

The GDOT Intersection Control Evaluation (ICE) v2.15 Tool is an open-source Excel workbook that includes eight worksheets, each containing information and data inputs to complete an ICE analysis. Note that the ICE tool computations require input on multiple worksheets that continually update analysis results; therefore, no results should be considered final until all worksheets are fully complete.

The Frequently Asked Questions (**FAQ**) **worksheet** provides information on ICE updates and answers to common questions analysts have. The **Intersections worksheet** provides illustrations and descriptions for each intersection type, as well as links to national publications that describe each intersection type in greater detail.

GDOT ICE Tool: Introduction Worksheet

Both full ICE studies and Waiver requests begin by filling out the information on the **Introduction worksheet**. **Figure 1** illustrates the blank worksheet requesting project info and traffic data. The project data info, illustrated for the example project in **Figure 2**, requires the following:

- Project number and responsible person/agency
- Drop down box of the County where the project is located (GDOT District Office auto-populates)
- Major/Minor Road names & speed limits (drop down)
- Major Street direction and area type (rural, suburban/transition, or urban) -- both drop down menus
- Existing intersection control
- Name of preparing firm and analyst
- Date, internal project ID, and brief project description

Figure 3 illustrates the project example traffic data entry. The first entries (upper left) are existing and project Opening and Design years, reflecting the year improvements are expected to be complete (open to traffic) and expected design life of the improvements (typically Opening Year + 20 years).

Next, input existing AM and PM peak hour volumes for each movement, truck percentages and peak hour pedestrian crossings for each approach (if available) using the tables to the right (outside the worksheet print border). This data is automatically copied into the data entry graphic. Other inputs include the annual growth rate (historical or model based) and the daily K-factor (upper right).

Based on these inputs, the worksheet will auto-calculate daily intersection entry volumes, approach volumes and Average Daily Traffic (ADT) volumes for existing, opening-year and design-year scenarios. If Opening and Design year traffic volumes and/or ADT volumes are known from other sources, the calculated volumes can be overwritten using the tables to the right (outside worksheet print border).

Figure 1: Blank Introduction Worksheet Data Input

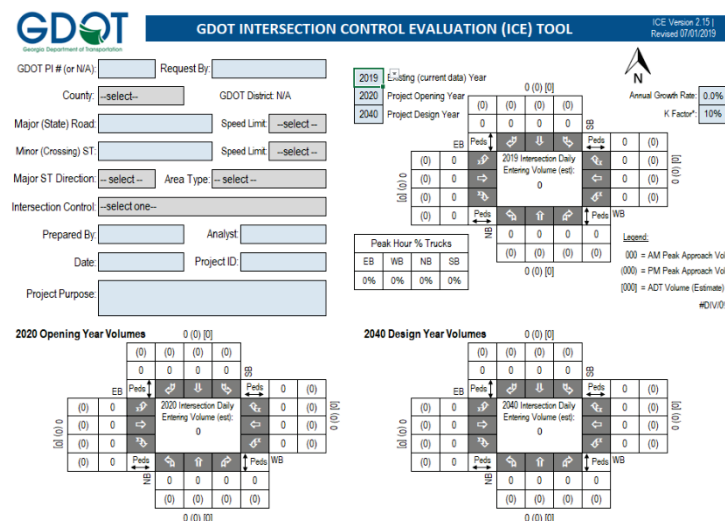


Figure 2: Project Information (Example Case)

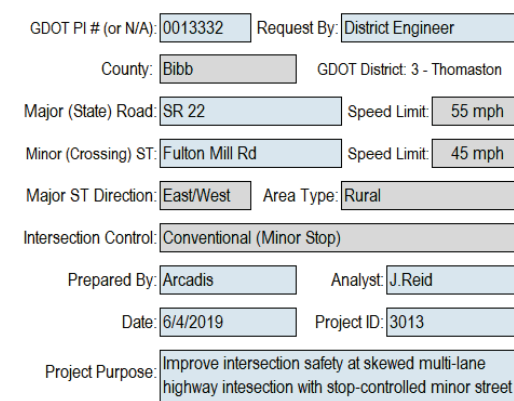
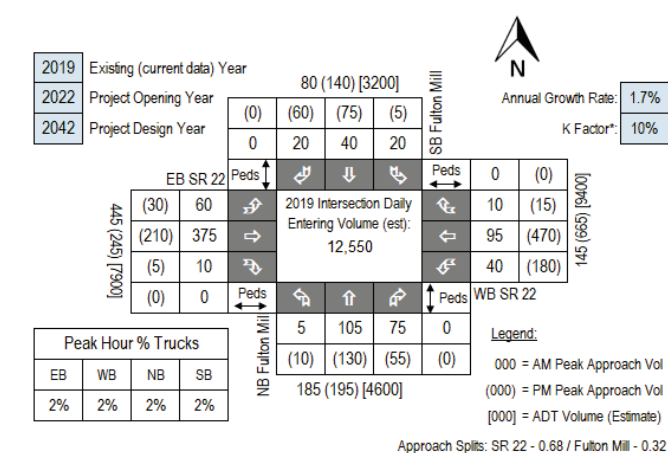


Figure 3: Traffic Data Entry



	EB SR 22			WB SR 22			NB Fulton Mill Rd			SB Fulton Mill Rd		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Existing Yr Volume Inputs	60	375	10	40	95	10	5	105	75	20	40	20
AM Peak Hour:	(30)	(210)	(5)	(180)	(470)	(15)	(10)	(130)	(55)	(5)	(75)	(60)
PM Peak Hour:												
Peak Hour Truck %	2.0%			2.0%			2.0%			2.0%		
AM (PM) Ped X-ings:	0	(0)		0	(0)		0	(0)		0	(0)	

* K Factor = proportion of average annual daily traffic occurring in the highest hour of the day

GDOT ICE Tool: Stage 1 Worksheet

Stage 1 serves as a screening effort meant to eliminate non-competitive options and to identify which alternatives merit further considerations in Stage 2 based on their practical feasibility. **Figure 4** illustrates the blank **Stage 1 worksheet** where intersection screening evaluations and justifications are made.

The top left portion of the worksheet includes project information data carried forward from the Introduction worksheet. It also notes that the alternative analysis requires consideration of at least two alternatives and a maximum of five alternative to be carried into the Stage 2 evaluation.

There are drop down boxes on the left side that allow the selection of alternatives consisting of one or more right and/or left turn lanes, and it is also possible to "write in" an intersection improvement type not contained in the defined list of alternatives. Write-in alternatives require additional work to calculate crash-modification factors and cost estimates described in later worksheets.

Analysts should use good engineering judgement in responding to the following six evaluation questions (listed in **Figure 5**) by selecting "Yes" or "No" in the drop-down boxes:

1. Does alternative address the project need in a balanced manner and in scale with the project?
2. Does alternative improve safety performance in terms of reducing severe crashes?
3. Does alternative incorporate safety, convenience and accessibility for pedestrians and /or bicyclists?
4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?
5. Does alternative appear feasible given the site characteristics, constraints and location context?
6. Does alternative appear feasible with respect to other project factors?

The response to question 7, by a Yes or No response, is the determinant question for which alternatives are to be carried forward for Stage 2 analysis. Selected alternatives are highlighted in blue and the minimum 2 to maximum 5 selected alternatives are automatically carried forward into the Stage 2 worksheet. **Figure 6** illustrates the responses and justifications for a project case study.

Alternatives should not be summarily rejected without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column. As illustrated for the example case in Figure 6, there is not a pre-determined number of positive responses to questions 1 to 6 that automatically determines a "Yes" response to question 7. Questions 1 through 6 are only a guide to best determine alternative feasibility for any number of justifiable reasons.

Figure 4: Blank Stage 1 Worksheet

Figure 5: Evaluation Questions

Figure 6: Example Stage 1 Selections (from Case Study)

GDOT ICE Tool: Stage 2 Worksheet

Figure 7 illustrates the top of the **Stage 2 worksheet** contains pre-populated project info data and drop-downs for entries of both the existing traffic control and study type (safety funded project or conventional, non-safety funded project). Below are drop downs to indicate if the current intersection volumes meet signal warrants and whether operational analysis will be performed using traditional delay and volume-to-capacity (v/c) measures produced in most standard static traffic analysis models or using network delay information produced in most microscopic (simulation) traffic analysis models. Both approaches require analysis using traffic analysis tools outside of the Stage 2 worksheet.

Next, input the AM and PM peak hour delay and V/C operational results for both Opening and Design Year no-build conditions (including growth in traffic without intersection improvements). To the right, check boxes if any complete street warrants are met. Furthest right, enter the number of intersection crashes (by type) occurring at the intersection using the most recent five years of available crash data.

Figure 8 illustrates the input of cost data for each of the selected alternatives (alternative names auto-populated along the top row). If cost estimates are independently generated for one or all of the selected alternatives, construction, ROW, environmental mitigation, utility and design/contingency costs can be directly entered using the table to right. If/when these costs are not readily available, analysts can use the **CostEst worksheet** to determine planning level costs (described later in greater detail).

Figure 9 illustrates data inputs for operational analysis of the Build Conditions for each of the alternatives (including growth in the traffic volume with the intersection improvements). The AM and PM peak hour operational results are generated using traffic analysis tools outside the Stage 2 worksheet.

Alternative safety analysis results are generated from Crash Modification Factors (CMF's) found in FHWA's CMF clearinghouse (<http://www.cmfclearinghouse.org>). Most safety CMFs from known to-and-from intersection types (i.e improvement from 2-way stop-controlled intersection to a single lane roundabout) are auto-populated from the clearinghouse data (sources are listed); however, when no clearinghouse data exist, or the analyst feels different clearinghouse data is more appropriate, analysts can use the fields below each alternative type to input CMFs for PDO and injury/fatal crash types and the source of the data.

Figure 10 illustrates inputs of potential environmental impacts for each alternative (none, minimal & significant). If there are potential impacts, the Environmental score is decreased AND a mitigation cost is added (depending on the impact type and potential severity). Stakeholder support of alternatives (both local community and GDOT support)

Figure 7: Project Type, Crash Data and No-Build Operations

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD		ICE Version 2.15 Revised 07/01/2019																																				
GDOT PI # (or N/A) 0013332 County Bibb Project Location SR 22 @ Fulton Mill Existing Intersection Control Conventional (Minor Stop)		GDOT District 3 - Thomson Area Type Rural Date 6/4/2019 Agency/Firm Arcadis Analyst J. Reid																																				
Opening / Design Year Traffic Operations Intersection meets signal/AWS warrants? <input type="checkbox"/> None Traffic Analysis Measure of Effectiveness <input type="checkbox"/> Intersection Delay Traffic Analysis Software Used <input type="checkbox"/> Synchro 9 Analysis Time Period <input type="checkbox"/> AM Peak Hr <input type="checkbox"/> PM Peak Hr 2042 Opening Yr No-Build Peak Hr Intersection Delay 20.6 sec 27.8 sec 2042 Opening Yr No-Build Peak Hr Intersection V/C 0.52 0.67 2042 Design Yr No-Build Peak Hr Intersection Delay 74.5 sec 80.5 sec 2042 Design Yr No-Build Peak Hr Intersection V/C 1.04 1.15		Type of Analysis <input type="checkbox"/> Conventional Non-Safety Funded Project Crash Data Enter most recent 5 years of crash data <table border="1"> <thead> <tr> <th rowspan="2">Crash Data</th> <th colspan="3">Crash Severity</th> </tr> <tr> <th>PDO</th> <th>Injury Crash*</th> <th>Fatal Crash*</th> </tr> </thead> <tbody> <tr> <td>Angle</td> <td>7</td> <td>8</td> <td>1</td> </tr> <tr> <td>Head-On</td> <td>1</td> <td>0</td> <td>2</td> </tr> <tr> <td>Rear End</td> <td>25</td> <td>5</td> <td>0</td> </tr> <tr> <td>Sideswipe - same</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Sideswipe - opposite</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>Not Collision w/Motor Veh</td> <td>3</td> <td>3</td> <td>0</td> </tr> <tr> <td>TOTALS</td> <td>37</td> <td>16</td> <td>3</td> </tr> </tbody> </table> <small>* Number of crashes resulting in injuries / fatalities, not number of persons</small>		Crash Data	Crash Severity			PDO	Injury Crash*	Fatal Crash*	Angle	7	8	1	Head-On	1	0	2	Rear End	25	5	0	Sideswipe - same	0	0	0	Sideswipe - opposite	1	0	0	Not Collision w/Motor Veh	3	3	0	TOTALS	37	16	3
Crash Data	Crash Severity																																					
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Sideswipe - opposite	1	0	0																																			
Not Collision w/Motor Veh	3	3	0																																			
TOTALS	37	16	3																																			

Figure 8: Alternative Cost Data

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Single Lane Roundabout	Multilane Roundabout	RCUT (stop control)	Add Left Turn Lanes	Traffic Signal
Project Cost: (From CostEst Worksheet)	Additional description here	Additional description here	Additional description here	Additional description here	Add three L.T. bars
Construction Cost	\$1,109,000	\$1,997,000	\$479,000	\$510,000	\$287,000
ROW Cost	\$76,000	\$149,000	\$12,000	\$0	\$0
Environmental Cost	\$0	\$67,000	\$10,000	\$10,000	\$0
Reimbursable Utility Cost	\$13,000	\$58,000	\$6,000	\$7,000	\$5,000
Design & Contingency Cost	\$313,000	\$582,000	\$122,000	\$130,000	\$100,000
Cost Adjustment (justification req'd)	0%	0%	0%	0%	0%
Total Cost	\$1,511,000	\$2,853,000	\$629,000	\$657,000	\$392,000

Cost Override Data (if generated independent of CostEst Tool)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Construction Cost	\$0	\$0	\$0	\$0	\$0
ROW Cost	\$0	\$0	\$0	\$0	\$0
Environmental Cost	\$0	\$0	\$0	\$0	\$0
Reimbursable Utility Cost	\$0	\$0	\$0	\$0	\$0
Design & Contingency Cost	\$0	\$0	\$0	\$0	\$0

Figure 9: Alternative Traffic Operations and Safety

Traffic Operations:	GDOT RND Tool 4.1	GDOT RND Tool 4.1	Synchro 9	Synchro 9	Synchro 9
Traffic Analysis Software Used	GDOT RND Tool 4.1	GDOT RND Tool 4.1	Synchro 9	Synchro 9	Synchro 9
Analysis Period	AM Peak Hr PM Peak Hr	AM Peak Hr PM Peak Hr	AM Peak Hr PM Peak Hr	AM Peak Hr PM Peak Hr	AM Peak Hr PM Peak Hr
2042 Design Yr Build Intersection Delay	16.5 sec 21.0 sec	10.8 sec 11.7 sec	32.0 sec 40.8 sec	74.0 sec 78.2 sec	27.9 sec 32.0 sec
2042 Design Yr Build Intersection V/C	0.59 0.65	0.51 0.58	0.65 0.74	1.03 1.13	0.67 0.75
Safety Analysis:					
Predefined CRF: PDO	71%	32%	31%	19%	44%
Predefined CRF: Fatal/Inj	87%	71%	53%	17%	40%
Predefined CRF Source:	FHWA Clearinghouse #s 229 / 230	FHWA Clearinghouse #s 236 / 237	NCHRP Table 4.7	FHWA Clearinghouse #s 270 / 274	FHWA Clearinghouse #s 7862 / 7864
User Defined CRF: PDO					
User Defined CRF: Fatal/Inj					
User Defined CRF Source (write in if applicable):					

Figure 10: Environmental/Stakeholder Data and Final Results

Environmental Impacts:					
Historic District/Property	None	None	None	None	None
Archaeology Resources	None	None	None	None	None
Gravelyard	None	None	None	None	None
Stream	None	Minimal	None	None	None
Underground Tank/Hazmat	None	None	None	None	None
Park Land	None	None	None	None	None
EJ Community	None	None	None	None	None
Wooded Area	None	None	Minimal	Minimal	None
Wetland	None	None	None	None	None
<small>Note: If environmental impact is significant (RED), provide justification impact won't jeopardize project delivery using "Em" worksheet * Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept</small>					
Stakeholder Posture:					
Local Community Support	Neutral	Negative	Neutral	Supportive	Supportive
GDOT Support	Supportive	Neutral	Supportive	Neutral	Neutral
Final ICE Stage 2 Score:	7.2	5.4	5.9	3.2	-
Rank of Control Type Alternatives	1	3	2	4	-
<small>Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met Provide additional comments and/or explain any unique analysis inputs, or results (as necessary):</small>					

should be determined and entered using drop-downs (strong, positive, neutral, negative, opposition or unknown).

The final ICE Stage 2 scores and rankings are provided at the bottom of the worksheet. Make sure all worksheet data has been completed, including the cost estimate (CostEst) worksheet, before relying on any results. Use the data field at the bottom to provide comments or explain unique data input or results.

GDOT ICE Tool: Cost Estimating Tool

The Cost Estimating (**CostEst**) **worksheet** can be used to generate planning-level cost estimates when no independent cost estimates are available. The process begins by selecting “yes” in the drop down “Cost Estimate Tool Used?” on the right side of the worksheet. This will insert the tool-generated cost estimates into the Stage 2 worksheet. **Figure 11** illustrates a blank template for the required inputs to identify existing intersection footprint, including number of lanes, turn bays and length, median width, and ROW.


Figure 12 illustrates the table used to identify specific elements for each alternative. Most of the input data can be determined from a mapping program image or GIS data and by using engineering judgement. The last row is used to identify any cost (in dollars) for ROW and structural impacts above and beyond the general ROW impacts of each alternative, which is automatically calculated by existing ROW inputs and expected alternative footprint.

Figure 13 illustrates the inputs of site context and cost multipliers for the example intersection. Begin with topography, maintenance of traffic and project size (all drop-box choices). These responses change overall factors in the cost estimates in the table below. Analysts enter preliminary engineering and contingency costs as a percentage. Intersection control choices include type of signal poles and design vehicle and the analyst can input anticipated diameters for each roundabout type (or leave the default parameters). The ROW cost is auto-populated based on county-generated cost data and drop-down lane use type.

Figure 14 illustrates the table (located at the bottom of the CostEst worksheet) where assumptions for each alternative are entered to refine costs. The grey drop-down and blue data fields will only appear for the selected alternative. Analysts can make choices in the drop-down boxes and override fields if the default values for ROW, sqft of pavement and/or project limits (calculated based on a generic alternative concept) are significantly different from analyst calculated values (calculated or estimated based on a more refined concept).

The table illustrated in **Figure 15** will appear on the one-page printout of the CostEst worksheet. The quantities and costs cannot be changed; analysts can only review individual cost components of the cost estimates carried into the Stage 2 worksheet. If the worksheet-generated cost estimates do not seem reasonable, costs can be modified in Stage 2 by either a) overriding costs data as described earlier or b) applying a percent multiplier to the overall costs. If a cost adjustment is made, a note will appear indicating the variance, and a reason for the variance should be included at the bottom of the Stage 2 worksheet. The cost estimate worksheet is intended to generate a planning-level cost for comparative purposes and the ranking of selected ICE alternatives; a more detailed cost estimate should be prepared for the preferred alternative in the later project concept phase.

Figure 11: Existing Intersection Geometrics



GDOT
Georgia Department of Transportation

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.15 | Revised 07/01/2019

Project Information

Location: @

County: --select--

Date: 1/01/1900

GDOT PI # (or N/A): 000000

Area Type: -- select --

Agency/Firm: 0

Existing Intersection Control: --select one--

GDOT District: N/A

Analyst: 0

Type of Analysis: Conventional Non-Safety Funded Project

Major Street Direction: -- select --

Table 1: Existing Conditions

Movement	EB			WB			NB			SB		
	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width*	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'
Bay Length*	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'
Median Width	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'
Right-of-Way	0'						0'					

Figure 12: Alternative Proposed Conditions

Table 2: Proposed Conditions	Single Lane Roundabout		Multilane Roundabout		RCUT (stop control)		Add Left Turn Lanes		Traffic Signal
	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	F.D. Asphalt	None	
Proposed Pavement Type	Minimal	Moderate	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	
Reimbursable Utility	2	2	0	0	0	0	0	0	
# of Driveway(s) Impacted	0	0	0	0	1	1	1	1	
Modify/Replace Traffic Signal	4	4	4	2	2	2	2	2	
Lighting Poles (ea)	0	0	0	1	0	0	0	0	
Flashing Beacons (ea)	0	0	0	0	0	0	0	0	
RFB/PHB Ped Crossings (ea)	0	0	0	0	0	0	0	0	
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'	0'	0'	0'	
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'	0'	0'	0'	
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'	0'	0'	0'	
New Retaining Wall (LF)	0'	0'	0'	0'	0'	0'	0'	0'	
Bridge New/Widen/Replace (sqft)	0	0	0	0	0	0	0	0	
Add ROW/Easements/Demolition	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Figure 13: Intersection Typology, ROW & Cost Multipliers

Site Context		Intersections	
Topography	Rolling	Signal Poles	Master Arm
Traffic Mgmt Plan	Maintain Traffic	Design Vehicle	WB-67
Project Size	Single Intersection	Existing Interchange?	No
Cost Multipliers		Roundabouts	
Grading Complete	20%	Inscribed DIA - Mini	80
Reimbursable Utility	2%	Inscribed DIA - Single	140
Traffic Control	20%	Inscribed DIA - Multi	200
Project Size	0%	Circulating Lane Width	18
Prelim Engineering	15%	ROW Costs	
Project Contingency	20%	Prevalent ROW Type	Mixed (Average)
		ROW Cost/Acre	\$74,813
		ROW Multiplier	1.4

Figure 14: Alternative Adjustment Factors

Table 4: Assumption Adjustments		Right of Way (ac)		Pavement (sqft)		Major ST Control		Minor ST Control		Assumption Notes
	Adjustable Assumptions	Calculated	User Override*	Calculated	User Override*	Major ST Control	User Override*	Minor ST Control	User Override*	
Conventional (Minor St)	N/A	0.00	0.0	0	0	140	0	70	0	No design costs, completed in-house with maintenance or quick-response funds.
Conventional (Major St)	--select one--	0.00	0.0	0	0	140	0	70	0	No design costs, completed in-house with maintenance or quick-response funds.
Mini Roundabout	--select one--	0.00	13,000	0	0	200	0	200	0	Pavement and landscaping elements calculated based on diameter and circulating road width inputs.
Single Lane Roundabout	High Speed Roundabout	0.73	0.0	34,524	0	500	0	500	0	Pavement and landscaping elements calculated based on diameter and circulating road width inputs.
Multilane Roundabout	High Speed Roundabout	1.43	0.0	70,550	0	900	0	900	0	Pavement and landscaping elements calculated based on diameter and circulating road width inputs.
RCUT (stop control)	Loops/Lanes Only	0.11	0.0	17,942	0	1,380	0	520	0	Assumes 12 lanes (6 L lanes based on median width/through vehicle, 600 spacing from near side lane).
RCUT (stop control)	--select one--	0.11	0.0	18,942	0	1,380	0	520	0	Assumes 12 lanes (6 L lanes based on median width/through vehicle, 600 spacing from near side lane).
High T (unpaved)	--select one--	0.25	0.0	16,000	0	300	0	370	0	Assumes additional one and median for 800 across intersection (no other new pavement assumed).
Other T Intersections	--select one--	0.00	6,000	0	600	0	300	520	0	Assumes additional back-back L.T. lane (no other new pavement assumed).
Channel Street (Stop Control)	--select one--	0.66	0.0	107,800	0	2,000	0	1,200	0	Assumes dual left turn lanes on crossing street (2 lanes).
Channel Street (Stop Control)	--select one--	0.66	0.0	107,800	0	2,000	0	1,200	0	Assumes single-lane roundabout with no left turn lanes on crossing street.
Add Left Turn Lanes	N/A	0.00	0.0	6,000	0	1,000	0	0	0	Add L.T. Lanes on SF 22, No RT Lane Improvements, No Median Improvements.
Other unassigned provide design	N/A	0.00	0.0	0	0	0	0	0	0	
Traffic Signal	Pave/Overlay Intersection	0.00	0.0	12,000	0	1,000	0	500	0	Add three L.T. lanes, Assumes no new ROW required, single L.T. lanes only.

Figure 15: Alternative Cost Summary

Table 3: Control Type Cost Breakdown												
Pay Item	Per Ln MI Unit Cost	Unit Cost	Single Lane Roundabout		Multilane Roundabout		RCUT (stop control)		Add Left Turn Lanes		Traffic Signal	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
New Construction (Base & Pave)	\$500/KLM	\$9,470/ft	34,624	\$442,639	70,344	\$889,286	17,042	\$161,385	9,000	\$85,227	0	\$0
Roadway Mill and Overlay	\$54/KLM	\$1,219/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Urban C&G/Drainage - both sides	\$10/0.00LF	\$10,000/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Rural Typ Drainage - both sides	\$150/KLM	\$2,841/ft	2767	\$10,811	3,431	\$13,157	3,820	\$10,852	2,200	\$5,682	3,000	\$8,623
Concrete Island (sqyds)	n/a	\$51,589/ft	480	\$33,424	600	\$41,780	500	\$25,790	0	\$0	0	\$0
Median Landscaping	\$100/KLM	\$1,891/ft	3000	\$7,670	3,600	\$9,205	5,730	\$10,852	0	\$0	0	\$0
Typical Driveways Impacted (ea)	n/a	\$7,500 ea	2	\$20,250	2	\$20,250	0	\$0	0	\$0	0	\$0
Typical E&S Control Temp/Perm	\$150/KLM	\$34,091/ft	1000	\$48,023	1,200	\$55,227	1,910	\$65,114	1,000	\$34,091	1,500	\$51,136
Roundabout Truck Apron (sqft)	n/a	\$10,250/ft	2953	\$40,866	4,273	\$55,126	0	\$0	0	\$0	0	\$0
Signage & Marking	\$0	\$22,731/ft	1,000	\$30,886	1,200	\$38,823	1,910	\$43,414	1,000	\$22,730	1,500	\$34,095
Fishing Beacon (ea)	n/a	\$20,000 ea	0	\$0	0	\$0	0	\$0	1	\$20,000	0	\$0
New Traffic Signal (Master Arms)	\$74,1000	\$182,575ea	0	\$0	0	\$0	0	\$0	1	\$182,575	1	\$182,575
Lighting (per pole)	n/a	\$5,607 ea	4	\$30,278	4	\$30,278	4	\$22,428	2	\$11,214	2	\$11,214
Signalized Ped Crossings (ea)	n/a	\$19,637 ea	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
5' Sidewalk (LF)	n/a	\$49,231/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
New/Replace cross drains (LF)	n/a	\$41,311/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Typical Guardrail (LF)	n/a	\$65,561/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Retaining Wall (LF)	n/a	\$808,521/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Bridge widening/replace (SF)	n/a	\$210/ft	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Env. Costs (from Stage 2 impacts)	n/a	n/a	0	\$0	0	\$87,500	0	\$10,000	0	\$10,000	0	\$0
Grading Complete - 20%	n/a	n/a		\$269,291		\$495,215		\$99,967		\$74,304		\$0
Traffic Control - 20%	n/a	n/a		\$178,861		\$332,810		\$69,967		\$74,304		\$0
Reimbursable Utility	n/a	n/a		\$13,249		\$55,257		\$6,797		\$7,220		\$5,751
Preliminary Engineering - 15%	n/a	n/a		\$134,145		\$269,608		\$52,475		\$55,728		\$43,131
Contingency - 20%	n/a	n/a		\$178,861		\$332,810		\$69,967		\$74,304		\$57,500
ROW Cost/Acre: Mixed / Average	n/a	\$74,813/ac		\$54,334		\$106,929		\$6,587		\$0		\$0
Add ROW / Displacement / Demo	n/a	n/a		\$0		\$0		\$0		\$0		\$0
ROW Multiplier - 1.4	n/a	n/a		\$21,733		\$42,772		\$3,435		\$0		\$0
Project Scale Reduction - 0.0%	n/a	n/a		\$0		\$0		\$0		\$0		\$0
Grand Total Costs				\$1,512,000		\$2,655,000		\$611,000		\$617,000		\$394,000

Table 4: Assumption Adjustments/Quantity Overrides										
Alternative Evaluated	Assumptions	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const.Limits	User Override*	Minor ST Const.Limits	User Override*
Single Lane Roundabout	High Speed Roundabout	F.D. Asphalt	0.73	0.0	34,624	0.0	500	0.0	500	0.0
Multilane Roundabout	High Speed Roundabout	F.D. Asphalt	1.43	0.0	70,344	0.0	900	0.0	900	0.0
RCUT (stop control)	Loops/Lanes Only	F.D. Asphalt	0.11	0.0	17,042	0.0	1,380	0.0	520	0.0
Add Left Turn Lanes	N/A	F.D. Asphalt	0.00	0.0	9,000	0.0	1,000	0.0	0	0.0
Traffic Signal	Pave/Overlay Intersection	None	0.0	0.0	12,000	0.0	1,000	0.0	500	0.0

GDOT ICE Tool: Environmental Worksheet

The last two worksheets are optional. **Figure 16** illustrates the Environmental (**ENV**) worksheet, which is used to document any potentially significant environmental impacts in any given alternative (indicated in red as “significant” in the drop-down box in Stage 2). The goal here is to document that reasonable mitigation (or avoidance) can be achieved (that would otherwise disqualify this alternative) before that alternative is selected a preferred solution.

GDOT ICE Tool: Waiver Worksheet

Figure 17 illustrates the **Waiver worksheet**, to be used when the analyst feels that a full ICE study is not warranted. Circumstance for a waiver are outlined in the top portion of the worksheet (and presented in the full ICE policy document). The top portion of the Waiver worksheet requires a Waiver Request Type (selected from a drop-down list), which identifies the level of waiver request and signature authority. In the remainder of the form, requests for crash data, ADT and operations data for Existing and Design Year No-Build conditions are made, determined the same way as data for the Introduction and Stage 2 tabs.

The Waiver Worksheet tab can not only be used as a waiver request from conducting a full ICE study but can also be used to waive the highest ICE result and choose to recommend a different (lower scoring) alternative. The data entry box at the bottom is used to describe the waiver request circumstances, and the worksheet requires submittal and signature of acceptance as described in the ICE policy.

GDOT ICE Tool: Multi-File ICE Summary

A separate file, **Multi-File ICE Summary.xls** is provided to allow the summary of multiple individual ICE results, that can be useful to see alternatives and recommendations for a corridor analysis of multiple intersections. Place the summary.xlms file into a folder with all ICE case studies desired to summarize, select the “Clear data and update information” box, and the program will read and display the final score for each alternative in each ICE file. The highest recommended alternative is highlighted in green.

On a separate page in the same worksheet, users can input multiple locations where two-way stop control (TWSC) waivers are being requested and can be approved as a group. Here, additional information is requested including geometry, ADT, operations and safety data, to better understand the circumstances under which the warrant is requested. Locations that do not meet waiver requirements are highlighted in bold **RED** text, and a full ICE process is recommended for these intersections.


Figure 16: Significant Environmental Impact Worksheet

Figure 17: ICE Waiver Data Form

Multi-File ICE Summary

Stage 2 Decision Document		UNSIGNALIZED										SIGNALIZED									
Study Intersection	Existing Intersection Type	Waiver Request Type	Conventional (Minor Stop)	Conventional (All Way Stop)	Mini Roundabout	Single Lane Roundabout	Multiple Roundabout	ICU (1 stop control)	ICU (2 stop control)	ICU (3 stop control)	ICU (4 stop control)	Signalized (Minor Stop)	Signalized (All Way Stop)	Signalized (Mini Roundabout)	Signalized (Single Lane Roundabout)	Signalized (Multiple Roundabout)	Signalized (ICU)	Signalized (ICU)	Signalized (ICU)	Signalized (ICU)	Signalized (ICU)
SR 22 @ Fulton Mill	Conventional (Minor Stop)	N/A	7.2	5.4	5.9							3.2									

Project PI# (if applicable): 0000000		Avg Daily Traffic (ADT)										Opening Year				Design Year			
Study Intersection	Existing Intersection Type	Major Rd	Minor Rd	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C	Delay	V/C
Main Street at First Street	Conventional (Minor Stop)	5,200	2,400	9.5 sec	0.30	12.5 sec	0.36												



GDOT

Georgia Department of Transportation

GDOT ICE TOOL: Waiver Form for Multiple TWSC Intersections

ICE Version 2.15
Revised 07/10/2019

Project PI# (or N/A): 00000000

Study Intersection	Existing Intersection Control	Proposed # Lanes on Mainline	Design Year		Minor Rd Percent	Open Year Warrants Met?		Traffic Operations Data ¹				Safety Data			
			Major Rd	Minor Rd		AWSC	Signal	Opening Year Delay V/C	Design Year Delay V/C	PDO	Injury	Crash Severity	Total		
Main Street at Second Street	Conventional (Minor Stop)	2	5400	500	8.5%	No	No	8.5	0.28	11.5	0.33	9	1	0	10
Main Street at Third Street	Conventional (Minor Stop)	2	5600	800	12.5%	No	No	12.5	0.34	15.3	0.4	16	3	0	19
--- select one ---					0.0%	No	No					0	0	0	0