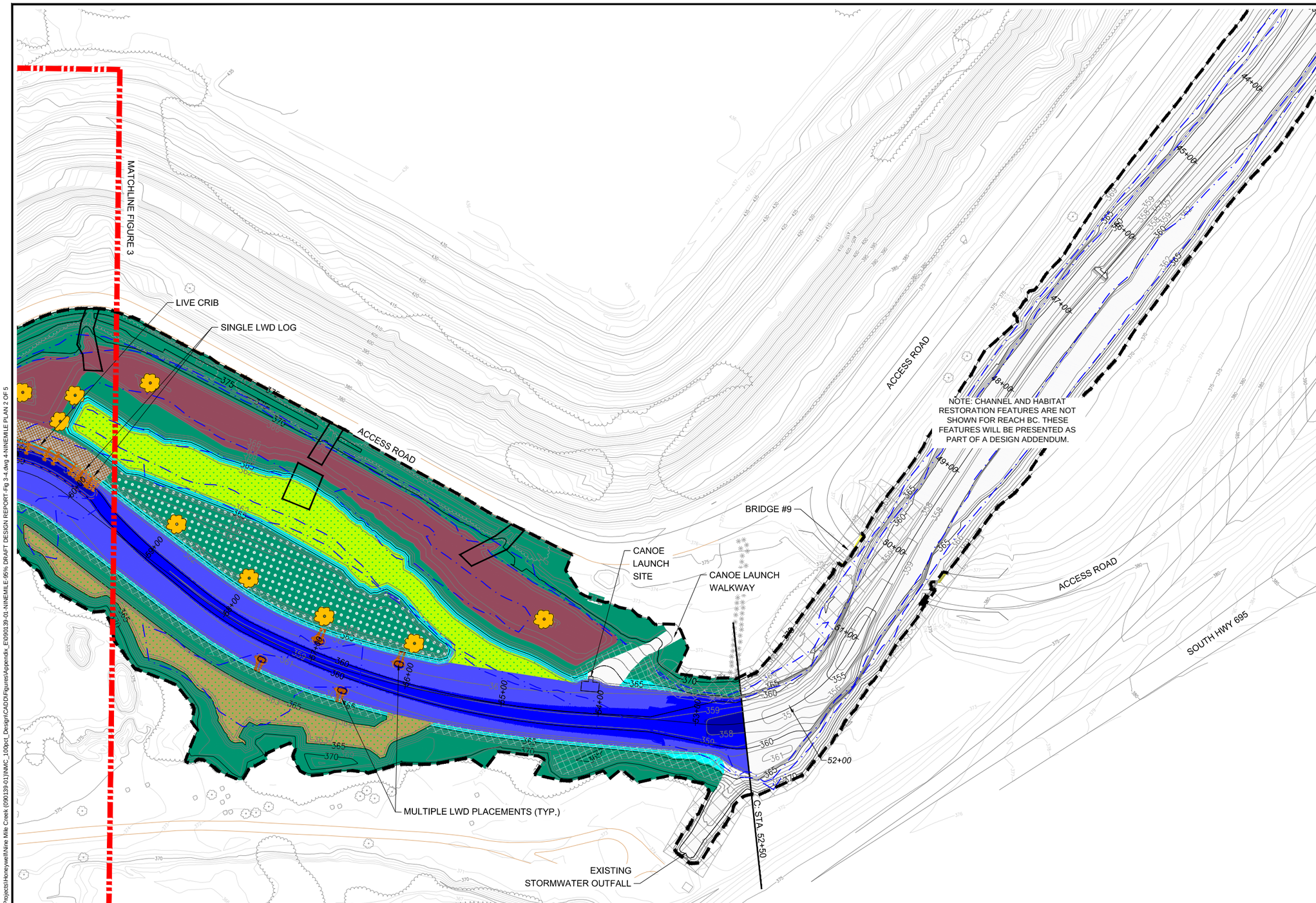


LEGEND:

- APPROX. LIMITS OF GRADING
- FINISHED GRADE MAJOR CONTOUR
- FINISHED GRADE MINOR CONTOUR
- EXISTING GRADE MAJOR CONTOUR
- EXISTING GRADE MINOR CONTOUR
- EXISTING TREE LINE
- EXISTING DELINEATED WETLAND BOUNDARIES
- PROPOSED POOL EXTENT
- SOIL WRAPS
- LIGHT STONE FILLING MATERIAL
- APPROX. EXTENT OF STORMWATER OUTFALL PROTECTION FEATURES
- BIO-DEGRADABLE RECP
- EMERGENT WETLAND (ZONE B1e)
- FORESTED WETLAND (ZONE B1f)
- FORESTED UPLAND (ZONE A1a)
- FORESTED UPLAND MIX (ZONE A1b)
- RED MAPLE/HARDWOOD SWAMP OR WOODS
- RIVERINE FRINGING WETLAND (ZONE A2)
- PROPOSED LARGE TREE

LONG TERM MEDIAN (180 cfs) FLOW DEPTHS

- 0-2FT
- 2-4 FT
- 4-6 FT
- 6-8 FT
- >8 FT

0 50 100
SCALE IN FEET

NOTES:

1. FIGURES ARE FOR REPRESENTATION ONLY. NOT FOR CONSTRUCTION.
2. HORIZONTAL DATUM: NY STATE PLANE CENTRAL ZONE (FT).
3. VERTICAL DATUM: NAVD 88 (FT).
4. CONTOURS ARE 1' INTERVAL.

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

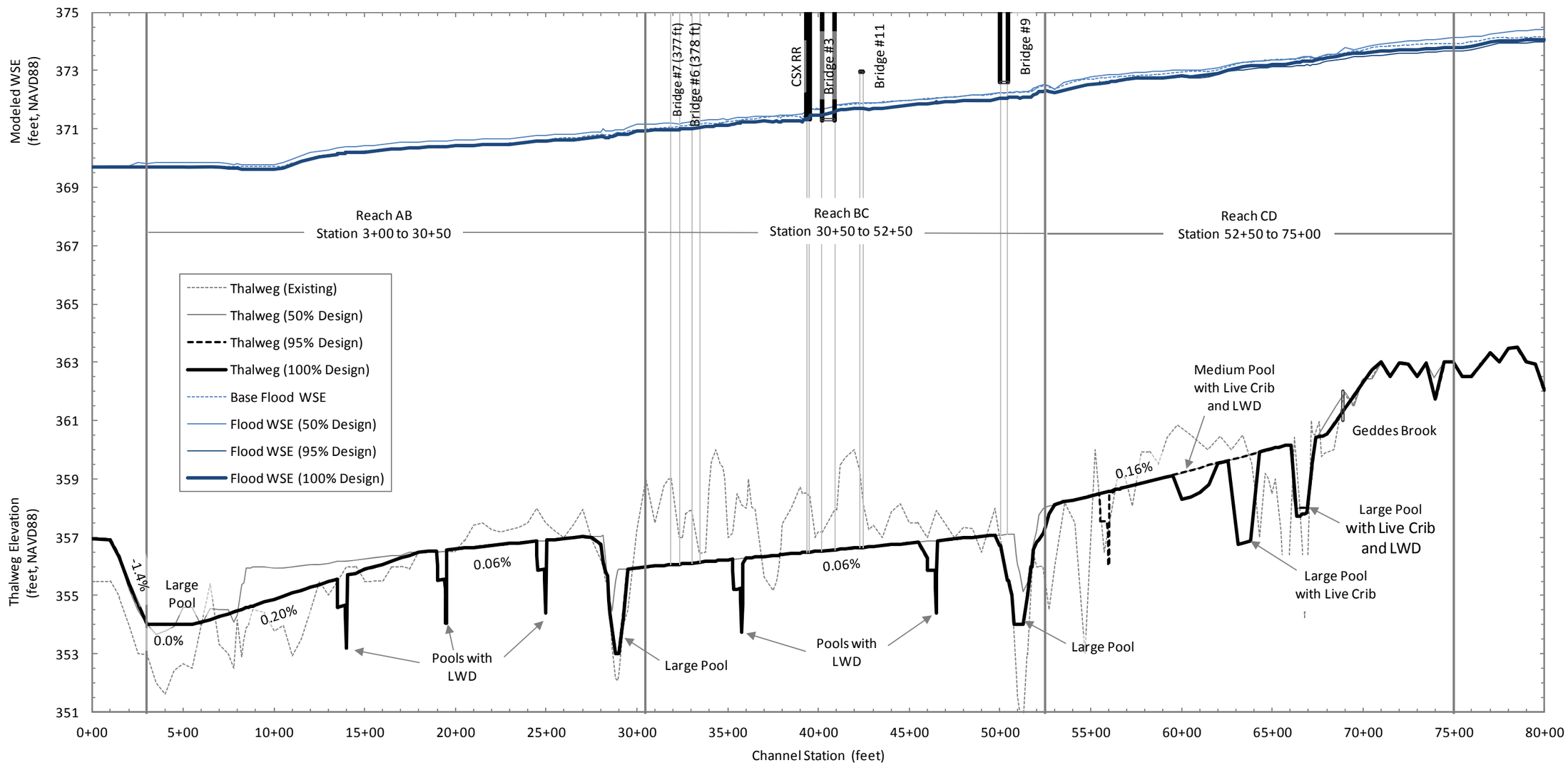
DESIGNED BY: R. DAVIS, J. GAFFNEY
DRAWN BY: E. PIPKIN, D. GAFFNEY
CHECKED BY: T. DRURY, R. DAVIS
APPROVED BY: -
SCALE: AS SHOWN
DATE: 06/19/2012

NINEMILE CREEK
CHANNEL & HABITAT RESTORATION
(NOT TO BE USED FOR CONSTRUCTION)

100% DESIGN
STA 60+00 TO STA 44+00

FIGURE NO.
4

Jun 19, 2012 12:25pm dgaffney B:\Projects\Honeywell\Nine Mile Creek (090139-01)\NMC_100pct_Design\CADD\Figures\Appendix_E\090139-01-NINEMILE-95% DRAFT DESIGN REPORT-Fig 3-4.dwg 4-NINEMILE PLAN 2 OF 5



Notes:

1) Thalweg profiles are from the existing and proposed conditions Ninemile Creek HEC-RAS model geometries produced using AutoCAD surfaces.
2) Water surface elevation (WSE) profiles are HEC-RAS model results for the 100 yr return period event. Discharge of 3,400 cfs with an Onondaga Lake WSEL of 369.7 ft.
3) Slopes shown for each major grade break within the project for the 100% design.
4) Bridge #7, West I-690. Bridge #6, East I-690. CSX RR, CSX Railroad Bridge. Bridge #3, State Fair Blvd. Bridge #11, Utility Crossing. Bridge #9, Access Road. Bridge decks shown with a heavy black line, abutment locations shown with a light grey line.
5) Geddes Brook enters Ninemile Creek at approximately station 68+90
6) LWD = Large Woody Debris

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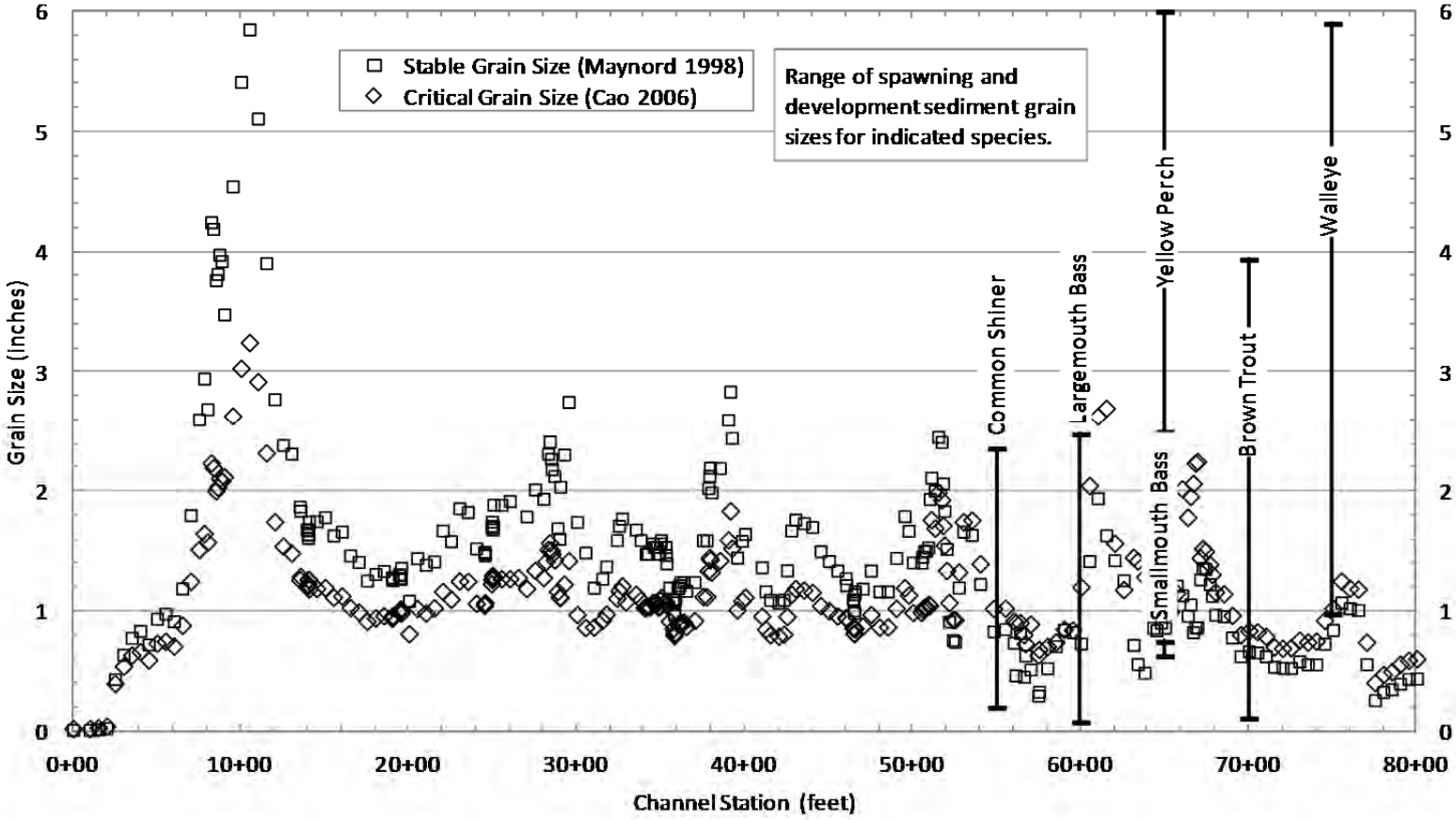
ANCHOR QEA Honeywell PARSONS

Figure 5

Ninemile Creek Thalweg Channel Profile – 95% Design, 50% Design, and Existing Conditions



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Notes:
100-year return period flow is 3400 cfs, low lake level is 367 feet NAVD88. For Cao (2006) critical grain size was determined using a critical dimensionless shear stress of 0.045. A factor of safety of 1.1 was applied to the Maynord's stable grain size calculations (Palermo et al. 1998). Position of species specific sediment grain size ranges are for presentation purposes only.

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Figure 6
Proposed Conditions Critical Grain Size
100 yr Return Period Flow, Low Lake Level

ATTACHMENT A
PROPOSED CONDITIONS FROM THE GEDDES BROOK AND NINEMILE CREEK RECORDS OF DECISION

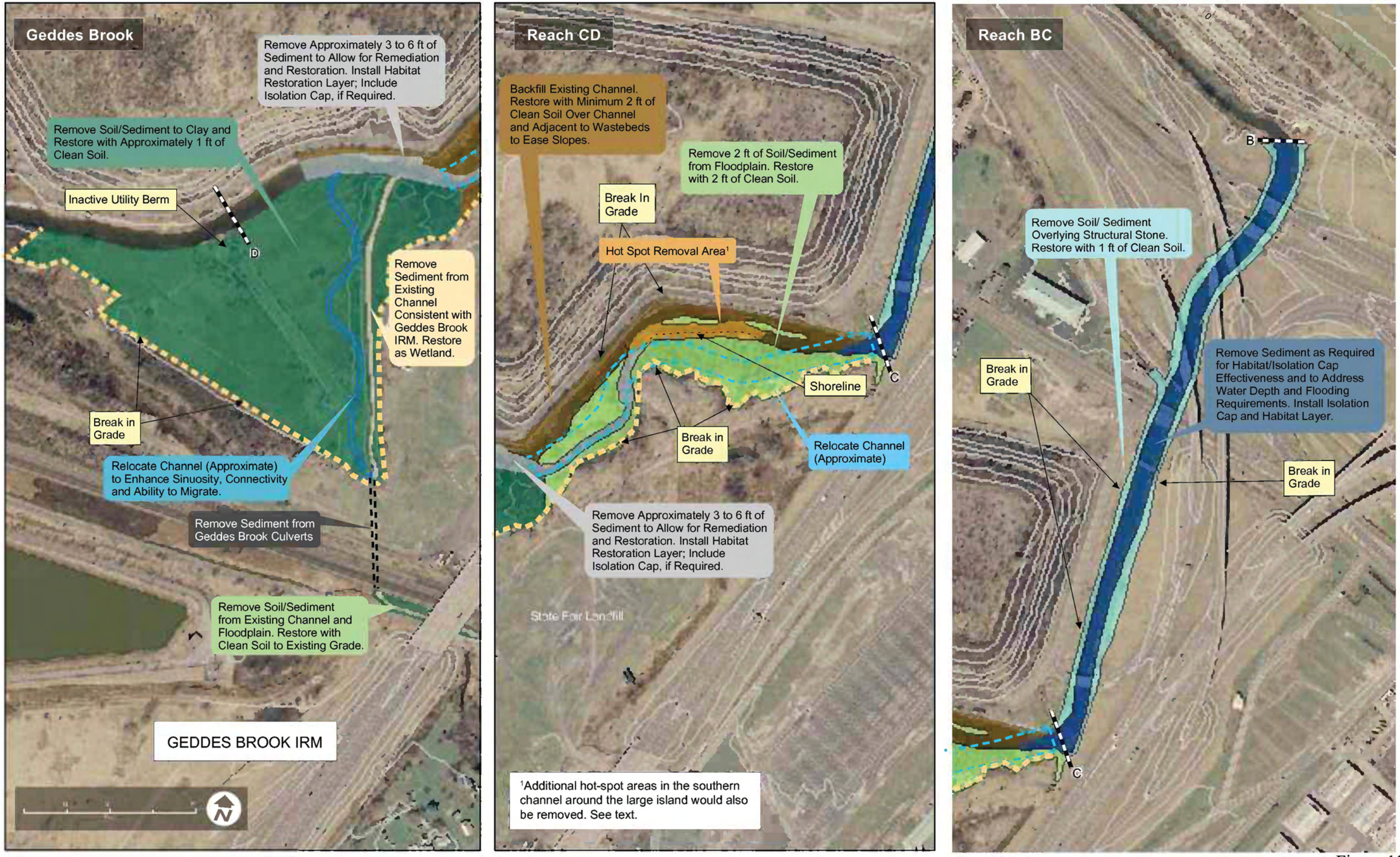

Figure 11.
Alternative 3 Remedial Approach and Geddes Brook IRM

Source: Modified from Supplemental FS (Parsons, 2008a)

Note: Removal depths noted above are preliminary and would be finalized during remedial design.

Source: Modified from OU2 Supplemental FS (Parsons, 2009)

Figure 12
Alternative 3 Remedial Approach

ATTACHMENT B
BOUNDARY CONDITIONS FOR HEC-RAS MODELING

A version of this attachment was included in the *100% Design Report for the Geddes Brook Interim Remedial Measures* submitted to NYSDEC in October 2010 and is provided here modified for this Report.

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LIST OF ACRONYMS AND ABBREVIATIONS

BCD	Barge Canal Datum
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
HEC-RAS	Hydraulic Engineering Center – River Analysis System
HEC-SSP	Hydrologic Engineering Center – Statistical Software Package
HFOP	High Flow Operating Procedure
LP-III	Log Pearson type III
NAVD88	North American Vertical Datum of 1988
NGVD29	National Geodetic Vertical Datum of 1929
NYSCC	New York State Canal Corporation
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

1 INTRODUCTION

This attachment summarizes the analysis of Onondaga Lake water levels and Ninemile Creek hydrology for use as boundary conditions in the Hydraulic Engineering Center – River Analysis System (HEC-RAS) hydraulic modeling of existing and proposed conditions.

2 ONONDAGA LAKE LEVELS

The evaluation of Onondaga Lake levels included a review of water level measurements collected in Onondaga Lake as well as a review of the operating procedures of the Phoenix Dam located on the Oswego River downstream of Onondaga Lake. Table B-1 presents a summary of the Onondaga Lake water levels to be used for the preliminary design model simulations for the various flow scenarios.

Table B-1
Onondaga Lake Water Level for Various Flow Scenarios

Scenario	Water Level (feet, NAVD88)
Low flow	362.0
Median flow	362.5
2-year	365.0
50-year	369.0
100-year	369.7

Note:
1. Water level referenced to the North American Vertical Datum of 1988 (NAVD88).

The analysis is presented in detail in the following subsections.

2.1 Phoenix Dam Operation

Onondaga Lake is part of the Erie (Barge) Canal system, and the elevation of the lake is controlled by a dam on the Oswego River in Phoenix, New York, downstream of the lake. The dam in Phoenix consists of six tainter gates, a 540-foot-long concrete overflow spillway, and one hydropower generation facility. Lock O-1 of the Erie (Barge) Canal operated by the New York State Canal Corporation (NYSCC) is also located at Phoenix Dam. The dam operates in a run-of-river mode with tainter gates being used to manage increases or decreases in river flow. The Phoenix Dam is required to maintain a headpond elevation (the water surface elevation immediately upstream of the dam) of no greater than 364.0 feet Barge Canal Datum (BCD) or 362.42 feet North American Vertical Datum of 1988 (NAVD88)[1] (Federal Energy Regulatory Commission [FERC] 1996). For canal navigation, the headpond

[1] To convert elevations from the BCD to the NAVD88 at the Phoenix Dam, subtract 1.58 feet.

elevation at Phoenix Dam must be maintained between 363.5 and 364.0 feet BCD. The hydropower generation is reduced at flows less than 3,000 cubic feet per second (cfs), and is shut down at flows less than 1,900 cfs to maintain these elevations and a minimum river flow of 300 cfs.

During low flow periods, which are 3,000 cfs or less in the Oswego River, the hydroelectric plant operates only one unit until the flow reduces to approximately 1,900 cfs. The hydroelectric plant cannot generate power, maintain a headpond elevation of 364.0 feet BCD, and maintain the minimum flow requirement of 300 cfs. Therefore, hydroelectric generation stops and the tainter gates are adjusted to maintain a headpond elevation of 363.5 feet BCD (361.92 feet NAVD88), which is the NYSCC navigation requirement (FERC 1996).

A High Flow Operating Procedure (HFOP) is currently followed when flows in the Oswego River increase. The HFOP calls for a 6-inch drawdown below the normal headpond elevation when the flows in the Oswego River at Phoenix exceed 10,000 cfs and when the Seneca River elevation downstream of Lock E-24 reaches 366.0 feet BCD. The headpond is drawn down to an elevation of 363.5 feet BCD (361.92 feet NAVD88). The HFOP increases the slope of the hydraulic grade line (i.e., water surface elevation profile) in the Seneca, Oneida, and Oswego rivers during high flow events (Oswego Hydro Partners, L.P. [Oswego Hydro Partners] and NYSCC 1997).

Figure B-1 shows the headpond rating curve (discharge versus headpond elevation) for the condition with the tainter gates open and hydroelectric units off.

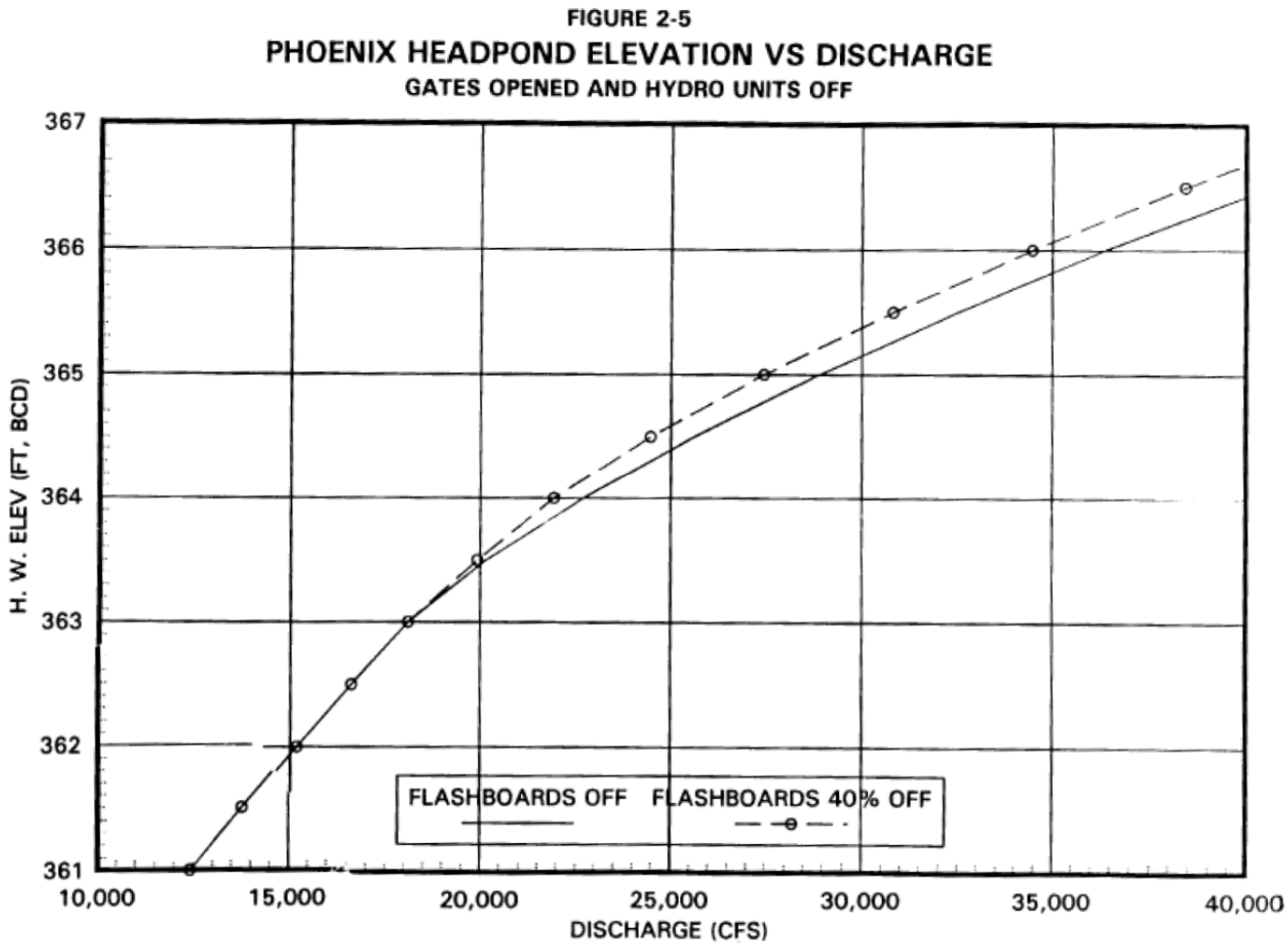

Figure B-1

Phoenix Headpond Rating Curve

Source: Figure 2-5 of FERC 1996

2.2 Measurements of Water Levels in Onondaga Lake

The U.S. Geological Survey (USGS) maintains a water level gage on Onondaga Lake at the Onondaga Lake Park Marina Basin in Liverpool, New York (USGS Gage 04240495). Daily mean (average) water level data since October 1970 are available online and can be accessed at: http://waterdata.usgs.gov/ny/nwis/dv/?site_no=04240495&agency_cd=USGS&referred_module=sw.[2]

A frequency analysis was performed on the daily mean water level data from October 1, 1970, to April 1, 2009 (approximately 38 years). Figure B-2 presents a time series of Onondaga Lake water levels. Figure B-3 presents the cumulative frequency distribution.

[2] It should be noted that the water level data were reported to the National Geodetic Vertical Datum of 1929 (NGVD29). These water levels were converted to the project datum, NAVD88, by subtracting 0.59 feet. To convert from the BCD to NAVD88 in Onondaga Lake, subtract 1.61 feet.

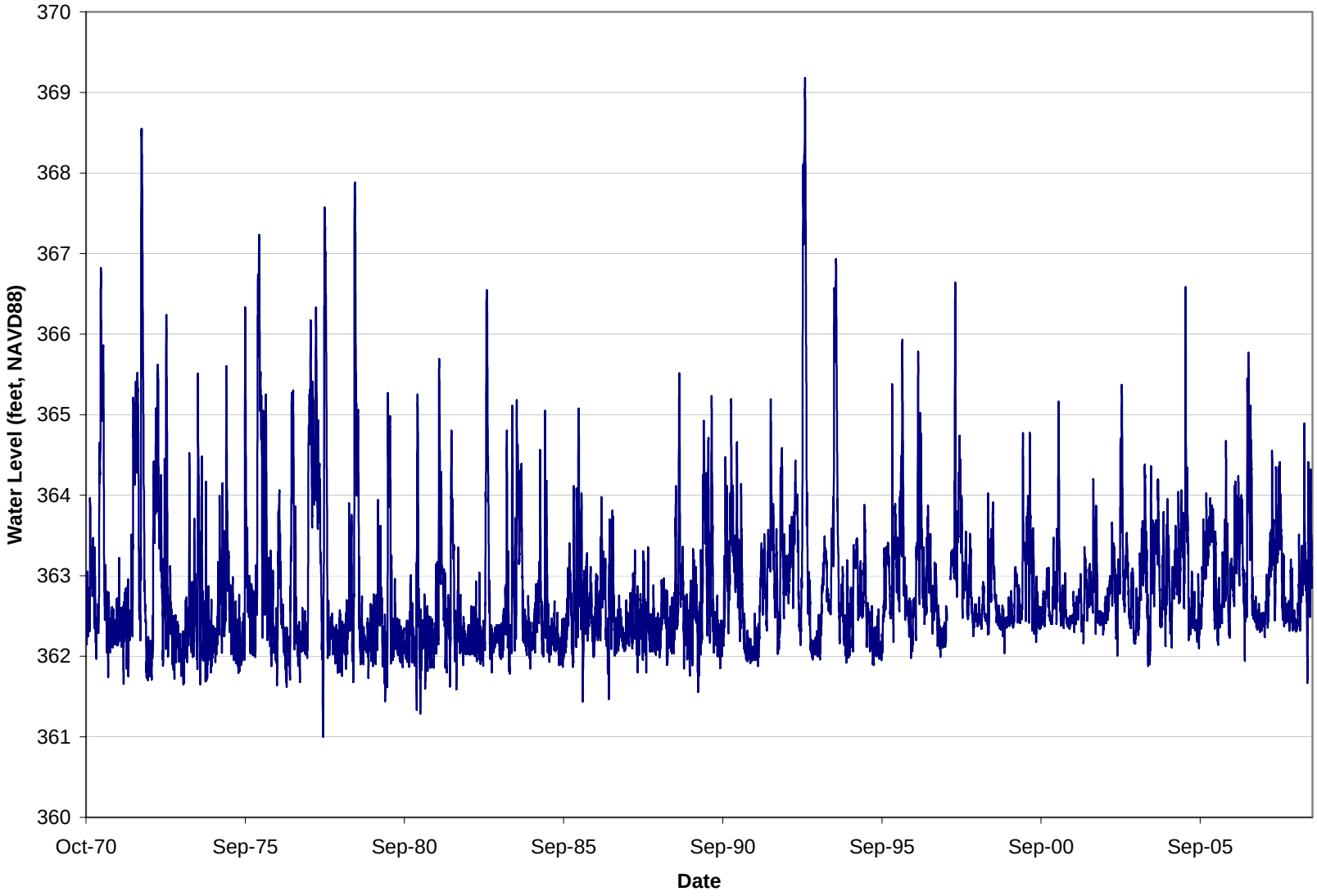

Figure B-2

Time Series of Onondaga Lake Water Levels 1970 to 2009

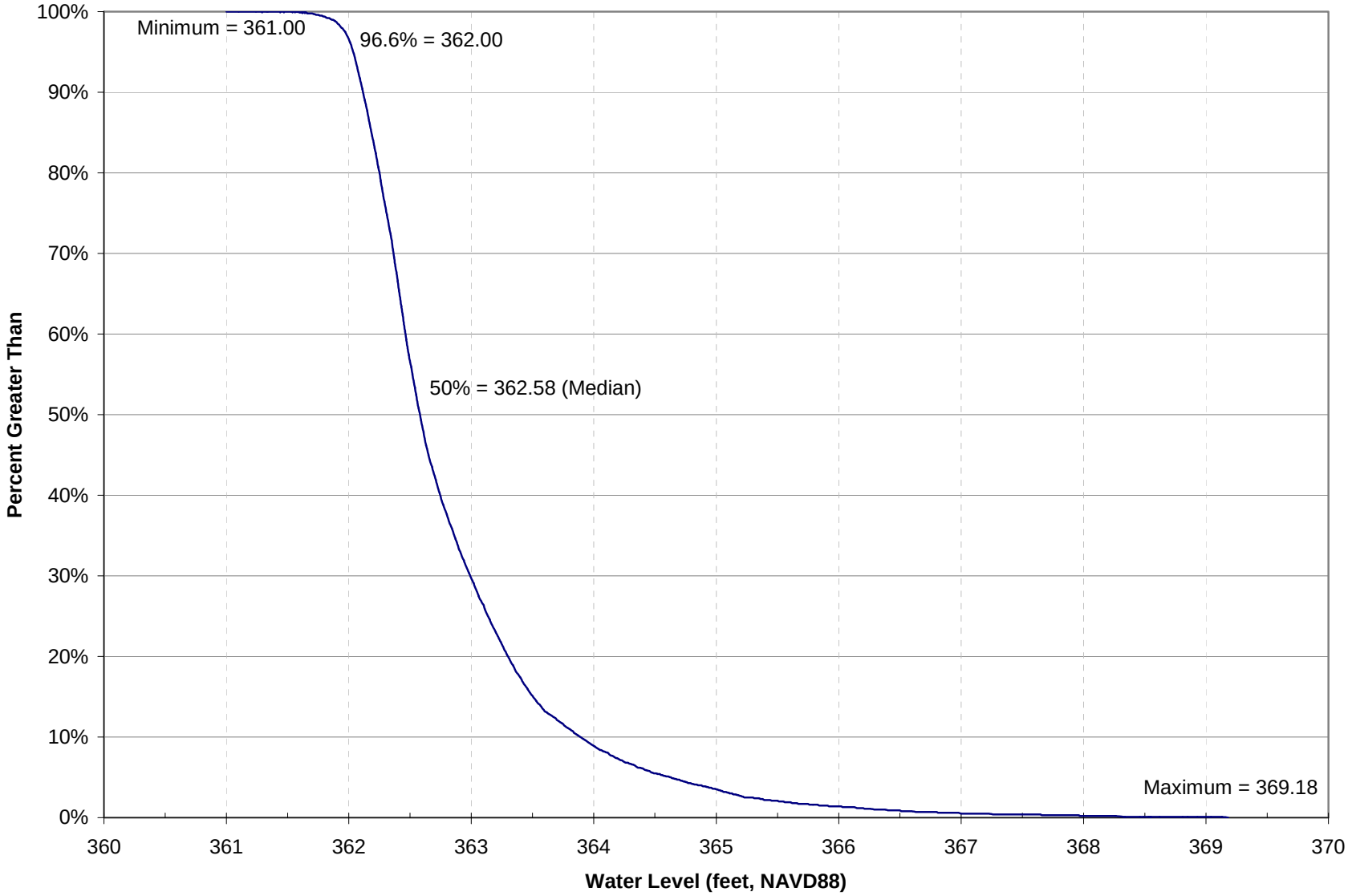

Figure B-3

Cumulative Frequency Distribution of Onondaga Lake Water Levels 1970 to 2009