OREGON CITY

Community Development – Planning

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To: Mayor Holladay and City Commission

From: Christina Robertson-Gardiner, Senior Planner
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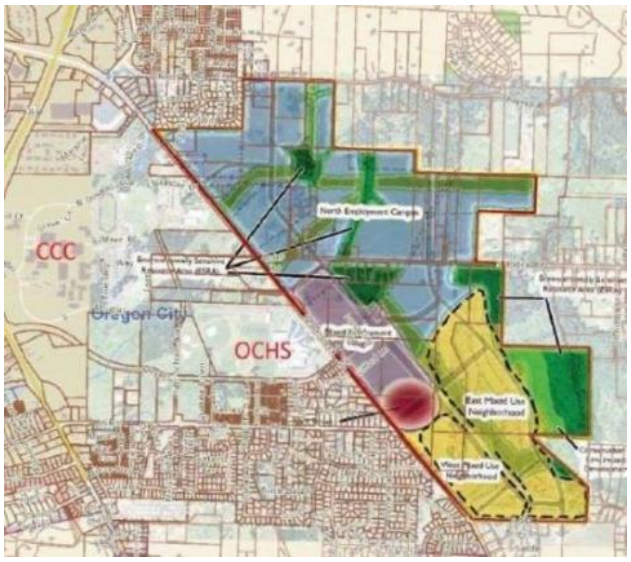
RE: Beavercreek Road Design

Date: November 5, 2019

The Beavercreek Road Concept Plan (BRCP) is a guide to the creation of a new neighborhood in southeast Oregon City. The adopted plan provides a framework for urbanization of 453 acres within the urban growth boundary including a diverse mix of uses (an employment campus north of Loder Road, mixed-use districts along Beavercreek Road, and two mixed-use neighborhoods), all woven together by open space, trails, a network of green streets, and sustainable development practices. The plan has been crafted to create a multi-use community linking Clackamas Community College, Oregon City High School, and adjacent neighborhoods together.

The city is currently updating the Comprehensive Plan and Oregon City Municipal Code (OCMC) to allow planned housing and mixed-use development in the Beavercreek Road Concept Plan area. Development of each newly zoned parcel will be based on market conditions, which could take many years to build out fully. Transportation impacts will be addressed at the time of each development application, which requires compliance with the Concept Plan and city development standards. More information can found at www.orcity.org/Beavercreekroadconceptplan.

However, staff and City Commissioners were hearing from the public that 11 years after Concept Plan adoption, a fresh look may be needed to see if the adopted 3-lane design of Beavercreek Road (roughly Old Acres Road to Clairmont Road) reflected the community vision compared to a 5-lane section and review the type of intersection control (roundabouts or traffic lights) along the corridor.



Beavercreek Road Concept Plan Boundary

At the August 13, 2019 City Commission work session, the City Commission requested that staff return at a future work session with more detail about the cost and design impacts of roadways width and intersection control for

the area of Beavercreek Road that abuts the Beavercreek Road Concept Plan boundary as well as more feedback from the public.

The following memo and attachments will provide additional background on the different approaches to the road design of Beavercreek and provide options for next steps on this issue.

City Commission Direction

Staff is looking for direction from the City Commission on a variety of items. Depending on the design approach, an additional work session focused on funding strategies may be needed.

- **How many lanes should Beavercreek Road be within the Concept Plan corridor?**
  - 3 lanes
  - 5 lanes
  - A transition from 5 lane to 3 lanes at either Meyers or Loder Roads.

- **What type of intersections should Beavercreek Road have within the Concept Plan corridor?**
  - Traffic signals
  - Roundabouts
  - Both (Should the City further investigate roundabout designs at specific intersections?)

- **Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connection projects from the Transportation System Plan (TSP)?**
  - No
  - Yes

- **Should Beavercreek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?**
  - The roadway should be constructed incrementally as development occurs.
  - The City should create a funding mechanism for building the roadway as a single project.

Once the preferred cross-section and intersection control are identified, the Transportation System Plan (TSP), Transportation Capital Improvement Project list (CIP), and the Beavercreek Road Concept Plan will be amended to include the preferred projects. Considerations for the City Commission to inform the above is provided below.

Tradeoffs – Number of Lanes

Creating additional lanes help vehicles move quicker through areas during peak traffic periods. However, during off-peak periods there may be little effect on travel times. Additional lanes also generally allow turning movements to and from the minor streets to be made with less delay. Additional lanes, particularly near signalized intersection, will reduce the length of the vehicle queues allowing cars to stop closer to the intersection rather than stretching the congestion out in a longer line. This additional capacity that results from added lanes can erode over time; however, as other drivers chose the newly expanded street over their previous commute route, also known as **induced demand**. Increasing the number of lanes generally results in increased travel speeds by motorists. The resulting increase in travel speed does not result in increased capacity as drivers feel the need to create additional buffer space in front and beside them. Increased travel speeds do result in more severe crashes that are particularly

devastating for pedestrians and bicyclists. More lanes and higher speeds also require longer intervals for pedestrian crossing signals and longer yellow times. These decrease the overall efficiency of signalized intersections.

Overall, increasing the number of lanes vary from no change in travel time during off-peak periods to real reductions in travel time at peak periods if regional growth is greater than predicted and if vehicle demand approaches or exceeds the capacity of the number of lanes provided on a road. It is difficult to provide definitive prediction of the travel time on a particular section of road as a three-lane or five-lane section because of the various factors that influence a prediction including use of alternative routes and the timing of completion of projects further along the corridor that reduce congestion such as the dedicated right turn lane to Highway 213 northbound.

Addressing Future Growth
Traffic models account for growth in other jurisdictions and their effects on Oregon City. Clackamas County, Oregon City, and the Oregon Department of Transportation all look at how growth is affecting their transportation network and create a list of funded projects that can address safety concerns or add system capacity. As you can imagine, this is not an easy task. Every year there are more project needs than budgeted funds. It is up to Oregon City to assure that all of the necessary projects are identified, even if we do not own the roadway.

Future Major Transportation Projects
Oregon City has identified a few automobile projects that will add connectivity and additional capacity to the road network in this area.

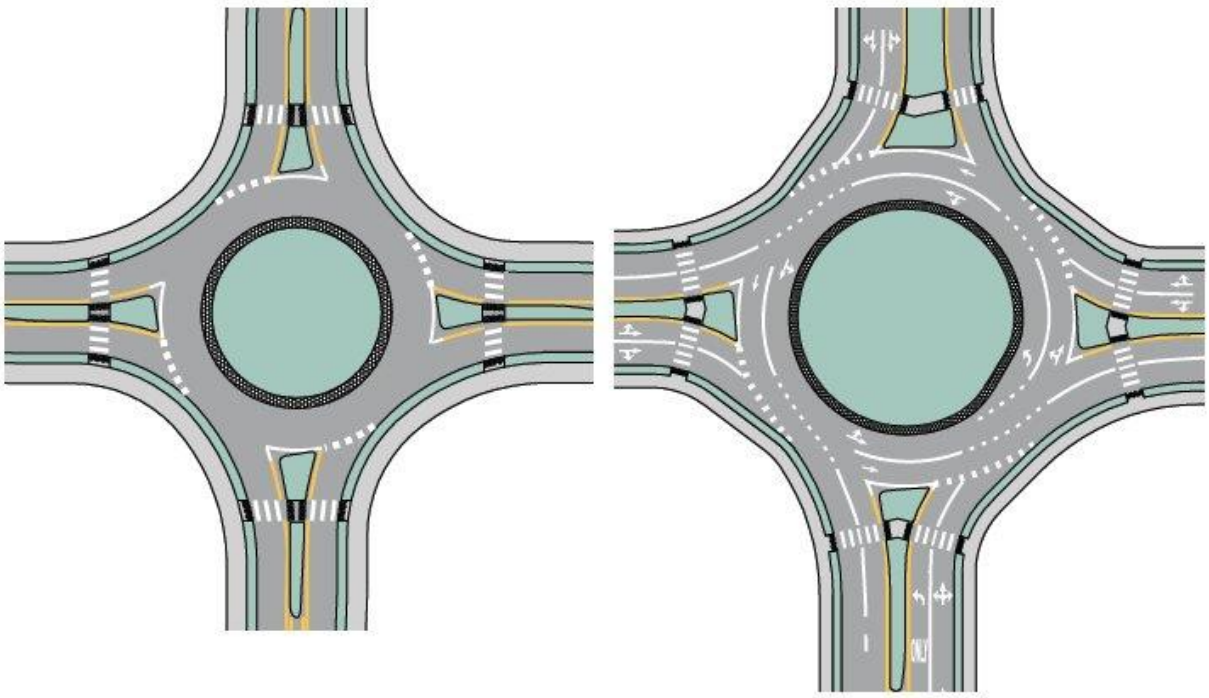
1. The Meyers Road Extension Project from 213 to the Oregon City High School
2. Extension of High School Avenue to Loder Road
3. Creation of a north/south road parallel to Beavercreek within the Concept Plan boundary
4. Improvements to Highway 213 and Beavercreek Road (conversion of the existing yield to free-flow right Turn lane onto northbound 213 from Beavercreek Road Northbound acceleration lane to merge into with traffic).

Adding more road connections, like Meyers Road, provides drivers alternate routes and decreases the dependency on using any one road. For example, currently most of the vehicles going to the high school from the west side of Hwy 213 are traveling on Hwy 213 to Beavercreek Road or Glen Oak Road, then to the High School. The Meyers Road extension will create a new east-west connection, removing a portion of the trips from both Hwy 213 and Beavercreek Road. In addition to the vehicular connections above, additional bicycle and pedestrian improvements are also identified.

Access Management/Intersection Control (Roundabouts vs. Signals)
When the Concept Plan area is developed, access to Beavercreek Road will only occur through the existing intersections (Clairmont Drive, Loder Road, Meyers Road, and Glen Oak Road). No new driveways will be allowed on Beavercreek Road. The 2008 Concept Plan identified roundabouts as a good approach to intersections, but the Transportation System Plan (TSP) also identifies some traffic signals along the roadway.

Roundabouts
Roundabouts are circular intersections designed to eliminate left turns by requiring traffic to exit to the right of the circle. Drivers travel counterclockwise around a center island. There are no traffic signals or

stop signs in a modern roundabout. Drivers yield at entry to traffic in the roundabout, then enter the intersection and exit at their desired street.



3- LANE ROUNDABOUT

5-LANE ROUNDABOUT

Think of roundabouts as a series of "T" intersections, where entering vehicles yield to one-way traffic coming from the left. A driver approaching a roundabout must slow down or stop for vehicles stopped ahead, yield to pedestrians in the crosswalk, and yield to traffic already in the roundabout. Roundabouts are designed to accommodate fire trucks and large vehicles. Large trucks may have to drive on the concrete apron around the central island in order to get through the roundabout.

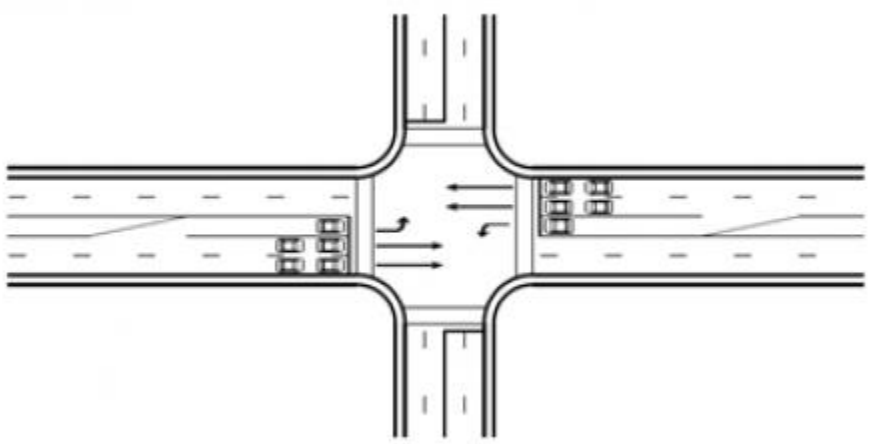
What are the advantages and disadvantages of roundabouts?

- Greater safety is achieved primarily by slower speeds and elimination of left turns which can greatly decrease the number & severity of accidents.
- Operation is improved by smooth flowing traffic (with less stop and go than a signalized intersection).
- Aesthetics are enhanced by landscaping.
- Roundabouts can distinguish the Concept Plan area as different than others in the City.
- Additional landscaping requires a long-term maintenance commitment but normally costs less in the long run than signal maintenance.
- Drivers must pay attention; pedestrians don't have a signal to help them cross and bicyclists must merge with motor vehicles to enter the roundabout or utilize a larger shared-use ped/bike sidewalk. This can be intimidating for people trying to cross the road.
- In general, multi-lane roundabouts are not recommended in areas with high levels of pedestrian and bicycle activity due to safety concerns of multiple threat crashes for pedestrians, especially those with visual impairments, and bicyclists.

- The process to acquire additional needed property can require more time and money compared to a signal installation in an existing urban intersection. Though once built, the long-term maintenance cost for roundabout can be less than traditional signal maintenance, assuming slow growing and low maintenance landscaping amenities are provided.
- Legs of a signalized intersection can be built in phases, whereas roundabouts need to be substantially built in the first phase of construction.
- Repaving or utility construction through an estabished roundabout is complicated and often more impactful to the traveling public than it would be through a signalized intersection due to the site limitations that result from curved lanes and medians.

Signalized Intersections (Traffic Signals)

Traffic signals are designed to allow for the safe and efficient passage of road users when demand exists.



What are the advantages and disadvantages of signalized intersections?

- Legs of a signalized intersection can be built in phases, whereas roundabouts need to be substantially built in the first phase of construction.
- Pedestrians have priority when crossing signalized intersections. However, accidents can prove more fatal from cars running intersections at full speed compared to cars that slow down to yield at a roundabout.
- Construction costs can be less for standard intersections, but long-term signal timing and maintenance will increase the overall cost.
- Multi-lane intersections create a longer crossing distance but can be configured to allow additional pedestrian crossing time, whereas multi-lane roundabouts can create confusion between pedestrians, bikes, and vehicles on who has the right of way.
- Signalized intersections do not create a unique sense of place.
- Cars often speed up and slow down between intersections, especially on a wider road.

Roundabout Conceptual Study

Attached are conceptual overlays of 3 and 5 lane roundabouts along existing intersections that abut the Concept Plan boundary. This was an inhouse exercise that took standard roundabout designs and overlaid them to the existing city maps, centered at the existing intersections, to allow the City Commission to see how different approaches to intersection design could affect neighboring properties.

Though this is just a high-level exercise to see the comparative difference in scale between the size of a 3 and 5 lane roundabout, one can see that a 5 lane roundabout requires much more land than a 3 lane roundabout and that the land around many of the intersections on Beavercreek Road is constrained with existing homes. In the event Commission directs staff to move forward with roundabouts more work would be required to identify the exact location, shape, and configuration of the roundabout at each intersection to minimize conflicts with adjacent properties.

Survey

A survey was released on October 24, 2019 to get an understanding of public opinion about Beavercreek Road design along the Concept Plan Corridor. The questions were set to be more of a value-based approach to understanding priorities and perception of using roundabouts and signals at intersections. While this was shared widely including through the project eblast list, Neighborhood Associations, Oregon City School District, Chamber of Commerce, Hamlet of Beavercreek, social media platforms, etc., it should not be viewed as a statistically significant sample. Rather, the results of this survey allow the City Commission to get a pulse of community members who may not have time to attend a Commission hearing or send in public comment but are interested in the topic. The survey closes on November 11, 2019 and a final analysis will be shared with the City Commission at the November 12th work session.

Jurisdictional Transfer

The portion of Beavercreek Road within the Concept Plan boundary is owned by Clackamas County, though much of it is within the city limits of Oregon City. Through the Clackamas County Coordinating Committee (C4) and discussions about the Clackamas County Vehicle Registration Fee (VRF), the County has agreed to set aside a "Strategic Investment Fund" which would allocate 10% of the revenues collected from the VRF for projects like jurisdictional transfers and other joint agency interest roadway capital projects. The details of this are currently under consideration by the County and C4. In those discussions Beavercreek Road is tentatively identified as Oregon City's priority Road/project.

City staff began conversations with Clackamas County about a jurisdictional transfer of the roadway so that it may be design and maintained to City standards. In order to move forward with this, staff would need to let the County formally know we are interested in taking jurisdiction of Beavercreek Road. If that is desired, the two agencies will create an Intergovernmental Agreement or Memo of Understanding, related to the future transfer of the roadway. This document will lay out the interim terms of the ownership and maintenance between now and the formal transfer of jurisdiction in the future. This would include who maintains the pavement, ditches, street lighting, traffic signals, and who will have permitting authority for franchise permits and development along the corridor.

Holly Lane

During the Transportation System Plan (TSP) update in 2012, it was determined that the intersection of Hwy 213 & Beavercreek Road would be too congested in the future and would not meet Oregon Highway Plan mobility standards through the TSP planning horizon year of 2035. The TSP recommended the City move forward with a project to address the need for a refinement plan at the intersections.

Over the next 3 years, the City worked with ODOT and a Technical Advisory Group and a Community Advisory Group identified a variety of reasonable improvements to increase the capacity and/or safety of the intersection along with alternative mobility targets for measuring congestion which was adopted by the City and the Oregon Transportation Commission. Holly Lane and its long-term connection to the Concept Plan area through Maple Lane and Thayer Road was identified as an alternate route to the intersection of Beavercreek and Highway 213. Seth Brumley, Region 1 Planner with the Oregon

Department of Transportation (ODOT) submitted a letter identifying that removing Holly Lane extension projects from the TSP would require the City to revise the alternate mobility target and provide an alternate project that meets or exceeds the benefit of the Holly Lane extension. Staff is currently unable to identify an alternate project which is affordable and has not allocated funding or staff time towards the creation of such an alternative. The city is currently working with Clackamas County on the implementation of the Holly Lane connection and believes that the project is an important alternate route to the system to ease congestion in this area.

Conceptual Cost Estimates

Staff has completed the following order of magnitude cost estimate of the options being discussed. The following cost estimates of the initial construction of various road width and intersection controls were created utilizing the methodology from the Transportation System Plan (TSP) and are based on conceptual designs only with the assumptions noted below. The costing exercise looks at the adopted 3-lane street section and a more standard urban 3 and 5-lane configuration. Please note that the assumptions were used for a costing exercise and the final cross-section may be different than identified below.

Beavercreek Road Options	**Adopted 3-Lane** 90 feet wide ROW	**Optimal 3-Lane Roadway** 76 feet wide ROW	**Optimal 5-Lane Roadway** 100 feet wide ROW
Signals	$26M	$22M	$34M
Roundabouts	$32M	$29M	$48M

The following assumptions were used in creating the conceptual cost estimates:

Adopted 3-lane (90 feet ROW)

- 6’ sidewalks, 10’ planter, 6’ bike lane + 2’ bike buffer each side, 12’ travel lanes (2) and an 18’ center turn lane/median
- Approximately 15 tax lots would be impacted by property acquisition along the corridor. Acquisition cost assumptions vary along the corridor.

Optimal 3-lane Roadway (76 feet ROW)

- 6’ sidewalks, 6’ planter, 6’ bike lane + 2’ bike buffer each side, 12’ travel lanes (2) and a 12’ center turn lane/median
- Approximately 15 tax lots would be impacted by property acquisition along the corridor. Acquisition cost assumptions vary along the corridor.

Optimal 5-lane Roadway (100 feet ROW)

- 6’ sidewalks, 6’ planter, 6’ bike lane + 2’ bike buffer each side, 12’ travel lanes (4) and a 12’ center turn lane/median
- Over 40 tax lots would be impacted by property acquisitions along the corridor, many of these are along the west side of the corridor
- Acquisition cost assumptions vary along the corridor, some parcels include full acquisition.

Options to mitigate the total project cost:

- The order of magnitude cost estimates are based on traditional lane widths, we could identify slightly narrower lane widths, which would provide a small cost savings in both right of way acquisitions and construction costs.
- The footprint of roundabouts is much larger than a signalized intersection, due to this larger right of way requirement, a roundabout is more expensive than a signalized intersection to construct.
- If a 5-lane cross-section is selected, it will be expensive and difficult to construct the second southbound lane due to the existing development along the west side of the roadway. One option that would decrease the overall cost of the 5-lane project is shifting the centerline of the roadway. This decreases the cost as the land on the east side is undeveloped, and the price per square foot of undeveloped land is less than developed land. The downside to this option is that the downsides to this option are:
    1. It utilizes more of the land allocated to job creation.
    2. It impacts a planned and land use approved live-work development at Beavercreek Road and Meyers Road
    3. It still impacts a few existing homes but would reduce the number of home acquisitions
    4. This option also requires the project be built all as one, not incrementally by development
- Creating additional refined details for the preferred design on this corridor will require additional funding and a timeline for completion. This work would be completed in cooperation with a contracted consulting firm, and the level of design work would be matched with the needed level of certainty of the design. Without further refinement of the question being asked and the level of detailed needed to answer the question, the cost for preliminary design work could be anywhere from $50,000 to $300,000 for this corridor.

Funding Large Scale Improvements

Many agencies struggle with how to transition from a two-lane roadway to fully built roadway. If a roadway is built as development occurs, it can and will be piece-meal. Often not occurring linearly along a corridor, which creates difficulties in implementing a center turn lane. If the city wants to build this before development occurs, we will need to identify how we fund a project of this magnitude.

Current Approach

- The adopted TSP project cost for Beaverceek Road was solely based on repaving and for a standard two-lane section with some sidewalk additions. The cost for the Beavercreek Corridor is identified as $8.6 million, assuming 2 lane roundabouts at Glen Oak Road and Loder Road, leaving existing signals at Clairmont Drive and Meyers Road.
- Currently, our transportation SDC methodology identifies projects in the Beavercreek Road corridor that total $8.6 million, of which $3.8 million is attributed to growth and therefore would be funded by SDC's. The remaining $4.8 million, would come from other sources.
- This $8.6 Million is insufficient to fund all the improvements called for in a 3 lane configuration and well under the need for a 5 lane configuration. However, identified capital improvement projects within the Beavercreek Concept area total a growth share of nearly $50 Million. Similar to the bond supported LID option, a capital funding bond could be authorized and reimbursed through future SDC revenues after the project is funded and built. The City would need to take a more detailed look into the entire Beavercreek Concept area project list and determine how onsite funding for transportation projects might be allocated less to the internal streets and more toward Beavercreek Road

Other Funding Options

- Another option to fund the improvements is the implementation of a Local Improvement District. A Local Improvement District (LID) is a method by which a group of property owners can share in the cost of infrastructure improvements. The LID is a method of providing public financing for the construction of public works improvement projects that benefit private properties. The property owners within the LID benefit area are responsible for repaying the costs of the project. If the project also benefits the general public, in addition to private property within the LID, the City can assist with those costs.
- LID's are a good way to share the cost amongst several benefitting property owners and in this case, the LID generated funds would be one element of the financial leverage plan contributing to the overall project costs which would include developer funding, SDC's, and possibly other smaller funding options. LID's are typically funded using existing City funds which are reimbursed over time which in this case would complicate the City's cash flow unless supported via a capital improvement bond.
- Urban Renewal is a mechanism that can assist in funding the development of a growing area. The creation of an Urban Renewal District is complex and requires voter approval.
- Projects that abut mixed-use or low-density residential along the urban fringe do not score well for state and federal grants. The highest scoring projects provide safety improvements, congestion relief along existing urban corridors, are in areas of historically underrepresented communities that are regionally important and leverage other funding sources. Currently, this corridor is not likely to score well with these criteria.
- Another option to fund the transportation improvements in the Beavercreek Concept Plan area is the creation of an area-specific Transportation System Development Fee (SDC). Typically, these additional SDCs are collected in an overlay area, that is intended to only be used in that area. Depending on the size of the area and the cost of the additional projects, the resulting Transportation SDC increase could have a negative effect on attracting new businesses and keeping housing affordable. The Bethany and Witch Hazel Village South (Hillsboro) Concept Plan areas utilize this approach.
- Beavercreek Road is a multi-jurisdictional roadway that is currently under the authority of Clackamas County, and a significant volume of traffic using Beavercreek Road is generated from outside the City. A meaningful Clackamas County contribution to the full development of Beavercreek Road is a policy issue that should be raised with the Board of County Commissioners (BCC). It is common for the BCC to support multi-jurisdictional roadway improvements in other cities within the County

Staff Recommendation

- **How many lanes should Beavercreek Road be within the Concept Plan corridor?**
    - A transitional section extending the existing 5 lane section near Maple Lane and transitioning to a 3 lane section at Loder Road.

- **What type of intersections should Beavercreek Road have within the Concept Plan corridor?**
    - Traffic signals

- **Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connections from Transportation System Plan (TSP)?**

- No

- **Should Beavercreek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?**
  - The roadway should be constructed incrementally as development occurs.

Additional Design Considerations

- To be able to utilize a fully built out 5-lane Beavercreek Road, staff recommends that the center lane of the road is shifted to the east. This approach also is very hard to build incrementally and should be pursued as a capital improvement project.
- A 3-lane Beavercreek Road can be built as a capital improvement project or incrementally.
- Roundabouts (3 or 5-lane) should be pursued as a capital improvement project.
- If the City Commission wishes a transition from 5 to 3-lanes through incremental development, staff suggest transitioning from 5 lanes to 3 lanes at Loder Road. Existing patterns at Meyers Road and Glen Oak Roads would result in only the northbound section of Beavercreek Road to be built out over time, in effect having 2 lanes northbound and 1 lane southbound at Concept Plan buildout.
- The adopted 90 feet wide 3-lane cross-section shows a large inverted crown stormwater section in the middle of the road. Abutting grades and the location of existing utilities make this design very difficult to implement. Staff recommends moving the stormwater area to the outside planter section of the road for both the 3 and 5- lane configurations.
- Keeping the adopted 90-foot width for the 3-lane section would allow for an increased width of the pedestrian/bikeway, which could include a separated bike lane on the eastside. A standard 12 feet planter medium can remain in the center turn lane.

Transportation System Plan (TSP) Consistency and Transportation Planning Rule (TPR) Compliance
Overall, the current TSP includes projects in and around the Beavercreek Road Concept Plan area, including the 3-lane segment along Beavercreek Road comply with the Statewide Transportation Planning Rule (TPR) and best practice congestion standards and planned intersection management solutions at key locations. These are required to be met when rezoning property within the city. If the City Commission would like to add additional lanes on Beavercreek Road or replace traffic signals identified in the TSP with roundabouts identified in the Concept Plan, those would also meet the TPR requirements. The Legislative file (**LEG 19-00003**) implementing the Zoning in the Concept Plan area can move forward concurrently with the Beavercreek Road design refinement process without delaying the adoption process. A final condition of approval could even be added that limits development until a final Beavercreek Road design is adopted.

Next Steps
Staff is looking for broad direction with the questions found at the front of the memo. All of the proposed configurations have cost implications that will need further City Commission direction and may require some additional engineering studies. Depending on the design approach – an additional work session focused on funding strategies is recommended.