



Flood Damage Reduction Segment / System Inspection Report

**US Army Corps
of Engineers®**

Name of Segment / System: Luna Pier Advanced Measures Flood Damage Reduction Project

Public Sponsor(s): City of Luna Pier

Public Sponsor Representative: Greg Stewart

Sponsor Phone: (734) 848-6495 x204

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Corps of Engineers Inspector: Tina Kowitz, John Goetzeluck Inspection Start Date: 7/5/2011

Inspection End Date: 7/5/2011

Inspection Report Prepared By: Tina Kowitz, P.E. Date Report Prepared: 12/12/2011

Internal Technical Review (for Periodic Inspections) By: N/A Date of ITR: _____

Final Approved By: Phillip C. Ross Date Approved: 12/12/2011

Type of Inspection:	<input type="checkbox"/> Initial Eligibility Inspection <input checked="" type="checkbox"/> Continuing Eligibility Inspection (Routine) <input type="checkbox"/> Continuing Eligibility Inspection (Periodic)	Overall Segment / System Rating:	<input type="checkbox"/> Acceptable <input type="checkbox"/> Minimally Acceptable <input checked="" type="checkbox"/> Unacceptable
Contents of Report:	<input checked="" type="checkbox"/> Instructions <input type="checkbox"/> Initial Eligibility Inspection <input checked="" type="checkbox"/> General Items for All Flood Control Works <input checked="" type="checkbox"/> Levee Embankment <input checked="" type="checkbox"/> Concrete Floodwalls <input type="checkbox"/> Sheet Pile and Concrete I-walls <input type="checkbox"/> Interior Drainage System <input type="checkbox"/> Pump Stations <input type="checkbox"/> FDR System Channels	<p>Note: In addition to the report contents indicated here, a plan view drawing of the system, with stationing, should be included with this report to reference locations of items rated less than acceptable. Photos of general system condition and any noted deficiencies should also be attached.</p> <p>Note: This inspection rating represents the Corps evaluation of operations and maintenance of the flood damage reduction system and may be used in conjunction with other information for a levee certification determination for National Flood Insurance Program (NFIP) purposes if applicable. An Acceptable Corps inspection rating, alone, does not equate to a certifiable levee for the NFIP. It is recommended for levee systems currently accredited by the Federal Emergency Management Agency (FEMA) for NFIP purposes receiving a Corps Minimally Acceptable or Unacceptable rating be evaluated by the levee owner to determine the potential impacts to the certification for FEMA.</p>	

General Items for All Flood Damage Reduction Segments / Systems

For use during all inspections of all Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Operations and Maintenance Manuals	A	A	Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.	City has copies of the O&M manual readily available.
		M	Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.	
		U	Sponsor has not obtained lost or missing manuals identified during previous inspection.	
2. Emergency Supplies and Equipment (A or M only)	A	A	The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.	City has access to sandbags for floodfighting.
		M	The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.	
3. Flood Preparedness and Training (A or M only)	M	A	Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.	The City has good working knowledge of flood fighting requirements, but no written plan
		M	The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
1. Unwanted Vegetation Growth ¹	U	A	The levee has little or no unwanted vegetation (trees, bush, or undesirable weeds), except for vegetation that is properly contained and/or situated on overbuilt sections, such that the mandatory 3-foot root-free zone is preserved around the levee profile. The levee has been recently mowed. The vegetation-free zone extends 15 feet from both the landside and riverside toes of the levee to the centerline of the tree. If the levee access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 or Corps policy for regional vegetation variance.
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the levee.
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above and must be removed to reestablish or ascertain levee integrity.
2. Sod Cover	M	A	There is good coverage of sod over the levee.
		M	Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.
		U	Over 50% of the sod cover is missing or damaged over a significant portion or portions of the levee embankment.
		N/A	Surface protection is provided by other means.
			lp01_2011_a_0007: dead stump left in levee (3' dia): Remove stump and rootball; backfill with compacted clay and reseed. (U) lp01_2011_a_0009:: dead tree stumps (3' dia): Remove stump and rootball, backfill with compacted clay and reseed. (U) lp01_2011_a_0010: dead tree stump & 20' tall living tree: Remove unacceptable vegetation including rootball; backfill with compacted clay and reseed. (U) lp01_2011_a_0028: large tree land side (1.5' dia): (U) lp01_2011_a_0029: large tree land side (2') dia: (U) lp01_2011_a_0030: large tree 3' dia land side: (U) lp01_2011_a_0031: 35' line of varies trees (3" to 12" dia) and vegetation brush: (U) lp01_2011_a_0032: tree 1' dia land side: (U) lp01_2011_a_0034: tree 2' dia land side: (U) lp01_2011_a_0038: large amount of vegetation and trees: (U) lp01_2011_a_0039: 2 large trees. over 6' dia. large amont of vegetation.. unable to inspect: (U) lp01_2011_a_0040: land side 1' dia tree: (U) lp01_2011_a_0043: tree 1.5' dia: (U) lp01_2011_a_0045: 3 small trees. landside: (U) lp01_2011_a_0046: 3' dia tree: (U) lp01_2011_a_0047: 18" dia pine tree: (U) lp01_2011_a_0048: 18" pine tree: (U) lp01_2011_a_0052: 3" dia tree land side: (U) lp01_2011_a_0054: 2' dia tree landside: (U) lp01_2011_a_0061: large bush: (U) lp01_2011_a_0063: large bush: (U) lp01_2011_a_0067: 4' dia cottonwood: (U) lp01_2011_a_0092: approx 10 large diameter trees: (U) lp01_2011_a_0093: various trees 12+ -2 ft diameter: (U)
		lp01_2011_a_0035: area of no sod cover: NA (M) lp01_2011_a_0068: area of no sod cover: NA (M)	

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Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
3. Encroachments	U	A	No trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the levee.
		M	Trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the levee.
			<p>lp01_2011_a_0001: telephone pole installed in levee w/o USACE approval: To remain in place, the local sponsor needs to request review and acceptance of the encroachment. (M)</p> <p>lp01_2011_a_0003: telephone pole installed in levee w/o USACE approval: To remain in place, the local sponsor needs to request review and acceptance of the encroachment. (M)</p> <p>lp01_2011_a_0004: telephone pole installed in levee w/o USACE approval: To remain in place, the local sponsor needs to request review and acceptance of the encroachment. (M)</p> <p>lp01_2011_a_0008: telephone pole installed in levee w/o USACE approval: Remove or request USACE review/ approval (M)</p> <p>lp01_2011_a_0018: telephone pole installed in levee w/o USACE approval (M)</p> <p>lp01_2011_a_0022: telephone pole installed in levee w/o USACE approval (M)</p> <p>lp01_2011_a_0026: telephone pole installed in levee w/o USACE approval (M)</p> <p>lp01_2011_a_0036: deck constructed by resident on levee w/o USACE approval: Remove or request USACE review & approval (U)</p> <p>lp01_2011_a_0037: Landside toe of levee removed and replaced by retaining wall: Restore levee to as-built conditions. (U)</p> <p>lp01_2011_a_0041: Land side toe of levee removed and retaining wall constructed w/o USACE approval.: Remove wall and restore levee to as-built conditions. (U)</p> <p>lp01_2011_a_0042: Land side toe of levee removed and wooden retaining wall constructed w/o USACE approval.: Remove wall and restore levee to as-built condition. (U)</p> <p>lp01_2011_a_0044: wood fence installed w/o USACE approval (M)</p> <p>lp01_2011_a_0049: Toe of levee removed and replaced by inadequate wood retaining wall: Remove wall and restore levee to as-built conditions (U)</p> <p>lp01_2011_a_0055: boat dock built on levee w/o USACE approval (U)</p> <p>lp01_2011_a_0056: Landside toe of levee removed and replaced with wood retaining wall (U)</p> <p>lp01_2011_a_0058: wood fence (M)</p>

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Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
			lp01_2011_a_0059: Sand bags at toe of levee. Placed without USACE approval (M) lp01_2011_a_0062: jetski ramp constructed on levee, slope is very steep (U) lp01_2011_a_0065: flag pole foundation (M) lp01_2011_a_0066: wood deck constructed on levee (U)
4. Closure Structures (Stop Log, Earthen Closures, Gates, or Sandbag Closures) (A or U only)		A	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.
		U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.
		N/A	There are no closure structures along this component of the FDR segment / system.
5. Slope Stability	M	A	No slides, sloughs, tension cracking, slope depressions, or bulges are present.
		M	Minor slope stability problems that do not pose an immediate threat to the levee embankment.
		U	Major slope stability problems (ex. deep seated sliding) identified that must be repaired to reestablish the integrity of the levee embankment.
6. Erosion/ Bank Caving	M	A	No erosion or bank caving is observed on the landward or riverward sides of the levee that might endanger its stability.
		M	There are areas where minor erosion is occurring or has occurred on or near the levee embankment, but levee integrity is not threatened.
		U	Erosion or caving is occurring or has occurred that threatens the stability and integrity of the levee. The erosion or caving has progressed into the levee section or into the extended footprint of the levee foundation and has compromised the levee foundation stability.
7. Settlement ²	M	A	No observed depressions in crown. Records exist and indicate no unexplained historical changes.
		M	Minor irregularities that do not threaten integrity of levee. Records are incomplete or inclusive.
		U	Obvious variations in elevation over significant reaches. No records exist or records indicate that design elevation is compromised.
			lp01_2011_a_0020: Station_1 NA: Low point in level of protection at road crossing.: Emergency action plan should identify area for sand bagging during floods. (A) lp01_2011_a_0002: Station_1 NA: Lakeside slope of levee has shallow failure. Does not intersect the crest of the levee.: Levee slopes need to be repaired and maintained, to include mowing. (M) lp01_2011_a_0013: Station_1 NA: End of shallow slope failures.: NA (M) lp01_2011_a_0025: Station_1 NA: bank erosion noted on river side of levee.: Repair slope and reseed. (M) lp01_2011_a_0021: Station_1 NA: Settlement from drainage pipe that has been removed.: Recommend filling low area. (M)

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Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
8. Depressions/ Rutting	M	A	There are scattered, shallow ruts, pot holes, or other depressions on the levee that are unrelated to levee settlement. The levee crown, embankments, and access road crowns are well established and drain properly without any ponded water.	lp01_2011_a_0051: Station_1 NA: small hole, possibly from tree removal: NA (M) lp01_2011_a_0053: Station_1 NA: depression in levee, possibly location of removed tree.: NA (M) lp01_2011_a_0060: Station_1 NA: small depression noted: NA (M) lp01_2011_a_0064: Station_1 NA: small depression in levee: NA (M)
		M	There are some infrequent minor depressions less than 6 inches deep in the levee crown, embankment, or access roads that will pond water.	
		U	There are depressions greater than 6 inches deep that will pond water.	
9. Cracking		A	Minor longitudinal, transverse, or desiccation cracks with no vertical movement along the crack. No cracks extend continuously through the levee crest.	
		M	Longitudinal and/or transverse cracks up to 6 inches in depth with no vertical movement along the crack. No cracks extend continuously through the levee crest. Longitudinal cracks are no longer than the height of the levee.	
		U	Cracks exceed 6 inches in depth. Longitudinal cracks are longer than the height of the levee and/or exhibit vertical movement along the crack. Transverse cracks extend through the entire levee width.	
10. Animal Control	M	A	Continuous animal burrow control program in place that includes the elimination of active burrowing and the filling in of existing burrows.	lp01_2011_a_0006: Station_1 NA: animal burrow noted: Fill hole (M) lp01_2011_a_0011: Station_1 NA: animal burrow: fill hole and reseed (M) lp01_2011_a_0050: Station_1 NA: small animal burrow in levee: NA (M) lp01_2011_a_0057: Station_1 NA: rodent hole in levee needs to be filled: NA (M) lp01_2011_a_0094: Station_1 NA: large rodent hole: NA (M)
		M	The existing animal burrow control program needs to be improved. Several burrows are present which may lead to seepage or slope stability problems, and they require immediate attention.	
		U	Animal burrow control program is not effective or is nonexistent. Significant maintenance is required to fill existing burrows, and the levee will not provide reliable flood protection until this maintenance is complete.	
11. Culverts/ Discharge Pipes ³ (This item includes both concrete and corrugated metal pipes.)	U	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	lp01_2011_a_0005: Culvert at road crossing. No videotape available.: All pipes crossing through or under the levee need to be videotaped every 5 years. (U) lp01_2011_a_0012: Culverts have not been videotaped: Videotape pipes every 5 years (U)

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Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	
12. Riprap Revetments & Bank Protection	A	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	
	M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
	U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
	N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
13. Revetments other than Riprap	A	Existing revetment protection is properly maintained, undamaged, and clearly visible.	
	M	Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
	U	Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
	N/A	There are no such revetments protecting this feature of the segment / system.	

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Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
14. Underseepage Relief Wells/ Toe Drainage Systems	A	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
	M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
	U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
	N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
15. Seepage	A	No evidence or history of unrepaired seepage, saturated areas, or boils.	
	M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
	U	Evidence or history of active seepage, extensive saturated areas, or boils.	

¹ If there is significant growth on the levee that inhibits the inspection of animal burrows or other items, the inspection should be ended until this item is corrected.

² Detailed survey elevations are normally required during Periodic Inspections, and whenever there are obvious visual settlements.

³ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

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Inspect ID: lp01_2011_a_0028 **Title:** USACE_CELRE_lp01_2011_a_0028_1.jpg
Rated Item: 1. Unwanted Vegetation Growth **Caption:** Large tree on land side of protection.



Inspect ID: lp01_2011_a_0029 **Title:** USACE_CELRE_lp01_2011_a_0029_1.jpg
Rated Item: 1. Unwanted Vegetation Growth **Caption:** Large tree on land side of protection.



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Inspect ID: lp01_2011_a_0031 **Title:** USACE_CELRE_lp01_2011_a_0031_1.jpg
Rated Item: 1. Unwanted Vegetation Growth **Caption:** Area of heavy vegetation on levee.



Inspect ID: lp01_2011_a_0067 **Title:** USACE_CELRE_lp01_2011_a_0067_1.jpg
Rated Item: 1. Unwanted Vegetation Growth **Caption:** Large cottonwood tree



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Inspect ID: lp01_2011_a_0035 **Title:** USACE_CELRE_lp01_2011_a_0035_1.jpg
Rated Item: 2. Sod Cover **Caption:** No grass cover due to shading from vegetation. Area more prone to erosion during overtopping.



Inspect ID: lp01_2011_a_0001 **Title:** USACE_CELRE_lp01_2011_a_0001_1 **Rated Item:** 3. Encroachments **Caption:** Telephone encroachment in levee

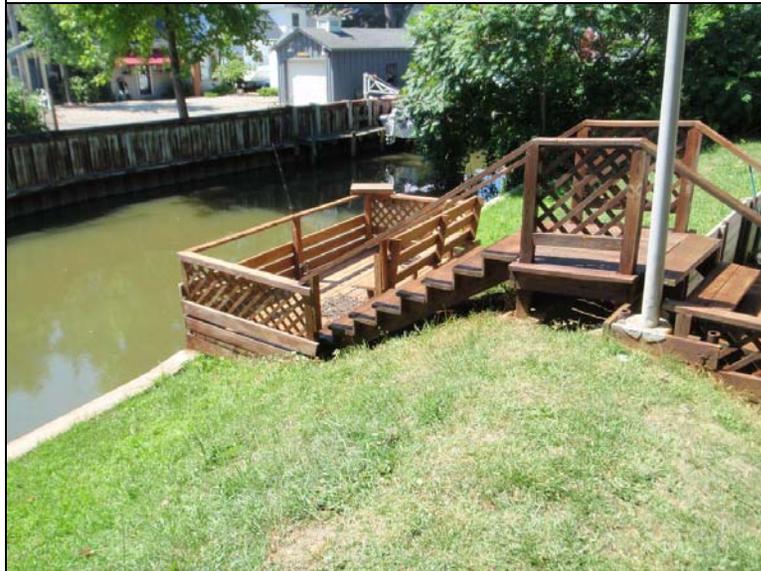


Levee Embankments

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Inspect ID: lp01_2011_a_0003 **Title:** USACE_CELRE_lp01_2011_a_0003_1.jpg
Rated Item: 3. Encroachments **Caption:** Telephone encroachment



Inspect ID: lp01_2011_a_0036 **Title:** USACE_CELRE_lp01_2011_a_0036_1.jpg
Rated Item: 3. Encroachments **Caption:** Deck built into levee



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Inspect ID: lp01_2011_a_0037 **Title:** USACE_CELRE_lp01_2011_a_0037_1.jpg
Rated Item: 3. Encroachments **Caption:** Retaining wall constructed on land side of levee; toe removed.



Inspect ID: lp01_2011_a_0042 **Title:** USACE_CELRE_lp01_2011_a_0042_1.jpg
Rated Item: 3. Encroachments **Caption:** Wood retaining wall constructed into the land side of the levee. Toe removed.



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Inspect ID: lp01_2011_a_0049 **Title:** USACE_CELRE_lp01_2011_a_0049_1.jpg
Rated Item: 3. Encroachments **Caption:** Wood retaining wall built into land side of levee. Toe removed.



Inspect ID: lp01_2011_a_0055 **Title:** USACE_CELRE_lp01_2011_a_0055_1.jpg
Rated Item: 3. Encroachments **Caption:** Wood boat dock



Levee Embankments

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Inspect ID: lp01_2011_a_0066 **Title:** USACE_CELRE_lp01_2011_a_0066_1.jpg
Rated Item: 3. Encroachments **Caption:** Wood deck



Inspect ID: lp01_2011_a_0020 **Title:** USACE_CELRE_lp01_2011_a_0020_1 **Rated Item:** 4. Closure Structures (Stop Log, Earthen Closures, Gates, or Sandbag Closures) (A or U only) **Caption:** Low area in levee protection at road crossing.



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Inspect ID: lp01_2011_a_0002 **Title:** USACE_CELRE_lp01_2011_a_0002_1.jpg
Rated Item: 5. Slope Stability **Caption:** Erosion along levee slope.



Inspect ID: lp01_2011_a_0021 **Title:** USACE_CELRE_lp01_2011_a_0021_1.jpg
Rated Item: 7. Settlement **Caption:** Areas of settlement in area where pipe was removed.



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Inspect ID: lp01_2011_a_0006 **Title:** USACE_CELRE_lp01_2011_a_0006_1.jpg
Rated Item: 10. Animal Control **Caption:** Animal burrow in levee



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Unwanted Vegetation Growth ¹	M	A	A grass-only or paved zone is maintained on both sides of the floodwall, free of all trees, brush, and undesirable weeds. The vegetation-free zone extends 15 feet from both the land and riverside of the floodwall, at ground-level, to the centerline of the tree. Additionally, an 8-foot root-free zone is maintained around the entire structure, including the floodwall toe, heel, and any toe-drains. If the floodwall access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 and/or Corps policy for regional vegetation variance.	lp01_2011_a_0071: Remove weeds near structure: (M) lp01_2011_a_0076: remove weeds near structure: (M)
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the floodwall.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above. This vegetation threatens the operation or integrity of the floodwall and must be removed.	
2. Encroachments	M	A	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the floodwall.	lp01_2011_a_0082: Station_1 NA: metall cyclone fence over splash wall: NA (M)
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the floodwall.	
3. Closure Structures (Stop Log Closures and Gates) (A or U only)	A	A	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.	lp01_2011_a_0091: Corrosion noted. sand blast and repaint closure gate. (A)
		U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
		N/A	There are no closure structures along this component of the FDR segment / system.	
4. Concrete Surfaces	U	A	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	lp01_2011_a_0070: repaint wave deflector, clean and paint to protect from corrosion.(M) lp01_2011_a_0072: Cracking observed at center line of cells, at control joints (M) lp01_2011_a_0073: Concrete cracking and spalling. Exposed rebar: Repair concrete spalls and seal cracks. (U)
		M	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		<p>U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.</p>	<p>lp01_2011_a_0075: 1" wide cracking along surface at control joint: Repair and seal. (U) lp01_2011_a_0077: cracking and exposed rebar (U) lp01_2011_a_0078: cracking on the concrete cell: Seal and/or monitor. (M) lp01_2011_a_0080: cracking and exposed rebar (U) lp01_2011_a_0081: spalling and cracking in concrete cell, exposed rebar (U) lp01_2011_a_0083: cracking at joint (M) lp01_2011_a_0084: cracking at joint and exposed rebar (U) lp01_2011_a_0085: Significant cracking and spalling. Exposed rebar (U) lp01_2011_a_0086: cracking along joint: (M) lp01_2011_a_0087: cracking along joint and exposed rebar.also approx 20 ft south (U) lp01_2011_a_0088: Significant cracking and deteriorated concrete (U) lp01_2011_a_0089: Significant cracking and exposed rebar (U) lp01_2011_a_0090: remove debris at provide scour protection under flap gates (A)</p>
5. Tilting, Sliding or Settlement of Concrete Structures ²		<p>A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.</p>	
		<p>M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.</p>	
		<p>U There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.</p>	
6. Foundation of	U	<p>A No active erosion, scouring, or bank caving that might endanger the structure's stability.</p>	lp01_2011_a_0074: exposed screw anchor: Replace riprap

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Floodwalls

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Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
Concrete Structures ¹	M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stable until the next inspection.	over screw anchors. (U)
	U	Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
7. Monolith Joints	A	The joint material is in good condition. The exterior joint sealant is intact and cracking/desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
	M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
	U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
	N/A	There are no monolith joints in the floodwall.	
8. Underseepage Relief Wells/ Toe Drainage Systems	A	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
	M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
	U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
	N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	

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Floodwalls

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Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
9. Seepage		A	No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U	Evidence or history of active seepage, extensive saturated areas, or boils.	

¹ Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

² The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

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Floodwalls

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Inspect ID: lp01_2011_a_0072 **Title:** USACE_CELRE_lp01_2011_a_0072_1.jpg
Rated Item: 4. Concrete Surfaces **Caption:** Deterioration of concrete cells



Inspect ID: lp01_2011_a_0074 **Title:** USACE_CELRE_lp01_2011_a_0074_1.jpg
Rated Item: 6. Foundation of Concrete Structures **Caption:**

