Staff Report

FLOOD MITIGATION PROJECTS

6/26/2012

BACKGROUND:

Following flooding in 2010, contractual engineering services were secured and Public Works staff submitted 11 projects for consideration under the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP). Unfortunately, nine of the projects have been denied federal funding due to the failure to achieve a benefit cost analysis greater than 1.0.

Included in the 2012-2017 Capital Improvements Plan is a new program entitled "Flood Response and Mitigation Projects" that includes $820,000 in General Obligation Bonds and $325,000 in Storm Sewer Utility Funds for anticipated local match (15%) for the 11 requested projects. The two remaining active HMGP projects (Stuart Smith Park Bank Stabilization and Northridge Parkway) will require a local match in an amount of, at least, $165,000 if approved for FEMA funding. **This leaves an estimated $980,000 in local funds (G.O. Bonds and Storm Sewer Utility Funds) available to be utilized for the remaining flood mitigation projects.**

The flood response and mitigation projects vary in category and number of properties/customers impacted.

-Some projects are erosion control projects that would prevent damage to public utilities or private residential units.

-Other projects would mitigate storm water runoff from entering private residential units through egress windows or doors that were constructed adjacent to storm water areas or lower than the adjacent storm sewer intake.

-Another category of projects includes mitigating for storm sewer overflow paths across areas not maintained by either home builders or homeowners; therefore, when the storm sewer becomes surcharged the residential units may be impacted.

SUMMARY OF PROJECTS (Not in priority order):

A description for each of the nine projects follows, along with additional information for each project that is intended to help prioritize the use of available funds.

Castlewood Place – Four apartment buildings (4 units per building) at the east end of Castlewood Place experienced flooding in the lower level units during August 2010. The storm sewer system in the area became overwhelmed causing the water to pond in the cul-de-sac. As the depth of the ponding increased to approximately 1.7' in the street, the storm water began to back up into the City's subdrain along the edge of the cul-de-sac. All five 4-plex units have piping connected to this subdrain from their sump pumps with the inlets located in front of the below-grade doors. The storm water was pushed back through the subdrain pipe and came out of the inlet in front of these doors, flooding the lower level apartments in four of the five buildings.

All 4-plex apartments in the neighborhood have below grade exterior doors to the bottom two units with small storm grates that are connected to the City's subdrain tile in the Right-of-Way. The area contains a sump condition (low point) with no overland flow path for large storm events. The existing parking lots, buildings, and storm sewers make it impossible to find overland relief and therefore require the existing storm sewer to completely drain the vicinity. This sump condition also requires adequate storage for larger storm events while the area is draining.

Damage documentation shows that a 2-year storm can cause minor damage to the area, while a 5-year storm will cause the same damage that we saw in 2010. A 25-year storm will drop an additional 2.44" of rain over the 1.2-acre watershed. It is estimated that a storm of this magnitude would add an additional 6" of water to the ponding depth and would therefore begin flowing down the stairs to the lower levels causing more damage to these units as well as begin entering a fifth building.

Currently there only exists one storm sewer intake at the end of the cul-de-sac that discharges through 12 and 15-inch pipe. The public improvement project would include installing larger storm sewer in the area, replacing the storm sewer intake to increase capacity, as well as require the property owner to add flap gates along the subdrain at each service connection in return for the City's improvements. These improvements would mitigate the area to a 50-year storm event.

Total documented flood damages = $22,889

Total estimated project cost = $72,000 ($4,500 per apartment)

Waterbury Court – Three homes along Waterbury Circle and Stonebrook Road experienced damage to the basements during the 2010 floods as a result of water backing up to the west from Ada Hayden.

On August 11, 2010 the Skunk River rose to near 500-year levels forcing the City of Ames to close the flood gates at the south east corner of Ada Hayden Lake. As the drainage basin continued to empty from the August 8 to August 10 local rain events, Ada Hayden Lake continued to rise due to no outfall. The lake spilled out of its banks to the west and water filled the western ponds and surrounding low areas. At its peak,

water lapped approximately 2" up on the lower level windows of 1801 and 1805 Waterbury circle and entered a dry detention basin directly south of 1810 Waterbury Circle. At 1801 and 1805 Waterbury Circle foundation tiles and sump pumps became overwhelmed and were not able to keep up with the water entering the home. At 1810 Waterbury Circle water entered this property's private storm sewer from the dry detention basin subsequently causing the basement to become wet. All other homes on Waterbury Circle were built at higher elevations and did not sustain flood damage.

It was determined that raising the trail on the west edge of Ada Hayden Lake to create a berm would allow for more storage within Ada Hayden Lake and would keep the water from backing up to 1801 and 1805 Waterbury. The area currently contains a City trail system and therefore requires the asphalt trail to be removed and replaced. **In order to keep the water from backing up into the existing basin, storm sewer, and north drainage ditch, it was also determined that backflow preventers (flap gates) would need to be placed on these pipes. These improvements would mitigate the area to a 50-year storm event.**

Total documented flood damages = $48,709
Total estimated project cost = $84,000 ($27,900 per home)

North Park Villa – Four homes in this area experienced damage to their basements during the 2010 floods. The overflow area where storm runoff would have gone when the storm sewer becomes overwhelmed has not been maintained as a clear path for free flow. In addition, an electrical transformer may have become overwhelmed by the rising water thereby causing a power outage (as reported by some residents, but not yet confirmed by Ames Electric).

This project would include obtaining an easement and then re-grading areas to create positive drainage away from the units as well as improving storm sewer in the area and possibly raising the electrical transformer.

Total documented flood damages = $33,152
Total estimated project cost = $42,000 ($10,500 per home)

Conceptually, this project will include obtaining an easement and installation of storm sewer to intercept storm water run-off that flows through the site. **However, applying current regulations, the private property owner would be required to design the development to accommodate this runoff flowing through their complex. Typically, the improvements mentioned above would be installed and maintained by the private property owner.**

Oakwood Road Area – The Oakwood Road area has experienced flooding on several occasions due to storm water flowing overland and into garages and window wells. An estimated 19 homes on White Oak Drive and Woodview Drive plus the Wessex apartment complex garages have experienced flood damage.

The proposed project would include installation of a 24" RCP storm sewer along Oakwood Road to University Boulevard. The new storm will tie into the existing 36" storm which flows south on University Boulevard. The new storm sewer will provide additional capacity to this area to relieve storm sewer surcharge and prevent roadway overtopping.

Total documented flood damages = $203,396
Total estimated project cost = $510,000 ($26,842 per home)

Schubert Street and Todd Drive – Three homes along Schubert Street and Todd Drive have experienced repeated flooding during storm events. The existing storm sewer picks up runoff from the Right-of-Way along west Lincoln Way and carries the flow within pipes south to a discharge point in College Creek. Some storm sewer flows between existing home foundations to connect into the storm sewer network within the street right-of-way. These existing mains are located either within street right-of-way or else within storm sewer easements.

Conceptually this project would include grading and additional storm sewer pipe installation in order to mitigate the flooding.

Total documented flood damages = $42,047
Total estimated project cost = $120,000 ($40,000 per home)

One reason why the documented damage cost was so low is due to the fact that after repeated smaller (non-FEMA eligible) events, some residents quit using their basement for storage, etc. therefore they did not technically have damage to document. Other residents did not keep adequate documentation of the damage that they encountered.

Trail Ridge Landslide – During the flood events, areas of the Clear Creek bank eroded, causing landslides to occur along the hillside on an outside curve of the creek. The high ground saturation in combination with the continued heavy rainfall caused larger quantities of stream bank to erode. One house is bordered by the eroding creek to the northwest**. Existing public storm and sanitary sewer pipes are located adjacent to the house and flow into/under this section of the creek.**

Grading and land stabilization needs to occur in order to prevent impacts to this home and the public utilities. It is estimated that at least nine homes are connected to the sanitary sewer in the vicinity of the erosion. The area of Clear Creek that is so heavily eroding toward this home is on City of Ames property (Munn Woods) and would typically be the City's responsibility to stabilize.

Total documented flood damages = $238,800 (value of one home)
Total estimated project cost = $250,000 ($27,777 per house served by sewer)

Pi Kappa Alpha (PIKE) & Phi Kappa Theta (PKT) – These fraternity houses are located lower than the surrounding area and have experienced repeated flooding of the lower levels. The two fraternities and one 2-unit apartment building are located south of Lincoln Way and west of Beach Avenue. The neighborhood in general is graded to naturally drain through these properties. The houses located along Gray Avenue and Sunset Drive are at higher elevations than the properties experiencing water damage. Therefore, the two houses experiencing damage are receiving the water runoff from the area of Gray Avenue/Sunset Drive/Lincoln Way/Beach Avenue.

Conceptually, this project will include obtaining an easement and installation of storm sewer to intercept storm water run-off that flows through the site. **However, applying current regulations, the private property owner would be required to design the development to accommodate this runoff flowing through their site. Typically, the improvements mentioned above would be installed and maintained by the private property owner.**

Total documented flood damages = $42,254
Total estimated project cost = $60,000 ($20,000 per building)

Utah Drive Landslide – During the flood events, areas of the Clear Creek bank eroded causing landslides to occur along the hillside on an outside curve of the creek. The high ground saturation in combination with the continued heavy rainfall caused larger quantities of stream bank to erode. Two houses are bordered by the creek to the northwest.

Grading and land stabilization is necessary in order to prevent impacts to the homes. The area of Clear Creek that is so heavily eroding toward these homes is on City of Ames property and would typically be the City's responsibility to stabilize.

Total documented flood damages = $515,300 (value of two homes)
Total estimated project cost = $250,000 ($125,000 per home)

South Duff Siphon Access Structure – This siphon was submerged for a number of days during the 2010 floods, thereby hindering maintenance crews from having full access to the structure. It is estimated that this loss of access equates to a potential loss of sanitary sewer service for approximately 4,800 people for 24 hours with each occurrence.

This project would include raising the elevation of the access to allow maintenance crews to have access even during flood events. This project cost estimate is $60,000.

Typically this project, since it impacts public utilities, would be a higher priority amongst the nine flood mitigation projects. However, as part of the current Sanitary Sewer System Evaluation (SSSE) the engineering consultant and City staffs are evaluating the

overall design and condition of each of the siphons that exist within the community. This evaluation will determine whether the existing siphons are in good condition and the best design for the community. **Considering this, it is recommended to first complete this evaluation through the SSSE before moving forward with raising the access point. Any improvements identified could potentially be funded through the Sanitary Sewer Rehabilitation Program.**

OPTIONS:

1. Approve the Trail Ridge Landslide, Utah Drive Landslide, Castlewood Place, Schubert Street & Todd Drive, and Waterbury Court projects to be funded from the 2012/13 Flood Response and Mitigation Projects program.

2. Approve the Trail Ridge Landslide, Utah Drive Landslide, Castlewood Place, Schubert Street & Todd Drive, Waterbury Court, North Park Villa, and PIKE/PKT projects to be funded from the 2012/13 Flood Response and Mitigation Projects program.

3. Approve some other combination of projects that are estimated to cost $980,000.

4. Approve only the Trail Ridge Landslide in order to protect public infrastructure.

5. Direct staff on how to further mitigate flooding of these areas.

6. Do not approve funding for any of the projects.

COUNCIL ACTION:

The table below summarizes staff's attempt to prioritize the nine remaining projects based on the following four criteria:

- Protection of public utilities
- Severity of potential damage to a private home
- Public storm water issue
- Source of storm water from public property

Location	Documented Damage	Project Costs	Cost Per Unit
Trail Ridge Landslide	$238,800	$250,000	$27,777
Utah Drive Landslide	$515,300	$250,000	$125,000
Castlewood Place	$22,889	$72,000	$4,500
Schubert Street & Todd	$42,047	$120,000	$40,000

Drive			
Waterbury Court	$48,709	$84,000	$27,900
Oakwood Road Area	$203,396	$510,000	$26,842
North Park Villa	$33,152	$42,000	$10,500
PIKE/ PKT	$42,254	$60,000	$20,000

Since $980,000 remains from the budgeted amount for flood mitigation projects, it is possible to fund the first five projects ($776,000) listed above. The remaining monies are needed at this time for project contingencies, since we do not have specific design documents developed yet. Any remaining funds after we complete the first five projects could be utilized to implement more cost effective options for dealing with the Oakwood Road project.

Since the North Park Villa and PIKE/PKT projects involve solely private property issues, staff would recommend that they not be considered for City funding at this time.

The next steps for the City Council are:

1) **To determine if we should proceed to issue all of the $820,000 in G.O. Bonds for neighborhood flood mitigation projects as originally planned, and,**

2) **To determine which, if any, of the remaining projects should be funded totally from local City monies.**