STORMWATER MANAGEMENT

10

- EXISTING STORMWATER MANAGEMENT SYSTEM
- STORMWATER MANAGEMENT STRATEGIES
- STORMWATER MANAGEMENT BMPS
- STORMWATER MANAGEMENT PLAN EXAMPLE
- ACTIONS

STORMWATER MANAGEMENT GOALS:

Imagine Mustang goals relevant to reducing flooding and better management of stormwater are included below:

M3 – Create quality pedestrian environments along primary walking/biking corridors which includes: benches, lighting, trash receptacles and wayfinding signage.

E2 – Promote a network of open space encompassing private and public developments within Mustang.

E3 – Connect Mustang through a framework of parks, pedestrian trails and recreation facilities that respond to community needs and match population demographics.

PUBLIC INPUT ON STORMWATER

Water issues in general are very important.

Flooding seems to be an issue with every rainstorm.

Better infrastructure should come before more development.

Survey respondents (14%) noted that stormwater management needs to be addressed in order for Mustang to become more prominent community in the Oklahoma City area.

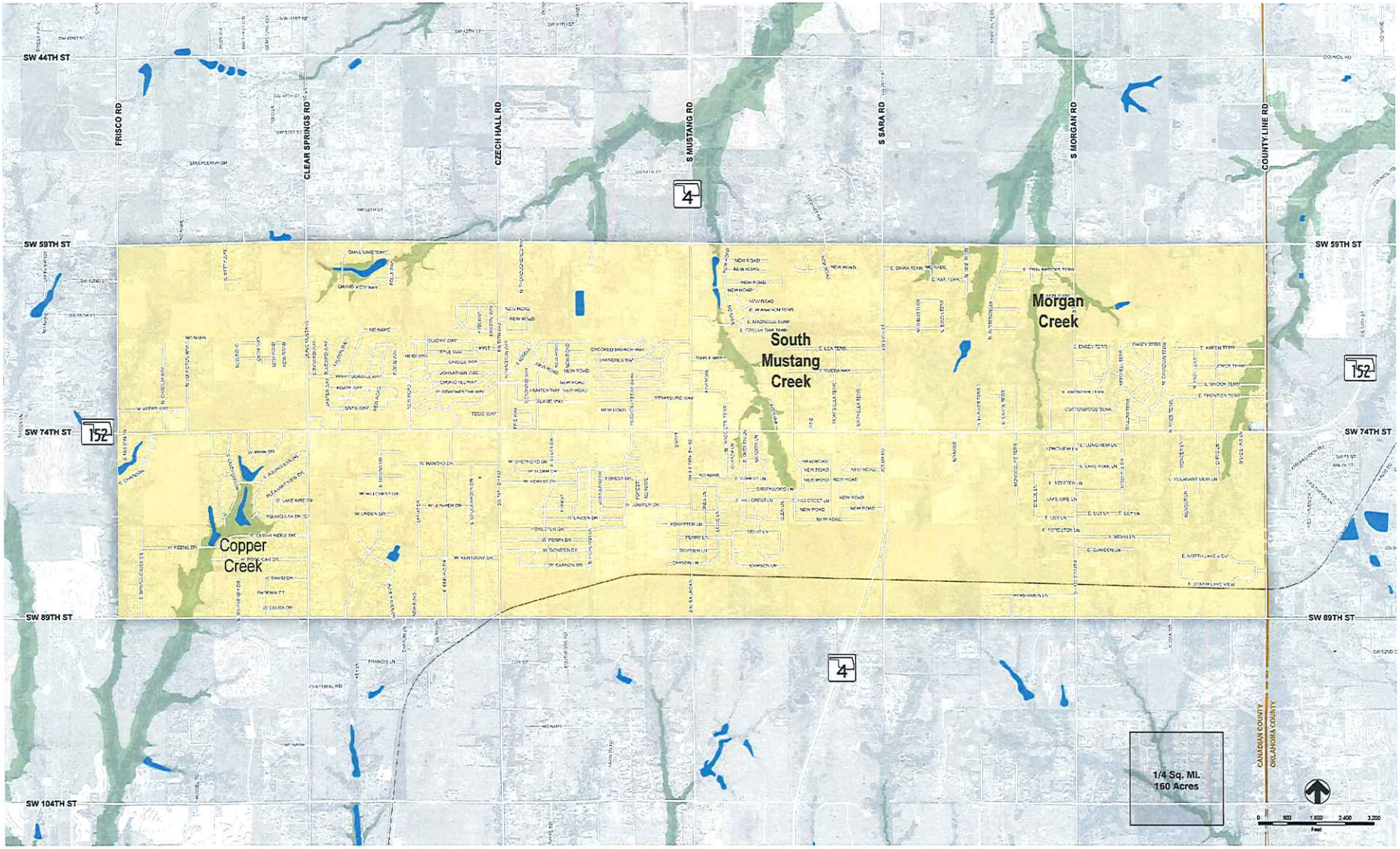
Community leaders and residents both noted their concerns about flooding during the Imagine Mustang planning process. Stormwater originates during rain and either soaks into the soil, evaporates, or ends up in nearby bodies or water. If stormwater isn't properly managed, stormwater runoff can cause drainage issues in roadways and flooding in creeks and the surrounding area. There are several best management practices related to effective stormwater management to reduce the chance of flooding after rain events. This chapter assesses the existing stormwater management conditions in Mustang and offers strategies to reduce the chance of flooding.

EXISTING STORMWATER MANAGEMENT SYSTEM

Since Mustang is not along a river, flood events are caused by inadequate drainage facilities that have not been able to handle the increased stormwater runoff as more urbanization occurs in the city. Flash flooding is also common in the Oklahoma City area given the climate conditions, so this also exacerbates the drainage issues in Mustang. Figure 10-1 depicts what areas are in the existing floodplain as defined by FEMA's Special Flood Hazard Area floodplain maps and standards. Areas that are in the 100-year floodplain follow creeks and water bodies in Mustang and covers approximately 270 acres of the city.

Additionally, in 2012, Canadian County led a Multi-Hazard Mitigation Plan update that assessed numerous hazards including, but not limited to, flooding, tornadoes, drought, fires, and transportation events, as well as strategies to mitigate these hazards. Natural and man-made hazards that the county as a whole faces were discussed as well as threats specific to Mustang. The plan stated that Mustang's flooding problems come from issues with local storm runoff and storm drains. Additionally, as urbanization increases and more impervious surfaces cover the land area, stormwater issues have increased. However, this can be avoided if new development is planned in conjunction with stormwater management best practices.

The 2012 plan concluded that Mustang has a moderate vulnerability to and high probability of flood hazard. This statement is evident as several high water rescues have occurred in the past decade. The primary recommendation that was made was that floodplain areas should be completely avoided and remain as open space.



Legend

- City of Mustang
- Bodies of Water
- 100 Year Flood Plain

Figure 10-1: **Mustang Creeks & Floodplain**

STORMWATER MANAGEMENT STRATEGIES

CHARRETTE RESULTS:

Stormwater was discussed during the design charrette in November and two main solutions were presented as ways to reduce the size of the 100-year floodplain: up-stream retention lakes and street stormwater pipe network.

Retention Lakes: When Mustang experiences a heavy rain event, the existing creeks can't handle the sudden influx of stormwater that comes from larger creeks and rivers upstream from the city. One solution to this would be to construct retention lakes upstream of Mustang that would store more stormwater instead of travelling downstream to small, vulnerable creek beds in Mustang. Figure 10-2 depicts this concept. If this solution were realized, retention lakes to the north of Mustang would actually decrease the size of the floodplain in Mustang. This option would involve coordination with the U.S. Army Corps of Engineers (USACE), Canadian County, and other applicable resource agencies.

Stormwater Pipe Network: Another solution would be to install a more robust network of street stormwater pipes that can better handle rain events. Many of the streets within subdivisions in Mustang don't have curb and gutters, which exacerbates flooding when heavy rain occurs. While this is a significant endeavor, the cost of installing adequate stormwater drainage within neighborhoods is a worthwhile expenditure because it can help protect lives and also prevent property damage.

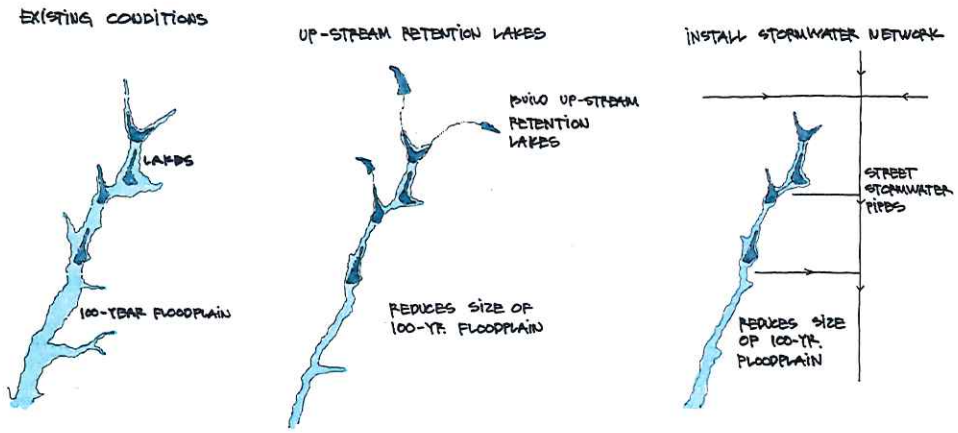
STORMWATER MANAGEMENT BMPS

Oklahoma Department of Transportation: ODOT uses best management practices to control and manage stormwater. Some of these strategies include detention ponds, catch basins, culverts, and pollution prevention practices during road construction.

Environmental Protection Agency: The EPA is concerned with stormwater because of pollutants that can be carried into bodies of water. In order to provide guidance, the EPA has developed a Stormwater Compliance Assistance Guide that helps entities to comply with the Stormwater Phase II final rule, which regulates stormwater discharges from construction activity and certain storm sewer systems. Additionally, EPA's website provides resources on sustainable stormwater management strategies including, but not limited to: green roofs; rail barrels; permeable pavements; bio-retention areas; vegetated swales; and, riparian buffers.

City of Yukon: The city has a Stormwater Quality Program that provides resources intended as guidance for incorporating stormwater BMPs into construction activity in Yukon.

Table 10.2: **Stormwater Retention Options**



STORMWATER MANAGEMENT PLAN EXAMPLE

This plan will include recommended elements to enable Mustang to better manage the impact of stormwater on the receiving waters from proposed and existing development. Every plan should include an introduction to identify why the plan is being prepared and a summary of the contents of the plan.

The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities. The final component of this plan can be a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact (flooding) of existing development.

The goals of this Stormwater Management Plan can be the following:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts, bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;

The simplest method to address the need to incorporate design and performance standards is to adopt the language in the Stormwater Management Rules and model ordinance. However, the Mustang may adjust these standards. For example, certain municipalities have designated entities required to assume maintenance responsibility. In some cases, Mustang may choose to assume this responsibility. The municipality may choose to revise land use and zoning ordinances to prescribe how nonstructural stormwater management measures must be addressed.

In addition to the design and performance standards for nonstructural strategies discussed above, the municipal stormwater management plan must be evaluated to determine how the municipal plan and ordinances should be amended to implement the principles of nonstructural stormwater management. Mustang may require to evaluate the municipal master plan, and land use and zoning ordinances to determine what adjustments need to be made to allow the implementation of nonstructural stormwater management techniques, also called low impact development techniques. Some of these techniques use the following tools and development options:

Cluster Development provides for a cluster development option to preserve land for public and agricultural purposes, to prevent development on environmentally sensitive areas, and to aid in reducing the cost of providing streets, utilities and services in residential developments. This cluster option is an excellent tool for reducing impervious roads and driveways. The option allows for smaller lots with smaller front and side yard setbacks than traditional development options. It also minimizes the disturbance of large tracts of land, which is a key nonstructural stormwater management strategy. The cluster option is being amended to require that [insert percentage here] of the total tract be preserved as common open space for residential area.

Natural Features requires that natural features, such as trees, brooks, swamps, hilltops, and views, be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area.

Off-site and Off-tract Improvements describes essential off-site and off-tract improvements.

ACTIONS

Action 10.1.1: Develop new Stormwater Management Plan for Mustang. This plan will include a stormwater management fee to assist in implementation of stormwater improvements. Fees will be required for residential and commercial properties.

Action 10.1.2: Become a member of the National Weather Service's 'StormReady' Program. This program provides resources to better prepare communities before, during, and after a severe weather event and focuses on communication and safety skills needed to protect both lives and property. Within the Oklahoma City area, there are twelve communities that are part of the program, including Del City, Midwest City, Moore, and Yukon.

Action 10.1.3: Provide resources on stormwater BMPs resources on the city website. Add additional links on BMPs from other agencies to the existing 'Stormwater Management' page on the city website.

Action 10.1.4: Meet with the USACE, Canadian County, and other applicable partners to discuss the possibility of constructing retention lakes up-stream of Mustang. Establishing partnerships early with these organizations will be vital to realizing this strategy.

Action 10.1.5: Codify feasible Best Management Practices (BMPs) into developer requirements. Consider incorporating feasible BMPs described by EPA and ODOT into existing requirements for developers and construction activity. This would give these strategies more teeth instead of just listing them as ideal strategies.

Action 10.1.6: Prioritize stormwater improvements in areas of Mustang that do not currently have a storm drainage system. Consider what areas of the city are most prone to flooding events and have had high-water rescues in the past.


with Parking
Lot for Car
Shows
Trails to
Connect
Parks
please!
I live on
89th - please
maintain
rural character!
I like 'Village'
idea on Morgan
Rd.
Not at Sara
or Mustang Rd
MORE
PEOPLE
PLACES
Use Town
Center
land only
for recreation
purposes.
Tennis
Courts
at current
or new
park.
Traffic
Fix-it!
TRAFFIC!
elevated
walkway
across Mustang
Road @ the
Park
Mustang Citizen
2016