

ATTACHMENT A
EXCERPTS FROM THE *TRANSPORTATION NEEDS ANALYSIS*

2.1.3.4 SR 32/Eight Mile Road Intersection

The SR 32/Eight Mile Road Intersection is a three-leg, unsignalized intersection:



Figure 7: SR 32/Eight Mile Road Intersection

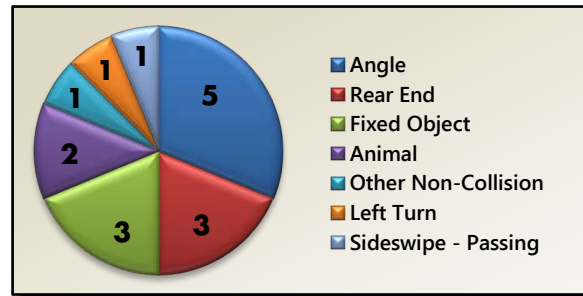
Stakeholder Input: Forty (40) comments address roadway concerns at the SR 32/Eight Mile Road intersection. Representative comments are:

- Difficult to make left-turns from Eight Mile Road onto westbound SR 32, particularly during periods of heavy congestion (8 comments)
- Dangerous intersection (10 comments)
- Frequent accidents (6 comments)
- The continuous right-turn lane from Eight Mile Road onto eastbound SR 32 is not functioning properly due to driver hesitancy (2 comments)
- A traffic signal is needed at this intersection (4 comments)
- Re-route SR 32 (1 comment)
- Poor intersection alignment (1 comment)
- Wider intersection needed (2 comments)
- The intersection is unsafe; redesign the intersection (1 comment)
- Weaving traffic on the eastbound approach is a concern (2 comments)

One comment cites a need for pedestrian access at Eight Mile Road and along SR 32, and another comment cites a need for bicycle lanes along SR 32. A third comment cites a need for rail access in this area.

**EASTERN CORRIDOR SEGMENTS II AND III
(PID 86462)
TRANSPORTATION NEEDS ANALYSIS**

Crash Data: Over the three-year period from 2013 to 2015, there were a total of 14 crashes, of which the most common collision was an angle collision. The type and frequency of crashes at the intersection are shown in [Figure 8](#). Of the 14 total crashes, 11 (80%) of the crashes occurred as a result of vehicles turning to or from Eight Mile Road. Causal factors for these turn-related crashes are restricted sight distance, excessive speed, and inadequate traffic control. The five angle crashes and the three fixed-object crashes all involved vehicles making a westbound to southbound left turn onto Eight Mile Road and striking the guardrail on the west side of the road. A plot of all 14 crashes is included in [Attachment A-2](#).



**Figure 8. Frequency of Crashes by Crash Type
SR 32/Eight Mile Road Intersection**

LOS Analysis: The HCS analysis indicates that traffic on Eight Mile Road waiting to enter SR 32 is LOS F during both the AM and PM peak hour for the existing, No Build opening year (2022), and No Build design year (2042) conditions. During the AM peak-hour, the northbound left turn movement has a v/c ratio of 1.07 in the opening year and is expected to increase to 1.39 by the design year. During the PM peak-hour, the northbound left turn movement has a v/c ratio of 1.72 and the northbound right turn movement has a v/c ratio of 1.15 in the opening year. They are expected to increase to 3.76 and 1.41 by the design year. It is anticipated that operational or minor intersection improvements are required for the existing conditions, and that major capacity improvements will be required for the No Build opening year and No Build design year conditions.

Geometric Data: Deficient stopping sight distances and intersection sight distances were identified at this intersection. The required stopping sight distance for a design speed of 55 mph is 495 feet; however, the stopping sight distance is 350 feet for eastbound vehicles and 415 feet for westbound vehicles. The intersection sight distance for northbound vehicles on Eight Mile Road is 300 feet for vehicles making right turns onto SR 32 and 310 feet for vehicles making left turns. The required intersection sight distance is 610 feet for left-turning vehicles, and 530 feet for right-turning vehicles.

Eight Mile Road exceeds the maximum grade criterion at this intersection, which is 10% for urban arterial at 35 mph (*Location & Design Volume 1, Figure 203-1, ODOT 2016*). This criterion is exceeded by the right-turn lane on northbound Eight Mile Road; right-turning vehicles on northbound Eight Mile Road experience grades of nearly 15%, as measured in the field.

Pedestrian Data: No pedestrians were observed at the intersection during a 24-hour period recorded on November 19, 2015.

2.1.3.5 SR 32: Eight Mile Road to Beechwood Road

The segment of SR 32 between Eight Mile Road and Beechwood Road is 0.68 miles in length. Just west of Eight Mile Road, SR 32 widens from a two-lane facility to a four-lane divided highway. Both sections of SR 32 have narrow 2-foot shoulders. At Moran Road, these sections merge into a four-lane highway. Throughout this section, the terrain becomes increasingly steep and SR 32 gradually increases in elevation from 540 feet in Newtown to 620 feet at Eight Mile Road and 870 feet at Beechwood Road.

HCS Analysis																						
Transportation Concern	MetroQuest Comments	Workshop Comments	Existing Year 2015	Opening Year 2022	Design Year 2042	Safety	Travel Time	Queue Analysis	Geometric Analysis	Primary Needs	Secondary Needs											
	4-lanes would be a huge improvement wherever possible. (2 pins)																					
Access	Getting in and out of the business here is horrid.	There are conflicts at the Burger Farm and Garden	n/a	n/a	n/a	none	n/a	n/a	n/a	none	none											
	Need a direct road from SR 32 to Red Bank Road.																					
	Need a better connection to U.S. 50.																					
	Turn lane into Burger Farm.																					
	Limited access direct arterial through the valley to connect with I-71/Redbank Road.	We need an ANCOR access road.																				
	Add access road for trucking to Broadwell/Round Bottom.																					
	Put it over closer to the river!																					
	Road to Ancor area for development.																					
	Connections to developable land in the Ancor area should be considered. (2 pins)																					
	access and development																					
Ancor Connector Road needed.																						
Safety	Bicyclists ride down SR 32 slowly, even though speed limit is posted much faster for cars. Coming down the hill at Eight Mile Road is dangerous with a bike in front of you going slowly. Post a "No Bike" sign on SR 32.	none	n/a	n/a	n/a	none	n/a	n/a	none	none												
	No place to safely ride.																					
	With two-lane road, sharing the road with cyclists in a 55 mph area seems unsafe for cyclists.																					
Mobility	Need Bike/Ped facility leading up Little Dry Run Road into Anderson Township.	none	n/a	n/a	n/a	n/a	n/a			none	none											
	Need Bike Path. (6 pins)																					
	Need a Bike Path connecting Eastgate to Newtown.																					
	No marked lanes all the way thru.																					
	Bike path connecting Eastgate to Newtown.																					
Mobility	Need a sidewalk to connect Little Dry Run.	none	n/a	n/a	n/a	n/a	n/a			none	none											
Safety	For the few runners, having a place to walk out of the traffic would be nice.		n/a	n/a	n/a	n/a	n/a			none	none											
Mobility	Need Accessible Transit Stop. [pin on rail line on western edge of focus area]	Improve or add bus access to SR 32 and, related to relief lanes idea, add relief lanes or turn-offs for school buses or other vehicles that stop frequently.	n/a	n/a	n/a	n/a	n/a			none	none											
	Need Accessible Transit Stop. Would love to see light rail run along here instead of having to drive. (2 pins)																					
	Need Bus Service. There is no public transportation along SR 32 and roads leading to SR 32. (2 pins)																					
	There is no real public transit here. How about public transportation Downtown or even just out to Eastgate. Instead, Eastgate is designed solely for people with cars with no consideration granted to bicycles, pedestrians or public transportation. (3 pins)																					
	Possible commuter line here for Mariemont/Terrace Park/Milford. Could stop in Newtown next on rail line for Anderson/Mt. Washington commuters.																					
	The only good option currently is cars - this contributes to pollution and crowded roads. I would love a quick train to downtown.																					
	There is already a rail line here. Why not use it?																					
	Need Accessible transit stop. (pin is just west of Eight Mile Road)																					
	Need rail service																					
	Need public transit; multimodal transit options needed to develop this area with mixed use approach, including residential options.																					
	Access											Mass transit-light rail, commuter rail to get people from outskirts to CBC.		n/a	n/a	n/a	n/a	n/a			none	none
												Direct access to various venues/locations in Cincinnati central district and downtown riverfront venues. If the ANCOR Area becomes home to many 1000's of quality jobs a park/ride station may be practical.										
Eight Mile / SR 32 Intersection																						
Safety / Congestion	Traffic Signal Issue; dangerous intersection.	Left turn from Eight Mile Road onto SR 32 is a concern	AM NBL = Queue > Storage	AM NBL = Queue > Storage,	AM NBL = Queue > Storage	14 crashes at intersection from 2013	n/a	n/a	Deficient intersection sight distance, stopping sight distance, and vertical grade.	1. Address capacity issues on Eight Mile Road. 2. Address safety issues for vehicles turning at Eight Mile Road. 3. Address deficient sight distance and roadway grade issues.	none											
	Traffic Signal Issue; Need stoplight. (3 pins)	concern	AM NBL = LOS F, v/c 0.75	AM NBL = LOS F, v/c 1.07	AM NBL = LOS F, v/c 1.39	through 2015 80% occurred turning on/off Eight Mile Road. Causal factors for the turning related crashes are due to restricted sight distance, excessive speed, and inadequate traffic control.																
	Hard to turn left from Eight Mile to SR 32.	People do not feel safe with the continuous right turn from Eight Mile onto SR 32. Trucks merge quickly into this continuous lane as they want to be on the right going up the hill.	PM NBL = Queue > Storage	PM NBL = Queue > Storage	PM NBL = Queue > Storage																	
	Poor alignment; causes driver indecision.		PM NBL = LOS F, v/c 0.81	PM NBL = LOS F, v/c 1.72	PM NBL = LOS F, v/c 3.76																	
	Frequent Accidents.		PM NBR = Queue > Storage	PM NBR = Queue > Storage	PM NBR = Queue > Storage																	
	People drive in and out of these lanes while there is a turn lane.		PM NBR = LOS F, v/c 0.87	PM NBR = LOS F, v/c 1.15	PM NBR = LOS F, v/c 1.41																	
	Trying to access Westbound SR 32 from Eight Mile is dangerous.	Weave on eastbound approach is a concern.																				
	During the morning and evening commute, attempting a left turn from Eight Mile onto SR 32 is not only an extremely long wait but can be dangerous when attempting to make a turn into traffic going 50 mph.	Need a larger area for the intersection.																				

HCS Analysis																	
Transportation Concern	MetroQuest Comments	Workshop Comments	Existing Year 2015	Opening Year 2022	Design Year 2042	Safety	Travel Time	Queue Analysis	Geometric Analysis	Primary Needs	Secondary Needs						
	Turning left onto Eight Mile when westbound on SR 32 is both dangerous and is a traffic congestion problem which leads to back ups. This becomes too congested too easily. This needs to be rerouted around Newtown. Frequent Accidents; Remove left turn from Eight Mile Road to SR 32. (2 pins) Wider roadway, intersection improvement at 8 Mile Road, access to ANCOR Area to encourage development and significant (many 1000's) job creation. Goes from two lanes down to one lane, frequently backed up and safety issue as people try to get ahead of traffic before the lane ends. This is a dangerous intersection as traffic is moving quickly. (6 pins) Frequent Accidents; The westbound lane onto Eight Mile at the bottom of the [hill] is dangerous. Improvement of Eight Mile/SR 32 intersection is key to safety , access, etc. It's the only direct north-south route to the area from Anderson Township. The merging of traffic on the hill puts slower vehicles in the left lane, causing a bottleneck. Continuous right turn onto SR 32 from Eight Mile not working. Far too many cars stop and wait. Cars turning left from Eight Mile onto Rt. 32 have to wait & block right turners when Rt. 32 is busy. Turning left onto Eight Mile Road when westbound on SR 32 is both dangerous and is a traffic congestion problem with a back up in the left turn lane on SR 32. (2 pins) Frequent Accidents; Lots of accidents at 32 and eight mile Dangerous and unnecessary. Remove access point all directions. 8 Mile to 32 east and west needs to be disconnected. Too many accidents and deaths!!!! Upgrade with turn lane and current standards with complete streets infrastructure; this interchange is unsafe. Needs a bridge over SR 32 and ramps. Use US 27 and Kemper Rd as an example. On eastbound SR 32 just east of 8-Mile Road, traffic often stays in the left lane, moving slowly, when the right lane is wide open. Although drivers should already know this, slower traffic should move to the right lane as soon as possible, allowing fast (cut off) Drivers on 8 Mile that want to turn onto WB 32 can get stuck with no gaps in traffic. EB 32 traffic travels too fast. This feels like a very dangerous intersection although I've only seen one accident in the 4 months I've been driving through the intersection.	There is a problem at the 8-mile intersection with SR 32.															
Access	Pedestrian access 8-Mile, all of Route 32. Actually all of Anderson Township.									None	None						
Access	Need bicycle lanes, access 8-mile, all of 32. All of Anderson, Eastern Corridor.									None	None						
Access	A train stop here would pull from Anderson Township as well.									None	None						
SR 32: Eight Mile to Beechwood																	
Maintenance	Road Needs Repair.	Litter just west of the intersection is a concern.	n/a	n/a	n/a	28 total crashes from 2013 through 2015; the sub segment of SR 32 from Eight Mile Road to the split was identified as a high hazard location. Fixed Object & Rear-End = 60% of the crashes. 16 of the 28 crashes occurred on the high hazard sub segment. Half of the high hazard segment crashes occurred on a curve with grade. The most common crash type was Fixed Object. Potential causal factors are excessive speed, slippery pavement, inadequate geometry, or inadequate delineation.	No significant increase in travel time during the peak hours.	n/a	Deficient super elevation and horizontal curvature, vertical grade, and vertical curve.	1. Address safety issues on the SR 32 hill 2. Address roadway grade deficiencies on the SR 32 hill to improve truck mobility 3. Addressroadway curve deficiencies on the SR 32 hill	none						
Safety	SR 32 Hill needs to be relocated to help make a smooth transition down the hill to Newtown. Coming into the SR 32 split is always chaotic and people drive very different speeds down the hill.	Grade of the hills is a concern (jake brake and traffic noise). Straighten SR 32 to lessen the steepness of the hill. Add 300-400 feet for deceleration.															
	Eastbound SR 32 coming up the hill from Newtown towards Eastgate is very narrow with no shoulder or emergency lane. I've almost been involved in several accidents here over the years.	Realignment of SR 32 going up the hill should be considered.															
	SR 32 hill is dangerous and needs to be rerouted and help extend Eight Mile Road farther over to help with road access.																
	Frequent Accidents (3 pins)																
	Remove access point at SR 32 and Moran Road.																
	Near miss accidents by the minute due to merging and stopped traffic.																
	Dangerous Area.																
	Better signage needed to keep trucks over 5 Ton off of steep hill																

Table 2: Action Plan for Eastern Corridor, Segment II/III Study Area

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
Ancor-SR 32 Hill		32-16		Add warning signs about lane drop on westbound SR 32.	High Priority	ODOT	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$9,500 to \$14,500	\$0
Linwood-Eastern_US-50_Red_Bank		X-2a		Add better signing for auto connectivity.	High Priority	The City of Cincinnati	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$11,000 to \$16,000	\$0
Linwood-Eastern_US-50_Red_Bank		X-4a		Add wayfinding signage.	High Priority	The Village of Fairfax	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$20,000 to \$30,000	\$0
Linwood-Eastern_US-50_Red_Bank		50-1		Add signage indicating "expressway ends". Add flashing beacon to alert drivers to long queues at the Meadowlark intersection.	High Priority	The Village of Fairfax	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$11,000 to \$16,000	\$0
Linwood-Eastern_US-50_Red_Bank		50-2		Add advance signing to alert drivers of drop right lane on eastbound US 50 at Wooster Rd.	High Priority	The Village of Fairfax	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$16,000 to \$24,000	\$0
Linwood-Eastern_US-50_Red_Bank		STS		Improve signal timing (including advanced detection and wireless signal interconnect)	High Priority	The Village of Fairfax	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$58,000 to \$87,000	\$0
Newtown		STS		Improve signal timing (including advanced detection and wireless signal interconnect)	High Priority	The Village of Newtown	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$80,000 to \$120,000	\$0
US 50 Corridor		STS		Improve signal timing (including advanced detection and wireless signal interconnect)	High Priority	The Village of Fairfax; The Village of Mariemont; ODOT	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$104,000 to \$156,000	\$0
US 50 Corridor		I-13a		Replace signal heads in Mariemont Square.	High Priority	The Village of Mariemont	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$27,000 to \$40,000	\$0
US 50 Corridor		I-33a I-32a I-12a I-11a		Add backplates to signals.	High Priority	The Village of Mariemont; ODOT	HSIP Application - Low Cost Bundle	Prepare 2019 HSIP Safety Fund Application	\$9,000 to \$13,000	\$0
Ancor-SR 32 Hill	C5	I-3b	Link	Install a signalized continuous green tee intersection at Eight Mile Rd. Includes grade adjustments on Eight Mile Rd approach to SR 32. Evaluate Eight Mile Road realignment to improve right turn to eastbound SR 32	High Priority	ODOT	Construct before C6	<ul style="list-style-type: none"> Prepare 2019 HSIP Safety Fund Application. Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$1,600,000 to \$2,375,000	\$100,000 to \$200,000
Newtown	B2	I-5a	Link	Increase left turn lane storage along SR 32, add eastbound through lane on SR 32, and add dual SB left turn lanes at Round Bottom intersection.	High Priority	The Village of Newtown		<ul style="list-style-type: none"> Meet with Newtown to develop funding strategy Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$4,400,000 to \$6,600,000	\$365,000 to \$730,000
Ancor-SR 32 Hill	C1	I-4a I-4b	Link	Lengthen storage lanes along SR 32 westbound and Little Dry Run Road northbound. Also improve sight distance problem by improving horizontal curve along Little Dry Run just south of SR 32, and add an EB right turn lane on SR 32	High Priority	The Village of Newtown	Construct with B2 or C3	<ul style="list-style-type: none"> Meet with Newtown to develop funding strategy Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$1,575,000 to \$2,350,000	\$80,000 to \$160,000
Newtown	B7	RB-2	Link	Add shared use path on Round Bottom Rd. between SR 32 and Valley.	High Priority	The Village of Newtown	Construct with B2	<ul style="list-style-type: none"> Meet with Newtown to develop funding strategy Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$90,000 to \$230,000	\$70,000 to \$140,000

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
Ancor-SR 32 Hill	C3	32-9	Link	Add center turn lane from Little Dry Run to East Corp Limit. Includes sidewalk from Little Dry Run to east corp. limit (originally part of B6).	High Priority	The Village of Newtown		<ul style="list-style-type: none"> Meet with Newtown to develop funding strategy Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$1,300,000 to \$1,950,000	\$130,000 to \$260,000
Linwood-Eastern_US-50_Red_Bank	E1	I-25b	Link	Improve signal timing, lengthen storage lanes, add dual WB right turn lanes and dual NB thru lanes at Red Bank/Colbank intersection. Also includes new coordinated traffic signal at Colbank & WB US 50 ramps, that allows ramp traffic to US 50 EB to bypass.	High Priority	The Village of Fairfax		Meet with Fairfax to develop funding strategy	\$675,000 to \$1,000,000	\$17,000 to \$34,000
SR 32 / SR 125	A5 A6	125-3a 125-3b	Link	<p>Concept A5 would connect SR 125 walk at Elstun Rd to Little Miami Trail with shared use path along SR 125 utilizing new bridge over Clough Creek and passing behind UDF.</p> <p>Concept A6 would connect SR 125 walk at Elstun Rd to Little Miami Trail with shared use path on new alignment south from SR 32 ramps, on new bridge over Clough Creek, and tying to Elstun Road. Concept A6 modified to provide shared use path along Elstun Road to SR 125 switching from west to east at Spindlehill Dr. {This concept eliminates need for Concept A3 (Elstun-1)}</p>	High Priority	Anderson Township		Evaluate possible slope stability issues on A5 alignment.	\$770,000 to \$1,450,000	\$65,000 to \$180,000
SR 32 / SR 125	A4	125-5	Link	Add shared use path along south side of SR 125 between Elstun Rd and Ranchvale Dr.	High Priority	The City of Cincinnati	Build with or after A5/A6	Work with City of Cincinnati to prioritize bike/ped projects and discuss funding strategy.	\$140,000 to \$200,000	\$200,000 to \$400,000
Linwood-Eastern_US-50_Red_Bank	D5	X-2b-2 X-2b-2a	Link	Create grade separated interchange to connect Wilmer and Wooster.	High Priority	The City of Cincinnati		Engage with Linwood Community Council to further evaluate D5. Next step will consist of developing alternatives before arriving at a recommended preferred alternative.	\$7,000,000 to \$12,100,000	\$875,000 to \$2,500,000
SR 32 / SR 125		X-1b		Install friction pavement to address crashes on ramps between SR 32 and SR 125 in wet conditions.	High Priority	ODOT		<ul style="list-style-type: none"> Prepare 2019 HSIP Safety Fund Application. Possibly advance with planned ODOT resurfacing projects (PID 105215 in FY22 and PID 105214 in FY24) 	\$140,000 to \$210,000	\$0
Ancor-SR 32 Hill	C9	I-9	Link	Improve Broadwell Road and Round Bottom Road intersection to accommodate turning movements of large trucks.	High Priority	Hamilton County		Meet with HCEO to in spring of 2019 to discuss abbreviated safety fund application	\$110,000 to \$170,000	\$15,000 to \$30,000
Newtown	B1	I-6a	Link	Lengthen turn lanes at the Church/Main intersection and add a westbound through lane on SR 32.	High Priority	The Village of Newtown	Evaluate after B2 is constructed	Meet with Newtown to develop funding strategy	\$1,200,000 to \$1,800,000	\$250,000 to \$500,000
US 50 Corridor	F7	BIKE-5	Link	Use old RR bed for bicycle connectivity to Little Miami Trail.	High Priority	Columbia Township		This alternative is being advanced by Great Parks / Columbia Township.	Getting info from Great Parks	Getting info from Great Parks
US 50 Corridor	F8	50-7a	Link	Create shared use path along the south side of US 50 to Promenade intersection, then continue on north side of US 50 to Pocahontas.	High Priority	Columbia Township		Meet with Great Parks to coordinate next steps	\$850,000 to \$1,300,000	\$100,000 to \$200,000
SR 32 / SR 125		X-1c		Extend merge length on ramp from westbound SR 32 to westbound SR 125.	High Priority	The City of Cincinnati		Need to meet with ODOT PM to determine if this work can be added to PID 107295	\$47,000 to \$71,000	\$0

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
US 50 Corridor		50-10		Pedestrian crossing of US 50 at Ashley Oaks.	High Priority	Columbia Township		This alternative is being advanced by Columbia Township.	\$55,000 to \$82,000	\$0
US 50 Corridor	F6	50-5	Link	Maintain two lanes in each direction on US 50 between East St and Petoskey Ave by restriping and minor widening into median island.	High Priority	The Village of Mariemont		Mariemont Planning Commission failed to pass consent legislation for this work in January of 2019 to include the work in the 2019 US-50 resurfacing project (PID 101309). Re-evaluate with updated crash data in the summer of 2019.	\$26,000 to \$39,000	\$0
SR 32 / SR 125		X-1e		Install drainage backflow preventer and additional grading along bike trail to reduce flooding frequency on SR 32 ramps under bridge.	High Priority	ODOT		Committed with PID 107295	\$35,000 to \$53,000	\$0
US 50 Corridor		I-13b		Refresh Mariemont Square pavement markings and add RPMs through intersections.	High Priority	The Village of Mariemont		Committed with PID 101309	\$9,000 to \$15,000	\$0
Newtown		I-10a		Install five section head for WB right turn movement at Church/Valley intersection.	High Priority	The Village of Newtown		Committed with local funding	\$4,800 to \$7,200	\$0
Ancor-SR 32 Hill		I-2a		Improve signal timing.	High Priority	ODOT		Committed with ODOT retiming study	n/a	\$0
Ancor-SR 32 Hill		32-13		Add friction pavement surface on SR 32.	High Priority	ODOT		Committed with PID 107133 in summer of 2019	n/a	\$0
Ancor-SR 32 Hill		32-8		Need speed study on SR 32 at Little Dry Run to consider lower legal speed.	High Priority	The Village of Newtown		Completed January 2019	n/a	n/a
Ancor-SR 32 Hill		I-3f		Investigate vegetation removal to improve intersection sight distance.	High Priority	ODOT		Committed with PID 101383 for fall 2019	\$15,000 to \$22,500	\$0
SR 32 / SR 125	A3	Elstun-1	Link	Add sidewalk along Elstun Rd to connect bus stops on SR 125 with rental properties on Spindlehill Dr and Reserve Cir.	Medium Priority	Anderson Township	Not needed if A6 is constructed	First evaluate A5/A6 options and consider sidewalk along Elstun only if shared use path is not considered feasible	\$43,000 to \$64,000	\$15,000 to \$30,000
Linwood-Eastern_US-50_Red_Bank		X-2C		Improve pedestrian crossing at existing bus stops located on SR 125/SR 32 at Wooster/Wilmer	Medium Priority	The City of Cincinnati		Pursue D5/D6 first and consider X-2C only if needed	\$450,000 to \$675,000	0
US 50 Corridor	F5	I-11c	Link	Install a roundabout at Newtown/US 50 intersection.	Medium Priority	ODOT		Re-evaluate this concept with 2019 crash data in the summer of 2019	\$1,375,000 to \$2,150,000	\$180,000 to \$360,000
Linwood-Eastern_US-50_Red_Bank	E3	I-16b	Link	Install roundabout at Meadowlark/US 50 intersection.	Medium Priority	The Village of Fairfax		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$1,200,000 to \$1,800,000	\$12,500 to \$25,000
Newtown	B3	I-8b	Link	Install roundabout at Round Bottom/Valley intersection.	Medium Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$475,000 to \$700,000	\$80,000 to \$160,000
Newtown	B4	I-10c	Link	Install roundabout at Church/Valley intersection.	Medium Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$600,000 to \$910,000	\$165,000 to \$330,000
SR 32 / SR 125	A2	I-7d	Link	Improve Clough & SR 32 intersection to allow full movements by using signalized green tee intersection. Includes center turn lane on SR 32 from Speedway to Clough.	Medium Priority	ODOT		Re-evaluate this concept with 2019 crash data in the summer of 2019	\$1,600,000 to \$2,400,000	\$150,000 to \$300,000
Linwood-Eastern_US-50_Red_Bank	E4	I-20b	Link	Install roundabout at Wooster/Red Bank intersection.	Medium Priority	The Village of Fairfax		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$1,150,000 to \$1,750,000	\$40,000 to \$80,000

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
SR 32 / SR 125	A9	32-2a	Link	Connect Five Mile Trail using subdivision streets in Turpin Hills to the end of Patterson Farms Ln, and then by utilizing existing emergency access road connecting to Turpin Lake Place to Little Miami Trail. Final connection to use A7 or A8.	Medium Priority	Anderson Township		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$2,500 to \$4,000	\$30,000 to \$60,000
SR 32 / SR 125	A7	32-1a	Link	Make connection from Turpin Lake subdivision to Little Miami Trail with "mid-block" at-grade pedestrian crossing. Perform speed study in conjunction and move crossing to the intersection.	Medium Priority	Anderson Township	Build after A9	Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$35,000 to \$50,000	%5,000 to \$10,000
Newtown	B10	RB-3d	Link	Connect Riverside Park and Lake Barber with Little Miami Trail with shared use path. Golf course alignment.	Medium Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$1,175,000 to \$1,775,000	\$107,000 to \$214,000
Newtown	B8	RB-3a	Link	Connect Riverside Park and Lake Barber with Little Miami Trail with shared use path. Portion of alignment along Valley.	Medium Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$160,000 to \$240,000	\$150,000 to \$300,000
Ancor-SR 32 Hill	C10 C11	A-1 A-2	Link	Add access road from Newtown east corporation line to Broadwell Road. Includes adjacent shared use path.	Medium Priority	TBD		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration. Next step will consist of developing alternatives before arriving at a recommended preferred alternative.	\$9,100,000 to \$16,850,000	\$175,000 to \$1,450,000
Ancor-SR 32 Hill	C6	I-3e	Link	New alignment and grade separation of eastbound SR 32 over Eight Mile; unsignalized continuous green tee intersection at Eight Mile and westbound SR 32. (Partial eastbound only grade improvements on hill). Includes grade adjustments on Eight Mile Rd.	Medium Priority	ODOT	Construct after C5	Re-evaluate after construction of C5 or if C10/C11 move forward.	\$11,650,000 to \$17,450,000	\$1,850,000 to \$3,700,000
Linwood-Eastern_US-50_Red_Bank	E5	BIKE-1a BIKE-2a	Link	Connect Wasson Trail to Eastern (at D2) with shared use path along US 50.	Medium Priority	The City of Cincinnati		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$5,100,000 to \$7,700,000	\$855,000 to \$1,710,000
Linwood-Eastern_US-50_Red_Bank	E7	BIKE-2b X-4d-1 BIKE-4a	Link	Connect Wasson Trail to Armleder with shared use path from Ault Park to Red Bank to Wooster, behind Cincinnati Paperboard to Armleder Trail Loop.	Medium Priority	The City of Cincinnati		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration. Shared use path connection without X-4d-1 could be considered.	\$3,100,000 to \$4,650,000	\$830,000 to \$1,660,000
Newtown	B8	RB-1	Link	Connect Riverside Park and Lake Barber with Little Miami Trail with shared use path. Portion of alignment from Riverside Park & Lake Barber to Valley.	Medium Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$820,000 to \$1,230,000	\$195,000 to \$390,000
SR 32 / SR 125		I-22a		Improve signal timing at SR 125 & Elstun intersection.	Medium Priority	ODOT / Anderson Township		Due to planned redevelopment of the Skytop Pavilion, this intersection needs to be analyzed in conjunction with the new development's Traffic Impact Study.	Not available	Not available
SR 32 / SR 125		I-22b		Improve turn lanes at SR 125 & Elstun intersection.	Medium Priority	ODOT / Anderson Township		Due to planned redevelopment of the Skytop Pavilion, this intersection needs to be analyzed in conjunction with the new development's Traffic Impact Study. Possible items to review would be: addition of westbound right turn lane and extension of northbound left turn lane.	Not available	Not available
US 50 Corridor		I-32b		Mariemont HS considering new access point to connect to US 50 Promenade signal.	Medium Priority	Columbia Township		This alternative is being considered by Mariemont Schools.	Not available	Not available

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
SR 32 / SR 125	A1	32-4	Link	Correct deficient 'S' curve with new horizontal geometry and make vertical adjustment to alleviate flooding in this area. Allows for pedestrian underpass in A8.	Low Priority	ODOT		<ul style="list-style-type: none"> Re-evaluate this concept with 2019 crash data in the summer of 2019. Include analysis of A8. Investigate raising road and keeping underpass without straightening. Possibly advance with planned ODOT 2022 preventative maintenance project (PID 105214). Evaluate low spot west of Turpin Lake Place that also is prone to flooding 	\$1,700,000 to \$2,500,000	\$40,000 to \$80,000
SR 32 / SR 125	A8	32-1b	Link	Make connection from Turpin Lake subdivision to Little Miami Trail with "mid-block" pedestrian underpass crossing in conjunction with A1.	Low priority	Anderson Township	Construct with A1	Evaluate in coordination with A1	\$540,000 to \$820,000	\$70,000 to \$140,000
SR 32 / SR 125	A10	32-2b	Link	Connect Five Mail Trail using subdivision streets in Turpin Hills to the end of Ropes Dr, and then by new path to Little Miami Trail in conjunction with A7 or A8.	Low Priority	Anderson Township	Construct with A7 or A8.	Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$1,050,000 to \$1,600,000	\$1,000,000 to \$2,000,000
Newtown	B5	Church-1	Link	Adjust grade at railroad crossing on Church St.	Low Priority	The Village of Newtown		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$85,000 to \$250,000	\$10,000 to \$20,000
Ancor-SR 32 Hill	C2	I-4c	Link	Install a continuous green tee intersection at Little Dry Run. Includes horizontal curve adjustment on Little Dry Run just south of SR 32 to improve sight distance.	Low Priority	The Village of Newtown	Construct after B2	Evaluate after completion of B2.	\$1,825,000 to \$2,750,000	\$50,000 to \$100,000
Ancor-SR 32 Hill	C4	32-10	Link	Add WB left turn lane at Hickory Creek Drive.	Low Priority	ODOT		Re-evaluate this concept with 2019 crash data in the summer of 2019. Possibly advance with planned ODOT 2024 resurfacing (PID 105214).	\$1,250,000 to \$1,850,000	\$40,000 to \$80,000
Ancor-SR 32 Hill	C8	I-2b	Link	Lengthen NB, SB and EB left turn lanes at Beechwood intersection. Adjust approach curve on Old SR 74 to provide better visibility at intersection.	Low Priority	ODOT		Re-evaluate this concept with 2019 crash data in the summer of 2019. Consider repurposing westbound outside shoulder as dedicated right turn lane.	\$350,000 to \$525,000	\$15,000 to \$30,000
Linwood-Eastern_US-50_Red_Bank	D1	I-26b	Link	Create continuous right turn lane at Beechmont Circle for turn onto Wooster from SR 125.	Low Priority	The City of Cincinnati		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$320,000 to \$480,000	\$0
Linwood-Eastern_US-50_Red_Bank	D3 D4	I-29a I-29b	Link	Install a traffic signal or roundabout at Beechmont/Linwood intersection. (Does not require closure of ramp from Eastern to US-50/SR-125).	Low Priority	The City of Cincinnati		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration. Update crash data for ramp from Eastern to US-50/SR-125 as part of analysis. Next step will consist of developing alternatives before arriving at a recommended preferred alternative.	\$310,000 to \$2,650,000	\$20,000 to \$120,000
US 50 Corridor	F3	I-15a	Link	Right turn lane extension on southbound Watterson by using peak-hour parking restriction.	Low Priority	The Village of Fairfax		Evaluate after completion of low-cost signal upgrade bundle.	\$10,000 to \$15,000	\$0
US 50 Corridor	F4	I-12b	Link	Extend southbound left turn lane at Walton Creek/US 50 intersection.	Low Priority	Hamilton County		Evaluate after completion of low-cost signal upgrade bundle.	\$75,000 to \$115,000	\$125,000 to \$250,000
SR 32 / SR 125	A11	32-3	Link	New shared use path (1.8 miles) from Five Mile Trail to Little Miami Trail along Newtown Rd., Ragland Rd & Turpin Ln. Includes culverts for stream crossings along Ragland Rd.	Low Priority	Anderson Township		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$2,100,000 to \$3,100,000	\$750,000 to \$1,500,000

Focus Area	PI Mtg Identifier	Identifier	Website Link	Conceptual Project Description	Priority	Maintaining Agency	Phasing Recommendations	Next Steps	Construction Cost Range	Right-of-Way Cost Range
US 50 Corridor	F9	50-9	Link	Extend sidewalk along south side of US 50 east to Newtown Rd.	Low Priority	Columbia Township		Work with Columbia Township to consider including this recommendation in zoning for redevelopment.	\$170,000 to \$260,000	\$100,000 to \$200,000
Ancor-SR 32 Hill	C7	32-18-3	Link	Reduce grade on SR 32 hill by grade separating the Beechwood/Old SR 74 and Eight Mile intersections. Includes two-way frontage road on north side of new SR 32 alignment, low speed connections at Eight Mile and roundabout interchange at Beechwood. (Full grade improvements on hill). Includes grade adjustments on Eight Mile Rd approach to SR 32 and addition of WB left turn lane at Hickory Creek (C4).	Low priority	ODOT		Re-evaluate after construction of C5/C6 or if C10/C11 move forward.	\$37,400,000 to \$56,100,000	\$2,600,000 to \$5,200,000
US 50 Corridor	F1 F2	I-13d I-13e	Link	Add curb bump out to move stop bar for better sight distance on northbound Miami at Square, also add curb bump out to create perpendicular crosswalk just west of Crystal Springs.	Low Priority	The Village of Mariemont		Eastern Corridor Study Analysis complete; turned over to local agency for future consideration.	\$28,000 to \$55,000	\$0



Eastern Corridor Segments II and III ANCOR/SR 32 Hill Focus Area

Theme

SR 32 – EIGHT MILE ROAD AND SR 32 HILL

Primary Needs identified for this theme:

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.
- P8) Address crash trends on the SR 32 hill.
- P9) Address roadway grade deficiencies on the SR 32 hill to improve truck mobility.
- P10) Address roadway curve deficiencies on the SR 32 hill.

Secondary Needs identified for this theme:

None.

Concept drawing is presented on the following page.

DESCRIPTION

- Lengthen left turn lane from Eight Mile Road to SR 32.
- Raise Eight Mile approach to SR 32 to eliminate steep grade at intersection.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.

5/16 MEETING DISCUSSION AND COMMENTS

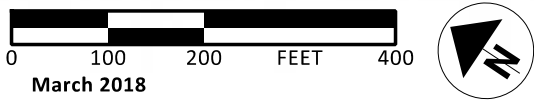
- The concept does not address primary needs in the area.
- The cost of this concept would be significant, but the project does not appear to offer significant benefit as currently proposed.
- Right of way or easements would be needed to modify the SR 32/Eight Mile intersection.
- This concept has a low anticipated cost/benefit ratio. It doesn't fully address needs on SR 32 in the intersection.
- No additional comments were received 5/16 meeting.

NEXT STEPS/RECOMMENDATION

- No further study. This concept is not being advanced due to the anticipated low cost/benefit ratio of this improvement solely on Eight Mile. It does not fully address needs on SR 32 at the intersection.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
IMPROVES	NEUTRAL	COMPLEX	??	PROPERTY TAKES	MINIMAL (D1/D2)	NEUTRAL	NEUTRAL	NEUTRAL	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Multi-Modal Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3A
EIGHT MILE ROAD LEFT TURN LANE
EXTENSION AND GRADE IMPROVEMENTS

Concept drawings are presented on the following pages.

DESCRIPTION

- Install a signalized continuous Green Tee intersection at Eight Mile Road.
 - Signal would manage flow through the SR 32/Eight Mile intersection and control left-hand turns onto Eight Mile from westbound SR 32.
 - A dedicated westbound lane on SR 32 would allow westbound traffic to flow continuously through the SR 32 and Eight Mile intersection; no stopping needed.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.

5/16 MEETING DISCUSSION AND COMMENTS

- Right of way or easements would be needed to modify the SR 32/Eight Mile intersection.
- This concept could be a first step leading toward the future construction of Concept 1-3e.
- This concept would address grade issues on Eight Mile but not on the SR 32 hill.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

- This concept doesn’t provide vertical grade correction of the SR 32 hill.
- Slow traffic heading up the hill could be an issue for heavily loaded trucks; however, because the concept provides two lanes up the hill, trucks would be able to move into the right lane instead of being forced into the left lane as they are today.
- This alternative will provide a protected left turn onto Eight Mile from westbound SR 32 which will improve safety at the intersection. Congestion also will be reduced by providing a turn lane to facilitate left turns without slowing down the flow of traffic.
- No additional comments were received following the 9/5 meeting.

12/10 MEETING DISCUSSION AND COMMENTS

This concept was presented as C5 at the October Open House meetings.

- The right turning movement from northbound Eight Mile Road to eastbound SR 32 should be studied further to account for trucks that turn wide and encroach into the opposite lane.
- This intersection ranks on ODOT’s statewide crash list. The committee agreed that this high crash rate makes implementing this concept a high priority.
- This concept should include the additional warning signs, as outlined in concept 32-16, to alert drivers that the left lane is ending at Eight Mile.

NEXT STEPS/RECOMMENDATION

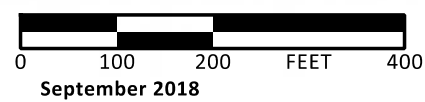
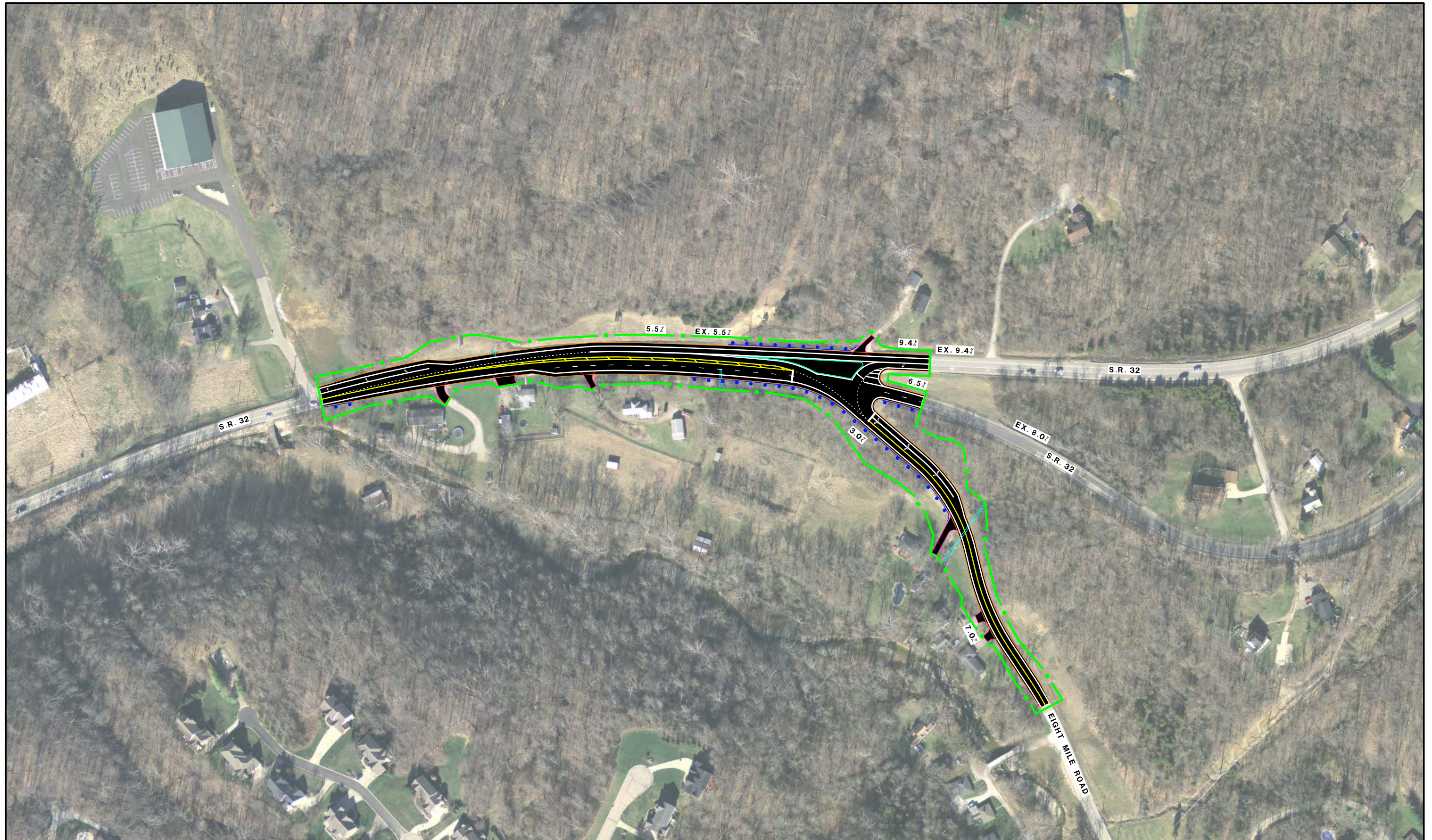
- Include project in Implementation Plan as a high priority.
- Consider including advanced signing as outlined in 32-16.
- This concept could function as Phase 1 of concept C6.
- HSIP and STP funding could be used on this project.
- Reevaluate the right turn from Eight Mile to eastbound SR 32 to see if minor realignment can improve acute angle.

Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
-0.5	AM	8.8	A	79%				\$2.0M to \$3.1M	0	\$100K to \$200K	C2	R/W, Stream Impact, Waterway Permit, Potential T&E	Neutral	Neutral	Neutral
	PM	19.3	B	71%											



Concept Drawing
Eastern Corridor Multi-Modal Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

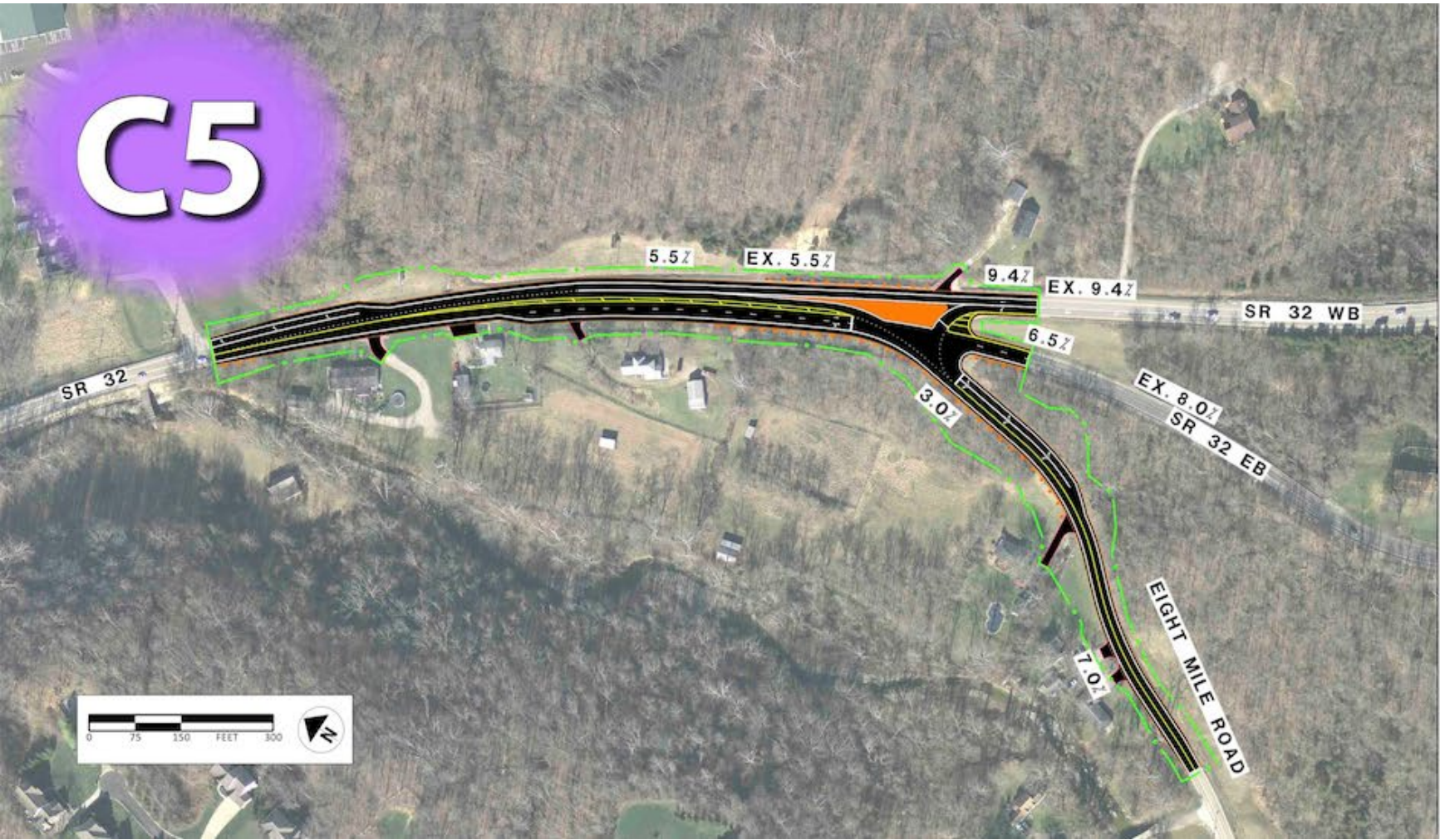
Figure I-3B
SIGNALIZED GREEN TEE INTERSECTION AT
S.R. 32 AND EIGHT MILE ROAD



Concept Drawing
 Eastern Corridor Multi-Modal Projects
 Segment II-III (SR 32 Corridor)
 HAM-32F-0.00; PID 86462

Figure I-3B
 SIGNALIZED GREEN TEE INTERSECTION AT
 S.R. 32 AND EIGHT MILE ROAD

Drawing was presented at the October 24 & 25 Open House meetings.



Signalized Green Tee Intersection at SR 32 and Eight Mile

- \$2.0M to \$3.1M construction cost
- New R/W needed from 11 parcels; no buildings impacted
- Reduce delay by approximately 75%
- New traffic signal
- Westbound thru movement bypasses signal
- Improves grade on Eight Mile; no grade changes on SR 32
- Reduces the likelihood of severe crashes

PUBLIC FEEDBACK RATINGS SUMMARY

Strongly Oppose	Dislike	Neutral	Like	Strongly Support
8%	10%	33%	19%	30%

(percentages have been rounded)

Concept drawing is presented on the following page.

DESCRIPTION

- Install a roundabout at Eight Mile Road.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.

5/16 MEETING DISCUSSION AND COMMENTS

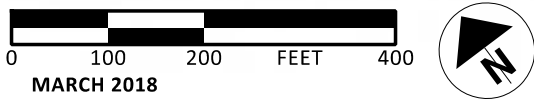
- Installing a roundabout at this location will be challenging due to topography.
- As drawn, the movement from SR 32 eastbound to Eight Mile would be difficult due to the slight shift in roadway alignment as it enters the roundabout.
- It may be difficult for vehicles, especially trucks, traveling at 60 mph or above to slow down for the roundabout. However, one of the benefits of a roundabout is to slow down traffic while allowing it to flow continuously.
- The financial costs of installing a roundabout at this location may exceed benefit offered.
- No additional comments were received following the 5/16 meeting.

NEXT STEPS/RECOMMENDATION

- No further study due to the concern of having a roundabout at the base of the steep portion of the hill, which would require vehicles coming down the hill to decelerate before getting to the roundabout.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
NEUTRAL	IMPROVES	COMPLEX	< \$5 MILLION	PROPERTY TAKES	MODERATE	NEUTRAL	NEUTRAL	NEUTRAL	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3C
ROUNDBOUT AT EIGHT MILE ROAD
AND S.R. 32 INTERSECTION

Concept drawing is presented on the following page.

DESCRIPTION

- New alignment and grade separation of SR 32 over Eight Mile, using ramps, improving grade for truck traffic on SR 32.
 - Reconstruct the SR 32/Eight Mile intersection.
 - Grade separate the two roads; SR 32 would travel over Eight Mile.
 - Construct ramps that would provide access from Eight Mile to SR 32.
 - Reduce the grade on SR 32.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.
- P10) Address roadway curve deficiencies on the SR 32 hill.

5/16 MEETING DISCUSSION AND COMMENTS

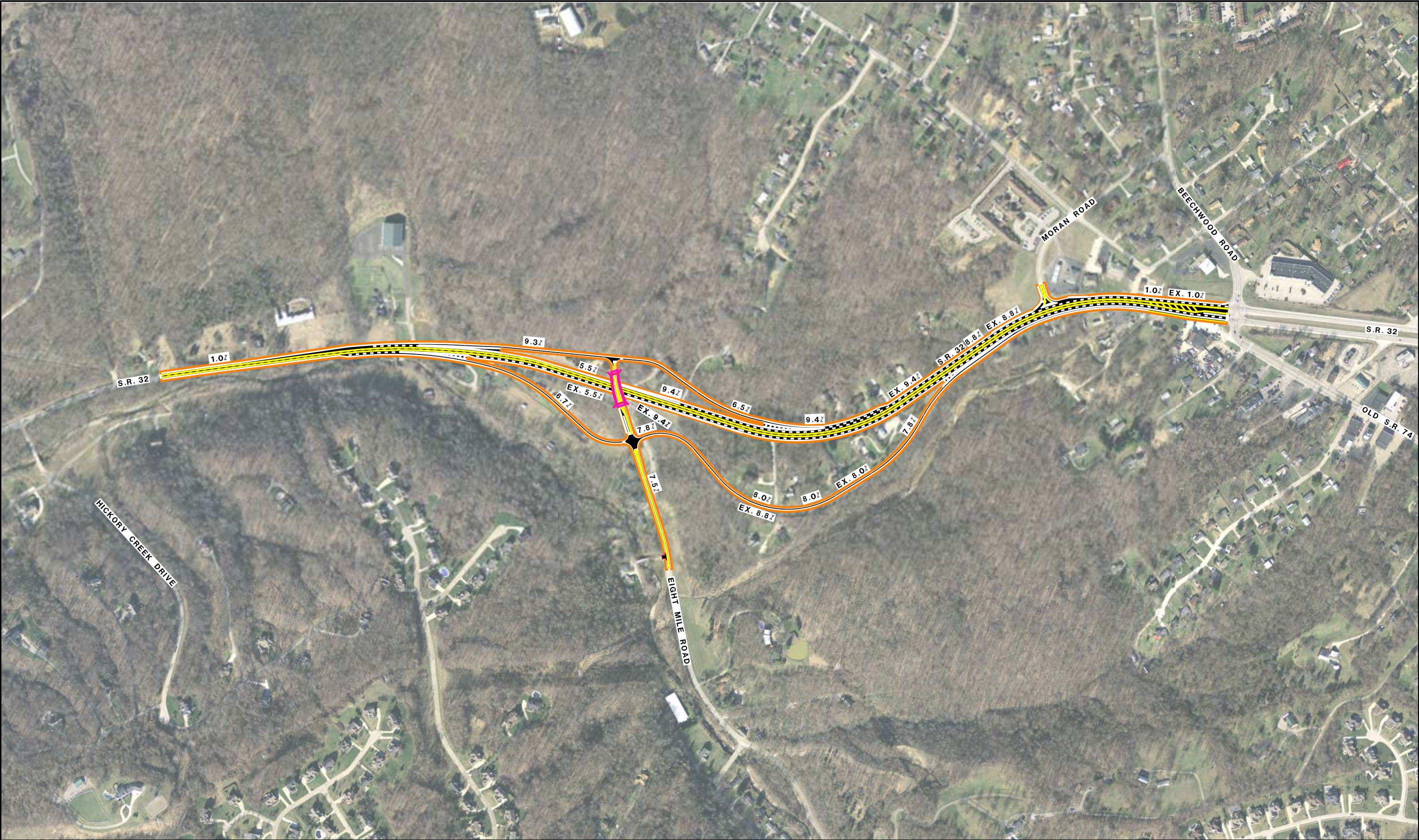
- Grade on the steepest part of the SR 32 hill would remain the same as it is today.
- Concept would be very expensive to construct.
- Preliminary analysis indicates that costs would likely far exceed benefits.
- Other concepts appear to work better.
- No additional comments were received following the 5/16 meeting.

NEXT STEPS/RECOMMENDATION

- No further study. SR 32 does not need high speed (interstate-like) ramp terminals given added cost and impacts.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
IMPROVES	IMPROVES	COMPLEX	> \$10 MILLION	RELOCATIONS	MODERATE (C1/C2)	NEUTRAL	NEUTRAL	NEUTRAL	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3D-1
S.R. 32 GRADE SEPARATED INTERCHANGE AT EIGHT MILE ROAD

Concept drawing is presented on the following page.

DESCRIPTION

- Relocate Eight Mile/SR 32 intersection to the west to move away from the hill using a signalized Green Tee.
- Possibly align with Ambassador’s Pointe Community Church drive to assist with access issues.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.

5/16 MEETING DISCUSSION AND COMMENTS

- Concept moves the intersection away from the steepest part of the SR 32 hill.
- This shift reduces the need for eastbound vehicles to slow down on the hill to make room for vehicles turning onto SR 32 from Eight Mile (it can be difficult for larger vehicles to regain a normal traveling speed on this hill due to its steep grade).
- A new Green Tee intersection would allow westbound traffic to flow continuously through the intersection. However, this may have an impact on vehicles turning into and out of Ambassador’s Pointe Community Church.
- Concept would require acquiring several residential properties.
- No additional comments were received following the 5/16 meeting.

NEXT STEPS/RECOMMENDATION

- No further study. Not advanced due to access issues it would create with adjacent properties.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
NEUTRAL	IMPROVES	MODERATE	\$5-10 MILLION	RELOCATIONS	MODERATE (C1/C2)	NEUTRAL	NEUTRAL	DEGRADES	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3G
RELOCATE S.R. 32 AND EIGHT MILE ROAD INTERSECTION
AND CHANGE TO A SIGNALIZED GREEN TEE

Concept drawings are presented on the following pages.

DESCRIPTION

- Relocate Eight Mile/SR 32 intersection to the west to get away from SR 32 hill.
- Replace intersection with a roundabout.
- Possibly align roundabout with church driveway to assist with access issues.

NEEDS ADDRESSED

- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.

9/5 MEETING DISCUSSION AND COMMENTS

- This concept doesn’t provide vertical grade correction of the SR 32 hill.
- When this concept was evaluated in TransModeler simulations, it demonstrated significant delays, particularly for traffic eastbound on SR 32 during PM peak hours.
- The concept would require four residential relocations.
- No additional comments were received following the 5/16 meeting.

NEXT STEPS/RECOMMENDATIONS

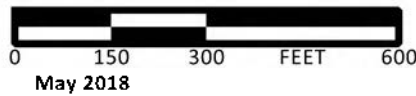
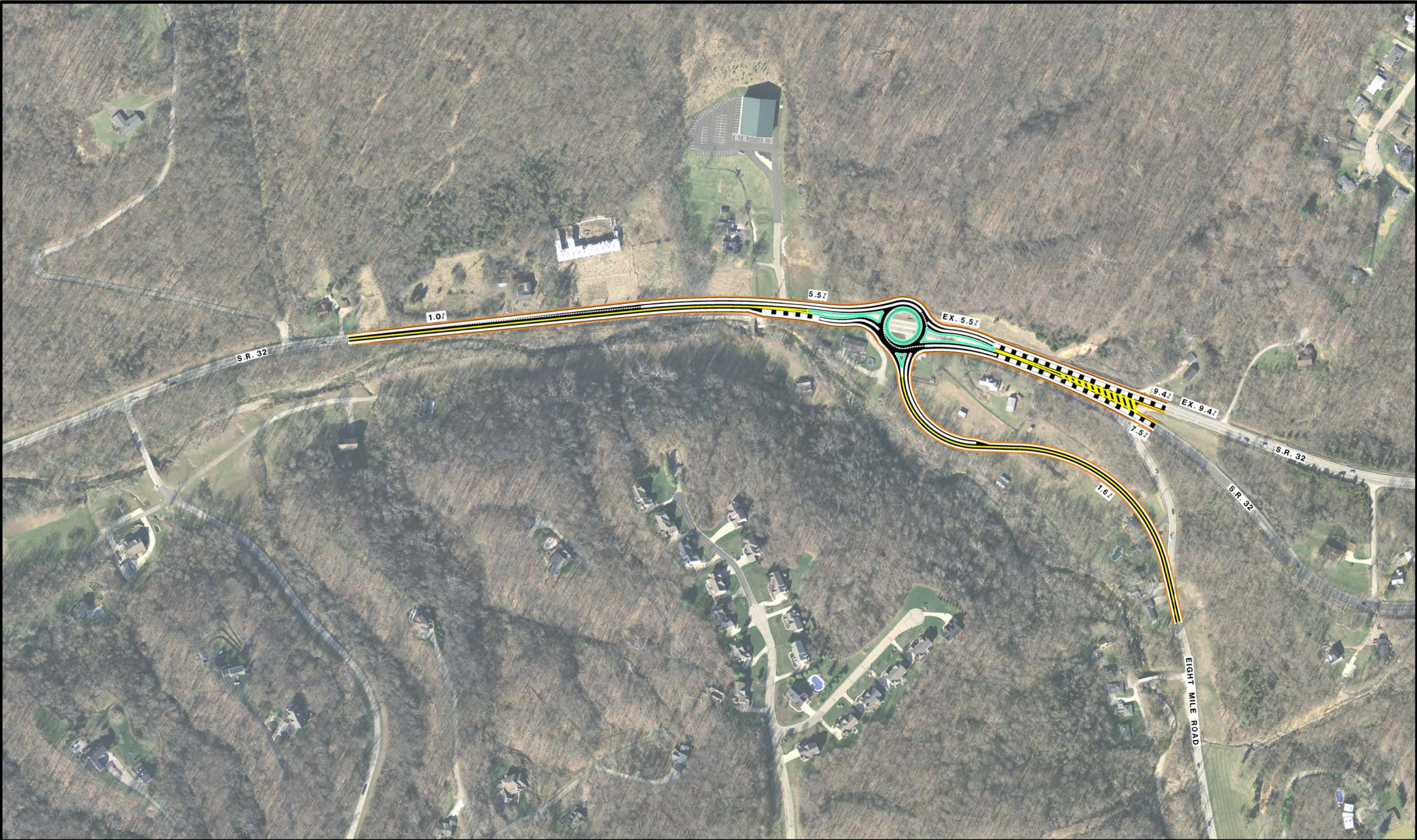
- No further study due to projected increased delays.

5/16 MEETING DISCUSSION AND COMMENTS

- Roundabouts tend to be safer and allow for continuous traffic flow.
 - A roundabout would slow down westbound traffic.
 - Roundabouts can be designed to accommodate freight traffic.
 - Islands where roads enter the roundabout can be raised to help ensure vehicles stay in their intended lanes.
- Proposed placement of the roundabout is intended to avoid the creek located on the south side of SR 32.
- Concept would require right-of-way or easement acquisitions, possibly property acquisitions.
- Concept does not address concerns related to the steep grade of the SR 32 hill.
- No additional comments were received following the 5/16 meeting.

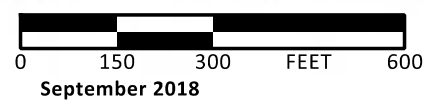
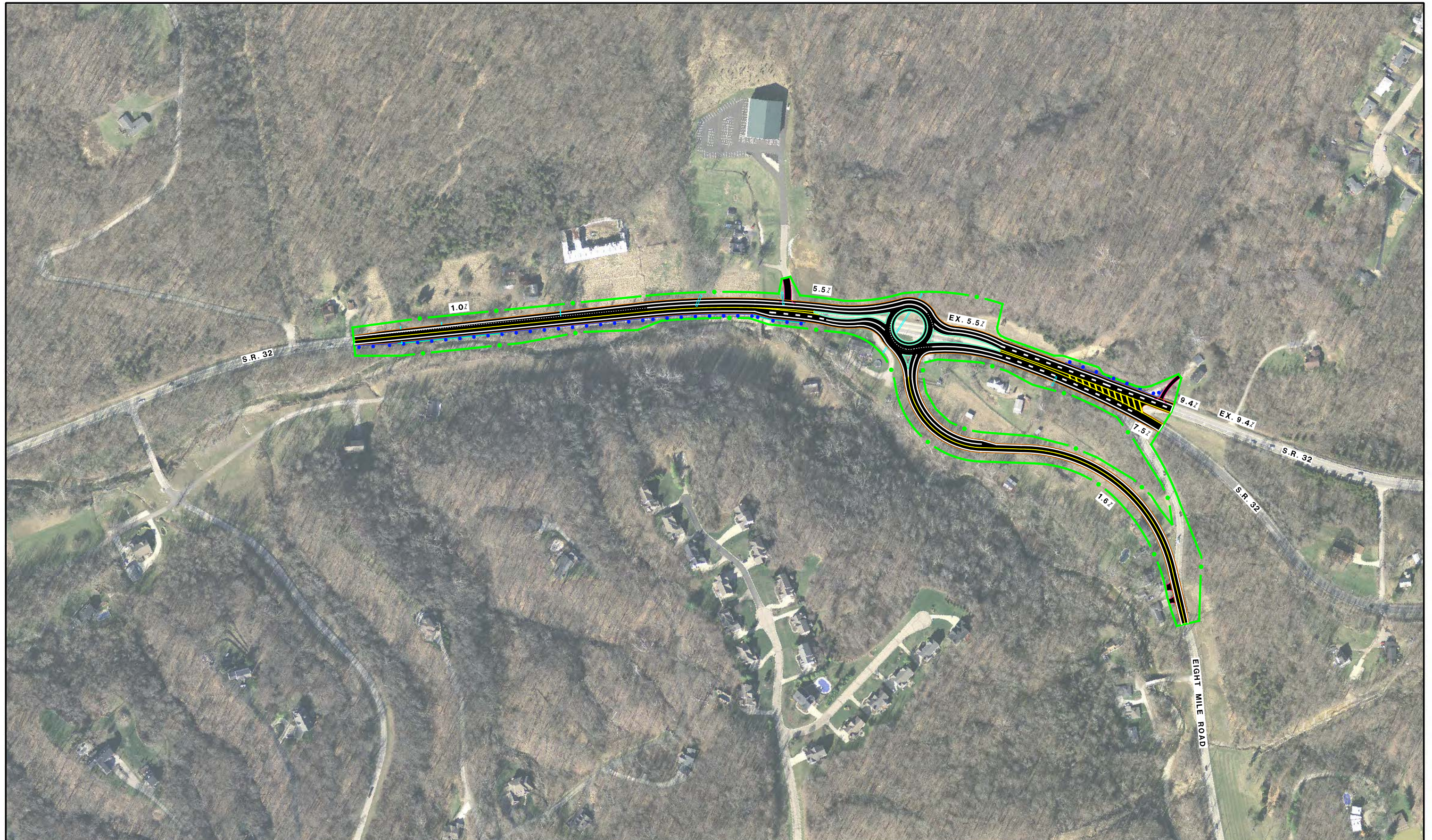
Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
0.0	AM	9.7	A	76%	19.7	C	-68%	\$3.3M to \$4.9M	4 residential	\$725K to \$1.5M	D2	R/W, relocations	Neutral	Neutral	Neutral
	PM	14.4	B	65%	64.0	F	24%								

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3H
RELOCATE S.R. 32 AND EIGHT MILE ROAD INTERSECTION
AND CHANGE TO A ROUNDABOUT



Concept Drawing
 Eastern Corridor Projects
 Segment II-III (SR 32 Corridor)
 HAM-32F-0.00; PID 86462

Figure I-3H
 RELOCATE S.R. 32 AND EIGHT MILE ROAD INTERSECTION
 AND CHANGE TO A ROUNDABOUT

Concept drawings are presented on the following pages.

DESCRIPTION

- New alignment and grade separation of SR 32 over Eight Mile, using right in right out intersections, improving grade for truck traffic on SR 32.
 - Reconstruct alignment of SR 32 between Eight Mile and Beechwood Road to bring east and westbound lanes back together.
 - Reconstruct the SR 32/Eight Mile intersection to allow SR 32 to travel over Eight Mile.
 - Construct a new entry point on the north side of SR 32 to connect Eight Mile to SR 32; construct new exit point from SR 32 to Eight Mile on south side of SR 32.

NEEDS ADDRESSED

- P4) Address congestion issues due to slow moving trucks and turning vehicles.
- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.
- P10) Address roadway curve deficiencies on the SR 32 hill.

5/16 MEETING DISCUSSION AND COMMENTS

- Concept would bring the east and westbound lanes of SR 32 back together (eliminate the split between the two). The current eastbound lanes of SR 32 between Eight Mile and Moran Road could be used for residential access.
- Concept would require acquiring right-of-way and/or easements to construct new access points to and from SR 32.
- Concept might help reduce crashes in the area.
- The design of this concept may reduce concerns related to the steep grade of SR 32 in this area.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

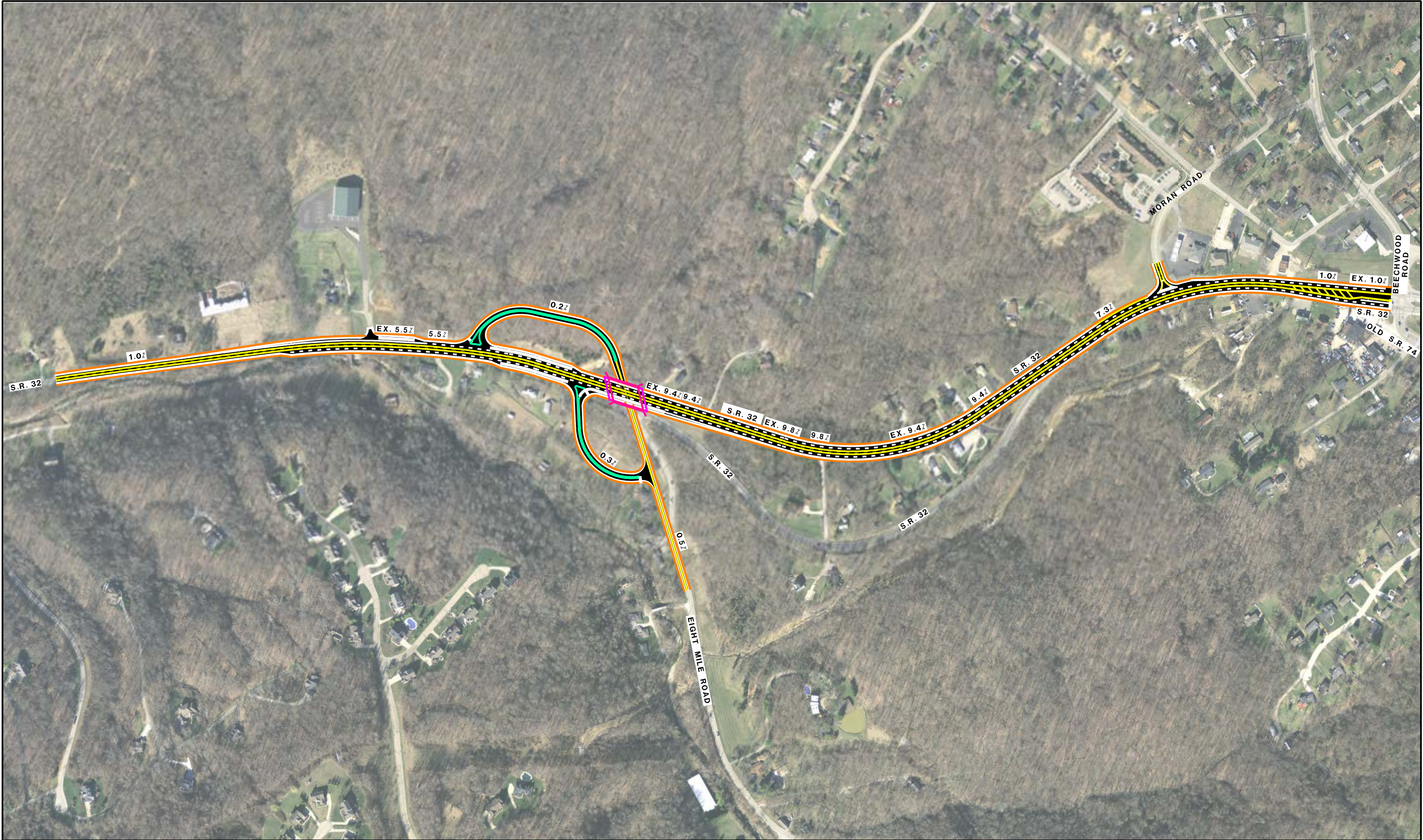
- This concept actually increases the eastbound grade on the eastbound SR 32 hill.
- The cost/benefit analysis for this option is not favorable.
- This concept would result in five residential relocations.
- No additional comments were received following the 9/5 meeting.

NEXT STEPS/RECOMMENDATION

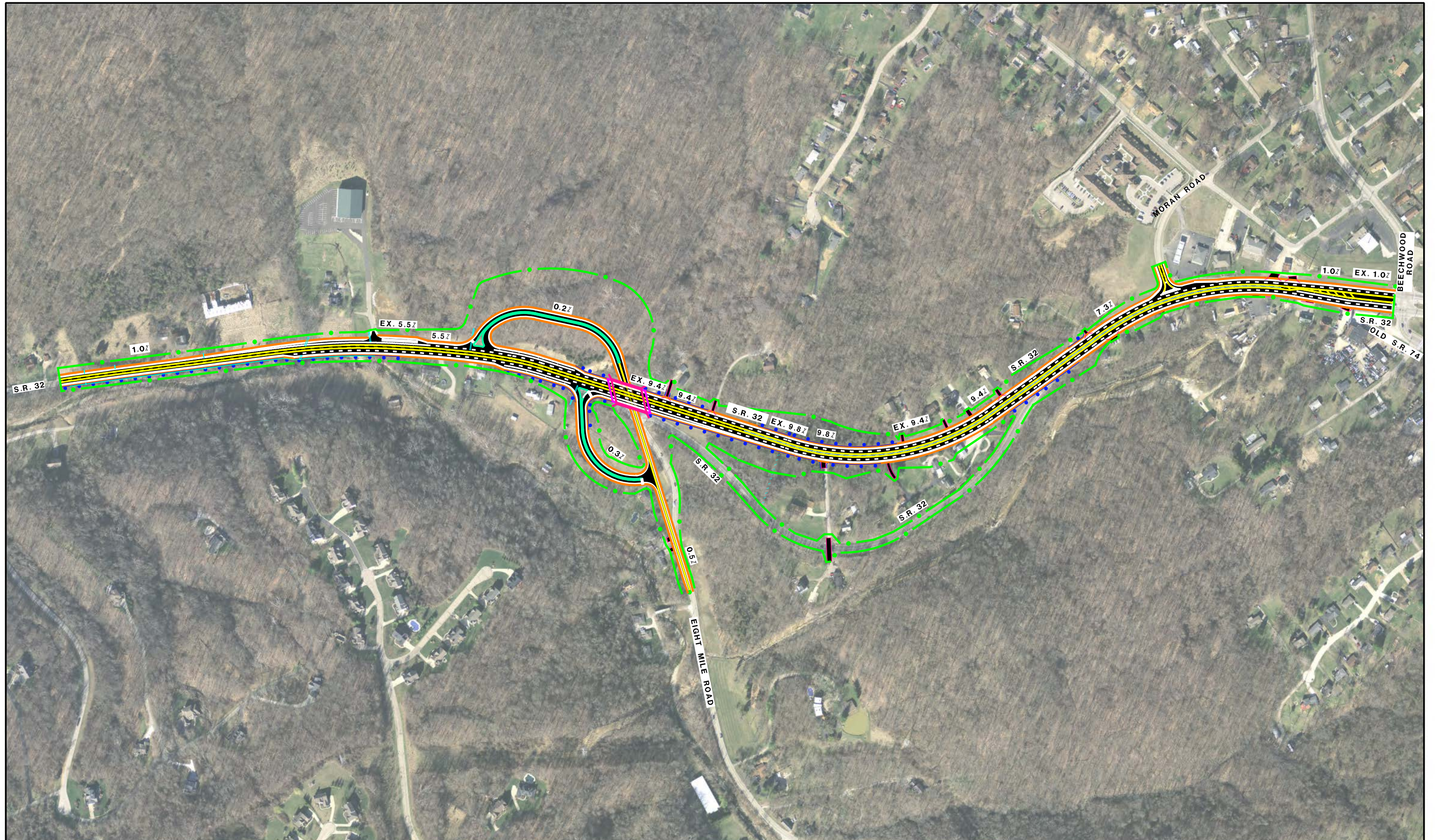
- No further study due to the anticipated low cost/benefit ratio and because the eastbound grade of SR 32 hill is worsened.

Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
	AM	2.5	A	94%				\$15.8M to \$23.7M	5 residential	\$1.3M to \$2.6M	D2	R/W, relocations	Neutral	Neutral	Neutral
	PM	4.4	A	93%											

RECOMMENDATION: NO FURTHER STUDY



<p>0 200 400 FEET 800</p> <p>MARCH 2018</p>		<p>Concept Drawing Eastern Corridor Projects Segment II-III (S.R. 32 Corridor) HAM-32F-0.00; PID 86462</p>	<p>Figure I-3D-2 NEW S.R. 32 ALIGNMENT AND GRADE SEPARATION AT EIGHT MILE ROAD</p>
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0 200 400 FEET 800
September 2018



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3D-2 (Overall View)
NEW S.R. 32 ALIGNMENT AND GRADE SEPARATION
AT EIGHT MILE ROAD

Concept drawings are presented on the following pages.

DESCRIPTION

- New alignment and grade separation of eastbound SR 32 over Eight Mile; signalized continuous Green Tee intersection at Eight Mile and westbound SR 32.
 - Incorporates Concept I-3b (signalized Green Tee intersection).
 - Eastbound SR 32 traffic would travel on new bridge over Eight Mile Road.
 - A new traffic signal would direct traffic entering SR 32 from Eight Mile Road.

NEEDS ADDRESSED

- P4) Address congestion issues due to slow moving trucks and turning vehicles.
- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.
- P8) Address crash trends on the SR 32 hill.
- P10) Address roadway curve deficiencies on the SR 32 hill.

5/16 MEETING DISCUSSION AND COMMENTS

- Primary concerns in this area relate to travel speed and the grade of the road.
 - Currently, it can be difficult for drivers of large vehicles and trucks to reach 50 - 55 mph when traveling eastbound.

- Concerns regarding grade are tied directly to the movement of freight along SR 32.
- The new eastbound SR 32 alignment would reduce the grade on the SR 32 hill to 7.5%. A 6% grade is considered the desired maximum.
- Concept would eliminate the “S” curve on the SR 32 hill, a documented crash location.
- Concept would use as much existing pavement as possible but would require right-of-way and/or easement acquisitions for widening portions of SR 32.
- Construction of new alignment may require acquiring several residential properties.
- No changes would be made to westbound SR 32.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

- This concept shows improvement to traffic flow and improves the grade on the eastbound portion of the SR 32 hill where it ties into the new alignment. Grade decreases from the current 8 percent to 5.7 percent.
- This concept could be phased as the second portion of the Green Tee intersection (Concept I-3b).
- Trucks traveling up the hill could use the right lane instead of being forced into the left lane as they are today.
- This concept requires the acquisition of six residences.
- No additional comments were received following the 9/5 meeting.

12/10 MEETING DISCUSSION AND COMMENTS

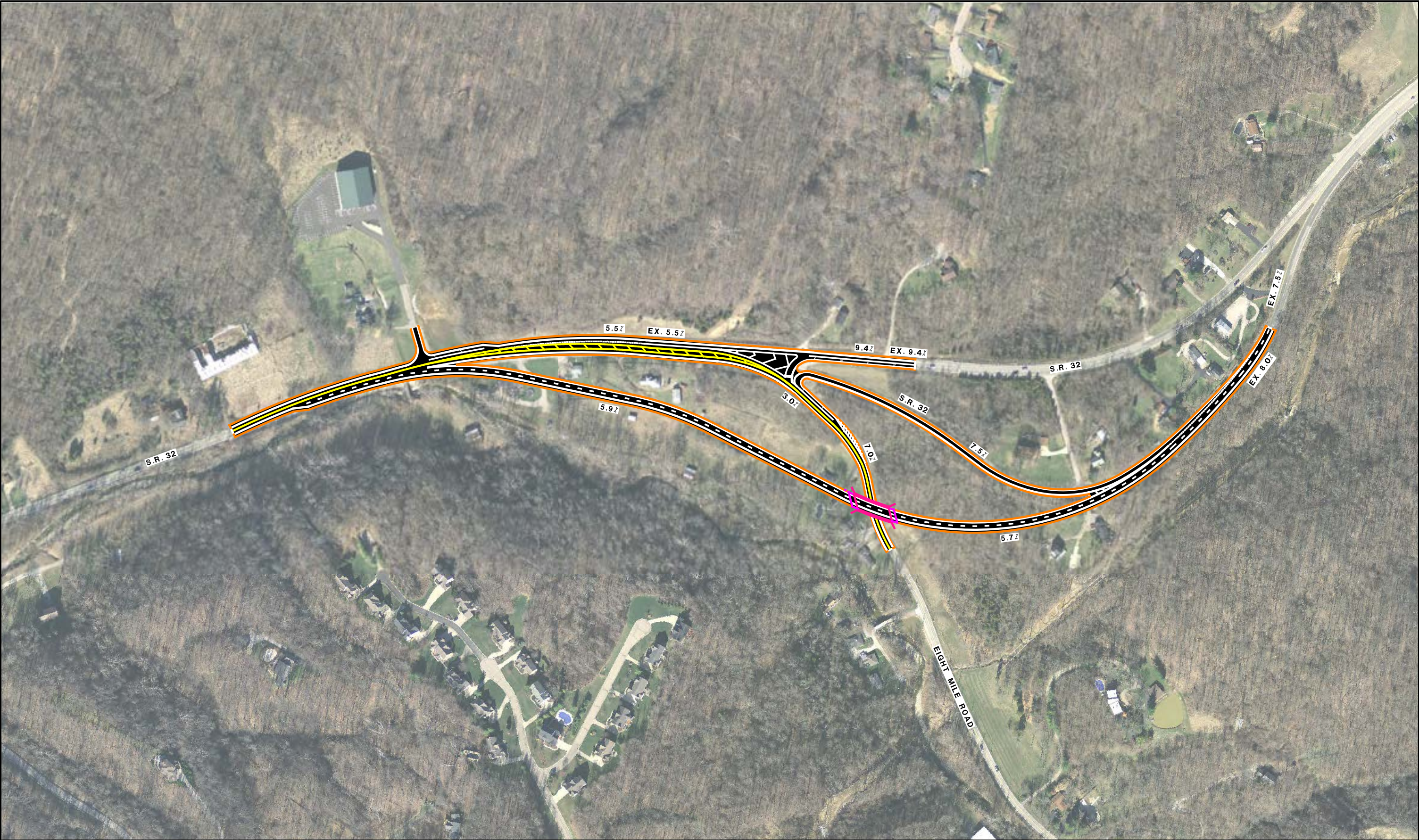
- This concept was presented as C6 at the October Open House meetings.
- It was noted that this project would solve half of the hill’s steep grade issue, which could be favorable to trucks.
 - A written comment received from the public noted that this proposed new alignment would impact designated green space, which is protected by Anderson Township. Anderson Township will look into this in more detail. If confirmed, then the green space may be an obstacle to completing the project. Mitigation may be necessary if the project were to advance.
 - This project would impact residents in the area. If it were to move forward, more public involvement would be needed.
 - The estimated cost for the project is high. Transportation Review Advisory Council (TRAC) funding may be necessary, as well as other funding sources.
 - The committee discussed building concept I-3b (C5) first, then reassessing the need for concept I-3e (C6).

NEXT STEPS/RECOMMENDATION

- Include project in Implementation Plan as a medium priority.
- Consider including advanced signing as outlined in 32-16.
- Could be phased by building I-3b (C5) first and adding new eastbound lanes at a later date.

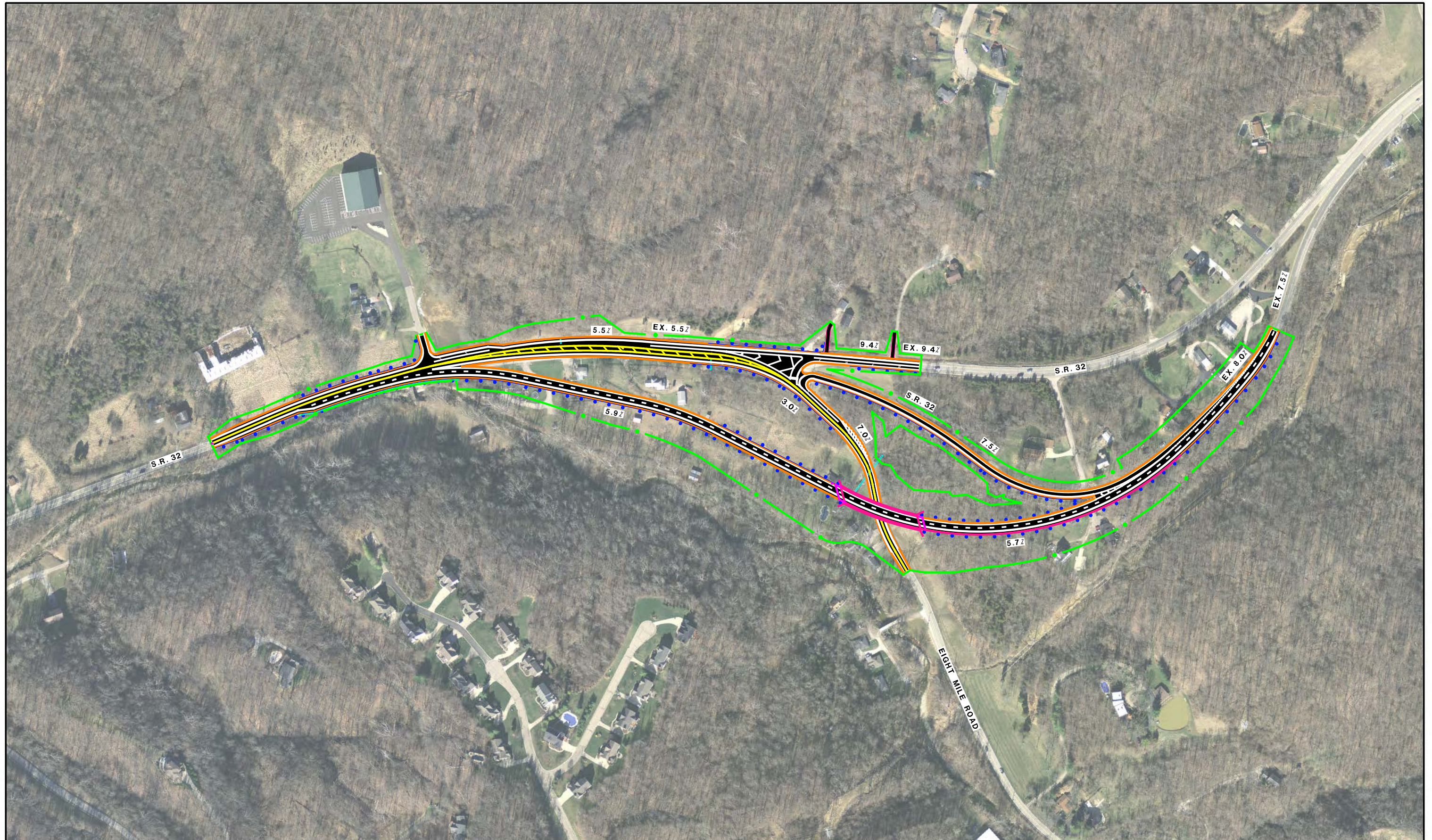
Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
0.0	AM	1.5	A	96%	2.6	A	78%	\$11.7M to \$17.5M	6 residential	\$1.9M to \$3.7M	D2	R/W, relocations, Section 4(f)	Neutral	Neutral	Neutral
	PM	2.5	A	96%	3.4	A	96%								

PRIORITY: MEDIUM



Concept Drawing
Eastern Corridor Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3E
NEW S.R. 32 EASTBOUND ALIGNMENT AND GRADE
SEPARATION OVER EIGHT MILE ROAD



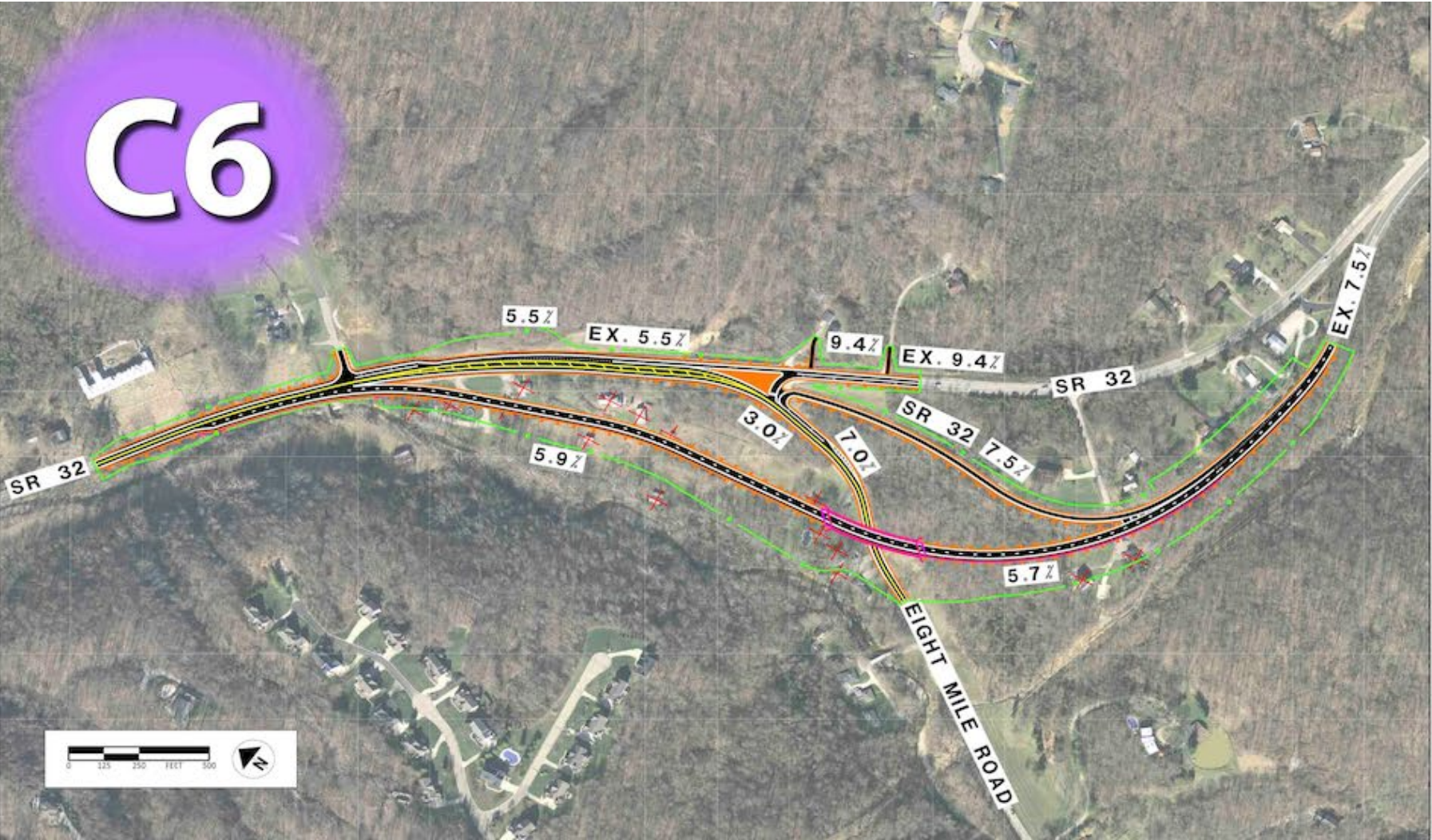
0 150 300 600
FEET
September 2018



Concept Drawing
Eastern Corridor Projects
Segment II-III (SR 32 Corridor)
HAM-32F-0.00; PID 86462

Figure I-3E
NEW S.R. 32 EASTBOUND ALIGNMENT AND GRADE
SEPARATION OVER EIGHT MILE ROAD

Drawing was presented at the October 24 & 25 Open House meetings.



New SR 32 Eastbound Alignment and Grade Separation over Eight Mile

- \$11.7M to \$17.5M construction cost
- New R/W needed from 26 parcels; including 9 residential relocations
- Reduce delay by approximately 90%
- Improves eastbound grade of SR 32
- Improves grade of Eight Mile
- No signal needed at SR 32 and Eight Mile
- Reduces likelihood of severe crashes

PUBLIC FEEDBACK RATINGS SUMMARY

Strongly Oppose	Dislike	Neutral	Like	Strongly Support
10%	8%	30%	31%	21%

(percentages have been rounded)

Concept drawing is presented on the following page.

DESCRIPTION

- Reduce grade on SR 32 hill by grade separating the Beechwood/Old SR 74 and Eight Mile intersections. Includes:
 - Constructing one-way frontage roads on both sides of new SR 32 alignment
 - Constructing high speed ramp connections

NEEDS ADDRESSED

- P9) Address roadway grade deficiencies on the SR 32 hill to improve truck mobility.
- P12) Address capacity issues on eastbound SR 32 and southbound Beechwood.
- P13) Address safety issues at Beechwood intersection.
- P14) Address westbound PM peak-hour delays.

5/16 MEETING DISCUSSION AND COMMENTS

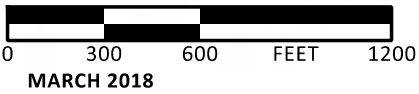
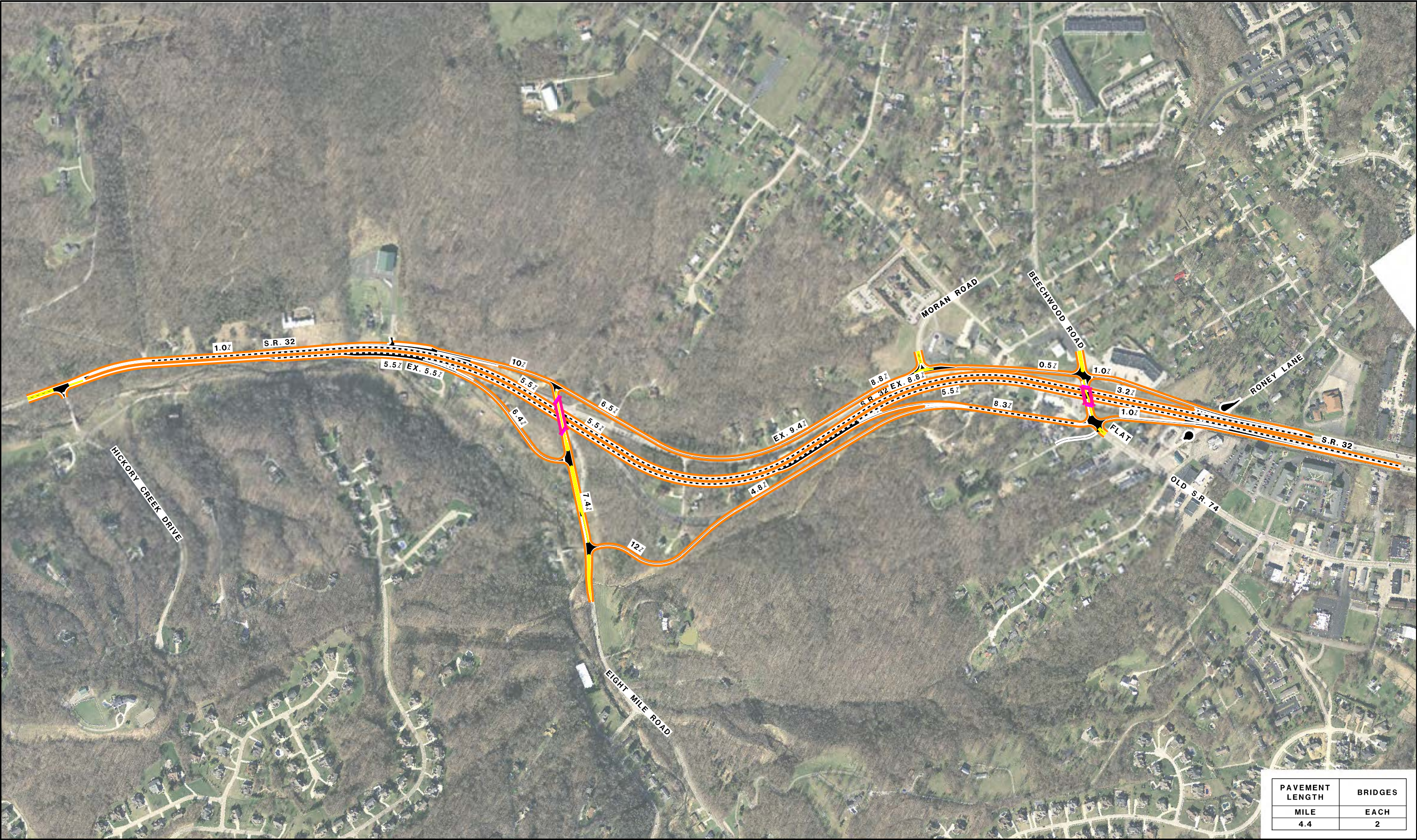
- Concept would adjust the grade on the SR 32 hill to a maximum of 5.5%.
- Concept would create two grade-separated interchanges (one at Beechwood, the other at Eight Mile) with ramps to access SR 32.
- Concept would require the acquisition of private property.
- Concept would impact access to businesses on the north side of SR 32 at the top of the hill.
- No additional comments were received following the 5/16 meeting.

NEXT STEPS/RECOMMENDATION

- No further study. Concept is not recommended for advancement due to high costs and anticipated impacts.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
IMPROVES	IMPROVES	COMPLEX	>\$10 MILLION	RELOCATIONS	HIGH (C3 OR GREATER)	NEUTRAL	IMPROVES	DEGRADES	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure 32-18-1
NEW S.R. 32 ALIGNMENT TO ACHIEVE 6% GRADE
GRADE SEPARATED INTERCHANGES AT EIGHT MILE ROAD
& BEECHWOOD ROAD

Concept drawing is presented on the following page.

DESCRIPTION

- Reduce grade on SR 32 hill by grade separating the Beechwood/Old SR 74 and Eight Mile intersections. Includes:
 - Constructing a new, one-way frontage road on north side of new SR 32 alignment
 - Constructing new low speed connections at Eight Mile and a roundabout interchange at Beechwood.

NEXT STEPS/RECOMMENDATION

- No further study. Concept is not recommended for advancement due to anticipated high costs and construction impacts. In addition, this concept provides a one-way frontage road, which would not operate as well as the two-way frontage road included in concept 32-18-3.

NEEDS ADDRESSED

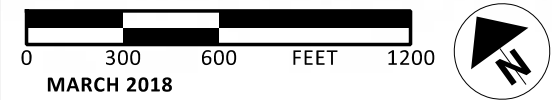
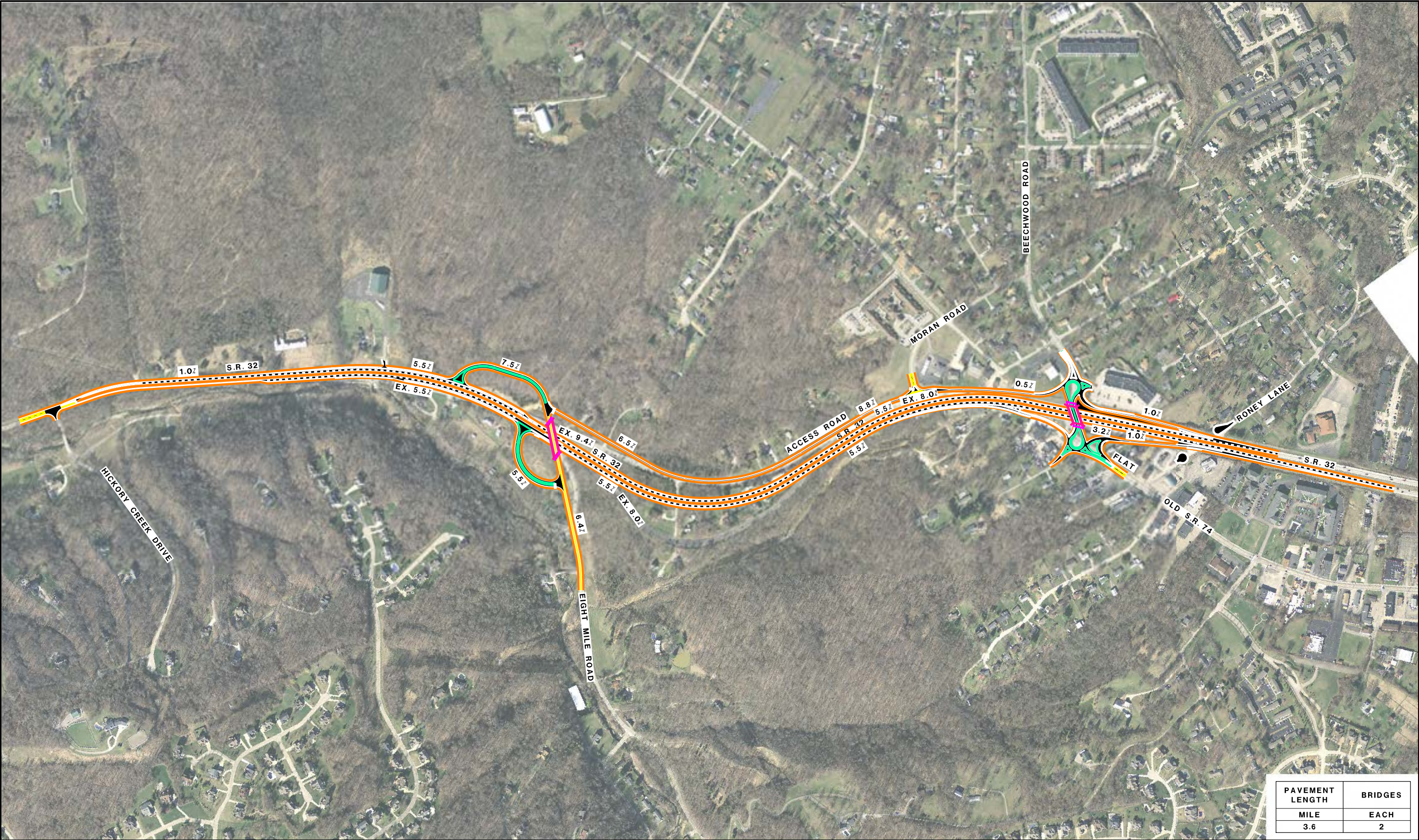
- P9) Address roadway grade deficiencies on the SR 32 hill to improve truck mobility.
- P12) Address capacity issues on eastbound SR 32 and southbound Beechwood.
- P13) Address safety issues at Beechwood intersection.
- P14) Address westbound PM peak-hour delays.

5/16 MEETING DISCUSSION AND COMMENTS

- Concept would adjust the grade on the SR 32 hill to a maximum of 5.5%.
- Concept would create two grade-separated interchanges at which SR 32 would travel under Eight Mile Road and Beechmont Road
 - At-grade access from Eight Mile to SR 32 would shift to the west.
 - An interchange with roundabouts would connect SR 32 with Beechwood Road and Old 74.
- Concept would require the acquisition of private property.
- Concept would impact access to businesses on the south side of SR 32 at the top of the hill.
- No comments received following the 5/16 meeting.

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
IMPROVES	IMPROVES	COMPLEX	>\$10 MILLION	RELOCATIONS	HIGH (C3 OR GREATER)	NEUTRAL	IMPROVES	DEGRADES	NO FURTHER STUDY

RECOMMENDATION: NO FURTHER STUDY



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure 32-18-2
NEW S.R. 32 ALIGNMENT TO ACHIEVE 6% GRADE
GRADE SEPARATED INTERCHANGES AT EIGHT MILE ROAD
& BEECHWOOD ROAD

Concept drawings are presented on the following page.

DESCRIPTION

- Reduce grade on SR 32 hill by grade separating the Beechwood/Old SR 74 and Eight Mile intersections. Includes:
 - Constructing a two-way frontage road on north side of new SR 32 alignment
 - Constructing low speed connections at Eight Mile and a new roundabout interchange at Beechwood.

NEEDS ADDRESSED

- P4) Address congestion issues due to slow moving trucks and turning vehicles.
- P5) Address capacity issues on Eight Mile Road.
- P6) Address safety issues for vehicles turning at Eight Mile Road.
- P7) Address deficient sight distance and roadway grade issues.
- P8) Address crash trends on the SR 32 hill.
- P9) Address roadway grade deficiencies on the SR 32 hill to improve truck mobility.
- P10) Address roadway curve deficiencies on the SR 32 hill.
- P12) Address capacity issues on eastbound SR 32 and southbound Beechwood.
- P13) Address safety issues at Beechwood intersection.
- P14) Address westbound PM peak-hour delays.

5/16 MEETING DISCUSSION AND COMMENTS

- Concept would adjust the grade on the SR 32 hill to a maximum of

5.5%.

- Concept would create two grade-separated interchanges at which SR 32 would travel under Eight Mile Road and Beechmont Road
 - Access from Eight Mile to/from eastbound SR 32 would shift to the west, while connections to/from westbound SR 32 would shift east.
 - A grade-separated interchange with roundabouts at the ramp terminals (where the ramps meet the roadways) would connect SR 32 with Beechwood Road and Old 74.
- Concept would require acquiring private property.
- Concept would impact access to businesses on the south side of SR 32 at the top of the hill.
- Eight Mile Road would travel on new alignment along the north side of SR 32 and terminate in an intersection with Beechwood Road.
- Project costs are expected to be very high.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

- This is the only concept that provides full grade improvements on the SR 32 hill, reducing the grade from 8 percent to preferred design standards of 5.5 percent.
- It would not be possible to phase this concept.
- The Committee asked how much grade correction of the hill should be prioritized when evaluating alternatives. The steepness of the existing hill grade is an issue for trucks as well as a safety consideration. The goal, however, is not to try to design to textbook standards but to make practical improvements that address identified needs.

- No additional comments were received following the 9/5 meeting.

12/10 MEETING DISCUSSION AND COMMENTS

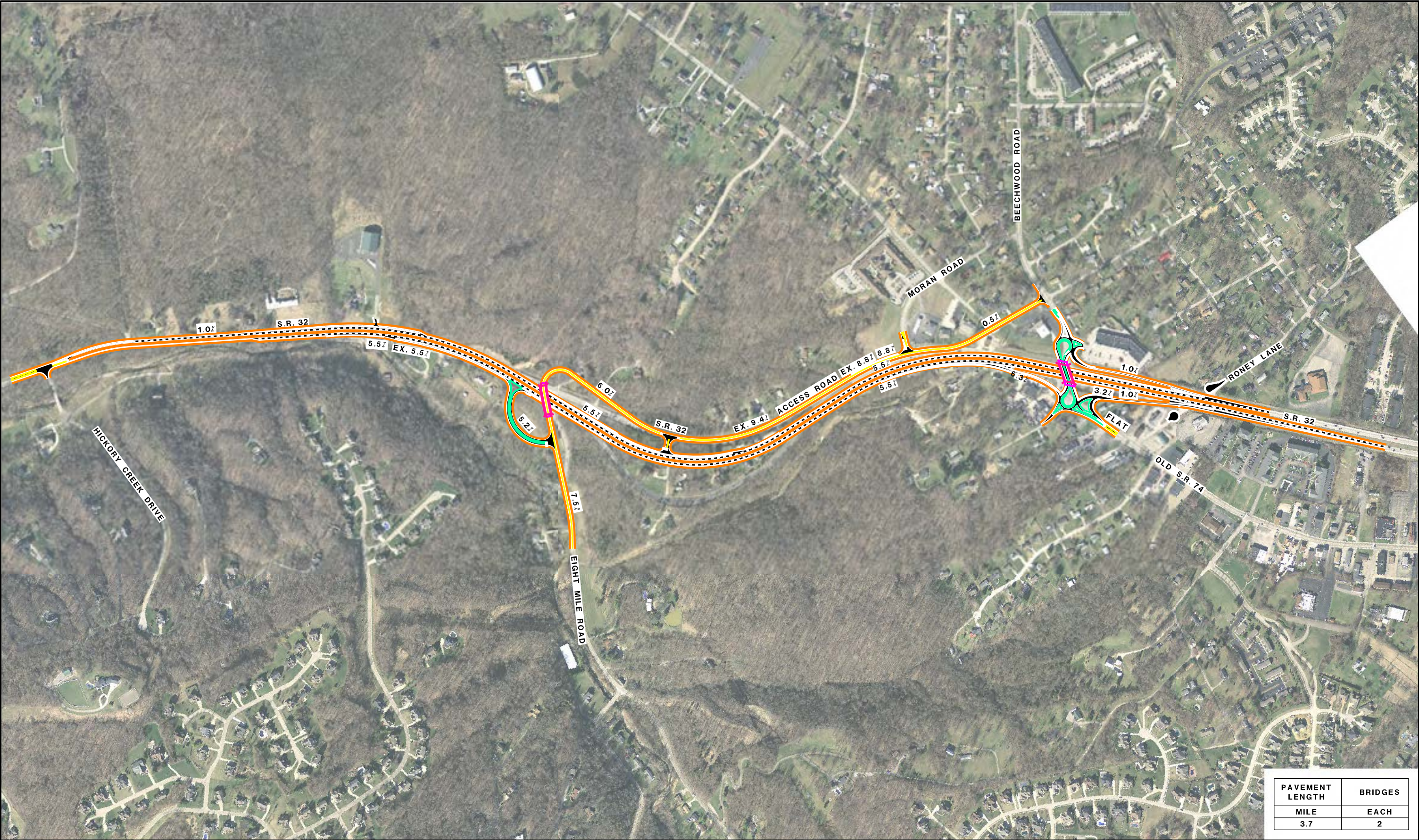
This concept was presented as C7 at the October Open House meetings.

- This concept would reduce the grade on the SR 32 hill from 8% to a maximum of 5.5%.
- The committee discussed building concept I-3b (C5) first, then reassessing the need for concept I-3e (C6) but not pursuing this concept [32-18-2 (C7)].
 - Reducing the grade of this hill would be a massive project and very expensive to complete.
- Committee members expressed concern with slowing the momentum of trucks on the hill. Other projects would create a climbing lane which would help trucks maintain their climbing speed.
- The committee also discussed the need for drivers to stay in their lanes. Perhaps people would stay in their travel lanes more often if the turning radius in increased or a wider right lane is provided.
- The committee agreed that this project should be a low priority due to large impacts and high costs.

NEXT STEPS/RECOMMENDATION

- Include project in Implementation Plan as a low priority.

Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
	AM	7.5	A	82%				\$37.4M to \$56.1M	6 residential 6 commercial	\$2.4M to \$4.8M	D3 or higher	R/W, relocations	Neutral	Improves	Degrades
	PM	6.0	A	91%											



PAVEMENT LENGTH	BRIDGES
MILE	EACH
3.7	2

0 300 600 FEET 1200
MARCH 2018



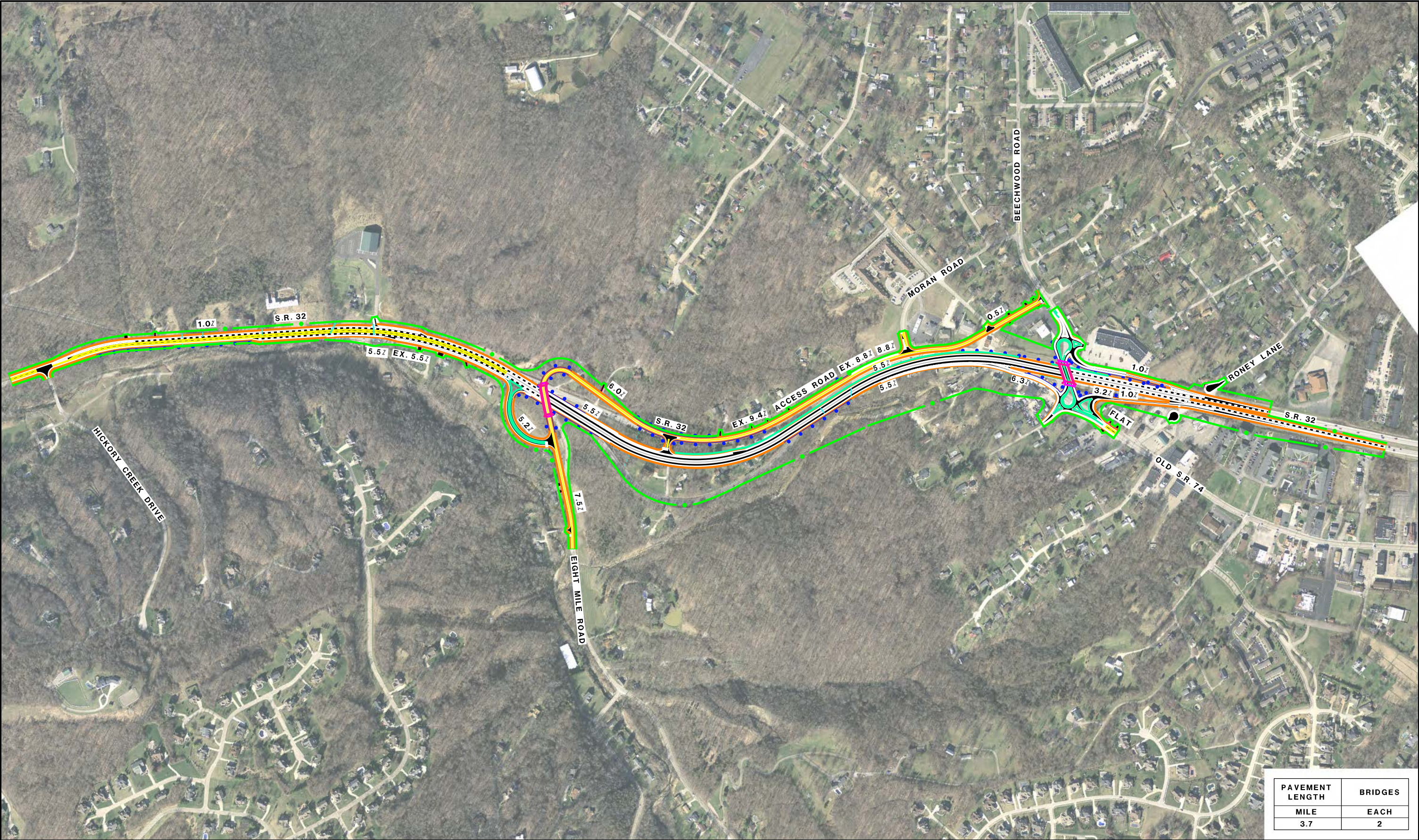
Stantec

Concept Drawing

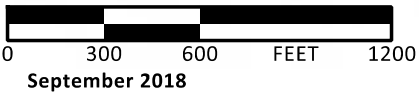
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure 32-18-3

NEW S.R. 32 ALIGNMENT TO ACHIEVE 6% GRADE
GRADE SEPARATED INTERCHANGES AT EIGHT MILE ROAD
& BEECHWOOD ROAD



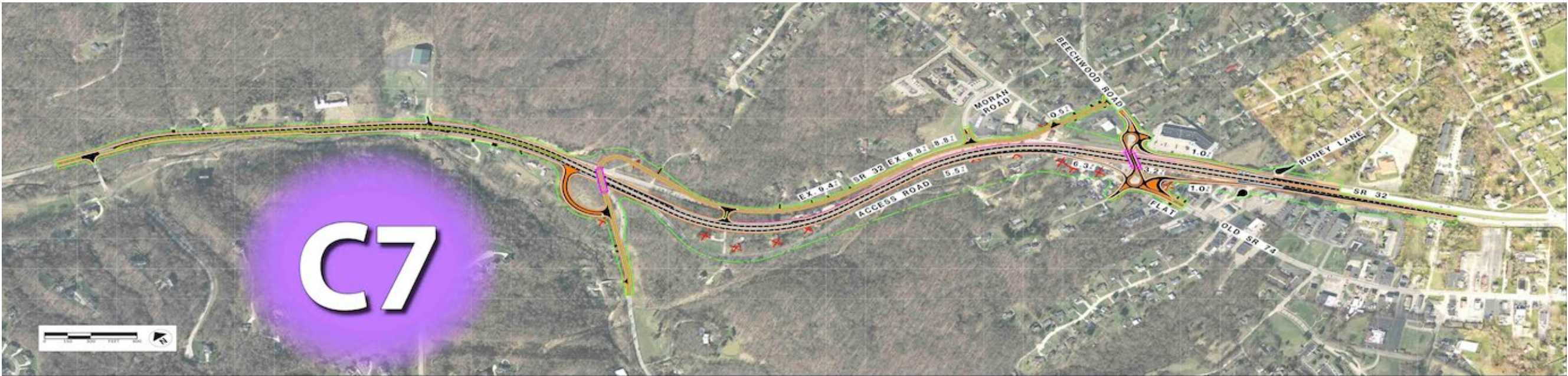
PAVEMENT LENGTH	BRIDGES
MILE	EACH
3.7	2



Concept Drawing
Eastern Corridor Projects
Segment II-III (S.R. 32 Corridor)
HAM-32F-0.00; PID 86462

Figure 32-18-3 (Overall View)
NEW S.R. 32 ALIGNMENT TO ACHIEVE 6% GRADE
GRADE SEPARATED INTERCHANGES AT EIGHT MILE ROAD
& BEECHWOOD ROAD

Drawing was presented at the October 24 & 25 Open House meetings.



New SR 32 Alignment to Create Grade Separated Interchanges

- \$37.4M to \$56.1M construction cost
- New R/W needed from 55 parcels, including 9 residential and 6 commercial relocations
- Reduce delay by approximately 85%
- Improves grade of SR 32 to a maximum of 5.5%
- Adds interchanges at Beechwood and Eight Mile
- Extends Eight Mile to Beechwood

PUBLIC FEEDBACK RATINGS SUMMARY

Strongly Oppose	Dislike	Neutral	Like	Strongly Support
15%	12%	30%	22%	22%

(percentages have been rounded)

Concept not drawn.

DESCRIPTION

- Realign curve on eastbound SR 32 hill.

NEEDS ADDRESSED

- P8) Address crash trends on the SR 32 hill.
- P10) Address roadway curve deficiencies on the SR 32 hill.

5/16 MEETING DISCUSSION AND COMMENTS

- Concept has not been drawn as the curve correction is best accomplished through other proposed concepts that modify SR 32’s alignment/profile.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

- Discussed and evaluated with other concepts.
- No additional comments were received following the 9/5 meeting.

12/10 MEETING DISCUSSION AND COMMENTS

- No discussion held.

NEXT STEPS/RECOMMENDATION

- Advance with concepts I-3e (C6) and 32-18-3 (C7).

Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental / Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	RECOMMENDATION
		Concept to be evaluated as part of Concepts I-3d, I-3e, and 32-18.							ADVANCING WITH CONCEPTS I-3d, I-3e and 32-18

RECOMMENDATION: ADVANCE WITH CONCEPTS I-3e (C6) and 32-18-3 (C7)

Concept drawing is presented on the following page.

DESCRIPTION

- Investigate removing vegetation to improve sight distance at intersection of SR 32 and Eight Mile Road.

NEXT STEPS/RECOMMENDATION

- Include in the Implementation Plan as a high priority.

NEEDS ADDRESSED

P7) Address deficient sight distance and roadway grade issues.

5/16 MEETING DISCUSSION AND COMMENTS

- None discussed.
- No additional comments were received following the 5/16 meeting.

9/5 MEETING DISCUSSION AND COMMENTS

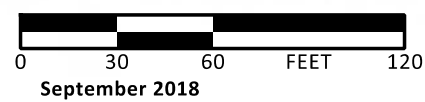
- Vegetation will be trimmed to improve sight distance for drivers turning left.
- A comment was made as to whether the cut area could be seeded for pollinator habitat.
- No additional comments were received following the 9/5 meeting.

12/10 MEETING DISCUSSION AND COMMENTS

- This project has been added to ODOT’s 2019 pruning contract (PID 101383).

Safety ECAT Benefit/Cost Ratio	Traffic Operations							Construction Cost	R/W Impacts		Environmental Impacts		Support and/or Facilitate Multi-Modal	Improve Regional Connectivity	Improve Local Access
	Time Period	HCS Results			TransModeler Results				Number of Relocations	R/W Cost	Anticipated Environmental Document	Red Flag Triggers			
		2042 Delay (seconds)	2042 LOS	% Reduction from No Build	2042 Delay (seconds)	2042 LOS	% Reduction from No Build								
								\$15K to \$22.5K	0	\$0	C1	None	Neutral	Neutral	Neutral

PRIORITY: HIGH



Concept Drawing
 Eastern Corridor Projects
 Segment II-III (SR 32 Corridor)
 HAM-32F-0.00; PID 86462

Figure I-3F

**VEGETATION REMOVAL ALONG S.R. 32 TO IMPROVE
 INTERSECTION SIGHT DISTANCE AT EIGHT MILE ROAD**

CAPACITY ANALYSIS

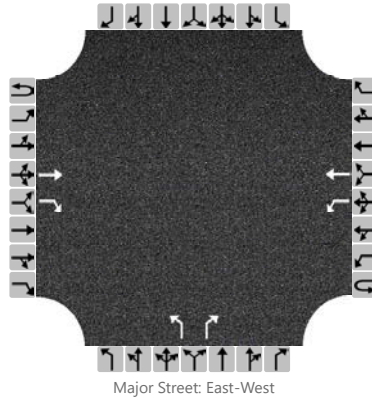
1A – ANCOR/SR 32 Hill Focus Area

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MJH	Intersection	SR 32 @ 8 Mile Rd
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	7/12/2016	East/West Street	SR 32
Analysis Year	2022	North/South Street	8 Mile Road
Time Analyzed	AM PEAK HOUR	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Intersection 3 - No Build		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			440	40		250	1070			130		190				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						278				144		211				
Capacity, c (veh/h)						1029				92		579				
v/c Ratio						0.27				1.56		0.36				
95% Queue Length, Q ₉₅ (veh)						1.1				11.3		1.7				
Control Delay (s/veh)						9.8				378.0		14.7				
Level of Service, LOS						A				F		B				
Approach Delay (s/veh)					1.9				162.1				(41.4 Sec - Overall			
Approach LOS									F				Delay)			

HCS7 Two-Way Stop-Control Report

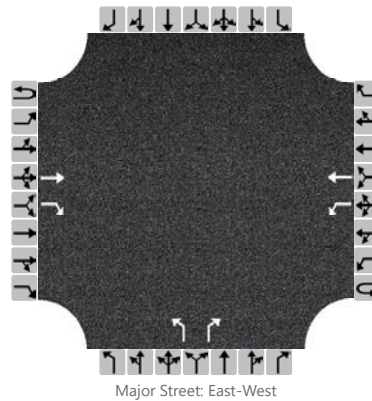
General Information

Analyst	MJH
Agency/Co.	
Date Performed	7/12/2016
Analysis Year	2022
Time Analyzed	NO-BUILD - PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			960	140		370	580			40		280				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						411				44		311				
Capacity, c (veh/h)						566				26		270				
v/c Ratio						0.73				1.72		1.15				
95% Queue Length, Q ₉₅ (veh)						6.1				5.4		13.7				
Control Delay (s/veh)						26.4				677.9		142.8				
Level of Service, LOS						D				F		F				
Approach Delay (s/veh)					10.3				209.1				(32.4 Sec - Overall Delay)			
Approach LOS									F							

HCS7 Two-Way Stop-Control Report

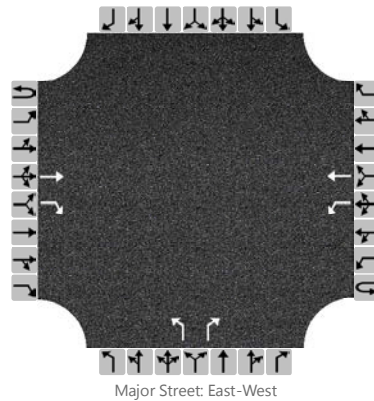
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3 - No Build

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			470	50		270	1150			140		210				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						300				156		233				
Capacity, c (veh/h)						990				74		554				
v/c Ratio						0.30				2.10		0.42				
95% Queue Length, Q ₉₅ (veh)						1.3				14.3		2.1				
Control Delay (s/veh)						10.2				626.3		16.1				
Level of Service, LOS						B				F		C				
Approach Delay (s/veh)					1.9				260.8				(41.0 Sec - Overall Delay)			
Approach LOS									F							

HCS7 Two-Way Stop-Control Report

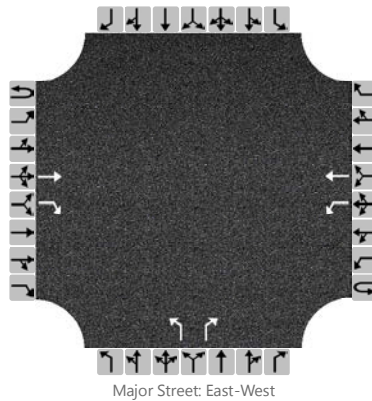
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3 - No Build

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			1030	150		400	620			40		310				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

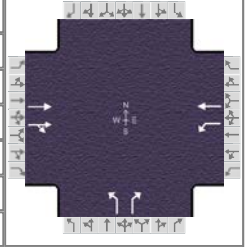
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						444				44		344				
Capacity, c (veh/h)						524				12		243				
v/c Ratio						0.85				3.76		1.41				
95% Queue Length, Q ₉₅ (veh)						8.8				6.6		19.3				
Control Delay (s/veh)						39.1				1885.6		247.6				
Level of Service, LOS						E				F		F				
Approach Delay (s/veh)					15.3				433.4				(65.8 Sec - Overall Delay)			
Approach LOS									F							

HCS7 Signalized Intersection Results Summary

General Information

Agency				Intersection Information		
Analyst	MJH	Analysis Date	Apr 23, 2018	Duration, h	0.25	
Jurisdiction	Anderson Twp (ODOT)	Time Period		Area Type	Other	
Urban Street	SR 32	Analysis Year	2022	PHF	0.90	
Intersection	SR 32 at 8 Mile Rd	File Name	AM-03b.xus	Analysis Period	1> 7:00	
Project Description	Build 3b - 2022 AM Peak Hour					



Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		440	40	250	0		130		190			

Signal Information

Cycle, s	70.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	10.0	27.0	18.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
				Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		32.0	15.0	47.0		23.0		
Change Period, (Y+R _c), s		5.0	5.0	5.0		5.0		
Max Allow Headway (MAH), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g _s), s		9.4	7.8			8.5		
Green Extension Time (g _e), s		0.9	0.1	0.0		0.6		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.00	1.00			0.01		

Movement Group Results

Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		270	263	278	0		144		211			
Adjusted Saturation Flow Rate (s), veh/h/ln		1856	1801	1767	1856		1781		1585			
Queue Service Time (g_s), s		7.3	7.4	5.8	0.0		4.6		6.5			
Cycle Queue Clearance Time (g_c), s		7.3	7.4	5.8	0.0		4.6		6.5			
Green Ratio (g/C)		0.39	0.39	0.56	0.60		0.26		0.40			
Capacity (c), veh/h		716	695	598	1113		458		634			
Volume-to-Capacity Ratio (X)		0.377	0.379	0.465	0.000		0.315		0.333			
Back of Queue (Q), ft/ln (95 th percentile)		129.6	123.6	84.4	0		82.3		96.1			
Back of Queue (Q), veh/ln (95 th percentile)		5.1	4.9	3.3	0.0		3.2		3.8			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		15.5	15.5	9.1	0.0		21.0		14.5			
Incremental Delay (d_2), s/veh		0.1	0.1	0.2	0.0		0.1		0.1			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		15.6	15.6	9.3	0.0		21.2		14.6			
Level of Service (LOS)		B	B	A			C		B			
Approach Delay, s/veh / LOS	15.6	B		9.3		A		17.3	B		0.0	
Intersection Delay, s/veh / LOS	14.6							B				

7.2 SEC
Aggregate Delay

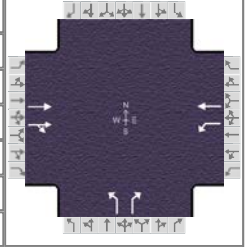
Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.3	B		0.7	A		2.7	C		2.3	B	
Bicycle LOS Score / LOS	0.9	A		0.9	A			F				

HCS7 Signalized Intersection Results Summary

General Information

Agency				Intersection Information		
Analyst	MJH	Analysis Date	Apr 23, 2018	Duration, h	0.25	
Jurisdiction	Anderson Twp (ODOT)	Time Period		Area Type	Other	
Urban Street	SR 32	Analysis Year	2022	PHF	0.90	
Intersection	SR 32 at 8 Mile Rd	File Name	PM-03b.xus	Analysis Period	1> 7:00	
Project Description	Build 3b - 2022 PM Peak Hour					



Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		960	140	370	0		40		280			

Signal Information

Cycle, s	90.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	20.0	41.0	14.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
				Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		46.0	25.0	71.0		19.0		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (MAH), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g_s), s		26.9	12.6			15.7		
Green Extension Time (g_e), s		2.4	0.6	0.0		0.0		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.05	0.05			1.00		

Movement Group Results

Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement		2	12	1	6		3		18				
Adjusted Flow Rate (v), veh/h		624	598	411	0		44		311				
Adjusted Saturation Flow Rate (s), veh/h/ln		1856	1773	1767	1856		1781		1585				
Queue Service Time (g_s), s		24.8	24.9	10.6	0.0		1.9		13.7				
Cycle Queue Clearance Time (g_c), s		24.8	24.9	10.6	0.0		1.9		13.7				
Green Ratio (g/C)		0.46	0.46	0.70	0.73		0.16		0.38				
Capacity (c), veh/h		845	808	553	1361		277		599				
Volume-to-Capacity Ratio (X)		0.738	0.741	0.743	0.000		0.160		0.520				
Back of Queue (Q), ft/ln (95 th percentile)		407.4	385.8	199.4	0		37.8		215.8				
Back of Queue (Q), veh/ln (95 th percentile)		15.9	15.4	7.8	0.0		1.5		8.5				
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00				
Uniform Delay (d_1), s/veh		20.1	20.1	17.1	0.0		32.9		21.7				
Incremental Delay (d_2), s/veh		3.0	3.2	4.8	0.0		0.1		0.4				
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0				
Control Delay (d), s/veh		23.1	23.4	21.9	0.0		33.0		22.1				
Level of Service (LOS)		C	C	C			C		C				
Approach Delay, s/veh / LOS	23.3	C		21.9		C		23.4		C		0.0	
Intersection Delay, s/veh / LOS	23.0							C					

17.3 SEC
Aggregate Delay

Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.3	B		2.3	B	A	2.7	C		2.3	B	
Bicycle LOS Score / LOS	1.5	A		1.2	A			F				

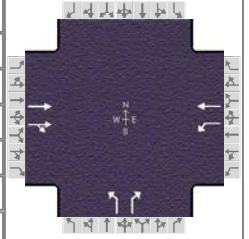
HCS7 Signalized Intersection Results Summary

General Information

Agency		Analysis Date	Apr 26, 2018
Analyst	CJK	Time Period	
Jurisdiction	Anderson Twp (ODOT)	Analysis Year	2042
Urban Street	SR 32	File Name	AM-03b.xus
Intersection	SR 32 at 8 Mile Rd		
Project Description	Build 3b - AM Peak Hour		

Intersection Information

Duration, h	0.25
Area Type	Other
PHF	0.90
Analysis Period	1> 7:00



Demand Information

Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		470	50	270	0		140		210			

Signal Information

Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		37.0	11.0	48.0		32.0		
Change Period, (Y+R _c), s		5.0	5.0	5.0		5.0		
Max Allow Headway (MAH), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g _s), s		11.1	8.0			10.1		
Green Extension Time (g _e), s		1.0	0.0	0.0		0.7		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.00	1.00			0.00		

Movement Group Results

	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		293	285	300	0		156		233			
Adjusted Saturation Flow Rate (s), veh/h/ln		1856	1793	1767	1856		1781		1585			
Queue Service Time (g _s), s		9.0	9.1	6.0	0.0		5.1		8.1			
Cycle Queue Clearance Time (g _c), s		9.0	9.1	6.0	0.0		5.1		8.1			
Green Ratio (g/C)		0.40	0.40	0.50	0.54		0.34		0.41			
Capacity (c), veh/h		742	717	460	997		601		654			
Volume-to-Capacity Ratio (X)		0.395	0.397	0.652	0.000		0.259		0.357			
Back of Queue (Q), ft/ln (95 th percentile)		165.1	156.7	147.7	0		90.9		125.2			
Back of Queue (Q), veh/ln (95 th percentile)		6.5	6.3	5.8	0.0		3.6		4.9			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d ₁), s/veh		17.1	17.1	15.8	0.0		19.2		16.2			
Incremental Delay (d ₂), s/veh		0.1	0.1	2.6	0.0		0.1		0.1			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		17.2	17.3	18.4	0.0		19.3		16.3			
Level of Service (LOS)		B	B	B			B		B			
Approach Delay, s/veh / LOS	17.2		B	18.4		B	17.5		B	0.0		
Intersection Delay, s/veh / LOS				17.6						B		

**8.8 SEC
Aggregate Delay**

Multimodal Results

	E	W	N	S
Pedestrian LOS Score / LOS	2.3	B	0.7	A
Bicycle LOS Score / LOS	1.0	A	1.0	A

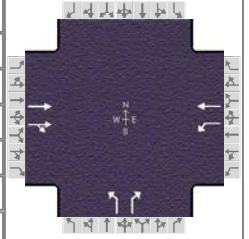
HCS7 Signalized Intersection Results Summary

General Information

Agency		Analysis Date	Apr 26, 2018
Analyst	CJK	Time Period	
Jurisdiction	Anderson Twp (ODOT)	Analysis Year	2042
Urban Street	SR 32	File Name	PM-03b.xus
Intersection	SR 32 at 8 Mile Rd		
Project Description	Build 3b - PM Peak Hour		

Intersection Information

Duration, h	0.25
Area Type	Other
PHF	0.90
Analysis Period	1> 7:00



Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		1030	150	400	0		40		310			

Signal Information

Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		46.0	27.0	73.0		17.0		
Change Period, (Y+R _c), s		5.0	5.0	5.0		5.0		
Max Allow Headway (MAH), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g _s), s		29.8	15.3			14.0		
Green Extension Time (g _e), s		2.5	0.6	0.0		0.0		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.14	0.10			1.00		

Movement Group Results

Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		669	642	444	0		44		344			
Adjusted Saturation Flow Rate (s), veh/h/ln		1856	1773	1767	1856		1781		1585			
Queue Service Time (g_s), s		27.6	27.8	13.3	0.0		2.0		12.0			
Cycle Queue Clearance Time (g_c), s		27.6	27.8	13.3	0.0		2.0		12.0			
Green Ratio (g/C)		0.46	0.46	0.72	0.76		0.13		0.38			
Capacity (c), veh/h		845	808	573	1402		238		599			
Volume-to-Capacity Ratio (X)		0.791	0.795	0.776	0.000		0.187		0.575			
Back of Queue (Q), ft/ln (95 th percentile)		455.5	433.1	361.1	0		39.1		241.5			
Back of Queue (Q), veh/ln (95 th percentile)		17.8	17.3	14.1	0.0		1.5		9.5			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		20.9	20.9	19.8	0.0		34.7		22.3			
Incremental Delay (d_2), s/veh		4.7	5.1	6.0	0.0		0.1		0.9			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		25.6	26.0	25.8	0.0		34.8		23.1			
Level of Service (LOS)		C	C	C			C		C			
Approach Delay, s/veh / LOS	25.8	C		25.8	C		24.5	C		0.0		
Intersection Delay, s/veh / LOS	25.6						C					

**30.6 SEC
Aggregate Delay**

Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.3	B		0.6	A		2.7	C		2.3	B	
Bicycle LOS Score / LOS	1.6	B		1.2	A			F				

Summary of Results

**PREPARED
FOR:** Stantec

**PREPARED
BY:** Eggeman Engineering & Consulting, LLC

DATE: March 18, 2019

The purpose of this memorandum is to present the results of Economic Crash Analysis Tool (ECAT) analysis for key intersections which were studied in connection with the Eastern Corridor Segment II/III project. The analyses were performed for:

- SR 32 @ 8 Mile Road
- SR 32 @ Clough Pike
- SR 32 @ Hickory Lane
- SR 32 @ Round Bottom Road
- US 50 @ Meadowlark Lane
- US 50 @ Newtown Road

The analyses were performed for various improvement alternatives for each intersection, as described below.

ECAT Analysis

ECAT is an Ohio Department of Transportation (ODOT) customized tool to complete Part C Predictive Method with Part C and D Crash Mitigation Factors (CMF'S) as described in AASHTO's Highway Safety Manual. Through this process, the existing predicted number of crashes for the existing conditions was compared with the predicted number of crashes for the proposed condition, to quantify the expected benefit-cost ratio (crash cost savings divided by the construction cost) associated with each alternative improvement.

SR 32 at 8 Mile Road

Two scenarios were evaluated using ECAT for the intersection of SR 32 at 8 Mile Road. According to the Ohio Department of Public Safety (ODPS) crash statistics, 12 crashes were recorded within the intersection influence area over a 3-year time period. According to the ECAT analysis, 1.7 crashes per year are expected per year. The analysis shows that similar intersections around the country are expected to experience 1.3 crashes per year. So, in terms of safety, this intersection is performing slightly worse than average under existing conditions.

Alternative 3b – Green Tee

Alternative 3b would convert this intersection from stop sign controlled to traffic signal controlled, with a Green Tee configuration. In order to analyze this Alternative in ECAT, a two-step process was necessary:

Summary of Results

Step 1: Quantify the safety (dis)benefits to convert from stop sign control to signalized control;

Step 2: Quantify the safety benefits to convert from signalized control to a Green T intersection.

In Step 1, the predicted crash rate for a traditional signalized intersection was calculated to be 3.711 crashes per year – significantly higher than existing conditions. This would result in a safety disbenefit of **\$1,255,411** over the course of the 20-year design life.

In Step 2, the Green Tee configuration was expected to reduce those crashes by 4.2%, according to the CMF Clearinghouse web site. This would reduce the expected number of crashes, and result in a **\$102,809** improvement in crash cost. Therefore, the expected net disbenefit of the improvement is negative \$1,152,602. (The net benefit is calculated by adding negative **\$1,255,411 + \$102,809**).

Alternative 3c – Roundabout

The predicted crash frequency with a roundabout at this location is 1.2 accidents per year. The net present day safety benefit of this improvement was calculated to be \$23,232. The expected cost of the project is approximately \$4.5M – resulting in a benefit cost ratio of less than 0.01.

SR 32 at Clough Pike

Two scenarios were evaluated using ECAT for the intersection of SR 32 at Clough Pike. According to the ODPS crash statistics, the 12 crashes were recorded within the intersection influence area over a 3-year time period. According to the ECAT analysis, 5.9 crashes per year are expected. The analysis also shows that similar intersections around the country are expected to experience 6.7 crashes per year. So, in terms of safety, this intersection is performing slightly better than average under existing conditions.

Alternative 7c – Roundabout

The predicted crash frequency with a roundabout at this location is 4.2 accidents per year. The net present day safety benefit of this improvement was calculated to be \$1,306,421. The expected cost of the project is approximately \$2.0M – resulting in a benefit cost ratio of approximately 0.7.

Alternative 7d – Green Tee

Alternative 7d would convert this intersection from signal controlled to Green-Tee signal controlled. According to the CMF Clearinghouse web site, the Green Tee configuration was expected to reduce those crashes by 4.2%, according to the CMF Clearinghouse web site. This would reduce the expected number of crashes and result in a \$102,809 improvement in crash cost.

Summary of Results

SR 32 at Hickory Creek Drive – Add a left-turn lane

ODPS crash statistics showed 4 crashes over a 3-year study period. According to the ECAT analysis, 0.3 crashes per year are expected and predicted per year, which means that safety conditions at this location are approximately average.

The predicted crash frequency with a left-turn lane added at this location is 0.2 accidents per year. The net present day safety benefit of this improvement was calculated to be \$49,868. The expected cost of the project is approximately \$1.5M – resulting in a benefit cost ratio of less than 0.01.

SR 32 at Round Bottom Road – Construct a Roundabout

ODPS crash statistics showed 21 crashes over a 3-year study period. According to the ECAT analysis, 7.7 crashes per year are expected and predicted per year, which means that safety conditions at this location are approximately average.

The predicted crash frequency associated with a roundabout at this location is 4.7 accidents per year. The net present day safety benefit of this improvement was calculated to be \$1,632,330. The expected cost of the project is approximately \$5.6M – resulting in a benefit cost ratio of 0.3.

US 50 at Meadowlark Lane – Construct a Roundabout

ODPS crash statistics showed 6 crashes over a 3-year study period. According to the ECAT analysis, 5.1 crashes per year are expected and 6.5 accident are predicted. Therefore, safety conditions at this location are slightly better than average.

The predicted crash frequency associated with a roundabout at this location is 4.0 accidents per year. The net present day safety benefit of this improvement was calculated to be \$1,338,674. The expected cost of the project is approximately \$1.5M – resulting in a benefit cost ratio of 0.9.

US 50 at Newtown Road – Construct a Roundabout

ODPS crash statistics showed 21 crashes over a 3-year study period. According to the ECAT analysis, 7.4 crashes per year are expected and 7.5 accident are predicted. Therefore, safety conditions at this location are approximately average.

The predicted crash frequency associated with a roundabout at this location is 4.7 accidents per year. The net present day safety benefit of this improvement was calculated to be \$1,387,743. The expected cost of the project is approximately \$1.8M – resulting in a benefit cost ratio of 0.8.

Eastern Corridor Segments II & III (PID 86462) ECAT Analysis
Summary of Results

TABLE 1
Summary of ECAT Results

INTERSECTION	Traffic Control		3-Year Accident Total	N (Existing)		N (Proposed)	Safety Benefits	Improvement Cost	B/C RATIO
	Existing	Proposed		Predicted	Expected	Predicted			
SR 32 at 8 Mile Rd									
Alternative 3b	Stop	Green Tee	12	1.3	1.7	4.6	\$1,152,602	\$1,987,500	-0.6
Alternative 3c	Stop	Roundabout	12	1.3	1.7	1.2	\$23,232	\$4,050,000	0.0
Alternative 3e	Stop	Grade Separation	12	1.3	1.7	N/A		\$14,050,000	0.0
SR 32 at Clough Pike									
Alternative 7c	Signal	Roundabout	15	6.7	5.9	4.2	\$1,306,421	\$2,000,000	0.7
Alternative 7d	Signal	Green Tee	15	6.7	5.9	6.4	\$102,809	\$4,700,000	0.1
SR 32 at Hickory Creek Drive	Stop	Add LT Lane	5	0.3	0.3	0.2	\$49,686	\$1,550,000	0.0
SR 32 at Round Bottom Rd	Signal	Roundabout	25	7.7	7.7	4.7	\$1,632,330	\$5,625,000	0.3
US 50 at Meadowlark	Signal	Roundabout	9	6.5	5.1	4.0	\$1,338,674	\$1,500,000	0.9
US 50 at Newtown	Signal	Roundabout	22	7.5	7.4	4.7	\$1,387,743	\$1,792,500	0.8

Existing Conditions: General Information and Data for Urban And Suburban Arterial Intersection						
General Information			Location Information			
Analyst	MJH		Route	SR32		
Agency or Company	EEC		Logpoint	6.82		
Date Performed	07/02/18		Common Name	SR 32 at 8 Mile Rd		
Intersection	SR32; 6.82		Analysis Year	2022		
Signalized/Unsignalized	Unsignalized					
Input Data			Existing Conditions		HSM Base Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)			3ST		--	
AADT _{major} (veh/day) (total entering on major approaches)*		AADT _{MAX} = 45,700 (veh/day)	20,790		--	
AADT _{minor} (veh/day) (total entering on minor approaches)*		AADT _{MAX} = 9,300 (veh/day)	3,180		--	
Intersection lighting (present/not present)			Present		Not Present	
Calibration factor, C _i			Varies, See Below		1.00	
Data for unsignalized intersections only:						
Number of major-road approaches with left-turn lanes			1		0	
Number of major-road approaches with right-turn lanes			1		0	
Data for signalized intersections only:						
Number of approaches with left-turn lanes					0	
Number of approaches with right-turn lanes					0	
Number of approaches with left-turn signal phasing					--	
Type of left-turn signal phasing for Leg #1					Permissive	
Type of left-turn signal phasing for Leg #2					--	
Type of left-turn signal phasing for Leg #3					--	
Not Applicable					--	
Number of approaches with right-turn-on-red prohibited					0	
Intersection red light cameras (present/not present)					Not Present	
Sum of all pedestrian crossing volumes (PedVol)					--	
Maximum number of lanes crossed by a pedestrian (n _{lanesx})					--	
Number of bus stops within 300 m (1,000 ft) of the intersection					0	
Schools within 300 m (1,000 ft) of the intersection (present/not present)					Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection					0	
Locality:			State System			

Existing Conditions: Crash Modification Factors (CMFs) for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.6700	1.0000	0.8600	1.0000	0.9999	1.0000	0.5762

Existing Conditions: Multiple-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(6)*(7)*(8)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.671	1.000	2.671	0.58	0.76	1.169

ATTACHMENT B
EXCERPTS FROM THE CONCEPTUAL ALTERNATIVES
IMPLEMENTATION PLAN

Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.944	$(4)_{FI}/((4)_{FI}*(4)_{PDO})$ 0.327	0.874	0.58	0.62	0.312
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.942	$(5)_{TOTAL}-(5)_{FI}$ 0.673	1.797	0.58	0.82	0.849

Existing Conditions: Single-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.331	1.000	0.331	0.58	0.54	0.103
Fatal and Injury (FI)	--	--	--	--	0.103	(4) _{FI} /((4) _{FI} +(4) _{PDO}) 0.302	0.100	0.58	0.47	0.027
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.237	(5) _{TOTAL} -(5) _{FI} 0.698	0.231	0.58	0.57	0.076

Existing Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Stop-Controlled Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{blmv}	Predicted N_{blsv}	Predicted N_{bl}	f_{pedi}	Calibration factor, C_i	Predicted N_{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16		$(4)*(5)*(6)$
Total	1.169	0.103	1.272	0.010	1.11	0.014
Fatal and injury (FI)	--	--	--	--	1.11	0.014

Existing Conditions: CMFs for Vehicle-Pedestrian Crash Summary for Urban And Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	$(1)*(2)*(3)$
--	--	--	--

Existing Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	--	--

Existing Conditions: Vehicle-Bicycle Crash Summary for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{blmv}	Predicted N_{blsv}	Predicted N_{bl}	f_{bikei}	Calibration factor, C_i	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17		$(4)*(5)*(6)$
Total	1.169	0.103	1.272	0.0057	1.16	0.008
Fatal and injury (FI)	--	--	--	--	1.16	0.008

Project Information			
General Information			
Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		
Perform Benefit Cost Analysis?	Yes		

Do the proposed improvements fundamentally change the conditions of the base safety performance function (SPF), Or is crash data unavailable for the analysis condition, Or is only predicted (and not expected) analysis needed for the existing or proposed condition?	Yes
--	-----

(Examples: unsignalized to signalized, undivided to divided, increase or decrease in the number of lanes, change the number of approaches to an intersection, significant realignment of the roadway)

If Yes, are you analyzing the existing or proposed conditions?	Proposed
--	----------

Project Elements Description Table							
Project Element ID (Must be Unique)	Site Type	Intersection Control Type	Location Information				
			NLFID	Begin Logpoint/ Intersection Midpoint	End Logpoint (Leave blank for Intersection)	Length (mi) OR Intersection Radius Buffer (mi)	Common Name
SR32: 6.82	Urban & Suburban Arterial Intersection	Signalized	SHAMSR00032**C	6.82		0.05	SR 32 at 8 Mile Rd

Traffic Volume Growth Rate Calculation For Benefit Cost Analysis			
	Year	AADT	
Present ADT (PADT)	2022	20,790	veh / day
Future ADT (FADT)	2042	22,380	veh / day
Annual Linear Growth Rate		0.0038	

Select Other Non-Site Characteristic Based Countermeasures For Entire Project						
CMF Nbr	Countermeasure	CMF KA Value	CMF B Value	CMF C Value	CMF O Value	CMF Valid for the Following Site Types
CMF 1						
CMF 2						
CMF 3						
CMF 4						
CMF 5						
CMF 6						
CMF 7						
CMF 8						
CMF 9						
CMF 10						

Proposed Conditions: General Information and Data for Urban And Suburban Arterial Intersection						
General Information			Location Information			
Analyst	MJH		Route	SR32		
Agency or Company	EEC		Logpoint	6.82		
Date Performed	07/02/18		Common Name	SR 32 at 8 Mile Rd		
Intersection	SR32; 6.82		Analysis Year	2022		
Signalized/Unsignalized	Signalized					
Input Data			Proposed Conditions		HSM Base Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)			3SG		--	
AADT _{major} (veh/day) (total entering on major approaches)*		AADT _{MAX} = 58,100 (veh/day)	20,790		--	
AADT _{minor} (veh/day) (total entering on minor approaches)*		AADT _{MAX} = 16,400 (veh/day)	3,180		--	
Intersection lighting (present/not present)			Not Present		Not Present	
Calibration factor, C _i			Varies, See Below		1.00	
Data for unsignalized intersections only:						
Number of major-road approaches with left-turn lanes					0	
Number of major-road approaches with right-turn lanes					0	
Data for signalized intersections only:						
Number of approaches with left-turn lanes			1		0	
Number of approaches with right-turn lanes			2		0	
Number of approaches with left-turn signal phasing			2		--	
Type of left-turn signal phasing for Leg #1			Protected		Permissive	
Type of left-turn signal phasing for Leg #2			Protected		--	
Type of left-turn signal phasing for Leg #3			Not Applicable		--	
Not Applicable					--	
Number of approaches with right-turn-on-red prohibited			0		0	
Intersection red light cameras (present/not present)			Not Present		Not Present	
Sum of all pedestrian crossing volumes (PedVol)			1		--	
Maximum number of lanes crossed by a pedestrian (n _{lanesx})			2		--	
Number of bus stops within 300 m (1,000 ft) of the intersection			0		0	
Schools within 300 m (1,000 ft) of the intersection (present/not present)			Not Present		Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection			0		0	
Locality:			State System			

Proposed Conditions: Crash Modification Factors (CMFs) for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.9300	0.8836	0.9200	1.0000	1.0000	1.0000	0.7560

Proposed Conditions: Multiple-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(6)*(7)*(8)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		
	a	b	c							
Total	-12.13	1.11	0.26	0.33	2.726	1.000	2.726	0.76	2.25	4.636

Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	0.934	$(4)_{FI}/((4)_{FI}*(4)_{PDO})$ 0.359	0.977	0.76	1.46	1.079
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	1.671	$(5)_{TOTAL}-(5)_{FI}$ 0.641	1.748	0.76	2.68	3.542

Proposed Conditions: Single-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.198	1.000	0.198	0.76	1.49	0.223
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.052	(4) _{FI} /((4) _{FI} +(4) _{PDO}) 0.267	0.053	0.76	1.66	0.067
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.143	(5) _{TOTAL} -(5) _{FI} 0.733	0.145	0.76	1.42	0.156

Proposed Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Stop-Controlled Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{pedi}	Calibration factor, C_i	Predicted N_{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16		$(4)*(5)*(6)$
Total	--	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--	--

Proposed Conditions: CMFs for Vehicle-Pedestrian Crash Summary for Urban And Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	$(1)*(2)*(3)$
1.00	1.00	1.00	1.00

Proposed Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	N _{pedbase}	Combined CMF	Calibration factor, C _i	Predicted N _{pedi}
	from Table 12-14									
	a	b	c	d	e		from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.002	1.00	0.69	0.001
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	0.69	0.001

Proposed Conditions: Vehicle-Bicycle Crash Summary for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Calibration factor, C_i	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17		$(4)*(5)*(6)$
Total	4.636	0.223	4.860	0.0079	4.00	0.154
Fatal and injury (FI)	--	--	--	--	4.00	0.154

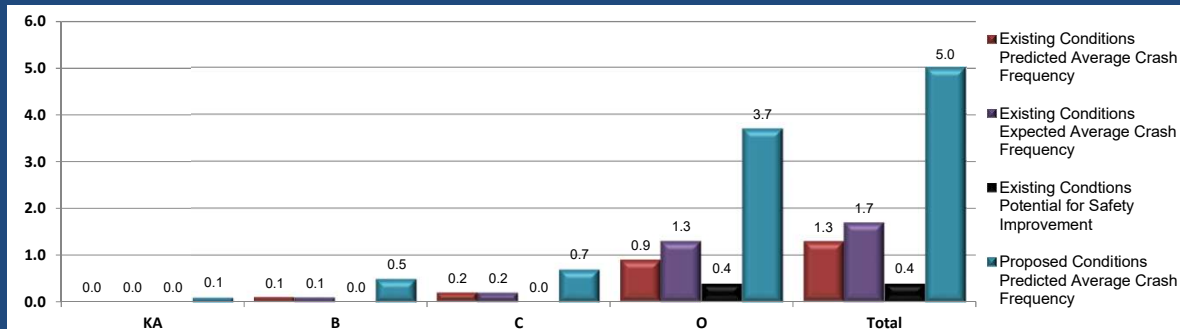


Project Safety Performance Report

General Information

Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0304	0.1349	0.1966	0.9250	1.2869
N_{expected} - Existing Conditions	0.0302	0.1440	0.1936	1.3271	1.6949
N_{potential for improvement} - Existing Conditions	-0.0002	0.0091	-0.0030	0.4021	0.4080
N_{predicted} - Proposed Conditions	0.1081	0.4963	0.6957	3.6979	4.9980

Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.0304	0.1349	0.1966	0.925
		Total			
		1.2869			

Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.0302	0.144	0.1936	1.3271
		Total			
		1.6949			

Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	-0.0002	0.0091	-0.003	0.4021
		Total			
		0.408			

Proposed Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.1081	0.4963	0.6957	3.6979
		Total			
		4.998			

Summary by Crash Type

Crash Type	Existing		PSI	Proposed
	Predicted Crash Frequency	Expected Crash Frequency		Predicted Crash Frequency
Unknown	0.0014	0.0015	0.0001	0.0014
Head On	0.0087	0.0087	0.0000	0.0087
Rear End	0.6987	1.1192	0.4205	0.6987
Backing	0.0365	0.0356	-0.0009	0.0365
Sideswipe - Meeting	0.0198	0.0197	-0.0001	0.0198
Sideswipe - Passing	0.1714	0.1551	-0.0163	0.1714
Angle	0.2537	0.2307	-0.0230	0.2537
Parked Vehicle	0.0500	0.0479	-0.0021	0.0500
Pedestrian	0.0168	0.0168	0.0000	0.0168
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0001	0.0000	-0.0001	0.0001
Pedalcycles	0.0098	0.0098	0.0000	0.0098
Other Non-Vehicle	0.0000	0.0000	0.0000	0.0000
Fixed Object	0.0803	0.0763	-0.0040	0.0803
Other Object	0.0029	0.0028	-0.0001	0.0029
Overturning	0.0044	0.0044	0.0000	0.0044
Other Non-Collision	0.0107	0.0107	0.0000	0.0107
Left Turn	0.1485	0.2031	0.0546	0.1485
Right Turn	0.0000	0.0000	0.0000	0.0000



Safety Benefit - Cost Analysis

General Information

Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

Comments:

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
Install Green T Traffic Signal	20	\$1,987,500.00			\$1,987,500.00	\$1,987,500.00	3.711	(\$1,255,411)
					\$0.00	\$0.00		
					\$0.00	\$0.00		
					\$0.00	\$0.00		
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
Totals		\$1,987,500.00	\$0.00	\$0.00	\$1,987,500.00	\$1,987,500.00	3.711	(\$1,255,411)

Benefit - Cost Calculator

Net Present Value of Project **\$1,987,500.00**

Net Present Value of Safety Benefits **(\$1,255,410.73)**

Net Benefit **(\$3,242,910.73)**

Benefit / Cost Ratio **-0.63**

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes **0.078**

Number of Injury Crashes **0.938**

Number of Total Crashes **3.711**

Comments:



Project Information

General Information

Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		
Perform Benefit Cost Analysis?	Yes		

Do the proposed improvements fundamentally change the conditions of the base safety performance function (SPF),
Or is crash data unavailable for the analysis condition,
Or is only predicted (and not expected) analysis needed for the existing or proposed condition?

Yes

(Examples: unsignalized to signalized, undivided to divided, increase or decrease in the number of lanes, change the number of approaches to an intersection, significant realignment of the roadway)

If Yes, are you analyzing the existing or proposed conditions?

Proposed

Project Elements Description Table

Project Element ID (Must be Unique)	Site Type	Intersection Control Type	Location Information					
			NLFID	Begin Logpoint/ Intersection Midpoint	End Logpoint (Leave blank for Intersection)	Length (mi) OR Intersection Radius Buffer (mi)	Cross Route NLFID(s)	Common Name
SR32; 6.82	Urban & Suburban Arterial Intersection	Unsignalized	SHAMSR00032**C	6.82		0.05		SR 32 at 8 Mile Rd

Traffic Volume Growth Rate Calculation For Benefit Cost Analysis

	Year	AADT	
Present ADT (PADT)	2022	20,790	veh / day
Future ADT (FADT)	2042	22,380	veh / day
Annual Linear Growth Rate		0.0038	

Select Other Non-Site Characteristic Based Countermeasures For Entire Project

CMF Nbr	Countermeasure	CMF KA Value	CMF B Value	CMF C Value	CMF O Value	CMF Valid for the Following Site Types
CMF 1	Conversion of stop-controlled intersection into multi-lane roundabout	0.95	0.95	0.95	0.95	7 / 10
CMF 2						

	Project Elements Description Table							
	Project Element ID (Must be Unique)	Site Type	Intersection Control Type	Location Information				
				NLFID	Begin Logpoint/ Intersection Midpoint	End Logpoint (Leave blank for Intersection)	Length (mi) OR Intersection Radius Buffer (mi)	Cross Route NLFID(s)
CMF 3								
CMF 4								
CMF 5								
CMF 6								
CMF 7								
CMF 8								
CMF 9								
CMF 10								

Proposed Conditions: General Information and Data for Urban And Suburban Arterial Intersection						
General Information			Location Information			
Analyst	MJH		Route	SR32		
Agency or Company	EEC		Logpoint	6.82		
Date Performed	07/02/18		Common Name	SR 32 at 8 Mile Rd		
Intersection	SR32; 6.82		Analysis Year	2022		
Signalized/Unsignalized	Unsignalized					
Input Data			Proposed Conditions		HSM Base Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)			3ST		--	
AADT _{major} (veh/day) (total entering on major approaches)*		AADT _{MAX} = 45,700 (veh/day)	20,790		--	
AADT _{minor} (veh/day) (total entering on minor approaches)*		AADT _{MAX} = 9,300 (veh/day)	3,180		--	
Intersection lighting (present/not present)			Present		Not Present	
Calibration factor, C _i			Varies, See Below		1.00	
Data for unsignalized intersections only:						
Number of major-road approaches with left-turn lanes			1		0	
Number of major-road approaches with right-turn lanes			1		0	
Data for signalized intersections only:						
Number of approaches with left-turn lanes					0	
Number of approaches with right-turn lanes					0	
Number of approaches with left-turn signal phasing					--	
Type of left-turn signal phasing for Leg #1					Permissive	
Type of left-turn signal phasing for Leg #2					--	
Type of left-turn signal phasing for Leg #3					--	
Not Applicable					--	
Number of approaches with right-turn-on-red prohibited					0	
Intersection red light cameras (present/not present)					Not Present	
Sum of all pedestrian crossing volumes (PedVol)					--	
Maximum number of lanes crossed by a pedestrian (n _{lanesx})					--	
Number of bus stops within 300 m (1,000 ft) of the intersection					0	
Schools within 300 m (1,000 ft) of the intersection (present/not present)					Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection					0	
Locality:			State System			

Proposed Conditions: Crash Modification Factors (CMFs) for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.6700	1.0000	0.8600	1.0000	0.9999	1.0000	0.5762

Proposed Conditions: Multiple-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(6)*(7)*(8)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bimv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.671	1.000	2.671	0.58	0.76	1.169

Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.944	$(4)_{FI}/((4)_{FI}*(4)_{PDO})$ 0.327	0.874	0.58	0.62	0.312
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.942	$(5)_{TOTAL}-(5)_{FI}$ 0.673	1.797	0.58	0.82	0.849

Proposed Conditions: Single-Vehicle Crash Summary for Urban And Suburban Arterial Intersection										
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N _{bisv}	Proportion of Total Crashes	Adjusted N _{bimv}	Combined CMFs	Calibration Factor, C _i	Predicted N _{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.331	1.000	0.331	0.58	0.54	0.103
Fatal and Injury (FI)	--	--	--	--	0.103	(4) _{FI} /((4) _{FI} +(4) _{PDO}) 0.302	0.100	0.58	0.47	0.027
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.237	(5) _{TOTAL} -(5) _{FI} 0.698	0.231	0.58	0.57	0.076

Proposed Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Stop-Controlled Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{pedi}	Calibration factor, C_i	Predicted N_{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16		$(4)*(5)*(6)$
Total	1.169	0.103	1.272	0.010	1.11	0.014
Fatal and injury (FI)	--	--	--	--	1.11	0.014

Proposed Conditions: CMFs for Vehicle-Pedestrian Crash Summary for Urban And Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	$(1)*(2)*(3)$
--	--	--	--

Proposed Conditions: Vehicle-Pedestrian Crash Summary at Urban And Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	N _{pedbase}	Combined CMF	Calibration factor, C _i	Predicted N _{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	--	--

Proposed Conditions: Vehicle-Bicycle Crash Summary for Urban And Suburban Arterial Intersection						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Calibration factor, C_i	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17		$(4)*(5)*(6)$
Total	1.169	0.103	1.272	0.0057	1.16	0.008
Fatal and injury (FI)	--	--	--	--	1.16	0.008

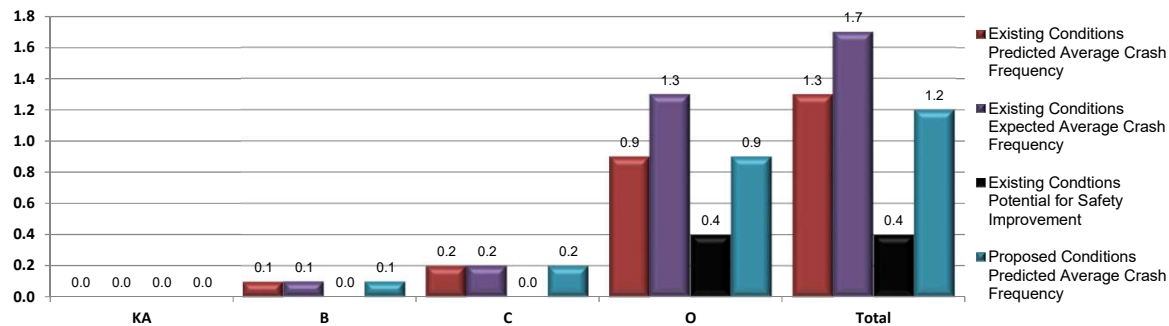


Project Safety Performance Report

General Information

Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0304	0.1349	0.1966	0.9250	1.2869
N_{expected} - Existing Conditions	0.0302	0.1440	0.1936	1.3271	1.6949
N_{potential for improvement} - Existing Conditions	-0.0002	0.0091	-0.0030	0.4021	0.4080
N_{predicted} - Proposed Conditions	0.0289	0.1282	0.1868	0.8787	1.2226

Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.0304	0.1349	0.1966	0.925
		Total			
		1.2869			

Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.0302	0.144	0.1936	1.3271
		Total			
		1.6949			

Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	-0.0002	0.0091	-0.003	0.4021
		Total			
		0.408			

Proposed Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level			
		KA	B	C	O
SR32: 6.82	SR 32 at 8 Mile Rd	0.0289	0.1282	0.1868	0.8787
		Total			
		1.2226			

Summary by Crash Type

Crash Type	Existing			Proposed Predicted Crash Frequency
	Predicted Crash Frequency	Expected Crash Frequency	PSI	
Unknown	0.0014	0.0015	0.0001	0.0014
Head On	0.0087	0.0087	0.0000	0.0087
Rear End	0.6987	1.1192	0.4205	0.6987
Backing	0.0365	0.0356	-0.0009	0.0365
Sideswipe - Meeting	0.0198	0.0197	-0.0001	0.0198
Sideswipe - Passing	0.1714	0.1551	-0.0163	0.1714
Angle	0.2537	0.2307	-0.0230	0.2537
Parked Vehicle	0.0500	0.0479	-0.0021	0.0500
Pedestrian	0.0168	0.0168	0.0000	0.0168
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0001	0.0000	-0.0001	0.0001
Pedalcycles	0.0098	0.0098	0.0000	0.0098
Other Non-Vehicle	0.0000	0.0000	0.0000	0.0000
Fixed Object	0.0803	0.0763	-0.0040	0.0803
Other Object	0.0029	0.0028	-0.0001	0.0029
Overturning	0.0044	0.0044	0.0000	0.0044
Other Non-Collision	0.0107	0.0107	0.0000	0.0107
Left Turn	0.1485	0.2031	0.0546	0.1485
Right Turn	0.0000	0.0000	0.0000	0.0000



Safety Benefit - Cost Analysis

General Information

Project Name	Eastern Corridor	Contact Email	mhunter@eec-eng.com
Project Description	Regional Traffic Study	Contact Phone	937.631.4915
Reference Number	N/A	Date Performed	7/2/2018
Analyst	MJH	Analysis Year	2022
Agency/Company	EEC		

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

Comments:

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
					\$0.00	\$0.00	0.000	\$12
					\$0.00	\$0.00		
					\$0.00	\$0.00		
					\$0.00	\$0.00		
CMF 1 - Conversion of stop-controlled intersection into multi-lane roundabout	20	\$1,000,000.00			\$1,000,000.00	\$1,000,000.00	-0.064	\$23,220
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
					\$0.00	\$0.00	0.000	\$0
Totals		\$1,000,000.00	\$0.00	\$0.00	\$1,000,000.00	\$1,000,000.00	-0.064	\$23,232

Benefit - Cost Calculator

Net Present Value of Project **\$1,000,000.00**

Net Present Value of Safety Benefits **\$23,232.33**

Net Benefit **(\$976,767.67)**

Benefit / Cost Ratio **0.02**

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes **-0.002**

Number of Injury Crashes **-0.018**

Number of Total Crashes **-0.064**

Comments:

Eastern Corridor Segments II & III (PID 86462) Traffic Signal Warrants
Summary of Results

PREPARED FOR: Stantec

PREPARED BY: Eggeman Engineering & Consulting, LLC

DATE: March 2, 2018

The purpose of this memorandum is to present the results of traffic signal warrant analyses which were conducted for the key intersections within the Eastern Corridor Traffic Study project area. The analysis was performed using PC Warrants software, with only Warrants 1, 2, and 3 considered for this study.

The traffic volumes for the analyses were based on 24-hour turning movement counts conducted at each study location. The right-turn volumes on the side roads were reduced in conformance with Section 402-5 of the Traffic Engineering Manual. The output reports attached to this memorandum reflect the traffic volumes after the right turn reduction factors were applied by the PC Warrants software. The supporting calculations which were used to check the accuracy of the software generated right-turn reductions are available upon request.

It should also be noted that several mainline corridors (classified as the major street for the signal warrant analysis) are signed at 40 MPH. Per Section 4C.02 of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD):

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, ... the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Since speed data was not available for these analyses, and to be conservative, the 100% values were used in situations where the posted speed limit was 40 MPH.

However, per Section 402-3.2 of the Traffic Engineering Manual:

*For new ODOT signals, Warrants 1, 2 and 3 shall be based on the 100 percent values (**OMUTCD Chapter 4C**) and right-turn reduction factors except in the following circumstance: If there are five or more crashes that can be corrected with the addition of a signal, and the speed exceeds 40 miles per hour on the major street, Warrants 1, 2 and 3 may be based on the 70 percent values combined with engineering judgment and right-turn reduction factors.*

Signal warrants for local projects using State or Federal funding shall be included in the above criteria.

Therefore, warrants for new traffic signals were based on the 100% values, regardless of the observed speed on the major road. For this study, this criteria was applied in particular to the intersection of SR 32 & Eight Mile Rd.

SUMMARY OF WARRANT ANALYSIS

Intersection	Maintaing Agency	Major Street Speed Limit (MPH)	Criteria	Control	Warrant 1 – 8-Hour Volumes			Warrant 2 4-Hour Volumes	Warrant 3 – Peak-Hour Volumes	
					1A	1B	1C		3A	3B
SR 32 & Beechwood	Union Township	55	70%	Signal	Yes	Yes	Yes	Yes	Yes	Yes
SR 32 & Ltl Dry Run Rd	Village of Newtown	50	70%	Signal	No	Yes	No	Yes	Yes	Yes
SR 32 & Ivy Hills Place	Village of Newtown	50	70%	Signal	No	No	No	Yes	No	Yes
SR 32 & Rnd Bottom Rd	Village of Newtown	25	100%	Signal	Yes	Yes	Yes	Yes	Yes	Yes
SR 32 & Church/ Newtown Rd	Village of Newtown	25	100%	Signal	Yes	No	Yes	Yes	Yes	Yes
SR 32 & Clough Pike	ODOT D8	55	70%	Signal	Yes	Yes	Yes	Yes	Yes	Yes
Round Bottom Rd & Valley	Village of Newtown	35	100%	Signal	No	No	No	No	Yes	No
Church St & Valley Ave	Village of Newtown	35	100%	Signal	No	Yes	No	Yes	Yes	Yes
US 50 & Newtown Rd	ODOT D8	40	100%	Signal	Yes	Yes	Yes	Yes	Yes	Yes
US 50 & Walton Creek	ODOT D8	40	100%	Signal	No	Yes	Yes	Yes	Yes	Yes
US 50 & Spring Hill	Village of Mariemont	40	100%	Signal	No	Yes	Yes	Yes	Yes	Yes
US 50 & Prom. S.C.	Village of Mariemont	40	100%	Signal	No	No	No	No	No	No
US 50 & Pocahontas	Village of Mariemont	35	100%	Signal	No	Yes	Yes	Yes	Yes	Yes

Intersection	Maintaing Agency	Major Street Speed Limit (MPH)	Criteria	Control	Warrant 1 – 8-Hour Volumes			Warrant 2 4-Hour Volumes	Warrant 3 – Peak-Hour Volumes	
					1A	1B	1C		3A	3B
Mariemont Square NE	Village of Mariemont	35	100%	Signal	No	No	No	No	No	Yes
Mariemont Square NW	Village of Mariemont	25	100%	Signal	Yes	No	Yes	Yes	Yes	Yes
Mariemont Square SE	Village of Mariemont	35	100%	Stop	No	No	No	No	No	No
Mariemont Square SW	Village of Mariemont	25	100%	Signal	No	No	Yes	Yes	Yes	Yes
US 50 & Watterson Rd	Village of Fairfax	25	100%	Signal	No	Yes	No	Yes	Yes	Yes
US 50 & Meadowlark	Village of Fairfax	35	100%	Signal	No	Yes	No	Yes	Yes	Yes
Red Bank Rd & Wooster	Village of Fairfax	35	100%	Signal	No	No	No	No	Yes	Yes
SR 125 & Elstun Rd	Anderson Township	45	70%	Signal	No	Yes	No	Yes	Yes	Yes
Red Bank Rd & US 50 Rmp	Village of Fairfax	35	100%	Signal	No	Yes	No	Yes	Yes	Yes
Beechmont Cir & Wilmer	Cincinnati	40	100%	Signal	No	No	No	No	Yes	Yes
Eastern Ave & Linwood	Cincinnati	35	100%	Signal	No	No	No	No	No	No
US 50 & Plainville Rd	Cincinnati	25	100%	Stop	No	Yes	Yes	Yes	Yes	Yes
SR 32 & Eight Mile Rd	Union Township	50	100%	Stop	No	Yes	No	Yes	Yes	Yes
Beechmont Cir & Wooster	Cincinnati	35	100%	Stop	No	No	No	No	No	No

Summary of Results

The results of the warrant analysis are discussed below. The output reports from the PC Warrants software is attached to this memorandum. An overview of the results for each intersection is listed below:

- SR 32 & Beechwood – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 15 hours of the day.
- SR 32 & Little Dry Run Rd – clearly warranted: Warrant #1 was comfortably met, exceeding minimum requirements for 13 hours.
- SR 32 & Ivy Hills Place – warranted: The intersection meets Warrants #2 and #3. Note that the intersection was analyzed at 70% levels. However, just 300' west of this intersection, SR 32 is signed at 35 MPH. If 100% levels are assumed, this intersection would not meet requirements for Warrants #1, #2, or #3.
- SR 32 & Round Bottom Rd – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 15 hours each day.
- SR 32 & Church/ Newtown Rd – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 13 hours.
- SR 32 & Clough Pike – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 15 hours.
- Round Bottom Rd & Valley – marginally warranted: Only Warrant #3B (Peak Hour Delay) is met for this location. Note that three of four hours are met for Warrant #2, with one additional hour just a few vehicles shy of meeting this requirement.
- Church St & Valley Ave –warranted: The intersection meets Warrant #1 for 9 hours. Warrants #2 and #3 are also met.
- US 50 & Newtown Rd – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 16 hours, at 100% levels. (Note that the speed limit is 40 MPH on the Major Street.)
- US 50 & Walton Creek – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 14 hours, at 100% levels. (Note once again that the speed limit is 40 MPH on the Major Street.)
- US 50 & Spring Hill – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 14 hours, at 100% levels. (Note once again that the speed limit is 40 MPH on the Major Street.)
- US 50 & Promenade S.C. – **not warranted** (at 100% values): The requirements to meet Warrant #1 are not met for even a single hour of the day (0 hours met). Note that the speed limit is 40 MPH. The intersection would meet Warrants #2 and #3, if 70% values were applied.
- US 50 & Pocahontas Ave –warranted: The intersection meets Warrant #1 for 11 hours. Warrants #2 and #3 are also met.

- Mariemont Square NE (WB Wooster Pike at Miami Rd) – marginally warranted: Only Warrant 3B (Peak Hour Volume) is met for this location. Warrant #1 is met for only 2 hours of the day.
- Mariemont Square NW (WB Wooster Pike at Madisonville Rd) – clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 11 hours.
- Mariemont Square SE (EB Wooster Pike at Miami Rd) – **not warranted**: This intersection is currently not signalized. The requirements to meet Warrant #1 are not met for even a single hour of the day (0 hours met).
- Mariemont Square SW (EB Wooster Pike at Madisonville Rd) – warranted: The intersection meets Warrant #1C (combination warrants) for 8 hours. Warrants #2 and #3 are also met.
- US 50 & Watterson Rd - clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 13 hours of the day.
- US 50 & Meadowlark Ln - warranted: The intersection meets Warrant #1 for 8 hours. Warrants #2 and #3 are also met.
- Red Bank Rd & Wooster Rd –warranted: Only Warrant #3 (Peak Hour) is met for this location under a traditional analysis. However, it should be noted that the intersection is configured in a “Y” shape – and because of the prevailing traffic patterns, the minor approach (WB or NB) changes as the day progresses. As a result, the intersection would easily satisfy Warrant #1, if NB was considered as the minor street in the morning hours of the day, and WB was considered the minor street in the afternoon hours of the day.
- SR 125 & Elstun Rd. – warranted: The intersection meets Warrant #1 for 9 hours. Warrants #2 and #3 are also met.
- Red Bank Rd & US 50 Ramps - clearly warranted: The intersection comfortably meets Warrant #1, exceeding minimum requirements for 12 hours of the day.
- Beechmont Circle & Wilmer Ave - marginally warranted: Only Warrant #3 (Peak Hour) is met for this location. Warrant #1 is met for only 4 hours of the day.
- Eastern Ave & Linwood Ave – **not warranted**: The requirements to meet Warrant #1 are met for only 2 hours. It should be noted that this intersection would meet the Peak Hour Warrant (Warrant #3A) if the right-turn reduction factors were not applied.
- US 50 & Plainville Rd - warranted: This intersection is currently not signalized. The intersection meets Warrant #1, exceeding minimum requirements for 10 hours of the day.
- SR 32 & Eight Mile Rd - warranted: This intersection is currently not signalized. The intersection meets Warrant #1, exceeding minimum requirements for 9 hours of the day. Warrants for this intersection were analyzed using 100% levels, since it is a warrant analysis for a new traffic signal.
- Beechmont Circle & Wooster– **not warranted**: This intersection is currently not signalized. The requirements for Warrant #1 are met for just one hour each day.

Signalized Locations

Warrant analysis show that two intersections (US 50 & Promenade S.C. and Eastern Ave & Linwood) which are currently signalized do not meet traditional warrants for signalization. HCS analysis were completed to determine the operational impact of removing the traffic signals at these two locations, as summarized in the Table below.

Intersection Performance (Removing Traffic Signal)

Intersection	Signalized Operation (Sec/Veh)		Unsignalized Operation (Sec/Veh)	
	Side Street LT	Overall	Side Street LT	Overall
US 50 at Promenade	14.6	13.4	145.3	1.3
Eastern Ave at Linwood Ave	9.9	11.8	15.9	3.9

Eliminating the traffic signal at the intersection of US 50 at Promenade Shopping Center will significantly increase side street delay and would also significantly reduce overall average delay. Removal of the traffic signal at the intersection of Eastern Ave at Linwood Ave would result in a very minor change to side street and overall delay at this location.

Unsignalized Locations

Warrant analysis also show that two intersections (US 50 & Plainville Rd and SR 32 & Eight Mile Rd) which are currently unsignalized meet traditional warrants for signalization. HCS analysis were completed to determine the operational impact of installing a traffic signal at these locations, as summarized in the Table below.

Intersection Performance (Adding Traffic Signal)

Intersection	Unsignalized Operation (Sec/Veh)		Signalized Operation (Sec/Veh)	
	Side Street LT	Overall	Side Street LT	Overall
US 50 at Plainville	314.1	32.5	112.9	79.8
SR 32 & Eight Mile	189.5	13.5	32.2	33.9

Adding a traffic signal would significantly reduce side street delay at both locations. However, the overall delay would also increase with traffic signalization at both locations.

Eastern Corridor

Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Signal Warrants - Summary

Major Street Approaches

Eastbound: SR 32

Number of Lanes : 1

Total Approach Volume: 8,461

Westbound: SR 32

Number of Lanes :1

Total Approach Volume: 10,545

Minor Street Approaches

Northbound: 8 MILE RD

Number of Lanes :2+

Total Approach Volume: 1,654

Southbound: None

Number of Lanes :2+

Total Approach Volume: 0

Warrant Summary (Urban Values Apply)

Warrant 1 - Eight Hour Vehicular Volumes.....Satisfied

Warrant 1A - Minimum Vehicular Volume.....Not Satisfied

Required volumes reached for 0 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic.....Satisfied

Required volumes reached for 9 hours, 8 are needed

Warrant 1C - Combination of Warrants.....Not Satisfied

Required 1A volumes reached for 1 hours, 8 are needed

Required 1B volumes reached for 12 hours, 8 are needed

Warrant 2 - Four Hour Volumes.....Satisfied

Number of hours (6) volumes exceed minimum >= minimum required (4).

Warrant 3 - Peak Hour.....Satisfied

Warrant 3A - Peak Hour Delay.....Satisfied

Number of one hour periods (5) volumes exceed minimum >= required (1). Delay data not evaluated.

Warrant 3B - Peak Hour Volumes.....Satisfied

Volumes exceed minimums for at least one hour period.

Warrant 4 - Pedestrian Volumes.....Not Evaluated

Warrant 5 - School Crossing.....Not Evaluated

Warrant 6 - Coordinated Signal System.....Not Evaluated

Warrant 7 - Crash Experience.....Not Evaluated

Warrant 8 - Roadway Network.....Not Evaluated

Warrant 9 - Intersection Near a Grade Crossing.....Not Evaluated

Eastern Corridor Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 1A - Minimum Volumes

Description

Intended for sites where the volume of intersecting traffic is the principal reason for consideration of a signal installation.

Summary

Only 0 one hour periods meet minimums.
Warrant is NOT met.

Site Data Required

Rural Settings Apply = **False**
Number of Major Lanes = **1**
Number of Minor Lanes = **Mixed**

Volume Requirements

Veh/Hr Major = **500**

Veh/Hr Minor = **200 150**

	Major Road				Minor Road						
	SR 32				8 MILE RD						
Time	Major EB	+	Major WB	=	Total		Minor NB		Minor SB		Met?
16:15 - 17:15	1022	+	787	=	1809		142		0		No
16:30 - 17:30	965	+	831	=	1796		158		0		No
16:45 - 17:45	958	+	814	=	1772		155		0		No
17:00 - 18:00	933	+	810	=	1743		154		0		No
16:00 - 17:00	956	+	723	=	1679		126		0		No
17:15 - 18:15	884	+	774	=	1658		138		0		No
15:45 - 16:45	916	+	729	=	1645		133		0		No
07:00 - 08:00	425	+	1160	=	1585		165		0		No
17:30 - 18:30	866	+	713	=	1579		135		0		No
15:30 - 16:30	893	+	681	=	1574		134		0		No
06:45 - 07:45	340	+	1194	=	1534		155		0		No
15:15 - 16:15	839	+	648	=	1487		141		0		No
17:45 - 18:45	802	+	672	=	1474		128		0		No
07:15 - 08:15	434	+	1016	=	1450		147		0		No
06:30 - 07:30	288	+	1158	=	1446		144		0		No
15:00 - 16:00	803	+	621	=	1424		133		0		No
14:45 - 15:45	768	+	622	=	1390		117		0		No
07:30 - 08:30	436	+	922	=	1358		134		0		No
14:30 - 15:30	694	+	630	=	1324		120		0		No
18:00 - 19:00	695	+	624	=	1319		120		0		No
06:15 - 07:15	244	+	1074	=	1318		118		0		No
14:15 - 15:15	625	+	640	=	1265		110		0		No
07:45 - 08:45	422	+	814	=	1236		119		0		No
14:00 - 15:00	564	+	635	=	1199		103		0		No
18:15 - 19:15	596		558		1154		100		0		No

Eastern Corridor Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 1B - Interruption of Continuous Traffic

Description

Intended for sites where the volume of the major street is so heavy that traffic on the minor street suffers excessive delay or hazard.

Summary

9 one hour periods meet minimums.
Warrant IS met.

Site Data Required

Rural Settings Apply = **False**
Number of Major Lanes = **1**
Number of Minor Lanes = **Mixed**

Volume Requirements

Veh/Hr Major = **750**

Veh/Hr Minor = **100 75**

Major Road SR 32						Minor Road 8 MILE RD		
Time	Major EB	+	Major WB	=	Total	Minor NB	Minor SB	Met?
17:00 - 18:00	933	+	810	=	1743	154	0	Yes
16:00 - 17:00	956	+	723	=	1679	126	0	Yes
07:15 - 08:15	434	+	1016	=	1450	147	0	Yes
15:00 - 16:00	803	+	621	=	1424	133	0	Yes
18:00 - 19:00	695	+	624	=	1319	120	0	Yes
06:15 - 07:15	244	+	1074	=	1318	118	0	Yes
14:00 - 15:00	564	+	635	=	1199	103	0	Yes
08:15 - 09:15	380	+	655	=	1035	104	0	Yes
11:00 - 12:00	426	+	554	=	980	104	0	Yes
13:45 - 14:45	502	+	585	=	1087	94	0	No
13:30 - 14:30	494	+	567	=	1061	81	0	No
06:00 - 07:00	191	+	861	=	1052	83	0	No
13:15 - 14:15	487	+	539	=	1026	82	0	No
13:00 - 14:00	473	+	539	=	1012	92	0	No
12:45 - 13:45	470	+	500	=	970	99	0	No
10:45 - 11:45	402	+	557	=	959	98	0	No
10:15 - 11:15	373	+	554	=	927	78	0	No
12:00 - 13:00	444	+	482	=	926	83	0	No
12:30 - 13:30	442	+	473	=	915	97	0	No
10:30 - 11:30	372	+	543	=	915	92	0	No
12:15 - 13:15	414	+	487	=	901	87	0	No
09:45 - 10:45	378	+	521	=	899	81	0	No
09:30 - 10:30	362	+	530	=	892	86	0	No
10:00 - 11:00	366	+	513	=	879	73	0	No
09:15 - 10:15	344		528		872	98	0	No

Eastern Corridor

Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 1C Combination of Warrants

Description

Intended for sites where the traffic volumes don't meet individual warrants but where Warrants 1A and 1B are both met to 80% of their stated values.

Summary

Only 1 hours meet 1A minimums.
12 hours meet 1B minimums.
Warrant is NOT met.

Site Data Required

Rural Settings Apply = **False**
Number of Major Lanes = **1**
Number of Minor Lanes = **Mixed**

Volume Requirements

Warrant 1A 1B
Veh/Hr Major = **400 600**
Veh/Hr Minor NB = **160 80**
Veh/Hr Minor SB = **120 60**

Major Road						Minor Road		
SR 32						8 MILE RD		
Time	Major EB	+	Major WB	=	Total	Minor NB	Minor SB	Met1A?
07:00 - 08:00	425	+	1160	=	1585	165	0	Yes
16:15 - 17:15	1022	+	787	=	1809	142	0	No
16:30 - 17:30	965	+	831	=	1796	158	0	No
16:45 - 17:45	958	+	814	=	1772	155	0	No
17:00 - 18:00	933	+	810	=	1743	154	0	No
16:00 - 17:00	956	+	723	=	1679	126	0	No
17:15 - 18:15	884	+	774	=	1658	138	0	No
15:45 - 16:45	916	+	729	=	1645	133	0	No
17:30 - 18:30	866	+	713	=	1579	135	0	No
15:30 - 16:30	893	+	681	=	1574	134	0	No
06:45 - 07:45	340	+	1194	=	1534	155	0	No
15:15 - 16:15	839	+	648	=	1487	141	0	No

Time	Major EB	+	Major WB	=	Total	Minor NB	Minor SB	Met1B?
16:30 - 17:30	965	+	831	=	1796	158	0	Yes
07:00 - 08:00	425	+	1160	=	1585	165	0	Yes
17:30 - 18:30	866	+	713	=	1579	135	0	Yes
15:30 - 16:30	893	+	681	=	1574	134	0	Yes
14:30 - 15:30	694	+	630	=	1324	120	0	Yes
08:00 - 09:00	386	+	704	=	1090	108	0	Yes
13:30 - 14:30	494	+	567	=	1061	81	0	Yes
06:00 - 07:00	191	+	861	=	1052	83	0	Yes
11:30 - 12:30	451	+	551	=	1002	92	0	Yes
09:00 - 10:00	331	+	587	=	918	106	0	Yes
12:30 - 13:30	442	+	473	=	915	97	0	Yes
10:30 - 11:30	372	+	543	=	915	92	0	Yes

Eastern Corridor

Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 2 - Four Hour Volumes

Description

Intended for sites where the volume of intersecting traffic during any four hours of the day is the principal reason for consideration of a signal installation.

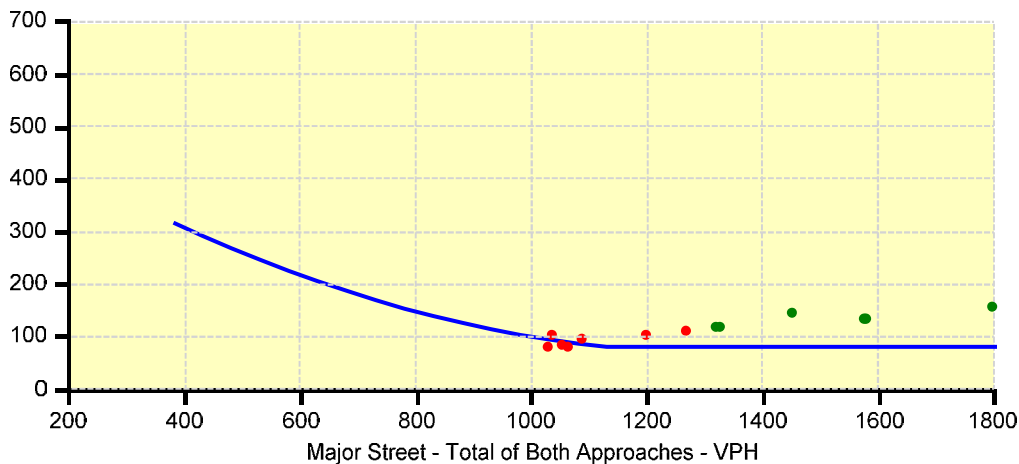
Summary

6 one hour periods meet minimums.
Warrant IS met.

Site Data Required

Rural Settings Apply = **False**
Number of Major Lanes = **1**
Number of Minor Lanes = **Mixed**

Major Road SR 32						Minor Road 8 MILE RD		Met?
Time	Major EB	+	Major WB	=	Total	Minor NB	Minor SB	
16:30 - 17:30	965	+	831	=	1796	158	0	Yes
17:30 - 18:30	866	+	713	=	1579	135	0	Yes
15:30 - 16:30	893	+	681	=	1574	134	0	Yes
07:15 - 08:15	434	+	1016	=	1450	147	0	Yes
14:30 - 15:30	694	+	630	=	1324	120	0	Yes
06:15 - 07:15	244	+	1074	=	1318	118	0	Yes
14:15 - 15:15	625	+	640	=	1265	110	0	No
14:00 - 15:00	564	+	635	=	1199	103	0	No
13:45 - 14:45	502	+	585	=	1087	94	0	No
13:30 - 14:30	494	+	567	=	1061	81	0	No
06:00 - 07:00	191	+	861	=	1052	83	0	No



Eastern Corridor

Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 3A - Peak Hour Delay

Description

Intended for sites where for one hour of the day minor street traffic suffers undue traffic delay entering or crossing the major street.

Summary

55 one hour periods meet minimums.
Warrant IS met.

Site Data Required

Number of Minor Lanes = **2 or more**

Volume and Delay Requirements

Veh/Hr All Approaches = **800**

Veh/Hr Minor = **150**

Total Delay (Veh-Hrs) = **5**

Major Road SR 32						Minor Road 8 MILE RD			
Time	Total of All Approaches	Met?	Minor NB	Delay NB	Met?	Minor SB	Delay SB	Met?	Warrant Met?
16:30 - 17:30	1954	Yes	158	-	Yes	0	-	---	Yes
16:45 - 17:45	1927	Yes	155	-	Yes	0	-	---	Yes
17:00 - 18:00	1897	Yes	154	-	Yes	0	-	---	Yes
07:00 - 08:00	1750	Yes	165	-	Yes	0	-	---	Yes
06:45 - 07:45	1689	Yes	155	-	Yes	0	-	---	Yes
16:15 - 17:15	1951	Yes	142	-	No	0	-	---	No
16:00 - 17:00	1805	Yes	126	-	No	0	-	---	No
17:15 - 18:15	1796	Yes	138	-	No	0	-	---	No
15:45 - 16:45	1778	Yes	133	-	No	0	-	---	No
17:30 - 18:30	1714	Yes	135	-	No	0	-	---	No
15:30 - 16:30	1708	Yes	134	-	No	0	-	---	No
15:15 - 16:15	1628	Yes	141	-	No	0	-	---	No
17:45 - 18:45	1602	Yes	128	-	No	0	-	---	No
07:15 - 08:15	1597	Yes	147	-	No	0	-	---	No
06:30 - 07:30	1590	Yes	144	-	No	0	-	---	No
15:00 - 16:00	1557	Yes	133	-	No	0	-	---	No
14:45 - 15:45	1507	Yes	117	-	No	0	-	---	No
07:30 - 08:30	1492	Yes	134	-	No	0	-	---	No
14:30 - 15:30	1444	Yes	120	-	No	0	-	---	No
18:00 - 19:00	1439	Yes	120	-	No	0	-	---	No
06:15 - 07:15	1436	Yes	118	-	No	0	-	---	No
14:15 - 15:15	1375	Yes	110	-	No	0	-	---	No
07:45 - 08:45	1355	Yes	119	-	No	0	-	---	No
14:00 - 15:00	1302	Yes	103	-	No	0	-	---	No
18:15 - 19:15	1254	Yes	100	-	No	0	-	---	No

Eastern Corridor

Traffic Signal Warrants

Study Name: 2b-03-US32@8-Mile

Study Date : 1/24/2018

Warrant 3B - Peak Hour Volumes

Description

Intended for sites where the volume of intersecting traffic during one hour of the day is the principal reason for consideration of a signal installation.

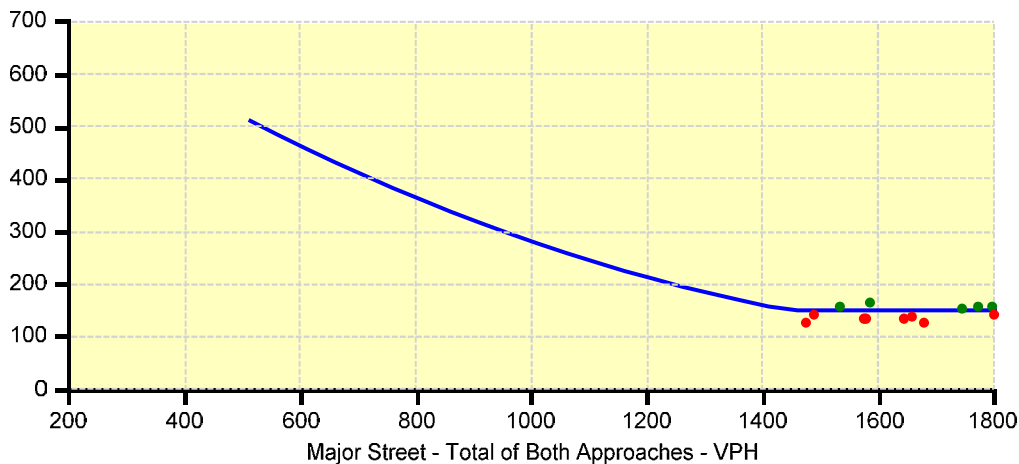
Summary

5 one hour periods meet minimums.
Warrant IS met.

Site Data Required

Rural Settings Apply = **False**
Number of Major Lanes = **1**
Number of Minor Lanes = **Mixed**

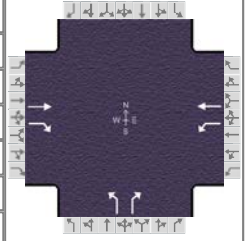
Major Road SR 32						Minor Road 8 MILE RD		Met?
Time	Major EB	+	Major WB	=	Total	Minor NB	Minor SB	
16:30 - 17:30	965	+	831	=	1796	158	0	Yes
16:45 - 17:45	958	+	814	=	1772	155	0	Yes
17:00 - 18:00	933	+	810	=	1743	154	0	Yes
07:00 - 08:00	425	+	1160	=	1585	165	0	Yes
06:45 - 07:45	340	+	1194	=	1534	155	0	Yes
16:15 - 17:15	1022	+	787	=	1809	142	0	No
16:00 - 17:00	956	+	723	=	1679	126	0	No
17:15 - 18:15	884	+	774	=	1658	138	0	No
15:45 - 16:45	916	+	729	=	1645	133	0	No
17:30 - 18:30	866	+	713	=	1579	135	0	No
15:30 - 16:30	893	+	681	=	1574	134	0	No



HCS7 Signalized Intersection Results Summary

General Information

Agency				Intersection Information		
Analyst	MJH	Analysis Date	Jan 24, 2018	Duration, h	0.25	
Jurisdiction	Cincinnati	Time Period		Area Type	Other	
Urban Street	SR 32	Analysis Year	2016	PHF	0.90	
Intersection	SR 32 @ 8 Mile Rd	File Name	4S-PM.xus	Analysis Period	1> 7:00	
Project Description	PM Peak Hour - Signalized					



Demand Information

	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		850	130	330	510		40		250			

Signal Information

Cycle, s	93.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	13.1	49.4	12.5	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
				Red	2.0	2.0	2.0	0.0	0.0	0.0		

Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		8		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		55.4	19.1	74.5		18.5		
Change Period, ($Y+R_c$), s		6.0	6.0	6.0		6.0		
Max Allow Headway (MAH), s		3.1	3.1	3.1		3.3		
Queue Clearance Time (g_s), s		46.5	15.1	12.6		14.5		
Green Extension Time (g_e), s		1.5	0.0	4.1		0.0		
Phase Call Probability		1.00	1.00	1.00		1.00		
Max Out Probability		1.00	1.00	0.00		1.00		

Movement Group Results

Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement		6	16	5	2		3		18				
Adjusted Flow Rate (v), veh/h		944	144	367	567		44		278				
Adjusted Saturation Flow Rate (s), veh/h/ln		1870	1610	1810	1870		1739		1610				
Queue Service Time (g_s), s		44.5	4.3	13.1	10.6		2.1		12.5				
Cycle Queue Clearance Time (g_c), s		44.5	4.3	13.1	10.6		2.1		12.5				
Green Ratio (g/C)		0.53	0.53	0.69	0.74		0.13		0.28				
Capacity (c), veh/h		994	855	364	1378		234		443				
Volume-to-Capacity Ratio (X)		0.951	0.169	1.007	0.411		0.190		0.627				
Back of Queue (Q), ft/ln (95 th percentile)		756.7	64.8	472.1	139.5		41.5		233.6				
Back of Queue (Q), veh/ln (95 th percentile)		29.8	2.6	18.9	5.5		1.6		9.3				
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00				
Uniform Delay (d_1), s/veh		20.6	11.2	29.2	4.6		35.8		29.5				
Incremental Delay (d_2), s/veh		17.7	0.0	48.9	0.1		0.1		2.1				
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0				
Control Delay (d), s/veh		38.3	11.3	78.1	4.7		35.9		31.6				
Level of Service (LOS)		D	B	F	A		D		C				
Approach Delay, s/veh / LOS	34.7	C		33.5		C		32.2		C		0.0	
Intersection Delay, s/veh / LOS	33.9						C						

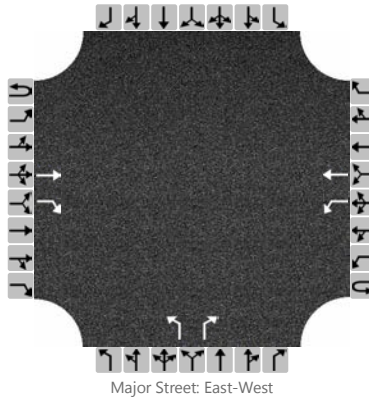
Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.3		B	0.6		A	2.3		B	2.3		B
Bicycle LOS Score / LOS	2.3		B	2.0		B			F			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	MJH	Intersection	SR 32 @ 8 Mile Rd
Agency/Co.		Jurisdiction	Union Township
Date Performed	4/26/2016	East/West Street	SR 32
Analysis Year	Existing	North/South Street	8 Mile Road
Time Analyzed	PM PEAK HOUR	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Intersection 3		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			850	130		330	510			40		250				
Percent Heavy Vehicles						2				2		2				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Undivided															
Median Storage																

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						367				44		278				
Capacity						649				54		318				
v/c Ratio						0.57				0.81		0.87				
95% Queue Length						3.5				3.5		8.0				
Control Delay (s/veh)						17.5				189.5		60.5				
Level of Service (LOS)						C				F		F				
Approach Delay (s/veh)					6.9				78.2							
Approach LOS									F							

ATTACHMENT C
HAM-32-6.82 Stage 1 Plans

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

H A M - 3 2 - 6 . 8 2

ANDERSON TOWNSHIP
HAMILTON COUNTY

INDEX OF SHEETS:

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SCHEMATIC	2
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CROSS SECTIONS S.R. 32	15-25
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DRIVE DETAILS S.R. 32	36
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TRAFFIC CONTROL PLANS S.R. 32	38-4
TRAFFIC CONTROL PLANS EIGHT MILE ROAD	41-42

PROJECT DESCRIPTION

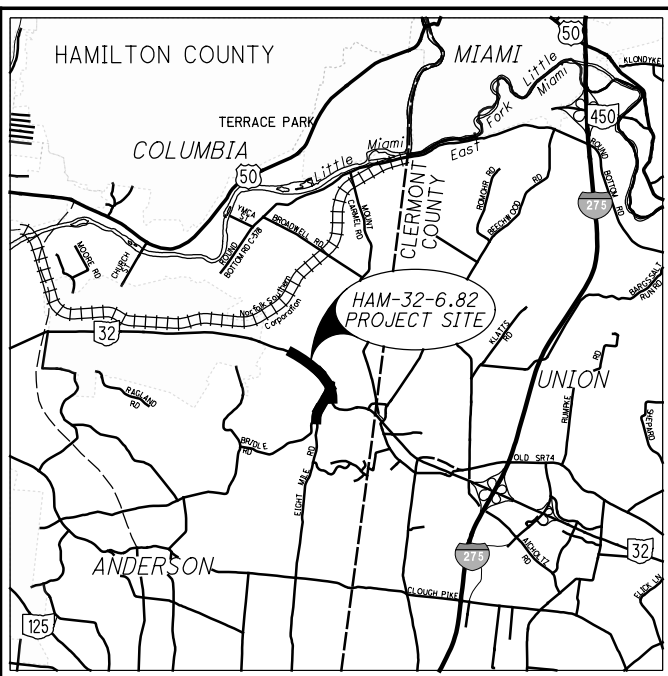
IMPROVE THE SR 32 AND EIGHT MILE ROAD INTERSECTION
BY INSTALLING A SIGNALIZED GREEN TEE INTERSECTION
AND IMPROVING THE PROFILE GRADE ON EIGHT MILE
ROAD.

EARTH DISTURBED AREAS

PROJECT EARTH DISTURBED AREA: 6.98 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: .25 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA: 7.23 ACRES

2019 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.



LOCATION MAP

LATITUDE: 39°07'07" LONGITUDE: -84°19'03"



PORTION TO BE IMPROVED	
INTERSTATE HIGHWAY	
FEDERAL ROUTES	
STATE ROUTES	
COUNTY & TOWNSHIP ROADS	
OTHER ROADS	

DESIGN DESIGNATION

<i>DESIGN DESIGNATION</i>	<u><i>S.R. 32</i></u>	<u><i>8 MILE ROAD</i></u>
<i>CURRENT ADT (2022)</i>	<i>39200</i>	<i>7300</i>
<i>DESIGN YEAR ADT (2042)</i>	<i>44800</i>	<i>8400</i>
<i>DESIGN HOURLY VOLUME (2042)</i>	<i>4032</i>	<i>840</i>
<i>DIRECTIONAL DISTRIBUTION</i>	<i>0.60</i>	<i>0.60</i>
<i>TRUCKS (24 HOUR B&C)</i>	<i>0.05</i>	<i>0.02</i>
<i>DESIGN SPEED</i>	<i>60</i>	<i>35</i>
<i>LEGAL SPEED</i>	<i>55</i>	<i>40</i>

DESIGN FUNCTIONAL CLASSIFICATION

NHS PROJECT _____ YES

DESIGN EXCEPTIONS

APPROVAL DATE SHEET NO

SHOULDER WIDT

UNDERGROUND UTILITIES
Contact Two Working Days Before You Dig
 OHIO811.org Before You Dig
OHIO811, 8-1-1, or 1-800-362-2764 (Non-members must be called directly)

ENGINEERS SEAL

SIGNED: _____
DATE: _____

[illegible]

STAGE 1 PLANS
NOT FOR CONSTRUCTION

I HEREBY DECLARE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE TRAFFIC REROUTED FOR SIDE ROAD CLOSURE AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED _____
DATE _____ DISTRICT DEPUTY DIRECTOR

APPROVED _____
DATE _____ DIRECTOR, DEPARTMENT OF
TRANSPORTATION

TITLE SHEET

DESIGN AGENCY



Stantec
11687 Lebanon Road
Cincinnati OH 45241
(513) 842-8200

DESIGNER

XXX

REVIEWED

REVIEWER
 XXX MM DD

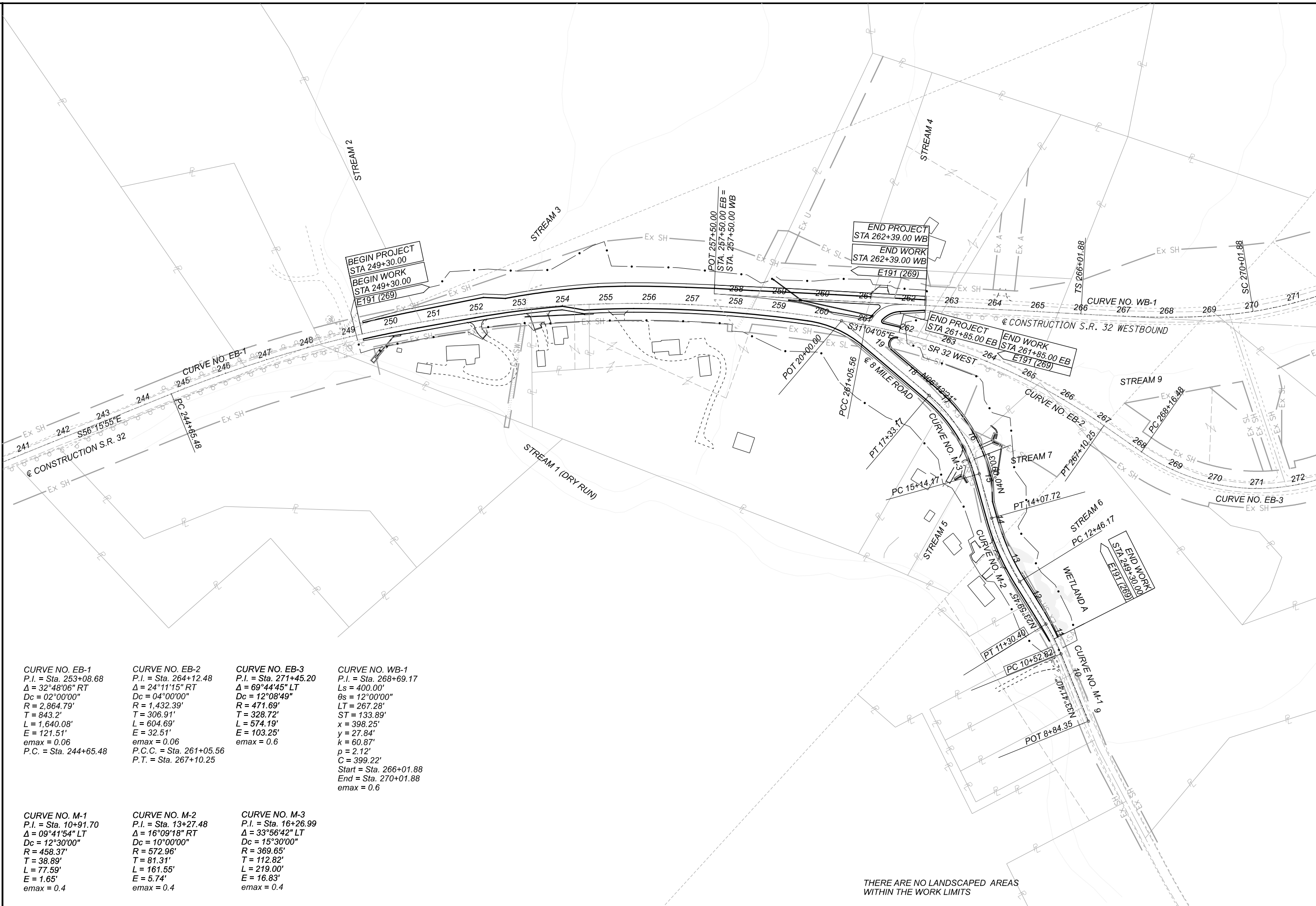
XXX MM-DD-

PROJECT ID

110991

SHEET	TOTAL
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P.1	0
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CURVE NO. EB-1
P.I. = Sta. 253+08.68
 $\Delta = 32^\circ 48' 06''$ RT
Dc = 02°00'00"
R = 2,864.79'
T = 843.2'
L = 1,640.08'
E = 121.51'
emax = 0.06
P.C. = Sta. 244+65.48

CURVE NO. EB-2
P.I. = Sta. 264+12.48
 $\Delta = 24^\circ 11' 15''$ RT
Dc = 04°00'00"
R = 1,432.39'
T = 306.91'
L = 604.69'
E = 32.51'
emax = 0.06
P.C.C. = Sta. 261+05.56
P.T. = Sta. 267+10.25

CURVE NO. EB-3
P.I. = Sta. 271+45.20
 $\Delta = 69^\circ 44' 45''$ LT
Dc = 12°08'49"
R = 471.69'
T = 328.72'
L = 574.19'
E = 103.25'
emax = 0.6

CURVE NO. WB-1
P.I. = Sta. 268+69.17
Ls = 400.00'
 $\theta_s = 12^\circ 00' 00''$
LT = 267.28'
ST = 133.89'
x = 398.25'
y = 27.84'
k = 60.87'
p = 2.12'
C = 399.22'
Start = Sta. 266+01.88
End = Sta. 270+01.88
emax = 0.6

CURVE NO. M-1
P.I. = Sta. 10+91.70
 $\Delta = 09^\circ 41' 54''$ LT
Dc = 12°30'00"
R = 458.37'
T = 38.89'
L = 77.59'
E = 1.65'
emax = 0.4

CURVE NO. M-2
P.I. = Sta. 13+27.48
 $\Delta = 16^\circ 09' 18''$ RT
Dc = 10°00'00"
R = 572.96'
T = 81.31'
L = 161.55'
E = 5.74'
emax = 0.4

CURVE NO. M-3
P.I. = Sta. 16+26.99
 $\Delta = 33^\circ 56' 42''$ LT
Dc = 15°30'00"
R = 369.65'
T = 112.82'
L = 219.00'
E = 16.83'
emax = 0.4

THERE ARE NO LANDSCAPED AREAS
WITHIN THE WORK LIMITS



HORIZONTAL
SCALE IN FEET
0 50 100 200

SCHEMATIC

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER

XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

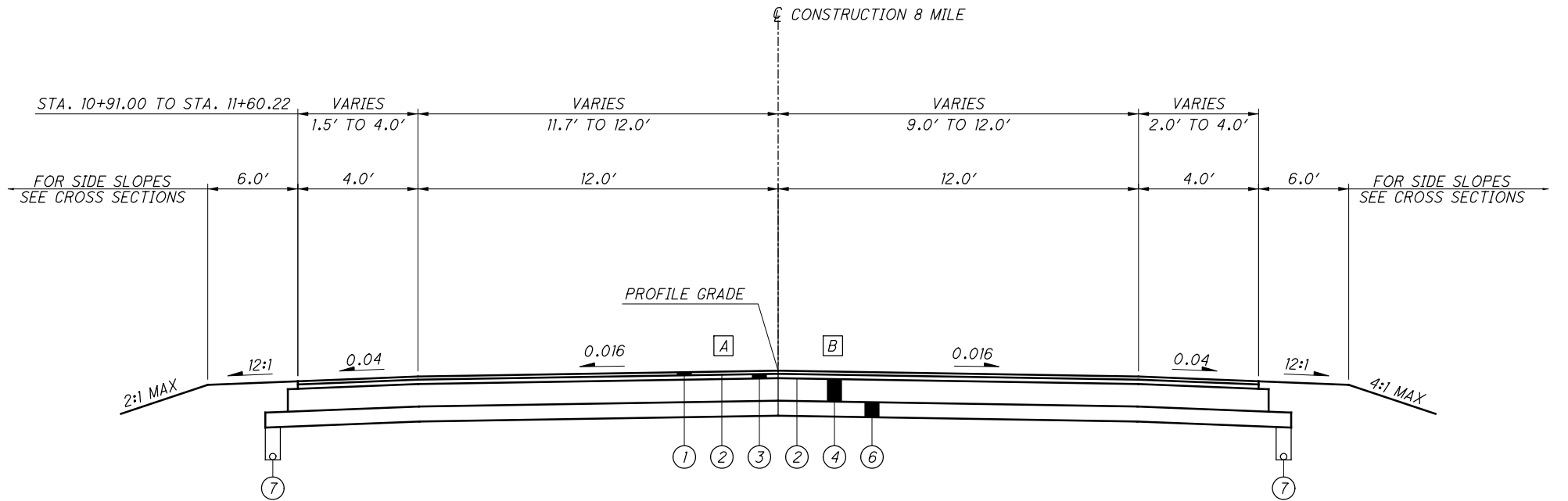
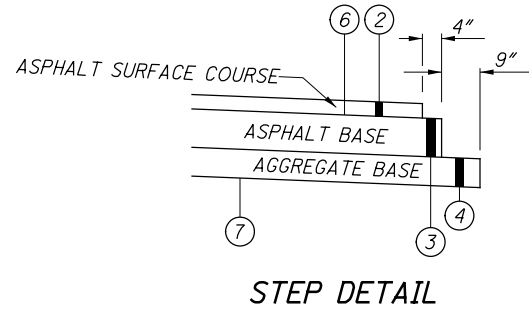
110991

SHEET TOTAL

P.2 0

LEGEND

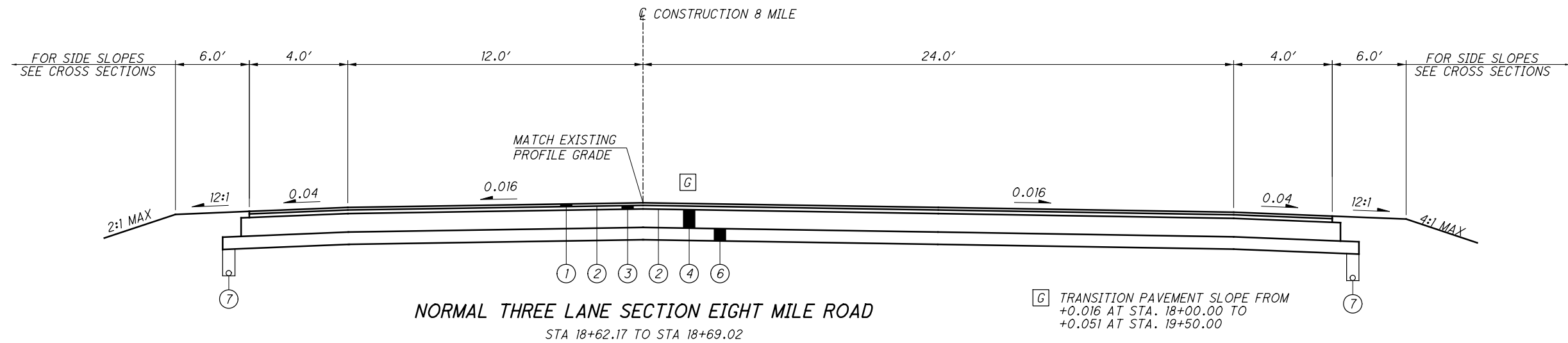
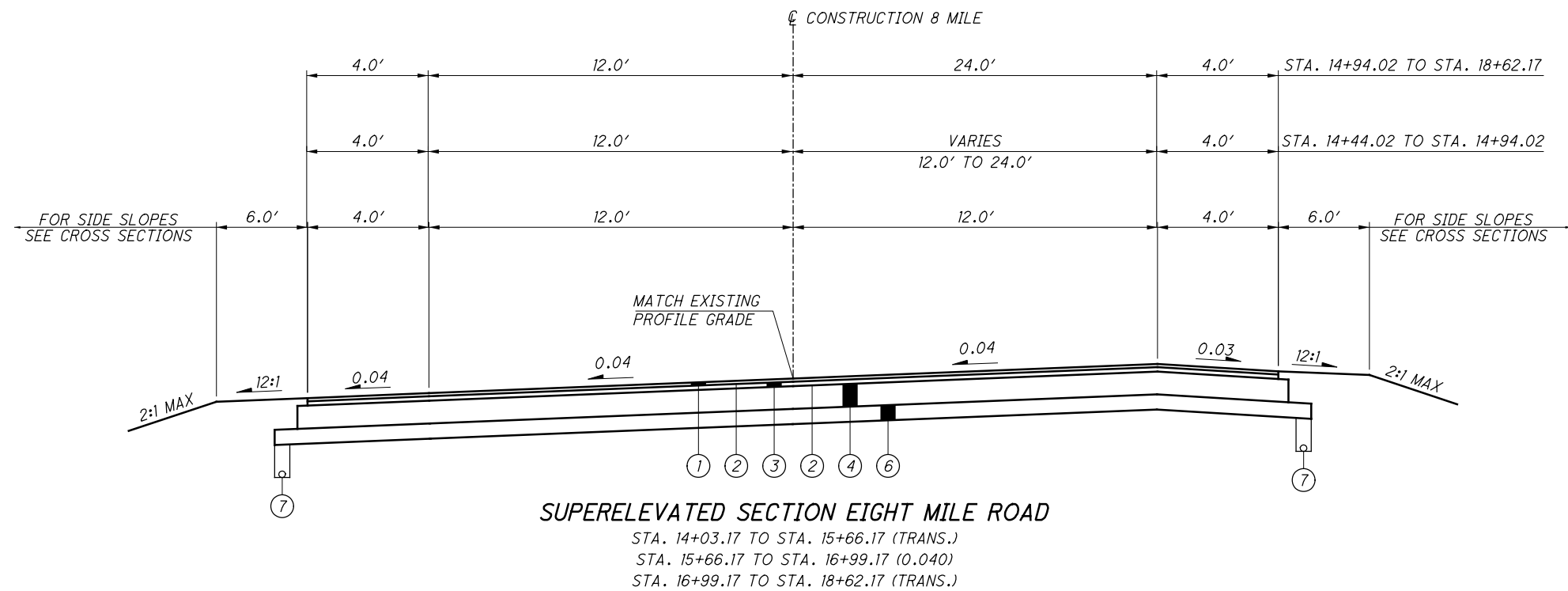
- ① ITEM 441, 1¼" ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), PG64-22
- ② ITEM 407, TACK COAT
- ③ ITEM 441, 1¾" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (448)
- ④ ITEM 301, 9" ASPHALT CONCRETE BASE, PG64-22
- ⑤ ITEM 301, 11" ASPHALT CONCRETE BASE, PG64-22
- ⑥ ITEM 304, 6" AGGREGATE BASE
- ⑦ ITEM 605, 6" SHALLOW PIPE UNDERDRAIN
- ⑧ ITEM 609, CURB, TYPE 3
- ⑨ ITEM 609, 4" CONCRETE TRAFFIC ISLAND
- ⑩ ITEM 609, CURB, TYPE 4-C



NORMAL TWO LANE SECTION EIGHT MILE ROAD

STA 10+91.00 TO STA 10+98.53 (TRANS.)
STA 10+98.53 TO STA 14+03.17 (0.016)

- A TRANSITION PAVEMENT SLOPE FROM
-0.0144 AT STA. 10+91.00 TO
-0.0160 AT STA. 10+94.09
- B TRANSITION PAVEMENT SLOPE FROM
-0.0121 AT STA. 10+91.00 TO
-0.0160 AT STA. 10+98.53



FOR LEGEND SEE SHEET NO. 3

EIGHT MILE TYPICAL SECTIONS

DESIGN AGENCY

11687 Lebanon Road
Cincinnati OH 45241
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XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

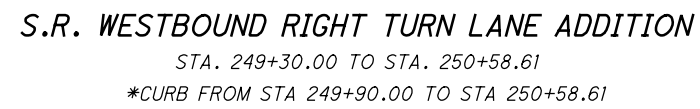
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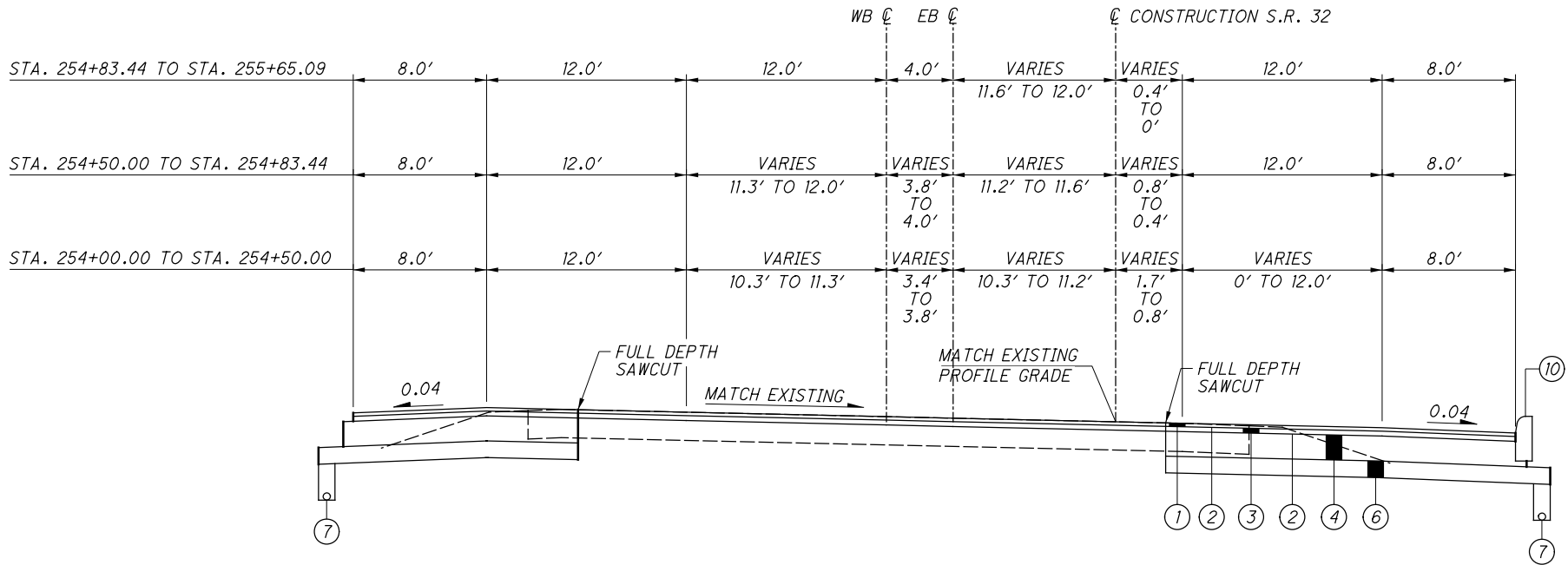
SHEET

P.4

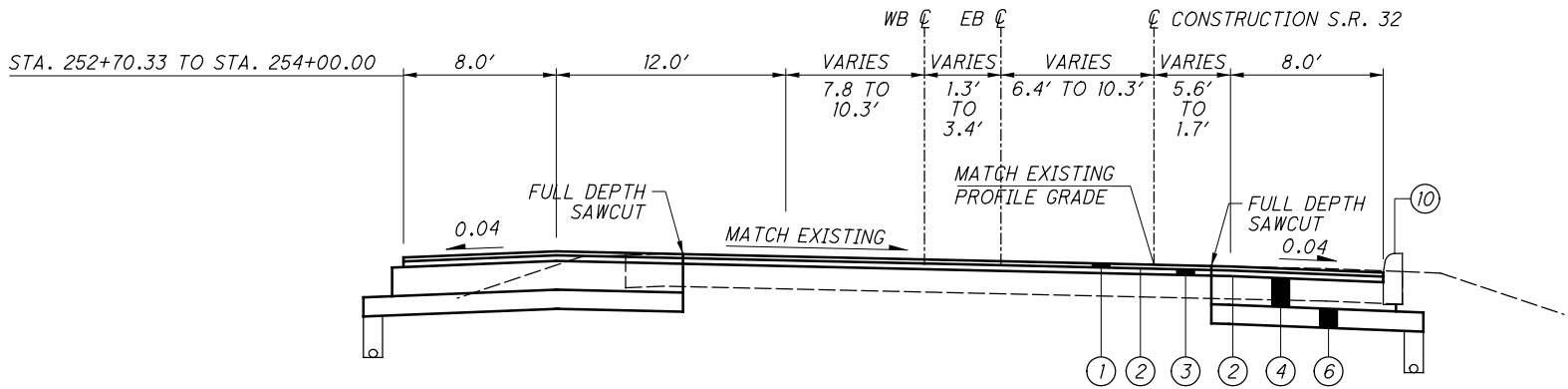
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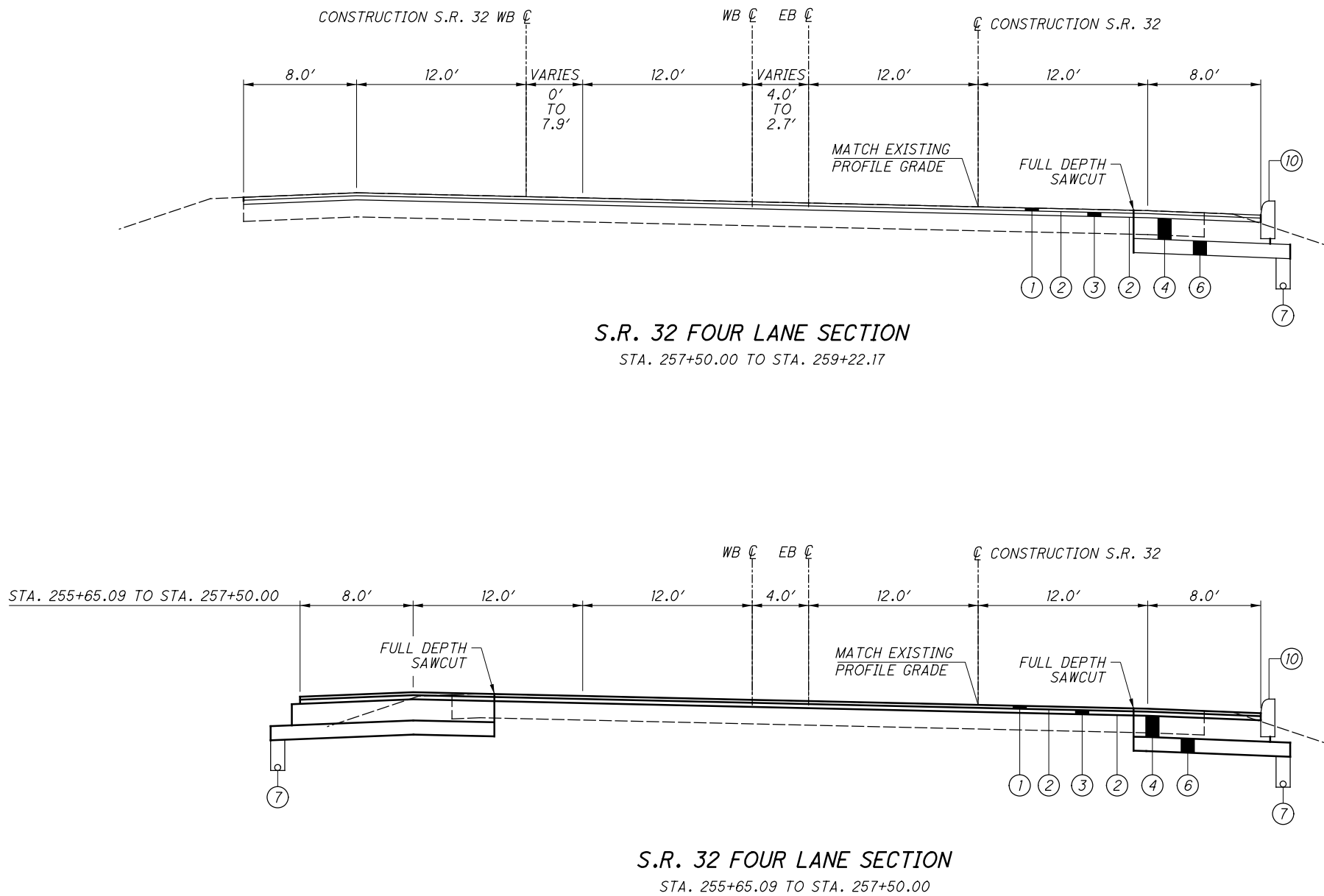


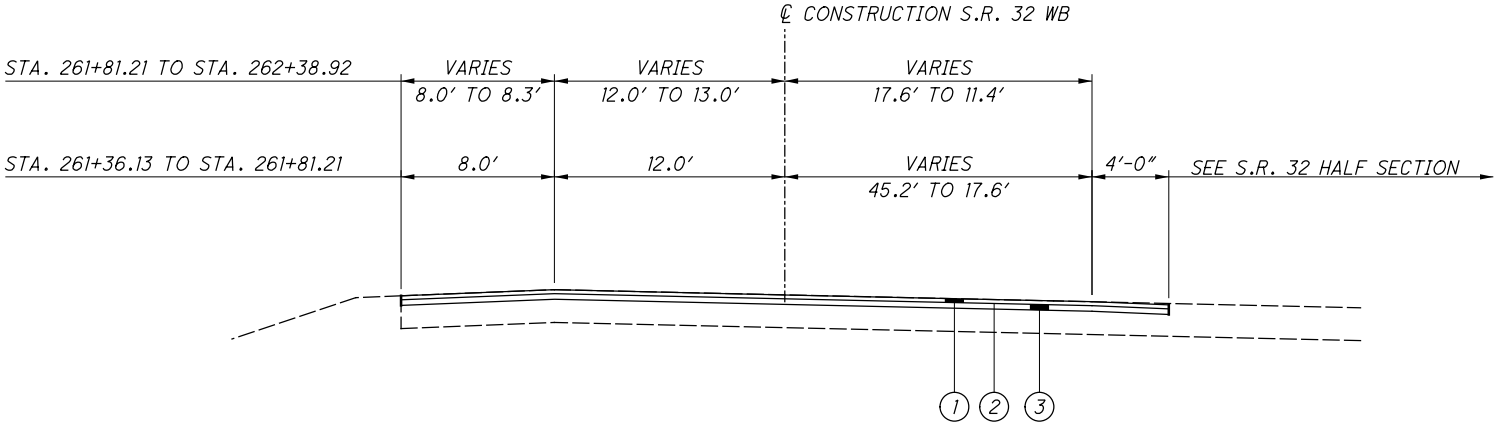


S.R. 32 FOUR LANE SALVAGE SECTION
STA. 254+00.00 TO STA. 255+65.09

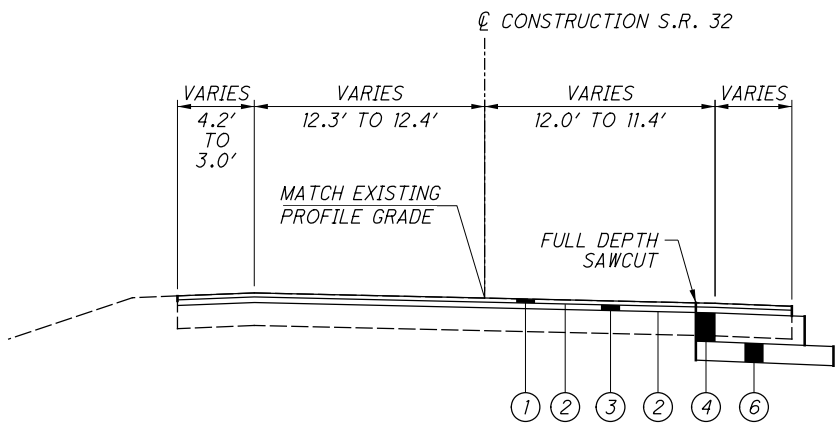


S.R. 32 SALVAGE SECTION
STA. 252+70.33 TO STA. 254+00.00



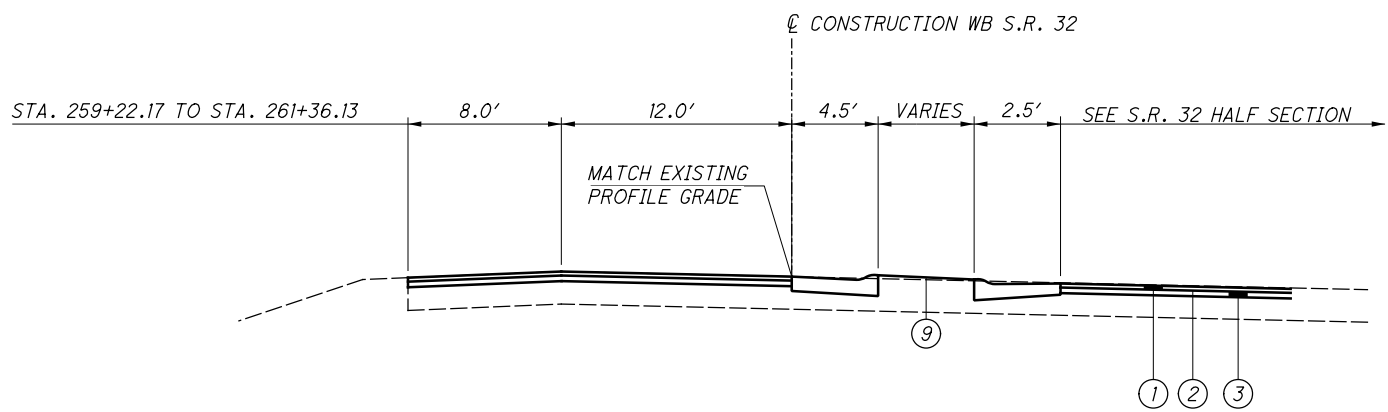


S.R. 32 WESTBOUND HALF SECTION



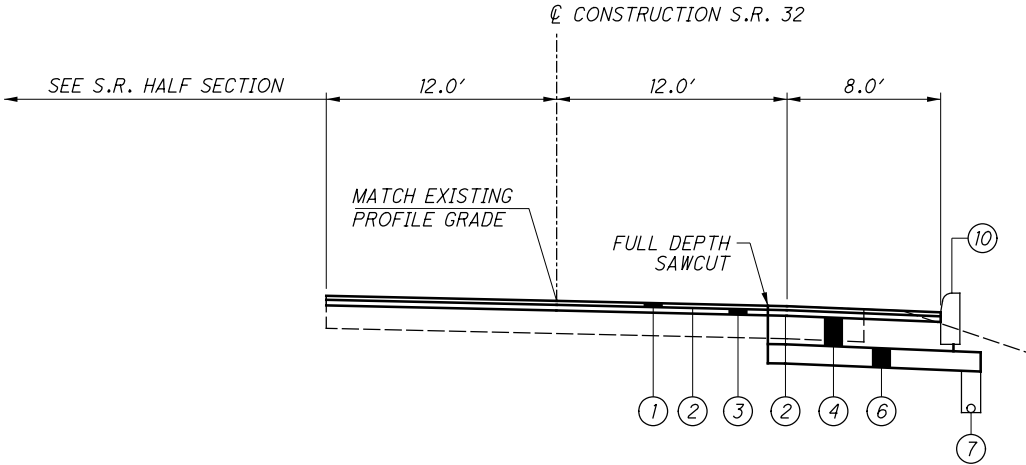
SR 32 EASTBOUND HALF SECTION

STA. 261+06.46 TO STA. 261+85.10



S.R. 32 WESTBOUND HALF SECTION

STA. 259+22.17 TO STA. 261+36.13



SR 32 EASTBOUND HALF SECTION

STA. 259+22.17 TO STA. 261+06.46

*CURB FROM STA 259+22.17 TO STA 260+00.00

FOR LEGEND SEE SHEET NO. 3

UTILITIES

THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS OF THE UTILITY AS REQUIRED BY SECTION 153.64 OF THE OHIO REVISED CODE.

LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

TELEPHONE:
CINCINNATI BELL TELEPHONE
221 EAST FOURTH ST, BLDG 121-900
CINCINNATI, OH 45201
PHONE: (513) 565-1336
(BEN OTTEN)

ELECTRIC:
DUKE ENERGY
139 EAST FOURTH ST, ROOM 467A
CINCINNATI, OH 45202
PHONE: (513) 287-3852
(CRAIG HUTCHISON)

ELECTRIC TRANSMISSION:
DUKE ENERGY
139 EAST FOURTH ST, ROOM 552A
CINCINNATI, OH 45202
PHONE: (513) 287-1266
(TIM MEYER)

GAS:
DUKE ENERGY
139 E FOURTH ST, ROOM 460A
CINCINNATI, OH 45273-9598
PHONE: (513) 287-2730
(RALPH PFISTER)

WATER
GREATER CINCINNATI WATER WORKS
1600 GEST STREET
CINCINNATI, OH 45204
PHONE: (513) 5577-5799
(MARTHA SHELBY)

MAINTENANCE:
ANDERSON TOWNSHIP MAINTENANCE
7850 FIVE MILE ROAD
ANDERSON TOWNSHIP, OH 45230
PHONE: (513) 688-8400

CABLE:
CHARTER COMMUNICATIONS
11252 CORNELL PARK DRIVE
CINCINNATI, OH 45242
PHONE: (513) 386-5499
(KENT RIEGER)

RELOCATION OF UTILITIES

ALL UTILITIES WHICH ARE SHOWN OR LOCATED DURING THE COURSE OF CONSTRUCTION THAT ARE FOUND TO BE IN CONFLICT WITH THESE PLANS ARE TO BE RELOCATED OR ADJUSTED BY THE OWNER OF THE UTILITY.

GENERAL NOTES

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-8200

DESIGNER

XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

10991

SHEET

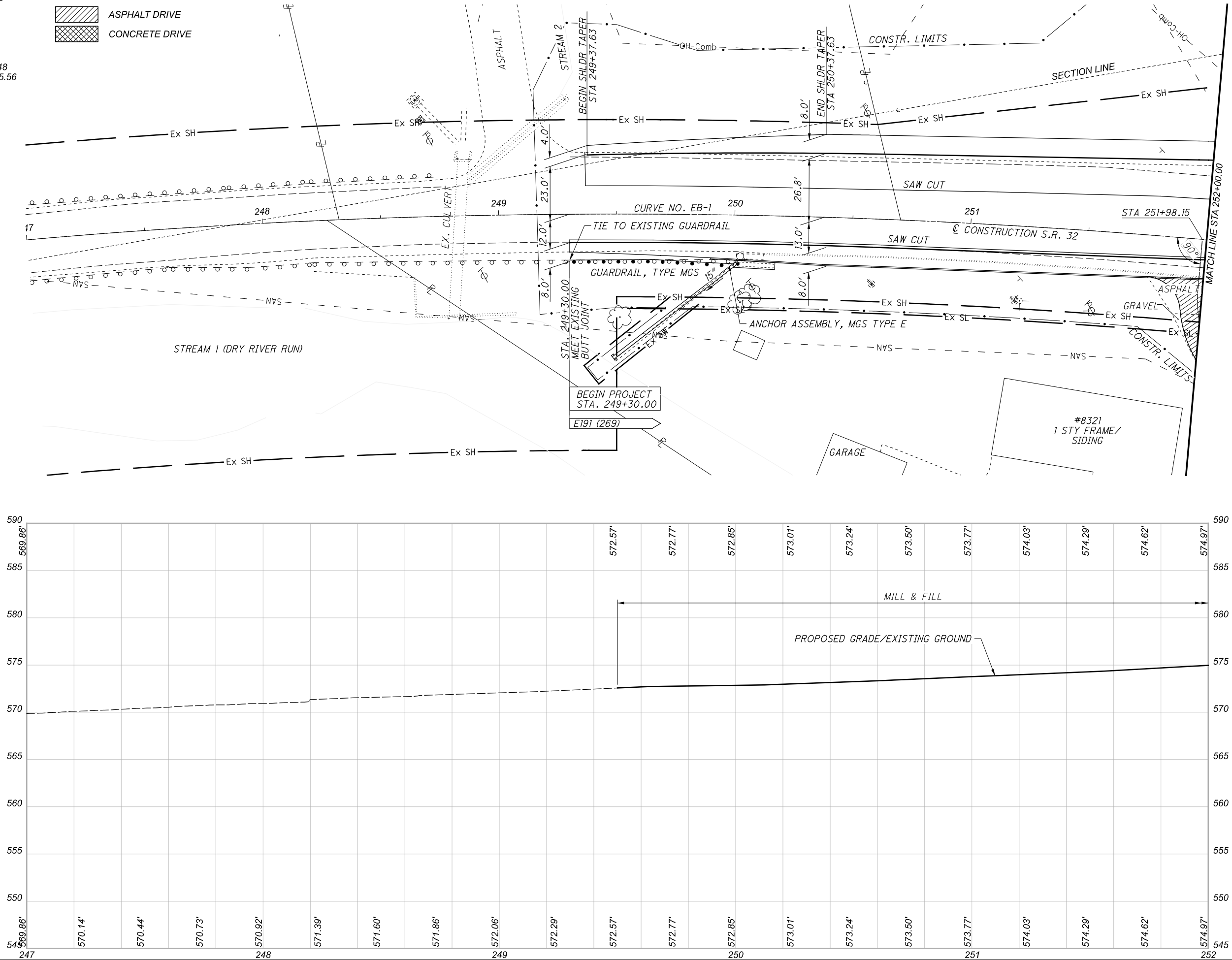
P.9

TOTAL

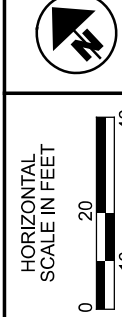
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CURVE NO. EB-1
P.I. = STA 253+08.68
 $\Delta = 32^\circ 48' 06''$
 $D_c = 02^\circ 00' 00''$
 $R = 2864.79'$
 $T = 843.20'$
 $L = 1640.08'$
 $E = 121.51'$
P.C. = Sta. 244+65.48
P.C.C. = Sta. 261+05.56

LEGEND
[Hatched Box] ASPHALT DRIVE
[Cross-hatched Box] CONCRETE DRIVE



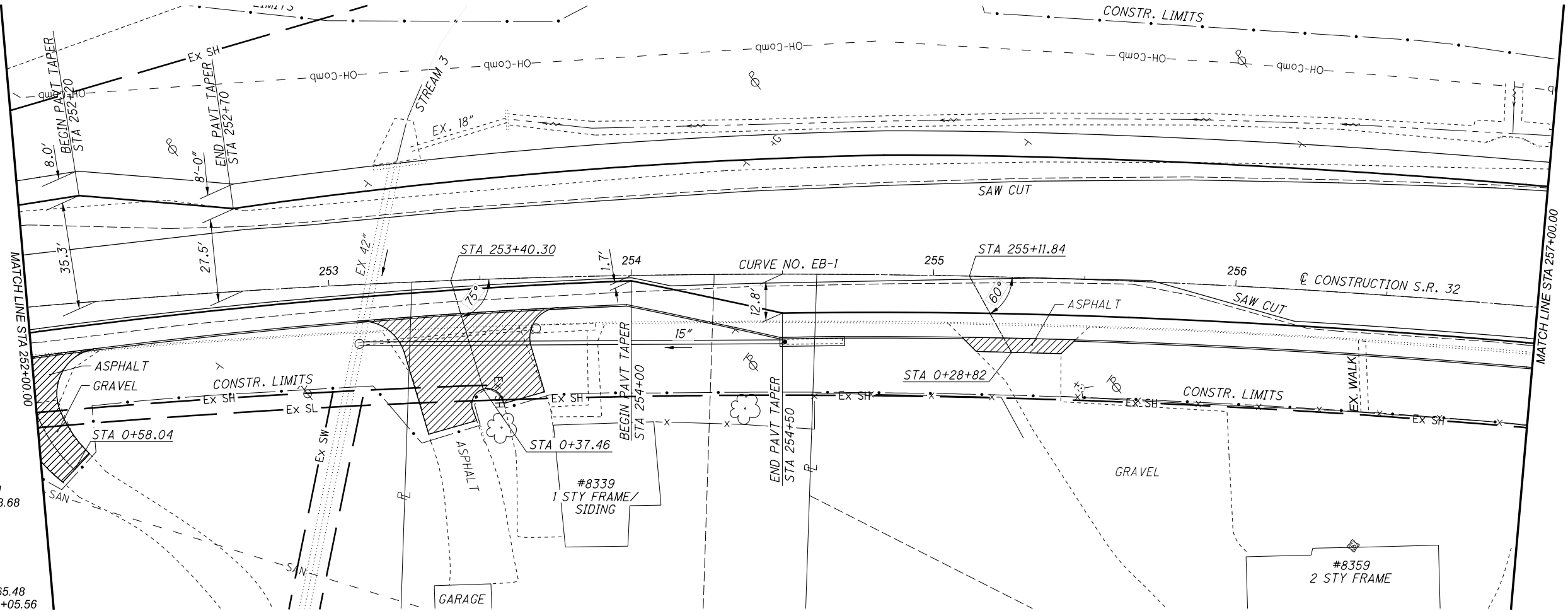
PLAN AND PROFILE S.R. 32
STA 247+00.00 TO STA 252+00.00



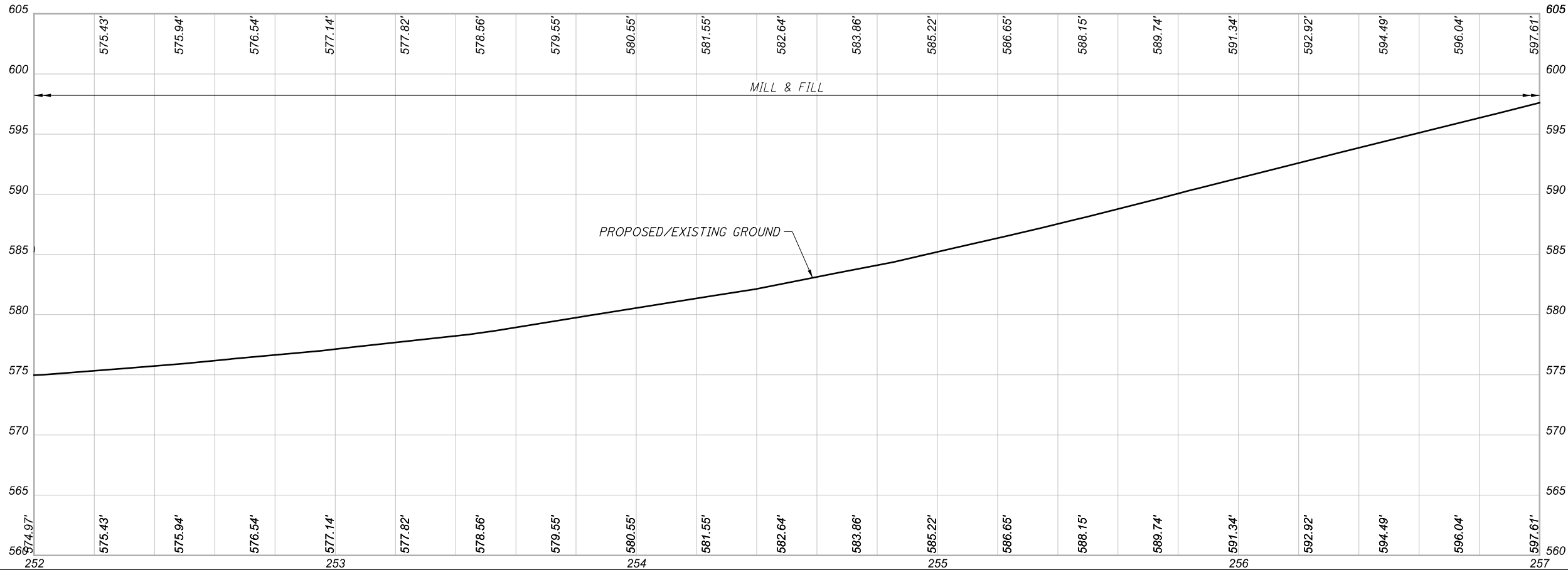
DESIGN AGENCY
Stantec
11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER
XXX
REVIEWER
XXX MM-DD-YY
PROJECT ID
110991
SHEET TOTAL
P.10 0

CURVE NO. EB-1
P.I. = STA 253+08.68
 $\Delta = 32^{\circ}48'06''$
 $D_c = 02^{\circ}00'00''$
 $R = 2864.79'$
 $T = 843.20'$
 $L = 1640.08'$
 $E = 121.51'$
P.C. = STA 244+65.48
P.C.C. = STA 261+05.56



FOR LEGEND, SEE SHEET NO. 10



HORIZONTAL
SCALE IN FEET



PLAN AND PROFILE S.R. 32
STA 252+00.00 TO STA 257+00.00

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER

XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

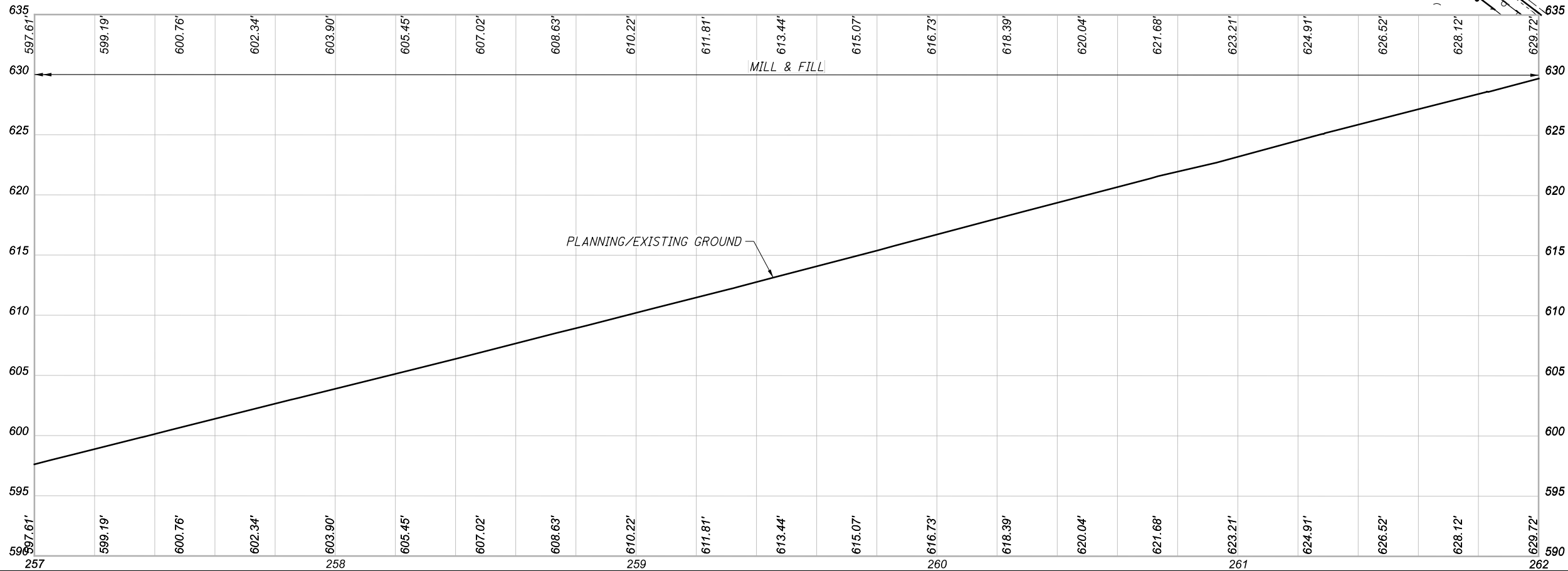
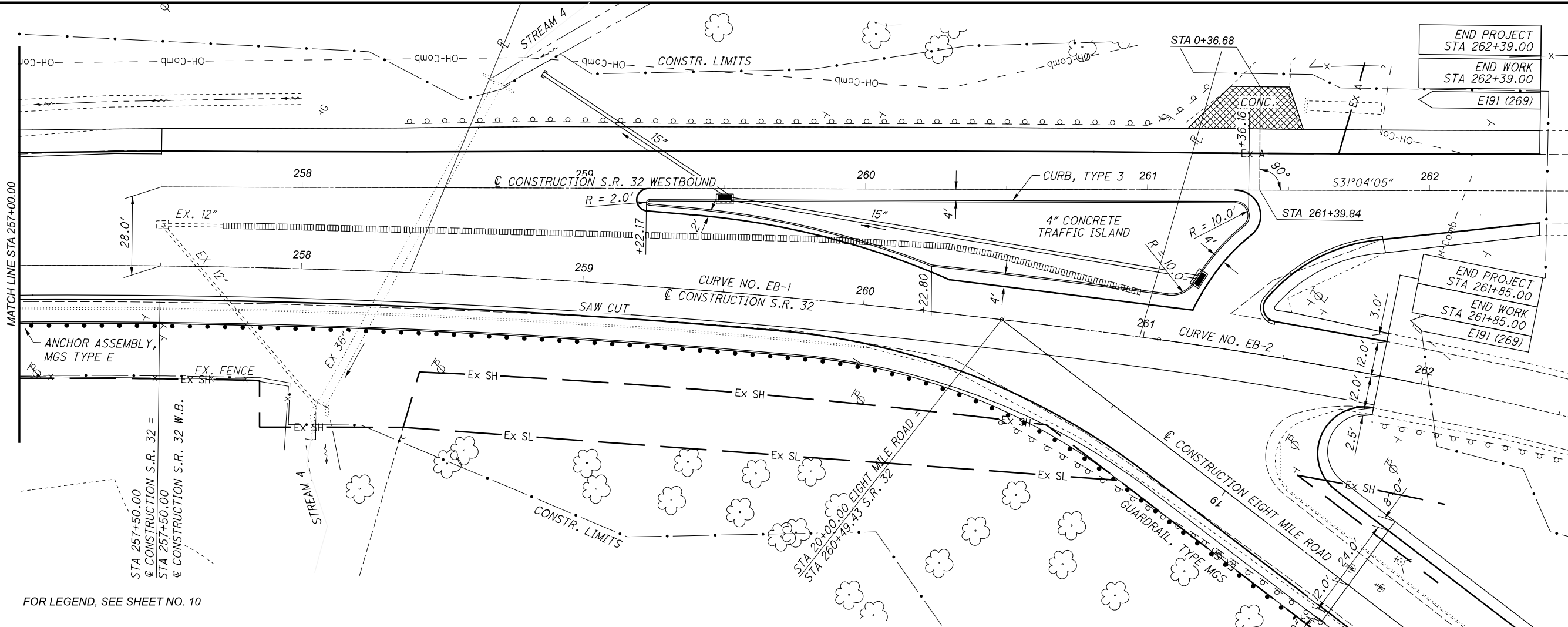
110991

SHEET TOTAL

P.11 0

CURVE NO. EB-1
P.I. = STA 253+08.68
 $\Delta = 32^\circ 48' 06''$
 $D_c = 02^\circ 00' 00''$
 $R = 2864.79'$
 $T = 843.20'$
 $L = 1640.08'$
 $E = 121.51'$
P.C. = STA 244+65.48
P.C.C. = STA 261+05.56

CURVE NO. EB-2
P.I. = STA 264+12.48
 $\Delta = 24^\circ 11' 15''$
 $D_c = 04^\circ 00' 00''$
 $R = 1432.39'$
 $T = 306.92'$
 $L = 604.69'$
 $E = 32.51'$
P.C.C. = STA 261+05.56
P.T. = STA 267+10.25



HORIZONTAL
SCALE IN FEET

0 10 20 40

PLAN AND PROFILE S.R. 32 EASTBOUND AND WESTBOUND
STA 257+00.00 TO STA 262+00.00

DESIGN AGENCY



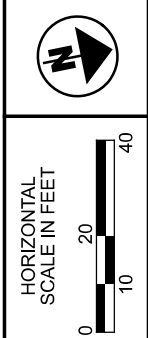
11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER
XXX

REVIEWER
XXX MM-DD-YY

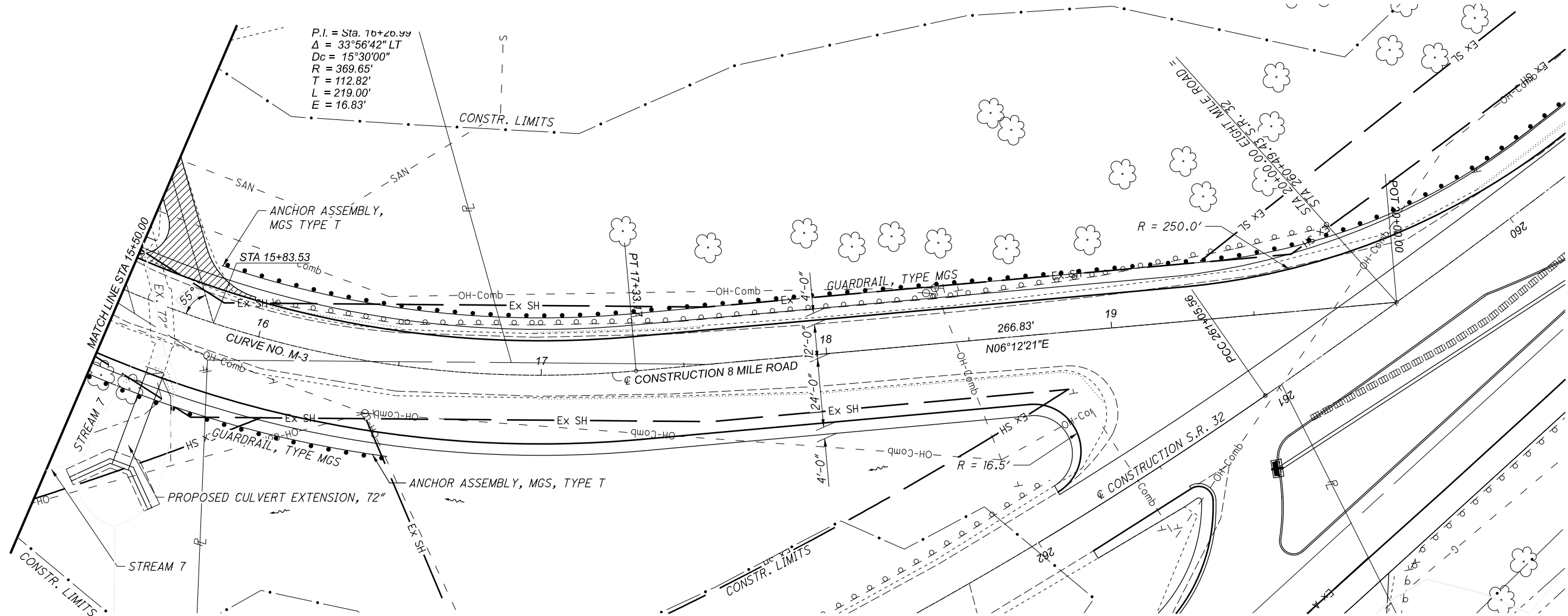
PROJECT ID
110991

SHEET TOTAL
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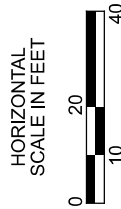
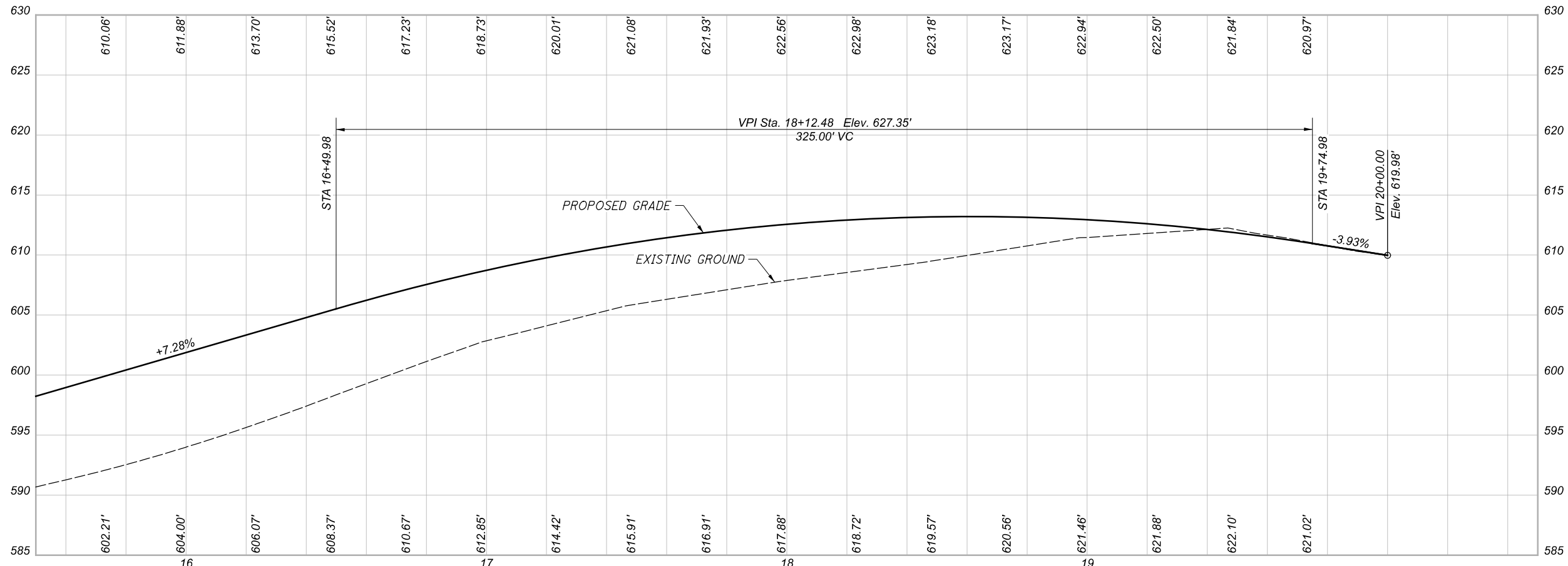


PLAN AND PROFILE EIGHT MILE ROAD
STA 10+50.00 TO STA 15+50.00

DESIGN AGENCY	
	
Stantec 11687 Lebanon Road Cincinnati OH 45241 (513) 842-8200	
DESIGNER	
XXX	
REVIEWER	
XXX MM-DD-YY	
PROJECT ID	
110991	
SHEET	TOTAL
P.13	0



FOR LEGEND, SEE SHEET NO. 10



PLAN AND PROFILE EIGHT MILE ROAD
STA 15+50.00 TO STA 20+00.00

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER

XXX

REVIEWER

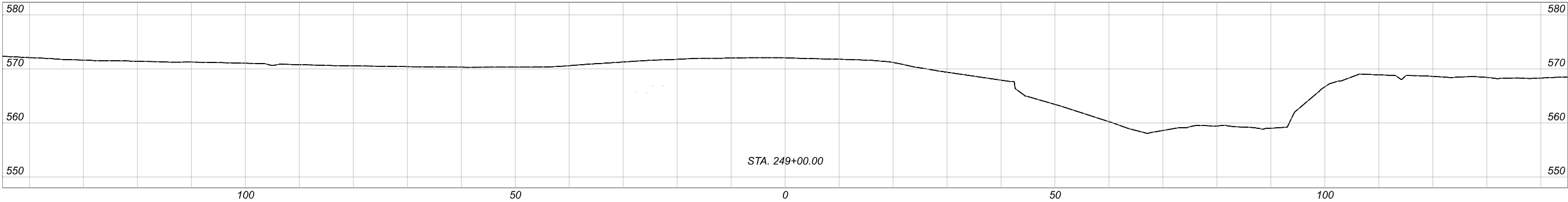
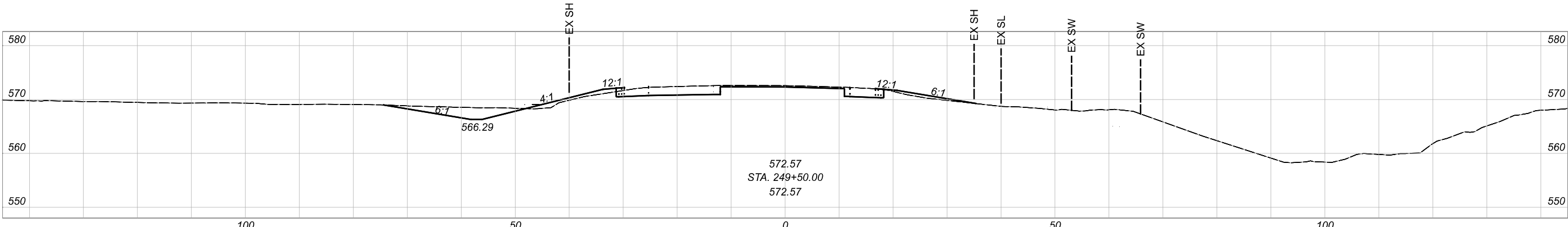
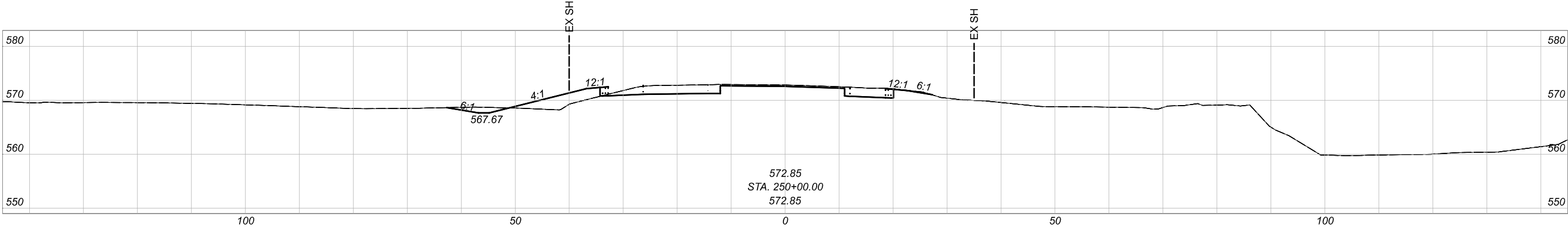
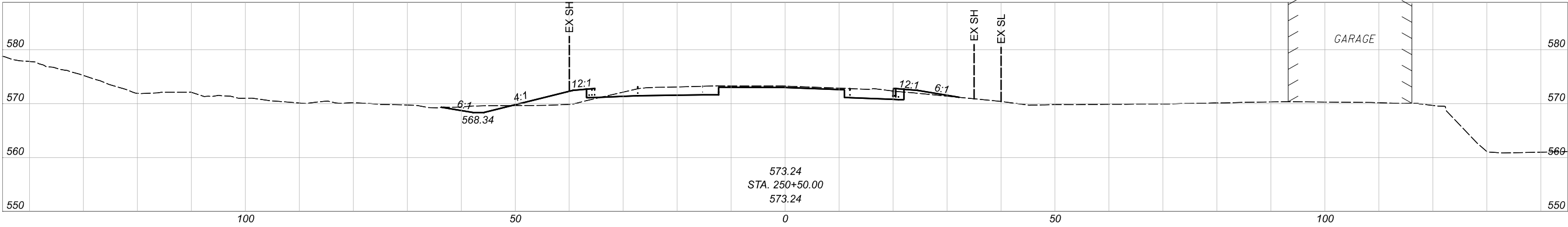
XXX MM-DD-YY

PROJECT ID

110991

SHEET TOTAL

P.14 0



CROSS SECTIONS S.R. 32 EASTBOUND
STA 249+00.00 TO STA 250+50.00

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER

XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

110991

SHEET

P.15

TOTAL

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Sheet Totals

Seeding

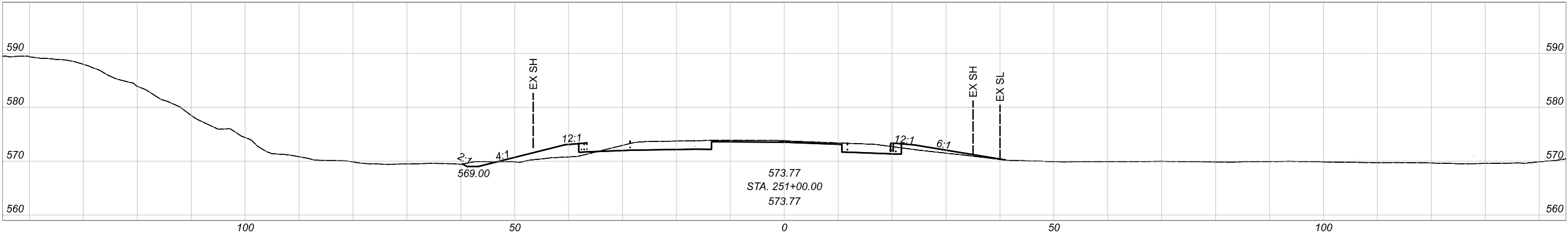
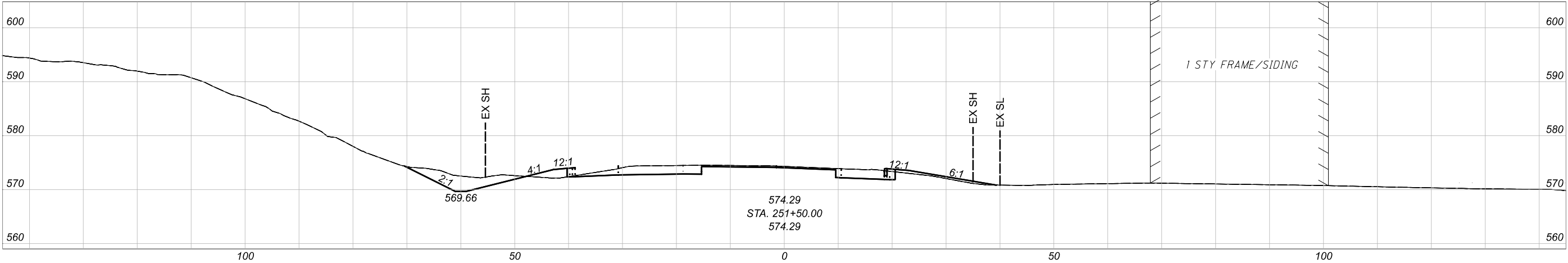
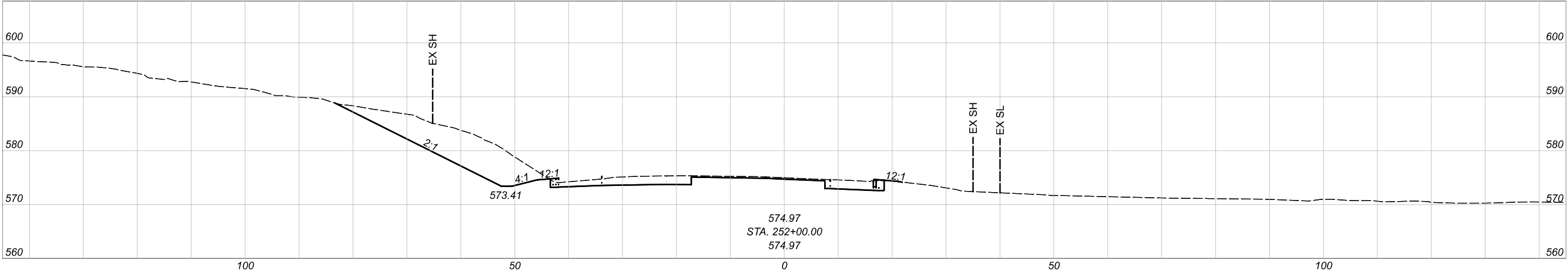
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Cut

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Fill

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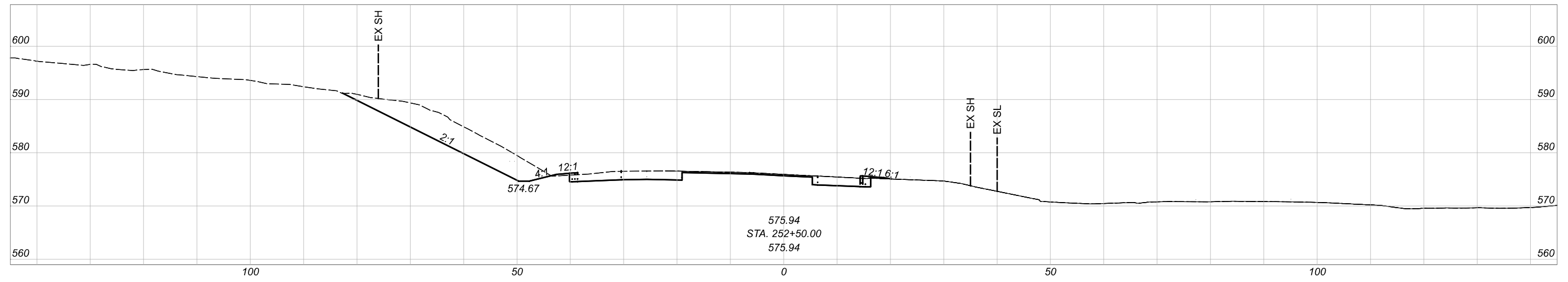
CROSS SECTIONS S.R. 32 EASTBOUND
STA 251+00.00 TO STA 252+00.00



DESIGN AGENCY	XXX
DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
SHEET	TOTAL
P.16	0

Sheet Totals		
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HAM-32-6.82



Sheet Totals		
Seeding	Cut	Fill
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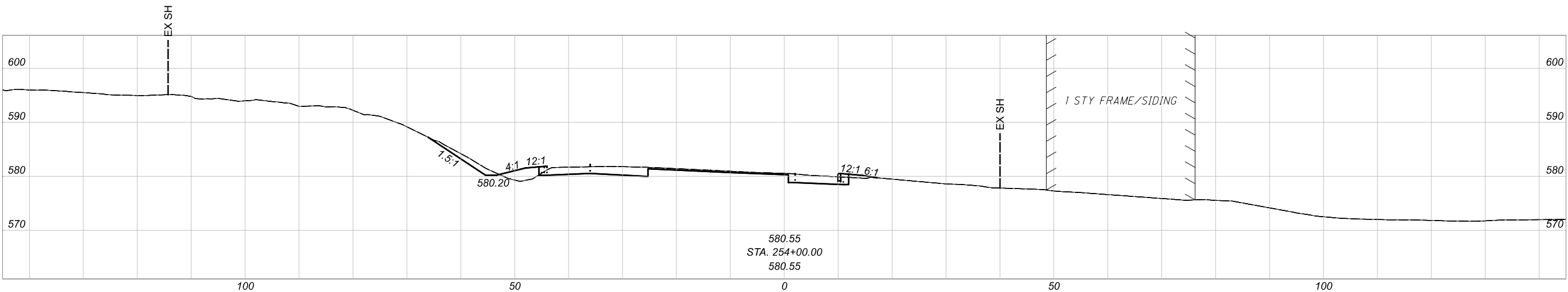
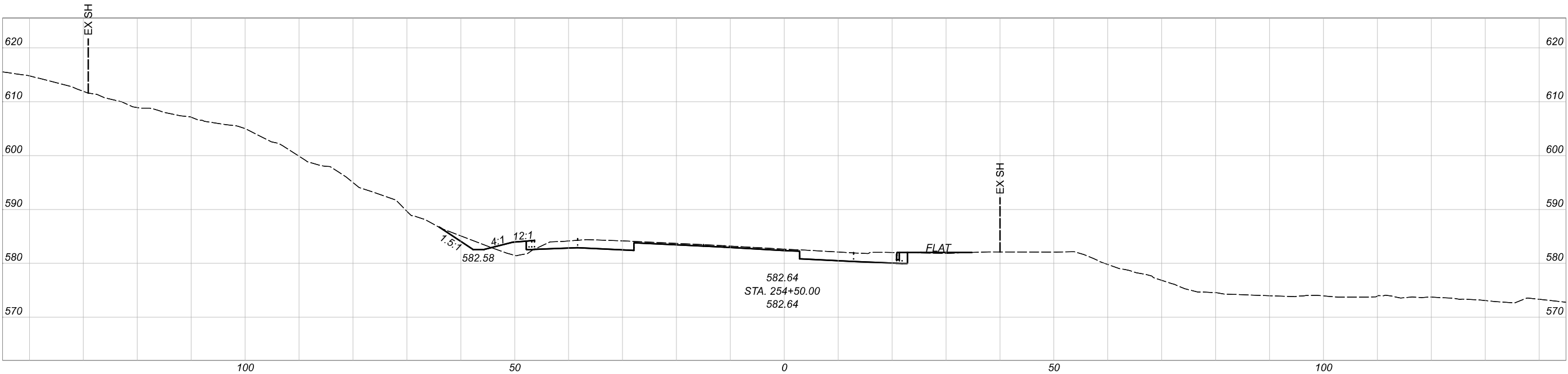
DESIGN AGENCY



Stantec
11687 Lebanon Road
Cincinnati OH 45241
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REVIEWER	XXX MM-DD-YY
PROJECT ID	110991

CROSS SECTIONS S.R. 32 EASTBOUND
STA 252+50.00 TO STA 253+50.00



Sheet Totals		
Seeding	Cut	Fill
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SHEET	TOTAL
P.18	0

DESIGN AGENCY

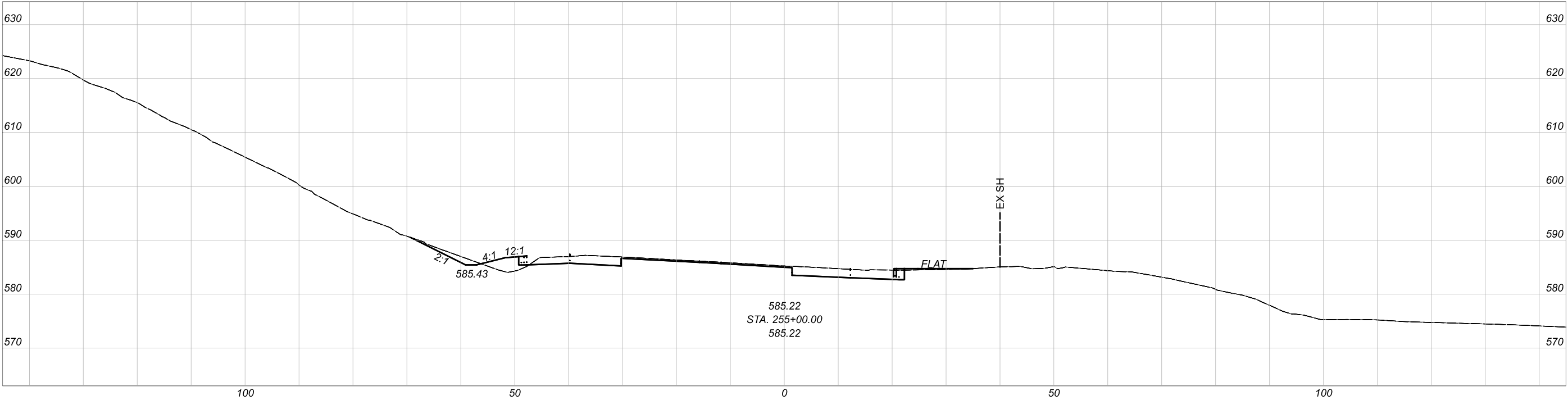
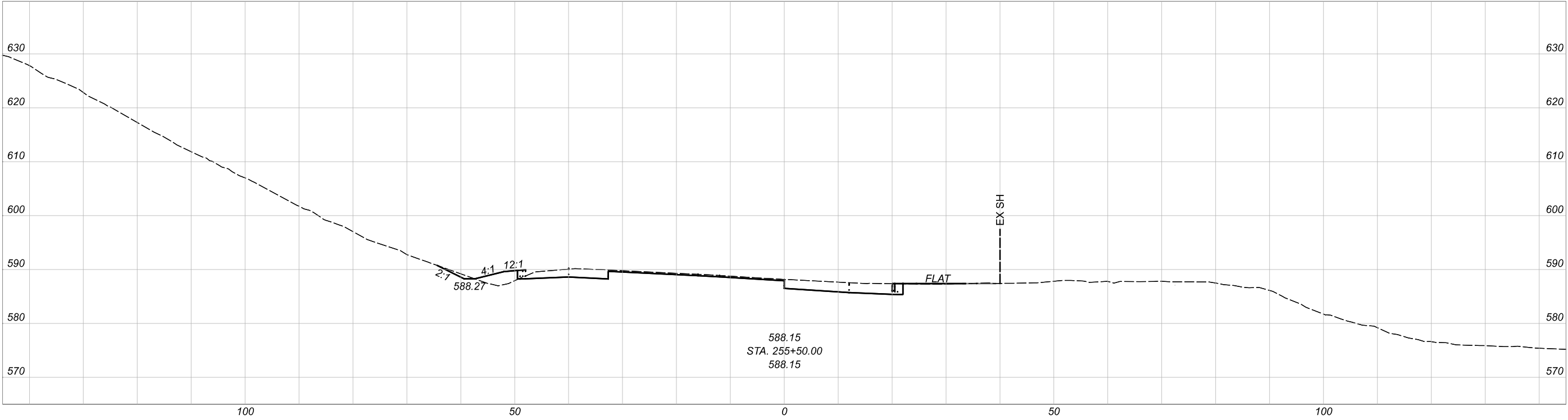
Stantec
11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER
XXX

REVIEWER
XXX MM-DD-YY

PROJECT ID
110991

CROSS SECTIONS S.R. 32 EASTBOUND
STA 254+00.00 TO STA 254+50.00

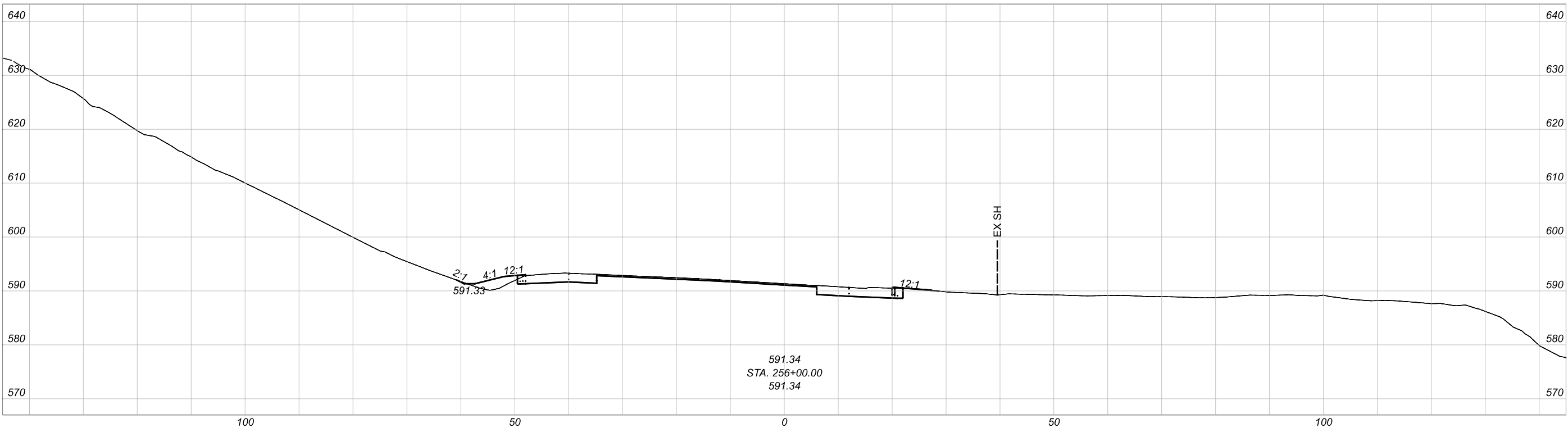
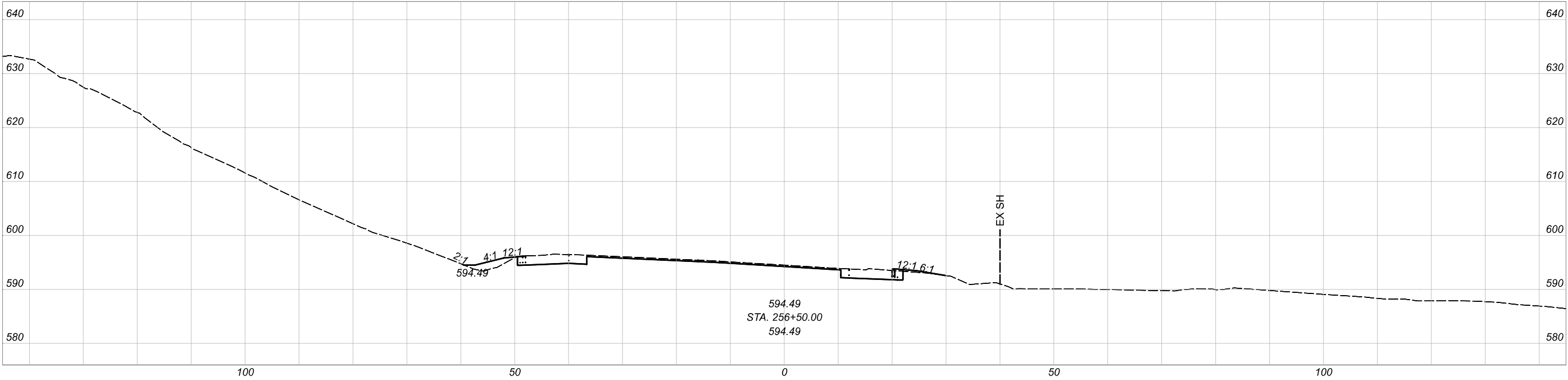


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.	.	.	P.19	0

CROSS SECTIONS S.R. 32 EASTBOUND
STA 255+00.00 TO STA 255+50.00



DESIGN AGENCY
XXX
REVIEWER
XXX MM-DD-YY
PROJECT ID
110991



Sheet Totals		
Seeding	Cut	Fill
.	.	.

DESIGN AGENCY

Stantec

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Cincinnati OH 45241
(513) 842-6200

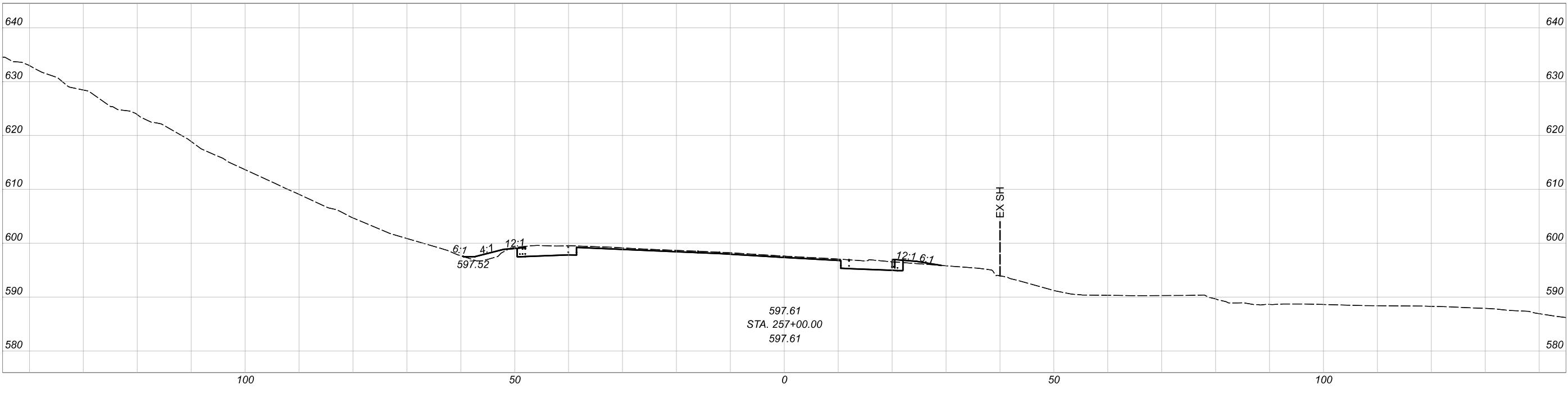
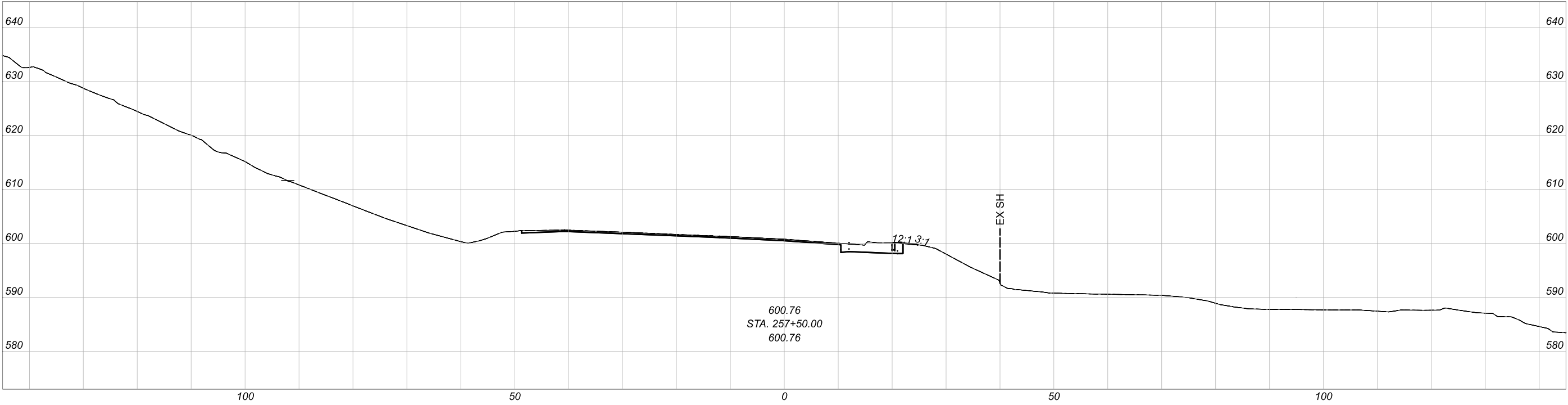
DESIGNER
XXX

REVIEWER
XXX MM-DD-YY

PROJECT ID
110991

SHEET	TOTAL
P.20	0

CROSS SECTIONS S.R. 32 EASTBOUND
STA 256+00.00 TO STA 256+50.00



Sheet Totals			110991	
Seeding	Cut	Fill	SHEET	TOTAL
.	.	.	P.21	0

CROSS SECTIONS S.R. 32 EASTBOUND
STA 257+00.00 TO STA 257+50.00

DESIGN AGENCY

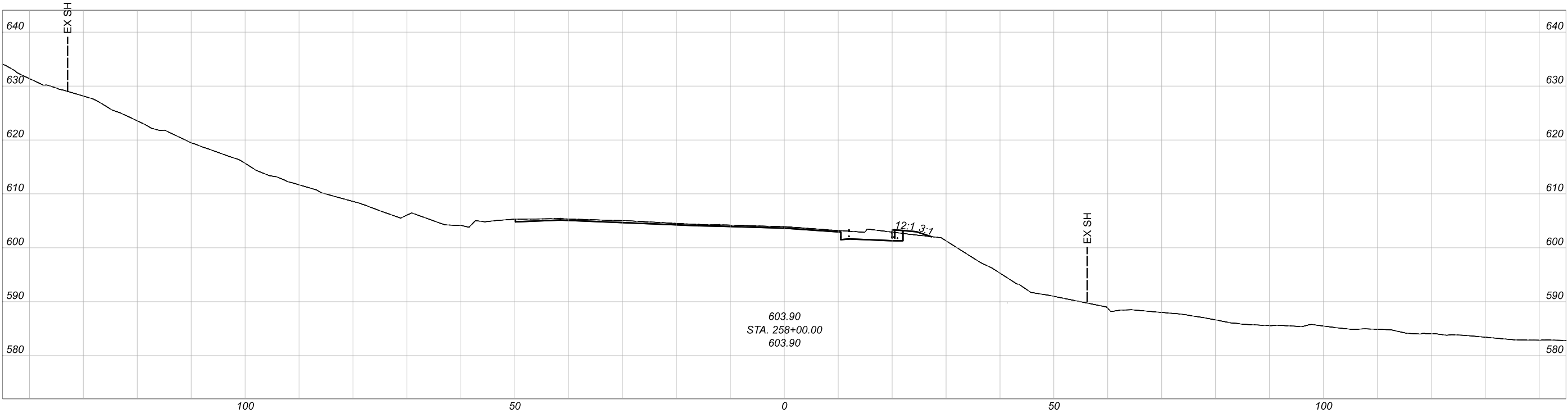
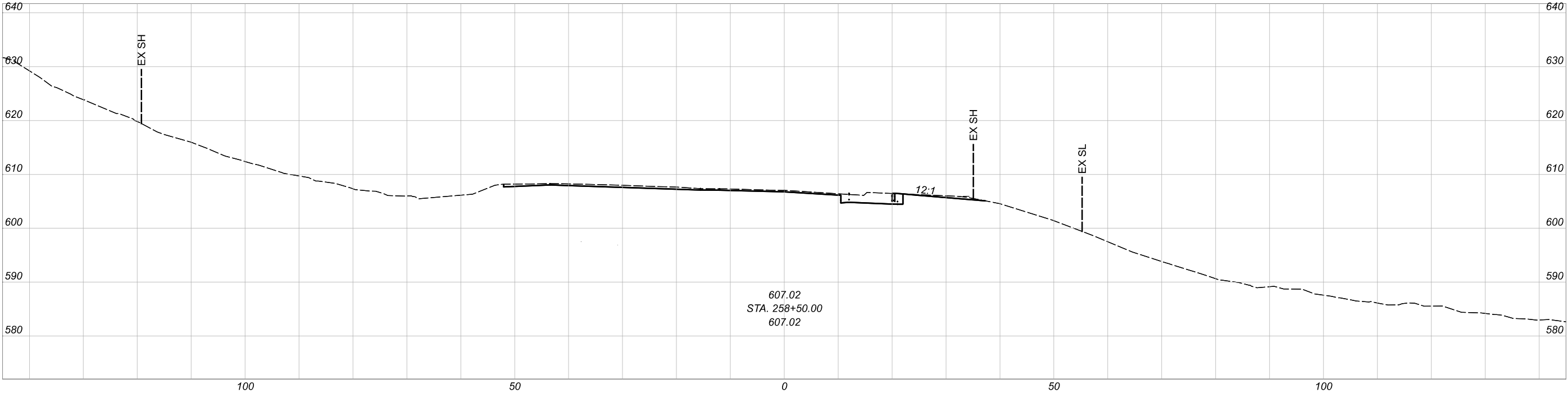
Stantec

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REVIEWER
XXX MM-DD-YY

PROJECT ID
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Sheet Totals		
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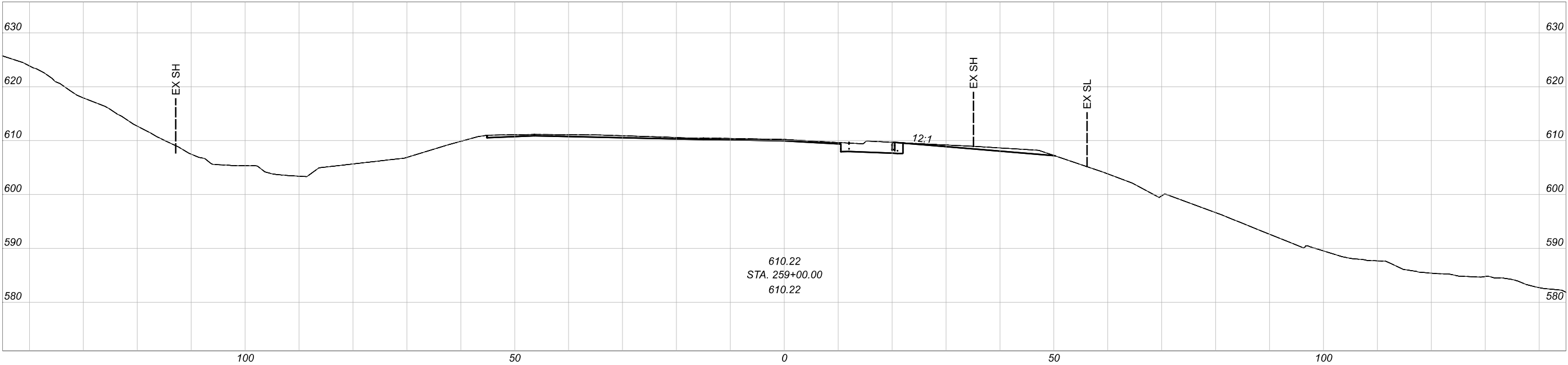
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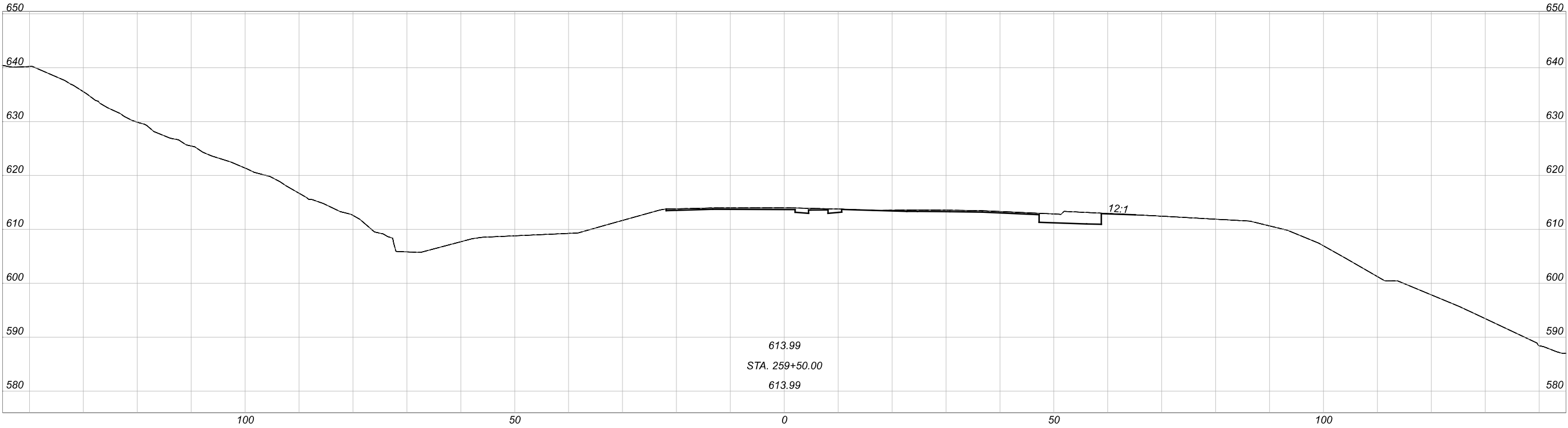
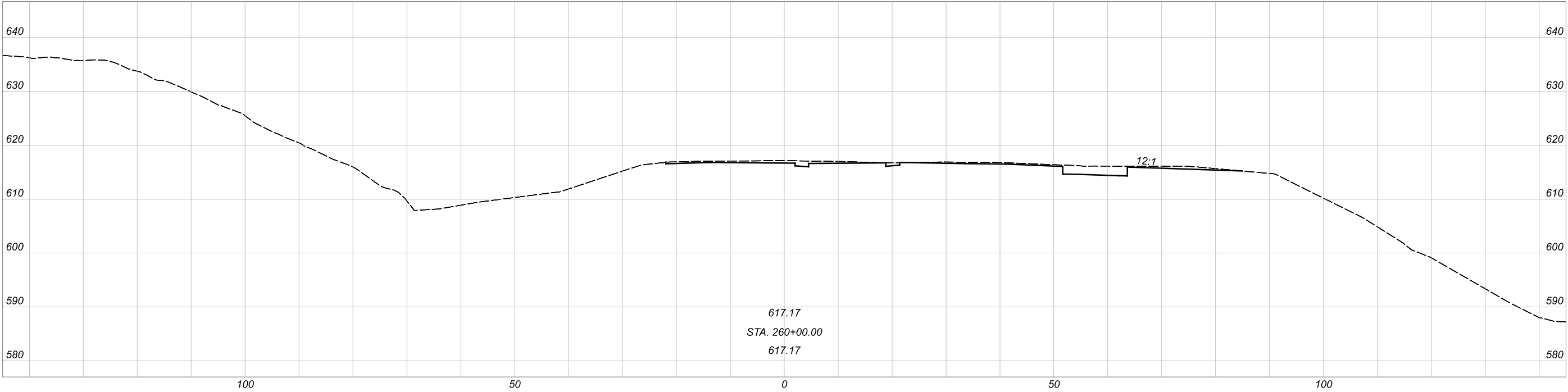
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CROSS SECTIONS S.R. 32 EASTBOUND
STA 259+00.00

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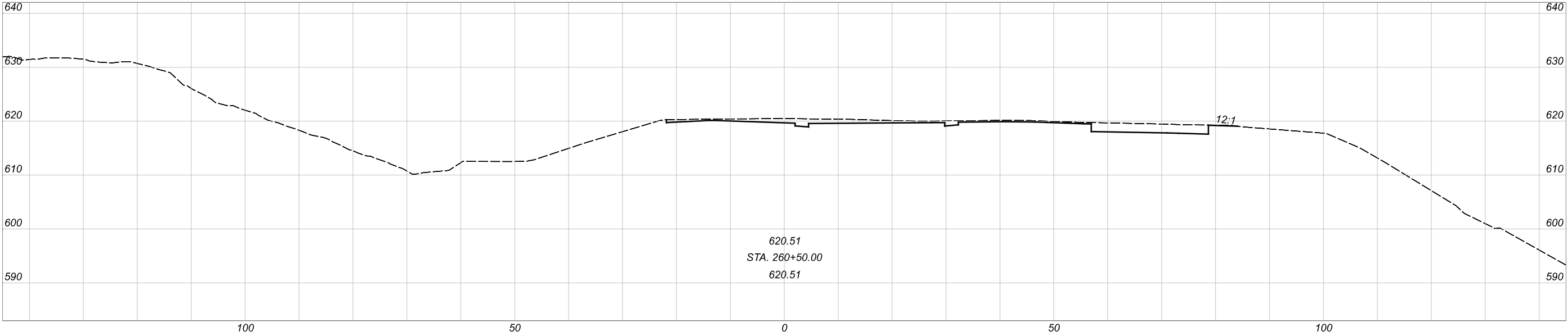
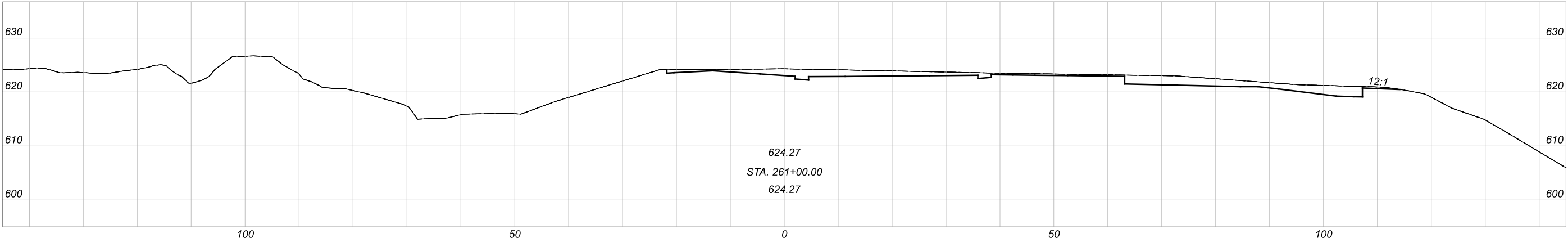
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CROSS SECTIONS S.R. 32 WESTBOUND
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REVIEWER
XXX MM-DD-YY
PROJECT ID
110991

SHEET	TOTAL
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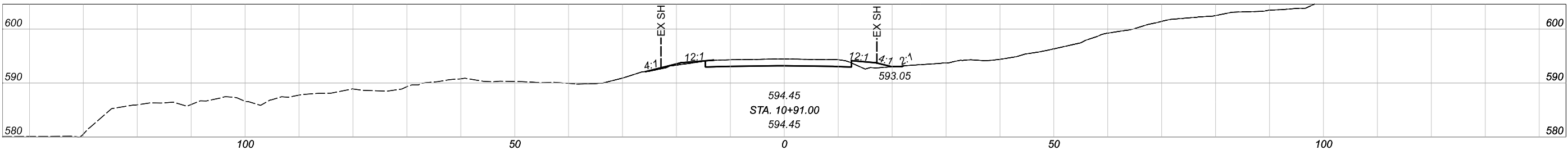
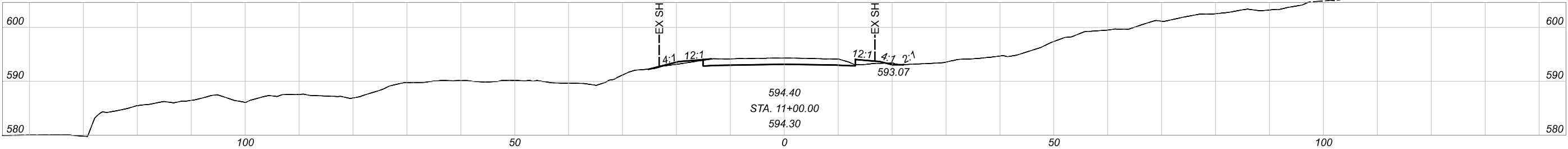
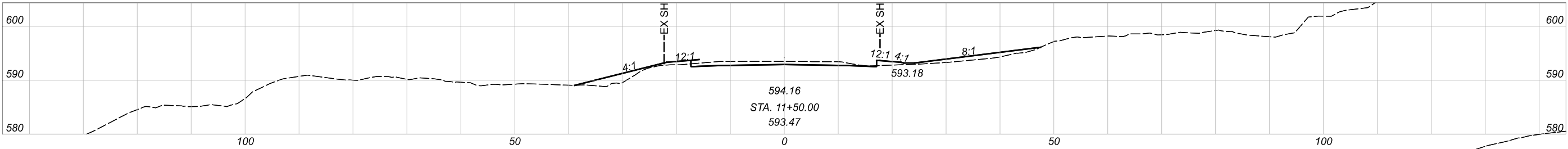
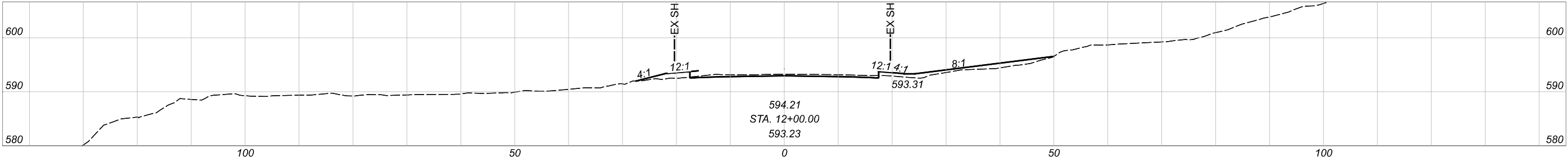
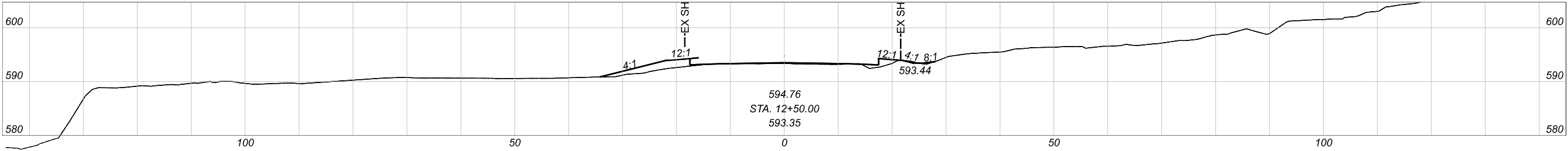
Stantec

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DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991

SHEET	TOTAL
P.25	0

CROSS SECTIONS S.R. 32 WESTBOUND
STA 260+50.00 TO STA 261+50.00



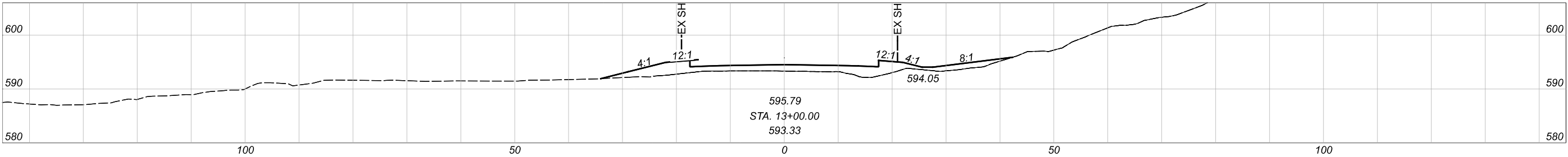
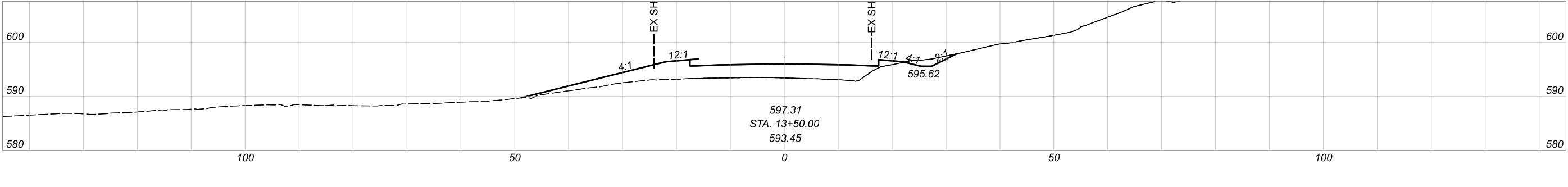
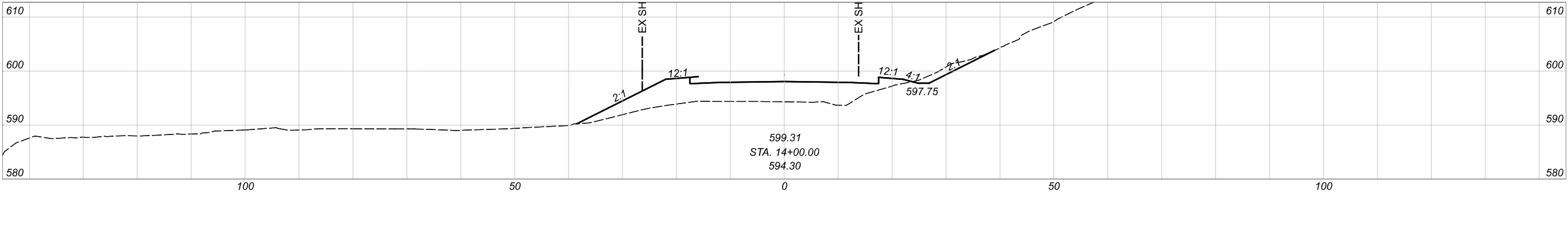
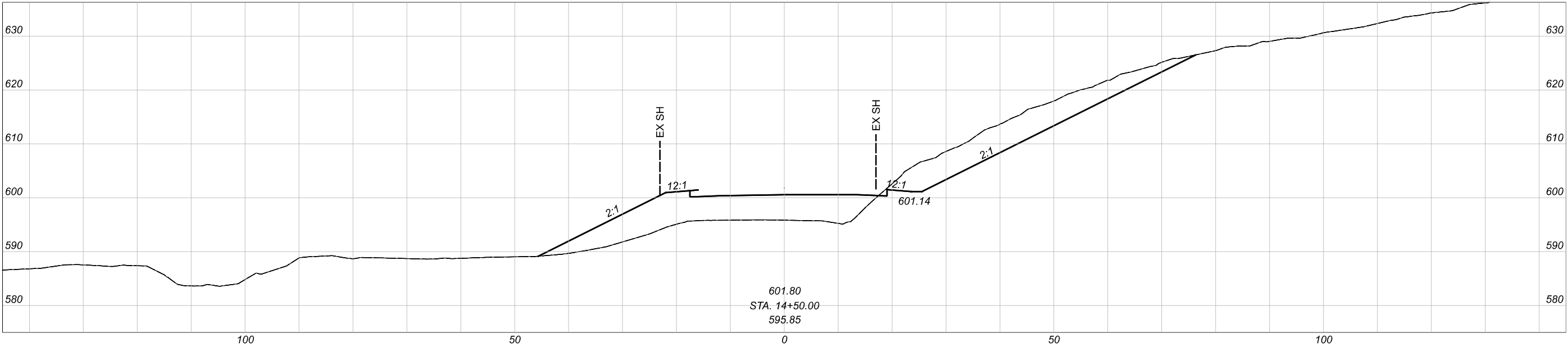
CROSS SECTIONS EIGHT MILE ROAD
STA 10+91.00 TO STA 12+50.00

DESIGN AGENCY

11687 Lebanon Road
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(513) 842-6200

DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
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P.26	0

Sheet Totals		
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CROSS SECTIONS EIGHT MILE ROAD
STA 13+00.00 TO STA 14+50.00

DESIGN AGENCY



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DESIGNER

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REVIEWER

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PROJECT ID

110991

Sheet Totals

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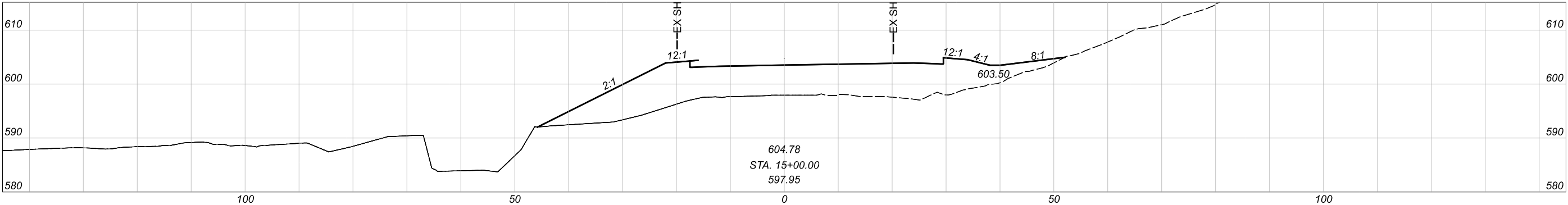
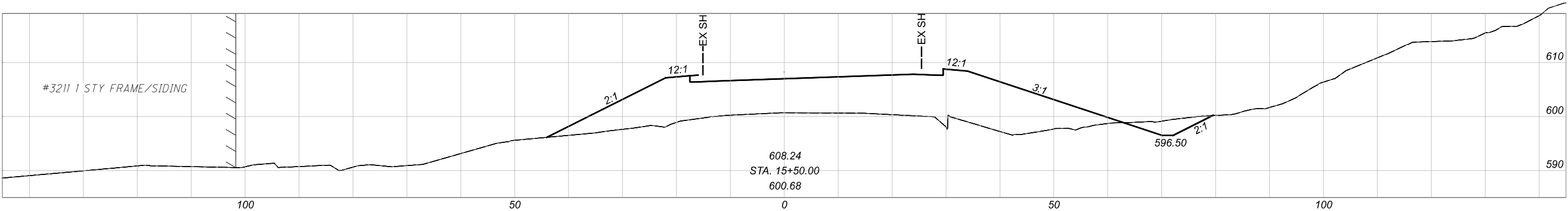
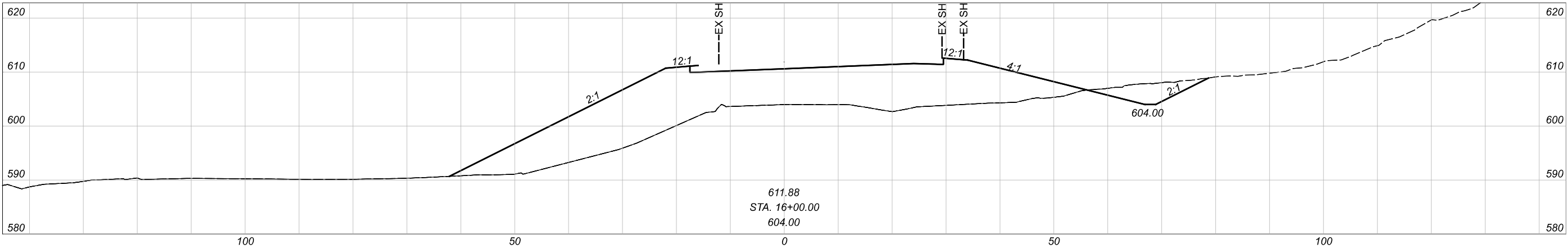
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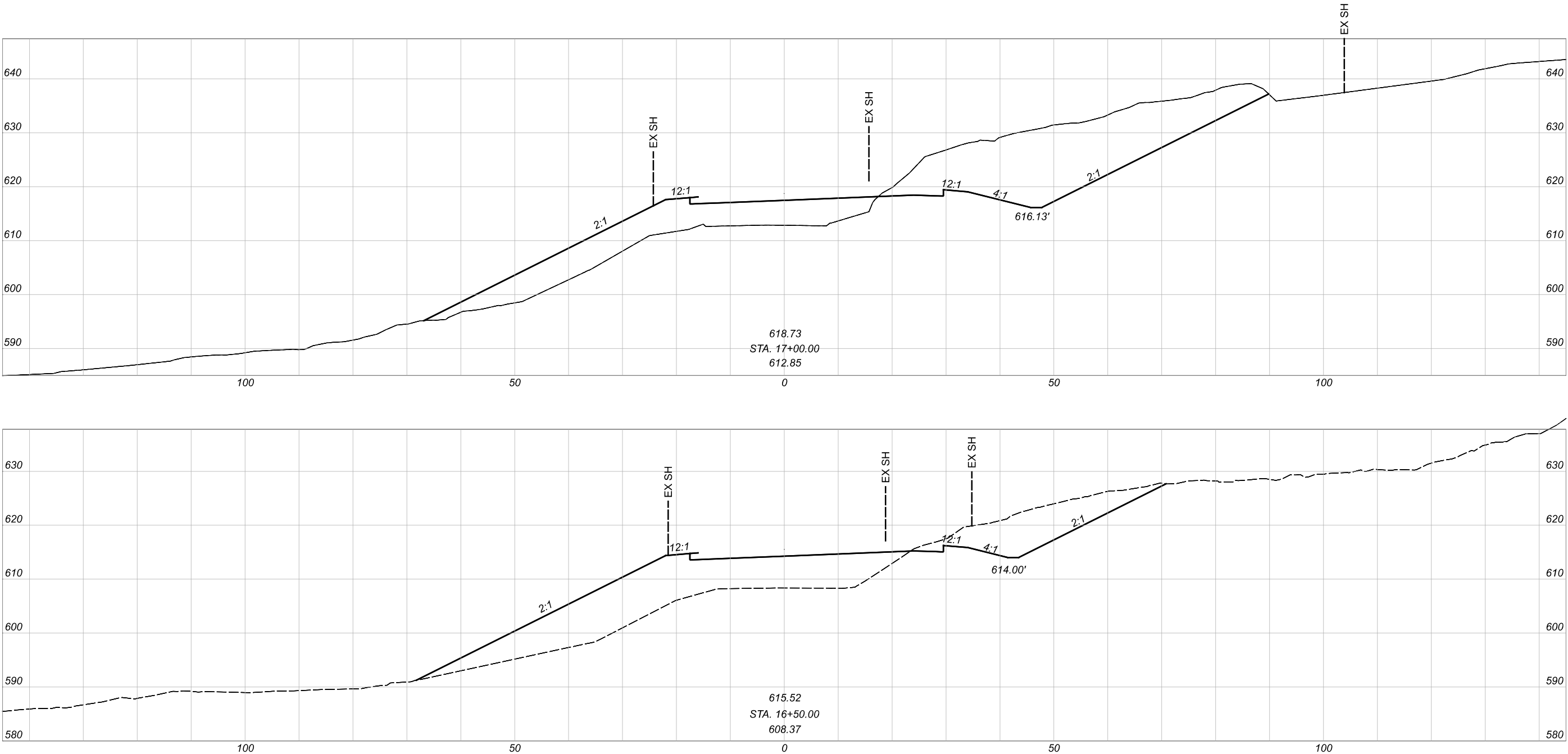
CROSS SECTIONS EIGHT MILE ROAD
STA 15+00.00 TO STA 16+00.00

DESIGN AGENCY

11687 Lebanon Road
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DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
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Seeding	Cut	Fill
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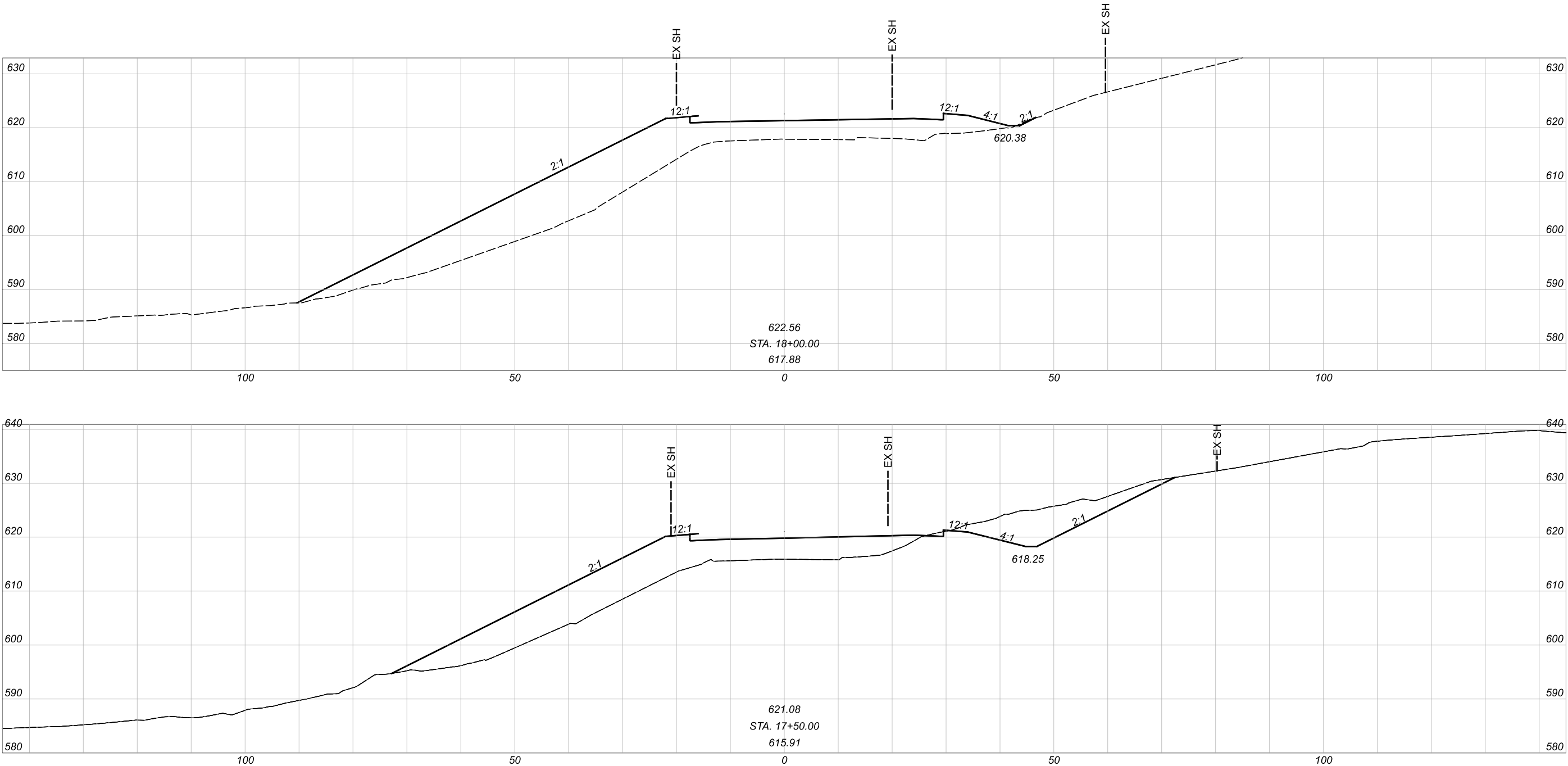


CROSS SECTIONS EIGHT MILE ROAD
STA 16+50.00 TO STA 17+00.00



DESIGNER
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REVIEWER
XXX MM-DD-YY
PROJECT ID
110991

Sheet Totals			SHEET	TOTAL
Seeding	Cut	Fill		
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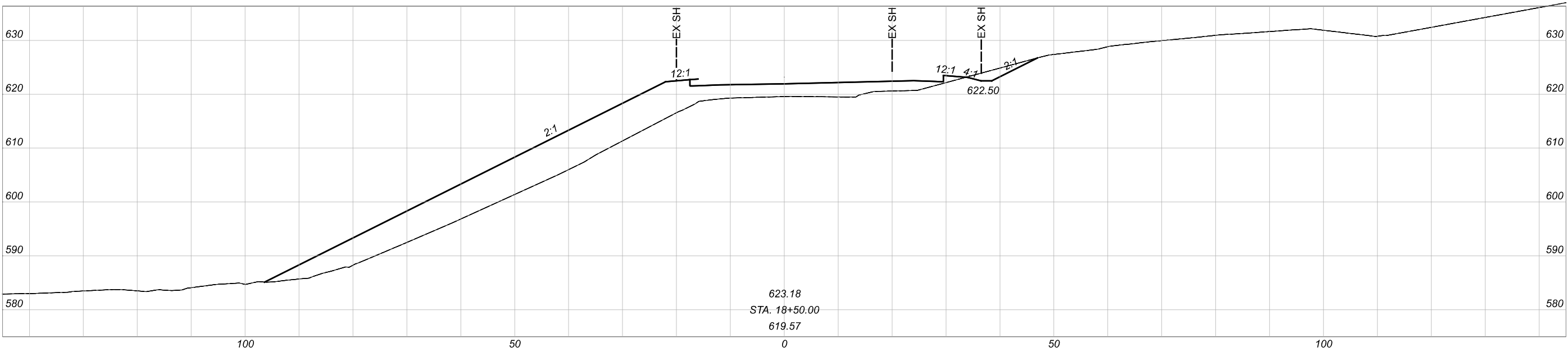
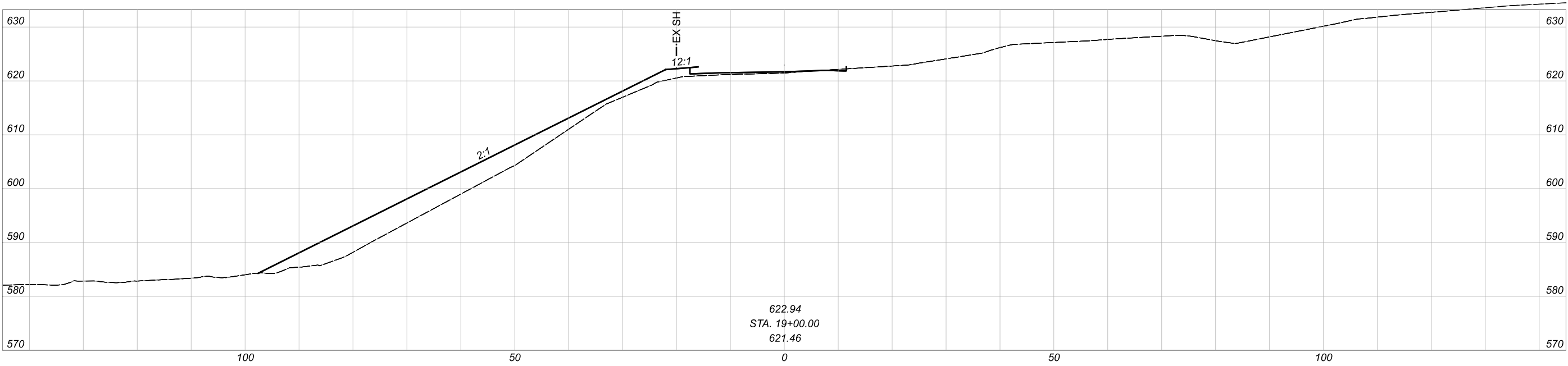


CROSS SECTIONS EIGHT MILE ROAD
STA 17+50.00 TO STA 18+00.00



DESIGNER
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REVIEWER
XXX MM-DD-YY
PROJECT ID
110991

Sheet Totals			SHEET	TOTAL
Seeding	Cut	Fill		
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Sheet Totals		
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DESIGN AGENCY



11687 Lebanon Road
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DESIGNER
XXX

REVIEWER
XXX MM-DD-YY

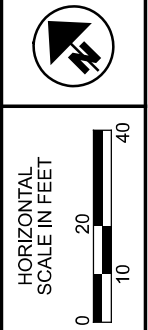
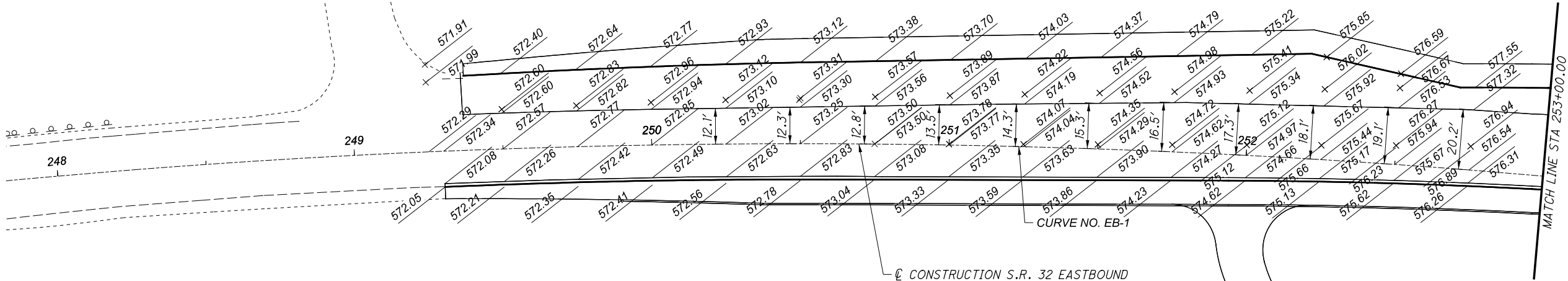
PROJECT ID
110991

SHEET	TOTAL
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CROSS SECTIONS EIGHT MILE ROAD
STA 18+50.00 TO STA 19+00.00

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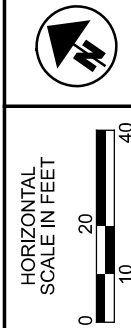
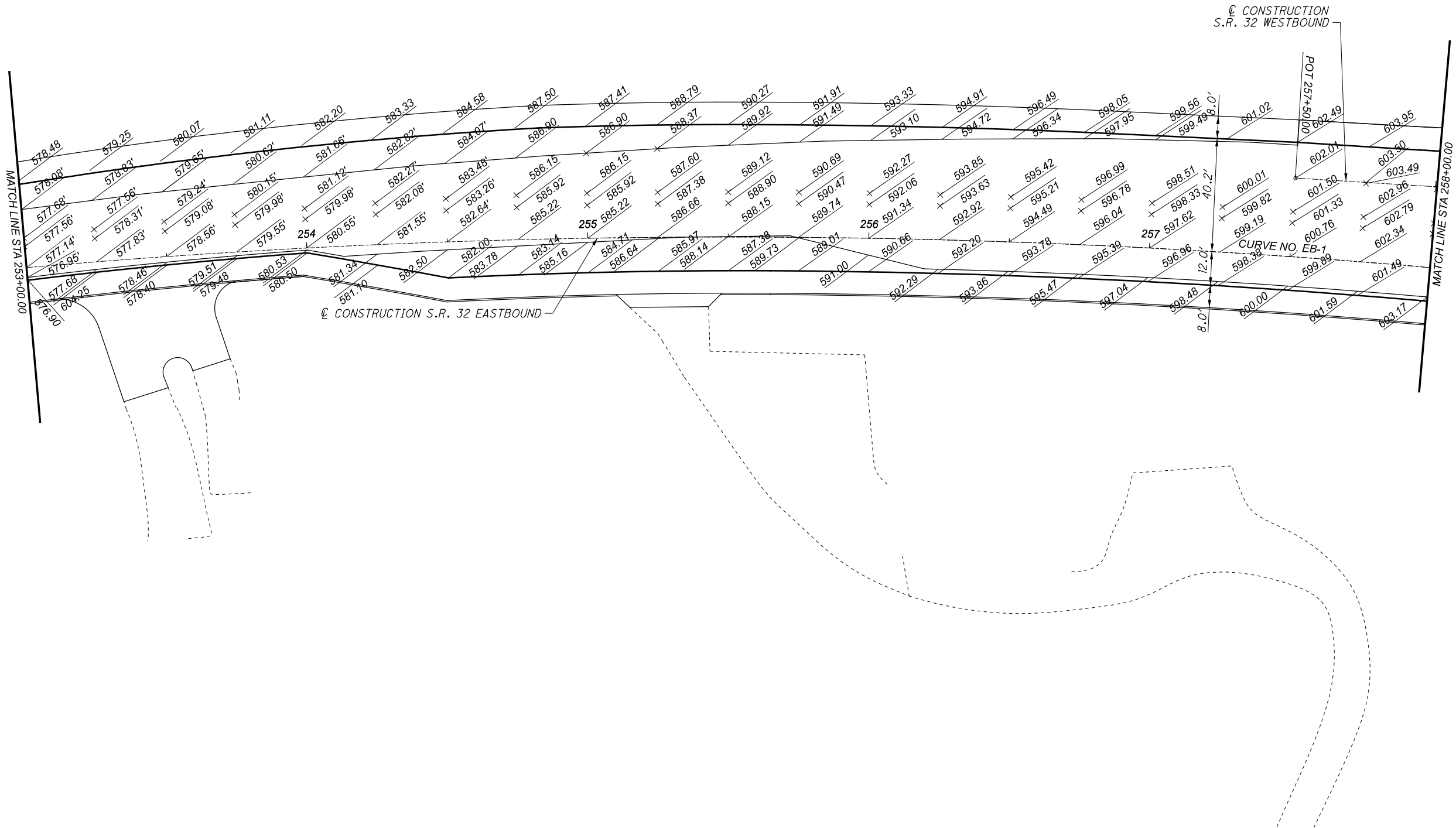
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 $Dc = 02^{\circ}00'00''$
 $R = 2864.79'$
 $T = 843.20'$
 $L = 1640.08'$
 $E = 121.51'$
P.C. = STA 244+65.48
P.C.C. = STA 261+05.56



PAVEMENT DETAIL SHEET S.R. 32
STA 248+00.00 TO STA 253+00.00

DESIGN AGENCY	
 11687 Lebanon Road Cincinnati OH 45241 (513) 842-6200	
DESIGNER	XXX
REVIEWER	XXX
PROJECT ID	110991
SHEET	P.33
TOTAL	0

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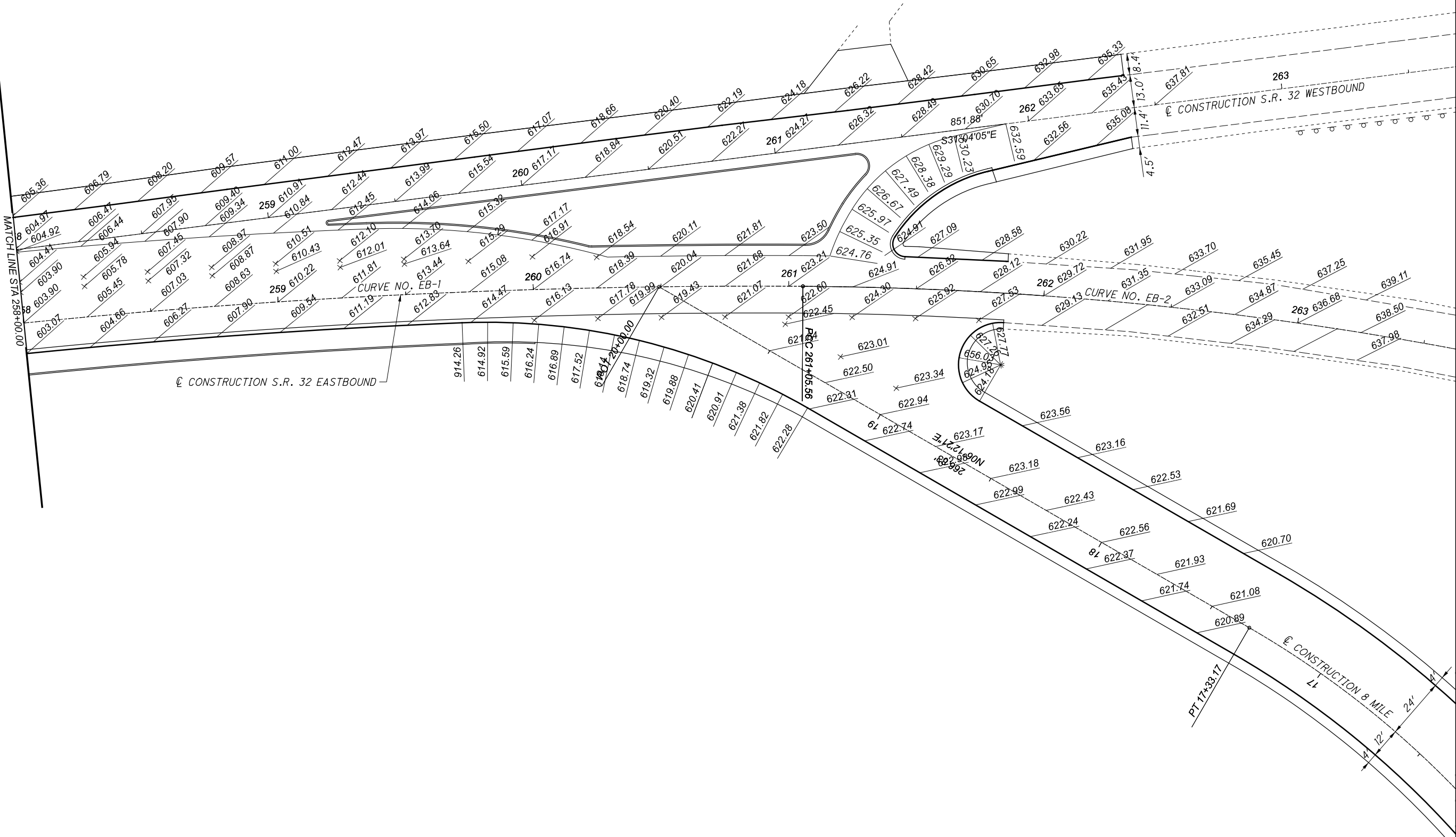
PAVEMENT DETAIL SHEET S.R. 32
STA 253+00.00 TO STA 258+00.00




DESIGNER	XXX
REVIEWER	XXX
PROJECT ID	110991
SHEET	P.34
TOTAL	0


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P.C.C. = STA 261+05.56
P.T. = STA 267+10.25






HORIZONTAL
SCALE IN FEET



PAVEMENT DETAIL SHEET S.R. 32
STA 258+00.00 TO STA 263+00.00

DESIGN AGENCY



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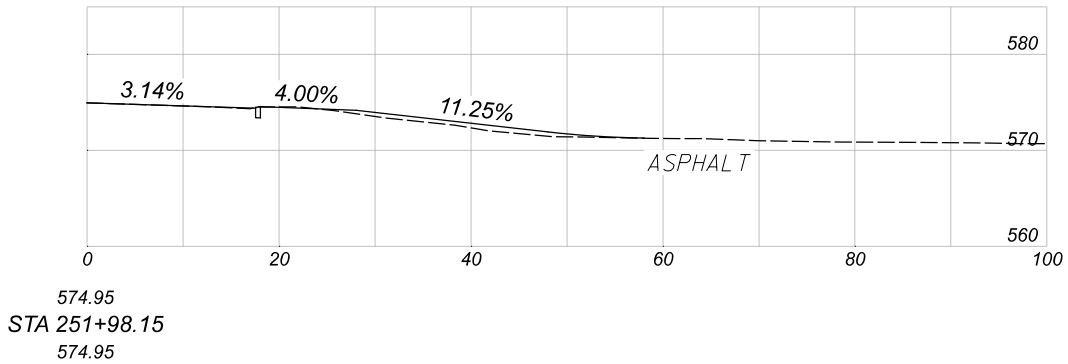
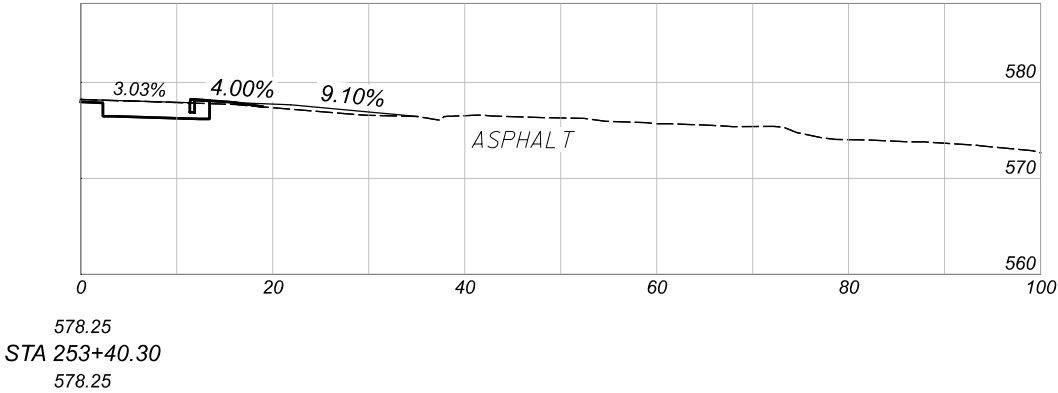
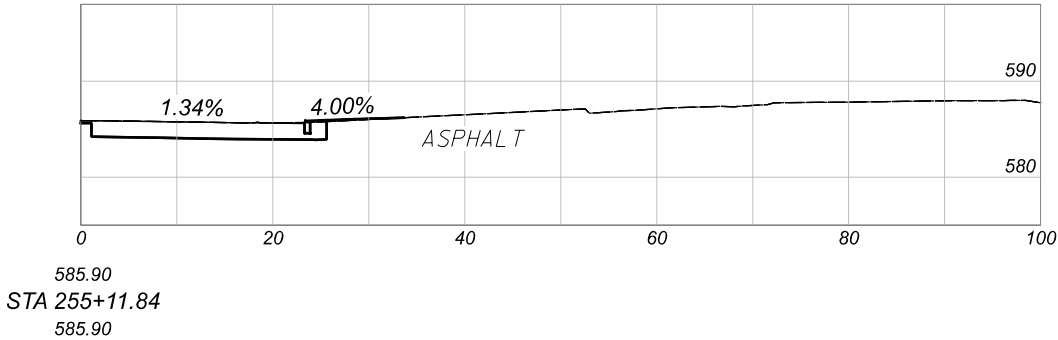
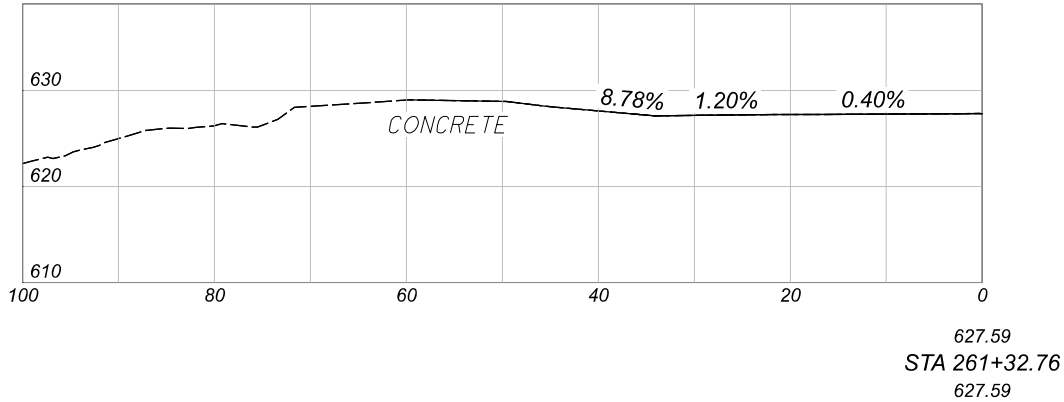
DESIGNER
XXX

REVIEWER
XXX MM-DD-YY

PROJECT ID
110991

SHEET
P.35

TOTAL
0



DRIVE DETAILS
S.R. 32

DESIGN AGENCY



11687 Lebanon Road
Cincinnati OH 45241
(513) 842-8200

DESIGNER

XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

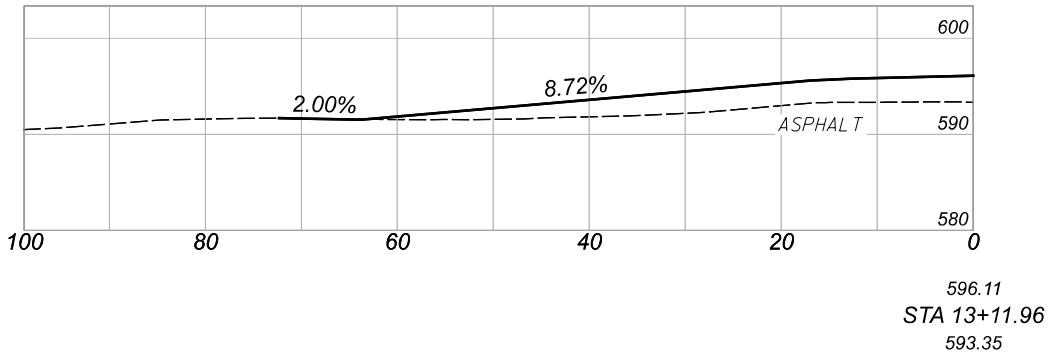
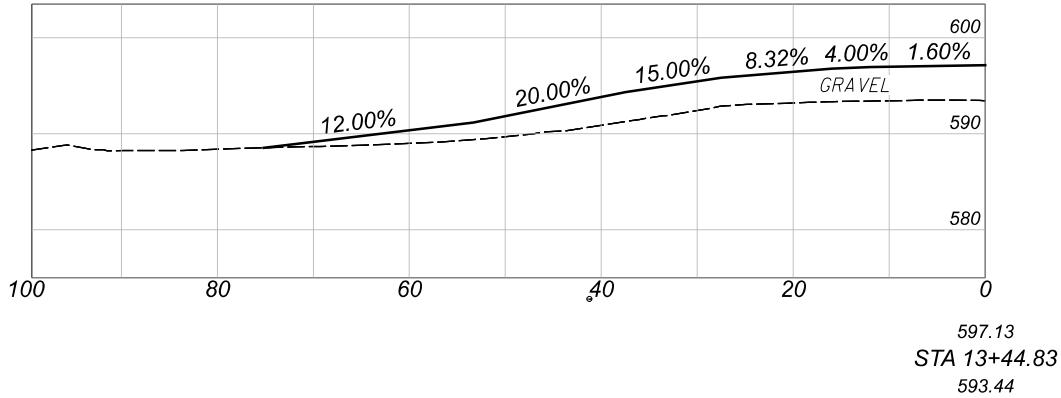
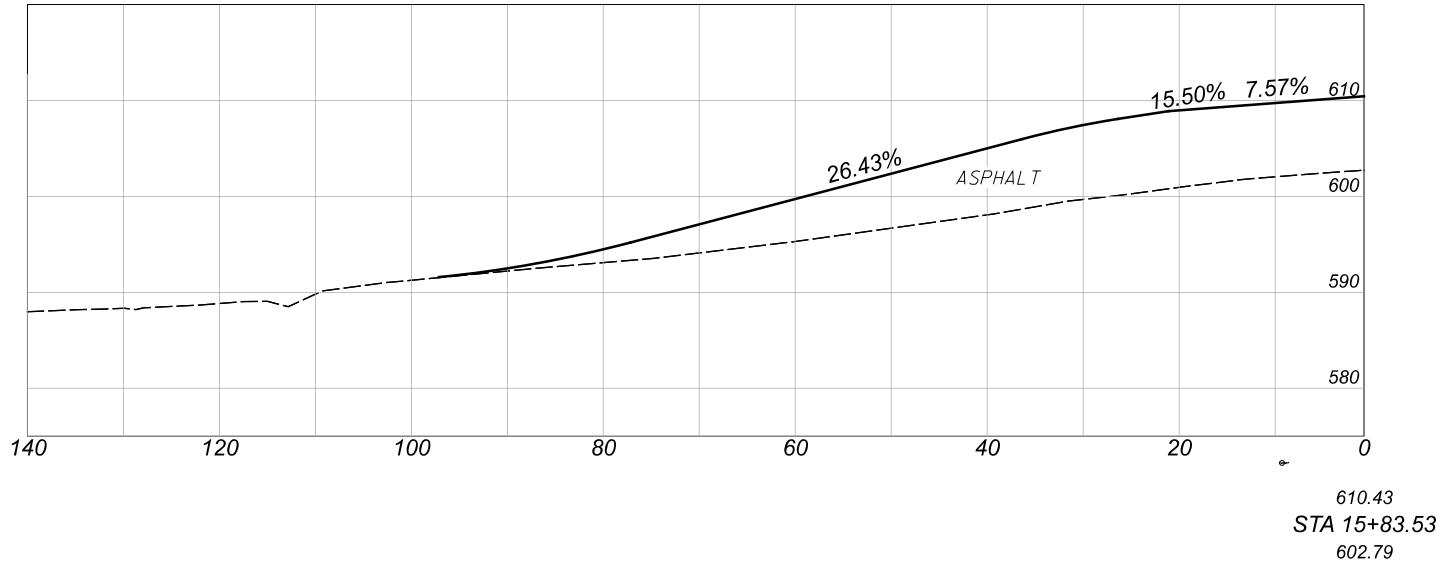
110991

SHEET

P.36

TOTAL

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DRIVEWAY DETAILS
EIGHT MILE ROAD

DESIGN AGENCY



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REVIEWER

XXX MM-DD-YY

PROJECT ID

110991

SHEET

P.37

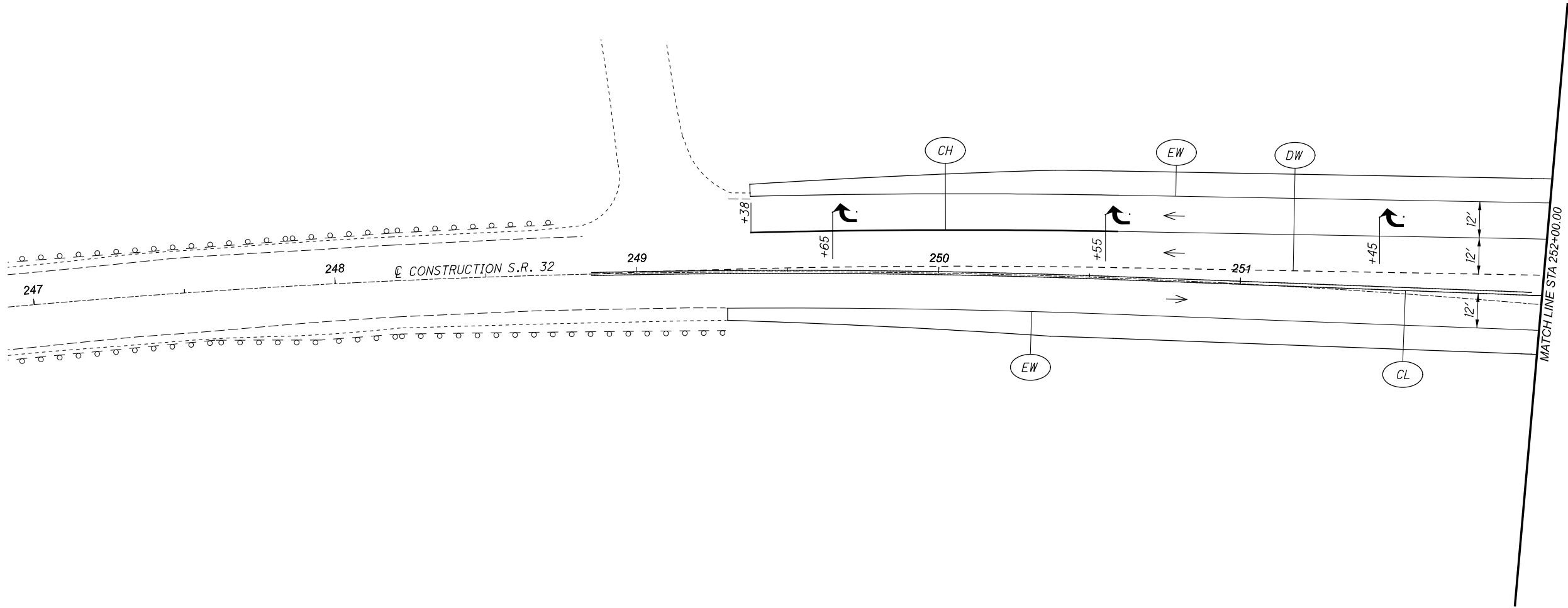
TOTAL

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PAVEMENT MARKING LEGEND

ALL PAVEMENT MARKINGS ARE ITEM 644 THERMOPLASTIC

- | | | | |
|----|---|----|-----------------------------------|
| EY | EDGE LINE (YELLOW), 6" | SL | STOP LINE |
| EW | EDGE LINE (WHITE)
4" WIDTH ON EIGHT MILE ROAD
6" WIDTH OF S.R. 32 | CH | CHANNELIZING LINE |
| CL | CENTER LINE | TW | TRANSVERSE/DIAGONAL LINE (WHITE) |
| DW | DOTTED LINE (WHITE), 12" | TY | TRANSVERSE/DIAGONAL LINE (YELLOW) |
| | | LL | LANE LINE, 6" |



HORIZONTAL
SCALE IN FEET



TRAFFIC CONTROL PLAN S.R. 32
STA 247+00.00 TO STA 252+00.00

DESIGN AGENCY



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XXX

REVIEWER

XXX MM-DD-YY

PROJECT ID

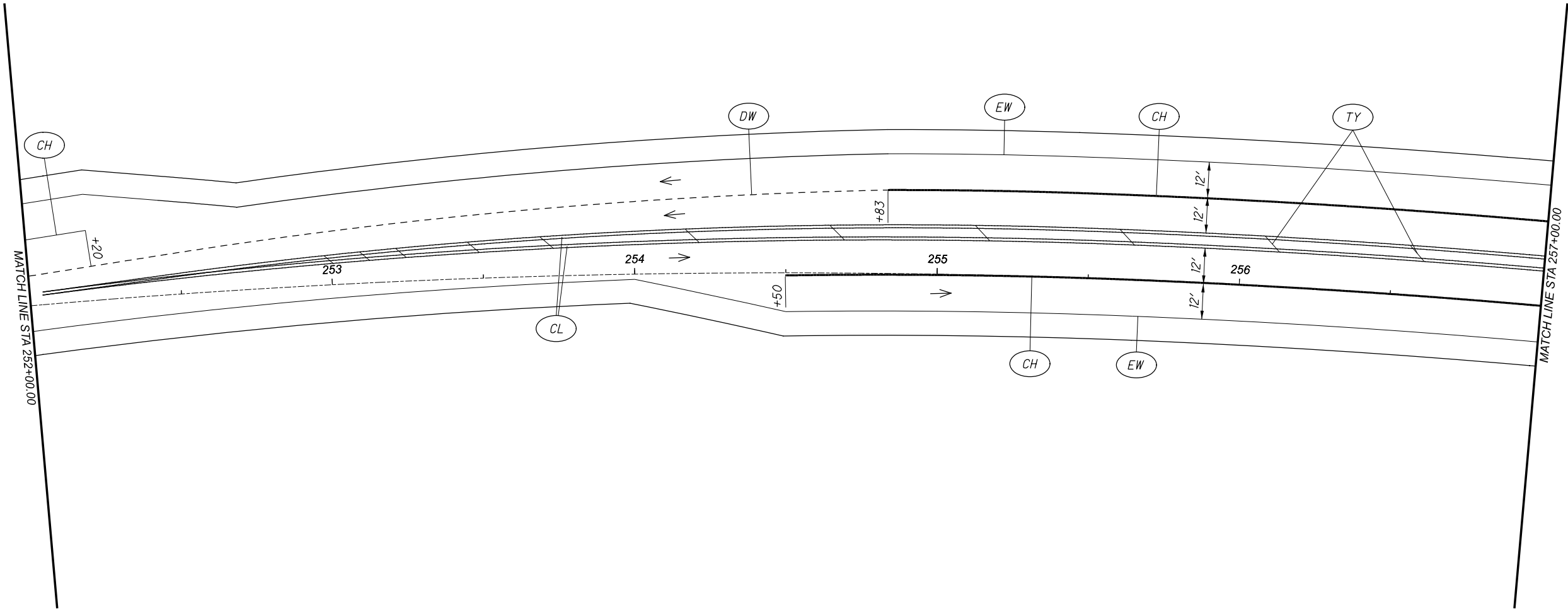
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SHEET

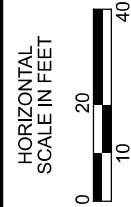
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FOR LEGEND, SEE SHEET NO. 38

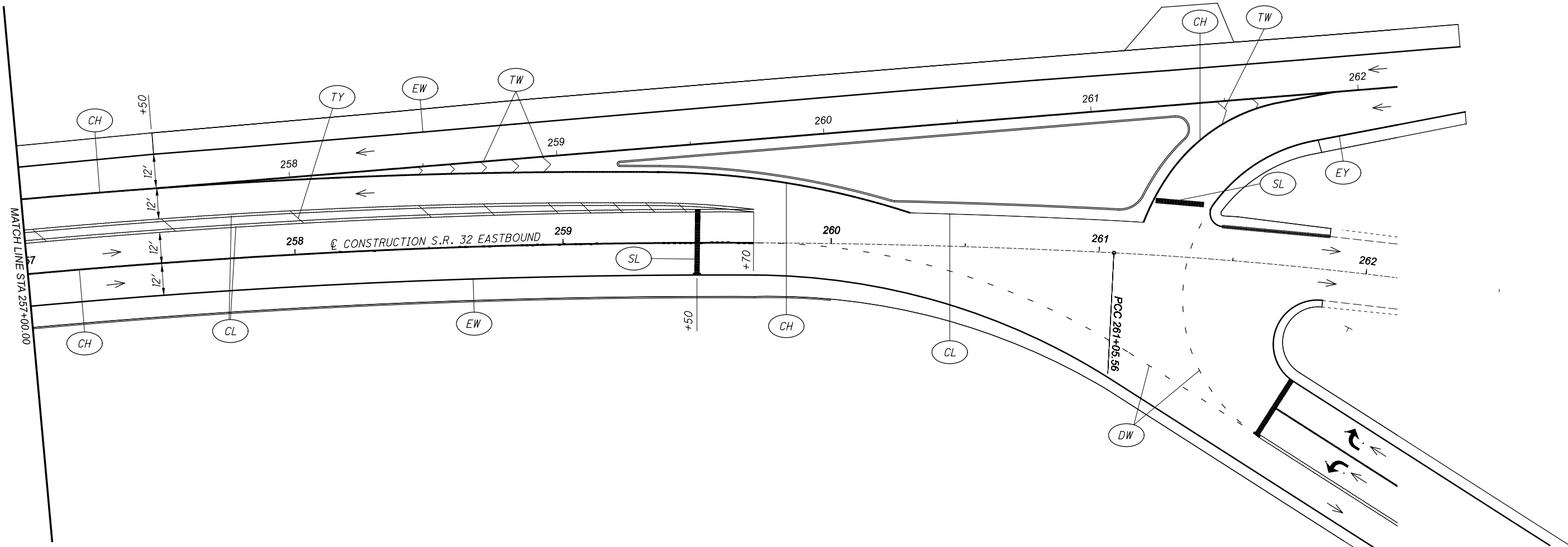


TRAFFIC CONTROL PLAN S.R. 32
STA 252+00.00 TO STA 257+00.00

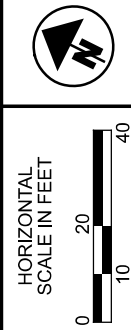
DESIGN AGENCY

11687 Lebanon Road
Cincinnati OH 45241
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DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
SHEET	P.39
TOTAL	0



FOR LEGEND, SEE SHEET NO. 38

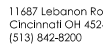


TRAFFIC CONTROL PLAN S.R. 32
STA 257+00.00 TO STA 262+00.00

DESIGN AGENCY
Stantec
11687 Lebanon Road
Cincinnati OH 45241
(513) 842-6200

DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
SHEET	P.40
TOTAL	0

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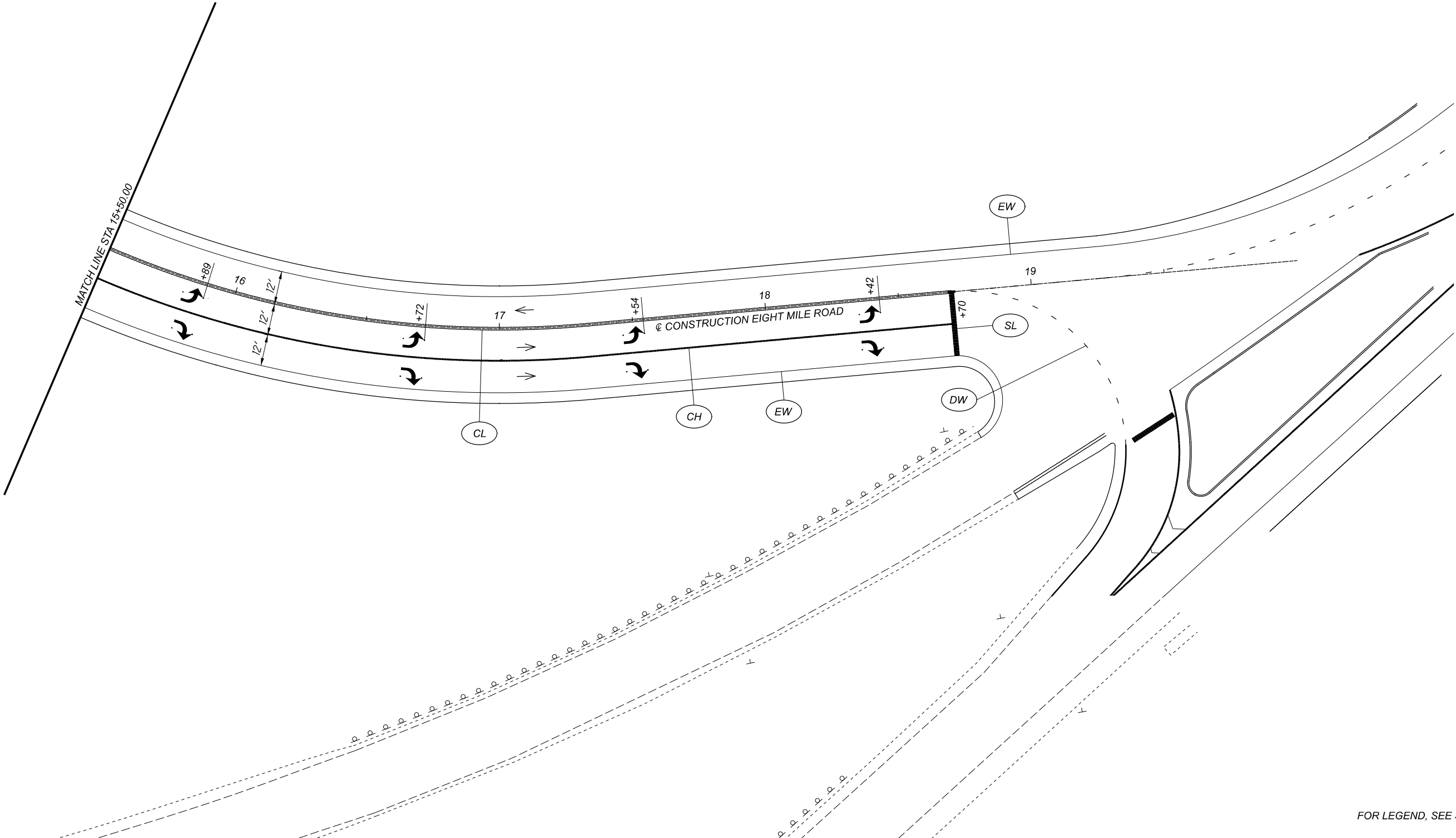


SHEET	TOTAL
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HORIZONTAL
SCALE IN FEET



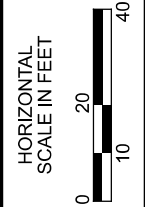
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FOR LEGEND, SEE SHEET NO. 38

TRAFFIC CONTROL PLAN EIGHT MILE ROAD
STA 15+50.00 TO STA 20+00.00

DESIGN AGENCY	
 11687 Lebanon Road Cincinnati OH 45241 (513) 842-6200	
DESIGNER	XXX
REVIEWER	XXX MM-DD-YY
PROJECT ID	110991
SHEET	P.42
TOTAL	0



ATTACHMENT D
Maintenance of Traffic Evaluation

To:	Charlie Rowe, PE Ohio Department of Transportation, District 8	From:	Paul Durham, PE Stantec Consulting Services Inc.
File:	HAM-32-6.82 PID 110991 MOT Alternative Evaluation	Date:	April 8, 2020

Reference: HAM-32-6.82

OVERVIEW

The construction of a green tee intersection at the intersection of State Route (SR) 32 and Eight Mile Road was recommended in the 2019 *Conceptual Alternative Implementation Plan* for Segment II/III of the Eastern Corridor Study (PID 86462). As ODOT started to move forward with the planning and design of this intersection improvement, they determined that there might be an opportunity to construct a planned landslide repair project just east of the intersection in at the same time. By constructing both projects concurrently, there could be potential Department and road user cost savings by reducing the total maintenance of traffic (MOT) cost and time. As a result, a major part of the feasibility study process for this intersection improvement project was to evaluate several MOT schemes in order to determine if there would be any advantages to constructing the two projects together. The following three major components were broken out individually to help fully evaluate MOT options: the reconstruction of Eight Mile Road, the construction of the landslide repair, and maintaining traffic on SR 32. Once all the components were fully evaluated, Stantec met with ODOT on February 19, 2020 to discuss the findings and choose a preferred MOT alternative. This memorandum provides an outline of how each component was evaluated and the process that was used to determine a preferred alternative.

EIGHT MILE ROAD RECONSTRUCTION

Proposed improvements on Eight Mile Road include significant profile adjustment, horizontal adjustment, and roadway widening. The existing constraints for the reconstruction of Eight Mile Road include a tight right of way, steep side slopes, and close proximity to adjacent residential properties. As a result, the options for constructing Eight Mile Road were limited. Stantec evaluated two alternatives for construction which included a stair step construction approach, and a long-term closure of Eight Mile Road.

Stair Step Construction

The stair step approach utilizing part width construction would be the most feasible option to maintain traffic and turn movements at the SR 32 intersection while minimizing the amount of temporary fill material necessary (See Figures 1 and 2). In this approach, traffic would be shifted from one side of the pavement to the other over the course of several MOT phases to build up the profile adjustment gradually. Stair step construction would require a substantial amount of temporary pavement and would also require sheet piling (less than 8 feet in height) in some areas along Eight Mile Road and SR-32 to maintain traffic. In addition, a short-term closure of Eight Mile Road would be required to build the tie in point at the intersection with SR 32. The estimated cost associated with maintaining traffic on Eight Mile Road during construction is estimated to be around \$500,000.

Reference: HAM-32-6.82

Long-Term Closure

A long-term closure of Eight Mile Road for a duration of approximately 3 to 6 months would accelerate the construction of Eight Mile Road, increase the safety of the work zone by removing vehicles from the roadway and reduce MOT costs compared to that associated with the stair step MOT option. See Figure 3. The cost of MOT for the Eight Mile Road Closure would be significantly less than the stair step construction method described above. The estimated cost for the closure MOT would be \$40,000 which is a savings of \$460,000 over the stair step approach.

LANDSLIDE REMEDIATION

The existing landslide near the intersection improvement project occurred in 2015. This slide is located approximately 450 feet east of the SR-32 and Eight Mile Road intersection on the outside slope of the eastbound SR 32 lanes. This slide has compromised the existing pavement for a length of approximately 125 feet. ODOT hired Terracon in 2015 to perform a geotechnical investigation and provide recommendations for repairs based on their findings. The HAM-32-6.89 Geotechnical Report recommended a full closure of eastbound SR 32 in order to remove and reconstruct the roadway embankment. As a part of the MOT evaluation process for this project, Stantec considered other landslide repair options, namely a drilled shaft wall, thinking that the increase in repair cost would be offset by a lower MOT cost.

Excavate & Replace Repair

The excavate and replace alternative was recommended in the 2015 geotechnical report. This repair involves the complete removal and replacement of the top 15 feet to 19 feet of the roadway embankment including the pavement. This alternative would require the closure of eastbound SR 32 and the implementation of a crossover to shift eastbound SR 32 lanes to the westbound SR 32 lanes (See Figure 3). The cost associated with the excavate and replace landslide repair (\$350,000) combined with the MOT eastbound SR 32 crossover (\$520,000) is approximately \$870,000.

Drilled Shaft Wall

A preliminary analysis of a drilled shaft wall was performed by Stantec to reduce overall project cost. The analysis recommended a 175-foot-long drilled shaft wall located 20 feet right of the centerline of eastbound SR 32. This wall would consist of 36-inch diameter drilled shafts, W24x229 reinforcing at 5-foot center to center spacing and 36-inch diameter plug piles. The reinforcing shafts would extend 45 feet deep and the plug piles would extend 25 feet deep and the wall. Using a drilled shaft wall to repair the slide would allow one lane of Eastbound SR-32 to be maintained and avoid the need for a crossover to transfer eastbound SR 32 traffic onto westbound SR 32 lanes (See Figure 4). This alternative would reduce the MOT costs and increase the safety of operations by keeping the eastbound and westbound traffic separate, however, the total project cost utilizing a drilled shaft wall will be greater than the cost for the excavate and replace option. The total cost for the drilled shaft wall repair (\$600,000) and the associated MOT (\$770,000), maintaining one lane of traffic, was approximately \$1,370,000.

Reference: HAM-32-6.82

MAINTAINING SR 32 TRAFFIC

At the intersection of Eight Mile Road and SR 32, the exiting typical section transitions from an undivided two-lane highway to a divided four-lane highway. Reducing SR 32 traffic to one lane in each direction through the project will be required to construct intersection improvement. Stantec evaluated two options for maintaining traffic on SR 32. The first option included maintaining traffic in the eastbound direction on SR 32, the second option included a crossover, shifting eastbound SR 32 traffic to the westbound lanes.

Maintaining One Lane of Eastbound SR 32

Maintaining one lane of traffic in the eastbound direction, in the eastbound lanes, of SR 32 would be possible for the intersection improvement alone. This lane reduction would have a minimal MOT cost. However, as discussed in the previous section, repairing the landslide will require the complete closing of the eastbound lanes. Since the landslide repair will require the closing of the eastbound lanes of SR 32, it appears to be prudent to construct both projects concurrently in order to reduce total impacts to the travelling public and overall project costs.

SR 32 Eastbound to Westbound Crossover

Shifting the eastbound SR 32 traffic to the westbound SR 32 lanes would allow the full closure of the eastbound SR 32 lanes which would minimize the impact of the landslide repair as well as ease construction of the south side of SR 32 through the intersection. The determination of the possible closure of Eight Mile Road during construction has a large impact on the cost of this MOT alternative. The long-term closure of Eight Mile Road during construction significantly reduces the cost of the crossover alternative. If Eight Mile Road is maintained during construction, additional temporary pavement and sheet piling (less than eight feet in height) would be required along the south side of westbound SR 32 to maintain turning movements at the intersection. There are several residential properties that have primary access on eastbound SR 32 and would be impacted by the crossover construction. These properties are all east of the existing connector between westbound and eastbound SR 32. Therefore, during construction residents and others could use this connector to reach their properties. A dedicated left turn lane would be developed for this connector to improve safety during construction. If Eight Mile Road were closed the cost of the crossover MOT would be \$520,000 as noted in the Eight Mile Construction Section above.

MEETING WITH ODOT

Stantec met with ODOT at District 8 Headquarters on February 19, 2020 at 10:00 AM to present the information contained above and choose a preferred MOT scheme. Charlie Rowe, Joe Smithson, and Scott Kraus from ODOT attended the meeting and Paul Durham, Steve Shadix, and Scott Connor from Stantec attending the meeting. ODOT agreed that the intersection improvement project and the landslide repair project should be built concurrently in order to minimize impacts to the traveling public. ODOT also decided that a long-term closure of Eight Mile Road, of 3-6 months, would be the preferred MOT alternative moving forward. Closing Eight Mile Road would also significantly reduce MOT impacts and costs for the crossover construction. An email summary of this meeting is attached.

April 8, 2020

Charlie Rowe, PE

Page 4 of 4

Reference: HAM-32-6.82

CONCLUSION

The recommended MOT scheme is a closure of Eight Mile Road during construction, with the landslide repair occurring concurrently. Closing Eight Mile Road will remove the turn movements at the SR-32 and Eight Mile Road intersection, which will minimize the need for temporary pavement and sheet piling along the south side of SR 32. Since SR 32 is a two-lane, two-way undivided roadway just west of the intersection, that configuration can be maintained through the split without the need of a portable concrete barrier to separate the two lanes of traffic. This will reduce the footprint of the temporary SR-32 lanes which will further minimize the need for temporary pavement and sheet piling along the south side of SR-32. This MOT approach will also maximize the safety of the work zones on Eight Mile Road and the landslide on eastbound SR-32 by removing traffic from these areas.

Stantec Consulting Services Inc.



Paul Durham PE

Senior Transportation Engineer

Phone: 513 619 6457

Paul.durham@stantec.com

Attachment: as noted

c. C.C.



FIGURE 1
PREPHASE 1 & PHASE 1A

DESCRIPTION:
PREPHASE 1 - CONSTRUCTION OF TEMPORARY PAVEMENT ALONG THE WEST/SOUTH EDGE OF THE EXISTING PAVEMENT ON 8 MILE ROAD.
PHASE 1A - CONSTRUCTING PORTIONS OF THE PROPOSED 8 MILE ALIGNMENT ON THE EAST/NORTH SIDE OF THE ALIGNMENT AND ADDITIONAL TEMPORARY PAVEMENT AND TEMPORARY SHORING FOR THE NEXT PHASE OF CONSTRUCTION OF 8 MILE ROAD.

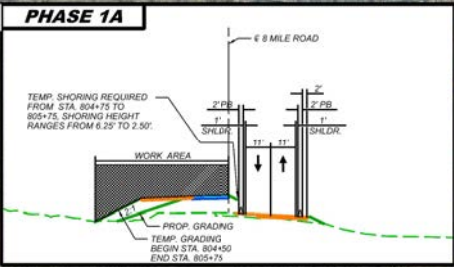
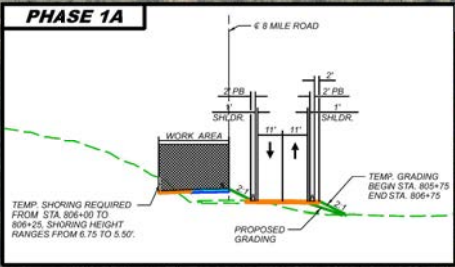
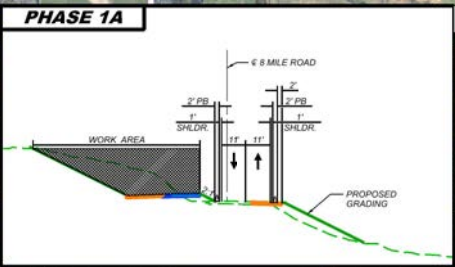




FIGURE 2
PHASE 1B - EIGHT MILE STAIR STEP CONSTRUCTION

DESCRIPTION:

CONSTRUCTION OF THE SOUTH SIDE OF S.R. 32 AND THE WEST/SOUTH SIDE OF 8 MILE ROAD WITH S.R. 32 EASTBOUND TRAFFIC REROUTED ONTO THE S.R. 32 WESTBOUND LANES AND FIX THE LAND SLIDE ON THE S.R. 32 EASTBOUND PAVEMENT.

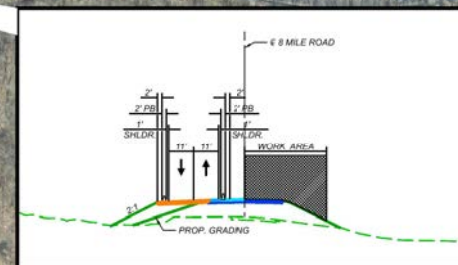
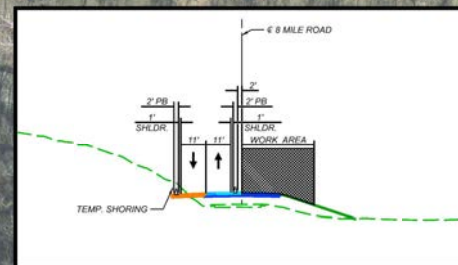
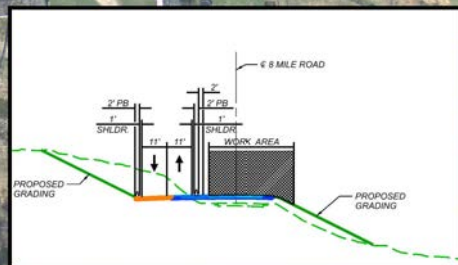
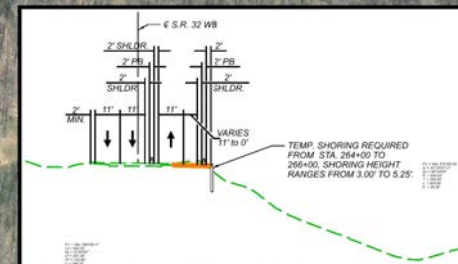
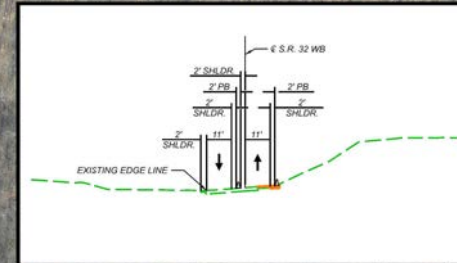
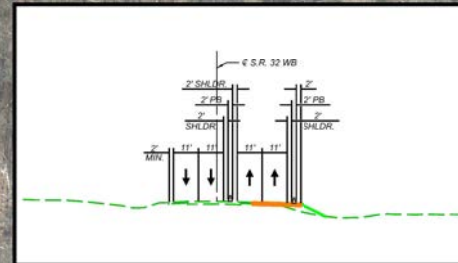




FIGURE 3
EASTBOUND TO WESTBOUND CROSSOVER

DESCRIPTION:
IMPLEMENTATION OF THE EASTBOUND SR 32 TO WESTBOUND SR 32 LINES AT THE EIGHT MILE ROAD INTERSECTION WHICH ALLOWS THE LONG TERM CLOSURE OF EIGHT MILE ROAD AND EASTBOUND SR 32 TO ALLOW CONSTRUCTION OF EIGHT MILE ROAD AND THE LANDSLIDE REPAIR USING THE EXCAVATE AND REPLACE ALTERNATIVE.

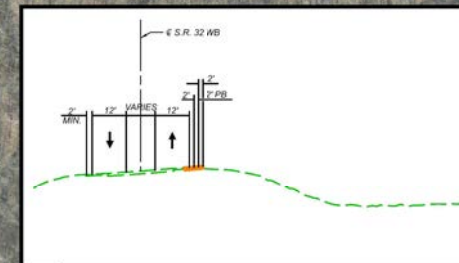
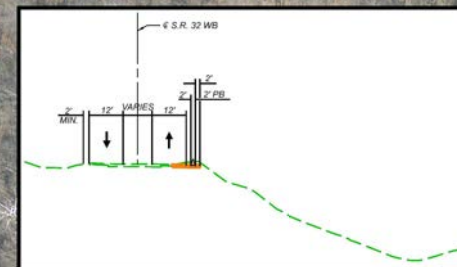


FIGURE 4
PHASE 1B ALTERNATIVE - DRILLED SHAFT WALL/SR 32
SINGLE LANE CLOSURE

DESCRIPTION:

CONSTRUCTION OF THE SOUTH SIDE OF S.R. 32 AND THE WEST/SOUTH SIDE OF 8 MILE ROAD WITH S.R. 32 EASTBOUND TRAFFIC DEMOTED TO A SINGLE, EXISTING LANE.



From: [Durham, Paul](#)
To: Charles.Rowe@dot.ohio.gov
Cc: [Shadix, Steve](#)
Subject: PID 110991 HAM-32-6.882 MOT Meeting Follow-up
Date: Monday, February 24, 2020 3:22:00 PM
Attachments: [Project Schedule.pdf](#)

Charlie,

Thanks for taking the time to meet with us last week regarding the MOT alternatives for the HAM-32-6.82 project.

Based on our conversation at the meeting we understand that the preferred MOT alternative to be included in the feasibility study should be the complete closure of eastbound SR 32 and 8-Mile road during the landslide repair and partial intersection reconstruction. A single lane in both the eastbound and westbound direction of SR 32 will be maintained in the existing westbound lanes during the closure. A detour will be installed for 8-Mile Road.

Additional directives from ODOT include:

- The landslide repair should be corrected concurrently with the 8 Mile green tee project to minimize total disruptions to traffic.
- A left turn lane must be provided for the access road crossing between the existing eastbound and westbound SR 32 alignments.
- Portable barrier is not warranted to divide eastbound and westbound traffic on the existing westbound lanes of SR 32. (The existing condition of SR 32 east and west of this project is undivided.)
- Rumble stripes or delineators should be used along the centerline in lieu of portable concrete barrier.
- Channelizing devices to control drive access should be installed in front of driveways on the SR 32 hill.
- As the project progresses, notification letters should be sent to property owners who will be impacted by the MOT of this project since the changes in traffic patterns are substantial.

Before we finalize the MOTAA we are asking for a confirmation that the temporary closing of 8-Mile road for construction is acceptable to the District.

Additionally we're requesting that the project schedule be updated. We've attached a suggested schedule. (Note that all schedule items after the Feasibility Study are contingent on completing a contract modification as outlined in the original scope.)

Sincerely,
Paul

Paul Durham PE
Senior Transportation Engineer
Direct: 513-619-6467
Paul.Durham@stantec.com

Stantec



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