Wild Rose State Fish Hatchery
Water Compliance and Renovation Project
Draft Environmental Assessment

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1.0 PURPOSE AND NEED

1.1 PURPOSE

The purpose of the Environmental Assessment (EA) is to consider the current and proposed future operation of the Wild Rose State Fish Hatchery (the Hatchery) located approximately one-mile north of the Village of Wild Rose in Waushara County, Wisconsin (see **Figure 1**). The draft EA discloses, explains and evaluates alternatives for the Hatchery and the potential environmental effects of those alternatives. Following a public review and comment period, a final EA will be prepared including information based on comments received during the public comment period. The final EA will provide the basis for selecting an alternative for the Hatchery project including a determination as to whether further environmental review, through preparation of an Environmental Impact Statement (EIS), is appropriate for this project.

The Hatchery is the largest coldwater fish hatchery in the State of Wisconsin and has been in operation since the early 1900s. In addition to rearing coldwater species, such as trout (Brown and Rainbow) and salmon (Chinook), the Hatchery also raises coolwater species including Northern Pike, Lake Sturgeon, Walleyed Pike and Muskellunge. Today, the Hatchery water supply facilities do not meet current minimum standards for well construction and protection of surface and groundwater resources. In addition, most of the Hatchery's facilities are out-of-date and difficult to maintain such that the productivity of the Hatchery is not being optimized. Alternatives for addressing the current inadequacies at the Hatchery are presented.

The Wisconsin Department of Natural Resources (WDNR) has studied the hatchery and fish rearing requirements of the State and presented the results of that study in a report titled *The Fish Propagation System Action Plan for Meeting Wisconsin's Fish Stocking Needs* (WDNR, July 2003). An overview of that study is included within this EA. The outcome of the study identified the Hatchery as the facility that, with improvements and modernization, could best help meet the fish rearing requirements of the State. This study identified alternatives for improving the Hatchery that can both bring the Hatchery into compliance, as well help the State meet its fish rearing requirements.

These efforts have resulted in the development of the *Wild Rose State Fish Hatchery Renovation and Compliance Project* (the Project), as described in this EA. The purpose of the Project is to complete Hatchery improvements such that it is a state-of-the-art cold and coolwater fish rearing facility that meets or exceeds all applicable regulations.

The proposed Project would utilize funding from a number of different sources including:

- Wisconsin Fish and Wildlife Segregated Fee account (F&W SEG) bonding (State license dollars)
- Wisconsin Great Lakes Trout and Salmon Stamp (SS) account (State stamp account)
- Sport Fish Restoration (SFR) funding (federal)
- Natural Resources Damage Assessment (NRDA) account (Fox River settlement)

Partial funding of the Project by the United States Fish and Wildlife Service (USFWS) acting as the lead federal agency, requires that this EA comply with both the National Environmental Policy Act (NEPA), consistent with Part 1500 of the Code of Federal Regulations, as well as the Wisconsin Environmental Policy Act (WEPA) including Chapter NR 150 of the Wisconsin Administrative Code. Both the WEPA and NEPA require the Project owner to conduct an assessment of environmental effects of projects funded by the state or federal government, respectively. The overall format of this EA follows that outlined by NEPA requirements.

1.2 NEED

The Project needs are as follows:

1. To bring the Hatchery water supply into compliance with existing standards for potable and non-potable water sources as applicable. The existing fish rearing water supply for current Hatchery operations includes springs, shallow well points and various wells, some of which are of undocumented construction and/or are not in compliance with current regulations.

2. To renovate the fish rearing capacity to help meet Wisconsin fish production requirements and provide for optimal fish health. The *Fish Propagation System Action Plan for Meeting Wisconsin's Fish Stocking Needs* (WDNR, July 2003) identifies renovation of the Wild Rose State Fish Hatchery as its highest need. Current fish rearing facilities at the Hatchery include areas that have deteriorated such that maintenance and operation have become increasingly difficult.

3. To construct a new, consolidated wastewater treatment system such that the Hatchery continues to discharge only high quality, treated effluent that continues to meet or exceed all applicable discharge standards and is protective of the Pine River (a Class 1 trout stream) that receives the wastewater discharge from the Hatchery.

4. To restore portions of the property's natural stream and wetland environment that were previously modified during development of the existing Hatchery.

5. To renovate and preserve select portions of the existing hatchery, including early hatchery structures as part of a Visitors Center and public education program.

1.3 DECISIONS THAT NEED TO BE MADE

As noted in Section 1.1, the Project must meet both WEPA and NEPA requirements. Upon completion and public review of this EA, the USFWS Region 3 Director will select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this EA is adequate to support a Finding of No Significant Impact, or whether an EIS will need to be prepared for the selected alternative. Similarly, under WEPA requirements, the EA evaluates probable environmental effects of the various feasible alternatives presented. Based on the findings contained in the Final EA, a decision as to the need to complete an Environmental Impact Statement (EIS) consistent with WEPA will be made.

1.4 BACKGROUND

Portions of the Hatchery property have been utilized for fish rearing for nearly 100 years, initially as a private facility and later as a State fish hatchery. The State purchased the Hatchery property and began operations in 1908. The Hatchery utilizes water from springs flowing from the base of a hillside located in a valley about ½-mile north of the Village of Wild Rose (**Figure 2**). These springs are located on the west side of Highway 22 and form an unnamed tributary stream that flows under Highway 22 to the Pine River. Over time, the Hatchery has developed with coldwater operations taking place on the west side of Highway 22. Coolwater operations were later developed on the east side utilizing flow (effluent) from the coldwater operations. The overall site layout of the existing Hatchery is shown on **Figures 3a** and **3b** representing the west and east sides of the facility respectively.

The Hatchery's primary purpose initially was to rear Brook and Brown Trout for stocking. During the 1930s, the Civilian Conservation Corps (CCC) laid red granite fieldstone and mortar walls to shape the ponds that are still present and in use today. Beginning in the early 1960s, many driven 2-inch sand point wells and header pipe were added in an attempt to augment the natural flow from springs and to direct well water to supply egg hatching batteries and fish rearing tanks in the buildings. In 1963, three 4-inch wells were drilled for the same purpose. In 1967, the main building for rearing cold-water fish was constructed. This building has 26 fish rearing tanks and eight egg hatching batteries.

In 1971, an old building located around 15 old concrete tanks was rebuilt with the addition of three cool water egg hatching batteries. In the 1970s the warm water rearing ponds were redeveloped to include solar heating ponds for the rearing of cool water fish. In 1985 a metal building was

constructed to house the 26 tanks that are used for rearing Lake Sturgeon, Northern Pike and other cool/warm water fish.

Below the cold water hatchery facilities, and on the east side of Highway 22, a dam was constructed in the 1950s. The dam formed a pond to act as a waste-settling basin to address concerns that effluent from the Hatchery could potentially affect the quality of the Pine River downstream of the Hatchery. This dam currently serves as one of the fish rearing wastewater outfalls for the facility. The water supply for cool/warm water fish rearing operations is primarily supplied from this settling pond and consequently can have water quality and nutrient loads that may not be optimal for fish production.

A majority of the facilities noted above have deteriorated to some extent with most remaining in use today while others have been abandoned. In some cases, the pond walls and bulkheads are crumbling, leak water and may allow fish to swim from one raceway section to another. This situation complicates operations, compromises segregation of different species and strains and may compromise fish health. Deterioration of raceway and pond walls is a significant safety concern for hatchery employees and public visitors. All of these systems are integrated across the Hatchery primarily utilizing gravity flow of water; thus, repair or replacement of one or more systems would disrupt other systems.

The current water supply system at the Hatchery has evolved over a substantial period time and was not developed according to an overall plan. Development of the water supply with sand points and wells has likely resulted in reduced spring flow and, at this point in time, it is not possible to compare historic and current flows for the springs or well system. Water quality problems associated with current operations include siltation, debris, excessive dissolved nitrogen, low dissolved oxygen, and storm water runoff, which have limited fish production and increased the potential for disease problems.

In 2003 a well inventory was conducted at the Hatchery and it was estimated that approximately 70 sand point type wells may be present at the facility in addition to approximately 10 other wells ranging from 2 to 16-inches in diameter. Many of these wells are of undocumented depth and construction and do not meet current well construction standards. The total number and condition of sand points and other wells is not known due to the fact that some may be buried, installed in existing raceway structures, or otherwise inaccessible.

The Hatchery water supply has been the subject of numerous discussions and studies over the years and was a driving force in development of this Project. In 1996 the United States Geological Survey (USGS) published a Water-Resources Investigation Report 96-4213 in cooperation with the WDNR. The report was titled Hydrogeology of the Sand and Gravel Aquifer in the Vicinity of the

Wild Rose State Fish Hatchery, North-Central Waushara County, Wisconsin (Conlon 1996), and built on a previous, county wide report prepared by the USGS in 1965 (Summers 1965). The Conlon report used existing data, and a limited number of seismic soundings, to assess the occurrence and movement of groundwater in the vicinity of the Hatchery. A follow-up investigation was undertaken by the USGS and WDNR in 1997 that included installation of a 16-inch test well at the Hatchery. A 24-hour pumping test was completed followed by initial development of a groundwater computer model.

Additional test drilling and aquifer testing was conducted during the summer of 2005 to further define aquifer conditions and provide preliminary design information for the necessary water supply facilities to supply the proposed Project. The results of this investigation are summarized later in this EA.

2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A summary of the various alternatives, associated activities and their ability to meet the Project purpose and needs, as described in Sections 1.2 and 1.3, are described below.

2.1 ALTERNATIVES NOT CONSIDERED FOR DETAILED ANALYSIS

2.1.1 Purchase Fish from Private Fish Farms

Privatization of the fish production at the Hatchery was considered as an alternative. Currently there are numerous practical, administrative and legal obstacles to the privatization alternative and these are briefly outlined below.

As WDNR discusses these issues with private industry and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) it is important that Great Lakes stocking efforts continue to maintain a world-class fishery. The potential for privatization will be considered as additional hatchery renovation projects are proposed. The WDNR will continue to work with Wisconsin's private fish farms to develop a system of cooperative fish production and new, outside funding to meet Wisconsin's fish stocking needs. This will be based on the industries capabilities and ability to reliably deliver the product needed by the WDNR, as well as economics.

- The Current State of Private Aquaculture in Wisconsin: While annual fish production numbers are compiled by the United States Department of Agriculture (USDA) for all Wisconsin fish farms (federal, state, tribal and private) reporting differences prevent accurate estimates of production by the individual groups. WDNR staff estimate that the three largest

private fish farms combined have total production capability that is less than the current facility at Wild Rose.

- The use of Feral Broodstock: WDNR fishery biologists prefer the use of feral broodstocks to take advantage of locally adapted genetics for increased survival rates. State statutes limit access to feral broodstocks to the WDNR, and there are additional concerns related to disease and the transfer of exotic organisms associated with any feral source of eggs.

- WDNR staff is not aware of any stocking programs in other States that rely on the private sector for a significant portion of their fish stocking needs.

2.1.2 Construct New Water Supply

This option involves construction of a new water supply that would be compliant with all applicable rules and regulations. The existing non-compliant water supply wells would be sealed under this alternative. Of the project needs listed in Section 1.2, this option would only bring the existing water supply into compliance and continue to use the existing facility in essentially its current condition. This option would not help meet statewide fish production requirements beyond the status quo, would not address the aging/failing facilities and would not enhance wastewater treatment processes or restore stream and wetland areas.

2.2 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

The alternatives carried forward include: A) the proposed Renovation and Compliance Project for the Wild Rose Hatchery; B) No Action; and, C) cease operations at the Wild Rose Hatchery and expand production at other State hatcheries.

2.2.1 Alternative A (Proposed Action)

The Proposed Action is the WDNR Wild Rose State Fish Hatchery Renovation and Compliance Project (the Project). The Project includes design and construction of improvements to the existing Hatchery, making it into a modern state-of-the-art cold and coolwater fish rearing facility.

The Project is proposed to be completed in two primary phases that focus on Hatchery facilities and a third phase that includes water supply compliance, wetlands restoration/reconstruction and dam removal. Phase 1 focuses on the west side of the property (west of Highway 22) and the coldwater species hatchery. Phase 2 will provide coolwater/warmwater hatchery facilities on the east side of the site. Phase 3 entails the restoration and reconstruction of stream and wetland areas on both sides

of the site. The overall Project layout is illustrated on **Figure 4** and its features are described below. The major aspects of the Project consist of the following:

- Remove existing coldwater and coolwater buildings and raceway structures.
- Construct new broodstock, coldwater and coolwater buildings and raceway pavilions.
- Renovate the existing office building.
- Upgrade the entire electrical system.
- Construct new wastewater treatment facilities.
- Develop a new water supply system that includes new high capacity wells for aquaculture and potable wells for domestic use.
- Seal existing non-compliant wells and water supply facilities.
- Restore/reconstruct wetlands and a portion of the natural stream.
- Preserve historic hatchery features, including an historic raceway for purposes of educating the public about historic fish rearing practices.
- Construction of a Visitor Center.

New Hatchery Facilities (Phase 1 and Phase 2)

The proposed Hatchery facilities include many features that provide for greater efficiency, flexibility and control to improve operations and provide for protection against fish diseases, accidents and other incidents that could be injurious to hatchery employees, visitors and the health of the various species of fish produced at the Hatchery. The new facilities also include new water supply and wastewater treatment facilities to provide enhanced environmental protection.

Phase 1 will focus on development of a new water supply and construction of the coldwater fish production and support facilities on the west side of the Hatchery. The new coldwater facilities will include a Coldwater Hatchery Building and adjacent Broodstock Building. These two primary buildings will be situated north of the existing Hatchery facilities and at higher elevation to facilitate gravity flow to four Raceway Pavilions (designated as Pavilion A through D). At the end of the Pavilions wastewater treatment facilities will be constructed including a circular clarifier, detention pond and sludge storage tank. Phase 1 also includes a Visitor Center that is proposed for the southwest portion of the Project site and adjacent to some of the historic raceways.

A primary feature of the coldwater hatchery facilities will be the flexibility to control water flow to the individual Raceway Pavilions. Water control structures will be included such that water can flow from one Raceway to another, or allow individual Raceways to be segregated out, as may be necessary for cleaning, disease control, maintenance and other activities. The new fish rearing water supply will allow for hatchery staff to withdraw only the amount of groundwater needed to meet fish production needs.

Phase 2 of the Project will focus on the coolwater/warmwater Hatchery facilities located on the east side of Highway 22. Primary features of Phase 2 will include a new Coolwater Hatchery Building, construction of 14 new rearing ponds (six ponds of one-half acres each, and eight ponds of one-acre each) a new wastewater treatment facility, and a solar pond that will help provide optimal water temperature to the rearing ponds for coolwater/warmwater species (see **Figure 6**).

Current wastewater treatment for the existing Hatchery is minimal and relies on a constant flow of water through the existing facilities with limited re-use of the water. Infiltration basins are located on each side of the site for disposal of concentrated wastes and high solids content water primarily generated during raceway cleaning on the coldwater side and during fish harvesting on the coolwater side. The dam located on the Hatchery stream, at the head of the coolwater rearing ponds, forms a relatively small settling pond on the east side prior to discharge to the Pine River. Water for the coolwater rearing ponds is obtained as needed from the settling pond and discharged directly to the Pine River. Proposed wastewater treatment for both Phase 1 and 2 will be significantly improved through the use of microscreens, clarifiers, ultraviolet disinfection, backwash cleaning ability, sludge storage and solids recovery. The existing infiltration basins on both sides of the existing facility will be abandoned as part of the Project eliminating the existing discharges to groundwater. These are wastewater treatment procedures that cannot be readily implemented with the current facility layout. The proposed treatment systems will facilitate greater water re-use and recycling without compromising fish health or water quality in the receiving waters. **Appendix B** provides flow schematics and a table comparing of current Hatchery effluent with projected average discharge for the Project.

New Well & Water Supply Construction

The proposed Wild Rose State Fish Hatchery Renovation and Compliance project involves the following major components related to water supply development: 1) development of a new groundwater supply for both the proposed coldwater (west side) and coolwater (east side) operations and 2) development of potable supply wells for the new buildings and facilities including the new coldwater and coolwater buildings, visitors center and the renovated office building.

The coldwater portion of the project will take place on the west side of the hatchery property (west of Highway 22) and involves the use of relatively cold water for propagation of trout and salmon. This portion of the project will use approximately 3200 gpm during normal operations when the water is conditioned and re-used between a series of four raceway pavilions. For limited periods of time, re-use of water may be restricted by maintenance operations, mechanical failure and/or contamination at one or more of the raceways. Assuming re-use is not possible, and fresh groundwater is required for all coldwater operations, approximately 6000 gpm would be required for limited periods under this emergency scenario.

The coolwater portion of the project will take place on the east side of the hatchery property (east of Highway 22) and involves the use of relatively warm water for propagation of coolwater species such as walleye, bass, muskellunge and sturgeon. This portion of the project will involve re-use of water from the west side coldwater operations to be augmented by a fresh groundwater supply of up to 1000 gpm.

Individual potable water supply wells, for domestic use, are also planned for the proposed coldwater and coolwater buildings, the Visitor's Center and the renovated office building. Depending on how the various components of the project are staged, a temporary water supply of approximately 300 gpm may be required to support the existing coldwater building prior to the availability of the permanent supply. Combined flow from the smaller potable supply wells is expected to be less than 5,000 gallons per day and neither these wells, nor the temporary supply well, are included in the assessment of potential impacts from pumping.

During the summer of 2005, a test drilling and aquifer testing procedure was conducted at the Hatchery. The results of this study are presented in a report titled *"Wild Rose State Fish Hatchery Renovation and Compliance Project No. 03I1F, Test Production Well Construction and Aquifer Testing Procedure"*. The purpose of this work was to build on previous investigations conducted at the Hatchery by gathering detailed information concerning the Quaternary aquifer including determination of aquifer characteristics and aquifer response to pumping. The goal of the testing was to collect sufficient information to determine the feasibility of the proposed water supply for the Project and to estimate the effects of the proposed withdrawal on the aquifer, nearby springs, wetlands and surface waters, including designated trout streams. The results of the testing procedure have also been used to determine potential interference with existing water supplies for area residents. A description of the proposed water supply is presented here and a more detailed discussion of site conditions and the effects of pumping is provided in Sections 3.0 and 4.0.

As part of the test drilling and aquifer testing program, test holes were drilled at seven locations on the hatchery property, observation wells were installed at four locations, and an 18-inch test production well was constructed. The following table presents the basic information concerning the test drilling locations.

Test Hole and Well Construction Summary

Bore Hole Name	WI Unique Well Number	Project Well Designation	Casing Diameter	Total Depth	Screened Interval (feet)
TH-1-05	Sealed	-	-	218	-
TH-2-05	Sealed	-	-	180	-

TH-3-05	PF 091	Obs-1-05	2-inch	200	145-165
TH-4-05	PF 092	Obs-2-05	2-inch	180	124-144
TH-5-05	PF 093	Obs-3-05	2-inch	218	145-165
TH-6-05	PF 094	Obs-4-05	2-inch	180	145-155
TH-7-05	Sealed	-	-	180	-
TPW-1-05	NV 233	TPW-1-05	18-inch	195	110-167

The locations of the wells and test holes tabulated above are shown in **Appendix C**. Small diameter observation wells, designated Obs-1-05 through Obs-4-05, were constructed as permanent observation points to monitor the effects of pumping over time and to assist in analysis of the effects of pumping during the aquifer testing procedure. An 18-inch test production well, designated TPW-1-05, was also constructed to facilitate a pumping test which was conducted during August of 2005. The test production well designation reflects the fact that the well was constructed to facilitate an aquifer test, however, the well was also constructed in such a way that it could be used a permanent production well for the renovated facility upon issuance of a WDNR High Capacity Well Approval. Approval was obtained from the permitting authority to construct and test the well. However, the well may not be used for high capacity water supply until the High Capacity Well Approval is issued.

Based on the results of the previous investigations and the work completed for this report, it is anticipated that the routine water requirement for the Project (both east and west sides) of 4200 gpm will be met by four wells operating at rates between 1000 and 1400 gpm. At least one additional well will be needed as a backup to the four primary wells for maintenance and repairs and a second additional well would likely be needed to supply the maximum demand of 7000 gpm under emergency conditions.

As indicated on the well location included in Appendix C, existing well TPW-1-05 will serve as one of three primary wells to be located on the west side for coldwater operations. A fourth well will be located on the east side for coolwater operations and a fifth well will be located near Highway 22 and plumbed to be able to serve as a back up supply well to either the east or west side water supplies. A sixth well will also be needed to meet the maximum, or emergency, demand of 7000 gpm. In order to accommodate the two phase construction schedule while providing a reliable supply of water for interim operations, it is proposed that Wells A, B and C are constructed first to supply Phase I (coldwater operations). While not needed for routine operations, construction of Well C at this time would provide for a back up well for use prior to completion of Phase II, an estimated period of approximately two years. Proposed Well D would be constructed as Part of Phase II and Well C would become the redundant well to back both east and west sides. Well E would be constructed to meet the emergency condition as part of Phase II.

An overview of the major components of construction of both Phase 1 and 2 is provided below.

Phase 1

Broodstock Building (7,920 SF)
Coldwater Hatchery Building (13,017 SF footprint)
Proposed Visitor Center Building (4,400 SF footprint)
Raceway Pavilions A through D
(Raceway Pavilion buildings each 7,695 SF)
Detention Pond (7,500 SF)
Circular Clarifier (1,963 SF)
Water Control Structures A through D
Parking Areas
Microscreens #1 and #2
Headtank
LPA Tank
Main Entrance Road and Well Road
Renovation of Office Building
Renovation of Garage
Renovation of Raceway Shack

Phase 2

6 Fish rearing ponds (each 1/2 acre)
8 Fish rearing ponds (each one acre)
Coolwater Hatchery Building (___ SF footprint)
edit to include other aspects of Phase 2
….
….

Note: Phase 1 square footage is approximate and based on *Wild Rose State Fish Hatchery Renovation and Compliance Phase 1 Plans* (FishPro, July 2005) provide addl or revised areas esp for Phase 2 when it is available.

As noted in previous sections, an important component of the overall Project involves removal of old Hatchery ponds, raceways, certain buildings and numerous wells for streambed and wetland restoration or reconstruction. These aspects of the proposed Project, which constitute Phase 3 are discussed below.

Well Sealing

The water supply for existing hatchery operations relies on artesian flow from springs and seeps below the raceways in addition to a variety of wells and sand points primarily used to direct water to the coldwater and coolwater buildings. Many of the wells and the sand points are not in compliance with current standards and state regulations for water supply wells. As such, these facilities will be abandoned as part of the Project when the new and renovated facilities are available for use.

The well inventory conducted in 2003 concluded that approximately 70 sand point type wells may be present in addition to approximately 10 other wells ranging from 2 to 16-inches in diameter. Many of these wells are of undocumented depth and construction, do not meet current well construction standards, will not be needed for the proposed Project and will therefore be sealed in accordance with NR 812 of the Wisconsin Administrative Code.

Well sealing will be conducted in cooperation with the local WDNR Water Supply Specialist and will generally involve sealing the existing flowing wells with neat cement grout. The goal of the sealing program is to prevent the wells from acting as conduits for groundwater to discharge at the surface by eliminating flow from the well and/or associated borehole. The general procedure for abandoning the flowing sand point wells will be to temporarily extend the casings above grade to eliminate or reduce flow, then grout the well from the bottom to the top through the use of a conductor pipe (tremie line). After the well is sealed, the temporary casing will be removed and the well may be cut off below grade. For very shallow wells, less than approximately 25 feet deep, it may be possible to pull the casing and grout the remaining open borehole. However, it's also possible that the rate of flow from the borehole would complicate or prevent adequate grout placement, in which case, the casing will be extending prior to grouting. Larger diameter wells will also be sealed by extending the casing if flowing conditions exist or by placing neat cement grout from the bottom to the top of the well through the use of a conductor pipe, if not flowing. An attempt will be made to clear any obstructions noted in the wells during abandonment.

Wetland & Stream Restoration / Reconstruction

The wetland and stream restoration / reconstruction portion of the proposed Project is based upon a goal of restoring portions of the site's wetlands as closely as possible to pre-disturbance conditions with limited exceptions for retaining certain historic structures for educational purposes and as part of Visitor Center. The restoration / reconstruction work will strive to reverse the disturbances that have affected the stream and associated wetlands within the constraints of the larger project that includes some wetland reconstruction for fish rearing purposes. The expectation of wetland and stream restoration is the development of a native dominated plant community that resembles reference sites. Along the stream on the west side, native species typical of groundwater fed saturated soil are already present (skunk cabbage, marsh marigold). These are expected to remain and possibly expand in area. Overall, this should result in native floral and fauna species diversity and provide greater habitat structural complexity that will benefit native fish and aquatic life

The proposed physical changes for wetland restoration / reconstruction include manipulation of terrestrial and aquatic resources as described below for both Phase I and Phase II of the Project. Restoration / reconstruction of the site will utilize local genotype seed and include species that have been identified on relatively undisturbed wetland and meadow areas located along the northeast side of the current Hatchery property that serve as reference for species that are appropriate for re-vegetation. Disturbed areas are to be protected from erosion with implementation of an erosion control plan that will include the installation of silt fencing, scheduling work to the extent possible to minimize work time in a particular areas, followed by seeding of any bare areas as soon as possible with a mix of a cover crop, native sedge meadow, and wetland species as described below.

For Phase I (coldwater complex) the numerous sand points, wells and old concrete structures (raceways and ponds) will be removed with the exception of a segment of old raceway that will be maintained as part of a Visitor Center exhibit. In addition to removal of concrete structures and wells, spoil piles from original pond and raceway construction will be removed. Some spoil areas are vegetated with mature (native) tree species that may be maintained, but other areas are vegetated with non-native species, such as reed canary grass and common buckthorn. Downstream from the pond area is a channelized section of stream with lined streambanks. Filling has occurred along this area and it is maintained in mowed lawn. White cedars are also present along portions of the stream. White cedars are more commonly found north of the tension zone. Wild Rose is just south of the tension zone, but white cedar can be considered native to the area. The individuals within Wild Rose are believed to have been planted. Removal of these trees is not recommended because of the large areas of canopy that would be removed and the disturbance associated with removal that would leave the area more open to erosion, especially in areas with steep banks

Concurrent with the removal of wells and concrete structures the large monotypic stand of reed canary grass would be shallowly scraped to remove reed canary grass rhizomes. Other areas of reed canary grass mixed with or close to native species should be treated repeatedly with herbicide to prevent this species from colonizing newly disturbed areas. For control of reed canary grass the herbicide Roundup (with glyphosate as the active ingredient) can be used where no standing water is present. Rodeo (glyphosate with a water soluble surfactant) can be used in areas where standing water is present. Glyphosate can be used where canary grass is totally monotypic and collateral damage to non-target species is not a concern, but would not be appropriate for areas where some native forbs and grasses are intermingled with reed canary grass. Where very precise spot treatment is possible to minimize collateral damage Roundup/Rodeo could be used.

Grass-specific herbicides can be used where native forbs are present to compete with reed canary grass but few native grasses are present. Vantage (with sethoxydim as the active ingredient) can be used in areas where no standing water is present. Grass-specific herbicides can be more effective if applied when air temperatures are greater than 70 degrees and when UV light levels are low (cloudy days, mid-morning or late afternoon). Vantage requires use of a surfactant that is non-ionic and contains a penetrant and acidifier to work effectively. Regardless of the type of herbicide used, multiple year treatments will be required in order to suppress reed canary re-growth from dormant rhizomes and the seed bank.

Any bare areas would be seeded and planted as soon as possible with a mix of native sedge meadow species along with a quick-germinating cover crop. The seed mix for these areas may need to be adjusted to accommodate wetter conditions around the pond area and shady conditions under trees but highly recommended graminoids, and their respective planting method are listed below.

Contracts or seed purchases will specify that invasive species will not be included. Further, there will be a restriction that local genotype seed will be used.

Graminoid (grass-like) species (present in reference site):

Latin Name	Common name	Planting method
Calamagrostis canadensis	Canada blue joint grass	seed
Carex stricta	Tussock sedge	plant plugs
Carex lacustris	Lake sedge	plant plugs
Glyceria grandis	American manna grass	seed
Juncus effuses	Common rush	seed
Poa palustris	Marsh bluegrass	seed
Scirpus cyperinus	wool-grass	seed

Other good graminoids:

Carex stipata	Common fox sedge	seed
Carex vulpinoidea	Fox sedge	seed
Glyceria striata	Fowl manna grass	seed
Leersia oryzoides	Rice cut grass	seed
Spartina pectinata	Prairie cord grass	plant plugs

Highly recommend forbs (present in reference site):

Aster firmus	Shining aster	seed
Aster lanceolatus	White panicle aster	seed
Cirsium muticum	Swamp thistle	seed
Helianthus grosseserratus	Saw-tooth sunflower	seed
Iris sp. (*I. versicolor* or *I. virginica*)	Blue flag	plant plugs
Rumex orbiculatus	Great water dock	seed

Other good forbs:

Asclepias incarnata	Swamp milkweed	seed
Aster puniceus	Swamp aster	seed
Eupatorium perfoliatum	Common boneset	seed
Helenium autumnale ?	Sneezeweed	seed
Lobelia siphilitica	Great blue lobelia	seed
Lycopus americanus	Common water-horehound	seed
Verbena hastata	Blue vervain	seed

Areas expected to retain water semi-permanently or permanently should be planted with native shallow marsh species as listed below.

Graminoid species:

Latin Name	Common name	Planting method
Carex lacustris	Lake sedge	plant plugs
Eleocharis obtusa	Blunt spike rush	seed
Leersia oryzoides	Rice cut grass	seed

Schoenoplectus acutus	Hard-stem bulrush	seed or plant plug
Schoenoplectus tabernaemontani	Soft-stem bulrush	seed
Spartina pectinata	Prairie cord grass	plant plugs

Forbs:

Alisma subcordatum?	American water-plantain	seed
Iris versicolor	Blue flag	plant plugs
Sagattaria latifolia	Common arrowhead	seed

The Phase II portion of the Project was historically developed as a series of large ponds with a dam on the channel at the end of the upper ponds. The stream from the ponds flows into the Pine River at the southeast end of the Hatchery property. The large ponds are surrounded by dikes and roads built from dredge spoils. Some roadways are asphalt covered. Signs of eutrophication are apparent around the upstream pond (upstream from the dam) with Elodea and algae in the water and reed canary grass on the pond banks. Evidence of groundwater seeps were evident in the downstream ponds. The substrate of the pond beds is gravel and sand. Restoration of Phase II includes removal of the dam on the upper ponds and treatment of the reed canary grass growing along the banks. Areas in the upper ponds that are currently inundated are to be seeded with a quick-germinating cover crop along with seeding and planting a mix of sedge-wet meadow species as listed above. Three of the ponds are to be retained. Other ponds downstream and northeast of this area are to be reconstructed for use as wastewater polishing ponds and for solar heating of the Phase II water supply. Where possible, restoration of these areas is to be as complete as possible within the context of the Project in order to re-establish the natural flow of water from the existing higher quality wetlands directly to Pine River on the southeast property edge. The actual square footage of restoration area and reconstruction area will be determined when the final layout on the east side is established; the final layout involves determining whether the existing ponds are needed for wastewater final polishing. If so they would not be considered restorations but reconstructions.

Reconstruction of the ponds will be done through the initial removal of unneeded asphalt, road and dike fill materials. Reconstruction will need to be gradual, moving northeast to southwest, since roads will be needed for equipment access to the ponds. Any original soil excavated from the ponds that was used to construct the dikes is to be spread across the pond beds. These areas are to be left with a slightly rough texture to simulate microtopographic variation in natural wetlands. Erosion control methods will need to be incorporated to prevent erosion of newly disturbed areas during and after construction. Pond beds are to be seeded and planted with quick-germinating cover crop species along with sedge meadow species as listed above.

A monitoring and management plan shall be developed to assess recovery of the site after construction. Mid-course corrections may be needed, particularly if invasive species move into restored areas. At a minimum, qualitative monitoring should include two vegetation surveys each

year during late June/early July and September. All plant species present should be recorded, and their abundance across the entire restoration site, and in each distinct community within the site, estimated using a scale from 1 to 5 (1=abundant, 2=common, 3= frequent, 4= uncommon, 5= rare). Populations of invasive species should be mapped to track changes after management activities. During each visit, evidence of wildlife use of the restoration site should be recorded. Management measures will depend on the monitoring results and whether invasive species have formed monocultures or are mixed with natives. In monocultural areas more aggressive techniques such as excavation of reed canary sod, or herbiciding the entire monocultural area may be justified, followed by reseeding. In mixed areas spot treatment of invasives done carefully to minimize collateral damage would be recommended. The choice of herbicides is also more restricted in mixed areas. For example, grass-specific Vantage (sethoxydim) would be preferred over Rodeo (glyphosate) in areas where native forbs and sedges are mixed with reed canary grass.

2.2.1.1 The Project Development Process Used by DNR to Develop the Scope of Work

WDNR initiated the process of developing the scope of work for the Project in 2001 using the Environmental Management System (EMS) process defined by ISO 14001. The EMS/ISO 14001 process is a set of standards used by organizations to improve their environmental performance by identifying aspects of their activities that impact the environment. The EMS process examined all aspects of the Hatchery operation. As examples, when detailing the environmental issues for the fish rearing water supply, the following design criteria were identified:

1. The new design of the water supply will meet current compliance standards.
2. The design of the new water supply system will provide water free of silt and debris.
3. Reliability and protection of the fish stocks being reared is the highest priority, with a failure analysis that protects broodstock production facilities.
4. The water supply design will minimize the level of dissolved nitrogen gas to 102% or lower and saturate the oxygen content.
5. The water supply design will be as mechanically simple as possible.
6. The water supply design will be low maintenance.
7. The water supply design will minimize the amount of energy required based on seasonal rearing needs.
8. The water supply design will incorporate the use of high quality materials based on life cycle cost analysis and have minimal additional overhead, maintenance and operational costs.
9. Consider the heightened sensitivity to ground water use/withdrawal in the design of the water supply system. If possible, gravity flow water should be provided to the following critical areas: coldwater broodstocks, incubation and early rearing buildings and “old time” rearing (educational and aesthetic) area.

For wastewater issues, the following design criteria were identified:

1. Maintain compliance with existing permit requirements and proposed changes.
2. Include an option that provides for a single discharge point for all fish rearing water, including treated water resulting from concentrated effluents, theraputants and disinfectants.
3. Discuss proposed changes and future needs with the wastewater contacts identified.

The results of the conceptual level study as in the report titled: "Wild Rose State Fish Hatchery Fish Propagation Water Supply Compliance and Renovation Study" presented design selection criteria for the Project as follows:

1. Meets production goals;
2. Least environmental impacts;
3. Minimizes impacts to wetlands;
4. Best cost benefit ratio;
5. Most public benefit; and
6. Most fisheries culture/resource/management benefit.

Aspects of the proposed Project have required additional evaluation to assess potential affects to groundwater and surface water from groundwater withdrawals and Project wastewater effluent. These are addressed as potential environmental consequences to the Project in Section ___.

2.2.1.2 Land Ownership Issues

The WDNR owns all of the land where the proposed Project will take place. Ownership of the Hatchery Property and adjacent properties is shown on **Figure 7**. *modify if necessary to describe the new property acquisition*

2.2.1.3 Authorities and Approvals (local, State and Federal permits or approvals required)

1. **High Capacity Well Approvals** (non-potable supply wells) (WDNR)
   The project will require a revision to the existing permit, or a new permit, for the proposed high capacity wells
2. **Domestic Water Supply Well Approvals** (potable supply wells) (WDNR)
   The potable supply wells will be included under the High Capacity Well Approval for the facility

3. **Domestic Septic System Permits** (Waushara County/ Department of Commerce)
   Permits will be required for construction of the required on-site septic systems and the work must be completed by a licensed professional
4. **WPDES** (Wisconsin Pollution Discharge Elimination System) (WDNR)
   The project will require a revision to the existing permit, or a new permit, for the proposed wastewater discharges
5. **Building Permits** (State Building Commission)
   State Building Commission Approval of Plans and Specifications is required
6. **Erosion Control Plans** or Approval (WDNR)
   Erosion control plans must be approved prior to any grading or construction
7. **Natural Water Body Permit** (NR16) (WDNR)
   Generally, required if the Project will utilize a natural water body. The proposed project may be exempt if a Chapter 30 or 31 permit is required
8. **Chapter 30 Waterway Permit** (WDNR)
   Generally required for pond construction, surface water structures and surface diversions. Both east and west side wetland restoration work will require a Chapter 30 permit
9. **Chapter 31 Dam Permit** (WDNR)
   Generally required for dam construction. May be required for this project for dam removal
10. **Wetland Permits** (Army Corps of Engineers, State and Local)
    Final plans for wetland restoration will be reviewed to determine required permits or approvals and compliance with Wisconsin NR 103 requirements that pertain to Water Quality Standards for Wetlands

In addition, this EA is subject to the NEPA (Federal) and the WEPA (State) review and approval processes.

2.2.2 Alternative B (No Action)

The No Action alternative would place WDNR in a position of non-compliance. The WDNR has a policy of being in compliance with all environmental laws. The Hatchery facilities would continue to deteriorate lending to a greater risk to the broodstock and a decrease in Hatchery production as well as safety concerns to Hatchery personnel and visitors.

The Hatchery produces approximately 27% of all the brown trout (Wild Rose and Seeforellen strain brown trout) and chinook salmon; 64% of all the northern pike; 100% of all the Lake Sturgeon and 100% of the Great Lakes Spotted Muskellunge strain muskellunge stocked in the Wisconsin waters. Potential reductions of this magnitude are not acceptable to the fisheries program or to the citizens of Wisconsin and member states of the Great Lakes Fisheries Commission, who depend on the

recreational fishing resource and its support of Wisconsin's economy - primarily the tourism industry.

A primary mission of the Wild Rose Hatchery is to provide fish to maintain a recreational fishery within Lake Michigan and to control exotic alewife populations in the lake. The resulting managed world-class fishery is an important component in maintaining a balance where several exotic species have destabilized native aquatic communities in Lake Michigan. Several deep-water fish species have been lost to over-fishing and predation by the sea lamprey. Alewives once littered beaches on the lake Michigan coastline. Stocking of trout and salmon have managed fisheries resources by restoring predator populations and lake aquatic community balance has been re-established. Maintaining fish stocking in Lake Michigan is an important tool in managing the fish and aquatic resource.

Wisconsin is member of the Great Lakes Fisheries Commission that has as one of its prime missions to coordinate the cooperative management of the fisheries resource between its partners in pursuit of mutually agreed upon fish community objectives. Fish stocking is an essential tool used to achieve these fish community objectives. Should Wisconsin not be able to meet its fish stocking commitments, fish community objectives for Lake Michigan would not be met, impacting the other member States of Illinois, Indiana and Michigan.

The American Sport Fishing Association (2001) estimated that the economic output of recreational fishing for Wisconsin is valued at $2.3 billion dollars. Recreational fishing generates $75.4 million dollars in sales and motor fuel taxes, $14.3 million dollars in State income taxes and $62.4million dollars in Federal income taxes. Two million anglers participate in recreational fishing in Wisconsin's waters. Thus it is significant to Wisconsin's economy.

Continuation of Hatchery operations without improvement would result in continued deterioration of the Hatchery facilities, leading to potential environmental consequences that are addressed in Section __ below.

2.2.2.1 Land Ownership Issues

The current Hatchery facility is on land entirely owned by the WDNR.

2.2.2.2 Authorities and Approvals (list local, State and Federal permits or approvals required)

The WDNR would have to proceed with issuing non-compliance orders for the fish rearing water system in place.

2.2.3 Alternative C (Ceasing Hatchery operations; and expanding operations at other, smaller hatchery facilities)

Ceasing Hatchery operations would entail the closure of the Wild Rose facility including sealing of wells, decommissioning and removal of man-made structures, site reclamation including wetland restoration/reconstruction and require expanding operations at other, smaller hatchery facilities. The expansion of fish production of other hatcheries and closure of the Wild Rose facility has been evaluated. A review of Wisconsin's fish propagation system was conducted by the WDNR and provided to the Joint Legislative Audit Committee, and documented in "A Fish Propagation System Action Plan for Meeting Wisconsin's Fish Stocking Needs" (WDNR, February 2002). The report identified five strategies for fully meeting Wisconsin's fish stocking needs. Rehabilitation of existing facilities is a major strategy and includes compliance needs, critical needs, high priority needs, enhancements and maintenance needs. These needs apply to some degree to nearly all of the Departments major fish production facilities and are especially applicable to 100-year old Wild Rose Hatchery that is the largest coldwater fish production facility in Wisconsin by several orders of magnitude.

Criteria used to screen facilities for expansion suitability as an alternative to renovation of the Hatchery included:

- A review of groundwater resources available and their stability for expanded coldwater fish production. Pumped well water supplies are considered the most desirable because the water has a relatively stable temperature and predictable flow volume, is high quality and is less subject to disease and contamination issues.
- Existing facility staff and utility infrastructure must be able to support expansion via modernization and use of technology to improve staff utilization efficiencies.
- Must exhibit few, if any, limitations on the type and age class of species that can be reared. Multiple coldwater and coolwater crops would result in increased facility utilization and staffing efficiencies.
- Fish production from the Hatchery is destined primarily for meeting Lake Michigan stocking goals. Distribution distances must be factored into any decision to expand operations at other facilities.
- The potential affects of expansion on the WPDES permit must be considered.
- No property ownership or use issues.

From this review, the following other hatcheries were identified as possible locations for expansion as an alternative to the recommended Project. All of these sites are considerably smaller than the Hatchery and would require significant investment to fully develop; all represent a compromise to

the proposed Project because limited expansion at other facilities would require fragmentation of production to these several different facilities.

Table 2a Summary of Facilities and Their Limitations for Consideration of Expansion to Meet Fish Production Goals Identified for Wild Rose Hatchery

Facility:	Water supply issues:	Infrastructure issues:	Rearing limitations:	Distribution issues:	Affect on WPDES permit:	Legal issues:
1. Kettle Moraine Springs SFH	Has groundwater study completed Would require pumping and new treatment and distribution system	Staffing adequate Utility expansion possible	No species/strain limitations anticipated Would be limited to Great Lakes stocking due to disease and exotics exposure	Excellent location near Lake Michigan	May require the addition of complex wastewater treatment systems	Hatchery was acquired with specific mission to provide fish for Lake Michigan Stocking
2. Lake Mills SFH	Would need groundwater study to determine the extent of expansion possible Would require pumping and new treatment and distribution system Limited space is available for maximizing coolwater production	Facility infrastructure would need to be upgraded – new rearing building and additional covered raceways Additional pond rearing space would need to be developed for coolwater fish	No species/strain limitations anticipated Would be limited to Great Lakes stocking due to disease and exotics exposure	Very good location near Lake Michigan	May require the addition of complex wastewater treatment systems	None identified
3. Nevin SFH	Groundwater withdrawal limited to 1,500 GPM by internal agreement	Significant groundwater recycling and treatment systems would be installed to increase production significantly	Fish health limitations would impact disease classification and continued use as a broodstock facility Would be limited to Great Lakes stocking due to disease and exotics exposure	Good location for access to Lake Michigan Stocking sites	May require the addition of complex wastewater treatment systems	None identified
4. Nevin Lima Pond Complex	Would need groundwater study to determine the extent of expansion possible Would require pumping and new treatment and distribution system	Currently no permanent staff on site, would have to redirect staff allocation Would need complete utility upgrade Would need a rearing/staff building constructed	No species/strain limitations anticipated Would be limited to Great Lakes stocking due to disease and exotics exposure	Very good location near Lake Michigan	May require the addition of complex wastewater treatment systems	None identified
5. Osceola SFH	None identified Would require pumping and new treatment and distribution system	Would need complete utility upgrade Facilities, including rearing building	Fish health limitations would impact disease classification and continued use as a broodstock facility	Marginal location for distribution to Lake Michigan because of distance to be traveled	Will require the addition of complex wastewater treatment systems	None identified

		and rearing units would need significant upgrading	Would be limited to Great Lakes stocking due to disease and exotics exposure			
6. Art Oehmke SFH	Would need groundwater study to determine the extent of expansion possible Coolwater expansion would require additional pond rearing facilities	Complete coldwater rearing facilities would need to be constructed Staffing adequate Utility expansion possible	No species/strain limitations anticipated Would be limited to Great Lakes stocking due to disease and exotics exposure	Acceptable location for Lake Michigan Stocking, but somewhat long distance	Will require the addition of complex wastewater treatment systems	None identified
7. Governor Thompson SFH	Would need groundwater study to determine the extent of expansion possible Coolwater expansion would require additional pond rearing facilities	Complete coldwater rearing facilities would need to be constructed Staffing adequate Utility expansion possible	No species/strain limitations anticipated Would be limited to Great Lakes stocking due to disease and exotics exposure	Marginal location for distribution to Lake Michigan because of distance to be traveled	Will require the addition of complex wastewater treatment systems	None identified

Facility specific notes:

- Kettle Moraine Springs SFH. The Kettle Moraine Springs SFH (and Annex) represents an opportunity for expansion if the current groundwater system were replaced with a pumped well system and new treatment and distribution system. A ground water study indicates that sufficient groundwater is available for pumping to support and increase in production that would be approximately 10% of the identified needs identified for the Hatchery.
- Lake Mills SFH. Represents an opportunity for expansion of coldwater operations with its relatively close proximity to Lake Michigan via the interstate system. However, the maximum amount of expansion is only approximately 10-15% of the coldwater and 10-15% of the coolwater production goals of the Hatchery. A groundwater study would need to be conducted to determine the total availability of groundwater resources available for expansion.
- Nevin SFH. While Nevin represents a good candidate site for expansion, groundwater withdrawal limits in this heavily urbanized area of the state have been established. Expansion would require extensive treatment and recycling of groundwater resources to achieve a limited expansion of fish production. At best, expansion of Nevin's production could account for only a fraction (5-10%) of the coldwater production goals for the Hatchery and would compromise the fish health rating of this important feral brown trout broodstock hatchery.
- Nevin – Lima pond complex. The rearing ponds at Lima Center represent an opportunity for increasing production. The ponds are currently operated at a lower density than the water supply can support because of its remote location from the Nevin SFH. Conversion of the ponds

to covered raceways and staffing on a permanent basis would result in increased production that would account for at best 10% of the planned coldwater production at the Hatchery. Distribution access to Lake Michigan stocking sites would be good.

- Osceola SFH. Osceola SFH represents an opportunity for expansion that would only be limited by the availability of groundwater. A groundwater study would have to be conducted to determine the limit of expansion. Sophisticated wastewater treatment systems would have to be constructed to address potential WPDES issues. At best, inland trout production could be shifted to this hatchery so that the fish health status of this important broodstock hatchery is maintained.
- Art Oehmke SFH. Expansion at the Art Oehmke SFH would require a groundwater study and conceptual level study to determine the potential and amount of expanded coldwater fish rearing at this facility. Physical space, staff and utility infrastructure would likely support expansion if groundwater resources were available. Distribution distances for Lake Michigan stocking would be acceptable.
- Governor Thompson SFH. Expansion at the Gov. Thompson SFH would require a groundwater study and conceptual level study to determine the potential and amount of expanded coldwater fish rearing at this facility. Physical space, staff and utility infrastructure would likely support expansion if groundwater resources were available. Distribution distances for Lake Michigan stocking would be long and therefore marginally acceptable.

All of the coldwater rearing stations (Brule River SFH, Langlade SFH, Lakewood SFH and Thunder River SFH) were not considered because of the following limitations:

- Considerable water supply issues
- Considerable infrastructure and utility issues
- Less efficient utilization of staff at smaller facilities

Long range plans for the coldwater rearing facilities call for consolidation of these facilities and staff into a single new facility. The new facility would have to take into account any needs for expanded coldwater production remaining after the renovation of the Hatchery.

The overall analysis of coldwater species propagation identified the Project at the Wild Rose Hatchery, as the most effective alternative as compared to the expansion or development of fish rearing at several of the other smaller facilities reviewed above. The Project at the Wild Rose Hatchery was the selected alternative based on the limitations of other hatcheries as identified above in Table 2a, and on the following factors that apply to the Hatchery:

- Compliance and maintenance issues need to be addressed.
- Wild Rose is the Wisconsin's and the Departments largest coldwater fish production facility by several orders of magnitude.

- It is in a good location with respect to both inland and Lake Michigan stocking sites.
- The Hatchery has a good availability of groundwater based on a USGS study.

2.2 SUMMARY OF ALTERNATIVE ACTIONS TABLE

Table 2b - Alternatives Not Considered for Detailed Analysis

Alternatives	Activity	Comments
Purchase Fish from Private Fish Farms	Privatize production at the Hatchery	State statutes limit access to feral broodstocks to the WDNR
Construct New Water Supply at Wild Rose Hatchery	Existing non-compliant wells sealed and new, compliant wells constructed	Would not help meet statewide fish production requirements, would not address failing facilities, would not enhance wastewater treatment or restore stream/wetland conditions

Table 2c - Alternatives Carried Forward for Detailed Analysis

Alternatives	Activity	Comments
Wild Rose State Fish Hatchery Fish Rearing Water Supply Compliance and Renovation Project	To design and construct improvements to the existing Hatchery, making it into a modern state-of-the-art cold and coolwater fish rearing facility	This option is the only option that meets all of the needs as stated in Section 1.2 of this EA
No Action	Operate and maintain existing Hatchery	This option is not an acceptable alternative, it would place WDNR in a position of non-compliance and the state of Wisconsin would eventually not be able to meet its management objectives for stocking fish state-wide, which would impact agreements with the Great Lakes Fisheries Commission regarding fish community objectives for Lakes Michigan and Superior
Ceasing operations at the Hatchery and expanding the operations at other, smaller, existing hatchery facilities	Fragmentation of production to several other, smaller, existing hatcheries, and decommissioning of the Wild Rose facility.	This option is not an acceptable alternative; it would require significant investment at the several other smaller facilities and is a compromise that, cumulatively, would increase the amount of pollutants that would require

		treatment prior to discharge

3.0 AFFECTED ENVIRONMENT

3.1 PHYSICAL CHARACTERISTICS

The Hatchery is located in North-Central Waushara County approximately one mile north of the Village of Wild Rose and eight miles north of the Town of Wautoma. Hatchery property consists of approximately 341.25 acres of land; 191.25 acres on the west side of Highway 22 in Township 20N, Range 10E, Section 24 and 150 acres on the east side of Highway 22 in Township 20N, Range 11E, Section 19 ***(note – do above acreages include newly acquired property?).*** Topography of the Hatchery property ranges in surface elevation from approximately 910 to 1030 feet above mean sea level (**Figure 2**). In addition to the primary Hatchery facilities described in Section 1.4, the property also includes a private residence, a walkway, a timber demonstration forest, paved parking and driveway areas. Remaining portions of the Hatchery property consist of primarily of managed woodland areas on the west side of Highway 22 and wetland, grasslands and wooded areas on the east side of Highway 22.

Portions of the natural stream are located in the area of the raceways and ponds. Flow from the west side of the property feeds the settling ponds and coolwater species rearing ponds on the east side. These ponds then discharge into the Pine River, which is further discussed below in Section 3.2.

The wooded areas are mainly comprised of former farmland managed by the WDNR that have been planted with monocultural forest trees for research and crop value. The wooded areas also include the timber demonstration area that consists of a stand of White Pine, Jack Pine and Red Pine trees with a nearby walking trail and interpretive signs (**Figure 3**) depicts the current Hatchery facilities and property layout.

Hydrogeologic Setting

The hydrogeologic setting of the Hatchery is of prime importance as it controls the water that is naturally available for current hatchery operations. The availability of groundwater is also of major importance to the proposed Project, and was a key element in the WDNR evaluation of the States overall fish rearing capabilities.

Bedrock in the area of the Hatchery consists of Precambrian granite, which may be overlain by a thin layer of Cambrian sandstone near the Hatchery (Summers 1965). The Bedrock is overlain by a sequence of glacial materials deposited during the Wisconsin Glaciation. The Green Bay Lobe of the Wisconsin Glaciation covered the area and deposited unconsolidated sediments consisting of

sand and gravel outwash and glacial till. At the Hatchery, shallow subsurface materials consist primarily of fine to medium sandy outwash deposits extending to depths of at least 20 feet. Conditions below this depth are more variable and include zones of more coarse sand and gravel outwash as well as thick sequences of silty glacial till extending to the bedrock surface at an estimated depth of 200 to 300 feet.

Groundwater discharging at the Hatchery originates as infiltrating precipitation in the hilly, topographically high area west of the Hatchery and flows towards the east and northeast discharging at topographically low areas at the Hatchery and at the Pine River below the millpond in Wild Rose (Summers 1965). Because the Pine River originates to the northwest of the Hatchery and water levels in the Pine River are greater than water levels in nearby wells and springs, it is possible that some of the water discharging at the Hatchery may originate at the Pine River west of the Hatchery (Conlon 1996).

The water source for current Hatchery operations is obtained from a surficial sand aquifer through artesian flow from natural springs, shallow sand point wells and drilled wells. This situation is less than ideal because the majority of the water currently used at the facility is obtained through artesian flow and cannot be effectively managed or controlled. The estimated artesian flow is approximately 1,500 to 2,000 gpm and varies as a result of seasonal and climatic fluctuations effecting groundwater recharge and storage.

The primary aquifer in the area is composed of permeable glacial outwash deposits occurring above the bedrock surface within the glacial drift. Historically, most area water supplies are obtained from this aquifer through the use of shallow sand point wells for individual homes or cabins or through the use of drilled wells completed deeper within the aquifer for newer homes and high capacity supplies. Since the Village of Wild Rose does not have a public water supply system the nearest public water supply is located at the town of Wautoma eight miles south of the Hatchery. In addition to the Hatchery, high capacity water supplies have been developed in this aquifer for irrigation of agricultural lands.

A survey of water supply wells in the vicinity of the Hatchery was completed in 2005 and the results of that survey including a map and a corresponding listing of the wells identified is provided in **Appendix C**. The nearest offsite private wells are located along Highway 22 between the east and west sides of the project. The 2005 survey included an inventory that indicates most wells are not listed in the state data base and there are a large percentage of sand point type wells that may not be fully compliant with current regulations.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Habitat/Vegetation

The Hatchery is located in a rural area with considerable forestland, grassland and agricultural land. In general the forested areas are found in areas with greater topographic relief and the agricultural land is situated in flatter upland areas. A representation of land cover types in the vicinity of the Hatchery is provided on **Figure 8**. More specifically, the Hatchery is located in a valley with natural spring groundwater discharges to wetlands and an unnamed tributary to the Pine River. The Pine River is the primary surface water resource in the area, and is designated as Class I trout stream (Class 1 streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout at or near carrying capacity). Numerous wetland areas are associated with the Pine River valley including a portion of the east side of the Project area. While it is uncertain exactly how the west side looked prior to development as a hatchery, it is anticipated that the area of the present day raceways was a groundwater discharge area characterized by springs and seeps forming the tributary stream to the Pine River.

The Pine River is a 28-mile long tributary to the southwest corner of Lake Poygan **(Figure 9)**. For management purposes the Pine River is divided into Upper and Lower portions with the division being the Wild Rose Millpond that encompasses 17 acres. In addition to being classified as Class 1 trout streams, both the Upper and Lower Pine River are considered Exceptional Resource Waters (ERW). The Hatchery is located below the Millpond and thus along the Lower Pine River. For much of its length, the Lower Pine River flows through mostly wooded and light agricultural land. The 23-mile Lower Pine River is considered a highly productive Class 1 trout stream that has some limited streambank erosion and animal waste issues that can deteriorate habitat. Several millponds and power dams are also located along its course and are responsible for some fluctuation in water levels and warm water discharge. There are 10 point-source discharges in the watershed including the Wild Rose Fish Hatchery and the Village of Wild Rose wastewater treatment plant that is located a short distance upstream of the Hatchery (WDNR Pine River and Willow Creek Watershed WR02). Point source discharges can affect stream habitat with possible nutrient loading and warm water discharges that can decrease oxygen content.

Portions of the Upper Pine River are located as close as one-third mile west of the Hatchery property. The Upper Pine River is a small, sandy-bottomed stream that has greater organic matter accumulated near the edges than does the Lower Pine River. Portions of the Upper Pine River have been degraded due to channel widening and filling of some wetlands and springs (WDNR, Publication WT-535-01, October 1998).

Important criteria to maintaining Pine River water quality include proper control of nutrient and sediment loading from both point sources and non-point sources. Wetlands along the stream corridor capture runoff and reduce nutrient and sediment loading, while springs contribute critical coldwater flow. Proper wastewater treatment prior to discharge is also critical to maintaining stream water quality. The Project includes elements that address each of these issues and minimize potential impact to the Lower Pine River.

As previously noted, some wetland areas occur on the Hatchery property. Wetlands identified on the Hatchery site and listed on the Wisconsin Wetlands Inventory maps consist of several subclasses of emergent/wet meadow, scrub/shrub, and forested cover type wetland classes. The Wisconsin Wetland Inventory map that includes the Property is included as **Figure 10**.

3.2.2 Listed, Proposed, and Candidate Species

Information regarding known occurrences of rare species and natural communities was obtained from the Wisconsin Natural Heritage Inventory Bureau of Endangered Resources. The Natural Heritage Inventory (NHI) provides information as to the presence of rare aquatic and/or terrestrial species and natural communities in individual sections of the County. Waushara County information is current to June 2004. The generalized information for the County indicates that no known rare species or natural communities have been identified in the section that includes the western half of the Project (west of Highway 22). The Project site east of Highway 22 is included in a section that has been identified to potentially include a rare or threatened aquatic occurrence(s).

Additional and more site-specific information regarding potential listed, proposed, or candidate species was requested from the Wisconsin Natural Heritage Inventory Bureau of Endangered Resources. The Bureau of Endangered Resources response (ERIR Log Number 05-226) dated September 11, 2005 and included in **Appendix D**, states that the NHI files contained information on only one record of an endangered species in the vicinity of the Project area. The Karner Blue Butterfly was reported at numerous locations within two miles of the Project location in 1998. The NHI Response states that the Karner Blue Butterfly is listed as Federally Endangered, and listed in Wisconsin as a Special Concern species. The NHI Response notes that the Karner Blue's only larval food plant is Wild Lupine (Lupinus perennis), therefore if the proposed Project would impact any Wild Lupine plants, the NHI response recommends that the area then be surveyed for the Karner Blue Butterfly. If Wild Lupine does not exist on the Project area, or if areas containing Wild Lupine can be avoided (if they were present), no survey for the Karner Blue Butterfly would be necessary.

Mr. Steve Fajfer with the WDNR Bureau of Fisheries and Habitat, walked the entire project site in September 2005 and found no evidence of Wild Lupine. The results of the site inspection for Wild Lupine were provided to the NHI who subsequently provided a September 27, 2005 verification

letter stating that there are no state or federally listed threatened or endangered species known or likely to occur in the project area, and that no further endangered species survey is warranted for the Project (see **Appendix D**).

For clarification, a follow-up inquiry was made to Ms. Helen Elise Kitchel with the NHI on September 29, 2005 regarding the general Waushara County NHI map. The map suggests the potential presence of an aquatic occurrence in the section that includes the eastern half of the Project (Section 19, Township 20N, Range 11E). According to Ms. Kitchel, the general Waushara County NHI map is not completely up to date, and that based on review of current files, there are no known threatened or endangered aquatic occurrences in that section.

3.2.3 Other Wildlife Species

Wildlife species on the Hatchery property include wildlife common to the area including deer, Black Bear, fox, raccoon, otters, squirrels, woodchucks and fishers (uncommon) Ruffed Grouse, turkeys, and seasonal inhabitants such as Woodcock, Great Blue Heron, Kingfisher and other resident and migratory birds common to central Wisconsin woodland edge habitats and urban settings.

Additionally, the Hatchery's Wild Rose Timber Demonstration Forest is planted with White Pine, Jack Pine and Red Pine. Visitors can hike or cross-country ski the trail while learning more about forestry management.

3.3 CULTURAL / PALEONTOLOGICAL RESOURCES

An archaeological survey has been completed for the Project by the Wisconsin Historical Society. The initial survey was completed for the west side of the Hatchery and identified a Euroamerican barn foundation, the Davies-Jones Barn site, on the southeast corner of the Project area. The Wisconsin Historical Society stated that it does not intend to recommend any additional archaeological investigation of the Davies-Jones Barn site. Additional evaluation of possible cultural resources was completed and …… Documentation is provided in **Appendix D**.

Preserving a portion of the original Hatchery facilities will be part of the Project and be a focus of the Visitor Center.

3.4 LOCAL SOCIO-ECONOMIC CONDITIONS

The Hatchery is an area attraction and advertised as such through the Village of Wild Rose publications and web-site. The close proximity of the Hatchery to the Village of Wild Rose (less

than one-mile to the south) makes it readily available to visitors to the area. The Hatchery is open to the public daily from 9:00 a.m. to 3:00 p.m. An estimated 15,000 people visit the Hatchery annually with the greatest number occurring during the summer months.

The Hatchery currently employs eight full-time and one 9-month seasonal employees and from one to seven limited term employees.

The most recent Wisconsin Department of Transportation Annual Average Daily Traffic (AADT) count along Highway 22 (2003) is 3,300 vehicles. Traffic counts for the nearest cross-roads are as follows:

Co. Rd. P (NNW of Site): 1,600 AADT
Co. Rd. A (SSE of Site): 1,900 AADT

In comparison to the average daily traffic on Highway 22, the number of vehicles associated with the Hatchery (suppliers, employees and visitors) is minimal ….. when compared to average daily traffic to the Hatchery …. ***modify with info on avg # of vehicles for daily traffic of hatchery during peak season (or range peak and slowest season).***

The land surrounding the Hatchery is used primarily for rural residential purposes with some current and former commercial activity along Highway 22. Commercial activities include a trucking company, recycling facility, an antique shop, former gas station, former gravel pit and the WDNR Habitat Management Facility one mile north of the Hatchery. The remaining area includes undeveloped land and agricultural uses, especially to the north of the Hatchery property. Surrounding landowners are shown on **Figure 7**.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 ALTERNATIVE A (PROPOSED ACTION)

4.1.1 Physical Impacts

The scope of the proposed Project has been described in Section 2.2.1 and will include some clearing, grading, construction of buildings, installation of wells as well as the wetland and stream restoration and reconstruction work. During construction best management practices will be implemented to minimize and control erosion and the timing of the work will be such that areas can be seeded as soon as possible following construction.

Water Supply Development

To assess potential impacts associated with development of the Project water supply, a computer model was developed as part of the 2005 aquifer testing work. The computer modeling results suggests that the proposed water supply development scenario for the Project is feasible from the stand point of groundwater availability, aquifer water levels and interference drawdown between existing and proposed wells. The impacts of pumping on area resources including the Hatchery spring complex, area wetlands and surface waters, in addition to private (domestic) water supply wells are discussed in more detail below.

Private Water Supplies

Under the proposed pumping scenario, a relatively limited area of the aquifer would be affected by the pumping by more than three feet of water level decline. This area is largely limited to WDNR property with the exception of the in-holdings, or privately owned parcels, within the Hatchery boundaries. It is anticipated that most, if not all area wells could tolerate such a decline without any interruption in their ability to supply water. Exceptions could include the previously mentioned in-holdings and properties immediately north of the Hatchery property on the west side of Highway 22. In these cases it may be necessary to modify or replace existing wells, prior to production pumping, to assure an uninterrupted supply of water.

Observation wells are in place to monitor the effects of pumping and these wells may be used to determine the effects of pumping at existing wells and surface water resources to assess the need for well replacement or other measures to mitigate potential impacts. The existing observation well network includes the four observation wells installed on-site (Obs-1-05 through Obs-4-05), The Village of Wild Rose Well located south of the Hatchery at the Village wastewater treatment facility (WWTF) and the WDNR Habitat Management well located north of the Hatchery property. The observation wells were constructed as permanent observation points that may be used to monitor the effects of pumping on the aquifer during operation of the renovated Hatchery. The supply wells for the Village WWTF and the WDNR Habitat Management Facility have also been monitored for pumping effects at off-site locations and will serve as important observation points in the future.

A detailed water level record is an invaluable tool in determining whether an existing private domestic well has been, or will be impacted, during pumping. The existing observation well network will be monitored on routine basis to establish a detailed pre-pumping record of water level changes in the aquifer. It is anticipated that additional observation wells will be added to the network as additional production well sites are established and developed for production pumping.

If future aquifer analysis, water level monitoring or computer modeling indicate that impacts are likely at existing domestic wells the pump should be set lower or the well should be replaced before the residents experience an out-of-water situation. In these situations the owner would be contacted and arrangements made for a licensed well contractor to examine the well and make recommendations to remedy the situation. If an area resident experiences an out-of-water situation that they believe may be the result of Hatchery operations they should contact a licensed well contractor to assess and/or remedy the problem and report the problem to the area WDNR Water Supply Specialist in Wautoma for further instructions. The observation well information, in combination with the production pumping records and information concerning the potentially affected well will be used to determine the cause of the problem. The Hatchery will be responsible for making any repairs, modifications or replacements to existing wells necessary to restore the water supply.

Hatchery Spring Complex and Wetlands

The actual effects of pumping on the area of the existing Hatchery spring complex and wetlands will be dependent on several factors including the wetland restoration proposed for the area. Major changes are proposed for the Hatchery spring complex including abandonment of the existing sand points, wells and non-compliant water supply facilities as well as abandonment of most of the existing raceways and restoration of the stream channel. The effects of these changes on water levels and the hydrology of the spring complex cannot be predicted with a high degree of certainty. However, the computer model presented in the previous section indicates that the proposed pumping scenario will result in a four foot decline in aquifer water levels near the existing raceways and that flow from the existing raceway area will decrease from approximately 1870 gpm to 1120 gpm. Projected impacts have been discussed with the WDNR wetland specialists responsible for the stream and wetland restoration and an adaptive management strategy has been proposed.

If it is determined that the effects of pumping in the vicinity of the existing raceways would be detrimental to the wetland restoration, it may be possible to develop additional supply wells further to the north, perhaps on the WDNR Habitat Management property immediately north of the Hatchery on the east side of Highway 22. The existing well for this facility was monitored during the pumping test without discernable drawdown after the 72-hour pumping period. Moving production pumping in this direction would spread the effects of pumping over a larger area with less drawdown and would have the added benefit of spreading the pumping perpendicular to the groundwater flow direction thereby reducing impacts. In addition, it may be possible to augment flow in the renovated Hatchery stream and wetlands through use, or re-use, of a portion of the coldwater water supply (currently 300 gpm is proposed for the historic raceway demonstration), through the use of existing Well E or by removing/reconfiguring spoil piles and filled areas.

As previously discussed, the next step in water supply development would involve construction of three additional wells on the west side of the Hatchery for coldwater operations. Assuming that each well is capable of supplying at least 1000 gpm, two of these wells, in combination with the existing TPW-1-05 would be capable of meeting routine pumping requirements. The third well would serve as a redundant supply wells for maintenance and emergency purposes, prior to construction of additional wells under Phase II of the Project. An additional test would then be conducted on these wells to verify model predictions and potential impacts to the aquifer. Subsequent phases of water supply development would then be based on the results of these wells.

If initial testing and operation of the four coldwater wells results in acceptable impacts, given the plans for restoration of the historic raceways and wetlands, then the coolwater well (Well D) would be installed as shown on the well location map in Appendix C, and Well C would be used as a back up well to support both east and west side operations, as necessary. If emergency capacity, for pumping up to 7000 gpm for limited periods is required, a location for a sixth well will then be selected based on the location of existing or planned water supply facilities.

If the initial testing and operation of the coldwater wells results in unacceptable impacts, then an additional coldwater well would become the emergency well and an additional well would be installed at an alternate location, such as the WDNR Habitat Management property, as shown on the well location map in Appendix C.

Pine River

The available information suggests that the flow in the Pine River is primarily the result of base flow from groundwater discharging to the stream in addition to runoff and direct precipitation. Under the existing conditions at the Hatchery, the particle trace conducted as part of the groundwater flow model suggests that flow from the existing Hatchery stream originates as groundwater in the area west of the Hatchery with a portion of that flow originating as recharge to groundwater from the Pine River in that area, as suggested in previous reports (Conlon 1996). Under the existing condition, the model indicates that the Hatchery stream contributes 1870 gpm to the flow of the Pine River with a portion of that flow originating from the Pine River upstream of the Hatchery.

A similar analysis was conducted for the proposed pumping scenario which also indicates that flow to the proposed wells and Hatchery stream will originate from a larger area west of the Hatchery with a portion of the flow originating as recharge to groundwater from the Pine River. Under the proposed pumping scenario, flow from the Hatchery stream and the renovated Hatchery would total 5320 gpm (stream at 1120 and hatchery at 4200 gpm).

The particle trace analysis suggests that the proposed pumping scenario does not cause a gradient reversal where groundwater that once flowed to the river now flows back towards the wells. The analysis does indicate that the Pine River recharges the groundwater in the area west of the Hatchery under both the pumping and non-pumping scenarios. Under the proposed pumping scenario for routine Hatchery operations (4200 gpm) where all water will be returned to the Pine River it is anticipated that there will be no net loss in the flow of water in the Pine River.

4.1.2 Biological Impacts

Habitat impacts associated with the completed Project will be minimal and upon conclusion the Hatchery will include restored or reconstructed natural stream and wetland areas as described in Section 2.2.1. Some forestry areas will be disturbed for construction of new roadways, hatchery buildings, raceways and rearing ponds and wastewater treatment facilities. The layout of the proposed Project (**Figure 4**) identifies the areas of new construction including a new entrance along the northern portion of the site.

The Project also includes the habitat restoration and partial reconstruction of wetland areas and original spring creek drainage as described in Section 2.2.1. The original stream course and wetlands on the west side of the project will be largely restored, and wetland areas on the east side that had previously been constructed into ponds, will be reconstructed to a condition resembling a wetland with portions remaining as part of Hatchery operations. The Project also minimizes the potential impact that the Hatchery may have on the Lower Pine River as a point-source discharge, by constructing the wastewater treatment improvements. Infiltration basins on the each side of the property and a settling pond on the east side provide current wastewater treatment for the Hatchery. Proposed wastewater treatment for both Phase 1 and 2 will be significantly improved with the use of microscreens, clarifiers, ultraviolet treatment, backwash cleaning ability, sludge storage and solids recovery. These are wastewater treatments that cannot be readily implemented with the current facility layout. The proposed treatment systems will facilitate greater water re-use and recycling without compromising fish health or water quality in the Lower Pine River. The wastewater treatment plant will be designed to maintain compliance with existing permit requirements, by meeting or improving discharge criteria, and to meet proposed changes to the permit requirement . The discharge location for the new wastewater treatment facilities will be similar to the current, improvised system, into the Lower Pine River. Flow schematics for the Project and a table of current and projected Hatchery discharge quality are provided in **Appendix B**.

The wetland and steam restoration portion of the Project will benefit the local flora and fauna of the area by minimizing potential impact to the Lower Pine River and restoring portions of Hatchery property to a more original state that is supportive of native flora and fauna. This should result in an

increase in native species diversity, and provide greater habitat structural complexity that will benefit native fish and aquatic life.

Additionally, it should be noted here that the Project will renovate the fish production system to meet WDNR fish production requirements and provide for optimal fish health. There will be an increase in the production of the existing species and strains reared at the Hatchery and that are stocked in waters of the State. The importance of stocking Lake Michigan to maintain recreational fishing needs and stabilize the aquatic community balance of the Lake were described in Section 2.2.2.

This alternative would not have an impact on any known endangered or threatened species. As noted in Section 3.2.2, there are no state or federally listed threatened or endangered species known or likely to occur at the site.

4.1.3 Cultural Resources

The archaeological survey completed for the Project by the Wisconsin Historical Society did not identity……. On the western side of the Hatchery a Euroamerican barn foundation, the Davies-Jones Barn site, was identified but it was concluded by _____ that it did not warrant any special preservation, or further evaluation. EXPAND with additional info as it becomes available. Documentation regarding the cultural resources evaluation for the Project site is provided in **Appendix D**.

This alternative does allow for preservation and incorporation of portions of the historic hatchery into an enhanced Visitor Center.

4.1.4 Environmental Justice

This alternative will not have a negative impact on a minority population or ethnic group. This alternative will not negatively impact the economically disadvantaged.

Any domestic water supply wells in the area that would be affected by the Project will be identified and modified or replaced to provide area residents and businesses with an adequate supply of groundwater. Potential impact on nearby water supply could occur if the water table is lowered to a level that is below existing well depths or pump settings. Mitigation of these impacts could include deepening of existing wells, lowering of pumps or installation of new deeper wells. *additional discussion and reference to aquifer testing* **.**

4.1.5 Cumulative Impacts

The cumulative impacts associated with the Project are positive. The Hatchery water supply would meet current groundwater protection laws enabling the Hatchery to meet the WDNR fish production requirements while providing for optimal fish health. This would have economic benefits long into the future for Wisconsin's tourism economy and ensure that Wisconsin meets its fish stocking commitments as a member of the Great Lakes Fisheries Commission.

The new water supply design will incorporate the use of high quality materials and have minimal additional overhead, maintenance and operational costs. New Hatchery structures, including the new fish rearing wastewater treatment system, would ensure that wastewater discharges meet or exceed current and future discharge standards, and the restored and reconstructed wetlands and natural stream would provide habitat for native flora and fauna of the area.

Continued and enhanced operation of the Hatchery would maintain employment and the Hatchery would be an improved local attraction to residents and visitors of the area. The Visitors Center would provide an educational experience to the general public and school groups and the past hatchery operations and remain a focal point for the Village of Wild Rose. The overall traffic associated with the Hatchery would remain minimal when considered in the context of the average daily traffic of Highway 22.
Please provide an estimate of the number of vehicles visiting the hatchery daily (employees and visitors) and estimate of potential increase with the Project.

The proposed Project does not conflict with local, State or Federal rules or regulations and is consistent with the State's action plan for meeting Wisconsin's fish stocking needs previously referenced in Section 1.2. This Project is not precedent setting.

4.2 ALTERNATIVE B (NO ACTION)

4.2.1 Physical Impacts

Continuation of Hatchery operations, in its current conditions and without improvement would result in continued deterioration of the Hatchery facilities. The deterioration would lead to greater risk to the broodstock and decreased Hatchery production and a resultant decrease in recreational fishery opportunities for Wisconsin. Groundwater compliance issues would remain unresolved and water supply to the Hatchery would continue to be difficult to effectively control to maximize Hatchery operations. Wetland restoration efforts would not be implemented. Improvements to wastewater management at the Hatchery would also not be made. Potential safety issues would remain a concern to employees and visitors due to the deterioration of raceway and pond walls

4.2.2 Biological Impacts

Some facilities at the Hatchery are aging and failing and will continue to do so. Degradation of wastewater management facilities could potentially impact habitat and water quality of the Lower Pine River. Wetland and stream restoration/reconstruction would also not occur at the Hatchery under this alternative. Maintenance and overall Hatchery management problems are increased by the lack of control over the water supply to the Hatchery. Water quality problems at the Hatchery include siltation, debris, excessive dissolved nitrogen, low dissolved oxygen, and storm water runoff that can limit fish production and can cause disease problems that ultimately could impact stocking capability to other waters of the State.

This alternative would not have an impact on any known endangered or threatened species. As noted in Section 3.2.2, there are no state or federally listed threatened or endangered species known or likely to occur at the site.

4.2.3 Cultural Resources

The archaeological survey completed for the Project by Wisconsin Historical Society did not identity……. On the western side of the Hatchery a Euroamerican barn foundation, the Davies-Jones Barn site, was identified but it was concluded by _____ that it did not warrant any special preservation, or further evaluation. *Expand with additional info as it becomes available or insert other language that has been proposed.*
Documentation regarding the cultural resources evaluation for the Project site is provided in **Appendix D**.

The no-action alternative does not allow for preservation and incorporation of historic hatcheries into an enhanced Visitor Center and continued deterioration of the facility could result in diminished attraction to the historic hatchery facilities.

4.2.4 Environmental Justice

This alternative will not have a negative impact on a minority population or ethnic group. This alternative will not negatively impact the economically disadvantaged. The result of this alternative could result in a negative impact to Wisconsin's economy because of decreased recreational fishery opportunities. Wisconsin would set a precedent by not meeting its management objectives for stocking fish state-wide and would impact agreements with the Great Lakes Fisheries Commission regarding fish community objectives for Lakes Michigan and Superior.

4.2.5 Cumulative Impacts

The cumulative impacts associated with the "No Action" alternative are viewed as negative. The Hatchery water supply would not be brought into compliance with current rules. Existing water supply control limitations would continue and would limit fish production and continue the risk of disease problems that could ultimately affect the Hatchery's ability to meet the WDNR fish production requirements. Thus, negative economic impacts could potentially arise if Wisconsin's ability to meet its fish stocking commitments as a member of the Great Lakes Fisheries Commission is jeopardized. Stocking of Lake Michigan with fish reared at the Hatchery has helped to create a world-class fishery that is also important to maintaining a balance where several exotic species have destabilized the native aquatic communities in Lake Michigan. Several deep-water fish species have been lost to over-fishing and predation by the sea lamprey. Alewives once littered beaches on the lake Michigan coastline. Stocking of trout and salmon have managed fisheries resources by restoring predator populations and lake aquatic community balance has been re-established. Maintaining fish stocking in Lake Michigan is an important tool in managing the fish and aquatic resource.

The result of ceasing operations at the Wild Rose hatchery would have consequences beyond impacts to stocking Lake Michigan. Because of the importance of stocking fish in Lake Michigan driven by recreational fishing needs and to stabilize the aquatic community balance, the Department would have to shift production of Lake Michigan bound fish to other, smaller, less efficient facilities. Distribution costs from these other smaller facilities would increase significantly. This has the net affect of reducing fish available for stocking inland, until facilities can be rebuilt to accommodate the increases in production.

The structures at the Hatchery would continue to deteriorate and the wetlands on the west side of the Site along with the natural stream would not be restored. The Hatchery would eventually become less of a local attraction as deterioration continues and safety concerns grow.

This alternative does not meet the stated needs.

4.3 ALTERNATIVE C (CEASING OPERATIONS AT THE HATCHERY AND EXPANDING THE OPERATIONS AT OTHER, SMALLER, EXISTING HATCHERY FACILITIES)

4.3.1 Physical Impacts

Cessation of operations at the Wild Rose Hatchery would require site reclamation, including wetland restoration/reconstruction, and proper well abandonment to protect the groundwater resource. This would involve removal of all man-made structures with habitat restoration and

include pre-demolition building surveys, demolition, grading, and establishment of vegetation. Site work would require proper erosion control and reclamation planning. It is likely that the resulting property would remain under Department ownership as part of the fishery area and the adjacent public hunting area. Sale of the property would not allow for the development of another private fish hatchery for example, as current environment laws would prevent significant redevelopment of the existing hatchery rearing area. However, a private hatchery could be built similar to what the Department proposes. Wetland and stream restoration will not take place at the Hatchery.

This is a significant cost to the fisheries program of potentially several million dollars while failing to meet program needs.

4.3.2 Biological Impacts

This alternative would not have an impact on any known endangered or threatened species. As noted in Section 3.2.2, there are no state or federally listed threatened or endangered species known or likely to occur at the site.

This alternative could potentially have negative biological affects on Lake Michigan and its fishery resource as described in Section 4.2.5. If stocking levels are compromised, it could destabilize the aquatic community of Lake Michigan.

Expansion at other, existing hatchery facilities would increase the amount of pollutants that must be managed and discharged by these smaller facilities. Effective effluent treatment of increased discharge volumes at the smaller facilities would required upgraded wastewater management systems at a number of facilities in order to meet the production provide by the Hatchery Project. Effluent. Also, there could potentially be impacts to groundwater resources at many of the identified alternative hatcheries; these potential impacts would require study and modeling similar to what has been completed for the Hatchery, to fully determine the potential environmental impacts.

Private ownership of the property could potentially result in development that could adversely effect the environment.

4.3.3 Cultural Resources

The archaeological survey completed for the Project by Wisconsin Historical Society did not identity……. On the western side of the Hatchery a Euroamerican barn foundation, the Davies-

Jones Barn site, was identified but it was concluded by _____ that it did not warrant any special preservation, or further evaluation. EXPAND with additional info as it becomes available. Documentation regarding the cultural resources evaluation for the Project site is provided in **Appendix D**.

This alternative does not allow for preservation and incorporation of historic hatcheries into an enhanced Visitor Center and continued deterioration of the facility could result in diminished attraction to the historic hatchery facilities.

4.3.4 Environmental Justice

This alternative will not have a negative impact on a minority population or ethnic group. This alternative will not negatively impact the economically disadvantaged.

Cessation of the Hatchery would result in the loss of Hatchery jobs and eliminate the Hatchery as a destination for area visitors and school groups. Reductions in stocking programs could effect the recreational fishing industry by destabilizing the aquatic community of Lake Michigan.

4.3.5 Cumulative Impacts

The cumulative impacts associated with closing the Hatchery and expanding the operations at other, smaller, existing hatchery facilities is generally viewed as negative. The Hatchery water supply would need to be abandoned and Hatchery structures would need to be closed/removed, all resulting in additional costs. The wetlands and natural stream on the west side of the Site would not be restored. The Hatchery would no longer be a local attraction.

Each of the facilities where operations would be expanded would require substantial investment to fully develop. This alternative may result in impacts to groundwater and surface water resources associated with expansion at other facilities.

The no-action alternative could lead to a decrease in fish stocking programs and a resultant decline in recreational fishery opportunities as well as disrupting the aquatic community balance of Lake Michigan as described in Section 4.2.5. The stocking of Lake Michigan that has resulted in a world-class fishery that has been a key component to controlling exotic species. Maintaining fish stocking in Lake Michigan is an important tool in managing the fish and aquatic resource. The result of ceasing operations at the Wild Rose hatchery would require a shift of production of Lake Michigan bound fish to other, smaller, less efficient facilities. Distribution costs from these other smaller facilities would increase significantly. This has the net affect of reducing fish available for stocking inland, until other facilities can be rebuilt to accommodate the increases in production.

Wisconsin would set a precedent by not meeting its management objectives for stocking fish state-wide and would impact agreements with the Great Lakes Fisheries Commission regarding fish community objectives for Lakes Michigan and Superior.

This alternative does not meet all of the stated needs.

4.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE

The following table briefly summarizes the environmental consequences of the alternatives carried forward for more detailed analysis:

Table 4a: Comparison of Environmental Consequences of the Alternatives

Condition/Alternative	**Alternative A – (Proposed Action) Wild Rose State Fish Hatchery Fish Rearing Water Supply Compliance and Renovation Project**	**Alternative B - No Action**	**Alternative C - Ceasing operations at the Hatchery and expanding the operations at other, smaller, existing hatchery facilities**
Habitat	The new water supply will meet current compliance standards and provide optimal water quality to maximize fish production New wastewater treatment facilities will maintain compliance with existing permit requirements, by meeting or improving discharge criteria, and meet proposed changes to the permit requirements. Wetlands and a natural stream area will be restored.	The aging and failing facilities will continue to deteriorate. The current Hatchery water supply will be non-compliant with existing permit requirements and proposed changes. Wetland and stream restoration will not take place at the Hatchery.	All water supply wells will need to be properly abandoned. The current wastewater treatment system and all other Facility structures will need to be properly closed, removed, and/or abandoned. Wetland and stream restoration will not take place at the Hatchery.
Biological	Groundwater withdrawal will be adequately monitored in order to mitigate potential impacts to the regional water system. Wastewater quality would be maintained or improved to maintain the quality of the receiving water.	Quality of the effluent wastewater discharge to Pine River may deteriorate. Public health and safety issues exist because of the deterioration of the Facilities, some of which do not meet current environmental protection statutes.	Facility structures, including the water supply wells that are not properly closed, removed and/or abandoned may pose a threat to health and the environment. Expansion at other, existing hatchery facilities would increase the amount of pollutants that would

	The Hatchery will meet WDNR fish production requirements and provide for optimal fish health for stocking programs in Lake Michigan and inland waters.	The current Hatchery operations are negatively impacting fish production.	need to be managed prior to discharge at other smaller facilities. Potential impacts may occur due to increased groundwater withdrawal at alternative hatchery facilities. Investigation and mitigation would need to be evaluated.
Listed, Proposed and Candidate Species	No endangered or threatened species were identified at the Site.	No endangered or threatened species were identified at the Site.	No endangered or threatened species were identified at the Site. Evaluation of their potential occurrence at other facilities would be required.
Cultural Resources	No additional archaeological investigation needed. CLARIFY WITH FINAL RESULTS	No additional archaeological investigation needed. CLARIFY WITH FINAL RESULTS	Cultural and archaeological investigation would be required for other hatcheries where expansion could occur to accommodate the production lost by closing Wild Rose SFH.
Environmental Justice	No impacts identified; mitigation of potential interference with adjacent water supply wells may e required	No impacts, except potential impacts associated with non-compliant hatchery wells. Diminishing value as a local attraction and destination for school groups.	No impacts. Loss of a local visitor attraction and educational opportunity for school groups.
Cumulative Impacts	Positive	Negative	Negative

5.0 LIST OF PREPARERS

Alfred Kaas, State Wide Fish Propagation Coordinator	WDNR, Madison, WI
Steve Fafjer, Bureau of Fisheries and Habitat	WDNR, Wild Rose Hatchery
James de Lambert, PG, Project Manager/Senior Hydrogeologist	Liesch Environmental Services
Mark Olson, Senior Environmental Scientist	Liesch Associates, Inc.
Suzanne Johnson, Environmental Scientist	Liesch Associates, Inc.
Others?	

6.0 CONSULTATION AND COORDINATION WITH THE PUBLIC AND OTHERS

The following are formal presentations given over the past 24 months by Mr. Steve Fajfer with the WDNR Bureau of Fisheries and Habitat about the Wild Rose Water Compliance and Renovation Project.

- Wautoma Rotary, September 2003
- Wisconsin Aquaculture Association, June 2004
- Wautoma Kiwanis, September 2004
- Waushara County Retired Teachers, September 2004
- Wild Rose Women's Club, November 2004
- NER Regional Management Team, March 2005
- Waushara County Historical Society, April 2005
- NER (Northeast Region) Foresters Meeting, May 2005
- Wild Rose Economic Development Council, August 2005

In addition to the above, Mr. Fajfer have given approximately 30 talks to schools from elementary schools to Fox Valley Tech and UW Stevens Pont, which were informal discussions where the renovation was not the focus, but a sideline item. There were Hatchery open houses held in 2003 and 2004 on the Free Fishing weekend, with displays and tours highlighting the future renovations. There have been numerous newspaper articles, and DNR Fisheries Program made mention of the future renovations in the Natural Resources magazine, and in the 2004 and 2005 Fish Forecast newsletter.

The WDNR Bureau of Fisheries and Habitat has coordinated with ----- complete the list other agencies (USFWS, ….

The NEPA will be put on public notice for a 33 day public review and comment period WEB-site?

7.0 PUBLIC COMMENTS ON DRAFT EA/EIS AND RESPONSES

(This Section is optional at the EA level. However, it is generally a good idea to include it and it is becoming increasingly more common in EAs. This section may be required for EAs where there is strong public controversy. Typically comments are lumped by issue. e.g. "Three commenters were concerned about increased dust being produced by traffic visiting the upgraded project site." Where the agency agrees with the comment, an appropriate change is typically made to the final document which is documented in the response. e.g. "The project design has been modified to include paving the access road." Where the agency disagrees with the comment, the response explains the basis for not incorporating the comment. This is an important section because the agency can demonstrate here that it is responsive to an interested public)

8.0 REFERENCES CITED

The Fish Propagation System Action Plan for Meeting Wisconsin's Fish Stocking Needs (WDNR, July 2003)

Wild Rose State Fish Hatchery Fish Propagation Water Supply Compliance and Renovation Study (WDNR)

Wild Rose State Fish Hatchery Wetland Restoration Recommendations Memorandum (State of Wisconsin, June 30, 2005)

Inventory of existing sand points and wells

Aquifer Testing Procedures (Liesch, August 2005)

Wisconsin Natural Heritage Inventory Response

Wisconsin Historical Society Cultural Survey

West Side Existing Conditions Wild Rose SFH Fish Propagation Water Supply Compliance and Renovation Study (FishPro, December 13, 2004)

Nonoint Source Control Plan for the Pine Creek / Willow Creek Priority Watershed Project (WDNR Runoff Management Practices Section, Publication WT-535-01, October 1998)

Pine River and Willow Creek Watershed (WR02) – Watershed Management link WDNR website. August 2005

Wisconsin Rapids, Wisconsin, Topographic Quadrangle Map, 30 x 60 Minute Series (U.S. Geologic Survey, 1986)

Wild Rose, Wisconsin, Topographic Quadrangle Map, 7.5 Minute Series (U.S. Geologic Survey, 1983)

Wautoma NE, Wisconsin, Topographic Quadrangle Map, 7.5 Minute Series (U.S. Geologic Survey, 1983)

Additional references to be added

(It is standard procedure to make EAs available on the Region 3 NEPA web site. Electronic copies are supposed to duplicate the printed copies so it is important to have appendices available in electronic format as well as the text of the EA. If an Appendix is not available in electronic format, the situation should be addressed early in the development process. Note that scanning is generally not a good option, because it creates extremely large files.)

Appendices

Appendix A - Figures

Project Name: Wild Rose State Fish Hatchery Water Compliance and Renovation County: Waushara

DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required ☒

The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process ☐

The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

Signature of Evaluator	Date Signed
	03/21/06

Number of responses to news release or other notice: 8

Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff	Date Signed
	03/21/06

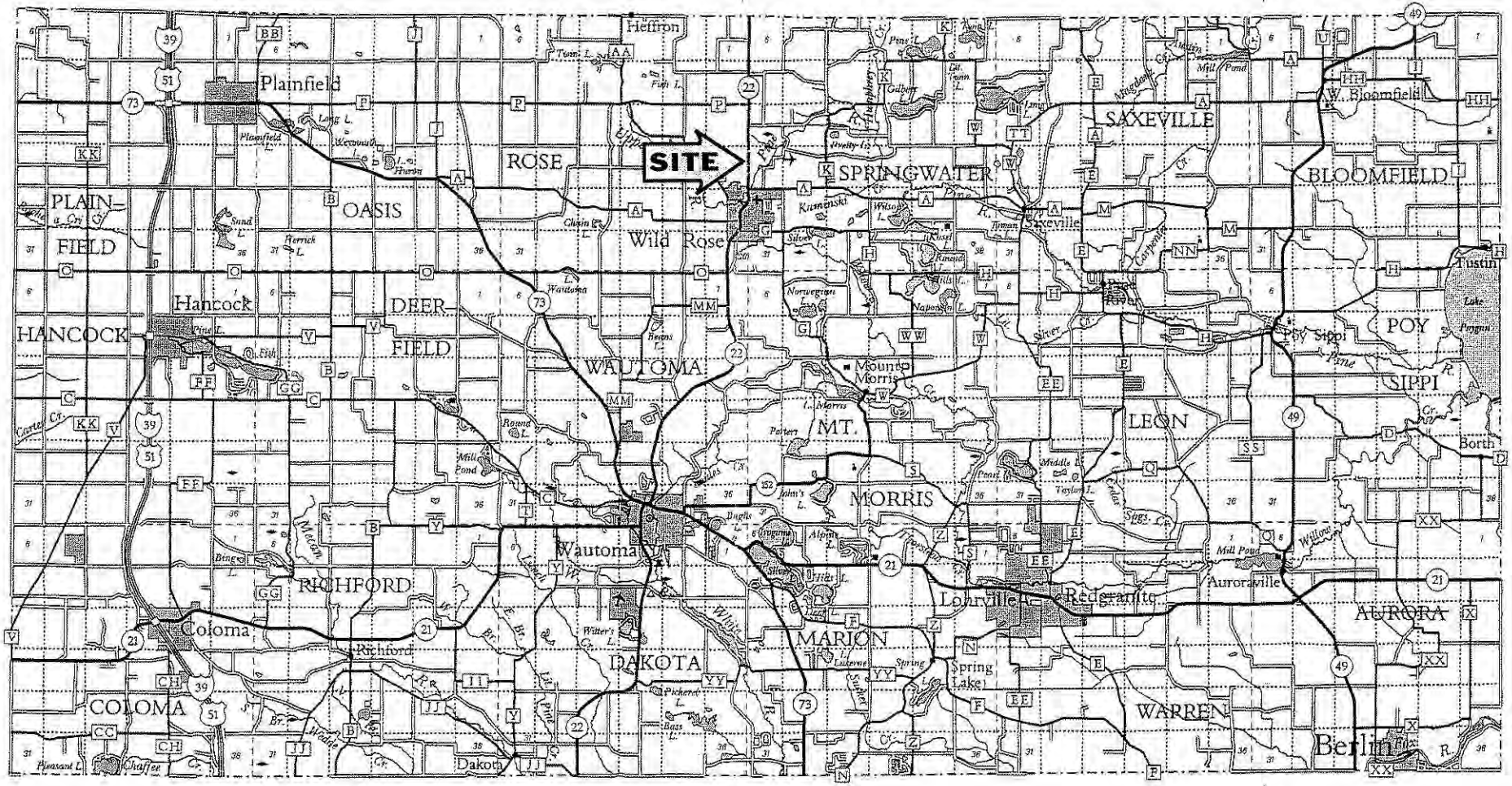
NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

This notice is provided pursuant to section 227.48(2), Stats.

Wild Rose State Fish Hatchery
DRAFT Environmental Assessment
Appendix A



LEGEND

- Freeway
- Multilane Divided
- U.S. or State Hwy
- County Trunk Hwy
- Town Road
- Firelane
- Railroad
- State Trail
- Interchange
- Highway Separation
- Interstate Highway No. (94)
- U.S. Highway No. (18)
- State Highway No. (59)
- County Highway Letter (T)
- State Boundary
- County Boundary
- Civil Town Boundary
- Section Line
- Dam
- Hospital
- Schools
- Airport
- County Seat
- Unincorporated Village
- Fish Hatchery
- Game Farm
- Public Hunt. or Fish. Grds.
- Public Camp & Picnic Grds.
- Ranger Station
- State Park
- County Park ..... With Facilities
- Without Facilities
- Rest Area ..... Modern Facilities
- Wayside ..... Rustic Facilities

CIVIL TOWNS

PLAINFIELD	OASIS	ROSE	SPRINGWATER	SAXEVILLE	BLOOMFIELD
HANCOCK	DEERFIELD	WAUTOMA	MOUNT MORRIS	LEON	POY SIPPI
COLOMA	RICHFORD	DAKOTA	MARION	WARREN	AURORA

SECTION NUMBERING OF A TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

MILES OF HIGHWAY
as of Dec. 31, 2003

STATE	132
COUNTY	334
LOCAL ROADS	662
OTHER ROADS	0
TOTAL FOR COUNTY	1,128

Land Area (2000 Census) ... 626.99 sq. mi.
Population (2000 Census) ... 23,154
County Seat ... Wautoma

North

WAUSHARA

DEPARTMENT OF TRANSPO
STATE OFFICE BUILD
Madison, Wisconsin

SCALE 0 1 2

Corrected for
JAN. 2005

Base compiled from U.S.G.S. Qu
1:100,000 Series

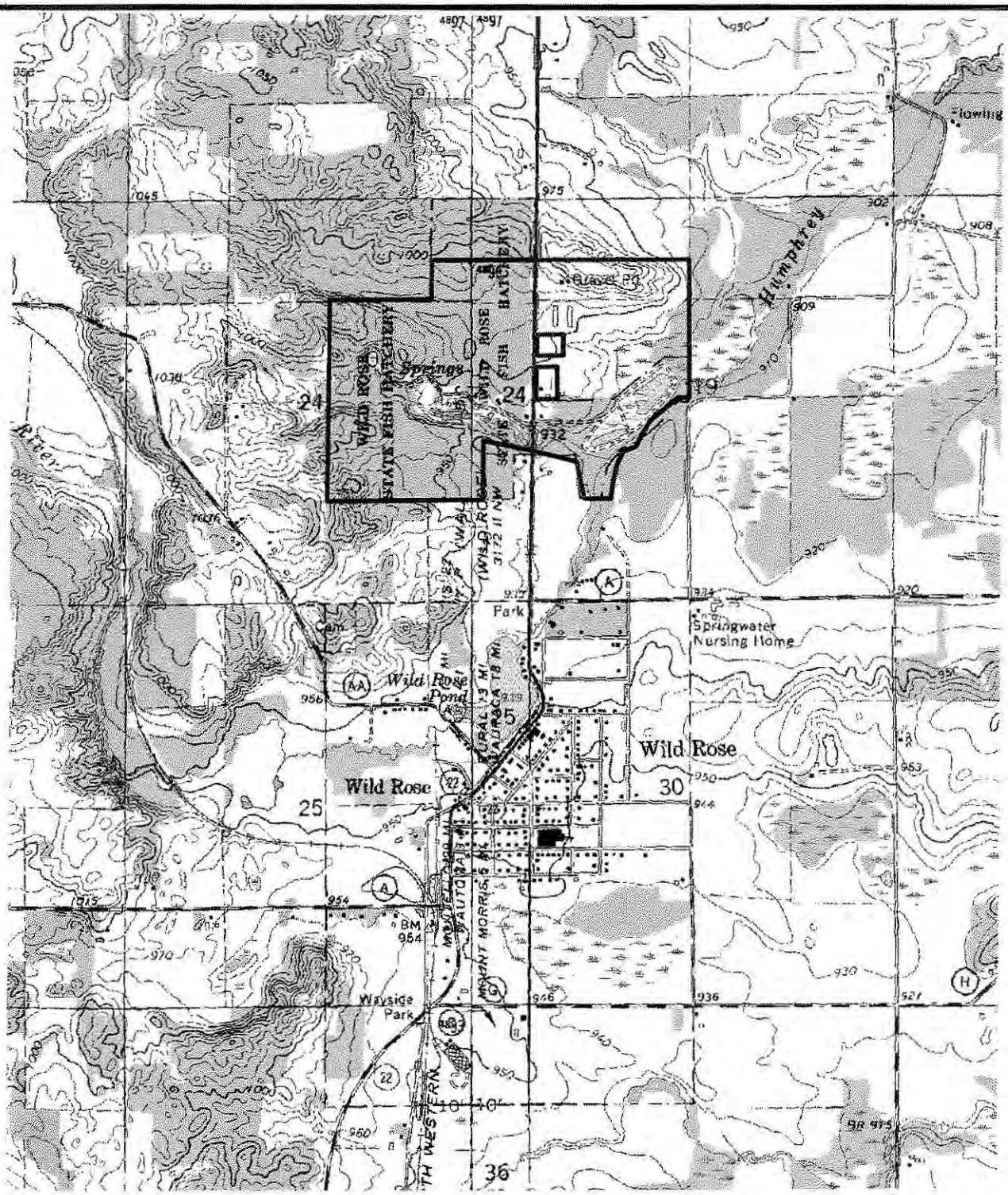
For boundaries of public hunting and fishing grounds please contact the Department of Natural Resources

Grid based on the state plane coordinate system south zone and the NAD 27

Hydrogeologists • Engineers

WISCONSIN DEPARTMENT

Wild Rose State Fish



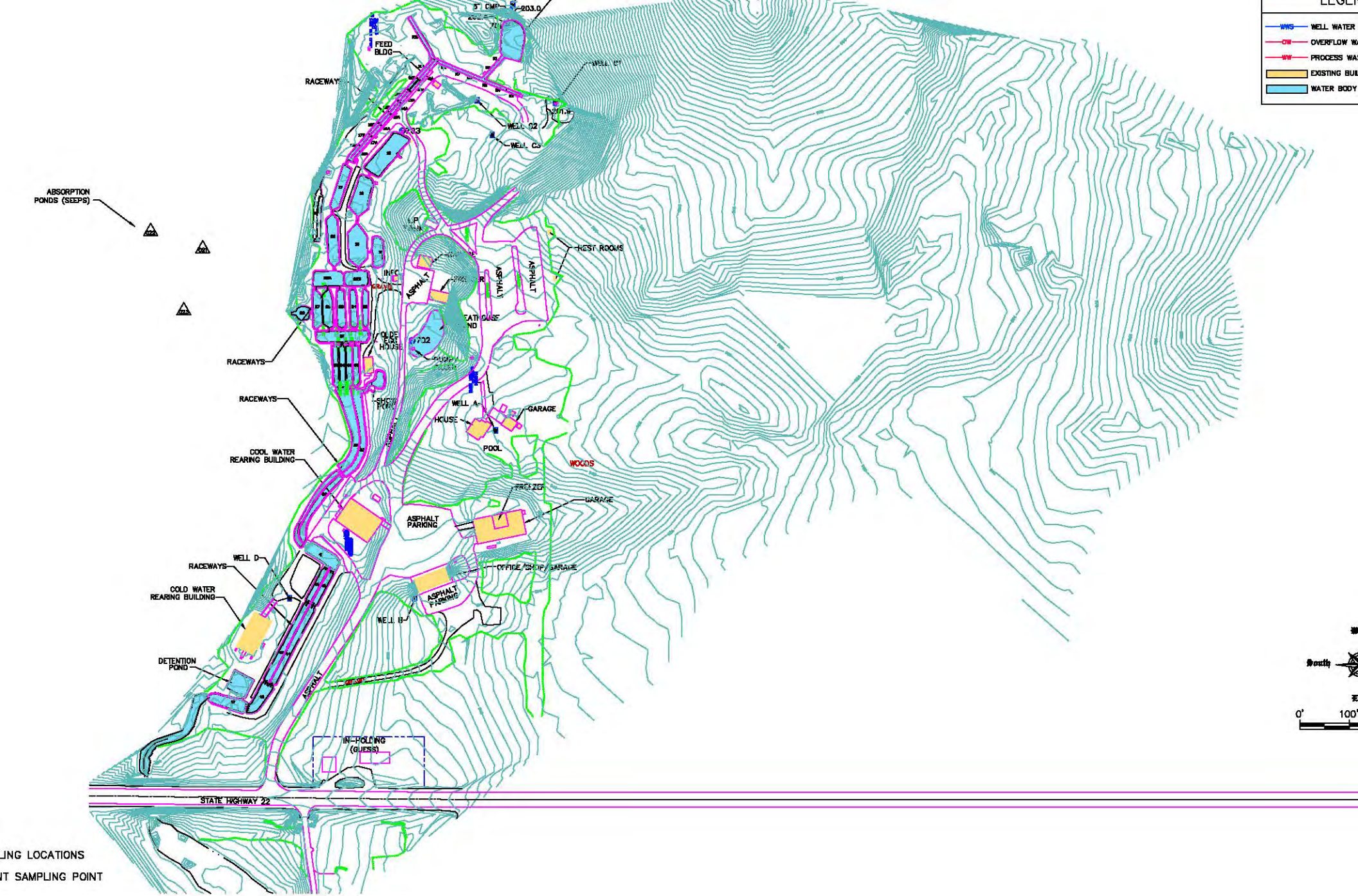
1 inch equals 2,000 feet
1:24,000

Source: USGS Topographic Quad

N

LIESCH Hydrogeologists • Engineers Environmental Scientists 6000 Gisholt Drive, Suite 203 Madison, WI 53713 (608) 223-1532	WISCONSIN DEPARTMENT OF NATURAL RESOURCES	Wild Rose State Fish Hatchery EA	Oct. 2005
		USGS Topographic Property Map	Figure 2

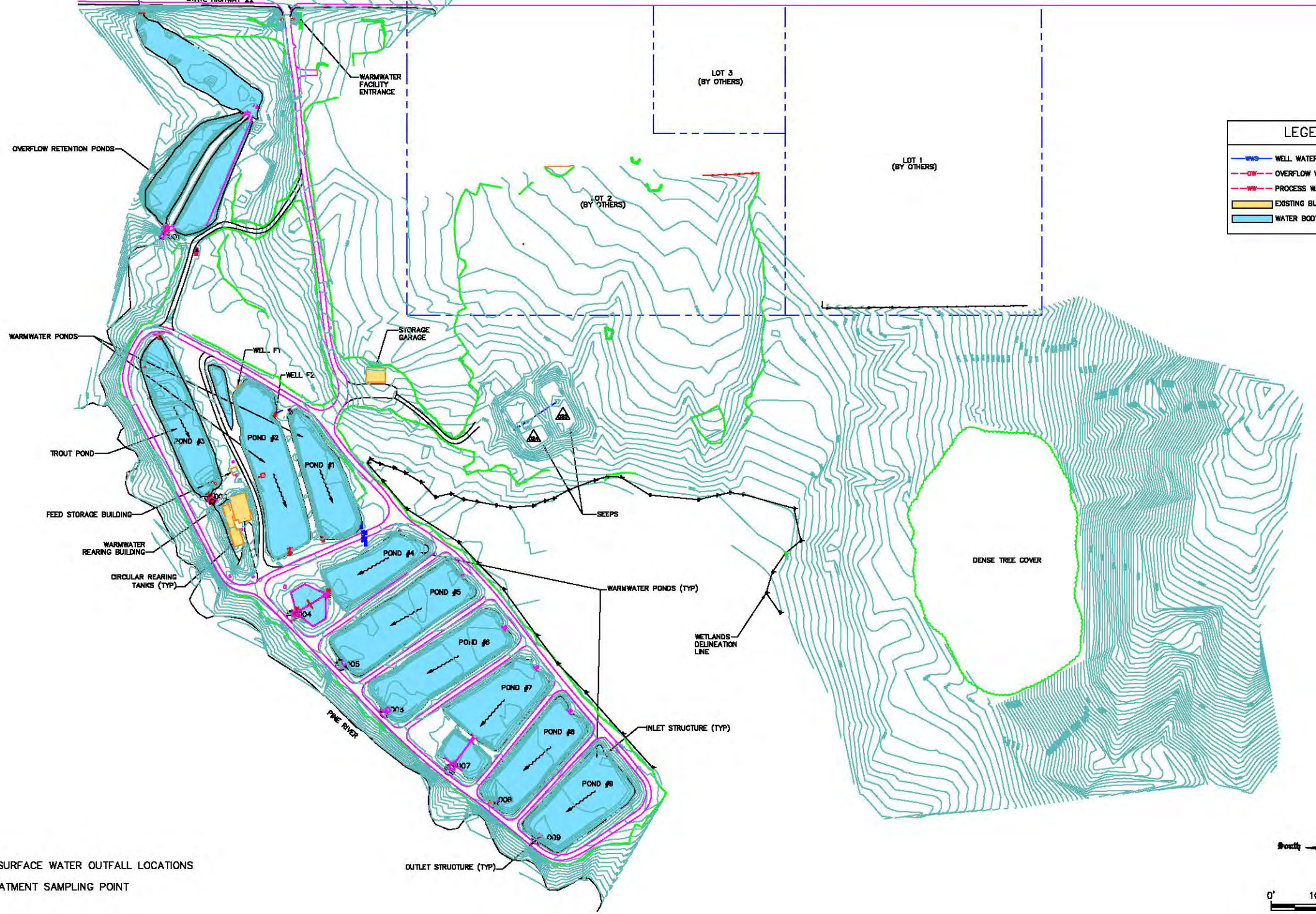
TJK 9-28-05 1=1 w:\13071\drawings\Figures 1-4



LING LOCATIONS
NT SAMPLING POINT

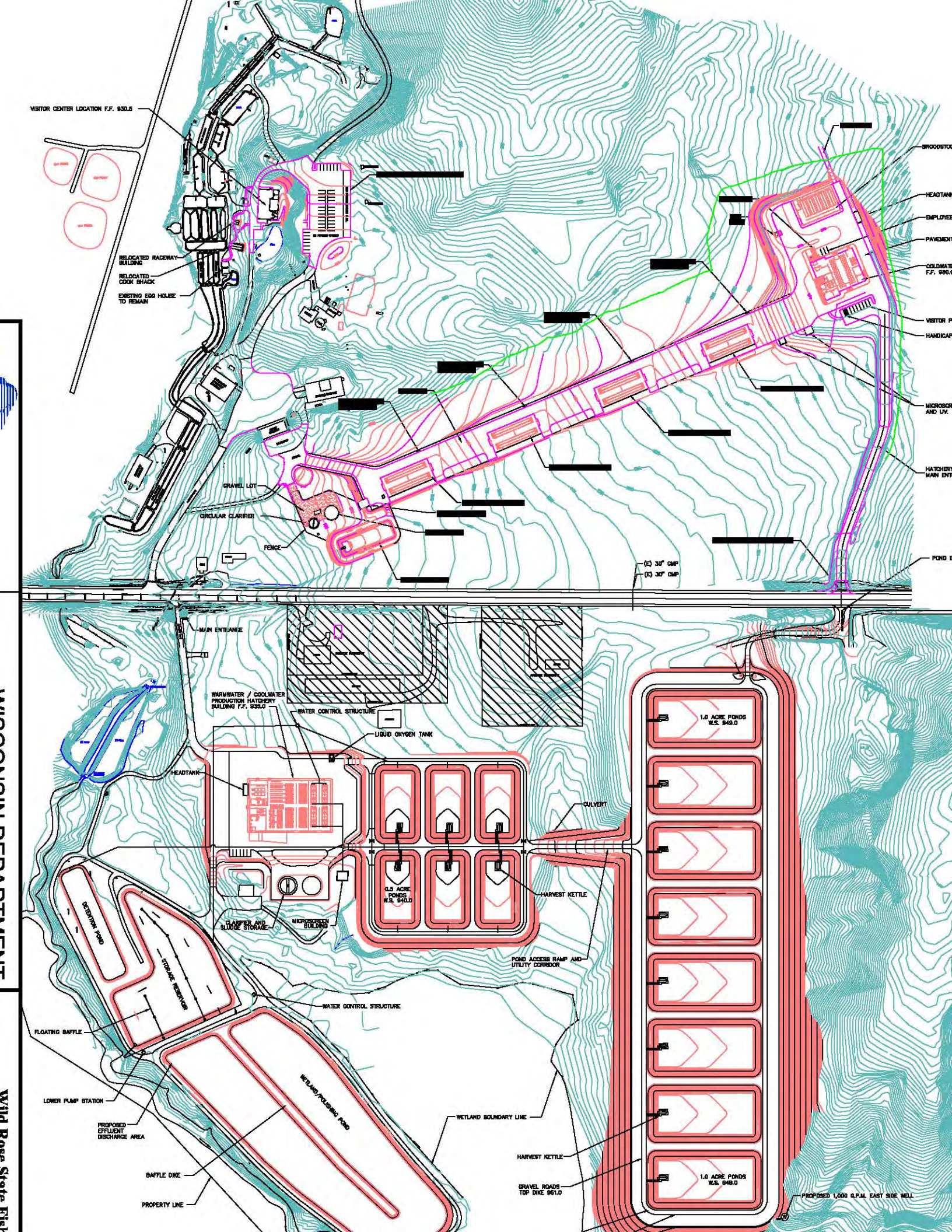
WISCONSIN DEPARTMENT

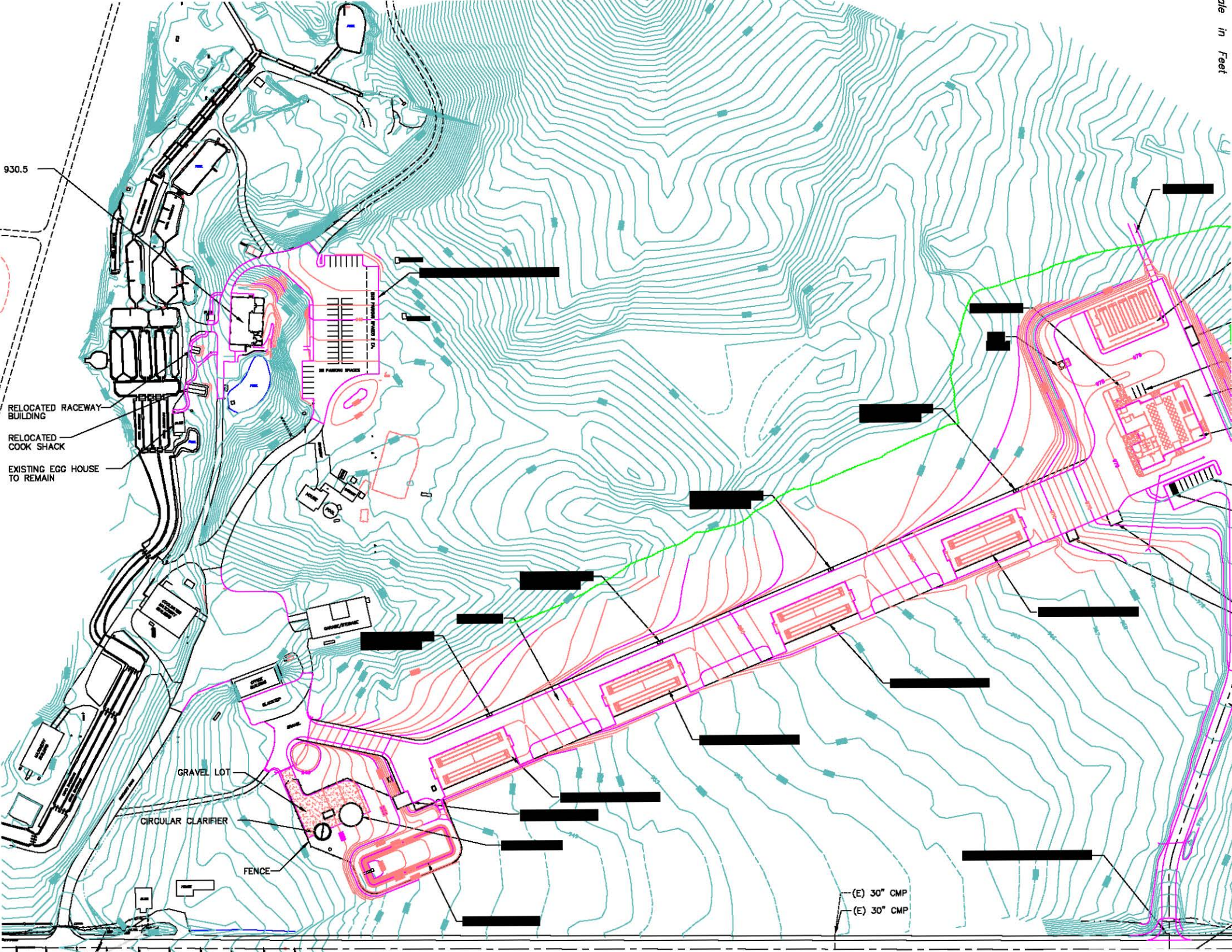
Wild Rose State Fish

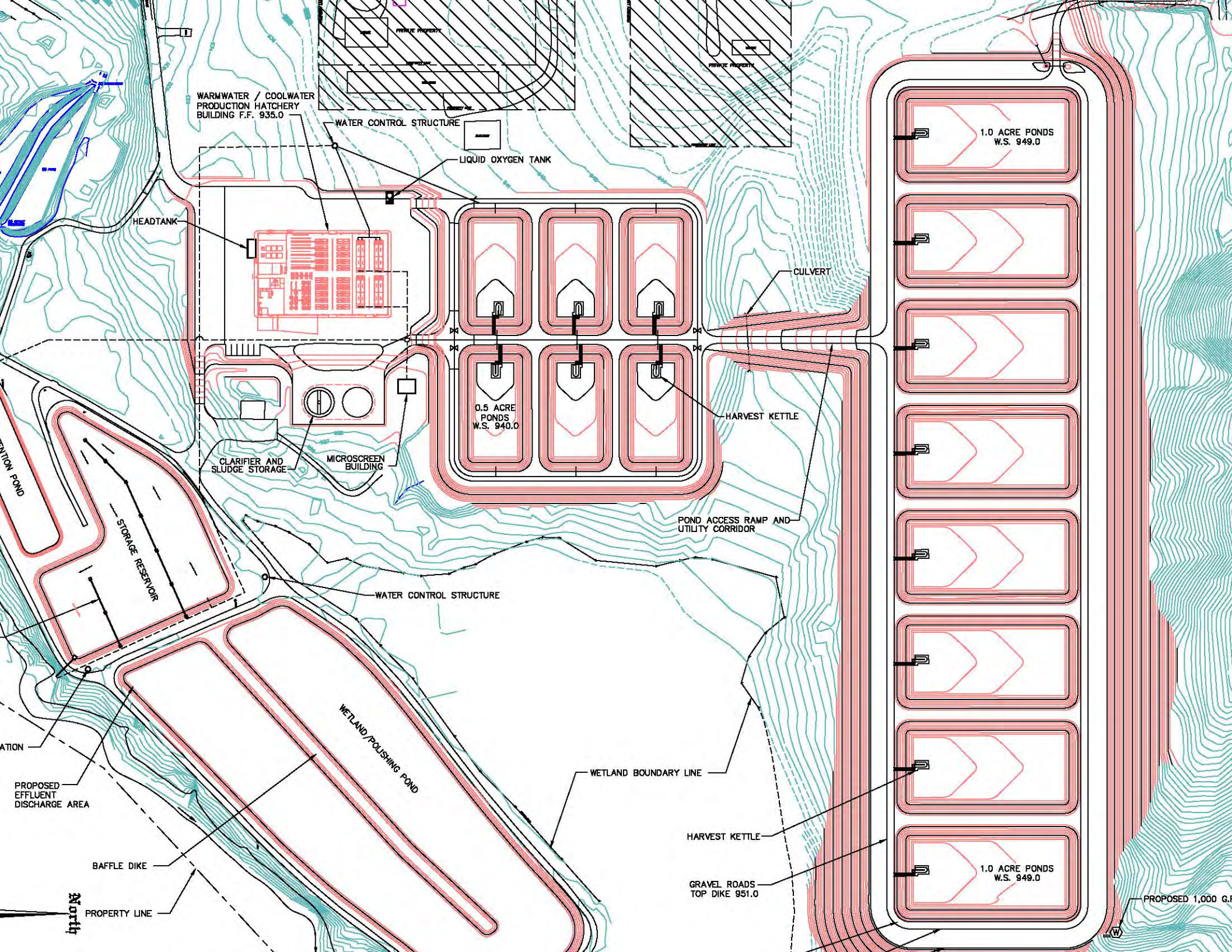


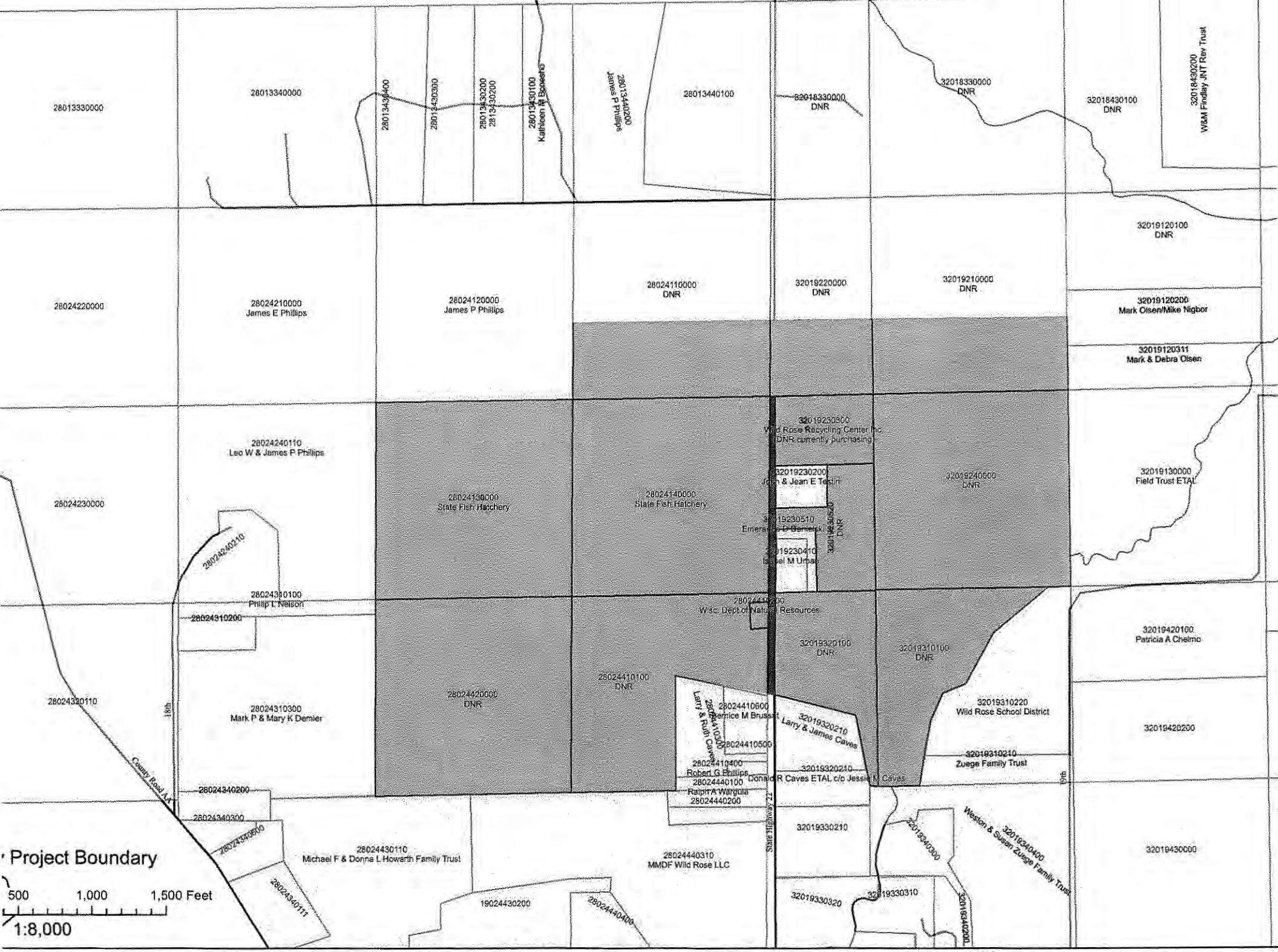
WISCONSIN DEPARTMENT

Wild Rose State Fish


VISITOR CENTER LOCATION F.F. 930.5
RELOCATED RACEWAY BUILDING
RELOCATED COOK SHACK
EXISTING EGG HOUSE TO REMAIN
GRAVEL LOT
CIRCULAR CLARIFIER
FENCE
(E) 30" CMP
(E) 30" CMP
MAIN ENTRANCE
WARMWATER / COOLWATER PRODUCTION HATCHERY BUILDING F.F. 935.0
WATER CONTROL STRUCTURE
LIQUID OXYGEN TANK
HEADTANK
CULVERT
0.5 ACRE PONDS W.S. 940.0
HARVEST KETTLE
CLARIFIER AND SLUDGE STORAGE
MICROSCREEN BUILDING
POND ACCESS RAMP AND UTILITY CORRIDOR
1.0 ACRE PONDS W.S. 949.0
DETENTION POND
STORAGE RESERVOIR
WATER CONTROL STRUCTURE
FLOATING BAFFLE
WETLAND/POLISHING POND
LOWER PUMP STATION
PROPOSED EFFLUENT DISCHARGE AREA
BAFFLE DIKE
PROPERTY LINE
WETLAND BOUNDARY LINE
HARVEST KETTLE
GRAVEL ROADS TOP DIKE 961.0
1.0 ACRE PONDS W.S. 949.0
PROPOSED 1,000 G.P.M. EAST SIDE WELL
WISCONSIN DEPARTMENT
Wild Rose State Fish


930.5
RELOCATED RACEWAY BUILDING
RELOCATED COOK SHACK
EXISTING EGG HOUSE TO REMAIN
GRAVEL LOT
CIRCULAR CLARIFIER
FENCE
(E) 30" CMP
(E) 30" CMP
Scale in Feet


WARMWATER / COOLWATER PRODUCTION HATCHERY BUILDING F.F. 935.0
WATER CONTROL STRUCTURE
LIQUID OXYGEN TANK
HEADTANK
1.0 ACRE PONDS W.S. 949.0
CULVERT
0.5 ACRE PONDS W.S. 940.0
HARVEST KETTLE
CLARIFIER AND SLUDGE STORAGE
MICROSCREEN BUILDING
POND ACCESS RAMP AND UTILITY CORRIDOR
STORAGE RESERVOIR
WATER CONTROL STRUCTURE
WETLAND/POLISHING POND
WETLAND BOUNDARY LINE
PROPOSED EFFLUENT DISCHARGE AREA
HARVEST KETTLE
BAFFLE DIKE
GRAVEL ROADS TOP DIKE 951.0
1.0 ACRE PONDS W.S. 949.0
PROPERTY LINE
North



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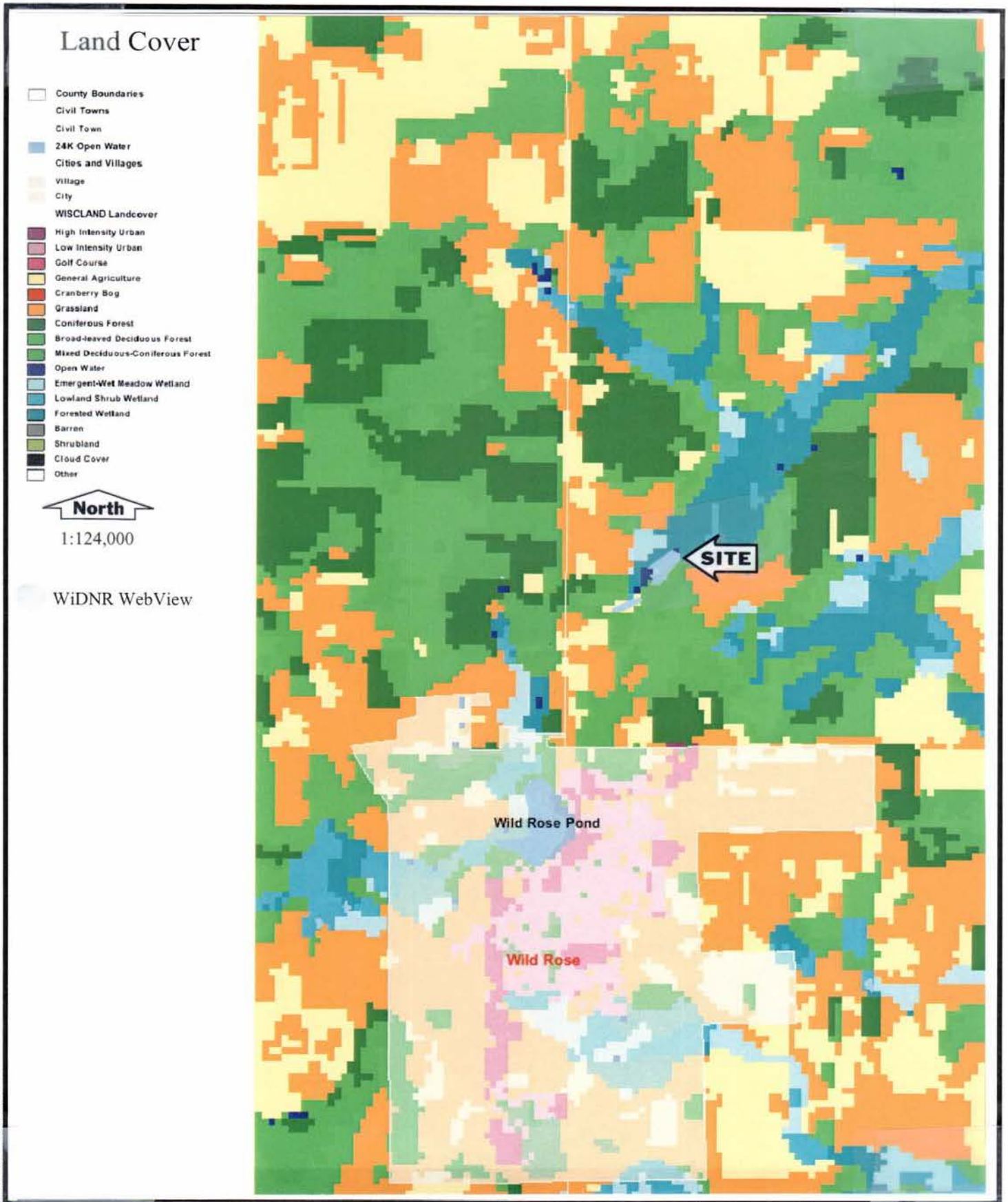
WISCONSIN DEPARTMENT

Wild Rose State Fish

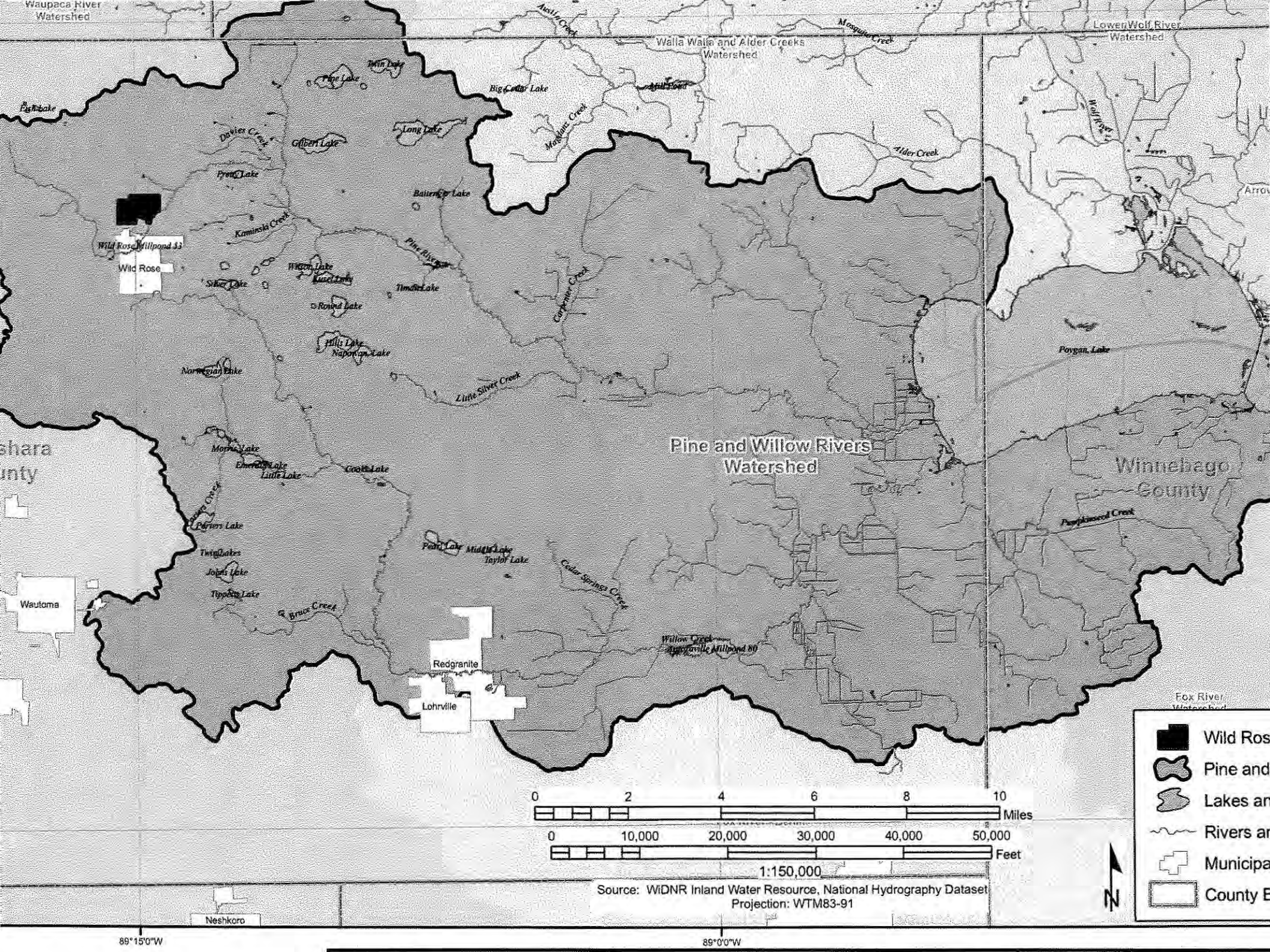


LIESCH Hydrogeologists • Engineers Environmental Scientists
6000 Gisholt Drive, Suite 203 Madison, WI 53713 (608) 223-1532

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wild Rose State Fish Hatchery EA	Oct. 2005
Site Land Cover Map	Figure 8

10-06-05 I:\gis\1307\drawings\Figures 1-4
mk



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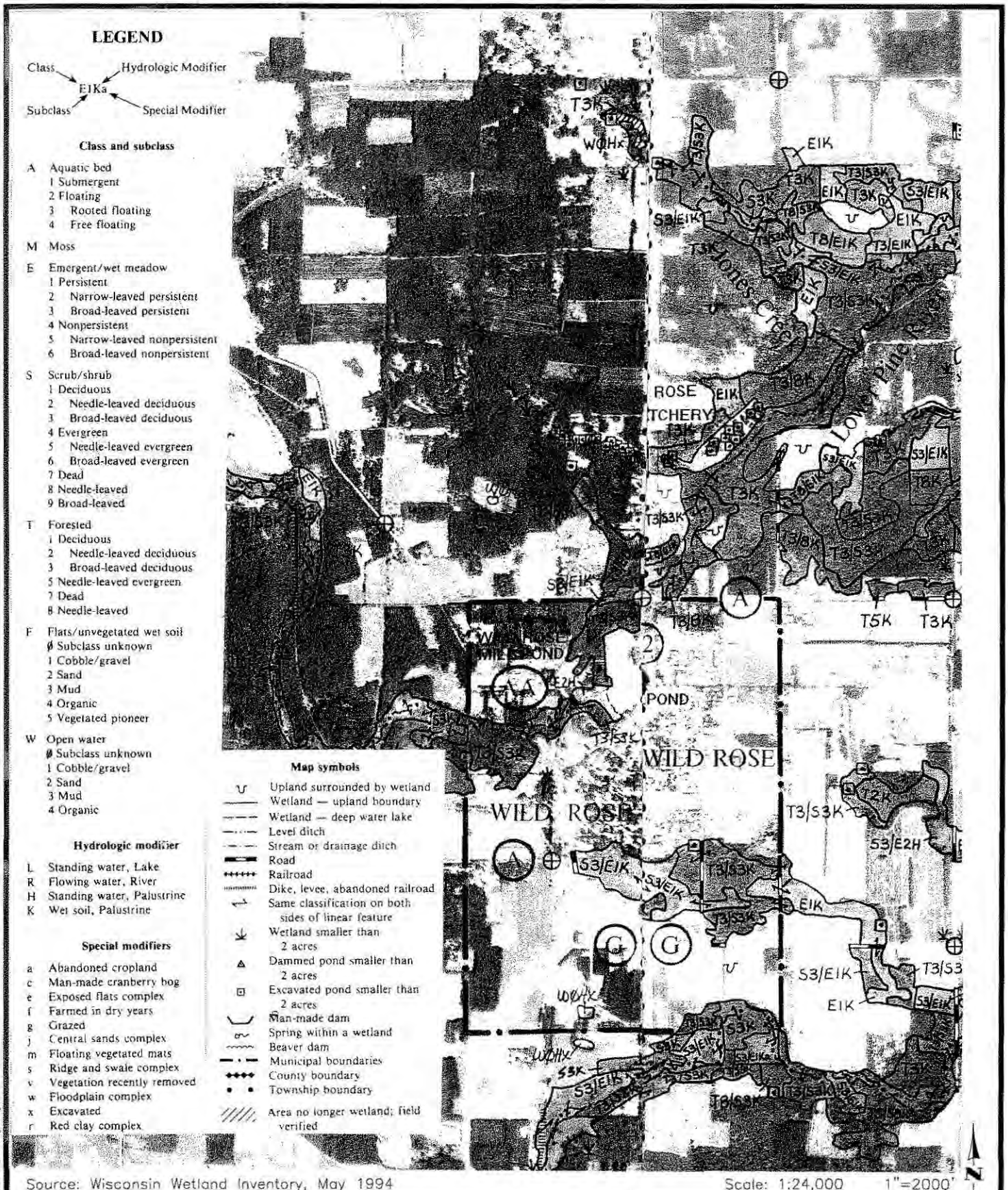
WISCONSIN DEPARTMENT

Wild Rose State Fish



Source: Wisconsin Wetland Inventory, May 1994

Scale: 1:24,000 1"=2000'

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6000 Gisholt Drive, Suite 203 Madison, WI 53713 (608) 223-1532

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wild Rose State Fish Hatchery EA	Oct. 2005
Wisconsin Wetland Inventory Map	Figure 10

9-26-05 1=1 ws\13071\drawings\Figures 1-4
trk

Wild Rose State Fish Hatchery
DRAFT Environmental Assessment
Appendix B

WILD ROSE STATE FISH HATCHERY
COLDWATER FACILITY – FLOW SCHEMATIC

07/29/05

GENERAL NOTES

1) THE WATER DEMAND IN THE INCUBATION ROOM RUNS FROM 0–280 GPM PER MONTH. 90% OF THE HEATING & COOLING WATER WILL BE RECIRCULATED (20 TRAYS @ 7 GPM EACH).

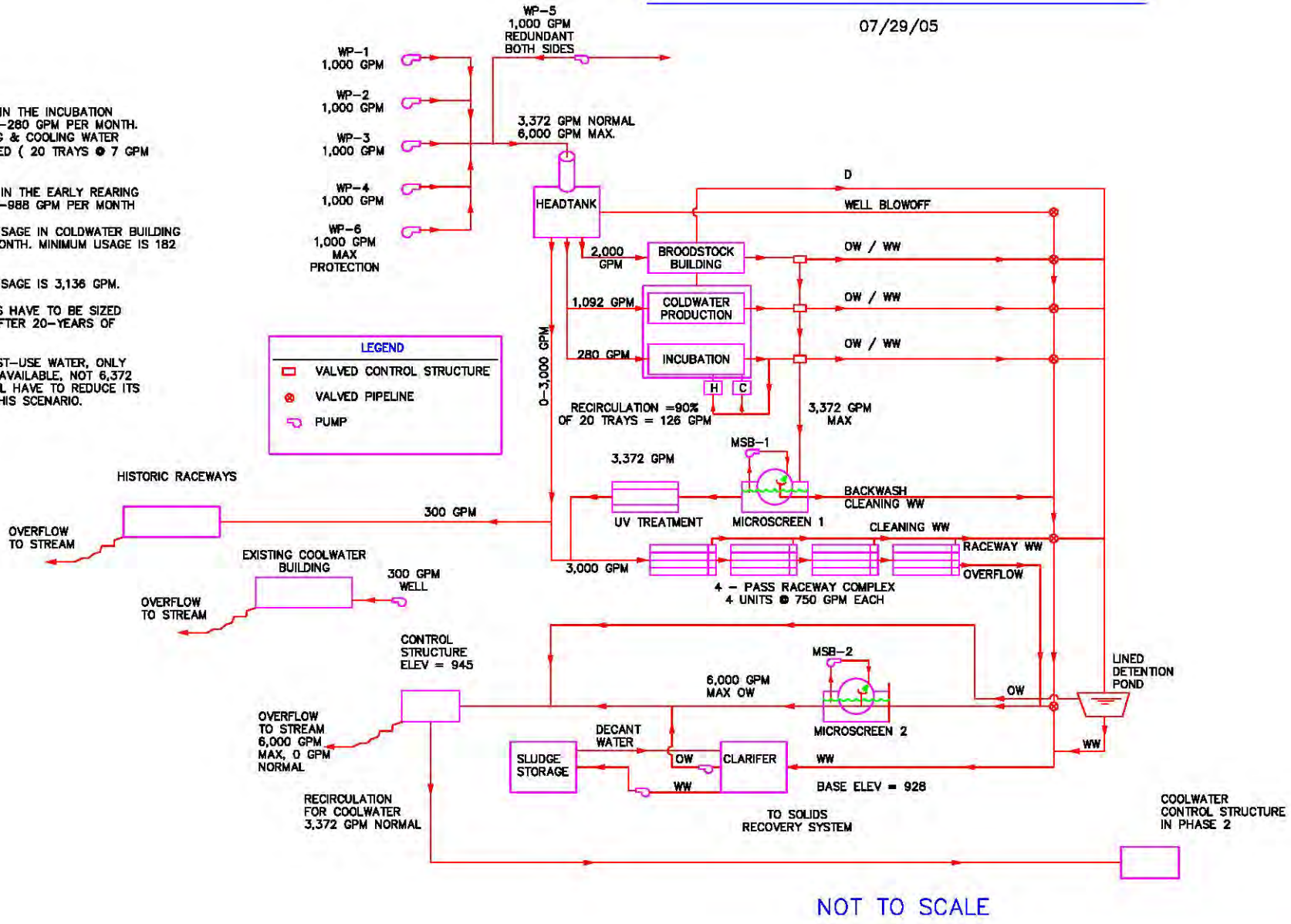
2) THE WATER DEMAND IN THE EARLY REARING UNIT RUNS FROM 52–988 GPM PER MONTH

3) MAXIMUM MONTHLY USAGE IN COLDWATER BUILDING IS 1,136 GPM PER MONTH. MINIMUM USAGE IS 182 GPM PER MONTH.

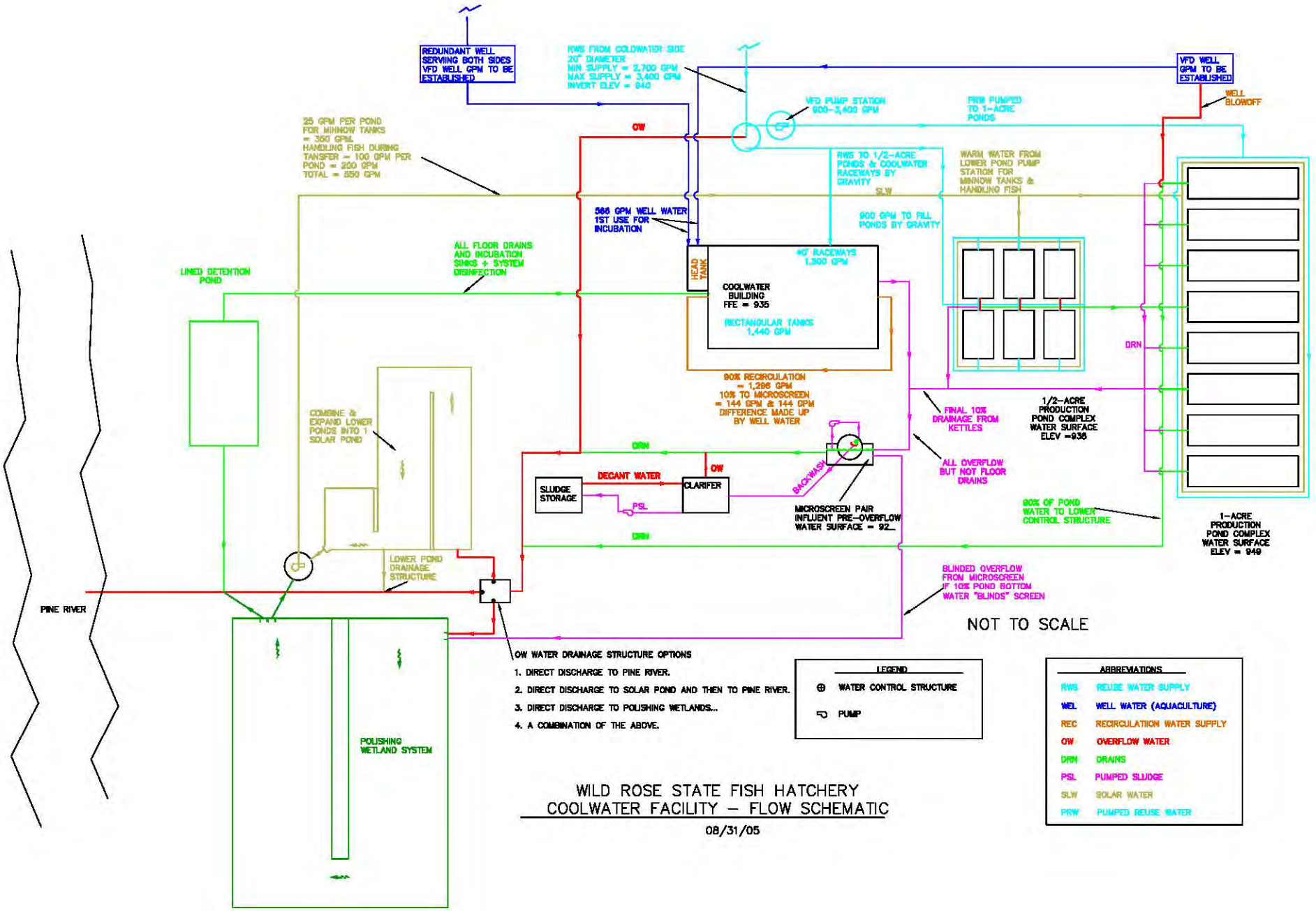
4) MAXIMUM MONTHLY USAGE IS 3,136 GPM.

5) THE WELL CAPACITIES HAVE TO BE SIZED TO PROVIDE 1,000 AFTER 20–YEARS OF OPERATION.

6) UNDER MAXIMUM FIRST–USE WATER, ONLY 6,000 GPM WILL BE AVAILABLE, NOT 6,372 SO MANAGEMENT WILL HAVE TO REDUCE ITS OPERATION UNDER THIS SCENARIO.

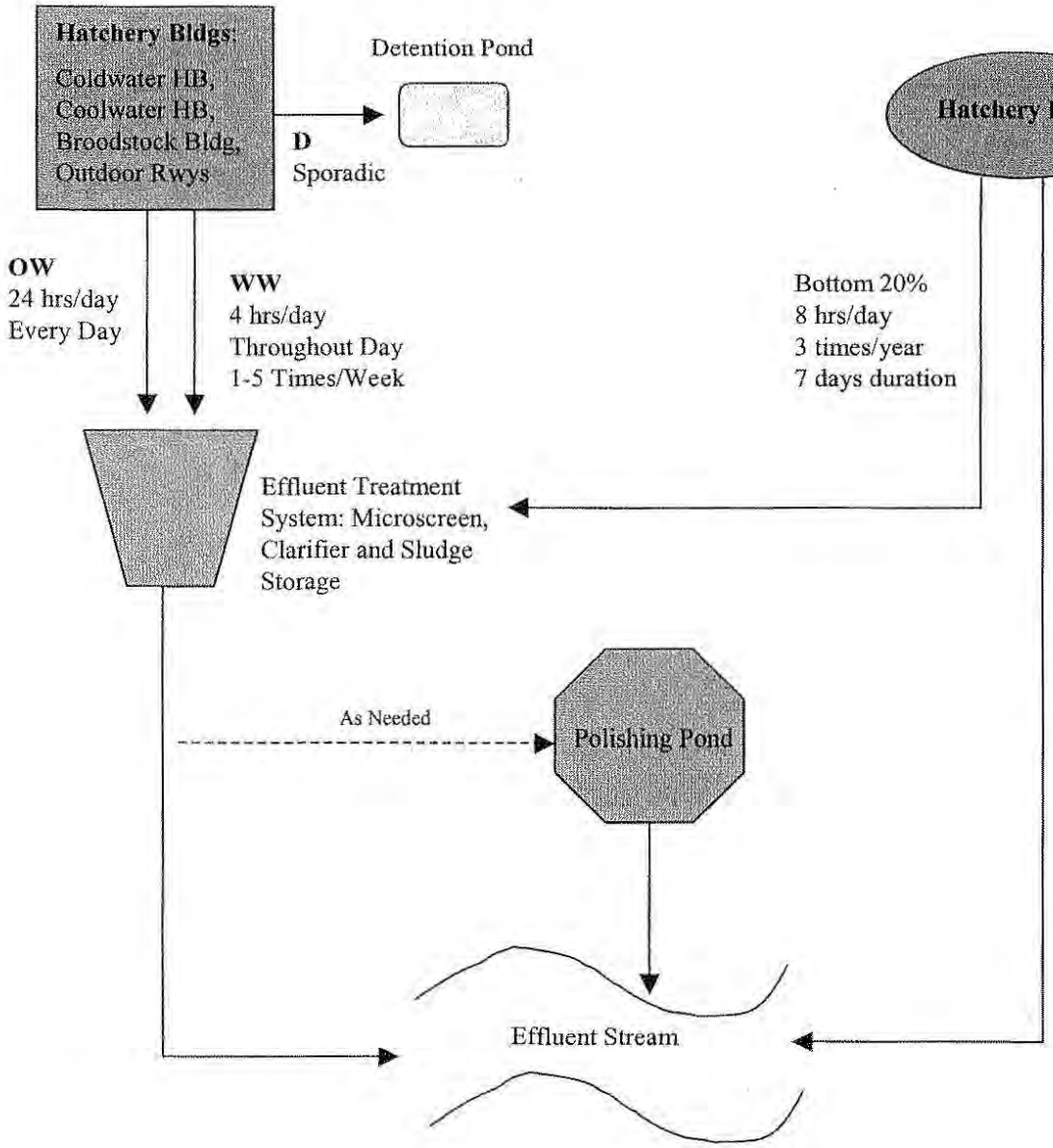


NOT TO SCALE



WILD ROSE STATE FISH HATCHERY
COOLWATER FACILITY – FLOW SCHEMATIC

08/31/05



	Coldwater & Coolwater Bldgs	Ponds	Expected Removal Efficiencies
OW			
TSS	2-5 mg/l	2-15 mg/l	75-90%
BOD	1-15 mg/l	2-10 mg/l	65-80%
TP	0.1-1 mg/l	0.1-1 mg/l	40-65%
TN	1-5 mg/l	1-5 mg/l	30-50%
WW			
TSS	10-100 mg/l	50-150 mg/l	75-90%
BOD	5-50 mg/l	10-60 mg/l	65-80%
TP	1-5 mg/l	1-2 mg/l	40-65%
TN	2-10 mg/l	1-15 mg/l	30-50%

Legend:

OW – Overflow Wastewater

WW – Cleaning/Draining Wastewater

TSS – Total Suspended Solids

BOD – Biochemical Oxygen Demand

TP – Total Phosphorus

TN – Total Nitrogen

Simplified Effluent Flow Schematic and Effluent Quality

Current Discharge to Pine River (8/02 through 5/05)

	Coldwater Facilities	Coolwater Facilities (7)
Average Flow	2.5 MGD	0.27 MGD
BOD5	<42 lbs/day (1)	<4.9 lbs/day (3)
TSS	<46 lbs/day (2)	<7.3 lbs/day (4)
Phosphorus, Total	1.1 lbs/day	0.14 lbs/day
Ammonia, Total	3.0 lbs/day	0.2 lbs/day

Current Discharge to Land Treatment (2002 through 2004)

	Coldwater Facilities	Coolwater Facilities
Volume	5.2 MG/year	0.72 MG/year
BOD5	<1,100 lbs/year (5)	<740 lbs/year (6)
TSS	12,000 lbs/year	890 lbs/year
Phosphorus, Total	150 lbs/year	10 lbs/year
TKN	260 lbs/year	130 lbs/year

Avg.Future Discharge to Pine River

	Coldwater Facilities	Coolwater Facilities
Average Flow	see below	see below
BOD5	1-10 mg/l	1-20 mg/l
TSS	1-15 mg/l	1-25 mg/l
Phosphorus, Total	0.05-3 mg/l	0.05-3 mg/l
Ammonia, Total	0.5-2 mg/l	0.5-2 mg/l

Future Discharge to Land Treatment

	Coldwater Facilities	Coolwater Facilities
Volume	NONE	
BOD5		
TSS		
Phosphorus, Total		
TKN		

(1) Of the 11 test results, 10 were non-detects at 2 mg/L BOD5.
(2) Of the 10 test results, 9 were non-detects at 2 mg/L BOD5.
(3) Of the 12 test results, 11 were non-detects at 2 mg/L TSS.
(4) Of the 12 test results, 9 were non-detects at 2 mg/L TSS.
(5) Of the 11 test results, 3 were non-detects at 30 mg/L.
(6) Of the 2 test results, 1 was a non-detect at 60 mg/L.
(7) Does not include discharge from rearing pond draw downs. From 2002 through 2004, ponds were drained 11 times with an average discharge volume of 0.32 MG, BOD5 discharge of < 6.1 lbs (7 of 11 BOD5 results were non-detects at 2 mg/L), and TSS discharge of <2.3 lbs (7 of 11 TSS results were non-detects at 2 mg/L).

	Before Phase 2		**After Phase 2** (No Pond Drain)	(With Pond Drain)
Q in MGD	Max Design Q	Avg Design Q	Max Design Q	Avg Design Q	Avg Design Q
001	0.43	0.43	0.43	0.43	0.43
002	9.25	4.06	0	0	0
003	na	na	11.39	4.4	9.97

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
Ronald W. Kazmierczak, Regional Director

Northeast Region Headquarters
1125 N. Military Avenue
P.O. Box 10448
Green Bay, WI 54307-0448
Telephone (920) 492-5800
FAX (920) 492-5913
TDD (920) 492-5812

May 26, 2000

Permit 2000-2005

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Steve Fajfer
Hatch Mgr
WI DNR - WILD ROSE FISH HATCHERY
N5871 State Rd 22
Wild Rose, WI 54984

SUBJECT: WPDES Permit Reissuance No. WI-0022756-06-0
WI DNR Wild Rose Fish Hatchery, N5871 STATE ROAD 22, WILD ROSE, WISCONSIN

Dear Permittee:

Your Wisconsin Pollutant Discharge Elimination System (WPDES) Permit is enclosed. The conditions of the attached permit reissuance were determined using the permit application, information from your WPDES permit file, other information available to the Department, comments received during the public notice period, and applicable Wisconsin Administrative Codes. All discharges from this facility and actions or reports relating thereto shall be in accordance with the terms and conditions of this permit.

This permit requires you to submit monitoring results to the Department on a periodic basis. Blank copies of the appropriate monitoring forms and instructions for completing them will be mailed to you under separate cover.

The WPDES permit program has been approved by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 402(b) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1342 (b)). The terms and conditions of this permit are accordingly subject to enforcement under ss. 283.89 and 283.91, Stats., and Section 309 of the Federal Act (33 U.S.C. Section 1319).

The Department has the authority under chs. 160 and 283, Stats., to establish effluent limitations, monitoring requirements, and other permit conditions for discharges to groundwater and surface waters of the State. The Department also has the authority to issue, reissue, modify, suspend or revoke WPDES permits under ch. 283, Stats.

The attached permit contains water quality based effluent limitations which are necessary to ensure that the water quality standards for the Pine River are met. You may apply for a variance from the water quality standard used to derive the limitations pursuant to s. 283.15, Stats. by submitting an application to the Director of the Bureau of Watershed Management, P.O. Box 7921, Madison, Wisconsin 53707 within 60 days after the date of reissuance of this permit. Chapter NR 200, Wis. Adm. Code, specifies the procedures that must be followed and the information that must be included when submitting an application for a variance.

To challenge the reasonableness of or necessity for any term or condition of the attached permit, s. 283.63, Stats, and ch. NR 203, Wis. Adm. Code require that you file a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date of this letter. This notice is provided pursuant to s. 227.48, Stats.

Sincerely,

Nanette E. Jameson

Nanette E. Jameson
Wastewater Specialist

Dated: May 26, 2000

cc: Permit File-NERHQ
Keri Behm-WT/2
Mark Debaker –NER Shawano Ave. Office

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE
WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

WI DNR - WILD ROSE FISH HATCHERY

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
N5871 STATE ROAD 22, WILD ROSE, WISCONSIN
to

the PINE RIVER and GROUNDWATER of the PINE RIVER and WILLOW CREEK WATERSHED (WR02), WOLF RIVER DRAINAGE BASIN via a SERIES of ABSORPTION PONDS in WAUSHARA COUNTY

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By Nanette E. Jameson
Nanette Jameson
Wastewater Specialist

May 26, 2000
Date of Signature

EFFECTIVE DATE: July 01, 2000 **EXPIRATION DATE: June 30, 2005**

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	Samples shall be collected of the Raceway Supply Pond influent.
702	Samples shall be collected of the Meathouse Pond influent.
703	Samples shall be collected of the Pond 13 influent.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 , 702, and 703

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Quarterly	Total Daily	
Suspended Solids, Total		mg/L	Quarterly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Quarterly	Grab	
pH Field		su	Quarterly	Grab	

2 In-Plant Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
115	Representative samples of the warmwater rearing area prior to discharge to the absorption pond.
117	Representative samples of the coldwater rearing area prior to discharge to the absorption pond.

2.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point 115 and 117

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Quarterly	Total Monthly	
Chloride		mg/L	Quarterly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Quarterly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Quarterly	Grab	
Nitrogen, Organic Total		mg/L	Quarterly	Grab	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	Grab	
BOD_5, Total		mg/L	Quarterly	Grab	900 m/s
Suspended Solids, Total		mg/L	Quarterly	Grab	500 m/s
Phosphorus, Total		mg/L	Quarterly	Grab	
pH Field		su	Quarterly	Grab	
Iron Dissolved		mg/L	Quarterly	Grab	
Manganese Dissolved		µg/L	Quarterly	Grab	

2.2.1.1 Parameter Reduction

The permittee may request review by the Department after the first year of monitoring to reduce required monitoring parameters.

3 Surface Water Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to the waste type(s) designated for the listed sampling point(s).

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Settling Pond Effluent sampled at the dam prior to discharge to the Pine River.
002	Hatchery Building and Trout Pond sampled at the dam prior to discharge to the Pine River.
004	Warm Water Pond 4 sampled at the dam prior to discharge to the Pine River.
005	Warm Water Pond 5 sampled at the dam prior to discharge to the Pine River.
006	Warm Water Static Pond 6 sampled at the dam prior to discharge to the Pine River.
007	Warm Water Static Pond 7 sampled at the dam prior to discharge to the Pine River.
008	Warm Water Static Pond 8 sampled at the dam prior to discharge to the Pine River.
009	Warm Water Static Pond 9 sampled at the dam prior to discharge to the Pine River.
090	This sample point was created to monitor and limit the Total Discharge from Outfalls 001, 002, 004 and 005.

3.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 001 - SETTLING POND

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Quarterly	Total Daily	
Suspended Solids, Total	Daily Max	20 mg/L	Quarterly	Grab	
Suspended Solids, Total	Monthly Avg	10 mg/L	Quarterly	Grab	
pH Field	Daily Max	9.0 su	Quarterly	Grab	
pH Field	Daily Min	6.0 su	Quarterly	Grab	
Formaldehyde	Daily Max	2.1 mg/L	Quarterly	Grab	
Phosphorus, Total	Rolling 12 Month Avg	1.0 mg/L	Quarterly	Grab	
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	19 mg/L	Quarterly	Grab	November to April
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	4.7 mg/L	Quarterly	Grab	May to October
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	340 lbs/day	Quarterly	Calculated	November to April
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	86 lbs/day	Quarterly	Calculated	May to October
BOD_5, Total		mg/L	Quarterly	Grab	

3.2.2 Sampling Point (Outfall) 002 - HATCHERY BLDG & TROUT PONDS

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Quarterly	Total Daily	
Suspended Solids, Total	Daily Max	20 mg/L	Quarterly	Grab	
Suspended Solids, Total	Monthly Avg	10 mg/L	Quarterly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Quarterly	Grab	
Formaldehyde	Daily Max	2.1 mg/L	Quarterly	Grab	
pH Field	Daily Max	9.0 su	Quarterly	Grab	
pH Field	Daily Min	6.0 su	Quarterly	Grab	
Phosphorus, Total		mg/L	Quarterly	Grab	
BOD_5, Total		mg/L	Quarterly	Grab	

3.2.3 Sampling Point (Outfall) 004 , 005

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD_5, Total		mg/L	Quarterly	Grab	
Flow Rate		MGD	Quarterly	Total Daily	
Suspended Solids, Total	Daily Max	20 mg/L	Quarterly	Grab	
Suspended Solids, Total	Monthly Avg	10 mg/L	Quarterly	Grab	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Quarterly	Grab	
pH Field	Daily Max	9.0 su	Quarterly	Grab	
pH Field	Daily Min	6.0 su	Quarterly	Grab	
Formaldehyde	Daily Max	2.1 mg/L	Quarterly	Grab	

3.2.4 Sampling Point (Outfall) 006 , 007, 008, 009

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	At Discharge	Total Daily	

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD_5, Total	Daily Max	20 mg/L	At Discharge	Grab	
BOD_5, Total	Monthly Avg	10 mg/L	At Discharge	Grab	
pH Field	Daily Max	9.0 su	At Discharge	Grab	
pH Field	Daily Min	6.0 su	At Discharge	Grab	

3.2.5 Sampling Point (Outfall) 090 - TOTAL:001, 002, 004 & 005

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD_5, Total	Weekly Avg	160 lbs/day	Quarterly	Calculated	May to October
BOD_5, Total	Weekly Avg	220 lbs/day	Quarterly	Calculated	November to April
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	340 lbs/day	Quarterly	Calculated	November to April
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	93 lbs/day	Quarterly	Calculated	May to October

4 Land Treatment Requirements

4.1 Sampling Point(s)

The discharge(s) shall be limited to the waste type(s) designated for the listed sampling point(s).

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, Waste Description/Sample Contents and Treatment Description (as applicable)**
021	Total pollutant loading to cold water absorption cell # 1
022	Total pollutant loading to cold water absorption cell # 2
023	Total pollutant loading to cold water absorption cell # 3
024	Total pollutant loading to warm water absorption cell # 1
025	Total pollutant loading to warm water absorption cell # 2

4.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

4.2.1 Sampling Point (Outfall) 021 , 022, 023, 024, and 025, Absorption Pond (Seepage Cell)

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		gal/yr	Annual	Total Annual	
Chloride		lbs/ac/yr	Annual	Calculated	
Nitrogen, Total		lbs/ac/yr	Annual	Calculated	
Phosphorus, Total		lbs/ac/yr	Annual	Calculated	

Daily Log – Monitoring Requirements and Limitations

All discharge and monitoring activity shall be documented on log sheets. Originals of the log sheets shall be kept by the permittee for the term of the permit and, if requested, made available to the Department.

Parameters	Limit	Units	Sample Frequency	Sample Type
Cells Being Loaded	-	Cell Number	Daily	Log
Start to End Time	-	Date, Hour	Daily	Log

Annual Report – Monitoring Requirements and Limitations

The Annual Report is due by January 31st of each year for the previous calendar year.

Parameters	Limit	Units	Sample Frequency	Sample Type
Total Volume Per Cell	-	Gallons	Annual	Total Annual
Total Nitrogen per Cell	-	Pounds/Acre/Year	Annual	Calculated
Total Chloride per Cell	-	Pounds/Acre/Year	Annual	Calculated

5 Groundwater Requirements

5.1 Monitoring Requirements and Limitations

5.1.1 Groundwater Monitoring System for Cold Water Rearing Area

Location of Monitoring system: Adjacent to Cold Water Rearing Area

Wells to be Monitored: MW-1 801, MW-2 802, MW-3 803

Well Used To Calculate PALs: MW-1 801

Enforcement Standard Wells: Not Applicable

Monitoring Frequency: Grab samples shall be collected per the frequency shown in the table at each well to be monitored. Grab samples shall be collected monthly from any new wells during the first three months following installation. (See the compliance schedule section herein for requirements on any new wells to be installed.) Thereafter monitoring shall be per the frequency shown in the table.

PARAMETER	UNITS	PREVENTIVE ACTION LIMIT	ENFORCEMENT STANDARD	FREQUENCY
Depth To Groundwater	feet	*****	N/A	Quarterly
Groundwater Elevation	feet MSL	*****	N/A	Quarterly
pH Field	su	8.3	N/A	Quarterly
pH Lab	su	9.2	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
Iron Dissolved	mg/L	0.15	0.3	Quarterly
Manganese Dissolved	mg/L	0.025	0.05	Quarterly
Nitrogen, Total Kjeldahl Dissolved	mg/L	*****	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	2.1	N/A	Quarterly
Nitrogen, Organic Dissolved	mg/L	2.3	N/A	Quarterly
Solids, Total Dissolved	mg/L	390	N/A	Quarterly
Sodium Dissolved	mg/L	13	N/A	Quarterly
Alkalinity, Total as $CaCO_3$ Dissolved	mg/L	310	N/A	Quarterly
Hardness, Total as $CaCO_3$	mg/L	290	N/A	Quarterly

- The pH preventive action limit (PAL) for a site is established in s. NR 140.20, Wis Adm. Code as one pH unit above or below the pH of site background groundwater quality. The**Field** pH PAL for this site has been established at 6.3 s.u. to 8.3 s.u. The**Lab** pH PAL for this site has been established at **7.2** s.u. to **9.2** s.u.

5.1.2 Groundwater Monitoring System for Warm Water Rearing Area

Location of Monitoring system: Adjacent to Warm Water Rearing Area

Wells to be Monitored: MW-1 804, MW-2 805, MW-3 806

Well Used To Calculate PALs: MW-1 804

Enforcement Standard Wells: Not Applicable

Monitoring Frequency: Grab samples shall be collected per the frequency shown in the table at each well to be monitored. Grab samples shall be collected monthly from any new wells during the first three months following installation. (See the compliance schedule section herein for requirements on any new wells to be installed.) Thereafter monitoring shall be per the frequency shown in the table.

PARAMETER	UNITS	PREVENTIVE ACTION LIMIT	ENFORCEMENT STANDARD	FREQUENCY
Depth To Groundwater	feet	*****	N/A	Quarterly
Groundwater Elevation	feet MSL	*****	N/A	Quarterly
pH Field	su	8.1	N/A	Quarterly
pH Lab	su	9.0	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
Iron Dissolved	mg/L	0.15	0.3	Quarterly
Manganese Dissolved	mg/L	0.025	0.05	Quarterly
Nitrogen, Total Kjeldahl Dissolved	mg/L	*****	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	2.0	N/A	Quarterly
Nitrogen, Organic Dissolved	mg/L	2.2	N/A	Quarterly
Solids, Total Dissolved	mg/L	400	N/A	Quarterly
Sodium Dissolved	mg/L	13	N/A	Quarterly
Alkalinity, Total as $CaCO_3$ Dissolved	mg/L	260	N/A	Quarterly
Hardness, Total as $CaCO_3$	mg/L	280	N/A	Quarterly

- The pH preventive action limit (PAL) for a site is established in s. NR 140.20, Wis Adm. Code as one pH unit above or below the pH of site background groundwater quality. The**Field** pH PAL for this site has been established at **6.1** s.u. to **8.1** s.u. The **Lab** ph PAL for this site has been established at **7.0** s.u. to **9.0** s.u

6 Schedules of Compliance

6.1 Land Treatment Management Plan

Absorption Pond System Performance and Compliance with NR 214

Required Action	Date Due
Management Plan: Submit a management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214. The plan shall specify information on the following: (a) pretreatment processes to be adopted including screening, settling, or pH adjustment; (b) wastewater water monitoring and sampling procedures including monitoring of pollutant loading to each cell; (c) management of pond vegetative cover and removal of vegetative material; (d) size of each pond (acres); (e) load/rest schedule for each pond and additional cells to be added; (f) an outline drawing of the system delineating and labeling management zones and monitoring well locations; (g) describe distribution and dosing system to achieve an even pond loading; (h) operation during winter and other adverse weather conditions; (i) schedule of routine maintenance to keep the system operating at optimum levels; (j) additional monitoring wells to be added to determine pollutant levels outside of the Designated Management Zone,(k) alternative disposal methods which may be adopted to reduce loading to existing cells. Following approval by the Department, the absorption pond system shall be operated in conformance with the management plan. If the permittee wishes to operate differently than specified in the approved plan, a written request shall be submitted to the Department for approval to amend the management plan.	01/15/2001

7 Standard Requirements

NR 205, Wisconsin Administrative Code (Conditions for Industrial Dischargers): The conditions in ss. NR 205.07(1) and NR 205.07(3), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(3).

7.1 Reporting and Monitoring Requirements

7.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report Form. This report form is to be returned to the Department no later than the date indicated on the form. The original and one copy of the Wastewater Discharge Monitoring Report Form shall be submitted to your DNR regional office. A copy of the Wastewater Discharge Monitoring Report Form shall be retained by the permittee.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report Form.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

Monitoring reports shall be signed by a principal executive officer, a ranking elected official, or other duly authorized representative.

7.1.2 Water Quality Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

7.1.3 Recording of Results

For each effluent measurement or sample taken, the permittee shall record the following information:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

7.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Effluent concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the effluent concentration as < 0.1 mg/L.

- Effluent concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For the purposes of calculating an average or a mass discharge value, the permittee may substitute a 0 (zero) for any effluent concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

7.1.5 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application, except for sludge management forms and records, which shall be kept for a period of at least 5 years.

7.1.6 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

7.2 System Operating Requirements

7.2.1 Noncompliance Notification

- The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance;
    - any noncompliance which may endanger health or the environment;
    - any violation of an effluent limitation resulting from an unanticipated bypass;
    - any violation of an effluent limitation resulting from an upset; and
    - any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit.

- A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

- The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

7.2.2 Unscheduled Bypassing

Any unscheduled diversion or bypass of wastewater at the treatment works or collection system is prohibited except in the following cases:

- an inadvertent bypass resulting from equipment damage or temporary power interruption;
- an unavoidable bypass necessary to prevent loss of life or severe property damage; or
- a bypass of excessive storm drainage or runoff which would damage any facilities necessary for compliance with the effluent limitations and prohibitions of the permit.

In the event of an unscheduled bypass, the permittee shall immediately notify the Department regional office by telephone within 24 hours after an occurrence. In addition, the permittee shall notify the Department by letter within 5 days after each such unscheduled diversion or unscheduled bypass. The written notification shall at a minimum include reasons for such unscheduled bypass including dates, length of bypass and steps taken or planned to correct and eliminate such occurrences.

7.2.3 Scheduled Bypassing

Any construction or normal maintenance which results in a bypass of wastewater from a treatment system is prohibited unless authorized by the Department in writing. If the Department determines that there is significant public interest in the proposed action, the Department may schedule a public hearing or notice a proposal to approve the bypass. Each request shall specify the following minimum information:

- proposed date of bypass;
- estimated duration of the bypass;
- estimated volume of the bypass;
- alternatives to bypassing; and
- measures to mitigate environmental harm caused by the bypass.

7.2.4 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

7.2.5 Spill Reporting

The permittee shall notify the Department in accordance with ch. NR 706 (formerly NR 158), Wis. Adm. Code, in the event that a spill or accidental release of any material or substance results in the discharge of pollutants to the waters of the state at a rate or concentration greater than the effluent limitations established in this permit, or the spill or accidental release of the material is unregulated in this permit, unless the spill or release of pollutants has been reported to the Department in accordance with s. NR 205.07 (1)(s), Wis. Adm. Code.

7.2.6 Planned Changes

In accordance with ss. 283.31(4)(b) and 283.59, Stats., the permittee shall report to the Department any facility expansion, production increase or process modifications which will result in new, different or increased discharges of

pollutants. The report shall either be a new permit application, or if the new discharge will not violate the effluent limitations of this permit, a written notice of the new, different or increased discharge. The notice shall contain a description of the new activities, an estimate of the new, different or increased discharge of pollutants and a description of the effect of the new or increased discharge on existing waste treatment facilities. Following receipt of this report, the Department may modify this permit to specify and limit any pollutants not previously regulated in the permit.

7.2.7 Duty to Halt or Reduce Activity

Upon failure or impairment of treatment facility operation, the permittee shall, to the extent necessary to maintain compliance with its permit, curtail production or wastewater discharges or both until the treatment facility operations are restored or an alternative method of treatment is provided.

7.3 Surface Water Requirements

7.3.1 Determining Compliance with a Water Quality Based Effluent Limitation

- When the water quality based effluent limitation is less than the limit of detection, levels less than the limit of detection are in compliance with the effluent limitation.

- When the water quality based effluent limitation is less than the limit of detection, effluent levels greater than the limit of detection, but less than the limit of quantitation are in compliance with the effluent limitation except when analytically confirmed and statistically confirmed by a sufficient number of analyses of multiple samples and use of appropriate statistical techniques.

- When the water quality based effluent limitation is greater than the limit of detection, but less than the limit of quantitation, levels less than the limit of detection or less than the limit of quantitation are in compliance with the effluent limitation.

- When the water quality based effluent limitation is expressed in the permit as a daily maximum or average mass limitation, compliance is determined as stated above in this section after converting the limit of detection (LOD) and limit of quantitation (LOQ) to mass values using the actual daily effluent flow (or actual average effluent flow for the averaging period). To convert LOD and LOQ from concentration to mass values use the following formula:

  LOD_{mass} or LOQ_{mass} (in lbs/day) = LOD or LOQ (in mg/L) x Flow (in MGD) x 8.34

7.3.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average limits and mass limits:

Weekly/Monthly average concentration = the sum of all daily results for that week/month, divided by the number of results during that time period.

Weekly Average Mass Discharge (lbs/day)

Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34

Average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day)

Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34

Average the daily mass values for the month.

7.3.3 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

7.3.4 Total Residual Chlorine

Test methods for total residual chlorine, approved in ch. NR 219 - Table B, Wis. Adm. Code, normally achieve a limit of detection of about 20 to 50 micrograms per liter and a limit of quantitation of about 100 micrograms per liter. Reporting of test results and compliance with effluent limitations for chlorine residual shall be as follows:

- Sample results which show no detectable levels are in compliance with the limit. These test results shall be reported on Wastewater Discharge Monitoring Report Forms as "< 100 µg/L". (Note: 0.1 mg/L converts to 100 µg/L)

- Samples showing detectable traces of chlorine are in compliance if measured at less than 100 µg/L, unless there is a consistent pattern of detectable values in this range. These values shall also be reported on Wastewater Discharge Monitoring Report Forms as "<100 µg/L." The facility operating staff shall record actual readings on logs maintained at the plant, shall take action to determine the reliability of detected results (such as re-sampling and/or calculating dosages), and shall adjust the chemical feed system if necessary to reduce the chances of detects.

- Samples showing detectable levels greater than 100 µg/L shall be considered as exceedances, and shall be reported as measured.

- To calculate average or mass discharge values, a "0" (zero) may be substituted for any test result less than 100 µg/L. Calculated values shall then be compared directly to the average or mass limitations to determine compliance.

7.3.5 Compliance with Phosphorus Limitation

Compliance with the concentration limitation for phosphorus shall be determined as a rolling twelve-month average and shall be calculated as follows:

$$\frac{\text{Total lbs of P discharged (most recent 12 months)}}{\text{Total flow in MGD (most recent 12 months) X 8.34}} = \text{Average conc of P in mg/L}$$

The quantity for the individual months is calculated by using the average of all the concentration values for phosphorus in mg/L and the total flow for the month in MGD.

This calculation shall be performed each monthly reporting period after substituting data from the most recent month for the oldest month. A calculated value in excess of the concentration limitation will be considered equivalent to a violation of a monthly average.

7.3.6 Additives

In the event that the permittee wishes to commence use of a water treatment additive, or increase the usage of the additives greater than indicated in the permit application, the permittee must get a written approval from the Department prior to initiating such changes. This written approval shall provide authority to utilize the additives at the specific rates until the permit can be either reissued or modified in accordance with s. 283.53, Stats. Restrictions on the use of the additives may be included in the authorization letter.

7.4 Land Treatment Requirements for Industrial Discharges

7.4.1 Formulas for Land Treatment Calculations

The permittee shall use the following formulas for land treatment calculations.

7.4.1.1 Hydraulic Application Rate

Calculate the monthly average hydraulic application rate for each sampling point by dividing the number of acres wetted during the month into the total gallons of wastewater loaded on that wetted acreage for the month and then dividing the quotient by the number of days in the month. Enter the calculated monthly average on the Discharge Monitoring Report form in the box for the last day of the month, in the "Hydraulic Application Rate" column.

7.4.1.2 Annual Total Nitrogen per Cell or per Zone

$$\frac{\text{(annual ave. concentration in mg/L) (tot. annual flow in million gallons per cell or zone) (8.34)}}{\text{acreage of cell or zone}} = \text{lbs/ac/yr}$$

7.4.1.3 Annual Total Chloride per Cell or per Zone

$$\frac{\text{(annual ave. concentration in mg/L) (tot. annual flow in million gallons per cell or zone) (8.34)}}{\text{acreage of cell or zone}} = \text{lbs/ac/yr}$$

7.4.2 Land Treatment Annual Report

Annual Land Treatment Reports are due by January 31st of each year for the previous calendar year.

7.4.3 Chloride Requirements for Land Treatment Systems

Since chloride is not significantly treated by the soil, the chloride level of the wastewater treated on land shall be minimized to the extent that is technically and economically feasible. The goal is to protect groundwater quality and prevent exceedance of the 125 mg/L groundwater preventive action limit.

7.4.4 Nitrogen Loading Requirements for Absorption Ponds

Since all forms of nitrogen in wastewater can be converted to nitrate nitrogen in the groundwater in the vicinity of an absorption pond, the average concentration of the sum of all nitrogen species in the absorption pond discharge shall be limited to minimize the concentration of nitrate+nitrite nitrogen in the groundwater to the extent that is technically and economically feasible and will prevent exceedance of the 2 mg/L groundwater preventive action limit.

7.4.5 Absorption Pond Discharge Restrictions

The volume of discharge to the absorption pond system shall be limited so that the discharge volume combined with the precipitation from a 10-year frequency, 24-hour duration rainfall event does not reduce the available freeboard to less than 1 foot below the top of the dike.

7.4.6 Discharges to the Absorption Pond System

No discharge to the absorption pond system may have physical or chemical characteristics which prevent the proper operation of the system.

7.4.7 Absorption Pond Management Plan

The absorption pond treatment system shall be operated and managed in accordance with a Department approved management plan. The management plan shall be consistent with the conditions listed in this permit and s. NR 214.12(5), Wis. Adm. Code which requires a load/rest schedule, weed control and removal, etc. If operational changes are needed, the management plan shall be amended by submitting a written request to the Department for approval.

7.5 Groundwater Standard Requirements

7.5.1 NR 140, Wis. Adm. Code

Ch. NR 140, Wis. Adm Code establishes groundwater quality standards for substances detected in or having a reasonable probability of entering the groundwater resources of the state. The groundwater monitoring requirements contained in this permit are based on substances reported to be in the discharge to groundwater but may not necessarily include all substances of public health or welfare concern which are in the effluent. Nonetheless, nothing in this permit allows the permittee to discharge any substance in a concentration which would cause groundwater standards in ch. NR 140, Adm. Code to be exceeded. Should a groundwater enforcement standard, preventive action limit or alternative concentration limit be exceeded at the point of standards application, the Department will seek a response in accordance with ch. NR 140, Wis. Adm. Code.

7.5.2 Groundwater Sampling

Groundwater sampling shall be performed in accordance with procedures contained in the WDNR publications, Groundwater Sampling Procedures Field Manual (PUBL-WR-168 87), Groundwater Sampling Procedures Guidelines (PUBL-WR-153 87), Groundwater Sampling Desk Reference (PUBL-DG-037-96) and Groundwater Sampling Field Manual (PUBL-DG-038-96).

7.5.3 Indicator Parameter - Preventive Action Limits

Indicator Parameter - Preventive Action Limits are calculated using a minimum of eight sample analysis results available from a representative background well in accordance with the procedures in s. NR 140.20, Wis. Adm. Code.

7.5.4 Groundwater Monitoring Forms

Results of the groundwater analyses shall be summarized and reported on Groundwater Monitoring Forms supplied by the Department. This report form is to be returned to the Department no later than the date indicated on the form. The original and one copy of the Groundwater Monitoring Form shall be submitted to your DNR regional office. A copy of the Groundwater Monitoring Form shall be retained by the permittee.

7.5.5 Appropriate Formulas for Groundwater

Total Nitrogen = Total Kjeldahl Nitrogen (mg/L) + [NO_2 + NO_3] Nitrogen (mg/L)

Organic Nitrogen (mg/L) = Total Kjeldahl Nitrogen (mg/L) - Ammonia Nitrogen (mg/L)

7.5.6 Reporting Depth to Groundwater

Depth to groundwater shall be reported in feet, to the nearest 0.01 foot, below the top of the well casing. A report shall be on file with the Department stating the well casing top elevation in feet above mean sea level (MSL), to the nearest 0.01 foot, for each groundwater monitoring well.

7.5.7 Groundwater Elevation

Groundwater elevations shall be calculated by subtracting the depth to groundwater measurement from the well casing top elevation and shall be reported in feet above mean sea level (MSL) to the nearest 0.01 foot.

7.5.8 Groundwater Grab Samples

Grab samples shall be taken of the groundwater only after adequate removal or purging of standing water within the well casing has been performed. For those wells which will refill with water as fast as the water can be removed by bailing or pumping, four well volumes shall be removed prior to sample collection and analysis. For those wells which will not refill with water as fast as the water can be removed by bailing or pumping, the existing volume of water inside the well casing shall be removed and samples collected after the well has refilled to at least half the original volume in the well.

7.5.9 Filtering of Groundwater Samples

All groundwater monitoring well samples shall be filtered prior to analysis, except for the portion used to measure pH or field specific conductance, which shall be done using an unfiltered sample. While in-field analysis is preferred for these two tests, laboratory analysis done within two hours of sample collection is acceptable. For the portion to be filtered, it is preferred that filtering be performed in the field immediately following sample collection. However, laboratory filtering is acceptable. Filtering shall be performed through a standard 0.45 micron filter.

7.5.10 Groundwater Data Log

A data log shall be used to record the results of all field sampling and analysis events. This log shall include date of sampling event, groundwater sampler's name, well identification, depth from pipetop to water, depth from pipetop to well bottom, time of purging (start to end), volume of water purged, indication of whether the well was purged dry, time of sample withdrawal, and the following applicable field observations: pH, field conductivity, temperature, color, odor and turbidity, indication of whether field filtering was performed and time of filtering, indication of cap and lock replaced, and comments.

7.5.11 Notification of Attaining or Exceeding Groundwater Quality Standards

If the concentration of a substance in groundwater attains or exceeds a Preventive Action Limit or Enforcement Standard at a point of standards application, the permittee shall submit a letter along with the groundwater monitoring data notifying the Department, in accordance with ss. NR 140.24 and NR 140.26, Wis. Adm. Code, that a Preventive Action Limit or Enforcement Standard has been attained or exceeded.

8 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Land Treatment Management Plan -Management Plan	January 15, 2001	10
Groundwater Monitoring Forms	no later than the date indicated on the form	17
Annual Land Treatment Reports	by January 31st of each year for the previous calendar year	16
Wastewater Discharge Monitoring Report Form	no later than the date indicated on the form	11

All submittals required by this permit shall be submitted to the Regional Headquarters except as follows. Report forms shall be submitted to the address printed on the report form. Any Facility Plans and/or Engineering Plans and Specifications shall be submitted to the Bureau of Watershed Management, P.O. Box 7921, Madison, WI, 53707-7921.

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES

PUBLIC NOTICE OF INTENT TO REISSUE A WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES) PERMIT No.WI-0022756-06-0

Permittee: WI DNR - WILD ROSE FISH HATCHERY, N5871 State Rd 22, Wild Rose, WI, 54984

Facility Where Discharge Occurs: WI DNR Wild Rose Fish Hatchery, N5871 STATE ROAD 22, WILD ROSE, WISCONSIN

Receiving Water And Location: the PINE RIVER and GROUNDWATER of the PINE RIVER and WILLOW CREEK WATERSHED (WR02), WOLF RIVER DRAINAGE BASIN via a SERIES of ABSORPTION PONDS in WAUSHARA COUNTY

Brief Facility Description and Summary of Proposed Changes: This facility is a fish hatchery which raises trout, salmon, pike, muskie, walleye, sturgeon, suckers and minnows. Fish eggs are incubated and hatched. Fry are started on dry formulated feed while larger fish are fed suckers and minnows. Fish are sorted, inventoried, moved and grown until they reach acceptable size for stocking to waters of the state. The water supply comes from artesian wells and springs located throughout the property. Water flows from the wells and springs through raceways, ponds and tanks. The water is then allowed to flow into the hatchery's two settling ponds or is discharged into the Pine River. All waste material produced as a result of rearing fish is pumped into a wastewater line that discharges into five seepage cells. The groundwater around these cells is monitored by six groundwater wells that are tested quarterly. The hatchery operates year round and produces approximately 120,000 pounds of fish each year. The annual average wastewater volume is 2.59 million gallons per day.

Permit Drafter's Name, Address and Phone: Nanette E. Jameson, NER Headquarters, 1125 N. Military Ave, Green Bay, WI, 54307, (920) 492-5874

Basin Engineer's Name, Address, and Phone: Mark Debaker, Po Box 10448, Green Bay, WI 54307, (920) 492-5824

The Department has tentatively decided that the above specified WPDES permit should be reissued.

Persons wishing to comment on or object to the proposed permit action, or to request a public hearing, may write to the Department of Natural Resources at the above named permit drafter's address. All comments or suggestions received no later than 30 days after the publication date of this public notice will be considered along with other information on file in making a final decision regarding the permit. Where designated as a reviewable surface water discharge permit, the U.S. Environmental Protection Agency is allowed up to 90 days to submit comments or objections regarding this permit determination.

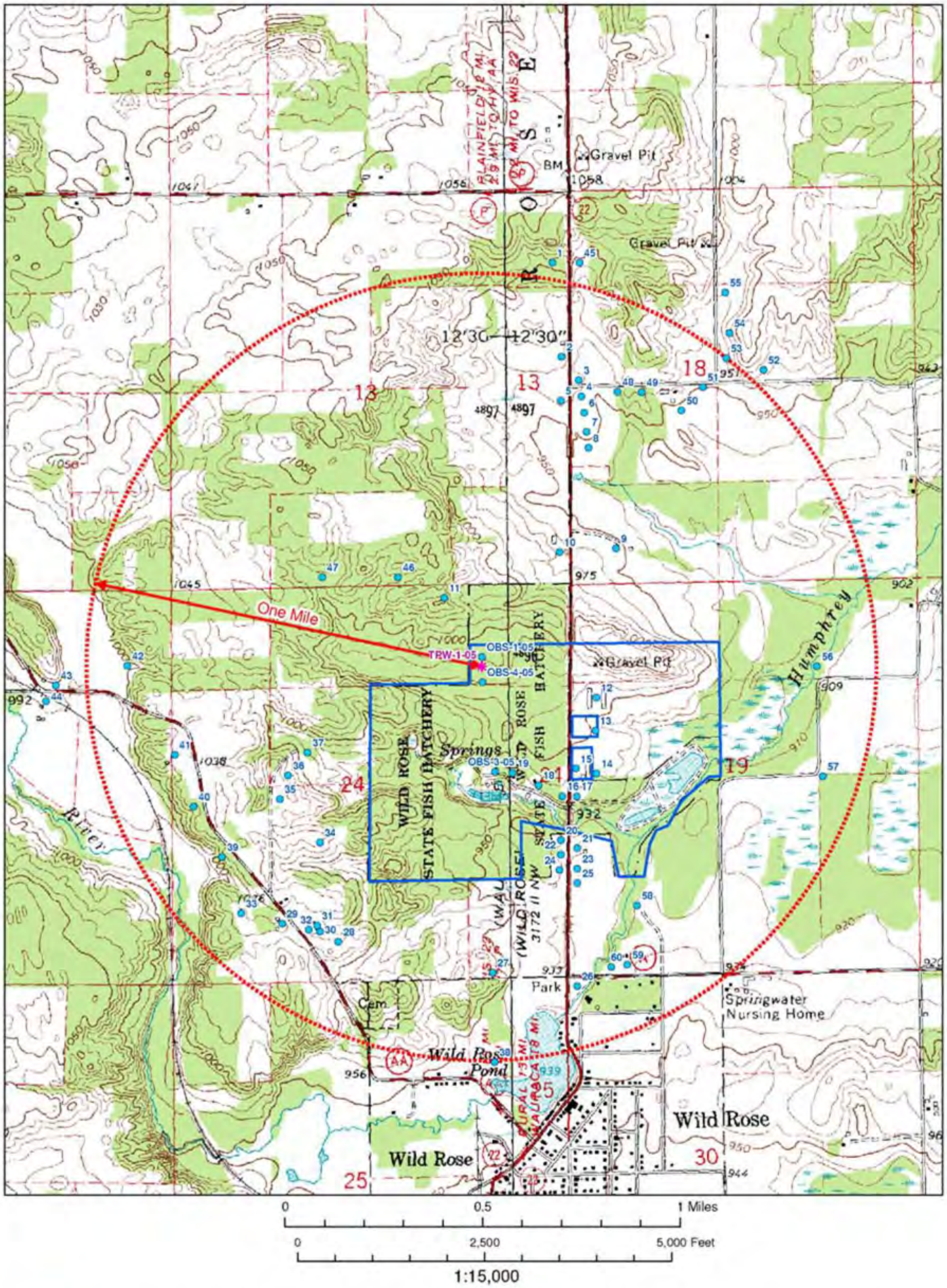
A public informational hearing may be held if response to this notice indicates significant public interest pursuant to s. 283.49, Stats., or if a petition requesting a hearing is received from 5 or more persons. Requests for a public informational hearing shall state the following: the name and address of the person(s) requesting the hearing; the interest in the proposed permit of the person(s) requesting the hearing; the reasons for the request; and the issues proposed to be considered at the hearing.

Information on file for this permit action may be inspected and copied at either the above named permit drafter's address or the above named basin engineer's address, Monday through Friday (except holidays), between 9:00 a.m. and 3:30 p.m. Information on this permit action may also be obtained by calling the permit drafter at (920) 492-5874 or by writing to the Department. Reasonable costs (usually 10 cents per page) will be charged for copies of information in the file other than the public notice and fact sheet. Permit information is also available for downloading from the Internet using a World Wide Web browser at: http://www.dnr.state.wi.us/org/water/wm/ww. Pursuant to the Americans with Disabilities Act, reasonable accommodation, including the provision of informational material in an alternative format, will be made to qualified individuals upon request.

NAME OF PUBLISHING NEWSPAPER: Waushara Argus, PO Box 838, Wautoma, WI 54982-0838

Date Notice Issued: April 26th, 2000

Wild Rose State Fish Hatchery
DRAFT Environmental Assessment
Appendix C



Hatchery Project Boundary

One Mile Radius (from test well location)

Domestic Wells*

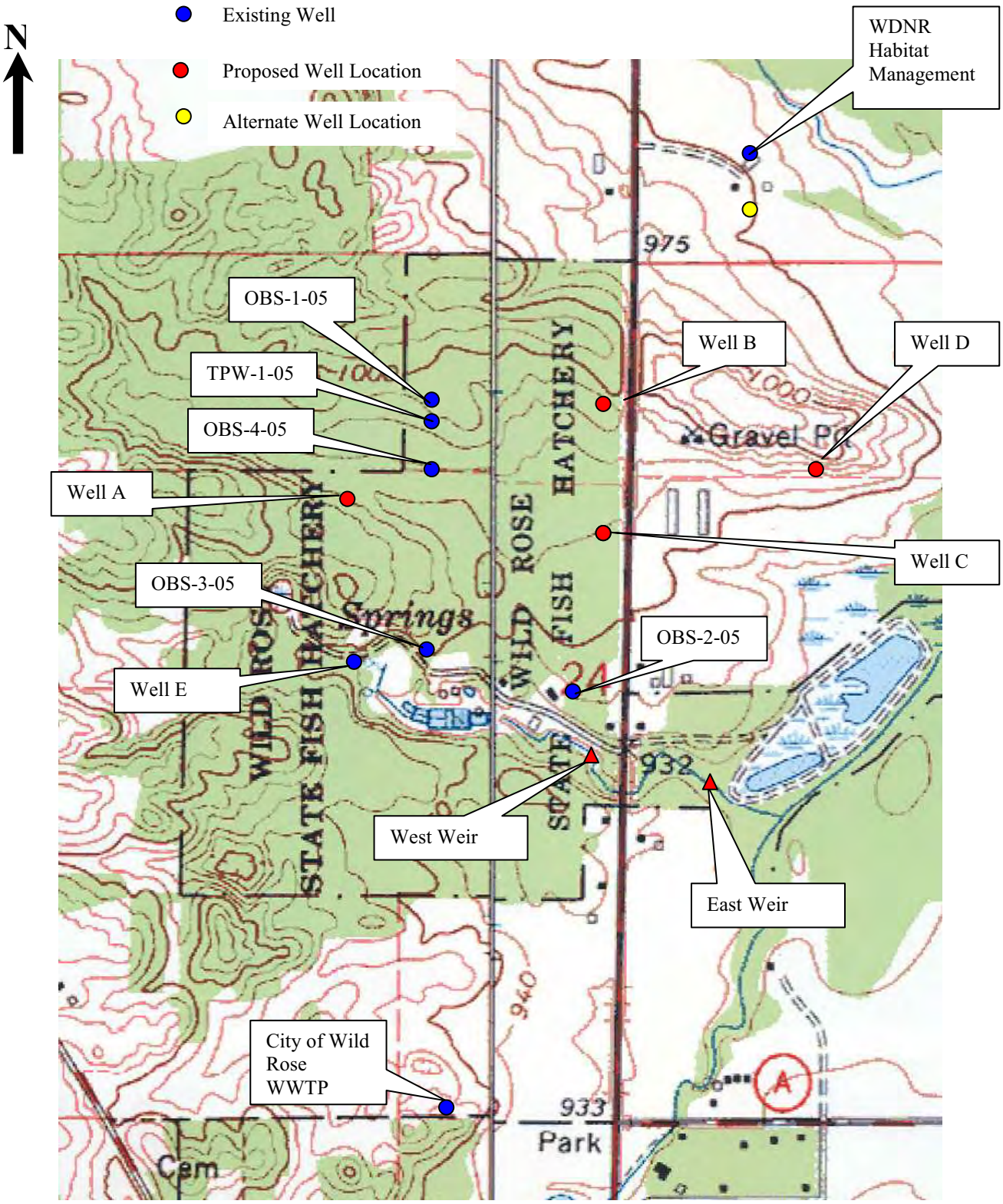
18 inch Test Production Well

* Domestic Wells correspond to attached Wild Rose State Fish Hatchery Domestic Water Well Inventory

LIESCH Hydrogeologists • Engineers • Environmental Scientists 6000 Gisholt Dr, Suite 203, Madison, WI 53713, (608) 223-1532 13400 15th Avenue N, Minneapolis, MN 55441, (763) 489-3100 4300 N Miller Rd, Suite 200, Scottsdale, AZ 85251, (480) 421-0853	**Wild Rose State Fish Hatchery EA**	**Oct. 2005**
	Area Water Supply Wells	**Figure**

Table 5-Domestic Water Well Inventory
Wild Rose State Fish Hatchery

Map Number	WI/USGSWell Number	Resident's Name	Fire Number	Street City Zip	Phone Number	Well Depth	Well Diameter	Year Constructed	Water Level	pumping level	gpm	Notes
1	WS 1114	Gregory Sage	N6423	SR 22 Wild Rose, WI 54984	920-622-3168	91	4-inch	1981	59	72	21	
2		Janis Fredette	N6337	SR 22 Wild Rose, WI 54984								
3		Ken Linke	N6304	SR 22 Wild Rose, WI 54984								
4		Phil Gloseneh	N6290	SR 22 Wild Rose, WI 54984								
5		Gail Moore	N6283	SR 22 Wild Rose, WI 54984								
6		Jones	N6266	SR 22 Wild Rose, WI 54984								For Sale; Majestic Oaks 920-293-8808
7		Noett	N6256	SR 22 Wild Rose, WI 54984								
8		Paul Tieaskie	N6222	SR 22 Wild Rose, WI 54984								
9	STH22N6154	DNR Habitat Management	6154	SR 22 Wild Rose, WI 54984		85	6-inch	1972	11	19	15	3/4 vent opening for access
10		Robert & Joyce Haese	6137	SR 22 Wild Rose, WI 54984								
11	993	James Phillips	6099	SR 22 Wild Rose, WI 54984		115	4-inch	1976	82	91	20	
12		Wild Rose Recycling	6012	SR 22 Wild Rose, WI 54984								
13	MY872	John & Jean Testin	5936	SR 22 Wild Rose, WI 54984	920-622-3823	89	6-inch	1999	10	18	15	
14	992	Emerance Denielski Jr.	5928	SR 22 Wild Rose, WI 54984		128	4-inch	1973	10	17	25	Egg plant well
15	991	Isabal Urban	5904	SR 22 Wild Rose, WI 54984		51	2-inch	1969	14	17	15	
16		No Name-Trailer	5881	SR 22 Wild Rose, WI 54984								
17		DNR East Gate	5876	SR 22 Wild Rose, WI 54984								
18		DNR West Gate	5871	SR 22 Wild Rose, WI 54984								
19		DNR Residence	5873	SR 22 Wild Rose, WI 54984								
20		Brussat	N5823	SR 22 Wild Rose, WI 54984								
21		Larry & James Caves	N5820	SR 22 Wild Rose, WI 54984								
22		Robert Jackie Phillips	5801	SR 22 Wild Rose, WI 54984								
23		Donald Craves	5796	SR 22 Wild Rose, WI 54984								
24		Paul Wakula	5795	SR 22 Wild Rose, WI 54984								
25		Larry & Ruth Caves	5758	SR 22 Wild Rose, WI 54984								
26		City of Wild Rose Park		SR 22 Wild Rose, WI 54984			2-inch					Flowing well for drinking water....
27	CI 653	City of Wild Rose WWTF		Sewer Lagoon Road Wild Rose, WI 54984		144	6-inch	1989	41.4	43.5	80	located 450 ft west of pond area, north side of sewer lagoon road
28		Larry Martin	N5738	CR AA Wild Rose, WI 54984								
29		Willard Nohr	N5753	CR AA Wild Rose, WI 54984								
30	DE512	Michael Colligan	N5754	CR AA Wild Rose, WI 54984		120	6-inch	1990	75	85	10	
31	986	Michael Colligan	N5768	CR AA Wild Rose, WI 54984		107	4-inch	1961	78	82	20	
32		Michael Colligan	N5764	CR AA Wild Rose, WI 54984								
33	988	Kelly Simons	N5769	CR AA Wild Rose, WI 54984		101	4-inch	1981	75	87	21	
34		Mary & Mark Demler	N5854	18th Court Wild Rose, WI 54990								
35	987	Edward Hayek	N5890	18th Court Wild Rose, WI 54990		112	2-inch	1966	74	76	20	
36	983	Phillip Nelson	N5902	18th Court Wild Rose, WI 54990		127	4-inch	1977	83	95	15	
37		James Bargenquast	N5940	18th Court Wild Rose, WI 54990								
38		City of Wild Rose - Roberts Park	CR AA	CR AA Wild Rose, WI 54988			4-inch					4" steel Drilled with submesible/pitless unit located on west side of pavillon
39	989	Nikolas Stokalo	N5807	CR AA Wild Rose, WI 54984		100	4-inch	1983	68	75	20	
40	990	Wayne Simons	N5853	CR AA Wild Rose, WI 54984		102	4-inch	1984	72	78	20	
41		Jerry Zawilenski	N5879	CR AA Wild Rose, WI 54984								
42		No Name-brown house	N5958	CR AA Wild Rose, WI 54984								
43		No Name - yellow house	N5994	CR AA Wild Rose, WI 54984								
44		No Name - Red Barn	N5999	CR AA Wild Rose, WI 54984								
45		Roger & Sally Carpenter	N6655	19TH DR Wild Rose, WI 54984								Old well with jack pump - out of service - posted no tresspassing or hunting - in ditch ~200ft east hwy 21 ~100 ft s drive to #1
46		No Name		SR 22 Wild Rose, WI 54984			4-inch					
47		No Name		SR 22 Wild Rose, WI 54984			4-inch					
48		Prill	N7225	Anwa Dr. Wild Rose, WI54984								
49		Christie	N7167	Anwa Dr. Wild Rose, WI54984								
50		Nowland	N7151	Anwa Dr. Wild Rose, WI54984								
51		Nowland	N7117	Anwa Dr. Wild Rose, WI54984								
52		Jeff Rivers	N7050	19thDr Wild Rose, WI 54984								
53		Norman Suranne	N6330	19thDr Wild Rose, WI 54984								
54		Rollin Sorge	N6356	19thDr Wild Rose, WI 54984								
55		Donald Olander	N6382	19thDr Wild Rose, WI 54984								
56		No Name -White House	N5999	19th Road Wild Rose, WI 54984								
57		No Name - Brown House	N5950	19th Road Wild Rose, WI 54984								
58		No Name	N7202	CR A Wild Rose, WI 54984								
59		No Name -Cream colored House	N7224	CR A Wild Rose, WI 54984								
60		No Name - Tan House	N7248	CR A Wild Rose, WI 54984								



Source: USGS 7.5 Minute Wild Rose and Wautoma NE Quadrangles

Scale: Not to Scale

W:\ws\13071\NEPA\Figures\Proposed Well Location Map

10/10/2005

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203
Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(763) 489-3100

4300 N Miller Rd, Suite 200
Scottsdale, AZ 85251
(480) 421-0853

Wild Rose Hatchery	Oct 2005
Proposed Well Locations	**Figure**

Wild Rose State Fish Hatchery
DRAFT Environmental Assessment
Appendix D

REGION 3 FEDERAL ASSISTANCE SECTION 7 EVALUATION FORM

PHASE I: COMPLETED BY STATE

(See Phase I Instructions for completing this form)
For federal assistance programs administered by the USFWS (Division of Federal Assistance.)

State: Wisconsin **Agency:** Dept. of Natural Resources

Grant Program(s): Sport Fish Restoration

Grant Proposal (GP), Grant Agreement (GA), GP Amendment, GA Amendment (Circle all that apply)

Title and Number (add amendment no.): _____

I. Species/Critical Habitat: List species or critical habitat (or attach list) that are and/or may be present within the action area.

None

II. Description of Proposed Action: Describe the action(s) in sufficient detail so that the potential effects of the action can be identified and fully evaluated.

Wild Rose Fish Hatchery Renovation
(See attached)

III. Description of Effects: Describe the effects, including beneficial, of the project actions on Species/Critical Habitat.

None

IV. Recommended Determination(s) of Effect(s): For all species and critical habitat identified in Section I, mark (X) the appropriate determinations.

A. Listed, Proposed and Candidate Species

✓ *a) "No Effect"*
List species for which this recommendation is applicable (or attach list): None

___ b) *"May Affect, but is Not Likely to Adversely Affect"*
List species for which this recommendation is applicable (or attach list):

___ c) *"May Affect, and is Likely to Adversely Affect"*
List species for which this recommendation is applicable (or attach list):

B. Designated and Proposed Critical Habitat

X *a) "No Effect"* to Critical Habitat
List critical habitat(s) for which the recommendation is applicable. None

___ b) *"May Affect, but is not likely to Adversely Affect"*
List critical habitat(s) for which the recommendation is applied.

___ c) *"May Affect, and is Likely to Adversely Affect"*
List critical habitat(s) for which the recommendation is applied.

State Signatures:

Prepared by:
Name/Title: Cheryl Goodman FH SFR Project Leader
Signature: Cheryl Goodman Date: 9/29/2005
Telephone No (608) 267-7506 email:

Reviewed by:
Name/Title: Andrew P. Galvin / Incidental Take Specialist
Signature: Date: 9/29/05
Telephone No. 608-264-2702 email:

Wild Rose Hatchery Renovation

This project entails renovating the Wild Rose Fish Hatchery, making it into a modern state-of-the-art cold and cool water fish rearing facility with a compliant water supply. The major components of the project include:

- Remove existing coldwater and coolwater buildings and raceway structures.
- Construct new brood stock, coldwater and coolwater buildings and raceway pavilions.
- Renovate the existing office building.
- Upgrade the entire electrical system.
- Construct new wastewater treatment facilities.
- Develop a new water supply system that includes new high capacity wells for aquaculture and potable wells for domestic use.
- Seal existing non-compliant wells and water supply facilities.
- Restore wetlands and a portion of the natural stream.
- Preserve historic features, including an historic raceway for purposes of educating the public about historic fish rearing practices.
- Construction of a Visitor Center.

State of Wisconsin
Department of Natural Resources
Bureau of Endangered Resources
PO Box 7921, Madison WI 53707-7921

Wisconsin Natural Heritage Inventory

Form ER – Endangered Resources Review Documentation

Form 1700-046 (R 1/05)

Instructions: Any action the Department conducts, approves, or funds on public or private lands, including projects funded by the Fish and Wildlife Service's Federal Aid program, that may affect state or federal endangered resources is subject to endangered resources screening. Use this form or other documentation of Endangered Resources Review. Place in project file to document that screening was completed. For additional information, consult the ER Screening Guidance or contact the Endangered Resources Program.

Project Information

Reviewer Last Name	First	MI
Kitchel	Lisie	

Project Description – Activity / Management Objective (include date(s) conducted)

Wild Rose Fish Hatchery Renovations

Are proposed activities part of a project funded under Fish and Wildlife Service Federal Aid Program? ☐ No ☒ Yes

County	Township	Range E/W	Section(s)	DNR Property Name
Waushara	20 N	10 E	24	Wild Rose Fish Hatcery
	20 N	11 E	19	Waterbody Name
	N			Describe Location (if applicable)
	N			

Describe Project Area and Surrounding Landscape (vegetative cover, habitat, waterbodies, river/stream substrate, etc.) and note what info this is based on (e.g., aerial photos, site visit - include date(s) of site visit)

Endangered Resources Information

Endangered Resources Information Reviewed (e.g. NHI Portal, NHI GIS, SEWRPC reports, inventory reports, experts consulted, etc.)

Portal

Extent of Area Screened (e.g. project area and surrounding sections, waterbodies, water systems, etc.)

Porject and surrounding area

Specify Species or Communities Recorded within 1 mile of search area (list below or attach). In some cases, a search area greater than 1 mile is necessary. See ER Screening Guidance.

Bartonia virginica[Yellow Screwstem] SC| - Historic
Lycaeides melissa samuelis[Karner Blue] SC/FL|LE - Reported in surrounding area

Federal Section 7 / Federal Aid Determination

Do Federally protected species or critical habitat occur at the project area? ☐ No ☑ Yes (Boxes are automatically checked based on search, or can be manually changed as appropriate.)

If yes, what effect will the proposed activities have on federally listed / proposed / candidate species and designated / proposed critical habitat?

☑ will have **"no effect"** — Appropriate when the proposed activities will not directly or indirectly affect the above. Place documentation of conclusion in file.

☐ may affect but **"not likely to adversely affect"** — Appropriate when the proposed activities are not likely to directly or indirectly adversely impact or would be beneficial to above. Beneficial effects are positive effects without any adverse effects to individual animals (includes insects) and plants. Contact the Bureau of Endangered Resources so they can work with the FWS Federal Aid Office to obtain their concurrence on this determination.

☐ may affect and **"likely to adversely affect"** — Appropriate when the proposed activities are likely to adversely impact the above. Contact the Bureau of Endangered Resources so they can work with the FWS Green Bay Field Office to initiate formal Section 7 consultation.

Provide Short Narrative Explaining Determination and include in file appropriate information (maps, field notes, etc.)

No lupine occur in the project area, although some lupine occur in the general area, these areas will not be impacted by the project as proposed. per Steve Fafjer memo.

State Endangered Resources Determination

Do State-listed species occur at the project area? ☑ No ☐ Yes (Boxes are automatically checked based on search, or can be manually changed as appropriate.)

If yes, will the proposed activities result in the Take of state listed species that are present or likely present in the project area?

☐ No – Provide short narrative explaining determination (unsuitable habitat, measures to avoid take, etc.). No further action needed – Place documentation in project file.

☐ Yes – Incidental take authorization is likely. Contact the Incidental Take Consultation Specialist at BER to initiate the formal consultation process for the take of a listed species.

Provide Short Narrative Explaining Determination and include in file appropriate information (maps, field notes, etc.)

Basis for Determination

Determination regarding presence of endangered resources and potential impact based on: (include in file appropriate information [maps, field notes, etc.])

☑ Personal Knowledge of Site and Species ☑ Experts: Steven Fafjer - Operations Supervisor at Wild Rose

☐ Site Visit ☐ Other (specify): _____

Grassland and Savanna Management Determination

If the objective of the proposed activities is to maintain or improve grassland or savanna habitat, broad taking coverage may be authorized through the Grassland/Savanna Management Taking Authorization. The listed species must be covered by the Authorization and the Conditions of the Authorization must be followed. See the Grassland/Savanna documentation for Conditions, grassland/savanna definitions, approved activities, and management protocols.

For grassland/savanna management activities, were the management protocols for the listed species followed?

☐ Yes – Describe how:

☐ No – Briefly describe the alternative to the protocol that was followed (include experts consulted):

Were Presence / Absence Surveys Conducted? ☐ Yes ☐ No

Estimated Project Acreage Covered by Authorization

Optional Grassland/Savanna Documentation: Describe Special Concern species and/or Natural Communities present, and measures to minimize or avoid impacts:

Reviewer Certification

I hereby certify that the above review documentation is true and correct to the best of my knowledge.

Signature of Project Reviewer: AE Fahl

Date Signed: 8/28/05

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
Telephone 608-266-2621
FAX 608-267-3579
TTY 608-267-6897

September 11, 2005

IN REPLY REFER TO: 1650

Suzanne Johnson
Liesch Associates, Inc.
13400 15th Ave. North
Plymouth, MN 55441

SUBJECT: Endangered Resources Information Review (Log Number 05-226)
Wild Rose Fish Hatchery Water Supply Compliance and Renovation Project

Dear Ms. Johnson:

The Bureau of Endangered Resources has reviewed the project area described in your letter for the proposed design and construction of improvements to the Wild Rose State Fish Hatchery, near Wild Rose, Wisconsin.

Our Natural Heritage Inventory data files contain information on only one record for the project area located in Section 24 of T20N R10E and Section 19 of T20 N R11E, Waushara County, Wisconsin. This rare species is not known to occur in the immediate project area, but was reported within two miles of the project's location. This information is provided to assist in determining if appropriate habitat exists for the species to occur in the project's impact area. Endangered resources occurring in proximity to the project area:

Lycaeides samuelis (Karner blue), a butterfly listed as Federally Endangered and Special Concern in Wisconsin, occurs at numerous locations within the town-ranges of the project area. The observation date for these occurrence records is 1998. The Karner blue prefers semi-open oak openings, pine barrens, and oak-pine barrens supporting wild lupine (*Lupinus perennis*), its only larval foodplant. This butterfly has two flight periods: one beginning in late May through mid-June and a second from mid-to-late July through early August.

If the proposed project will impact any wild lupine populations, I recommend that these areas be surveyed for the Karner Blue Butterfly. If this species is located in the project's impact area, then you will need to coordinate with our Bureau and the Fish and Wildlife Service to get authorization for the project to proceed. If areas with wild lupine occur in the project impact area and have previously been surveyed with no Karners found, please provide that information to our Bureau. If no wild lupine occurs in the project area, or areas containing wild lupine can be avoided, no surveys are necessary.

In addition to the above information, our data files also contain historical records (records 25 years or older) of rare species known to occur within the vicinity of the project site. There is an historic record for a plant, the Yellow Screwstem (*Bartonia virginia*), from 1913 in the project area, however it is not likely that this species still occurs in the project area and no surveys would be necessary for this species.

Comprehensive endangered resource surveys have not been completed for the project area. As a result, our data files may be incomplete. However, given your description of the project site and the nature of the proposed project I do not believe that further endangered resource surveys are warranted, other than those noted above regarding the Karner Blue Butterfly.

This letter is for informational purposes and only addresses endangered resource issues. This letter does not constitute Department of Natural Resources authorization of the project and does not exempt the project from securing necessary permits and approvals from the Department.

Please give me a call at (608) 266-5248 if you have any questions about this information.

Sincerely,

Helen Elise Kitchel
Environmental Review Specialist

enclosure – map

cc: Alfred Kaas – DNR/GEFII/FH-4
Bill Furbish – DNR/GEFII/DG-2

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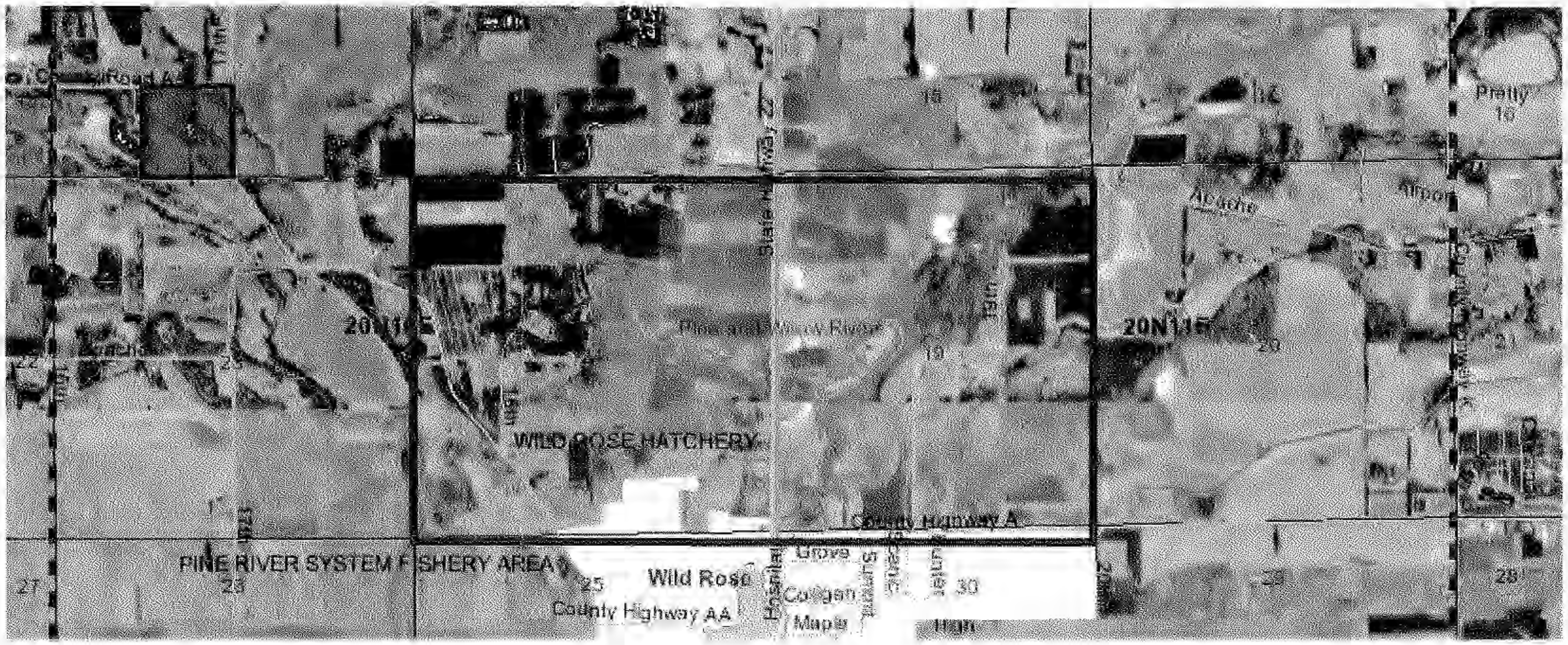

WILD ROSE HATCHERY
Wild Rose
County Highway AA
County Highway A
20N11E
Apache
Pretty
Grove
Maple
30

WISCONSIN DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
Telephone 608-266-2621
FAX 608-267-3579
TTY 608-267-6897

September 27, 2005

IN REPLY REFER TO: 1650

Suzanne Johnson
Liesch Associates, Inc.
13400 15th Ave. North
Plymouth, MN 55441

SUBJECT: Wild Rose Fish Hatchery Water Supply Compliance and Renovation Project
Endangered Resources Review follow-up (ERIR Log Number 05-226)
Verification of no Endangered Resources in the project area

Dear Ms. Johnson:

In response to our September 11, 2005 letter indicating the potential for Karner Blue Butterfly *(Lycaeides samuelis)* to occur in the proposed project area we have received verification from Steven Fajfer, Operations Supervisor for the Wild Rose Fish Hatchery, that there are no wild lupine (*Lupinus perennis*) plants in the project area. It is my understanding that there have been attempts to establish wild lupine in areas around the hatchery, but none of these areas are in proximity to the proposed project impact area.

The lack of wild lupine in the project area makes it unlikely that the Karner Blue Butterfly would be found to occur in the project area. Therefore this project, as proposed, would not adversely impact this federally listed species.

At this time, there are no other state or federally listed threatened or endangered species known or likely to occur in the project area. Although some listed species may occur or historically occurred in the general area outside of Wild Rose Fish Hatchery they are not likely to occur in the project impact area due to lack of suitable habitat for those species.

I do not believe that further endangered resource surveys are warranted, nor do I believe that any state or federally listed species are likely to occur in the project area.

Please give me a call at (608) 266-5248 if you have any questions about this information.

Sincerely,

Helen Kitchel

Helen Elise Kitchel
Environmental Review Specialist

cc: Alfred Kaas – DNR/GEFII/FH-4
Bill Furbish – DNR/GEFII/DG-2

Erirprojects\dv\dves_05-226WildRose2.doc

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE PERMIT

2. AUTHORITY-STATUTES
16 USC 703-712

REGULATIONS *(Attached)*
50 CFR Part 13
50 CFR 21.41

1. PERMITTEE

WISCONSIN DNR STATE FISH HATCHERY
WILD ROSE STATE FISH HATCHERY
N5871 ST RD 22
WILD ROSE, WI 54984

3. NUMBER
MB716112-0

4. RENEWABLE
YES
NO

5. MAY COPY
YES
NO

6. EFFECTIVE
01/01/2005

7. EXPIRES
12/31/2005

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
STEVEN FAJFER

9. TYPE OF PERMIT
DEPREDATION

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
WILD ROSE STATE FISH HATCHERY
N5871 STATE RD 22
WILD ROSE, WISCONSIN

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. AUTHORIZED TO KILL UP TO:

18 KINGFISHERS 15 GREAT-BLUE HERONS 4 DOUBLE-CRESTED CORMORANTS 2 GREEN HERONS.

DEPREDATING CROWS AND GRACKLES CAN BE REMOVED UNDER 50 CFR 21.43. BIRDS MAY BE KILLED ONLY IN CONJUNCTION WITH AN ON-GOING NON-LETHAL CONTROL PROGRAM.

E. METHOD OF TAKING IS LIMITED TO THE USE OF A SHOTGUN, NO LARGER THAN 10 GAUGE, FIRED FROM THE SHOULDER ON OR OVER THREATENED AREAS ONLY AND IN ACCORDANCE WITH LOCAL AREA ORDINANCES. NON-TOXIC SHOT MUST BE USED.

F. THE FOLLOWING ARE AUTHORIZED TO CONDUCT THE DEPREDATION ACTIVITY: RICH KLETT, DAVE SWANSBY, TODD RICH, RYAN ZERNACH, AND STEVE FAJFER.

G. PERMITTEE MUST ALSO COMPLY WITH ATTACHED REVIEWED BY WISCONSIN CONDITIONS.

Reviewed by Wisconsin
Department of Natural Resources

Ryan Wrasky
FEB 21 2005

ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
ANNUAL REPORT DUE: 1/10

ISSUED BY
Stephen D. Wilds

TITLE
CHIEF - MIGRATORY BIRD PERMITS

DATE
01/19/2005

STANDARD CONDITIONS
MIGRATORY BIRD DEPREDATION PERMITS
(50 CFR Part 13; 50 CFR 21.41)

Standard conditions for depredation permits are below. Failure to comply with the conditions of your permit could be cause for suspension of the permit. If you have questions regarding the conditions of your permit, refer to the regulations or contact the migratory bird permit office that issued your permit. Regulations and contact information are available on the Internet at: http://permits.fws.gov/ltr/ltr.shtml.

1. You, and any subpermittees, must carry a legible copy of this permit, and display it upon request, whenever you are exercising its authority.

2. You may not exercise the authorization granted by this permit contrary to the laws of the applicable State, County, Municipal, or Tribal government, or any other applicable law.

3. You are not authorized to take, capture, or harass Bald or Golden Eagles or federally listed threatened or endangered species.

4. You may not use blinds, pits or other means of concealment, decoys, duck calls, or other devices to lure or entice birds within gun range.

5. If you use a shotgun to take birds, it can be no larger than 10 gauge and it must be fired from the shoulder. You must use a nontoxic shot listed in 50 CFR 20.21(j).

6. To minimize lethal take of birds, you are required to continually apply nonlethal methods of harassment alternately with lethal control.

7. You are not authorized to take any birds, nests, or eggs, or to release birds on Federal or State lands or other public or private property without additional written authorization, permission, or permits from the applicable Federal or State agency, landowner, or custodian.

8. Unless otherwise specified on the face of the permit, birds, nests or eggs taken under this permit must be (1) turned over to the U.S. Department of Agriculture for official purposes, (2) donated to a public educational or scientific institution as defined in 50 CFR 10, or (3) completely destroyed by burial or incineration.

9. You must maintain records of the activities conducted under your permit for 5 years from the date of expiration of the permit (50 CFR 13.46), including the following information: species (common name); date taken; location where taken; number of birds killed or relocated; number of eggs, or nests with eggs, taken or relocated; name of person taking birds; and the final disposition of the birds or eggs.

10. You must keep all records relating to the permitted activities at the location(s) identified in writing by you to the issuing office.

11. Acceptance of this permit authorizes the Service to inspect any wildlife held, and to audit or copy any permits, books, or records required to be kept by the permit and governing regulations.

(3/25/2004)

Appendix A

Source: Yahoo.com Maps

Scale: Not to Scale

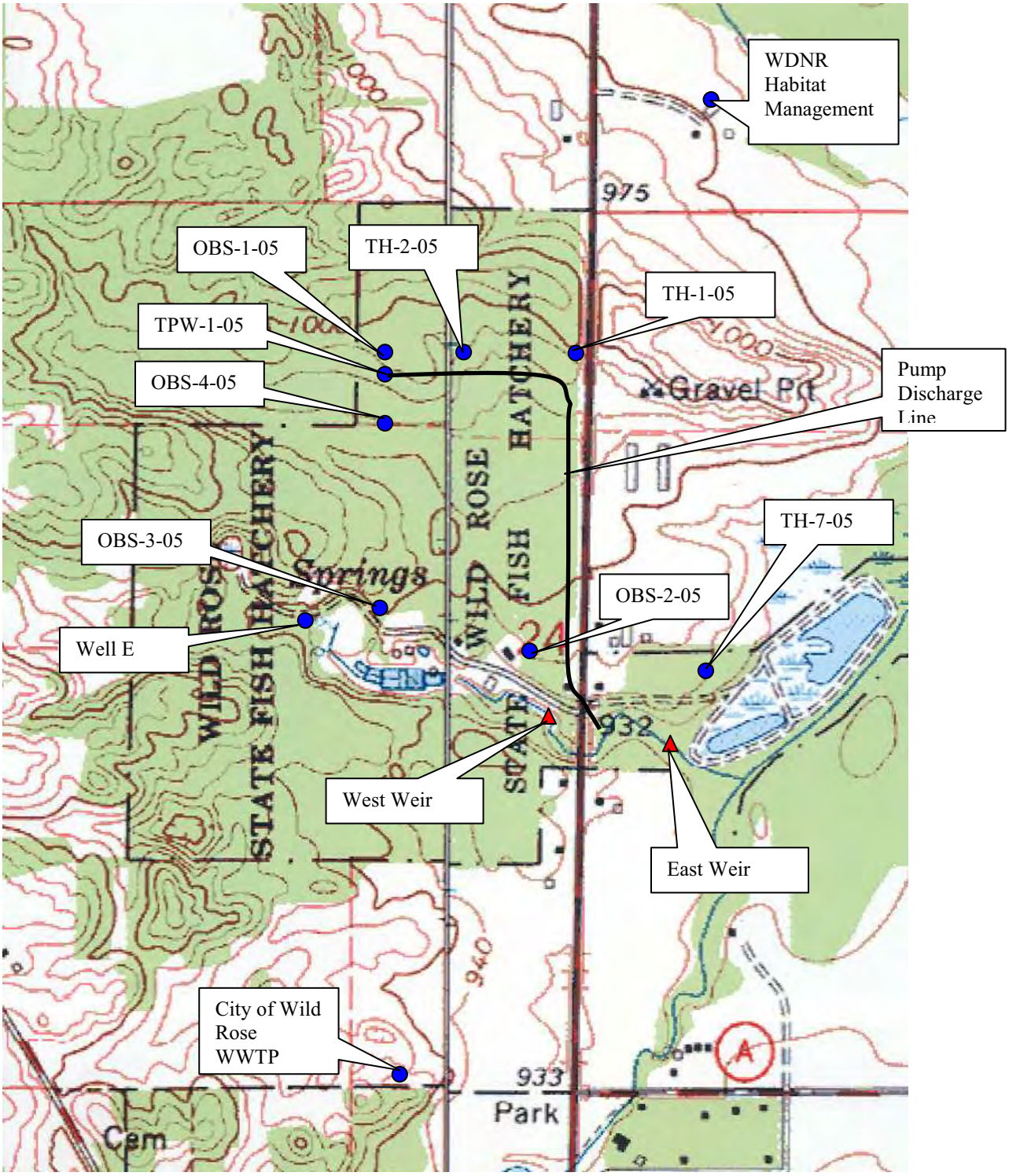
LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203
Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(763) 489-3100

4300 N Miller Rd, Suite 200
Scottsdale, AZ 85251
(480) 421-0853

Wild Rose Fish Hatchery	Oct 05
Site Location Map	Figure 1

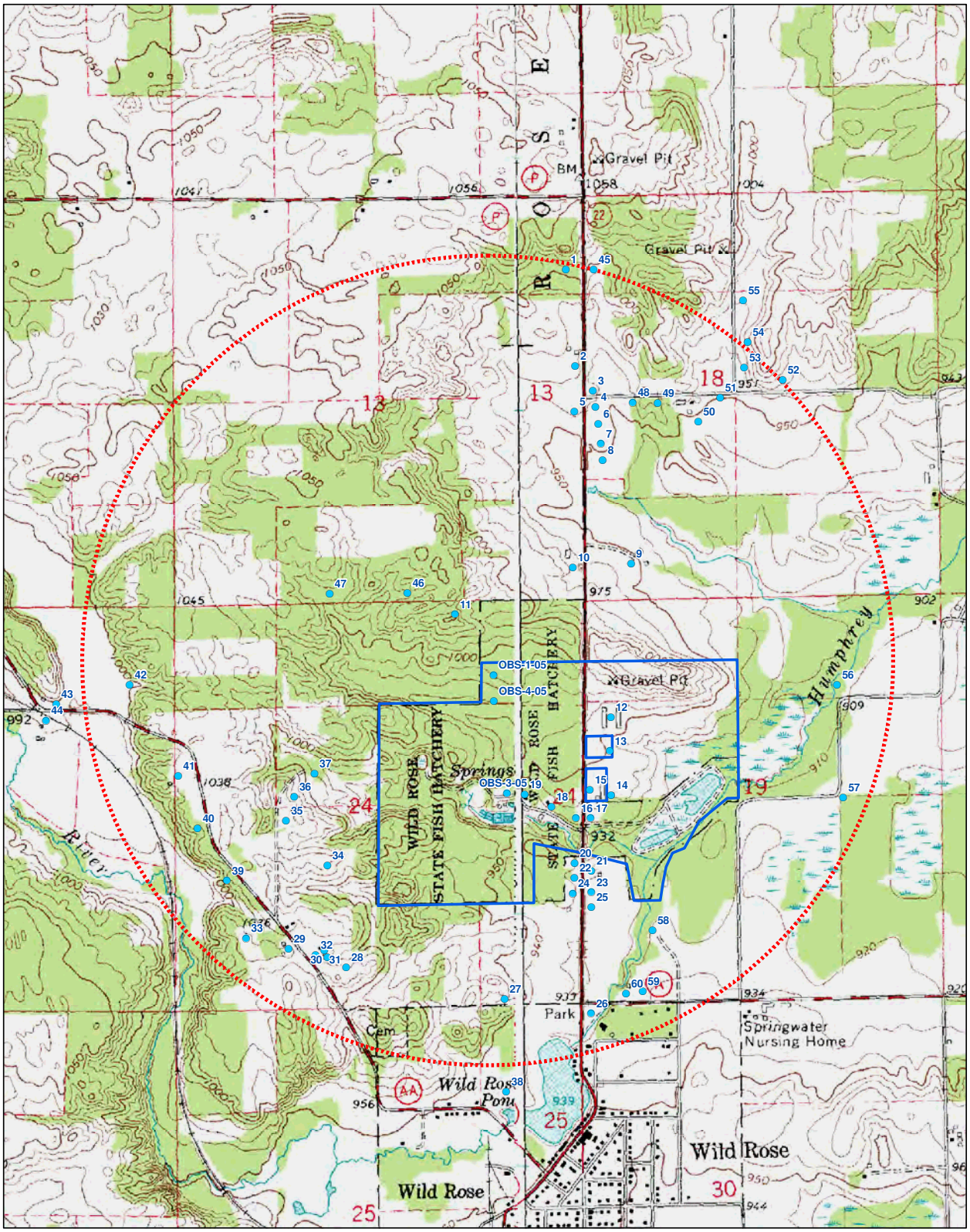


Source: Map Tech – USGS Quadrangle

Scale: Not to Scale

LIESCH Hydrogeologists • Engineers • Environmental Scientists 6000 Gisholt Dr, Suite 203 Madison, WI 53713 (608) 223-1532 13400 15th Avenue N Minneapolis, MN 55441 (763) 489-3100 4300 N Miller Rd, Suite 200 Scottsdale, AZ 85251 (480) 421-0853	**Wild Rose Hatchery**	**Oct 05**
	Site Map	**Figure 2**

10/7/2005 W:\ws\13071\2005 Aquifer Test\Report\Figure 2.doc



0 0.5 1 Miles

0 2,500 5,000 Feet

1:15,000

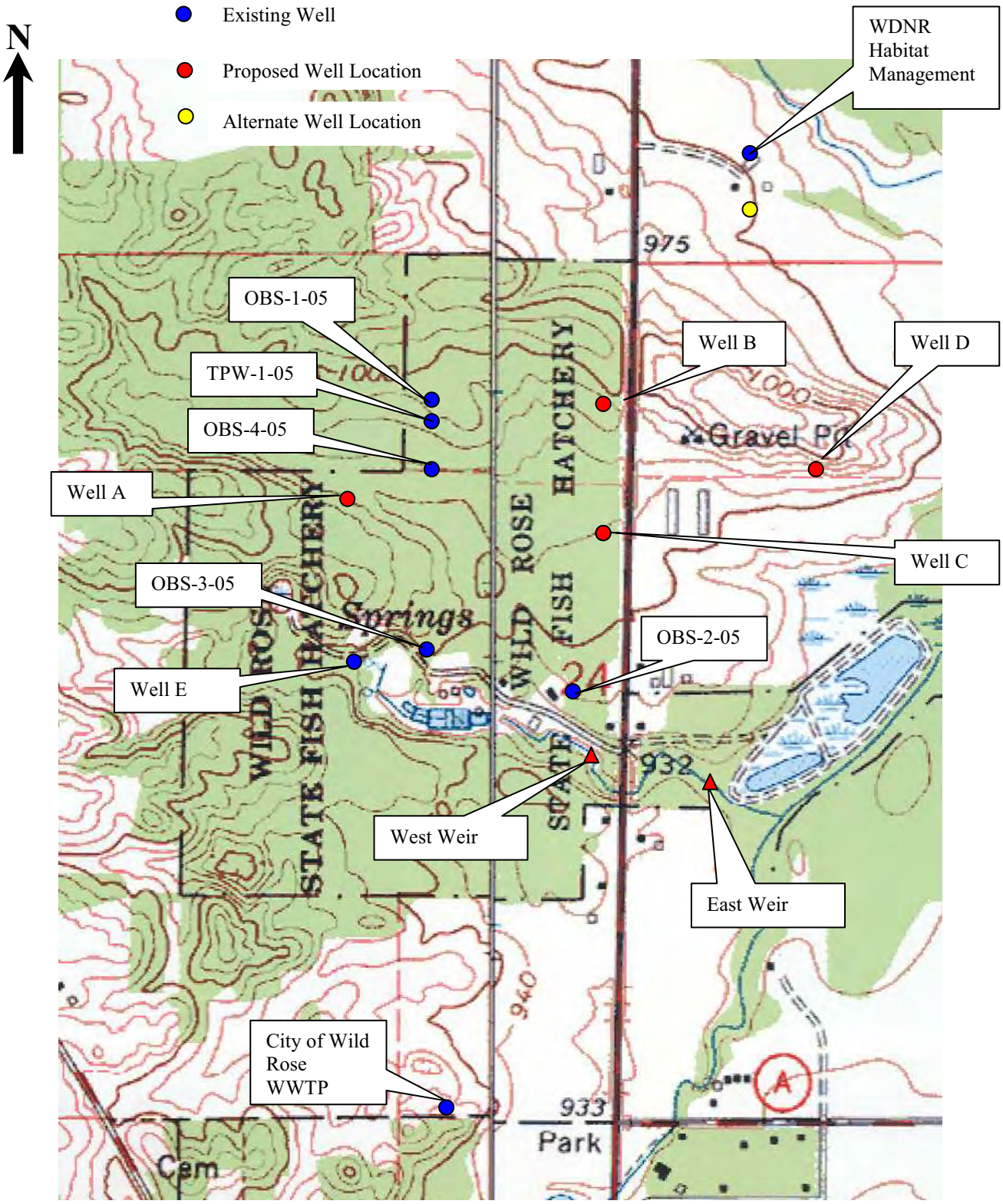
Hatchery • Domestic Wells 1 Mile Radius

C:\GIS\WS\13071\TOPOMap.mxd

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203, Madison, WI 53713, (608) 223-1532
13400 15th Avenue N, Minneapolis, MN 55441, (763) 489-3100
4300 N Miller Rd, Suite 211, Phoenix, AZ 85251, (480) 421-0853

WILD ROSE, WI	OCT 05
WILD ROSE STATE FISH HATCHERY SURROUNDING DOMESTIC WELLS	Figure # 3



Source: USGS 7.5 Minute Wild Rose and Wautoma NE Quadrangles

Scale: Not to Scale

W:\ws\13071\2005 Aquifer Test\Report\Fig 4 Proposed Well

10/10/2005

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Scottsdale, AZ 85251
(480) 421-0853

Wild Rose Hatchery	Oct 05
Proposed Well Locations	**Figure 4**

Appendix B

Table 5-Domestic Water Well Inventory
Wild Rose State Fish Hatchery

Map Number	WI/USGSWell Number	Resident's Name	Fire Number	Street City Zip	Phone Number	Well Depth	Well Diameter	Year Constructed	Water Level	pumping level	gpm	Notes
1	WS 1114	Gregory Sage	N6423	SR 22 Wild Rose, WI 54984	920-622-3168	91	4-inch	1981	59	72	21	
2		Janis Fredette	N6337	SR 22 Wild Rose, WI 54984								
3		Ken Lintie	N6304	SR 22 Wild Rose, WI 54984								
4		Phil Gloseneh	N6290	SR 22 Wild Rose, WI 54984								
5		Gail Moore	N6283	SR 22 Wild Rose, WI 54984								
6		Jones	N6266	SR 22 Wild Rose, WI 54984								For Sale; Majestic Oaks 920-293-8808
7		Noett	N6256	SR 22 Wild Rose, WI 54984								
8		Paul Tieaskie	N6222	SR 22 Wild Rose, WI 54984								
9	STH22N6154	DNR Habitat Management	6154	SR 22 Wild Rose, WI 54984		85	6-inch	1972	11	19	15	3/4 vent opening for access
10		Robert & Joyce Haese	6137	SR 22 Wild Rose, WI 54984								
11	993	James Phillips	6099	SR 22 Wild Rose, WI 54984		115	4-inch	1976	82	91	20	
12		Wild Rose Recycling	6012	SR 22 Wild Rose, WI 54984								
13	MY872	John & Jean Testin	5936	SR 22 Wild Rose, WI 54984	920-622-3823	89	6-inch	1999	10	18	15	
14	992	Emerance Denielski Jr.	5928	SR 22 Wild Rose, WI 54984		128	4-inch	1973	10	17	25	Egg plant well
15	991	Isabal Urban	5904	SR 22 Wild Rose, WI 54984		51	2-inch	1969	14	17	15	
16		No Name-Trailer	5881	SR 22 Wild Rose, WI 54984								
17		DNR East Gate	5876	SR 22 Wild Rose, WI 54984								
18		DNR West Gate	5871	SR 22 Wild Rose, WI 54984								
19		DNR Residence	5873	SR 22 Wild Rose, WI 54984								
20		Brussat	N5823	SR 22 Wild Rose, WI 54984								
21		Larry & James Caves	N5820	SR 22 Wild Rose, WI 54984								
22		Robert Jackie Phillips	5801	SR 22 Wild Rose, WI 54984								
23		Donald Craves	5796	SR 22 Wild Rose, WI 54984								
24		Paul Wakula	5795	SR 22 Wild Rose, WI 54984								
25		Larry & Ruth Caves	5758	SR 22 Wild Rose, WI 54984								
26		City of Wild Rose Park		SR 22 Wild Rose, WI 54984			2-inch					Flowing well for drinking water….
27	CI 653	City of Wild Rose WWTF		Sewer Lagoon Road Wild Rose, WI 54984		144	6-inch	1989	41.4	43.5	80	located 450 ft west of pond area, north side of sewer lagoon road
28		Larry Martin	N5738	CR AA Wild Rose, WI 54984								
29		Willard Nohr	N5753	CR AA Wild Rose, WI 54984								
30	DE512	Michael Colligan	N5754	CR AA Wild Rose, WI 54984		120	6-inch	1990	75	85	10	
31	986	Michael Colligan	N5768	CR AA Wild Rose, WI 54984		107	4-inch	1961	78	82	20	
32		Michael Colligan	N5764	CR AA Wild Rose, WI 54984								
33	988	Kelly Simons	N5769	CR AA Wild Rose, WI 54984		101	4-inch	1981	75	87	21	
34		Mary & Mark Demler	N5854	18th Court Wild Rose, WI 54990								
35	987	Edward Hayek	N5890	18th Court Wild Rose, WI 54990		112	2-inch	1966	74	76	20	
36	983	Phillip Nelson	N5902	18th Court Wild Rose, WI 54990		127	4-inch	1977	83	95	15	
37		James Bargenquast	N5940	18th Court Wild Rose, WI 54990								
38		City of Wild Rose - Roberts Park	CR AA	CR AA Wild Rose, WI 54988			4-inch					4" steel Drilled with submesible/pitless unit located on west side of pavillon
39	989	Nikolas Stokalo	N5807	CR AA Wild Rose, WI 54984		100	4-inch	1983	68	75	20	
40	990	Wayne Simons	N5853	CR AA Wild Rose, WI 54984		102	4-inch	1984	72	78	20	
41		Jerry Zawilenski	N5879	CR AA Wild Rose, WI 54984								
42		No Name-brown house	N5958	CR AA Wild Rose, WI 54984								
43		No Name - yellow house	N5994	CR AA Wild Rose, WI 54984								
44		No Name - Red Barn	N5999	CR AA Wild Rose, WI 54984								
45		Roger & Sally Carpenter	N6655	19TH DR Wild Rose, WI 54984								Old well with jack pump - out of service - posted no tresspassing or hunting - in ditch ~200ft east hwy 21 ~100 ft s drive to #1
46		No Name		SR 22 Wild Rose, WI 54984			4-inch					
47		No Name		SR 22 Wild Rose, WI 54984			4-inch					
48		Prill	N7225	Anwa Dr. Wild Rose, WI54984								
49		Christie	N7167	Anwa Dr. Wild Rose, WI54984								
50		Nowland	N7151	Anwa Dr. Wild Rose, WI54984								
51		Nowland	N7117	Anwa Dr. Wild Rose, WI54984								
52		Jeff Rivers	N7050	19thDr Wild Rose, WI 54984								
53		Norman Suranne	N6330	19thDr Wild Rose, WI 54984								
54		Rollin Sorge	N6356	19thDr Wild Rose, WI 54984								
55		Donald Olander	N6382	19thDr Wild Rose, WI 54984								
56		No Name -White House	N5999	19th Road Wild Rose, WI 54984								
57		No Name - Brown House	N5950	19th Road Wild Rose, WI 54984								
58		No Name	N7202	CR A Wild Rose, WI 54984								
59		No Name -Cream colored House	N7224	CR A Wild Rose, WI 54984								
60		No Name - Tan House	N7248	CR A Wild Rose, WI 54984								

Appendix C

State of Wisconsin
Department of Natural Resources

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

Form 3300-5 2/2000 Page 1 of 2

Notice: Please complete Form 3300-5 and return it to the appropriate DNR office and bureau. Completion of this report is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See the instructions for more information.

Route to: ☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other

(1) GENERAL INFORMATION

WI Unique Well No. | DNR Well ID No. | County: Washara

Common Well Name: TH -05 | Gov't Lot (If applicable)

Grid Location: SW 1/4 of NE 1/4 of Sec. 24 ; T. 20 N; R. 10 ☒ E ☐ W

_____ ft. ☐ N. ☐ S., _____ ft. ☐ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat. ° ' " Long ° ' " or

St. Plane _____ ft. N. _____ ft. E. ☐ S ☐ C ☐ N Zone

Reason For Abandonment: Test hole | WI Unique Well No. of Replacement Well: _____

(2) FACILITY/OWNER INFORMATION

Facility Name: Wild Rose Fish Hatchery

Facility ID | License/Permit/Monitoring No.

Street Address of Well: N5871 State Road 22

City, Village, or Town: Wild Rose WI

Present Well Owner: Same | Original Owner

Street Address or Route of Owner

City, State, Zip Code

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 6-7-05

☐ Monitoring Well
☐ Water Well
☒ Borehole / Drillhole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) _____

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft.) (From groundsurface): 218 | Casing Diameter (in.): NA | Casing Depth (ft.): NA

Lower Drillhole Diameter (in.): 6"

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? NA Feet

Depth to Water (Feet): 25

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	NA
Was Casing Cut Off Below Surface?	☐ Yes	☐ No	NA
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☐ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☒ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry (11 lb./gal. wt.)
☒ Bentonite-Sand Slurry " "
☐ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite - Cement Grout
☐ Bentonite - Sand Slurry

(5) Material Used To Fill Well/Drillhole	From (Ft.)	To (Ft.)	No. Yards, Sacks, Sealant or Volume (Circle One)	Mix Ratio or Mud Weight
High Solids Bentonite/Sand Slurry	Surface	218	11	12 lbs/gal

(6) Comments: _____

(7) Name of Person or Firm Doing Sealing Work: Mark J Traut Wells Inc | Date of Abandonment: 6-7-05

Signature of Person Doing Work | Date Signed

Street or Route: 1412 8th Ave S | Telephone Number: (320) 251-5090

City, State, Zip Code: White Bear MN 56387

FOR DNR OR COUNTY USE ONLY
Date Received | Noted By
Comments

FIELD BORING LOG

FOR Lesch + Assoc. JOB # 307211
LOCATION Wild Rose Fish Hatchery BORING # TH #1-05
CITY Wild Rose WI DATE
DRILLER Robbie HELPER Kevin UNIQUE # NA

BLOW COUNTS	VISUAL FIELD CLASSIFICATION
	Silty Sand 0-13
15	Sand & Gravel 50 slot 13-28
10	Sand 20 slot 28-85
15	Sand & Gravel 50 slot 85-120
20	Sand & Gravel 70 slot 120-143
25	Sand & Gravel 50 slot 143-158
30	Sand 20 slot 158-188
35	Silty Clay 188-198
40	Sand 15 slot 198-201
45	Silty Clay 201-208
50	

Boring ~~Well~~ Depth 218
Drill Method Mud Rotary
Drill Fluid Bentonite

Screen
Type
Slot NA
Diameter
Set Between &

Casing
Type
Diameter NA
Set Between &

Sand Pack
Type NA
Set Between &

Seal
Type NA
Set Between & Bags

Annular Space Sealant
Type High Solids Bentonite
Set Between 0 & 218 Bags 11
& Bags
& Bags

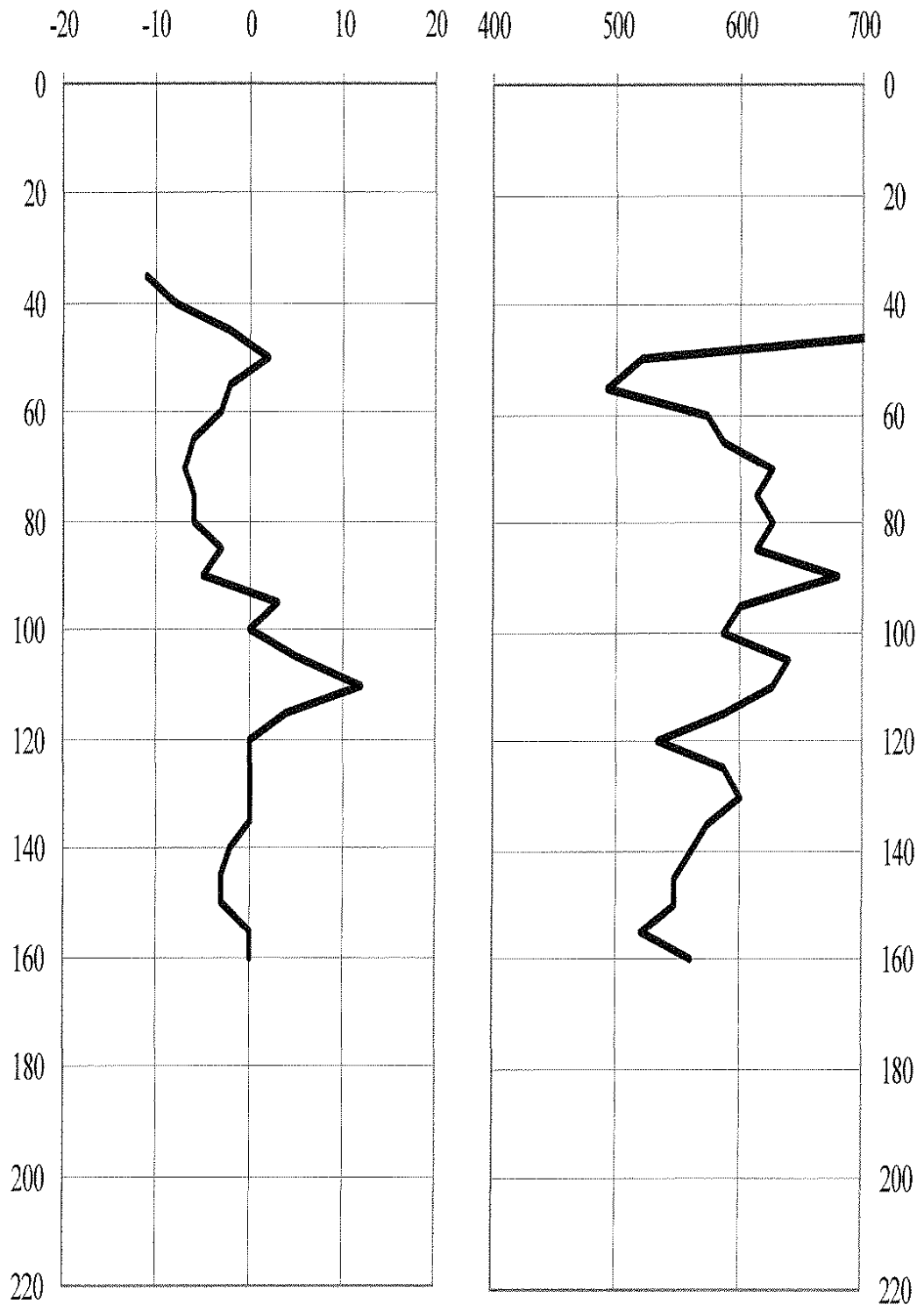
Protective Casing
Type
Size
Bumper

Water Level 25'

Bottom Of Boring
Bottom Of Sample 218

Map

N 44° 11.733'
W 89° 11.837'



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8/19/2005

LIESCH Hydrogeologists • Engineers • Environmental Scientists

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Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(612) 559-1423

2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose	June 05
Electric Log of TH-1-05	

State of Wisconsin
Department of Natural Resources

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

Form 3300-5 2/2000 Page 1 of 2

Notice: Please complete Form 3300-5 and return it to the appropriate DNR office and bureau. Completion of this report is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See the instructions for more information.

Route to: ☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other

(1) GENERAL INFORMATION

WI Unique Well No. | DNR Well ID No. | County: Washara

Common Well Name: TH#2-05 | Gov't Lot (If applicable):

Grid Location: SW 1/4 of NE 1/4 of Sec. 24 ; T. 20 N; R. 10 ☒ E ☐ W

_____ ft. ☐ N. ☐ S., _____ ft. ☐ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat. ° ' " Long ° ' " or

St. Plane _____ ft. N. _____ ft. E. S C N Zone ☐☐☐

Reason For Abandonment: festhole | WI Unique Well No. of Replacement Well:

(2) FACILITY/OWNER INFORMATION

Facility Name: Wild Rose Fish Hatchery

Facility ID | License/Permit/Monitoring No.

Street Address of Well: N5871 State Road 22

City, Village, or Town: Wild Rose WI

Present Well Owner: Same | Original Owner

Street Address or Route of Owner

City, State, Zip Code

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date: 6-8-05

☐ Monitoring Well
☐ Water Well
☒ Borehole / Drillhole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify)

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft.) 189 (From ground surface) | Casing Diameter (in.) NA | Casing Depth (ft.) NA

Lower Drillhole Diameter (in.) 6"

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? NA Feet

Depth to Water (Feet) 25

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	NA
Was Casing Cut Off Below Surface?	☐ Yes	☐ No	NA
Did Sealing Material Rise to Surface?	☒ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☒ No	
If Yes, Was Hole Retopped?	☐ Yes	☐ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☒ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry (11 lb./gal. wt.)
☒ Bentonite-Sand Slurry " "
☐ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite - Cement Grout
☐ Bentonite - Sand Slurry

(5) Material Used To Fill Well/Drillhole	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant or Volume (Circle One)	Mix Ratio or Mud Weight
High Solids Bentonite / Sand Slurry	Surface	189	10	12 lb/gal

(6) Comments:

(7) Name of Person or Firm Doing Sealing Work: Mark J Traut Wells Inc | Date of Abandonment: 6-8-05

Signature of Person Doing Work | Date Signed

Street or Route: 141 28th Ave S | Telephone Number: (320) 251-5090

City, State, Zip Code: White Bear MN 56387

FOR DNR OR COUNTY USE ONLY
Date Received | Noted By
Comments

FIELD BORING LOG

FOR Liesch & Assoc.
LOCATION Wild Rose Fish Hatchery
CITY Wild Rose WI
DRILLER Robbie HELPER Kevin

JOB # 307211
BORING # TH#2-05
DATE
UNIQUE # NA

BLOW COUNTS	VISUAL FIELD CLASSIFICATION
	Silty Sand 0-5
	Sand & Gravel 5-14 30 slot
	Silty Sand 14-20
	Sand & Gravel 30 slot 20-121
	Sand 15 slot 121-153
	Sand & Gravel 30 slot 153-162
	Sand - 20 slot 162-174
	Clay 174-180

Boring
Drill Depth
Drill Method Mud Rotary
Drill Fluid Bentonite

Screen
Type
Slot NA
Diameter
Set Between &

Casing
Type
Diameter NA
Set Between &

Sand Pack
Type NA
Set Between &

Seal
Type NA
Set Between & Bags

Annular Space Sealant
Type: High Solids Bentonite
Set Between & Bags
& Bags
& Bags

Protective Casing
Type
Size
Bumper

Water Level

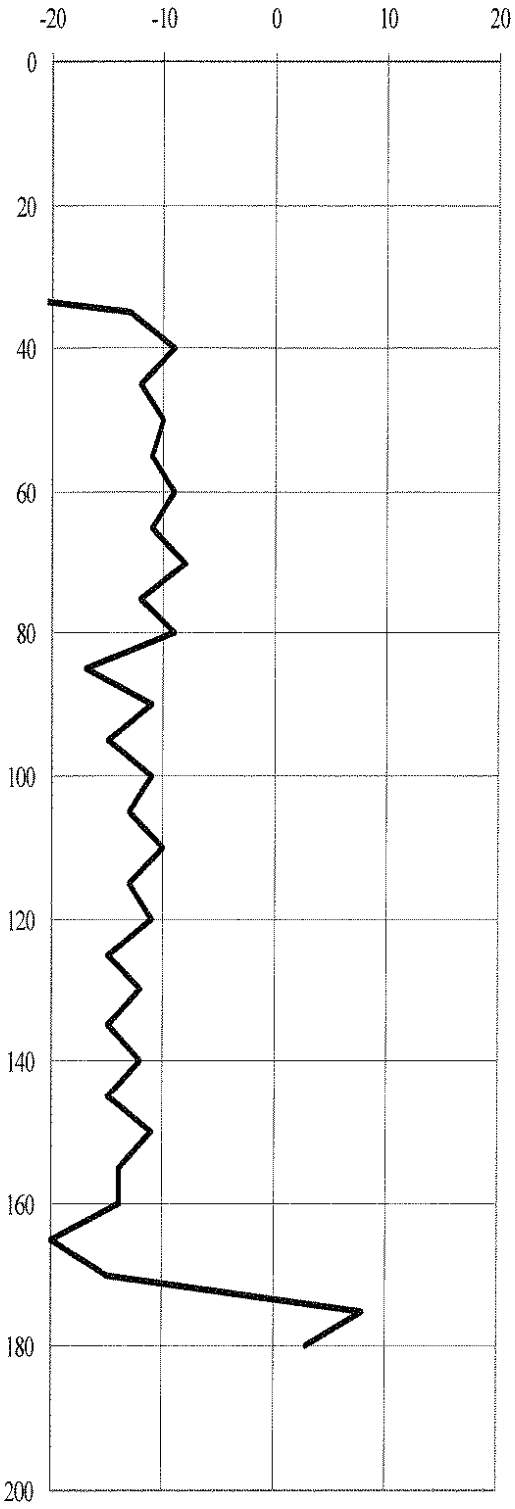
Bottom Of Boring

Bottom Of Sample

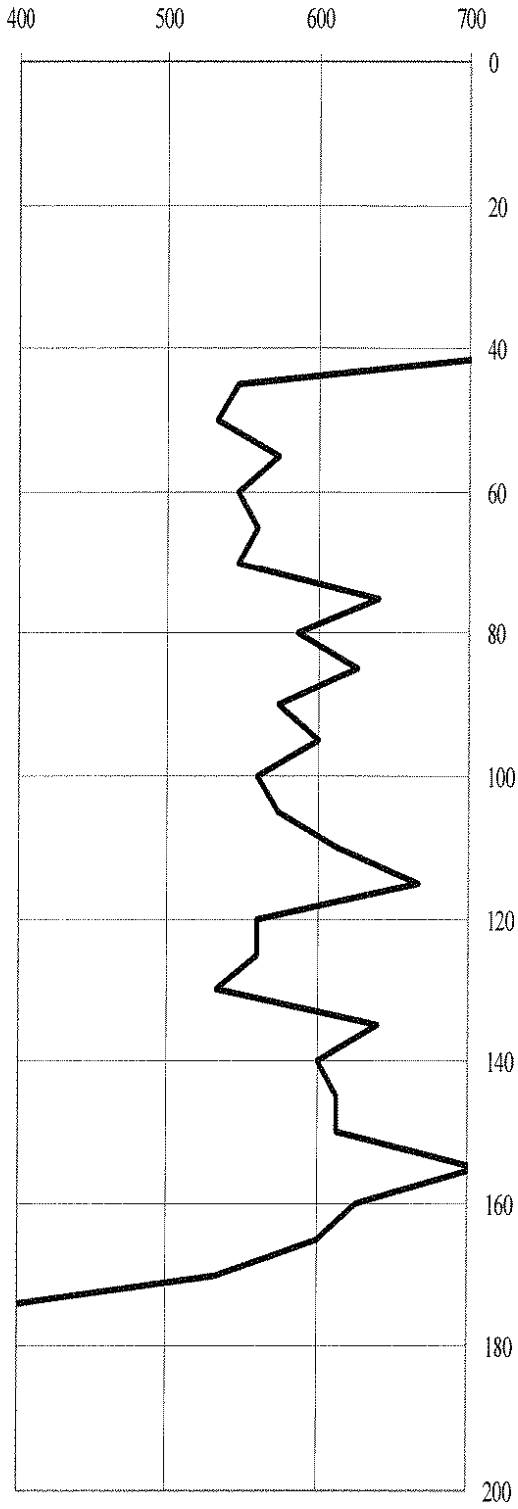
Map

N 44° 11.788'
W 89° 14.972'

SPONTANEOUS POTENTIAL (mV)



APPARENT RESISTIVITY (OHM/FT)



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8/19/2005

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2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose	June 05
Electric Log of TH-2-05	

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater [X] Waste Management [ ]
Remediation/Redevelopment [ ] Other [ ]

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name: Wild Rose Fish Hatchery
Facility License, Permit or Monitoring No.:
Facility ID:
Type of Well: Well Code ___/___
Distance from Waste/Source ___ ft. | Enf. Stds. Apply [ ]

Local Grid Location of Well ___ ft. [ ] N. [ ] S. ___ ft. [ ] E. [ ] W.
Local Grid Origin [ ] (estimated: [ ]) or Well Location [ ]
Lat. ° ' " Long. ° ' "
St. Plane ___ ft. N. ___ ft. E. S/C/N
Section Location of Waste/Source: NE 1/4 of NE 1/4 of Sec. 24, T. 20 N, R. 10 [X] E [ ] W
Location of Well Relative to Waste/Source: u [ ] Upgradient s [ ] Sidegradient d [ ] Downgradient n [ ] Not Known
Gov. Lot Number:

Well Name: TH# 3-05
Wis. Unique Well No.: PF091
DNR Well ID No.:
Date Well Installed: ___/___/___ (m m d d y y y y)
Well Installed By: Name (first, last) and Firm: Robbie Terres
Mark J. Traut Wells, Inc.

A. Protective pipe, top elevation 2.5 ft. MSL
B. Well casing, top elevation 2 ft. MSL
C. Land surface elevation ___ ft. MSL
D. Surface seal, bottom ___ ft. MSL or ___ ft.

12. USCS classification of soil near screen:
OP [ ] GM [ ] GC [ ] GW [ ] SW [ ] SP [ ]
SM [ ] SC [ ] ML [ ] MH [ ] CL [ ] CH [ ]
Bedrock [ ]
13. Sieve analysis performed? [ ] Yes [ ] No
14. Drilling method used: Rotary [X] 50
Hollow Stem Auger [ ] 41
Other [ ]
15. Drilling fluid used: Water [ ] 02 Air [ ] 01
Drilling Mud [X] 03 None [ ] 99
16. Drilling additives used? [X] Yes [ ] No
Describe: Bentonite Drill Fluid
17. Source of water (attach analysis, if required):

E. Bentonite seal, top 139 ft. MSL or ___ ft.
F. Fine sand, top 141 ft. MSL or ___ ft.
G. Filter pack, top 143 ft. MSL or ___ ft.
H. Screen joint, top 145 ft. MSL or ___ ft.
I. Well bottom 165 ft. MSL or ___ ft.
J. Filter pack, bottom 166 ft. MSL or ___ ft.
K. Borehole, bottom 200 ft. MSL or ___ ft.
L. Borehole, diameter 6 in.
M. O.D. well casing 2.36 in.
N. I.D. well casing 2.06 in.

1. Cap and lock? [X] Yes [ ] No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 7 ft.
c. Material: Steel [X] 04 Other [ ]
d. Additional protection? [ ] Yes [X] No
If yes, describe:
3. Surface seal: Bentonite [ ] 30 Concrete [ ] 01 Other [X]
Neat cement
4. Material between well casing and protective pipe: Bentonite [ ] 30 Other [X]
Neat Cement
5. Annular space seal: a. Granular/Chipped Bentonite [ ] 33
b. 15 Lbs/gal mud weight . . . Bentonite-sand slurry [X] 35
c. ___ Lbs/gal mud weight . . . . . Bentonite slurry [ ] 31
d. ___ % Bentonite . . . . . Bentonite-cement grout [ ] 50
e. ___ Ft³ volume added for any of the above
f. How installed: Tremie [ ] 01 Tremie pumped [X] 02 Gravity [ ] 08
6. Bentonite seal: a. Bentonite granules [ ] 33
b. [ ] 1/4 in. [X] 3/8 in. [ ] 1/2 in. Bentonite chips [X] 32
c. ___ Other [ ]
7. Fine sand material: Manufacturer, product name & mesh size
a. #70 Badger
b. Volume added 2 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. #40 Red Flint
b. Volume added ___ ft³
9. Well casing: Flush threaded PVC schedule 40 [ ] 23 Flush threaded PVC schedule 80 [ ] 24
Black Steel Other [X]
10. Screen material: Stainless Steel
a. Screen type: Factory cut [ ] 11 Continuous slot [ ] 01
wire wrapped Other [X]
b. Manufacturer: Johnson
c. Slot size: 0.010 in.
d. Slotted length: ___ ft.
11. Backfill material (below filter pack): None [ ] 14 Other [ ]

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature: Robbi Terres Firm:

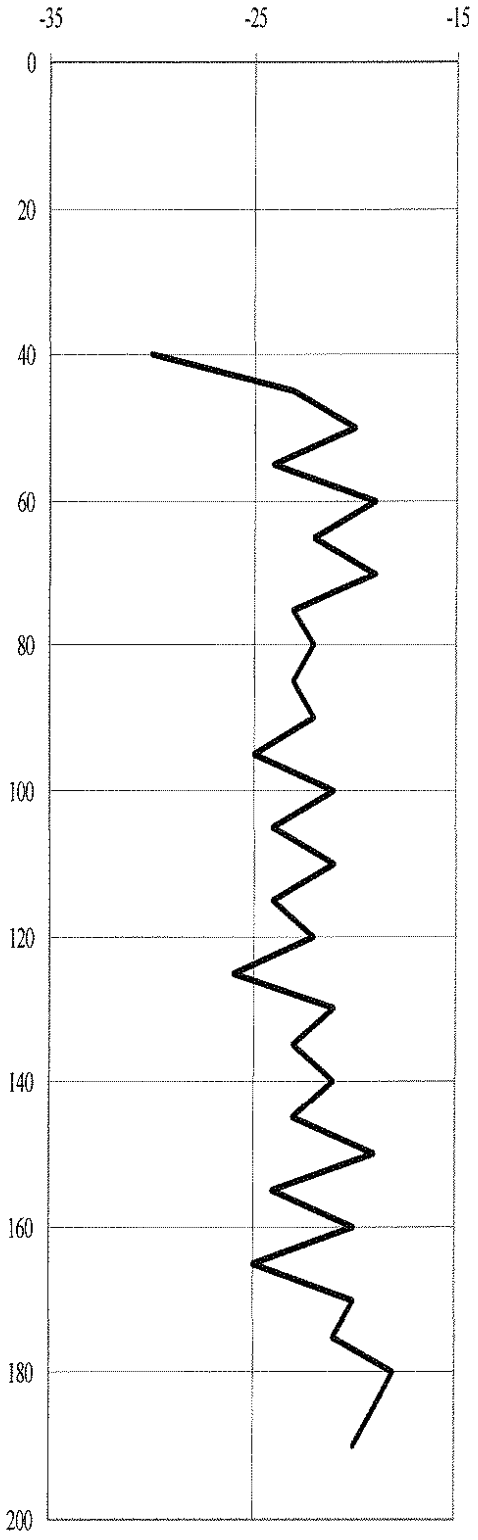
Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

FIELD BORING LOG

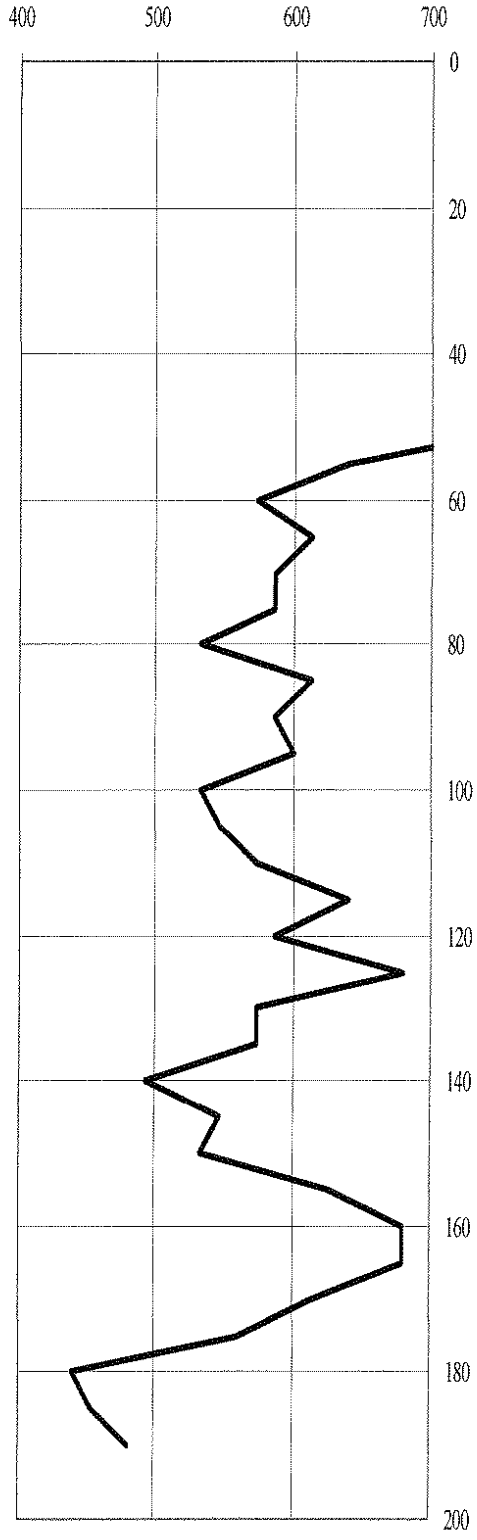
Leisch + Assoc	JOB #: 307216
LOCATION: Wild Rose Fish Hatchery	BORING #: TW 7
CITY: Wild Rose WI	DATE:
DRILLER: Robbie HELPER: Kevin	UNIQUE #: PF 091

BLOW COUNTS	VISUAL FIELD CLASSIFICATION	
	0-12 Brn Sand 10 slot	Well Depth 165 ft Drill Method Mud Rotary Drill Fluid Bentonite
	5 12-18 Brn Sand 30 Slot 18-20 Black White Rock	Screen Johnson Type Stainless Steel Slot .010 Diameter 8" Set Between 145 ft & 165 ft
	10 20-45 Brn Sand Gravel 30 Slot 45-80 Brn Sand 20 slot	Casing Wheatland Type Black Steel Diameter 2" Set Between +2 & 145 ft
	15 80-111 Brn Sand 10 Slot 111-165 Brn Sand 20 Slot	Sand Pack #40 Type Red Flint Set Between 143 & 166
	20 165-176 Brn Sand 30 Slot 176-177 Brn Clay	Seal #20 Badger 3/8 Bent. Chips Type Sand Set Between 141 & 143 Bags
	25 177-182 Brn Sand 20 Slot 182-200 Brn Clay	Annular Space Sealant Type Volclay Set Between 5 & 141 Bags neat cement 0 & 5 Bags 1 & Bags
	30	Protective Casing Type Pickup Size 6" Bumper
	35	Water Level 39 ft
	40	Bottom Of Boring 200 ft Bottom Of Sample 200 ft
	45	Map N 44°11.801 W 89°15.088
	50	

SPONTANEOUS POTENTIAL (mV)



APPARENT RESISTIVITY (OHM/FT)



DEPTH FEET

DEPTH FEET

W:\ws\130712005 Aquifer Test\test holes June 2005\title-elog TH-3-05.doc

8/19/2005

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203
Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(612) 559-1423

2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose	June 05
Electric Log of TH-3-05	

State of Wisconsin Department of Natural Resources — Route to: Watershed/Wastewater ☒ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Wild Rose Fish Hatchery
Facility License, Permit or Monitoring No.:
Facility ID:
Type of Well: Well Code ___
Distance from Waste/Source ___ ft. Enf. Stds. Apply ☐

Local Grid Location of Well ___ ft. ☐ N. ☐ S. ___ ft. ☐ E. ☐ W.
Local Grid Origin ☐ (estimated: ☐) or Well Location ☐
Lat. ___ ° ___ ' ___ " Long. ___ ° ___ ' ___ " or
St. Plane ___ ft. N, ___ ft. E. S/C/N
Section Location of Waste/Source: NE 1/4 of SE 1/4 of Sec. 24 T. 20 N. R. 10 ☒ E ☐ W
Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known
Gov. Lot Number:

Well Name: TH# 4-05
Wis. Unique Well No.: PE092
DNR Well ID No.:
Date Well Installed: ___/___/___ (m m d d y y y y)
Well Installed By: Name (first, last) and Firm: Robbie Terres — Mark J. Traut Wells, Inc.

A. Protective pipe, top elevation ___ 2.5 ___ ft. MSL
B. Well casing, top elevation ___ 2 ___ ft. MSL
C. Land surface elevation ___ ft. MSL
D. Surface seal, bottom ___ ft. MSL or ___ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

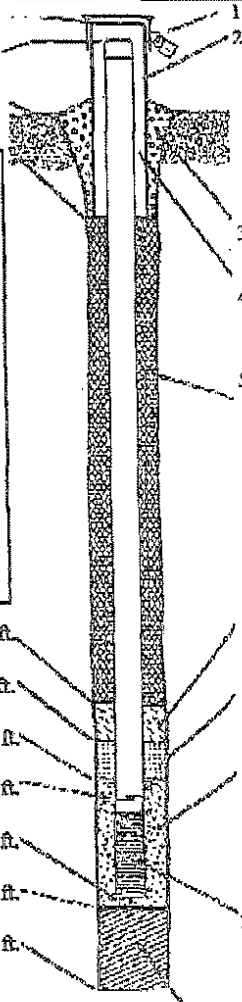
14. Drilling method used: Rotary ☒ 50; Hollow Stem Auger ☐ 41; Other ☐

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☒ 03; None ☐ 99

16. Drilling additives used? ☒ Yes ☐ No
Describe: Bentonite Drill Fluid

17. Source of water (attach analysis, if required):

E. Bentonite seal, top ___ 118 ft. MSL or ___ ft.
F. Fine sand, top ___ 120 ft. MSL or ___ ft.
G. Filter pack, top ___ 122 ft. MSL or ___ ft.
H. Screen joint, top ___ 124 ft. MSL or ___ ft.
I. Well bottom ___ 144 ft. MSL or ___ ft.
J. Filter pack, bottom ___ 145 ft. MSL or ___ ft.
K. Borehole, bottom ___ 180 ft. MSL or ___ ft.
L. Borehole, diameter ___ 6 in.
M. O.D. well casing 2.36 in.
N. I.D. well casing 2.06 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 7 ft.
c. Material: Steel ☒ 04; Other ☐
d. Additional protection? ☒ Yes ☒ No
If yes, describe:
3. Surface seal: Bentonite ☐ 30; Concrete ☐ 01; Neat cement; Other ☒
4. Material between well casing and protective pipe: Bentonite ☐ 30; Neat Cement; Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. 15 Lbs/gal mud weight . . . Bentonite-sand slurry ☒ 35
c. ___ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ___ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ___ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☒ 02; Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 32
c. ___ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. # 70 Badger
b. Volume added 2 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. # 40 Red Flint
b. Volume added ___ ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 23; Flush threaded PVC schedule 80 ☐ 24; Black Steel; Other ☒
10. Screen material: Stainless Steel
a. Screen type: Factory cut ☐ 11; Continuous slot ☐ 01; wire wrapped; Other ☒
b. Manufacturer Johnson
c. Slot size: 0.010 in.
d. Slotted length: ___ ft.
11. Backfill material (below filter pack): None ☐ 14; Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Robbie Terres Firm:

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

FIELD BORING LOG

FOR Leisch + Assoc
LOCATION Wild Rose Fish Hatchery
CITY Wild Rose WI
DRILLER Robbie HELPER Kevin

JOB # 307711
BORING # TH#405
DATE
UNIQUE # PF092

BLOW COUNTS	VISUAL FIELD CLASSIFICATION
	0-22 Brn Sand 10 Slot
5	22-77 Brn Clay
	77-80 Brn Sand 15 Slot
10	80-95 Brn Clay
	95-110 Brn. Sandy Clay
15	110-126 Brn Sand + Gravel 50 Slot
	126-170 Brn Sand 20 slot
20	170-180 Brn Sandy Clay
25	
30	
35	
40	
45	
50	

Well Depth 141 Ft
Drill Method Mud Rotary
Drill Fluid Bentonite

Screen Johnson
Type Stainless Steel
Slot .010
Diameter 2"
Set Between 124 Ft & 144 Ft

Casing Wheatland
Type Black Steel
Diameter 2"
Set Between +2 & 124 Ft

Sand Pack #40
Type Best Tint
Set Between 122 Ft & 145 Ft

Seal #70 Badger 3/8 Bent. Chips
Type Sand
Set Between 120 Ft & 122 Ft Bags

Annular Space Sealant
Type Volclay
Set Between ' & ' Bags
neat cement 0 & 5 Bags
' & ' Bags

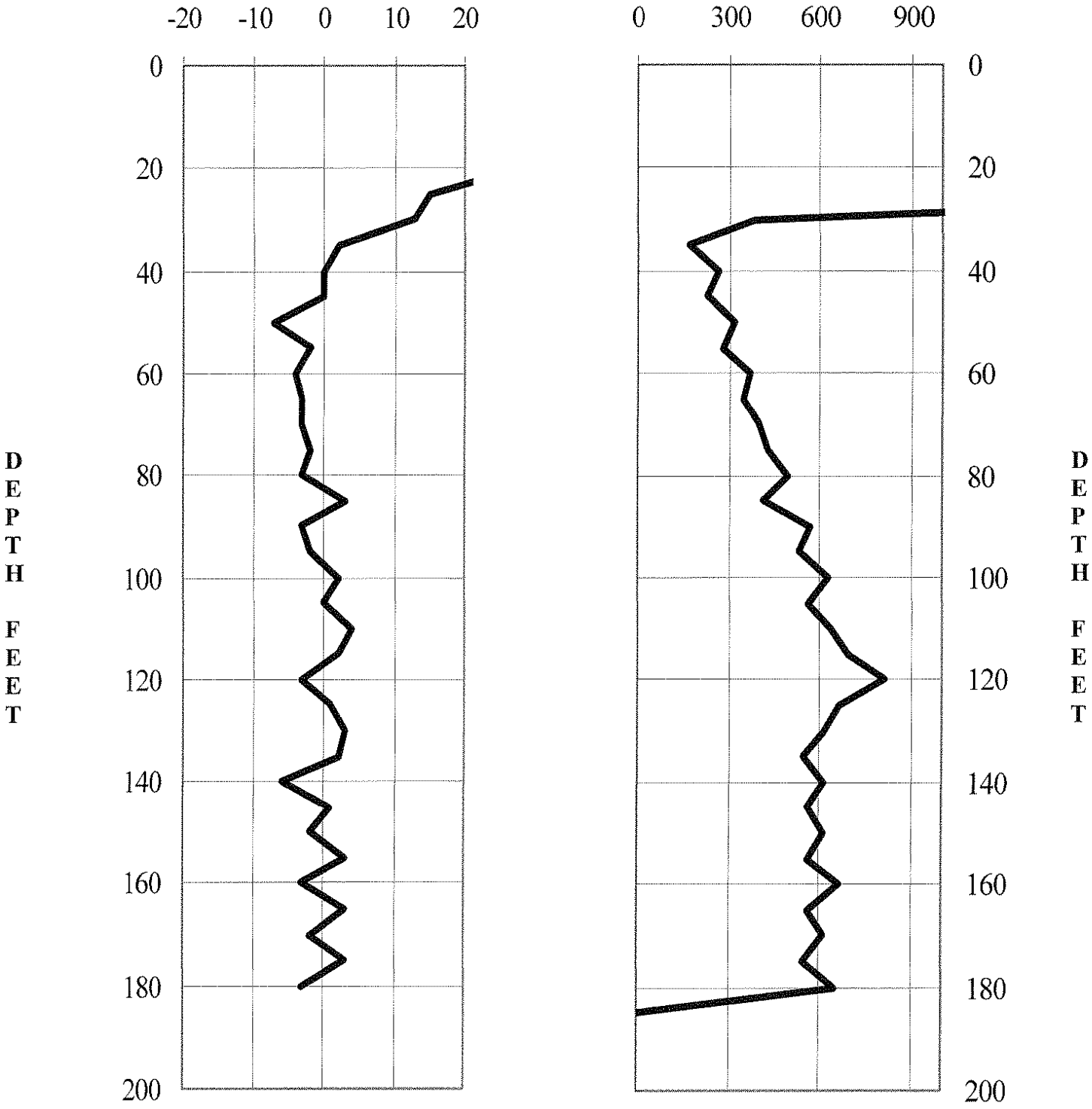
Protective Casing
Type Pedestal
Size 6"
Bumper

Water Level 9 Ft

Bottom Of Boring 180 Ft

Bottom Of Sample 180 Ft

Map
N 44° 11. 513
W 89° 14. 891



W:\ws\13071\2005 Aquifer Test\test holes June 2005\title-elog TH-4-05.doc

8/19/2005

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203
Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(612) 559-1423

2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose	June 05
Electric Log of TH-4-05	

...ING WELL CONSTRUCTION
...1A Rev. 7-98

TH#5-05

...Well No. 93 | DNR Well ID No.

...SON | Date Well Installed ___/___/_____ (m m d d y y y y)

...N, R. 10 E W | Gov't Lot Number | Well Installed By: Name (first, last) and Firm
Robbie Terres
Mark T. Traut Wells, Inc.

...SW ☐ SP ☐
...ML ☐ CL ☐ CH ☐

...? ☐ Yes ☐ No
Rotary ☒ 50
Hollow Stem Auger ☐ 41
Other ☐

...Used: Water ☐ 02 Air ☐ 01
Drilling Mud ☒ 03 None ☐ 99

16. Drilling additives used? ☒ Yes ☐ No
Describe Bentonite Drill Fluid

17. Source of water (attach analysis, if required):

E. Bentonite seal, top ___139 ft. MSL or _____ ft.

F. Fine sand, top ___141 ft. MSL or _____ ft.

G. Filter pack, top ___143 ft. MSL or _____ ft.

H. Screen joint, top ___145 ft. MSL or _____ ft.

I. Well bottom ___165 ft. MSL or _____ ft.

J. Filter pack, bottom ___164 ft. MSL or _____ ft.

K. Borehole, bottom ___218 ft. MSL or _____ ft.

L. Borehole, diameter ___6 in.

M. O.D. well casing 2.36 in.

N. I.D. well casing 2.06 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: __6 in.
b. Length: __2 ft.
c. Material: Steel ☒ 04 Other ☐
d. Additional protection? ☒ Yes ☒ No
If yes, describe:
3. Surface seal: Bentonite ☐ 30 Concrete ☐ 01 Other ☒
Neat cement
4. Material between well casing and protective pipe: Bentonite ☐ 30
Neat Cement Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. 15 Lbs/gal mud weight . . . Bentonite-sand slurry ☒ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. _____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. _____ ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 Tremie pumped ☒ 02 Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. #70 Badger
b. Volume added 2 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. #40 Red Flint
b. Volume added _____ ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 23 Flush threaded PVC schedule 80 ☐ 24
Black Steel Other ☒
10. Screen material: Stainless Steel
a. Screen type: Factory cut ☐ 11 Continuous slot ☐ 01
wire-wrapped Other ☒
b. Manufacturer Johnson
c. Slot size: 0.010 in.
d. Slotted length: ____ ft.
11. Backfill material (below filter pack): None ☐ 14 Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Robbie Terres | Firm

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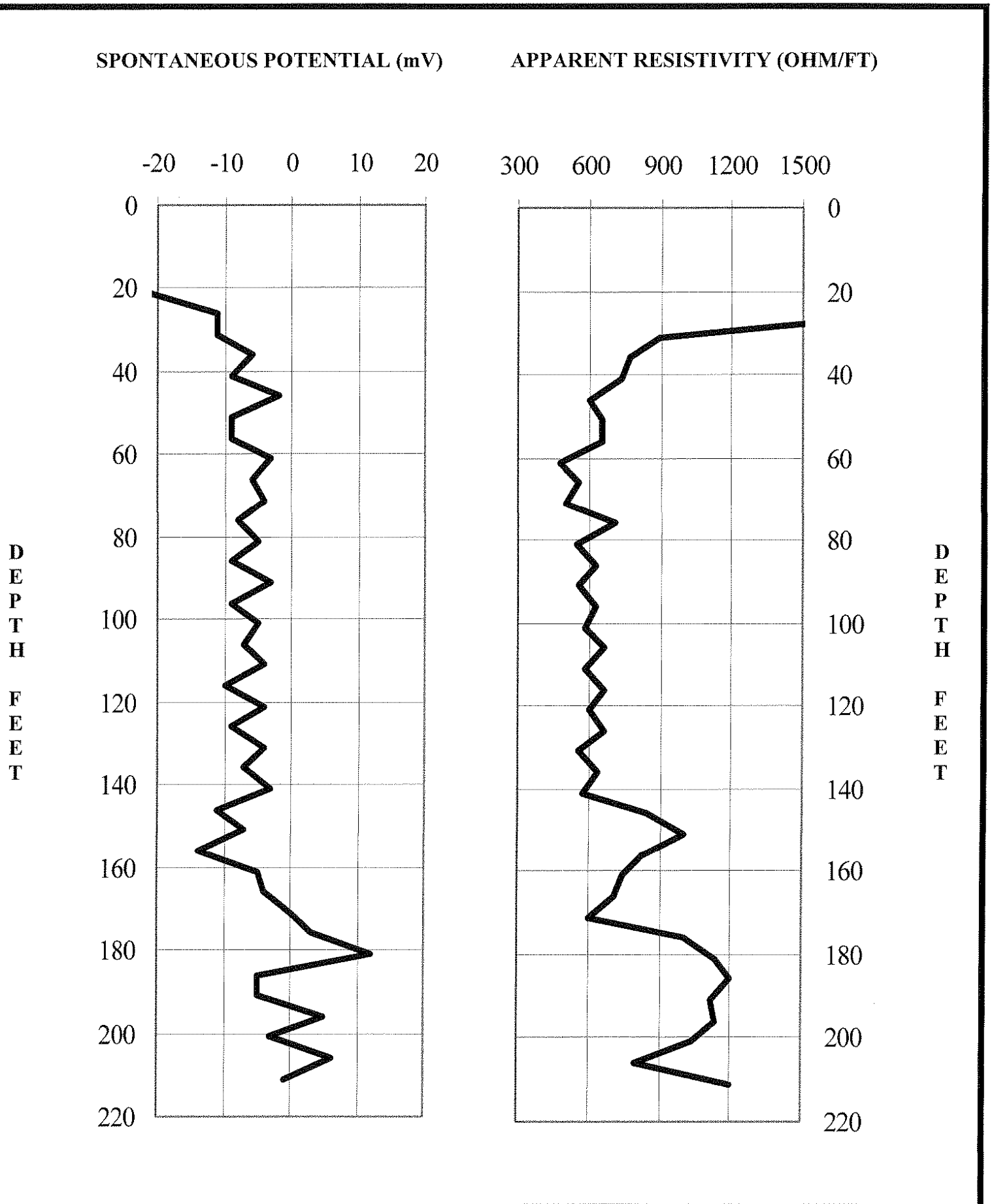

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8/19/2005

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Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(612) 559-1423

2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose	June 05
Electric Log of TH-5-05	

FIELD BORING LOG

FOR Leisch & Assoc
LOCATION Wild Rose Fish Hatchery
CITY Wild Rose WI
DRILLER Bobbie HELPER Kevin

JOB # 307216
BORING # Recond TH # 5-05
DATE
LANDUSE # PF 093

BLOW COUNTS	VISUAL FIELD CLASSIFICATION
	0-17 Brn Silty Sand 10 Slot
5	17-51 Brn Sand 25 Slot
	51-153 Brn Sand 15 Slot
10	153-161 Brn Sand & Gravel 80 Slot
	161-164 Brn Clay
15	164-208 Brn Sand 10 Slot
	208-213 Brn Clay
20	213-218 Brn Sandy Clay
25	
30	
35	
40	
45	
50	

Well Depth 165 Ft
Drill Method Mud Rotary
Drill Fluid Bentonite

Screen Johnson
Type Stainless Steel
Slot .010
Diameter 8"
Set Between 145 Ft & 165 Ft

Casing Wheatland
Type Black Steel
Diameter 2"
Set Between +2 & 145 Ft

Sand Pack #40
Type Red-E Flint
Set Between 143 Ft & 166 Ft

Seal #30 Badger 3/4 Bent. Chips
Type Sand
Set Between 141 Ft & 143 Ft Bags

Annular Space Sealant
Type Volclay
Set Between 5 ' & 141 ' Bags
Neat cement 0 ' & 5 ' Bags 1
' & ' Bags

Protective Casing
Type Pratap
Size 6"
Bumper

Water Level 76 Ft

Bottom Of Boring 218

Bottom Of Sample 218

Map
N 44° 11.575
W 89° 15.03

TH#6

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name: Wild Rose Fish Hatchery
Facility License, Permit or Monitoring No.:
Facility ID:
Type of Well — Well Code: 1
Distance from Waste/Source: ____ ft. Enf. Stds. Apply ☐

Local Grid Location of Well: ____ ft. ☐N ☐S ____ ft. ☐E ☐W
Local Grid Origin ☐ (estimated: ☐) or Well Location ☐
Lat. ____ ° ____ ' ____ " Long. ____ ° ____ ' ____ " or
St. Plane ____ ft. N, ____ ft. E. S/C/N
Section Location of Waste/Source: NE 1/4 of NE 1/4 of Sec. 24 T. 20 N, R. 10 ☒E ☐W
Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known
Gov. Lot Number:

Well Name: TH#6
Wis. Unique Well No.: DNR Well ID No.:
Date Well Installed: 07/21/2005 (m m d d y y y y)
Well Installed By: Name (first, last) and Firm: Mark J Trautwells, Inc
Robbie Torres

A. Protective pipe, top elevation 2.5 ft. MSL
B. Well casing, top elevation 2 ft. MSL
C. Land surface elevation 0 ft. MSL
D. Surface seal, bottom 3 ft. MSL or ____ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐
13. Sieve analysis performed? ☑ Yes ☐ No
14. Drilling method used: Rotary ☑ 50 Hollow Stem Auger ☐ 41 Other ☐
15. Drilling fluid used: Water ☐ 02 Air ☐ 01 Drilling Mud ☑ 03 None ☐ 99
16. Drilling additives used? ☐ Yes ☑ No
Describe ____
17. Source of water (attach analysis, if required):

E. Bentonite seal, top 139 ft. MSL or ____ ft.
F. Fine sand, top 141 ft. MSL or ____ ft.
G. Filter pack, top 143 ft. MSL or ____ ft.
H. Screen joint, top 145 ft. MSL or ____ ft.
I. Well bottom 155 ft. MSL or ____ ft.
J. Filter pack, bottom 160 ft. MSL or ____ ft.
K. Borehole, bottom 180 ft. MSL or ____ ft.
L. Borehole, diameter 6 in.
M. O.D. well casing 2.36 in.
N. I.D. well casing 2.06 in.

1. Cap and lock? ☑ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: ____ ft.
c. Material: Steel ☑ 04 Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: ____
3. Surface seal: Bentonite ☐ 30 Concrete ☑ 01 Other ☐
4. Material between well casing and protective pipe: Cement — Bentonite ☐ 30 Other ☑
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☑ 35
c. ____ Lbs/gal mud weight . . . . . Bentonite slurry ☑ 31
d. ____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ____ ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 Tremie pumped ☑ 02 Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☑ 3/8 in. ☐ 1/2 in. Bentonite chips ☑ 32
c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint #70
b. Volume added 2 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint #30
b. Volume added 12 ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 23 Flush threaded PVC schedule 80 ☐ 24 Other ☐
10. Screen material: Stainless Steel
a. Screen type: Factory cut ☑ 11 Continuous slot ☐ 01 Other ☐
b. Manufacturer ____
c. Slot size: ____ ft. ____ in.
d. Slotted length: ____ ft.
11. Backfill material (below filter pack): None ☐ 14 Bentonite-cement grout 160-180 Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature: Robbie Torres Firm: Traut Wells

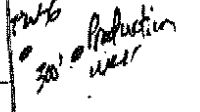
Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and laboratory. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

FIELD BORING LOG

FOR Liesch Associates JOB # 307216
LOCATION Wild Rose Fish Hatchery BORING #
CITY Wild Rose WI DATE 7-22-05
DRILLER Robbie HELPER Matt INVOICE #

BLOW COUNTS	VISUAL FIELD CLASSIFICATION	
	Sand 10 slot	0-14
5	Sand & Gravel 25 slot	14-81
	Sand 10 slot	81-125
10	Clay	125-129
	Sand 20 slot	129-138
15	Clay	138-141
	Sand & Gravel 25 slot	141-165
20	Sand 10 slot	165-175
	Clay	175-180
25		
30		
35		
40		
45		
50		

Well Depth 155'
Drill Method mud rotary
Drill Fluid
Screen
Type
Slot
Diameter
Set Between &
Casing
Type
Diameter
Set Between &
Sand Pack
Type
Set Between &
Seal
Type
Set Between & Bags
Annular Space Sealant
Type
Set Between & Bags
& Bags
& Bags
Protective Casing
Type
Size
Bumper
Water Level
Bottom Of Boring
Bottom Of Sample
Map



Hwy 22

"1 17"

State of Wisconsin
Department of Natural Resources

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

Form 3300-5 2/2000 Page 1 of 2

Notice: Please complete Form 3300-5 and return it to the appropriate DNR office and bureau. Completion of this report is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See the instructions for more information.

Route to: ☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other _____

(1) GENERAL INFORMATION

WI Unique Well No. _____ DNR Well ID No. _____ County: Waushara

Common Well Name _____ Gov't Lot (If applicable) _____

Grid Location: NW 1/4 of NW 1/4 of Sec. 19 ; T. 20 N; R. 10 ☒ E ☐ W

_____ ft. ☐ N. ☐ S., _____ ft. ☐ E. ☐ W.

Local Grid Origin ☐ (estimated: ☐) or Well Location ☐

Lat. ° ' " Long ° ' " or

St. Plane _____ ft. N. _____ ft. E. ☐S ☐C ☐N Zone

Reason For Abandonment _____ WI Unique Well No. of Replacement Well _____

(2) FACILITY / OWNER INFORMATION

Facility Name: Wild Rose Fish Hatchery

Facility ID _____ License/Permit/Monitoring No. _____

Street Address of Well _____

City, Village, or Town _____

Present Well Owner: WI DNR Original Owner _____

Street Address or Route of Owner _____

City, State, Zip Code _____

(3) WELL/DRILLHOLE/BOREHOLE INFORMATION

Original Construction Date 7-21-05

☐ Monitoring Well
☐ Water Well
☒ Borehole / Drillhole

If a Well Construction Report is available, please attach.

Construction Type:
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) _____

Formation Type:
☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft.) _____ Casing Diameter (in.) _____
(From groundsurface) Casing Depth (ft.) _____

Lower Drillhole Diameter (in.) 6"

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? _____ Feet

Depth to Water (Feet) _____

(4) PUMP, LINER, SCREEN, CASING, & SEALING MATERIAL

Pump & Piping Removed?	☐ Yes	☐ No	☒ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☒ Not Applicable
Screen Removed?	☐ Yes	☐ No	☒ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	
Was Casing Cut Off Below Surface?	☐ Yes	☐ No	
Did Sealing Material Rise to Surface?	☐ Yes	☐ No	
Did Material Settle After 24 Hours?	☐ Yes	☐ No	
If Yes, Was Hole Retopped?	☐ Yes	☐ No	

Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Screened & Poured (Bentonite Chips) ☐ Other (Explain)

Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Bentonite-Sand Slurry " "
☐ Bentonite Chips

For monitoring wells and monitoring well boreholes only
☐ Bentonite Chips
☐ Granular Bentonite
☐ Bentonite - Cement Grout
☐ Bentonite - Sand Slurry

(5) Material Used To Fill Well/Drillhole	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant or Volume (Circle One)	Mix Ratio or Mud Weight
Bentonite	Surface	180		

(6) Comments: _____

(7) Name of Person or Firm Doing Sealing Work: Robbie Trout Wells

Date of Abandonment _____

Signature of Person Doing Work: Robbie Trout

Date Signed: 7-21-05

Street or Route _____

Telephone Number: (320) 251-5090

City, State, Zip Code _____

FOR DNR OR COUNTY USE ONLY

Date Received _____ Noted By _____

Comments _____

FIELD BORING LOG

FOR: Liesch Associates
LOCATION: Wild Rose Fish Hatchery
CITY: Wild Rose WI
DRILLER: Bobbie HELPER: Matt

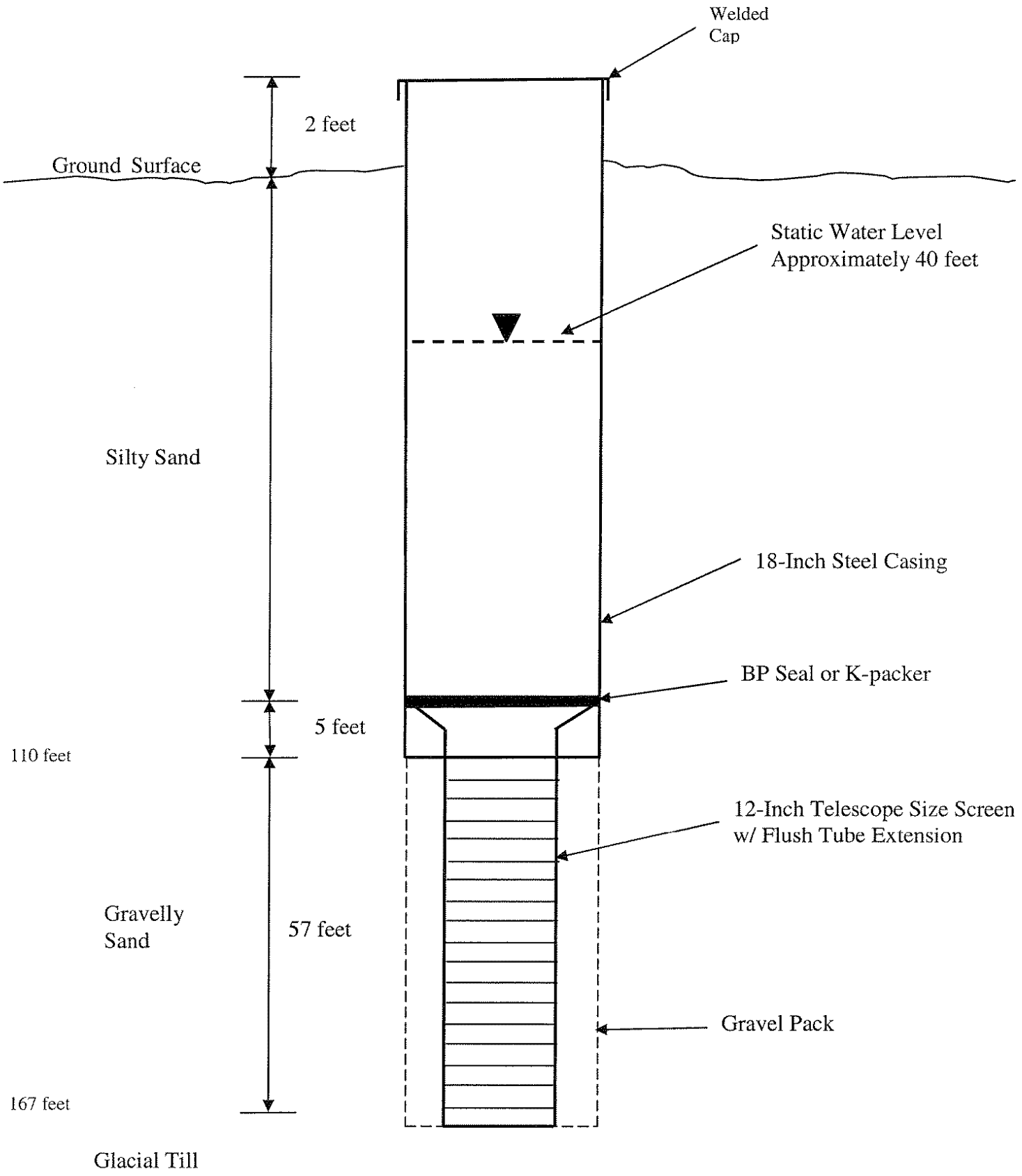
JOB #: 307216
BORING #: TH #7
DATE: 7-22-05
UNIQUE #:

BLOW COUNTS	VISUAL FIELD CLASSIFICATION
	Silty Sand 0-10
5	Sand (10 slot) 10-28
	Clay 28-120
10	Silty Sand 120-142
	Clay 142-146
15	Silty Sand (5 slot) 146-170
	Sand & Gravel (25 slot) 170-180'
20	
25	
30	
35	
40	
45	
50	

Boring Depth 180'
Drill Method mud rotary
Drill Fluid
Screen
Type
Slot
Diameter
Set Between &
Casing
Type
Diameter
Set Between &
Sand Pack
Type
Set Between &
Seal
Type
Set Between & Bags
Annular Space Sealant
Type:
Set Between & Bags
& Bags
& Bags
Protective Casing
Type
Size
Bumper
Water Level
Bottom Of Boring
Bottom Of Sample
Map

Hwy 22 • 35' red bar

Appendix D



Drawing Not to Scale

W:\ws\13071\2005 Aquifer TestReport\Fig tpw gp 18.doc

9/9/2005

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr, Suite 203
Madison, WI 53713
(608) 223-1532

13400 15th Avenue N
Minneapolis, MN 55441
(612) 559-1423

2700 N Central Ave, Suite 890
Phoenix, AZ 85004
(602) 650-2815

Wild Rose State Fish Hatchery	**Sept 05**
18-inch Test Production Well TPW-1-05	**Figure**

WISCONSIN UNIQUE WELL NUMBER AW V 233

Private Water Systems-DG
Department of Natural Resources
Box 7921
Madison, WI 53707

(Please type or print using a black pen.)

Property Owner	Wild Rose Fish Hatchery
Telephone Number	( )
Mailing Address	Dept of Natural Resources N 5871 State Road 22
City	Wild Rose
State	WI
Zip Code	54984
County of Well Location	Waushara
Co. Well Permit No.	W
Well Completion Date (mm-dd-yy)	
Well Constructor (Business Name)	mark J. Traut well Drilling
License #	73464
Address	141 28Th ave So
City	White Park
State	MN
Zip Code	56387

2. Mark well location with a dot in correct 40-acre parcel of section.

N / W / E / S

1. Well Location — Please use decimals instead of fractions.
☐ Town ☐ City ☐ Village of
Fire # (if avail.)
Grid or Street Address or Road Name and Number
Subdivision Name Lot # Block #
Gov't Lot # ____ or ____ 1/4 of ____ 1/4 of
Section ____, T ____ N; R ____ ☐ E ☐ W

3. Well Type ☐ New ☐ Replacement (see item 13 below) ☐ Reconstruction
of previous unique well # ____ constructed in 19____
Reason for replaced or reconstructed well?
☐ Drilled ☐ Driven Point ☐ Jetted ☐ Other ____

4. Well serves ____ # of homes and or ____
(Eg: barn, restaurant, church, school, industry, etc.)

High Capacity:
Well? ☐ Yes ☐ No
Property? ☐ Yes ☐ No

5. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties? ☐ Yes ☐ No If no, explain on back side.
Well located in floodplain? ☐ Yes ☐ No
Distance in Feet From Well To Nearest: (include proposed)

1. Landfill
2. Building Overhang
3. Septic or Holding Tank (circle one)
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. Shoreline/Swimming Pool (circle one)
9. Downspout/Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain ☐ Cast Iron or Plastic ☐ Other
14. Building Sewer ☐ Gravity ☐ Pressure ☐ Cast Iron or Plastic ☐ Other
15. Collector Sewer: ___units ___in. diameter
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe ☐ Gravity ☐ Pressure ☐ Cast Iron or Plastic ☐ Other
23. Other Manure Storage ____
24. Ditch
25. Other NR 812 Waste Source

Drillhole Dimensions

Dia. (in.)	From (ft.)	To (ft.)
	surface	

Upper Enlarged Drillhole: Method of Construction
☐ 1. Rotary - Mud Circulation
☐ 2. Rotary - Air
☐ 3. Rotary - Foam
☐ 4. Reverse Rotary
☐ 5. Cable-tool Bit ____ in. dia.
☐ 6. Temp. Outer Casing ____ in. dia. ____ depth Removed? ☐ Yes ☐ No
If no, explain why not ____
☐ 7. Other ____

7. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
18"		surface	

Dia. (in.)	screen type, material & slot size	From	To
12"			

8. Grout or Other Sealing Material
Method ____ Kind of Sealing Material

From (ft.)	To (ft.)	# Sacks Cement
surface		

DNR USE ONLY

9. Geology

Type, Caving/Noncaving, Color, Hardness, Etc.	From (ft.)	To (ft.)
Brn Fine SILTY Sand	surface	10
Brn Fine sand	10	15
Brn Fine Sand & Rocks	15	16
Brn Fine Sand	16	17
Brn Fine & med Sand	17	82
Brn Fine sand & Rocks	82	97
Brn Sand	97	115
Brn Sand w gravel See next Sheet Cont'd	115	120 Co

10. Static Water Level
____ ft. above ground surface
40' ft. below ground surface

11. Pump Test
Pumping Level ____ ft. below surface
Pumping at ____ GPM for ____ hours

12. Well Is:
____ in. ☐ Above ☐ Below Grade
Developed? ☐ Yes ☐ No
Disinfected? ☐ Yes ☐ No
Capped? ☐ Yes ☐ No

13. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
☐ Yes ☐ No If no, explain ____

14. Signature of Point Driver or Licensed Supervisory Driller — Date Signed

Signature of Drill Rig Operator (Mandatory unless same as above) — Date Signed

Make additional comments on reverse side about geology, additional screens, water quality, etc.
Comments on reverse side ____ (CHECK √, IF YES)

WELL CONSTRUCTION REPORT
Form 3300-77A Rev. 8-98

DNR

Unique # NV 233 Page # 2

Geologiacal Materials	Color	Hardness Of Materials	From	To
Sand + gravel	Brn		120	125
Fine sand	Brn		125	154
Sand + Coarse gravel	Brn		154	160
Coarse sand w/gravel	Brn		160	167
Very Fine Sand	Brn		167	180
very Fine SILTY Sand	Brn		180	185
w/ Some cementing chunks				
Fine SILTY Sand w/ Rocks	Brn		185	195
+ Light cementing & clay				
Layers				

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651-636-3900
1-800-833-9173
FAX 651-636-3171 or 1-800-328-9891
P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

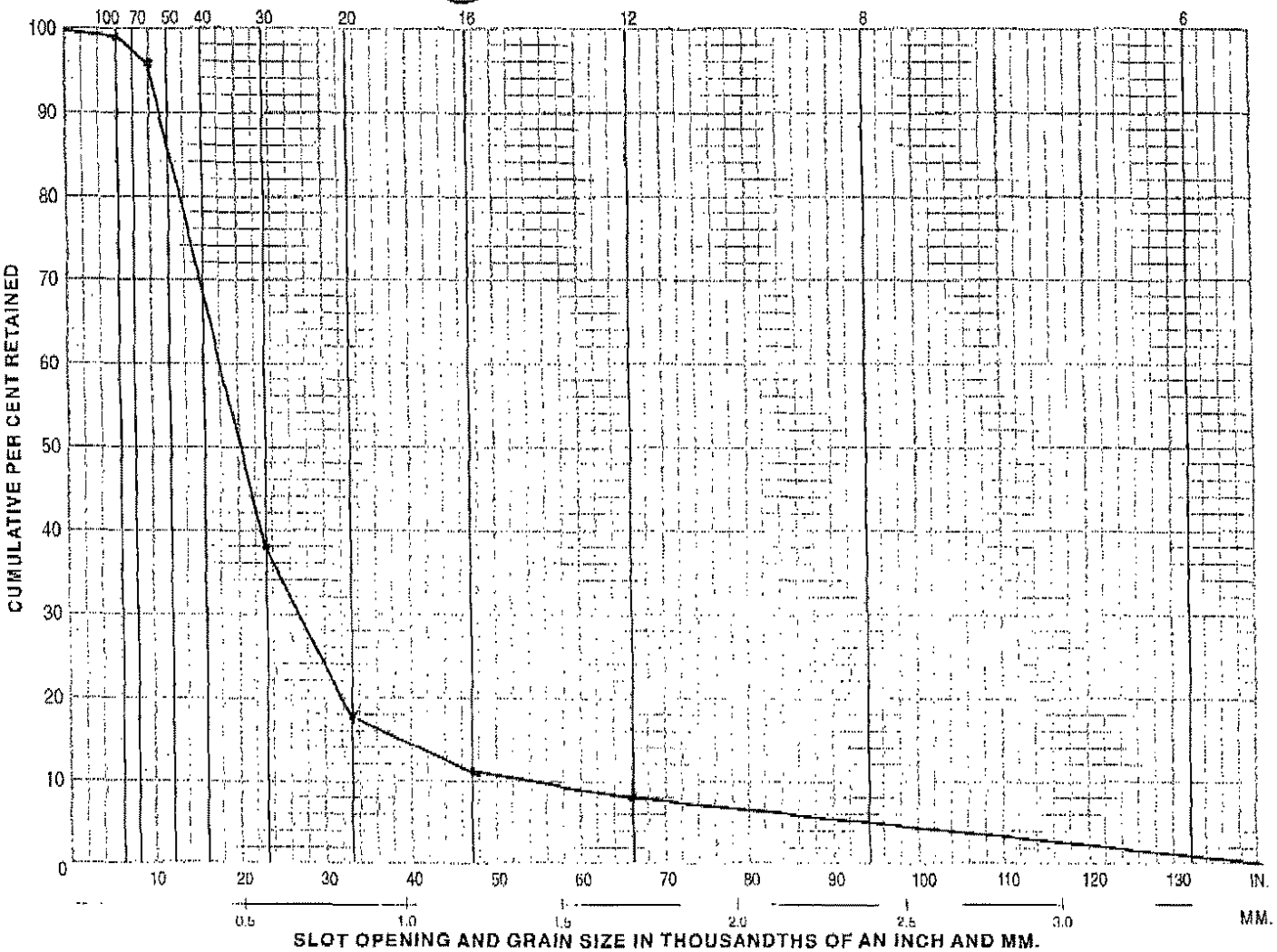
Job Name Fish Hatchery Date 7-11-05

City Wild Rose WI State Zip

Driller Phone

Engineer Phone

Remarks 97-102 (40' static water level) (18" casing 12" screen)



U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.30~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	54	54	08
16	.047	1.19	26	80	11
20	.033	0.84	46	126	18
30	.023	0.60	135	261	38
~~40~~	~~.016~~	~~0.42~~			
60	.012	0.30	385	646	96
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	20	666	99
PAN			4	670	100

Comments Bun Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

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1-800-833-9473
FAX 651-638-3171 or 1-800-328-9891
P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Black River Falls Fish Hatchery Date 7-11-05

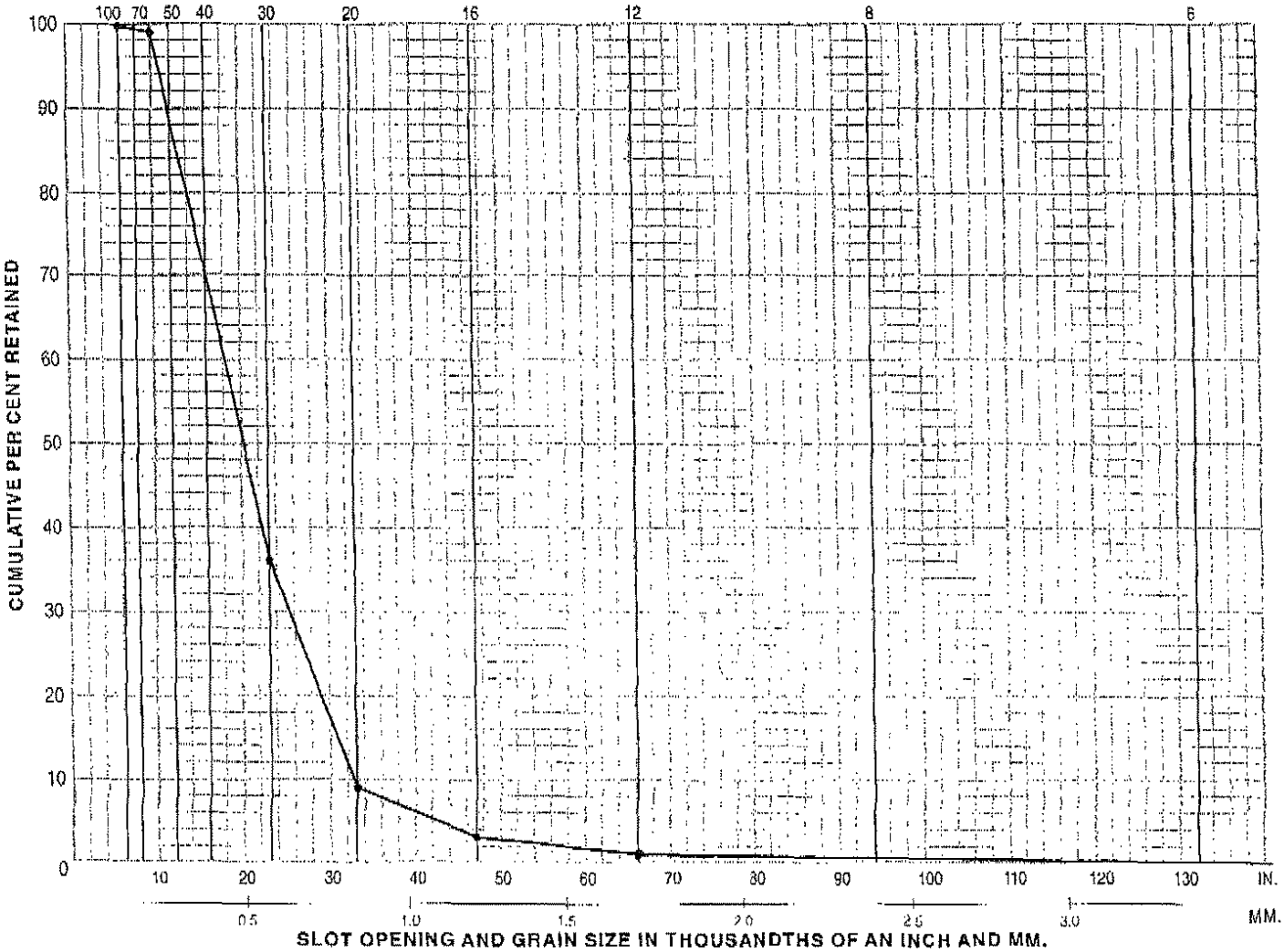
City Black River Falls State Zip

Driller Tony Traut Phone

Engineer R.A. Leisch Phone

Remarks 102-107 40' static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM	SAMPLE DEPTHS		
~~5~~	132	3.36			
~~8~~	~~094~~	2.38			
12	.066	1.68	8	8	.01
16	.047	1.19	14	22	.03
20	.033	0.84	32	54	.09
30	.023	0.60	185	209	.36
~~40~~	.015	0.42			
#60	.012	0.30	364	573	.99
~~70~~	~~009~~	~~0.21~~			
100	.000	0.15	4	577	1.00
Dust			0	577	

Comments Brn Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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F 45 R7-97

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

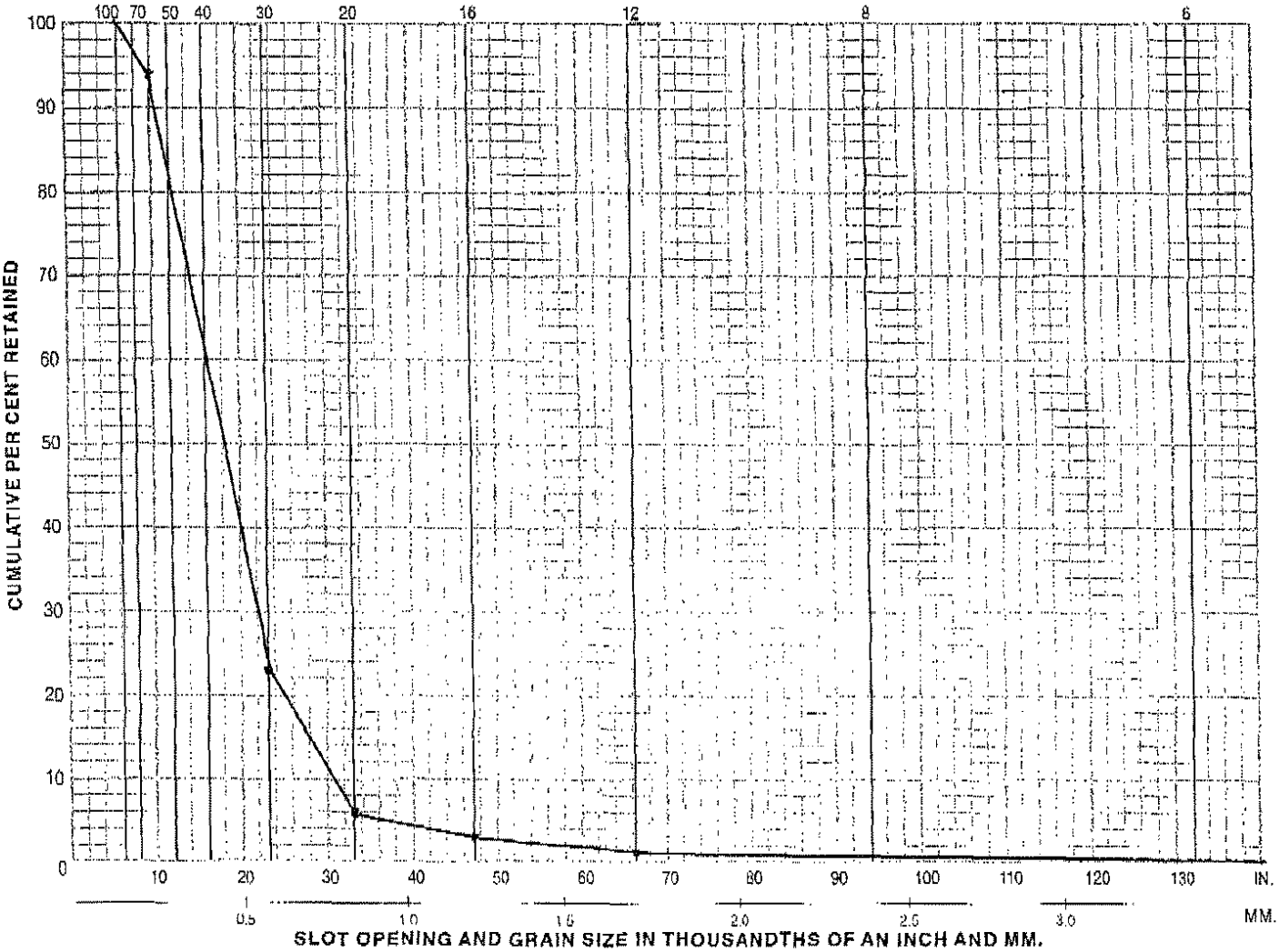
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer B.A. Leisch Phone

Remarks 107 - 110 40 static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~0~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	14	14	01
16	.047	1.19	9	23	03
20	.033	0.84	25	48	06
30	.023	0.60	120	168	23
~~40~~	~~.016~~	~~0.42~~			
~~60~~ 60	012	0.30	502	670	94
~~70~~	~~.008~~	~~0.21~~			
100	006	0.15	35	705	99
Dust			#5	710	100

Comments Brn Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-19-05

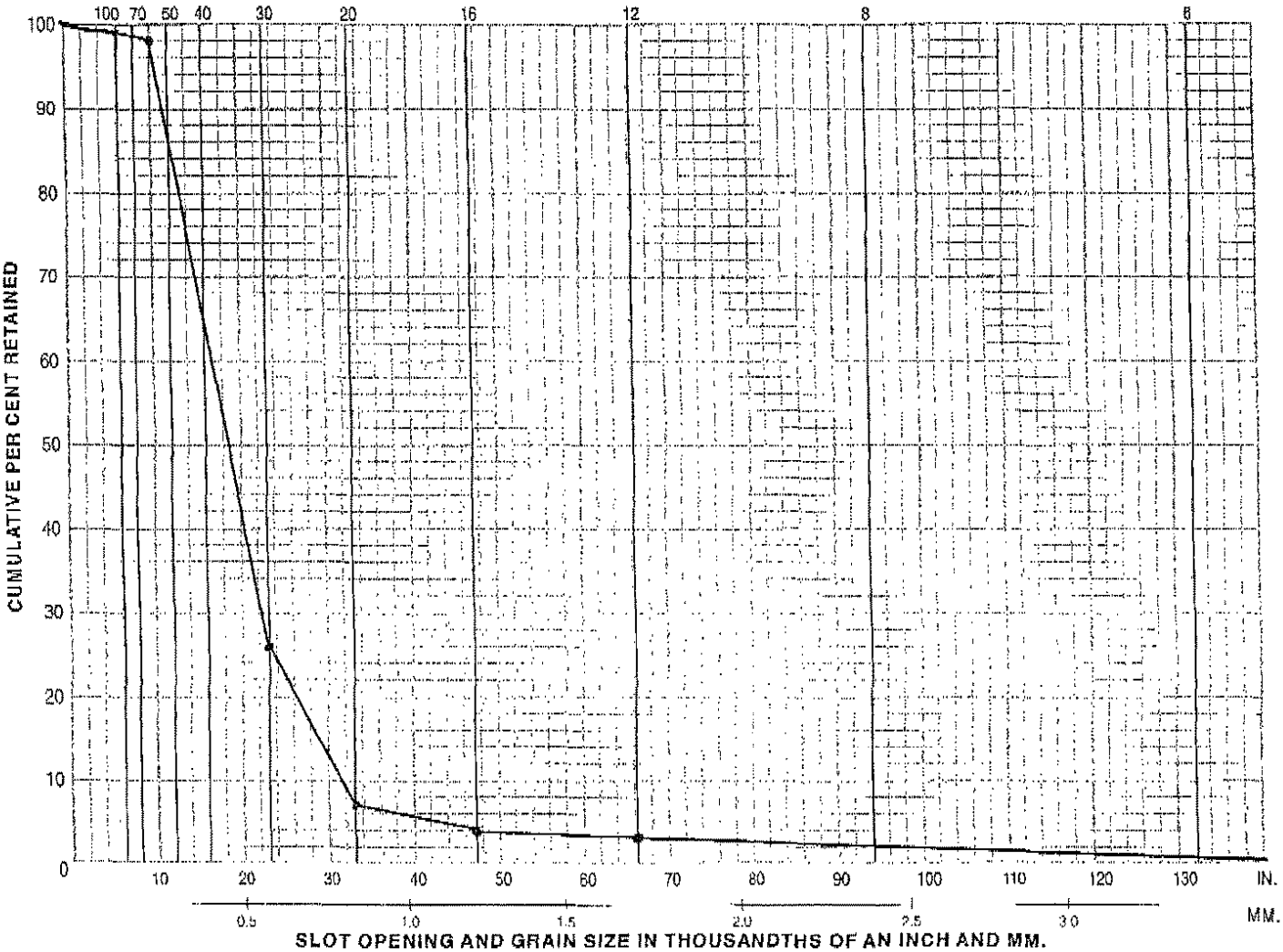
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer BA Leach Phone

Remarks 110 -115 40' Static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	22	22	03
16	.047	1.19	8	30	04
20	.033	0.84	18	48	07
30	.023	0.60	131	179	26
~~40~~	~~.016~~	~~0.42~~			
~~60~~	.012	0.30	488	667	98
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	10	677	99
Dust			1	678	100

Comments Brn [illegible] Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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1-800-833-9473
FAX 651-638-3171 or 1-800-328-9891
P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish hatchery Date 7-11-05

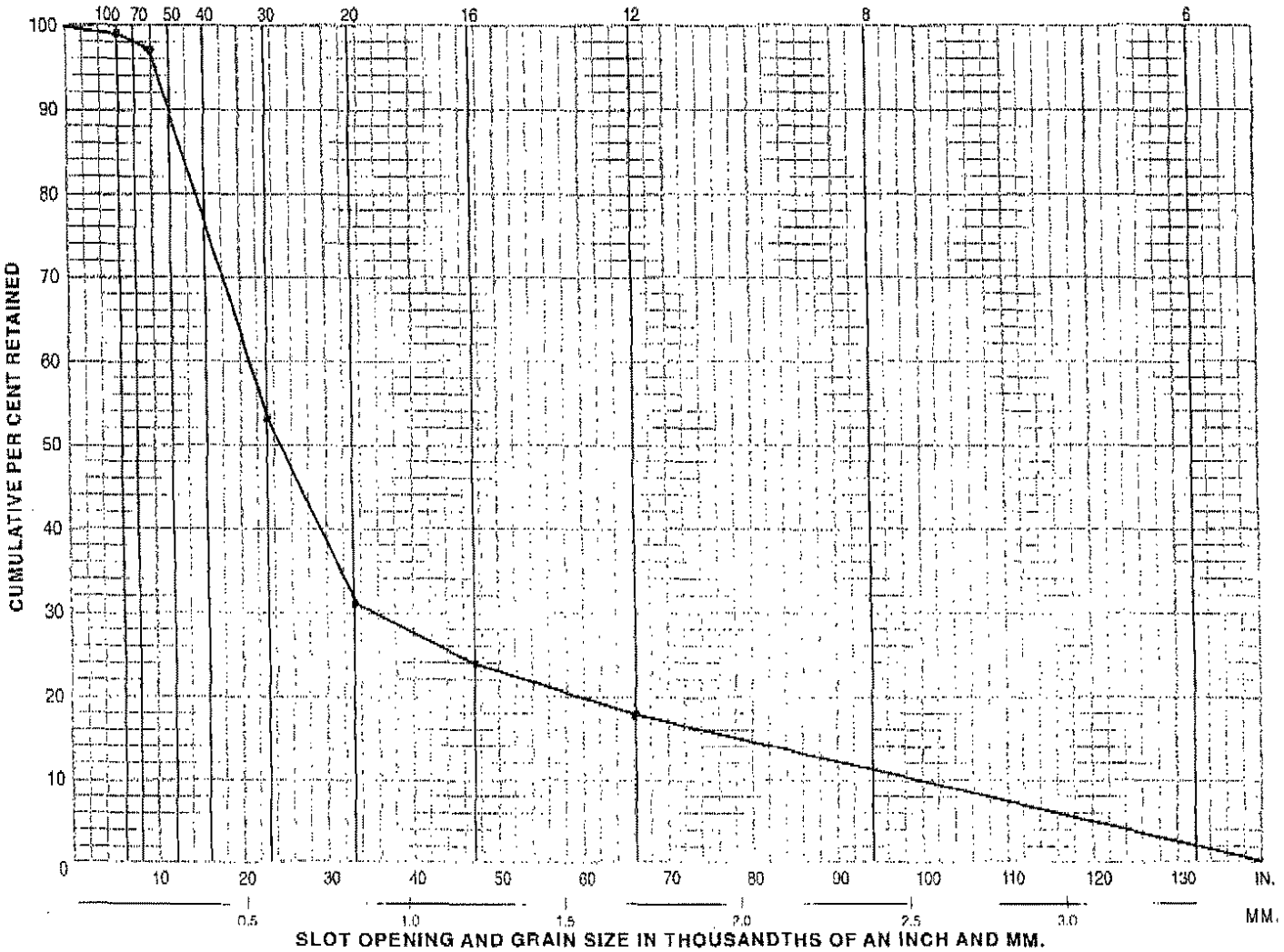
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer Ka Welsh Phone

Remarks 115 -120 40' Static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	121	121	18
16	.047	1.19	36	157	24
20	.033	0.84	48	205	31
30	.023	0.60	142	347	53
~~40~~	~~.016~~	~~0.42~~			
#60	.012	0.30	291	638	97
~~70~~	~~.008~~	~~.021~~			
100	.006	0.15	12	650	99
DUST			2	652	100

Comments Brn sand w-gravel

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL.

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish hatchery Date 7-11-05

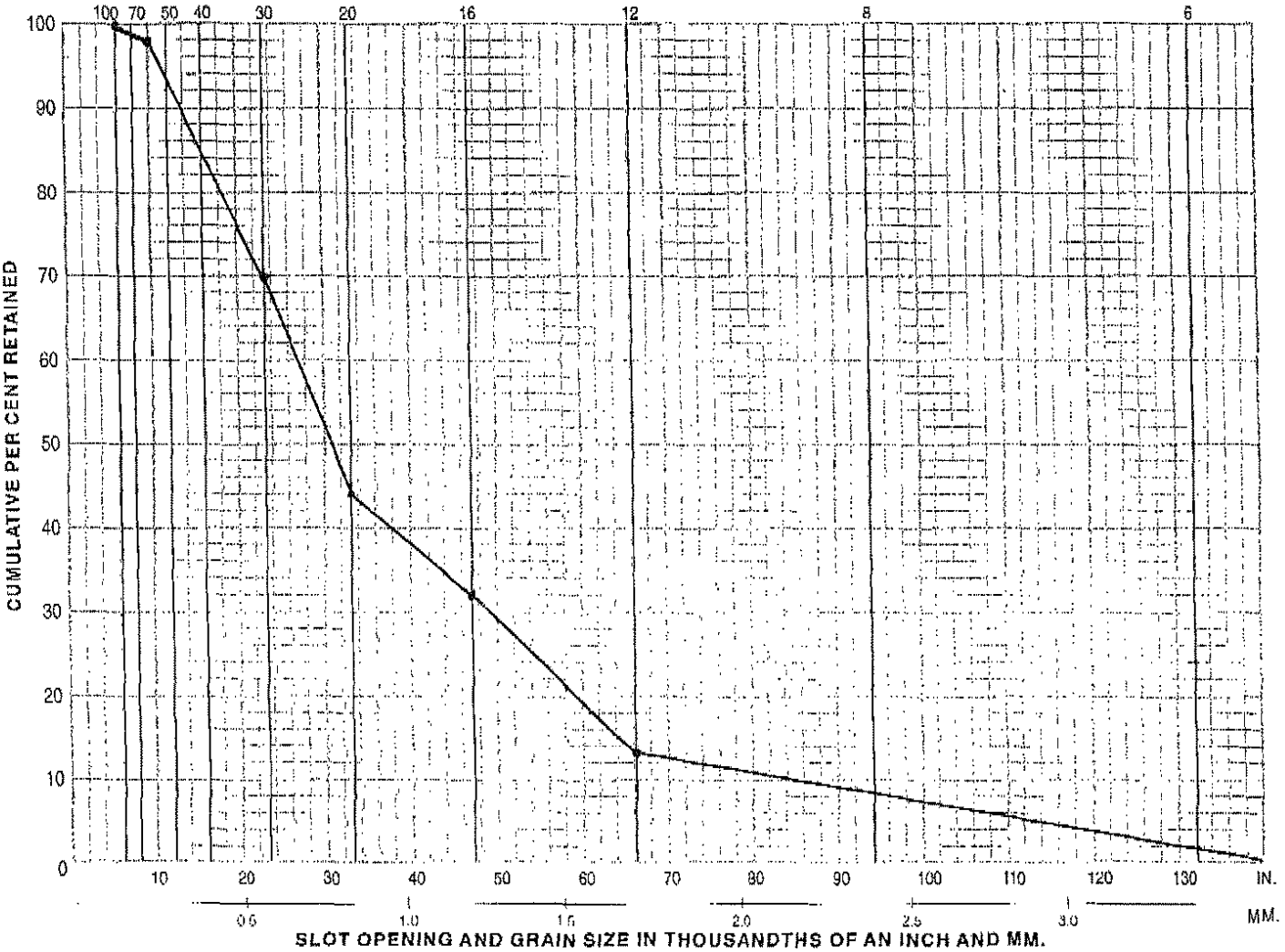
City Cold Spring State Zip

Driller Tony Traut Phone

Engineer B.A. Walsh Phone

Remarks 120-125 40' static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	143	143	23
16	.047	1.19	50	193	32
20	.033	0.84	71	264	44
30	.023	0.60	159	423	70
~~40~~	~~.016~~	~~0.42~~			
60	.012	0.30	169	592	98
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	7	599	100
Dust			0	599	100

Comments Brn sand & gravel

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

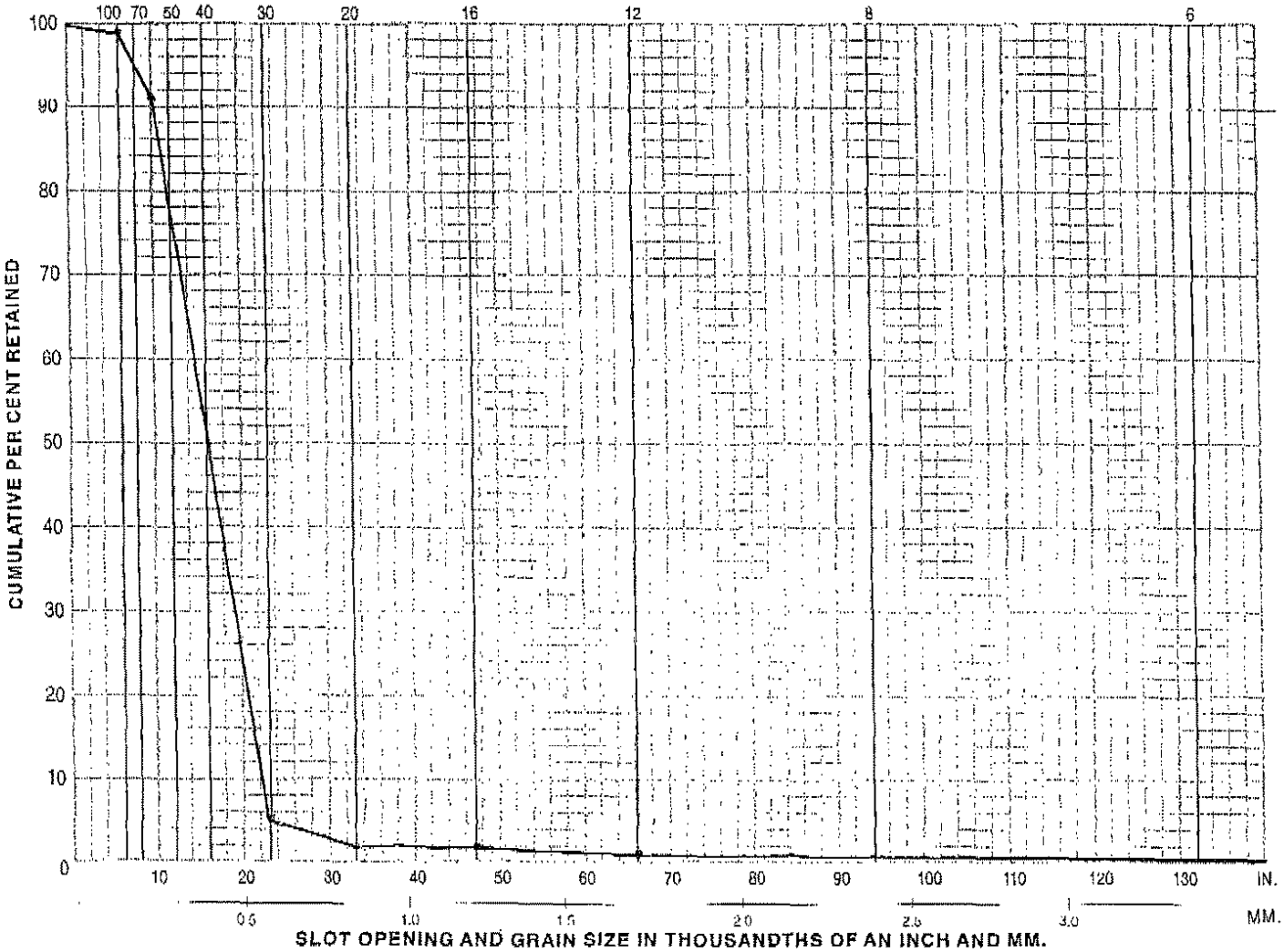
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer BA. Lrash Phone

Remarks 125-130 40' static water Level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	13	13	01
16	.047	1.19	3	16	02
20	.033	0.84	4	20	02
30	.023	0.60	24	44	05
~~40~~	~~.016~~	~~0.42~~			
#60	.012	0.30	661	705	91
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	65	770	99
Dust			4	774	100

Comments Brn Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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F 45 07 97

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P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

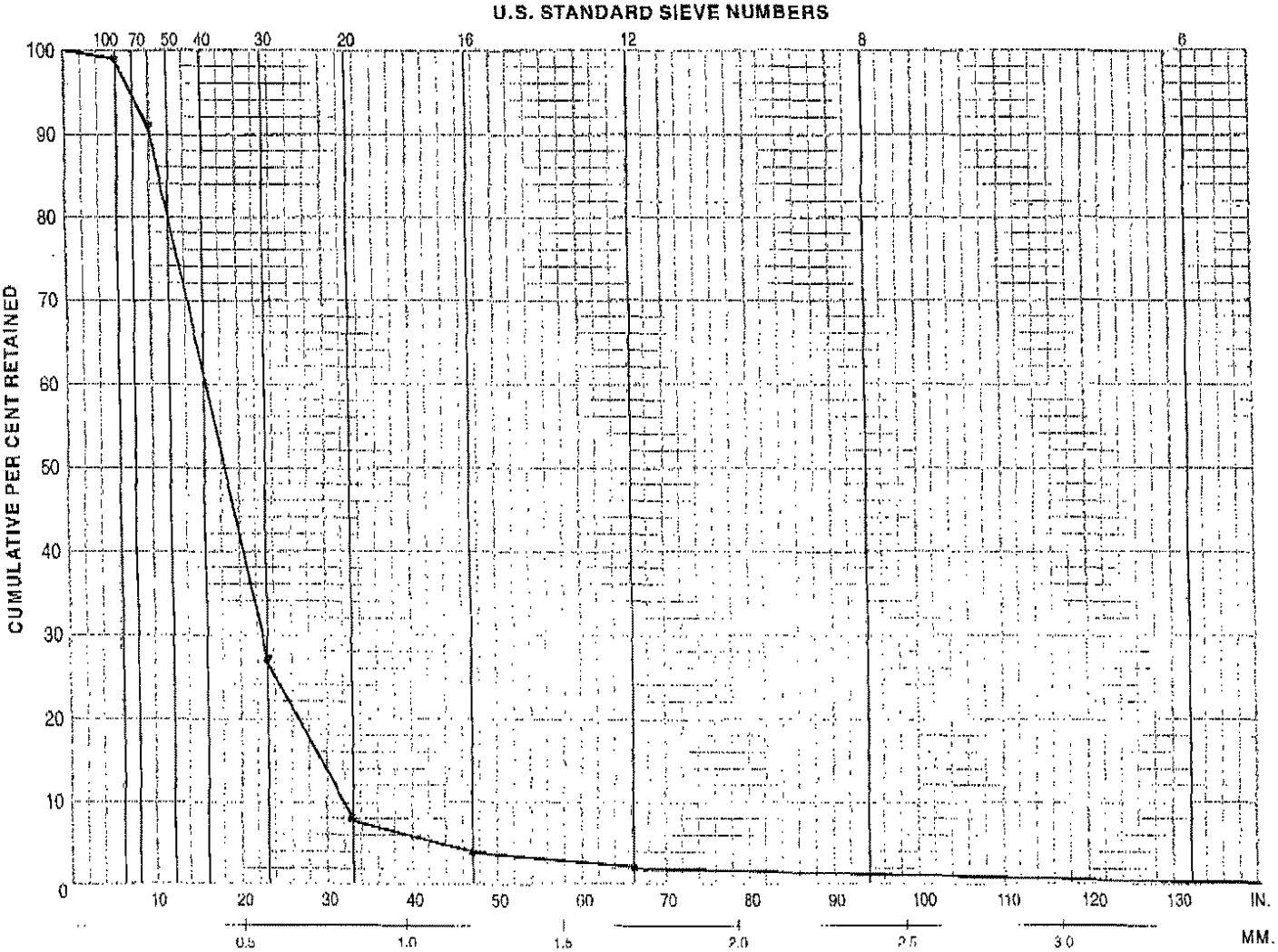
Job Name Fish Hatchery Date 7-11-05

City W190 Rose int State Zip

Driller Tony Traut Phone

Engineer BA Liesh Phone

Remarks 130'-135' 40' static water level



U.S. SIEVE NO	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~132~~	~~3.30~~			
~~8~~	~~094~~	~~2.30~~			
12	090	1.68	17	17	02
16	047	1.19	11	28	04
20	033	0.84	28	56	08
30	023	0.60	126	182	27
~~40~~	~~016~~	~~0.42~~			
~~50~~60	.012	0.30	421	603	91
~~70~~	~~008~~	~~0.21~~			
100	006	0.15	49	652	99
0457			5	657	100

Comments Brn Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL.

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651 636-3900
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FAX 651-636-3171 or 1-800-328-9891
P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

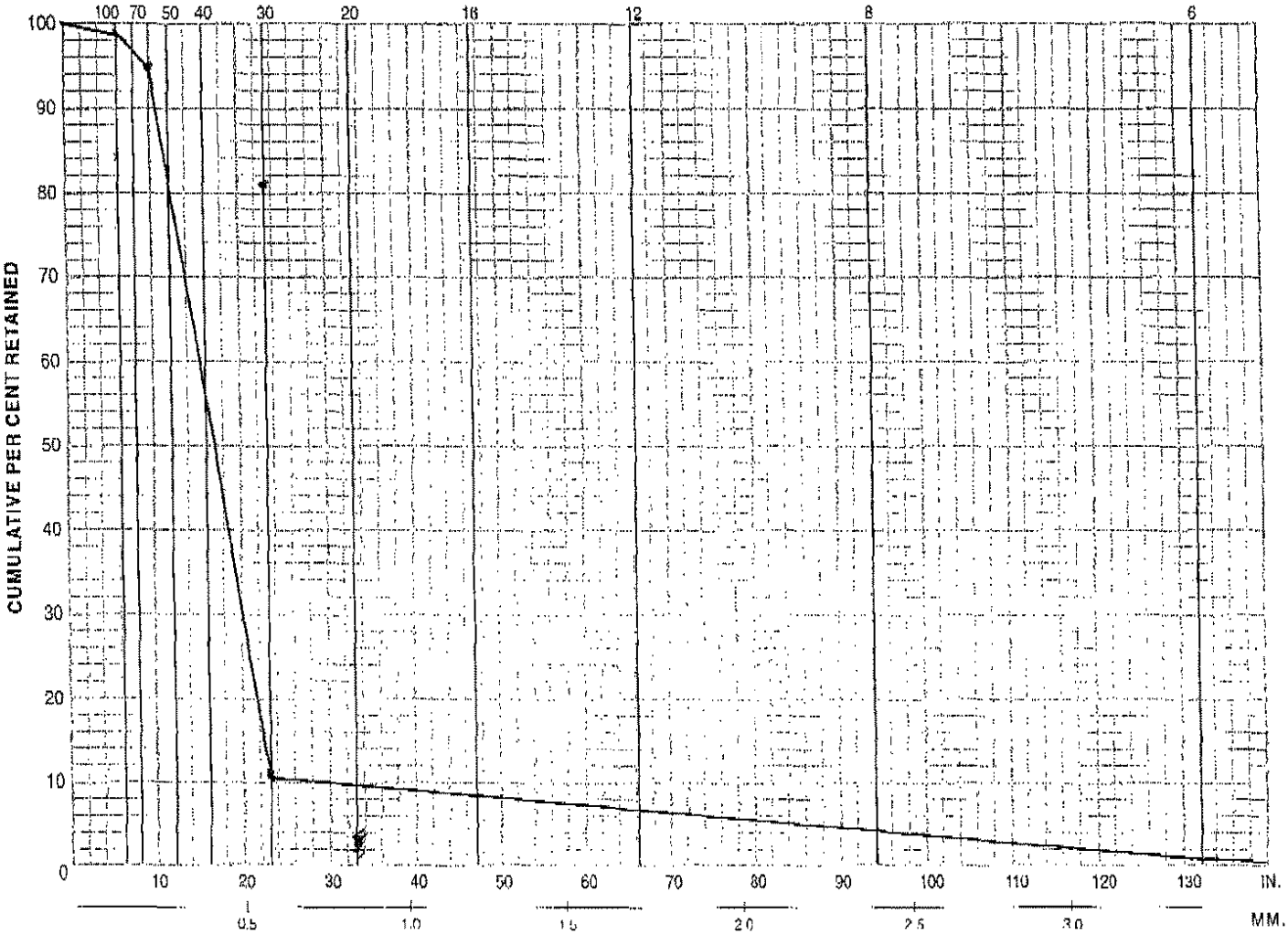
City Wild Rose State Zip

Driller Tony Traut Phone

Engineer Bill Walsh Phone

Remarks 135'-140' 40' static water level

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	SLOT OPENING MM.	SAMPLE DEPTHS		
6	.132	3.36			
8	.094	2.38			
12	.066	1.68	0	0	0
16	.047	1.19	0	0	0
20	.033	0.84	3	3	0
30	.023	0.60	78	81	11
40	.016	0.42			
#60	.012	0.30	577	658	95
70	.008	0.21			
100	.006	0.15	31	689	99
Dust			2	691	100

Comments Brn Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

F 46 8/-97

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

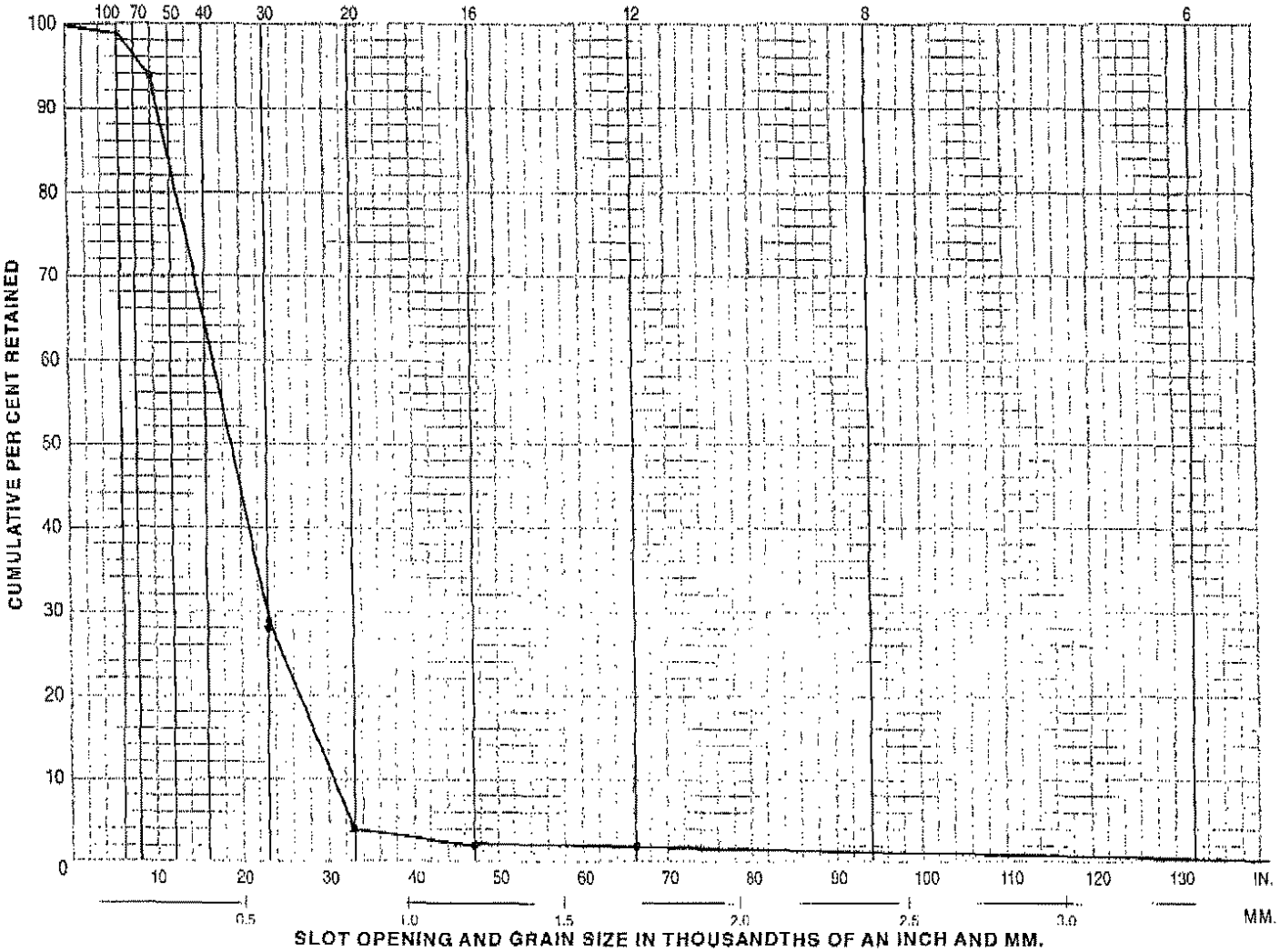
City Wild Rice Wt State Zip

Driller Tony Traut Phone

Engineer R.A. Lush Phone

Remarks 140-145' 40' sml

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	SLOT OPENING MM	SAMPLE DEPTH		
~~8~~	~~.100~~	~~2.46~~			
~~8~~	.094	2.38			
12	.066	1.68	16	16	02
16	.047	1.19	5	21	02
20	.033	0.84	11	32	04
30	.023	0.60	187	219	29
~~40~~	~~.016~~	~~0.40~~			
~~50~~ 60	.012	0.30	493	712	94
~~70~~	.008	0.21			
100	.000	0.15	36	748	99
Dust			2	750	100

Comments Bin Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

U.S. FILTER JOHNSON SCREENS
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1-800-833-9473
FAX 651-638-3171 or 1-800-328-9891
P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

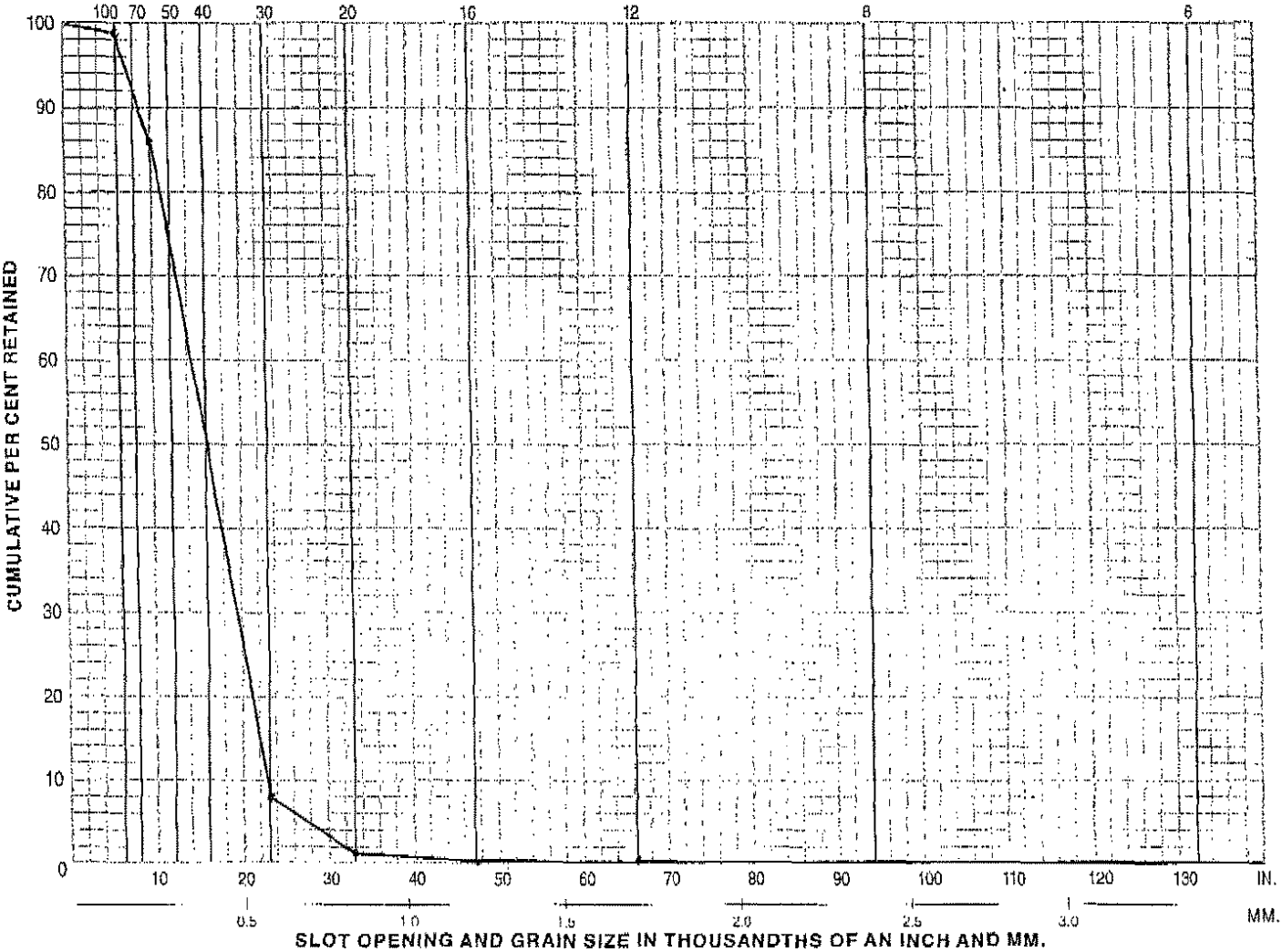
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer B.A. Lush Phone

Remarks 145-150 40' sand

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~8~~	~~.132~~	~~3.36~~			
~~6~~	~~.094~~	~~2.38~~			
12	.066	1.68	3	3	0
16	.047	1.19	1	4	0
20	.033	0.84	6	10	01
30	.023	0.60	43	53	08
~~40~~	~~.016~~	~~0.42~~			
#60	.012	0.30	466	519	86
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	77	596	99
Dust			3	599	100

Comments Brn Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL TRIAL WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

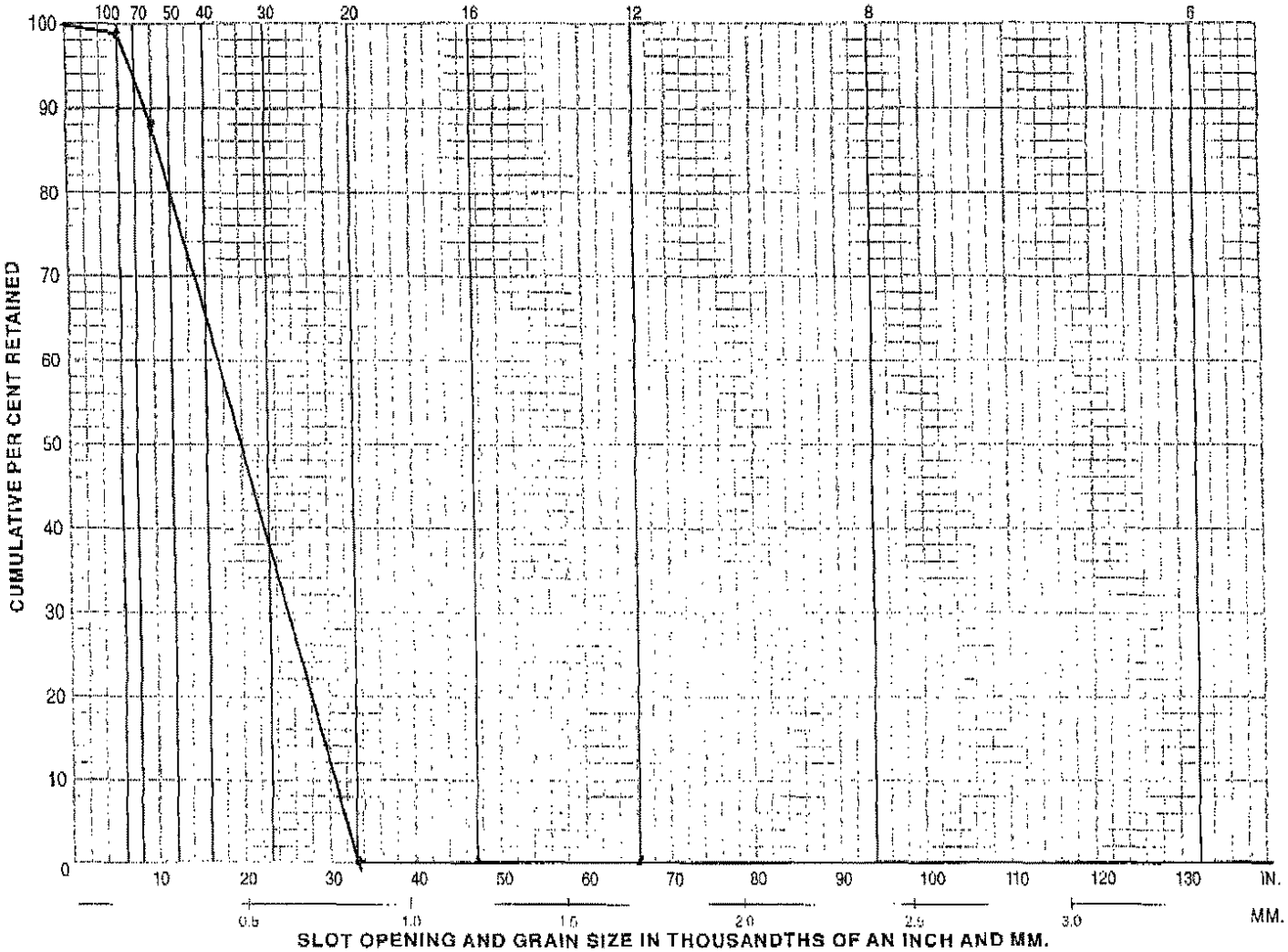
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer B.A. Liesch Phone

Remarks 150-154 40' SAND

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
8	.132	3.30			
~~8~~	.094	2.38			
12	066	1.68	0	0	0
16	047	1.19	0	0	0
20	033	0.84	2	2	0
30	023	0.60	16	18	02
~~40~~	~~.016~~	~~0.42~~			
~~60~~ 60	.012	0.30	613	631	.88
~~70~~ 70	~~.009~~	~~0.21~~	[illegible]		
100	006	0.15	79	710	99
Dust			5	715	100

Comments Brn Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL.

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SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

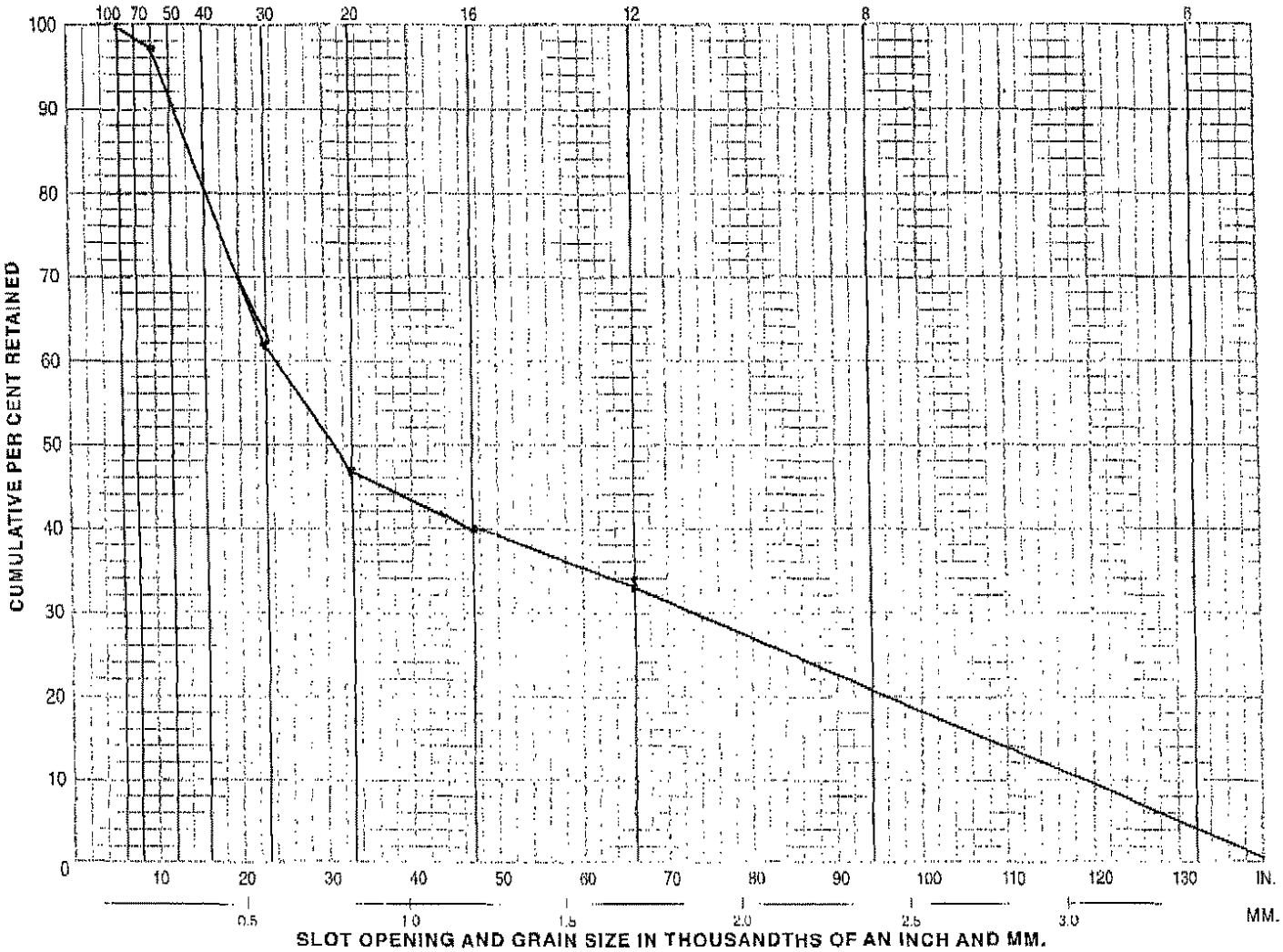
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer R.A. Lrash Phone

Remarks 154-160 40' SWL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	SLOT OPENING MM.	SAMPLE DEPTHS		
6	.132	3.36	M		
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	116	116	33
16	.047	1.19	23	139	40
20	.033	0.84	25	164	47
30	.023	0.60	52	216	62
~~40~~	~~.016~~	~~0.42~~			
#60	.012	0.30	121	337	97
~~70~~	~~.009~~	~~0.21~~			
100	.006	0.15	9	346	100
Dust			0	346	100

Comments Brn sand & coarse gravel

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

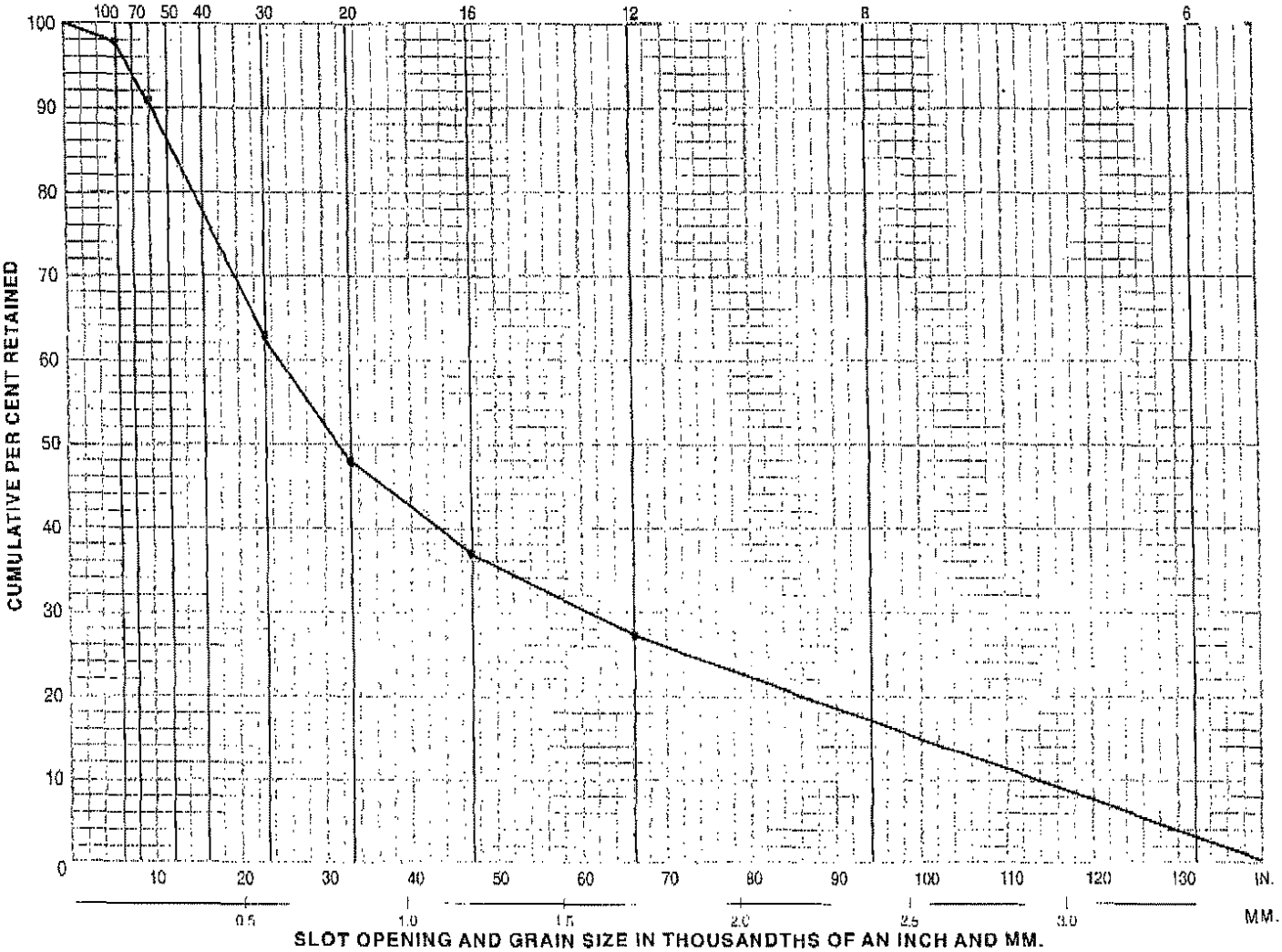
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer Ba Welsh Phone

Remarks 160-167 40' SWL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	SLOT OPENING MM	SAMPLE DEPTHS		
~~8~~	~~.157~~	~~4.00~~			
~~8~~	~~.094~~	2.38			
12	.066	1.68	177	177	27
16	.047	1.19	65	242	37
20	.033	0.84	73	315	48
30	.023	0.00	95	410	63
~~40~~	~~.016~~	~~0.42~~			
#60	.012	0.30	177	587	91
~~70~~	~~.009~~	0.21			
100	.006	0.15	48	635	98
PAN			10	645	100

Comments Brn Course sand w/gravel

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7/1/05

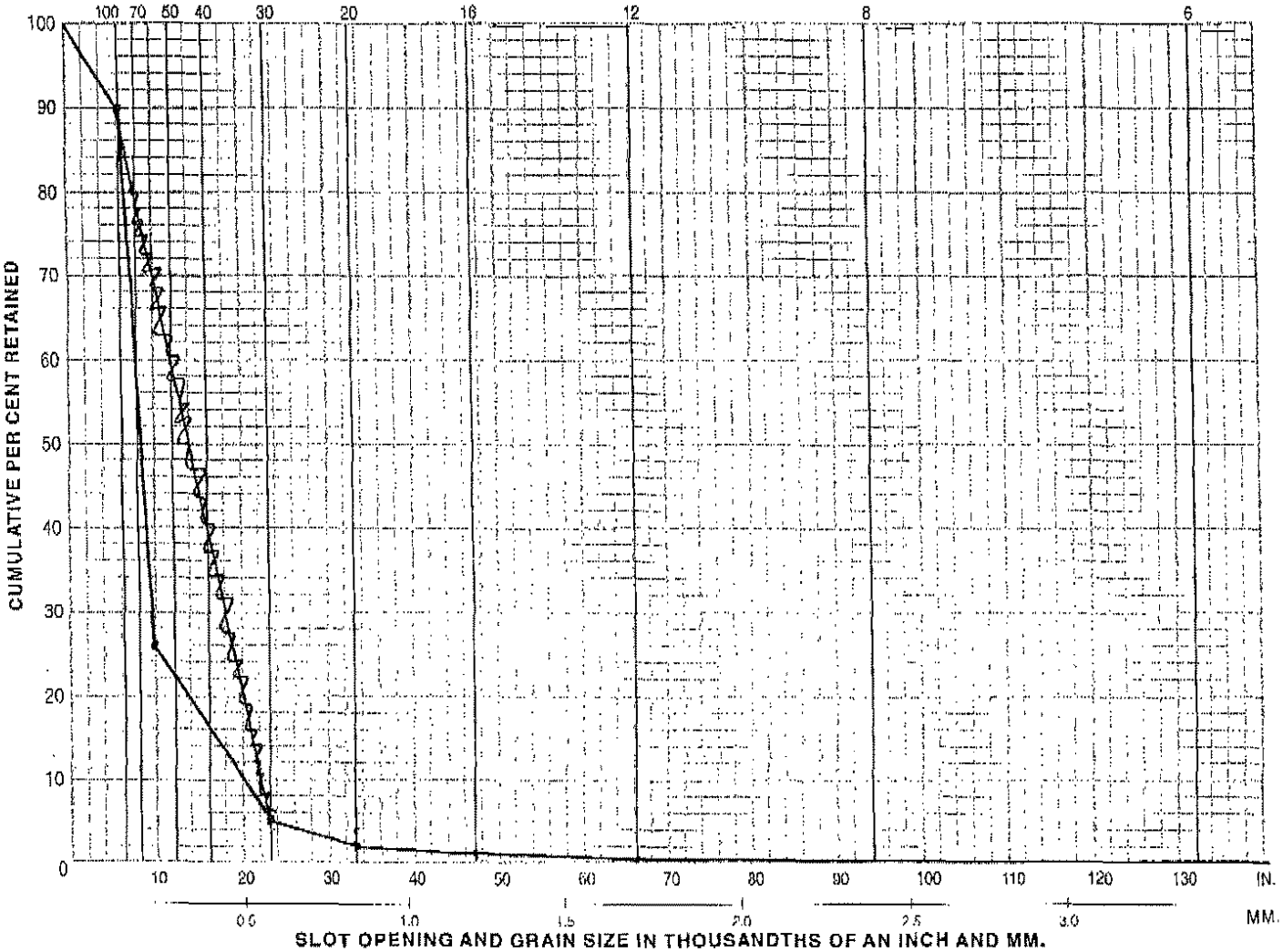
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer B.A. Lrash Phone

Remarks 167 - 172 Ho SAL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~6~~	~~.132~~	~~3.35~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	0	0	0
16	.047	1.19	5	5	01
20	.033	0.84	7	12	02
30	.023	0.60	14	26	05
~~40~~	~~.016~~	~~0.42~~	[redacted]		
~~50~~ 60	.012	0.30	104	130	26
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	320	450	90
Dust			45	495	140

Comments Bon - very Fine Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL, THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

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P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

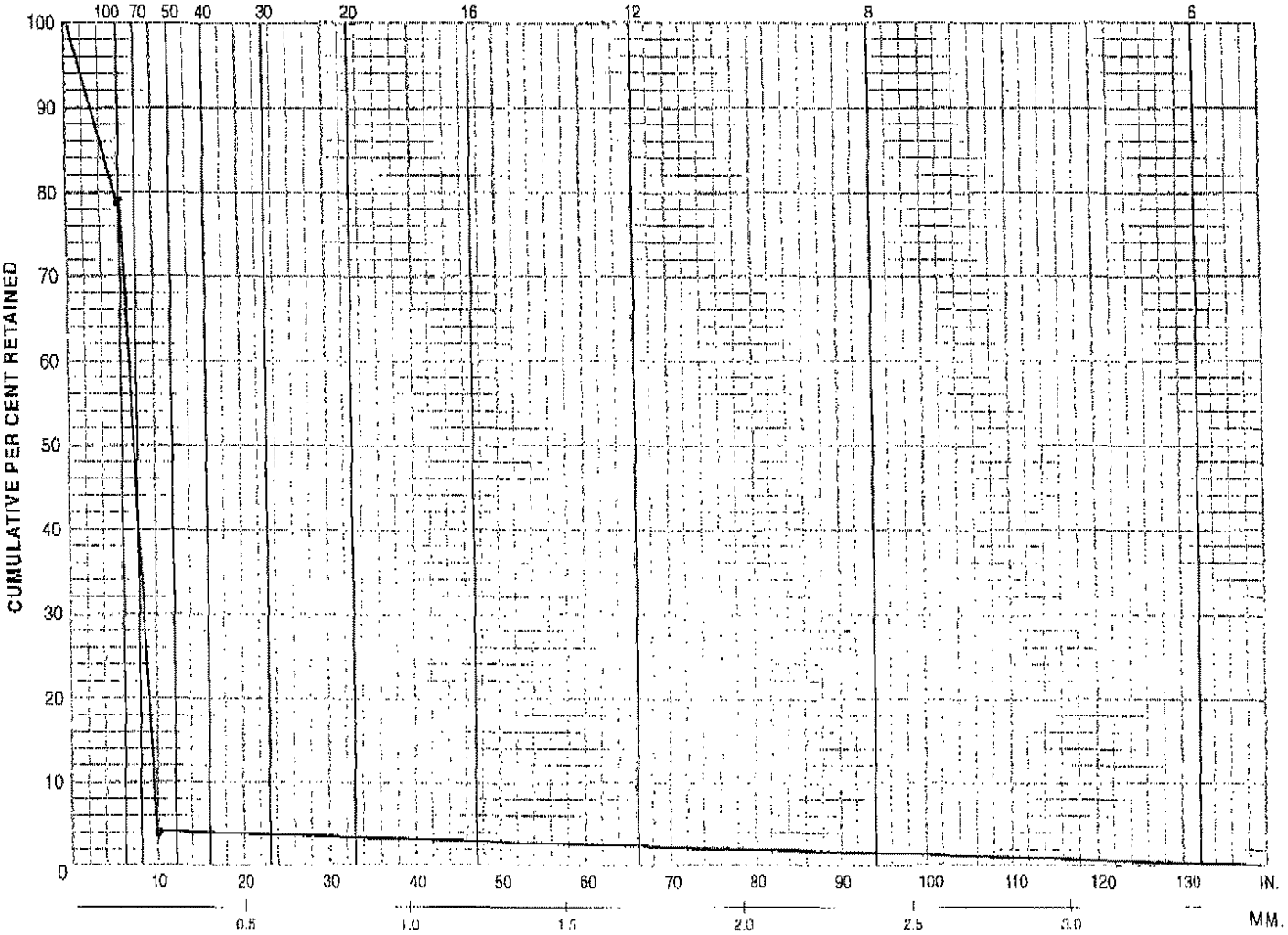
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer B.A. Lesh Phone

Remarks 172-180 40' SWL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN	SLOT OPENING MM.	SAMPLE DEPTH		
6	.132	3.36			
8	.094	2.38			
12	.066	1.68	0	0	
16	.047	1.19	0	0	
20	.033	0.84	0	0	
30	.023	0.60	0	0	
40	.016	0.42			
50 60	.012	0.30	25	25	.04
70	.008	0.21			
100	.006	0.15	381	406	79
Dust			105	511	100

Comments Very Fine Brn Sand

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

U.S. FILTER JOHNSON SCREENS
651-636-3900
1-800-833-9473
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P.O. Box 64118
St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

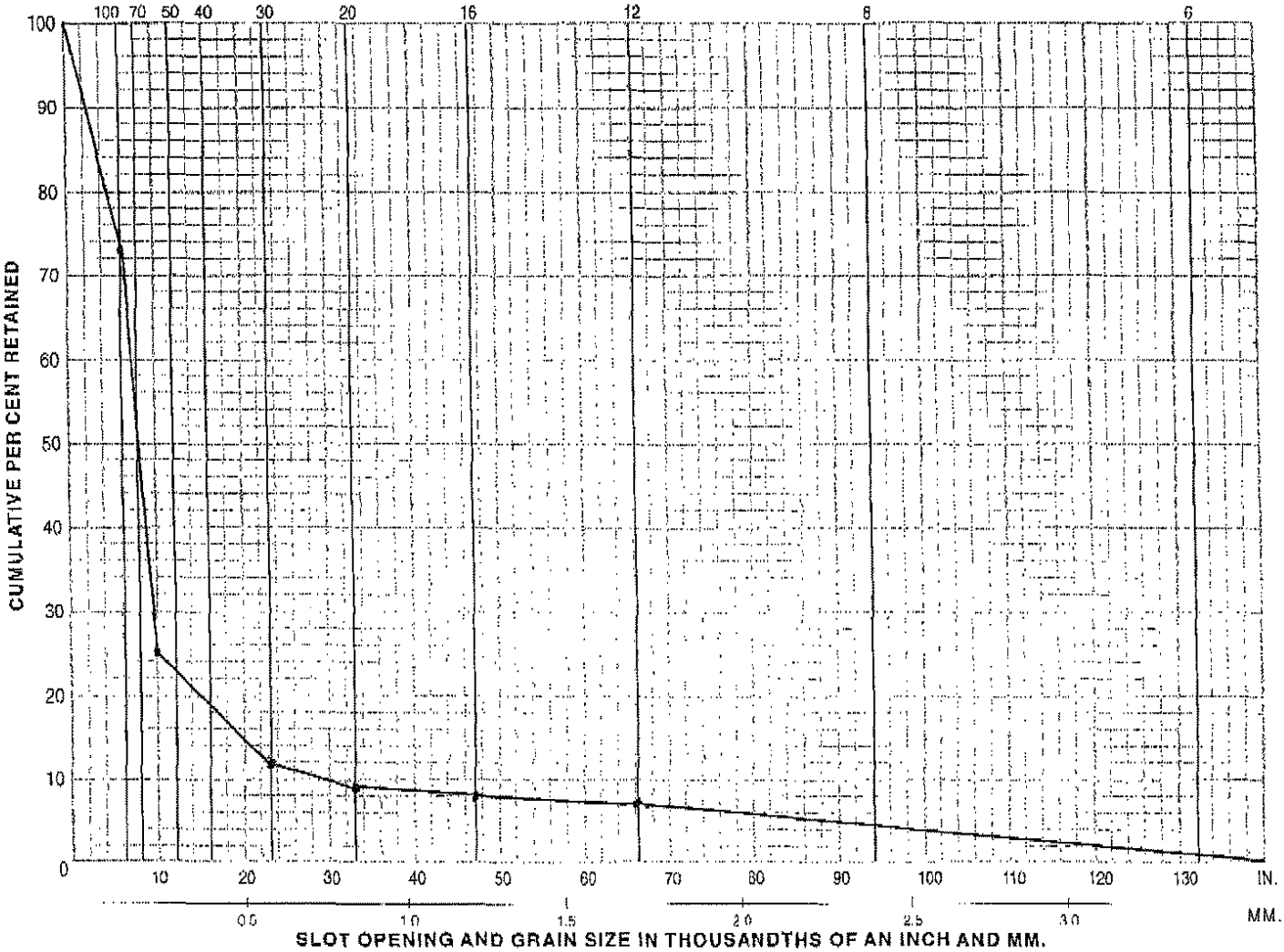
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer Bill Lesh Phone

Remarks 180-185 40' SWL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~5~~	~~.132~~	~~3.36~~			
~~8~~	~~.094~~	~~2.38~~			
12	.066	1.68	38	38	07
16	.047	1.19	06	44	08
20	.033	0.84	6	50	09
30	.023	0.60	14	64	12
~~40~~	~~.016~~	~~0.42~~			
~~50~~ 60	.012	0.30	66	130	25
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	243	373	73
DUST			133	506	100

Comments Brn - very fine silty sand w- some cement & chunks

SCREEN RECOMMENDATIONS: DIAM.

SLOT	SETTING	LENGTH

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St. Paul, MN 55164

SAND ANALYSIS

BY: Tony Traut

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Fish Hatchery Date 7-11-05

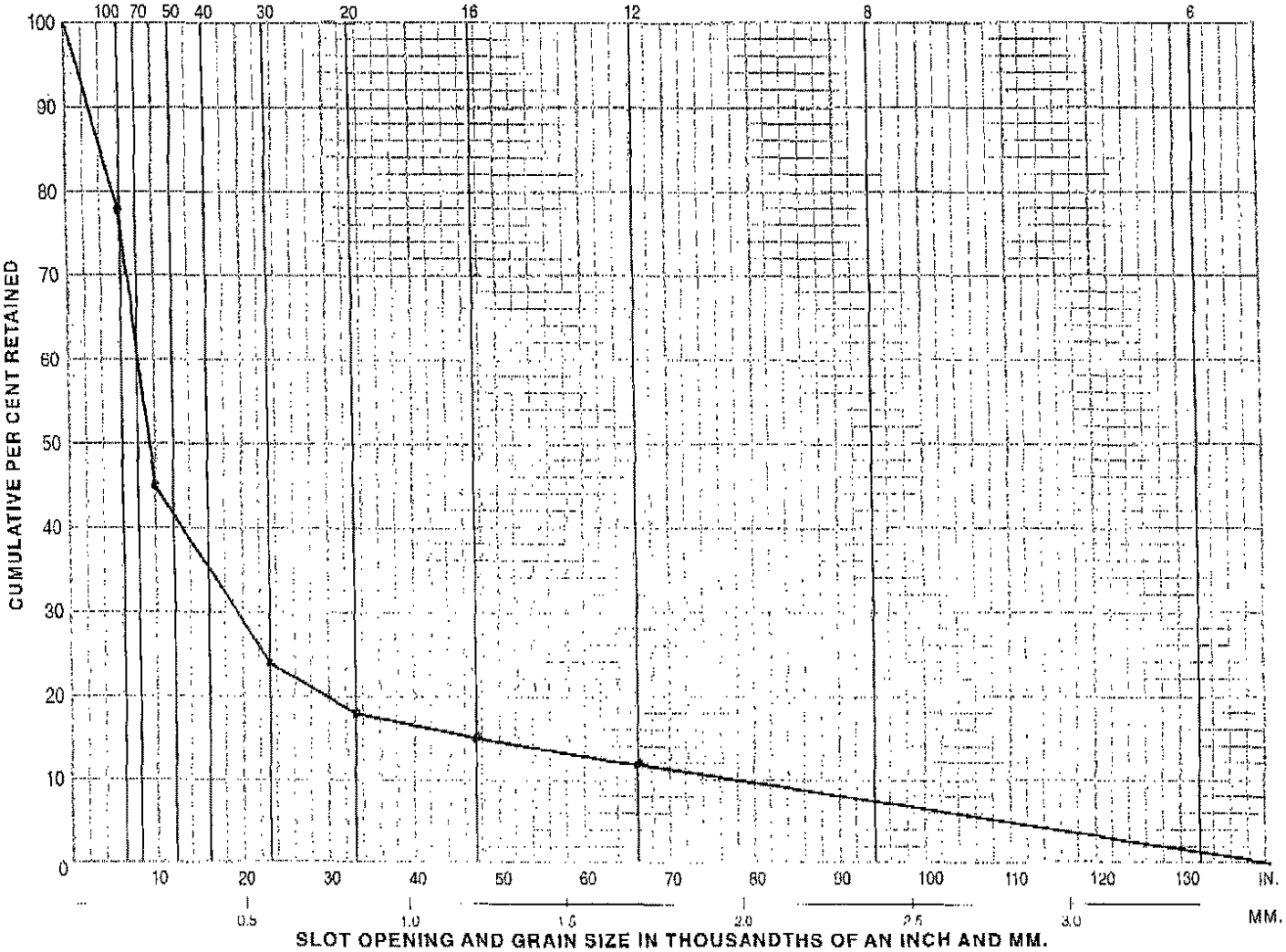
City Wild Rose WI State Zip

Driller Tony Traut Phone

Engineer Bob Welsh Phone

Remarks 185-195 40' SWL

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING IN.	SLOT OPENING MM.	SAMPLE DEPTHS		
~~4~~	~~.132~~	~~3.35~~			
~~5~~	~~.094~~	~~2.38~~			
12	.066	1.68	38	38	12
16	.047	1.19	08	46	15
20	.033	0.84	16	56	18
30	.023	0.60	17	73	24
~~40~~	~~.016~~	~~0.42~~			
~~50~~ 60	.012	0.30	65	138	45
~~70~~	~~.008~~	~~0.21~~			
100	.006	0.15	98	236	78
Dust			65	301	100

Comments Brn Fine SILTY Sand w- Rocks Light Cementing w- clay Layers

SCREEN RECOMMENDATIONS: DIAM.

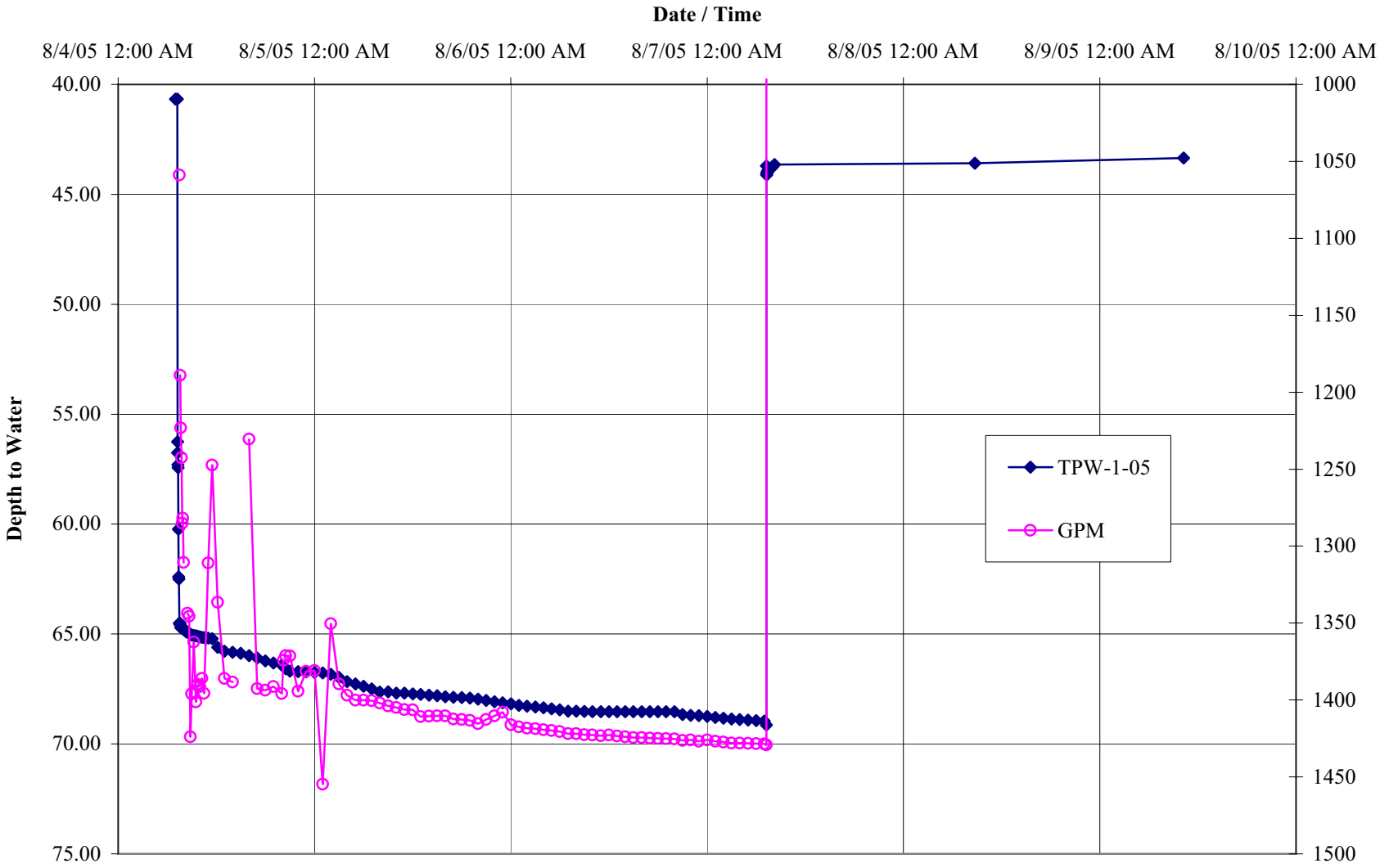
SLOT	SETTING	LENGTH

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL

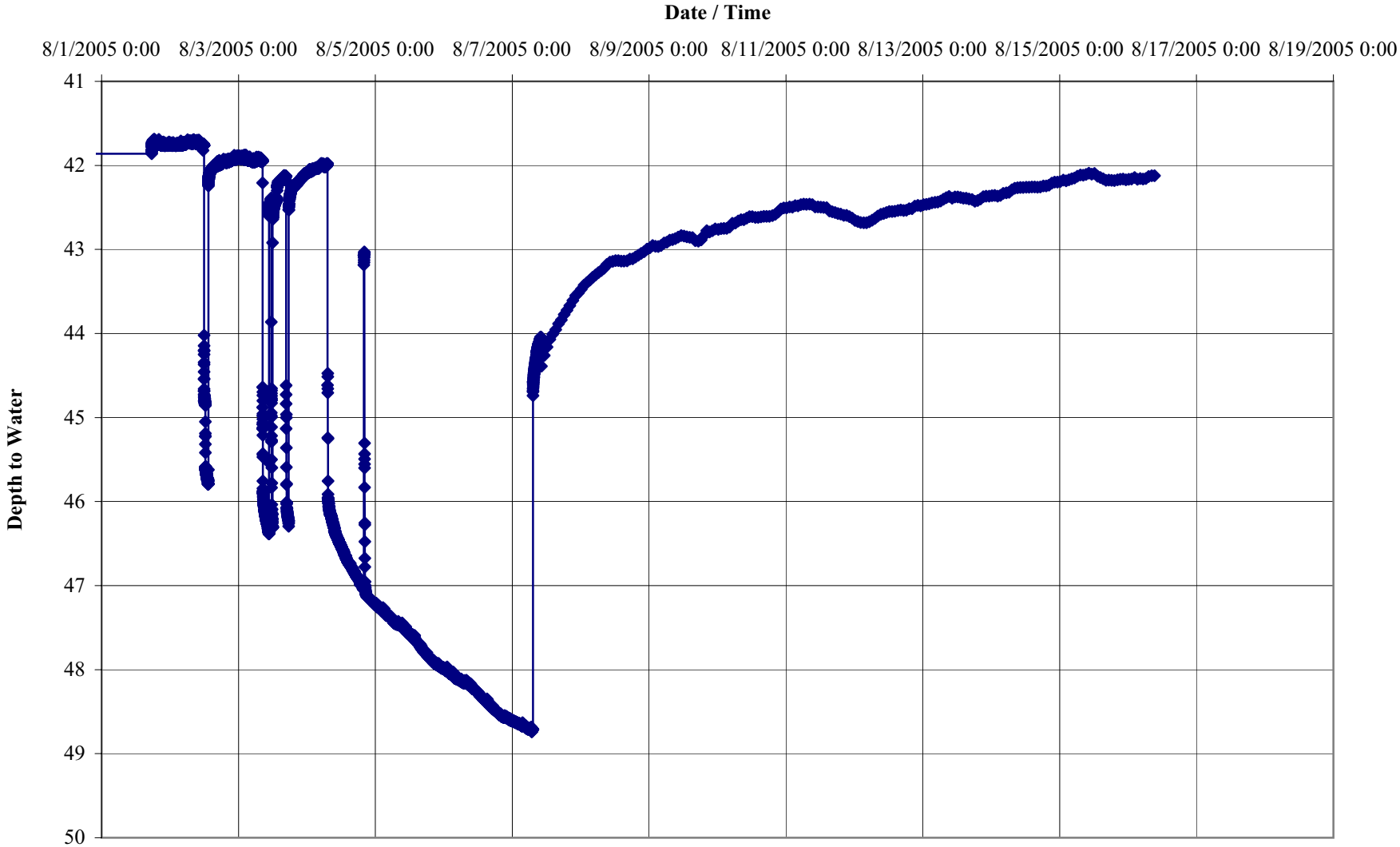
F 45 117-97

Appendix E

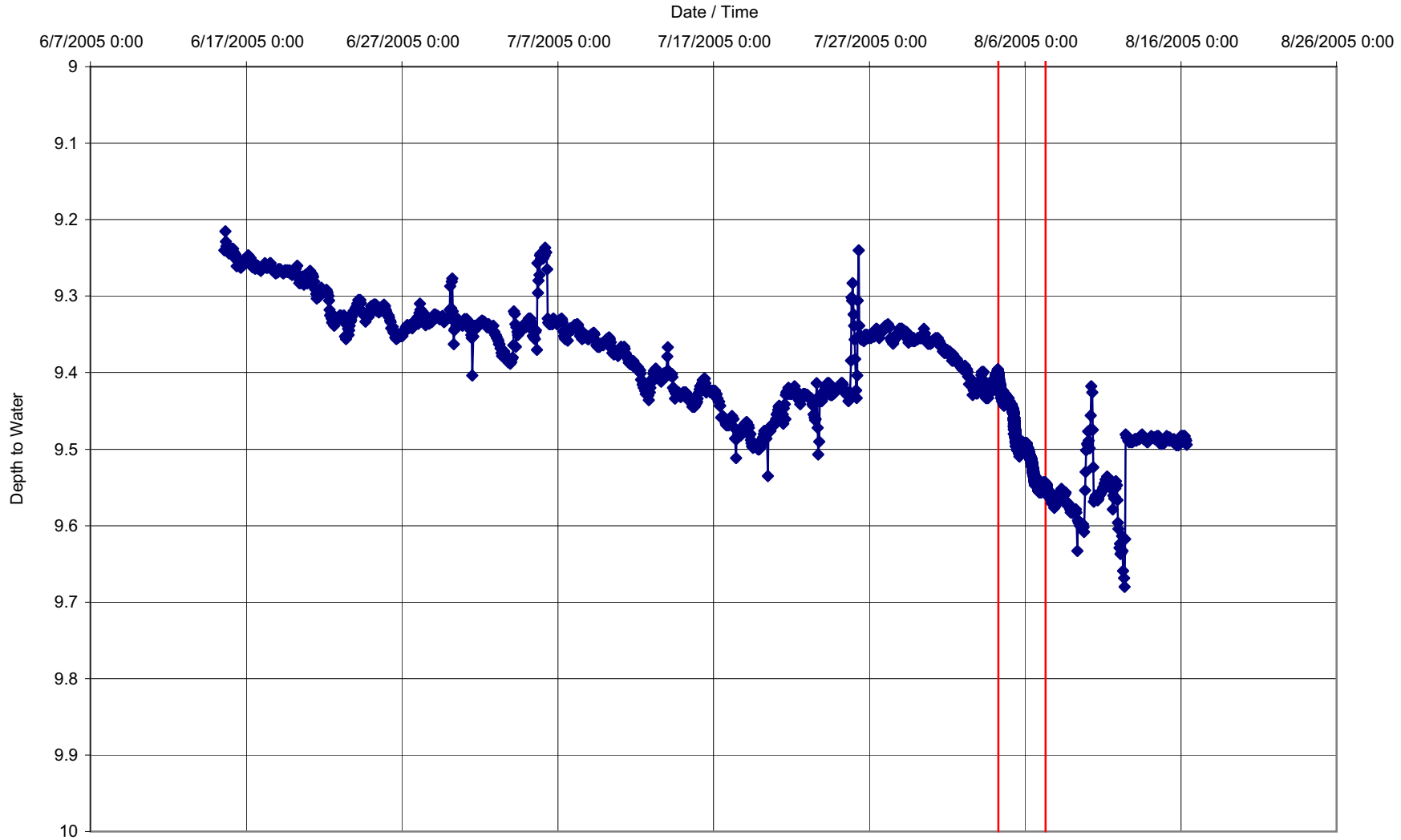
Wild Rose TPW-1-05 Arithmetic Chart



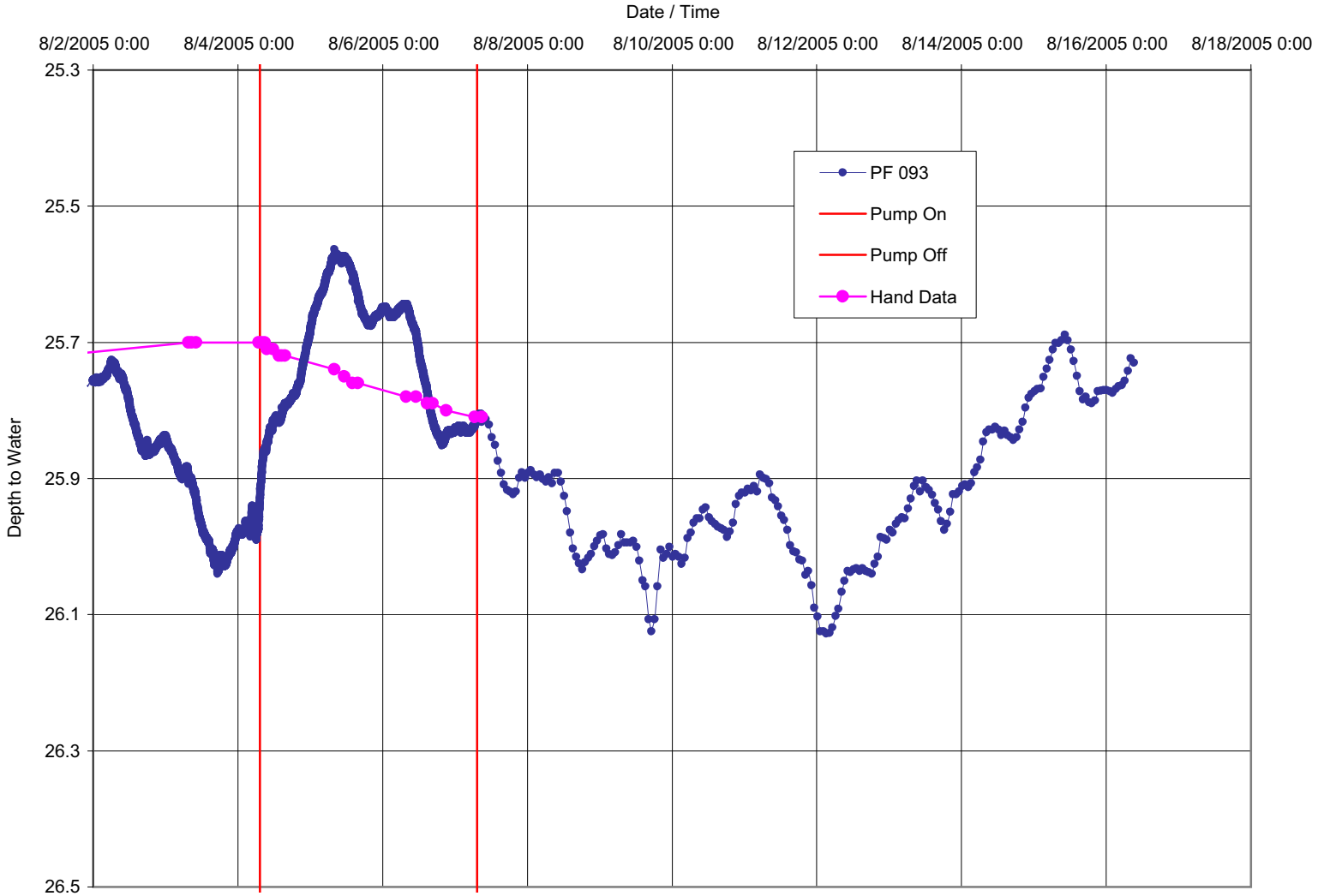
Wild Rose PF 091 Arthimetic Chart



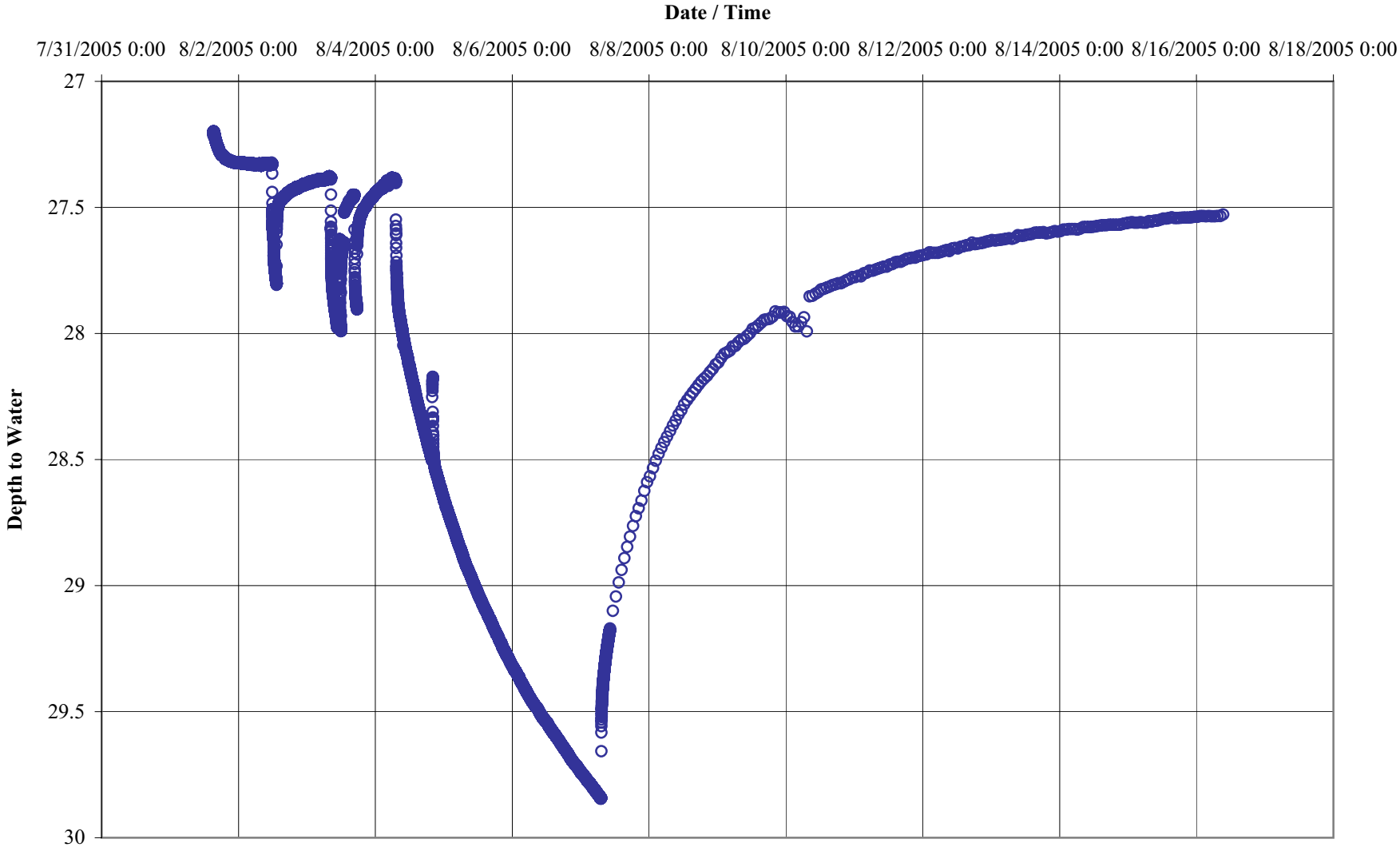
Arithmetic Chart of PF 092



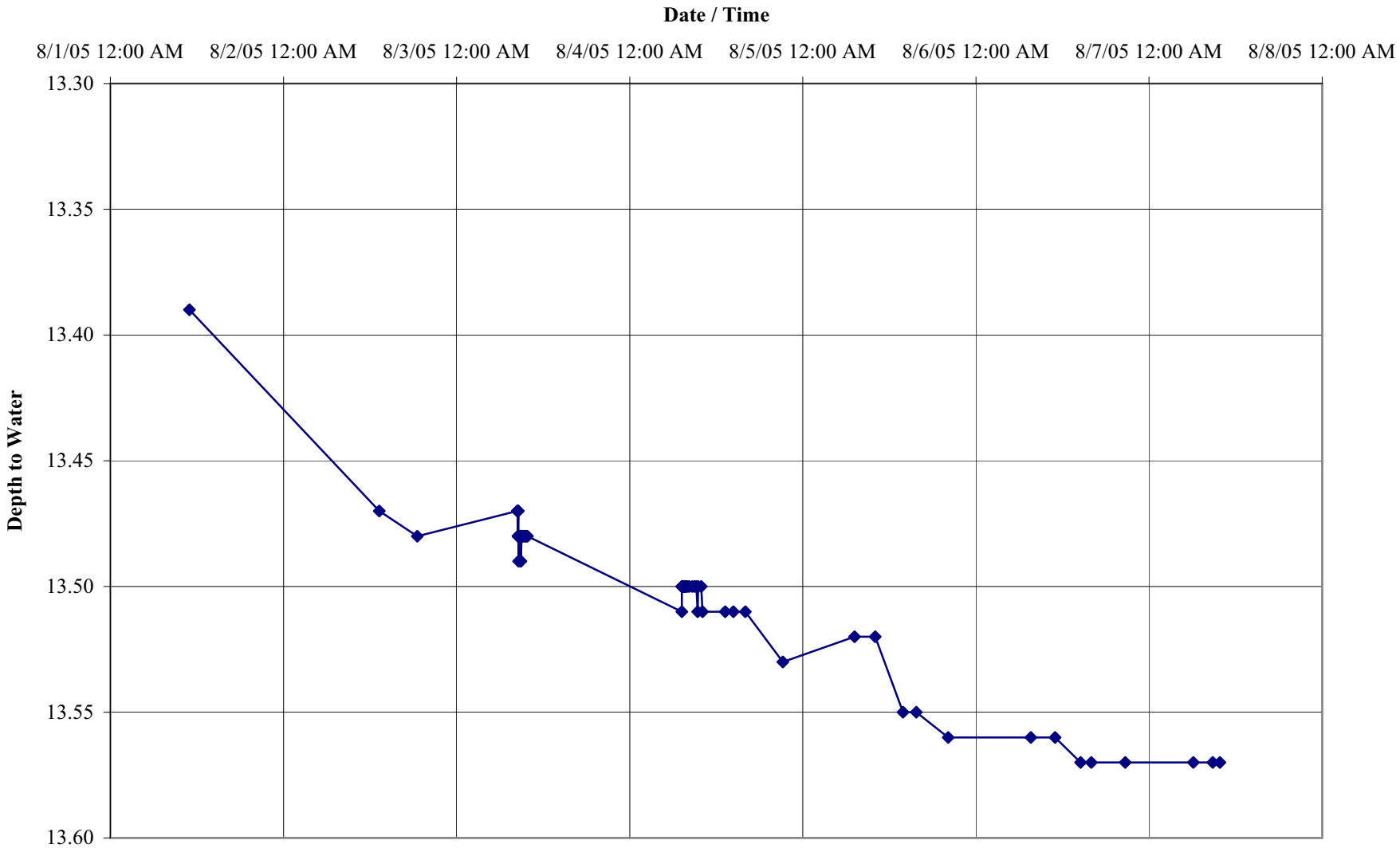
Arithmetic Chart of PF 093



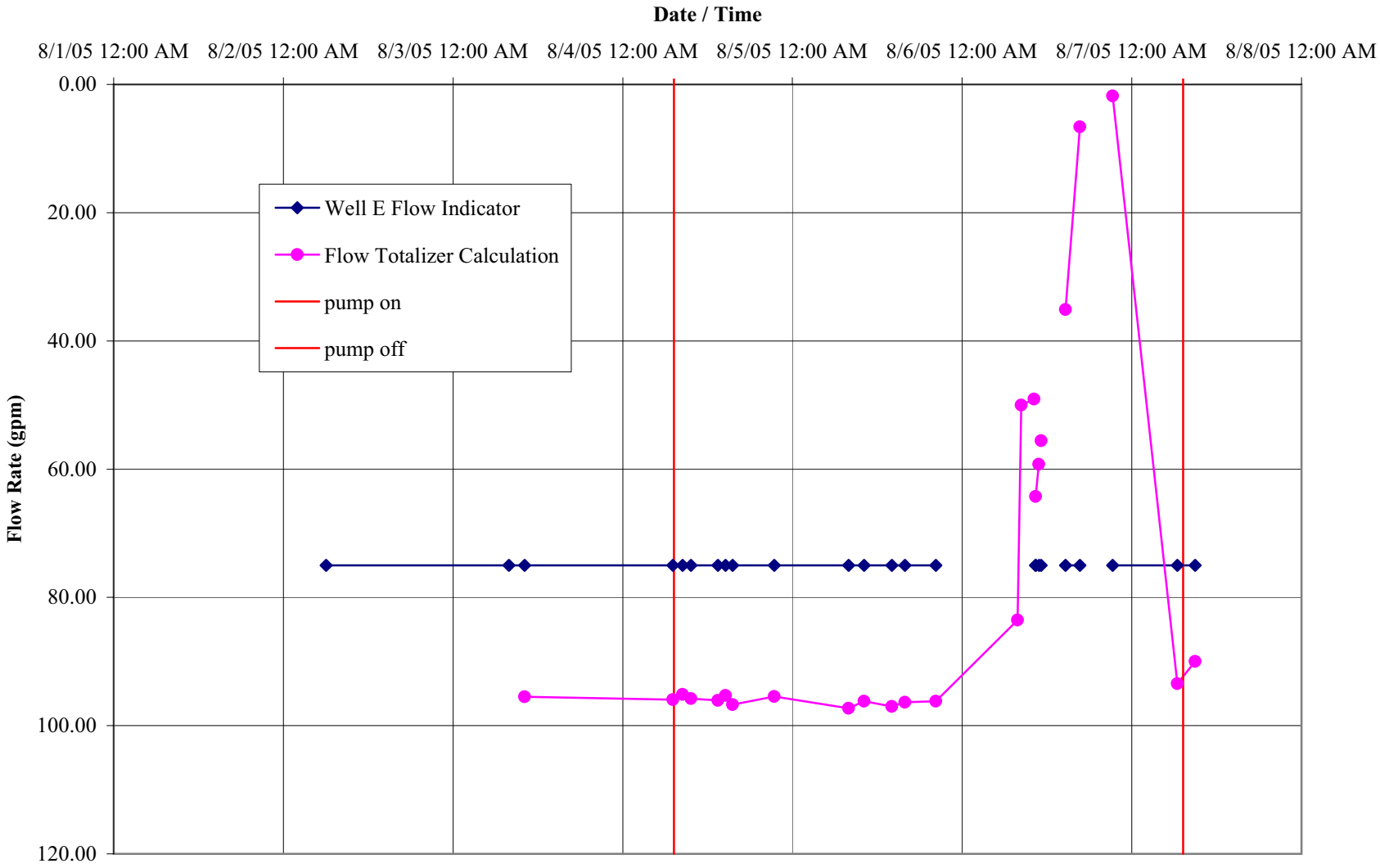
Wild Rose PF 094 Arithmetic Water Level Chart



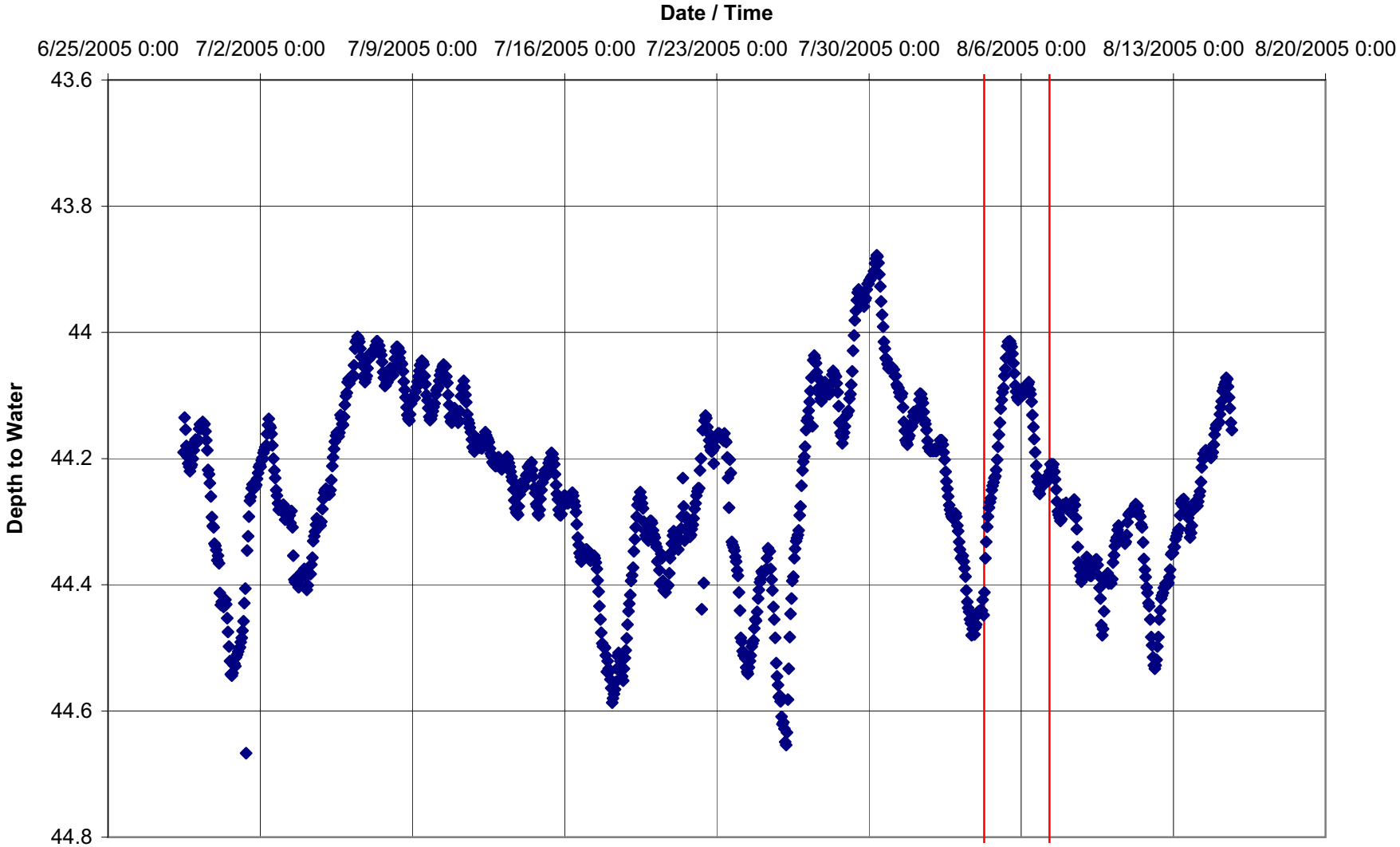
WI DNR Habitat Management Well Arithmetic Chart

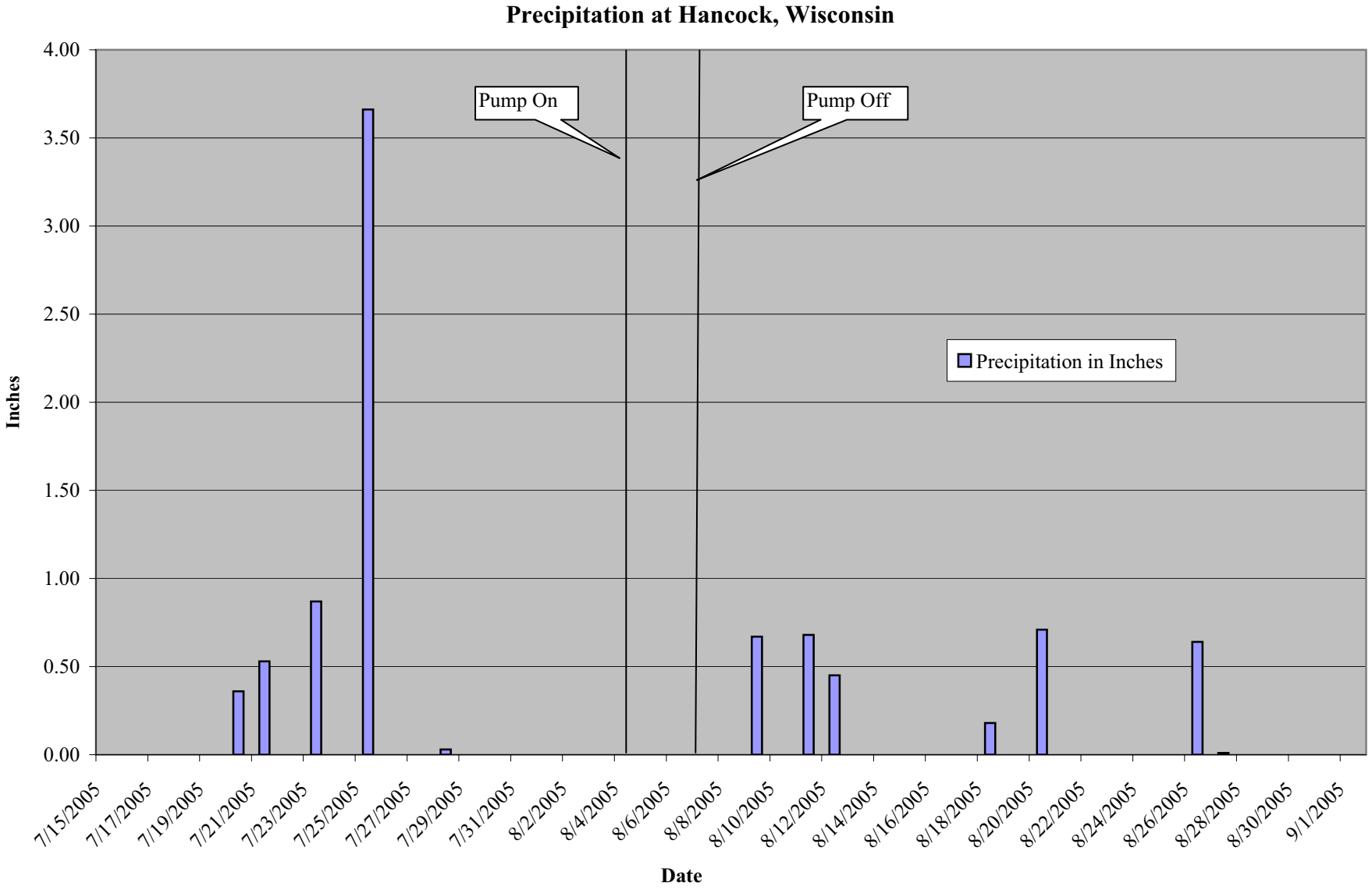


Wild Rose Well E (666) Flow Meter

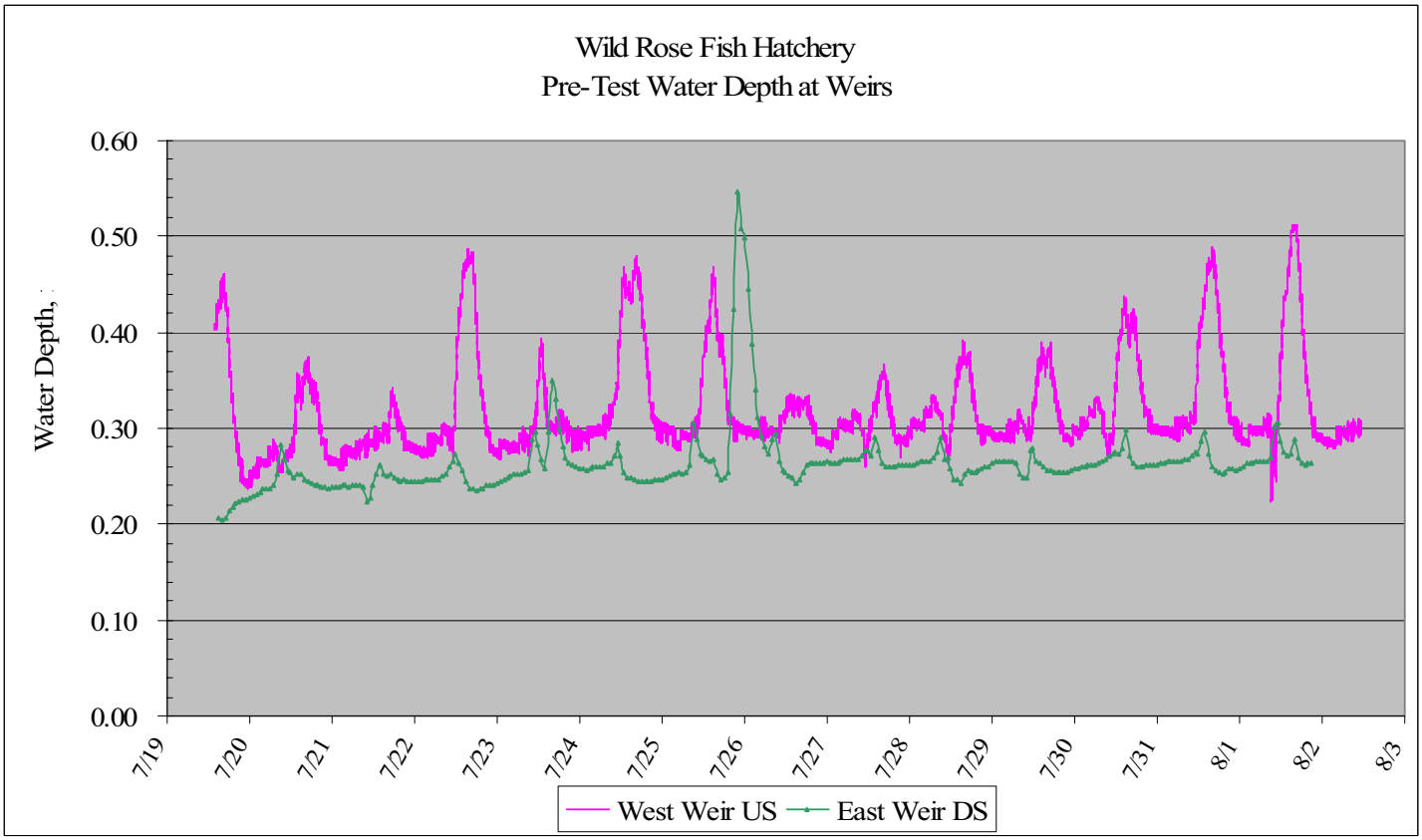


CI 653 City of Red Rose WWTP




Precipitation at Hancock, Wisconsin
Pump On
Pump Off
Precipitation in Inches
Inches
Date
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
7/15/2005
7/17/2005
7/19/2005
7/21/2005
7/23/2005
7/25/2005
7/27/2005
7/29/2005
7/31/2005
8/2/2005
8/4/2005
8/6/2005
8/8/2005
8/10/2005
8/12/2005
8/14/2005
8/16/2005
8/18/2005
8/20/2005
8/22/2005
8/24/2005
8/26/2005
8/28/2005
8/30/2005
9/1/2005

Appendix F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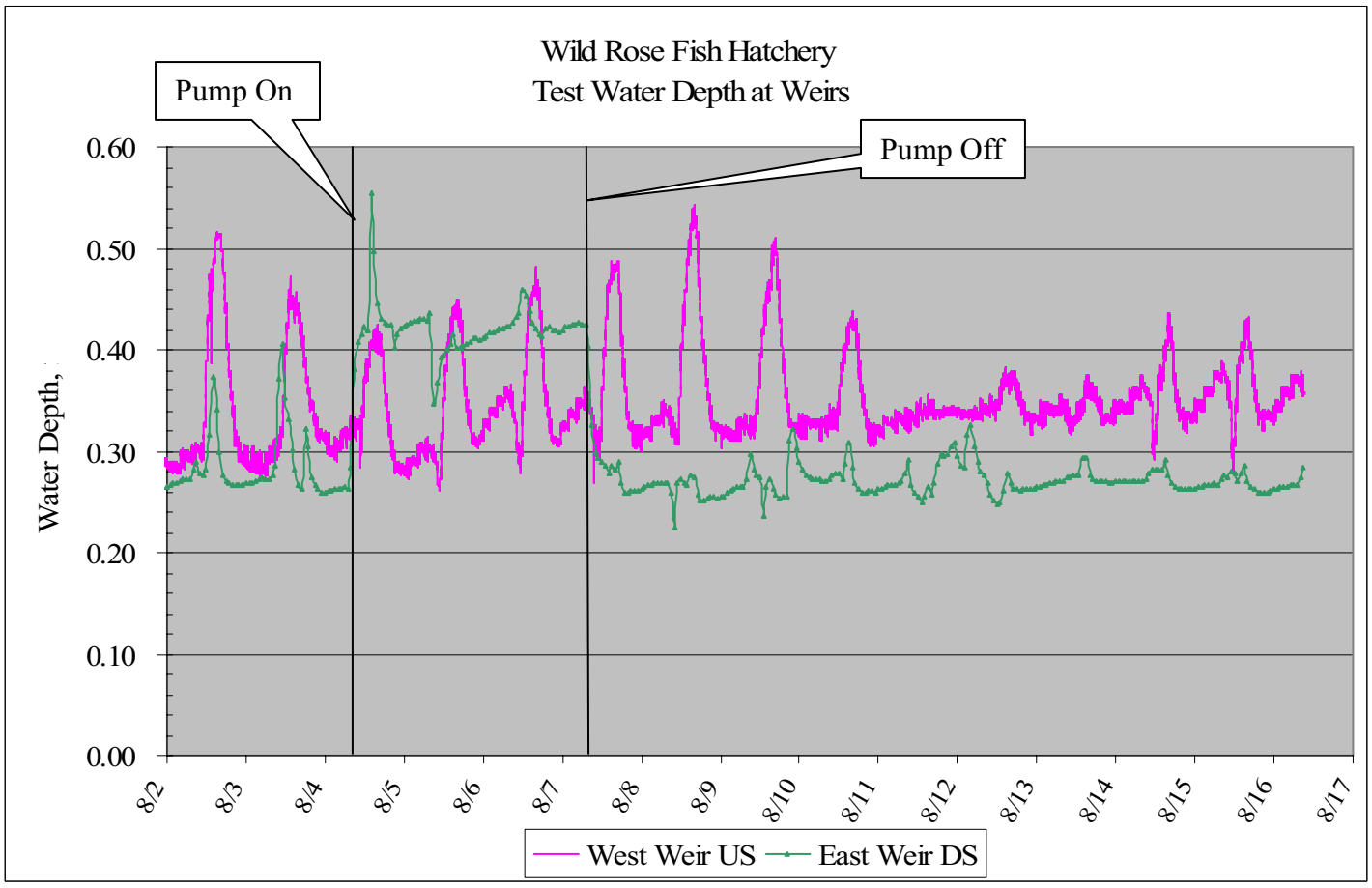
0.10
0.00
7/19
7/20
7/21
7/22
7/23
7/24
7/25
7/26
7/27
7/28
7/29
7/30
7/31
8/1
8/2
8/3
West Weir US
East Weir DS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Test Water Depth at Weirs
Pump On
Pump Off
Water Depth, .
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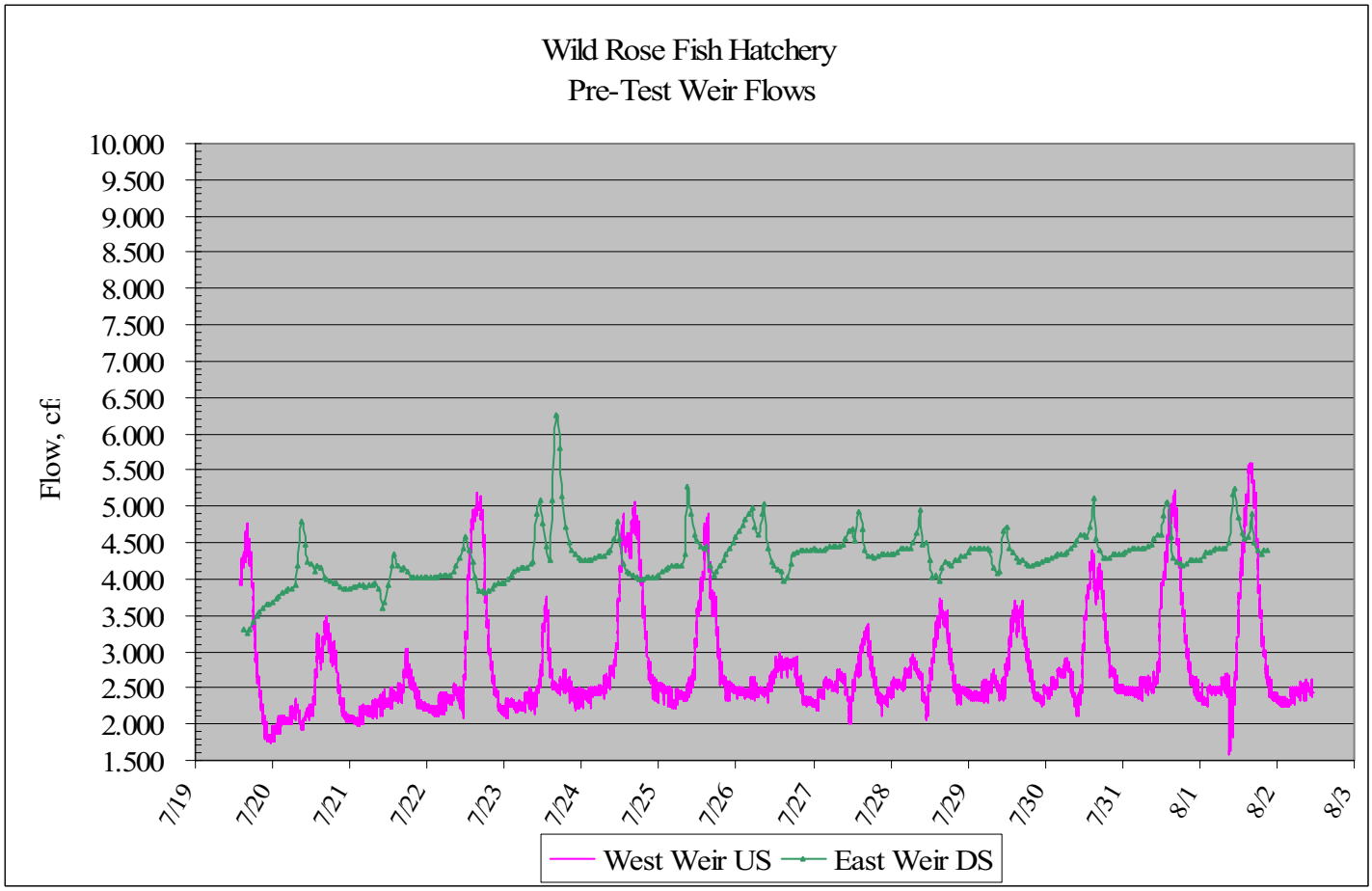
0.10
0.00
8/2
8/3
8/4
8/5
8/6
8/7
8/8
8/9
8/10
8/11
8/12
8/13
8/14
8/15
8/16
8/17
West Weir US
East Weir DS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Pre-Test Weir Flows
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8.000
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7.000
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6.000
5.500
5.000
4.500
4.000
3.500
3.000
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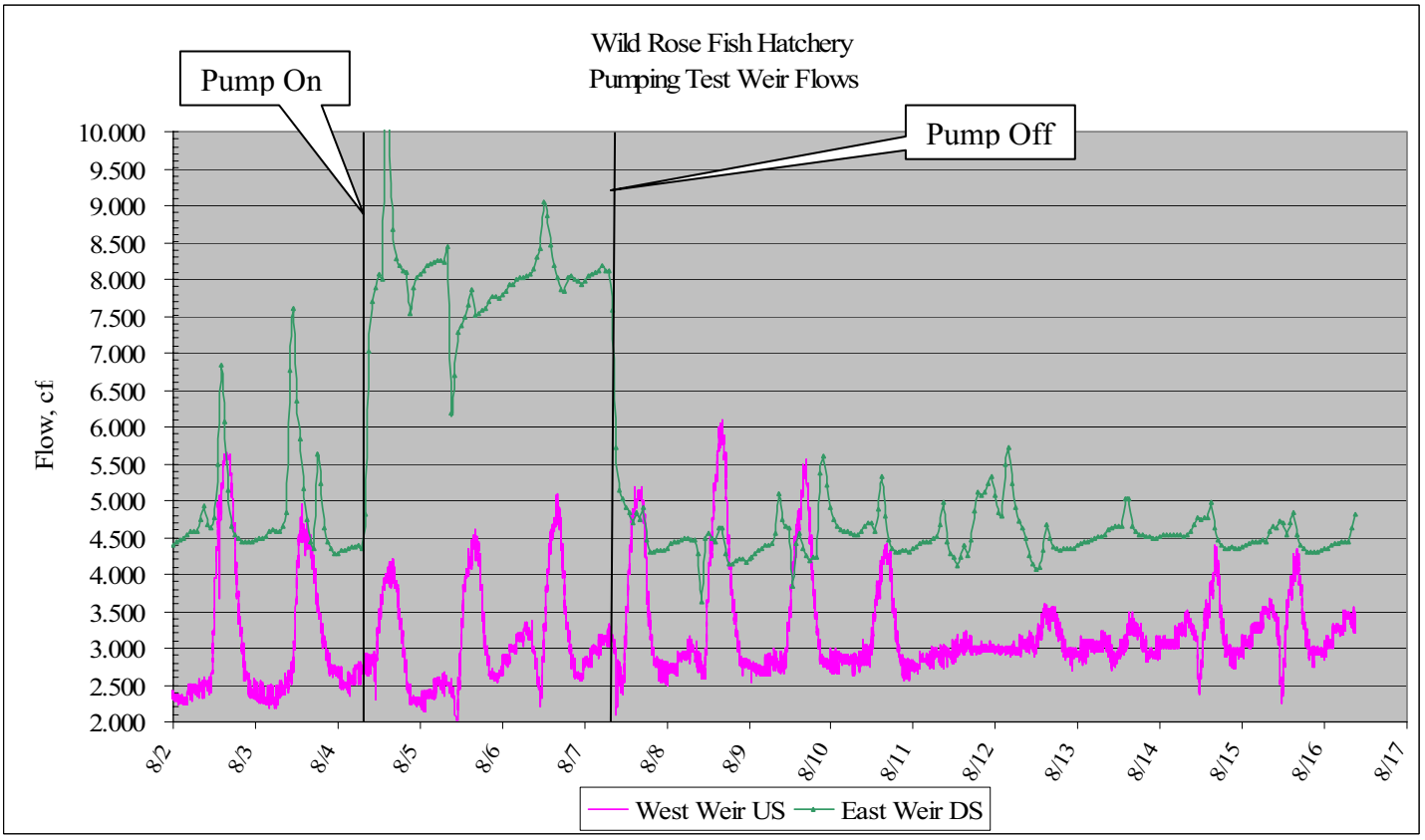
1.500
7/19
7/20
7/21
7/22
7/23
7/24
7/25
7/26
7/27
7/28
7/29
7/30
7/31
8/1
8/2
8/3
West Weir US
East Weir DS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Pumping Test Weir Flows
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Pump Off
Flow, cf
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8/7
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8/11
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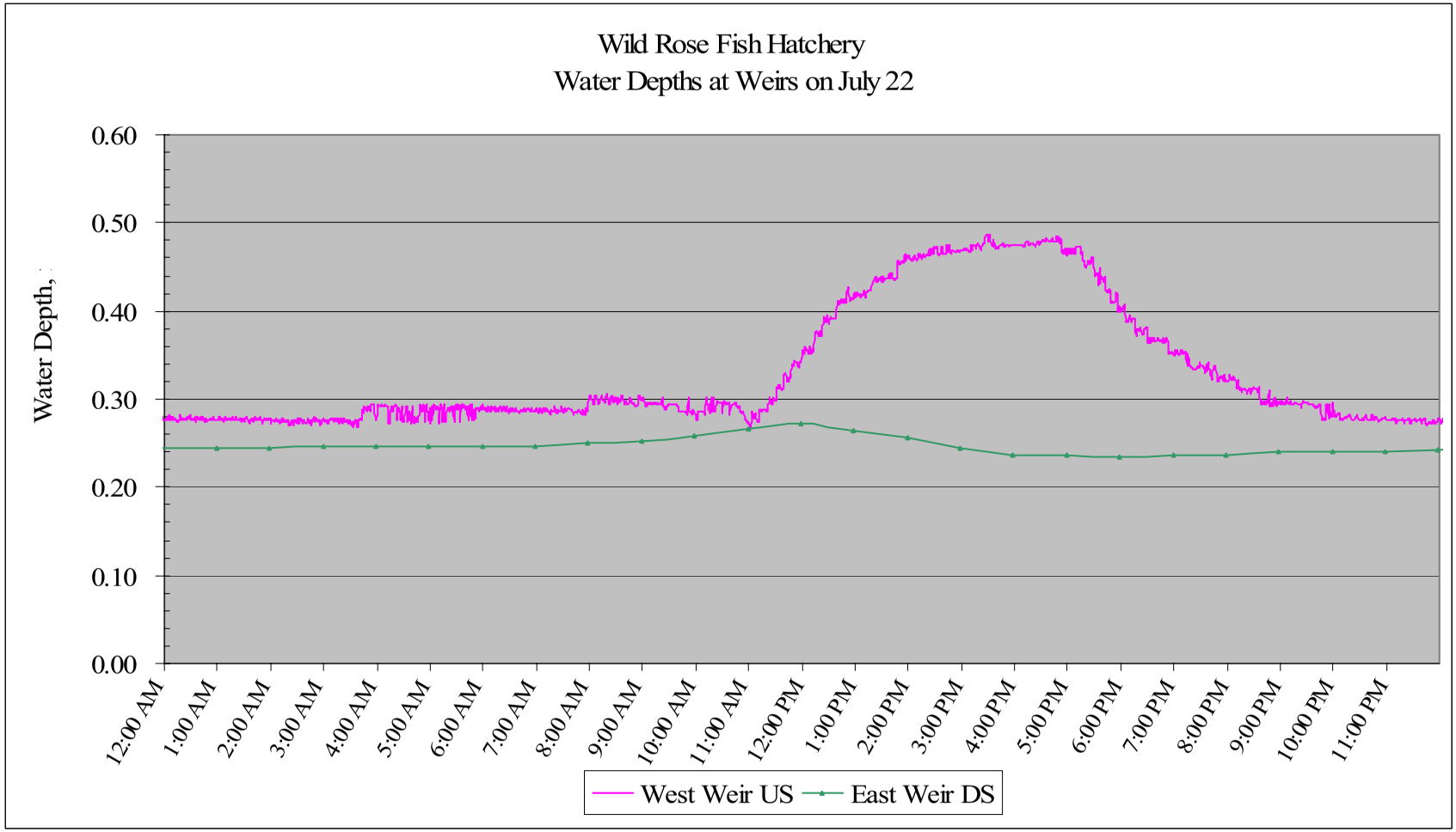
8/13
8/14
8/15
8/16
8/17
West Weir US
East Weir DS


Wild Rose Fish Hatchery
Water Depths at Weirs on July 22
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0.00
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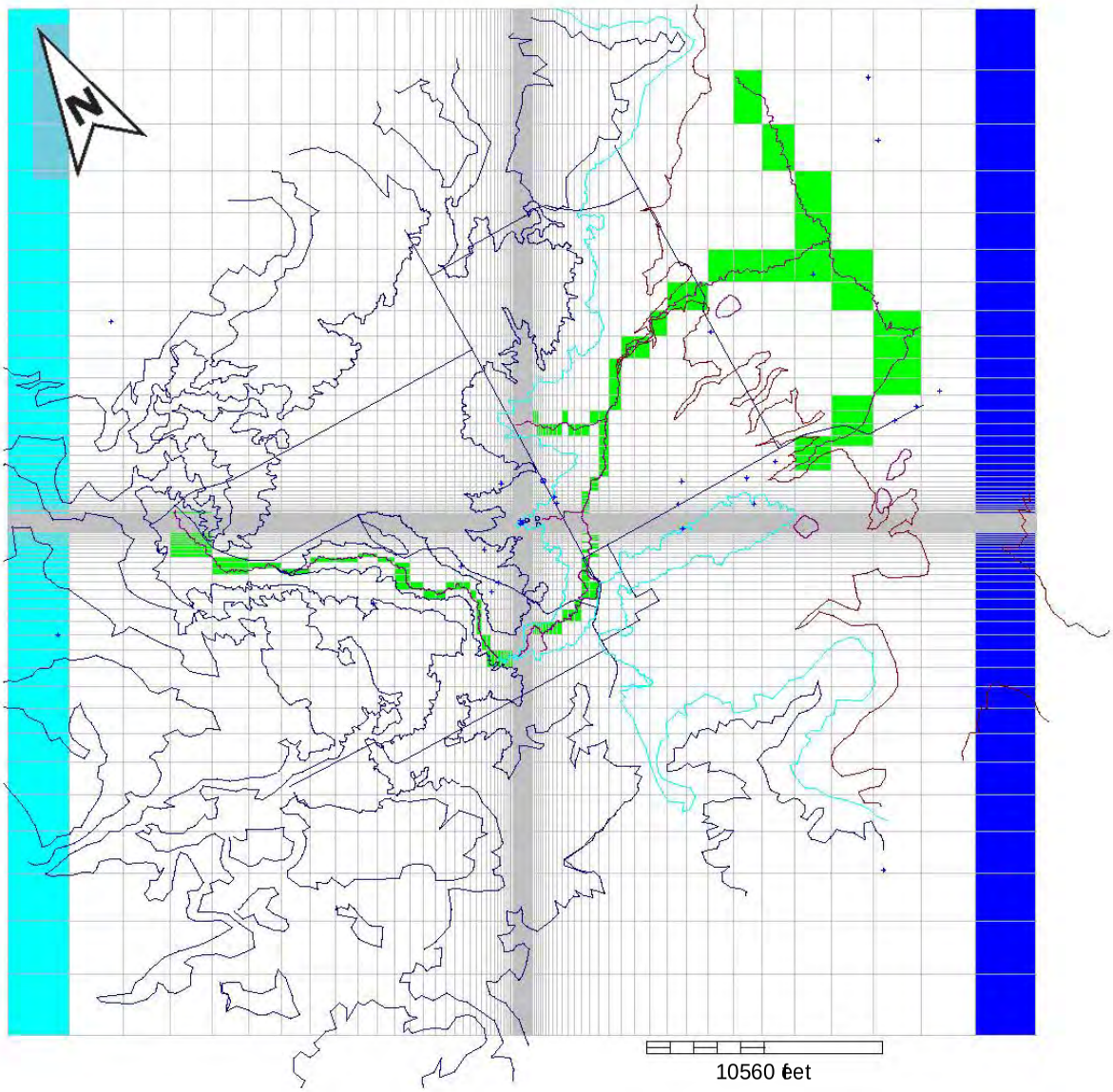
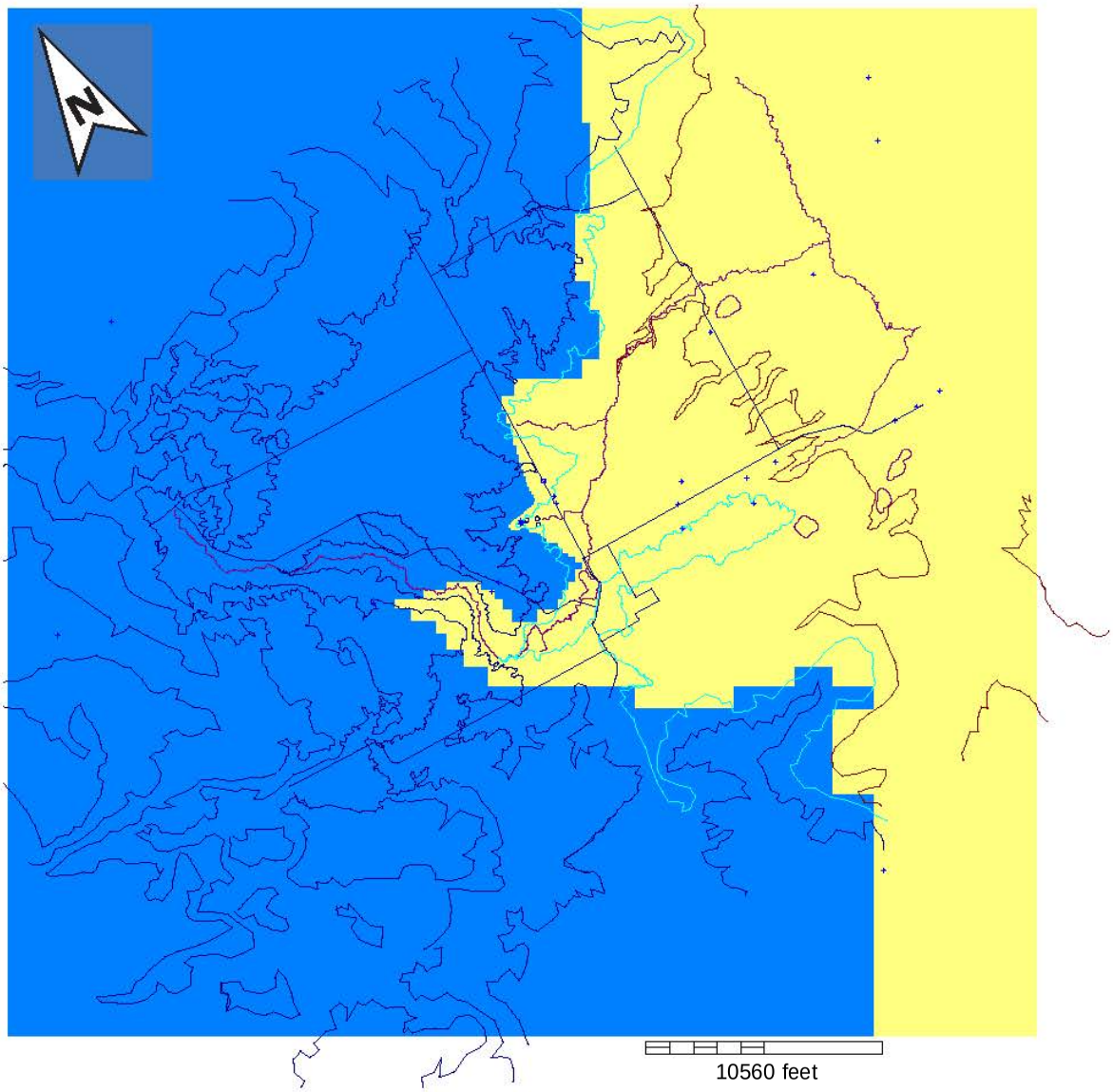
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
West Weir US
East Weir DS

Appendix G

Wild Rose Fish Hatchery
Groundwater Flow Model
Modeling Domain



Wild Rose Fish Hatchery
Groundwater Flow Model
Hydraulic Conductivity Zones



Wild Rose Fish Hatchery
Groundwater Flow Model
Steady-State -- No Pumping

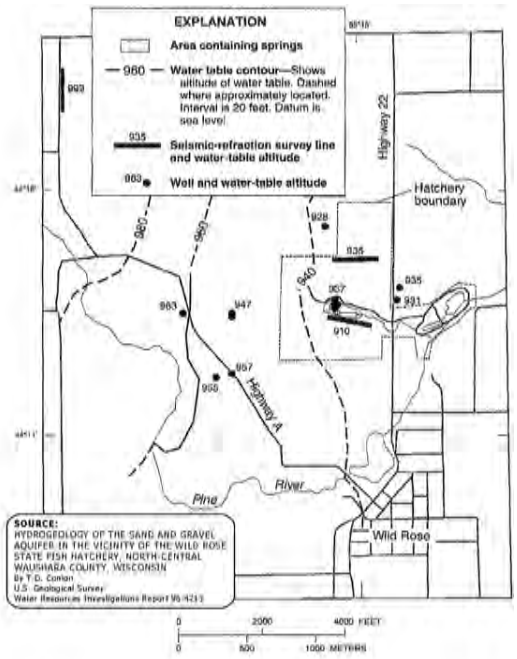
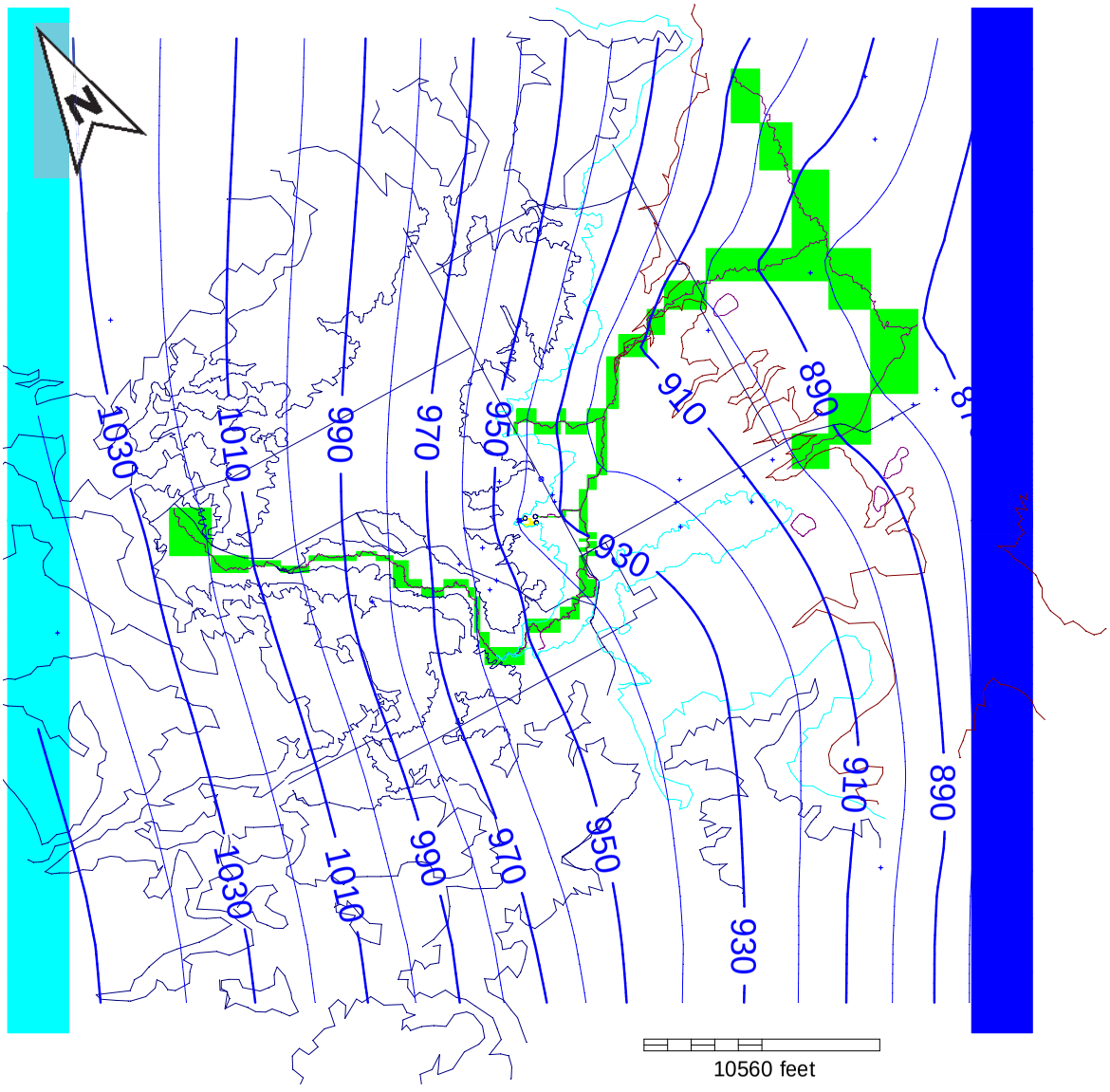


Figure 4. Altitude of water table, north-central Waushara County, Wisconsin.



Wild Rose Fish Hatchery

Groundwater Flow Model

Model drawdown after 72 hours

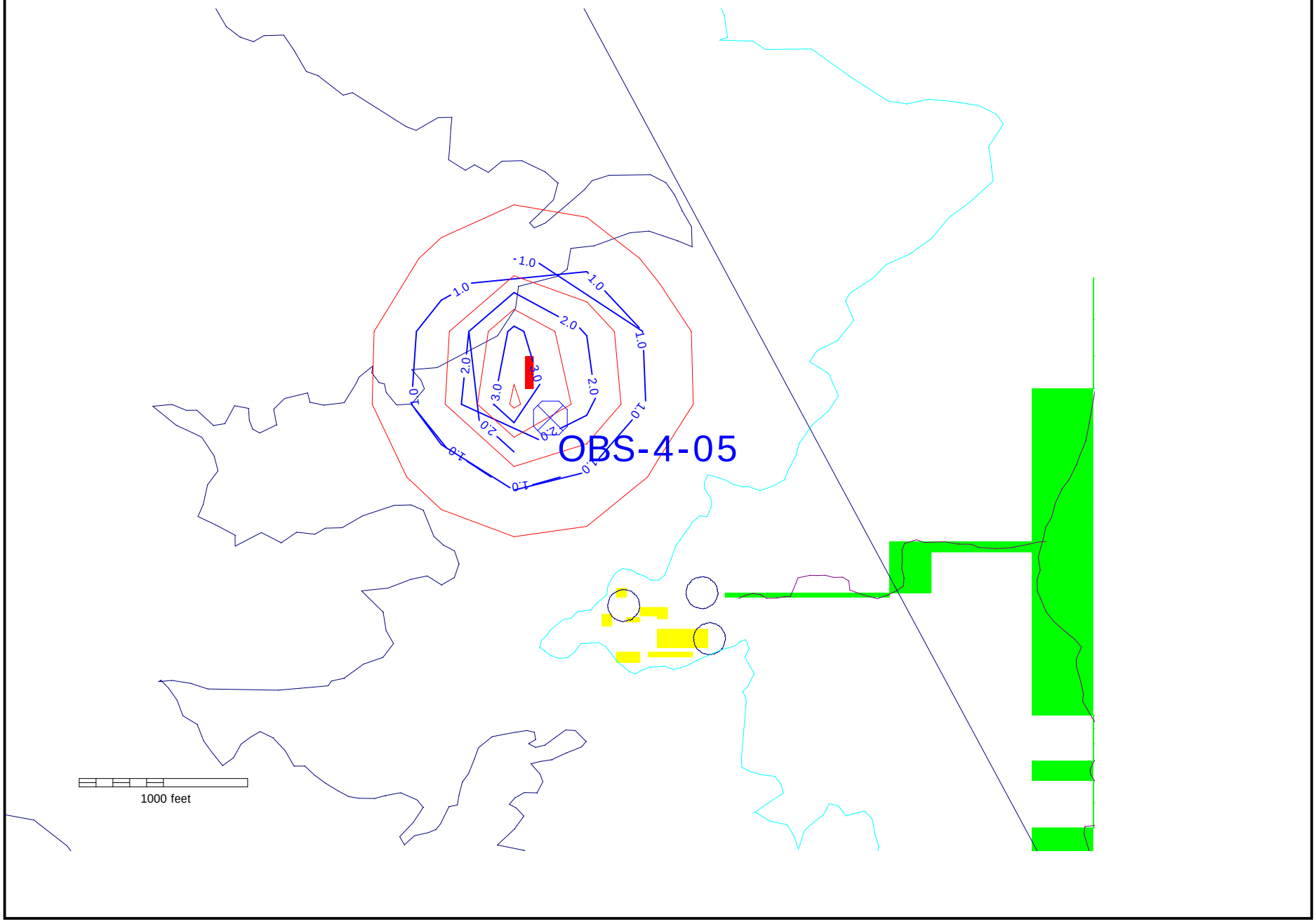
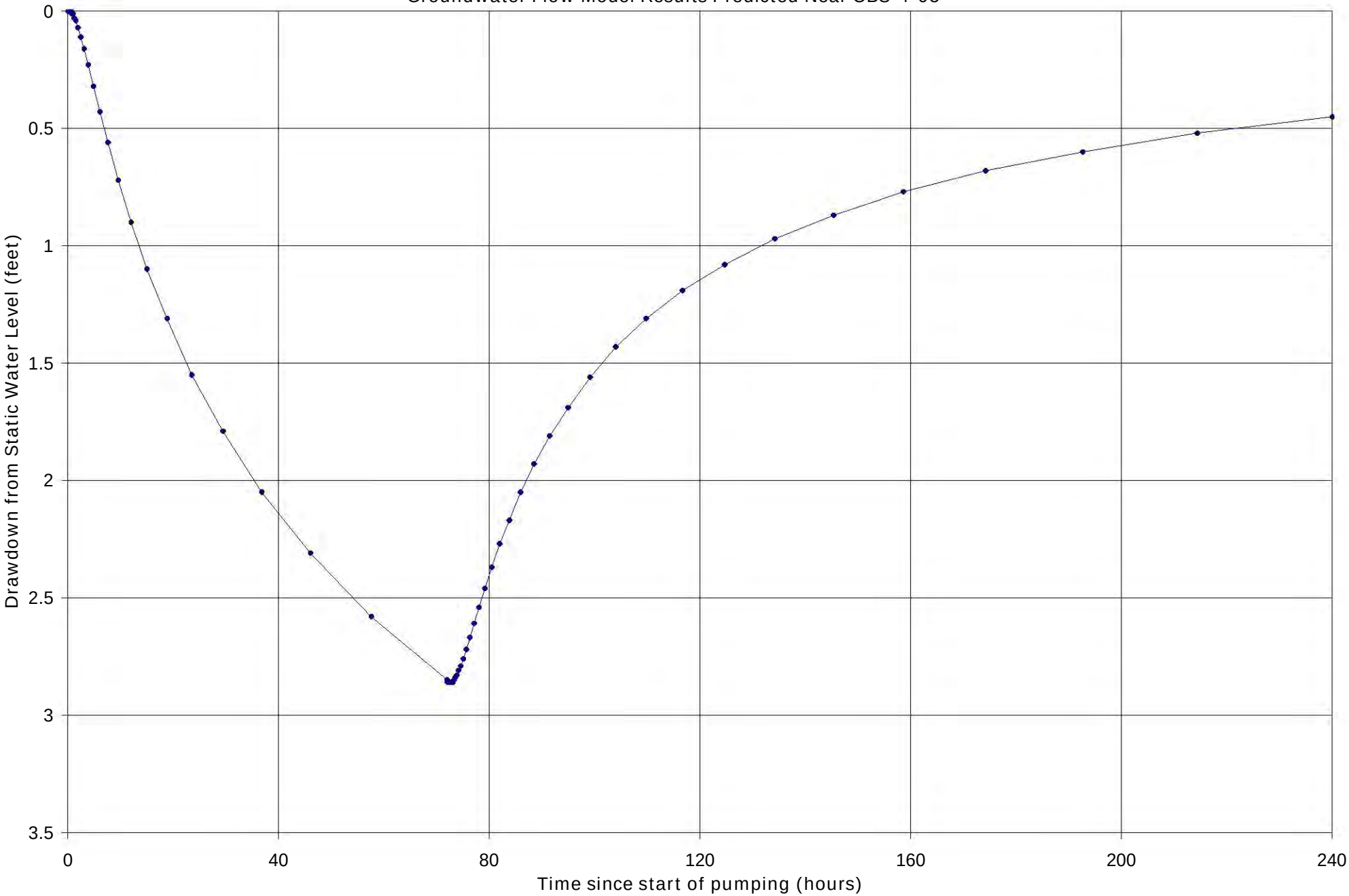


Figure G-5

Groundwater Flow Model Results Predicted Near OBS-4-05



W:\ws\13071\model\Results.xls Liesch Associates, Inc. 09/27/2005

Figure G-6

Groundwater Flow Model Results Predicted Near OBS-4-05

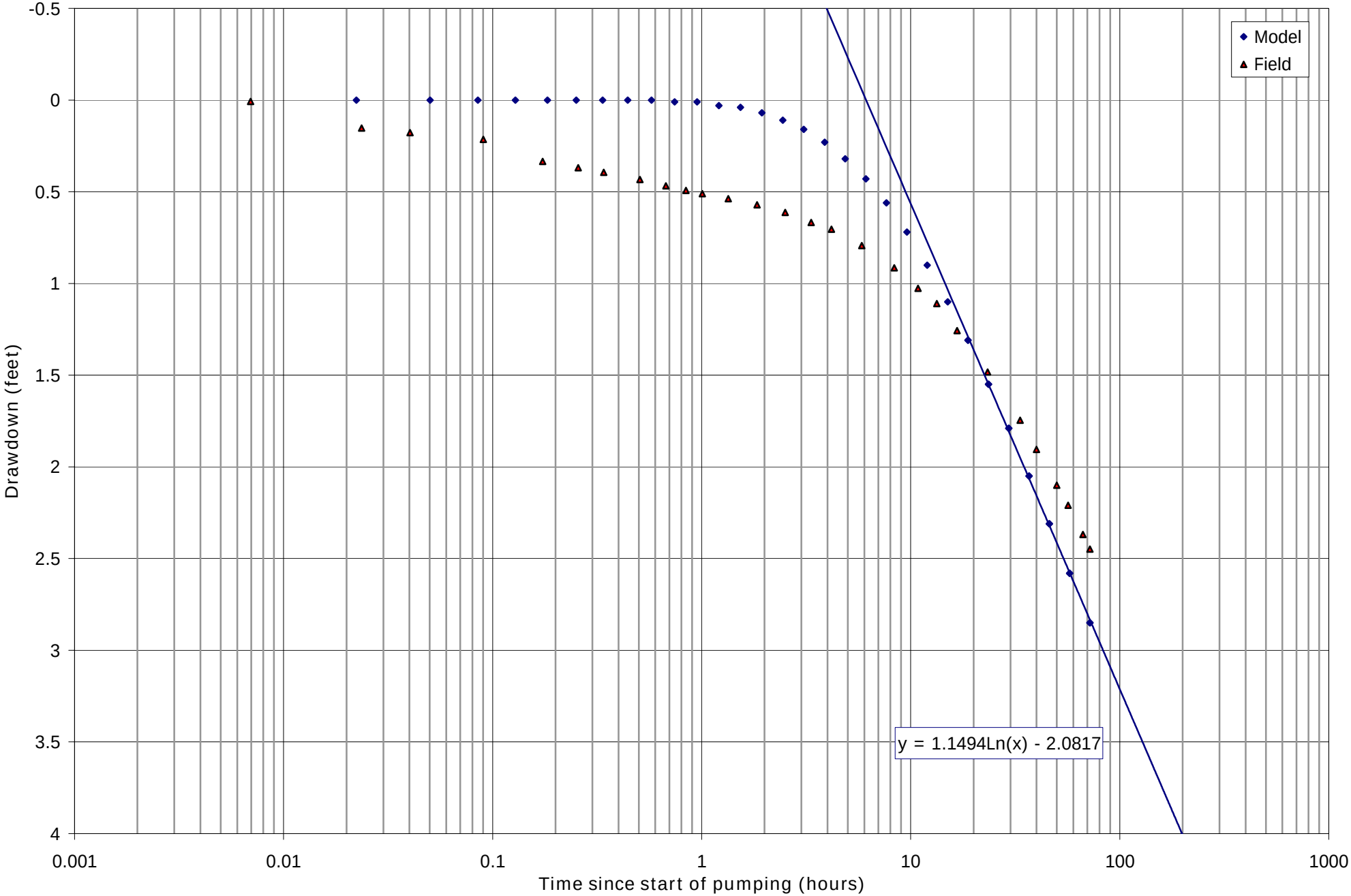


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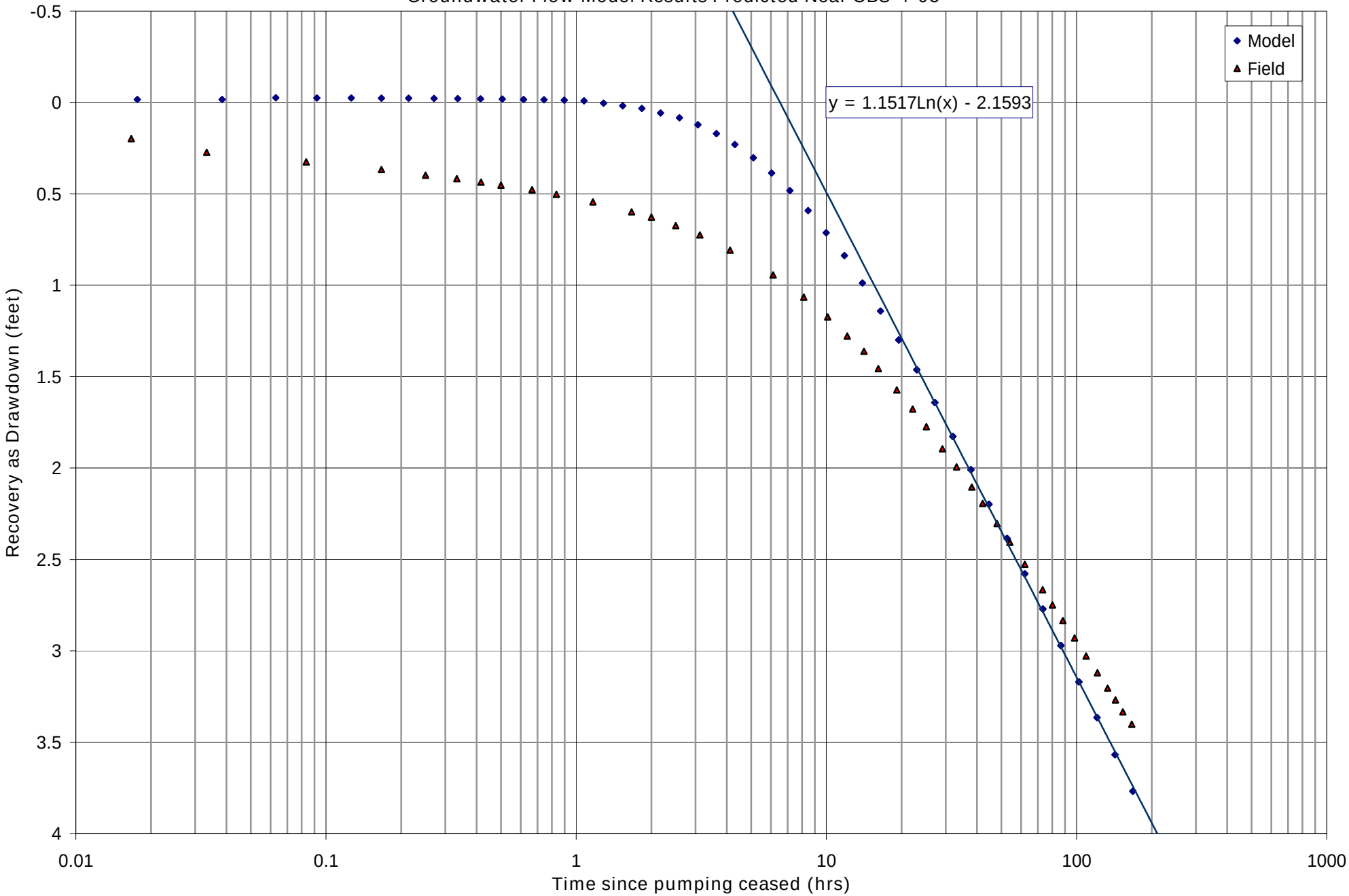
Figure G-7

Groundwater Flow Model Results Predicted Near OBS-4-05



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Wild Rose Fish Hatchery
Groundwater Flow Model
Steady-state contour map (4,200 gpm)

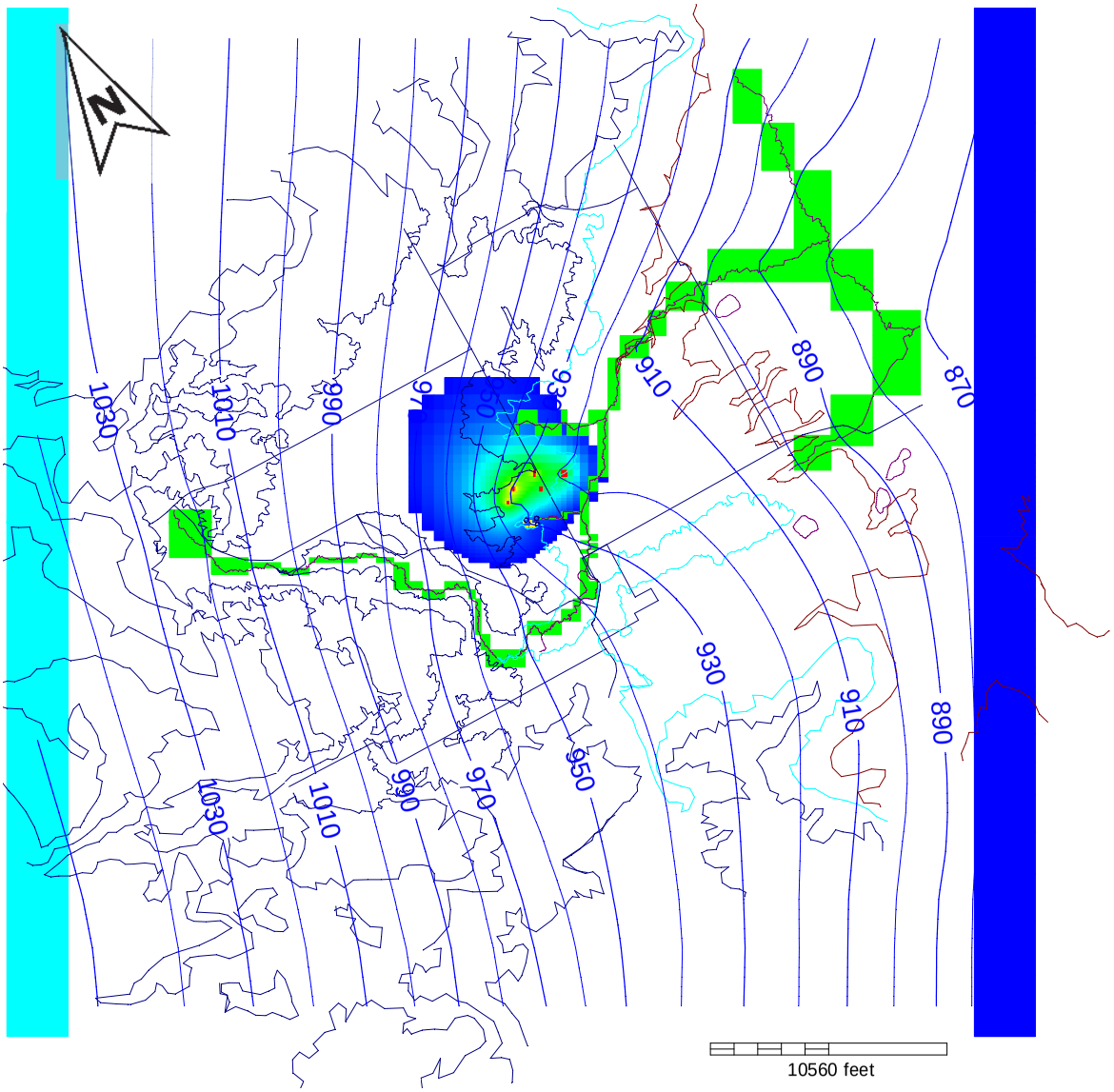
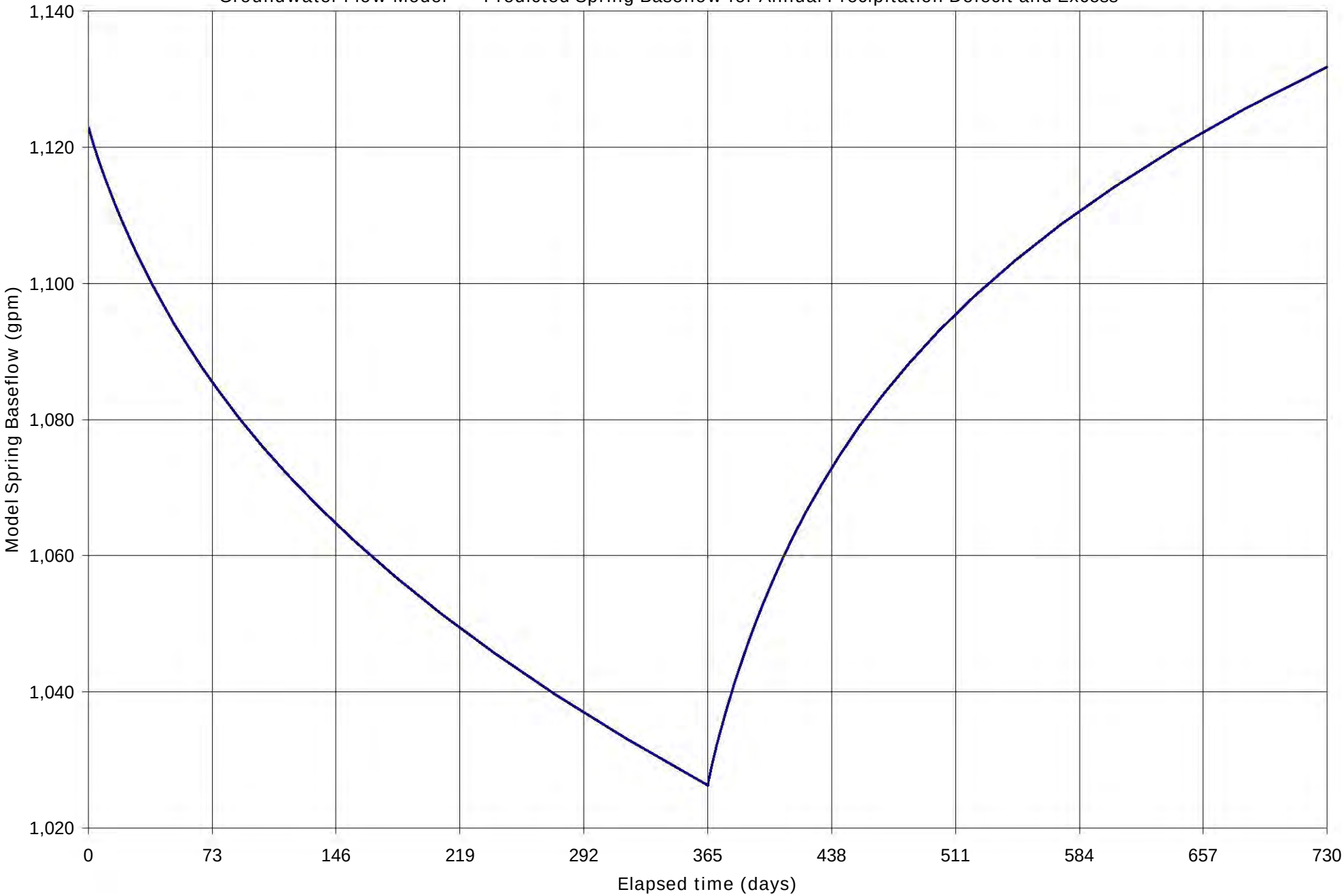


Figure G-9

Groundwater Flow Model -- Predicted Spring Baseflow for Annual Precipitation Defecit and Excess



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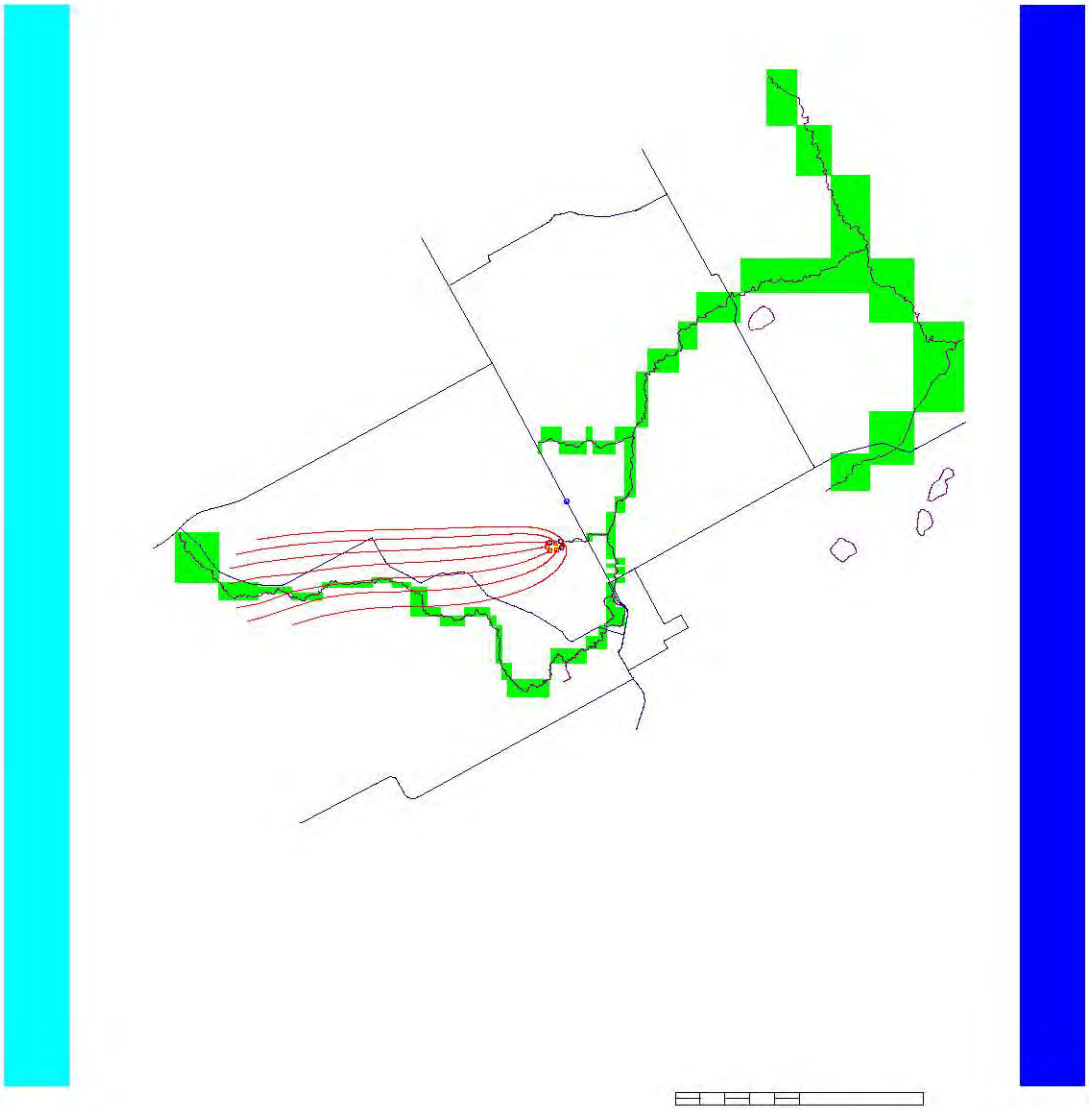
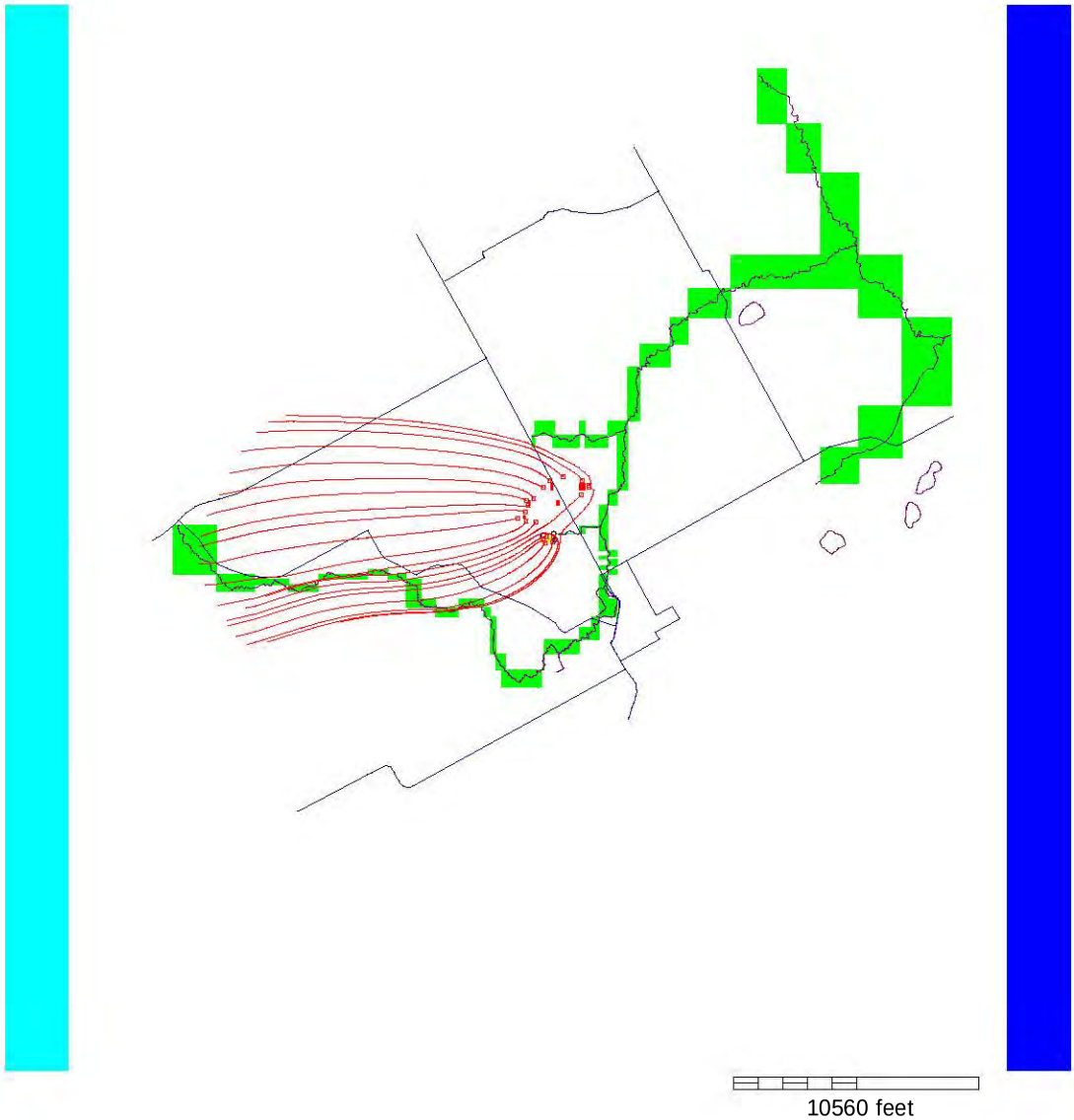
Wild Rose Fish Hatchery
Groundwater Flow Model
Steady-State particle traces -- No Pumping

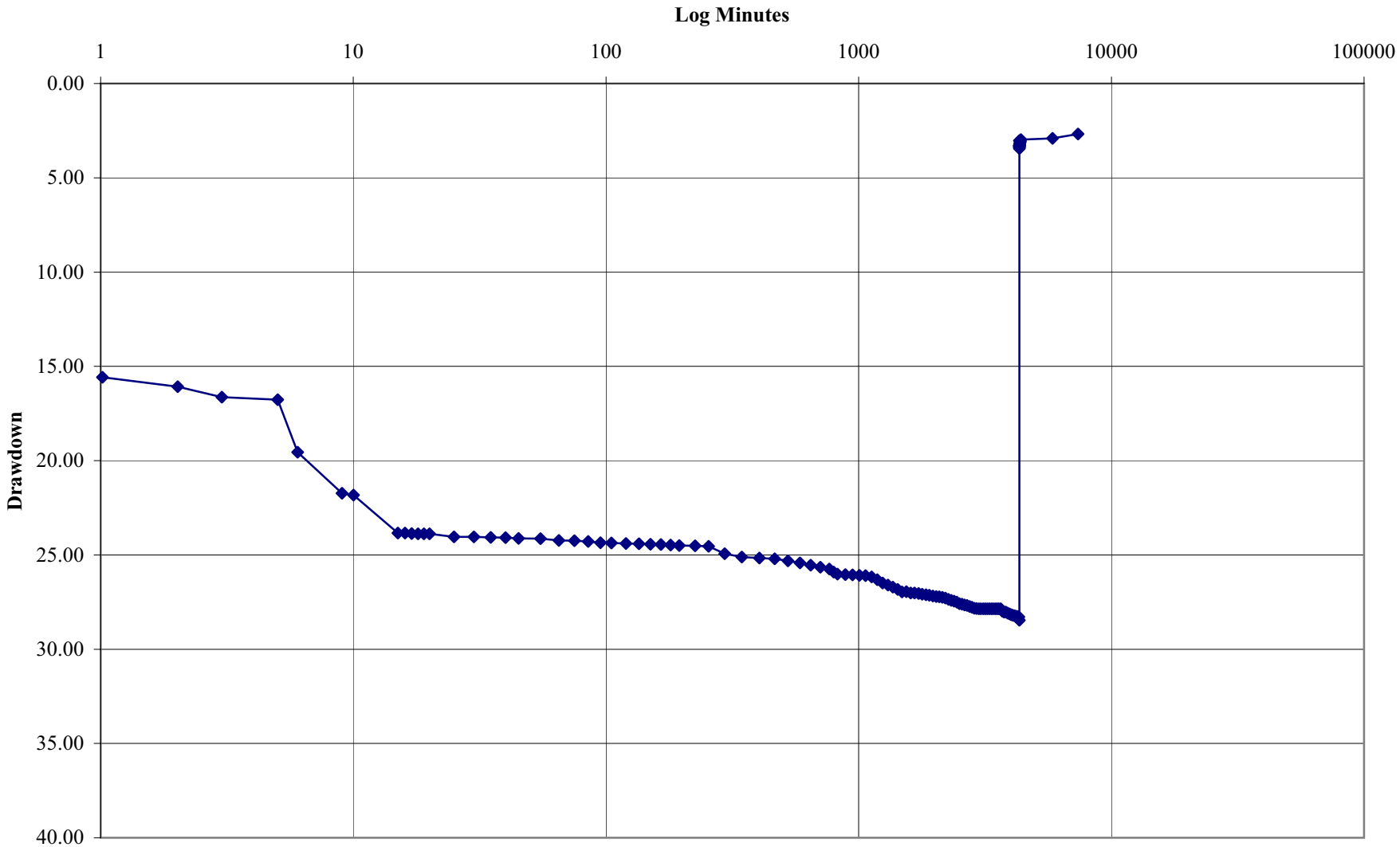


Wild Rose Fish Hatchery
Groundwater Flow Model
Steady-state particle-traces (0 gpm)

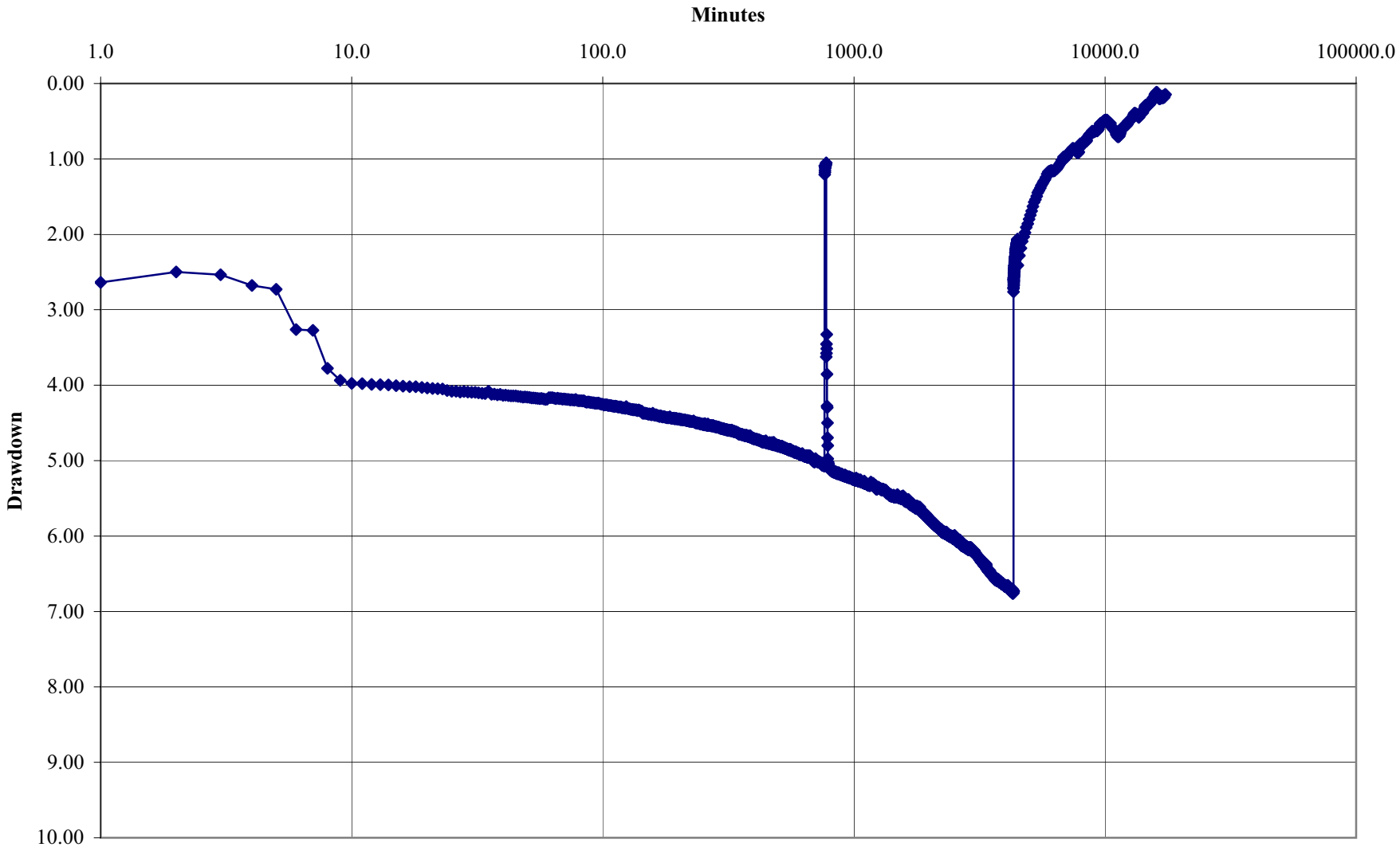


Appendix H

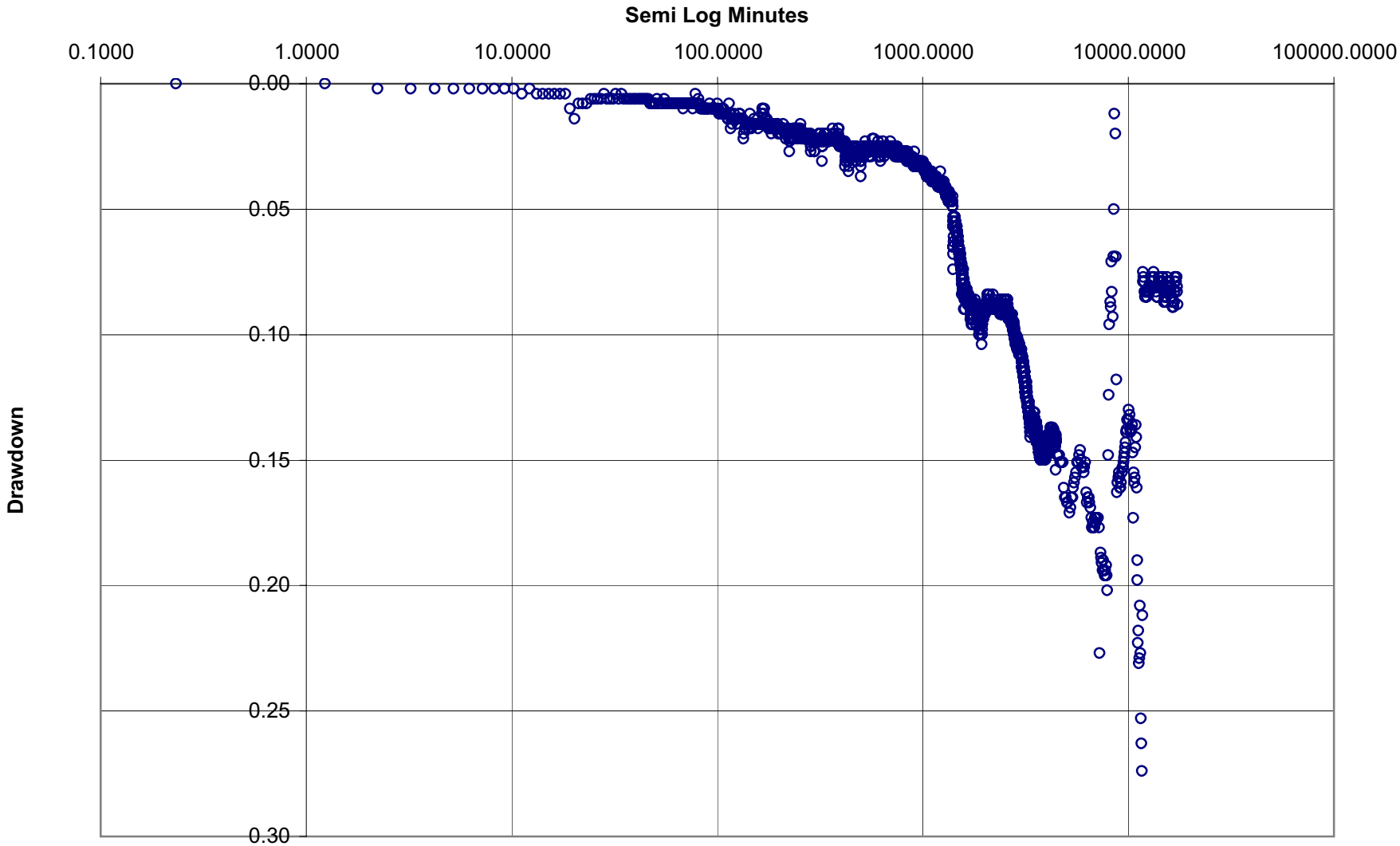
Semi Log Chart of TPW-1-05



Semi Log Chart PF 091



PF 092


Semi Log Minutes
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1.0000
10.0000
100.0000
1000.0000
10000.0000
100000.0000
Drawdown
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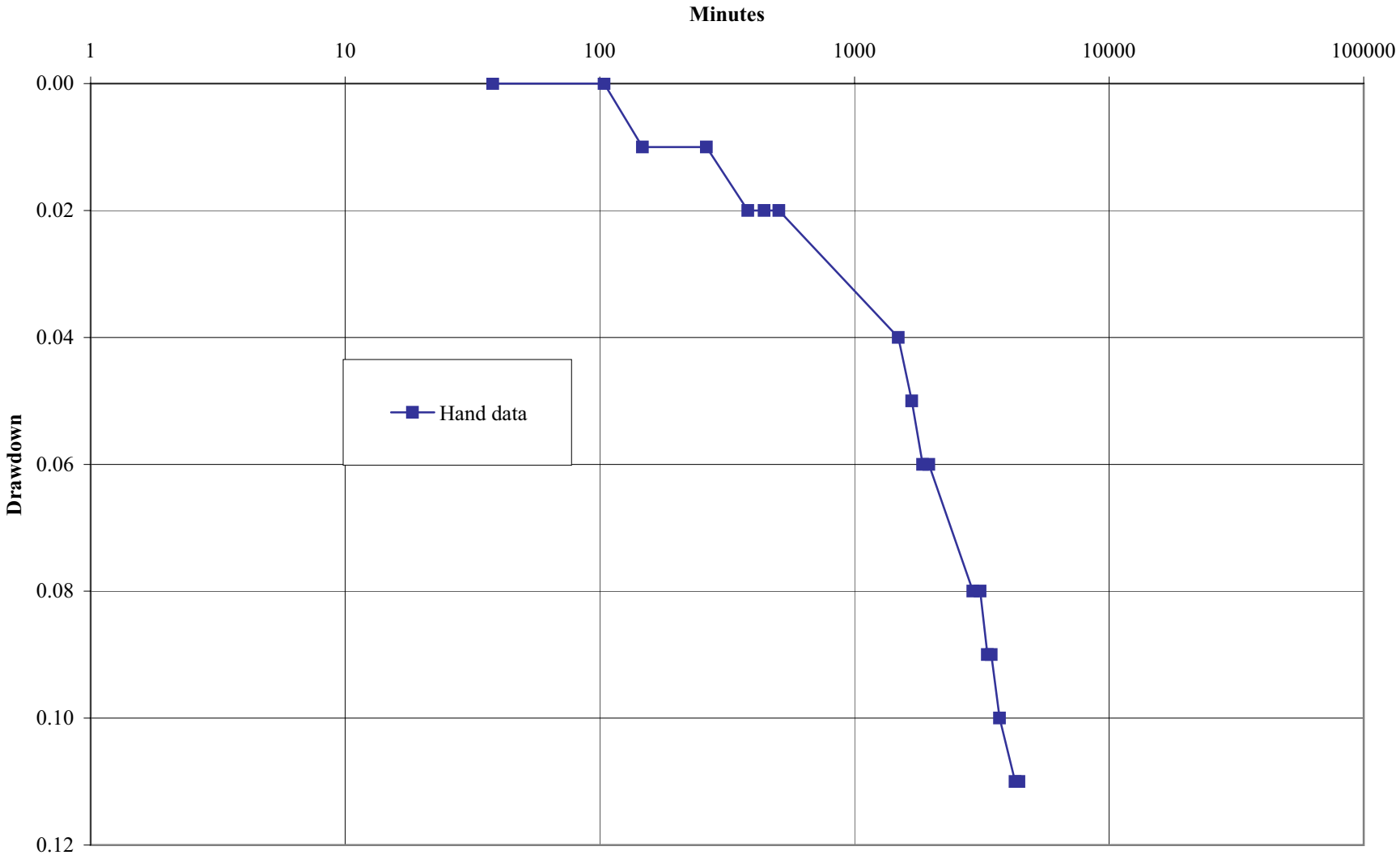
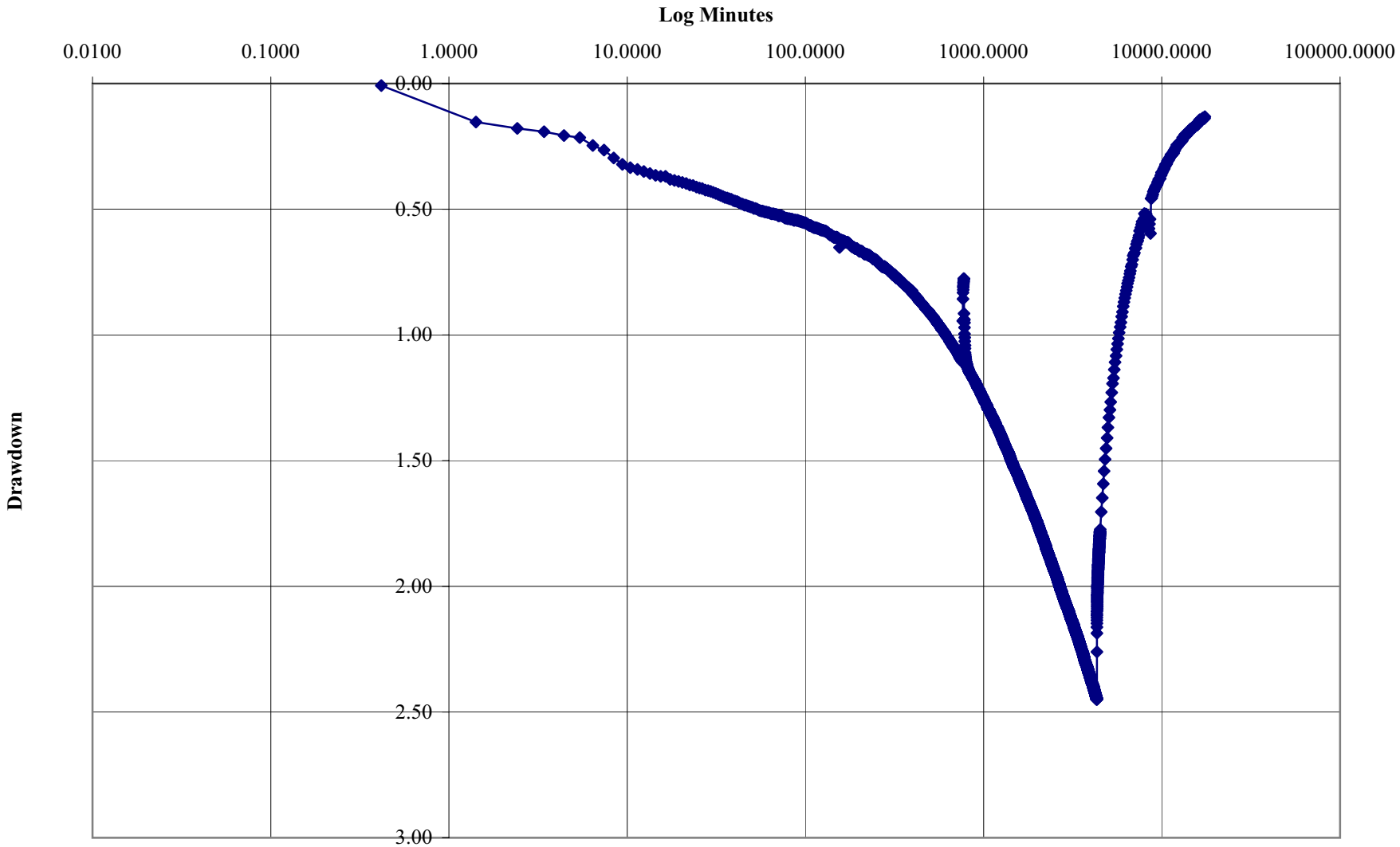
0.05
0.10
0.15
0.20
0.25
0.30

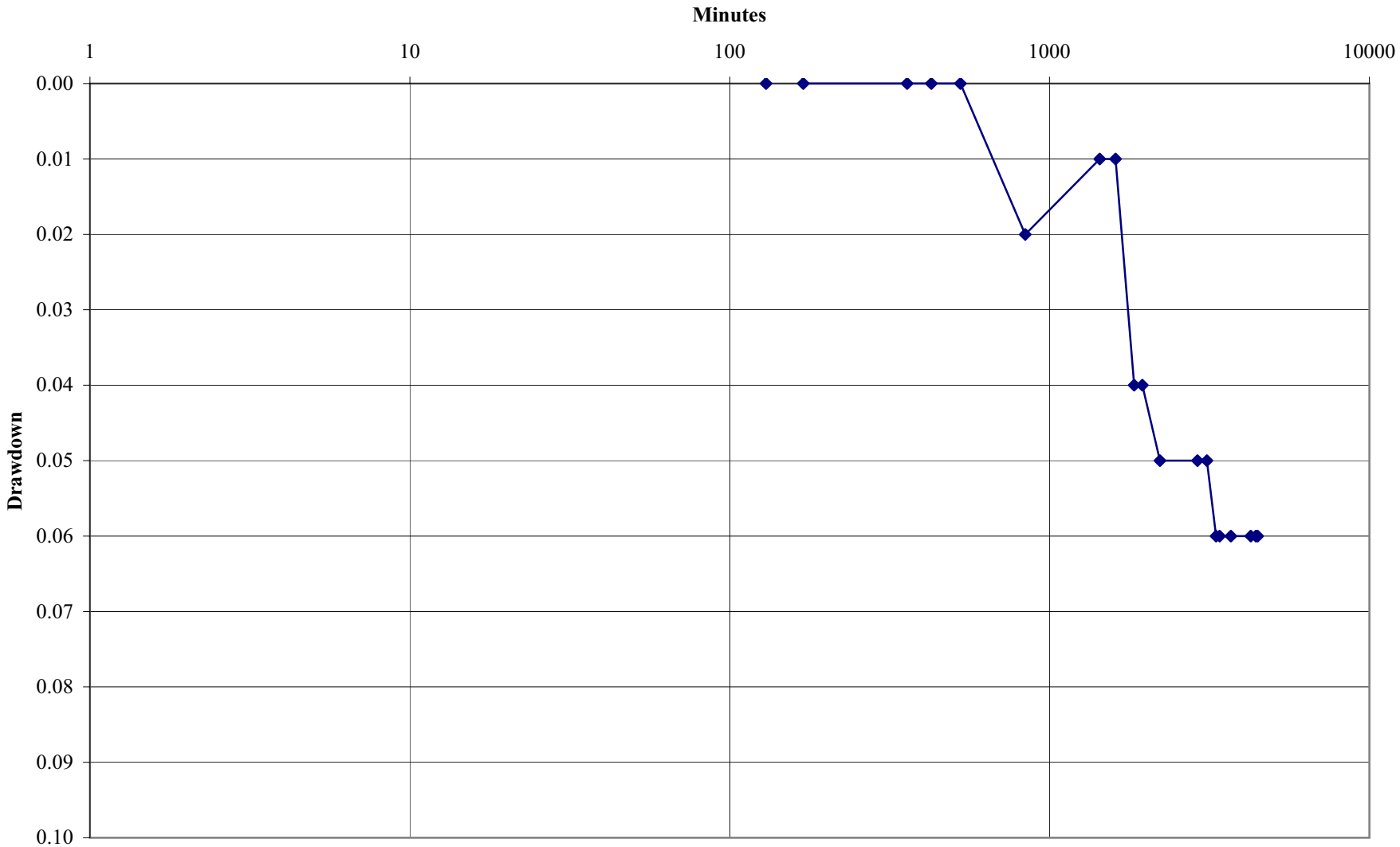
Wild Rose PF 093 Semi Log

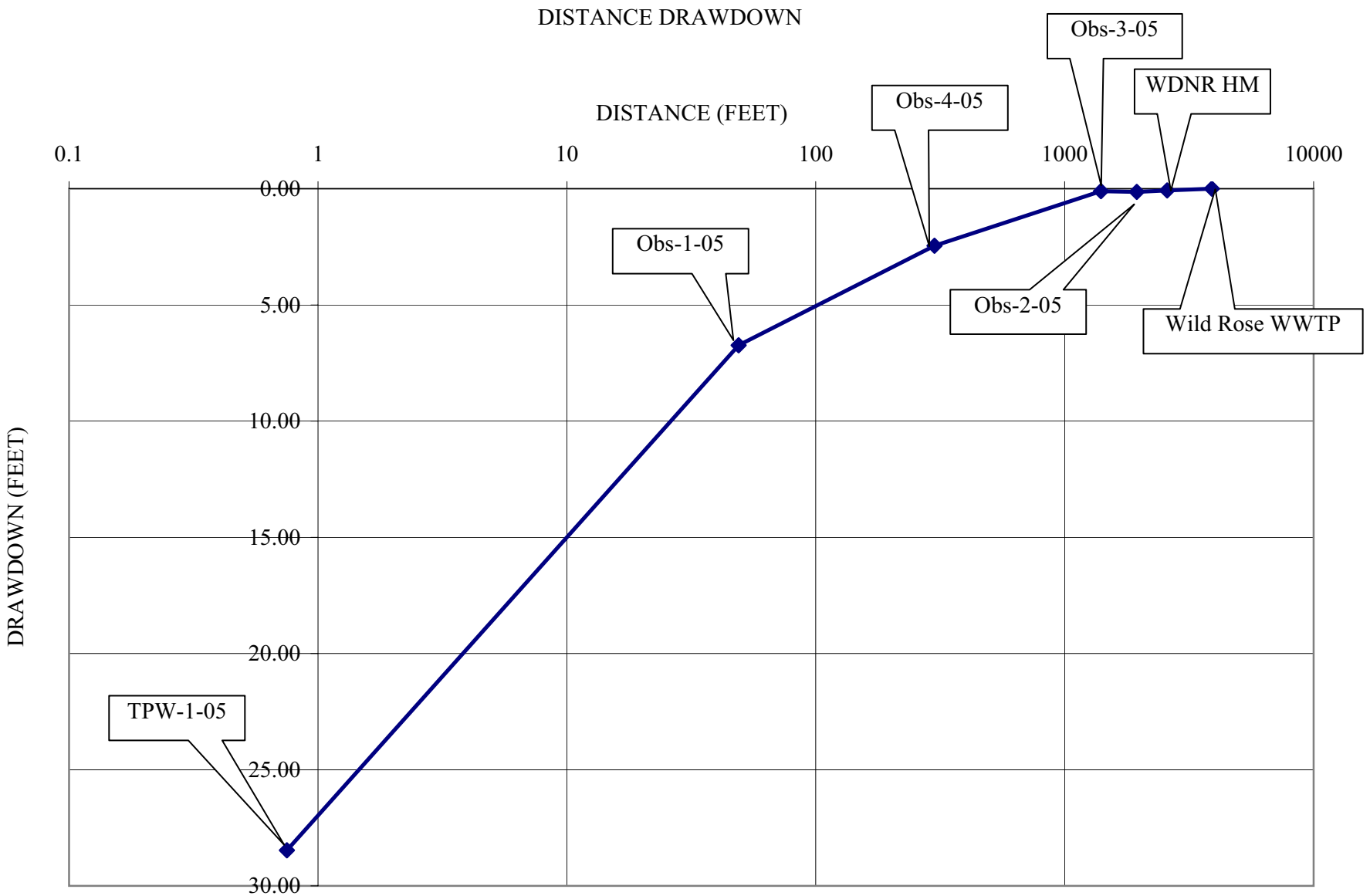


Semi - Log of PF 094



WI DNR Habitat Management Well




DISTANCE DRAWDOWN
DISTANCE (FEET)
0.1
1
10
100
1000
10000
0.00
5.00
10.00
15.00
20.00
25.00
30.00
DRAWDOWN (FEET)
Obs-3-05
WDNR HM
Obs-4-05
Obs-1-05
Obs-2-05
Wild Rose WWTP
TPW-1-05

Appendix I

FISHPRO
Consulting Engineers & Scientists
A Division of Cochran & Wilken, Inc.

Laboratory Division
5201 South Sixth Street Road
Springfield, IL 62703-5149
ph (217) 585-8300 fx (217) 585-1890

Wild Rose State Fish Hatchery
Well Water Analysis

DSF# 03I1F
FishPro 04071

Samples Collected on 8/7/05
Samples Received on 8/9/05

Laboratory Analyst: Meghan Oh

Certificate of Analysis

Field Data Collected with MiniSonde4a

Analyte	Result	Method	Date Analyzed
Conductivity	352.4 mS/cm	120.1	8/7/2005
Dissolved Oxygen	4.13 mg/L O_2	360.1	8/7/2005
ORP	428 mV	SM 2580 B	8/7/2005
pH	7.76	150.1	8/7/2005
Temperature	12.66 °C	170.1	8/7/2005
Total Dissolved Gas	755 mmHg	SM 2810 B	8/7/2005

Note: Data was collected by Liesch Environmental Services, Inc.

Results from Laboratory Analyses*

Analyte	Result	Detection Limit	Method	Date Analyzed
Alkalinity	183 mg/L as $CaCO_3$	10 mg/L	H 8203	8/9/2005
Ammonia-Nitrogen, Total	Not Detected	0.06 mg/L	H 8038	8/18/2005
Calcium	32 mg/L Ca	4 mg/L	SM 3500-Ca B	8/18/2005
Carbon Dioxide, Free	6.5 mg/L CO_2	0.1 mg/L	SM-4500-CO_2	8/9/2005
Carbon Dioxide, Total	154.5 mg/L CO_2	0.1 mg/L	SM-4500-CO_2	8/9/2005
Hardness, Total	198 mg/L as $CaCO_3$	10 mg/L	SM 2340 C	8/17/2005
Hydrogen Sulfide	< 0.001 mg/L H_2S	0.01 mg/L	SM 4500-S^{2-} H	8/12/2005
Iron, Total	0.03 mg/L Fe	0.01 mg/L	H 8214	8/19/2005
Magnesium	29 mg/L Mg	2 mg/L	SM 3500-Mg B	8/17/2005
Manganese	< 0.6 mg/L Mn	0.6 mg/L	H 8034	8/22/2005
Nitrate	1.4 mg/L NO_3	0.1 mg/L	H 8171	8/18/2005
Nitrite	0.023 mg/L NO_2	0.001 mg/L	H 8507	8/9/2005
pH (Upon Arrival)	6.03	0.1 SU	150.1	8/9/2005
Temperature (Upon Arrival)	11.3 °C	0.1 °C	170.1	8/9/2005
Total Dissolved Solids	189.4 mg/L	0.1 mg/L	160.1	8/9/2005
Turbidity	0.13 NTU	0.01 NTU	180.1	8/9/2005

H - Hach Method
SM - Standard Methods

*Results may be affected by extended holding time and elevated temperature during transport

FISHPRO
Consulting Engineers & Scientists
A Division of Cochran & Wilken, Inc.

Laboratory Division
5201 South Sixth Street Road
Springfield, IL 62703-5149
ph (217) 585-8300 fx (217) 585-1890

Wild Rose State Fish Hatchery
Well Water Analysis

DSF# 03I1F
FishPro 04071

Certificate of Analysis

Field Data Collected with MiniSonde4a

	1 hr (failed start)	1 hr 15 min	24 hrs	48 hrs	71 hrs
	9:20 AM	8:30 AM	7:15 AM	8:00 AM	6:15 AM
Analyte	**8/3/05**	**8/4/05**	**8/5/05**	**8/6/05**	**8/7/05**
Temperature (°C)	12.40	14.11	11.21	12.34	12.66
Barometric Pressure (mm Hg)	735.7	737.4	745.1	744.9	741.3
DO (%)	41.0	31.0	41.6	49.9	39.5
Dissolved Oxygen (mg/L)	4.38	3.12	4.48	5.27	4.13
Specific Conductance (mS/cm)	366.9	354.5	367.7	363.6	352.4
pH	7.82	7.60	7.80	7.79	7.76
ORP (mV)	463	471	446	433	428
Total Dissolved Gas (mm Hg)	716	755	744	738	755

Note: Data was collected by Liesch Environmental Services, Inc.

Gas Saturation Data Calculated According to SM 2810

	1 hr (failed start)	1 hr 15 min	24 hrs	48 hrs	71 hrs
	9:20 AM	8:30 AM	7:15 AM	8:00 AM	6:15 AM
Analyte	**8/3/05**	**8/4/05**	**8/5/05**	**8/6/05**	**8/7/05**
TGP (%)	97.32	102.39	99.85	99.07	101.85
Oxygen (%)	42.39	31.29	41.65	50.29	39.89
Nitrogen (%)	111.9	121.3	115.3	112	118.3
Oxygen (mm Hg)	64	48	64	77	61
Nitrogen (mm Hg)	641	695	670	650	683

Wild Rose State Fish Hatchery
Renovation & Compliance Project No. 03I1F

Test Production Well Construction
And Aquifer Testing Procedures

October 2005

Liesch Project Number: 13071.00

Prepared for:

Wisconsin Department of Natural Resources
Bureau of Fisheries and Habitat Management
101 South Webster
PO Box 7921
Madison, Wisconsin 53707-7921

Prepared by:

Liesch Environmental Services
6000 Gisholt Drive
Suite 203
Madison, WI 53713

This report was prepared by me or under my direct supervision.

James de Lambert, PG

WISCONSIN
JAMES DE LAMBERT
G-745
MINNETONKA MN
PROFESSIONAL GEOLOGIST

TABLE OF CONTENTS

TABLES (in text)

APPENDICES

1.0 INTRODUCTION

A major fish hatchery renovation and compliance project (the Project) is planned for the Wild Rose State Fish Hatchery (Hatchery). Among other items, the Project involves renovation of the existing Hatchery water supply including abandonment of existing, non-compliant wells and water supply facilities and development of a new water supply system. The new water system will include installation of new production wells to provide a routine flow rate of approximately 4200 gallons per minute (gpm) on a continuous basis, and a short term maximum flow rate of up to 7000 gpm under emergency conditions.

The water source for current Hatchery operations is obtained from a surficial sand aquifer through artesian flow from natural springs, shallow sand point wells and various drilled wells. This situation is less than ideal because the majority of the water currently used at the facility, estimated to range from approximately 1500 to 2200 gpm, is obtained through artesian flow. As a result, hatchery operators cannot effectively control the flow and the quantity of water available to the hatchery varies seasonally, as well as annually, with changes in groundwater recharge and storage. The proposed water system improvements will include new wells situated so they will not flow under artesian conditions. These wells will be outfitted with variable speed pumps so more water can be pumped when more water is needed and less water will flow to waste when not needed.

This well construction and aquifer testing procedure is intended to gather detailed information concerning the Quaternary aquifer at the hatchery including determination of aquifer characteristics and aquifer response to pumping. The goal of the testing will be to collect sufficient information to determine the feasibility of the proposed water supply scenario and to estimate the effects of the proposed withdrawal on the aquifer, nearby springs, wetlands and surface waters, including designated trout streams. The results of the testing procedure will also be examined to determine potential interference with existing water supplies for area residents.

The information can then be used to assess the environmental effects of the proposed withdrawal as well as potential measures to mitigate any identified adverse impacts on area resources. The results of the test will also be used to obtain additional information for design of the water supply facilities including the number, location and size of the wells needed to obtain a reliable water supply for the Project. A Site Location Map and Site Map are included as **Figures 1** and **2** located in **Appendix A.**

The Hatchery water supply has been the subject of numerous discussions and studies over the years and was a driving force in development of this Project. In 1996 the United States Geological Survey (USGS) published Water-Resources Investigation Report 96-4213 in cooperation with the WDNR. The report was titled *Hydrogeology of the Sand and Gravel Aquifer in the Vicinity of the Wild Rose State Fish Hatchery, North-Central Waushara County, Wisconsin* (Conlon 1996) and built on a previous, county wide report prepared by the USGS in 1965 (Summers 1965). This report used existing data, and a limited number of seismic soundings, to assess the occurrence and movement of groundwater in the vicinity of the Hatchery. A follow-up investigation was undertaken by the USGS and WDNR 1997 that included installation of a 16-inch test well at the Hatchery. A 24-hour pumping test was completed followed by initial development of a groundwater computer model based on the pumping test results.

2.0 HYDROGEOLOGIC SETTING

Bedrock in the area of the Hatchery consists of Precambrian granite, which may be overlain by a thin layer of Cambrian sandstone near the Hatchery (Summers 1965). The Bedrock is overlain by a sequence of glacial materials deposited during the Wisconsin Glaciation. The Green Bay Lobe of the Wisconsin Glaciation covered the area and deposited unconsolidated sediments consisting of sand and gravel outwash and glacial till. At the Hatchery, shallow subsurface materials consist primarily of fine to medium sandy outwash deposits extending to depths of at least 20 feet. Conditions below this depth are more variable and include zones of more coarse sand and gravel outwash as well as thick sequences of silty glacial till extending to the bedrock surface at an estimated depth of 200 to 300 feet.

Groundwater discharging at the Hatchery originates as infiltrating precipitation in the hilly, topographically high area west of the Hatchery and flows towards the east and northeast discharging at topographically low areas at the Hatchery site and at the Pine River below the millpond in Wild Rose (Summers 1965). Because the Pine River originates to the northwest of the Hatchery and water levels in the Pine River are greater than water levels in nearby wells and springs, it is possible that some of the water discharging at the Hatchery may originate at the Pine River west of the Hatchery (Conlon 1996).

The primary aquifer in the area is composed of permeable glacial outwash deposits occurring above the bedrock surface within the glacial drift. Historically, most area water supplies are obtained from this aquifer through the use of shallow sand point wells for individual homes or

cabins or through the use of drilled wells completed deeper within the aquifer for newer homes and high capacity supplies. Since the Village of Wild Rose does not have a public water supply system the nearest public water supply is located at the town of Wautoma eight miles south of the Hatchery. In addition to the Hatchery water supply, high capacity water supplies have been developed in this aquifer for irrigation of agricultural lands.

2.1 AREA GROUNDWATER USE

An inventory of potential domestic wells was completed utilizing information from a variety of resources including the Wisconsin Department of Natural Resources (WDNR), Wisconsin Geologic and Natural History Survey (WGNHS) well data base, Waushara County Parcel data and review of properties near the project site. The domestic well inventory included an area within approximately 1 mile of the test production well location. An attempt was made to contact home owners nearest the site to obtain additional information concerning their sources of water supply. Since this area has no public water supply system, it was assumed that the presence of a residence would indicate that a domestic water supply well was located nearby. Each potential well location was then assigned a map number and the available information was tabulated. **Figure 3** shows potential locations for area domestic wells and the Domestic Well Inventory Table provided in **Appendix B** provides a summary of the available information.

A total of 60 possible domestic water supply wells were identified during the inventory. Only 14 of the identified sites have additional information available in the form of well construction records. The reason for this is that many of the water wells in the area consist of small diameter sand point type wells that do not have recorded construction information. It is possible that a number of current or former home owners have installed their own sand point wells to relatively shallow depths up to approximately 40 or 50 feet.

As part of the well inventory, Liesch Environmental Services personally contacted several of the residents to obtain and/or verify well information and to discuss the project. Each resident was instructed to contact Liesch Environmental Services should any issues arise with their water supply during the testing procedure. Liesch Associates Inc. also delivered letters that briefly described the project and what to do if a well problem occurs.

3.0 DRILLING SUMMARY

Mark J. Traut Well Company of Waite Park, Minnesota provided the well contractor services and

materials for this project. During this phase of investigation, a total of seven test holes were advanced using mud rotary drilling techniques. Four two-inch diameter observation wells were installed were installed in these boreholes and three were sealed after drilling and sampling. One 18-inch diameter test production well, designated TPW-1-05, was installed using duel rotary drilling techniques. The following **Table 1** is a brief summary of the basic test hole and well construction details. Copies of the well construction records are provided in **Appendix C**.

Table 1 - Test Hole and Well Construction Summary

Bore Hole Name	WI Unique Well Number	Project Well Designation	Casing Diameter	Total Depth	Screened Interval (feet)
TH-1-05	Sealed	-	-	218	-
TH-2-05	Sealed	-	-	180	-
TH-3-05	PF 091	Obs-1-05	2 inch	200	145-165
TH-4-05	PF 092	Obs-2-05	2 inch	180	124-144
TH-5-05	PF 093	Obs-3-05	2 inch	218	145-165
TH-6-05	PF 094	Obs-4-05	2 inch	180	145-155
TH-7-05	Sealed	-	-	180	-
TH-8-05	NV 233	TPW-1-05	18 inch	195	110-167

Borehole electric logging procedures were conducted by Liesch at selected boreholes to characterize the geologic materials and to assist with the selection of the more favorable portions of the aquifer. The parameters measured during electric logging were spontaneous potential and apparent resistivity (using a lateral arrangement). Readings were collected at two and one-half foot intervals through significant sand and gravel formations, and at five foot intervals throughout the remaining portion of the borehole, using both a 0.25 and 2.5 foot electrode spacing. The 0.25 foot electrode spacing readings of spontaneous potential (SP) and the 2.5 foot electrode spacing readings for resistivity were used to create the electric log data plots. In general, higher electrical resistivity values reflect more favorable conditions in the unconsolidated glacial deposits. Charts of the electric logs are included with the test hole records located in **Appendix C**.

3.1 TEST DRILLING AND OBSERVATION WELL CONSTRUCTION

Between June 6 and 14, 2005 five test holes, designated TH-1-05 through TH-5-05, were drilled at the locations indicated on **Figure 2**. Test holes TH-1-05 through TH-3-05 were drilled to assess conditions for installation of a high capacity test production well on the northern portion

of the Hatchery property.

The first two test holes were sampled, logged and sealed in search of a better location for the test production well. The third test hole, designated TH-3-05, encountered more favorable aquifer material and a 2-inch observation well, designated Obs-1-05, was installed at that location. Test holes TH-4-05 and TH-5-05 are locations for permanent observation wells located closer to the existing hatchery operation and are designated as Obs-2-05 and Obs-3-05, respectively.

During the week of July 20, two additional test holes, designated TH-6-05 and TH-7-05 were drilled. TH-6-05 was installed at a distance of approximately 300 feet from TPW-1-05 to provide an additional location to monitor drawdown during the pumping test and to provide additional information concerning aquifer conditions. A 2-inch observation well, designated Obs-4-05, was installed in the borehole to a depth of 155 feet. TH-7-05 was drilled on the east side of the Hatchery, near the red barn along the entrance road, to assess aquifer conditions for potential installation of a water supply well in this area. At this location, mostly clay till with some silty sand was encountered between the depths of 28 and 170 feet. Sand and gravel was encountered at 170 feet to the bottom of the hole to a depth of 180 feet, however, an observation well was not installed due to unfavorable aquifer conditions.

3.2 Test Production Well Construction

The test production well was completed the week of July 20, 2005. The well construction is shown on the as-built diagram located in **Appendix D.**

TPW-1-05 was constructed with 18-inch diameter, low carbon steel casing using a telescoping screen installation and a gravel pack. The well screen was manufactured by US Filter (Johnson Screens division) and consists of 63 feet of 35 slot, 12-inch telescope size, type 304-stainless steel. The top five feet of the well screen consists of tight wind (zero slot well screen) with a K-packer, step down cone and gravel fill pipe. The gravel pack consists of Eau Claire #30.

The well screen is a "High Q" design with a maximum transmitting capacity of approximately 44 gpm per foot of well screen, or 2800 gpm for the entire screen, at the manufacturers maximum recommended entrance velocity of 0.1 ft./per second. The maximum recommended pumping rate for this well should be less than 1400 gpm to prolong well life, reduce maintenance and to account for the effects of the gravel pack. The sieve analysis conducted on the formation samples is included with the well records in **Appendix D**. The well was developed using a combination of water jetting and air lifting techniques.

4.0 PUMPING TEST SUMMARIES AND AQUIFER ANALYSIS

The pumping test was performed using a high capacity turbine pump, 150 horse power electric motor, flow regulating valve and flow meter. The motor was powered by a diesel generator. The initial pumping rate was set during a brief pumping period to check the pump installation and associated equipment during the afternoon of August 2, 2005. The initial attempt at starting the test failed after approximately 2.5 hours of pumping on August 3 due to a contaminated supply of diesel fuel. Maintenance procedures were successfully conducted on the generators fuel system and the test was rescheduled to begin the next morning. Therefore, the pumping period at TPW-1-05 started on August 4, 2005 at 7:15 am and ended on August 7, 2005 at 7:15 am. Recovery measurements were collected using data loggers until August 16, 2005.

The discharge line for TPW-1-05 consisted of approximately 3500 feet of six inch diameter flexible hose. The discharge was set within 100 feet of the Hatchery stream on the east side of Highway 22. The end of the discharge line was fitted with a diffuser to dissipate energy and facilitate gentle overland flow from the discharge line to the stream.

Representatives from Liesch were on-site to equip and maintain the observation points with data loggers and to collect water level measurements during the testing procedures. All water levels were monitored to the nearest 0.01 foot before, during and after the pumping phase of the test. A summary of the monitoring locations, parameters and equipment utilized is included as **Table 2**.

Table 2 - Aquifer Test Monitoring Locations and Equipment

Monitoring Point	Monitoring:	Equipment
TPW-1-05	Water Level, Flow &Water Quality	Solinst, Flow Meter & Minisonde
Obs-1-05	Water Level	Mini Troll & Solinst
Obs-2-05	Water Level	Mini Troll & Solinst
Obs-3-05	Water Level	Mini Troll & Solinst
Obs-4-05	Water Level	Mini Troll & Solinst
West Weir	Water Level/Flow	ISCO Data Logger
East Weir	Water Level/Flow	ISCO Data Logger
WDNR Habitat Management Well	Water Level	Solinst
Village of Wild Rose WWTP	Water Level	Mini Troll & Solinst
Well E	Flow	Flow Meter

The pumping rate was manually adjusted during the first ten minutes of pumping to gently fill the discharge line. Flow rates were obtained using a flow meter by reading the flow indicator needle position and using the totalizer readings with calculated the time since the last reading. The flow indicator needle oscillated from 1350 to 1400 gpm during the initial 36 hours of the test then from 1400 to 1450 gpm for the remainder of the test. The arithmetic water level chart (**Appendix E**) for TPW-1-05 includes the calculated totalizer values for the pumping rates on the secondary axis. This chart indicates that the flow rate did show a minor increase from approximately 1350 to 1425 gpm during the period of the test.

Other than a trace of precipitation observed on the morning of August 4, 2005, no precipitation was noted at the Hatchery during the Aquifer testing procedure. A chart of precipitation measured at Hancock, Wisconsin (approximately 15 miles west of the Hatchery), for the period from July 15 through September 1, 2005, is provided in **Appendix E**. While precipitation during the year has generally been below normal, a substantial rainfall event was noted on July 25, 2005 at Hancock station. The arithmetic chart for Obs-3-05 (Unique well number PF093) provides a record of water level fluctuation from mid-June through period of the pumping test until August 17, 2005. This chart generally shows a declining water level during the summer with a recharge event that corresponds with the July 25, 2005 precipitation event.

The data provided in **Table 3** represents the basic information regarding water level fluctuations under these specific pumping conditions.

Table 3 - Aquifer Test Water Level Summary

Common Name	TPW-1-05	Obs-1-05	Obs-4-05	Obs-3-05	Obs-2-05	WDNR Habitat Management
WI Unique Well Number	NV 233	PF 091	PF 094	PF 093	PF 092	STH22N6154
Distance from Well TPW-1	-	49	300	1400	1950	2580
Static Level	40.67	41.97	27.40	25.70	9.40	13.50
Water level at 1hour	64.91	46.16	27.90	25.70	9.41	13.50
Water level at 24 hours	67.64	47.45	28.90	25.74	9.46	13.52
Water level at 48 hours	68.51	48.15	29.46	25.78	9.51	13.56
Water level at 72 hours	69.14	48.71	29.84	25.81	9.54	13.57
Drawdown at 72 hours	28.47	6.74	2.45	0.11	0.14	0.07
Recovery Level at 1 hour	43.65	44.32	29.34	25.81	9.54	13.57
Recovery Level at 24 hours	-	43.25	28.38	-	9.55	-
Recovery Level at 48 hours	-	42.88	28.03	-	9.58	-
Recovery Level at 72 hours	-	42.66	27.99	-	9.42	-
Recovery Level after 9 days	-	42.21	27.43	25.78	9.51	13.59

Notes:
All measurements are in feet
The pumping rate at TPW-1-05 was 1400 gpm for 72 hours

An attempt was made to monitor the flow from Well E through the use of a flow meter. Well E has been discharging continuously to the head pond that supplies the hatchery and over time the flow has decreased to approximately 110 gpm, according to hatchery personnel. Hatchery operations now depend on this flow so it was not possible to significantly restrict flow to assist with more accurate monitoring of water levels or flows at this location. The 6-inch discharge pipe was modified to keep the pipe full which resulted in a slight decrease in observed flow. The temporary meter installed at Well E displayed a constant rate of approximately 75 gpm prior to and during the testing procedure. However, during the last 36 hours of the test the meter malfunctioned several times apparently as the result of sand grains from Well E lodging in the meter. The meter would start with a tap of a hammer on the associated piping, only to stop again. Using the flow totalizer, the flow rate has been calculated to be approximately 95 gpm. Changes in flow were not apparent during the testing procedure. A chart of the data from Well E is located in **Appendix E**.

Stream flow monitoring during the test consisted of two stream gage sites with data loggers and weirs. The two sites were chosen for the ease of equipment installation and a reduced chance of submergence due to tail water. Each site had an ISCO digital data logger with a submersible transducer that recorded water levels continuously. This data is easily retrieved at the gage site

with a laptop computer. The weirs at the gaging sites are primary measuring devices that require only the measurement of water depth and not velocity. Empirically based flow equations for the weirs provided flow rates at each site using just the flow depths, eliminating the uncertainty associated with measuring average velocities. The upstream, or western gaging site, included four weirs, one for each bay. This site used two contracted weirs having 2.5-foot lengths for low flows and two sharp crested weirs having lengths of four feet for higher flows. The downstream, or eastern gaging site, consisted of an eight foot sharp crested weir.

Appendix F contains three charts prepared from the weir data for the monitoring period which ran from July 19 to August 16, 2005. The first two charts show water depth and weir flows at the upstream and downstream weir locations. These charts show a pronounced diurnal effect, generally corresponding with a spike in water depths and flows in the afternoon of each day. The third chart shows water depth for one day. Hatchery personnel have indicated that the spike appears to correspond with Hatchery operations involving cleaning of the raceway screens. As algae and other debris accumulate on the raceway screens flow is restricted and water backs up behind the screen. As the screens are manually cleaned during the day flow is restored and the water is released from storage. During the monitoring period, flows were observed to increase by approximately 0.5 cubic feet per second at both the upstream and downstream weirs. During the three day pumping period, the increased flow resulting from the pump discharge is apparent at the downstream weir and flow appeared to remain the same or slightly increase at the upstream weir. Reduction in stream flow resulting from the 72-hour pumping test is not apparent under the conditions of the test.

4.1 PUMPING TEST DATA ANALYSIS

The water level data has been compiled using Microsoft Excel to create charts of time versus depth to water, drawdown and recovery levels. Arithmetic charts of drawdown and recovery data for all monitoring points are included in **Appendix E**. Data logger measurements are primarily used to create the charts used in this report. However, occasionally, the data loggers can malfunction as indicated by the erroneous data logger information observed at Obs-3-05, where the data logger shows an increasing water level and the manual readings indicate a decreasing water level. Water level measurements collected in the field for Obs-3-05 were then utilized in place of the logger information.

A graphic method is often used to assist in determining aquifer coefficients as well as to detect possible boundary conditions encountered by the expanding cone of depression during the test.

Although other procedures can be useful, the Semi-logarithmic plots provided in **Appendix H** are commonly used because they provide a visual representation of possible boundaries and require shorter times to plot and analyze. Semi-logarithmic charts are also useful to estimate long term pumping effects by extending observed water level trends into the future. In addition, the final chart located in **Appendix H** is a distance verses drawdown chart that illustrates the amount of drawdown with distance from the pumping well for the final minutes of the 72-hour pumping test.

Water level responses attributable to pumping at TPW-1-05 were not observed at the Village of Wild Rose waste water treatment plant well (CI 653), WDNR Habitat Management Well and no apparent change in flow occurred at Well E. Water level responses to pumping at observation wells Obs-2-05 (PF092) and Obs-3-05 (PF093) were not apparent, or were minimal and masked by natural water fluctuations during the test. Charts for all locations are located in **Appendix E.**

The two most commonly sought aquifer characteristics are coefficients that represent the transmissivity and storativity of the aquifer. Transmissivity is a measure of an aquifers ability to transmit water and is defined as the rate of flow through a vertical section of aquifer of unit width (extending the full saturated height of the aquifer), under a hydraulic gradient of one. The higher the transmissivity, the more easily water can move through the aquifer. Storativity is a measure of the amount of water stored in an aquifer and is defined as the volume of water released or taken into storage per unit surface area, per unit change in head. These two coefficients are physical properties of the aquifer material. The values calculated from the data obtained at select observation wells are presented on **Table 4**.

Table 4 – Calculated Aquifer Coefficients

Source:	Transmissivity (g/d/ft.)	Storativity
Jacob's Plots		
Obs-1-05 @ T2	134,400	1.28x10-1
Neumann Type A Curve		
Obs-4-05	106,697	2.20x10-4
Distance Drawdown	77,810	
MODFLOW Charts		
Obs-4-05	136,000	

Notes: Transmissivity, gallons per day per foot (g/d/ft) of aquifer width.
Storativity coefficient, dimensionless ratio.

The charts included as **Appendix H** represent the effective conditions for pumping from the aquifer for at least the period of the test and are commonly used to calculate storage and transmissivity values.

Observations made during borehole drilling and logging indicated that a substantial formation of glacial till has been encountered to the south and southeast of the test production well. Based upon the pumping results, it is apparent that the extent of aquifer formation may be locally influenced by changes in formational permeability or glacial till. This situation agrees with the current geological interpretation of the borehole data for this site.

The specific capacity of 49 gallons per minute per foot of drawdown (gpm/ft.) is in general agreement with average transmissivity values on the order of 115,000 gpd/ft. Comparison of water level responses at the observation wells and TPW-1-05 indicate that TPW-1-05 is reasonably efficient and fully developed. Trace amounts of sand were detected in samples collected during the pumping test.

5.0 WATER QUALITY SAMPLING

Water quality information was collected in the field during the test using a Hach Environmental Hydrolab Minisonde. Field measurements were taken near the beginning of the test and at approximate 24-hour intervals to the end of the test. A sample was also collected for a comprehensive laboratory analysis near the end of the test after 71 hours of pumping. The sample was iced down and delivered to the FishPro laboratory for analysis. The laboratory analysis and field measurements are summarized and provided in **Appendix I**.

6.0 PROPOSED HATCHERY WATER SUPPLY DEVELOPMENT

The proposed Wild Rose State Fish Hatchery Renovation and Compliance project involves the following major components related to water supply development: 1) abandonment of existing non-compliant wells and water supply facilities, 2) development of a new groundwater supply for both the proposed coldwater (west side) and coolwater (east side) operations and 3) development of potable supply wells for the new buildings and facilities including the new coldwater and coolwater buildings, visitors center and the renovated office building.

The water supply for existing hatchery operations relies on artesian flow from springs and seeps

below the raceways in addition to a variety of wells and sand points primarily used to direct water to the coldwater and coolwater buildings. Many of the wells and the sand points are not in compliance with current standards and state regulations for water supply wells. As such, these facilities will be abandoned as part of the Project when the new and renovated facilities are available for use.

The coldwater portion of the project will take place on the west side of the hatchery property (west of Highway 22) and involves the use of relatively cold water for propagation of trout and salmon. This portion of the project will use approximately 3200 gpm during normal operations when the water is conditioned and re-used between a series of four raceway pavilions. For limited periods of time, re-use of water may be restricted by maintenance operations, mechanical failure and/or contamination at one or more of the raceways. Assuming re-use is not possible, and fresh groundwater is required for all coldwater operations, approximately 6000 gpm would be required for limited periods under this emergency scenario.

The coolwater portion of the project will take place on the east side of the hatchery property (east of Highway 22) and involves the use of relatively warm water for propagation of coolwater species such as walleye, bass, muskellunge and sturgeon. This portion of the project will involve re-use of water from the west side coldwater operations to be augmented by a fresh groundwater supply of up to 1000 gpm.

Individual potable water supply wells, for domestic use, are also planned for the proposed coldwater and coolwater buildings, the Visitor's Center and the renovated office building. Depending on how the various components of the project are staged, a temporary water supply of approximately 300 gpm may be required to support the existing coldwater building prior to the availability of the permanent supply. Combined flow from the smaller potable supply wells is expected to be less than 5,000 gallons per day and neither these wells, nor the temporary supply well, are included in the assessment of potential impacts from pumping.

Based on the results of the previous investigations and the work completed for this report, it is anticipated that the routine water requirement for the Project (both east and west sides) of 4200 gpm will be met by four wells operating at rates between 1000 and 1500 gpm. Proposed locations for these four wells are shown on **Figure 4** - Proposed Well Location Map. At least one additional well will be needed as a backup to the four primary wells for maintenance and repairs and a second additional well would likely be needed to supply the maximum demand of 7000 gpm under emergency conditions.

As indicated on **Figure 4**, existing well TPW-1-05 will serve as one of three primary wells to be located on the west side for coldwater operations. A fourth well will be located on the east side for coolwater operations and a fifth well will be located near Highway 22 and plumbed to be able to serve as a back up supply well to either the east or west side water supplies. A sixth well will also be needed to meet the maximum, or emergency, demand of 7000 gpm. In order to accommodate the two phase construction schedule while providing a reliable supply of water for interim operations, it is proposed that Wells A, B and C are constructed first to supply Phase I (coldwater operations). While not needed for routine operations, construction of Well C at this time would provide for a back up well for use prior to completion of Phase II, an estimated period of approximately two years. Proposed Well D would be constructed as Part of Phase II and Well C would become the redundant well to back both east and west sides. Well E would be constructed to meet the emergency condition as part of Phase II.

The computer model discussed in the following section utilizes the normal, routine pumping scenario for both east and west side operations where a supply of 4200 gpm is obtained from existing well TPW-1-05 together with proposed Wells A, B and D.

7.0 MODFLOW COMPUTER MODEL

As part of the 1997 pumping test project conducted by the USGS and the WDNR, the USGS utilized their MODFLOW groundwater flow model to simulate aquifer conditions in the vicinity of the Wild Rose State Fish Hatchery. The results of the 1997 pumping test modeling effort were not published, however, the information was provided to Liesch for review during the initial development phase of this project. The USGS model was modified by Liesch to more specifically assess aquifer conditions in the vicinity of the Project based on the 2005 Test Drilling and Aquifer Testing project. Graphical output from the various model-scenarios is provided in **Appendix G**.

7.1 REVIEW OF MODFLOW

The following information regarding MODFLOW comes directly from the USGS web site. Where language is taken verbatim, it is reproduced in italics.

The modular finite-difference ground-water flow model (MODFLOW) developed by the U.S. Geologic Survey (USGS) is a computer program for simulating common features in ground-water systems (McDonald and Harbaugh 1988; Harbaugh and McDonald, 1996). The program was

constructed in the early 1980's and has continually evolved since then with development of many new packages and related programs for ground-water studies.

MODFLOW is designed to simulate aquifer systems in which (1) saturated-flow conditions exist, (2) Darcy's Law applies, (3) the density of groundwater is constant, and (4) the principal directions of horizontal hydraulic conductivity or transmissivity do not vary within the system. These conditions are met for many aquifer systems for which there is an interest in analysis of groundwater flow and contaminant movement. For these systems, MODFLOW can simulate a wide variety of hydrologic features and processes. Steady-state and transient flow can be simulated in unconfined aquifers, confined aquifers, and confining units.

MODFLOW simulates groundwater flow in aquifer systems using the finite-difference method. In this method, an aquifer system is divided into rectangular blocks by a grid. The grid of blocks is organized by rows, columns, and layers, and each block is commonly called a "cell".
For each cell within the volume of the aquifer system, the user must specify aquifer properties. Also, the user specifies information relating to wells, rivers, and other inflow and outflow features for cells corresponding to the location of the features.

MODFLOW uses the input to construct and solve equations of groundwater flow in the aquifer system. The solution consists of head (groundwater level) at every cell in the aquifer system (except for cells where head was specified as known in the input data sets) at intervals called "time steps". The head can be printed and (or) saved on a computer storage device for any time step.

Liesch used the version of MODFLOW that is produced by Environmental Simulations, Inc. This version of MODFLOW (e.g. Groundwater Vistas) includes the packages of the USGS MODFLOW, and also incorporates pre- and post-processors to facilitate model design and analysis of the results. The figures referenced in this section are designated as **Figure G-1** through **Figure G-11** and are included in **Appendix G**.

7.2 HYDROGEOLOGIC ASSUMPTIONS/CONDITIONS USED IN MODEL

The domain for the USGS model (model domain) includes 101 rows and 101 columns, and is centered on the west side of the fish-hatchery springs, near the location of Well E, constructed as part of the 1997 USGS/WDNR pumping test. The dimensions of the center cell are 1.5 meters on each side. The cell spacing increases exponentially away from the center, to a maximum of 832 meters (height of rows 1 & 101, and width of columns 1 & 101). The grid for the model domain is square, extending 14 kilometers along each side (see **Figure G-1**).

The grid for the model domain is rotated 30° east of geographic north; Liesch understands this rotation was used so the natural groundwater flow (generally east-southeasterly) would be displayed from left-to-right across the model domain. For the purposes of discussing the model, the directions presented hereafter reference the model domain. As an example, if the ensuing discussion refers to the eastern side of the model, the area is actually located to the east-southeast (geographically) of the Hatchery.

The original USGS model included five separate layers. However, based on the geologic logs for test drilling completed during this project, Liesch did not see a compelling reason to maintain the complexity associated with these distinct layers. With a goal of making the model domain more straightforward, Liesch collapsed the five layers into a single layer.

Every model simulation includes at least four different classes of hydrogeologic boundary conditions. These boundary conditions were part of the original USGS flow model, and are briefly discussed below. The model inflow and outflow referenced in the following sections relate to predictions based on the steady-state, ambient groundwater flow (e.g. there is no groundwater pumping).

- The cells in the easternmost column are set as constant-head (CH) cells. The CH cells are set with water elevations ranging between 856 and 870 feet. The CH cells represent a significant discharge zone for the model, accounting for nearly 40% of the groundwater outflow. CH cells are displayed in a blue color on **Figure G-1**.
- The cells in the westernmost column are set as general-head-boundary (GHB) cells. The GHB cells provide for groundwater flow from upgradient portions of the aquifer. The GHB cells provide for nearly 20% of the groundwater inflow to the model domain. GHB cells are displayed in a cyan color on **Figure G-1**.
- The model domain includes 313 cells configured as river cells; these cells are placed in the model domain along existing streams and rivers. The discharge from the river cells accounts for nearly 55% of the groundwater outflow. The cells with river boundary conditions are presented in a green color on **Figure G-1**.
- The model domain includes 96 drain cells at the fish hatchery. These cells are used in the model to simulate natural flow from the springs, wells and well-point systems, and account for over 5% of the groundwater outflow. The flow from these drain cells is 1,870 gallons per minute (gpm), which approximates the natural flow observed from this area. The drain

cells are located in an area of high-density grid lines; as a result the drain cells are not readily apparent on **Figure G-1**.

The original USGS model included three zones of hydraulic conductivity. All five layers in the western half, and a southern section of the model domain, were assigned a hydraulic conductivity (K) equal to 100 feet per day (ft/day). The zone with 100 ft/day conductivity is illustrated with blue shading on **Figure G-2**. The cells in the top three layers of the remaining model domain were assigned a K equal to 120 ft/day; the cells of the two bottom layers were assigned a K equal to 150 ft/day. In reducing the model from five- to one-layer, Liesch maintained the hydraulic conductivity values in the blue zones at 100 ft/day, and set the hydraulic conductivity of the remaining cells at 120 ft/day. These conductivity ranges are consistent with the values calculated based on the recent aquifer testing procedure.

Recharge to the groundwater flow model is assigned uniformly across the model domain. The original USGS model assigned a recharge value equal to 11 inches per year. Unless otherwise noted, Liesch used the same value for recharge.

The original USGS model used uniform storage coefficients across the model domain; the storage coefficient was assigned a value of $5 * 10^{-5}$ and the specific yield was fixed at 0.01 (dimensionless). Liesch assigned a value of 0.15 (dimensionless) for both the storage coefficient and the specific yield.

7.3 Steady-State (Non-Pumping) Model

After reducing the model from five to one-layer and incorporating the above-referenced changes, Liesch ran the groundwater flow model under steady-state conditions. The initial conductance terms for the drain cells – which were used to simulate the springs and well-point systems – was too high and resulted in excess groundwater outflow from the model. The conductance terms for the drains was reduced until the drain outflow approximated the spring flow. The steady-state groundwater contours from the single-layer flow model are similar to the published contours (USGS, 1996). The results from the groundwater model are presented with a copy of the USGS contours in **Figure G-3** for comparison.

7.4 Aquifer Pumping Test Simulation

The aquifer test completed in 2005 included pumping from the production well at a rate of 1,400 gpm for 72-hours. After the drawdown portion of the test was finished, the pump was shut down and the recovering water-levels were measured. During the test, water levels were recorded

in the pumping well and at several remote monitoring stations – including monitoring well Obs-4-05, which is located 300 feet from the pumping well. The goal for this transient modeling was to determine whether the water-level changes predicted by the model approximate those observed during the test. The initial water levels for this simulation were extracted from the steady-state, non-pumping scenario.

A well boundary condition was installed in the model domain, and a water-level monitoring well (e.g. phantom well) was used to track the predicted water level changes at Obs-4-05. The pumping well was configured to act as a groundwater outflow (1,400 gpm for 72 hours) during the first stress period. The second stress-period of the model included no pumping and spanned seven days. The predicted drawdown at the end of the first stress period is presented in **Figure G-4**.

The predicted drawdown and recovery-as-drawdown at the phantom monitoring well are similar to the water level changes recorded at Obs-4-05 during the aquifer testing. Several figures are provided in **Appendix G** to illustrate the predicted water-level response at the phantom monitoring well:

- **Figure G-5** Predicted water-level changes at the phantom monitoring well during the 10-day, transient simulation
- **Figure G-6** Semi-log plot of elapsed time versus drawdown
- **Figure G-7** Semi-logarithmic plot of elapsed time versus recovery-as-drawdown

The predicted drawdown at the phantom monitoring well is similar to the observed drawdown at Obs-4-05. The model results also indicate roughly 0.1-feet of drawdown near the springs at the end of the first stress period, which is similar to the drawdown observed at the hatchery monitoring wells. A comparison of the predicted and observed drawdown indicates that the groundwater flow model is a reasonable predictor of water-level changes resulting from the pumping.

7.5 Fish Hatchery – Model of Normal Operations

The plan for the fish hatchery envisions 4,200 gpm sustained flow will be needed to maintain routine operations at the project. In order to model the anticipated drawdown resulting from long-term operations, well boundary conditions were set in four cells; two were configured for groundwater outflows at 1,000 gpm and the other two were configured at 1,100 gpm. The initial water levels for this simulation were extracted from the steady-state, non-pumping scenario.

For this scenario, three additional primary wells were added to the model as shown on **Figure 4**.

The pumping rate for the east-side supply well was set at 1,000 gpm and the three west-side supply wells were modeled at rates between 1,000 and 1,100 gpm. The model was run as a steady-state simulation.

The model predicts that approximately 4 to 5 feet of drawdown could be expected as a result of pumping for normal hatchery operations – in the vicinity of the current raceways, springs, and hatchery stream. Contours of the groundwater elevations predicted by the model are provided in **Figure G-8**; this illustration also provides color-shading of those areas where the predicted drawdown is at least three feet.

The model also suggests that natural flow at the hatchery stream, as indicated by the drain boundaries in the model, would decrease from 1,870 to 1,120 gpm; the actual impacts at the stream as a result of the Project are somewhat more difficult to quantify. The existing stream is not in a natural condition as flow to it has been enhanced for fish rearing over the last 100 years by raceway construction, spring development, sand point and well installation, including Well E - the flowing 16-inch well.

7.6 DROUGHT-YEAR MODEL

The groundwater flow model predicts that pumping for the hatchery has an effect on baseflow through the spring complex. Owing to this relationship, an extension of the modeling was completed to assess potential changes in spring baseflow resulting from a year of below-normal precipitation. The changes in the hydrogeologic conditions used for this model include:

- The model is set up as a transient simulation with two stress periods. The duration of each stress period is one year.
- The first stress period represents one year of drought conditions, where recharge to the aquifer system is 40% below normal (e.g. 6.6-inches per year). The second stress period represents a more-wet year, with precipitation 20% above normal (13.2-inches per year).

The reduced infiltration resulting from drought conditions results in reduced head throughout the model domain, which in turn results in reduced spring baseflow. The increased precipitation in the following year increases head across the model domain, with a net increase in spring baseflow (see **Figure G-9**). The model predicts a 100 gpm flow reduction during the drought simulation.

7.7 SPRING AND WELL-WATER SOURCES - PARTICLE TRACKING

The groundwater flow model provides information on the zone of influence and the amount of

drawdown resulting from pumping, in addition to the sources of water discharged at the springs. Liesch used ModPath to calculate reverse particle traces based on groundwater elevations for the steady-state non-pumping and pumping models. Reverse particle-tracking in ModPath relies on the steady-state groundwater elevations; based on the final destinations of particles, ModPath iteratively steps backward in model time to calculate earlier locations of these particles. Using the particle traces, it is possible to estimate the aquifer source zone for groundwater discharge.

The reverse particle tracking for the non-pumping model is centered on the drain functions that represent the spring system. Liesch used seven final particle locations in this simulation, and allowed ModPath to track the particle locations backward in time. These particle traces extend westerly from the springs (see **Figure G-10**).

Reverse particle tracking for the pumping simulation is centered about both the drain functions and the well functions. Liesch used six final particle locations around the spring system plus 14 locations spread across the well field to illustrate the source zone for groundwater discharging at the spring system and well field (see **Figure G-11**). The results of this model indicate that pumping at the well field deflects spring-system flow contours to the south. Overall, the particle tracking indicates the source zones for the spring system and well field lie to the west.

8.0 DISCUSSION OF RESULTS

The results of the test drilling, aquifer testing and computer modeling of aquifer conditions suggests that the proposed water supply development scenario for the Project is feasible from the stand point of groundwater availability, aquifer water levels and interference drawdown between existing and proposed wells. The effects of pumping on area resources including the Hatchery spring complex, area wetlands and surface waters, in addition to private (domestic) water supply wells are discussed in more detail below.

Private Water Supplies

Under the proposed pumping scenario, a relatively limited area of the aquifer would be affected by the pumping by more than three feet of water level decline. This area is largely limited to WDNR property with the exception of the in-holdings, or privately owned parcels, within the Hatchery boundaries. It is anticipated that most, if not all area wells could tolerate such a decline without any interruption in their ability to supply water. Exceptions could include the previously mentioned in-holdings and properties immediately north of the Hatchery property on the west

side of Highway 22. In these cases it may be necessary to modify or replace existing wells, prior to production pumping, to assure an uninterrupted supply of water.

Observation wells are in place to monitor the effects of pumping and these wells may be used to determine the effects of pumping at existing wells and surface water resources to assess the need for well replacement or other measures to mitigate potential impacts. The existing observation well network includes the four observation wells installed on-site (Obs-1-05 through Obs-4-05), The Village of Wild Rose Well located south of the Hatchery at the Village wastewater treatment facility (WWTF) and the WDNR Habitat Management well located north of the Hatchery property. The observation wells were constructed as permanent observation points that may be used to monitor the effects of pumping on the aquifer during operation of the renovated Hatchery. The supply wells for the Village WWTF and the WDNR Habitat Management Facility have also been monitored for pumping effects at off-site locations and will serve as important observation points in the future.

A detailed water level record is an invaluable tool in determining whether an existing private domestic well has been, or will be impacted, during pumping. The existing observation well network will be monitored on routine basis to establish a detailed pre-pumping record of water level changes in the aquifer. It is anticipated that additional observation wells will be added to the network as additional production well sites are established and developed for production pumping.

If future aquifer analysis, water level monitoring or computer modeling indicate that impacts are likely at existing domestic wells the pump should be set lower or the well should be replaced before the residents experience an out-of-water situation. In these situations the owner would be contacted and arrangements made for a licensed well contractor to examine the well and make recommendations to remedy the situation. If an area resident experiences an out-of-water situation that they believe may be the result of Hatchery operations they should contact a licensed well contractor to assess and/or remedy the problem and report the problem to the area WDNR Water Supply Specialist in Wautoma for further instructions. The observation well information, in combination with the production pumping records and information concerning the potentially affected well will be used to determine the cause of the problem. The Hatchery will be responsible for making any repairs, modifications or replacements to existing wells necessary to restore the water supply.

Hatchery Spring Complex and Wetlands

The actual effects of pumping on the area of the existing Hatchery spring complex and wetlands will be dependent on several factors including the wetland restoration proposed for the area. Major changes are proposed for the Hatchery spring complex including abandonment of the existing sand points, wells and non-compliant water supply facilities as well as abandonment of most of the existing raceways and restoration of the stream channel. The effects of these changes on water levels and the hydrology of the spring complex cannot be predicted with a high degree of certainty. However, the computer model presented in the previous section indicates that the proposed pumping scenario will result in a four foot decline in aquifer water levels near the existing raceways and that flow from the existing raceway area will decrease from approximately 1870 gpm to 1120 gpm. Projected impacts have been discussed with the WDNR wetland specialists responsible for the stream and wetland restoration and an adaptive management strategy has been proposed.

If it is determined that the effects of pumping in the vicinity of the existing raceways would be detrimental to the wetland restoration, it may be possible to develop additional supply wells further to the north, perhaps on the WDNR Habitat Management property immediately north of the Hatchery on the east side of Highway 22. The existing well for this facility was monitored during the pumping test without discernable drawdown after the 72-hour pumping period. Moving production pumping in this direction would spread the effects of pumping over a larger area with less drawdown and would have the added benefit of spreading the pumping perpendicular to the groundwater flow direction thereby reducing impacts. In addition, it may be possible to augment flow in the renovated Hatchery stream and wetlands through use, or re-use, of a portion of the coldwater water supply (currently 300 gpm is proposed for the historic raceway demonstration), through the use of existing Well E or by removing/reconfiguring spoil piles and filled areas.

As previously discussed, the next step in water supply development would involve construction of three additional wells on the west side of the Hatchery for coldwater operations. Assuming that each well is capable of supplying at least 1000 gpm, two of these wells, in combination with the existing TPW-1-05 would be capable of meeting routine pumping requirements. The third well would serve as a redundant supply wells for maintenance and emergency purposes, prior to construction of additional wells under Phase II of the Project. An additional test would then be conducted on these wells to verify model predictions and potential impacts to the aquifer. Subsequent phases of water supply development would then be based on the results of these wells.

If initial testing and operation of the four coldwater wells results in acceptable impacts, given the

plans for restoration of the historic raceways and wetlands, then the coolwater well (Well D) would be installed as shown on **Figure 4**, and Well C would be used as a back up well to support both east and west side operations, as necessary. If emergency capacity, for pumping up to 7000 gpm for limited periods is required, a location for a sixth well will then be selected based on the location of existing or planned water supply facilities.

If the initial testing and operation of the coldwater wells results in unacceptable impacts, then an additional coldwater well would become the emergency well and an additional well would be installed at an alternate location, such as the WDNR Habitat Management property, as shown on **Figure 4**.

Pine River

The available information suggests that the flow in the Pine River is primarily the result of base flow from groundwater discharging to the stream, runoff and direct precipitation. Under the existing conditions at the Hatchery, the particle trace (**Figure G-10**) conducted as part of the MODFLOW analysis suggests that flow from the existing Hatchery stream originates as groundwater in the area west of the Hatchery with a portion of that flow originating as recharge to groundwater from the Pine River to the west of the Hatchery, as suggested in previous reports (Conlon 1996). Under the existing condition, the model indicates that the Hatchery stream contributes 1870 gpm to the flow of the Pine River with a portion of that flow originating from the Pine River upstream of the Hatchery.

A similar analysis was conducted for the proposed pumping scenario (**Figure G-11**) which also indicates that flow to the proposed wells and Hatchery stream will originate from a larger area west of the Hatchery with a portion of the flow originating as recharge to groundwater from the Pine River west of the Hatchery. Under the proposed pumping scenario, flow from the Hatchery stream and the renovated Hatchery would total approximately 5320 gpm (stream at 1120 and Hatchery at 4200 gpm).

The particle trace analysis suggests that the proposed pumping scenario does not cause a gradient reversal where groundwater that once flowed to the river now flows back towards the wells. The analysis does indicate that the Pine River recharges the groundwater in the area west of the Hatchery under both the pumping and non-pumping scenarios. Under the proposed pumping scenario for routine Hatchery operations (4200 gpm), where all water will be returned to the Pine River, it is anticipated that there will be no net loss in the flow of water in the Pine River.

9.0 RECOMMENDATIONS

Well Construction, Operation and Maintenance

1) The 18-inch test production well constructed under this investigation, TPW-1-05, is a reasonably efficient and fully developed well capable of producing yields in excess of 2000 gpm. Based on the screen transmitting capacity and lack of operating history for similar high capacity wells in the aquifer, a maximum routine operating rate of 1400 gpm is recommended for this well. This figure is based on a recommended pumping rate equal to one half of the manufacturers recommended maximum screen entrance velocity of 0.1 ft/second. During the initial stages of well field operations, frequent measurements of static and pumping water levels should be taken from each well in order to calculate the specific capacity of each well over time. If significant declines in specific capacity are observed, maintenance and/or well rehabilitation procedures should be implemented at the earliest opportunity.

2) Future wells should be constructed to take full advantage of the aquifer conditions at each proposed well site in order to obtain the greatest screen transmitting capacity. To this end, 18-inch production wells are recommended with either a gravel packed or naturally developed screen, depending on the grain size distribution of the aquifer at each individual well site.

3) The test drilling conducted under this investigation has revealed highly variable subsurface conditions with respect to the occurrence of favorable aquifer segments for production well construction. As a result, test holes are recommended for all future production well sites prior to finalizing plans for production well construction. Test holes should be drilled at the proposed production well sites indicated on **Figure 4,** and any alternate sites, if available, and analyzed to determine which sites are suitable for test production well construction and preliminary well design.

Resource Monitoring

4) The observation wells constructed as part of this work should be maintained for further aquifer testing and analysis. A monitoring plan should be developed to obtain a minimum of monthly water level measurements with more frequent measurements

taken as additional water supply development activities are implemented. Prior to production pumping, select wells should be outfitted with pressure transducers and data loggers to provide a continuous record of water level changes.

5) In addition to the outfalls planned for the new facilities, surface water flow measurements should be obtained on a regular basis at the restored Hatchery stream as part of a long term monitoring plan.

10.0 REFERENCES

Conlon, T.D. 1996, Hydrogeology of the Sand and Gravel Aquifer in the Vicinity of the Wild Rose State Fish Hatchery, North-Central Waushara County, Wisconsin: U.S. Geological Survey Water –Resources Investigations Report 96-4213 (Conlon 1996)

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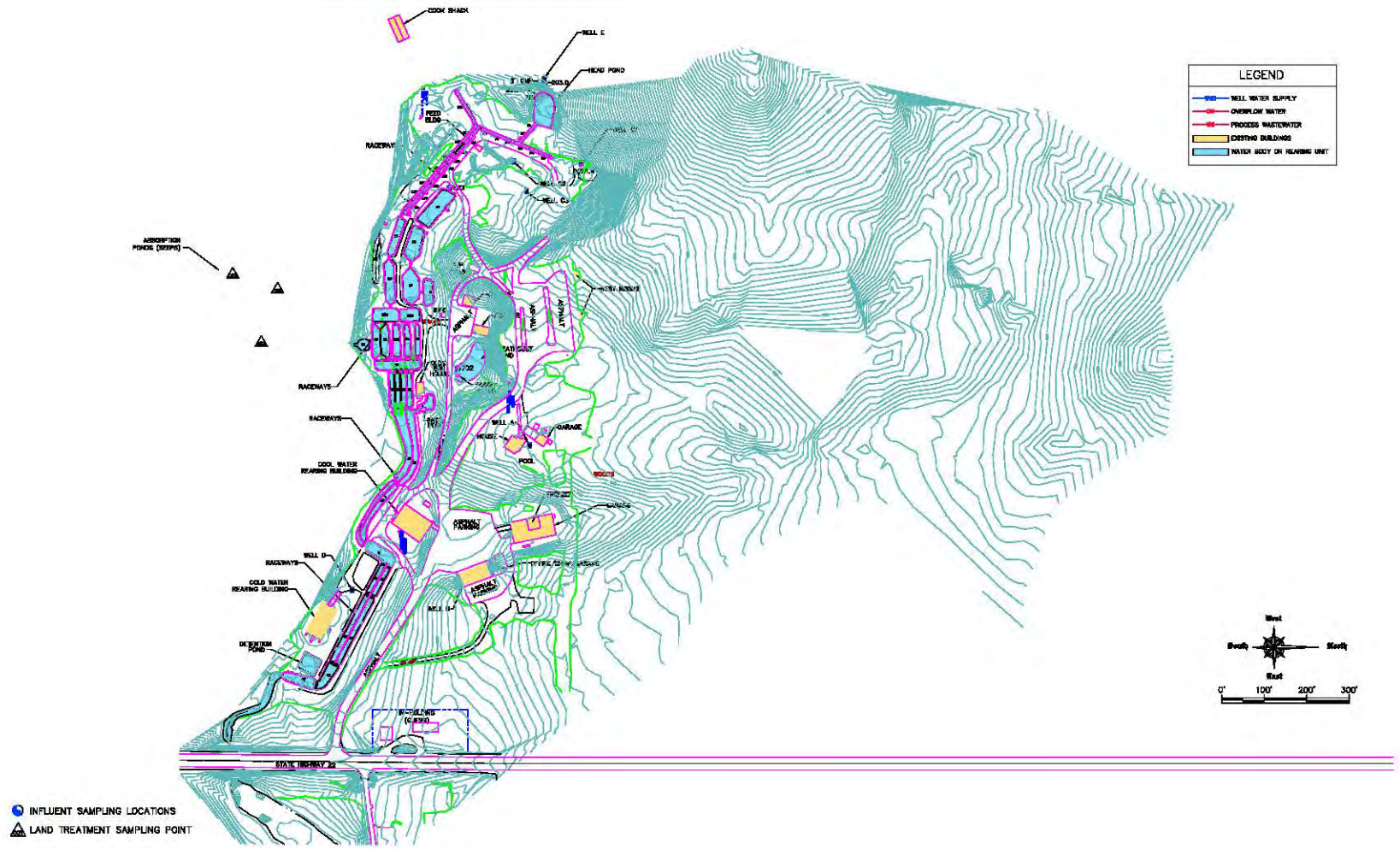
Summers, W.K. 1965, Geology and ground-water resources of Waushara County, Wisconsin: U.S. Geological Survey Water-supply Paper 1809-B (Summers 1965)

W:\ws\13071\2005 Aquifer Test\Report\rpt TPW-1-05 100305.doc



Source: FishPro, Oct. 2005

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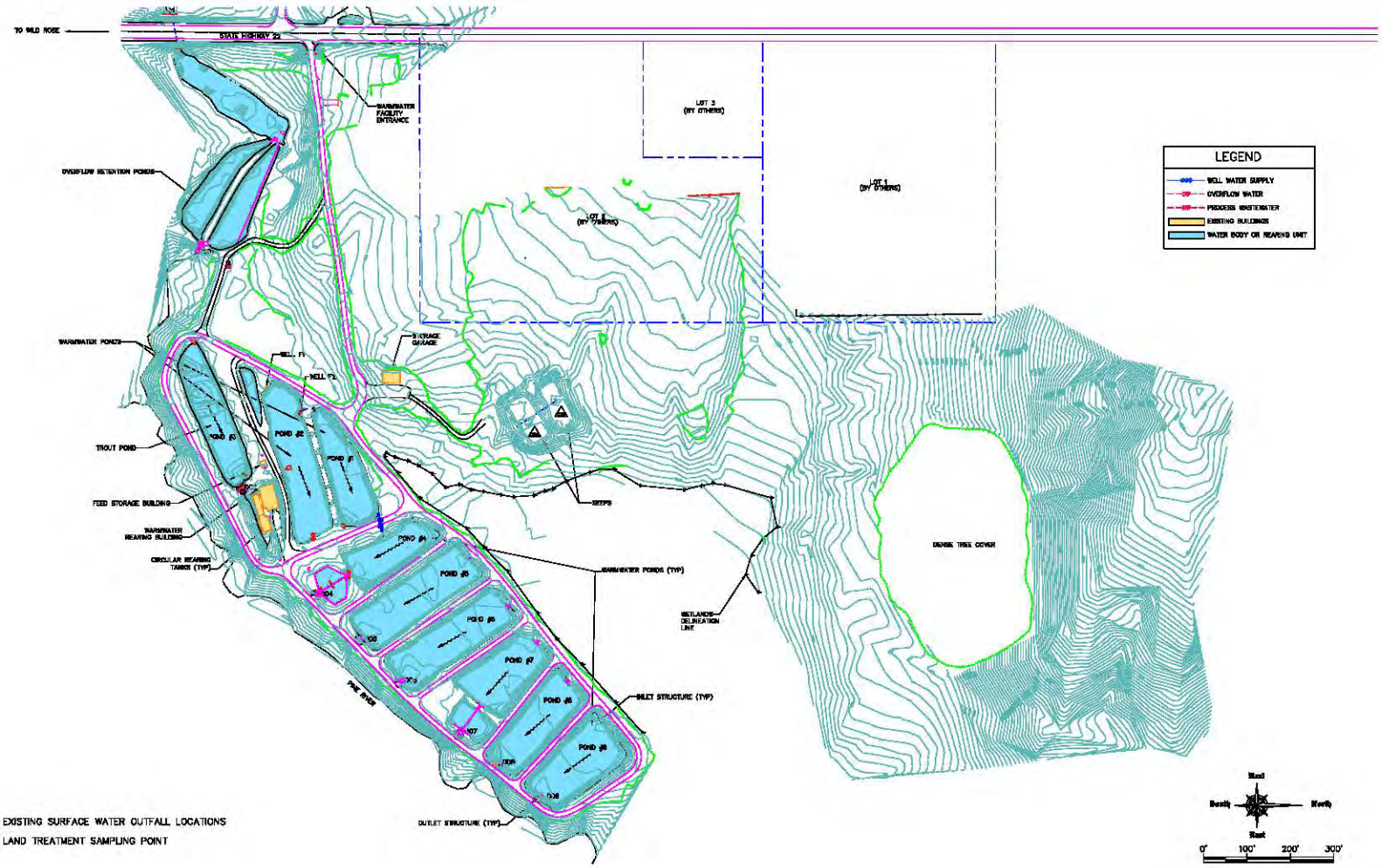
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wild Rose State Fish Hatchery EA	Oct. 2005
West Side Existing Hatchery Operations	FIGURE 3a



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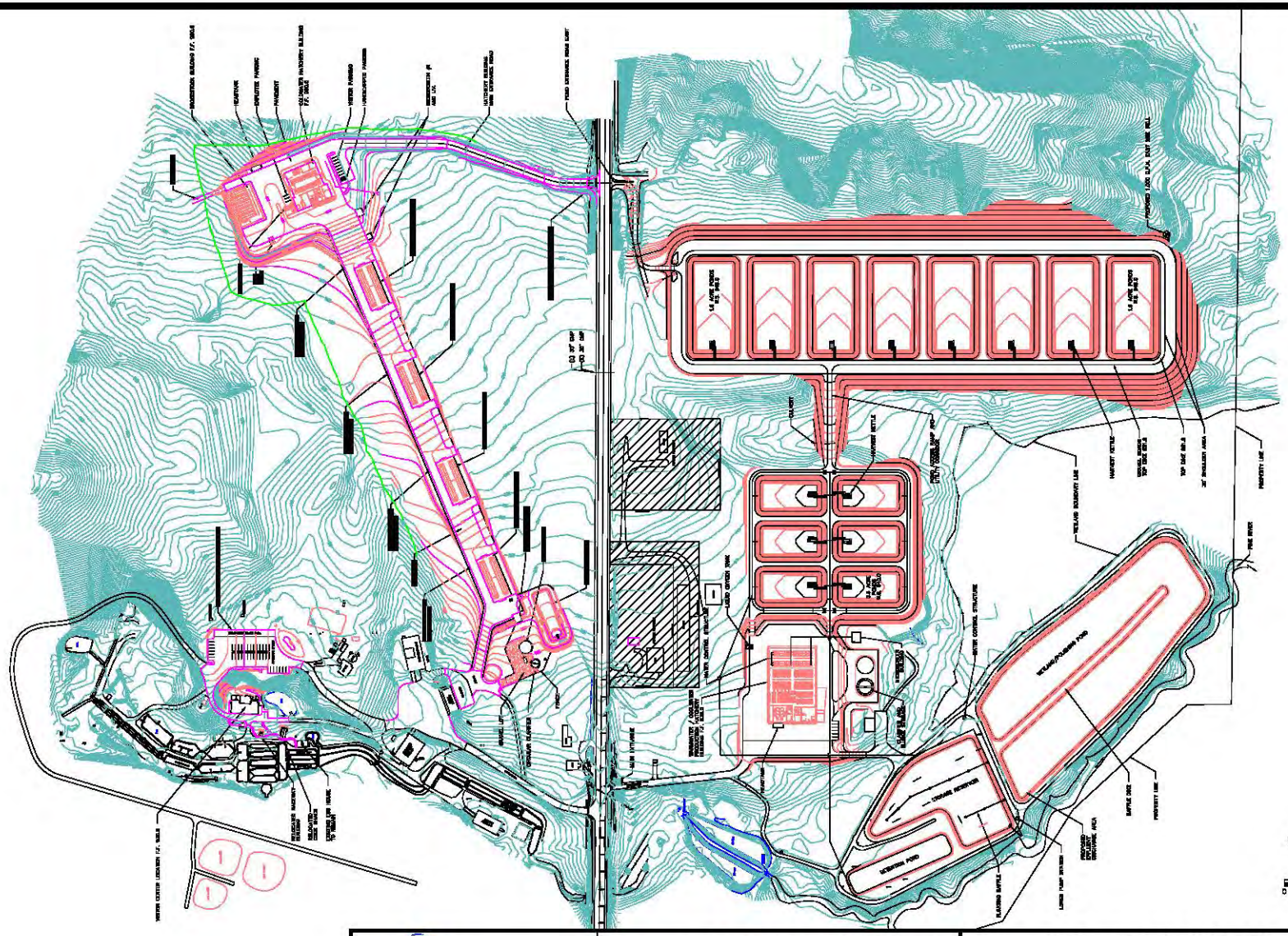
Wild Rose State Fish Hatchery EA	Oct. 2005
East Side Existing Hatchery Operations	FIGURE 3b



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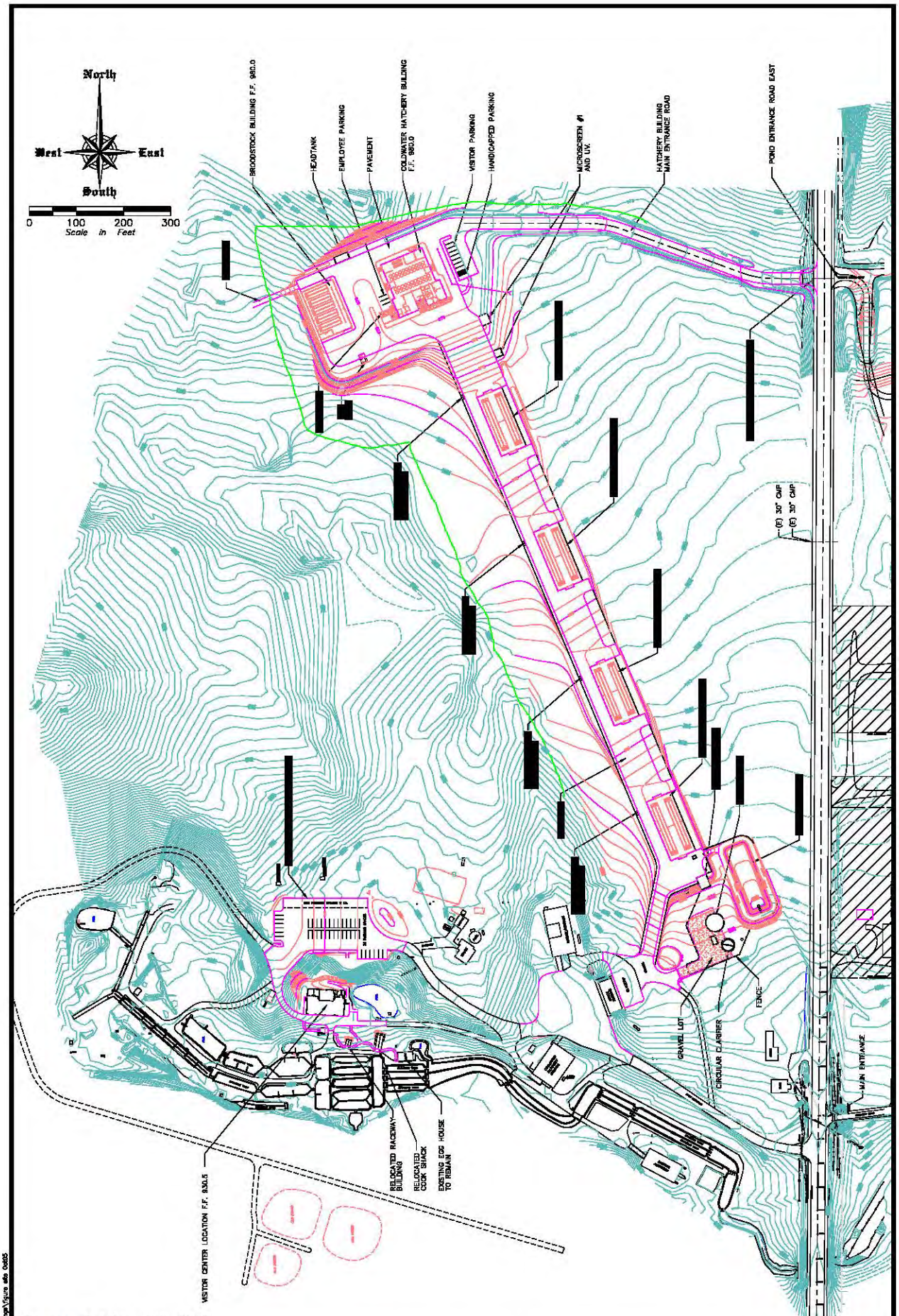
Wild Rose State Fish Hatchery EA	Oct. 2005
Proposed Project Site Development Plan	FIGURE 4



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Wild Rose State Fish Hatchery EA	Oct. 2005
Proposed Phase I Facilities	FIGURE 5

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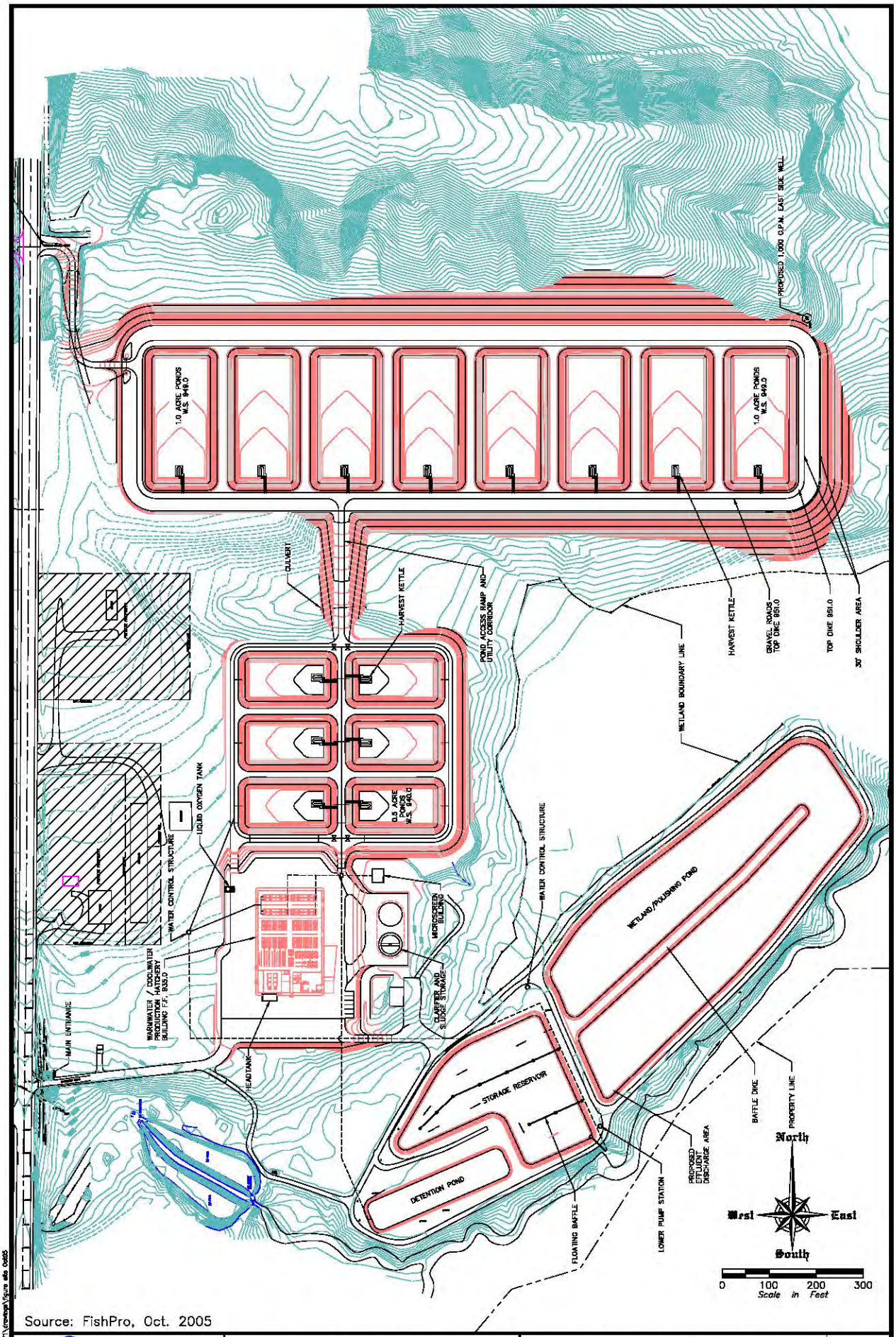

Source: FishPro, Oct. 2005

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Wild Rose State Fish Hatchery EA	Oct. 2005
Proposed Phase II Facilities	FIGURE 6

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Simulated and measured flow in the Upper Pine River

	Simulated steady-state, no pumping, 13 in/yr recharge, run jtk9				**Measured Average[1]**
Upper Pine Site	Inflow ft^3/d	Outflow ft^3/d	Outflow - Inflow ft^3/d	Outflow - Inflow cfs	cfs
site 1	50,038.2	168,045.7	118,007.5	1.37	0.916
site 2	199,566.9	497,327.7	297,760.8	3.45	2.39
site 3	199,566.9	666,745.1	467,178.2	5.41	5.98
site 4	199,566.9	774,189.9	574,623.0	6.65	7.64

[1] site locations and measured flows are from Scott Provost (Wrflowsfinal.xls)

HB & BB Reuse (Normal Operation)	Discharge Flows	Max[4] Design		*5 Max	Min	Avg	Jan 01-Jan	Jan 15-Jan	Feb 01-Feb	Feb 15-Feb	Mar 01-Mar	Mar 15-Mar	Apr 01-Apr	Apr 15-Apr	May 01-May	May 15-May	Jun 01-Jun	Jun 15-Jun	Jul 01-Jul	Jul 15-Jul	Aug 01-Aug	Aug 15-Aug	Sep 01-Sep	Sep 15-Sep	Oct 01-Oct	Oct 15-Oct	Nov 01-Nov	Nov 15-Nov	Dec 01-Dec	Dec 15-Dec
	Abbrev.																													
Water Demand and Usage Rates (GPM)																														
Ph. I - Coldwater Side (West Side)																														
Incubation, Early Rearing and BB[1, 2]	Bldg	**3,424**		3,284	2,089	2,547	3,284	3,129	3,065	2,648	2,908	2,888	2,624	2,624	2,416	2,338	2,250	2,250	2,182	2,198	2,171	2,183	2,089	2,179	2,604	2,696	2,696	2,579	2,593	2,528
Existing Coolwater Building (New Well)[3]	ECB	**300**		300	0	100	0	0	0	0	300	300	300	300	300	300	300	300	0	0	0	0	0	0	0	0	0	0	0	0
Ph. II - Coolwater Side (East Side)																														
Well Water Demand (Incubation + 10% Makeup)	Well	**985**		680	180	342	180	180	180	180	393	437	403	680	546	577	517	517	300	300	300	300	300	330	390	360	300	180	180	180
Total		**4,709**		4,264	2,269	2,989	3,464	3,309	3,245	2,828	3,601	3,624	3,327	3,604	3,262	3,215	3,067	3,067	2,482	2,498	2,471	2,483	2,389	2,509	2,994	3,056	2,996	2,759	2,773	2,708
					6	7						8											9							

Notes: = yellow high-lighting added by Al Kaas

1 BB=broodstock building
2 all of this water goes to the raceways
3 This building will not be regularly used after Phase 2 is done
4 The figures in this column are a design condition where all waters sources are used at their maximum simultaneously
5 These 3 columns represent the maximum or minimum or calculated vales for the row
The maximum value listed is the maximum row value found, which may not occur at the same time
The minimum value listed is the maximum row value found, which may not occur at the same time
The Average value listed is the row average value
6 The Maximum value listed here was used for the model (4,200 gpm)
7 The Average value listed here is similar to the operational design value for the raceways at 4 exchanges per hour
8 High, 1/2 monthly water usage based on the bio-criteria
9 Low, 1/2 monthly water usage based on the bio-criteria

WILD ROSE FISH HATCHERY GROUND-WATER-FLOW MODEL – MODIFICATION AND RESULTS

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Background

The U.S. Geological Survey (USGS) developed and calibrated a MODFLOW ground-water-flow model in the vicinity of the Wild Rose Fish Hatchery in 1997-98 at the request of the Wisconsin Department of Natural Resources (DNR). The model is 101 rows by 101 columns. The grid spacing is variable ranging from 1.5 feet at the center to 832 feet at the model extent. The grid is rotated 30 degrees relative to map north to align the grid with the general direction of ground-water flow. The grid is designed to simulate a test well (drilled and tested in 1997) located at the grid center. Five model layers are used to account for varying depths of observation wells and the screened interval of the test well. Perimeter boundary conditions include 1) a general head boundary on the left edge of the grid to simulate ground water entering the model from an adjacent watershed, 2) a constant head boundary on the right edge of the grid to simulate surface water features (e.g., lakes, streams, wetlands) distant from the hatchery site and 3) no-flow boundaries on the remaining 2 edges to simulate flow parallel to these boundaries (figure 1). The interior model boundaries include drains to simulate the spring complex on the hatchery site and river cells to simulate the Pine River. The global recharge rate is 11 in/yr. The Upper Pine River is defined as the river above and including the Wild Rose mill pond (figure 1).

The Wild Rose Fish Hatchery ground-water-flow model described above was recently modified by Liesch Environmental Services (2005). The only major modifications were changing the five layer model to a one layer model and increasing the hydraulic conductivity in one part of the model from 100 ft/day to 120 ft/day. The calibration statistics of the modified model are not as good as the original five-layer model (compare table 1 to table 2). For example, the residual mean using observed and computed ground-water levels from 26 existing wells is -0.14 ft for the original model and -2.59 ft for the

modified model. The residual mean is the sum of the differences between observed and computed ground-water levels divided by the number of observations. The modified model results (drawdown) do compare favorably to a 72-hour pump test. The modified model was than used to simulate pumping of the 4 wells shown on figure 1 at a total rate of 4200 gallons per minute (gpm) and to forecast the effects of this pumping on ground-water levels and changes in flow to the hatchery spring complex (drain boundaries) and the Pine River (river boundaries).

A problem arose when an attempt was made to simulate and forecast flow reduction to the Upper Pine River. Both predevelopment (no pumping) and pumping simulations indicate that the Upper Pine River has losing and gaining reaches (figure 2). The steady-state modified model simulated net ground-water inflow to the Upper Pine River equal to 1.56 cubic feet per second (cfs) under predevelopment conditions, and a net flow out of the stream equal to 0.28 cfs under pumping conditions. Because the MODFLOW simulation only accounts for the ground-water contribution to the stream and does not include routing of overland flow, the net loss simulated with pumping does not necessarily imply that the stream will actually go dry under pumping conditions.

The $Q_{7,10}$ of the Upper Pine River is estimated to be 5.6 cfs and the average flow is estimated to be 19 cfs (written communication, Alfred Kaas, DNR, 2005). The $Q_{7,10}$ is a measure of low flow in a stream and is typically below the long-term average rate of baseflow. The average flow takes into account both baseflow and flow due to storm events. Because the modified model is assumed to simulate baseflow conditions under average conditions, the model must simulate flow greater than the $Q_{7,10}$ of 5.6 cfs but less than the average flow of 19 cfs. The original version of the model only simulated a flow of 1.94 cfs.

Model Modification

To increase simulated flow in the Upper Pine River the model was further modified by increasing the conductance of river cells one order of magnitude in cells representing the Upper Pine River, and decreasing the conductance of the river cells representing the mill

pond one order of magnitude. Conductance takes into account the hydraulic conductivity of the river bed, the thickness of river sediment, and the width and length of the river in a model cell. The one order of magnitude increase in the conductance assumes that the hydraulic conductivity of the river bed is similar to the hydraulic conductivity of the aquifer while decreasing the conductance in the mill pond assumes that the pond bottom has a low hydraulic conductivity due to sedimentation.

The USGS 7.5 minute Wautoma NE quadrangle map shows a spring in the headwaters of the Upper Pine River which was verified by a measurement of 4.0 cfs in August 2000 (written communication, Alfred Kaas, DNR, 2005). It is assumed that the spring flow, possibly derived from outside the model domain, is responsible for the flow in the headwater of the Upper Pine River rather than any local baseflow contribution. Therefore, the model river cells in the head waters of the Upper Pine River were deleted (figure 2).

Model Results

Model results incorporating the changes described above indicate that drawdown due to pumping at 4200 gpm is similar to that reported by Liesch (2005) (figure 3), that these changes only affect ground-water levels near the stream (figure 4), and that the calibration remains similar to the previous predevelopment models (compare table 3 to table 2). Because the model cannot simulate the headwater spring flow the most reasonable alternative is to add this flow of 4.0 cfs to the simulated flow.

With the changes described above the model simulates a predevelopment flow in the Upper Pine River just below the mill pond of 6.93 cfs which consists of 2.93 cfs simulated net inflow and 4.0 cfs as measured from the headwaters spring. The reduction of flow in the Upper Pine River due to pumping at 4200 gpm is 2.4 cfs (see table 3; model run jtk2b). By comparing figures 5 and 6, that is, predevelopment to pumping simulations, it is possible to identify the river cells where gradient reversals occur; these are the stream segments that are most effected by the pumping.

An additional simulation was run using a recharge rate of 13 in/yr (2 in/yr greater than the original model). Lin (2002) used a value between 12 and 13 in/yr to calibrate a ground-water-flow model of a hydrologic setting similar to the Wild Rose Fish Hatchery, the Buena Vista Groundwater Basin, located approximately 20 to 30 miles to the northwest. The 13 in/yr recharge rate results in higher flow in the Pine River than the 11 in/yr rate. At predevelopment the total flow in the Upper Pine River is 10.89 cfs (6.89 cfs simulated net inflow, see table 4; model run jtk9). The simulated flow reduction in the Upper Pine River due to pumping 4200 gpm from the 4 wells is 2.41 cfs (table 4). Comparing figure 7 to figure 8 gives an indication of which stream segments are most affected by the pumping.

The calibration using observed ground-water levels for the 13 in/yr recharge rate model run (jtk9) is similar but not quite as good as the 11 in/yr model run (jtk2b) (compare table 4 to table 3). For example, the residual mean for the 13 in/yr run is -3.36 ft versus -2.28 ft for the 11 in/yr run. The simulated flow in the Upper Pine River is 6.93 cfs and 10.89 cfs for the 11 in/yr and 13 in/yr runs, respectively. The 13 in/yr run is probably closer to an average baseflow condition.

Model results for the two model runs incorporating the Upper Pine River conductance changes (tables 3 and 4; model runs jtk2b and jtk9, respectively) are very similar and the model mass balances indicate that the sources of water to the 4 pumping wells are from the following model boundaries: constant head – 60 gpm, river – 3390 gpm (with 1070 gpm from the Upper Pine River), drain (hatchery springs) – 700 gpm, general head – 40 gpm. The maximum drawdown is about 15 feet (figure 4).

Discussion

The Wild Rose Fish Hatchery ground-water-flow model is the best available tool for estimating the effects of pumping on ground-water levels and flow to the fish hatchery spring complex and the Pine River. However, because the model is a simplification of reality it has limitations. The most important limitation is in the simulation of the Upper Pine River and the spring in the headwaters of the Upper Pine River. The model as

presently constructed cannot route water in the Upper Pine which is an important consideration because model results indicate that there are gaining and losing reaches. The model also does not simulate the Upper Pine River headwater springs. With further study and monitoring a more realistic simulation using stream routing is possible. Further study would include measurement of ground-water levels beneath stream beds and stream flow measurement at selected intervals along the Upper Pine River. These measurements would provide data to estimate stream conductance and additional data to improve model calibration. Study of the headwater springs would provide insight into the origin of the spring flow which can than also be simulated in the model. The headwater spring is an important source of the water to sustaining flow in the Upper Pine River which in turn is an important source of water to the simulated pumping wells. Further study will help protect these springs and the Upper Pine River.

Conclusions

The original model and the model modified by Leisch Environmental Services are reasonably calibrated to observed ground-water levels but not to baseflow in the Upper Pine River. When account is taken of the Upper Pine River headwater spring and changes to conductance are inserted, the revised model preserves calibration to ground-water levels and simulates baseflow in the Upper Pine River slightly greater than the estimated $Q_{7,10}$ of 5.6 cfs. When the recharge rate is increased from 11 in/yr to 13 in/yr the baseflow in the Upper Pine River increases from 6.93 cfs to 10.89 cfs which is believed to be closer to an average baseflow. The revised model mass balances are very similar and indicate that the sources of water to the 4 wells pumping at a total rate of 4200 gpm are: constant head – 60 gpm, river – 3390 gpm (with 1070 gpm from the Upper Pine River), drain (hatchery springs) – 700 gpm, general head – 40 gpm. The maximum drawdown is about 15 feet.

References

Liesch Environmental Services, October, 2005, Wild Rose State Fish Hatchery Renovation and Compliance Project No. 0311F - Test Production Well Construction and Aquifer Testing Procedures

Lin Y-F., 2002, Development of a Digital Method for Estimating Groundwater Recharge and Discharge, Ph.D. Dissertation, University of Wisconsin - Madison, 106 p. (plus one CDROM).

Table 1

WildRff5 USGS predevelopment

Name	X	Y	Layer	Observed	Computed	Weight	Group	Residual
Well990	20236	21000	3	963	960.4328	1	1	2.567207
Well988	21600	19850	3	955	954.8853	1	1	0.114653
Well986	21900	20270	3	957	952.3223	1	1	4.677663
Well983	21270	21730	3	947	951.8231	1	1	-4.823147
Well993	22030	24700	3	928	937.5206	1	1	-9.520564
Well992	24400	24100	1	935	926	1	1	9
Well991	24500	23800	1	931	926	1	1	5
Well34	4608	31935	4	1058	1021.193	1	1	36.80696
Well424	2232	17921	4	1058	1038.515	1	1	19.48488
Well39	16327	19326	3	985	983.4761	1	1	1.523862
Well12	38410	42845	2	885	890.7211	1	1	-5.721145
Well403	38852	40033	2	881	885.5334	1	1	-4.533382
Well237	35959	34048	2	883	881.8493	1	1	1.150739
Well233	31381	31473	1	897	901.9666	1	1	-4.966559
Well278	34261	25675	1	908	904.9995	1	1	3.000522
Well251	32991	24936	2	907	910.9456	1	1	-3.94557
Well321	30095	24786	2	908	917.3122	1	1	-9.312197
Well404	29938	23778	3	911	920.1941	1	1	-9.194056
Well371	41604	28829	3	880	873.9709	1	1	6.029144
Well372	39610	27519	2	881	882.2811	1	1	-1.281123
Well322	33322	23790	3	904	912.9113	1	1	-8.911323
Well249	30141	22674	3	908	922.9236	1	1	-14.92363
DN514	40568	28143	3	875	878.1113	1	1	-3.11127
EK076	39110	7404	3	871	908.8245	1	1	-37.82447
PumpedW	22956.23	22956.16	1	937.5	931.4447	1	1	6.055312
PT2	22882.46	23020.1	1	939.1	932.3839	1	1	6.716115
PT1	23007.83	22942.55	1	936.5	930.1692	1	1	6.330754
PT3	22879.3	22889.04	1	938.8	933.008	1	1	5.792011
Residual Mean						-0.136379		
Res. Std. Dev.						12.24101		
Sum of Squares						4196.103		
Abs. Res. Mean						8.297081		
Min. Residual						-37.82447		
Max. Residual						36.80696		
Range						187		
Std/Range						0.06546		

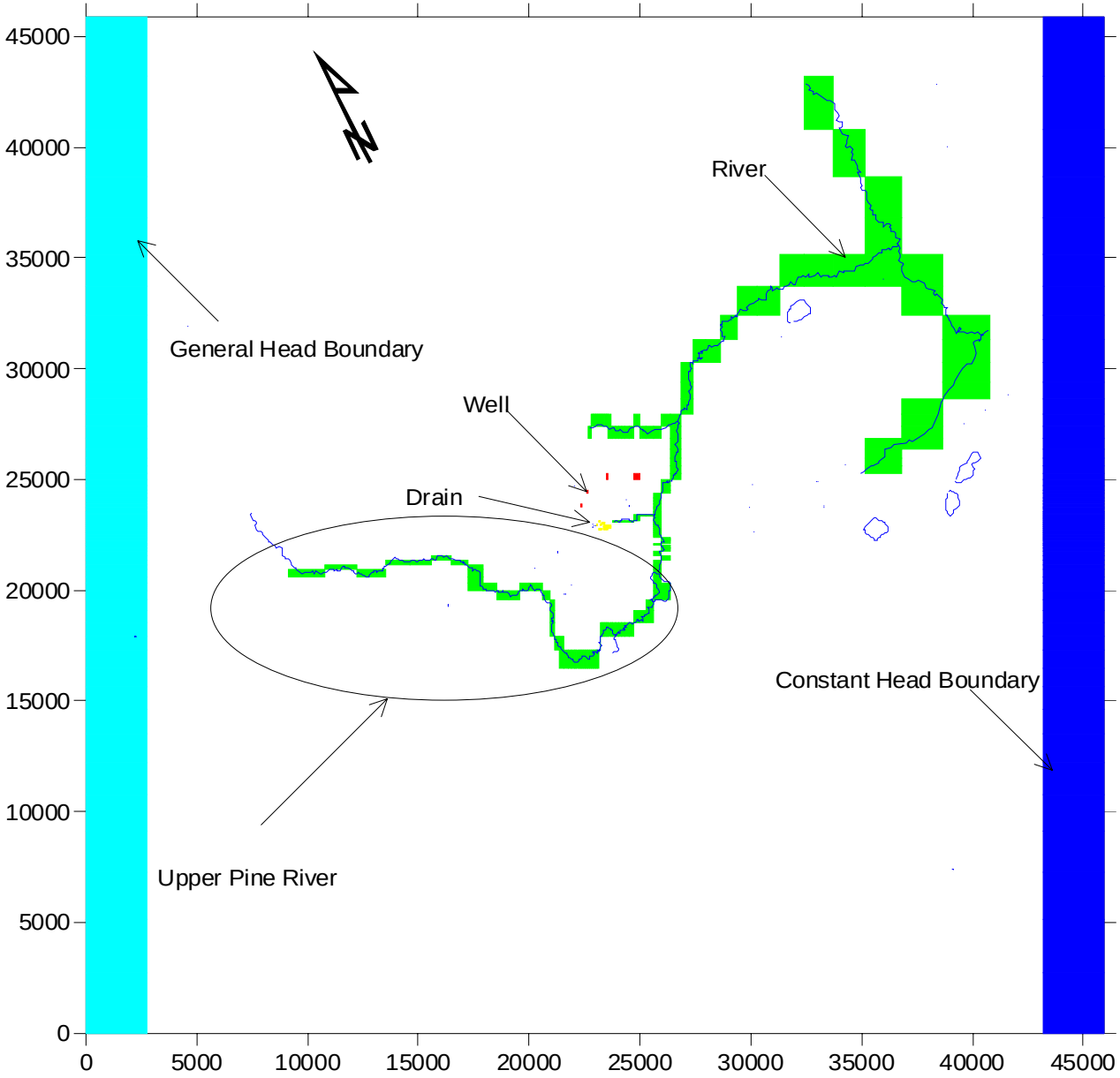

45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
N
River
General Head Boundary
Well
Drain
Constant Head Boundary
Upper Pine River

Figure 1

Table 2

Leisch predevelopment

Name	X	Y	Layer	Observed	Computed	Weight	Group	Residual
Well 990	20236	21000	1	963	962.8756	1	1	0.124446
Well 988	21600	19850	1	955	956.7057	1	1	-1.70571
Well 986	21900	20270	1	957	954.4672	1	1	2.532771
Well 983	21270	21730	1	947	955.651	1	1	-8.650963
Well 993	22030	24700	1	928	948.3823	1	1	-20.38233
Well 992	24400	24100	1	935	932.136	1	1	2.863995
Well 991	24500	23800	1	931	931.379	1	1	-0.378967
Well 34	4608	31935	1	1058	1027.758	1	1	30.24167
Well 424	2232	17921	1	1058	1044.746	1	1	13.25356
Well 39	16327	19326	1	985	984.5266	1	1	0.473427
Well 12	38410	42845	1	885	889.6744	1	1	-4.674409
Well 403	38852	40033	1	881	884.7747	1	1	-3.774682
Well 237	35959	34048	1	883	882.298	1	1	0.702044
Well 233	31381	31473	1	897	902.3289	1	1	-5.328886
Well 278	34261	25675	1	908	904.4759	1	1	3.524082
Well 251	32991	24936	1	907	910.3058	1	1	-3.305776
Well 321	30095	24786	1	908	917.5159	1	1	-9.515905
Well 404	29938	23778	1	911	920.2134	1	1	-9.21339
Well 371	41604	28829	1	880	873.6058	1	1	6.394207
Well 372	39610	27519	1	881	881.9734	1	1	-0.973408
Well 322	33322	23790	1	904	911.9083	1	1	-7.908337
Well 249	30141	22674	1	908	922.5166	1	1	-14.51664
DN 514	40568	28143	1	875	877.8186	1	1	-2.818583
EK 076	39110	7404	1	871	903.6403	1	1	-32.6403
PT 2	22882.46	23020.1	1	939.1	939.6749	1	1	-0.574859
PT 3	22879.3	22889.04	1	938.8	939.8114	1	1	-1.011374
Residual Mean						-2.587089		
Res. Std. Dev.						10.88039		
Sum of Squares						3251.974		
Abs. Res. Mean						7.210951		
Min. Residual						-32.6403		
Max. Residual						30.24167		
Range						187		
Std/Range						0.058184		

Liesch Model Mass Balance Upper Pine River
Predevelopment Steady State

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	164305.20	294700.90	130395.70	1.56

Liesch Model Mass Balance Upper Pine River
Pumping 4200 gpm Steady State

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	242297.50	219261.90	-23035.60	-0.28

Model Mass Balance (ft^3/day)

	Liesch Predevelopment		Leisch 4200 gpm	
Description	**Inflow**	**Outflow**	**Inflow**	**Outflow**
Recharge	4976348.00	0.00	4976348.00	0.00
ET	0.00	0.00	0.00	0.00
Constant Head	0.00	2513411.00	0.00	2492792.00
River	179147.80	3501883.00	283227.00	2972421.00
Lake	0.00	0.00	0.00	0.00
Drain	0.00	360261.10	0.00	216194.10
GHB	1220058.00	0.00	1230386.00	0.00
Well	0.00	0.00	0.00	808556.00
Stream	0.00	0.00	0.00	0.00
Storage	0.00	0.00	0.00	0.00
TOTAL	6375554.00	6375555.00	6489961.00	6489963.00
ERROR	0.00		0.00	

Model Mass Balance (gpm)

	Liesch Predevelopment		Leisch 4200 gpm		
Description	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Sources to Wells**
Recharge	25847.15	0.00	25847.15	0.00	
ET	0.00	0.00	0.00	0.00	
Constant Head	0.00	13054.66	0.00	12947.56	107.10
River	930.49	18188.78	1471.08	15438.75	3290.61
Lake	0.00	0.00	0.00	0.00	
Drain	0.00	1871.20	0.00	1122.91	748.28
GHB	6336.98	0.00	6390.62	0.00	53.64
Well	0.00	0.00	0.00	4199.64	
Stream	0.00	0.00	0.00	0.00	
Storage	0.00	0.00	0.00	0.00	
TOTAL	33114.63	33114.63	33708.86	33708.87	
ERROR	0.00	0.00	0.00	0.00	
	0.00		0.00		
		Total sources to wells in gpm			4199.64

Figure 2

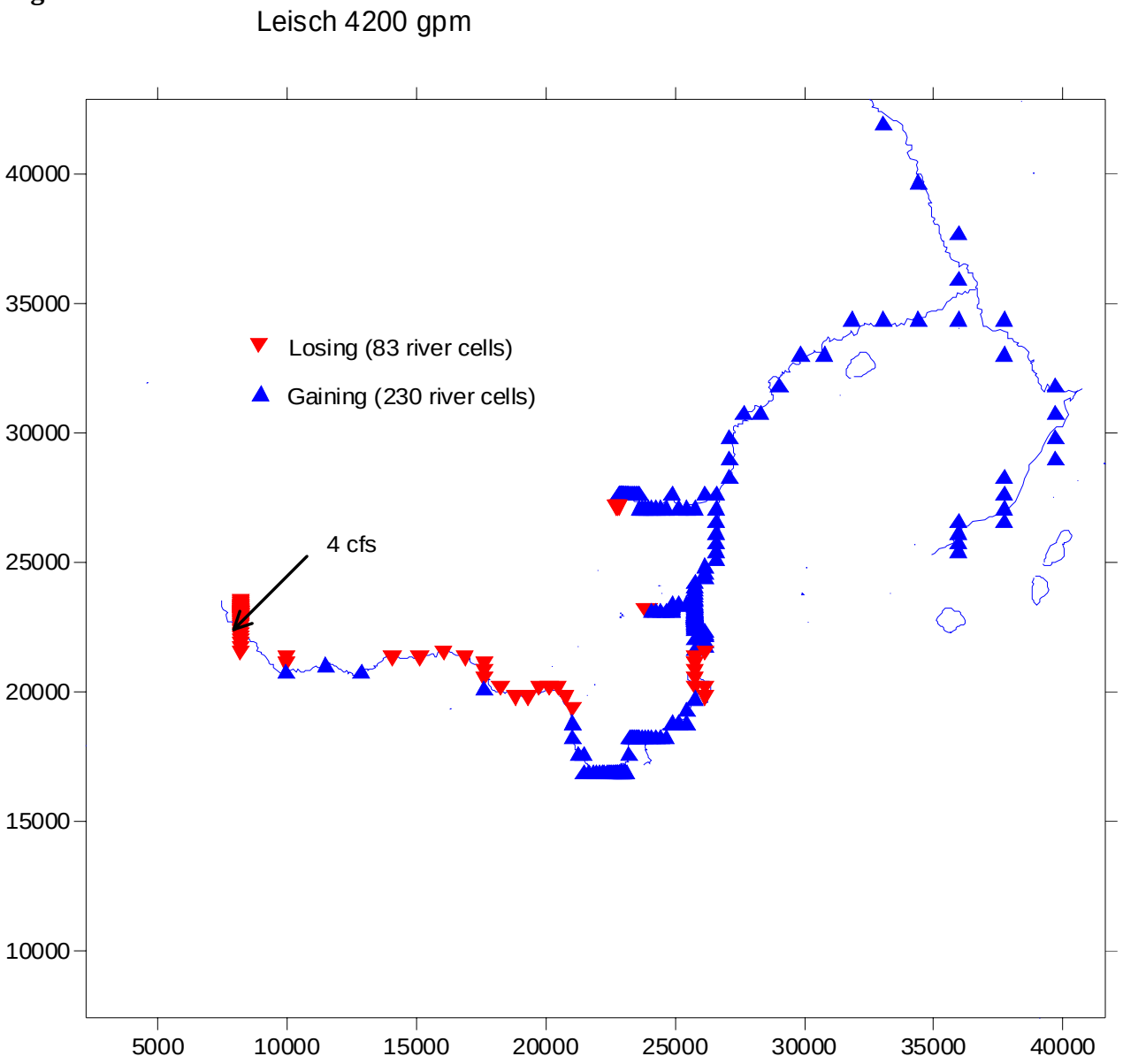

Leisch 4200 gpm
Losing (83 river cells)
Gaining (230 river cells)
4 cfs
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Table 3

jtk2b

Name	X	Y	Layer	Observed	Computed	Weight	Group	Residual
Well 990	20236	21000	1	963	963.1251	1	1	-0.12508
Well 988	21600	19850	1	955	956.0134	1	1	-1.013438
Well 986	21900	20270	1	957	953.8011	1	1	3.198871
Well 983	21270	21730	1	947	955.5155	1	1	-8.515548
Well 993	22030	24700	1	928	948.2163	1	1	-20.21626
Well 992	24400	24100	1	935	931.9506	1	1	3.049382
Well 991	24500	23800	1	931	931.1855	1	1	-0.185473
Well 34	4608	31935	1	1058	1026.966	1	1	31.03391
Well 424	2232	17921	1	1058	1043.711	1	1	14.28924
Well 39	16327	19326	1	985	984.2441	1	1	0.755887
Well 12	38410	42845	1	885	889.6368	1	1	-4.636801
Well 403	38852	40033	1	881	884.7471	1	1	-3.747109
Well 237	35959	34048	1	883	882.2658	1	1	0.734207
Well 233	31381	31473	1	897	902.2178	1	1	-5.217837
Well 278	34261	25675	1	908	904.1839	1	1	3.816061
Well 251	32991	24936	1	907	909.9289	1	1	-2.928878
Well 321	30095	24786	1	908	917.1189	1	1	-9.118934
Well 404	29938	23778	1	911	919.7265	1	1	-8.72645
Well 371	41604	28829	1	880	873.5618	1	1	6.438169
Well 372	39610	27519	1	881	881.8839	1	1	-0.883873
Well 322	33322	23790	1	904	911.4567	1	1	-7.456726
Well 249	30141	22674	1	908	921.9086	1	1	-13.90865
DN 514	40568	28143	1	875	877.7544	1	1	-2.7544
EK 076	39110	7404	1	871	903.1237	1	1	-32.12369
PT 2	22882.46	23020.1	1	939.1	939.4706	1	1	-0.37059
PT 3	22879.3	22889.04	1	938.8	939.5964	1	1	-0.796403
Residual Mean						-2.285015		
Res. Std. Dev.						10.93908		
Sum of Squares						3247.004		
Abs. Res. Mean						7.155456		
Min. Residual						-32.12369		
Max. Residual						31.03391		
Range						187		
Std/Range						0.058498		

wld-Rose_jtk2b--ss with mill pond Increase conductance of river cells for Upper Pine River one order
Predevelopment Steady State of magnitude but lower mill pond river cells by 2 orders of magnitude

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	325419.90	569835.90	244416.00	2.93

wld-Rose_jtk2b with pumping with mill pond
Pumping 4200 gpm Steady State

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	445189.50	488988.50	43799.00	0.53

Model Mass Balance (ft^3/day)

	jtk2b Predevelopment		jtk2b 4200 gpm	
Description	Inflow	Outflow		
Recharge	4978331.00	0.00	4978331.00	0.00
ET	0.00	0.00	0.00	0.00
Constant Head	0.00	2482715.00	0.00	2470552.00
River	357058.00	3734729.00	505501.90	3229876.00
Lake	0.00	0.00	0.00	0.00
Drain	0.00	353673.60	0.00	217897.60
GHB	1235727.00	0.00	1243044.00	0.00
Well	0.00	0.00	0.00	808556.00
Stream	0.00	0.00	0.00	0.00
Storage	0.00	0.00	0.00	0.00
TOTAL	6571116.00	6571118.00	6726877.00	6726882.00
ERROR	0.00		0.00	

Model Mass Balance (gpm)

	jtk2b Predevelopment		jtk2b 4200 gpm		
Description	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Sources to Wells**
Recharge	25857.45	0.00	25857.45	0.00	
ET	0.00	0.00	0.00	0.00	
Constant Head	0.00	12895.22	0.00	12832.05	63.17
River	1854.56	19398.18	2625.58	16775.98	3393.22
Lake	0.00	0.00	0.00	0.00	
Drain	0.00	1836.98	0.00	1131.76	705.22
GHB	6418.37	0.00	6456.37	0.00	38.00
Well	0.00	0.00	0.00	4199.64	
Stream	0.00	0.00	0.00	0.00	
Storage	0.00	0.00	0.00	0.00	
TOTAL	34130.38	34130.39	34939.40	34939.43	
ERROR	0.00	0.00	0.00	0.00	
	0.00		0.00		
		Total sources to wells in gpm			4199.62

Figure 3

jtk2b drawdown - pumping 4200gpm (max drawdown 15 feet)

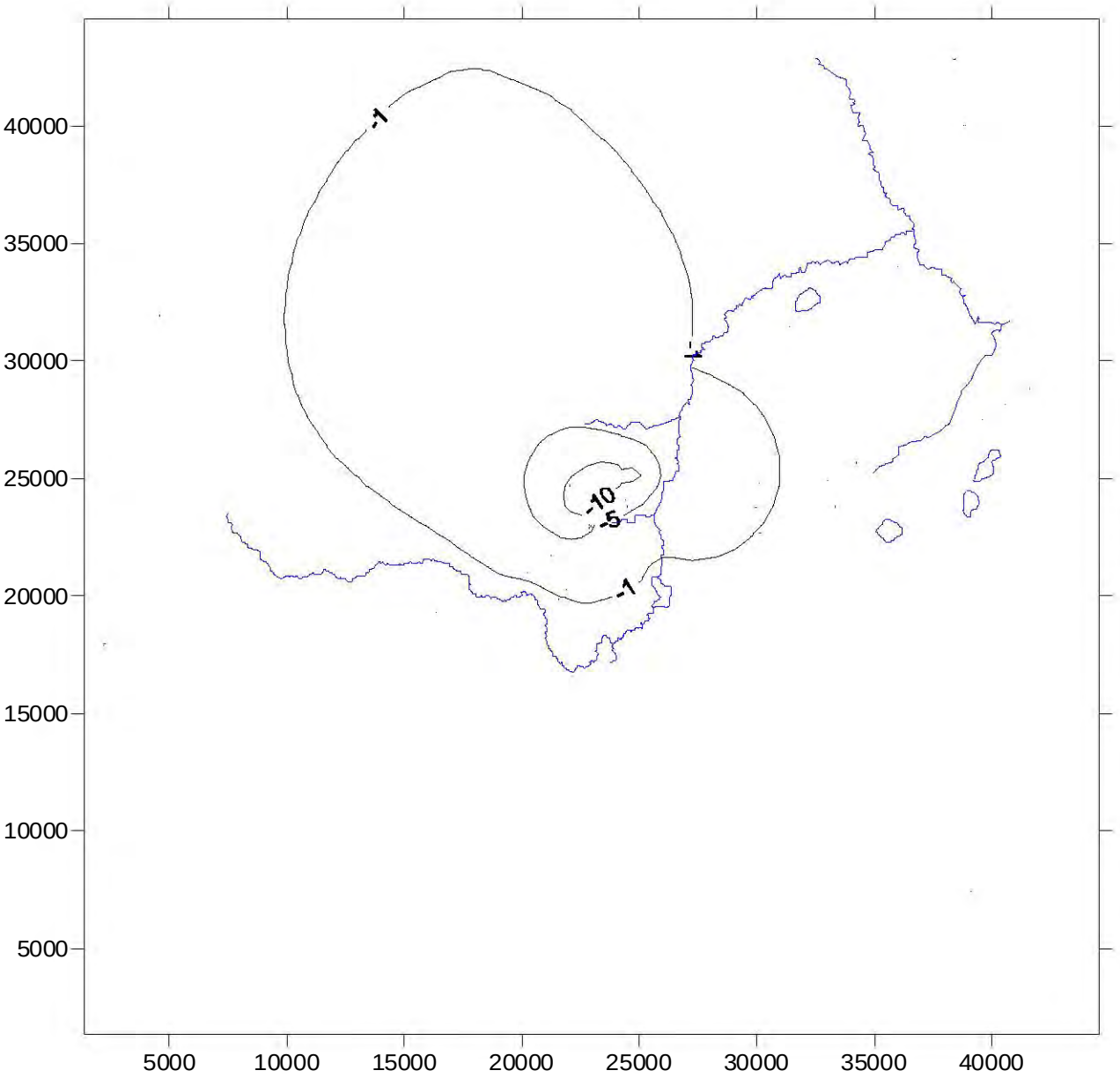


Figure 4

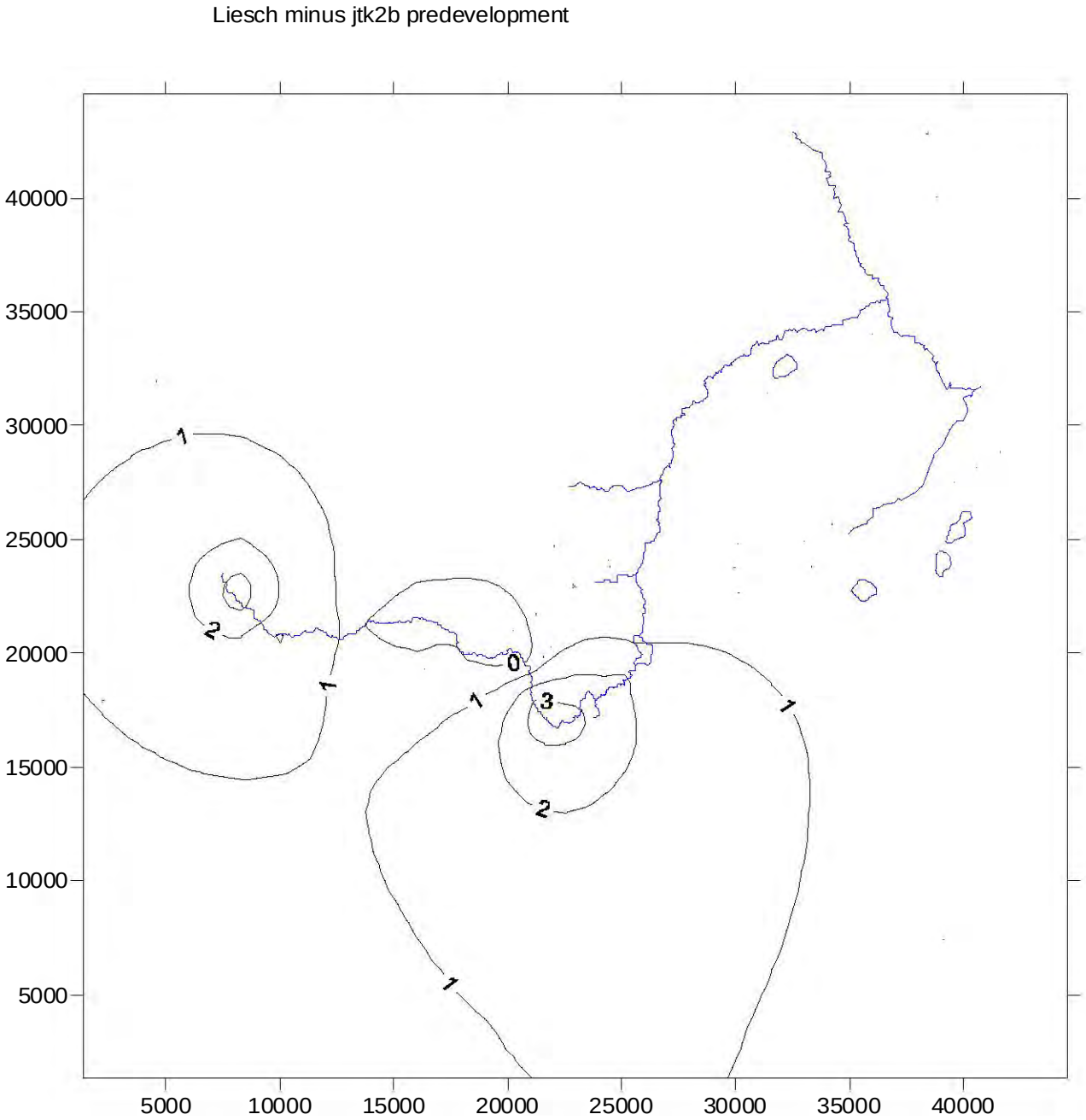

Liesch minus jtk2b predevelopment
40000
35000
30000
25000
20000
15000
10000
5000
5000
10000
15000
20000
25000
30000
35000
40000
1
2
1
0
1
3
1
2
1

Figure 5

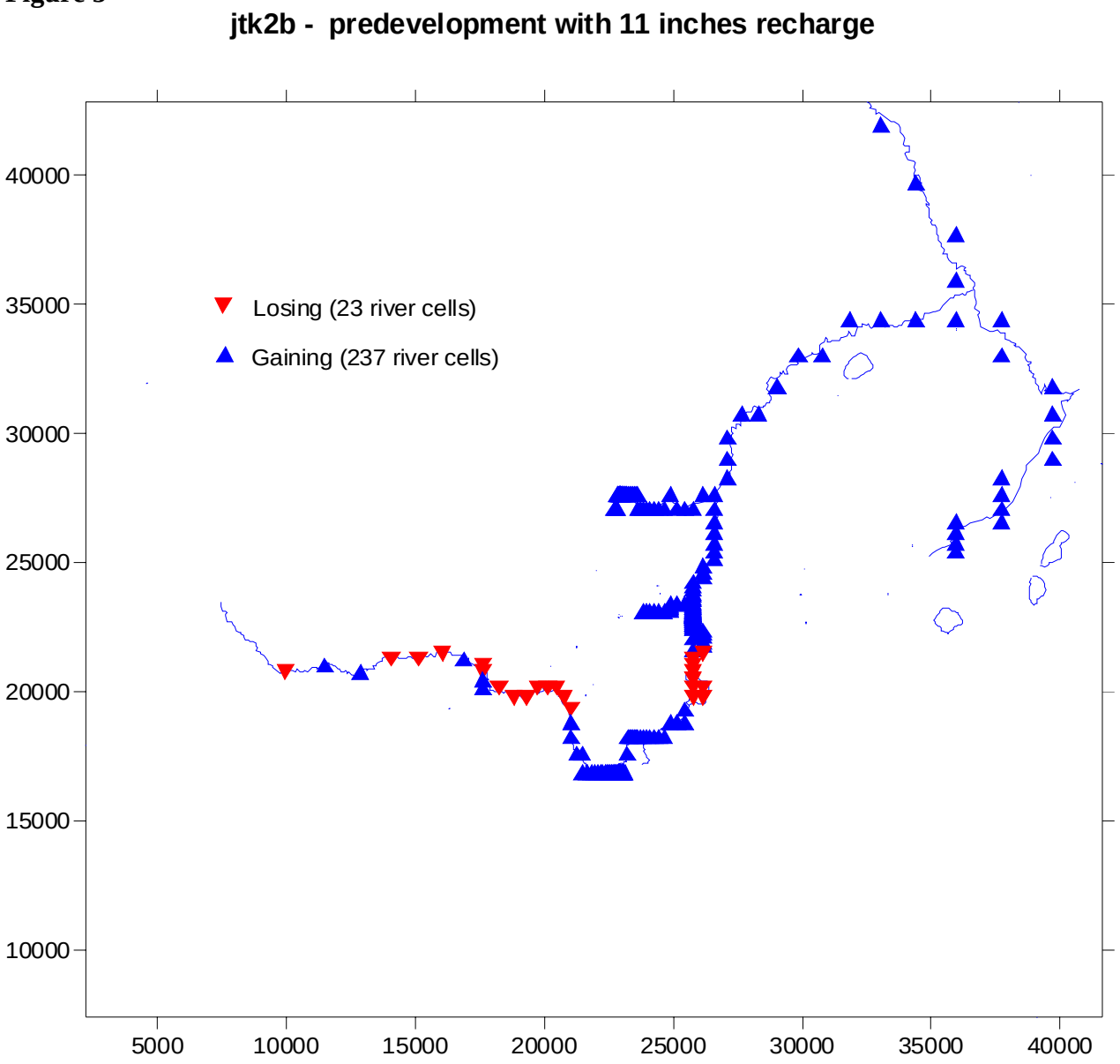

jtk2b - predevelopment with 11 inches recharge
Losing (23 river cells)
Gaining (237 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Figure 6

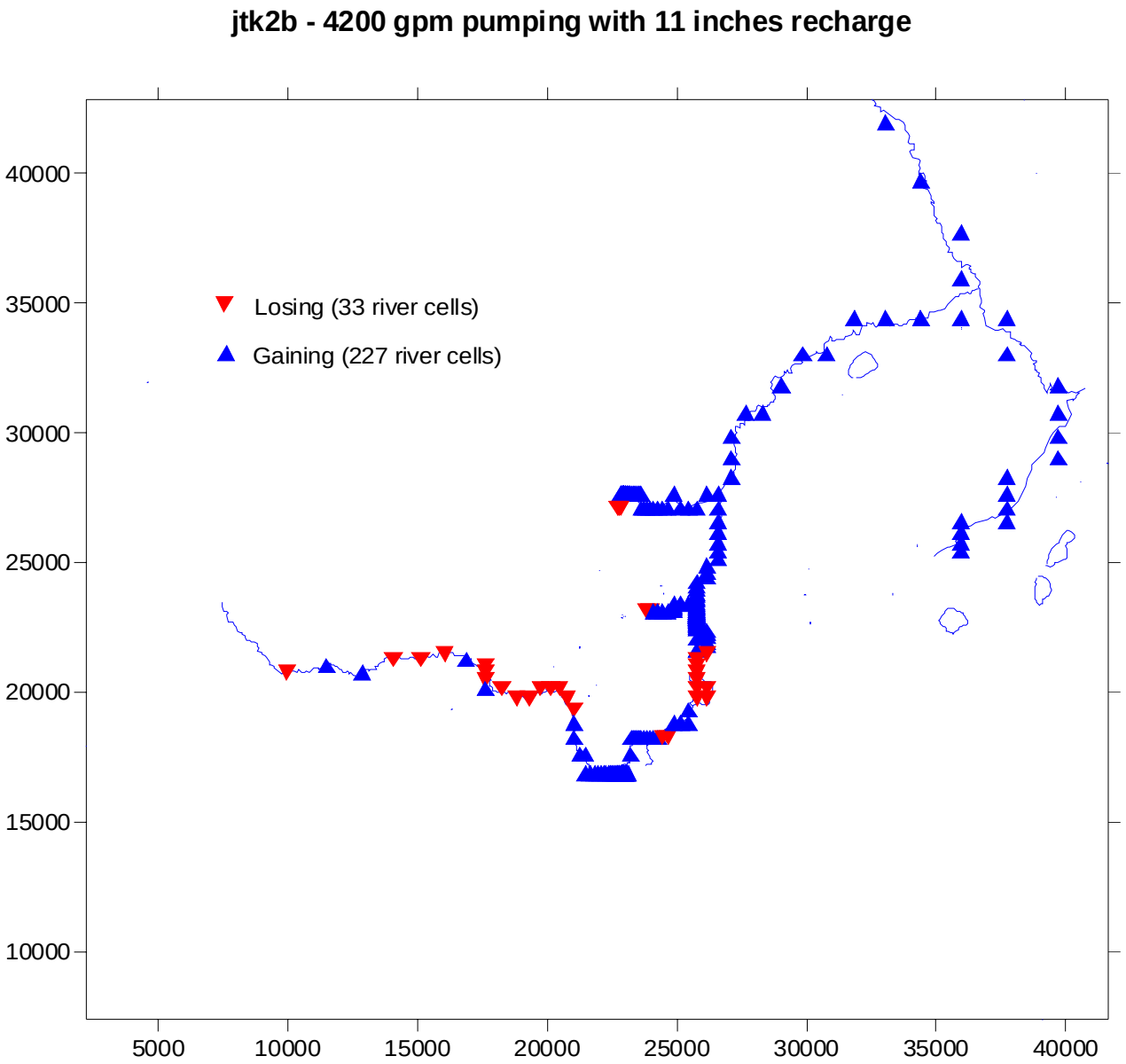

jtk2b - 4200 gpm pumping with 11 inches recharge
Losing (33 river cells)
Gaining (227 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Table 4

jtk9

Name	X	Y	Layer	Observed	Computed	Weight	Group	Residual
Well 990	20236	21000	1	963	963.4882	1	1	-0.488154
Well 988	21600	19850	1	955	956.2329	1	1	-1.232901
Well 986	21900	20270	1	957	954.0979	1	1	2.902078
Well 983	21270	21730	1	947	956.0456	1	1	-9.045552
Well 993	22030	24700	1	928	949.2352	1	1	-21.2352
Well 992	24400	24100	1	935	932.5324	1	1	2.46756
Well 991	24500	23800	1	931	931.704	1	1	-0.704039
Well 34	4608	31935	1	1058	1030.906	1	1	27.09443
Well 424	2232	17921	1	1058	1046.789	1	1	11.21109
Well 39	16327	19326	1	985	984.9347	1	1	0.065319
Well 12	38410	42845	1	885	890.9817	1	1	-5.981695
Well 403	38852	40033	1	881	885.8312	1	1	-4.831242
Well 237	35959	34048	1	883	882.727	1	1	0.272954
Well 233	31381	31473	1	897	903.2878	1	1	-6.287803
Well 278	34261	25675	1	908	905.4155	1	1	2.584453
Well 251	32991	24936	1	907	911.2943	1	1	-4.294319
Well 321	30095	24786	1	908	918.3309	1	1	-10.3309
Well 404	29938	23778	1	911	920.9694	1	1	-9.969393
Well 371	41604	28829	1	880	874.0597	1	1	5.940259
Well 372	39610	27519	1	881	882.5644	1	1	-1.564355
Well 322	33322	23790	1	904	912.923	1	1	-8.923011
Well 249	30141	22674	1	908	923.2418	1	1	-15.24179
DN 514	40568	28143	1	875	878.3309	1	1	-3.330878
EK 076	39110	7404	1	871	905.3167	1	1	-34.31668
PT 2	22882.46	23020.1	1	939.1	939.9811	1	1	-0.881057
PT 3	22879.3	22889.04	1	938.8	940.0915	1	1	-1.291483
Residual Mean						-3.362011		
Res. Std. Dev.						10.71708		
Sum of Squares						3280.131		
Abs. Res. Mean						7.403407		
Min. Residual						-34.31668		
Max. Residual						27.09443		
Range						187		
Std/Range						0.057311		

wld-Rose_jtk9 with mill pond use jtk2b but increase recharge from 11 in/yr to 13 in/yr

Predevelopment Steady State

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	199801.60	774189.90	574388.30	6.89

wld-Rose_jtk9 with pumping with mill pond

Pumping 4200 gpm Steady State

Description	Inflow ft^3/day	Outflow ft^3/day	Outflow - Inflow (ft^3/day)	Outflow - Inflow (cfs)
River	302910.60	676333.00	373422.40	4.48

Model Mass Balance (ft^3/day)

	jtk9 Predevelopment		jtk9 4200 gpm	
Description	Inflow	Outflow		
Recharge	5884383.00	0.00	5884383.00	0.00
ET	0.00	0.00	0.00	0.00
Constant Head	0.00	2667149.00	0.00	2654918.00
River	220244.30	4228676.00	348857.60	3703914.00
Lake	0.00	0.00	0.00	0.00
Drain	0.00	366193.40	0.00	230525.90
GHB	1157381.00	0.00	1164658.00	0.00
Well	0.00	0.00	0.00	808556.00
Stream	0.00	0.00	0.00	0.00
Storage	0.00	0.00	0.00	0.00
TOTAL	7262008.00	7262018.00	7397898.00	7397914.00
ERROR	0.00		0.00	

Model Mass Balance (gpm)

	jtk9 Predevelopment		jtk9 4200 gpm		
Description	**Inflow**	**Outflow**	**Inflow**	**Outflow**	**Sources to Wells**
Recharge	30563.49	0.00	30563.49	0.00	
ET	0.00	0.00	0.00	0.00	
Constant Head	0.00	13853.17	0.00	13789.64	63.53
River	1143.95	21963.74	1811.97	19238.13	3393.63
Lake	0.00	0.00	0.00	0.00	
Drain	0.00	1902.01	0.00	1197.35	704.66
GHB	6011.44	0.00	6049.23	0.00	37.80
Well	0.00	0.00	0.00	4199.64	
Stream	0.00	0.00	0.00	0.00	
Storage	0.00	0.00	0.00	0.00	
TOTAL	37718.87	37718.92	38424.68	38424.77	
ERROR	0.00	0.00	0.00	0.00	
	0.00		0.00		
		Total sources to wells in gpm			4199.61

Figure 7

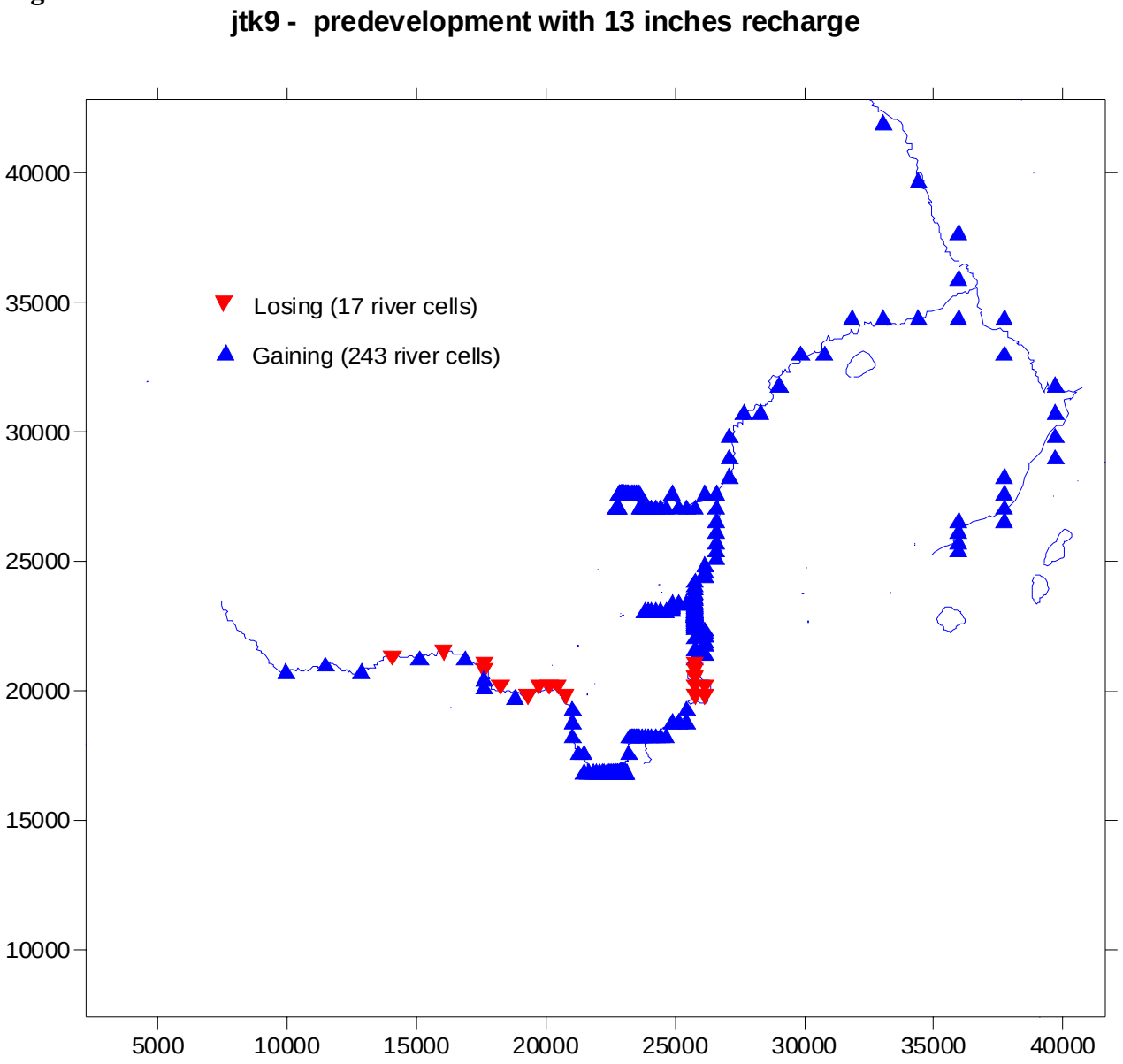
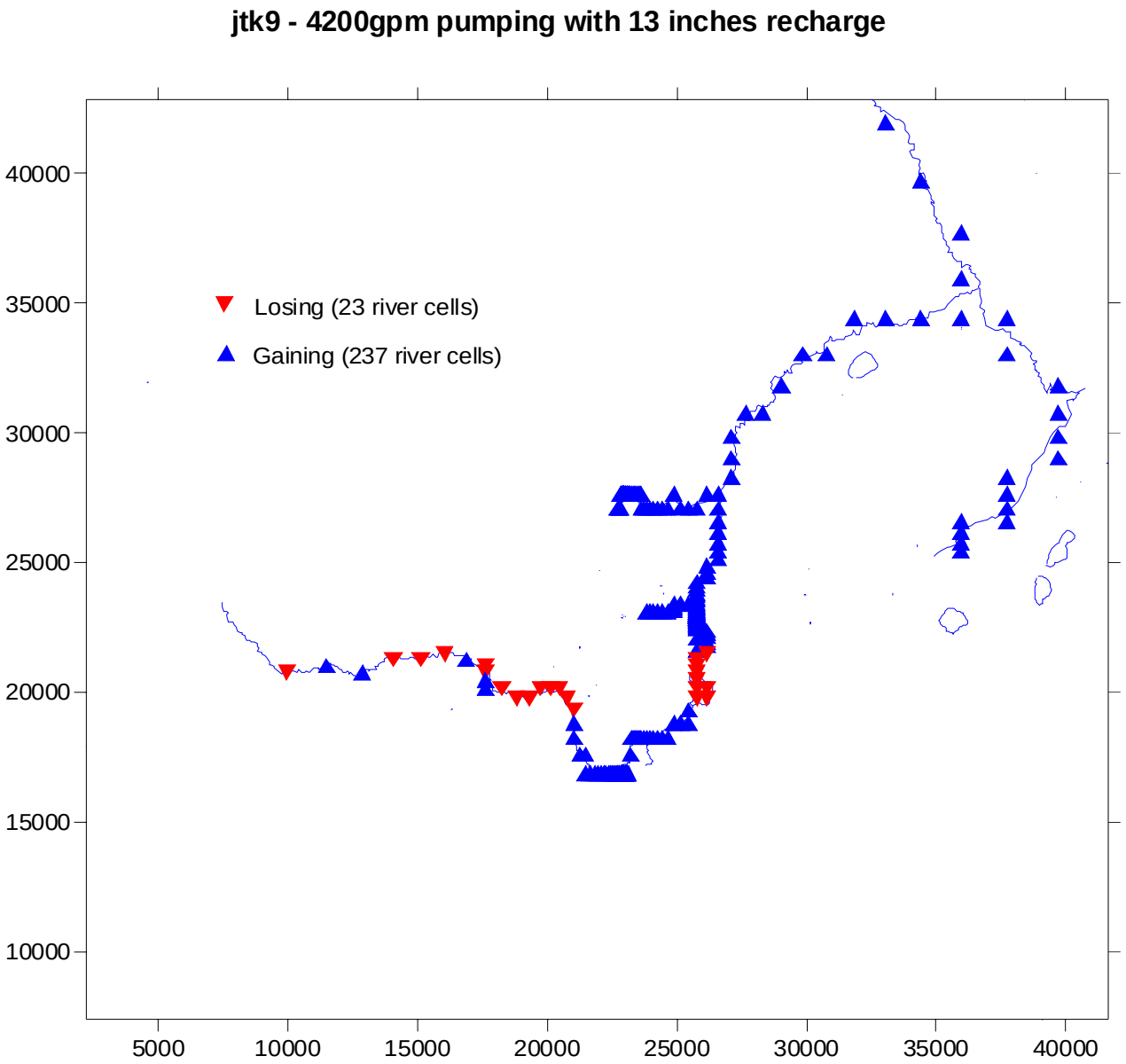

jtk9 - predevelopment with 13 inches recharge
Losing (17 river cells)
Gaining (243 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Figure 8


jtk9 - 4200gpm pumping with 13 inches recharge
Losing (23 river cells)
Gaining (237 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

WILD ROSE FISH HATCHERY GROUND-WATER-FLOW MODEL – ADDITIONAL MODEL RUNS SIMULATING 2500 GALLONS PER MINUTE PUMPING

By
Jim Krohelski
U.S. Geological Survey
Middleton, Wisconsin

Introduction

In order to provide an estimated range of effects (i.e., groundwater drawdown and flow reductions in the Upper Pine River and hatchery spring complex) due to pumping, an additional two model runs using the modified Wild Rose Fish Hatchery model described in Liesch (2005) and Krohelski (2005) were requested by the Wisconsin Department of Natural Resources. The two model runs named, jtk10 and jtk11, use the version of the model (named jtk9) which simulates steady state and 13 inches per year recharge. This model version results in a baseflow of 10.89 cubic feet per second (cfs) (6.89cfs simulated and 4.0 cfs measured from the headwater spring) in the Upper Pine River which is assumed to represent average baseflow conditions. The two additional model runs simulate pumping at 2500 gpm in place of the 4200 gpm simulated in previous model runs. Model run jtk10 simulates pumping from the same four wells as model run jtk9 but at the reduced pumping rate of 625 gpm from each well (figure 1). Model run jtk11 simulates pumping from 2 wells (Well 1 and Well 4 shown on figure 1) at a rate of 1250 gpm for each well.

Results

Model results indicate that the largest sources of water to the pumping wells are groundwater that would have discharged to the Pine River but under pumping conditions is captured by the wells or in some Upper Pine River model cells water that is recharging the aquifer (river cells). The next largest source of water is groundwater that the wells have captured from the hatchery spring complex (drain cells) (table 1). As expected, the amount of flow reduction to the river and spring is much lower for the model runs simulating a pumping rate of 2500 gpm (runs jtk10 and jtk11) than 4200 gpm (run jtk9). The captured flow from the Pine River and hatchery spring complex for runs jtk10 and

jtk11 is similar, about 2030 gpm and 410 gpm, respectively (table 1). This compares to 3390 gpm and 705 gpm for run jtk9. The flow reduction to the Upper Pine River is about 630 gpm (1.4 cfs) for runs jtk10 and jtk11 and about 1080 gpm (2.4 cfs) for run jtk9 (table 2). The maximum drawdown for run jtk9 (figure 2) is about 15 feet and about 8.5 feet for runs jtk10 and jtk11 (figures 3 and 4 respectively). There are slightly more gradient reversals in river cells representing the Upper Pine River for run jtk9 than for runs jtk10 and jtk11 (compare figure 5 to figures 6 and 7). The different pumping well configurations for runs jtk10 and jtk11 have little effect on river and spring flow reduction, Upper Pine River gradient reversal, or drawdown.

References

Krohelski, J.T., 2005, Wild Rose Fish Hatchery Ground-Water-Flow Model – Modification and Results, submitted to Wisconsin Department of Natural Resouces, December 5, 2005

Liesch Environmental Services, October, 2005, Wild Rose State Fish Hatchery Renovation and Compliance Project No. 0311F - Test Production Well Construction and Aquifer Testing Procedures

Table 1. – Model mass balances in gallons per minute for simulations using 13 inches per year of recharge.

Model Mass Balance (gpm)

Description	jtk9 Predevelopment		jtk9 (pumping 4200 gpm/ 4 wells)			jtk10 (2500 gpm/ 4 wells)			jtk11 (2500 gpm/ 2 wells)		
	Inflow	Outflow	Inflow	Outflow	Sources to Wells	Inflow	Outflow	Sources to Wells	Inflow	Outflow	Sources to Wells
Recharge	30563.5	0.0	30563.5	0.0		30563.5	0.0		30563.5	0.0	
Constant Head	0.0	13853.2	0.0	13789.6	63.5	0.0	13814.9	38.3	0.0	13812.9	40.3
River	1143.9	21963.7	1812.0	19238.1	3393.6	1519.9	20313.6	2026.2	1510.8	20299.6	2031.0
Drain	0.0	1902.0	0.0	1197.4	704.7	0.0	1489.2	412.8	0.0	1493.1	408.9
GHB	6011.4	0.0	6049.2	0.0	37.8	6033.8	0.0	22.4	6031.0	0.0	19.6
Well	0.0	0.0	0.0	4199.6		0.0	2499.8		0.0	2499.8	
TOTAL	37718.9	37718.9	38424.7	38424.8	4199.6	38117.3	38117.4	2499.7	38105.3	38105.4	2499.7

Table 2. – Upper Pine River inflow and outflow in gallons per minute and cubic feet per second for simulations using 13 inches per year of recharge.

Upper Pine River

Model Run	Gallons per minute				Cubic feet per second			
	Inflow	Outflow	Outflow - Inflow	Sources to wells	Inflow	Outflow	Outflow - Inflow	Sources to wells
jtk9 Predevelopment	1074.13	4162.04	3087.91		2.40	9.29	6.89	
jtk9 pumping 4200 gpm	1628.45	3635.97	2007.52	1080.39	3.63	8.10	4.47	2.41
jtk10 pumping 2500 gpm	1383.68	3836.07	2452.38	635.53	3.08	8.55	5.46	1.42
jtk11 pumping 2500 gpm	1370.42	3839.59	2469.17	618.74	3.05	8.55	5.50	1.38

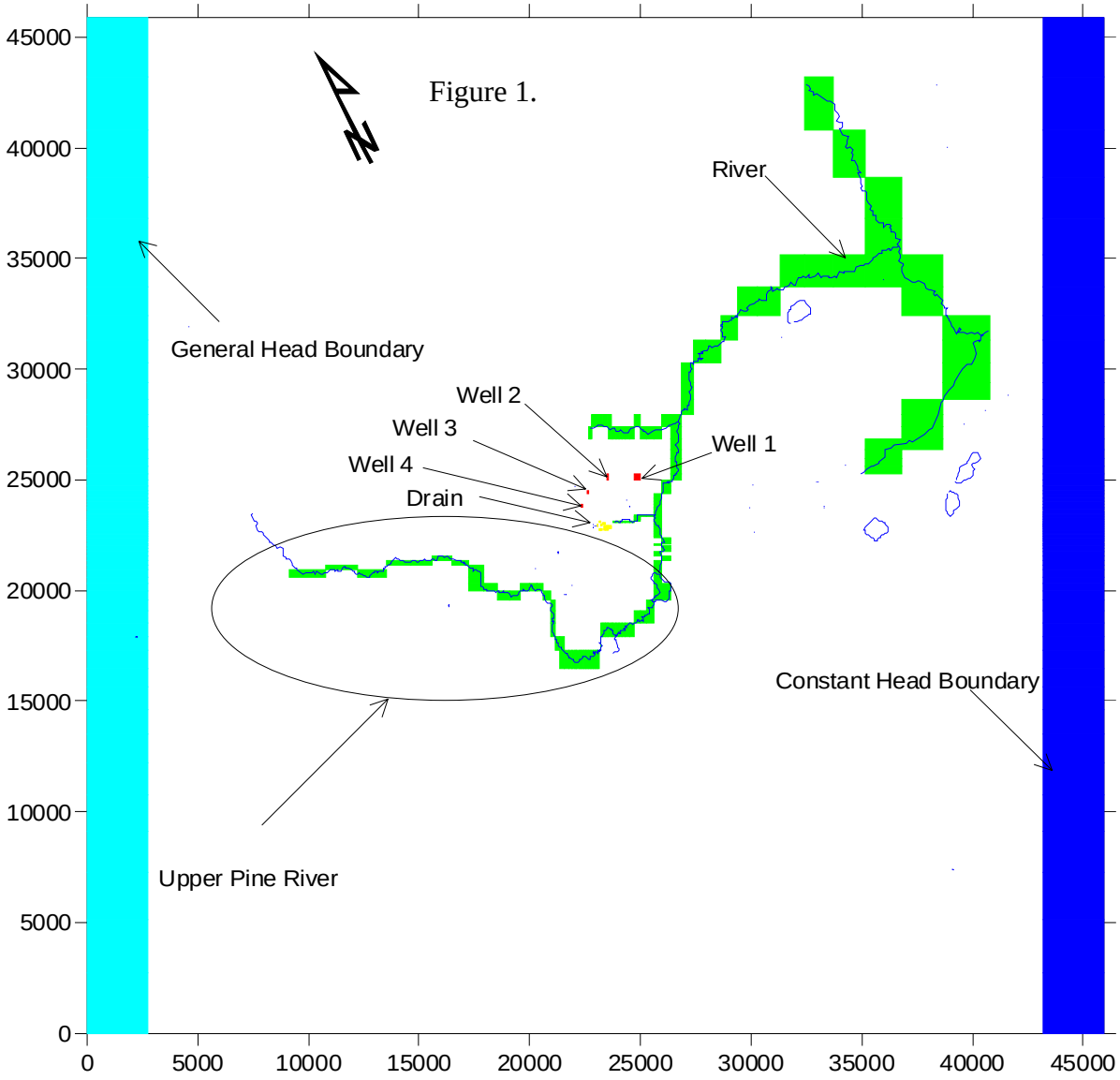


Figure 1.
River
General Head Boundary
Well 2
Well 3
Well 4
Drain
Well 1
Constant Head Boundary
Upper Pine River
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000

jtk9 drawdown - pumping 4200 gpm; 4 wells. Maximum drawdown 15 feet.

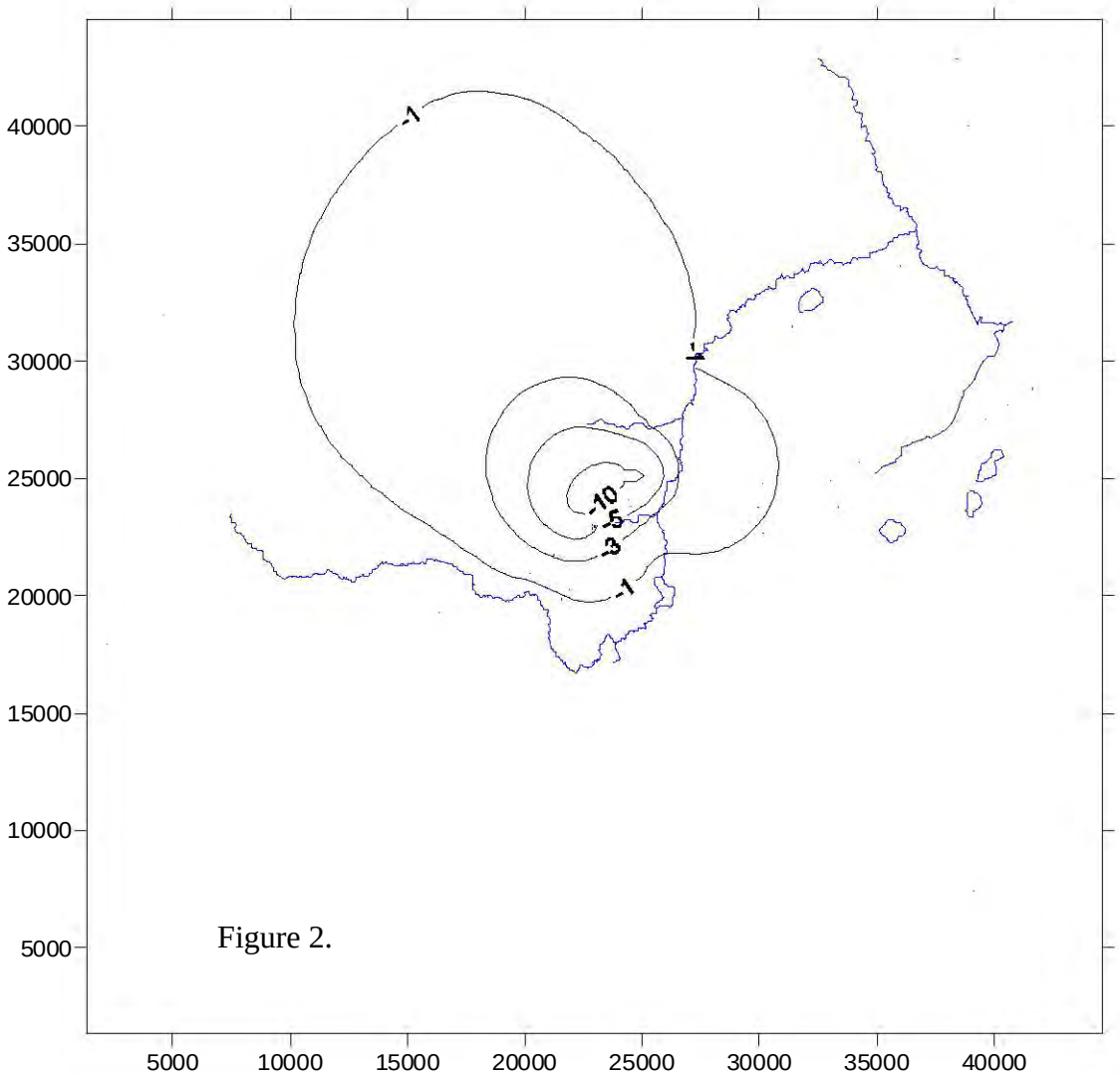


Figure 2.

jtk10 drawdown - pumping 2500 gpm; 4 wells at 625 gpm each. Maximum drawdown 8.3 feet.

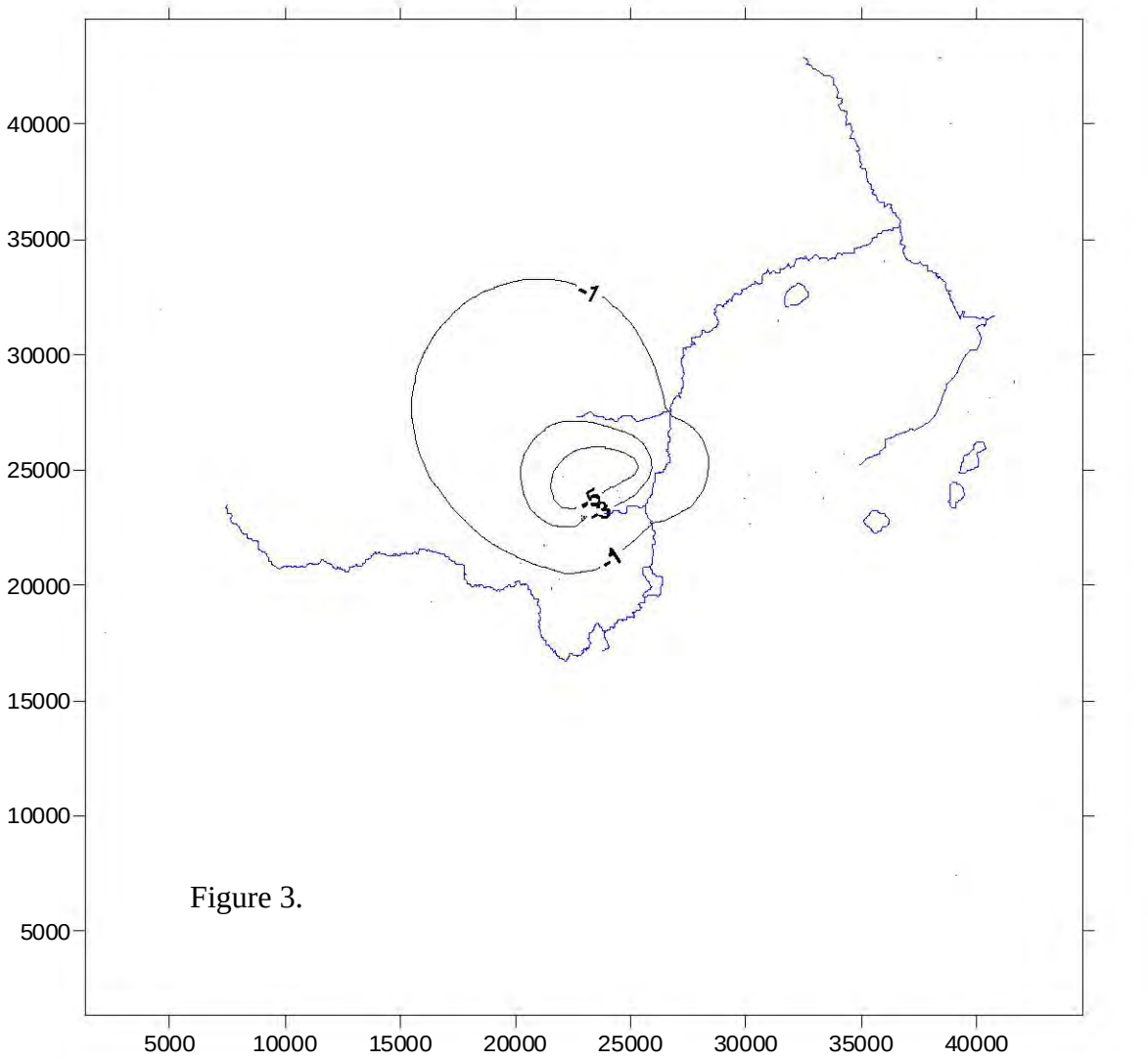


Figure 3.

jtk11 drawdown - pumping 2500 gpm; 2 wells at 1250 gpm each. Maximum drawdown 8.8 feet.

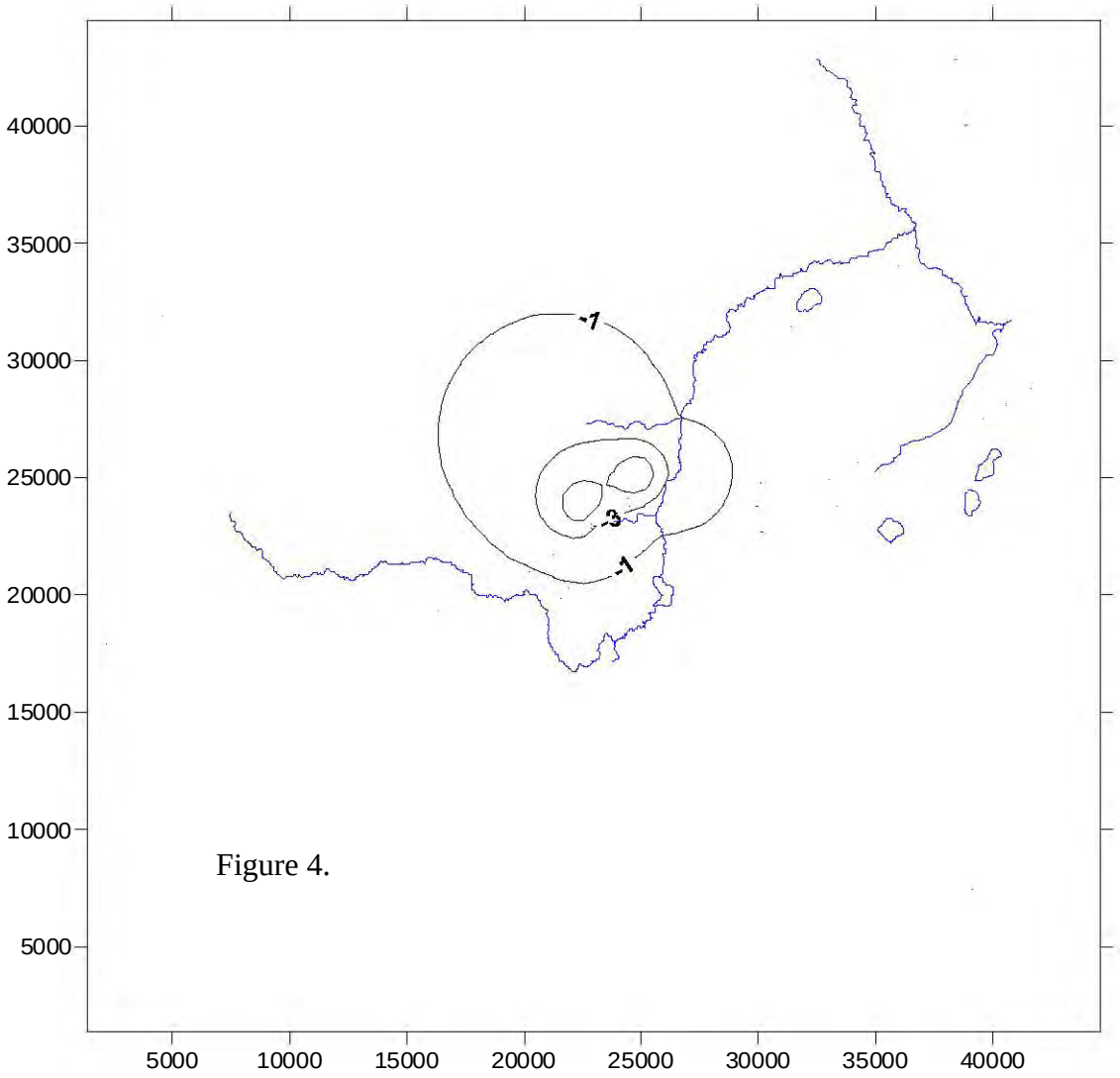


Figure 4.

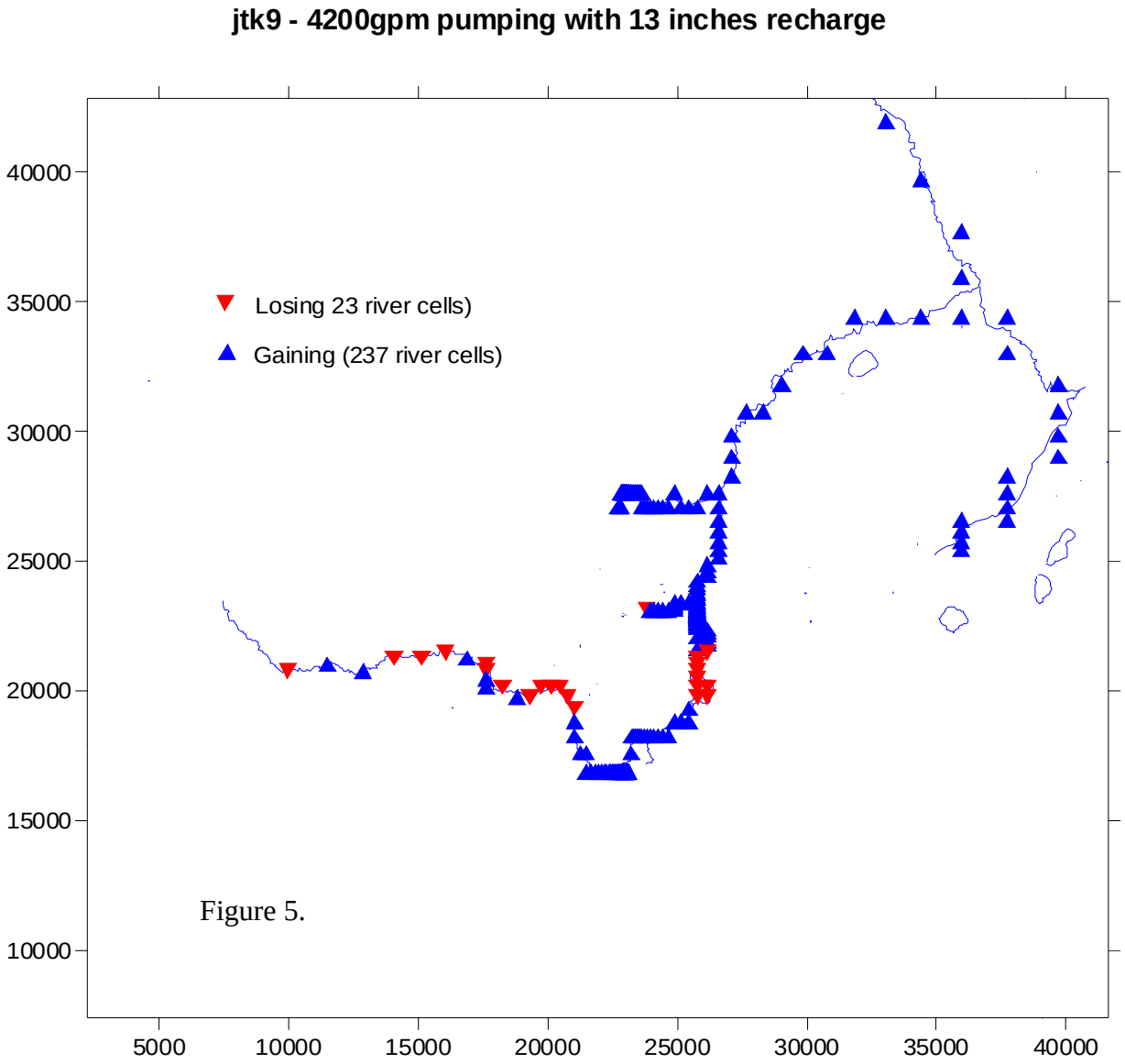

jtk9 - 4200gpm pumping with 13 inches recharge
Losing 23 river cells)
Gaining (237 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Figure 5.

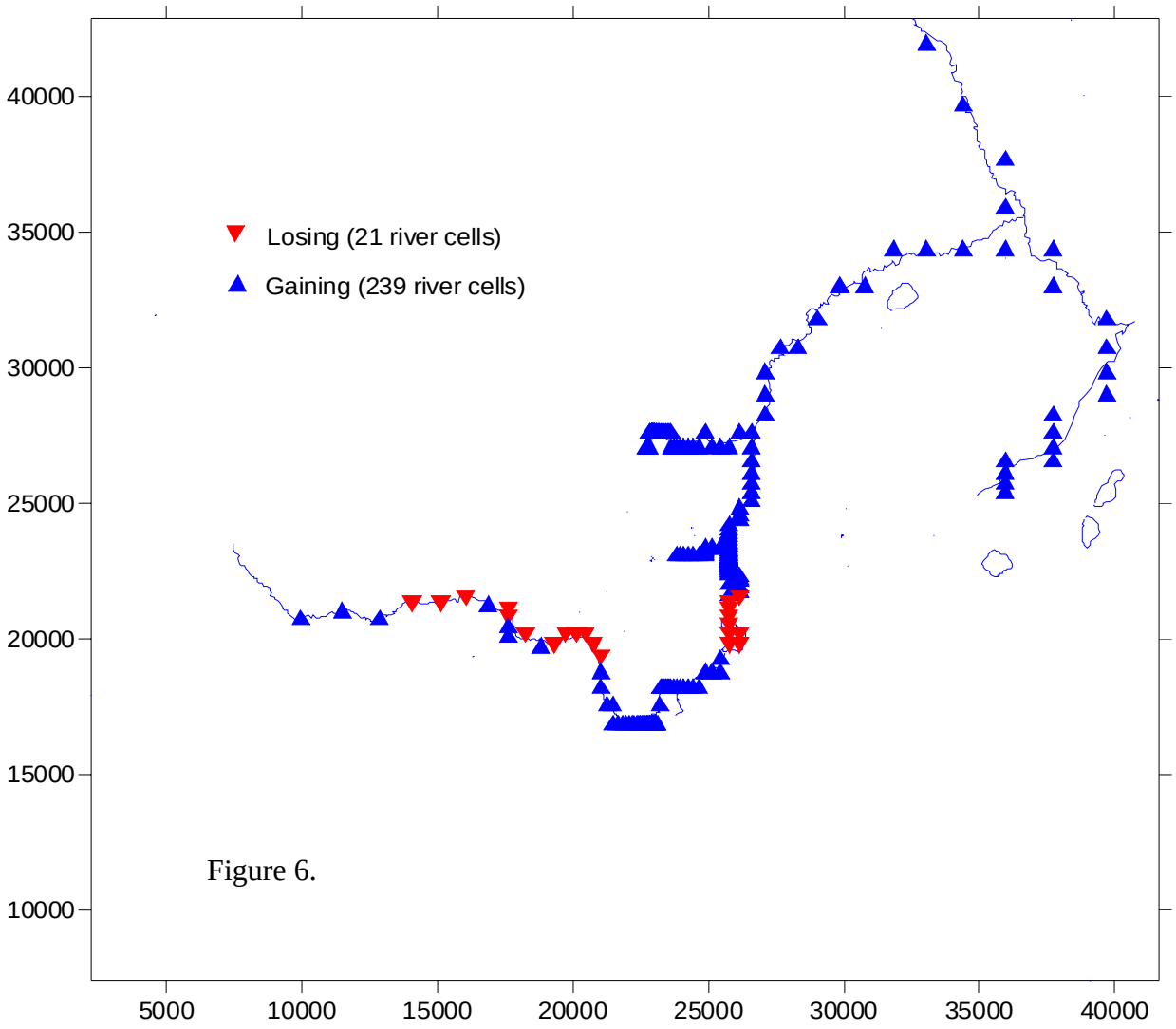

jtk10 - 2500 gpm (4 wells 625 gpm each) pumping with 13 inches recharge
Losing (21 river cells)
Gaining (239 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Figure 6.

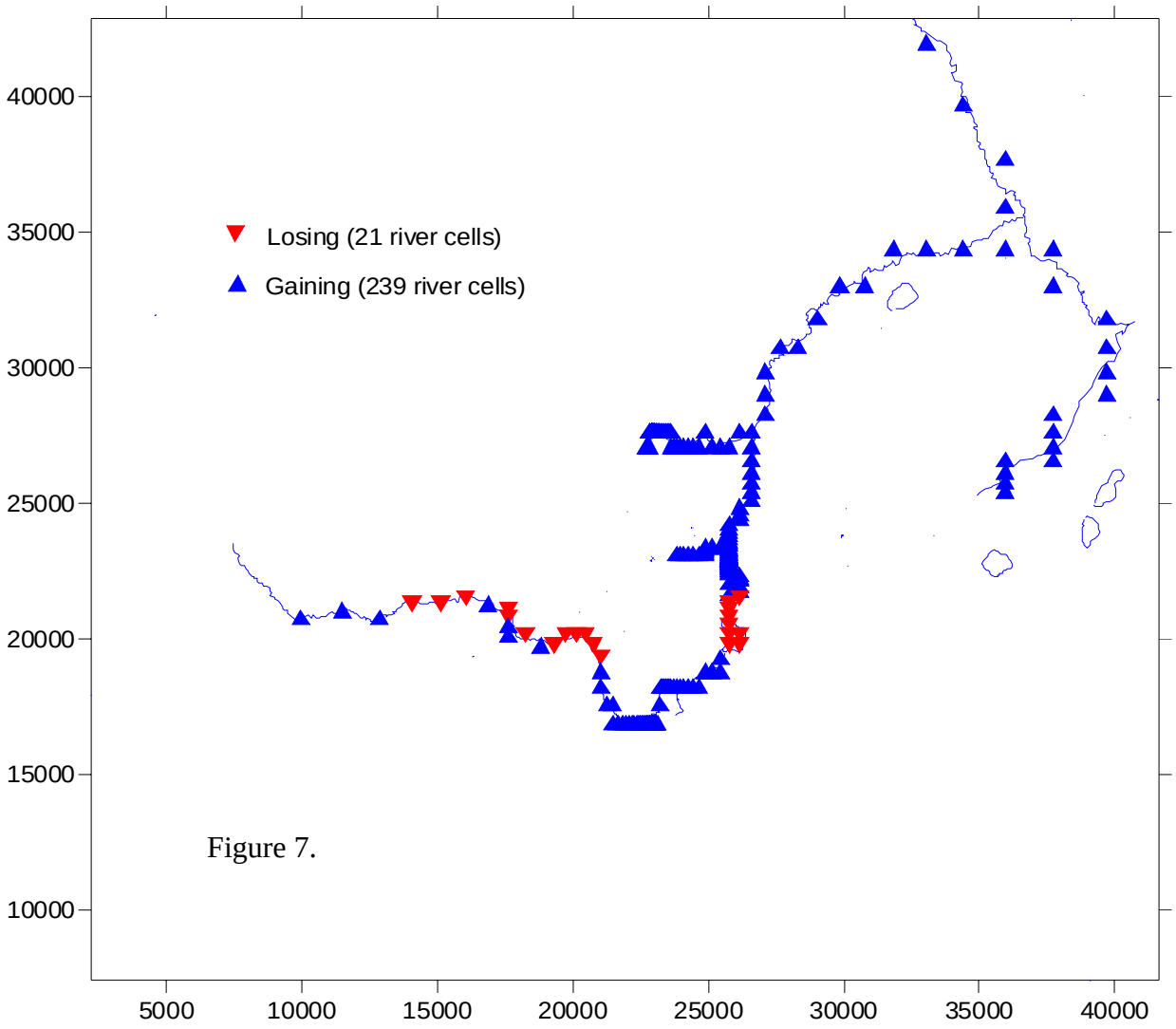

jtk11 - 2500 gpm (2 wells 1250 gpm each) pumping with 13 inches recharge
Losing (21 river cells)
Gaining (239 river cells)
40000
35000
30000
25000
20000
15000
10000
5000
10000
15000
20000
25000
30000
35000
40000

Figure 7.

Public input sought on Environmental Assessment for Wild Rose Hatchery reconstruction

MADISON – The public will have an opportunity to comment on a draft Environmental Assessment for proposed future operation of the Wild Rose State Fish Hatchery during 30-day comment period that ends Nov. 14, 2005. The hatchery is located near the Village of Wild Rose, in Waushara County.

The Wisconsin Department of Natural Resources is proposing to complete hatchery improvements to convert the century-old facility into a state-of-the-art cold and coolwater fish rearing facility that meets or exceeds all state and federal environmental regulations and allows production of more fish for stocking.

The DNR developed the draft Environmental Assessment (EA) as required by the National Environmental Policy Act. The DNR and the U.S. Fish and Wildlife Service (USFWS) will each make an independent decision on the EA in accordance with their respective environmental regulations, but the agencies are cooperating together to gather information and public comments regarding the draft EA.

The proposed alternative in the EA would be completed in two primary phases that focus on hatchery facilities and a third phase that includes wetlands restoration/reconstruction and dam removal. Phase 1 focuses on property west of Highway 22 that is the coldwater species hatchery. Phase 2 would provide coolwater/warmwater hatchery facilities on the east side of the highway. Phase 3 entails restoring and reconstructing stream and wetland areas on both sides of the site.

The DNR and Service will conduct two public information meetings on the renovation plan and environmental assessment on Oct. 19 in Wautoma and the Madison area Oct. 21.

A second action alternative analyzed in the environmental assessment would involve closing the Wild Rose Hatchery and expanding operations at other, smaller facilities. A third "No Action" alternative is also considered, as required under the National Environmental Policy Act, which would maintain the site and usage as it currently exists. Two other alternatives were considered, but not carried forward for detailed analysis, as they presented administrative and legal obstacles, and could not meet the purpose and need of the project.

If public comments indicate there are additional issues not covered in the draft EA, these issues will be addressed in the final EA. The proposed project is not anticipated to result in significant environmental impacts, and a preliminary determination has been made that an Environmental Impact Statement is not required.

The proposed project is also being reviewed under Section 106 of the National Historic Preservation Act. The public is encouraged to inform the DNR or the Service about archeological sites, buildings and structures, historic places, cemeteries, and traditional uses of the area that could influence decisions about the project.

Copies of the draft EA are available on the DNR Web site. The draft environmental assessment also can be obtained by writing to Alfred Kaas, Bureau of Fisheries Management and Habitat Protection, Wisconsin Department of Natural Resources, PO Box 7921, Madison, Wisconsin 53707-7921, or emailing at <Alfred.Kaas@dnr.state.wi.us>.

The draft EA is also available by contacting David Pederson, U.S. Fish and

Wildlife Service, Bishop Henry Whipple Federal Building, 1 Federal Drive, Twin Cities, MN 55111, or e-mailing <David_Pederson@fws.gov>.

Written comments should be sent to Alfred Kaas no later than Nov. 14, 2005, to: Alfred Kaas, Department of Natural Resources, 101 South Webster Street, Madison, Wisconsin 53707-7921, via email to <Alfred.Kaas@dnr.state.wi.us> or via fax to (608) 266-2244.

FOR MORE INFORMATION CONTACT: Al Kaas, Wisconsin DNR - (608) 267-7865 or David Peterson, USFWS - (612) 713-5143

DNR responses to comments received during the public comment period on the Wild Rose Draft Environmental Assessment (EA).

Public comments that have been received during the public Environmental Assessment (EA) open comment period are listed in this document. The comments are not verbatim and may have been summarized or paraphrased from one or more comments received via e-mail or from public informational meetings held on the Wild Rose SFH Renovation project. The Department finds that the Wild Rose SFH Renovation, as planned, will not cause significant environment impacts.

Comment #1 - "When you restore and improve it (the Wild Rose SFH), try to keep as much of the 'old' flavor of this resource as possible…"; "Save a small part of the old raceways."; "Save the lunker (show pond) pond."; "Have access to the buildings."; "Have better signage explaining the different fish and (their) age in each raceway."
Response to comment #1 - In the planning and design of the Wild Rose SFH Renovation, a portion of the historic raceways and buildings will be retained and become one of the anchor points for the new visitor complex and interpretive area based in the "old" part of the hatchery. The existing "show pond" will be retained. We will be enhancing the interpretive area as a part of the visitor center complex and historic preservation area, which will include signs explaining the operations, including signs labeling rearing unit contents.

Comment #2 – I would like a copy of the Wild Rose SFH Renovation EA. (Several requests were received)
Responses to comment #2 - All requests for copies of the Wild Rose SFH Renovation project EA were filled.

Comment #3 – "Don't do this project on the Cheap! We don't need a 'Volkswagen hatchery', we need a 'Cadillac hatchery'."
Response to Comment #3 - Comment noted. The project has been designed and engineered with function and reliability in mind.

Comment #4 – (I am) worried about the amount of groundwater that will be pumped and its affect on streams and lakes.
Response to Comment #4 – The Department, after test drilling, aquifer testing, computer modeling of the hydrogeologic conditions near the project, concludes that the Department does not anticipate any significant environmental impacts to the steams and lakes in the area. Please see the **Response to Comment 8** for a more detailed response.

Comment #5 – I am glad to see that this is finally happening. It should have been done several years ago. (Combined comments from several sources)
Response to comment #5 – Comment(s) noted. The Department appreciates the recognition of need and the support of the public in moving forward with this project.

Comment #6 – "I feel our lakes need to be monitored for the future." (implied reference to fish stocking)
Response to comment #6 - Comment noted and forwarded to the local fisheries biologist for follow-up.

Comment #7 – "I would like to be updated on the spotted musky program on Long Lake (Waushara county) when something new is happening. By 'something new', I mean size, growth, reproduction, when and if an open season is planned in the near future."

Response to comment #7 - Comment noted and forwarded to the local fisheries biologist for follow-up.

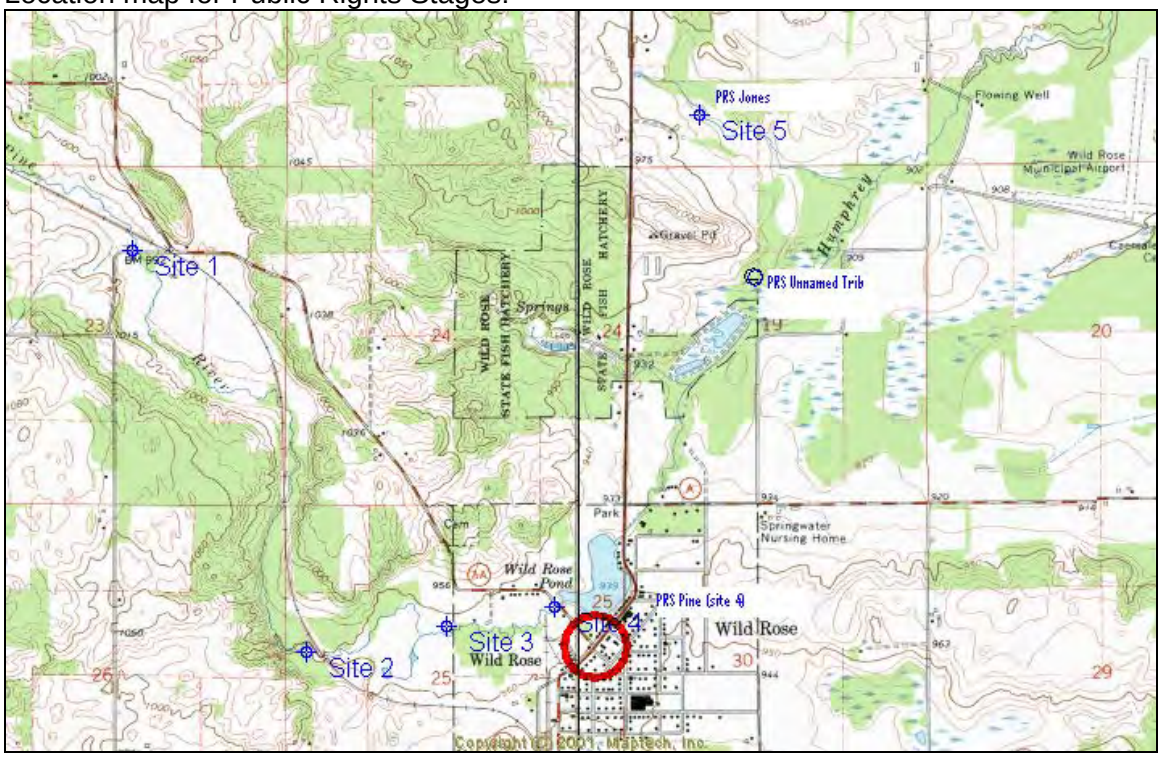
Comment #8 – "Is there going to be groundwater fluctuation that could potentially dry up the spring in the park at the North end of the Village of Wild Rose or the springs behind my house that feed the Pine River?"
Response to comment #8 – [Note: This response elaborates on the response to Comment #4 and provides a more detailed explanation in response to Comment #8.]

Public comments expressing concern regarding potential impacts to the Pine River, and it's tributaries, warrants a more detailed explanation of the Project water needs, hatchery operations and analysis conducted to date. The Environmental Assessment (EA) process has determined that groundwater withdrawal for hatchery operations is the area of greatest public concern regarding the proposed project. To assess the potential for environmental impacts from groundwater withdrawal, the Department of Natural Resources Fisheries Program (the Department), has undertaken several activities during the planning and design phases of the Project including test drilling, aquifer testing and computer modeling of hydrogeologic conditions near the Project. The computer model has been used as a tool to assess the effects of groundwater withdrawal for hatchery operations on groundwater and surface water resources in the area. The model was calibrated to estimate base flow (based on a small number of actual measurements over time), available historical groundwater level measurements and the pump test results.

In addition, the Department has established a Public Rights Stage (PRS) for the Upper Pine River (site #4), Jones Creek (site #5) and an unnamed tributary stream (labeled as 'PRS Unnamed Trib.') located on Hatchery property. The PRS is the minimum water surface elevation (and sometimes associated flow) of a stream that is necessary to maintain the integrity of public rights associated with that stream. Public rights include but are not limited to fishing, hunting, navigation, water quality, water quantity and scenic beauty. The PRS's that were set will assure adequate flow to sustain the current fishery, macroinvertebrates and wildlife use of the streams. As with any natural system, there will be significant variation in flow conditions ranging from flooding to greatly reduced flows during periods of prolonged drought conditions. The elevation of the PRS set on the Upper Pine River has an associated estimated flow of 5.50 cubic feet per second (cfs). This flow value is an extrapolated value based on observed flows at known elevations. Since there are no predicted impacts to either Jones creek or the unnamed creek, the flows associated with the PRS elevations have not yet been determined.

Potential impacts to surrounding groundwater elevations and surface waters (streams) were determined by computer modeling. Modeling results at the predevelopment (no pumping) show that 10 of the river cells on the Upper Pine River and 7 river cells immediately below the mill pond were loosing cells. (A 'cell' is a modeled portion of the stream. A 'loosing' cell occurs when groundwater ceases to flow into the stream.) At the 2,500 gpm pumping rate, the number of loosing cells on the Upper Pine River increased from 10 to 12 and increased from 7 to 9 on the Pine River immediately below the mill pond. At the 4,200 gpm pumping rate, the number loosing cells on the Upper Pine River increased from 10 to 12, increased from 7 to 9 on the Pine River immediately below the mill pond and one additional loosing cell was noted at the head end of the hatchery stream. Pumping at either rate did not result in a lowering of the groundwater level sufficient to cause any of the modeled cells on Jones Creek to become loosing cells. Modeling did not include the unnamed creek because it does not show up on USGS topographic maps due its small size. The Department established a PRS for both of these locations because of public interest with these two tributaries.

Location map for Public Rights Stages:



Along with the PRS determinations, the Department has established several permanent flow gauging stations as observation points. These flow- and water level monitoring stations will be incorporated into an ongoing hatchery monitoring plan that includes regular observation of groundwater, surface water and operational parameters. The monitoring plan will be used to further characterize area water resources, interaction between groundwater and surface water and to assess flow conditions that will verify or improve the computer model and will trigger changes in hatchery operations to prevent flow reductions below the pre-determined PRS at historically observed flow regimes, if needed.

The computer model has been used to estimate the effects of maximum and minimum water withdrawals for the proposed hatchery operations of 4,200 gallons per minute (gpm) and 2,500 gpm, respectively. The 4,200 gpm maximum flow rate represents a 'worst case maximum flow design point' and the unlikely situation where the various parts of the hatchery would be using the maximum amount of water simultaneously. The actual maximum anticipated need is 3,624 gpm. The actual minimum flow anticipated is 2,389 gpm. This number was rounded up to 2,500 and represents the anticipated minimum flow needed for routine operations as planned.

The table below summarizes the total groundwater needs of the hatchery based on the fish bio-criteria by ½-month time periods:

Summary of Hatchery Pumping Requirements

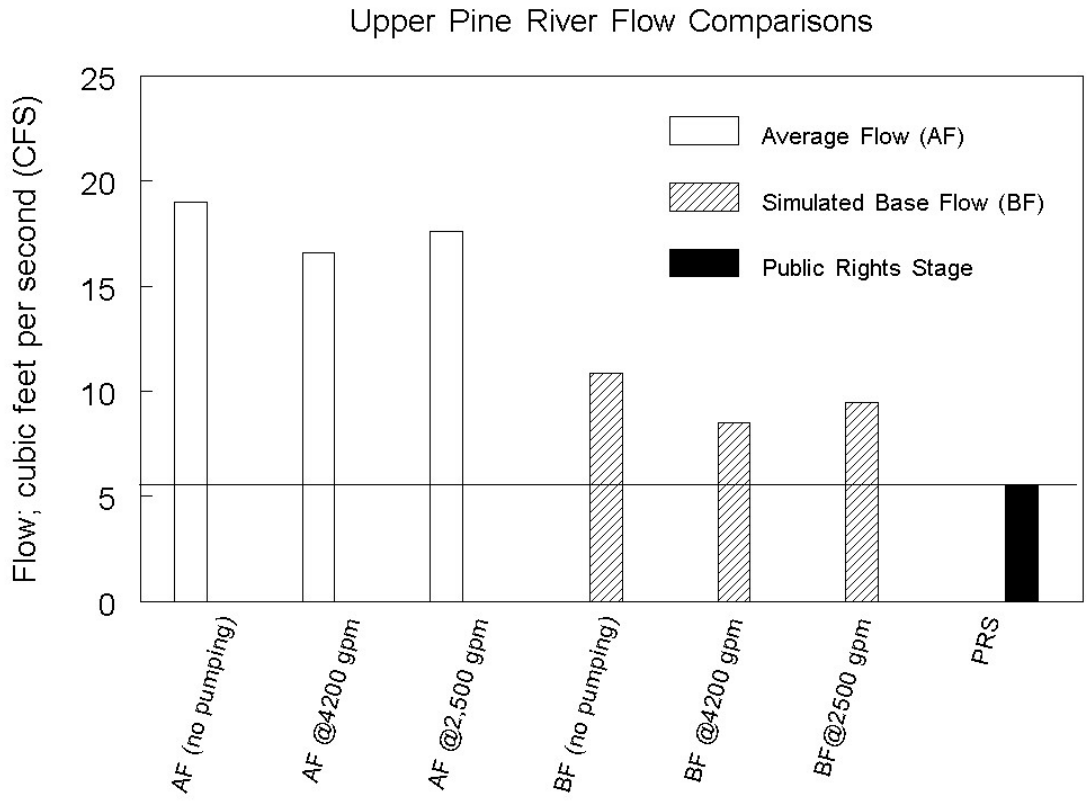
Month:/ (Program:)	**Jan. 1**	**Jan. 15**	**Feb. 1**	**Feb. 15**	**Mar. 1**	**Mar. 15**	**Apr. 1**	**Apr. 15**	**May 1**	**May 15**	**Jun. 1**	**Jun. 15**
Coldwater Flow-gpm:	3,284	3,129	3,065	2,648	2,908	2,888	2,624	2,624	2,416	2,338	2,250	2,250
#Coolwater flow-gpm:	180	180	180	180	393	437	403	680	546	577	517	517
***Existing coolwater bldg flow-gpm:**	0	0	0	0	300	300	300	300	300	300	300	300
	3,464	**3,309**	**3,245**	**2,828**	**3,601**	**3,624**	**3,327**	**3,604**	**3,262**	**3,215**	**3,067**	**3,067**
						Max^						

Month:/ (Program:)	**Jul. 1**	**Jul. 15**	**Aug. 1**	**Aug. 15**	**Sep. 1**	**Sep. 15**	**Oct. 1**	**Oct. 15**	**Nov. 1**	**Nov. 15**	**Dec. 1**	**Dec. 15**
Coldwater Flow-gpm:	2,182	2,198	2,171	2,183	2,089	2,179	2,604	2,696	2,696	2,579	2,593	2,528
#Coolwater flow-gpm:	300	300	300	300	300	330	390	360	300	180	180	180
***Existing coolwater bldg flow-gpm:**	0	0	0	0	0	0	0	0	0	0	0	0
	2,482	**2,498**	**2,471**	**2,483**	**2,389**	**2,509**	**2,994**	**3,056**	**2,996**	**2,759**	**2,773**	**2,708**
					Min^							

Notes:
Coolwater flow needs will not begin until the coolwater portion of the hatchery, Phase 2, has been completed.
* The existing coolwater building will receive 300 gpm until the new coolwater facilities are complete.
^ Indicates the water flow needed by the fish to meet bio-criteria. The minimum (Min) and maximum (Max) flows are marked.

The model predicts water table drawdown in the aquifer in the area of the Upper Pine River to be less than 1 foot under the 4,200 gpm condition while normal groundwater level fluctuations in the basin can be on the order of several feet. It should also be noted that flows in the Pine River could fall below the PRS during extended drought conditions even with no pumping at the hatchery.

Under normal, average river flows, the model indicates that the Pine River will not be significantly impacted and that the PRS will not be breached under either the 4,200 gpm or the 2,500 gpm pumping scenario. The normal (average) flow of the Upper Pine River segment is reported as 19.00 cfs and the simulated the base flow was 10.89 cfs. The Model predicts a reduction in flow of 2.41 cfs at the 4,200 gpm pumping rate and 1.40 cfs at the 2,500 gpm pumping rate. The resulting flow in the Upper Pine River at the 4,200 gpm pumping rate would then be 16.59 cfs at average flow and 8.48 cfs during base flow conditions, well above the extrapolated flow at the PRS elevation. Under the 2,500 gpm pumping rate, the resulting flow in the Upper Pine River would be 17.60 gpm at normal flows and 9.49 gpm during base flow conditions. Actual, observed flows and water elevations have all been higher than the extrapolated value at the PRS elevation. The chart below summarizes the resulting flows under different pumping conditions at average and base flows. Under severe drought conditions, the model indicates that there is a potential for reducing flows below the PRS for portions of the Upper Pine River. The Department's plan to monitor the PRS, coupled with a plan to adjust operations and reduce groundwater withdrawals, if needed, will assure that there are no significant environmental impacts from hatchery operations even under drought conditions.



The coldwater fish production portion of the hatchery uses the majority of the groundwater. The coldwater fish production facilities have been designed to provide optimal conditions for rearing coldwater species of fish for stocking the public waters of Wisconsin. The design of the coldwater portion of the hatchery incorporates a great deal of operational flexibility. Oxygen supplementation and rearing unit design will allow for a range of operational conditions before water quality degradation affects fish health or results in reductions in fish loading (production).

Should monitoring reveal unanticipated effects on area water resources, the Department is committed to take action to avoid significant environmental impacts. For example, should monitoring indicate a reduction in the elevation at the various surface water monitoring stations, the hatchery would modify operations and progressively reduce groundwater withdrawals. If long term monitoring show this to be a frequent or recurring potential impact to the PRS or result in unacceptable operational adjustments, DNR would engineer and construct a solution to remedy this unforeseen impact. As part of an adaptive management strategy, engineered solutions would be implemented if normal hatchery operations reduce stream flows below the PRSs. In the example above, if the PRS is affected, possible responses could include pumping treated hatchery overflow water to an alternative discharge site; development of an alternative water supply; installation of a groundwater well to augment flow in an affected river segment; or habitat improvement in affected river segments, depending on the nature and degree of the potential impact.

Prepared by Alfred Kaas March 16, 2006.