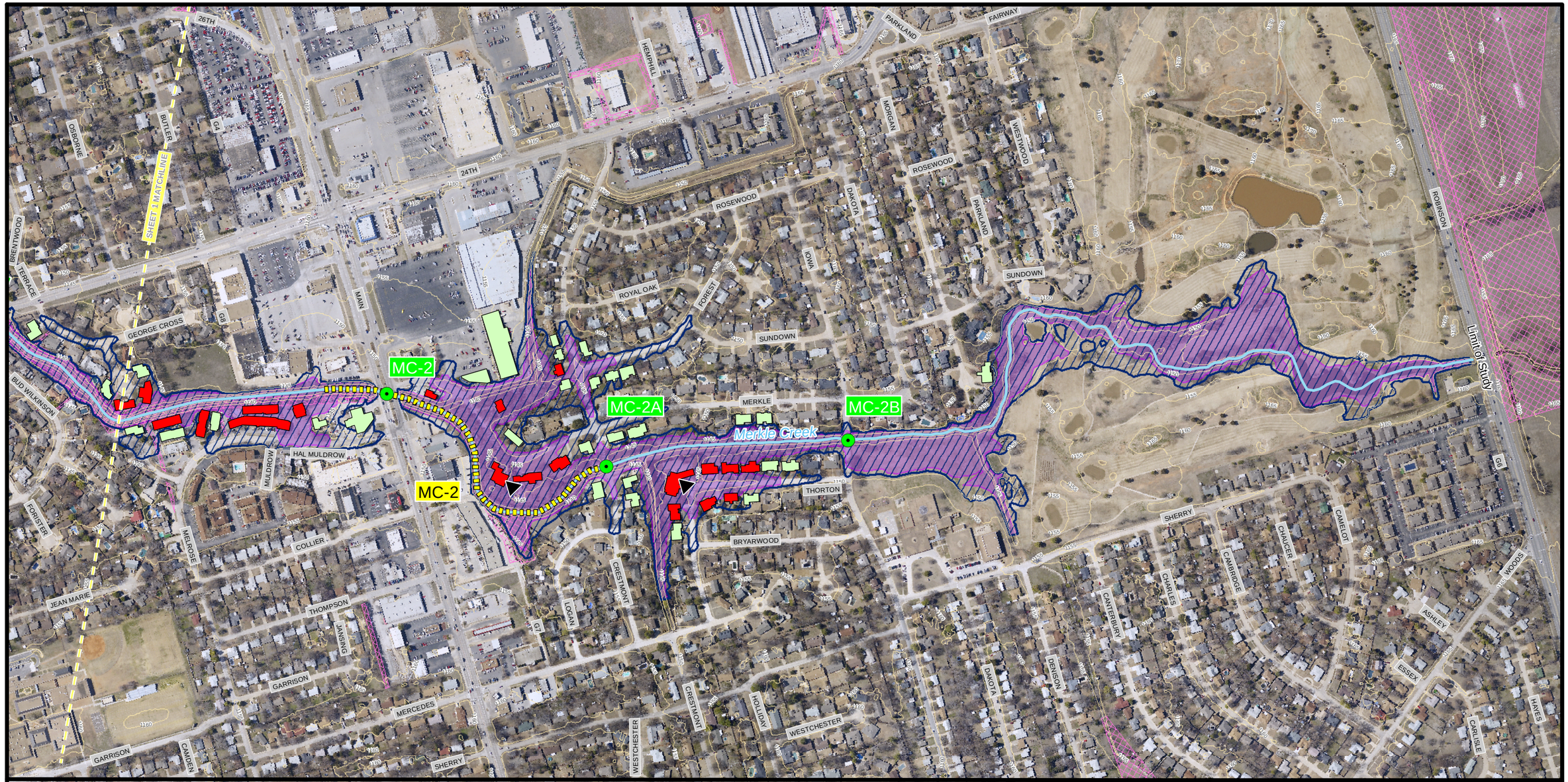


0 250 500 1,000 Feet

Aerial Photography: 2007
Coordinate System: Oklahoma State Plane, South Zone
Horizontal Datum: NAD 1983
Vertical Datum: NAVD 1988

Legend

City Boundary
Existing Drainage Easement

Stream Centerlines
Level 1 and 2 (Detailed)
Level 3 and 4 (General)

Floodplains
100-year Baseline
100-year Solution

Buildings in Floodplain
100-year Baseline
100-year Solution

Recommended Solutions
Road Crossing Upgrade
Property Buyouts
Floodwall
Channel Stabilization
Channel Improvements
Storm Sewer Improvements
Storm Water Detention

PBS&J

Storm Water Master Plan

Exhibit 6-15

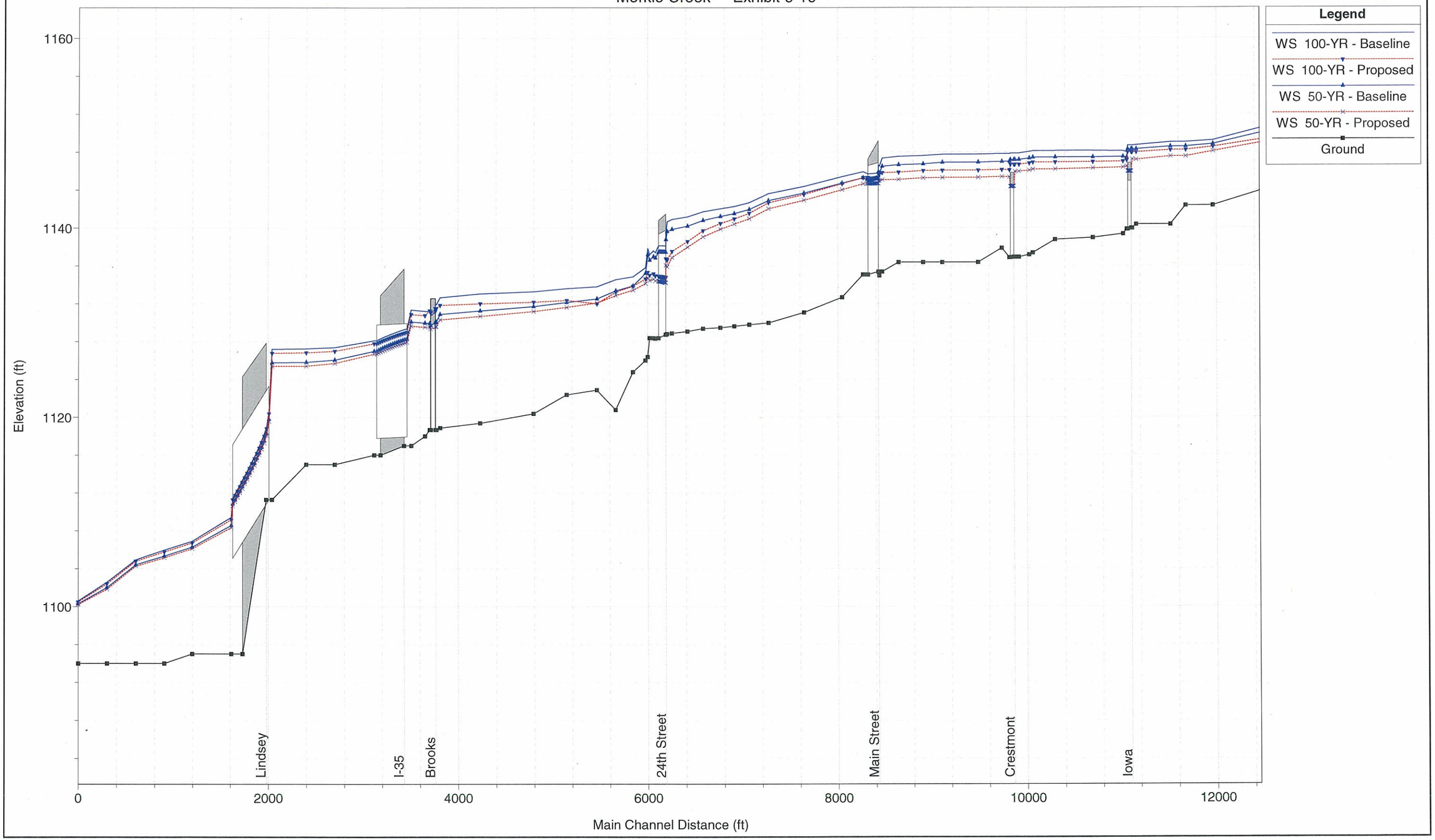
Baseline Floodplain and Recommended Solutions Overview Merkle Creek

Sheet 2 of 2

Job No.: 044194100	Date: 12-11-08	Scale: 1 inch = 500 Feet

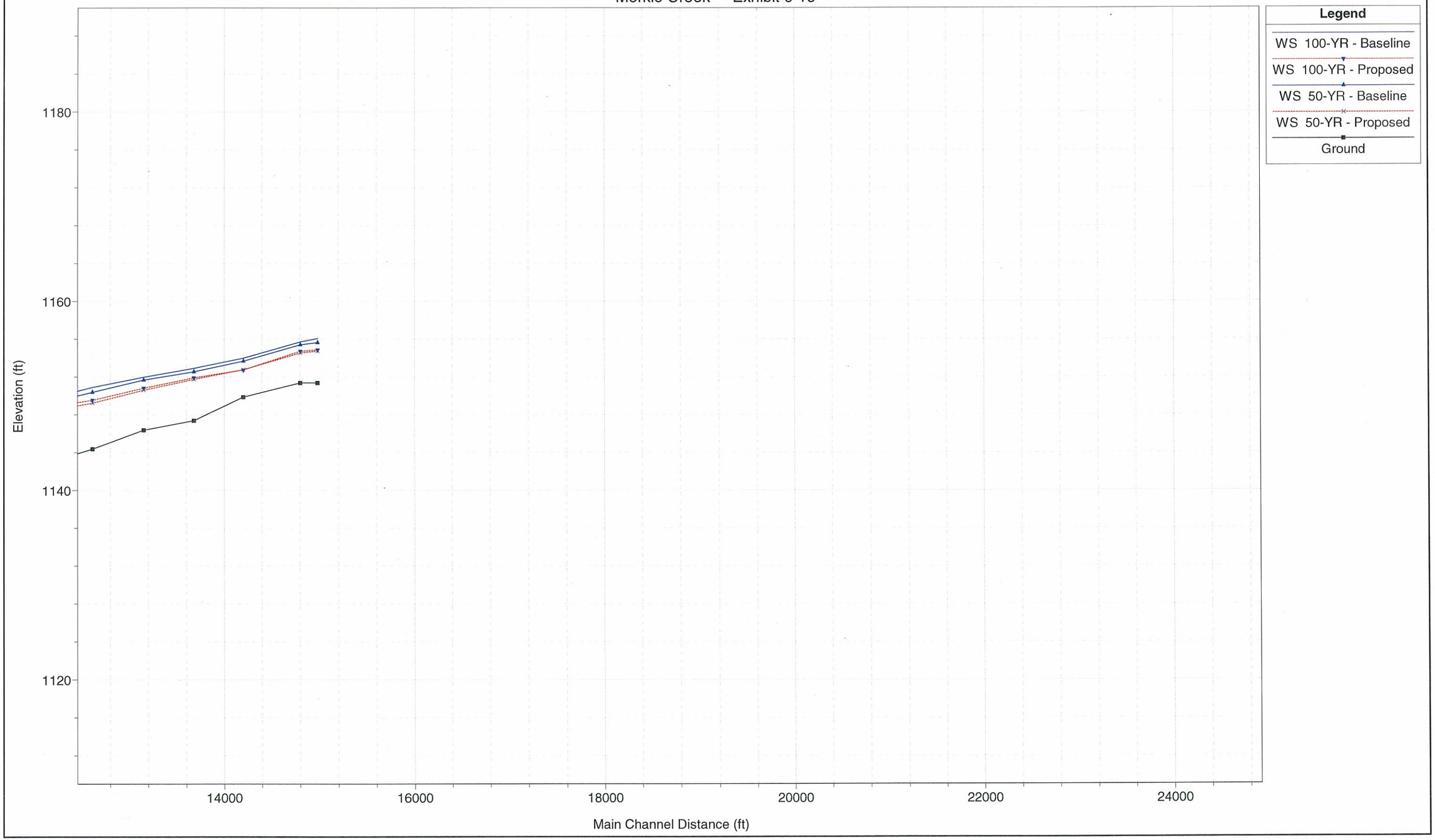
File: W:/WR/proj/441941_Norman/Report/Figures/Merkle_2.mxd

Merkle Creek Exhibit 6-16



1 in Horiz. = 1000 ft 1 in Vert. = 10 ft

Merkle Creek Exhibit 6-16



1 in Horiz. = 1000 ft 1 in Vert. = 10 ft

In addition, channel modifications downstream of the culvert to accommodate the additional culvert are proposed. The length of the channel improvements extends approximately 135 ft downstream of 24th Avenue SW and includes a bottom width of 30 to 50 ft and 3:1 side slopes. These improvements remove eight of the 15 flooded structures from the baseline floodplain.

The MC-2 solution in the Main Street area is by far the biggest and most expensive solution in the watershed at a cost of over $6 million. This solution is related to the MC-2A and MC-2B solutions as the upstream road crossings at Crestmont Street and Iowa Street experience flooding simply from a moderate amount of backwater caused by the existing Main Street culverts. However, the principal problem is that the Crestmont Street and Iowa Street top of road elevations are several feet lower than Main Street top of road elevation. In fact, the Crestmont and Iowa Street tops of road are both lower than the culvert opening top elevation at Main Street. This means that it is possible for storm water to be flowing through the culverts at Main Street near, but below, the top of its culvert opening while at the same time Crestmont and Iowa Streets would be inundated.

There are 14 structures located in the 100-year baseline floodplain footprint between Main Street and Crestmont Street that the MC-2 solution addresses. The MC-2 solution at Main Street involves removing the existing three 10-x-11.5-ft RCB system, replacing it with a three 12-x-12-ft culvert system, providing 1,500 ft of stream capacity improvements, and buying out four flood prone properties. The additional height of the proposed culvert can be accommodated due to the proposed lowering of the culvert invert. The culvert inverts can be lowered since there is a fairly steep drop in the creek bottom just downstream of Main Street. To maximize the benefit from the creek bottom changes, channel modifications were made beginning approximately 300 ft Street downstream of Main Street and extending upstream to the downstream face of Crestmont. This will give the channel a nice gradual slope. The costs for acquiring the four most-expensive properties amount to about $2.4 million, which represents almost 40% of the near $6.1 million total costs of the solution. The long runs of large box culverts also contributes heavily to the total costs for MC-2 shown in Table 6-2 with details provided in Appendix H. The MC-2 solution improvements remove eight of the 14 structures from the baseline floodplain although four of these structures were removed due to buyouts. Although this solution lowers water surfaces considerably, when considered alone it does not prevent Crestmont and Iowa Street from overtopping during the 50-year design storm.

The MC-2A solution at Crestmont Street includes removing the existing three 10-x-7.5-ft RCB system, replacing it with a three 12-x-8-ft RCB system, raising the Crestmont roadway by 1 ft in order to provide overtopping protection for a 50-year flood event, and acquiring two properties. These two properties targeted for acquisition cost almost $1.2 million, which is almost 70% of the total $1.75 million costs for the solution (see Appendix H). Again, without making improvements at Main Street, the solutions for Crestmont and Iowa Streets will not be sufficient even with the proposed changes. Combined with the MC-2 solution, MC-2A removes 14 of the 21 homes located in the baseline floodplain. This overall solution allows the culverts at Crestmont to pass the 50-year design flows.

The MC-2B solution at Iowa Street calls for removing the existing two 10-x-5-ft RCB system, replacing it with a three 11-x-6-ft RCB system, and raising the roadway by 1 ft. The MC-2 improvements at Main Street assist the solutions for Crestmont and Iowa Streets in mitigating the problems, to the extent possible. This solution, while combined with solutions MC-2A and MC-2B will remove the one structure presently located in the baseline floodplain and allow the Iowa Street culverts to pass the 50-year design flows.

No stream erosion or local drainage solutions were needed in this watershed.

Rock Creek

The RC-1, RC-2, and RC-3 solutions are fairly straightforward and similar in that they all involve upsizing culvert systems at local roadway crossings while two are also located along the mainstem and one problem (RC-3) is located along Tributary C. The Robinson Street (RC-1) and 36th Avenue NE crossings over Rock Creek as well as the 36th Avenue NE crossing over Tributary C to Rock Creek are all overtopped for the 10-year and greater floods under baseline conditions. The upgraded culvert systems at the road crossings will allow the systems to approximately pass the 50-year design event.

Table 6-2 as well as Exhibits 6-17a, 6-17b, 6-17c, 6-18a and 6-18b adequately discuss these solutions and display the associated benefits.

No stream erosion or localized solutions were required in the watershed.

Ten Mile Flat

The TMF-1 localized solution, located in Exhibit 6-19, is the only solution developed for this watershed and is fairly simple with channel capacity being increased with cross section enlargement and laying back of the channel side slopes. As shown in Exhibit 6-19, the 100-year baseline and solution floodplains are considered to be the same for Ten Mile Flat Creek since future development is projected to be very limited. Additionally, the floodplain shown was taken directly from the 2007 CLOMR study performed by MacArthur Associated Consultants, Ltd. (2005). The CLOMR was approved by FEMA in 2007. Any detailed use of this information should utilize the 2007 CLOMR study and any updates since the information presented herein was geo-referenced and digitized from that earlier work.

No stream erosion or stream flooding solutions were required in the watershed.

6.2 SOLUTIONS DEVELOPMENT METHODOLOGY

The solutions development methodologies discussed below cover stream flooding, stream erosion, local drainage and water quality. Stream flooding, stream erosion, and local drainage are discussed together as in most instances the proposed improvements involve providing storm water detention to reduce downstream peak flows or a modification of the creek channel and/or drainage system conveyance system. In one instance, BC-6, a floodwall was selected as the best solution to provide flood protection. A floodwall simply acts in the same manner as a levee and prevents flooding from the source (likely a creek) from reaching otherwise flood-prone structures. It is designed to look like a typical concrete or rock wall, but it is water tight with a solid foundation and length to hold back floodwaters. Water quality is discussed separately and, as discussed above, is more programmatic in nature.