

**DATE:** July 20, 2017

**TO:** C. H. Huckelberry  
County Administrator

**FROM:** Eric Shepp, P.E.  
Acting Director 

**SUBJECT:** Tucson Drainage Project/Arroyo Chico – Increment 3

This memorandum is in response to your June 23, 2017 memorandum requesting additional information about the project and the apparent discrepancy between the Federal Emergency Management Agency (FEMA) and the US Army Corps of Engineers (Corps) with respect to the flood risk potential. The issue is primarily one of methodology. The Corps' HEC-1 hydrologic modeling (prepared by Tetra Tech) that was used to justify the project resulted in the 100-year (base flood-peak) discharge at the Campbell Avenue culvert of 3,976 cfs without the project in place, and 2,343 cfs with the project constructed. The "without project" value assumes that the upstream detention basin (Randolph South) had not been constructed, while the "with project" value assumes that the Randolph South Detention basin is in place.

Alternatively, when pursuing the Letter of Map Revision, the Regional Flood Control District (District) utilized the City of Tucson's TSMS hydrologic method, which has previously been accepted by FEMA. This methodology results in a base flood-peak discharge of only 1,567 cfs for this reach. The Corps did not approve this methodology.

Using the Corps base flood-peak discharge, flow breaks out of the channel and overflows into the adjacent neighborhood and around the Park Avenue basins. Using the smaller TSMS flow, the design storm is contained within the channel and dip sections. In addition, any increase above the TSMS value of 1,567 cfs results in flow breaking out of the channel and affecting the neighborhood between Campbell Avenue and Parkway Terrace.

The proposed path forward would include the following:

**1. Discuss Revised Hydrology with the Corps**

Although we know that using the TSMS is not acceptable to the Corps, we have noted that the Corps' hydrology used NOAA-2 rainfall. This is out-of-date information and we will propose the use of the more current NOAA-14 rainfall, which includes 30 additional years of rainfall record. The District anticipates that this updated rainfall will reduce the base flood-peak discharge, and although some channel work will still be required, reduce the project scope and cost.

**2. Minimize Disturbance of Contaminated Soils**

Although tritium was the original soil contaminant of concern, additional testing by the Corps revealed that tritium was not present in quantities above background levels. However, the presence of polynuclear hydrocarbons were found in the soil in quantities exceeding safe thresholds and needs to be addressed. The District will work with the Corps to clearly define

C. H. Huckelberry, County Administrator

**Tucson Drainage Project/Arroyo Chico – Increment 3**

July 20, 2017

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the limits of removal and minimize the disturbance of these areas. Since the local sponsor is responsible for the disposal of this material, this cost would be the responsibility of the District.

**3. Provide Enhanced Restoration Where Feasible**

Understanding the environmental concerns associated with project, which includes the soil contamination and the removal of a fairly intact riparian corridor; the District will advocate for enhanced restoration. The previous plan called for the placement of cactus and succulents to replace the riparian corridor.

**4. Consider Other Alternatives**

Noting that the Corps considered the original design not feasible, there is opportunity to revise the design. In addition to the priorities identified above, the alternatives to consider include:

- a) Increasing capacity at the Campbell box culverts to reduce any backwater.
- b) Removing one or more of the dip crossings entirely to increase conveyance and reduce the potential for breakout.
- c) Laying back the slope, and using alternate methods of bank protection including gabions.

As additional background information, attached is previous correspondence on this topic.

Please let me know if you have any questions or desire additional information regarding Increment 3

ES/tj

Attachments

- c: Carmine DeBonis, Deputy County Administrator – Public Works  
Nanette Slusser, Assistant County Administrator for Public Works Policy  
Suzanne Shields, P.E., Director – Regional Flood Control District  
Andy Dinauer, P.E., Division Manager – Regional Flood Control District



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# MEMORANDUM

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Date: June 23, 2017

To: Eric Shepp, Acting Director  
Regional Flood Control District

From: C.H. Huckelberry  
County Administrator *CHH*

Re: **Your June 15, 2017 Memorandum Regarding the Tucson Drainage Project/Arroyo Chico – Increment 3 Upstream Channel Improvement**

I would appreciate additional information regarding this subject.

Is the area that would potentially be flooded if the improvements were not made due to one of the following:

1. a lack of lineal channel capacity,
2. a lack of culvert capacity at perhaps Campbell Avenue, or
3. the restriction in channel capacity caused by the dip sections at the roadways that cross Arroyo Chico?

I would appreciate whatever additional information you can provide prior to the meeting with the US Army Corps of Engineers.

CHH/lab

Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works  
Nanette Slusser, Assistant County Administrator for Public Works

**DATE:** June 15, 2017

**TO:** C. H. Huckelberry  
County Administrator

**FROM:** Eric Shepp, P.E.  
Acting Director 

**SUBJECT: Tucson Drainage Project/Arroyo Chico – Increment 3 Upstream Channel Improvement**

The purpose of this Memorandum is to inform you of the Regional Flood Control District's (District) recent communication with the US Army Corps of Engineers (Corps) regarding the unanticipated funding of the last phase of the Tucson Drainage Project, familiarly known as Arroyo Chico. This phase includes the construction of channel and culvert improvements from Kino Boulevard to Parkway Terrace (see attached map).

Until recently, the Corps indicated that funding for this project would not occur until FY 2018/19 at the earliest. However, upon the LA District's receipt of their work plan from Corps Headquarters they were surprised to find that \$4 million has been budgeted for FY 2017/18 in order to complete and closeout this project. The Corps' estimate to complete Increment 3 is \$4.8 million, including redesign, construction management, administration and other costs.

As you know, based on the current effective Flood Insurance Rate Maps (FIRMs) approved by the Federal Emergency Management Agency, the District determined that this final phase of the project was unnecessary and requested confirmation from the Corps. The Corps responded by saying that since this portion of the project is a critical component to the overall project design and was included in the original benefit-cost evaluation, its completion was necessary. Further, the Corps indicated that failure to complete this project may result in a revision to the FIRMs thereby placing properties back into the floodplain, partially negating the benefits provided by the other phases of the project.

A further complicating factor is that the neighborhoods in which the project is located does not support the project. With issues including potential soil contamination and the removal of a riparian corridor, some neighbors and their elected representative, Councilman Kozachik, have voiced concerns about this project. The attached map, which also shows the current FEMA Special Flood Hazard Area in dark blue, shows the location of American Atomics Corp. There is a concern regarding disturbance of this site due to the potential presence of tritium and other soil contamination.

At a recent meeting with the Corps in Phoenix, I was able to discuss this project with Colonel Gibbs and Deputy District Engineer David Van Dorpe. While thanking them for bringing project funding to Pima County, I noted that there is much concern about the current proposed channel construction. They indicated an understanding of the concerns and committed to being open to a re-scoping the project to reduce the impact, if possible, as long as they can meet their necessary metrics. Options that need to be evaluated include the use of gabions, soil nails or pilings in lieu of the vertical concrete cantilevered walls.

Since this phase of the project was designed in 2004, there is considerable updating that will be required including acquiring new temporary construction easements, new environmental permitting, updating utility plans and a cultural survey, which will provide additional opportunity for redesign.

C. H. Huckelberry, County Administrator

**Tucson Drainage Project/Arroyo Chico – Increment 3 Upstream Channel Improvement)**

June 15, 2017

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The Corps has not formally notified us in writing that this project has been budgeted, but will do so once they have figured out what the District, as local sponsor, has contributed to the overall Arroyo Chico project. This will be used to determine the required local sponsor's contribution for this phase. I anticipate that our contribution will be approximately \$700,000, but may change depending on the need and extent of the removal of contaminated soil.

Please let know if you have any questions.

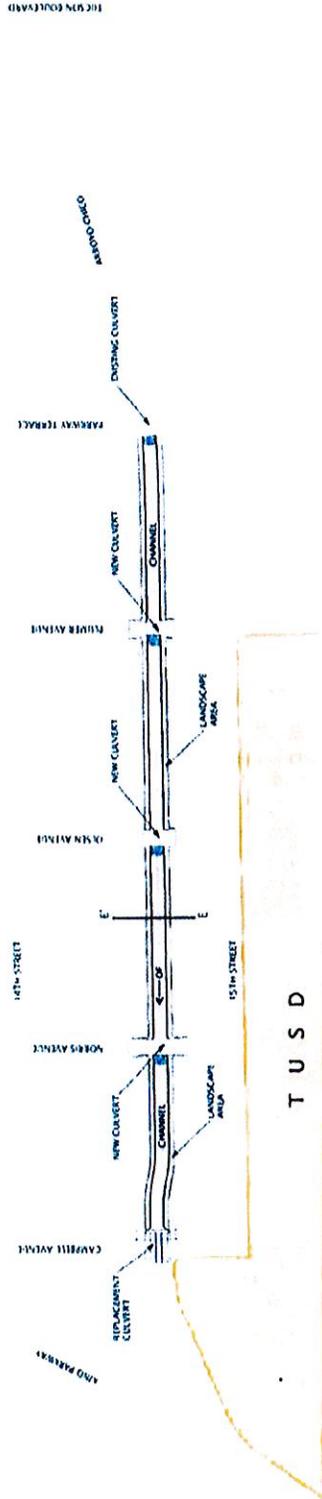
SS/tj

Attachments

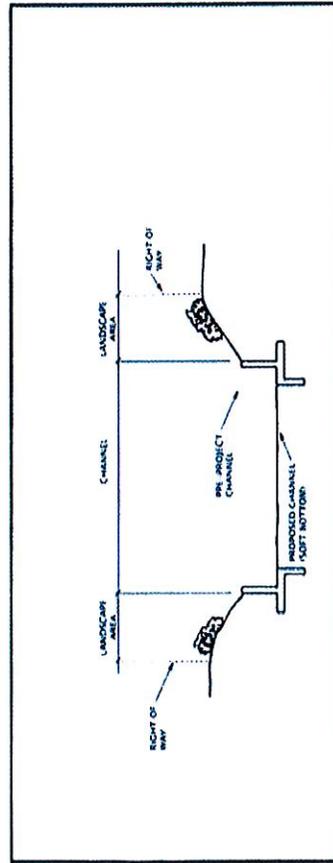
c: Carmine DeBonis, Deputy County Administrator – Public Works  
Suzanne Shields, P.E., Director – Regional Flood Control District  
Andy Dinauer, P.E., Division Manager – Regional Flood Control District

13TH STREET

CHERRY FIELDS



T U S D

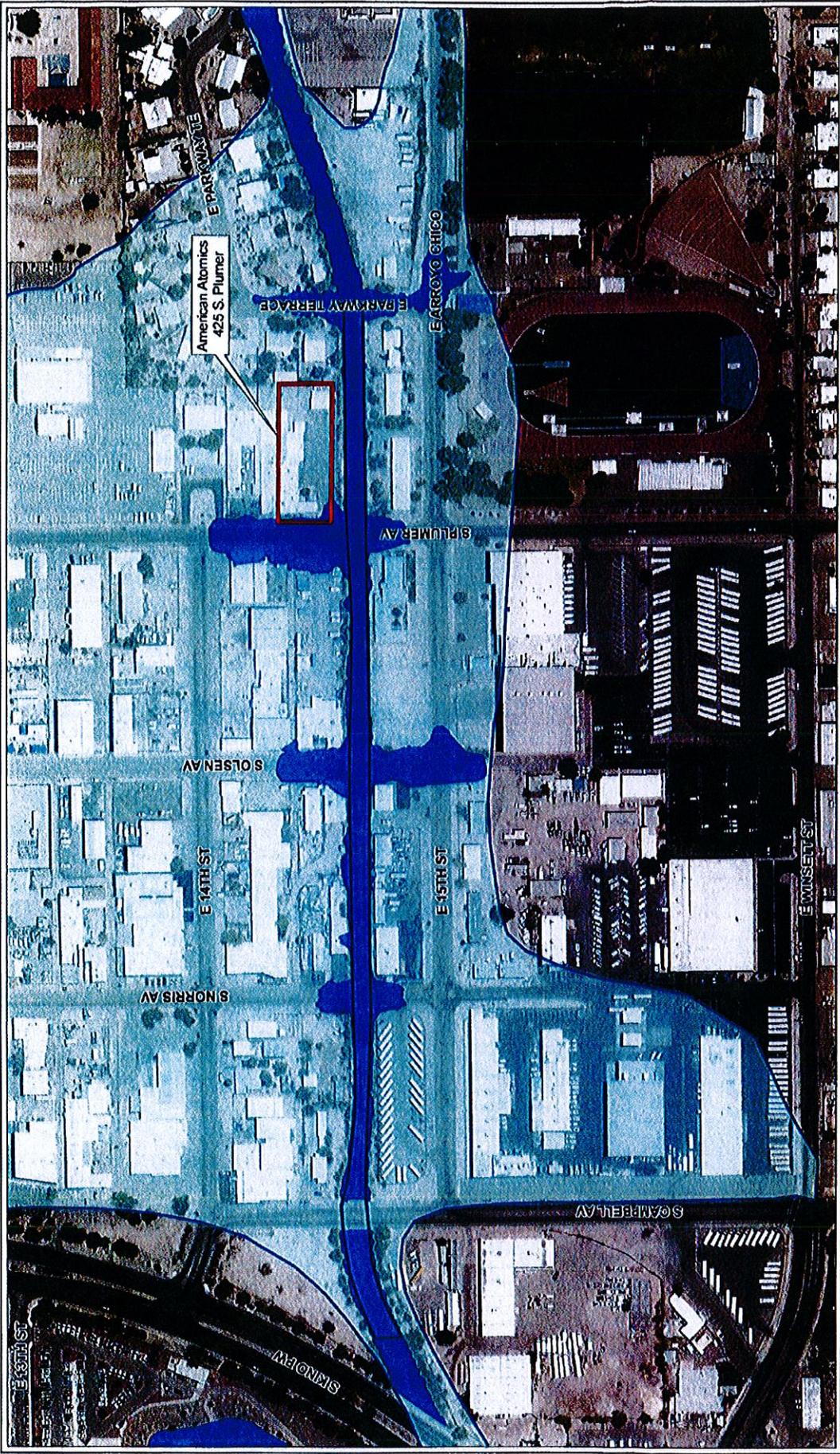


CROSS-SECTION E-E

Arroyo Chico Channel Improvements  
Campbell Avenue - Parkway Terrace  
November 17, 2003

# Tucson (Park Avenue) Detention Basin





**Project Location**

**Proposed Floodplain**

**FEMA Floodplain**

1 inch = 80 feet

Date: 9/10/2013

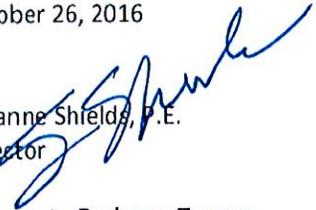
The information on this map was derived from the following sources:

- 1. Aerial Photography
- 2. FEMA Floodplain Data
- 3. American Atomics Site Data
- 4. Other Available Data

This information is provided "as is" without any warranty, express or implied.

**DATE:** October 26, 2016

**TO:** C. H. Huckelberry  
County Administrator

**FROM:** Suzanne Shields, P.E.  
Director 

**SUBJECT:** Tucson Drainage/Arroyo Chico Project Increment 3 – Kino Parkway to Parkway Terrace

As you requested, the following is a summary of what the U.S. Army Corps of Engineers (Corps) has proposed and the status of the project formally known as Increment 3 of the Tucson Drainage Area Project (Project). The improvements to Arroyo Chico and its tributaries were initiated in 1996 and have been constructed in phases; this project is the last and final phase.

In 2013, I wrote to the Corps requesting the cancellation of Increment 3 (see attached letter dated September 12, 2013 to Colonel Colloton). This request was due to environmental concerns and the significant reduction in the extent of the floodplain due to the construction of the other phases of the Project. Our analysis resulted in the removal of nearly all the private property in the area associated with Increment 3. The Federal Emergency Management Agency (FEMA) agreed with this analysis and issued a Letter of Map Revision (LOMR), effective September 29, 2014, removing these properties out the Special Flood Hazard Area

In response to my request, the Corps compared the hydrologic model that we developed to map the floodplain (and which was approved by FEMA) against the original hydrologic model the Corps used to: 1) evaluate the impact of the Project; 2) determine the cost benefit analysis; and 3) justify the design and construction of the Project.

In a letter dated December 18, 2015, Colonel Gibbs responded stating that Increment 3 was still a critical component of the Project and that their model still showed that the area upstream of Kino Parkway was subject to flooding. The letter also states that without full containment in this area, areas downstream would also be subject to flooding. Furthermore, they indicated that without the Increment 3 improvements in place, future federal interest could potentially cause the existing FEMA-approved LOMR to be rescinded, potentially leaving the District without federal disaster funding during an emergency flooding event and undoing many of the benefits provided by the other phases of the Project.

On February 5, 2016, I sent a letter to Colonel Gibbs acknowledging the Corps' findings and expressing concern that the plans developed in 1996 and updated in 2004 were out-of-date. The plans require removing a rich mesquite bosque canopy that is lining the banks of the arroyo, and retaining the steep bank slopes of this natural channel. Removing the mesquites and replacing them with concrete walls, desert cactus and succulents is not an acceptable solution to a vocal public. I requested that the Corps work with us to preserve the existing habitat within the very limited available right-of-way, and to restore the riparian ecosystem as part of the overall environmental restoration goals.

The Corps is currently contracting and paying for geotechnical, survey and environmental field investigations, which are scheduled to occur in November and December 2016. This work is being done to verify if the 2004 plans are or are not viable. Based on the results of these additional studies,

C. H. Huckelberry, County Administrator

**Tucson Drainage/Arroyo Chico Project Increment 3 – Kino Parkway to Parkway Terrace**

October 26, 2016

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the plans may change. The Corps' project manager is now aware of the public concerns regarding the protection of the vegetation, the unacceptability of the concrete wall, and the other environmental concerns. If the plans change, these issues will be considered in the redesign.

The outreach correspondence that the neighborhoods recently received was to inform them of the additional field investigations which would be necessary to justify a change in the plans.

As stated, this investigation is fully funded by the Corps. Per our last conversation with the Corps' project manager, the earliest that funding would be available to change the plans is the federal fiscal year beginning in October 2018. In addition to modifications to the drainage design, new plans and permits will be necessary to reconstruct the waterlines and sewer line within the streets, which will occur if the Corps secures funding.

Please let me know if you have any other questions.

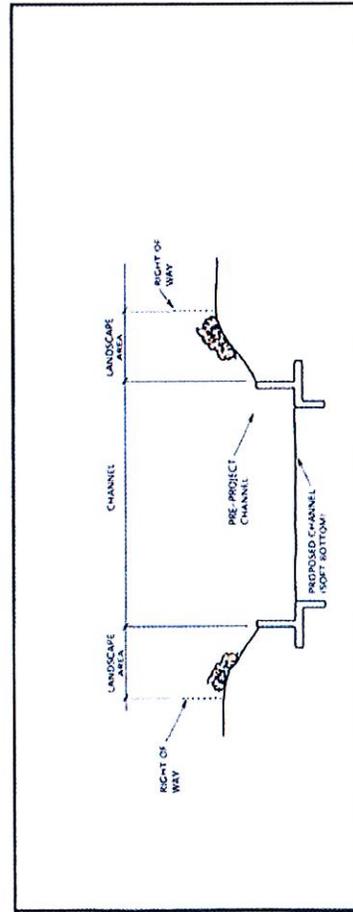
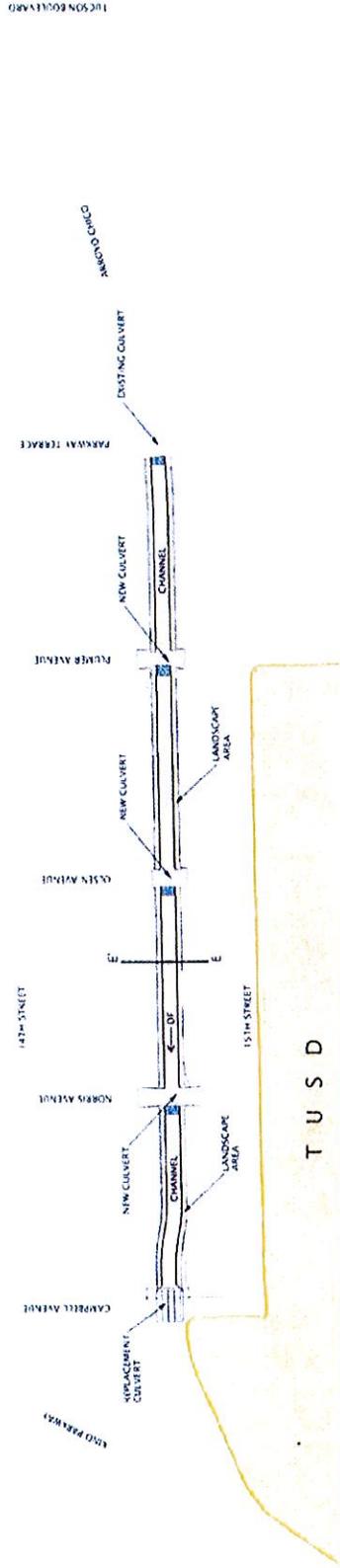
SS/tj

Attachments

c: John Bernal, Deputy County Administrator – Public Works  
Bill Zimmerman, Deputy Director – Regional Flood Control District  
Eric Shepp, P.E., Deputy Director – Regional Flood Control District  
Larry Robison, Project Manager – Regional Flood Control District

13TH STREET

CHERRY FIELDS



CROSS-SECTION E-E

Arroyo Chico Channel Improvements  
Campbell Avenue - Parkway Terrace  
November 17, 2003



Department of the Mayor  
City of Tucson  
San Diego District, Corps of Engineers





**PIMA COUNTY  
REGIONAL FLOOD CONTROL DISTRICT**  
97 EAST CONGRESS STREET, THIRD FLOOR  
TUCSON, ARIZONA 85701-1797

**SUZANNE SHIELDS, P.E.  
DIRECTOR**

**(520) 243-1800  
FAX (520) 243-1821**

September 12, 2013

Colonel Kimberly Colloton, PMP  
U.S. Army Corps of Engineers, Los Angeles District  
P.O. Box 532711  
Los Angeles, CA 90053

**Subject: Tucson Drainage/Arroyo Chico Project Increment 3**

Dear Colonel Colloton:

Pima County Regional Flood Control District is very appreciative of the cooperation and diligence of working with the US Army Corps of Engineers to implement the Tucson Drainage/Arroyo Chico Flood Control Project. The project includes the completion of flood detention basins on the Del Ulrich (Randolph South) Golf Course, Cherry Field (TUSD Basin), and most recently the three Park Avenue detention basins between Park Avenue and Cherry Avenue which has significantly reduced the potential for flooding in the Tucson downtown area. Two project increments remain to be completed, Increment 3 is channel work on Arroyo Chico between Campbell Avenue and Parkway Terrace, and Increment 4 is the High School Wash storm drain.

It has been brought to our attention that the site is the location of a past tritium release by the American Atomic Company. We are concerned about the residual effects and contamination from this tritium release and have reexamined the need for channel modifications. These modifications will disturb the soils and the adjacent riparian vegetation. Our investigation has determined a lack of information regarding the residual tritium in the soil and has resulted in considerable public concern.

Given the potential of the unknown issues associated with the tritium contamination as well as the removal of riparian vegetation, we are requesting that Increment 3 be cancelled.

The District is committed to the construction of the High School Wash Storm Drain (Increment 4) and therefore we are requesting that the Corps continue with construction of this vital link and the completion of the Tucson Drainage/Arroyo Chico project.

If you have any questions please feel free to contact me at (520) 724-4680.

Sincerely,

  
Suzanne Shields, P.E.  
Director and Chief Engineer

SS/tj

c: C. H. Huckelberry, County Administrator  
John Bernal, Deputy County Administrator – Public Works  
Drew Savage, Senior Project Manager – US Army Corps of Engineers

RECEIVED

DEC 29 2015

RFCD



DEPARTMENT OF THE ARMY  
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS  
915 WILSHIRE BOULEVARD, SUITE 930  
LOS ANGELES, CALIFORNIA 90017

December 18, 2015

Office of the Commander  
And District Engineer

Ms. Suzanne Shields  
Director  
Pima County Regional Flood Control District  
97 E. Congress Street, 2<sup>nd</sup> Floor  
Tucson, AZ 85701-1797

Dear Ms. Shields:

I am writing regarding your previous letter requesting deletion of Increment 3 from the Tucson Drainage Area (TDA) Project. Your request was based on concerns that there was Tritium in the Arroyo Chico Wash and that the expense of clean up would outweigh the need for Increment 3. At our request, you had a study completed that analyzed Hazardous, Toxic, and Radioactive Waste (HTRW) in the wash and its results indicated that no Tritium existed beyond the background amounts found in the Tucson area. The second part of your request was to remove Increment 3, since a Letter of Map Revision (LoMR) was already received. This LoMR was provided based on information from a locally approved hydrologic model. My staff has analyzed and compared the local hydrologic model and the one developed as part of the study phase and has determined that based on this evaluation, the Arroyo Chico reach is still a critical component of the Tucson Drainage Project. In addition, my staff has expressed concern that FEMA and their contractor could require the Corps of Engineers hydrologic model be used which could potentially cause the existing LoMR to be suspended. I understand this concern was also discussed between members of our respective staff at a meeting held May 12, 2015.

Therefore, I request that Pima County Regional Flood Control District (PCRFCD) concur that construction of Increment 3 should be completed. This action will complete the project as authorized. Should PCRFCD agree to continue with Increment 3, we will continue to request budget funding for construction in FY2017. Alternatively, if PCRFCD decides to discontinue the project, then a formal letter to the Assistant Secretary of the Army (Civil Works) would be requested to officially terminate and financially close out the project. This action will require a decision document be prepared that will summarize the changes to the project and expected benefits from it. Please let us know your intentions on completing this important project.

If you have any questions, please contact me at (213) 452-3961, or your staff can direct any questions regarding the TDA Project to Mr. John Drake, Project Manager at (602) 230-6933 or via email at [john.e.drake@usace.army.mil](mailto:john.e.drake@usace.army.mil)

Sincerely,

A handwritten signature in black ink, appearing to read "K. E. Gibbs", written in a cursive style.

Kirk E. Gibbs  
Colonel, U.S. Army  
Commander and District Engineer



February 5, 2016

Colonel Kirk E. Gibbs, District Engineer  
US Army Corps of Engineers, Los Angeles District  
915 Wilshire Boulevard, Suite 930  
Los Angeles, CA 90017

**Subject: Tucson Drainage Project Increment 3 – Upstream Channel and Culvert Improvements**

Dear Colonel Gibbs:

Thank you for your letter of December 18, 2015. After considerable internal discussion, the Pima County Regional Flood Control (District) concurs with the US Army Corps of Engineers (Corps) on the construction of Increment 3 (Upstream Channel and Culvert Improvements) as part of the Tucson Drainage (TDA) Project. The District agrees that the Corps should continue to request budget funding for construction of Increment 3 in fiscal year 2017. We acknowledge the requirement to utilize the Corps' hydrologic model for the TDA Project, and that future federal interest could potentially cause the existing FEMA approved LOMR to be rescinded, potentially leaving the District without federal disaster funding during an emergency flooding event unless this federal project is completed.

We request that the Corps also provide project funding for work in the time preceding construction in order to secure additional project information that was not previously available or provided during the PED phase of the project for Increment 3. A geotechnical study is needed to determine the hardness and thickness of the caliche layer observed in the channel bottom; caliche in basins 2 and 3 of Phase 2B of the TDA was extremely hard, was up to 10 feet deep and required a rock grinder at a change order cost of \$269,378.87 in order to meet finished grade. The geotechnical study also needs to determine the vibration impact on adjacent buildings that are located on the right-of-way line and may be adversely impacted during the construction. Concrete rubble and construction debris have also been noted in the side slopes of the existing channel. The extent and amount of this debris needs to be evaluated so that the contractor does not request a change order for access debris removal as was needed during Phase 2B for Basin 3 and to ensure that the debris does not extend under adjacent building foundations and fences.

As the local sponsor, we are very concerned about the neighborhood and the public's perception and interest in the environmental impacts and preservation along this reach of the project. The project plans including Increment 3 were completed in 2004 and included a Native Plant Inventory. This plant inventory is out-of-date as small trees have matured and mature trees have died or have become too large to transplant. The plans require the removal of a rich mesquite bosque canopy that is lining the banks of the arroyo, and retaining the steep bank slopes of this natural channel. Removal of the mesquites and replacing them with concrete walls, desert cactus and succulents is not an acceptable

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Suzanne Shields, P.E., Director

201 N. Stone Ave, 9th Floor, Tucson, Arizona 85701-1207 • Phone: 520-724-4600 • Fax: 520-724-4621

Colonel Kirk E. Gibbs, District Engineer

**Tucson Drainage Project Increment 3 – Upstream Channel and Culvert Improvements**

February 5, 2016

Page 2

solution to a vocal public. We need to work together to preserve the existing habitat within the very limited right-of-way that is available for this project, and to restore the riparian ecosystem as part of the overall environmental restoration goals.

The District also needs to reestablish temporary construction easements, utility permits, and clearances that have lapsed due to the time delay from the time the project was bid in 2010. Water and sanitary sewer relocations are included in the project plans and the District will need to work with the Corps to ensure that these improvements meet current standards as required by their respective permits.

As you can tell we still have a lot of work to complete before construction can begin. The District and the Corps have successfully worked together in the past to complete the other phases and increments of the TDA project.

If you have any questions please feel free to contact me, or your staff may direct their questions to Larry Robison at (520) 724-4660 or via email at [larry.robison@pima.gov](mailto:larry.robison@pima.gov).

Sincerely,



Suzanne Shields, P.E.  
Director and Chief Engineer

SS/tj

- c: John Bernal, Deputy County Administrator – Public Works  
Bill Zimmerman, Deputy Director – Regional Flood Control District  
Larry Robison, Design Engineering Division Manager – Regional Flood Control District  
John Drake, Project Manager – US Army Corps of Engineers