

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

**OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE**

FILE P.I. # 0013531
Henry County
GDOT District 3 - Thomaston
SR 20 from I-75 to CS 721/Phillips Drive
Widening and Improvements –
Including a Roundabout

OFFICE Design Policy & Support

DATE August 15, 2016

Kim Phillips
FROM *for* Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT APPROVED CONCEPT REPORT

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Hiral Patel, Director of Engineering
Joe Carpenter, Director of P3/Program Delivery
Genetha Rice-Singleton, Assistant Director of P3/Program Delivery
Albert Shelby, State Program Delivery Engineer
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Michael Presley, District Engineer
Adam Smith, District Preconstruction Engineer
Scott Parker, District Utilities Engineer
Cherral Dempsey, Project Manager
BOARD MEMBER - 3rd Congressional District

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
PROJECT CONCEPT REPORT**

Project Type: <u>Road Widening</u>	P.I. Number: <u>0013531</u>
GDOT District: <u>3</u>	County: <u>Henry</u>
Federal Route Number: <u>N/A</u>	State Route Number: <u>20/81</u>
Project Number: _____	N/A

This project involves widening SR 20 from I-75 to CS 721/Phillips Drive from a two lane rural section to four lane urban section with sidewalk and a raised median.

Submitted for approval:

<u>Hatem F. Aly</u>	<u>6/7/2016</u>
Consultant Designer & Firm, <u>Jacobs Engineering Group</u>	Date
<u>Kimberley Nesbitt for AVS</u>	<u>6.9.16</u>
State Program Delivery Engineer	Date
<u>C. L. B. KESD</u>	<u>6/7/2016</u>
GDOI Project Manager	Date

Recommendation for approval: (Delete any inapplicable signature lines)

* <u>Eric Duft/KLP</u>	<u>6-13-2016</u>
State Environmental Administrator	Date
* <u>Christopher Raymond/KLP</u>	<u>6-24-2016</u>
State Traffic Engineer	Date
* <u>Lisa Myers/KLP</u>	<u>6-10-2016</u>
Project Review Engineer	Date
* <u>Yulonda Pride-Foster/KLP</u>	<u>6-14-2016</u>
State Utilities Engineer	Date
* <u>Bill DuVall/KLP</u>	<u>6-9-2016</u>
State Bridge Design Engineer	Date
_____ District Engineer	Date

- MPO Area: This project is consistent with the MPO adopted Regional Transportation Plan (RTP)/Long Range Transportation Plan (LRTP).
- Rural Area: This project is consistent with the goals outlined in the Statewide Transportation Plan (SWTP) and/or is included in the State Transportation Improvement Program (STIP).

<u>Camille L. Burke</u>	<u>6-16-16</u>
State Transportation Planning Administrator	Date

PROJECT LOCATION MAP

P.I. NO. 0013531- Henry County - Location Sketch
SR 20 Widening from I-75 to Phillips Drive



PLANNING AND BACKGROUND

Project Justification Statement: (Provided by the Office of Planning)

SR 20/81 (Hampton Street) in Henry County is classified as an urban minor arterial. It is a two lane facility that connects I-75 to the residential and commercial parts of McDonough. This project was identified by Georgia Department of Transportation in October of 1985 and is currently included in the Atlanta Regional Commission's (ARC) Plan 2040 and the Transportation Improvement Program.

According to ARC's regional travel demand model, SR 20/81 currently operates at a Level of Service (LOS) C from Phillips Drive to East of I-75, with the exception of one segment just east of Willow Lane that is operating at a LOS of E. The current (2013) volumes range from 18,400 to 27,500 vehicles per day between I-75 and Phillips Drive. By the design year 2042, on SR 20/81 volumes are projected to increase to the range of 31,300 to 37,850 between Willow Lane and Phillips Drive and up to 42,350 vehicles per day just east of I-75, which correlates to a LOS of F. LOS F for an urban area is deemed an unacceptable level of service. This project is aligned with the goals and objectives in the Statewide Transportation Plan Improvement and ARC's plan 2040 by aiming to improve access to jobs, reduce congestion costs and by focusing on the Region's Strategic Transportation System (RSTS), the regional truck route network (ASTRoMaP), and the strategic through fare network.

The crash rates for SR 20/81 are higher than the statewide average for a similar type corridor. The crash rate for SR 20/81 for years 2012, 2013, and 2014 are 1,287, 1,506, and 1,355 per million vehicle-miles traveled (MVMT) respectively. The statewide average crash rate for an urban minor arterial from years 2012-2014 are 476, 610 and 631 respectively. The most common type of collision, 54% of all collisions are a rear end collision. Rear end collisions are often associated with heavy traffic congestion.

The goals of this project, PI 0013531 are to alleviate present and future traffic congestion on SR 20/81 and to reduce crash frequency and severity. The preliminary proposed limits are at Phillips Drive on the east (connecting to an existing two-lane section) and just east of I-75 on the west end (connecting to an existing four lane section).

Another widening project programmed in the area, PI 321530, accommodates traffic from the northwest approach to McDonough. PI 321530 is the extension and upgrade of the one-way pair on Jonesboro Street and Hampton Street through downtown McDonough from west of the Southern Railroad on Jonesboro Street to a point approximately 2500 feet east of Cedar Street.

Existing conditions: SR 20 between I-75 and Phillips Drive is running east-west and has a posted speed of 45 mph. The segment of SR 20 between I-75 and Industrial Blvd is currently four lane section with 12 feet wide urban shoulders and five-foot sidewalks both sides of the road. The eastbound approach of this section has two dedicated left turn lanes onto Old Industrial Boulevard. The existing sidewalk on the left side stops at Willow Lane and picks up again in front of McDonough Village shopping center up to TEXACO gas station. The sidewalk on the right side continues approximately 300 ft east of Regency Plaza Blvd. and picks up again in front of United Community Bank. East of Industrial Blvd., the road width narrows down to two-lane road with some auxiliary lanes at intersections. The existing overhead utilities are located both sides of the road and the existing underground utilities are located on the north side of SR 20. There are wetlands and two stream crossing within the project limits. The roadway vertical curve over Camp Creek Tributary crossing has a deficient K value of 45 (for 45 MPH road, min. K is 79). There are five existing traffic signals along SR 20 and are located at the intersections with I-75, Old Industrial Blvd., Industrial Blvd/Willow Ln., Regency Park Dr., and Phillips Drive. Another signal will be added before this project is let under Henry County project HC-15-64 at the intersection of McDonough Pkwy. The major intersections along SR 20 are at the ramps with I-75, Old Industrial Blvd., Willow Ln., Preston Creek Dr., Regency Plaza Blvd., Pennsylvania Ave., Regency Park Dr., W Asbury Rd., McDonough Pkwy., and Phillips Drive.

Other projects in the area:

- 0013294 - I-75 @ SR 20 – Diverging Diamond Interchange

The project proposes to convert the existing interchange into a Diverging Diamond Interchange. Right-of-way impacts are not anticipated.

- 321530- East-West 1-Way Pair, McDonough

The project begins just west of the Southern Railroad on Jonesboro Street with the eastbound lanes on SR 81/SR 20 and the westbound lanes on Jonesboro Street/Covington Road to a point approximately 2500 feet east of Cedar Street. Connections on both ends will be constructed on new alignment. Two traffic lanes with parking will be provided except three traffic lanes will be provided in each direction from SR 42 (Macon Street) to Cedar Street. A roundabout will be included at the intersection of Jonesboro Street and Doris Street. Additional drainage improvements will be made along Jonesboro Street from Marian's Way to SR 42/Griffin Street.

- HC-15-64 - McDonough Pkwy at SR 20 Intersection Improvements

The project proposes to extend Henry Parkway to connect SR 20/81 at McDonough Parkway and add a traffic signal at the intersection of McDonough Parkway and SR 20/81. The project is anticipated being open by 2019.

MPO: Atlanta Regional Commission

TIP #: HE-020A

Congressional District(s): 3

Federal Oversight: PoDI Exempt State Funded Other

Projected Traffic: ADT 24 HR T: 4.4%
Current Year (2013): 27,500 Open Year (2022): 32,600 Design Year (2042): 42,350
Traffic Projections Performed by: GDOT Office of Planning

Functional Classification (Mainline): Urban Minor Arterial Street

Complete Streets - Bicycle, Pedestrian, and/or Transit Standard Warrants:

Warrants met: None Bicycle Pedestrian Transit

In consideration of GDOT's Complete Street policy, an assessment of existing and planned bicycle facilities was performed.

The existing project corridor does not have existing bicycle lanes. Beyond the extents of the project, the concept for the DDI at SR 20 and I-75 (PI 0013294) does [not] include bicycle lanes. East of Phillips Drive there is only a 2-ft paved shoulder on both sides of SR 20.

In June 2007, Atlanta Regional Commission (ARC) published the Atlanta Region Bicycle Transportation & Pedestrian Walkways Plan (ARC 2007). The plan examined "the bicycle and pedestrian facilities associated with roadways that are part of ARC's Regionally Strategic Transportation System (RSTS). SR 20 from the City of Hampton to the City of McDonough was included in the study. The plan included the portion of SR 20 from I-75 to McDonough as one of the segment candidates for bicycle facility improvements and recommended new paved shoulders in the future stating:

"If shoulders are developed on these segments they should extend to a minimum of 6.5 feet beyond the existing edge stripe. While only four feet of space is generally recommended, the possibility of the inclusion of rumble strips necessitates this wider shoulder. The 6.5 foot shoulder has recently been proposed by GDOT to ensure bicycle accommodation in locations with rumble strips. The proposed GDOT cross section would leave 4'2" outside of the rumble

strips, meeting the 4-foot clear zone recommended by AASHTO. Due to high traffic volumes, speeds, or truck traffic, certain segments may require wider shoulders to meet the desired level of bicycling accommodation; final dimensions for widened shoulders will need to be determined in preliminary engineering for individual projects.” (ARC 2007, page 44)

Table below shows the bicycle warrant analysis per the Complete Street Policy.

Standard Criteria	Warrant Check	Notes
Project is on a designated (i.e. adopted) U.S., State, regional or local bicycle route	Regional –Meets Warrant	ARC (2007) recommends paved shoulders for bicycles to improve bike LOS along the SR 20 corridor from Hampton, GA to McDonough, GA.
Existing bikeway along or linking to the end of the project corridor (e.g. shared lane, paved shoulder, bike lane, bike boulevard, or shared-use path)	No	West of I-75, an existing multi-use path runs approximately ½ mile from Avalon Pkwy west to Industrial Pkwy.
Corridor with bicycle travel generators and destinations (i.e. residential neighborhoods, commercial centers, schools, colleges, scenic byways, public parks, transit stops/stations, etc)	Meets Warrant	A large commercial area (retail and restaurants) is located at the west terminus of PI 0013531.
On projects where a bridge deck is being replaced or rehabilitated and the existing bridge width allows for the addition of a bikeway with eliminating or precluding needed pedestrian accommodations	Potentially Meets Warrant	Scope of PI 0013294 (I-75 @ SR 20 Diverging Diamond) converts the existing interchange into a diverging diamond. Coordination is required for the interface of Bike and Pedestrian features between PI 0013294 and PI 0013531.
Occurrence of reported bicycle crashes which equals or exceeds a rate of five for a 1-mile segment of roadway, over the most recent three years for which crash data is available	[TBD]	To be determined, based on crash data.

Is this a 3R (Resurfacing, Restoration, & Rehabilitation) Project? No Yes

Pavement Evaluation and Recommendations

Preliminary Pavement Evaluation Summary Report Required? No Yes

Preliminary Pavement Type Selection Report Required? No Yes

Feasible Pavement Alternatives: HMA PCC HMA & PCC

Pavement Evaluation and Type Selection Reports will be completed during preliminary design

DESIGN AND STRUCTURAL

Description of the proposed project: The project proposes to widen a 1.5 mile section of SR 20 from I-75 ramps east of I-75 to Phillips Drive in McDonough, Georgia. It is proposed to widen the existing two lane section to four lane urban section divided by a raised median with median breaks at designated locations. The four lane section will end at Phillips Drive by creating a right-turn bay eastbound and adding a lane westbound. The project includes pedestrian and bicycle improvements to both sides of the road. The outside shoulder on the south side of SR 20 will be 12 feet wide with 30" curb and gutter and five foot sidewalk. The outside shoulder on the north side of SR 20 will be 22 feet wide with 30" curb and gutter and a 10 foot multi-use path. Proposed right turn and left turn lanes will be 12 feet wide. The existing signal equipment will be upgraded and traffic signal timing will be adjusted to improve corridor operations and safety. A hydraulic study will be performed for the two existing culverts along the corridor to determine appropriate culvert size. If the existing culvert found to be adequate to convey the water with a no-rise condition, the existing culverts will be extended to accommodate the road widening. Otherwise, the existing culvert will be replaced with a bridge culvert recommended by the hydraulic study.

The project proposes to correct the deficient vertical curvature over Camp Creek Tributary crossing to meet the AASHTO design criteria for a minimum 45 mph design speed which will require the sag point to be raised approximately 5-foot and would involve additional wetland impacts. The project will pay a close attention to construction staging to keep existing road open for traffic during the construction of this segment of the road.

Several turning lanes will be lengthened based on the traffic study recommendations. The existing right of way varies from 80 to 140 feet. Additional right of way is required for the widening and will follow the proposed urban shoulder break point. Additional Right of Way and/or permanent/temporary easements will be proposed as needed beyond the shoulder break point.

Major Structures:

Structure	Existing	Proposed
Camp Creek Culvert	Dbl 8 x 8 box culvert	Project proposes to extend existing culvert to accommodate roadway widening
Camp Creek Tributary 1 Culvert	Dbl 9 x 9 box culvert	Project proposes to extend existing culvert to accommodate roadway widening
Retaining Wall 1	KFC existing parking lot sits approximately 6 feet above the roadway on the west side of Willow Ln. at the intersection with SR 20.	A retaining wall will be constructed along west side of the Willow Ln. at the northwest quadrant of the intersection with SR 20 to avoid impacts to KFC parking lot. the wall height is approximately 6 ft. tall at its highest point and approximately 200 ft long
Retaining Wall 2	A cut wall on the south side of SR 20, the existing parking lot of Sakura Hibachi Sushi Buffet sits approximately 15-20 feet above grade	A retaining wall will be constructed along south side of the SR 20 at the southeast corner of the intersection of SR 20 and Regency Plaza Blvd to avoid impacts to parking lot. The wall height is approximately 10 ft. tall at its highest point and approximately 230 ft long
Retaining Wall 3	A fill wall on the north side of SR 20 at McDonough Village shopping center where existing parking lot sits approximately 10-15 feet below the roadway	A retaining wall will be constructed along north side of the SR 20 at McDonough Village shopping center located east of Regency Plaza Blvd to avoid impacts to parking lot. the wall height is approximately 10 ft. tall at its highest point and approximately 270 ft long

Structure	Existing	Proposed
Retaining Wall 4	A detention pond is located on the south side of SR 20 in front of the Henry County Hospital Authority.	A retaining wall will be constructed on the south side of SR 20 in front of the existing detention pond located at Henry County Hospital Authority to avoid impacts to exiting detention pond. The wall height is approximately 6 ft. tall at its highest point and approximately 350 ft long

Mainline Design Features:
SR 20/81 – Hampton Rd, Urban Minor Arterial

Feature	Existing	Standard*	Proposed
Typical Section	Rural/Urban	Urban	Urban
- Number of Lanes	2	4	4
- Lane Width(s)	12'	11' – 12'	11'-12'
- Median Width & Type	N/A	20' -24' Raised	20' Raised
- Outside Shoulder or Border Area Width	Varies	10' – 16'	12' – 22'
- Outside Shoulder Slope	Varies	2% max.	2% max.
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	5'	5'	5' – 10'
- Auxiliary Lanes	12' Right Turn	11' – 12'	12'
- Bike Lanes	N/A	4'	10' Multi Use Path
Posted Speed	45 MPH	45 MPH	45 MPH
Design Speed	45 MPH	45 MPH	45 MPH
Min Horizontal Curve Radius	711'	711'	711'
Maximum Superelevation Rate	6.8%	4%	4%
Maximum Grade	6.5%	6%	6%
Access Control	N/A	N/A	N/A
Design Vehicle	WB-67	WB-67	WB-67
Pavement Type	HMA	HMA	HMA

*According to current GDOT design policy if applicable

McDonough Pkwy (Urban Collector)

Feature	Existing	Standard*	Proposed
Typical Section	Urban	Urban	Urban
- Number of Lanes	2	4	4
- Lane Width(s)	11'	11' – 12'	11'
- Median Width & Type	N/A	20' – 24' Raised	20' Raised
- Outside Shoulder or Border Area Width	12'	10' – 16'	12'
- Outside Shoulder Slope	2%	2% max.	2% max.
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	N/A	5'	5'
- Auxiliary Lanes	N/A	11' – 12'	12'
- Bike Lanes	N/A	N/A	N/A
Posted Speed	35 MPH	35 MPH	35 MPH
Design Speed	35 MPH	35 MPH	35 MPH
Min Horizontal Curve Radius	371'	371'	371'
Maximum Superelevation Rate	4%	4%	4%
Maximum Grade	9%	9%	9%
Access Control	N/A	N/A	N/A
Design Vehicle	WB-67	WB-67	WB-67
Pavement Type	HMA	HMA	HMA

*According to current GDOT design policy if applicable

Urban Local Roads (Willow Ln., Industrial Blvd.)

Feature	Existing	Standard*	Proposed
Typical Section	Urban	Urban	Urban
- Number of Lanes	2	2	2 ¹
- Lane Width(s)	12'	10' - 12'	12'
- Median Width & Type	N/A	N/A	N/A
- Outside Shoulder or Border Area Width	12'	10' – 16'	12'
- Outside Shoulder Slope	6% max.	2% max.	2% max.
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	5' ²	5' ²	5' ²
- Auxiliary Lanes	12'	11' – 12'	12'
- Bike Lanes	N/A	N/A	N/A
Posted Speed	35 MPH	35 MPH	35 MPH
Design Speed	35 MPH	35 MPH	35 MPH
Min Horizontal Curve Radius	371'	371'	371'
Maximum Superelevation Rate	6.5%	4%	4%
Maximum Grade	10%	10%	10%
Access Control	N/A	N/A	N/A
Design Vehicle	WB-67	WB-67	WB-67
Pavement Type	HMA	HMA	HMA

*According to current GDOT design policy if applicable

¹ two lanes will be proposed on Willow lane northbound to accommodate the future dual left lanes eastbound on SR 20 onto Willow lane then one of these two lanes will drop at Shoppes lane.

² Five foot (5') sidewalk shall be included to match existing.

Urban Local Roads (Old Industrial Blvd., Preston Creek Dr., Regency Plaza Blvd., Pennsylvania Ave., Saddlecreek Dr., Regency Park Dr., Prity Ct., International Ave., West Asbury Rd., Phillips Drive.)

Feature	Existing	Standard*	Proposed
Typical Section	Urban	Urban	Urban
- Number of Lanes	2 ¹	2 ¹	2 ¹
- Lane Width(s)	12'	10' - 12'	12'
- Median Width & Type	N/A	N/A	N/A
- Outside Shoulder or Border Area Width	Varies	10' – 16'	12'
- Outside Shoulder Slope	Varies	2% max.	2% max.
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	5' ²	5' ²	5' ²
- Auxiliary Lanes	12'	11' – 12'	12'
- Bike Lanes	N/A	N/A	N/A
Posted Speed	25 MPH	25 MPH	25 MPH
Design Speed	25 MPH	25 MPH	25 MPH
Min Horizontal Curve Radius	154'	154'	154'
Maximum Superelevation Rate	Varies	4%	4%
Maximum Grade	11%	11%	11%
Access Control	N/A	N/A	N/A
Design Vehicle	BUS 40 or SU	BUS 40 or SU	BUS 40 or SU
Pavement Type	HMA	HMA	HMA

¹ Number of proposed lanes shall match existing.

² Five foot (5') sidewalk shall be included to match existing conditions at the following intersections: Old Industrial Blvd., Regency Plaza Blvd., Pennsylvania Ave., Regency Park Dr., Philips Drive.

Multi-Use Path along SR 20/81 – Hampton Rd

Feature	Existing	Standard*	Proposed
Typical Section	N/A	N/A	N/A
- Number of Lanes	None	1	1
- Lane Width(s)	N/A	10' - 14'	10'
- Median Width & Type	N/A	N/A	N/A
- Outside Shoulder or Border Area Width	N/A	5'	5'
- Outside Shoulder Slope	N/A	2% max.	2% max.
- Inside Shoulder Width (offset from face of curb)	N/A	5'	5'
- Sidewalks	N/A	N/A	N/A
- Auxiliary Lanes	N/A	N/A	N/A
- Bike Lanes	N/A	10' - 14'	10'
Posted Speed	N/A	18 MPH ¹	18 MPH ¹
Design Speed	N/A	18 MPH ¹	18 MPH ¹
Min Horizontal Curve Radius	N/A	60'	60'
Maximum Superelevation Rate	N/A	2%	2%
Maximum Grade	N/A	5%	5%
Access Control	N/A	N/A	N/A
Design Vehicle	N/A	Bike	Bike
Pavement Type	N/A	HMA or Concrete	HMA

¹ The minimum design speed for chicanes at approaching intersection will be 8 mph per Guide for the Development of Bicycle Facilities, 2012 Fourth Edition.

Major Interchanges/Intersections:

Old Industrial Blvd – Old Industrial Blvd. northbound will consist of one right turn lane, one left turn lane, and one thru lane. Old Industrial Blvd. southbound will consist of one right turn lane, one left turn lane, and one thru lane. SR 20 eastbound has one right turn lane, two left turn lanes, and two thru lanes. SR 20 westbound has one right turn lane, one left turn lane, and two thru lanes. This intersection is currently signalized.

Industrial Blvd. / Willow Ln. - Industrial Blvd. northbound has one right turn lane, one left turn lane, and one thru lane. Willow Ln. northbound will consist of two thru lanes. Willow Ln. southbound will consist of one right, one thru lane and one left turn lane. SR 20 eastbound will have one right turn lane, one left turn lane, and two thru lanes. SR 20 westbound will have one right turn lane, one left turn lane, and two thru lanes.

Regency Plaza Blvd. – Existing Regency Plaza Blvd. northbound has one right turn lane, and one left turn lane. SR 20 eastbound will consist of one right turn lane, and two thru lanes. SR 20 westbound will consist of one left turn lane, and two thru lanes. A Restricted Crossing U-Turn intersection (RCUT), also known as a J-Turn intersection or superstreet intersection, is proposed at this intersection with left only from SR 20 westbound onto Regency Plaza Blvd. Regency Plaza Blvd. northbound traffic going onto SR 20 westbound will make a right onto SR 20 then a U-turn at Pennsylvania Ave.

Regency Park Dr. / Saddlecreek Dr. - Regency Park Dr. northbound has one left turn lane and one shared right/thru lane. Saddlecreek Dr. southbound will consist of one shared right/thru, and one left turn lane. SR 20 eastbound will consist of one right turn lane, two thru lanes, and one left turn lane. SR 20 westbound will consist of one left turn lane, two thru lanes, and one right turn lane. This intersection is currently signalized.

Prity Ct. - Prity Ct. will consist of a right only turn lane onto SR 20 west bound. SR 20 eastbound will consist of two thru lanes and one left turn lane onto Prity Ct. SR 20 westbound will consist of one right turn lane onto Prity Ct. and two thru lanes. RCUT will be proposed at this intersection to provide left in only from SR 20 eastbound onto Prity Ct. Traffic in and out of Prity Ct. will be right-in right-out only.

International Ave. / W Asbury Rd. - International Ave. and W Asbury Rd. will have a shared Right/thru/left lane onto SR 20 with stop control on both side roads. An RCUT is proposed at this intersection to allow left-in only from SR 20 onto International Ave. and W Asbury Rd. Traffic in and out of side roads will be right-in right-out only.

McDonough Pkwy. – The intersection of SR 20 and McDonough Pkwy will be multi-lane roundabout². This intersection will be signalized under HC-15-64 Henry County project which anticipated being open by 2019.

Phillips Dr. - Phillips Dr. northbound has one right turn lane, one thru lane, and one left turn lane. Autumn Lake Dr. has one right turn lane and one shared left/thru. SR 20 both eastbound and westbound will consist of one right turn lane, one left turn lane, and one thru lane. This intersection is currently signalized.

Lighting required: No Yes

Off-site Detours Anticipated: No Yes Undetermined

Transportation Management Plan [TMP] Required: No Yes

If Yes: Project classified as: Non-Significant Significant

TMP Components Anticipated: TTC TO PI

² The final traffic control would be determined pending the roundabout feasibility study in preliminary design

Design Exceptions to FHWA/AASHTO controlling criteria anticipated:

FHWA/AASHTO Controlling Criteria	No	Undeter- mined	Yes	Appvl Date (if applicable)
1. Design Speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Lane Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Shoulder Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Bridge Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Horizontal Alignment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Superelevation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Vertical Alignment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Grade	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Stopping Sight Distance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Cross Slope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Vertical Clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Lateral Offset to Obstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Bridge Structural Capacity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Design Variances to GDOT Standard Criteria anticipated:

GDOT Standard Criteria	Reviewing Office	No	Undeter- mined	Yes	Appvl Date (if applicable)
1. Access Control/Median Openings	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Intersection Sight Distance	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Intersection Skew Angle	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Lateral Offset to Obstruction	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Rumble Strips	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Safety Edge	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Median Usage	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Roundabout Illumination Levels	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Complete Streets	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. ADA & PROWAG	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. GDOT Construction Standards	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. GDOT Drainage Manual	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. GDOT Bridge & Structural Manual	Bridges	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

The project proposes median openings at Preston Creek Drive, Pennsylvania Ave, Prity Ct, resulting in spacing less than 660'

The length of the proposed horizontal curve on SR 20 west of the intersection of SR 20 and Phillips Drive is less than the AASHTO required length of $15 \times V$, where V is the design speed (mph). The proposed length of curve is 367 feet; the minimum length for a design speed of 45 mph is 675 feet. This curve is shorter than minimum required length to avoid the impacts to the historic resource west of Phillips Drive.

VE Study anticipated: No Yes Completed – Date:

UTILITY AND PROPERTY

Railroad Involvement: No

Utility Involvements:

- Snapping Shoals EMC – Power
- Georgia Power - Distribution
- Henry County Water and Sewerage Authority – Water and Sewer
- AT&T – Telephone
- Charter Communications – Cable TV
- Georgia Power - Power
- Atlanta Gas Light (AGL) - Gas

SUE Required: No Yes Undetermined

Public Interest Determination Policy and Procedure recommended? No Yes

Right-of-Way (ROW): Existing width: 80 to 140 ft. Proposed width: 88 to 140 ft.

Required Right-of-Way anticipated: None Yes Undetermined

Easements anticipated: None Temporary Permanent Utility Other

Anticipated total number of impacted parcels:	<u>51</u>
Displacements anticipated:	Businesses: <u>1</u>
	Residences: _____
	Other: _____
	Total Displacements: <u>1</u>

Location and Design approval: Not Required Required

Impacts to USACE property anticipated? No Yes Undetermined

ROUNDBABOUTS

Roundabout feasibility study was performed at the intersection of SR 20/McDonough Pkwy. Refer to Attachment 6 (Traffic Technical Memorandum) for the roundabout Level of Service (LOS) results.

A roundabout will also be considered at the intersection of SR 20/Regency Plaza Blvd if the RCUT option is not viable at this location.

If Roundabouts are warranted at any of these intersections a lighting agreement will be negotiated between GDOT and Henry County and/or City of McDonough.

Roundabout Lighting Agreement/Commitment Letter received: No Yes

Roundabout Planning Level Assessment: Yes – Refer to Attachment 6..

Roundabout Feasibility Study: Will be performed under TO#2.

Roundabout Peer Review Required: No Yes Completed – Date:

CONTEXT SENSITIVE SOLUTIONS

Issues of Concern:

1. SR 20 within the project limits has commercial and business properties which will be impacted by this project.

2. There is one historic property along the corridor that will need to be preserved. It is Richard Allen Carmichael property which is located on the north side of SR 20 west of Phillips drive intersection. There is also an unmarked cemetery located in front of Henry County Department of Transportation building located east of McDonough Pkwy intersection.
3. The existing roadway corridor has little pedestrian/bicyclist accommodation east of Willow Ln.
4. The existing corridor has a higher crash rate than other roadways also classified as urban minor arterials.
5. Adding extra pavement and changing the hydraulics of the area could result in flooding.
6. An unmarked cemetery is located on the property of the Henry County Department of Transportation.

Context Sensitive Solutions Proposed:

1. The stakeholders will be engaged during the design process to identify local and regional issues and concerns.
2. Impacts to the historic property and the unmarked cemetery will be minimized by widening to the opposite side of the road.
3. A sidewalk and multi-use path will be added along the project to provide a pedestrian and bicyclist friendly corridor.
4. A raised median, which has been shown by FHWA to reduce crashes, will be installed.
5. To minimize the risk of flooding, under the GAR041000 NPDES/MS4 permit, the implementation of post-construction BMPs is required to treat the first 1.2 inches of stormwater runoff for water quality, provide detention of the channel protection volume, and provide safe passage to the 100-year storm event.
6. The project will avoid impacting the unmarked cemetery by staying within existing R/W in front of Henry County DOT property.

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document:

GEPA: NEPA: CE EA/FONSI EIS

MS4 Permit Compliance – Is the project located in a MS4 area? No Yes

Environmental Permits/Variations/Commitments/Coordination anticipated:

Permit/ Variance/ Commitment/ Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Forest Service/Corps Land	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. CWA Section 404 Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NW 14 anticipated
4. 33 USC 408 Decision	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Tennessee Valley Authority Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Buffer Variance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. Coastal Zone Management Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. NPDES	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9. FEMA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pending Hydraulic Study
10. Cemetery Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All work outside of cemetery boundary
11. Other Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12. Other Commitments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13. Other Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	USACE and Georgia DNR

Is a PAR required? No Yes Completed – Date:

Environmental Comments and Information:

NEPA/GEPA: GEPA Type EER document anticipated.

Ecology: The January 2016 field study identified six jurisdictional Waters of the US: two perennial streams, two intermittent streams, and two wetlands. Of these systems, four would require a state mandated 25-foot protective buffer. In addition to the jurisdictional waters, three additional non-buffered state waters were identified along the project corridor: two non-jurisdictional ephemeral channels and one non-jurisdictional wetland (detention pond). Consideration of fish passage would be required if the proposed project would require the replacement of any existing culverts located within perennial streams.

No waters within the project area or within one linear mile of the project survey area are classified as biota impaired streams. The nearest 303(d) impaired stream segment, as documented by the Draft 2014 Georgia Environmental Protection Division 305(b)/303(d) List, is located approximately 3.4 miles northeast of the proposed project at Walnut Creek. Refer to Attachment 12 – Ecology Resources Survey Report for more details.

Neither critical habitat nor essential fish habitat is located within the project area or Henry County. Inspections of structures along the project alignment identified suitable migratory bird habitat and bat roosting habitat. Migratory birds and bat specimens were not identified during the January 2016 field survey. Refer to Attachment 12 – Ecology Resources Survey Report for more details.

History: there are two eligible historic resources on this project. The first one is the cemetery in front of the Henry County DOT building and the Allen Carmichael House located on the north side of Hampton Street (SR 20/Highway 81). It is approximately 300 feet southwest from the intersection with Phillips Drive at 502 Hampton Street. Refer to Attachment 11 – Historic Resources Survey Report in the appendices for more information.

Archeology: Detailed Archaeology studies have not been performed yet. Ground penetrating radar identified an unmarked cemetery which is being treated as a historic resource. The project widening will be shifted to the north side to avoid impacts to the unmarked cemetery. Refer to Attachment 10 – Cemetery Investigation in the appendices for more information.

Air Quality:

Is the project located in a PM 2.5 Non-attainment area? No Yes
 Is the project located in an Ozone Non-attainment area? No Yes
 Carbon Monoxide hotspot analysis: Required Not Required TBD

The proposed project is included in the Atlanta Regional Commission's (ARC) Plan 2040 and the Transportation Improvement Program (TIP) as Project HE—020A. The termini, # of lanes, and proposed open to traffic year listed in the TIP match the project's current proposed concept.

Noise Effects: Noise modeling will only be required at the eligible historic resources identified in the project area. No other noise assessment is required under GEPA.

Public Involvement: The project is anticipated to have several stakeholder meetings with local government officials. A Stakeholder meeting with Henry County and City of McDonough was held on May 12, 2016.

In addition, it is anticipated that a Public Information Open House (PIOH) will be held due to the addition of a median. A Public Hearing Open House (PHOH) will be required if an Environmental Effects Report (EER) is warranted.

Major stakeholders: Businesses located in the project area, Henry County DOT, City of McDonough, property owners

CONSTRUCTION

Issues potentially affecting constructability/construction schedule: None

Early Completion Incentives recommended for consideration: No Yes**COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS****Initial Concept Meeting:** Meeting was held on 12-15-2015 - minutes attached**Concept Team Meeting:** Meeting was held on 04-07-2016 - minutes attached**Other Coordination to date:**

- Project Kick-off meeting was held on 10-26-2015 - minutes attached
- Meeting with Henry County and City of McDonough was held 01-13-2016 to discuss typical section alternatives - minutes attached
- Conference call with Tyler Peek (GDOT District 3) was held 02-03-2016 to discuss median openings - minutes attached
- Conference call with OES on 12-09-2015 to discuss the unmarked cemetery in front of Henry County DOT building - minutes attached
- Conference call with Tyler Peek (GDOT District 3) was held 05-26-2016 to discuss Intersection LOS at Industrial Blvd - minutes attached
- Conference call with GDOT was held 07-05-2016 to discuss traffic control at the intersection of SR 20 and McDonough Pkwy – minutes attached

P.A.R. Meetings: N/A**USFWS:** Early coordination has started**Georgia DNR:** Early coordination has started**US Army Corps of Engineers (USACE):** TBD**Public Involvement:** TBD**Stakeholder Meeting:** Stakeholder meeting with Henry County and City of McDonough was held 05-12-2016 – minutes attached

Project Activity	Party Responsible for Performing Task(s)
Concept Development	Jacobs
Design	Jacobs
Right-of-Way Acquisition	GDOT
Utility Coordination (Preconstruction)	GDOT
Utility Relocation (Construction)	Utility Owners
Letting to Contract	GDOT
Construction Supervision	GDOT
Providing Material Pits	Contractor
Providing Detours	GDOT
Environmental Studies, Documents, & Permits	GDOT / Edwards Pitman
Environmental Mitigation	GDOT
Construction Inspection & Materials Testing	GDOT

Project Cost Estimate Summary and Funding Responsibilities:

	Breakdown of PE	ROW	Reimbursable Utility	CST*	Environmental Mitigation	Total Cost
Funded By	GDOT	GDOT	GDOT	GDOT	GDOT	
\$ Amount	TBD	\$3,642,000	\$1,335,000	\$12,665,371	288,000	
Date of Estimate		06/06/2016	05/24/2016	06/06/2016	06/06/2016	

*CST Cost includes: Construction, Engineering and Inspection, Contingencies and Liquid AC Cost Adjustment. Construction cost estimate was performed based on existing pavement being retained, milled and overlaid

ALTERNATIVES DISCUSSION

Alternative selection:

In accordance with the need and purpose of the project, four (4) alternatives have been analyzed: three (3) build and one (1) no-build as shown in the table below.

Alternative	Description
Alternative I	Widen existing to a four (4) lane urban section
Alternative II	Alternative I + 4' bike lanes
Alternative III	Alternative I + Multi-use path
Alternative IV	No-Build

Alternative I

Alternative I is considered a type of base-level alternative. Alternative I proposes to widen SR 20 from two (2) 12-foot to four (4) 11-foot lanes with 20' raised median and 12-foot urban shoulders with a 5' sidewalk. The minimum median width per GDOT's Design Policy Manual ranges from 20' to 24'; for Alternative I a 20-foot median was selected to reduce the overall required right-of-way width. The proposed shoulder is 12-foot urban shoulder with curb and gutter, utility strip and sidewalk on both sides. The minimum border area for an urban arterial roadway ranges from 10' to 16'. A 12-foot shoulder was selected to reduce the overall right-of-way width.

This alternative widens to the north side of SR 20 in front of the unmarked cemetery to avoid any right of way take from Henry County DOT property. In addition, this alternative will not impact the historic resource located just west of Phillips Drive.

Alternative I would require a Design Exception/Design Variance for the length of the horizontal curve at of the unmarked cemetery and at the historic resource.

Alternative II

In consideration of GDOT's Complete Street policy, Alternative II proposes the same base-level typical from Alternative I plus a 4-foot bike lane in each direction along SR 20.

Alternative III

In consideration of GDOT's Complete Street policy, Alternative III proposes to install a 10-foot multi-use path on the north side of SR 20 in addition to the base-level urban shoulder of Alternative I to improve the bicycle and pedestrian LOS of the corridor and meet GDOT's Complete Streets Policy. For materials cost analysis, the multi-use path was assumed to be asphalt with 3.5" of asphalt and 6" of GAB.

Alternative IV

For comparison purposes, Alternative IV is the "No-Build Alternative" so that a measurement of improvement can be quantified. While improvements can be measured in terms of level of service (LOS), driver safety improvements can be associated with the level of service enhancements. The "No-Build Alternative" does not encourage a reduction in the accidents, injuries, and fatalities and thus does not meet the need and purpose of the project.

Preferred Alternative: Proposes to widen SR 20 from two (2) 12-foot to four (4) 11-foot lanes with 20' raised median and 22-foot urban shoulders with 10-foot multi-use path on the north side of SR 20 and 12-foot urban shoulders with 5' sidewalk on the south side of SR 20			
Estimated Property Impacts:	51	Estimated Total Cost:	\$17,930,371
Estimated ROW Cost:	\$3,642,000	Estimated CST Time:	24 months
Rationale: <i>This alternative complies with complete street policy and increases bikers' safety by separating the bike route from roadway and providing a multi-use path</i>			

No-Build Alternative:			
Estimated Property Impacts:	0	Estimated Total Cost:	\$0
Estimated ROW Cost:	\$0	Estimated CST Time:	None
Rationale: <i>Does not meet the need and purpose of the project. The "No-Build Alternative" does not encourage a reduction in the accidents, injuries, and fatalities</i>			

Alternative 1: Alternative I proposes to simply widen SR 20 from two (2) 12-foot to four (4) 11-foot lanes with 20' raised median and 12-foot urban shoulders with 5' sidewalk			
Estimated Property Impacts:	47	Estimated Total Cost:	\$16,401,882
Estimated ROW Cost:	\$2,901,221	Estimated CST Time:	24 months
Rationale: <i>Doesn't comply with complete street policy</i>			

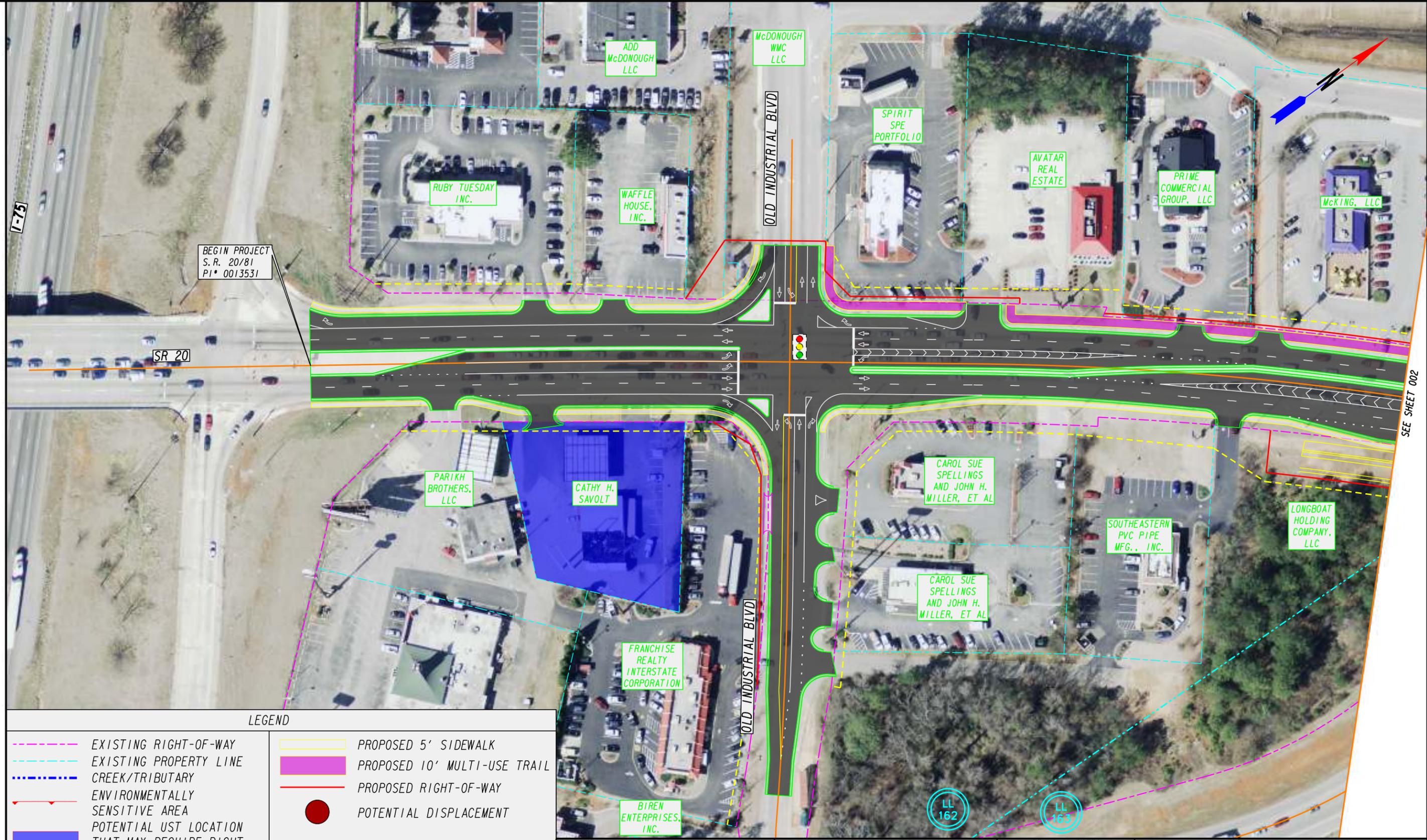
Alternative 2: Alternative II proposes the same base-level typical from Alternative I plus a 4-foot bike lane in each direction along SR 20			
Estimated Property Impacts:	48	Estimated Total Cost:	\$17,818,351
Estimated ROW Cost:	\$3,457,286	Estimated CST Time:	24 months
Rationale: <i>This alternatives raises bikers' safety concern being adjacent to vehicles</i>			

Alternative 3: Alternative III proposes the same base-level typical from Alternative I plus proposes to install a 10-foot multi-use path in the westbound direction along SR 20			
Estimated Property Impacts:	51	Estimated Total Cost:	\$17,930,371
Estimated ROW Cost:	\$3,642,000	Estimated CST Time:	24 months
Rationale: <i>This alternative complies with complete street policy and increases bikers' safety by separating the bike route from roadway and providing a multi-use path.</i>			

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Attachment #1

Concept Plan



BEGIN PROJECT
 S. R. 20/81
 PI • 0013531

LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		PROPOSED SIGNAL
	EXISTING SIGNAL		

GDOT
PROGRAM DELIVERY

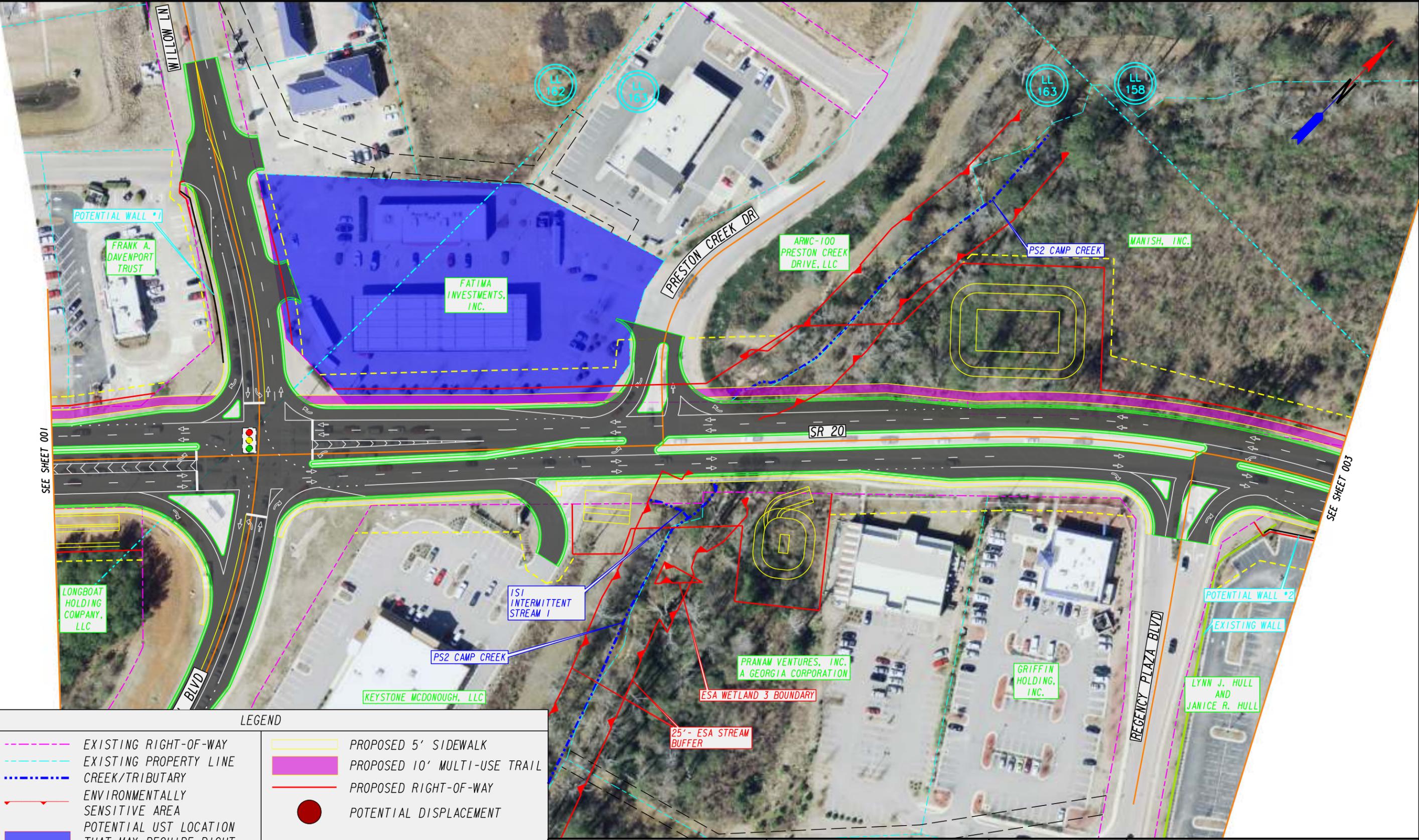
JACOBS
 SCALE IN FEET
 0 100 200 400

REVISION DATES	

CONCEPT PLAN
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	001
CORRECTED:	DATE:	
VERIFIED:	DATE:	

SEE SHEET 002



LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		PROPOSED SIGNAL
	EXISTING SIGNAL		

GDOT
PROGRAM DELIVERY

JACOBS
 SCALE IN FEET
 0 100 200 400

REVISION DATES	

CONCEPT PLAN
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	002
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		PROPOSED SIGNAL
	EXISTING SIGNAL		

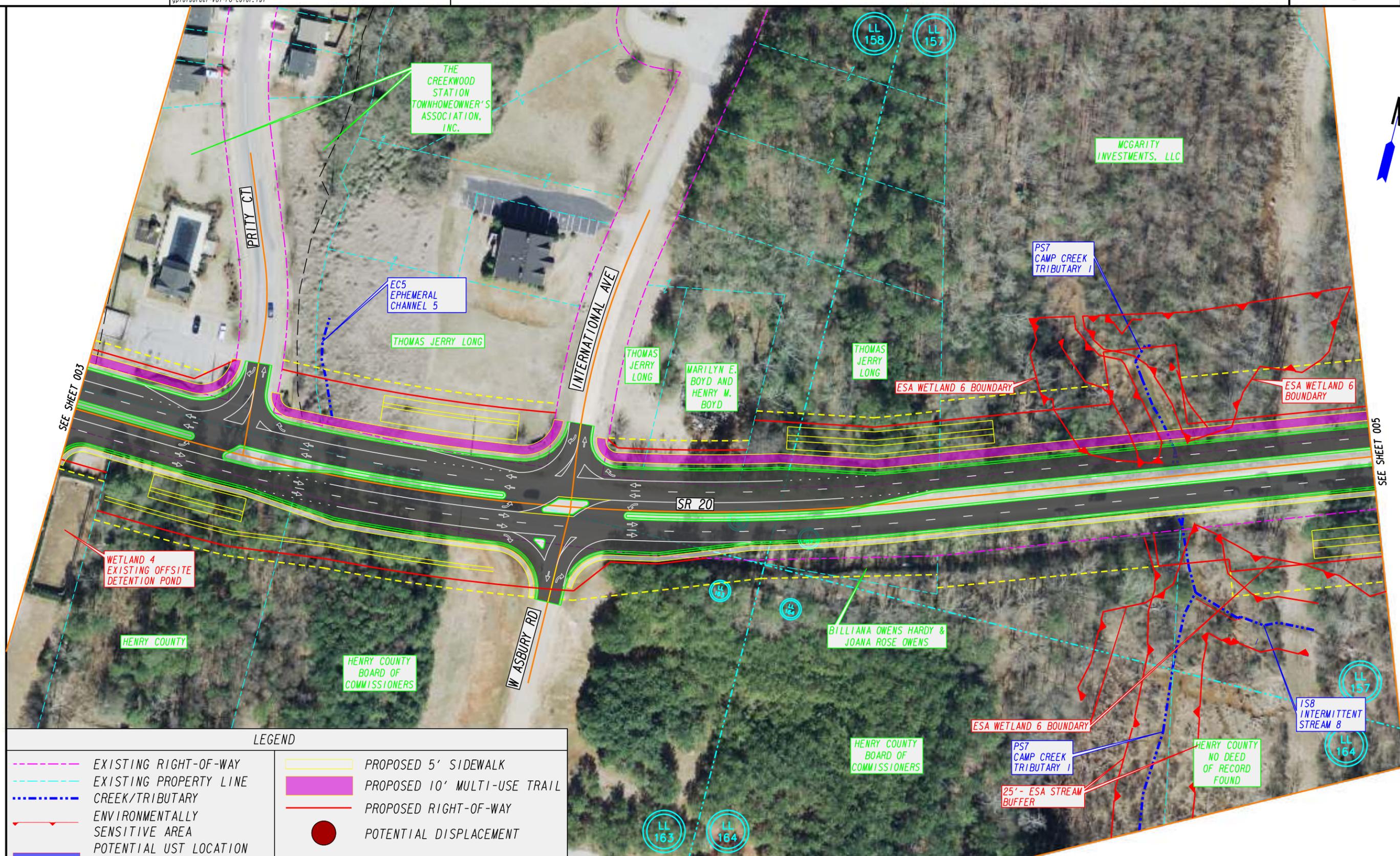
GDOT
PROGRAM DELIVERY

JACOBS
SCALE IN FEET
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REVISION DATES	

CONCEPT PLAN
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	003
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 003

SEE SHEET 005

LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		PROPOSED SIGNAL
	EXISTING SIGNAL		

GD&T

PROGRAM DELIVERY

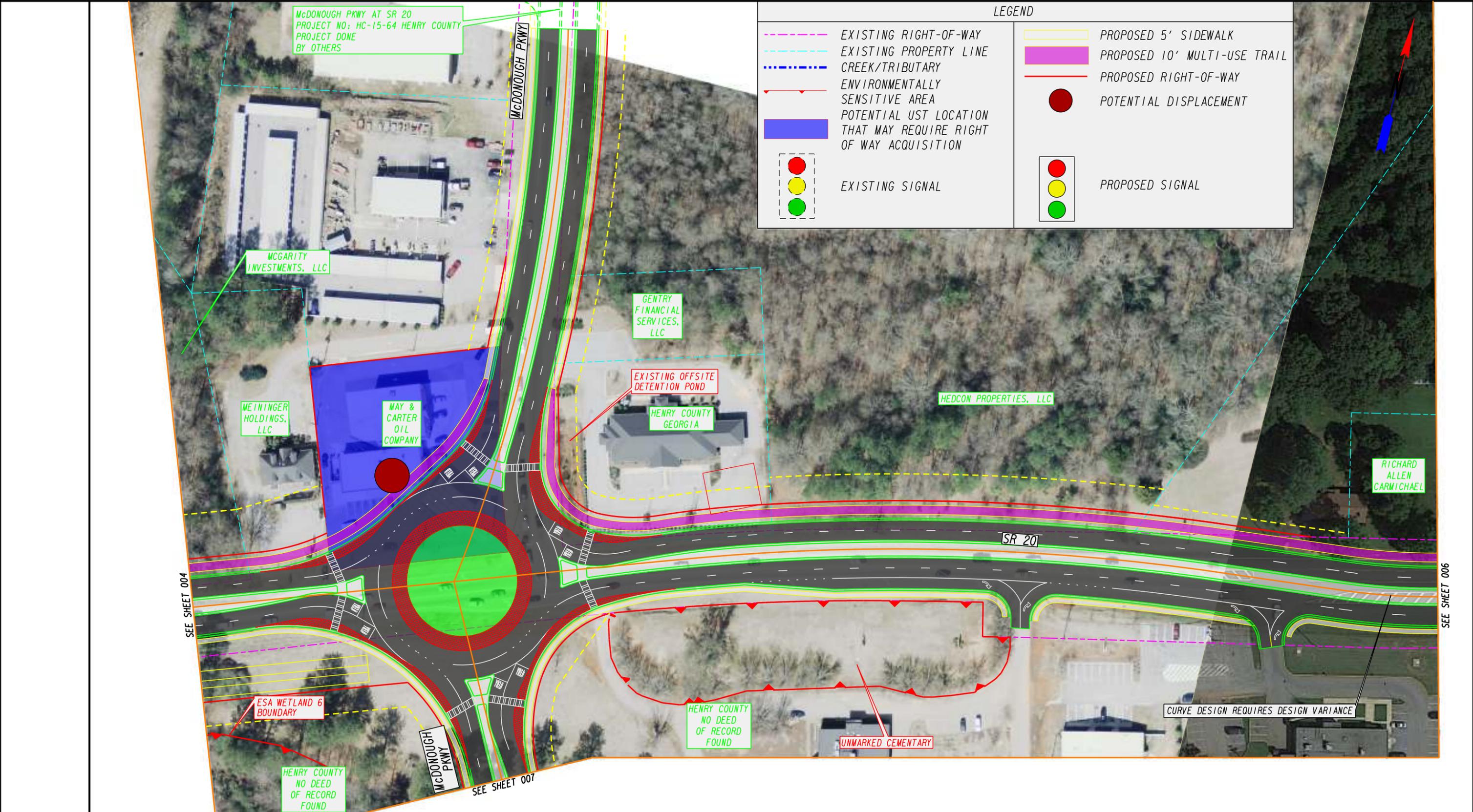
JACOBS

SCALE IN FEET

REVISION DATES	

CONCEPT PLAN
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

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CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

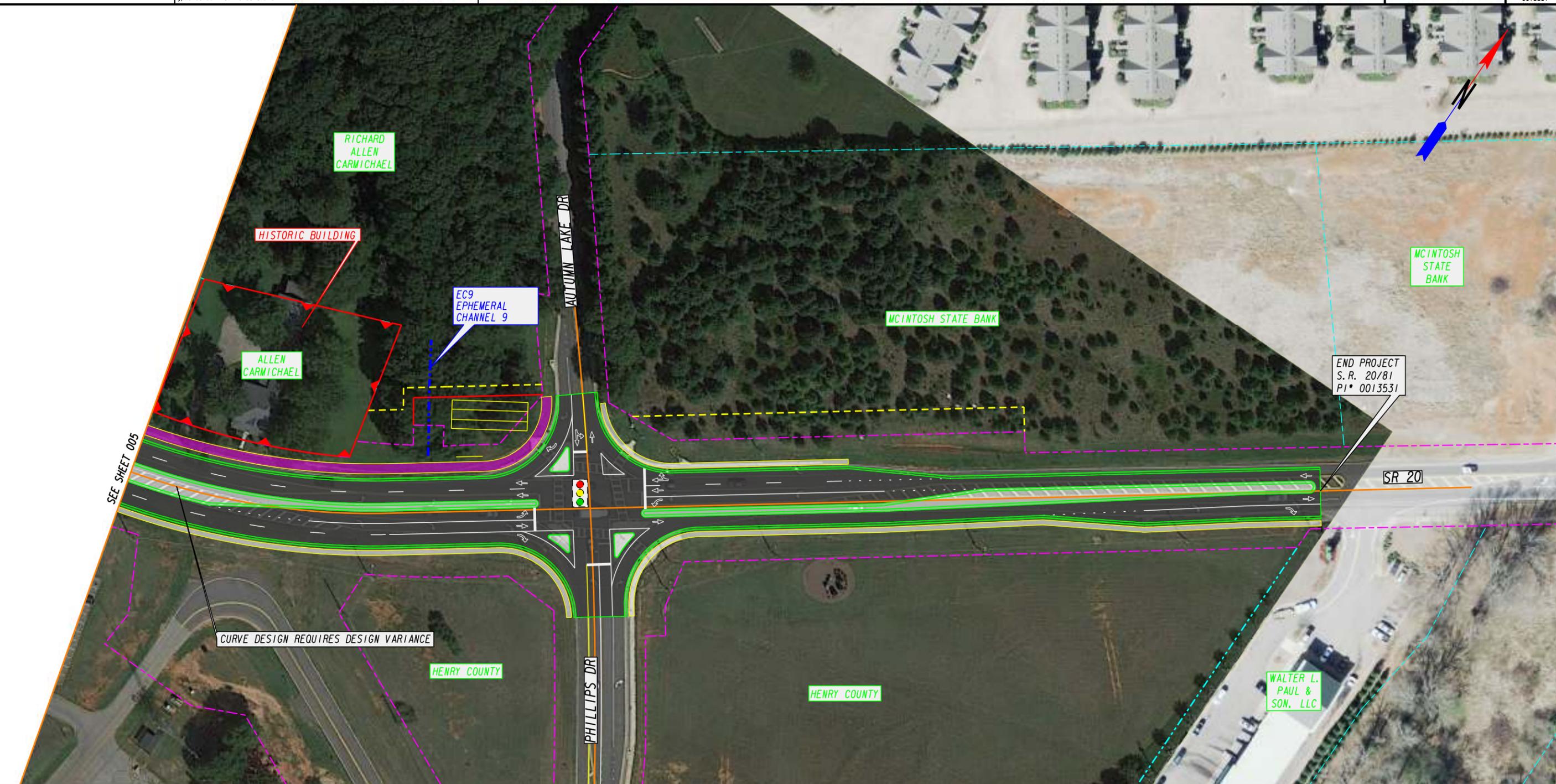
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	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		EXISTING SIGNAL
	EXISTING SIGNAL		PROPOSED SIGNAL



REVISION DATES	

CONCEPT PLAN
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	005
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 005

HISTORIC BUILDING

RICHARD ALLEN CARMICHAEL

ALLEN CARMICHAEL

EC9 EPHEMERAL CHANNEL 9

AUTUMN LAKE DR

MCINTOSH STATE BANK

MCINTOSH STATE BANK

END PROJECT S.R. 20/81 PI# 0013531

SR 20

CURVE DESIGN REQUIRES DESIGN VARIANCE

HENRY COUNTY

HENRY COUNTY

WALTER L. PAUL & SON, LLC

PHILLIPS DR

LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		PROPOSED SIGNAL
	EXISTING SIGNAL		

IMAGE SOURCE: GOOGLE

GDOT

PROGRAM DELIVERY

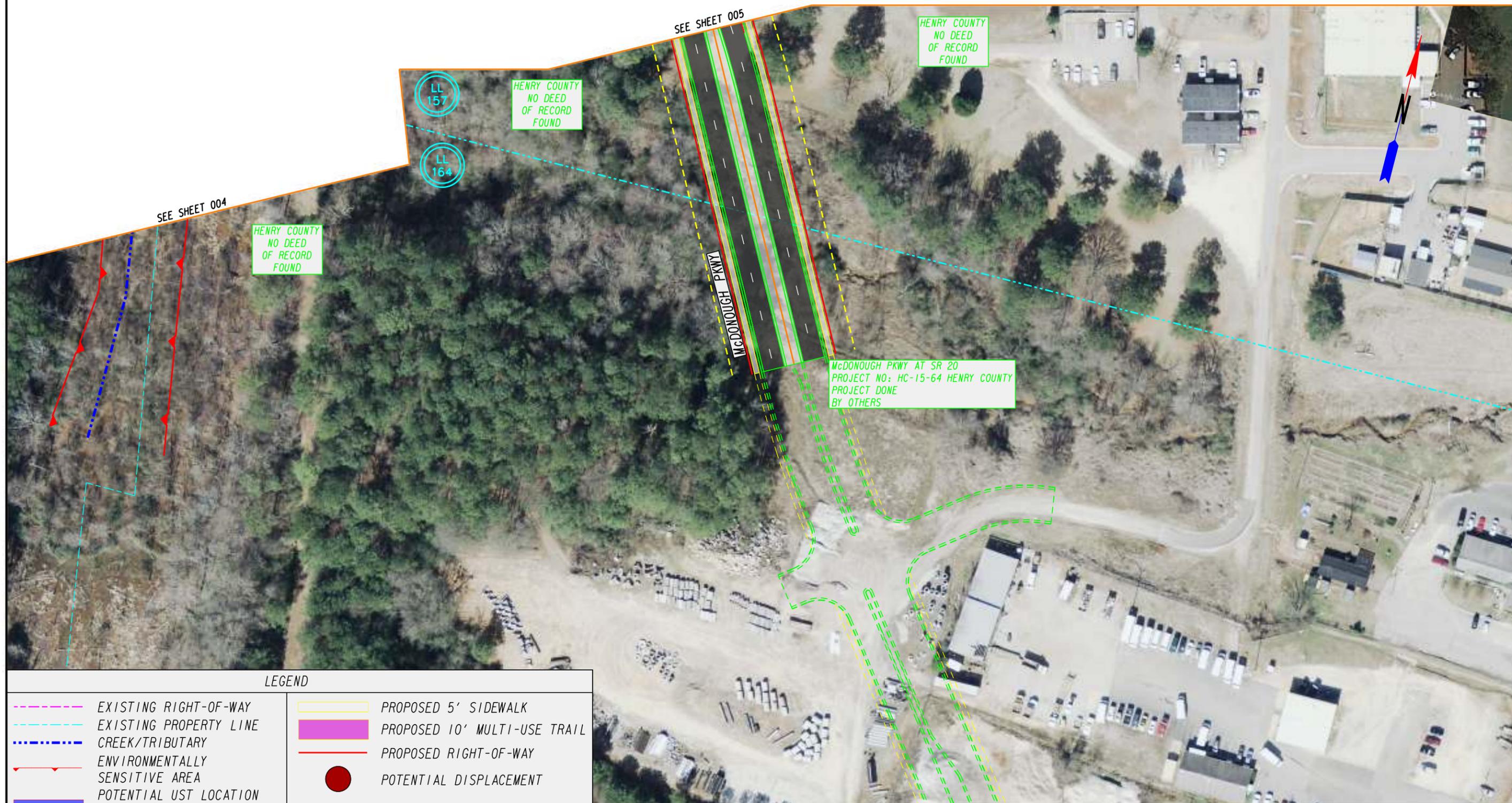
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SCALE IN FEET

REVISION DATES	

CONCEPT PLAN
S.R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	006
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

	EXISTING RIGHT-OF-WAY		PROPOSED 5' SIDEWALK
	EXISTING PROPERTY LINE		PROPOSED 10' MULTI-USE TRAIL
	CREEK/TRIBUTARY		PROPOSED RIGHT-OF-WAY
	ENVIRONMENTALLY SENSITIVE AREA		POTENTIAL DISPLACEMENT
	POTENTIAL UST LOCATION THAT MAY REQUIRE RIGHT OF WAY ACQUISITION		EXISTING SIGNAL
			PROPOSED SIGNAL

GD&T

PROGRAM DELIVERY

JACOBS

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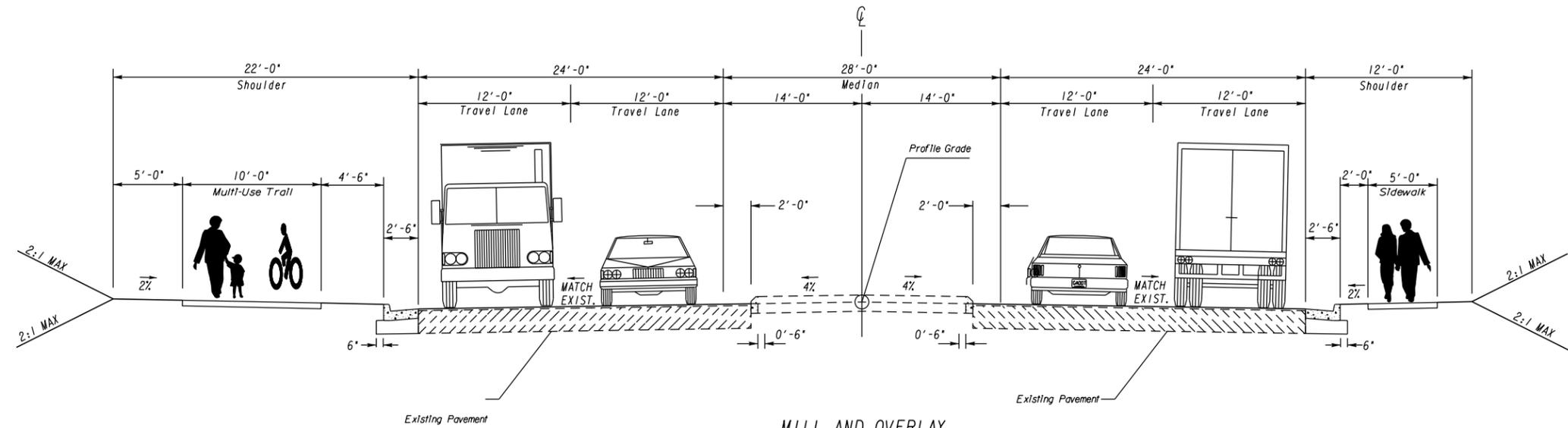
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CONCEPT PLAN
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

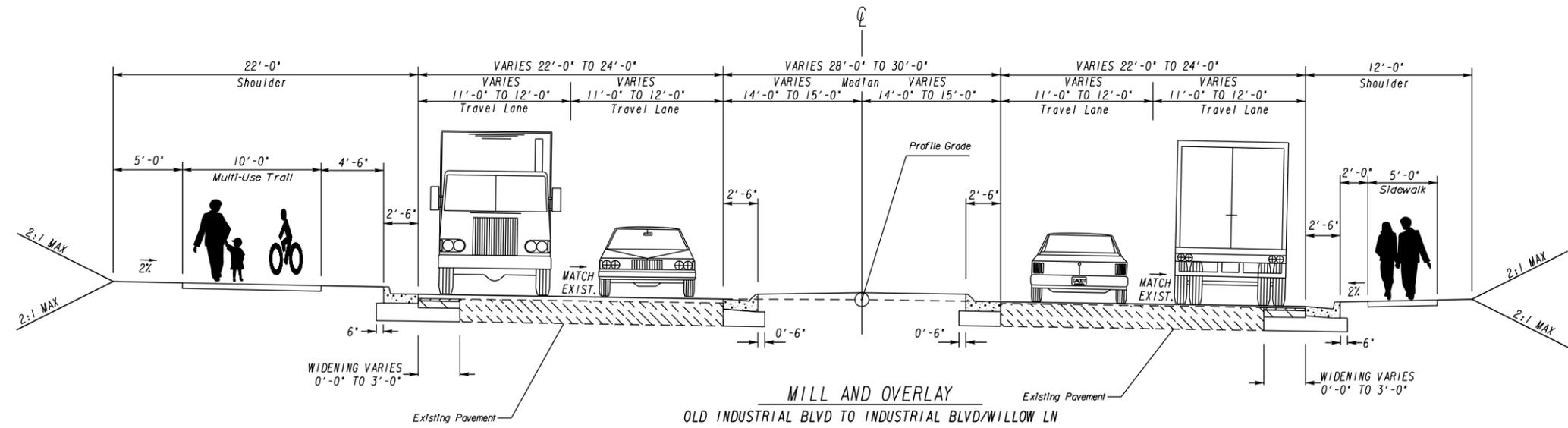
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Attachment #2

Typical Sections



MILL AND OVERLAY
FROM I-75 RAMPS TO OLD INDUSTRIAL BLVD



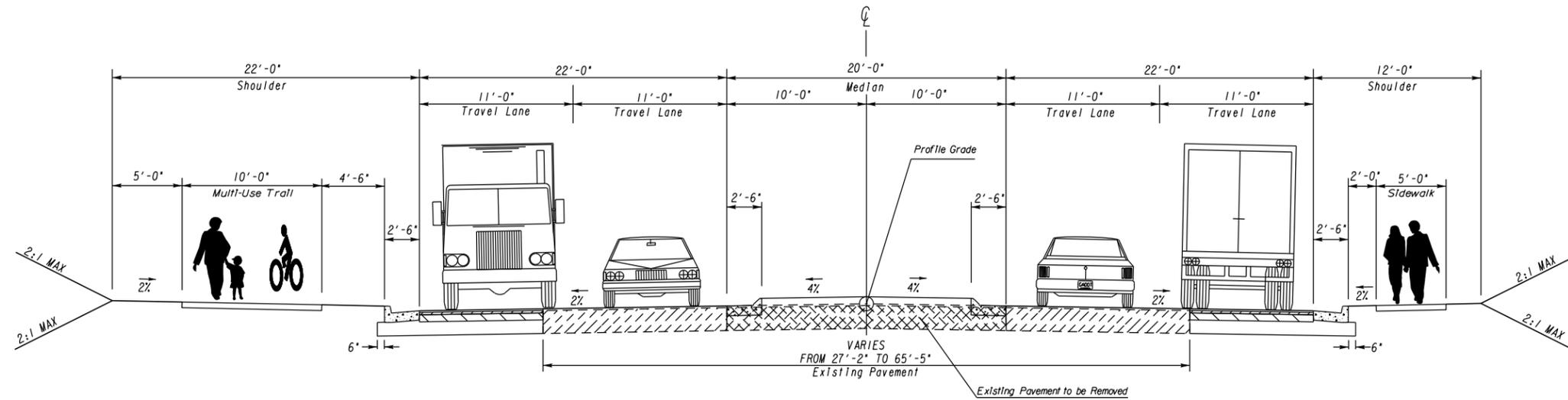
MILL AND OVERLAY
OLD INDUSTRIAL BLVD TO INDUSTRIAL BLVD/WILLOW LN



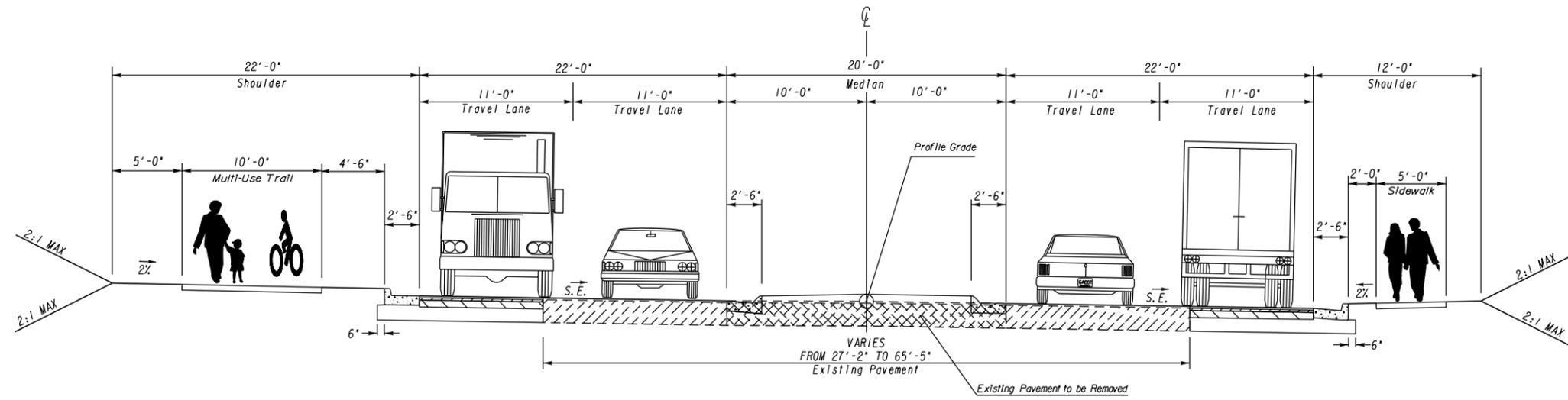
REVISION DATES	

TYPICAL SECTIONS
S. R. 20 WIDENING

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TANGENT SECTION
FROM INDUSTRIAL BLVD/WILLOW LN TO PHILLIPS DRIVE



SUPERELEVATED SECTION
FROM INDUSTRIAL BLVD/WILLOW LN TO PHILLIPS DRIVE

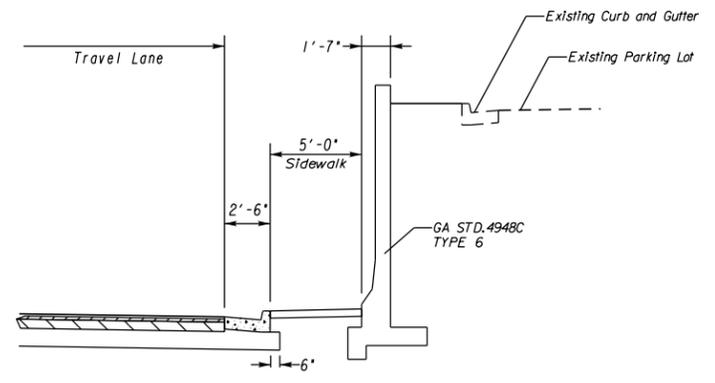


REVISION DATES	

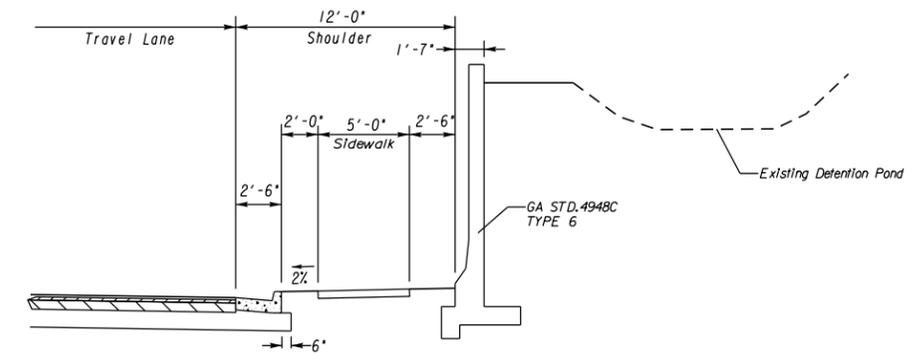
TYPICAL SECTIONS

S. R. 20 WIDENING

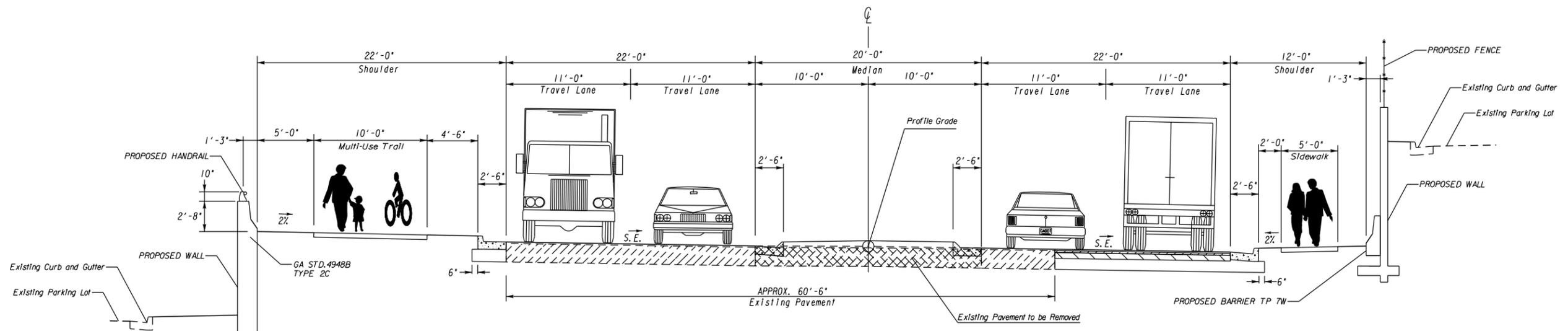
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WALL SECTION
WALL #1 AT WILLOW LANE



WALL SECTION
WALL #4 IN FRONT OF
HENRY COUNTY HOSPITAL AUTHORITY

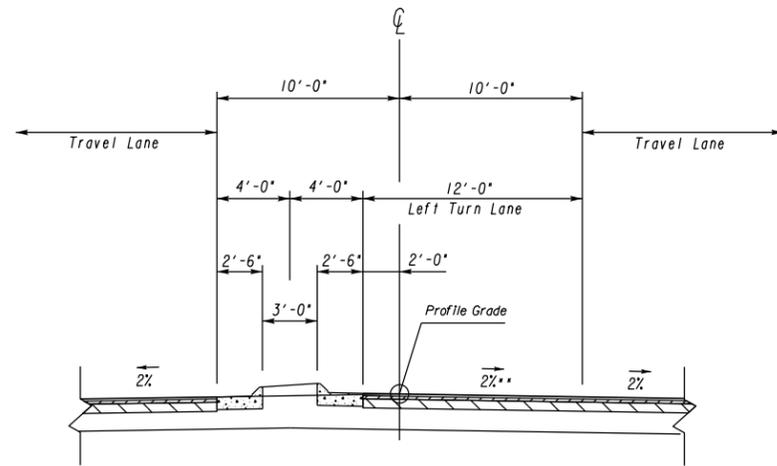


WALL SECTION
WALLS #2 & #3 IN FRONT OF
McDONOUGH VILLAGE SHOPPING CENTER
AND EAST OF REGENCY PLAZA BLVD.



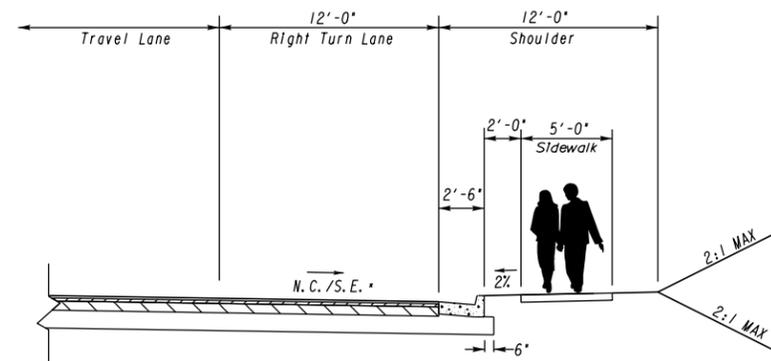
REVISION DATES	

TYPICAL SECTIONS		
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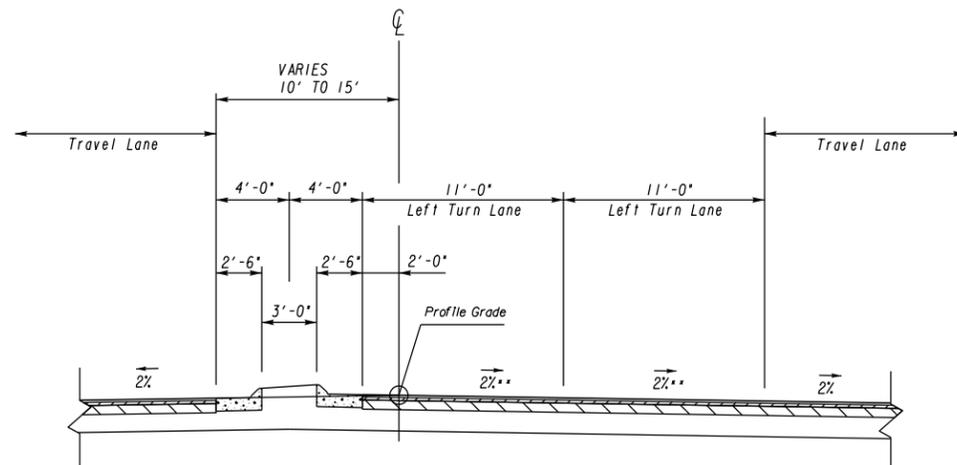
TYPICAL LEFT TURN SECTION

** IN SUPERELEVATED SECTION THE LEFT TURN LANE'S CROSS SLOPE MATCHES THE ADJACENT TRAVEL LANE CROSS SLOPE.



RIGHT TURN LANE DETAIL

* IN SUPERELEVATED SECTION THE RIGHT TURN LANE'S CROSS SLOPE MAY BREAK OVER FROM THE ADJACENT TRAVEL LANE S.E. UP TO A MAXIMUM BREAKOVER OF 2%.



TYPICAL DUAL LEFT TURN SECTION

** IN SUPERELEVATED SECTION THE LEFT TURN LANE'S CROSS SLOPE MATCHES THE ADJACENT TRAVEL LANE CROSS SLOPE.



REVISION DATES

NO.	DATE	DESCRIPTION

TYPICAL SECTIONS

S. R. 20 WIDENING

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	05-004
CORRECTED:	DATE:	
VERIFIED:	DATE:	

Attachment #3
Detailed Cost
Estimates

JOB DETAIL ESTIMATE

JOB NUMBER : 0013531 SPEC YEAR: 13
 DESCRIPTION: SR 20 FROM I-75 TO CS 721/PHILLIPS DRIVE

COST GROUPS FOR JOB 0013531

COST GROUP	DESCRIPTION	QUANTITY	PRICE	AMOUNT	ACTIVE?
MISC	EROSION CONTROL (LS)	1.000	500000.00000	500000.00	Y
MISC	MS4 REQUIRMENTS (LS)	1.000	500000.00000	500000.00	Y
SGNL	TRAFFIC SIGNALS UPGRADE (LS)	5.000	70000.00000	350000.00	Y
MISC	SIGNING AND MARKING (LS)	1.000	200000.00000	200000.00	Y
LTNG	LIGHTING (EA)	1.000	100000.00000	100000.00	Y
ACTIVE COST GROUP TOTAL				1650000.00	
INFLATED COST GROUP TOTAL				1650000.00	

ITEMS FOR JOB 0013531

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0001	150-1000		LS	TRAFFIC CONTROL - 0013531	1.000	750000.00	750000.00
0002	150-5010		EA	TRAF CTRL,PORTABLE IMPACT ATTN	2.000	7807.09	15614.19
0007	153-1100		EA	FIELD ENGINEERS OFFICE TP 1	1.000	75000.00	75000.00
0012	207-0203		CY	FOUND BKFILL MATL, TP II	120.000	55.51	6661.48
0017	210-0100		LS	GRADING COMPLETE - 0013531	1.000	2000000.00	2000000.00
0031	310-1101		TN	GR AGGR BASE CRS, INCL MATL	30960.000	22.70	703015.22
0032	402-1812		TN	RECYL AC LEVELING,INC BM&HL	6000.000	72.17	433060.74
0037	402-3113		TN	RECYL AC 12.5MM SP,GP1/2,BM&HL	6940.000	77.87	540465.76
0042	402-3121		TN	RECYL AC 25MM SP,GP1/2,BM&HL	13245.000	70.82	938131.16
0047	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	5620.000	76.40	429376.43
0052	413-0750		GL	TACK COAT	5060.000	1.60	8096.00
0060	430-0200		SY	PLN PC CONC PVMT/CL1C/ 10 TK	650.000	40.00	26000.00
0061	432-5010		SY	MILL ASPH CONC PVMT,VARB DEPTH	60000.000	2.31	138786.00
0062	441-0018		SY	DRIVEWAY CONCRETE, 8 IN TK	160.000	50.43	8069.98
0067	441-0104		SY	CONC SIDEWALK, 4 IN	4920.000	28.77	141575.80
0071	441-0740		SY	CONC MEDIAN, 4 IN	1670.000	28.65	47859.61
0072	441-0754		SY	CONC MEDIAN, 7 1/2 IN	870.000	51.45	44769.19
0077	441-4030		SY	CONC VALLEY GUTTER, 8 IN	550.000	47.10	25907.61
0080	441-5008		LF	CONC HEADER CURB, 6 IN, TP 7	370.000	15.58	5767.97
0081	441-5025		LF	CONC HEADER CURB, 4, TP 9	460.000	15.00	6900.00
0082	441-6222		LF	CONC CURB & GUTTER/ 8X30TP2	19750.000	13.03	257413.40
0087	441-6740		LF	CONC CURB & GUTTER/ 8X30 TP7	17100.000	13.05	223228.70
0092	446-1100		LF	PVMT REF FAB STRIPS, TP2,18 INCH WIDTH	9700.000	3.69	35863.62
0097	500-3101		CY	CLASS A CONCRETE	320.000	648.48	207516.68
0107	500-9999		CY	CL B CONC,BASE OR PVMT WIDEN	100.000	222.92	22292.31
0112	511-1000		LB	BAR REINF STEEL	32700.000	0.97	31976.68
0117	515-2020		LF	GALV STEEL PIPE HDRAIL,2,ROUD	2000.000	28.58	57172.02

JOB DETAIL ESTIMATE

0122	550-4118	EA	FLARED END SECT 18 IN, SIDE DR	16.000	534.88	8558.23
0127	550-4124	EA	FLARED END SECT 24 IN, SIDE DR	4.000	457.87	1831.49
0132	550-4218	EA	FLARED END SECT 18 IN, ST DR	10.000	593.39	5933.98
0137	550-4224	EA	FLARED END SECT 24 IN, ST DR	5.000	703.63	3518.18
0142	550-4230	EA	FLARED END SECT 30 IN, ST DR	2.000	784.92	1569.84
0147	550-4236	EA	FLARED END SECT 36 IN, ST DR	2.000	1201.06	2402.14
0152	550-4242	EA	FLARED END SECT 42 IN, ST DR	1.000	1836.88	1836.89
0157	550-1181	LF	STM DR PIPE 18,H 10-15	7800.000	40.79	318213.25
0162	550-1240	LF	STM DR PIPE 24,H 1-10	3200.000	46.47	148710.94
0167	550-1300	LF	STM DR PIPE 30,H 1-10	1600.000	54.95	87929.78
0172	550-1360	LF	STM DR PIPE 36,H 1-10	1600.000	68.25	109209.38
0177	550-1420	LF	STM DR PIPE 42,H 1-10	900.000	75.13	67623.77
0182	550-1480	LF	STM DR PIPE 48,H 1-10	900.000	94.68	85219.16
0187	603-2060	SY	STN DUMPED RIP RAP, TP 1, 60	600.000	70.00	42000.00
0192	603-2182	SY	STN DUMPED RIP RAP, TP 3, 24	250.000	46.96	11740.22
0197	603-7000	SY	PLASTIC FILTER FABRIC	850.000	4.32	3678.04
0202	620-0100	LF	TEMP BARRIER, METHOD NO. 1	2000.000	29.81	59632.10
0207	621-4022	LF	CONCRETE SIDE BARRIER, TY 2B	270.000	466.29	125898.30
0215	621-4060	LF	CONCRETE SIDE BARRIER, TY 6	550.000	285.00	156750.00
0216	621-4063	LF	CONCRETE SIDE BARRIER, TY 6C	230.000	585.00	134550.00
0217	634-1200	EA	RIGHT OF WAY MARKERS	90.000	114.00	10260.30
0221	641-1100	LF	GUARDRAIL, TP T	200.000	57.49	11498.23
0222	641-1200	LF	GUARDRAIL, TP W	2400.000	18.04	43308.74
0227	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	8.000	897.19	7177.56
0232	641-5012	EA	GUARDRAIL ANCHORAGE, TP 12	8.000	2082.30	16658.43
0237	668-1100	EA	CATCH BASIN, GP 1	100.000	2345.67	234567.51
0242	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	15.000	204.33	3065.00
0247	668-1200	EA	CATCH BASIN, GP 2	15.000	2956.53	44348.00
0252	668-1210	LF	CATCH BASIN, GP 2, ADDL DEPTH	5.000	275.02	1375.12
0257	668-2100	EA	DROP INLET, GP 1	45.000	1873.39	84302.82
0262	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	10.000	212.15	2121.52
0267	668-2200	EA	DROP INLET, GP 2	7.000	2545.38	17817.71
0272	668-4300	EA	STORM SEW MANHOLE, TP 1	23.000	2052.94	47217.74
0277	668-4311	LF	ST SEW MANHOLE, TP 1, A DEP, CL 1	5.000	238.25	1191.26
0282	668-4400	EA	STORM SEW MANHOLE, TP 2	2.000	2635.23	5270.47

ITEM TOTAL	9087506.63
INFLATED ITEM TOTAL	9087506.63

TOTALS FOR JOB 0013531

ESTIMATED COST:	10737506.65
CONTINGENCY PERCENT (15.0):	1610626.00
ESTIMATED TOTAL:	12348132.65

PROJ. NO.

N/A

CALL NO.

P.I. NO.

0013531

DATE

5/15/2016

INDEX (TYPE)

REG. UNLEADED
DIESEL
LIQUID AC

DATE	INDEX
May-16	\$ 2.174
	\$ 2.220
	\$ 328.00

Link to Fuel and AC Index:

<http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx>

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)				312961.2	\$	312,961.20
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	524.80		
Monthly Asphalt Cement Price month project let (APL)			\$	328.00		
Total Monthly Tonnage of asphalt cement (TMT)				1590.25		

ASPHALT	Tons	%AC	AC ton
Leveling	6000	5.0%	300
12.5 OGFC		5.0%	0
12.5 mm	6940	5.0%	347
9.5 mm SP		5.0%	0
25 mm SP	13245	5.0%	662.25
19 mm SP	5620	5.0%	281
	31805		1590.25

BITUMINOUS TACK COAT

Price Adjustment (PA)				\$	4,277.10	\$	4,277.10
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	524.80			
Monthly Asphalt Cement Price month project let (APL)			\$	328.00			
Total Monthly Tonnage of asphalt cement (TMT)							21.73321067

Bitum Tack

Gals	gals/ton	tons
5060	232.8234	21.7332107

PROJ. NO.

N/A

CALL NO.

P.I. NO.

0013531

DATE

5/15/2016

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)						0	\$	-
Monthly Asphalt Cement Price month placed (APM)		Max. Cap	60%	\$	524.80			
Monthly Asphalt Cement Price month project let (APL)				\$	328.00			
Total Monthly Tonnage of asphalt cement (TMT)					0			

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0
					0

TOTAL LIQUID AC ADJUSTMENT							\$	317,238.30
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GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 6/6/2016 Project: PI#0013531
 Revised: County: Henry
 PI: 0013531

Description: SR 20 Highway Improvement
 Project Termini: SR 20 Highway Improvement

Existing ROW: Varies
 Required ROW: Varies
 Parcels: 51

Land and Improvements _____ \$2,473,867.50

Proximity Damage	\$0.00
Consequential Damage	\$0.00
Cost to Cures	\$0.00
Trade Fixtures	\$25,000.00
Improvements	\$105,000.00

Valuation Services _____ \$301,250.00

Legal Services _____ \$334,425.00

Relocation _____ \$102,000.00

Demolition _____ \$0.00

Administrative _____ \$429,500.00

TOTAL ESTIMATED COSTS _____ \$3,641,042.50

TOTAL ESTIMATED COSTS (ROUNDED) _____ \$3,642,000.00

Preparation Credits	Hours	Signature

Prepared By: Deshone Alexander CG#: 286999 06/06/2016 (DATE)
 Approved By: Deshone Alexander CG#: 286999 06/06/2016 (DATE)

NOTE: No Market Appreciation is included in this Preliminary Cost Estimate

Department of Transportation State of Georgia

Interdepartmental Correspondence

FILE R/W Cost Estimate **OFFICE** Atlanta
DATE 06/06/2016
FROM Troy Beyers, Right of Way Administrator
LaShone Alexander, Right of Way Cost Estimator
TO Cherral Dempsey, Project Manager
SUBJECT **Preliminary Right of Way Cost Estimate**
Project: Henry County
P.I. No.: 0013531
Description: SR 20

As per your request, attached is a copy of the approved Preliminary Right of Way Cost Estimates on the above referenced projects.

If you have any questions, please contact LaShone Alexander at One Georgia Center 600 West Parkway Street, NW Atlanta, GA 30308, Right of Way Office at (478) 553-1569 or (478) 232-4045.

PC:LA
Attachments
c: File

Concept Utility Report

Project Number: 0013531

District: 3rd

County: Henry

Prepared by: Harland Smith

P.I. # 0013531

Date: 04/05/2016

Project Description: SR 20 From Industrial Blvd to Philips Dr.

The information provided herein has been gathered from Georgia811 and/or field visits and serves as an estimate. Nothing contained in this report is to be used as a substitute for 1st Submission or SUE.

Are SUE services recommended? Yes Level: A B C D

Public Interest Determination (PID): Automatic Mandatory Consideration
 No Use Exempt

Is a separate utility funding phase recommended? _____

Existing Facilities: Atlanta Gas Light, BellSouth dba ATT, Charter Communication, GPC D, Henry County Water and Sewer, City of McDonough Water and Sewer

Potential Project (Schedule/Budget) Impacts: Possible utility aid request from HCWS and The City of McDonough. Potential reimbursable cost/ prior rights claim from GPC and Snapping Shoal EMC. _____

Capital Improvement Projects (Utilities) Anticipated in the Area: _____

Project Specific Recommendations for Avoidance/Mitigation: _____

Right of Way Coordination: it is possible that the proposed R/W will encroach onto existing easements within the project limits. Therefore, an ELA would be required.

Environmental Coordination: Please account for all utility relocations within the project limits.

Additional Remarks: All existing access drive will need to be accounted for. Utilities companies will be given the following due date for 2nd submission plans: 90 days for the pole owner and underground facilities. 120 days for all attached the pole line. It is anticipated that the City and HCWS will placed their facilities within the contract.

As previously mentioned GPC and Snapping Shoal EMC will possibly have some reimbursable cost. Both companies will possibly claim prior rights.

The following utilities have facilities within the project limits. Utilities have been located using Georgia811 and/or field visits.

Existing Facilities/Appurtenances	Approximate Limits (Station/Offset)	Reimbursable cost (est.)	Non-reimbursable cost (est.)	Facilities to Avoid (Station/Offset)	Facility Retention Recommended	Comments
AGL		\$125,000.00	\$50,000.00			
BellSouth dba ATT		\$135,000.00	\$55,000.00			
Charter Communication		\$125,000.00	\$20,000.00			
GPC Distribution		\$300,000.00	\$0.00			Will claim pri
Henry Co. Water/Sewer		\$200,000.00	\$0.00			Possible utili
City of McDonough Water and Sewer		\$250,000.00	\$0.00			Possible utili
Snapping Shoal EMC		\$200,000.00	\$0.00			Anticipated p
TOTAL		\$1,335,000.00	\$125,000.00			

P.I. NO. 0013531- Henry County
SR 20 Widening from I-75 to Phillips Drive

Environmental Mitigation Cost

SR 20 would need about 4,000 stream credits for 600 feet of impact and 4 wetland credits for 0.5 acre of impact. Based on the current credit pricing the mitigation cost is as following:

- Stream mitigation total estimate: $4,000 \text{ credits} \times \$32/\text{credit} = \$128,000$
- Wetland mitigation total estimate: $4 \text{ credits} \times \$40,000/\text{credit} = \$160,000$

Total Environmental Mitigation cost = \$288,000

Attachment #4

Crash Summaries

Crash Data
SR 20 / GA 81 from I-75 to Phillips Drive
PI # 0013531
County: Henry

Crash Data

The SR 20 corridor was previously analyzed and findings were summarized in a Project Justification Statement on October 24, 2013. According to this document, ARC's regional travel demand model shows that SR 20/81 operated at a Level of Service (LOS) C from Phillips Drive to East of I-75, with the exception of one segment just east of Willow Lane that is operating at a LOS E. The current (2013) volumes range from 18,400 to 27,500 vehicles per day between I-75 and Phillips Drive. By the design year 2042, on SR 20/81 volumes are projected to increase to the range of 31,300 to 37,850 between Willow Lane and Phillips Drive and up to 42,350 vehicles per day just east of I-75, which correlates to a LOS F. LOS F for an urban area is deemed an unacceptable level of service. New traffic volumes are under development and will be used to analyze the corridor with updated existing, opening and design years. This project is aligned with the goals and objectives in the Statewide Transportation Plan and ARC's plan 2040 by aiming to improve access to jobs, reduce congestion costs and by focusing on the Region's Strategic Transportation System (RSTS), the regional truck route network (ASTRoMaP), and the strategic through fare network.

According to the Project Justification Statement from October 24, 2013, crash rates for SR 20/81 are higher than the statewide average for a similar type corridor. The crash rate for SR 20/81 for years 2007, 2008, and 2009 are 1,607, 1647, and 1,311 per million vehicle-miles traveled (MVMT) respectively. The statewide average crash rate for an urban minor arterial from years 2007-2009 are 513, 469 and 463 respectively. The SR 20 crash rates are more than 3 times greater than the statewide average in 2007 and 2008. The most common type of collision, 54% of all collisions, is a rear end collision. Rear end collisions are often associated with heavy traffic congestion. Updated crash data from 2012-2014 are shown in Table 1 and Table 2. As shown, the crash rates from 2012-2014 are similar to previously reported for 2007-2009. The SR 20 corridor crash rates are consistently exceeding statewide averages.

Table 1: Crash Rates Summary

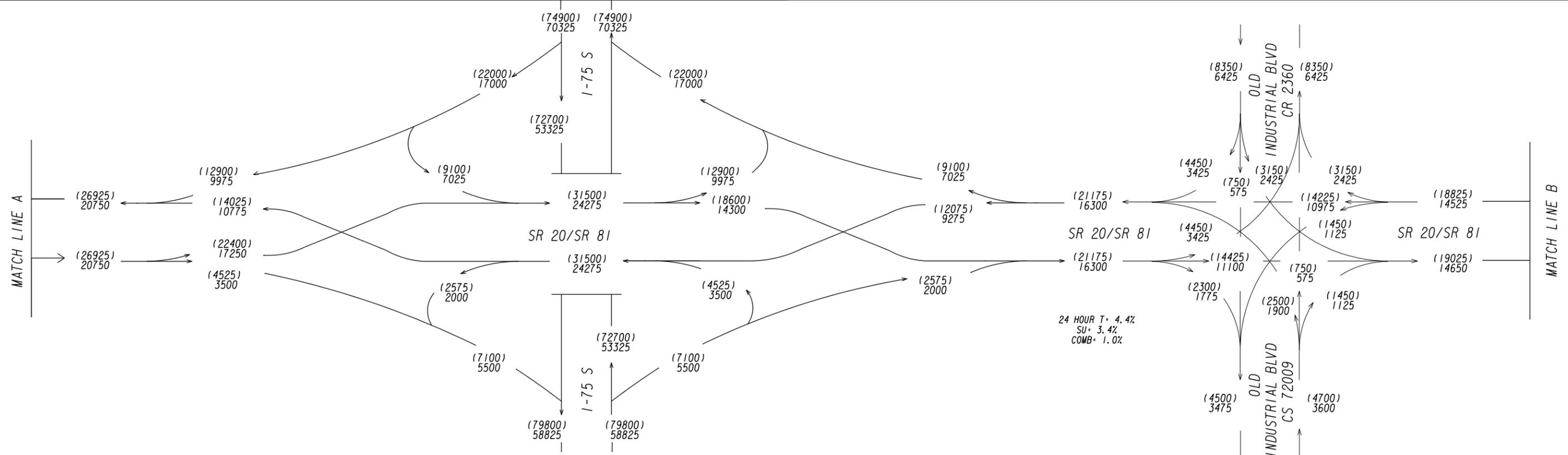
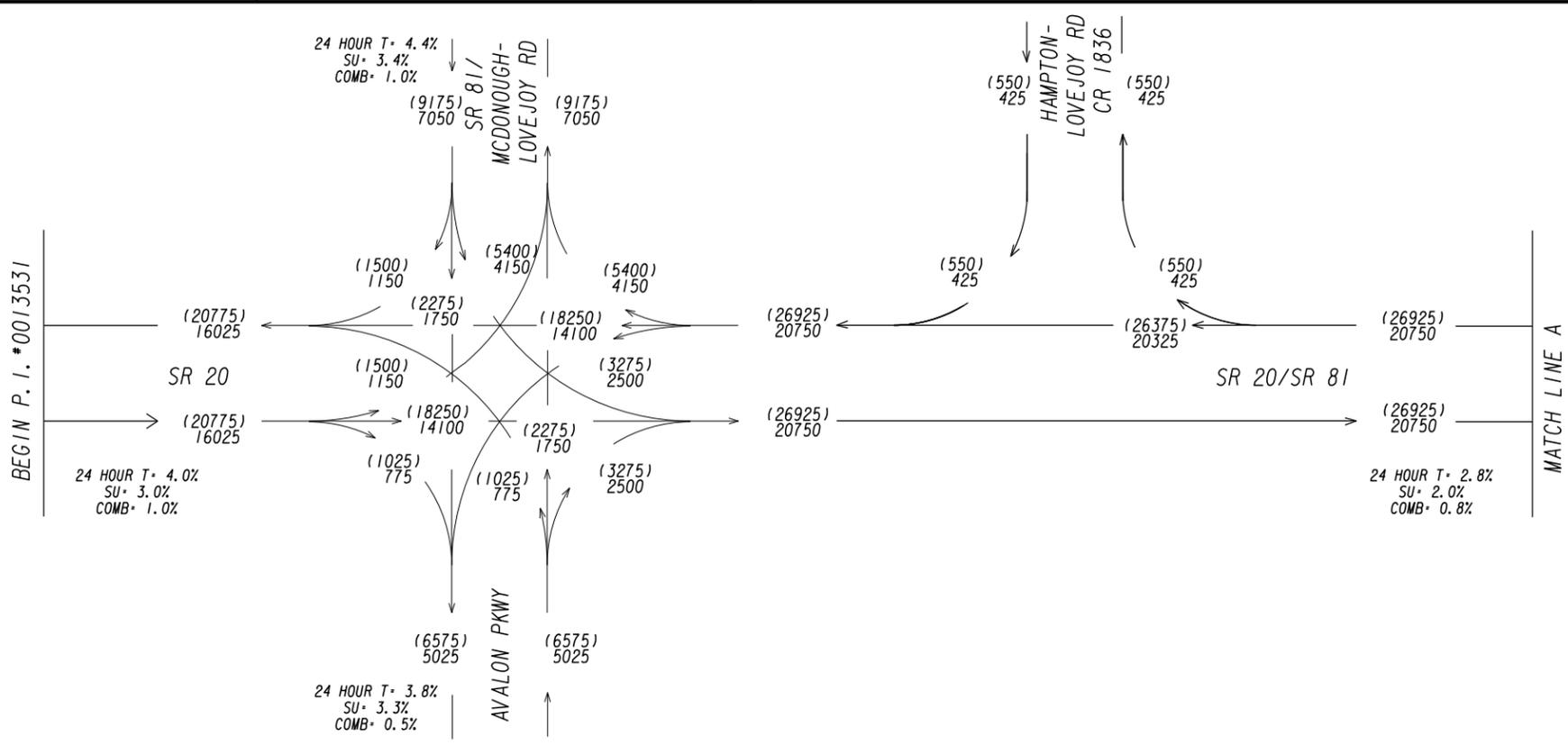
Year	Crashes			Injuries			Fatalities		
	Number	Rate	Statewide Rate	Number	Rate	Statewide Rate	Number	Rate	Statewide Rate
2012	134	1287	476	59	567	178	0	0	1.13
2013	159	1506	610	77	729	190	0	0	1.20
2014	145	1355	631	54	505	190	0	0	1.18

Table 2: Crash Type Summary

Accident Types	2012		2013		2014		Total	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Rear End	84	63%	77	48%	76	52%	237	54%
Angle	33	25%	70	44%	50	34%	153	35%
Not a collision with motor vehicle	7	5%	1	1%	2	1%	10	2%
Sideswipe	7	5%	10	6%	13	9%	30	7%
Head On	2	1%	1	1%	3	2%	6	1%
Unidentified	1	1%	0	0%	1	1%	2	0%
Total	134	100%	159	100%	145	100%	438	100%

Attachment #5

Traffic Diagrams

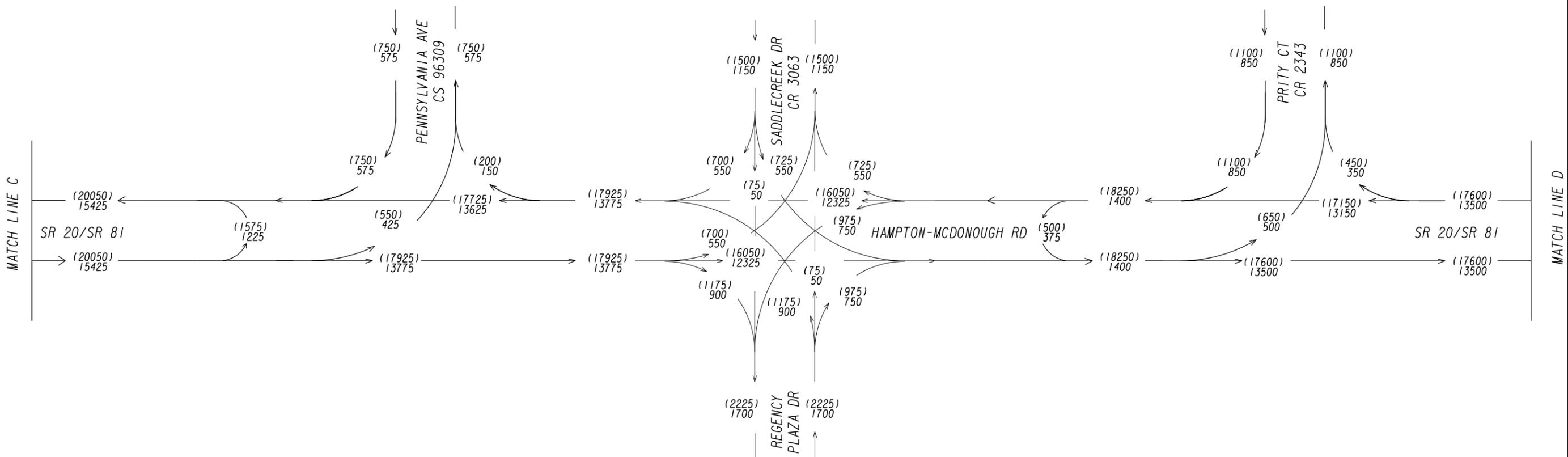
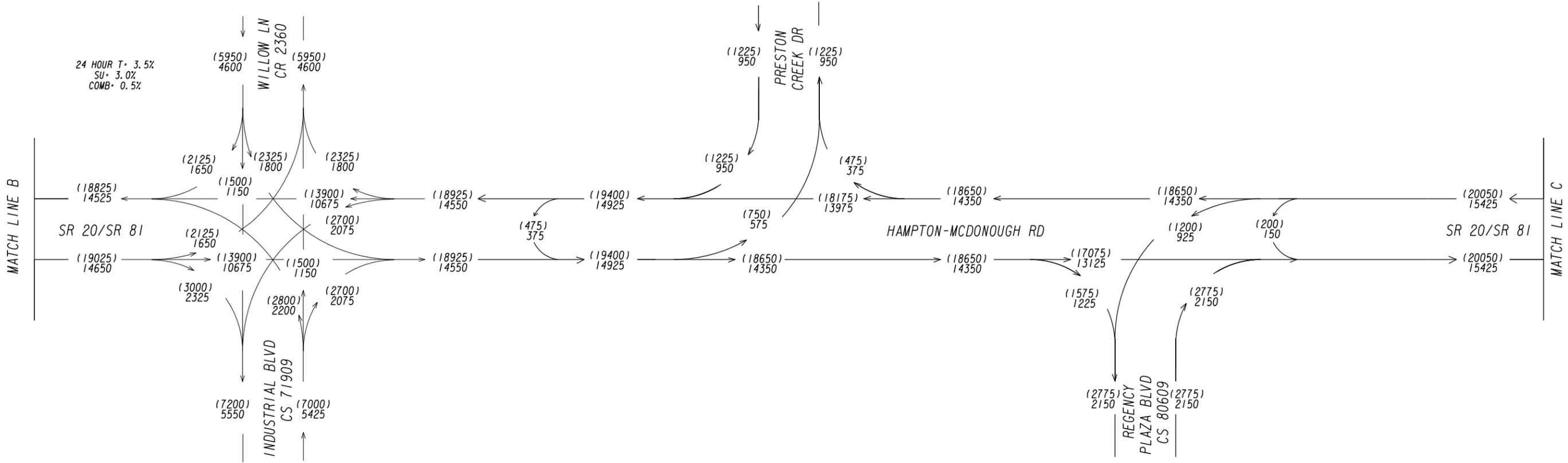


PI # 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2042 ADT = (000)
2022 ADT = 000
BUILD



REVISION DATES		TRAFFIC DIAGRAM		
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5/2016		BACKCHECKED:	DATE:	10-1
		CORRECTED:	DATE:	
		VERIFIED:	DATE: 5/2016	



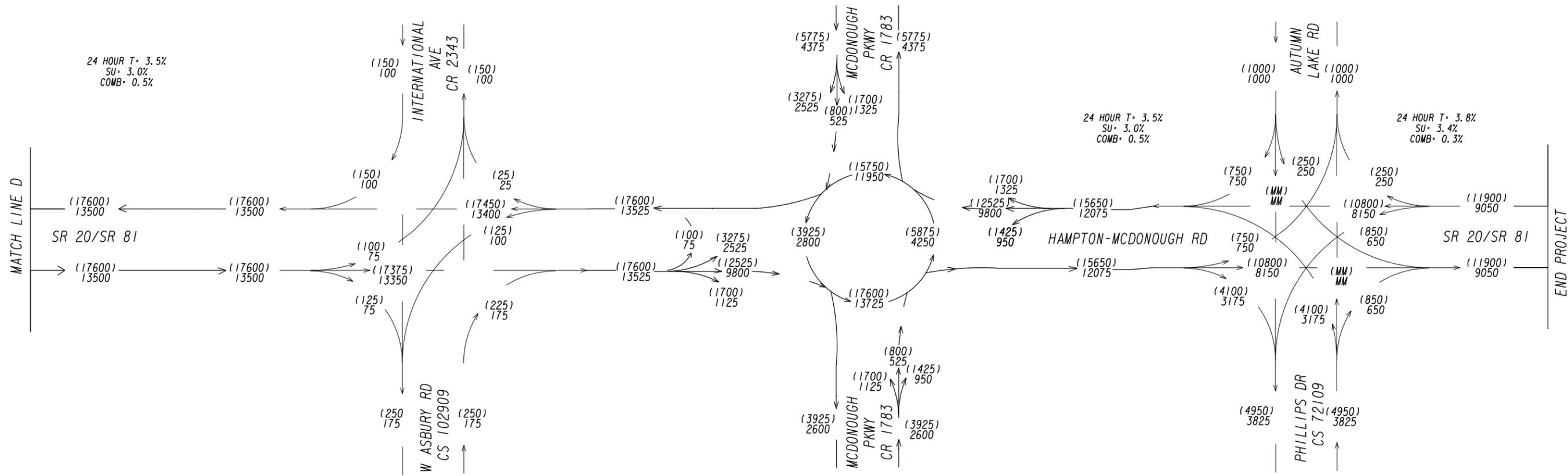
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2042 ADT= (000)
2022 ADT= 000
BUILD



REVISION DATES	
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5/2016	

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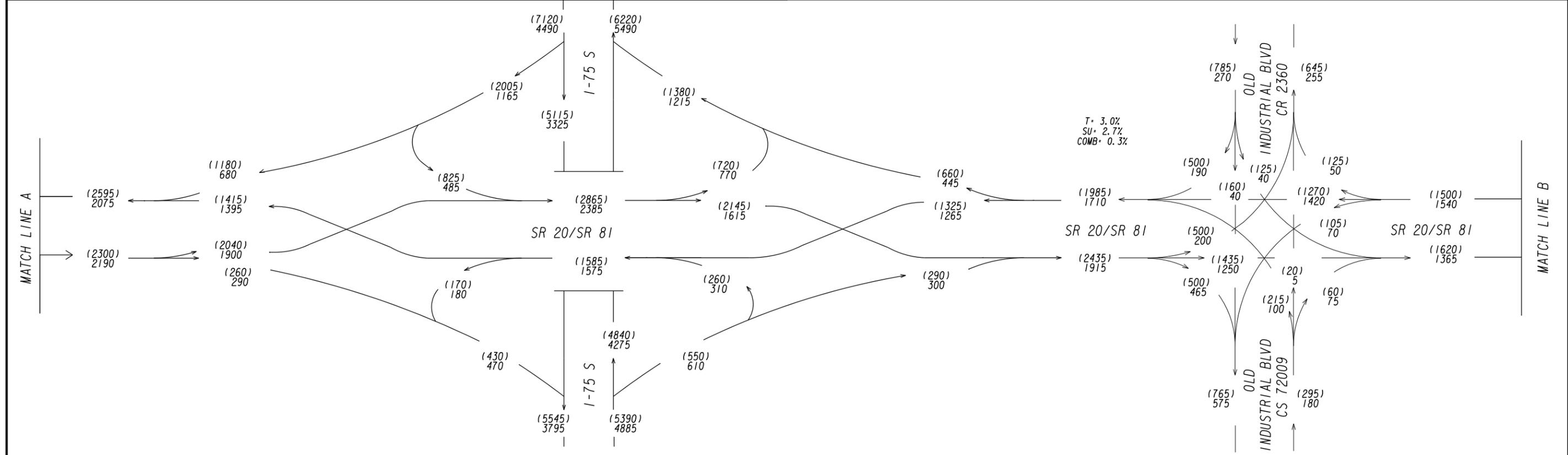
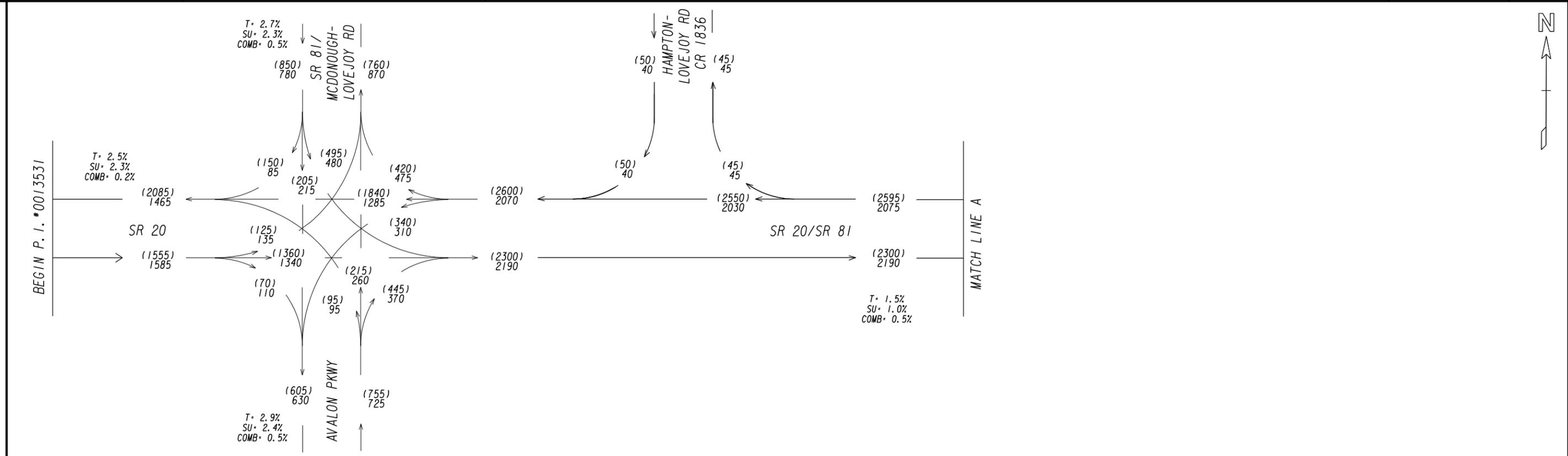
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

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2022 ADT = 000
BUILD



REVISION DATES	
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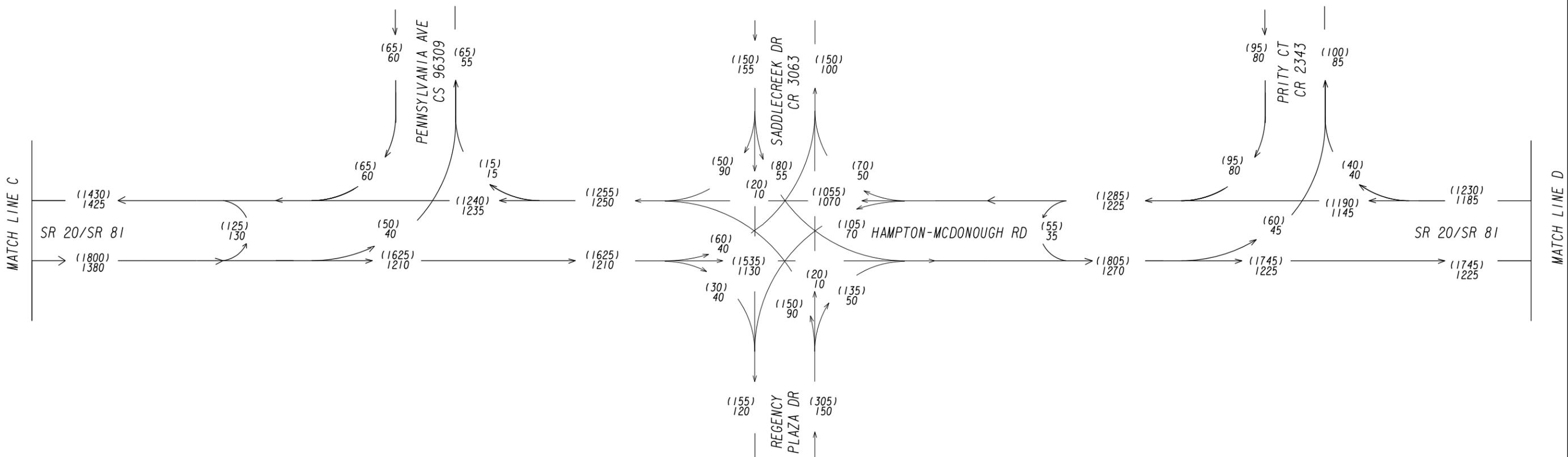
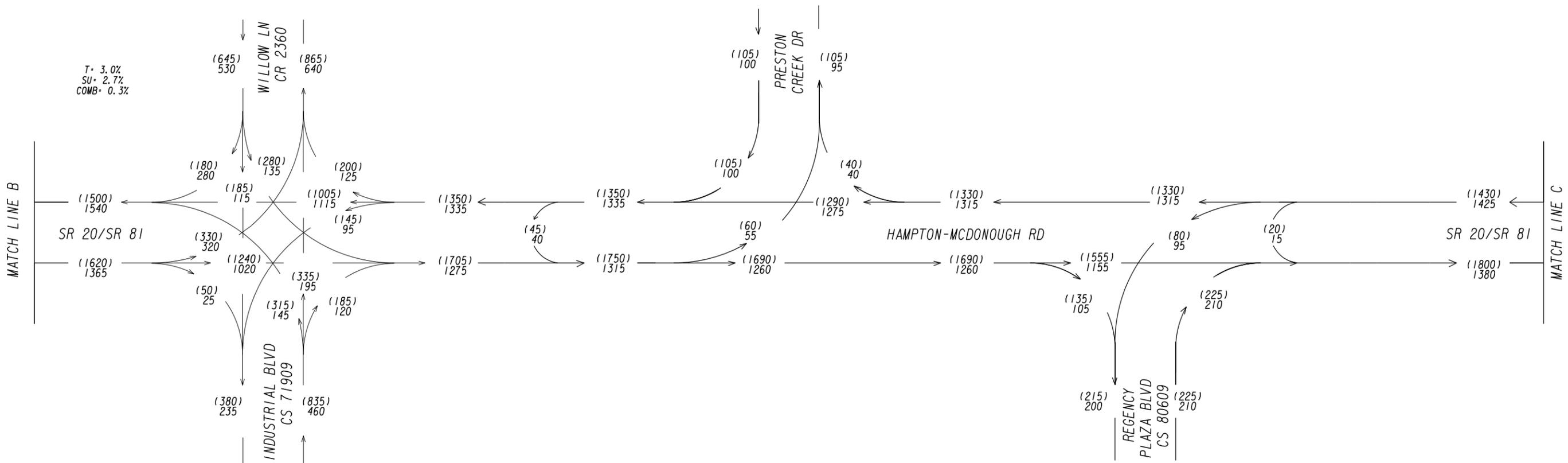


PI# 0013531
 HENRY COUNTY
 SR 20 FM I-75 TO
 CS 721/PHILLIPS DR

2042 PM DHV = (000)
 2042 AM DHV = 000
 BUILD



REVISION DATES		TRAFFIC DIAGRAM	
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5/2016		BACKCHECKED:	DATE:
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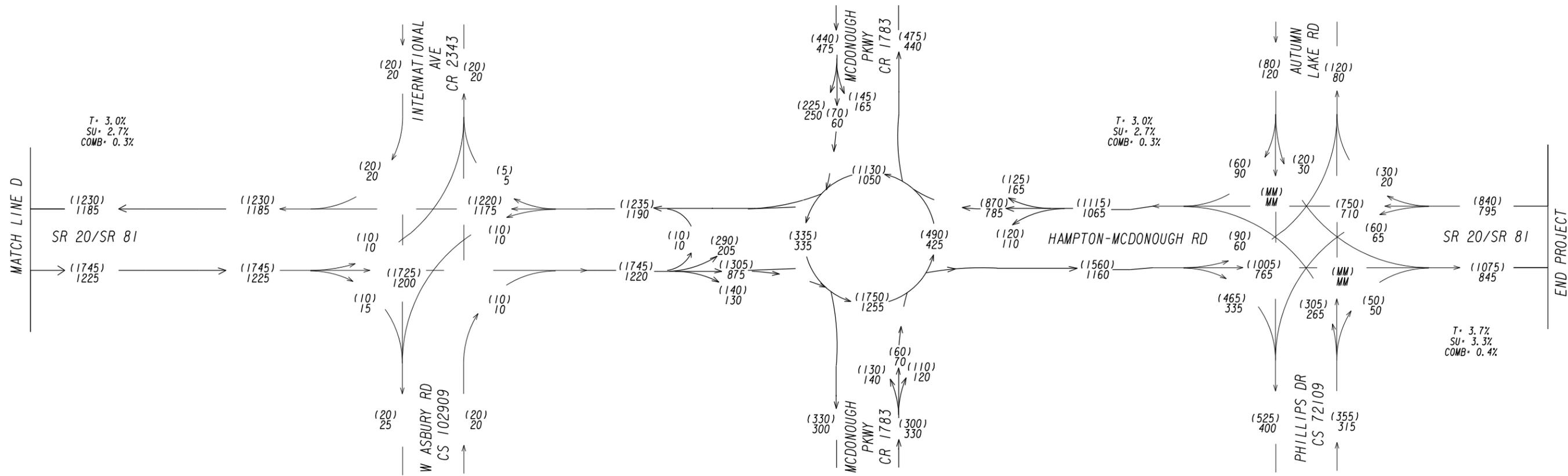


PI# 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2042 PM DHV = (000)
2042 AM DHV = 000
BUILD



REVISION DATES		TRAFFIC DIAGRAM	
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5/2016		BACKCHECKED:	DATE:
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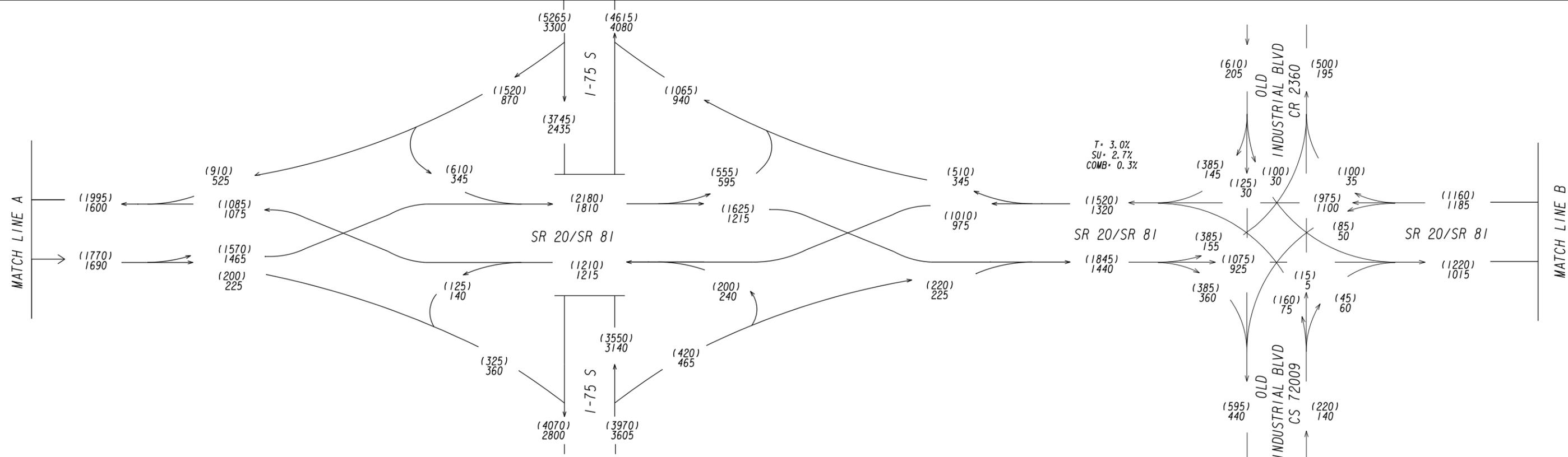
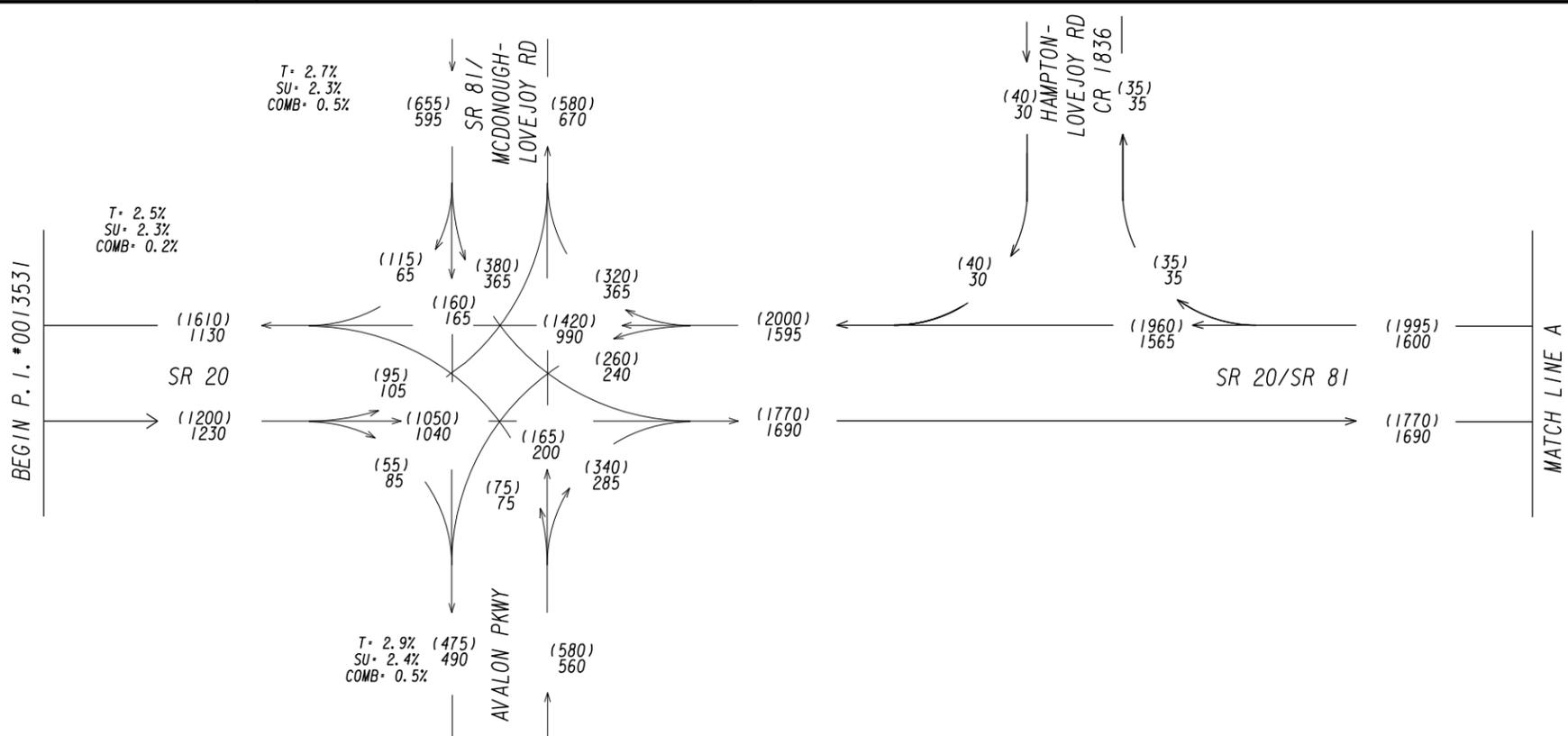
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2042 PM DHV = (000)
2042 AM DHV = 000
BUILD



REVISION DATES	
3/2016	
5/2016	

TRAFFIC DIAGRAM			
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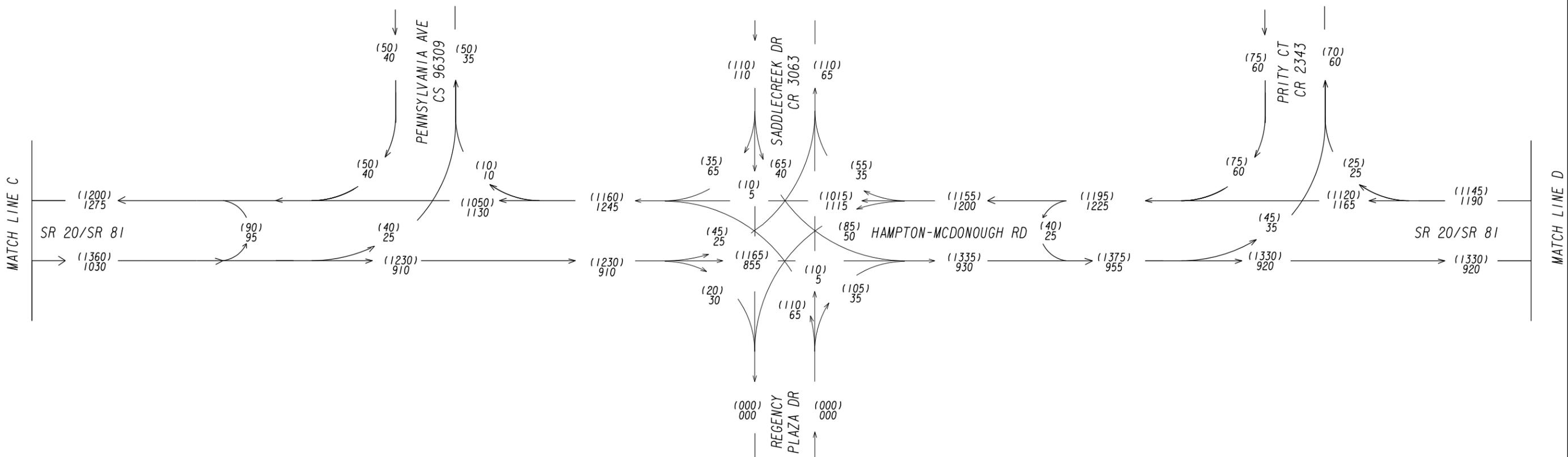
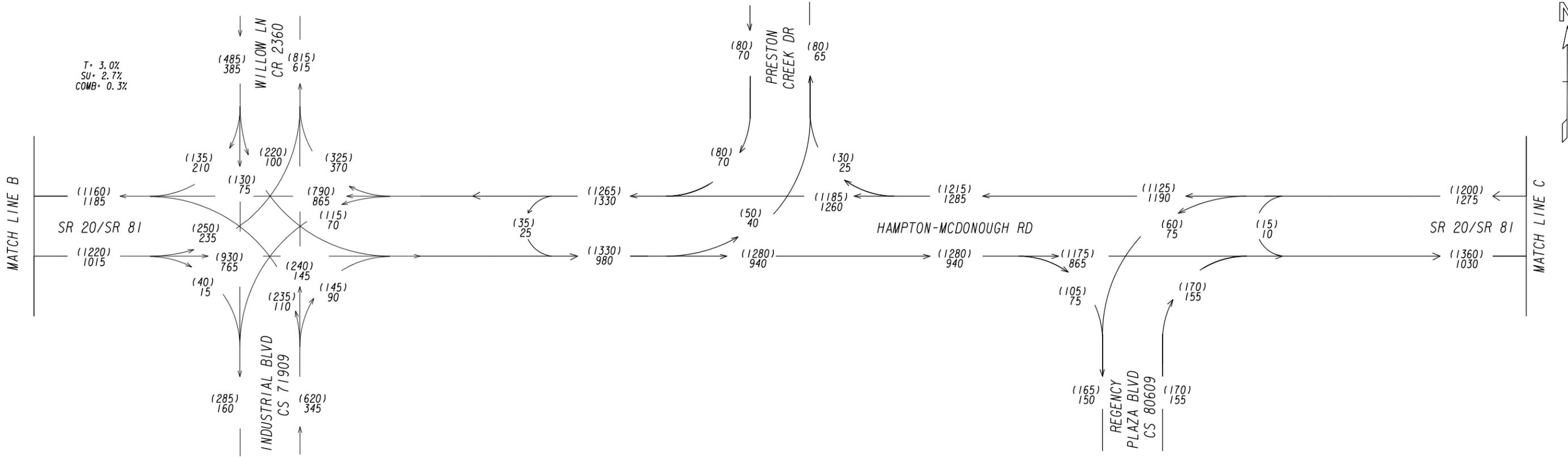
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2022 PM DHV = (000)
2022 AM DHV = 000
BUILD



REVISION DATES	
3/2016	
5/2016	

TRAFFIC DIAGRAM			
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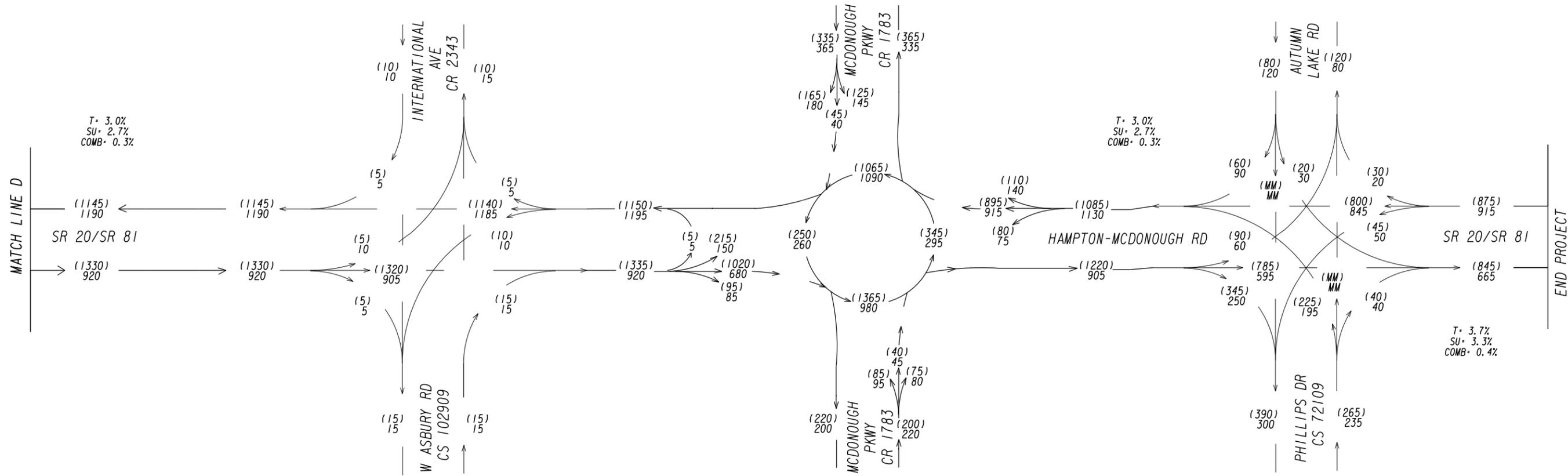
PI # 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2022 PM DHV = (000)
2022 AM DHV = 000
BUILD



REVISION DATES	
3/2016	
5/2016	

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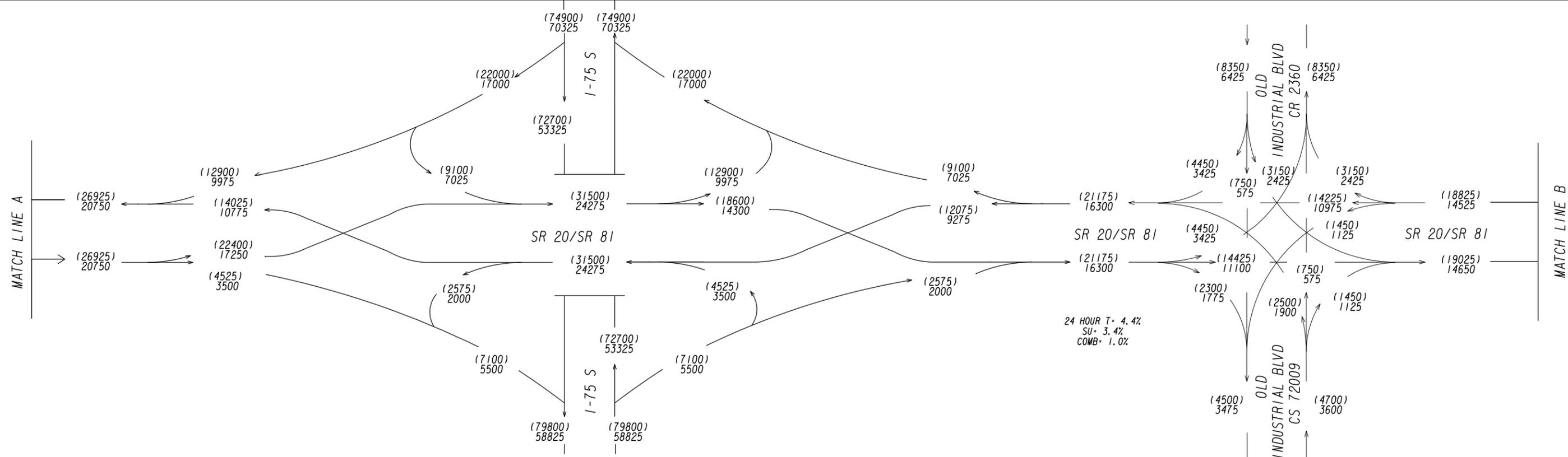
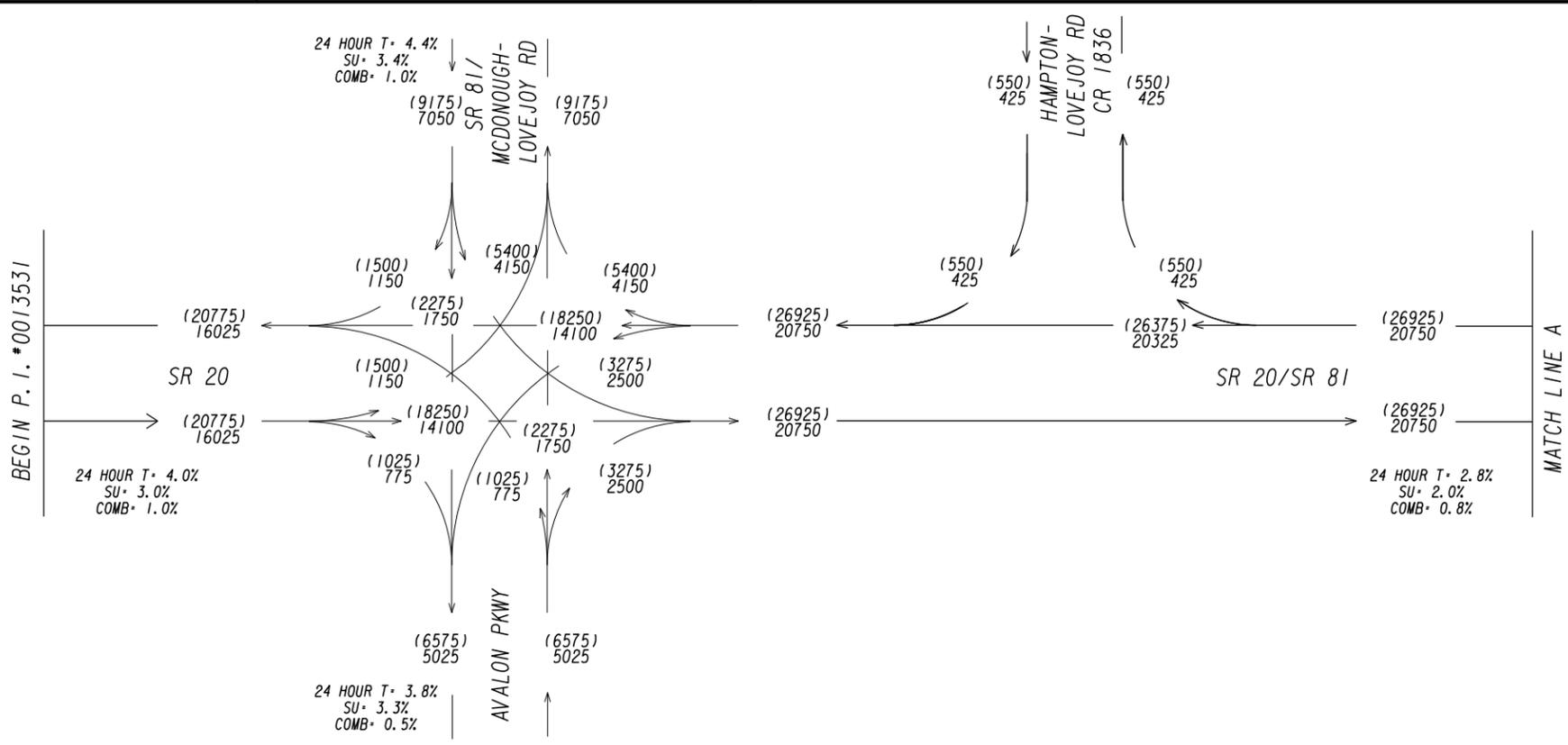
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 HENRY COUNTY
 SR 20 FM I-75 TO
 CS 721/PHILLIPS DR

2022 PM DHV = (000)
 2022 AM DHV = 000
 BUILD



REVISION DATES	
3/2016	
5/2016	

TRAFFIC DIAGRAM			
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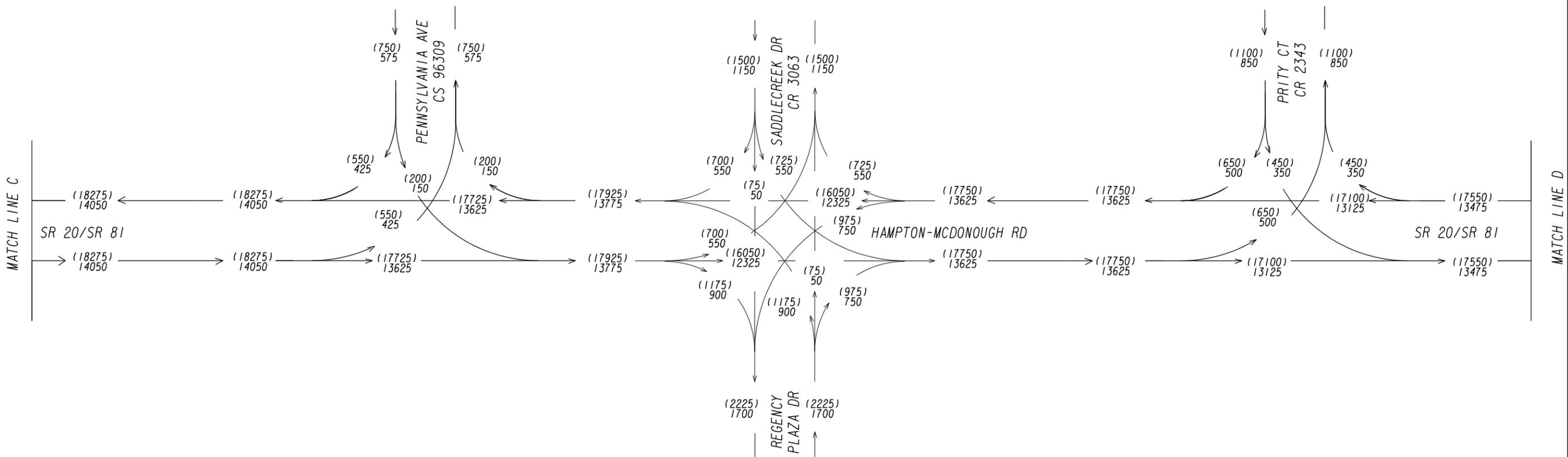
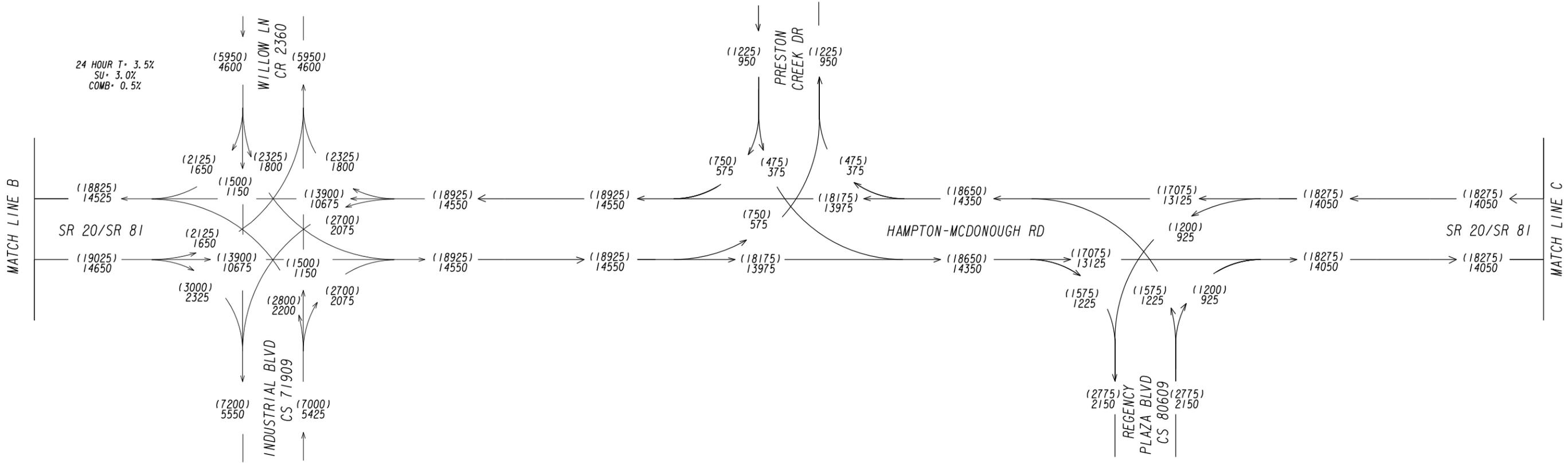
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2042 ADT = (000)
2022 ADT = 000
NO BUILD



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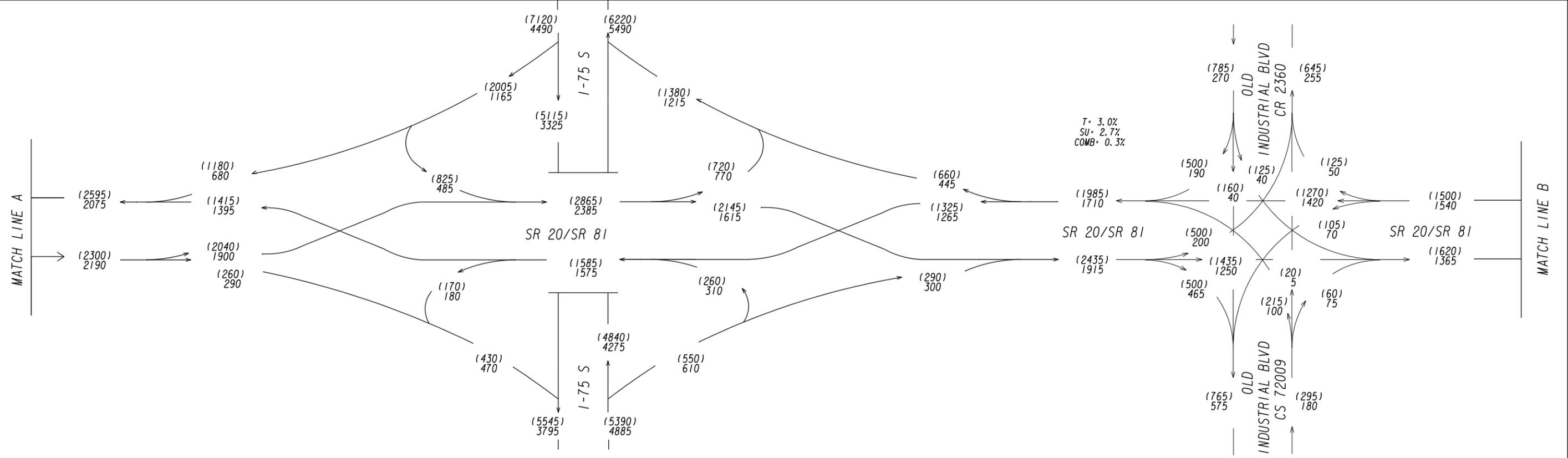
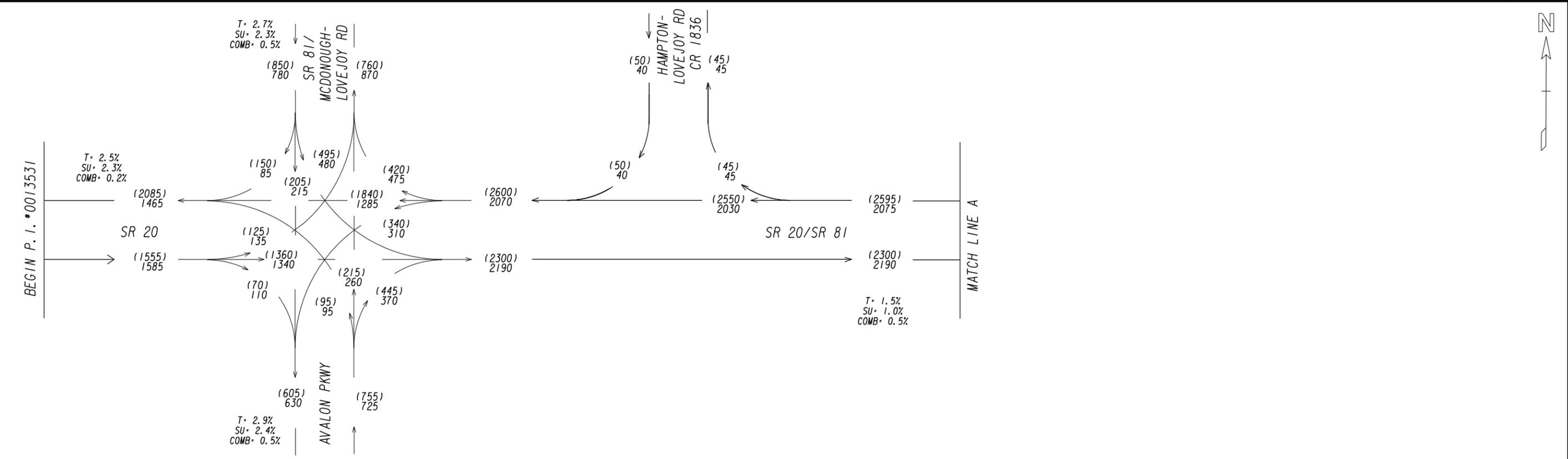
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SR 20 FM I-75 TO
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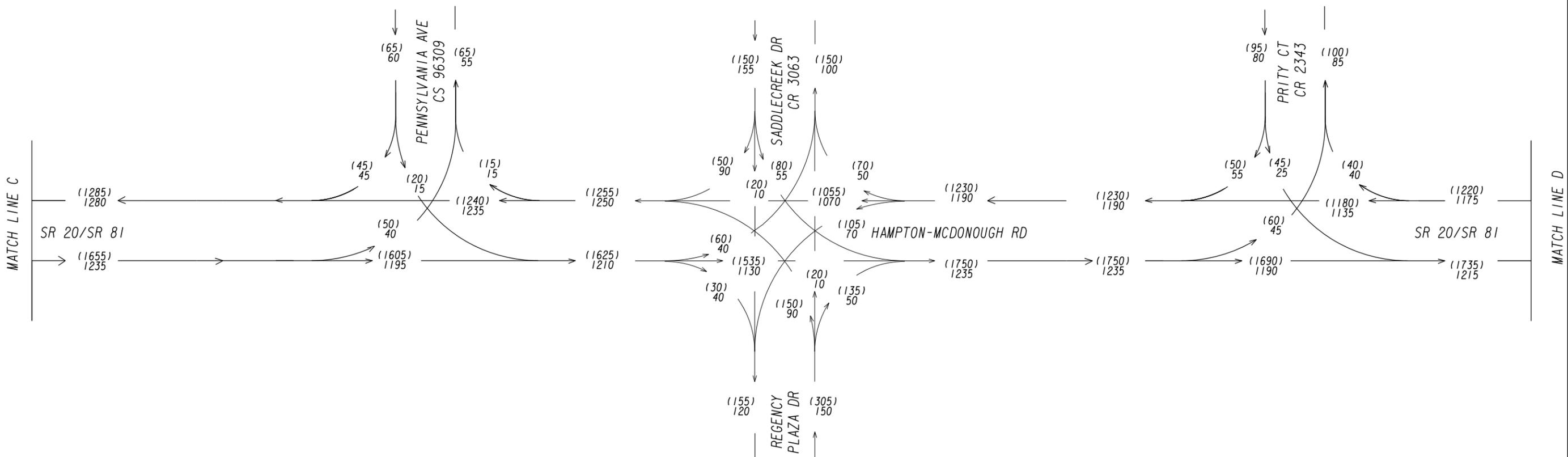
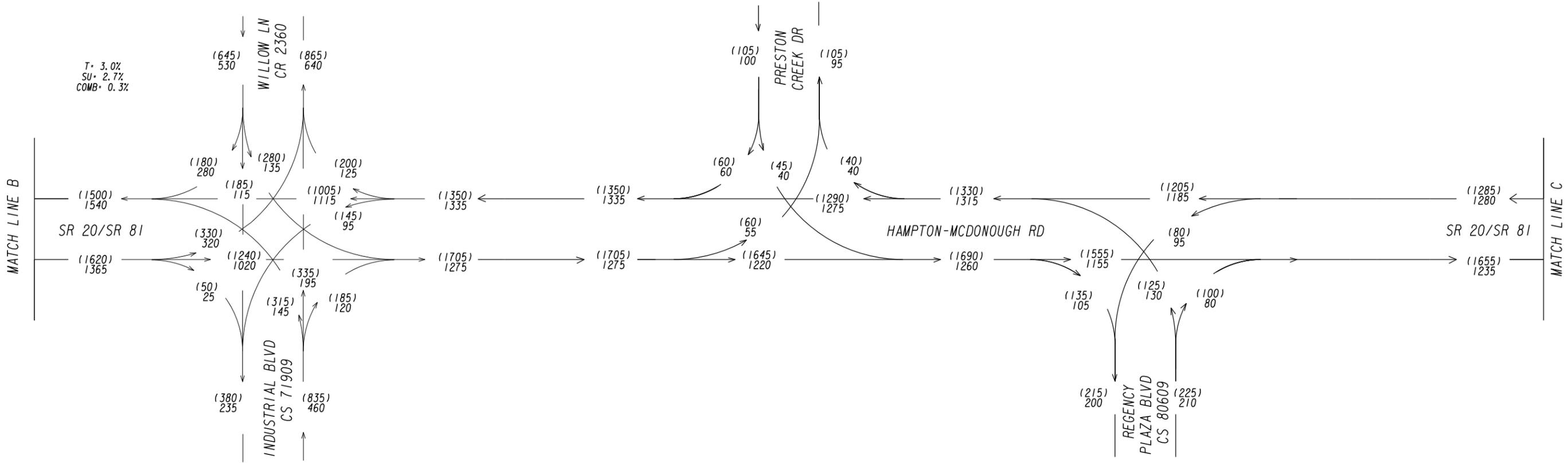


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SR 20 FM I-75 TO
CS 721/PHILLIPS DR

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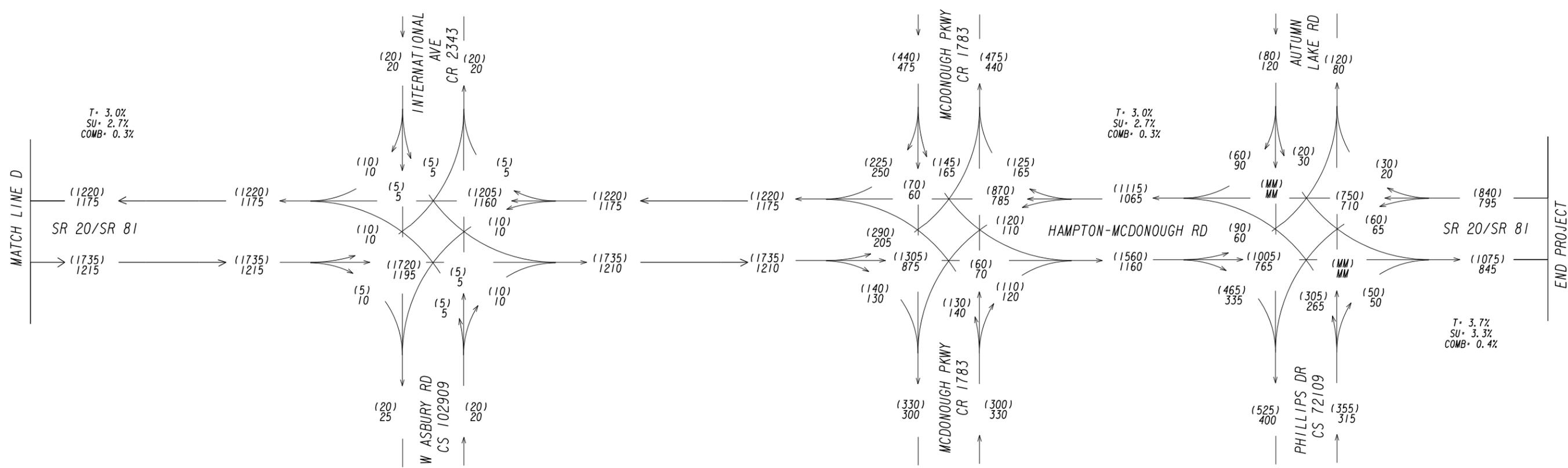
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SR 20 FM I-75 TO
CS 721/PHILLIPS DR

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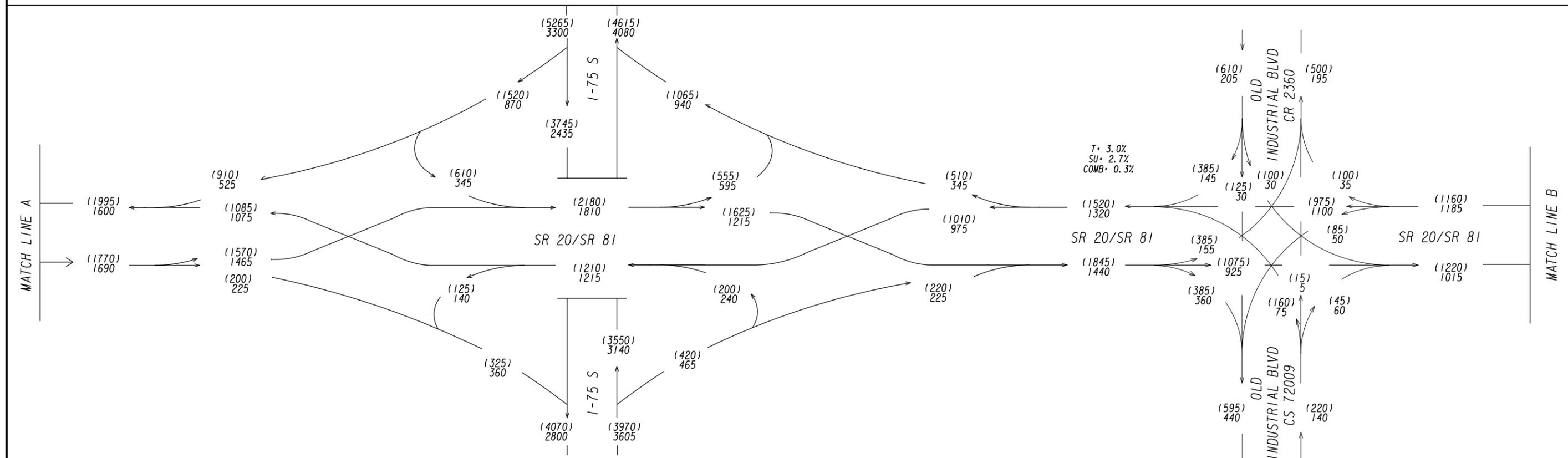
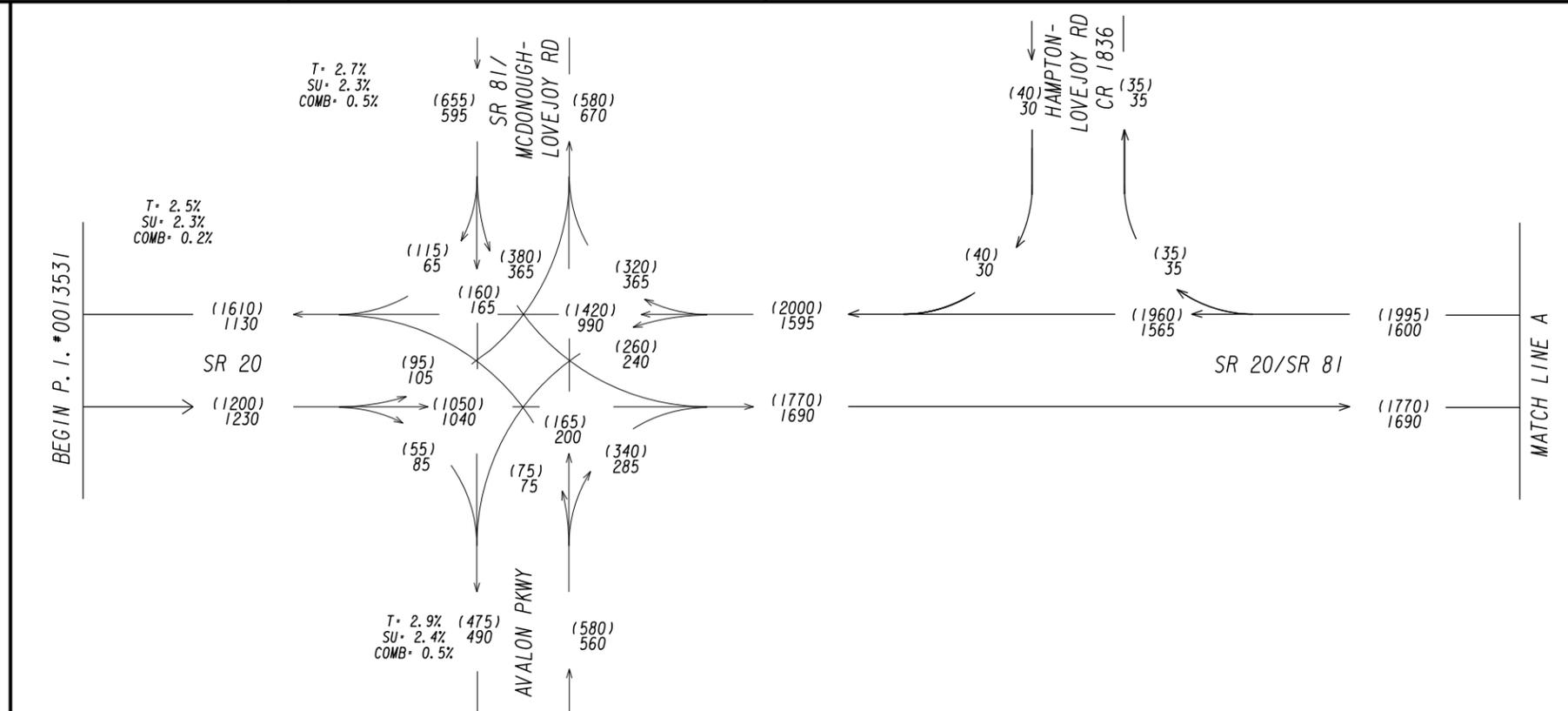
PI# 0013531
 HENRY COUNTY
 SR 20 FM I-75 TO
 CS 721/PHILLIPS DR

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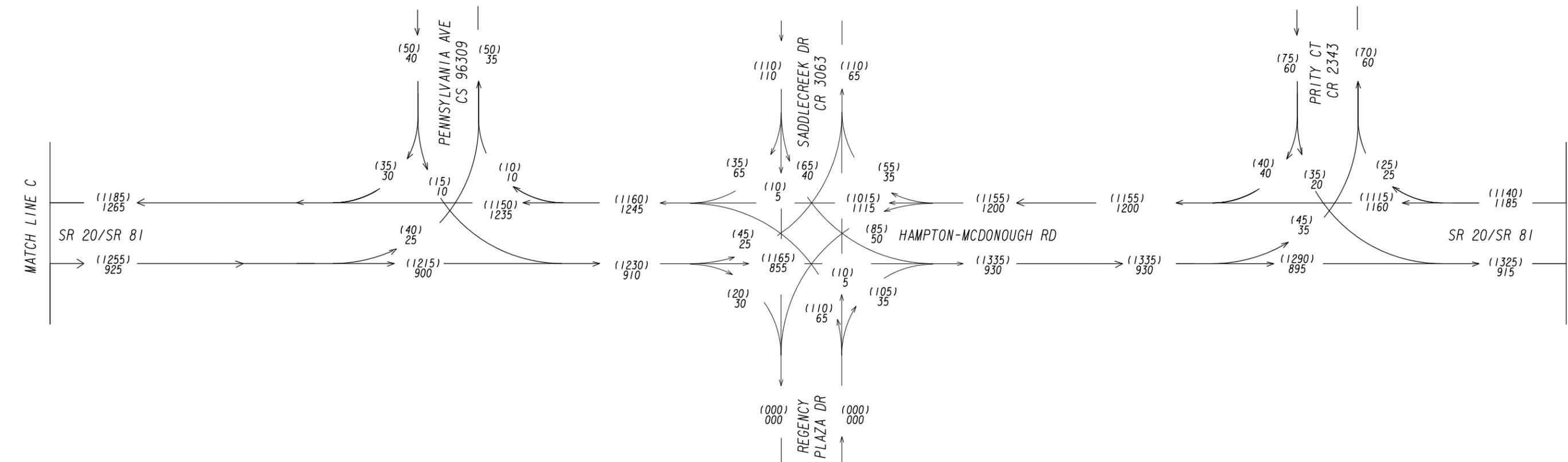
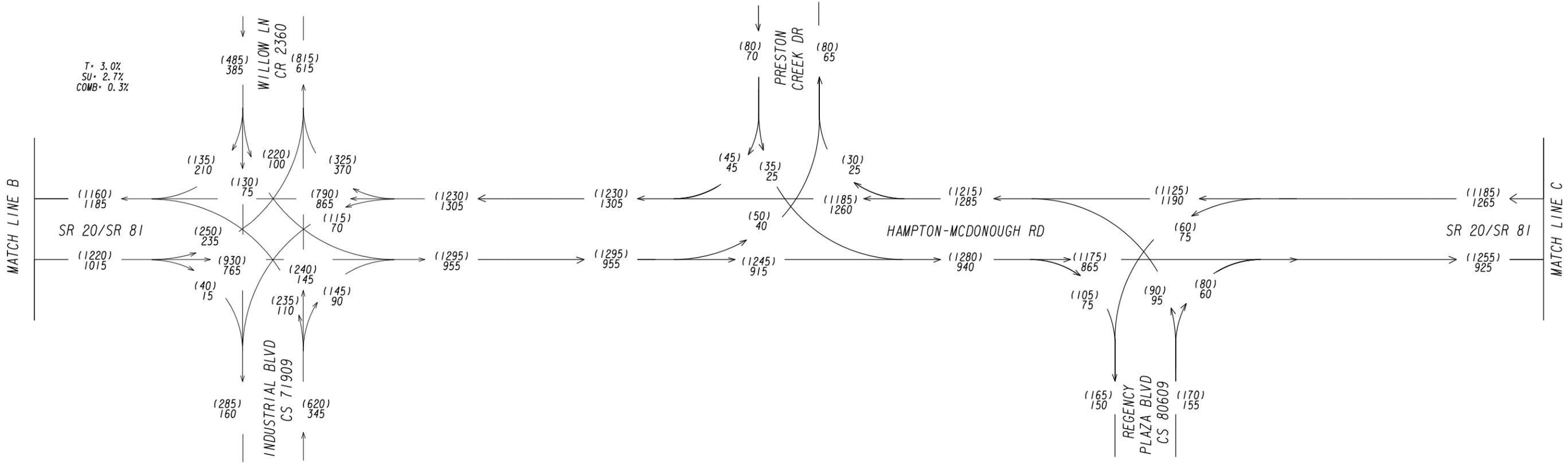
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 SR 20 FM I-75 TO
 CS 721/PHILLIPS DR

2022 PM DHV = (000)
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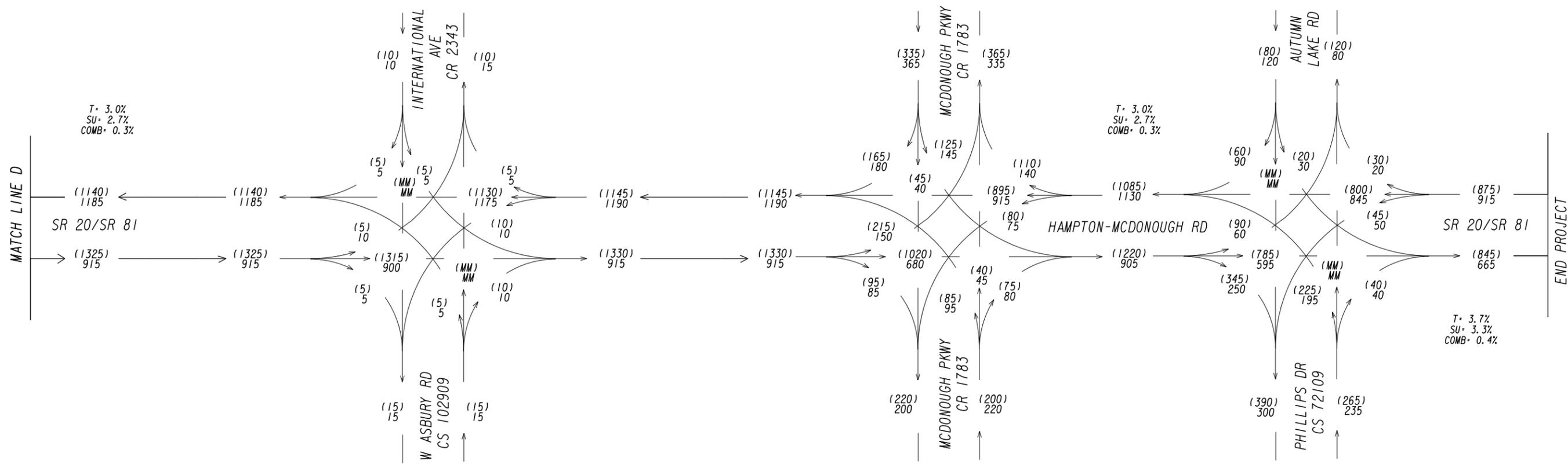
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

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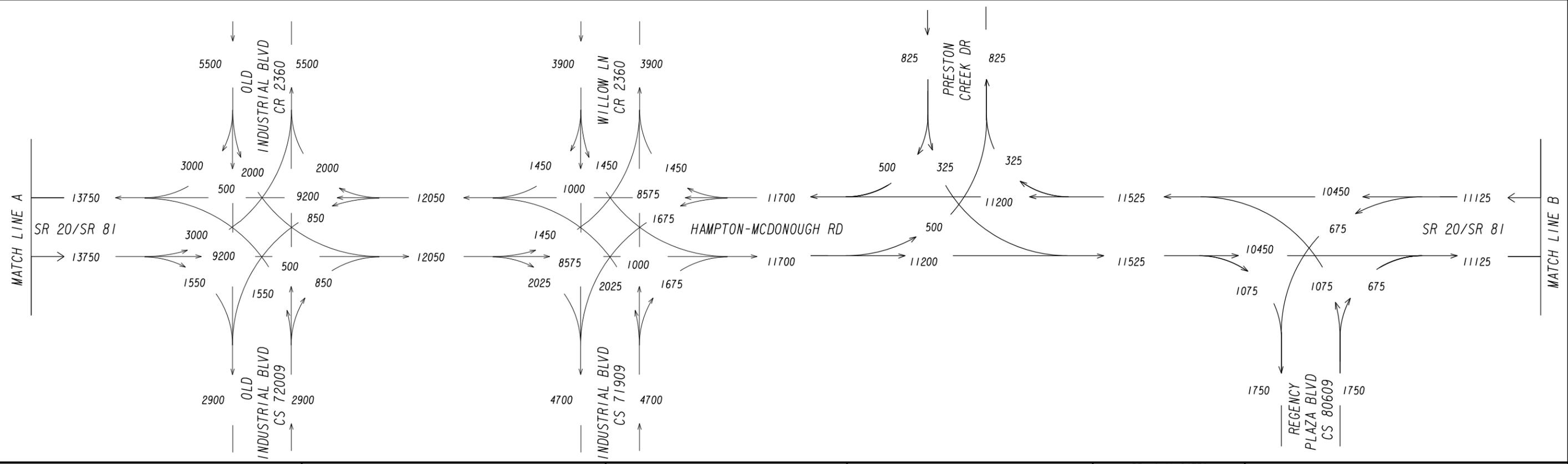
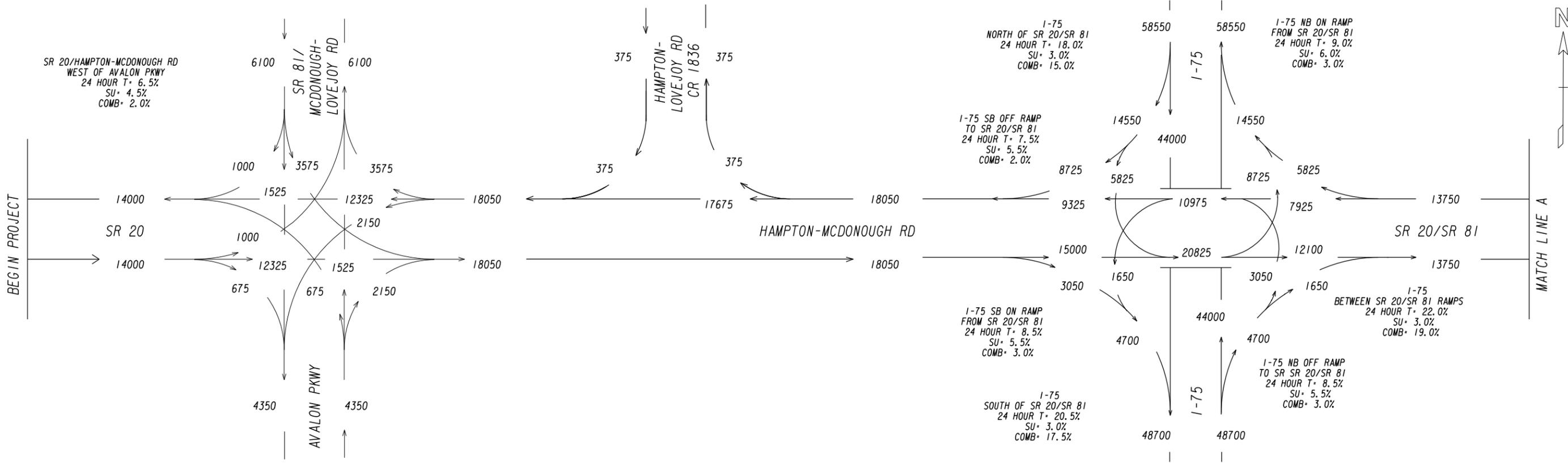
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HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2022 PM DHV = (000)
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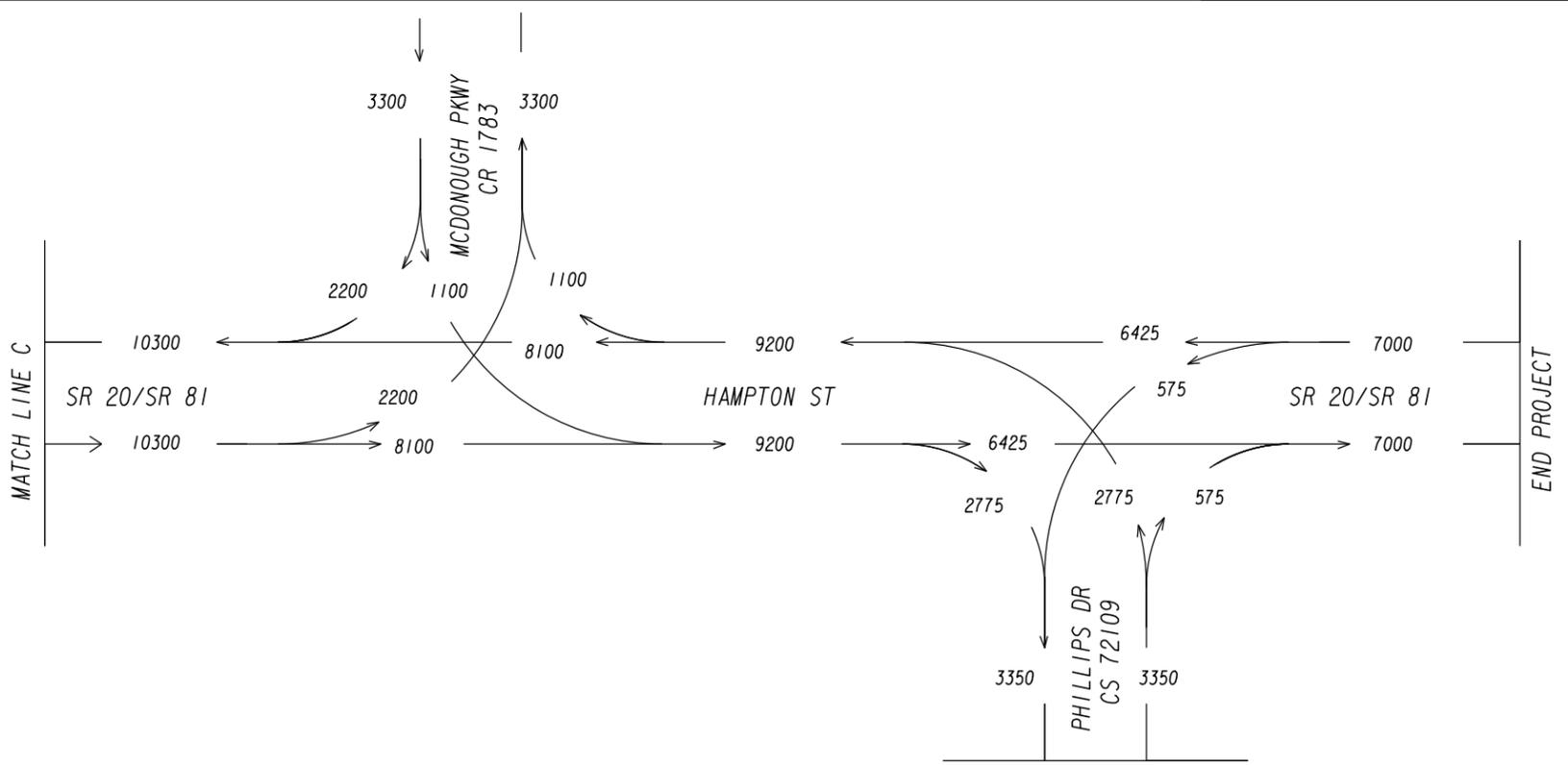
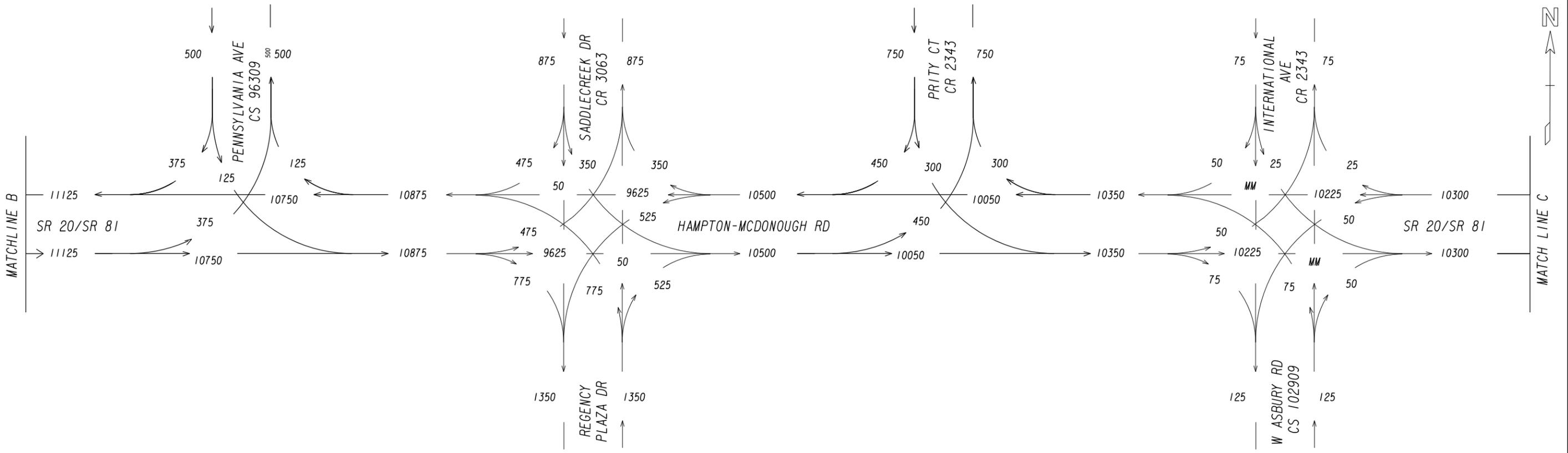


PI# 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2013 ADT
EXISTING



REVISION DATES		TRAFFIC DIAGRAM	
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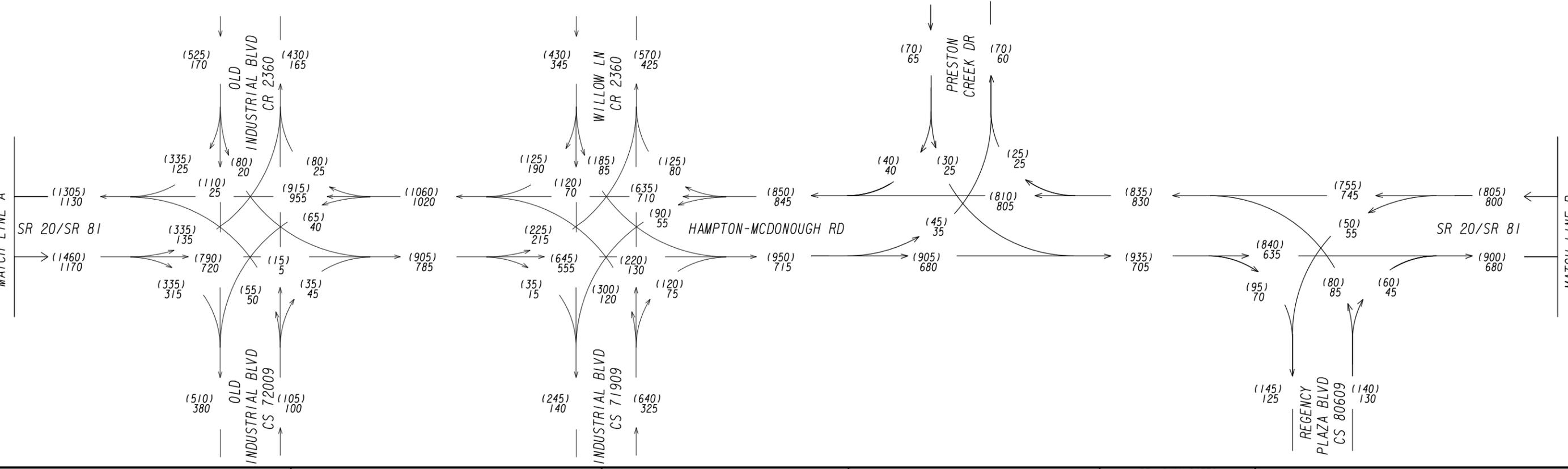
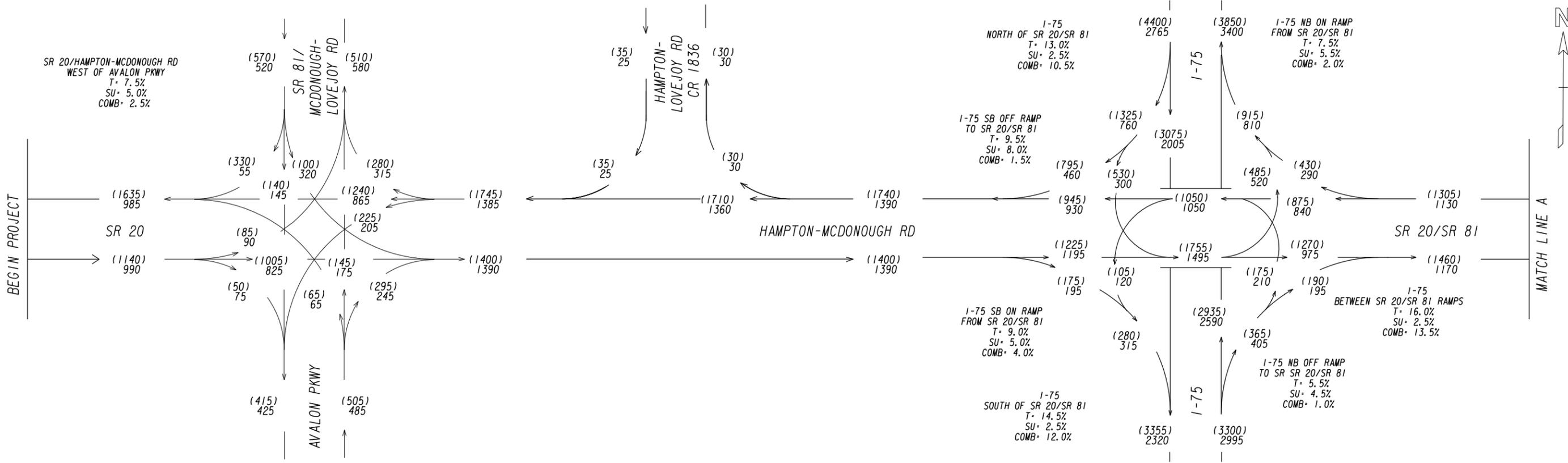


PI# 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2013 ADT
EXISTING



REVISION DATES		TRAFFIC DIAGRAM	
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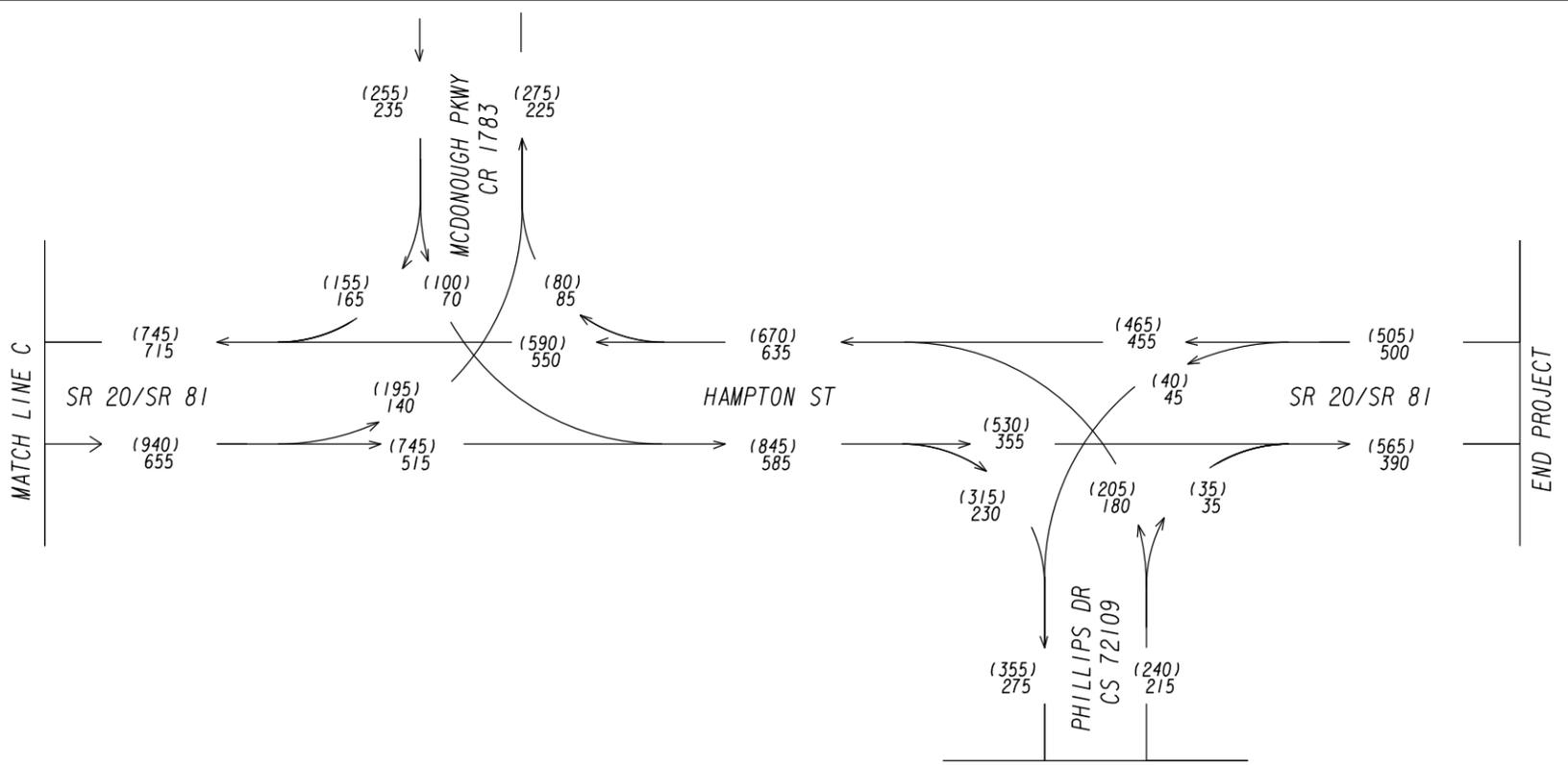
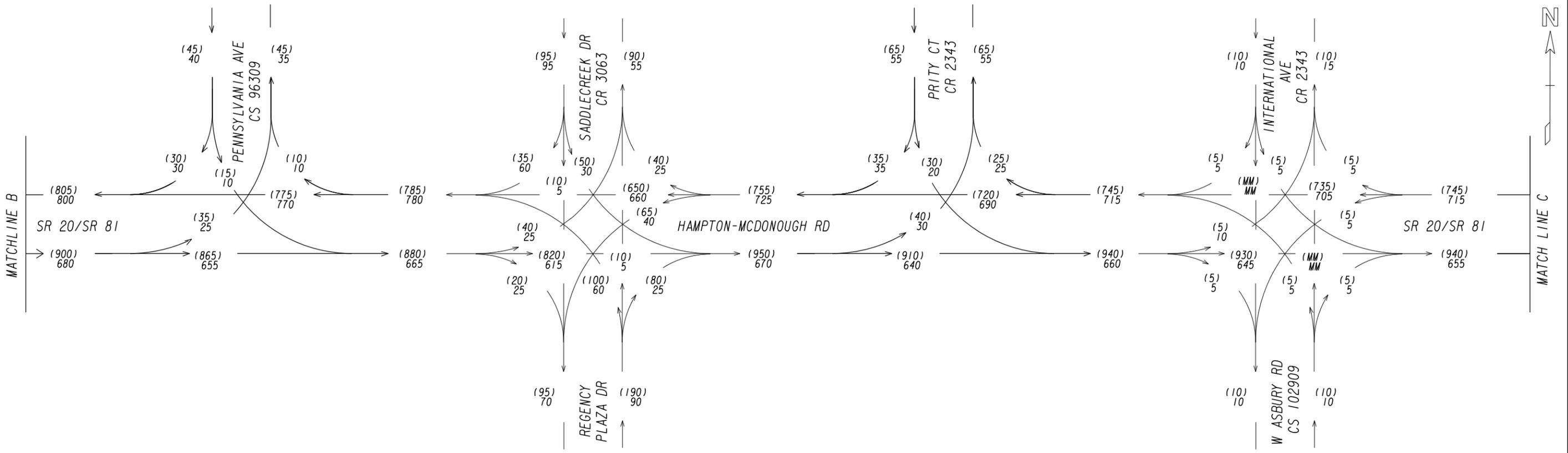


PI# 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2013 PM DHV = (000)
2013 AM DHV = 000
EXISTING



REVISION DATES		TRAFFIC DIAGRAM	
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PI # 0013531
HENRY COUNTY
SR 20 FM I-75 TO
CS 721/PHILLIPS DR

2013 PM DHV = (000)
2013 AM DHV = 000
EXISTING



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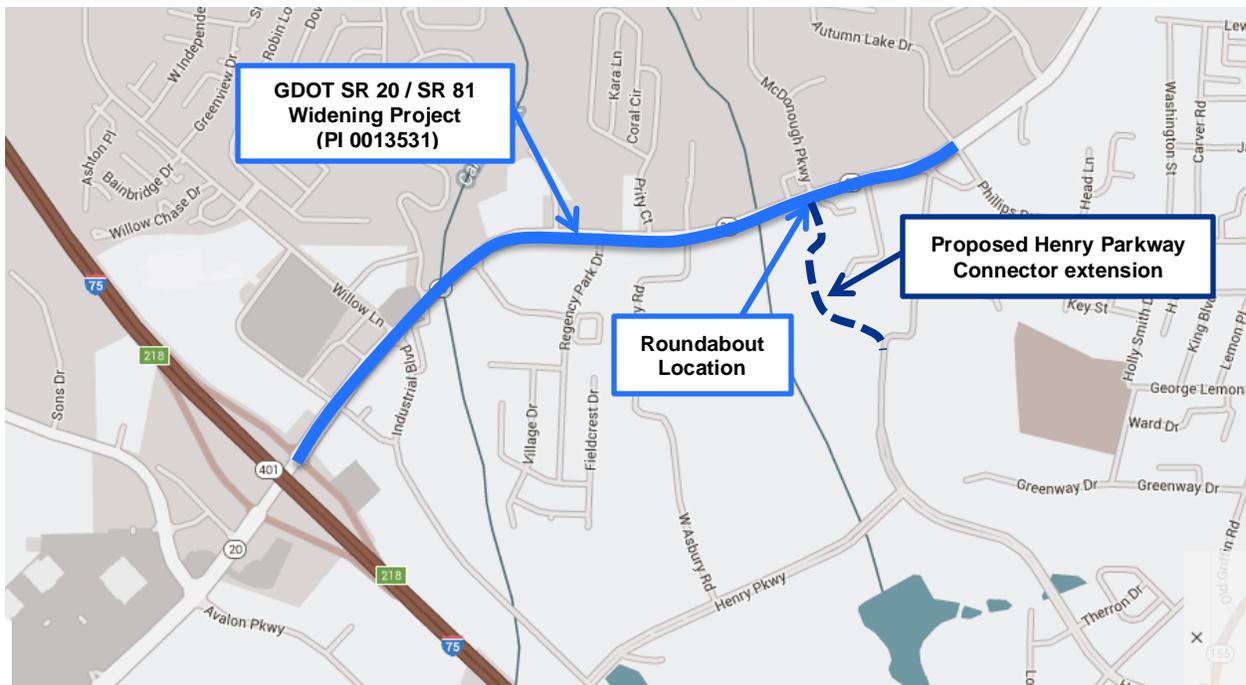
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Attachment #6
Traffic Technical
Memorandum

Ten 10th Street, NW, Suite 1400
Atlanta, Georgia 30309
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www.jacobs.com

Date 7/14/2016
Attention Hatem Aly
From Juan Gonzalez
Subject SR 20 from I-75 to CS 721/Phillips Drive in Henry County, Georgia, P.I. No 0013531
Copies to Cherral Dempsey, GDOT

Jacobs analyzed the Existing and the No-Build and Build scenarios for the design and opening years for the proposed SR 20/81 widening from I-75 to CS 721/Phillips Drive in Henry County.



Tables 1 through 3 show the Existing (2013) and future No-Build and Build (2022 & 2042) signalized and unsignalized HCM level-of-service (LOS) results for each of the study intersections.

The alternative to build a multi-lane roundabout at the intersection of State Route 20/81 and McDonough Parkway was considered and a preliminary analysis was completed based on criteria established by GDOT. Table 5 shows the roundabout suitability screening and Table 6 shows the comparison between signalizing and constructing a roundabout at the intersection of SR 20/81 at McDonough Parkway. The multi-lane roundabout analysis was conducted with the GDOT Roundabout Analysis Tool V3.0. Table 7 and Table 8 show the multi-lane roundabout alternative analysis with the addition of eastbound and northbound bypass lanes.

Queue lengths from the Build 2042 model, in addition to available right-of-way and guidelines provided in the GDOT's Regulation for Driveway and Encroachment Control Manual, were used in calculating the expected storage lengths along the SR 20/81 corridor. The recommended left and right turn storage lengths are shown in Table 4.

Intersection Capacity Analysis

As shown in Table 1, below, most signalized intersections are operating at an acceptable LOS (LOS D or better) with the exception of SR 20 at Industrial Blvd/Willow Lane which has an intersection LOS of E with a delay of 58.4 seconds during the PM peak. All of the unsignalized intersections are operating at LOS F on the side street approaches during the PM peak. This shows that side street traffic is having difficulty finding adequate gaps in the heavy mainline volume.

Table 1 : Existing Level of Service (LOS) Table

Existing (2013)					
SR 20/81 at:	Approach	AM Peak Hour		PM Peak Hour	
		Delay (s)	LOS	Delay (s)	LOS
1. Old Industrial Blvd	EB	13.4	B	25.8	C
	WB	8.7	A	19.7	B
	NB	68.5	E	70.8	E
	SB	66.8	E	73.3	E
	Overall	17.4	B	33.2	C
2. Industrial Blvd/Willow Lane	EB	22.1	D	36.7	D
	WB	26.8	D	35.5	D
	NB	53.0	D	92.5	F
	SB	74.1	E	98.6	F
	Overall	36.0	D	58.4	E
3. Preston Creek Drive (U)	EBL	9.9	A	10.0	B
	SB	61.2	F	464.9	F
4. Regency Plaza Boulevard (U)	WBL	9.5	A	11.3	B
	NB	29.0	D	59.5	F
5. Pennsylvania Avenue (U)	EBL	1.0	A	1.6	A
	SB	30.6	D	60.0	F
6. Regency Park Drive	EB	13.3	B	14.9	B
	WB	13.7	B	10.5	B
	NB	25.9	C	49.8	E
	SB	26.2	C	47.5	D
	Overall	15.0	B	18.2	B
7. Prity Court (U)	EBL	9.5	A	9.7	A
	SB	34.1	D	180.6	F
8. West Asbury Road (U)	EBL	0.3	A	0.2	A
	WBL	0.2	A	0.3	A
	NB	37.2	E	96.7	F
	SB	38.1	E	94.1	F
9. McDonough Parkway (U)	EBL	4.0	A	6.0	A
	SBL	99.4	F	609.9	F
10. Phillips Drive (U)	WBL	8.2	A	8.8	A
	NBL	48.5	E	138.2	F
(U) Unsignalized Intersection					

Table 2 : No Build 2022 and No Build 2042 Level of Service (LOS) Table

SR 20/81 at:	Approach	No Build (2022)				No Build (2042)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1. Old Industrial Blvd	EB	14.4	B	28.5	C	17.5	B	71.2	E
	WB	8.8	A	20.5	B	9.7	A	40.8	D
	NB	67.6	E	74.2	E	67.3	E	44.3	D
	SB	65.2	E	73.5	E	64.2	E	48.2	D
	Overall	18.2	B	35.4	C	19.9	B	56.9	E
2. Industrial Blvd/Willow Lane	EB	58.5	E	127.4	F	139.2	F	295.0	F
	WB	38.4	D	55.4	E	41.9	D	62.6	E
	NB	54.6	D	74.3	E	62.5	E	154.5	F
	SB	88.6	F	88.3	F	254.8	F	232.2	F
	Overall	53.3	D	87.9	F	111.1	F	189.0	F
3. Preston Creek Drive (U)	EBL	13.0	B	12.5	B	13.3	B	13.6	B
	SB	>1000	F	>1000	F	>1000	F	>1000	F
4. Regency Plaza Boulevard (U)	WBL	12.1	B	20.5	B	21.8	C	79.7	F
	NB	314.0	F	206.6	E	941.3	F	>1000	F
5. Pennsylvania Avenue (U)	EBL	8.5	A	15.8	C	23.4	C	0.9	A
	SB	>1000	F	>1000	F	>1000	F	>1000	F
6. Regency Park Drive	EB	13.7	B	67.9	E	48.7	D	242.4	F
	WB	27.1	C	21.1	C	29.4	C	42.1	D
	NB	51.4	D	53.5	D	63.3	E	55.2	E
	SB	48.9	D	57.8	E	56.5	E	68.9	E
	Overall	23.9	C	46.2	D	41.5	D	142.8	F
7. Prity Court (U)	EBL	12.3	B	12.1	B	12.3	B	13.0	B
	SB	661.9	F	>1000	F	>1000	F	>1000	F
8. West Asbury Road (U)	EBL	1.7	A	1.7	A	21.0	A	0.1	A
	WBL	1.0	A	5.5	A	3.5	A	36.1	E
	NB	38.1	E	73.0	F	98.2	F	696.8	F
	SB	56.8	F	54.8	F	92.1	F	832.8	F
9. McDonough Parkway	EB	19.0	B	29.9	C	26.6	C	93.4	F
	WB	30.4	C	38.1	D	33.0	C	86.7	F
	NB	87.6	F	89.9	F	88.8	F	94.9	F
	SB	93.3	F	93.7	F	95.1	F	91.4	F
	Overall	40.0	D	44.2	D	46.1	C	91.2	F
10. Phillips Drive	EB	22.8	C	31.2	C	34.1	C	84.3	F
	WB	43.1	D	41.7	D	32.1	C	39.4	D
	NB	39.9	D	41.9	D	42.8	D	46.3	D
	SB	56.3	E	57.7	E	58.4	E	58.8	E
	Overall	35.0	D	37.0	D	35.8	C	65.5	E

(U) Unsignalized Intersection

As shown in Table 2, all of the signalized intersections are expected to operate at an unacceptable LOS (LOS E or worse) by 2042 during the PM peak under the no build scenario. All of the unsignalized intersections are operating at LOS F on the side street approach during both peaks by 2022. The LOS continues to degrade further by 2042.

Table 3 : Build 2022 and Build 2042 Level of Service (LOS) Table

SR 20/81 at:	Approach	Build (2022)				Build (2042)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay (s)	LOS						
1. Old Industrial Blvd	EB	26.7	C	27.8	C	18.2	B	36.4	D
	WB	12.5	B	19.4	B	8.3	A	37.0	D
	NB	28.7	C	32.2	C	48.1	D	60.8	E
	SB	36.6	D	44.2	D	56.7	E	62.1	E
	Overall	21.8	C	28.1	C	18.3	B	42.1	D
2. Industrial Blvd/Willow Lane	EB	7.3	A	17.1	B	24.1	C	37.6	D
	WB	19.9	C	34.8	D	22.3	C	45.1	D
	NB	41.5	D	36.4	D	54.1	D	70.6	E
	SB	40.7	D	38.3	D	51.3	D	74.8	E
	Overall	20.8	C	29.5	C	31.0	C	51.4	D
3. Preston Creek Drive (U)	EBL	13.0	B	12.6	B	13.5	B	13.7	B
	SB	16.5	C	16.0	C	18.1	C	18.5	C
4. Regency Plaza Boulevard (U)	WBL	9.8	A	11.1	B	11.6	B	14.7	B
	NB	10.0	B	10.6	B	10.8	B	13.1	B
5. Pennsylvania Avenue (U)	EBL	10.4	B	10.1	B	10.4	B	11.9	B
	SB	9.6	A	9.6	A	9.7	A	10.3	B
6. Regency Park Drive	EB	16.3	B	14.2	B	13.2	B	11.4	B
	WB	19.3	B	13.5	B	24.6	C	21.8	C
	NB	34.9	C	32.2	C	44.8	D	54.7	D
	SB	33.8	C	31.1	C	41.4	D	47.6	D
	Overall	19.5	C	16.1	B	21.6	C	20.9	C
7. Prity Court (U)	EBL	12.0	B	12.2	B	12.2	B	12.8	B
	SB	14.9	B	15.4	C	15.6	C	16.7	C
8. West Asbury Road (U)	EBL	11.0	B	10.6	B	11.1	B	10.8	B
	WBL	9.4	A	11.3	B	10.8	B	15.0	C
	NB	9.1	A	9.9	A	9.4	A	10.7	B
	SB	9.8	A	9.2	A	10.4	B	9.6	A
9. McDonough Parkway	EB	13.1	B	10.8	B	10.2	B	36.0	D
	WB	7.2	A	10.4	B	14.9	B	47.6	D
	NB	51.9	D	48.2	D	53.8	D	51.1	D
	SB	49.0	D	48.1	D	54.3	D	50.6	D
	Overall	18.8	B	17.4	B	23.2	C	42.6	D
10. Phillips Drive	EB	9.9	A	15.0	B	11.8	B	33.6	C
	WB	47.4	D	45.4	D	25.8	C	32.5	C
	NB	40.2	D	54.0	D	54.8	D	63.4	E
	SB	51.5	D	39.9	D	56.5	E	64.5	E
	Overall	31.2	C	31.0	C	24.4	C	37.9	D

(U) Unsignalized Intersection

As shown in Table 3, all intersections are expected to operate an acceptable LOS (LOS D or better) during both peaks in 2022 and 2042 under the Build scenario. While some movements at signalized locations may show LOS E, the overall intersection LOS is expected to be an acceptable level (LOS D or

better). All of the unsignalized intersections are operating at an acceptable LOS (LOS C or better) during both peaks in 2022 and 2042.

Table 4 : Recommended Storage Lengths

SR 20/81 at:	Recommended Storage Length (ft)							
	SR 20/81 - Eastbound Approach		SR 20/81 - Westbound Approach		Side Street - Northbound Approach		Side Street - Southbound Approach	
	Left	Right	Left	Right	Left	Right	Left	Right
1. Old Industrial Blvd	300	275	235	100	300	175	225	250
2. Industrial Blvd/Willow Lane	300	235	175	250	325	200	250	175
3. Preston Creek Drive (u)	75	-	-	175	-	-	-	-
4. Regency Plaza Boulevard (u)	-	175	235	-	-	-	-	-
5. Pennsylvania Avenue (u)	235	-	-	100	-	-	-	-
6. Regency Park Drive	250	250	175	75	225	-	160	-
7. Prity Court (u)	175	-	-	175	-	-	-	-
8. West Asbury Road (u)	200	175	235	175	-	-	-	-
9. McDonough Parkway	300	300	275	275	175	100	200	100
10. Phillips Drive	235	175	235	175	-	375	-	75

The storage lengths presented in Table 4 are expected to provide adequate storage capacity based on the analysis results. However, based on the ROW constraints, some approaches may not meet the minimum design elements of left turn lanes required as specified in the Driveway and Encroachment Control Manual (235 feet of full width storage for a 45 mph roadway). These approaches are:

- Eastbound left at SR 20 at Preston Creek Drive
- Westbound left at SR 20 at Regency Park
- Eastbound left at SR 20 at Prity Court

Roundabout Analysis

An alternatives analysis was prepared to evaluate operations for a roundabout at the McDonough Parkway intersection. It should be noted that this intersection is planned to be included in a future Henry County project to extend McDonough Parkway as a connection between SR 155 and SR 81. The expected traffic volumes for this extension have been taken into account in the analysis.

Roundabouts may not operate well if there is too much traffic entering the intersection or if the percentage of traffic on the major road is too high. Table 5 shows how the intersection measures against each of the generalized thresholds recommended by GDOT.

Table 5 : SR 20 at McDonough Parkway – GDOT Roundabout Suitability Screening

State Route 20/81 at McDonough Parkway	ADT					ADT Less than 45,000?	Traffic on Major Street less than 90%?
	Major Street <u>SR 20/81</u>	Minor Street <u>McDonough Parkway</u>	Percent on Major Street	Percent on Minor Street	Total		
Opening Year (2022)	27,050	8,750	76 %	24 %	35,800	Yes	Yes
Design Year (2042)	35,200	11,500	75 %	25 %	46,750 *	No	Yes
* ADT over the 45,000 threshold							

A multi-lane roundabout may not be suitable based on the ADTs thresholds provided by GDOT (shown in Table 5). The total ADT at the intersection is 46,750, slightly over the recommended total ADT of 45,000. A roundabout feasibility study is, therefore, recommended to further investigate operations of a roundabout at this intersection. Table 6 includes preliminary results of a comparison between the operations of a roundabout versus operations of a traffic signal in the opening and design years of the project.

Table 6 : SR 20 at McDonough Parkway – Signalized intersection LOS vs. Roundabout LOS

SR 20/81 at McDonough Parkway	Approach	Build (2022)				Build (2042)			
		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Signalized Intersection (HCM)	EB	13.1	B	10.8	B	10.2	B	36.0	D
	WB	7.1	A	10.4	B	14.8	B	47.6	D
	NB	51.9	D	48.2	D	53.8	D	51.1	D
	SB	49.0	D	48.1	D	54.3	D	50.6	D
	Overall	18.8	B	17.4	B	23.2	C	42.6	D
Roundabout (GDOT Analysis Tool V3.0)	EB (West Leg)	9.0	A	14.2	B	14.9	B	45.8	E
	WB (East Leg)	12.1	B	12.7	B	14.6	B	18.9	C
	NB (South Leg)	10.4	B	16.5	C	19.3	C	46.3	E
	SB (North Leg)	15.9	C	14.4	B	18.7	C	20.3	C
	Overall								

As shown in Table 6, the intersection of SR 20 at McDonough Parkway is expected to operate with an acceptable LOS (LOS D or better) on all approaches in 2022 and 2042 if the intersection is signalized. The GDOT's roundabout analysis tool indicates the intersection is expected to operate with an acceptable LOS (LOS C or better) on all approaches in the opening year (2022); however, with continued background growth in through traffic, the eastbound and westbound approaches are expected to operate at an undesirable level of service in the design year (2042). An alternative analysis was performed to determine if the addition of bypass lanes on the eastbound and northbound approaches would improve the approach LOS. The results of the analysis are shown in Table 7 and Table 8.

Table 7 : SR 20 at McDonough Parkway – Roundabout LOS with NB and EB Bypass Lanes

SR 20/81 at McDonough Parkway	Approach	Build (2022)				Build (2042)			
		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Roundabout (GDOT Analysis Tool V3.0)	EB (West Leg) **	7.8	A	11.9	B	11.6	B	29.1	D
	WB (East Leg)	12.1	B	12.7	B	14.6	B	18.9	C
	NB (South Leg) **	8.2	A	12.1	B	13.2	B	27.7	D
	SB (North Leg)	15.9	C	14.4	B	18.7	C	20.3	C
** Bypass lane added									

As shown in Table 7, the eastbound and northbound approaches in 2042 PM have reduced delays and are expected to operate at LOS D with the addition of bypass lanes. Adding a bypass lane to the northbound approach may not be feasible due to its impact to the cemetery located on the southeast corner. Table 8 shows the level-of-service if no bypass lane is added to the northbound approach.

Table 8 : SR 20 at McDonough Parkway – Roundabout LOS with Only EB Bypass Lane

SR 20/81 at McDonough Parkway	Approach	Build (2022)				Build (2042)			
		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Roundabout (GDOT Analysis Tool V3.0)	EB (West Leg) **	7.8	A	11.9	B	11.6	B	29.1	D
	WB (East Leg)	12.1	B	12.7	B	14.6	B	18.9	C
	NB (South Leg)	10.4	B	16.5	C	19.3	C	46.3	E
	SB (North Leg)	15.9	C	14.4	B	18.7	C	20.3	C
** Bypass lane added									

The northbound approach is expected to see a higher delay if no bypass lane is constructed due to ROW constraints in the southeast corner of the intersection. Comparing the signalized intersection and the multi-lane roundabout operations shown in Table 8, the northbound approach is expected to have a 51.1 seconds delay if signalized and 46.3 seconds of delay with a multi-lane roundabout.

Conclusions

Based on the results of the analysis along the SR 20 / SR 81 corridor, the planned widening project is anticipated to improve traffic flow and reduce incidents of delays to an acceptable level-of-service for each of the study intersections. A roundabout at the intersection of SR 20 / SR 81 at McDonough Parkway will operate with similar or less approach delay than a traffic signal if bypass lanes can be accommodated on at least the eastbound approach. Furthermore studies prepared by the Insurance Institute for Highway Safety show that roundabouts, when compared to signalized intersections, typically reduce overall delay and congestion, increase capacity, and improve safety. It is recommended that a roundabout be considered for the intersection of SR 20 / SR 81 at McDonough Parkway and that a full roundabout feasibility analysis be prepared to further verify configuration and operational characteristics.

Appendix

General & Site Information		v3.0
Analyst:	Juan Gonzalez	
Agency/Co:	Jacobs	
Date:	6/6/2016	
Project or PI#:	0013531	
Year, Peak Hour:	2042 AM	
County/District:	Henry County / District 3	
Intersection:	SR 20/81 at McDonough Pkwy	

Volumes	Entry Legs (FROM)							
	N1 (1)	N2 (1)	NE1 (2)	NE2 (2)	E1 (3)	E2 (3)	SE1 (4)	SE2 (4)

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
Exit Legs (TO)	N (1), vph						165		
	NE (2), vph								
	E (3), vph	165							
	SE (4), vph								
	S (5), vph	58	2			110			
	SW (6), vph								
	W (7), vph		250			388	397		
	NW (8), vph								
Entry Volume, vph		223	252	0	0	498	562	0	0

Lane Designation	S1 (5)	S2 (5)	SW1 (6)	SW2 (6)	W1 (7)	W2 (7)	NW1 (8)	NW2 (8)
------------------	--------	--------	---------	---------	--------	--------	---------	---------

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
	N (1), vph		70			205			
	NE (2), vph								
	E (3), vph					297	578		
	SE (4), vph								
	S (5), vph								
	SW (6), vph								
	W (7), vph	140				10			
	NW (8), vph								
Entry Volume, vph		140	70	0	0	512	578	0	0

	N	NE	E	SE	S	SW	W	NW
# of Entry Flow Lanes	2	0	2	0	2	0	2	0
# of Conflict Flow Lanes	2	2	2	2	2	2	2	2

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
------------------------	---	----	---	----	---	----	---	----

% Cars	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%
% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.92	0.95	0.92	0.95	0.92	0.95
F _{hv}	0.971	1.000	0.971	1.000	0.971	1.000	0.971	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	185	0	78	0	230	0

Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	185	0	0	0	0	0	980	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	67	0	123	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	280	0	879	0	157	0	11	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Entry flow, pcu/h	532	0	1187	0	235	0	1220	0
	Entry flow Lane 1, pcu/h	250	0	558	0	157	0	573	0
	Entry flow Lane 2, pcu/h	282	0	629	0	78	0	647	0
	Conflicting flow, pcu/h	1170	0	476	0	1405	0	375	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N		E		S		W	
	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru
Lane Designations								
Entry Capacity, veh/h	447	510	846	920	360	418	928	1002
Entry Flow Rates, veh/h	242	274	541	611	152	76	557	628
V/C ratio	0.54	0.54	0.64	0.66	0.42	0.18	0.60	0.63
Control Delay, s/veh	19.9	17.6	14.7	14.6	19.3	11.4	12.5	12.6
LOS	C	C	B	B	C	B	B	B
95th % Queue (ft)	82	81	122	134	52	17	106	118
Approach Delay, LOS	18.7 sec, LOS C		14.6 sec, LOS B		13.2 sec, LOS B		11.6 sec, LOS B	
	NE		SE		SW		NW	
Lane Designations	Lane 1	Lane 2						
Entry Capacity, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
Entry Flow Rates, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
V/C ratio			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Control Delay, sec/pcu			#VALUE!	#VALUE!			#VALUE!	#VALUE!
LOS			#VALUE!	#VALUE!			#VALUE!	#VALUE!
95th % Queue (ft)			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Approach Delay, LOS			#N/A				#N/A	

v3.0

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)	W (7)	S (5)				
Select Exit Leg for Bypass (TO)	S (5)	E (3)				
Does the bypass have a dedicated receiving lane?	No	No				
# of Conflicting Exit Flow Lanes	2	2	2	2	2	2
Volumes						
Entry Leg: Insert Right Turn Volume	130	120				
Exit Leg: (Select Input Method)	Default	Default				
Lane Flow in Exit Leg***	127	777				
Sum of inner circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Sum of outer circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Critical Lane Flow (Manual) in Exit Leg***						
Volume Characteristics						
PHF (Entry Leg)	0.92	0.92				
F _{HV} (Entry Leg)	0.97	0.97				

F_{ped}	1.00	1.00				
PHF (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
F_{HV} (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
***Volume Characteristics are already taken into account for Default method ONLY. Insert Values above if Manual method.						
Entry/Conflicting Flows						
Entry Flow	146	134				
Conflicting Critical Flow	127	777				
Bypass Lane Results						
Entry Capacity of Bypass, veh/h	1238	712				
Flow Rates of Exiting Traffic, veh/h	141	130				
V/C ratio	0.11	0.19				
Control Delay, sec/pcu	3.9	7.2				
LOS	A	A				
95th % Queue (ft)	10	18				

General & Site Information		v3.0
Analyst:	Juan Gonzalez	
Agency/Co:	Jacobs	
Date:	6/6/2016	
Project or PI#:	0013531	
Year, Peak Hour:	2042 PM	
County/District:	Henry County / District 3	
Intersection:	SR 20/81 at McDonough Pkwy	

Volumes	Entry Legs (FROM)							
	N1 (1)	N2 (1)	NE1 (2)	NE2 (2)	E1 (3)	E2 (3)	SE1 (4)	SE2 (4)

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
Exit Legs (TO)	N (1), vph						125		
	NE (2), vph								
	E (3), vph	145							
	SE (4), vph								
	S (5), vph	62	8			120			
	SW (6), vph								
	W (7), vph		225			404	466		
	NW (8), vph								
Entry Volume, vph		207	233	0	0	524	591	0	0

Lane Designation	S1 (5)	S2 (5)	SW1 (6)	SW2 (6)	W1 (7)	W2 (7)	NW1 (8)	NW2 (8)
------------------	--------	--------	---------	---------	--------	--------	---------	---------

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	Right only	SELECT
	N (1), vph	0	60			290			
	NE (2), vph								
	E (3), vph					454	851		
	SE (4), vph								
	S (5), vph								
	SW (6), vph								
	W (7), vph	130				10			
	NW (8), vph								
Entry Volume, vph		130	60	0	0	754	851	0	0

	N	NE	E	SE	S	SW	W	NW
# of Entry Flow Lanes	2	0	2	0	2	0	2	0
# of Conflict Flow Lanes	2	2	2	2	2	2	2	2

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
------------------------	---	----	---	----	---	----	---	----

% Cars	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%
% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.92	0.95	0.92	0.95	0.92	0.95
F _{hv}	0.971	1.000	0.971	1.000	0.971	1.000	0.971	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	140	0	67	0	325	0

Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	162	0	0	0	0	0	1461	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	78	0	134	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	252	0	974	0	146	0	11	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Entry flow, pcu/h	493	0	1248	0	213	0	1797	0
	Entry flow Lane 1, pcu/h	232	0	587	0	146	0	844	0
	Entry flow Lane 2, pcu/h	261	0	662	0	67	0	953	0
	Conflicting flow, pcu/h	1265	0	549	0	1959	0	375	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N		E		S		W	
	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru
Lane Designations								
Entry Capacity, veh/h	409	470	791	865	216	261	928	1002
Entry Flow Rates, veh/h	225	253	570	642	141	65	820	925
V/C ratio	0.55	0.54	0.72	0.74	0.65	0.25	0.88	0.92
Control Delay, s/veh	21.8	18.9	18.9	18.9	46.8	19.6	29.2	33.2
LOS	C	C	C	C	E	C	D	D
95th % Queue (ft)	83	81	162	179	102	25	309	371
Approach Delay, LOS	20.3 sec, LOS C		18.9 sec, LOS C		27.7 sec, LOS D		29.1 sec, LOS D	
	NE		SE		SW		NW	
Lane Designations	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Right only	Lane 2
Entry Capacity, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
Entry Flow Rates, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
V/C ratio			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Control Delay, sec/pcu			#VALUE!	#VALUE!			#VALUE!	#VALUE!
LOS			#VALUE!	#VALUE!			#VALUE!	#VALUE!
95th % Queue (ft)			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Approach Delay, LOS	#N/A				#N/A			

v3.0

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)	W (7)	S (5)				
Select Exit Leg for Bypass (TO)	S (5)	E (3)				
Does the bypass have a dedicated receiving lane?	No	No				
# of Conflicting Exit Flow Lanes	2	2	2	2	2	2
Volumes						
Entry Leg: Insert Right Turn Volume	140	110				
Exit Leg: (Select Input Method)	Default	Default				
Lane Flow in Exit Leg***	142	1083				
Sum of inner circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Sum of outer circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Critical Lane Flow (Manual) in Exit Leg***						
Volume Characteristics						
PHF (Entry Leg)	0.92	0.92				
F _{HV} (Entry Leg)	0.97	0.97				

F_{ped}	1.00	1.00				
PHF (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
F_{HV} (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
***Volume Characteristics are already taken into account for Default method ONLY. Insert Values above if Manual method.						
Entry/Conflicting Flows						
Entry Flow	157	123				
Conflicting Critical Flow	142	1083				
Bypass Lane Results						
Entry Capacity of Bypass, veh/h	1222	549				
Flow Rates of Exiting Traffic, veh/h	152	120				
V/C ratio	0.12	0.22				
Control Delay, sec/pcu	4.0	9.6				
LOS	A	A				
95th % Queue (ft)	11	22				

General & Site Information		v3.0
Analyst:	Juan Gonzalez	
Agency/Co:	Jacobs	
Date:	6/6/2016	
Project or PI#:	0013531	
Year, Peak Hour:	2042 AM	
County/District:	Henry County / District 3	
Intersection:	SR 20/81 at McDonough Pkwy	

Volumes **Entry Legs (FROM)**

		N1 (1)	N2 (1)	NE1 (2)	NE2 (2)	E1 (3)	E2 (3)	SE1 (4)	SE2 (4)
Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
Exit Legs (TO)	N (1), vph						165		
	NE (2), vph								
	E (3), vph	165							
	SE (4), vph								
	S (5), vph	58	2			110			
	SW (6), vph								
	W (7), vph		250			388	397		
	NW (8), vph								
Entry Volume, vph		223	252	0	0	498	562	0	0

		S1 (5)	S2 (5)	SW1 (6)	SW2 (6)	W1 (7)	W2 (7)	NW1 (8)	NW2 (8)
Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
	N (1), vph	15	55			205			
	NE (2), vph								
	E (3), vph		120			297	578		
	SE (4), vph								
	S (5), vph								
	SW (6), vph								
	W (7), vph	140				10			
	NW (8), vph								
Entry Volume, vph		155	175	0	0	512	578	0	0

	N	NE	E	SE	S	SW	W	NW
# of Entry Flow Lanes	2	0	2	0	2	0	2	0
# of Conflict Flow Lanes	2	2	2	2	2	2	2	2

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%
% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.92	0.95	0.92	0.95	0.92	0.95
F _{hv}	0.971	1.000	0.971	1.000	0.971	1.000	0.971	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	185	0	78	0	230	0

Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	185	0	0	0	134	0	980	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	67	0	123	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	280	0	879	0	157	0	11	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Entry flow, pcu/h	532	0	1187	0	369	0	1220	0
	Entry flow Lane 1, pcu/h	250	0	558	0	174	0	573	0
	Entry flow Lane 2, pcu/h	282	0	629	0	196	0	647	0
	Conflicting flow, pcu/h	1170	0	476	0	1405	0	375	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N		E		S		W	
	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru
Lane Designations								
Entry Capacity, veh/h	447	510	846	920	360	418	928	1002
Entry Flow Rates, veh/h	242	274	541	611	168	190	557	628
V/C ratio	0.54	0.54	0.64	0.66	0.47	0.46	0.60	0.63
Control Delay, s/veh	19.9	17.6	14.7	14.6	20.9	17.9	12.5	12.6
LOS	C	C	B	B	C	C	B	B
95th % Queue (ft)	82	81	122	134	62	60	106	118
Approach Delay, LOS	18.7 sec, LOS C		14.6 sec, LOS B		19.3 sec, LOS C		11.6 sec, LOS B	
	NE		SE		SW		NW	
Lane Designations	Lane 1	Lane 2						
Entry Capacity, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
Entry Flow Rates, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
V/C ratio			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Control Delay, sec/pcu			#VALUE!	#VALUE!			#VALUE!	#VALUE!
LOS			#VALUE!	#VALUE!			#VALUE!	#VALUE!
95th % Queue (ft)			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Approach Delay, LOS	#N/A				#N/A			

v3.0

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)	W (7)					
Select Exit Leg for Bypass (TO)	S (5)					
Does the bypass have a dedicated receiving lane?	No					
# of Conflicting Exit Flow Lanes	2	2	2	2	2	2
Volumes						
Entry Leg: Insert Right Turn Volume	130					
Exit Leg: (Select Input Method)	Default					
Lane Flow in Exit Leg***	127					
Sum of inner circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Sum of outer circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Critical Lane Flow (Manual) in Exit Leg***						
Volume Characteristics						
PHF (Entry Leg)	0.92					
F _{HV} (Entry Leg)	0.97					

F_{ped}	1.00					
PHF (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
F_{HV} (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
***Volume Characteristics are already taken into account for Default method ONLY. Insert Values above if Manual method.						
Entry/Conflicting Flows						
Entry Flow	146					
Conflicting Critical Flow	127					
Bypass Lane Results						
Entry Capacity of Bypass, veh/h	1238					
Flow Rates of Exiting Traffic, veh/h	141					
V/C ratio	0.11					
Control Delay, sec/pcu	3.9					
LOS	A					
95th % Queue (ft)	10					

General & Site Information		v3.0
Analyst:	Juan Gonzalez	
Agency/Co:	Jacobs	
Date:	6/6/2016	
Project or PI#:	0013531	
Year, Peak Hour:	2042 PM	
County/District:	Henry County / District 3	
Intersection:	SR 20/81 at McDonough Pkwy	

Volumes	Entry Legs (FROM)							
	N1 (1)	N2 (1)	NE1 (2)	NE2 (2)	E1 (3)	E2 (3)	SE1 (4)	SE2 (4)

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	SELECT	SELECT
Exit Legs (TO)	N (1), vph						125		
	NE (2), vph								
	E (3), vph	145							
	SE (4), vph								
	S (5), vph	62	8			120			
	SW (6), vph								
	W (7), vph		225			404	466		
	NW (8), vph								
Entry Volume, vph		207	233	0	0	524	591	0	0

Lane Designation		Left-Thru	Right-Thru	SELECT	SELECT	Left-Thru	Right-Thru	Right only	SELECT
	N (1), vph	11	49			290			
	NE (2), vph								
	E (3), vph		110			454	851		
	SE (4), vph								
	S (5), vph								
	SW (6), vph								
	W (7), vph	130				10			
	NW (8), vph								
Entry Volume, vph		141	159	0	0	754	851	0	0

	N	NE	E	SE	S	SW	W	NW
# of Entry Flow Lanes	2	0	2	0	2	0	2	0
# of Conflict Flow Lanes	2	2	2	2	2	2	2	2

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%	97.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%	3.0%	0.0%
% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.92	0.95	0.92	0.95	0.92	0.95
F _{hv}	0.971	1.000	0.971	1.000	0.971	1.000	0.971	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	140	0	67	0	325	0

Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	162	0	0	0	123	0	1461	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	78	0	134	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	252	0	974	0	146	0	11	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Entry flow, pcu/h	493	0	1248	0	336	0	1797	0
	Entry flow Lane 1, pcu/h	232	0	587	0	158	0	844	0
	Entry flow Lane 2, pcu/h	261	0	662	0	178	0	953	0
	Conflicting flow, pcu/h	1265	0	549	0	1959	0	375	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N		E		S		W	
	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru	Left-Thru	Right-Thru
Lane Designations								
Entry Capacity, veh/h	409	470	791	865	216	261	928	1002
Entry Flow Rates, veh/h	225	253	570	642	153	173	820	925
V/C ratio	0.55	0.54	0.72	0.74	0.71	0.66	0.88	0.92
Control Delay, s/veh	21.8	18.9	18.9	18.9	52.7	40.6	29.2	33.2
LOS	C	C	C	C	F	E	D	D
95th % Queue (ft)	83	81	162	179	119	109	309	371
Approach Delay, LOS	20.3 sec, LOS C		18.9 sec, LOS C		46.3 sec, LOS E		29.1 sec, LOS D	
HCM 6th Edition	NE		SE		SW		NW	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Right only	Lane 2
Lane Designations								
Entry Capacity, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
Entry Flow Rates, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
V/C ratio			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Control Delay, sec/pcu			#VALUE!	#VALUE!			#VALUE!	#VALUE!
LOS			#VALUE!	#VALUE!			#VALUE!	#VALUE!
95th % Queue (ft)			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Approach Delay, LOS			#N/A				#N/A	

v3.0

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)	W (7)					
Select Exit Leg for Bypass (TO)	S (5)					
Does the bypass have a dedicated receiving lane?	No					
# of Conflicting Exit Flow Lanes	2	2	2	2	2	2
Volumes						
Entry Leg: Insert Right Turn Volume	140					
Exit Leg: (Select Input Method)	Default					
Lane Flow in Exit Leg***	142					
Sum of inner circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Sum of outer circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Critical Lane Flow (Manual) in Exit Leg***						
Volume Characteristics						
PHF (Entry Leg)	0.92					
F _{HV} (Entry Leg)	0.97					

F_{ped}	1.00					
PHF (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
F_{HV} (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
***Volume Characteristics are already taken into account for Default method ONLY. Insert Values above if Manual method.						
Entry/Conflicting Flows						
Entry Flow	157					
Conflicting Critical Flow	142					
Bypass Lane Results						
Entry Capacity of Bypass, veh/h	1222					
Flow Rates of Exiting Traffic, veh/h	152					
V/C ratio	0.12					
Control Delay, sec/pcu	4.0					
LOS	A					
95th % Queue (ft)	11					

Attachment #7
MS4 Concept Report
Summary

MS4 Concept Report Summary – P.I. No 0013531

Attach the following checklist information to the Concept Report Template:

-
- Is there a Project Level Exclusion that applies to this project: No Yes
- If yes, please indicate which of the following exclusions apply:
- Roadways that are not owned or operated (maintained) by GDOT may not require post-construction BMPs. Coordinate with the appropriate local government or entity to determine stormwater management requirements.
 - The project location is not within a designated MS4 area.
 - Maintenance and safety improvement projects whereby the sites are not connected and disturbs less than one acre at each individual site. This includes projects such as repaving, shoulder building, fiber optic line installation, sign addition, and sound barrier installation.
 - Projects that have their environmental documents approved or right-of-way plans submitted for approval on or before June 30th, 2012.
 - Road projects that disturb less than 1 acre or for site development projects that add less than 5,000 ft² of impervious area.
-

If the project has a Project Level Exclusion nothing further is needed. If the project does not have a Project Level Exclusion use the MS4 Concept Level Design Spreadsheet to estimate the treatment volumes and flow rates, size the BMP's, complete the tables below, and include as an attachment to the Concept Report. Add additional rows, if necessary. It is understood that this information will be approximate based on available information at the time of the concept. In MS4 designated areas, water quantity requirements may be waived for drainage areas that flow directly into surface waters that have a drainage area greater than 5 square miles.

Table 1: Drainage Area Summary

Drainage Area Summary									
Outfall Area ¹	Pre-Development			Post-Development			Water Quality Volume (Cubic Feet)	Channel Protection Volume (Cubic Feet)	Required Detention Volume (Cubic Feet)
	Tc (hrs)	Weighted CN	Area (Acres)	Tc	Weighted CN	Area (Acres)			
A1-a	0.1	85	5.04	0.1	86	5.04	627	1454	0 ²
A1-b	0.1	82	4.42	0.1	85	4.42	1333	3624	0 ²
A2-a	0.1	80	4.40	0.1	90	4.40	4665	12564	32069
A2-b	0.1	75	1.68	0.1	80	1.68	862	1950	6508
A3	0.1	87	0.98	0.1	90	0.98	314	921	0 ²
A4	0.1	88	0.37	0.1	92	0.37	157	484	0 ²
B1	Drainage area originates offsite, and is assumed to be bypassed.								
C1-a	0.1	77	1.34	0.1	83	1.34	784	1999	0 ²
C1-b	0.1	74	1.12	0.1	88	1.12	1725	4025	0 ²
D1	0.1	73	2.44	0.1	85	2.44	3136	7105	0 ²
D2	0.1	78	7.76	0.1	84	8.04	6233	13717	0 ²
E1	0.1	79	3.66	0.1	84	3.39	1215	2982	0 ²

¹ For conceptual purposes, outfall areas are estimated as the disturbed area. Disturbed area is assumed from ROW to ROW. Areas outside of the ROW are considered offsite and are assumed to be bypassed.

² The differences between Pre- and Post-development discharges within the Zone of Influence for the 25- and 100-storm events are negligible, refer to Table 3: Zone of Influence Discharge Summary.

Table 2: BMP Selection and Feasibility Summary

BMP Selection and Feasibility Summary					
Outfall Area	Outfall Level Exclusion?		BMP Selected	Is the BMP Feasible?	
	Y/N	Exclusion No.		Y/N	Infeasibility Criteria No.
A1-a	N		Dry Swale	Y	Dry Swale - Feasible ¹
A1-b	Y ²	3	Dry Swale	Y	
A2-a	N		Wet Pond	Y	
A2-b	N		Wet Pond	Y	
A3	Y	6			
A4	Y	6			
B1	Y	5			
C1-a	N		Dry Swale	Y	Dry Swale – Feasible
C1-b	N		Dry Swale	Y	Dry Swale - Feasible
D1	Y ³	3	Dry Swale	Y	
D2	Y ⁴	3	Sand Filter	Y	
E1	N		Dry Swale	Y	Dry Swale – Feasible Wet Pond – 1 ⁵
			Dry Pond (Q ₂₅ & Q ₁₀₀)	N	

In addition to the above charts, attach the Drainage Area Map, drainage basin summary spreadsheets, and cost estimates (if required) to the Concept Report.

MS4 Concept Level Feasibility Assessment Workflow

1. Project Level Exclusions

If the project has a Project Level Exclusion, no further work is required for the Concept Report. Document the exclusion using the checklist and include in the Concept Report. Please note that the cover of the Post Construction Stormwater Management Report must be completed and submitted during preliminary plans to confirm that the Project Level Exclusion still applies. See page 10-5 in the Drainage Manual for a complete list of the Project Level Exclusions.

2. Define Outfall Area Drainage Basins and Calculate Volumes and Peak Flows

Delineate approximate pre-development and post-development drainage basins. Use the MS4 Concept Level Design Spreadsheet to calculate the Water Quality Volume, Required Storage Volume and Peak Flow for each drainage basin. See the spreadsheet instructions for further guidance on this process.

¹ WQv and detention for Channel Protection for Outfall Area A1-a are provided. Detention for Overbank and Extreme flood protection are infeasible.

² WQv and detention for Channel Protection for Outfall Area A1-b are provided. Detention for Overbank and Extreme flood protection is excluded due to impacts to Stream and Wetland Buffers.

³ WQv and detention for Channel Protection for Outfall Area D1 are provided. Detention for Overbank and Extreme flood protection is excluded due to impacts to Stream and Wetland Buffers.

⁴ WQv and detention for Channel Protection for Outfall Area D2 are provided. Detention for Overbank and Extreme flood protection is excluded due to impacts to Stream and Wetland Buffers.

⁵ WQv and detention for Channel Protection for Outfall Area E1 is feasible. Detention for Overbank and Extreme flood protection is infeasible. Refer to Section 8: E1 Detention Pond Feasibility.

3. Outfall Level Exclusions

Using the information from step 2, consider Outfall Level Exclusions 3, 5, and 6 below. Outfall Level Exclusions 1, 2, and 4 require more detail than is available at the concept level. See pages 10-5 and 10-6 in the Drainage Manual for a complete list of the Outfall Level Exclusions.

1. Change in existing roadway alignment that would create a safety concern
2. Installation of BMP causes realignment or piping of a stream
3. Installation of BMP impacts a stream buffer or wetland
4. Discharge exits right-of-way as sheet flow
5. Flows that originate offsite
6. Reduction or no change (or negligible increase) in impervious area

Zone Of Influence Summary for Overbank and Extreme Flood Detention Requirements

The peak pre- and post-development discharges of the overall basin were analyzed for the Zone of Influence for the overall basins to which each BMP discharges. The Zone of Influence discharges listed in the table below were used to determine if detention for Overbank and/or Extreme Flood Protection would be required. An assumed Time of Concentration of 0.5 hours for each basin was used to estimate the Pre- and Post- peak discharges.

The table below shows the estimated Pre- and Post-development peak discharges for the 25-year (Overbank) and 100-year (Extreme Flood), 24 hour storm events (QP-25 and QP-100 respectively).

Basin E is the only basin where detention for the 25- and 100-year events is recommended based on the zone of influence. Although detention is not recommended for the remaining basins, BMPs for sub-basins A2-a and A2-b will provide detention storage and all on-site conveyance systems will be sized to safely pass Q_{P-25} and Q_{P-100} per the GDOT Drainage Manual.

Table 3: Zone of Influence Discharge Summary

Zone of Influence Discharge Summary										
Overall Basin	Drainage Area (ac)		CN		Overbank Protection (25-Year, 24 Hour Storm)			Extreme Flood Protection (100-Year, 24 Hour Storm)		
	Pre	POST	Pre	Post	Pre-Qpeak (cfs)	Post-Qpeak (cfs)	Overbank Recommended	Pre-Qpeak (cfs)	Post-Qpeak (cfs)	Extreme Recommended
A	1635.03	1635.03	86	86	6650.7	6650.7	No	8937.1	8937.1	No
B ¹	0.87	0.87					No			No
C	13.30	13.30	88	88	149.0	149.0	No	198.4	198.4	No
D	757.57	757.84	86	86	3075.1	3075.1	No	4132.3	4132.3	No
E	35.05	34.77	61	62	115.3	119.9	Yes	178.8	184.6	Yes ²

¹ Note Basin B in considered 100% bypass, and is not disturbed by the project.

² Implementation of BMP for Overbank and Extreme Flood Protection is considered infeasible. Refer to BMP Feasibility analysis for sub-basin E1.

4. Infeasibility Criteria

Utilize appropriate Infeasibility Criteria to eliminate drainage areas for treatment. Concentrate on using Criterion 3, 4, 5, 6, 9, and 10 at this stage. After the BMPs are selected the Infeasibility Criteria can be used again to evaluate the suitability of the BMPs.

1. Cost
2. Delay – Starting the planning process at this point should eliminate this as a viable option unless no other right-of-way is going to be acquired on the project.
3. Impact to Threatened or Endangered Species
4. Impact to a Cultural Resource
5. Displacement of Resident or Business
6. Violation of State or Federal Law
7. Site Limitations
8. Limited Hydraulic Conductivity
9. Site Size
10. No Gravity Flow to BMP

5. BMP Selection

Basins that have not been excluded in steps 3 and 4 will require BMPs to be selected and sized. Use the results from the MS4 Concept Level Design Spreadsheet to further review basins that have not been excluded in steps 3 and 4. Initially, use the drainage basin area to limit your choices.

BMPs for an individual drainage basin can be selected or excluded based on the size of the drainage area.

Potential BMPs for outfall areas greater than 10 acres:

- a. Stormwater Wetland
- b. Wet Detention Pond
- c. Dry Detention Basin*

Potential BMPs for outfall areas greater than 5 acres but less than 10 acres:

- a. Sand Filter
- b. Dry Detention Basin*

Potential BMPs for outfall areas less than 5 acres:

- a. Grass Channel*
- b. Dry Enhanced Swale
- c. Wet Enhanced Swale
- d. Infiltration Trench
- e. Sand Filter
- f. Bioretention Basin
- g. Dry Detention Basin*

The bioslope and filter strip* are not limited by drainage area size.

See Table 10.3-2 of the Drainage Manual for additional BMP screening criteria.

*These BMPs do not remove 80% of the total suspended solids and must be used in a treatment train.

6. Size the BMP

Refer to the Drainage Manual for sizing the BMP.

Table 4: BMP Sizing Summary

BMP Sizing Summary						
BMP	Type	Length (ft)	Width (ft)	Depth (ft)	Storage Volume (cuft)	Notes
A1-a	Dry Swale	150	2	3	2250	WQv and CPv met
A1-b	Dry Swale	50	6	4	2200	WQv met; Add'l storage impacts Stream buffer
A2-a	Wet Pond	90	45	5	35087	
A2-b	Wet Pond	20	10	5	7962	
C1-a	Dry Swale	100	4	3	2400	WQv and CPv met
C1-b	Dry Swale	150	4	3.5	4725	WQv and CPv met
D1	Dry Swale	225	6	4	7500	WQv and CPv met
D2	Sand Filter	260	8	5	13867	WQv and CPv met
E1	Dry Swale	75	10	4	3100	WQv and CPv met

7. Locate the BMP

Locate the BMP on the project and estimate right-of-way requirements.

Refer to Attached MS4 conceptual layouts for BMP locations.

8. Reassess Infeasibility Criteria

All Infeasibility Criteria with the exception of 7 and 8 should be able to be evaluated at this point.

Infeasibility Criteria 1 (cost of the BMP versus the cost of the roadway construction) can be evaluated at this point. This should be a quick analysis with the following parameters:

1. Use a cost per linear foot for roadway cost.
2. Use dollars per square foot or dollars per acre for the right-of-way cost.
3. Estimate the cost of the BMP.

BMP E1 Detention Pond Feasibility

A conceptual feasibility study was conducted for the use of a dry detention pond for Overbank and Extreme Flood Protection for Sub-basin E1. Pursuant to section 10.2.2.3 of the GDOT Drainage Manual, the implementation of a post-construction BMP is considered infeasible if the BMP cost (BMP construction and additional right-of-way costs) are equal to or exceed 10% of the total project costs (including right-of-way acquisition, roadway construction, utility relocation).

Feasibility Assumptions

1. Sub-basin E1 costs without the BMP are proportional to the disturbed area of E1 to the disturbed area of the overall project.
2. Cost of BMP is based on a conceptual earthwork estimate. The cost per cubic yard is assumed to be \$20/CY (including the cost of the outlet control structure).

3. Right-of-way costs are estimated at \$247,500/acre of commercial property (consistent with the project Concept Alternatives Report dated January 7, 2016).

Table 5 below summarizes the estimated costs of a dry detention pond for sub-basin E1.

Table 5: Estimated Cost of Sub-basin E1 Detention Pond

Estimated Cost of Sub-basin E1 Detention Pond			
Item (within Sub-basin E1)	Cost w/o BMP "A"	Cost w/ BMP "B"	Cost of BMP "B – A"
Roadway	\$916,250	\$1,354,250	\$438,000
Utility Relocation	\$198,750	\$198,750	\$0
Right-of-way	\$621,300	\$692,900	\$71,600
Total	\$1,736,300	\$2,245,900	\$509,600

The implementation of BMP increases the total project cost for sub-basin E1 by an estimated 29.3%; therefore, the implementation of the BMP for overbank and extreme flood projection is considered infeasible. However, the project shall still implement a post-construction BMP to meet the requirements for the water quality and channel protection volumes.

9. Document Results in the Concept Report

Complete the Drainage Area Summary and BMP Selection and Feasibility Summary charts shown on page 1 of these Guidelines and include as an attachment to the Concept Report. Also attach an Outfall Area Summary sheet (from MS4 Concept Level Design Spreadsheet) for each drainage basin along with a Drainage Area Map, and cost estimates (if required).

BMP Sizing Criteria for Concept Reports

Refer to Chapter 10 of the GDOT Manual on Drainage Design for Highways (Drainage Manual) for detailed information. Equations included in the MS4 Concept Level Design Spreadsheet are intended to estimate the conceptual-level worst case BMP size and should not be used for preliminary or final BMP sizing.

Filter Strip

The table below provides minimum filter strip sizing recommendations based on the amount of pervious or impervious area with a slope perpendicular to the roadway of 2% to 6%. If the calculated minimum filter strip length, using Equation 10.4.1-3 from the Drainage Manual, is less than the table value, the table value will be used as a design minimum. Table values are otherwise not meant to replace calculated values from the equation. The filter strip does not achieve the required 80% total suspended solids (TSS) removal and must be used in conjunction with another BMP.

Minimum Filter Strip Length (Perpendicular to the Roadway) Sizing Recommendations

Parameter	Impervious Area		Pervious Area (Lawns, etc.)	
	35	75	75	100
Maximum inflow approach length (ft)	35	75	75	100
Filter strip minimum length (ft)	15	25	12	18

Grass Channel

The grass channel should be sized to treat the peak discharge for the water quality storm. The grass channel does not achieve the required 80% TSS removal and must be used in conjunction with another BMP.

Enhanced Dry Swale

The enhanced dry swale should be sized so that the volume above the filter can contain the water quality volume and, if required, the channel protection volume.

Enhanced Wet Swale

The enhanced wet swale should be sized so that the volume of the swale can contain the water quality volume and, if required, the channel protection volume.

Infiltration Trench

The infiltration trench should not be used for planning purposes. At the concept stage there will not be enough utility and soils information to determine if the infiltration trench is feasible.

Bioslope

Use Equation 10.4.5-1 from the Drainage Manual to determine the required width of the bioslope. The length is typically the entire length of the drainage area. For planning purposes you can assume that the width of the bioslope will be added to the typical shoulder width.

Sand Filter

Use Equation 10.4.6-1 from the Drainage Manual to determine the required filter area. The sand filter should have a 2:1 length to width ratio. While most BMPs require pre-treatment, the sand filter has very specific requirements. Use Equation 10.4.6-2 to determine the required area for the sedimentation chamber for the sand filter.

Bioretention Basin

Use Equation 10.4.7-1 from the Drainage Manual to determine the required filter area.

Dry Detention Basin

Using the sum of the required water quality volume, channel protection volume, and 25-year volume and an assumed depth, size the dry detention basin. The dry detention basin should have a 2:1 length to width ratio. The dry detention basin does not achieve the required 80% TSS removal and must be used in conjunction with another BMP.

Wet Detention Pond

Using the sum of the required water quality volume, channel protection volume, and 25-year volume and an assumed depth, size the wet detention pond. The wet detention pond should have a 2:1 length to width ratio.

Stormwater Wetland

The stormwater wetland requires 2% to 3% of the entire drainage area.

Open Graded Friction Course (OGFC)

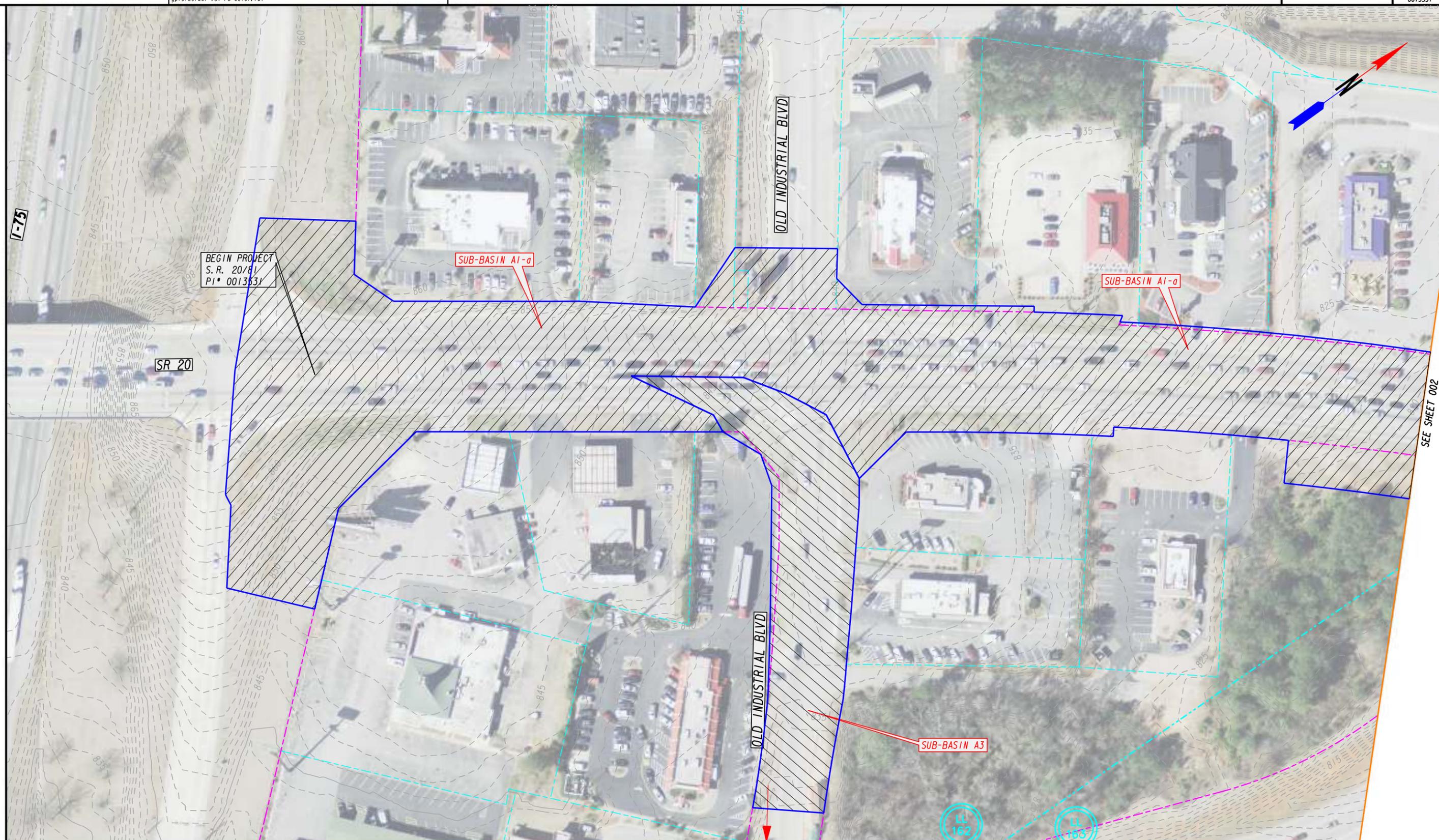
Use of OGFC must be approved by the GDOT Pavement Committee. In a road widening scenario TSS removal rate of 50% can be claimed for installing OGFC or PEM as long as enough existing OGFC or PEM is present to account for the shoulder width.

Attachments Index

Attachment 1 – Drainage Area Map (Conceptual MS4 Layouts)

Attachment 2 – Drainage Basin Summary Sheets

Attachment 1 – Drainage Area Map (Conceptual MS4 Layouts)



BEGIN PROJECT
S. R. 20/8
PI • 0013531

SUB-BASIN AI-a

SUB-BASIN AI-a

SUB-BASIN A3

SR 20

OLD INDUSTRIAL BLVD

OLD INDUSTRIAL BLVD

SEE SHEET 002

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GD&T

PROGRAM DELIVERY

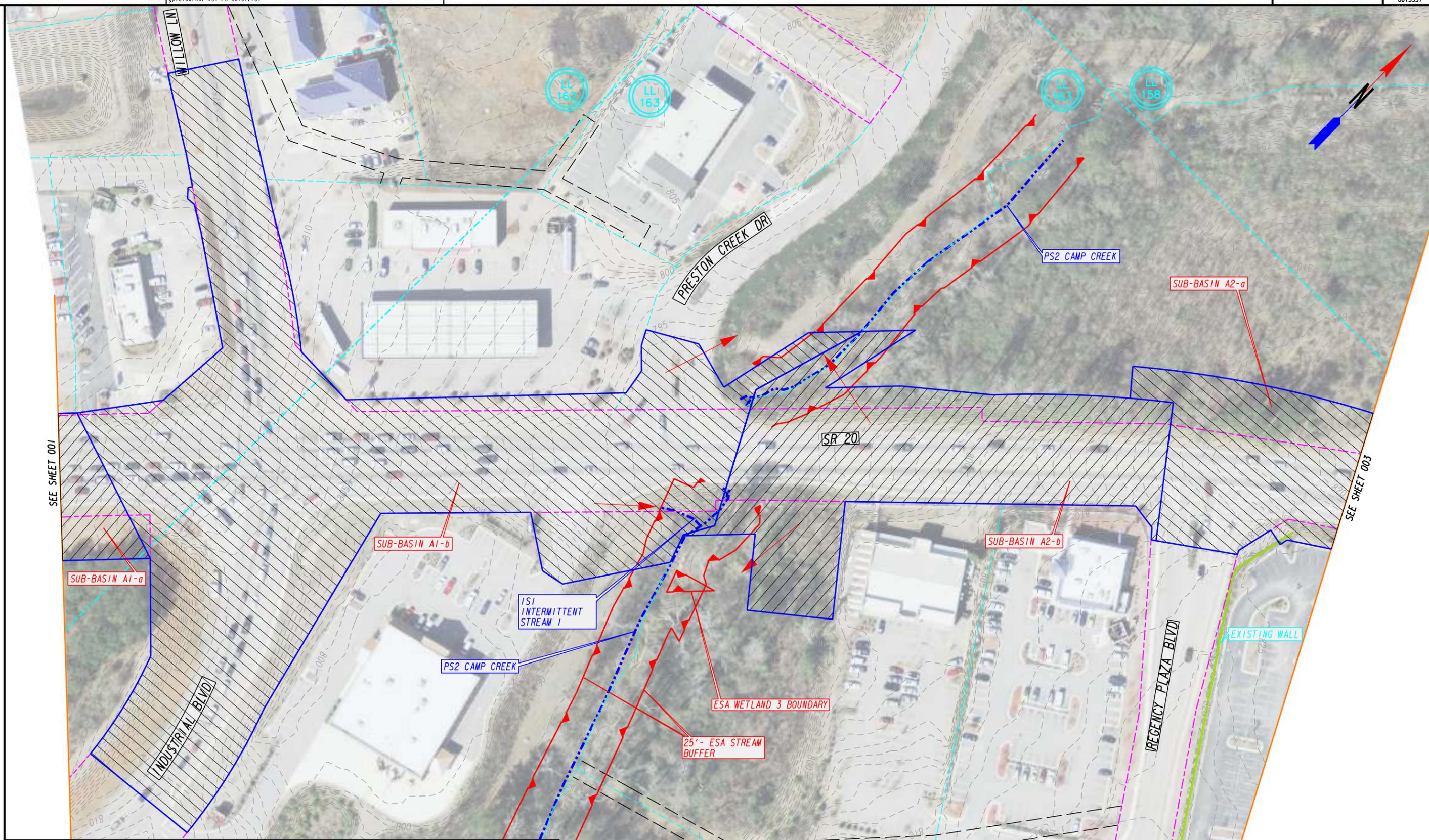
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 001
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 001

SEE SHEET 003

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GD&T

PROGRAM DELIVERY

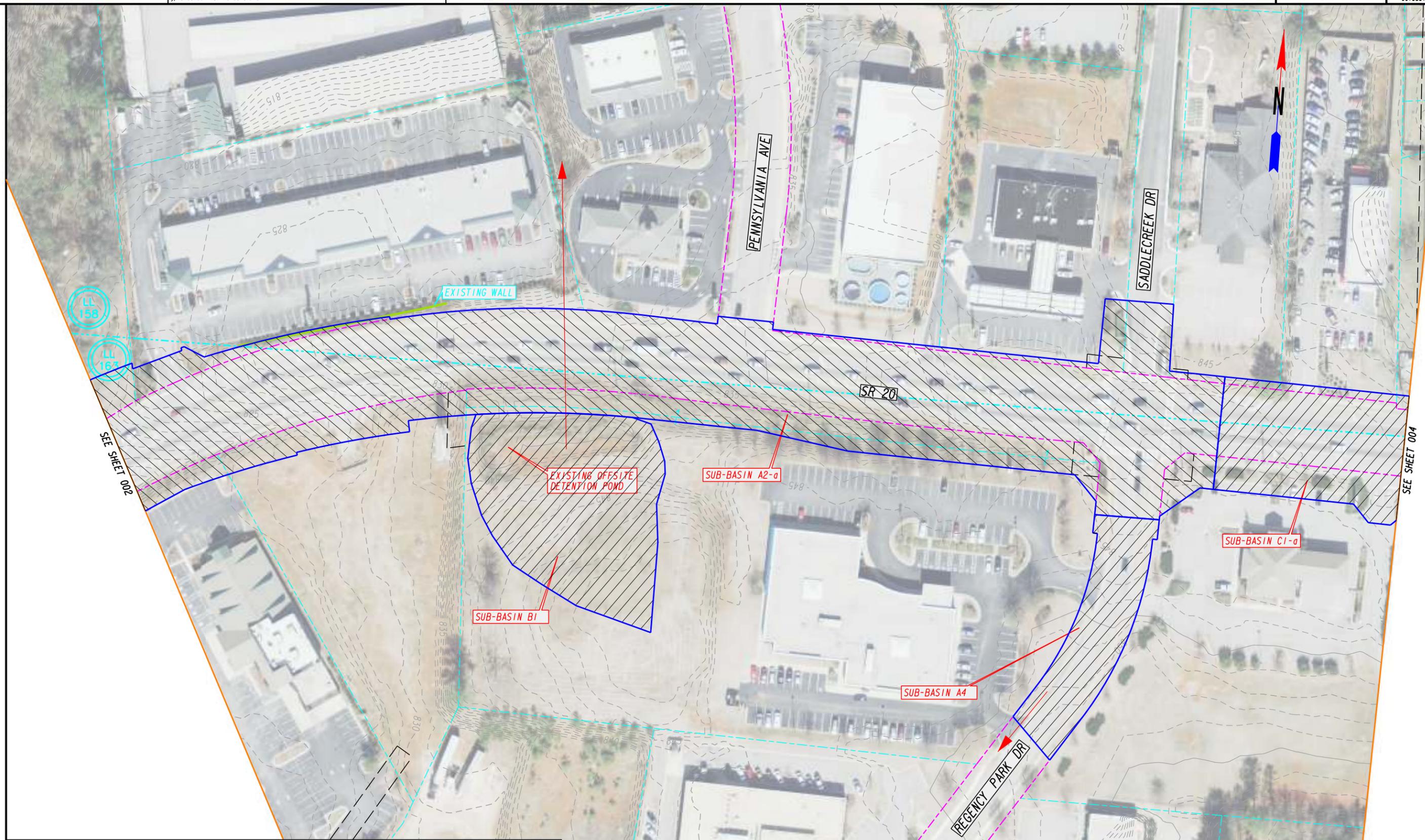
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 002
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 002

SEE SHEET 004

LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- CREEK/TRIBUTARY
- ENVIRONMENTALLY SENSITIVE AREA
- MS4 SUB-BASIN
- PROPOSED RIGHT-OF-WAY

GD&T

PROGRAM DELIVERY

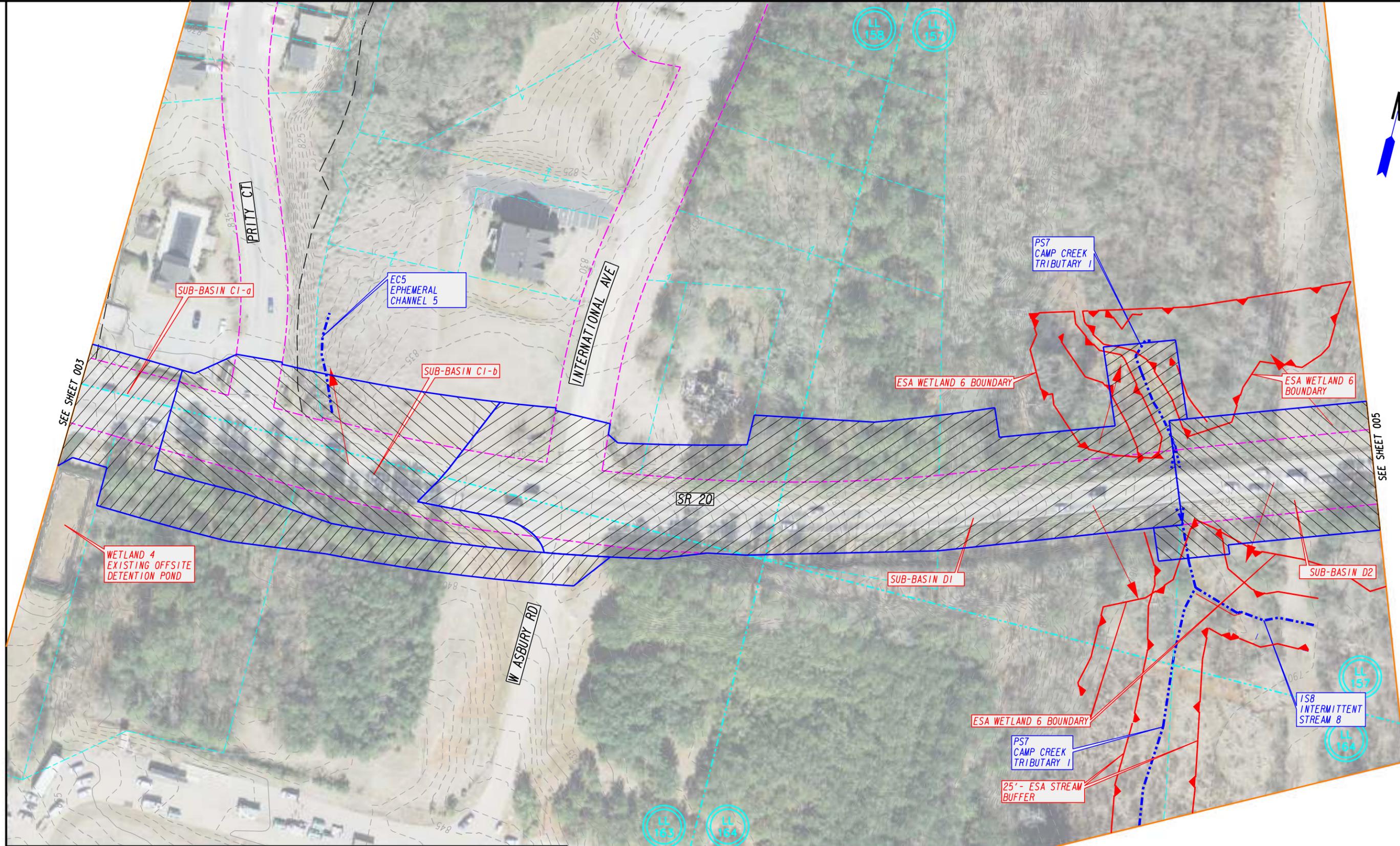
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 003
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 003

SEE SHEET 005

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

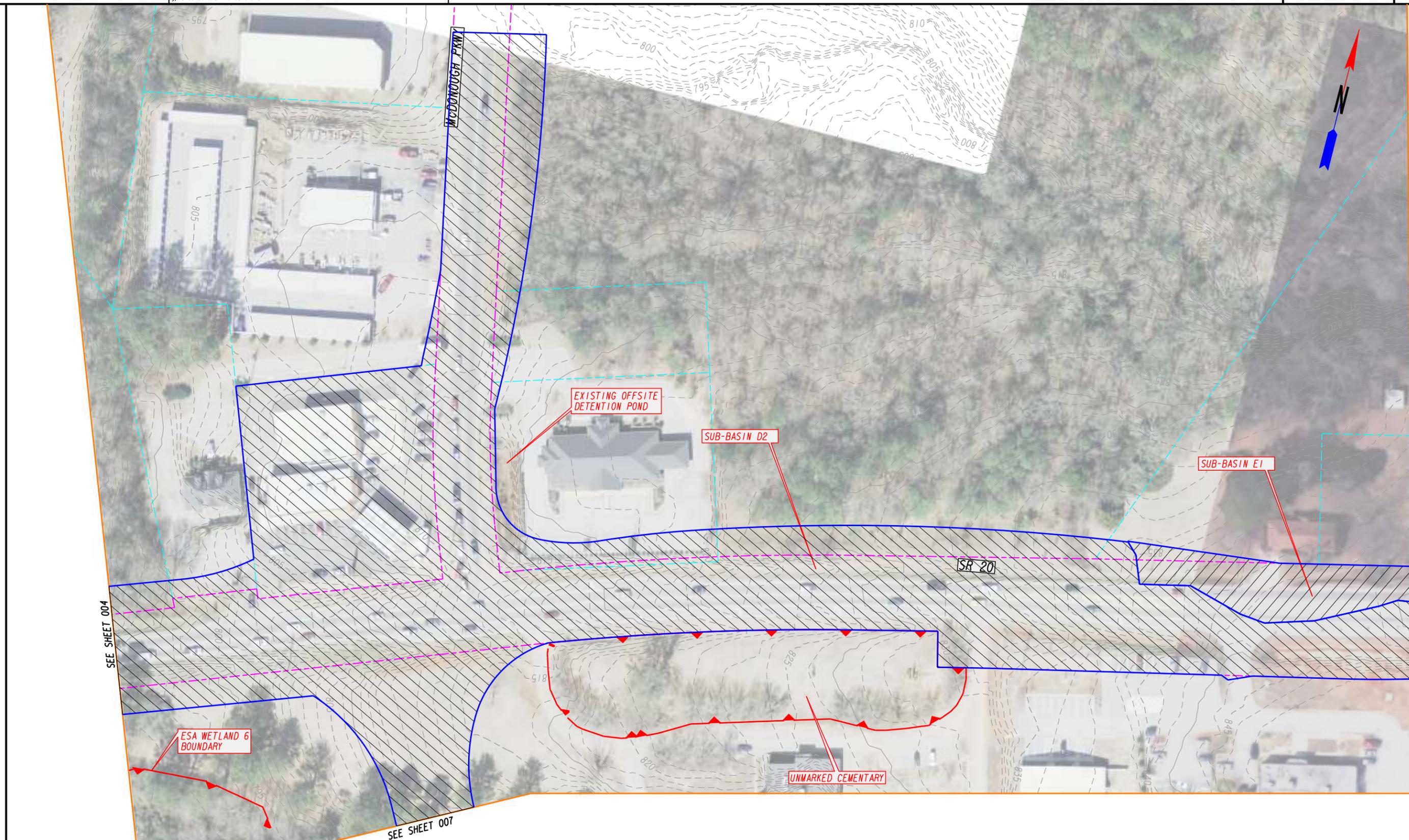
GDOT
PROGRAM DELIVERY

JACOBS
 SCALE IN FEET
 0 100 200 400

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	004
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GDOT

PROGRAM DELIVERY

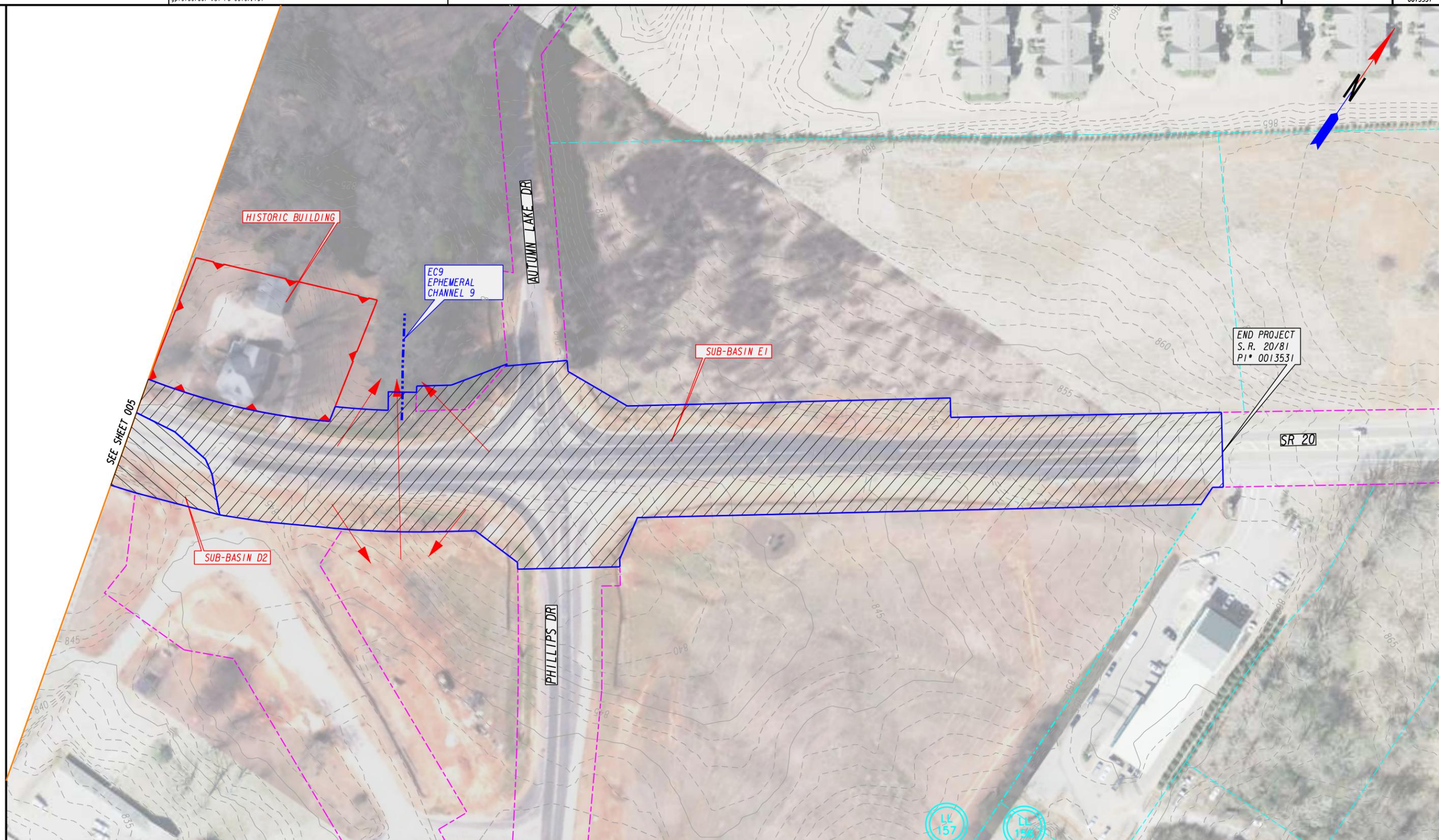
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 005
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- CREEK/TRIBUTARY
- ENVIRONMENTALLY SENSITIVE AREA
- MS4 SUB-BASIN
- PROPOSED RIGHT-OF-WAY

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PROGRAM DELIVERY

JACOBS™

SCALE IN FEET

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 006
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND	
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE
	CREEK/TRIBUTARY
	ENVIRONMENTALLY SENSITIVE AREA
	MS4 SUB-BASIN
	PROPOSED RIGHT-OF-WAY

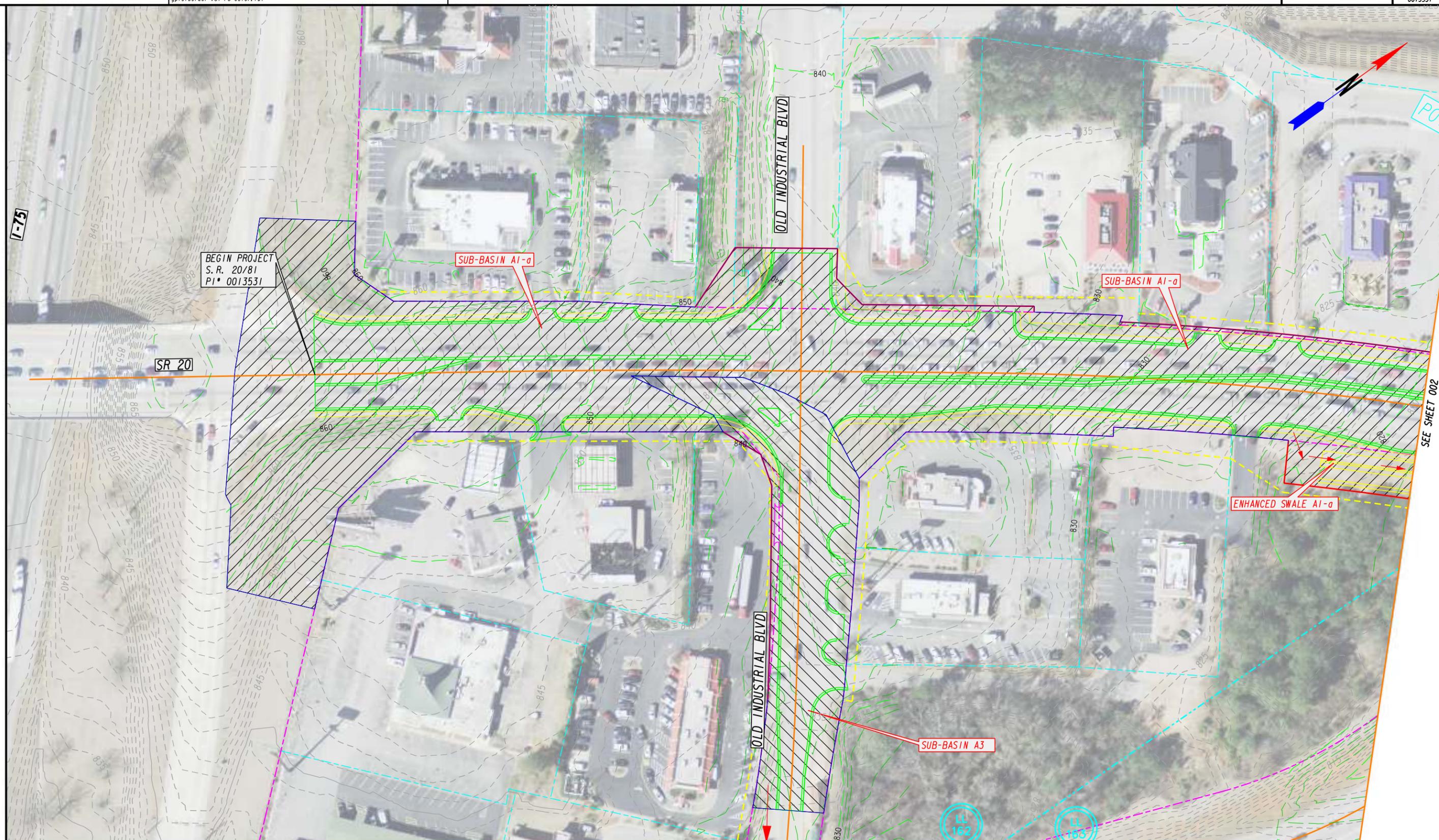
GDOT
PROGRAM DELIVERY

JACOBS
 SCALE IN FEET
 0 100 200 400

REVISION DATES	

MS4 PRE-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 007
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING PROPERTY LINE
- CREEK/TRIBUTARY
- ENVIRONMENTALLY SENSITIVE AREA
- MS4 SUB-BASIN
- PROPOSED RIGHT-OF-WAY

GDOT

PROGRAM DELIVERY

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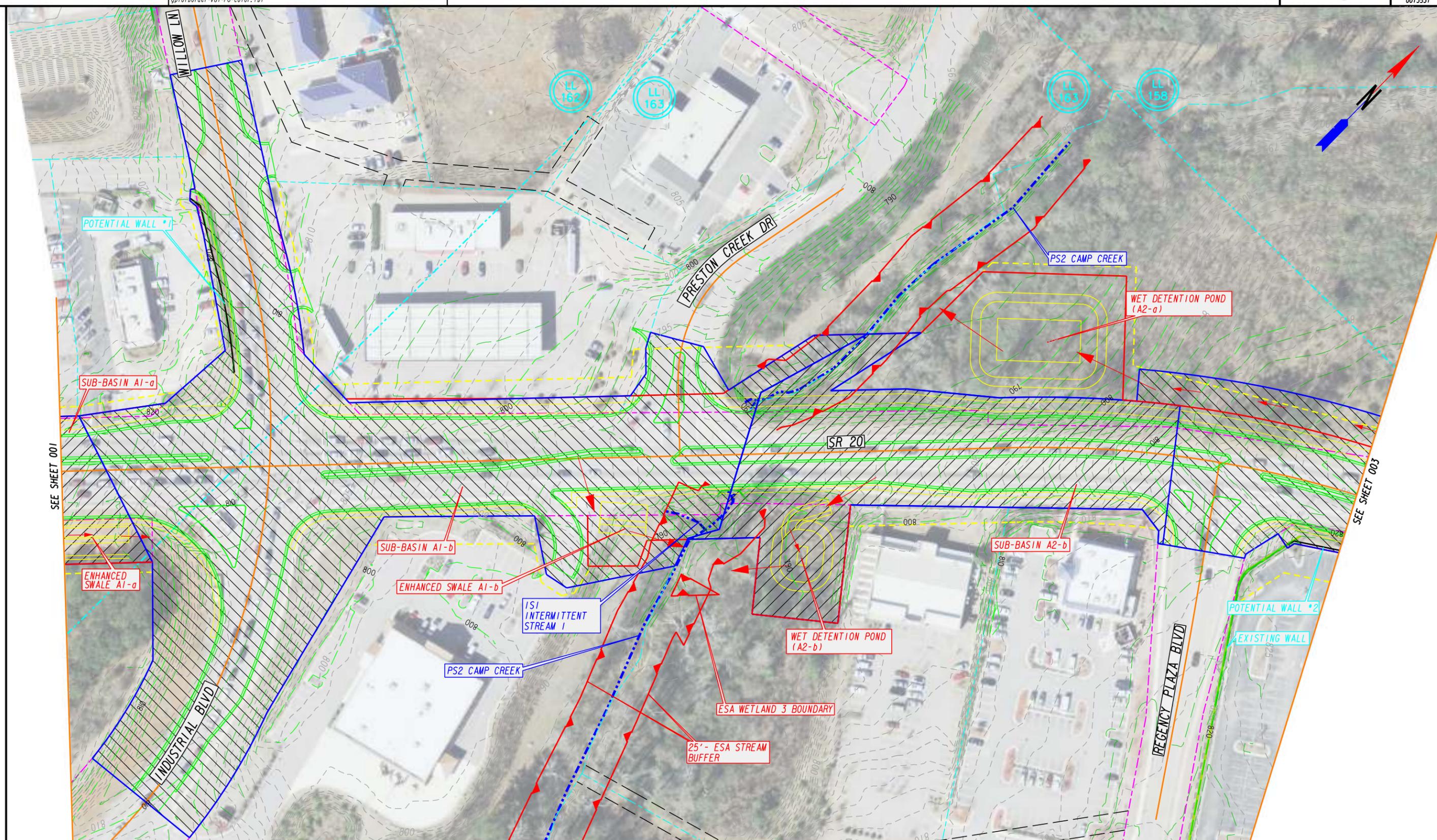
SCALE IN FEET

0 100 200 400

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 001
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GDOT

PROGRAM DELIVERY

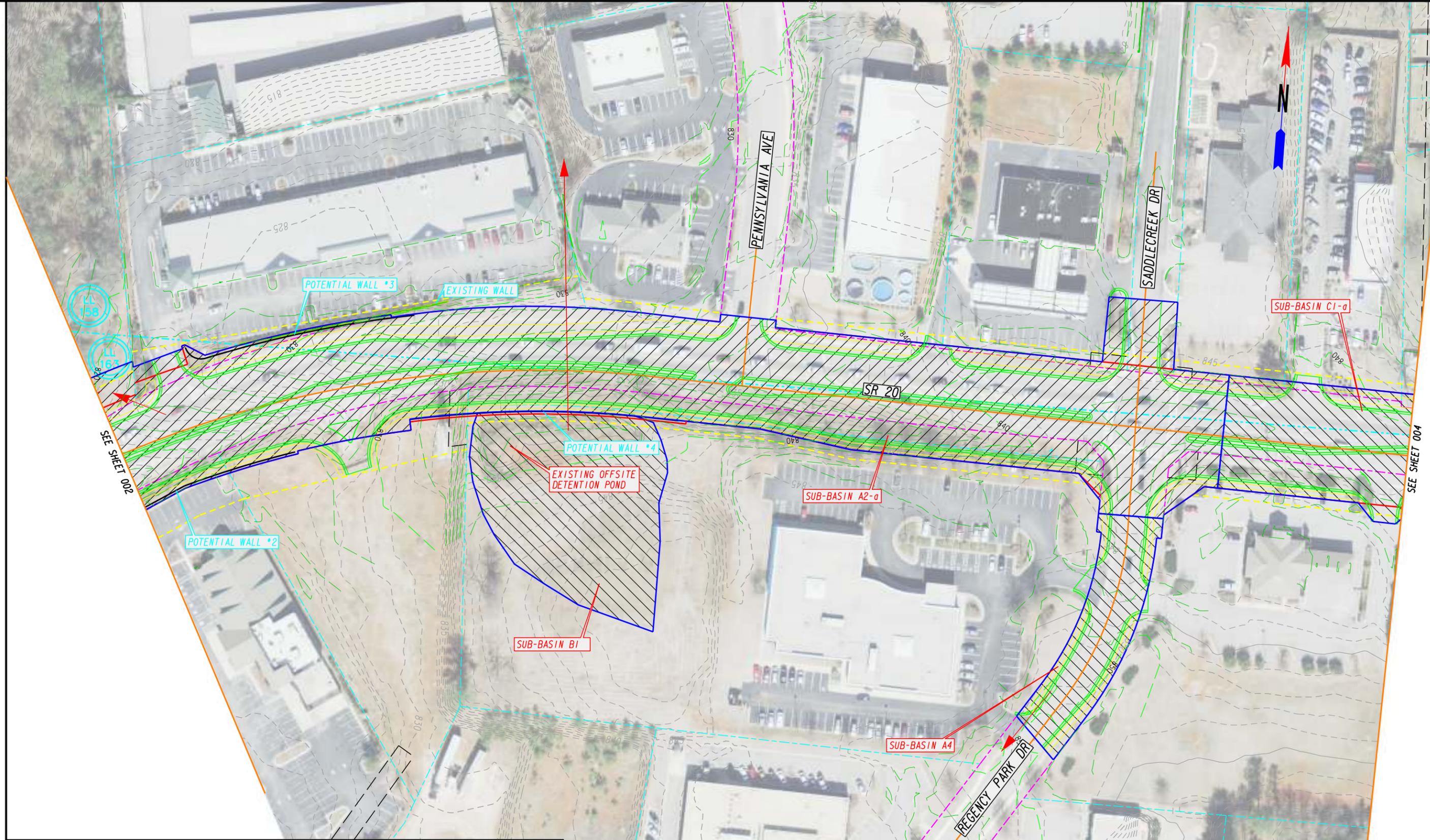
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	002
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND	
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE
	CREEK/TRIBUTARY
	ENVIRONMENTALLY SENSITIVE AREA
	MS4 SUB-BASIN
	PROPOSED RIGHT-OF-WAY

GDOT

PROGRAM DELIVERY

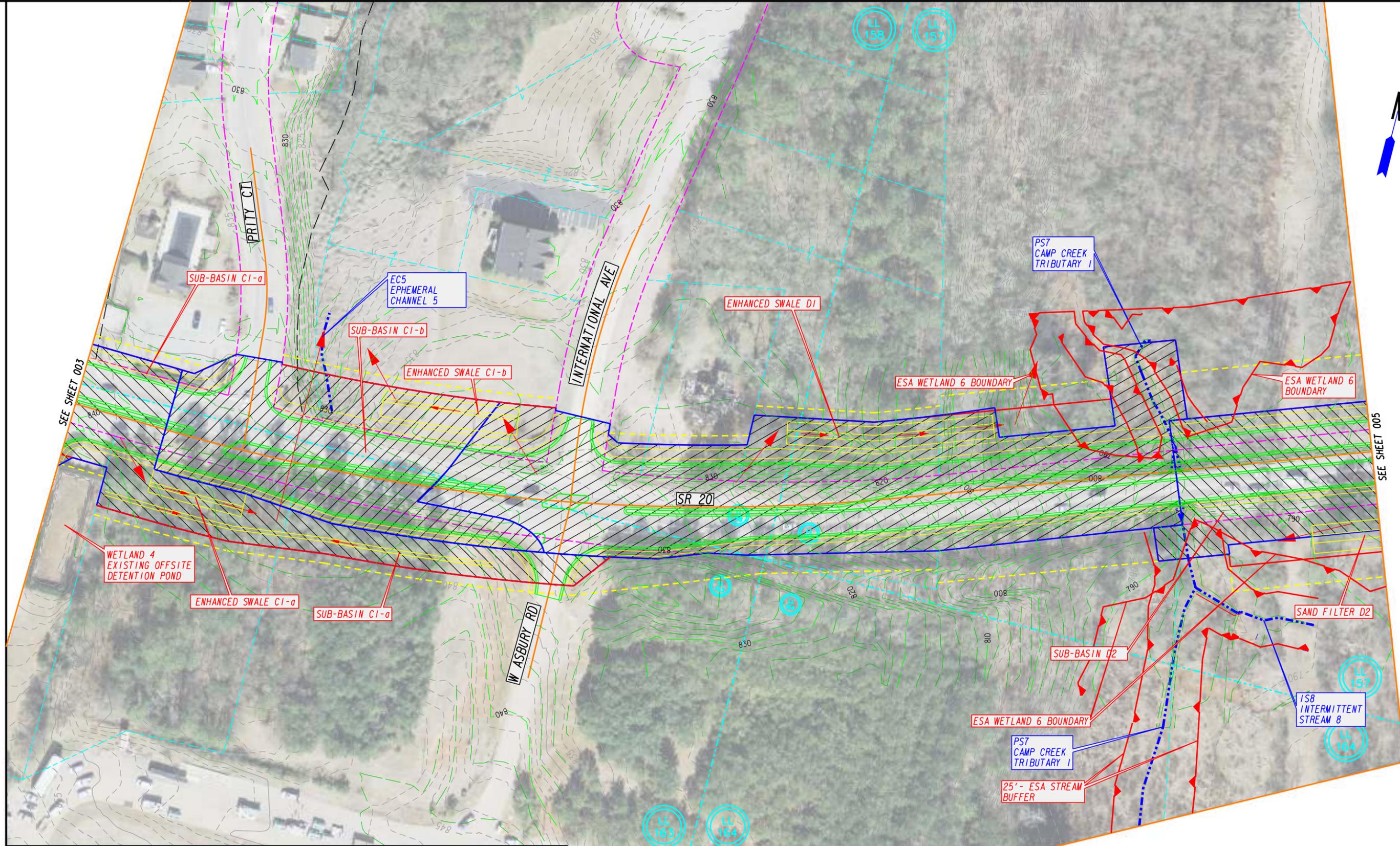
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 003
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 003

SEE SHEET 005

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

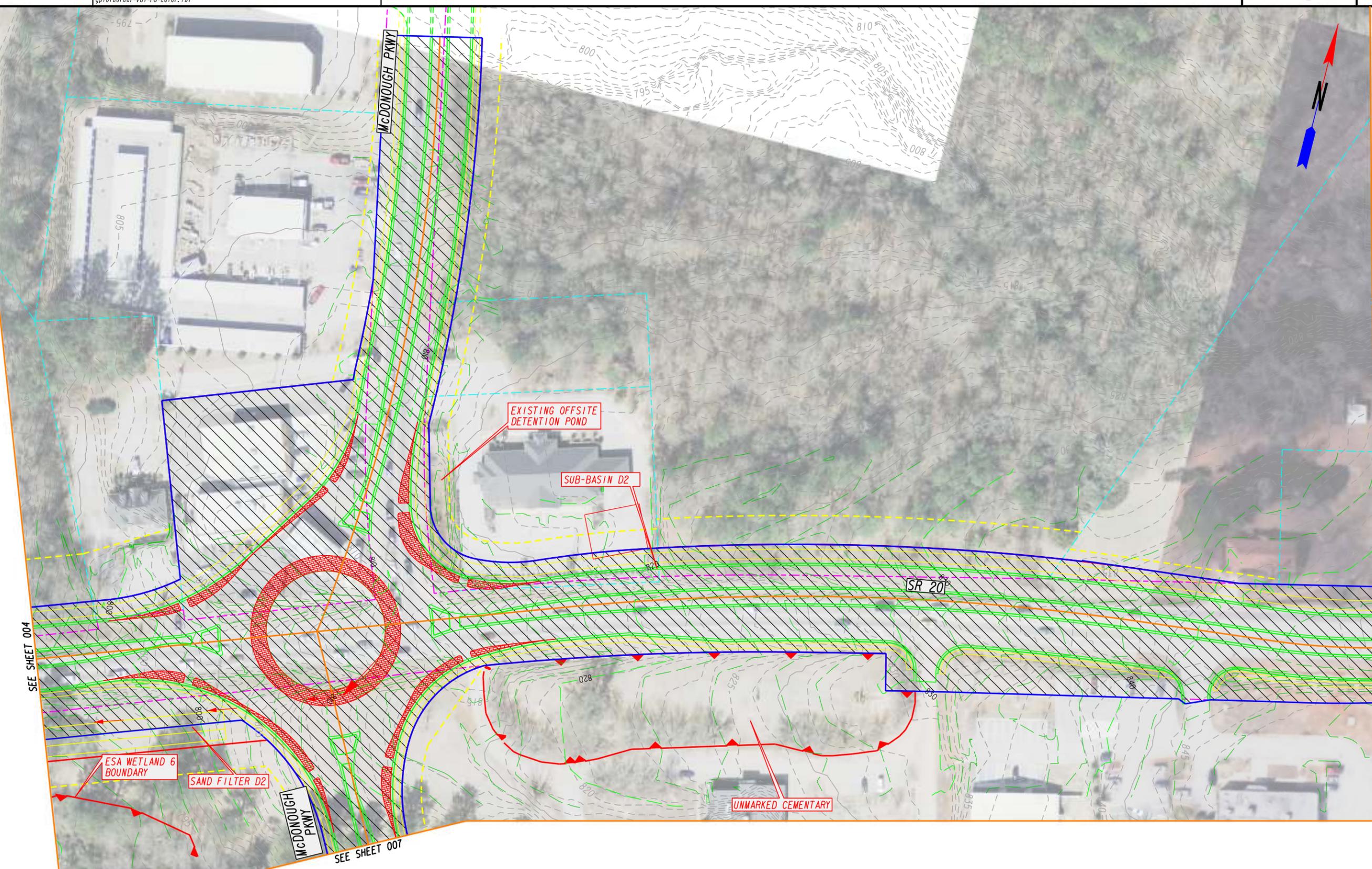
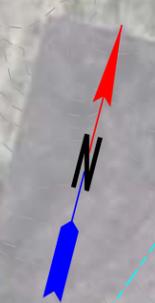
GDOT
PROGRAM DELIVERY

JACOBS
 SCALE IN FEET
 0 100 200 400

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	004
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 004

SEE SHEET 006

SEE SHEET 007

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GD&T

PROGRAM DELIVERY

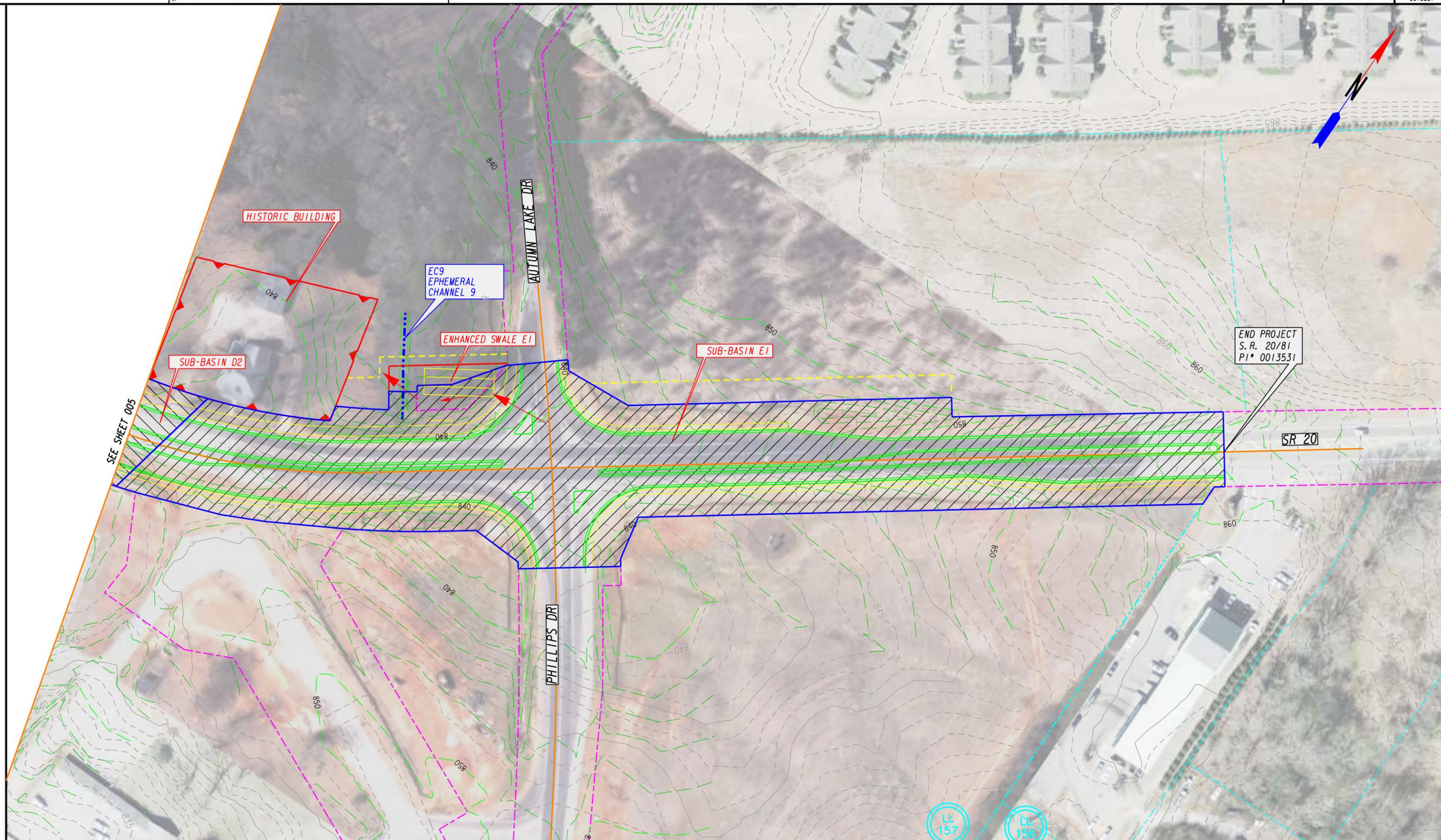
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	005
CORRECTED:	DATE:	
VERIFIED:	DATE:	



SEE SHEET 005

END PROJECT
 S. R. 20/81
 PI# 0013531

LEGEND

	EXISTING RIGHT-OF-WAY		MS4 SUB-BASIN
	EXISTING PROPERTY LINE		PROPOSED RIGHT-OF-WAY
	CREEK/TRIBUTARY		
	ENVIRONMENTALLY SENSITIVE AREA		

GDOT

PROGRAM DELIVERY

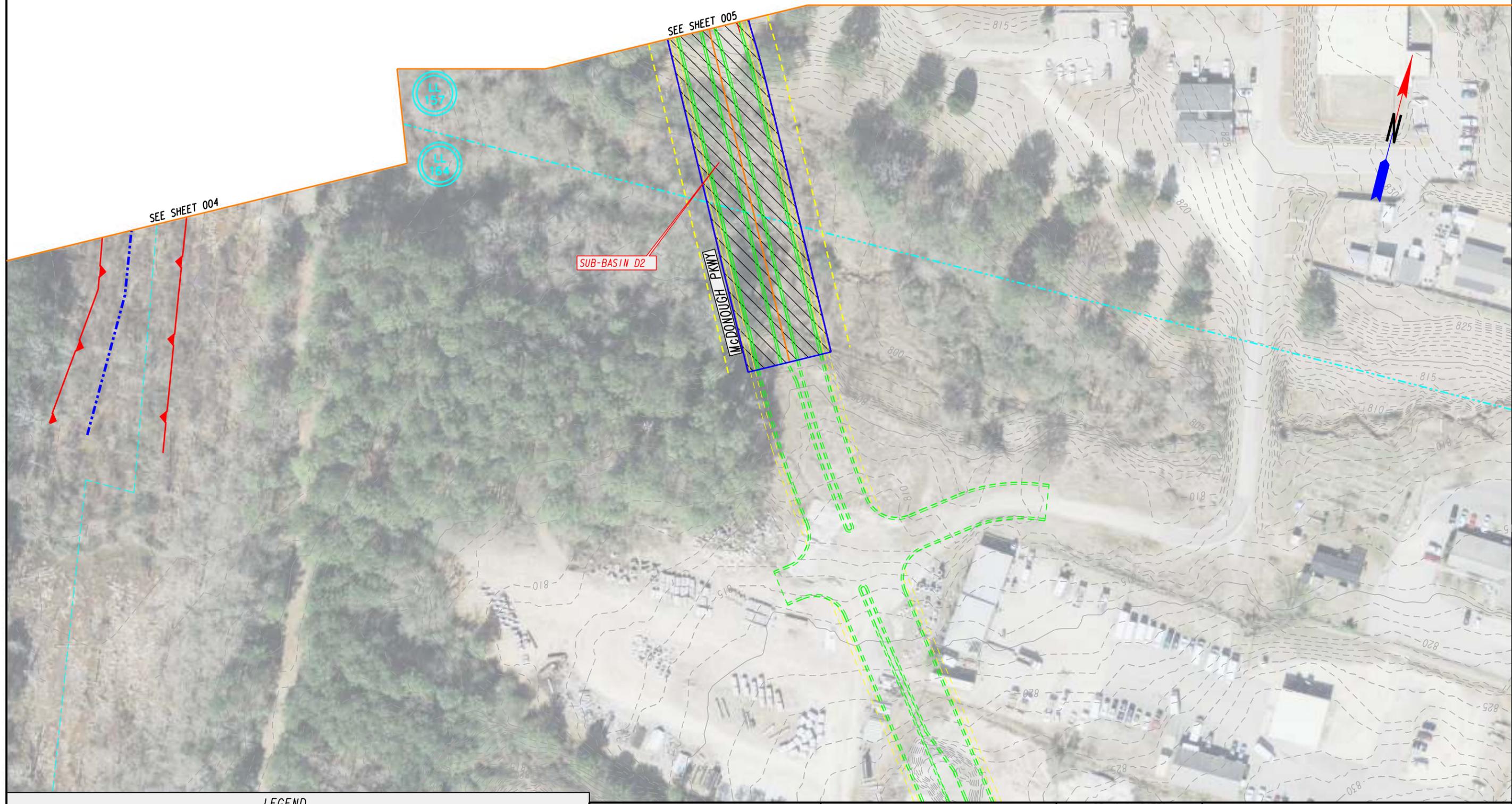
JACOBS

SCALE IN FEET

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
 S. R. 20 WIDENING
 FROM I-75 TO PHILLIPS DRIVE
 HENRY COUNTY

CHECKED:	DATE:	DRAWING No. 006
BACKCHECKED:	DATE:	
CORRECTED:	DATE:	
VERIFIED:	DATE:	



LEGEND	
	EXISTING RIGHT-OF-WAY
	EXISTING PROPERTY LINE
	CREEK/TRIBUTARY
	ENVIRONMENTALLY SENSITIVE AREA
	MS4 SUB-BASIN
	PROPOSED RIGHT-OF-WAY

GDOT
PROGRAM DELIVERY

JACOBS
SCALE IN FEET
0 100 200 400

REVISION DATES	

MS4 POST-CONSTRUCTION LAYOUT
S. R. 20 WIDENING
FROM I-75 TO PHILLIPS DRIVE
HENRY COUNTY

CHECKED:	DATE:	DRAWING No.
BACKCHECKED:	DATE:	007
CORRECTED:	DATE:	
VERIFIED:	DATE:	

Attachment 2 – Drainage Basin Summary Sheets

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A1-a

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	5.04 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	5.04 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	85	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	86	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	64.09 %	
Percent Impervious Post (I_{Post})	67.26 %	
Runoff Coefficient (R_V)	0.029	(Equals R_V Post - R_V Pre)
Water Quality Volume (WQ_V)	0.014 ac-ft	
Water Quality Volume (WQ_V)	627 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	1454	8708	11425

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	14.87	36.78	49.65
Post-Development	15.50	37.65	50.59
Change (Post - Pre)	0.63	0.87	0.94
Percent Change	4.24%	2.37%	1.89%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A1-b

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	4.42 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	4.42 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	82	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	85	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	57.24 %	
Percent Impervious Post (I_{Post})	64.93 %	
Runoff Coefficient (R_V)	0.069	(Equals R_V Post - R_V Pre)
Water Quality Volume (WQ_V)	0.031 ac-ft	
Water Quality Volume (WQ_V)	1333 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	3624	9182	11770

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	11.46	30.00	41.07
Post-Development	13.04	32.25	43.54
Change (Post - Pre)	1.58	2.25	2.47
Percent Change	13.79%	7.50%	6.01%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A2-a

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	4.40 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	4.40 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	80	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	90	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	52.50 %	
Percent Impervious Post (I_{Post})	79.55 %	
Runoff Coefficient (R_V)	0.243	(Equals R_V Post- R_V Pre)
Water Quality Volume (WQ_V)	0.107 ac-ft	
Water Quality Volume (WQ_V)	4665 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	12564	14840	18149

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	10.24	28.40	39.25
Post-Development	15.90	35.95	47.46
Change (Post - Pre)	5.66	7.55	8.21
Percent Change	55.27%	26.58%	20.92%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A2-b

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	1.68 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	1.68 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	75	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	80	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	38.69 %	
Percent Impervious Post (I_{Post})	51.79 %	
Runoff Coefficient (R_V)	0.118	(Equals R_V Post- R_V Pre)
Water Quality Volume (WQ_V)	0.020 ac-ft	
Water Quality Volume (WQ_V)	862 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	1950	3696	4783

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	3.02	9.47	13.44
Post-Development	3.91	10.84	14.99
Change (Post - Pre)	0.89	1.37	1.55
Percent Change	29.47%	14.47%	11.53%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A3

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	0.98 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	0.98 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	87	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	90	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_v = 0.05 + 0.009(I)$	$WQ_v = \frac{1.2R_v A}{12}$	
Percent Impervious Pre (I_{Pre})	71.43 %	
Percent Impervious Post (I_{Post})	79.59 %	
Runoff Coefficient (R_v)	0.073	(Equals R_v Post - R_v Pre)
Water Quality Volume (WQ_v)	0.007 ac-ft	
Water Quality Volume (WQ_v)	314 cf	

Required Volume Storage Summary

	CP _v /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	921	2234	2803

Channel Protection Volume (CP_v) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	3.14	7.49	10.02
Post-Development	3.54	8.01	10.57
Change (Post - Pre)	0.40	0.52	0.55
Percent Change	12.74%	6.94%	5.49%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: A4

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	0.37 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	0.37 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	88	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	92	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_v = 0.05 + 0.009(I)$	$WQ_v = \frac{1.2R_v A}{12}$	
Percent Impervious Pre (I_{Pre})	72.97 %	
Percent Impervious Post (I_{Post})	83.78 %	
Runoff Coefficient (R_v)	0.097	(Equals R_v Post- R_v Pre)
Water Quality Volume (WQ_v)	0.004 ac-ft	
Water Quality Volume (WQ_v)	157 cf	

Required Volume Storage Summary

	CP _v /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	484	943	1164

Channel Protection Volume (CP_v) Control Required? No (1-year peak flow less than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	1.23	2.89	3.85
Post-Development	1.44	3.16	4.13
Change (Post - Pre)	0.21	0.27	0.28
Percent Change	17.07%	9.34%	7.27%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 6/3/2016
 Outfall Area ID: C1-a

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	1.34 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	1.34 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	77	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	83	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_v = 0.05 + 0.009(I)$	$WQ_v = \frac{1.2R_v A}{12}$	
Percent Impervious Pre (I_{Pre})	44.03 %	
Percent Impervious Post (I_{Post})	58.96 %	
Runoff Coefficient (R_v)	0.134	(Equals R_v Post - R_v Pre)
Water Quality Volume (WQ_v)	0.018 ac-ft	
Water Quality Volume (WQ_v)	784 cf	

Required Volume Storage Summary

	CP _v /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	1999	3322	4223

Channel Protection Volume (CP_v) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	2.71	7.99	11.21
Post-Development	3.63	9.32	12.70
Change (Post - Pre)	0.92	1.33	1.49
Percent Change	33.95%	16.65%	13.29%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: C1-b

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	1.12 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	1.12 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	74	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	88	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	34.82 %	
Percent Impervious Post (I_{Post})	74.11 %	
Runoff Coefficient (R_V)	0.354	(Equals R_V Post- R_V Pre)
Water Quality Volume (WQ_V)	0.040 ac-ft	
Water Quality Volume (WQ_V)	1725 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	4025	4199	5166

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	1.91	6.14	8.75
Post-Development	3.74	8.76	11.66
Change (Post - Pre)	1.83	2.62	2.91
Percent Change	95.81%	42.67%	33.26%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: D1

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	2.44 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	2.44 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	73	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	85	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	31.97 %	
Percent Impervious Post (I_{Post})	64.75 %	
Runoff Coefficient (R_V)	0.295	(Equals R_V Post - R_V Pre)
Water Quality Volume (WQ_V)	0.072 ac-ft	
Water Quality Volume (WQ_V)	3136 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	7105	8170	10205

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	3.95	12.99	18.62
Post-Development	7.20	17.81	24.04
Change (Post - Pre)	3.25	4.82	5.42
Percent Change	82.28%	37.11%	29.11%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: D2

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	7.76 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	8.04 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	78	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	84	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	43.28 %	
Percent Impervious Post (I_{Post})	63.06 %	
Runoff Coefficient (R_V)	0.178	(Equals R_V Post - R_V Pre)
Water Quality Volume (WQ_V)	0.143 ac-ft	
Water Quality Volume (WQ_V)	6233 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	13717	21793	27897

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	16.45	47.53	66.36
Post-Development	22.73	57.30	77.70
Change (Post - Pre)	6.28	9.77	11.34
Percent Change	38.18%	20.56%	17.09%

Project Name: SR 20 (Henry County)
 Project Number: 0013531
 Calculated By: PWC
 Date: 06/08/2016
 Outfall Area ID: E1

Outfall Area Information

Denotes Input Cell

Rainfall Depths	NOAA	
Outfall Area Pre (A_{Pre})	3.66 ac	Pond/Swamp Area Percentage
Outfall Area Post (A_{Post})	3.39 ac	0.0 %
SCS Curve Number Pre (CN_{Pre})	79	Pond/Swamp Adjustment Factor (F_p)
SCS Curve Number Post (CN_{Post})	84	1.00
Time of Concentration (T_c)	6.0 min	

Water Quality Volume Calculation

$R_V = 0.05 + 0.009(I)$	$WQ_V = \frac{1.2R_V A}{12}$	
Percent Impervious Pre (I_{Pre})	52.51 %	
Percent Impervious Post (I_{Post})	61.65 %	
Runoff Coefficient (R_V)	0.082	(Equals R_V Post - R_V Pre)
Water Quality Volume (WQ_V)	0.028 ac-ft	
Water Quality Volume (WQ_V)	1215 cf	

Required Volume Storage Summary

	CP _V /1-Year (cf)	25-Year (cf)	100-Year (cf)
Post-Development	2982	6275	7617

Channel Protection Volume (CP_V) Control Required? Yes (1-year peak flow greater than 2 cfs)

Peak Flow Summary

	1-Year (cfs)	25-Year (cfs)	100-Year (cfs)
Pre-Development	8.13	23.02	31.97
Post-Development	9.59	24.16	32.76
Change (Post - Pre)	1.46	1.14	0.79
Percent Change	17.96%	4.95%	2.47%

Attachment #8
Minutes of Concept
Team Meeting

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Subject	Concept Team Meeting		
Project	SR 20/GA 81 - Henry County	Project No.	0013531
Prepared by	Patrick Capasse, P.E.	Phone No.	404-978-7510
Location	GDOT Rm 409	Date/Time	April 7, 2016
Participants	See sign-in sheet	Apologies	
Copies to		File	2016-04-07_0013531_Concept Team Meeting Minutes.docx

Notes	Action
<p>1 Opening Achor Njoku (GDOT) welcomed everyone to the meeting. Achor reminded all participants that the concept report being discussed was still being finalized and is still a draft.</p> <p>2 Safety Patrick Capasse (Jacobs) shared a safety minute about beginning spring yard work. He recommended to be cautious of yellow jacket nests and ant beds in cutting grass and cleaning up yards after the winter.</p> <p>3 Project Description Hatem Aly (Jacobs) opened by describing the project. The existing corridor is a 4-lane urban typical section from the beginning of the project to Willow Lane. From Willow Lane to the end of the project, the corridor is generally a 2-lane rural section. Hatem mentioned that the existing vertical curvature is deficient at the crossing of the Camp Creek Tributary 1. He said the concept proposes to raise SR 20 at this location to mitigate the sub-standard condition.</p> <p>Hatem stated PI 0013531 proposes to widen SR 20 from I-75 to Phillips Drive from 2 lanes to 4 lanes. He stated the concept proposes a raises median with openings spaces throughout the corridor. The concept also includes pedestrian and bicycle improves to the corridor.</p> <p>Hatem stated Jacobs would perform a Hydraulic Study for two stream crossings (Camp Creek and Camp Creek</p>	

Notes	Action
<p>Tributary 1).</p>	
<p>4 Design Criteria Proposed Patrick presented the project's proposed design criteria for the mainline of SR 20. He stated the mainline would have 4 through lanes at 11' wide, with a 20' raised median. The proposed design speed is 45 mph, which corresponds to a minimum radius of 711 feet. The proposed design vehicle is a WB-67 for the mainline.</p>	
<p>5 Horizontal and Vertical Alignments Patrick stated the existing radius just east of Phillips Drive is approximately 711' matching the minimum radius. Patrick reiterated the deficient vertical curve k-value that Hatem mentioned previously at the crossing of Camp Creek Tributary 1. Patrick stated the existing sag curve meets the criteria for a 30-35 mph design speed and the concept proposes to raise the profile of SR 20 approximately 5-foot at this location to meet the criteria for 45 mph.</p>	
<p>6 Typical Section and Alternative Considerations Hatem discussed the typical section alternatives explored during the development of the draft concept. He stated three (3) alternative typical sections were considered:</p> <ol style="list-style-type: none"> 1. 4-lane urban section, raised median, and 12 ft urban shoulder with 5' sidewalk on both sides of the road 2. 4-lane urban section, raised median, 4' bike lanes in each direction, and 12 ft urban shoulder with 5' sidewalk on both sides of the road 3. 4-lane urban section, raised median, 12' ft urban shoulder with 5' sidewalk on the south side of the road and 22' urban shoulder with 10' multiuse path on the north side of the road. <p>He stated after discussions with GDOT, City of McDonough, and Henry County, Alternative 3 (Multi-use path) was identified as the Preferred Alternative.</p>	
<p>7 Design Exceptions and Design Variances Patrick discussed potential design exceptions and design variances the proposed concept may require. <u>Horizontal Curve Length</u> Patrick stated there are two horizontal curves on the</p>	

Notes	Action
<p>mainline of SR 20 where the minimum length of horizontal curve (15 x Design Speed) recommended by the GDOT Design Policy Manual is not met:</p> <ol style="list-style-type: none"> 1. Location 1 is just east of the intersection of SR 20 and McDonough Pkwy. The minimum recommended (15 x 45) is 675; the length provided is 625 ft. 2. Location 2 is just west of Phillips Drive. The minimum recommended is 675; the length provided is 367 ft. <p>Matt Sanders (GDOT) and Hatem agreed these design deviations are usually treated as a Design Variance; however they do not require approval by the Chief Engineer.</p> <p><u>Access Control/Median Opening Spacing</u></p> <p>Patrick stated that the proposed concept would require a design variance for the spacing of median openings along the project. He stated that proposed median openings between Willow Ln and International Ave are less than the minimum spacing of 660 ft.</p> <p><u>Documentation during the Concept Phase</u></p> <p>Kim Phillips stated that design exception or design variance is not necessarily required in the concept phase to be included in the concept report, because PI# 0013531 is exempt.</p> <p>She continued the approval of a variance or an exception is basically required by FHWA in concept reports with federal oversight.</p> <p>Achor stated that the documentation should be completed prior to PFPR after the concept is approved.</p>	<p>Jacobs will draft a Design Variance memo to document the design deviation and update the concept report to show the deviations as a variance rather than exception.</p>
<p>8 Environmental Concerns</p> <p><u>Ecology</u></p> <p>Stacy Stewart (Jacobs) stated a Nationwide 14 Permit is anticipated for the project. She stated Jacobs prepared a draft Ecology report and that EPD has concurred with the streams identified and delineated by Jacobs.</p> <p>Aquatic survey scheduled this season (to be performed by CCR).</p>	

Notes	Action
<p><i>Endangered Species</i></p> <p>Stacy said habitat for 2 terrestrial species has been identified within the project corridor; however, she anticipates no major impacts.</p> <p><i>Historic Properties and Archaeological Sites</i></p> <p>Stacy stated that ground penetrating radar (GPR) was used to confirm the existence of an unmarked cemetery in front of the Henry County DOT. GDOT has approved the Cemetery Report and it will be appended to the future Archaeology Rpt. Further archeology scope will begin after NTP is received for Task Order 2 (TO2).</p> <p>Stacy mentioned the draft History Report is in review at OES. We recommended two resources as eligible: the first one is the cemetery in front of Henry County DOT building and the other is the Allen Carmichael House (located near the project's eastern termini). There is an adjacent brick house next to Allen Carmichael House that we are not recommending as eligible for National Register (NR) because of the modifications to this house. However, this has not been concurred by OES to date.</p> <p>Quinton requested the trees in front of the historic building to be shown on layout.</p> <p><i>USTs</i></p> <p>Stacy said there are 5 potential UST sites along the project. Hatem confirmed that Phase I and Phase II assessments (if any) are scoped for Task Order 2.</p> <p><i>Public Involvement</i></p> <p>Stacy stated that a PIOH is anticipated to be held in mid-January, 2017.</p> <p><i>Stakeholders</i></p> <p>Hatem stated a stakeholder's meeting is anticipated for this summer. Stakeholders include local governments (Henry County, City of McDonough) and businesses. Hatem suggested a large portion of the meeting should be devoted to discussing access along the corridor.</p>	<p>Jacobs will show trees in front of historic building on plans</p>
<p>9 Traffic</p> <p>Juan Gonzalez (Jacobs) presented preliminary traffic</p>	<p>Jacobs will consider additional</p>

Notes	Action
<p>roundabout. The roundabout design will be shown to the public in PIOH</p> <p>Achor stated that a roundabout feasibility study is not included in Task Order 1. Hatem added that roundabout peer review is included in Task Order 2. Achor said that a minimum of two months is required for approval of NTP for Task Order 2.</p> <p>Tyler suggested updating the concept to propose a roundabout. If the feasibility study reveals a roundabout is infeasible, then the concept report can be revised to show a permanent signal.</p> <p>Tyler stated if a RCUT option doesn't work at Regency Plaza Blvd, than a roundabout should be considered. He also mentioned there could be possible driveway permit application for the parcel across from Regency Plaza Blvd, but the concept does not need to update the proposed traffic control at this time.</p> <p>Tyler suggested the possibility of a roundabout at Regency Park Drive/Saddlecreek Drive. Achor decided to evaluate a roundabout at that location to limit scope creep and project risk.</p> <p>Tyler asked if a median break at W. Asbury Rd/International Ave is required for truck traffic.</p>	<p>Tyler (GDOT) will verify the features of the roundabout and send to Jacobs for inclusion in the concept layout.</p> <p>A lighting agreement will be needed between GDOT and Henry County and will be included in the final concept report.</p> <p>Jacobs will confirm if a median break is required at W. Asbury Rd/International Ave.</p>
<p>10 Right-of-Way (ROW)</p> <p>Hatem said the number of parcels listed in the draft concept report was solely those parcels requiring ROW only and did not reflect easements, etc.</p> <p>Patrick presented the methodology for estimating the ROW costs for the project. He said the average cost (\$/acre) was estimated based on the tax assessments for each category – residential, commercial, government – for parcels along the project.</p>	<p>Jacob will send all updated ROW information (ROW and Easements) to GDOT and request an updated ROW cost.</p>

Notes	Action
<p>Achor asked Jacobs to send all information regarding required ROW needed to accommodate the concept. Hatem said Jacobs would update the concept to include the roundabout and estimate the required easements. Achor mentioned a separate ROW meeting could be held if necessary to address any subsequent concerns.</p> <p>11 Structures <i>Culverts</i> Hatem said there are two existing culverts on the project:</p> <ol style="list-style-type: none"> 1. Dbl 8x8 at Camp Creek 2. Dbl 9x9 at Camp Creek Tributary 1 <p>Hatem stated the culverts will be extended if hydraulic study reveals a no-rise condition, otherwise they will be replaced.</p> <p><i>Retaining Walls</i> Hatem mentioned there are two existing retaining walls on the project:</p> <ol style="list-style-type: none"> 1. McDonough Village Shopping Center (north side of SR 20, east of Regency Plaza Blvd) 2. Hibachi Sushi Buffet (south side of SR 20, east of Regency Plaza Blvd) <p>Hatem said the existing northern wall at the McDonough Village Shopping Center will be replaced. The proposed wall is anticipated to be between 10-15 feet tall. Hatem stated the existing southern wall along the Hibachi Sushi Buffet would be extended.</p>	
<p>12 Pavement Evaluation and Recommendations Hatem stated existing pavement evaluation will be performed under TO#2</p>	
<p>13 Soil Conditions Hatem stated Soil Survey is included in TO#2</p>	
<p>14 Construction and Maintenance of Traffic Hatem stated the project would be constructed in 3 phases:</p> <ol style="list-style-type: none"> 1. Widen to one side while traffic remains on existing road 	

Notes	Action
<p>2. Widen the other side while traffic will be on existing road and the portion of the road that is constructed in phase-1</p> <p>3. Overlay the existing pavement and the final layer of asphalt for the widening portion</p>	
<p>15 Utilities</p> <p>Yolanda Pride stated that the \$1.6M estimate, currently shown in TransPI, should be used as our estimate for concept purposes.</p> <p>Yolanda asked Jacobs to add City of McDonough Sewer to the list of Utility Owners.</p> <p>Achor confirmed SUE is included in Task Order 2.</p>	
<p>16 Cost Estimates</p> <p>Hatem asked if anybody has comments regarding the cost estimate. Achor mentioned the cost estimate will be more precise once we move to the design phase.</p>	
<p>17 MS4</p> <p>Patrick presented the preliminary M4S feasibility study. He stated the project was delineated into 5 overall drainage basins (A through E). He said those 5 basins were then subdivided into 8 sub-basins for BMP analysis.</p> <p>Patrick said the conceptual MS4 report recommends the following exclusions:</p> <ol style="list-style-type: none"> 1. Project Level Exclusions for sub-basins A3 (along Old Industrial Blvd) – increased impervious area is less than 5,000 sq ft. 2. Outfall Level Exclusions <ol style="list-style-type: none"> a. Sub-basin B1 – offsite b. Sub-basin E1 – detentions for 25- and 100- year infeasible. BMP costs are estimated to be 30% of the construction cost of that sub-basin. <p>Patrick said the concept uses a combination of enhanced swales and a detention pond to achieve the water quality and channel protection for all sub-basins.</p>	
<p>18 Assignment Table</p> <p>Yolanda will confirm who will be responsible for utility relocation on the project. She suggested updating the concept report:</p>	<p>Jacobs will update the assignment table in the concept report.</p>

Notes	Action
<ol style="list-style-type: none"> 1. Utility Coordination – GDOT District 2. Utility Relocation – Utility Owners 	
<p>Jacobs is responsible for all Environmental Studies, Documents, and Permits.</p>	
<p>19 Coordination with other projects Hatem mentioned that Jacobs will coordinate with the two adjacent projects which are the I-75/SR 20 DDI (GDOT) and the McDonough Pkwy project (Henry County).</p>	
<p>20 Questions Achor asked if anybody has any questions to the design team. Matt asked to check if horizontal curve length should be handled as DE or DV Check DE/DV for horizontal curve Hatem stated two design variances will be required for this project which are the spacing for median opening that are less than 660' and the length for horizontal curves that are less than 15v Respond to Draft Concept Report comments Hatem said he will respond to comments received from Kim Phillips and send it to Achor. Tyler will send Achor his comments to incorporate in final submission.</p> <p>The Meeting was then concluded</p>	

Concept Team Meeting
April 7, 2016

Concept Team MEETING 0013531 April 7, 2016			
Name	Title	Representing	Email
Achar Njoku	PM	GDOT-OPD	Injoku@dot.ga.gov
Hatem ALY	PM	JACOBS	Hatem.Aly@Jacobs.com
PATRICK LAPASSE	LEAD DESIGN	JACOBS	patrick.lapasse@jacobs.com
Stacy Stewart	Ecologist	JACOBS	stacy.stewart2@jacobs.com
Juan Gonzalez	Traffic	JACOBS	Juan.gonzalez@jacobs.com
Chris Puglisi	Traffic Engineer	JACOBS	chris.puglisi@jacobs.com
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Tyler Beck	TRAFFIC ENGINEER	DB	
Achar Njoku	GDOT PM	GDOT	Injoku@dot.ga.gov

Attachment #9
Supplemental Meeting
Minutes

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Purpose	PI 0013531 Kickoff Meeting		
Project	SR 20/81	Project No.	0013531
Prepared by	Patrick Capasse		
Location	GDOT, 25 th Floor Conf Room	Date/Time	October 26,2015
Participants	See Sign-in Sheet		
File	2015-10-26_0013531_Project Kickoff Meeting Minutes		

Notes	Action
<p>1 Schedule</p> <p>Achor (GDOT) opened the meeting beginning with the Schedule. Ed (Jacobs) stated the project funding has changed from Federal to State; therefore, the project will follow a GEPA Schedule.</p> <p>Ed outlined the concept submittal schedule:</p> <ol style="list-style-type: none"> 1. Early January – Concept Alternatives Report – Interim Submittal 2. End of February – Jacobs Submits Concept Alternative Selection Report to GDOT for Review 3. End of March – Jacobs Submits Draft Concept Report and Layouts 4. Late April – Concept Team Meeting 5. Late May – Submit Concept Report for Approval 6. Late July – Concept Approval <p>Ed stated multiple submittals for deliverable for TO #1 are anticipated including: QA, Interim Reviews and Final submittals.</p>	

Notes	Action
<ul style="list-style-type: none"> c. Jonathan noted there are two stream crossings and normal stream impacts are expected. Jonathan stated no individual permit is anticipated. d. Jonathan mentioned the need for cemetery survey. e. Jonathan mentioned there are a couple of potential historical resources located at the northern end of the project. f. Jonathan anticipates a GEPA Type-E environmental document. g. Regarding Logical Termini, GDOT stated the lead agency will be USACE. h. Jonathan stated there are no anticipated issues with Independent Utility. i. Jonathan stated environmental resources will be submitted per the approved schedule. j. Ed stated that a Phase I UST investigation is not included in the scope for TO #1. It was noted that Phase I is usually performed by the District. UST Investigation will be added to TO #2. k. Jonathan noted a noise analysis may be needed for the two potential historic properties. l. It was mentioned that Jacobs need to write template letter for the USACE and submit to GDOT. 	<p>GDOT will confirm the type of GEPA Document required.</p> <p>Jacobs will write a template letter for the USACE and submit to GDOT.</p>
<p>4. Public Involvement</p> <ul style="list-style-type: none"> a. GDOT emphasized the NEPA CE public involvement requirements may still apply. GDOT stated an Open House was conducted in early 2000's. b. Gerald Ross noted the Chamber of Commerce is active in the corridor. c. Change of access will need to be reviewed and approved. GDOT prefers the holding a Stakeholder Meeting and 	

Notes	Action
<p style="text-align: center;">PHOH meetings to discuss access changes.</p>	
<p>3 Contract</p> <ol style="list-style-type: none"> 1. Ed noted TO1 contract date ends 12/15/2015. GDOT confirmed the TO1 contract will be extended. 2. GDOT confirmed Peer Review will be required for roundabout warrant analysis. Ed stated a Peer Review is not included in the scope for TO1 and will need to be added to TO2. 3. Jacobs to begin scoping TO #2 	
<p>4 Other</p> <ol style="list-style-type: none"> 1. GDOT stated all deliverables should be checked by the Prime (Jacobs) and sent to GDOT from the Prime instead of sub consultants. 2. Hatem Aly (Jacobs) asked about bicycle and pedestrian needs for the project. GDOT confirmed that the project shall meet GDOT's Complete Streets Policy. 3. GDOT noted the One Way Pair Project (PI No. 321530) added a roundabout and addressed some drainage issues per request by Henry County. 4. Roundabout will be considered at the Intersection of SR 20 and Regency Plaza Blvd (near the IHOP). 5. Aerial Photos received from Henry County 6. Jacobs site visit planned end of October for roadway and environmental. 	

PI# 0013531 SR 20 FM I-75 to CS721/ PHILLIPS RD TEAM KICK OFF Meeting- October 26, 2015.			
Name	Title	Representing	Email
1. Achor Njoku	Project Manager	GDOT	injoku@dot.ga.gov
2. Kristie Dedenick	Principal, / Public Involvement	Sycamore County	kristie.dedenick@sycamorecountytj.com
3. Erick Smith	Survey - Manager	CERM	esmith@cerm.com
4. Femi ADESANYA	Operations Manager	CERM	badesanya@cerm.com
5. Julie Coco	Cultural Resources	NewSouth	jcoco@newsouthassoc.com
6. DAN COLLINS	JACOBS - SURVEY	JACOBS	danicollins@jacobs.com
7. Jonathan Cox	JACOBS - ENV	JACOBS	Jonathan.Cox@jacobs.com
8. Ed Cullivan	JACOBS - Project Man.	JACOBS	
9. PATRICK CAPASSE	JACOBS - ROADWAY	JACOBS	PATRICK.CAPASSE@jacobs.com
10. Brandon Crawford	Project Manager	Cardno	brandon.crawford@cardno.com
11. Hatem ALY	PROJECT manager	JACOBS	Hatem.ALY@jacobs.com
12. GERALD ROSS	PRINCIPLE	JACOBS	gerald.ross@jacobs.com
13. Aaron Burgess	GDOT - QES NEPA planner		aburgess@dot.ga.gov
14. Amy Diaz	JACOBS - Traffic	JACOBS	amy.diaz@jacobs.com
15. DAOD KAZWAH	ACCURA Engineering	ACCURA	DKAZWAH@accura.com
16. ASHLE STONE	JACOBS - ENV Sci	JACOBS	ashlie.stone@jacobs.com
17. Emily Ritzler	JACOBS - env.	JACOBS	emily.ritzler@jacobs.com
18. Krystal Stovall-Dixon	GDOT - OPD Program Manager	GDOT	krystal-stovall-dixon@dot.ga.gov

SR 20
PI No. 0013531

Minutes for conference call on 12/9/15 at 2:00pm

Participants

Mike Carlock (GDOT)
Jim Pomfret (GDOT)
Jonathan Cox (Jacobs)
Julie Coco (New South)
Matt Matternes (New South)
Shawn Patch (New South)

Discussion

Shawn Patch presented overview of GPR results. There are two distinct clusters of probable graves. Cluster 1 (eastern) is the smaller of the two and includes an existing grave marker on the surface. Cluster 2 (western) is much larger and contains no surface indications of graves. There are also nine additional anomalies located close to SR 20 between the two clusters.

Julie Coco presented information that was just obtained that morning based on research at the Henry County courthouse. One person knew about previous work prior to the Henry County DOT building that identified a paupers' cemetery. It appears that Henry County may have purchased that land specifically for a cemetery.

Several issues were raised:

- 1) could these be avoided in the design phase?
- 2) was field verification (ground-truthing) necessary?

Jonathan Cox advised that Jacobs' designers were fairly confident they could avoid these resources by holding the south side of existing pavement.

GDOT advised that a site boundary should be placed around all anomalies with a 20-foot buffer up to existing right-of-way (ROW). No field verification is necessary at this time. Jim Pomfret noted that if any of the graves or potential graves will be impacted a cemetery permit pursuant to OCGA 36-72 would be required and that would add a minimum of six (6) months to the overall schedule.

Action Items:

- 1) New South to obtain state site number and will prepare a technical report on the GPR survey that incorporates a summary of the archival research. Current delivery date is scheduled for 1/15/16 at GDOT OES.

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Purpose	SR 20/81 Initial Concept Team Meeting		
Project	SR 20/81	Project No.	0013531
Prepared by	Patrick Capasse, P.E.	Phone No.	404-978-7510
Location	GDOT Room 409	Date/Time	December 15, 2015; 10:30 AM
Participants	See Sign-in Sheet		
Distribution	See Sign-in Sheet	File	2015-12-15 - Initial Concept Team Meeting Minutes - Final.docx

Notes	Action
<p>1 Welcome</p> <p>Achor (GDOT) opened the meeting. Attendees introduced themselves, firm and discipline.</p>	
<p>2 Safety</p> <p>Ed Culican (Jacobs) noted the location of the stairwell outside the conference room in case of emergency. asked who would be responsible for CPR and 911 in the event in an emergency. David Kasbo (Jacobs) volunteered for CPR and Krystal Stovall-Dixon (GDOT) volunteered to call 911 in an emergency.</p>	
<p>3 Project Overview</p> <p>Ed described the overview of the project - the project begins at the radius returns of I-75 and SR 20 in Henry County.</p>	
<p>4 Project Justification</p> <p>Hatem Aly (Jacobs) mentioned the existing corridor from I-75 to Willow Lane is a 4-lane section with raised median and an urban shoulder and from Willow lane to Phillips Drive the roadway is a 2-lane rural section with auxiliary turn lanes.</p> <p>Hatem listed the five (5) existing signals. He said Henry County Project (HC-15-64) proposes to widen McDonough Pkwy to 4 lanes and a raised median.</p>	

Notes	Action
<p>Hatem stated the existing corridor has an LOS C from I-75 to Willow Lane and an LOS E from Willow Lane to Phillips Drive. He mentioned that the corridor is anticipated to operate at LOS F by the design year 2042.</p>	
<p>5 Safety Concerns</p> <p>Hatem summarized the safety concerns with the existing corridor. He mentioned that 57% of the crash data resulted from rear-end collisions, which is typical of roadway segments that experience traffic congestion.</p> <p>Hatem stated that the opposing north and south legs of the intersection of Old Industrial Blvd and SR 20 are offset approximately 18'. He said due to the shift, the northbound left turn movement has limited sight distance due to the southbound left turn queue blocking the visibility of the southbound thru movement.</p> <p>Hatem also mentioned the sight distance at the intersection of SR 20 and Regency Plaza Blvd is substandard. He reported the existing sight distance to be 410', and said the minimum required to be 565' for passenger vehicles and approximately 830' for trucks.</p>	
<p>6 Design Criteria</p> <p>Patrick Capasse (Jacobs) discussed the design criteria of the project. He stated the design speed for the mainline is 45 mph and the design speed of the sideroads roads ranges from 25 to 35 mph. Patrick stated all alternatives were designed according to the 2011 AASHTO Green Book and the GDOT Design Policy Manual (DPM).</p> <p>Patrick stated in general the proposed alignment follows the existing corridor. He said there are no new location roadway segments anticipated.</p> <p>Patrick discussed the GDOT Complete Streets Policy and the warrants as they relate to the project.</p> <p>Warrant 1: Bike Route – Project corridor was identified as regional route between city of Hampton and city of McDonough by a 2007 ARC Study (<i>Atlanta Region Bicycle Transportation & Pedestrian Walkways Plan</i>).</p> <p>Warrant 2: Connectivity – No existing bicycle facilities connect to the limits of the project. Patrick stated on the west side of I-75 there is a multi-use path, but no other</p>	

Notes	Action
<p>existing facilities are in use.</p> <p>Warrant 3: Generators/Destinations – Patrick stated there 4 neighborhood/apartment areas that conjoin the project corridor and there is a large commercial center with restaurants and retail at the western terminus of the project.</p> <p>Warrant 4: Bridge – Patrick said while there is no sidewalks or bike lanes on the bridge, the project should be coordinated with pedestrian and bicycle accommodations (if any) provided with the adjacent Diverging Diamond Interchange project (DDI) – PI 0013294.</p> <p>Warrant 5: Safety – Patrick stated the safety warrant of the complete streets policy is yet to be evaluated based on bicycle/pedestrian crash data.</p>	<p>GDOT provide PI 0013294 concept information</p> <p>Jacobs – request bicycle/pedestrian crash data for analysis from GDOT</p>
<p>7 Environmental Concerns</p> <p>Jonathan Cox (Jacobs) discussed the environmental aspects of the project. He said a GEPA EER document is anticipated, however there may be an opportunity for a GEPA Type-B document for the project. Jonathan stated the project is state funded and FHWA involvement is not anticipated.</p> <p>Jonathan gave an update on the status of the environmental studies' progress. He stated preliminary field work has begun.</p> <p><i>Streams/Wetlands</i></p> <p>There are two streams that will require culvert extensions, and Jonathan anticipated only lower tier permits would be required.</p> <p><i>Ecology</i></p> <p>Jonathan stated field ecology work will be needed in a few areas.</p> <p><i>History</i></p> <p>Jonathan said west of Autumn Lake Drive there are two (2) historical resources. He said there are no displacements of the structures anticipated based on the alternatives considered.</p>	

Notes	Action
<p><i>Archeology</i></p> <p>Jonathan gave an update on the archeology investigation of the project. He said ground penetrated radar (GPR) revealed two (2) burial sites consistent with mass graves on the property of the Henry County DOT at the intersection of McDonough Pkwy and SR 20. Jonathan stated guidance from GDOT OES in response to the GPR results is to avoid impacts to the existing R/W in this location.</p> <p><i>Underground Storage Tanks (USTs)/Hazardous Materials (HazMat)</i></p> <p>Hatem stated the five (5) parcels identified as for a Phase I UST investigation – Tire Depot; QuikTrip gas station; Texaco gas station; AAMCO transmission shop; BP gas station.</p>	
<p>8 Alternatives Considered</p> <p>Patrick Capasse (Jacobs) discussed the project alternatives. He states the geometry of the project was constrained by i) the existing retaining walls at NE of Regency Plaza Blvd intersection; ii) the archeology of the unmarked cemetery at McDonough Pkwy; and iii) the historical resources west of Phillips Drive.</p> <p>He stated three Alternative typical sections were considered. Alternative I is a base level alternative with four (4) 11-foot lanes, 20' raised median, 12' urban shoulder and 5' sidewalks on both sides and 12-foot right and left turn lanes. In consideration of the Complete Streets Policy, Alternative II adds 4' bike lanes to the base alternative and Alternative III uses a 10' multi-use path in place of sidewalk on the north side of SR 20.</p> <p><i>Alternative I</i></p> <p>Patrick stated Alternative I does not impact the unmarked cemetery; does not impact the historical resources west of Phillips Drive; however Alternative I potentially impacts the UST on the BP gas station property, at the NW corner of the intersection of McDonough Pkwy in order to avoid impacts to the unmarked cemetery. Patrick stated the impact to the gas station may result in a ROW displacement due to impacts to the pumps.</p> <p>Patrick stated Alternative I would require two (2) design</p>	

Notes	Action
<p>variances for the length of horizontal curves to avoid the unmarked cemetery and historical resources.</p> <p>Patrick anticipated 33 parcels to be impacted and one (1) potential displacement; ROW costs are estimated to be \$3.9 million.</p> <p><i>Alternative II</i></p> <p>Patrick stated Alternative II (bike lanes) does not impact the unmarked cemetery; does not impact the historical resources west of Phillips Drive; however Alternative II potentially impacts the UST on the BP gas station property, at the NW corner of the intersection of McDonough Pkwy in order to avoid impacts to the unmarked cemetery. Patrick stated the impact to the gas station may result in a ROW displacement due to impacts to the pumps.</p> <p>Patrick stated Alternative II would also require two (2) design variances for the length of horizontal curves to avoid the unmarked cemetery and historical resources.</p> <p>Patrick anticipated 34 parcels to be impacted and one (1) potential displacement; ROW costs are estimated to be \$4.7 million.</p> <p><i>Alternative III</i></p> <p>Patrick stated Alternative III (multi-use path) does not impact the unmarked cemetery; does not impact the historical resources west of Phillips Drive; however Alternative III potentially impacts the UST on the BP gas station property, at the NW corner of the intersection of McDonough Pkwy in order to avoid impacts to the unmarked cemetery. Patrick stated the impact to the gas station may result in a ROW displacement due to impacts to the pumps.</p> <p>Patrick stated Alternative II would also require two (2) design variances for the length of horizontal curves to avoid the unmarked cemetery and historical resources.</p> <p>Patrick anticipated 37 parcels to be impacted and one (1) potential displacement; ROW costs are estimated to be \$5.0 million.</p> <p>Two different shoulder widths are proposed for this alternative left shoulder. One is 17 ft wide shoulder and the second is 22 ft shoulder to meet the 2012 AASHTO Guide for the Development of Bicycle Facilities. Katelyn stated that if multi use path alternative is selected, she</p>	

Notes	Action
<p>prefers the 22 ft shoulder to be used</p> <p><i>Alternatives Cost Comparison</i></p> <p>Patrick stated the estimated construction and total project costs of Alternative I are \$11.1 million and \$16.4 million respectively.</p> <p>Patrick stated the estimated construction and total project costs of Alternative II are \$11.5 million and \$17.8 million respectively.</p> <p>Patrick stated the estimated construction and total project costs of Alternative III are \$11.2 million and \$17.8 million respectively.</p>	
<p>9 Signal Warrant/Roundabout Analysis</p> <p>Hatem stated there are three (3) unsignalized intersections along the corridor where signal warrants and roundabout feasibility is being investigated – Preston Creek Drive, Prity Court, and Regency Plaza Blvd.</p> <p>Hatem continued</p> <ul style="list-style-type: none"> • SR 20/Preston Creek Drive. The Preston Creek intersection looks like a tough location with the adjacent business and the offset right-aid driveway • SR 20/ Regency Plaza Blvd (mainly for safety issue as we have a sight distance issue at this intersection) • SR 20/ Prity Ct. The Prity intersection is only about 400 feet away from the signal and could have queue spillback between the 2 intersections 	
<p>10 Access Options</p> <p>Hatem discuss alternatives for access options at the three intersections listed above if a signal is found unwarranted and a roundabout is found infeasible. He mentioned three (3) possible options – i) left in only; ii) closed median; and iii) full median opening.</p> <p>Hatem also discussed modifying existing access to two parcels. He mentioned vehicles entering Popeyes by turning left from Old Industrial Blvd are blocked by the NB queue of the intersection at SR 20, thus forming a secondary queue along EB SR 20 affecting the traffic</p>	

Notes	Action
<p>operations at the signal. Hatem mentioned the option of converting the entrance to Popeyes along Old Industrial Blvd to be “right in/right out” only and vehicles coming from SR 20 could use the existing entrance on SR 20.</p> <p>Hatem also discussed converting the existing “right in/right out” only entrance to the Rite-Aid SR 20 and Industrial Pkwy to a “right in” only.</p>	
<p>11 Preliminary Design Traffic</p> <p>Ed stated Daniel Funk (GDOT) is working with the traffic data to finalize the traffic for the project corridor.</p> <p>Robinson Nicol (Jacobs) stated Henry County is planning a new connection at McDonough Pkwy that is expected to re-route traffic in the area. He also mentioned expansions to the south of SR 20 by Henry County DOT will generate new trips.</p> <p>Ed noted that GDOT has requested a re-count of the corridor.</p>	<p>GDOT – Daniel Funk will complete combining traffic numbers.</p> <p>GDOT – Traffic count</p>
<p>12 Crash Data</p> <p>Robinson stated the previous crash data for the corridor from 2007 to 2009 showed a high crash rate compared to the statewide rates. He stated the crash data database has been updated and crash data obtained recently (for years 2012-2014) on this and other projects reveals reduced accident events and rates than the previous database did. Robinson said there are questions regarding the difference in the crash data. He stated further investigation is needed.</p> <p>Robinson said the new crash data (2012-2014) is in line with the state rates. He suspects hard copies of the law enforcement reports are missing from the electronic database.</p>	<p>Jacobs – Robinson will coordinate with GDOT to investigate crash data differences.</p>
<p>13 Staging</p> <p>Hatem stated the project is anticipated to be constructed in two (2) stages by constructing one side and maintaining traffic on the existing. In the subsequent phase, traffic would be maintained on the newly constructed pavement while the remaining construction is completed.</p>	
<p>14 Maintenance Problems</p>	<p>GDOT District provide any</p>

Notes	Action
<p><i>Drainage Issues</i> Hatem mentioned there is a double 8'x8' box culvert with one barrel blocked with silt.</p>	known issues
<p><i>Pavement Problems</i> Ed stated existing pavement will be evaluated under Task Order 2.</p>	GDOT/Jacobs joint coordination
<p>15 Utilities Krystal Stovall-Dixon (GDOT) stated SUE is required instead of Public Interest Determination (PID). Yulonda Pride-Foster (GDOT) stated concept funds are available for Quality Level B (QL-B) SUE.</p>	GDOT – Provide Utility Owners information
<p>16 Public Involvement Hatem stated This project will require public outreach especially with businesses that their access management will change with the construction of the raised median for example Rite Aid, Popeys restaurant</p>	
<p>17 Coordination with other Projects Hatem stated the project will be coordinated with the DDI project (PI 0013294) and Henry County DOT's McDonough Pkwy (HC-15-64).</p>	
<p>18 Possible Permits Jonathan stated a PAR is not required. Jonathan also stated that a stream buffer variance is anticipated for this project.and 404 permit would be required.</p>	
<p>19 Schedule Ed anticipated submitting a Draft Concept Alternatives Report by January 7, 2016 in hopes of an Alternative Selection by the end of February. Ed anticipated submitting the Draft Concept Report early March, with a concept team meeting in April.</p> <p><i>Survey Database</i> Ed stated the 20% Database Check is scheduled for June 2, 2016; however he hopes to submit by the middle to end of March.</p>	

Notes	Action
<p><i>Environmental</i></p> <p>Ed stated early coordination letters have been sent out and field visits are in progress.</p> <p><i>Traffic</i></p> <p>Ed, Achor, Daniel have met to discuss combining traffic numbers. There is not significant impact to the schedule at this time.</p>	
<p>20 Open Discussion</p> <p><i>Complete Streets Policy</i></p> <p>Katelyn DiGioria (GDOT) stated this is a highly populated corridor and that this project is an important piece of the connection between Hampton and McDonough. She also stated that a design variance can be pursued if the costs associated with the complete streets policy increase the project costs by 20%. She said, based on the preliminary estimates, the project cost are not increased by 20%, but a design variance can still be pursued.</p> <p>Katelyn suggested any design and placement of the multi-use consider the number of conflict points between the users and the driveways/side streets. She mentioned AASHTO requires a 5' offset from the face of curb to the multi-use path. She stated if multi-use path is selected, it should be design to meet all AASHTO requirements.</p> <p>The group concurred local/public involvement will need to be incorporated into the selection of the preferred alternative</p> <p>Ed mentioned the "One-way Pair" project in the city of McDonough and suggested coordination with Henry County to determine their preference for a typical section.</p> <p>Tyler Peek (GDOT) mentioned the typical section on west side of I-75 to Hampton has 10' paved shoulders.</p> <p><i>Traffic Control</i></p> <p>Tyler stated Henry County is still investigating the preferred method of traffic control at McDonough Pkwy at SR 20 (HC-15-64). Henry County is considering a</p>	<p>GDOT – Review Alternatives (I, II, and III); select preferred</p>

Notes	Action
<p>signal versus a multi-lane roundabout. He stated Henry County was investigating the potential impacts to the BP gas station due to HC-15-64 and Tyler said he is meeting with Henry County Wednesday (12/16/15) to discuss HC-15-64 and would bring up PI 0013531 if appropriate. Tyler stated GDOT prefers a multi-lane roundabout at the intersection of McDonough Pkwy and SR 20. Tyler stated that if the Bp gas station will be total take under the 0013531 project Henry County may prefer the multi-lane Roundabout option for the intersection of McDonough Pkwy and SR 20.</p> <p><i>Access Management</i></p> <p>Tyler discussed the used of “R-cuts” for existing intersections (both signalized and unsignalized). He asked the team to look at the overall corridor and to evaluated the existing signals and access control to see if there are better options for improving the traffic operation of the corridor.</p> <p>Hatem stated the preferred is a left in/right out at Preston Creek.</p> <p>Tyler stated the decisions for proposed roundabout and signals need to be made prior to the final concept report and formal public involvement.</p> <p>Tyler mentioned the design vehicle for U-turns and R-cuts. Would be a school bus and all trucks will not be permitted U turn at these median breaks.</p> <p><i>Environmental</i></p> <p>Krystal stated federal PE funds may be used for a GEPA Type B and that NEPA is not required as long as no federal funds are used for right-of-way or construction.</p> <p><i>Utilities</i></p> <p>Krystal stated utility relocations are shown as the responsibility of the Local Government. A revised PFA is not required, since PFA’s are for the PE phase only. The Local government sponsor should be identified (Henry County or the City of McDonough) and notified that they are fiscally responsible for utility relocations,</p>	

Notes	Action
<p>as this will affect utility coordination on the project.</p> <p><i>Lighting</i> Achor asked if there are any lighting requirements on the project. Ed responded, lighting would need to be at any proposed roundabouts, and possibly the interchange depending upon the limits of the impacts for the DDI.</p> <p><i>Landscaping</i> Achor asked if there are landscaping requirements on the project. Ed responded that Alternative III would provide an opportunity for the corridor.</p>	<p>GDOT review lighting requirements for PI 0013531 and PI 0013294.</p> <p>GDOT review landscaping requirements.</p>
<p>21 Action Items Summary</p> <p>GDOT</p> <ul style="list-style-type: none"> • Utility responsibilities need to be resolved, and a Memorandum of Understanding needs to be established to identify which agencies are responsible for utility issues. • Review Typical Section Alternative • Identify Preferred Alternative • Coordinate bikeway w/ DDI, Send Jacobs DDI project concept information • Send Jacobs Utility Owners Information • Send Jacobs final traffic data • Send Jacobs any known maintenance issues in the corridor, including any existing drainage problems (GDOT District) • Investigate landscaping • Review requirements for lighting regarding: <ul style="list-style-type: none"> • Roundabouts • DDI <p>Jacobs</p> <ul style="list-style-type: none"> • Set up meeting by mid-January with Henry County and McDonough regarding Alternatives II and III • Set up meeting by late-January with GDOT regarding a preferred typical section alternative – tentatively late January. • Email GDOT requesting any known historical maintenance issues identified in the corridor. • Schedule meeting with GDOT regarding the need 	

Notes	Action
<p>for a pavement evaluation for the corridor.</p> <ul style="list-style-type: none">• Meet with GDOT regarding Access Control/Management – Schedule work session with GDOT (including Tyler Peek) in mid-January.• Request bike/pedestrian crash data from GDOT• Coordinate with the City of McDonough and Henry County regarding any lighting and landscaping desired features in the corridor.	

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Purpose	SR 20/81 Typical Sections discussion		
Project	SR 20/81	Project No.	0013531
Prepared by	Hatem Aly, P.E.	Phone No.	404-978-7511
Location	140 Henry Parkway, McDonough, GA 30253, Conference Room B	Date/Time	January 13, 2016; 2:30 PM
Participants	See Sign-in Sheet		
Distribution	See Sign-in Sheet	File	Henry County Meeting Minutes 01-13-2016.docx

The purpose for this meeting was to discuss the three alternative typical sections for the project with Henry County and City of McDonough.

Hatem started the meeting with describing the proposed project and presented the three alternative typical sections. He stated that Alternative I is four (4) 11-foot lanes with 20-foot raised median and 12-foot urban shoulder with 5-foot sidewalk both sides of the road. Alternative II is the same base-level typical from Alternative I plus a 4-foot bike lane in each direction along SR 20. Alternative III proposes to install a 10-foot multi-use path on the north side of SR 20 in addition to the base-level urban shoulder of Alternative I to improve the bicycle and pedestrian LOS of the corridor and meet GDOT's Complete Street Policy.

Hatem mentioned that Jacobs did a Complete Street Warrant Analysis for the corridor and found that this segment of SR 20 meets the first and the third warrants which are "Project is on a designated U.S, State, Regional or Local bicycle rout" and "Corridor with bicycle travel generators and destinations such as residential neighborhoods, commercial centers, schools, colleges, scenic byways, public parks, transit stops/stations" respectively. He continued if bike facility is not proposed on this corridor a design variance will be performed and submitted to GDOT for approval.

David said that bikers don't use this segment of the road because there is no bike facility and shoulders are narrow and can't be used by bikers due to safety concern. He continued, west of I-75, bikers use the wide paved rural shoulder and he thinks if bike facility is provided east of I-75 bikers will start using it.

David stated that if bike facility is proposed on the road he prefers the multi-use path option because it is safer for bikers than a bike lane next to the travel lanes. Hatem asked which side of the road is preferred for the multi-use path. David and Stacey preferred the north side as it has more commercial/business properties and bikers who use bikes as a method of transportation will prefer this side to reach their destination. David continued bikers can cross to the other side of the road at traffic signals and use the 5-foot sidewalk if they want.

Hatem moved to the second subject in the agenda which is Henry County SPLOST project at the intersection of SR 20 and McDonough Pkwy. Hatem asked if a decision is made regarding what type of intersection it would be there (Roundabout or signal). David said he believes it will

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be a signal but we need to confirm that with Rocky. David said Roundabout will case a total take to BP gas station on the northwest corner of the intersection. Hatem said this gas station will be a total take if we go with the multi-use path option as we are trying to stay away from the unmarked cemetery in front of Henry County DOT building.

Hatem then moved to the third subject in the agenda which is access to Henry County DOT building from SR 20 and from proposed extension of Henry Pkwy project that Henry County is proposing. Hatem said based on the conceptual layout that Jacobs presented to GDOT on December 15, 2015 Henry County will not have a median break in front of their driveway on SR 20 and westbound traffic who wants to go to DOT building have to go to the proposed traffic signal/Roundabout at McDonough Pkwy and make U-turn to access DOT driveway. David said this is not an issue as long as a protected green arrow at McDonough Pkwy signal is provided to make a U-turn. He also suggested providing a median break in front of DOT drive way for left-in only if this option will not impact the left turn storage onto Henry Pkwy. Hatem showed the attendees similar option proposed at SR 20/Preston Creek Drive, SR 20/Regency Plaza Blvd, and SR 20/Prity Ct. Having a median break in front of Henry County DOT driveway will require a design exception as median breaks will be less than 660 ft apart.

Hatem asked about utility owners on this corridor. Stacey said Henry County for water and sewer, Atlanta Gas Light (AGL) for gas, Charter for cable, Georgia Power (GP) for power, and ATT for phone. David stated he believes the utility coordination will be managed by GDOT and Cheri mentioned that Henry County is still in contact with GDOT regarding who is responsible for funding the utility relocation. Stacey said that he got a request from GDOT to look into reducing the utility relocation cost from 1.7 million to around 1.5 million.

Action Items

- Hatem will prepare meeting minutes and send to attendees for review and approval and will send to GDOT
- Jacobs will schedule a coordination meeting with Henry County SPLOST to coordinate with the intersection project at McDonough Pkwy

The meeting was the concluded.

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Subject	SR 20 Widening Project - Median Openings		
Project	SR 20/81	Project No.	P.I. 0013531
Prepared by	Patrick Capasse, P.E.	Phone No.	404-978-7510
Location	Conf Call	Date/Time	February 3, 2016
Participants	Tyler Peek (GDOT Dist 3) Hatem Ali (Jacobs) Patrick Capasse (Jacobs) Robinson Nicol (Jacobs)		
Copies to	Achor Njoku (GDOT); Daniel Funk (GDOT)	File	2016-02-03 - SR 20 Widening - Median Openings.docx

Notes	Action
<p>1 Tyler Peek (GDOT District 3) preferred the RCUT option at the following intersections:</p> <ul style="list-style-type: none"> • Preston Creek Dr. • Regency Plaza Blvd. • Prity Ct. • Pennsylvania Ave • International Ave/W Asbury Ct <p>All RCUTs will be right-in/right-out for side road traffic to reduce conflict points.</p> <p>Robinson (Jacobs) said Jacobs would provide GDOT with an updated layout showing RCUTs at the five locates listed above.</p> <p>Tyler confirmed a design exception would be required at each location where median openings (partial, full, or RCUT) is less than the allowable minimum.</p>	<p>Jacobs – send GDOT Office of Planning (Dan Funk) updated layout with RCUTs at the five (5) locations at left.</p> <p>GDOT</p> <ul style="list-style-type: none"> • Volume Development using RCUTs in new layout • Send to Jacobs approved traffic volumes <p>Jacobs will submit Design Exceptions where necessary.</p>
<p>2 Tyler suggested an RCUT be considered at the intersection of Regency Plaza Blvd in place of a new signal or roundabout to fix the sight distance concern. If RCUT is proposed at this intersection, Regency Plaza</p>	<p>Jacobs will perform signal warrant analysis and roundabout feasibility study at Regency Plaza Blvd.</p>

Notes	Action
<p>Blvd. northbound vehicles going onto SR 20 westbound would make a right onto SR 20 and U-turn at Pennsylvania Ave.</p>	
<p>Hatem and Tyler agreed the final decision to use an RCUT at Regency Plaza would be contingent on the approved Traffic Volumes (GDOT responsible) and the Signal Warrant/Roundabout Feasibility Analysis (Jacobs responsible).</p>	
<p>3 Tyler suggested closing the median at the intersection of Asbury Rd. /International Avenue or using an RCUT if corridor experiences significant left turns onto Asbury Rd. and International Ave.</p>	
<p>Patrick mentioned a full median opening was provided in the initial layout to accommodate truck traffic exiting the recycling facility. The design vehicle should be considered to see if making a U-turn at McDonough Pkwy is a viable option for trucks heading west from Asbury Rd.</p>	<p>Jacobs – will verify design vehicle</p>
<p>4 Tyler will coordinate with Achor regarding the intersection of McDonough Pkwy. Tyler stated the Henry County project (HC-15-64) is considering a temporary signal at this intersection; and if selected, additional study would be needed to determine if a permanent signal or a roundabout would be the best traffic control option that would be implemented under PI 0013531. Hatem stated this option needs to be discussed with Achor because it would impact Jacobs' Task Order 2 scope, schedule and fee estimate.</p>	<p>GDOT – Tyler meet with Achor to discuss McDonough Pkwy traffic control options and Jacobs' Task Order 2.</p>

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Subject	SR 20 Widening Project - Stakeholder Meeting		
Project	SR 20/81	Project No.	P.I. 0013531
Prepared by	Patrick Capasse, P.E.	Phone No.	404-978-7510
Location	Henry County SPLOST Building	Date/Time	May 12, 2016
Participants	See Sign Sheet	Apologies	
Copies to	All participants	File	2016-05-12 - SR 20 Widening - Stakeholder.docx

Notes	Action
<p>1 Safety Hatem Aly (Jacobs) open the meeting with a safety moment. He said driving through the construction on I-75 south can be hazardous and suggested that drivers use caution and limit distractions.</p>	
<p>2 Project Description Hatem opened by describing the project. He described the existing typical and current concept. The following key concept items were discussed:</p> <p>Hatem mentioned that the existing vertical curvature is deficient at the crossing of the Camp Creek Tributary 1. He said the concept proposes to raise SR 20 at this location to mitigate the sub-standard condition. David Simmons (Henry County) asked if a design exception could be pursued for the sub-standard vertical curve. Hatem stated the preference is to mitigate it with this project by raising the roadway.</p> <p>Keith Dickerson asked if the eastern project termini has been established and/or finalized. Achor Njoku (GDOT-OPD) responded the project is scoped to end at Phillips Drive.</p>	
<p>3 Alternatives Considerations and Typical Section Hatem discussed the typical section alternatives explored during the development of the draft concept. He stated three (3) alternative typical sections were considered:</p> <ol style="list-style-type: none"> 1. 4-lane urban section, raised median, and 12 ft urban shoulder with 5' sidewalk on both sides of 	

Notes	Action
<p>the road</p> <ol style="list-style-type: none"> 2. 4-lane urban section, raised median, 4' bike lanes in each direction, and 12 ft urban shoulder with 5' sidewalk on both sides of the road 3. 4-lane urban section, raised median, 12' ft urban shoulder with 5' sidewalk on the south side of the road and 22' urban shoulder with 10' multiuse path on the north side of the road. <p>He stated after discussions with GDOT, Alternative 3 (Multi-use path) was identified as the Preferred Alternative.</p> <p>Achor (GDOT) asked for concurrence/comments on the preferred alternative</p> <p>Keith Dickerson (City of McDonough) stated the multi-use path is acceptable and he preferred the multi-use option over dedicated bike lanes.</p> <p>David Simmons (Henry County) stated that experienced bicyclists prefer the travel lanes to the multi-use path, given those 2 options. But given the choice of bike lanes or a multi-use path, Henry County prefers the multi-use path due to the use of the Rascal-type electric scooters in the area and for those that are inexperienced bikers.</p>	
<p>4 Environmental Concerns</p> <p>Jonathan Cox (Jacobs) discussed the environmental resources that have been identified along the project corridor:</p> <p><i>Streams</i></p> <p>Jonathan showed the locations of two streams (Camp Creek and Camp Creek Tributary 1). He stated each crossing is perpendicular and each existing culvert is anticipated to be extended. He noted the project would likely require a Section 404 permit (not anticipated to be an Individual Permit) & that Jacobs is still in the process of evaluating the need for stream buffer variances.</p> <p><i>History</i></p> <p>Jonathan stated the [white] Carmichael House immediately west of Phillips Drive is eligible as a historic resource. The red brick home adjacent to the west of the Carmichael House is not eligible.</p> <p><i>Cemetery</i></p>	

Notes	Action
<p>Jonathan said ground penetrated radar (GPR) revealed burial sites consistent with graves on the property of the Henry County DOT at the intersection of McDonough Pkwy and SR 20. Jonathan stated guidance from GDOT OES in response to the GPR results is to avoid impacts to the existing R/W in this location. Any disturbance within the cemetery boundary would require a cemetery permit (including further testing).</p> <p><i>Logical Termini</i> David Simmons asked if Logical Termini had been resolved. Jonathan noted that since the project is funded with state funds, Logical Termini does not apply (as it would with a federally funded project).</p>	<p>Jacobs will provide a copy of the GDOT-OES approved Cemetery Study Report (GPR results).</p>
<p>5 Traffic</p> <p>Robinson presented the Level of Service (LOS) for the intersections of Industrial Blvd and Old Industrial Blvd. Preliminary analysis showed unacceptable LOS at Industrial Boulevard. Upon further investigation, the volumes do not reflect the new 2-way geometry on Old Industrial Boulevard. The volumes are being re-evaluated by GDOT Planning and the analysis will not be complete until volumes are received.</p> <p>A sensitivity analysis was performed testing different volume splits between Old Industrial and Industrial for the NB left turns. The analysis showed the potential need for dual left turns at the Industrial Boulevard, but the geometry cannot be validated until final volumes are received.</p>	
<p>6 Access Control and Intersection Improvements</p> <p><i>R-Cuts at Un-signalized Intersections</i> The group discussed the locations of the R-Cuts along the corridor. Tyler Peek (GDOT) stated all existing un-signalized intersections will be converted to R-Cuts. The intersection of SR 20 at International Ave and W. Asbury Road will be a full R-Cut with left-only access to both side roads. All other un-signalized intersections (Preston Creek, Regency Plaza, Pennsylvania Ave, and Prity Ct) are "T"-intersections and have R-Cuts with a single left-only access to one side street. All R-Cuts will prohibit left-out access to SR 20.</p> <p>Tyler Peek asked if the full R-Cut at International and</p>	<p>Jacobs will verify if a raised</p>

Notes	Action
<p>W. Asbury can be raised concrete instead of painted.</p>	<p>island is feasible at this location.</p>
<p>David Simmons (Henry County) asked GDOT for a raised R-Cut detail for a 20' median.</p>	<p>Tyler said he would send one.</p>
<p><i>Access Management</i> Old Industrial Blvd</p> <ul style="list-style-type: none"> • Hatem stated the left turn queue on Old Industrial Blvd blocks inbound traffic to Popeye's. • Gerald Ross (Jacobs) stated the Popeye's parcel owner also owns the adjoining parcel (former Wendy's). He suggested the county or city could choose to convert the old Wendy's exit driveway to an entrance driveway for both parcels; and the driveway to Popeye's could be converted to exit only. • Tyler and David agreed the right turn bay on SR 20 EB to Old Industrial Blvd SB was short. David suggested extending the right turn bay and closing the easternmost driveway of the tire shop. David and Rocky (Henry County) also asked if the turn lane could be extended to the I-75 NB off-ramp. Hatem stated Jacobs responsible for the design of the DDI. • David stated the Arby's on the NE quadrant of the intersection has two driveways on Old Industrial Blvd and an access point on the backside of the restaurant. He suggested the egress driveway closest to SR 20 be closed. • Stacy (Henry County) asked if Old Industrial could be reverted back to one-way southbound or close it off at a cul-de-sac. Tyler (GDOT) stated that would not be a preferred option. Robinson (Jacobs) agreed – he stated by closing Old Industrial or reverting to one-way, all WB traffic must continue to the intersection of Industrial Blvd and SR20 causing it to fail. 	<p>City of McDonough and Henry County will consider this option and will meet with property owners if option is favorable.</p> <p>Jacobs will update the concept layout to show the easternmost driveway closed and extend the right turn bay.</p> <p>Jacobs will update the concept layout to close the southernmost egress driveway.</p>
<p><i>Driveway West of Willow Lane</i></p> <ul style="list-style-type: none"> • David Simmons said the three parcels on the north side of SR20 and west of Willow lane have access from Willow lane. He suggested closing the first two driveways (one into KFC/Burger King, and the one out of Burger King). The third driveway should remain open since it provides access to the private drive on the north side of the three parcels. 	<p>Jacobs will update the concept layout.</p>

Notes	Action
<p>7 Roundabout at McDonough Pkwy Patrick Capasse (Jacobs) presented a roundabout at the intersection SR 20 and McDonough Pkwy.</p> <p>Keith asked what pedestrian accommodations will be provided in the roundabout design.</p> <p>Tyler Peek (GDOT) said the Henry County Phase I project for McDonough Pkwy will be installing a temporary signal. GDOT's preferred permanent condition is a multi-lane roundabout to be constructed via GDOT PI 0013531 (SR 20).</p> <p>Patrick stated the roundabout was designed for WB-67 trucks and pedestrian crossings would be added to the layout. He stated the placement was selected to avoid impacts to the unmarked cemetery which results in displacement of the BP Gas Station (in the NW quadrant) and old bank parcel now owned by Henry County.</p> <p>Rocky stated Henry County has potential occupancy plans for the parcel in the NE quadrant of the roundabout. He asked if the roundabout could be shifted further west to avoid impacts to the Henry County building. Hatem requested the latest plans from Henry County for McDonough Pkwy (design done by others) and said Jacobs would look into modifying the roundabout placement to minimize impacts to bank parcel.</p> <p>Rocky said Phase I of McDonough Pkwy is the portion north of SR 20. He stated preliminary plans have been completed and Right-of-way plan would soon start. He anticipated construction to begin by the end of 2016.</p> <p>Rocky said Phase II of McDonough Pkwy (the portion south of SR 20) will follow in similar fashion and is one (1) year behind Phase I. He anticipated construction of Phase II to be completed by the start of construction for SR 20.</p> <p>Krystal (GDOT) stated the One-Way Pair is anticipated to be let for construction in April, 2017. Achor stated SR 20 is anticipated to be let for construction in February, 2019.</p> <p>Hatem distributed a draft lighting agreement to Henry County and City of McDonough at the meeting. Keith</p>	<p>Jacobs will update the concept layout to show pedestrian crossings.</p> <p>Jacobs will investigate shifting the roundabout to the west to minimize impacts to the Henry County parcel in the NE quadrant</p> <p>Henry County will send McDonough Pkwy plans to Jacobs.</p> <p>Jacobs will send a revised electronic version.</p>

Notes	Action
<p>confirmed the final lighting agreement would need to be sent to City of McDonough as well.</p>	
<p>8 Maintenance of Traffic David Simmons asked if raising SR 20 over Camp Creek Trib 1 to mitigate the sub-standard vertical curve would adversely impact the construction staging. Hatem anticipated the new westbound lanes could be constructed while maintain traffic on the existing roadway.</p>	
<p>9 Utility Coordination/Project Assignments Hatem stated the draft concept report lists Henry County and City of McDonough for Water and Sewer. Keith confirmed the city does not have any Water and Sewer within the project limits.</p>	
<p>Stacy requested the GDOT project utility report with anticipated utility relocation cost to present to the county board and city council members.</p>	<p>Jacobs will send the report to GDOT to confirm before sending it to Henry County.</p>
<p>10 Public Involvement Plan Hatem preferred to present the roundabout to the public after all feasibility studies have been completed. He anticipated public involvement to occur in September or October, 2016.</p> <p>Achor stated that by the time the public involvement meeting will be held, the concept would be approved and will require the concept to be revised if any changes in design resulting from the meeting is recommended and approved by GDOT.</p>	
<p>11 Project Schedule Hatem stated the project will be let for construction in February of 2019 and estimated construction time will be 36 months (12 months for utility relocations and 24 months for project construction.)</p>	
<p>12 Open Discussion Hatem said a pavement evaluation will be performed.</p> <p>Hatem stated SUE will be included in the preliminary design phase.</p> <p>Stacy mentioned a potential transit pilot route that may use SR 20. He asked if the outside lane could be 12' wide instead of 11' as depicted in the concept typical sections. Jacobs is conducting the Transit Feasibility</p>	<p>Jacobs planning staff confirmed the pilot transit route includes the entire length of SR 20 for PI 0013531. Jacobs will update the</p>

Notes	Action
Study as part of Henry County's Comprehensive Transportation Plan (CTP) update. Jonathan Webster (Jacobs) said he would coordinate with Jacobs planning staff to determine the extents of the pilot transit route.	typical section and send out for comment and review.

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Subject	Intersection LOS Discussion at Industrial Blvd		
Project	SR 20/GA 81 - Henry County	Project No.	0013531
Prepared by	Hatem Aly, P.E.	Phone No.	404-978-7511
Location	Conference Call – Piedmont	Date/Time	May 26, 2016
Participants	Apologies Tyler Peek – GDOT Traffic Engineer D3 Robinson Nicol – Jacobs Traffic Engineer Juan Gonzalez – Jacobs Traffic Engineer Patrick Capasse – Jacobs Roadway Design Hatem Aly – Jacobs Project manager		
Copies to	File	2016-05-26_0013531 _Conference Call LOS minutes.docx	

Notes	Action
1 Tyler reviewed LOS at Industrial Boulevard done by Jacobs' traffic group based on new volumes provided by GDOT Office of Planning	
2 Two scenarios were analyzed (single left turn lanes on all approaches; dual lefts on EB and dedicated right turn lane on SB)	
3 Overall LOS was LOS E with single left turn lanes but was able to achieve overall LOS D with dual lefts on EB and dedicated right turn lane on SB	
4 Tyler was in agreement that LOS E was acceptable on some approaches since the overall intersection was LOS D; he was going to send to State Traffic Office (Zehngraff) to confirm they are in agreement with this scenario and LOS	Tyler will send the LOS data to State Traffic Office for concurrence on proposed intersection configuration and LOS
5 Unless Jacobs hears back differently from Zehngraff, the proposed geometry will be dual lefts on EB and dedicated right turn lane on SB	

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Purpose	SR 20/81 and McDonough Pkwy Traffic Control Discussion		
Project	SR 20/81	Project No.	0013531
Prepared by	Hatem Aly, P.E.	Phone No.	404-978-7511
Location	Conference Call	Date/Time	July 5, 2016; 2:00 PM
File	J:\EGXJ0900\500COMM\550MIN\2016-07-05 McDonough Pkwy Intersection Conf Call		

The purpose for this conference call was to discuss the traffic control at the intersection of SR 20/McDonough Pkwy and how the roundabout is justified over a signal.

In attendance:

- Cherral Dempsey, GDOT Project Manager.
- Tyler Peek, GDOT District 3
- Christina Berry, GDOT Traffic Ops
- Hatem Aly, Jacobs
- Geoff Warr, Jacobs
- Patrick Capasse, Jacobs

Schedule Review:

- Let Date: 02-12-2019
- Concept Report Submitted: 06-08-2016
- Concept Report Approval: Anticipated 08-12-16

Discussion:

- Jacobs gave a brief history of the intersection of SR 20 @ McDonough Pkwy. Initially, a signal was proposed at this location. Then based on a Henry County Traffic Study for the McDonough Pkwy project complete by Wilburn Engineering, GDOT recommended a roundabout. The draft concept report was submitted showing a multi-lane roundabout at SR 20 and McDonough Pkwy. GDOT DP&S provided a comment responding to the concept report asking "How is the roundabout design justified over the signal design?"
- Jacobs summarized the findings in the Technical Memorandum (dated 06-06-2016). The memorandum showed a signal to have better operations than a roundabout for the 2042 PM peak hour due to the high projected volumes on the eastbound approach.
- Tyler Peek said GDOT noted that as well, however, they also observed the delay for a signal was on the order of 50 (+/-) seconds as noted in the Technical Memorandum.
- Tyler Peek wanted to know that, if the delays (apart from LOS letter grades) were similar, what would be the trigger for recommending a traffic signal? Jacobs response was that the delays, while similar, showed a better operation for the traffic signal, and the v/c ratios for the eastbound approach to the intersection would be reaching its

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capacity as a roundabout in the 2042 evening peak period; whereas with a signal, the EB approach would be at approximately 80% of its capacity by 2042.

- Christina noted that the approach through movement volumes need to be redistributed in the analyses where a bypass was evaluated.
- Christina pointed out that a full roundabout feasibility study would include a SIDRA analysis (in addition to the GDOT tool), along with a fastest path evaluation and a peer review. Jacobs noted that a roundabout feasibility study is anticipated to be completed in Preliminary Design, and that the concept report could be revised if necessary, pending the outcome of the feasibility study.
- Tyler posited that if the projected 2042 traffic volumes were (for some reason) not realized, a traffic signal would not seem to have any advantages over the roundabout.
- Tyler and Christina noted the safety benefits of roundabouts over signalized intersections.
- In responding to the comment received from DP&S, Jacobs suggested adding a note to the concept report that the final traffic control would be determined pending the roundabout feasibility study in preliminary design. Jacobs also suggested revising the technical memorandum to include safety benefits of roundabouts compared to traffic signals and updating the bypass lane traffic distribution.

Consensus:

- Jacobs will revise the memorandum report to include the following items for submittal of the concept report:
 - the redistribution of through traffic for the bypass lane scenarios
 - a statement on the researched safety benefits of roundabouts as an alternative to traffic signals
 - a note that that a final recommendation of traffic control would be pending review of the forthcoming roundabout feasibility study
- Jacobs is tasked to later complete roundabout feasibility studies for the following intersections:
 - Regency Plaza
 - Preston Creek
 - McDonough Pkwy

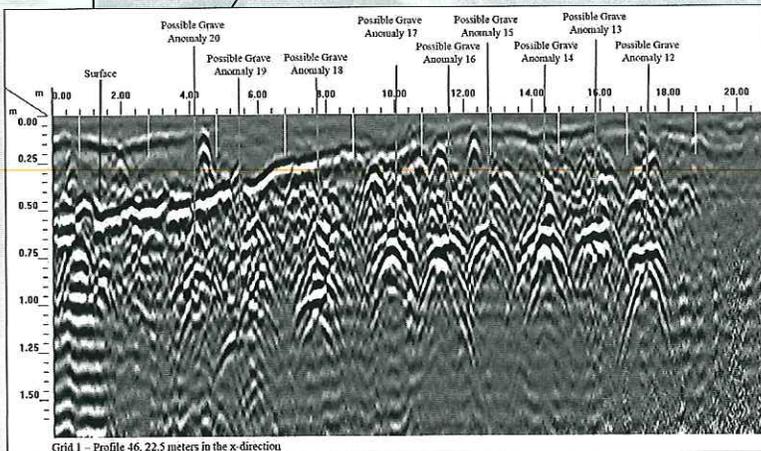
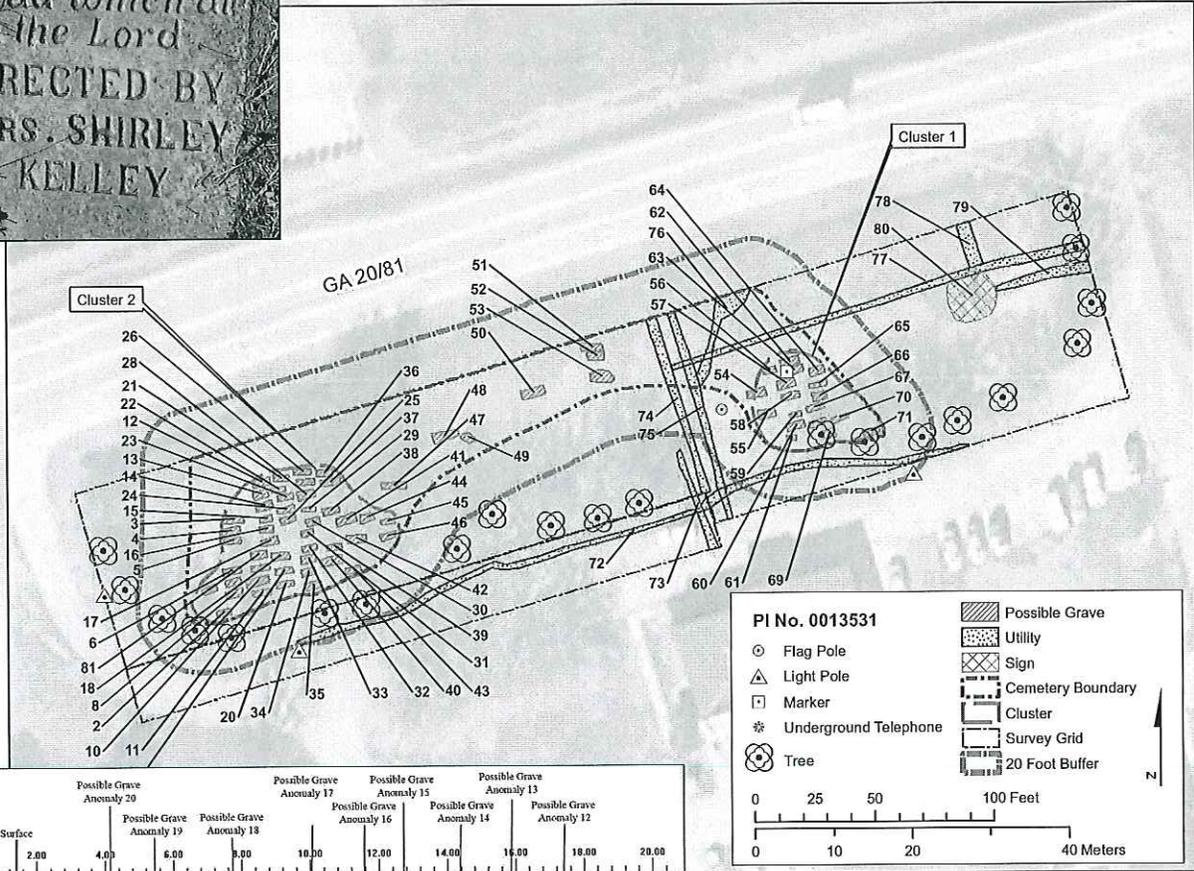
The conference call was then concluded.

Attachment #10
Cemetery Investigation

Ground Penetrating Radar Survey to Prospect for an Unmarked Cemetery Adjacent to State Road 20

Henry County, Georgia

PI No. 0013531



New South Associates, Inc.

Ground Penetrating Radar Survey to Prospect for an Unmarked Cemetery Adjacent to State Road 20

Henry County, Georgia

PI No. 001353

Report submitted to:

Jacobs • 10 Tenth Street, NW, Suite 1400 • Atlanta, Georgia 30309

Report prepared by:

New South Associates • 6150 East Ponce de Leon Avenue • Stone Mountain, Georgia 30083
and
New South Associates • 408B Blandwood Avenue • Greensboro, North Carolina 27401



Shawn M. Patch, MA, RPA – Principal Investigator

Sarah Lowry, MA, RPA – Geophysical Archaeologist and Co-Author
Terri Gillett – Historian and Co-Author

January 15, 2016 • Draft Report
New South Associates Technical Report 2549

ABSTRACT

New South Associates conducted ground-penetrating radar (GPR) survey south of State Road 20 (Hampton Street) on the front lawn of the Henry County Department of Transportation (DOT) building and south of SR 20 in an area thought to contain an unmarked cemetery. The GPR survey had three major goals: (1) to determine if there are possible graves in the survey area; (2) to estimate the number of possible graves; and (3) to draw a boundary around the possible unmarked graves. The survey was undertaken during the concept phase of planned work on SR 20. Two GPR grids were collected, covering approximately 0.94 acres. There were 72 possible graves identified in two distinct clusters with seven possible graves outside of the clusters.

Following the identification of 72 possible graves, New South contacted Mr. Gene Morris, retired County Historian for Henry County. Through a phone interview, Mr. Morris provided information about the well-known pauper cemetery located at the front of the property along SR 20. Prior to the construction of the county building (presently the county DOT building), the Henry County Water and Sanitation Authority conducted a study in which the site was scraped and a map of potential graves was produced that also has two clusters of graves. The GPR results provide additional confidence in the presence of graves in these locations.

Report Summary Table

EPM Date/Version	Chapter V.3, revised 2/13/12
USGS 7'5 Quads	McDonough, Georgia
Project Acreage or Length/Width of Corridor	0.94 acres
No. of Previously Recorded Sites (by type)	0
No. of New Sites	1
Isolates	0
No. of Eligible Sites	N/A
Date of Plans	N/A
Man-Hours	GPR Survey – 32 hours

The cemetery has been recorded as site 9HY533. In accordance with Georgia State Law, Title 36, Chapter 72, on abandoned cemeteries and burial grounds, the cemetery was not disturbed during this survey. New South Associates recommends that the 72 geophysical anomalies identified as probable graves should be treated as such for design and planning purposes and avoided. No field verification of graves or other anomalies is necessary at this time because the design has been shifted to avoid impacts. However, should the design be altered in the future to encroach on the cemetery boundary, a permit pursuant to OCGA 36-72 will be necessary. Finally, because burials could have been missed due to lack of preservation and ground conditions, caution should be taken if any ground is to be disturbed on the south side of SR 20 within the vicinity of the cemetery clusters and seven isolated anomalies.

ACKNOWLEDGEMENTS

New South Associates extends its gratitude to all who helped to make this project run smoothly. Thanks to Terry McMickle of the Henry County DOT for facilitating work onsite. Mike Carlock and Jim Pomfret of GDOT provided helpful information of project results. Thanks to Jonathan Cox of Jacobs for providing project management.

Attachment #11
Historic Resources
Survey Report

SURVEY REPORT

GDOT PROJECT STP00-1070-00(008), HENRY COUNTY

P.I. #0013531

The proposed project was field surveyed for historic properties in compliance with the Georgia Environmental Policy Act. The survey boundary and methodology were established using the *GDOT/FHWA Cultural Resources Survey Guidelines*. These guidelines were established as a result of past interaction with the State Historic Preservation Officer (SHPO) and his staff and were agreed upon by the GDOT and the SHPO.

The proposed project would consist of widening a 1.5-mile section of State Route (SR) 20 from approximately I-75 to Phillips Drive in McDonough, Georgia. It would widen the existing two-lane section to four lanes divided by a planted raised median with median breaks at designated locations. The project would include five-foot wide sidewalks on both sides of the road and 12-foot outside shoulders with 30-inch curb and gutter. Proposed right turn and left turn lanes would be approximately 12 feet wide. The four-lane section would end at Phillips Drive by creating a right-turn bay eastbound and adding a lane westbound. The existing traffic signals would be upgraded and traffic signal timing would be adjusted to improve corridor operations and safety (see attached location map). Existing right-of-way (ROW) is 80-140 feet. Proposed ROW would be 88-140 feet.

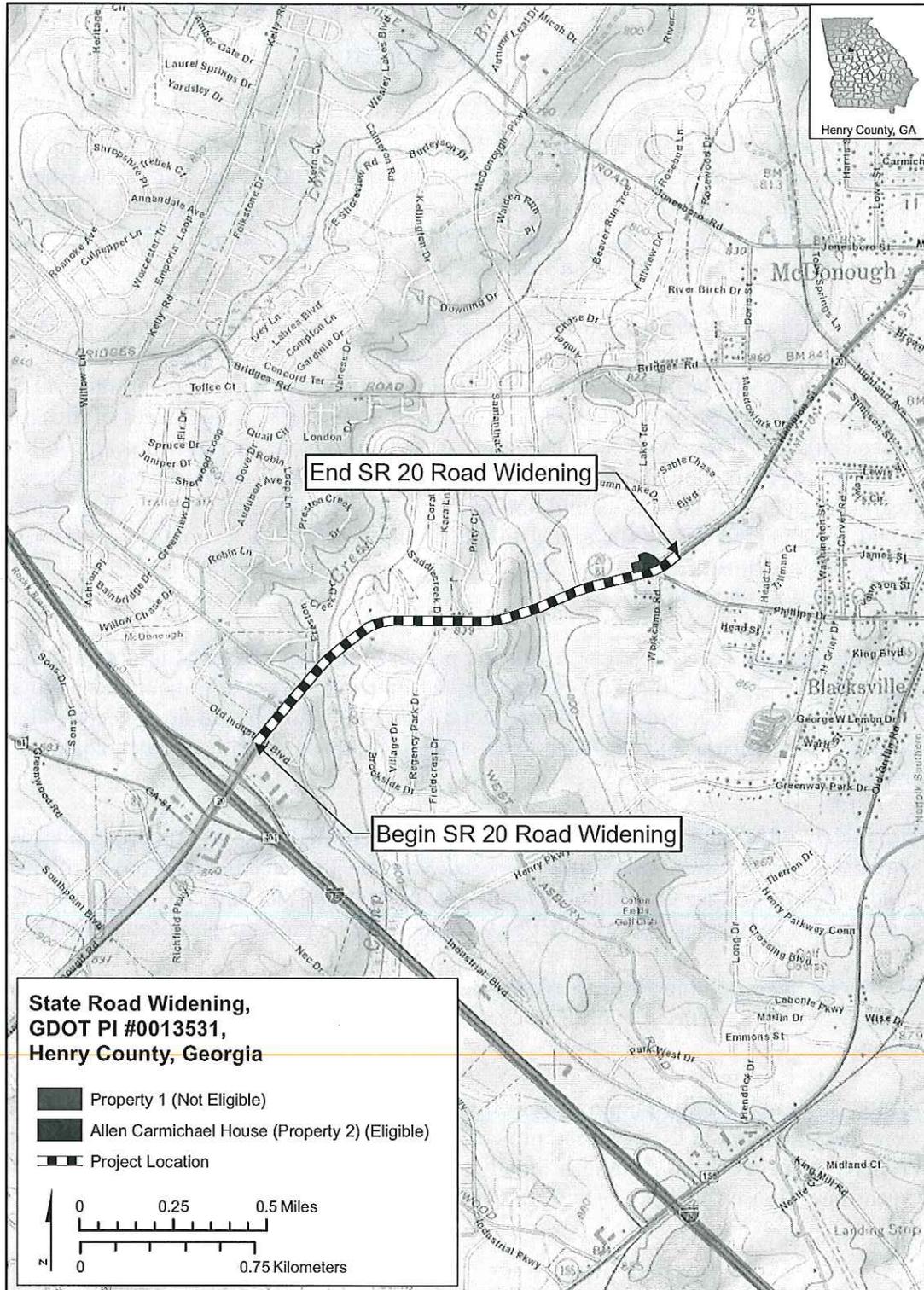
The area of potential effects (APE) for the proposed project would consist of a broad corridor approximately 140 feet from the project begin point at I-75 to the project end point at Phillips Drive (Figure 1). The potential for indirect effects will be evaluated as projected data becomes available and a clearer picture of possible changes in traffic patterns and development pressures emerge.

The review of existing information on previously identified historic properties revealed that no National Register listed properties, proposed National Register nominations, National Historic Landmarks, or bridges determined eligible for inclusion in the National Register in the updated Georgia Historic Bridge Survey (GHBS) were identified within the proposed project's APE.

In addition, no properties 50 years old or older were identified within the proposed project's APE in the 1998 DNR Henry County survey and the 2007 FindIt! Survey of unincorporated Henry County.

A total of two (2) additional properties 50 years of age or older not identified in the DNR survey were identified within the proposed project's APE during the field survey. These properties are: Property 1, a circa 1935 American Small House at 522 Hampton Street/SR 20/SR 81 and Allen Carmichael House (Property 2), a circa 1910 Georgian Cottage at 502 Hampton Street/SR 20/SR 81.

Figure 1.
Project Location Map



Sources: USGS Topographic Quadrangle Map, McDonough, GA (1981) and ESRI Resource Data

In addition to the Georgia SHPO, other interested parties were identified based on the nature of the undertaking and the guidance in the *GDOT Cultural Resources Survey Guidelines*. The other interested parties invited to comment on the undertaking in accordance with Section 12-16-4(b) of GEPA were the Atlanta Regional Commission, the Henry County Commission, Genealogical Society of Henry and Clayton Counties, and the Henry County Library System. The interested parties were informed of our efforts to identify historic properties by consulting existing information and the results of those efforts and asked to provide information on any unidentified National Register listed or eligible properties within the project's APE by a Notification dated _____ (see Notification in Appendix). A response was received from the *[name(s)]* to the Department's invitation to become an interested party in the GEPA process.

For each property 50 years old or older identified within the APE, a Property Information Form with attached photographs has been prepared. The Criteria of Eligibility was applied to each property and a recommendation regarding National Register eligibility has been made. For those properties recommended eligible for listing in the National Register, a site plan sketch and proposed boundary depiction have also been attached to the Property Information Form.

Of the three (3) properties 50 years old or older that were surveyed and to which the Criteria of Eligibility was applied, two (2) have been recommended eligible for inclusion on the National Register of Historic Places.

Attachment #12
Ecology Resources
Survey Report

Ecology Resource Survey Overview
P.I. No. 0013531, Henry County

Streams, Wetlands and Open Waters

Resource	Resource Type	Buffer	Protected Species Habitat
IS 1	Intermittent Stream	Yes	No
PS 2	Perennial Stream	Yes	Yes
WL 3	Wetland	No	No
NBSW 4	State Water	No	No
NBSW 5	State Water	No	No
WL 6	Wetland	No	No
PS 7	Perennial Stream	Yes	Yes
IS 8	Intermittent Stream	Yes	No
NBSW 9	State Water	No	No

Present Within the Survey Corridor

Invasive Species	Y
Bald Eagle Nest, Habitat	N
Critical Habitat	N
Essential Fish Habitat	N
Bat Roosting Habitat	Y
Migratory Bird Habitat	Y

Federally and State Protected Species

Species Name	Common Name	Federal Rank	State Rank	Habitat Present	Survey Season	Expected Survey Date
<i>Amphianthus pusillus</i>	little amphianthus	T	T	No	March - May	Not Required
<i>Cyprinella xaenura</i>	Altamaha shiner	NA	T	Yes	April - November	June 2016
<i>Elliptoideus sloatianus</i>	purple bankclimber	T	T	No	April - November	Not Required
<i>Isoetes melanospora</i>	black spored quillwort	E	E	No	November - April; Following rainy periods June - August	Not Required
<i>Lampsilis subangulata</i>	shinyrayed pocketbook	E	E	No	April - November	Not Required
<i>Medionidus penicillatus</i>	Gulf moccasinshell	E	E	No	April - November	Not Required
<i>Pleurobema pyriforme</i>	oval pigtoe	E	E	No	April - November	Not Required
<i>Rhus michauxii</i>	dwarf sumac	E	E	Yes	June - October	June 2016
<i>Trillium reliquum</i>	relict trillium	E	E	Yes	March - April	April 2016

Protection status is as follows: E-Endangered, T-Threatened, NA-Not Applicable

Executive Summary

The Georgia Department of Transportation Project P.I. No. 0013531 proposes to widen the existing State Route 20/Hampton Road from two lanes to four lanes in Henry County, Georgia. The proposed project is located in the City of McDonough and would be approximately 1.5 miles in length. A field study to identify and document ecological resources along the proposed project corridor was conducted on January 6, 2016.

The January 2016 field study identified seven habitat types: ruderal/commercial, planted ornamental trees, mixed hardwood, mixed pine hardwood, planted pine, young natural pine and Waters of the United States (US). Land use practices within the project survey area consist primarily of commercial development and road right-of-way. These areas were segmented by small tracts of undeveloped land. A total of four invasive species were identified along these habitats: English ivy (*Hedera helix*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and kudzu (*Pueraria montana*).

As a result of early coordination and the utilization of species data sets provided by the Georgia Department of Natural Resources (GDNR) and the US Fish and Wildlife Service, a list of federally and state protected species of potential occurrence along the project corridor was prepared prior to the January 2016 field investigation. Eight federally protected species were identified for Henry County: little amphianthus (*Amphianthus pusillus*), purple bankclimber (*Elliptoideus sloatianus*), black spored quillwort (*Isoetes melanospora*), shinyrayed pocketbook (*Lampsilis subangulata*), Gulf moccasinshell (*Medionidus penicillatus*), oval pigtoe (*Pleurobema pyriforme*), dwarf sumac (*Rhus michauxii*), and relict trillium (*Trillium reliquum*). One state protected species was identified by the GDNR as occurring within a three mile radius of the proposed project: the Altamaha shiner (*Cyprinella xaenura*). Suitable habitat was identified for dwarf sumac, relict trillium, and the Altamaha shiner. No additional suitable habitat was identified for species afforded protection by the Endangered Species Act.

Neither critical habitat nor essential fish habitat is located within the project area or Henry County. Inspections of structures along the project alignment identified suitable migratory bird habitat and bat roosting habitat. Migratory birds and bat specimens were not identified during the January 2016 field survey.

The January 2016 field study identified six jurisdictional Waters of the US: two perennial streams, two intermittent streams, and two wetlands. Of these systems, four would require a state mandated 25-foot protective buffer. In addition to the jurisdictional waters, three additional non-buffered state waters were identified along the project corridor: two non-jurisdictional channels and one non-jurisdictional detention pond. Consideration of fish passage would be required if the proposed project would require the replacement of any existing culverts located within perennial streams.

No waters within the project area or within one linear mile of the project survey area are classified as biota impaired streams. The nearest 303(d) impaired stream segment, as documented by the Draft 2014 Georgia Environmental Protection Division 305(b)/303(d) List, is located approximately 3.4 miles northeast of the proposed project at Walnut Creek.

Attachment #13

Indication of

Roundabout Support

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF ROUNDABOUT SUPPORT

Georgia Department of Transportation
Office of Traffic Operations
935 E. Confederate Ave, Building 24
Atlanta, Georgia 30316
ATTN: Christina Barry, Traffic Design Supervisor

Location

City of McDonough supports the consideration of a roundabout at the location specified below.

Description: McDonough Pkwy @ SR 20

State/County Route Numbers: (SR 20)

Project: Henry County P.I. No. 0013531

Associated Conditions

The undersigned agrees to participate in the following maintenance of the intersection in the event that the roundabout is selected as the preferred concept alternative:

- The full and entire cost to energize the lighting system installed and to provide for the operation/maintenance thereof.

We agree to participate in a formal *Local Government Lighting Project Agreement* during the preliminary design phase. This indication of support is submitted and all the conditions are hereby agreed to. The undersigned are duly authorized to execute this agreement.

Attest:



County Clerk
City

This 3rd day of June, 20 16

By: 

Title: Mayor, City of McDonough