
Technical Memorandum

To: Mirela Keserovic, P.E, Amish Bhatt, P.E., S.E., AECOM
From: Mohammed (Mike) Kothawala, P.E., D. GE
Date: December 20, 2019
Subject: Revised TSRS Location for Retaining Wall 51 (SN 016-Z048)
Project: Circle Interchange Reconstruction
IDOT Job No. D-91-227-13, IDOT PTB 163, Item 01
Wang Project No. 1100-04-01

Wang prepared Structure Geotechnical Report (SGR) dated December 3, 2018 for Wall 51 which was approved by the IDOT for use in completing the final design plans and specifications. A temporary soil retention system (TSRS) was proposed between alley and existing CIP retaining wall. Subsequently TSRS was moved in front of the existing retaining wall. The new location is 9 inches in front of the existing CIP wall footing along proposed Retaining Wall 51 (SN 016-Z048). At AECOM request, Wang Engineering, Inc. (Wang) performed analyses for the revised TSRS location. We understand that the proposed TSRS will be left in place after MSE wall construction.

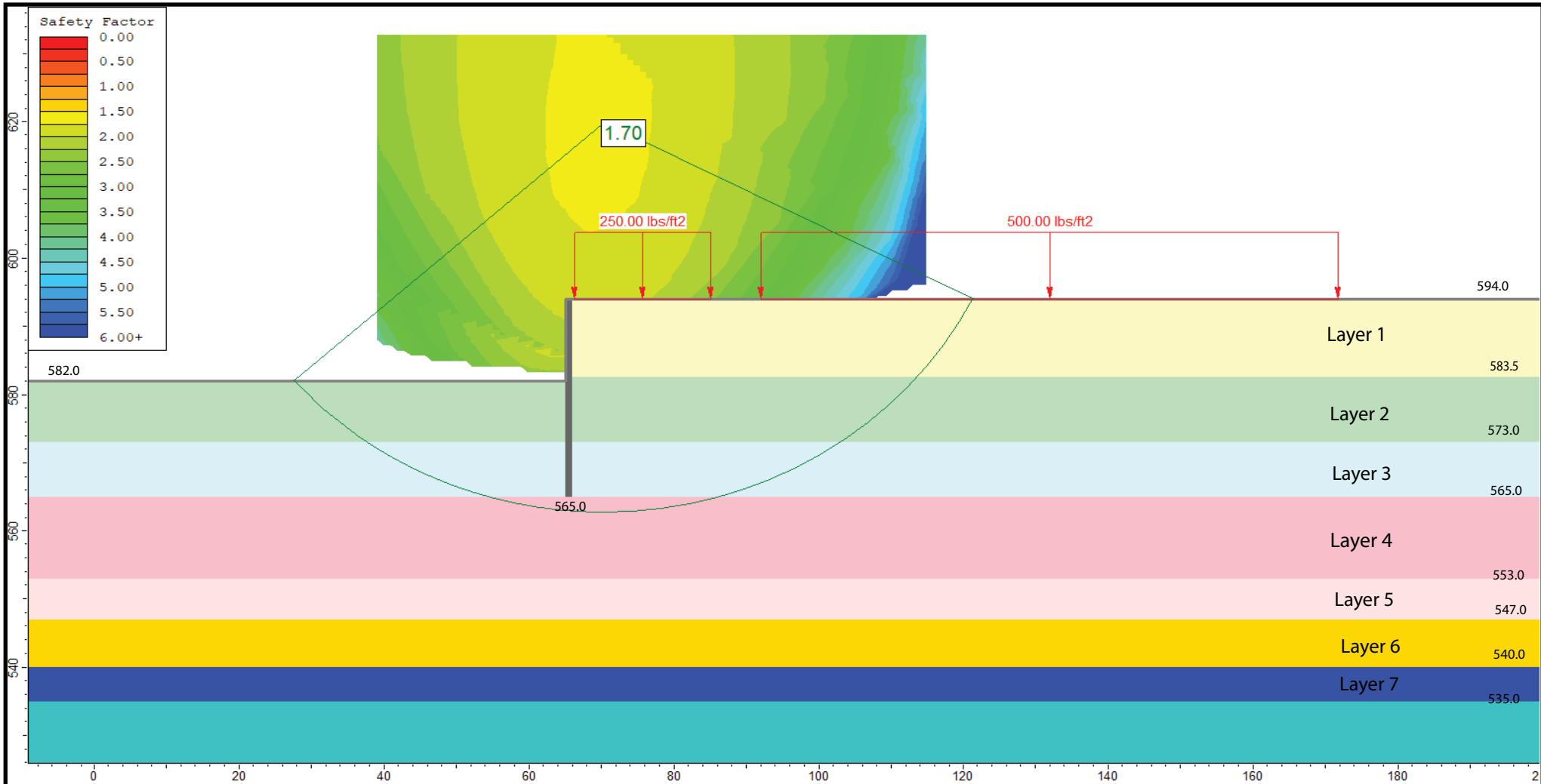
We reanalyzed to check the TSRS effect on the MSE wall using regular fill for the top 2 feet of the MSE wall zone area and the remaining portion with IDOT District One Class III Lightweight Cellular Concrete Fill (LCCF) as per TSL dated December 19, 2019. Our analyses show the MSE wall reinforcement zone should extend to 1.33 times the total wall height or 8 feet minimum to satisfy the external stability and the factored soil bearing resistance.

In addition, we performed global stability analysis to determine the minimum tip elevation for TSRS. Our analyses show the TSRS tip should be to at least elevation 565 feet. The global stability analysis results are presented in Exhibit 1.

It should be noted that the MSE wall designer should consider the proposed noise abatement wall foundation loads in the MSE wall design.


Attachments:

Global Stability Analysis Results, Exhibit 1
Revised TSL Plan



Undrained Analysis, Station 6345+67.48, Ref Borings 29-RWB-01 and VST-02

Layer ID	Description	Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	SANDY GRAVEL FILL	120	0	30
2	Soft CLAY to SILTY CLAY	110	480	0
3	Medium Stiff CLAY to SILTY CLAY	110	570	0
4	Medium Stiff CLAY to SILTY CLAY	110	690	0
5	Medium Stiff CLAY to SILTY CLAY	115	900	0
6	Stiff SILTY CLAY to SILTY CLAY LOAM	115	1200	0
7	Stiff SILTY CLAY to SILTY CLAY LOAM	120	1400	0
8	V Stiff SILTY CLAY to SILTY CLAY LOAM	120	2200	0

GLOBAL STABILITY ANALYSIS: CIRCLE INTERCHANGE RECONSTRUCTION TSRS FOR RETAINING WALL 51, SN 016-Z048, COOK COUNTY, ILLINOIS		
SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: NSB CHECKED BY: MAK
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01

Bench Mark: BM 1400 - Chisel "X" on chain bolt of fire hydrant, south side of Monroe, first fire hydrant west of Des Plaines Street. Elevation 594.76'

Existing Structure: Existing Cast-in-Place Cantilever Retaining Wall was originally built as F.A.I. Route No. 2, Section 0101.6-2P in 1957. The existing wall supporting the alley is approximately 100'-1" long and has a total height of 6'-0".

Traffic Control: Traffic will be maintained along NB I-90/94 lanes during construction. Alley behind proposed wall will be closed for traffic.

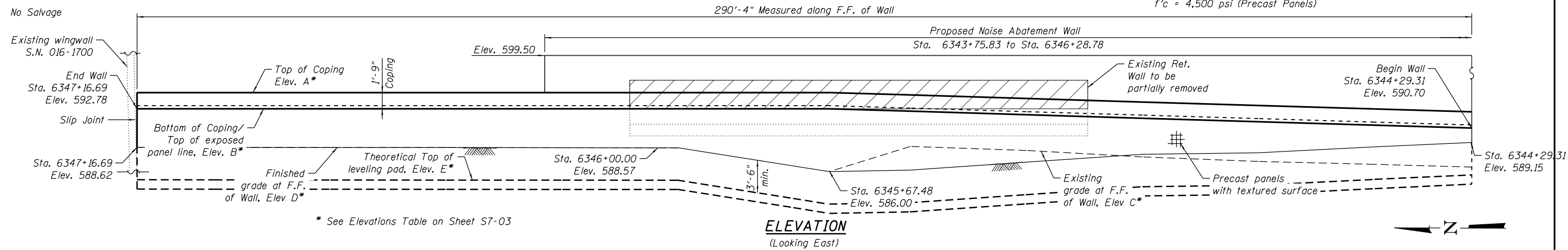
No Salvage

DESIGN STRESSES

FIELD UNITS
 f'c = 3,500 psi
 fy = 60,000 psi (Reinforcement)
PRECAST UNITS
 f'c = 4,500 psi (Precast Panels)

DESIGN SPECIFICATIONS

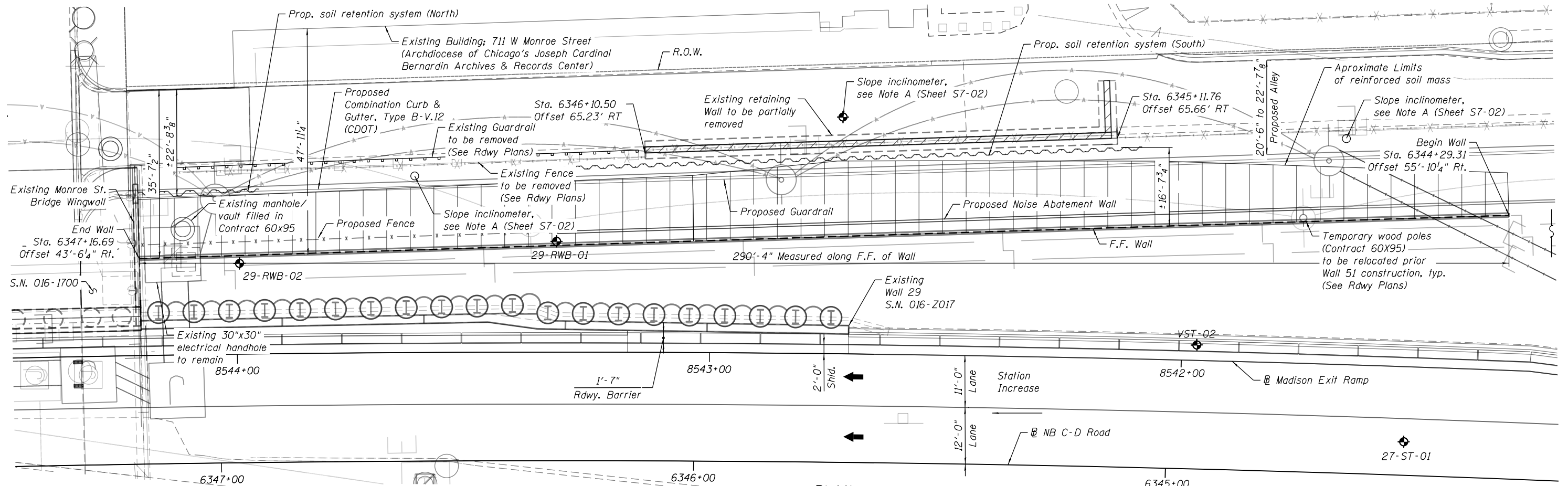
2017 AASHTO LRFD Bridge Design Specifications, 8th Edition



* See Elevations Table on Sheet S7-03

ELEVATION

(Looking East)



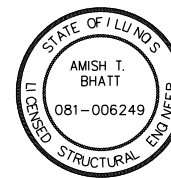
PLAN

LEGEND:

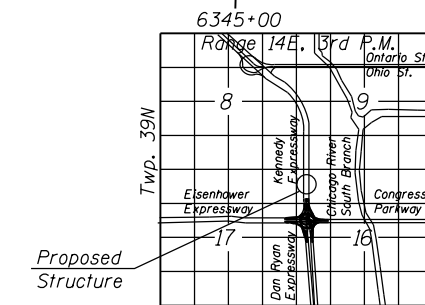
- Gas line — G —
- Electric — E —
- Existing Catch Basin ○
- Proposed Catch Basin ●
- Proposed Inlet ■
- Existing Storm Sewer — S —
- Proposed Storm Sewer — S —
- Existing Fence — x — x —
- Fiber Optic — FO —
- Limits of Removal of Existing Retaining Wall (hatched area)
- Limits of reinforced Soil Mass (stippled area)
- Temporary Aerial Cable — —
- Temporary Wood Pole — —
- Existing Manhole ○
- Soil Boring Location (circle with crosshair)
- B.F. - Back Face of Wall
- F.F. - Front Face of Wall

NOTES:

1. Stations and offsets are measured along NB C-D Road.



AMISH T. BHATT
 LICENSE EXPIRES 11/30/2020
 DATE 10/04/2019



LOCATION SKETCH

GENERAL PLAN & ELEVATION

RETAINING WALL 51

F.A.I. RTE. 90/94

SECTION 2014-015 R&B-R

COOK COUNTY

STA. 6344+29.31 TO STA. 6347+16.69

STRUCTURE NO. 016-Z048



USER NAME = keserovicm	DESIGNED - MK	REVISED
	CHECKED - ATB	REVISED
PLOT SCALE = N.T.S.	DRAWN - MK	REVISED
PLOT DATE = 12/19/2019	CHECKED - ATB	REVISED

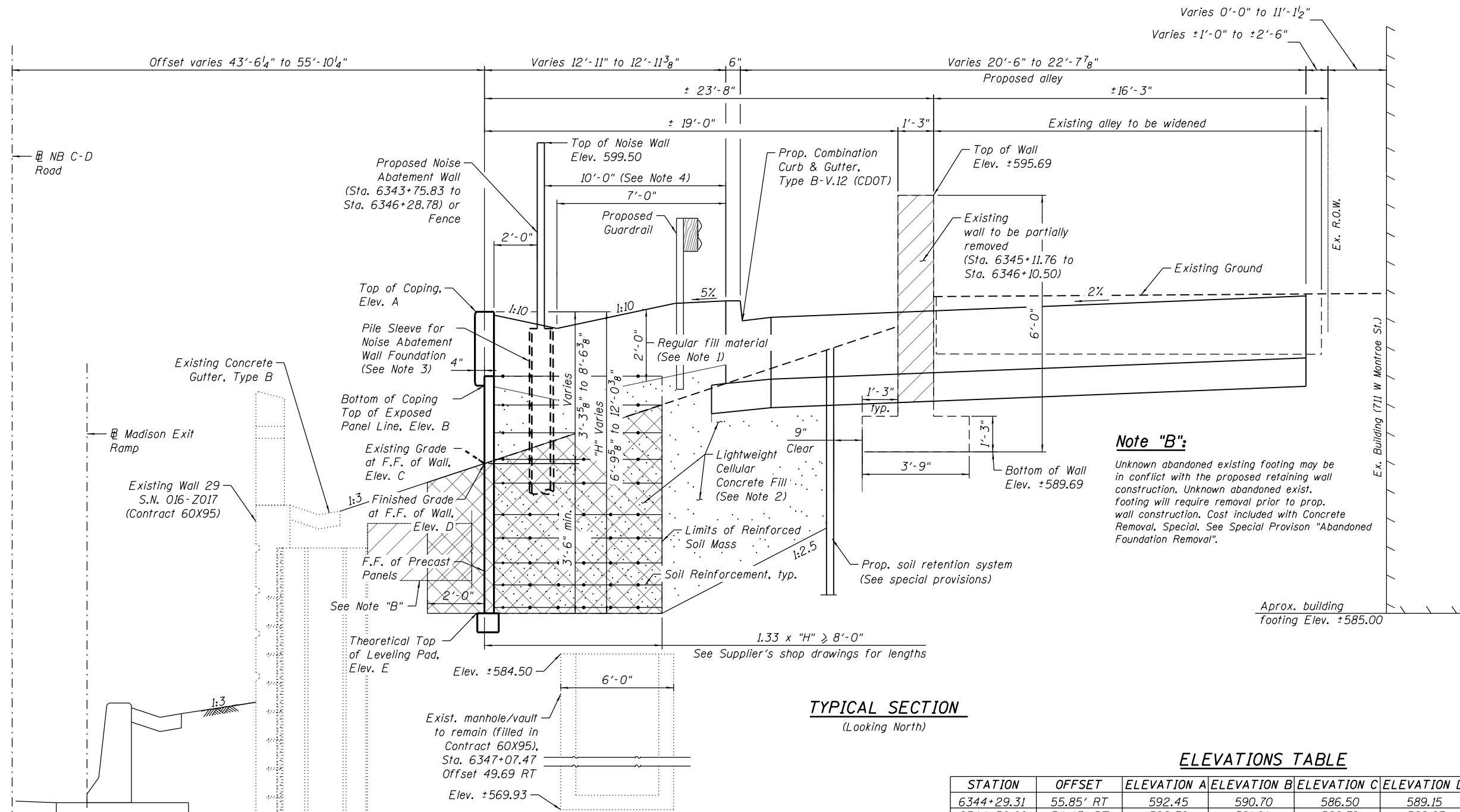
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GENERAL PLAN AND ELEVATION
RETAINING WALL 51 (STRUCTURE NO. 016-Z048)

SHEET NO. S7-01 OF 9 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94	2014-015 R&B-R	COOK	#TOT	#P51-01
			CONTRACT NO. 60X94	
ILLINOIS FED. AID PROJECT				

016-Z048-SHT-ACW-001-GPE.dgn



Note "B":
 Unknown abandoned existing footing may be in conflict with the proposed retaining wall construction. Unknown abandoned exist. footing will require removal prior to prop. wall construction. Cost included with Concrete Removal, Special. See Special Provision "Abandoned Foundation Removal".

TYPICAL SECTION
 (Looking North)

ELEVATIONS TABLE

STATION	OFFSET	ELEVATION A	ELEVATION B	ELEVATION C	ELEVATION D	ELEVATION E
6344+29.31	55.85' RT	592.45	590.70	586.50	589.15	585.65
6344+50.00	54.43' RT	592.76	591.01	586.79	588.67	585.17
6344+75.00	52.82' RT	593.14	591.39	587.10	588.04	584.54
6345+00.00	51.33' RT	593.51	591.76	587.59	587.88	584.38
6345+25.00	49.97' RT	593.89	592.14	588.38	587.02	583.52
6345+50.00	48.73' RT	594.27	592.52	588.72	586.16	582.66
6345+67.48	47.93' RT	594.53	592.78	586.94	586.00	582.50
6345+75.00	47.60' RT	594.53	592.78	586.60	586.60	583.10
6346+00.00	46.60' RT	594.53	592.78	588.57	588.57	585.07
6346+25.00	45.72' RT	594.53	592.78	588.58	588.58	585.08
6346+50.00	44.96' RT	594.53	592.78	588.59	588.59	585.09
6346+75.00	44.32' RT	594.53	592.78	588.60	588.60	585.10
6347+00.00	43.80' RT	594.53	592.78	588.61	588.61	585.11
6347+16.69	43.52' RT	594.53	592.78	588.62	588.62	585.12

Elevation A: Top of Coping
 Elevation B: Bottom of Coping / Top of Exposed Panel Line
 Elevation C: Existing Grade at F.F. of Wall
 Elevation D: Finished Grade at F.F. of Wall
 Elevation E: Theoretical Top of Leveling Pad

- NOTES:**
- Top 2'-0" of MSE Wall shall have regular fill material. For quantity see Civil plans.
 - Lightweight Cellular Concrete fill shall be Class III (District I) Lightweight Cellular Concrete Fill. LCCF shall be used within reinforced soil mass and behind reinforced soil mass within excavated area.
 - Noise Abatement Wall (NAW) Foundation type, diameter, depth, and spacing to be determined by Contractor. The Contractor shall install pile sleeve around NAW foundation elements prior to LCCF placement for the wall. Annulus between sleeve and NAW foundation shall be filled with loose dry sand. Cost is included Mechanically Stabilized Earth Retaining Wall, Special.
 - Planting of trees or other large plants with deep root systems shall not be allowed in the area between MSE Wall and alley guardrail.

LEGEND:

- Lightweight Cellular Concrete Fill
- Structure Removal Limit
- Structure Excavation Limits

B.F. - Back Face of Wall
 F.F. - Front Face of Wall

016-Z048-SHT-ACW-003-TypSec.dgn



USER NAME = keserovic	DESIGNED - MK	REVISED
	CHECKED - ATB	REVISED
PLOT SCALE = N.T.S.	DRAWN - MK	REVISED
PLOT DATE = 12/19/2019	CHECKED - ATB	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION
STRUCTURE NO. 016-2048
 SHEET NO. ST-03 OF 10 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94	2014-015 R&B-R	COOK	#TOT	#P51-03
CONTRACT NO. 60X94			ILLINOIS FED. AID PROJECT	