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TECHNICAL MEMORANDUM

To: Technical Committee

From: Sheri Murata, P.E

Date: April 1, 2014

Re: Beuca – Revision of 166th Court NE by Shadow Creek

Shadow Creek is a 15 lot plat currently in construction located on NE 122nd Street at 166th Place NE in North Redmond. The Beuca Plat is a 14 lot plat located south and east of Shadow Creek and is currently in the PREP process. 166th Court NE will be the entry road for both plats. See *Figure 1 – Vicinity Map* below.

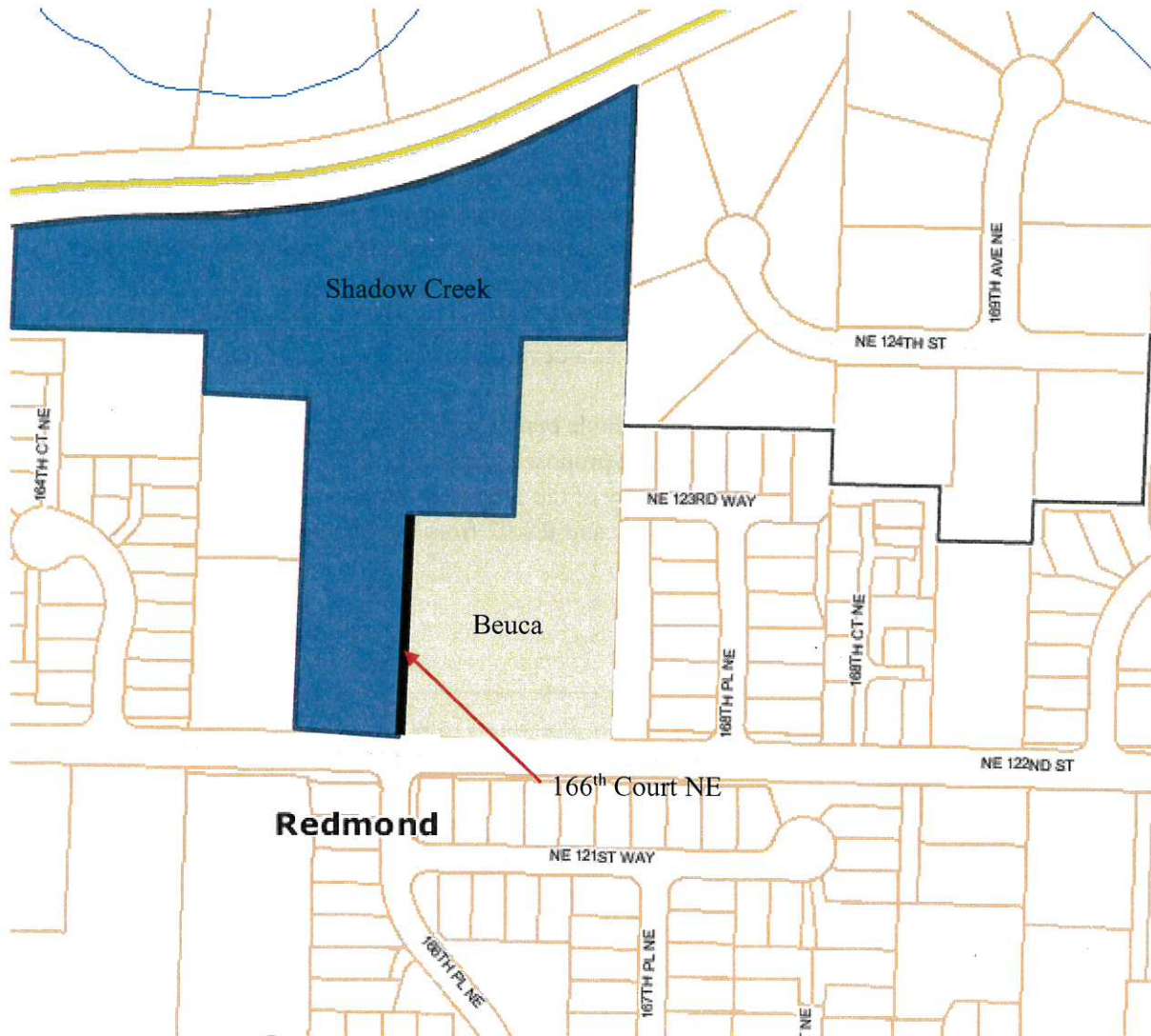


Figure 1- Vicinity Map

The Beuca project was anticipated to have approval this spring and be under construction in early May. The project was delayed by the requirement to incorporate a connection to a neighboring plat, thus requiring the proposed agreement attached. Because Shadow Creek is currently in construction, 166th Court NE will already be built by the time Beuca is constructed. The current design of 166th Court NE includes 20 feet of pavement with a thickened edge on the east side as shown below in *Figure 2 – 166th Ct NE (Current Section)*.

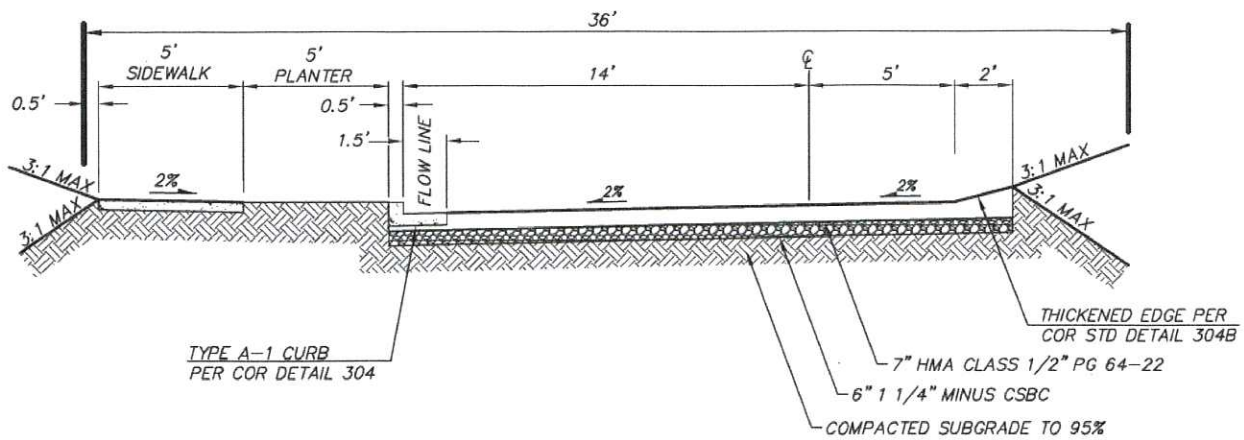


Figure 2- 166th Ct NE (Current Section)

When the Beuca development is constructed, the seven feet of pavement east of the centerline would be removed to construct a 14 foot crowned section, curb, gutter, sidewalk and associated utilities. To minimize disturbance to a new public street and lower construction costs, the proposal is for Shadow Creek to build 166th Court NE in its permanent configuration as shown in *Figure 3 - 166th Ct NE (Proposed Section)* below. This would include 14 feet of pavement east of the centerline and the curb and gutter. The 5 foot sidewalk would be built by the Beuca development at the time of plat construction.

Additional road improvements by Shadow Creek include curb ramps on the southeast and northeast corner of 166th Court NE and Road A, relocating the proposed curb ramp on the west side of 166th Court NE and a 25 foot road stub for Road A. An overview of the proposed improvements are shown in *Figure 4 – Design Revision of 166th Ct NE* and sheets RS-01 and RS-02 from the Shadow Creek plans are also attached.

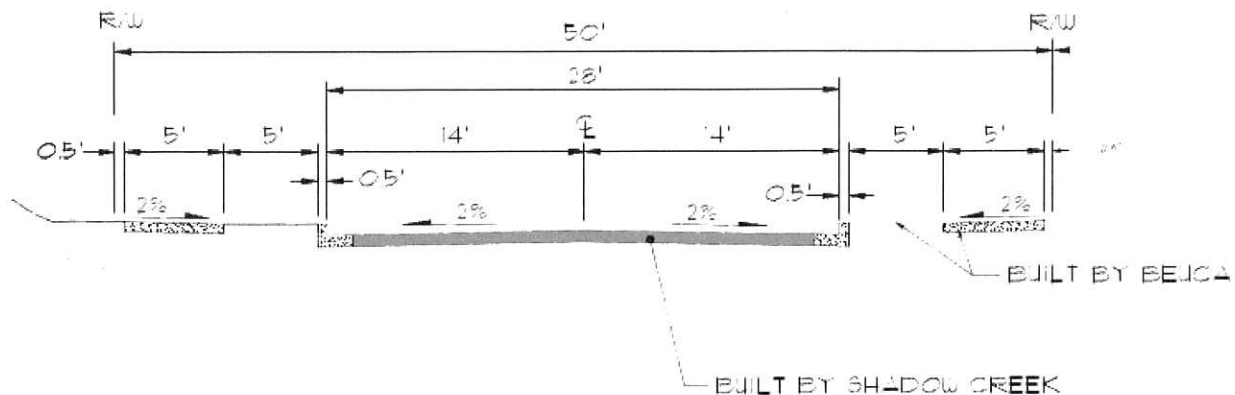


Figure 3- 166th Ct NE (Revised Section)

Utility Revisions

Shadow Creek will also be constructing additional utilities to serve the Beuca development which include:

166th Court NE

- 18-inch storm drain pipe and catch basins including the a stub for the Beuca detention vault
- 12-inch storm drain stub and catch basin for the Beuca detention vault outlet and connection to the existing storm drain in NE 122nd Street
- Temporary 12-inch pipe
- 6-inch side sewer stubs for lots 1-4

Road A

- 18-inch storm drain pipe and associated catch basins
- 8-inch sanitary sewer stub
- 8-inch water stub
- (3) 8-inch gate valves

Detention and Water Quality Treatment

An additional 4,011 square feet or 0.09 acres of pollution generating impervious area will be constructed with the design revision. However, this is less than the 5,000 square feet threshold area, so detention and water quality treatment is not required. A temporary 12-inch pipe will connect the permanent 18-inch storm drain with the permanent 12-inch storm drain to discharge runoff from the east side of 166th Court NE to NE 122nd Street. This temporary 12-inch pipe will be plugged during the construction of the Beuca development so all runoff from Beuca will be discharged to the development's detention/water quality vault.

Right of Way Dedication

Approximately 140 square feet from the southwest corner of Lot 15 of Shadow Creek will be dedicated to the City as part of the ROW for 166th Court NE.

Conclusion

Due to the timing of construction between Shadow Creek and Beuca, this memorandum is proposing that Shadow Creek construct 166th Court NE in its permanent configuration (except for the sidewalk on the east side). This design revision will eliminate the need for temporary construction and demolition of newly constructed features such as the wall and pavement east of the centerline on 166th Court NE. In addition, it will minimize disturbance of a new public street during the construction of the Beuca plat and provide a design that provides a seamless transition between the two communities.



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TECHNICAL MEMORANDUM

To: Kurt Seemann, P.E.
From: Sheri Murata, P.E.
Date: March 17, 2014
Re: Beuca - Deviation for Horizontal Curve Design

It was the City's request to provide a road connection between NE 123rd Way in Wexford and the entrance road of 166th Place NE in the Beuca and Shadow Brook developments. Due to this connection involving two fixed points, the design standards for the minimum radius of horizontal curves and minimum tangent distances between horizontal curves from Appendix 2 of the Redmond Zoning Code (Appendix 2) were not satisfied. Therefore, a deviation is being requesting for the design of Road A.

Design Standard – Appendix 2

Table 5 indicates that for Local Access Streets the minimum radius for a typical cross slope of less than 8 percent is 335 feet. The minimum tangent distance between horizontal curves shall be 100 feet for streets with a posted speed limit of 25 mph.

Proposed Design

A reverse curve with the first curve having a radius of 90 feet and the second curve having a radius of 115 feet and no tangent in between is proposed for Road A. Although the design of Road A does not meet the design standards above, it does meet AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roads ($ADT \leq 400$) shown below.

Design Standard – AASHTO

For constrained situations, roads with average daily traffic volumes of 250 vehicles per day or less, horizontal curves may be designed using Exhibit 5, which indicated that for a design speed of 20 mph and a maximum superelevation of 4 percent the minimum radius is 70 feet. (A design speed of 20 mph is appropriate to use in this situation of where such low volumes are anticipated.)

A typical crown section of 2 percent is proposed through the horizontal curves instead of a superelevation because this is a low speed urban street. This design is consistent with AASHTO's design of low speed urban streets in their Geometric Design of Highways and Streets where the lateral force is solely from side friction. Although vehicles traveling to the left experience an adverse superelevation with a normal cross slope, the resultant friction needed to sustain the lateral force is small for flat curves. Also, since no superelevation is proposed, no tangent between horizontal curves is proposed.

Conclusion

Therefore, although the design of Road A does not meet the City's Design Standards, it provides a minimum radius greater than AASHTO's design standards for low volume local roads and will not have a negative impact on residents.

