

## ITEM 4.7

### CITY MANAGER'S REPORT OCTOBER 12, 2020, CITY COUNCIL REGULAR MEETING

**ITEM:**                                   **ADEQUATE      PROGRESS      FINDING      TOWARD  
PROVISION OF 200-YEAR URBAN LEVEL OF FLOOD  
PROTECTION FOR RECLAMATION DISTRICT 2062  
(RIVER ISLANDS PHASE 2)**

**RECOMMENDATION:**   **Adopt Resolution, Acting as the Land Use Agency,  
Adopting Adequate Progress Findings toward  
providing a 200-Year Urban Level of Flood Protection  
in Phase 2 Levees of Reclamation District 2062 by  
the Year 2025**

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#### **SUMMARY:**

Senate Bill 5 (SB5), and related companion bills created a new requirement for certain land use decisions made by cities and counties in the California Central Valley. Starting on July 2, 2016, prior to approving discretionary land use decisions for nonresidential projects, and prior to approving ministerial land use decisions (building permits) for new residential buildings, land use agencies are required to make a Finding of Adequate Progress toward provision of Urban Level Flood Protection (ULOP) 200-year flood protection.

On June 20, 2016, City Council approved the first Adequate Progress Finding (APF) for levees protecting the River Islands at Lathrop Phase 1 area based on certification by Reclamation District 2062 (RD 2062) that the levee system would provide ULOP upon completion of the procedural requirements in the Urban Levee Design Criteria (ULDC) set by the State. This allowed the City of Lathrop to continue to issue, within Phase 1 areas that are fully flood protected, discretionary permits to commercial uses, and ministerial permits (building permits) for new residential homes through June 2017. Since that time, the Council has adopted APF for Phase 1 levees in River Islands each year, including 2020 earlier this year, which allowed development approvals in the Phase 1 area through December 2021.

In May 2019, Califia, LLC, as the landowner of property within the Phase 2 area of River Islands, entered into a Letter of Guarantee with the City for issuance of a grading permit for the Phase 2 levee system. Subsequently, RD 2062 publicly bid the construction of the Phase 2 levee system, with the levees substantially completed in December 2019.

The APF for River Islands will allow the City of Lathrop to issue, within the River Islands at Lathrop Phase 2 Area, discretionary permits to commercial uses, and ministerial permits (building permits) for new residential homes through December 2021 while RD 2062 continues to make progress towards providing the necessary improvements and documentation of full ULOP protection.

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**ADEQUATE PROGRESS FINDING TOWARD PROVISION OF 200-YEAR URBAN**  
**LEVEL OF FLOOD PROTECTION FOR RECLAMATION DISTRICT 2062 (RIVER**  
**ISLANDS PHASE 2)**

**BACKGROUND:**

The California Department of Water Resources (DWR) developed technical and procedural criteria in response to requirements outlined in the Central Valley Flood Protection Act of 2008, enacted by SB5 in 2007 and amended by subsequent legislation (2007 California Flood Legislation). DWR developed the ULDC and ULOP criteria to assist affected cities and counties within the Sacramento-San Joaquin Valley, in making the findings related to an ULOP before approving certain land use entitlements in accordance with the 2007 California Flood Legislation.

The levees constructed for both Phase 1 and Phase 2 of River Islands by RD 2062 meet the updated ULDC standards adopted by DWR in May 2012. With the pending Letter of Map Revision for Phase 2 levees expected this year, along with additional internal drainage improvements by RD 2062, it is expected that all of River Islands will have achieved the ULOP next year (2021). The Council will review such a recommendation at the time of completion and take action accordingly. Tonight's action will be for an APF for Phase 2 levees only; action was taken in July 2020 for Phase 1 levees.

In August 2020, MBK Engineers, the District Engineer for RD 2062, prepared the "River Islands at Lathrop Phase 2 Area Report of Adequate Progress Towards Urban Level of Flood Protection Annual Report" or simply "Adequate Progress Report" (APR). The APR serves as a strategic plan describing and outlining the steps that the RD 2062 and the City as the land use authority will use to ultimately implement 200-year levee improvements for Phase 2 River Islands levees in accordance with the requirements of SB 5. According to the letter dated September 30, , 2020 (Attachment D), RD 2062 Board of Trustees, acting as the Local Flood Management Agency, approved the Annual Report and transmitted it to the City for the City Council's consideration at this meeting.

Government Code Section 65007 (a)(5) requires that "The local flood management agency shall annually report to the CVFPB on the efforts in working toward completion of the flood protection system." RD 2062 has provided this report to the CVFPB on behalf of both the District and the City in the past and will send the letter (Attachment E) to the CVFPB should the Council adopt the attached resolution and approve the Adequate Progress Finding.

The August 2020 APR describes the progress made in constructing the Phase 2 levees since the issuance of a grading permit by the City in May 2019, including:

- Completion of the River Islands Phase 2 Levee Project construction.
- Preparation of deeds and the transfer of real estate rights (easements) to RD 2062 for the Phase 2 levees.
- Progress on Scour Prevention Projects, including evaluation of the potential for erosion and scour failure of the Stage 1 Interior Levee, Stage 2A Levee and Stage 2B Levee caused by failure of the Old River Levee, as well as a separate

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analysis for the erosion and scour failure of the Cross Levee, due to its proximity to the UPRR embankment. These evaluations were completed in 2020 and indicate that six "check dams" are required to address the scour potential. RD 2062 has made application to the Central Valley Flood Protection Board (CVFPB) for an encroachment permit to construct the check dams. It is expected the check dams would be completed in 2021.

- Progress on the completion of the RD 2062 Operation and Maintenance (O&M) Manual Modernization Project, with expected completion in 2021.

The 2020 APR was prepared by RD 2062's District Engineer to satisfy requirements of SB 5 so that the City of Lathrop, as a land use agency defined by State law, may rely on the prior findings of Adequate Progress.

**REASON FOR RECOMMENDATION:**

Both the RD 2062 District Engineer and the City Engineer believe there is substantial evidence in the record for the City Council to make a finding of adequate progress for the Phase 2 River Islands development area.

Adoption of the resolution will allow the City of Lathrop to approve, through December 2021, discretionary permits for all uses, including non-residential uses, and ministerial permits (building permits) for all new residential homes within the RD 2062 Phase 2 while RD 2062 completes the ULOP Flood protection. It should be noted that River Islands has proposed a vesting tentative map, amendment to the General Plan and West Lathrop Specific Plan and other entitlements for residential and non-residential development within Phase 2. Those entitlements would also need to be approved and in effect for building permits to be issued in the Phase 2 area.

**BUDGET IMPACT:**

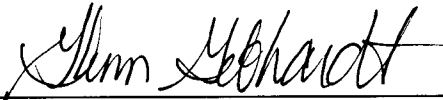
There is no budget impact to the City as to date, all technical reports and studies have been funded by RD 2062 and River Islands at a cost in excess of \$2 million. This includes City staff time to review these documents.

**ATTACHMENTS:**

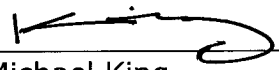
- A. Resolution, Acting as the Land Use Agency, Adopting Adequate Progress Findings toward providing a 200-Year Urban Level of Flood Protection in Phase 2 Levees of Reclamation District 2062 by the Year 2025
- B. 2020 River Islands at Lathrop Phase 2 Area Report of Adequate Progress towards Urban Level of Flood Protection Annual Report, dated August 2020
- C. Vicinity Map of River Islands Phase 2 Area and Levee System
- D. Letter from RD 2062, as the Local Flood Management Agency, dated September 30, 2020, presenting the Adequate Progress
- E. Draft Letter from RD 2062 to the Central Valley Flood Protection Board providing required notification of the Adequate Progress Finding

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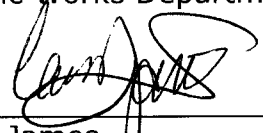
**APPROVALS**

  
\_\_\_\_\_  
Glenn Gebhardt  
City Engineer

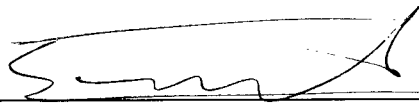
9/29/2020  
Date

  
\_\_\_\_\_  
Michael King  
Public Works Department


10-2-2020  
Date

  
\_\_\_\_\_  
Cari James  
Finance & Administrative Services Director

10/5/2020  
Date

  
\_\_\_\_\_  
Salvador Navarrete  
City Attorney

9-30-2020  
Date

  
\_\_\_\_\_  
Stephen J. Salvatore  
City Manager

10-6-2020  
Date

## **RESOLUTION NO. 20-**

### **A RESOLUTION OF THE CITY OF LATHROP, ACTING AS THE LAND USE AGENCY, ADOPTING ADEQUATE PROGRESS FINDINGS TOWARD PROVIDING A 200-YEAR URBAN LEVEL OF FLOOD PROTECTION IN PHASE 2 LEVEES OF RECLAMATION DISTRICT 2062 BY THE YEAR 2025**

**WHEREAS**, California Senate Bill 5 (SB5), passed in 2007 and later amended by various bills, requires the State to develop and adopt a comprehensive Central Valley Flood Protection Plan (CVFPP), which was approved by the Central Valley Flood Protection Board (CVFPB) in June 2012; and

**WHEREAS**, SB5 also required all cities and counties in the Central Valley to incorporate the CVFPP into their general plans by July 2, 2015 and into their zoning ordinances by July 2, 2016, and both actions were completed by Lathrop within the deadlines; and

**WHEREAS**, SB5 restricted development beyond July 2, 2016 unless the land use agency makes a finding related to an Urban Level of Flood Protection (ULOP), a 200-year level of flood protection; and

**WHEREAS**, Island Reclamation District 2062 ("RD 2062"), as the local maintenance agency for the levee system associated with the River Islands at Lathrop Phase 2 project, has provided documentation to the City for its adequate progress finding in conformation with SB5 which allows development to occur within the River Islands at Lathrop Phase 2 Area, and RD 2062 will send the letter (Attachment E to the October 12, 2020 staff report) to the CVFPB should the Council adopt this resolution and approve the Adequate Progress Finding; and

**WHEREAS**, the 2020 Adequate Progress Finding pursuant to Government Code Section 65962 approved with the passage of this resolution, with the City as the local land use agency, will allow the City to approve discretionary and ministerial permits within the River Islands at Lathrop Phase 2 Area; and

**WHEREAS**, this Adequate Progress Finding is based on substantial evidence in the record, including the Annual Report of Progress provided by RD 2062 and its District Engineer, included as Attachment B to the October 12, 2020 staff report and incorporated herein.

**NOW, THEREFORE, BE IT RESOLVED**, that the City Council of the City of Lathrop, acting as the Land Use Agency as defined by State law, hereby adopts this Adequate Progress Finding pursuant to California Government Code Section 65962 based on substantial evidence in the record, including Attachment B to the October 12, 2020 staff report, that adequate progress towards providing a 200-year Urban Level of Flood Protection by the year 2025 for the River Islands at Lathrop Phase 2 is being made.

**PASSED AND ADOPTED** by the City Council of the City of Lathrop this 12<sup>th</sup> day of October 2020 by the following vote:

AYES:

NOES:

ABSTAIN:

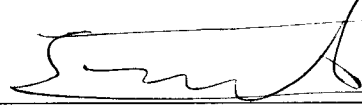
ABSENT:

\_\_\_\_\_  
Sonny Dhaliwal, Mayor

**ATTEST:**

\_\_\_\_\_  
Teresa Vargas, City Clerk

**APPROVED AS TO FORM:**

  
\_\_\_\_\_  
Salvador Navarrete, City Attorney

**RD 2062**



**RIVER ISLANDS AT LATHROP  
PHASE 2**

**REPORT OF ADEQUATE PROGRESS  
TOWARDS AN URBAN LEVEL OF FLOOD  
PROTECTION**

**AUGUST 2020**

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### Appendices

Appendix A	Engineer's Certification
Appendix B	Engineer's Response
Appendix C	Report by the Independent Panel of Experts
Appendix D	Engineer's Report





Finding, has been included as Appendix D. The Professional Civil Engineer's certification is provided as Appendix A.

- } A report by an Independent Panel of Experts (IPE) on the review of the report prepared by the Professional Civil Engineer. Appendix C is the IPE's Report to support an APF.
- } A response by the Professional Civil Engineer to the comments from the IPE. Specific comment responses are included in the IPE's Report (Appendix C). A response by the Professional Civil Engineer to the IPE's report is provided as Appendix B.
- } The most recent annual report prepared by the local flood management agency that was submitted to the Central Valley Flood Protection Board (CVFPB) documenting the efforts in working toward completion of the flood protection system. This requirement is non-applicable because this document is the first report.
- } Any additional data and information that cities or counties use to make the finding.

## 1.1 PURPOSE OF REPORT

The ULOP Criteria requires a report be prepared by the local maintaining agency, in this case Reclamation District 2062, demonstrating adequate progress as defined below:

- } The total project scope, schedule, and cost of the completed flood protection system have been developed to meet the appropriate standard of protection.
- } Revenues that are sufficient to fund each year of the project schedule have been identified and, in any given year and consistent with that schedule, at least 90 percent of the revenues scheduled to be received by that year have been appropriated and are currently being expended. And, notwithstanding this, for any year in which state funding is not appropriated consistent with an agreement between a state agency and a local flood management agency, the CVFPB may find that the local flood management agency is making adequate progress in working toward the completion of the flood protection system.
- } Critical features of the flood protection system are under construction, and each critical feature is progressing as indicated by the actual expenditure of the construction budget funds.
- } The city or county has not been responsible for a significant delay in the completion of the system.
- } The local flood management agency shall provide the DWR and the CVFPB with the information sufficient to determine substantial completion of the required flood protection. The local flood management agency shall annually report to the CVFPB on the efforts in working toward completion of the flood protection system.

This report addresses each of these items in subsequent chapters.

## 2. SCOPE

The ULOP Criteria requires a scope of work for completion of the flood protection system. The specific structural actions necessary for the Phase 2 levees to meet ULDC and the procedural actions to



demonstrate this compliance are presented in the *Engineer's Report*. Whereas the *Engineer's Report* is a technical document identifying the specific actions required for the levee system, this report is a planning document and describes the efforts that will accomplish these actions. Additionally, there are procedural actions required to meet ULOP Criteria beyond what is presented in the *Engineer's Report*.

## **2.1 STRUCTURAL ACTIONS**

In 2019, River Islands constructed the approximately 36,000 foot Phase 2 Levee. The levee ties in with the Phase 1, Stage 2B Levee, continues along the left bank of the Old River and along the right bank of Paradise Cut, until it terminates with the tie-in point with the Phase 1, Stage 1 Cross Levee (Plate 2). The levee embankments necessary to protect the Phase 2 Area have been constructed; however, additional structural actions are required to provide an urban level of flood protection, as described below.

### **PHASE 2 RELIEF WELLS**

As part of the design of the Phase 2 levee, seepage analyses associated with the Paradise Cut Setback Levee indicate that underseepage mitigation will be necessary to achieve 200-year level of flood protection. This is primarily due to the proximity of the Main Drain, a stormwater canal, and its invert elevation being lower than the groundwater elevation and partially penetrating the surficial fine-grained blanket layer. Relief wells were selected by the design team as the preferred underseepage mitigation method. A line of 28 relief wells, spaced apart between 70 and 135 feet, is proposed between the Paradise Cut Setback Levee and the Main Drain, between approximate levee stations 46+00 to 71+00, to intercept flow during high water events and reduce the exit gradient within the Main Drain. Discharged water will be collected in a pipe and discharged into an interior lake. Construction will commence after review of the relief wells by the IPE.

### **SCOUR PREVENTION PROJECT**

As part of the IPE review of the Phase 1 substantial evidence record, the IPE requested that River Islands evaluate the potential for erosion and scour failure of the Phase 1 Levees caused by failure of other embankments (i.e., the federal perimeter project levees and the UPRR embankment). This same concern applies to the Phase 2 levee and is therefore included as a structural action for the Phase 2 levee as well.

Design of the scour prevention projects was completed in 2020 and includes a series of landside fill embankments, i.e. "check dams", located between the Phase 1 and 2 levees and the federal project levees. The check dams will reduce the exposure time to erosive hydraulic shear stress on the landside of the interior levees in the event of breach along the federal project levee and/or the UPRR embankment. RD2062 has submitted an encroachment permit application to the CVFPB. Construction will begin once the permit has been issued.

## **2.2 RD 2062 O&M MODERNIZATION**

The ULDC provides requirements to support a modern levee program. This includes ensuring robust operations and maintenance (O&M) practices and procedures are in place for urban levees. To this end,



RD 2062 will review its current O&M practices and procedures, and will revise its manual to reflect a modern levee program. This will include new and improved practices and procedures for inspecting encroachments and penetrations, mitigating burrowing rodent damage, managing vegetation, and implementing a security plan. It will also include a review of existing flood safety plans to ensure any plans in place meet ULDC.

This effort was already completed as part of certification efforts for Phase 1; therefore, the work completed for Phase 1 will be expanded to the Phase 2 Levee. Expected deliverables are:

- } Rodent Control and Abatement Program
- } Encroachment and Penetrations Inspection Logs
- } Erosion Inspection Log
- } Flood Relief Cut Plan
- } Security Plan
- } Flood Safety Plan

### **2.3 RD 2062 RIGHT-OF-WAY ACQUISITION**

The ULDC requires fee title or an easement for the entire levee prism extending to a minimum of 20 feet beyond the landside toe of the flood protection system for access and inspection. Furthermore, waterward of the levee prism, where there is sufficient area to do so without resulting in the loss of sensitive riparian habitat, ULDC encourages a 15-foot-wide zone.

River Islands has transferred lands rights to RD 2062 for the entire embankment and 20 feet from the levee toes. Following completion of the ULDC evaluation, the right-of-way will be reviewed to determine if sufficient rights have been transferred. If additional rights are needed, River Islands will provide those.

### **2.4 DEVELOPMENT OF THE SUBSTANTIAL EVIDENCE RECORD**

Although the Phase 2 levee will meet ULDC, there is a considerable amount of effort involved in developing the substantial evidence record needed to demonstrate this fact. Individual memoranda, reports, and other documents, upon their completion, will be compiled to form the foundation of the substantial evidence record. RD 2062 will then prepare an *Engineer's Report*, which summarizes the compliance of the Phase 2 levees with the ULDC. The substantial evidence record, including the *Engineer's Report*, will be reviewed by the IPE. The IPE's review will be documented in a report, and subsequently, added to the substantial evidence record. The certifying engineer will then prepare a response to the IPE's review.

Expected deliverables for the Phase 2 Levee are:

- } Water surface elevations technical memorandum
- } Minimum top of levee evaluation memorandum
- } Geotechnical evaluation report
- } Scour evaluation memorandum



- } Levee Loading evaluation memorandum
- } Wind setup and wave runup evaluation report
- } Real estate deeds
- } RD 2062 Updated O&M Manual (i.e., O&M Modernization documents)
- } Phase 2 Urban Level of Flood Protection Engineer's Report
- } Phase 2 Urban Level of Flood Protection IPE's report

## 2.5 ULOP CRITERIA PROCEDURAL ACTIONS

Finally, in addition to the structural and procedural actions required to meet ULDC and described above, there also remains several procedural actions required to support a future ULOP Finding:

- } RD 2062 adoption of the ULDC certification package comprised of:
  - a. Engineer's Certification
  - b. Engineer's Report
  - c. IPE report
  - d. Engineer's Response
- } RD 2062 transmittal of the ULDC certification package to the City of Lathrop
- } City of Lathrop preparation of the ULOP Finding
- } City of Lathrop adoption of ULOP Finding

## 3. SCHEDULE

The required actions identified in the Engineer's Report, which are being accomplished through the aforementioned efforts, are anticipated to be completed within one to two years (Table 1). Some of the efforts will be conducted concurrently, while other efforts will be staggered.

**Table 1. Project Schedule**

ACTION	ESTIMATED START	ESTIMATED COMPLETION
Phase 2 Relief Wells - Design	Underway	2021
Phase 2 Relief Wells - Construction	2021	2021
Scour Prevention Project (Check Dams) – Design and Permitting	Underway	2020
Scour Prevention Project (Check Dams) – Construction	2021	2022
RD 2062 O&M Modernization	Underway	2021
RD 2062 Transfer of Real Estate Rights for Phase 2 Levee	Underway	2021
Development of the Substantial Evidence Record	Underway	2021
ULOP Criteria Procedural Actions	2021	2021



**Table 2** presents the status of compliance for each criterion, by levee. Both **Table 1** and **Table 2** will be updated annually as part of the annual report.

**Table 2. Status of Compliance With ULDC**

ULDC	CURRENT STATUS	ESTIMATED COMPLETION DATE
7.1 DESIGN WATER SURFACE	🕒	2020
7.2 MINIMUM TOP OF LEVEE	🕒	2021
7.3 SOIL SAMPLING, TESTING, AND LOGGING	🕒	2021
7.4 SLOPE STABILITY	🕒	2021
7.5 UNDERSEEPAGE	🕒	2021
7.6 LEVEE LOADING	🕒	2021
7.7 SEISMIC VULNERABILITY	🕒	2021
7.8 LEVEE GEOMETRY	🕒	2021
7.9 INTERFACES AND TRANSITIONS	🕒	2021
7.10 EROSION	🕒	2022
7.11 RIGHT-OF-WAY	🕒	2021
7.12 ENCROACHMENTS	🕒	2021
7.13 PENETRATIONS	🕒	2021
7.14 FLOODWALLS, RETAINING WALLS, AND CLOSURE STRUCTURES	🕒	2021
7.15 ANIMAL BURROWS	🕒	2021
7.16 LEVEE VEGETATION	🕒	2021
7.17 WIND SETUP AND WAVE RUNUP	🕒	2021
7.18 SECURITY	🕒	2021
7.19 SEA LEVEL RISE	🕒	2021
7.20 EMERGENCY ACTIONS	🕒	2021

- 🕒 In-Progress. Evaluations underway and construction required.
- 🕒 In-Progress. Development of the substantial evidence record underway.
- 🕒 In-Progress. IPE Review remaining.









GILBERT COSIO, JR., P.E.  
 MARC VAN CAMP, P.E.  
 WALTER BOUREZ, III, P.E.  
 RIC REINHARDT, P.E.  
 DON TRIEU, P.E.  
 DARREN CORDOVA, P.E.  
 NATHAN HERSHEY, P.E., P.L.S.  
 LEE G BERGFELD, P.E.  
 BEN TUSTISON, P.E.  
 THOMAS ENGLER, P.E., CFM  
 MICHAEL MONCRIEF, P.E.

ANGUS NORMAN MURRAY  
 1913-1985

CONSULTANTS:  
 JOSEPH I BURNS, P.E.  
 DONALD E KIENLEN, P.E.

## CERTIFICATION

This certification is provided to the City of Lathrop, River Islands at Lathrop, and Reclamation District (RD) 2062 for the sole purpose of supporting an Adequate Progress Finding (APF). This certification is made in accordance with the requirements, definitions, and descriptions in the State of California Department of Water Resources' (DWR) *Urban Level of Flood Protection Criteria* (November 2013), Section 2, Subsection EVD-3 and *Urban Levee Design Criteria* (ULDC) (May 2012), Section 7.0 *Urban Levee Design Criteria*.

All information, calculations, definitions, descriptions, restrictions, limitations, or other pertinent data contained or referenced in this document form the basis of this certification. This certification does not constitute a warranty or guarantee of performance, expressed or implied. This certification is made with respect to the River Islands at Lathrop Phase 2 Levee (Levee), as described in the *Reclamation District 2062, River Islands at Lathrop Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection Engineer's Report, August 2020* (Engineer's Report).

### Limits and Conditions of This Certification

This certification shall expire or become invalid at the earliest time any of the following conditions are met:

- } A certification of an urban level of flood protection for the Levees.
- } Integrity of the Levee has degraded to the point that the identified actions will not be adequate to provide an urban level of flood protection, as determined by me, or a duly qualified designated successor.
- } Discovery of any substantive defect in the condition of any component of the Levee that was not known at the time this certification was made, and which materially affects the Levee's ability to provide protection relative to the 0.5 percent annual flood, as determined by me, or a duly qualified designated successor.

## Certification Statement

At the request of RD 2062, as supported by the information contained and referenced within the Engineer's Report, this is to certify the following:

- } *Certification of Data and Information* – The data and information presented in this report are accurate to the best of my knowledge.
- } *Certification of Analysis* – To the best of my knowledge, the analyses conducted were performed in accordance with DWR's ULDC and/or sound engineering practices, in a manner consistent with the degree of skill and care ordinarily exercised by members of the civil engineering profession currently practicing in the same locality under similar conditions.

I, Richard Reinhardt, PE, a professional registered civil engineer in the State of California, certify that the aforementioned levee system, as described in the *Reclamation District 2062, River Islands at Lathrop, Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection Engineer's Report, August 2020* will provide an urban level of flood protection upon completion of the substantial evidence record.



Date: August 15, 2020

**ENGINEER'S RESPONSE TO**

**INDEPENDENT PANEL OF EXPERTS REPORT ON THE REVIEW OF  
*RIVER ISLANDS AT LATHROP, PHASE 2 LEVEE, ADEQUATE  
PROGRESS TOWARDS AN URBAN LEVEL OF FLOOD PROTECTION,  
ENGINEER'S REPORT*, DATED AUGUST 2020, PREPARED BY  
RECLAMATION DISTRICT 2062**

**PREPARED BY: RICHARD G. REINHARDT, P.E.**

SEPTEMBER 4, 2020

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Reclamation District 2062 issued its final *River Islands at Lathrop, Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection, Engineer's Report* (Engineer's Report) in August 2020. Subsequently, the RD 2062 Urban Level of Flood Protection Independent Panel of Experts (IPE) reviewed the Engineer's Report and issued its own report (Letter, Subject: *River Islands at Lathrop, Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection, Independent Panel of Experts' Review of Engineer's Report*) on their review on September 3, 2020. State of California, Department of Water Resources' Urban Level of Flood Protection Criteria requires a response by the Engineer to the IPE's report.

After review of the IPE's report, I concur with the IPE's opinion indicating the Engineer's Report documents the criteria, evaluations, and construction that will be implemented to provide an urban level of flood protection and does not provide substantial evidence that an urban level of flood protection currently exists. In addition to the IPE's report, the IPE provided non-substantive, but valuable comments that were considered and incorporated as appropriate. In support of the APF, there are no outstanding or unresolved comments from the IPE.

Signed,

A handwritten signature in black ink, appearing to read "Ric Reinhardt".

Ric Reinhardt, PE  
MBK Engineers



**Raymond Costa, PE, GE**  
Consulting Geotechnical Engineer  
6187 Reservoir Ct.  
Granite Bay, CA 95746

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September 3, 2020

Ms. Susan Dell'Osso, President  
Reclamation District 2062  
73 West Stewart Road  
Lathrop, CA 95330

**Subject: River Islands at Lathrop, Phase 2 Levee  
Adequate Progress towards an Urban Level of Flood Protection  
Independent Panel of Experts' Review of Engineer's Report**

Dear Ms. Dell'Osso:

**Introduction**

This letter serves as the Independent Panel of Experts' (IPE) report on the review of the Reclamation District (RD) 2062, *River Islands at Lathrop Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection Engineer's Report, August 2020* (Engineer's Report) for levees protecting the Phase 2 development area of River Islands on Stewart Tract. The Engineer's Report was prepared by MBK Engineers.

Phase 2 consists of an extension of the Phase 1 Old River setback levee, the Paradise Cut setback levee, and an extension of the Phase 1 Cross levee. These levee segments are for an additional ring levee cell within the interior of Stewart Tract that is adjacent to the Phase 1 ring levee system previously constructed in Stewart Tract. Together with the Phase 1 Stages 1, 2A, and 2B levees, these additional levee segments surround and protect the Phase 2 development area of Stewart Tract (see Figure 1). The Phase 2 levee portion of Stewart Tract is part of the Sacramento-San Joaquin Delta and part of the City of Lathrop in San Joaquin County, California.

The intent of the Phase 2 Engineer's Report is to demonstrate by substantial evidence in the record that a 200-year Urban Level of Flood Protection (ULOP) will exist within the Phase 2 development area if all of the actions outlined in the Engineer's Report are completed. Specifically, the purpose of the Engineer's Report is to document the work completed to date and identify what additional work might need to be completed to assure that the 200-year ULOP will exist no later than 2025. The Phase 1 Stages 1, 2A, and 2B levee systems were previously constructed and were the subject of a previous Adequate Progress Finding (APF) by the City of Lathrop in 2017. The Phase 2 levee segments have now also been constructed. The Phase 2 Engineer's Report will be used to support an APF to be made by the City of Lathrop that the Phase 2 levee system is making adequate progress towards a 200-year ULOP. Both the Phase 1 and the Phase 2 levee systems are necessary to provide a 200-year ULOP for the Phase 2 development area.

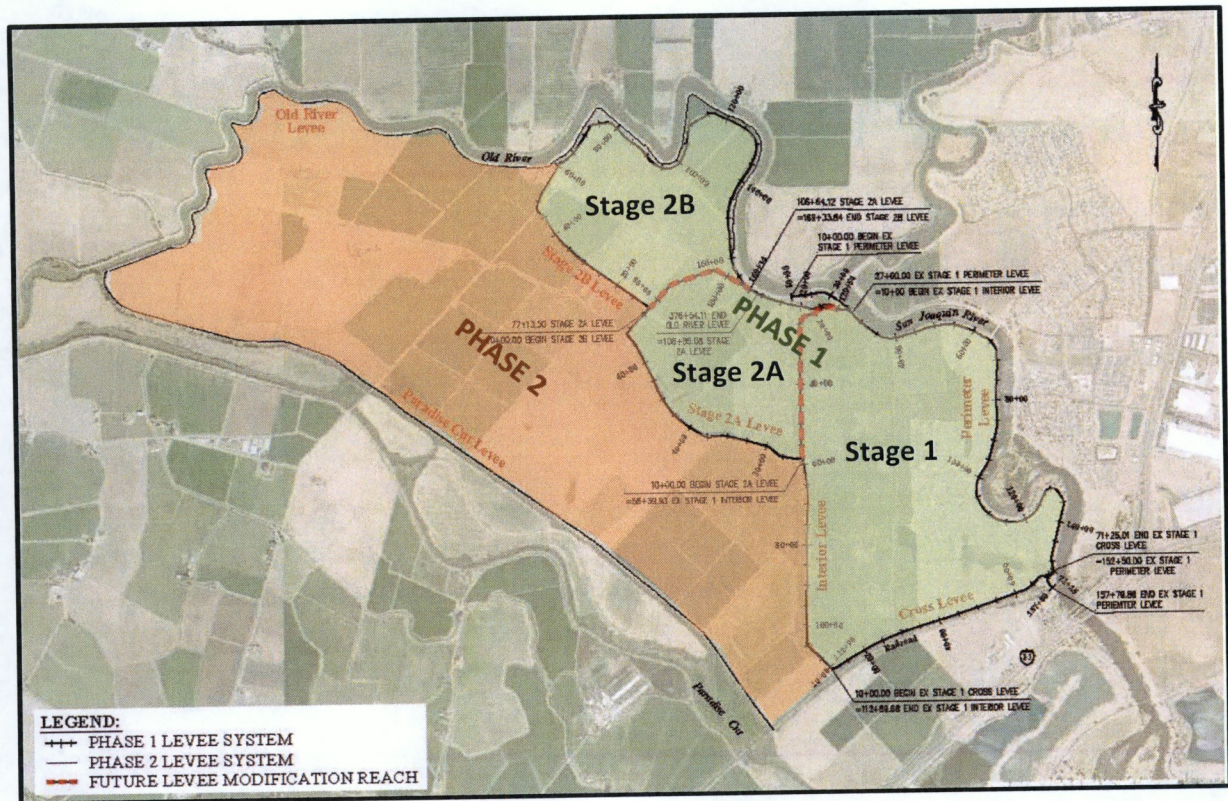


Figure 1: River Islands at Lathrop - Phases 1 and 2 Development Areas (adapted from MBK, 2016)

A review of the Engineer’s Report by the IPE and a letter of concurrence from the IPE is typically required in order to complete the APF. The IPE previously reviewed the Engineer’s Reports and other supporting documents for the Stage 1 portion of the Phase 1 development area and documented its conclusions in a May 9, 2016 report. The IPE also previously reviewed the Engineer’s Reports and other supporting documents for the Stages 2A and 2B portions of the Phase 1 development area and documented its conclusions in a January 28, 2017 report. In both reviews, the IPE concurred at the time that there was substantial evidence in the record that the levee systems will meet a 200-year ULOP if all of the actions outlined in the Engineer’s Reports were completed.

**Purpose of Review**

Senate Bill 5, enacted in 2007, requires cities and counties within the Sacramento-San Joaquin Valley to make a finding related to the Urban Level of Flood Protection criteria before approving certain land-use decisions within a flood basin. The finding can be either a finding that the levee system **provides** an Urban Level of Flood Protection, or a finding that **adequate progress** is being made towards providing an Urban Level of Flood Protection. In this case, the IPE is being asked to review an Engineer’s Report for the River Islands Phase 2 levee system in support of an APF. The technical criteria associated with an Urban Level of Flood Protection and what is

required for substantial evidence in the record to support an APF are contained in the following two documents:

1. Urban Levee Design Criteria (ULDC) – published by the Department of Water Resources (DWR) in May 2012, this document provides the engineering criteria and guidance for the design, evaluation, operation, and maintenance of levees and floodwalls that provide a 200-year Urban Level of Flood Protection. It outlines 20 technical areas associated with levee integrity and the evaluations needed to assure an Urban Level of Flood Protection:
  - ❖ Section 7.1 - Design Water Surface Elevation
  - ❖ Section 7.2 - Minimum Top of Levee
  - ❖ Section 7.3 - Soil Sampling, Testing, and Logging
  - ❖ Section 7.4 - Slope Stability for Intermittently Loaded Levees
  - ❖ Section 7.5 - Underseepage for Intermittently Loaded Levees
  - ❖ Section 7.6 - Frequently Loaded Levees
  - ❖ Section 7.7 - Seismic Vulnerability
  - ❖ Section 7.8 - Levee Geometry
  - ❖ Section 7.9 - Interfaces and Transitions
  - ❖ Section 7.10 - Erosion
  - ❖ Section 7.11 - Right-of-Way
  - ❖ Section 7.12 - Encroachments
  - ❖ Section 7.13 - Penetrations
  - ❖ Section 7.14 - Floodwalls, Retaining Walls, and Closure Structures
  - ❖ Section 7.15 - Animal Burrows
  - ❖ Section 7.16 - Levee Vegetation
  - ❖ Section 7.17 - Wind Setup and Wave Runup
  - ❖ Section 7.18 - Security
  - ❖ Section 7.19 - Sea Level Rise
  - ❖ Section 7.20 - Emergency Actions
  
2. Urban Level of Flood Protection (ULOP) Criteria – published in November 2013 by DWR, this document describes the procedures for making findings, including the processes for having substantial evidence in the record to make an APF.

To support an APF, the ULOP Criteria includes the following requirements:

*“EVD-3: Substantial evidence in the record to support a finding related to an urban level of flood protection based on adequate progress on the construction of a flood protection system shall include the following, at a minimum:*

- *A report prepared by a Professional Civil Engineer registered in California to document the data and analyses for demonstrating the property, development project, or subdivision will have an urban level of flood protection at the time when the flood protection system is completed.*
- *A report by an Independent Panel of Experts on the review of the report prepared by the Professional Civil Engineer.*

- *A response by the Professional Civil Engineer to the comments from the Independent Panel of Experts.*

The ULOP EVD-3 Criteria has other requirements as well, but the subject of this report by the IPE pertains to the second bullet outlined above. Under Section 3.0, Other Considerations, the ULOP Criteria also states:

*“The report prepared by a Professional Civil Engineer registered in California should provide the following information as evidence that an urban level of flood protection exists or will exist for the area under consideration:*

- *A list of the flood management facilities utilized in providing an urban level of flood protection, including, but not limited to, SPFC facilities.*
- *The location of the flood management facilities utilized in providing an urban level of flood protection.*
- *The entities that operate and maintain the flood management facilities utilized in providing an urban level of flood protection.*
- *A list of, and consideration of, reports, evaluations, inspections, and performance history of the flood management facilities utilized in providing an urban level of flood protection since the previous finding, if any, was made.*
- *The response to the Independent Panel of Experts.”*

Also under Section 3.0, Other Considerations, the ULOP Criteria states:

*“The report by an Independent Panel of Experts should consider the assertions made in the Professional Civil Engineer’s report and determine whether:*

- *An urban level of flood protection from the identified sources of flooding exists or will exist for the area under consideration. or*
- *The subject flood management facilities meet the Urban Levee Design Criteria (DWR, 2012).*

*If the panel does not concur with the assertions made in the Professional Civil Engineer’s report, the report by the Independent Panel of Experts should state the reason(s) for not concurring.”*

### **Composition of the IPE**

The ULOP Criteria requires an IPE review of the Engineer’s Report when flood management facilities and procedures are relied upon to provide an Urban Level of Flood Protection. As described in ULOP Criteria EVD-5, the ULOP Criteria requires a panel of at least three experts with different expertise, including at least one with expertise in hydrology and hydraulics, and at least two with expertise in design and construction of flood management facilities relevant to those under review, in this case, levee systems protecting urbanized areas. This IPE is comprised of Mr. Raymond Costa and Dr. Leslie F. Harder, both of whom have expertise in the design and

construction of levees and other flood management facilities, and Dr. David T. Williams who has expertise in hydrology and hydraulics.

### **Current IPE Review of the Engineer's Report for the Phase 2 Levee Systems**

The IPE reviewed the Engineer's Report, dated August 2020, prepared by MBK Engineers. In addition, the IPE has also received two interim reports prepared by ENGE0. These reports include a ULOP Evaluation Summary of Services dated July 23, 2020 and Testing and Observation Services During Levee Construction dated December 20, 2019. No technical analyses have been included in these reports.

The IPE makes the following observations with regard to the August 2020 Engineer's Report prepared by MBK Engineers in meeting the requirements for an APF for an Urban Level of Flood Protection:

1. The Engineer's Report has been prepared under the direction of a licensed Civil Engineer in the State of California, Mr. Richard G. Reinhardt, PE, who has provided a Certification Statement stating that the Phase 2 levees will provide an Urban Level of Flood Protection upon completion of the actions identified in the Engineer's Report. Mr. Reinhardt has signed and stamped the Certification Statement (see Attachment 1).
2. The Engineer's Report has prepared a complete list of the flood management facilities subject to this finding, namely the Phase 2 levee system.
3. The Engineer's Report defines and describes the flood protection facilities, and their locations.
4. The Engineer's Report identifies the local maintaining agencies that operate and maintain the flood management facilities that will be utilized in providing an Urban Level of Flood Protection, namely Reclamation District 2062.
5. The Engineer's Report demonstrates a clear understanding of the requirements of DWR's ULDC and what is needed for the Phase 2 levee system to meet these requirements.

In addition, MBK Engineers and other members of the River Islands Team have previously provided substantial evidence in the record that it fully understands the requirements of DWR's ULDC in addressing the APF for the Phase 1 Stages 1, 2A, and 2B levee system.

It is important to note that, other than the current Engineer's Report, no specific documentation regarding the engineering analyses, evaluations, or construction documentation have yet been provided for Phase 2 levee system for IPE review. Such information has also not yet been provided to the IPE for the Phase 1 Stages 2A and 2B levee systems, which also contribute to eventually providing a 200-year ULOP for the area protected by the Phase 2 levees. For both sets of levee systems, the Engineer's Reports simply documents the criteria, evaluations, and construction that *will be implemented* to support a 200-year ULOP for these levees. For the Phase 2 levee system, the Engineer's Report concludes that *none* of ULDC criteria are currently met for the Phase 2 levee system, in part because none of the engineering analyses, evaluations, and related documentation has been reviewed by the IPE. Thus, there remains a significant amount



of work, analyses, construction, and documentation to be done before a full finding that a 200-year ULOP exists can be made. This statement applies to both the Phase 1 and Phase 2 levees. Nevertheless, the IPE believes the Engineer's Report satisfies the requirements for an ULOP APF.

The IPE also wishes to state clearly that while the Phase 2 levee system has already been constructed, additional structural actions may need to be made to this levee system if it is found that the constructed features cannot be fully documented and shown to meet ULDC criteria. The Engineer's Report already describes the need for adding relief wells to the constructed Phase 2 Paradise Cut Setback Levee in order to meet underseepage criteria. There may need to be additional measures added to meet ULDC criteria once the evaluations have been fully developed, documented, and reviewed. In addition, there may be a need to purchase additional right-of-way for the additional measures and facilities that may need to be added. This should be recognized and acknowledged in the Engineer's Report.

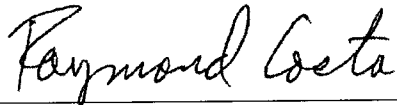
The IPE also provided several comments informally to MBK Engineers on the Engineer's Report. These comments do not affect our finding and were provided as recommendations to improve the clarity of the Engineer's Report.

### **Conclusion of the IPE**

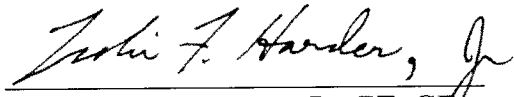
The IPE has reviewed the August 2020 Engineer's Report and the Engineer's Certification and concurs that there is substantial evidence in the record demonstrating that the River Islands Phase 2 levee system will provide an Urban Level of Flood Protection upon completion of the evaluations and construction of any additional measures such as relief wells needed to meet ULDC criteria. The Engineer's Report provides documentation of an understanding of the ULDC criteria and types of measures and efforts necessary to meet the criteria.

Respectfully submitted,

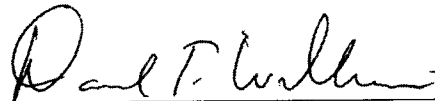
**RIVER ISLANDS IPE TEAM MEMBERS**



Mr. Raymond Costa, PE, GE



Dr. Leslie F. Harder, Jr., PE, GE



Dr. David T. Williams, PE, PH, CFM, DWRE

Attachments:

- 1) Certification Statement from Ric Reinhardt, MBK Engineers, dated August 15, 2020

**Attachment 1:**

**Certification Statement from Richard Reinhardt, MBK  
Engineers,**

**Dated: August 15, 2020**



GILBERT COSIO, JR., P.E.  
 MARC VAN CAMP, P.E.  
 WALTER BOUREZ, III, P.E.  
 RIC REINHARDT, P.E.  
 DON TRIEU, P.E.  
 DARREN C. ORDOVA, P.E.  
 NATHAN HERMNEY, P.E., P.L.S.  
 LET G. BERGFELD, P.E.  
 BEN DUSTISON, P.E.  
 THOMAS ENGLER, P.E., CFM  
 MICHAEL MONCRIEF, P.E.

ANGUS NORMAN MURRAY  
 1913-1985

CONSULTANTS:  
 JOSEPH J. BURSS, P.E.  
 DONALD E. KIENLEN, P.E.

### CERTIFICATION

This certification is provided to the City of Lathrop, River Islands at Lathrop, and Reclamation District (RD) 2062 for the sole purpose of supporting an Adequate Progress Finding (APF). This certification is made in accordance with the requirements, definitions, and descriptions in the State of California Department of Water Resources' (DWR) *Urban Level of Flood Protection Criteria* (November 2013), Section 2, Subsection *FVD-3* and *Urban Levee Design Criteria* (ULDC) (May 2012), Section 7.0 *Urban Levee Design Criteria*.

All information, calculations, definitions, descriptions, restrictions, limitations, or other pertinent data contained or referenced in this document form the basis of this certification. This certification does not constitute a warranty or guarantee of performance, expressed or implied. This certification is made with respect to the River Islands at Lathrop Phase 2 Levee (Levee), as described in the *Reclamation District 2062, River Islands at Lathrop Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection Engineer's Report, August 2020* (Engineer's Report).

#### Limits and Conditions of This Certification

This certification shall expire or become invalid at the earliest time any of the following conditions are met:

- } A certification of an urban level of flood protection for the Levees.
- } Integrity of the Levee has degraded to the point that the identified actions will not be adequate to provide an urban level of flood protection, as determined by me, or a duly qualified designated successor.
- } Discovery of any substantive defect in the condition of any component of the Levee that was not known at the time this certification was made, and which materially affects the Levee's ability to provide protection relative to the 0.5 percent annual flood, as determined by me, or a duly qualified designated successor.

Continued on next page

*MBK Certification River Islands Phase 2 Levee*

**Certification Statement**

At the request of RD 2062, as supported by the information contained and referenced within the Engineer's Report, this is to certify the following:

- } *Certification of Data and Information* – The data and information presented in this report are accurate to the best of my knowledge.
  
- } *Certification of Analysis* – To the best of my knowledge, the analyses conducted were performed in accordance with DWR's ULDC and/or sound engineering practices, in a manner consistent with the degree of skill and care ordinarily exercised by members of the civil engineering profession currently practicing in the same locality under similar conditions.

I, Richard Reinhardt, PE, a professional registered civil engineer in the State of California, certify that the aforementioned levee system, as described in the *Reclamation District 2062, River Islands at Lathrop, Phase 2 Levee, Adequate Progress Towards an Urban Level of Flood Protection Engineer's Report, August 2020* will provide an urban level of flood protection upon completion of the substantial evidence record.



Date: August 15, 2020

**RD 2062**



**RIVER ISLANDS AT LATHROP  
PHASE 2 LEVEE**

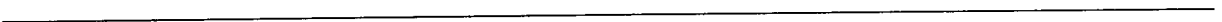
**ADEQUATE PROGRESS TOWARDS AN URBAN  
LEVEL OF FLOOD PROTECTION**

**ENGINEER'S REPORT**

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**AUGUST 2020**

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## ACRONYMS AND ABBREVIATIONS

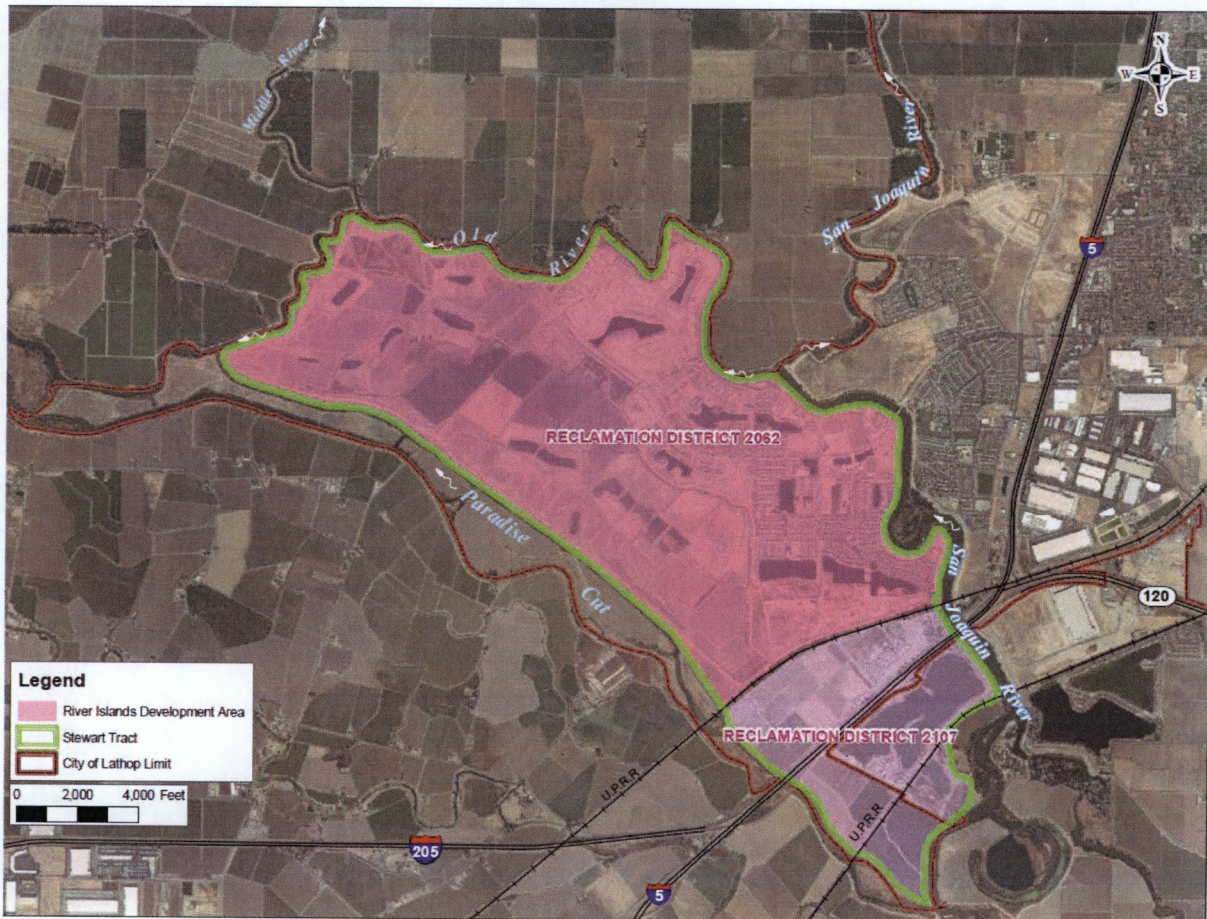
APF	Adequate Progress Finding
DWR	California Department of Water Resources
DWSE	Design Water Surface Elevation
ETL	Engineering Technical Letter
FEMA	Federal Emergency Management Agency
H:V	horizontal-to-vertical ratio
HTOL	Hydraulic Top of Levee
IPE	Independent Panel of Experts
LSJR Model	Lower San Joaquin River HEC-RAS Model
MBK	MBK Engineers
MTOL	Minimum Top of Levee
O&M	operation and maintenance
pcf	pounds per cubic foot
RD	Reclamation District
SB	Senate Bill
SOP	Standard Operating Procedure
SPFC	State Plan of Flood Control
SPK	Sacramento District (USACE)
ULDC	Urban Levee Design Criteria
ULOP Finding	Urban Level of Flood Protection Finding
ULOP Criteria	Urban Level of Flood Protection Criteria
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
WSE	water surface elevation



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**Figure 1. Reclamation District 2062**

The City of Lathrop (City) made an initial Adequate Progress Findings (APF) for the River Islands at Lathrop Project Phase 1-Stage 1 Area in 2016 and the entire Phase 1 Area (Stage 1, Stage 2A, and 2B Areas) in 2017 based on certification by Reclamation District (RD) 2062 that the Phase 1 Levee System would provide an urban level of flood protection upon completion of the procedural requirements in the ULOP Criteria (see references in Section 5.0). Subsequently, River Islands constructed a new levee, the Phase 2 Levee, in the summer of 2019 which was designed to protect against the 200-year event (Figure 1. Reclamation District 2062).

The City now intends to adopt an APF for the Phase 2 Area (Figure 2).

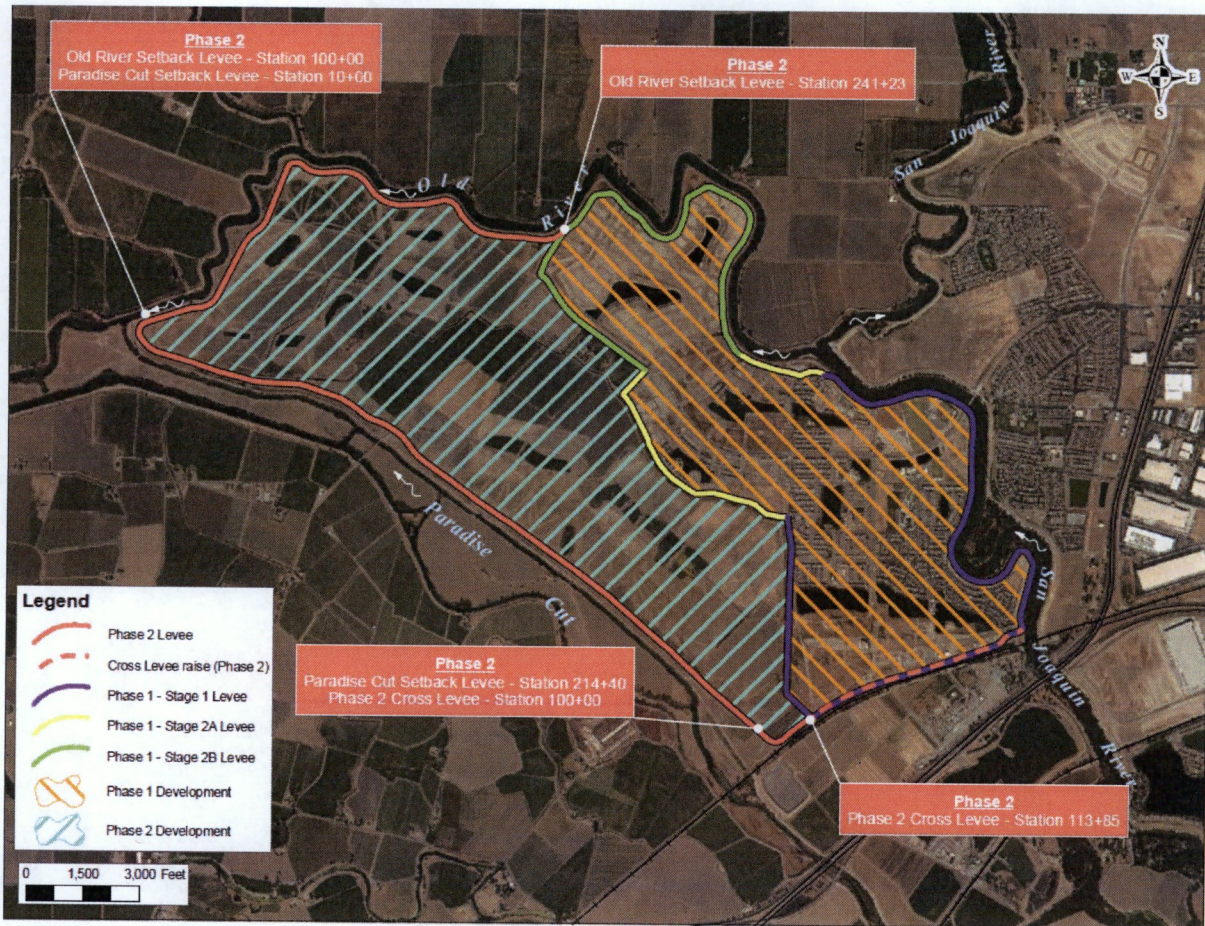


Figure 2. Phase 1 and Phase 2 Levees

## REPORT PURPOSE AND ORGANIZATION

The purpose of this engineer's report is to present the required information listed above, and to describe the current status of the levee system's compliance with the ULDC. Because the City is amending the Phase 1 Area APF, this report only discusses the Phase 2 Levee. This report relies on other documents, reports, analyses, and evaluations to comprise the substantial evidence record in support of an APF. In particular, this report relies heavily, and hereby incorporates by reference, the substantial evidence record presented in the River Islands at Lathrop Phase 1 Stage 1 (Reclamation District 2062, 2016) and Phase 1 Stages 2A and 2B Engineer's Reports (Reclamation District 2062, 2017).

This report provides a description of the flood system in Section 2.0 and each individual ULDC is discussed in Section 3.0. Section 4.0 describes the outstanding actions that require resolution to provide an urban level of flood protection.

## **REVIEW BY AN INDEPENDENT PANEL OF EXPERTS**

The ULOP Criteria (Section Substantial Evidence, Subsection EVD-5), requires a review by an Independent Panel of Experts (IPE) when flood management facilities are relied upon to provide an urban level of flood protection. The River Islands at Lathrop IPE is comprised of Dr. Les Harder and Mr. Ray Costa, both of whom have expertise in the design and construction of levees and other flood management facilities, and Dr. David Williams who has expertise in hydrology and hydraulics.

The IPE has been heavily engaged in the River Islands at Lathrop project since before 2014. Their engagement has focused on ensuring that levees designed and constructed by River Islands not only meet ULDC but provide a robust and resilient system. This includes their participation in the two prior APFs. Their previous reviews are documented in the APF packages included in the references provided in Section 5.

Following the IPE's review of this Engineer's Report, the IPE will prepare its own report, and the Engineer will prepare a response to the IPE's report. The IPE's report and the Engineer's Response are separate documents that will support the APF.



## 2.0 DESCRIPTION OF FLOOD MANAGEMENT FACILITIES

The River Islands at Lathrop project is a master planned community located within the limits of the City of Lathrop on Stewart Tract. The island is comprised of two sections, delineated by the Union Pacific Railroad (UPRR) embankment located west of Interstate 5, which coincides with the jurisdictional boundary between RD 2062 and RD 2107 (Figure 1). RD 2062 can be further delineated into the Phase 1 and Phase 2 Areas of the River Islands at Lathrop development (Figure 2). RD2062 maintains both the Federal and non-Federal levees within its jurisdictional boundary.

The Phase 1 area is bounded by the Stage 1 Levees (i.e., Perimeter Levee, Interior Levee, and Cross Levee), Stage 2A Levee, and Stage 2B Levee. The Phase 2 area is bounded by both the Phase 2 Levee and portions of the Phase 1 levee system (Figure 2). Because portions of the Phase 1 levee system protect the Phase 2 area, the Phase 1 substantial evidence record is hereby incorporated by reference into this document.

### PHASE 2 LEVEE

The Phase 2 Levee is a non-Federal levee and is not a SPFC facility, constructed to provide flood protection to future urban areas. It is a dry-land levee in that it is interior to the federally authorized levees surrounding Stewart Tract. The levee consists of a new continuous earthen embankment, approximately 36,000 feet (6.81 miles) in length, connecting the Phase 1- Stage 2B Levee to the Phase 1 - Stage 1 Cross Levee (Figure 2). The Phase 2 Levee can be delineated into three reaches: **Old River setback** (14,123 feet / 2.67 miles) along the left bank of the Old River joined with the existing Stage 2B levee; the **Paradise Cut setback** (20,440 feet / 3.87 miles) along the right bank of Paradise Cut between the Old River reach and the Phase 1- Stage 1 Cross levee; and the **Cross levee connection** (1,385 feet) between the Paradise Cut setback and the previously constructed Phase 1-Stage 1 Cross Levee.

Construction of the Phase 2 Levee occurred in 2019 and began with removal of existing irrigation infrastructure and excavation of the inspection trench (which is centered on the waterside hinge point for the entire levee extent). Fill generated from excavation of the inspection trench and future lakes was used to construct the levee and backfill the inspection trench. The new levee waterside toe was offset a minimum of 20 feet from the existing landside toe of the Old River Project Levee and 100 feet from the existing landside toe of the Paradise Cut Levee, outside of the Central Valley Flood Protection Board easement. The new levee embankment consists of 3 horizontal: 1 vertical (H:V) slopes and a 40-foot-wide crown. The crown elevation was selected based on criteria established by the ULDC.

Based on observation of the inspection trench and analyses performed between the existing and new levees, no adverse impacts to the Federal levee are expected. The material used for construction meets current U.S. Army Corps of Engineers (USACE) and ULDC geotechnical requirements and construction was overseen by geotechnical engineers to ensure conformance with plans and specifications, through visual inspection, and field and laboratory testing. A total of 603 soil samples were taken throughout the inspection trench subexcavation and levee embankment during fill placement to confirm compliance with the project specifications. Specifically, material compliance testing performed during levee construction consisted of Atterberg Limits and grain size distribution tests. Levee fill was compacted to at least 90 percent relative compaction at a minimum of 3 percentage points over the optimum moisture content





(ASTM D-1557). Levee fill consisted of soil material with a Plasticity Index of 8 or more, a Liquid Limit of less than 50 percent, 20 percent or more passing the No. 200 sieve, and a maximum particle size of two inches.

In addition to construction of the new levee embankment, construction of the Phase 2 Levee also included raising the Phase 1-Stage1 Cross Levee by up to three feet for 4,900 ft.

The levee will be maintained by RD 2062. Additional details about the Phase 2 Levee are found in Chapter 3.

## **PAST PERFORMANCE**

The Phase 2 Levee is a dry-land levee of recent construction (2019) and has not experienced a high-water event.



### 3.0 ULDC EVALUATION OF THE PHASE 2 LEVEE

To support an APF for the Phase 2 Area, an evaluation of the Phase 2 Levee was performed to determine their compliance with ULDC. The evaluation of the levee for each criterion is provided below.

#### ULDC 7.1: DESIGN WATER SURFACE ELEVATION

The Design Water Surface Elevation (DWSE) is the 200-year WSE used to design and evaluate levees and floodwalls for the purposes of providing an urban level of flood protection. The ULDC offers two options for determination of the DWSE: the FEMA approach and the USACE approach. The median 200-year Water Surface Elevations (WSE) is the unadjusted DWSE. With consideration and adjustments for debris loading, superelevation, climate change, updated hydrology, updated hydraulic models, and sea level rise, the median 200-year WSE becomes the DWSE.

An additional water surface elevation required by the ULDC is the Hydraulic Top of Levee (HTOL), which is defined as the lower of the DWSE plus 3 feet or the median 500-year water surface elevation. The HTOL is used to evaluate slope stability and seepage.

#### PHASE 2 LEVEE

River Islands has computed the DWSE and HTOL for the Phase 2 Levee using the same methods and assumptions as used for the Phase 1 Levee Systems (Stages 1, 2A, and 2B). The FEMA approach was used, and the MBK Lower San Joaquin River HEC-RAS model (LSJR Model) was used for the hydraulic computations. The DWSE profiles for the Phase 2 levee segments are shown in Figures 3 through 5. The HTOL was defined as the median 500-year water surface elevation. While the Phase 2 Levee appears to meet ULDC 7.1, and development of the DWSE and HTOL have been documented, the document and analysis are undergoing review by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.1.



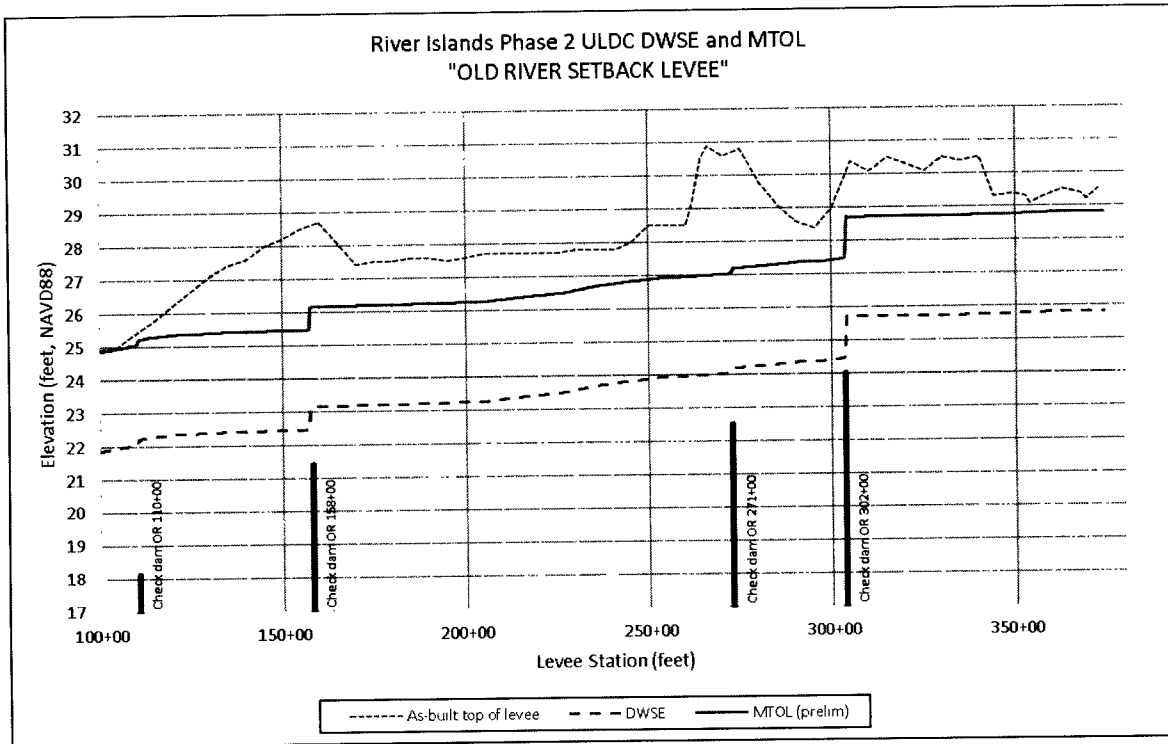


Figure 3. DWSE and MTOL Profiles for Old River Setback Levee

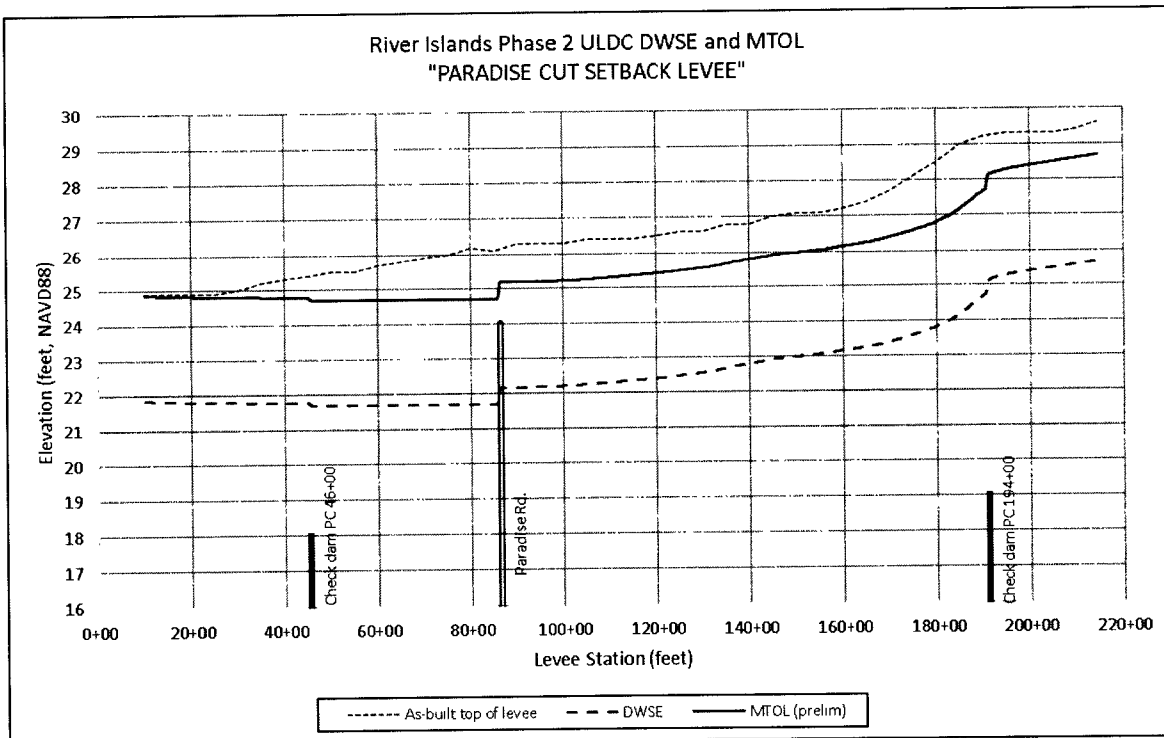


Figure 4. DWSE and MTOL Profiles for Paradise Cut Setback Levee



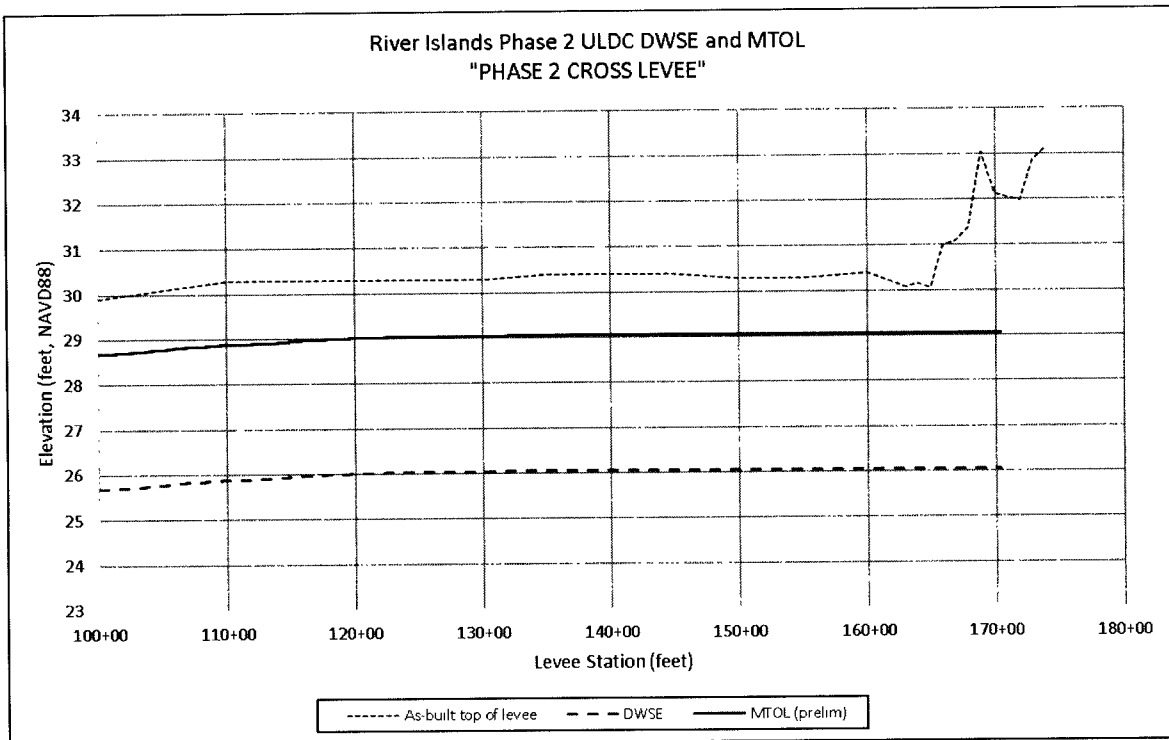


Figure 5. DWSE and MTOL Profiles for Cross Levee

## ULDC 7.2: MINIMUM TOP OF LEVEE

The Minimum Top of Levee (MTOL) is the required minimum elevation for the physical top of levee to provide reasonable assurance of containing the DWSE. The MTOL is defined as the higher of the DWSE plus 3 feet or the DWSE plus wind setup and wave runup (discussed in ULDC 7.17).

### PHASE 2 LEVEE

The maximum computed wind setup and wave runup for the Phase 2 levee is 2.53 feet, therefore the MTOL is equal to the DWSE plus 3 feet. MTOL and top of levee elevation profiles are shown in Figures 3 through 5. The Phase 2 Levee appears to meet ULDC 7.2 for MTOL; however, because this evaluation has not undergone review by the IPE, the Phase 2 Levee **does not meet** ULDC 7.2.

## ULDC 7.3: SOIL SAMPLING, TESTING, AND LOGGING

ULDC 7.3 requires soil sampling, testing, and logging, per standard procedures prescribed in guidance documents, including USACE Sacramento District's *Geotechnical Levee Practice Standard Operating Procedures* and DWR's Division of Flood Management *Soil and Rock Logging, Classification, Description and Presentation Manual* (2009) (SOP).

## PHASE 2 LEVEE

River Islands completed a thorough geotechnical investigation effort for the Phase 2 Levee that included 43 borings, 15 test pits, and 176 Cone Penetration Test sounding. In addition, an additional 70 borings and 245 Cone Penetration Test soundings were performed within the interior of the Phase 2 levee in support of various geotechnical investigations, which have been used in support of the analysis of the Phase 2 Levee. The Phase 2 Levee construction was observed by the geotechnical engineer of record, and the as-built plans and field and laboratory testing indicate that the entire levee was constructed of levee-specification fill.

The Phase 2 Levee appears to meet ULDC 7.3, however, geotechnical data reports have not yet been reviewed by the IPE; therefore, the Phase 2 **does not meet** ULDC 7.3.

## **ULDC 7.4: SLOPE STABILITY FOR INTERMITTENTLY LOADED LEVEES**

ULDC 7.4.1 requires a minimum factor of safety of 1.4 landside slope stability during steady-state seepage conditions, based on the DWSE, for failure surfaces that intersect the levee crown and are greater than a few feet deep in the levee slope. It also requires a minimum factor of safety of 1.2, based on the HTOL, for failure surfaces that intersect the levee crown and are greater than a few feet deep in the levee slope. ULDC 7.4.2 requires a minimum safety factor of 1.0 to 1.2 for waterside slope stability during rapid drawdown conditions from the DWSE depending how long the embankment is saturated with the higher factor of safety used for longer duration events.

The ULDC also provides guidance for the presence of wide (crown width over 20 feet) and extremely wide (crown width over 50 feet) levees with respect to levee stability. A slope may have a factor of safety less than the specified criteria, provided that the minimum levee dimensions are contained within the existing levee prism, and that the minimum levee geometry meets the minimum slope stability and seepage criteria. Based on crown width of 40 feet, the Phase 2 Levee can be considered a wide levee.

Though the ULDC does not directly address through seepage analyses, it does consider the potential for erosion when addressing the integrity of the levee. Specifically, the ULDC states that if the "phreatic surface emerges onto a landside levee slope consisting of erodible materials, remediation will be required to prevent unraveling and progressive slope failure that may lead to a levee breach." However, based on the material specifications for the Phase 2 levee fill, the embankments, through which seepage is exiting, do not consist of erodible material.

## PHASE 2 LEVEE

Preliminary slope stability and through seepage analyses were evaluated for the Phase 2 Levee. Utilizing the supplemental and historic explorations, idealized subsurface stratigraphy was developed at critical locations to model and analyze seepage and slope stability in the GeoStudios software packages SEEP/W and SLOPE/W, respectively. Critical locations were identified based on explorations performed within Phase 2, and cross sections were analyzed using the GeoStudios 2012 software program. The stability of the Phase 2 levee slopes relative to steady state seepage conditions under the design water surface elevation (DWSE) and the hydraulic top of levee (HTOL), and the rapid drawdown condition between the DWSE and the waterside adjacent ground surface were evaluated. Based on the preliminary results, the



slope stability for steady state seepage and rapid drawdown conditions are in conformance with the criteria specified above. Although the Phase 2 Levee appears to meet for ULDC 7.4, the analyses and results have not yet been documented or reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.4.

## **ULDC 7.5: UNDERSEEPAGE FOR INTERMITTENTLY LOADED LEVEES**

ULDC 7.5 provides levee underseepage criteria for intermittently loaded levees. Based on USACE Engineering Manual 1110-2-1913 (as modified by Engineering Technical Letter 1110-2-569) and the ULDC, the current guidance for acceptable exit gradients through soils with a minimum saturated unit weight of 112 pounds per cubic foot at the toe of the levee (average exit gradient) should be no greater than 0.5 and no greater than 0.8 at a distance of 150 feet from the levee toe for the DWSE. In addition, the minimum criteria for any location between the levee toe and 150 feet from the toe should be linearly interpolated between 0.5 and 0.8 for the DWSE. When modeling a scenario that incorporates the HTOL, the allowable exit gradient is no greater than 0.6 at the levee toe.

### **PHASE 2 LEVEE**

Preliminary seepage analyses were performed for the Phase 2 Levee, including simultaneous flood stage conditions due to flooding within the RD 2062 basin and flood stage in Old River and the presence of landside lakes. Utilizing the supplemental and historic explorations, idealized subsurface stratigraphy was developed at critical locations to model and analyze seepage and slope stability in the Geostudios software packages SEEP/W and SLOPE/W, respectively. Consideration of three-dimensional underseepage effects have been evaluated based on plan-view seepage analyses and will be incorporated by applying a surcharge to the total head within the confined aquifer underlying the proposed levee.

Based on preliminary analysis, portions of the Phase 2 Levee will require additional mitigation to meet underseepage criteria specified above. The proximity of the Main Drain to the Paradise Cut setback levee between approximately Station 46+00 to 71+00 results in adverse underseepage exit gradients within the drain. To accommodate the drain, relief wells will be constructed between the Paradise Cut setback levee and the Main Drain.

Due to the sharp bends in the channels adjacent to Phase 2, the three-dimensional underseepage effects generally create high pore pressures in portions of the Phase 2 levee alignment. Based on our preliminary plan view analyses, these effects will be greatly reduced by the presence of interior lakes within Phase 2 that intercept the aquifer and dissipate excess pore pressures beneath the levees. However, since these lakes will not be completed until future development progresses, temporary relief wells will be constructed outside of the future lake alignments to intercept underseepage and reduce the total head within the aquifer in a similar manner to the future lake. Design of the proposed relief wells for both the Main Drain and the future lakes is in progress, and the evaluation and results have not yet been documented or reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.5.



## ULDC 7.6: FREQUENTLY LOADED LEVEES

ULDC 7.6 clarifies that frequently loaded levees are subject to more stringent requirements. Frequently loaded levees are those levees that experience a water surface elevation of 1 foot or higher above the elevation of the landside levee toe at least once a day for more than 36 days per year on average.

### PHASE 2 LEVEE

The Phase 2 Levee is a dry-land levee and does not meet the definition of a frequently loaded levee. Therefore, more stringent requirements do not apply. However, this conclusion requires documentation by River Islands and review by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.6.

## ULDC 7.7: SEISMIC VULNERABILITY

ULDC 7.7 requires an analysis of seismic vulnerability of the levee system for the 200-year return period ground motions. ULDC 7.7.1 indicates that if seismic damage from the 200-year return period ground motion is expected, a post-earthquake remediation plan is required as part of a flood safety plan developed in coordination with pertinent local, State, and Federal agencies.

### PHASE 2 LEVEE

Seismic vulnerability was evaluated for the Phase 2 Levee using the same methods as used for the Phase 1 Levee. Based on preliminary seismic vulnerability analyses, including liquefaction triggering, pseudostatic stability, and post-liquefaction stability analysis, portions of the Phase 2 levee will be subject to seismic-induced deformations. Seismic deformations, including both vertical settlement and lateral deformation, will be quantified, and recommendations for a post-earthquake remediation plan will be included in the flood safety plan. Because a post-earthquake remediation plan needs to be developed, and because the evaluation and results have not yet been documented or reviewed by the IPE, the Phase 2 Levee **does not meet** ULDC 7.7.

## ULDC 7.8: LEVEE GEOMETRY

ULDC 7.8 requires that for new levees or levees with extensive reconstruction situated along major waterways, a minimum 20-foot-wide crown width and 3:1 horizontal-to-vertical ratio (H:V) waterside and landside slopes are required.

ULDC 7.8.1 allows levees wider than the minimum requirement to have steeper slopes if the minimum required dimensions would fit entirely within the actual levee, and if seepage and slope stability criteria are met (for both deep and shallow failure surfaces). Furthermore, for extremely wide levees, seepage and slope stability criteria do not need to be met for the outer levee slopes as long as certain criteria are met.

ULDC 7.8.2 requires a patrol road along the crown of the levee for inspection, maintenance, and flood-fighting. The patrol road must be designed, constructed, and maintained to provide "all-weather" support of maintenance and patrolling vehicles.



## PHASE 2 LEVEE

The Phase 2 Levee embankment is considered a wide levee with a 40-foot crown width and 3:1 landside and waterside slopes. An all-weather patrol road is present along the crown. Access ramps are present on both the landside and every approximate 0.25 to 0.5 mile. Gates along the patrol road and at access points are anticipated but are not currently present. The Phase 2 Levee appears to meet ULDC 7.8 for geometry. However, because this evaluation has not undergone review by the IPE, the Phase 2 Levee **does not meet** ULDC 7.8.

## ULDC 7.9: INTERFACES AND TRANSITIONS

ULDC 7.9 highlights the need to ensure that the levee system functions holistically, such that no levee reach is more susceptible to problems than an adjacent reach due to gaps in features, loading/demand concentrations, or other three-dimensional effects when designing interfaces, transitions, and connections that commonly occur at the ends of seepage berms, seepage cutoff walls, revetments, and floodwalls.

## PHASE 2 LEVEE

Interfaces and transitions were evaluated for the Phase 2 Levee using the same methods as used for the Phase 1 Levee Systems (Stages 1, 2A, and 2B). Construction of the Phase 2 Levee was performed in one continuous project to avoid potential changes in soil characteristics or construction methods during construction. The only locations where transitions occurred with the levee construction are at the start and end of the Phase 2 Levee, where the levee ties into the existing Phase 1 Stage 1 and Stages 2B levees. The Phase 2 Levee fill was benched into the existing levees with a maximum bench height of 2 feet, and the same material specification were used for both levees. There are no other interfaces or transitions present. Although the Phase 2 Levee appears to meet for ULDC 7.9, the analyses and results have not yet been documented or reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.9.

## ULDC 7.10: EROSION

Levees that pose an immediate erosional breaching hazard during either a flood or normal flow condition need to be repaired to meet ULDC. Similarly, levees that are likely to be significantly damaged by erosion during either a flood or normal flow condition should be protected with appropriate slope treatments. Erosion hazards are evaluated for the following conditions: 1) high-velocity flows coupled with erosive levee materials and/or poor hydraulic conditions; 2) large waves developed by wind over large, open bodies of water; and 3) boat wakes.

## PHASE 2 LEVEE

Erosion was evaluated for the Phase 2 Levee using the same methods as used for the Phase 1 Levee Systems (Stages 1, 2A, and 2B). Because the Phase 2 Levee is a dry-land levee there is no potential for erosion damage due to high-velocity flows and erosive materials or boat wakes, although there is a potential for wind-generated waves. However, there is potential for erosion caused by failure of the Old River or Paradise Cut federal levees. This erosion is being mitigated by the construction of check dams, which will reduce the duration of erosive action between the two levee systems and reduce the velocity of the water between the levees. The check dams are currently being permitted by the CVFPB and reviewed





by the IPE. Because erosion mitigation measures are required, and the IPE has not completed its review, the Phase 2 Levee **does not meet** ULDC 7.10.

## ULDC 7.11: RIGHT-OF-WAY

Per ULDC, right-of-way criteria for levees and floodwalls in urban and urbanizing areas need to allow adequate room for maintenance, inspection, patrolling during high water, and flood-fighting; allow additional room to expand facilities in the future; and prohibit excavations and land modifications that would endanger the integrity of the levee or floodwall. Specifically, the ULDC requires fee title or an easement for the entire levee prism extending to a minimum of 20 feet beyond the landside toe of the flood protection system for access and inspection. Furthermore, waterward of the levee prism, where there is sufficient area to do so without resulting in the loss of sensitive riparian habitat, consideration should be given to acquiring a 15-foot-wide zone. In addition to the minimums required by the ULDC for access and inspection, the ULDC recommends acquiring right-of-way that has a width equal to at least four times the levee height or 50 feet, whichever is greater, on the landside of the 20-foot clear zone for longer-term flood protection. Lastly, the ULDC recommends that the city or county adopt restrictions on excavations within 200 to 400 feet depending on the levee height.

In 2016, the City of Lathrop adopted a grading ordinance that restricts any excavation within 500 feet of the physical waterside hinge point of a levee within River Islands.

### PHASE 2 LEVEE

The Phase 2 Levee embankment and lands under the embankment are all owned by River Islands. River Islands has granted an easement to RD2062 for the embankment and 20 feet from each toe. Additional rights may be necessary based on the outcome of the ULDC evaluations. For this reason, and because this conclusion has not been reviewed by the IPE, the Phase 2 Levee **does not meet** ULDC 7.11.

## ULDC 7.12: ENCROACHMENTS

ULDC 7.12 requires a hazard assessment of each existing encroachment, permitted or not, to determine the encroachment's impact on the reliability of levee performance. The evaluation of encroachments considers the following: age, type, condition, performance history, impacts on the levee structural integrity, impacts on the hydraulic effect of the channel, and impacts on the Operation & Maintenance (O&M) of the levee. If encroachments are considered high-hazard, additional evaluation and action is required.

### PHASE 2 LEVEE

There are no encroachments along the Phase 2 Levee; therefore, the Phase 2 Levee appears to meet ULDC 7.12. However, this conclusion has not been reviewed by the IPE; therefore, the Phase Levee **does not meet** ULDC 7.12. Future encroachments related to recreation and for security purposes are planned and will meet ULDC requirements.



## **ULDC 7.13: PENETRATIONS**

ULDC 7.13 requires a hazard assessment of each existing penetration, permitted or not, to determine the penetration's impact on the reliability of levee performance. If penetrations are considered high-hazard, additional evaluation and action are required. For other existing penetrations that are not considered to be high-hazard, but have not been permitted, the city or county is required to have a remediation plan in place, or reference such a plan, for the entire length of levee that the finding is to cover.

### **PHASE 2 LEVEE**

There are fourteen newly installed pipe penetrations along the Phase 2 Levee. These penetrations were designed and constructed in accordance with ULDC. This includes five irrigation related pipe penetrations ranging in diameter from 12-20 inches along the Old River setback and nine irrigation related pipe penetrations ranging in diameter from 18-24 inches along the Paradise Cut setback. The Phase 2 Levee appears to meet ULDC 7.13. However, this conclusion has not been reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.13.

## **ULDC 7.14: FLOODWALLS, RETAINING WALLS, AND CLOSURE STRUCTURES**

ULDC 7.14 presents requirements for design of special features such as floodwalls, retaining walls, and closure structures.

### **PHASE 2 LEVEE**

There are no floodwalls, retaining walls, or closure structures along the Phase 2 Levee; therefore, the Phase 2 Levee appears to meet ULDC 7.14. However, this conclusion has not been reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.14.

## **ULDC 7.15: ANIMAL BURROWS**

Burrowing animals can present a significant threat to levee integrity and therefore proactive animal control and damage repair are required levee maintenance practices.

RD 2062 has an annual rodent control and abatement program. The program uses two primary modes to control rodent populations and one primary method to repair rodent holes and burrows. The District uses bait stations to administer chemicals at active rodent areas to control populations, as well as traps at areas where excessive rodent activity is present. The District also administers a grouting program to backfill rodent holes identified within the levee; the grouting is performed on the waterside and landside of the levee, as necessary.

### **PHASE 2 LEVEE**

RD 2062's rodent control and abatement program has not undergone review by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.15.



## ULDC 7.16: VEGETATION EVALUATION

ULDC 7.16.1 requires an engineering inspection and evaluation to identify trees and other woody vegetation on the levee and within 15 feet of the levee toe that pose an unacceptable threat to the integrity of the levee. Those posing an unacceptable threat are to be removed; those not posing an unacceptable threat need not be removed. Non-hazardous vegetation allowed to remain because they do not pose an unacceptable threat must be trimmed and thinned for access and visibility. RD 2062 will follow an annual maintenance schedule to control annual grasses and woody vegetation.

### PHASE 2 LEVEE

There are no trees or other woody vegetation on or adjacent to the Phase 2 Levee. The levee was hydroseeded following construction in 2019. The Phase 2 Levee appears to meet ULDC 7.16; however, this conclusion has not been reviewed by the IPE. Therefore, the Phase 2 Levee **does not meet** ULDC 7.16.

## ULDC 7.17: WIND SETUP AND WAVE RUNUP

ULDC 7.17 requires a wind-wave analysis. The wind setup and wave runup distances must be computed and added to the median 200-year still WSE to determine the required elevation of the MTOL. Wind setup and wave runup may also be considered when evaluating erosion. The formation and magnitude of wind-generated waves against shoreline structures is controlled by the physical conditions present on and near the shore such as slope and roughness of the structure, wind speed, and distance over which wind blows (fetch length).

### PHASE 2 LEVEE

Wind setup and wave runup were evaluated for the Phase 2 Levee. The design wind speed was determined through a frequency analysis to estimate the 72.6-year wind speed for each wind direction based on the ULDC. Wind speeds and fetch lengths were determined for each incremental 10-degree direction using ARC GIS; then the optimal wind velocity was determined and used to calculate wave growth using the ACES software. The evaluation and results have been documented in a memorandum, and while the Phase 2 Levee appears to meet for ULDC 7.17, the evaluation and results have not yet been reviewed by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.17.

## ULDC 7.18: SECURITY

ULDC criterion 7.18 requires a security plan to protect urban and urbanizing area levee systems from acts of terrorism and other malicious or negligent acts. The security plan is to identify security personnel, responsibilities, resources, and measures. In developing the security plan, the agency/agencies responsible for levee maintenance must consider and prioritize vulnerabilities and employ an array of security measures from four basic categories to address vulnerabilities: networked detection (criterion 7.18.1); deterrence (criterion 7.18.2); physical security (criterion 7.18.3); and intrusion interdiction (criterion 7.18.4) during high-threat periods.



## PHASE 2 LEVEE

A security plan for the Phase 2 Levee does not currently exist; therefore, this levee **does not meet** ULDC 7.18. RD 2062 has developed a Security Plan for portions of the Phase 1 Levee that will be modified for the Phase 2 Levee.

### **ULDC 7.19: SEA LEVEL RISE**

ULDC 7.19 requires that the effects of sea level rise be estimated and addressed for the duration during which a ULOP Finding may be valid. Guidance for sea level rise is available through the State of California Ocean Protection Council, *State of California Sea-Level Rise Guidance, 2018 Update*. The guidance provides sea level rise projections for numerous points in the future and for several probabilities, using the year 2000 as the baseline.

The effects of the sea level rise were considered and incorporated by increasing the stages at the hydraulic model downstream boundaries, which are located far enough into the Delta to be primarily tidally driven, by the sea level rise projection.

## PHASE 2 LEVEE

The effects of the sea level rise were considered for the Phase 2 levee by increasing the stages at the hydraulic model downstream boundaries, which are located far enough into the Delta to be primarily tidally driven. The 1-in-200 chance sea level rise projection for the year 2070 of 3.5 feet at San Francisco was used for the Phase 2 levee DWSE determination. Consideration and incorporation of sea level rise has been documented in the DWSE technical memorandum. While the Phase 2 Levee appears to meet for ULDC 7.19, the application of sea level rise has not yet been reviewed by the IPE, therefore, the Phase 2 Levee **does not meet** ULDC 7.19.

### **ULDC 7.20: EMERGENCY ACTIONS AND FLOOD SAFETY PLANS**

ULDC 7.20 includes requirements for preparing flood safety plans, as it is important for local maintaining agencies and communities to understand the responsibilities of flood risk management within their jurisdictions. Specifically, the ULDC requires each public agency with the responsibility for public safety for residents protected by levees and floodwalls to have a plan for flood events and other natural or man-made flood-related incidents that could result in human casualties, property destruction, and economic losses.

## PHASE 2 LEVEE

While there are several emergency planning documents related to flood safety, many of which include the required information to meet ULDC 7.20, these plans will require modification to incorporate the Phase 2 Levee and require review by the IPE; therefore, the Phase 2 Levee **does not meet** ULDC 7.20.



## 4.0 ACTIONS REQUIRED TO PROVIDE AN URBAN LEVEL OF FLOOD PROTECTION

ULOP Criteria requires a complete plan to provide an urban level of flood protection by 2025 for an APF. This plan is provided as a separate document titled *River Islands at Lathrop, Phase 2, Report of Adequate Progress Towards an Urban Level of Flood Protection*, prepared in conjunction with this report by RD 2062. This chapter describes the specific structural actions necessary for the Phase 2 Levee to meet ULDC and the procedural actions to demonstrate this compliance. Table 1 presents an overview of the required actions by criterion.

### STRUCTURAL ACTIONS

Structural actions are those actions requiring modification to the flood protection facilities. These actions may include embankment construction or modification; placement of rock slope protection; removal, replacement, or modification of encroachments, penetrations, and/or vegetation.

#### PHASE 2 LEVEE

Since the Phase 2 Levee is already constructed, the required structural actions for the levee to meet ULDC are limited to the installation of check dams, similar to those required for the Phase 1 Levee System, and installation of relief wells to address underseepage. Installation of piezometers is also planned to monitor performance of the levee system. However, because the substantial evidence record for providing 200-year protection is still under development and has not yet been reviewed by the IPE, it is possible that additional or alternative structural actions may be taken.

### PROCEDURAL ACTIONS

Procedural actions are those actions that support certification of the levees in meeting ULDC. These actions may include technical evaluations; development of technical memoranda, reports, or other documents; development of protocols and/or procedures; and/or policy or legal actions. IPE Review of the substantial evidence record, including the future Engineer's Report, is required by the ULOP Criteria, and given the technical nature of this review, is included here as an action required for ULDC compliance. The remaining procedural actions required to meet ULOP Criteria are discussed in the APF Report.

#### PHASE 2 LEVEE

Several procedural actions are required:

- } Perform evaluations and develop technical memoranda, reports, or other documentation for minimum top of levee (ULDC 7.2), geotechnical evaluations (ULDC 7.3, 7.4, 7.5, 7.7, 7.9), levee loading (ULDC 7.6), levee geometry (ULDC 7.8), erosion (ULDC 7.10), right-of-way (ULDC 7.11), encroachments (ULDC 7.12), penetrations (ULDC 7.13), animal burrows (ULDC 7.15), levee vegetation (ULDC 7.16), security (ULDC 7.18), and emergency actions (ULDC 7.20).
- } Verify sufficient right-of-way (ULDC 7.11) has been acquired for the final project.
- } Update Operations and Maintenance Manual.



- } IPE review of all evaluations and documentation supporting these evaluations (ULDC 7.1 – 7.20), and subsequent revision of evaluations and documentation as appropriate.



**Table 1. Required Actions for Phase 2 Levee**

	ULDC	PHASE 2 LEVEE		
		DEVELOP SUBSTANTIAL EVIDENCE RECORD	STRUCTURAL ACTION	IPE REVIEW
7.1	DESIGN WATER SURFACE	⊙	○	⊙
7.2	MINIMUM TOP OF LEVEE	⊙	○	●
7.3	SOIL SAMPLING, TESTING, AND LOGGING	⊙	○	●
7.4	SLOPE STABILITY	⊙	○	●
7.5	UNDERSEEPAGE	⊙	●	●
7.6	LEVEE LOADING	⊙	○	●
7.7	SEISMIC VULNERABILITY	⊙	○	●
7.8	LEVEE GEOMETRY	⊙	○	●
7.9	INTERFACES AND TRANSITIONS	⊙	○	●
7.10	EROSION	⊙	●	●
7.11	RIGHT-OF-WAY	⊙	○	●
7.12	ENCROACHMENTS	⊙	○	●
7.13	PENETRATIONS	⊙	○	●
7.14	FLOODWALLS, RETAINING WALLS, AND CLOSURE STRUCTURES	⊙	○	●
7.15	ANIMAL BURROWS	⊙	○	●
7.16	LEVEE VEGETATION	⊙	○	●
7.17	WIND SETUP AND WAVE RUNUP	⊙	○	●
7.18	SECURITY	●	○	●
7.19	SEA LEVEL RISE	○	○	⊙
7.20	EMERGENCY ACTIONS	○	○	●
-	OPERATIONS & MAINTENANCE	●	○	●
KEY	○ No Action Required. ⊙ Action In-Progress. ● Action Required.			



## **5.0 REPORT REFERENCES**

Reclamation District 2062. (2016). River Islands at Lathrop Stage 1 Levee Systems, Adequate Progress Towards and Urban Level of Flood Protection, Engineer's Report, Final.

Reclamation District 2062. (2017). River Islands at Lathrop Stages 2A and 2B Levee Systems, Adequate Progress Towards and Urban Level of Flood Protection, Engineer's Report, Final.

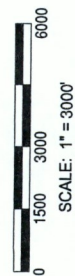




NOTE: STAGES 1, 2A AND 2B  
LEVEE SYSTEMS COMPRISE  
PHASE 1 FLOOD PROTECTION  
AREA FOR RIVER ISLANDS



- LEGEND**
- RD 2062 BOUNDARY
  - - - STAGE 1 BOUNDARY
  - STAGE 2A BOUNDARY
  - STAGE 2B BOUNDARY
  - - - PHASE 2 BOUNDARY



# RIVER ISLANDS FLOOD PROTECTION AREAS

CITY OF LATHROP, CALIFORNIA ♦ SEPTEMBER 2020

**ISLAND RECLAMATION DISTRICT No. 2062**

STEWART TRACT – SAN JOAQUIN COUNTY

73 W. Stewart Road

LATHROP, CALIFORNIA 95330

TEL: (209) 879-7900

September 30, 2020

Mr. Glenn Gebhardt, City Engineer  
City of Lathrop  
390 Towne Center Drive  
Lathrop, CA 95330

Re: Adequate Progress Finding for Phase 2 – River Islands at Lathrop

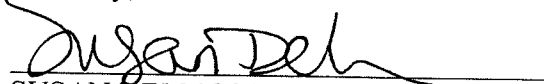
Dear Glenn,

At its September 28, 2020 special meeting, the Island Reclamation District 2062 Board of Trustees (RD 2062) unanimously adopted Resolution 20-4, approving “*The River Islands at Lathrop Phase 2 Area Report of Adequate Progress Towards Urban Level of Flood Protection Annual Report* (“2020 Annual Report”) and directed the President to provide the Annual Report to the City for adoption of an Adequate Progress Finding (“APF”).

The Phase 2 Area does not currently have an approved urban level of flood protection. Therefore, to support the continued development of the River Islands project, and in accordance with the ULOP Criteria, RD 2062 has prepared an Annual Report for Phase 2 of River Islands in order to support an APF by the City of Lathrop. To support this finding, substantial evidence is provided in the Annual Report that meets California Government Code Section 65007(a). This includes the required Engineer’s Report, prepared by a Professional Civil Engineer registered in California to document the data and analyses for demonstrating that the development project and proposed subdivision will have an urban level of flood protection at the time when the flood protection system is completed. The Engineer’s Report, drafted by MBK Engineers as the District Engineer, fulfills this requirement and is included in the Annual Report. The District and River Islands continues to improve the urban levee system within RD 2062, with the Phase 2 levees recently being completed and ancillary improvements and actions required to meet the ULOP Criteria are in the process of being completed.

The Annual Report is enclosed with this letter for your review and the City Council’s adoption at their October 12, 2020 regular meeting.

Sincerely,



SUSAN DELL’OSSO  
President, RD 2062

Encl.: 2020 Annual Report – Phase 2 Levees

**ISLAND RECLAMATION DISTRICT No. 2062**

*STEWART TRACT – SAN JOAQUIN COUNTY*

73 W. Stewart Road

LATHROP, CALIFORNIA 95330

TEL: (209) 879-7900

October 13, 2020

Ms. Leslie Gallagher, Executive Officer  
Central Valley Flood Protection Board  
3310 El Camino Avenue, Suite 170  
Sacramento, CA 95821

Re: Annual Report of Progress - River Islands at Lathrop Phase 2 Area, Lathrop, CA

On October 12, 2020, the City of Lathrop adopted an Adequate Progress Finding for the River Islands at Lathrop Phase 2 Area. In accordance with the requirements of Government Code §65007 (a) and the Urban Level of Flood Protection Criteria issued by the Department of Water Resources in 2013, Island Reclamation District No. 2062, as the local flood management agency, respectfully submits the enclosed annual report of progress towards providing an urban level of flood protection for the River Islands at Lathrop Phase 2 urban area.

This report is available to the public at the following website: [www.ci.lathrop.ca.us](http://www.ci.lathrop.ca.us).

Questions on the matter may be referred to Ms. Claire Marie Turner at [turner@mbkengineers.com](mailto:turner@mbkengineers.com) or 916-456-4400.

Sincerely,

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SUSAN DELL'OSSO  
President, RD 2062

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