



**US Army Corps
of Engineers**
Kansas City District

***MANHATTAN LOCAL PROTECTION PROJECT
FEASIBILITY STUDY
MANHATTAN, KANSAS
(Manhattan Levee)***

(Section 216 Review of Completed Civil Works)

Project Maps Appendix

August 2014 Final Feasibility Report

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Manhattan Levee

Feasibility Study

Existing Conditions and Reliability Improvements

JULY 2014



This is a series of mapping products currently used in the Manhattan Levee Feasibility Study. These maps include existing conditions and potential reliability improvements to the levee. These maps are not yet fully reflective of ongoing local, agency and public input.

As the Corps of Engineers planning process is dynamic and responsive to public and stakeholder input, it is entirely possible that the concept(s) herein may change markedly as more information becomes available. Federal and agency policies governing development of Civil Works planning studies are also subject to change. This document/map does not necessarily represent the perspective of higher review levels within the agencies involved or the Executive Branch of the Federal Government.

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

Existing Levee With
City Streets View

INDEX

Sheet No.	Description
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1	Existing Levee With City Streets View

Existing Conditions

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7	0.33% ACE Event with project
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9	0.2% ACE Event with project

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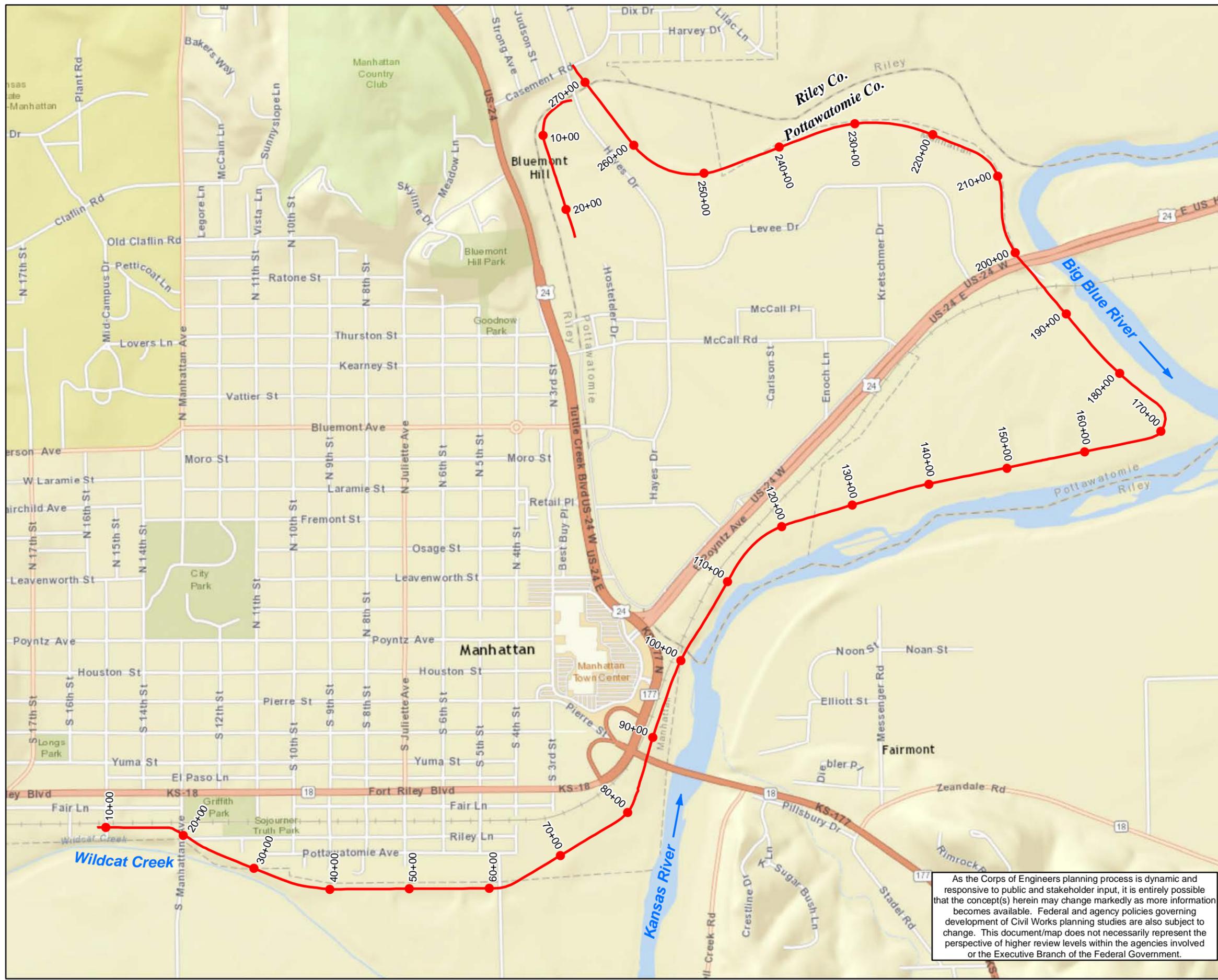
14	Station 0+00 to Station 38+50
15	Station 38+00 to Station 68+50
16	Station 66+00 to Station 93+50
17	Station 93+00 to Station 114+50
18	Station 113+50 to Station 144+00
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21	Station 206+00 to Station 239+00
22	Station 238+50 to Station 272+00
23	Station 3+00 to Station 23+50

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Sheet No. 1

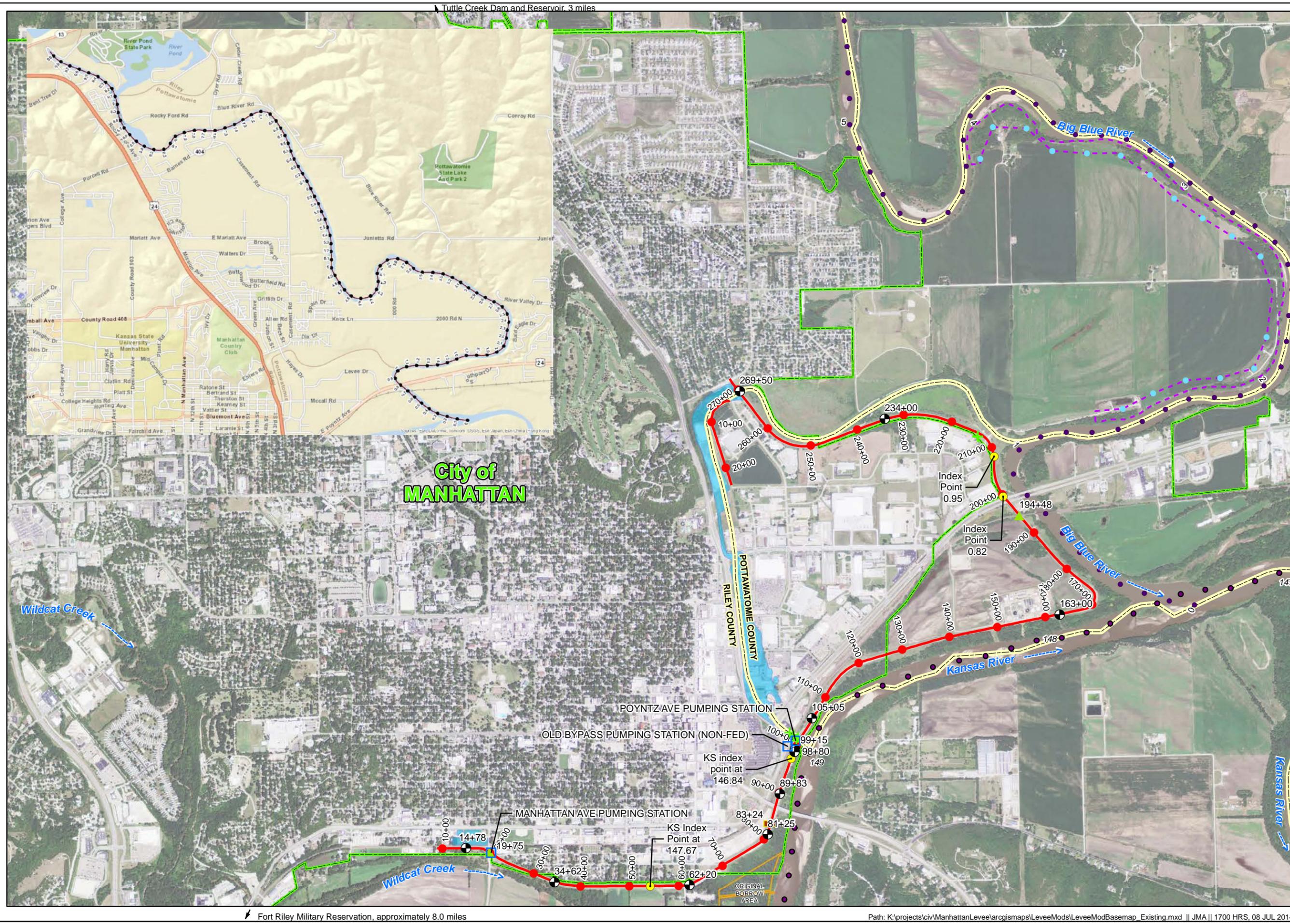
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Manhattan Levee Feasibility Study

Existing Conditions and Reliability Improvements

Existing Features



Legend

- KS_river_miles
- Manhattan Future Well Fields
- Manhattan Future Wells
- County Boundary
- City Boundary
- Original Borrow Area
- Original Ponding Areas

Levee Structures

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Index Point
- Pump Station
- piezometer_point
- Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North Datum: NAD 83

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Kansas City District,
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Kansas City, Missouri, 64106

0 300 600 1,200 1,800 Feet



Sheet No. 2

Fort Riley Military Reservation, approximately 8.0 miles

Path: K:\projects\civ\ManhattanLevee\arcgismaps\LeveeMods\LeveeModBasemap_Existing.mxd || JMA || 1700 HRS. 08 JUL 2014

Manhattan Levee Feasibility Study

Existing Conditions and Reliability Improvements

Existing Utility Features Crossing Unit

Legend

- KS river miles
- County Boundary
- Utility Crossings
- Original Borrow Area
- City Boundary

Levee Structures

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North Datum: NAD 83

Created by:
U.S. Army Corps of Engineers
Kansas City District, GDS Team

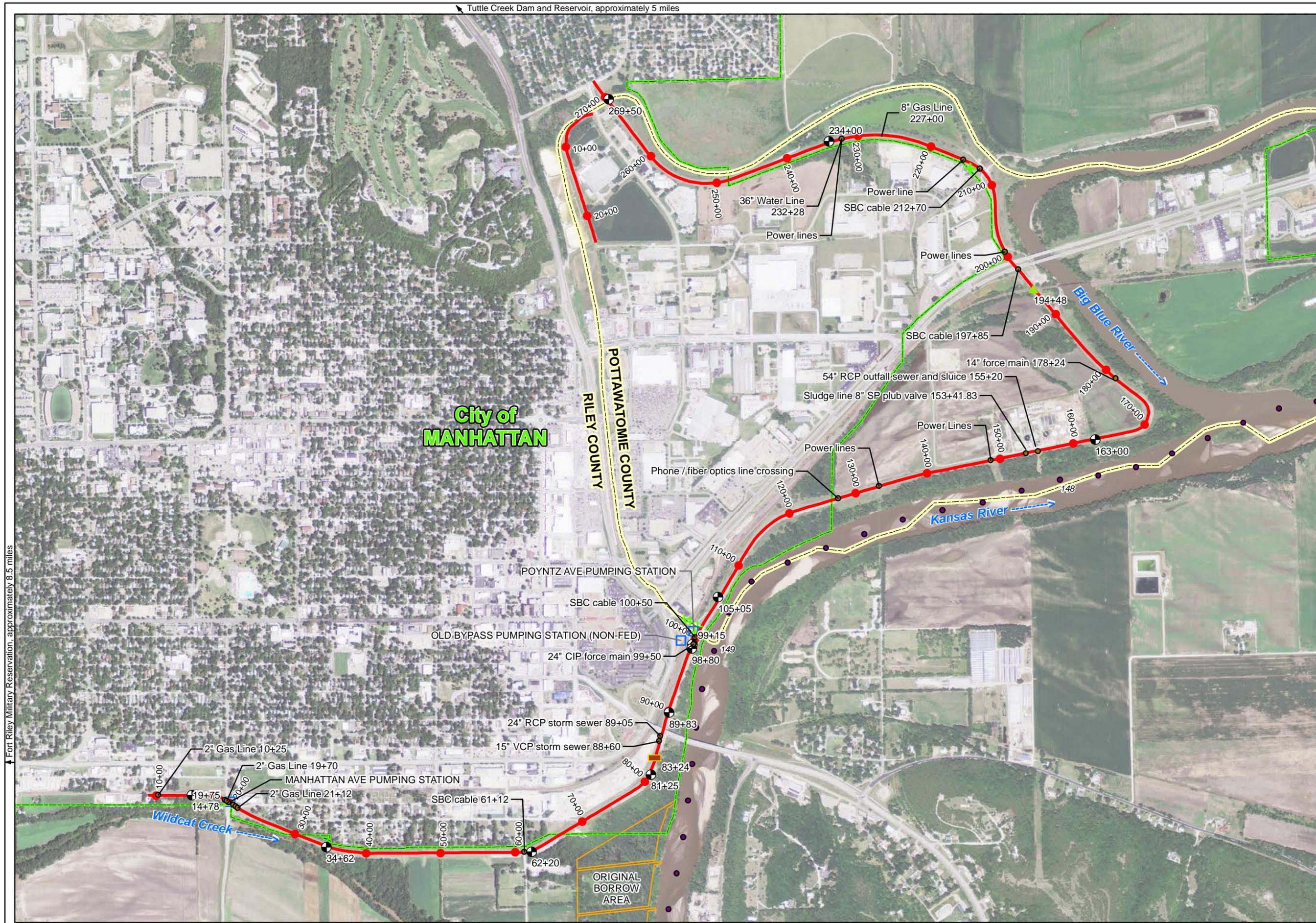
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0 300 600 1,200 Feet



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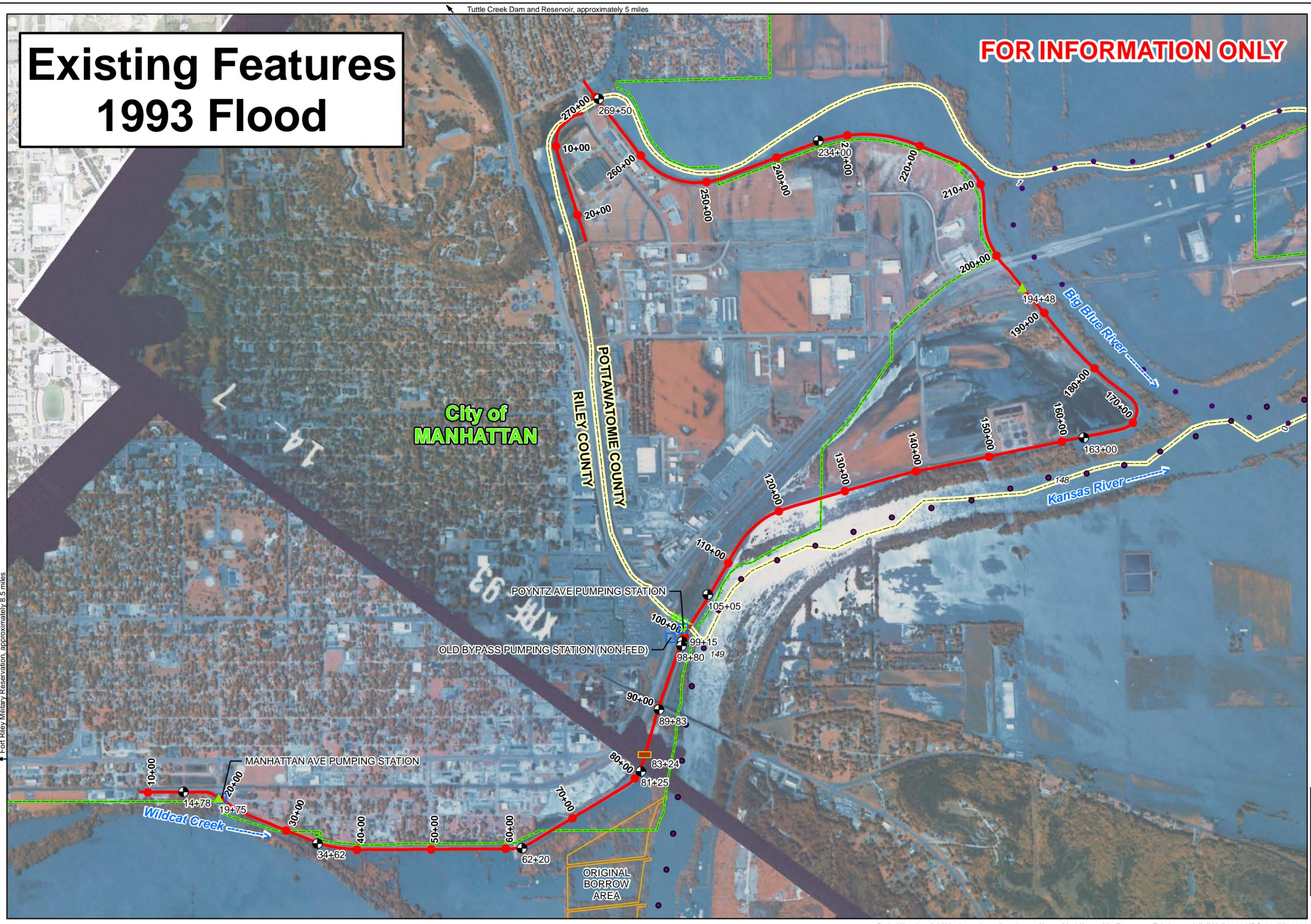


Existing Features 1993 Flood

FOR INFORMATION ONLY

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Existing Features
1993 Flood



Legend

- KS_river_miles
- County Boundary
- City Boundary
- Original Borrow Area
- Levee Structures**
- ⊙ Gate Well
- ▲ Sandbag Gap
- Stoplog Gap
- Pump Station
- + piezometer_point
- Manhattan Levee Unit

N

US Army Corps of Engineers
Kansas City District

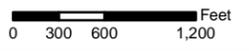
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Projection: State Plane, Kansas North
Datum: NAD 83

Created by:
U.S. Army Corps of Engineers
Kansas City District, GDS Team

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Sheet No. 5

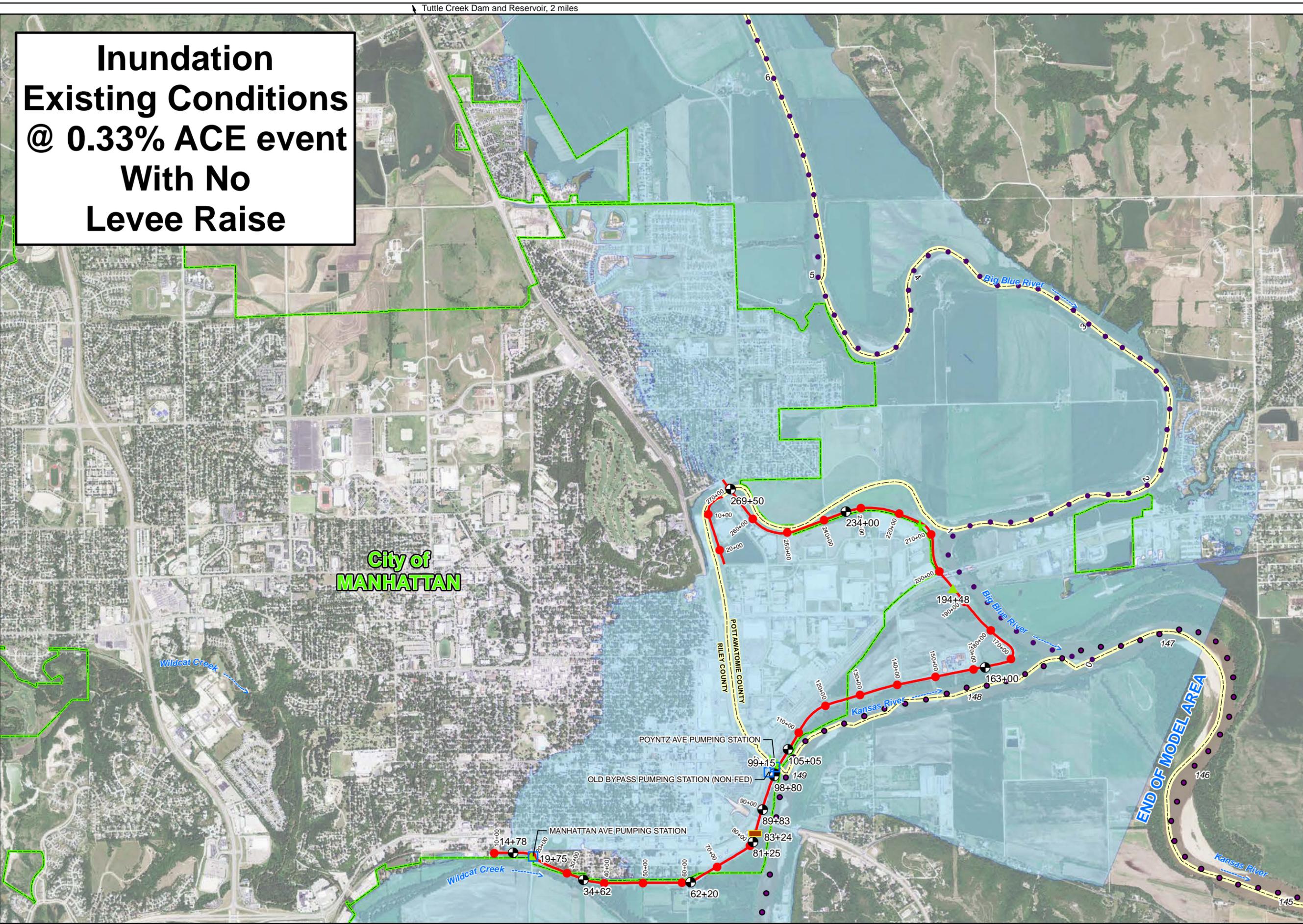
Fort Riley Military Reservation, approximately 8.5 miles

Tuttle Creek Dam and Reservoir, approximately 5 miles

Inundation Existing Conditions @ 0.33% ACE event With No Levee Raise

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Inundation at 0.33% ACE Event
With No Levee Raise



Legend

- KS River Miles
- County Boundary
- 0.33% ACE inundation w/ no levee raise
- City Boundary

Levee Structures

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- piezometer_point
- Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North
Datum: NAD 83

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0 300 600 1,200 1,800 2,400 Feet



Sheet No. 6

Fort Riley Military Reservation, approximately 6.9 miles

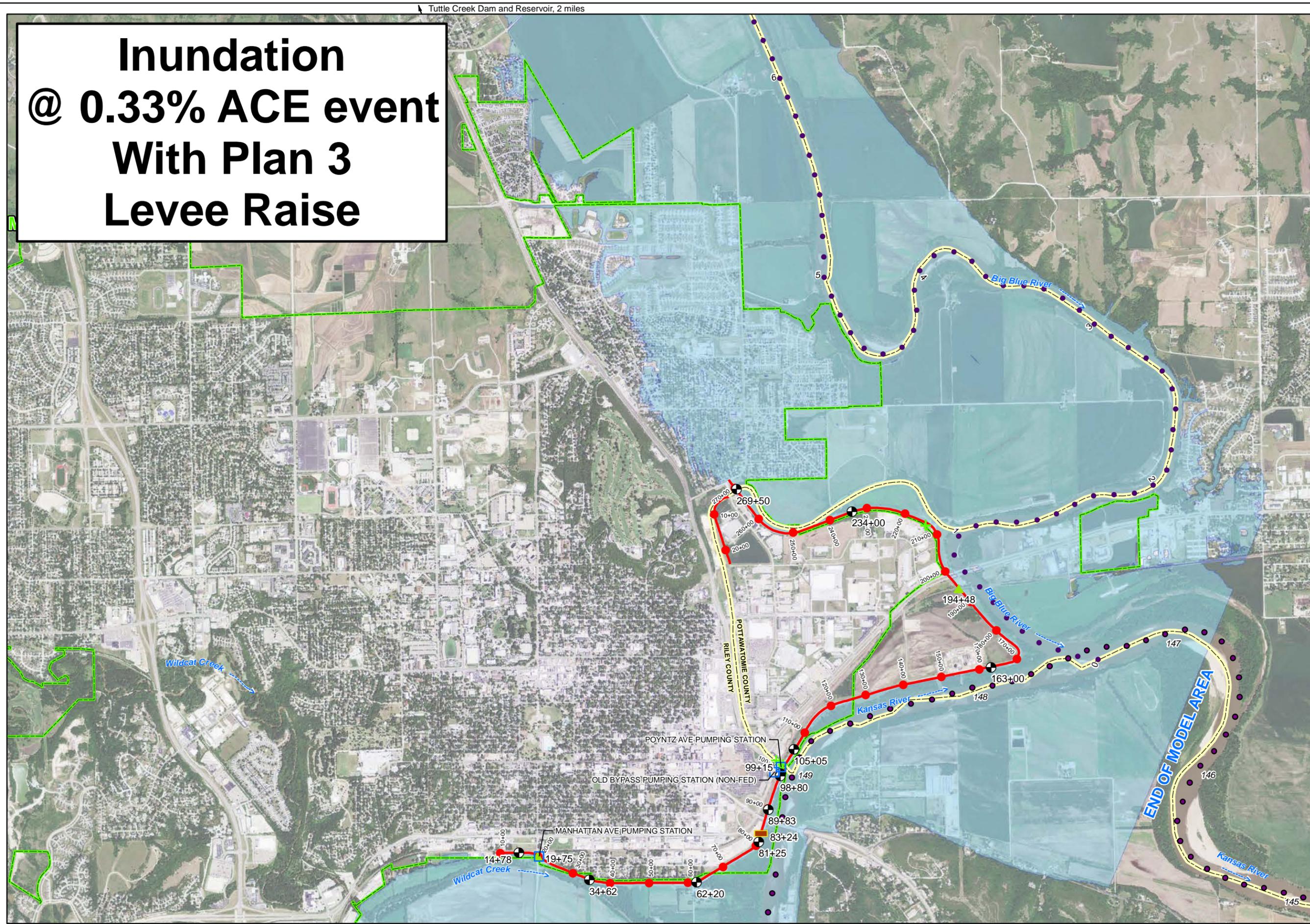
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Inundation @ 0.33% ACE event With Plan 3 Levee Raise

Tuttle Creek Dam and Reservoir, 2 miles

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Inundation
@ 0.33% ACE event
With Plan 3
Levee Raise



Legend

- KS River Miles
- ▭ County Boundary
- ▭ City Boundary
- ▭ 0.33% ACE inundation w/ levee raise

Levee Structures

- ⊙ Gate Well
- ▲ Sandbag Gap
- Stoplog Gap
- Pump Station
- + piezometer_point
- Manhattan Levee Unit

N

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North
Datum: NAD 83

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Kansas City, Missouri, 64106

0 300 600 1,200 1,800 2,400 Feet



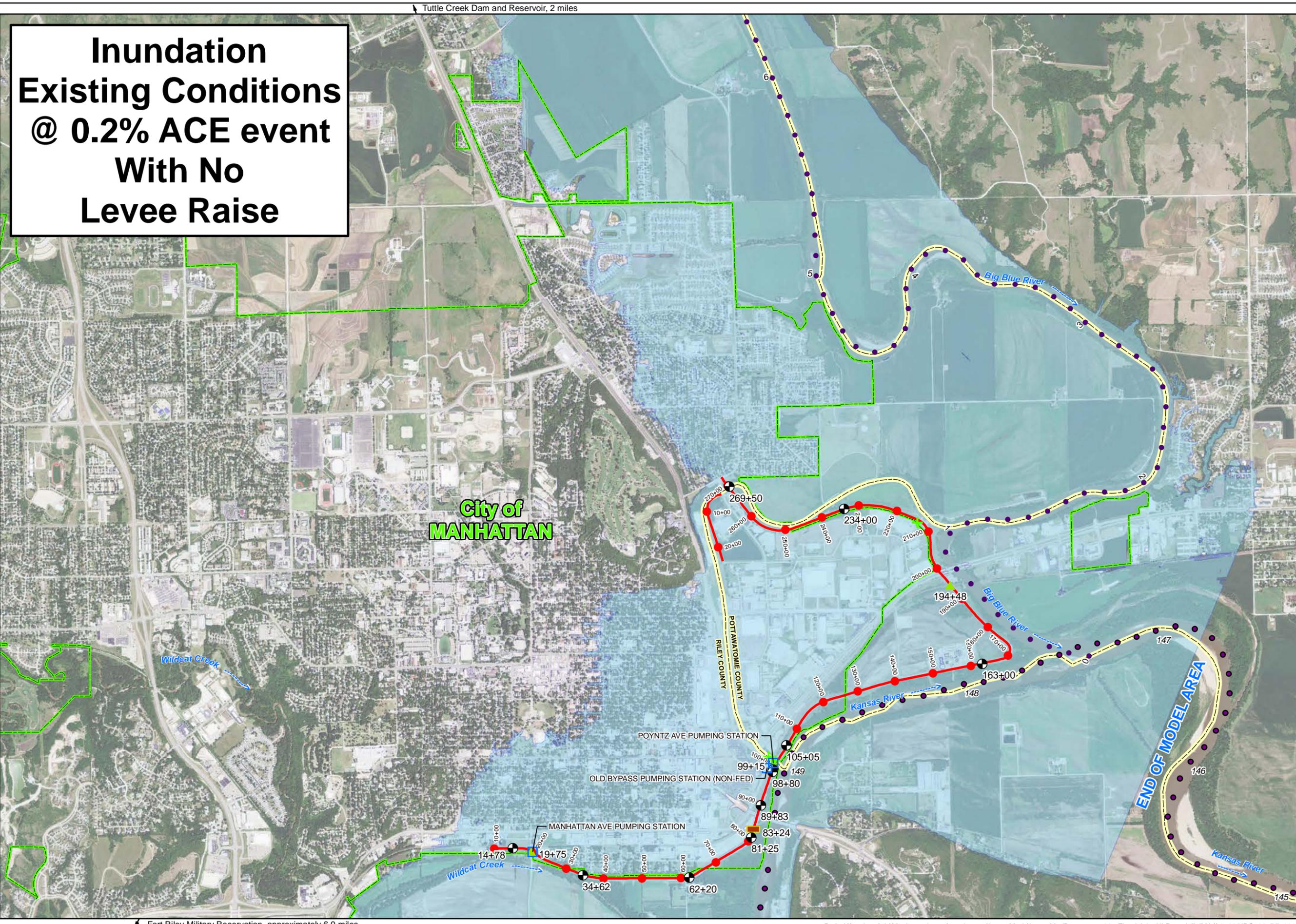
Fort Riley Military Reservation, approximately 6.9 miles

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Inundation Existing Conditions @ 0.2% ACE event With No Levee Raise

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Inundation 0.2% ACE event
With No Levee Raise



Legend

- KS River Miles
- County Boundary
- 0.2% ACE inundation w/ no levee raise
- City Boundary

Levee Structures

- Gate Well
- ▲ Sandbag Gap
- Stoplog Gap
- Pump Station
- + piezometer_point
- Manhattan Levee Unit

N

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North
Datum: NAD 83

Created by:
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0 300 600 1,200 1,800 2,400 Feet



Sheet No. 8

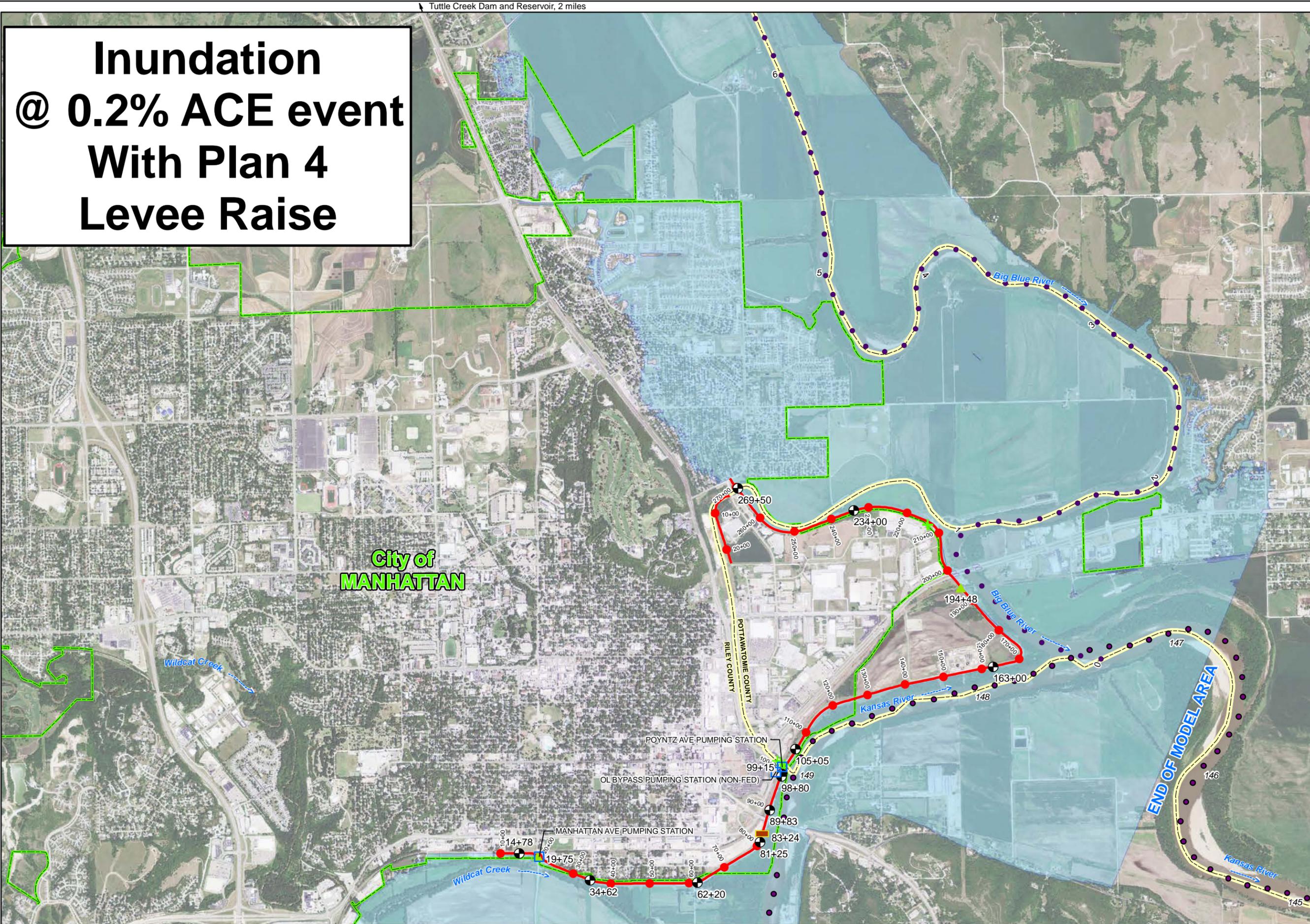
Fort Riley Military Reservation, approximately 6.9 miles

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Inundation @ 0.2% ACE event With Plan 4 Levee Raise

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Inundation
@ 0.2% ACE event
With Plan 4
Levee Raise



Legend

- KS_river_miles
- County Boundary
- City Boundary
- 0.2% ACE inundation w/ levee raise

Levee Structures

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- piezometer_point
- Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District
Photography Date: 2012

Projection: State Plane, Kansas North Datum: NAD 83
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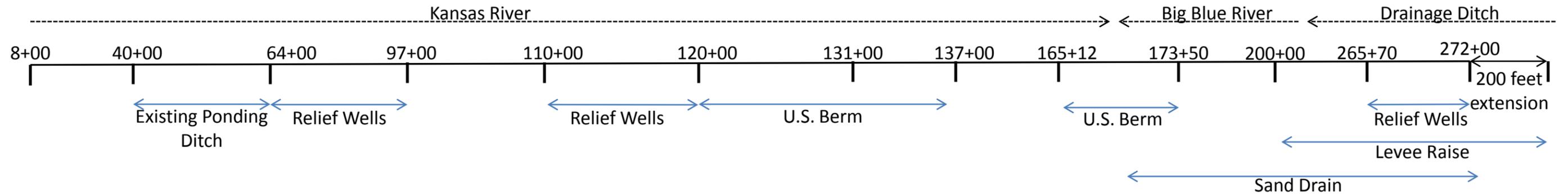


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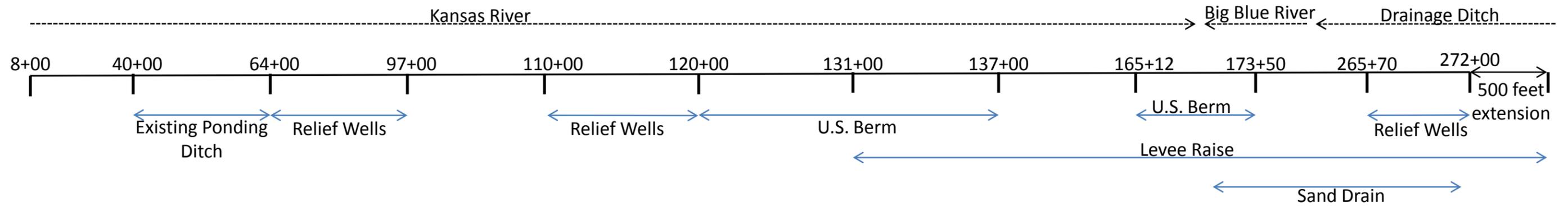
Fort Riley Military Reservation, approximately 6.9 miles

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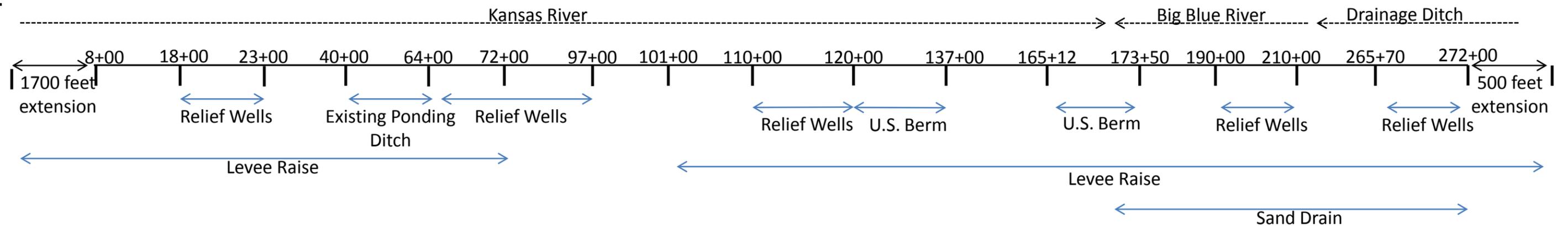
Plan 2



Plan3, Plan 5



Plan 4

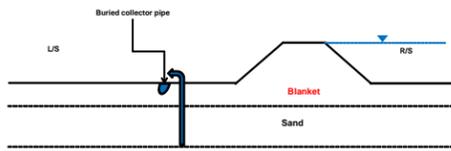


Plan 3

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Plan 3

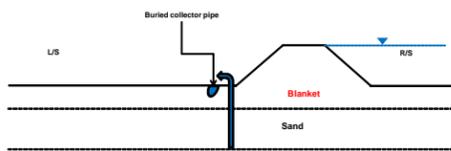
0.33%: Station 94+00 to 97+00
(Relief Wells and collector ditch)



- 6 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 50 ft

6

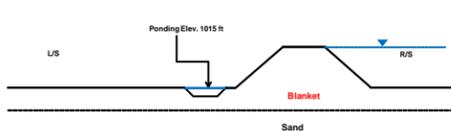
0.33%: Station 64+00 to 94+00
(Relief Wells and collector ditch)



- 20 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 50 ft

5

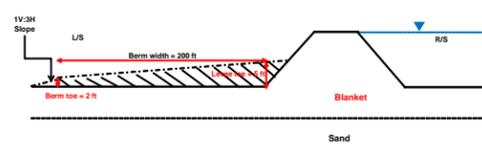
0.33%: Station 40+00 to 64+00
(Maintain ponding Elevation)



- Survey landside

4

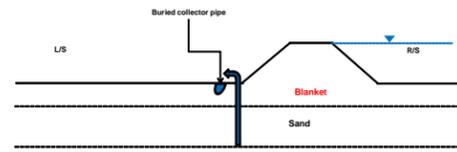
0.33%: Station 120+00 to 137+00
(Berm)



- Strip top soil
- Minimum berm thickness at levee toe 5 ft
- Minimum berm thickness at berm toe 2 ft

8

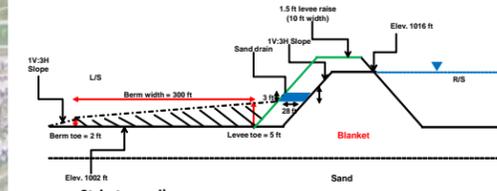
0.33%: Station 110+00 to 120+00
(Relief Wells and collector ditch)



- 9 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 60 ft

7

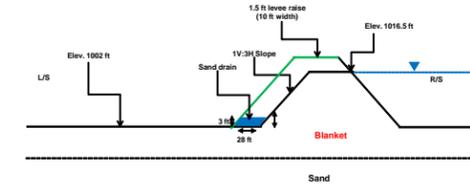
0.33%: Station 170+00 to 173+50 – Confluence Zone
(Berm, levee raise, and sand drain)



- Strip top soil
- Strip 6 inch levee crest aggregate
- Minimum berm thickness at levee toe 5 ft
- Minimum berm thickness at berm toe 2 ft
- Compact 6 inch levee crest aggregate
- Construct sand drain

9

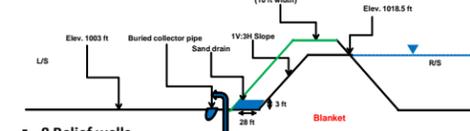
0.33%: Station 173+50 to 265+70
(Levee raise and sand drain)



- Strip top soil
- Strip 6 inch levee crest aggregate
- Raise levee
- Compact 6 inch levee crest aggregate
- Construct sand drain

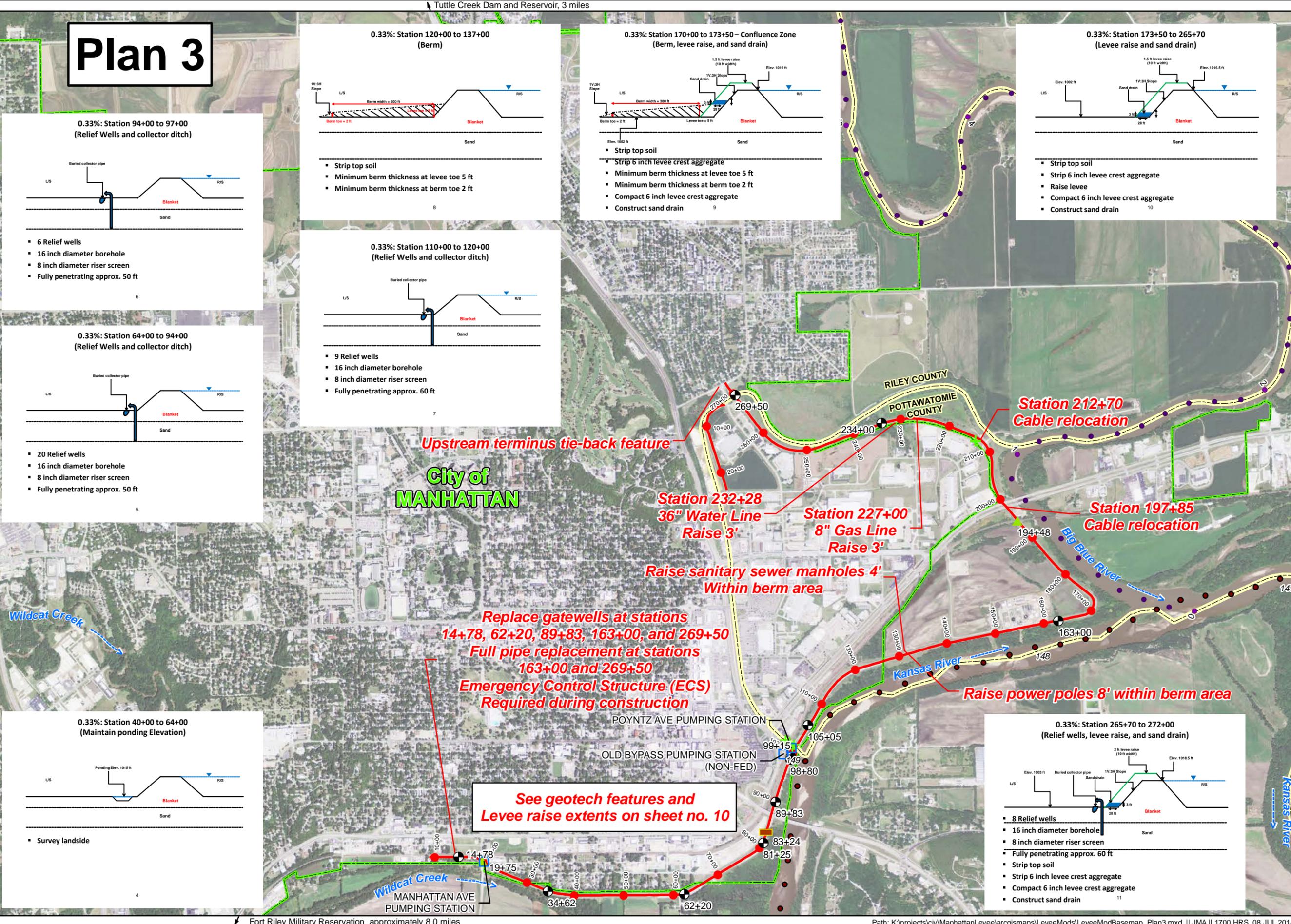
10

0.33%: Station 265+70 to 272+00
(Relief wells, levee raise, and sand drain)



- 8 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 60 ft
- Strip top soil
- Strip 6 inch levee crest aggregate
- Compact 6 inch levee crest aggregate
- Construct sand drain

11



Legend

- KS_river_miles
- County Boundary
- City Boundary
- Levee Structures**
 - Gate Well
 - Sandbag Gap
 - Stoplog Gap
 - Pump Station
 - piezometer_point
 - Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District
Photography Date: 2012

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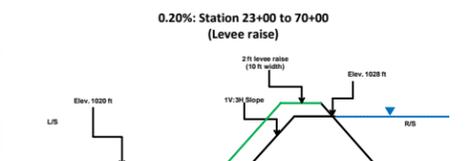
See geotech features and Levee raise extents on sheet no. 10

Plan 4

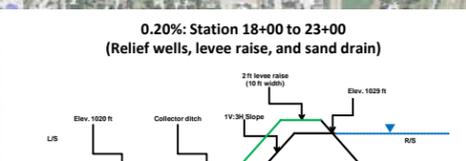
Tuttle Creek Dam and Reservoir, 3 miles

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

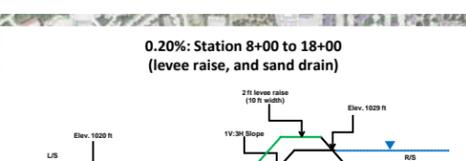
Plan 4



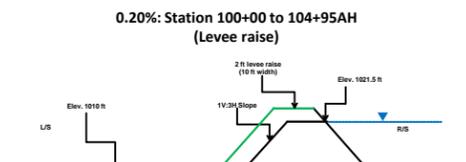
- Strip top soil
- Strip 6 inch levee crest aggregate
- Raise levee
- Compact 6 inch levee crest aggregate
- Construct sand drain
- Analyze need for landside ditch between Sta. 40+00 and 64+00



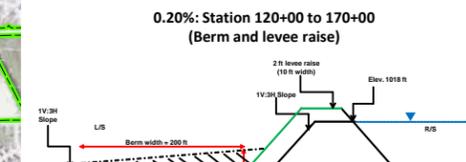
- 6 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 50 ft
- Strip top soil
- Strip 6 inch levee crest aggregate
- Compact 6 inch levee crest aggregate



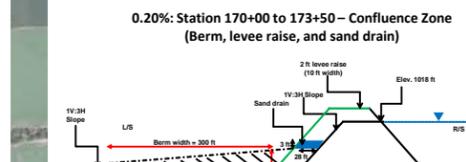
- Strip top soil
- Strip 6 inch levee crest aggregate
- Raise levee
- Compact 6 inch levee crest aggregate



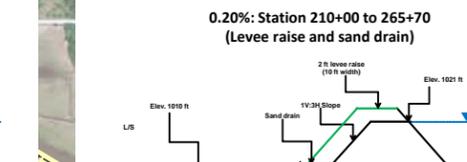
- Strip top soil
- Strip 6 inch levee crest aggregate
- Raise levee
- Compact 6 inch levee crest aggregate



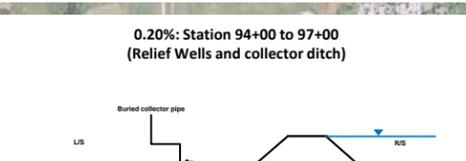
- Strip top soil
- Strip 6 inch levee crest aggregate
- Minimum berm thickness at levee toe 5 ft
- Minimum berm thickness at berm toe 2 ft
- Compact 6 inch levee crest aggregate



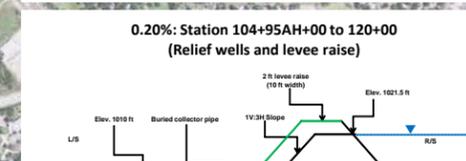
- Strip top soil
- Strip 6 inch levee crest aggregate
- Minimum berm thickness at levee toe 5 ft
- Minimum berm thickness at berm toe 2 ft
- Compact 6 inch levee crest aggregate
- Construct sand drain



- Strip top soil
- Strip 6 inch levee crest aggregate
- Raise levee
- Compact 6 inch levee crest aggregate
- Construct sand drain



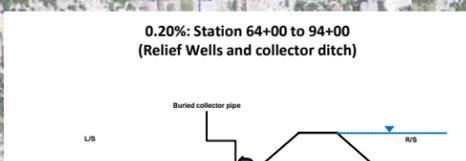
- 6 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 50 ft



- 28 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 60 ft
- Strip top soil
- Strip 6 inch levee crest aggregate
- Compact 6 inch levee crest aggregate



- 10 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 60 ft
- Strip top soil
- Strip 6 inch levee crest aggregate
- Compact 6 inch levee crest aggregate
- Construct sand drain



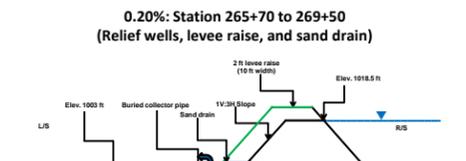
- 20 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 50 ft

1700 ft. levee extension to tie into high ground
Full pipe replacement and Replace all gatewells except at 98+80
10 temporary Emergency Control Structures (ECS) Required during construction

See geotech features and Levee raise extents on sheet no. 10

Strengthen walls and slab For Pump Station at 20+13

Abandon and fill Old By-Pass Pump Station at 98+80



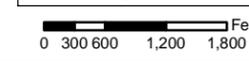
- 8 Relief wells
- 16 inch diameter borehole
- 8 inch diameter riser screen
- Fully penetrating approx. 60 ft
- Strip top soil
- Strip 6 inch levee crest aggregate
- Compact 6 inch levee crest aggregate
- Construct sand drain

Legend

- KS_river_miles
- County Boundary
- City Boundary
- Levee Structures**
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- piezometer_point
- Manhattan Levee Unit

US Army Corps of Engineers
 Kansas City District
 Photography Date: 2012

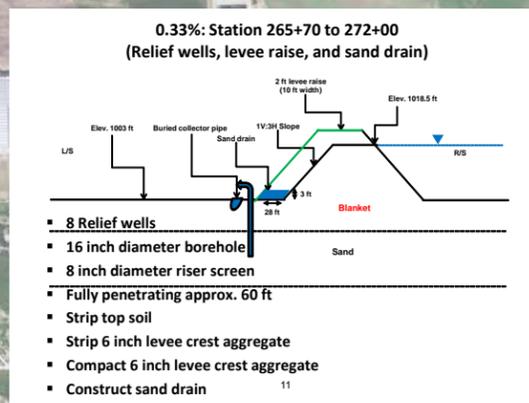
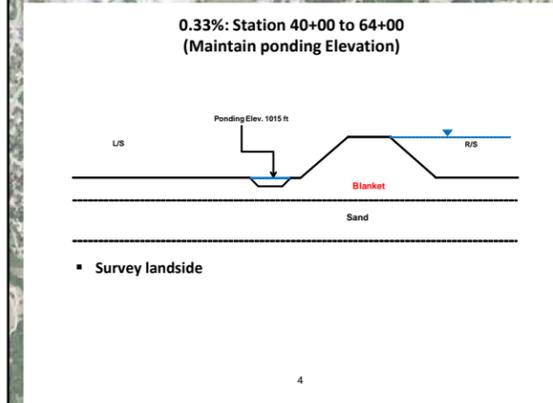
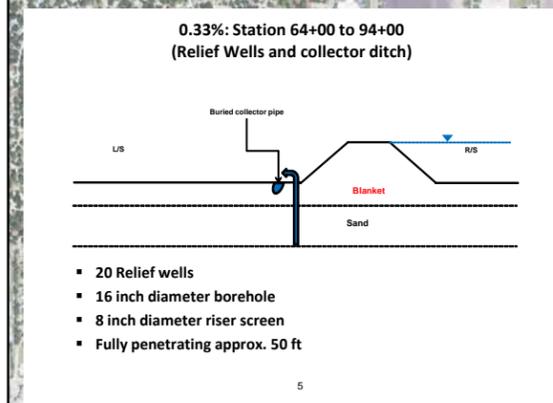
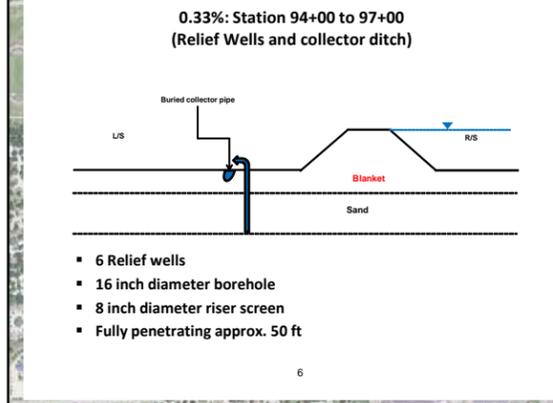
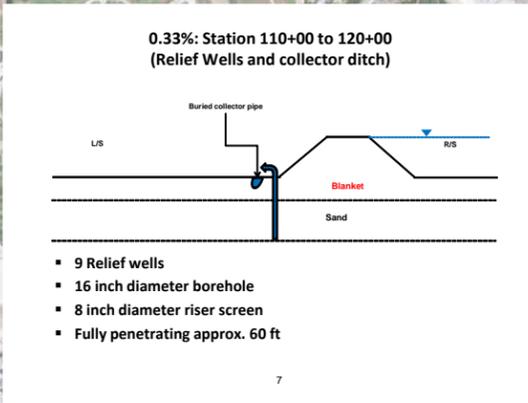
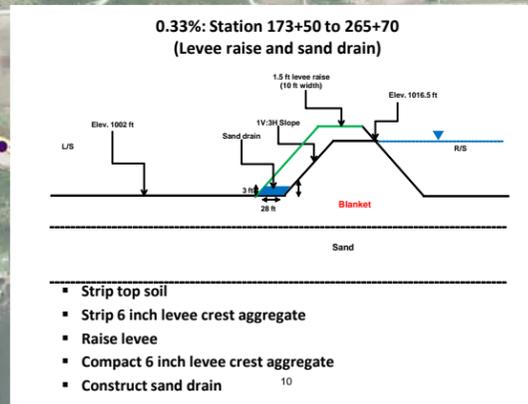
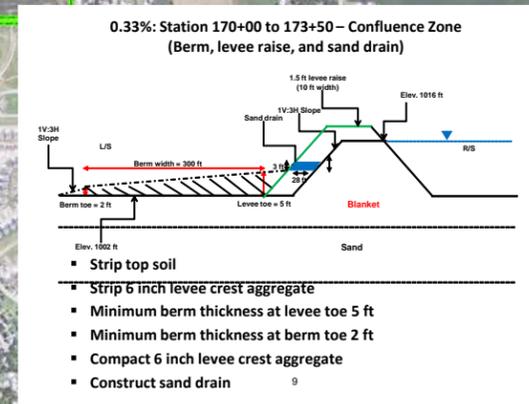
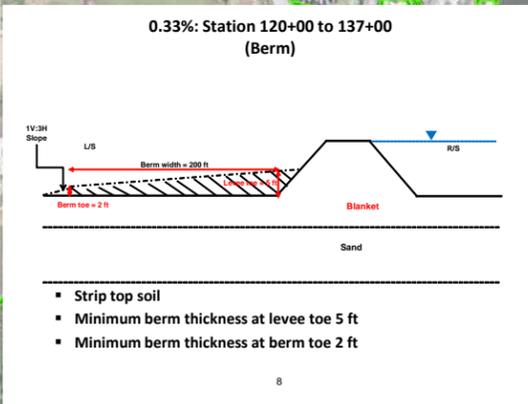
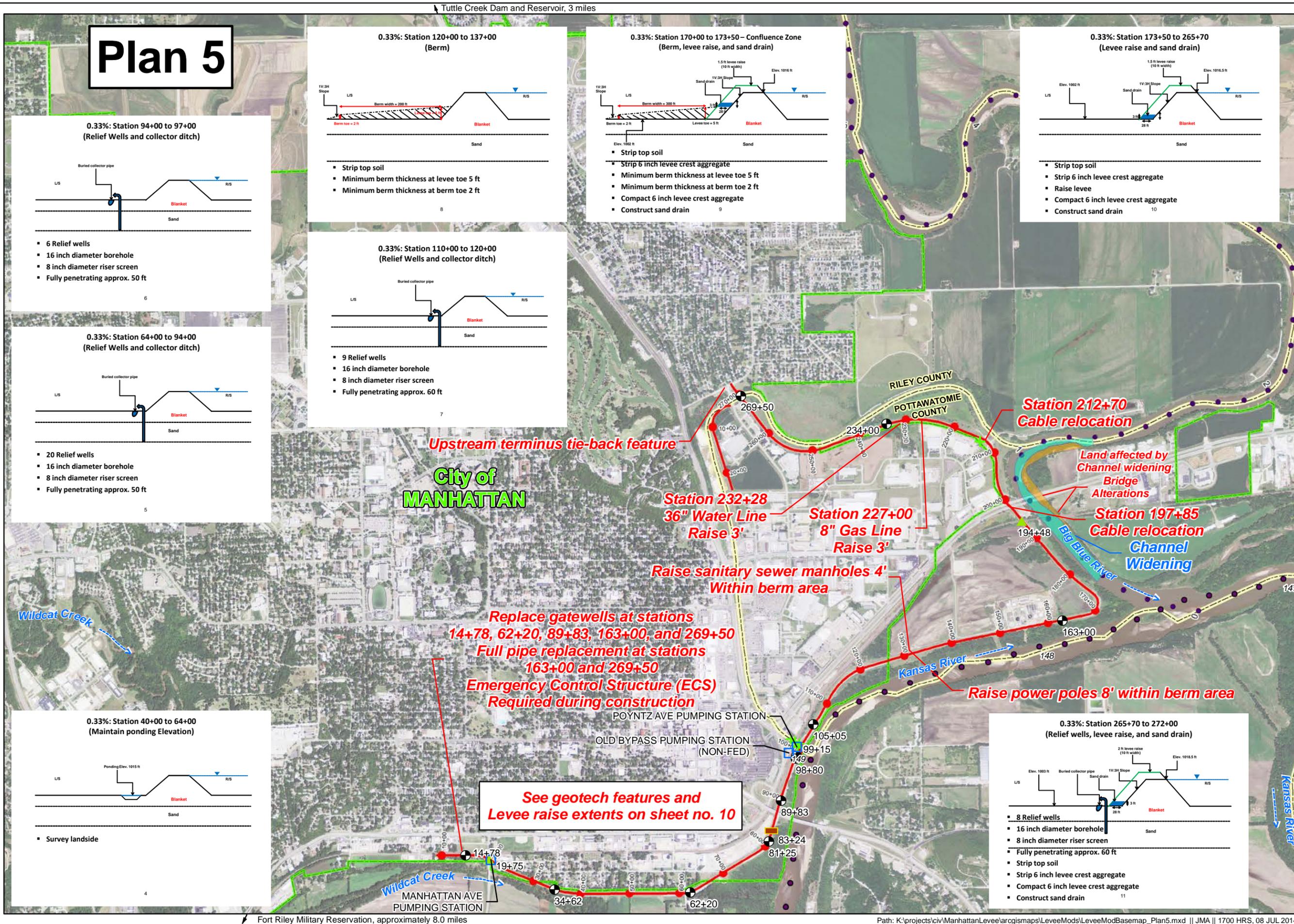
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Sheet No. 12

Fort Riley Military Reservation, approximately 8.0 miles

Plan 5



See geotech features and Levee raise extents on sheet no. 10

Legend

- KS River Miles
- County Boundary
- City Boundary
- Channel Widening Area**
 - land affected
 - river affected
- Levee Structures**
 - Gate Well
 - Sandbag Gap
 - Stoplog Gap
 - Pump Station
 - piezometer_point
 - Manhattan Levee Unit

US Army Corps of Engineers
Kansas City District

Photography Date: 2012

Projection: State Plane, Kansas North Datum: NAD 83

Created by:
U.S. Army Corps of Engineers
Kansas City District, GDS Team

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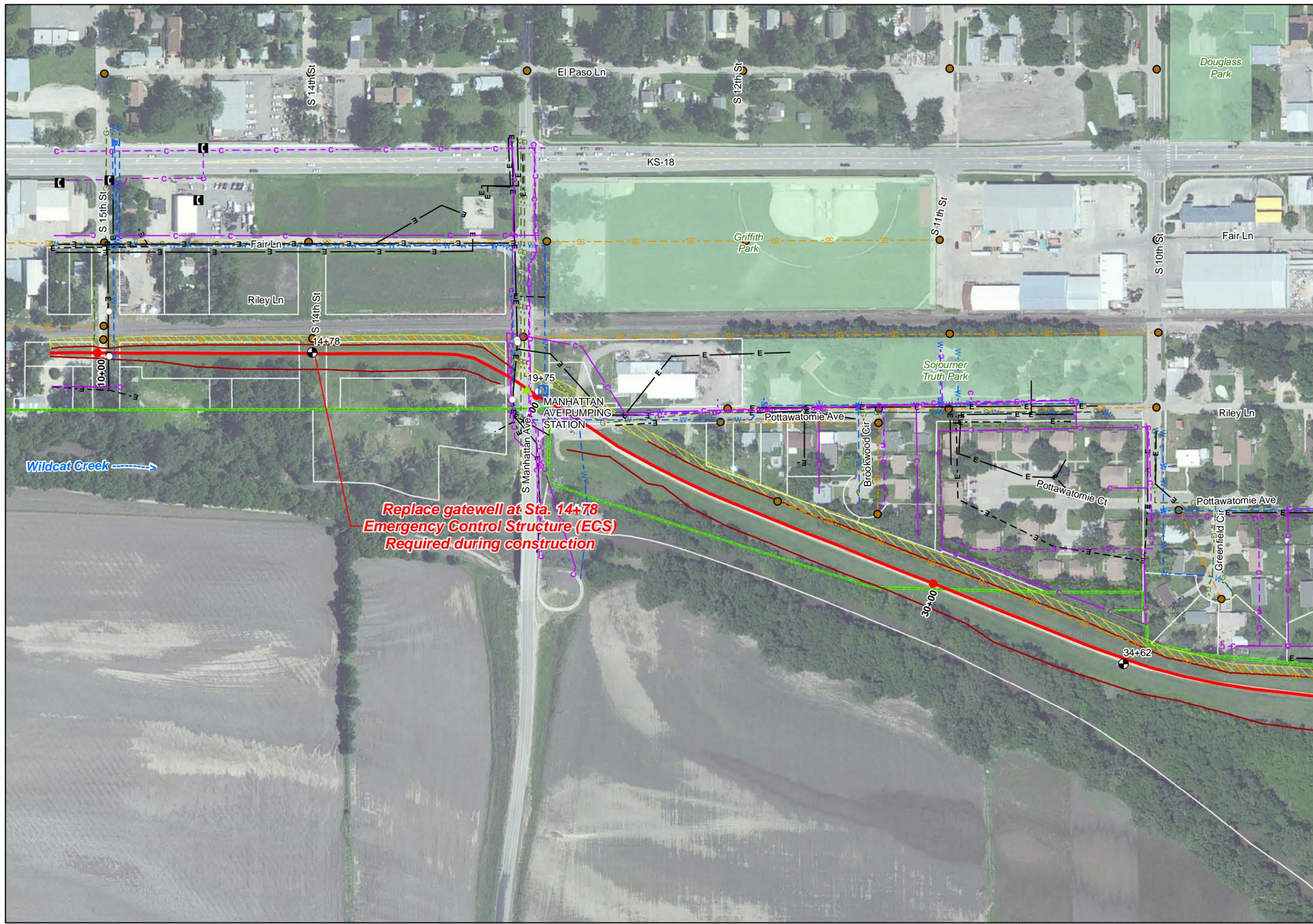
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0 300 600 1,200 1,800 Feet



Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Plan 3
Station 0+00 to 38+50



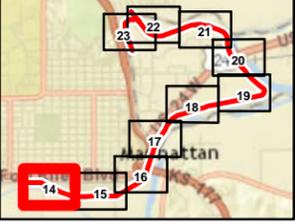
- Key**
- Proposed Features**
- Berm
 - Berm and Raise
 - Ponding
 - Raise
 - Relief Wells
 - Permanent Real Estate Easement
 - Temporary Real Estate Easement
 - Parks
 - Parcels
 - County Boundary
 - City Boundary
 - TCE Plume
 - Proposed Sandbag Gap
 - Proposed Levee Extension
- Existing UL Features**
- Aerial Com & Fiber Optic (FO)
 - Underground Com & FO
 - Aerial Electrical & Light
 - Underground Electrical & Light
 - Natural Gas Lines
 - Water Lines
 - Storm Sewer Lines
 - sewlines_StudyArea selection
- Existing Levee Features**
- Communication Structure
 - Electrical Poles
 - Manholes
 - Gate Well
 - Sandbag Gap
 - Stoplog Gap
 - Pump Station
 - Piezometers
 - Manhattan Levee Unit
 - Toe 2006 Survey

US Army Corps of Engineers
Kansas City District
Photography Date: 2010

Projection: State Plane, Kansas North
Datum: NAD 83

Created by:
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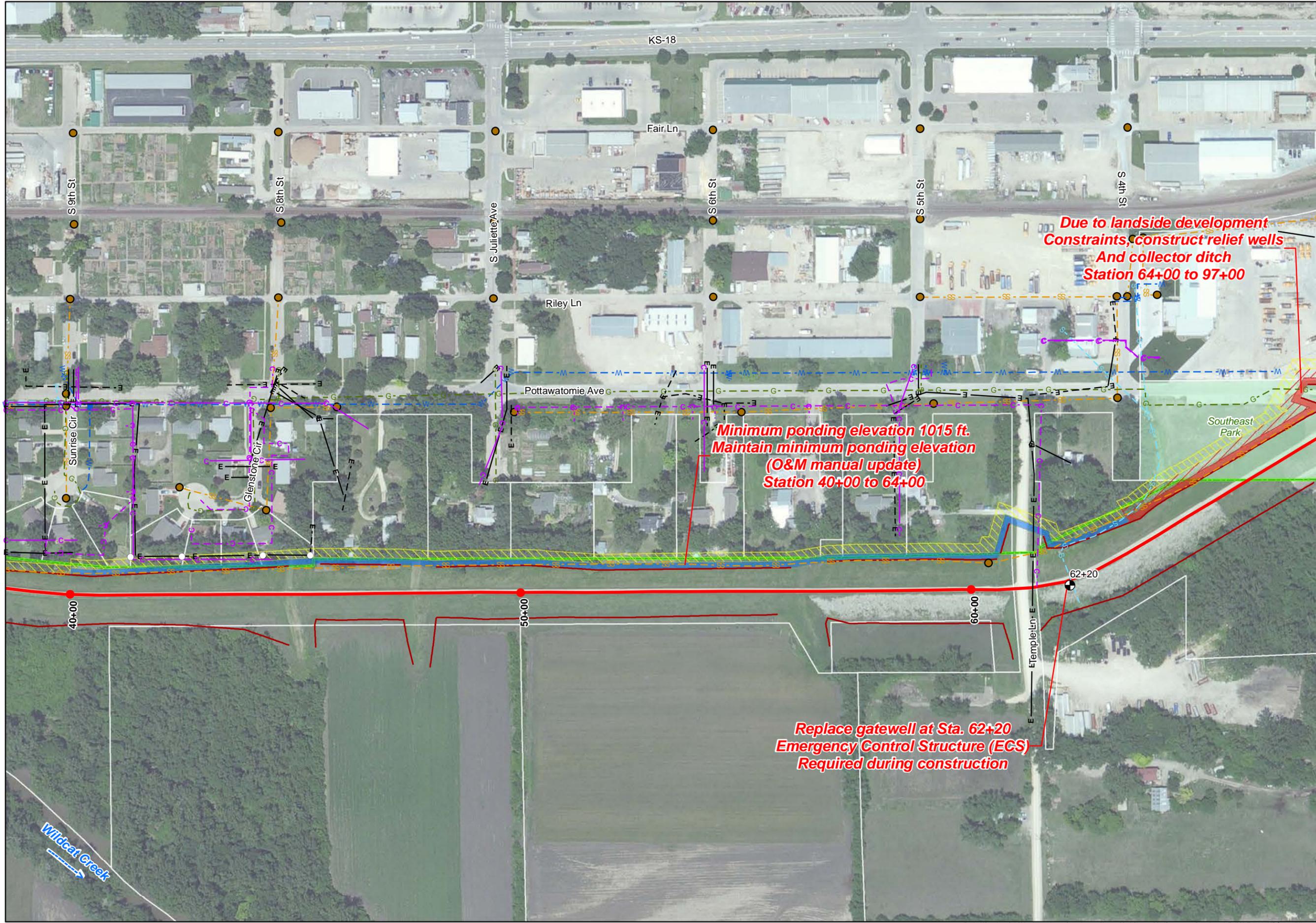
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Sheet No. 14

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

**Plan 3
Station 38+00 to 68+50**



**Due to landside development
Constraints, construct relief wells
And collector ditch
Station 64+00 to 97+00**

**Minimum ponding elevation 1015 ft.
Maintain minimum ponding elevation
(O&M manual update)
Station 40+00 to 64+00**

**Replace gatewell at Sta. 62+20
Emergency Control Structure (ECS)
Required during construction**

Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection
- Communication Structure
- Electrical Poles
- Manholes

Existing Levee Features

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

US Army Corps of Engineers
Kansas City District

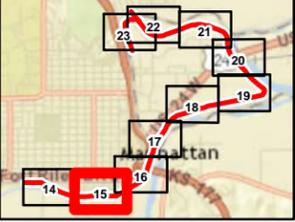
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Datum: NAD 83

Created by:
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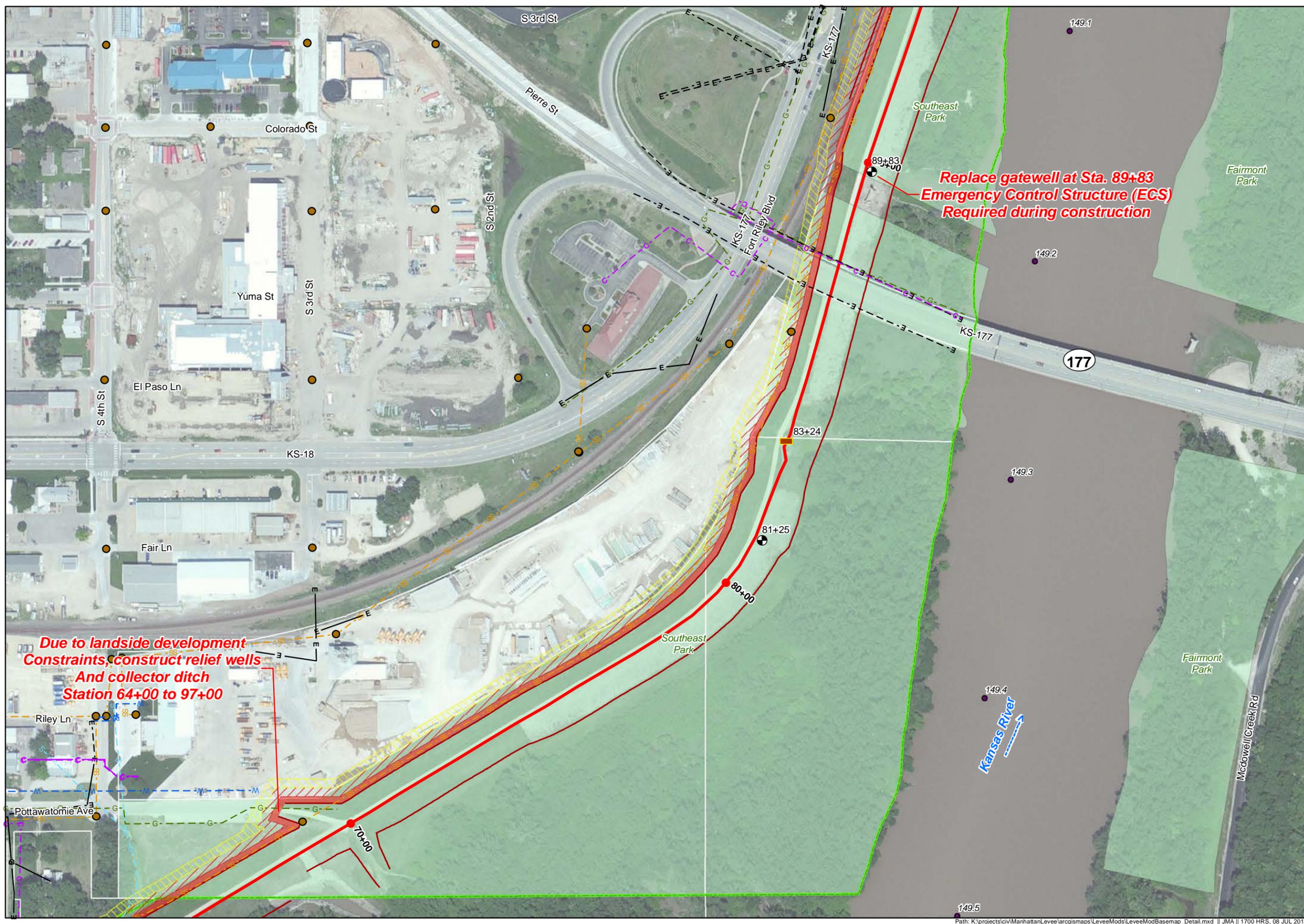
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Manhattan Levee Feasibility Study

Existing Conditions and Reliability Improvements

Plan 3
Station 66+00 to 93+50



**Replace gatewell at Sta. 89+83
Emergency Control Structure (ECS)
Required during construction**

**Due to landside development
Constraints, construct relief wells
And collector ditch
Station 64+00 to 97+00**

Key	
Proposed Features	
[Pink Box]	Berm
[Light Blue Box]	Berm and Raise
[Blue Box]	Ponding
[Yellow Box]	Raise
[Red Box]	Relief Wells
[Red Hatched Box]	Permanent Real Estate Easement
[Yellow Hatched Box]	Temporary Real Estate Easement
[Green Box]	Parks
[Grey Box]	Parcels
[Yellow Box]	County Boundary
[Green Box]	City Boundary
[Yellow Box]	TCE Plume
[Black Box]	Proposed Sandbag Gap
[Black Box]	Proposed Levee Extension
Existing UL Features	
[Purple Dashed Line]	Aerial Com & Fiber Optic (FO)
[Purple Dashed Line]	Underground Com & FO
[Black Dashed Line]	Aerial Electrical & Light
[Black Dashed Line]	Underground Electrical & Light
[Green Dashed Line]	Natural Gas Lines
[Blue Dashed Line]	Water Lines
[Blue Dashed Line]	Storm Sewer Lines
[Blue Dashed Line]	sewelines_study area selection
[Black Square]	Communication Structure
[White Circle]	Electrical Poles
[Black Circle]	Manholes
Existing Levee Features	
[Black Circle with Dot]	Gate Well
[Yellow Triangle]	Sandbag Gap
[Yellow Square]	Stoplog Gap
[Blue Square]	Pump Station
[Green Cross]	Piezometers
[Red Line]	Manhattan Levee Unit
[Red Line]	Toe 2006 Survey

US Army Corps of Engineers
Kansas City District
Photography Date: 2010

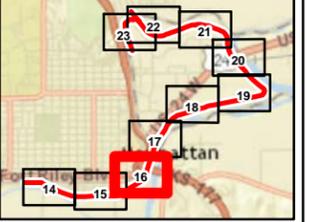
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Datum: NAD 83

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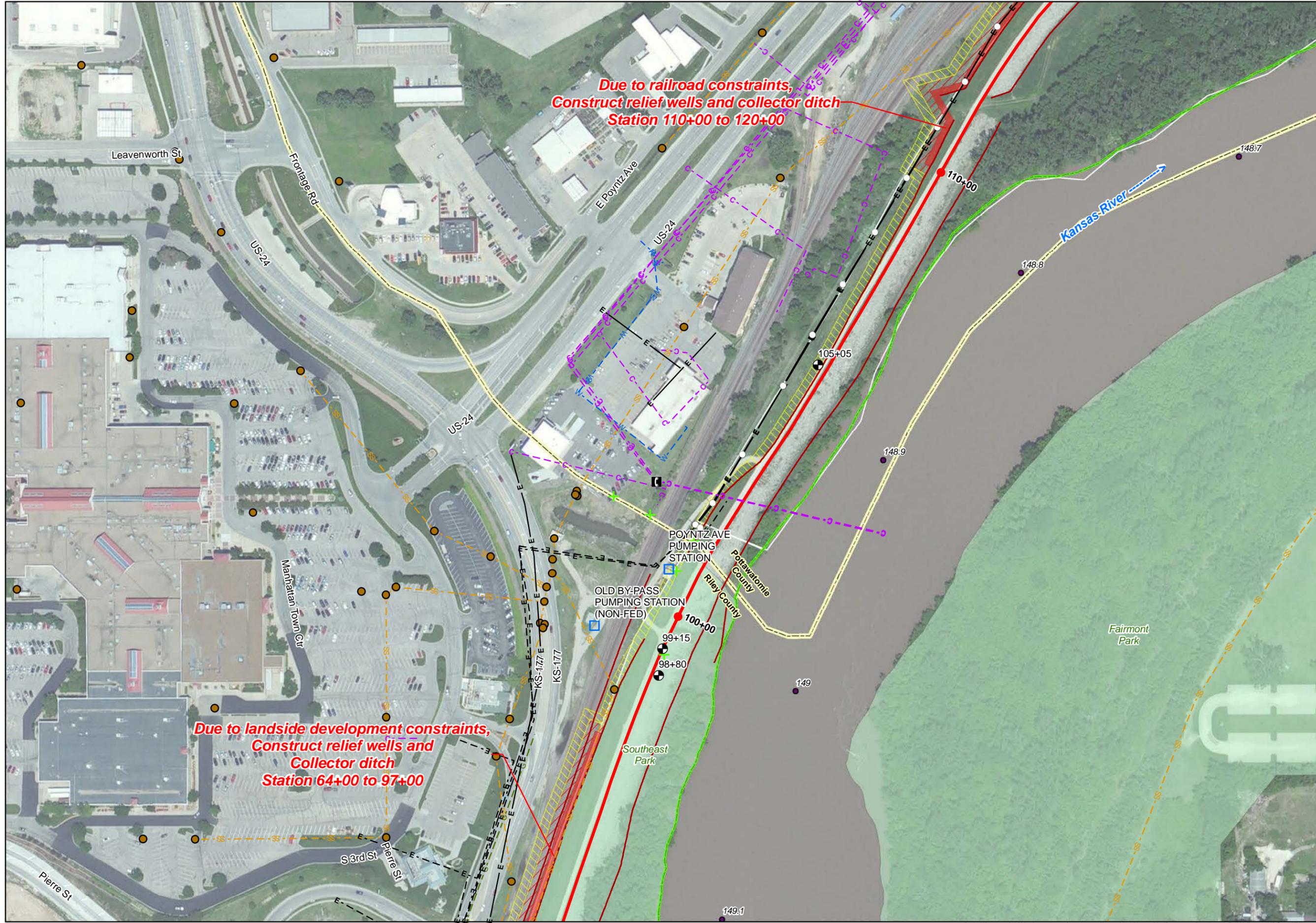
0 50 100 200 Feet



Sheet No. 16

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

**Plan 3
Station 93+00 to 114+50**



Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection

Existing Levee Features

- Communication Structure
- Electrical Poles
- Manholes
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

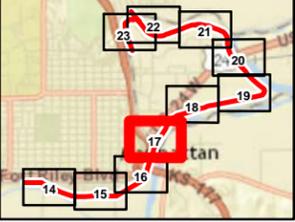
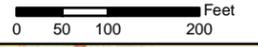
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Photography Date: 2010

Projection: State Plane, Kansas North
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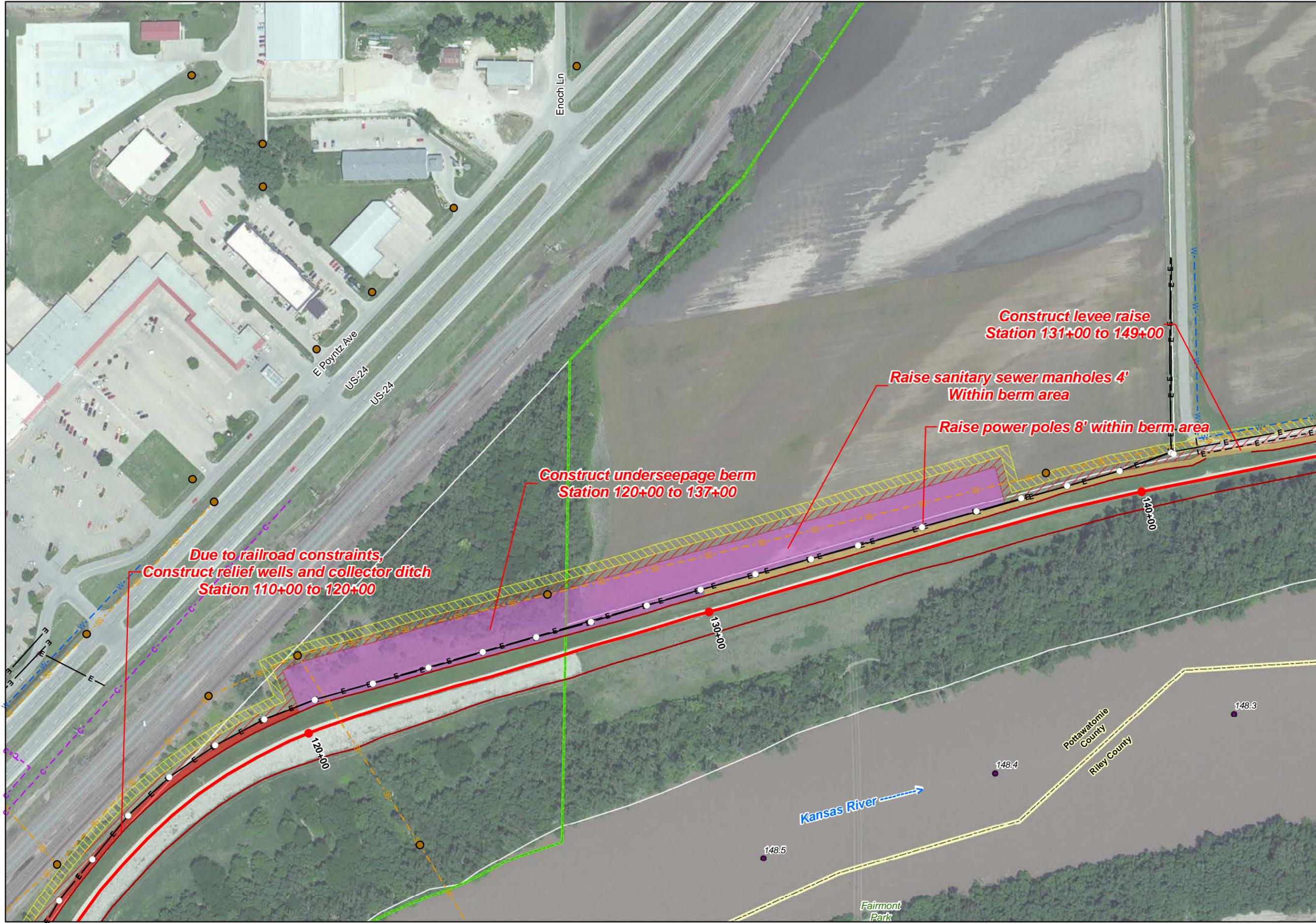
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**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

**Plan 3
Station 113+50 to 144+00**



Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection

Existing Levee Features

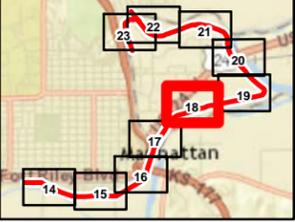
- Communication Structure
- Electrical Poles
- Manholes
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

US Army Corps of Engineers
Kansas City District
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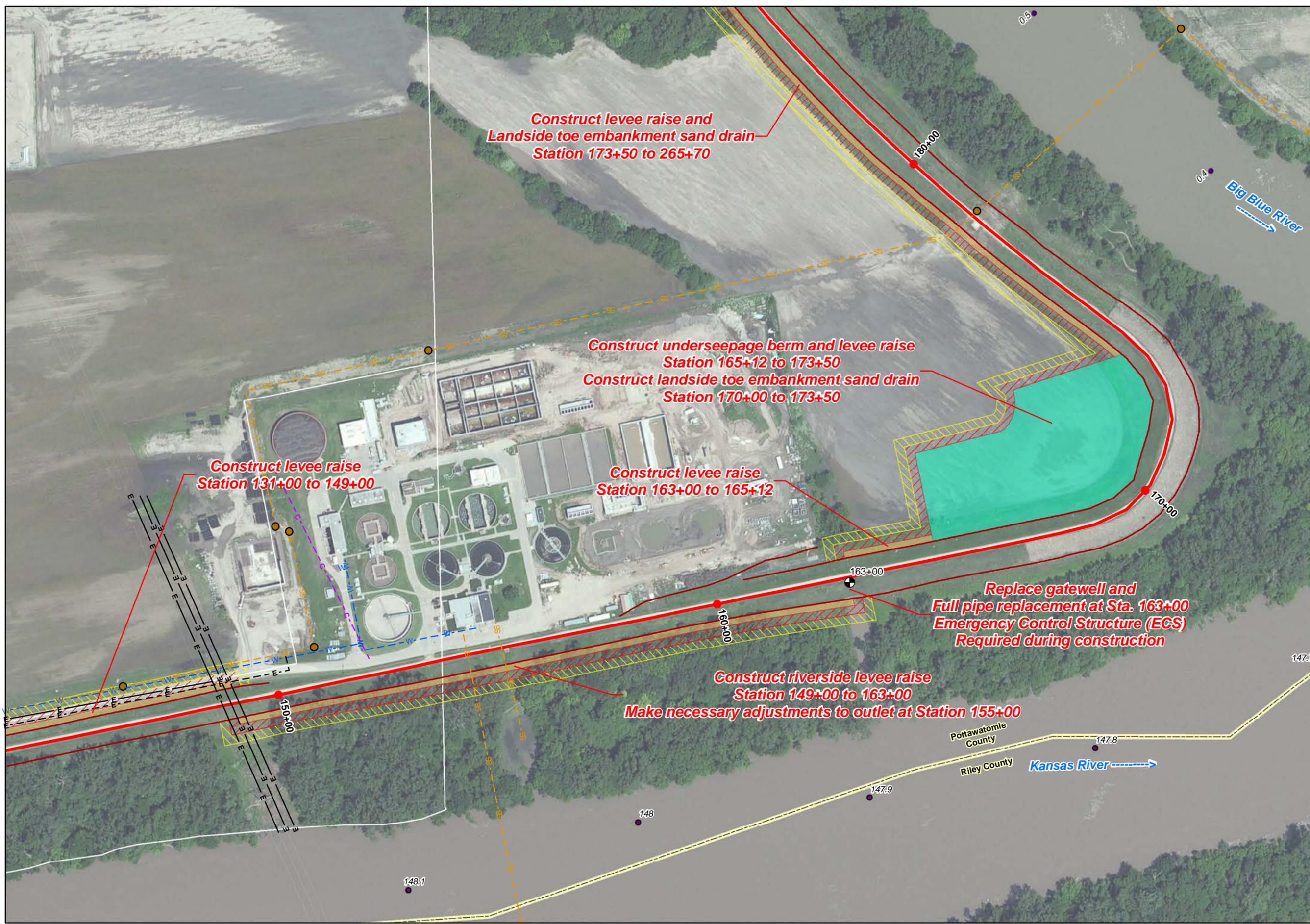


Sheet No. 18

Manhattan Levee Feasibility Study

Existing Conditions and Reliability Improvements

Plan 3
Station 144+00 to 184+50



Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection

Existing Levee Features

- Communication Structure
- Electrical Poles
- Manholes
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

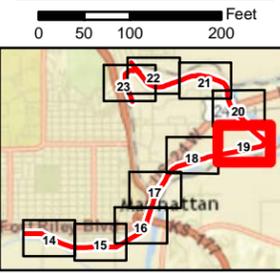
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Path: K:\projects\civ\ManhattanLevee\arcgismaps\LeveeMods\LeveeModBasemap_Detail.mxd || JMA || 1700 HRS, 08 JUL 2014

Station 212+70
Cable relocation

Station 197+85
Cable relocation

Construct levee raise and
Landside toe embankment sand drain
Station 173+50 to 265+70

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Plan 3
Station 184+00 to 208+50

Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection
- Communication Structure
- Electrical Poles
- Manholes

Existing Levee Features

- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

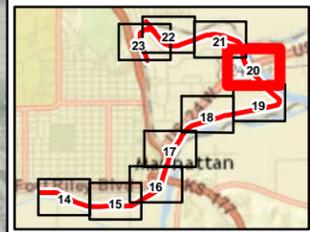
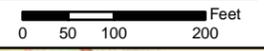
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Datum: NAD 83

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Sheet No. 20

Manhattan Levee Feasibility Study Existing Conditions and Reliability Improvements

Plan 3
Station 206+00 to 239+00

- Key**
- Proposed Features**
- Berm
 - Berm and Raise
 - Ponding
 - Raise
 - Relief Wells
 - Permanent Real Estate Easement
 - Temporary Real Estate Easement
 - Parks
 - Parcels
 - County Boundary
 - City Boundary
 - TCE Plume
 - Proposed Sandbag Gap
 - Proposed Levee Extension
- Existing UL Features**
- Aerial Com & Fiber Optic (FO)
 - Underground Com & FO
 - Aerial Electrical & Light
 - Underground Electrical & Light
 - Natural Gas Lines
 - Water Lines
 - Storm Sewer Lines
 - sewlines_StudyArea selection
- Existing Levee Features**
- Communication Structure
 - Electrical Poles
 - Manholes
 - Gate Well
 - Sandbag Gap
 - Stoplog Gap
 - Pump Station
 - Piezometers
 - Manhattan Levee Unit
 - Toe 2006 Survey

US Army Corps of Engineers
Kansas City District
Photography Date: 2010

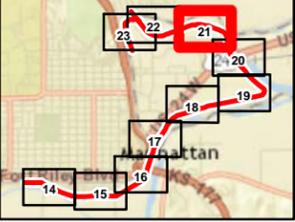
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Datum: NAD 83

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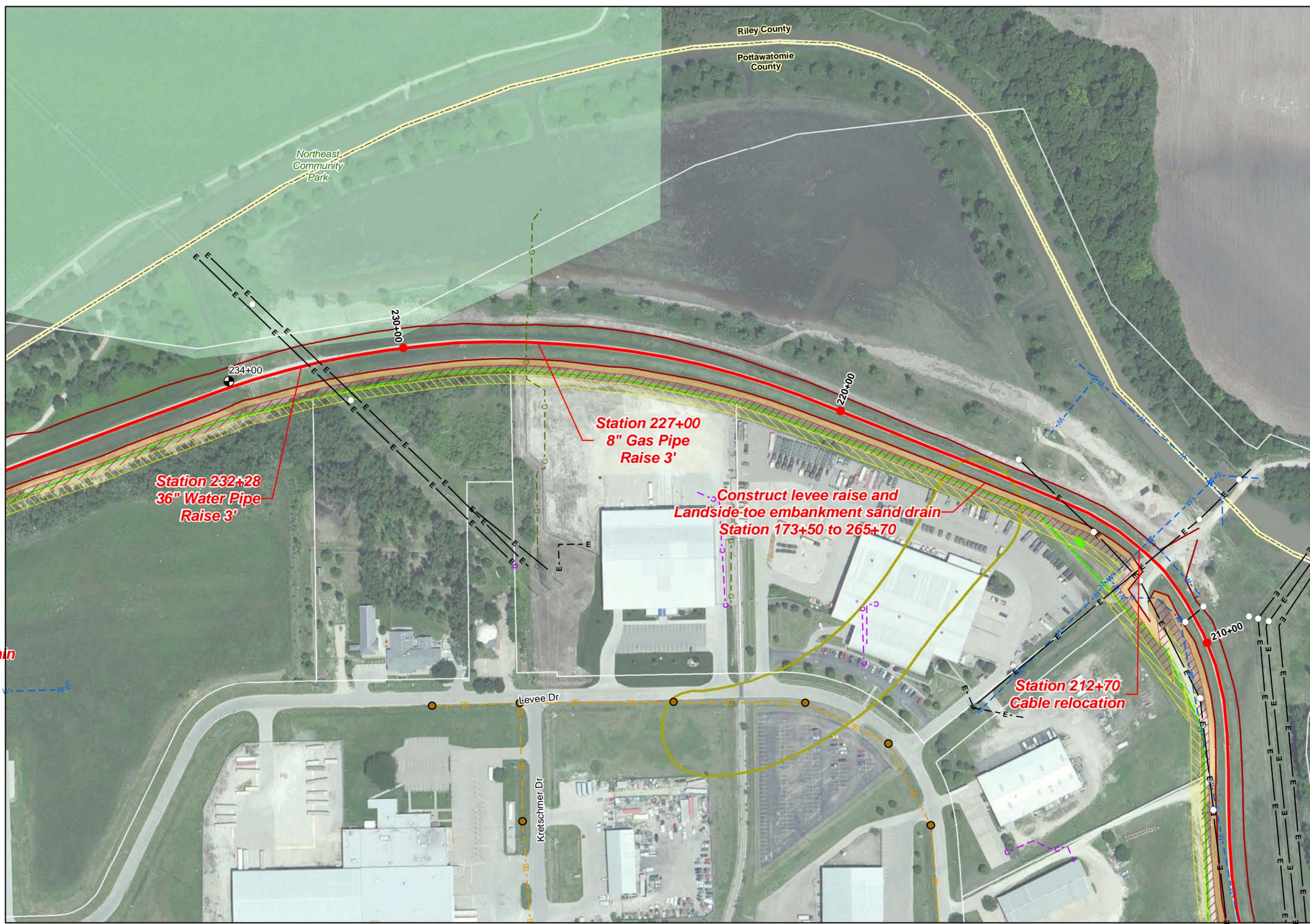
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0 50 100 200 Feet

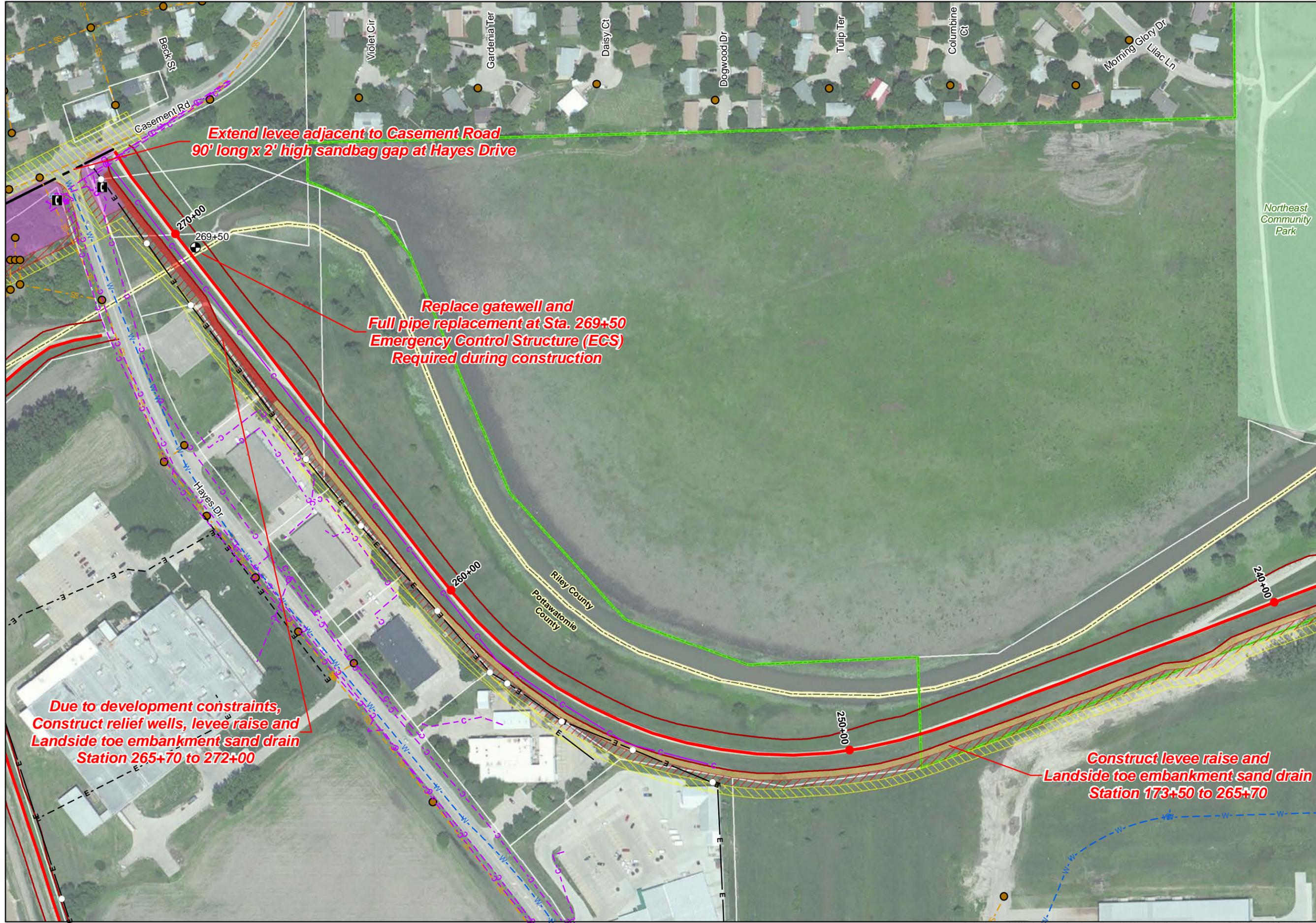


Sheet No. 21



**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

**Plan 3
Station 238+50 to 272+00**



Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection

Existing Levee Features

- Communication Structure
- Electrical Poles
- Manholes
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

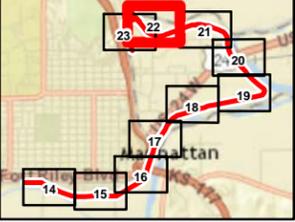
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Kansas City District
Photography Date: 2010

Projection: State Plane, Kansas North
Datum: NAD 83

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**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

**Plan 3
Station 3+00 to 23+50**

Upstream terminus tie into high ground

**Replace gatewell and
Full pipe replacement at Sta. 269+50
Emergency Control Structure (ECS)
Required during construction**

**Due to development constraints,
Construct relief wells, levee raise and
Landside toe embankment sand drain
Station 265+70 to 272+00**

Key

Proposed Features

- Berm
- Berm and Raise
- Ponding
- Raise
- Relief Wells
- Permanent Real Estate Easement
- Temporary Real Estate Easement
- Parks
- Parcels
- County Boundary
- City Boundary
- TCE Plume
- Proposed Sandbag Gap
- Proposed Levee Extension

Existing UL Features

- Aerial Com & Fiber Optic (FO)
- Underground Com & FO
- Aerial Electrical & Light
- Underground Electrical & Light
- Natural Gas Lines
- Water Lines
- Storm Sewer Lines
- sewlines_StudyArea selection

Existing Levee Features

- Communication Structure
- Electrical Poles
- Manholes
- Gate Well
- Sandbag Gap
- Stoplog Gap
- Pump Station
- Piezometers
- Manhattan Levee Unit
- Toe 2006 Survey

US Army Corps of Engineers
Kansas City District
Photography Date: 2010

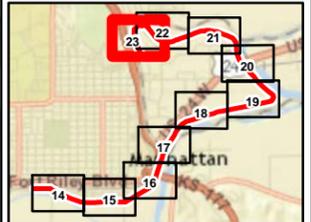
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0 50 100 200 Feet



Sheet No. 23

Manhattan Levee Feasibility Study
Existing Conditions and Reliability Improvements

-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

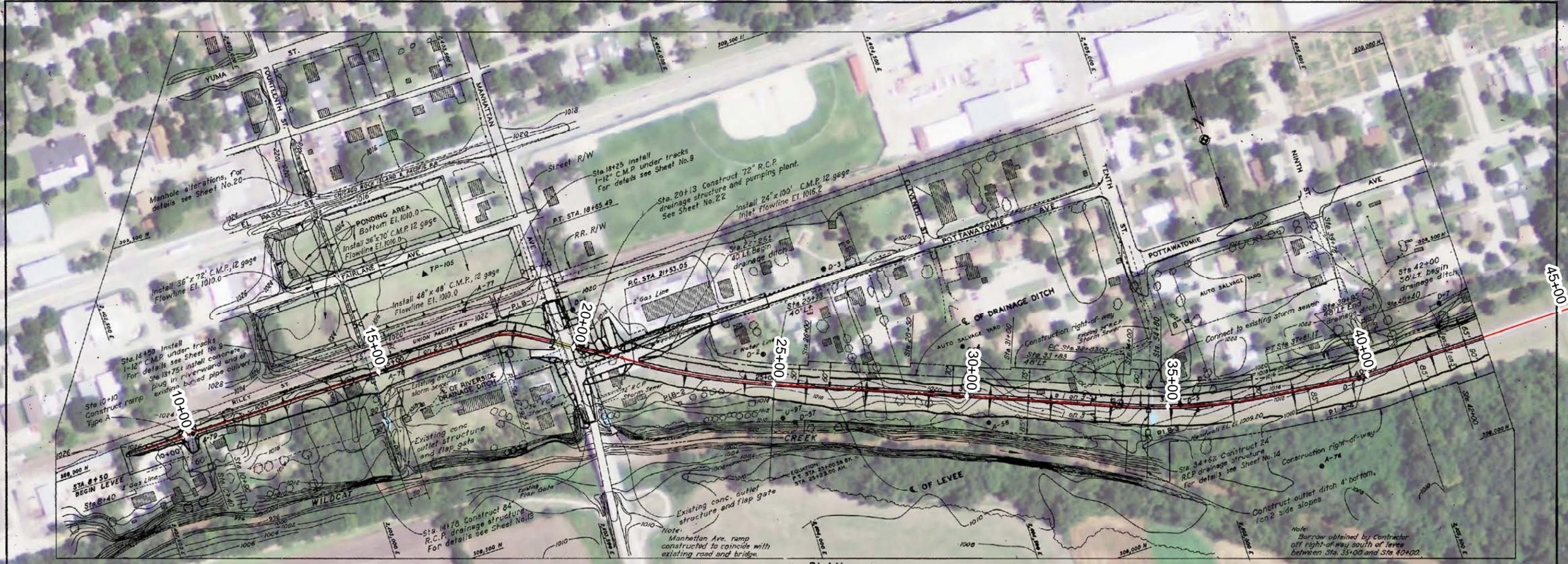
-----Levee Record Drawings for Reference-----

This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.

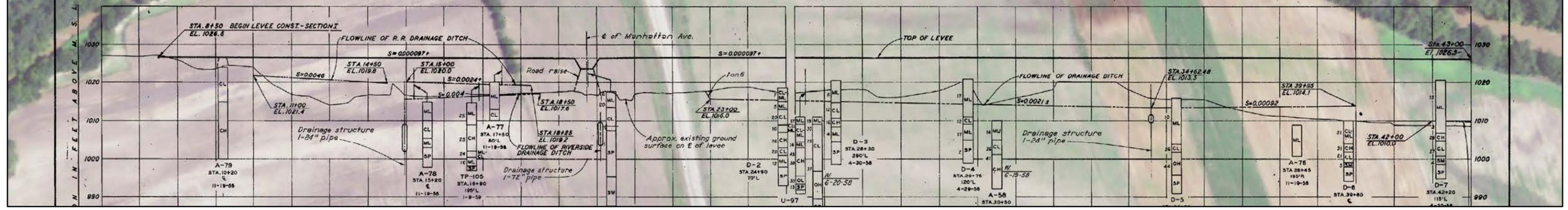
Plan View

U. S. ARMY

CORPS OF ENGINEERS



PLAN
 SCALE IN FEET
 0 100 200 300



1 inch = 250 feet

Spatial extent approximately equal to Section 1 Sheet 2 from 1965 record drawings

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

-----Levee Record Drawings for Reference-----

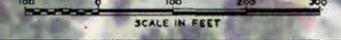
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U. S. ARMY

Plan View
1



PLAN



0 200 400 800 1,200 1,600 Feet

1 inch = 250 feet

Spatial extent approximately equal to Section 1 Sheet 3 from 1965 record drawings

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

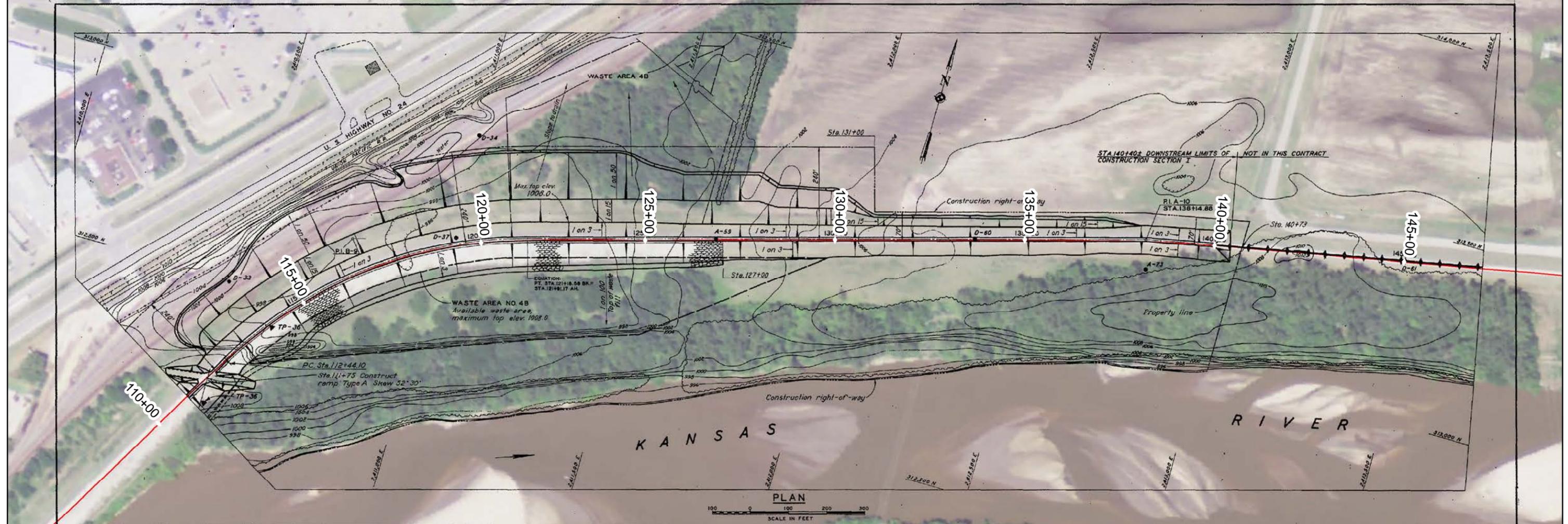
-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

-----Levee Record Drawings for Reference-----

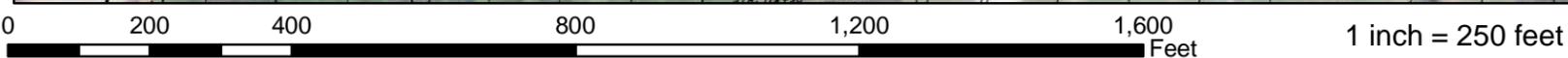
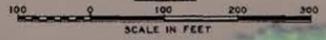
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Plan View



PLAN



Spatial extent approximately equal to Section 1 Sheet 5 from 1965 record drawings

Manhattan Levee Feasibility Study
Existing Conditions and Reliability Improvements

-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

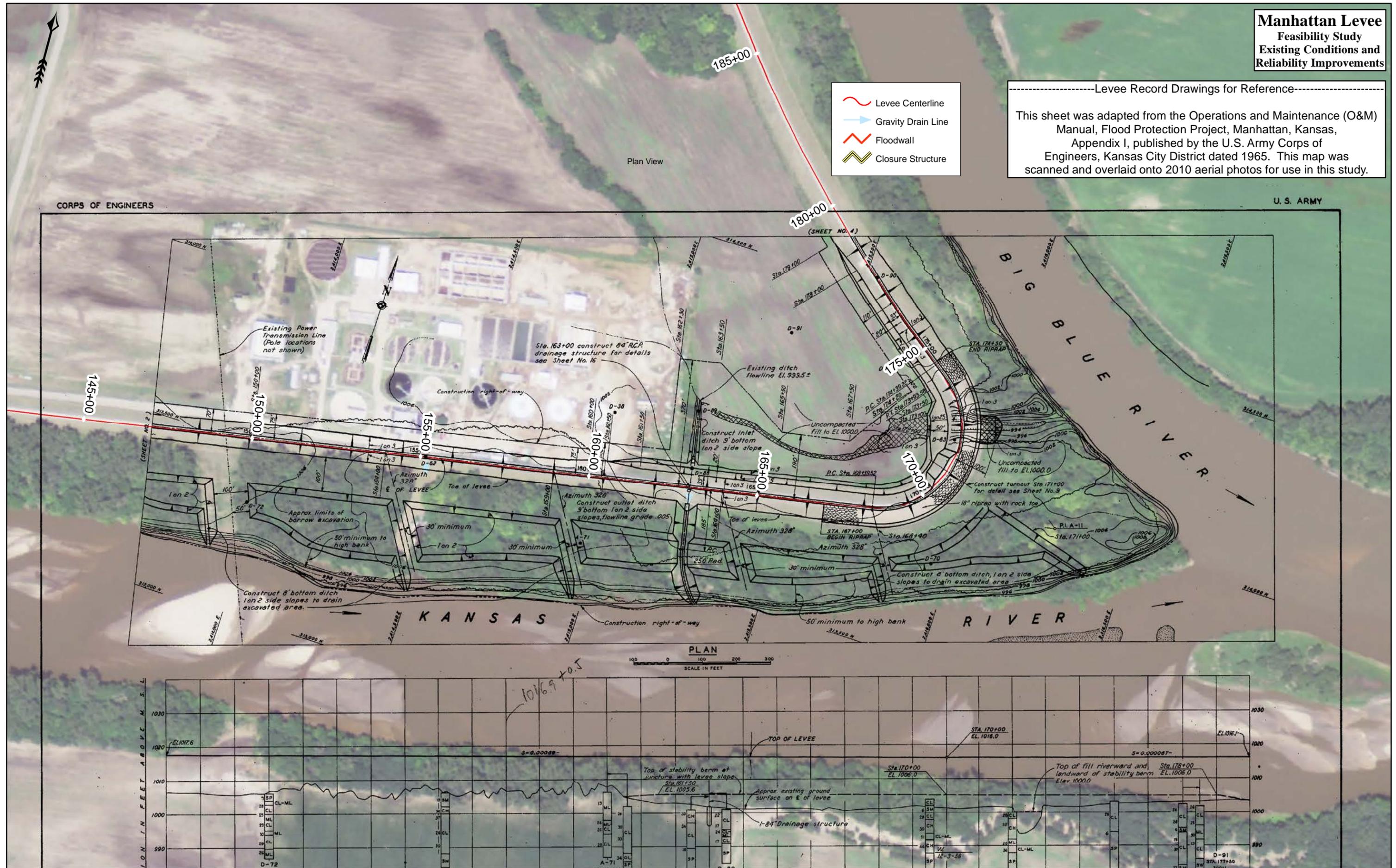
-----Levee Record Drawings for Reference-----

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Plan View

CORPS OF ENGINEERS

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PLAN

SCALE IN FEET



0 200 400 800 1,200 1,600 Feet 1 inch = 250 feet

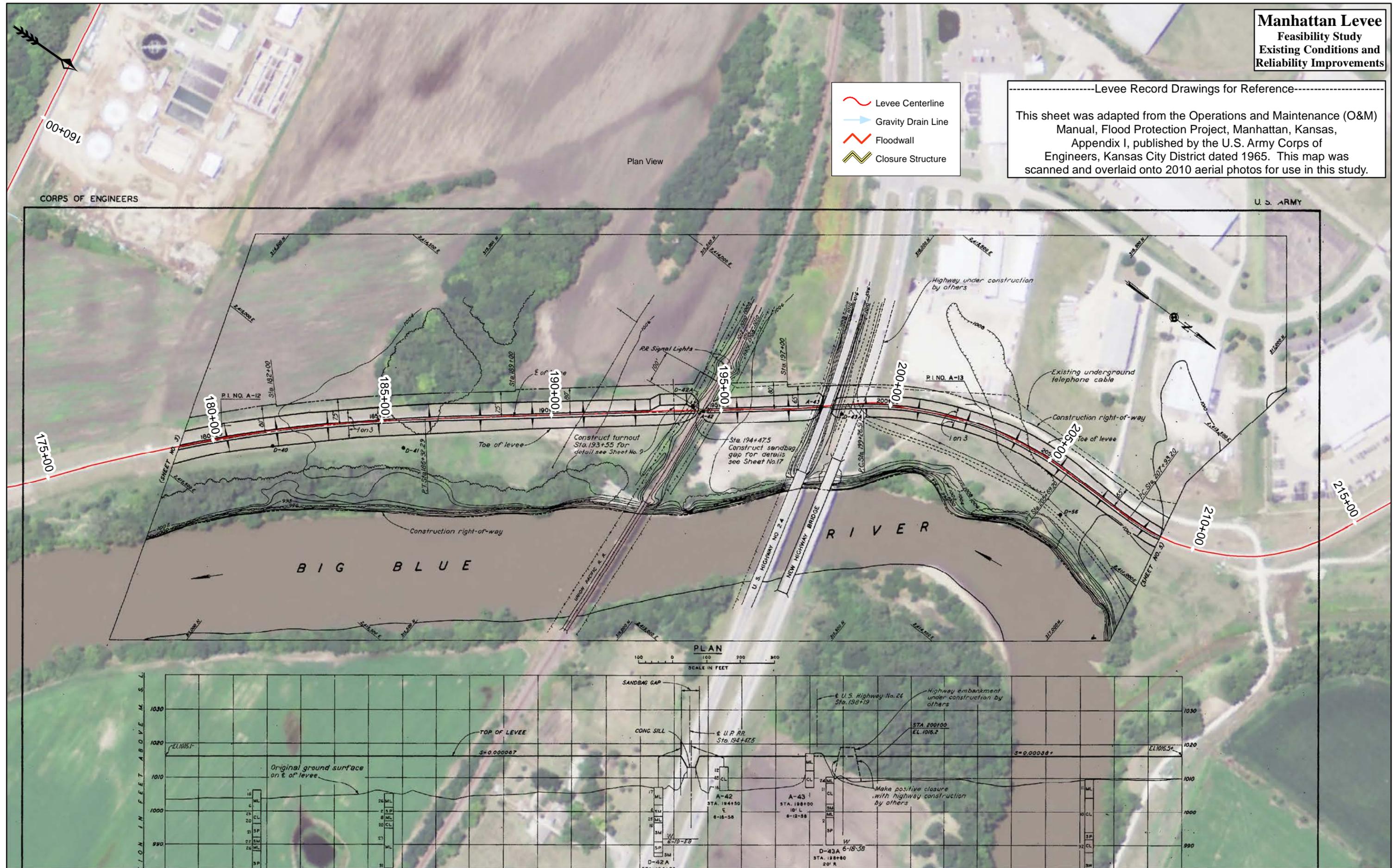
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**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

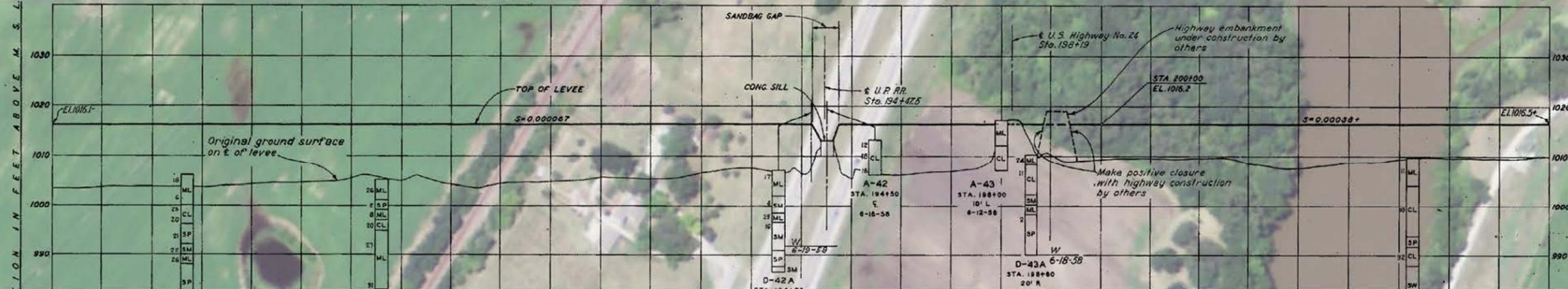
-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

-----Levee Record Drawings for Reference-----

This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.



PLAN
SCALE IN FEET
0 100 200 300



Spatial extent approximately equal to Section 2 Sheet 4 from 1965 record drawings

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

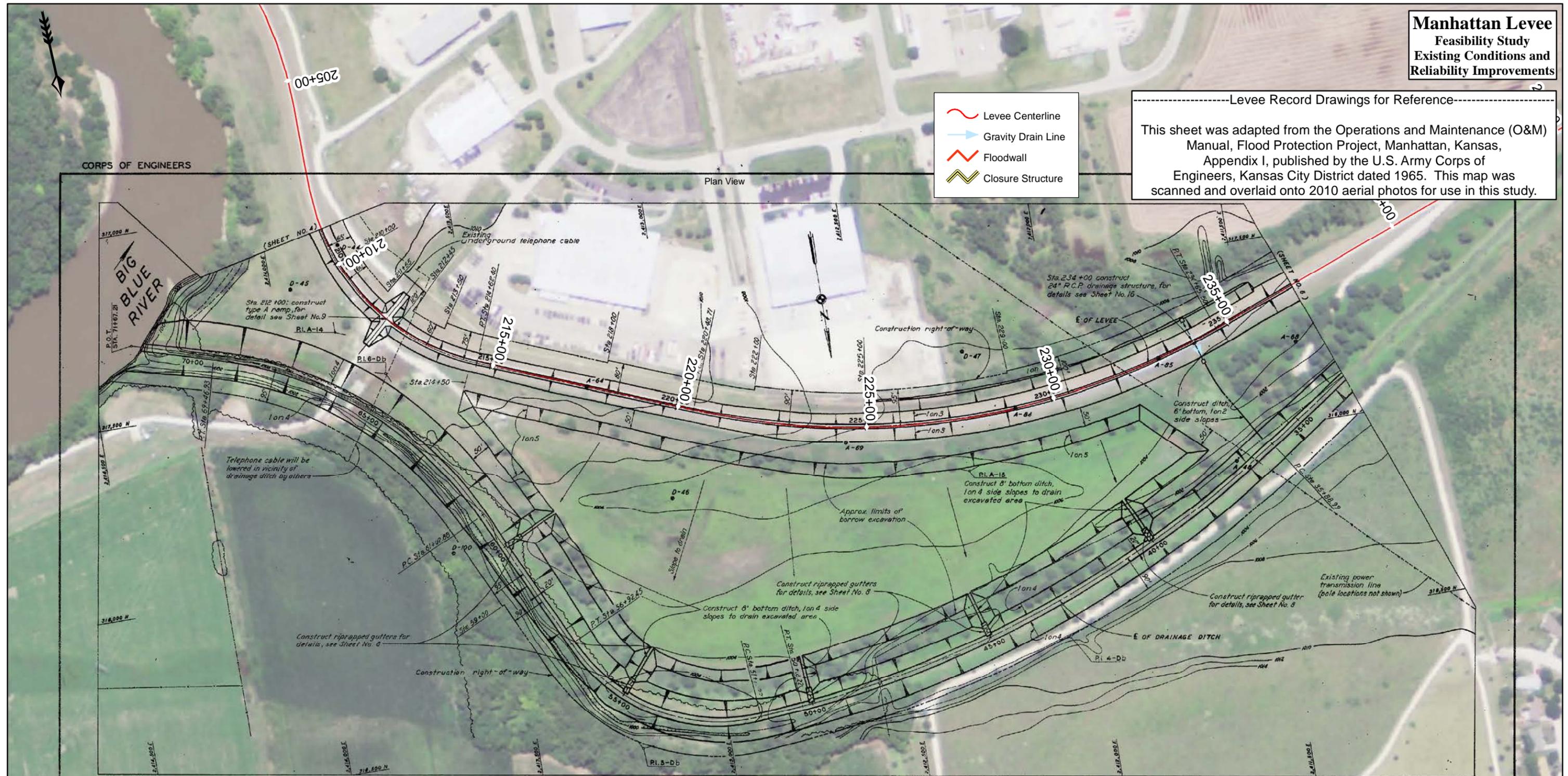
-----Levee Record Drawings for Reference-----

This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.

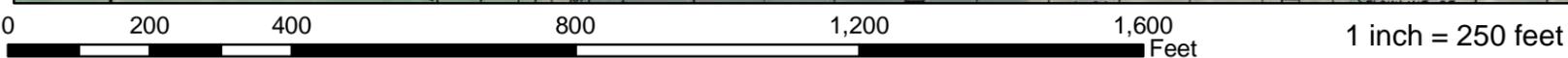
-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

CORPS OF ENGINEERS

Plan View



NOTES:
For General Notes see Sheet No. 1
All utility lines and poles within the construction limits will be removed, altered or relocated by others.
For legend of underground explorations see Sheet No. 2
For profiles of drainage ditch see Sheet No. 8



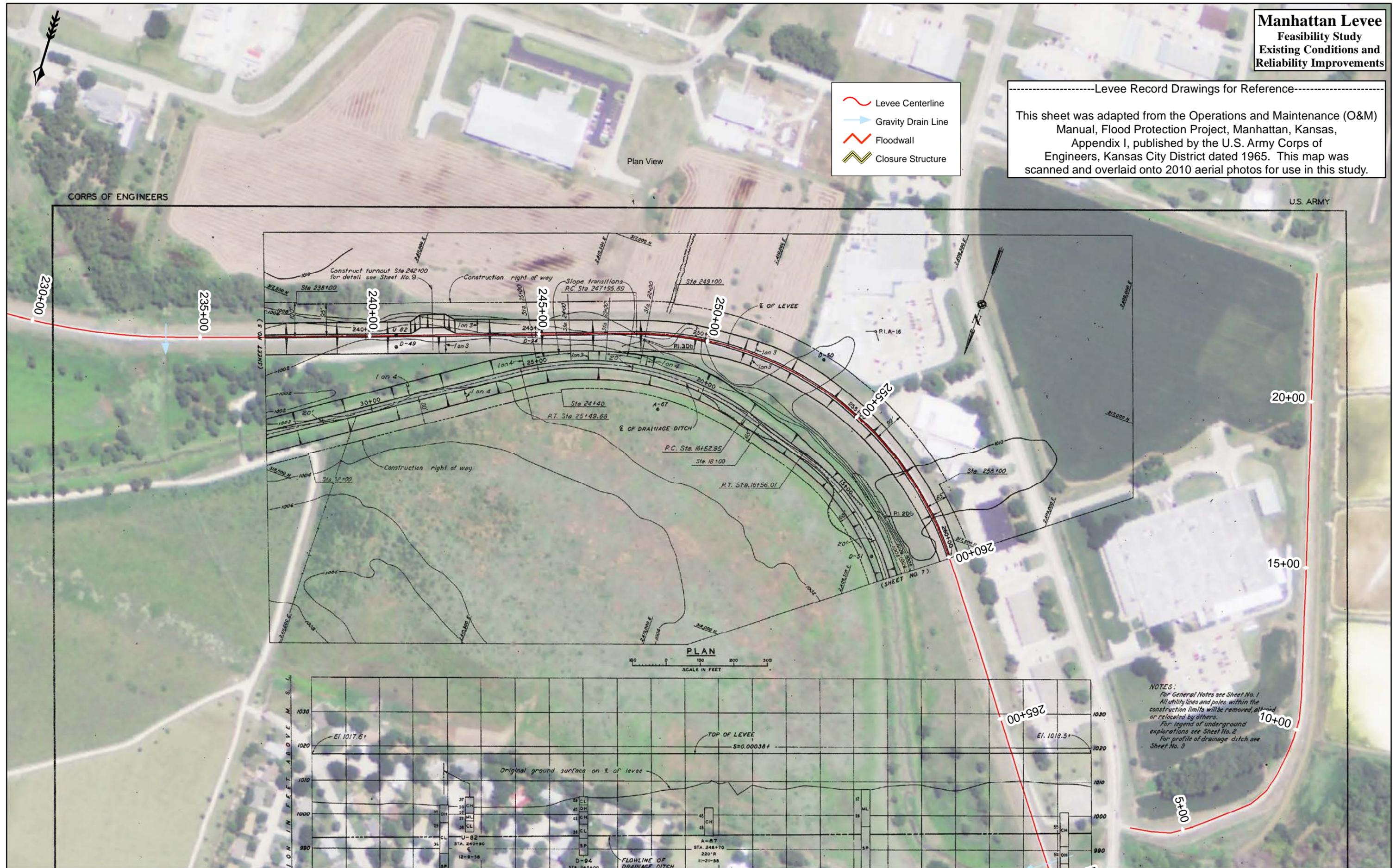
Spatial extent approximately equal to Section 2 Sheet 5 from 1965 record drawings

**Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements**

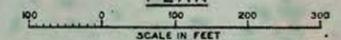
-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure

-----Levee Record Drawings for Reference-----

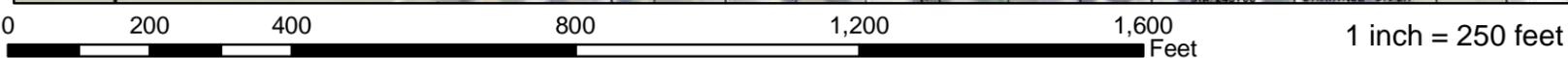
This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.



PLAN



NOTES:
For General Notes see Sheet No. 1
All utility lines and poles within the construction limits will be removed, allowed or relocated by others.
For legend of underground explorations see Sheet No. 2
For profile of drainage ditch see Sheet No. 3



Spatial extent approximately equal to Section 2 Sheet 6 from 1965 record drawings

Manhattan Levee Feasibility Study
Existing Conditions and Reliability Improvements

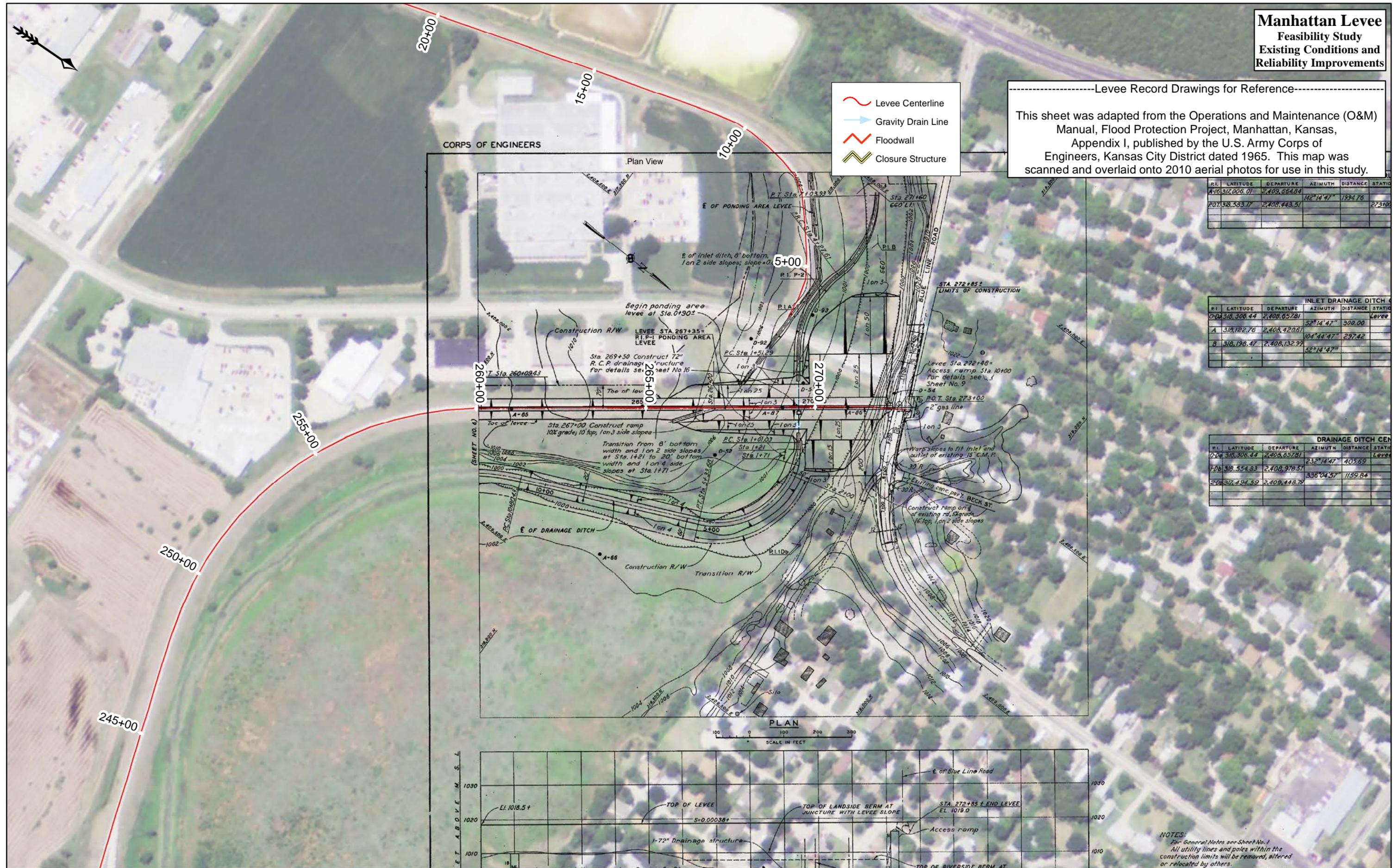
-----Levee Record Drawings for Reference-----
This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.

 Levee Centerline
 Gravity Drain Line
 Floodwall
 Closure Structure

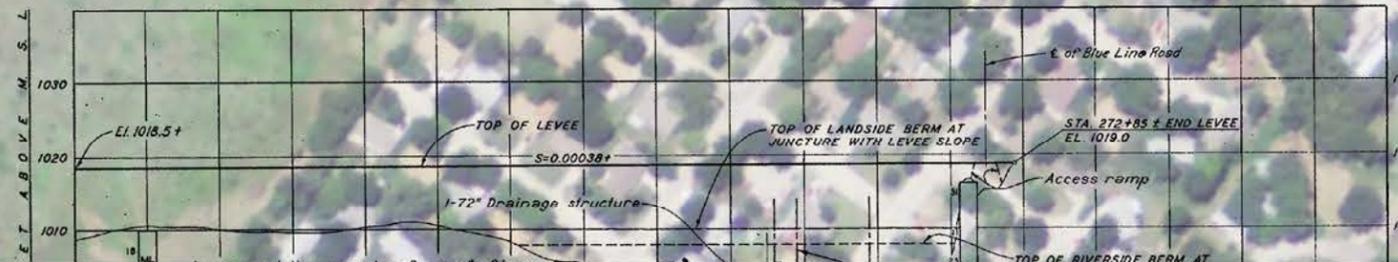
P.I.	LATITUDE	DEPARTURE	AZIMUTH	DISTANCE	STATION
A-10	317,206.01	2,409,564.84			
P.O.T.	318,583.17	2,408,443.51	102°14'47"	1994.76	273+00

P.I.	LATITUDE	DEPARTURE	AZIMUTH	DISTANCE	STATION
0+00	318,306.44	2,408,657.81	52°14'47"	300.00	Levee
A	318,122.76	2,408,420.61	104°44'47"	297.42	
B	318,198.47	2,408,132.99	52°14'47"		

P.I.	LATITUDE	DEPARTURE	AZIMUTH	DISTANCE	STATION
0+00	318,306.44	2,408,657.81	232°14'47"	405.69	Levee
1+00	318,554.83	2,408,978.51	336°04'57"	1159.84	
2+00	317,494.59	2,409,448.79			



PLAN
SCALE IN FEET
0 100 200 300



NOTES:
For General Notes see Sheet No. 1
All utility lines and poles within the construction limits will be removed, altered or relocated by others.

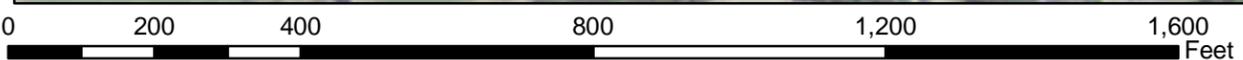
0 200 400 800 1,200 1,600 Feet
1 inch = 250 feet

Spatial extent approximately equal to Section 2 Sheet 7 from 1965 record drawings

Manhattan Levee
Feasibility Study
Existing Conditions and
Reliability Improvements

-----Levee Record Drawings for Reference-----
 This sheet was adapted from the Operations and Maintenance (O&M) Manual, Flood Protection Project, Manhattan, Kansas, Appendix I, published by the U.S. Army Corps of Engineers, Kansas City District dated 1965. This map was scanned and overlaid onto 2010 aerial photos for use in this study.

-  Levee Centerline
-  Gravity Drain Line
-  Floodwall
-  Closure Structure



1 inch = 250 feet

Spatial extent approximately equal to Section 2 Sheet 8 from 1965 record drawings