STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	1	26

CASS COUNTY HIGHWAY DEPARTMENT

PLANS

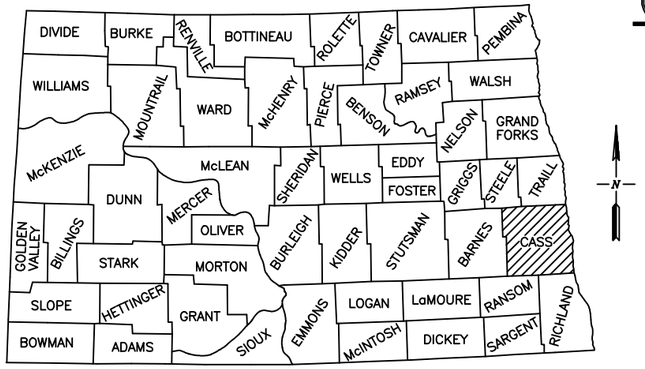
FOR THE PROPOSED IMPROVEMENT OF A

COUNTY HIGHWAY

COUNTY PROJECT NO. CH1301

GRADING & BITUMINOUS SURFACING

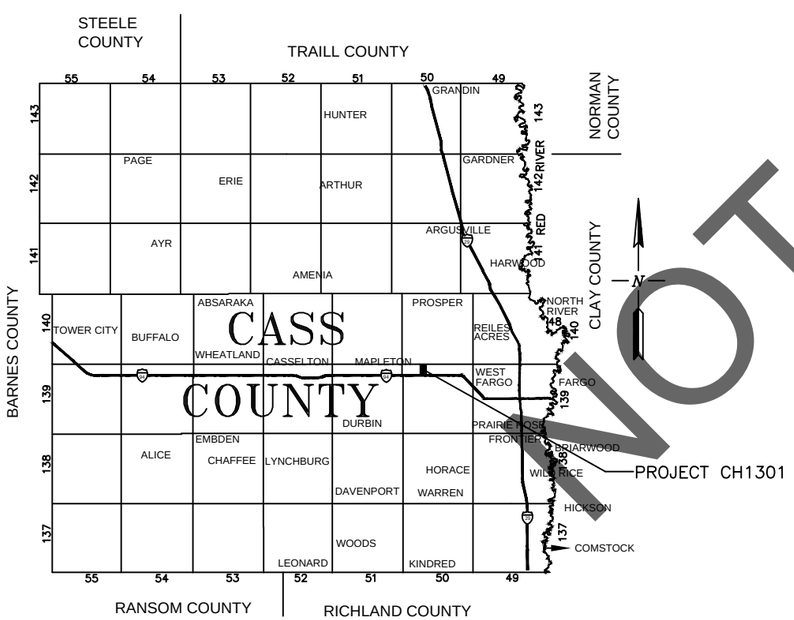
CASS CO. HWY 15; FROM INTERSTATE 94 EXIT 340 TO CASS CO. HWY 10



SKETCH MAP OF NORTH DAKOTA SHOWING COUNTIES

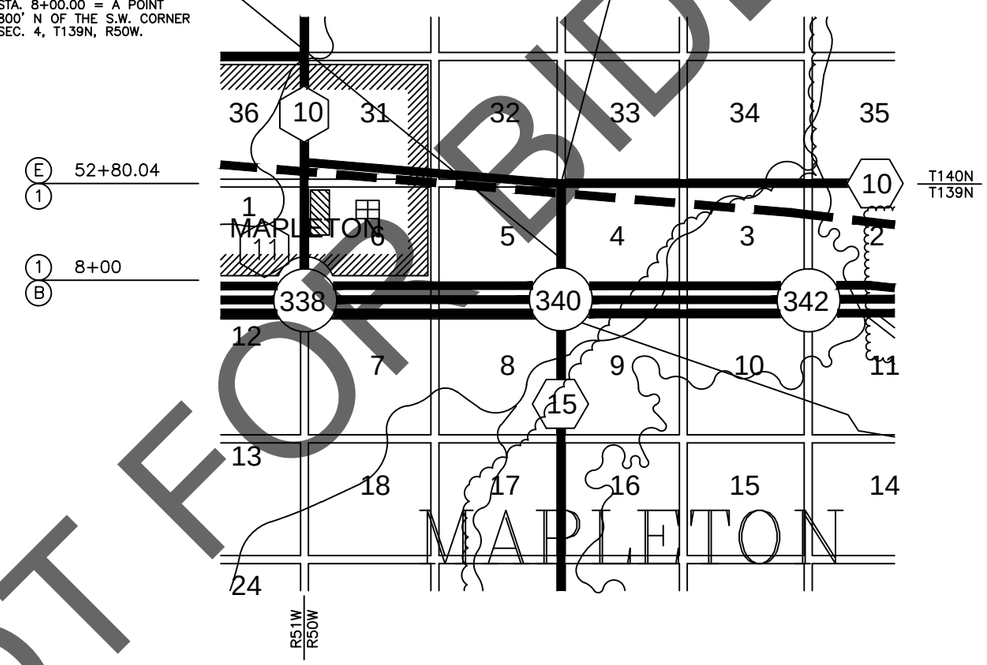
TRAFFIC	CURRENT (2013)		FORECAST (2033)	
C-15 FROM I-94 TO C-10	PASS	350	PASS	625
	TRUCKS	25	TRUCKS	50
	TOTAL	375	TOTAL	675

DESIGN SPEED	65 MPH
MINIMUM SIGHT DISTANCE (STOPPING)	645 FEET
SUPERELEVATION	.05 FT/FT
HIGHWAY CROSS SLOPE	2.1%



BEGIN PROJECT CH1301
STA. 8+00.00 = A POINT
800' N OF THE S.W. CORNER
SEC. 4, T139N, R50W.

END PROJECT CH1301
STA. 52+80.04 = N.W. CORNER
SEC. 4, T139N, R50W.



GOVERNING SPECICATIONS:
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.

INDEX OF DRAWINGS

SHEET NO.	TITLE
1	COVER SHEET
2–4	CONSTRUCTION NOTES
5–6	BASIS OF ESTIMATE
7	ESTIMATED QUANTITIES
8–12	TYPICAL SECTIONS
13	CULVERT DETAILS
14	APPROACH DETAILS
15	INTERSECTION DETAILS
16	RUMBLE STRIP DETAILS
17–18	CONSTRUCTION SIGNING
19–20	PLAN AND PROFILE
21–26	CROSS SECTIONS

STANDARD DRAWINGS

NUMBER	TITLE
D–704–7,8,9,10, 11,12,13,14,15 20,22,26,56	CONSTRUCTION SIGNING & BARRICADE DETAILS
D–714–1,4,5,22	CULVERT DETAILS
D–762–4	PAVEMENT MARKING
D–762–6	SHORT TERM PVMT. MARKING

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

LENGTH OF PROJECT

PROJECT	MILES GROSS	MILES NET
SECTION	0.715	0.715

DESIGN JANUARY 2014

NOT FOR BIDDING

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY
JASON P. BENSON
N.D. REG. NO. 7490
ON 01/24/2014 AND THE ORIGINAL DOCUMENT IS STORED AT THE CASS COUNTY HIGHWAY DEPARTMENT, WEST FARGO, ND

CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301

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

DATE: _____

JASON P. BENSON N.D. REG. NO. 7490

J:\Admin-Eng\PROJECTS\C-15 N of I-94 Grading\c15N of I94 Grading Plans.dwg

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	2	26

GENERAL PROVISIONS:
Quantities are rounded to the nearest whole unit for bidding purposes.

The cost of items on the plans, but not listed in the estimate of quantities, shall be included in the unit price for various items.

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 at 71–087M. 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.

EARTHWORK:
Forty five percent (45%) additional volume in yardage computed by the average end area method is allowed for shrinkage in the earth embankment. Additional material for approaches and entrances has been added to the project.

Payment for "COMMON EXCAVATION – TYPE A" shall be in accordance with section 203.03B of the Standard Specification. Average haul has not been computed for this project.

The bid item for "COMMON EXCAVATION _ TYPE A" shall also include all costs associated with undercutting the ditch bottom 0.33 feet to allow for topsoil placement.

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 "BORROW – EXCAVATION".

COMMON EXCAVATION – WASTE:
This item includes all costs associated to excavate and dispose of material removed from the NDDOT Right of Way ditches, to construct a ditch bottom 10' wide, with approximate 3:1 backslopes. Estimated quantity is 674 CY. Disposal site shall be off the project limits and approved by the Engineer. Pay quantity based on truck load counts.

TOPSOIL:
All excavation and embankment areas shall require removal and placement of topsoil (4" minimum depth) as shown in the typical sections. Removed topsoil shall be stockpiled on the right of way at designated acceptable locations outside the grading limits. If topsoil is placed before paving is complete, excess topsoil shall be stockpiled along the shoulders to be used to cover the Class 5 and pavement to the top of the asphalt slough. All costs to complete shall be included in price bid for "TOPSOIL." The following quantities are included in the bid item for "TOPSOIL":

STA 13+00 TO STA 52+80 7,324 CY

TOPSOIL – IMPORTED:
Bid item is for topsoil to be imported and placed on aggregate inslope and asphalt slough. Approximately 4"–6" deep and 10' wide shall be placed over graded section, with additional topsoil placed on existing NDDOT right of way. Pay quantity based on truck load counts. Following quantities are included in bid item for "TOPSOIL – IMPORTED":

STA 13+00 TO STA 52+80 2,037 CY

REMOVAL OF EXISTING CULVERTS:
All culverts removed on the project shall become the property of the contractor. Disposal shall be at a location off the project determined by the contractor and approved by the engineer. All costs associated with removal, including excavation for culverts, shall be included in the price bid for the new culverts to replace the culverts removed. Also included shall be all costs associated with removal and disposal of any existing aprons, flap gates or other attached appurtenances.

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."

SS–1H, CSS–1H, OR MS–1 EMULSIFIED ASPHALT:
This item shall be included in the unit cost for "SUPERPAVE FAA 42." The approximate quantity required for this project is: 1,591 Gallons at 0.05 GAL/SY.

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

HOT BITUMINOUS PAVEMENT:
The hot bituminous pavement shall be placed in three lifts. The base course shall be paver laid to an approximate thickness of 3" using PG 58–28 asphalt cement. The intermediate course shall be paver laid to an approximate thickness of 2.5" using PG 58–28 asphalt cement. The hot bituminous pavement shall be placed and accepted according to NDDOT Standard Specification (Section 410).

The wear course shall be paver laid to an approximate thickness of 1.5" using PG 58–28 asphalt cement. The hot bituminous pavement shall be placed and accepted according to NDDOT Standard Specifications (Section 410).

All compaction equipment shall meet the NDDOT Standard Specification 151.02.

All hot bituminous mix and asphalt cement required for all three 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.

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. 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.

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 or seal coat shall be placed after the final rolling, while the bituminous pavement is still warm.

This item shall be included in the unit cost for "SUPERPAVE FAA 42." The approximate quantity required for this project is 1,013 Gallons.

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
CONSTRUCTION NOTES
SHEET 2 OF 26

BORROW – EXCAVATION:
This item shall include all costs required transport and compact borrow material from the borrow source to the project site.

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, # Gyrations	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

PLACEMENT OF CLASS 5 AGGREGATE:
The Contractor shall be responsible for the direction, placement (Dumpman) and coordination of aggregate trucks.

RECYCLED ASPHALT PAVEMENT (RAP) and MILLING PAVEMENT SURFACE:
Contractor shall incorporate millings in bituminous mix from Cass County Highway Department project CH1401 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.

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.

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 18 for device listing), flagging and pilot car. Flagging hours are estimated at 78 hours for the project, Pilot Car hours are estimated at 39 hours for the project.

The traffic control layout shown in the plans represents the minimum signing required for the project. Additional signs may be required by the Engineer if the contractors operations create a hazard to the traveling public. Any additional signing shall be installed at the contractor's expense with no additional compensation.

The contractor shall leave the work area free of all hazards during non–working hours. If a hazard exists after working hours, the contractor shall provide signing or traffic control at their own expense until the hazard has been eliminated.

Any proposed changes or additions must conform to the Manual of Uniform Traffic Control Devices (MUTCD – Latest Edition) and be approved by the Engineer.

PREFORMED PATTERENED PVT MK–MESSAGE (GROOVED):
Railroad crossing messages as detailed on Standard Drawing D–762–1 shall be installed each way from the railroad crossings at STA. 26+43. The messages 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.

SEEDING:
Seeding Type B Class V shall meet the requirements of Section 708 of the Standard Specifications. Except that the minimum amount of live seed per acre shall be modified as follows:

A–1 Pasture Mix
Meadow Bromegrass – 25%
Intermediate Wheatgrass – 25%
Crested Wheatgrass – 25%
Tetraploid Int. Ryegrass – 10%
Creeping Alfalfa – 15%

80 lbs of Seed and 20 lbs of Rye per acre.

Basis of payment for seeding shall be actual field measurements. No adjustment to unit prices will be made for the increase or decrease in Seeding or Mulching. All costs for labor, equipment and materials necessary to complete the work will be included in the bid price for "SEEDING – TYPE B – CLASS V and "MULCHING".

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.

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

ROAD MAINTENANCE AND CENTERLINE CULVERT INSTALLATION:
The Contractor shall be responsible for maintaining the roadway and driveways so that they remain accessible to local residents and emergency vehicles at all times whether construction is in progress or not in progress. Installation and backfilling to a height for safe passage of traffic must be completed prior to sundown on the same day as the installation was started. The trench class 5 aggregate shall be paid for by the (TON). The cost of the reinforcing fabric shall be included in the culvert items. The contractor shall verify the depth of culverts in the field before the works starts. See detail on sheet 13 for centerline culvert detail.

NOT FOR BIDDING

CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
CONSTRUCTION NOTES
SHEET 3 OF 26

SELECT BACKFILL:

The class 5 aggregate backfill shall be compacted in layers not to exceed 6 inches using a hand–held vibratory plate compactor or hand–held mechanical tamper to the top pipe a distance of two feet on either side of the pipe. All equipment shall be operated to produce a uniform density throughout the entire section. The desired degree of compaction will be considered obtained when the surface is tightly bound and show no rutting or displacement under equipment operation. Water shall be applied as needed to secure required results. All other aggregate pertaining to pipe culverts shall be placed according to Section 203.02H. Plan quantity includes 25% shrinkage.

WATER:

Water required to achieve the optimum moisture content will be considered incidental to the price bid for the stabilization process. Also, any water required for the roadway shaping of the existing aggregate and the additional Class 5 aggregate materials.

PORTLAND CEMENT:

This item shall include all costs associated Portland Cement required for this project. The estimated quantity is 6% by weight. Certifications will be required for this material. This item will be paid per the actual tons of material required by the mix design for necessary field changes to be approved by the engineer in the field.

STABILAZATION:

This item shall include all costs associated with stabilization of the center 1' X 26' of subgrade with Portland cement. This item shall also include all costs associated with restoring the subgrade back to the bluetop elevations and 2.1% cross slope.

EQUIPMENT FOR SUBGRADE REPAIR:

The Road Reclaimer – The Contractor shall furnish a self–propelled machine designed to blend together the remaining in–place aggregate and subgrade. It shall be capable of uniformly blending the material to the depth of 12" or as directed by the Engineer. The width required to be stabilization is 26' for mainline and truck inspection locations at STA 15+50 to STA 18+75, therefore the machine would be required to make the necessary number of passes.

The control system shall be capable of fully automated operation, as well as manual operation, when injecting the liquids to be addmixed. All functions shall be controlled from the operators' station including automatic nozzle cleaning, partial spray bar use, and on–the–fly changes to the quantities of material being added. Non contact flow meters shall be employed to measure liquid volumes and the control systems shall be proportional to the machines advance speed and shall be capable of maintaining accurate mixing regardless of changes in the machines working speed.

All pumps shall be separately controlled by the automatic system in the operators' cabin. During automatic operation, the system will allow liquids to be added only when the machine is in motion.

There shall be a system allowing the operator to verify that the nozzles on the spray bars are open and working from the operators' cabin.

The pump shall spray liquid into the mixing chamber through a single spray bar with sixteen spray nozzles. The nozzles shall be self–cleaning and the operator shall be able to switch off any number of individual nozzles, for working at reduced widths, from the control console in the operators cabin.

All reclaimed materials and aggregates shall be mixed properly to provide a homogenous material prior to injecting the stabilizing agent. The Reclaiming Machine shall be capable of injecting the stabilizing agent and automatically metering it with a variation of not more than plus or minus 0.2 percent by weight of the stabilizing agent. The unit shall be equipped with facilities so that the Contractor can verify and calibrate these items by a method acceptable to the Engineer.

The Reclaimer shall be equipped with a system capable of adding a binding agent with water for material compaction, from bulk tankers, directly into the mixing chamber.

The pump shall be a positive displacement, eccentric shaft style with a minimum capacity of 210 gallons per minute, and shall be resistant to damage from the contaminants in the water or stabilizing agent.

The drop spreader truck shall be capable of accurately placing the cement in a uniform manner per the mix design requirements.

QUALITY CONTROL/QUALITY ASSURANCE:

A third party testing lab will be required for QC/QA testing. A nuclear gauge will be required to check and verify moisture before and after the cement is added. This will insure that the optimum moisture and density per the mix design requirements. A mix design will be required for this project prior to construction. The contractor will determine the number of field samples needed to get a good representative of the existing field conditions. The mix design shall be submitted to the engineer for approval.

The contractor must have an individual on site at all times capable of making decisions and recommendations to the Engineer as field conditions change throughout the project to assure the best possible product.

CONSTRUCTION SURVEY:

Cass County will provide the initial cut and fill stakes at the right of way lines at each station, approximately 4 benchmarks per mile, and initial inlet and outlet stakes for all culverts only. All other survey work to necessary to construct the project to the lines, grade and typical sections shown on the plans shall be the responsibility of the contractor.

The lump sum bid item "CONSTRUCTION SURVEY" only covers the final blue top hubs at the road centerline, LT & RT shoulders and LT & RT ditches at each full station and elevation shots on the inlets and outlets of all culverts to verify they are set at the correct grade between STA 8+00 to STA 52+80.

The Contractor shall provide the Engineer with copies of the "blue top" survey notes. These survey notes shall include verification of the finished roadway, ditch, and culvert elevations and will include any corrective actions taken to repair errors in the construction of the roadway or ditches. The survey notes shall be signed and dated by the individual in charge of the survey.

Payment for construction survey shall be as follows: The percentage of the original contract amount earned on each progressive estimate shall be the percentage of the amount bid for construction surveying paid up to 95% the amount bid. The remaining 5% will be paid upon final acceptance of the project.

A TIN file of the roadway will be made available to the Contractor if machine control used. Survey item will still be employed to verify the final blue top elevations and inlets and outlets of all the culverts with use of machine control.

CRUSHED CONCRETE:

Salvaged or reclaimed concrete will be used for aggregate base and shoulder material. The salvaged or reclaimed concrete must meet gradation requirements found in section 817.02 of the standard specifications:

SIEVE SIZE	PERCENT PASSING
1–1/2"	100
1"	90–100
NO. 4	35–85
NO. 30	16–50
NO. 200	0–12

Plan quantity includes 25% shrinkage.

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
CONSTRUCTION NOTES
SHEET 4 OF 26

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	5	26

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%
SHRINKAGE FOR COMMON EXCAVATION	45%
HOT BITUMINOUS PAVEMENT	2 TON/CY
PG 58-28 ASPHALT CEMENT	5.0% OF HBP BY WEIGHT
EMULSIFIED ASPHALT FOR TACK COAT	0.05 GAL/SY
WATER	
AGGREGATE BASE CLASS 5 COMPACTION	30 GAL/TON
AS A DUST PALLATIVE ON HAUL ROADS	30 M GAL PER DAY OF HAULING
	(ESTIMATED TO BE 5 DAYS)

PAVING TONNAGE ESTIMATE CASS 15

TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	8+00	13+50	550	26	14,300	2	177
MAINLINE	13+00	13+50	50	26	1,300	4	32
SHOULDER	13+00	13+50	50	8	400	4	10
MAINLINE	13+50	15+50	200	24	4,800	4	119
SHOULDER	13+50	15+50	200	14	2,800	4	69
MAINLINE	15+50	52+80	3,730	26	96,980	7	4,190
SHOULDER	18+75	52+80	3,405	12	40,860	4	1,009
EAST SHOULDER	15+50	18+75	325	5	1,625	4	40
WEST SHOULDER	15+50	18+75	325	12	3,900	7	169
						TOTAL	**5,815**
						10% OVERAGE	**582**
						APPROACHES/INT	**100**
						GRAND TOTAL	**6,497**

BASIS OF ESTIMATE (SURFACING APPROACHES)

DESCRIPTION	PRIVATE DRIVE (1 EA)		SECTION LINE (0 EA)		FIELD APPROACH (2 EA)	
HOT BITUMINOUS PVMT.	20	TON	20	TON	8	TON
PG 58-28 ASPHALT CEMENT	1	TON	1	TON	0.4	TON
AGGREGATE BASE - CLASS 5	23	TON	23	TON	23	TON
EMULS. ASPH. FOR TACK COAT	10	GAL.	15	GAL.	10	GAL.

BASIS OF ESTIMATE (SURFACING INTERSECTIONS)

DESCRIPTION	HWY 15 & HWY 10	
HOT BITUMINOUS PVMT.	100	TON
PG 58-28 ASPHALT CEMENT	5	TON
EMULS. ASPH. FOR TACK COAT	60	GAL.
EMULS. ASPH. FOR FOG COAT	30	GAL.

PAVEMENT MARKING QUANTITIES

START STA	END STA	LANE	4" YELLOW TEMPORARY (2 LIFTS) SKIP (L.F.)	4" YELLOW TEMPORARY (2 LIFTS) NPZ (L.F.)	4" PERMANENT MARKING 4" SKIP (L.F.)	4" PERMANENT MARKING 4" NPZ (L.F.)	4" PERMANENT MARKING 4" WHITE (L.F.)	4" PERMANENT MARKING TOTAL 4" (L.F.)
8+00	52+80		1,120		1,120		8,960	10,080
33+40	41+40	RT		800		800		
41+40	49+40	LT		800		800		
47+80	52+80	RT		500		500		
SINGLE LIFT TOTALS =			1,120	2,100	1,120	2,100	8,960	10,080
MULTI LIFT TOTALS=			3,360	6,300				10,080

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PROJECT NO. CH1301
BASIS OF ESTIMATE
SHEET 5 OF 26

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	6	26

Station	Cut Area (Sq.ft.)	Cut Volume (Cu.yd.)	Reusable Volume (Cu.yd.)	Fill Area (Sq.ft.)	Fill Volume (Cu.yd.)	Cum. Cut Vol. (Cu.yd.)	Cum. Fill Vol. (Cu.yd.)	Cum. Net Vol. (Cu.yd.)	Ditch Bottom Undercut Vol. (Cu.yd.)	Cum. Ditch Bottom Undercut (Cu.yd.)
13+00	70.48	0.00	0.00	72.88	0.00	0.00	0.00	0.00	30.56	30.56
13+50	96.36	154.48	154.48	25.12	131.59	154.48	131.59	22.89	30.56	61.11
14+00	92.64	175.00	175.00	18.01	57.91	329.48	189.50	139.98	30.56	91.67
14+50	90.85	169.90	169.90	17.80	48.07	499.38	237.57	261.81	30.56	122.22
15+00	84.55	162.41	162.41	21.65	52.96	661.79	290.53	371.26	30.56	152.78
15+50	91.41	162.93	162.93	19.71	55.53	824.72	346.06	478.66	30.56	183.33
16+00	86.17	164.43	164.43	29.61	66.22	989.15	412.28	576.87	30.56	213.89
16+50	75.94	150.11	150.11	30.38	80.54	1139.26	492.82	646.44	30.56	244.44
17+00	71.90	136.89	136.89	32.33	84.20	1276.15	577.02	699.13	30.56	275.00
17+50	64.88	126.65	126.65	32.60	87.18	1402.80	664.20	738.60	30.56	305.56
18+00	60.76	116.33	116.33	38.61	95.60	1519.13	759.80	759.33	30.56	336.11
18+50	48.95	101.58	101.58	31.04	93.51	1620.71	853.31	767.40	30.56	366.67
19+00	37.84	80.36	80.36	31.76	84.31	1701.07	937.62	763.45	30.56	397.22
19+50	29.10	61.98	61.98	42.56	99.77	1763.05	1037.39	725.66	30.56	427.78
20+00	22.72	47.98	47.98	40.86	111.99	1811.03	1149.38	661.65	30.56	458.33
20+50	18.38	38.06	38.06	41.74	110.90	1849.09	1260.28	588.81	30.56	488.89
21+00	10.43	26.68	26.68	50.80	124.25	1875.77	1384.53	491.24	30.56	519.44
21+50	13.56	22.21	22.21	57.84	145.86	1897.98	1530.39	367.59	30.56	550.00
22+00	13.39	24.95	24.95	62.54	161.62	1922.93	1692.01	230.92	30.56	580.56
22+50	47.01	55.93	55.93	41.49	139.67	1978.86	1831.68	147.18	30.56	611.11
23+00	21.37	63.32	63.32	60.88	137.44	2042.18	1969.12	73.06	30.56	641.67
23+50	14.10	32.84	32.84	63.44	166.91	2075.02	2136.03	-61.01	30.56	672.22
24+00	14.94	26.90	26.90	68.50	177.14	2101.92	2313.17	-211.25	30.56	702.78
24+50	12.01	24.96	24.96	69.16	184.81	2126.88	2497.98	-371.10	30.56	733.33
25+00	11.67	21.93	21.93	73.44	191.45	2148.81	2689.43	-540.62	30.56	763.89
25+50	27.05	35.86	35.86	59.59	178.61	2184.67	2868.04	-683.37	30.56	794.44
26+00	55.08	76.05	76.05	49.85	146.94	2260.72	3014.98	-754.26	30.56	825.00
26+50	40.66	88.65	88.65	71.27	162.62	2349.37	3177.60	-828.23	30.56	855.56
27+00	23.79	59.67	59.67	86.37	211.65	2409.04	3389.25	-980.21	30.56	886.11
27+50	23.18	43.48	43.48	93.62	241.65	2452.52	3630.90	-1178.38	30.56	916.67
28+00	19.57	39.58	39.58	84.87	239.64	2492.10	3870.54	-1378.44	30.56	947.22
28+50	14.93	31.95	31.95	87.78	231.79	2524.05	4102.33	-1578.28	30.56	977.78
29+00	17.63	30.15	30.15	87.54	235.38	2554.20	4337.71	-1783.51	30.56	1008.33
29+50	20.54	35.34	35.34	82.84	228.75	2589.54	4566.46	-1976.92	30.56	1038.89
30+00	22.24	39.62	39.62	81.81	221.06	2629.16	4787.52	-2158.36	30.56	1069.44
30+50	25.29	44.02	44.02	80.26	217.59	2673.18	5005.11	-2331.93	30.56	1100.00
31+00	31.16	52.27	52.27	70.53	202.44	2725.45	5207.55	-2482.10	30.56	1130.56
31+50	33.21	59.60	59.60	69.05	187.40	2785.05	5394.95	-2609.90	30.56	1161.11
32+00	31.69	60.09	60.09	68.84	185.13	2845.14	5580.08	-2734.94	30.56	1191.67
32+50	23.85	51.43	51.43	72.00	189.10	2896.57	5769.18	-2872.61	30.56	1222.22
33+00	19.27	39.93	39.93	68.55	188.70	2936.50	5957.88	-3021.38	30.56	1252.78
33+50	25.10	41.08	41.08	59.94	172.51	2977.58	6130.39	-3152.81	30.56	1283.33
34+00	30.10	51.11	51.11	55.31	154.73	3028.69	6285.12	-3256.43	30.56	1313.89
34+50	31.46	57.00	57.00	53.03	145.45	3085.69	6430.57	-3344.88	30.56	1344.44
35+00	32.35	59.09	59.09	60.16	151.96	3144.78	6582.53	-3437.75	30.56	1375.00
35+50	32.23	59.80	59.80	82.98	192.17	3204.58	6774.70	-3570.12	30.56	1405.56
36+00	26.88	54.73	54.73	117.94	269.75	3259.31	7044.45	-3785.14	30.56	1436.11
36+50	14.49	38.30	38.30	154.92	366.34	3297.61	7410.79	-4113.18	30.56	1466.67
37+00	11.36	23.93	23.93	196.77	472.17	3321.54	7882.96	-4561.42	30.56	1497.22
37+50	12.50	22.10	22.10	236.67	581.92	3343.64	8464.88	-5121.24	19.03	1516.26
37+81	12.36	14.34	14.34	263.32	418.18	3357.98	8883.06	-5525.08	11.52	1527.78
38+00	10.94	8.13	8.13	277.06	273.55	3366.11	9156.61	-5790.50	30.56	1558.33
38+50	9.31	18.75	18.75	300.74	775.75	3384.86	9932.36	-6547.50	30.56	1588.89
39+00	12.88	20.54	20.54	322.01	836.10	3405.40	10768.46	-7363.06	30.56	1619.44
39+50	16.40	27.11	27.11	330.75	876.40	3432.51	11644.86	-8212.35	30.56	1650.00
40+00	10.26	24.69	24.69	324.19	879.32	3457.20	12524.18	-9066.98	30.56	1680.56
40+50	35.68	42.54	42.54	237.26	753.80	3499.74	13277.98	-9778.24	30.56	1711.11
41+00	66.49	94.60	94.60	112.24	469.24	3594.34	13747.22	-10152.88	61.11	1772.22
42+00	69.86	252.51	252.51	74.87	502.44	3846.85	14249.66	-10402.81	30.56	1802.78
42+50	38.84	100.65	100.65	175.18	335.72	3947.50	14585.38	-10637.88	30.56	1833.33
43+00	0.05	36.01	36.01	258.05	581.66	3983.51	15167.04	-11183.53	30.56	1863.89
43+50	1.08	1.04	1.04	230.07	655.35	3984.55	15822.39	-11837.84	30.56	1894.44
44+00	11.60	11.74	11.74	198.51	575.40	3996.29	16397.79	-12401.50	30.56	1925.00
44+50	13.93	23.64	23.64	167.64	491.59	4019.93	16889.38	-12869.45	30.56	1955.56
45+00	14.87	26.66	26.66	138.25	410.69	4046.59	17300.07	-13253.48	30.56	1986.11
45+50	18.81	31.19	31.19	114.23	338.98	4077.78	17639.05	-13561.27	30.56	2016.67
46+00	33.61	48.54	48.54	82.75	264.47	4126.32	17903.52	-13777.20	30.56	2047.22
46+50	48.82	76.33	76.33	75.80	212.87	4202.65	18116.39	-13913.74	30.56	2077.78
47+00	51.08	92.50	92.50	77.46	205.77	4295.15	18322.16	-14027.01	30.56	2108.33
47+50	44.59	88.58	88.58	83.25	215.77	4383.73	18537.93	-14154.20	30.56	2138.89
48+00	38.37	76.82	76.82	86.44	227.83	4460.55	18765.76	-14305.21	30.56	2169.44
48+50	38.62	71.29	71.29	85.74	231.17	4531.84	18996.93	-14465.09	30.56	2200.00
49+00	39.17	72.03	72.03	86.05	230.64	4603.87	19227.57	-14623.70	30.56	2230.56
49+50	41.72	74.90	74.90	85.01	229.66	4678.77	19457.23	-14778.46	30.56	2261.11
50+00	47.29	82.42	82.42	84.40	227.45	4761.19	19684.68	-14923.49	30.56	2291.67
50+50	60.75	100.04	100.04	82.79	224.47	4861.23	19909.15	-15047.92	30.56	2322.22
51+00	66.04	117.40	117.40	79.44	217.81	4978.63	20126.96	-15148.33	30.56	2352.78
51+50	66.80	123.01	123.01	80.04	214.12	5101.64	20341.08	-15239.44	30.56	2383.33
52+00	0.11	61.96	61.96	83.95	220.18	5163.60	20561.26	-15397.66	13.17	2396.51
52+22	0.00	0.04	0.04	101.23	107.18	5163.64	20668.44	-15504.80	17.38	2413.89
52+50	39.51	20.81	20.81	30.69	100.77	5184.45	20769.21	-15584.76	3.06	2416.94
52+55	76.78	10.77	10.77	1.56	4.33	5195.22	20773.54	-15578.32	0.00	2416.94
Approaches					450	5195.22	21223.54	-16028.32	0.00	2416.94

TOTAL COMMON EXCAVATION 7312 CY
TOTAL BORROW-EXCAVATION 16028 CY

EMULSIFIED ASPHALT FOR TACK COAT

CH1301 - HWY 15

LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT	3,730	26	10,776	539
MAINLINE - TOP LIFT	3,730	36	14,920	746
OVERLAY SECTION - 1ST LIFT	750	26	2,167	108
OVERLAY SECTION - TOP LIFT	750	26	2,167	108
APPROACHES/INTERSECTIONS				90
		TOTAL =	30,029	1,591

EMULSIFIED ASPHALT FOR FOGGING

CH1301 - HWY 15

LOCATION	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
RUMBLE STRIPS	3,930	4	1,747	87
MAINLINE	4,480	36	17,920	896
APPROACHES/INTERSECTIONS				30
		TOTAL =	19,667	1,013

MAXIMUM SIZE OF AGGREGATES

DESCRIPTION	TYPE OF AGGR.	MAXIMUM SIZE
HOT BITUMINOUS PAVEMENT - SUPERPAVE FAA 42	CRUSHED	5/8"
AGGREGATE BASE & SHOULDERS - CLASS 5	CRUSHED	1"

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
BASIS OF ESTIMATE
SHEET 6 OF 26

STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	7	26

CASS COUNTY HIGHWAY DEPARTMENT

PROJECT NO. CH1301
GRADING AND BITUMINOUS SURFACING ON C15
FROM INTERSTATE 94 TO CASS HIGHWAY 10

ESTIMATED QUANTITIES

ITEM	SPEC NO.	CODE	DESCRIPTION	UNIT	APPROX. QUANTITY
1	103	0100	CONTRACT BOND	L SUM	1
2	201	0295	CLEARING AND GRUBBING	L SUM	1
3	203	0095	COMMON EXCAVATION - TYPE A	CY	7,612
4	203	0109	TOPSOIL	CY	7,324
5	203	0113	COMMON EXCAVATION - WASTE	CY	674
6	203	0119	TOPSOIL - IMPORTED	CY	2,037
7	203	0140	BORROW - EXCAVATION	CY	16,028
8	210	0198	SELECT BACKFILL	TON	725
9	216	0100	WATER	M GAL	802
10	302		CRUSHED CONCRETE	TON	11,692
11	302	0120	AGGREGATE BASE COURSE CL 5	TON	69
12	410	0247	RECYCLED ASPHALT PAVEMENT - SUPERPAVE FAA 42	TON	6,497
13	410	0445	PG 58-28 ASPHALT CEMENT	TON	325
14	702	0100	MOBILIZATION	L SUM	1
15	704	1100	TRAFFIC CONTROL	L SUM	1
16	706	0200	FIELD LABORATORY-TYPE B	EA	1
17	708		STABILIZATION	SY	10,544
18	708	1430	FIBER ROLL 12IN	LF	550
19	708	2280	SEEDING TYPE B - CLASS V	ACRE	9.45
20	708	5500	MULCHING	ACRE	9.45
21	708	5651	ECB TYPE 2	SY	110
22	709	0701	GEOTEXTILE FABRIC - TYPE R1	SY	12,249
23	714	5015	PIPE CORR STEEL 0.064IN 24IN	LF	52
24	714	0900	PIPE CONC REINF 36IN CL II	LF	82
25	714	2165	PIPE CONC REINF ARCH 65IN X 40IN CL III	LF	80
26	714	5820	END SECT CORR STEEL .064IN 24IN	EA	2
27	714	3035	END SECT-CONC REINF 36IN	EA	2
28	714	5830	END SECT-CONC REINF ARCH 65IN X 40IN	EA	2
29	760	0005	RUMBLE STRIPS-ASPHALT SHOULDER	MILE	1.5
30	762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	265
31	762	0405	SHORT TERM 4 IN BROKEN LINE-PNT TAPE OR RSD MARK	LF	3,360
32	762	0410	SHORT TERM 4 IN LINE NPZ - PN TP OR RS MARK	LF	6,300
33	762	1104	PVMT MK PAINTED 4IN LINE	LF	12,180
34	802		PORTLAND CEMENT	TON	342
35	930		QC/QA TESTING	LS	1
36	930	2510	CONSTRUCTION SURVEY	LS	1

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
ESTIMATED QUANTITIES
SHEET 7 OF 26

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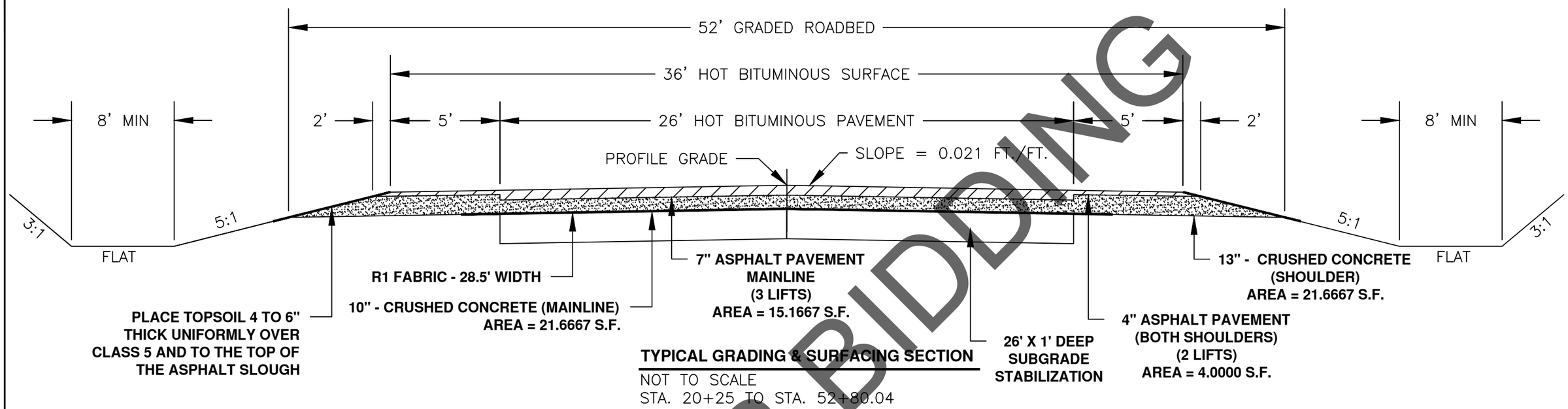
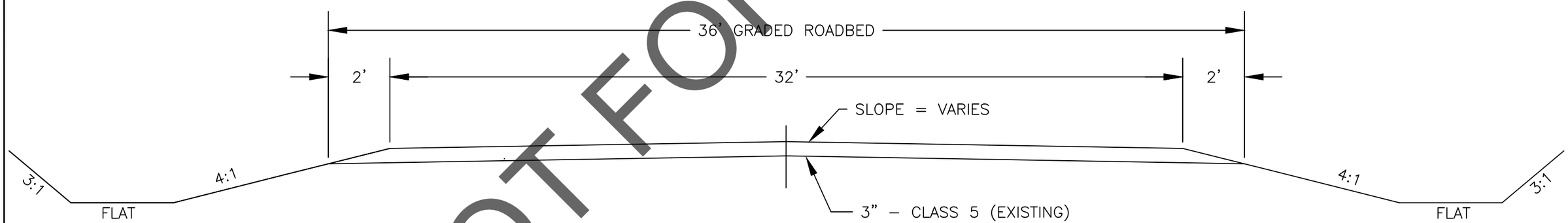
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	8	26



TYPICAL GRADING & SURFACING SECTION

NOT TO SCALE
STA. 20+25 TO STA. 52+80.04



TYPICAL EXISTING SECTION

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
TYPICAL SECTION
SHEET 8 OF 26

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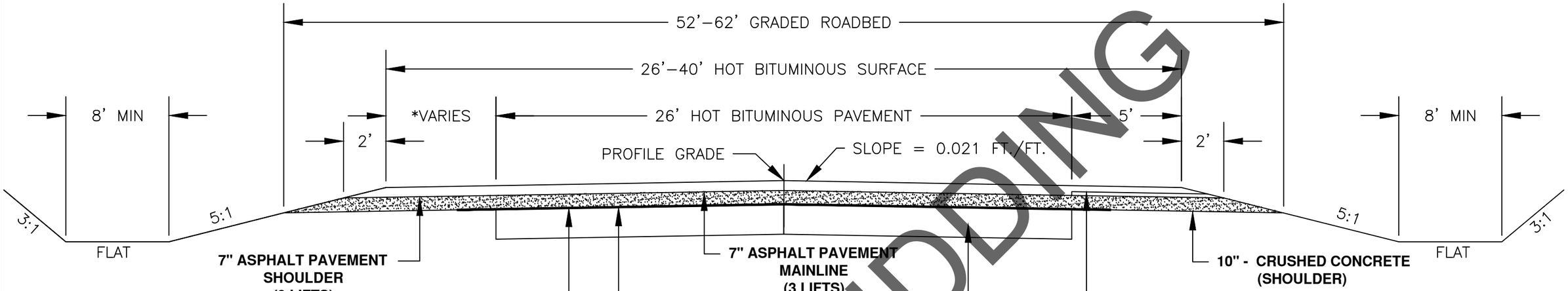
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	9	26



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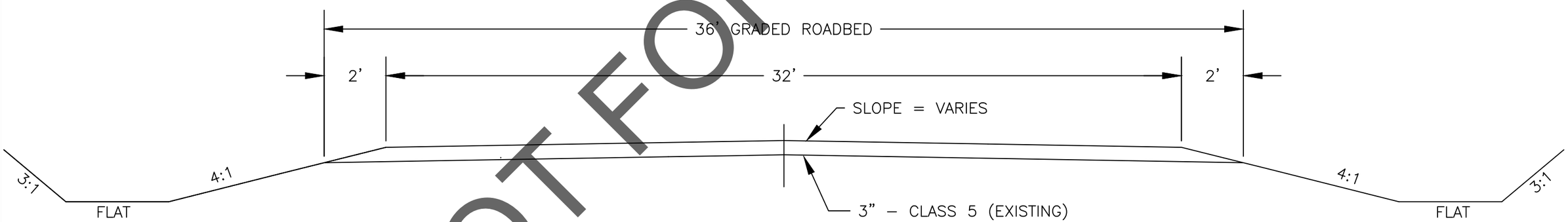

TYPICAL EXISTING SECTION

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
TYPICAL SECTION
SHEET 9 OF 26

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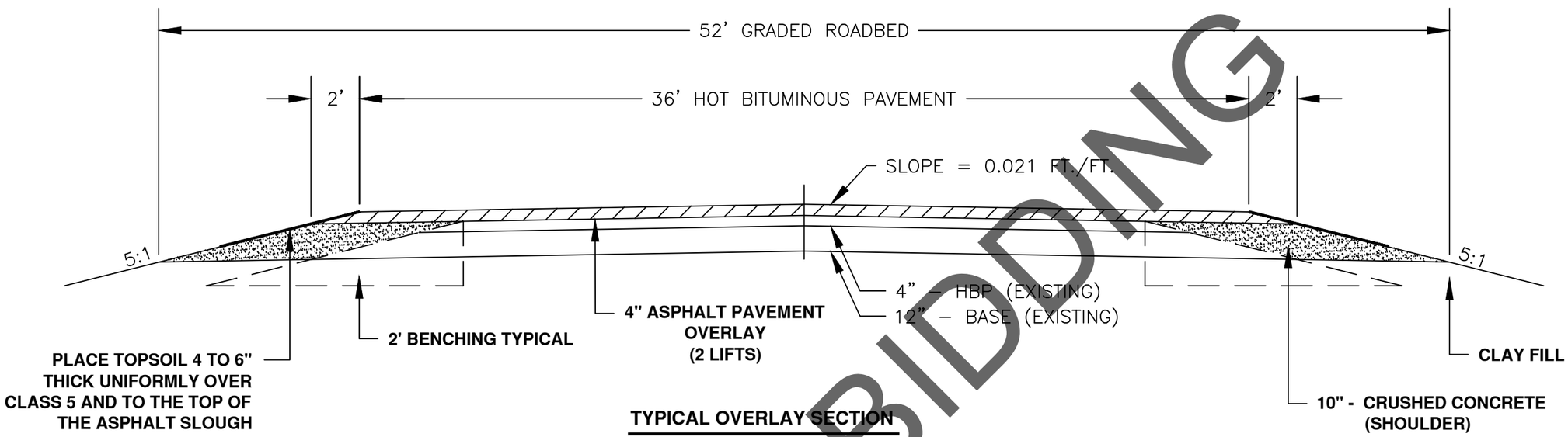
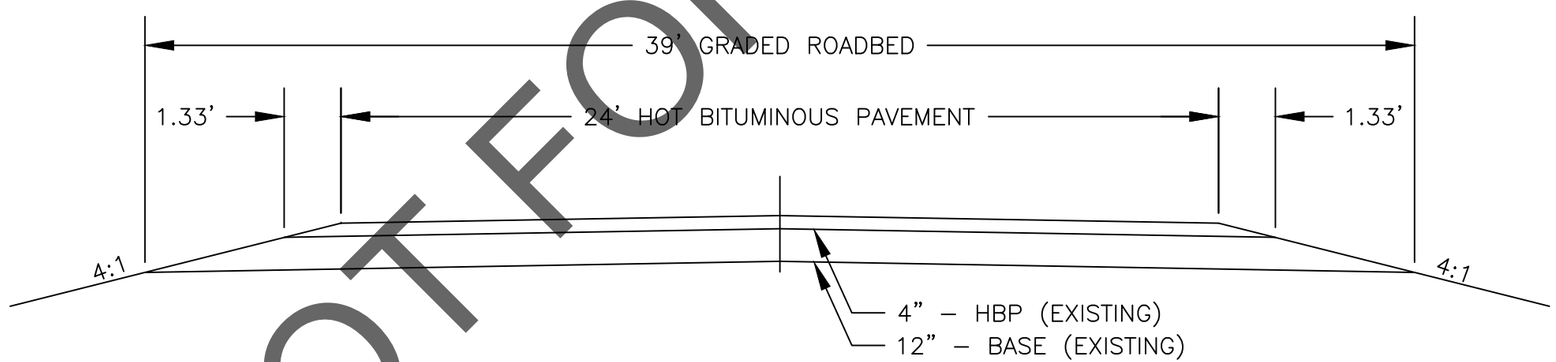
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	10	26



TYPICAL OVERLAY SECTION

NOT TO SCALE
STA. 13+50 TO STA. 15+50



TYPICAL EXISTING SECTION

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
TYPICAL SECTION
SHEET 10 OF 26

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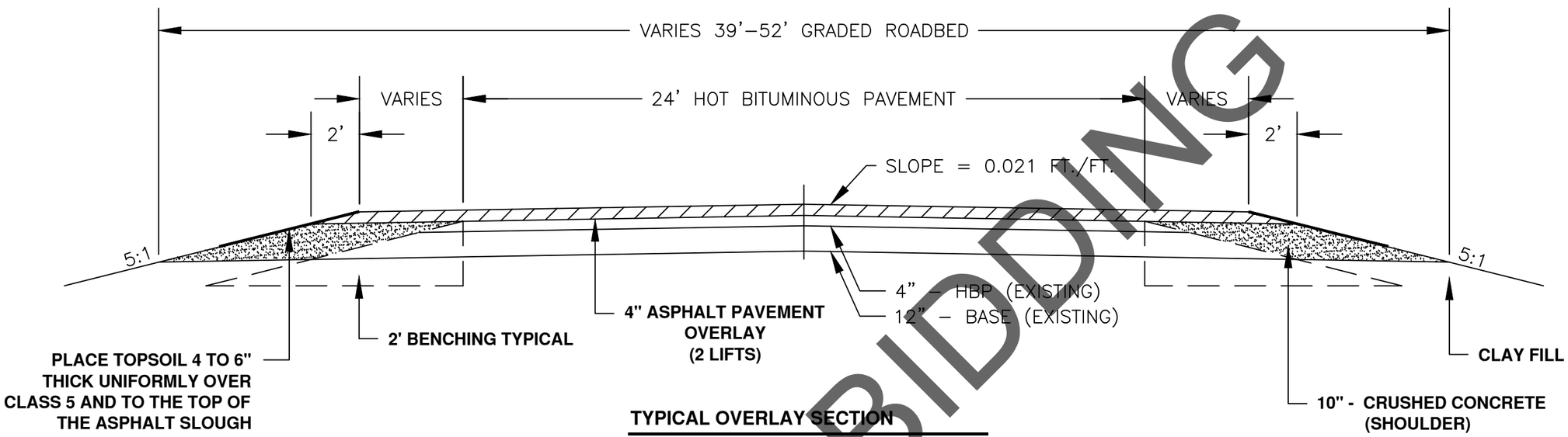
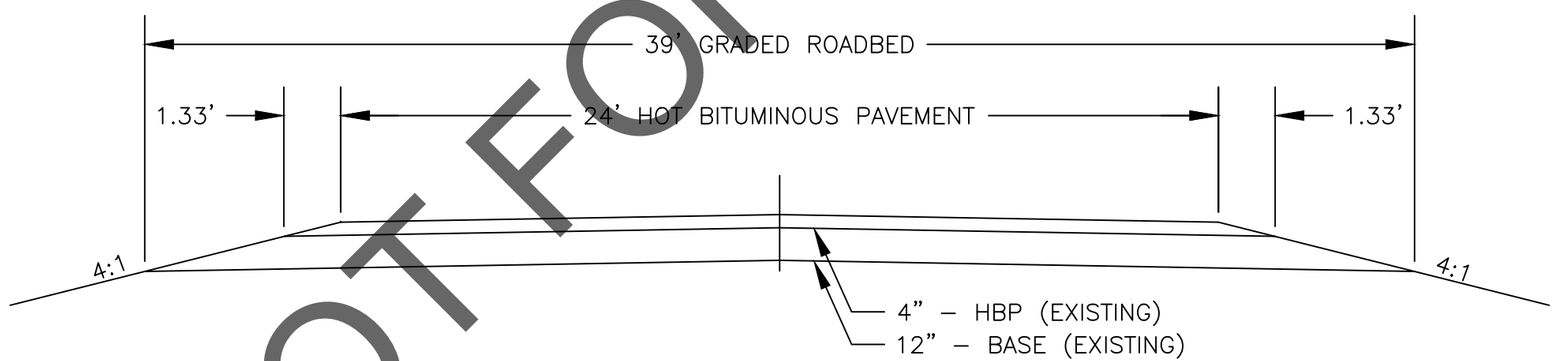
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	11	26



TYPICAL OVERLAY SECTION

NOT TO SCALE
STA. 13+00 TO STA. 13+50



TYPICAL EXISTING SECTION

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
TYPICAL SECTION
SHEET 11 OF 26

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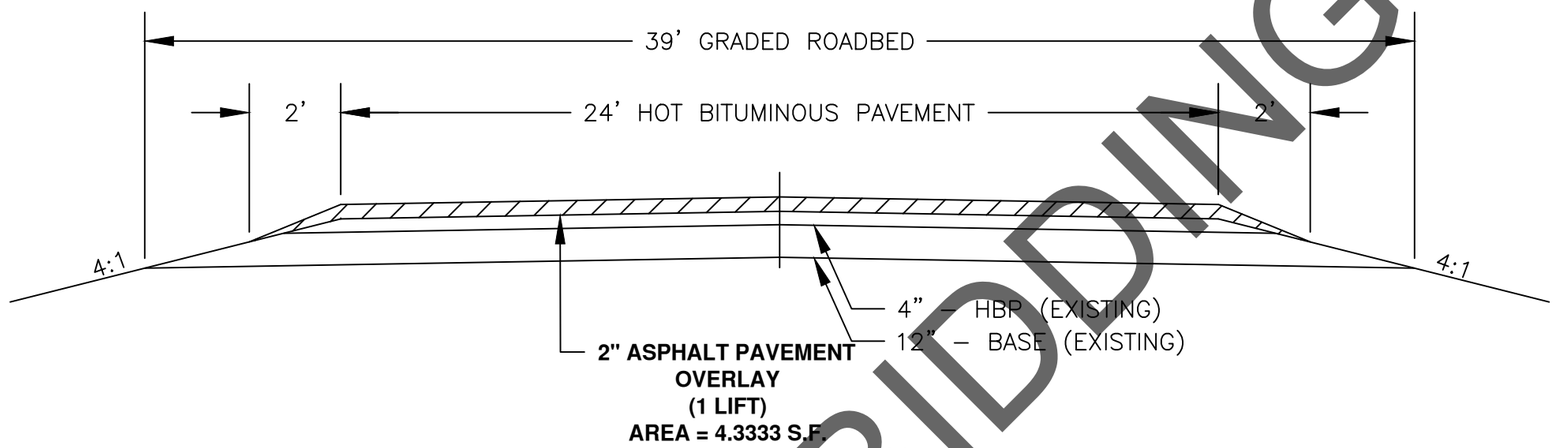
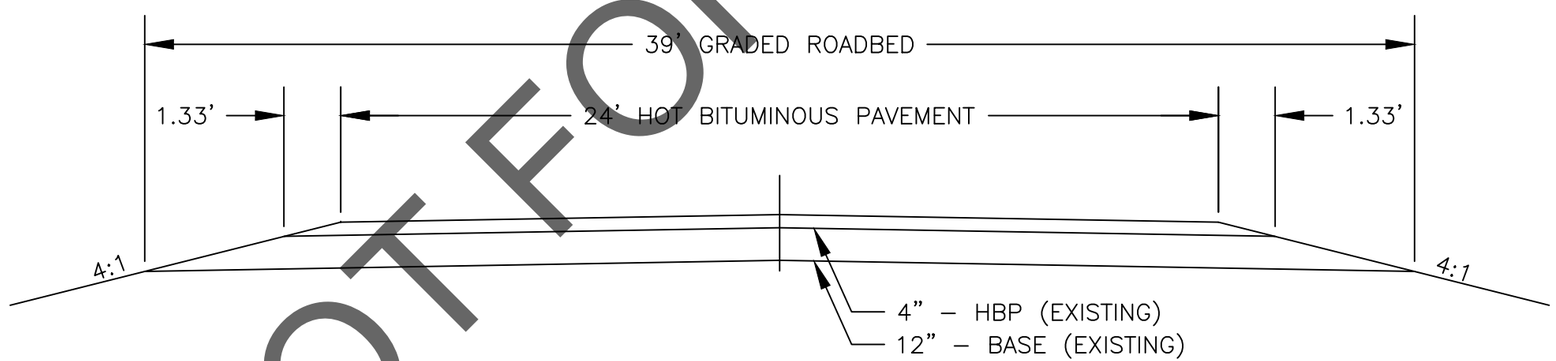
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	12	26



TYPICAL OVERLAY SECTION

NOT TO SCALE
STA. 8+00 TO STA. 13+00



TYPICAL EXISTING SECTION

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
TYPICAL SECTION
SHEET 12 OF 26

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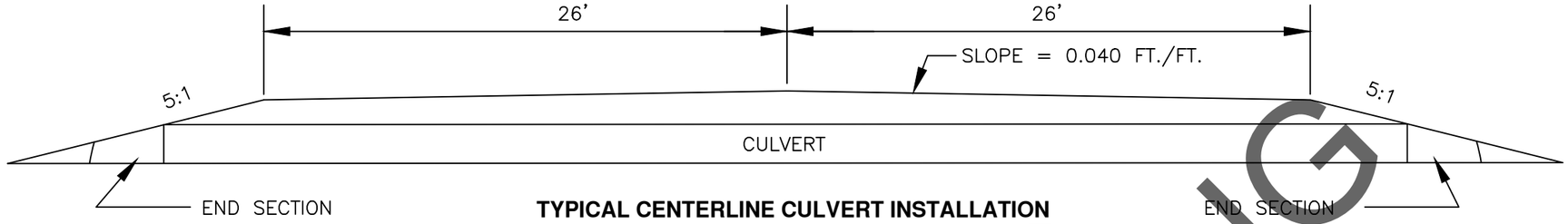
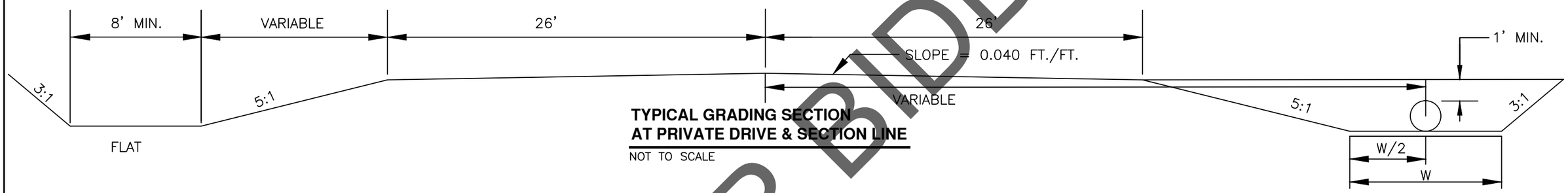
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	13	26



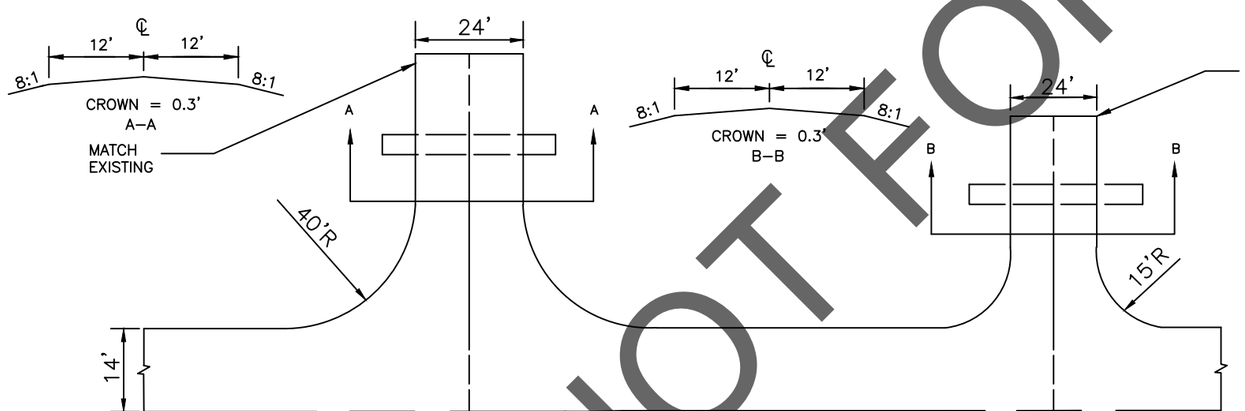
TYPICAL CENTERLINE CULVERT INSTALLATION

NOT TO SCALE



TYPICAL GRADING SECTION AT PRIVATE DRIVE & SECTION LINE

NOT TO SCALE

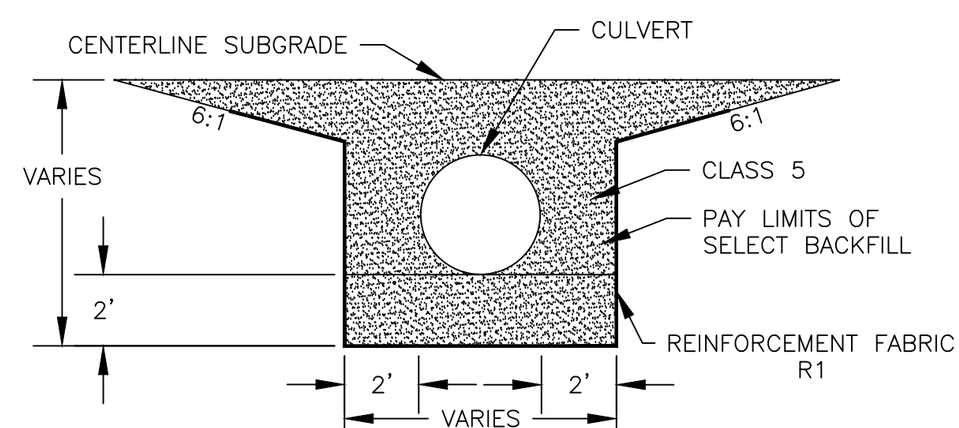


SECTION LINE APPROACH

NOT TO SCALE

FIELD & PRIVATE DRIVE APPROACH

NOT TO SCALE



CENTERLINE CULVERT BACKFILL DETAIL

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
CULVERT DETAILS
SHEET 13 OF 26

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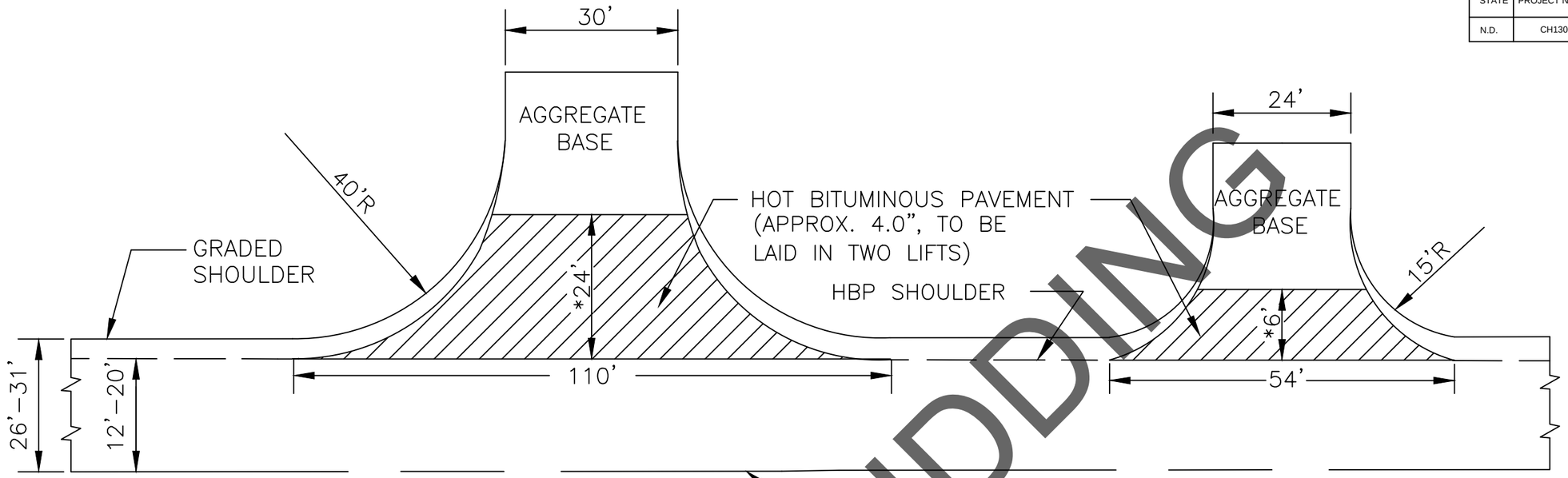
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	14	26



SECTION LINE APPROACH

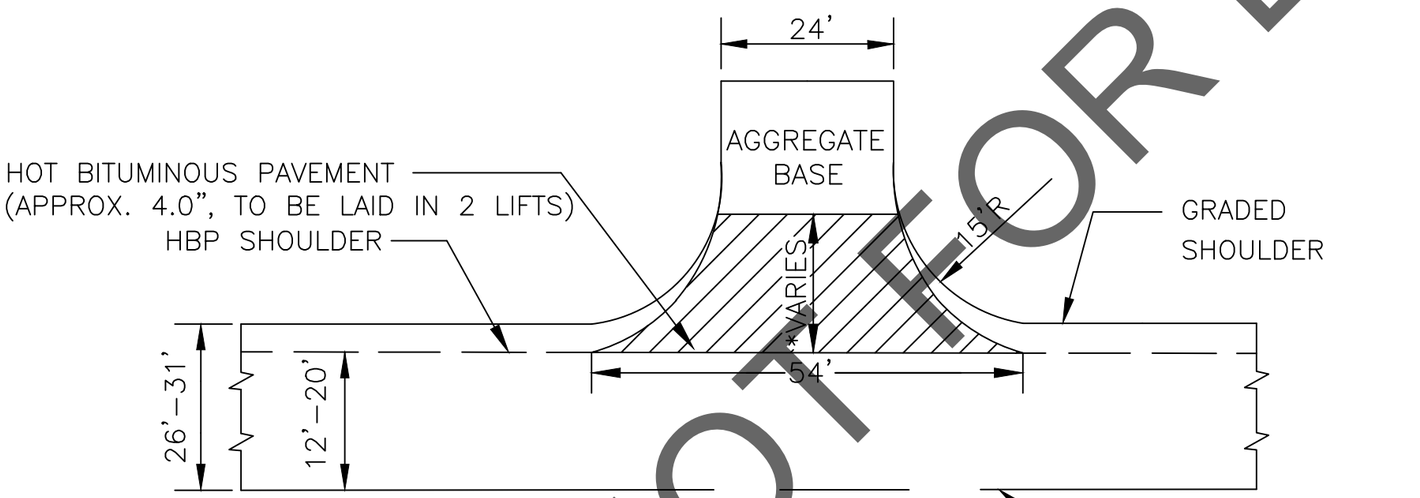
NOT TO SCALE

℄ OF HIGHWAY

FIELD APPROACH

NOT TO SCALE

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



PRIVATE DRIVE APPROACH

NOT TO SCALE

℄ OF HIGHWAY

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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PROJECT NO. CH1301
APPROACH DETAILS
SHEET 14 OF 26

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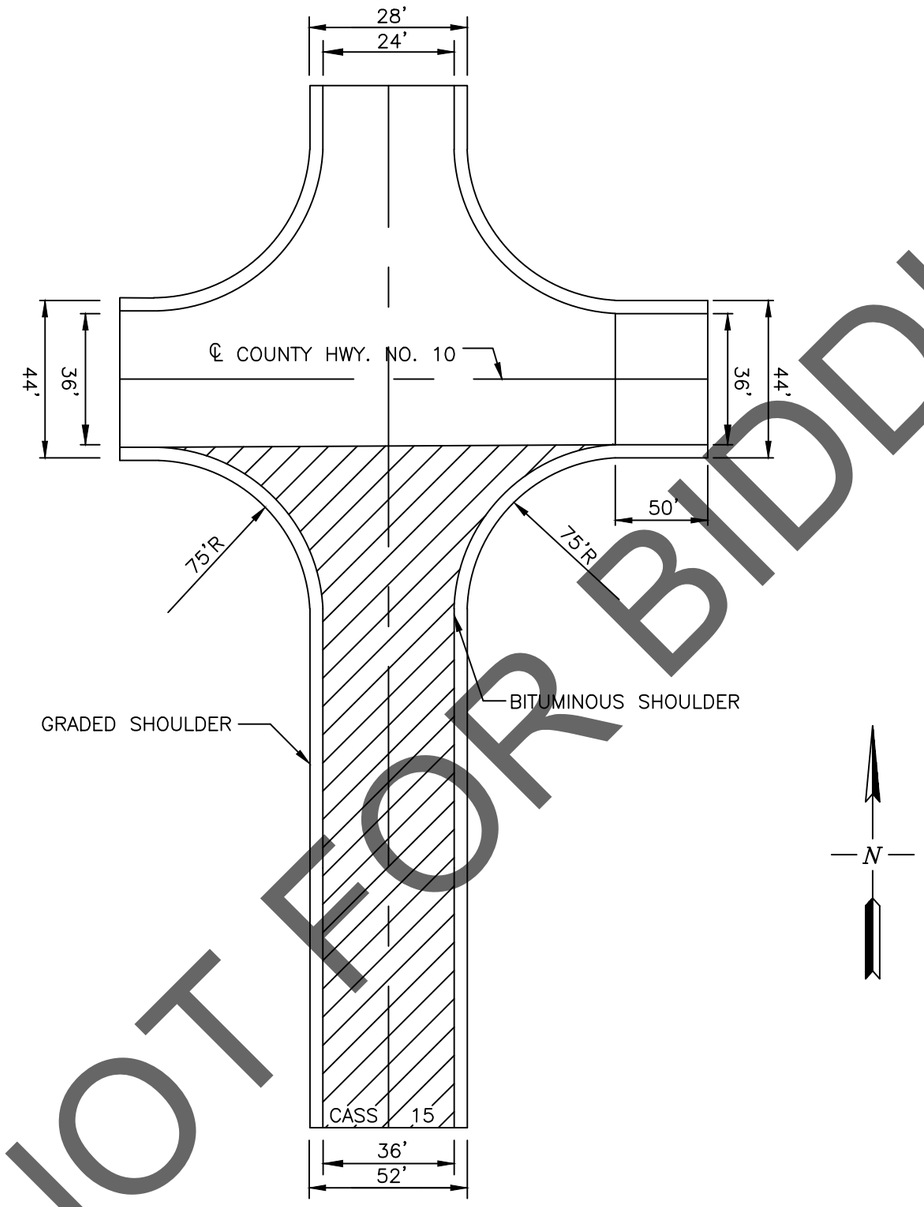
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	15	26



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INTERSECTION DETAIL

STA 52+80.04
CASS HIGHWAYS 10 & 15
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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
INTERSECTION DETAILS
SHEET 15 OF 26

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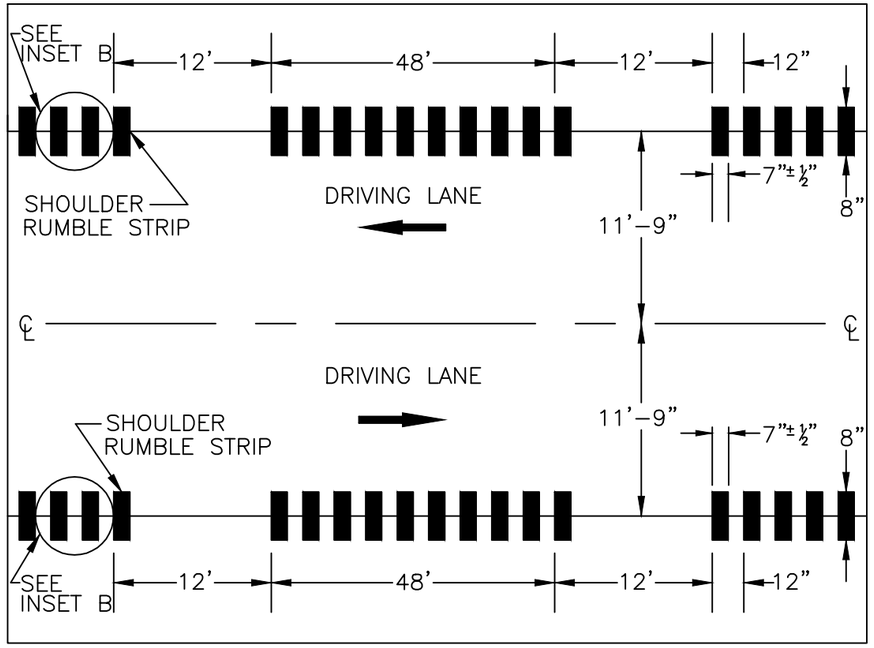
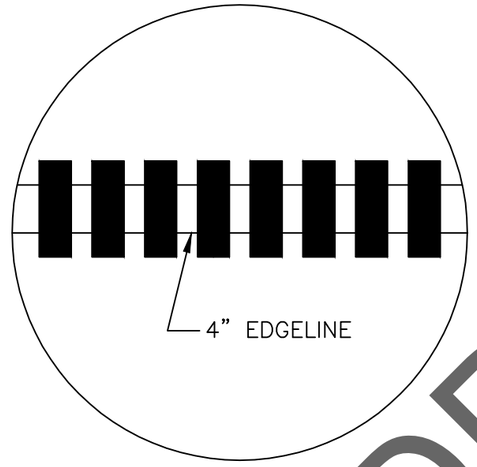
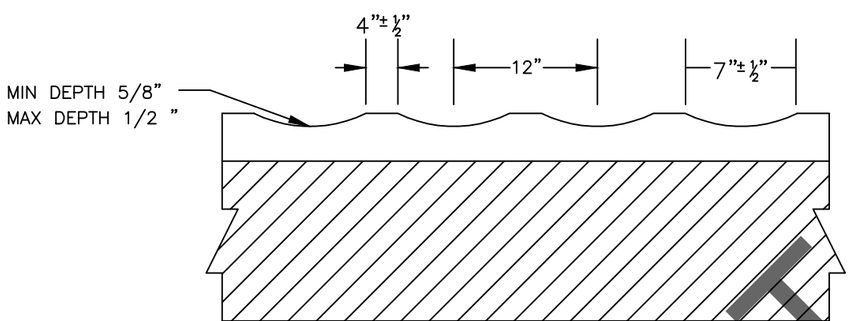
STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	16	26



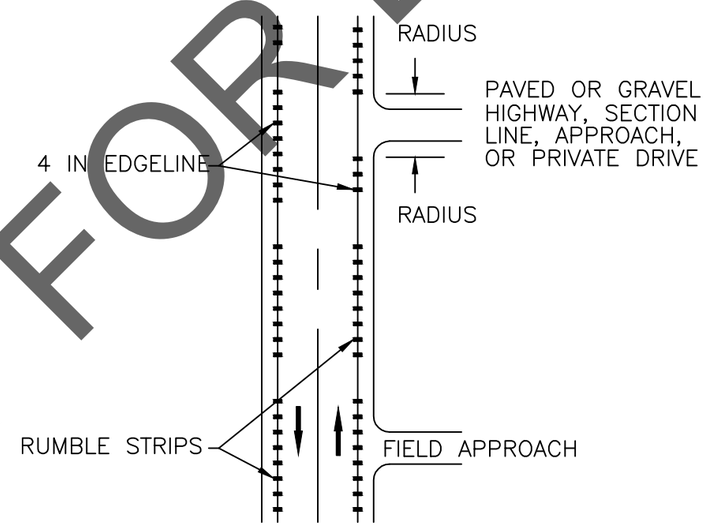
PLAN VIEW OF RUMBLE STRIPS



INSET B - SHOULDER RUMBLE STRIP



PROFILE VIEW OF RUMBLE STRIPS



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.

NOT FOR BIDDING

RUMBLE STRIP DETAILS

NOT TO SCALE

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PROJECT NO. CH1301
RUMBLE STRIP DETAILS
SHEET 16 OF 26

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STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	17	26

TRAFFIC CONTROL LEGEND

POST–MOUNTED SIGN

TYPE III BARR.

(A) ROAD WORK AHEAD
W21–4–48

(B) ROAD WORK 1000 FT
W21–4–48

(C) ROAD WORK 500 FT
W21–4–48

(D) ROAD WORK NEXT X MILES
G20–1a–60

(E) END ROAD WORK
G20–2a–48

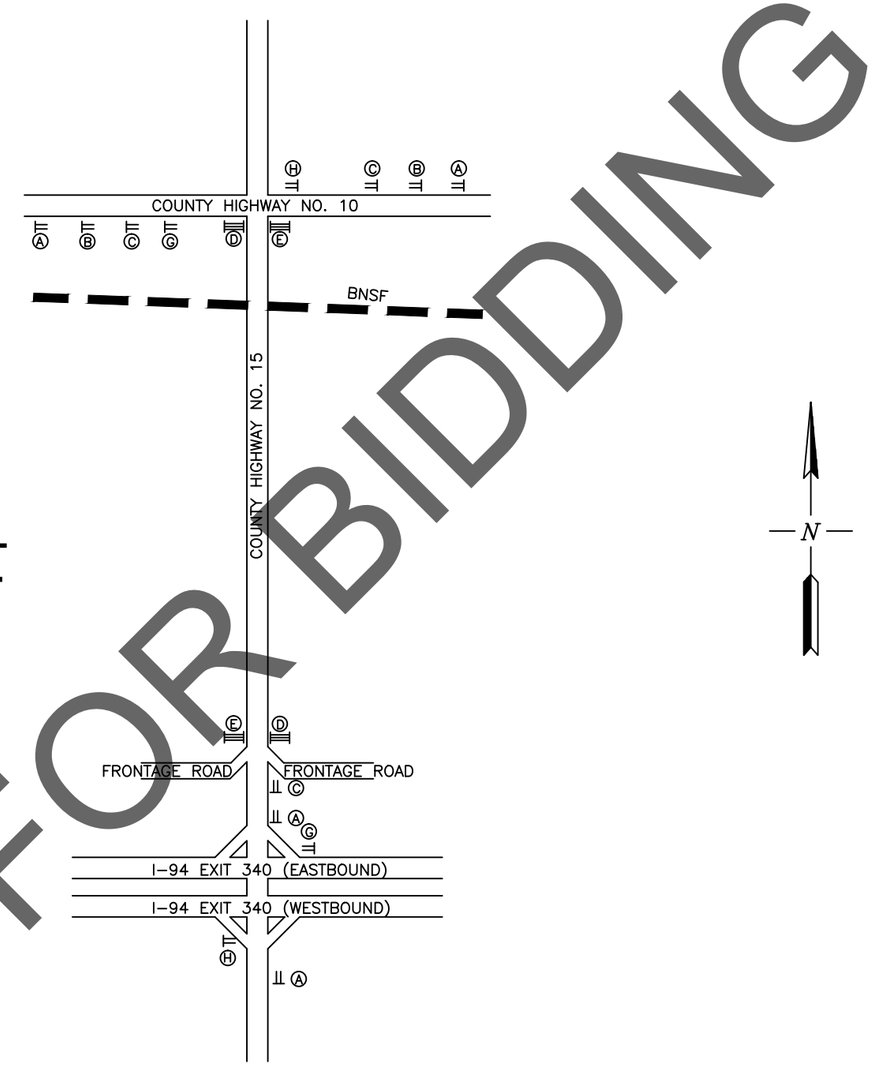
(F) ROAD WORK ← NEXT X MILES NEXT X MILES →
G20–50a–72

(G) ROAD WORK NEXT X MILES →
G20–52a–72

(H) ROAD WORK ← NEXT X MILES
G20–52a–72

CONSTRUCTION SIGN LAYOUT

NOT TO SCALE



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*** NOTE: TRAFFIC CONTROL BID ITEM IS LUMP SUM AS PER NDDOT SPEC 704.04. B. SEE SIGN LIST ON SHEET 18 FOR SIGN QUANTITIES.**

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. CH1301
CONSTRUCTION SIGN LAYOUT
SHEET 17 OF 26

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STATE	PROJECT NUMBER	SHEET	TOTAL SHEETS
N.D.	CH1301	18	26

PROJECT NO. CH1301

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQ'D	UNITS PER AMOUNT	UNITS SUB-TOTAL
G20-1a-60	**60" X 24"**	**ROAD WORK NEXT ___ MILES**	**2**	**34**	**68**
G20-2a-48	**48" X 24"**	**END ROAD WORK**	**2**	**19**	**38**
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		37	
G20-52a-72	**72" X 24"**	**ROAD WORK NEXT ___ MILES RT OR LT ARROWS**	**4**	**30**	**120**
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		39	
R2-1a-24	24" X 24"	MINIMUM FEE $80		10	
R2-5a-48	48" X 60"	SPEED ZONE AHEAD		39	
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**	**2**	**28**	**56**
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**	**1**	**31**	**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		35	

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**	**2**	**35**	**70**
W8-1-48	**48" X 48"**	**BUMP**	**2**	**35**	**70**
W8-3a-48	48" X 48"	PAVEMENT ENDS SYMBOL		35	
W8-53-48	**48" X 48"**	**TRUCKS ENTERING HIGHWAY**	**2**	**35**	**70**
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**
W13-1-24	24" X 24"	___ MPH ADVISORY SPEED PLATE		11	
W13-4-48	48" X 60"	RAMP ARROW		39	
W20-1a-48	48" X 48"	MEN WORKING SYMBOL		35	
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**	**2**	**35**	**70**
W20-52-54	**54" X 12"**	**NEXT ___ MILES**	**2**	**12**	**24**
W20-5-48	48" X 48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.		35	
W20-7a-48	**48" X 48"**	**FLAGGING SYMBOL**	**2**	**35**	**70**
W20-7b-48	**48" X 48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W20-7k-24	**24" X 18"**	**___ FEET**	**2**	**10**	**20**
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.**	**9**	**35**	**315**
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		35	
W22-7-48	48" X 48"	SINGLE LANE AHEAD or ___ FT.		35	
W22-8-48	**48" X 48"**	**FRESH OIL LOOSE ROCK**	**4**	**35**	**140**
		TOTAL UNITS			**1,480**

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

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CONSTRUCTION SIGN LIST
SHEET 18 OF 26

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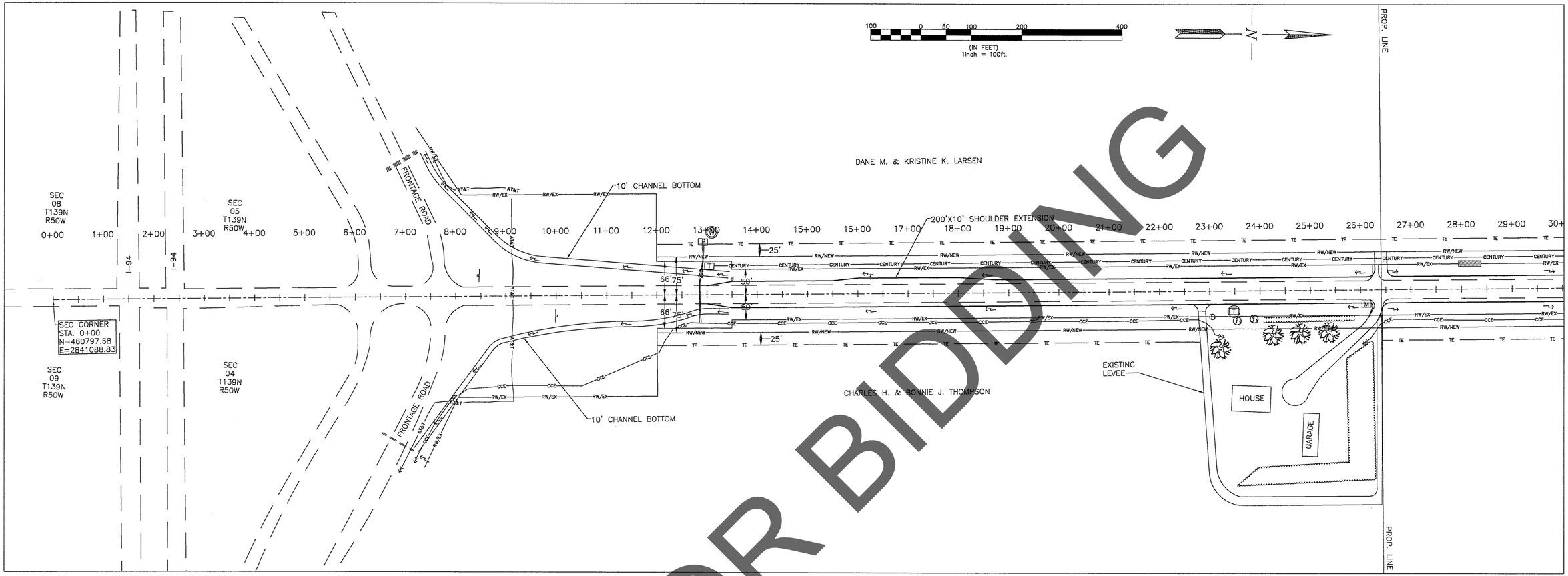

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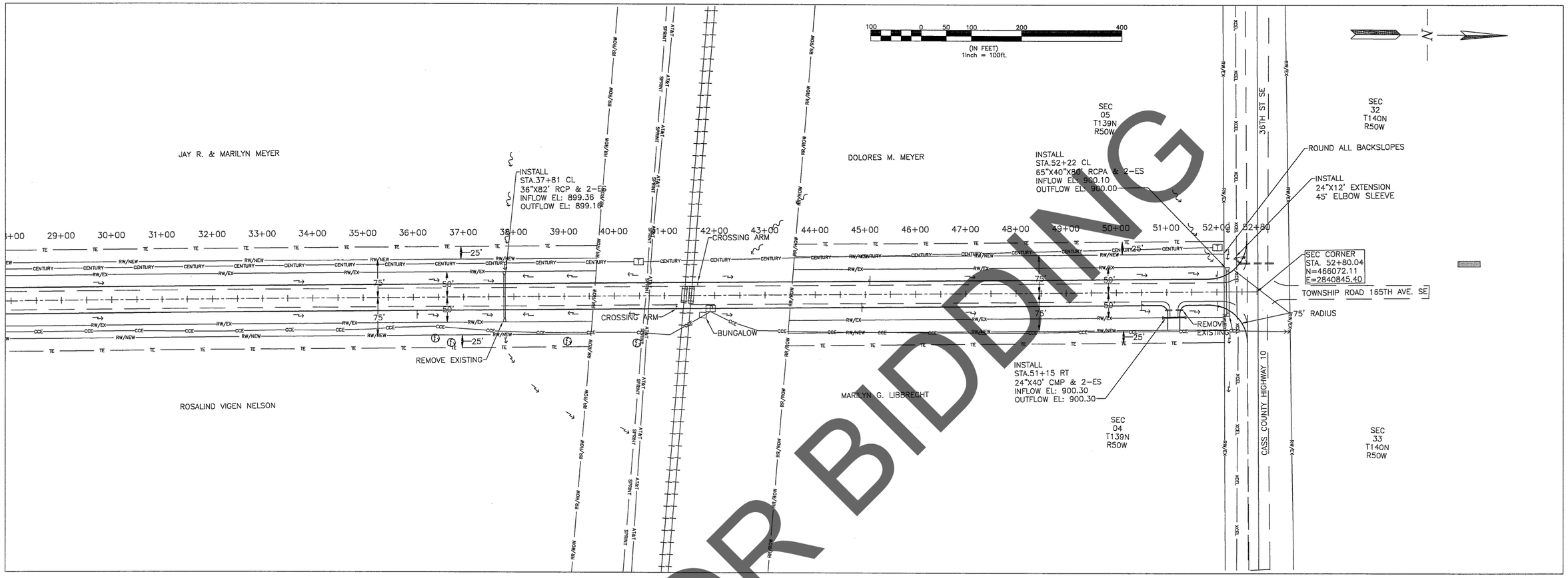
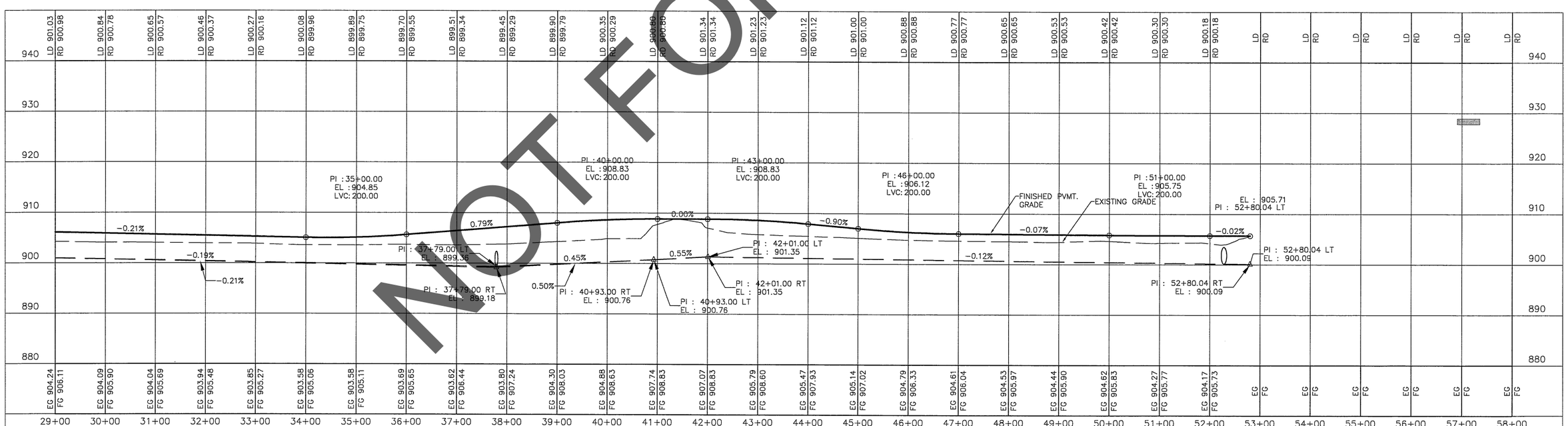
CASS COUNTY HIGHWAY DEPARTMENT
WEST FARGO, NORTH DAKOTA

CH1301
PLAN & PROFILE

REV. 01-24-14





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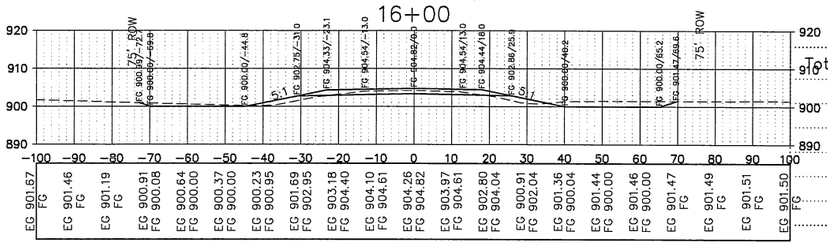
CASS COUNTY HIGHWAY DEPARTMENT
WEST FARGO, NORTH DAKOTA

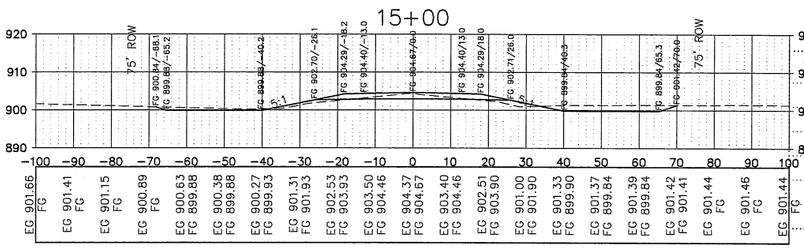
CH1301
PLAN & PROFILE

REV. 01-24-14



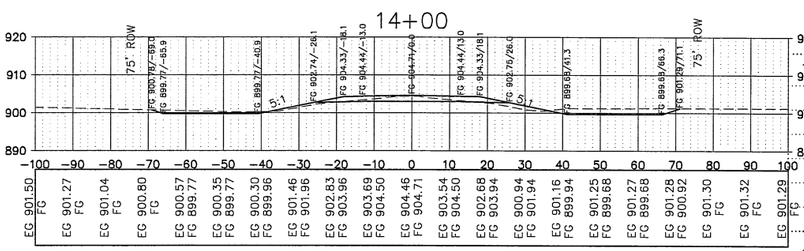
Total Volume at Station 16+00.00

Cut Area	86.17
Fill Area	29.61
Cut Vol	316.16
Fill Vol	137.64
Cum Cut Vol	1076.89
Cum Fill Vol	683.91



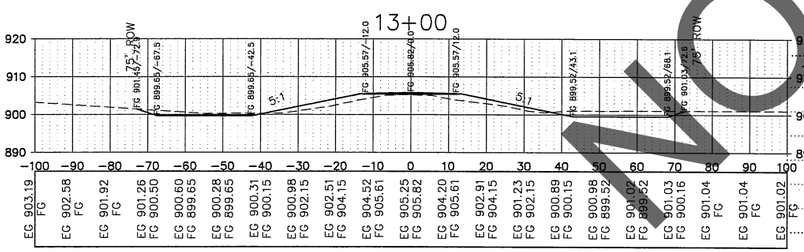
Total Volume at Station 15+00.00

Cut Area	84.55
Fill Area	21.65
Cut Vol	328.14
Fill Vol	105.49
Cum Cut Vol	760.73
Cum Fill Vol	546.26



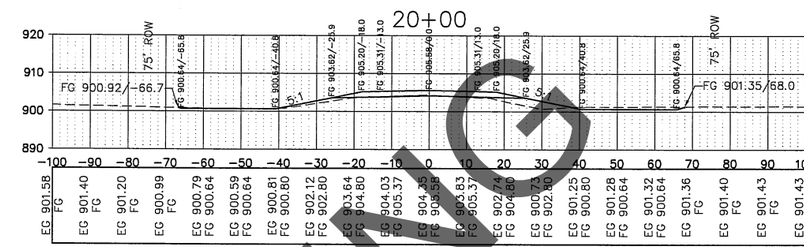
Total Volume at Station 14+00.00

Cut Area	92.64
Fill Area	18.01
Cut Vol	302.08
Fill Vol	244.06
Cum Cut Vol	432.59
Cum Fill Vol	439.77



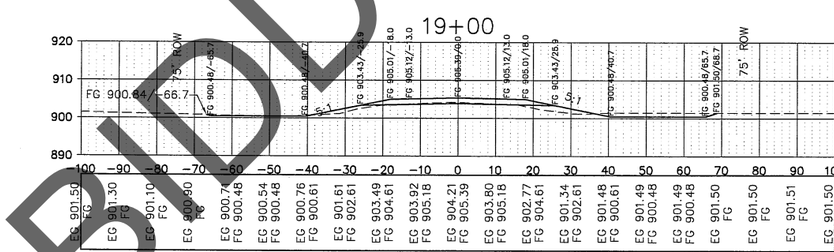
Total Volume at Station 13+00.00

Cut Area	70.48
Fill Area	72.88
Cut Vol	130.51
Fill Vol	195.71
Cum Cut Vol	130.51
Cum Fill Vol	195.71



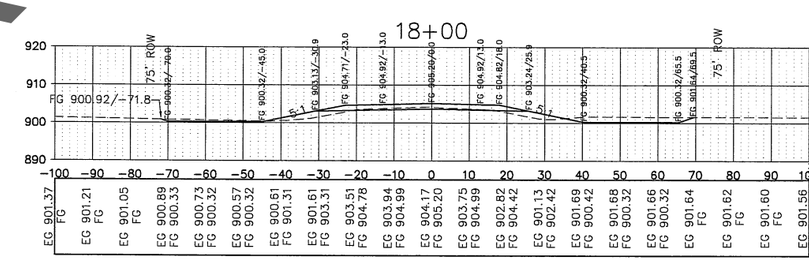
Total Volume at Station 20+00.00

Cut Area	22.72
Fill Area	40.86
Cut Vol	112.15
Fill Vol	194.99
Cum Cut Vol	1910.03
Cum Fill Vol	1424.67



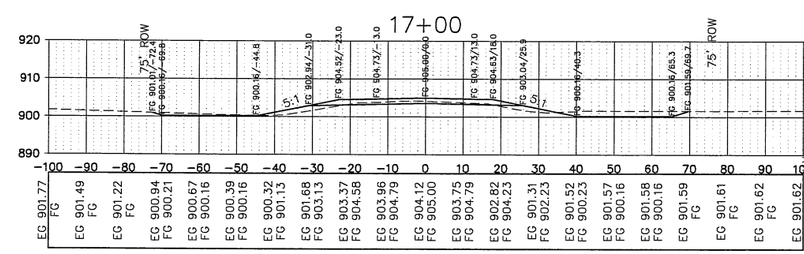
Total Volume at Station 19+00.00

Cut Area	37.84
Fill Area	31.76
Cut Vol	182.60
Fill Vol	188.95
Cum Cut Vol	1797.88
Cum Fill Vol	1229.68



Total Volume at Station 18+00.00

Cut Area	60.76
Fill Area	38.61
Cut Vol	245.67
Fill Vol	190.49
Cum Cut Vol	1615.28
Cum Fill Vol	1040.73



Total Volume at Station 17+00.00

Cut Area	71.90
Fill Area	32.33
Cut Vol	292.73
Fill Vol	166.33
Cum Cut Vol	1369.61
Cum Fill Vol	850.24

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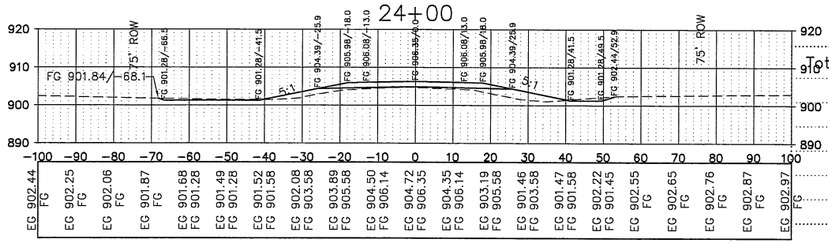
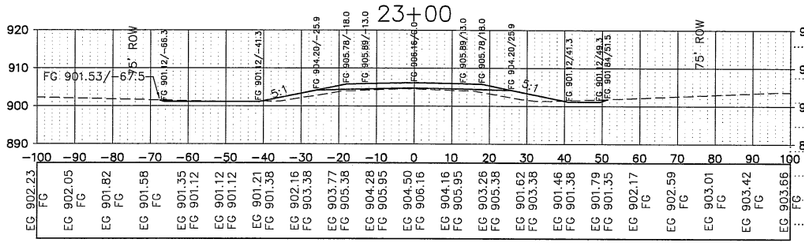


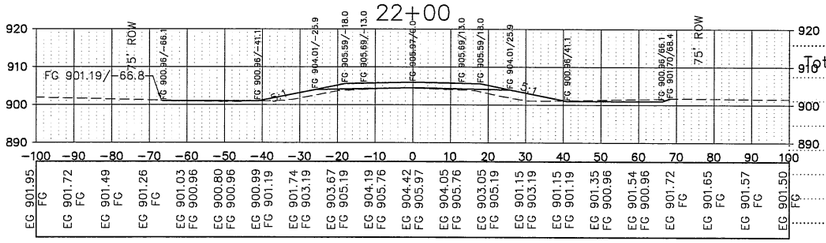
Total Volume at Station 24+00.00

Cut Area	14.94
Fill Area	68.50
Cut Vol	43.90
Fill Vol	347.39
Cum Cut Vol	2100.48
Cum Fill Vol	2653.90



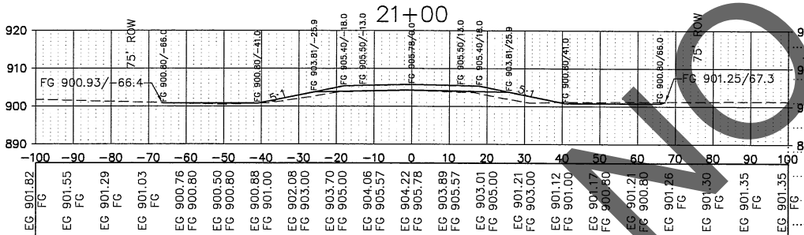
Total Volume at Station 23+00.00

Cut Area	8.77
Fill Area	60.88
Cut Vol	41.03
Fill Vol	331.39
Cum Cut Vol	2056.57
Cum Fill Vol	2306.51



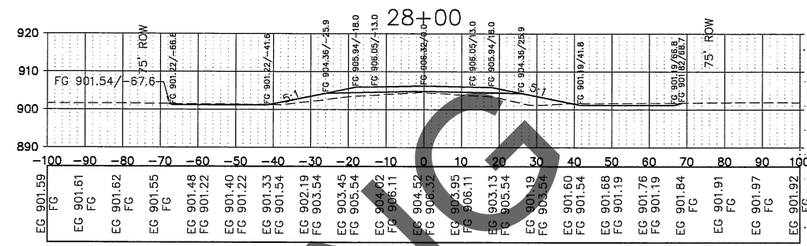
Total Volume at Station 22+00.00

Cut Area	13.39
Fill Area	62.54
Cut Vol	44.12
Fill Vol	304.33
Cum Cut Vol	2015.55
Cum Fill Vol	1975.12



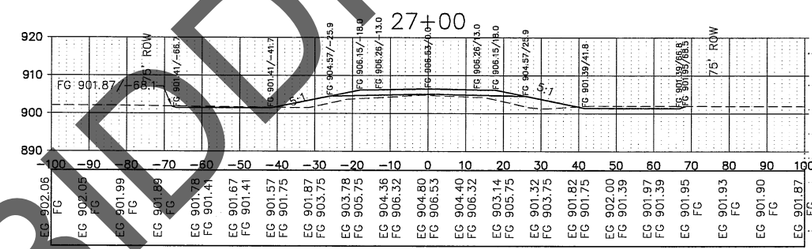
Total Volume at Station 21+00.00

Cut Area	10.43
Fill Area	50.80
Cut Vol	61.40
Fill Vol	246.12
Cum Cut Vol	1971.43
Cum Fill Vol	1670.79



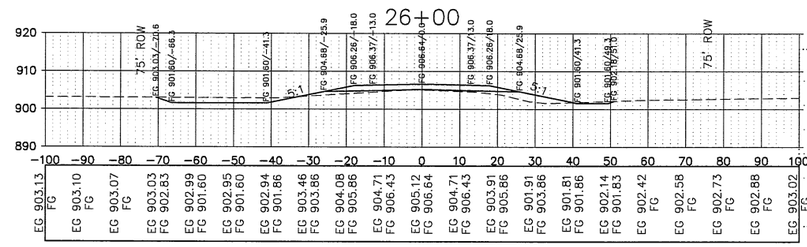
Total Volume at Station 28+00.00

Cut Area	19.57
Fill Area	84.87
Cut Vol	80.29
Fill Vol	459.80
Cum Cut Vol	2466.80
Cum Fill Vol	4191.68



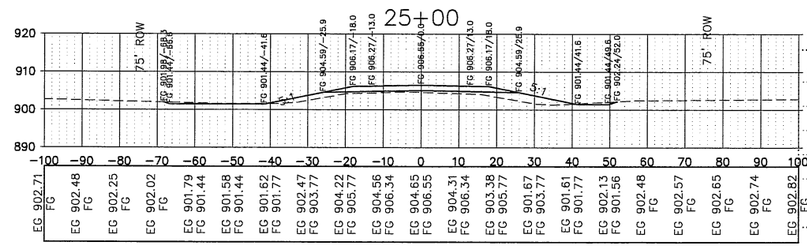
Total Volume at Station 27+00.00

Cut Area	23.79
Fill Area	86.37
Cut Vol	129.59
Fill Vol	365.77
Cum Cut Vol	2386.51
Cum Fill Vol	3731.87



Total Volume at Station 26+00.00

Cut Area	46.19
Fill Area	49.85
Cut Vol	107.16
Fill Vol	331.07
Cum Cut Vol	2256.92
Cum Fill Vol	3366.10



Total Volume at Station 25+00.00

Cut Area	11.67
Fill Area	73.44
Cut Vol	49.29
Fill Vol	381.14
Cum Cut Vol	2149.77
Cum Fill Vol	3035.04

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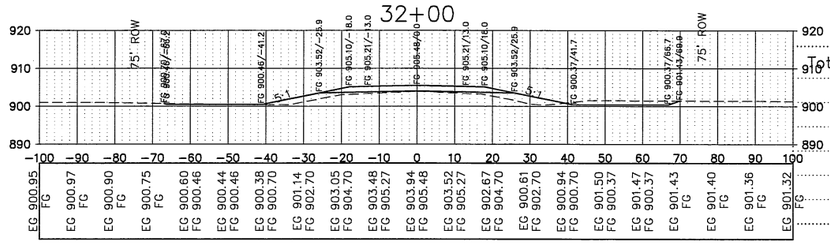
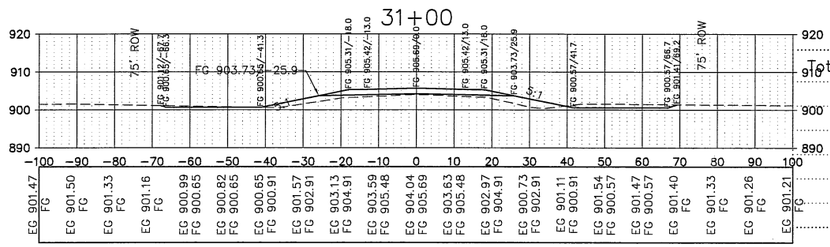


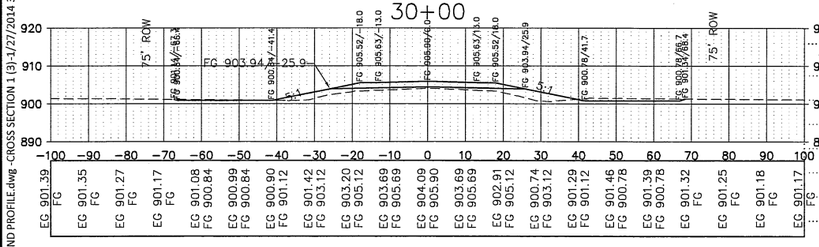
Total Volume at Station 32+00.00

Cut Area	31.69
Fill Area	68.84
Cut Vol	116.39
Fill Vol	374.24
Cum Cut Vol	2824.81
Cum Fill Vol	5892.67



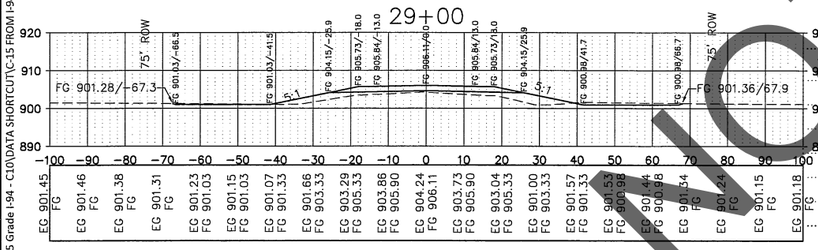
Total Volume at Station 31+00.00

Cut Area	31.16
Fill Area	70.53
Cut Vol	98.89
Fill Vol	409.06
Cum Cut Vol	2708.42
Cum Fill Vol	5518.43



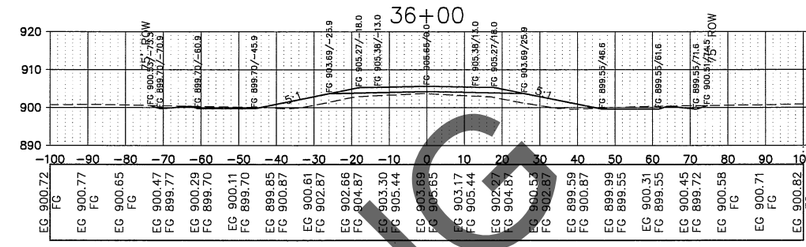
Total Volume at Station 30+00.00

Cut Area	22.24
Fill Area	81.81
Cut Vol	73.83
Fill Vol	454.74
Cum Cut Vol	2609.53
Cum Fill Vol	5109.37



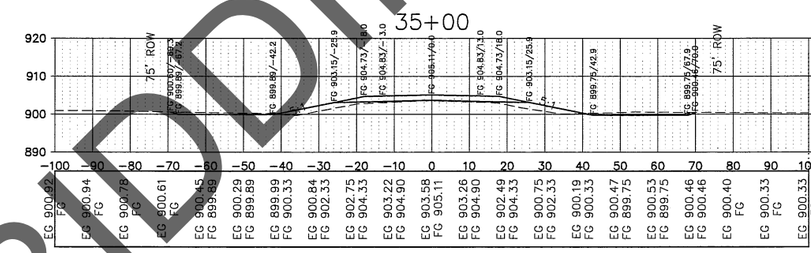
Total Volume at Station 29+00.00

Cut Area	17.63
Fill Area	87.54
Cut Vol	68.89
Fill Vol	462.96
Cum Cut Vol	2535.69
Cum Fill Vol	4654.63



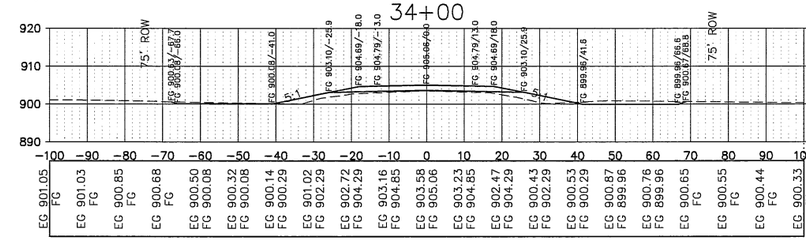
Total Volume at Station 36+00.00

Cut Area	26.88
Fill Area	117.94
Cut Vol	109.68
Fill Vol	478.24
Cum Cut Vol	3235.95
Cum Fill Vol	7382.44



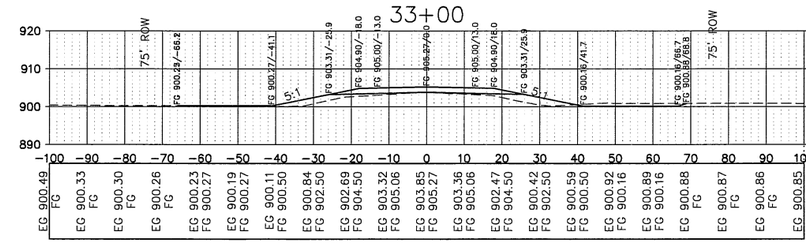
Total Volume at Station 35+00.00

Cut Area	32.35
Fill Area	60.16
Cut Vol	115.65
Fill Vol	310.05
Cum Cut Vol	3126.27
Cum Fill Vol	6904.20



Total Volume at Station 34+00.00

Cut Area	30.10
Fill Area	55.31
Cut Vol	91.43
Fill Vol	332.57
Cum Cut Vol	3010.62
Cum Fill Vol	6594.15



Total Volume at Station 33+00.00

Cut Area	19.27
Fill Area	68.55
Cut Vol	94.38
Fill Vol	368.91
Cum Cut Vol	2919.19
Cum Fill Vol	6261.58

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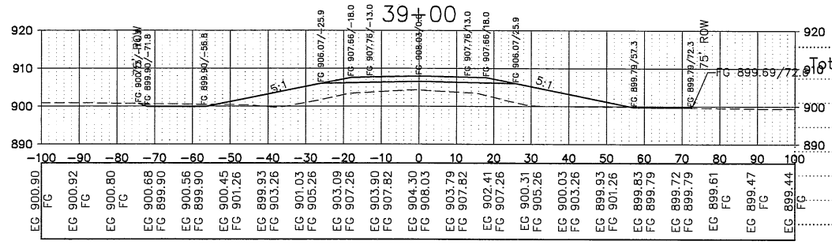
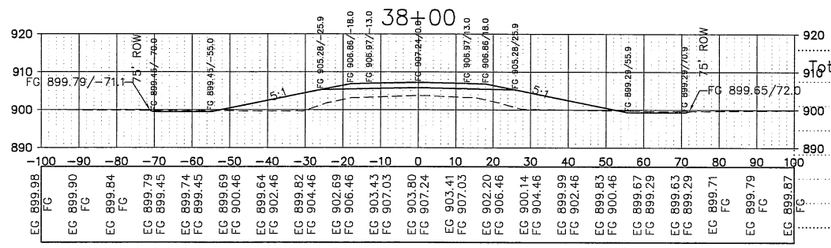
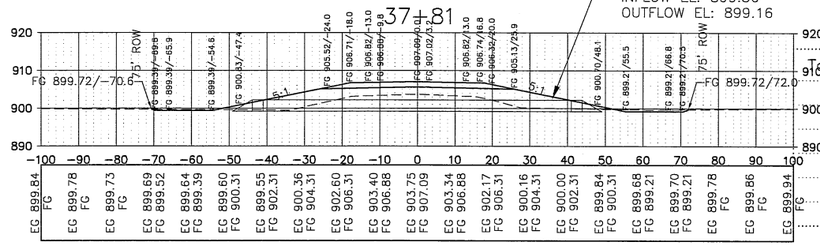


Total Volume at Station 39+00.00	
Cut Area	12.88
Fill Area	322.01
Cut Vol	44.10
Fill Vol	1608.62
Cum Cut Vol	3394.61
Cum Fill Vol	11112.20

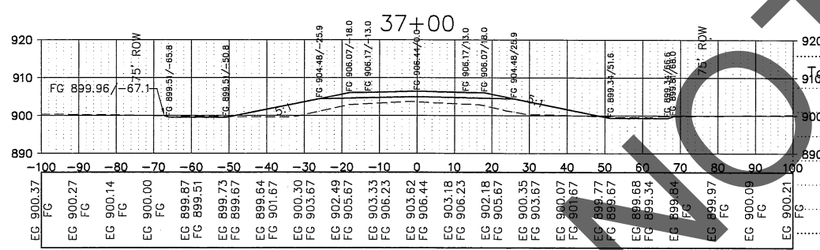


Total Volume at Station 38+00.00	
Cut Area	10.94
Fill Area	277.06
Cut Vol	8.11
Fill Vol	272.89
Cum Cut Vol	3350.51
Cum Fill Vol	9503.58

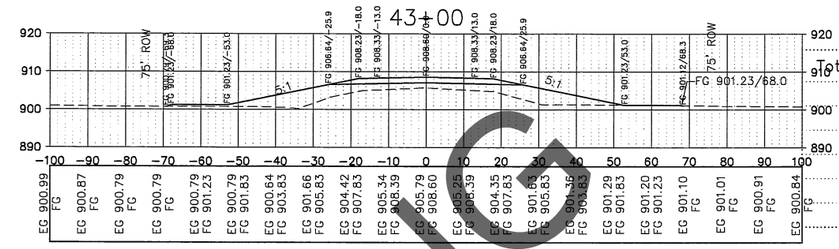
82'X36" RCP CLII
INFLOW EL: 899.36
OUTFLOW EL: 899.16



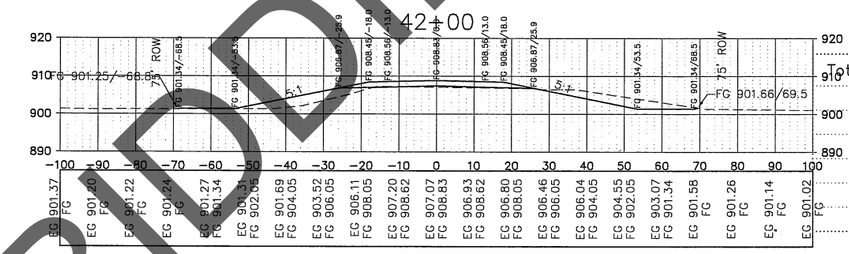
Total Volume at Station 37+81.19	
Cut Area	12.35
Fill Area	263.38
Cut Vol	35.65
Fill Vol	1003.19
Cum Cut Vol	3342.40
Cum Fill Vol	9230.69



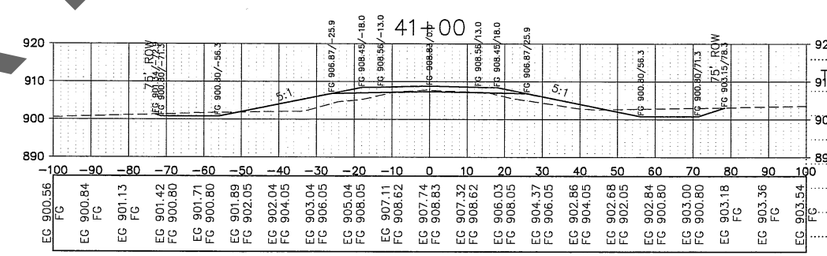
Total Volume at Station 37+00.00	
Cut Area	11.36
Fill Area	196.77
Cut Vol	70.81
Fill Vol	845.06
Cum Cut Vol	3306.75
Cum Fill Vol	8227.50



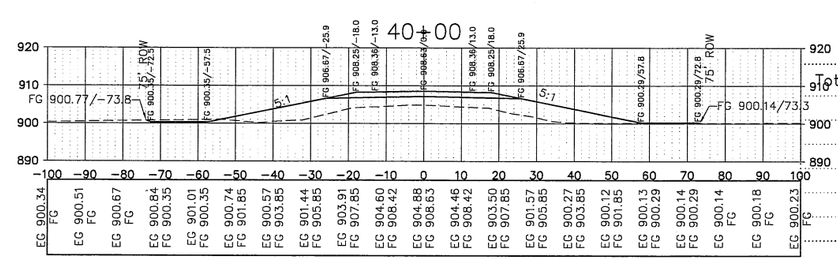
Total Volume at Station 43+00.00	
Cut Area	0.05
Fill Area	258.05
Cut Vol	129.47
Fill Vol	893.97
Cum Cut Vol	3967.99
Cum Fill Vol	15415.69



Total Volume at Station 42+00.00	
Cut Area	69.86
Fill Area	74.87
Cut Vol	255.71
Fill Vol	502.44
Cum Cut Vol	3838.52
Cum Fill Vol	14521.72



Total Volume at Station 41+00.00	
Cut Area	68.22
Fill Area	112.24
Cut Vol	145.35
Fill Vol	1171.90
Cum Cut Vol	3582.81
Cum Fill Vol	14019.28



Total Volume at Station 40+00.00	
Cut Area	10.26
Fill Area	324.19
Cut Vol	42.85
Fill Vol	1735.18
Cum Cut Vol	3437.46
Cum Fill Vol	12847.38

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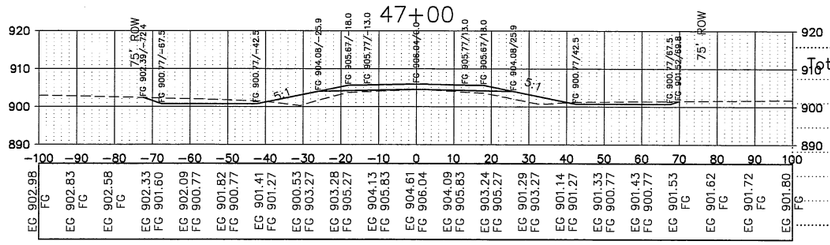
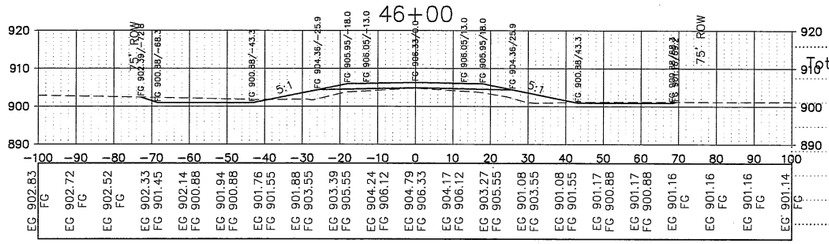


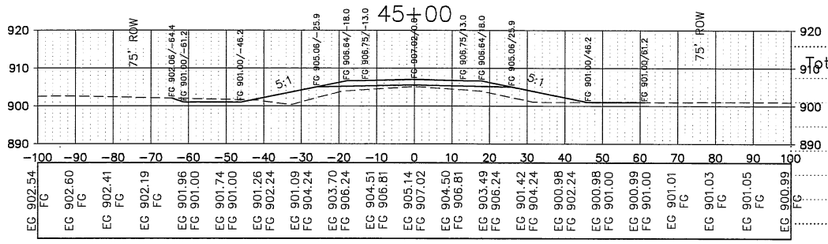
Total Volume at Station 47+00.00

Cut Area	51.08
Fill Area	77.46
Cut Vol	171.50
Fill Vol	430.21
Cum Cut Vol	4314.53
Cum Fill Vol	18569.56



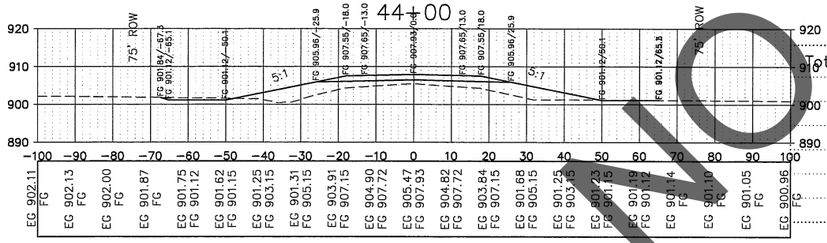
Total Volume at Station 46+00.00

Cut Area	41.53
Fill Area	82.75
Cut Vol	104.45
Fill Vol	593.43
Cum Cut Vol	4143.02
Cum Fill Vol	18139.35



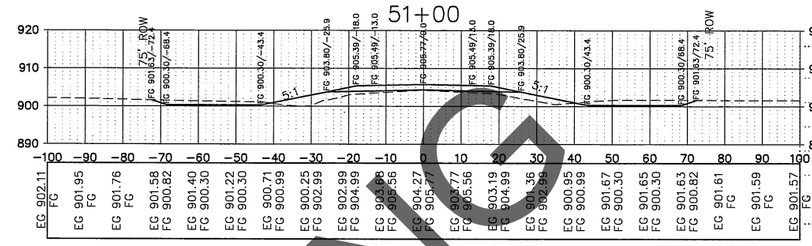
Total Volume at Station 45+00.00

Cut Area	14.87
Fill Area	138.25
Cut Vol	49.01
Fill Vol	904.27
Cum Cut Vol	4038.58
Cum Fill Vol	17545.92



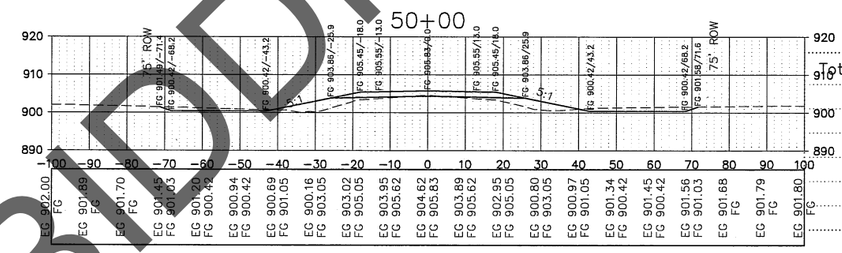
Total Volume at Station 44+00.00

Cut Area	11.60
Fill Area	198.51
Cut Vol	21.58
Fill Vol	1225.96
Cum Cut Vol	3989.56
Cum Fill Vol	16641.65



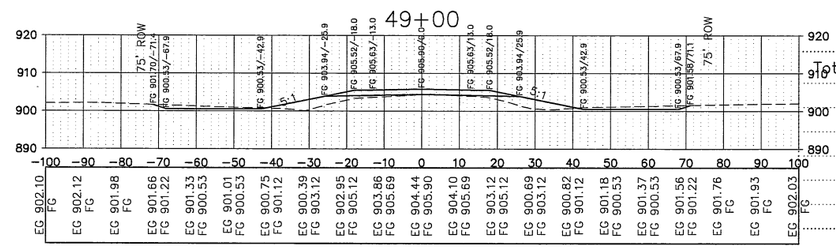
Total Volume at Station 51+00.00

Cut Area	66.04
Fill Area	79.44
Cut Vol	209.89
Fill Vol	439.94
Cum Cut Vol	4993.80
Cum Fill Vol	20370.50



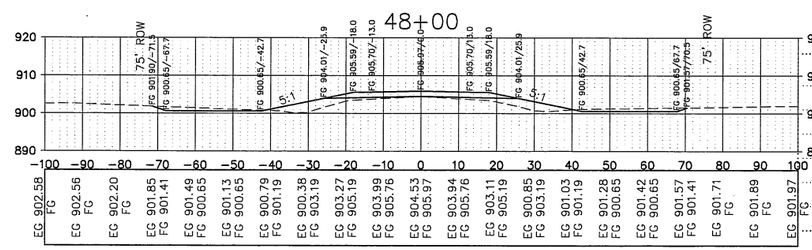
Total Volume at Station 50+00.00

Cut Area	47.29
Fill Area	84.40
Cut Vol	160.13
Fill Vol	457.70
Cum Cut Vol	4783.91
Cum Fill Vol	19930.56



Total Volume at Station 49+00.00

Cut Area	39.17
Fill Area	86.05
Cut Vol	143.61
Fill Vol	463.18
Cum Cut Vol	4623.78
Cum Fill Vol	19472.86



Total Volume at Station 48+00.00

Cut Area	38.37
Fill Area	86.44
Cut Vol	165.65
Fill Vol	440.12
Cum Cut Vol	4480.18
Cum Fill Vol	19009.68

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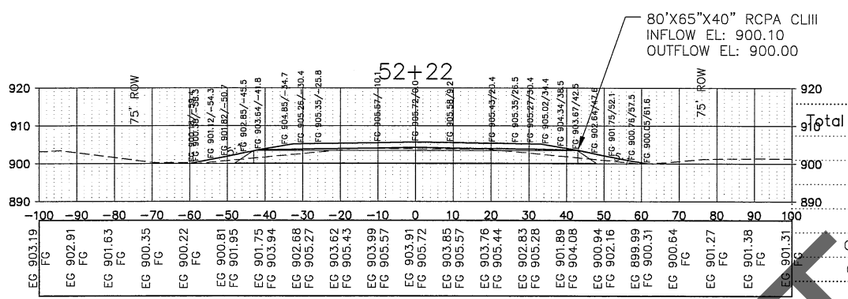
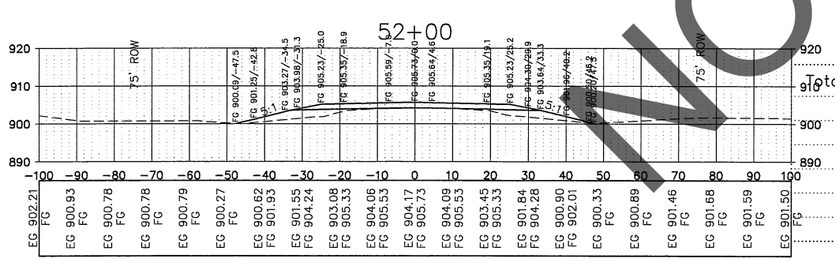


Total Volume at Station 52+21.78	
Cut Area	0.00
Fill Area	101.88
Cut Vol	0.04
Fill Vol	108.70
Cum Cut Vol	5116.35
Cum Fill Vol	20917.93



Total Volume at Station 52+00.00	
Cut Area	0.11
Fill Area	83.95
Cut Vol	122.51
Fill Vol	438.73
Cum Cut Vol	5116.30
Cum Fill Vol	20809.23

NOT FOR BIDDING