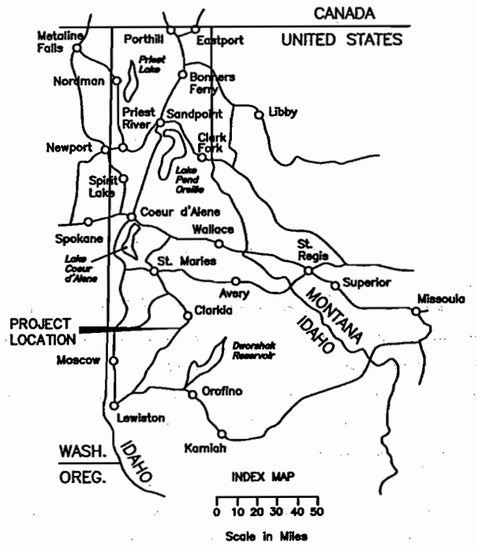
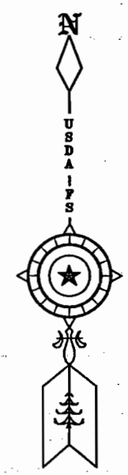
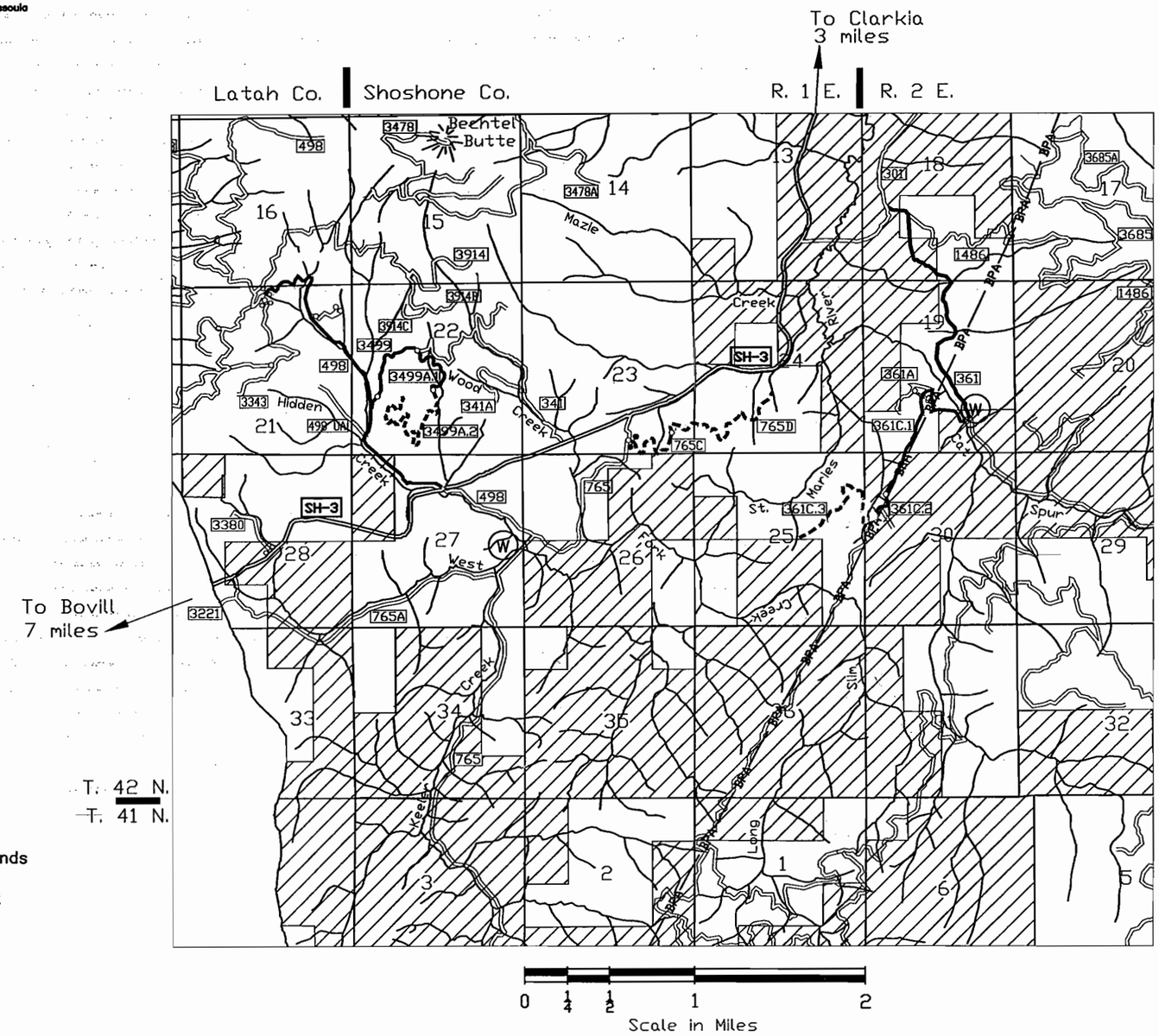
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE – REGION ONE
DRAWINGS FOR PROPOSED FOREST DEVELOPMENT

HIDDEN SLIM CONVENTIONAL

TIMBER SALE ROADS
IDAHO PANHANDLE NATIONAL FORESTS
St. JOE RANGER DISTRICT
Shoshone and Latah County, Idaho







LEGEND

- Existing Road
- Reconstruction
- New Construction
- National Forest System Lands
- Other than National Forest System Lands
- Water Source
- New Gate
- Existing Gate
- Powerline

SHEET	DESCRIPTION
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Recommended to be technically correct and that this project is in conformance with Environmental Assessment requirements

Brent A. Briggs
Infra Team Leader

Approved to be in conformance with sound Engineering practice for safety, structural integrity, and operational requirements.

Forest Engineer

Approved: Charles A. Mace 3/12/08
District Ranger Date

SUMMARY OF ESTIMATED QUANTITIES

ROAD NUMBER				361	361A	361C.1	361C.2	361C.3	498	765C	765D	3499	3499A.1	3499A.2	Project
TYPE OF CONSTRUCTION: (C = CONSTRUCTION, R = RECONSTRUCTION)				R	R	R	R	C	R	C	C	R	R	C	Totals
LENGTH OF CONSTRUCTION (MILES)								0.95		0.44	1.16			1.24	3.79
LENGTH OF RECONSTRUCTION (MILES)				1.60	0.60	0.75	0.21		2.15			0.45	0.46		6.22
ITEM NO.	DESCRIPTION	M/M*	UNIT												
173(01)A	Establishing Slope Stakes, Cut Side(s) & Through Fills, Clearing Limit & Slope Stake Combined	DQ	MI				0.21	0.95		0.44	1.16	0.45	0.46	1.24	4.91
201(01)	Clearing & Grubbing, Slash Treatment Methods for Tops & Limbs 11.1, Logs 8.1, & Stumps 11.1, Utilization of Timber 1.	DQ	AC				1.04	6.36		2.61	5.48	1.93	2.05	6.28	25.75
201(03)	Clearing & Grubbing, Slash Treatment Methods for Tops & Limbs 4, 6.1, 11.3, Logs 8.1, & Stumps 4, 11.3, Utilization of Timber 1.	DQ	MI	1.60	0.60				2.15						4.35
202(02)CM	Removal of Metal Pipe	AQ	EA				1								1
203(01)H	Excavation, P.M. 1, Includes Sta. Yd. Haul	DQ	CY				642	10977		4430	7208	670	2041	9889	35857
204(01)	Temporary Seeding and Fertilizing	DQ	AC				0.21	2.99		1.20	4.47	1.35	1.63	5.34	17.19
204(09)	Sediment Basin	AQ	EA				1	1				1	1		4
206A(02)	Pipe Culvert Excavation	DQ	CY									150			150
304(10)	Placing Aggregate, Type Surfacing, Grading D, Compaction B, Commercial Source	DQ	CY			914	342	1613	20	1089	1937		133	102	6150
306(01)	Reconditioning of Roadbed, Compaction A	DQ	MI	1.60	0.60	0.75			2.15						5.10
412(16)	Calcium Chloride Flake @77% Min. Concentration, Preparation Method 1	AQ	Ton	11.30	4.30	5.30	1.50	6.80							
601(01)	Mobilization	LSQ	LS	Job	Job	Job	Job	Job	Job	Job	Job	Job	Job	Job	Job
603(01)18C	18" Corrugated Metal Pipe (incl. Culv. Exc.) Thickness: Steel 0.064, Thickness: Aluminum 0.060, Method C	AQ	LF				72	382		160	246		40	182	1082
603(01)24C	24" Corrugated Metal Pipe (incl. Culv. Exc.) Thickness: Steel 0.064, Thickness: Aluminum 0.060, Method C	AQ	LF										40		40
603(01)30C	30" Corrugated Metal Pipe (incl. Culv. Exc.) Thickness: Steel 0.064, Thickness: Aluminum 0.060, Method C	AQ	LF				40	34							74
603(02)	66 inch span, 51 inch rise, Corrugated Metal Pipe Arch, 0.109 inch Thickness for Steel, or 0.105 inch thickness for Aluminum, Method C	AQ	LF									34			34
625(07)	Seeding, Dry Method (with Mulch)	DQ	AC				0.21	2.99		1.20	4.47	1.35	1.63	5.34	17.19
640(01)	Furnish and Install Road Closure Device, Type Gate, size 14'0" - 16'6"	AQ	EA							1					1
640(05)	Install Gate Bypass	AQ	EA							1					1

M/M* = Method of Measurement

General Notes

Section 201:

1. Log decks shall be located beyond toe of fill so as to not interefere with road construction.
2. Embankment material shall not be placed on or against log decks.

Section 203:

1. All excess or unsuitable excavation not utilized shall be sidecast wasted along the roadway unless otherwise Designated On The Plans or Directed By The Contracting Officer.
2. No material shall be sidecast wasted into live streams.
3. Scarification will not be required.
4. No material shall be sidecast wasted on slopes within 20 Ft. of cross-drain culverts.
5. Water for subgrade compaction is incidental to the excavation pay item. An allowance has been calculated into the unit price.
6. All road construction shall conform to Tolerance Class I.

Section 204:

1. All areas of disturbed earth outside roadbed shall be temporary seeded and fertilized.
2. All areas of disturbed earth including the roadbed shall be seeded on newly constructed or reconstructed roads.
3. Sediment basins and trapped sediment shall be removed prior to the end of the construction season. Material removed shall be placed 5 Ft. above high water mark.

Section 206A

1. All excess or unsuitable material shall be sidecast wasted along the roadway.
2. No material shall be sidecast wasted into live streams, or along slopes adjacent to, live streams .

Section 207:

1. Water sources are located along Rd. 765 in the SE ¼ of section 27, T.42 N., R.1 E., B.M. and along road 361A in the SE ¼ of section 19, T.42 N., R.2 E., B.M.

Section 304:

1. All quantities and depths shown on the drawings and estimate are compacted in-place quantities and depths.
2. Water for aggregate compaction is incidental to the crushed aggregate pay item. An allowance has be calculated into the unit price.
3. Crushed aggregate is a commercial source item. One possible source of crushed aggregate is located near State Highway 3 in the NE ¼ Section 6, T.43 N., R.1 E., B.M.

Section 306:

1. All excess, oversize or unsuitable material removed under Section 306 shall be sidecast wasted along the roadway unless otherwise Designated On The Plans.
2. No material shall be sidecast wasted into, or along slopes adjacent to, or within 50 feet of live streams.
3. No material shall be sidecast wasted on slopes within 20 Ft. of cross-drain culverts.
4. Scarification Will Not Be Required.

Section 412:

1. Dust Palliative shall be applied prior to rock haul.
2. Apply dust palliative at 12 foot width.
3. Apply Calcium Chloride flake 77% at a rate of 2 lbs / square yard. Adjustment of rate will be based on concentration of product provided.

Section 625:

1. All areas of disturbed earth outside of roadbed shall be seeded.
2. All areas of disturbed earth including the roadbed shall be seeded on newly constructed or reconstructed roads that do not have aggregate placed on them.

Noxious Weed Control:

In order to prevent the spread of noxious weeds into the Hidden Slim Conventional Timber Sale, The Contractor shall provide certification that any seed or straw/hay on the project is noxious weed free. The Contractor shall furnish the Forest Service with proof of weed free equipment as provided in the contract.

Construction Signing:

All construction signs and installations shall conform to the current M.U.T.C.D. standards .

CALL BEFORE YOU DIG:
A BPA powerline traverses the sale area. No other utlities are known within the project. Purchaser is responsible for damage to any utilities, known or unknown.

Worklist Rd 498

M.P.	Description
0.64	Jct. w/ SH-3(M.P.48.6). Begin reconstruction Item 201(03) Clearing, Item 306(01) Reconditioning.
2.72	Existing gate
2.73	Begin reconstruction Item 304(10) aggregate.
2.741	End Item 304(10) aggregate.
2.79	Jct. w/ road 3343 Lt. End reconstruction Item 201(03) clearing, Item 306(01) reconditioning.

Work List Rd 361

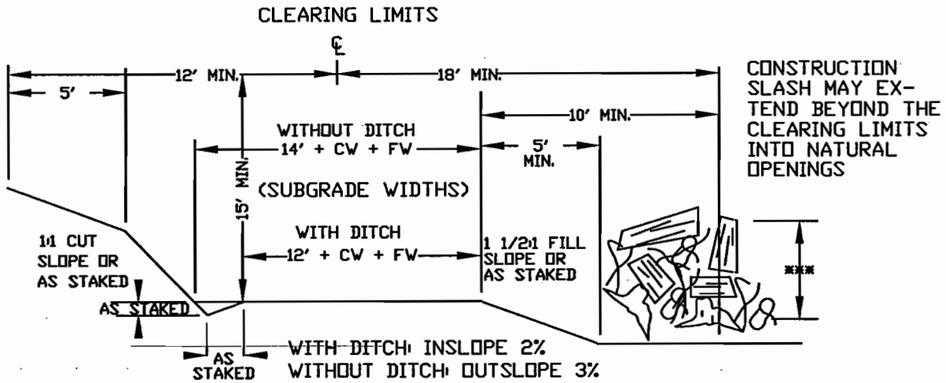
M.P.	Description
0.00	Jct with road 1486 M.P. 0.14. Begin reconstruction Item 201(03)clearing, Item 306(01) reconditioning, Item 412(16) Calcium Chloride
1.60	Jct with road 361A. End reconstruction Items 201(03) clearing, 306(01) reconditioning, Item 412(16) Calcium Chloride.

Worklist Rd 361A

M.P.	Description
0.00	Jct with road 361 M.P. 1.60. Begin reconstruction Item 201(03) clearing, Item 306(01) reconditioning, Item 412(16) Calcium Chloride.
0.60	End reconstruction Items 201(03) clearing, 306(01) reconditioning.

Work List Rd 361C.1

M.P.	Description
0.00	Jct with road 361A M.P. 0.60. Begin reconstruction Item 201(03)clearing, Item 304(10) aggregate, Item 306(01) reconditioning, Item 412(16) Calcium Chloride
0.75	End reconstruction Items 201(03) clearing, Item 304(10) aggregate, 306(01) reconditioning, Item 412(16) Calcium Chloride.



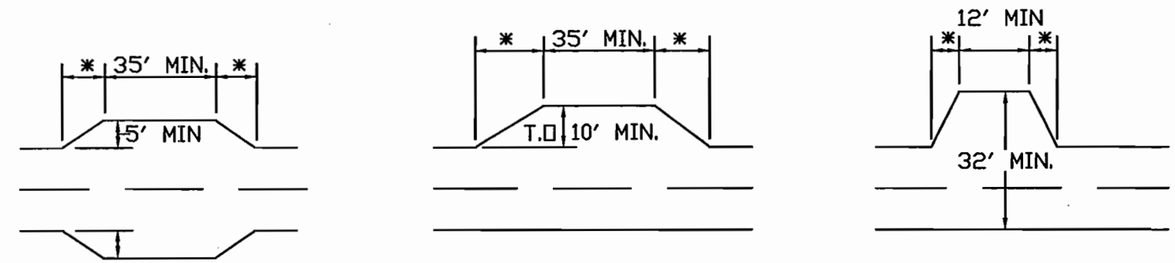
CONSTRUCTION TYPICAL SECTION

Rd 361C.3 Sta. 11+10-61+50,
Rd 765C, Rd 765D, Rd 3499A.2

NO SCALE

***IN AREAS WHERE FILL IS 5' OR LESS, THE HEIGHT OF PILE ABOVE SUBGRADE SHALL NOT EXCEED 10'. IN AREAS WHERE FILL IS GREATER THAN 5' THE HEIGHT OF PILE ABOVE SUBGRADE SHALL NOT EXCEED 5'.

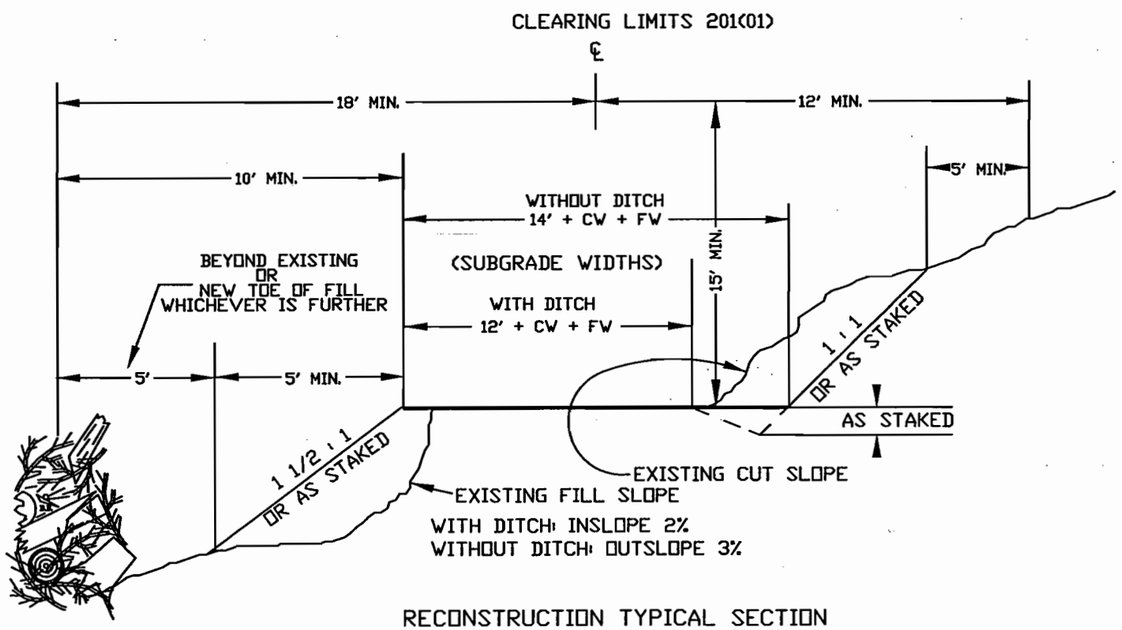
TURNOUT TYPICAL SECTION



*AS STAKED

All roads

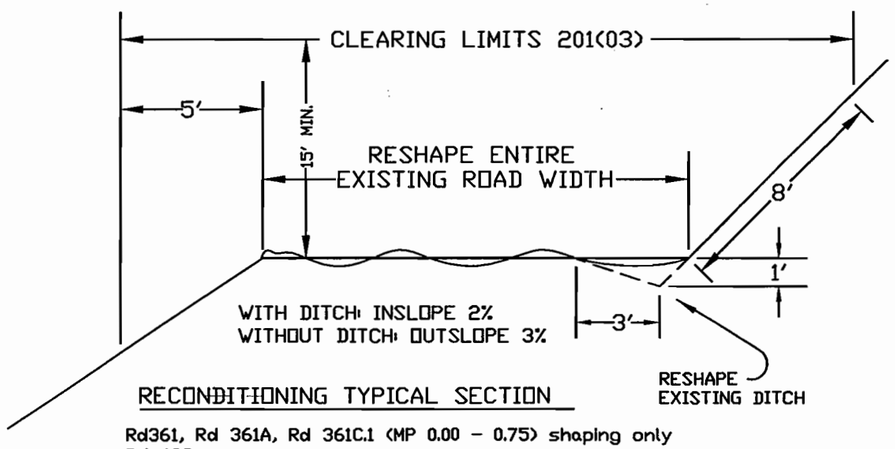
Design Speed = 10 MPH
Curve Widening = logtruck



RECONSTRUCTION TYPICAL SECTION

Rd 498, Rd 361C.2, Rd 3499, Rd 3499A.1

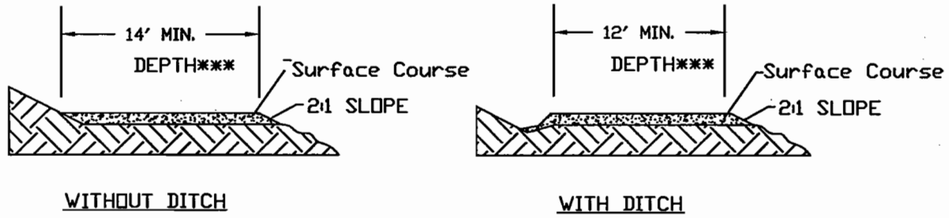
NO SCALE



RECONDITIONING TYPICAL SECTION

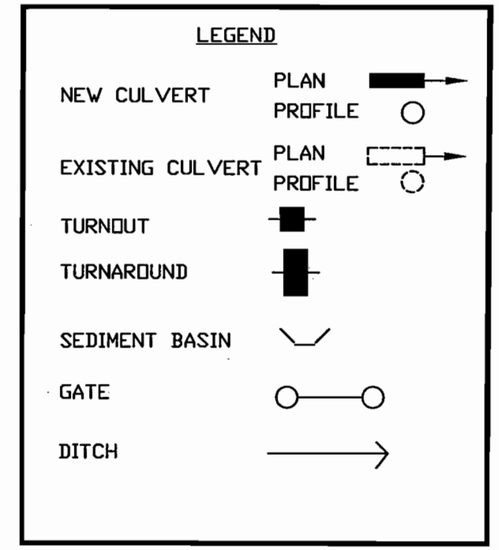
Rd361, Rd 361A, Rd 361C.1 (MP 0.00 - 0.75) shaping only
Rd 498,

NO SCALE



SURFACE COURSE TYPICAL

***THE SURFACE COURSE TYPICAL DEPTH SHOWN ON THE PLANS IS A COMPACTED IN-PLACE DEPTH. SURFACE THE ENTIRE SUBGRADE, INCLUDING CURVE WIDENING, FILL WIDENING, TURNOUTS AND DITCH, AS SHOWN.



Crushed Aggregate Depths

Road #	Location	Surface Course Item 304(10)S
361C.1	MP 0.00 - 0.50	4"
361C.1	MP 0.50 - 0.75	6"
361C.2	0+00 - 11+10	6"
361C.3	11+10 - 55+89	6"
498	Past gate, just before Rd. 3343 Jct. for 60'	6"
765C	0+00 - 23+45	6"
765D	0+00 - 61+15	6"
3499A.1	3+90 - 6+85	6"
	22+80 - 24+12	6"
3499A.2	1+75 - 4+75	6"

Drainage Structure Summary

Road / Sta.		Designed Length 18"	24"	30"	36"		66 x 51"			Staked Length	Installed Length	Date Installed	Gravel Blanket	Date Installed	Misc.	Date Installed	Sediment Basin	Date Installed	Remarks
361C.2	2+25	34'																	
	3+73			40'													X		
	4+45	38'																	
361C.3	12+77			34'													X		
	14+16	30'																	
	24+24	38'																	
	27+05	34'																	
	35+55	32'																	
	39+01	38'																	
	40+61	48'																	
	45+49	60'																	
	47+87	64'																	
	53+20	38'																	
765C	6+55	50'																	
	7+10	38'																	
	8+20	40'																	
	19+30	32'																	
765D	22+95	36'																	
	27+00	40'																	
	37+50	42'																	
	42+45	42'																	
	48+25	40'																	
	51+90	46'																	
3499	0+36						34'										X		
3499A.1	11+47	40'																	
	23+87		40'														X		
34994.2	12+60	38'																	
	30+15	34'																	
	40+05	36'																	
	42+30	40'																	
	64+45	34'																	

Hidden Slim conventional
Cattail
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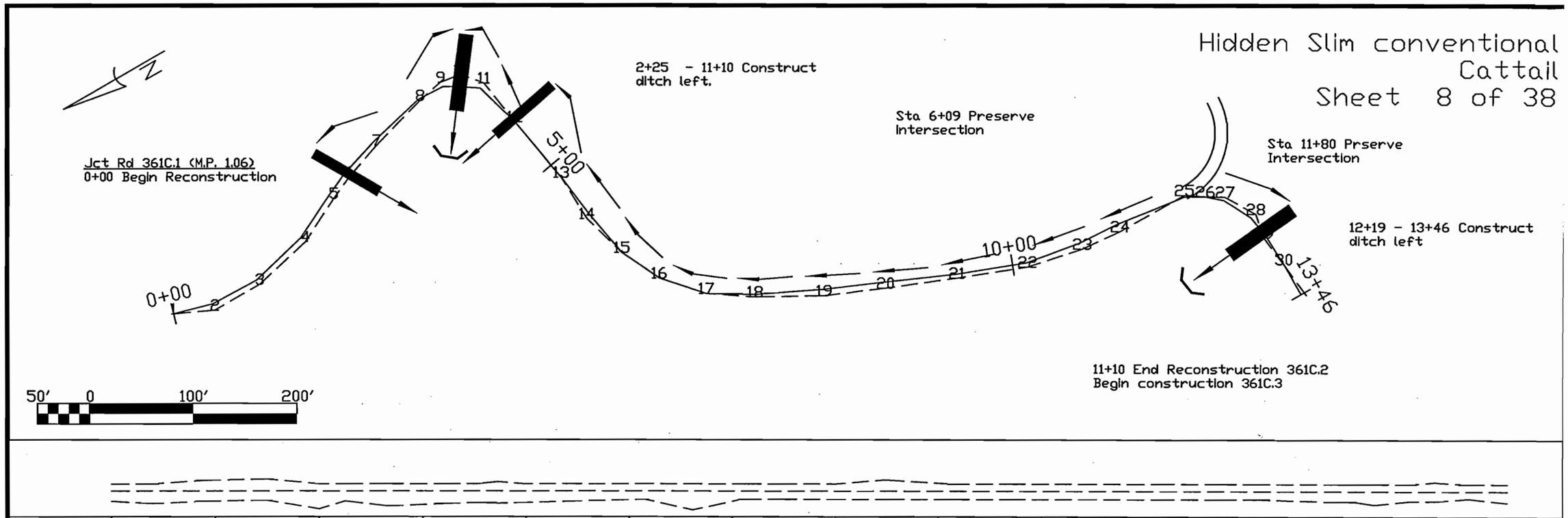

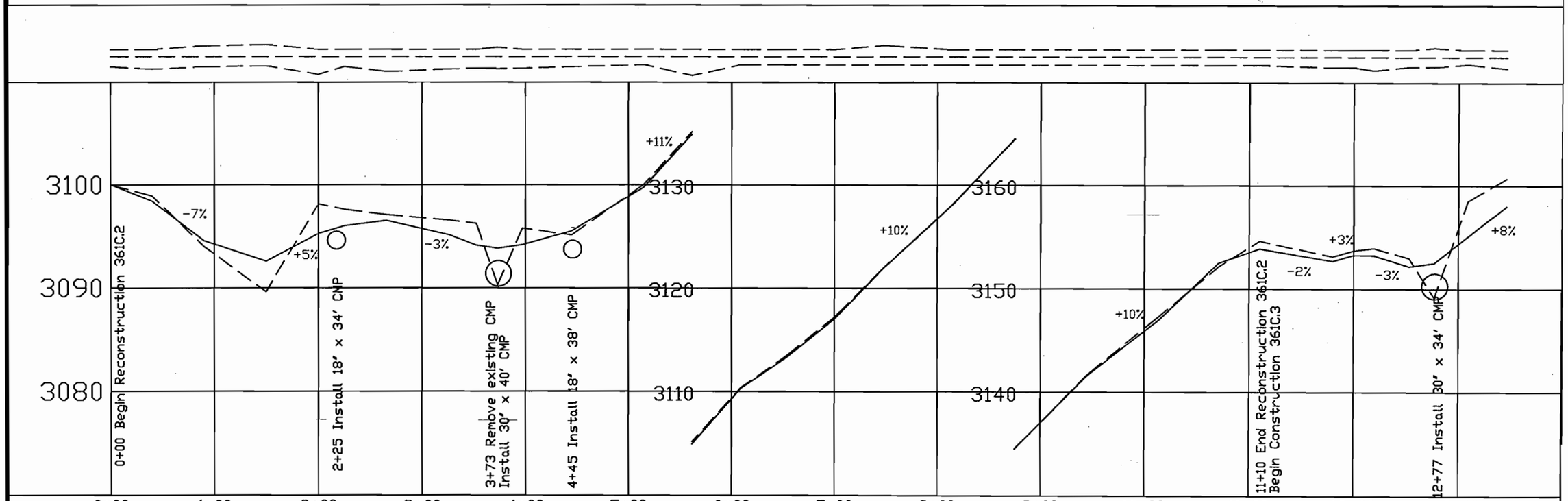

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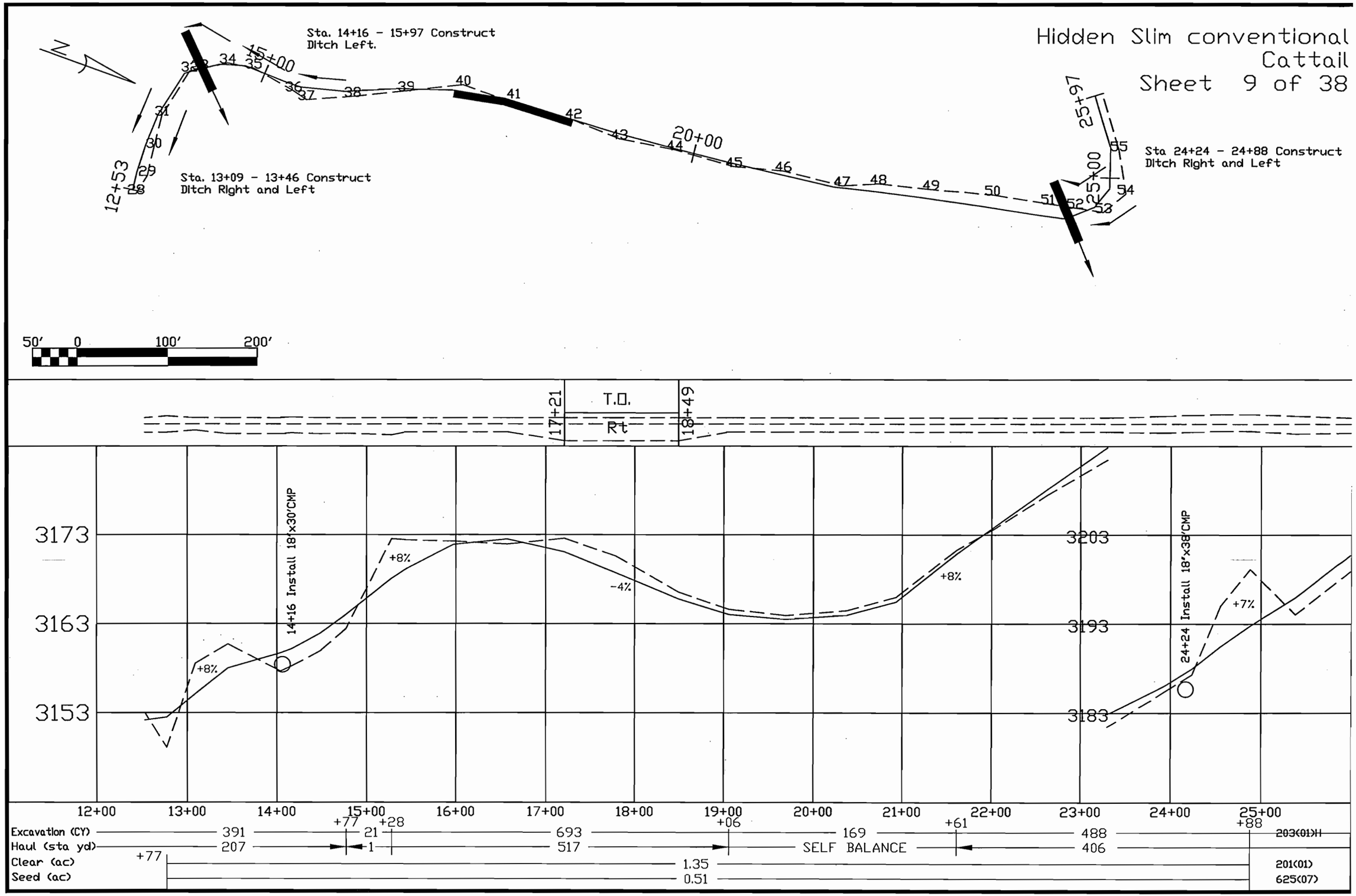

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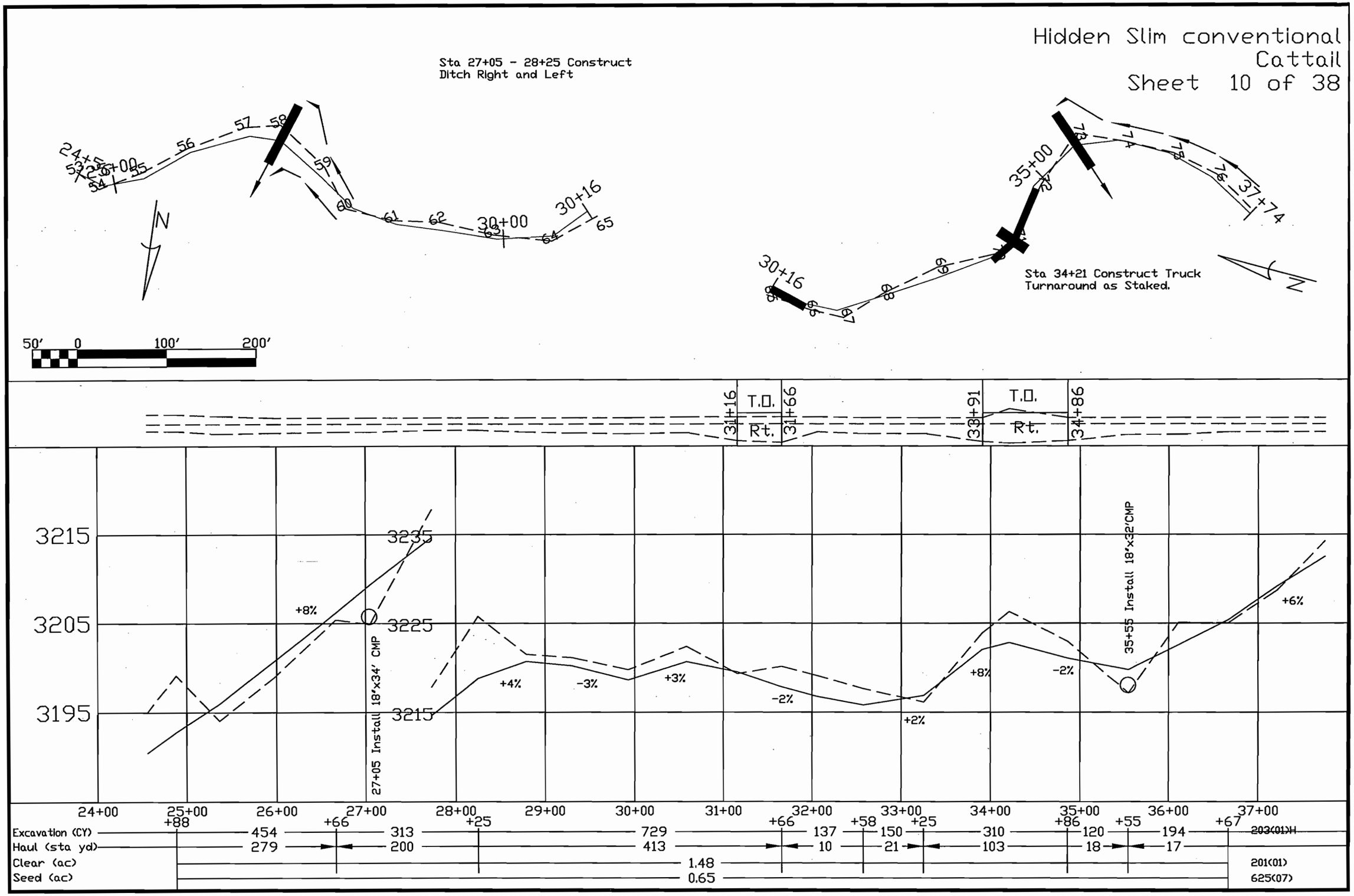

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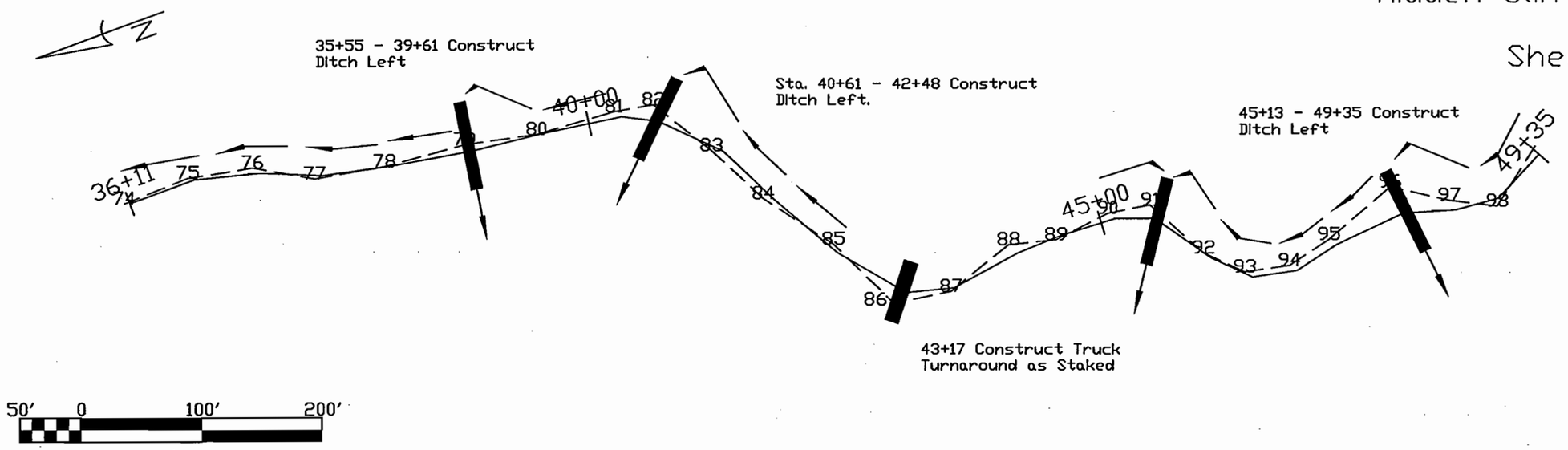

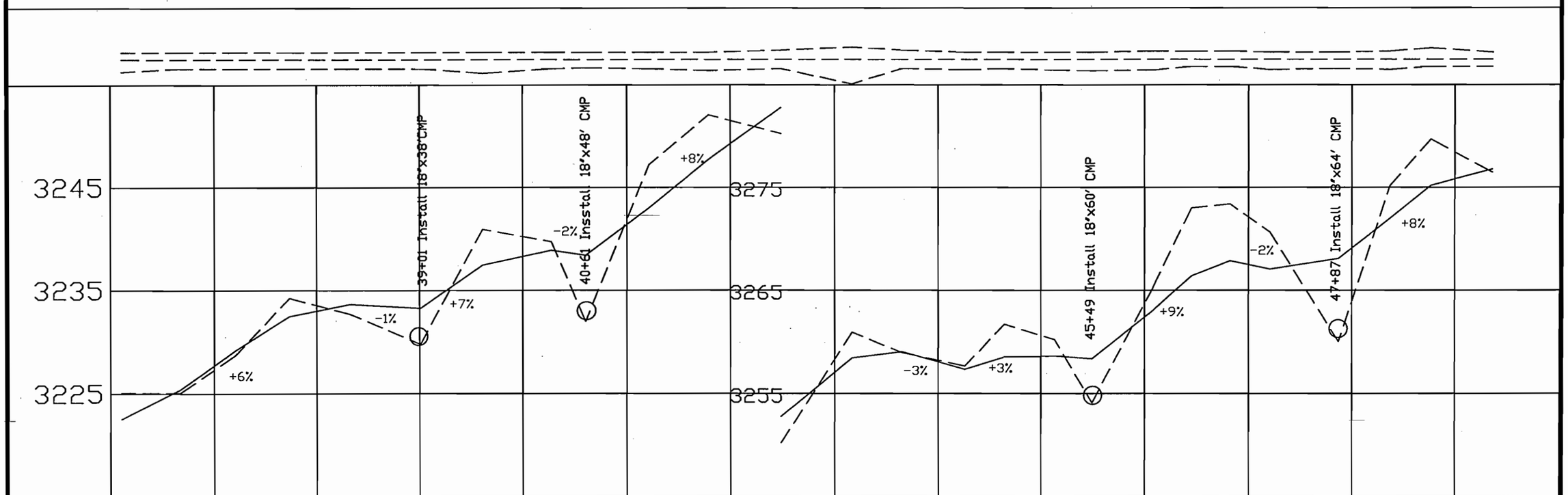

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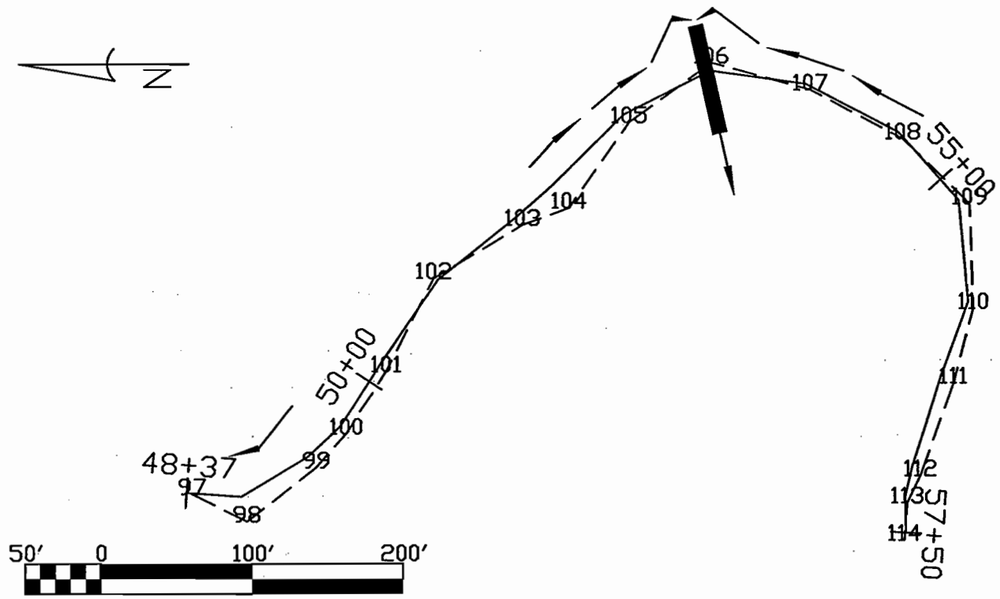
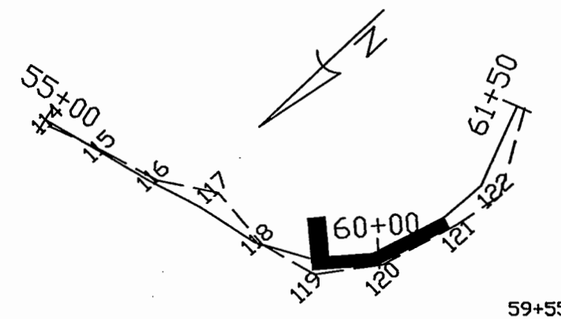
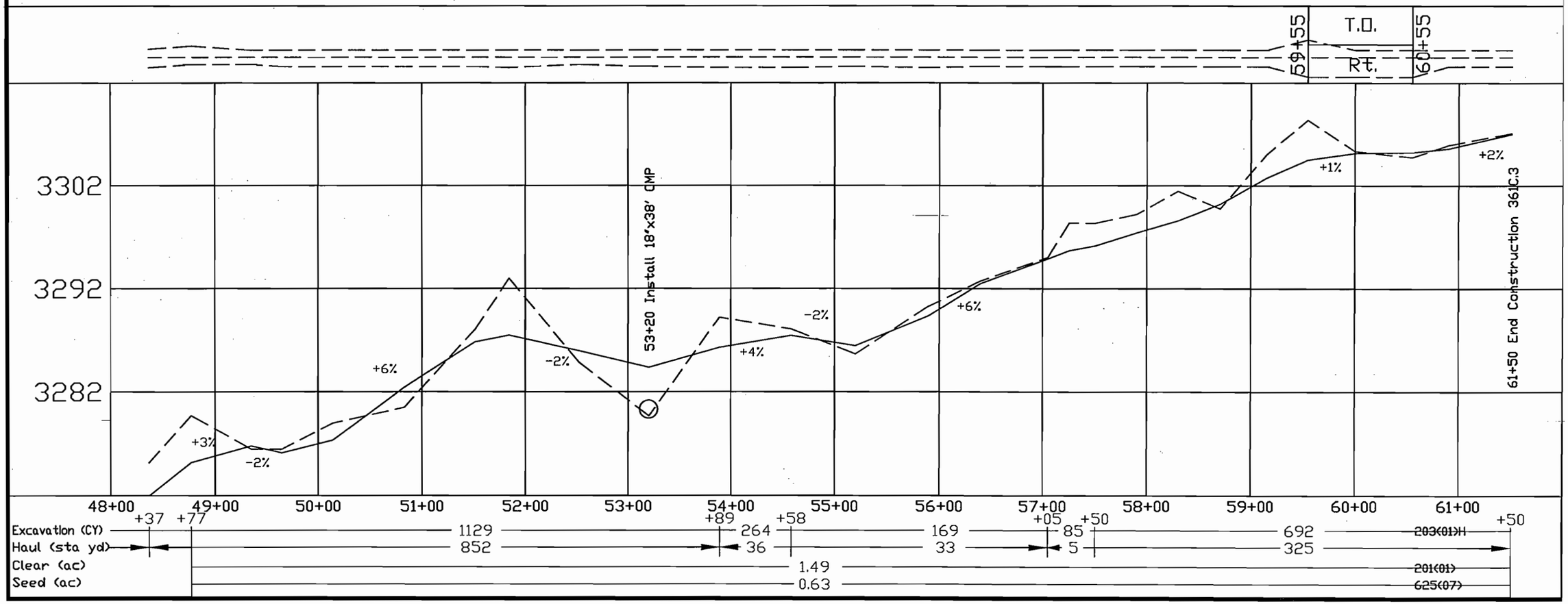


51+84 - 54+58 Construct
Ditch Left.



59+55 Construct Truck
Turnaround as Staked.



Jct Rd 765 (M.P. 0.21)
0+00 Begin Construction

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Keel Haul Rd 765 C
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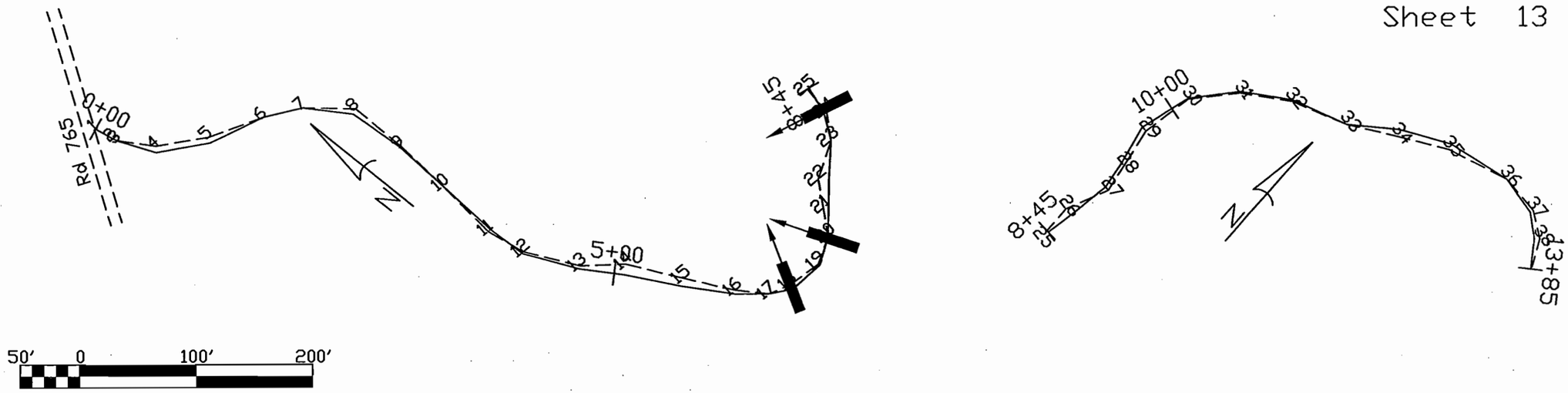

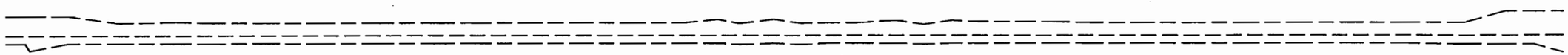

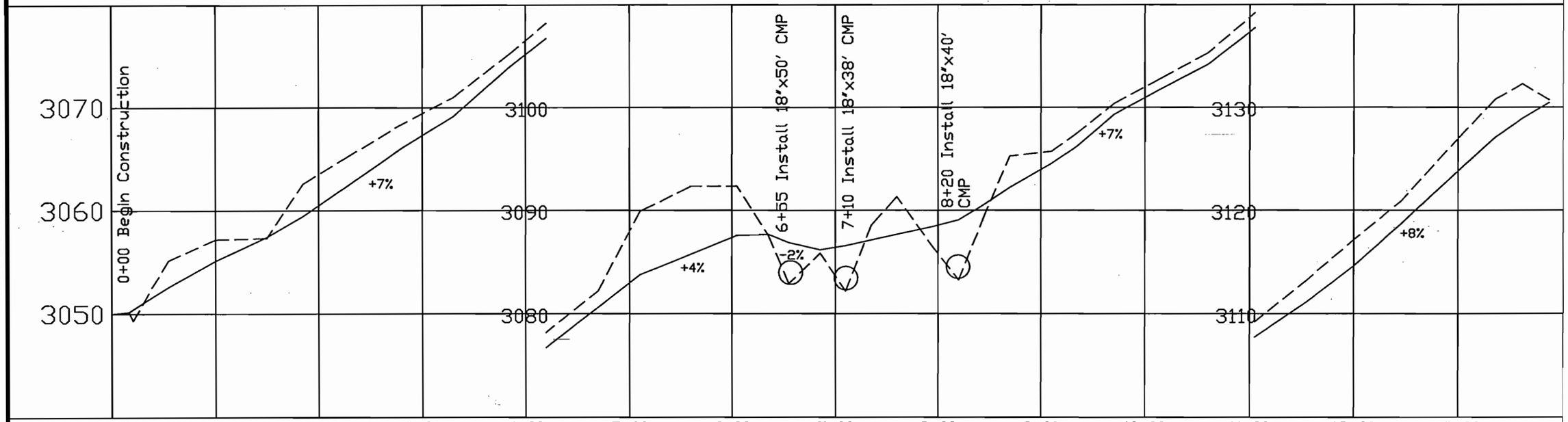

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Keel Haul Rd 765 C
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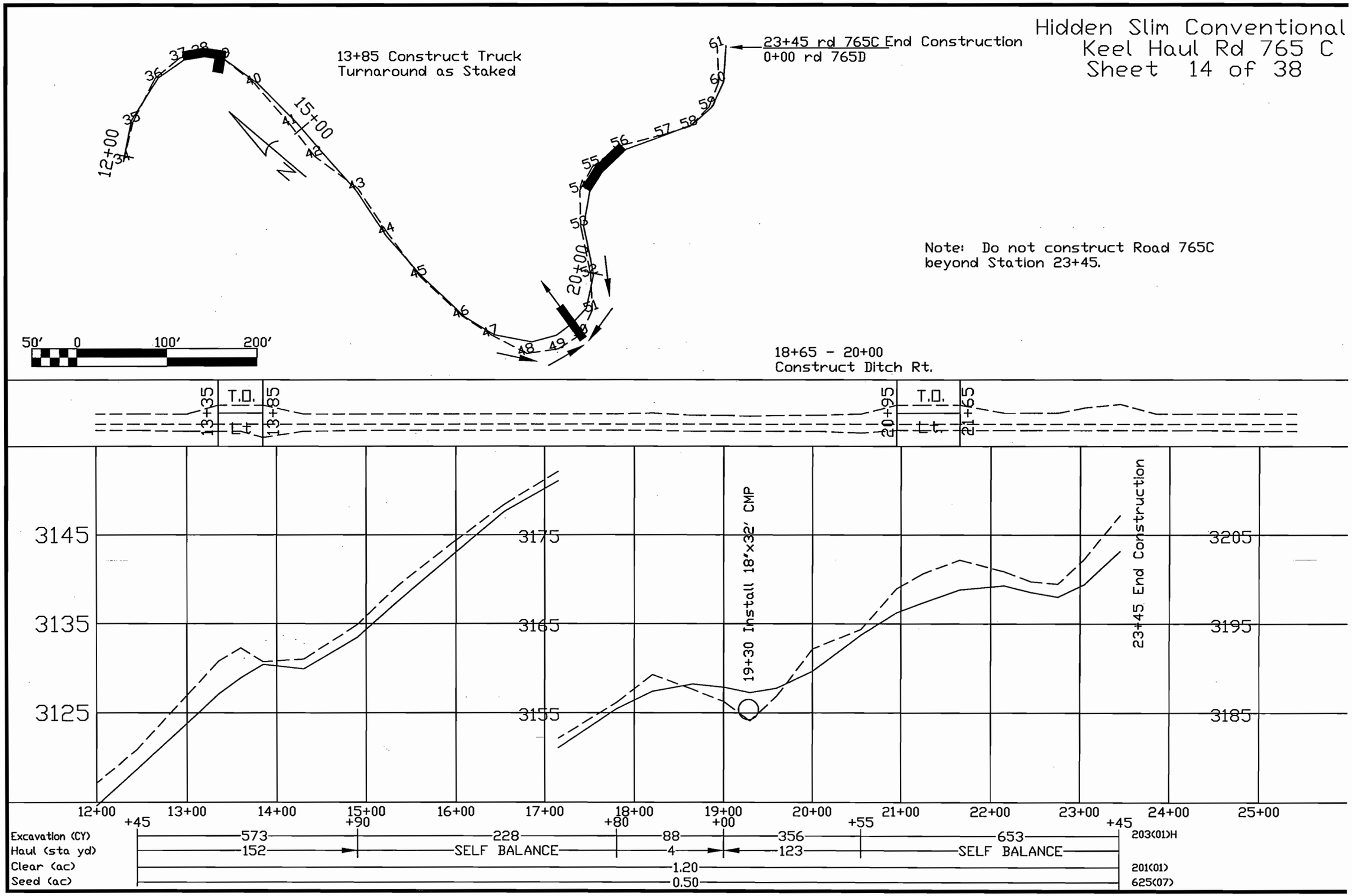

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Keelover Rd. 765D
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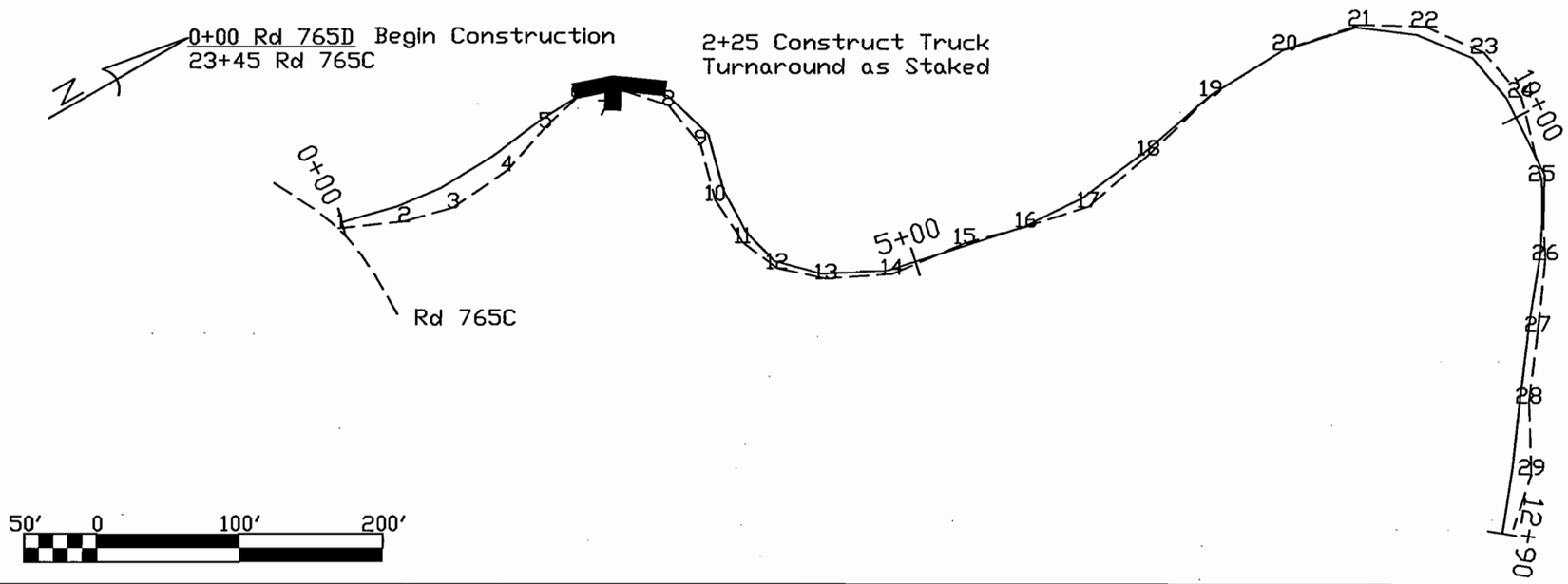

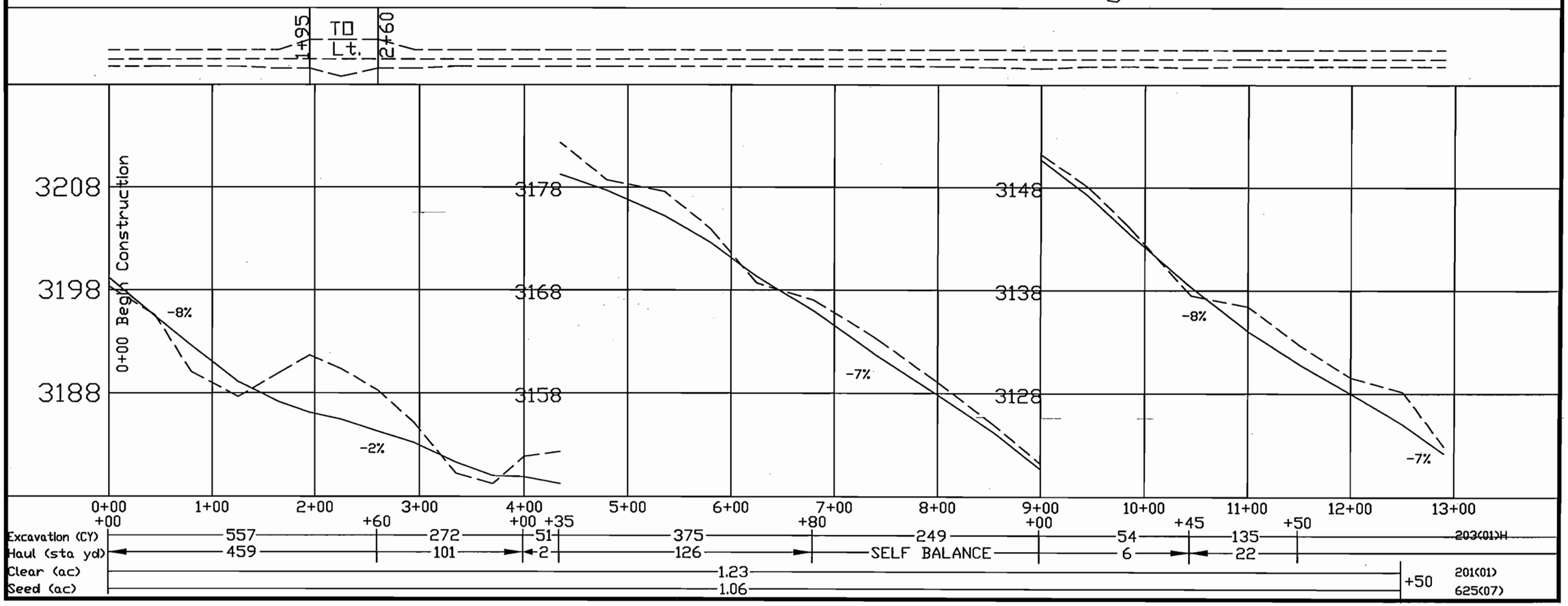

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Keelover Rd. 765D
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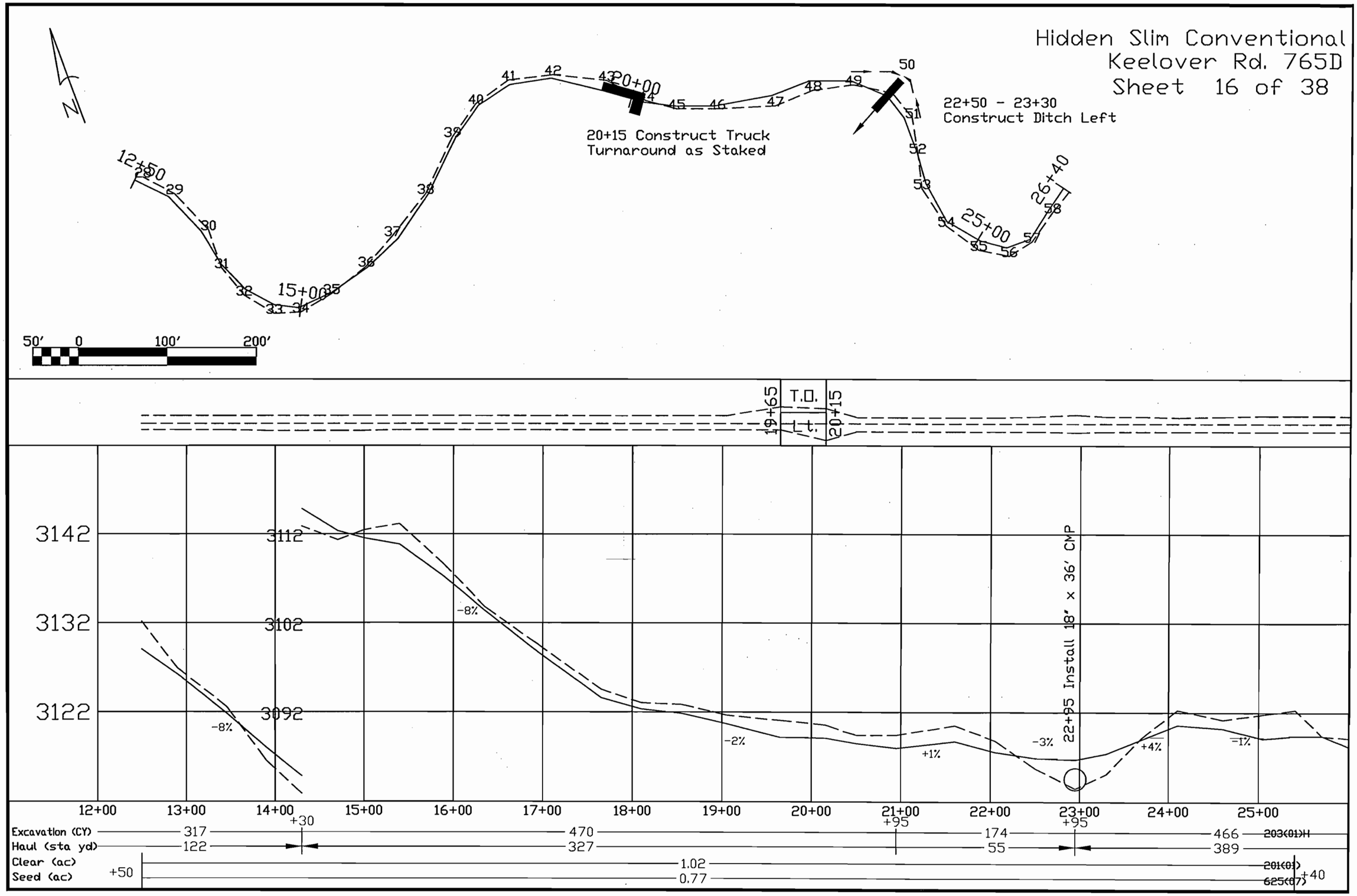

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Keelover Rd. 765D
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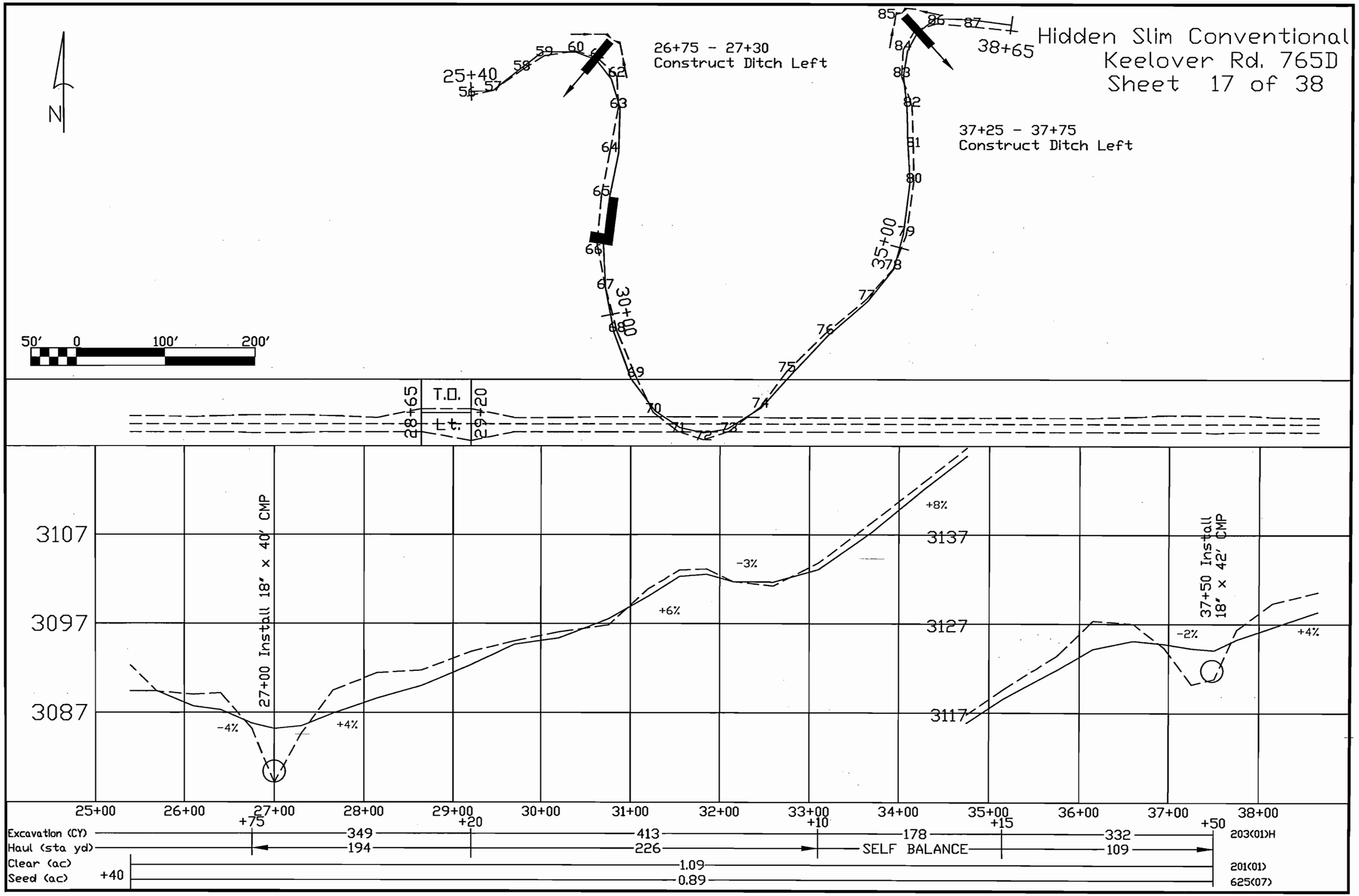

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Keelover Rd. 765D
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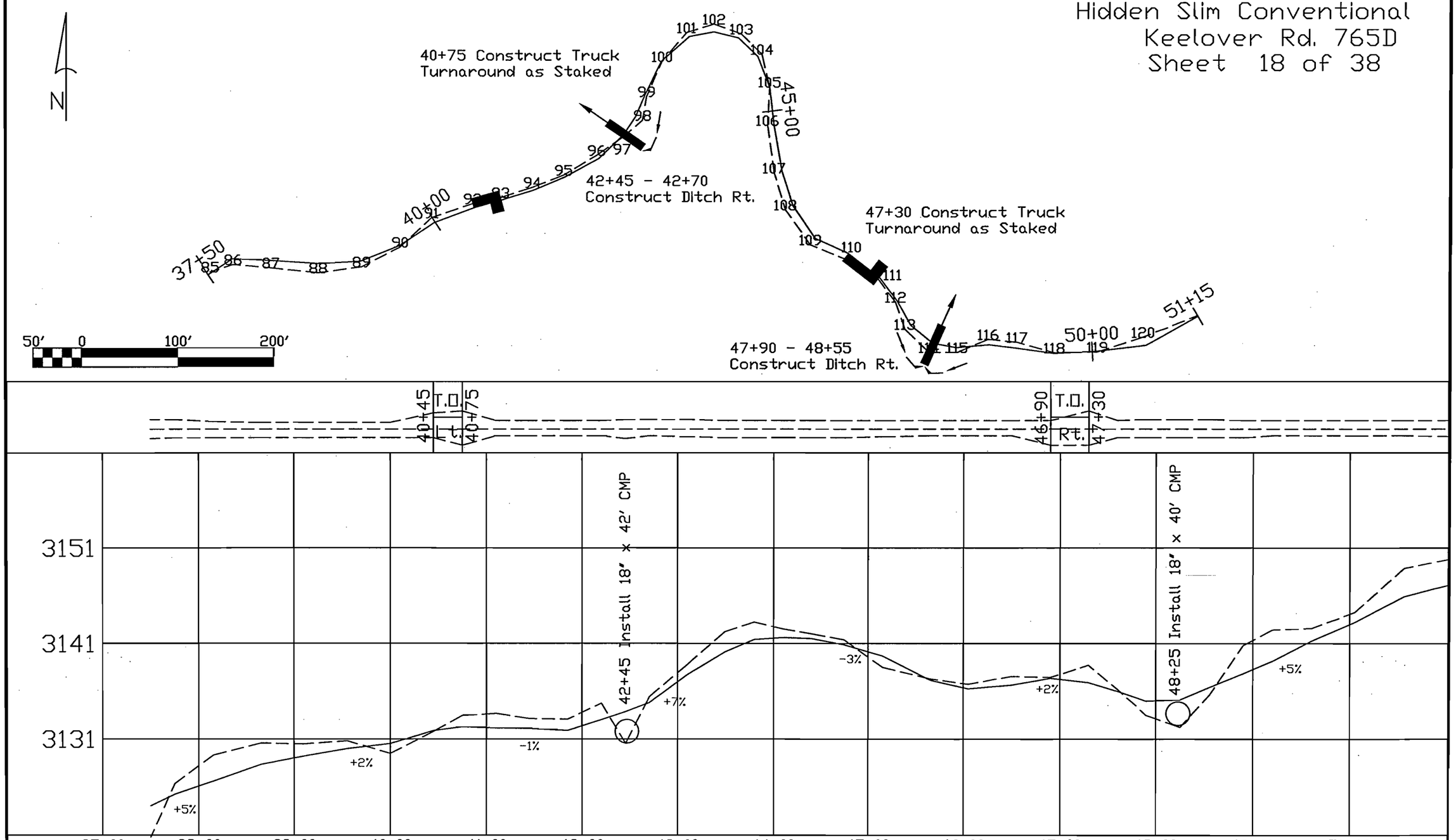

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Keelover Rd. 765D
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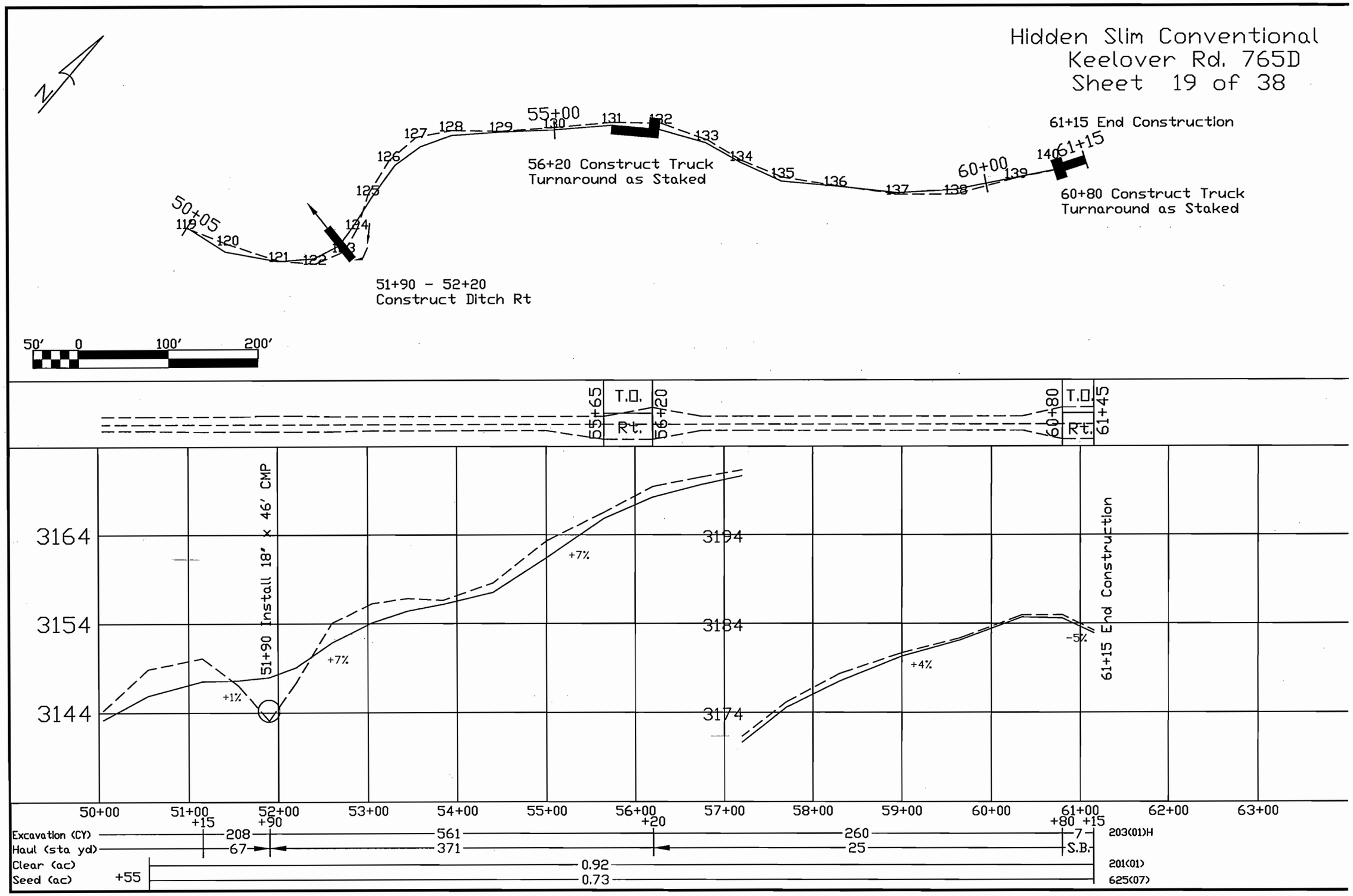

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Wood Creek Connection 3499
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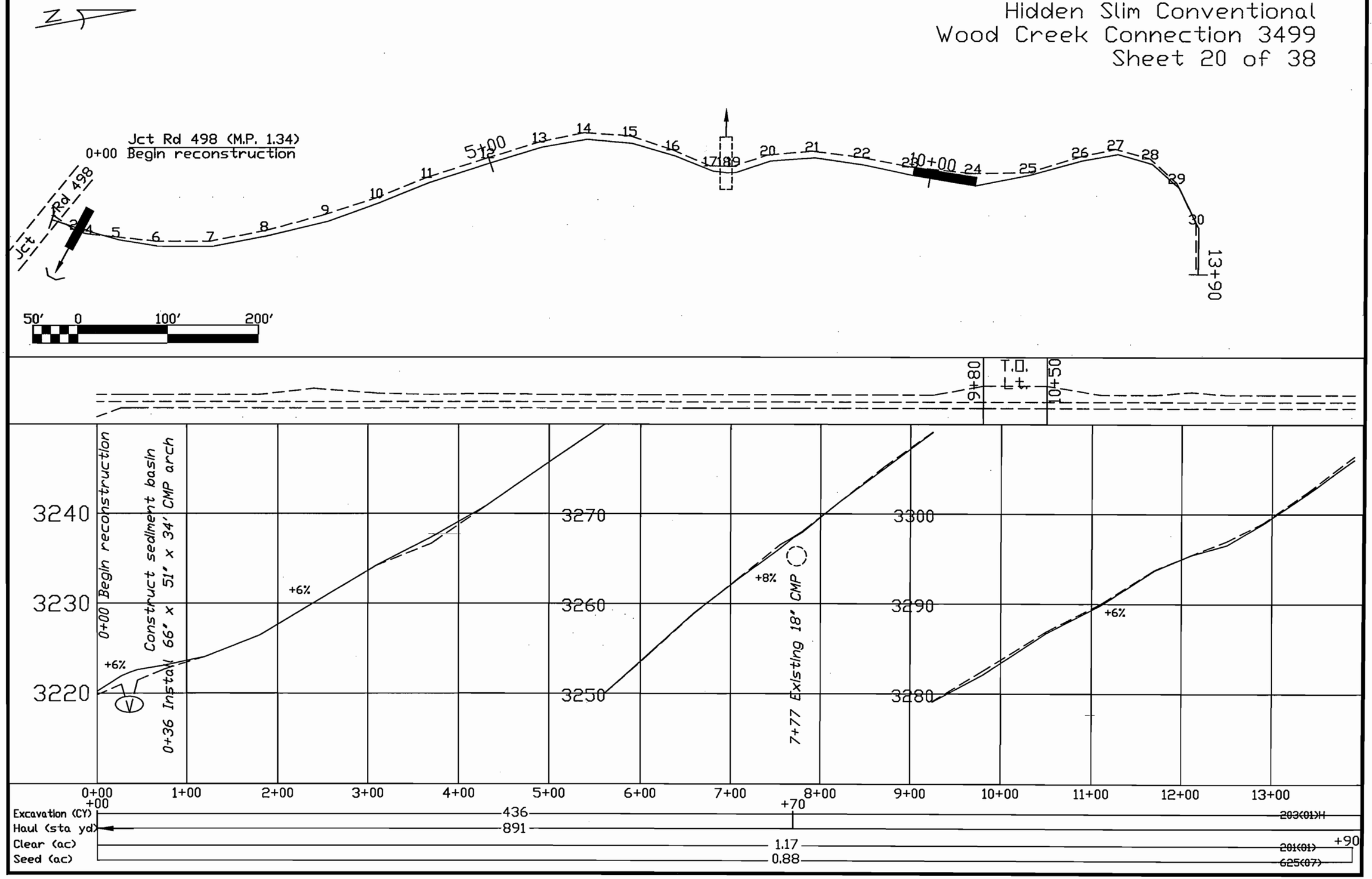

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Wood Creek Connection 3499
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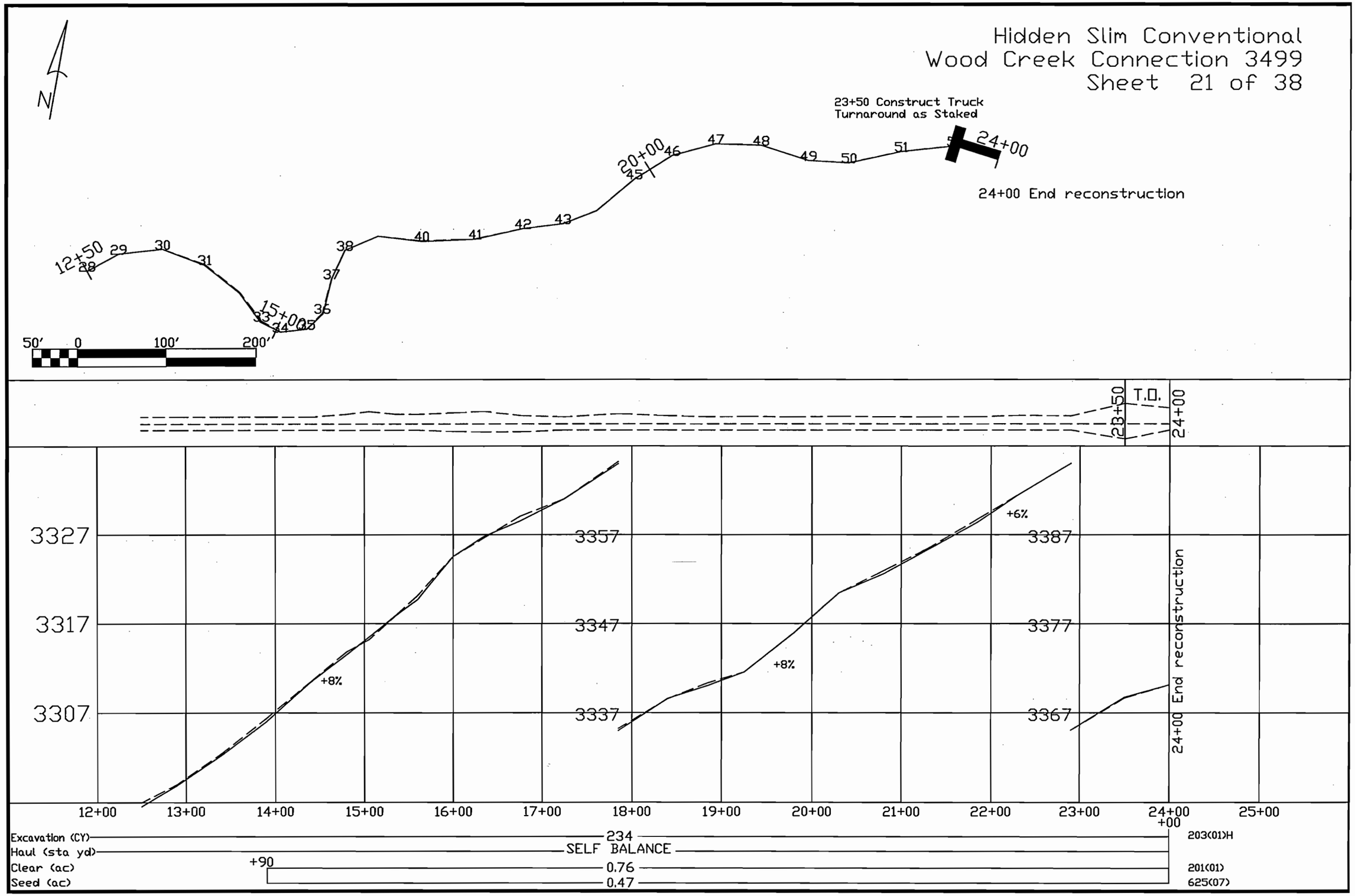

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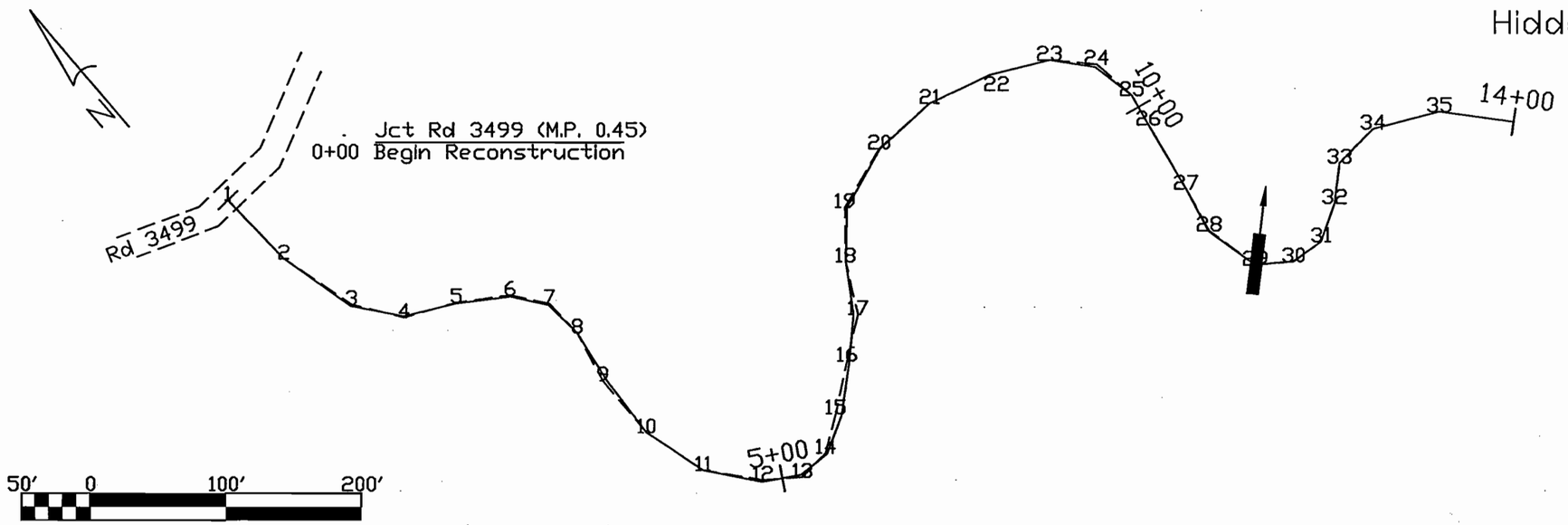
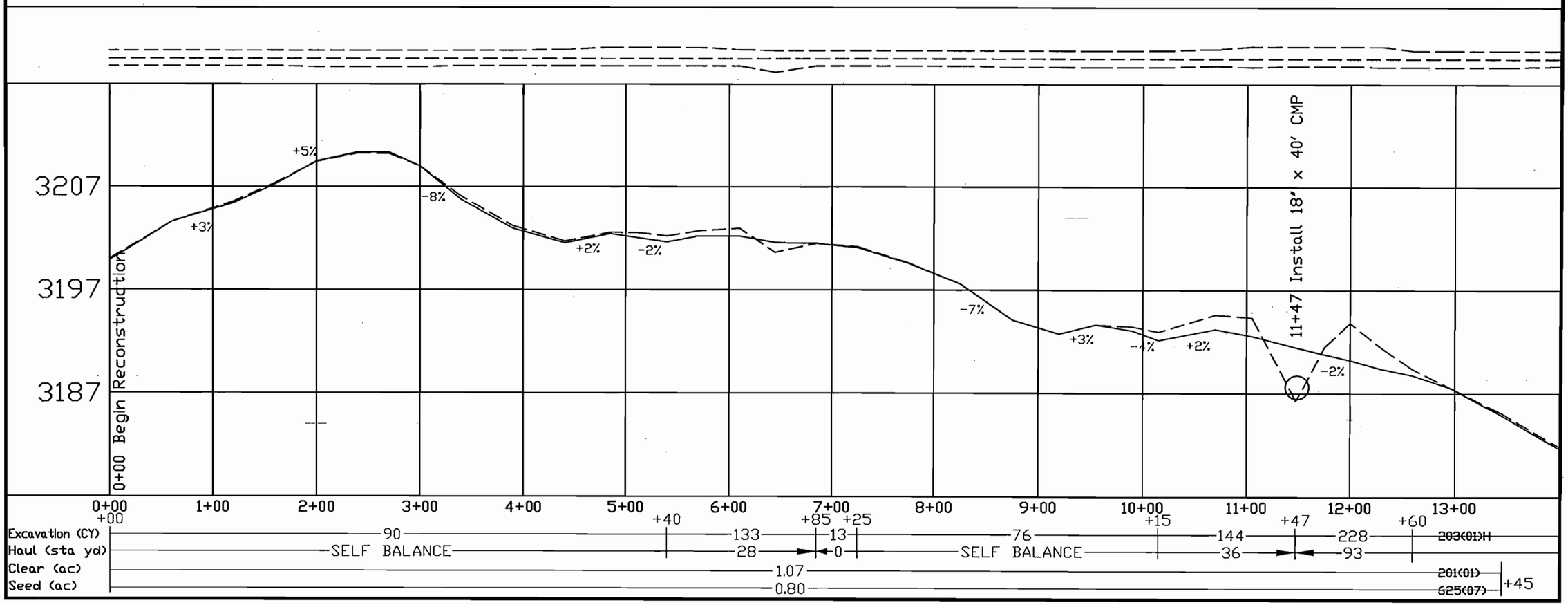
Rd 3499A.1
Sheet 22 of 38





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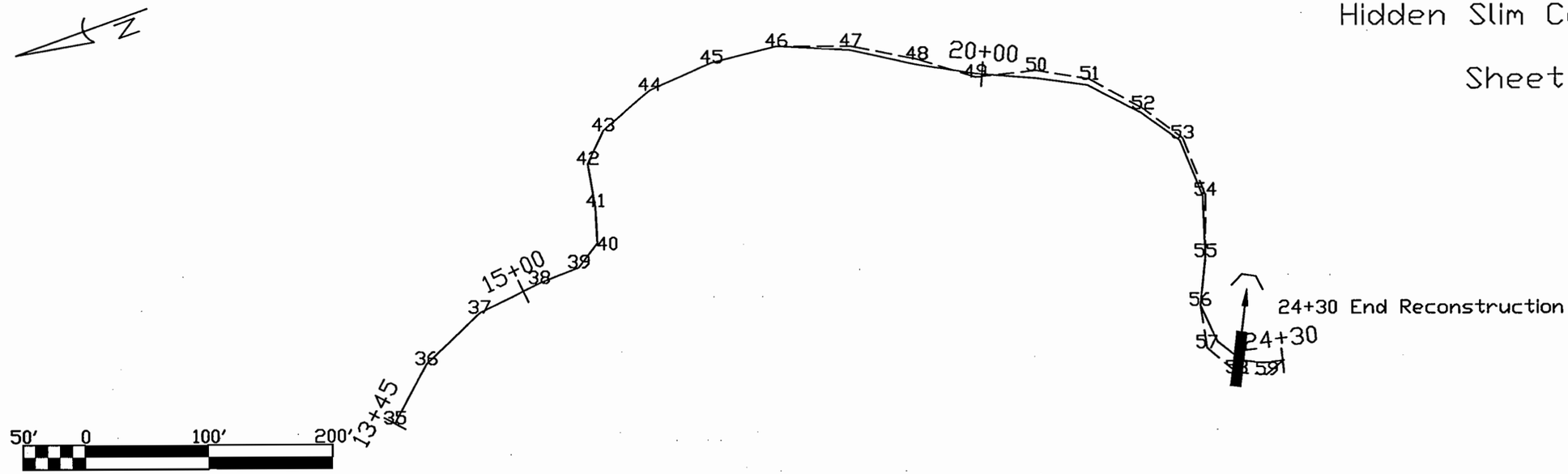

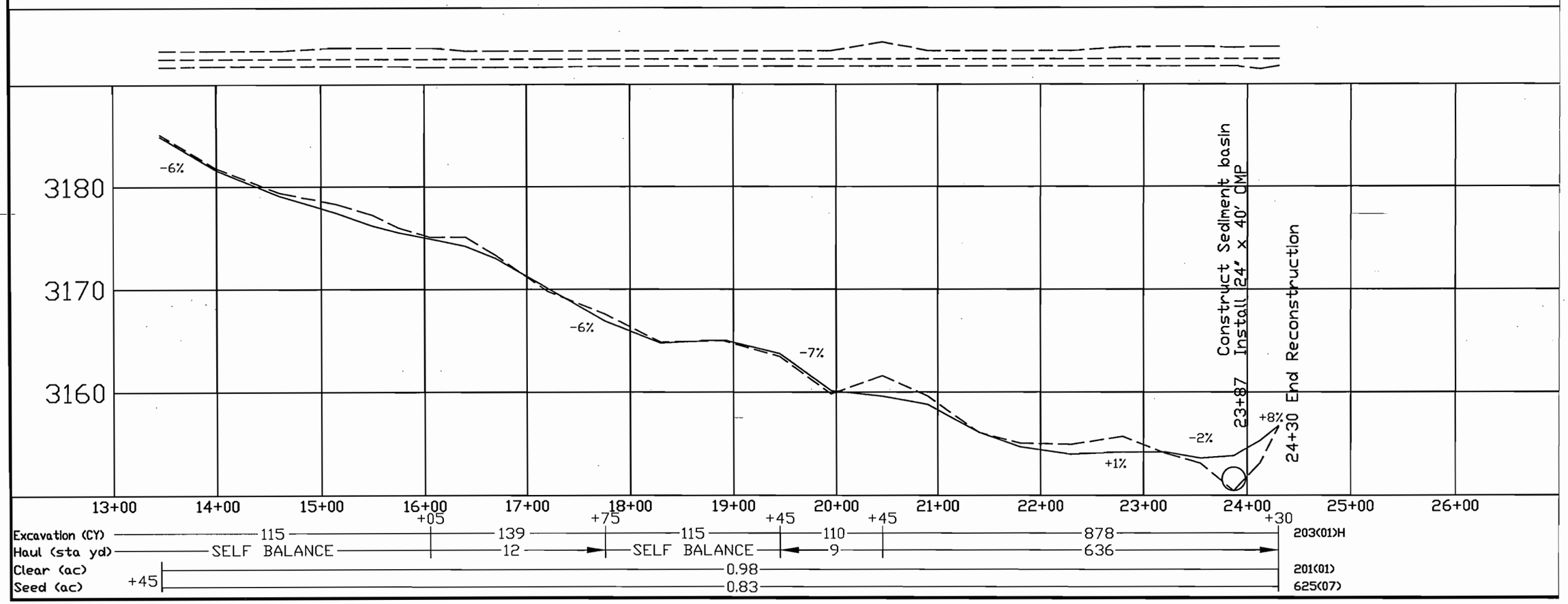

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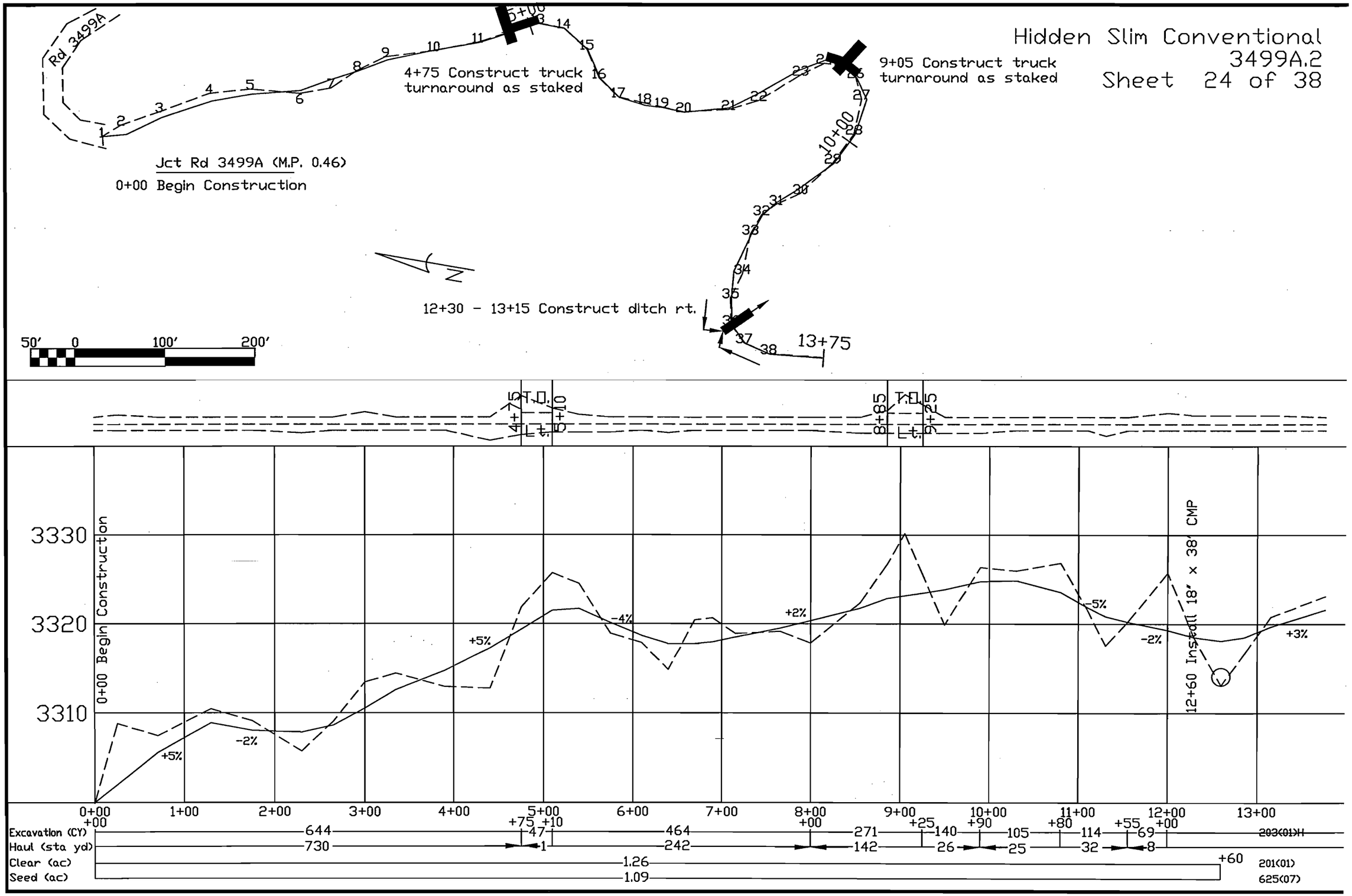

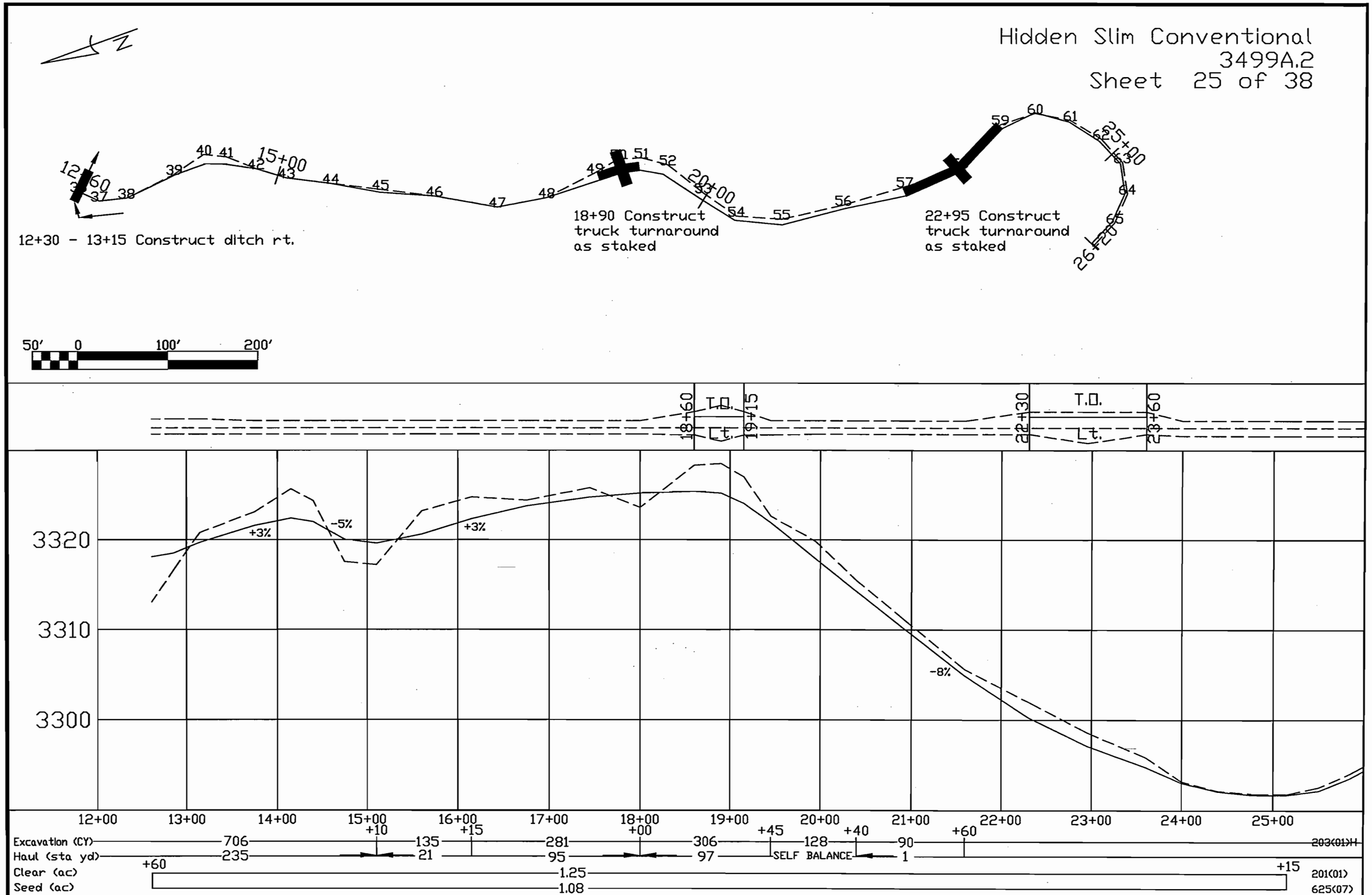

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Sheet 25 of 38
12+30 - 13+15 Construct ditch rt.
18+90 Construct truck turnaround as staked
22+95 Construct truck turnaround as staked
50' 0 100' 200'
T.O.
Lt.
18+60
19+15
22+30
23+60
3320
3310
3300
+3%
-5%
+3%
-8%
12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00
+10 +15 +00 +45 +40 +60
Excavation (CY) 706 135 281 306 128 90
Haul (sta yd) 235 21 95 97 SELF BALANCE 1
Clear (ac) +60 1.25 +15
Seed (ac) 1.08
203(01)H
201(01)
625(07)

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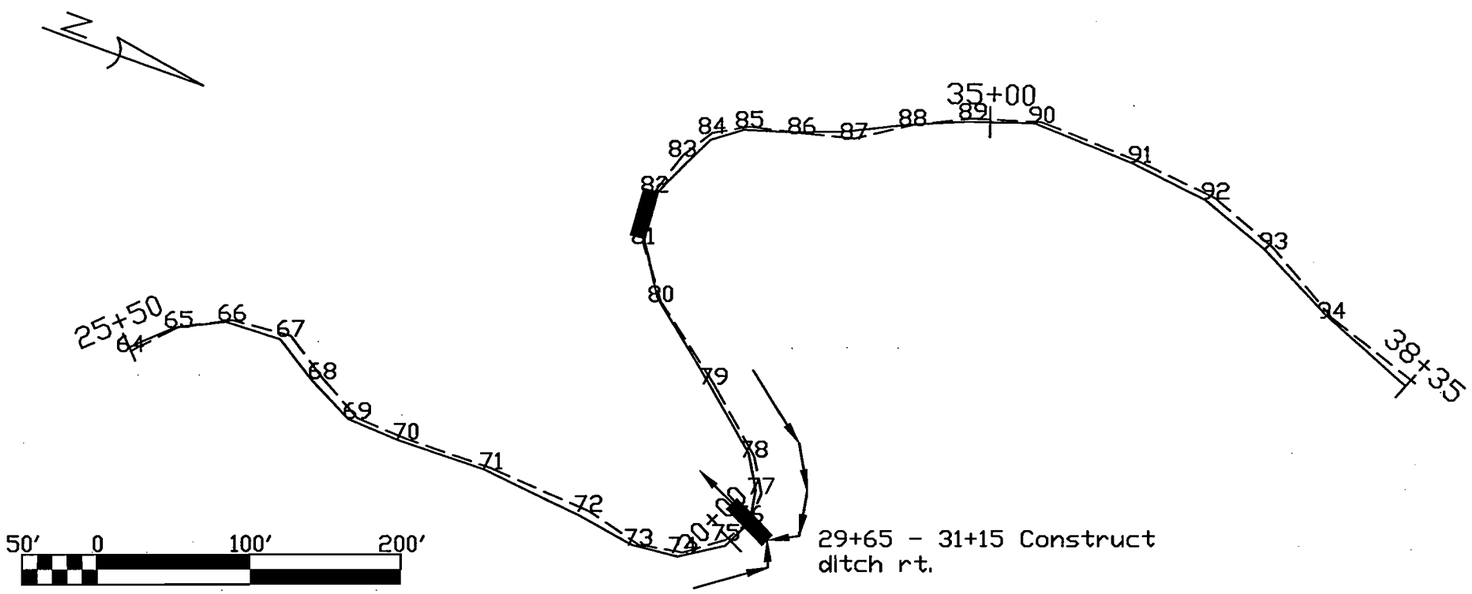
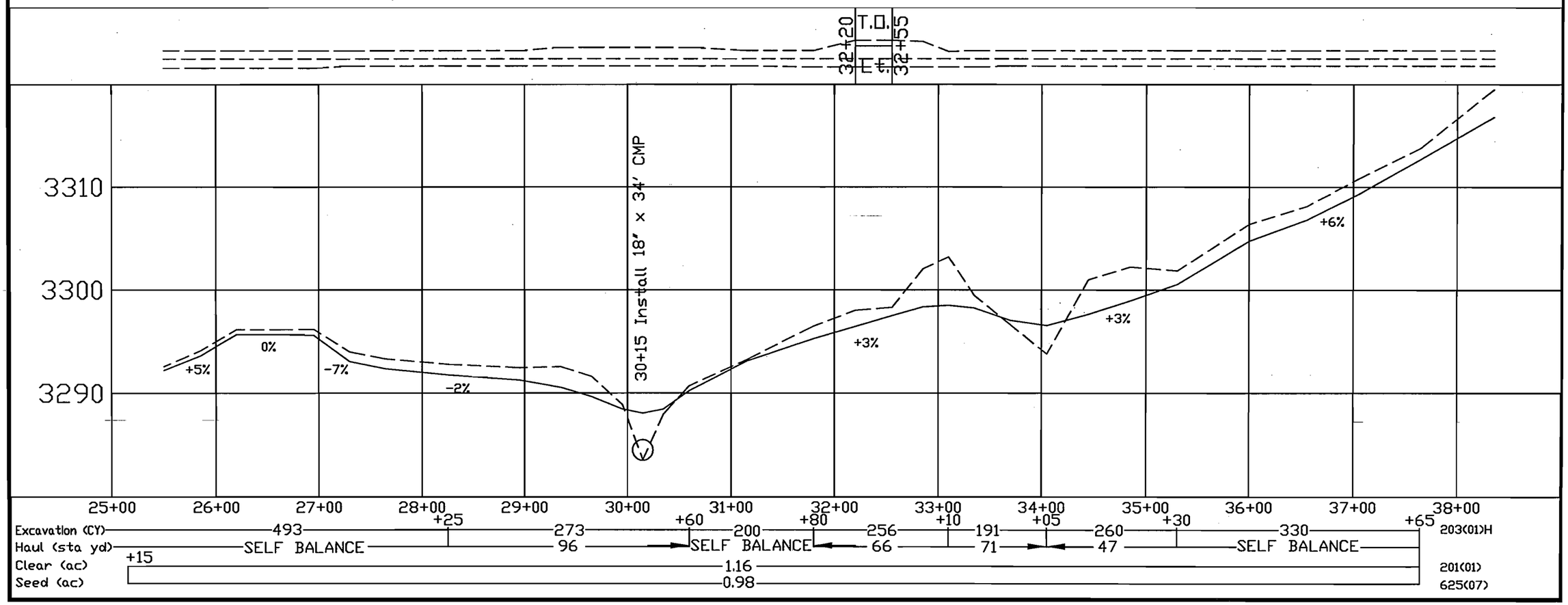
3499A.2
Sheet 26 of 38





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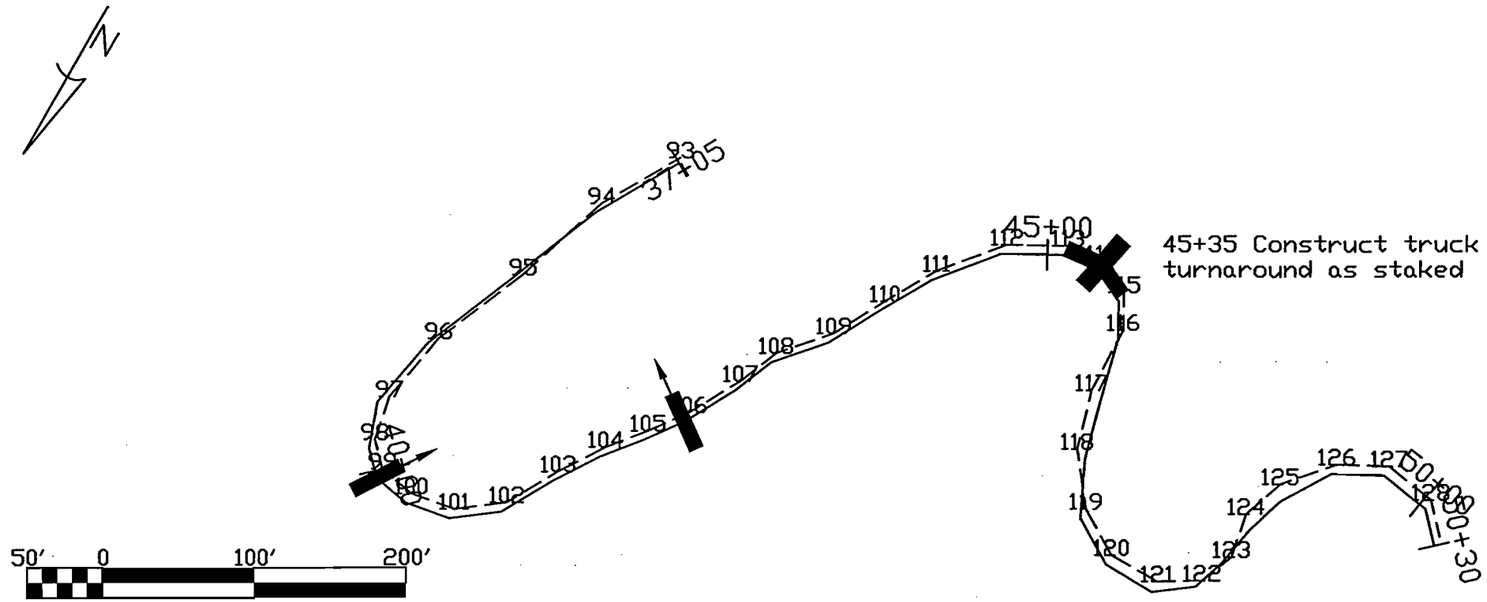

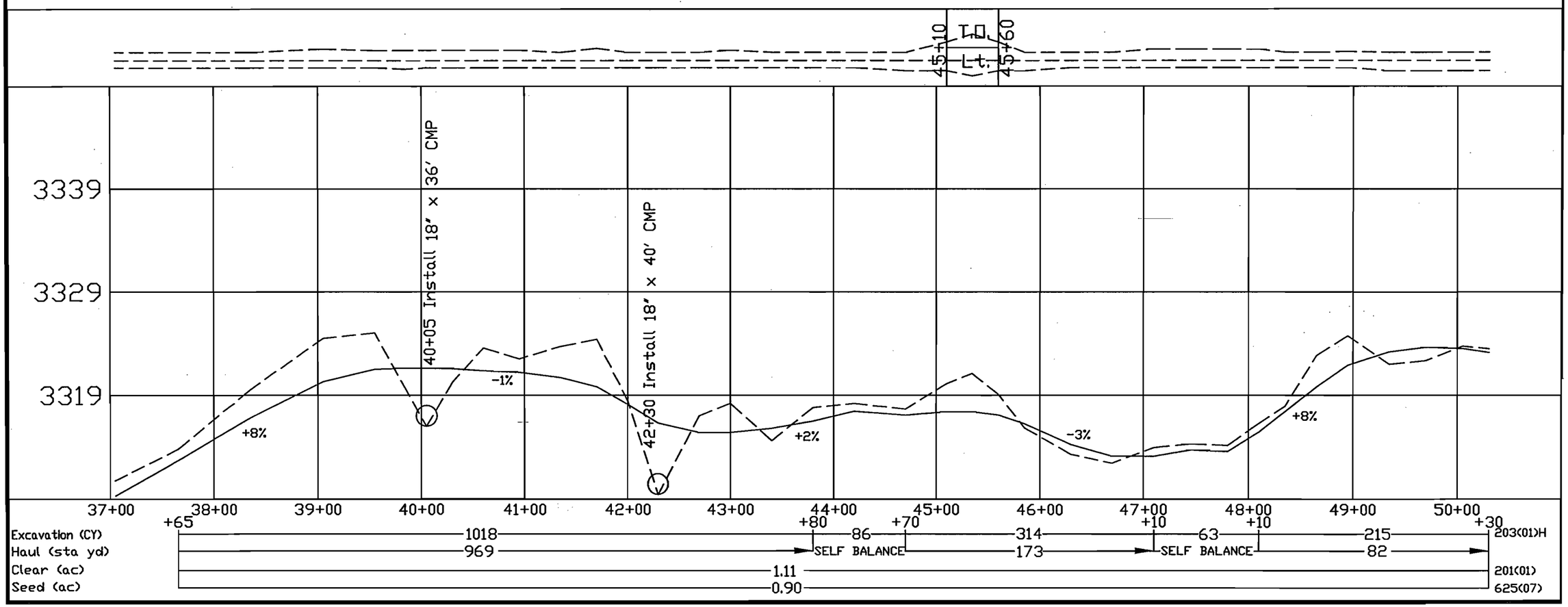

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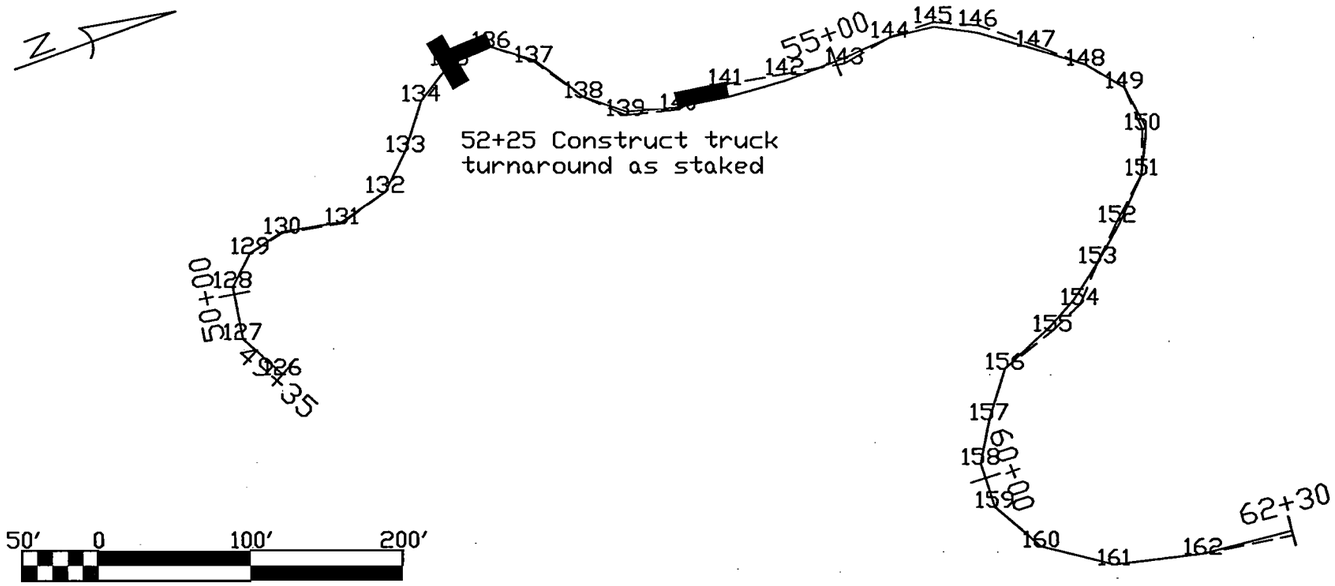

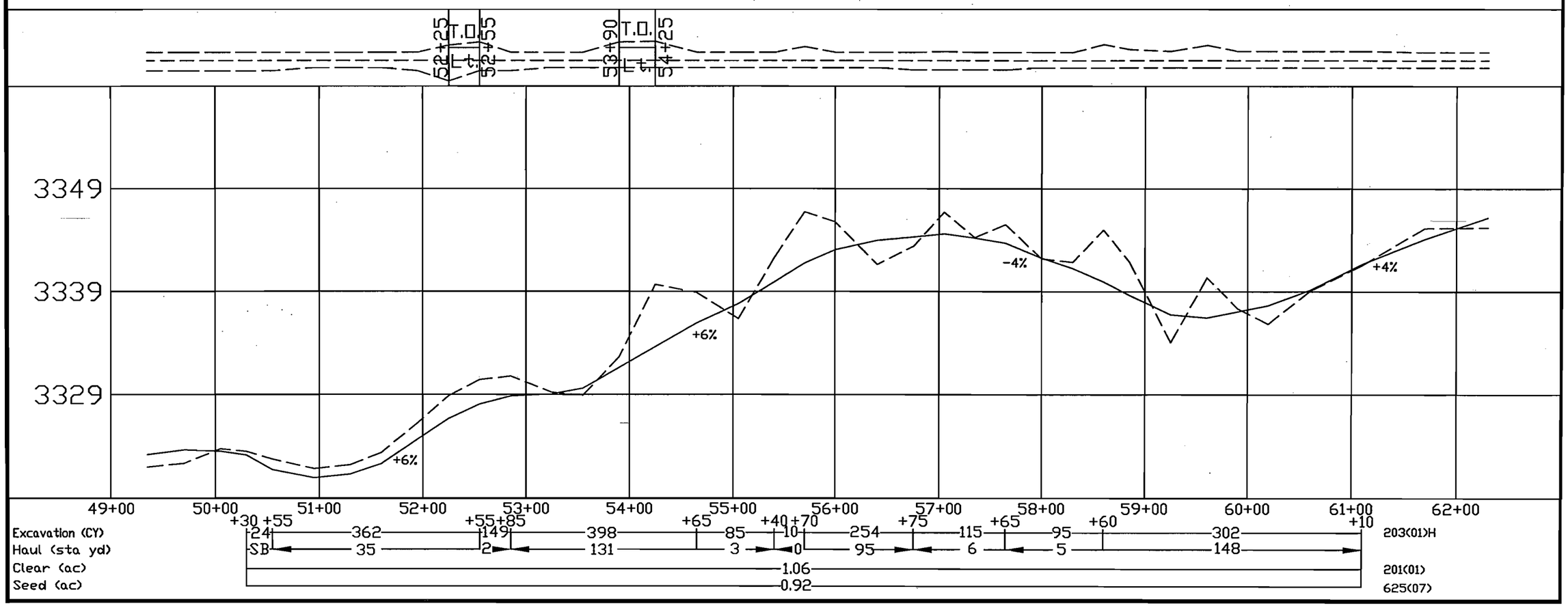

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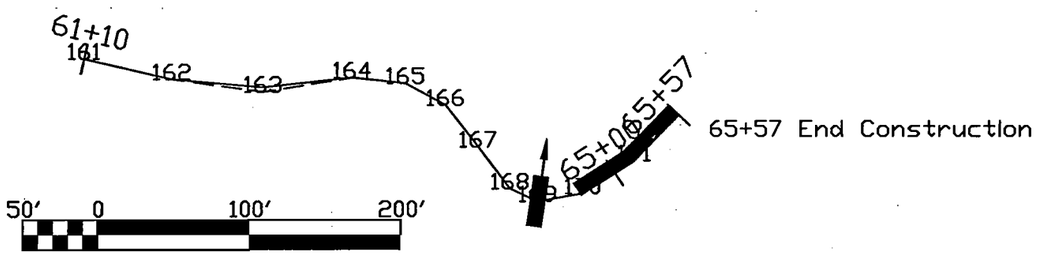
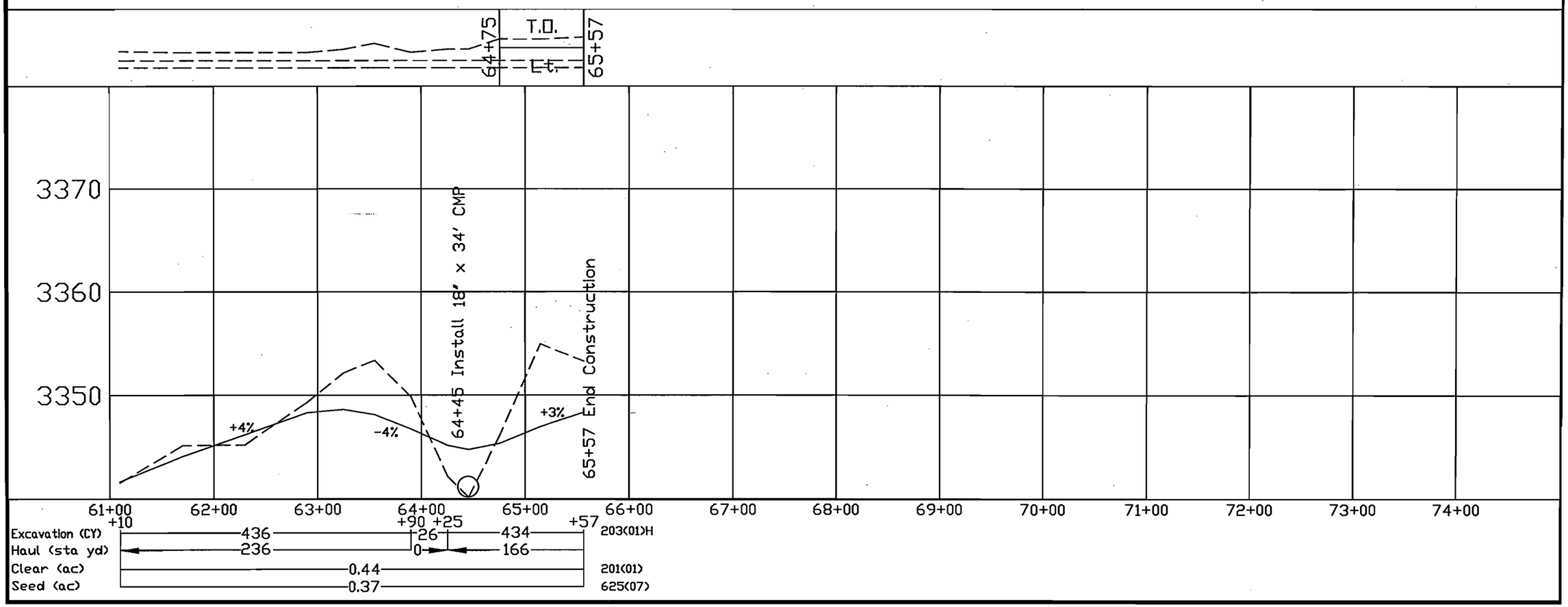
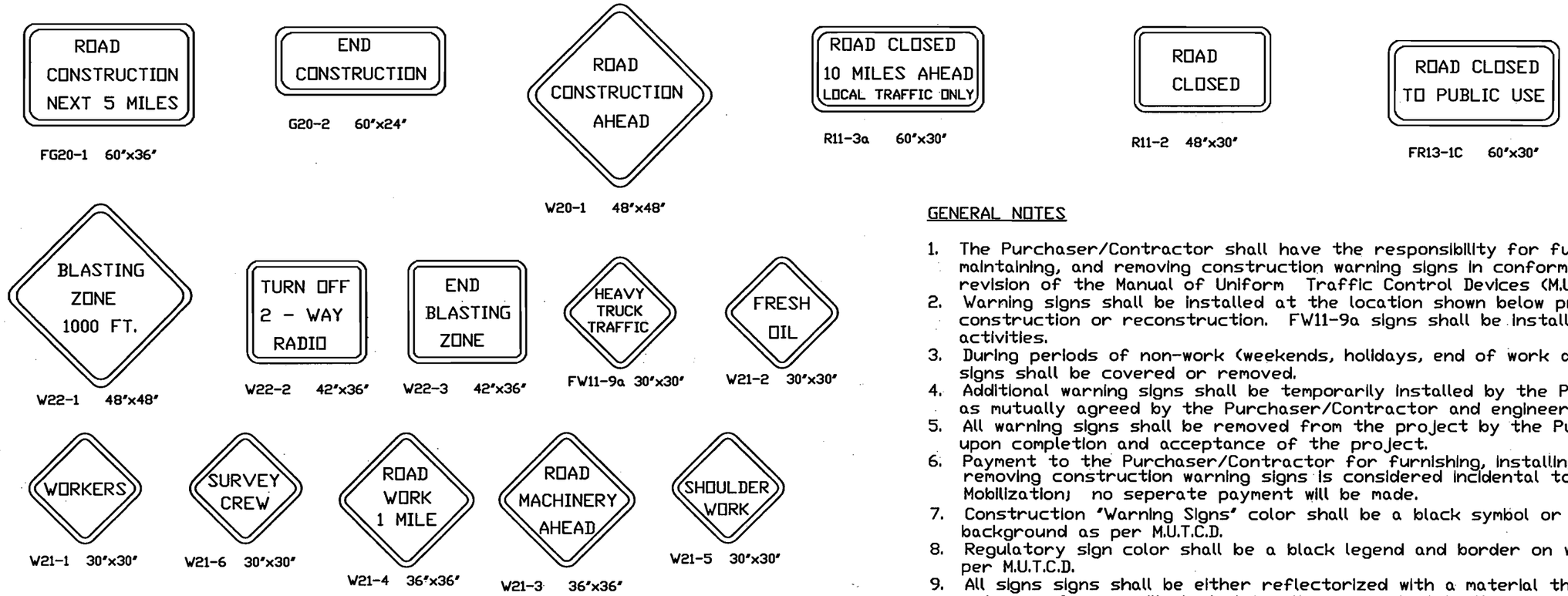
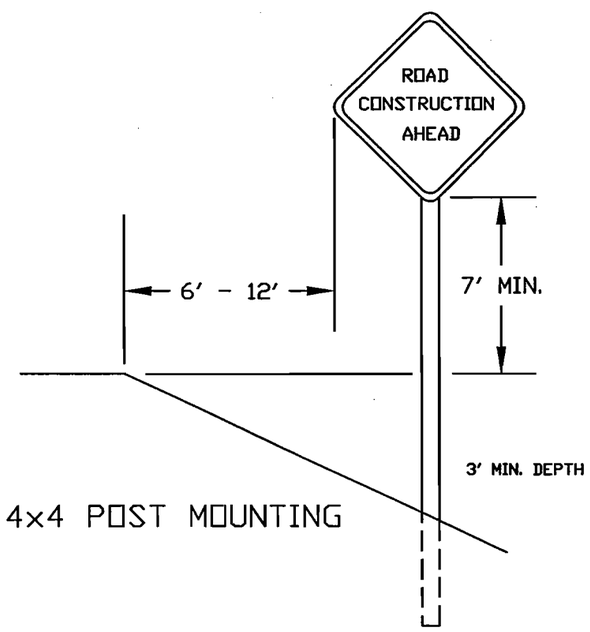
Sheet 29 of 38



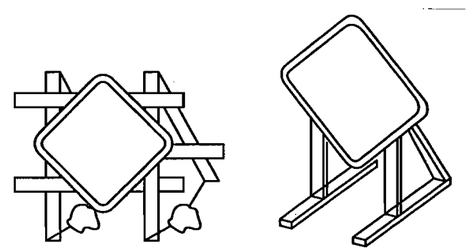




TYPICAL CONSTRUCTION WARNING SIGNS (AS PER M.U.T.C.D)



4x4 POST MOUNTING



PORTABLE AND TEMPORARY MOUNTINGS

TYPICAL SIGN INSTALLATION (AS PER M.U.T.C.D)

GENERAL NOTES

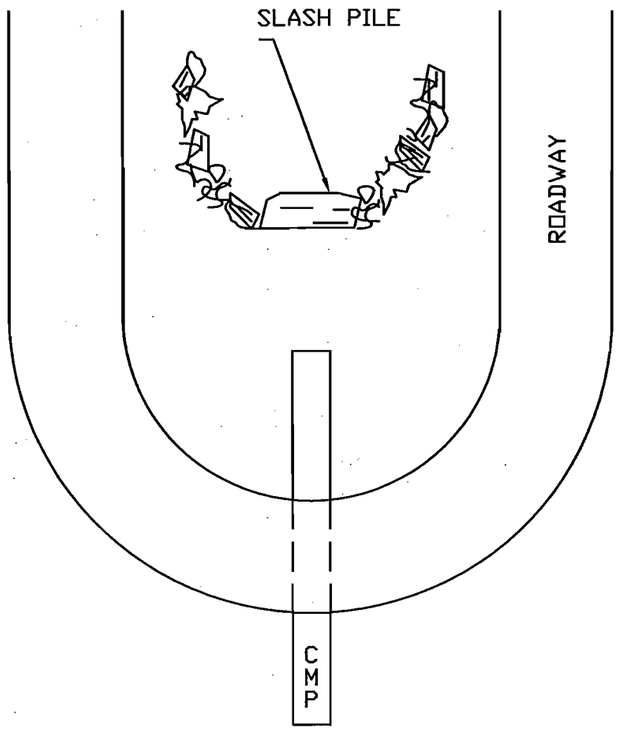
1. The Purchaser/Contractor shall have the responsibility for furnishing, installing, maintaining, and removing construction warning signs in conformance with the latest revision of the Manual of Uniform Traffic Control Devices (M.U.T.C.D).
2. Warning signs shall be installed at the location shown below prior to beginning of construction or reconstruction. FW11-9a signs shall be installed prior to hauling activities.
3. During periods of non-work (weekends, holidays, end of work day, etc.) all FW11-9a signs shall be covered or removed.
4. Additional warning signs shall be temporarily installed by the Purchaser/Contractor as mutually agreed by the Purchaser/Contractor and engineering representive.
5. All warning signs shall be removed from the project by the Purchaser/Contractor upon completion and acceptance of the project.
6. Payment to the Purchaser/Contractor for furnishing, installing, maintaining, and removing construction warning signs is considered incidental to Pay Item 601 - Mobilization; no seperate payment will be made.
7. Construction 'Warning Signs' color shall be a black symbol or message on an orange background as per M.U.T.C.D.
8. Regulatory sign color shall be a black legend and border on white background as per M.U.T.C.D.
9. All signs signs shall be either reflectorized with a material that has a smooth, sealed outer surface, or illuminated to show approximately the same shape and color day and night.

MINUMIM SIGNS REQUIRED FOR THIS PROJECT

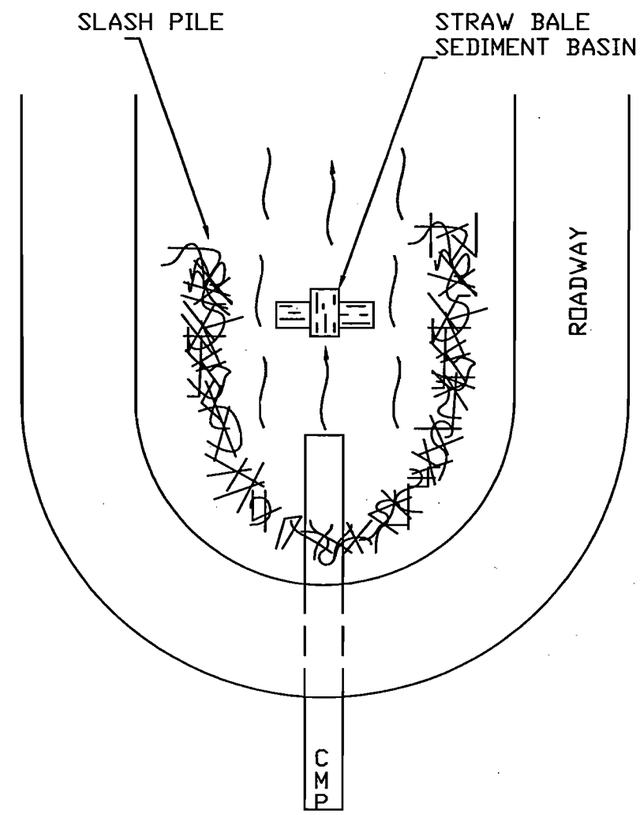
ROAD	LOCATION	WARNING SIGN	PERIOD OF USE
361	Jct. w/ rd 301	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
	Jct. w/ rd 361A		
361A	Jct. w/ rd 361	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
361C	M.P. 0.01	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
		ROAD CONSTRUCTION AHEAD W20-1	Reconstruction Activities
498	Jct. w/ SH - 3	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
		ROAD CONSTRUCTION AHEAD W20-1	Reconstruction Activities
765	Jct. w/ SH - 3	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
765A	Jct. w/ SH - 3	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
765C	M.P. 0.01	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
		ROAD CONSTRUCTION AHEAD W20-1	Reconstruction Activities
3499	M.P. 0.01	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
		ROAD CONSTRUCTION AHEAD W20-1	Reconstruction Activities
3499A	M.P. 0.01	HEAVY TRUCK TRAFFIC FW11-9a	Log, Water, or Aggregate Haul
		ROAD CONSTRUCTION AHEAD W20-1	Reconstruction Activities

PILING CONSTRUCTION
SLASH TYPICAL SECTION

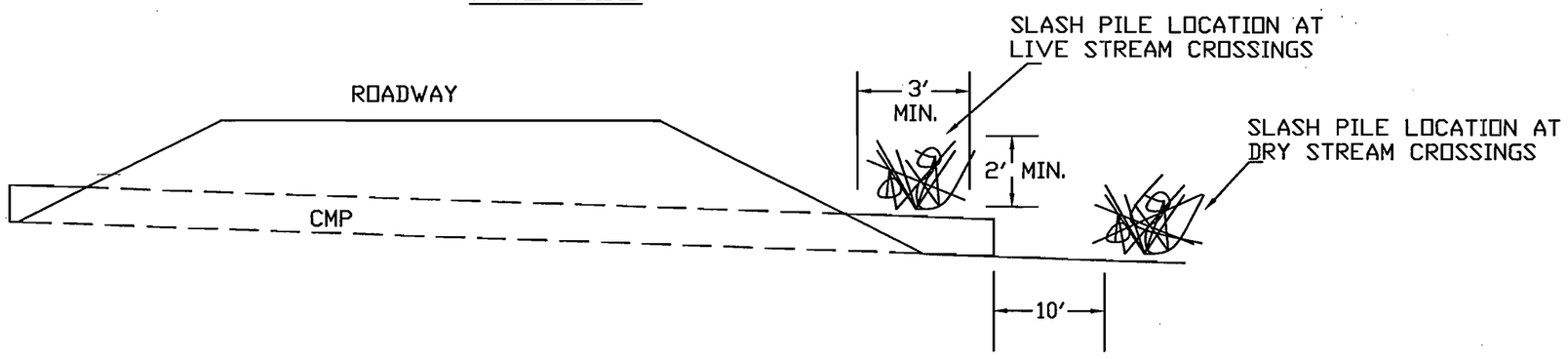
PLAN - DRY DRAW



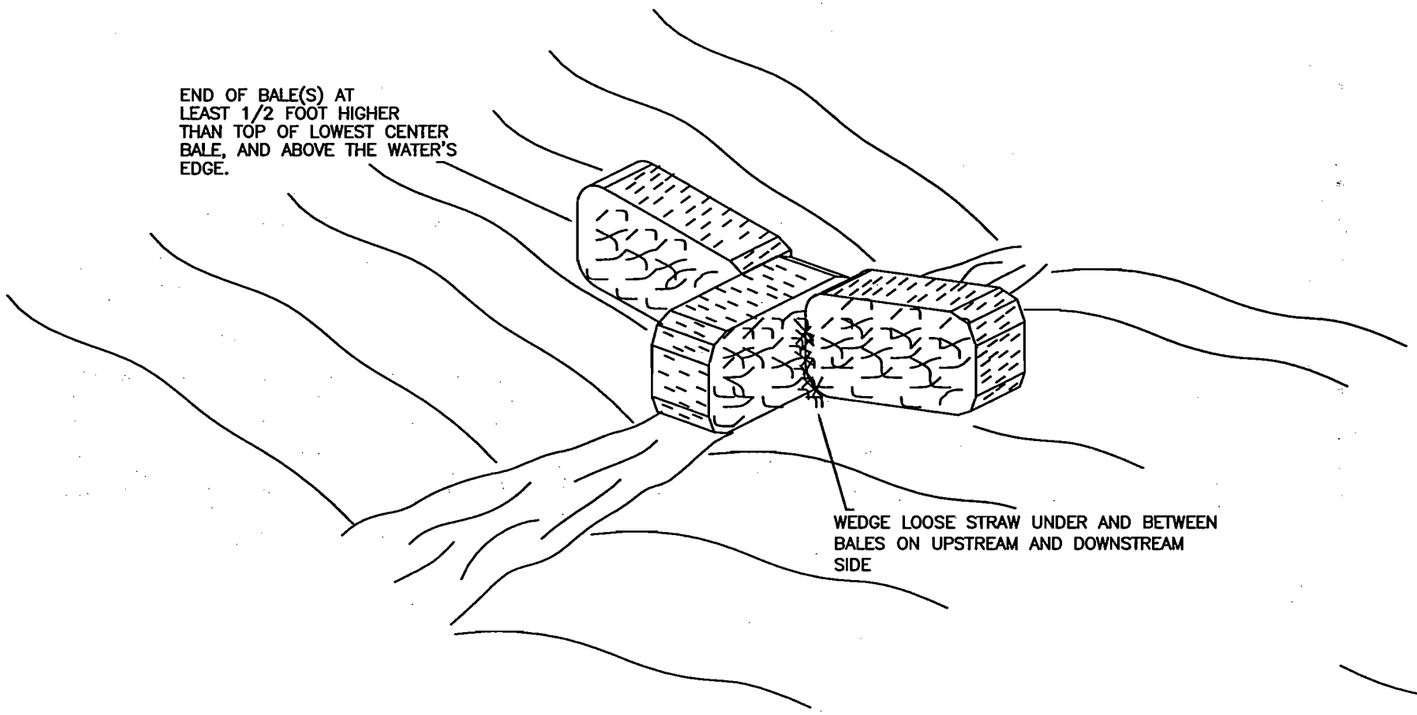
PLAN - WET DRAW



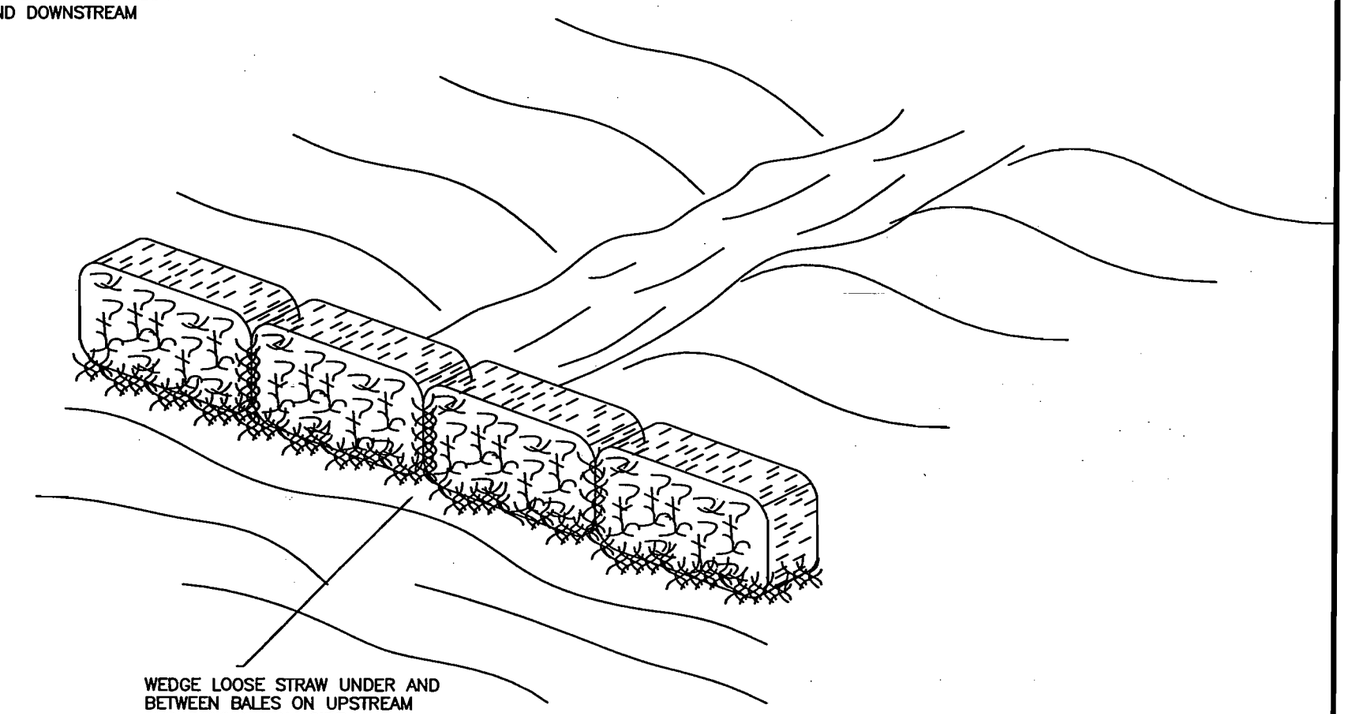
PROFILE



TYPE A
(FOR NARROW V BOTTOM DRAWS)



TYPE B
(FOR WIDE FLAT BOTTOM DRAWS)

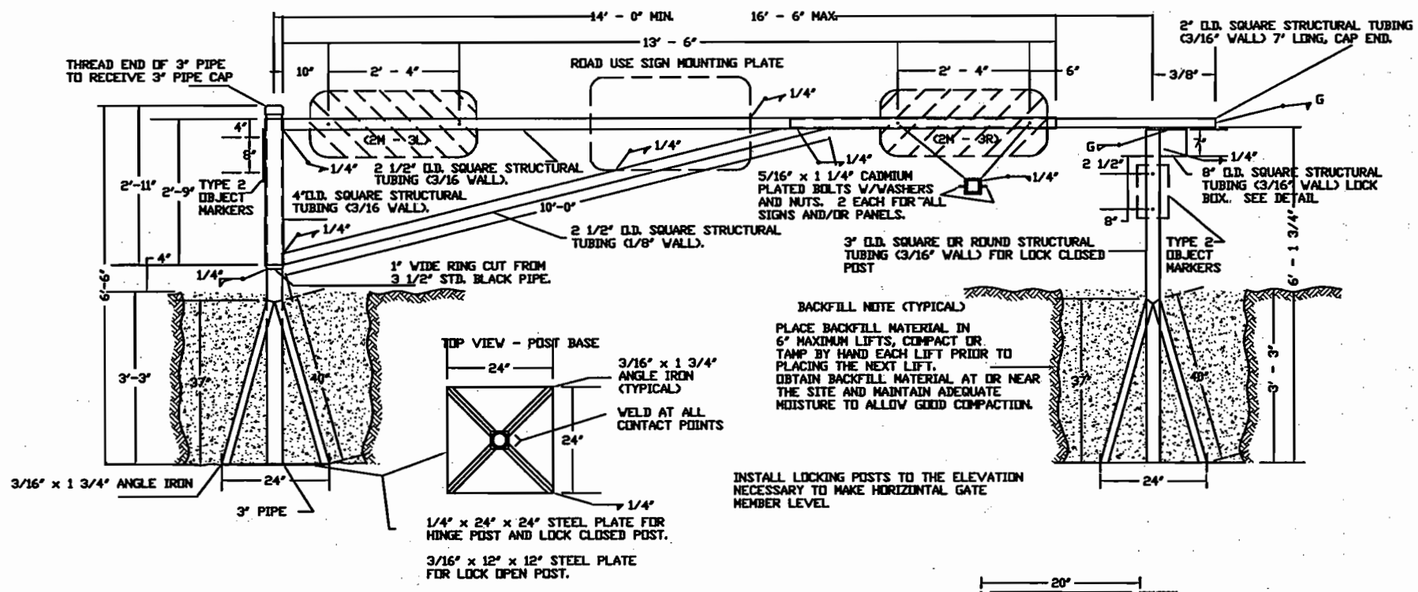


NOTE: THE NUMBER OF BALES SHOWN ABOVE ARE FOR TYPICAL INSTALLATIONS. THE ACTUAL NUMBER OF BALES REQUIRED MAY VARY.

STRAW BALE SEDIMENT BASINS
ITEM 204(09)

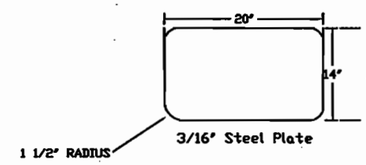
NOTES:

1. GRASS HAY OR STRAW SHALL BE OF APPROVED HERBACEOUS MOWINGS, CERTIFIED FREE OF NOXIOUS WEEDS OR OTHER OBJECTIONABLE MATERIAL.
2. STRAW BALE SEDIMENT BASINS SHALL BE CONSTRUCTED IN THE AREAS SHOWN ON THE DRAWINGS PRIOR TO PIONEER ROAD CONSTRUCTION ACTIVITY IN THE AREA.
3. THE BARRIER LENGTH SHALL EXTEND ACROSS THE STREAM SO THAT THE BOTTOM OF EACH END BALE IS AT LEAST ONE HALF FOOT HIGHER THAN THE TOP OF THE LOWEST CENTER BALE AND ABOVE THE WATER'S EDGE.
4. BALES SHALL BE STAKED OR WEIGHTED IN PLACE USING NATIVE MATERIALS. LOOSE STRAW OR HAY SHALL BE WEDGED UNDER AND BETWEEN THE BALES.
5. STRAW BALE SEDIMENT BASINS SHALL BE REGULARLY MAINTAINED DURING CONSTRUCTION OF ADJACENT ROAD SEGMENTS AND REPAIRED AS NECESSARY. DAMAGED OR WASHED OUT BALES WILL BE REPLACED.



GATE DETAIL

(NO SCALE)

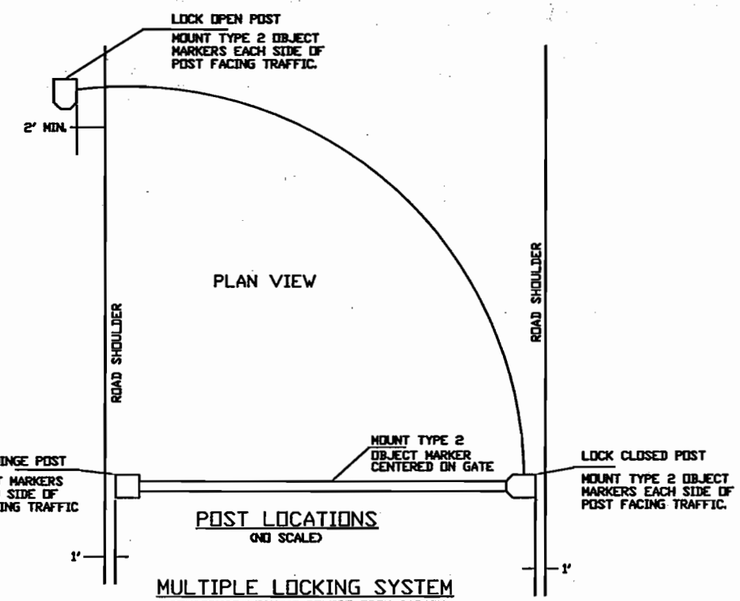


ROAD USE SIGN MOUNTING PLATE

(NO SCALE)

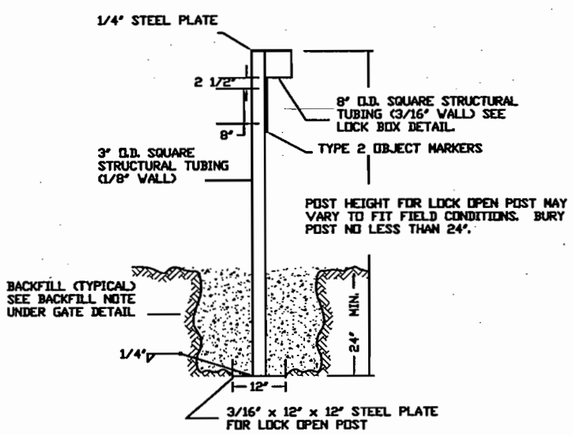
Notes:

- Pipe sizes shown are for standard weight steel pipe.
- Center road use sign mounting plate on gate as shown on plans.
- Mark gate post with reflectorized yellow type 2 (MUTCD) object markers, 6"x12", both sides of lock close post and both sides of lock open post as shown on plans. On hinge post, mount markers to face traffic when gate is locked open and locked close. Mount one marker on backside of gate crossbar.
- Road use sign to be furnished and installed by Forest Service.
- Type 3 (MUTCD) object markers, 1'-0"x3'-0" panels, white with 3" wide reflective red stripes.
- Type 2 (MUTCD) object markers, 6"x12" panels, yellow.
- Furnish and install all object markers, type 2 & 3.
- After fabrication, sand all gate components to remove all rust, scale, and oily substance and paint with brown or red primer meeting requirements of 708.03(F)(1).
- Use structural tubing meeting ASTM A36 structural steel.
- Order lock open post after post height has been approved.
- Install the open, closed, and hinge posts so that the crossbar is horizontal when the gate is open and closed.



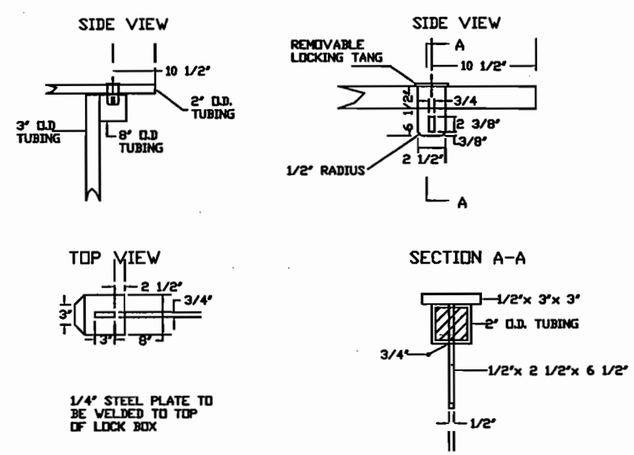
POST LOCATIONS

(NO SCALE)



LOCK OPEN POST

(NO SCALE)

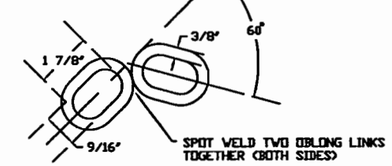


LOCK BOX DETAIL

(NO SCALE)

MULTIPLE LOCKING SYSTEM

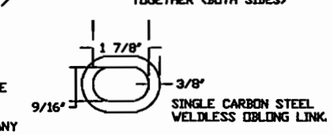
CONSTRUCT LOCKING DEVICE FROM CARBON STEEL WELDLESS OBLONG LINKS



NOTE:

THE CARBON STEEL WELDLESS OBLONG LINKS SHALL BE THE SAME OR EQUIVILENT TO THOSE LISTED BY:

McMASTER-CARR SUPPLY COMPANY
P.O. BOX 54960
LOS ANGELES, CA. 90054

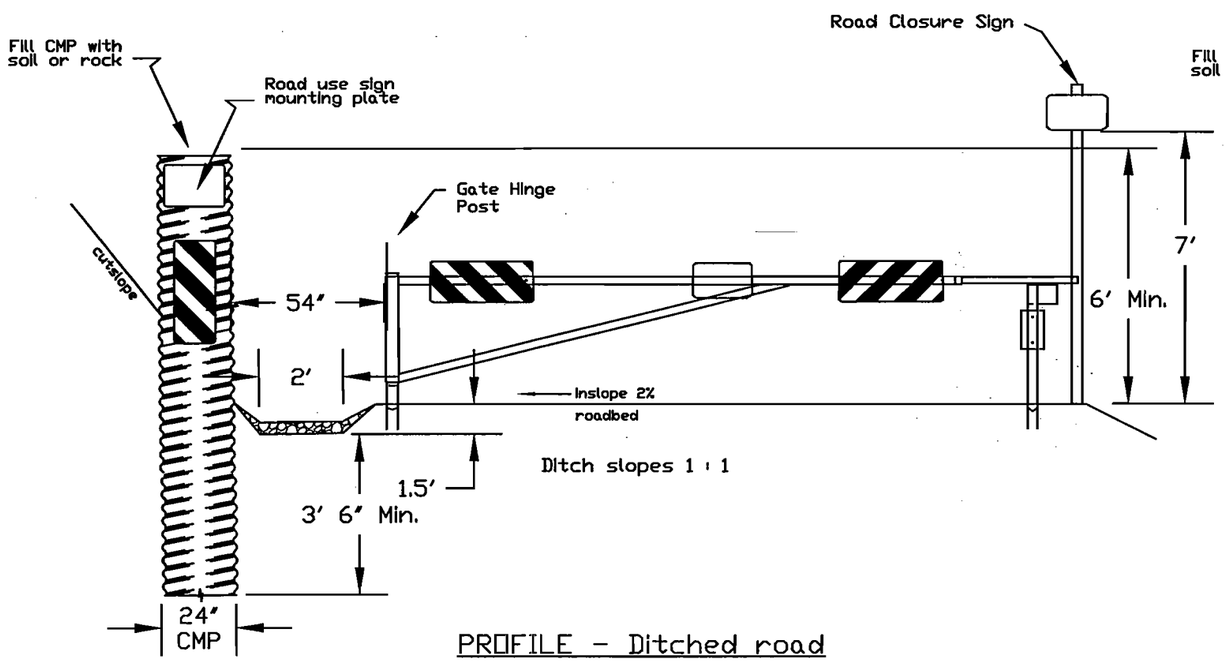


TWO SINGLE LINKS AND ONE DOUBLE (WELDED) LINK REQUIRED FOR EACH LOCKING SYSTEM

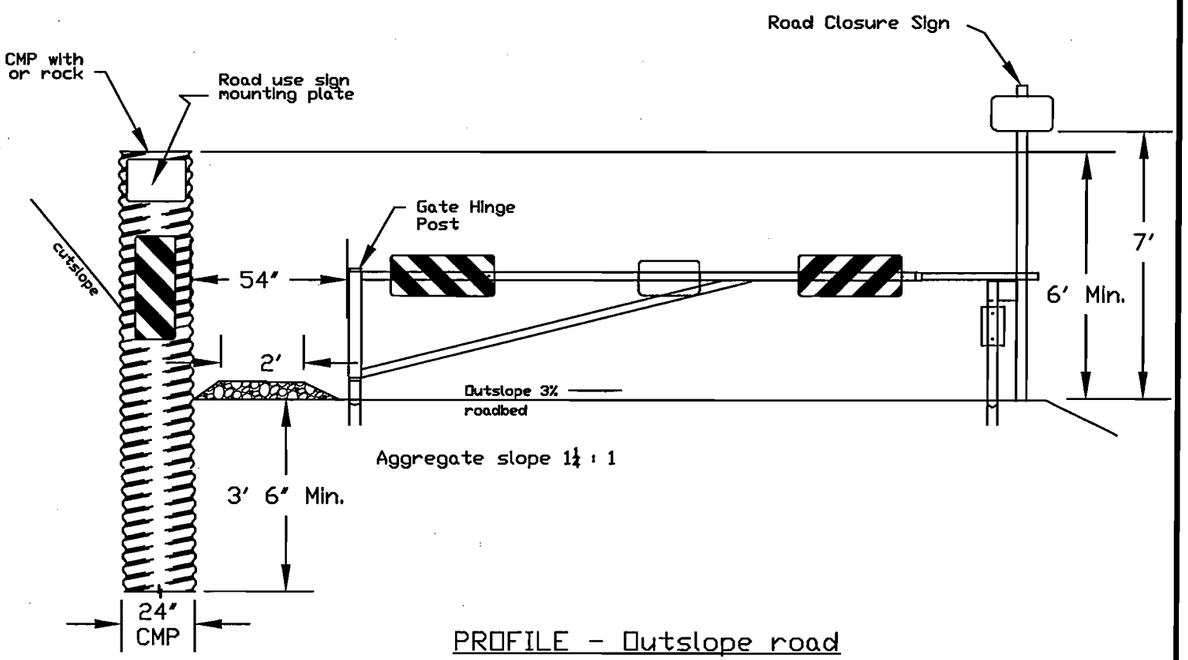
Gate Installation Typical
Gate Bypass Item 640(05)

GENERAL NOTES:

- Surface bypass 20' each side of barrier with 6" crushed aggregate.
- Remove any burrs or sharp edges on top end of culvert.
- Place type 3 object markers on both sides of culvert facing traffic.
- Fill culvert and overfill for future settlement with material from excavation or adjacent cutbank.
- Install Road use mounting plate facing closure

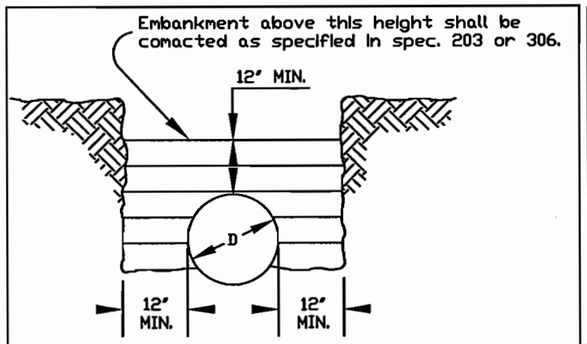


PROFILE - Ditched road



PROFILE - Outslope road

No Scale



Maximum 6-inch compacted layers to density called for in the specifications. Bedding shall be suitable material uniformly compacted and shaped to fit the bottom of the pipe.

METAL THICKNESS AND GAGE TABLES			
Steel		Aluminum	Approx. Gage
Zinc Coated	Un-Coated		
Metal Thickness in Inches			
0.064	0.0598	0.060	16
0.079	0.0747	0.075	14
0.109	0.1046	0.105	12
0.138	0.1345	0.135	10
0.168	0.1644	0.164	8
0.188	0.1838		7
0.218	0.2145		5
0.249	0.2451		3
0.280	0.2758		1

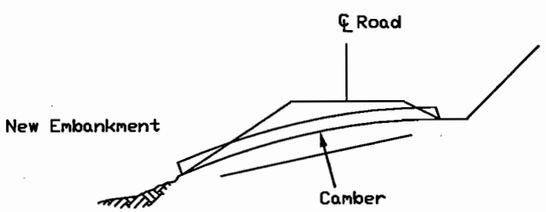
GENERAL NOTES:

TREATMENT OF DAMAGED SPELTER: The damaged or corroded ends of metal pipe to be extended shall be removed. If the damaged end is flame cut, the burned spelter on the galvanized pipe shall be wire brushed to clean metal and the area shall be painted with two coats of paint, high in zinc content, for repair of the galvanized surfaces.

SETTLEMENT AND CAMBER: Pipes shall be cambered as necessary to compensate for any anticipated settlement in the foundation or bed. Camber shall be on a parabolic curve with no point along the invert being higher than the invert at the inlet.

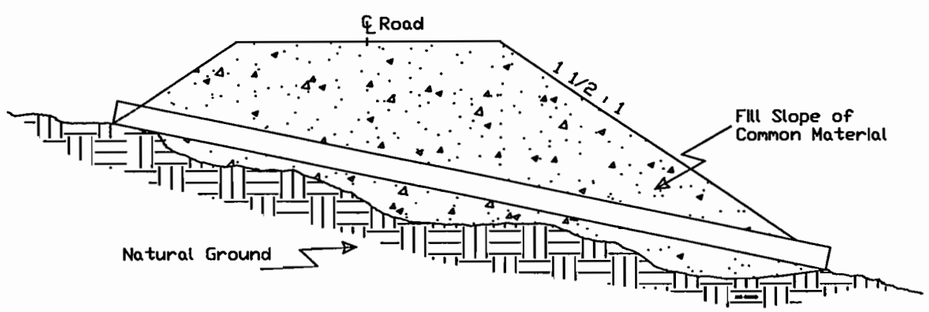
EMBANKMENT AND FOUNDATION SOIL CONDITION
Existing Fills, Regardless of Foundation Soils

CAMBER
1% of pipe length, not to exceed 3/4 of pipe span.

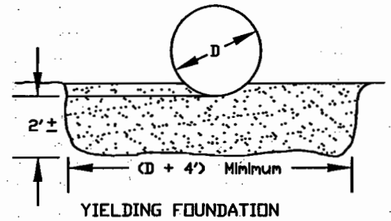


1% of pipe length, not to exceed 3/4 of pipe span or as determined by the engineer.

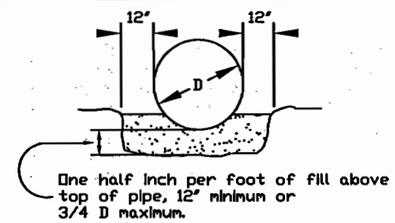
TYPICAL INSTALLATION IN EMBANKMENT



TYPICAL BEDDING MATERIAL

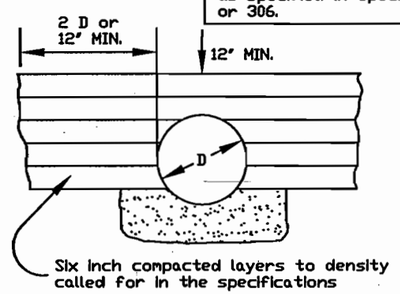


YIELDING FOUNDATION



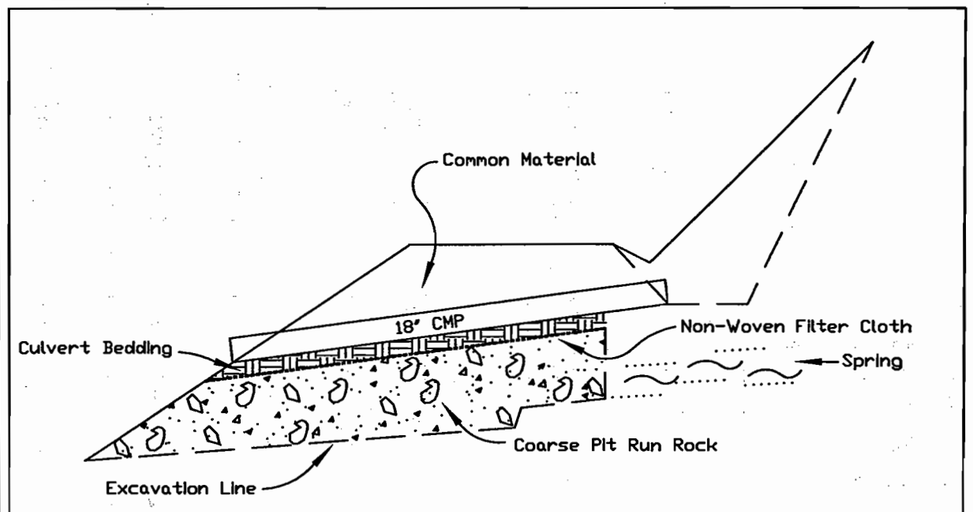
ROCK FOUNDATION

Embankment above this height shall be compacted as specified in Spec. 203 or 306.

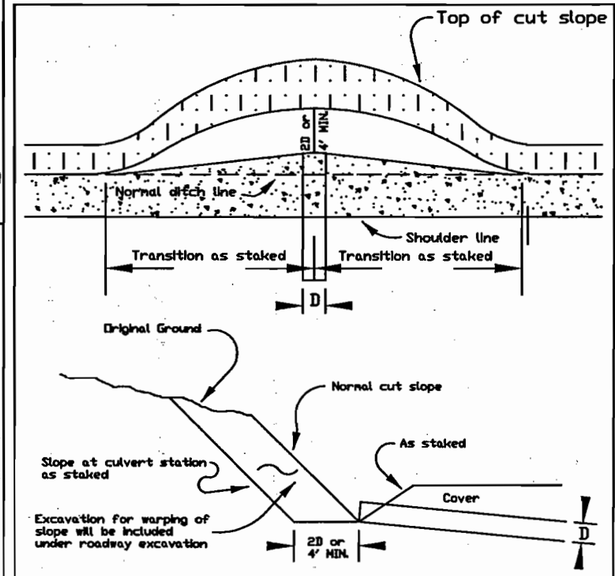


TYPICAL BACKFILL DETAIL

Bedding shall be suitable material uniformly compacted and shaped to fit the bottom of the pipe

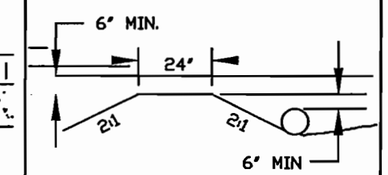


UNDERDRAIN TYPICAL SECTION

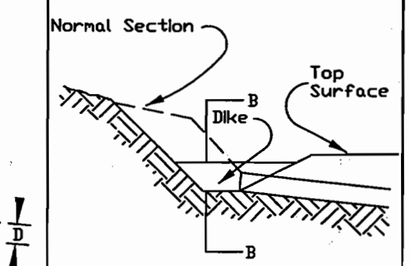


TREATMENT OF CUT SLOPE AT CULVERT INLET

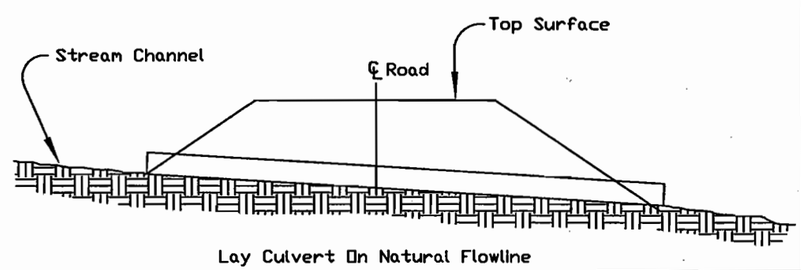
Construct Ditch Dikes at Locations designated by the Engineer



SECTION B-B



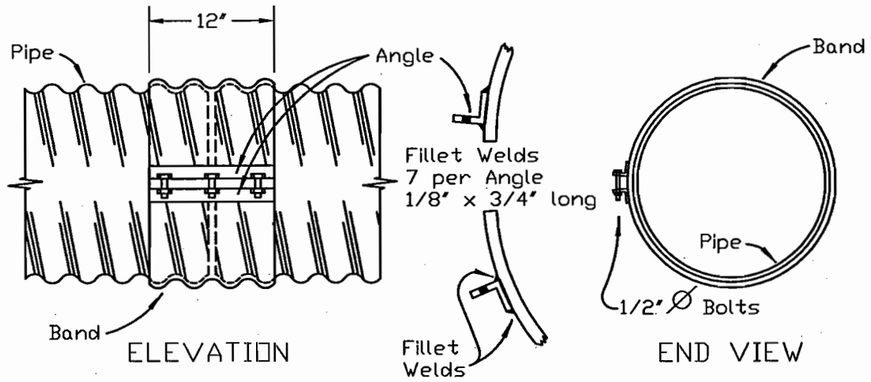
DITCH DIKE



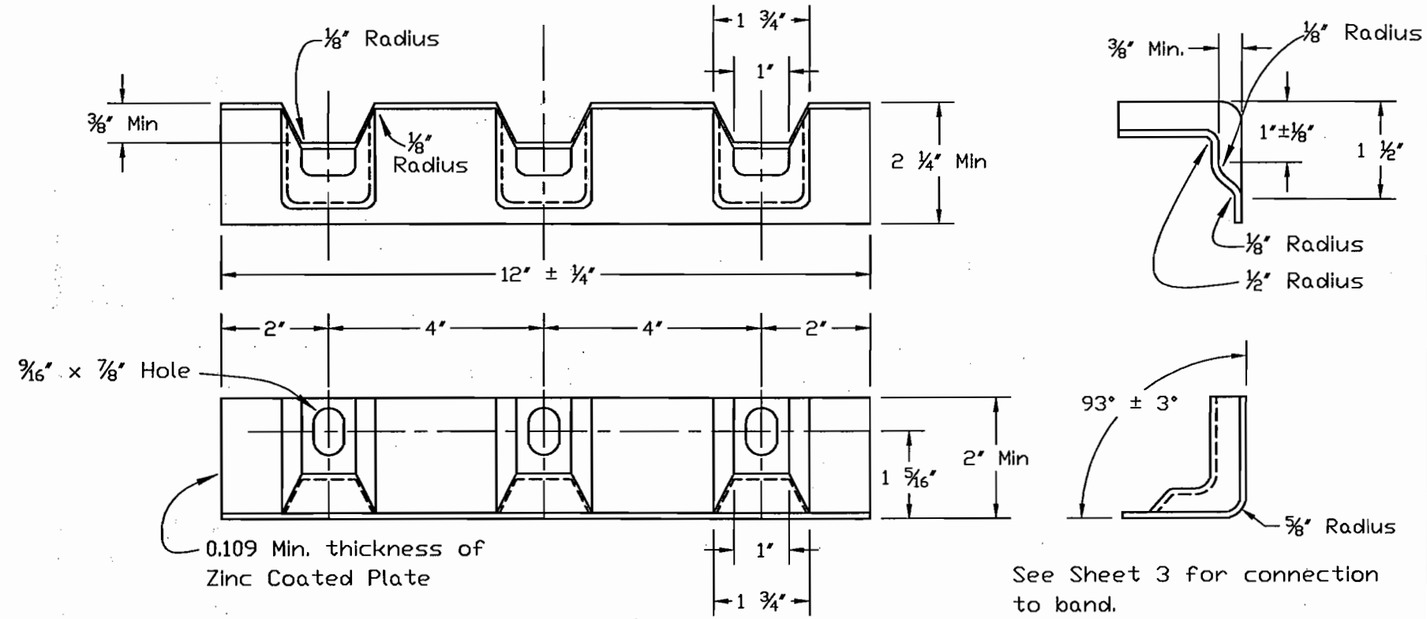
TYPICAL INSTALLATION IN STREAM CHANNEL

NO SCALE

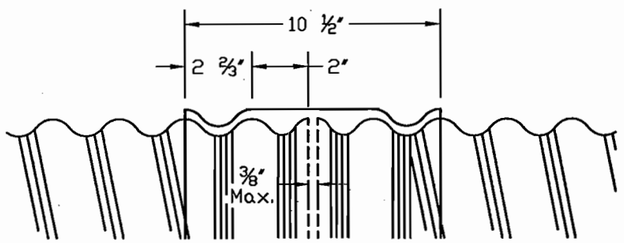
CULVERT DETAILS



AMERICAN CULVERT BAND
FOR HELICALLY CORRUGATED STEEL PIPE



NORTHWEST CULVERT ANGLE ALTERNATIVE
FOR STEEL PIPE



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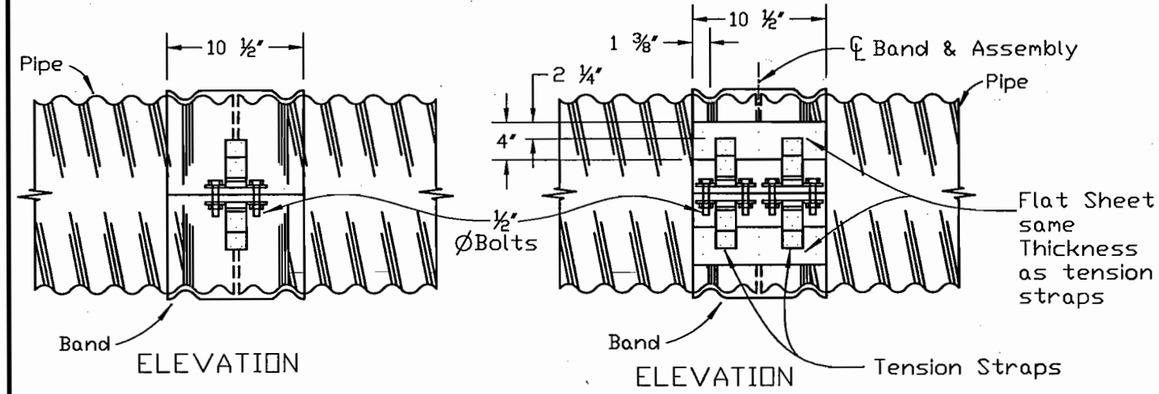
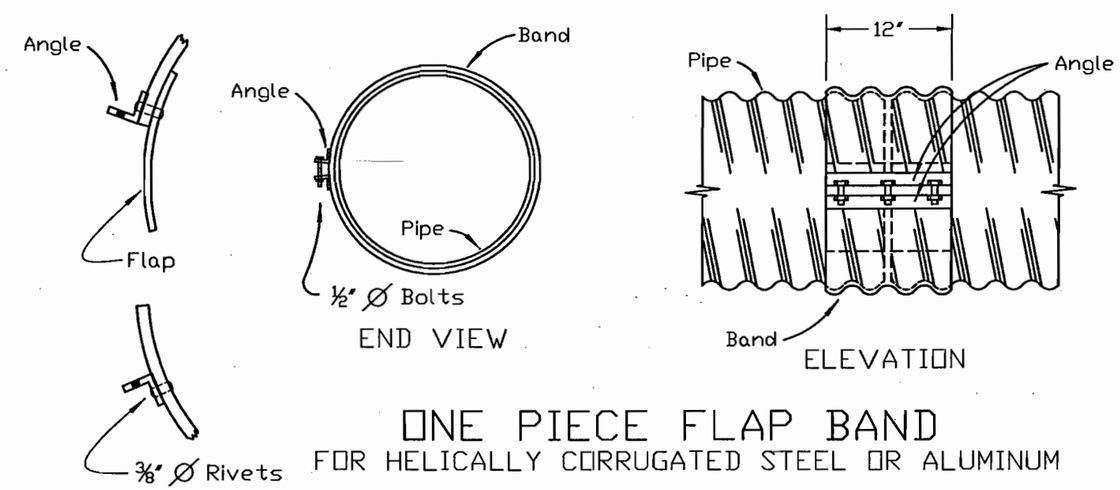


HUGGER COUPLING BAND
FOR REFORMED END HELICALLY CORRUGATED
WELDED SEAM STEEL PIPE



ONE PIECE FLAP BAND
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM

COUPLING BAND DETAILS FOR
CORRUGATED PIPE AND PIPE ARCH

Submitted CARL CAIN Date 6/7/89
Approved BILL HARPER Date 6/13/89

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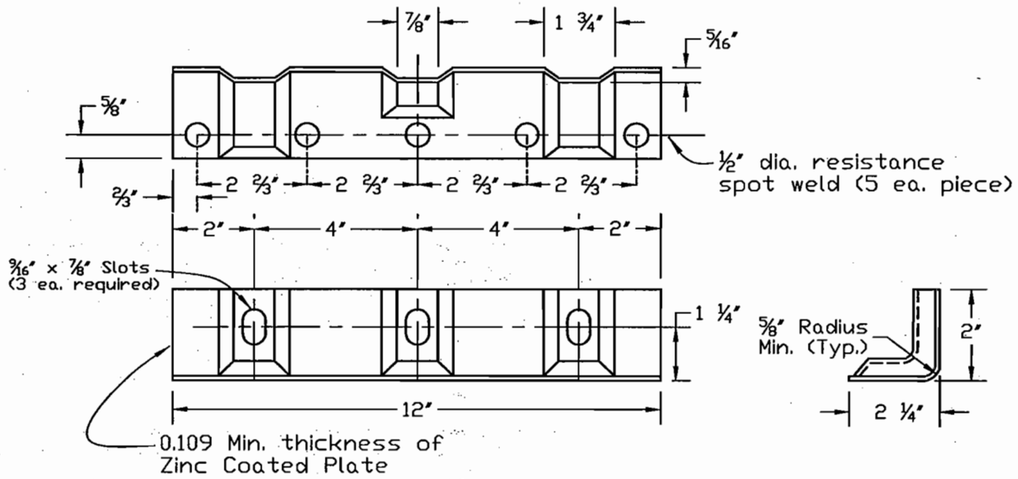
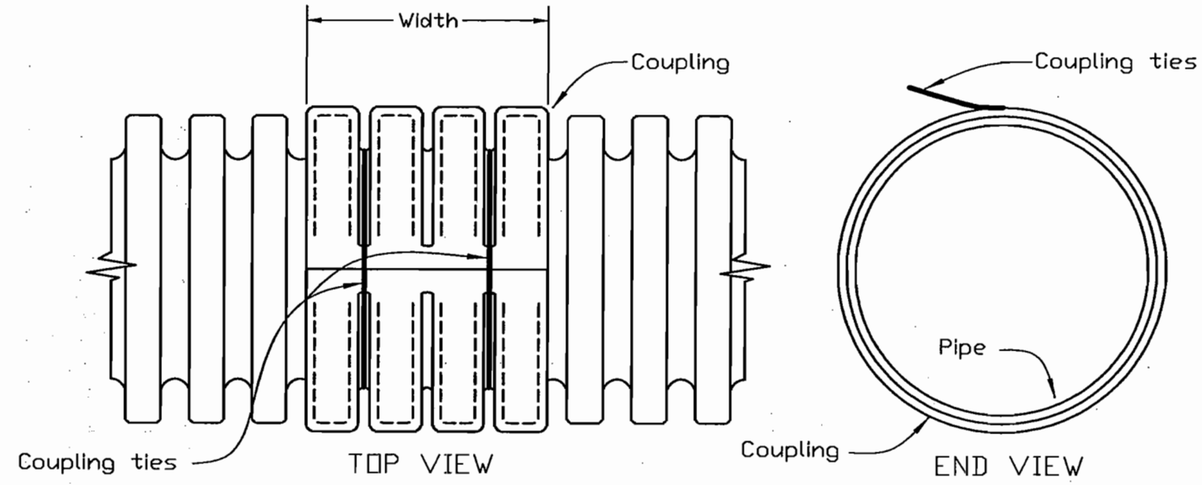
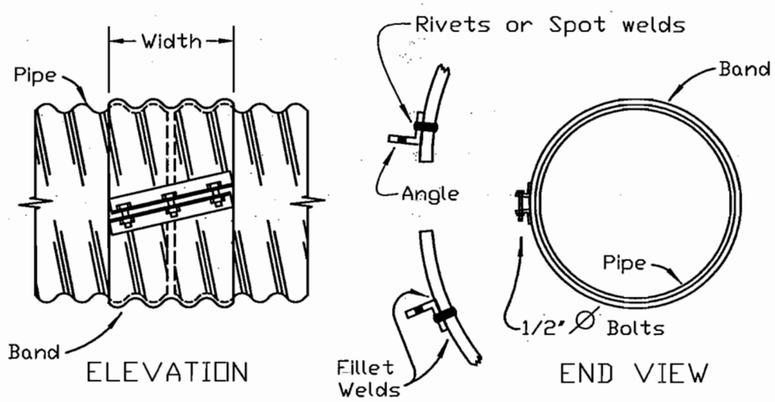


ALTERNATE FOR 2X2X3/16 ANGLE
FOR STEEL PIPE

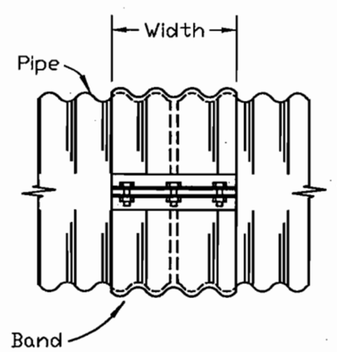


SPLIT COLLAR COUPLING
FOR ANNULAR CORRUGATED POLYETHYLENE PIPE

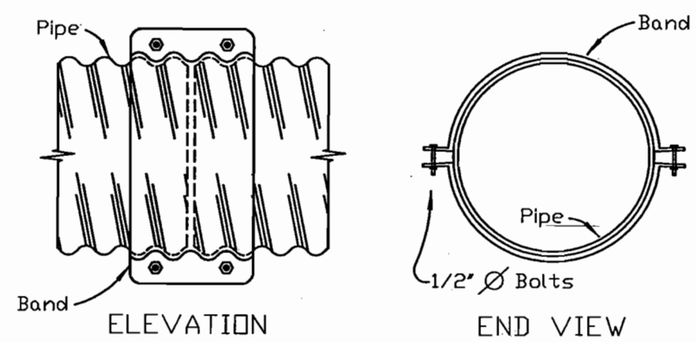
Notes:
1. Minimum width 4 corrugations, 2 on each culvert segment.
2. The opening of the coupling shall be within 15° of the top of the culvert.



HELICAL COUPLING BAND
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE



ANNULAR COUPLING BAND
FOR AUUNLAR OR REFORMED END HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE



TWO PIECE INTEGRAL FLANGE
FOR HELICALLY CORRUGATED STEEL OR ALUMINUM PIPE

Notes:
1 Use 2x12x0.150 thickness 5052-H141 aluminum plate washer under bolt head & nut on aluminum pipe flange.

2. Use 2x12x0.125 thickness galvanized steel plate washer under bolt head & nut on steel pipe flange.

COUPLING BAND DETAILS FOR CORRUGATED PIPE AND PIPE ARCH

Submitted CARL CAIN Date 6/7/89
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COUPLING TYPE	CORRUGATION Inches	PIPE DIAMETER Inches	WIDTH Inches	SPECIFIED THICKNESS See Note 1-C		ANGLE - See Note 1-H			
						DIMENSION	BOLTS NO / DIAMETER	ANGLE TO BAND	
				Pipe Wall	Band			RIVETS	SPOT WELDS
Metal Pipe Annular and Helical	2-2/3x1/2 (Steel or Aluminum)	Thru 36	12	0.064-0.138	0.064-0.079	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	12	0.064-0.079	0.064	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	12	0.064-0.168	0.064-0.109	2x2x5/16	3-1/2	5-3/8	
		66-84	24	0.109-0.168	0.064-0.109	2x2x5/16	5-1/2	7-3/8	
	3x1 and 5x1 (Steel Only)	36-60	14	0.064-0.079	0.064	2x2x3/16	3-1/2	3-3/8	5-1/2
		42-60	14	0.109	0.064	2x2x5/16	3-1/2	5-3/8	
		66-120	25	0.064-0.109	0.064	2x2x5/16	5-1/2	9-3/8	
One Piece Flap Band & Two Piece Integral Flange	2-2/3x1/2 (Steel or Aluminum) see Note 1-I	18-24	12	0.064-0.079	0.064		3-1/2	4-3/8*	* Flap Band Only
								WELDS ANGLE TO BAND	
American Culvert Band	2-2/3x1/2 (Steel Only)	Thru 24	12	0.064-0.109	0.064-0.079	2x2x0.183	3-1/2	7-1/8x3/4 Long Fillet	
		30-36	12	0.064-0.109	0.064	2x2x0.183	3-1/2		
		42-48	12	0.064-0.079	0.064	2x2x0.183	3-1/2		
Northwest Culvert Alternative	2-2/3x1/2 (Steel Only)	Thru 84	12	0.064-0.079	0.064-0.109			5-3/16x3/4 Long Fillet	
		Thru 54	12	0.109	0.064-0.109				
		Thru 42	12	0.138	0.064-0.109				
		Thru 84	12	0.064-0.168	0.064-0.109			5-1/2 Spot	
						BAR AND STRAP			
						NUMBER/ THICKNESS	BOLT DIAMETER	BAR DIAMETER	BAR YIELD STRENGTH P.S.I.
Hugger	2-2/3x1/2 (Steel Only)	Thru 48	10-1/2	0.064-0.109	0.064-0.109	One 0.079	1/2	7/8	32,000
		36-48	10-1/2	0.138-0.168	0.079-0.109	One 0.109	1/2	7/8	45,000
		54-60	10-1/2	0.079-0.168	0.064-0.109	Two 0.079	1/2	7/8	32,000
		66-84	10-1/2	0.109-0.168	0.109	Two 0.109	1/2	7/8	45,000
	3x1 (Steel Only)	36-66	10-1/2	0.064-0.109	0.064	Two 0.079	1/2	7/8	32,000
		72-84	10-1/2	0.109	0.079	Two 0.079	1/2	7/8	32,000
		61-120	10-1/2	0.109	0.109	Two 0.109	1/2	7/8	45,000
PE Pipe Split Collar		Thru 24	See Drawing	per AASHTO M-294	per AASHTO M-294				

GENERAL NOTES

1. Metal Coupling Bands

   A. These coupling bands meet the strength requirements for special Joint Types under Non-erodible Soil Conditions, Table 2.23.3 of AASHTO's 'Standard Specifications for Highway Bridges'.

   B. For pipe walls and bands, the Specified Thickness for steel is given. For aluminum, the Specified Thickness is that for steel less the allowance for the zinc coating which is 0.003 to 0.004 of an inch per AASHTO M-36, M-196 and M-197.

   C. The minimum specified Thickness for bands is two Specified Thicknesses less than that for the pipe, but in no case thinner than 0.064 inches, (0.060 for aluminum).

   D. For pipe arches, use the same width band as for round pipe of equal periphery.

   E. A two-piece band is required for pipe greater than 42 inches in diameter.

   F. Tension straps may be connected to bands of plates with either spot or fillet welds that develop minimum required strength of strap.

   G. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.

   H. Use 1 1/4 inch center to center gauge line dimension on attached angle leg for rivets and spot welds.

   I. The Two Piece Integral Flange coupling band shall not be used on pipe arches.

   J. Culvert bands shall be made of the same metal as the culverts being joined.

2. Polyethylene (PE) Couplings

   Testing standards for Corrugated Polyethylene (PE) Pipe couplings have not been established nor have couplings been tested for shear or bending moment. Therefore, until further information is available, PE couplings shall be used only where bending moment and shear requirements are minimal. Typical situations are:

   A. Where the slope of the culvert will not be more than 5%.

   B. Where the fill below the culvert is less than 2 feet.

   C. In areas of firm soils. This excludes marshes unless the bedding is specially designed and approved by the engineer.

3. Other

   Couplings other than those shown on this drawing may be used upon submission of testing data (see 1-A above) and approval by the Engineer.

U.S. FOREST SERVICE

COUPLING BAND DETAILS FOR CORRUGATED PIPE AND PIPE ARCH

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Approved BILL HARPER Date 6/13/89

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