Intensive Level Historical & Architectural Survey & Evaluation

Lake Delhi Dam and Powerhouse
Delhi, Iowa – Delaware County

March 20, 2009

Completed for the

Lake Delhi Recreation Association

Completed by

AKAY Consulting
Alexa McDowell, Architectural Historian

Lake Delhi Dam and Powerhouse

NOTE: All contemporary photographs found in this report were taken by AKAY Consulting on February 25, 2009

PROJECT SUMMARY

An intensive level historical and architectural survey and evaluation of the Lake Delhi Dam and Powerhouse south of Delhi, Iowa in Delaware County was conducted in compliance with Section 106 of the National Historic Preservation Act in preparation for a proposed rehabilitation project that will make use of FEMA funds. The project involves the repair of dam elements damaged by the floods of 2008 and the replacement of some equipment that functions inadequately.

The Lake Delhi Dam and Powerhouse was constructed in 1926-1927 by the Interstate Power Company of Dubuque as the second largest hydroelectric facility in its system. The dam continued to produce electricity for the Interstate system until the mid-1960s and was owned by the company until 1973. At that time the structure was purchased by private parties, then sold the following year to the Lake Delhi Recreational Association (LDRA). The LDRA, a non-profit organization, retains ownership of the dam and powerhouse to this day.

In addition to its function as a hydroelectric facility, the construction of Lake Delhi Dam and Powerhouse created a recreational area that quickly became a popular destination, particularly for residents of northeastern Iowa. When electricity production ceased, the retention of Lake Delhi became the primary function of the dam. The dam and powerhouse continue to function as a mechanism of recreation at Lake Delhi to this day. The LDRA maintain the dam and powerhouse, utilizing a primarily volunteer staff to see to its daily functioning as it relates to monitoring water levels and maintaining the workings of the facility.

The Lake Delhi Dam and Powerhouse is an integrated structure; in total, comprised of the bridge deck and a portion of the CR-X31 (both owned and maintained by Delaware County) roadway and the dam and powerhouse (both owned and maintained by the LDRA.) Because the pending rehabilitation project is directed specifically at the dam and powerhouse, the present survey and evaluation focused on those components. However, the integrated nature of the facility creates a strong case for a historic district that encompasses the various elements and so the attached Iowa Site Inventory addresses the resources in that manner.

Lake Delhi Dam and Powerhouse is considered eligible for listing on the National Register of Historic Places, significant under Criterion A in its association with the history of the hydroelectric industry in the state of Iowa and in its association with development of electric service in the state of Iowa. The structure contributes to a larger district comprised of the dam, the powerhouse, the bridge, a portion of the roadway (CR-X31), and the operator's house sited on the east side of CR-X31, just south of the dam. The potential district is significant at the state level in its ability to illustrate the impact of the river as a power source for the creation of electricity and the resulting services to its community. As the second-largest energy producer in the Interstate Power Company's system, the facility at Lake Delhi was a significant contributor to the story of hydroelectric power in Iowa.

The Period of Significance for the Lake Delhi Dam and Powerhouse is 1927-1959, which marks the year the dam was placed in service through the fifty-year window established by the National Park Service. This timeframe encompasses the facility's period of hydroelectric function, which ended ca. 1964.

Lake Delhi Dam and Powerhouse maintains a high degree of all seven aspects of integrity: location, design, setting, materials, workmanship, feeling and association. Because the resource derives is significance from its industrial function as a hydroelectric dam, integrity of setting, location, and association are paramount. Both, the location of the dam and powerhouse and the physical relationship to the associated bridge and roadway, remain intact and are significant elements critical to the facility's historic integrity.

In addition, the structure retains a high level of historic integrity related to design, materials and workmanship. The structure retains its original form, without alterations or major changes of any kind. Construction materials – dominated by poured concrete – remain intact, with any alterations limited to erosion of surfaces due to natural forces. The retention of the dam's structural integrity speaks to the integrity of workmanship. The interior of the space also retains its historic plan, with much of its historic equipment, including the original generators, turbines, and wickets, intact.

Loss of historic integrity as it relates specifically to the dam and powerhouse, is the removal of the historic glazing on the downriver side. The loss is significant as it alters the dam's appearance from both the exterior and the interior. However, the high level of integrity on the whole balances the loss.

Together, the retention of location, design, setting, materials, workmanship, and association result in the retention of a high level of integrity relating to feeling. Without the addition of modern additions or the infill of interior spaces and without a disconnection from the river upon which the dam relies, the Lake Delhi Dam and Powerhouse continues to provide a true feeling of its historic function.

ACKNOWLEDGEMENTS

Special thanks to Dave Fink for his endless patience. It was his assignment to explain the functioning of the facility to this novice, which he did with great care. Also thanks to Marcheta Cooley of the LDRA who provided the historic images included in this report (and many more not used) and to Lisa for digitizing those images.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

SITE DESCRIPTION

The Lake Delhi Dam and Powerhouse is integrated into the CR-X31 bridge over the Maquoketa River in Delhi Township of Delaware County, approximately two miles south of Delhi. The roadway winds through the hills of this area, and at the site of the dam and powerhouse, runs generally north-south. As a result, the dam and powerhouse are oriented north-south, with the upriver side (or lakeside) on the west and the downstream side on the east.

STRUCTURE DESCRIPTION

As indicated the Lake Delhi Dam and Powerhouse is an integrated structure; in total, comprised of the bridge deck and a portion of the CR-X31 (both owned and maintained by Delaware County) roadway and the dam and powerhouse (both owned and maintained by the LDRA.) The present survey and evaluation addresses the dam and powerhouse components specifically.

The Lake Delhi Dam and Powerhouse is an earthen berm and poured concrete structure that rises three stories, from the riverbed to the bridge deck above. The structure extends approximately 660 feet over the Maquoketa River, with the powerhouse integrated into the north end of the structure. The dam itself is comprised of a 500-foot earthen embankment (with a concrete core) at the south end, a 100-foot flood pass section that houses three electrically operated flood gates, and the north section that accommodates the 40-foot by 60-foot powerhouse and associated pair of gates.

The Lake Delhi Dam is of the concrete gravity type, which relies on the weight of the concrete and reinforced earth to hold back the retained water. At Delhi, the gravity dam utilizes flat slab buttressing on the downstream site to counter the force of Maquoketa River. The buttresses transfer the weight of the dam and the force of the river to the river's bedrock. Concrete gravity dams can be either curved, or as is the case at Delhi, flat.[1]

The earthen berm, or embankment, is constructed of natural materials excavated from the riverbed that were reinforced with steel pilings and a concrete core. The embankment extends from the natural riverbank, into the river's path creating the platform, if you will, to connect the county roadway (X-31) to the concrete portion of the dam.

Three steel floodgates dominate the flood pass section of the dam, each measuring 15-feet high by 25-feet long. The deck of the dam over the flood pass accommodates the mechanical equipment used to operate the gates. The equipment is original to the dam and, though

---

[1] Koester, Frank. *Hydroelectric Developments and Engineering.* (New York: D.Van Norstrand Company, 1909), p112.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

Description, cont'd.

functional, in a condition that presents significant safety hazards. Large sections of the flood pass decking are cut-away, with grills inset to allow visual monitoring of the gates beneath. A tubular steel safety railing runs the length of the section.

The 40-foot by 60-foot powerhouse is located at the north end of the dam, fully integrated into the structure. The deck connects the flood pass section to the powerhouse, which, like the flood pass, is bound by a safety railing on the west and the roadway on the east. The deck also houses warning signs and emergency equipment for boaters on the lake. A wood plank wall topped by fencing has been added to the road's guardrail as a further safety measure.

Topside, the powerhouse is dominated by two dam gates. From the deck, the gates are opened and closed and upriver debris is raked from the dam. Currently raking is done by hand. The installation of specialize equipment at this point on the deck will mechanize that task. Because the dam does not currently produce power, the powerhouse gates generally remain open. Flooding in the summer of 2008 damaged the gates, a condition the present rehabilitation project would correct. Access to the interior of the powerhouse is made at the north end. Here, a small concrete block entry structure was recently constructed. The construction involved cutting into the dam's deck to create a larger access point that now accommodates an interior set of steps that lead to a small operator's office space.

From the operator's office, a steep descent is made into the generator room via a single-run staircase. The generator room is a large, open, two-story space. Historically, the room was lit by large expanses of glazing that nearly filled the three bays of the structure's downriver side (east). The glazing has been removed and replaced by steel panels; a single, undersized window is set into each panel. A door in the panel of the north bay provides access to the exterior.

The powerhouse's original generators remain. Although no longer operational, the equipment has been evaluated in preparation of a project to re-establish hydroelectric production, and the generators can be refurbished and placed back in service. In addition, the associated mechanisms – turbines and wickets – are original and in working condition. Only the historic governors have been changed out due to malfunction. The historic plan drawing on page 23 illustrates the power-generating equipment.

The drawing noted above also documents the location of the lowermost space in the powerhouse, which is below water level. The room is accessed via a straight-run staircase located just beneath the stairs from the operator's office to the generator room. This space was used for coal storage and a washroom for personnel. The room remains intact, with shower and toilet stalls in place.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

Description, cont'd.

The powerhouse lacks applied ornament and stylistic elements both inside and out. Rather, the structure's visual character is derived from its function and construction materials. The interior of the powerhouse reflects that character and as such is all about function. The massive concrete beams of the structure are exposed in all spaces. The sole decorative finish is paint, which remains intact in its historic (albeit deteriorated) form at the lower level. It should be noted, that the historic glazing on the downstream side, was a decorative device of sorts.

In summary, the Lake Delhi Dam and Powerhouse is an integrated structure, consisting of three primary elements. Each of those elements remains much the same today as when constructed in 1927. The greatest loss to the structure's historic integrity is the removal of the glazing on the downstream side.

STATEMENT REGARDING REHABILITATION PLANS

Plans to repair damage to the Lake Delhi Dam and Powerhouse resulting from the floods of 2008 (for which the current survey and evaluation was undertaken) evolves the following, generalized elements.

- Concrete Repair: Level the deck to mitigate tripping hazard; repair the tail apron (underwater, downstream side), which has been damaged by debris; add metal armor at water level on the upstream side (also damaged by debris.)

- Addition of a trash raking system. This task is currently done by hand. The raking system would be mounted to the deck over the powerhouse.

- Addition of a debris rail guard. The present guard was put in place about 20 years ago where none existing historically. Such a guard is important to limit the amount of debris that passes through the dam, causing damage to the wickets, etc.

- Gates: Repair those "tweaked" during flooding; replace deteriorated seals (not historic); replace historic winching mechanisms that present a significant safety hazard (located on the deck over the flood pass).

- Electrical upgrade.

- Repair/replacement of deteriorated steel beams in the powerhouse.

With the exception of the removal of the winching mechanisms, none of the proposed work presents the potential for an adverse effect to the historic integrity of the Lake Delhi Dam and Powerhouse. Despite the loss of historic fabric posed by the removal of the winching mechanisms, the existing safety issues pose a significant threat that need to be mitigated. Limited space on the deck does not allow for the retention of the historic equipment and the addition of the new.

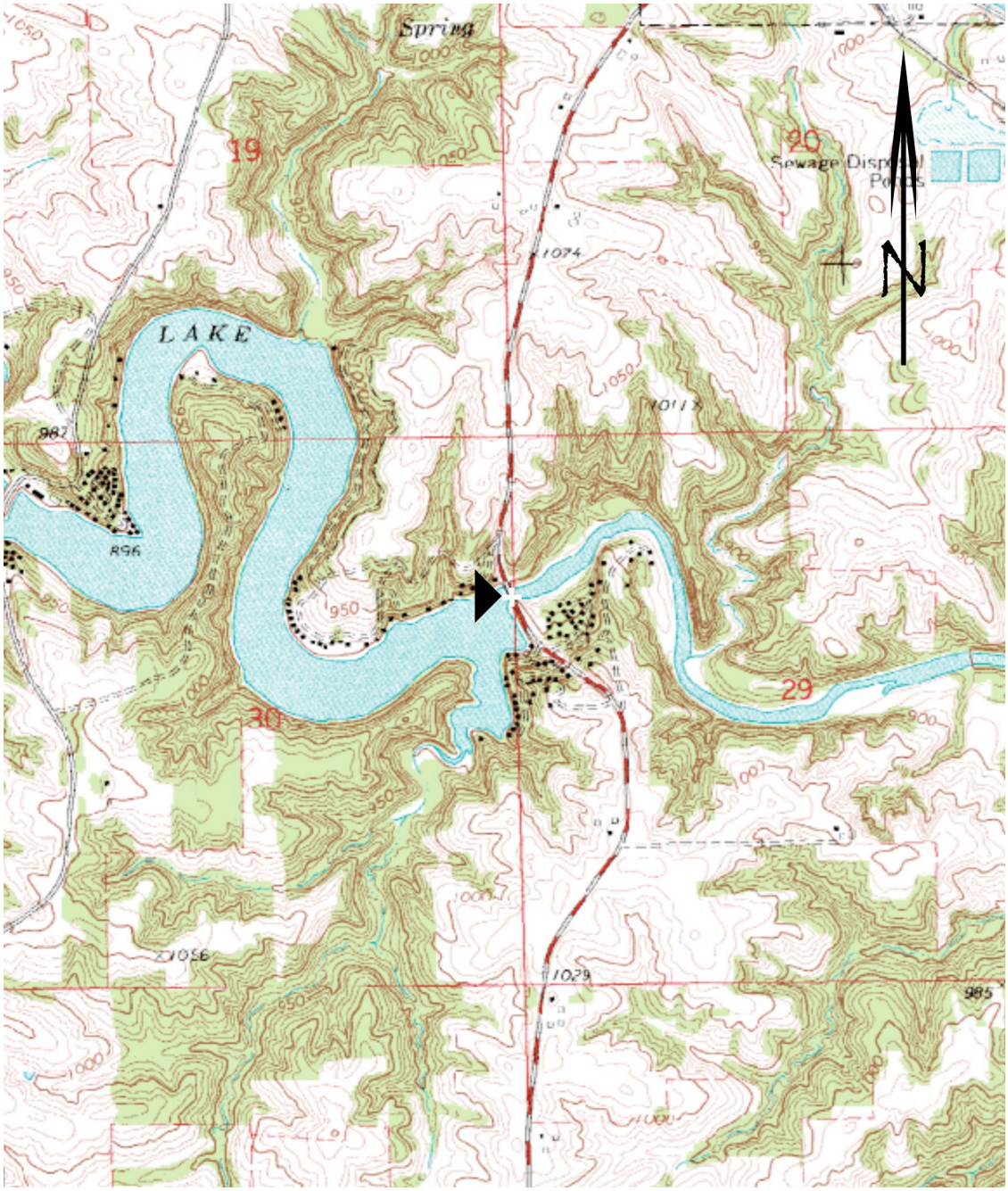
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

USGS 7.5 MINUTE TOPOGRAPHIC MAP – EARLVILLE QUAD



MAP SOURCE: www.trails.com

The arrowhead indicates the location of the Lake Delhi Dam and Powerhouse.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

SATELLITE MAP - 1994

MAP SOURCE: www.trails.com

This long-view of the dam and Powerhouse (indicated by the arrowhead) offers an understanding of the structure's location and the area's topography, with the winding route of the Maquoketa River apparent. CR-X-31, which passes over the dam, leads into the town of Delhi, about two miles to the north.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

SATELLITE MAP - 1994

MAP SOURCE: www.trails.com

This zoomed view of the Lake Delhi Dam and Powerhouse (indicated by the arrowhead) provides a clear view of the structure's site over the Maquoketa River. The dam is comprised of a 500-foot earthen berm with a concrete core on the south, a 100-foot flood pass and the 60-foot powerhouse, with the county bridge spanning the Maquoketa over the flood pass and powerhouse section of the dam.

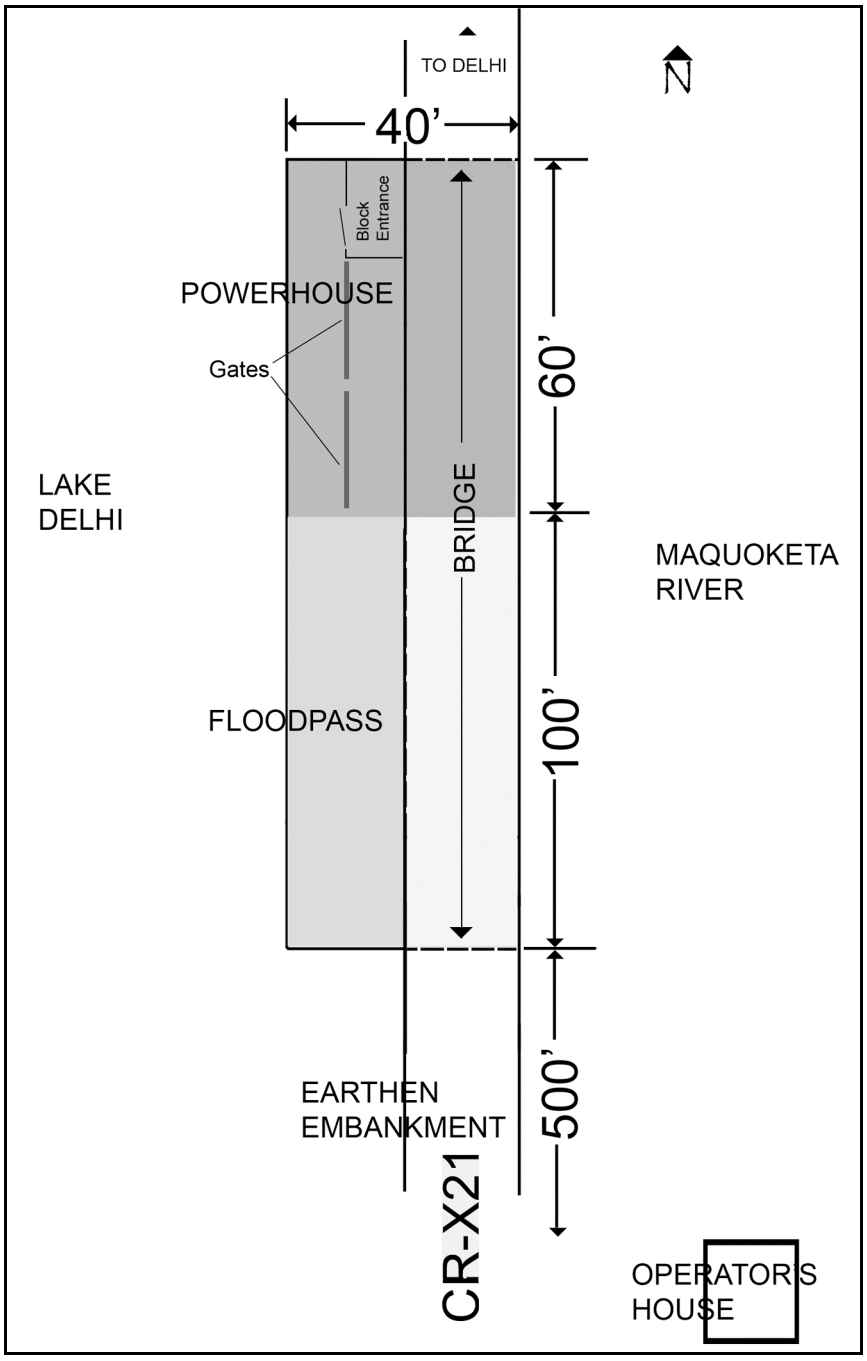
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PLAN SKETCH (Not to scale)



SOURCE: AKAY Consulting – March 2009

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Context

View of the Lake Delhi Dam and Powerhouse looking northwest from the downstream side.

View of the Maquoketa River looking southeast from the downstream side of the dam.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Context

View of the Lake Delhi Dam and Powerhouse, looking east from the upstream (lake) side.

View of Lake Delhi, looking from north to south across the lake. Approximately 950 cottages or homes are located along the eleven miles of Lake Delhi.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Exterior

The dam and powerhouse are an integral part of the CR-X-31 bridge over the Maquoketa River. This view looks south along the bridge, with sections of the dam visible on either side.

View looking north along the bridge and dam.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Exterior

View of the downstream side of the dam and powerhouse, looking to the south. The concrete structure remains intact, with alterations made to the bridge's guard rail and the windows of the powerhouse - now filled with white, metal panels.

View of the upriver side of the dam, looking south from the lake. The three bays of the flood pass are located on the right and the two gates associated with the generation of hydroelectric power on the left.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Exterior

View of the deck of the dam structure, looking to the south. The winching mechanisms that operate the dam gates are housed in the red steel boxes. This obsolete equipment, which pose a significant safety hazard, will be replaced as part of the proposed rehabilitation of the dam.

View of the deck of the dam structure, looking to the south from a position over the flood pass gates. The grates inset into the deck allow for the visual monitoring of the gates below.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Exterior

View of the deck over the powerhouse, with the raised dam gates at left.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

View of the operator's office looking down into the space from the entrance.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

View of the generator room, looking down into the space from the top of the stairs.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

View of the generator room, looking to the north. Note the stairs descending from the operator's office at left. The generators are original to the powerplant and will be refurbished if the plan to return the facility to hydroelectric production proceeds as intended. The control cabinets in this view (and above) are recent additions.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

View of one of the two, massive generators that, while the dam produced electricity, powered the turbines. As indicated, plans to return the dam to hydroelectric production are underway and if completed, the generators would be refurbished. An enlargement of the manufacturer's plate is found on the following page.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

These identification plates located on the generators mark the equipment as designed and built by S. Morgan Smith Co., of York, Pennsylvania for the Westinghouse Company.

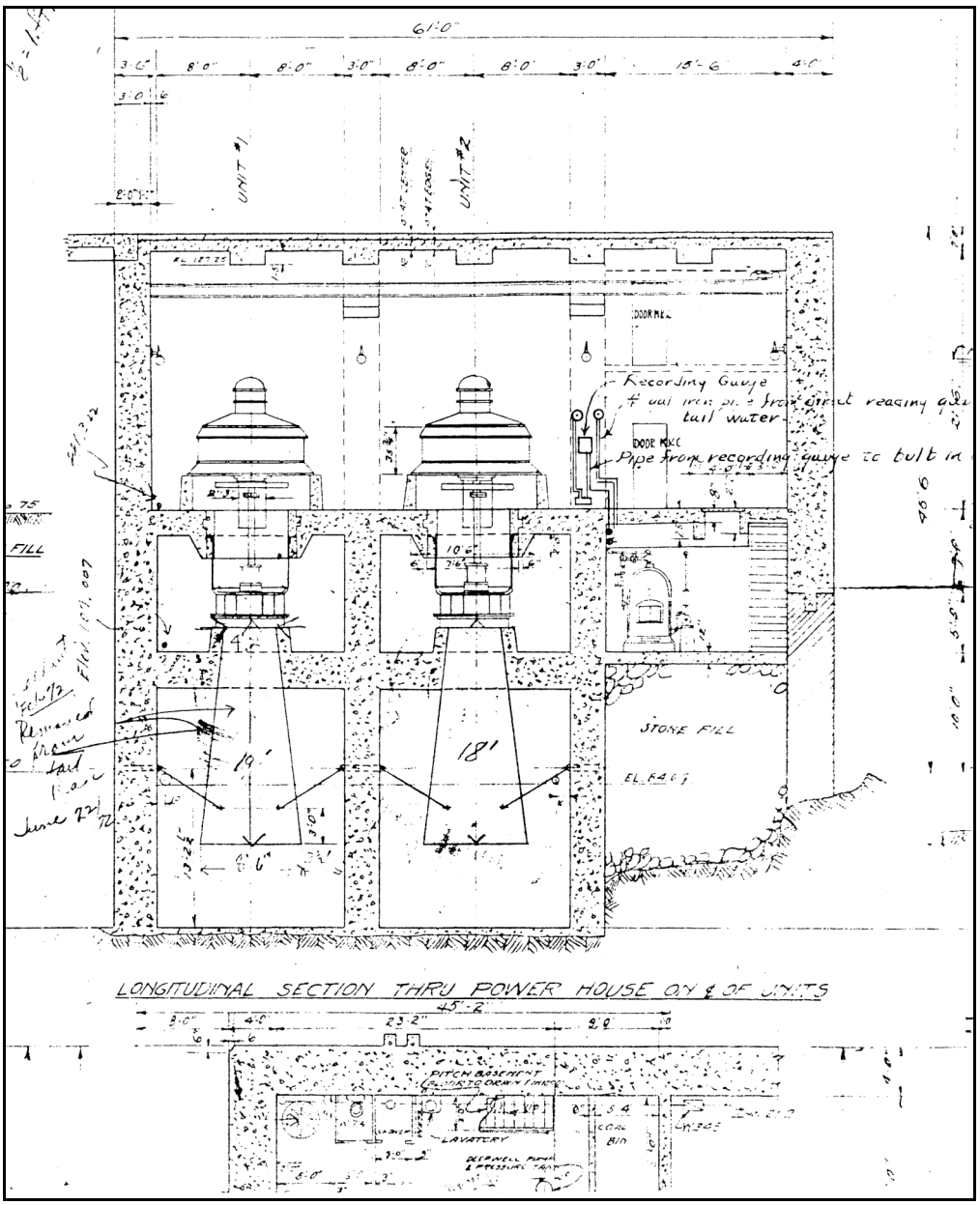
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC PLAN DETAIL – ca. 1926



SOURCE: LDRA Office Files

This detail from the historic plans for the dam and powerhouse illustrate the system for generating power and locates the sub-water level room. The remaining design plans are also available, but due to their oversized scale, are not included in this document.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

This view shows both the concrete beam system of the bridge deck/dam ceiling and the steel I-beams that provide the support structure for the pulley system used to move heavy equipment. The rusting of the beams is a result of leakage in the bridge deck. Additional images on the following pages show the extent of the water damage.

The central (east-west) I-beam bears the manufacturers identification plate, which reads "Heichisholm-Moore Mfg. Co., Cleveland, Ohio 5 TON".

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

The damage due to water infiltration from the bridge deck is particularly troublesome in the northeast corner of the plant. Here, both the structure's concrete (i.e. dam walls and bridge deck) and the steel I-beam is showing significant deterioration. Rehabilitation plans call for the replacement of the I-beam, with every attempt made to replace only that portion of the beam that cannot be salvaged for re-use.

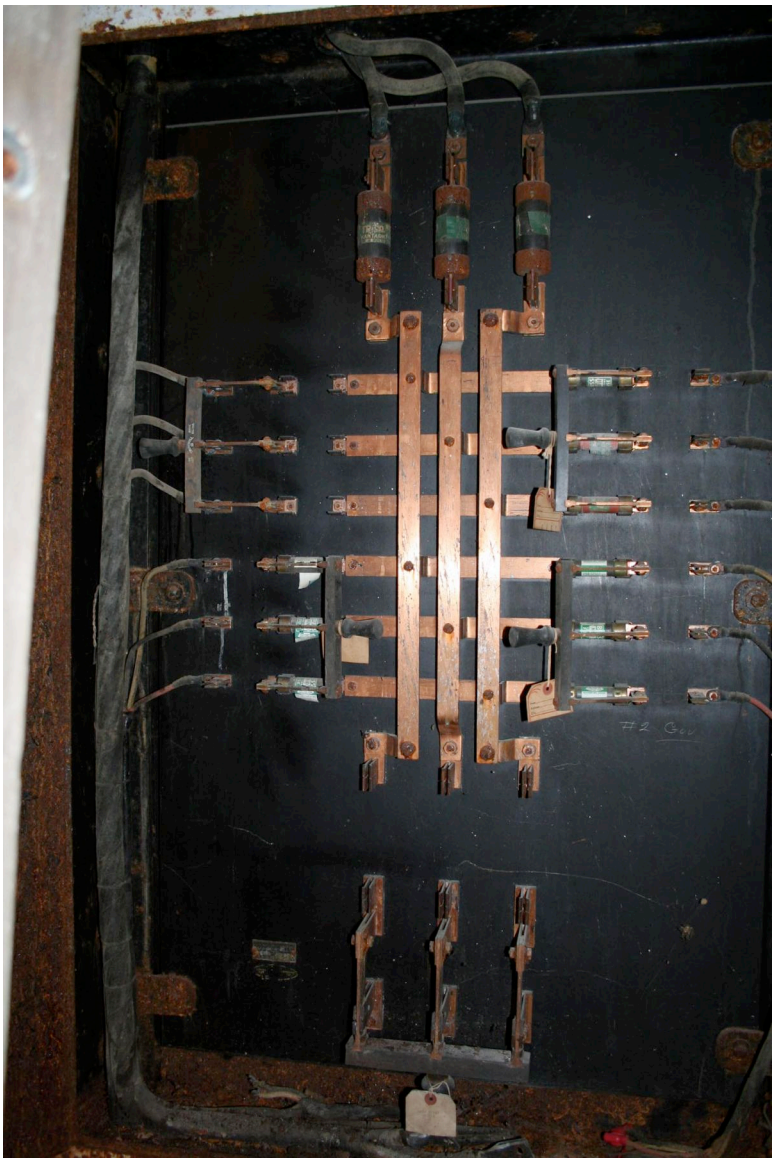
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior



View of the plant's original control panel for the electrical system.
The panel is non-operative, but will be retained as an artifact.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior

View of an original light fixture in the generator room.
There are six such fixtures in the space.

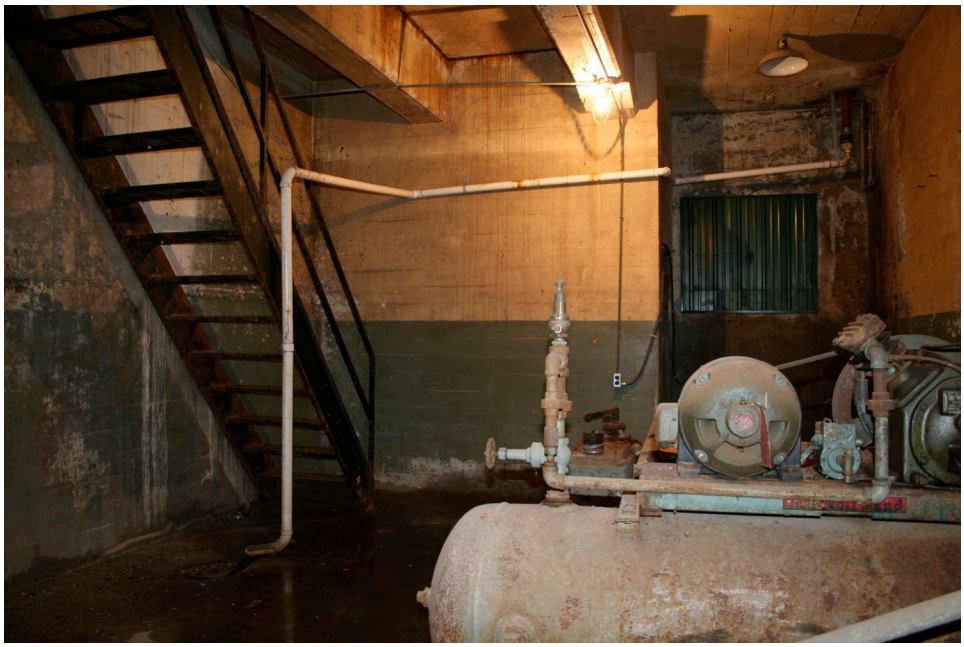
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

PHOTOGRAPHS – Interior



View of the lower level of the powerplant, (which is below water level), looking north toward the coal room. Equipment original to the powerhouse remains in this, now unused space.

View of the lower level, looking south toward the showers and toilet stall used by the powerhouse personnel. Note the heavy concrete beams of the structural system.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam and Powerhouse

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC BACKGROUND

The River as a Power Source

The harnessing of flowing water for use as a power source is a very old practice, first used by the Greeks to grind grain to flour.[2] By the 1700's the technology had developed to utilize mechanical devices for extensive use in milling and pumping and by the time westward expansion was pushing through the Midwest, settlers were well aware of the importance of the river and the power it held.[3] Across the state of Iowa, early settlers chose town sites because of their location along a river, which would provide them with a ready power source. Those pioneers quickly constructed low-head dams to harness the river and take immediate advantage of its power to mill grist and wood, which provided a fledgling community the means (food and shelter) to survive.

In 1880 the first industrial use of hydropower to generate electricity occurred at the Wolverine Chair Factory in Grand Rapids, Michigan. "Hydropower" describes the conversion of "the energy of flowing water into electricity or hydroelectricity". The greater the flow of the water and the greater the head (the distance between the powerhouse's turbine and the water), the greater the amount of electricity produced.[4] In 1882 the first U.S. hydroelectric Powerhouse had opened on the Fox River near Appleton, Wisconsin.[5]

The development of hydroelectric power in Iowa had its beginning in the early 1900s with many of the old mill dams and mill sites being converted to generate hydroelectricity.[6] In those years, hydroelectric power provided more than forty percent of American electricity. Power plants of that era varied greatly in design; not until after World War I did the plants see any standardization.[7]

The use of hydroelectric power declined because it was unable to meet increasing demands for electricity. Many of the best hydropower sites were already operating at capacity and further expansion was limited. Iowa's somewhat extreme weather patterns, its flat topography and the nature of Iowa's inland streams all made increasing hydroelectric power supply difficult.[8] As a result, other technologies and power sources became more economically viable and the reliance on hydroelectric power declined.

---

[2] http://www.usbr.gov/power/edu/history.html

[3] http://inventors.about.com/library/inventors/bl_lester_pelton.htm?p=1

[4] Ibid.

[5] Ibid.

[6] "Iowa's Low-Head Dams Their Past, Present, and Future Roles – A Cooperative Study."

[7] http://inventors.about.com/library/inventors/bl_lester_pelton.htm?p=1

[8] "Iowa's Low-Head Dams Their Past, Present, and Future Roles – A Cooperative Study."

Historic Background, cont'd.

Lake Delhi Dam and Powerhouse

This area of Delaware County is most aptly described as picturesque, with the Maquoketa River cutting through the rocky hills that dominate the area's topography. The potential benefits derived from the power of the river became quickly evident to early explorers and, in 1842 the Territorial Legislature declared the Maquoketa River a "public highway" as it related to navigation, thus requiring existing dam owners to make the necessary alterations to their facilities to allow the passage of both commercial and recreational boats.[9]

The first European settlement of the area in vicinity of what is now known as Lake Delhi began in the mid-1850s when John W. Clark laid out the town of Hartwick, where he quickly constructed a sawmill. Soon after Clark added a flourmill and by 1855 numerous settlers had joined Clark and other businesses were established.

Charles F. Fleming, a native of Sweden, was an early settler in Delhi Township of Delaware County, having arrived after the California gold rush of 1849. Fleming, a large landowner in the county, constructed a steam gristmill on the bank of Silver Lake, and then later assumed ownership of an existing mill on the Maquoketa River.[10] Conflicting sources name Fleming's grist mill as that upon which the Delhi dam was constructed in 1926. Regardless of which of Fleming's mills was the foundation of the new dam, an existing eight-foot dam was removed in preparation for the new structure.[11]

By 1904 Delaware County had six low-head dams (ranging in height from eight to fourteen feet) located along the Maquoketa River: Forestville in Richland Township, Quaker Mills and Manchester in Delaware Township, Hopkinton in South Fork Township, and Hartwick and Fleming's Mill in Delhi Township. These sites dated to a wide time period and functioned as mill sites. Numerous additional mill sites were located along Honey Creek.[12]

Although work was well underway, the Interstate Power Company of Dubuque made the official announcement of their plans for the construction of a hydroelectric dam over the Maquoketa River near Delhi in Delaware County on August 10, 1926. Because the new dam would be higher than the elevation of the existing bridge spanning the Maquoketa, the plans for the new

[9] Merry, John F. *History of Delaware County, Iowa and Its People.* (Chicago: S.J. Clarke Publishing Co., 1914), 58.
[10] Ibid., 218.
[11] *Cedar Rapids Republican.* "Work Resumed on Large Delhi Dam." 26 September 1926, p. 1.
[12] Merry, 48.

Historic Background, cont'd.

facility involved the integration of the dam and a bridge, with the bridge spanning a portion of the new dam. The bridge was under the purview of the county supervisors and so the official announcement was not made until after the conclusion of contractual negotiations between the power company and the county supervisors.

The Interstate Power Company of Dubuque was established in 1914, with one property and 360 customers. By 1918 the company served up to twenty communities with 8000 customers and in 1924 had a customer base of 50,000.[13] The hydroelectric dam and power plant was projected to cost $400,000 and was to be completed by the fall of 1927. News accounts indicated that the new dam would be Interstate's highest power-producing facility.[14]

In addition to its function as a hydroelectric producer, the new dam would create an 1100-acre lake ten miles long, which was projected to become a popular tourist destination. Development plans for the new recreational area included cottage sites and a golf course.[15] The flooding area covered the community of Hartwick and required the demolition of the mill located adjacent to the dam's construction site.

News articles during the summer of 1926 document the construction of the dam near Delhi. By early August the dam construction, which had been slowed by summer flooding, was proceeding at a swift pace. Articles describe the use of a "tower for hoisting concrete" as well as the use of a cofferdam to divert water during construction of the permanent dam. Further, the article describes the sections of the dam – a 500-foot earthen embankment on the south end with a concrete that would be reinforced by steel pilings; the 100 foot flood pass section that would house three electrically operated flood gates, each measuring "15-feet high and 25-feet long"; and the north end where the 40 by 60 foot powerhouse would be located. The new dam had a 35-foot head, the tallest in the state including the Keokuk dam and it was projected that is two, generator-run turbines would each produce 750 kilowatts of power or 4,500,00 kilowatt hours annually. The power produced was absorbed into the Interstate Power system, rather than utilized for a specific community, such as Delhi. The new facility joined the company's existing system of fifteen plants as its second largest.[16]

Area news reports document that personnel associated with the Utilities, Light & Power Company visited Delhi, presumably under the direction of Interstate Power Company officials.

---

[13] *Oelwein Daily Register.* 25 June 1925, p. 4.

[14] Ibid., "Announce Plans for Dam Delhi." 11 August 1926, p. 8. *Cedar Rapids Republican.* "Work Resumed on Large Delhi Dam." 26 September 1926, p. 1.

[15] *Oelwein Daily Register.* "Announce Plans for Dam Delhi." 11 August 1926, p. 8.

[16] Ibid., "Announce Plans for Dam Delhi." 11 August 1926, p8. *Cedar Rapids Republican.* "Speed Delhi Dam as Water Recedes." 10 August 1926.

Historic Background, cont'd.

The personnel included P.W. Potgeitor - hydraulic engineer, C.W. Merchant – engineer, and W.P. Ireland – construction superintendent.[17] Original design plans are on file at the Lake Delhi Recreation Association Office.

Work on the new dam was scheduled through the winter – accomplished through the use of steam pipes to heat the needed gravel. During this period, the road from Delhi was graded and gravel surfaced to make it serviceable by the construction company.[18]

In 1964 Delaware County received farm-to-market funds to straighten the road through Delhi. The project included widening the bridge road over the dam and the removal of two ninety-degree turns on the north side of the bridge. Further, the "wings on the west side of the bridge" were replaced and the road at the north end was widened.[19]

In 1972 the LaVern and Jack Schiltz entered into an option to buy the dam, (which no longer generated electricity), and surrounding land totaling 537 acres from the Interstate Power Company for $10,000 for the purpose of developing the area as a recreational resort.[20] That sale was completed in 1973. Local residents soon stood opposed to the Schiltz plans, concerned as they were that the plan would impact their property rights and initiate user fees. The Lake Delhi Recreation Association (LDRA) was formed at this time as an organized opposition. By March of 1974, the Schlitz brothers had given up the battle and sold their interest to the LDRA. At that time there were approximately 800 cottages and homes along the lake. Today that number is more than 900.

Since purchasing the Lake Delhi Dam and Powerhouse in 1974, the LDRA has maintained the facility with primarily volunteer support. The not-for-profit organization is nominally funded by association dues.

---

[17] *Cedar Rapids Republican.* "High Water Takes Out Coffer Dams." 01 August 1926, p. 21.

[18] *Cedar Rapids Republican.* "Speed Delhi Dam as Water Recedes." 10 August 1926. *Oelwein Daily Register.* "Announce Plans for Dam Delhi." 11 August 1926, p8.

[19] *Cedar Rapids Republican*. "Straighten Road Through Delhi." 16 August 1964, p.27.

[20] *Des Moines Register*. 16 August 1972.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC IMAGES - 1926

(SOURCE: Lake Delhi Recreation Association – Marcheta Cooley)

View of the dam and powerhouse under construction. News articles printed in September of 1926 detail the challenges of construction, particularly faced during periods of heavy rain and associated flooding that washed away the cofferdams used to divert the river during the construction of a specific section of the dam.

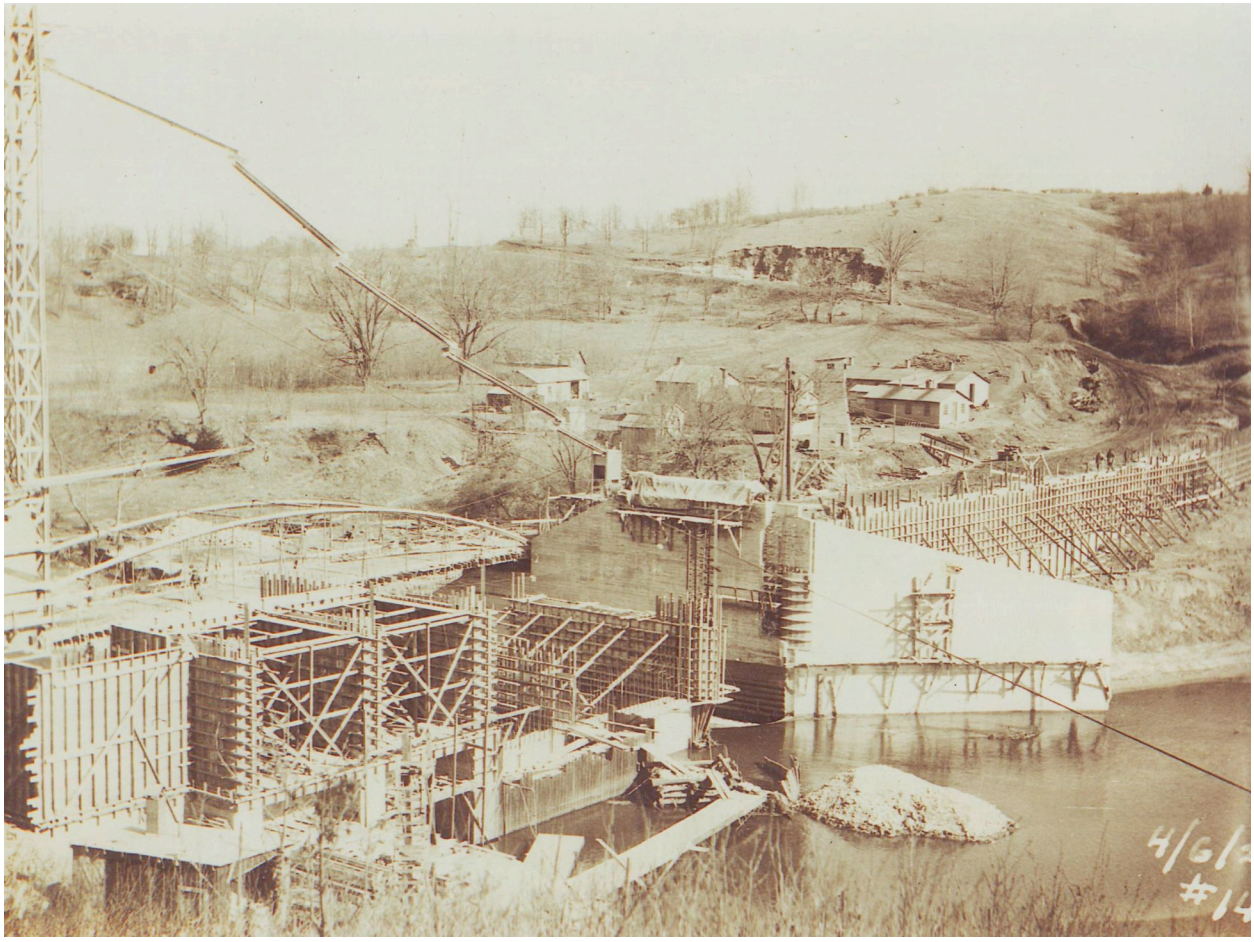
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC IMAGES – 1926



(SOURCE: Lake Delhi Recreation Association – Marcheta Cooley)

This view of the dam and powerhouse construction, looking southeast, shows the curve of the roadway and the curved form of the existing bridge. The slab buttress at the south end of the concrete section of the dam, where it meets the earthen embankment, is nearly complete.

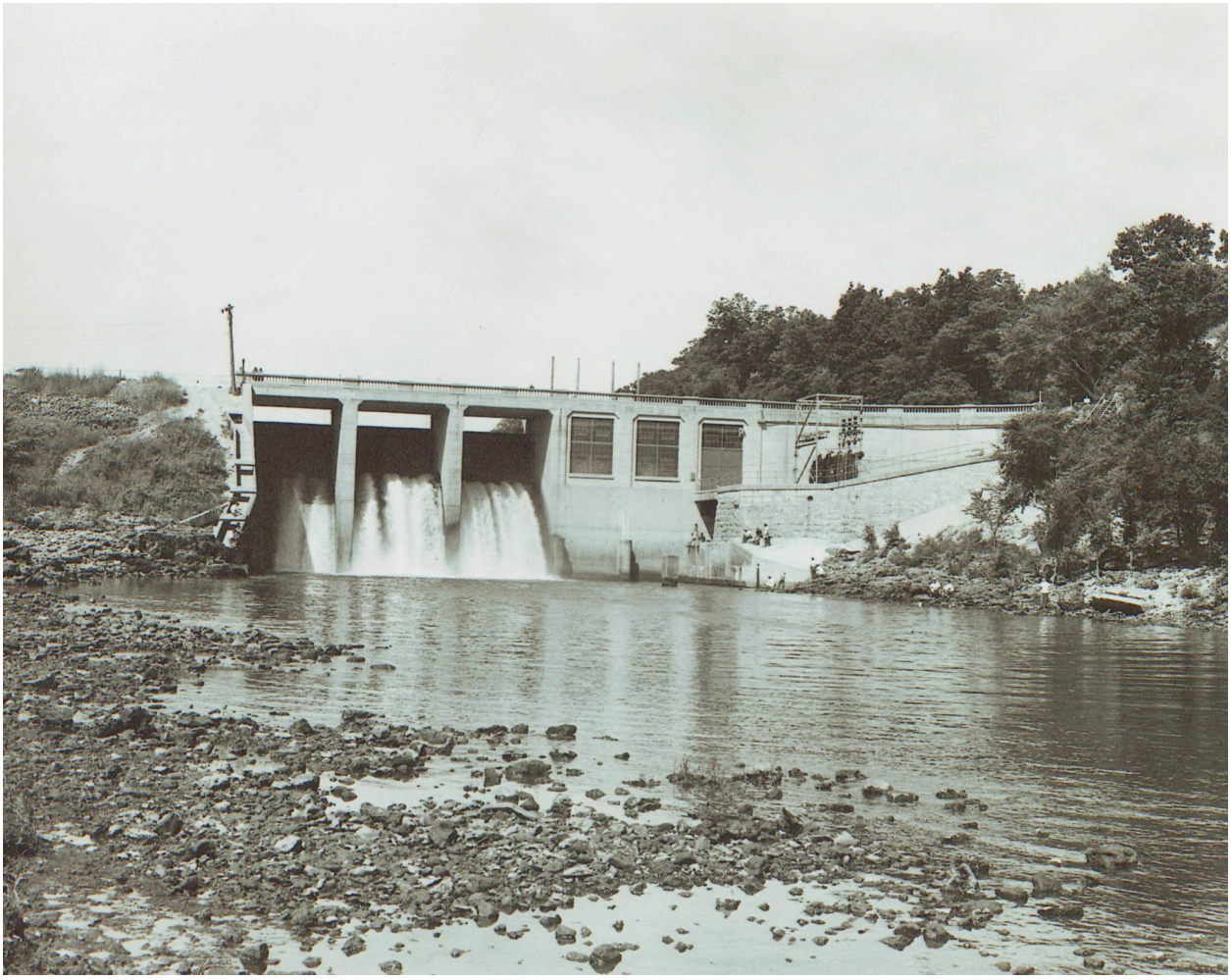
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC IMAGES – ca. 1927



(SOURCE: Lake Delhi Recreation Association – Marcheta Cooley)

This view of the downstream side of the dam and powerhouse reveals the historic glazing in the powerhouse and the electrical transformers adjacent to the dam –both now gone. A portion of the earthen embankment (with a concrete core) portion of the dam is visible at left.

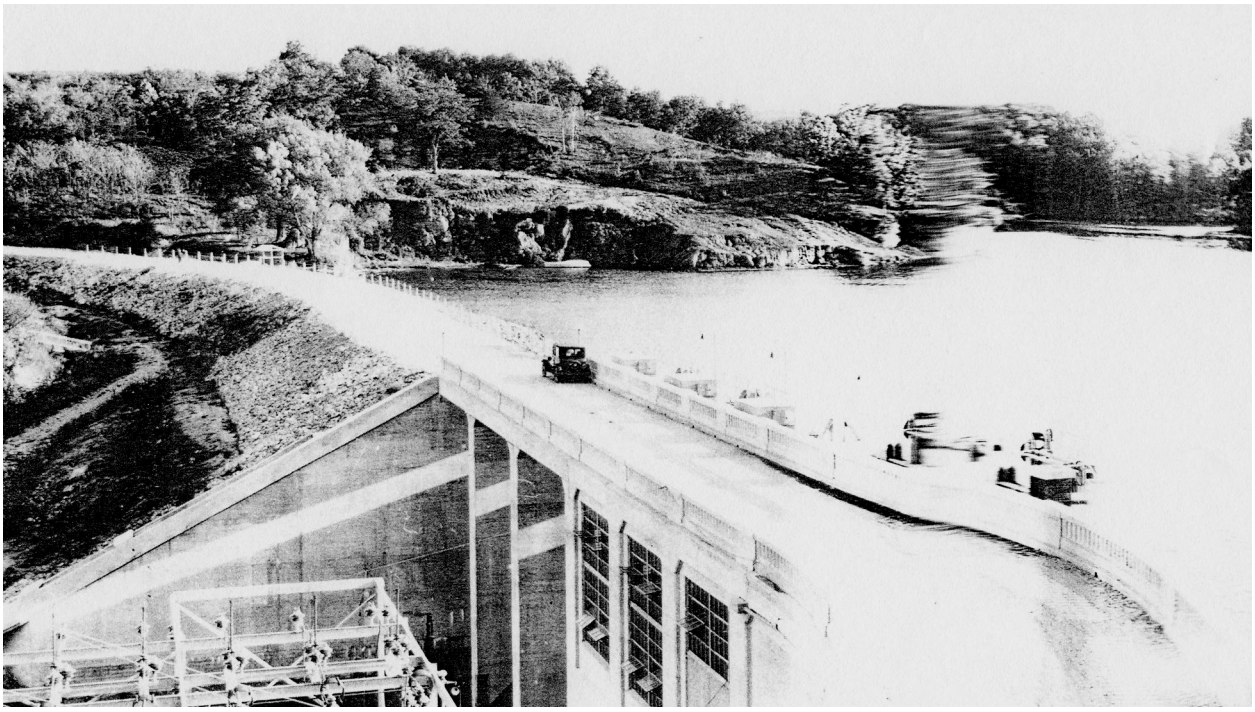
PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

HISTORIC IMAGES – ca. 1927



(SOURCE: Lake Delhi Recreation Association – Marcheta Cooley)

This view of the completed dam and powerhouse also documents the historic appearance of the bridge, with its classically inspired guardrail (now gone.) The mass of the earthen embankment section of the dam is well understood from this perspective.

PROJECT NAME: Intensive Level Survey & Evaluation

RESOURCE NAME: Lake Delhi Dam

LOCATION: Delhi, Iowa - Delaware County

SURVEY DATE: February 25, 2009

BIBLIOGRAPHIC REFERENCES

National Register of Historic Places
Database of listed resources www.nps.gov

Iowa State Historic Preservation Office

Hippen, James C. "Historical Evaluation of the Greene, Iowa Powerhouse and Dam". February 1994.

"Mitchell Powerhouse and Dam". National Register of Historic Places.

Internet Sources

Newsarchive.com
Source for historic newspapers www.NewspaperARCHIVE.com
Various Iowa newspapers with news reports relevant to this survey are archived on this searchable website. When referred to in the text, they are properly footnoted.

Maps
Source for USGS Topographic and Satellite maps www.trails.com

History of Hydroelectric Power http://www.usbr.gov/power/edu/history.html
http://inventors.about.com/library/inventors
http://www.fuelfromthewater.com/history.htm

Koester, Frank. *Hydroelectric Developments and Engineering.* New York: D.Van Norstrand Company, 1909. (Digitized Version – Google Books.)

Iowa's Low-Head Dams Their Past, Present, and Future Roles. Iowa Conservation Commission & Iowa State University. July 1979.

Lake Delhi Recreation Association Files. Including historic images on loan from association member, Marcheta Cooley.

McDowell, Alexa K. *Intensive Level Survey & Evaluation of the Cedar Valley Power Company Hydroelectric Powerhouse at Nashua, Iowa.* R&C #60519117. April 1, 2008.

Merry, John F., ed. *History of Delaware County, Iowa, and its People.* Chicago: The S.J. Clarke Publishing Company, 1914. (Digitized Version – Google Books.)

Oral Informant. Dave Fink, Dam Operator. February 25, 2009.

APPENDIX A

Iowa Site Inventory Form

Lake Delhi Dam and Powerhouse

Site Inventory Form

State Historical Society of Iowa
(November 2005)

State Inventory No. _____ ☐ New ☐ Supplemental
☐ Part of a district with known boundaries (enter inventory no.) _____
Relationship: ☐ Contributing ☐ Noncontributing
☐ Contributes to a potential district with yet unknown boundaries
National Register Status:(any that apply) ☐ Listed ☐ De-listed ☐ NHL ☐ DOE
9-Digit SHPO Review & Compliance (R&C) Number _____
☐ Non-Extant (enter year) _____

1. Name of Property

historic name Lake Delhi Dam and Powerhouse Historic District

other names/site number _____

2. Location

street & number _____
city or town Delhi ☒ vicinity, county Delaware
Legal Description: (If Rural) Township Name Delhi; Township No. 88; Range No. 04; Section 30; Quarter ___ of Quarter ___
(If Urban) Subdivision _____ Block(s) _____ Lot(s) _____

3. State/Federal Agency Certification [*Skip this Section*]

4. National Park Service Certification [*Skip this Section*]

5. Classification

Category of Property (Check only one box)
☐ building(s)
☒ district
☐ site
☐ structure
☐ object

Number of Resources within Property

	If Non-Eligible Property Enter number of:	*If Eligible Property, enter number of:* Contributing	Noncontributing
buildings	___	1	___
sites	___	___	___
structures	___	3	___
objects	___	___	___
Total	___	4	___

Name of related project report or multiple property study (Enter "N/A" if the property is not part of a multiple property examination).
Title: N/A
Historical Architectural Data Base Number: _____

6. Function or Use

Historic Functions (Enter categories from instructions)
10D03 INDUSTRY; hydro electric dam
10D02 INDUSTRY: power plant
14D04 TRANSPORTATION; bridge

Current Functions (Enter categories from instructions)
10C04 INDUSTRY; dam
10D02 INDUSTRY: power plant
14D04 TRANSPORTATION; bridge

7. Description

Architectural Classification (Enter categories from instructions)
_____
_____
_____
_____

Materials (Enter categories from instructions)
foundation 10B CONCRETE; poured
walls (visible material) 10B CONCRETE; poured
roof _____
other _____

Narrative Description (☒ SEE CONTINUATION SHEETS, WHICH MUST BE COMPLETED)

8. Statement of Significance

Applicable National Register Criteria (Mark "x" representing your opinion of eligibility after applying relevant National Register criteria)

☒ Yes ☐ No ☐ More Research Recommended	A	Property is associated with significant events.
☐ Yes ☒ No ☐ More Research Recommended	B	Property is associated with the lives of significant persons.
☐ Yes ☒ No ☐ More Research Recommended	C	Property has distinctive architectural characteristics.
☐ Yes ☒ No ☐ More Research Recommended	D	Property yields significant information in archaeology or history.

County Delaware Address ___ Site Number
City Delhi District Number

Criteria Considerations

- ☐ A Owned by a religious institution or used for religious purposes.
- ☐ B Removed from its original location.
- ☐ C A birthplace or grave.
- ☐ D A cemetery
- ☐ E A reconstructed building, object, or structure.
- ☐ F A commemorative property.
- ☐ G Less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)

17 INDUSTRY

Significant Dates

Construction date
1927 ☐ check if circa or estimated date
Other dates, including renovation

Significant Person
(Complete if National Register Criterion B is marked above)

Architect/Builder
Architect
Builder

Narrative Statement of Significance (☒ SEE CONTINUATION SHEETS, WHICH MUST BE COMPLETED)

9. Major Bibliographical References

Bibliography ☐ See continuation sheet for citations of the books, articles, and other sources used in preparing this form

10. Geographic Data

UTM References *(OPTIONAL)*

	Zone	*Easting*	*Northing*		*Zone*	*Easting*	*Northing*
1	15			2			
3				4			

☐ See continuation sheet for additional UTM references or comments

11. Form Prepared By

name/title Alexa McDowell, Architectural Historian
organization AKAY Consulting date 03-15-09
street & number 1226 6th Street telephone 515-432-5216
city or town Boone state IA zip code 50036

ADDITIONAL DOCUMENTATION (Submit the following items with the completed form)

FOR ALL PROPERTIES

1. ***Map:*** showing the property's location in a town/city or township.
2. ***Site plan:*** showing position of buildings and structures on the site in relation to public road(s).
3. ***Photographs:*** representative black and white photos. If the photos are taken as part of a survey for which the Society is to be curator of the negatives or color slides, a photo/catalog sheet needs to be included with the negatives/slides and the following needs to be provided below on this particular inventory site:

   Roll/slide sheet # ___ Frame/slot # ___ Date Taken ___
   Roll/slide sheet # ___ Frame/slot # ___ Date Taken ___
   Roll/slide sheet # ___ Frame/slot # ___ Date Taken ___

   ☐ See continuation sheet or attached *photo & slide catalog sheet* for list of photo roll or slide entries.
   ☐ Photos/illustrations without negatives are also in this site inventory file.

FOR CERTAIN KINDS OF PROPERTIES, INCLUDE THE FOLLOWING AS WELL

1. ***Farmstead & District:*** (List of structures and buildings, known or estimated year built, and contributing or noncontributing status)
2. ***Barn:***
   a. A sketch of the frame/truss configuration in the form of drawing a typical middle bent of the barn.
   b. A photograph of the loft showing the frame configuration along one side.
   c. A sketch floor plan of the interior space arrangements along with the barn's exterior dimensions in feet.

State Historic Preservation Office (SHPO) Use Only Below This Line

Concur with above survey opinion on National Register eligibility: ☐ *Yes* ☐ *No* ☐ *More Research Recommended*
☐ *This is a locally designated property or part of a locally designated district.*

Comments: ___

Evaluated by (name/title): ___ *Date:* ___

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

5. Function, cont'd.

14D02 TRANSPORTATION; highway
01A01 DOMESTIC; residence

7. Description

The proposed Lake Delhi Dam and Powerhouse historic district located on the Maquoketa River in Delhi Township of Delaware County, approximately two miles south of Delhi, Iowa. The district is comprised of four contributing resources: the Lake Delhi Dam and Powerhouse, the integrated roadway of CR-X31, the integrated bridge spanning the Maquoketa River, and the operator's house. Each resource is described below.

Dam and Powerhouse

The Lake Delhi Dam and Powerhouse is an integrated structure; in total, comprised of the bridge deck and a portion of the CR-X31 (both owned and maintained by Delaware County) roadway and the dam and powerhouse (both owned and maintained by the LDRA.)

The Lake Delhi Dam and Powerhouse is an earthen berm and poured concrete structure that rises three stories, from the riverbed to the bridge deck above. The structure extends approximately 660 feet over the Maquoketa River, with the powerhouse integrated into the north end of the structure. The dam itself is comprised of a 500-foot earthen embankment (with a concrete core) at the south end, a 100-foot flood pass section that houses three electrically operated flood gates, and the north section that accommodates the 40-foot by 60-foot powerhouse and associated pair of gates.

The Lake Delhi Dam is of the concrete gravity type, which relies on the weight of the concrete and reinforced earth to hold back the retained water. At Delhi, the gravity dam utilizes flat slab buttressing on the downstream site to counter the force of Maquoketa River. The buttresses transfer the weight of the dam and the force of the river to the river's bedrock. Concrete gravity dams can be either curved, or as is the case at Delhi, flat.[1]

The earthen berm, or embankment, is constructed of natural materials excavated from the riverbed that were reinforced with steel pilings and a concrete core. The embankment extends from the natural riverbank, into the river's path creating the platform, if you will, to connect the county roadway (X-31) to the concrete portion of the dam.

Three steel floodgates dominate the flood pass section of the dam, each measuring 15-feet high by 25-feet long. The deck of the dam over the flood pass accommodates the mechanical equipment used to operate the gates. Large sections of the flood pass decking are cut-away, with grills inset to allow visual monitoring of the gates beneath. A tubular steel safety railing runs the length of the section.

[1] Koester, Frank. *Hydroelectric Developments and Engineering.* (New York: D.Van Norstrand Company, 1909), p112.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

Description, cont'd.

The 40-foot by 60-foot powerhouse is located at the north end of the dam, fully integrated into the structure. The deck connects the flood pass section to the powerhouse, which, like the flood pass, is bound by a safety railing on the west and the roadway on the east. The deck also houses warning signs and emergency equipment for boaters on the lake. A wood plank wall topped by fencing has been added to the road's guardrail as a further safety measure.

Topside, the powerhouse is dominated by two dam gates. From the deck, the gates are opened and closed and upriver debris is raked from the dam. Access to the interior of the powerhouse is made at the north end. Here, a small concrete block entry structure was recently constructed. The construction involved cutting into the dam's deck to create a larger access point that now accommodates an interior set of steps that lead to a small operator's office space.

From the operator's office, a steep descent is made into the generator room via a single-run staircase. The generator room is a large, open, two-story space. Historically, the room was lit by large expanses of glazing that nearly filled the three bays of the structure's downriver side (east). The glazing has been removed and replaced by steel panels; a single, undersized window is set into each panel. A door in the panel of the north bay provides access to the exterior.

The powerhouse's original generators remain. Although no longer operational, the equipment has been evaluated in preparation of a project to re-establish hydroelectric production, and the generators can be refurbished and placed back in service. In addition, the associated mechanisms – turbines and wickets – are original and in working condition. Only the historic governors have been changed out due to malfunction. The historic plan drawing on page NEED illustrates the power-generating equipment.

The drawing noted above also documents the location of the lowermost space in the powerhouse, which is below water level. The room is accessed via a straight-run staircase located just beneath the stairs from the operator's office to the generator room. This space was used for coal storage and a washroom for personnel. The room remains intact, with shower and toilet stalls in place.

The powerhouse lacks applied ornament and stylistic elements both inside and out. Rather, the structure's visual character is derived from its function and construction materials. The interior of the powerhouse reflects that character and as such is all about function. The massive concrete beams of the structure are exposed in all spaces. The sole decorative finish is paint, which remains intact in its historic (albeit deteriorated) form at the lower level. It should be noted, that the historic glazing on the downstream side, was a decorative device of sorts.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

Description, cont'd.

Bridge

The bridge spanning the Maquoketa River is a poured concrete deck supported by the dam and powerhouse structure. The bridge is approximately 160' feet in length, carrying County Road X-31 over the river. When constructed the bridge featured a classically inspired balustrade for a guard rail, which was removed at an unknown time. The historic rail was replaced with a poured concrete and tubular steel type.

The approach to the bridge was widened in NEED.

County Road X-31

The portion of of County Road X-31 that is directly associated with the integrated structure of the dam and powerhouse is that section sited on the earthen embankment at the south end of the dam. The road is currently paved, though somewhat deteriorated.

Operator's House

The Operator's House is located on an elevated site on the east side of CR-X-31, just south of dam. The house was constructed ca. 1927, its Arts and Crafts stylistic influence indicate of that era. The one-and-a-half story house is a woodframe construction on a poured concrete foundation. The building's exterior is currently sheathed in artificial siding of an undetermined material; its roof is sheathed in asphalt shingles. The house is cross-gabled in form – the gable end of its front porch (and primary elevation) faces west. The porch has been enclosed, but has not lost a sense of its orginal appearance.

Integrity Considerations

The Lake Delhi Dam and Powerhouse Historic District maintains a high degree of all seven aspects of integrity: location, design, setting, materials, workmanship, feeling and association. Because the primary resource derives is significance from its industrial function as a hydroelectric dam, integrity of setting, location, and association are paramount. Both, the location of the dam and powerhouse and the physical relationship to the associated bridge and roadway, remain intact and significant elements critical to the facility's historic integrity, as does the relationship to the operator's house.

In addition, the district as a whole retains a high level of historic integrity relating to issues of design, materials and workmanship. The dam and powerhouss retains its original form, without alterations or major changes of any kind and with no additions or changes to its overall design. The interior of the space also retains its historic plan, with much of its historic equipment, including the original generators, turbines, and wickets, intact.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

Integrity Considerations, cont'd.

The primary loss of integrity is limited to the removal of the historic glazing on the downriver side of the powerhouse. The loss is significant as it alters the dam's appearance from both the exterior and the interior. In addition, the removal of the historic railing on the bridge diminishes that resource's design integrity. This loss is emphasized by the addition of a wood plank retaining wall between the dam's deck and the bridge. The enclosure of the house's front porch is relatively minor. However, the high level of integrity on the whole balances the losses.

Together, the retention of location, design, setting, materials, workmanship, and association result in the retention of a high level of integrity relating to feeling. Without the addition of modern additions or the infill of interior spaces and without a disconnection from the river upon which the dam relied for its very existence, the Lake Delhi Dam and Powerhouse Historic District continues to provide a true feeling of its historic functions.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

8. Statement of Significance

The River as a Power Source

The harnessing of flowing water for use as a power source is a very old practice, first used by the Greeks to grind grain to flour.[2] By the 1700's the technology had developed to utilize mechanical devices for extensive use in milling and pumping and by the time westward expansion was pushing through the Midwest, settlers were well aware of the importance of the river and the power it held.[3] Across the state of Iowa, early settlers chose town sites because of their location along a river, which would provide them with a ready power source. Those pioneers quickly constructed low-head dams to harness the river and take immediate advantage of its power to mill grist and wood, which provided a fledgling community the means (food and shelter) to survive.

In 1880 the first industrial use of hydropower to generate electricity occurred at the Wolverine Chair Factory in Grand Rapids, Michigan. "Hydropower" describes the conversion of "the energy of flowing water into electricity or hydroelectricity". The greater the flow of the water and the greater the head (the distance between the powerhouse's turbine and the water), the greater the amount of electricity produced.[4] In 1882 the first U.S. hydroelectric Powerhouse had opened on the Fox River near Appleton, Wisconsin.[5]

The development of hydroelectric power in Iowa had its beginning in the early 1900s with many of the old mill dams and mill sites being converted to generate hydroelectricity.[6] In those years, hydroelectric power provided more than forty percent of American electricity. Power plants of that era varied greatly in design; not until after World War I did the plants see any standardization.[7]

The use of hydroelectric power declined because it was unable to meet increasing demands for electricity. Many of the best hydropower sites were already operating at capacity and further expansion was limited. Iowa's somewhat extreme weather patterns, its flat topography and the nature of Iowa's inland streams all made increasing hydroelectric power supply difficult.[8] As a result, other technologies and power sources became more economically viable and the reliance on hydroelectric power declined.

---

2 http://www.usbr.gov/power/edu/history.html

3 http://inventors.about.com/library/inventors/bl_lester_pelton.htm?p=1

4 Ibid.

5 Ibid.

6 "Iowa's Low-Head Dams Their Past, Present, and Future Roles – A Cooperative Study."

7 http://inventors.about.com/library/inventors/bl_lester_pelton.htm?p=1

8 "Iowa's Low-Head Dams Their Past, Present, and Future Roles – A Cooperative Study."

8. State of Significance, cont'd.

Lake Delhi Dam and Powerhouse Historic District

This area of Delaware County is most aptly described as picturesque, with the Maquoketa River cutting through the rocky hills that dominate the area's topography. The potential benefits derived from the power of the river became quickly evident to early explorers and, in 1842 the Territorial Legislature declared the Maquoketa River a "public highway" as it related to navigation, thus requiring existing dam owners to make the necessary alterations to their facilities to allow the passage of both commercial and recreational boats.[9]

The first European settlement of the area in vicinity of what is now known as Lake Delhi began in the mid-1850s when John W. Clark laid out the town of Hartwick, where he quickly constructed a sawmill. Soon after Clark added a flourmill and by 1855 numerous settlers had joined Clark and other businesses were established.

Charles F. Fleming, a native of Sweden, was an early settler in Delhi Township of Delaware County, having arrived after the California gold rush of 1849. Fleming, a large landowner in the county, constructed a steam gristmill on the bank of Silver Lake, and then later assumed ownership of an existing mill on the Maquoketa River.[10] Conflicting sources name Fleming's grist mill as that upon which the Delhi dam was constructed in 1926. Regardless of which of Fleming's mills was the foundation of the new dam, an existing eight-foot dam was removed in preparation for the new structure.[11]

By 1904 Delaware County had six low-head dams (ranging in height from eight to fourteen feet) located along the Maquoketa River: Forestville in Richland Township, Quaker Mills and Manchester in Delaware Township, Hopkinton in South Fork Township, and Hartwick and Fleming's Mill in Delhi Township. These sites dated to a wide time period and functioned as mill sites. Numerous additional mill sites were located along Honey Creek.[12]

Although work was well underway, the Interstate Power Company of Dubuque made the official announcement of their plans for the construction of a hydroelectric dam over the Maquoketa River near Delhi in Delaware County on August 10, 1926. Because the new dam would be higher than the elevation of the existing bridge spanning the Maquoketa, the plans for the new facility involved the integration of the dam and a bridge, with the bridge spanning a portion of the new dam. The bridge was under the purview of the county supervisors and so the official announcement was not made until after the conclusion of contractual negotiations between the power company and the county supervisors.

---

[9] Merry, John F. *History of Delaware County, Iowa and Its People.* (Chicago: S.J. Clarke Publishing Co., 1914), 58.

[10] Ibid., 218.

[11] *Cedar Rapids Republican.* "Work Resumed on Large Delhi Dam." 26 September 1926, p. 1.

[12] Merry, 48.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

Historic Background, cont'd.

The Interstate Power Company of Dubuque was established in 1914, with one property and 360 customers. By 1918 the company served up to twenty communities with 8000 customers and in 1924 had a customer base of 50,000.[13] The hydroelectric dam and power plant was projected to cost $400,000 and was to be completed by the fall of 1927. News accounts indicated that the new dam would be Interstate's highest power-producing facility.[14]

In addition to its function as a hydroelectric producer, the new dam would create an 1100-acre lake ten miles long, which was projected to become a popular tourist destination. Development plans for the new recreational area included cottage sites and a golf course.[15] The flooding area covered the community of Hartwick and required the demolition of the mill located adjacent to the dam's construction site.

News articles during the summer of 1926 document the construction of the dam near Delhi. By early August the dam construction, which had been slowed by summer flooding, was proceeding at a swift pace. Articles describe the use of a "tower for hoisting concrete" as well as the use of a cofferdam to divert water during construction of the permanent dam. Further, the article describes the sections of the dam – a 500-foot earthen embankment on the south end with a concrete that would be reinforced by steel pilings; the 100 foot flood pass section that would house three electrically operated flood gates, each measuring "15-feet high and 25-feet long"; and the north end where the 40 by 60 foot powerhouse would be located. The new dam had a 35-foot head, the tallest in the state including the Keokuk dam and it was projected that is two, generator-run turbines would each produce 750 kilowatts of power or 4,500,00 kilowatt hours annually. The power produced was absorbed into the Interstate Power system, rather than utilized for a specific community, such as Delhi. The new facility joined the company's existing system of fifteen plants as its second largest.[16]

Area news reports document that personnel associated with the Utilities, Light & Power Company visited Delhi, presumably under the direction of Interstate Power Company officials. The personnel included P.W. Potgeitor - hydraulic engineer, C.W. Merchant – engineer, and W.P. Ireland – construction superintendent.[17] Original design plans are on file at the Lake Delhi Recreation Association Office.

---

[13] *Oelwein Daily Register.* 25 June 1925, p. 4.

[14] Ibid., "Announce Plans for Dam Delhi." 11 August 1926, p. 8. *Cedar Rapids Republican.* "Work Resumed on Large Delhi Dam." 26 September 1926, p. 1.

[15] *Oelwein Daily Register.* "Announce Plans for Dam Delhi." 11 August 1926, p. 8.

[16] Ibid., "Announce Plans for Dam Delhi." 11 August 1926, p8. *Cedar Rapids Republican.* "Speed Delhi Dam as Water Recedes." 10 August 1926.

[17] *Cedar Rapids Republican.* "High Water Takes Out Coffer Dams." 01 August 1926, p. 21.

8. Statement of Significance, cont'd.

Work on the new dam was scheduled through the winter – accomplished through the use of steam pipes to heat the needed gravel. During this period, the road from Delhi was graded and gravel surfaced to make it serviceable by the construction company.[18]

In 1964 Delaware County received farm-to-market funds to straighten the road through Delhi. The project included widening the bridge road over the dam and the removal of two ninety-degree turns on the north side of the bridge. Further, the "wings on the west side of the bridge" were replaced and the road at the north end was widened.[19]

In 1972 the LaVern and Jack Schiltz entered into an option to buy the dam, (which no longer generated electricity), and surrounding land totaling 537 acres from the Interstate Power Company for $10,000 for the purpose of developing the area as a recreational resort.[20] That sale was completed in 1973. Local residents soon stood opposed to the Schiltz plans, concerned as they were that the plan would impact their property rights and initiate user fees. The Lake Delhi Recreation Association (LDRA) was formed at this time as an organized opposition. By March of 1974, the Schlitz brothers had given up the battle and sold their interest to the LDRA. At that time there were approximately 800 cottages and homes along the lake. Today that number is more than 900.

Since purchasing the Lake Delhi Dam and Powerhouse in 1974, the LDRA has maintained the facility with primarily volunteer support. The not-for-profit organization is nominally funded by association dues.

STATEMENT OF SIGNIFICANCE

Lake Delhi Dam and Powerhouse Historic district is considered eligible for listing on the National Register of Historic Places, significant under Criterion A in its association with the history of the hydroelectric industry in the state of Iowa and in its association with development of electric service in the state of Iowa. The potential district is significant at the state level in its ability to illustrate the impact of the river as a power source for the creation of electricity and the resulting services to its community. As the second-largest energy producer in the Interstate Power Company's system, the facility at Lake Delhi was a significant contributor to the story of hydroelectric power in Iowa.

The Period of Significance for the Lake Delhi Dam and Powerhouse is 1927-1959, which marks the year the dam was placed in service (including the integrated components – bridge and roadway) and the house was constructed, through the fifty-year window established by the National Park Service. This timeframe encompasses the dam and powerhouse's period of hydroelectric function from which it derives its significance.

---

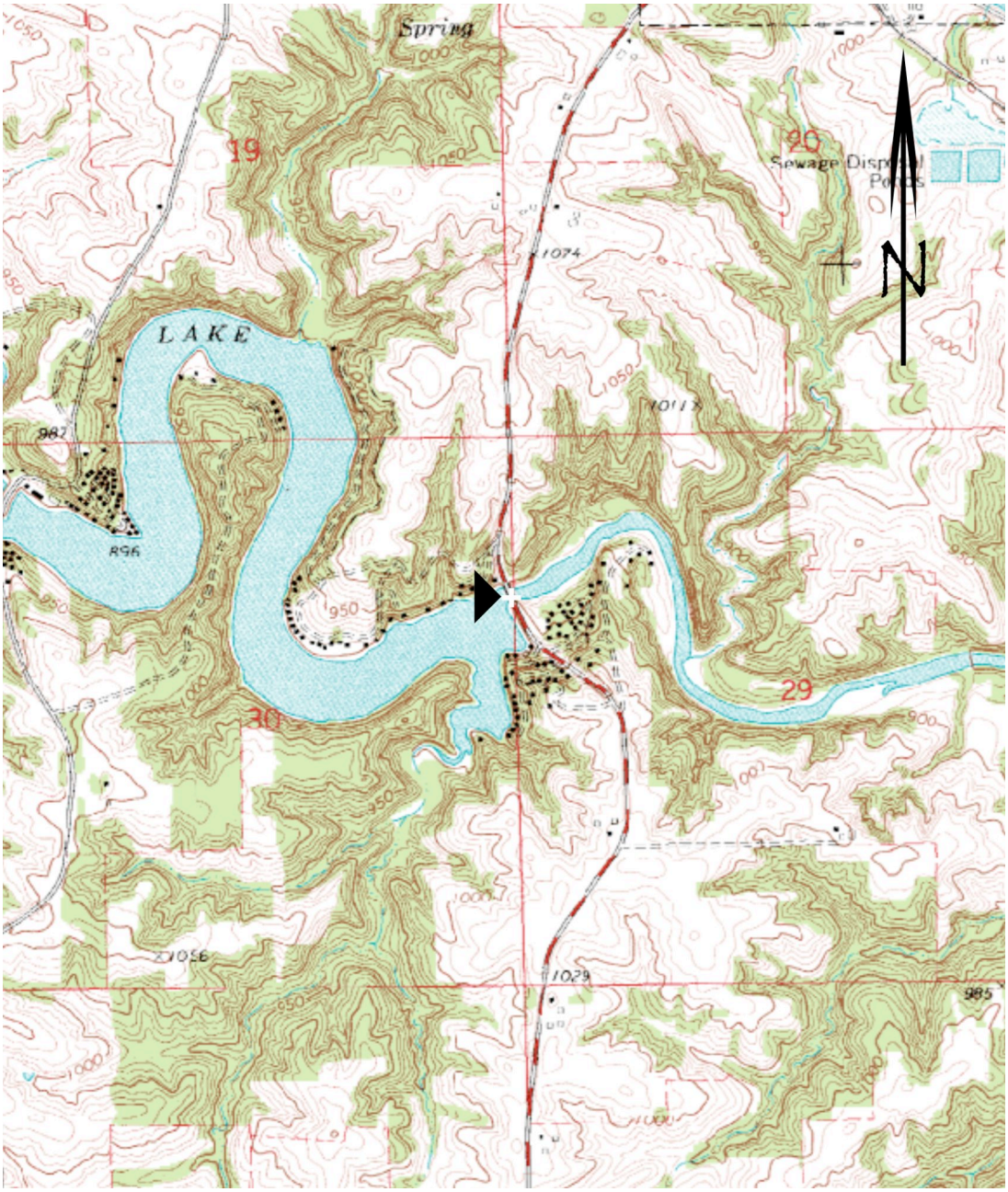
[18] *Cedar Rapids Republican.* "Speed Delhi Dam as Water Recedes." 10 August 1926. *Oelwein Daily Register.* "Announce Plans for Dam Delhi." 11 August 1926, p8.

[19] *Cedar Rapids Republican*. "Straighten Road Through Delhi." 16 August 1964, p.27.

[20] *Des Moines Register*. 16 August 1972.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

USGS 7.5 MINUTE TOPOGRAPHIC MAP – EARLVILLE QUAD



MAP SOURCE: www.trails.com

The location of the Lake Delhi Dam and Powerhouse Historic District is indicated by the arrowhead.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

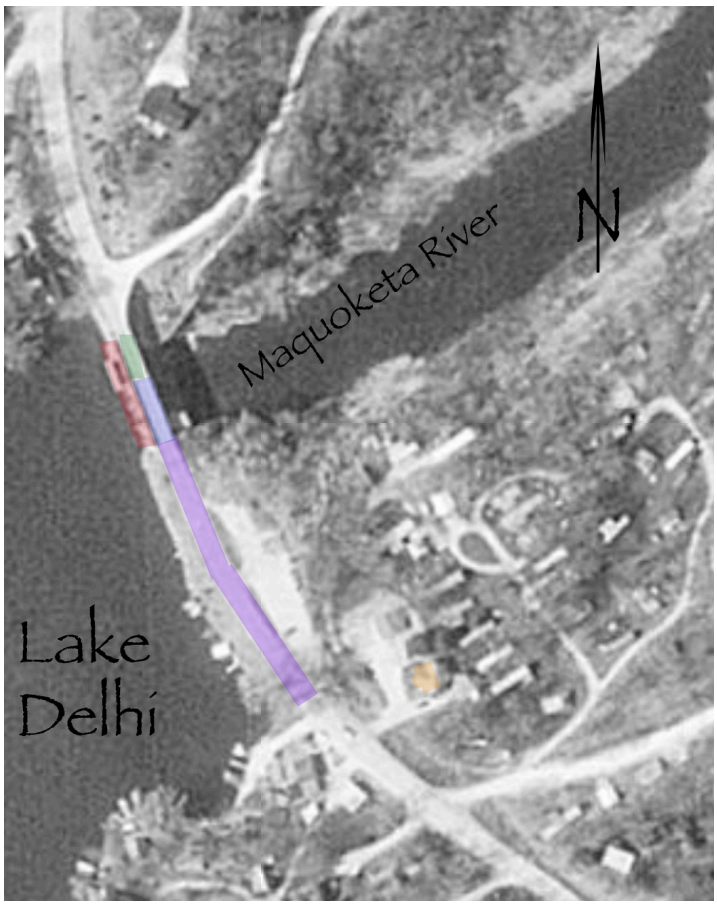
SATELLITE MAP - 1994

MAP SOURCE: www.trails.com

This long-view of the site (indicated by the arrowhead) offers an understanding of the structure's location and the area's topography, with the winding route of the Maquoketa River apparent. CR-X-31, which passes over the dam, leads into the town of Delhi, about two miles to the north.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

RESOURCE MAP - 1994



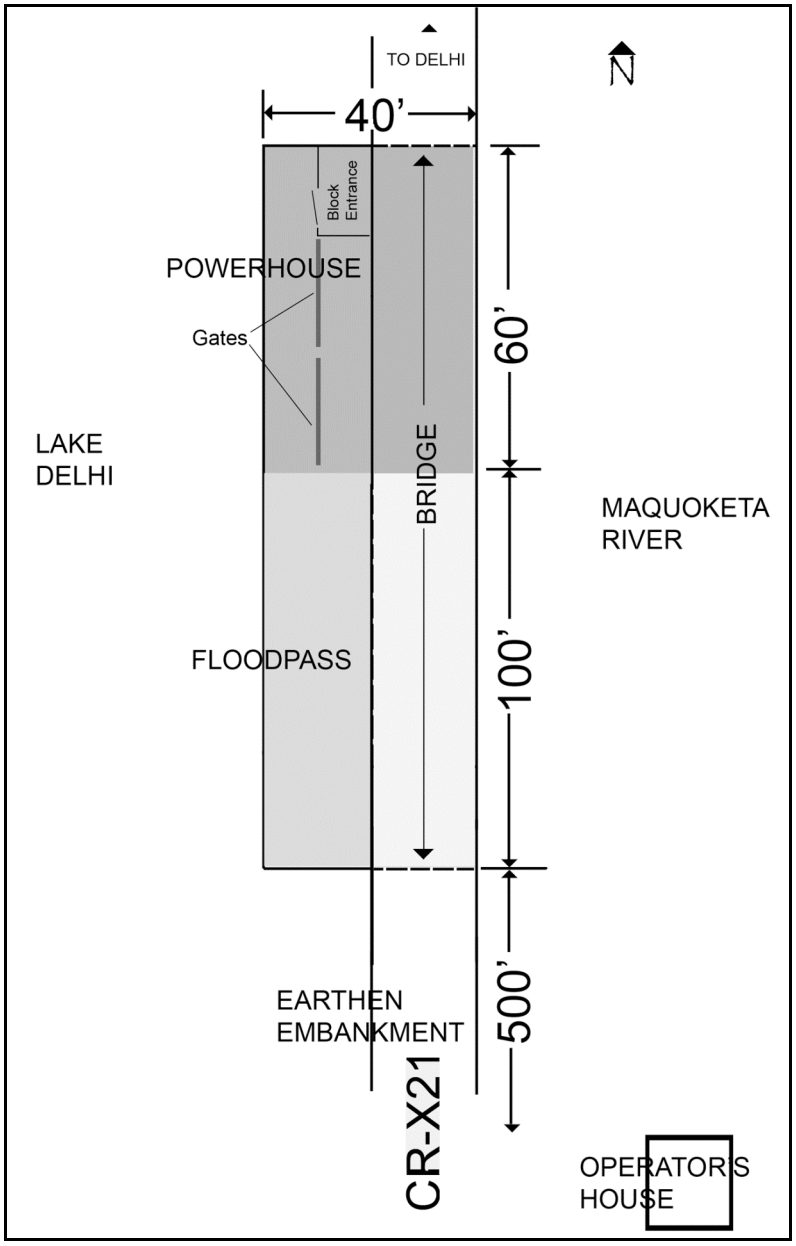
MAP SOURCE: www.trails.com

This zoomed view shows the relationship of the district's resources.

The dam (including the powerhouse) is indicated in red; the section of the bridge over the powerhouse is indicated in green; the section of the bridge over the flood pass of the dam is indicated in blue; the portion of the roadway (X-31) over the earthen embankment is indicated in purple; and the operator's house is indicated in orange.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

HISTORIC DISTRICT PLAN SKETCH – 2009 (Not to Scale)

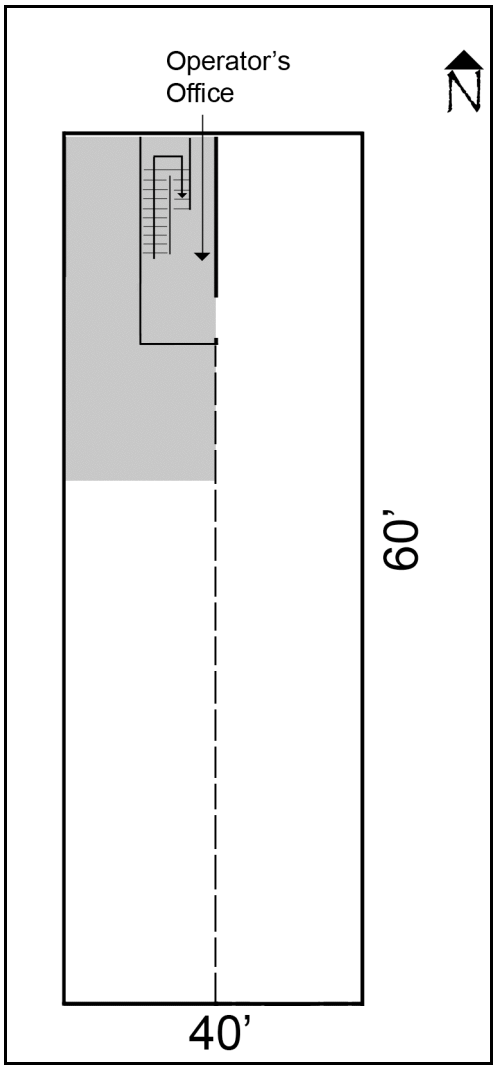


SOURCE: AKAY Consulting – March 2009

The sketch identifies the resources of the proposed historic district: powerhouse, dam (including the external deck over the powerhouse, the floodpass, and the earthen embankment), the bridge, the roadway (CR-X31), and the operator's house.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PLAN SKETCH OF THE POWERHOUSE – 2009 (Not to Scale)

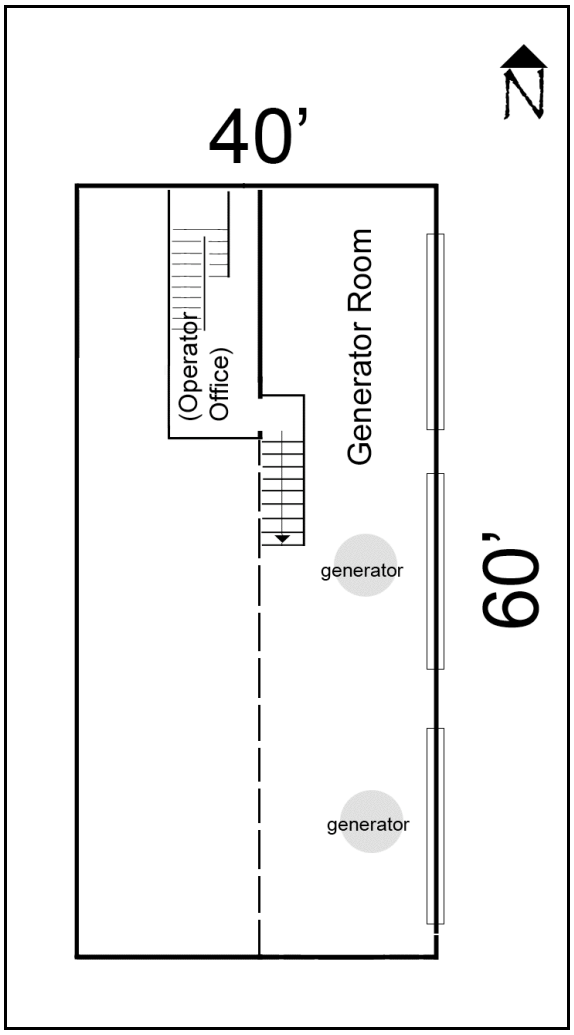


SOURCE: AKAY Consulting – March 2009

The gray shading indicates the location of the powerhouse within the larger dam. The recently constructed, concrete block entrance area (see sketch on the previous page) now provides sheltered access to the interior of the powerhouse. Once inside the entrance area, metal switch-back steps lead to the operator's office, as seen here.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PLAN SKETCH OF THE POWERHOUSE – GENERATOR ROOM - 2009 (Not to Scale)

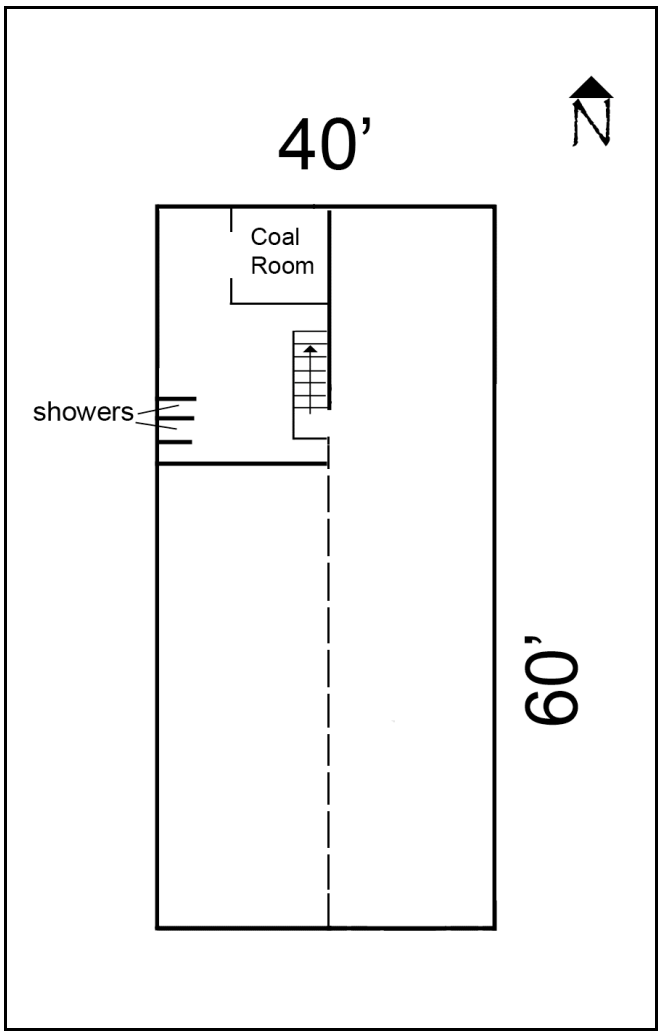


SOURCE: AKAY Consulting – March 2009

The generator room is reached via a steep set of metal stairs out of the operator’s office. The space is two-stories in height, with the underside of the bridge deck providing its ceiling. Two enormous generators dominate the space. Now relatively dark, the generator room was originally well-lit by three over-sized, glazed openings on the down-river side of the dam. These openings are now covered by metal panels – the glazing has been removed.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PLAN SKETCH OF THE POWERHOUSE – LOWER LEVEL - 2009 (Not to Scale)



SOURCE: AKAY Consulting – March 2009

This space sits below water level and historically stored coal and provided a washroom for dam operators.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Context

View of the Lake Delhi Dam and Powerhouse looking northwest from the downstream side.

View of the Maquoketa River looking southeast from the downstream side of the dam.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Context

View of the Lake Delhi Dam and Powerhouse, looking east from the upstream (lake) side.

View of Lake Delhi, looking from north to south across the lake. Approximately 950 cottages or homes are located along the eleven miles of Lake Delhi.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Exterior

The dam and powerhouse are an integral part of the CR-X-31 bridge over the Maquoketa River. This view shows all resources of the district except the house, which is site on the east side of the roadway, at the south of the bridge.

View of the downstream side of the dam and powerhouse, looking to the south. The concrete structure remains intact, with alterations made to the bridge's guard rail and the windows of the powerhouse - now filled with white, metal panels.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Exterior

View of the deck-side of the dam structure, looking to the south from a position over the flood pass gates.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Interior

View of the generator room, looking to the north. Note the stairs descending from the operator's office at left. The generators are original to the powerplant and will be refurbished if the plan to return the facility to hydroelectric production proceeds as intended.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

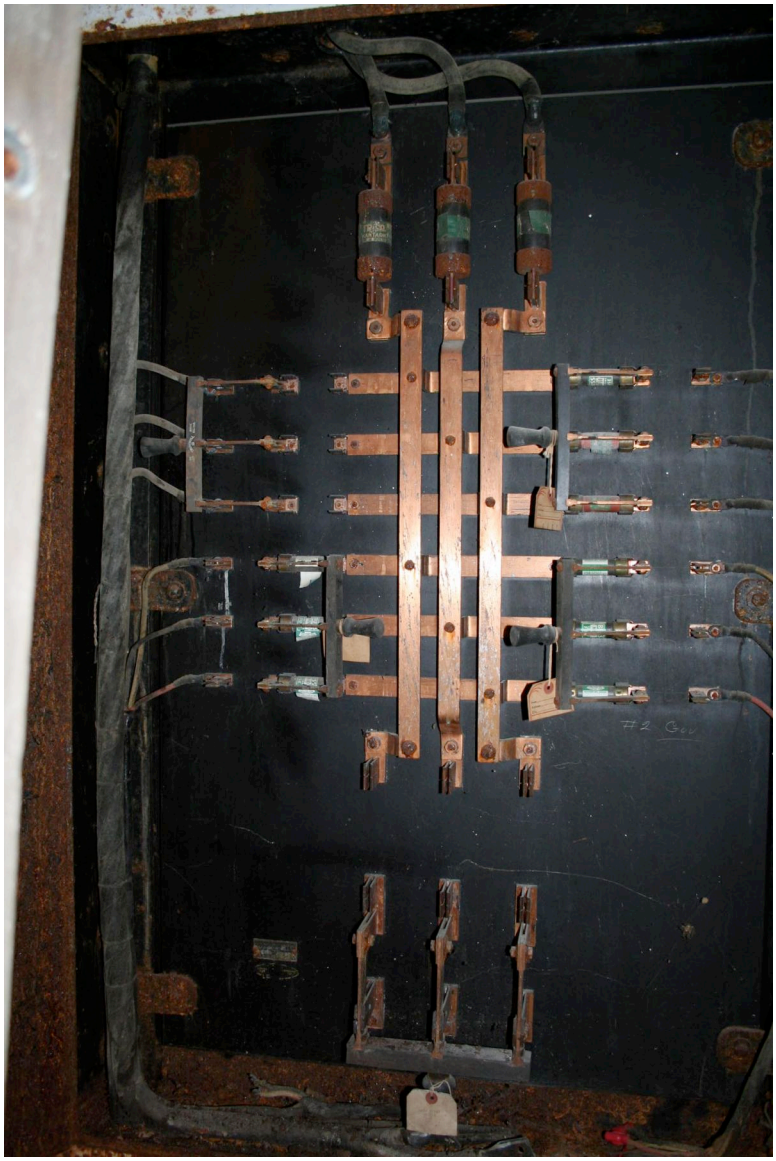
PHOTOGRAPHS – Interior

View of the lower level of the powerplant, (which is below water level), looking north toward the coal room. Equipment original to the powerhouse remains in this, now unused space.

View of the lower level, looking south toward the showers and toilet stall used by the powerhouse personnel. Note the heavy concrete beams of the structural system.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Interior Details



View of the plant's original control panel for the electrical system. The panel is non-operative, but will be retained as an artifact.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS – Interior Details

View of an original light fixture in the generator room.
There are six such fixtures in the space.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

PHOTOGRAPHS

View of the operator's house, looking to the southeast from CR-X-31.

Lake Delhi Dam and Powerhouse Historic District	Delaware
Name of Property	County
	Delhi
Address	City

BIBLIOGRAPHIC REFERENCES

National Register of Historic Places
Database of listed resources www.nps.gov

Iowa State Historic Preservation Office

Hippen, James C. "Historical Evaluation of the Greene, Iowa Powerhouse and Dam". February 1994.

"Mitchell Powerhouse and Dam". National Register of Historic Places.

Internet Sources

Newsarchive.com
Source for historic newspapers www.NewspaperARCHIVE.com
Various Iowa newspapers with news reports relevant to this survey are archived on this searchable website. When referred to in the text, they are properly footnoted.
Maps
Source for USGS Topographic and Satellite maps www.trails.com

History of Hydroelectric Power http://www.usbr.gov/power/edu/history.html
http://inventors.about.com/library/inventors
http://www.fuelfromthewater.com/history.htm

Koester, Frank. *Hydroelectric Developments and Engineering.* New York: D.Van Norstrand Company, 1909. (Digitized Version – Google Books.)

Iowa's Low-Head Dams Their Past, Present, and Future Roles. Iowa Conservation Commission & Iowa State University. July 1979.

Lake Delhi Recreation Association Files. Including historic images on loan from association member, Marcheta Cooley.

McDowell, Alexa K. *Intensive Level Survey & Evaluation of the Cedar Valley Power Company Hydroelectric Powerhouse at Nashua, Iowa.* R&C #60519117. April 1, 2008.

Merry, John F., ed. *History of Delaware County, Iowa, and its People.* Chicago: The S.J. Clarke Publishing Company, 1914. (Digitized Version – Google Books.)

Oral Informant. Dave Fink, Dam Operator. February 25, 2009.