



## History of Construction Lawrence Energy Center

Inactive Units - Ash Pond Area 2, Ash Pond Area 3,  
and Ash Pond 4

Prepared for:

Westar Energy

Lawrence Energy Center

Lawrence, Kansas

Prepared by:

APTIM Environmental & Infrastructure, Inc.

April 2018



## TABLE OF CONTENTS

|   |          |
|---|----------|
| <b>1.0 INTRODUCTION.....</b>  | <b>1</b> |
| <b>2.0 AREA 2, AREA 3, AND AREA 4 PONDS OVERVIEW.....</b>   | <b>2</b> |
| <b>3.0 HISTORY OF CONSTRUCTION .....</b>  | <b>3</b> |
| 3.1 SITE NAME AND OWNERSHIP INFORMATION (§257.73(c)(1)(i)) .....  | 3        |
| 3.2 CCR UNIT LOCATION MAP (§257.73(c)(1)(ii)).....  | 3        |
| 3.3 STATEMENT OF PURPOSE FOR CCR UNIT (§257.73(c)(1)(iii)) .....  | 3        |
| 3.4 WATERSHED DESCRIPTION (§257.73(c)(1)(iv)).....  | 3        |
| 3.5 DESCRIPTION OF PHYSICAL AND ENGINEERING PROPERTIES (§257.73(c)(1)(v)) .....                                   | 4        |
| 3.6 SUMMARY OF SITE PREPARATION/CONSTRUCTION ACTIVITIES (§257.73(c)(1)(vi)) ..                                    | 4        |
| 3.7 ENGINEERING DIAGRAM FOR CCR IMPOUNDMENTS (§257.73(c)(1)(vii)).....  | 4        |
| 3.8 DESCRIPTION OF INSTRUMENTATION (§257.73(c)(1)(viii)) .....  | 4        |
| 3.9 AREA-CAPACITY CURVES FOR THE CCR UNITS (§257.73(c)(1)(ix)).....   | 4        |
| 3.10 SPILLWAY/DIVERSION DESIGN FEATURES AND CAPACITY CALCULATIONS<br>(§257.73(c)(1)(x)) .....                     | 5        |
| 3.11 CONSTRUCTION SPECIFICATIONS AND PROVISIONS FOR SURVEILLANCE,<br>MAINTENANCE/REPAIR (§257.73(c)(1)(xi)) ..... | 5        |
| 3.12 KNOWN RECORDS OF STRUCTURAL INSTABILITY (§257.73(c)(1)(xii)) .....   | 5        |
| <b>4.0 RECORDS RETENTION AND MAINTENANCE .....</b>  | <b>6</b> |
| 4.1 INCORPORATION OF REPORT INTO OPERATING RECORD (§257.73(g)).....   | 6        |
| 4.2 NOTIFICATION REQUIREMENTS (§257.73(g)).....   | 6        |
| 4.3 CHANGES TO HISTORY OF CONSTRUCTION (§257.73(c)(2)) .....  | 6        |

## LIST OF FIGURES AND APPENDICES

### FIGURES

- Figure 1 - Inactive Units - Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Location Plan
- Figure 2 - Inactive Units - Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Topography Prior to Closure

### APPENDICES

- Appendix A - Settlement Pond Flow Diagram
- Appendix B - Historical Construction Diagrams for Inactive CCR Units
- Appendix C - Construction Diagrams & Cross-Sections for Closure of Inactive CCR Units
- Appendix D - Area-Capacity Curves for Inactive CCR Units

## CCR Regulatory Requirements

| USEPA CCR Rule Criteria<br>40 CFR §257.73(c)   | Lawrence Energy Center (LEC)<br>History of Construction Report –<br>Inactive Units 2,3 & 4 |
|--|--|
| <p>§257.73(c)(1) stipulates:</p> <p><i>“(1) No later than October 17,2016, the owner or operator of the CCR unit must compile a history of construction, which shall contain, to the extent feasible, the information specified in paragraphs (c)(1)(i) through (xi) of this section.”</i></p> | Section 1.0  |
| <p>§257.73(c)(1)(i) stipulates:</p> <p><i>“(i) The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.”</i></p>                                    | Section 3.1  |
| <p>§257.73(c)(1)(ii) stipulates:</p> <p><i>“(ii) The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7 1/2 minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.”</i></p>              | Section 3.2  |
| <p>§257.73(c)(1)(iii) stipulates:</p> <p><i>“(iii) A statement of the purpose for which the CCR unit is being used.”</i></p>   | Section 3.3  |
| <p>§257.73(c)(1)(iv) stipulates:</p> <p><i>“(iv) The name and size in acres of the watershed within which the CCR unit is located.”</i></p>  | Section 3.4  |

| USEPA CCR Rule Criteria<br>40 CFR §257.73(c)   | Lawrence Energy Center (LEC)<br>History of Construction Report –<br>Inactive Units 2,3 & 4 |
|--|--|
| <p>§257.73(c)(1)(v) stipulates:</p> <p><i>“(v) A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.”</i></p>  | <p>Section 3.5</p>   |
| <p>§257.73(c)(1)(vi) stipulates:</p> <p><i>“(vi) A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.”</i></p>  | <p>Section 3.6</p>   |
| <p>§257.73(c)(1)(vii) stipulates:</p> <p><i>“(vii) At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.”</i></p> | <p>Section 3.7</p>   |

| USEPA CCR Rule Criteria<br>40 CFR §257.73(c)   | Lawrence Energy Center (LEC)<br>History of Construction Report –<br>Inactive Units 2,3 & 4 |
|--|--|
| §257.73(c)(1)(viii) stipulates:<br><br><i>“(viii) A description of the type, purpose, and location of existing instrumentation.”</i>   | Section 3.8  |
| §257.73(c)(1)(ix) stipulates:<br><br><i>“(ix) Area-capacity curves for the CCR unit.”</i>  | Section 3.9  |
| §257.73(c)(1)(x) stipulates:<br><br><i>“(x) A description of each spillway and diversion design features and capacities and calculations used in their determination.”</i>   | Section 3.10   |
| §257.73(c)(1)(xi) stipulates:<br><br><i>“(xi) The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.”</i>   | Section 3.11   |
| §257.73(c)(1)(xii) stipulates:<br><br><i>“(xii) Any record or knowledge of structural instability of the CCR unit.”</i>  | Section 3.12   |
| §257.73(c)(2) stipulates:<br><br><i>“(2) Changes to the history of construction. If there is a significant change to any information compiled under paragraph (c)(1) of this section, the owner or operator of the CCR unit must update the relevant information and place it in the facility’s operating record as required by §257.105(f)(9).”</i> | Section 4.3  |

| USEPA CCR Rule Criteria<br>40 CFR §257.73(c)  | Lawrence Energy Center (LEC)<br>History of Construction Report –<br>Inactive Units 2,3 & 4 |
|---|--|
| <p>§257.73(g) stipulates:</p> <p><i>“(g) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(f), the notification requirements specified in §257.106(f), and the internet requirements specified in §257.107(f).”</i></p> | <p>Section 4.1 and 4.2</p>   |

## 1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (APTIM, f/k/a CB&I Environmental & Infrastructure, Inc., CB&I) has prepared the following History of Construction Report (Report) at the request of Westar Energy (Westar) for the inactive Ash Pond Area 2 (Area 2 Ponds), Ash Pond Area 3 (Area 3 Ponds), and the Scrubber Supply Pond (Area 4 Pond) located at the Lawrence Energy Center (LEC) in Lawrence, Kansas.

The Area 2, 3, and 4 Ponds have been deemed to be regulated, inactive CCR units by the United States Environmental Protection Agency (USEPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) 40 CFR §257 and §261. On July 26, 2016 the USEPA extended the CCR Rule requirements for certain inactive CCR surface impoundments. Westar is currently in the process of conducting closure by removal of CCR (per §257.100(b)) within the inactive Area 2, 3, and 4 Ponds to prepare for construction of a Kansas National Pollutant Discharge Elimination System (NPDES) regulated pond system. All facility water containing CCR material is managed in settling tanks. CCR material from the Area 2, 3, and 4 Ponds is being disposed of in Industrial Landfill No. 847. Westar intends to complete closure of the Area 2, 3, and 4 Ponds in 2018.

In support of compliance with the CCR Rule, APTIM has conducted an on-site inspection of the Area 2, 3, and 4 Ponds and reviewed the relevant portions of the facility's operating record, permit application, and historical documentation in relation to this Report. This Report meets the requirements set forth within 40 CFR §257.73(c)(1) and (c)(2), based on the review of available information.



## 2.0 AREA 2, AREA 3, AND AREA 4 PONDS OVERVIEW

Westar owns and operates a series of clarifying ponds for process water at LEC in Douglas County, Kansas. LEC is located approximately 3 miles northwest of Lawrence, Kansas, is bounded by the Kansas River and resides in Sections 13 and 14, Township 12 South, Range 19 East. The locations of the Area 2, Area 3, and Area 4 Ponds are depicted in **Figure 1**.

The ponds are separated into three “areas”, termed Areas 2, 3, and 4, as noted below:

### □ Area 2 Ponds

- Pond 501 (CCR removed and operating)
- Pond 502 (CCR removed and operating)
- Pond 503 (CCR removed and operating)
- Clear Pond (a.k.a. West Pond, CCR removed and operating)
- Laydown Area (in the process of being dewatered, CCR removed, and incorporated into the Storm Water Settling Pond)
- Storm Water Settling Pond (in the process of being dewatered and CCR removed)

### □ Area 3 Ponds

- Pond 401 (CCR removed and operating)
- Pond 402 (CCR removed and incorporated into Pond 404)
- Pond 403 (CCR removed and incorporated into Pond 404)
- Pond 404 (CCR removed and operating)

- Area 4 Pond – Scrubber Supply Pond (certified CCR removed in May 2017 and removed from service)

The Area 2, 3, and 4 Ponds are regulated impoundments under the CCR Rule and stopped receiving CCR prior to October 2015. Historically the Area 2, 3, and 4 Ponds received CCR material from the plant. The CCR material was deposited in the Area 2, 3, and 4 Ponds while overflow water was discharged to the Kansas River via Outfall 001BV, in line with Kansas NPDES Permit No. I-KS-31-PO09. As each pond was progressively filled, the ponds were dewatered and the CCR material was excavated and placed in Industrial Landfill No. 847. CCR material was distributed to different ponds within each area depending on the availability of capacity.

A perimeter impoundment dike was constructed to surround the LEC ponds and ties into the natural grades near the southern portion of the Area 2 Pond and the eastern portion of the Area 4 Pond. The crest of the perimeter dike is at approximately 839 feet Mean Sea Level (ft MSL) with side slopes at 3H:1V, providing a maximum height of 15 feet located in the northwest section. The crest width is approximately 30 feet. The perimeter dike was originally constructed of silty clay, which was obtained by excavation of existing grades in the area.

Currently a reconfiguration of the Area 2, 3, and 4 Ponds is being undertaken. With the Area 4 Pond closed, plant process water flows from the Area 2 Ponds (with the exception of Ponds 502 and 503) to the Area 3 Ponds prior to discharge to the Kansas River through Outfall 001BV. Site topography prior to closure of the Area 2, 3, and 4 Ponds is depicted in **Figure 2**.

### 3.0 HISTORY OF CONSTRUCTION

In accordance with §257.73(c)(1), the history of construction has been compiled from available information sources and is presented in the following subsections.

#### 3.1 Site Name and Ownership Information (§257.73(c)(1)(i))

Owner/Operator:

Westar Energy, Inc.  
818 S. Kansas Avenue  
Topeka, KS 66612

CCR Unit Name(s):

Area 2, 3, and 4 Ponds (all inactive units)

State CCR Identification Number:

Kansas Bureau of Waste Management Permit #0847, dated October 15, 2015.

#### 3.2 CCR Unit Location Map (§257.73(c)(1)(ii))

The location of the LEC and associated CCR Units (Area 2, Area 3, and Area 4 Ponds) are depicted on **Figure 1** and **Figure 2**.

#### 3.3 Statement of Purpose for CCR Unit (§257.73(c)(1)(iii))

The Area 2, 3, and 4 Ponds have been deemed to be regulated, inactive CCR units and have stopped receiving CCR prior to October 2015. Historically the Area 2, 3, and 4 Ponds received CCR material from the LEC plant, plant process water, and runoff. The CCR material traveled from the Area 2 Ponds and then to the Area 3 and 4 Ponds, before being discharged to the Kansas River via Outfall 001BV (Kansas NPDES Permit No. I-KS-31-PO09). As each pond was progressively filled, the ponds were dewatered and the CCR material was excavated and placed in the Industrial Landfill No. 847 and No. 600 (until 2012). CCR material was distributed to different ponds within each area depending on the availability of capacity.

Currently a reconfiguration of the Area 2, 3, and 4 Ponds is being undertaken. Closure construction of the Area 4 Pond (a.k.a. Scrubber Supply Pond) was completed in August 2016. Certification of closure activities are anticipated to conclude in 2018. Currently, plant process water flows from the Area 2 Ponds to the Area 3 Ponds prior to discharge to the Kansas River through Outfall 001BV. A generalized schematic flow diagram for the inactive CCR ponds is provided in **Appendix A**.

#### 3.4 Watershed Description (§257.73(c)(1)(iv))

The LEC, including the CCR Units are located within the *Lower Kansas Watershed* - 10270104 Hydrologic Unit Code (HUC), which has a total catchment area of 1,059,500 acres, and includes the counties of Atchison, Douglas, Jackson, Jefferson, Johnson, Leavenworth, Osage, Shawnee, Wabaunsee, and Wyandotte.

### **3.5 Description of Physical and Engineering Properties (§257.73(c)(1)(v))**

A perimeter impoundment dike surrounds the Areas 2, 3, and 4 Ponds. The perimeter dike area is approximately 1,100 feet in length. The inside and outside slopes of the perimeter dike embankments were designed to be 3H:1V however, some interior slopes have been previously reported as being steeper than 1H to 1V.

The physical and engineering properties of the perimeter dike foundation materials typically consists of silty clay. At construction, the silty clay materials were obtained from excavation of existing grades in the area. Surficial geologic deposits are sedimentary alluvial and low terrace deposits consisting of firm to stiff silty clays and/or clayey silts. Detailed sub-surface information can be found in the *Evaluation of Ash Pond Berm Stability Report; Lawrence Energy Center*, dated December 23, 2009. This report was completed by Golder Associates, Inc. at the request of Westar Energy, Inc. in response to a USEPA request for information.

### **3.6 Summary of Site Preparation/Construction Activities (§257.73(c)(1)(vi))**

According to available records reviewed, the Areas 2, 3, and 4 Ponds were constructed in phases between 1969 and 1976. The perimeter dike was constructed to tie into the natural grades near the southern portion of the Area 2 Ponds and the eastern portion of the Area 4 Pond. The original design crest elevation of the perimeter impoundment dike was 839 feet above mean sea level (MSL), and has a typical crest width of approximately 30 feet. The ponds are separated by internal dikes that were constructed to provide additional stilling areas that improve water quality prior to discharge. These internal dikes may contain historically beneficially reused CCRs.

Ash Pond 4 (Scrubber Supply Pond) was unlined at construction however closure of this former CCR unit was undertaken in August 2016, and closure was completed and certified in May 2017.

Clay liners were added in select Area 2 and 3 Ponds after CCR material clean-out in order for the continuation of non-CCR process water management. The extent of the clay liners would not be verified and therefore the ponds are considered to be unlined. Any in-place clay liners in the Area 2 and 3 Ponds will be removed during closure.

### **3.7 Engineering Diagram for CCR Impoundments (§257.73(c)(1)(vii))**

Available historical engineering diagrams for the inactive CCR units are provided in **Appendix B**. Additional engineering diagrams, including various cross sections through the inactive CCR units, which have been prepared as part of the initial pond closure design phase (Black & Veatch, January 2017) are included in **Appendix C**.

### **3.8 Description of Instrumentation (§257.73(c)(1)(viii))**

There are no instrumentation devices associated with the perimeter dike, impoundment embankments, or associated hydraulic structures at or near the Area 2, 3, and 4 Ponds.

### **3.9 Area-Capacity Curves for the CCR Units (§257.73(c)(1)(ix))**

Area/Capacity data for each CCR pond unit was calculated by APTIM utilizing the most recent topographic survey conducted by Professional Engineering Consultants (PEC) in 2016. The

Area/Capacity curves for each of the CCR pond units, with the exception of the Area Pond 4, are provided in **Appendix D**.

### **3.10 Spillway/Diversion Design Features and Capacity Calculations (§257.73(c)(1)(x))**

No spillways and/or other diversion design features are currently associated with the inactive CCR pond units. A former emergency overflow outlet structure was located within the northwest corner of the former Scrubber Supply Pond (Area 4 Pond). The overflow outlet discharged at the base of the northeastern slope of the perimeter dike. It has been previously reported that plant personnel believe the overflow structure had never been used.

### **3.11 Construction Specifications and Provisions for Surveillance, Maintenance/Repair (§257.73(c)(1)(xi))**

No construction specifications associated with the inactive CCR unit's initial construction were available for review.

Inspections of the perimeter and interior impoundment dikes are critical components and are conducted on a regular basis at the facility. Annual inspections are performed by a qualified professional engineer, and at least weekly by trained plant personnel. In addition, inspections are performed after unusual events such as storms. The inspections provide assurance that structures are sound and that action is taken, as needed, based on the findings.

Inspections are completed in accordance with the CCR Rule requirements. The most recent annual inspection was conducted in May 2017, and was completed in compliance with the frequency of inspection timeframe set forth in §257.83(b)(4). The most recent facility inspection report; *Annual Inspection Report, Lawrence Energy Center – Inactive Units – Ash Pond Area 2, Ash Pond Area 3, and Ash Pond 4*, dated June 2017, was completed by CB&I on behalf of Westar.

### **3.12 Known Records of Structural Instability (§257.73(c)(1)(xii))**

There are no records and/or known instances of structural instability associated with the inactive CCR Units.

## **4.0 RECORDS RETENTION AND MAINTENANCE**

### **4.1 Incorporation of Report into Operating Record (§257.73(g))**

§257.105(f) of 40 CFR Part §257 provides record keeping requirements to ensure that this Report will be placed in the facility's operating record. Specifically, §257.105(f) stipulates:

*§257.105(f): "(f) Design criteria. The owner or operator of a CCR unit subject to this subpart must place the following information, as it becomes available, in the facility's operating record: (9) The history of construction, and any revisions of it, as required by §257.73(c), except that these files must be maintained until the CCR unit completes closure of the unit in accordance with §257.102."*

This Report will be placed within the Facility Operating Record upon Westar's review and approval.

### **4.2 Notification Requirements (§257.73(g))**

§257.106(f) of 40 CFR Part §257 provides guidelines for the notification of the availability of the initial and periodic Report. Specifically, §257.106(f) stipulates:

*§257.106(f): "(f) Design criteria. The owner or operator of a CCR unit subject to this subpart must notify the State Director and/or appropriate Tribal authority when information has been placed in the operating record and on the owner or operator's publicly accessible internet site. The owner or operator must: (8) Provide notification of the availability of the history of construction, and any revision of it, specified under §257.105(f)(9)."*

The State Director and appropriate Tribal Authority will be notified upon placement of this Report in the Facility Operating Record.

§257.107(f) of 40 CFR Part §257 provides publicly accessible Internet site requirements to ensure that this Report is accessible through the Westar webpage. Specifically, §257.107(f) stipulates:

*§257.107(f): "(f) Design criteria. The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site: (8) The history of construction, and any revisions of it, specified under §257.105(f)(9)."*

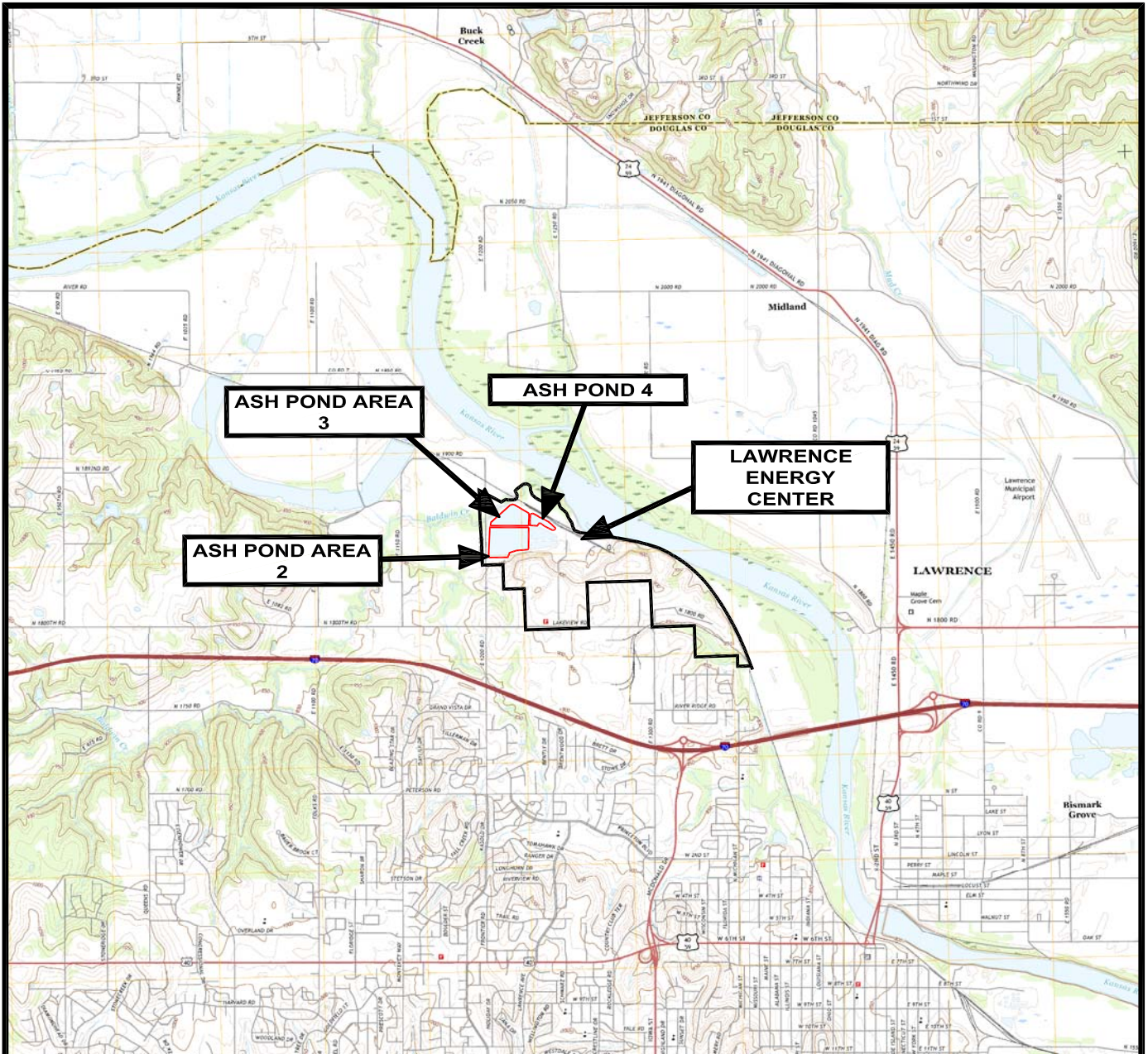
This Report will be uploaded to Westar's CCR Compliance Reporting Website upon Westar's review and approval.

### **4.3 Changes to History of Construction (§257.73(c)(2))**

The Report will be updated to reflect any significant changes to the history of construction information presented in Section 3.0. The update Report will then be placed in the facility's operating record as required by §257.105(f)(9), if applicable.

## FIGURES

- Figure 1 - Inactive Units – Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Location Plan
- Figure 2 - Inactive Units – Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Topography Prior to Closure



**LEGEND**

- LAWRENCE ENERGY CENTER FACILITY BOUNDARY
- CCR UNIT BOUNDARY

**NOTES**

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, LAWRENCE EAST, LAWRENCE WEST, MIDLAND AND WILLIAMSTOWN QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE.



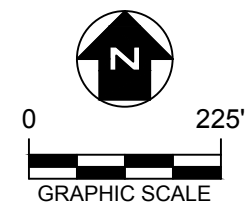
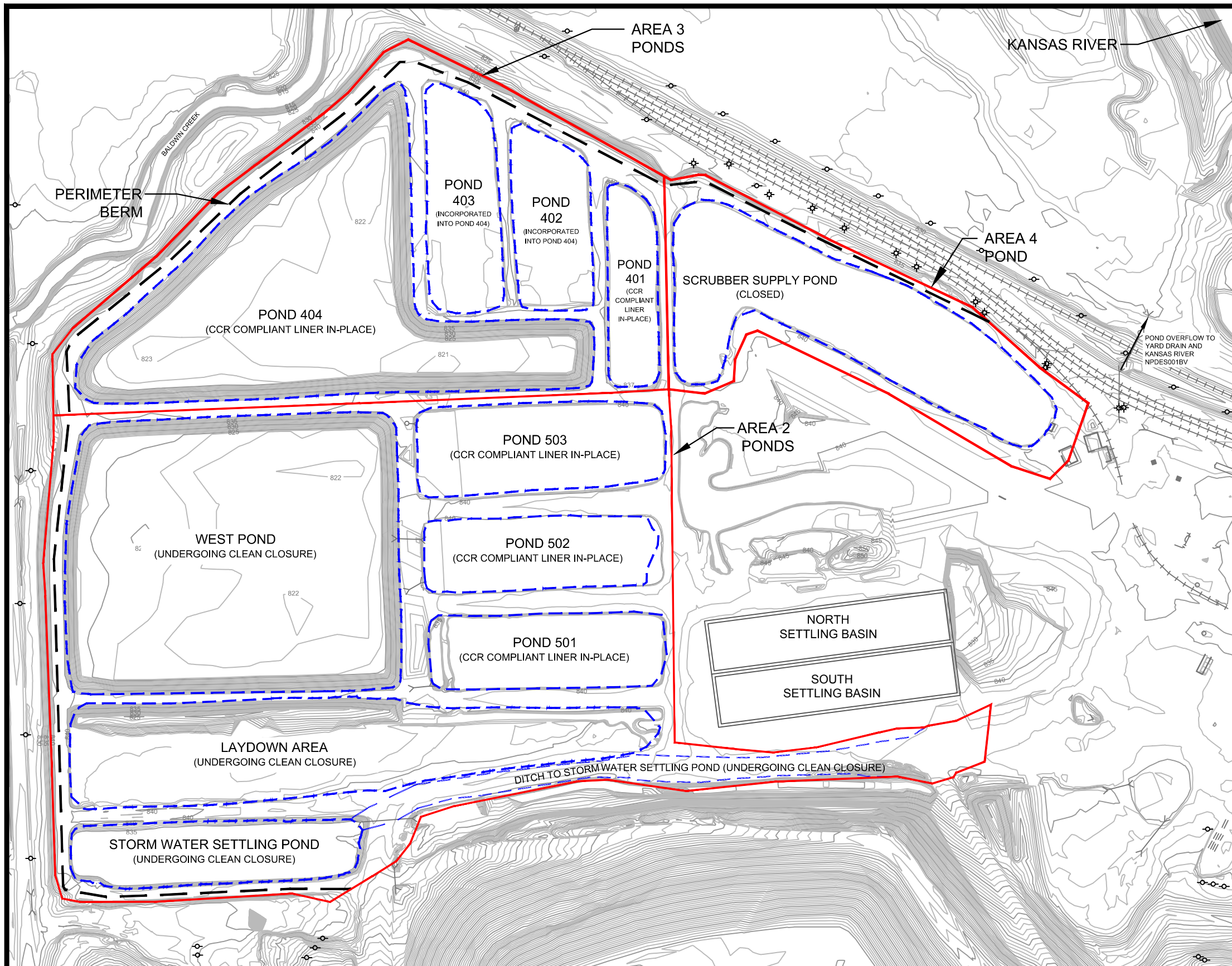
**APTIM Environmental & Infrastructure, Inc.**

APTIM Environmental & Infrastructure, Inc. has prepared this document for a specific project or purpose. All information contained within this document is copyrighted and remains intellectual property of APTIM Environmental & Infrastructure, Inc. This document may not be used or copied, in part or in whole, for any reason without expressed written consent by APTIM Environmental & Infrastructure, Inc.

**LAWRENCE ENERGY CENTER  
1250 N. 1800 RD., LAWRENCE, KS.**

**FIGURE 1  
INACTIVE UNITS - ASH POND AREA 2, ASH POND AREA 3, ASH POND 4  
SITE LOCATION PLAN**

|                  |                      |                  |
|------------------|----------------------|------------------|
| APPROVED BY: RDS | PROJ. NO.: 631232565 | DATE: APRIL 2018 |
|------------------|----------------------|------------------|



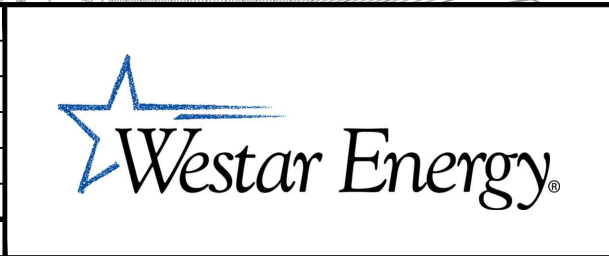

**LEGEND**

- APPROXIMATE POND AREA BOUNDARY
- - - APPROXIMATE POND BOUNDARY
- - - APPROXIMATE PERIMETER DIKE LOCATION

**NOTES**

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY PEC IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. ALL BOUNDARIES AND FEATURE LOCATIONS ARE APPROXIMATE.

| REV. NO. | DATE | DESCRIPTION |
|----------|------|-------------|
|          |      |             |
|          |      |             |
|          |      |             |

**APTIM Environmental & Infrastructure, Inc.**  
APTIM Environmental & Infrastructure, Inc. has prepared this document for a specific project or purpose. All information contained within this document is copyrighted and remains intellectual property of APTIM Environmental & Infrastructure, Inc. This document may not be used or copied, in part or in whole, or any reason without the expressed written consent by APTIM Environmental & Infrastructure, Inc.

**LAWRENCE ENERGY CENTER  
1250 N 1800 RD. LAWRENCE, KANSAS**

**FIGURE 2  
INACTIVE UNITS - ASH POND AREA 2, ASH POND AREA 3, ASH POND 4  
SITE TOPOGRAPHY PRIOR TO CLOSURE**

|           |     |              |     |            |           |       |            |
|-----------|-----|--------------|-----|------------|-----------|-------|------------|
| DRAWN BY: | ORC | APPROVED BY: | RDS | PROJ. NO.: | 631232565 | DATE: | APRIL 2018 |
|-----------|-----|--------------|-----|------------|-----------|-------|------------|

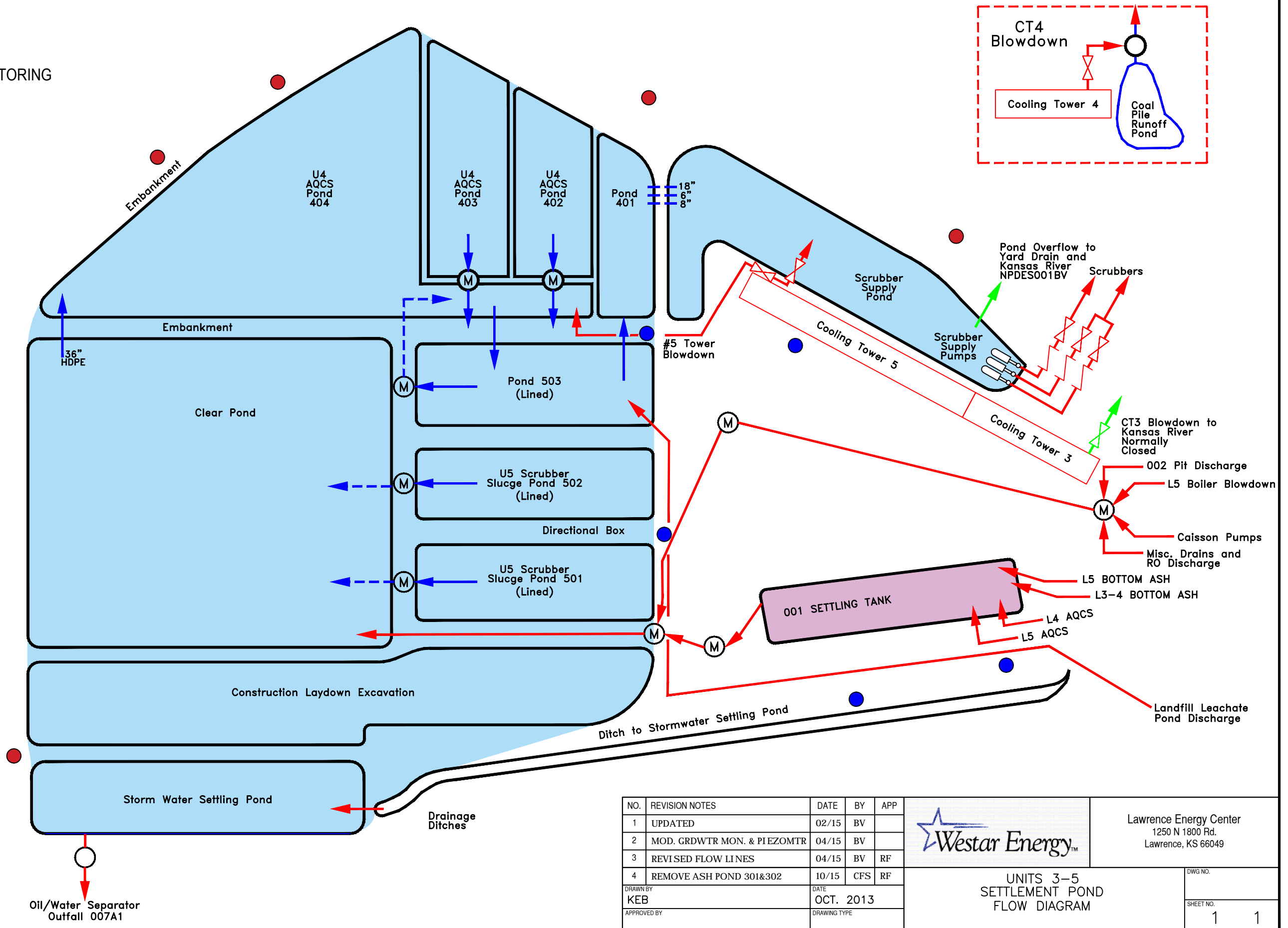


# APPENDICES

# APPENDIX A

## Settlement Pond Flow Diagram

- IN-ACTIVE POND
- CCR SETTLING TANKS
- GROUNDWATER MONITORING
- PIEZOMETER



| NO. | REVISION NOTES              | DATE  | BY  | APP |
|-----|-----------------------------|-------|-----|-----|
| 1   | UPDATED                     | 02/15 | BV  |     |
| 2   | MOD. GRDWTR MON. & PIEZOMTR | 04/15 | BV  |     |
| 3   | REVISED FLOW LINES          | 04/15 | BV  | RF  |
| 4   | REMOVE ASH POND 301&302     | 10/15 | CFS | RF  |

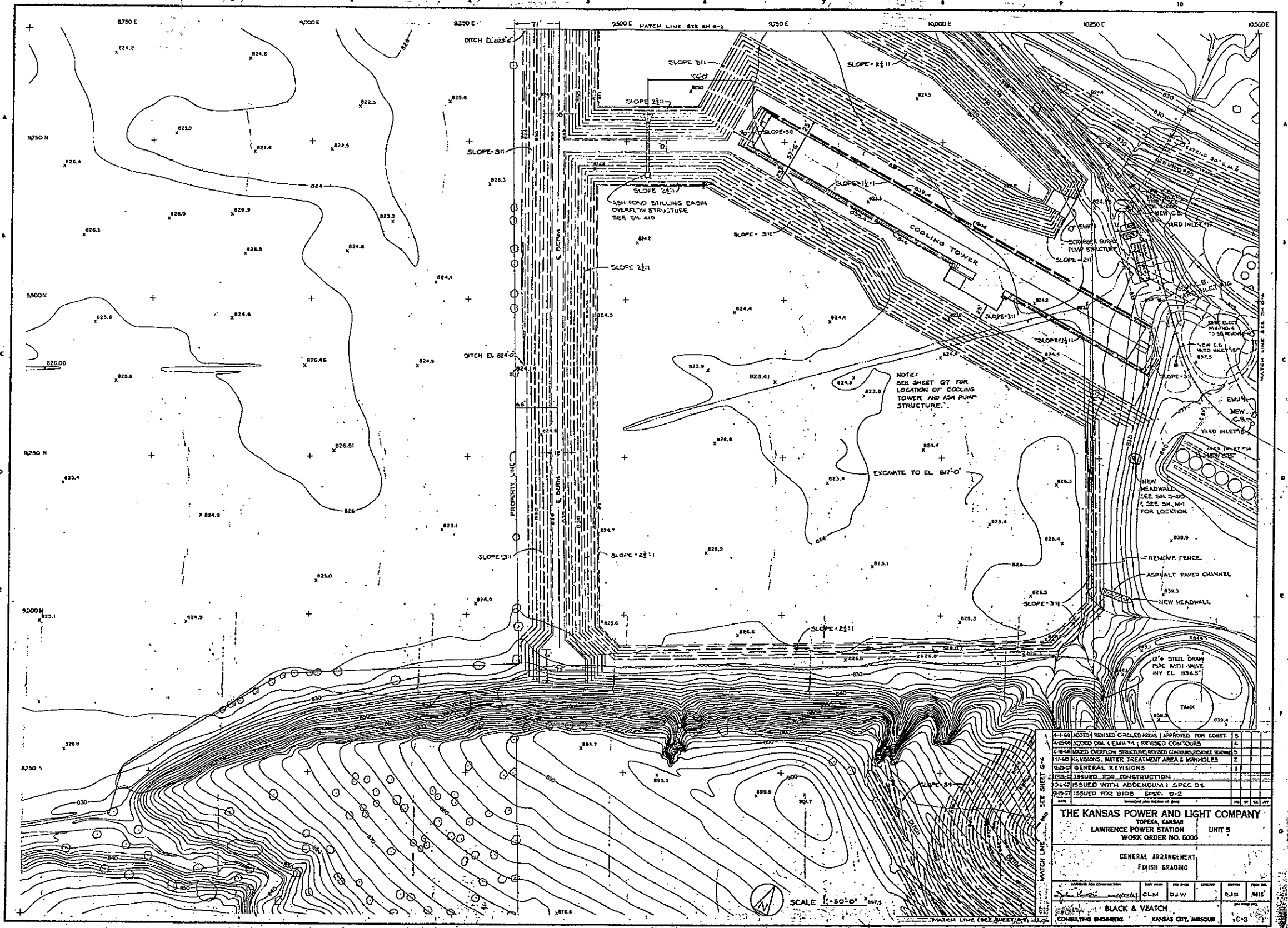


Lawrence Energy Center  
1250 N 1800 Rd.  
Lawrence, KS 66049

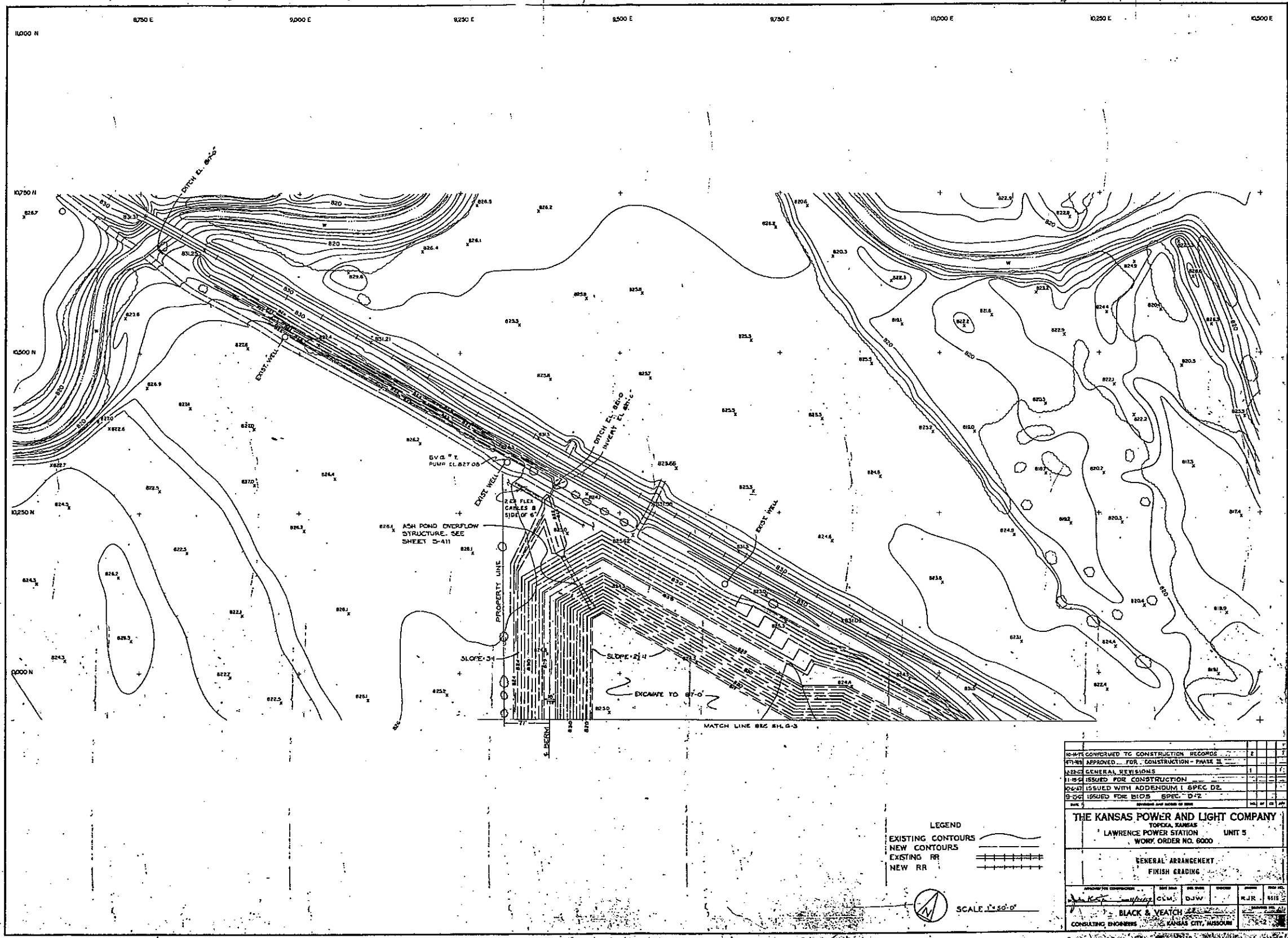
UNITS 3-5  
SETTLEMENT POND  
FLOW DIAGRAM

# APPENDIX B

## Historical Construction Diagrams for Inactive CCR Units



|   |                    |
|---|--------------------|
| 1-11 SHADDED REVISION CIRCLED AREAS APPROVED FOR CONST.   | 15                 |
| 4-15-64 ADDED DIM. 4 EACH "4"; REVISED CONTOURS   | 4                  |
| 2-15-64 ADDED OVERFLOW STRUCTURE, BODIED CONDUIT, PAVED HEADWALLS   | 2                  |
| 1-17-60 REVISIONS, WATER TREATMENT AREA & MANHOLES  | 2                  |
| 1-12-57 GENERAL REVISIONS   | 1                  |
| 1-15-57 ISSUED FOR CONSTRUCTION   |                    |
| 10-4-57 ISSUED WITH ADDENDUM 1 SPEC. D.2  |                    |
| 8-15-57 ISSUED FOR BIDS SPEC. D.2   |                    |
| <b>THE KANSAS POWER AND LIGHT COMPANY</b><br>TOPEKA, KANSAS<br>LAWRENCE POWER STATION UNIT 5<br>WORK ORDER NO. 5000 |                    |
| GENERAL ARRANGEMENT<br>FINISH GRADING   |                    |
| DESIGNED BY: CLM<br>CHECKED BY: B.J.W.<br>DRAWN BY: R.J.R.<br>DATE: 11/22/61  | SCALE: 1" = 50'-0" |
| <b>BLACK &amp; VEATCH</b><br>CONSULTING ENGINEERS<br>KANSAS CITY, MISSOURI  |                    |



LEGEND  
 EXISTING CONTOURS  
 NEW CONTOURS  
 EXISTING RR  
 NEW RR

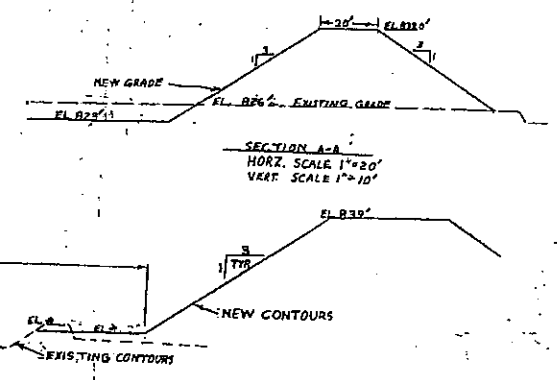
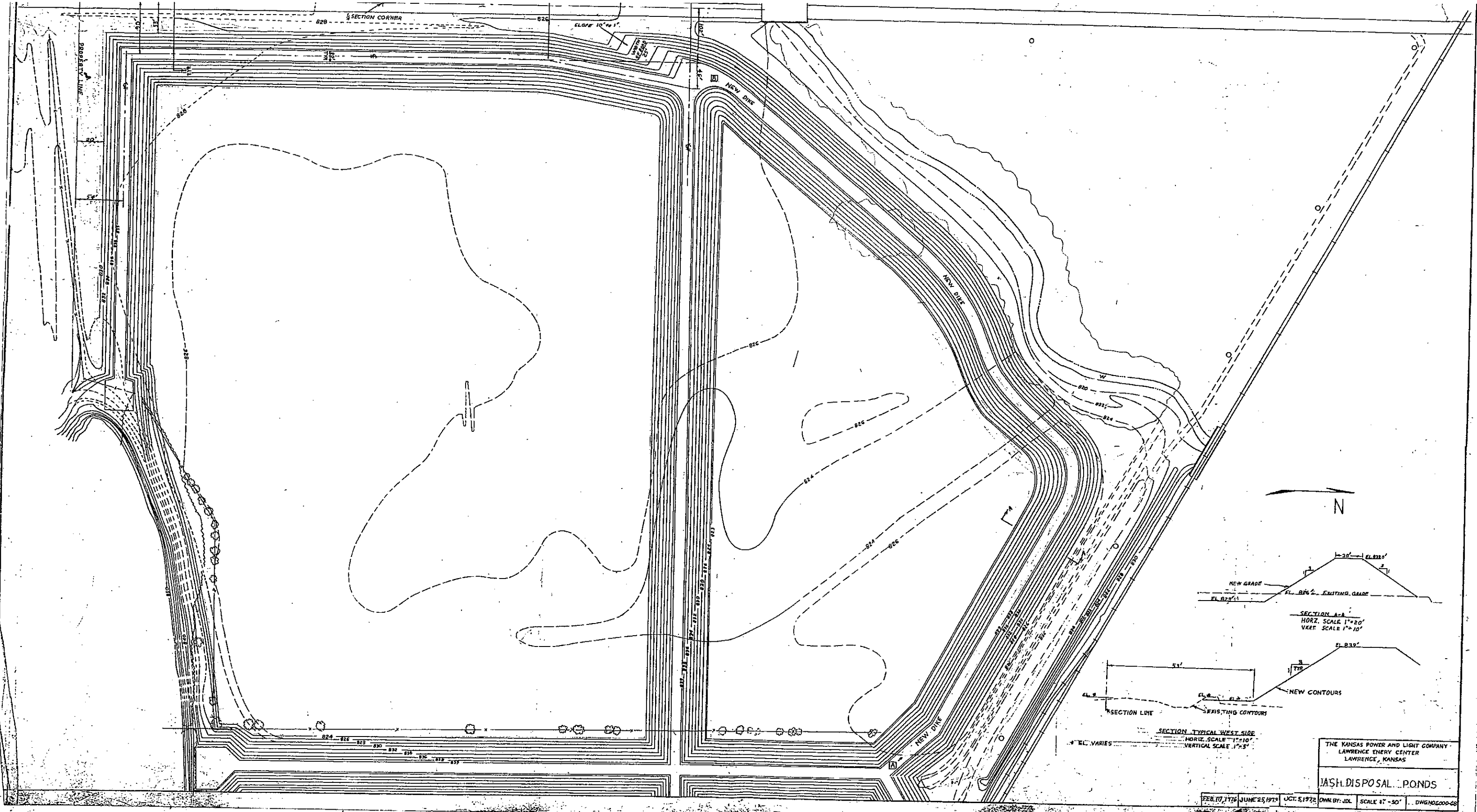
SCALE 1"=50' 0"

|   |   |   |
|---|---|---|
| 10-411 COVERED TO CONSTRUCTION RECORDS      | 2 | 1 |
| 47-411 APPROVED FOR CONSTRUCTION - PHASE II | 1 | 1 |
| 11-52 GENERAL REVISIONS                     | 1 | 1 |
| 11-52 ISSUED FOR CONSTRUCTION               | 1 | 1 |
| 05-67 ISSUED WITH ADDENDUM I SPEC. D2       | 1 | 1 |
| 9-00 ISSUED FOR BIDS SPEC. D-2              | 1 | 1 |
| DATE AND SCALE OF SHEET                     |   |   |

THE KANSAS POWER AND LIGHT COMPANY  
 TOPEKA, KANSAS  
 LAWRENCE POWER STATION UNIT 5  
 WORK ORDER NO. 6000

GENERAL ARRANGEMENT  
 FINISH GRADING

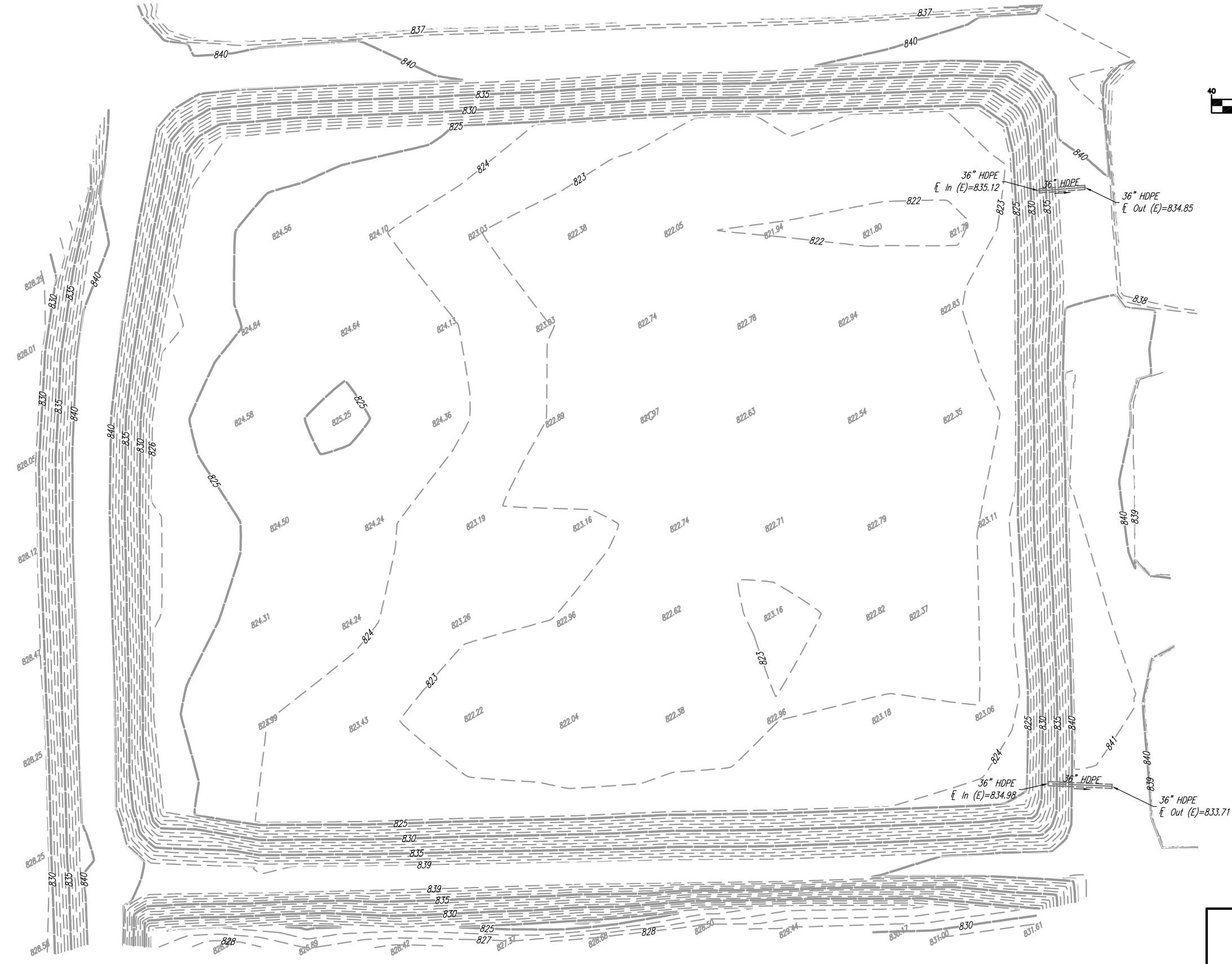
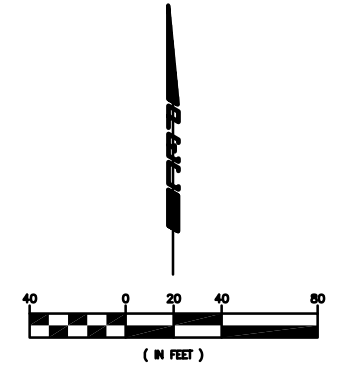
|   |                    |                    |         |
|---|--------------------|--------------------|---------|
| DESIGNED BY   | CHKD BY            | APP'D BY           | DATE    |
| <i>[Signature]</i>  | <i>[Signature]</i> | <i>[Signature]</i> | 8/11/51 |
| BLACK & VEATCH<br>CONSULTING ENGINEERS<br>KANSAS CITY, MISSOURI |                    |                    |         |



THE KANSAS POWER AND LIGHT COMPANY  
 LAWRENCE ENERGY CENTER  
 LAWRENCE, KANSAS

JASH DISPOSAL PONDS

FEB. 10, 1976    JUNE 25, 1976    OCT. 5, 1976    OWN. BY: JKL    SCALE 1" = 50'    DWG. NO. 6000-28



Lawrence Energy Center  
West Pond Exhibit

**Professional Engineering Consultants, P.A.**  
1263 SW. TOPEKA BLVD. • TOPEKA, KANSAS 66612  
785-233-8300 • FAX 785-233-8855

|                        |                         |                           |
|------------------------|-------------------------|---------------------------|
| Designed by <b>KAJ</b> | Job No. <b>0904-017</b> | Sht. <b>1</b> of <b>1</b> |
| Drawn by <b>CLM</b>    | Date <b>May 2011</b>    |                           |

Saved: 05-12-2011 8:22:58 AM by CLM  
 Plot Scale: 1:2 05-12-2011 8:24:43 AM by CLM L. McDONALD  
 F:\2009\0904-017\SURVEY\DWG\0904017S

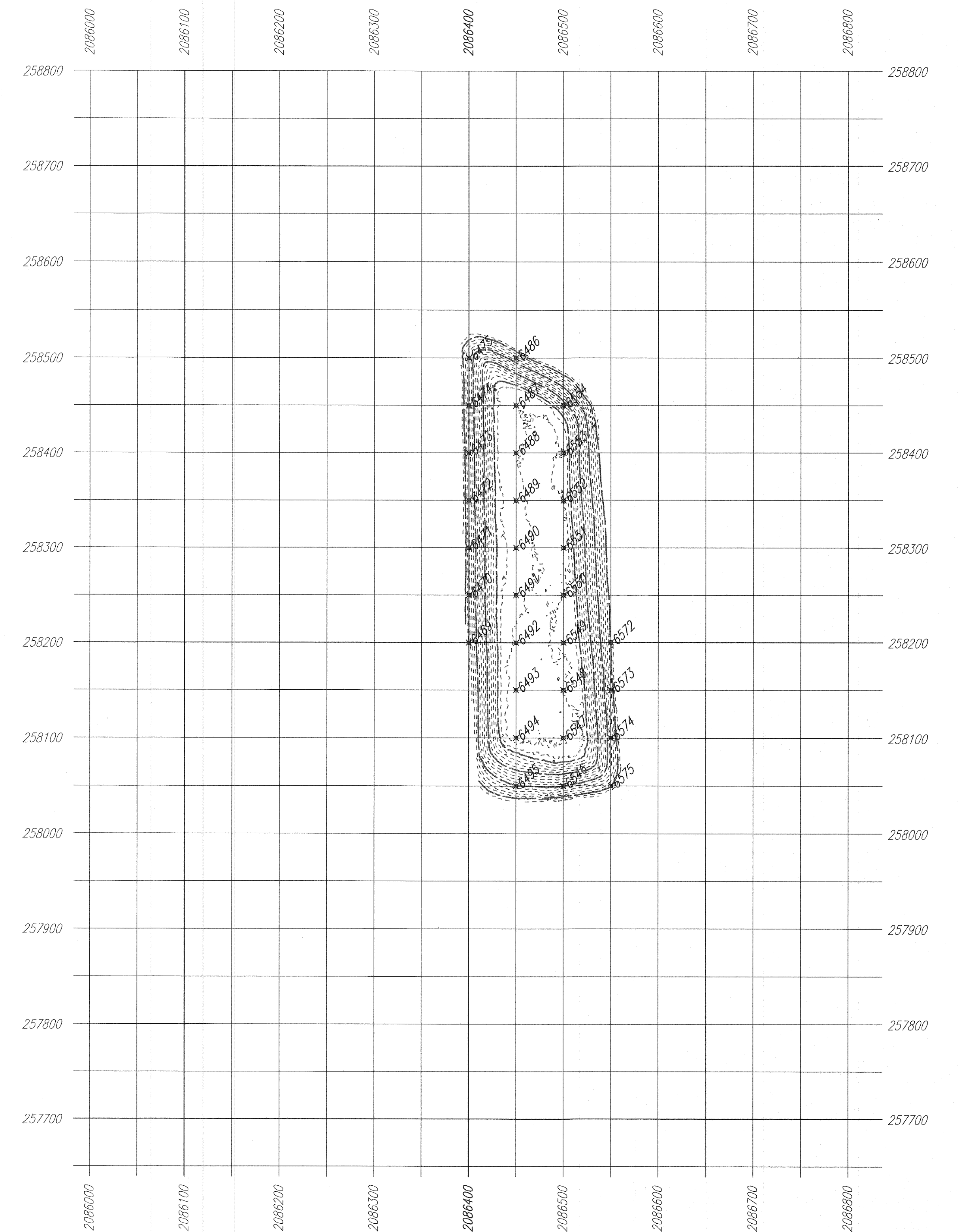


Sheet 04-10-2014 8:29:59 AM by LDS  
 Plot Date: 04-11-2014 8:22:31 AM by LDS, SUMMER  
 F:\2013\2401\003\SURVEY\DWG\Call 3 LEC AS-Built 2013-10-09\2401-003-LEC Pond 403 As-Built 04-07-2014

| Surface Report |          |         |                       |
|----------------|----------|---------|-----------------------|
| Point Number   | Northing | Easting | Clay Elevation (feet) |
| 6469           | 258200   | 2086400 | 838.83                |
| 6470           | 258250   | 2086400 | 838.39                |
| 6471           | 258300   | 2086400 | 838.56                |
| 6472           | 258350   | 2086400 | 838.03                |
| 6473           | 258400   | 2086400 | 837.87                |
| 6474           | 258450   | 2086400 | 837.44                |
| 6475           | 258500   | 2086400 | 837.05                |
| 6486           | 258500   | 2086450 | 837.19                |
| 6487           | 258450   | 2086450 | 823.06                |
| 6488           | 258400   | 2086450 | 823.21                |
| 6489           | 258350   | 2086450 | 823.41                |
| 6490           | 258300   | 2086450 | 823.60                |
| 6491           | 258250   | 2086450 | 823.32                |
| 6492           | 258200   | 2086450 | 822.90                |
| 6493           | 258150   | 2086450 | 822.30                |
| 6494           | 258100   | 2086450 | 822.58                |
| 6495           | 258050   | 2086450 | 835.35                |
| 6546           | 258050   | 2086500 | 835.06                |
| 6547           | 258100   | 2086500 | 822.80                |
| 6548           | 258150   | 2086500 | 822.94                |
| 6549           | 258200   | 2086500 | 823.10                |
| 6550           | 258250   | 2086500 | 822.99                |
| 6551           | 258300   | 2086500 | 822.73                |
| 6552           | 258350   | 2086500 | 822.95                |
| 6553           | 258400   | 2086500 | 822.95                |
| 6554           | 258450   | 2086500 | 828.52                |
| 6572           | 258200   | 2086550 | 840.16                |
| 6573           | 258150   | 2086550 | 838.77                |
| 6574           | 258100   | 2086550 | 836.78                |
| 6575           | 258050   | 2086550 | 839.90                |

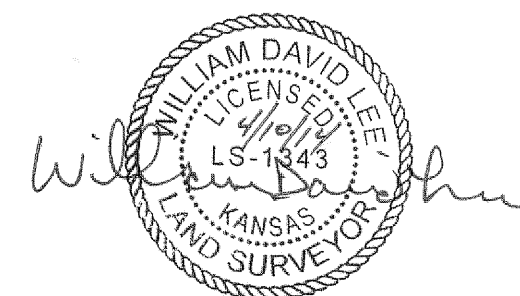
| Pipe Shots |         |                  |            |
|------------|---------|------------------|------------|
| Northing   | Easting | Elevation (feet) | Pipe       |
| 258428     | 2086530 | 838.56           | PVC FL 6"  |
| 258427     | 2086530 | 838.76           | PVC FL 6"  |
| 258040     | 2086485 | 837.74           | PVC FL 12" |
| 258007     | 2086486 | 837.73           | PVC FL 12" |

| Bottom of Clay |         |                  |          |
|----------------|---------|------------------|----------|
| Northing       | Easting | Elevation (feet) | Pot Hole |
| 258449         | 2086436 | 819.64           | NW       |
| 258434         | 2086493 | 820.15           | NE       |
| 258131         | 2086510 | 820.73           | SE       |
| 258129         | 2086443 | 820.02           | SW       |

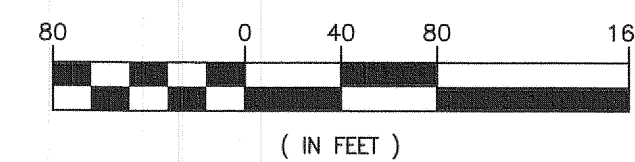


**SURVEYOR'S CERTIFICATION:**

We, Professional Engineering Consultants, P.A., a professional association authorized to practice Land Surveying in the State of Kansas, do hereby certify that on March 28, 2014 a survey was made under the direct supervision of the undersigned and, to the best of our knowledge and belief to be represented correctly as depicted hereon.



William David Lee, LS# 1343



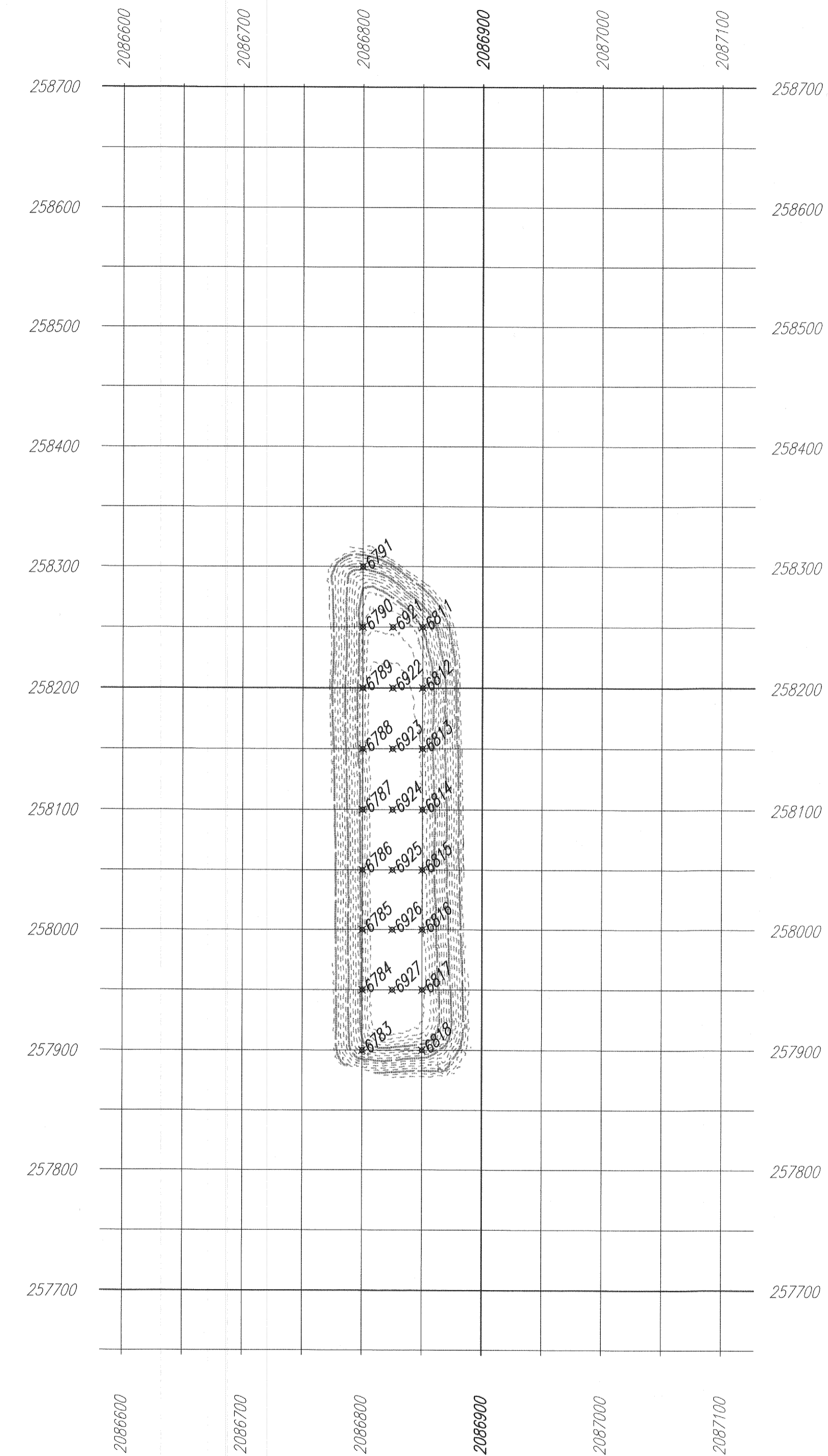
|   |          |         |             |
|---|----------|---------|-------------|
| No.   | Revision | By      | Date        |
| <b>LAWRENCE ENERGY CENTER<br/>ASH POND 403<br/>CLAY AS-BUILT</b>  |          |         |             |
| <b>Professional Engineering Consultants, P.A.</b><br>1263 SW TOPEKA BLVD. • TOPEKA, KANSAS 66612<br>783-233-8300 • FAX 783-233-8855 |          |         |             |
| Surveyor  | WDL      | Job No. | 14A19       |
| Drawn by  | LDS      | Date    | APRIL 2014  |
|   |          |         | Sht. 1 of 1 |

Sheet 06-13-2014 11:11:55 AM by LDS  
 Plot Scale 1:1 06-13-2014 11:22:02 AM by JSA SUMNER  
 U:\Topeka, 2014\14A19\00pp\Survey\Drawings\14A19-LEC\_Pond\_403\_As-Built\_06-10-2014

| Surface Report |          |         |                       |
|----------------|----------|---------|-----------------------|
| Point Number   | Northing | Easting | Clay Elevation (feet) |
| 6783           | 257900   | 2086800 | 831.93                |
| 6784           | 257950   | 2086800 | 829.26                |
| 6785           | 258000   | 2086800 | 829.19                |
| 6786           | 258050   | 2086800 | 829.08                |
| 6787           | 258100   | 2086800 | 828.79                |
| 6788           | 258150   | 2086800 | 828.23                |
| 6789           | 258200   | 2086800 | 828.13                |
| 6790           | 258250   | 2086800 | 828.67                |
| 6791           | 258300   | 2086800 | 836.12                |
| 6811           | 258250   | 2086850 | 830.55                |
| 6812           | 258200   | 2086850 | 826.71                |
| 6813           | 258150   | 2086850 | 826.55                |
| 6814           | 258100   | 2086850 | 825.77                |
| 6815           | 258050   | 2086850 | 825.93                |
| 6816           | 258000   | 2086850 | 825.89                |
| 6817           | 257950   | 2086850 | 825.79                |
| 6818           | 257900   | 2086850 | 832.21                |
| 6921           | 258250   | 2086825 | 827.27                |
| 6922           | 258200   | 2086825 | 825.54                |
| 6923           | 258150   | 2086825 | 825.26                |
| 6924           | 258100   | 2086825 | 825.29                |
| 6925           | 258050   | 2086825 | 825.31                |
| 6926           | 258000   | 2086825 | 825.25                |
| 6927           | 257950   | 2086825 | 825.26                |

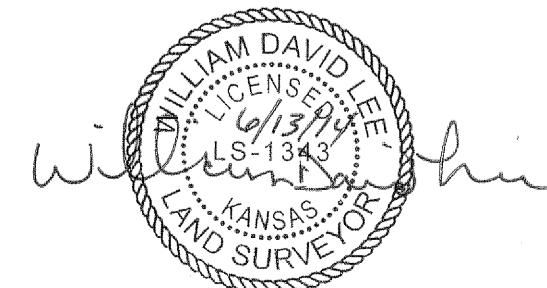
| Bottom of Clay |         |                  |          |
|----------------|---------|------------------|----------|
| Northing       | Easting | Elevation (feet) | Pot Hole |
| 258232         | 2086841 | 825.17           | N        |
| 257923         | 2086842 | 824.20           | S        |

| Pipe Shots |         |                  |                |
|------------|---------|------------------|----------------|
| Northing   | Easting | Elevation (feet) | Pipe           |
| 257904     | 2086863 | 835.79           | CMP FL 30"     |
| 257902     | 2086804 | 834.31           | IRON FL 12"    |
| 258166     | 2086868 | 835.97           | PLASTIC FL 21" |
| 258179     | 2086864 | 834.11           | PVC FL 12"     |
| 258189     | 2086864 | 835.11           | PVC FL 12"     |

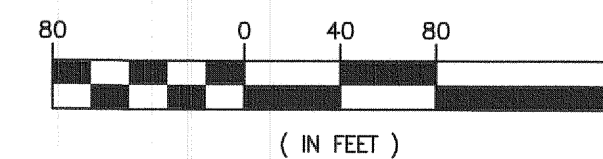


**SURVEYOR'S CERTIFICATION:**

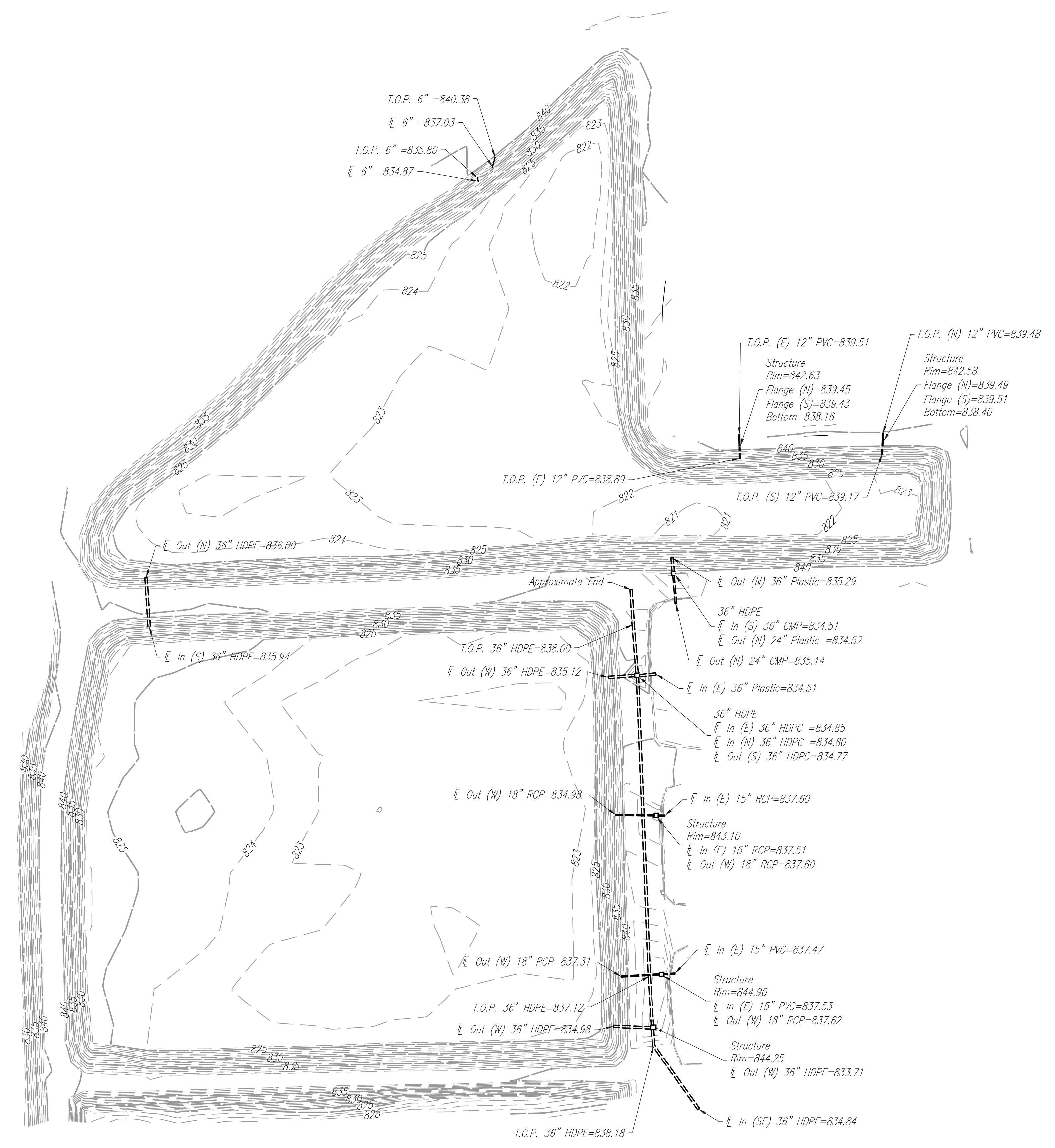
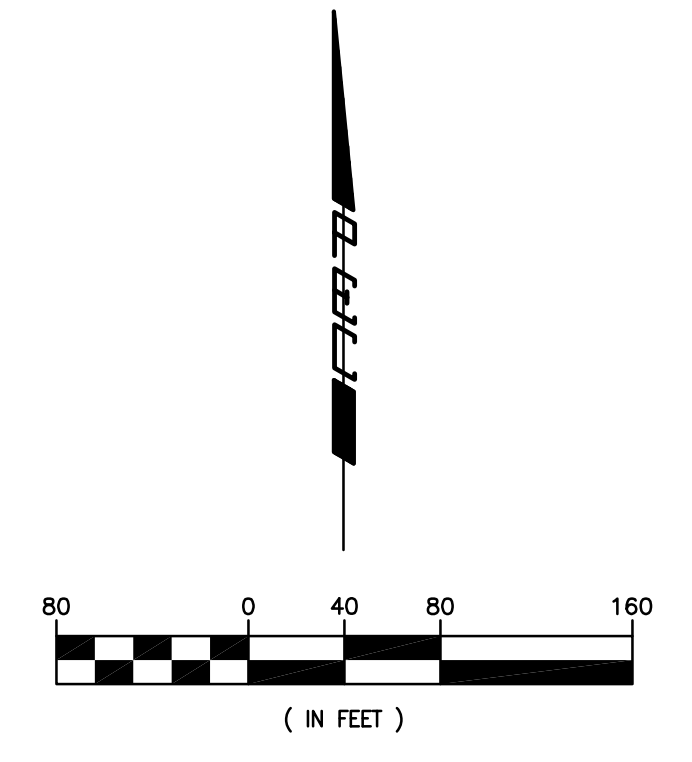
We, Professional Engineering Consultants, P.A., a professional association authorized to practice Land Surveying in the State of Kansas, do hereby certify that on June 9, 2014 a survey was made under the direct supervision of the undersigned and, to the best of our knowledge and belief to be represented correctly as depicted hereon.



William David Lee, LS# 1343



|   |          |         |             |
|---|----------|---------|-------------|
| No.   | Revision | By      | Date        |
| <b>LAWRENCE ENERGY CENTER<br/>ASH POND 401<br/>CLAY AS-BUILT</b>  |          |         |             |
| <b>Professional Engineering Consultants, P.A.</b><br>1263 S.W. TOPEKA BLVD. • TOPEKA, KANSAS 66612<br>785-233-8300 • FAX 785-233-8855 |          |         |             |
| Surveyor  | WDL      | Job No. | 14A19       |
| Drawn by  | LDS      | Date    | JUNE 2014   |
|   |          |         | Sht. 1 of 1 |

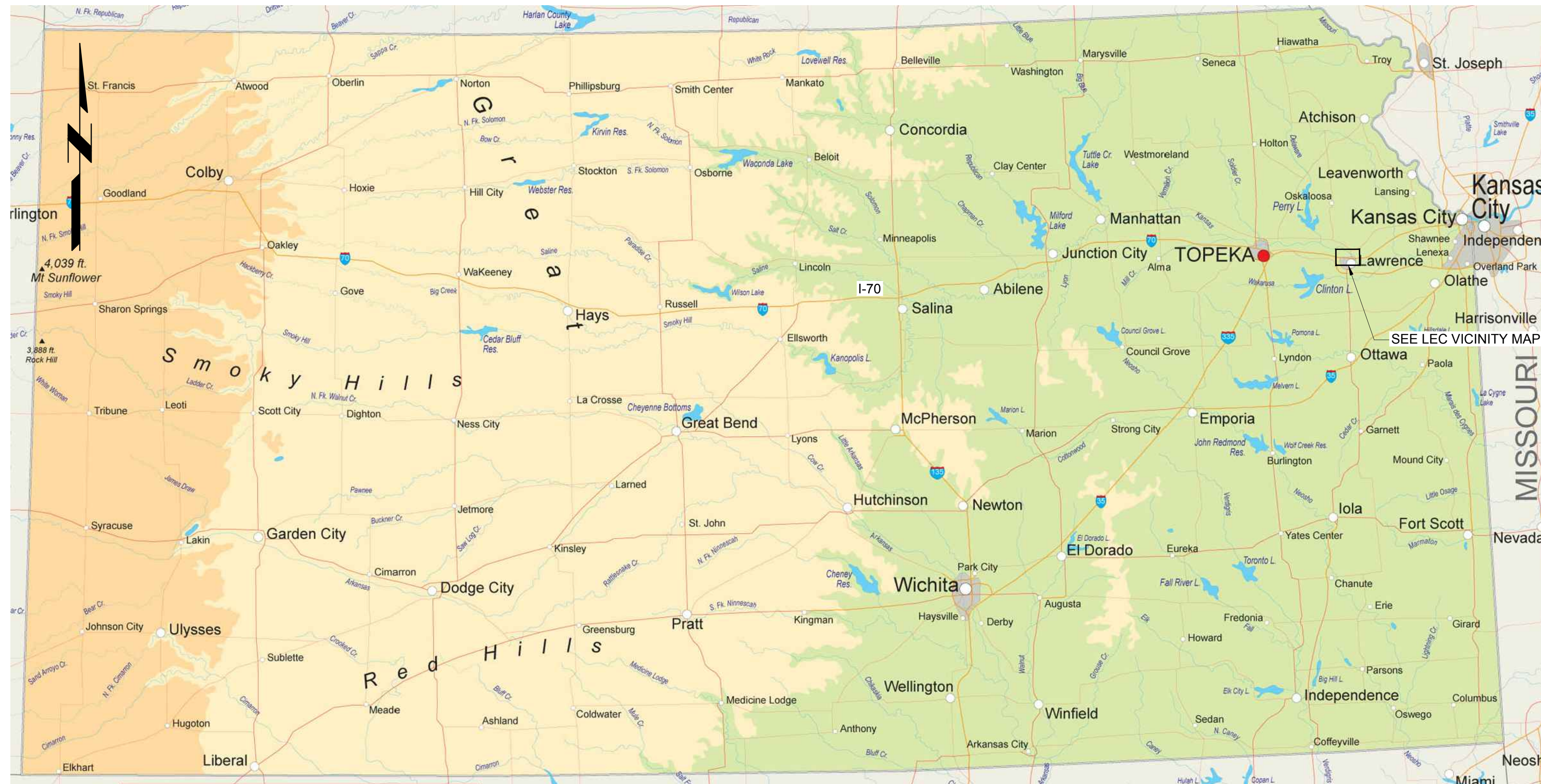


Saved 10-22-2012 8:30:56 AM by CLM  
 Plot Scale 1:1 10-22-2012 8:31:16 AM by GUYE, L. MCDONALD  
 P:\2008\09A04-017\SURVEY\DWG\Exam\LEC West Pond Exhibit

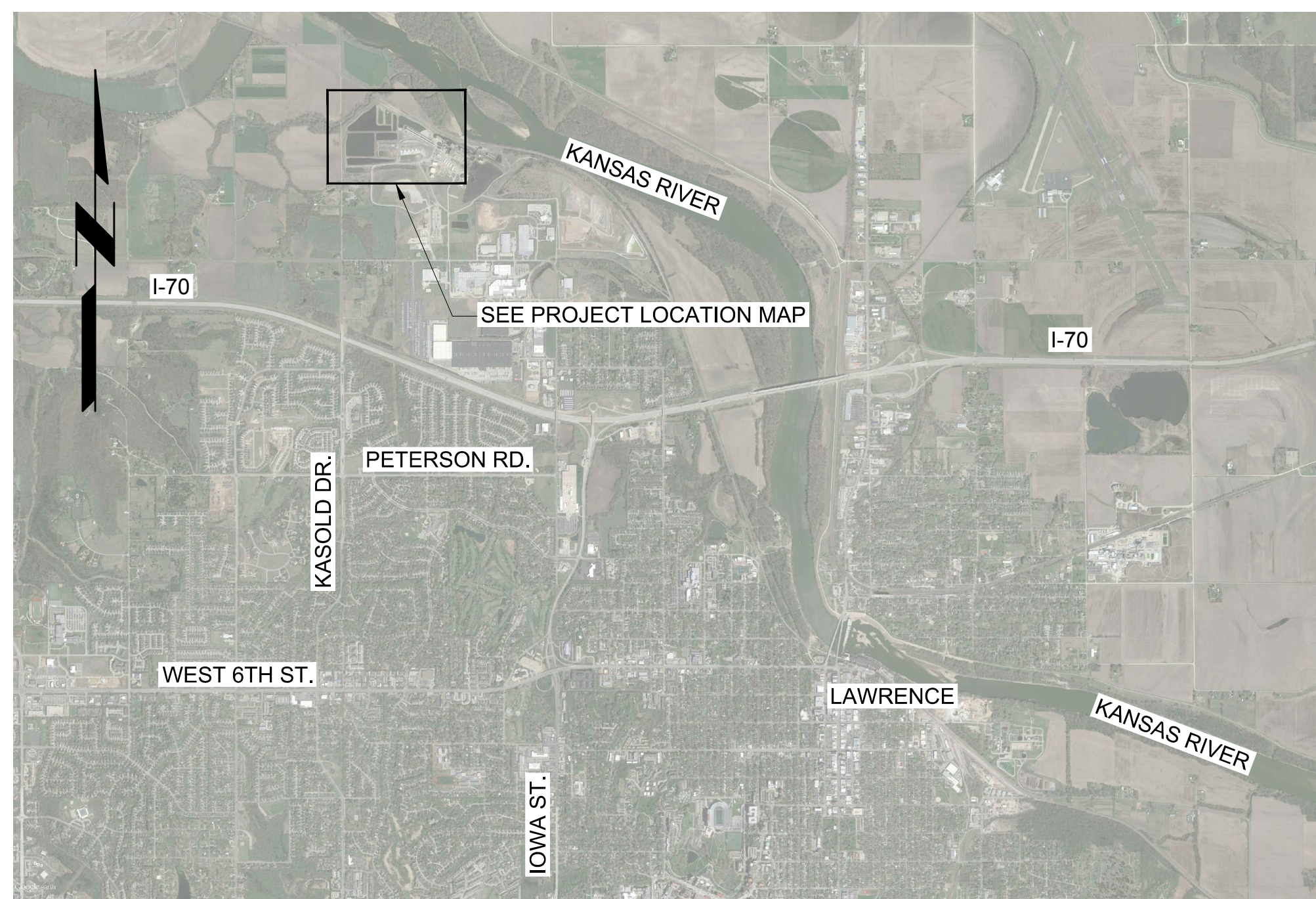
|  |                          |             |
|--|--------------------------|-------------|
| <b>Lawrence Energy Center<br/>West Pond Exhibit</b>  |                          |             |
| <b>Professional Engineering Consultants, P.A.</b><br><small>1263 SW TOPEKA BLVD. • TOPEKA, KANSAS 66612<br/>         785-233-8300 • FAX 785-233-8855</small> |                          |             |
| Designed by <b>KAJ</b>   | Job No. <b>09A04-017</b> | Sht. 1 of 1 |
| Drawn by <b>CLM</b>  | Date <b>October 2012</b> |             |

# APPENDIX C

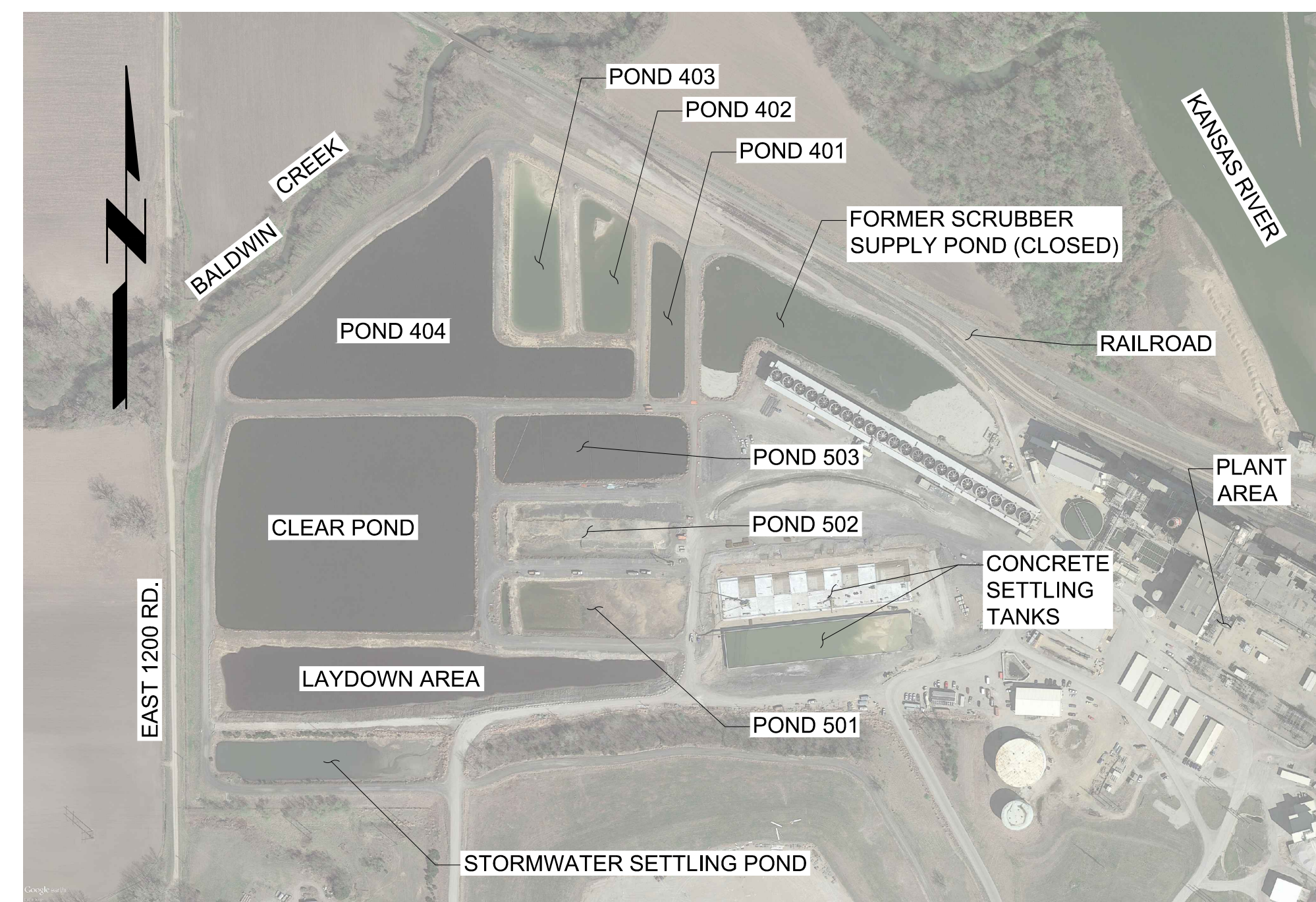
## Construction Diagrams & Cross-Sections for Closure of Inactive CCR Units



**OVERALL MAP**  
NOT TO SCALE



**LEC VICINITY MAP**  
NOT TO SCALE



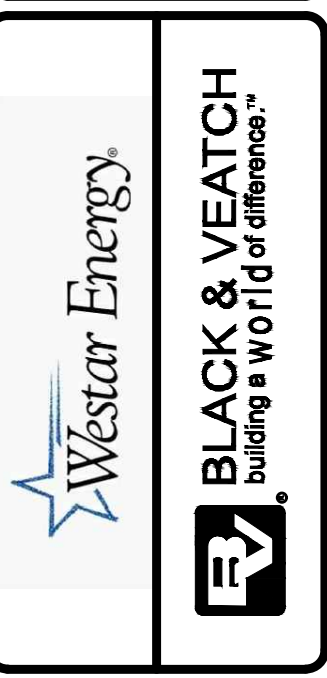
**PROJECT LOCATION MAP**  
NOT TO SCALE

100% DESIGN  
**FINAL**  
ISSUED FOR CONSTRUCTION  
DATE OF ISSUE 01/26/2017

| Rev. | Description | Date | Appr. |
|------|-------------|------|-------|
| 16   |             |      |       |
| 15   |             |      |       |
| 14   |             |      |       |
| 13   |             |      |       |
| 12   |             |      |       |
| 11   |             |      |       |
| 10   |             |      |       |
| 9    |             |      |       |

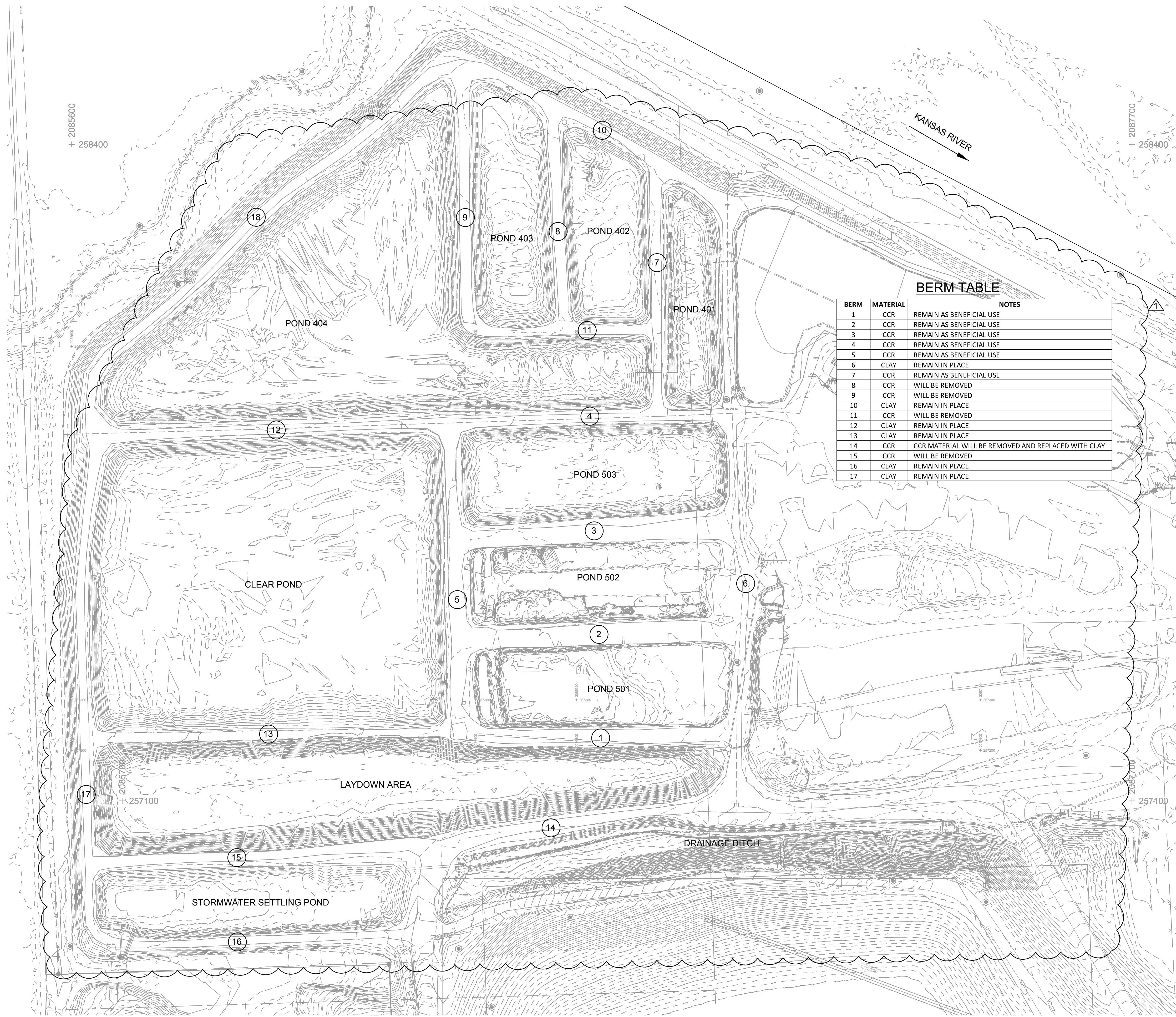
| Rev. | Description | Date | Appr. |
|------|-------------|------|-------|
| 8    |             |      |       |
| 7    |             |      |       |
| 6    |             |      |       |
| 5    |             |      |       |
| 4    |             |      |       |
| 3    |             |      |       |
| 2    |             |      |       |
| 1    |             |      |       |

|                   |                  |
|-------------------|------------------|
| Date: 12/16/2016  | Designed by: JJB |
| Drawn by: MJF     | Check by: TFP    |
| Submitted by: CDH | File Name:       |



WESTAR ENERGY  
LAWRENCE ENERGY CENTER  
LOCATION AND VICINITY MAP

DRAWING NO.  
**G-101**



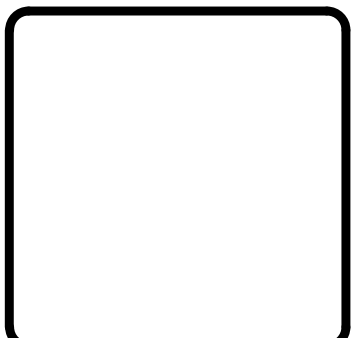
**BERM TABLE**

| BERM | MATERIAL | NOTES   |
|------|----------|---|
| 1    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 2    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 3    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 4    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 5    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 6    | CLAY     | REMAIN IN PLACE                                     |
| 7    | CCR      | REMAIN AS BENEFICIAL USE                            |
| 8    | CCR      | WILL BE REMOVED                                     |
| 9    | CCR      | WILL BE REMOVED                                     |
| 10   | CLAY     | REMAIN IN PLACE                                     |
| 11   | CCR      | WILL BE REMOVED                                     |
| 12   | CLAY     | REMAIN IN PLACE                                     |
| 13   | CLAY     | REMAIN IN PLACE                                     |
| 14   | CCR      | CCR MATERIAL WILL BE REMOVED AND REPLACED WITH CLAY |
| 15   | CCR      | WILL BE REMOVED                                     |
| 16   | CLAY     | REMAIN IN PLACE                                     |
| 17   | CLAY     | REMAIN IN PLACE                                     |

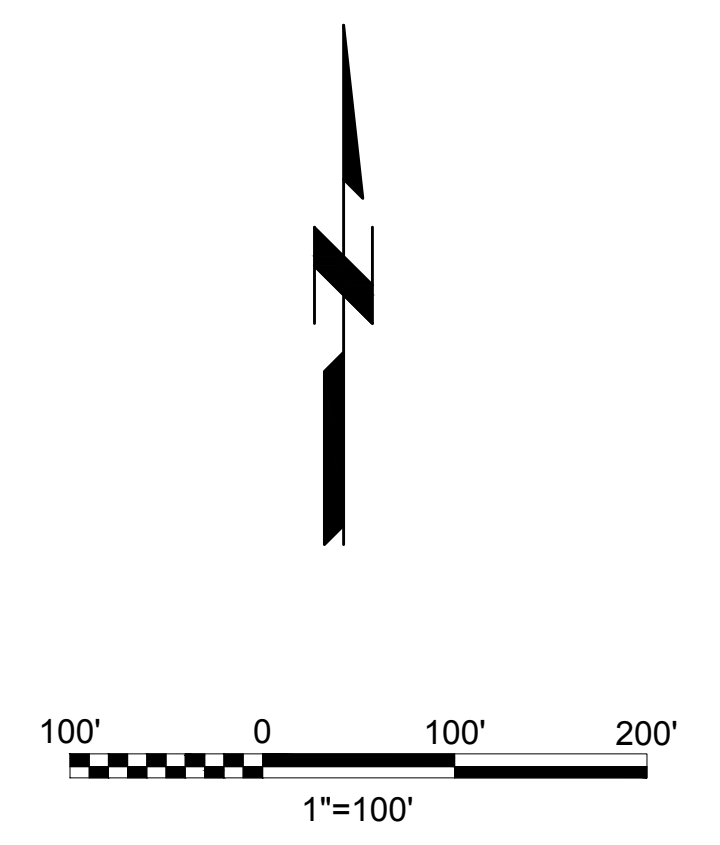
**NOTES:**

- SEE SHEETS G-102 AND G-103 FOR GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
- SEE SHEET V-100 FOR PROJECT SURVEY CONTROL PLAN.
- SEE SHEET C-010 FOR CONSTRUCTION LIMITS.
- SEE SHEETS C-100 THROUGH C-115 FOR SITE PLANS.
- PLANS REFLECT COMPLETION OF ALL PHASES OF CONSTRUCTION.

| Date       | Designed by:  | Rev. | Description                                   |
|------------|---------------|------|---|
| 12/16/2016 | JDB           | 8    |   |
|            | Check by:     | 7    |   |
|            | TFP           | 6    |   |
|            | MJF           | 5    |   |
|            | Submitted by: | 4    |   |
|            | CDH           | 3    |   |
|            | File Name:    | 2    |   |
|            |               | 1    | STORM POND MOD & KDHE COMMENTS (04/28/17) CDH |

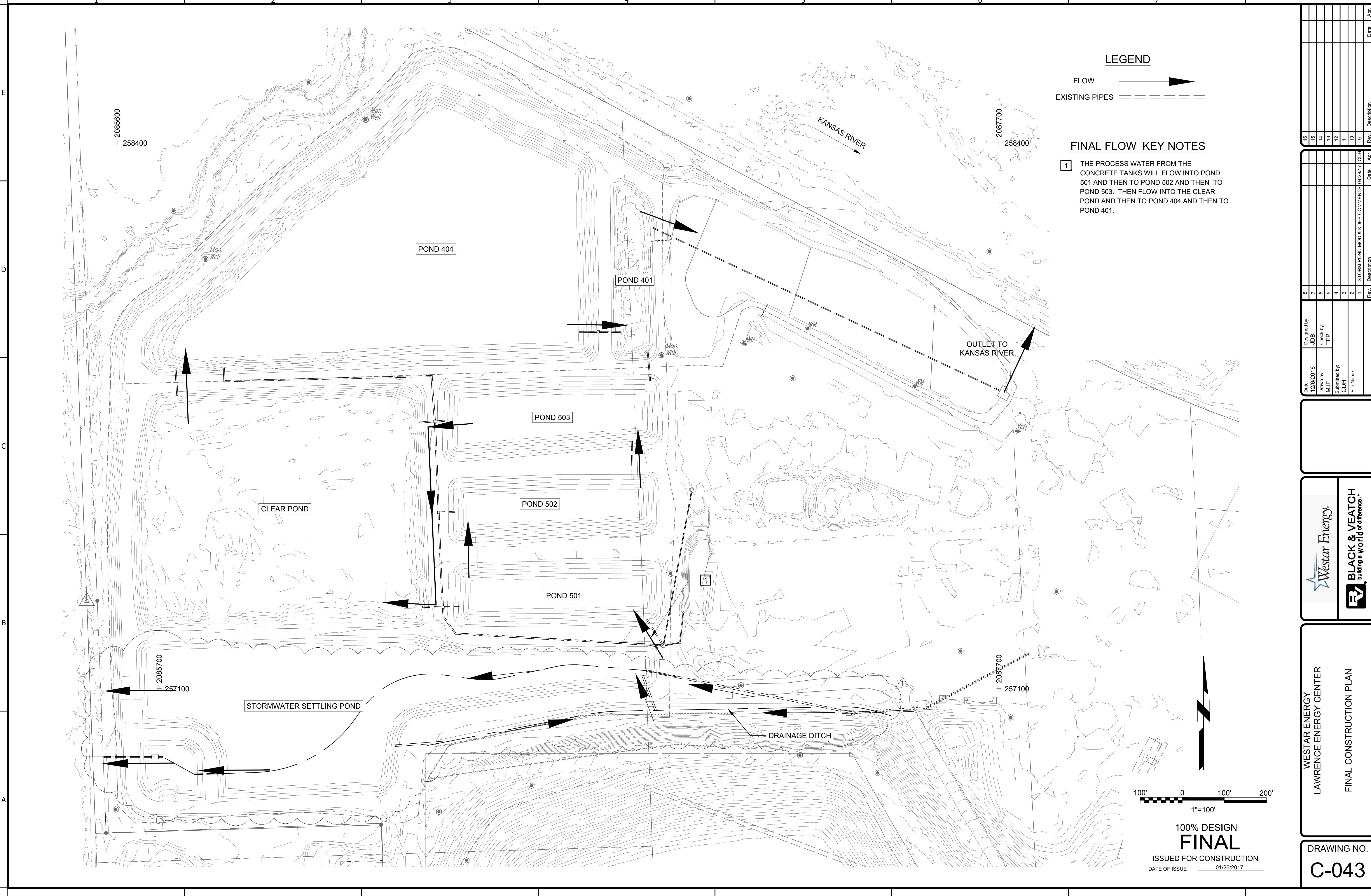


WESTAR ENERGY  
LAWRENCE ENERGY CENTER  
CCR AND CLAY BERM LOCATIONS



100% DESIGN  
**FINAL**  
ISSUED FOR CONSTRUCTION  
DATE OF ISSUE 01/26/2017

DRAWING NO.  
**C-032**



**LEGEND**

FLOW

EXISTING PIPES

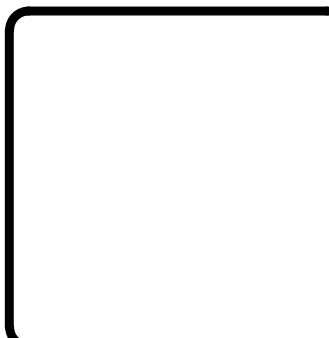
**FINAL FLOW KEY NOTES**

- 1 THE PROCESS WATER FROM THE CONCRETE TANKS WILL FLOW INTO POND 501 AND THEN TO POND 502 AND THEN TO POND 503. THEN FLOW INTO THE CLEAR POND AND THEN TO POND 404 AND THEN TO POND 401.

| Rev. | Description | Date | Appr. |
|------|-------------|------|-------|
| 16   |             |      |       |
| 15   |             |      |       |
| 14   |             |      |       |
| 13   |             |      |       |
| 12   |             |      |       |
| 11   |             |      |       |
| 10   |             |      |       |
| 9    |             |      |       |

| Rev. | Description                      | Date     | Appr. |
|------|----------------------------------|----------|-------|
| 8    |                                  |          |       |
| 7    |                                  |          |       |
| 6    |                                  |          |       |
| 5    |                                  |          |       |
| 4    |                                  |          |       |
| 3    |                                  |          |       |
| 2    | 1 STORM POND MOD & KDHE COMMENTS | 04/28/17 | CDH   |

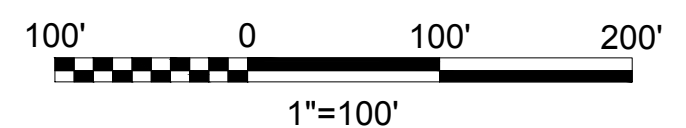
|               |            |              |     |
|---------------|------------|--------------|-----|
| Date:         | 12/16/2016 | Designed by: | JDB |
| Drawn by:     | MJF        | Check by:    | TJP |
| Submitted by: | CDH        | File Name:   |     |



**WESTAR ENERGY**  
 LAWRENCE ENERGY CENTER  
**BLACK & VEATCH**  
 building a world of difference.™

**WESTAR ENERGY**  
 LAWRENCE ENERGY CENTER  
**FINAL CONSTRUCTION PLAN**

DRAWING NO.  
**C-043**



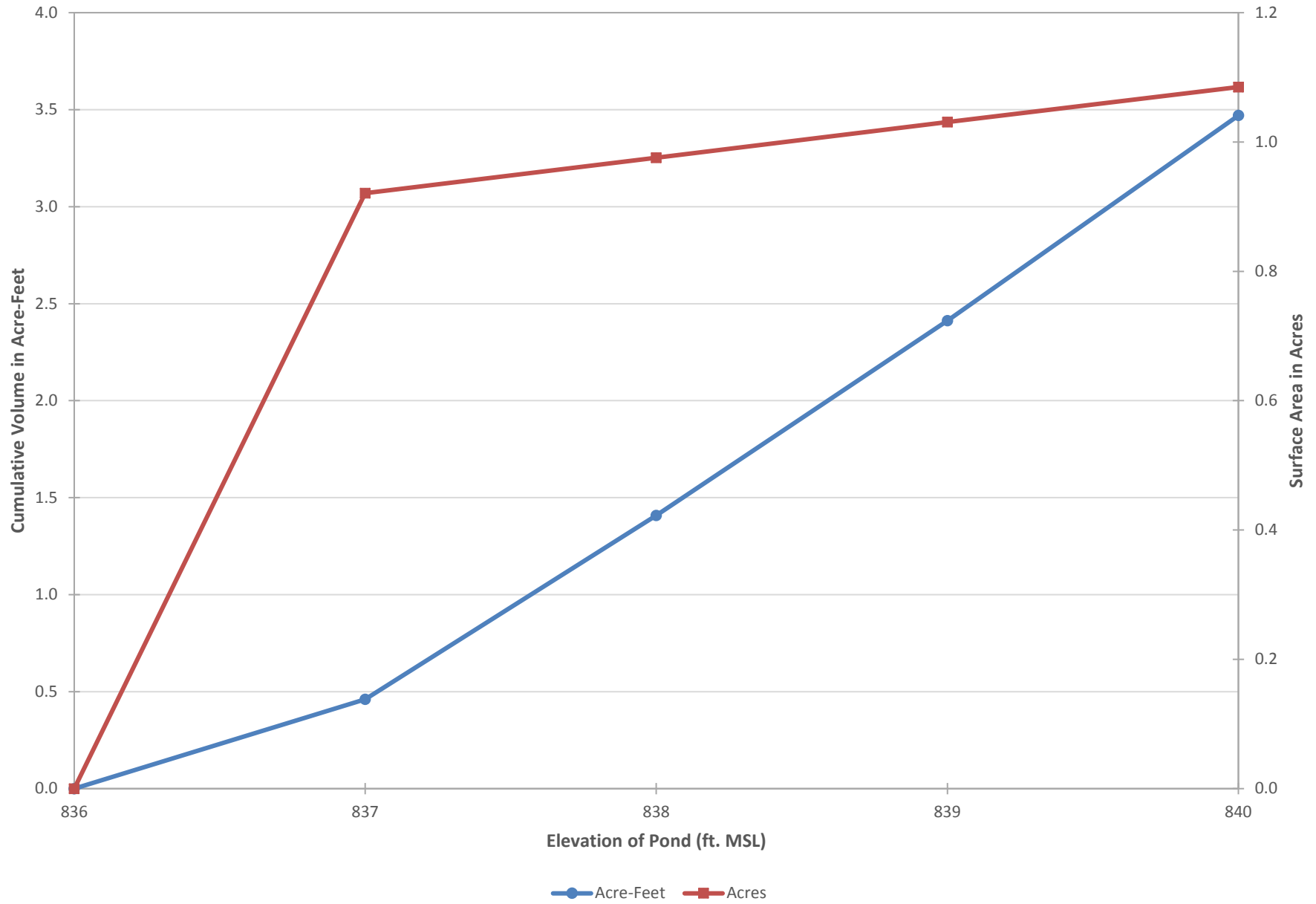
**100% DESIGN**  
**FINAL**  
 ISSUED FOR CONSTRUCTION  
 DATE OF ISSUE 01/26/2017

# APPENDIX D

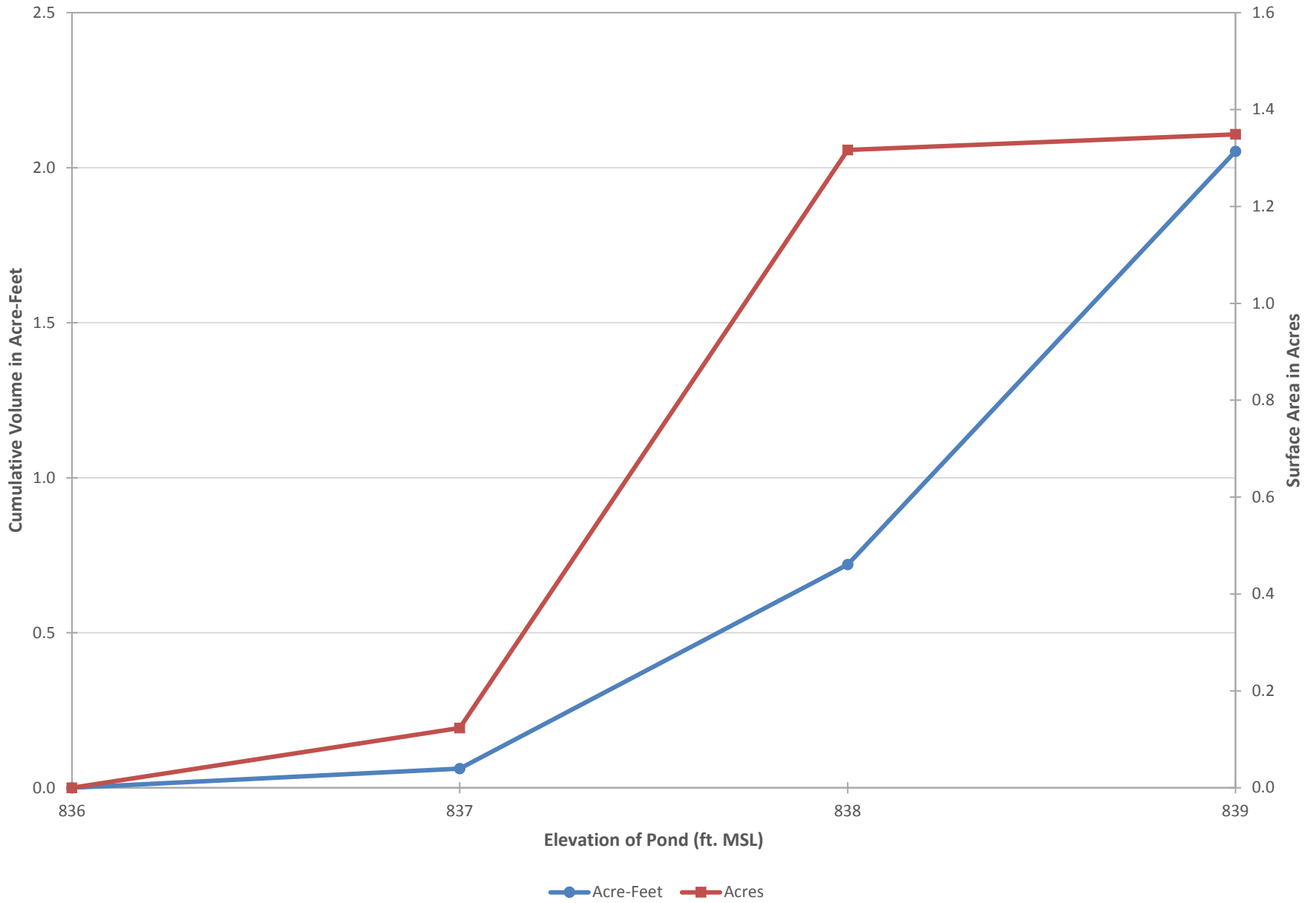
## Area-Capacity Curves for Inactive CCR Units



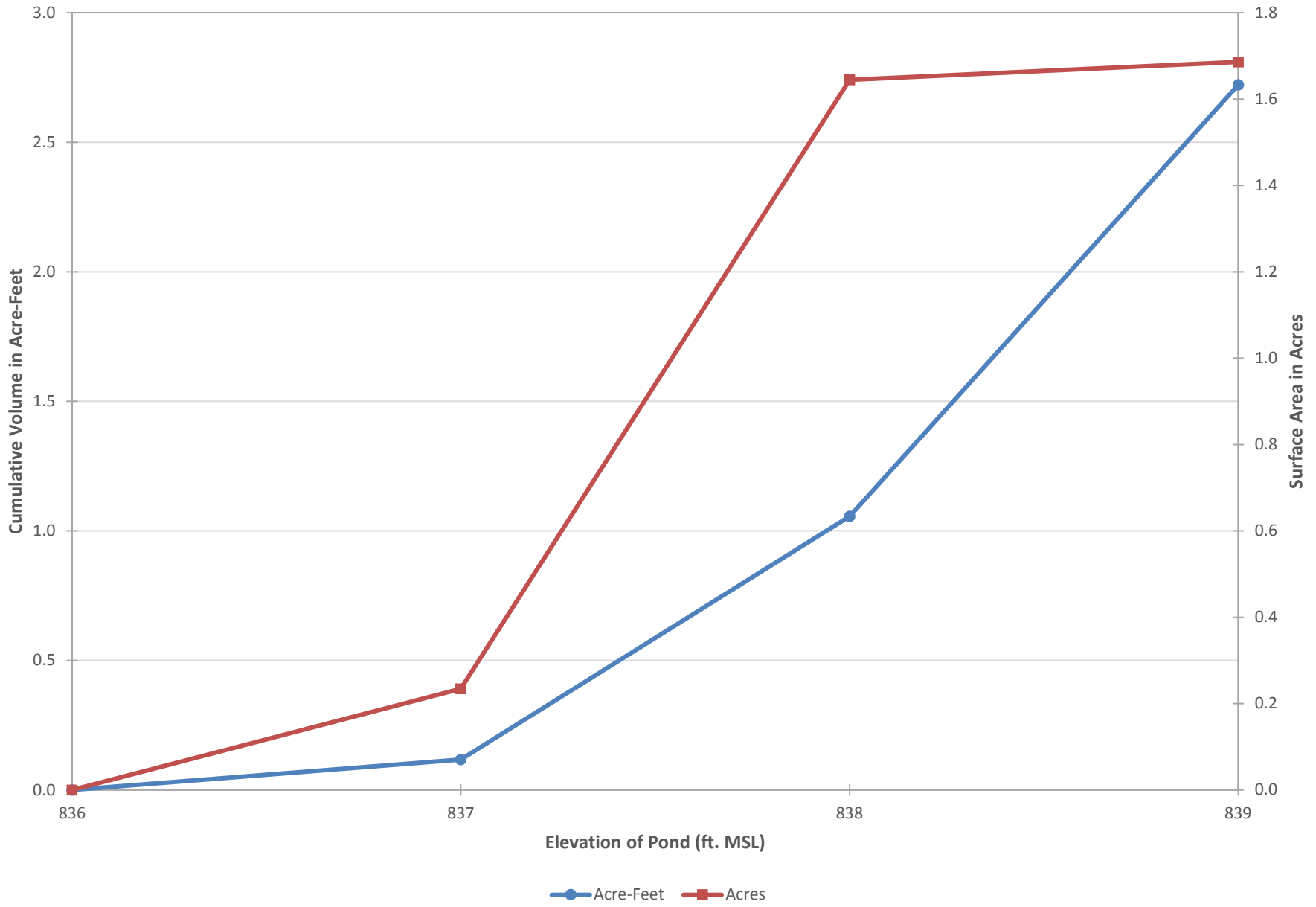
Pond 401 Area Capacity Curve



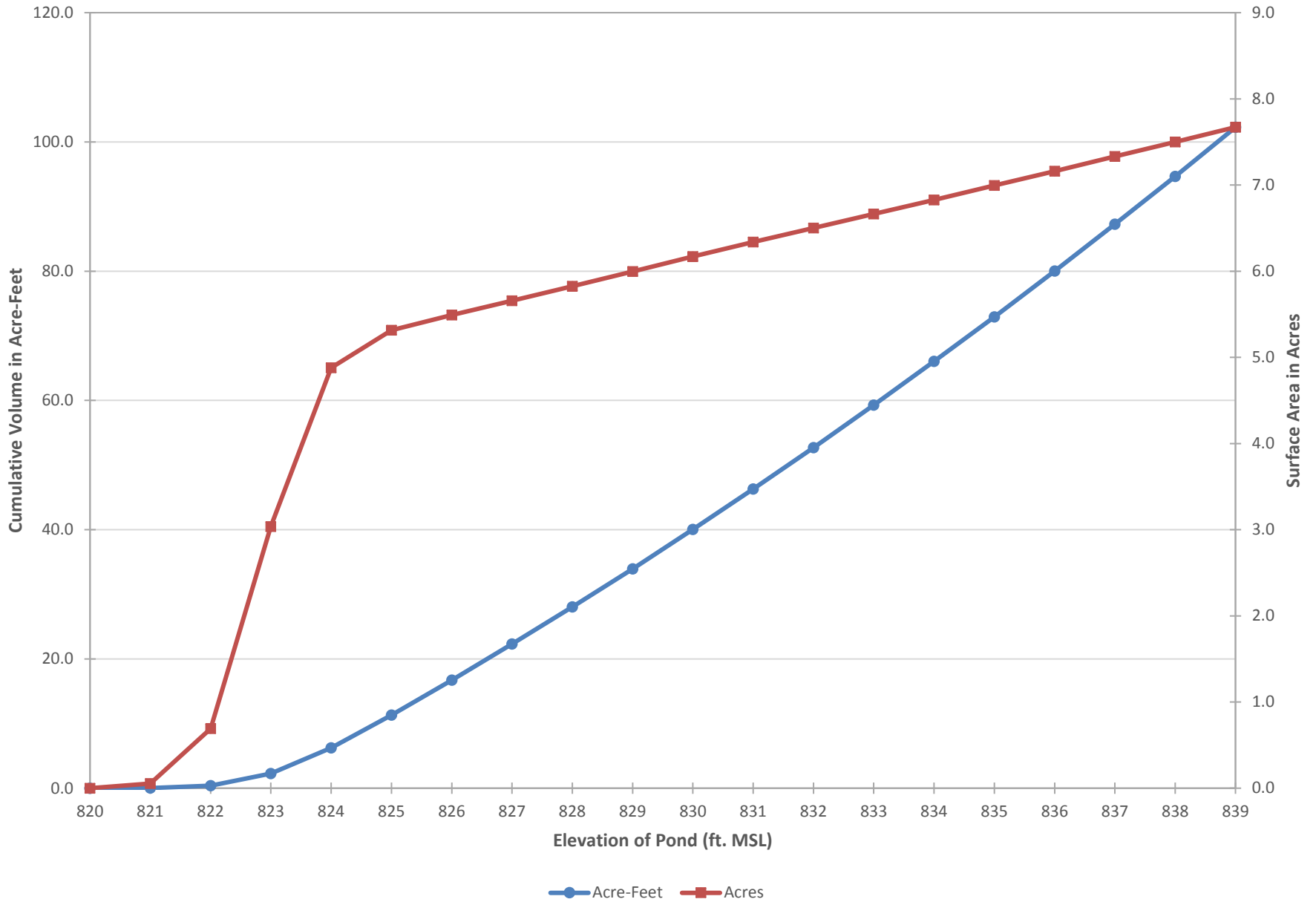
Pond 402 Area Capacity Curve



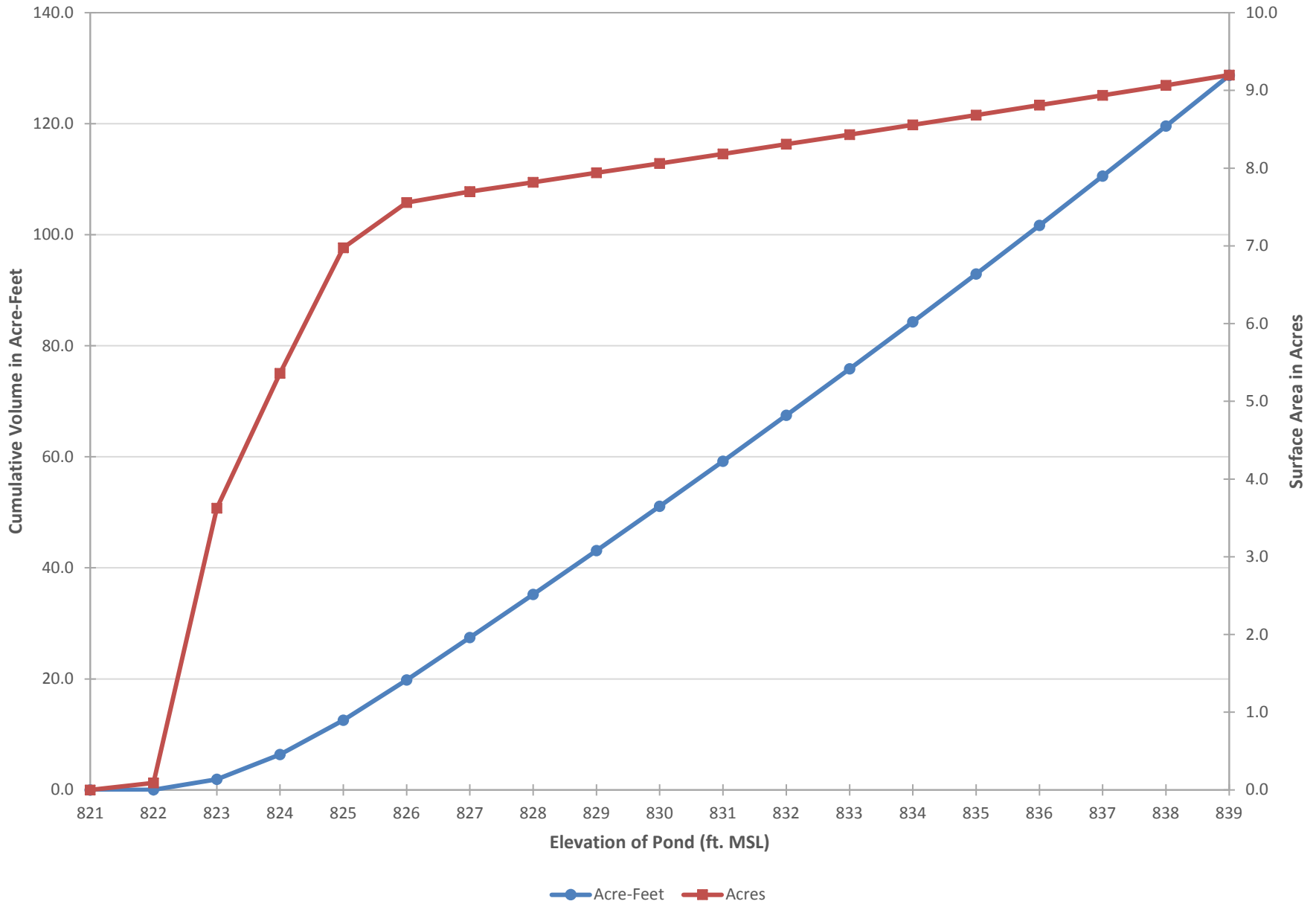
Pond 403 Area Capacity Curve



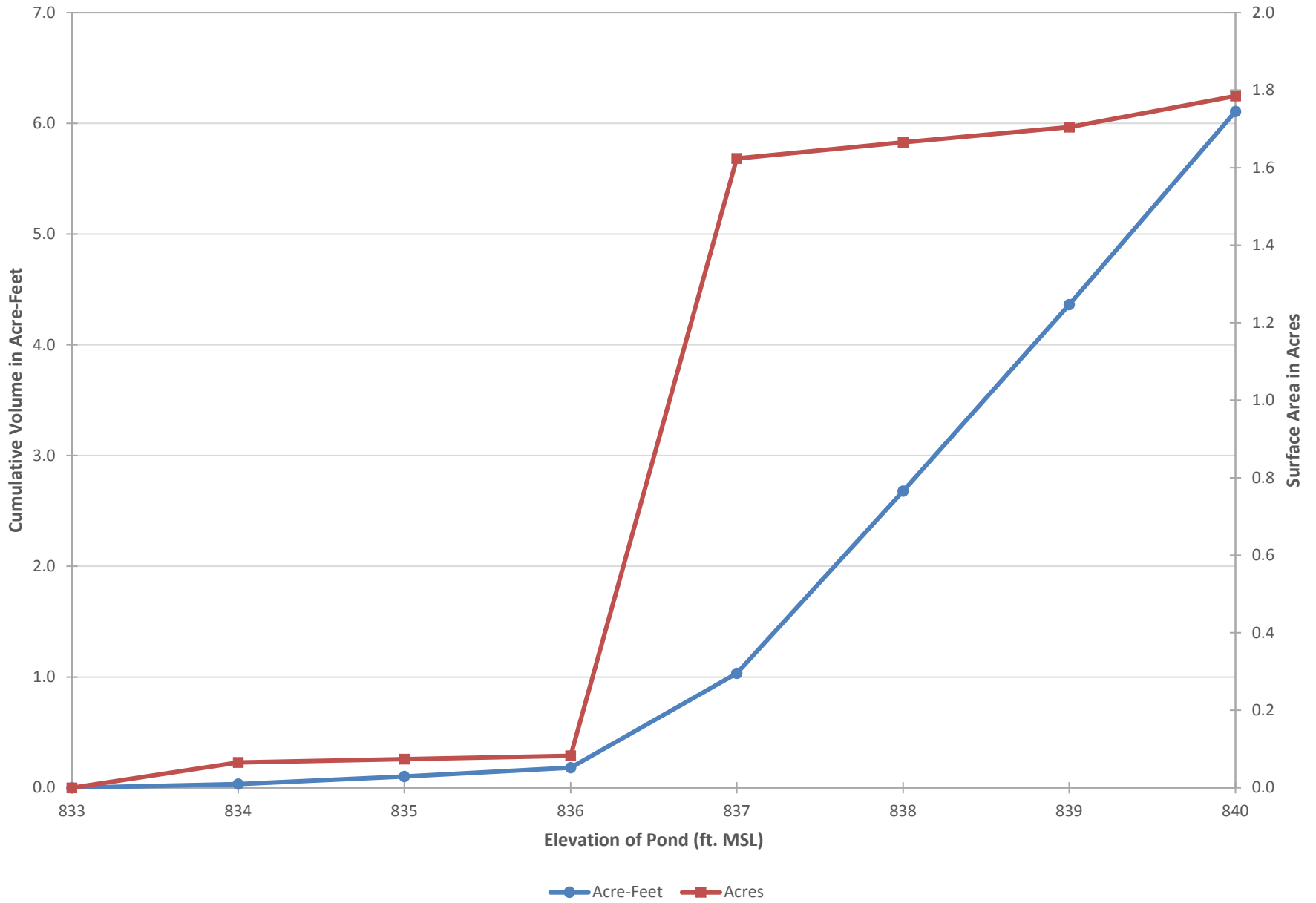
Pond 404 Area Capacity Curve



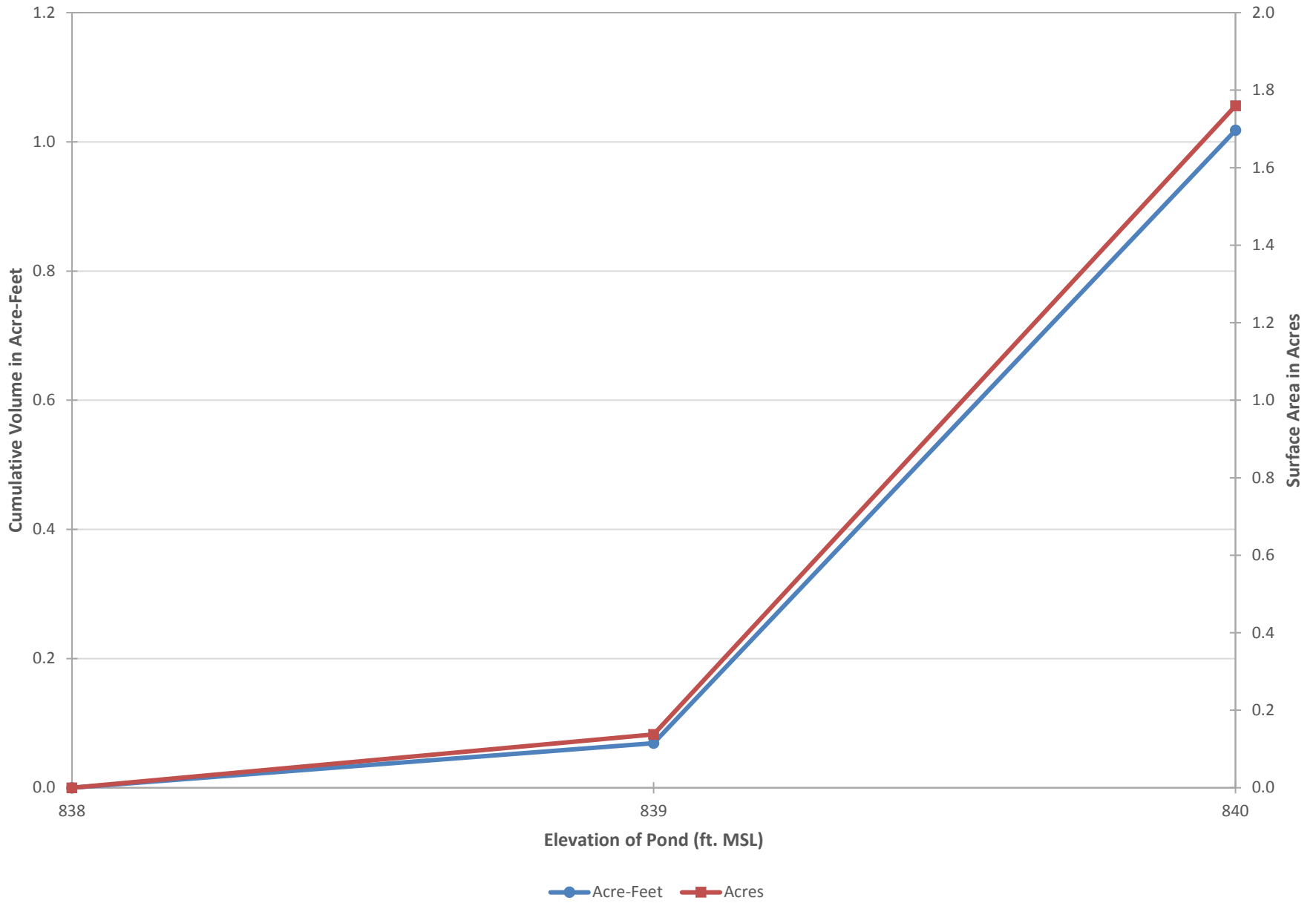
### West Pond Area Capacity Curve



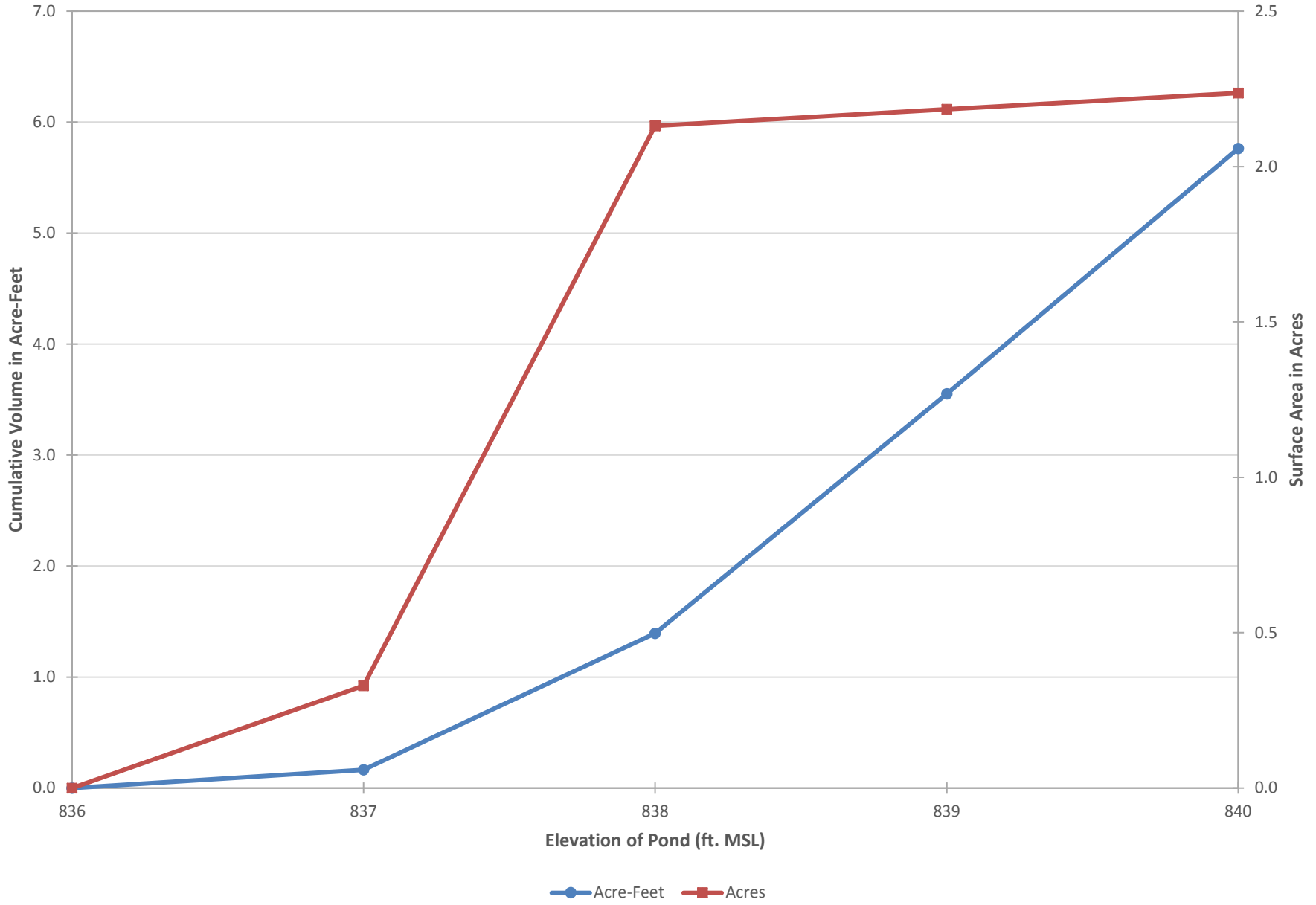
Pond 501 Area Capacity Curve



Pond 502 Area Capacity Curve

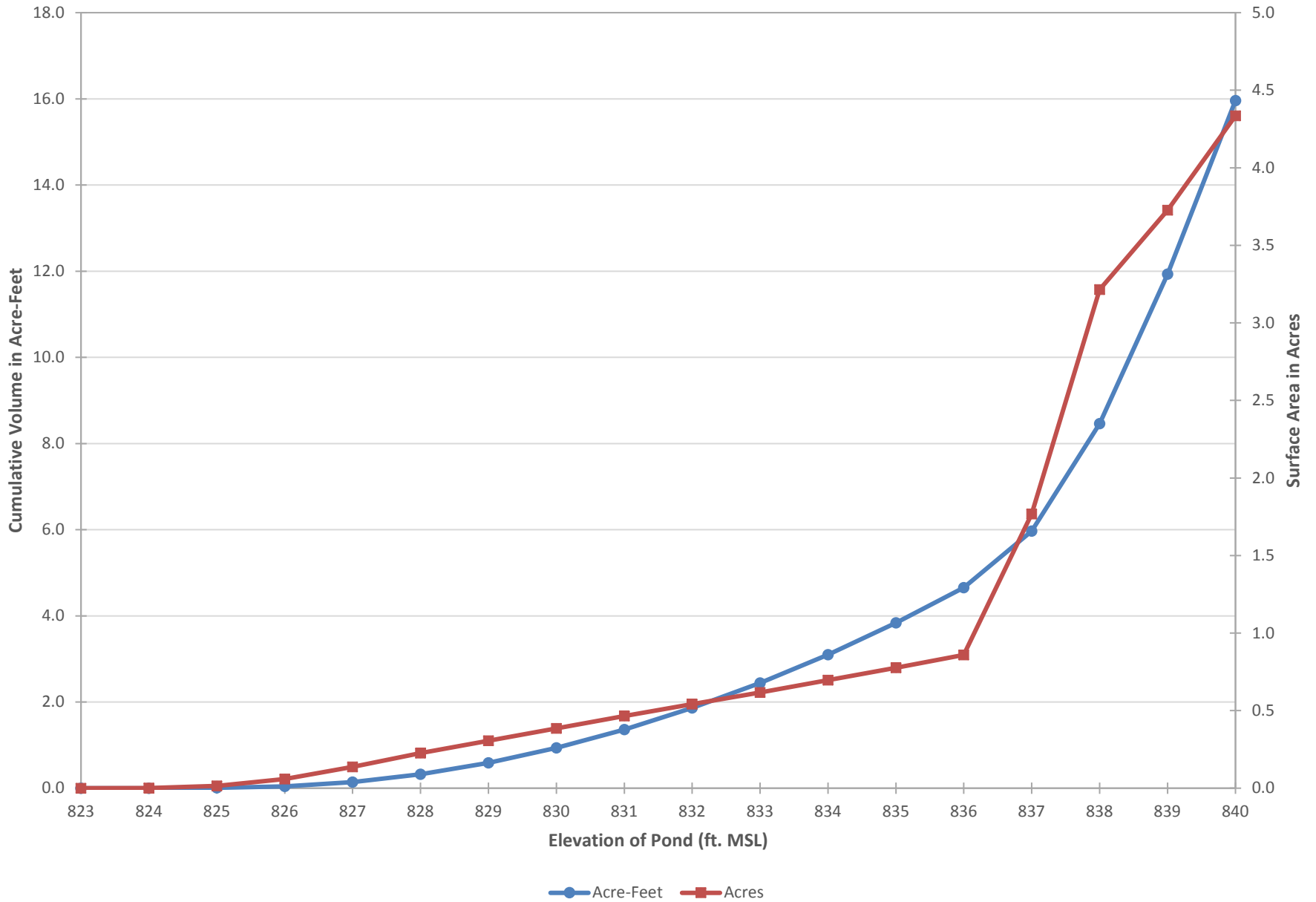


### Pond 503 Area Capacity Curve





Laydown Area Area Capacity Curve



### Stormwater Settling Pond Area Capacity Curve

