



**ENGINEERS  
SURVEYORS  
PLANNERS**

November 7, 2008  
BKF Job 20050061-10

## **Description of Infrastructure Improvements proposed for the Laurel Way Joint Venture Development**

The Laurel Way Joint Venture project proposes a private street extension from the existing Laurel Way to a new cul-de-sac turn around. This new private street will provide public ingress and egress along with emergency vehicle access. The proposed private street will also provide the area needed for public utilities, including storm drainage improvements to convey, store and treat storm water runoff (in accordance with current C-3 requirements) from the proposed project area, new sanitary sewer extensions, water main extension to create a looped water system, underground electric, telephone, CATV and gas lines to serve the proposed and existing residences along the Laurel Way extension. Therefore, the proposed Laurel Way extension will provide a public benefit of access and utilities to serve support the existing and proposed homes in the project area.

At the center of the project there is an existing drainage swale that passes through the project site and drains a 2.5-acre drainage area, an area approximately five times greater than the Laurel Way Joint Venture project site area. Within the project site, the existing drainage swale discharges to an existing 18 inch diameter, approximately 45-foot long corrugated metal culvert, conveying storm water flows under the existing 10 foot wide gravel roadway. The existing 18-inch diameter corrugated metal pipe (CMP) culvert has a flow capacity of about 19 cubic feet per second (cfs) with no surcharge and about 20 cfs when rainfall runoff ponds to the edge of pavement. Currently, under existing conditions the roadway will be overtopped with water briefly during a 10-year storm event. Downstream erosion and landsliding has occurred due to overtopping and uncontrolled discharge from the culvert outlet and the existing 10-foot wide gravel access roadway. Additionally, the peak 100-year inflow to the culvert is about 30 cfs. Therefore, the existing culvert is undersized and needs to be replaced with a new 24-inch pipe in the future. The attached Figure 1 shows the proposed Private Street improvements in the vicinity of the existing drainage swale that passes through the project site. The figure also shows the extent of the storm drainage facilities to convey and treat storm water from the private street area areas as well as drainage from the lots on the upper side of the street. Three filterra units are proposed in the street area adjacent to the swale to treat the storm water runoff prior to discharge into the drainage swale. A retaining wall is proposed along the lower side of the street to support these facilities and to deal with the grade differential due to the widening of improvements in this area. This retaining wall varies in height from approximately 5 feet to maximum of height of 11 feet in the area of the existing swale. The retaining wall will also stabilize the stream bank erosion and landsliding that has occurred at the outlet of the culvert. The new culvert extension would extend approximately 30 feet further than the existing 18-inch CMP culvert; to the face of the new retaining wall and from there the new storm drain culvert would discharge into the existing drainage swale. Outfall protection will be needed and is shown at the retaining outfall location (refer to Figure 1). The outfall protection/erosion protection would most likely be comprised of rock rip-rap for the bottom and banks of the swale and extend approximately

25 additional feet down the swale from the new culvert outfall. Therefore, the new storm drainage and private street improvements will affect approximately 55 to 60 feet of the existing swale below the current outlet of the existing 18-inch CMP culvert (refer to Figure 2). The project would fill in approximately 55 to 60 feet of the existing swale for street and public utilities needed to support the existing and proposed future homes. In summary, improvements are needed to the current culvert. These improvements will benefit the downstream neighbors, existing homeowners and the proposed homes and street improvements.

There are other storm drainage improvements proposed in the area of the swale just before the point where the swale leaves the project site (refer to Conceptual Utility Plan). In this area, storm flow from lots 1 through 5 and lots 7 through 10 are conveyed through pipes, with detention and storm water treatment and discharge through storm water lateral spreader outfalls along the top of the banks of the existing drainage swale (refer to Sheet C-3 Conceptual Utility Plan). There are no proposed impacts to the swale in this area since the current development plan does not include any work in the swale.

In addition to the information provided above, the proposed drainage improvements include storm water storage, treatment, conveyance and energy dissipation facilities. The project area is divided into six drainage areas that will store, treat, convey and discharge runoff in separate facilities. The following describes proposed facilities for each of the lot areas:

- Lots 1 through 4 - Storm water detention pipes are needed on each lot. Each detention system would include a 36-inch diameter pipe approximately 20 feet long. The individual detention pipes will release water into a vegetated swale that is 118 feet long, with a 1.5 foot width at bottom. The swale area will be constructed on the existing slope with retaining walls to create the graded bench and will carry runoff to the drainage swale.
- Lot 5 - A bio-retention basin is provided for this lot with 9-inches of ponding depth. Bio-retention media consists of 21-inches of sand/compost mix and 12 inches of drain rock. The bio-retention basin is sized based on the 100-year storage volume requirements for lot conditions. The bio-retention basin will release to a storm drain line and from there will discharge into the storm water lateral spreader outfalls along the top of the banks of the existing drainage swale.
- Lots 7 through 10 (space) - Bio-retention basins are provided for these lots with 9 inches of ponding depth. Bio-retention media consist of 21-inches of sand/compost mix and 12-inches of rock. The bio-retention basins are sized based on the 100-year storage volume requirements for each of the lot conditions. The bio-retention basin will release to a storm drain line and from there (space) will discharge into the storm water lateral spreader outfalls along the top of the banks of the existing drainage swale
- Lots 11 through 13 and the Street Area - Storm water detention pipes are needed on each lot. Each detention system would include 36-inch diameter pipe of approximately 20 feet with a restrictor orifice for controlled release of storm water flows. The pipes will release through curb drains to the street gutter. The

detained flow will be conveyed to a Filterra storm water treatment unit previously mentioned. The Filterra will release to the drainage swale at the culvert crossing.

- Lots 14 through 19 and the Street Area - Storm water detention pipes are needed on each lot. Each detention system would include 36-inch diameter pipe of approximately 20 feet with a restrictor orifice for controlled release of storm water flows. The pipes will release through curb drains to the street gutter. The detained flow will be conveyed to dual Filterra storm water treatment units previously mentioned. The Filterra will release to the drainage swale at the culvert crossing. In addition, a cut-off swale across the upper area of lots 14 through 19, upslope of the proposed homes will convey off-site storm water runoff to the drainage swale with no treatment or detention.
- Lot 6 and the sanitary sewer easement - No development is proposed within this area. No treatment or storage facilities are required. As previously mentioned, the existing corrugated metal pipe culvert crossing under the roadway is undersized for a 100-year storm event. The existing pipe shall be removed and replaced with a 24-inch diameter reinforced concrete pipe as a part of the overall development plan proposed by Laurel Way Joint Venture.

Additional details and information can be found in the Conceptual Development Plans, which further delineate these systems, including additional information on the water system and sanitary sewer tie-in points to existing facilities. Please refer to the Conceptual Plans, e.g. Development Plan, Grading Plan, Utility Plan and Retaining Wall Plan and the Storm Drainage Report for Laurel Way Joint Venture dated May 30, 2008.