

OHIO ENVIRONMENTAL PROTECTION AGENCY
DRINKING WATER STATE REVOLVING FUND (DWSRF)
AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (ARRA)
GREEN PROJECT INFORMATION

FFY 2009 ARRA GREEN PROJECT INFORMATION FORM

The Federal American Recovery and Reinvestment Act of 2009 (ARRA) requires a minimum amount of funding be used toward Green Infrastructure, Energy Efficiency, Water Efficiency, or other Environmentally Innovative activity. To ensure that this requirement is met, Ohio EPA is requiring ARRA recipients to provide additional information about potential green components of their project(s).

In many instances, a Business Case is required for justification to consider an item or activity "green". The US Environmental Protection Agency (EPA) has provided guidance for help in evaluating the green elements of a project. Please complete this cover sheet and appropriate page(s), as noted below for each project that will incorporate a "green" component(s). More guidance is provided on the back of each form.

PWS Name: Cleveland PWSID: 1800311

Project Name: Baldwin Residuals & Fairmount Reservoir PPL #: 75
(as assigned by OEPA-- refer to project list on web)

Total Estimated Project Cost: \$14,000,000 Total Est. Green Amount: \$ 3,011,500

Type of "Green" Element(s) included in this project. For each box that is checked the corresponding page of this form must be completed and submitted with this cover page. Attach additional pages as necessary:

- Green Infrastructure (porous pavement, bioretention, trees, green roofs, and other practices that mimic natural hydrology and reduce effective imperviousness)
- Energy Efficiency (energy audit, water pump system improvements or replacements, variable frequency drives, SCADA, on-site clean power, solids treatment or handling, replacement or rehabilitation of distribution lines)
- Water Efficiency (water meter installation or replacement, leak detection equipment, water line replacement, water audit, water efficient fixtures)
- Other Environmentally Innovative Activity

Completed by:

Name: Karen M. Lisowski Title: Consulting Engineer
(please print)

Signature: Karen M. Lisowski Date: 10-16-09

For OEPA use only:

Project #: FS 390560-01 DWSRF #: PPL #75

OHIO ENVIRONMENTAL PROTECTION AGENCY
DRINKING WATER STATE REVOLVING FUND (DWSRF)
AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (ARRA)
GREEN PROJECT INFORMATION

OTHER ENVIRONMENTALLY INNOVATIVE ACTIVITY

PWS Name: Cleveland PWSID: 1800311

Project Name: Baldwin Residuals & Fairmount Reservoir PPL #: 75
as assigned by OEPA – refer to
ARRA project list on web)

Total Est. Project Cost: \$14,000,000 Total Est. Green Reserve Amount: \$2,513,000

Project Summary:

A key component of the Baldwin Residuals and Fairmount Reservoir project is the de-commissioning of the existing 40 million gallon Fairmount Raw Water Reservoir. A new 1.4 million gallon pre-stressed concrete equalization basin will be constructed on a portion of the re-graded site. Site will incorporate “low mow” grass in remaining landscape.

Business Case Narrative:

SEE ATTACHED “Raw Water Reservoir (Class 1 Dam) Decommissioning” Business Case.

Attached Supporting Documentation

- | | |
|---|---|
| <input type="checkbox"/> Engineering Project Planning Documents | <input type="checkbox"/> Water/Energy Efficiency Determination (OEPA) |
| <input type="checkbox"/> Public Water System Records | <input checked="" type="checkbox"/> Other: Emergency Action Plan, Section 2, 3 & 7 from the Operation, Maintenance and Inspection Manual for the Fairmount Raw Water Reservoir, December 2005, Revised June 2006. Drawing Sheet No. C-5 “Overall Existing Site Plan – Fairmount” and Drawing Sheet No. C-8 “Proposed Site Plan” from the Baldwin Residuals and Fairmount Reservoir Project. |

RAW WATER RESERVOIR (CLASS I DAM) DECOMMISSIONING

SUMMARY

- A key component of the Baldwin Residuals and Fairmount Reservoir project is decommissioning of the Fairmount Raw Water Reservoir. Currently the raw water reservoir provides a substantial storage volume to equalize flows and allows for the Baldwin Plant to recycle these flows to the head of the plant during high flow periods, in keeping with recycle flow goals. In order for the plant to meet the 5% recycle rate coinciding with the Partnership for Safe Water recycled water goal, and continue with current standard operating procedures, some storage volume capacity is recommended but the entire 40 million gallon reservoir is no longer necessary. A new 1.4 million gallon pre-stressed concrete equalization basin will be constructed in a portion of the regraded reservoir site.
- Loan amount = \$14,000,000
- Cost of reservoir decommissioning = \$895,000
- Cost of new Equalization Basin = \$1,565,000
- Cost of seeding site with low mow seed mixture = \$53,000
- Water saving (green) portion of loan = \$2,513,000 or 17.95%

BACKGROUND

- The Cleveland Division of Water owns and operates the Fairmount Reservoir as a part of its Baldwin Water Works Plant. The Baldwin Water Works Plant is currently in the midst of a major capital improvement program to rehabilitate this 1924 facility in order to continue providing sufficient quantity and high quality drinking water to CWD's customers.
- In 2007, during one of the phased plant improvements, the Fairmount Raw Water Reservoir was hydraulically disconnected from the raw water piping to the Baldwin Water Works Plant, thereby eliminating the ability to pump flow from the reservoir to the Chemical Building located at the Baldwin Plant. The Fairmount Reservoir will no longer serve its original intended purpose as an intermediate raw water holding reservoir.
- The Fairmount Raw Water Reservoir (FRWR) is considered a *Class I* dam structure (ODNR #1314-003) regulated under the Ohio Department of Natural Resources, Division of Water. The FRWR is placed in the Class 1 category by ODNR since ODNR has determined that failure of the dam could result in probable loss of human life.¹
- The most recent Dam Inspection Report conducted by ODNR, dated February 15, 2006, indicated various remedial measures and Owner repairs and/or maintenance items that must be completed.

RESULTS

- In accordance with a requirement from ODNR's most recent inspection report, a Fairmount Reservoir Operation, Maintenance and Inspection Manual was prepared and submitted to ODNR. The manual was revised in June 2006.
- Part of the O&M Manual was an Emergency Action Plan (EAP) for the earth fill dam structure. In the event of a dam failure, surrounding properties could be at risk.^{1, 2} Hazards and impacts associated with failure of the dam could include some of the following:
 1. Probable loss of life (3 homes located in immediate area).
 2. Loss of public water supply; impact to the Baldwin Water Works Plant.
 3. Flooding of structures or high-value property. Approximately ten (1) businesses could be inundated.
 4. Damage to local roads.
 5. Damage to railroad or public utility. RR tracks and Rapid Transit Tracks are considered to be in the "most probable" flood path.

BENEFITS

- Utilizing the re-grading reservoir area for construction of the new Equalization Basin optimizes the residuals storage process, and eliminates the pumping, operation and maintenance associated with the raw water reservoir.
- Utilization of “low mow” grass in the re-graded reservoir area saves in maintenance costs of mowing approximately 2 times per year now vs. 30 times per year previously, at a savings of approximately \$15,000/year. Will eliminate air pollution and emissions due to reduction in mowing. Gas powered lawn equipment emit high levels of carbon monoxide, volatile organic compounds (VOCs) and nitrogen oxides, producing up to 5% of the nation’s air pollution and a good deal more in metropolitan areas. An EPA Study has determined that a typical 3.5 horsepower gas mower can emit the same amount of VOCs in an hour as a new car driven 340 miles and that one gas mower spews 87 lbs. of the greenhouse gas CO₂ and 54 lbs. of other pollutants into the air every year³.
- De-commissioning of the reservoir removes it from regulatory oversight under ODNR as a dam structure. Initial expenditure to comply with ODNR required remedial measures is approximately \$2.5 to \$3 million. Future operational and maintenance costs associated with reservoir structure and equipment is no longer necessary.

CONCLUSION

- By removing the raw water reservoir CWD will eliminate the potential for loss of life. As recently as the last two years there was a drowning in the reservoir.
- Additional benefits include reductions in unnecessary pumping and operations and maintenance expenditures, and eliminating potential health hazards associated with waterborne pathogens entering the water distribution system.
- Harmful emissions from landscaping and mowing activities are eliminated with the addition of the “low mow” grass areas.
- Remaining site area has the potential for future “brownfield” development.

1 ODNR Fairmount Reservoir, File Number: 1314-003, Inspected: February 15, 2006 DMR.

2 Operation, maintenance and Inspection Manual, Fairmount Raw Water Reservoir, December 2005, Revised June 2006. Emergency Action Plan (EAP), “Potential Downstream Hazard” and “Section 7: Inundation Maps”.

3 Fact Sheet, EPA Statistics: Gas Mowers Represent 5% of U.S. Air Pollution.

SECTION 2: Statement of Purpose

The purpose of this Emergency Action Plan (EAP) is to identify and document the actions to be taken by CWD employees, government agencies, and the general public during a dam failure at the Fairmount Raw Water Reservoir, located adjacent to the Baldwin Water Treatment Plant, 11216 Stokes Blvd., Cleveland, OH.

In the event of a dam failure, surrounding properties could be at risk. Hazards and impacts associated with failure of the dam could include some of the following:

1. Probable loss of life (3 homes located on Mt. Overlook Drive).
2. Loss of public water supply; impact to the Baldwin Water Works Plant.
3. Flooding of structures or high-value property. Approximately ten (10) businesses could be inundated.
4. Damage to local roads. Mount Overlook Drive and Quincy Avenue could sustain significant damage.
5. Damage to railroad or public utility. RR tracks and Rapid Transit Tracks are considered to be in the "most probable" flood path.

This plan defines responsibilities and provides procedures to:

- Initiate notification procedures to warn downstream residents of impending or actual failure of the dam.
- Identify unusual conditions or extreme events which may endanger the dam.
- Initiate remedial actions to prevent or minimize the downstream impacts of a dam failure.

Specifically, in the event of an emergency at the Fairmount Reservoir, the EAP is designed to do the following:

- Prevent or minimize injuries.
- Lessen the impact on the general public.
- Provide guidance to personnel who will have to deal with emergencies (e.g., Incident Response Team).
- Minimize equipment damage.
- Minimize environmental damage.
- Coordinate emergency efforts with the Cuyahoga County Local Emergency Planning Commission (LEPC).

The Fairmount EAP is intended to address physical conditions at the reservoir. Other conditions, such as water quality issues, etc. will continue to be handled according to the most recent version of the Cleveland Division of Water Emergency Response Plan.

SECTION 3: Reservoir Description

The Fairmount Raw Water Reservoir (FRWR) is considered a *Class I* dam structure regulated under the Ohio Department of Natural Resources, Division of Water. The FRWR is placed in the Class I category by ODNR since ODNR has determined that failure of the dam could result in probable loss of human life.

The Owner of the Fairmount Raw Water Reservoir is:

The City of Cleveland
 Public Utilities, Division of Water
 1201 Lakeside Avenue
 Cleveland, OH 44114
 (216) 644-2444

General information on the FRWR is listed in the table below:

Item	Description
Dam Name	FAIRMOUNT RESERVOIR
ID Numbers	State – ODNR #1314-003 Federal – OH01048 (National Inventory of Dams)
Purpose of Dam	Public Raw Water Supply
Location	Baldwin Water Works Plant 11216 Stokes Blvd. Cleveland, OH 44104
Type of Impoundment	Upground reservoir
Type of structure	Earthfill
Drainage area	(Sq. mi.): .03 or (acres): 16
Embankment Design Data	Dam max. height: 29 feet Length (ft): 3580 feet Top width (ft): 15 feet Upstream Slope: 1.75H:1V Downstream Slope: 2H:1V Vol. of fill (cu. yds.): 92,100
Spillway & Outlet works data	Lake drain** No longer operable – abandoned Principal: Three (3), sluice gates in outlet Gatehouse #9 discharge into 7-ft. dia. tunnel Emergency overflow – two (2): 24 inch dia. pipe, northeast embankment, elev. 745.5 ft., and a 16-ft. long weir wall inside gatehouse #8, crest elev. 746.8 ft. Maximum total spillway discharge (CFS): 292 Design flood: PMF Flood Capacity: PMF
Dam/Reservoir Design Data	Foundation (cutoff) elevation 717.00 Streambed elevation 721.00 Principal spillway elevation 745.00 Top of dam elevation 750.00

Information attached to the end of this section are maps, arial surveys, system overviews and specific location sites for the Fairmount Reservoir, Baldwin Water Treatment Plant and surrounding areas that could be affected in the event of an emergency.

Attachments are as listed:

- ODNR sheet from the February 15, 2006 Inspection Report for the Fairmount Reservoir, File Number 1314-003, indicating potential downstream hazards and the sketch of Developments Downstream of Dam
- USGS Arial Survey, dated 12 Oct 2000
- Baldwin Water Treatment Plant overall site plan (indicates residential areas)
- Cleveland Water Distribution System Overview (indicates CWD Facilities)
- Fairmount Pump Station general information sheet
- Baldwin Water Treatment Plant general information sheet

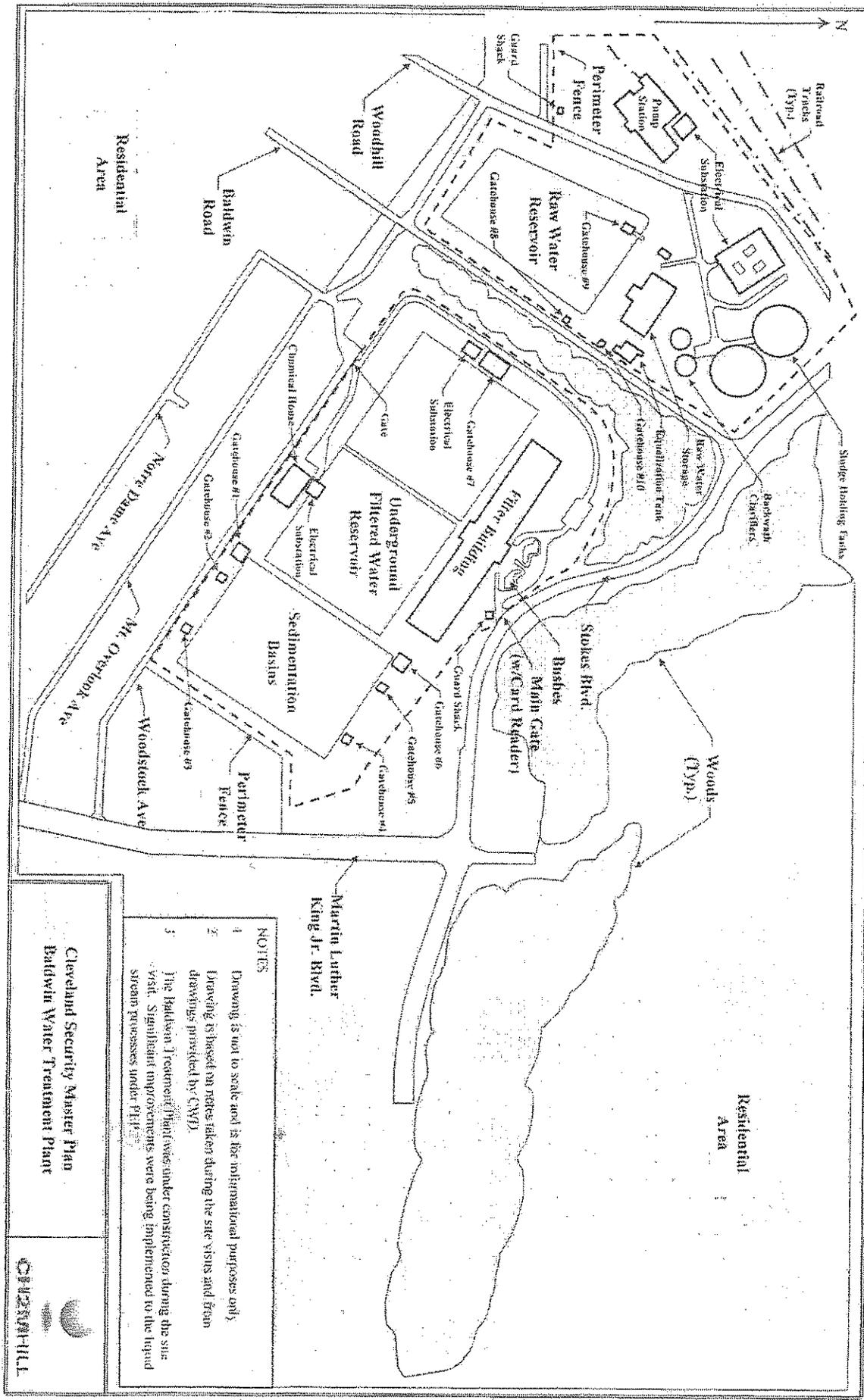
POTENTIAL DOWNSTREAM HAZARD

I						III	IV	-	-				
Probable loss of human life	Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Flooding of structure or high-value property	Damage to high-value or Class I, II, III dam or levee	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to railroad or public utility	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Damage to local road (county and township)	Loss restricted mainly to the dam or agricultural/rural land	No hazard to structure noted	No hazard assessment; further investigation needed	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)
B	A												reservoir
		C											3 homes
					E	D							>10 bldgs
													2 roads
													RR tracks

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC - it does not necessarily show all potential hazards or the full extent of inundation.

Sketch of Developments Downstream of Dam

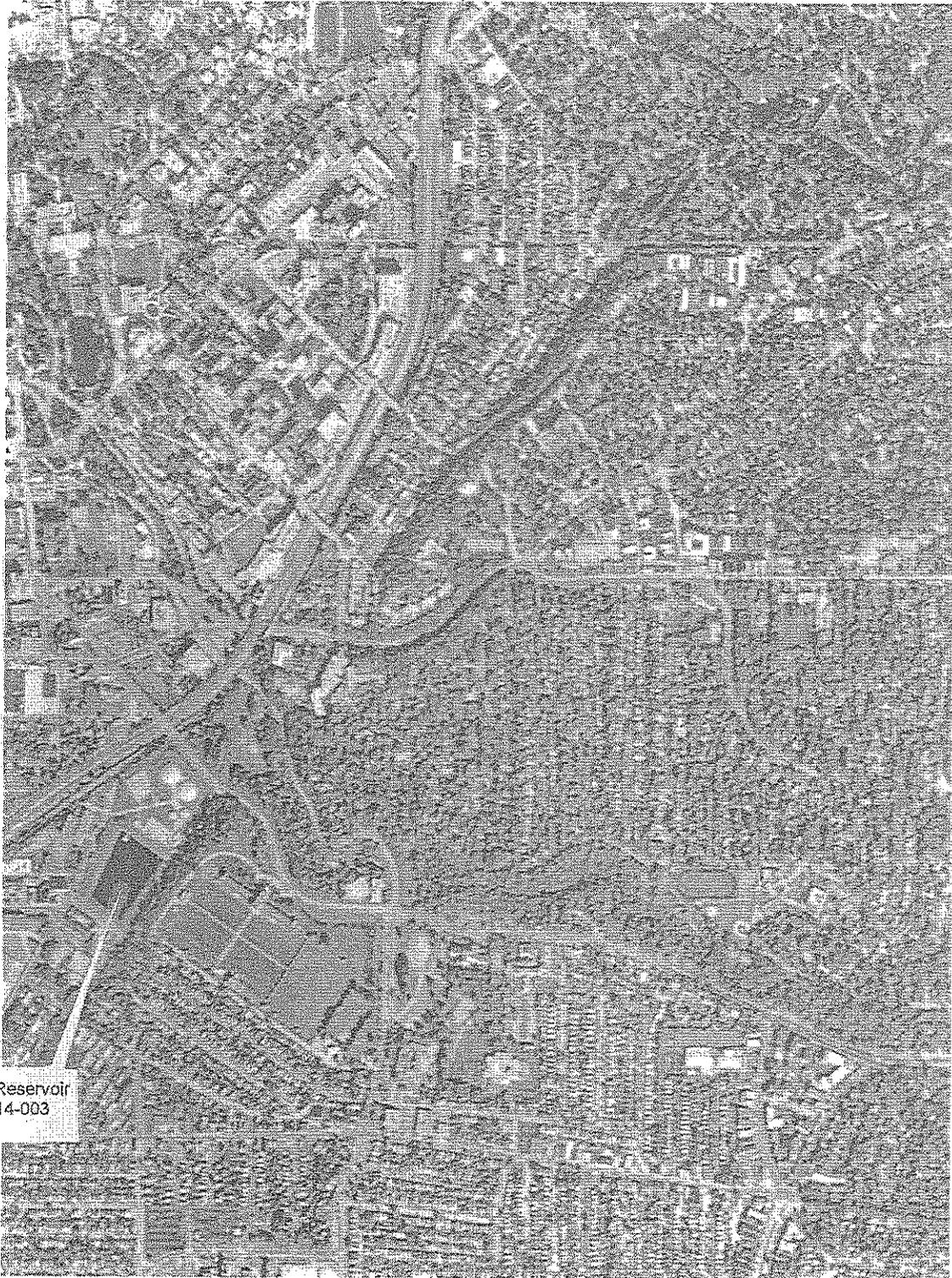




- NOTES**
1. Drawing is not to scale and is for informational purposes only.
 2. Drawing is based on notes taken during the site visits and from drawings provided by CWD.
 3. The Baldwin Treatment Plant is under construction during the site visit. Significant improvements were being implemented to the hybrid stream processes under P1P.

Cleveland Security Master Plan
Baldwin Water Treatment Plant

CLEVELAND



Fairmount Reservoir
File No. 1314-003
Class 1

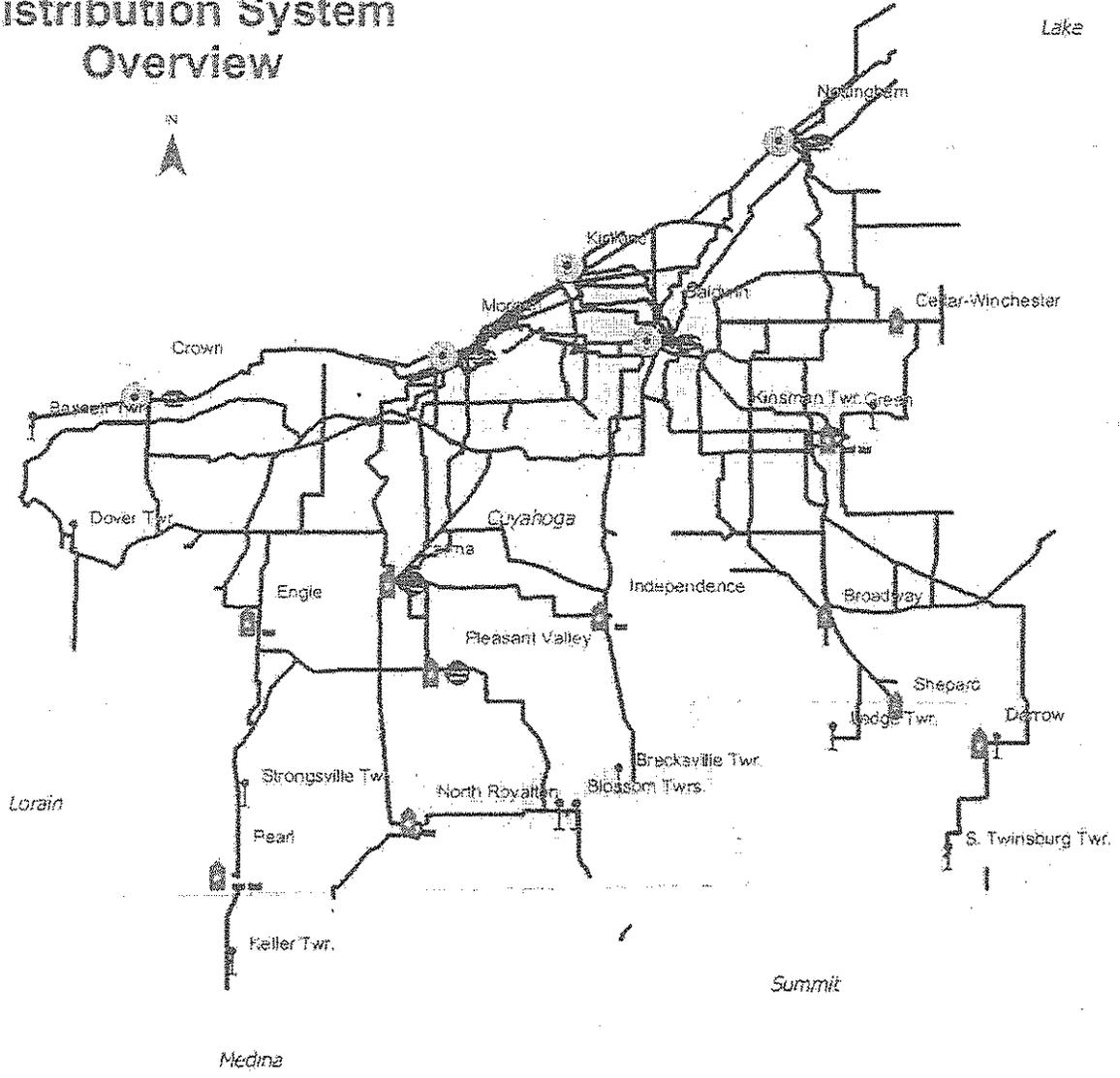
0 ————— .5Km

0 ————— .25Mi

Image courtesy of the U.S. Geological Survey
© 2004 Microsoft Corporation. [Terms of Use](#) [Privacy Statement](#)

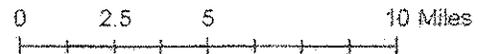


Cleveland Water Distribution System Overview



CWD Facilities

- | | | | |
|--|-------------------|--|--------------------|
| | Waterworks | | PS + Stor. Unit |
| | Pump Station (PS) | | PS + Reservoir |
| | Secondary PS | | Two Towers |
| | Tower | | PS + 2 Stor. Units |
| | Reservoir + PS | | PS + 1 Stor. Unit |



Fairmount Pump Station

Address: 2316 Woodhill Road, Cleveland, OH 44106

Closest Major Intersection: Woodhill Road and Quincy Avenue

Contact Number (Main Office): (216) 664-2444

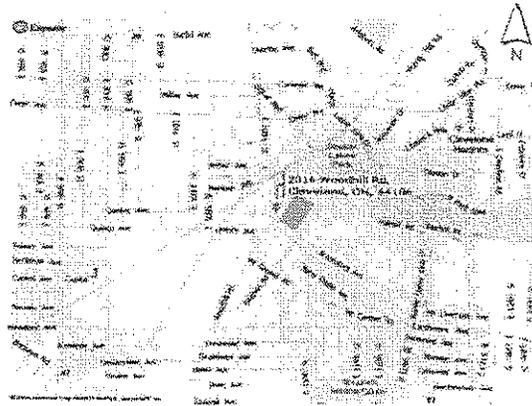
Contact Number (Security Office): (216) 664-8141

Guardhouse: (216) 664-4025

Primary Contact: Frank Wojcisi

(216) 664-3190

(216) 667-7517 (cell)



Description:

Finished water pump station for the Bakwin Water Treatment Plant to convey water to the first high and second high service areas.

Neighboring Facilities of Concern

Name	Address	Phone Number	Contact Person, Title
State Route 20 - Euclid Avenue (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
State Route 87 - Shaker Boulevard (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
State Route 322 - Mayfield Road (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
St. Lukes Medical Center	11311 Shaker Boulevard, Cleveland, OH 44104	(216) 368-7125	
Cleveland Clinic Children's Hospital for Rehabilitation	2901 Martin Luther King, Jr. Drive, Cleveland, OH 44104	(216) 721-5400	
Ohio Renal Care Group	11205 Stokes Boulevard, Cleveland, OH 44104	(216) 368-2004	
Case Western Reserve University	10300 Euclid Avenue, Cleveland, OH 44106	(216) 368-2000	
Life Skills Center of Cleveland	3222 Carnegie Avenue, Cleveland, OH 44115	(216) 431-7571	
Kaiser Permanente Medical Offices	6051 Cedar Avenue, Cleveland, OH 44115	(216) 445-4997	
Cleveland Institute of Art	11141 East Boulevard, Cleveland OH 44106	(216) 421-7000	
Cleveland Institute of Music	11021 East Boulevard, Cleveland OH 44106	(216) 791-5000 (216) 707-5153 if No Answer (216) 961-2003	
Jesse Owens Academy	11711 Larchmere Boulevard, Cleveland, OH 44120	(216) 421-3350	
Fairhill Center for Aging	12200 Fairhill Road, Cleveland, OH 44120	(216) 421-3350	
Life Skills Center of Cleveland	12201 Larchmere Boulevard, Cleveland, OH 44120	(216) 421-7587	

Mechanical Equipment On-Site

HVAC equipment for pump station

Pump Characteristics

Pump #	Service	M.G.D.	H.P.	Volts
1E	Raw Water	40	800	4160
2E	Raw Water	40	800	4160
3E	Raw Water	40	800	4160
4E	Raw Water	40	800	4160
5E	Raw Water	40	800	4160
6E	Raw Water	40	800	4160
17E	First High	30	1000	4160
54E	First High	20	700	4160
56E	First High	20	700	4160
18E	Second High	20	1750	4160
50E	Second High	20	1750	4160
57E	Second High	20	1750	4160
58E	Second High	20	1750	4160

Buildings/ Storage On-Site

Back Wash Clarifier Tanks

Raw Water Storage

40 MG capacity

Guard Houses

Sudge Storage Tanks

Pump Station

360 MGD capacity (combined total)

Chlorine gate house

Security Systems On-Site

Chain link fence enclosure with three-strand barbed wire

Locked chain link sliding and swing gates

Guard station at gate with key card access

Baldwin Water Treatment Plant

Address: 11215 Stokes Boulevard, Cleveland, OH 44104

Closest Major Intersection: Stokes Boulevard and Martin Luther King Drive
 Contact Number (Main Office): (216) 864-3121
 Contact Number (Security Office): (216) 864-5141
 Guardhouse Number: (216) 864-3423

Primary Contact: Frank Whyms
 216-864-3100
 (216) 857-7517 (cell)



Description:

165 MGD conventional water treatment plant. Processes include rapid mixing, flocculation, sedimentation and filtration.

Neighboring Facilities of Concern

Name	Address	Phone Number	Contact Person, Title
State Route 20 - Euclid Avenue (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
State Route 37 - Shaker Boulevard (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
State Route 322 - Mayfield Road (ODOT)	5500 Transportation Boulevard Garfield Heights, OH 44125	(216) 581-2100 or Toll Free: 1-866-737-8112	District 12 Office
St. Lukes Medical Center	11341 Shaker Boulevard, Cleveland, OH 44104	(216) 388-7125	
Cleveland Clinic Children's Hospital for Rehabilitation	2801 Martin Luther King, Jr. Drive, Cleveland, OH 44104	(216) 721-5400	
Ohio Renal Care Group	11203 Stokes Boulevard, Cleveland, OH 44104	(216) 358-0004	
Case Western Reserve University	10900 Euclid Avenue, Cleveland, OH 44105	(216) 368-2000	
Life Skills Center of Cleveland	3223 Carnegie Avenue, Cleveland, OH 44115	(216) 431-7571	
Kaiser Permanente Medical Offices	9051 Cedar Avenue, Cleveland, OH 44115	(216) 445-4987	
Cleveland Institute of Art	11141 East Boulevard, Cleveland OH 44106	(216) 421-7000	
Cleveland Institute of Music	14021 East Boulevard, Cleveland OH 44106	(216) 791-5000	
Jesse Owens Academy	11711 Larchmere Boulevard, Cleveland, OH 44129	(216) 707-5153	
Life Skills	12201 Larchmere Boulevard, Cleveland, OH 44120	(216) 421-7587	
Fairhill Center for Aging	12200 Fairhill Road, Cleveland, OH	(216) 421-1950	

Mechanical Equipment On-Site

- HVAC equipment for the filter and administration building
- HVAC equipment for the chemical building
- Pumps (water, chemical metering, etc.)
- Air Scour System
- Motors for drive units on sedimentation tanks

Buildings/ Storage On-Site

- Administration Building
- Chemical House
- Guard House 1-8
- Filter Building
- Underground Finished Water Reservoir 135 MG capacity
- Radio Tower
- Radio Equipment Shelter
- Equipment Building
- Electrical Substation

SECTION 7: Inundation Maps

Inundation maps, developed by CWD, indicate the most probable location of a dam failure as being the southwest corner of the reservoir.** As indicated in previous inspections, this is a wet area, approximately 15 feet long by 3 feet high that could cause soil saturation, slope instability and could possibly trigger a slide on the embankment, resulting in slope and/or embankment failure.

Four (4) Inundation Maps were developed for the dam, as listed below:

- **Probable Dam Failure Point and Flood Path**

Identifies the location of most probable failure point of the reservoir as being the southwest corner. An approximate 50 ft. breach area in the embankment was used to develop the inundation map.

- **Probable Flood Path and Maximum Flood Area with Orthographic Photography**

Indicates the anticipated flow path within the Railroad ROW. Location of inundated area for complete dam failure is approximately 1.9 miles along the RR corridor. Inundated area is the E. 55th. St. Rapid Transit Station, property owned by the City of Cleveland Rapid Transit Authority.

- **Probable Flood Path and Maximum Flood Area with Existing Terrain**

This map focuses on the topography of the anticipated flow path with darker colors representing higher elevations, and the deeper blue colors the lowest points.

- **Probable Flood Zones**

This map indicates probable flood zones utilizing different colors for % of failure.

- **100% Failure Flood Zone indicated in RED**
- **50% Failure Flood Zone indicated in YELLOW**
- **25% Failure Flood Zone indicated in GREEN**

Each map includes a table evaluating the below listed items for each of the failure conditions.

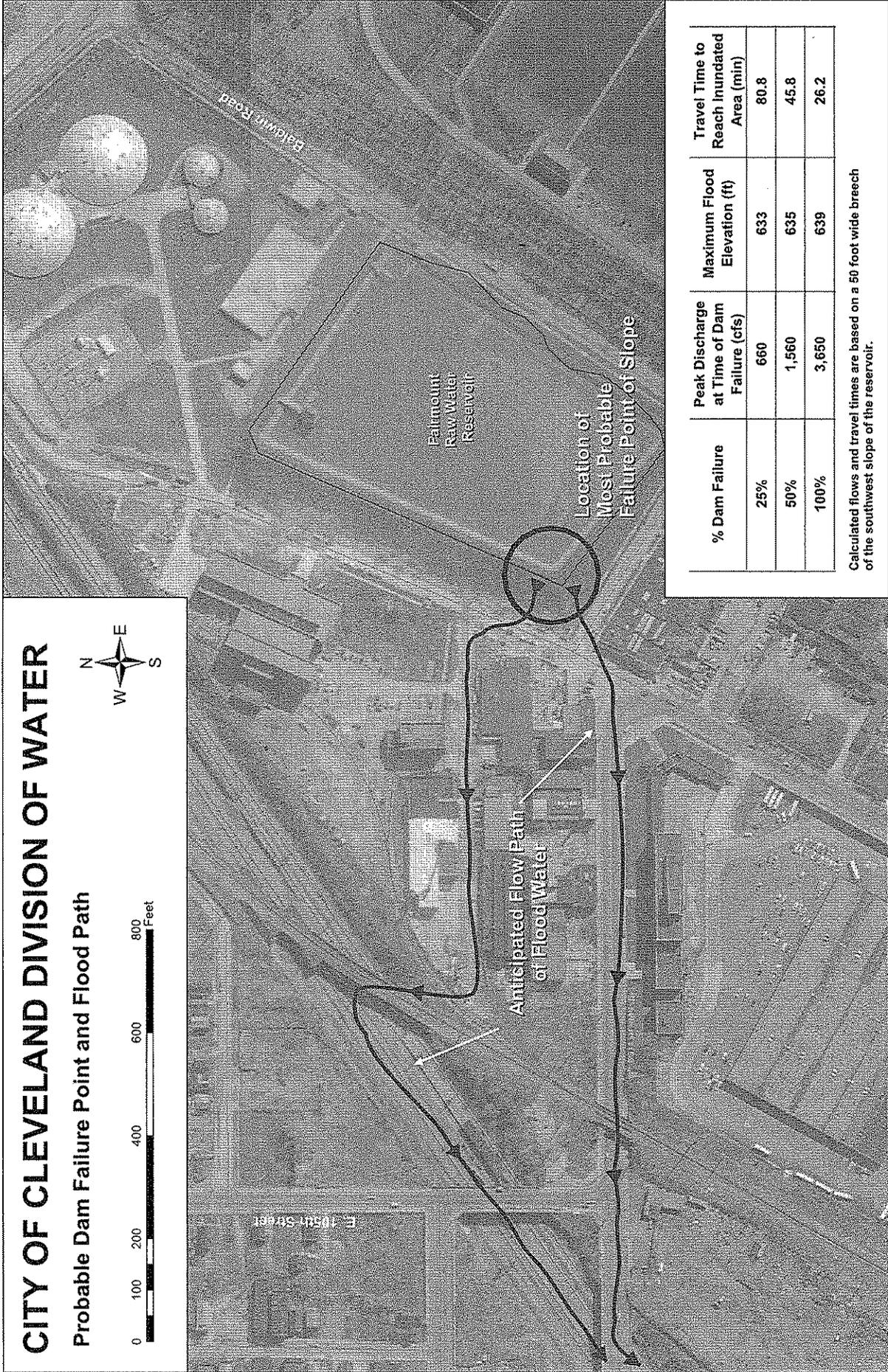
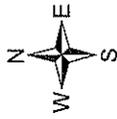
- Peak Discharge at Time of Dam Failure (cfs)
- Maximum Flood Elevation (ft)
- Travel Time to Reach Inundated Area (min)

*For description of methodology, breach assumption and termination of downstream routing of map development see **Appendix A: Investigation and Analysis of Dam Break Floods.***

**** Other structures in proximity to the reservoir, beyond what is indicated as the “most probable flow path”, may be impacted by failure of the dam at other points.**

CITY OF CLEVELAND DIVISION OF WATER

Probable Dam Failure Point and Flood Path

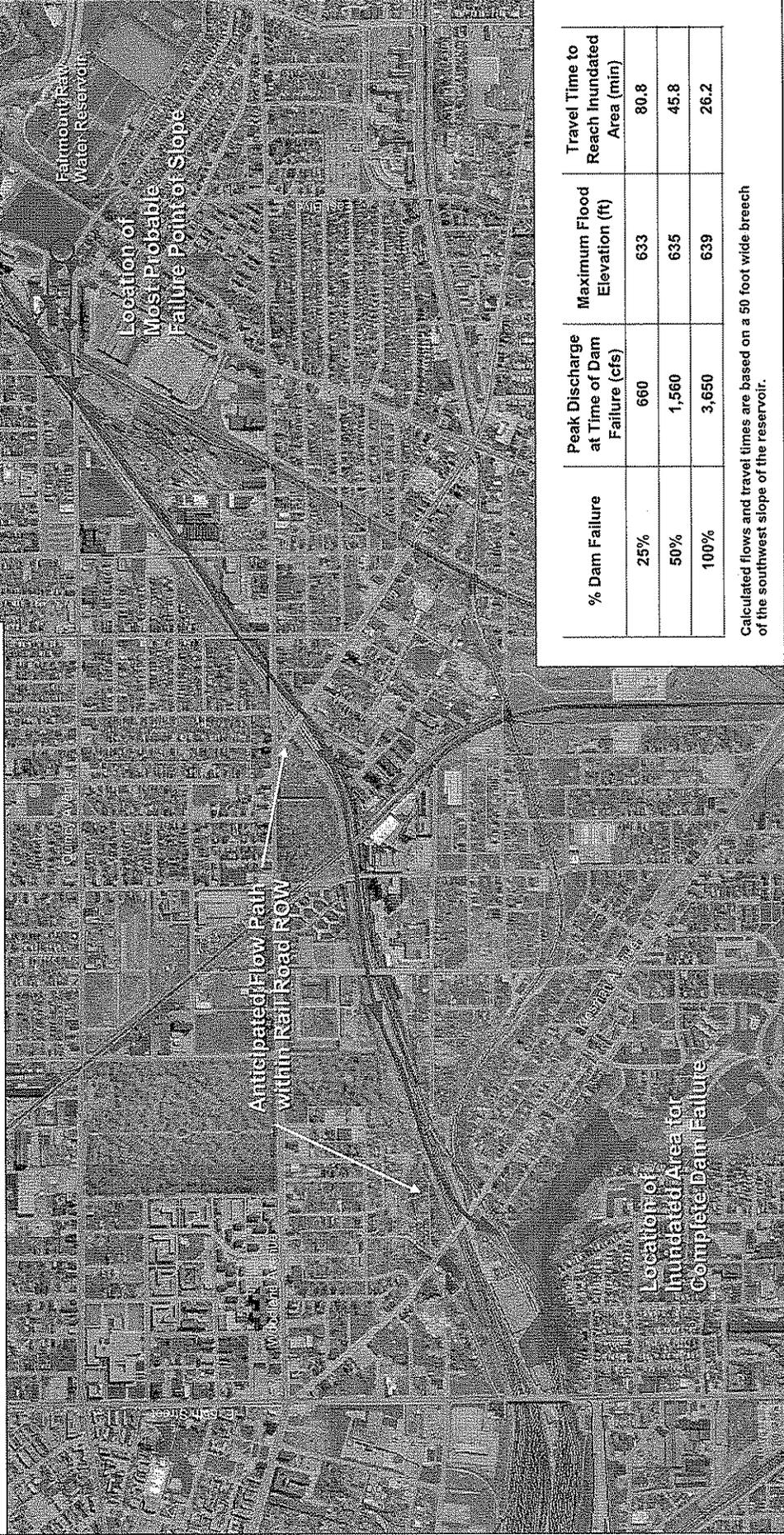
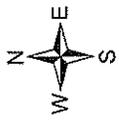


% Dam Failure	Peak Discharge at Time of Dam Failure (cfs)	Maximum Flood Elevation (ft)	Travel Time to Reach Inundated Area (min)
25%	660	633	80.8
50%	1,560	635	45.8
100%	3,650	639	26.2

Calculated flows and travel times are based on a 50 foot wide breach of the southwest slope of the reservoir.

CITY OF CLEVELAND DIVISION OF WATER

Probable Flood Path and Maximum Flood Area
with Orthographic Photography

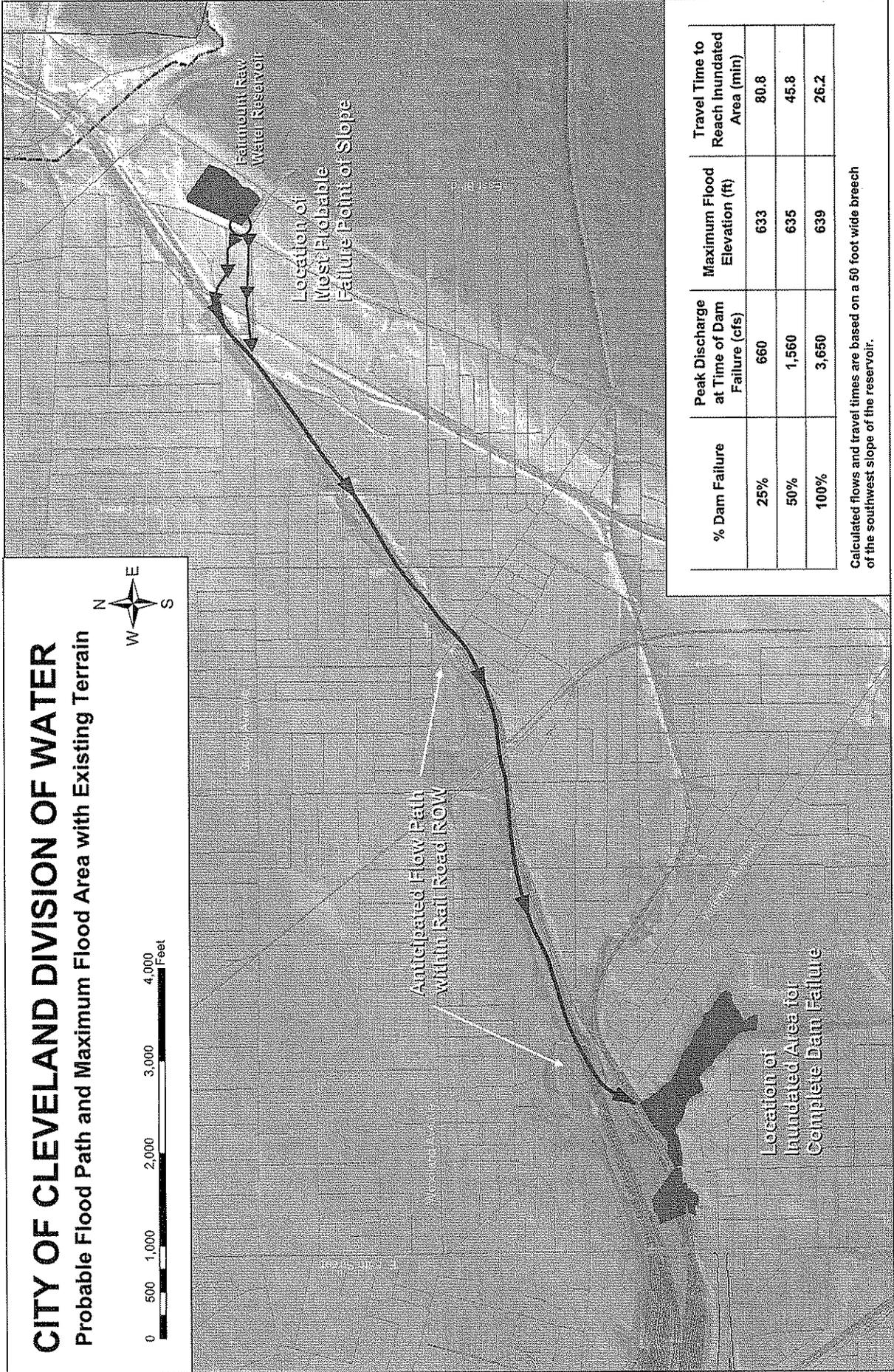
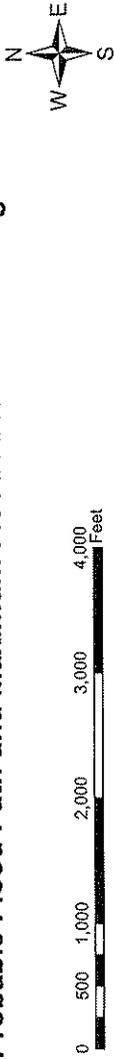


% Dam Failure	Peak Discharge at Time of Dam Failure (cfs)	Maximum Flood Elevation (ft)	Travel Time to Reach Inundated Area (min)
25%	660	633	80.8
50%	1,560	635	45.8
100%	3,650	639	26.2

Calculated flows and travel times are based on a 50 foot wide breach of the southwest slope of the reservoir.

CITY OF CLEVELAND DIVISION OF WATER

Probable Flood Path and Maximum Flood Area with Existing Terrain

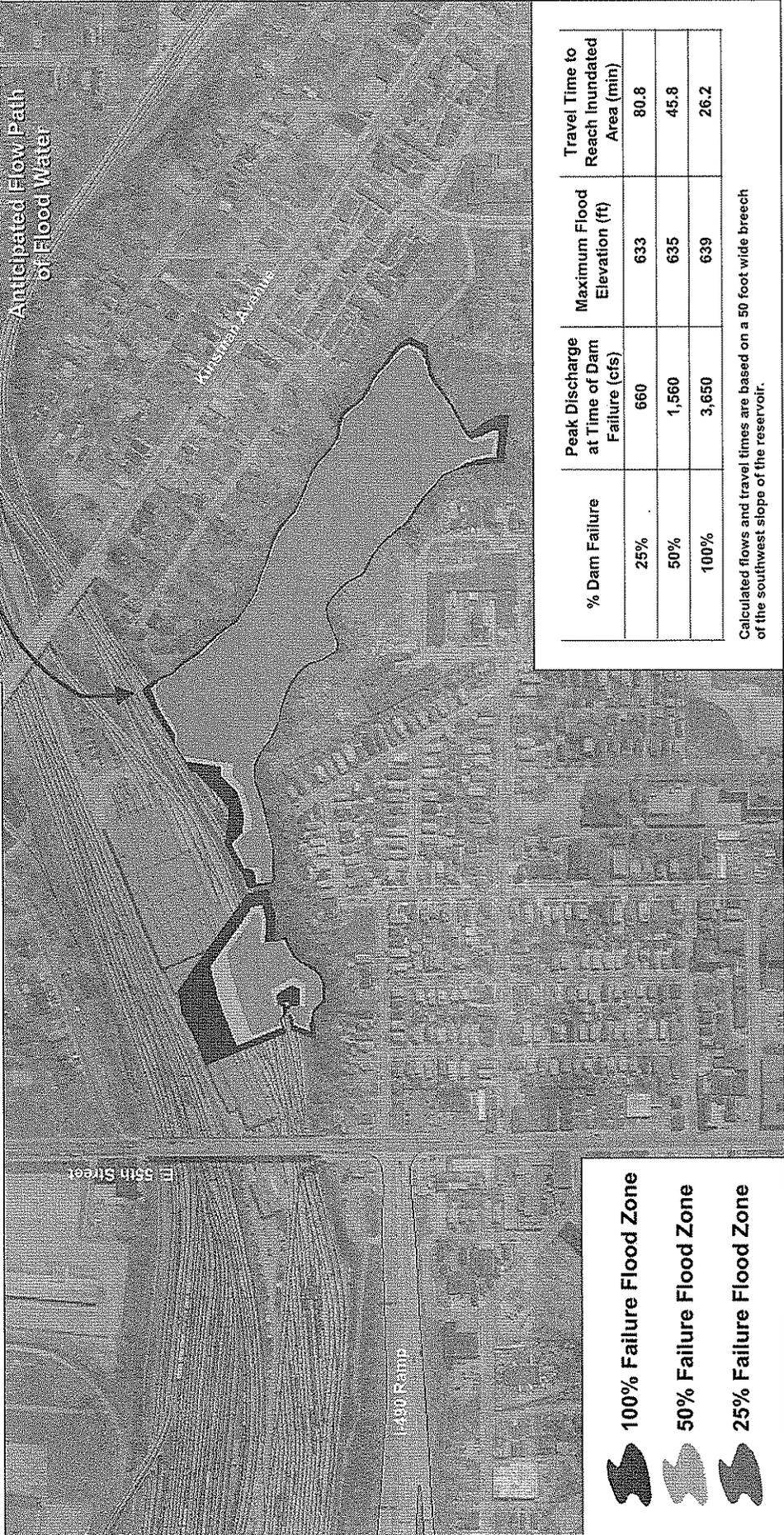
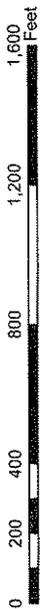


% Dam Failure	Peak Discharge at Time of Dam Failure (cfs)	Maximum Flood Elevation (ft)	Travel Time to Reach Inundated Area (min)
25%	660	633	80.8
50%	1,560	635	45.8
100%	3,650	639	26.2

Calculated flows and travel times are based on a 50 foot wide breach of the southwest slope of the reservoir.

CITY OF CLEVELAND DIVISION OF WATER

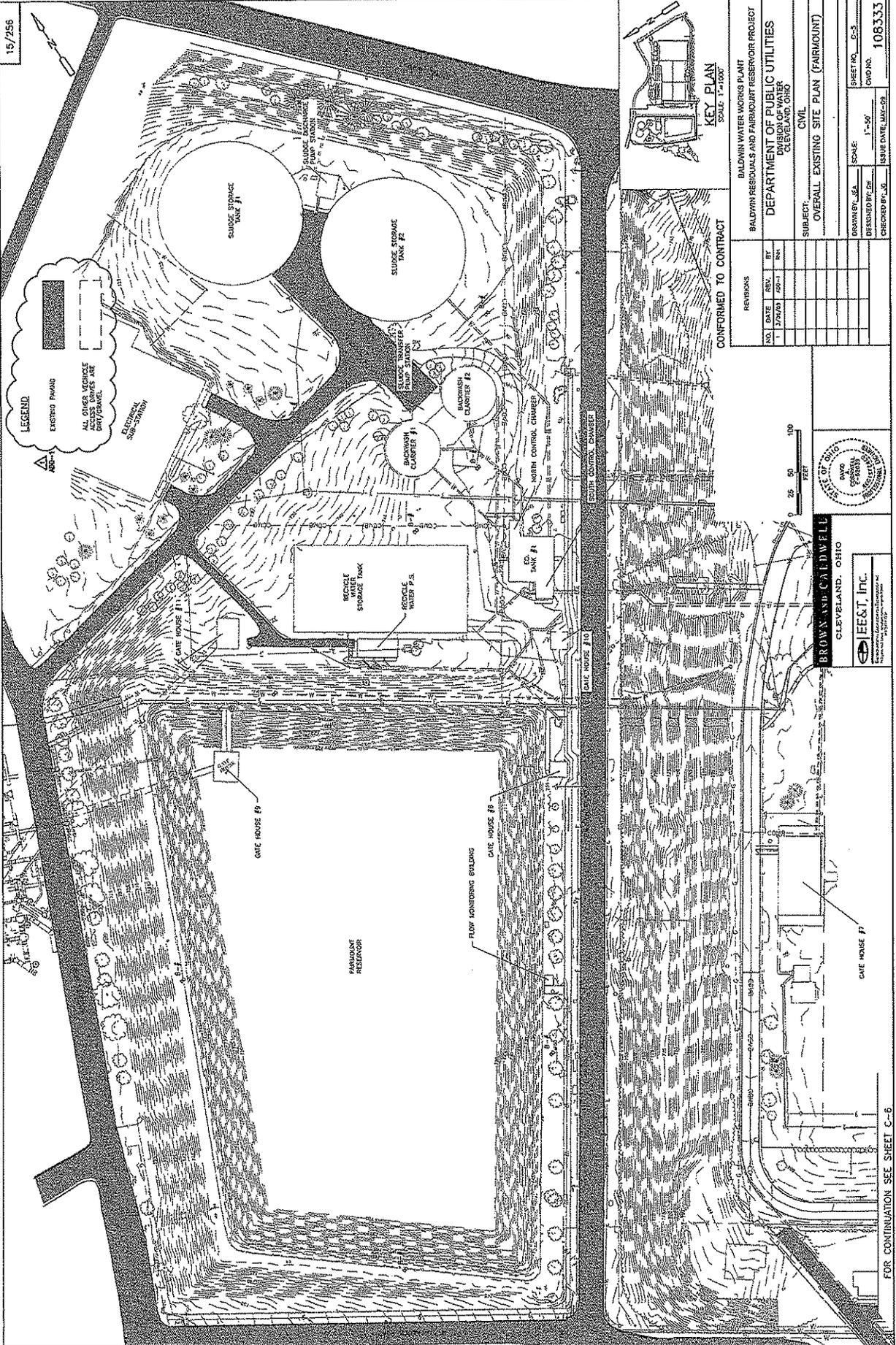
Probable Flood Zones



-  100% Failure Flood Zone
-  50% Failure Flood Zone
-  25% Failure Flood Zone

% Dam Failure	Peak Discharge at Time of Dam Failure (cfs)	Maximum Flood Elevation (ft)	Travel Time to Reach Inundated Area (min)
25%	660	633	80.8
50%	1,560	635	45.8
100%	3,650	639	26.2

Calculated flows and travel times are based on a 50 foot wide breach of the southwest slope of the reservoir.



LEGEND

EXISTING PAVING

ALL OTHER SURFACE ACCESS DRIVES ARE DIRT/GRAVEL

CONFORMED TO CONTRACT

KEY PLAN
SCALE: 1"=100'

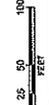
BALDWIN WATER WORKS PLANT
BALDWIN RESERVOALS AND FAIRMOUNT RESERVOIR PROJECT
DEPARTMENT OF PUBLIC UTILITIES
CIVIL ENGINEERING DIVISION
CLEVELAND, OHIO

SUBJECT: OVERALL EXISTING SITE PLAN (FAIRMOUNT)

NO.	DATE	BY	REASON
1	1/27/03	ADP/ML	ISSUED FOR BIDDING

DESIGNED BY: DE
CHECKED BY: JLS
ISSUE DATE: MAR-08

SHEET NO. C-5
JOB NO. 108333

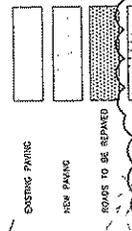


BROWN AND CALDWELL
CLEVELAND, OHIO

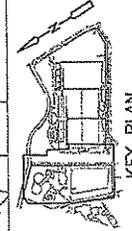
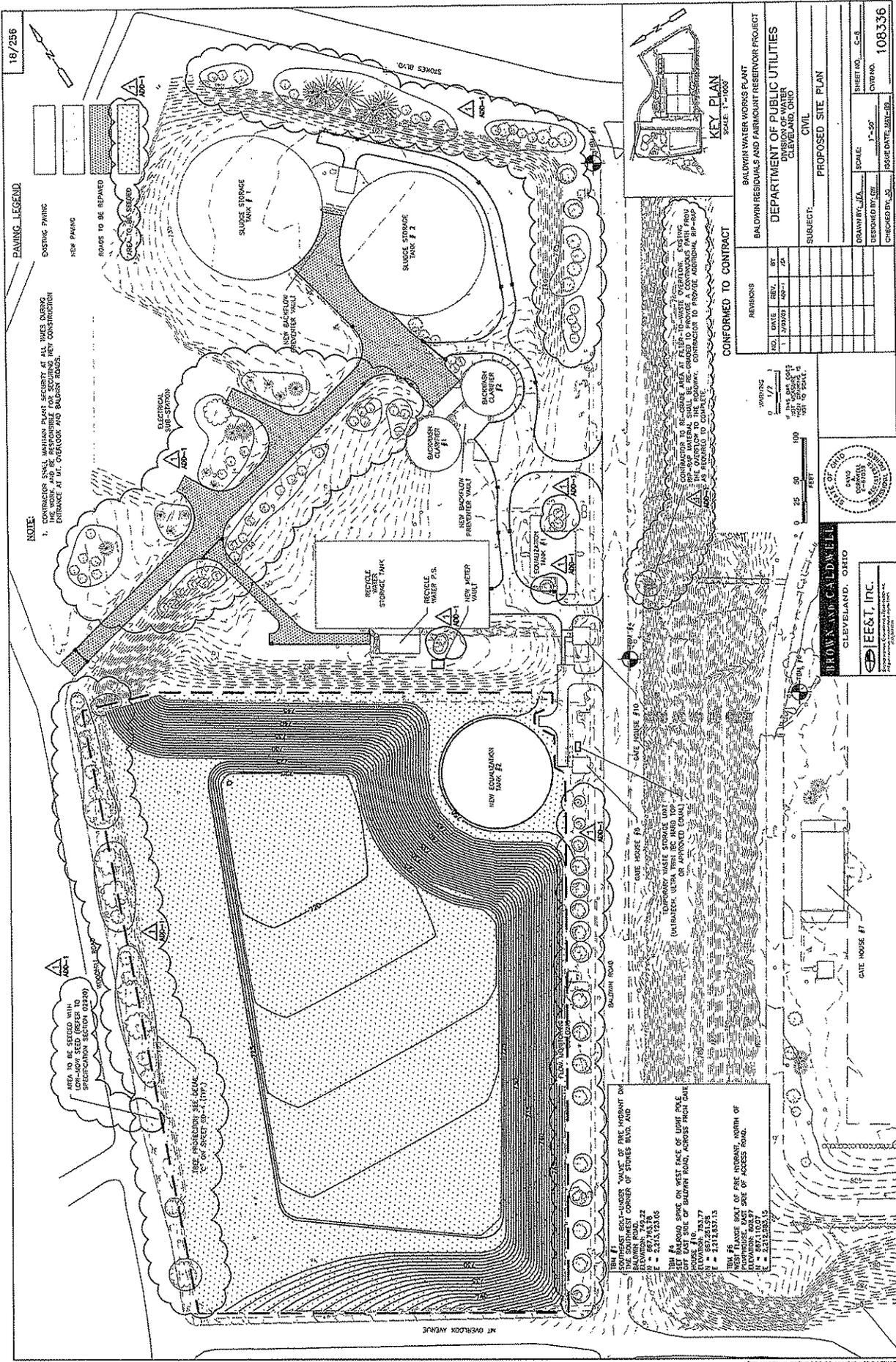
EEEST, INC.
Engineering, Environmental & Construction Services

FOR CONTINUATION SEE SHEET C-6

PAVING LEGEND



NOTE:
1. THE CONTRACTOR SHALL MAINTAIN THE EXISTING 48" DIAMETER CURBS AND CURB AND GUTTER THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING CURBS AND GUTTERS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING CURBS AND GUTTERS.



CONFORMED TO CONTRACT

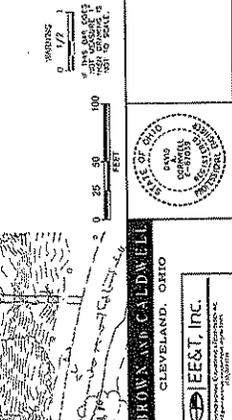
REVISIONS

NO.	DATE	REV.	BY
1	10/20/07	100-1	JL

BALDWIN WATER WORKS PLANT
BALDWIN RESERVOIRS AND FAIRHURST RESERVOIR PROJECT
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF WATER
CLEVELAND, OHIO

SUBJECT: CIVIL
PROPOSED SITE PLAN

DRAWN BY: JEA
SCALE: 1"=50'
CHECKED BY: JLS
ISSUE DATE: 10/20/07
SHEET NO.: C-1
CIVIL NO.: 108336



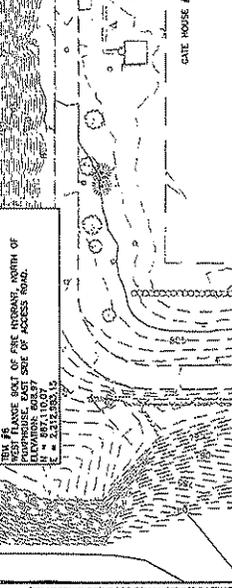
THE OHIO STATE ENGINEERING BOARD
CLEVELAND, OHIO

EEEST, INC.
Professional Engineers and Surveyors
10000 Eastman Avenue, Suite 100
Cleveland, Ohio 44130
Tel: (216) 751-1000
Fax: (216) 751-1001
www.eeest.com

AREA TO BE SEED WITH GRASS AND SOIL TO BE SEED TO SPECIFICATION SECTION 01220

NEW FLANGE BOAT OF FIRE HYDRANT, NORTH OF FAIRHURST RESERVOIR, EAST SIDE OF ACCESS ROAD.
N = 887.1007
E = 231.3823

NEW FLANGE BOAT OF FIRE HYDRANT, SOUTH OF FAIRHURST RESERVOIR, WEST SIDE OF ACCESS ROAD.
N = 887.1007
E = 231.3823



Sam MacDonald - FFY 2009 ARRA Green Project Information Form (1)

From: "Lisowski, Karen" <karen_lisowski@ClevelandWater.com>
To: "Sam MacDonald" <sam.macdonald@epa.state.oh.us>, <ARRA.DWReports@epa.state.oh.us>
Date: Friday, October 16, 2009 2:59 PM
Subject: FFY 2009 ARRA Green Project Information Form (1)
CC: <deborah.nicholas@epa.state.oh.us>, <dave.maschak@epa.state.oh.us>, <KMiller@peppmc.com>
Attachments: B-RFR project - Energy Efficiency with attachments.pdf; B-RFR project - FY 2009 ARRA Green Form p.1-4,8-10.pdf

Sam,

As requested, attached is a completed Ohio EPA FFY 2009 ARRA Green Project Information Form for Cleveland Water's Baldwin Residuals and Fairmount Reservoir project. At this time we have checked the Energy Efficiency and Other Environmentally Innovative Activity boxes; the Green Infrastructure and Water Efficiency categories aren't applicable to this project. I sent the entire 11 page document (in several e-mails), with just pages 1, 5 and 11 filled out since these are applicable. Attached to pages 5 and 11 is also backup documentation including the business cases for each. I am sending this information in 3 e-mails as the files are quite large. Please let me know if you do not receive all 3 e-mails and attachments.

Given the time constraint, the green aspects that we have noted here are those that are most apparent and amount to over \$3 million. With additional time and or another opportunity to revisit this matter, there are other items that we could have included. For instance, we did not include the residuals handling aspects of the project. Also each individual unit of the project can't stand alone and green aspects could be considered for the whole overall project as well. If there is another opportunity to refine this information we can include these additional aspects at that time.

As always if there are any additional questions please call or e-mail me. You can also contact Kristen Miller at MWH if there are any detailed technical questions related to this information.

Thanks and have a good weekend.

Karen Lisowski
Cleveland Division of Water
216-664-2444, x5633