Prepared for El Paso County, Colorado

AECOM

Peyton



June 2022

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Reference Documents

1. Your El Paso Master Plan (El Paso County, Colorado; May 2021)
2. El Paso County Parks Master Plan (El Paso County, Colorado; June 2013)
3. 2040 Major Transportation Corridors Plan (El Paso County, Colorado; December 2016)
4. Moving Forward 2045 Pikes Peak Area Regional Transportation Plan (Pikes Peak Area Council of Governments, October 2021)
5. US-24 Planning and Environmental Linkages Study (Colorado Department of Transportation, March 2018)
6. Manual on Uniform Traffic Control Devices (Federal Highway Administration, May 2012)
7. Central Front Range Transportation Planning Region 2035 Regional Transportation Plan (CDOT, January 2008)
8. El Paso County Land Development Code General Development Standards (El Paso County, December 2017)

1.0 Introduction

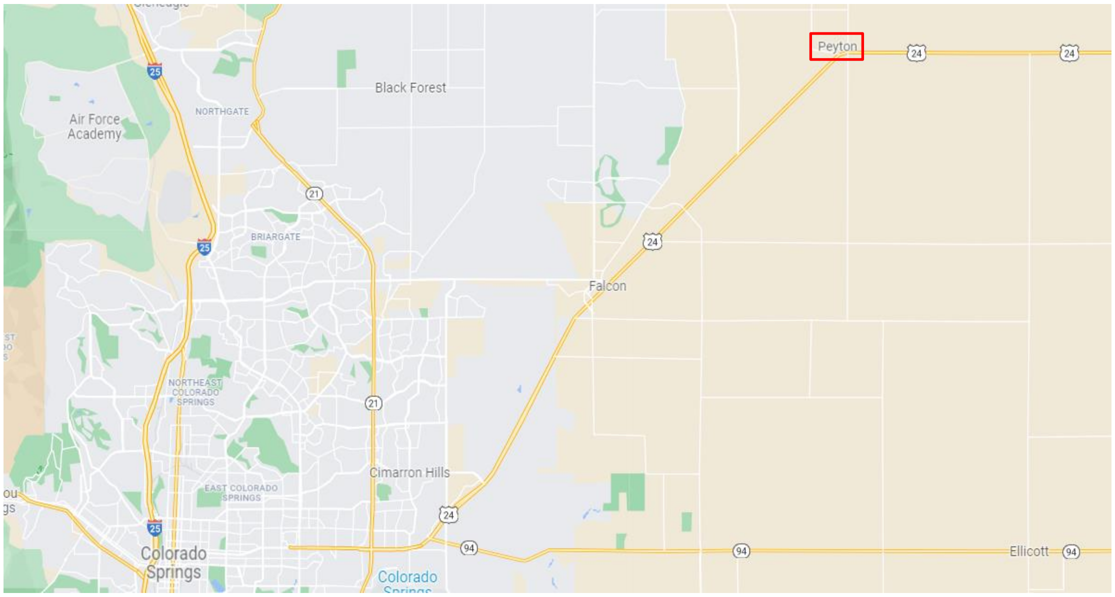


Figure 1. Reference map of Peyton, Colorado.

The Town of Peyton, Colorado is a rural town in El Paso County, located approximately 20 miles northeast of Colorado Springs. Peyton is home to a school system with a large geographic coverage area, a recently revitalized downtown Front Street area, and 250 residents.

1.1 Purpose

The intent of this Drainage and Transportation Master Plan (DTMP) is to detail a comprehensive understanding of existing drainage and roadway infrastructure challenges in Peyton, and then identify solutions to address those issues over the short and long term. Understanding the needs of Peyton's infrastructure network is critical before making specific drainage or transportation investments.

This DTMP provides documentation of the current drainage and transportation conditions in Peyton, including information on the existing drainage basins, utilities, general roadway network, bicycle and pedestrian facilities, and traffic patterns within the study area. The DTMP also describes the outreach process used to develop a community vision for future infrastructure in Peyton and inform the broader planning process. Overall, the DTMP identifies gaps in Peyton's infrastructure network and provides concept designs for key improvement projects. The DTMP concludes with a list of projects and an investment framework that serve as an implementation guide to El Paso County. Figure 2 illustrates an overview of the DTMP approach.

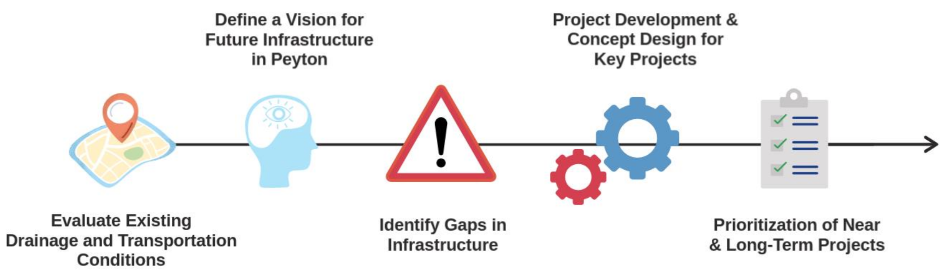


Figure 2. Overview of the DTMP planning approach.

2.0 Existing Conditions

An inventory of the existing drainage and transportation network in Peyton was conducted to understand and catalog drainage infrastructure, utilities, roadways, trails, sidewalks, signals, and signage. In addition, previously conducted county-wide studies were reviewed to understand current plans and policies that affect Peyton.

2.1 Study Area Description

Figure 3. Project study area.

Peyton is classified as an unincorporated town and Census Designated Place (CDP) in El Paso County. The full DTMP study area, shown in Figure 3, covers approximately 1.5 square miles and includes approximately six miles of roadway. The drainage study extent is narrowed to Peyton's core street grid, and the larger traffic study extent includes Peyton Elementary School and Peyton Junior-Senior High School (Peyton School District).

2.2 Regional Context and Land Use

Peyton has distinct rural character, yet access via US-24 allows residents to reach Colorado Springs and its amenities. The City of Colorado Springs is the second-most populous city in Colorado (478,961 residents, 2020 U.S. Census), behind only Denver, and the most extensive city in the state. At large, El Paso County, which spans Peyton and the Colorado Springs Metro Area, is experiencing population growth and development pressures. Your El Paso Master Plan, the county's latest comprehensive master plan adopted in May 2021, estimates that El Paso County will increase in population by more than 250,000 people over the next 30 years.

Chapter 3 (Land Use) of Your El Paso Master Plan analyzes the county's growth trends and provides recommendations to help meet the needs of the region's future generations. The Town of Peyton is identified as an Area of Minimal Change, and the area immediately surrounding Peyton is identified as an Area of Change for new development. Figure 4 shows the county-wide Areas of Change map from the Master Plan.

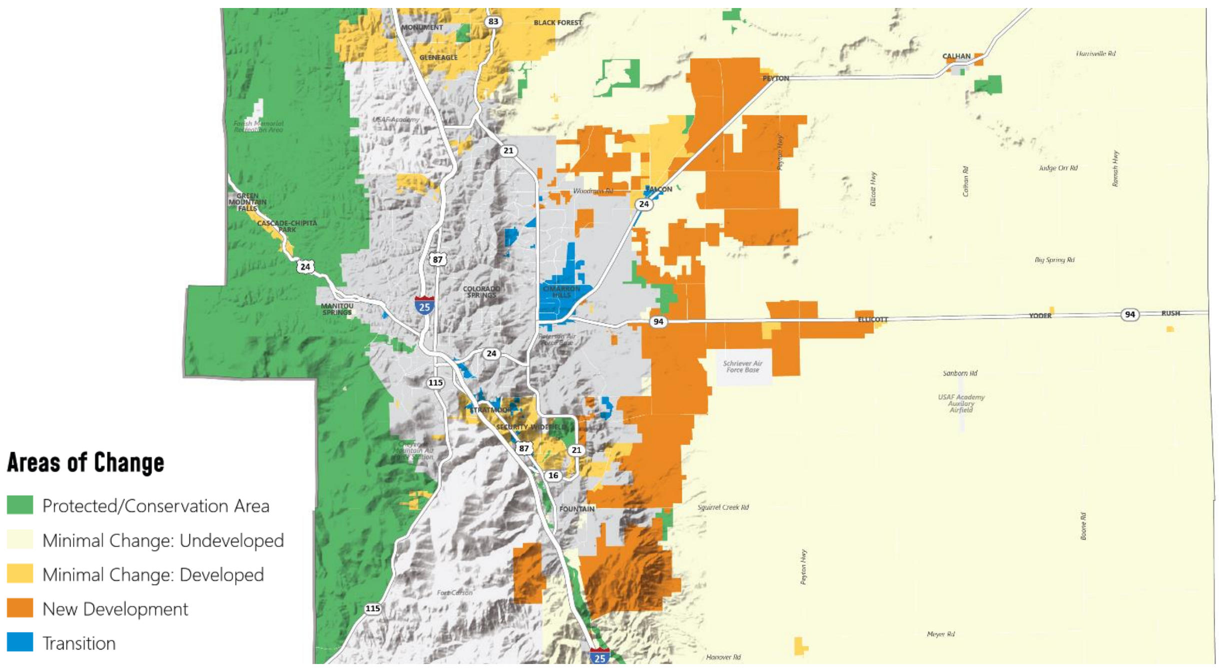


Figure 4. El Paso County Areas of Change. (Source: Your El Paso Master Plan, El Paso County)

The Town of Peyton has a mix of residential (178 acres), commercial (3.5 acres), school (120 acres), park (10 acres), municipal/county (15 acres), and agricultural (362 acres) land uses. Over the last decade, community members have advocated for a revitalized Front Street area that helps to generate economic activity and attract visitors. Community members have also proposed the conversion of county land adjacent to the Post Office into future park space.

The Peyton School District serves roughly 600 students in grades Pre-K through 12. The School District includes Peyton Elementary School (grades Pre-K through 6), Peyton Junior-Senior High School (grades 7-12), and a Career Technical Education Facility (CTEF) (grades 9-12).The School District spans 122 square miles and encompasses parts of both El Paso and Elbert Counties. Currently, the School District is developing a Master Plan to examine projected growth in student enrollment and ensure its facilities are adequate to support this growth. For example, the Grandview Reserve—an incoming residential development located eight miles southwest of Peyton, adjacent to Eastonville Road and US-24—is estimated to add over 3,200 homes to the School District by 2035.

2.3 Population and Employment

Per the 2020 U.S. Census, the resident population of Peyton is 250. The median household income is $64,000, and the percentage of the population below the poverty level is six percent. The primary mode of transport for Peyton residents is automobile use, and the average commute time is 25.3 minutes. Figure 5 shows Peyton's population breakdown by age. Figure 6 further depicts where Peyton residents travel to work, highlighting that most residents travel southwest (towards the Colorado Springs Metro Area) and have an average trip distance of 10-24 miles.

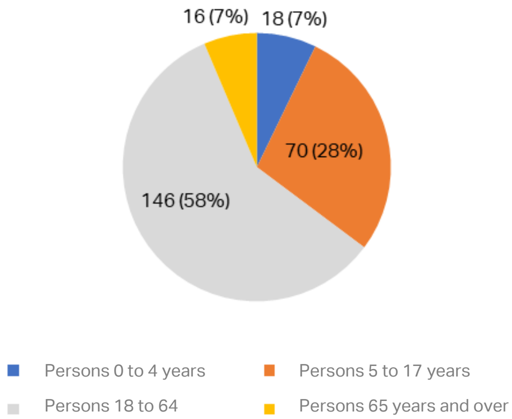


Figure 5. Peyton population by age. (Source: 2020 U.S. Census)

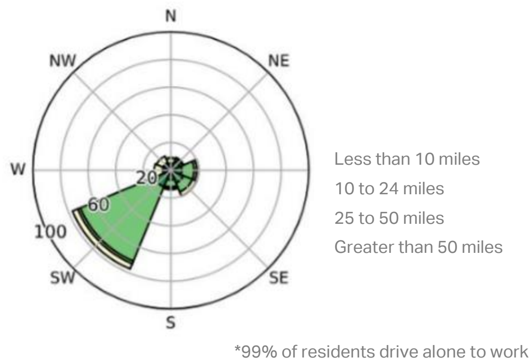


Figure 6. Where Peyton residents travel to work. (Source: 2019 U.S. Census ACS)

The rural and dispersed nature of Peyton increases transportation costs as people must rely on owning cars and driving farther distances, which in turn increases the area's cost of living. The Center for Neighborhood Technology (CNT), a research laboratory for urban sustainability, generates a Housing and Transportation (H+T) Affordability Index to provide a holistic view of affordability—one that includes the cost of housing and transportation at the neighborhood level. The H+T Affordability Index indicates the average annual transportation costs in Peyton are $16,716. Moreover, the average number of autos per household is 2.38, and the average annual vehicle miles traveled for households is 26,612. Average monthly housing costs in Peyton are $1,636. Combined, housing and transportation make up 62 percent of the average income of Peyton households.

The Pikes Peak Area Council of Governments prepares a socioeconomic forecast every four years for each update of its Regional Transportation Plan (RTP). Development of a demographic forecast (i.e., the Small Area Forecast) is required by federal regulations to ensure that Regional Transportation Plans are based on the latest available estimates and assumptions for population, land use, travel, employment, congestion, and economic activity. The Small Area Forecast is a socioeconomic forecast for El Paso and Teller Counties and uses the best available data (U.S. Census data, commercial employment databases, etc.) and local planning knowledge. Figure 7 shows the geographic extent used for this Small Area Forecast. Figure 8 illustrates results from the most recent Small Area Forecast with employment and population growth projections considering a 2045 horizon year.

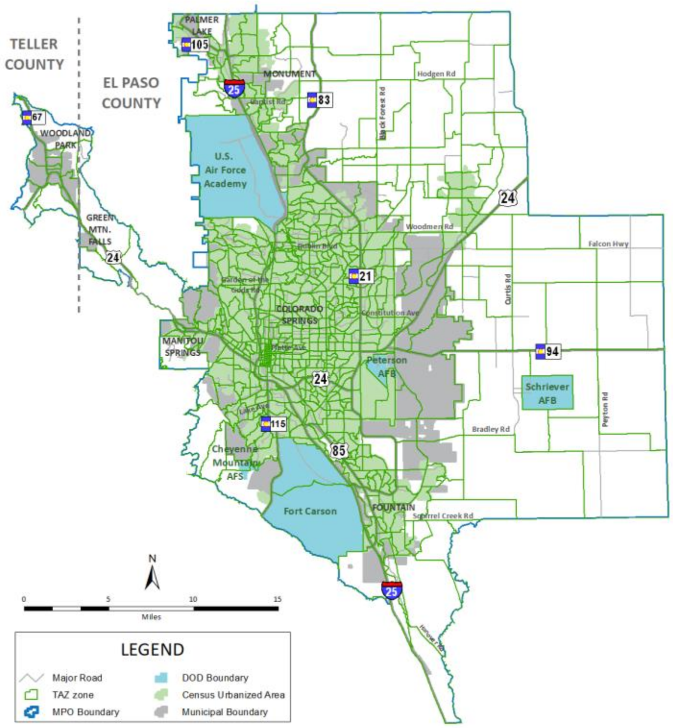


Figure 7. PPACG TAZ (Traffic Analysis Zone) map. (Source: 2045 Long Range Transportation Plan, PPACG)

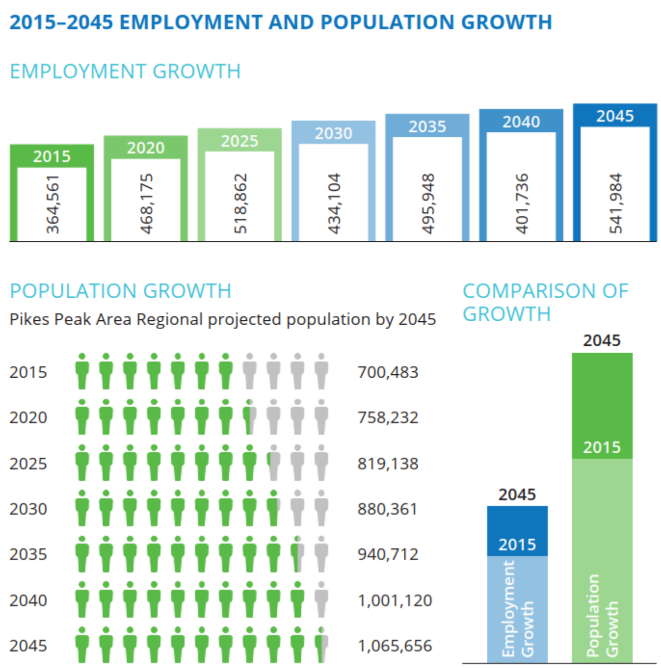


Figure 8. PPACG 2015-2045 employment and population growth. (Source: 2045 Long Range Transportation Plan, PPACG)

Peyton is also located within the Central Front Range (CFR) Transportation Planning Region. According to the CFR 2035 Regional Transportation Plan, population in the region is anticipated to grow by over 160 percent between 2000 and 2035. The El Paso County portion of this area, which excludes the City of Colorado Springs and its immediate surrounding area, is forecast to grow annually at 1.7 percent. Employment in this same area of El Paso County is forecasted to grow by 1.8 percent annually.

2.4 Origin-Destination Analysis

Origin-destination (O-D) analysis is used in transportation planning to determine travel and traffic patterns in an area of interest over time. O-D analysis tracks an individual's movement from the start of a trip to the end. O-D analysis can be aggregated to evaluate travel patterns along specific corridors and to understand regional travel patterns. The DTMP considers O-D data from Street Light—a software service that leverages anonymous location-based services data from cell phones—to evaluate current travel patterns to, from, and within Peyton.

The O-D data shown below is constrained to typical weekday vehicle trips. Trips that occurred Monday-Friday during the months of March, April, September, and October of 2019 are included in this dataset. This period represents traffic flow during standard commute and business hours under average seasonal roadway conditions. Data from 2019 is used rather than 2020-2021 data to avoid capturing irregular travel patterns during the COVID-19 pandemic.

Figure 9 shows an O-D analysis of trips made traveling to the Town of Peyton**.** Figure 10 and Figure 11 show the traffic by average trip length and trip purpose, respectively. Most people traveling to Peyton on a typical weekday come in from just north of Peyton, as well as Calhan, Falcon, Black Forest, and Cimarron Hills. The purpose for most people's trips is non-home based (NHB; any trip that does not either come from or go to a home). Other trip purpose types considered are home-based work (HBW; only trips from a home to work, or vice versa) and home-based other (HBO; any other kind of trip with one end at a home).

Notably, residents of nearby Falcon (an unincorporated community exurb in El Paso County*,* located 14 miles northeast of Colorado Springs along US-24) are assigned the same zip code as Peyton. This results in Falcon residents often traveling to Peyton to utilize the Post Office. Trips to the Post Office are captured as NHB.

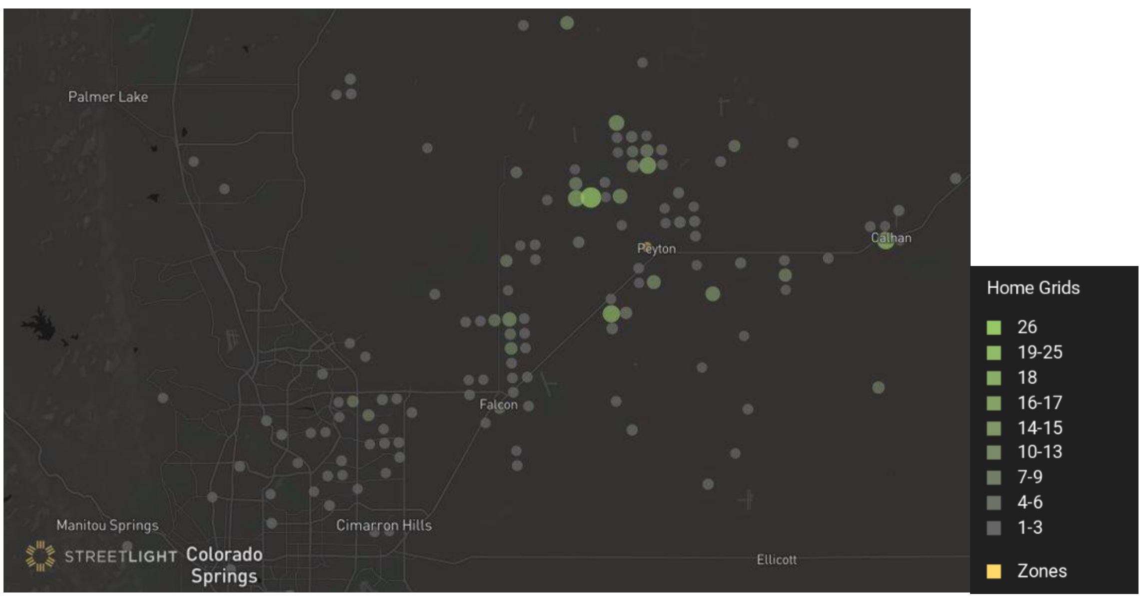


Figure 9. O-D analysis of typical weekday daily vehicle trips made traveling to Peyton. Number of trips is aggregated to 1-km residential grid blocks (Home Grids) based on home address origin location.

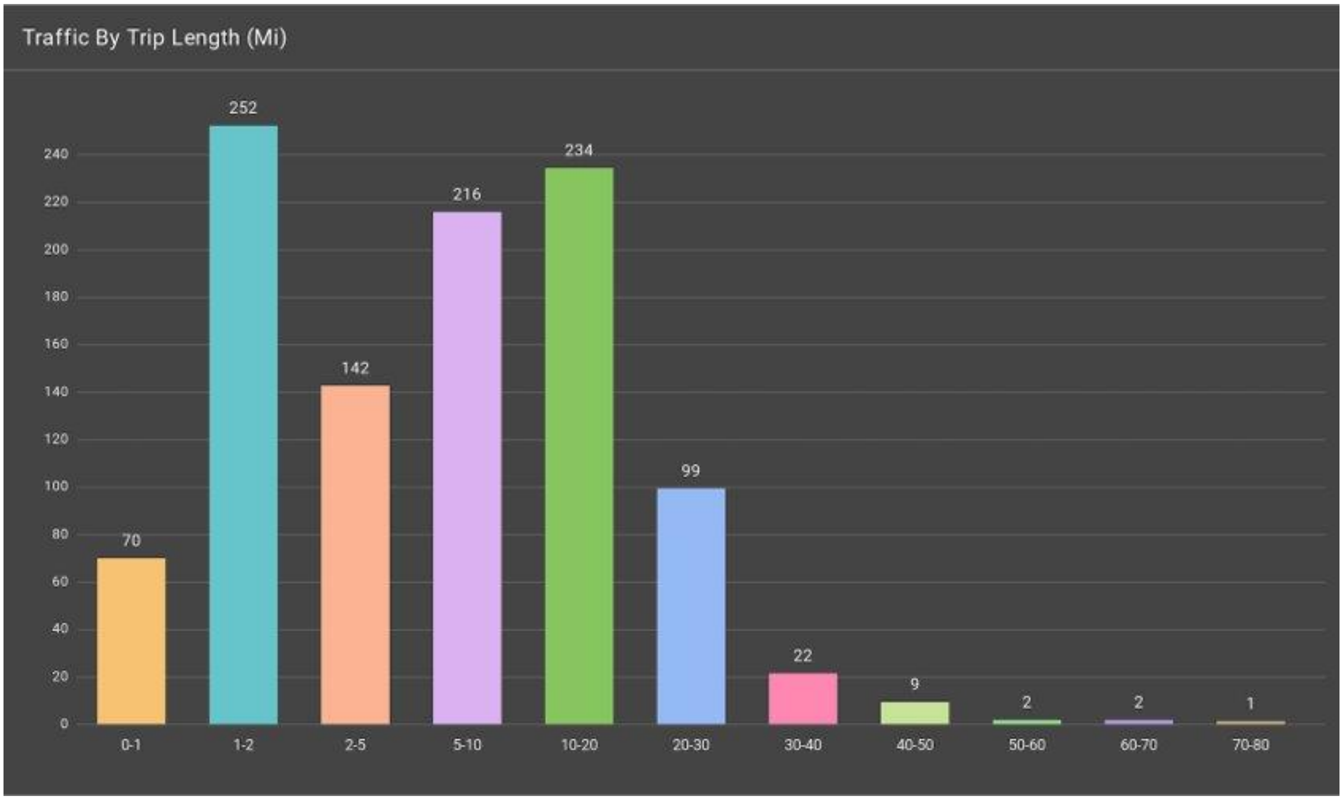


Figure 10. Trip length (miles) of typical weekday vehicle trips traveling to Peyton.

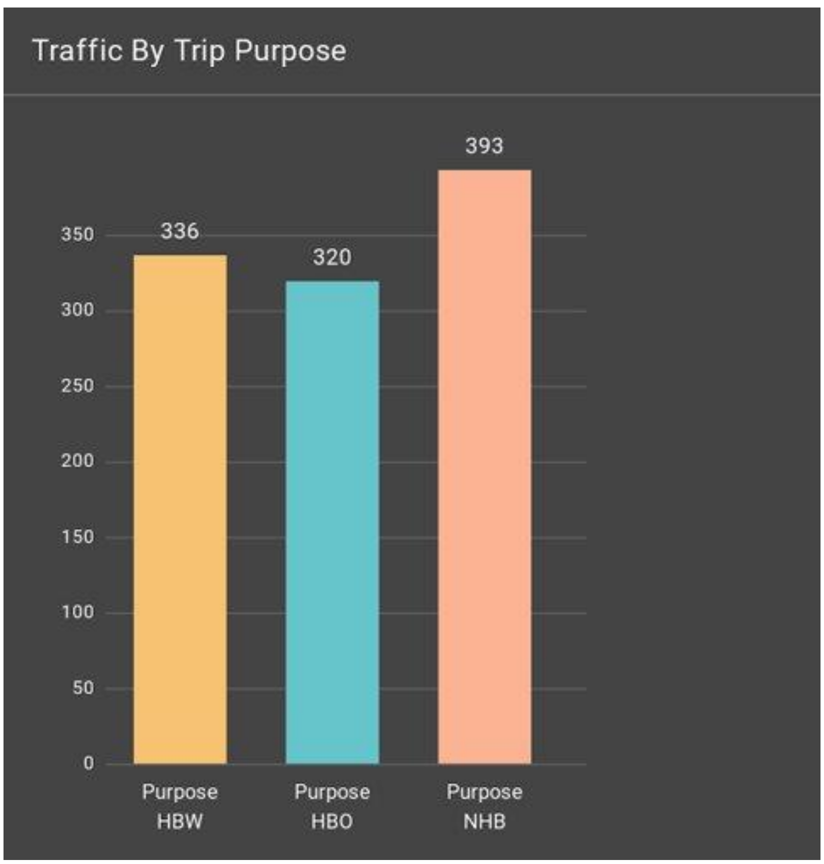


Figure 11. Trip purpose of typical weekday vehicle trips traveling to Peyton.

Figure 12 shows a secondary O-D analysis of typical weekday daily vehicle trips made traveling specifically to Peyton schools. Most people traveling to access the Peyton School District come in from just north of Peyton, as well as Eastonville, Falcon, and Calhan. Due to the large size of Peyton School District (122 square miles, encompassing parts of both El Paso and Elbert Counties), housing growth and development pressures surrounding Peyton will increase the number of trips made into Peyton to access the schools. Public school bus services are available to students and can eliminate congestion, but trip counts for parents and faculty are likely to increase over time.

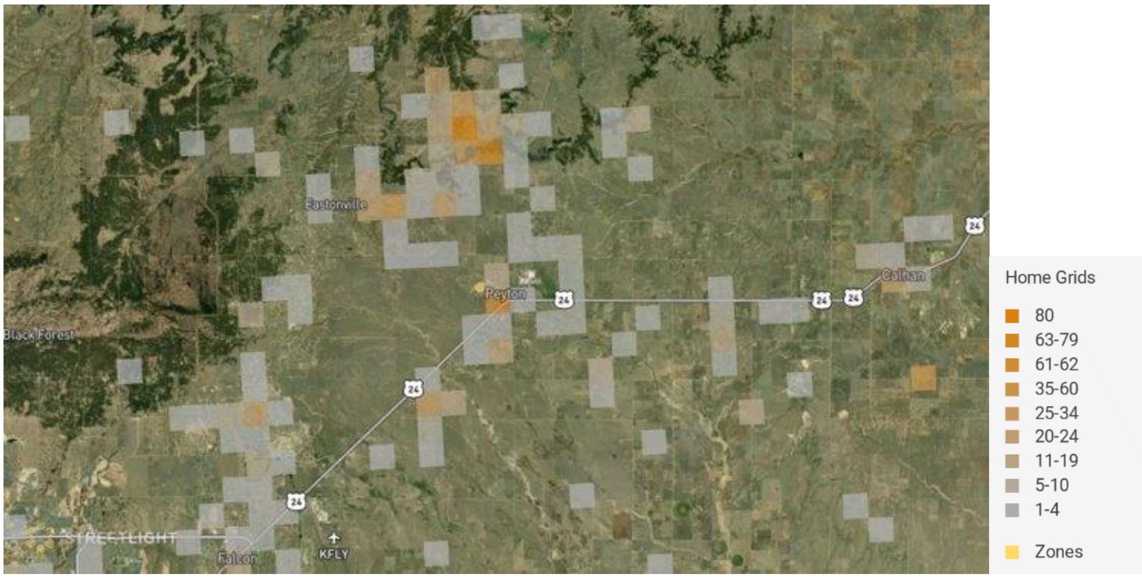


Figure 12. Typical weekday daily vehicle trips traveling to Peyton Schools. Number of trips is aggregated to 1-km grid blocks (Home Grids) based on home address origin location.

2.5 Existing Drainage Basins

To understand drainage patterns in Peyton, existing drainage basins were determined. Drainage basins are used to evaluate the volume of runoff an area receives and in what direction runoff flows. Flow is calculated for minor and major year storm events (e.g., 5-year and 100-year floods) and is measured in cubic feet per second (cfs). The location where flow ultimately collects is a design point.

There are six existing drainage basins within the Town of Peyton. One larger basin (B6) is approximately 4.9 square miles northeast of town, and five smaller basins (B1, B2, B3, B7, and B8) encompass the town. Basin B6 generally flows northwest to southeast near the intersection of Peyton Highway and Railroad Street. Basins B1, B2, B3, B7, and B8 generally flow from north to south. All flow ultimately drains to Brackett Creek, which runs in a southernly direction east of Peyton. There are no downstream conditions to note on Brackett Creek. The design points used for the existing basins are described as follows. Further technical drainage details for the existing basins can be found in the Town of Peyton Hydraulics and Hydrology Report **(Appendix A)**.

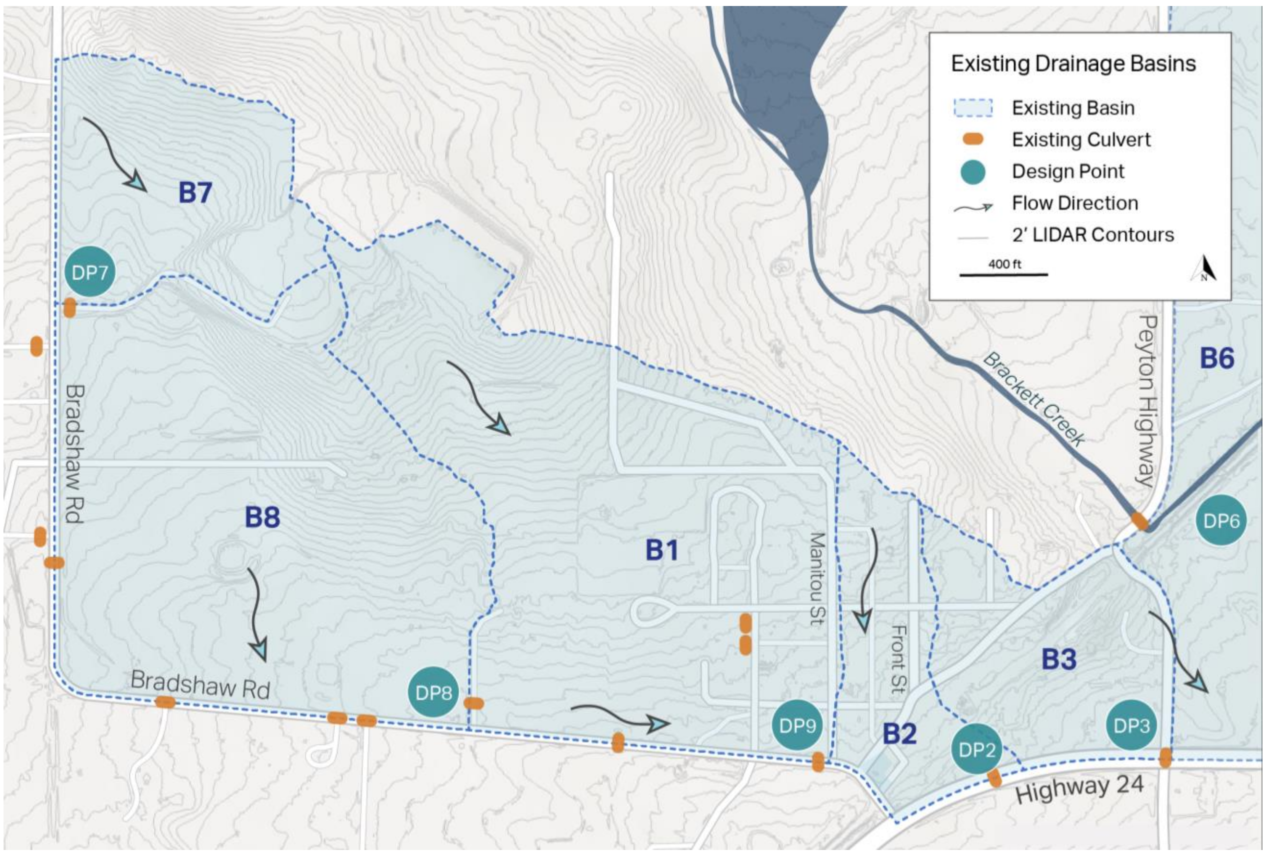


Figure 13. Existing drainage basins map.

The first design point (DP), DP9, is an existing culvert located at the intersection of Bradshaw Road and Manitou Street. The basin covers the area from Bradshaw Road on the west all the way to Manitou Street, which runs down the center of Peyton. This DP includes basins B1, B7, and B8, so the number 9 was arbitrarily chosen as the DP name. The land use in this basin is largely undeveloped fields, but residential, school, and park areas are also included. The minor storm flow in this area is approximately 39 cubic feet per second (cfs), and the major storm flow is approximately 158 cfs. Flow from this location ultimately crosses under Bradshaw Road, the Rock Island Trail, and US-24 before entering a ditch that carries runoff into Brackett Creek.

The second design point, DP2, is a culvert located under US-24 between Bradshaw Road and Peyton Highway. This basin includes the area between Manitou Street and Railroad Street. This DP includes basin B2, and that is why the DP name is DP2. Most of the land use in this basin is residential, but a portion of the north end of this basin is a large, undeveloped field. The minor storm flow in this area is approximately 17 cfs, and the major storm flow is approximately 46 cfs. Surface runoff from the town flows south into an existing low area south of the Post Office and is ultimately carried into Brackett Creek via a culvert.

The third design point is an area inlet, DP3. This design point is located on the northwest corner at the intersection of Peyton Highway and US-24. This DP includes basin B3, and that is why the DP name is DP3. This basin is a mix of residential, commercial, and undeveloped open space. The minor storm flow is approximately 21 cfs, and the major storm flow is approximately 30 cfs. Surface runoff ultimately flows east under Peyton Highway and reaches Brackett Creek. The outfall of the area inlet at this location was not located with survey or field reconnaissance visits.

The last design point, DP6, consists of three existing culverts that convey flow for Bracket Creek. This basin is delineated by the continental divide near Homestead Ranch Park to the north, Bradshaw Road to the west, and Peyton Highway to the east. This DP includes basin B6, and that is why the DP name is DP6. Much of this area is undeveloped. The minor storm flow in this area is approximately 39 cfs, and the major storm flow is approximately 400 cfs. The culverts for this basin are located northeast of the intersection of Railroad Street and Peyton Highway. Flow is then carried under Peyton Highway and continues in a southeasterly direction.

2.6 Existing Utilities

The DTMP project team coordinated with utility providers to understand the potential impacts of drainage and transportation improvements on local and regional utilities. The following utility companies were notified of the DTMP:

- LUMEN
- ZAYO
- Verizon
- Black Hills Gas
- Mountain View Electric Association
- Stratus IQ
- Woodmen Hills District

Of the companies listed above, only LUMEN, ZAYO, Black Hills Gas, and Mountain View Electric Association stated that they have existing infrastructure within the project study area. Black Hills gas serves some property owners within town limits; however, most of the properties use propane. Mountain View Electric Association provides electric services within the project study area.

There is no public water service within the Town of Peyton, as every property owner is on well water. Property owners are each on their own septic system since there is no public wastewater infrastructure. Peyton Junior-Senior High School treats its waste before releasing to septic.

Residents also stated that they do not have a reliable internet service.

2.7 Existing Street Network

Figure 14 illustrates Peyton's existing street network and intersection control. Most of the existing roadways do not meet current Engineering Criteria Manual standards. Per standards, all urban roadway cross sections have curb and gutter while rural roadway cross sections have smaller shoulders that transition to a roadside ditch on each side. Each of the major roads that comprise this street network are described as follows.

Figure 14. Existing roadway network and intersection control.

US-24

US-24 is a two-lane undivided roadway just south of Peyton with a posted speed limit of 65 mph. US-24 is maintained by CDOT and is classified as a Rural Principal Arterial. There are two at-grade intersections within the vicinity of Peyton spaced approximately 1300 feet apart: one at Bradshaw Road and one at Peyton Highway. Both are stop-controlled intersections with Bradshaw Road and Peyton Highway having the stop conditions. Acceleration and deceleration lanes are provided on US-24 for both intersections. US-24 has a paved shoulder of approximately nine feet along the south side of the roadway (northeast direction of travel) and approximately three feet on the north side (southwest direction of travel). The El Paso County 2016 Major Transportation Corridors Plan Update (MTCP) states that this section of US-24 will continue to be classified as a Principal Arterial in 2040.

Bradshaw Road

Bradshaw Road is a two-lane undivided roadway with a posted speed limit of 35 mph in the vicinity of the Town of Peyton. Bradshaw Road is maintained by the County and is classified as a Rural Minor Collector. Bradshaw Road runs west for approximately 3700 feet at the southern border of downtown Peyton and then turns north. Bradshaw Road is the main road to access Peyton from US-24. Bradshaw Road creates a T-intersection with US-24. This intersection is stop-controlled with Bradshaw Road having the stop condition. Both accesses to Peyton Elementary School and Peyton Junior-Senior High School west of the core of Peyton are located off Bradshaw Road. Bradshaw Road does not have curb and gutter or paved shoulders. The MTCP states that Bradshaw Road will be classified as a Collector in 2040.

Peyton Highway

Peyton Highway is a two-lane undivided roadway with a posted speed limit of 45 mph. Peyton Highway is maintained by the County and is classified as a Rural Major Collector. Peyton Highway runs north-south just east of downtown Peyton. Peyton Highway creates a T-intersection with Main Street, then continues north. Altman Plants, a plant nursery, can be accessed from Peyton Highway. Peyton Highway intersects US-24 and is stop-controlled with Peyton Highway having the stop conditions. Peyton Highway does not have curb and gutter or paved shoulders. The MTCP states that Peyton Highway will be classified as a Collector in 2040.

Railroad Street

Railroad Street is a two-lane local roadway with a posted speed limit of 20 mph. Railroad Street is maintained by the County and is classified as a Rural Minor Collector. Railroad Street runs diagonally east west between Bradshaw Road and Main Street and is the east border of downtown Peyton. Railroad Street turns into Main Street north of the Main Street intersection but maintains its east west alignment. Railroad Street/Main Street is a direct connection between Bradshaw Road and Peyton Highway. Railroad Street does not have curb and gutter.


Railroad St and Bradshaw Road

Front Street

Front Street is a two-lane local roadway that runs north south. Front Street is maintained by the County and is classified as a Rural Local street. Local businesses, such as the Peyton Junction Mercantile, line the segment between Railroad Street and Main Street. This segment does not have curb and gutter or marked parking for these businesses. This segment also does not have sidewalk access to these businesses.


Front Street


Front Street – Peyton Junction Mercantile

Other local roads

Within downtown Peyton, there are six local paved and unpaved roads providing access to various residential and commercial properties. The paved roads are classified as Rural Local streets. The intersection control for intersections within Peyton are a combination of two-way-stop control and two-way-yield control. The local roads currently do not have curb and gutter, allowing unrestricted off-street parking. The local roads also currently do not have adjacent sidewalks or pedestrian paths.

2.8 Traffic Volumes

To understand local traffic volumes, eight-hour turning movement counts and 24-hour tube counts were collected on May 13, 2021, by Idax. Peyton School District schools were in session on this day and the weather was good, so this represents a typical traffic day. Traffic counts were collected 14 months into the COVID-19 pandemic. Vehicle travel patterns and the number of vehicles traveling in May 2021 may be different than pre-COVID-19. Traffic data were collected at the following locations:

- Peyton Highway and Railroad Street intersection
- Main Street and Railroad Street intersection
- Bradshaw Road and Peyton High School Access intersection
- Bradshaw Road and Peyton Elementary School Access intersections
- Peyton Highway at Altman Plants Access Road

Additional traffic data was collected using Street Light's online on-demand data platform. Data from 2019 were collected to capture travel before COVID-19 restrictions. The data analyzed are an average of weekday a.m. and p.m. peak hour travel during the month of May in 2019. In rural areas without a lot of traffic, Street Light data can be less accurate given the small sample size and potential sporadic cell phone coverage. Street Light travel data were collected at the following locations:

- US-24 and Bradshaw Road intersection
- US-24 and Peyton Highway intersection
- Peyton Highway and Railroad Street intersection
- Bradshaw Road and Railroad Street intersection
- Bradshaw Road and Peyton Elementary School Access intersections
- Bradshaw Road and Peyton High School Access intersection
- Peyton Highway and Altman Plants Access Road intersection

Comparing traffic counts collected on May 13, 2021, verses Street Light data from May 2019, it appears that travel within the Town of Peyton has remained constant between 2019 and 2021. However, travel entering and leaving

Peyton from the south via US-24 and from the north on both Bradshaw Road and Peyton Highway has decreased by approximately 70 percent between 2019 and 2021. This difference may be due to the accuracy of the data compared with manual turning movement counts. Street Light traffic data from 2019 is used for analysis in this report to represent travel conditions before the COVID-19 pandemic modified travel patterns.

Figure 15 shows the 2019 a.m. and p.m. peak hour turning movement traffic volumes at key intersections. These volumes were used for the traffic operational analysis summarized below. The peak hours correspond with school class times of the Elementary School, Junior-Senior High School, and Career Technical Education Facility. The a.m. peak hour was 7:00-8:00 a.m. and the p.m. peak hour was 3:15-4:15 p.m.

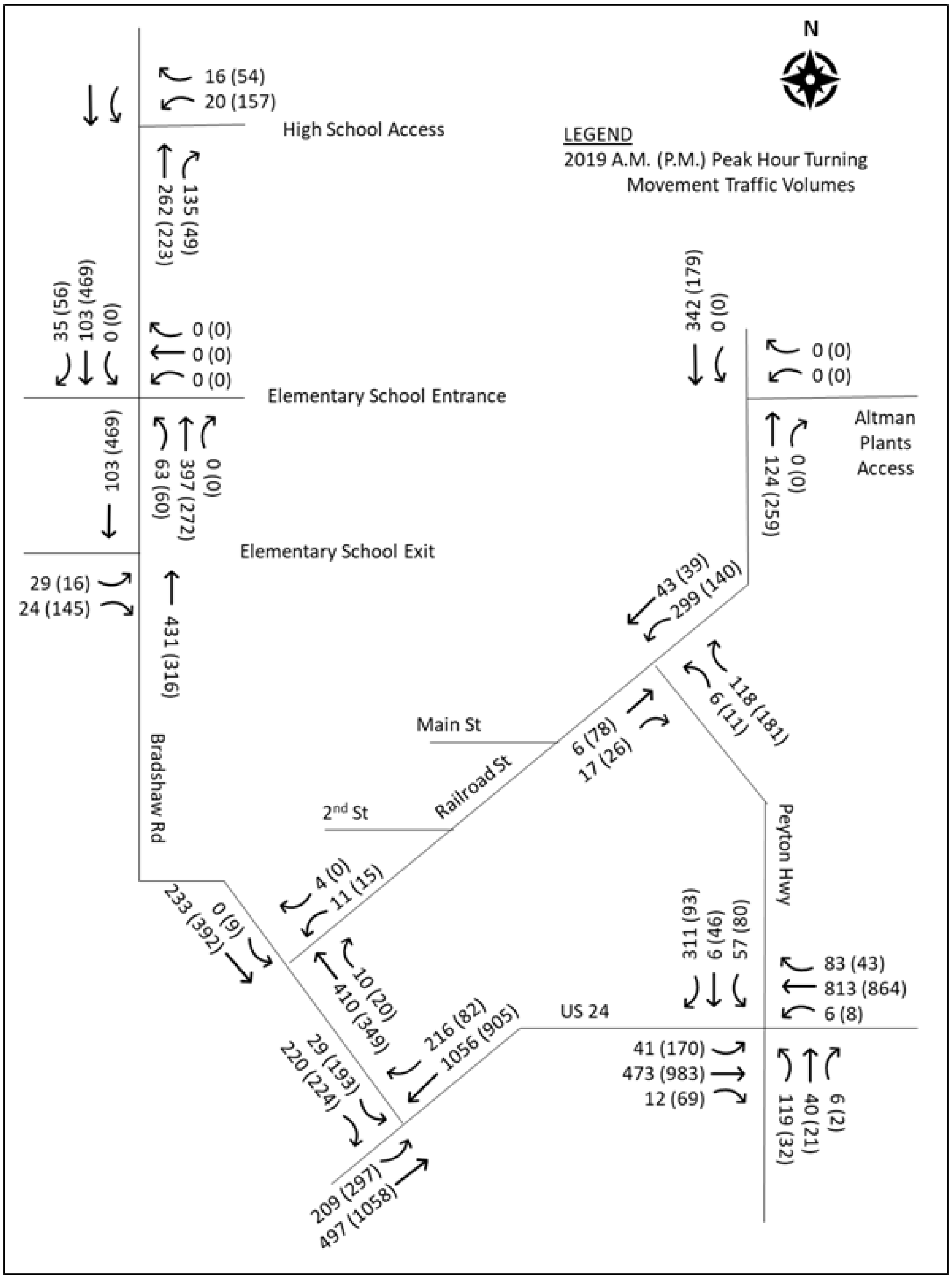


Figure 15. 2019 a.m. and p.m. peak hour turning movement traffic volumes.

Traffic volumes for 2040 were calculated by applying an annual growth rate to the 2019 traffic volumes. The Online Transportation Information System (OTIS) managed by Colorado Department of Transportation (CDOT) provides traffic data along all state highways within Colorado. Along US-24 in the vicinity of Peyton, OTIS data states that the 20-year growth factor ranges between 1.2 and 1.4, which calculates to an annual growth rate of 0.9 to 1.7 percent. For this DTMP, an annual growth rate of two percent (compound annual growth rate of approximately 1.5) was applied to represent a worst-case scenario. The annual growth rate of 1.0 percent was applied to traffic volumes entering and exiting the Elementary School and Junior-Senior High School.

Peyton School District anticipates growth in student attendance over the next 20 years with various housing developments currently planned within the School District's borders. The Elementary School saw an increase in students over the past year, yet the Junior-Senior High school saw a decline. United States historical birth rates have increased 0.09 percent each year since 2019 but are expected to decrease over the next 20 years. A 1.0 percent annual growth rate for school traffic is deemed appropriate for this traffic analysis at this time. Traffic volumes at the schools were rounded to the nearest five to aid in traffic balancing between intersections. Figure 16 shows the forecasted 2040 a.m. and p.m. peak hour turning movement traffic volumes at key intersections.

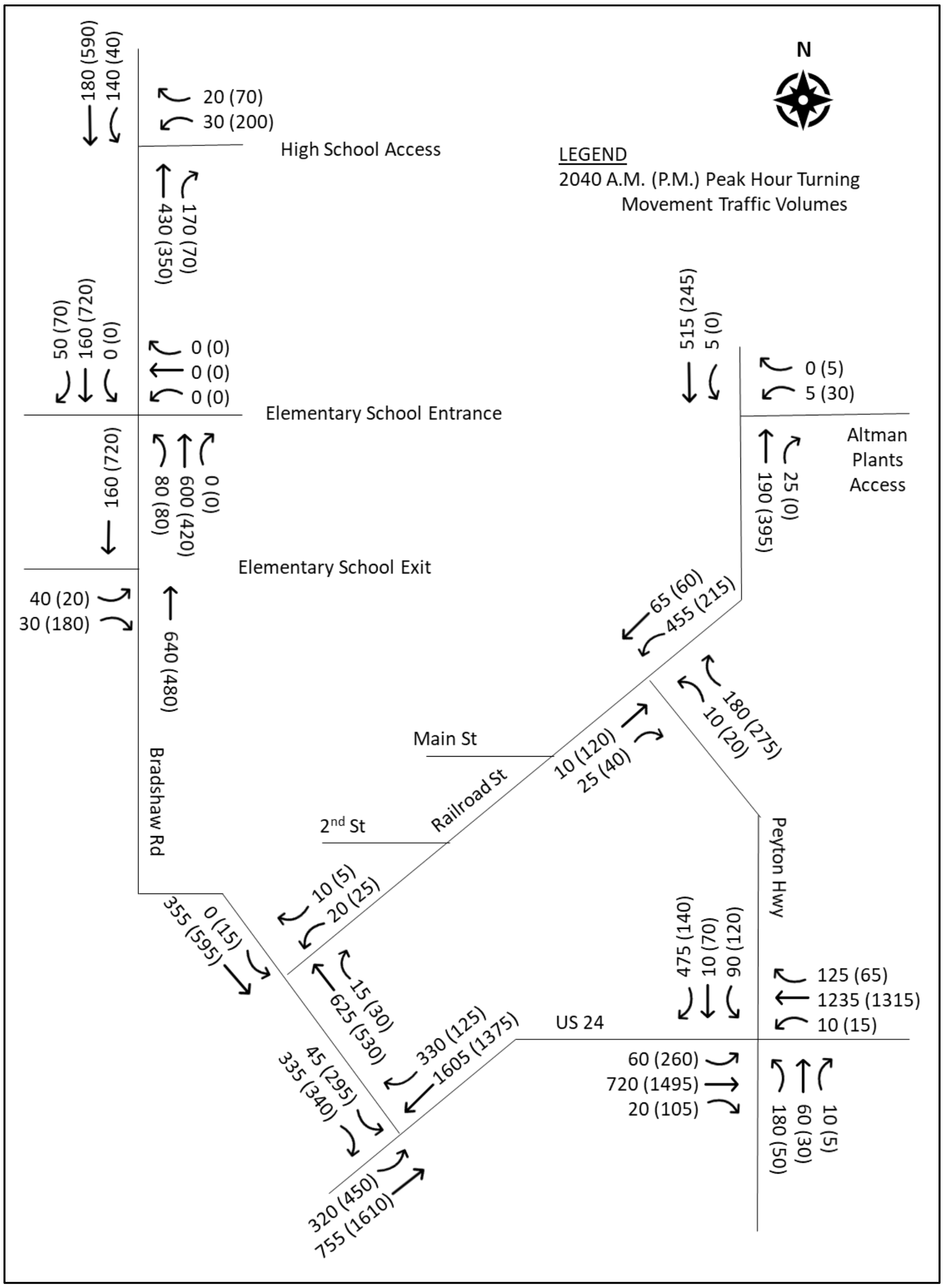


Figure 16. 2040 a.m. and p.m. peak hour turning movement traffic volumes.

2.9 Traffic Operations

Traffic operations at each intersection in the Peyton study area were analyzed using Synchro 11, which implements methodologies of the Highway Capacity Manual 6th Edition (HCM). Synchro calculates vehicle delay by movement, approach, and for the intersection overall to determine level of service (LOS) based on roadway geometric data, volume data, and type of traffic control. LOS is categorized by letter grades ranging from A to F. LOS A represents the best traffic conditions with vehicles flowing freely and minimal congestion and vehicle delay, while LOS F represents the worst traffic conditions with stop-and-go traffic and extreme congestion with high vehicle delay. Criteria for assigning LOS differ based on whether an intersection is signalized or unsignalized, as shown in Table 1.

Table 1. Level of Service Criteria (Source: Highway Capacity Manual 6th Edition, 2016)

Level of Service	**Unsignalized Delay** (s/veh)	**Signalized Delay** (s/veh)
A	≤ 10	≤ 10
B	>10 − 15	>10 − 20
C	>15 − 25	>20 − 35
D	>25 − 35	>35 − 55
E	>35 − 50	>55 − 80
F	> 50	> 80

Synchro default values were used while performing this analysis, except for the peak hour factor (PHF). PHF is the hourly volume during the maximum-volume hour of the day divided by the peak 15-minute flow rate within the peak hour, a measure of traffic demand fluctuations within the peak hour.

PHF = Peak Hour Volume/ (4 x Peak 15-Minute Volume)

A PHF equal to one indicates that there is no fluctuation in the 15-minute intervals within the peak hour. As the PHF decreases, the variation between the peak 15-minute interval and the average 15-minute interval becomes greater. The HCM recommends using a PHF of 0.88 for rural locations, which was used at all intersections except at the Elementary School and Junior-Senior High School intersections. It is common to see a larger influx of vehicles entering and exiting a school site within 15 minutes of the start of class and within 15 minutes of the end of class. For this reason, PHFs calculated using the collected data on May 13, 2019 were used at both school intersections instead of the HCM recommended 0.88 for this analysis. The PHF for the school related traffic was calculated for comparison purposes.

2.10 Traffic Operational Analysis Results

The following sections summarize the traffic operational analysis results from Synchro for existing 2019 conditions and 2040 future conditions. Further technical details for the 2019 and 2040 Synchro reports can be found in **Appendix B** and **Appendix C**, respectively. It was assumed that no roadway intersection configuration changes were made between 2019 and 2040.

US-24 and Bradshaw Road

The US-24 and Bradshaw Road intersection is stop-controlled with the stop-control on Bradshaw Road. The lane configuration is depicted in Figure 17, and traffic operations are summarized in Table 2. In 2019, overall, the intersection operated at LOS C in the a.m. and LOS F in the p.m. The southbound Bradshaw Road left turn movement experienced significant delays and LOS F during both the a.m. and p.m. peak hours. In 2040, overall, the intersection is forecasted to operate at LOS F for both peak hours with the northbound US-24 left and southbound Bradshaw Road movements operating at LOS F.

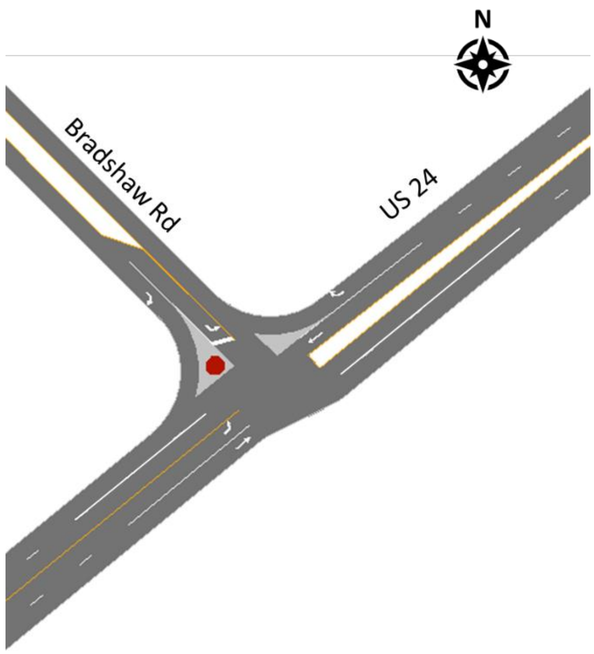


Figure 17. Existing US-24 and Bradshaw Road intersection configuration.

Table 2. Traffic operations – US-24 and Bradshaw Road

	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
One-Way Stop-Control	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
Overall	**C**	**21.0**	**F**	**>300**	**F**	**>300**	**F**	**>300**
US-24 - Northeast bound Left	C	15.4	C	15.5	F	110.2	F	142.9
Bradshaw Road - Southbound Left	F	>300	F	>300	F	>300	F	>300
Bradshaw Road - Southbound Right	A	0.0	A	0.0	F	>300	F	>300
US-24 - Southwest bound Approach	A	0.0	A	0.0	A	0.0	A	0.0

Existing traffic volumes at the intersection of US-24 and Bradshaw Road were evaluated to determine if the volumes satisfy criteria to justify possible signal control per standards discussed in the MUTCD, Chapter 4C Traffic Control Signal Need Studies. HCS7 software was used to evaluate the traffic volumes. The existing volumes satisfy the criteria for Warrant 2 (Four-Hour Vehicular Volume). Further technical details for the HCS7 reports can be found in **Appendix D**.

US-24 and Peyton Highway

The US-24 and Peyton Highway intersection is two-way stop-controlled with the stop control on Peyton Highway. The lane configuration is depicted in Figure 18, and traffic operations are summarized in Table 3. In 2019, overall, the intersection operated at LOS F with both left-thru movements on Peyton Highway operating at LOS F during both peak hours. In 2040, overall, the intersection is forecasted to operate at LOS F for both peak hours with both left thru-movements on Peyton Highway operating at LOS F.

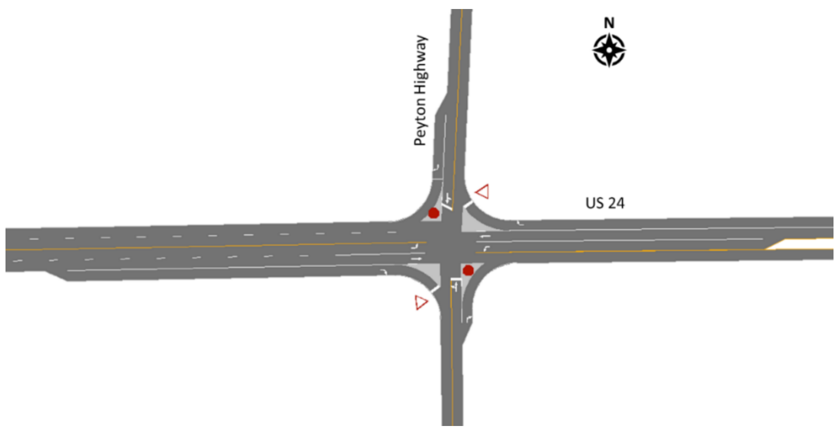


Figure 18. Existing US-24 and Peyton Highway intersection configuration.

Table 3. Traffic operations – US-24 and Peyton Highway

Two-Way Stop-Control	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**
Peyton Highway – Northbound Left-Thru	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**
Peyton Highway – Southbound Left-Thru	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**
US-24 – Eastbound Left	B	10.2	B	12.0	B	13.6	D	27.1
US-24 – Westbound Left	A	8.5	B	10.8	A	9.5	C	15.1

Existing traffic volumes at the intersection of US-24 and Peyton Highway were evaluated to determine if the volumes satisfy criteria to justify possible signal control per standards discussed in the MUTCD, Chapter 4C Traffic Control Signal Need Studies. HCS7 software was used to evaluate the traffic volumes. The volumes satisfy the criteria for Warrant 2 (Four-Hour Vehicular Volume). Decisions about signalization will be coordinated by CDOT. Further technical details for the HCS7 reports can be found in **Appendix D**.

Bradshaw Road and Peyton Elementary School

Peyton Elementary School has a circle driveway that accesses a parking lot and a pick-up/drop-off zone in front of the school. The north driveway acts as the entrance and the south driveway as the exit. The lane configuration is depicted in Figure 19, and traffic operations are summarized in Table 4 and Table 5. Table 6 summarizes the PHF values calculated using the traffic data collected from Street Light used for the Synchro analysis.

In 2019, overall, both driveways operated at LOS A for both peak hours; however, both movements exiting the school at the south driveway had LOS D in the p.m. peak hour. In 2040, both driveways are forecasted to operate at LOS A except for the south driveway, which is forecasted to operate at an overall LOS D with both movements exiting the school operating at LOS F during the p.m. peak hour.

It is expected that the intersections operate better in the a.m. as parents drop off their children over a longer period of time, whereas parents pick up their children in a more compact time frame usually within 30 minutes of classes ending for the school day. An increase in 2040 cross traffic contribute to the additional delay for those exiting the school.

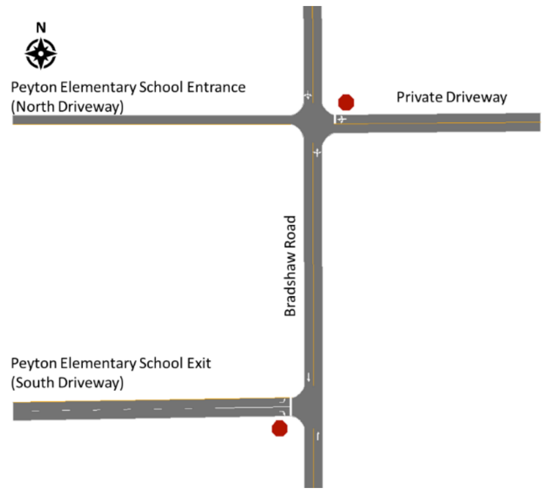


Figure 19. Existing Bradshaw Road and Peyton Elementary School intersection configurations.

Table 4. Traffic operations – Bradshaw Road and Peyton Elementary School entrance (north driveway)

No control	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**A**	**0.9**	**A**	**0.7**	**A**	**0.8**	**A**	**0.9**
Bradshaw Road - Northbound Left	A	7.9	B	10.4	A	8.4	B	14.3

Table 5. Traffic operations – Bradshaw Road and Peyton Elementary School exit (south driveway)

One-Way Stop-Control	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**A**	**1.0**	**A**	**4.4**	**A**	**2.0**	**D**	**26.3**
School Exit- Eastbound Left	C	21.6	D	29.8	**F**	**54.6**	**F**	**121.7**
School Exit - Eastbound Right	A	9.2	D	26.5	A	9.8	**F**	**199.5**

Table 6. Traffic operations – Bradshaw Road and Peyton Elementary School (Synchro analysis PHF values)

Movement	A.M. PHF	P.M. PHF
Northbound	0.49	0.62
Southbound	0.65	0.59
Eastbound Left	0.73	0.50
Eastbound Right	0.78	0.64

Bradshaw Road and Peyton Junior-Senior High School

Peyton Junior-Senior High School has one driveway to enter and exit the school. The lane configuration is depicted in Figure 20, and traffic operations are summarized in Table 7. Table 8 summarizes the PHF values calculated using the traffic data collected from Street Light and used for the Synchro analysis.

In 2019, overall, the intersection operated at LOS A during the a.m. peak and LOS F in the p.m. peak. It is forecasted to operate at LOS F for both peak hours in 2040. The westbound movement exiting the High School operates at LOS F in both the a.m. and p.m. peak hours for both years. This is expected as many of the students are old enough to drive, and with a large concentration leaving the school within 30 minutes of classes ending for the school day.

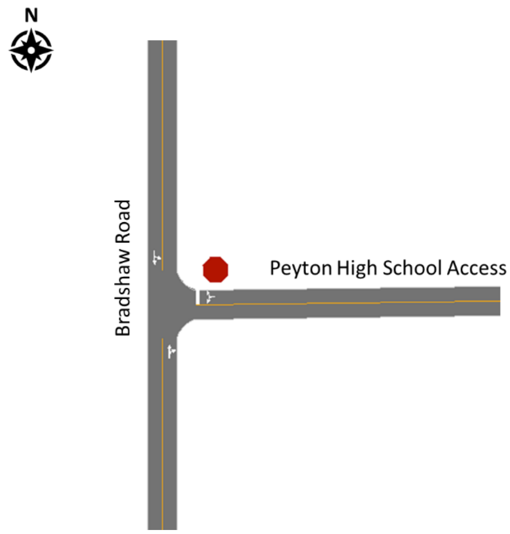


Figure 20. Existing Bradshaw Road and Peyton High School intersection configuration.

Table 7. Traffic operations – Bradshaw Road and Peyton High School

	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
One-Way Stop-Control	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**A**	**3.8**	**F**	**91.4**	**F**	**146.2**	**F**	**>300**
Bradshaw Road - Northbound	A	0.0	A	0.0	A	0.0	A	0.0
Bradshaw Road - Southbound Left	B	12.9	A	8.2	D	29.9	A	8.9
High School - Westbound Right-Left	**F**	**54.2**	**F**	**290.1**	**F**	**>300**	**F**	**>300**

Table 8. Traffic operations – Bradshaw Road and Peyton High School (Synchro analysis PHF values)

Movement	A.M. PHF	P.M. PHF
Northbound	0.39	0.72
Southbound	0.47	0.64
Westbound Left	0.71	0.45
Westbound Right	0.57	0.50

Main Street and Railroad Street

Railroad Street ends at the T-intersection with Main Street. Main Street continues on the Railroad Street alignment until the intersection with Peyton Highway, approximately 500 feet north. The lane configuration is depicted in Figure 21, and traffic operations are summarized in Table 9**.** For both 2019 and 2040, overall, the intersection operates at LOS A for both peak hours with all movements operating at LOS A.

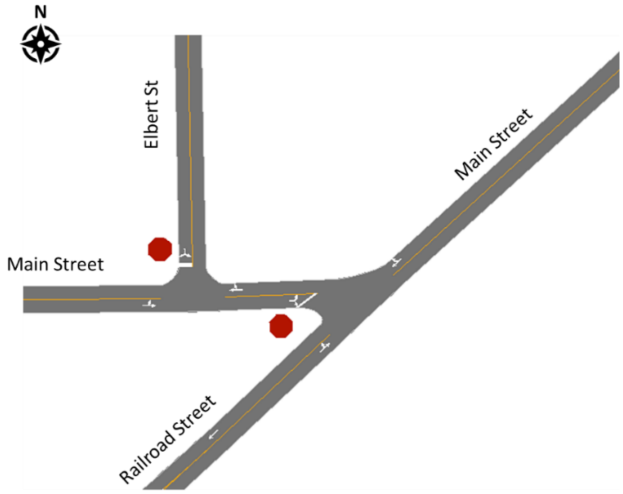


Figure 21. Existing Main Street and Railroad Street intersection configuration.

Table 9. Traffic operations – Main Street and Railroad Street

	2019 Existing Conditions				2040 Future Conditions			
One-Way Stop-Control	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**A**	**7.9**	**A**	**7.1**	**A**	**7.9**	**A**	**7.1**
Railroad Street - Northeast bound Left	A	0.0	A	0.0	A	0.0	A	0.0
Main Street - Southwest bound	A	0.0	A	0.0	A	0.0	A	0.0
Main Street - Eastbound Left-Right	A	8.6	A	8.5	A	8.6	A	8.5

Railroad Street and Bradshaw Road

Railroad Street ends at the T-intersection with Bradshaw Road. The lane configuration is depicted in Figure 22, and traffic operations are summarized in Table 10. In 2019**,** overall, the intersection operated at LOS A with the southwest Railroad Street movement operating at LOS B in the a.m. peak hour and LOS C in the p.m. peak hour. In 2040, overall, the intersection is forecasted to operate at LOS A with the southwest Railroad Street movement operating at LOS C in the a.m. peak hour and LOS D in the p.m. peak hour.

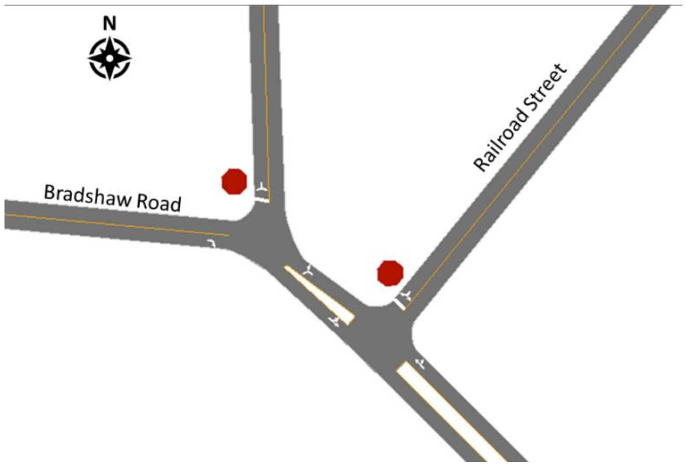


Figure 22. Existing Bradshaw Road and Railroad Street intersection configuration.

Table 10. Traffic operations – Bradshaw Road and Railroad Street

One-Way Stop-Control	2019 Existing Conditions				2040 Future Conditions			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
OVERALL	**A**	**0.3**	**A**	**0.4**	**A**	**0.6**	**A**	**0.8**
Northwest bound	A	0.0	A	0.0	A	0.0	A	0.0
Southeast bound	A	0.0	A	0.2	A	0.0	A	8.9
Southwest bound Left-Right	B	13.8	C	17.0	C	19.8	D	28.5

2.11 Crash Analysis

El Paso County provided crash data in the study area from 2017 to 2021 via the County's online database. Figure 23 shows the locations of the reported crashes. There were seven (7) reported crashes. Six (6) crashes involved a single vehicle, and one (1) involved two vehicles. Full crash data reports can be found in **Appendix E**.

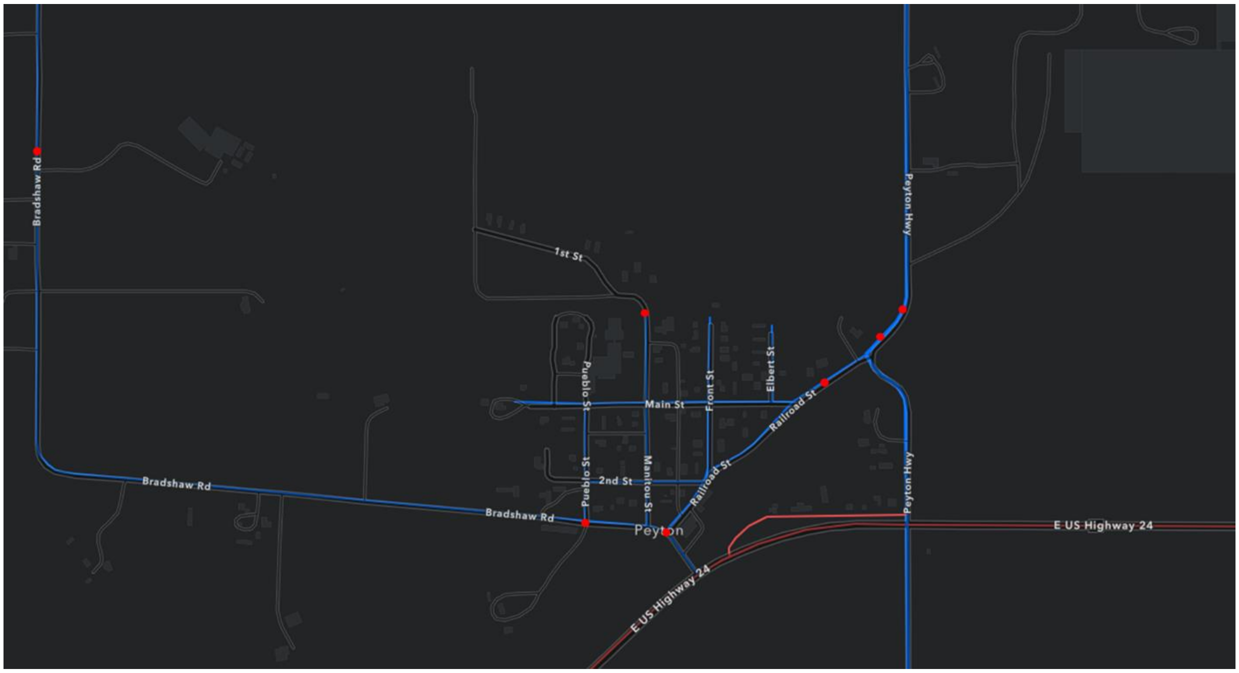


Figure 23. Crash locations (2017-2021).

Roadway Location

Three (3) crashes were reported on Bradshaw Road. One (1) was on Main Street, two (2) on Peyton Highway, and one (1) on Manitou Street. Seven (7) crashes were non-intersection related, and one (1) was at an intersection.

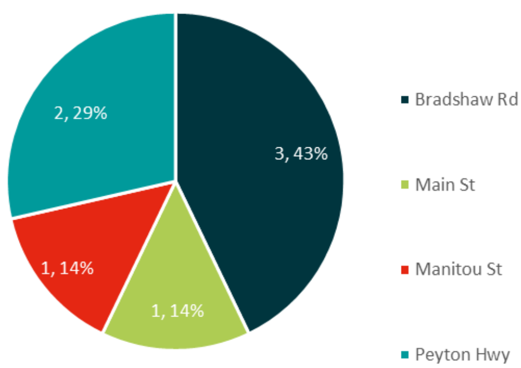


Figure 24. Crash analysis based on roadway location (2017-2021).

The two crashes reported on Peyton Highway were along the curve in the road between Main Street and the Altman Plants access road intersections. Crashes resulted in the vehicle overturning or running off the roadway and hitting a stationary object. A review of existing curve-related warning signing revealed the presence of some advance turn warning, advisory speed plaque, and chevron alignment signing, which are consistent with MUTCD guidance on horizontal alignment signing considerations. As a result, this location may need to be evaluated for possible improvements to the horizontal curve geometry, given the tighter curve radius. The remaining five crashes reported were all at different locations within Peyton.

Injury Severity

Five (5) reported crashes resulted in Property Damage Only (PDO), and two (2) resulted in Injuries. Of the two crashes resulting in Injuries, one (1) was reported as Non-Incapacitating, and one (1) was Incapacitating. There were no fatalities reported.

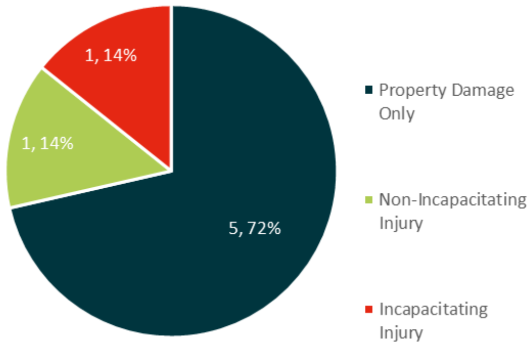


Figure 25. Crash analysis based on injury severity (2017-2021).

Weather Conditions

Five (5) reported crashes were during dry conditions. One (1) was during icy conditions, and one (1) was during wet conditions.

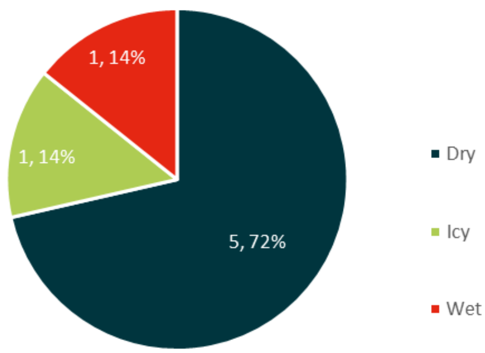


Figure 26. Crash analysis based on weather conditions (2017-2021).

Lighting Conditions

Four (4) crashes were reported during dark-unlighted conditions, and three (3) were during daylight.

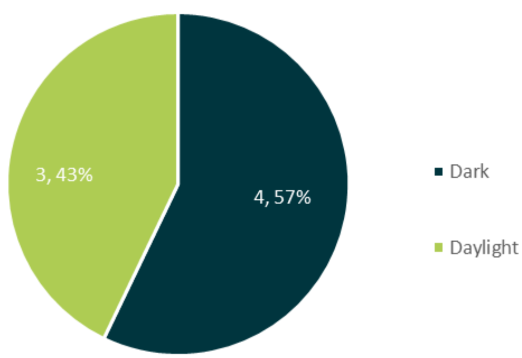


Figure 27. Crash analysis based on lighting conditions (2017-2021).

Crash Type

Four (4) reported crashes were overturning. One (1) was with another object, one (1) was a broadside crash, and one (1) was with a parked car.

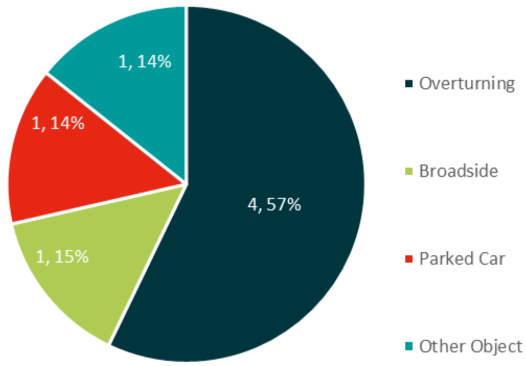


Figure 28. Crash analysis based on crash type (2017-2021).

Driver Impairment

Four (4) crashes reported the driver had no impairment, and three (3) reported that alcohol was involved.

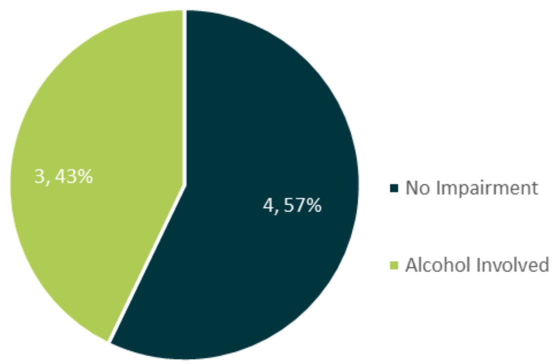


Figure 29. Crash analysis based on driver impairment (2017-2021).

2.12 Bicycle and Pedestrian Facilities

The roadways within Peyton currently do not have sidewalks or dedicated bike facilities. Neither Bradshaw Road nor Peyton Highway have shoulders. Bicyclists traveling these roadways must share the lanes with vehicles. Pedestrians must walk in the dirt alongside the roadways. These unimproved conditions present challenges to pedestrians and those with disabilities or vision impairment. Traffic counts conducted during the planning process did not identify a large number of pedestrians or bicyclists at intersections, but this may be due to lack of facilities.

The Rock Island Regional Trail is an unpaved trail that runs adjacent to US-24. The trail is 10.5 miles in length between Falcon and Peyton, terminating at Bradshaw Road south of downtown Peyton. The existing unpaved surface generally meets ADA criteria as a firm and stable surface but requires regular maintenance to maintain the surface. The El Paso County Parks Master Plan (updated June 2021) proposes to continue the trail east to Calhan and Ramah for a total length of 32 miles. Currently there is not a dedicated parking facility for trail access in Peyton. Community members stated that those wanting to access the trail usually park in the Post Office parking lot across Bradshaw Road.

Strava Metro heat maps include bicycle activity that users track via GPS and upload to Strava. Most of the bicycle activity in and near Peyton is on US-24, the Rock Island Trail, Bradshaw Road, and Peyton Highway. Within town, there is activity on Railroad Street, as well as on other local streets.

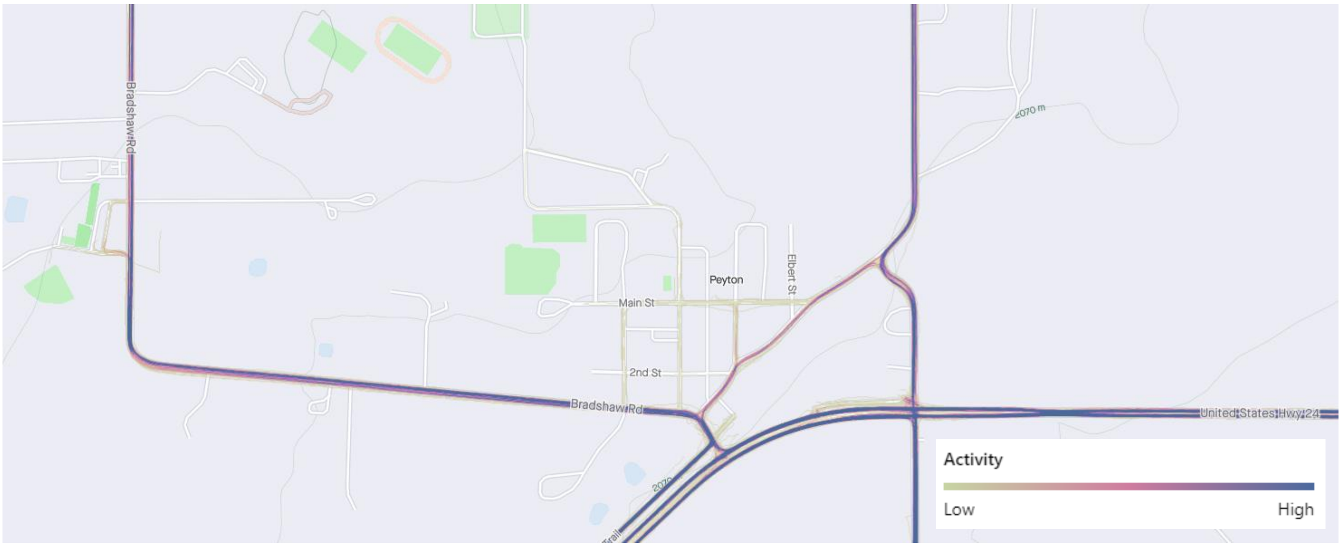


Figure 30. Bicycle activity in Peyton (Source: Strava Metro)

2.13 Schools

There are three schools within the project area. Peyton Elementary School has students in grades Pre-K through 6. It is a four-day school (Monday-Thursday) with class hours from 7:38 a.m. to 3:28 p.m. Peyton Junior-Senior High School has students in grades 7 through 12 and is a four-day school (Monday-Thursday) with class hours from 7:36 a.m. to 3:40 p.m. Both the Elementary School and Junior-Senior High School are located along Bradshaw Road, northwest of the core of Peyton. Peyton's Career Technical Education Facility (CTEF) has students in grades 9 through 12 and is a four-day school (Monday-Thursday) with class hours from 7:36 a.m. to 3:40 p.m. CTEF is located within the core of Peyton off Main Street.

There is a signed and marked crosswalk on the south leg of Bradshaw Road at the north entrance to the Elementary School driveway intersection. However, there are no sidewalks or multi-use paths along Bradshaw Road for pedestrians or bicyclists. There are no pedestrian or bicycle facilities along Bradshaw Road for the Junior-Senior High School, and there are no sidewalks along the streets within Peyton. Bicyclists must share the road with vehicles, and students must walk either in the dirt or on the street to access CTEF.

Informal trails at Peyton High School

Crosswalk on Bradshaw Road (no connections)

2.14 Parking

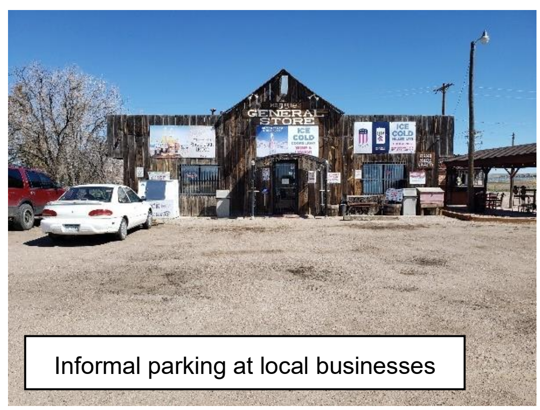
Formalized parking is minimal within Peyton. With the lack of curb and gutter along the roadways, drivers can pull off the road and park where it is convenient. Paved parking lots are provided at the Peyton Post Office, Elementary School, Junior-Senior High School, and CTEF. A dirt lot is located adjacent to the baseball and football fields. However, residents identified that overflow parking at the fields tends to spill into the nearby residential streets, and parking in front of personal residences is an issue. In front of Peyton Junction on Front Street, there is a gravel parking lot that is often heavily utilized during community events. There is no dedicated parking for the Rock Island Regional Trailhead. Off-street parking requirements for new development in El Paso County are defined in the Land Development Code. Table 11 summarizes the approximate number of parking spaces available at each of these key locations.

Table 11. Parking spaces at existing parking lots

Location	Lot condition	Approximate number of parking spaces
Peyton Post Office	Paved	32
Peyton Elementary School	Paved	70
Peyton Junior-Senior High School	Paved/Dirt	140
CTEF Building	Paved	55
Pueblo Street Athletic Fields	Dirt	46
Peyton Junction (Front Street)	Gravel	30
Rock Island Regional Trailhead	N/A	0


Formal parking at CTEF


Formal parking at Post Office



Informal parking at local businesses

2.15 Transit

The only public transit that currently serves Peyton is Envida paratransit via the Calhan Line. Envida is a non-profit that provides its transportation services to individuals with disabilities, older adults, and those experiencing financial challenges. The Calhan Line runs Monday through Thursday with seven regularly scheduled stops at the locations listed below. The travel time between Calhan (Stop 1) and Peyton (Stop 3) is approximately 12 minutes. The travel time between Peyton (Stop 3) and Colorado Springs (Stop 7) is approximately 55 minutes. Envida will deviate from the fixed route upon request if a desired stop falls within the agency's general service area.

Stop 1: Calhan Community Outreach Center

Stop 2: U.S. Post Office – Calhan

Stop 3: U.S. Post Office – Peyton

Stop 4: Walmart – Falcon

Stop 5: St. Francis Medical Center – Colorado Springs

Stop 6: UC Memorial Hospital North – Colorado Springs

Stop 7: Mountain Metro Transit Hub North – Colorado Springs

Mountain Metro Transit, based out of Colorado Springs, is the nearest public transit service provider with regional bus services throughout the Colorado Springs Metro Area. The nearest stop location is at the intersection of Tutt Boulevard and Stetson Hills Boulevard on Line 23, located 21 miles southeast of Peyton.

Peyton School District offers public school bus services to Peyton School District students on weekdays during the school year and for some off-campus extracurricular events.

3.0 Community Input

To ensure community input guided the DTMP, a stakeholder group was developed. This stakeholder group was involved throughout the DTMP process through a total of three meetings (held virtually via Microsoft Teams) where the project team presented ideas and gathered feedback on the direction of the project. A list of individuals part of the stakeholder group can be found in **Appendix F**.

3.1 SWOT

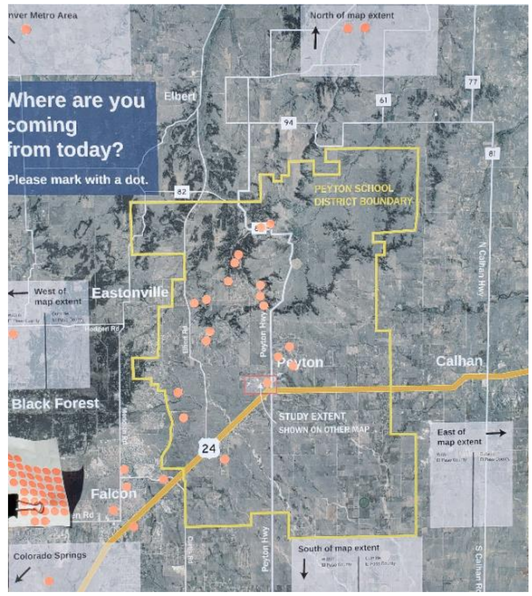
During the first stakeholder meeting, existing Strengths, Weaknesses, Opportunities, and Threats (SWOT) for Peyton were identified. Figure 31 outlines the key SWOT themes recorded.

Figure 31. SWOT key themes.

The second stakeholder meeting allowed the project team to field additional comments and focus on the recommendations section of the DTMP. The final stakeholder meeting, held on December 14, 2021, consisted of validating the project recommendations.

Stakeholders additionally submitted photos to help document areas of concern, such as drainage pooling and lack of formal parking on Front Street.

3.2 Public Meetings



Two public meetings were held to reach a broader audience, gather ideas on the vision for drainage and transportation in Peyton, and generate and validate ideas on future investments in Peyton. The first public meeting was held in the format of a pop-up informational booth at the Annual Country Market at Peyton Junction on June 12, 2021. The second public meeting was held in-person as an open house event located at the town's CTEF building on October 13, 2021.

During each of the public meeting events, the project team briefed attendees on the status of the project and then solicited feedback through participatory mapping exercises. A summary of this process is provided below.

Public Meeting 1

For the first public meeting, El Paso County setup up an outdoor, informational pop-up booth for six hours (9:00 a.m.-3:00 p.m.) in a central location at The Annual Country Market at Peyton Junction. The informational booth was advertised through a digital flyer that was distributed via El Paso County channels in advance of the event. Using different scales of mapping and informational boards, the project team collected information about where people came from and what their specific areas of concern are within Peyton. The team spoke to and engaged with approximately 40 total passersby throughout the day to introduce the project, solicit feedback on specific issues, and respond to questions. The project team completed the following actions:

- Collected 28 dot sticker and verbal responses on a contextual site location map, indicating where people came from the day of the event
- Collected 27 dot sticker and verbal responses on a detailed project scope map, indicating specific issues or areas of concern. Four color-coded dot sticker categories were used: Drainage (blue), Walking and Biking (green), Driving (Red), and Parking (orange).
- Collected four comment cards with written feedback

Dot sticker and verbal responses, and comment card responses, are outlined below.

Drainage: 10 Dot Stickers

- Places at the Town's core where water tends to significantly pool or poorly drain:
  - Pueblo Street
  - Front Street
  - South side of the CTEF building
  - South side of the Post Office
  - Intersection at Peyton Highway
  - Intersections at US-24
- Most storefronts have raised steps to prevent runoff from entering the buildings
- Pipe bursts and leakage coming from CTEF have occurred in the past

Walking and Biking: 2 Dot Stickers

- Bradshaw Road sees high driving speeds, despite it being a designated school zone
- Pedestrian crosswalks and bike infrastructure for students at the Elementary and Junior-Senior High Schools are lacking; walking and biking feels unsafe in these areas

Driving: 15 Dot Stickers

- The three-way intersection at Railway Street and Peyton Highway feels unintuitive and unsafe (i.e., high-speed vehicles coming from the highway, non-standard merge rules)
- There are often long wait-times at intersections with US-24 (i.e., high-speed vehicles along the highway, consistent freight truck traffic)
- There is strong interest and desire for US-24 to be converted into four lanes

Parking: No dot stickers recorded

Comment Card Responses

Please list any specific drainage or transportation issues or concerns you would like the project team to investigate or evaluate.

- "Driving on US-24 (needing more lanes) and safety for driving around schools"
- "Safer means for walking between the Elementary and High Schools"

Do you have any ideas for roadway, trail, parking, or drainage improvements within the Town of Peyton? Are there any big ideas you'd like El Paso County to consider?

- "Parking and a city park in the town of Peyton by the Junction"
- "Stop sign at Railroad Street and Peyton Highway"

Public Meeting 2

The second public meeting was held on a weeknight evening (6:00-7:30 p.m.) at the town's CTEF building. Post-It notes and comment cards were provided to attendees to share their thoughts on potential project improvements.

A total of 10 attendees signed into the meeting, and staff counted an additional 4-5 attendees that did not sign in. This turnout is an impressive six percent of Peyton's population. The meeting was advertised through a digital flyer that was distributed via El Paso County channels in advance of the event, as well as paper flyers distributed at local businesses. However, many of the attendees were notified of the meeting through a NextDoor app notification or heard by word of mouth. Verbal comments not recorded within the meeting focused on appreciation of the effort towards improving the Town's infrastructure, along with scrutiny that improvements could not occur in the short term.

The Post-It note responses on several project display boards, as well as comment card responses, are listed below.

Post-It Note Responses

Drainage Improvement Concepts

- Manitou houses flood; shops flood
- Building heights are not as high as they should be for drainage

Intersection Improvement Concepts

- Straighten Peyton stop sign on Main Street; area gets icy
- Make Main Street a stop sign
- Roundabout at Peyton & Main?

Roadway Improvement Concepts

- Flashing light needed for school speed limits

Bradshaw Road Improvement Concepts

- New trail system here would be used

Front Street (Railroad St to Main St) Concepts

- One-way street – typical of Iowa historic downtown; like the feel
- Preserve the rural, historical feel of Peyton
- Boardwalk look preferred rather than sidewalk
- Parallel parking intimidation!

Parking Improvement Concepts

- Parallel parking needed for football and other events

Trail Improvement Concepts

- Improvements between schools would help walkers
- Improvements needed to connect to Town Center
- Parking needed for Rock Island Trail on north side

Comment Card Responses

Name	Where are you coming from today?	Feedback
Greg Land	Peyton	"I would like to see a flashing yellow light/sign for the school zone on Bradshaw due to the volume of traffic and speed of traffic now. Multiple wrecks per quarter at the corner south of the Elementary School."
Greg Land	Peyton	"Peyton Fire needs more space and support. A lack of water is a threat to them and the community. Even adding a cistern would help (i.e.., under a park or park area). They would not need a pump, just a cistern. The recent Birds Eye fire is a great example."
Monica Hoffman	Peyton	"I think the whole concept of transportation and drainage and doing it together is good. Both are needed badly. All these ideas presented are needed for this growing small rural community."
Terre Reeder	Peyton	"I am the logistics coordinator for our largest public event. We have observed over 5,000 guests park. They are basically "sloppy parkers". So, why not start with the simplest type of parking for Front St, one-way diagonal parking?"

Following both public meetings, the resounding takeaway is residents' desire to invest in reconstructing Peyton's street network—ensuring connections are made to Front Street and the town's rural character is preserved. The following Recommendations section is built out from this community consensus.

4.0 Recommendations

Infrastructure in Peyton is currently in poor condition and needs to be updated to meet El Paso County standards. The overall goal for Peyton is a fully functional drainage and roadway network that supports the demands of current and future residents. The recommendations outlined below may be implemented in phases, meanwhile some recommendations can be considered stand-alone or independent projects.

4.1 Drainage Concepts

Proposed drainage improvements in Peyton have been separated into concepts that range from smaller, localized changes to a full, urbanized design. The overall proposed basin map is shown in Figure 32. Each design concept is described as follows. The cost estimates attached to these recommendations are only for drainage work and materials; they do not include roadway materials, erosion control, or any other costs. Further technical drainage details (such as land use, slopes, etc.) for the proposed basins and proposed drainage systems can be found in the Town of Peyton Hydraulics and Hydrology Report **(Appendix A)**.

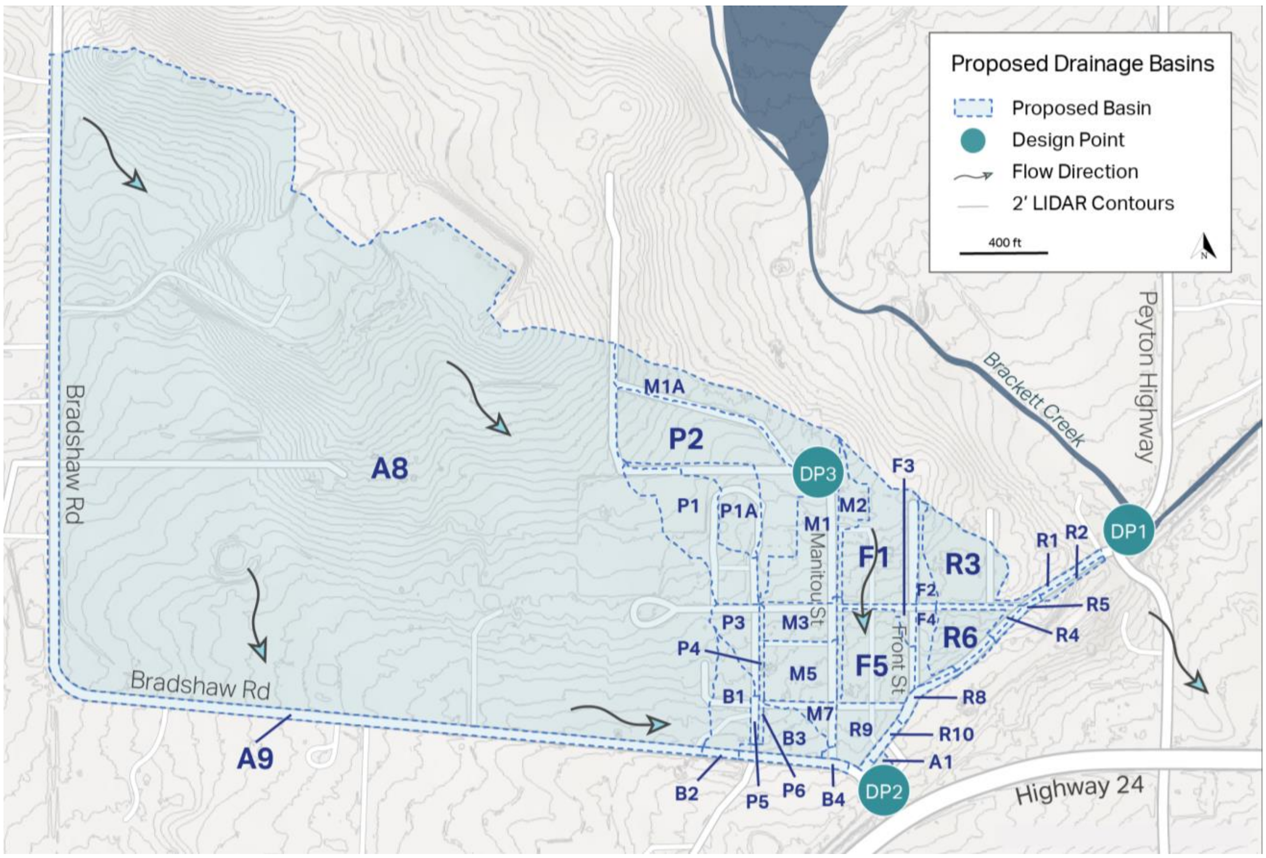


Figure 32. Proposed drainage basins map.

Concept 1: Clean Existing Infrastructure

Figure 33. Proposed drainage schematic – Concept 1.

This concept consists of cleaning and/or replacing existing culverts if they are damaged beyond repair. This concept will work best if a regular maintenance schedule is established. This level of improvement will increase stormwater conveyance from Peyton with minimal cost and effort but will not be a long-term solution as most of the existing drainage is undersized.

Cost estimate: $100,000-$150,000

Concept 2: Upgrade Existing Infrastructure

Figure 34. Proposed drainage schematic – Concept 2.

This concept includes adding parallel pipes alongside existing culverts under Bradshaw Road, Peyton Highway, and US-24 to meet current El Paso County criteria. The current pipe size for culvert B1 under Bradshaw Road is 30". This will need to be upsized to 3-36" reinforced concrete pipe (RCP) culverts. The current pipe size for culvert B2 under US-24 is 24". This will need to be upsized to 2-24" RCP culverts to meet current criteria. This crossing will need to be resolved with coordination from CDOT. This concept is the only concept that addresses the undersized culvert at US-24, and upsizing this culvert will need to be done regardless of other concepts going to construction. The current pipe size for culvert B6 under Peyton Highway is 2-36" culverts and 1-30" culvert; these culverts will need to be updated to 3-42" RCP culverts to meet current criteria. This concept is the only concept that address the undersized culvert under Peyton Highway, and upsizing this culvert will need to be done regardless of other concepts going to construction.

Cost estimate: $180,000-$260,000

Concept 3: Post Office

Figure 35. Proposed drainage schematic – Concept 3.

This concept aims to alleviate the flooding problems around the Peyton Post Office. The flooding issues fall within both County right-of-way and Post Office land, so these entities will need to work together to resolve the issue. While this concept will work as a stand-alone project, it has also been designed so that the infrastructure can be maintained in the fully urbanized drainage concept (Concept 5). This concept will add one Type D area inlet with a close mesh grate on the west side of the Post Office. The inlet will capture flow and direct it under the Post Office entrance and discharge from a 36" RCP. The system will then discharge into the low-lying area on the northeast intersection of US-24 and Bradshaw Road. Runoff in this low-lying area flows east to a cross culvert which carries the flow south under US-24 and ultimately into Brackett Creek downstream of the study area. This concept should be completed in tandem with the upsizing of the US-24 culvert in Concept 2. Upsizing the US-24 culvert is not included in the cost estimate.

Cost estimate: $30,000-$50,000

Concept 4: CTEF Building

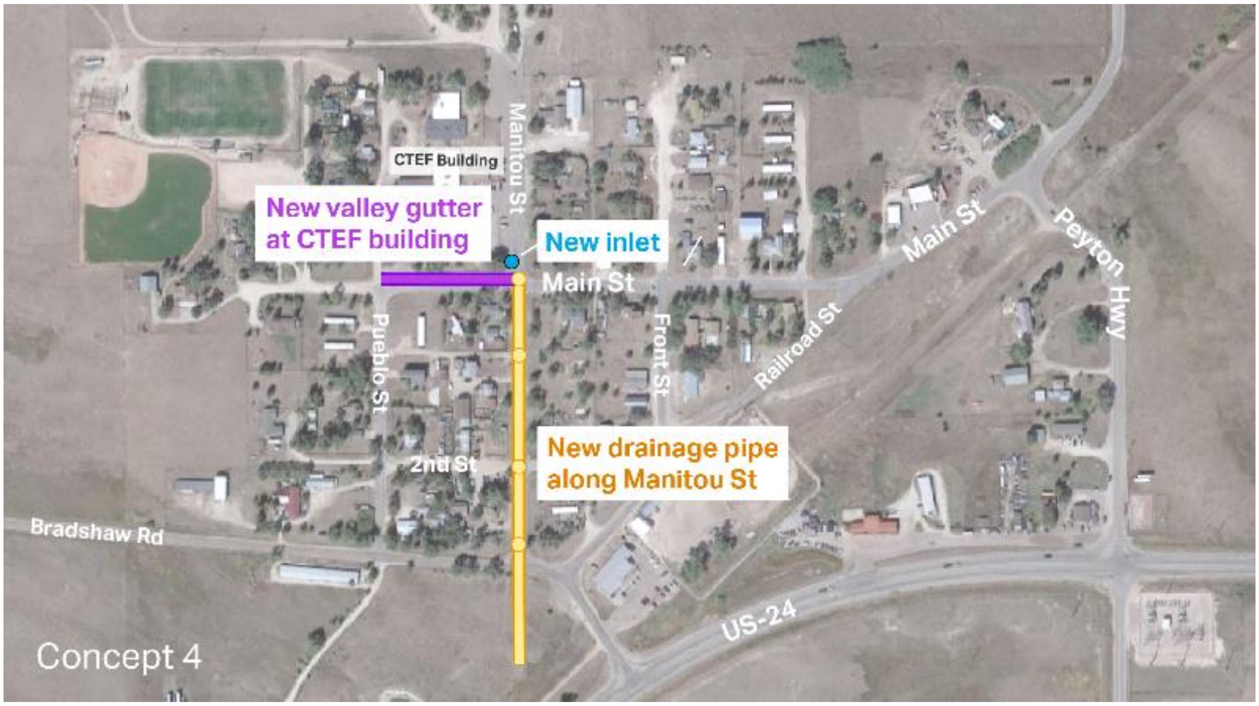


Figure 36. Proposed drainage schematic – Concept 4.

This concept addresses an area of concern brought up Peyton residents. To help alleviate ponding at the intersection of Manitou Street and Main Street, a valley gutter along the north side of Main Street in front of the school area is proposed. The valley gutter will help direct runoff to the east towards Manitou Street. An inlet on the northwest side of the intersection will carry this flow by way of a closed storm drain system under Manitou Street until its outfalls near culvert B1. This storm drain system is sized to carry the flow for the existing conditions along with curb and gutter recommended in Option 5. The mainline pipe begins as 24" RCP and outfalls with a 72" RCP. The proposed mainline is sized to handle the flow when added to Concept 5.

Flow will ultimately enter a tributary of Brackett Creek via the existing culverts under the trail and US-24. This concept might have downstream impacts that were not analyzed in detail for this conceptual plan. A preliminary roadway design should be completed to see what impacts the curb and gutter corridor will have on private properties and a full hydraulic floodplain model should be completed to analyze how the additional runoff affects the floodplain south of US-24. The two major culverts downstream of this area, the trail culvert and the US-24 culvert, have been analyzed conceptually and appear to function properly with the additional runoff. However, survey data should be collected and used during a preliminary design to analyze the culverts. A future utility corridor along Manitou Street and on Main Street would be implemented when new drainage is placed.

Cost estimate: $350,000-$420,000

Concept 5: Full Urbanized System

Figure 37. Proposed drainage schematic – Concept 5.

Concept 5 involves urbanizing downtown Peyton by constructing paved roadways with curb and gutter, as well as a sidewalk throughout the Town. This concept includes three closed stormwater systems to carry the stormwater from the town and release it near the existing outfall locations.

The first system, Bradshaw, begins approximately 285 feet east of the intersection of Pueblo Street and Bradshaw Road and runs under the center of Bradshaw Road. It will collect roadway runoff from Pueblo Street, Manitou Street, and Bradshaw Road using curb inlets and discharge just southwest of the Bradshaw Road and Railroad Street intersection with a 72” RCP. This outfall will then convey flow in a southwesterly direction towards the culvert located under the trail and eventually will reach a tributary of Brackett Creek south of US-24. The proposed basins that contribute to this line include P1A, P2, P3, P4, P5, P6, M1A, M2, M3, M4, M5, M6, A8, A9, B1, B2, and B3. The largest concentration of flow for this system comes from the routed basin A8 (192cfs for Q100). It is recommended that there be a curb cut at the low point on the southwest side of the intersection of Bradshaw Road and Railroad Street. This basin is shown in the proposed hydrology (B4) without an inlet to approximate the runoff. If an inlet were placed there, it may not have the flow necessary to meet velocity criteria. Hydrology for this system assumes that Bradshaw Road will be a paved roadway all the way to Peyton High School, but hydraulics calculations assume that Bradshaw Road is only paved until approximately 285 feet west of Pueblo Street.

The second system, Railroad, collects runoff from Front Street and Railroad Street using curb inlets. On the north side, a storm line runs under the center of each street until they intersect to the south. From here, the lines are connected and flow southwest under Railroad Street. At the intersection of Railroad Street and Bradshaw Road, on the north side of the Post Office, the line turns south and connects with the area inlet in Concept 3. The inlet will capture flow and direct it under the Post Office entrance and discharge to a 36” RCP. The system will then discharge into the low-lying area on the northeast intersection of US-24 and Bradshaw Road. Runoff flows east to a cross culvert which carries the flow south under US-24 and ultimately into Brackett Creek downstream of the study area. The proposed basins in this system include F1, F2, F3, F4, F5, R3, R4, R5, R6, R8, R9, R10 and A1. This concept should be completed in tandem with the upsizing of the US-24 culvert in Concept 2. Upsizing the US-24 culvert is not included in this concept cost estimate.

The third system, East Railroad, collects the runoff from the high point on Railroad Street as it flows east towards Peyton Highway. It includes two curb inlets that carry the runoff south and then east under Peyton Highway. The proposed basins in this system are R1 and R2. This system discharges into an existing low point on the east side of Peyton Highway with an 18” RCP. This area drains to the east and connects with Brackett Creek just east of the study area. A few of the lateral lines in this conceptual design are under the minimum velocity requirement of 3 ft/sec and would need further analysis if the design is to proceed. This conceptual design assumes the following:

- Pueblo Street, Manitou Street, Front Street, Railroad Street, Main Street, and 2nd Street would be urbanized in their entirety.
- Bradshaw Road would only be urbanized until approximately 285 feet west of the intersection with Pueblo Street.
- Detailed grading at the outfalls would need to be designed for preliminary.
- Roadway elevations would remain the same or close to existing conditions.

Concept 5 could be implemented in phases. Any of the systems can be built independently of the others and allow for the city to urbanize certain roadways individually. A planned utility corridor would offset the closed stormwater system. Water quality and detention would not be required for any of the concepts because underground utility projects are exempt from needing water quality and detention per MS4 Permit Part I.E.4.a.i.D (Water Quality Exclusion D). However, for a fully urbanized system, flow would reach the discharge locations faster than in existing conditions, and detention facilities should be evaluated in further designs.

Cost estimate: $1.8M-$2.1M

More details on the specific drainage concepts can be found in the Town of Peyton Hydrology and Hydraulics Report **(Appendix A)**.

4.2 Utilities

Some solutions to address growth and development in Peyton include utility upgrades or planned utility corridors for potential utility upgrades.

Several Metro Districts already exist within the area; see **Appendix G** for a list. Peyton could possibly join an existing Metro District to provide water and wastewater or form its own Metro District to provide its water and wastewater needs. Private fiber providers could extend their service out to the area or improve their existing service. Coordination and planning of potential utility corridor for both dry utilities and wet utilities will help to alleviate potential future impacts of drainage and transportation improvements in the area.

Potential utility investments should include:

- Coordination and planning between the town utility companies (private and public)
- Planned utility corridors for proposed infrastructure
- Reliable and more fiber choices added to the area
- Water system
- Wastewater system
- Gas service expansion
- Electric service expansion

4.3 Roadway Concepts

Proposed roadway improvements in Peyton have been separated into concepts under the following categories: intersection improvements, general roadway improvements, Bradshaw Road improvements, and Front Street improvements. Each of these proposed concepts are outlined below.

Intersection Improvement Concepts

Intersection delays were identified from technical analysis and community input. Specific improvements are feasible at three intersection locations: Main Street and Peyton Highway, US-24 and Bradshaw Road, and US-24 and Peyton Highway. Figure 38 identifies these three intersection locations.

Current stop conditions show a significant delay to vehicles wanting to turn left onto US-24 from Bradshaw Road and Peyton Highway. The Town of Peyton was included in the 2018 CDOT US-24 Planning and Environmental Linkages (PEL) study, and CDOT representatives were involved in the DTMP Stakeholder Group. Specific recommendations at the intersections of US-24 and Bradshaw Road and US-24 and Peyton Highway will be considered by CDOT as they advance future investment in US-24.

Figure 38. Intersection improvement concepts.

General Roadway Improvement Concepts

General roadway improvements are feasible in three different concepts. Figure 39 shows an overview of these concepts and classifies each roadway based on its relative right-of-way capacity. It is recommended that Bradshaw Road, Railroad Street, and Main Street be designed per Rural Collector Roadway design standards as these roadways will carry more traffic through Peyton and could be designed to accommodate higher speeds. The remaining roadways within Peyton are primarily used for accessing residential areas and have lower traffic volumes; a Rural Local Roadway classification and design standards are appropriate for these roadways.

The first concept, depicted in Figure 40, involves reconstructing all roadways in Peyton with chip seal and/or mill and overlay. This change would temporarily extend the pavement life of the existing roadways and be relatively inexpensive to implement.

The second concept, depicted in Figure 41, involves reconstructing roadways to meet El Paso County Rural Local Roadway Standards. Roadways and ditches would be reconstructed to adequately address drainage issues. This concept would require additional right-of-way for the ditches to meet El Paso County Criteria. Paved and gravel shoulders would be added where not already present. This concept would be relatively more expensive to implement.

The third concept, depicted in Figure 42, involves reconstructing roadways with curb and gutter to meet El Paso County Urban Local Roadway standards. New curb would delineate street edges in the Peyton core, and gutter would provide improved drainage. Sidewalks would also be added for improved pedestrian access. On-street parking would need to be further evaluated. This concept would be relatively most expensive to implement.

Figure 39. General roadway improvement concepts overview.

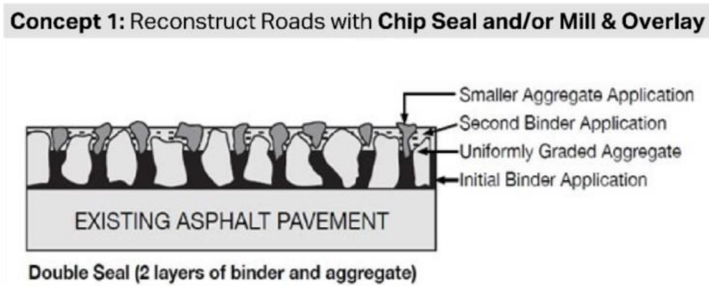


Figure 40. General roadway improvements – Concept 1.

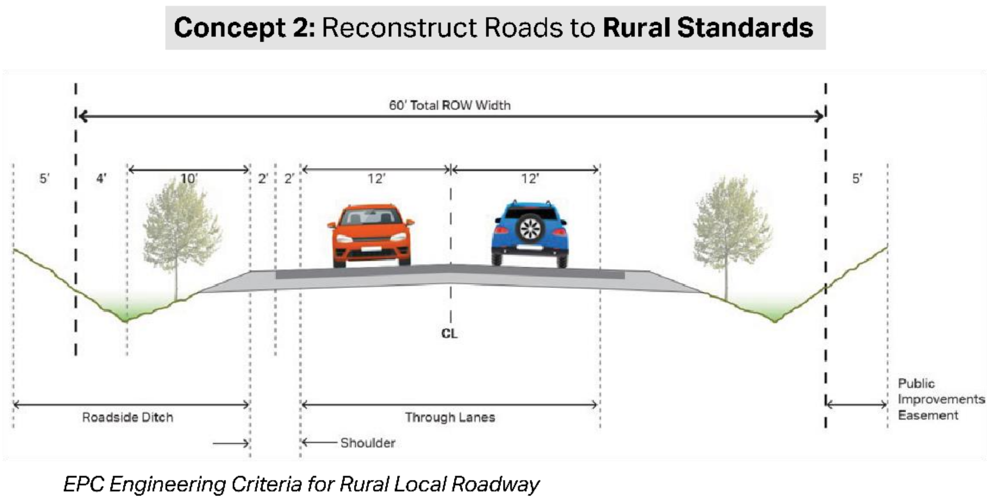


Figure 41. General roadway improvements – Concept 2.

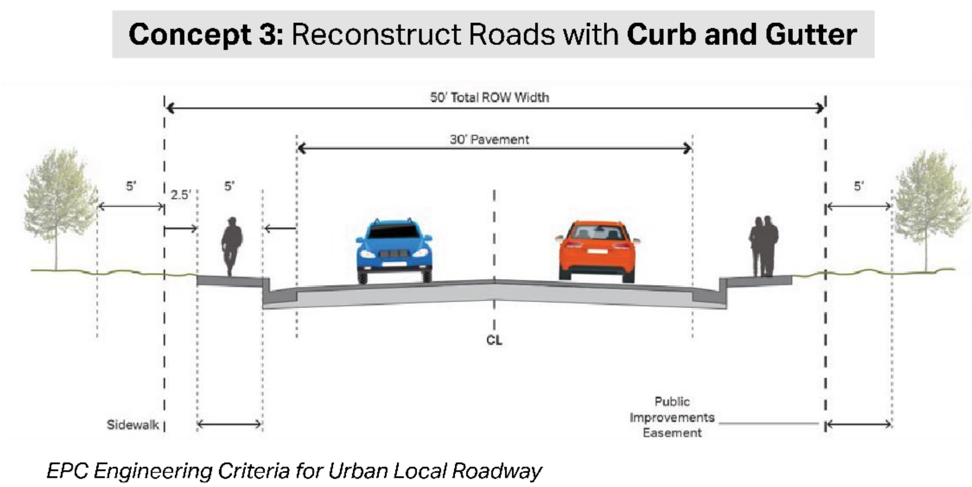


Figure 42. General roadway improvements – Concept 3.

Bradshaw Road Improvement Concepts

Bradshaw Road currently lacks shoulders and pedestrian access. This poses safety challenges for bicyclists and pedestrians, particularly students. Improvements are feasible in three different concepts. Figure 43 shows the extent of the cross-section under consideration.

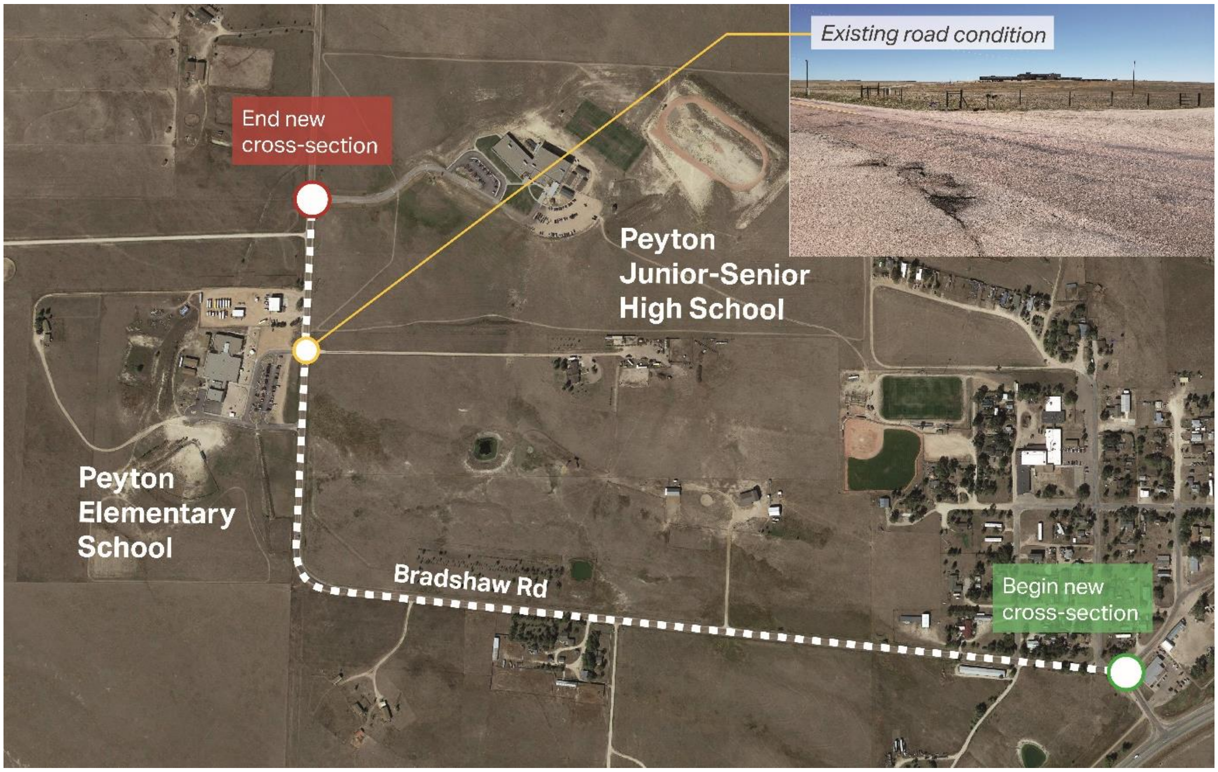


Figure 43. Bradshaw Road improvement concepts overview.

Three concepts were evaluated in this process. Concept 1, depicted in Figure 44, involves reconstructing Bradshaw Road to meet El Paso County Rural Minor Collector standards and incorporating a shoulder for bicyclists. Concept 2, depicted in Figure 45, involves reconstructing the road to meet Rural Local Roadway standards, incorporating a multiuse trail for shared bicycle and pedestrian access. Concept 3, depicted in Figure 46, involves reconstructing the road to meet Urban Non-Residential Collector standards, incorporating an on-street bicycle lane and separated sidewalks for pedestrian access.

Each of these concepts would enhance multimodal access to the Elementary and Junior-Senior High Schools and would require widening of the existing roadway right-of-way. Each of these concepts would be relatively more expensive to implement. Additional roadway modifications should be considered to reduce the speed or improve the horizontal curve geometry where Bradshaw Road transitions from a north-south road to an east-west road. Concept 2 was the preferred configuration by stakeholders and El Paso County as it would provide a separated multiuse facility on this rural roadway with higher speeds. In addition to a multiuse trail, this recommendation includes a full reconstruction of the roadway to add shoulder and drainage improvements.

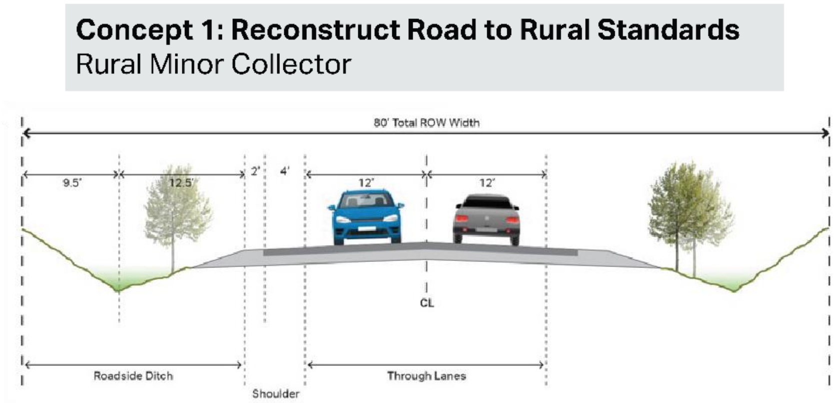


Figure 44. Bradshaw Road improvements – Concept 1.

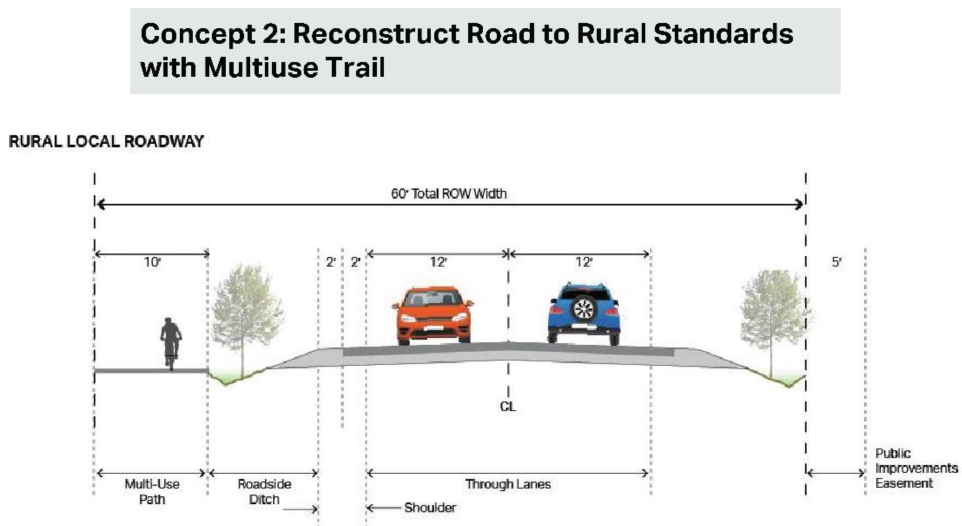


Figure 45. Bradshaw Road improvements – Concept 2.

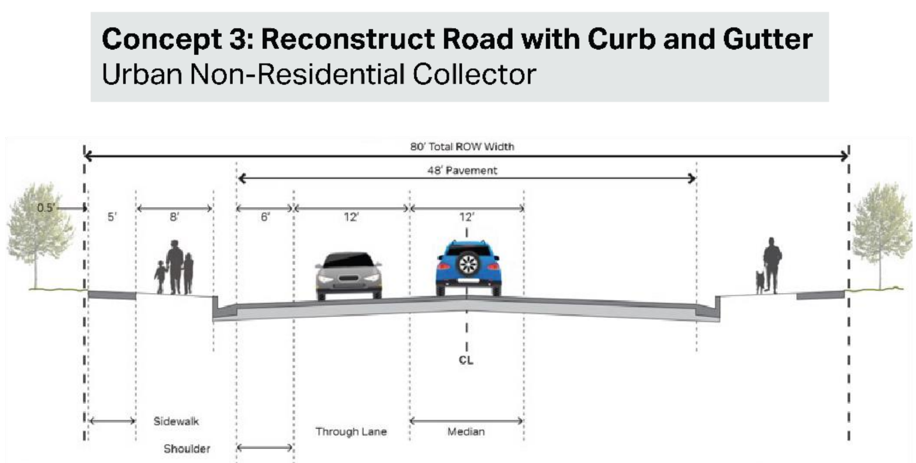


Figure 46. Bradshaw Road improvements – Concept 3.

Front Street (Railroad St to Main St) Improvement Concepts

Front Street is the heart of downtown Peyton. However, pedestrian-oriented space and parking in this area is currently informal and limited. Figure 47 and Figure 48 outline three improvement concepts that were evaluated.

- **Concept 1**: Involves creating head-in parking on one side of Front Street. This would mimic existing parking behavior in front of the local businesses. However, pedestrian space would be decreased between the roadway and buildings, and potential new business frontage development could be limited. This configuration would accommodate 30 parking spaces on the east side of the street and seven spaces on the west side (37 parking spaces total). The concept includes a sidewalk on both sides of the street.
- **Concept 2**: Involves creating one-way angled parking on both sides of the street. This would convert Front Street to be one-way northbound for the block between Railroad Street and Main Street. This configuration would accommodate 29 parking spaces on the east side of the street and 17 spaces on the west side (46 parking spaces total). The concept includes a sidewalk on both sides of the street.
- **Concept 3**: Involves creating parallel parking on both sides of the street. This would follow El Paso County standards, though it would require some parking further away from the front doors of businesses. This configuration would accommodate 12 parking spaces on the east side of the street and seven spaces on the west side (19 parking spaces total). The concept includes a sidewalk on both sides of the street.

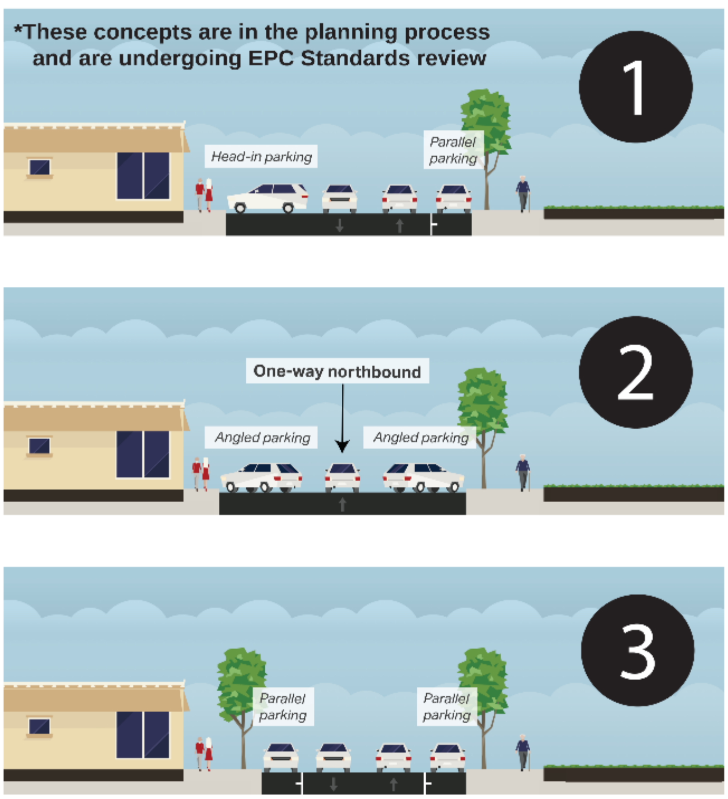


Figure 47. Front Street improvement concepts

*Shaded area indicates areas being considered. Actual implementation may include a smaller footprint of the various concepts resulting in fewer parking spaces.

Figure 48. Front Street improvement concepts overview.

Additional coordination with adjacent businesses and study is needed before a final recommendation, but Concept 3 is the preliminary recommendation from El Paso County.

4.4 Parking Improvement Concepts

Parking improvement concepts were identified from technical analysis and community input. Specific project improvements are feasible at two locations: adjacent to the athletic fields off Pueblo Street, and at the terminus of the Rock Island Trail. Figure 49 shows these two locations, respectively.

The existing dirt parking lot adjacent to the athletic fields off Pueblo Street does not provide formal parking for the baseball and football fields. There is opportunity for paving and striping formal parking spaces, as well as new landscaping. Notably, there would be short-term loss of parking during construction. This concept would be relatively inexpensive to implement but would require coordination with Peyton School District as the parking lot is on school property.

There is no designated parking at the Rock Island Trail terminus. Trail users typically occupy parking spaces at the Peyton Post Office parking lot. There is opportunity for improved, dedicated trailhead access. This concept would be relatively inexpensive to implement, and the proposed area is owned by El Paso County. However, coordination would be required to align with drainage improvements.

Figure 49. Parking improvement concepts – Pueblo Street and Rock Island Trailhead.

4.5 Trails and Multimodal Improvement Concepts

Multiple improvements for trails and multimodal connectivity are feasible, as shown in Figure 50. Key opportunity areas include school connections, an improved crossing to the Post Office, a Rock Island Trail to Front Street connection, and a Rock Island Trail to US-24 frontage connection. The El Paso County Parks Master Plan also indicates a possible continuation of the Rock Island Trail to Calhan and Ramah. These improvements would be relatively inexpensive to implement. However, coordination with the Post Office would be required for the trail connections in that area, and school trail connections may have limited access during school hours.

New trail identification and wayfinding signage could help to show points of interest on the Rock Island Trail and encourage trail users to explore destinations within Peyton. Figure 51 illustrates example signage.

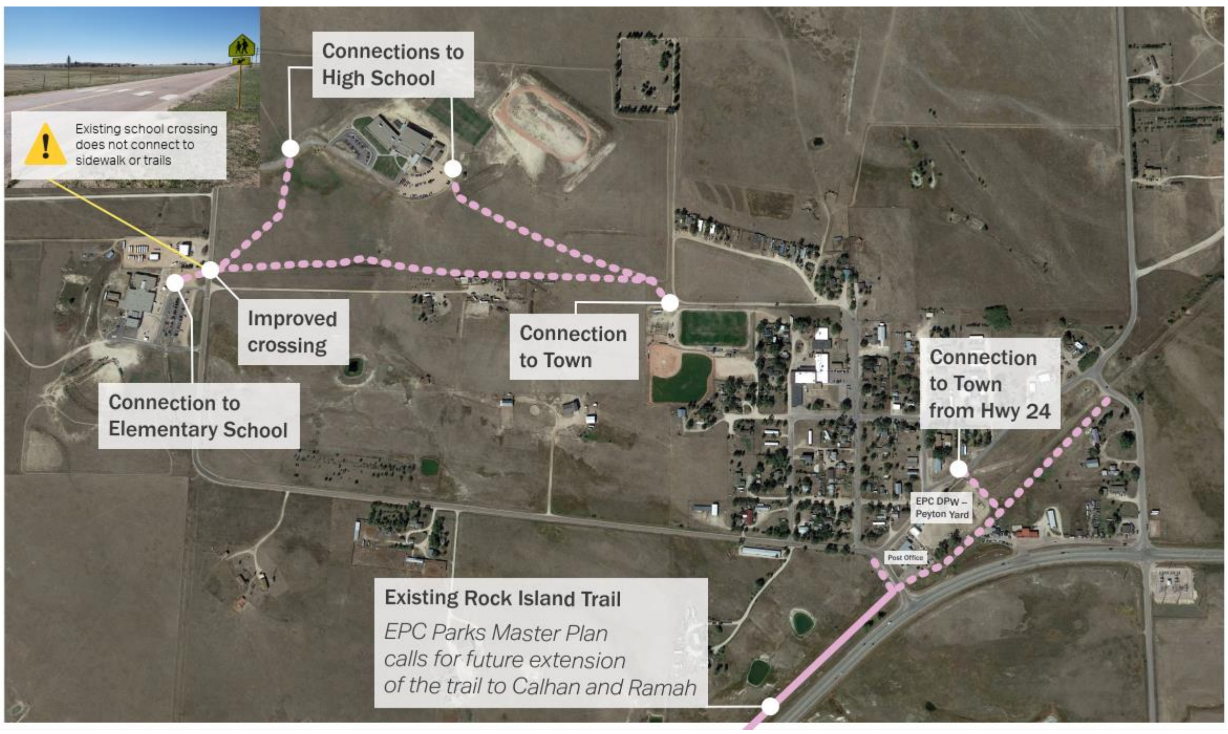


Figure 50. Trails and multimodal improvement concepts.

Figure 51. Proposed trail wayfinding signage.

4.6 Transit Improvement Concepts

If future transit routes are developed along US-24, a formalized bus stop in Peyton could provide residents and visitors access to Front Street and downtown.

5.0 Implementation

El Paso County has historically responded to infrastructure improvements in Peyton by repairing problem areas rather than with complete roadway reconstruction. This DTMP identifies several strategies for approaching investment, from simple projects to major roadway reconstruction. El Paso County has limited fiscal resources, so it is essential that the highest priority projects be identified and prioritized accordingly. As funding is identified, El Paso will approach investment in Peyton using the following strategies.

Strategy 1 – Implement low-cost, high benefit improvements that solve immediate problems as soon as possible

Strategy 2 – Implement individual projects in Peyton that work toward the vision of an urbanized roadway system

Strategy 3 – Enhance primary roadways including Main Street, Front Street, and Bradshaw Road

Strategy 4 – Prioritize projects that increase safety and multimodal connectivity

This DTMP is not intended to provide detailed design of proposed projects, nor does it contain detailed analysis of the feasibility of projects.

5.1 Recommendations

Projects identified in in this DTMP process have been coordinated with stakeholders and will help to advance the transportation, drainage, and utility systems in Peyton. Preliminary design on specific projects, and additional input from the community and local stakeholders, will continue to help prioritize projects and advance the goals of this master plan.

Within these actions, some projects could be implemented independently while others will require coordination and phasing to achieve identified goals. The process is intended to group projects together to identify project phasing.

Immediate Actions

Quick Fixes and Repairs

- Advance short-term repairs to roadways as necessary before reconstruction of new roads. Specific areas for improvement include poor pavement quality and areas with routine drainage issues, as identified in the existing conditions. Most of the roadways in Peyton are in poor condition and could benefit from repairs if roadway reconstruction is not planned.
- Clean out, repair, or replace identified existing drainage culverts to reduce drainage problems, as shown in Figure 33.

Further Master Plan Development

- Identify El Paso County funding strategies to conduct preliminary engineering on identified drainage and transportation improvements.
- Advance preliminary design on Bradshaw Road, as shown in Figure 45, to reconstruct to rural standards and include a shared use path to increase safety and connectivity for bicycles and pedestrians between the town and schools.
- Continue to work with businesses and stakeholders on Front Street to design a new urban street that includes on-street parking and accommodations for pedestrians. The initial recommendation, shown in Figure 47, is to implement a roadway with parallel parking on both sides of the street.
- Conduct preliminary design for curb and gutter roadways throughout Peyton, as outlined in Figure 42. Separate systems that address drainage in the town could be approached individually, and remaining streets in Peyton could also be designed and paved to work with the systems.
- Develop new signage and striping and geometric modifications at Main Street and Peyton Highway, as shown in Figure 38.

- Starting with concepts identified in Figure 50, conduct a multiuse trail conceptual design to connect the Elementary School, Junior-Senior High School, and town, as well as extend the Rock Island Trail to Peyton Highway, including additional town connections.
- Advance preliminary design and site selection for a new trail parking area accessible near the Post Office, as shown in Figure 49.
- Continue coordination with utility providers with any new project engineering.

Master Plan Execution

- Upgrade existing culverts, as identified in Figure 34.
- Implement low-cost bicycle and pedestrian wayfinding signage on the Rock Island Trail, as shown in Figure 51.
- Implement a new pipe system adjacent to the Post Office, as shown in Figure 35.
- Implement a new valley gutter system in the vicinity of the CTEF building, as shown in Figure 36.
- Coordinate with CDOT on Bradshaw Road and Peyton Highway intersections with Highway 24 (shown in Figure 38), keeping in line with the CDOT Highway 24 PEL Study and any future state-led development.
- Advance preliminary design and site selection for a new trail parking area near the Post Office, as shown in Figure 49.
- Coordinate with Peyton School District to advance design of a paved parking lot at the athletic fields on Front Street, as shown in Figure 49.
- As funding allows, implement master plan projects as they are designed and ready for implementation. This includes a full build-out of paved roadways in the core of Peyton.

5.2 Funding

This plan's recommendations are flexible to accommodate availability of funding to implement projects. The basic funding mechanisms for new concrete and overlay programs in El Paso County are vetted and compete for funding through multiple programs. This plan is intended to provide County leadership with a guide for planning capital expenditures in future years.

In addition to regular El Paso County funding streams, there are a wide variety of federal and state funding programs that El Paso County can apply to and leverage. Road and bridge funds can pay for local match to federal and state grants and smaller capital projects that do not have federal funds.

The Safe Routes to Schools (SRTS) program, federally funded and administered by CDOT, allows for the application of funds to construct or update transportation infrastructure focused on making routes to schools safer. Projects can include sidewalks and developing off-street bicycle and pedestrian facilities. Schools must participate with outreach and education programs or events.

The Highway Safety Improvement Program (HSIP), another federally funded program administered by CDOT, supports projects that address safety concerns that have resulted in fatal and incapacitating crashes, including pedestrian crossing improvements and intersection improvements. Areas with higher crash activity are generally more competitive than areas with fewer crashes.

CDOT's Multimodal Options Fund (MMOF) is an additional funding opportunity that aims to enhance Colorado's multimodal network. This program funds bicycle and pedestrian projects that improve multimodal transportation options for seniors, people with disabilities, people that live in rural areas, and children going to school. Projects that could be funded under this funding program include sidewalks, bicycle facilities, and pedestrian crossing improvements.

The Colorado Department of Parks and Wildlife also administers Non-Motorized Trails grants. The goal of this funding program is to improve outdoor recreation opportunities while protecting wildlife and cultural resources. This grant provides funding for planning, constructing, or maintaining a trail.

Appendix A

Town of Peyton Hydraulics and Hydrology Report

Town of Peyton

Hydraulics and Hydrology Report

Prepared for:

El Paso County
Department of Public Works
Transportation Division

Prepared by:

AECOM

2315 Briargate Pkwy Suite 150
Colorado Springs, CO 80920

November 24, 2021

DRAINAGE CERTIFICATION:

Engineer's Statement

This report for the drainage planning study of the Peyton Planning Project was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the El Paso County Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

______________________________ ____________________

Leylin N. Marroquin, P.E. Date

State of Colorado
No. 0055805

The findings in this report have been partly based on data from the previously performed drainage analyses listed in this report. AECOM has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of this information.

El Paso County

County plan review is provided only for general conformance with County Design Criteria. The County is not responsible for the accuracy of the design, dimensions, and/or elevations which shall be confirmed at the job site. The County through the approval of this document assumes no responsibility for completeness and/or accuracy of this document.

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria, and Engineering Criteria Manual as amended.

______________________________ ____________________

Date

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LIMITATIONS

The scope of services performed during the preparation of this document may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Background information, design bases, and other data have been furnished to AECOM by third parties, which AECOM has used in preparing this report. AECOM has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of all of the information.

This report has been prepared based on certain key assumptions made by AECOM which substantially affect the conclusions and recommendations of this report. These assumptions, although thought to be reasonable and appropriate, may not prove to be true in the future. The conclusions and recommendations of AECOM are conditioned upon these assumptions.

1.1 GENERAL

This report presents information to evaluate existing conditions and provide proposed conceptual design alternatives to improve stormwater conveyance through the Town of Peyton. The primary goal of this document is to document existing drainage conditions and potential proposed drainage designs for El Paso County. Analysis of the on-site and off-site drainage basins has been conducted to estimate runoff peak discharges and used for analyzing structures to convey stormwater off the roadway and under the roadway.

1.2 SITE LOCATION AND DESCRIPTION

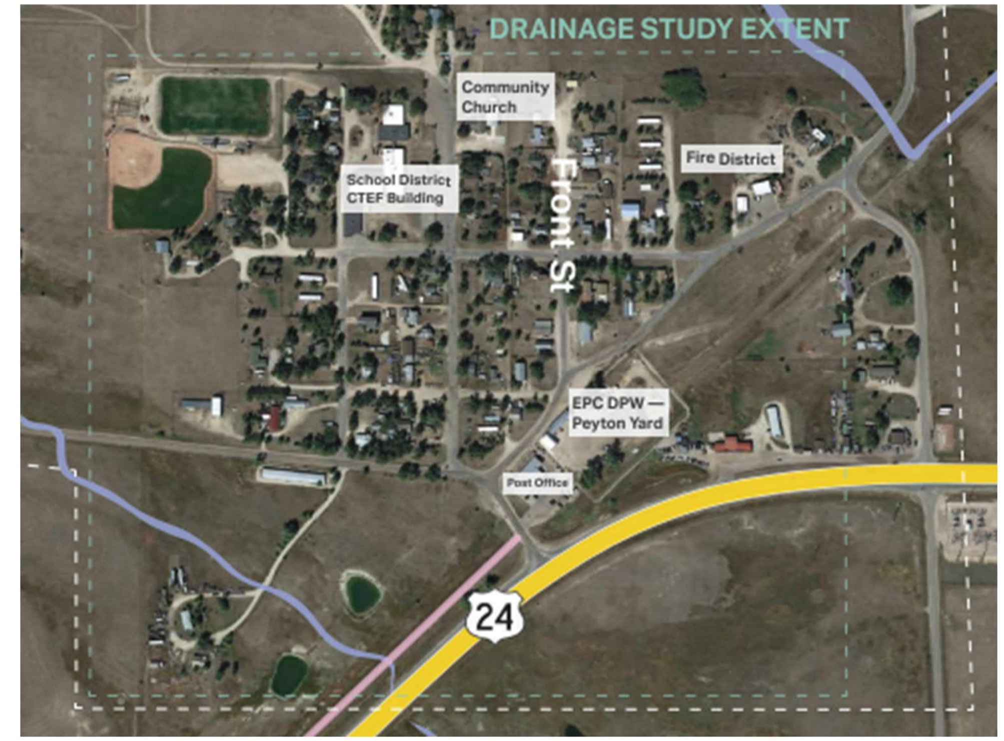
The study area is shown in Figure 1.

Major Roadway Structures:	None
Intersections:	Highway 24 & Bradshaw Rd, Highway 24 & Peyton Highway, Bradshaw Rd and Railroad St.
Drainageways:	Brackett Creek
County:	El Paso County
Legal Description:	The study area limits extend from Sections 6 and 7 of Township 12S, Range 63W of the 44th Principal Meridian.

1.3 PROJECT MAPPING

Mapping for the study includes aerial photographs, El Paso County contours, and available Light Detection and Ranging (LiDAR) elevation data. Survey was completed for the existing cross culverts in Summer of 2021. The survey was completed based on the NAD_1983_2011_StatePlane_Colorado_Central_FIPS_0502_Ft_US coordinate system and a vertical datum of NAVD88.

Figure 1 Location Map



Storm runoff generally flows from northwest to southeast within the study area. The ultimate receiving water is Brackett Creek. The drainage area is a mix of undeveloped land, paved streets, unpaved streets and residential areas. Stormwater flow northwest of the town is directed southeast via channels and ditches where it is ultimately discharged into Brackett Creek. Runoff in the Town of Peyton generally flows from north to south down the unpaved streets to culverts that carry the water under Highway 24 and Peyton Highway. Ditches then carry the water into Brackett Creek.

Soils data was obtained from the National Resources Conversation Service (NRCS) Web Soil Survey. The site is mainly composed of Type A and B rated soils as defined by the Natural Resources Conservation Service Web Soil Survey. Specifically, the project site contains Type A Truckton sandy loam, Type A Blakeland loamy sand, Type A Columbine gravelly sandy loam, Type A Ellicott loamy coarse sand, Type B Bresser sandy loam, Type B Kettle-Rock outcrop complex, Type B Peyton sandy loam, Type B Peyton-Pring complex, Type B Pring coarse sandy loam and Type B Stapleton sandy loam. The hydrologic soils map is located in Appendix A.

The study area is located on Panels 08041C0375G of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), December 7, 2018. The site is located in an unshaded Zone X area, defined as an area determined to be outside of the 0.2% annual chance floodplain. However, some of the outfalls will have flow that ultimately drains into Bracket Creek and into a tributary to Bracket Creek. These stormwater discharges will discharge into Zone A floodplains. Zone A floodplain is defined as an area subject to inundation by the 1-percent-annual-chance flood event using approximate methodologies. No base flood elevations or flood depths are shown for this area. It is recommended that floodplain modeling be completed in future design phases to assess the impacts of each concept on the surrounding floodplains. See Appendix B for the Flood Insurance Rate Maps.

2.1 DESIGN CRITERIA REFERENCES

Drainage analysis is based on the project configuration, contributing basin peak flows, historic drainage patterns, and the following technical criteria requirements:

- El Paso County Drainage Criteria Manual, Vol. 1 Update; (DCM); October 2018
- City of Colorado Springs Drainage Criteria Manual, Vol. 1 Chapter 6; (COSDCM); May 2014, adopted by El Paso County January 2015.

2.2 HYDROLOGIC CRITERIA

The hydrologic analysis has been conducted in conformance with the El Paso County Drainage Criteria Manual (DCM) Volume 1 Update, Chapter 6 (Hydrology). Design flows were calculated using the Rational Method for the roadway drainage and used to size the cross culverts and area inlets. Design flows for the culverts on the northeast side of Peyton were calculated using the National Resources Conservation Service (NRCS) method in Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS).

2.2.1 Design Flood Frequency

The 5-year and 100-year design storms are the minor and major hydrologic storm events for the roadway drainage design according to Chapter 6 of the El Paso County DCM. For the culvert hydraulics the 10-year and 100-year events were calculated as per Section 1, Chapter 2 of the El Paso County DCM. Appendix C contains drainage basin maps and calculations.

2.2.2 Rational Method

The hydrology for the sub-basin and drainage elements for this project was developed for the minor and major storms using the Rational Method. The Rational Method is valid for basins up to 130 acres. All the proposed drainage basins are less than 130 acres and all of the existing basins except for basin B6 were smaller than 130 acres. Basin B6 was over 130 acres in size and the NRCS method was used to calculate flows for that basin.

Time of Concentration

The time of concentration (Tc) for the Rational Method for each sub-basin was calculated using the method outlined in the El Paso County DCM, Volume 1 Update, section 3.2. The time of concentration consists of the initial time of overland flow and travel time in channel flow.

Time of Concentration Equation: $t_c = t_i + t_t$

Where t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

Rainfall Intensity

Rainfall intensities for use in the Rational Method were calculated based on Intensity-Duration-Frequency curves provided in the COSDCM as per the El Paso DCM,Volume 1 Update, section 3.3. The curves are based on the rainfall depths for an elevation of 6,840 feet in the Colorado Springs area.

Intensity Equations: $I5 = -1.50 \ln(D) + 7.583$

$I100 = -2.52 \ln(D) + 12.735$

I = Rainfall Intensity (inches per hour)

D = Duration (minutes)

Runoff Coefficients

Rational Method runoff coefficients (C) were taken from Table 6-6 of the El Paso County DCM for sub-basins which contribute runoff to the study area, including roadway, residential, and undeveloped areas. A weighted C value was then determined for each sub-basin area. Calculations for weighted C values are included in the appendices.

Table 2.1

Runoff Coefficients

Runoff C Values	5-year		100-year	
	HSG A/B	HSG C/D	HSG A/B	HSG C/D
Streets - Paved	0.90	0.90	0.96	0.96
Streets - Gravel	0.59	0.63	0.70	0.74
Undeveloped - Pasture/Meadow Lawns	0.08	0.15	0.35	0.50
Residential – 1/4 Acre	0.30	0.35	0.50	0.58
Residential – 1/2 Acre	0.22	0.28	0.46	0.56
Residential - 1 Acre	0.20	0.26	0.44	0.55
Industrial-Light	0.59	0.63	0.70	0.74
Business-Commercial	0.81	0.82	0.88	0.89
Parks and Cemeteries	0.12	0.19	0.39	0.52

2.2.3 NRCS Method

Hydrology for the Brackett Creek flow (Basin B6) was completed using the United States Army Corps of Engineers (USACE) HEC-HMS 4.6. software. This method was used because the drainage area is greater than 130 acres.

NRCS Curve Number

The curve number (CN) was calculated using the method outlined in the El Paso County DCM. The CN is determined by the hydrologic soil group, the hydrologic condition, and the antecedent runoff condition (ARC). Curve numbers were calculated for the pre-development thunderstorm conditions using Table 6-9 from the El Paso County DCM. This ARC storm was chosen because it better reflects the existing rural conditions of the basin. The percent impervious values used in the model were estimated using aerial imagery.

Initial Abstraction

Initial abstractions were calculated using the method outlined in the El Paso County DCM,Volume 1 Update, section 4.5. The initial abstraction in inches is calculated using the following equation:

I_a = 0.1[(1000/CN)-10]

I_a = Initial Abstraction (inches)

CN = Composite curve number (dimensionless)

Time of Concentration

The time of concentration was calculated using the method in the El Paso County DCM,Volume 1 Update, section 4.6. The Time of Concentration is the sum of overland flow time and the t values for the various consecutive flow segments:

$t_c = t_i + t_{t1} + t_{t2} + t_{t3} \ldots t_{tm}$ (Eq. 6-14)

Where:

t_c = time of concentration (hr)

t_i = overland (initial) flow time (hr)

t_{tm} = travel time for each flow segment (hr)

m = number of flow segments ;0h5; 4.6.1.\Overland Flow Time for NRCS Method

2.3 EXISTING BASIN DESCRIPTION

There are three existing drainage basins within the Town of Peyton and one larger basin (B6), approx. 4.9 square miles, to the northeast. Flow within the Town generally flows from north to south. Basin B6 flows through three existing culverts on the northeast side of Peyton near where Peyton Highway and Railroad St. intersect. There are no existing gages on Brackett Creek. Computed flows from the existing hydrology HEC-HMS model were compared with regression analysis from the Streamstats website to verify calculations. Existing Basin Maps can be found in Appendix C.

There are four main design points located within the study limits. DP9 is an existing culvert located at the intersection of Bradshaw Rd. and Manitou St. The basin covers the area from Bradshaw Rd on the west all the way to Manitou St, which runs down the center of Peyton. It is the largest of the basins that feed directly into the Town of Peyton and includes 196.9 acres. The flow was routed through three basins, B7, B8 and B1. This basin is largely undeveloped fields but also contains some residential, school and recreational areas. The minor storm flow is approximately 39 cfs and the major storm is approximately 158 cfs. It carries water under Bradshaw Rd.and discharges to the southwest towards the Rock Island Trail. From there, flow is carried through a culvert under Rock Island Trail and then under Highway 24 through two parallel culverts. From the south side of Highway 24, the flow travels eastward through a ditch, downstream of the study area, into Brackett Creek.

The second design point, DP2, is a culvert located under Highway 24 between Bradshaw Rd.and Peyton Highway. This basin includes the area between Manitou St and Railroad St. Most of the area is residential but a portion of the north end of this basin is a large undeveloped field. The minor storm flow is approximately 17 cfs and the major storm is approximately 46 cfs. Surface runoff from the town flows south through town into an existing low area, south of the Post Office. Runoff flows east to a cross culvert which carries the flow south under Highway 24 and ultimately into Brackett Creek downstream of the study area.

The third design point is an area inlet, DP3. This design point is located on the northwest corner at the intersection of Peyton Highway and Highway 24. The basin that feeds into this area contains some residential area north of Railroad St. all the way south to Highway 24 with the eastern boundary of Peyton Highway. This basin is a mix of residential, commercial, and undeveloped open space. The minor storm flow is approximately 21 cfs and the major storm is approximately 30 cfs. The pipe from this area inlet flows east under Peyton Highway and presumably outlets to a roadside ditch, the outfall was not located with survey or field reconnaissance visits. Before any future design work is completed, it is recommended that the outfall for this area inlet be located. The roadside ditch continues to flow east and discharges into Brackett Creek downstream of the study area.

The last design point, DP6, consists of three existing culverts that convey flow for Bracket Creek. At the north end of this basin is the continental divide near Homestead Ranch Park, and is contained by Bradshaw Rd.to the west and Peyton Hwy to the east. Much of this area is also rural and largely undeveloped. The storm flow is approximately 39 cfs for the 5 year, 74 cfs for the 10 year, and 400 cfs for the 100 year. The culverts are located northeast of the intersection of Railroad St. and Peyton Highway. During a storm, runoff from the basin collects and flows southeast to the culverts. Flow is carried under Peyton Highway and continues in a southeasterly direction.

There are two existing culverts under driveways on Pueblo St. These culverts are shown in the calculations but carry very little flow, are in poor condition, and are therefore not used as design points.

2.3.1 Flood History

There is no official recorded history of flooding within the project area. However, in meetings with the community members, two areas of flooding were mentioned. The first area is by the Post Office on the south side of town. The second area is by the Peyton school building on Manitou St. and Main St.

2.4 PROPOSED BASIN DESCRIPTION

The proposed basins were delineated assuming the roadways within the Town of Peyton will be updated to urban corridors. Study recommendations will maintain existing flow patterns.

There are three proposed outfalls in the fully urbanized concept. Flows for these outfalls can be found in Table 2.3 of this report.

Outfall 3 is located to the south of the intersection of Bradshaw Rd and Railroad St near the existing DP9. This is the outfall for the Bradshaw stormwater system. This system collects roadway runoff from Manitou St., Pueblo St. and Bradshaw Rd., as well as offsite flow from the undeveloped area north of Bradshaw Road.

Outfall 2 is located at the sump area south of the Post Office on the northeast side of the intersection of Highway 24 and Bradshaw Rd. This is the outfall for the Railroad stormwater system. This outfall collects roadway runoff from Front St. and Railroad St.. The basins primarily consist of residential, paved, and commercial land use.

Outfall 1 is part of the East Railroad system and is located on the east side of Peyton Highway where it intersects with Railroad St. This outfall collects roadway runoff from the eastern part of Railroad St. (basins R1 and R2) and land use is primarily paved for these basins.

2.4.1 Major Drainage Basins

The contributing drainage areas remain the same. Existing flows that are part of the Bracket Creek Basin will continue to flow to the Bracket Creek Basin.

2.4.2 Major Drainage Basin Routing

All major drainage basins in this study will be routed to their outfalls via roadside ditches and culverts. All basins ultimately outfall to Brackett Creek south of the study area.

Brackett Creek currently flows from northwest to southeast under Highway 24. The routing for this creek will remain unchanged with proposed recommendations.

2.4.3 Minor Drainage Basins

The minor basins are generally limited to roadway drainage. The proposed basins within the Town of Peyton are much smaller due to the roadway inlets. The flow from the town will be collected and outfall to the existing locations.

The minimum time of concentration of five minutes would be used for all roadway basins in accordance with the DCM. Basins with offsite drainage have longer times of concentration and lower runoff coefficients. These basins are summarized within Appendix C.

2.5 PREDICTION OF DESIGN DISCHARGES

Peak design flows for individual basins can be found in Appendix D.

Design Flows

Existing and proposed peak runoff rates are listed for each design point in Table 2.2 and are included on the drainage basin maps included in Appendix C.

Table 2.2

Rational Method Summary Runoff Tables

Design Point	Flow Rate	
	Existing	
	Q_5 (cfs)	Q_{100} (cfs)
DP9	38.9	158.4
DP2	17.3	45.7
DP3	20.9	59.6

Table 2.3

StormCAD Outfall Flows

Design Point	Flow Rate	
	Proposed	
	Q_5 (cfs)	Q_{100} (cfs)
Outfall 1	2.2	3.3
Outfall 2	22.0	48.0
Outfall 3	75.8	261.0

Table 2.4

HEC-HMS Summary Runoff Tables

Design Point	Flow Rate Existing (cfs)					
	5-year	10-year	25-year	50-year	100-year	500-year
DP6	38.7	73.5	158.7	260.4	398.9	886.3

3.1 HYDRAULIC DESIGN CRITERIA

3.1.1 General Concept

All proposed drainage improvements were designed to convey the 5-year design flow and analyzed for impact during the 100-year flow per the DCM. Culverts were also analyzed with the 10-year design flow as per DCM criteria. Proposed drainage improvements do not significantly change the general drainage flow patterns in the area. Hydraulic calculations are included in Appendix D.

3.1.2 Proposed Inlets

Roadway inlet selection and placement conforms to the requirements of the Drainage Criteria Manual, Volume 1, El Paso County, Section 6.2. The roadways within the Town of Peyton are classified as local roadways and collector roadways (Bradshaw Rd, Main St and Railroad St.) For local roads, spread from the minor year storm event may spread to crown of street or top of curb, whichever is the most limiting and flow may not overtop the curb. A maximum of 6” of depth is allowed in the cross pan or gutter flow line.

For the major storm, residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. The depth of water at the gutter flow line shall not exceed 12”. For collector roads, spread from the minor year storm event must be limited to a maximum of 20’ from each curb face. Overtopping the curb is not allowed and flow depth in the cross pan or gutter cannot exceed the gutter depth (6”). For the major storm, residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. The depth of water at the gutter flow line shall not exceed 12”. The area inlets were designed and located assuming containment of the 100-year storm event runoff within the Project corridor.

3.1.3 Proposed Manholes

Manholes were modeled using a Hydraulic Engineering Circular No. 22 (HEC 22) “flat bench” loss factor.

3.1.4 Proposed Culverts

Per Section 2.4 of the El Paso Drainage Criteria Manual, culverts must meet design criteria for street overtopping, allowable headwater and freeboard requirements. Bradshaw Rd. and Railroad St. are collector roads so only 6” of depth is allowed over the street. When flows are allowed to overtop the roadway, adequate embankment protection must be employed to preserve the roadway from eroding and potential failure. Headwater to depth ratio must be less than or equal to the height of the culvert. The 10 year storm is the minor storm design for culverts with the 100 year being the major design storm. Minimum culvert size is 18” and the minimum velocity is 2.5 ft/sec.

3.2 EXISTING STRUCTURE DESCRIPTIONS

Existing hydraulics were analyzed within the study area against DCM criteria. Existing ditches run parallel to Peyton Highway along both the west and east side of the highway. Each culvert in the study area was analyzed using Bentley’s CulvertMaster version 10.03.00.03.

Culvert B1 is a 30” CMP located at the intersection of Bradshaw Rd and Manitou St. This culvert is located at DP9. Roadway centerline points from survey were used for the analysis. This culvert is undersized and does not meet the DCM because the computed headwater exceeds the allowable headwater and may allow damage to nearby property.

Culvert B2 is a 24” CMP. It is located under Highway 24 between Bradshaw Rd and Peyton Highway just west of the business access turn. This culvert is located at DP2. Roadway centerline points from survey were used for the analysis. This culvert is undersized and does not meet the DCM because the headwater to depth ratio is too high.

Culverts B4 and B5 are approximately 20 LF of 18” CMP. They are both driveway culverts on Pueblo St. just south of Main St. They carry almost no flow with 0.11cfs in the 100-year storm. The culverts are damaged, full of debris and flow backwards. They are not a major part of this study.

Three culverts make up the crossing under Peyton Highway for basin B6. Two of the culverts are 36” CMP. The third culvert is approximately two feet higher at the invert and a 30” CMP. The culverts are located at DP6. Roadway centerline points from survey were used for the analysis. These culverts do not meet criteria for both allowable headwater elevation and the HW/D ratio.

The last structure within the study area is an area inlet on the northwest side of the intersection of Peyton Highway and Highway 24. The invert of the pipe in the inlet box was located but the pipe size, length, downstream invert and material were not determined. Whether or not this area inlet meets current criteria was not able to be determined.

3.2.1 Utilities

This study did not undertake a detailed survey of the existing utilities. LUMEN, ZAYO, Black Hills Gas, and Mountain View Electric Association have stated that they have existing infrastructure within the project limits. There is not a public water service within the town of Peyton, every property owner is on well water. Property owners are each on their own septic system, as there is no public wastewater infrastructure.

3.3 PROPOSED IMPROVEMENTS

Proposed improvements in the Town of Peyton have been separated into concepts that go from smaller localized changes to a full urbanized design. These improvements came after understanding existing conditions so recommendations could be made. The improvements include both addressing undersized infrastructure as well as recommendations for full development. The concepts are discussed in detail below. The cost estimates are only for drainage work and materials. They do not include roadway materials, erosion control or any other costs.

Concept 1: Replace Existing Infrastructure

The first concept consists of cleaning and/or replacing existing culverts if they are damaged. This concept will work best if a regular maintenance schedule is established. This will increase stormwater conveyance from the town with minimal cost and effort but will not be a long-term solution as most of the existing drainage is undersized. The cost of drainage work for Concept 1 is estimated to be in the range of $90,000-$120,000. A cost estimate showing other possible project items and additional contingencies are included in the appendix. Hydraulic information can be in Appendix D.1.

Concept 2: Upgrade Existing Infrastructure

This concept includes adding parallel pipes alongside existing culverts under Bradshaw Rd., Peyton Highway and Highway 24 to meet current criteria. The current pipe size for culvert B1 under Bradshaw Road is 30”. This will need to be upsized to 3x36” RCP culverts. The current pipe size for culvert B2 under Hwy 24 is 24”. This will need to be upsized to 2x24” RCP culverts to meet current criteria. This concept is the only concept that address the undersized culvert at Highway 24 and upsizing this culvert will need to be done regardless of other concepts going to construction. The current pipe size for culvert B6 under Peyton highway is 2 36” culverts and 1 30” culvert, these culverts will have to be updated to 42” RCP culverts to meet current criteria. This concept is the only concept that address the undersized culvert at Peyton Highway and upsizing this culvert will need to be done regardless of other concepts going to construction. The cost of drainage work for Concept 2 is estimated to be in the range of $180,000 - $260,000. A cost estimate showing other possible project items and additional contingencies are included in the appendix. Hydraulic information is included in Appendix D.2.

Concept 3: Post Office

This concept aims to alleviate the flooding problems around the Post Office. While this concept will work as a stand-alone project, it has also been designed so that the infrastructure can be maintained in the fully urbanized drainage concept (Concept 5). This concept will add one Type D area inlet with a close mesh grate on the west side of the post office. The inlet will capture flow and direct it under the Post Office entrance and discharge from a 36” RCP. The system will then discharge into the sump area on the NE intersection of Highway 24 and Bradshaw Rd. Runoff flows east to a cross culvert which carries the flow south under Highway 24 and ultimately into Brackett Creek downstream of the study area. The cost of drainage work for Concept 3 is estimated to be in the range of $30,000 - $50,000. A cost estimate showing other possible project items and additional contingencies are included in the appendix. Hydraulic information is included in Appendix D.3.

Concept 4: Peyton School Building

This concept addresses an area of concern brought up by residents of Peyton. To help alleviate ponding at the intersection Manitou St and Main St, a valley gutter along the north side of Main St in front of school area is proposed. The valley gutter will help direct runoff to the east towards Manitou St. An inlet on the northwest side of the intersection will carry this flow by way of a closed storm drain system under Manitou St. until its outfalls near culvert B1. This storm drain system is sized to carry the flow for the existing conditions along with curb and gutter recommended in Option 5. Due to this, the mainline pipe begins as 24” RCP and outfalls with a 72” RCP. The proposed mainline is sized to handle the flow when added to concept 5. The cost of drainage work for Concept 4 is estimated to be in the range of $350,000-$420,000. A cost estimate showing other possible project items and additional contingencies are included in the appendix. Hydraulic information is included in Appendix D.4.

Concept 5: Full Urbanized System

Concept 5 involves urbanizing downtown Peyton by constructing paved roadways with curb and gutter as well as a sidewalk throughout the Town. This concept includes three closed stormwater systems to carry the stormwater from the town and release it near the existing outfall locations.

The first system, Bradshaw, begins approximately 285 feet east of the intersection of Pueblo St and Bradshaw Rd and runs under the center of Bradshaw Rd. It will collect roadway runoff from Pueblo St, Manitou St and Bradshaw Rd using curb inlets and discharge just southwest of the Bradshaw Rd and Railroad St intersection with a 72" RCP. The proposed basins that contribute to this line are as follows: P1A, P2, P3, P4, P5, P6, M1A, M2, M3, M4, M5, M6, A8, A9, B1, B2, and B3. The largest concentration of flow for this system comes from the routed basin A8 (192cfs for Q100). It is recommended that there be a curb cut at the low point on the southwest side of the intersection of Bradshaw Rd and Railroad St. This basin is shown in the proposed hydrology (B4) without an inlet to approximate the runoff. If an inlet were placed there, it may not have the flow necessary to meet velocity criteria. Hydrology for this system assumes that Bradshaw Rd will be a paved roadway all the way to Peyton High School, but hydraulics calculations assume that Bradshaw Rd is only paved until approximately 285 ft west of Pueblo St.

The second system, Railroad, collects runoff from Front St and Railroad St using curb inlets. On the north side, a storm line runs under the center of each street until they intersect to the south. From here, the lines are connected and flow southwest under Railroad St. At the intersection of Railroad St and Bradshaw Rd, on the north side of the Post Office, the line turns south and connects with the area inlet in Concept 3. The inlet will capture flow and direct it under the Post Office entrance and discharge to a 36" RCP. The system will then discharge into the sump area on the NE intersection of Highway 24 and Bradshaw Rd. Runoff flows east to a cross culvert which carries the flow south under Highway 24 and ultimately into Brackett Creek downstream of the study area. The proposed basins in this system are as follows: F1, F2, F3, F4, F5, R3, R4, R5, R6, R8, R9, R10 and A1.

The third system, East Railroad, collects the runoff from the high point on Railroad St as it flows east towards Peyton Highway. It includes two curb inlets that carry the runoff south and then east under Peyton Highway. The proposed basins in this system are R1 and R2. This system discharges into an existing low point on the east side of Peyton Highway with an 18" RCP. This area drains to the east and connects with Brackett Creek just east of the study area.

A few of the lateral lines in this conceptual design are under the minimum velocity requirement of 3 ft/sec and would need further analysis if the design is to proceed.

This conceptual design assumes the following:

- Pueblo St., Manitou St., Front St., Railroad St., Main St. and 2nd St. would be urbanized in their entirety.
- Bradshaw Rd. would only be urbanized until approximately 285 feet west of the intersection with Pueblo St.
- Detailed grading at the outfalls would need to be designed for preliminary.
- Roadway elevations would remain the same or close to existing conditions.

Concept 5 could also be implemented in phases. Any of the systems can be built independently of the others and allow for the town to urbanize certain roadways individually. The cost of drainage work for Concept 5 is estimated to be in the range of 1.8 million dollars to 2.1 million dollars. A cost estimate showing other possible project items and additional contingencies are included in the appendix. Hydraulic and hydrologic calculations for this system can be found in Appendices C and D.5.

3.3.1 Stormwater Management Facilities

This project will not have any permanent water quality features. Section 4.2 includes site specific information regarding the Project's stormwater quality management.

3.3.2 Design documents

The design schematic in Appendix E presents the recommended concepts for this project.

4.1 EROSION CONTROL PLAN

Erosion control is not part of the planning study and will be designed with each individual concept if the concept goes to preliminary design and construction.

4.2 POST CONSTRUCTION WATER QUALITY

Based on the MS4 permit requirements, Part I.E.4.a.i.D, water quality is not required for these concepts because underground utility projects are exempt from needed water quality.

Depending on the concepts chosen to improve drainage in the Town of Peyton and with the urbanization of the downtown streets of Peyton, the runoff will be reaching the outfall locations faster than existing conditions. Having a stormwater detention facility and requirements at Outfall 1 and Outfall 2 is something that should be evaluated further in future designs. If stormwater detention is required stormwater quality should also be address per DCM volume 2, Chapter 4.1.

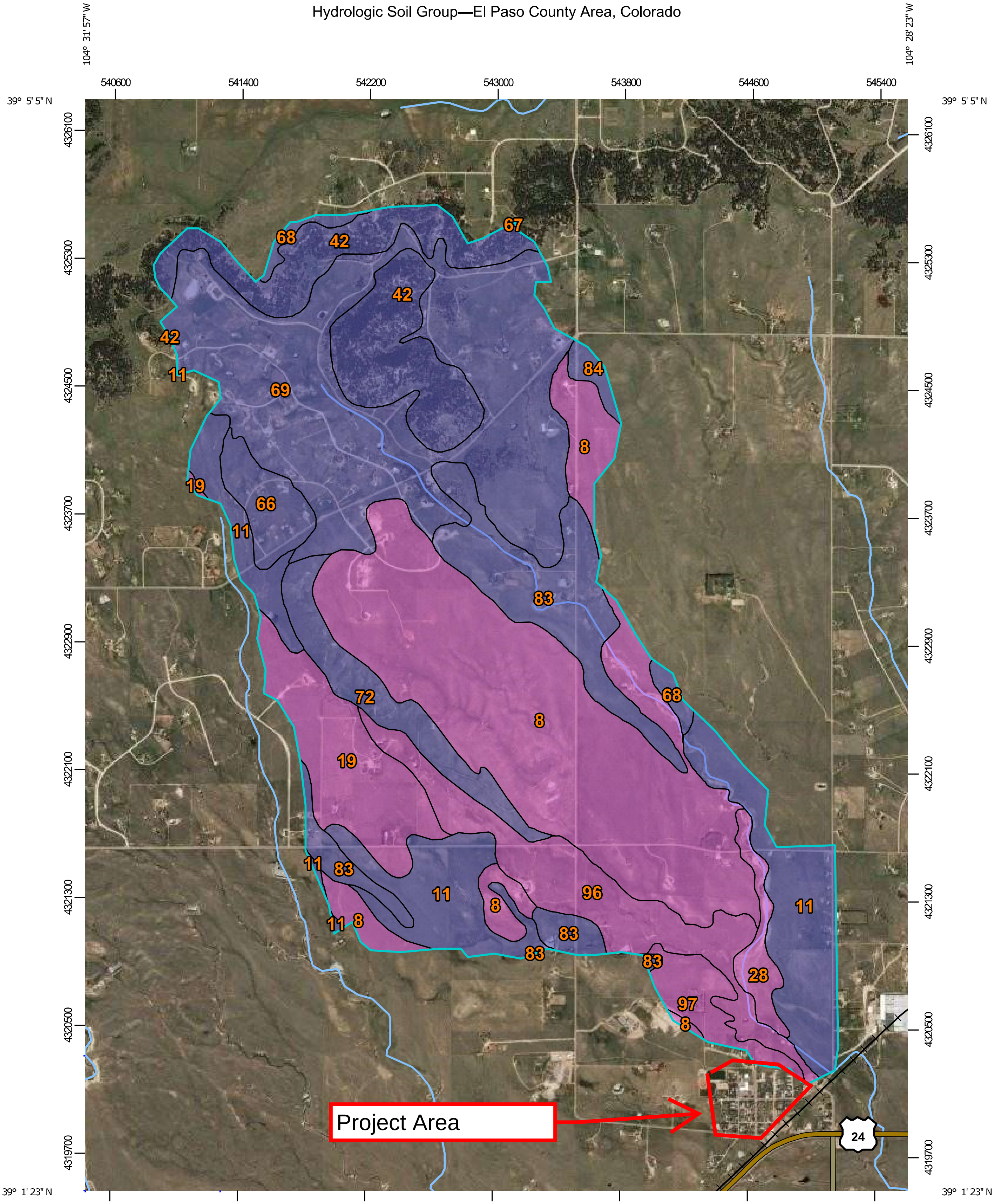
5.1 CONCLUSION

The proposed drainage concepts and the methods used are in compliance with the City of Colorado Springs / El Paso County Drainage Criteria Manual. There are no significant changes in the historic drainage patterns, nor are there any new flooding impacts created by the proposed concepts.

1. Flood Insurance Rate Map 08041C0393H Firmette, Effective Date December 7, 2018, FEMA Map Service Center. http://www.fema.gov/hazard/map/firm.shtm.
2. Web Soil Survey of El Paso County, Colorado. Version 9, July 31, 2019. United States Department of Agriculture-Natural Resources Conservation Service (NRCS). November 2020. <http://websoilsurvey.nrcs.usda.gov>.
3. "City of Colorado Springs / El Paso County Drainage Criteria Manual." City of Colorado Springs and El Paso County. Colorado Springs, CO: Volume 1 Update (October 2018).
4. "City of Colorado Springs Drainage Criteria Manual." City of Colorado Springs. Colorado Springs, CO: Volume 1 Chapter 6 (May 2014).
5. "El Paso County Engineering Criteria Manual." El Paso County. El Paso County, CO: Revision 6 (December 2016)
6. Bentley CulvertMaster Connect Edition Version 10.03.00.03, Bentley Systems Inc. 27 Siemen Company Drive, Suite 200W, Watertown CT 06795, 2020.
7. Bentley StormCAD Connect Edition Update 3 Version 10.03.00.03, Bentley Systems Inc. 27 Siemen Company Drive, Suite 200W, Watertown CT 06795, 2020.
8. Street Capacity and Inet Sizing-MHFD-Inlet v.5.01 Apr-2021.
9. Colorado Department of Transportation Erosion Control and Stormwater Quality Guide. Colorado Department of Transportation, 2019.

Appendix A

NRCS Soils Data



Map Scale: 1:33,300 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 450, 900, 1800, 2700

Feet: 0, 1500, 3000, 6000, 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	827.3	26.5%
11	Bresser sandy loam, cool, 0 to 3 percent slopes	B	368.9	11.8%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	179.2	5.7%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	A	42.6	1.4%
42	Kettle-Rock outcrop complex	B	293.3	9.4%
66	Peyton sandy loam, 1 to 5 percent slopes	B	63.9	2.0%
67	Peyton sandy loam, 5 to 9 percent slopes	B	0.2	0.0%
68	Peyton-Pring complex, 3 to 8 percent slopes	B	23.7	0.8%
69	Peyton-Pring complex, 8 to 15 percent slopes	B	696.4	22.3%
72	Pring coarse sandy loam, 8 to 15 percent slopes	B	108.4	3.5%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	237.0	7.6%
84	Stapleton sandy loam, 8 to 15 percent slopes	B	15.8	0.5%
96	Truckton sandy loam, 0 to 3 percent slopes	A	203.8	6.5%
97	Truckton sandy loam, 3 to 9 percent slopes	A	59.2	1.9%
Totals for Area of Interest			**3,119.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

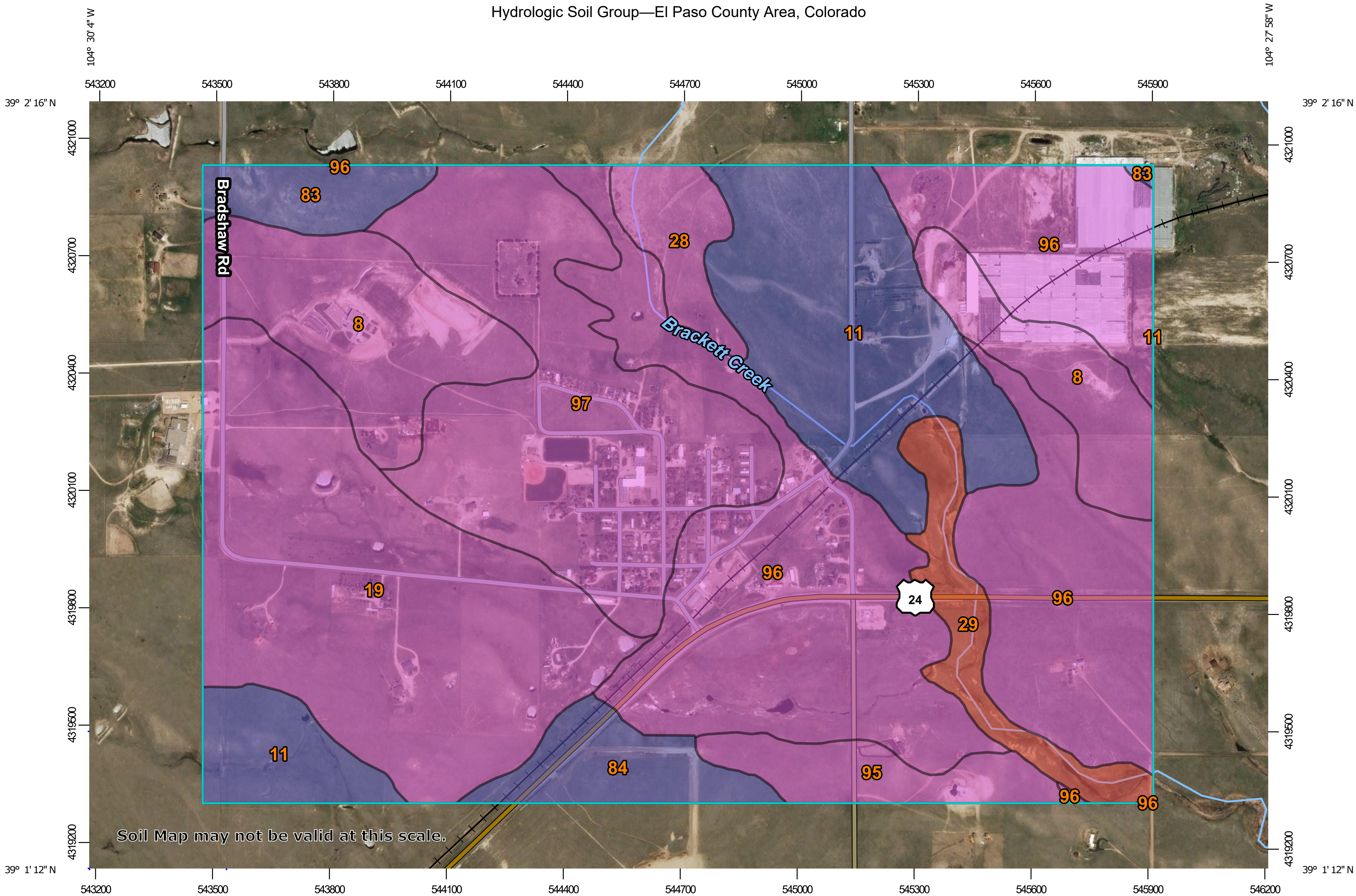
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Map Scale: 1:13,800 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	106.6	10.8%
11	Bresser sandy loam, cool, 0 to 3 percent slopes	B	134.4	13.6%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	183.2	18.6%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	A	22.3	2.3%
29	Fluvaquentic Haplaquolls, nearly level	D	31.3	3.2%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	21.2	2.2%
84	Stapleton sandy loam, 8 to 15 percent slopes	B	28.9	2.9%
95	Truckton loamy sand, 1 to 9 percent slopes	A	27.2	2.8%
96	Truckton sandy loam, 0 to 3 percent slopes	A	282.3	28.6%
97	Truckton sandy loam, 3 to 9 percent slopes	A	149.6	15.2%
Totals for Area of Interest			**987.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix B

FEMA FIRMETTES

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

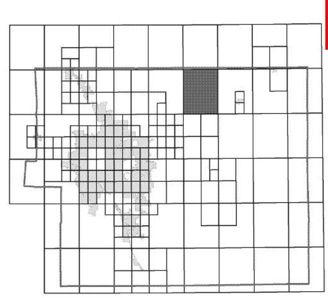
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

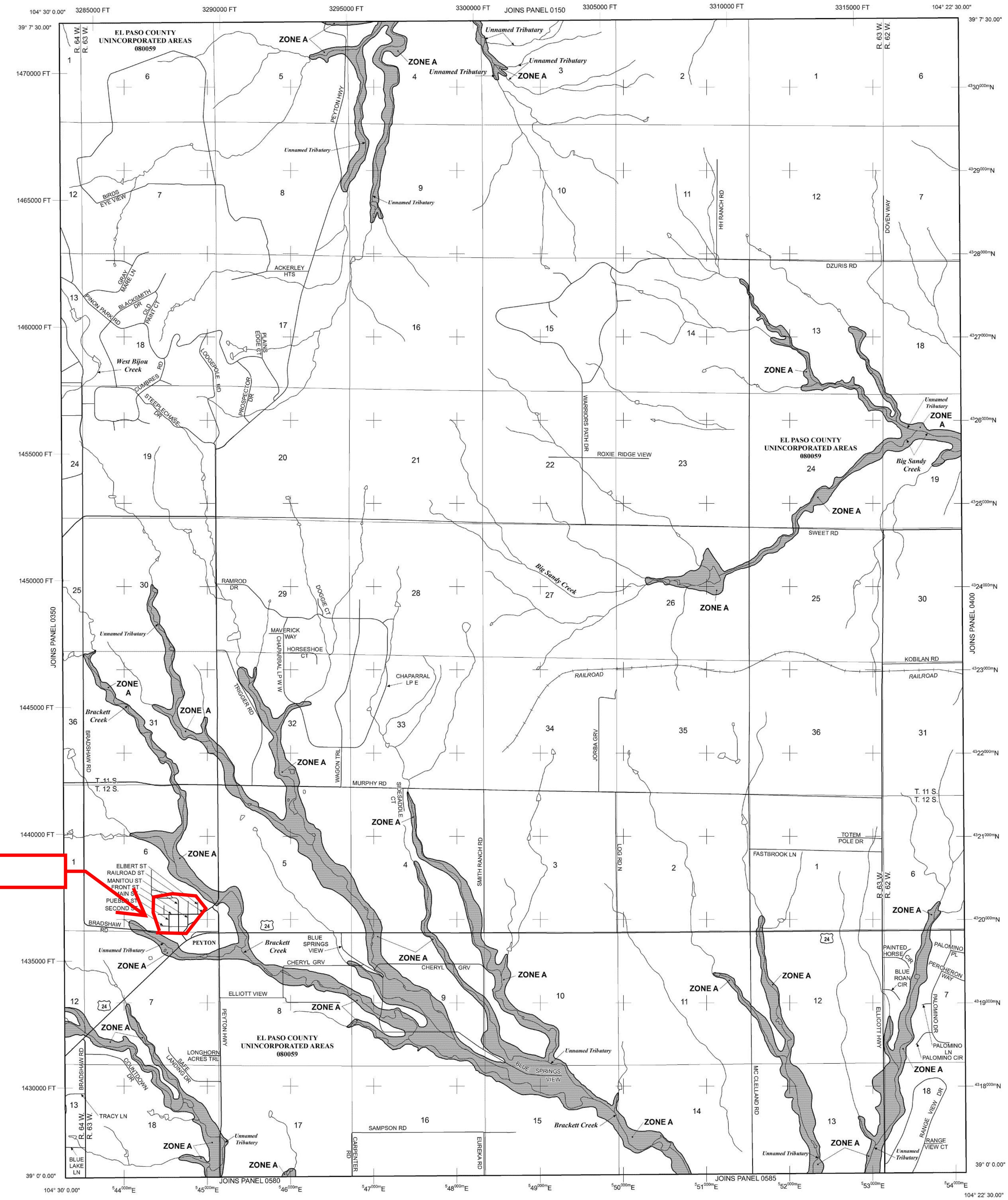
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

PANEL 0375G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 375 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0375	G

Notice to User: The **Map Number** shown below should be used when placing map orders: the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0375G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

Appendix C

Hydrology

		User Entered Data
		Calculated Cells

Peyton Existing Hydrology

BASIN NAMES	CHECK	Total Area [sf]	Total Area [ac]	A/B Soil [sf]	Pred. Soil Type	Surface Type 1 (Streets - Paved) C_2	C_5	C_{100}	Area	Surface Type 2 (Streets - Gravel) C_2	C_5	C_{100}	Area	Surface Type 3 (Undeveloped - Pasture/Meadow or Lawns) C_2	C_5	C_{100}	Area
B1	3727835	3727858	85.58	3727858	A/B	0.89	0.90	0.96	111649	0.57	0.59	0.70	58598	0.02	0.08	0.35	2091535
B2	753789	753789	17.30	753789	A/B	0.89	0.90	0.96	52921	0.57	0.59	0.70	23171	0.02	0.08	0.35	74276
B3	991953	991955	22.77	991955	A/B	0.89	0.90	0.96	55915	0.57	0.59	0.70	7940	0.02	0.08	0.35	365234
B4	1896	1896	0.04	1896	A/B	0.89	0.90	0.96	0	0.57	0.59	0.70	0	0.02	0.08	0.35	1896
B5	794	794	0.02	794	A/B	0.89	0.90	0.96	0	0.57	0.59	0.70	0	0.02	0.08	0.35	794
B7	1076029	1076029	24.70	1076029	A/B	0.89	0.90	0.96	41327	0.57	0.59	0.70	0	0.02	0.08	0.35	1034691
B8	3774120	3774121	86.64	3774121	A/B	0.89	0.90	0.96	146862	0.57	0.59	0.70	0	0.02	0.08	0.35	2982259

Landuse & C-Values (continued)

BASIN NAMES	Surface Type 4 (Residential - 1/4 Acre) C_2	C_5	C_{100}	Area	Surface Type 5 (Residential - 1/2 Acre) C_2	C_5	C_{100}	Area	Surface Type 6 (Residential - 1 Acre) C_2	C_5	C_{100}	Area	Surface Type 7 (Industrial-Light) C_2	C_5	C_{100}	Area
B1	0.23	0.30	0.50	74328	0.15	0.22	0.46	382781	0.12	0.20	0.44	477598	0.57	0.59	0.70	233161
B2	0.23	0.30	0.50	0	0.15	0.22	0.46	462537	0.12	0.20	0.44	0	0.57	0.59	0.70	93949
B3	0.23	0.30	0.50	0	0.15	0.22	0.46	215078	0.12	0.20	0.44	168139	0.57	0.59	0.70	48981
B4	0.23	0.30	0.50	0	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0
B5	0.23	0.30	0.50	0	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0
B7	0.23	0.30	0.50	0	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	11
B8	0.23	0.30	0.50	0	0.15	0.22	0.46	0	0.12	0.20	0.44	273253	0.57	0.59	0.70	371746

BASIN NAMES	Surface Type 8 (Business-Commercial) C_2	C_5	C_{100}	Area	Surface Type 9 (Parks and Cemeteries) C_2	C_5	C_{100}	Area	Average C_2	Average C_5	Average C_{100}
B1	0.79	0.81	0.88	0	0.05	0.12	0.39	298185	0.12	0.18	0.42
B2	0.79	0.81	0.88	46936	0.05	0.12	0.39	0	0.29	0.35	0.55
B3	0.79	0.81	0.88	130666	0.05	0.12	0.39	0	0.25	0.30	0.51
B4	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.02	0.08	0.35
B5	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.02	0.08	0.35
B7	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.05	0.11	0.37
B8	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.12	0.17	0.41

BASIN NAMES	Overland Flow [ft]	Overland Flow Length [ft]	High Point Elevation	Low Point Elevation	Slope [ft/ft]	Channel Flow/ Guter Flow: Channel flow Length [ft]	High Point Elevation	Low Point Elevation	Slope [ft/ft]	Initial [min]	Channel [min]	Total [min]	i_2 [in/hr]	Q_2 [cfs]	i_5 [in/hr]	Q_5 [cfs]	i_{10} [in/hr]	Q_{10} [cfs]	i_{100} [in/hr]	Q_{100} [cfs]
B1	4234	300	6888.00	6883.00	0.02	3934.40	6883.00	6800.00	0.021	24.26	64.50	33.52	1.86	**19.35**	2.31	**36.01**	2.70	**98.15**	3.88	**141.16**
B2	2353	300	6834.00	6826.00	0.03	2052.70	6826.00	6782.00	0.021	17.01	11.68	23.07	2.30	**11.71**	2.88	**17.32**	3.35	**31.79**	4.83	**45.74**
B3	1927	300	6824.00	6812.00	0.04	1626.60	6813.00	6775.70	0.023	15.79	25.58	20.70	2.43	**13.67**	3.04	**20.91**	3.54	**41.43**	5.10	**59.61**
B4	82	35	6817.00	6816.00	0.03	46.60	6816.00	6815.50	0.011	7.78	1.07	8.85	3.44	**0.00**	4.31	**0.02**	5.03	**0.08**	7.24	**0.11**
B5	45	8	6815.00	6814.60	0.05	36.90	6814.60	6814.10	0.014	3.06	0.75	5.00	4.12	**0.00**	5.17	**0.01**	6.03	**0.04**	8.68	**0.06**
B7	1343	300	6882.00	6877.00	0.02	1042.65	6877.00	6852.00	0.024	26.12	16.03	17.46	2.63	**3.47**	3.29	**9.07**	3.84	**35.44**	5.53	**50.99**
B8	3021	300	6859.00	6851.50	0.03	2721.28	6851.50	6812.00	0.015	21.47	53.78	26.78	2.12	**21.20**	2.65	**39.24**	3.09	**111.15**	4.45	**159.89**

Use Rational Method if basin is less than 130 acres, otherwise use SCS Method.
Design Storms determined from El Paso County Drainage Criteria Manual
C values taken from El Paso Drainage Criteria Maual Table 5.1, based on predominant soil type for each basin
Elevations taken from survey data and LIDAR outside of survey data
Intensities determined using the tablel 5-1 from Drainage Criteria Manual of El Paso County

From Drainage Criteria Manual for El Paso County, Volume 1-Updated, Section 3.1

Table 6-6. Runoff Coefficients for Rational Method (Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
⅛ Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
¼ Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
⅓ Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
½ Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis—Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

	User Entered Data
	Calculated/Linked Cells

Travel Time

Basin	[1] Cv	[2] Length ft	Upstream Elevation	Downstream Elevation	Sw, Slope ft/ft	[3] V ft/sec	[4] T min
B1	7.0	3934.40	6883.00	6800.00	0.021	1.02	64.50
B2	20.0	2052.70	6826.00	6782.00	0.021	2.93	11.68
B3	7.0	1626.60	6813.00	6775.70	0.023	1.06	25.58
B4	7.0	46.60	6816.00	6815.50	0.011	0.73	1.07
B5	7.0	36.90	6814.60	6814.10	0.014	0.81	0.75
B7	7.0	1042.65	6877.00	6852.00	0.024	1.08	16.03
B8	7.0	2721.28	6851.50	6812.00	0.015	0.84	53.78

Procedure follows El Paso Drainage Design Manual

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

Figure 6-25. Estimate of Average Concentrated Shallow Flow

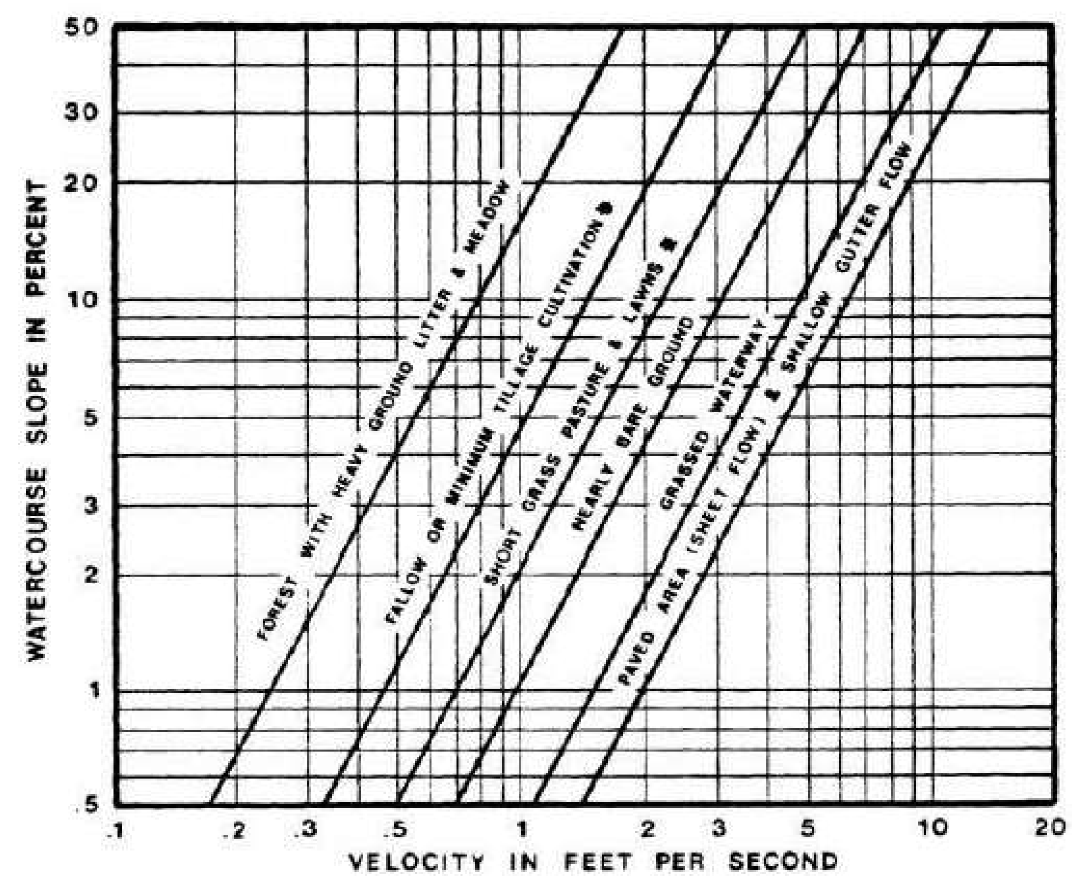
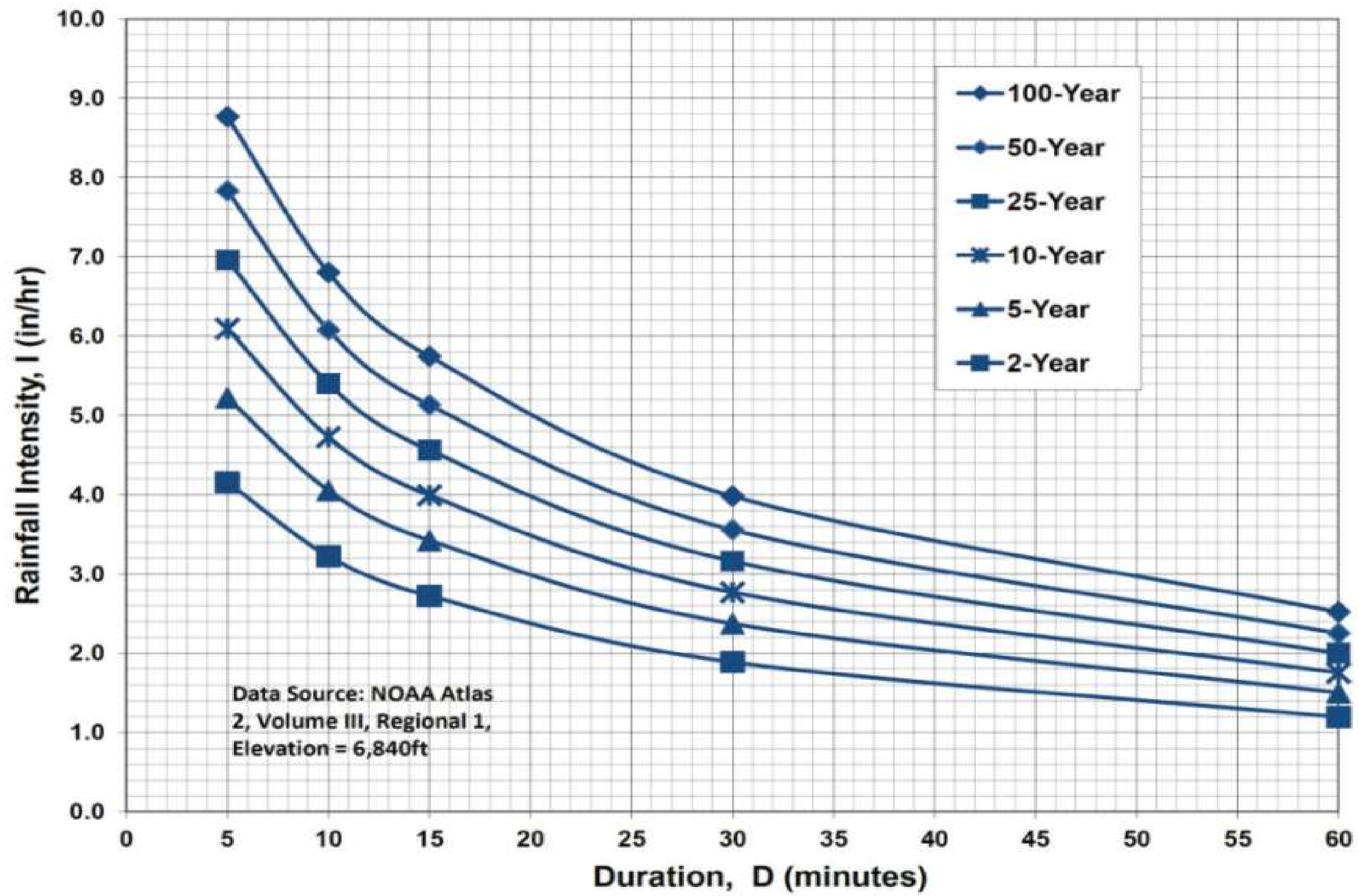


Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

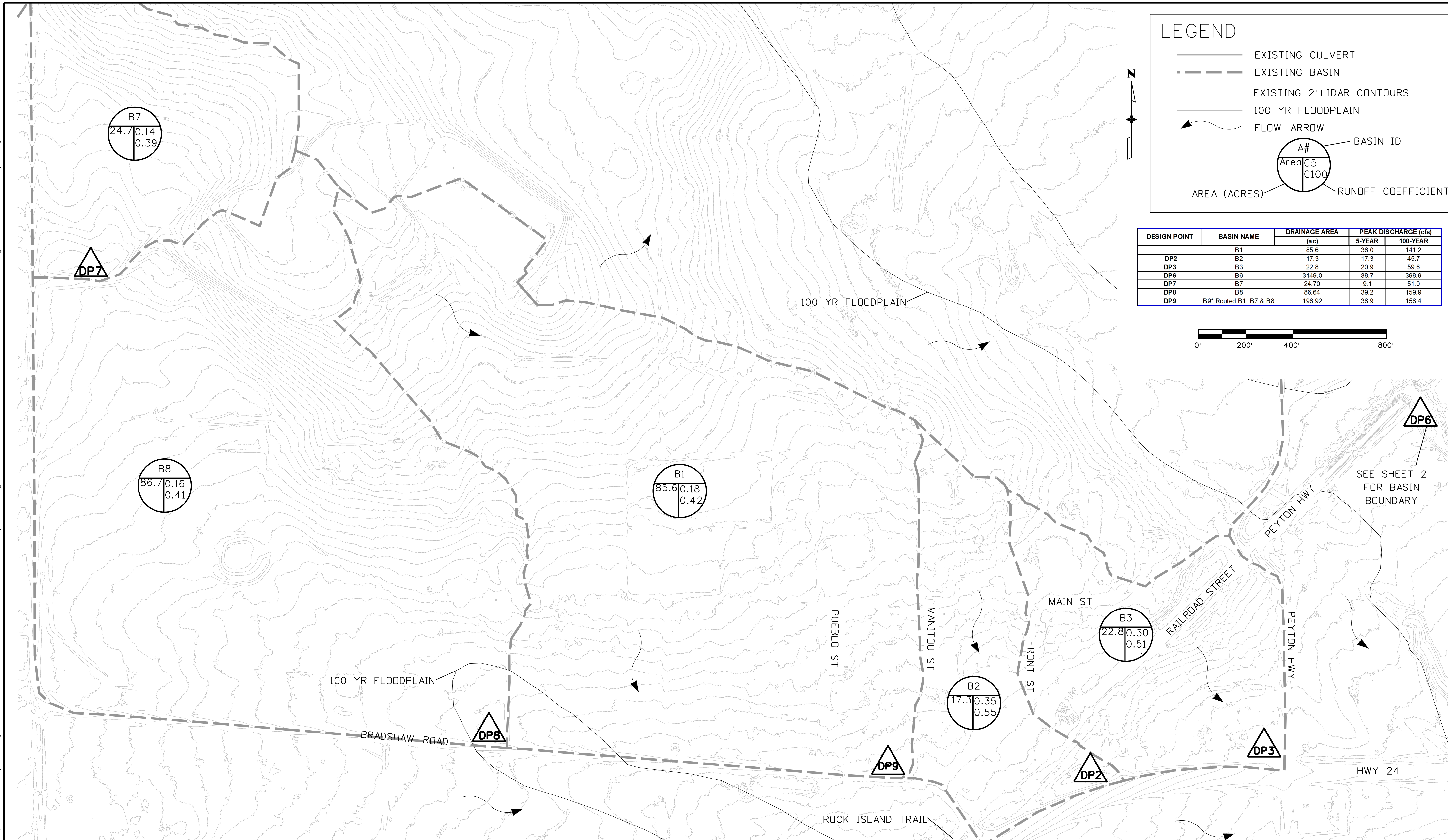
$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

From Drainage Criteria Manual for El Paso County, Volume 1-Updated, Section 3.3
Peyton is 24.6 miles from Colorado Springs. In comparing the NOAA rainfall data for each of them, the data for Colorado Springs would be very close to that in Peyton; but erred on the conservative side.
Peyton is also at the same elevation (6840ft), that was used to develop the equations for figure 6-5.



DESIGN POINT	BASIN NAME	DRAINAGE AREA (ac)	PEAK DISCHARGE (cfs)	
			5-YEAR	100-YEAR
	B1	85.6	36.0	141.2
DP2	B2	17.3	17.3	45.7
DP3	B3	22.8	20.9	59.6
DP6	B6	3149.0	38.7	398.9
DP7	B7	24.70	9.1	51.0
DP8	B8	86.64	39.2	159.9
DP9	B9* Routed B1, B7 & B8	196.92	38.9	158.4

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Computer File Information

Print Date: 11/18/2021
File Name: 60652732-Basin Map_01.dgn
Last Modification Date: 11/18/2021
Designer: LNM Detailer: CS Checker: XXX
11x17 Scale: 1"= 400' Units: Survey Feet

Index of Revisions

Date:	Comments	Init.

El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

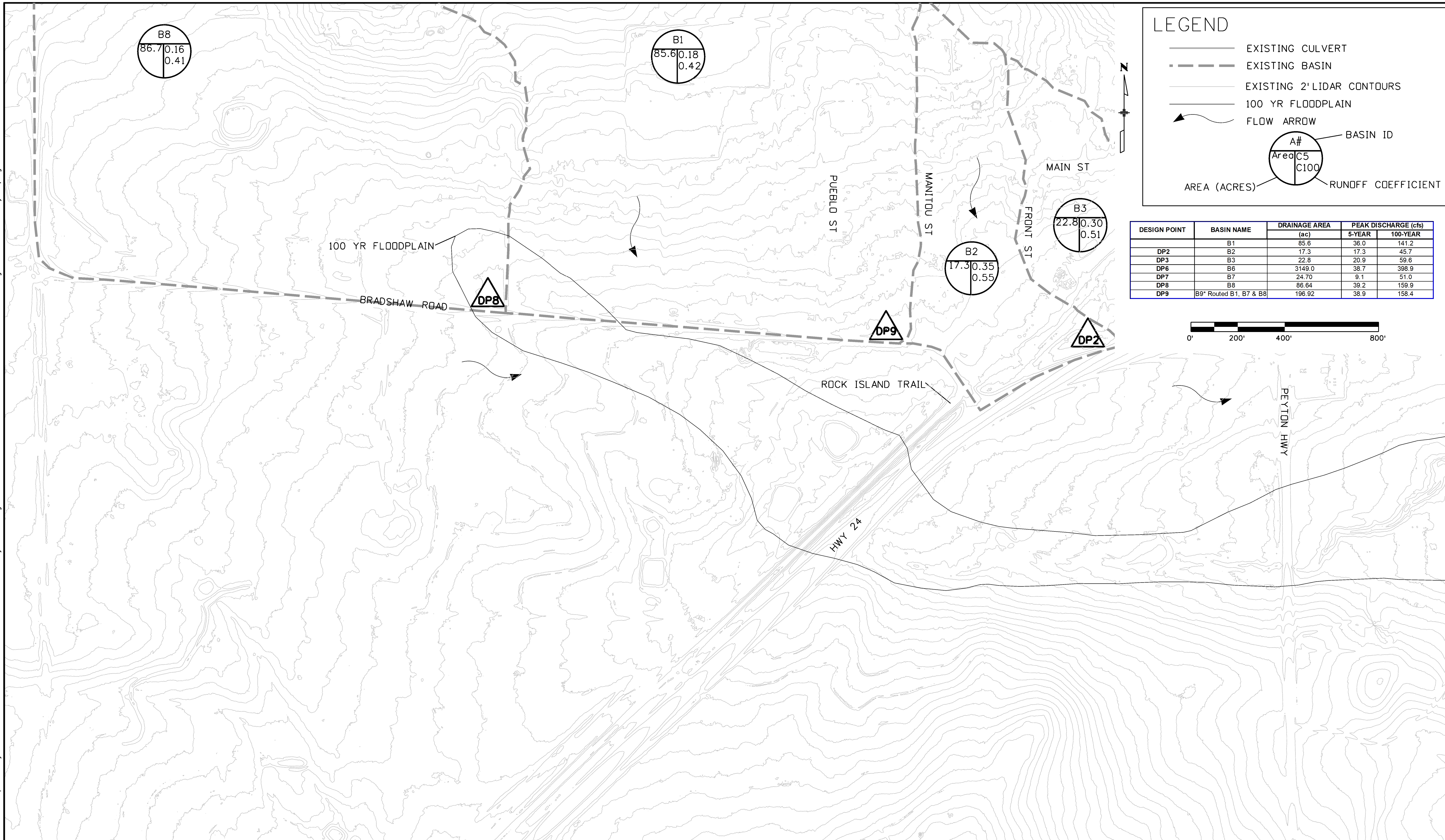
AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60652732

Peyton Drainage and Master Plan

EXISTING BASIN MAP

Drainage 1 of 3

Sheet Number 1



DESIGN POINT	BASIN NAME	DRAINAGE AREA (ac)	PEAK DISCHARGE (cfs)	
			5-YEAR	100-YEAR
	B1	85.6	36.0	141.2
DP2	B2	17.3	17.3	45.7
DP3	B3	22.8	20.9	59.6
DP6	B6	3149.0	38.7	398.9
DP7	B7	24.70	9.1	51.0
DP8	B8	86.64	39.2	159.9
DP9	B9* Routed B1, B7 & B8	196.92	38.9	158.4

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Computer File Information

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Last Modification Date: 5/18/2022
Designer: LNM Detailer: CS Checker: XXX
11x17 Scale: 1"= 400' Units: Survey Feet

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El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

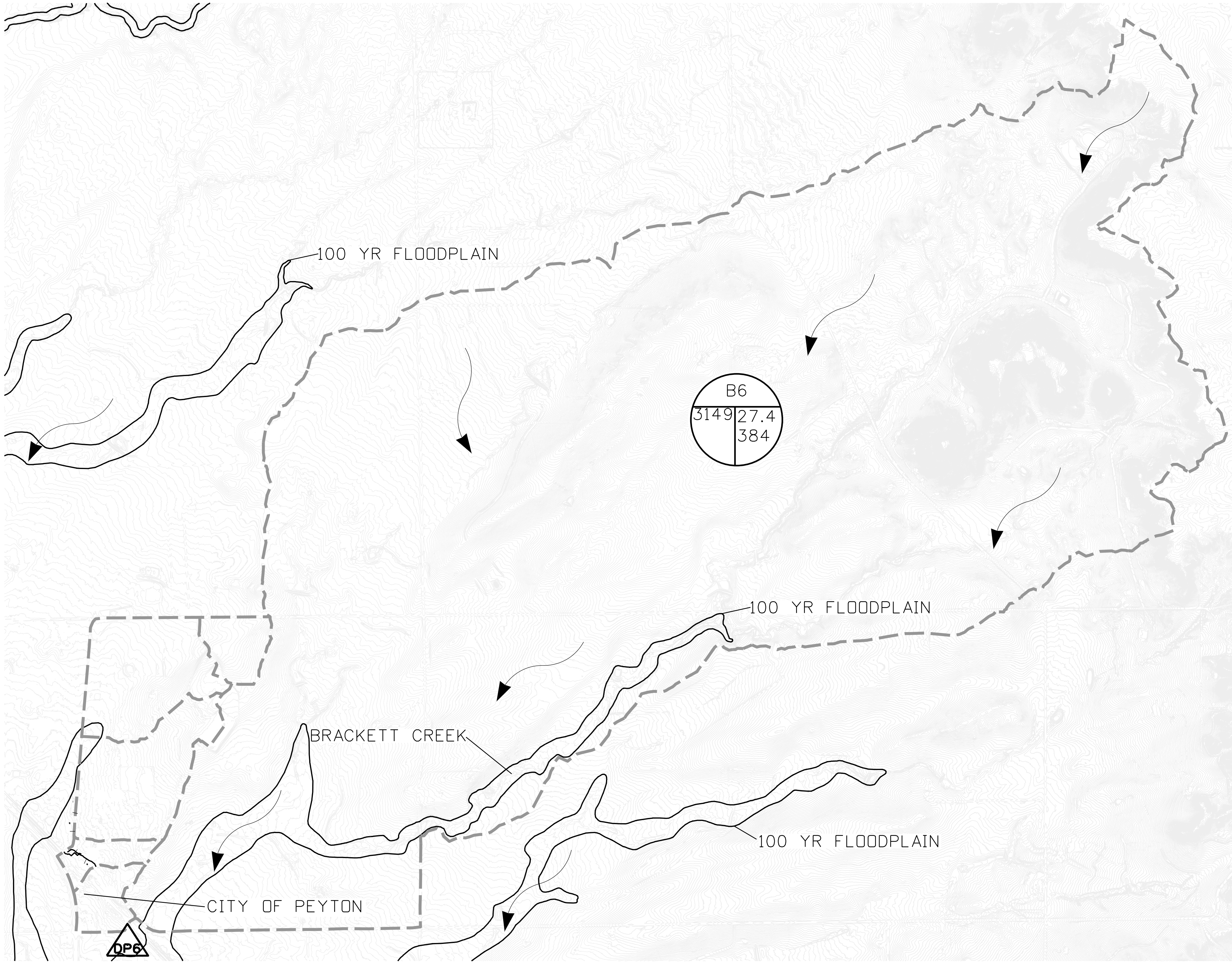
AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60652732

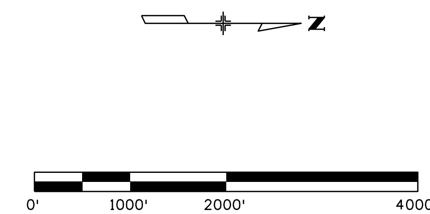
Peyton Drainage and Master Plan

EXISTING BASIN MAP

Drainage 2 of 3

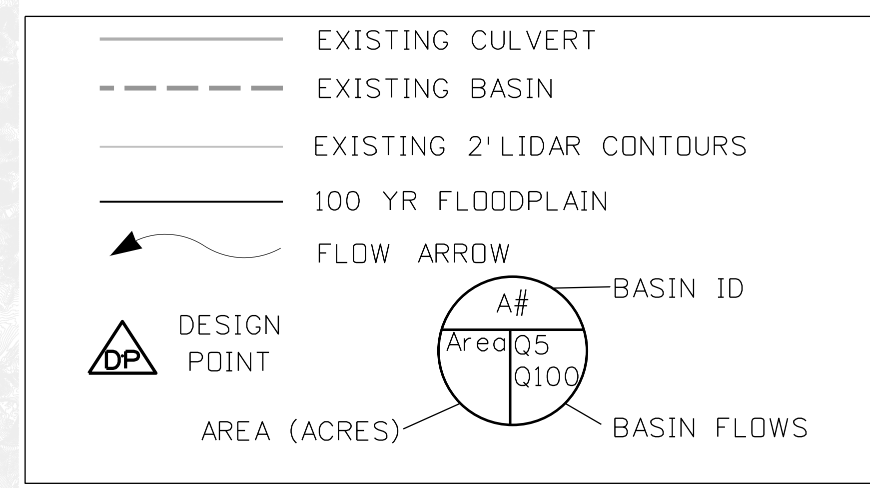
Sheet Number 2





DESIGN POINT	BASIN NAME	DRAINAGE AREA (ac)	PEAK DISCHARGE (cfs)	
			5-YEAR	100-YEAR
DP6	B6	3149.0	38.7	398.9

LEGEND



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Last Modification Date: 11/18/2021
Designer: LNM Detailer: CS Checker:
11x17 Scale: 1"= 2000' Units: Survey Feet

Index of Revisions

Date:	Comments	Init.

El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60652732

PEYTON BASIN MAP

EXISTING BASIN MAP

2 of 3

Sheet Number 3

Peyton Proposed Hydrology

		User Entered Data
		Calculated Cells

BASIN NAMES	CHECK	Total Area [sf]	Total Area [ac]	A/B Soil [sf]	Pred. Soil Type	Surface Type 1 (Streets - Paved) C_2	C_5	C_{100}	Area	Surface Type 2 (Streets - Gravel) C_2	C_5	C_{100}	Area	Surface Type 3 (Undeveloped - Pasture/Meadow or Lawns) C_2	C_5	C_{100}	Area	Surface Type 4 (Residential - 1/4 Acre) C_2	C_5	C_{100}	Area
P1	177367	177367	4.07	177367	A/B	0.89	0.90	0.96	38698	0.57	0.59	0.70		0.02	0.08	0.35	0	0.23	0.30	0.50	0
P2	302431	302431	6.94	302431	A/B	0.89	0.90	0.96	13175	0.57	0.59	0.70	204	0.02	0.08	0.35	207437	0.23	0.30	0.50	0
P3	57189	57190	1.31	57190	A/B	0.89	0.90	0.96	11511	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	0
P4	9559	9559	0.22	9559	A/B	0.89	0.90	0.96	9559	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
P5	5258	5258	0.12	5258	A/B	0.89	0.90	0.96	5258	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
P6	5443	5443	0.12	5443	A/B	0.89	0.90	0.96	5443	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
M1	142985	142985	3.28	142985	A/B	0.89	0.90	0.96	60535	0.57	0.59	0.70	0	0.02	0.08	0.35	48419	0.23	0.30	0.50	0
M2	43685	43685	1.00	43685	A/B	0.89	0.90	0.96	11929	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	0
M3	65179	65179	1.50	65179	A/B	0.89	0.90	0.96	14386	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	0
M4	5562	5562	0.13	5562	A/B	0.89	0.90	0.96	5562	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
M5	99926	99926	2.29	99926	A/B	0.89	0.90	0.96	15162	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	0
M6	6526	6526	0.15	6526	A/B	0.89	0.90	0.96	6526	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
M7	28833	28833	0.66	28833	A/B	0.89	0.90	0.96	12089	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
F1	195844	195844	4.50	195844	A/B	0.89	0.90	0.96	22792	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
F2	22774	22774	0.52	22774	A/B	0.89	0.90	0.96	12918	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
F3	20853	20853	0.48	20853	A/B	0.89	0.90	0.96	13378	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
F4	35503	35503	0.82	35503	A/B	0.89	0.90	0.96	17647	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
F5	143861	143861	3.30	143861	A/B	0.89	0.90	0.96	13503	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R1	11622	11622	0.27	11622	A/B	0.89	0.90	0.96	11622	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R2	10110	10110	0.23	10110	A/B	0.89	0.90	0.96	10110	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R3	134239	134239	3.08	134239	A/B	0.89	0.90	0.96	18316	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R4	16493	16493	0.38	16493	A/B	0.89	0.90	0.96	16493	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R5	8385	8385	0.19	8385	A/B	0.89	0.90	0.96	8385	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R6	72841	72841	1.67	72841	A/B	0.89	0.90	0.96	7510	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R8	17713	17713	0.41	17713	A/B	0.89	0.90	0.96	17713	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R9	73358	73358	1.68	73358	A/B	0.89	0.90	0.96	26303	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
R10	6646	6646	0.15	6646	A/B	0.89	0.90	0.96	6646	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
A1	18047	18047	0.41	18047	A/B	0.89	0.90	0.96	6104	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
B1	87493	87493	2.01	87493	A/B	0.89	0.90	0.96	5241	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
B2	5120	5120	0.12	5120	A/B	0.89	0.90	0.96	5120	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
B3	62352	62352	1.43	62352	A/B	0.89	0.90	0.96	13748	0.57	0.59	0.70	0	0.02	0.08	0.35	0	0.23	0.30	0.50	0
P1A	99337	99337	2.28	99337	A/B	0.89	0.90	0.96	1398	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	
M1A	181808	181813	4.17	181813	A/B	0.89	0.90	0.96	2737	0.57	0.59	0.70	33007	0.02	0.08	0.35	33230	0.23	0.30	0.50	74327
A9	224594	224594	5.16	224594	A/B	0.89	0.90	0.96	224594	0.57	0.59	0.70		0.02	0.08	0.35		0.23	0.30	0.50	
A8*(B7, B8, A8)	7233608	7233609	166.06	7233609	A/B	0.89	0.90	0.96	224017	0.57	0.59	0.70	6827	0.02	0.08	0.35	5836416	0.23	0.30	0.50	0
A8	2383459	2383459	54.72	2383459	A/B	0.89	0.90	0.96	35828	0.57	0.59	0.70	6827	0.02	0.08	0.35	1819466	0.23	0.30	0.50	0

BASIN NAMES	Surface Type 5 (Residential - 1/2 Acre) C_2	C_5	C_{100}	Area	Surface Type 6 (Residential - 1 Acre) C_2	C_5	C_{100}	Area	Surface Type 7 (Industrial-Light) C_2	C_5	C_{100}	Area	Surface Type 8 (Business-Commercial) C_2	C_5	C_{100}	Area	Surface Type 9 (Parks and Cemeteries) C_2	C_5	C_{100}	Area	Average C_2	Average C_5	Average C_{100}
P1	0.15	0.22	0.46	0	0.12	0.20	0.44	44975	0.57	0.59	0.70	0	0.79	0.81	0.88		0.05	0.12	0.39	93695	0.25	0.31	0.53
P2	0.15	0.22	0.46	460	0.12	0.20	0.44		0.57	0.59	0.70	81155	0.79	0.81	0.88		0.05	0.12	0.39		0.21	0.25	0.47
P3	0.15	0.22	0.46	35756	0.12	0.20	0.44	9923	0.57	0.59	0.70	0	0.79	0.81	0.88		0.05	0.12	0.39		0.29	0.35	0.56
P4	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
P5	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
P6	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
M1	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	34031	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.52	0.55	0.69
M2	0.15	0.22	0.46	31756	0.12	0.20	0.44		0.57	0.59	0.70	0	0.79	0.81	0.88		0.05	0.12	0.39		0.35	0.41	0.60
M3	0.15	0.22	0.46	50793	0.12	0.20	0.44		0.57	0.59	0.70	0	0.79	0.81	0.88		0.05	0.12	0.39		0.31	0.37	0.57
M4	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
M5	0.15	0.22	0.46	84764	0.12	0.20	0.44		0.57	0.59	0.70	0	0.79	0.81	0.88		0.05	0.12	0.39		0.26	0.32	0.54
M6	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
M7	0.15	0.22	0.46	16744	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.46	0.51	0.67
F1	0.15	0.22	0.46	173052	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.24	0.30	0.52
F2	0.15	0.22	0.46	9856	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.57	0.61	0.74
F3	0.15	0.22	0.46	7475	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.62	0.66	0.78
F4	0.15	0.22	0.46	17856	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.52	0.56	0.71
F5	0.15	0.22	0.46	130358	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.22	0.28	0.51
R1	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
R2	0.15	0.22	0.46	0	0.12	0.20	0.44		0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
R3	0.15	0.22	0.46	115924	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.25	0.31	0.53
R4	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
R5	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
R6	0.15	0.22	0.46	65331	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.23	0.29	0.51
R8	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
R9	0.15	0.22	0.46	47056	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.42	0.46	0.64
R10	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
A1	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	11943	0.05	0.12	0.39	0	0.82	0.84	0.91
B1	0.15	0.22	0.46	2340	0.12	0.20	0.44	79911	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.17	0.24	0.47
B2	0.15	0.22	0.46	0	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.89	0.90	0.96
B3	0.15	0.22	0.46	48604	0.12	0.20	0.44	0	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.31	0.37	0.57
P1A	0.15	0.22	0.46	39712	0.12	0.20	0.44	14310	0.57	0.59	0.70	203	0.79	0.81	0.88		0.05	0.12	0.39	43713	0.11	0.18	0.43
M1A	0.15	0.22	0.46	35725	0.12	0.20	0.44	0	0.57	0.59	0.70	2781	0.79	0.81	0.88	0	0.05	0.12	0.39	0	0.25	0.31	0.51
A9	0.15	0.22	0.46		0.12	0.20	0.44		0.57	0.59	0.70		0.79	0.81	0.88		0.05	0.12	0.39		0.89	0.90	0.96
A8*(B7, B8, A8)	0.15	0.22	0.46	24437	0.12	0.20	0.44	583875	0.57	0.59	0.70	371757	0.79	0.81	0.88	0	0.05	0.12	0.39	186279	0.09	0.14	0.40
A8	0.15	0.22	0.46	24437	0.12	0.20	0.44	310622	0.57	0.59	0.70	0	0.79	0.81	0.88	0	0.05	0.12	0.39	186279	0.05	0.11	0.38

BASIN NAMES	Overland Flow [ft]	Overland Flow Length [ft]	High Point Elevation	Low Point Elevation	Slope [ft/ft]	Channel Flow/ Guter Flow: Channel flow Length [ft]	High Point Elevation	Low Point Elevation	Slope [ft/ft]	Initial [min]	Channel [min]	Total [min]	i_2 [in/hr]	Q_2 [cfs]	i_5 [in/hr]	Q_5 [cfs]	i_{10} [in/hr]	Q_{10} [cfs]	i_{100} [in/hr]	Q_{100} [cfs]
P1	1070	300	6840.00	6833.00	0.02	769.88	6833.00	6817.50	0.020	18.67	12.92	15.94	2.74	**2.80**	3.43	**4.34**	4.00	**8.59**	5.76	**12.35**
P2	1560	300	6849.50	6838.00	0.04	1259.89	6838.00	6817.50	0.016	17.00	23.52	18.67	2.55	**3.65**	3.19	**5.61**	3.73	**12.18**	5.36	**17.52**
P3	543	300	6819.50	6813.25	0.02	243.24	6813.25	6809.75	0.014	18.33	1.69	13.02	2.98	**1.15**	3.73	**1.73**	4.36	**3.19**	6.27	**4.58**
P4	454	25	6817.00	6816.50	0.02	428.72	6816.50	6809.75	0.016	1.44	2.85	5.00	4.12	**0.80**	5.17	**1.02**	6.03	**1.27**	8.68	**1.83**
P5	240	18	6809.75	6809.25	0.03	221.80	6809.25	6803.00	0.028	1.09	1.10	5.00	4.12	**0.44**	5.17	**0.56**	6.03	**0.70**	8.68	**1.01**
P6	239	18	6809.75	6809.25	0.03	221.27	6809.25	6802.50	0.031	1.08	1.06	5.00	4.12	**0.46**	5.17	**0.58**	6.03	**0.72**	8.68	**1.04**
M1	540	20	6828.00	6827.50	0.03	519.71	6827.50	6814.75	0.025	3.29	7.90	11.19	3.16	**5.39**	3.96	**7.13**	4.62	**10.49**	6.65	**15.09**
M2	832	300	6834.25	6827.25	0.02	531.78	6827.25	6815.00	0.023	16.42	8.34	14.62	2.84	**1.00**	3.56	**1.45**	4.15	**2.48**	5.98	**3.57**
M3	502	24	6817.00	6816.50	0.02	478.23	6816.50	6809.25	0.015	5.07	3.24	8.30	3.52	**1.65**	4.41	**2.44**	5.14	**4.39**	7.40	**6.32**
M4	216	21	6814.50	6814.00	0.02	195.00	6814.00	6810.00	0.021	1.24	1.13	5.00	4.12	**0.47**	5.17	**0.59**	6.03	**0.74**	8.68	**1.06**
M5	576	20	6813.50	6813.00	0.03	555.66	6813.00	6805.00	0.014	4.64	3.86	8.49	3.49	**2.10**	4.37	**3.24**	5.10	**6.27**	7.34	**9.03**
M6	276	20	6809.50	6809.00	0.03	256.00	6809.00	6805.00	0.016	1.19	1.71	5.00	4.12	**0.55**	5.17	**0.70**	6.03	**0.87**	8.68	**1.25**
M7	534	20	6808.50	6808.00	0.03	514.49	6808.00	6800.50	0.015	3.55	3.55	7.10	3.70	**1.13**	4.64	**1.55**	5.42	**2.40**	7.80	**3.46**
F1	911	300	6834.50	6825.50	0.03	611.30	6825.50	6810.50	0.025	17.43	3.25	15.06	2.81	**2.98**	3.51	**4.73**	4.10	**9.55**	5.90	**13.75**
F2	485	20	6825.50	6819.50	0.30	464.90	6819.50	6810.50	0.019	1.30	7.96	9.25	3.39	**1.01**	4.25	**1.34**	4.95	**1.93**	7.13	**2.77**
F3	511	20	6814.00	6813.50	0.03	490.90	6813.50	6802.50	0.022	2.65	2.73	5.38	4.03	**1.21**	5.06	**1.59**	5.90	**2.21**	8.49	**3.17**
F4	412	20	6810.00	6809.50	0.03	392.30	6809.50	6800.50	0.023	3.23	2.16	5.39	4.03	**1.70**	5.06	**2.30**	5.90	**3.41**	8.49	**4.90**
F5	658	300	6813.00	6804.80	0.03	357.97	6804.80	6799.50	0.015	18.32	2.45	13.66	2.92	**2.12**	3.66	**3.43**	4.27	**7.15**	6.15	**10.29**
R1	384	28	6808.00	6807.50	0.02	356.17	6807.50	6799.00	0.024	1.57	1.92	5.00	4.12	**0.98**	5.17	**1.24**	6.03	**1.54**	8.68	**2.22**
R2	380	20	6807.00	6806.50	0.03	360.00	6806.50	6799.00	0.021	1.19	2.08	5.00	4.12	**0.85**	5.17	**1.08**	6.03	**1.34**	8.68	**1.93**
R3	894	300	6824.50	6811.50	0.04	593.70	6811.50	6808.00	0.006	15.17	6.44	14.97	2.82	**2.18**	3.52	**3.40**	4.11	**6.69**	5.92	**9.63**
R4	570	20	6810.00	6809.50	0.03	549.70	6809.50	6802.50	0.013	1.19	11.60	12.79	3.00	**1.01**	3.76	**1.28**	4.39	**1.59**	6.31	**2.29**
R5	323	20	6807.50	6807.00	0.03	302.70	6807.00	6802.50	0.015	1.19	2.07	5.00	4.12	**0.71**	5.17	**0.90**	6.03	**1.11**	8.68	**1.60**
R6	389	244	6801.00	6800.50	0.00	144.85	6800.50	6799.50	0.007	38.53	1.45	12.16	3.06	**1.16**	3.84	**1.86**	4.48	**3.83**	6.44	**5.51**
R8	394	23	6801.00	6800.50	0.02	370.61	6800.50	6799.00	0.004	1.34	4.85	6.19	3.86	**1.40**	4.85	**1.77**	5.66	**2.21**	8.14	**3.18**
R9	607	20	6803.75	6803.25	0.03	586.80	6803.25	6799.00	0.007	3.80	5.75	9.54	3.35	**2.34**	4.20	**3.28**	4.90	**5.27**	7.05	**7.59**
R10	252	20	6799.50	6799.00	0.03	231.99	6799.00	6797.50	0.006	1.19	2.40	5.00	4.12	**0.56**	5.17	**0.71**	6.03	**0.88**	8.68	**1.27**
A1	178	23	6797.00	6795.50	0.07	154.86	6795.50	6795.00	0.003	1.21	2.27	5.00	4.12	**1.41**	5.17	**1.80**	6.03	**2.27**	8.68	**3.26**
B1	711	300	6816.50	6811.50	0.02	411.00	6811.50	6802.50	0.022	22.66	2.31	13.95	2.90	**0.97**	3.63	**1.77**	4.23	**4.01**	6.09	**5.77**
B2	204	28	6804.50	6804.00	0.02	176.00	6804.00	6802.50	0.009	1.58	4.54	6.12	3.88	**0.41**	4.87	**0.51**	5.68	**0.64**	8.17	**0.92**
B3	425	271	6809.00	6800.50	0.03	153.80	6800.50	6800.00	0.003	14.88	6.42	12.36	3.04	**1.36**	3.81	**2.02**	4.45	**3.63**	6.40	**5.22**
P1A	1053	300	6840.00	6833.00	0.02	752.88	6833.00	6819.50	0.018	21.67	4.69	15.85	2.75	**0.71**	3.44	**1.44**	4.01	**3.97**	5.77	**5.71**
M1A	1350	300	6856.00	6842.50	0.05	1049.53	6842.50	6827.50	0.014	15.04	7.32	17.50	2.63	**2.77**	3.29	**4.26**	3.84	**8.19**	5.52	**11.78**
A9	6148	24	6882.00	6881.00	0.04	6123.16	6881.00	6803.00	0.013	1.12	45.21	44.15	1.53	**7.01**	1.90	**8.82**	2.22	**10.98**	3.19	**15.79**
A8*(B7, B8, A8)	5354	300	6882.00	6877.00	0.02	5054.00	6877.00	6803.00	0.015	25.28	34.81	39.74	1.65	**23.33**	2.06	**49.00**	2.40	**157.95**	3.46	**227.14**
A8	4234	300	6888.00	6883.00	0.02	3934.40	6883.00	6800.00	0.021	26.05	64.50	33.52	1.86	**5.21**	2.31	**14.44**	2.70	**55.58**	3.88	**79.94**

Use Rational Method if basin is less than 130 acres, otherwise use SCS Method.
Design Storms determined from El Paso County Drainage Criteria Manual
C values taken from El Paso Drainage Criteria Maual Table 5.1, based on predominant soil type for each basin
Elevations taken from survey data and LIDAR outside of survey data
Intensities determined using the tablel 5-1 from Drainage Criteria Manual of El Paso County

From Drainage Criteria Manual for El Paso County, Volume 1-Updated, Section 3.1

Table 6-6. Runoff Coefficients for Rational Method (Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
⅛ Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
¼ Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
⅓ Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
½ Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis—Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

	User Entered Data
	Calculated/Linked Cells

Travel Time

Basin	[1] Cv	[2] Length ft	Upstream Elevation	Downstream Elevation	Sw, Slope ft/ft	[3] V ft/sec	[4] T min
P1	7.0	769.88	6833.00	6817.50	0.020	0.99	12.92
P2	7.0	1259.89	6838.00	6817.50	0.016	0.89	23.52
P3	20.0	243.24	6813.25	6809.75	0.014	2.40	1.69
P4	20.0	428.72	6816.50	6809.75	0.016	2.51	2.85
P5	20.0	221.80	6809.25	6803.00	0.028	3.36	1.10
P6	20.0	221.27	6809.25	6802.50	0.031	3.49	1.06
M1	7.0	519.71	6827.50	6814.75	0.025	1.10	7.90
M2	7.0	531.78	6827.25	6815.00	0.023	1.06	8.34
M3	20.0	478.23	6816.50	6809.25	0.015	2.46	3.24
M4	20.0	195.00	6814.00	6810.00	0.021	2.86	1.13
M5	20.0	555.66	6813.00	6805.00	0.014	2.40	3.86
M6	20.0	256.00	6809.00	6805.00	0.016	2.50	1.71
M7	20.0	514.49	6808.00	6800.50	0.015	2.41	3.55
F1	20.0	611.30	6825.50	6810.50	0.025	3.13	3.25
F2	7.0	464.90	6819.50	6810.50	0.019	0.97	7.96
F3	20.0	490.90	6813.50	6802.50	0.022	2.99	2.73
F4	20.0	392.30	6809.50	6800.50	0.023	3.03	2.16
F5	20.0	357.97	6804.80	6799.50	0.015	2.43	2.45
R1	20.0	356.17	6807.50	6799.00	0.024	3.09	1.92
R2	20.0	360.00	6806.50	6799.00	0.021	2.89	2.08
R3	20.0	593.70	6811.50	6808.00	0.006	1.54	6.44
R4	7.0	549.70	6809.50	6802.50	0.013	0.79	11.60
R5	20.0	302.70	6807.00	6802.50	0.015	2.44	2.07
R6	20.0	144.85	6800.50	6799.50	0.007	1.66	1.45
R8	20.0	370.61	6800.50	6799.00	0.004	1.27	4.85
R9	20.0	586.80	6803.25	6799.00	0.007	1.70	5.75
R10	20.0	231.99	6799.00	6797.50	0.006	1.61	2.40
A1	20.0	154.86	6795.50	6795.00	0.003	1.14	2.27
B1	20.0	411.00	6811.50	6802.50	0.022	2.96	2.31
B2	7.0	176.00	6804.00	6802.50	0.009	0.65	4.54
B3	7.0	153.80	6800.50	6800.00	0.003	0.40	6.42
B4	20.0	515.66	6802.00	6798.50	0.007	1.65	5.22
P1A	20.0	752.88	6833.00	6819.50	0.018	2.68	4.69
M1A	20.0	1049.53	6842.50	6827.50	0.014	2.39	7.32
A9	20.0	6123.16	6881.00	6803.00	0.013	2.26	45.21
A8*(B7, B8, A8)	20.0	5054.00	6877.00	6803.00	0.015	2.42	34.81
Existing B7	7.0	1042.65	6877.00	6852.00	0.024	1.08	16.03
Existing B8	7.0	2721.28	6851.50	6812.00	0.015	0.84	53.78
A8	7.0	3934.40	6883.00	6800.00	0.021	1.02	64.50
A1-Option 3	20.0	1557.20	6826.00	6794.75	0.020	2.83	9.16

Procedure follows El Paso Drainage Design Manual

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

Figure 6-25. Estimate of Average Concentrated Shallow Flow

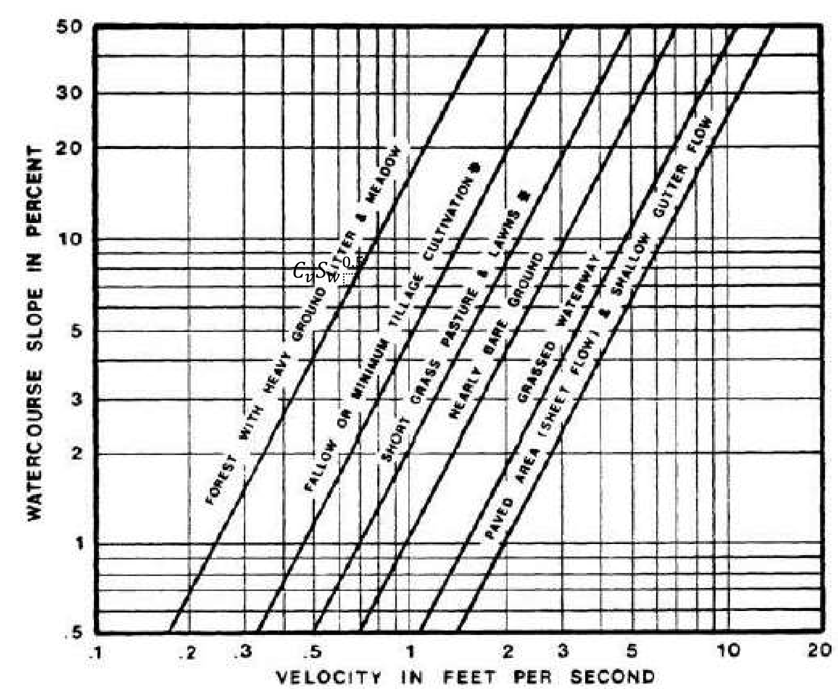
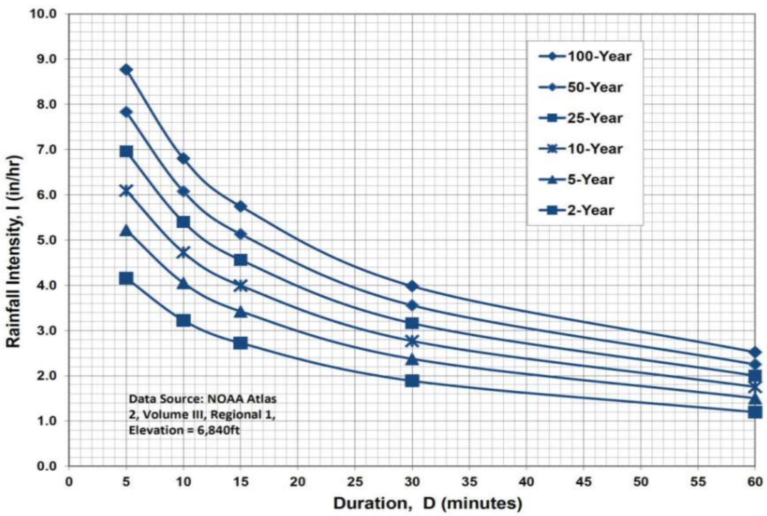


Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

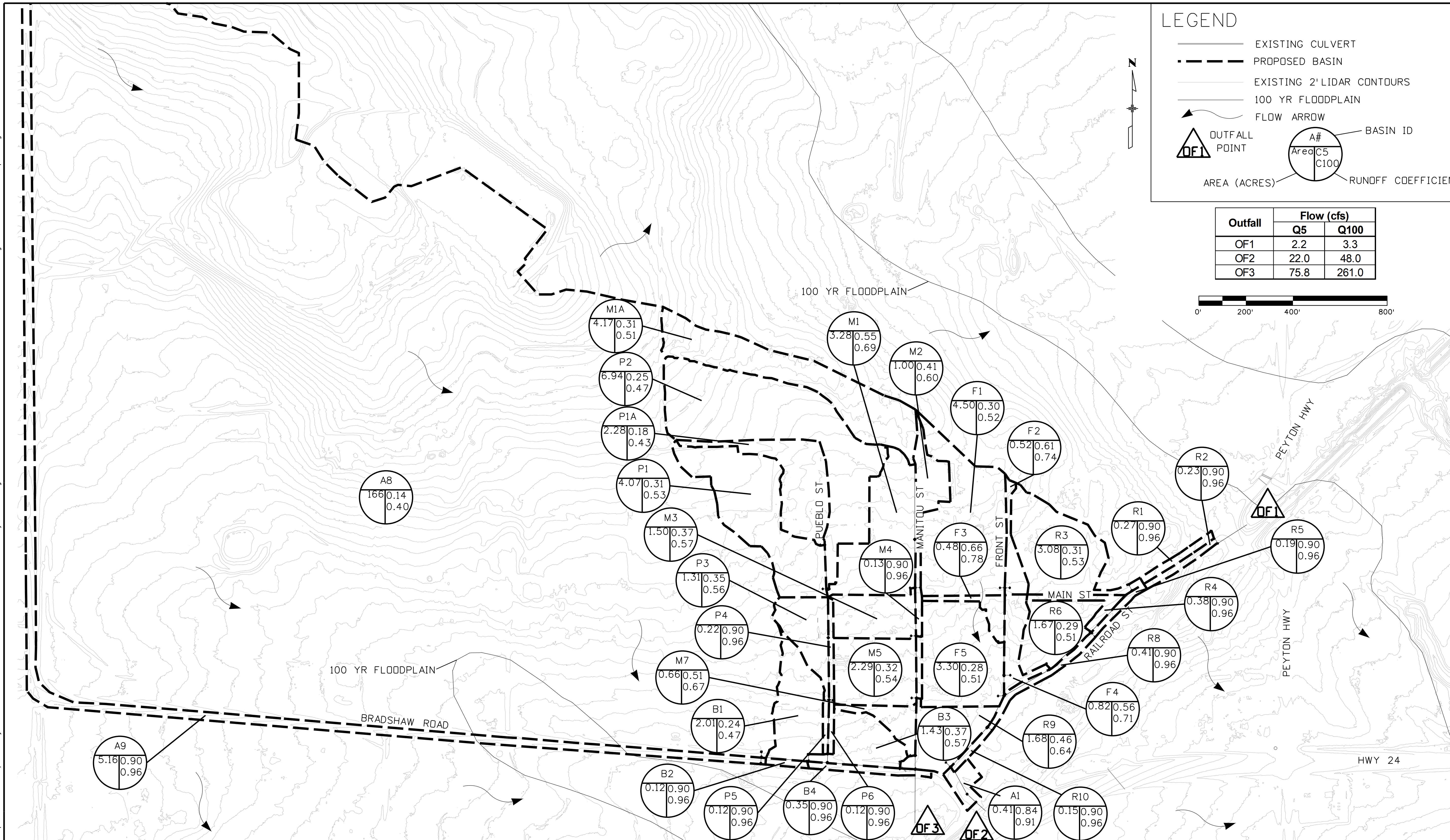
$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

From Drainage Criteria Manual for El Paso County, Volume 1-Updated, Section 3.3
Peyton is 24.6 miles from Colorado Springs. In comparing the NOAA rainfall data for each of them, the data for Colorado Springs are very close to that in Peyton.
Peyton is also at the same elevation (6840ft), that was used to develop the equations for figure 6-5.



Outfall	Flow (cfs)	
	Q5	Q100
OF1	2.2	3.3
OF2	22.0	48.0
OF3	75.8	261.0

Computer File Information
Print Date: 11/18/2021
File Name: 60652732-Basin Map_03.dgn
Last Modification Date: 11/18/2021
Designer: LNM Detailer: CS Checker: XXX
11x17 Scale: 1"= 400' Units: Survey Feet

Index of Revisions		
Date:	Comments	Init.

El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60652732

Peyton Drainage and Master Plan

PROPOSED BASIN MAP

Drainage 1 of 1

Sheet Number 1

Peyton Planning Study

Peak Discharge (CFS)		Runoff Volume (in)
Recurrance Probability	Thunderstorm (24 Hr)	Thunderstorm (24 Hr)
20%	38.7	0.07
10%	73.5	0.13
4%	158.7	0.26
2%	260.4	0.4
1%	398.9	0.6
0.20%	886.3	1.26

StreamStats 8/23/2021

Statistic	Value	Unit
50-percent AEP flood	32.5	ft^3/s
20-percent AEP flood	91.2	ft^3/s
10-percent AEP flood	155	ft^3/s
4-percent AEP flood	270	ft^3/s
2-percent AEP flood	384	ft^3/s
1-percent AEP flood	536	ft^3/s
0.5-percent AEP flood	712	ft^3/s
0.2-percent AEP flood	997	ft^3/s

Peak-Flow Statistics Citations

BASIN S-2

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
42	Kettle-Rock outcrop complex	52.637	B	Fair	Woods	39
68	Peyton-Pring complex, 3-8%	24.297	B	Fair	Grass	48
69	Peyton-Pring complex, 8-15%	88.352	B	Fair	Grass	48
	Total Area	**165.29**			Composite Curve Number	45.13

Impervious Area	6.05%

Initial Abstraction Thunderstorm Curve Number (ARCI)	
S	12.16 inches
Ia	**1.22** inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\ [(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-2

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.014	ft/ft
Ti	0.59	hr

Shallow Concentrated Flow		
Flow Length	8002	ft
S	3.75	Percent
Velocity	5040	ft/hr
Tsc	1.59	hrs

1.4 ft/sec from figure 6-25

Time of Concentration		
Tc	2.18	hrs
Lag Time	1.31	hrs
Tc	130.81	Mins
Lag Time	78.49	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

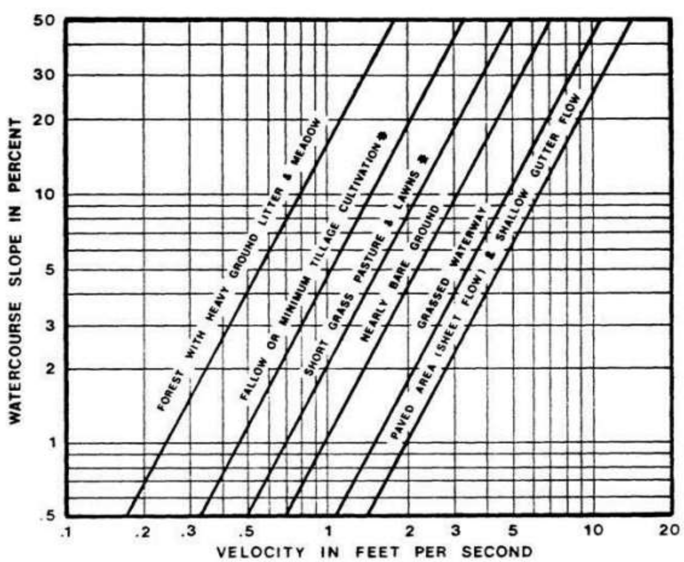
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-3

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
42	Kettle-Rock outcrop complex	75.148	B	Fair	Woods	39
68	Peyton-Pring complex, 3-8%	1.875	B	Fair	Grass	48
69	Peyton-Pring complex, 8-15%	49.711	B	Fair	Grass	48
	Total Area	**126.73**			Composite Curve Number	42.66

Impervious Area	3.95%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	13.44	inches
Ia	**1.34**	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-3

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.277	ft/ft
Ti	0.18	hr

Shallow Concentrated Flow			
Flow Length	3584	ft	
S	4.05	Percent	
Velocity	5400	ft/hr	1.5 ft/sec from figure 6-25
Tsc	0.66	hrs	

Time of Concentration		
Tc	0.84	hrs
Lag Time	0.51	hrs
Tc	50.70	Mins
Lag Time	30.42	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

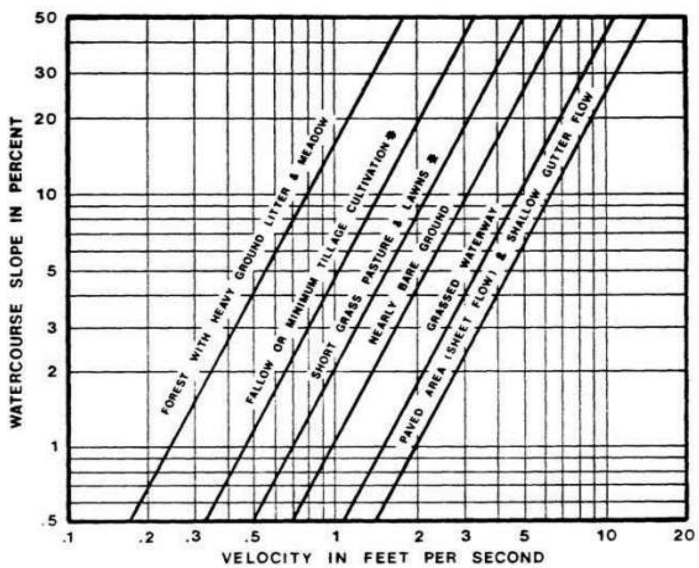
Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).
5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.
6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-1

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	49.085	A	Fair	Grass	29
42	Kettle-Rock outcrop complex	364.5	B	Fair	Woods	39
67	Peyton sandy loam, 3-8%	0.042	B	Fair	Grass	48
68	Peyton-Pring complex, 3-8%	1.4	B	Fair	Grass	48
69	Peyton-Pring complex, 8-15%	240.62	B	Fair	Grass	48
83	Stapleton sandy loam, 3-8%	27.394	B	Fair	Grass	48
84	Stapleton sandy loam, 8-15%	1.657	B	Fair	Grass	48
	Total Area	684.7			Composite Curve Number	41.85

Impervious Area	1.46%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	13.90	inches
Ia	1.39	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\ [(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-1

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.093	ft/ft
Ti	**0.28**	hr

Shallow Concentrated Flow		
Flow Length	10037	ft
S	3.51	Percent
Velocity	4680	ft/hr
Tsc	**2.14**	hrs

1.3 ft/sec from figure 6-25

Time of Concentration		
Tc	**2.42**	hrs
Lag Time	**1.45**	hrs
Tc	**145.48**	Mins
Lag Time	**87.29**	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

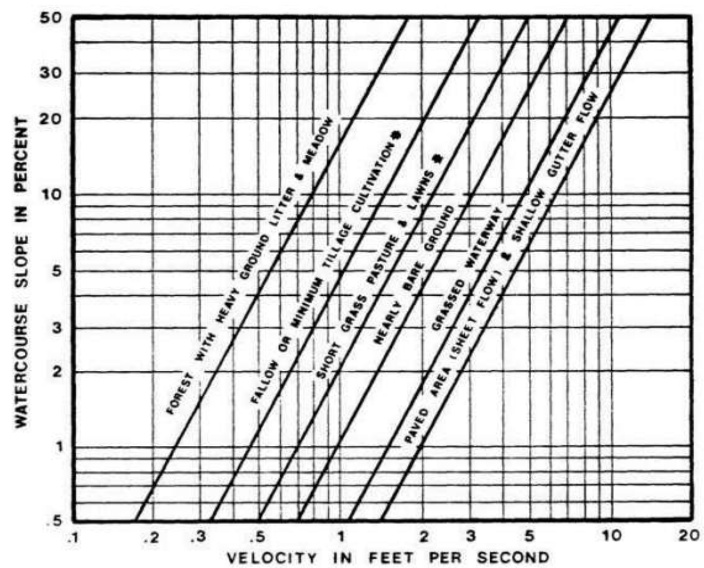
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-8

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	42.554	A	Fair	Grass	29
42	Kettle-Rock outcrop complex	48.641	B	Fair	Woods	39
69	Peyton-Pring complex, 8-15%	244.13	B	Fair	Grass	48
83	Stapleton sandy loam, 3-8%	88.201	B	Fair	Grass	48
	Total Area	**423.52**			Composite Curve Number	45.06

Impervious Area	1.28%

Initial Abstraction Thunderstorm Curve Number (ARCI)	
S	12.19 inches
Ia	**1.22** inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-8

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.039	ft/ft
Ti	0.40	hr

Shallow Concentrated Flow		
Flow Length	10590	ft
S	2.02	Percent
Velocity	3600	ft/hr
Tsc	2.94	hrs

1 ft/sec from figure 6-25

Time of Concentration		
Tc	3.34	hrs
Lag Time	2.00	hrs
Tc	200.32	Mins
Lag Time	120.19	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

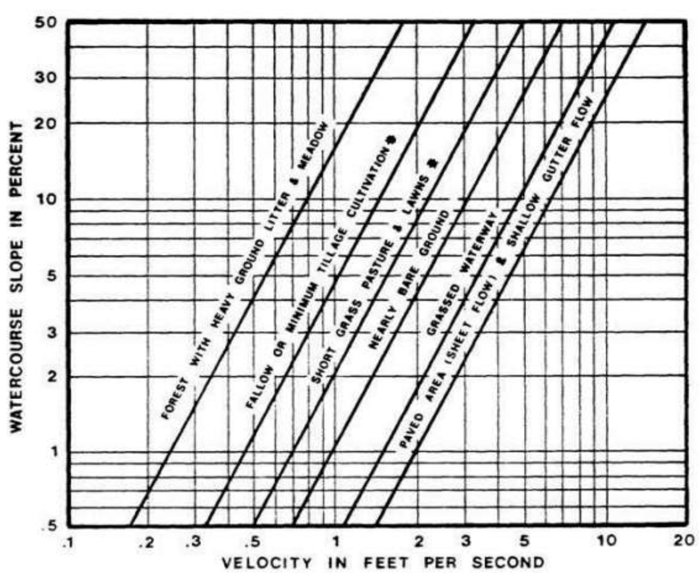
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-14

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	329.92	A	Fair	Grass	29
69	Peyton-Pring complex, 8-15%	6.065	B	Fair	Grass	48
72	Pring coarse sandy loam, 8-15%	2.364	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	2.077	A	Fair	Grass	29
	Total Area	**340.43**			Composite Curve Number	29.47

Impervious Area	0.29%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	23.93	inches
Ia	**2.39**	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-14

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.032	ft/ft
Ti	**0.43**	hr

Shallow Concentrated Flow		
Flow Length	8874	ft
S	2.45	Percent
Velocity	4320	ft/hr
Tsc	**2.05**	hrs

1.2 ft/sec from figure 6-25

Time of Concentration		
Tc	**2.49**	hrs
Lag Time	**1.49**	hrs
Tc	**149.14**	Mins
Lag Time	**89.49**	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

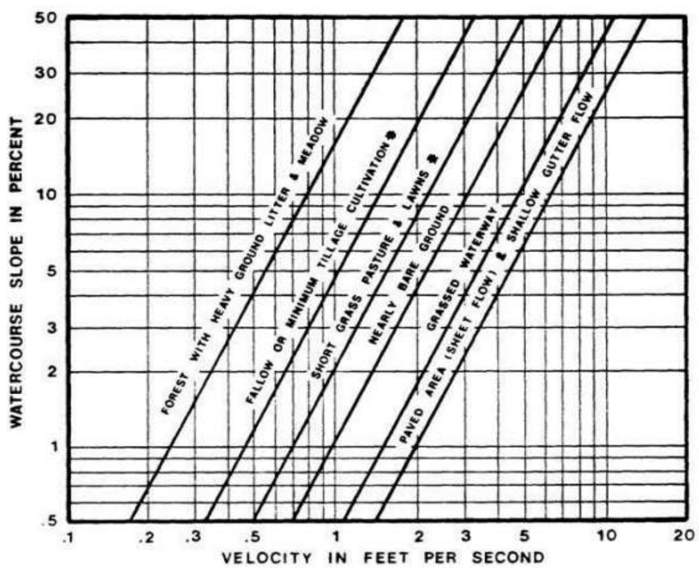
Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).
5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.
6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-5

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	51.151	A	Fair	Grass	29
11	Bresser sandy loam, cool, 0-3%	68.201	B	Fair	Grass	48
19	Columbine gravelly, sandy loam, 0-3%	68.201	A	Fair	Grass	29
66	Peyton sandy loam, 1-5%	27.28	B	Fair	Grass	48
72	Pring coarse sandy loam, 8-15%	61.381	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	64.791	A	Fair	Grass	29
	Total Area	**341**			Composite Curve Number	37.74
		1.38				

Impervious Area	0.59%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	16.50	inches
Ia	**1.65**	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-5

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.190	ft/ft
Ti	0.21	hr

Shallow Concentrated Flow		
Flow Length	18177	ft
S	2.31	Percent
Velocity	3960	ft/hr
Tsc	4.59	hrs

1.1 ft/sec from figure 6-25

Time of Concentration		
Tc	4.80	hrs
Lag Time	2.88	hrs
Tc	288.05	Mins
Lag Time	172.83	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

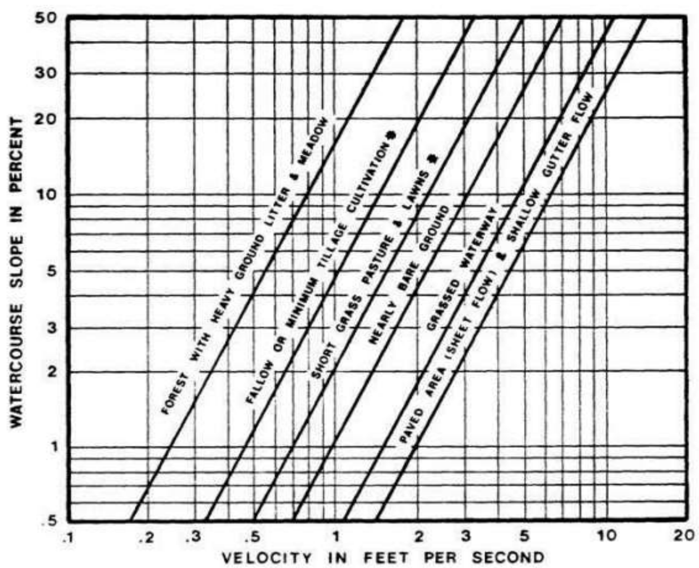
Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).
5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.
6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-7

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	34.804	A	Fair	Grass	29
11	Bresser sandy loam, cool, 0-3%	104.99	B	Fair	Grass	48
19	Columbine gravelly, sandy loam, 0-3%	9.819	A	Fair	Grass	29
83	Stapleton sandy loam, 3-8%	23.782	B	Fair	Grass	48
	Total Area	**173.39**			Composite Curve Number	43.11

Impervious Area	2.08%

Green denotes input, blue denotes calculated values

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	13.20	inches
Ia	**1.32**	inches

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\ [(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-7

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.035	ft/ft
Ti	**0.42**	hr

Shallow Concentrated Flow		
Flow Length	5833	ft
S	1.50	Percent
Velocity	3060	ft/hr
Tsc	**1.91**	hrs

0.85 ft/sec from figure 6-25

Time of Concentration		
Tc	**2.32**	hrs
Lag Time	**1.39**	hrs
Tc	**139.34**	Mins
Lag Time	**83.61**	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

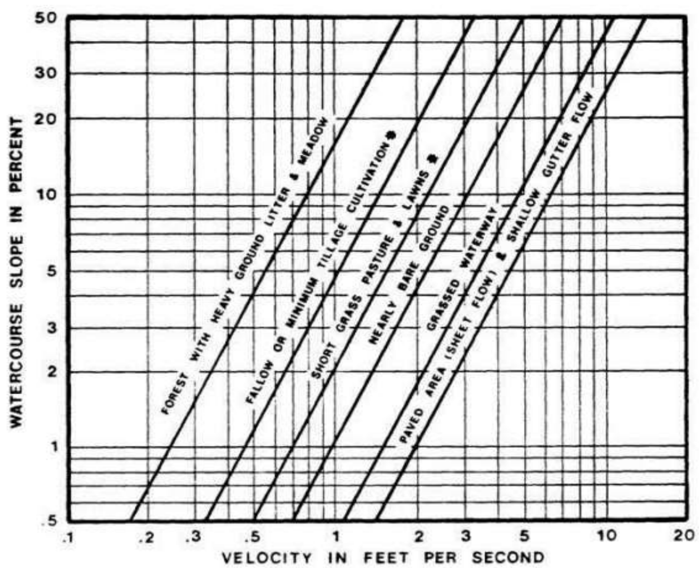
Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

Surface description	**n[1]**
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).
5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.
6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-12

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	100.96	A	Fair	Grass	29
11	Bresser sandy loam, cool, 0-3%	34.604	B	Fair	Grass	48
28	Ellicott loamy coarse sand, 0-5%	24.523	A	Fair	Grass	29
68	Peyton-Pring complex, 3-8%	6.807	B	Fair	Grass	48
83	Stapleton sandy loam, 3-8%	64.774	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	0.535	A	Fair	Grass	29
	Total Area	**232.21**			Composite Curve Number	37.69

Impervious Area	0.30%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	16.53	inches
Ia	**1.65**	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-12

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.029	ft/ft
Ti	0.44	hr

Shallow Concentrated Flow		
Flow Length	14248	ft
S	2.11	Percent
Velocity	3600	ft/hr
Tsc	3.96	hrs

1 ft/sec from figure 6-25

Time of Concentration		
Tc	4.40	hrs
Lag Time	2.64	hrs
Tc	264.16	Mins
Lag Time	158.50	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

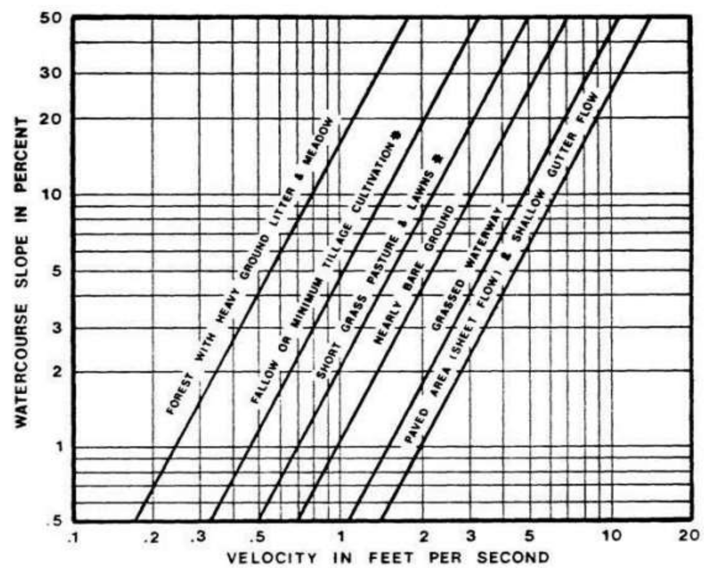
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-9

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	139.18	A	Fair	Grass	29
83	Stapleton sandy loam, 3-8%	0.017	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	26.216	A	Fair	Grass	29
	Total Area	**165.41**			Composite Curve Number	29.00

Impervious Area	1.21%

Green denotes input, blue denotes calculated values

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	24.48	inches
Ia	**2.45**	inches

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\,[(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-9

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.017	ft/ft
Ti	**0.56**	hr

Shallow Concentrated Flow		
Flow Length	6215	ft
S	2.33	Percent
Velocity	3960	ft/hr
Tsc	**1.57**	hrs

1.1 ft/sec from figure 6-25

Time of Concentration		
Tc	**2.13**	hrs
Lag Time	**1.28**	hrs
Tc	**127.64**	Mins
Lag Time	**76.58**	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

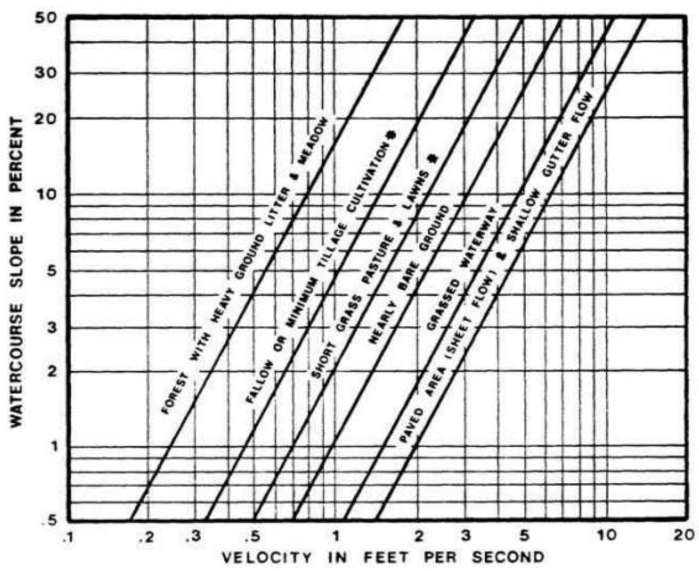
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses[2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods[3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-10

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	0.205	A	Fair	Grass	29
11	Bresser sandy loam, cool, 0-3%	0.439	B	Fair	Grass	48
83	Stapleton sandy loam, 3-8%	36.732	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	53.875	A	Fair	Grass	29
97	Truckton sandy loam, 3-9%	1.366	A	Fair	Grass	29
	Total Area	**92.617**			Composite Curve Number	36.63

Impervious Area	2.16%

Initial Abstraction Thunderstorm Curve Number (ARCI)	
S	17.30 inches
Ia	**1.73** inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\ [(1000/CN) - 10] \qquad \text{(Eq. 6-12)}$$

BASIN S-10

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.047	ft/ft
Ti	**0.37**	hr

Shallow Concentrated Flow		
Flow Length	4289	ft
S	1.61	Percent
Velocity	3060	ft/hr
Tsc	**1.40**	hrs

0.85 ft/sec from figure 6-25

Time of Concentration		
Tc	**1.77**	hrs
Lag Time	**1.06**	hrs
Tc	**106.27**	Mins
Lag Time	**63.76**	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

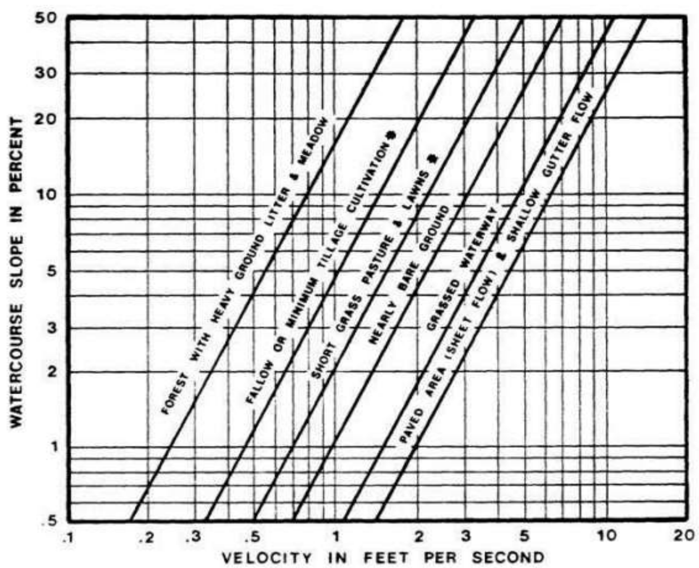
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-11

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	90.66	A	Fair	Grass	29
28	Ellicott loamy coarse sand, 0-5%	3.391	A	Fair	Grass	29
83	Stapleton sandy loam, 3-8%	1.155	B	Fair	Grass	48
96	Truckton sandy loam, 0-3%	39.786	A	Fair	Grass	29
97	Truckton sandy loam, 3-9%	27.946	A	Fair	Grass	29
	Total Area	**162.94**			Composite Curve Number	29.13

Impervious Area	0.61%

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	24.32	inches
Ia	**2.43**	inches

Green denotes input, blue denotes calculated values

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\left[(1000/CN) - 10\right] \qquad \text{(Eq. 6-12)}$$

BASIN S-11

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.017	ft/ft
Ti	0.56	hr

Shallow Concentrated Flow		
Flow Length	5788	ft
S	2.28	Percent
Velocity	3960	ft/hr
Tsc	1.46	hrs

1.1 ft/sec from figure 6-25

Time of Concentration		
Tc	2.02	hrs
Lag Time	1.21	hrs
Tc	121.17	Mins
Lag Time	72.70	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

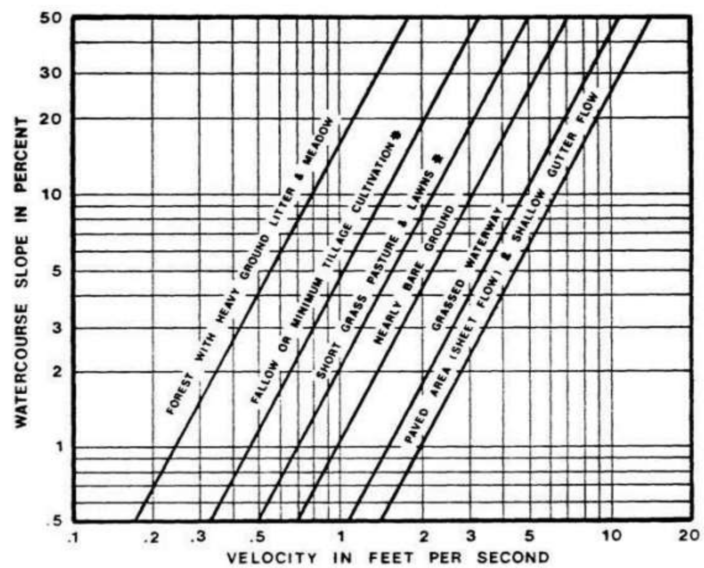
Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).
5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.
6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

Figure 6-25. Estimate of Average Concentrated Shallow Flow



BASIN S-13

Thunderstorm Curve Number (ARCI)						
Map Unit Symbol	Name	Acres	Hydrologic Group	Hydrologic Condition	Cover Type	Curve Number
8	Blakeland loamy sand, 1-9%	93.763	A	Fair	Grass	29
11	Bresser sandy loam, cool, 0-3%	113.53	B	Fair	Grass	48
28	Ellicott loamy coarse sand, 0-5%	14.644	A	Fair	Grass	29
96	Truckton sandy loam, 0-3%	22.735	A	Fair	Grass	29
97	Truckton sandy loam, 3-9%	36.854	A	Fair	Grass	29
	Total Area	**281.52**			Composite Curve Number	36.66

Impervious Area	0.67%

Green denotes input, blue denotes calculated values

Initial Abstraction Thunderstorm Curve Number (ARCI)		
S	17.28	inches
Ia	**1.73**	inches

4.5 Initial Abstraction

The initial abstraction (Ia) represents a volume of rainfall that must fall to satisfy losses in a drainage basin before runoff begins. The default value for Ia is 0.20 times the potential maximum retention (S). Through modeling of the Jimmy Camp Creek drainage basin using gage-adjusted, NEXRAD-generated rainfall input and comparing model results with recorded flow data, it was determined that a more appropriate value for Ia is 0.10·S. Therefore, this value shall replace the default value for any evaluations that apply the NRCS curve number method for rainfall losses. To apply this adjustment when using HEC-HMS it will be necessary to provide the initial abstraction as a depth in inches rather to a fraction of the potential maximum retention. The initial abstraction in inches is calculated using Equation 6-12.

$$Ia = 0.1\left[(1000/CN) - 10\right] \quad \text{(Eq. 6-12)}$$

BASIN S-13

Overland Flow		
n	0.15	
L	300	ft
P2	1.84	in
S	0.020	ft/ft
Ti	0.52	hr

Shallow Concentrated Flow		
Flow Length	4966	ft
S	1.63	Percent
Velocity	3060	ft/hr
Tsc	1.62	hrs

0.85 ft/sec from figure 6-25

Time of Concentration		
Tc	2.14	hrs
Lag Time	1.28	hrs
Tc	128.49	Mins
Lag Time	77.09	Mins

No channelized flow is present (no well defined channel). Velocity taken from "short grass pasture line" in figure 6.25

Slope and flowpath length comes from hydrology dgn, rainfall data from NOAA.

Table 6-11. Roughness Coefficients (Manning's n) for NRCS Overland Flow

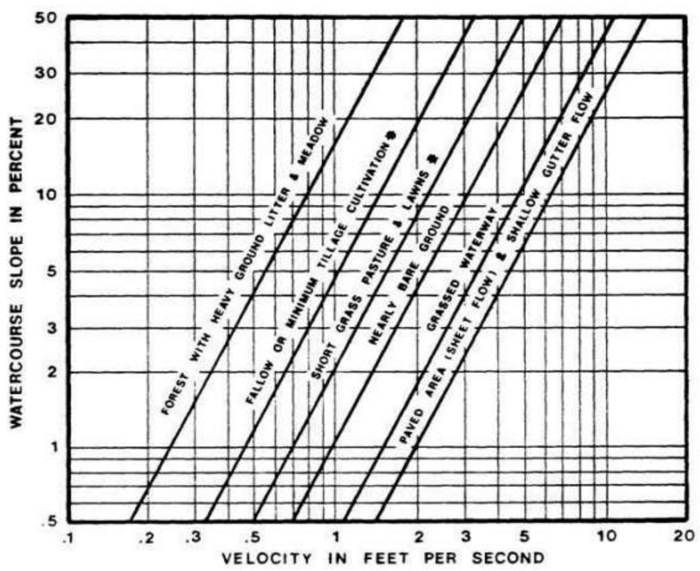
Surface description	n[1]
Smooth surfaces (concrete, asphalt, gravel, bare soil, etc.)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover ≤20%	0.06
Residue cover >20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses [2]	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods [3]	
Light underbrush	0.40
Dense underbrush	0.80

4. [1]The values are a composite of information compiled by Engman (1986).

5. [2]Includes species such as weeping lovegrass, bluegrass, buffalograss, blue gramma grass, native grass mixtures.

6. [3]When selecting n, consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

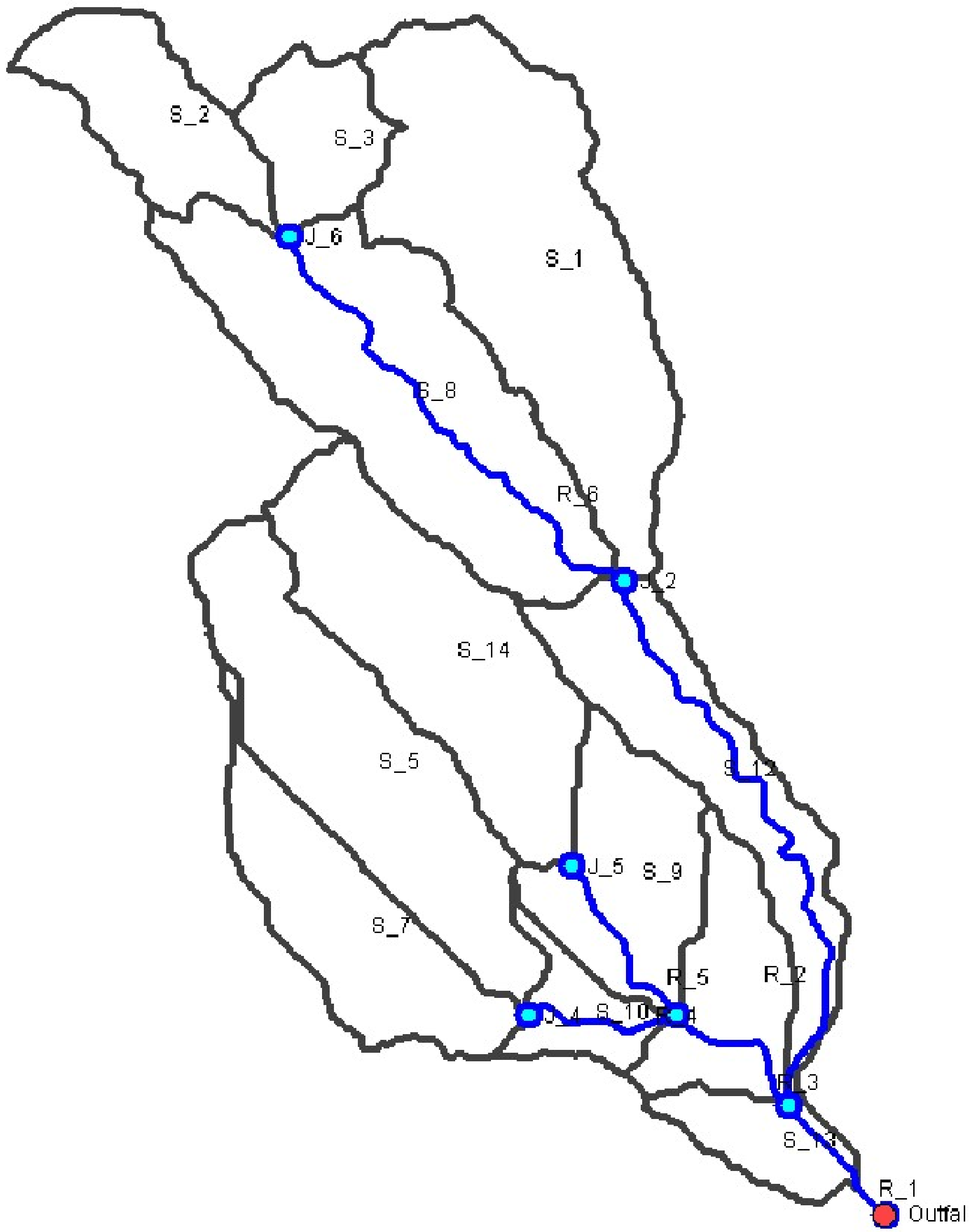
Figure 6-25. Estimate of Average Concentrated Shallow Flow



Reach	Upper Elevation	Lower Elevation	Reach Length	S (ft/ft)	Channel Width
1	6818	6787	2404	0.012895175	250
2	6961	6818	11155	0.012819364	200
3	6836	6818	2631	0.006841505	100
4	6870	6836	2285	0.01487965	30
5	6898	6836	3112	0.019922879	90
6	7106	6964	7985	0.017783344	20

Estimated Percent Impervious

Basin	Estimated impervious area (acres)	Estimated impervious area (mi^2)	size of basin (mi^2)	percent impervious
S_1	10	0.015625	0.72328	2.16%
S_2	10	0.015625	0.2578	6.06%
S_3	5	0.0078125	0.19797	3.95%
S_5	2	0.003125	0.965625	0.32%
S_7	3.6	0.005625	0.270313	2.08%
S_8	5.4	0.0084375	0.661719	1.28%
S_9	2	0.003125	0.25875	1.21%
S_10	2	0.003125	0.145312	2.15%
S_11	1	0.0015625	0.254531	0.61%
S_12	0.7	0.00109375	0.362031	0.30%
S_13	1.9	0.00296875	0.298438	0.99%
S_14	1	0.0015625	0.53125	0.29%


S_2
S_3
J_6
S_1
S_8
R_6
J_2
S_14
S_5
S_12
J_5
S_9
S_7
R_5
R_2
J_4
S_10
R_3
R_1
Outfall

Appendix D

Hydraulics

Peyton Planning Study Existing Culverts, 10 Year

Culvert Name	Size	US invert	DS invert	Length	Slope	Allowable Headwater	Computed Headwater	Velocity	Meets Criteria	HW/D (10 year)	Q10 cfs	Q100 cfs
B1	30" CMP	6797.59	6796.42	49.61	0.024	6800.72	6800.86	8.25	No	1.3	108.91	156.66
B2	24" CMP	6780.95	6780.4	131	0.004	6786.06	6787.78	8.01	No	3.4	31.79	45.7
B6	36" CMP	6787.48	6785.77	46.1	0.037	6792.56	6790.17	9.52	Yes	0.9	73.5	398.9
B6	36" CMP	6787.07	6785.74	46.1	0.029	6792.64	6790.17	9.17	Yes	1.0		
B6	30" CMP	6789.19	6788.72	44.3	0.011	6792.64	6790.17	3.98	Yes	0.4		

Peyton Planning Study Existing Culverts, 100 Year

Culvert Name	Size	US invert	DS invert	Length	Slope	Allowable Headwater	Computed Headwater	Velocity	Meets Criteria	HW/D (100 year)	Q100 cfs
B1	30" CMP	6798.59	6796.42	49.61	0.024	6800	6801.02	8.53	No	0.97	156.66
B2	24" CMP	6780.95	6780.4	131	0.004	6786.06	6787.86	8.04	No	3.45	45.7
B6	36" CMP	6787.48	6785.77	46.1	0.037	6792.56	6794.28	12.69	No	2.3	398.9
B6	36" CMP	6787.07	6785.74	46.1	0.029	6792.64	6794.28	12.71	No	2.4	
B6	30" CMP	6789.19	6788.72	44.3	0.011	6792.64	6794.28	9.54	No	2.0	

Project Number: 60652732								Project Name: Peyton Planning

Interim Engineers Concept Estimate
(CDOT Project Cost Planner Tool unit costs 2020)

AECOM

CDOT Pay Item	Item	Unit	Unit Cost	Quantity			Subtotal Costs	Total Cost	*Assumptions*
	DRAINAGE								
202-00035	Removal of Pipe	LF	$40.00	300			12,000.00	**$12,000**	
202-00037	Removal of End Section	EACH	$500.00	2			1,000.00	**$1,000**	
420-00112	Riprap	SY	$4.50	66			296.01	**$296**	
506-00000	24 Inch Reinforced Concrete Pipe (Complete In	CY	$100.00	30			2,990.00	**$2,990**	
603-01245	36 Inch Reinforced Concrete Pipe (Complete In	LF	$170.00	110			18,700.00	**$18,700**	
603-01305	42 Inch Reinforced Concrete Pipe (Complete In	LF	$175.00	95			16,625.00	**$16,625**	
603-01365	#REF!	LF	$220.00	94			20,680.00	**$20,680**	
603-05024	24 Inch Reinforced Concrete End Section	EACH	$2,000.00	2			4,000.00	**$4,000**	
603-05030	36 Inch Reinforced Concrete End Section	EACH	$2,200.00	4			8,800.00	**$8,800**	
603-05036	42 Inch Reinforced Concrete End Section	EACH	$2,500.00	4			10,000.00	**$10,000**	
							95,091.01	**$95,091**	

			% Range		% Used	Cost	
	Project Construction Bid Items		**Project Dependent**		N / A	**$95,091**	**A**
	Roadway		Estimated $400/LF and $20K per intersection	$0.00	N/A	**$0.00**	**B**
	Erosion Control		(3 - 10%) of **A**	$2,852.73	3.0%	**$2,852.73**	**C**
	Lighting		(1 - 5%) of **A**	$950.91	1.0%	**$950.91**	**E**
	Traffic Control		(5 - 25%) of **A**	$4,754.55	5.0%	**$4,754.55**	**F**
	Clearing & Grubbing		(1-5%) of **A**	$1,901.82	2.0%	**$1,901.82**	**G**
	Total of Construction Bid Items		**(A+B+C+D+E+F+G)**	$105,551.02		**$105,551**	**H**
	Contingencies (Construction Items) incl. F/A & MCR		(20%) of **H**	$21,110.20	20.0%	**$21,110**	**I**
	Mobilization		(4 - 7%) of **H**	$5,277.55	5.0%	**$5,278**	**J**
	Subtotal Project Cost		**(H+I+J)**	$131,938.78		**$131,939**	**N**
	Utilities		Project Dependent	$0.00	0.0%	**$0**	**O**
	ROW Acquisition		Project Dependent	$1,319.39	1.0%	**$1,319**	**P**
	Grand Total		**(N+O+P)**	$133,258.16		**$133,258**	

NOTES:
1. Drainage Quantities are based on the conceptual Concept 1 for the Peyton Planning Study.
2. Roadways estimate assumes 6' sidewalks on both sides, full pavement reconstruction, ped ramps, and signing and striping.

Peyton Planning Study Proposed Culverts, 10 Year

Culvert Name	Size	US invert	DS invert	Length	Allowable Headwater	Computed Headwater	Velocity	Meets Criteria	HW/D (10 yr)	Q10 cfs	Q100 cfs
B1	3x36" RCP	6797.59	6796.42	49.61	6800.72	6800.47	11.26	Yes	1.0	108.91	156.66
B2	2x24" RCP	6780.95	6780.4	131	6786.06	6783.25	6.58	Yes	1.2	31.79	45.7
B6	42" RCP	6787.07	6785.74	46.1	6792.56	6789.29	8.13	Yes	0.6	73.5	398.9
B6	42" RCP	6787.07	6785.74	46.1	6792.64	6789.29	8.13	Yes	0.6		
B6	42" RCP	6787.07	6785.74	44.3	6792.64	6789.29	8.24	Yes	0.6		

Peyton Planning Study Proposed Culverts, 100 Year

Culvert Name	Size	US invert	DS invert	Length	Allowable Headwater	Computed Headwater	Velocity	Meets Criteria	HW/D (100 yr)	Q10 cfs	Q100 cfs
B1	3x36" RCP	6797.59	6796.42	49.61	6800.72	6800.71	11.42	Yes	1.04	108.91	156.66
B2	2x24" RCP	6780.95	6780.4	131	6786.06	6784.58	8.02	Yes	1.81	31.79	45.7
B6	42" RCP	6787.07	6785.74	46.1	6794.06	6793.90	12.52	Yes	2.0	73.5	398.9
B6	42" RCP	6787.07	6785.74	46.1	6794.06	6793.90	12.52	Yes	2.0		
B6	42" RCP	6787.07	6785.74	44.3	6794.06	6793.90	12.61	Yes	2.0		

Culvert Analysis Report
Existing B2 10 YR with Roadway

Comments: Elevations are estimates from Google Earth Pro and elevation contours from the hydrology dgn. We are waiting on survey data.

Analysis Component			
Storm Event	Design	Discharge	31.79 cfs

Peak Discharge Method: User-Specified			
Design Discharge	31.79 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,780.40 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-24 inch Circular	22.81 cfs	6,787.78 ft	8.01 ft/s
Weir	Roadway	9.06 cfs	6,787.79 ft	N/A
Total	----------------	31.87 cfs	6,787.78 ft	N/A

Culvert Analysis Report
Existing B2 10 YR with Roadway

Component:Culvert-1

Culvert Summary

Computed Headwater Elevation	6,787.78	ft	Discharge	22.81	cfs
Inlet Control HW Elev.	6,783.89	ft	Tailwater Elevation	6,780.40	ft
Outlet Control HW Elev.	6,787.78	ft	Control Type	Outlet Control	
Headwater Depth/Height	3.42				

Grades

Upstream Invert	6,780.95	ft	Downstream Invert	6,780.40	ft
Length	131.00	ft	Constructed Slope	0.004198	ft/ft

Hydraulic Profile

Profile	CompositeM2PressureProfile		Depth, Downstream	1.70	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	1.70	ft
Velocity Downstream	8.01	ft/s	Critical Slope	0.032610	ft/ft

Section

Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties

Outlet Control HW Elev.	6,787.78	ft	Upstream Velocity Head	0.82	ft
Ke	0.20		Entrance Loss	0.16	ft

Inlet Control Properties

Inlet Control HW Elev.	6,783.89	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	3.1	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Existing B2 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	9.06	cfs	Allowable HW Elevation	6,787.79	ft
Roadway Width	0.00	ft	Overtopping Coefficient	3.09	US
Low Point	6,787.70	ft	Headwater Elevation	6,787.78	ft
Discharge Coefficient (Cr)	3.09		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,780.40	ft			

Sta (ft)	Elev. (ft)
0.00	6,787.70
120.00	6,787.70

Culvert Analysis Report
Existing B2 100 YR with Roadway

Comments: Elevations are estimates from Google Earth Pro and elevation contours from the hydrology dgn. We are waiting on survey data.

Analysis Component			
Storm Event	Design	Discharge	45.70 cfs

Peak Discharge Method: User-Specified			
Design Discharge	45.70 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,780.40 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-24 inch Circular	22.95 cfs	6,787.86 ft	8.04 ft/s
Weir	Roadway	22.86 cfs	6,787.86 ft	N/A
Total	----------------	45.81 cfs	6,787.86 ft	N/A

Culvert Analysis Report
Existing B2 100 YR with Roadway

Component:Culvert-1

Culvert Summary

Computed Headwater Elevation	6,787.86 ft	Discharge	22.95 cfs
Inlet Control HW Elev.	6,783.90 ft	Tailwater Elevation	6,780.40 ft
Outlet Control HW Elev.	6,787.86 ft	Control Type	Outlet Control
Headwater Depth/Height	3.45		

Grades

Upstream Invert	6,780.95 ft	Downstream Invert	6,780.40 ft
Length	131.00 ft	Constructed Slope	0.004198 ft/ft

Hydraulic Profile

Profile	CompositeM2PressureProfile	Depth, Downstream	1.70 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.70 ft
Velocity Downstream	8.04 ft/s	Critical Slope	0.032896 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	6,787.86 ft	Upstream Velocity Head	0.83 ft
Ke	0.20	Entrance Loss	0.17 ft

Inlet Control Properties

Inlet Control HW Elev.	6,783.90 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	3.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Existing B2 100 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	22.86	cfs	Allowable HW Elevation	6,787.86	ft
Roadway Width	0.00	ft	Overtopping Coefficient	3.09	US
Low Point	6,787.70	ft	Headwater Elevation	6,787.86	ft
Discharge Coefficient (Cr)	3.09		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,780.40	ft			

Sta (ft)	Elev. (ft)
0.00	6,787.70
120.00	6,787.70

Culvert Analysis Report
Existing B6 10 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed. They meet criteria for both the 10 and 100 year events if they were cleaned. Flow for the 10 year came from the HEC-HMS "Peyton North Basin" model.

Analysis Component			
Storm Event	Design	Discharge	73.50 cfs

Peak Discharge Method: User-Specified			
Design Discharge	73.50 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,785.74 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-36 inch Circular	30.57 cfs	6,790.17 ft	9.52 ft/s
Culvert-2	1-36 inch Circular	38.54 cfs	6,790.17 ft	9.17 ft/s
Culvert-3	1-30 inch Circular	4.37 cfs	6,790.17 ft	3.98 ft/s
Weir	Roadway	0.00 cfs	6,790.17 ft	N/A
Total	----------------	73.48 cfs	6,790.17 ft	N/A

Culvert Analysis Report
Existing B6 10 YR with Roadway

Component:Culvert-1

Culvert Summary

Computed Headwater Elevation	6,790.17 ft	Discharge	30.57 cfs
Inlet Control HW Elev.	6,790.02 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,790.17 ft	Control Type	Entrance Control
Headwater Depth/Height	0.90		

Grades

Upstream Invert	6,787.48 ft	Downstream Invert	6,785.77 ft
Length	46.10 ft	Constructed Slope	0.037093 ft/ft

Hydraulic Profile

Profile	S2	Depth, Downstream	1.39 ft
Slope Type	Steep	Normal Depth	1.39 ft
Flow Regime	Supercritical	Critical Depth	1.79 ft
Velocity Downstream	9.52 ft/s	Critical Slope	0.016077 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	6,790.17 ft	Upstream Velocity Head	0.75 ft
Ke	0.20	Entrance Loss	0.15 ft

Inlet Control Properties

Inlet Control HW Elev.	6,790.02 ft	Flow Control	Unsubmerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	7.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Existing B6 10 YR with Roadway

Component:Culvert-2

Culvert Summary

Computed Headwater Elevation	6,790.17	ft	Discharge	38.54	cfs
Inlet Control HW Elev.	6,790.04	ft	Tailwater Elevation	6,785.74	ft
Outlet Control HW Elev.	6,790.17	ft	Control Type	Entrance Control	
Headwater Depth/Height	1.03				

Grades

Upstream Invert	6,787.07	ft	Downstream Invert	6,785.74	ft
Length	46.10	ft	Constructed Slope	0.028850	ft/ft

Hydraulic Profile

Profile	S2		Depth, Downstream	1.72	ft
Slope Type	Steep		Normal Depth	1.72	ft
Flow Regime	Supercritical		Critical Depth	2.02	ft
Velocity Downstream	9.17	ft/s	Critical Slope	0.017998	ft/ft

Section

Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties

Outlet Control HW Elev.	6,790.17	ft	Upstream Velocity Head	0.90	ft
Ke	0.20		Entrance Loss	0.18	ft

Inlet Control Properties

Inlet Control HW Elev.	6,790.04	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	7.1	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Existing B6 10 YR with Roadway

Component:Culvert-3

Culvert Summary					
Computed Headwater Elevation	6,790.17	ft	Discharge	4.37	cfs
Inlet Control HW Elev.	6,790.11	ft	Tailwater Elevation	6,785.74	ft
Outlet Control HW Elev.	6,790.17	ft	Control Type	Outlet Control	
Headwater Depth/Height	0.39				

Grades					
Upstream Invert	6,789.19	ft	Downstream Invert	6,788.72	ft
Length	44.30	ft	Constructed Slope	0.010609	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	0.69	ft
Slope Type	Mild		Normal Depth	0.74	ft
Flow Regime	Subcritical		Critical Depth	0.69	ft
Velocity Downstream	3.98	ft/s	Critical Slope	0.014122	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	6,790.17	ft	Upstream Velocity Head	0.20	ft
Ke	0.20		Entrance Loss	0.04	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,790.11	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	4.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Existing B6 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	6,790.17	ft
Roadway Width	26.00	ft	Overtopping Coefficient	2.90	US
Low Point	6,793.56	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	2.90		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,785.74	ft			

Sta (ft)	Elev. (ft)
0.00	6,793.60
30.00	6,793.56
59.56	6,793.64
109.04	6,793.64

Culvert Analysis Report
Existing B6 100 YR with Roadway <duplicate>

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed. They meet criteria for both the 10 and 100 year events if they were cleaned. Flow for the 100 year came from the HEC-HMS "Peyton North Basin" model.

Analysis Component			
Storm Event	Design	Discharge	398.90 cfs

Peak Discharge Method: User-Specified			
Design Discharge	398.90 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,785.74 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-36 inch Circular	87.69 cfs	6,794.28 ft	12.69 ft/s
Culvert-2	1-36 inch Circular	87.87 cfs	6,794.28 ft	12.71 ft/s
Culvert-3	1-30 inch Circular	43.70 cfs	6,794.28 ft	9.54 ft/s
Weir	Roadway	179.85 cfs	6,794.28 ft	N/A
Total	----------------	399.11 cfs	6,794.28 ft	N/A

Culvert Analysis Report
Existing B6 100 YR with Roadway <duplicate>

Component:Culvert-1

Culvert Summary

Computed Headwater Elevation	6,794.28 ft	Discharge	87.69 cfs
Inlet Control HW Elev.	6,793.65 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,794.28 ft	Control Type	Outlet Control
Headwater Depth/Height	2.27		

Grades

Upstream Invert	6,787.48 ft	Downstream Invert	6,785.77 ft
Length	46.10 ft	Constructed Slope	0.037093 ft/ft

Hydraulic Profile

Profile	CompositeM2PressureProfile	Depth, Downstream	2.83 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.83 ft
Velocity Downstream	12.69 ft/s	Critical Slope	0.050944 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	6,794.28 ft	Upstream Velocity Head	2.39 ft
Ke	0.20	Entrance Loss	0.48 ft

Inlet Control Properties

Inlet Control HW Elev.	6,793.65 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	7.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Existing B6 100 YR with Roadway <duplicate>

Component:Culvert-2

Culvert Summary					
Computed Headwater Elevation	6,794.28	ft	Discharge	87.87	cfs
Inlet Control HW Elev.	6,793.27	ft	Tailwater Elevation	6,785.74	ft
Outlet Control HW Elev.	6,794.28	ft	Control Type	Outlet Control	
Headwater Depth/Height	2.40				

Grades					
Upstream Invert	6,787.07	ft	Downstream Invert	6,785.74	ft
Length	46.10	ft	Constructed Slope	0.028850	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	2.83	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.83	ft
Velocity Downstream	12.71	ft/s	Critical Slope	0.051160	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	6,794.28	ft	Upstream Velocity Head	2.40	ft
Ke	0.20		Entrance Loss	0.48	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,793.27	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	7.1	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Existing B6 100 YR with Roadway <duplicate>

Component:Culvert-3

Culvert Summary

Computed Headwater Elevation	6,794.28 ft	Discharge	43.70 cfs
Inlet Control HW Elev.	6,793.18 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,794.28 ft	Control Type	Outlet Control
Headwater Depth/Height	2.04		

Grades

Upstream Invert	6,789.19 ft	Downstream Invert	6,788.72 ft
Length	44.30 ft	Constructed Slope	0.010609 ft/ft

Hydraulic Profile

Profile	CompositeM2PressureProfile	Depth, Downstream	2.20 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.20 ft
Velocity Downstream	9.54 ft/s	Critical Slope	0.034770 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	6,794.28 ft	Upstream Velocity Head	1.23 ft
Ke	0.20	Entrance Loss	0.25 ft

Inlet Control Properties

Inlet Control HW Elev.	6,793.18 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	4.9 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Existing B6 100 YR with Roadway <duplicate>

Component:Weir

Hydraulic Component(s): Roadway			
Discharge	179.85 cfs	Allowable HW Elevation	6,794.28 ft
Roadway Width	26.00 ft	Overtopping Coefficient	3.02 US
Low Point	6,793.56 ft	Headwater Elevation	6,794.28 ft
Discharge Coefficient (Cr)	3.02	Submergence Factor (Kt)	1.00
Tailwater Elevation	6,785.74 ft		

Sta (ft)	Elev. (ft)
0.00	6,793.60
30.00	6,793.56
59.56	6,793.64
109.04	6,793.64

Culvert Analysis Report
Existing B9 10 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed.
Allowable Headwater is based on the elevation of the roadway edge of pavement. The upstream invert of the culvert should be 6797.59 based on the crown elevation from the survey and the 2.5ft diameter of the pipe. The culvert is filled in with dirt and debris. Downstream invert should be 6796.42 if the culvert was not full of debris.

Analysis Component			
Storm Event	Design	Discharge	108.91 cfs

Peak Discharge Method: User-Specified			
Design Discharge	108.91 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,796.42 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-30 inch Circular	34.81 cfs	6,800.86 ft	8.25 ft/s
Weir	Roadway	73.97 cfs	6,800.86 ft	N/A
Total	----------------	108.77 cfs	6,800.86 ft	N/A

Culvert Analysis Report
Existing B9 10 YR with Roadway

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	6,800.86	ft	Discharge	34.81	cfs
Inlet Control HW Elev.	6,800.86	ft	Tailwater Elevation	6,796.42	ft
Outlet Control HW Elev.	6,800.86	ft	Control Type	Inlet Control	
Headwater Depth/Height	1.31				

Grades					
Upstream Invert	6,797.59	ft	Downstream Invert	6,796.42	ft
Length	49.61	ft	Constructed Slope	0.023584	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	2.00	ft
Slope Type	Mild		Normal Depth	2.10	ft
Flow Regime	Subcritical		Critical Depth	2.00	ft
Velocity Downstream	8.25	ft/s	Critical Slope	0.025581	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	2.50	ft
Section Size	30 inch		Rise	2.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	6,800.86	ft	Upstream Velocity Head	0.97	ft
Ke	0.20		Entrance Loss	0.19	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,800.86	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	4.9	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Existing B9 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	73.97	cfs	Allowable HW Elevation	6,800.86	ft
Roadway Width	20.00	ft	Overtopping Coefficient	3.00	US
Low Point	6,800.22	ft	Headwater Elevation	6,800.86	ft
Discharge Coefficient (Cr)	3.00		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,796.42	ft			

Sta (ft)	Elev. (ft)
0.00	6,800.62
85.30	6,800.22

Culvert Analysis Report
Existing B9 100 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed.
Allowable Headwater is based on the elevation of the roadway edge of pavement. The upstream invert of the culvert should be 6797.59 based on the crown elevation from the survey and the 2.5ft diameter of the pipe. The culvert is filled in with dirt and debris. Downstream invert should be 6796.42 if the culvert was not full of debris.

Analysis Component			
Storm Event	Design	Discharge	156.66 cfs

Peak Discharge Method: User-Specified			
Design Discharge	156.66 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,796.42 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-30 inch Circular	36.88 cfs	6,801.02 ft	8.53 ft/s
Weir	Roadway	119.93 cfs	6,801.02 ft	N/A
Total	----------------	156.82 cfs	6,801.02 ft	N/A

Culvert Analysis Report
Existing B9 100 YR with Roadway

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	6,801.02 ft	Discharge	36.88 cfs
Inlet Control HW Elev.	6,801.01 ft	Tailwater Elevation	6,796.42 ft
Outlet Control HW Elev.	6,801.02 ft	Control Type	Outlet Control
Headwater Depth/Height	1.37		

Grades			
Upstream Invert	6,797.59 ft	Downstream Invert	6,796.42 ft
Length	49.61 ft	Constructed Slope	0.023584 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	2.06 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.06 ft
Velocity Downstream	8.53 ft/s	Critical Slope	0.027367 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	6,801.02 ft	Upstream Velocity Head	0.96 ft
Ke	0.20	Entrance Loss	0.19 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,801.01 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	4.9 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Existing B9 100 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway							
Discharge	119.93	cfs		Allowable HW Elevation	6,801.02	ft
Roadway Width	20.00	ft		Overtopping Coefficient	3.02	US
Low Point	6,800.22	ft		Headwater Elevation	6,801.02	ft
Discharge Coefficient (Cr)	3.02			Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,796.42	ft				

Sta (ft)	Elev. (ft)
0.00	6,800.62
85.30	6,800.22

Culvert Analysis Report
Proposed B2 10 YR with Roadway

Comments: Elevations are estimates from Google Earth Pro and elevation contours from the hydrology dgn. We are waiting on survey data.

Analysis Component			
Storm Event	Design	Discharge	31.79 cfs

Peak Discharge Method: User-Specified			
Design Discharge	31.79 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,780.40 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	2-24 inch Circular	31.78 cfs	6,783.25 ft	6.58 ft/s
Weir	Roadway	0.00 cfs	6,783.25 ft	N/A
Total	----------------	31.78 cfs	6,783.25 ft	N/A

Culvert Analysis Report
Proposed B2 10 YR with Roadway

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	6,783.25 ft	Discharge	31.78 cfs
Inlet Control HW Elev.	6,783.15 ft	Tailwater Elevation	6,780.40 ft
Outlet Control HW Elev.	6,783.25 ft	Control Type	Outlet Control
Headwater Depth/Height	1.15		

Grades			
Upstream Invert	6,780.95 ft	Downstream Invert	6,780.40 ft
Length	131.00 ft	Constructed Slope	0.004198 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	1.44 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.44 ft
Velocity Downstream	6.58 ft/s	Critical Slope	0.006581 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	6,783.25 ft	Upstream Velocity Head	0.47 ft
Ke	0.20	Entrance Loss	0.09 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,783.15 ft	Flow Control	Transition
Inlet Type	Beveled ring, 33.7° bevels	Area Full	6.3 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B2 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	6,783.25	ft
Roadway Width	0.00	ft	Overtopping Coefficient	3.09	US
Low Point	6,787.70	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	3.09		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,780.40	ft			

Sta (ft)	Elev. (ft)
0.00	6,787.70
120.00	6,787.70

Culvert Analysis Report
Proposed B2 100 YR with Roadway

Comments: Elevations are estimates from Google Earth Pro and elevation contours from the hydrology dgn. We are waiting on survey data.

Analysis Component			
Storm Event	Design	Discharge	45.70 cfs

Peak Discharge Method: User-Specified			
Design Discharge	45.70 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,780.40 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	2-24 inch Circular	45.71 cfs	6,784.58 ft	8.02 ft/s
Weir	Roadway	0.00 cfs	6,784.58 ft	N/A
Total	----------------	45.71 cfs	6,784.58 ft	N/A

Culvert Analysis Report
Proposed B2 100 YR with Roadway

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	6,784.58	ft	Discharge	45.71	cfs
Inlet Control HW Elev.	6,783.89	ft	Tailwater Elevation	6,780.40	ft
Outlet Control HW Elev.	6,784.58	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.81				

Grades					
Upstream Invert	6,780.95	ft	Downstream Invert	6,780.40	ft
Length	131.00	ft	Constructed Slope	0.004198	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	1.70	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	1.70	ft
Velocity Downstream	8.02	ft/s	Critical Slope	0.009595	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	6,784.58	ft	Upstream Velocity Head	0.82	ft
Ke	0.20		Entrance Loss	0.16	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,783.89	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	6.3	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Proposed B2 100 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	6,784.58	ft
Roadway Width	0.00	ft	Overtopping Coefficient	3.09	US
Low Point	6,787.70	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	3.09		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,780.40	ft			

Sta (ft)	Elev. (ft)
0.00	6,787.70
120.00	6,787.70

Culvert Analysis Report
Proposed B6 10 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed. They meet criteria for both the 10 and 100 year events if they were cleaned. Flow for the 10 year came from the HEC-HMS "Peyton North Basin" model.

Analysis Component			
Storm Event	Design	Discharge	73.50 cfs

Peak Discharge Method: User-Specified			
Design Discharge	73.50 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,785.74 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-42 inch Circular	24.51 cfs	6,789.29 ft	8.13 ft/s
Culvert-2	1-42 inch Circular	24.51 cfs	6,789.29 ft	8.13 ft/s
Culvert-3	1-42 inch Circular	24.51 cfs	6,789.29 ft	8.24 ft/s
Weir	Roadway	0.00 cfs	6,789.29 ft	N/A
Total	----------------	73.53 cfs	6,789.29 ft	N/A

Culvert Analysis Report
Proposed B6 10 YR with Roadway

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	6,789.29 ft	Discharge	24.51 cfs
Inlet Control HW Elev.	6,789.13 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,789.29 ft	Control Type	Entrance Control
Headwater Depth/Height	0.63		

Grades			
Upstream Invert	6,787.07 ft	Downstream Invert	6,785.74 ft
Length	46.10 ft	Constructed Slope	0.028850 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.23 ft
Slope Type	Steep	Normal Depth	1.23 ft
Flow Regime	Supercritical	Critical Depth	1.52 ft
Velocity Downstream	8.13 ft/s	Critical Slope	0.013153 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	6,789.29 ft	Upstream Velocity Head	0.58 ft
Ke	0.20	Entrance Loss	0.12 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,789.13 ft	Flow Control	Unsubmerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	9.6 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B6 10 YR with Roadway

Component:Culvert-2

Culvert Summary			
Computed Headwater Elevation	6,789.29 ft	Discharge	24.51 cfs
Inlet Control HW Elev.	6,789.13 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,789.29 ft	Control Type	Entrance Control
Headwater Depth/Height	0.63		

Grades			
Upstream Invert	6,787.07 ft	Downstream Invert	6,785.74 ft
Length	46.10 ft	Constructed Slope	0.028850 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.23 ft
Slope Type	Steep	Normal Depth	1.23 ft
Flow Regime	Supercritical	Critical Depth	1.52 ft
Velocity Downstream	8.13 ft/s	Critical Slope	0.013153 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	6,789.29 ft	Upstream Velocity Head	0.58 ft
Ke	0.20	Entrance Loss	0.12 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,789.13 ft	Flow Control	Unsubmerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	9.6 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B6 10 YR with Roadway

Component:Culvert-3

Culvert Summary

Computed Headwater Elevation	6,789.29 ft	Discharge	24.51 cfs
Inlet Control HW Elev.	6,789.13 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,789.29 ft	Control Type	Entrance Control
Headwater Depth/Height	0.63		

Grades

Upstream Invert	6,787.07 ft	Downstream Invert	6,785.74 ft
Length	44.30 ft	Constructed Slope	0.030023 ft/ft

Hydraulic Profile

Profile	S2	Depth, Downstream	1.22 ft
Slope Type	Steep	Normal Depth	1.22 ft
Flow Regime	Supercritical	Critical Depth	1.52 ft
Velocity Downstream	8.24 ft/s	Critical Slope	0.013153 ft/ft

Section

Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	1		

Outlet Control Properties

Outlet Control HW Elev.	6,789.29 ft	Upstream Velocity Head	0.58 ft
Ke	0.20	Entrance Loss	0.12 ft

Inlet Control Properties

Inlet Control HW Elev.	6,789.13 ft	Flow Control	Unsubmerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	9.6 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B6 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway			
Discharge	0.00 cfs	Allowable HW Elevation	6,789.29 ft
Roadway Width	26.00 ft	Overtopping Coefficient	2.90 US
Low Point	6,793.56 ft	Headwater Elevation	N/A ft
Discharge Coefficient (Cr)	2.90	Submergence Factor (Kt)	1.00
Tailwater Elevation	6,785.74 ft		

Sta (ft)	Elev. (ft)
0.00	6,793.60
30.00	6,793.56
59.56	6,793.64
109.04	6,793.64

Culvert Analysis Report
Proposed B6 100 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed. They meet criteria for both the 10 and 100 year events if they were cleaned. Flow for the 100 year came from the HEC-HMS "Peyton North Basin" model.

Analysis Component			
Storm Event	Design	Discharge	398.90 cfs

Peak Discharge Method: User-Specified			
Design Discharge	398.90 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,785.74 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-42 inch Circular	115.97 cfs	6,793.90 ft	12.52 ft/s
Culvert-2	1-42 inch Circular	115.97 cfs	6,793.90 ft	12.52 ft/s
Culvert-3	1-42 inch Circular	116.94 cfs	6,793.90 ft	12.61 ft/s
Weir	Roadway	50.15 cfs	6,793.90 ft	N/A
Total	----------------	399.03 cfs	6,793.90 ft	N/A

Culvert Analysis Report
Proposed B6 100 YR with Roadway

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	6,793.90	ft	Discharge	115.97	cfs
Inlet Control HW Elev.	6,793.45	ft	Tailwater Elevation	6,785.74	ft
Outlet Control HW Elev.	6,793.90	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.95				

Grades					
Upstream Invert	6,787.07	ft	Downstream Invert	6,785.74	ft
Length	46.10	ft	Constructed Slope	0.028850	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	3.22	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.22	ft
Velocity Downstream	12.52	ft/s	Critical Slope	0.039315	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	6,793.90	ft	Upstream Velocity Head	2.26	ft
Ke	0.20		Entrance Loss	0.45	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,793.45	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	9.6	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Proposed B6 100 YR with Roadway

Component:Culvert-2

Culvert Summary			
Computed Headwater Elevation	6,793.90 ft	Discharge	115.97 cfs
Inlet Control HW Elev.	6,793.45 ft	Tailwater Elevation	6,785.74 ft
Outlet Control HW Elev.	6,793.90 ft	Control Type	Outlet Control
Headwater Depth/Height	1.95		

Grades			
Upstream Invert	6,787.07 ft	Downstream Invert	6,785.74 ft
Length	46.10 ft	Constructed Slope	0.028850 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	3.22 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.22 ft
Velocity Downstream	12.52 ft/s	Critical Slope	0.039315 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	6,793.90 ft	Upstream Velocity Head	2.26 ft
Ke	0.20	Entrance Loss	0.45 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,793.45 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	9.6 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B6 100 YR with Roadway

Component:Culvert-3

Culvert Summary					
Computed Headwater Elevation	6,793.90	ft	Discharge	116.94	cfs
Inlet Control HW Elev.	6,793.51	ft	Tailwater Elevation	6,785.74	ft
Outlet Control HW Elev.	6,793.90	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.95				

Grades					
Upstream Invert	6,787.07	ft	Downstream Invert	6,785.74	ft
Length	44.30	ft	Constructed Slope	0.030023	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	3.23	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.23	ft
Velocity Downstream	12.61	ft/s	Critical Slope	0.039938	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	3.50	ft
Section Size	42 inch		Rise	3.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	6,793.90	ft	Upstream Velocity Head	2.30	ft
Ke	0.20		Entrance Loss	0.46	ft

Inlet Control Properties					
Inlet Control HW Elev.	6,793.51	ft	Flow Control	Submerged	
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels		Area Full	9.6	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Proposed B6 100 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	50.15	cfs	Allowable HW Elevation	6,793.90	ft
Roadway Width	26.00	ft	Overtopping Coefficient	2.98	US
Low Point	6,793.56	ft	Headwater Elevation	6,793.90	ft
Discharge Coefficient (Cr)	2.98		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,785.74	ft			

Sta (ft)	Elev. (ft)
0.00	6,793.60
30.00	6,793.56
59.56	6,793.64
109.04	6,793.64

Culvert Analysis Report
Proposed B9 10 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed.
Allowable Headwater is based on the elevation of the roadway edge of pavement. The upstream invert of the culvert should be 6797.59 based on the crown elevation from the survey and the 2.5ft diameter of the pipe. The culvert is filled in with dirt and debris. Downstream invert should be 6796.42 if the culvert was not full of debris.

Analysis Component			
Storm Event	Design	Discharge	108.91 cfs

Peak Discharge Method: User-Specified			
Design Discharge	108.91 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,796.42 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	3-36 inch Circular	102.37 cfs	6,800.46 ft	11.26 ft/s
Weir	Roadway	6.59 cfs	6,800.47 ft	N/A
Total	----------------	108.96 cfs	6,800.46 ft	N/A

Culvert Analysis Report
Proposed B9 10 YR with Roadway

Component:Culvert-1

Culvert Summary

Computed Headwater Elevation	6,800.47	ft	Discharge	102.37	cfs
Inlet Control HW Elev.	6,800.34	ft	Tailwater Elevation	6,796.42	ft
Outlet Control HW Elev.	6,800.47	ft	Control Type	Entrance Control	
Headwater Depth/Height	0.96				

Grades

Upstream Invert	6,797.59	ft	Downstream Invert	6,796.42	ft
Length	49.60	ft	Constructed Slope	0.023589	ft/ft

Hydraulic Profile

Profile	S2		Depth, Downstream	1.33	ft
Slope Type	Steep		Normal Depth	1.19	ft
Flow Regime	Supercritical		Critical Depth	1.90	ft
Velocity Downstream	11.26	ft/s	Critical Slope	0.004950	ft/ft

Section

Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	3				

Outlet Control Properties

Outlet Control HW Elev.	6,800.47	ft	Upstream Velocity Head	0.81	ft
Ke	0.20		Entrance Loss	0.16	ft

Inlet Control Properties

Inlet Control HW Elev.	6,800.34	ft	Flow Control	Unsubmerged	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	21.2	ft²
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Culvert Analysis Report
Proposed B9 10 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	6.59	cfs	Allowable HW Elevation	6,800.47	ft
Roadway Width	20.00	ft	Overtopping Coefficient	2.94	US
Low Point	6,800.22	ft	Headwater Elevation	6,800.47	ft
Discharge Coefficient (Cr)	2.94		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,796.42	ft			

Sta (ft)	Elev. (ft)
0.00	6,800.62
85.30	6,800.22

Culvert Analysis Report
Proposed B9 100 YR with Roadway

Comments: Elevations for culverts came from the survey information in the hydrology dgn. The downstream elevations were the crown elevation minus the pipe size. It is assumed that the pipes are clean and not crushed.
Allowable Headwater is based on the elevation of the roadway edge of pavement. The upstream invert of the culvert should be 6797.59 based on the crown elevation from the survey and the 2.5ft diameter of the pipe. The culvert is filled in with dirt and debris. Downstream invert should be 6796.42 if the culvert was not full of debris.

Analysis Component			
Storm Event	Design	Discharge	156.66 cfs

Peak Discharge Method: User-Specified			
Design Discharge	156.66 cfs	Check Discharge	0.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	6,796.42 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	3-36 inch Circular	116.85 cfs	6,800.71 ft	11.59 ft/s
Weir	Roadway	39.93 cfs	6,800.71 ft	N/A
Total	----------------	156.78 cfs	6,800.71 ft	N/A

Culvert Analysis Report
Proposed B9 100 YR with Roadway

Component:Culvert-1

Culvert Summary			
Computed Headwater Elevation	6,800.71 ft	Discharge	116.85 cfs
Inlet Control HW Elev.	6,800.59 ft	Tailwater Elevation	6,796.42 ft
Outlet Control HW Elev.	6,800.71 ft	Control Type	Entrance Control
Headwater Depth/Height	1.04		

Grades			
Upstream Invert	6,797.59 ft	Downstream Invert	6,796.42 ft
Length	49.60 ft	Constructed Slope	0.023589 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.44 ft
Slope Type	Steep	Normal Depth	1.28 ft
Flow Regime	Supercritical	Critical Depth	2.03 ft
Velocity Downstream	11.59 ft/s	Critical Slope	0.005315 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	3		

Outlet Control Properties			
Outlet Control HW Elev.	6,800.71 ft	Upstream Velocity Head	0.91 ft
Ke	0.20	Entrance Loss	0.18 ft

Inlet Control Properties			
Inlet Control HW Elev.	6,800.59 ft	Flow Control	Unsubmerged
Inlet Type	Beveled ring, 33.7° bevels	Area Full	21.2 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Analysis Report
Proposed B9 100 YR with Roadway

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	39.93	cfs	Allowable HW Elevation	6,800.71	ft
Roadway Width	20.00	ft	Overtopping Coefficient	2.98	US
Low Point	6,800.22	ft	Headwater Elevation	6,800.71	ft
Discharge Coefficient (Cr)	2.98		Submergence Factor (Kt)	1.00	
Tailwater Elevation	6,796.42	ft			

Sta (ft)	Elev. (ft)
0.00	6,800.62
85.30	6,800.22

Project Number: 60652732	Project Name: Peyton Planning

Interim Engineers Concept Estimate
(CDOT Project Cost Planner Tool unit costs 2020)

CDOT Pay Item	Item	Unit	Unit Cost	Quantity			Subtotal Costs	Total Cost	*Assumptions*
	DRAINAGE								
202-00035	Removal of Pipe	LF	$40.00	300			12,000.00	**$12,000**	
202-00037	Removal of End Section	EACH	$500.00	2			1,000.00	**$1,000**	
420-00112	Geotextile (Drainage) (Class 1)	SY	$4.50	138			618.75	**$619**	
506-00000	Riprap	CY	$100.00	63			10,625.00	**$10,625**	
603-01245	24 Inch Reinforced Concrete Pipe (Complete In	LF	$170.00	220			48,400.00	**$48,400**	
603-01365	36 Inch Reinforced Concrete Pipe (Complete In	LF	$220.00	150			39,000.00	**$39,000**	
603-01425	42 Inch Reinforced Concrete Pipe (Complete In	LF	$260.00	139			36,140.00	**$36,140**	
603-05024	24 Inch Reinforced Concrete End Section	EACH	$2,000.00	4			8,000.00	**$8,000**	
603-05036	36 Inch Reinforced Concrete End Section	EACH	$2,500.00	6			15,000.00	**$15,000**	
603-05042	42 Inch Reinforced Concrete End Section	EACH	$2,700.00	6			16,200.00	**$16,200**	
							186,983.75	**$186,984**	

		% Range		% Used	Cost	
Project Construction Bid Items		**Project Dependent**		N / A	**$186,984**	**A**
	Roadway	Estimated $400/LF and $20K per intersection	$0.00	N/A	**$0.00**	**B**
	Erosion Control	(3 - 10%) of **A**	$5,609.51	3.0%	**$5,609.51**	**C**
	Lighting	(1 - 5%) of **A**	$1,869.84	1.0%	**$1,869.84**	**E**
	Traffic Control	(5 - 25%) of **A**	$9,349.19	5.0%	**$9,349.19**	**F**
	Clearing & Grubbing	(1-5%) of **A**	$3,739.68	2.0%	**$3,739.68**	**G**
	Total of Construction Bid Items	**(A+B+C+D+E+F+G)**	$207,551.96		**$207,552**	**H**
	Contingencies (Construction Items) incl. F/A & MCR	(20%) of **H**	$41,510.39	20.0%	**$41,510**	**I**
	Mobilization	(4 - 7%) of **H**	$10,377.60	5.0%	**$10,378**	**J**
	Subtotal Project Cost	**(H+I+J)**	$259,439.95		**$259,440**	**N**
	Utilities	Project Dependent	$0.00	0.0%	**$0**	**O**
	ROW Acquisition	Project Dependent	$2,594.40	1.0%	**$2,594**	**P**
	Grand Total	**(N+O+P)**	$262,034.35		**$262,034**	

NOTES:
1. Drainage Quantities are based on the conceptual Concept 2 for the Peyton Planning Study.
2. Roadways estimate assumes 6' sidewalks on both sides, full pavement reconstruction, ped ramps, and signing and striping.

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
OUTLET 2	CB-A1	O-2	36.0	109.5	45.07	6.34	6,790.00	6,789.50	0.005	6,795.00	6,789.50	6,791.51	6,790.98	22.04

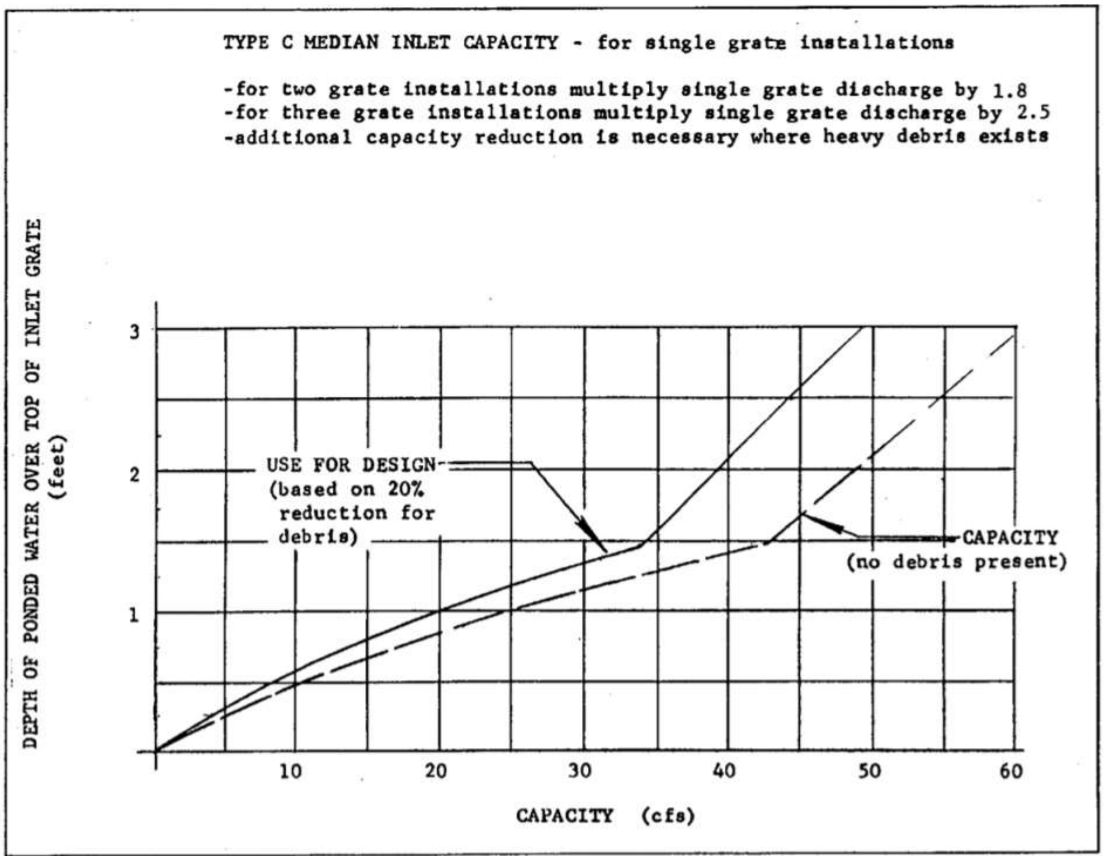
FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
OUTLET 2	CB-A1	O-2	36.0	109.5	45.07	7.91	6,790.00	6,789.50	0.005	6,795.00	6,789.50	6,792.92	6,791.93	55.92

Concept 3	Area in left on west side of Post Office	
	Q5	11.9 cfs
	Q100	33.8 cfs

It is assumed that pedestrians may walk through the area on occasion; especially if a parking lot is built for the trail across the street.
This means we need a close mesh grate for pedestrian safety.

From the chart below, one type c close mesh grates area inlets at almost 2' feet deep is needed.
The pipe needed in concepts 5 & 3 is a 36" RCP which would be too big for a type c, therefore a type d is required.
One type d area inlet with close mesh grate with 0.8 feet of depth
Also note, the chart is from CDOT



Project Number: 60652732 | **Project Name: Peyton Planning**

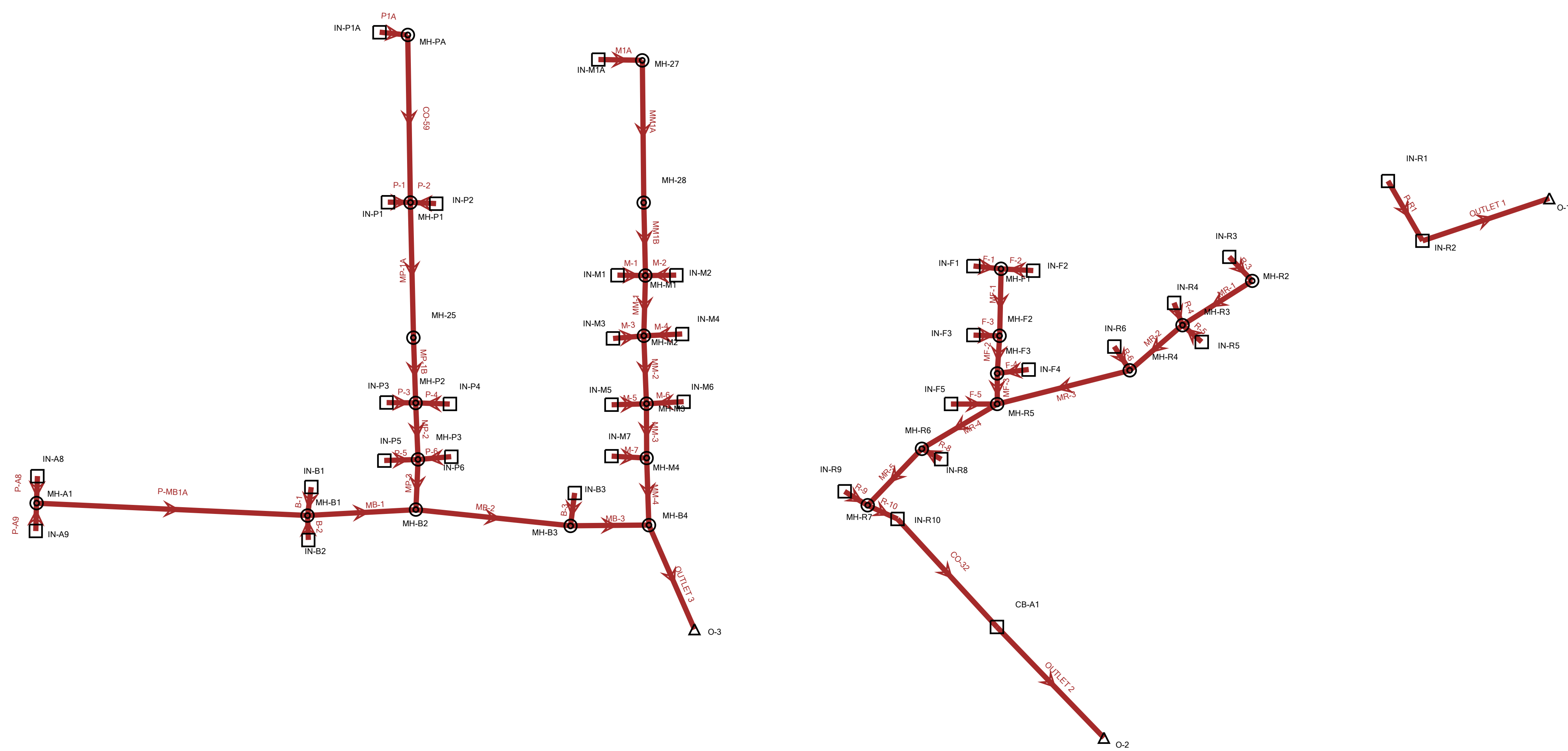
Interim Engineers Concept Estimate
(CDOT Project Cost Planner Tool unit costs 2020)

CDOT Pay Item	Item	Unit	Unit Cost	Quantity			Subtotal Costs	Total Cost	*Assumptions*
	DRAINAGE								
420-00112	Geotextile (Drainage) (Class 1)	SY	$4.50	17			77.22	**$77**	
506-00000	Riprap	CY	$100.00	8			780.00	**$780**	
604-00505	Inlet Type D (5 Foot)	EACH	$6,000.00	1			6,000.00	**$6,000**	
603-01365	36 Inch Reinforced Concrete Pipe (Complete In	LF	$220.00	110			24,200.00	**$24,200**	
603-05036	36 Inch Reinforced Concrete End Section	EACH	$2,500.00	1			2,500.00	**$2,500**	
							33,557.22	**$33,557**	

		% Range		% Used	Cost	
	Project Construction Bid Items	**Project Dependent**		N / A	**$33,557**	**A**
	Roadway	Estimated $400/LF and $20K per intersection	$0.00	N/A	**$0.00**	**B**
	Erosion Control	(3 - 10%) of **A**	$1,342.29	4.0%	**$1,342.29**	**C**
	Lighting	(1 - 5%) of **A**	$335.57	1.0%	**$335.57**	**E**
	Traffic Control	(5 - 25%) of **A**	$1,677.86	5.0%	**$1,677.86**	**F**
	Clearing & Grubbing	(1-5%) of **A**	$1,006.72	3.0%	**$1,006.72**	**G**
	Total of Construction Bid Items	**(A+B+C+D+E+F+G)**	$37,919.66		**$37,920**	**H**
	Contingencies (Construction Items) incl. F/A & MCR	(20%) of **H**	$7,583.93	20.0%	**$7,584**	**I**
	Mobilization	(4 - 7%) of **H**	$1,895.98	5.0%	**$1,896**	**J**
	Subtotal Project Cost	**(H+I+J)**	$47,399.57		**$47,400**	**N**
	Utilities	Project Dependent	$0.00	0.0%	**$0**	**O**
	ROW Acquisition	Project Dependent	$947.99	2.0%	**$948**	**P**
	Grand Total	**(N+O+P)**	$48,347.56		**$48,348**	

NOTES:
1. Drainage Quantities are based on the conceptual Concept 3 for the Peyton Planning Study. (from StormCAD)
2. Roadways estimate assumes 6' sidewalks on both sides, full pavement reconstruction, ped ramps, and signing and striping.

Scenario: 100 yr



FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
OUTLET 3	MH-B4	O-3	72.0	224.0	154.98	5.45	6,792.30	6,792.00	0.001	6,800.00	6,792.00	6,795.10	6,794.33	75.82
M-1	IN-M1	MH-M1	18.0	15.0	8.58	5.44	6,810.00	6,809.90	0.007	6,814.75	6,815.50	6,811.20	6,811.16	7.20
MM-4	MH-M4	MH-B4	42.0	50.8	194.64	12.35	6,795.30	6,793.40	0.037	6,801.00	6,800.00	6,796.54	6,795.20	16.63
MM-3	MH-M3	MH-M4	36.0	236.4	91.00	9.66	6,799.80	6,795.40	0.019	6,805.50	6,801.00	6,801.07	6,796.25	15.79
MM-2	MH-M2	MH-M3	30.0	257.0	52.12	8.80	6,804.05	6,799.90	0.016	6,810.50	6,805.50	6,805.26	6,801.11	12.91
MM-1	MH-M1	MH-M2	24.0	198.1	38.20	10.55	6,809.80	6,804.15	0.029	6,815.50	6,810.50	6,811.00	6,804.89	11.17

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
OUTLET 3	MH-B4	O-3	72.0	224.0	154.98	9.23	6,792.30	6,792.00	0.001	6,800.00	6,792.00	6,797.95	6,796.43	260.98
M-1	IN-M1	MH-M1	18.0	15.0	8.58	8.53	6,810.00	6,809.90	0.007	6,814.75	6,815.50	6,812.25	6,811.94	15.07
MM-4	MH-M4	MH-B4	42.0	50.8	194.64	15.51	6,795.30	6,793.40	0.037	6,801.00	6,800.00	6,798.40	6,798.37	36.51
MM-3	MH-M3	MH-M4	36.0	236.4	91.00	11.97	6,799.80	6,795.40	0.019	6,805.50	6,801.00	6,801.70	6,798.43	34.28
MM-2	MH-M2	MH-M3	30.0	257.0	52.12	10.77	6,804.05	6,799.90	0.016	6,810.50	6,805.50	6,805.84	6,801.79	27.61
MM-1	MH-M1	MH-M2	24.0	198.1	38.20	12.82	6,809.80	6,804.15	0.029	6,815.50	6,810.50	6,811.53	6,805.96	23.75

Project Number: 60652732	Project Name: Peyton Planning

Interim Engineers Concept Estimate
(CDOT Project Cost Planner Tool unit costs 2020)

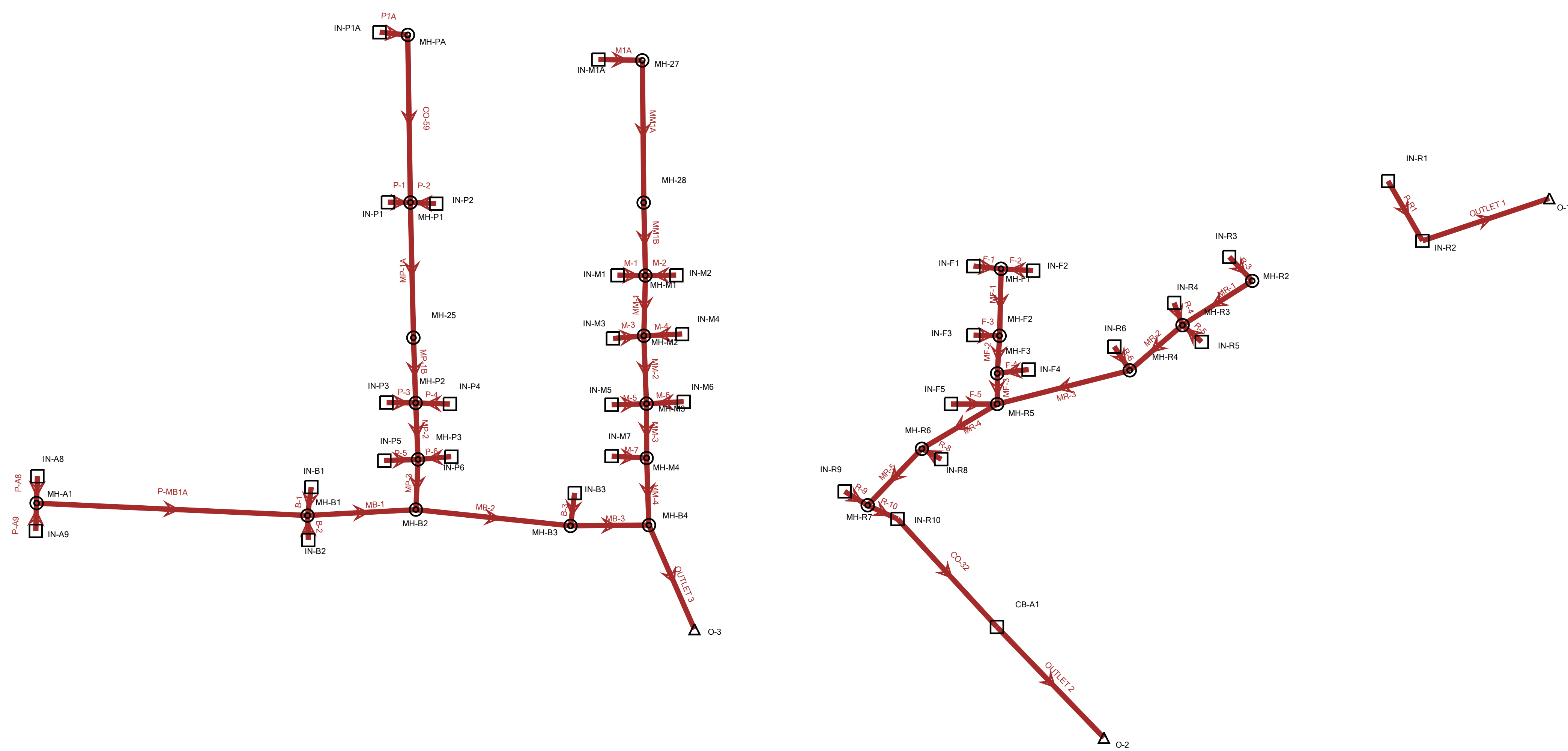
AECOM

CDOT Pay Item	Item	Unit	Unit Cost	Quantity			Subtotal Costs	Total Cost	*Assumptions*
	DRAINAGE								
420-00112	Geotextile (Drainage) (Class 1)	SY	$4.50	66			297.00	**$297**	
506-00000	Riprap	CY	$100.00	30			3,000.00	**$3,000**	
603-01185	18 Inch Reinforced Concrete Pipe (Complete In	LF	$145.00	15			2,175.00	**$2,175**	
603-01245	24 Inch Reinforced Concrete Pipe (Complete In	LF	$170.00	198			33,660.00	**$33,660**	
603-01305	30 Inch Reinforced Concrete Pipe (Complete In	LF	$175.00	257			44,975.00	**$44,975**	
603-01365	36 Inch Reinforced Concrete Pipe (Complete In	LF	$220.00	237			52,140.00	**$52,140**	
603-01425	42 Inch Reinforced Concrete Pipe (Complete In	LF	$260.00	51			13,260.00	**$13,260**	
603-01725	72 Inch Reinforced Concrete Pipe (Complete In	LF	$640.00	224			143,360.00	**$143,360**	
603-05072	72 Inch Reinforced Concrete End Section	EACH	$4,000.00	1			4,000.00	**$4,000**	
604-19505	Inlet Type R L 20 (5 Foot)	EACH	$12,000.00	1			12,000.00	**$12,000**	
604-30010	Manhole Slab Base (10 Foot)	EACH	$10,000.00	4			40,000.00	**$40,000**	
604-31010	Manhole Box Base (10 Foot)	EACH	$10,000.00	1			10,000.00	**$10,000**	
							358,867.00	**$358,867**	

			% Range		% Used	Cost	
	Project Construction Bid Items		**Project Dependent**		N / A	**$358,867**	**A**
	Roadway		Estimated $400/LF and $20K per intersection	$340,000.00	N/A	**$340,000.00**	**B**
	Erosion Control		(3 - 10%) of **A**	$17,943.35	5.0%	**$17,943.35**	**C**
	Lighting		(1 - 5%) of **A**	$3,588.67	1.0%	**$3,588.67**	**D**
	Traffic Control		(5 - 25%) of **A**	$25,120.69	7.0%	**$25,120.69**	**E**
	Clearing & Grubbing		(1-5%) of **A**	$10,766.01	3.0%	**$10,766.01**	**F**
	Total of Construction Bid Items		**(A+B+C+D+E+F)**	$756,285.72		**$756,286**	**G**
	Contingencies (Construction Items) incl. F/A & MCR		(20%) of **H**	$151,257.14	20.0%	**$151,257**	**I**
	Mobilization		(4 - 7%) of **H**	$37,814.29	5.0%	**$37,814**	**J**
	Subtotal Project Cost		**(H+I+J)**	$945,357.15		**$945,357**	**N**
	Utilities		Project Dependent	$0.00	0.0%	**$0**	**O**
	ROW Acquisition		Project Dependent	$28,360.71	3.0%	**$28,361**	**P**
	Grand Total		**(N+O+P)**	$973,717.86		**$973,718**	

NOTES:
1. Drainage Quantities are based on the conceptual Concept 4 for the Peyton Planning Study. (from StormCAD)
2. Roadways estimate assumes 6' sidewalks on both sides, full pavement reconstruction, ped ramps, and signing and striping.

Scenario: 100 yr



FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
P-MB1A	MH-A1	MH-B1	72.0	193.3	288.96	11.13	6,795.20	6,794.30	0.005	6,804.50	6,803.00	6,801.05	6,800.61	208.26
P-A8	IN-A8	MH-A1	66.0	24.0	573.47	8.10	6,796.00	6,795.30	0.029	6,803.00	6,804.50	6,801.75	6,801.67	192.37
P-A9	IN-A9	MH-A1	30.0	24.0	109.16	3.25	6,798.00	6,796.30	0.071	6,803.00	6,804.50	6,801.71	6,801.67	15.93
P-R1	IN-R1	IN-R2	18.0	56.9	7.63	3.53	6,794.00	6,793.70	0.005	6,799.00	6,799.00	6,794.66	6,794.66	1.79
MM1B	MH-28	MH-M1	24.0	198.3	30.48	8.59	6,813.50	6,809.90	0.018	6,818.50	6,815.50	6,814.61	6,811.77	9.57
MM1A	MH-27	MH-28	24.0	312.3	37.76	10.07	6,822.30	6,813.60	0.028	6,828.00	6,818.50	6,823.41	6,814.29	9.70
M1A	IN-M1A	MH-27	15.0	15.0	5.27	7.91	6,822.50	6,822.40	0.007	6,827.50	6,828.00	6,824.01	6,823.67	9.71
CO-59	MH-PA	MH-P1	18.0	180.7	10.77	6.45	6,814.30	6,812.40	0.011	6,820.00	6,818.00	6,815.31	6,814.33	6.84
P1A	IN-P1A	MH-PA	18.0	15.0	8.58	5.39	6,814.50	6,814.40	0.007	6,819.50	6,820.00	6,815.60	6,815.57	6.85
MP-1B	MH-25	MH-P2	24.0	257.0	27.33	9.88	6,808.40	6,804.65	0.015	6,813.50	6,810.25	6,810.18	6,806.56	25.56
MP-1A	MH-P1	MH-25	24.0	200.2	31.17	11.08	6,812.30	6,808.50	0.019	6,818.00	6,813.50	6,814.08	6,810.32	25.74
OUTLET 3	MH-B4	O-3	72.0	224.0	154.98	9.23	6,792.30	6,792.00	0.001	6,800.00	6,792.00	6,797.95	6,796.43	260.98
B-3	IN-B3	MH-B3	15.0	24.0	13.83	10.58	6,795.00	6,793.90	0.046	6,800.00	6,800.50	6,800.84	6,799.87	12.99
M-7	IN-M7	MH-M4	15.0	15.0	12.92	3.02	6,796.00	6,795.40	0.040	6,800.50	6,801.00	6,798.46	6,798.42	3.71
M-6	IN-M6	MH-M3	15.0	15.0	12.92	7.27	6,800.50	6,799.90	0.040	6,805.00	6,805.50	6,801.73	6,801.72	1.68
M-5	IN-M5	MH-M3	15.0	15.0	12.92	6.68	6,800.50	6,799.90	0.040	6,805.00	6,805.50	6,802.03	6,801.79	8.20
M-4	IN-M4	MH-M2	15.0	15.0	15.38	9.05	6,805.00	6,804.15	0.057	6,810.00	6,810.50	6,805.84	6,805.88	2.34
M-3	IN-M3	MH-M2	15.0	15.0	12.92	8.98	6,804.75	6,804.15	0.040	6,809.25	6,810.50	6,805.93	6,805.90	3.55
M-2	IN-M2	MH-M1	15.0	15.0	12.92	7.94	6,810.50	6,809.90	0.040	6,815.00	6,815.50	6,811.60	6,811.59	2.28
M-1	IN-M1	MH-M1	18.0	15.0	8.58	8.53	6,810.00	6,809.90	0.007	6,814.75	6,815.50	6,812.25	6,811.94	15.07
R-9	IN-R9	MH-R7	18.0	24.0	20.34	5.04	6,793.00	6,792.10	0.037	6,799.00	6,799.50	6,794.86	6,794.68	8.90
R-8	IN-R8	MH-R6	15.0	24.0	13.19	7.90	6,794.50	6,793.50	0.042	6,799.00	6,799.50	6,795.47	6,795.46	2.14
F-5	IN-F5	MH-R5	18.0	24.0	17.94	4.26	6,794.50	6,793.80	0.029	6,799.50	6,800.00	6,796.65	6,796.52	7.54
F-4	IN-F4	MH-F3	18.0	24.0	15.16	7.76	6,797.50	6,797.00	0.021	6,800.50	6,801.00	6,798.48	6,798.56	5.15
F-3	IN-F3	MH-F2	18.0	24.0	6.78	4.68	6,797.50	6,797.40	0.004	6,802.50	6,803.00	6,799.52	6,799.38	8.28
F-2	IN-F2	MH-F1	18.0	15.0	8.58	4.06	6,805.50	6,805.40	0.007	6,810.50	6,811.00	6,806.57	6,806.57	2.19
F-1	IN-F1	MH-F1	18.0	15.0	8.58	5.51	6,805.50	6,805.40	0.007	6,810.50	6,811.00	6,806.88	6,806.82	7.93
R-6	IN-R6	MH-R4	15.0	24.0	16.15	10.34	6,796.00	6,794.50	0.063	6,799.50	6,800.00	6,796.73	6,796.69	3.31
R-5	IN-R5	MH-R3	15.0	24.0	10.21	5.86	6,798.00	6,797.40	0.025	6,802.50	6,803.00	6,798.47	6,798.44	1.42
R-4	IN-R4	MH-R3	18.0	24.0	6.78	3.96	6,797.50	6,797.40	0.004	6,802.50	6,803.00	6,798.53	6,798.51	3.86
R-3	IN-R3	MH-R2	15.0	24.0	4.17	5.03	6,803.00	6,802.90	0.004	6,808.00	6,808.50	6,804.27	6,804.02	6.17
OUTLET 2	CB-A1	O-2	36.0	109.5	45.07	7.18	6,790.00	6,789.50	0.005	6,795.00	6,789.50	6,792.55	6,791.76	47.95
CO-32	IN-R10	CB-A1	36.0	106.5	84.26	12.19	6,791.80	6,790.10	0.016	6,797.50	6,795.00	6,794.01	6,792.62	46.07
R-10	MH-R7	IN-R10	36.0	24.0	43.05	6.92	6,792.00	6,791.90	0.004	6,799.50	6,797.50	6,794.50	6,794.39	44.49
MR-5	MH-R6	MH-R7	36.0	222.5	50.98	7.91	6,793.40	6,792.10	0.006	6,799.50	6,799.50	6,795.41	6,794.89	38.02
MR-4	MH-R5	MH-R6	36.0	143.4	24.91	5.24	6,793.70	6,793.50	0.001	6,800.00	6,799.50	6,796.33	6,795.60	37.01
MR-3	MH-R4	MH-R5	30.0	215.3	23.39	4.84	6,794.50	6,793.80	0.003	6,800.00	6,800.00	6,796.67	6,796.50	12.47
MR-2	MH-R3	MH-R4	24.0	228.1	25.50	7.56	6,797.30	6,794.40	0.013	6,803.00	6,800.00	6,798.41	6,796.71	9.65
MR-1	MH-R2	MH-R3	18.0	242.9	15.66	8.33	6,802.80	6,797.40	0.022	6,808.50	6,803.00	6,803.76	6,798.50	6.16
OUTLET 1	IN-R2	O-1	18.0	144.6	19.73	8.31	6,793.60	6,788.50	0.035	6,799.00	6,788.50	6,794.30	6,788.92	3.34
MF-3	MH-F3	MH-R5	24.0	79.8	44.58	13.49	6,796.90	6,793.80	0.039	6,801.00	6,800.00	6,798.44	6,796.50	18.31
MF-2	MH-F2	MH-F3	24.0	133.5	10.72	4.78	6,797.30	6,797.00	0.002	6,803.00	6,801.00	6,799.25	6,798.58	15.01
MF-1	MH-F1	MH-F2	18.0	224.1	19.72	11.03	6,805.30	6,797.40	0.035	6,811.00	6,803.00	6,806.49	6,799.33	9.41
MM-4	MH-M4	MH-B4	42.0	50.8	194.64	15.51	6,795.30	6,793.40	0.037	6,801.00	6,800.00	6,798.40	6,798.37	36.51
MM-3	MH-M3	MH-M4	36.0	236.4	91.00	11.97	6,799.80	6,795.40	0.019	6,805.50	6,801.00	6,801.70	6,798.43	34.28
MM-2	MH-M2	MH-M3	30.0	257.0	52.12	10.77	6,804.05	6,799.90	0.016	6,810.50	6,805.50	6,805.84	6,801.79	27.61
MM-1	MH-M1	MH-M2	24.0	198.1	38.20	12.82	6,809.80	6,804.15	0.029	6,815.50	6,810.50	6,811.53	6,805.96	23.75
B-2	IN-B2	MH-B1	15.0	24.0	14.44	0.82	6,796.50	6,795.30	0.050	6,802.50	6,803.00	6,801.14	6,801.13	1.01

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
B-1	IN-B1	MH-B1	15.0	24.0	14.44	2.32	6,796.50	6,795.30	0.050	6,802.50	6,803.00	6,801.17	6,801.12	2.84
MB-1	MH-B1	MH-B2	72.0	72.1	315.38	7.43	6,794.20	6,793.80	0.006	6,803.00	6,802.00	6,800.49	6,800.31	210.03
P-6	IN-P6	MH-P3	15.0	12.5	5.78	5.15	6,797.50	6,797.40	0.008	6,802.50	6,803.00	6,801.43	6,801.31	6.32
P-5	IN-P5	MH-P3	15.0	12.5	5.78	3.70	6,797.50	6,797.40	0.008	6,802.50	6,803.00	6,801.33	6,801.27	4.54
P-4	IN-P4	MH-P2	18.0	12.5	9.39	2.60	6,804.75	6,804.65	0.008	6,809.75	6,810.25	6,806.55	6,806.53	4.60
P-3	IN-P3	MH-P2	18.0	12.5	9.39	2.16	6,804.75	6,804.65	0.008	6,809.75	6,810.25	6,806.53	6,806.52	3.81
MB-3	MH-B3	MH-B4	72.0	57.5	353.33	8.47	6,792.80	6,792.40	0.007	6,800.50	6,800.00	6,799.04	6,798.86	239.44
MB-2	MH-B2	MH-B3	72.0	302.0	203.88	8.26	6,793.70	6,793.00	0.002	6,802.00	6,800.50	6,800.12	6,799.20	233.52
MP-3	MH-P3	MH-B2	30.0	30.0	97.72	7.67	6,797.30	6,795.60	0.057	6,803.00	6,802.00	6,801.18	6,800.93	37.65
MP-2	MH-P2	MH-P3	30.0	221.5	73.69	14.40	6,804.55	6,797.40	0.032	6,810.25	6,803.00	6,806.46	6,801.40	31.29
P-2	IN-P2	MH-P1	18.0	12.5	9.39	6.88	6,812.50	6,812.40	0.008	6,817.50	6,818.00	6,814.59	6,814.42	12.16
P-1	IN-P1	MH-P1	18.0	12.5	9.39	4.31	6,812.50	6,812.40	0.008	6,817.50	6,818.00	6,814.35	6,814.29	7.62

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
P-MB1A	MH-A1	MH-B1	72.0	193.3	288.96	7.82	6,795.20	6,794.30	0.005	6,804.50	6,803.00	6,797.15	6,796.06	53.94
P-A8	IN-A8	MH-A1	66.0	24.0	573.47	14.38	6,796.00	6,795.30	0.029	6,803.00	6,804.50	6,797.82	6,797.42	45.04
P-A9	IN-A9	MH-A1	30.0	24.0	109.16	13.39	6,798.00	6,796.30	0.071	6,803.00	6,804.50	6,798.99	6,797.42	8.90
P-R1	IN-R1	IN-R2	18.0	56.9	7.63	3.16	6,794.00	6,793.70	0.005	6,799.00	6,799.00	6,794.41	6,794.42	1.22
MM1B	MH-28	MH-M1	24.0	198.3	30.48	6.81	6,813.50	6,809.90	0.018	6,818.50	6,815.50	6,814.22	6,811.09	4.21
MM1A	MH-27	MH-28	24.0	312.3	37.76	7.97	6,822.30	6,813.60	0.028	6,828.00	6,818.50	6,823.03	6,814.05	4.28
M1A	IN-M1A	MH-27	15.0	15.0	5.27	4.79	6,822.50	6,822.40	0.007	6,827.50	6,828.00	6,823.36	6,823.24	4.29
CO-59	MH-PA	MH-P1	18.0	180.7	10.77	5.41	6,814.30	6,812.40	0.011	6,820.00	6,818.00	6,815.01	6,813.68	3.42
P1A	IN-P1A	MH-PA	18.0	15.0	8.58	4.58	6,814.50	6,814.40	0.007	6,819.50	6,820.00	6,815.21	6,815.13	3.42
MP-1B	MH-25	MH-P2	24.0	257.0	27.33	8.53	6,808.40	6,804.65	0.015	6,813.50	6,810.25	6,809.68	6,805.60	12.62
MP-1A	MH-P1	MH-25	24.0	200.2	31.17	9.42	6,812.30	6,808.50	0.019	6,818.00	6,813.50	6,813.58	6,809.39	12.71
OUTLET 3	MH-B4	O-3	72.0	224.0	154.98	5.45	6,792.30	6,792.00	0.001	6,800.00	6,792.00	6,795.10	6,794.33	75.82
B-3	IN-B3	MH-B3	15.0	24.0	13.83	8.50	6,795.00	6,793.90	0.046	6,800.00	6,800.50	6,795.63	6,795.37	2.46
M-7	IN-M7	MH-M4	15.0	15.0	12.92	7.02	6,796.00	6,795.40	0.040	6,800.50	6,801.00	6,796.48	6,796.56	1.49
M-6	IN-M6	MH-M3	15.0	15.0	12.92	5.47	6,800.50	6,799.90	0.040	6,805.00	6,805.50	6,801.06	6,801.08	0.64
M-5	IN-M5	MH-M3	15.0	15.0	12.92	9.09	6,800.50	6,799.90	0.040	6,805.00	6,805.50	6,801.28	6,801.11	3.70
M-4	IN-M4	MH-M2	15.0	15.0	15.38	6.56	6,805.00	6,804.15	0.057	6,810.00	6,810.50	6,805.35	6,805.27	0.78
M-3	IN-M3	MH-M2	15.0	15.0	12.92	7.50	6,804.75	6,804.15	0.040	6,809.25	6,810.50	6,805.29	6,805.28	1.87
M-2	IN-M2	MH-M1	15.0	15.0	12.92	6.83	6,810.50	6,809.90	0.040	6,815.00	6,815.50	6,810.96	6,811.03	1.35
M-1	IN-M1	MH-M1	18.0	15.0	8.58	5.44	6,810.00	6,809.90	0.007	6,814.75	6,815.50	6,811.20	6,811.16	7.20
R-9	IN-R9	MH-R7	18.0	24.0	20.34	8.49	6,793.00	6,792.10	0.037	6,799.00	6,799.50	6,793.70	6,793.56	3.33
R-8	IN-R8	MH-R6	15.0	24.0	13.19	7.15	6,794.50	6,793.50	0.042	6,799.00	6,799.50	6,794.99	6,794.79	1.51
F-5	IN-F5	MH-R5	18.0	24.0	17.94	7.79	6,794.50	6,793.80	0.029	6,799.50	6,800.00	6,795.42	6,795.48	3.38
F-4	IN-F4	MH-F3	18.0	24.0	15.16	6.37	6,797.50	6,797.00	0.021	6,800.50	6,801.00	6,798.10	6,797.99	2.53
F-3	IN-F3	MH-F2	18.0	24.0	6.78	3.41	6,797.50	6,797.40	0.004	6,802.50	6,803.00	6,798.47	6,798.47	2.17
F-2	IN-F2	MH-F1	18.0	15.0	8.58	3.61	6,805.50	6,805.40	0.007	6,810.50	6,811.00	6,806.24	6,806.24	1.45
F-1	IN-F1	MH-F1	18.0	15.0	8.58	4.89	6,805.50	6,805.40	0.007	6,810.50	6,811.00	6,806.33	6,806.36	4.40
R-6	IN-R6	MH-R4	15.0	24.0	16.15	8.45	6,796.00	6,794.50	0.063	6,799.50	6,800.00	6,796.51	6,795.56	1.63
R-5	IN-R5	MH-R3	15.0	24.0	10.21	5.11	6,798.00	6,797.40	0.025	6,802.50	6,803.00	6,798.37	6,798.10	0.89
R-4	IN-R4	MH-R3	18.0	24.0	6.78	3.14	6,797.50	6,797.40	0.004	6,802.50	6,803.00	6,798.13	6,798.13	1.60
R-3	IN-R3	MH-R2	15.0	24.0	4.17	3.77	6,803.00	6,802.90	0.004	6,808.00	6,808.50	6,803.82	6,803.63	3.32
OUTLET 2	CB-A1	O-2	36.0	109.5	45.07	6.34	6,790.00	6,789.50	0.005	6,795.00	6,789.50	6,791.51	6,790.98	22.04
CO-32	IN-R10	CB-A1	36.0	106.5	84.26	9.90	6,791.80	6,790.10	0.016	6,797.50	6,795.00	6,793.27	6,791.14	21.02
R-10	MH-R7	IN-R10	36.0	24.0	43.05	6.01	6,792.00	6,791.90	0.004	6,799.50	6,797.50	6,793.46	6,793.44	20.43
MR-5	MH-R6	MH-R7	36.0	222.5	50.98	6.60	6,793.40	6,792.10	0.006	6,799.50	6,799.50	6,794.76	6,793.67	18.14
MR-4	MH-R5	MH-R6	36.0	143.4	24.91	3.81	6,793.70	6,793.50	0.001	6,800.00	6,799.50	6,795.39	6,794.85	17.40
MR-3	MH-R4	MH-R5	30.0	215.3	23.39	4.04	6,794.50	6,793.80	0.003	6,800.00	6,800.00	6,795.54	6,795.46	6.31
MR-2	MH-R3	MH-R4	24.0	228.1	25.50	6.28	6,797.30	6,794.40	0.013	6,803.00	6,800.00	6,798.08	6,795.58	4.94
MR-1	MH-R2	MH-R3	18.0	242.9	15.66	7.03	6,802.80	6,797.40	0.022	6,808.50	6,803.00	6,803.49	6,798.13	3.31
OUTLET 1	IN-R2	O-1	18.0	144.6	19.73	7.40	6,793.60	6,788.50	0.035	6,799.00	6,788.50	6,794.16	6,788.84	2.23
MF-3	MH-F3	MH-R5	24.0	79.8	44.58	10.90	6,796.90	6,793.80	0.039	6,801.00	6,800.00	6,797.93	6,795.47	8.41
MF-2	MH-F2	MH-F3	24.0	133.5	10.72	3.61	6,797.30	6,797.00	0.002	6,803.00	6,801.00	6,798.44	6,797.99	6.81
MF-1	MH-F1	MH-F2	18.0	224.1	19.72	9.51	6,805.30	6,797.40	0.035	6,811.00	6,803.00	6,806.19	6,798.47	5.38
MM-4	MH-M4	MH-B4	42.0	50.8	194.64	12.35	6,795.30	6,793.40	0.037	6,801.00	6,800.00	6,796.54	6,795.20	16.63
MM-3	MH-M3	MH-M4	36.0	236.4	91.00	9.66	6,799.80	6,795.40	0.019	6,805.50	6,801.00	6,801.07	6,796.25	15.79
MM-2	MH-M2	MH-M3	30.0	257.0	52.12	8.80	6,804.05	6,799.90	0.016	6,810.50	6,805.50	6,805.26	6,801.11	12.91
MM-1	MH-M1	MH-M2	24.0	198.1	38.20	10.55	6,809.80	6,804.15	0.029	6,815.50	6,810.50	6,811.00	6,804.89	11.17
B-2	IN-B2	MH-B1	15.0	24.0	14.44	5.70	6,796.50	6,795.30	0.050	6,802.50	6,803.00	6,796.79	6,796.44	0.56

FlexTable: Conduit Table

Label	Start Node	Stop Node	Diameter (in)	Length (User Defined) (ft)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow (cfs)
B-1	IN-B1	MH-B1	15.0	24.0	14.44	7.64	6,796.50	6,795.30	0.050	6,802.50	6,803.00	6,796.99	6,796.43	1.52
MB-1	MH-B1	MH-B2	72.0	72.1	315.38	8.37	6,794.20	6,793.80	0.006	6,803.00	6,802.00	6,796.17	6,796.09	54.87
P-6	IN-P6	MH-P3	15.0	12.5	5.78	3.00	6,797.50	6,797.40	0.008	6,802.50	6,803.00	6,798.63	6,798.63	0.57
P-5	IN-P5	MH-P3	15.0	12.5	5.78	3.58	6,797.50	6,797.40	0.008	6,802.50	6,803.00	6,798.64	6,798.64	1.05
P-4	IN-P4	MH-P2	18.0	12.5	9.39	3.48	6,804.75	6,804.65	0.008	6,809.75	6,810.25	6,805.85	6,805.85	1.02
P-3	IN-P3	MH-P2	18.0	12.5	9.39	4.00	6,804.75	6,804.65	0.008	6,809.75	6,810.25	6,805.86	6,805.86	1.65
MB-3	MH-B3	MH-B4	72.0	57.5	353.33	9.57	6,792.80	6,792.40	0.007	6,800.50	6,800.00	6,795.10	6,795.33	65.90
MB-2	MH-B2	MH-B3	72.0	302.0	203.88	6.41	6,793.70	6,793.00	0.002	6,802.00	6,800.50	6,796.03	6,795.15	64.96
MP-3	MH-P3	MH-B2	30.0	30.0	97.72	14.51	6,797.30	6,795.60	0.057	6,803.00	6,802.00	6,798.62	6,796.38	15.36
MP-2	MH-P2	MH-P3	30.0	221.5	73.69	11.66	6,804.55	6,797.40	0.032	6,810.25	6,803.00	6,805.83	6,798.68	14.48
P-2	IN-P2	MH-P1	18.0	12.5	9.39	5.54	6,812.50	6,812.40	0.008	6,817.50	6,818.00	6,813.71	6,813.70	5.58
P-1	IN-P1	MH-P1	18.0	12.5	9.39	5.14	6,812.50	6,812.40	0.008	6,817.50	6,818.00	6,813.67	6,813.67	4.10

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-P1	IN-P2	IN-P3	IN-P5
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	4.3	5.6	1.7	0.6
Major Q_{Known} (cfs)	12.4	17.5	4.6	1.0

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	IN-P1A	No Bypass Flow Received	IN-P1	IN-P3
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.3	0.4
Major Bypass Flow Received, Q_b (cfs)	0.8	0.0	5.6	6.6

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**4.3**	**5.6**	**2.0**	**0.9**
Major Total Design Peak Flow, Q (cfs)	**13.2**	**17.5**	**10.2**	**7.7**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.3	0.0	0.4	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	5.6	5.4	6.6	4.5

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-P4	IN-P6	IN-M1	IN-M3
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.0	0.6	7.1	2.4
Major Q_{Known} (cfs)	1.8	1.0	15.1	6.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	IN-P2	IN-P4	IN-M1A	IN-M1
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	5.4	4.2	2.1	2.5

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.0**	**0.6**	**7.1**	**2.4**
Major Total Design Peak Flow, Q (cfs)	**7.3**	**5.2**	**17.2**	**8.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	0.0	0.6
Major Flow Bypassed Downstream, Q_b (cfs)	4.2	0.6	2.5	5.5

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-M5	IN-M7	IN-M2	IN-M4
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.2	1.6	1.5	0.6
Major Q_{Known} (cfs)	9.0	3.5	3.6	1.1

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	IN-M3	IN-M5	No Bypass Flow Received	IN-M2
Minor Bypass Flow Received, Q_b (cfs)	0.6	0.1	0.0	0.1
Major Bypass Flow Received, Q_b (cfs)	5.5	6.6	0.0	1.3

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.8**	**1.7**	**1.5**	**0.7**
Major Total Design Peak Flow, Q (cfs)	**14.5**	**10.1**	**3.6**	**2.4**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.1	0.2	0.1	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	6.6	6.5	1.3	0.6

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-M6	IN-F1	IN-F3	IN-F4
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.7	4.7	1.6	2.3
Major Q_{Known} (cfs)	1.3	13.8	3.2	4.9

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	IN-M4	No Bypass Flow Received	IN-F1	IN-F2
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.4	0.2
Major Bypass Flow Received, Q_b (cfs)	0.6	0.0	6.0	1.2

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**0.7**	**4.7**	**2.0**	**2.5**
Major Total Design Peak Flow, Q (cfs)	**1.8**	**13.8**	**9.1**	**6.1**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.1	0.4	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.3	6.0	2.8	1.0

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-R1	IN-R2	IN-F2	IN-F5
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.2	1.1	1.6	3.4
Major Q_{Known} (cfs)	2.2	1.9	3.4	10.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	IN-F3
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	2.8

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.2**	**1.1**	**1.6**	**3.4**
Major Total Design Peak Flow, Q (cfs)	**2.2**	**1.9**	**3.4**	**13.1**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.1	0.0	0.2	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.5	0.3	1.2	5.5

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-R3	IN-R4	IN-R6	IN-R9
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.4	1.3	1.9	3.3
Major Q_{Known} (cfs)	9.6	2.3	5.5	7.6

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	IN-R3	IN-R4	User-Defined
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.1	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	3.2	2.8	3.3

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.4**	**1.3**	**1.9**	**3.3**
Major Total Design Peak Flow, Q (cfs)	**9.6**	**5.5**	**8.3**	**10.9**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.1	0.3	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	3.2	2.8	5.1	4.0

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-R5	IN-R8	IN-R10	IN-B2
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.9	1.8	0.7	0.5
Major Q_{Known} (cfs)	1.6	3.2	1.3	0.9

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	IN-R5	IN-R8	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.3	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.2	1.3	0.0

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**0.9**	**1.8**	**1.0**	**0.5**
Major Total Design Peak Flow, Q (cfs)	**1.6**	**3.4**	**2.5**	**0.9**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.3	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.2	1.3	0.0	0.0

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-B1	IN-B3	IN-P1A	IN-M1A
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.8	2.0	1.4	4.3
Major Q_{Known} (cfs)	5.8	5.2	5.7	11.8

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	User-Defined	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0		0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	4.2		0.0

Watershed Characteristics

Subcatchment Area (acres)				
Percent Impervious				
NRCS Soil Type				

Watershed Profile

Overland Slope (ft/ft)				
Overland Length (ft)				
Channel Slope (ft/ft)				
Channel Length (ft)				

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)				
One-Hour Precipitation, P_1 (inches)				

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.8**	**2.0**	**1.4**	**4.3**
Major Total Design Peak Flow, Q (cfs)	**5.8**	**9.4**	**5.7**	**11.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.2	0.0	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	3.0	1.0	0.8	2.1

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	IN-A1	A1 - Concept 3
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	AREA	AREA
Hydraulic Condition	Swale	Swale
Inlet Type	CDOT Type C	CDOT Type D (In Series)

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.8	11.9
Major Q_{Known} (cfs)	3.3	33.8

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

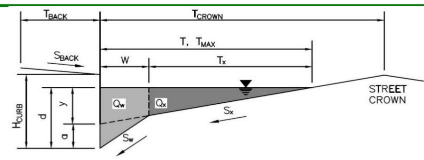
CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.8**	**11.9**
Major Total Design Peak Flow, Q (cfs)	**3.3**	**33.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P1



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.016	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.1**	**18.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

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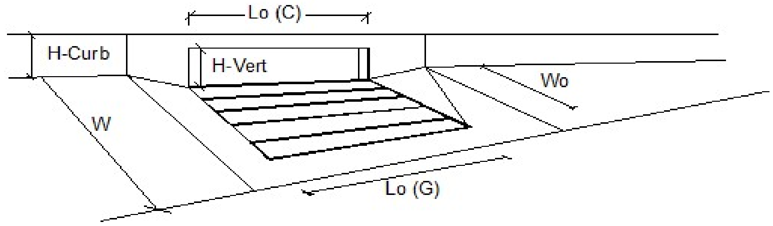


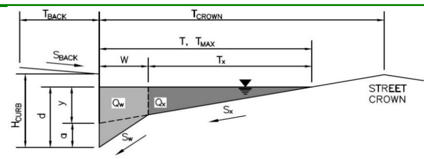
Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.1**	**7.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.3**	**5.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**94**	**57**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P2



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.016		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.2**	**18.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

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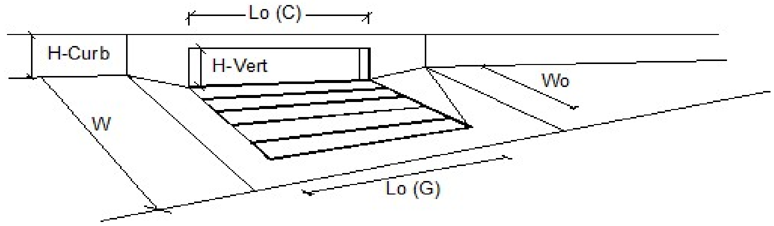
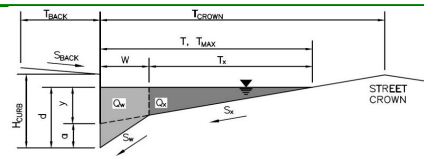


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Design Discharge for Half of Street (from *Inlet Management*)	Q_o =	5.6	17.5	cfs
Water Spread Width	T =	10.3	16.7	ft
Water Depth at Flowline (outside of local depression)	d =	4.0	5.5	inches
Water Depth at Street Crown (or at T_{MAX})	d_{CROWN} =	0.0	0.0	inches
Ratio of Gutter Flow to Design Flow	E_o =	0.564	0.357	
Discharge outside the Gutter Section W, carried in Section T_x	Q_x =	2.4	11.3	cfs
Discharge within the Gutter Section W	Q_W =	3.2	6.2	cfs
Discharge Behind the Curb Face	Q_{BACK} =	0.0	0.0	cfs
Flow Area within the Gutter Section W	A_W =	0.50	0.75	sq ft
Velocity within the Gutter Section W	V_W =	6.4	8.3	fps
Water Depth for Design Condition	d_{LOCAL} =	7.0	8.5	inches
Grate Analysis (Calculated)		MINOR	MAJOR	
Total Length of Inlet Grate Opening	L =	N/A	N/A	ft
Ratio of Grate Flow to Design Flow	$E_{o\text{-}GRATE}$ =	N/A	N/A	
Under No-Clogging Condition		MINOR	MAJOR	
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Interception Capacity	Q_i =	N/A	N/A	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient for Multiple-unit Grate Inlet	GrateCoef =	N/A	N/A	
Clogging Factor for Multiple-unit Grate Inlet	GrateClog =	N/A	N/A	
Effective (unclogged) Length of Multiple-unit Grate Inlet	L_e =	N/A	N/A	ft
Minimum Velocity Where Grate Splash-Over Begins	V_o =	N/A	N/A	fps
Interception Rate of Frontal Flow	R_f =	N/A	N/A	
Interception Rate of Side Flow	R_x =	N/A	N/A	
Actual Interception Capacity	**Q_a =**	**N/A**	**N/A**	**cfs**
Carry-Over Flow = Q_o-Q_a (to be applied to curb opening or next d/s inlet)	**Q_b =**	**N/A**	**N/A**	**cfs**
Curb or Slotted Inlet Opening Analysis (Calculated)		MINOR	MAJOR	
Equivalent Slope S_e (based on grate carry-over)	S_e =	0.126	0.087	ft/ft
Required Length L_T to Have 100% Interception	L_T =	14.29	30.28	ft
Under No-Clogging Condition		MINOR	MAJOR	
Effective Length of Curb Opening or Slotted Inlet (minimum of L, L_T)	L =	14.29	15.00	ft
Interception Capacity	Q_i =	5.6	12.4	cfs
Under Clogging Condition		MINOR	MAJOR	
Clogging Coefficient	CurbCoef =	1.31	1.31	
Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet	CurbClog =	0.04	0.04	
Effective (Unclogged) Length	L_e =	13.03	13.03	ft
Actual Interception Capacity	**Q_a =**	**5.6**	**12.1**	**cfs**
Carry-Over Flow = $Q_{b(GRATE)}$-Q_a	**Q_b =**	**0.0**	**5.4**	**cfs**
Summary		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.6**	**12.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**5.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**69**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Peyton Planning Study**
Inlet ID: **IN-P3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

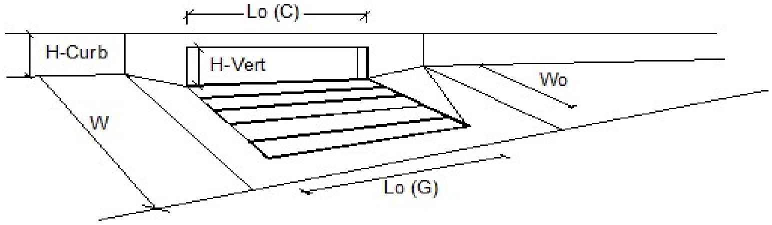
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**5.8**	**17.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

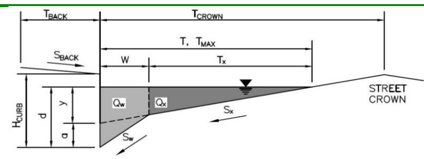


Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.6**	**3.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.4**	**6.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**82**	**35**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P5



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.031	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

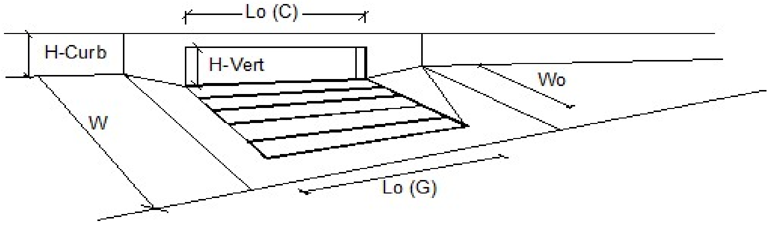
MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

		Minor Storm	Major Storm	
	Q_{allow} =	**8.7**	**19.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

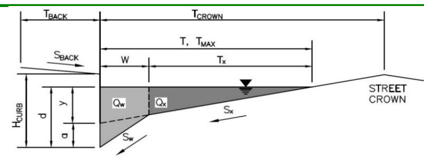


Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.9**	**3.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**4.5**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**99**	**42**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P4



Gutter Geometry:

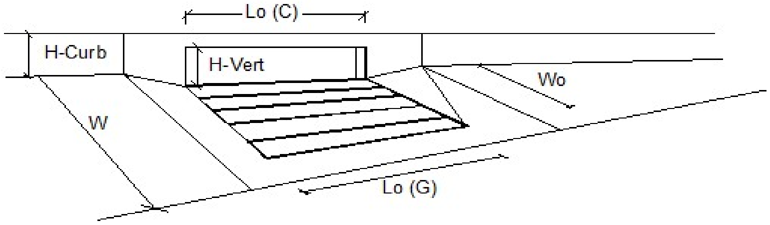
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.016		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.2**	**18.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

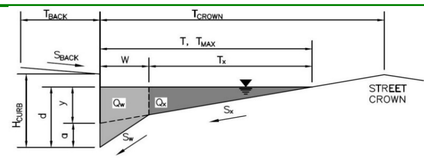


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.0**	**3.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**43**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P6



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.031	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

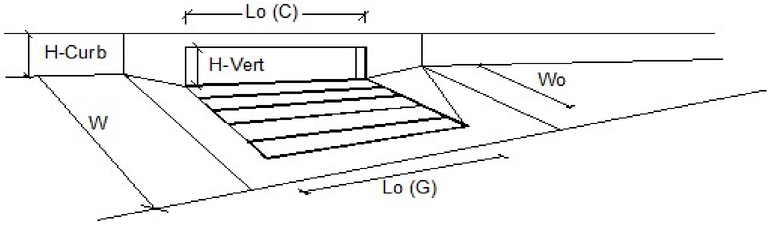
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**8.7**	**19.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



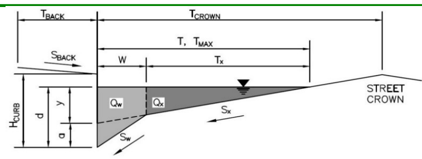
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.6**	**4.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**89**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M1



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.025	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

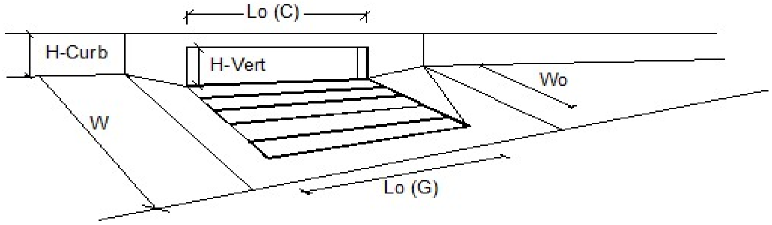
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**7.8**	**20.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

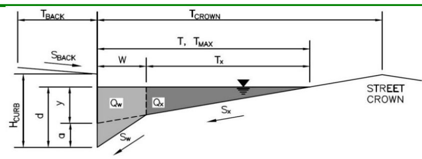


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	20.00	20.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**7.1**	**14.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**85**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M3



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

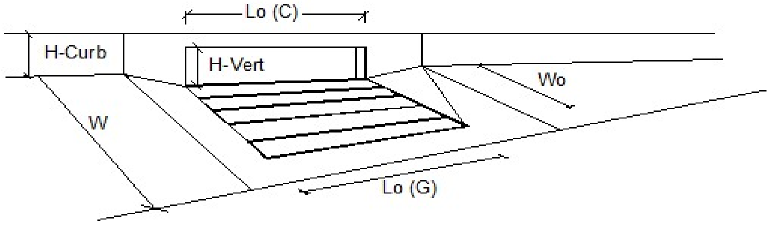
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**5.8**	**17.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

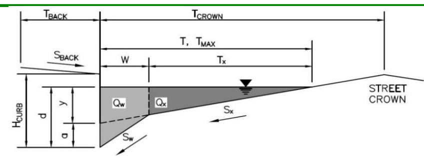
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.8**	**3.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.6**	**5.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**76**	**38**	**%**

MHFD-Inlet, Version 5.01 (April 2021)

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M5



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

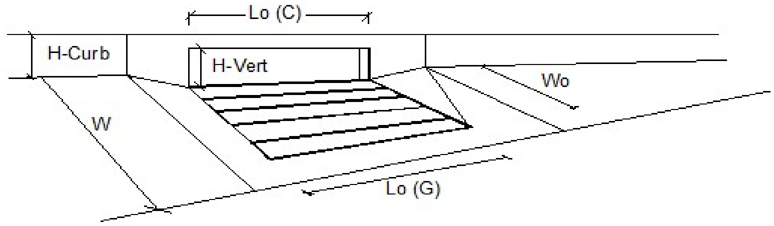
MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
Q_{allow} =	**5.8**	**17.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



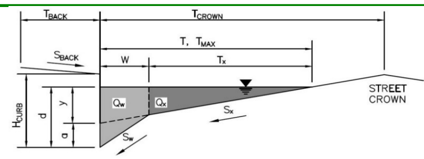
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.7**	**7.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**6.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**97**	**55**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M7



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

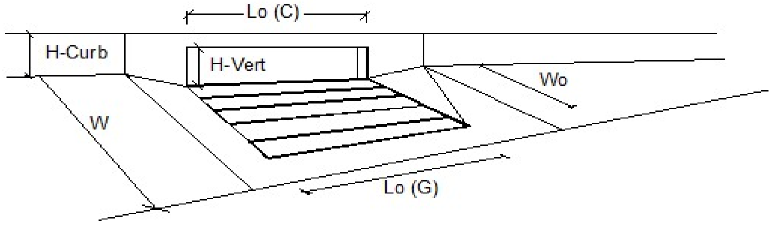
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.0**	**17.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

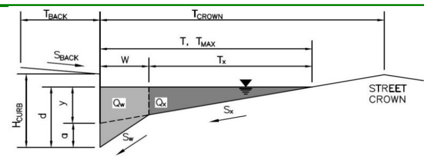


Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.5**	**3.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.2**	**6.5**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**88**	**35**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M2



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

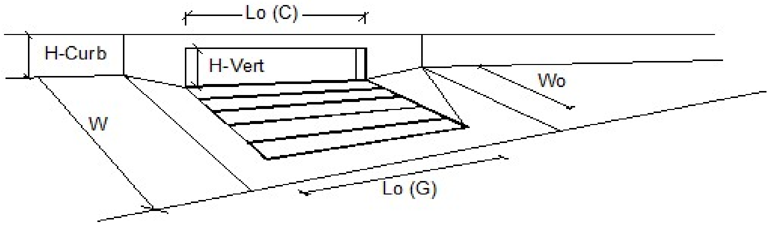
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**7.5**	**20.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



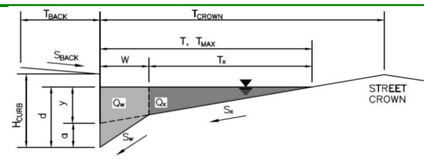
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.3**	**2.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**1.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**92**	**63**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M4



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.021	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

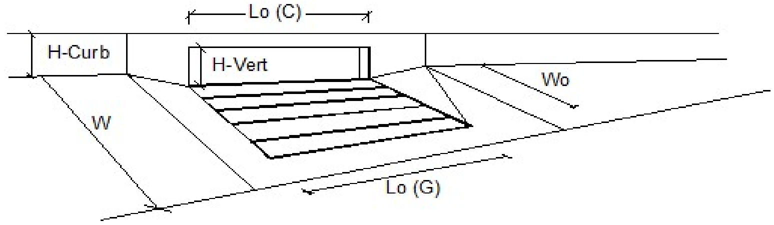
MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Spread Criterion

		Minor Storm	Major Storm	
	Q_{allow} =	**7.1**	**21.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

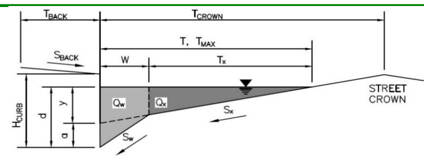


Design Information (Input)		MINOR	MAJOR	
CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.7**	**1.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**77**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-M6



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.016	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

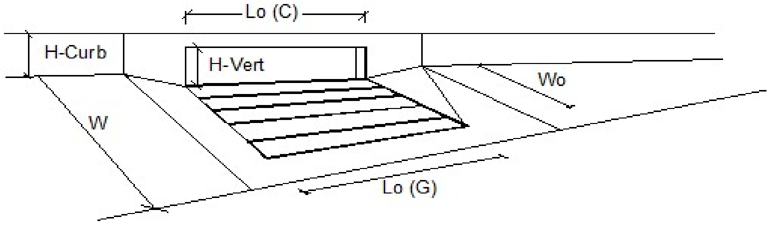
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.2**	**18.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

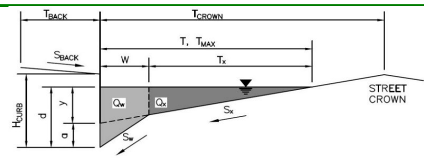


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.6**	**1.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**0.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**91**	**86**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-F1



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.025	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

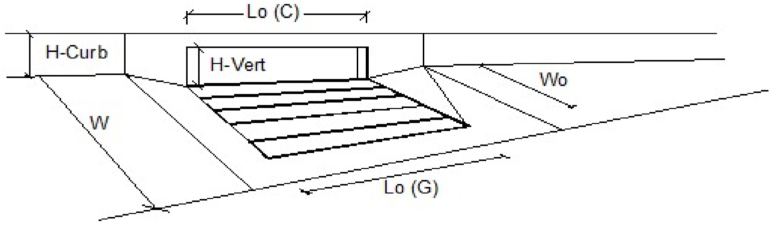
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**7.8**	**20.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

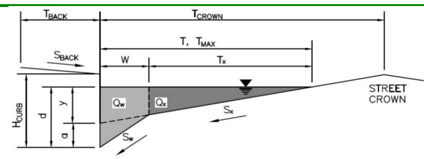


Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.3**	**7.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.4**	**6.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**92**	**57**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-F3



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.022	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

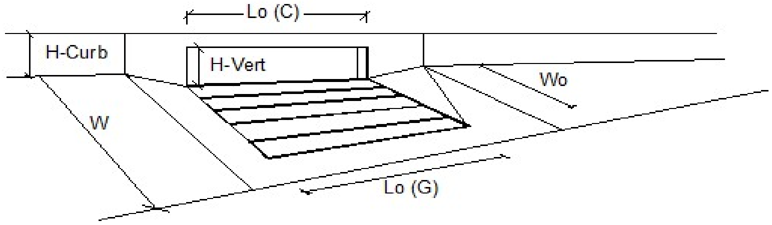
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**23.7**	**23.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

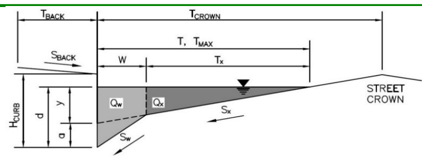
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.0**	**6.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**70**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study

Inlet ID: IN-F4



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

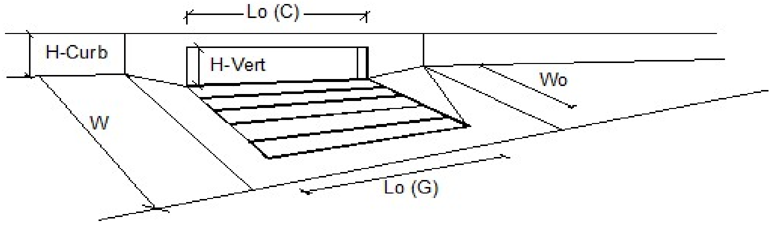
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**24.9**	**24.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

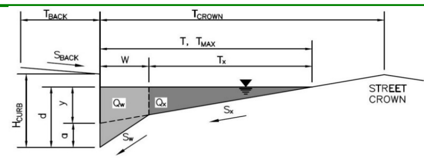


Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.5**	**5.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**84**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R1



Gutter Geometry:

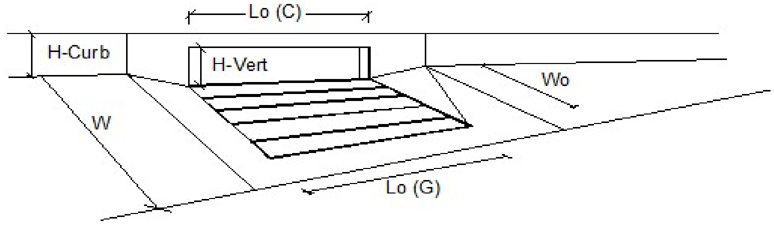
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**24.9**	**24.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

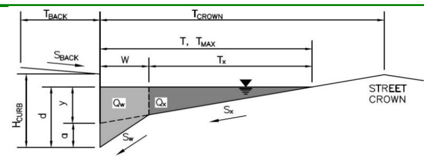


Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.2**	**1.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**0.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**96**	**79**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R2



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.021	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

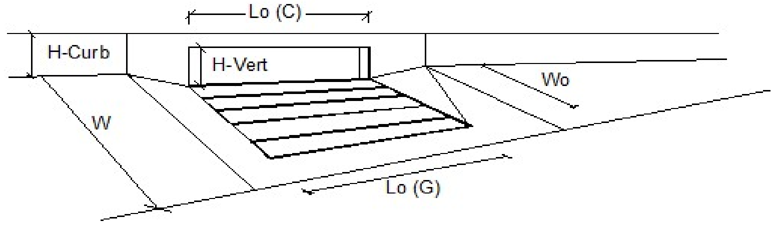
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**23.8**	**23.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

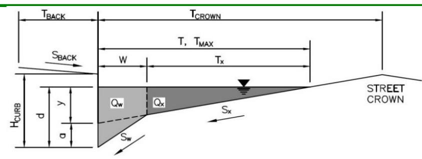


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.1**	**1.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**98**	**83**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-F2



Gutter Geometry:

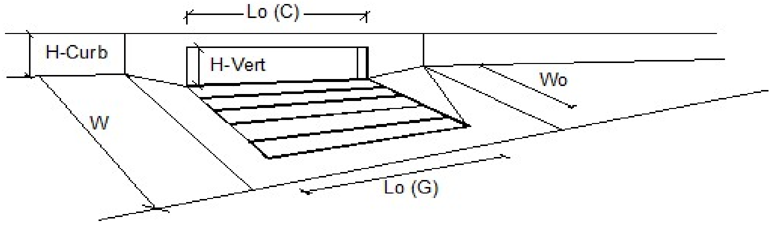
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**7.5**	**20.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

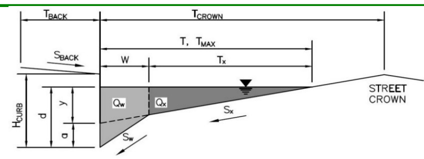


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.4**	**2.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**88**	**65**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-F5



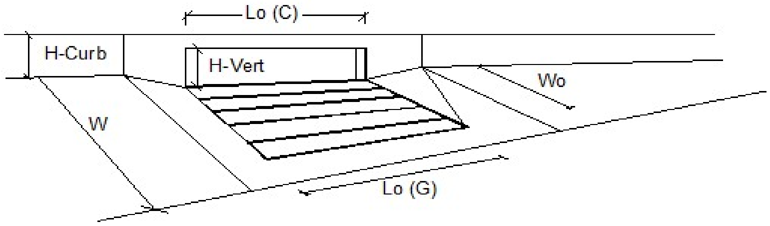
Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**20.1**	**22.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

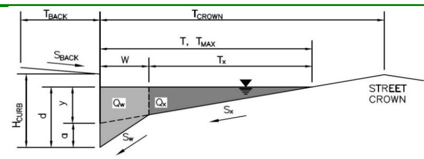


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.4**	**7.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**5.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**58**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R3



Gutter Geometry:

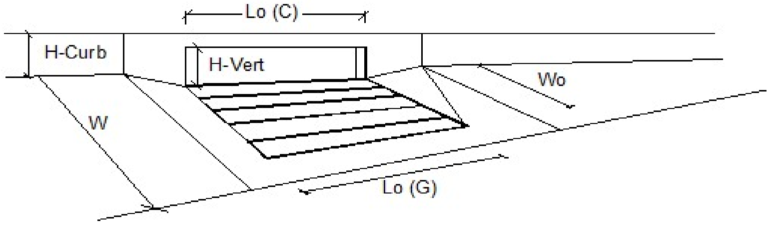
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.006		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**12.7**	**14.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



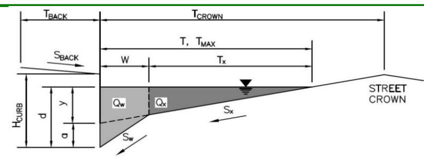
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.4**	**6.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**3.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**67**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Peyton Planning Study**
Inlet ID: **IN-R4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.013	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

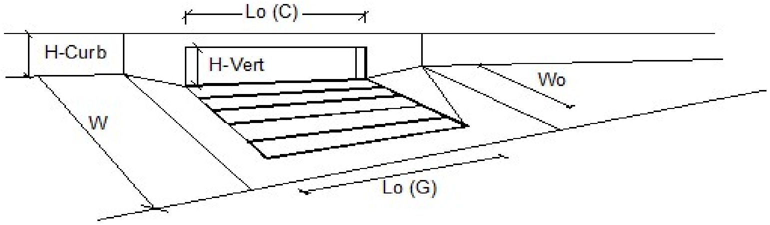
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**18.7**	**20.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

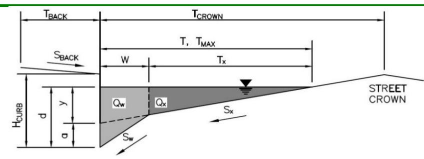


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.3**	**2.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**2.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**95**	**50**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R6



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.003	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

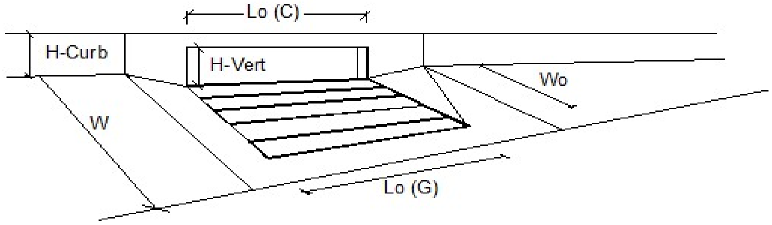
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**9.0**	**10.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

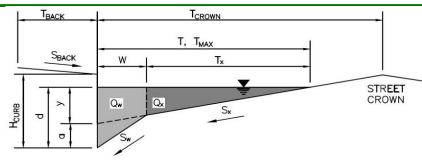


Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.6**	**3.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.3**	**5.1**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**82**	**39**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R9



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

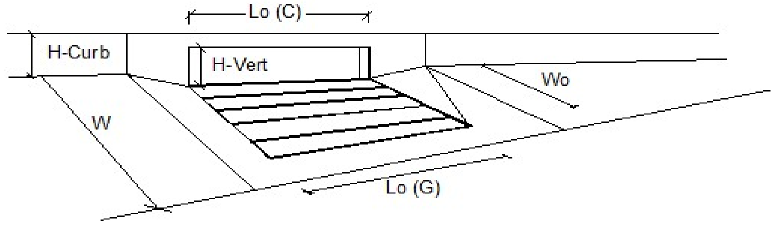
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**20.1**	**22.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

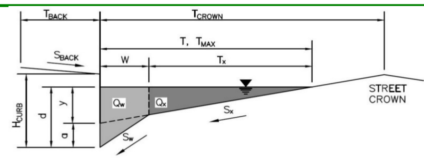


Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.3**	**6.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**63**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R5



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

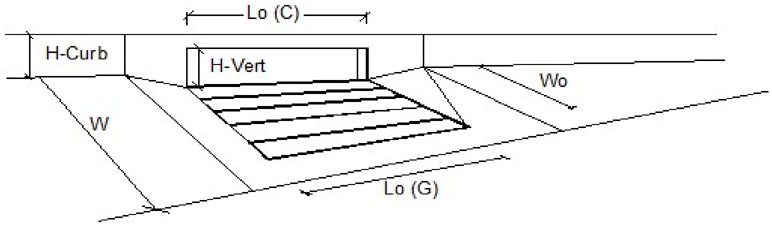
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**20.1**	**22.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



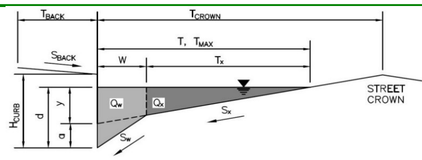
Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.9**	**1.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**89**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R8



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.001	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

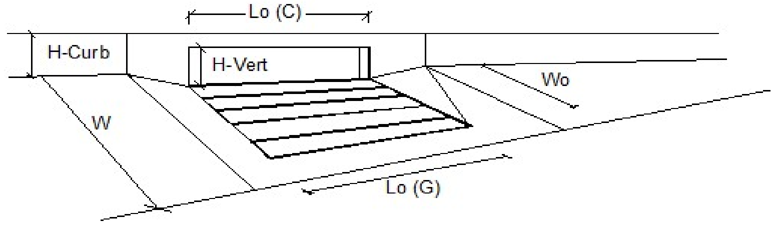
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**5.2**	**5.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

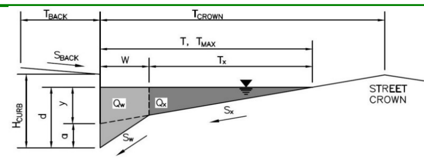


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.5**	**2.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.3**	**1.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**84**	**63**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-R10



Gutter Geometry:

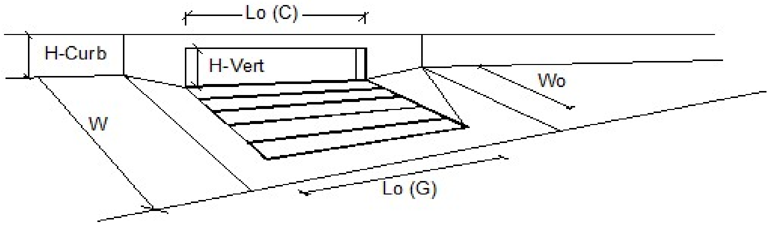
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.004		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**10.4**	**11.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

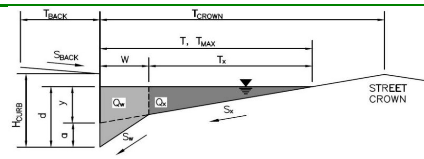


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.0**	**2.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-B2



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.009	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

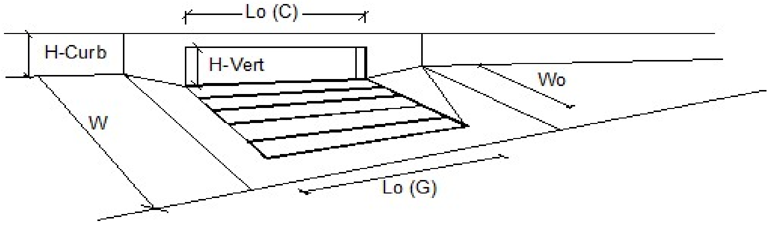
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.6**	**17.4**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion				

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLEt ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

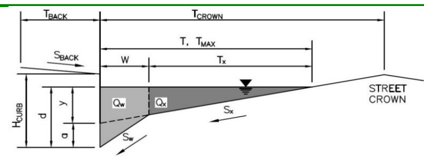


Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.5**	**0.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-B1



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.022	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

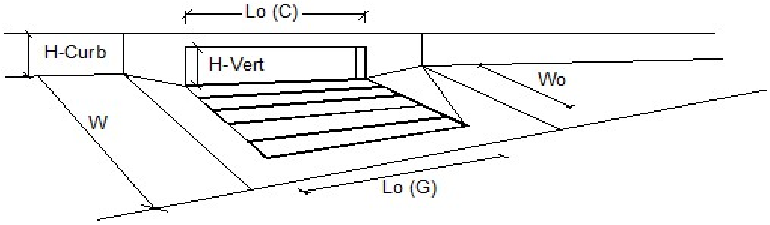
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**24.3**	**24.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

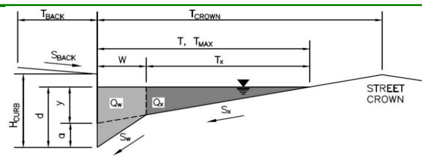


Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.5**	**2.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**3.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**86**	**49**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-B3



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.003		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.8	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

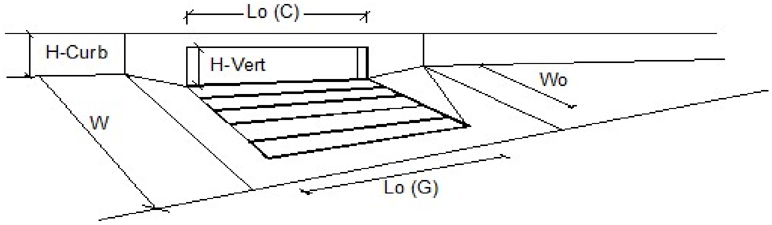
MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	**9.0**	**10.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

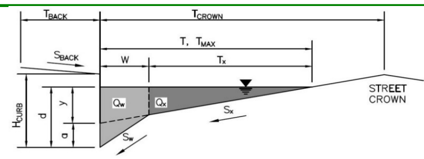


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.0**	**8.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**89**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Peyton Planning Study
Inlet ID: IN-P1A



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

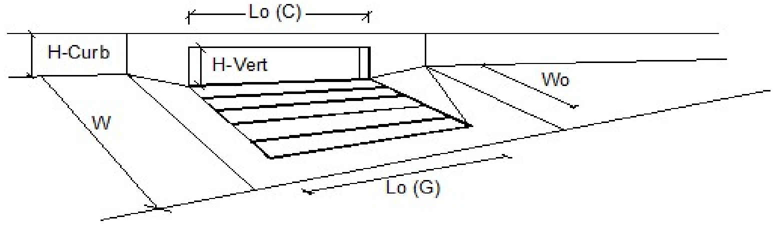
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**5.8**	**17.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

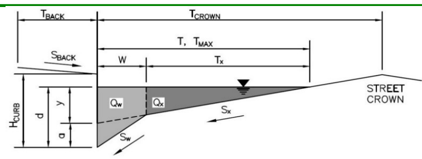


Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.4**	**4.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**85**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Peyton Planning Study**
Inlet ID: **IN-M1A**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.014	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

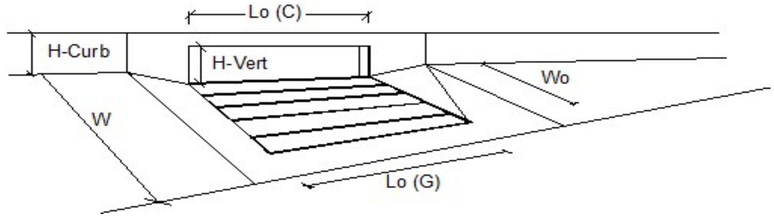
MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
Q_{allow} =	**5.8**	**17.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)

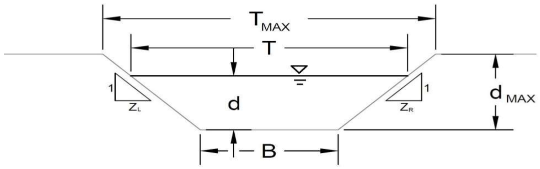


Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.3**	**9.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**2.1**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**82**	**%**

AREA INLET IN A SWALE

Peyton Planning Study

IN-A1



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =	A	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0030	ft/ft
Bottom Width	B =	3.00	ft
Left Side Slope	Z1 =	8.00	ft/ft
Right Side Sloe	Z2 =	8.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- ◯ **Non-Cohesive**
- ◯ **Cohesive**
- ◯ **Paved**

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**30.00**	**30.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**1.00**	**2.00**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**2.2**	**6.6**	**cfs**
MAJOR STORM Allowable Capacity is based on Top Width Criterion	d_{allow} =	**1.00**	**1.69**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**1.8**	**3.3**	**cfs**
Water Depth	d =	**0.91**	**1.21**	**ft**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

AREA INLET IN A SWALE

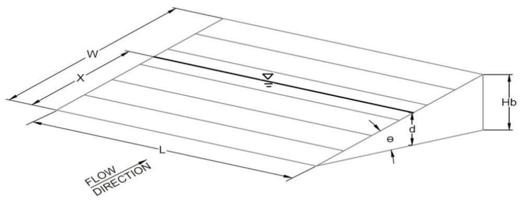
Peyton Planning Study

IN-A1

Inlet Design Information (Input)

Type of Inlet: CDOT Type C — Inlet Type = CDOT Type C

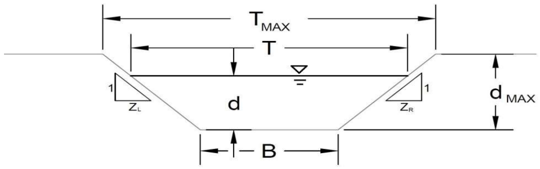
Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	3.00	ft
Length of Grate	L =	3.00	ft
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.00	ft
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.91	1.21	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**15.4**	**17.8**	**cfs**
Bypassed Flow	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Qa/Qo	**C% =**	**100**	**100**	**%**

AREA INLET IN A SWALE

Peyton Planning Study
A1 - Concept 3



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =	A	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0129	ft/ft
Bottom Width	B =	8.00	ft
Left Side Slope	Z1 =	8.00	ft/ft
Right Side Sloe	Z2 =	8.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- ○ Non-Cohesive
- ● Cohesive
- ○ Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**63.00**	**63.00**	ft
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**1.75**	**2.25**	ft

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**18.7**	**38.8**	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**1.75**	**2.25**	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**11.9**	**33.8**	cfs
Water Depth	d =	**1.43**	**2.15**	ft

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

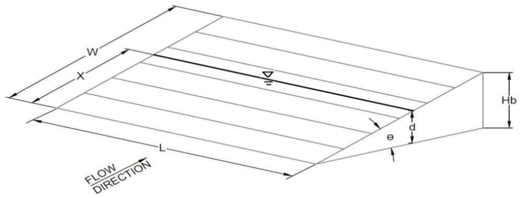
AREA INLET IN A SWALE

Peyton Planning Study

A1 - Concept 3

Inlet Design Information (Input)

Type of Inlet	CDOT Type D (In Series)	Inlet Type =	CDOT Type D (In Series)	
Angle of Inclined Grate (must be <= 30 degrees)		θ =	0.00	degrees
Width of Grate		W =	3.00	ft
Length of Grate		L =	6.00	ft
Open Area Ratio		A_{RATIO} =	0.70	
Height of Inclined Grate		H_B =	0.00	ft
Clogging Factor		C_f =	0.38	
Grate Discharge Coefficient		C_d =	0.78	
Orifice Coefficient		C_o =	0.52	
Weir Coefficient		C_w =	1.67	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	1.43	2.15	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**39.3**	**48.2**	**cfs**
Bypassed Flow	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Qa/Qo	**C% =**	**100**	**100**	**%**

Project Number: 60652732	Project Name: Peyton Planning

Interim Engineers Concept Estimate
(CDOT Project Cost Planner Tool unit costs 2020)

AECOM

CDOT Pay Item	Item	Unit	Unit Cost	Quantity			Subtotal Costs	Total Cost	*Assumptions*
	DRAINAGE								
202-00035	Removal of Pipe	LF	$40.00	300			12,000.00	**$12,000**	
202-00037	Removal of End Section	EACH	$500.00	2			1,000.00	**$1,000**	
420-00112	Geotextile (Drainage) (Class 1)	SY	$4.50	174			781.11	**$781**	
506-00000	Riprap	CY	$100.00	79			7,890.00	**$7,890**	
604-00305	Inlet Type C (5 Foot)	EACH	$5,500.00	1			5,500.00	**$5,500**	
604-00505	Inlet Type D (5 Foot)	EACH	$6,000.00	1			6,000.00	**$6,000**	
604-00510	Inlet Type D (10 Foot)	EACH	$8,000.00	2			16,000.00	**$16,000**	
603-01155	15 Inch Reinforced Concrete Pipe (Complete In	LF	$125.00	298			37,250.00	**$37,250**	
603-01185	18 Inch Reinforced Concrete Pipe (Complete In	LF	$145.00	1,080			156,600.00	**$156,600**	
603-01245	24 Inch Reinforced Concrete Pipe (Complete In Place)	LF	$170.00	1,608			273,360.00	**$273,360**	
603-01305	30 Inch Reinforced Concrete Pipe (Complete In	LF	$175.00	748			130,900.00	**$130,900**	
603-01365	36 Inch Reinforced Concrete Pipe (Complete In	LF	$220.00	843			185,460.00	**$185,460**	
603-01425	42 Inch Reinforced Concrete Pipe (Complete In	LF	$260.00	51			13,260.00	**$13,260**	
603-01665	66 Inch Reinforced Concrete Pipe (Complete In	LF	$600.00	24			14,400.00	**$14,400**	
603-01725	72 Inch Reinforced Concrete Pipe (Complete In	LF	$640.00	849			543,360.00	**$543,360**	
603-05018	18 Inch Reinforced Concrete End Section	EACH	$2,000.00	1			2,000.00	**$2,000**	
603-05036	36 Inch Reinforced Concrete End Section	EACH	$2,500.00	1			2,500.00	**$2,500**	
603-05042	42 Inch Reinforced Concrete End Section	EACH	$2,700.00	6			16,200.00	**$16,200**	
603-05072	72 Inch Reinforced Concrete End Section	EACH	$4,000.00	1			4,000.00	**$4,000**	
604-19105	Inlet Type R L 5 (5 Foot)	EACH	$8,000.00	14			112,000.00	**$112,000**	
604-19110	Inlet Type R L 5 (10 Foot)	EACH	$8,500.00	3			25,500.00	**$25,500**	
604-19205	Inlet Type R L 10 (5 Foot)	EACH	$9,000.00	9			81,000.00	**$81,000**	
604-19210	Inlet Type R L 10 (10 Foot)	EACH	$9,500.00	2			19,000.00	**$19,000**	
604-19305	Inlet Type R L 15 (5 Foot)	EACH	$11,000.00	3			33,000.00	**$33,000**	
604-19505	Inlet Type R L 20 (5 Foot)	EACH	$12,000.00	1			12,000.00	**$12,000**	
604-30010	Manhole Slab Base (10 Foot)	EACH	$10,000.00	19			190,000.00	**$190,000**	
604-30016	Manhole Slab Base (15 Foot)	EACH	$14,000.00	1			14,000.00	**$14,000**	
604-31010	Manhole Box Base (10 Foot)	EACH	$10,000.00	5			50,000.00	**$50,000**	
							1,964,961.11	**$1,964,961**	

		% Range		% Used	Cost	
Project Construction Bid Items		**Project Dependent**		N / A	**$1,964,961**	**A**
	Roadway	Estimated $400/LF and $20K per intersection	$2,560,000.00	N/A	**$2,560,000.00**	**B**
	Erosion Control	(3 - 10%) of **A**	$137,547.28	7.0%	**$137,547.28**	**C**
	Lighting	(1 - 5%) of **A**	$19,649.61	1.0%	**$19,649.61**	**D**
	Traffic Control	(5 - 25%) of **A**	$196,496.11	10.0%	**$196,496.11**	**E**
	Clearing & Grubbing	(1-5%) of **A**	$98,248.06	5.0%	**$98,248.06**	**F**
	Total of Construction Bid Items	**(A+B+C+D+E+F)**	$4,976,902.17		**$4,976,902**	**H**
	Contingencies (Construction Items) incl. F/A & MCR	(20%) of **H**	$995,380.43	20.0%	**$995,380**	**I**
	Mobilization	(4 - 7%) of **H**	$248,845.11	5.0%	**$248,845**	**J**
	Subtotal Project Cost	**(H+I+J)**	$6,221,127.71		**$6,221,128**	**N**
	Utilities	Project Dependent	$0.00	0.0%	**$0**	**O**
	ROW Acquisition	Project Dependent	$311,056.39	5.0%	**$311,056**	**P**
	Grand Total	**(N+O+P)**	$6,532,184.09		**$6,532,184**	

NOTES:
1. Drainage Quantities are based on the conceptual Concept 5 for the Peyton Planning Study. (from StormCAD)
2. Roadways estimate assumes 6' sidewalks on both sides, full pavement reconstruction, ped ramps, and signing and striping.

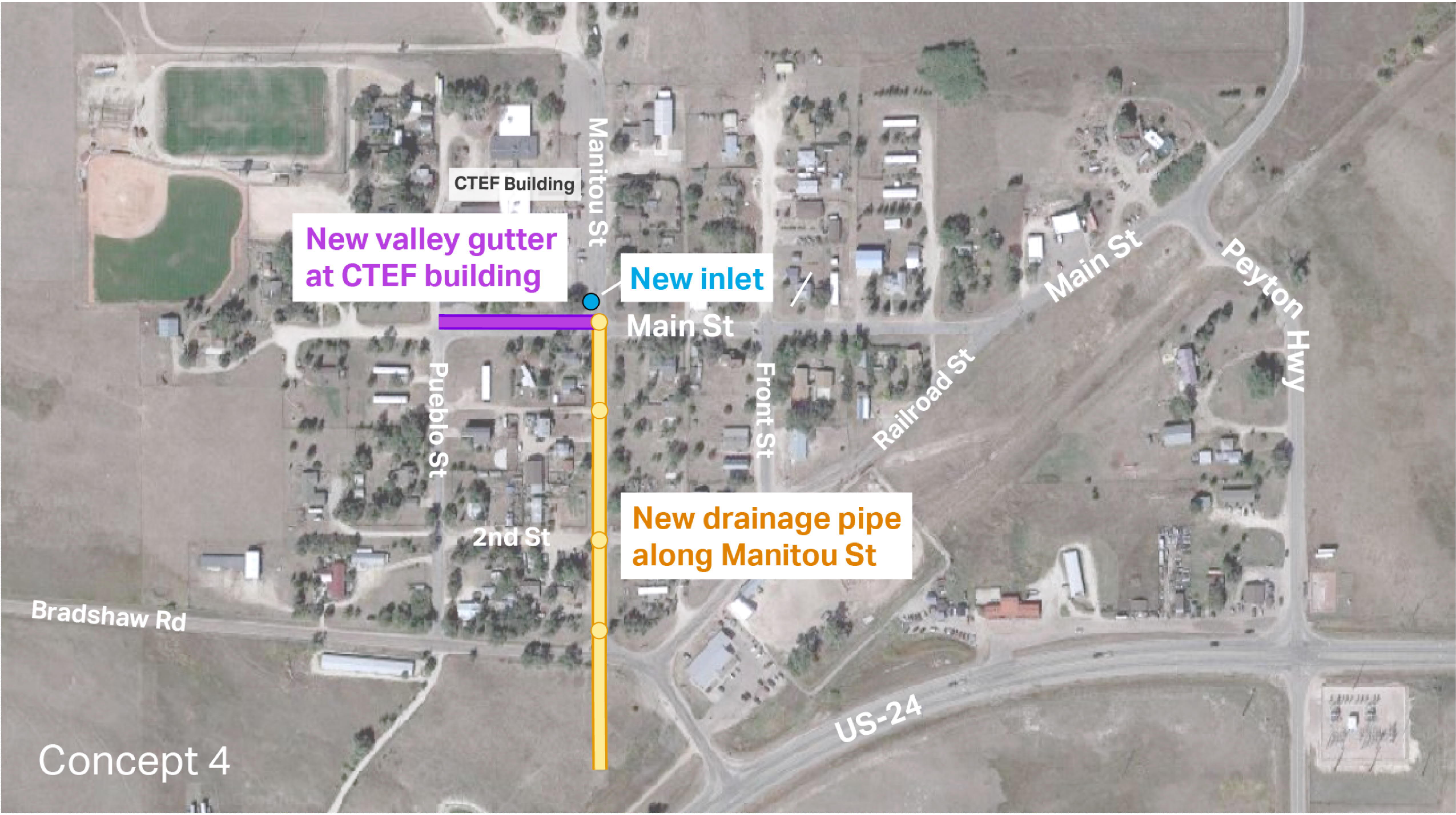
Appendix E

Drainage Schematics

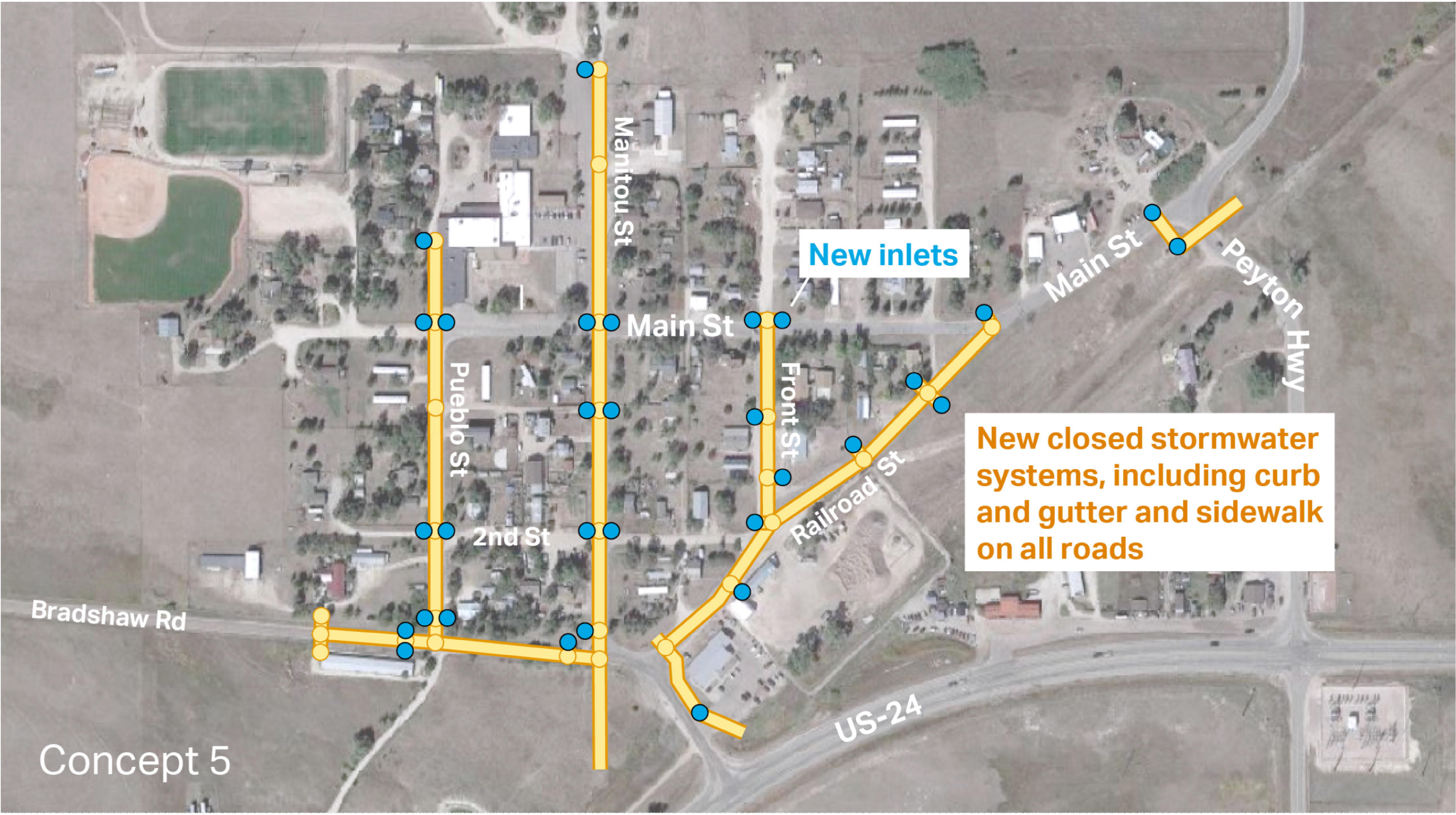
Manitou St
Main St
Main St
Replace Existing Culvert
Pueblo St
Front St
Railroad St
Peyton Hwy
Replace Existing Culvert
Replace Existing Culvert
Bradshaw Rd
US-24
Concept 1


Manitou St
Main St
Main St
Upgrade Existing Culvert
Pueblo St
Front St
Railroad St
Peyton Hwy
Upgrade Existing Culvert
Upgrade Existing Culvert
Bradshaw Rd
US-24
Concept 2


Manitou St
Main St
Main St
Pueblo St
Front St
Railroad St
Peyton Hwy
New drainage pipe at Post Office
EPC DPW — Peyton Yard
Bradshaw Rd
Post Office
New inlet
US-24
Concept 3



CTEF Building
Manitou St
New valley gutter at CTEF building
New inlet
Main St
Main St
Peyton Hwy
Pueblo St
Front St
Railroad St
2nd St
New drainage pipe along Manitou St
Bradshaw Rd
US-24
Concept 4



Manitou St
Main St
New inlets
Main St
Peyton Hwy
Pueblo St
Front St
Railroad St
New closed stormwater systems, including curb and gutter and sidewalk on all roads
2nd St
Bradshaw Rd
US-24
Concept 5

Appendix B

2019 Synchro Reports

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	29	220	209	497	1056	216
Future Volume (Veh/h)	29	220	209	497	1056	216
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	33	250	238	565	1200	245
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2241	1200	1200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2241	1200	1200			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	59			
cM capacity (veh/h)	27	226	582			

Direction, Lane #	SE 1	SE 2	NE 1	NE 2	SW 1	SW 2
Volume Total	33	250	238	565	1200	245
Volume Left	33	0	238	0	0	0
Volume Right	0	250	0	0	0	245
cSH	27	226	582	1700	1700	1700
Volume to Capacity	1.20	1.11	0.41	0.33	0.71	0.14
Queue Length 95th (ft)	97	283	50	0	0	0
Control Delay (s)	453.1	137.9	15.4	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	174.6		4.6		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	21.0		
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	473	12	6	813	83	119	40	6	57	6	311
Future Volume (Veh/h)	41	473	12	6	813	83	119	40	6	57	6	311
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	47	538	14	7	924	94	135	45	7	65	7	353
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	924			538			1574	1570	538	1592	1570	924
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	924			538			1574	1570	538	1592	1570	924
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			99			0	56	99	0	93	0
cM capacity (veh/h)	739			1030			0	103	543	53	103	327

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	47	538	14	7	924	94	187	425
Volume Left	47	0	0	7	0	0	135	65
Volume Right	0	0	14	0	0	94	7	353
cSH	739	1700	1700	1030	1700	1700	0	273
Volume to Capacity	0.06	0.32	0.01	0.01	0.54	0.06	528.52	1.55
Queue Length 95th (ft)	5	0	0	1	0	0	Err	631
Control Delay (s)	10.2	0.0	0.0	8.5	0.0	0.0	Err	300.3
Lane LOS	B			A			F	F
Approach Delay (s)	0.8			0.1			Err	300.3
Approach LOS							F	F

Intersection Summary			
Average Delay	893.6		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	
Traffic Vol, veh/h	29	24	0	431	103	0
Future Vol, veh/h	29	24	0	431	103	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	78	49	49	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	31	0	880	158	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1038	158	-	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	256	887	0	-	-	0
Stage 1	871	-	0	-	-	0
Stage 2	406	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	256	887	-	-	-	-
Mov Cap-2 Maneuver	256	-	-	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	406	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	256	887	-
HCM Lane V/C Ratio	-	0.155	0.035	-
HCM Control Delay (s)	-	21.6	9.2	-
HCM Lane LOS	-	C	A	-
HCM 95th %tile Q(veh)	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	0	63	397	0	0	103	35
Future Vol, veh/h	0	0	0	0	0	0	63	397	0	0	103	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	49	49	49	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	129	810	0	0	158	54

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1253	1280	810	212	0	0	810	0	0
Stage 1	1068	1068	-	-	-	-	-	-	-
Stage 2	185	212	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	190	166	380	1358	-	-	816	-	-
Stage 1	330	298	-	-	-	-	-	-	-
Stage 2	847	727	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	157	0	380	1358	-	-	816	-	-
Mov Cap-2 Maneuver	157	0	-	-	-	-	-	-	-
Stage 1	273	0	-	-	-	-	-	-	-
Stage 2	847	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1358	-	-	-	816	-	-
HCM Lane V/C Ratio	0.095	-	-	-	-	-	-
HCM Control Delay (s)	7.9	0	-	0	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	16	262	135	107	118
Future Vol, veh/h	20	16	262	135	107	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	57	39	39	47	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	28	672	346	228	251

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1552	845	0	0	1018	0
Stage 1	845	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	125	363	-	-	682	-
Stage 1	421	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	77	363	-	-	682	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	421	-	-	-	-	-
Stage 2	299	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	54.2	0	6.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	127	682	-
HCM Lane V/C Ratio	-	-	0.443	0.334	-
HCM Control Delay (s)	-	-	54.2	12.9	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	2	1.5	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	12	0	0	0	0	0
Future Vol, veh/h	12	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	1022	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	1084	1622	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NE	SW
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	EBLn1	SWT	SWR
Capacity (veh/h)	1622	-	1022	-	-
HCM Lane V/C Ratio	-	-	0.013	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.3					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	0	233	410	10	11	4
Future Vol, veh/h	0	233	410	10	11	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	265	466	11	13	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	477	0	-	0	737	472
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1085	-	-	-	386	592
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	779	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1085	-	-	-	386	592
Mov Cap-2 Maneuver	-	-	-	-	386	-
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	779	-

Approach	SE	NW	SW
HCM Control Delay, s	0	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1085	-	425
HCM Lane V/C Ratio	-	-	-	-	0.04
HCM Control Delay (s)	-	-	0	-	13.8
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	193	224	297	1058	905	82
Future Volume (Veh/h)	193	224	297	1058	905	82
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	219	255	338	1202	1028	93
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2906	1028	1028			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2906	1028	1028			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	10	50			
cM capacity (veh/h)	9	284	676			

Direction, Lane #	SE 1	SE 2	NE 1	NE 2	SW 1	SW 2
Volume Total	219	255	338	1202	1028	93
Volume Left	219	0	338	0	0	0
Volume Right	0	255	0	0	0	93
cSH	9	284	676	1700	1700	1700
Volume to Capacity	25.29	0.90	0.50	0.71	0.60	0.05
Queue Length 95th (ft)	Err	203	70	0	0	0
Control Delay (s)	Err	69.7	15.5	0.0	0.0	0.0
Lane LOS	F	F	C			
Approach Delay (s)	4657.3		3.4		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	705.8		
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	983	69	8	864	43	32	21	2	80	46	93
Future Volume (Veh/h)	170	983	69	8	864	43	32	21	2	80	46	93
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	193	1117	78	9	982	49	36	24	2	91	52	106
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	982			1117			2529	2503	1117	2515	2503	982
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	982			1117			2529	2503	1117	2515	2503	982
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	73			99			0	0	99	0	0	65
cM capacity (veh/h)	703			625			0	20	252	0	20	302

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	193	1117	78	9	982	49	62	249
Volume Left	193	0	0	9	0	0	36	91
Volume Right	0	0	78	0	0	49	2	106
cSH	703	1700	1700	625	1700	1700	0	0
Volume to Capacity	0.27	0.66	0.05	0.01	0.58	0.03	230.63	1751.52
Queue Length 95th (ft)	28	0	0	1	0	0	Err	Err
Control Delay (s)	12.0	0.0	0.0	10.8	0.0	0.0	Err	Err
Lane LOS	B			B			F	F
Approach Delay (s)	1.7			0.1			Err	Err
Approach LOS							F	F

Intersection Summary			
Average Delay	1136.2		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	4.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	
Traffic Vol, veh/h	16	145	0	316	469	0
Future Vol, veh/h	16	145	0	316	469	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	64	62	62	59	59
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	227	0	510	795	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1305	795	-	0	-	0
Stage 1	795	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	177	388	0	-	-	0
Stage 1	445	-	0	-	-	0
Stage 2	603	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	177	388	-	-	-	-
Mov Cap-2 Maneuver	177	-	-	-	-	-
Stage 1	445	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	177	388	-
HCM Lane V/C Ratio	-	0.181	0.584	-
HCM Control Delay (s)	-	29.8	26.5	-
HCM Lane LOS	-	D	D	-
HCM 95th %tile Q(veh)	-	0.6	3.6	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	0	60	272	0	0	469	56
Future Vol, veh/h	0	0	0	0	0	0	60	272	0	0	469	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	62	62	62	59	59	59
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	97	439	0	0	795	95

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1476	1523	439	890	0	0	439	0	0
Stage 1	633	633	-	-	-	-	-	-	-
Stage 2	843	890	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	139	118	618	761	-	-	1121	-	-
Stage 1	529	473	-	-	-	-	-	-	-
Stage 2	422	361	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	116	0	618	761	-	-	1121	-	-
Mov Cap-2 Maneuver	116	0	-	-	-	-	-	-	-
Stage 1	440	0	-	-	-	-	-	-	-
Stage 2	422	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	761	-	-	-	1121	-	-
HCM Lane V/C Ratio	0.127	-	-	-	-	-	-
HCM Control Delay (s)	10.4	0	-	0	0	-	-
HCM Lane LOS	B	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	91.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	157	54	223	49	28	368
Future Vol, veh/h	157	54	223	49	28	368
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	45	50	72	72	64	64
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	108	310	68	44	575

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1007	344	0	0	378	0
Stage 1	344	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 267	699	-	-	1180	-
Stage 1	718	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 252	699	-	-	1180	-
Mov Cap-2 Maneuver	~ 252	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	484	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	290.1	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	297	1180	-
HCM Lane V/C Ratio	-	-	1.538	0.037	-
HCM Control Delay (s)	-	-	290.1	8.2	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	26.5	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	7.1					

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	5	0	0	0	0	0
Future Vol, veh/h	5	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	1022	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	1084	1622	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NE	SW
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	EBLn1	SWT	SWR
Capacity (veh/h)	1622	-	1022	-	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	9	392	349	20	15	0
Future Vol, veh/h	9	392	349	20	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	445	397	23	17	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	420	0	-	0	874	409
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	465	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1139	-	-	-	320	642
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	632	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1139	-	-	-	316	642
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	632	-

Approach	SE	NW	SW
HCM Control Delay, s	0.2	0	17
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1139	-	316
HCM Lane V/C Ratio	-	-	0.009	-	0.054
HCM Control Delay (s)	-	-	8.2	0	17
HCM Lane LOS	-	-	A	A	C
HCM 95th %tile Q(veh)	-	-	0	-	0.2

Appendix C

2040 Synchro Reports

HCM Unsignalized Intersection Capacity Analysis
11: Hwy 24 & Bradshaw Rd

2040 Conditions - AM Peak

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	45	335	320	755	1605	330
Future Volume (Veh/h)	45	335	320	755	1605	330
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	51	381	364	858	1824	375
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3410	1824	1824			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3410	1824	1824			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	0			
cM capacity (veh/h)	0	96	335			

Direction, Lane #	SE 1	SE 2	NE 1	NE 2	SW 1	SW 2
Volume Total	51	381	364	858	1824	375
Volume Left	51	0	364	0	0	0
Volume Right	0	381	0	0	0	375
cSH	0	96	335	1700	1700	1700
Volume to Capacity	Err	3.97	1.09	0.50	1.07	0.22
Queue Length 95th (ft)	Err	Err	341	0	0	0
Control Delay (s)	Err	Err	110.2	0.0	0.0	0.0
Lane LOS	F	F	F			
Approach Delay (s)	Err		32.8		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	720	20	10	1235	125	180	60	10	90	10	475
Future Volume (Veh/h)	60	720	20	10	1235	125	180	60	10	90	10	475
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	68	818	23	11	1403	142	205	68	11	102	11	540
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1403			818			2384	2379	818	2413	2379	1403
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1403			818			2384	2379	818	2413	2379	1403
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			99			0	0	97	0	62	0
cM capacity (veh/h)	487			810			0	29	376	0	29	171

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	68	818	23	11	1403	142	284	653
Volume Left	68	0	0	11	0	0	205	102
Volume Right	0	0	23	0	0	142	11	540
cSH	487	1700	1700	810	1700	1700	0	0
Volume to Capacity	0.14	0.48	0.01	0.01	0.83	0.08	Err	3129.53
Queue Length 95th (ft)	12	0	0	1	0	0	Err	Err
Control Delay (s)	13.6	0.0	0.0	9.5	0.0	0.0	Err	Err
Lane LOS	B			A			F	F
Approach Delay (s)	1.0			0.1			Err	Err
Approach LOS							F	F

Intersection Summary			
Average Delay	2754.3		
Intersection Capacity Utilization	117.5%	ICU Level of Service	H
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	25	0	655	160	0
Future Vol, veh/h	30	25	0	655	160	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	78	49	49	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	32	0	1337	246	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1583	246	-	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	1337	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	120	793	0	-	-	0
Stage 1	795	-	0	-	-	0
Stage 2	245	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	120	793	-	-	-	-
Mov Cap-2 Maneuver	120	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	245	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	32.3		0		0
HCM LOS	D				

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	120	793	-
HCM Lane V/C Ratio	-	0.342	0.04	-
HCM Control Delay (s)	-	49.9	9.7	-
HCM Lane LOS	-	E	A	-
HCM 95th %tile Q(veh)	-	1.4	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	0	65	605	0	0	160	35
Future Vol, veh/h	0	0	0	0	0	0	65	605	0	0	160	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	49	49	49	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	133	1235	0	0	246	54

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1774	1801	1235	300	0	0	1235	0	0
Stage 1	1501	1501	-	-	-	-	-	-	-
Stage 2	273	300	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	91	80	215	1261	-	-	564	-	-
Stage 1	204	185	-	-	-	-	-	-	-
Stage 2	773	666	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	60	0	215	1261	-	-	564	-	-
Mov Cap-2 Maneuver	60	0	-	-	-	-	-	-	-
Stage 1	135	0	-	-	-	-	-	-	-
Stage 2	773	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1261	-	-	-	564	-	-
HCM Lane V/C Ratio	0.105	-	-	-	-	-	-
HCM Control Delay (s)	8.2	0	-	0	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	13.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	20	400	135	110	180
Future Vol, veh/h	20	20	400	135	110	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	57	39	39	47	47
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	35	1026	346	234	383

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2050	1199	0	0	1372	0
Stage 1	1199	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	61	226	-	-	500	-
Stage 1	286	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 25	226	-	-	500	-
Mov Cap-2 Maneuver	~ 25	-	-	-	-	-
Stage 1	286	-	-	-	-	-
Stage 2	170	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 360.7	0	7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	49	500	-
HCM Lane V/C Ratio	-	-	1.291	0.468	-
HCM Control Delay (s)	-	-	$ 360.7	18.4	0
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	5.8	2.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	7.9					

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	12	0	0	0	0	0
Future Vol, veh/h	12	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	1022	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	1084	1622	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NE	SW
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	EBLn1	SWT	SWR
Capacity (veh/h)	1622	-	1022	-	-
HCM Lane V/C Ratio	-	-	0.013	-	-
HCM Control Delay (s)	0	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	0	335	625	15	20	10
Future Vol, veh/h	0	335	625	15	20	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	381	710	17	23	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	727	0	-	0	1100	719
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	876	-	-	-	235	428
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	876	-	-	-	235	428
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	691	-

Approach	SE	NW	SW
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	876	-	277
HCM Lane V/C Ratio	-	-	-	-	0.123
HCM Control Delay (s)	-	-	0	-	19.8
HCM Lane LOS	-	-	A	-	C
HCM 95th %tile Q(veh)	-	-	0	-	0.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	295	340	450	1610	1375	125
Future Volume (Veh/h)	295	340	450	1610	1375	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	335	386	511	1830	1562	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4414	1562	1562			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4414	1562	1562			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	0			
cM capacity (veh/h)	0	138	423			

Direction, Lane #	SE 1	SE 2	NE 1	NE 2	SW 1	SW 2
Volume Total	335	386	511	1830	1562	142
Volume Left	335	0	511	0	0	0
Volume Right	0	386	0	0	0	142
cSH	0	138	423	1700	1700	1700
Volume to Capacity	Err	2.80	1.21	1.08	0.92	0.08
Queue Length 95th (ft)	Err	879	510	0	0	0
Control Delay (s)	Err	880.9	142.9	0.0	0.0	0.0
Lane LOS	F	F	F			
Approach Delay (s)	Err		31.2		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	123.6%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	1495	105	15	1315	65	50	30	5	120	70	140
Future Volume (Veh/h)	260	1495	105	15	1315	65	50	30	5	120	70	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	295	1699	119	17	1494	74	57	34	6	136	80	159
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1494			1699			3857	3817	1699	3834	3817	1494
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1494			1699			3857	3817	1699	3834	3817	1494
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	34			95			0	0	95	0	0	0
cM capacity (veh/h)	449			375			0	1	114	0	1	151

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	295	1699	119	17	1494	74	97	375
Volume Left	295	0	0	17	0	0	57	136
Volume Right	0	0	119	0	0	74	6	159
cSH	449	1700	1700	375	1700	1700	0	0
Volume to Capacity	0.66	1.00	0.07	0.05	0.88	0.04	Err	Err
Queue Length 95th (ft)	116	0	0	4	0	0	Err	Err
Control Delay (s)	27.1	0.0	0.0	15.1	0.0	0.0	Err	Err
Lane LOS	D			C			F	F
Approach Delay (s)	3.8			0.2			Err	Err
Approach LOS							F	F

Intersection Summary			
Average Delay	1133.8		
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

Intersection						
Int Delay, s/veh	13.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	145	0	480	715	0
Future Vol, veh/h	20	145	0	480	715	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	64	62	62	59	59
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	227	0	774	1212	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1986	1212	-	0	-	0
Stage 1	1212	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	67	~ 222	0	-	-	0
Stage 1	282	-	0	-	-	0
Stage 2	455	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	67	~ 222	-	-	-	-
Mov Cap-2 Maneuver	67	-	-	-	-	-
Stage 1	282	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	113.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	67	222	-
HCM Lane V/C Ratio	-	0.597	1.021	-
HCM Control Delay (s)	-	118.6	112.3	-
HCM Lane LOS	-	F	F	-
HCM 95th %tile Q(veh)	-	2.5	9.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	0	60	415	0	0	715	60
Future Vol, veh/h	0	0	0	0	0	0	60	415	0	0	715	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	62	62	62	59	59	59
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	97	669	0	0	1212	102

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2126	2177	669	1314	0	0	669	0	0
Stage 1	863	863	-	-	-	-	-	-	-
Stage 2	1263	1314	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	55	46	458	526	-	-	921	-	-
Stage 1	413	372	-	-	-	-	-	-	-
Stage 2	266	228	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	39	0	458	526	-	-	921	-	-
Mov Cap-2 Maneuver	39	0	-	-	-	-	-	-	-
Stage 1	292	0	-	-	-	-	-	-	-
Stage 2	266	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	526	-	-	-	921	-	-
HCM Lane V/C Ratio	0.184	-	-	-	-	-	-
HCM Control Delay (s)	13.4	0	-	0	0	-	-
HCM Lane LOS	B	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	232.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	160	55	340	50	30	560
Future Vol, veh/h	160	55	340	50	30	560
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	45	50	72	72	64	64
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	356	110	472	69	47	875

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1476	507	0	0	541	0
Stage 1	507	-	-	-	-	-
Stage 2	969	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 139	566	-	-	1028	-
Stage 1	605	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 127	566	-	-	1028	-
Mov Cap-2 Maneuver	~ 127	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	~ 335	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 963.4	0	0.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	155	1028	-
HCM Lane V/C Ratio	-	-	3.004	0.046	-
HCM Control Delay (s)	-	-	$ 963.4	8.7	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	42.9	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations	Y			↰	↱	
Traffic Vol, veh/h	5	0	0	0	0	0
Future Vol, veh/h	5	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1	1	1	0	-	0
Stage 1	1	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	1022	1084	1622	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1022	1084	1622	-	-	-
Mov Cap-2 Maneuver	1022	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NE	SW
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	EBLn1	SWT	SWR
Capacity (veh/h)	1622	-	1022	-	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	0	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↰	↱		Y	
Traffic Vol, veh/h	15	595	530	30	25	5
Future Vol, veh/h	15	595	530	30	25	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	676	602	34	28	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	636	0	-	0	1329	619
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	710	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	947	-	-	-	171	489
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	947	-	-	-	166	489
Mov Cap-2 Maneuver	-	-	-	-	166	-
Stage 1	-	-	-	-	521	-
Stage 2	-	-	-	-	487	-

Approach	SE	NW	SW
HCM Control Delay, s	0.2	0	28.5
HCM LOS			D

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	947	-	187
HCM Lane V/C Ratio	-	-	0.018	-	0.182
HCM Control Delay (s)	-	-	8.9	0	28.5
HCM Lane LOS	-	-	A	A	D
HCM 95th %tile Q(veh)	-	-	0.1	-	0.6

Appendix D

Signal Warrants

Warrants Summary

Information			
Analyst	AECOM	Intersection	US 24 and Bradshaw Rd
Agency/Co	El Paso County	Jurisdiction	
Date Performed	7/19/2021	Units	U.S. Customary
Project ID		Time Period Analyzed	Existing
East/West Street	US 24	North/South Street	Bradshaw Rd
File Name	2019 Existing US 24 and Bradshaw Rd.xhy	Major Street	East-West
Project Description			

General				Roadway Network	
Major Street Speed (mph)	65	☑	Population < 10,000	Two Major Routes	☐
Nearest Signal (ft)	0	☐	Coordinated Signal System	Weekend Count	☐
Crashes (per year)	0	☐	Adequate Trials of Alternatives	5-yr Growth Factor	0

Geometry and Traffic	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	1	1	0	0	1	1	0	0	0	1	0	1
Lane usage	L	T			T	R				L		R
Vehicle Volume Averages (vph)	123	572	0	0	579	53	0	0	0	44	0	0
Peds (ped/h) / Gaps (gaps/h)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
Delay (s/veh) / (veh-hr)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--

Warrant 1: Eight-Hour Vehicular Volume	☐
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☐
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☐
1 (56%) Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 2: Four-Hour Vehicular Volume	☐
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 3: Peak Hour	☑
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 4: Pedestrian Volume	☐
4 A. Four Hour Volumes --or--	☐
4 B. One-Hour Volumes	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☐
6. Degree of Platooning (Predominant direction or both directions)	☐
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐

7 C. (56%) Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☐
Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐
Warrant 9: Grade Crossing	☐
9 A. Grade Crossing within 140 ft --and--	☐
9 B. Peak-Hour Vehicular Volumes	☐

 *HCS7*TM Warrants Version 7.1 Generated: 5/23/2022 10:09 AM

Warrants Volume

Information

Analyst	AECOM	Intersection	US 24 and Bradshaw Rd
Agency/Co	El Paso County	Jurisdiction	
Date Performed	7/19/2021	Units	U.S. Customary
Project ID		Time Period Analyzed	Existing
East/West Street	US 24	North/South Street	Bradshaw Rd
File Name	2019 Existing US 24 and Bradshaw Rd.xhy	Major Street	East-West

Project Description

Warrant 1

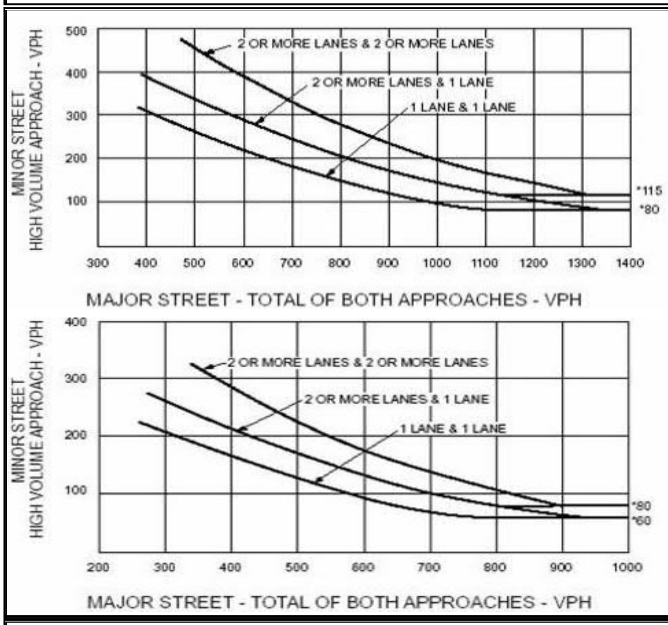
Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

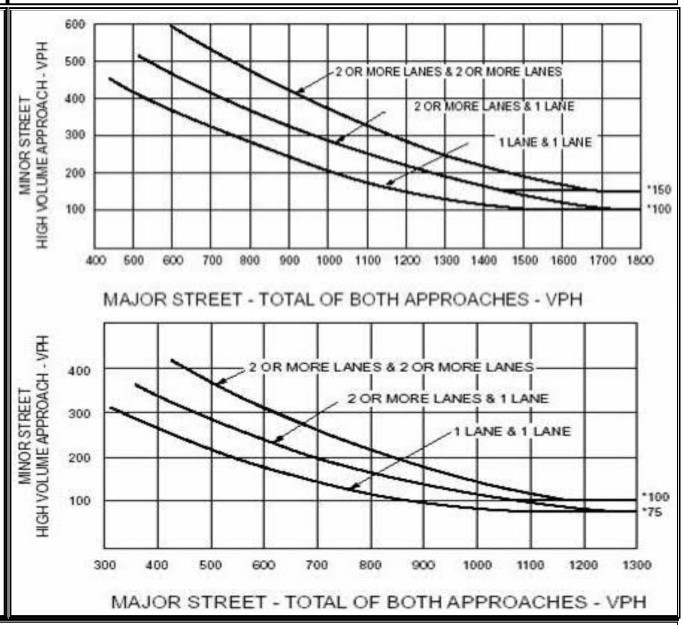
Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant 2



Warrant 3



Volume Summary

Major Street Lanes 2+ **Minor Street Lanes** 2+ **Speed** 65 **Population** <10000

Hours	Major Volume	Minor Volume	Total Volume	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)
07-08	1253	11	1264	No	No	No	No	No	No	No
08-09	1978	29	2007	No	No	No	No	No	No	No
09-10	1693	36	1729	No	No	No	No	No	No	No
10-11	1736	33	1769	No	No	No	No	No	No	No
11-12	0	0	0	No	No	No	No	No	No	No
12-13	0	0	0	No	No	No	No	No	No	No
13-14	0	0	0	No	No	No	No	No	No	No
14-15	0	0	0	No	No	No	No	No	No	No
15-16	2347	156	2503	Yes	Yes	Yes	Yes	Yes	No	Yes
16-17	2470	118	2588	No	Yes	Yes	Yes	Yes	No	Yes
17-18	2551	84	2635	No	No	Yes	Yes	Yes	No	No
18-19	1912	66	1978	No	No	No	Yes	No	No	No
Totals	15940	533	16473	1	2	3	4	3	0	2

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Warrants Summary

Information

Analyst	AECOM		
Agency/Co	El Paso County	Intersection	US 24 and Peyton Hwy
Date Performed	7/19/2021	Jurisdiction	
Project ID	Town of Peyton Master Plan	Units	U.S. Customary
		Time Period Analyzed	Existing
East/West Street	US 24	North/South Street	Peyton Hwy
File Name	2019 Existing Hwy 24 and Peyton Hwy.xhy	Major Street	East-West

Project Description *Town of Peyton Master Plan*

General

Major Street Speed (mph)	65
Nearest Signal (ft)	0
Crashes (per year)	0

☑	Population < 10,000
☐	Coordinated Signal System
☐	Adequate Trials of Alternatives

Roadway Network

Two Major Routes	☐
Weekend Count	☐
5-yr Growth Factor	0

Geometry and Traffic	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	1	1	1	1	1	1	0	1	1	0	1	1
Lane usage	L	T	R	L	T	R		LT	R		LT	R
Vehicle Volume Averages (vph)	111	471	22	5	485	42	28	19	2	40	15	0
Peds (ped/h) / Gaps (gaps/h)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
Delay (s/veh) / (veh-hr)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--

Warrant 1: Eight-Hour Vehicular Volume	☐
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☐
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☐
1 (56%) Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 2: Four-Hour Vehicular Volume	☑
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 3: Peak Hour	☑
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 4: Pedestrian Volume	☐
4 A. Four Hour Volumes --or--	☐
4 B. One-Hour Volumes	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☐
6. Degree of Platooning (Predominant direction or both directions)	☐
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐

7 C. (56%) Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☑
Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐
Warrant 9: Grade Crossing	☐
9 A. Grade Crossing within 140 ft --and--	☐
9 B. Peak-Hour Vehicular Volumes	☐

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Warrants Volume

Information

Analyst	AECOM
Agency/Co	El Paso County
Date Performed	7/19/2021
Project ID	Town of Peyton Master Plan
East/West Street	US 24
File Name	2019 Existing Hwy 24 and Peyton Hwy.xhy

Intersection	US 24 and Peyton Hwy
Jurisdiction	
Units	U.S. Customary
Time Period Analyzed	Existing
North/South Street	Peyton Hwy
Major Street	East-West

Project Description *Town of Peyton Master Plan*

Warrant 1

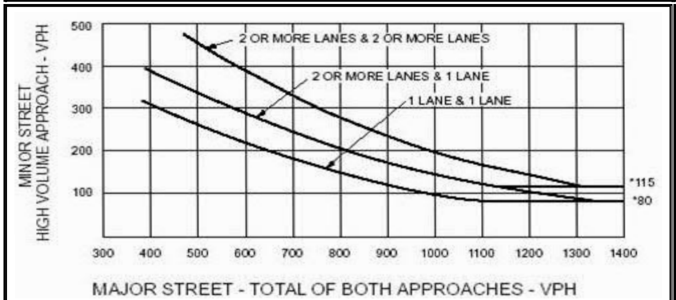
Condition A—Minimum Vehicular Volume

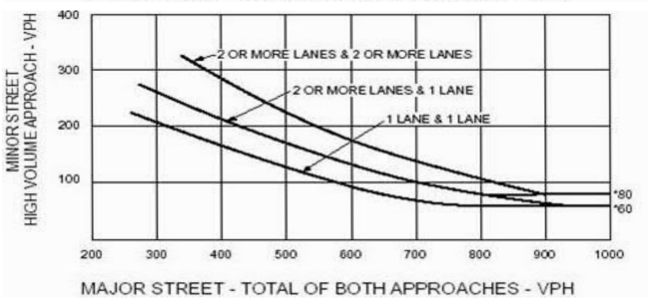
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

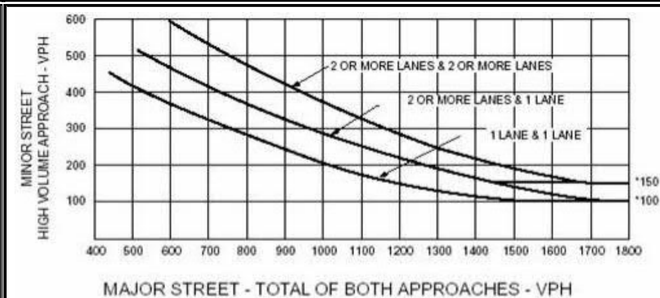
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

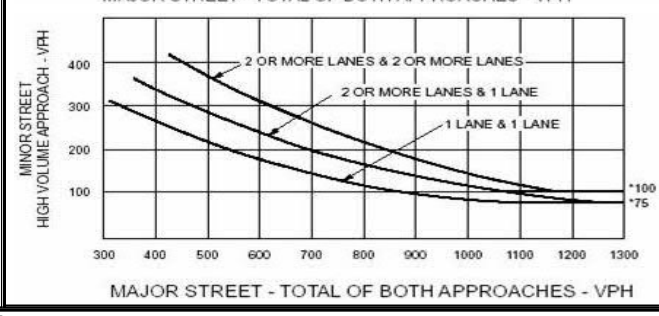
Warrant 2





Warrant 3





Volume Summary

Major Street Lanes 2+ **Minor Street Lanes** 2+ **Speed** 65 **Population** <10000

Hours	Major Volume	Minor Volume	Total Volume	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)
07-08	978	64	1066	No	No	No	Yes	No	No	No
08-09	1428	165	1656	Yes	Yes	Yes	Yes	Yes	No	Yes
09-10	1425	88	1568	No	No	Yes	Yes	Yes	No	No
10-11	1543	77	1696	No	No	Yes	Yes	No	No	No
11-12	0	0	0	No	No	No	No	No	No	No
12-13	0	0	0	No	No	No	No	No	No	No
13-14	0	0	0	No	No	No	No	No	No	No
14-15	0	0	0	No	No	No	No	No	No	No
15-16	2064	129	2250	No	Yes	Yes	Yes	Yes	No	Yes
16-17	2270	94	2416	No	No	Yes	Yes	Yes	No	No
17-18	2298	126	2477	No	Yes	Yes	Yes	Yes	No	Yes
18-19	1671	97	1820	No	No	Yes	Yes	Yes	No	No
Totals	13677	840	14949	1	3	7	8	6	0	3

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Appendix E

Peyton Crashes

Source: El Paso County

Number of Injuries	Injury Type	Location	Road Description	Vehicles Involved	Contour	Condition	Lighting	Weather	Event_1	Direction	Event_2	Vehicle_1	Driver_1	Factor_1	Speed	Veh_move_1	age_1	state_1
2	No Injury, Non-Incapacitating	On	Non-Intersection	1	Curve On-Level	Wet	Dark-Unlighted	None	Overturning	N		Motorcycle	Alcohol Involved	Unknown	45	Going Straight	58	AL
2	No Injury	On	At Intersection	2	Straight On-Level	Dry	Daylight	None	Broadside	S		Passenger Car/Van	No Impairment	No apparent		Making Left Turn	16	CO
	No Injury									W		Passenger Car/Van	No Impairment	No apparent	30	Going Straight	18	CO
1	Incapacitating	Off left	Non-Intersection	1	Straight On-Level	Dry	Daylight	Wind	Overturning	W	Embankment Cut/Fill Slope	Motorcycle	No Impairment	Unknown	80	Going Straight	24	CO
1	No Injury	Off right	Non-Intersection	1	Curve On-Level	Dry	Daylight	None	Overturning	S		Passenger Car/Van	No Impairment	Driver Inexperience	45	Other	18	CO
1	Non-Incapacitating	Off left	Non-Intersection	1	Curve On-Level	Dry	Dark-Unlighted	None	Embankment Cut/Fill Slope	S	Tree/Shrubbery	Passenger Car/Van	Alcohol Involved	Unknown	50	Going Straight	48	CO
1	No Injury	Off right	Non-Intersection	1	Curve On-Level	Dry	Dark-Unlighted	None	Involving Other Object	N		SUV	Alcohol Involved	Unknown	50	Going Straight	52	CO
1	No Injury	Off left	Non-Intersection	1	Curve On-Level	Icy	Dark-Unlighted	Snow/Sleet/Hail	Overturning	S		SUV	No Impairment	No apparent	40	Other	49	CO

Appendix F

Stakeholder Group Contact List

Peyton, Colorado
Drainage and Transportation Master Plan (DTMP)
Stakeholder Group Contact List

CATEGORY	STAKEHOLDER	INDIVIDUAL CONTACT	DISTRIBUTION EMAIL
EPC	El Paso County	Carrie Geitner, County Commissioner	CarrieGeitner@elpasoco.com
EPC	El Paso County DPW	Kevin Mastin, DPW Director	KevinMastin@elpasoco.com
EPC	El Paso County DPW	**John Lantz, DTMP Project Manager**	JohnLantz@elpasoco.com
EPC	El Paso County DPW	Jennifer Irvine, County Engineer	JenniferIrvine@elpasoco.com
EPC	El Paso County DPW	Joshua Palmer, Asst County Engineer	JoshuaPalmer@elpasoco.com
EPC	El Paso County DPW	Troy Wiitala, Highway Manager	TroyWiitala@elpasoco.com
EPC	El Paso County DPW	Tim Stickel, Highway Superintendent	TimStickel@elpasoco.com
EPC	El Paso County Parks	Jason Meyer	JasonMeyer@elpasoco.com
EPC	El Paso County Parks	Ross Williams	RossWilliams@elpasoco.com
School	Peyton School District	Tim Kistler, Superintendent	Kistler@peyton.k12.co.us
School	Peyton School District	Greg Land, Facilities Director	GregLand@peyton.k12.co.us
School	Peyton School District	Brian Lessig, Transportation Director	BrianLessig@peyton.k12.co.us
Church	Peyton Community Church	Keith Moore, Senior Pastor	keith@peytoncommunitychurch.org
Fire	Peyton Fire Protection District	David Solin, District Manager	dsolin@sdmsi.com
Post Office	Peyton Post Office	Carlos Soriano-Pacheco	carlos.soriano-pacheco@usps.gov
Post Office	Peyton Post Office	Kevin Orlowitz	kevin.s.orlowitz@usps.gov
Cemetery	Town of Peyton Cemetery	General Contact	parks@elpasoco.com
Local Business	Store Owner in Peyton Junction mission	Terri Lundy	morningstarranchllc@gmail.com
Local Business	Store Owner in Peyton Junction mission	Sheree Jameson	slsunkin323.333@gmail.com
Local Business	High Plaines Auto Brokers	General Contact	highpautobrokers@gmail.com
Local Business	Coffee Shack Brew and Q	Ross Hadley	coffeeshackbrewandq@gmail.com
Local Business	The Sweet Spot	General Contact	thesweetspotpeyton@gmail.com
Local Business	Peyton Junction Mercantile	Shirley Archuletta, Owner & Manager	shirlarchuletta@mindspring.com
Local Business	Peyton Junction, LLC	Mark Schultz	mark1.15@icloud.com
Local Business	Lewis and Holmes	Desiree Schultz	lewisandholmes2@gmail.com

Peyton, Colorado
Drainage and Transportation Master Plan (DTMP)
Stakeholder Group Contact List

Local Business	Altman Plants	Bobby Steinlein, General Manager	bobbysteinlein@altmanplants.com
Utility	Mountain View Electric Association	Clint Gross	clint.g@mvea.coop
Utility	Black Hills Gas	Bob Swatek	bob.swatek@blackhillscorp.com
Utility	Lumen/CenturyLink	Ken Davis, Senior Engineer/Planner	ken.davis2@centurylink.com
Utility	Lumen/CenturyLink	Patti Moore	Patti.Moore@CenturyLink.com
Utility	Lumen/CenturyLink	Matthew Schaad	mschaad@pauleyc.com
Utility	Lumen/Terra Technologies	Danny McKeon, Principal Engineer	dmckeon@terratechllc.net
Utility	Lumen/Terra Technologies	Robert McLeod	rmcleod@terratechllc.net
Utility	ZAYO	James Black, OSP Project Manager	jamesr.black@zayo.com
Utility	ZAYO	Eric Boe	eric.boe@zayo.com
Utility	Verizon	David McAllister, Telecom Engineer	david.mcallister@verizon.com
Utility	Woodmen Hills Metro District	Jerry Jacobson, General Manager	jerry@whmd.org
CDOT	Colorado Department of Transportation Region 2	Shane Ferguson	shane.ferguson@state.co.us
CDOT	Colorado Department of Transportation Region 2	Robert Frei	robert.frei@state.co.us

Appendix G

Utilities Metropolitan Districts

Peyton, Colorado
Drainage and Transportation Master Plan (DTMP)
Utilities Metropolitan Districts

4-Way Ranch Metropolitan District Nos. 1 & 2
Bent Grass Metropolitan District
Central Colorado Conservation District
El Paso County
El Paso County Conservation District
El Paso County Public Improvement District No. 2
El Paso County School District No. 49
Falcon Fire Protection District
Falcon Regional Transportation Metropolitan District
Latigo Creek Metropolitan District
Meridian Ranch Metropolitan District
Meridian Ranch Metropolitan District 2018 Subdistrict
Meridian Service Metropolitan District
Pain Brush Hills Metropolitan District
Paint Brush Hills Metropolitan District Subdistrict A
Peyton Fire Protection District
Peyton School District No. 23
Pikes Peak Library District
Upper Black Squirrel Creek Groundwater Management District
Woodmen Hills Metropolitan District
Woodmen Road Metropolitan District

El Paso County, Department of Public Works
270 S. Tejon Street, Suite S
Colorado Springs, CO 80903
dotweb@elpasoco.com
(719) 520-7276