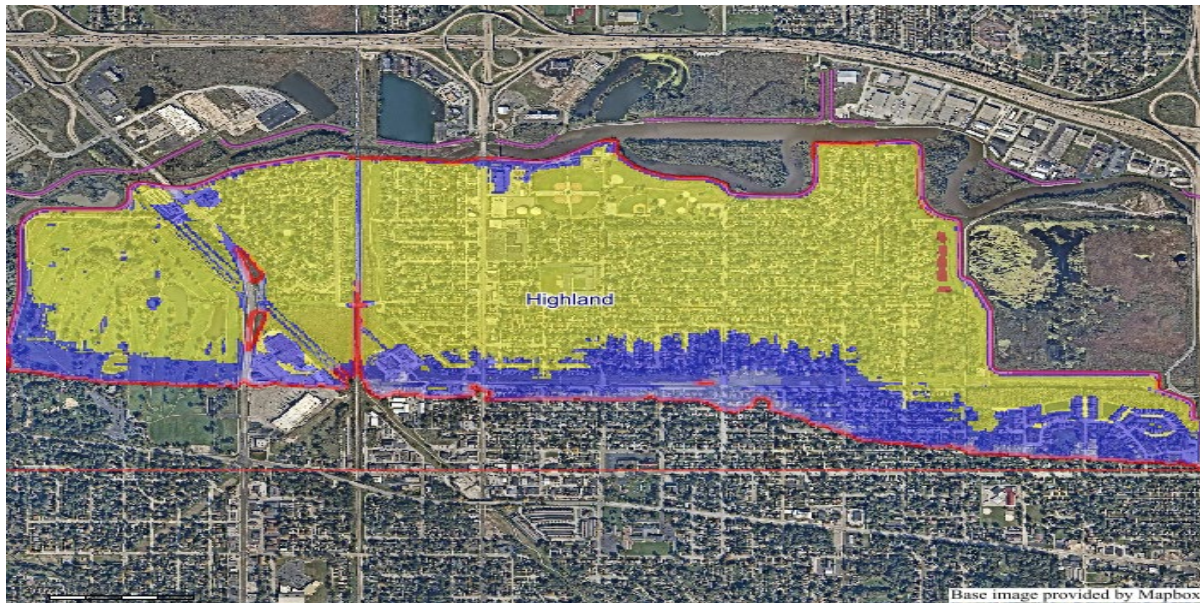


# Highland

## Levee Screening Project Fact Sheet

U. S. ARMY CORPS OF ENGINEERS

BUILDING STRONG



**Project Description:** The Little Calumet River Local Flood Protection Project reaches over five cities in northwest Indiana: Gary, Griffith, Highland, Hammond, and Munster. The project extends from the I-80/94 and I-65 interchange at the east end to the Indiana – Illinois State border at the west end. The portion of the project covered in this Periodic Inspection report is located in the Marshalltown Subdivision in Gary. The Highland project protects an area that extends west from Cline to Hart Ditch along the southern side of the Little Calumet River. The Highland levee was constructed by the US Army Corps of Engineers (USACE – Chicago District) between 1993 to 2011 in response to extreme flooding along the Little Calumet River. The Highland flood protection consists of 3 miles of clay levee with 2.5H:1V side slopes, 0.8 miles of floodwalls, 19 gates, 4 road closures, and 3 pump stations.

**Consequences:** Population Index: This population parameter is defined as "the number of people that identified an address within the protected area as their primary residence in the most recent census." The default population is base year 2000. Two adjustments are being made to the base year population to estimate the daytime and nighttime populations of the protected area. First, the 2000 default population is updated to 2010 based on the population data for the city or town as reported in 2000 and 2010 census reports. Second, the daytime population estimate is adjusted in consideration of the US Census Bureau's Estimated Daytime Population ratios developed from the 2000 Census and issued in Table 3. "Selected Places by State" - (<http://www.census.gov/population/www/socdemo/daytime/daytimepop.html>). The Census reported a daytime population ratio of .91166 for Highland in 2000. The 10 year population change for Highland is  $(23727 / 23546) 1.00773$ . The night time population target for the leveed area is then the 2000 base population times the

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2010 adjustment 1.00773, or 4947. The day time population target for the leveed area is the night time population times the day time ratio of .91166, or 4510. To generate the target populations in the LST a Population Day Index Factor of 0.9632492, and a Population Night Index Factor of 1.5268352 is applied. Structure Index Factor: The number of structures in the base data appears reasonable. The development is largely dense residential development. There is a light commercial strip along Kennedy Avenue, and two larger commercial uses along Rt. 41 / Indianapolis Ave, outdoor retail malls - but relatively high within the flood plain. Economic Index Factor: The only factor considered to update the economic index factor is the price level. The Property Value in Leveed Area (\$1000s) is defined as the value of structure and contents in the protected area, base year 2006. To update this value to 2012 dollars the Bureau of Labor Statistics unadjusted CPI for Chicago-Gary-Kenosha is used. Specifically the Housing and Durable Goods line items from this index are used together with the overall CPI from this region to derive the Economic Index Factor designed to update the Property Value for Price Level changes. The derived Economic Index Factor is :

$$\text{CPI+Housing+Durable}(2012) / \text{CPI+Housing+Durable}(2006) = (222.396+217.583+97.711)/(198.3+204.2+103.8) = 1.062.$$

**Major Findings and Understandings:** The project is an urban levee with a return of 200 years plus 3.8 ft of freeboard. The levee has been loaded to greater than 75% of full height and performed well. There were minor maintenance issues with the levee and floodwalls noted during the inspection. The community is very aware and effective with evacuation and flood preparedness.

**Recommendations:** Sponsor – Continue minor maintenance as required Community – Provide evacuation plan documentation USACE – Perform Phase II/III I-wall evaluation All – Continue flood risk awareness

**Levee Safety Action Classification:** The LSOG considers the risk associated with the Highland levee system (LST ID# 2397) to be moderate (LSAC 3), with a prior to overtopping LSAC of 3 and an overtopping LSAC of 4. The project has been loaded to approximately 81% of its height in 2008. Toe loading is annual. A large portion of the leveed area will experience deep inundation depths (6' to 15' depths). Potential for loss of life is 11 (day) and 37 (night). All failure modes had a low level of risk, except there is uncertainty (ML) in floodwall stability due to the I-wall embedment to stick-up ratio (2.2 to 1) and lack of Phase II or ETL assessment. Largely residential area with potential for traffic congestion. There is a designated overtopping section which would inundate the golf course first; the overtopping section is not armored. Overtopping is expected to be a 2,000-year event section at this overtopping section. The river is fast rising due to the location by Hart Ditch so there is limited time to flood fight while the levee overtops at the designed notch as well as evacuate prior to stage reaching top levee. The flood duration is long, 2 weeks in 2008, 3 days at peak stage. There is a high level of community awareness and good flood warning effectiveness.

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Levee Information	
USACE District:	LRC
USACE Division:	LRD
NLD Segment ID#:	2604000007
NLD System ID#:	2605000005
Levee Screening ID#:	2397
Proposed LSAC:	Moderate
LSAC:	Moderate
Length (Miles):	4.37
Inspection Date:	SEP 2012
Inspection Rating:	M
Elevations (NAVD 88)	
Top of Levee Segment - Max:	607.62
Top of Levee Segment - Min:	602.9
Top of Levee System - Min:	602.9
Leveed Area Min Elev:	590.2
Typical Section Height (ft.)	0 - 12.9
Annual Exceedance Probability (AEP)	
Toe:	1.00E+00
Authorized Capacity:	5.00E-03
Overtopping:	5.00E-04
Largest Historic Load (% of height):	75%
Flood Duration Characteristics	Long

Leveed Area Information	
Population (Day)	3118
Population (Night)	7127
# Structures	2026
Property Value (1000s)	\$682,558
LST Computed Consequences	
% Area Inundated (> 2')	99.35
PAR (Day)	3112
PAR (Night)	7109
Evacuation Effectiveness (Prior)	75% (D) : 67% (N)
Loss of Life (Day)	11
Loss of Life (Night)	37
Weighted Fatality Rate (%)	1.44
Property Damages (1000s)	\$400,973
# Structures Inundated	2020

Contribution to Risk Prior to Overtopping Performance Type	API	AALL	AAPD
Embankment and Foundation Seepage and Piping	12.92%	12.92%	12.92%
Embankment Stability	3.76%	3.76%	3.76%
Embankment Erosion	9.47%	9.47%	9.47%
Closure Systems	0.04%	0.02%	0.04%
Floodwall Stability	65.82%	65.83%	65.82%
Floodwall Underseepage and Piping	8.00%	8.00%	8.00%

Annualized Consequence	Percent Rank
Life Loss - Prior to Overtopping	82
Life Loss - Overtopping	75
Property Damage - Prior	76
Property Damage - Overtopping	62
<i>The percent rank for this levee is relative to all levees in the Corps portfolio that have been screened to date.</i>	

Screening Status	Submitter	Date
District Submittal	J.SCHMIDT	24Sep2014
MSC Submittal	L.BROTHERTON	10Mar2016
National Submittal	J.NIENABER	18Mar2016
SOG Approval	T.FERGUSON	26Aug2017
HQ LSO Approve	E.HALPIN	21Nov2017

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44 CFR 65.10 Design Provision	Description	Relevant Screening Result		NFIP Finding
Freeboard	Height of the levee sufficient to meet the freeboard requirements of 44 CFR 65.10 and/or the assurance requirements of EC 1110-2-6067	H&H/Likelihood to Meet NFIP H&H Requirements	Yes	Positive Finding
Closure Devices for All Openings	All openings must be provided with closure devices according to sound engineering practice	All ratings in closure performance module	LL/LL/LL/LL/LL	Positive Finding
Embankment Protection	No appreciable erosion is expected during the base flood	Erosion Performance - Erosion/Bank Caving factor	LL	Positive Finding
Embankment and Foundation Stability	No seepage into or through the levee foundation and embankment will jeopardize the stability of the levee	Embankment/Foundation Seepage and Piping Embankment Stability/Slope Stability Floodwall Stability/Tilting, Sliding or Settlement Floodwall Underseepage and Piping/Seepage	LL-N/A LL-N/A ML-No LL-N/A	Inconclusive
Settlement	Future settlement will not impact levee's ability to pass the base flood	H&H/Global Settlement Concerns	No	Positive Finding