STORM DRAIN	LF	0	0	0	0	140	0	0	0	140
37	714	5200	PIPE CORR STEEL .079IN 24IN	LF	0	0	0	16	158	0	0	0	174
38	714	4112	PIPE CONDUIT 30IN-STORM DRAIN	LF	0	0	0	0	2,278	0	0	0	2,278
39	714	9656	INSTALL END SECTION-ALL TYPES & SIZES	EA	0	0	0	2	13	0	0	0	15
40	714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	0	0	0	0	1	0	0	0	1
41	722	0091	MANHOLE	EA	0	0	0	0	16	0	0	0	16
42	722	3499	INLET SHALLOW CATCH BASIN 6IN BEEHIVE.	EA	0	0	0	0	16	0	0	0	16
43	752	0640	FENCE CHAIN LINK RESET	LF	0	0	0	0	0	0	0	330	330
44	760	0005	RUMBLE STRIPS-ASPHALT SHOULDER	MILE	89.00	0.00	0.00	4.76	0.00	5.23	3.95	0.00	103.96
45	762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	0	0	0	0	268	473	265	0	1,006
46	762	0405	SHORT TERM 4 IN BROKEN LINE-PNT TAPE OR RSD MRK	LF	0	0	0	37,014	5,043	10,032	7,137	10,494	71,745
47	762	0410	SHORT TERM 4 IN LINE NPZ - PN TP OR RS MRK	LF	0	0	0	1,635	11,505	15,009	10,020	40,590	80,259
48	762	1104	PVMT MK PAINTED 4IN LINE	LF	0	0	0	118,227	41,923	36,471	26,596	29,943	259,735
49	762	1108	PVMT MK PAINTED 8IN LINE	LF	0	0	0	0	1,000	600	0	0	1,600
50	764	0135	THRIE BEAM GUARDRAIL	LF	0	0	0	150	0	0	0	0	150
51	764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	0	0	0	4	0	0	0	0	4
52	764	0150	REMOVE & RESET GUARDRAIL	LF	0	0	0	0	0	0	0	480	480

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
ESTIMATED QUANTITIES
SHEET 14 OF 43

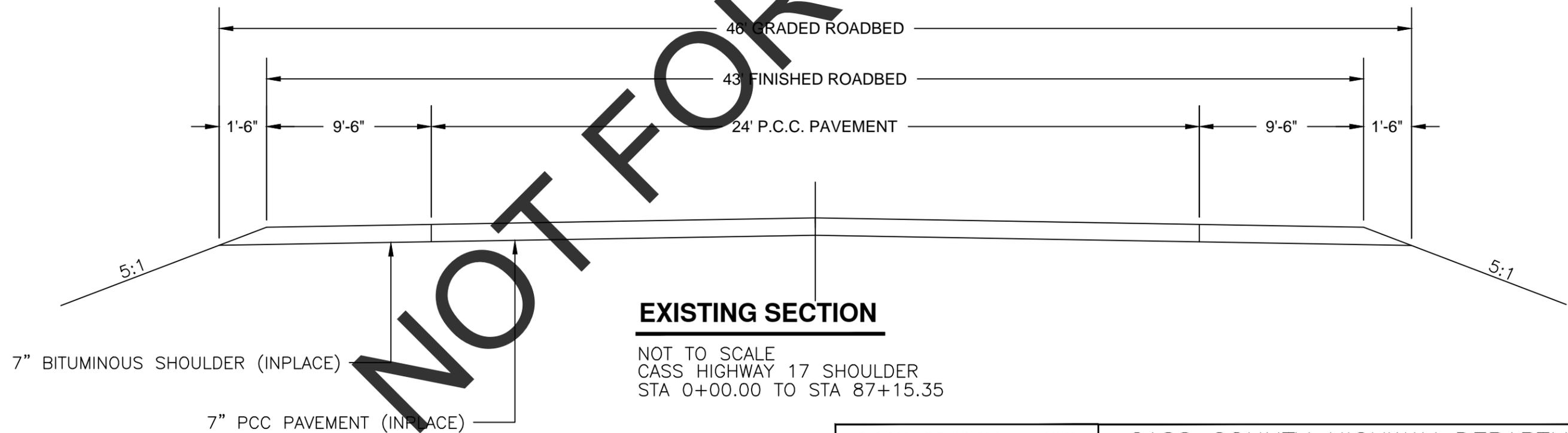
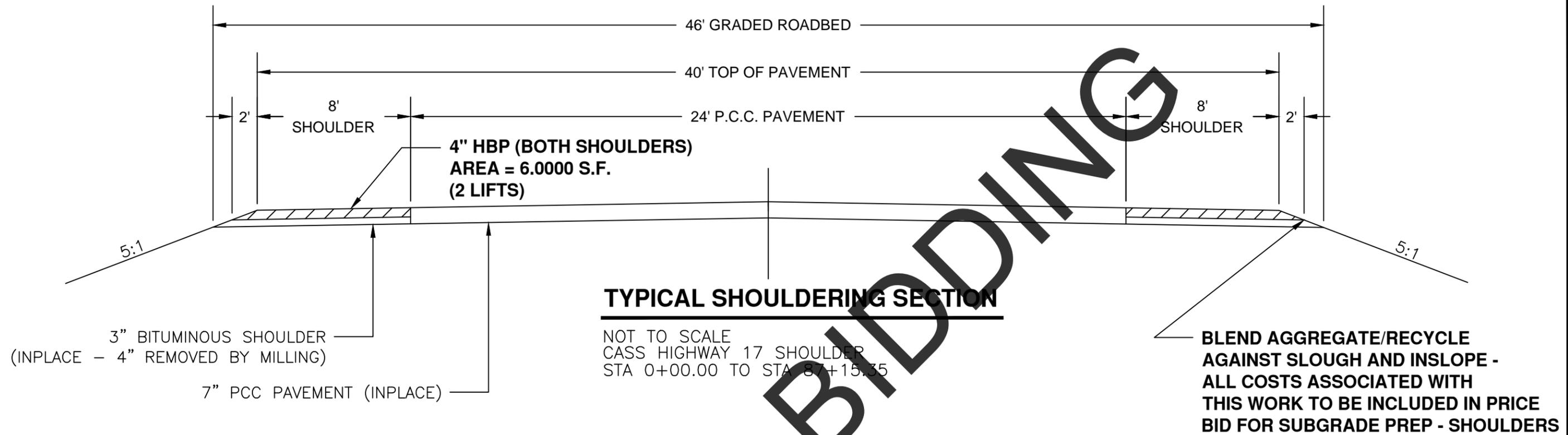
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	15	43



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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 15 OF 43

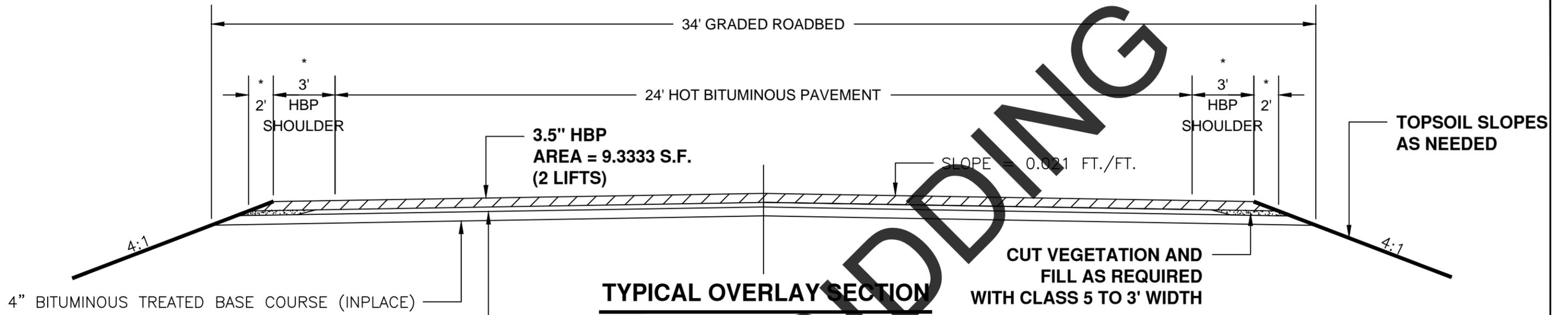
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N.D.	CH1401	16	43



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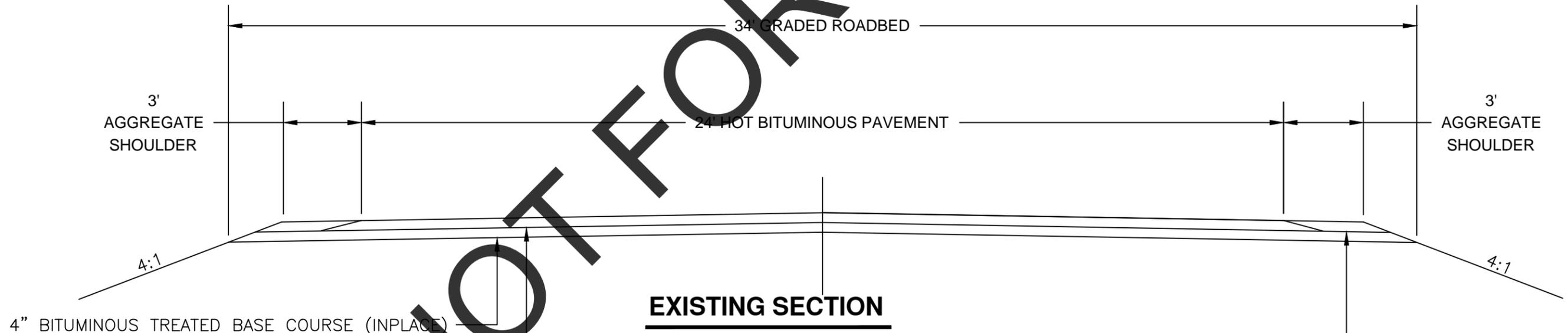
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STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	17	43



NOT TO SCALE
CASS HIGHWAY 20 - "A"
STA 0+00.00 TO STA 125+56.70

***THE ENGINEER IN THE FIELD WILL DETERMINE
THE DIMENSIONS OF THE SHOULDER AND
SLOUGH TO BEST FIT THE FIELD CONDITIONS**

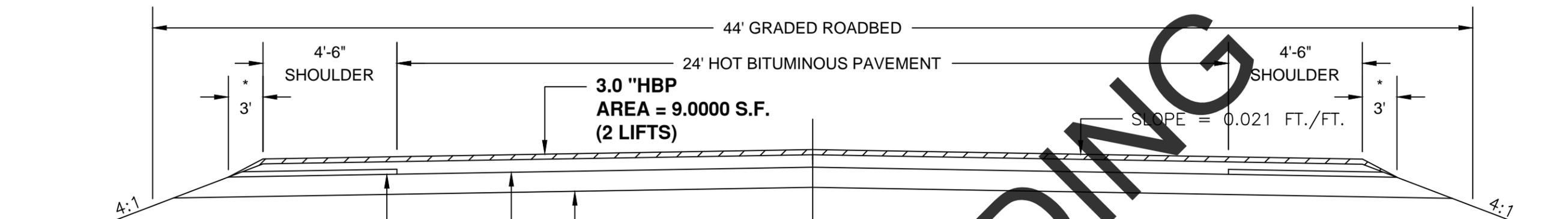


NOT TO SCALE
CASS HIGHWAY 20 - "A"
STA 0+00.00 TO STA 125+56.70

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TYPICAL SECTIONS
SHEET 17 OF 43

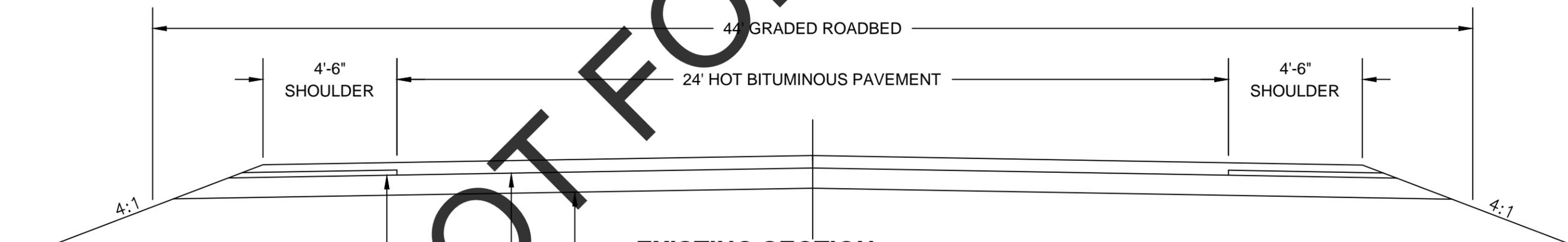
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	18	43



TYPICAL OVERLAY SECTION

NOT TO SCALE
CASS HIGHWAY 20 - "B"

***THE ENGINEER IN THE FIELD WILL DETERMINE THE DIMENSIONS OF THE SHOULDER AND SLOUGH TO BEST FIT THE FIELD CONDITIONS**



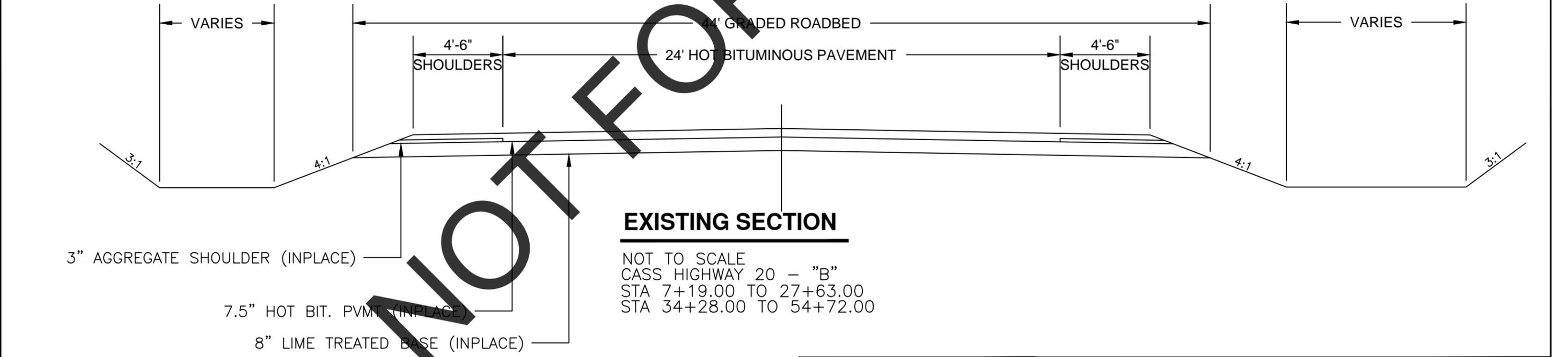
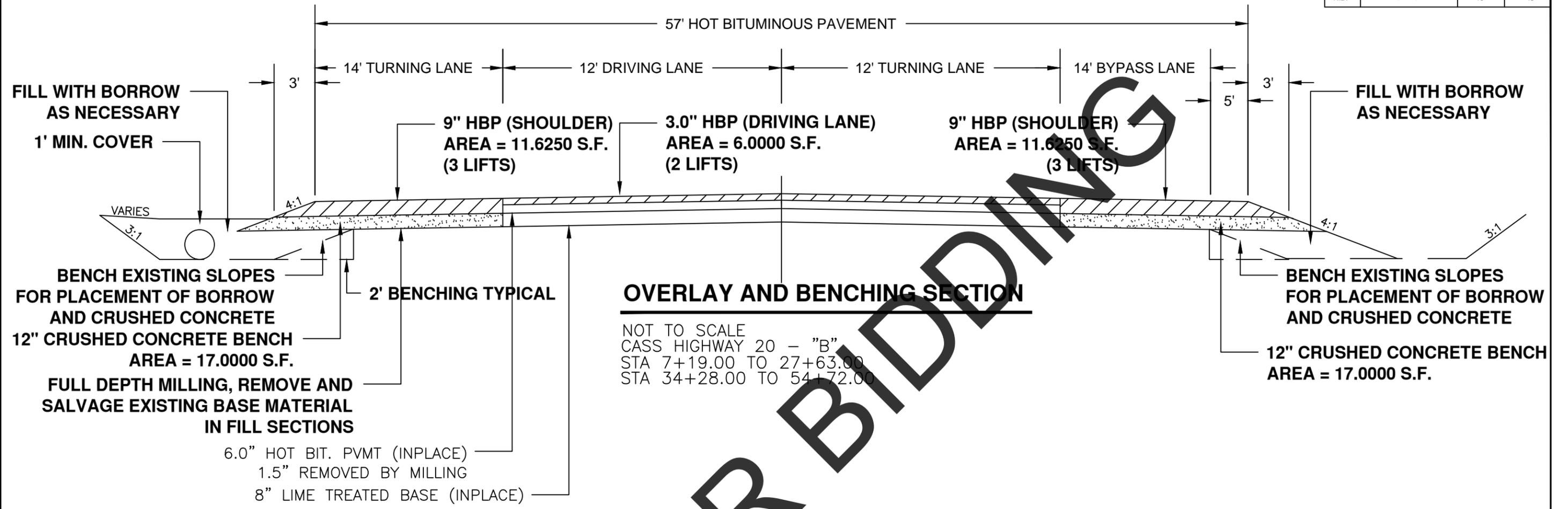
EXISTING SECTION

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CASS HIGHWAY 20 - "B"

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TYPICAL SECTIONS
SHEET 18 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	19	43

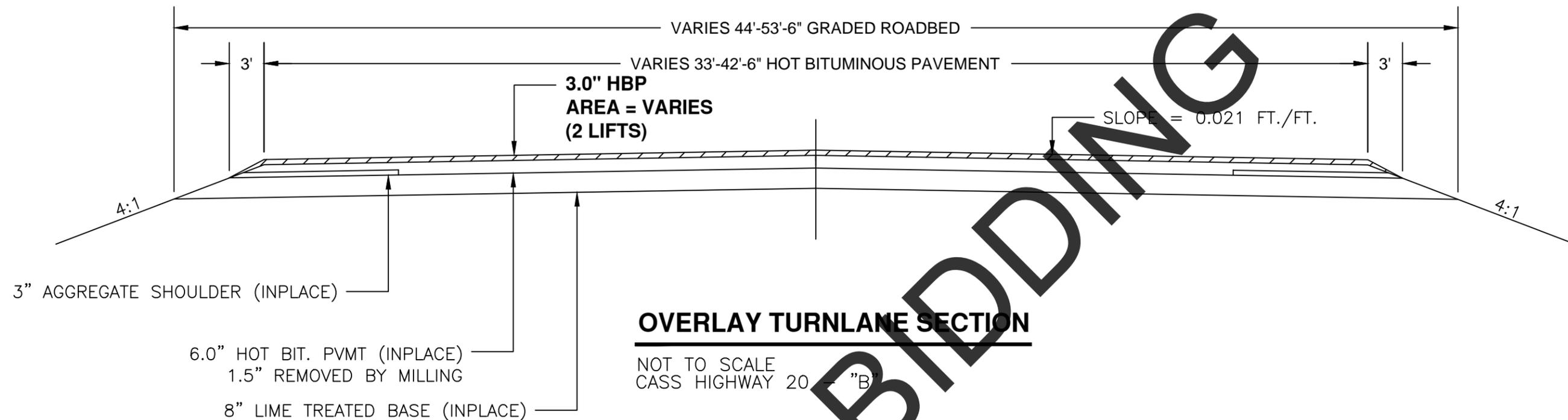


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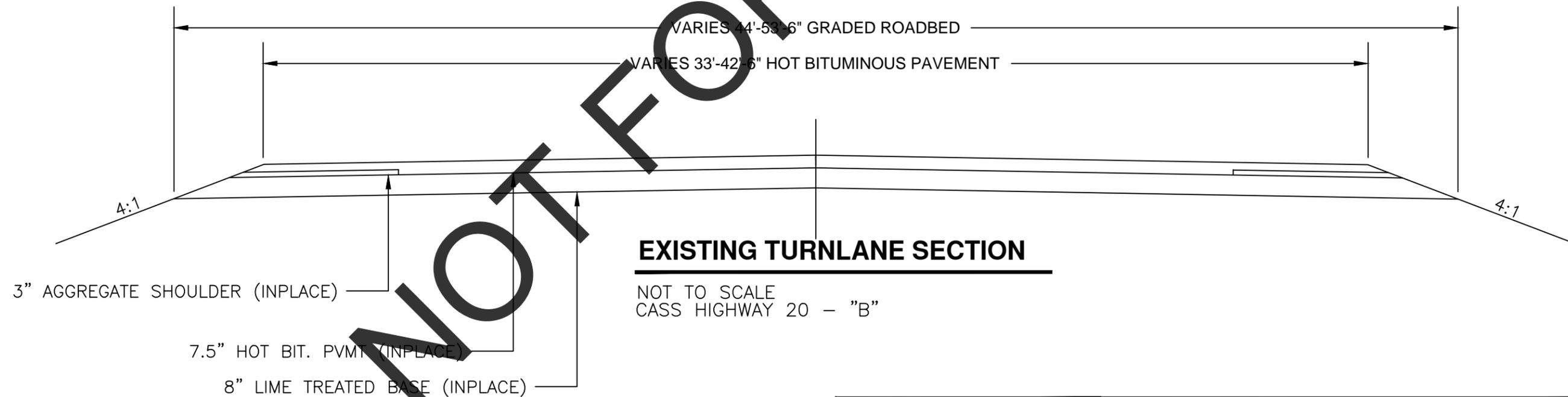
CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 19 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	20	43



OVERLAY TURNLANE SECTION

NOT TO SCALE
CASS HIGHWAY 20 - "B"



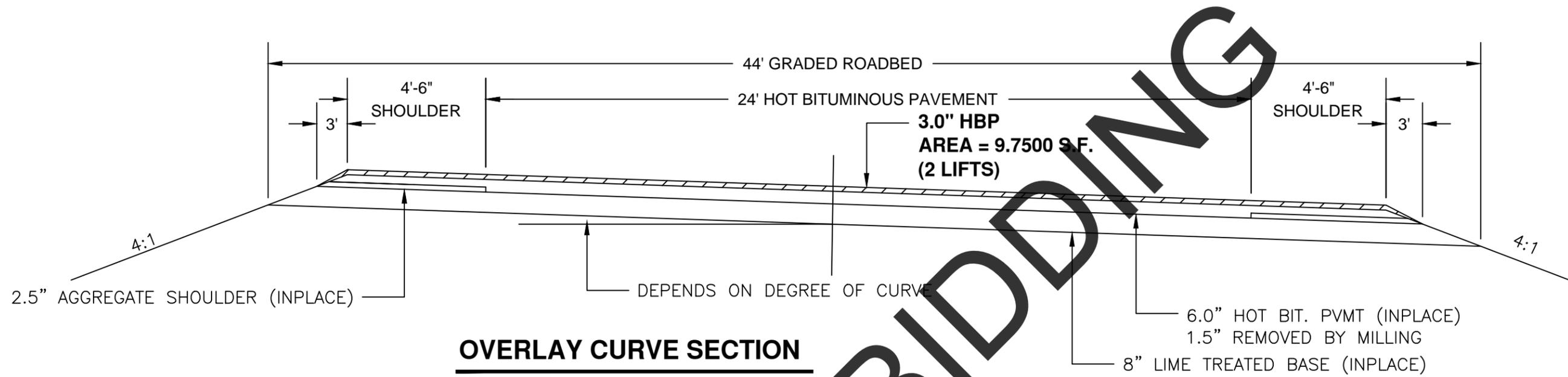
EXISTING TURNLANE SECTION

NOT TO SCALE
CASS HIGHWAY 20 - "B"

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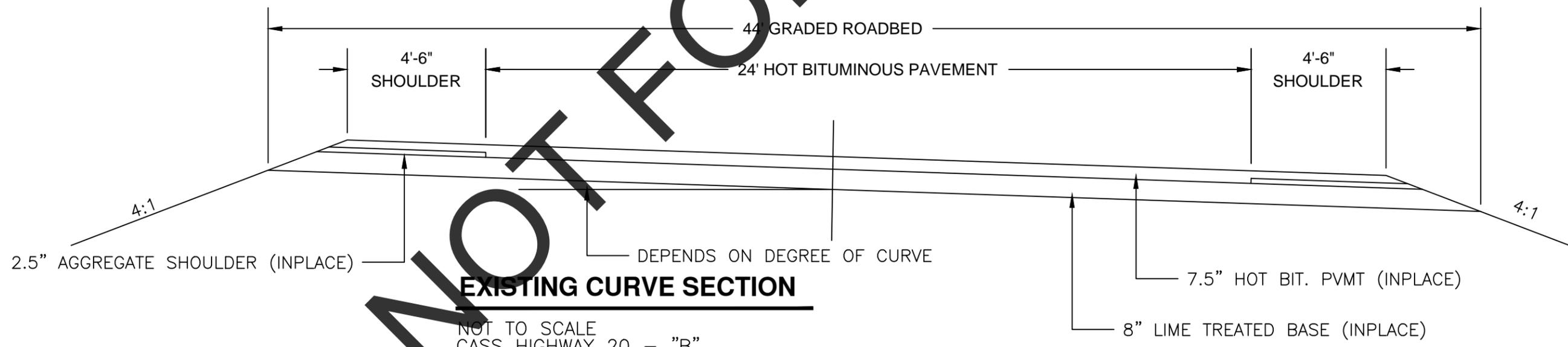
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TYPICAL SECTIONS
SHEET 20 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	21	43



OVERLAY CURVE SECTION

NOT TO SCALE
CASS HIGHWAY 20 - "B"
STA 44+86.00 TO STA 53+83.30
STA 72+65.00 TO STA 90+54.60
STA 109+39.70 TO STA 118+37.60



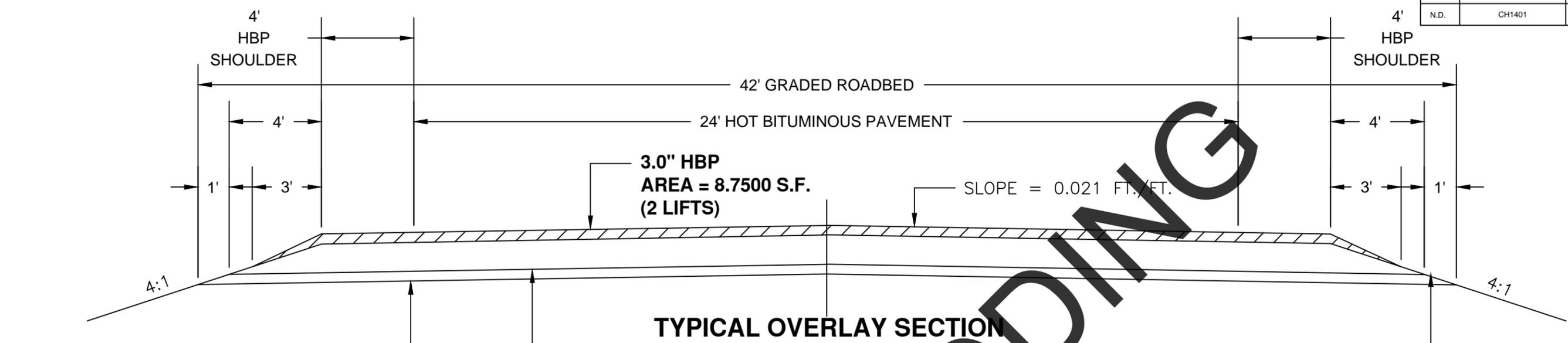
EXISTING CURVE SECTION

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HIGHWAY DEPARTMENT, WEST FARGO, ND

CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TYPICAL SECTIONS
SHEET 21 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	22	43

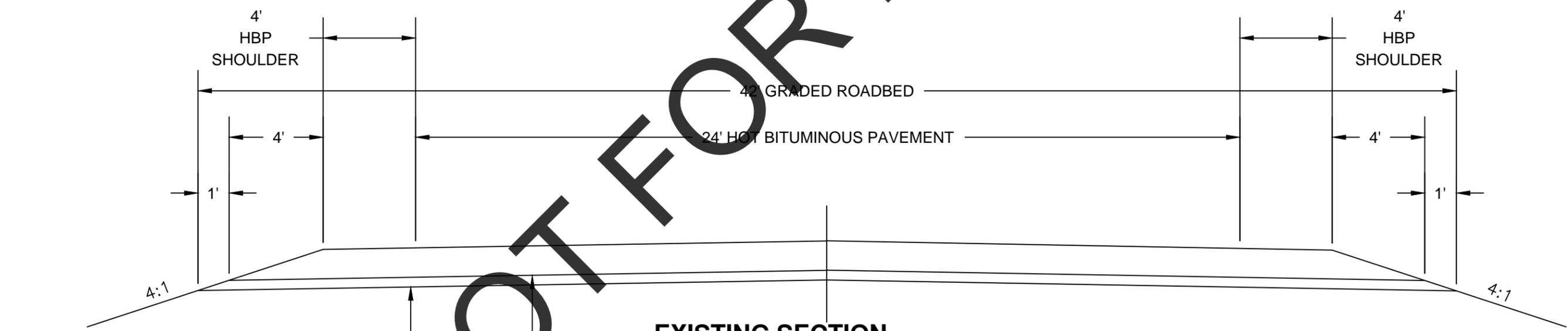


TYPICAL OVERLAY SECTION

NOT TO SCALE
 CASS HIGHWAY 22 – HARWOOD
 STA 0+00.00 TO STA 13+61.45

3" AGGREGATE BASE COURSE (INPLACE)
 9.5" HOT BIT. PVMT (INPLACE)
 1.5" REMOVED BY MILLING

TOPSOIL BLENDED INTO SLOPE



EXISTING SECTION

NOT TO SCALE
 CASS HIGHWAY 22 – HARWOOD
 STA 0+00.00 TO STA 13+61.45

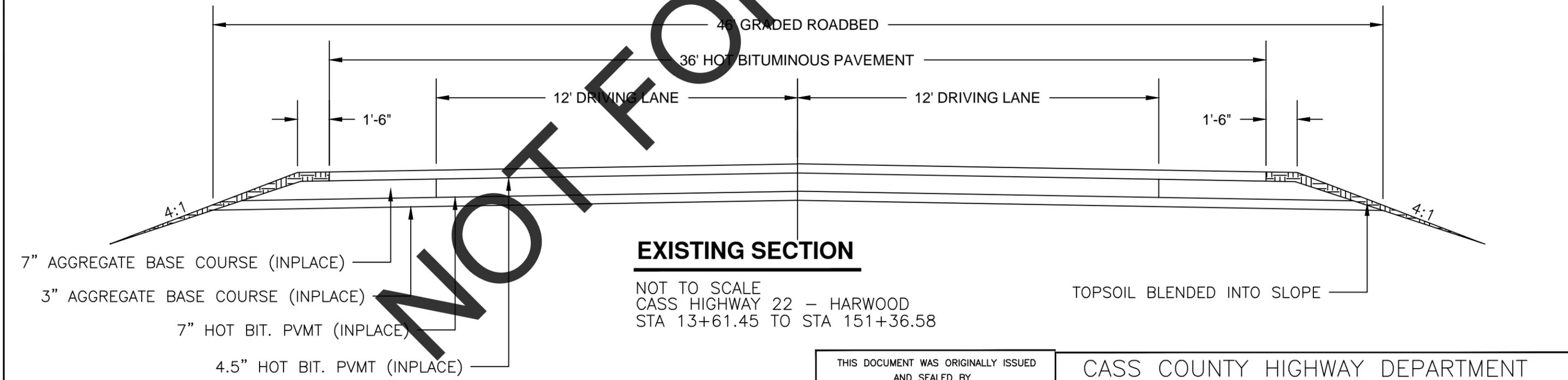
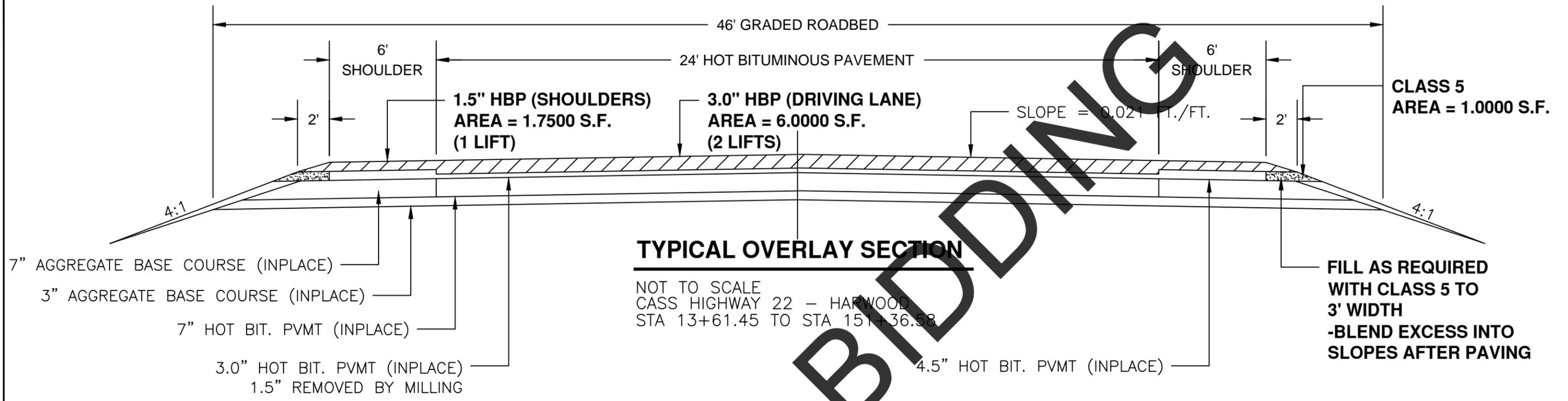
3" AGGREGATE BASE COURSE (INPLACE)
 11" HOT BIT. PVMT (INPLACE)

NOT FOR BIDDING

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 22 OF 43

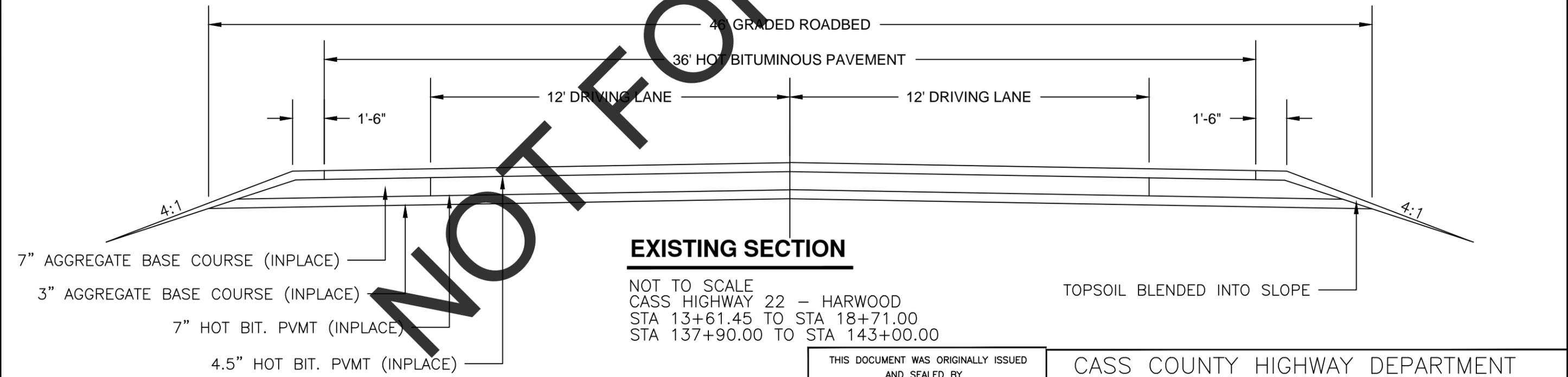
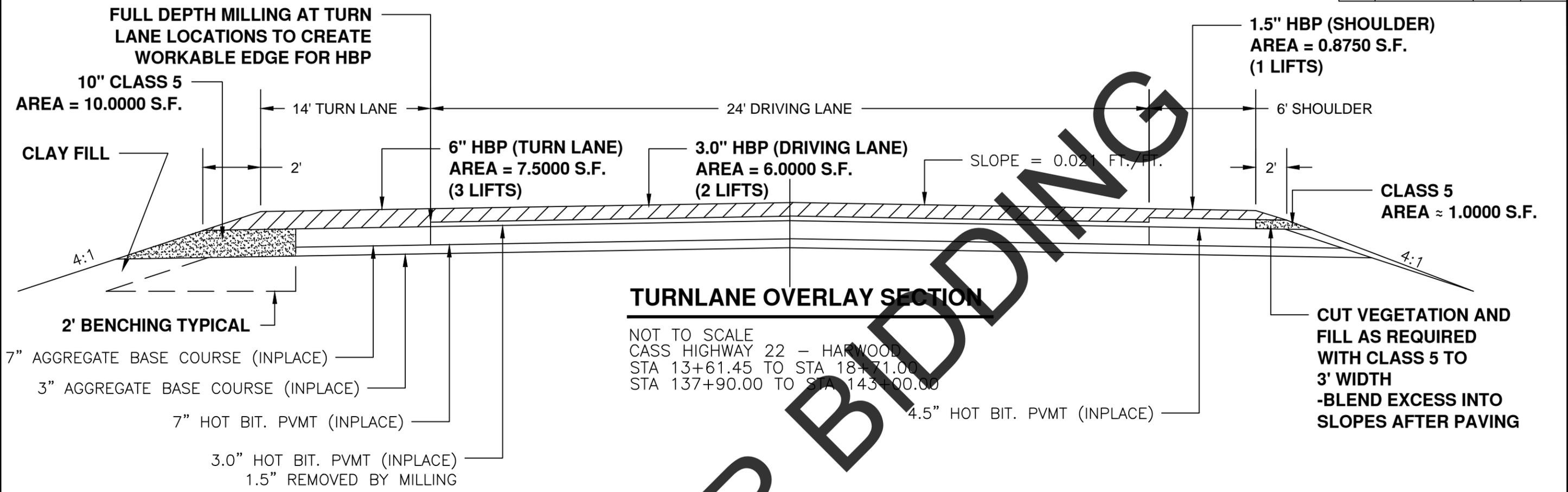
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	23	43



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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 23 OF 43

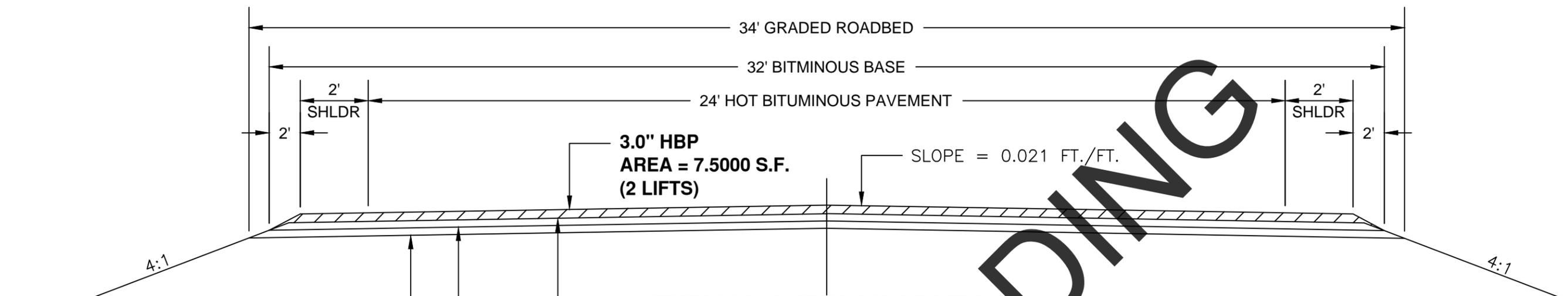
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	24	43



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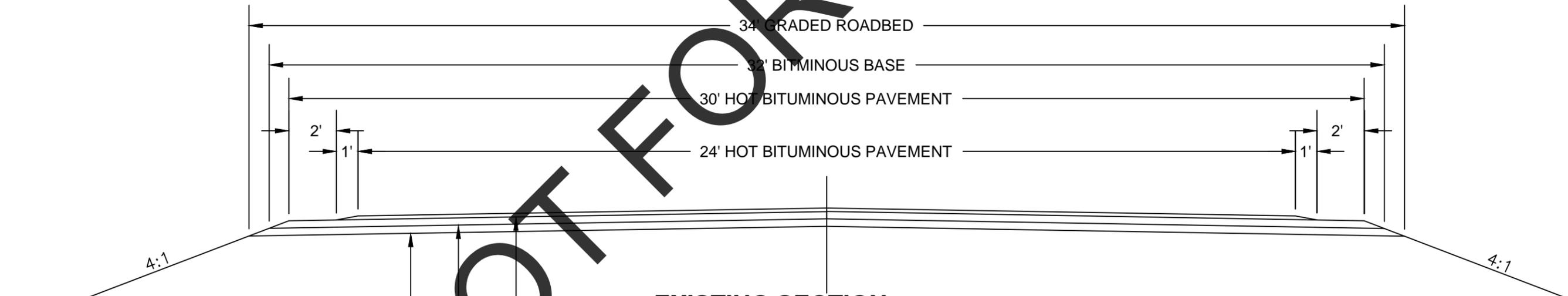
CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 24 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	25	43



TYPICAL OVERLAY SECTION

NOT TO SCALE
 CASS HIGHWAY 22 – PROSPER
 STA 0+00.00 TO STA 105+52.80



EXISTING SECTION

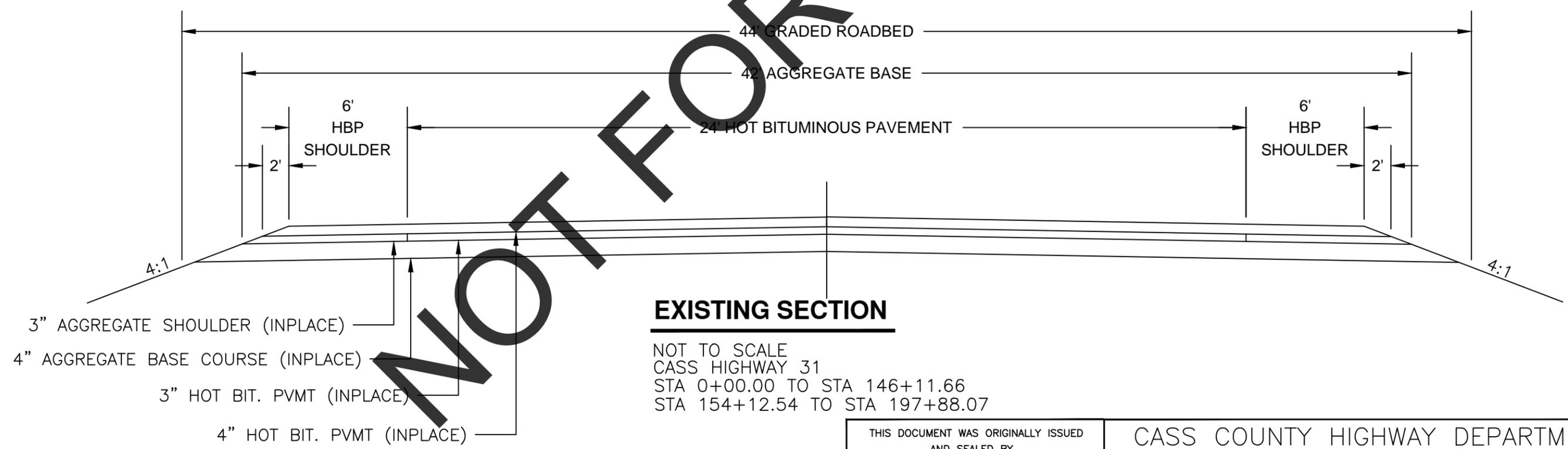
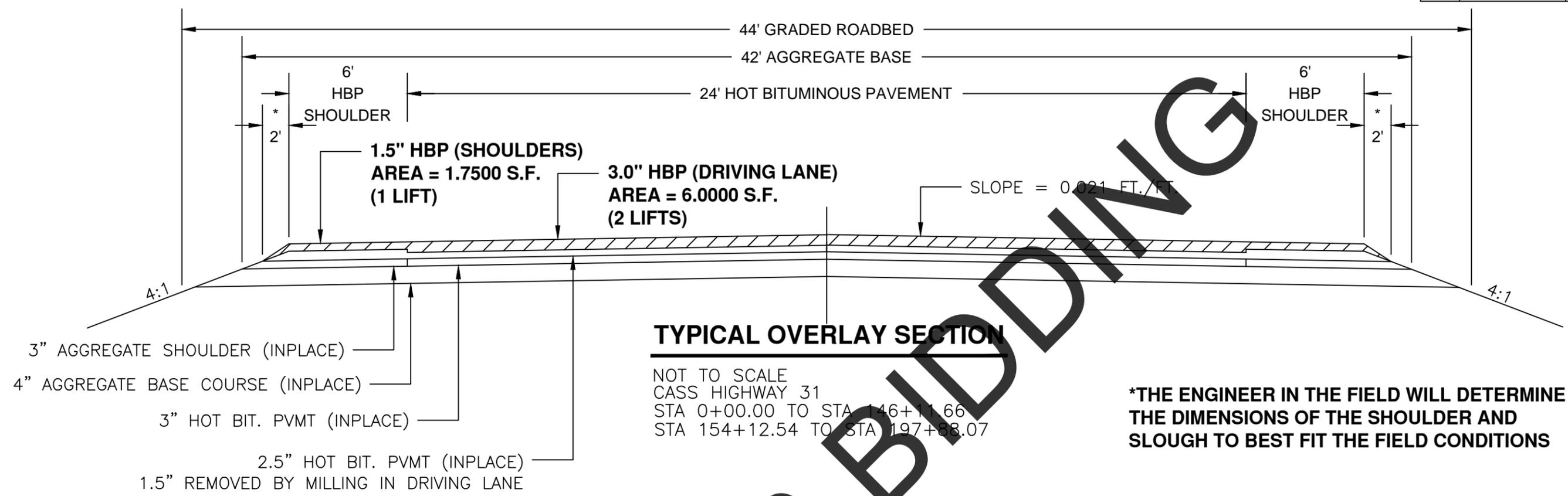
NOT TO SCALE
 CASS HIGHWAY 22 – PROSPER
 STA 0+00.00 TO STA 105+52.80

NOT FOR BIDDING

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 25 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	26	43

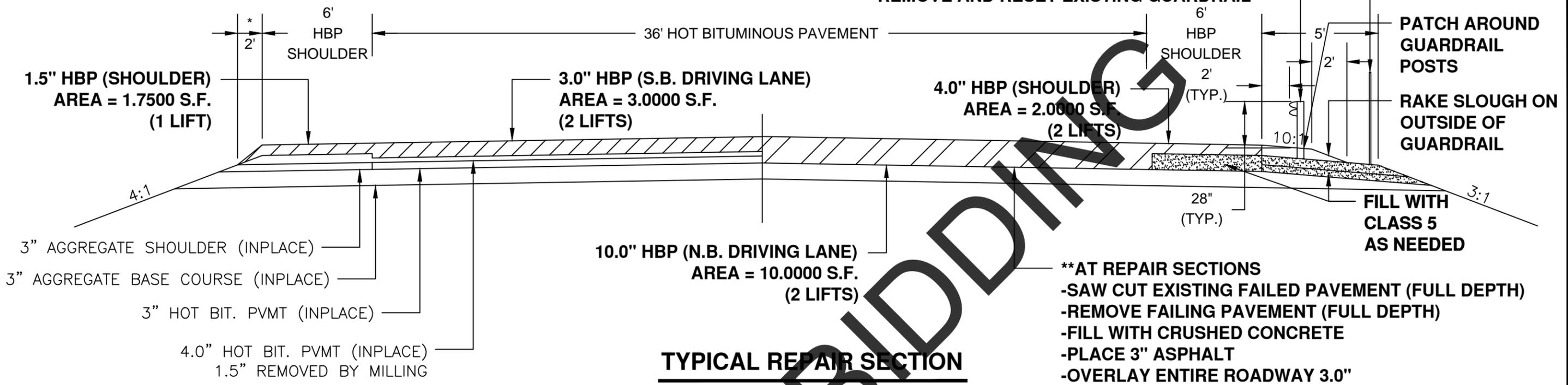


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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 26 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	27	43

REMOVE AND RESET EXISTING CHAIN LINK FENCE
 REMOVE AND RESET EXISTING GUARDRAIL



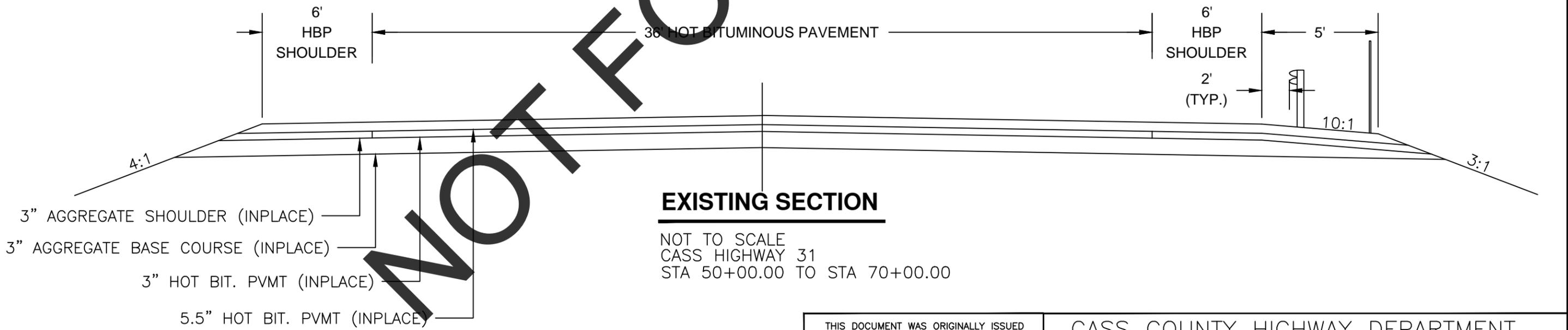
TYPICAL REPAIR SECTION

NOT TO SCALE
 CASS HIGHWAY 31
 STA 50+00.00 TO STA 70+00.00
 AS NECESSARY

- **AT REPAIR SECTIONS**
- SAW CUT EXISTING FAILED PAVEMENT (FULL DEPTH)
 - REMOVE FAILING PAVEMENT (FULL DEPTH)
 - FILL WITH CRUSHED CONCRETE
 - PLACE 3" ASPHALT
 - OVERLAY ENTIRE ROADWAY 3.0"

***THE ENGINEER IN THE FIELD WILL DETERMINE THE DIMENSIONS OF THE SHOULDER AND SLOUGH TO BEST FIT THE FIELD CONDITIONS**

****THE ENGINEER IN THE FIELD WILL DETERMINE LOCATIONS AND DIMENSIONS OF REPAIR SECTIONS**



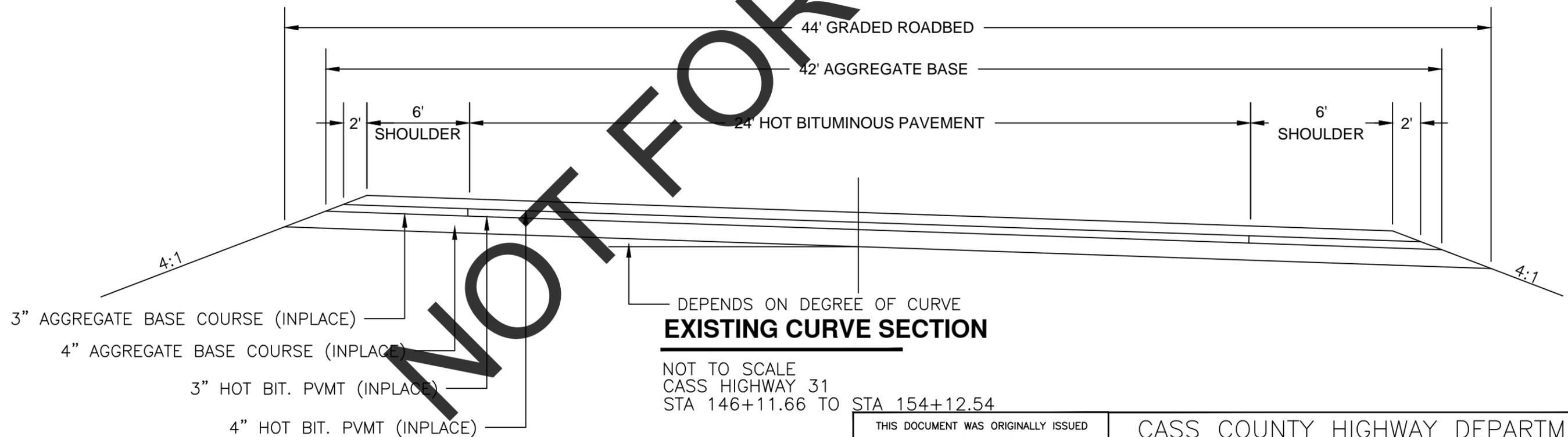
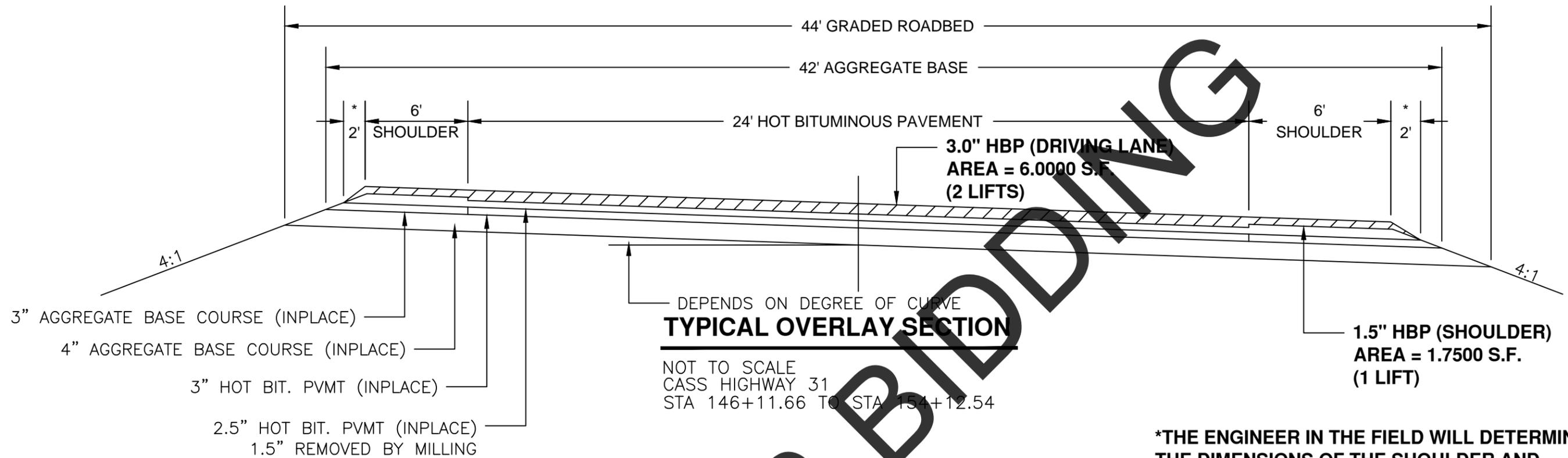
EXISTING SECTION

NOT TO SCALE
 CASS HIGHWAY 31
 STA 50+00.00 TO STA 70+00.00

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 27 OF 43

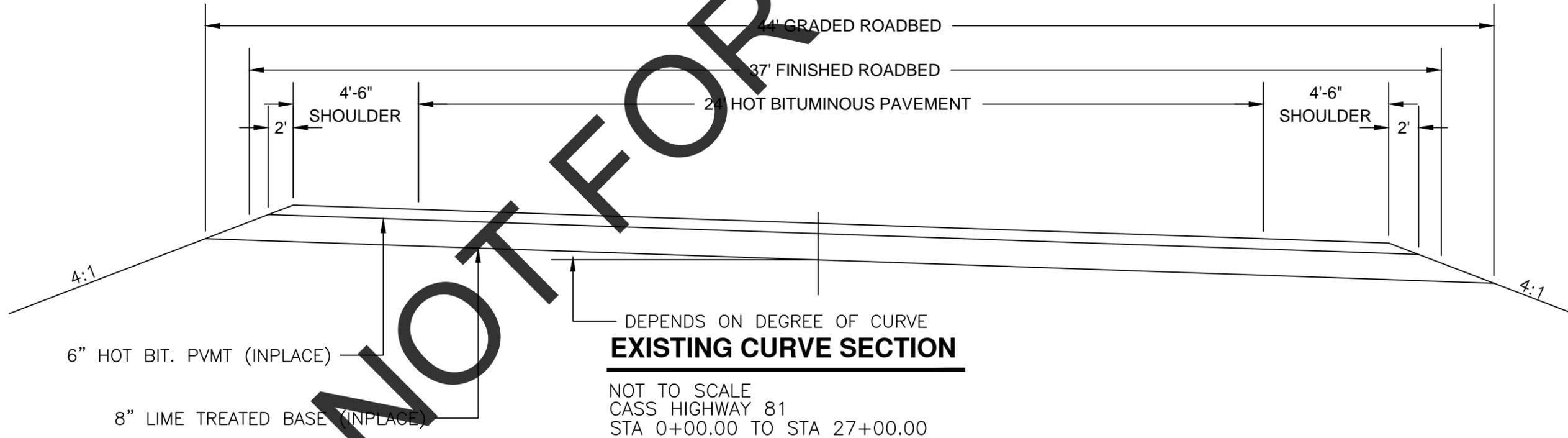
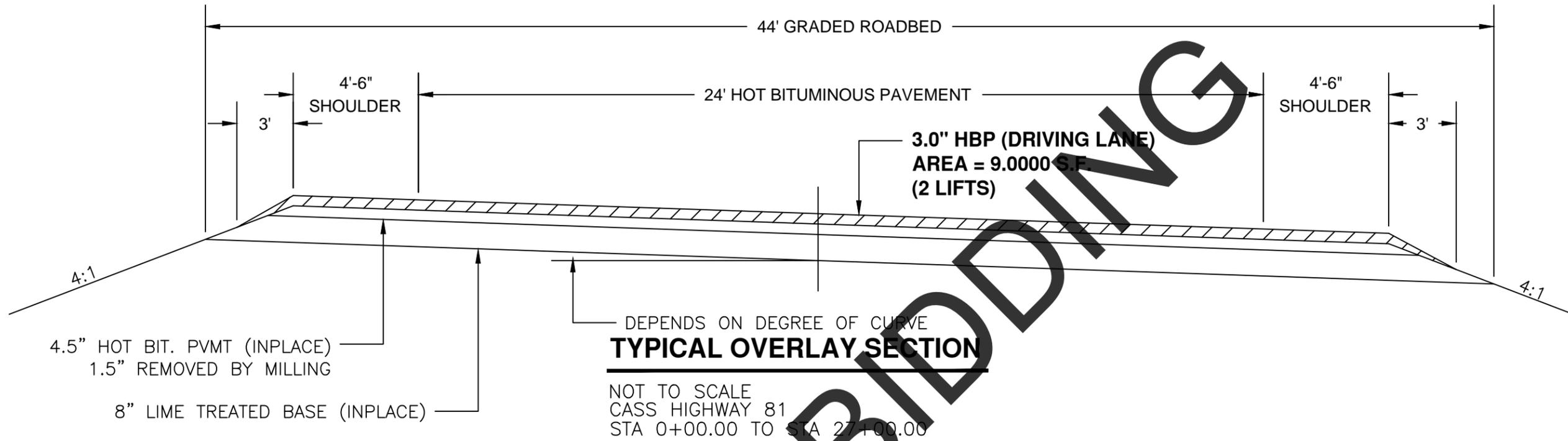
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	28	43



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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 TYPICAL SECTIONS
 SHEET 28 OF 43

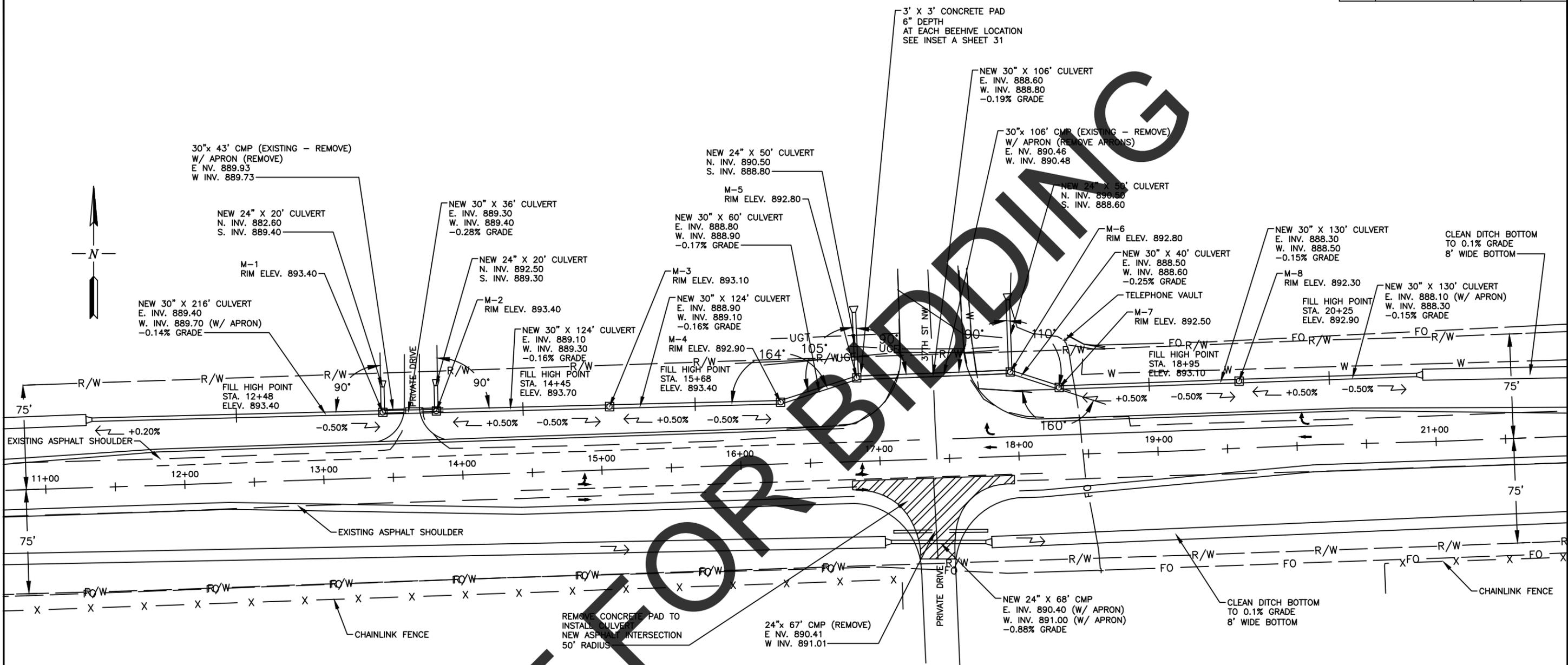
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	29	43



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TYPICAL SECTIONS
SHEET 29 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	30	43



NOT FOR BIDDING

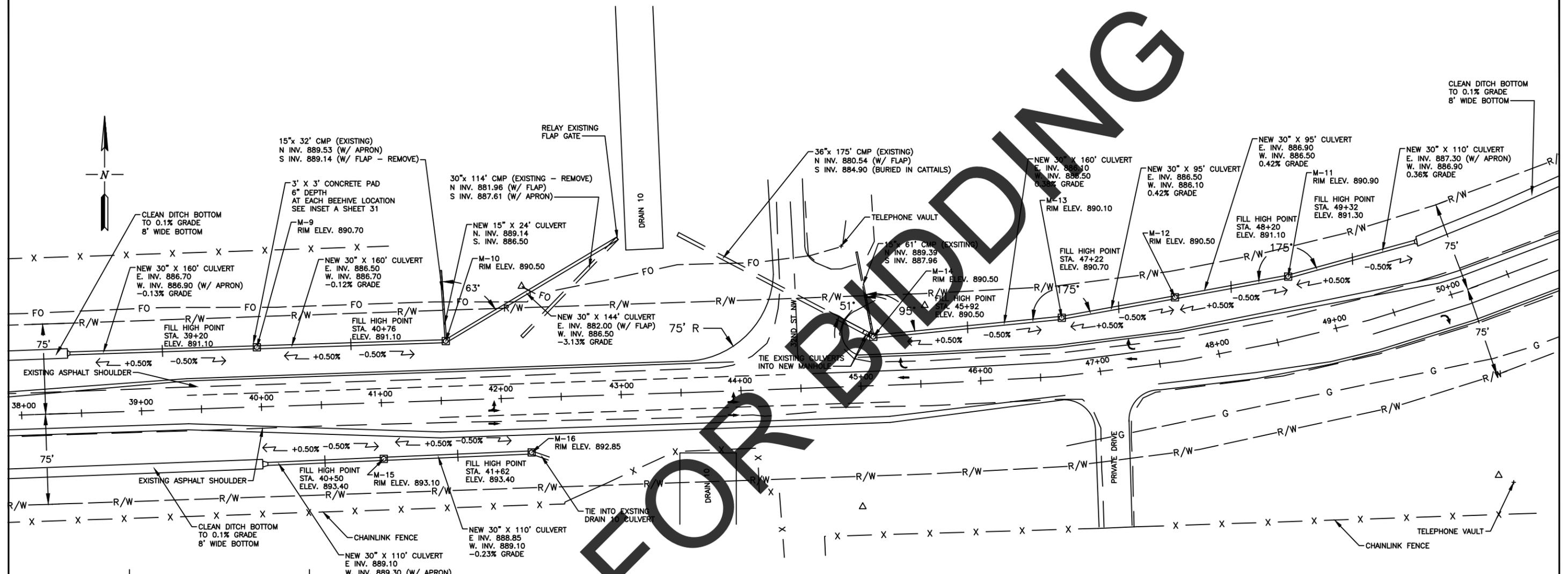
PLAN VIEW - 37TH ST NW INTERSECTION

CASS HIGHWAY 20 - "B"
STA 11+00 TO STA 22+00

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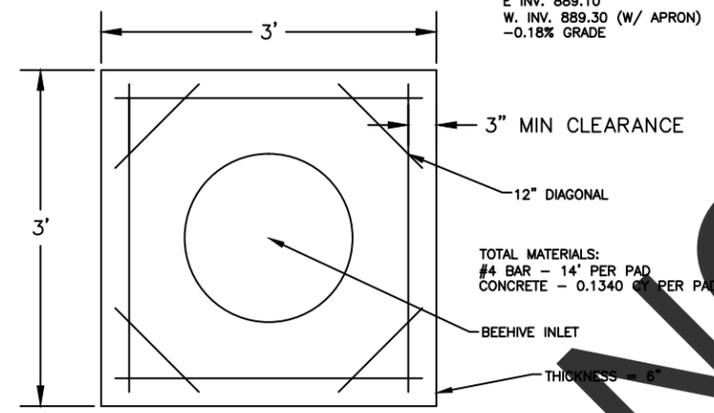
CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 STORM SEWER DETAILS
 SHEET 30 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	31	43



PLAN VIEW - 32ND ST NW INTERSECTION

CASS HIGHWAY 20 - "B"
STA 38+00 TO STA 50+00



INSET A - REBAR AND CONCRETE DETAIL

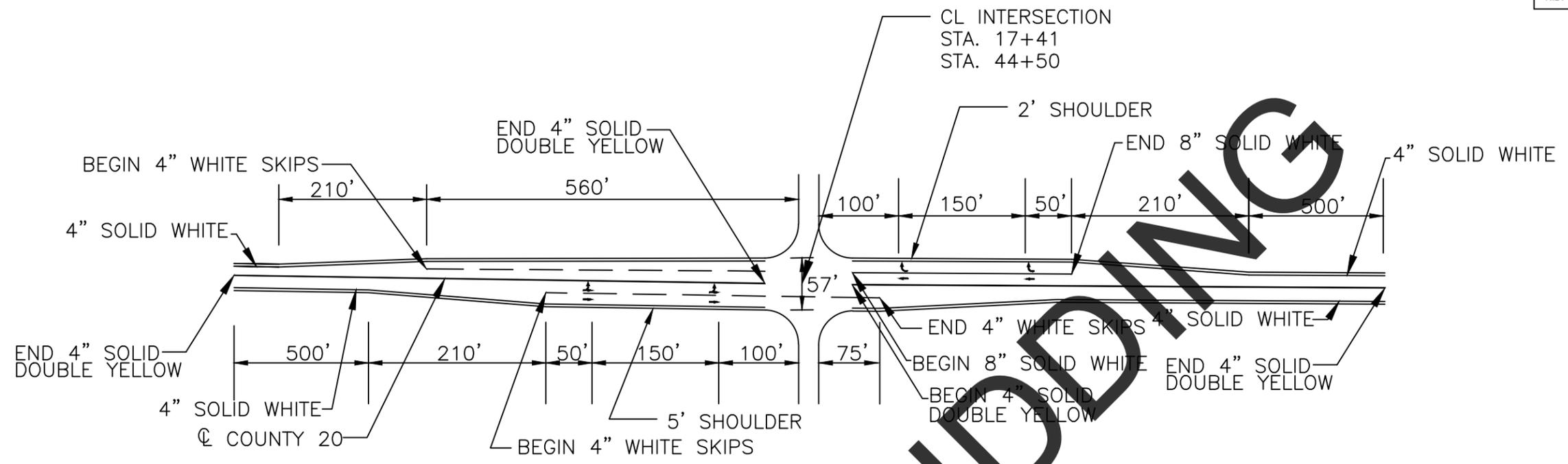
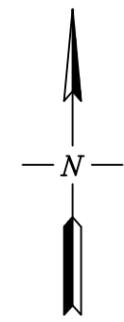
NOT TO SCALE
CASS HIGHWAY 20 - "B"
BEEHIVE INLET DETAILS

TOTAL MATERIALS:
#4 BAR - 14' PER PAD
CONCRETE - 0.1340 CU YD PER PAD

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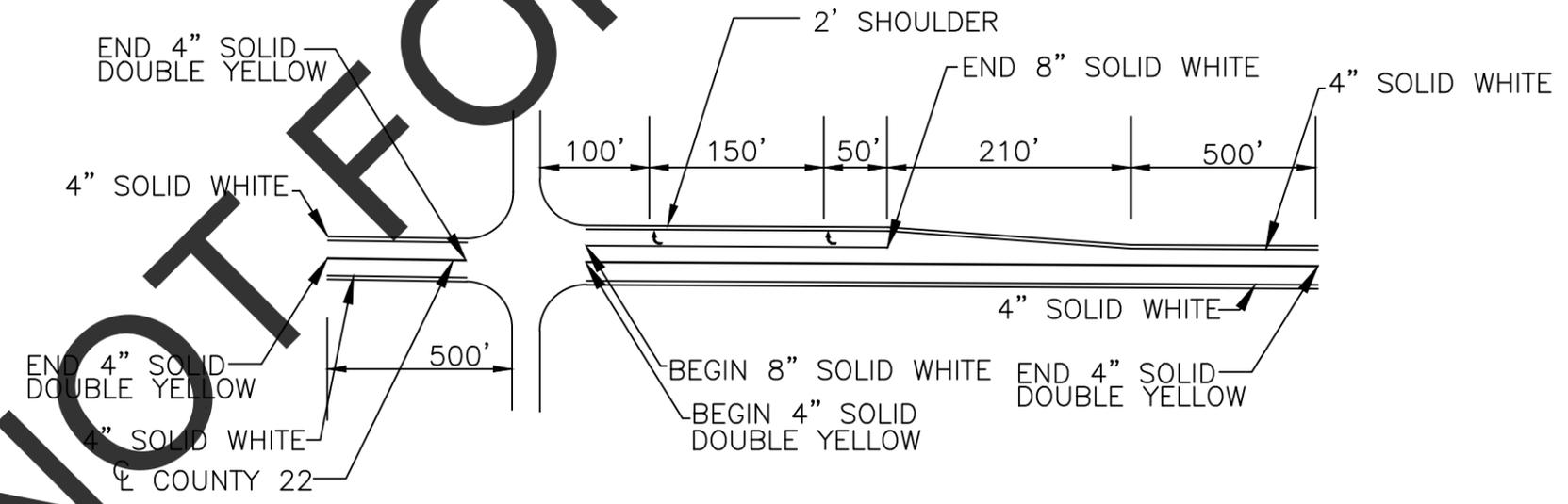
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
STORM SEWER DETAILS
SHEET 31 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	32	43



**BYPASS, ACCELERATION,
AND RIGHT TURN LANES**

CASS HIGHWAY 20 - "B"
NOT TO SCALE
STA 7+19.00 TO 27+63.00
STA 34+28.00 TO 54+72.00



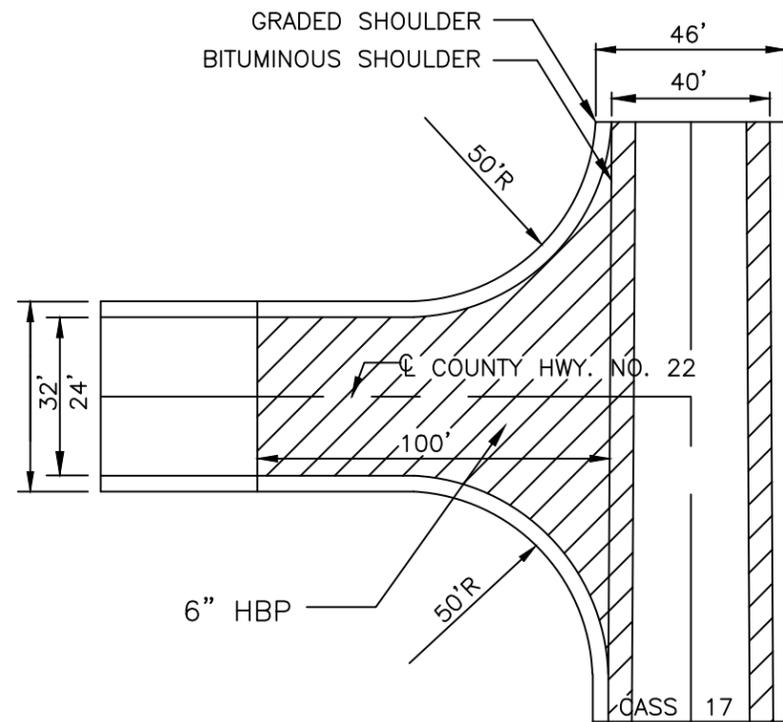
RIGHT TURN LANE

CASS HIGHWAY 22 - HARWOOD
NOT TO SCALE
STA 8+61.45 TO 23+71.45
STA 133+90.00 TO 148+00.00

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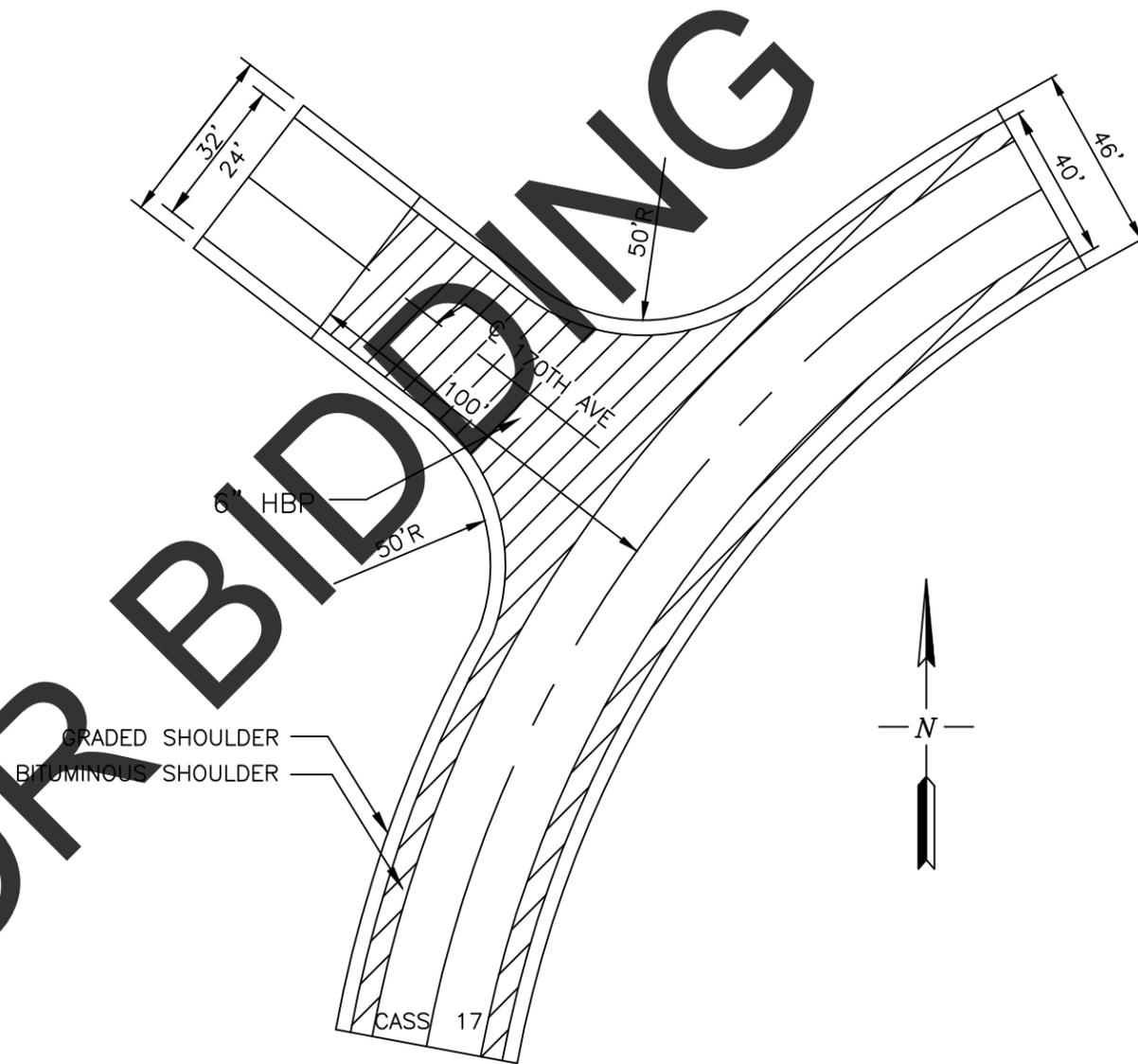
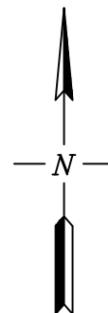
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
TURN LANE DETAILS
SHEET 32 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	33	43



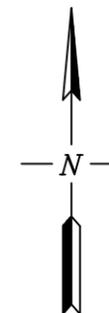
TEE INTERSECTION DETAIL

CASS COUNTY HIGHWAY 17 & 22 WEST
 STA 87+15.35
 NOT TO SCALE



TEE INTERSECTION DETAIL

CASS COUNTY HIGHWAY 17 & 170TH AVE SE
 STA 40+00.00
 NOT TO SCALE

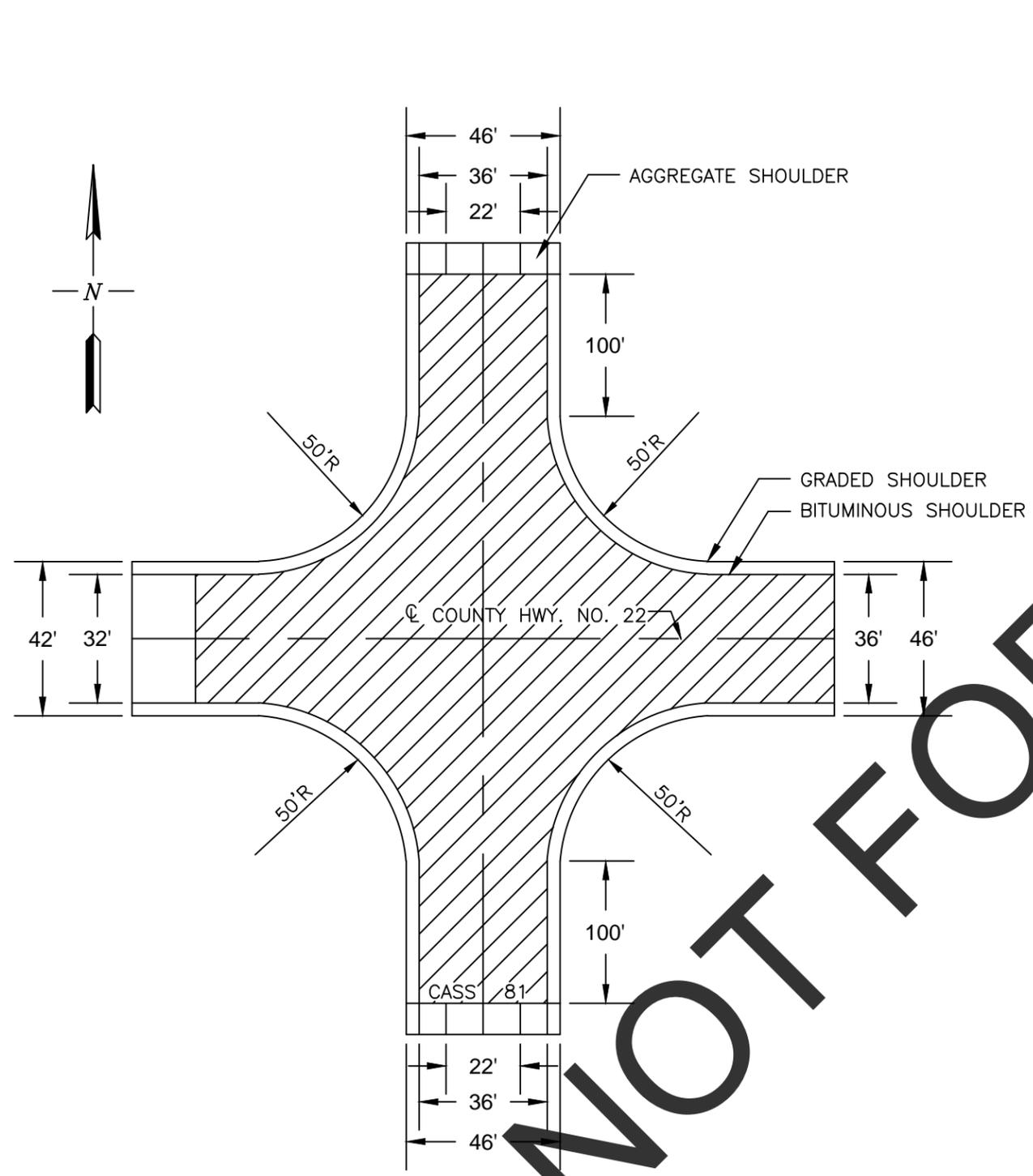


NOT FOR BIDDING

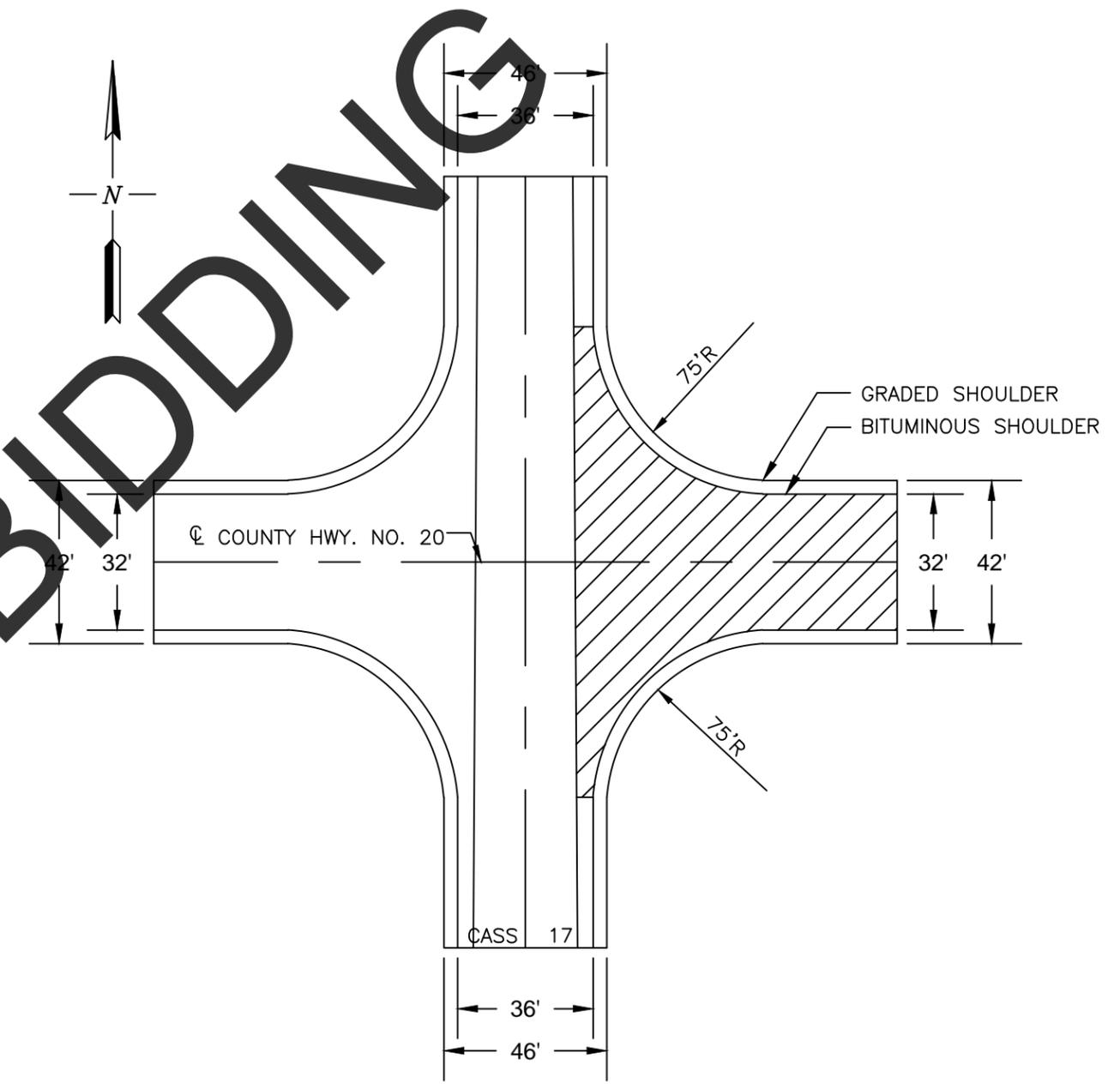
*ALL EXCAVATION AND SHAPING TO BE INCLUDED IN THE COST OF THE MIX FOR INTERSECTIONS

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--	---

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	34	43



INTERSECTION DETAIL
 CASS COUNTY HIGHWAY 22 & 81
 NOT TO SCALE

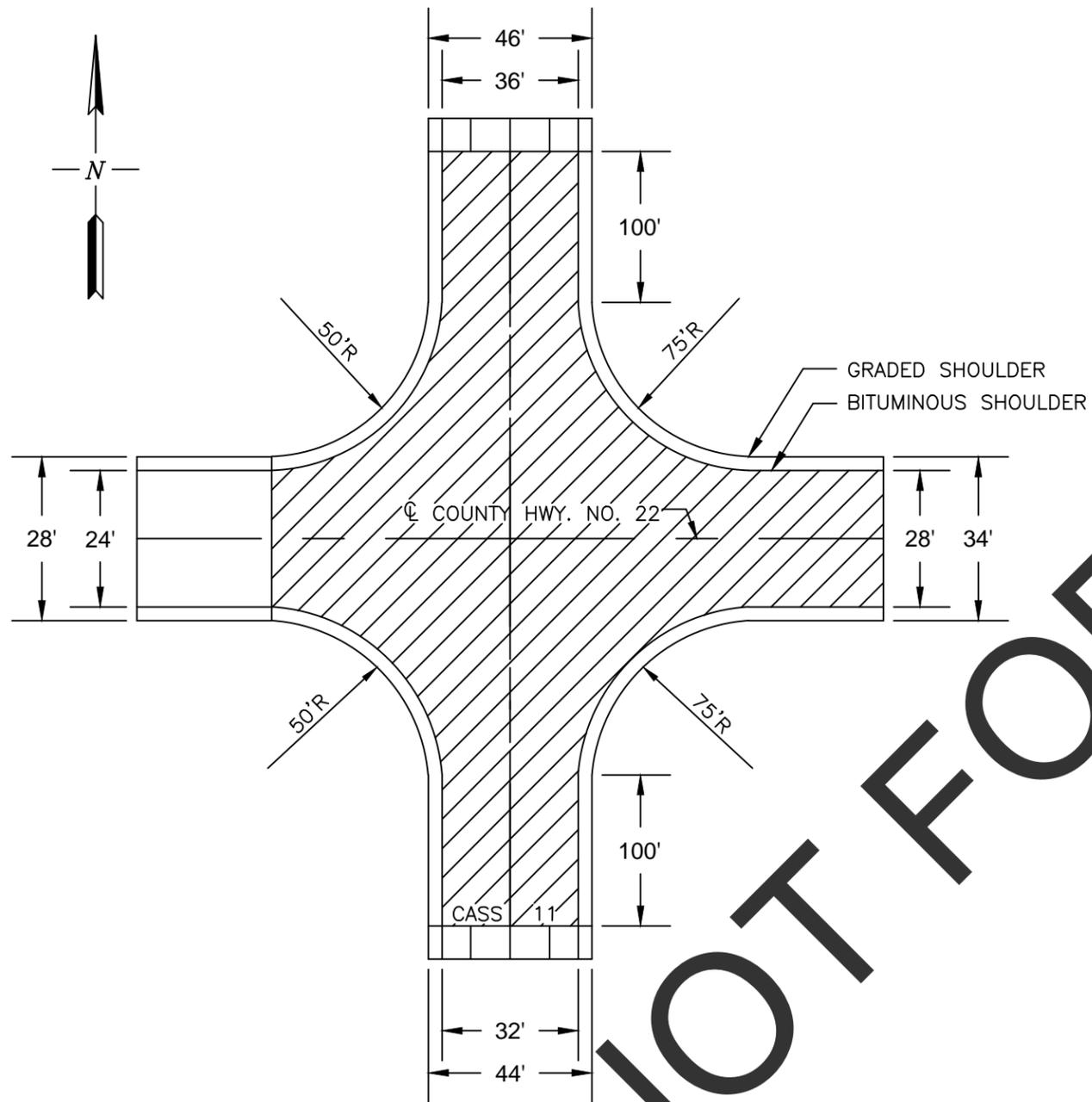


INTERSECTION DETAIL
 CASS COUNTY HIGHWAY 17 & 20
 NOT TO SCALE

NOT FOR BIDDING

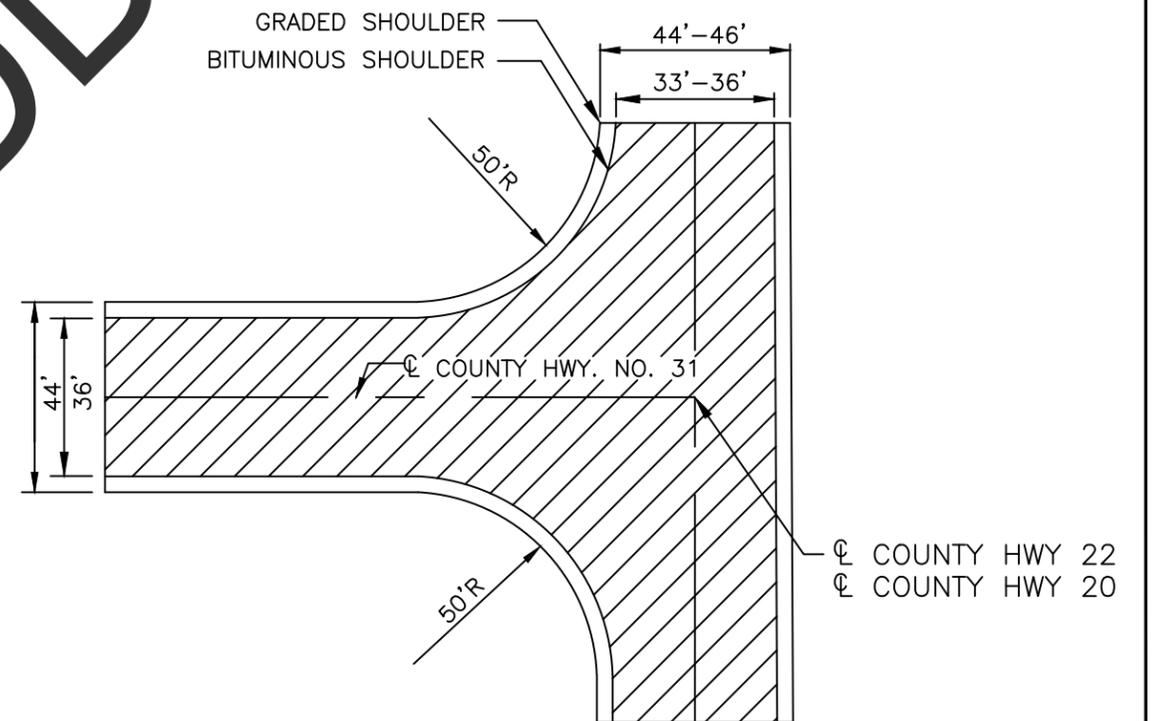
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STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	35	43



INTERSECTION DETAIL

CASS COUNTY HIGHWAY 11 & 22
NOT TO SCALE



TEE INTERSECTION DETAIL

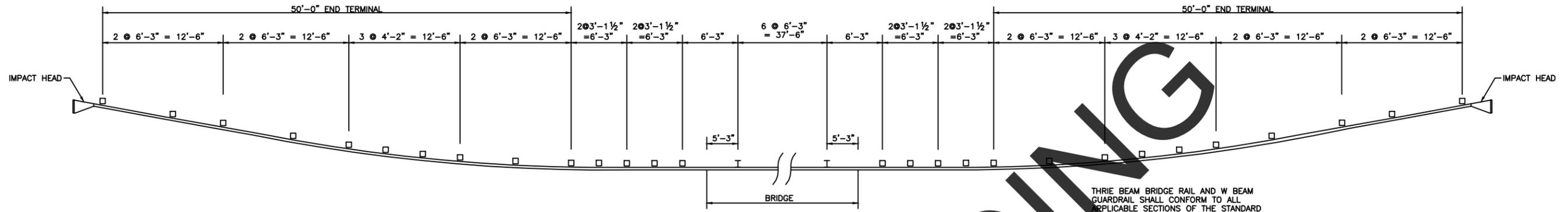
CASS COUNTY HIGHWAY 31 & 22
CASS COUNTY HIGHWAY 31 & 20
NOT TO SCALE

NOT FOR BIDDING

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1401
INTERSECTION DETAILS
SHEET 35 OF 43

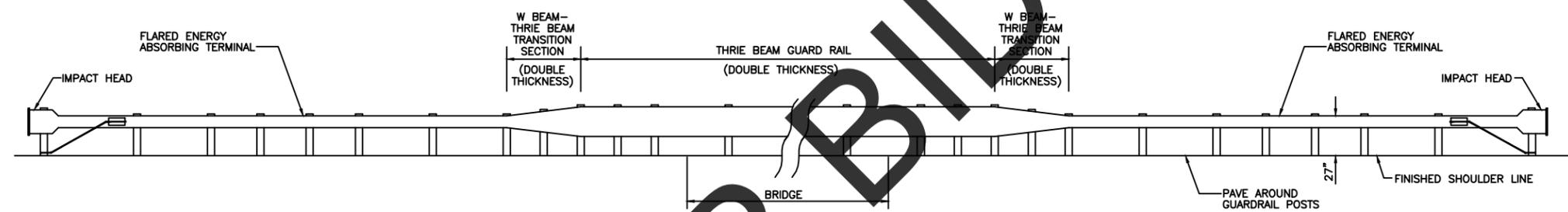
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	36	43



PLAN VIEW

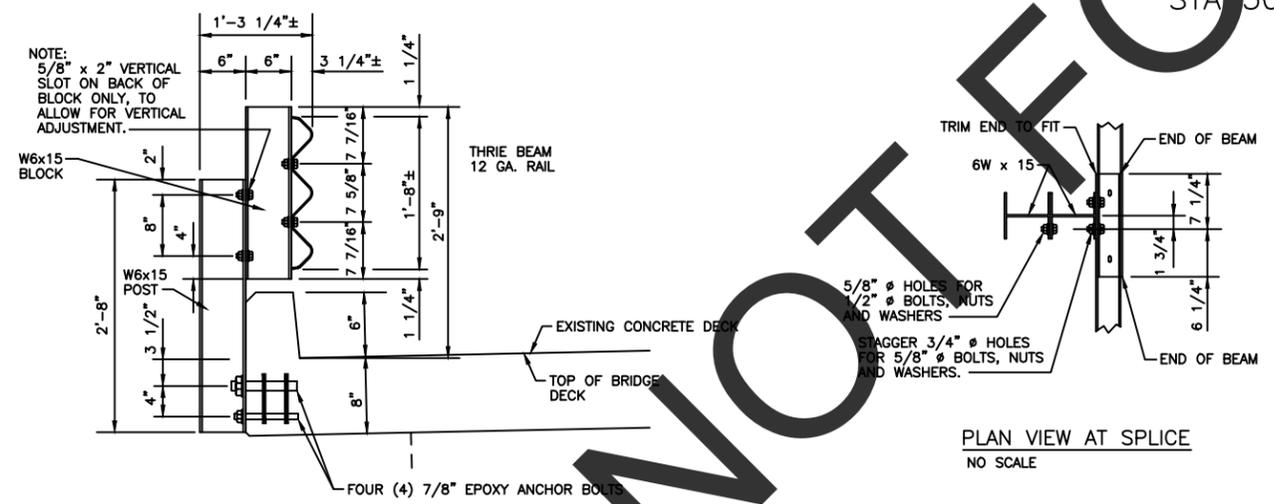
NOT TO SCALE
 CASS HIGHWAY 20 = "A"
 STA 50+72.00 TO 51+19.00

THRIE BEAM BRIDGE RAIL AND W BEAM GUARDRAIL SHALL CONFORM TO ALL APPLICABLE SECTIONS OF THE STANDARD SPECS. AND STANDARD DRAWINGS. THRIE BEAM TRANSITION TO BE INCLUDED IN PRICE BID FOR THRIE BEAM GUARDRAIL.



ELEVATION VIEW

NOT TO SCALE
 CASS HIGHWAY 20 = "A"
 STA 50+72.00 TO 51+19.00

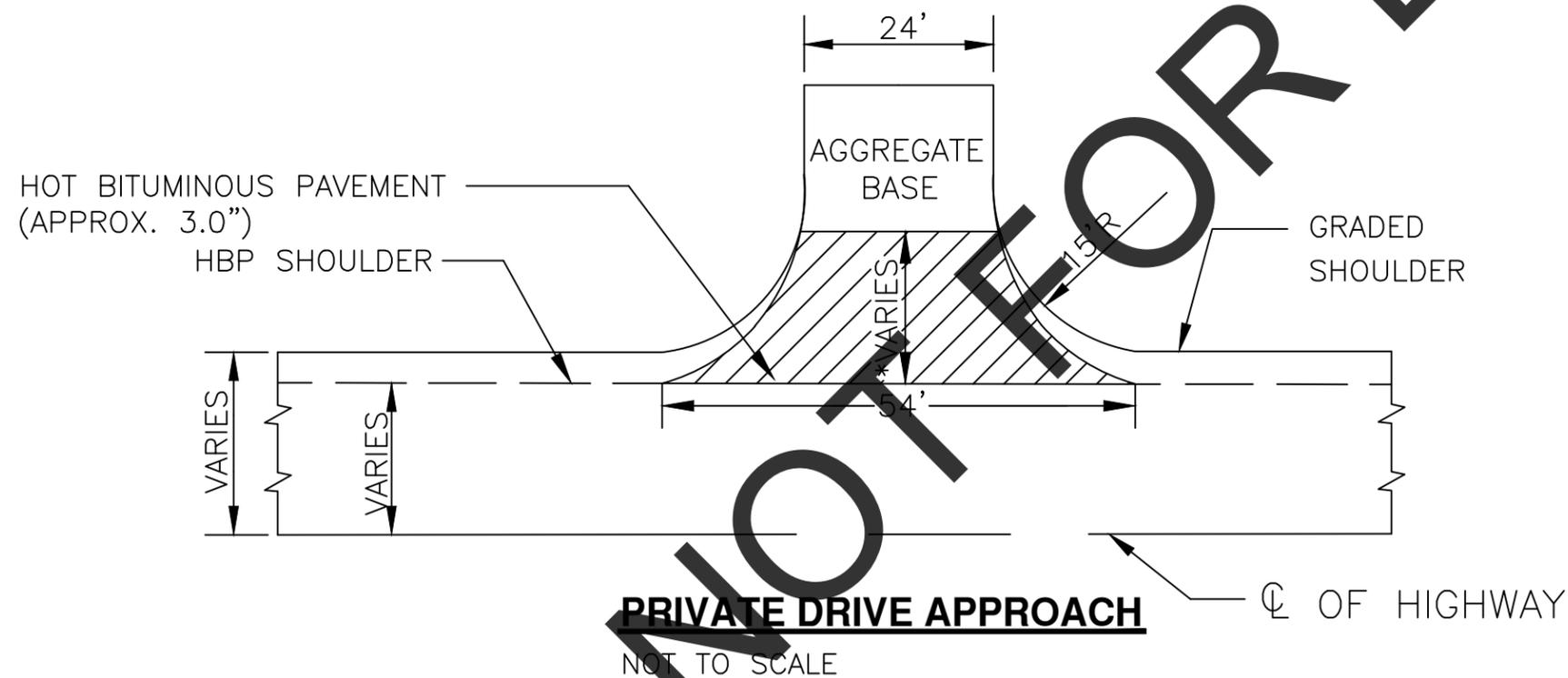
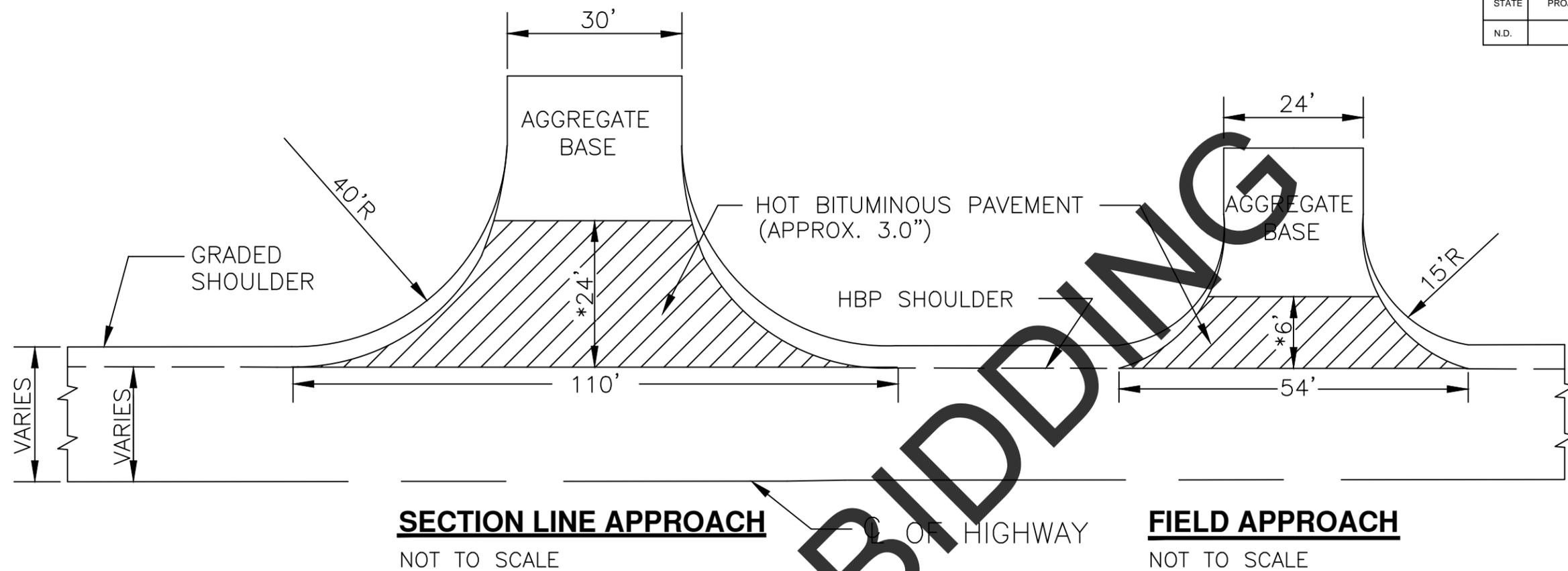


TYPICAL RAIL DETAILS

* ALL PATCHING AND EXCAVATION AROUND GUARDRAIL POSTS TO BE INCLUDED IN BID PRICE FOR "THRIE BEAM GUARDRAIL"

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--	--

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	37	43



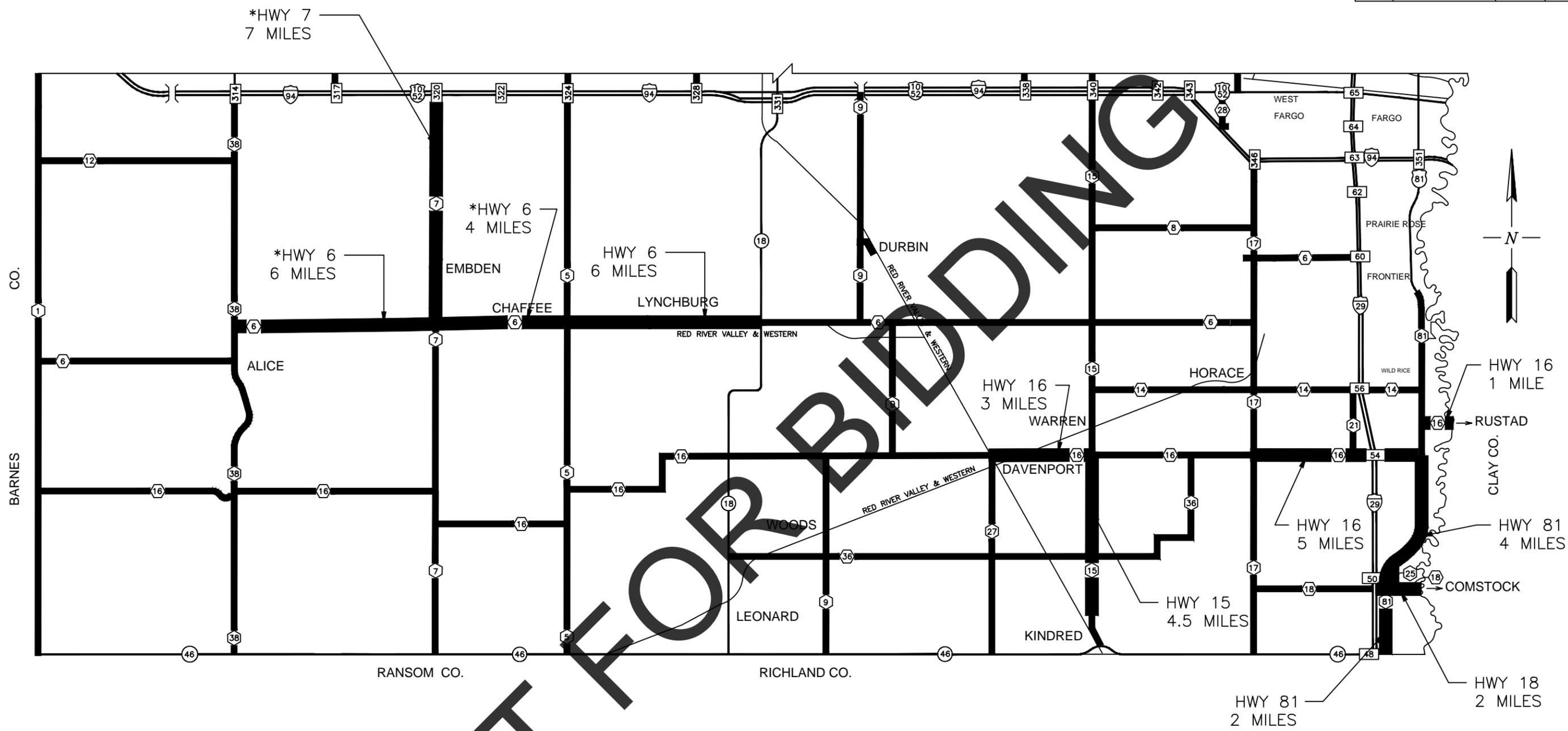
*** DIMENSIONS MAY VARY. ENGINEER IN FIELD SHALL DETERMINE EXACT LIMITS OF SURFACING AT ALL DRIVES AND APPROACHES.**

PLACEMENT OF APPROACH PVMT:
PAVEMENT FOR APPROACHES SHALL BE PLACED AHEAD OF THE MAINLINE TOP LIFT PAVING OPERATION. NO COLD JOINT WILL BE ALLOWED BETWEEN THE MAINLINE AND APPROACHES.

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 APPROACH DETAILS
 SHEET 37 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	38	43



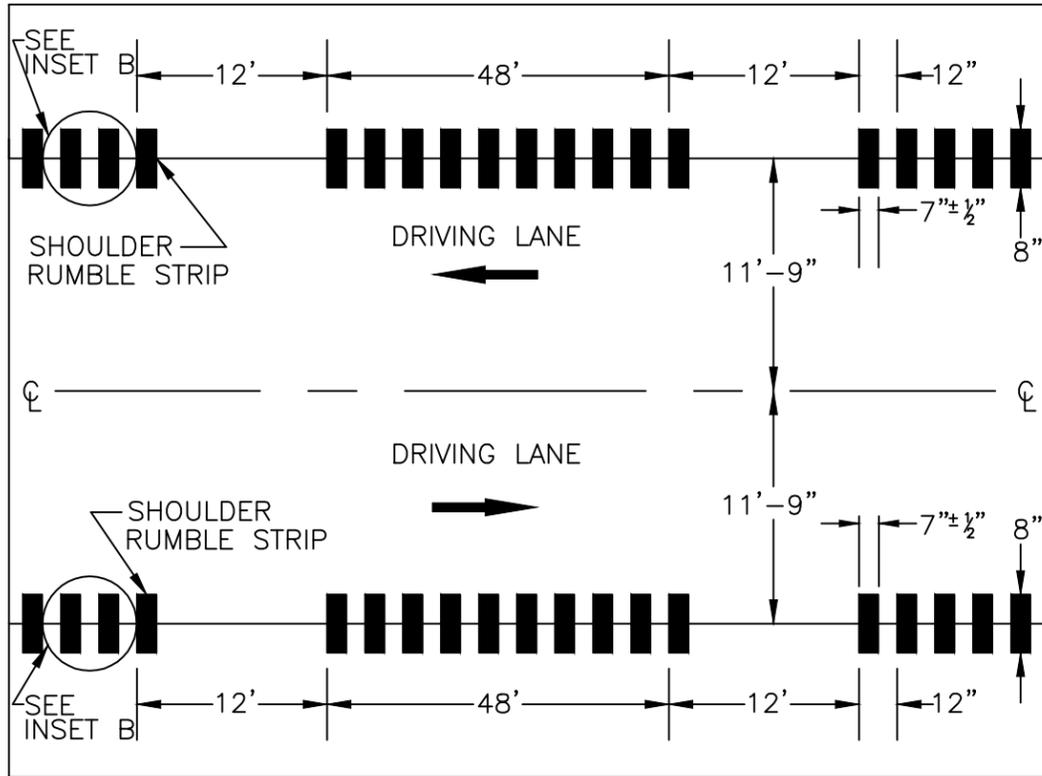
NOT FOR BIDDING

CASS COUNTY HIGHWAYS TO HAVE RUMBLE STRIPS ADDED
 ALL DISTANCES SHOWN ARE ROAD MILES
 DO NOT CUT RUMBLES IN SPEED ZONES OF LESS THAN 40 MPH
 *CASS HIGHWAY 6 & 7 FROM CASS HIGHWAY 38 TO CASS HIGHWAY 5
 MUST BE COMPLETED BY JUNE 1, 2014 FOR CHIPSEAL PROJECT

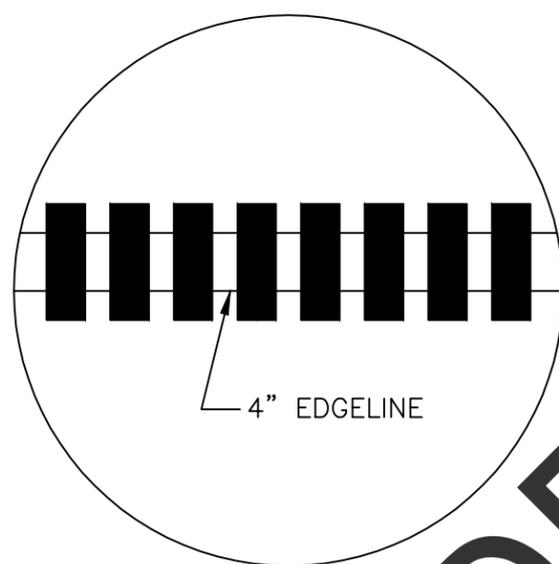
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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 RUMBLE STRIP LOCATIONS
 SHEET 38 OF 43

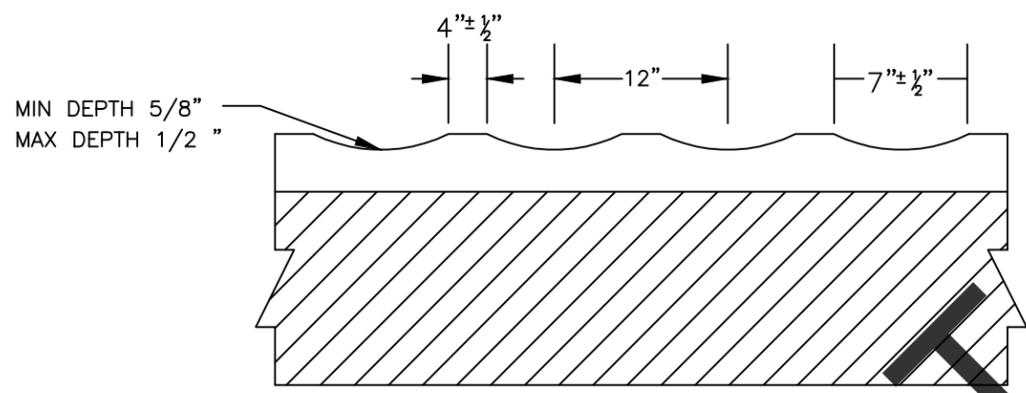
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	39	43



PLAN VIEW OF RUMBLE STRIPS



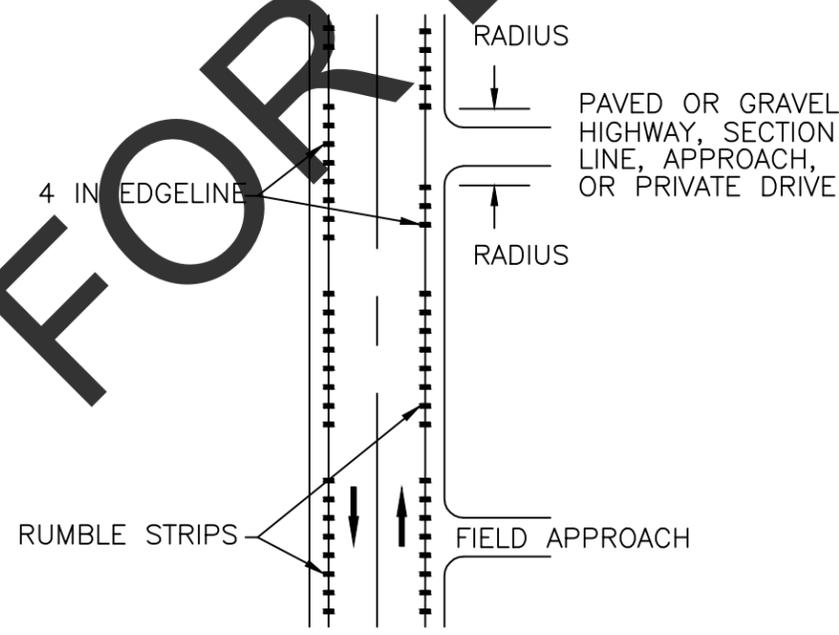
INSET B - SHOULDER RUMBLE STRIP



PROFILE VIEW OF RUMBLE STRIPS

RUMBLE STRIP DETAILS

NOT TO SCALE



ENTRANCE ROADWAYS

NOTES:

- 1) Rumble strips shall be milled into the bituminous paved shoulders. All milled materials shall be swept off of the driving lanes and paved shoulders using a mechanical sweeper. All costs for sweeping shall be included in the price bid for "RUMBLE STRIPS - ASPHALT SHOULDER."
- 2) Rumble strips milled into new or existing bituminous pavements shall be fog sealed across the full width of the milling with an application of SS-1h or CSS-1h emulsified asphalt at a rate of about 0.10 Gal/SY diluted 50/50 sprayed in both directions. All costs for fog sealing shall be included in the price bid for "RUMBLE STRIPS - ASPHALT SHOULDER."
- 3) Discontinue rumble strips across bridge decks and approach slabs, adjacent to guardrail, and 1/2 mile on either side of:
 - highways with posted speeds 40 mph or less
 - all urban areas
 - areas with curb and gutter
- 4) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
- 5) All costs associated with the use of a paint dribble line for rumble strip alignment shall be included in the "RUMBLE STRIPS - ASPHALT SHOULDER" bid item.

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 RUMBLE STRIP DETAILS
 SHEET 39 OF 43

TRAFFIC CONTROL LEGEND

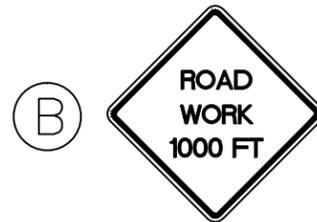
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	40	43

⇨ POST-MOUNTED SIGN

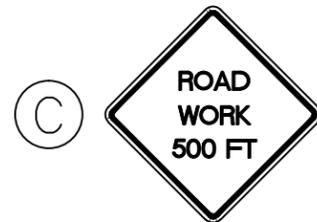
|| TYPE III BARR.



W20-1-48



W20-1-48



W20-1-48



G20-1a-60



G20-2a-48



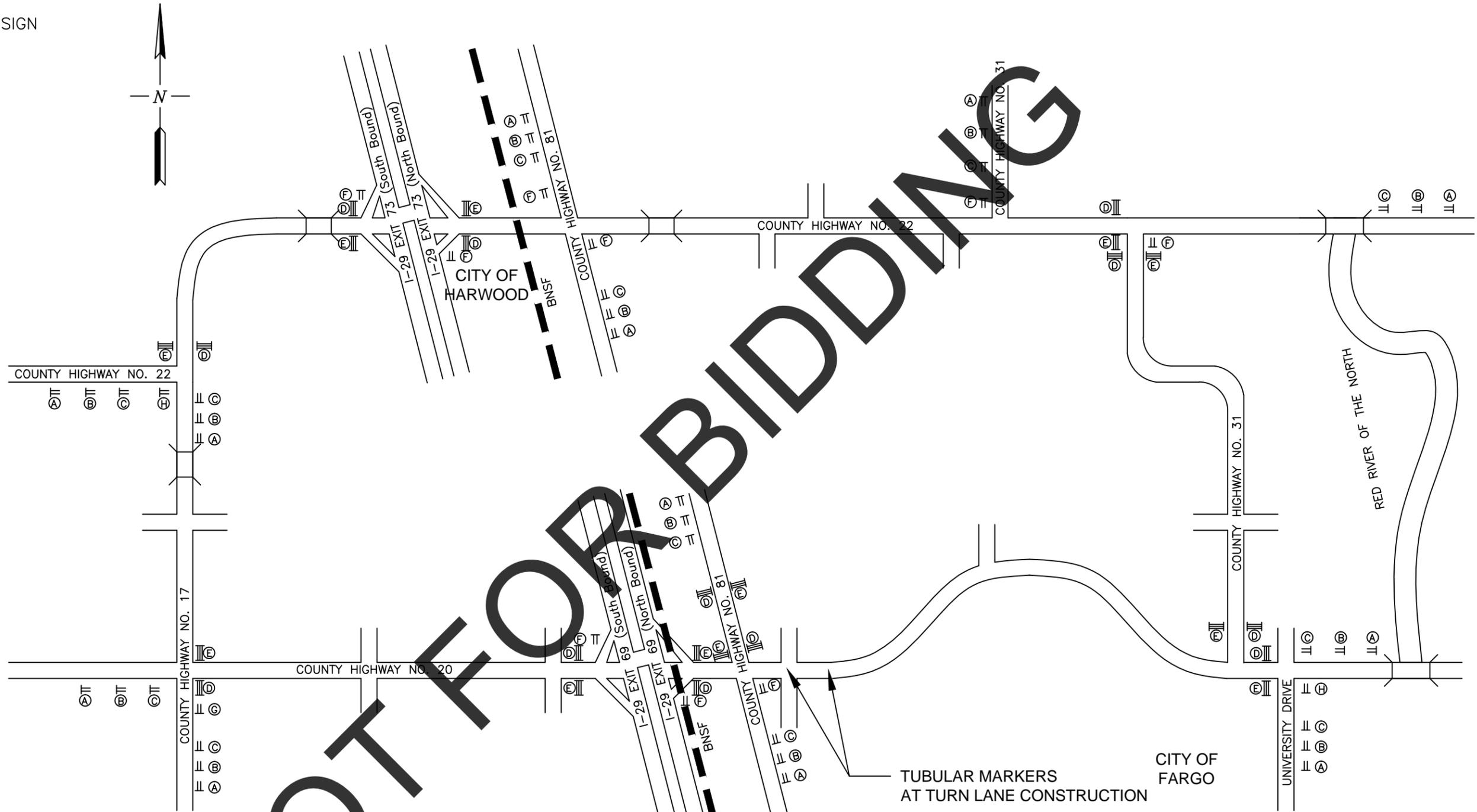
G20-50a-72



G20-52a-72



G20-52a-72



CONSTRUCTION SIGN LAYOUT

NOT TO SCALE

* NOTE: TRAFFIC CONTROL BID ITEM IS LUMP SUM AS PER NDDOT SPEC 704.04. B. SEE SIGN LIST ON SHEET 43 FOR SIGN QUANTITIES.

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 CONSTRUCTION SIGN LAYOUT
 SHEET 40 OF 43

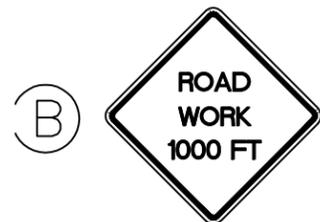
TRAFFIC CONTROL LEGEND

⇒ POST-MOUNTED SIGN

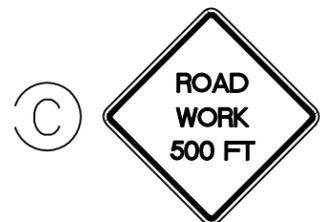
||| TYPE III BARR.



W20-1-48



W20-1-48



W20-1-48



G20-1a-60



G20-2a-48



G20-50a-72

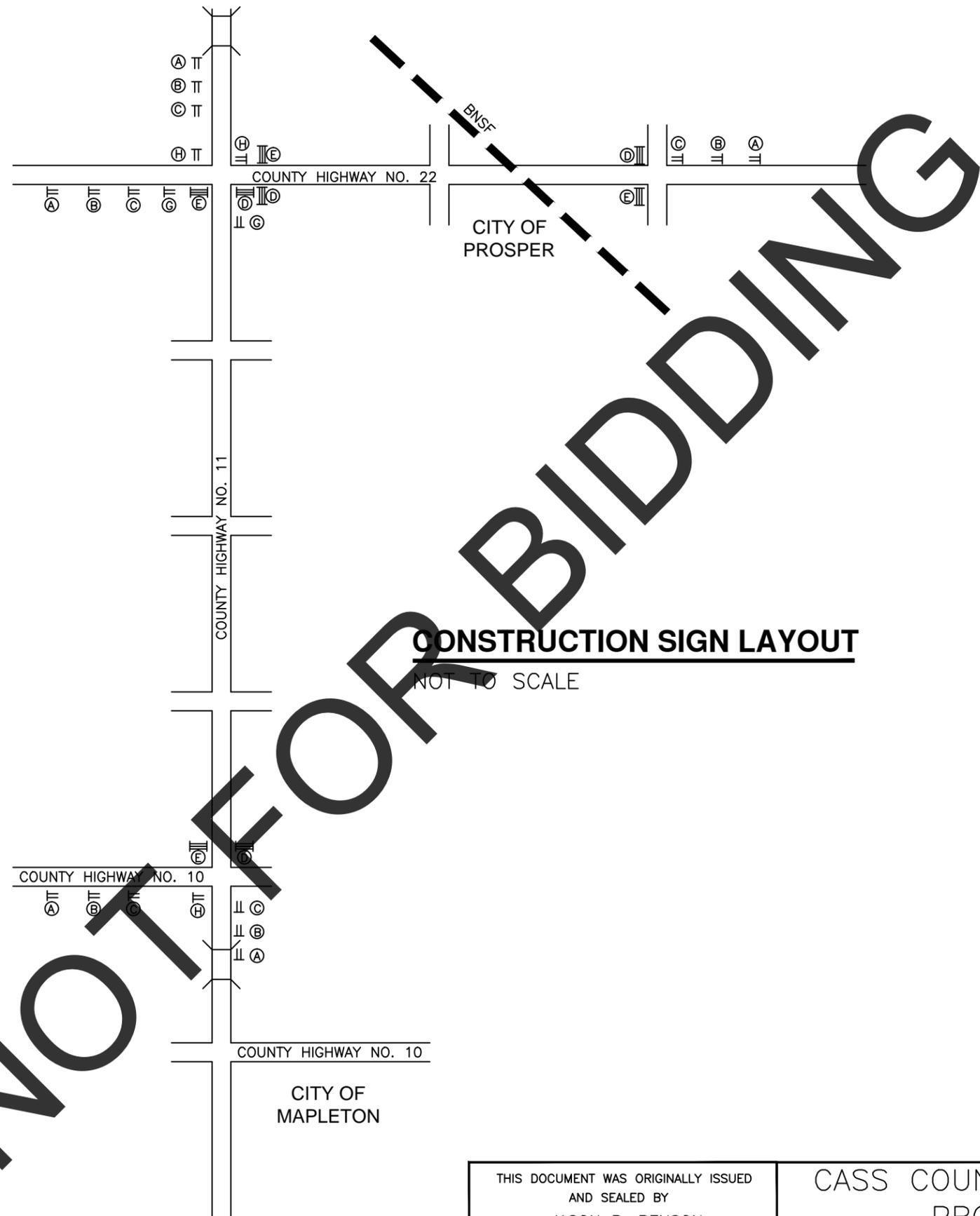


G20-52a-72



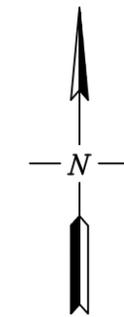
G20-52a-72

* NOTE: TRAFFIC CONTROL BID ITEM IS LUMP SUM AS PER NDDOT SPEC 704.04. B. SEE SIGN LIST ON SHEET 43 FOR SIGN QUANTITIES.



CONSTRUCTION SIGN LAYOUT

NOT TO SCALE



STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	41	43

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CASS COUNTY HIGHWAY DEPARTMENT
 PROJECT NO. CH1401
 CONSTRUCTION SIGN LAYOUT
 SHEET 41 OF 43

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1401	42	43



W21-4-48



R2-1-48



R2-1-48



G20-2a-48



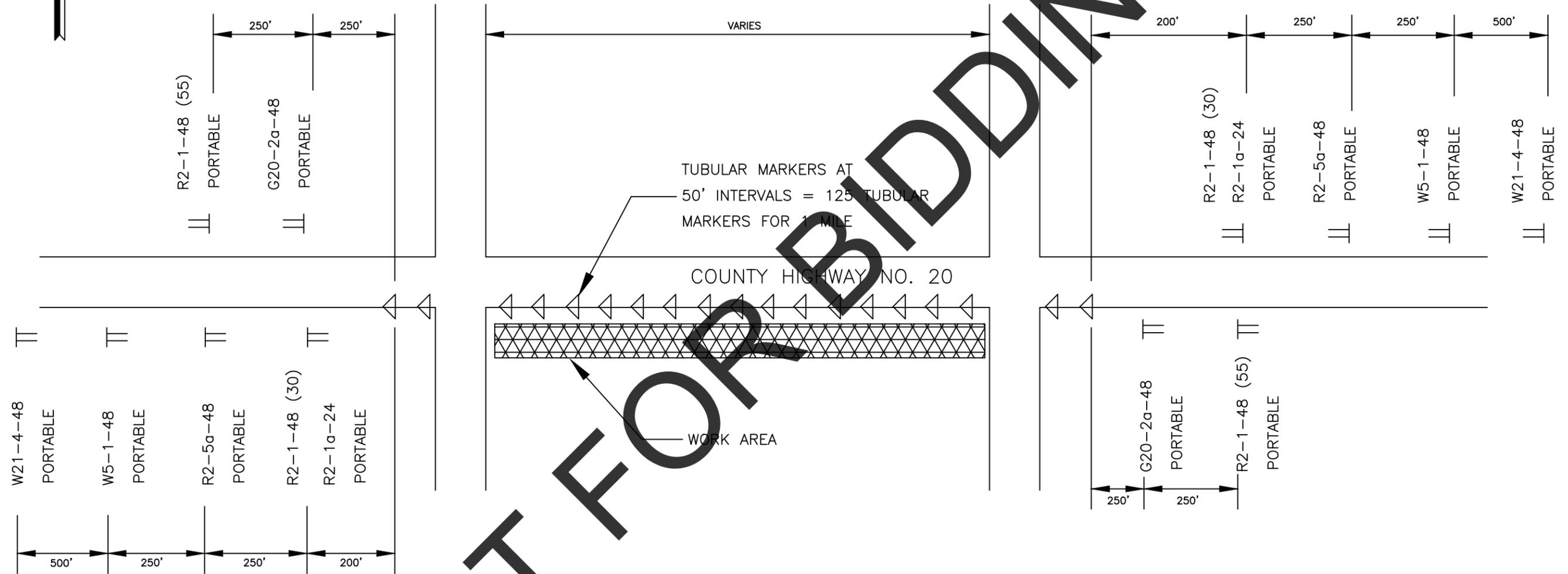
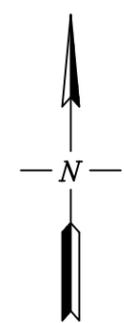
W5-1-48



R2-5a-48



R2-1a-24



NOT FOR BIDDING

SHOULDER WORK TRAFFIC CONTROL LAYOUT

NOT TO SCALE
CASS HIGHWAY 20 - "B"

*** NOTE: TRAFFIC CONTROL BID ITEM IS LUMP SUM AS PER NDDOT SPEC 704.04. B. SEE SIGN LIST ON SHEET 43 FOR SIGN QUANTITIES.**

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CASS COUNTY HIGHWAY DEPARTMENT
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CONSTRUCTION SIGN LAYOUT
SHEET 42 OF 43

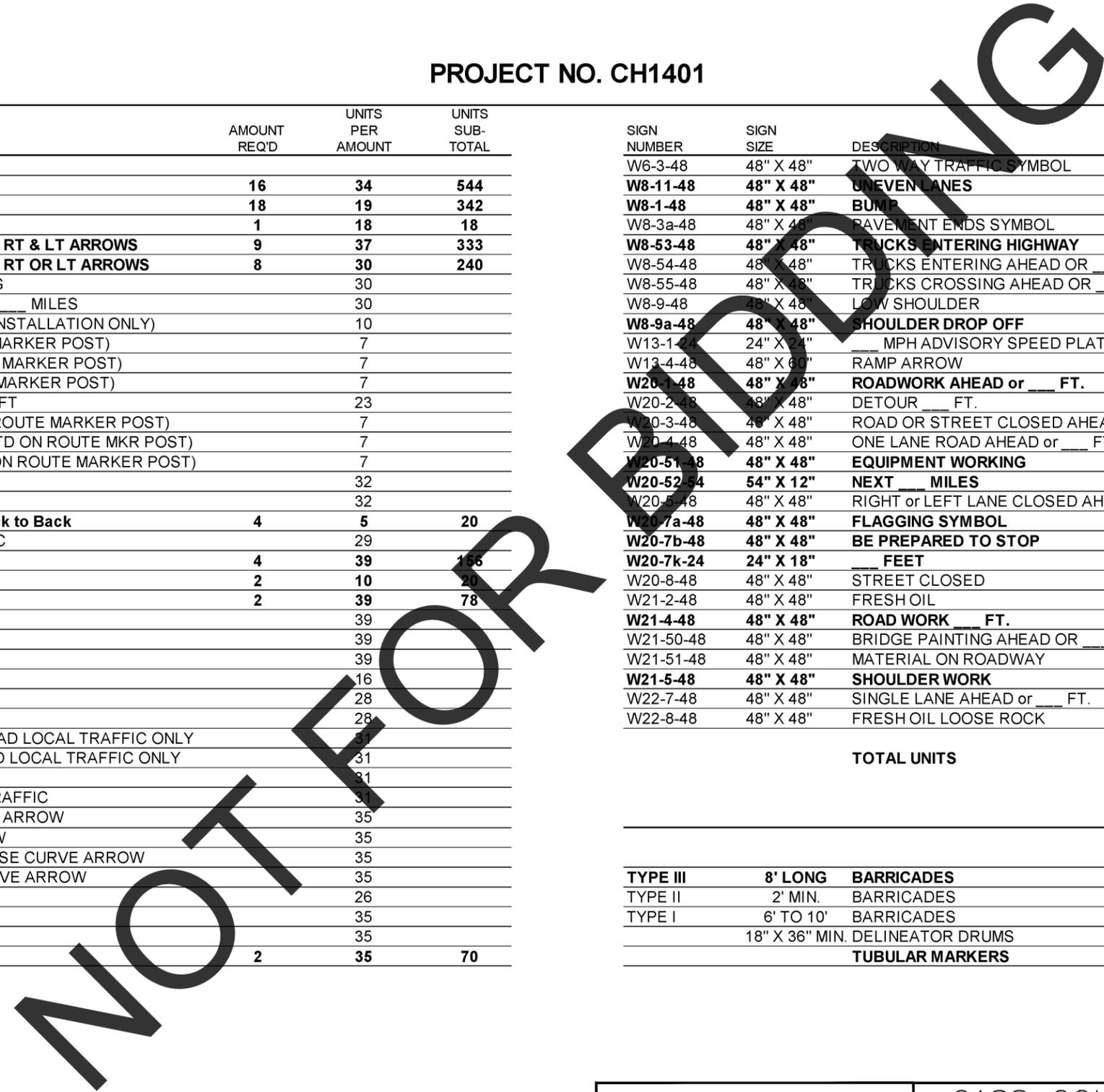
PROJECT NO. CH1401

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQ'D	UNITS PER AMOUNT	UNITS SUB-TOTAL
G20-1a-60	60" X 24"	ROAD WORK NEXT ___ MILES	16	34	544
G20-2a-48	48" X 24"	END ROAD WORK	18	19	342
G20-4-36	36" X 18"	PILOT CAR FOLLOW ME	1	18	18
G20-50a-72	72" X 36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS	9	37	333
G20-52a-72	72" X 24"	ROAD WORK NEXT ___ MILES RT OR LT ARROWS	8	30	240
G20-54-48	48" X 36"	OVERHEAD BRIDGE PAINTING		30	
G20-8-48	48" X 36"	TEMPORARY SURFACE NEXT ___ MILES		30	
M1-4-24	24" X 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)		10	
M3-2-24	24" X 12"	EAST (MOUNTED ON ROUTE MARKER POST)		7	
M3-3-24	24" X 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)		7	
M3-4-24	24" X 12"	WEST (MOUNTED ON ROUTE MARKER POST)		7	
M4-10-48	48" X 18"	DETOUR ARROW RIGHT or LEFT		23	
M4-8-24	24" X 12"	DETOUR (MOUNTED ON THE ROUTE MARKER POST)		7	
M5-1-21	21" X 15"	ARROW AHD AND RT or LT (MTD ON ROUTE MKR POST)		7	
M6-1-21	21" X 15"	ARROW RT or LT (MOUNTED ON ROUTE MARKER POST)		7	
R1-1-48	48" X 48"	STOP		32	
R1-1-30	30" X 30"	STOP		32	
R1-1a-18	18" X 18"	STOP and SLOW PADDLE Back to Back	4	5	20
R1-2-48	48" X 48"	YIELD TO ONCOMING TRAFFIC		29	
R2-1-48	48" X 60"	SPEED LIMIT	4	39	156
R2-1a-24	24" X 24"	MINIMUM FEE \$80	2	10	20
R2-5a-48	48" X 60"	SPEED ZONE AHEAD	2	39	78
R4-1-48	48" X 60"	DO NOT PASS		39	
R4-7-48	48" X 60"	KEEP RIGHT SYMBOL		39	
R4-8-48	48" X 60"	KEEP LEFT SYMBOL		39	
R10-6-48	48" X 72"	STOP HERE ON RED		16	
R11-2-48	48" X 30"	ROAD CLOSED		28	
R11-2a-48	48" X 30"	STREET CLOSED		28	
R11-3a-60	60" X 30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3b-60	60" X 30"	BRIDGE OUT ___ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-48	60" X 30"	STREET CLOSED		31	
R11-4a-60	60" X 30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-1-48	48" X 48"	RIGHT or LEFT SHARP CURVE ARROW		35	
W1-2-48	48" X 48"	RIGHT or LEFT CURVE ARROW		35	
W1-3-48	48" X 48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48" X 48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48" X 24"	LARGE ARROW		26	
W3-1a-48	48" X 48"	STOP AHEAD SYMBOL		35	
W3-2a-48	48" X 48"	YIELD AHEAD SYMBOL		35	
W5-1-48	48" X 48"	ROAD NARROWS	2	35	70

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQ'D	UNITS PER AMOUNT	UNITS SUB-TOTAL
W6-3-48	48" X 48"	TWO WAY TRAFFIC SYMBOL		35	
W8-11-48	48" X 48"	UNEVEN LANES	10	35	350
W8-1-48	48" X 48"	BUMP	10	35	350
W8-3a-48	48" X 48"	PAVEMENT ENDS SYMBOL		35	
W8-53-48	48" X 48"	TRUCKS ENTERING HIGHWAY	6	35	210
W8-54-48	48" X 48"	TRUCKS ENTERING AHEAD OR ___ FT.		35	
W8-55-48	48" X 48"	TRUCKS CROSSING AHEAD OR ___ FT.		35	
W8-9-48	48" X 48"	LOW SHOULDER		35	
W8-9a-48	48" X 48"	SHOULDER DROP OFF	6	35	210
W13-1-48	24" X 24"	___ MPH ADVISORY SPEED PLATE		11	
W13-4-48	48" X 60"	RAMP ARROW		39	
W20-1-48	48" X 48"	ROADWORK AHEAD or ___ FT.	51	35	1785
W20-2-48	48" X 48"	DETOUR ___ FT.		35	
W20-3-48	48" X 48"	ROAD OR STREET CLOSED AHEAD or ___ FT.		35	
W20-4-48	48" X 48"	ONE LANE ROAD AHEAD or ___ FT.		35	
W20-51-48	48" X 48"	EQUIPMENT WORKING	6	35	210
W20-52-54	54" X 12"	NEXT ___ MILES	6	12	72
W20-5-48	48" X 48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.		35	
W20-7a-48	48" X 48"	FLAGGING SYMBOL	6	35	210
W20-7b-48	48" X 48"	BE PREPARED TO STOP	6	35	210
W20-7k-24	24" X 18"	___ FEET	6	10	60
W20-8-48	48" X 48"	STREET CLOSED		35	
W21-2-48	48" X 48"	FRESH OIL		35	
W21-4-48	48" X 48"	ROAD WORK ___ FT.	2	35	70
W21-50-48	48" X 48"	BRIDGE PAINTING AHEAD OR ___ FT.		35	
W21-51-48	48" X 48"	MATERIAL ON ROADWAY		35	
W21-5-48	48" X 48"	SHOULDER WORK	10	35	350
W22-7-48	48" X 48"	SINGLE LANE AHEAD or ___ FT.		35	
W22-8-48	48" X 48"	FRESH OIL LOOSE ROCK		35	

TOTAL UNITS **5,908**

		SPEC&CODE	
TYPE III	8' LONG BARRICADES	EACH	704-1000
TYPE II	2' MIN. BARRICADES	EACH	704-1052 32
TYPE I	6' TO 10' BARRICADES	EACH	704-1051
	18" X 36" MIN. DELINEATOR DRUMS	EACH	704-1050
	TUBULAR MARKERS	EACH	704-1060
			704-1067 125



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