MEMORANDUM

Date: April 23, 2018

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Santa Cruz River Maintenance Whitepaper**

For your review, attached is a Santa Cruz River maintenance whitepaper (Attachment 1) prepared by Regional Flood Control District (RFCD) staff regarding the need for major maintenance on the Santa Cruz River. The whitepaper highlights issues associated with the necessary maintenance improvements to reduce flooding of adjacent properties and/or increased risk of damage to major bridge crossings and utility systems.

The project is being divided into three phases. Phase I will be implemented within the next 10 days.

Recently, the RFCD held an open house and public comments were taken during the meeting. Attachment 2 lists the written public comments received at the meeting. Each of the issues will be answered by RFCD staff and directed to the individual who made the comment. RFCD is flexible enough in the early project stage to make adjustments to certain logistical aspects of the project based on input. However, requests to not perform maintenance cannot be accommodated due to flood risks to adjacent properties.

The RFCD has worked to avoid and minimize disturbance as well and will be undertaking specific mitigation measures regarding the work in Phase I. The Permit and Compliance Manager has coordinated this activity with the US Army Corp of Engineers and obtained permit and regulatory compliance approval. Harris Environmental has conducted nesting bird surveys and voluntary biological conservation work. Dr. Phil Rosen is working with this group to develop appropriate herpetological salvage and translocations. Burrowing Owl sites were previously inventoried and, working with Wild at Heart, remote cameras will be used to review nesting sites to ensure there is no disturbance of active burrows. Select terrace areas with the densest vegetation were prioritized for preserving and based on the nesting bird surveys, slight modifications are being made to avoid areas with nesting birds. All of the RFCD activities are covered by our Multi-Species Conservation Plan Section 10 Permit.

After all of the comments have been responded to, actual Phase I implementation will begin on or after May 1, 2018.

Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District

ATTACHMENT 1

PIMA COUNTY
FLOOD CONTROL

MEMORANDUM

DATE: April 20, 2018

TO: C. H. Huckelberry
County Administrator

FROM: Suzanne Shields, P.E.
Director

SUBJECT: **Santa Cruz River Capacity Restoration Project from Grant Road to 29th Street**

As you know, our independent study conducted by JE Fuller showed that sediment and vegetation has significantly reduced the flood carrying capacity of the Santa Cruz River channel in the downtown reach from Grant Road to 29th Street. Restoring the flow capacity is critical to protect public health and welfare, and prevent flood damage to private and public improvements including bridges and utilities such as the TEP substation located at Mission Lane.

Attached is a white paper that discusses why the maintenance is necessary and identifies three phases for the excavation of sediment and vegetation to restore flow capacity in the channel. The first phase of maintenance will start next week as the contractor sets up an equipment yard and begins mobilization. We anticipate that the project will end by late June ahead of the summer monsoon season (see attached project schedule).

Please let me know if you would like additional information or have any questions.

SS/tj

Attachments

c: Carmine DeBonis, Deputy County Administrator – Public Works
Eric Shepp, P.E., Deputy Director – Regional Flood Control District
Andy Dinauer, P.E., Deputy Director – Regional Flood Control District

PIMA COUNTY FLOOD CONTROL

Santa Cruz Maintenance Project Phase 1

Hunter CONTRACTING CO.

ID	Task Name	Duration	Start	Finish
1	SANTA CRUZ MAINTENANCE PROJECT PHASE 1	48 days	4/16/18	6/21/18
2	PRECONSTRUCTION	7 days	4/16/18	4/24/18
3	Bluestake	1 day	4/16/18	4/16/18
4	Setup Traffic Control	2 days	4/19/18	4/20/18
5	Yard Setup	2 days	4/19/18	4/20/18
6	Water Setup	2 days	4/23/18	4/24/18
7	Trackout / SWPPP	1 day	4/24/18	4/24/18
8	Pathway Fencing	1 day	4/24/18	4/24/18
9	Survey	1 day	4/24/18	4/24/18
10	CONSTRUCTION	43 days	4/23/18	6/21/18
11	Prep Clear & Grub / Haul Road	2 days	4/23/18	4/24/18
12	Build Access Ramps	3 days	4/24/18	4/26/18
13	Build Haul Raod	3 days	4/26/18	4/30/18
14	Clear & Grub	6 days	4/27/18	5/4/18
15	Start Export	0 days	5/3/18	5/3/18
16	Ex to Dumpsite	20 days	5/3/18	5/31/18
17	Rough Grade Dumpsite	10 days	5/17/18	5/31/18
18	Finish Grade Dumpsite	9 days	6/1/18	6/13/18
19	Remove Ramp	3 days	6/1/18	6/5/18
20	Cleanup	3 days	6/14/18	6/18/18
21	Replace Handrail	2 days	6/6/18	6/7/18
22	Demob	3 days	6/19/18	6/21/18
23	Project Complete	0 days	6/21/18	6/21/18

Project: Santa Cruz Maintenanc
Date: 4/13/18

Task | Split | Milestone | Summary | Project Summary | Inactive Summary | Deadline | Critical | Critical Split | Progress

SANTA CRUZ RIVER MAINTENANCE
WHITE PAPER

In fiscal year 2015, the Regional Flood Control District (District) assumed maintenance responsibilities for the segment of the Santa Cruz River from 29th Street to Speedway, which is owned by the City of Tucson (City) and Rio Nuevo. At that time, the City and the District knew that there was a critical, urgent need to address channel maintenance for this segment of the Santa Cruz River (see Figure 1). Previous studies including the final study for the Cushing Street Bridge indicated the need for maintenance.

Sediment and vegetation build up in the channel has restricted the flow capacity such that a minor flow of only 13,400 cubic feet per second (cfs) on September 8, 2014 forced the City to close bridges. At Congress Street, the flow had a gage height of 11.51 feet. By comparison, the flood of 1993 at the same location had a flow of 37,400 cfs had a gage height of 11.67 feet. In twenty years (1993 to 2014), the flow capacity has been reduced by two thirds.

This section of the Santa Cruz River under current conditions does not have capacity for even a moderate flood event and has no capacity for large floods including the 100-year flood (60,000 cfs). Sediment may also block the outlet of storm drains causing local flooding.

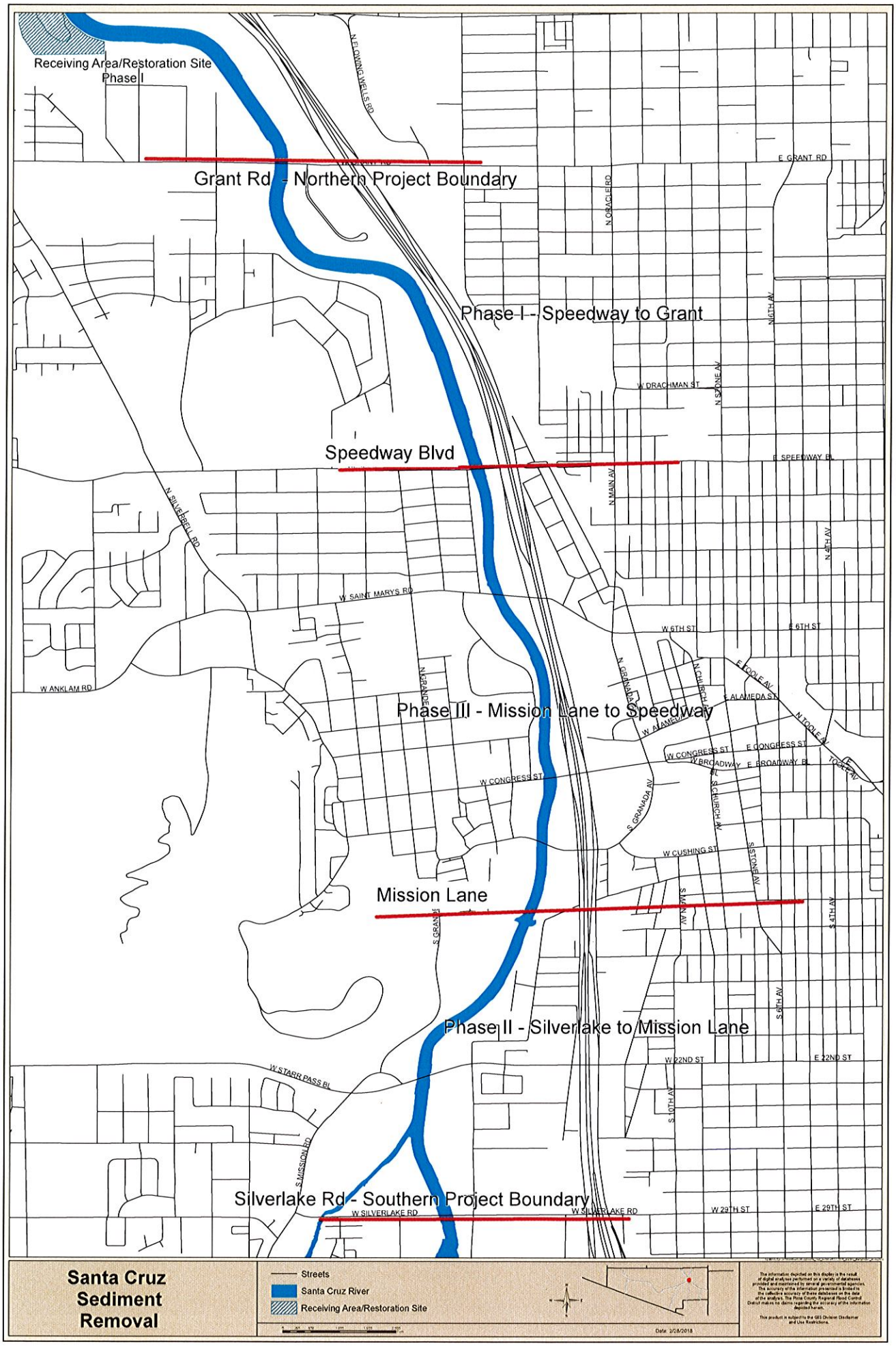
The current channel conditions must be addressed for public safety protection of public infrastructure. Removal of sediment and the vegetation that has grown on top of the sediment is the only option to minimize flood risk. If the City will not allow channel maintenance, the other alternative is to delineate this area as a new Special Flood Hazard Area and revise the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) to inform businesses and residents of the current flood risk. In addition, emergency response plans would need to be revised for flooding and bridge closures. Additionally, we would exclude that area from the City-County Maintenance of Major Watercourses and River Parks Intergovernmental Agreement (IGA) such that Pima County and the District would not be responsible for its maintenance.

The following information is presented to document the investigations and analyses of the flooding risks and identify steps to mitigate potential flood hazards.

INTRODUCTION

In 2014, Pima County (County), the District and the City approved an IGA providing the District and the County with the responsibilities of maintaining major watercourses and river parks where the land or right-of-way is under the City's ownership. The City is the primary owner of the Santa Cruz River and river park from Speedway Boulevard south to 29th Street.

The IGA specifies that the County and the District will provide plans for any major maintenance work to the City for their review and approval. The District has undertaken an evaluation of the existing conditions of the Santa Cruz River from Grant Road to 22nd Street to identify maintenance needs in order to minimize potential flood hazards. The area from 22nd to 29th streets was added to the study in response to Tucson Water's proposed Heritage Water Project.


Receiving Area/Restoration Site
Phase I
Grant Rd - Northern Project Boundary
Phase I - Speedway to Grant
Speedway Blvd
Phase III - Mission Lane to Speedway
Mission Lane
Phase II - Silverlake to Mission Lane
Silverlake Rd - Southern Project Boundary
N FLOWING WELLS RD
E GRANT RD
N ORACLE RD
N 6TH AV
W DRACHMAN ST
N STONE AV
E SPEEDWAY BL
N MAIN AV
N SILVERBELL RD
N 4TH AV
W SAINT MARYS RD
W 6TH ST
E 6TH ST
W ANKLAM RD
N GRANADA AV
N CHURCH AV
E TOOLE AV
E ALAMEDA ST
W ALAMEDA ST
N TOOLE AV
W CONGRESS ST
E CONGRESS ST
W BROADWAY
E BROADWAY BL
TOOLE AV
S GRANADA AV
S CHURCH AV
W CUSHING ST
S STONE AV
S MAIN AV
S 4TH AV
S GRANDE AV
S 6TH AV
W 22ND ST
E 22ND ST
W STARR PASS BL
S 10TH AV
S MISSION RD
W SILVERLAKE RD
W 29TH ST
E 29TH ST
Santa Cruz Sediment Removal
Streets
Santa Cruz River
Receiving Area/Restoration Site
Date: 2/28/2018

BACKGROUND

Santa Cruz River

The United States Geological Survey (USGS) has monitored flows in the Santa Cruz River at Congress Street since 1905. Scientists and engineers rely on the historic flow records to estimate flood peaks. Prior to the 1960s, the largest flood of record for the Santa Cruz River was 15,000 cfs. This flow rate was used in the design of the Speedway Boulevard and Saint Mary's Road bridges in the late 1950s. Later, the Congress Street Bridge was designed to convey a 50-year discharge of 17,000 cfs based on more conservative flood information developed in the 1960s.

After a flood occurred in 1977 with a peak flow of 23,700 cfs, the USGS and FEMA revised the 100-year flood peak discharge for the Santa Cruz River through downtown to 30,000 cfs. The Rio Nuevo channel improvement designs began in 1979 and utilized this 30,000 cfs discharge value. The final construction plans called for a compound channel with a soil cement lined inner channel to carry flows equal to the 1977 flood, and the channel plus the landscaped overbank river park would contain 30,000 cfs. These river improvements were constructed in 1982.

Tropical Storm Octave in 1983 caused widespread flooding in Southeast Arizona with three-day rainfall totals of 6.5 to 8 inches and 10 to 12 inches in the mountain areas. The peak flow rate of the 1983 flood, as measured by the USGS at Congress Street, was 52,700 cfs. The capacity of the existing channel was exceeded including within the newly constructed Rio Nuevo section. During the flood peak, floodwaters even reached Interstate 10 (1-10), flowing through the underpasses and inundating areas east of I-10. Flood depths at I-10 were approximately two feet. After the 1983 flood, FEMA revised the 100-year peak discharge for the Santa Cruz River to 60,000 cfs.

The river channels between 29th Street and Mission Lane and from Speedway Boulevard to Grant Road were built after the 1983 flood and were constructed to contain the 100-year flood of 60,000 cfs.

FEMA Floodplain Standards

The current FEMA FIRMs for floodplain management of the Santa Cruz River in the downtown Tucson area were developed in 1986 using aerial mapping taken in 1984. At that time, the Santa Cruz River channel contained very little vegetation. The FIRMs were reprinted numerous times since, with the last reprinting occurring in 2011 for the entire County and City, but no significant reevaluation of the Santa Cruz River flood hazard has occurred since the 1986 delineations. Although the federal floodplain management regulations have not changed much over the years, the mapping standards, and modeling techniques and technologies have changed substantially. Two of these changes, which could significantly modify the Santa Cruz River regulatory floodplain are FEMA's guidance regarding the modeling of the impacts of bridges on river hydraulics and debris blockage from piers, and their standards for the design, construction and maintenance of floodwalls and levees.

A third factor impacting flood depths does not, but perhaps should, involve FEMA. This factor is the on-going development of Rio Neuvo. The standard practice for Rio Nuevo has been to use fill to elevate structures so their lowest floors are above the water surface elevation as shown on the adopted FIRMs (1986 data). Map revisions were not required for individual improvements and the cumulative impact of these encroachments into the floodplain has never been evaluated. Over time, in some areas, new development expanded up to the regulatory floodway and the overbank flow area of the original Rio

Nuevo compound channel was diminished or totally lost. The result of these encroachments has the potential to cause a 0.5 to one foot rise in the 100-year water surface elevations, placing adjacent structures and improvements at increased flood risk.

2015 STUDY OF THE SANTA CRUZ RIVER

The District surveys and evaluates the major watercourses the District maintains on a regular basis to ensure that there is adequate channel flow capacity to convey the 100-year flood without overtopping the banks and flooding adjacent properties. These watercourses, and the tributary channels and storm drains that connect to them are manmade improvements that require maintenance to properly function as designed. In 2015, the District funded an aerial flight to provide topography throughout the metropolitan area including the Santa Cruz River from 29nd Street to Grant Road (Downtown (Segment). The District assumed maintenance responsibility of the Downtown Segment of the river from the City via an IGA in 2014. Prior to that, the river channel had not been maintained by the City and, as a result, the channel contains significant quantities sediment and dense vegetation.

The District compiled and evaluated the topographic information along the Santa Cruz River in the Downtown Segment. The evaluation included a comparison of the new 2015 topographic information to the elevation information found on the design plans for the bank protection, bridges and other constructed flood control improvements. The District also performed additional hydraulic modeling to evaluate the different flood hazard conditions between the current (2015) conditions and the FEMA's mapped 100-year floodplains on the FIRMs. Based on these findings, areas have been identified that require sediment and/or vegetation removal in order to reduce flood risk to the property adjacent to the Santa Cruz River from 29th Street to Grant Road, especially in the area from Mission Lane, upstream of Cushing Street, to Speedway Boulevard. The results of the evaluation revealed that the aggradation, which has occurred over 30 years, has the potential to flood an additional 173 structures and increase the flood risk to property with an estimated assessed value of $84 million.

The District's evaluation also determined that the bridges at Congress Street, Saint Mary's Road, and Speedway Boulevard would be overtopped during the 100-year flood and perhaps during smaller floods, and sustain a substantial amount of water pressure, which could possibly result in bridge failure. The Speedway Boulevard and St. Mary's Road bridges, built in the 1950s, are the oldest, and designed for a flow of 15,000 cfs. Congress Street Bridge was built in the early 1970s and was designed for 17,000 cfs. Currently, the flood discharges adopted by FEMA for the Santa Cruz River are a 10-year flow of 16,600 cfs, and a 100-year flow, or regulatory flow, of 60,000 cfs.

When comparing existing conditions (2015 topography) to the design of the original plans, the average water surface elevation is about four feet higher than the water surface elevation on the adopted FEMA FIRMs. Even with excavation of the channel back to original design conditions, the average post excavation water surface elevations are about 1.8 feet above the water surface elevation on the adopted FEMA FIRMs. The improved methodology for hydraulic modeling highlight the impact of the bridges on the floodplain and the resultant risk to the bridges themselves.

In order to identify the extent to which sediment removal activities must be performed, the District evaluated numerous alternatives to provide insight regarding the consequences of leaving otherwise desirable vegetation in the channel. Keeping the vegetation means that the sediment underneath the vegetation cannot be removed. The alternative scenarios included: 1) Full channel cleanout, 2) Leaving vegetation in place where flood damage potential is least severe, 3) Leaving trees and the most

desirable vegetation in place irrespective of flood damage potential, 4) Maintenance near bridges to minimize bridge failure, and 5) No action, leaving the channel at 2015 conditions. As anticipated, there is a correlation to the removal of sediment and vegetation and the reduction in flood damage potential.

CHANNEL MAINTENANCE ALTERNATIVES

Alternative	Description	# of Buildings in 100-Year Floodplain	Asset Value of Buildings and Property
1	Clean Channel; Original Design Conditions	47	$20,950,000
2	Minimize Flood Risk, Maintain Limited Vegetation in Channel	109	$44,120,000
3	Maintain Trees, Minimal Vegetation Removal	151	$81,210,000
4	Maintenance Only at Bridges, 200 Feet Downstream to 100 Feet Upstream	167	$78,450,000
5	No Action, Leave Channel at Current Conditions	173	$84,400,000

Although sediment removal in some areas would be more effective at reducing flood risk than other areas, it is important to note that in all cases the bridges at Congress Street, Saint Mary's Road, and Speedway Boulevard would be overtopped during the 100-year flood. Not only does this increase the risk of bridge failure during a flood, but also the bridges' impact on the floodplain increases the risk of flooding too many adjacent properties.

SANTA CRUZ RIVER CAPACITY RESTORATION

The District proposes to break up the project into three phases due to the size of the project, four river miles in length; difference in maintenance requirements for each segment; and to adequately address public and neighborhood concerns at each segment.

PHASE I – SPEEDWAY BOULEVARD TO GRANT ROAD

The District is fee owner or has other property rights for maintenance of the portion of the river from Speedway Boulevard to Grant Road and wants to commence maintenance activities. In addition to the hydraulic results, a vegetation survey was completed that identified the most desirable native plant species. The goal is to preserve as many of the native trees as possible while restoring the necessary capacity. Attached is the final recommendation for maintenance of this section of the river (Attachment 1). The green line indicates areas that are proposed for preservation.

In the northern part of the river near Grant Road, Forbes Business Park on the east bank is protected by a levee and the need to maximize river capacity is warranted. While significant sediment removal is proposed, numerous stands of trees can be left where levee freeboard requirements have been met. Where levee freeboard requirements have not been met, more sediment removal is necessary. In some cases, modification to raise or extend the levee may also be necessary.

In the southern portion near Speedway Boulevard, the presence of vacant state land on the west bank provides some buffer that allows for overbank flows to occur without risk to structures or private property. The result is that much, but not all, of the desirable native vegetation can remain in the channel. Further, the recommended maintenance plan removes sediment and vegetation within 100 feet downstream and 200 feet upstream of the bridges in this reach, i.e., Grant and Speedway.

Overall, the final design most closely resembles Alternative 2 with a few modest changes to reflect the presence or absence of desirable native vegetation (see Attachment 2). It is anticipated that upon completion of this sediment removal project, of the 51 structures that are impacted by the floodplain in today's conditions (22 commercial, 20 residential, and 9 government structures), six or fewer structures will remain in the floodplain. It is possible that once the lowest floor of these structures are measured, one or more will be found to be elevated such that flood damage to the interior is not anticipated.

It is also important to note that the receiving area for the sediment being removed during Phase I, is an old meander north of Grant Road on the west bank that has been cut off from the river. The plan is for this site to become a restoration project after the sediment removal project is completed (see Attachment 3). This area is currently a sparsely vegetated hole and will be turned into a neighborhood scale water-harvesting project that will serve as an amenity to the adjacent Silver Creek II subdivision as well as a node on The Loop. The placement of the sediment from the river will occur in a way that results in a multi-acre water-harvesting basin with terraces that provide for a lush mesquite bosque in the lower areas with hardier desert species in the upper terraces. The diversion of flow from an adjacent small watershed will reduce the need for long-term irrigation, while containing the full flow volume of the 100-year flood. Due to the benefits associated with restoration of this site, this project is being evaluated using AutoCASE as directed by the Pima County Board of Supervisors (Board) as part of their resolution on climate change.

PHASE II – 29TH STREET TO MISSION LANE

The proposed second phase of the Santa Cruz River sediment removal project will be from 29th Street to Mission Lane. This phase was selected for two reasons. First, this is the initial location for the introduction of reclaimed into the Santa Cruz River water that is part of the City's Heritage Water Project. Performing maintenance in advance of that project, which the City anticipates will commence in 2019, would be prudent. The second reason is that since there are relatively few structures in close proximity to the Santa Cruz River banks, there is an opportunity to preserve more vegetation in the channel. After review of hydraulic analysis and the vegetation survey, the District will propose a grading plan for Phase II. Since this is property owned by the City and is subject to the IGA, the maintenance plan will be submitted to them for comment and approval. We anticipate that the sediment from this reach will be deposited at the A Mountain landfill or adjacent locations as the City desires.

PHASE III – MISSION LANE TO SPEEDWAY BOULEVARD

The remaining reach from Mission Lane to Speedway Boulevard contains development that is very close to the channel, has undersized bridges that impact the conveyance capacity of the river, and very complicated property rights including a jigsaw puzzle of ownership by the City, Rio Nuevo and platted Common Area. In addition, in this segment are numerous floodplain encroachments that has likely increased the flood risk to adjacent properties. These issues will require more discussion prior to any proposal on the extent of sediment removal.

The current FIRM, adopted in 1986, for this portion of the Santa Cruz River does not accurately describe the actual flood risk and does not reflect the changed floodplain conditions due to sedimentation reducing channel capacity, the placement of fill material on the west bank and new improvements and infrastructure in the floodplain, including the Cushing Street Bridge and the associated upstream floodwall.

The City has attempted to get FEMA to revise the floodplain map to address the impacts to the floodplain from the Cushing Street Bridge; however, FEMA has not done so and has some significant comments regarding the adequacy of existing flood control infrastructure.

FEMA's concern regarding the adequacy of the flood control infrastructure upstream of Cushing Street is reflective of the changed flood hazards in this area. Even though the current floodplain map and the data the City submitted to FEMA do not reflect the changed flood risk, FEMAs review comments indicate a concern that adjacent private improvements are at risk of flooding. These issues arise because the City's request for a Letter of Map Revision (LOMR) used four different topographic data sets (2006, 2011, 2013, and 2015) to model the channel, and because the east side floodwalls do not meet FEMA's standards. At the City's request, FEMA suspended the proposed map revision request in the fall of 2016 to allow the City to address FEMA's technical concerns regarding the east side floodwall. Further, the Cushing Street Bridge's encroachment in to the floodway raises the 100-year water surface elevation. FEMA's standards prohibit increasing the flood height on insurable structures. In order to remain compliant with FEMA standards, considerable effort other than channel maintenance may be required including restoring overbank flow on the west bank and/or modifying the channel geometry.

The JE Fuller 2015 evaluation indicates the flood hazards are more severe than the City's information due to the use of more accurate channel bed topography reflecting the sedimentation issue and a more accurate estimate of impacts from vegetation. Specifically, the evaluation of existing conditions (2016) indicates that the water surface elevations upstream of Cushing Street is approximately two to three feet above the water surface elevation identified in the City's map revision request. This increased flood height is higher than the design parameters used for the floodwall constructed on the east, upstream side of Cushing Street, and protecting the River Park Inn.

In addition, the District considers it prudent for the City to use the JE Fuller information when improvements are planned. Both the LOMR data and the JE Fuller analysis indicate that the hotel and power substation are subject to a high risk of flooding due to the inadequacy of the floodwall. It appears very likely that improvements to the floodwall are necessary and should occur prior to, or concurrent with, the anticipated improvements to the hotel. Other action that would reduce the power substation and river protection include restoring overbank flows on the west side of the river, channel modifications to increase channel capacity, and extending and improving the floodwall. It is most likely a combination of these that will be most effective. It is possible that the City's obligations with respect to the Cushing Street Bridge LOMR will compel the City to make some or all of these improvements.

In summary, the Santa Cruz River channel has not been properly maintained for the last 30 years. The channel is undersized and cannot accommodate the current regulatory flow volumes, the channel sedimentation has reduced the channel capacity by 60%, the bridges on the cross streets are in jeopardy of being washed out, new developments are knowingly being approved by the City based on floodplain mapping that the City knows is errant, and existing properties, including a major hotel and the TEP facility that provides power downstream of Tucson, are in dire jeopardy of being flooded. Even with full channel maintenance to maximize the channel capacity, nearly 50 buildings with property valuations exceeding $20M will end up being mapped into the floodplain. The District has brought the above issues to the City's attention on numerous occasions, but there has been little to no acknowledgement of these issues or indication that the City will allow maintenance to place on City-owned property and flood control infrastructure.

If Phase III cannot be completed in the near (immediately after Phase I and II), the District will pursue FEMA floodplain map amendments, and the segment of the Santa Cruz River should be removed from the IGA.

PIMA COUNTY
FLOOD CONTROL

Pima County Regional Flood Control District
201 N. Stone Ave. - 9th Floor
Tucson, Arizona 85701-1207
(520) 724-4600, FAX: (520)724-4621
http://www.rfcd.pima.gov

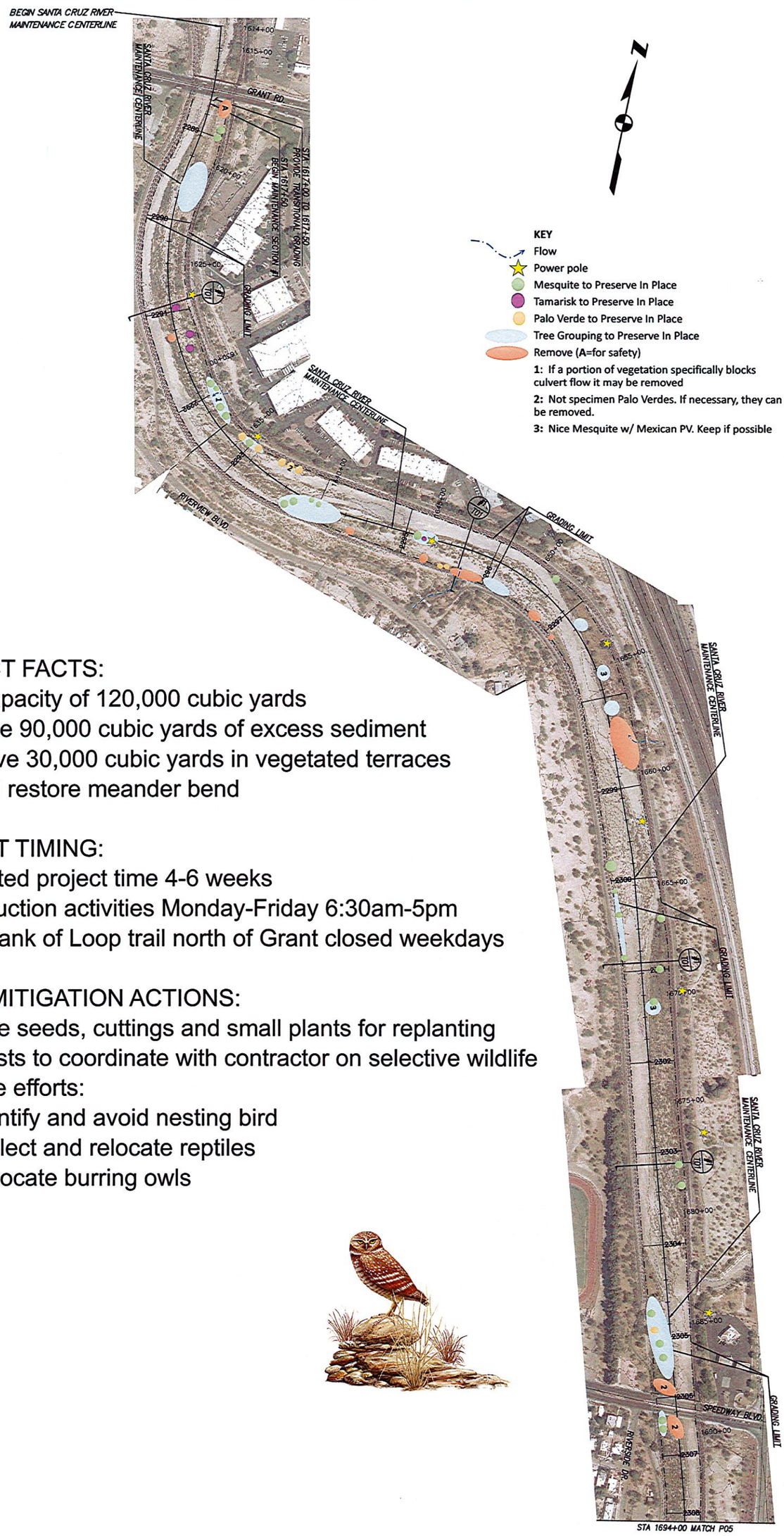
Santa Cruz Sediment Removal

Phase I Areas to be Preserved (207,895 sq ft)

Streets

1 inch = 210 feet

Date: 2/28/2018



PROJECT FACTS:

- Lost capacity of 120,000 cubic yards
- Remove 90,000 cubic yards of excess sediment
- Preserve 30,000 cubic yards in vegetated terraces
- Fill and restore meander bend

PROJECT TIMING:

- Estimated project time 4-6 weeks
- Construction activities Monday-Friday 6:30am-5pm
- West bank of Loop trail north of Grant closed weekdays

OTHER MITIGATION ACTIONS:

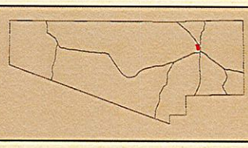
- Salvage seeds, cuttings and small plants for replanting
- Biologists to coordinate with contractor on selective wildlife salvage efforts:
  - Identify and avoid nesting bird
  - Collect and relocate reptiles
  - Relocate burring owls

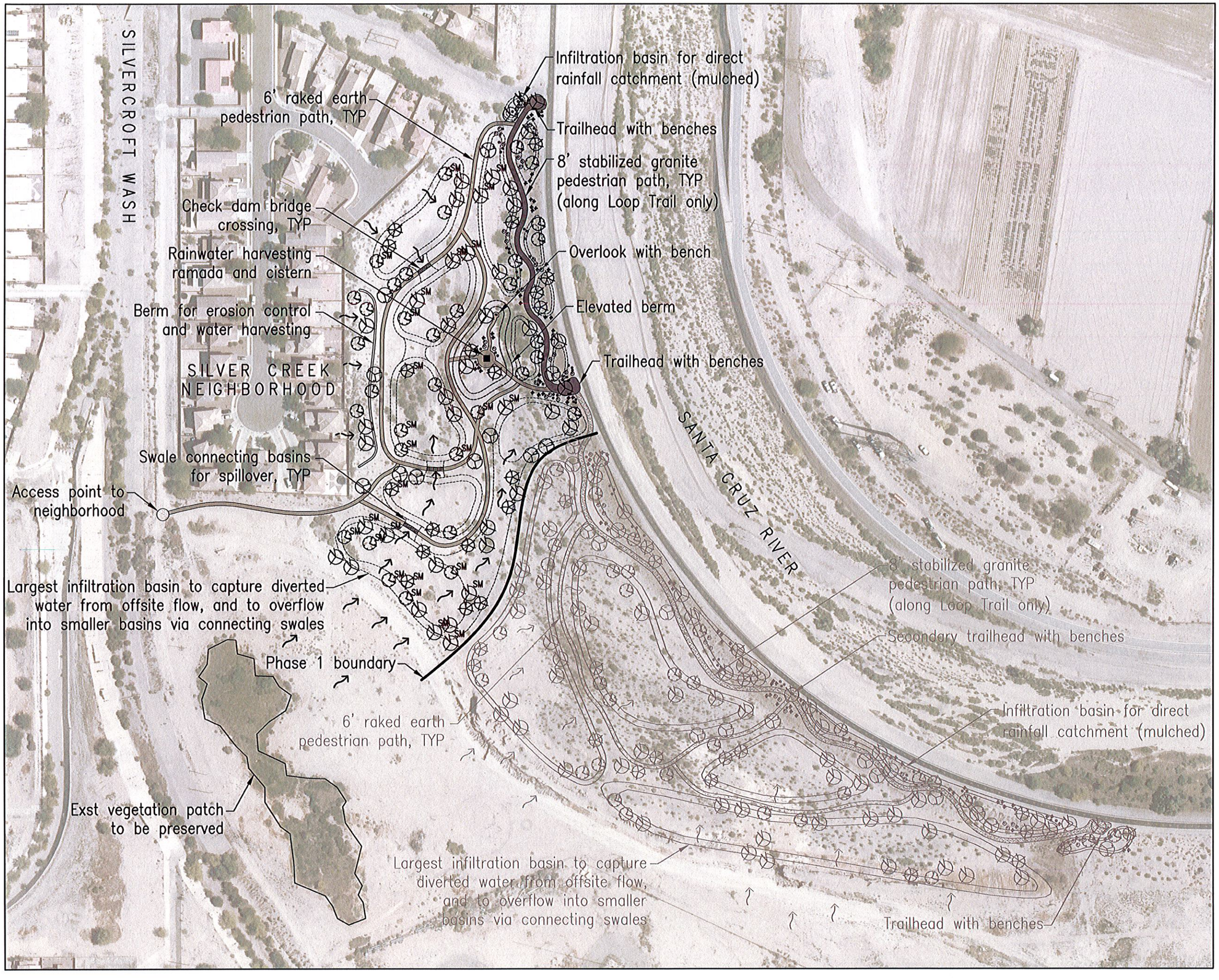
PIMA COUNTY
FLOOD CONTROL
Pima County Regional Flood Control District
201 N. Stone Ave – 9th Floor
Tucson, Arizona 85701-1797
(520) 724-4600, FAX: (520)724-4621
http://www.rfcd.pima.gov

Santa Cruz River Vegetation Survey

0 200 400 Feet

Date: 4/19/2018





GI/LID TREES ASSESSMENT
PIMA COUNTY

Green Infrastructure Concept
Meander Bend Park

PLANT MATERIAL LEGEND

TREES

SYMBOL	BOTANICAL NAME COMMON NAME
	Celtis reticulata Western Hackberry
	Chilopsis linearis 'AZT' AZT Desert Willow
	Parkinsonia florida Blue Palo Verde
	Prosopis velutina Native Velvet Mesquite

NOTE:
Trees with SM notation refer to trees expected to germinate from seed mix. Location of trees is conceptual.

SHRUBS & CACTUS

SYMBOL	BOTANICAL NAME COMMON NAME
	Encelia farinosa Brittlebush
	Larrea tridentata Creosote
	Opuntia engelmannii Prickly Pear

NOTE:
Shrub and cactus symbols enlarged in legend for legibility.

150' 0 75' 150' 225' 300'

PIMA COUNTY
FLOOD CONTROL

WHEAT | DESIGN GROUP
LANDSCAPE ARCHITECTS

ATTACHMENT 2

Santa Cruz River Capacity Restoration Project
April 19, 2018 Open House
Comments

(The following comments are transcribed as written)

From: Diana Hadley

This project should now to allow time for more research and refinement of flood control. Can the county consider retention basins and even infiltration possibilities upstream? South of 29th St. the channel is very wide with ample room for multiple basins and a protected bank.

Tucson should for once try to be creative. Follow the example of the Los Angels River which has done a wonderful job of riparian restoration and improved neighborhoods along some 15 miles of river front.

From: JoAnne Campbell

In the past 10 years Melrose & Delaware have become a bus thourghofare for Tucson Unified School District, Az School for Deaf & Blind buses & when gas line repairs occur Caterpiller trucks would go up & down the neighborhood streets. Concerned about project trucks doing this during this project would really hope the lot on Melrose/Speedway would not be for project trucks & Delaware traffic minimized.

From: Patrick J Dooley

I live in Barrio Hollywood just ½ block from the SC River. I am very concerned that the project for sediment removal is not currently going to address our neighborhood. Additionally, I think it important for us to have up-to-date flood maps for our neighborhood & ways to find out if flood insurance would be an issue for us to consider based on the present state of affairs in the SC River as it travels past Barrio Hollywood. A response to this comment is respectfully requested.

From: Anonymous

I'm glad to see plans for native plant restoration with an eye to habitat for native animals. But I'm dismayed at the extreme amount of litter and trash in the river. Maybe we need a new "Litterbug" campaign – in English, Spanish and Native Languages.

Santa Cruz River Capacity Restoration Project
April 19, 2018 Open House
Comments

From: Anonymous

Seems ridiculous to show such a small piece of what needs to be looked at comprehensively. Very disappointed to hear that plans "upstream" are the venue of the COT and can't be seen. There should be substantial information, feel again these neighborhoods are collateral.

From: Peter Chesson, TMA President

[redacted]

More effort should be made to allow the river to flood naturally. How about working with the city to find places where wetlands could be constructed to take flood waters? I am strongly opposed to vegetation removal in the Santa Cruz except for invasive species. The proposed removals are environmentally damaging & are not policies that should be followed in the 21st century. Let's see the Santa Cruz restored, not destroyed.

From: Christopher Takenaka

[redacted]

EXCELLENT! Please encourage us homeowners/community to keep trash from clogging the sewers and help keep this endeavor relatively maintenance free ☺