

MEMORANDUM

Date:	August 18, 2022	TG:	21147.08
To:	Jeremy Metzler, PE, City of Edgewood		
From:	Brett Schock, PE, AICP, RSP2i, Transpo Group		
cc:	Jon Pascal, PE, Transpo Group		
Subject:	36th Street E/Meridian Avenue E/Chrisella Road Intersection Configuration		

Background

The intersection of Meridian Avenue E (State Route 161), 36th Street E and Chrisella Road E in the City of Edgewood is likely to be converted from a signalized intersection to a roundabout in the future, due to operational challenges and WSDOT preference for roundabouts. The intersection has been the subject of several previous studies by the City, including:

- A conceptual design process for a 5-leg roundabout, replacing the existing 5-leg signalized intersection (SCJ Alliance, 2016)
- An alternatives analysis comparing four alternatives to addressing Chrisella's inclusion in the intersection with Meridian and 36th (Transpo Group, April 2021)
- An alternatives analysis for relocation concepts for Chrisella along 36th, east of the existing intersection (Transpo Group, April 2022)

Through each analysis, the City has identified safety and operational benefits, as well as tradeoffs in access and cost, from various configurations of the intersection of the three roads. The following analysis advances the results of each study and compares the approaches to the intersection configuration, as well as a potential new alternative of relocating the intersection of Chrisella with Meridian to a point south of the existing signalized intersection.

Existing Conditions

The existing intersection is signalized, with all 5 legs having full two-way access. Meridian is a four-lane section through the intersection, with two northbound through lanes, one southbound through lane, and a left turn lane approaching from the north and south legs. 36th and Chrisella are two lane roads approaching the intersection. Chrisella is not striped directly into the intersection, but the striped centerline is only 35 feet east of the intersection, so it functions as a fifth leg. Traffic can access Chrisella directly from either 36th or Meridian. The intersection is sloped from north to south, and the grade of Meridian gets much steeper south of the intersection.

Marked crossings are only present on the west, north and east legs of the intersection. The pedestrian crossing on the east leg of the intersection, which crosses 36th and Chrisella, is 85 feet long, nearly triple the length of the crossing on the west leg of the intersection. The only sidewalk present in the vicinity of the intersection is along the 36th frontage of the property on the southwest corner. New pedestrian paths in Edgewood Community Park connect to the intersection in the northeast corner, but they do not directly abut the edge of the travel lanes or intersection.

There are existing businesses and residences on the southeast corner of the intersection, fronting both 36th and Chrisella. The northeast corner of the intersection was developed in 2021 into a new community park by the City of Edgewood. The park has a playground with a large, destination play structure, grassy amphitheater, a picnic shelter, trails and open green spaces.

Development Forecast

36th, west of Meridian, is the subject of active developments that will add more than 100 new single-family residences. Multimodal traffic on 36th, especially pedestrians accessing the new Edgewood Community Park, is expected to increase the pedestrian demand at the intersection of 36th and Meridian significantly in the next few years.

Alternatives Considered

The City has, through the various studies identified in the background, narrowed the alternative approaches for converting the subject intersection from a signalized intersection to a roundabout to three feasible options:

Alternative 1. 5 Leg roundabout

The 5 leg roundabout alternative maintains the three existing roads (Meridian, 36th and Chrisella) in their existing alignments. The roundabout would be designed in a manner that allows access to and from each leg. Physical constraints may not allow direct movements between all legs, such as northbound Meridian to southbound Chrisella, without use of the full roundabout circulation. Further description of this alternative is included in technical memoranda from Transpo Group presented to the Edgewood City Council in 2021 and 2022.

Alternative 2. 4 Leg roundabout, Chrisella relocated east

Relocating Chrisella to the east, at least 300 feet from the existing signal, removes Chrisella from the intersection, allowing for a more typical 4-leg, 90-degree intersecting roundabout connecting Meridian and 36th. The relocated Chrisella would connect to 36th as a minor road intersection. Further description of this alternative is included in the technical memorandum from Transpo Group presented to the Edgewood City Council in 2022.

Alternative 3. 4 Leg roundabout, Chrisella relocated south

Relocating Chrisella to the south, at least 300 feet from the existing signal, also allows for a more typical 4-leg, 90-degree intersecting roundabout connecting Meridian and 36th. The relocated Chrisella would connect to Meridian as a minor road intersection, and is not likely to be a signalized access due to present WSDOT intersection control and access standards. This relocation of Chrisella would also require the acquisition of right of way and the dead-ending of the existing alignment, similar to Alternative 2.

Evaluation of Alternatives

To compare the three alternatives, several criteria were selected to determine which alternative best met the overall goals of improving safety, especially for active mode users, improving traffic operations and being feasible to permit and construct in a reasonable timeframe. The highest priority for the City is addressing active mode safety, especially considering the new development in progress to the west along 36th and the recent opening of the Edgewood Community Park.

Pedestrian Safety

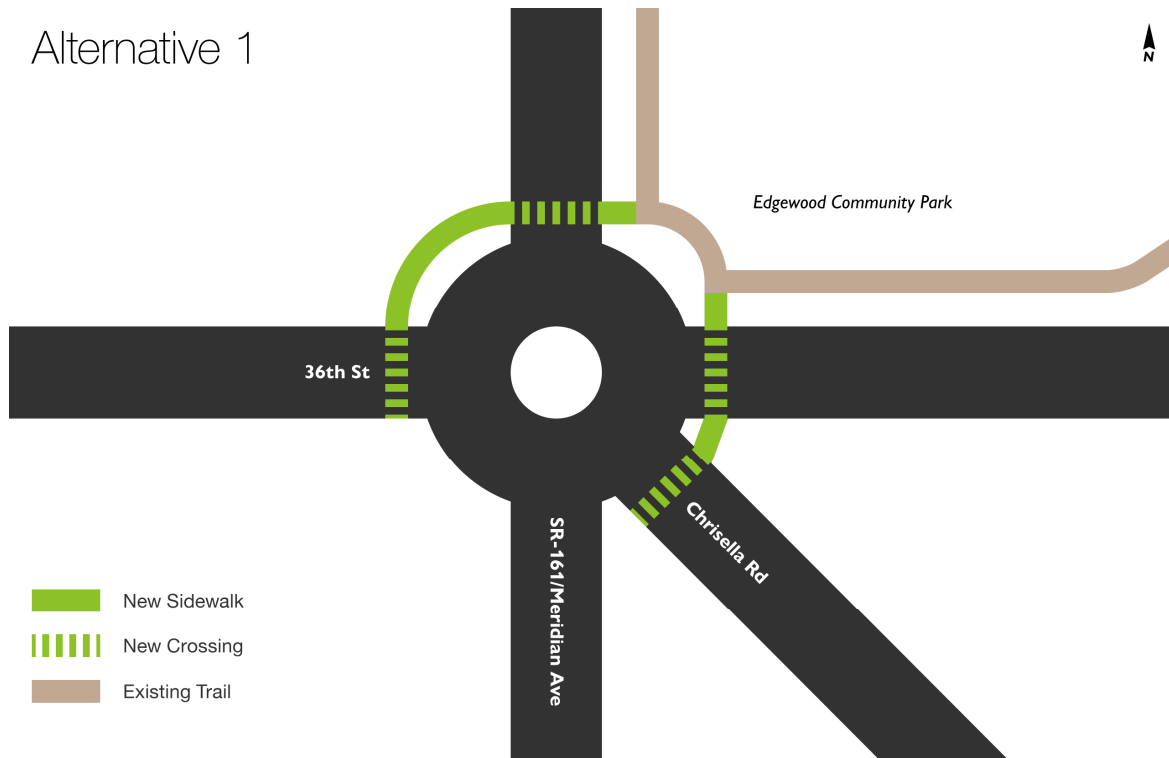
The existing intersection is uncomfortable for pedestrians, with several safety risk factors, especially on the east leg.



Existing intersection crossings

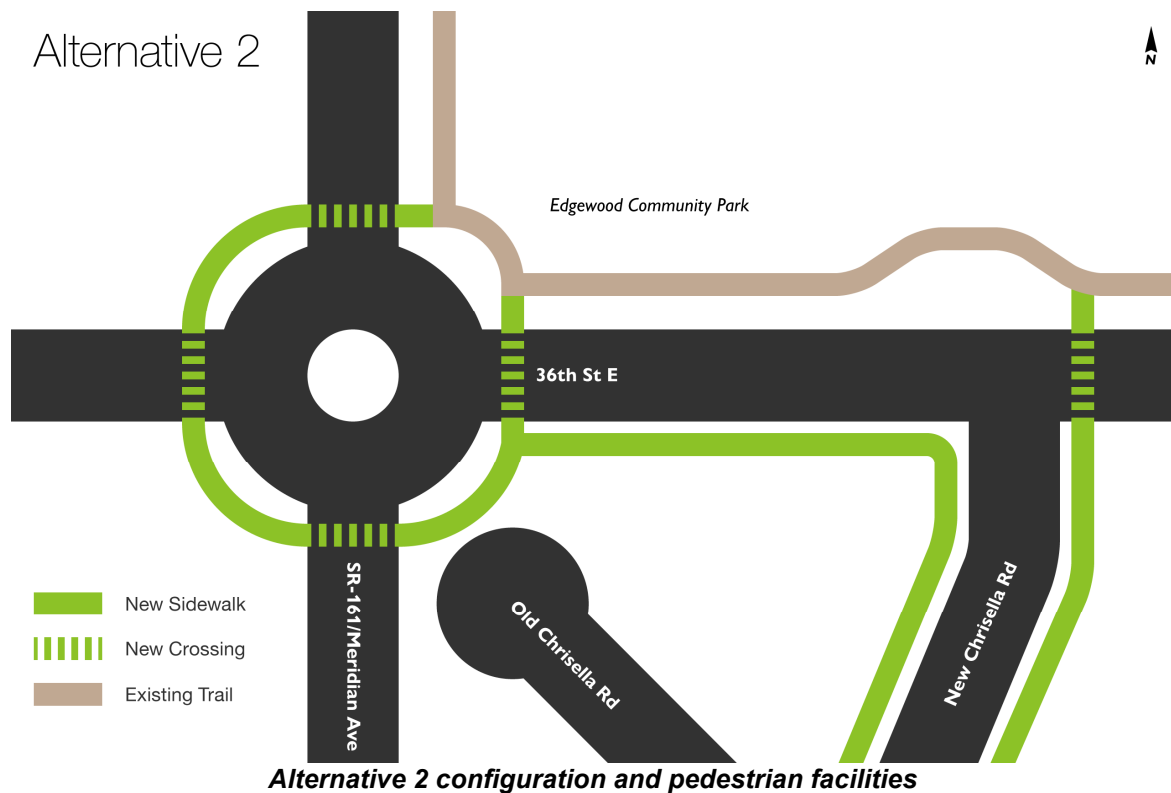
Each of the roundabout alternatives improves on the current conditions, reducing crossing distances, providing refuge islands, and per standard, providing rectangular rapid flashing beacons (RRFBs) on multi-lane crossings. The 5-leg roundabout, Alternative 1, would require an extra pair of roadway crossings at Chrisella to access the Community Park for those approaching from the southwest corner of the intersection, assuming the southern crosswalks are even provided. The southern leg crosswalks in Alternative 1 may not be feasible due to ADA concerns related to the sharp change in vertical grade south of 36th. The roundabout for Alternative 1 is larger than the other alternatives and pushes the southern crossings further down this non-ADA-compliant grade.

Alternative 1

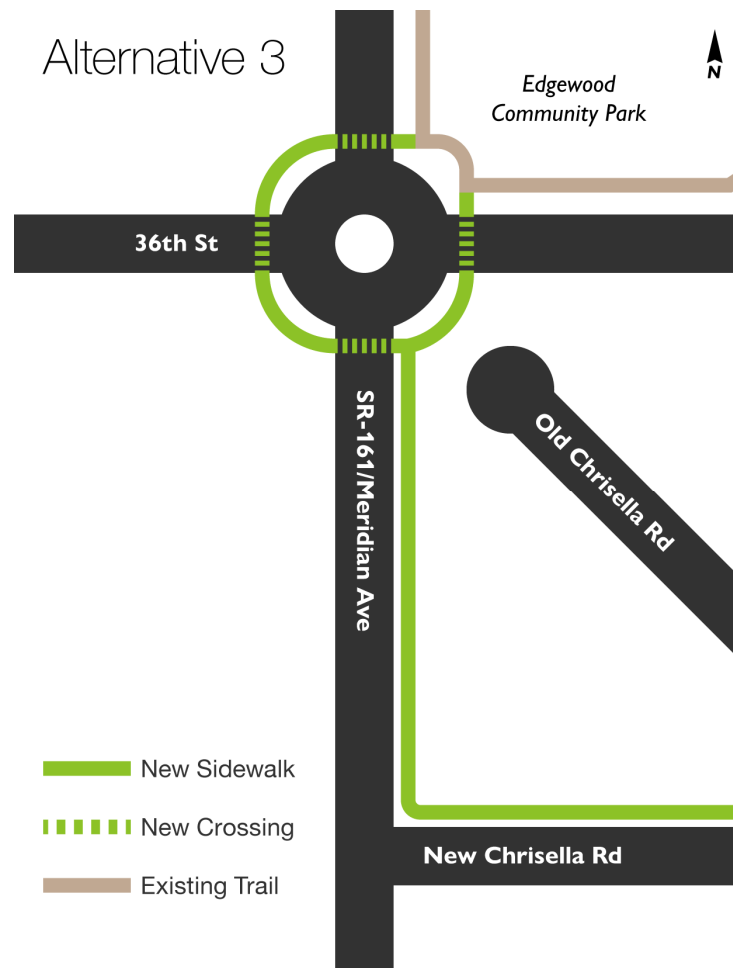


Alternative 1 configuration and pedestrian facilities

Alternative 2 includes new crossings at the roundabout in a slightly more compact footprint, requiring less total distance for pedestrians crossing from the southwest corner (new 36th Street development) to the northeast corner (Edgewood Community Park). Alternative 2 also includes new sidewalk along 36th and along Chrisella. The 36th and Chrisella sidewalks are not included in either Alternative 1 or 3.



Alternative 3's roundabout crossings are the same as Alternative 2. But, alternative 3 does not provide separated pedestrian facilities along 36th from Meridian to the Park entrance, which are included in Alternative 2. Alternative 3 could include pedestrian facilities along the east side of Meridian, connecting to the new Chrisella connection. No other sidewalks along Chrisella would be included in Alternative 3. A new crossing would not be provided at the south Chrisella and Meridian intersection.



Alternative 3 configuration and pedestrian facilities

Vehicle Safety

The roundabout alternatives each improve on the safety for vehicle modes in the intersection. Removing the fifth leg, Chrisella, creates a roundabout that is more intuitive and familiar to drivers, as compared to the 5-leg roundabout, and it would remove the possible need for northbound Meridian drivers to navigate the entire roundabout for access to Chrisella (more than a 360° movement).

Relocating Chrisella along the lower volume, 2-lane 36th (Alternative 2) creates a safer approach and connection for vehicles to Chrisella. In Alternative 3, vehicles looking to access Chrisella on southbound Meridian, and from 36th, may need to turn left across the higher traffic volumes of Meridian. The potential location of the Chrisella intersection in Alternative 3 is located in a section of Meridian with significant vertical grade and near to a significant horizontal curve. Turns to and from Chrisella in Alternative 3 would have potential sight distance issues, which may require right-in-right-out only for safety of drivers on both roads, not to mention additional risk factors due to lower light conditions, precipitation or ice and snow events.

WSDOT Approval

WSDOT has a strong preference for replacing signalized intersections with roundabouts on state routes such as Meridian (SR 161). A 5-leg roundabout may generate additional comments and requested modifications from WSDOT during the permitting process, compared to a more

traditional 4-leg intersection. Relocating Chrisella along 36th (Alternative 2) creates an intersection on local Edgewood roads, removing WSDOT from the permitting process of Chrisella's relocation. Relocating Chrisella to a point south along Meridian (Alternative 3) would require additional WSDOT coordination to approve the new connection and the configuration. WSDOT may require the new connection to be right-in-right-out only for safety, reducing local access to Chrisella compared to the other alternatives. Any limited access to Chrisella may result in other traffic pattern changes along 36th to the east, like increased traffic volumes on 108th Avenue E and 114th Avenue E, as Chrisella is a well-known bypass route for afternoon commute traffic when delays on Meridian to the south are significant.

Environmental Impact

The 5-leg roundabout would have a wider footprint than the two 4-leg roundabout alternatives, requiring additional right of way and more impervious area compared to the other two alternatives. Recent findings about tire-related pollutants affecting local salmon have increased the focus on limiting pollution-generating impervious surfaces, and surface water runoff from this project area drains through seasonal drainage courses and wetlands on its way toward Wapato Creek. Mitigation of the effects of pollution generating surfaces may be costly, and the timeline for review and approval is currently more than two years. A south relocation of Chrisella would cross an intermittent waterway and require impacting vegetation and soils on a steep slope approaching Meridian. The east relocation of Chrisella would require property acquisition and relocation/demolition of existing structures but is at a flatter topography. Both relocations (Alternatives 2 and 3) will have similar pollution generating footprints.

Cost

The costs of Alternatives 1 and 2 are covered in the previous studies completed for the intersection. Alternative 1 is estimated at more than \$7,000,000 in Transpo Group's April 2021 analysis. Unexpectedly high inflation in construction costs that has occurred since the 2021 memo would likely increase the cost of Alternative 1 to a price of more than \$8,000,000 (in today's dollars). The estimated cost of Alternative 2 is \$5,970,000 (Table 3, Package 3, Transpo, April 2022). A cost for Alternative 3 would include the same roundabout cost as Alternative 2, but it is estimated because of the more complex topography, environmental and WSDOT permitting and connection with a higher volume roadway, the cost of the realignment of Chrisella will be approximately 150% of the cost in Alternative 2. Therefore, for comparison of the alternatives, the estimated cost of Alternative 3 is \$6,800,000.

Traffic Operations

Implementation of a roundabout at the existing intersection will improve traffic operations over the existing signalized intersection. Each of the roundabout options provides some operational benefit. Alternative 1 (with the 5th leg for Chrisella) may experience some operational impact from the entry and exit of traffic to Chrisella compared to the other alternatives. Outside of the intersection, Alternative 3 may have an operational impact from traffic making left turns, if allowed, to the relocated Chrisella from Meridian. Even in a right-in-right-out scenario, there may be operational impacts to Chrisella and/or Meridian south of the roundabout with Alternative 3, compared to the other alternatives.

Local Access

Local access to Chrisella, especially north of the point where a relocated/realigned Chrisella would deviate from the existing alignment, will differ among the three alternatives. Alternative 1 maintains local access in the existing locations, but geometric constraints mean that northbound Meridian traffic would not be able to turn directly onto Chrisella and would need to make a full circulation "U-turn" at the roundabout. In Alternatives 2 and 3, local access is maintained from other roadways to Chrisella, meaning some parcels near the existing intersection will be accessed via a remnant stub and cul-de-sac/dead end. Access to Chrisella from 36th in Alternative 2 is likely to be easier,

compared to Alternative 3's higher volume access on Meridian where access may be restricted to right-in-right-out.

Summary of Evaluation and Scoring

Summarizing the analysis for the three alternatives, a score is developed for each alternative based on the advantages each has in each of the criteria. Advantages or disadvantages are evaluated based on comparing to the existing conditions and comparing between the three alternatives. A significant advantage or disadvantage is worth +2 or -2 points respectively. An advantage or disadvantage is worth +1 or -1 points respectively. If an alternative is evaluated to have no distinct advantage or disadvantage compared to existing conditions or compared to the other alternatives, 0 points are given.

Table 1 shows the summary of evaluation and the scores for each alternative.

Table 1. 36th Street E/Meridian Avenue/Chrisella Road Alternatives

A "choose by advantages" comparison of alternatives

Alternative	Pedestrian Safety	Vehicle Safety	WSDOT Approval	Environmental Impact	Cost	Traffic Operations	Local Access	Total Score
1 – 5 Leg RAB	▲	▲	▲	◄►	▽▽	▲	▲	+3
2 – 4 Leg RAB, East Chrisella	▲▲	▲▲	▲▲	▲	◄►	▲▲	◄►	+9
3 – 4 Leg RAB, South Chrisella	▲	◄►	▲	▽	▽	▲	▽	0

1. Evaluation in each criteria is relative to existing conditions and the other alternatives. ▲▲ represents a significant advantage, ▲ an advantage, ◄► indicates no advantage or disadvantage, ▽ a disadvantage and ▽▽ a significant disadvantage.
2. Scoring is based on +1 point for each ▲ and -1 point for each ▽. A ◄► is worth 0 points.

Preferred Alternative

Based on the criteria discussed above, the preferred alternative for the future configuration of the 36th/Meridian/Chrisella intersection is Alternative 2: a 4-leg roundabout with Chrisella relocated to a new connection with 36th to the east of the existing intersection. The preferred alternative matches the preferred alternative identified in Transpo's 2022 memorandum. The preferred alternative provides the highest level of safety and comfort improvements for active mode and motorized users over the existing conditions, as well as compared to the other alternatives. The preferred alternative is expected to have the easiest WSDOT and environmental permitting process and provides the best local access to businesses and residences along both 36th and Chrisella near the existing intersection, without requiring complex movements like full roundabout U-turns or left turns near tight horizontal curves and vertical grades in higher traffic areas.

The City has placed a high priority on improving pedestrian safety in the identification of a preferred alternative and improvements at the subject intersection. Even without additional weight given to the pedestrian safety criteria, Alternative 2 is the preferred alternative. To further improve upon pedestrian safety, especially connecting the future development along 36th to the west of the intersection and the Edgewood Community Park, additional crossing enhancements on the north leg of the Alternative 2 roundabout could include:

- RRFBs, as required by standard, on both two-lane crossings
- Additional flashing "Crosswalk ahead" signage in advance of both crossings (north of the intersection and in the south approach to the roundabout) actuated by the same pushbuttons for the north leg crossings