Aqua Indiana, Inc. – Aboite Wastewater Division
May 17, 2016 Site Visit Photos – Lift Stations

1. Sycamore Hills Lift Station (Upgraded 2014)

3. Inverness Hills Lift Station (2002)

2. Braemer Road Lift Station (Completed January 21, 2015)

4. Braemer Road Lift Station (2015)

WATER POLLUTION TREATMENT CONTRACT
BETWEEN
UTILITY CENTER, INC. d/b/a AQUA INDIANA, INC.
AND
CITY OF FORT WAYNE, INDIANA

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WATER POLLUTION TREATMENT CONTRACT BETWEEN UTILITY CENTER, INC. d/b/a AQUA INDIANA, INC. AND CITY OF FORT WAYNE, INDIANA

THIS WATER POLLUTION TREATMENT CONTRACT (hereinafter referred to as "Contract") entered into this 4th day of December, 2014, by and between **UTILITY CENTER, INC. d/b/a AQUA INDIANA, INC.**, a for-profit corporation organized under the laws of the State of Indiana (hereinafter referred to as "Aqua"), and **CITY OF FORT WAYNE, INDIANA**, a municipal corporation of the State of Indiana (hereinafter referred to as "City"). Aqua and City each are herein referred to as "Party" or collectively as "Parties."

WITNESSETH THAT:

WHEREAS, Utility Center, Inc. d/b/a Aqua Indiana, Inc., and City have entered into that certain Utility System Asset Acquisition Agreement dated May 14, 2014 ("AAA") and this Contract is a requirement for the consummation of the transaction described in the AAA.

WHEREAS, Aqua is an affiliate of Utility Center, Inc. d/b/a Aqua Indiana, Inc. and, following the Purchased Assets Closing Date described in the AAA, will own and operate a Water Pollution Control Plant (hereafter referred to as "Aqua's WPCP") in Allen County to treat Sewage; and

WHEREAS, City desires to send its Sewage from a portion of the City's service area to Aqua's WPCP for treatment; and

WHEREAS, Aqua will have capacity available in Aqua's WPCP to treat the portion of the City's Sewage sent to Aqua's WPCP, pursuant to the terms, provisions and limitations of this Contract; and

WHEREAS, the Parties desire to enter into a contract under which the City will convey a certain portion of its Sewage from its Sewer System into Aqua's WPCP and Aqua will accept and treat that portion of the City's Sewage pursuant to the terms, provisions and limitations of this Contract.

NOW THEREFORE, in consideration of the foregoing, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

I. DEFINITIONS.

Capitalized terms not defined in the body of this Contract or in this Section I shall have the meaning as described to them in the AAA. For all purposes of this Contract and all exhibits and schedules to this Contract, except as otherwise expressly provided, the following terms shall have the meanings assigned to them in this Section I or in the section referenced for such term in this Contract:

A. **Connection Point**. As defined in Section II. A.

B. **Contract Conveyance Year.** Each one year (twelve month non-calendar) period following the Initial Conveyance Date through the Original Term and Extended Term of this Contract (For example, if the Initial Conveyance Date is April 1, 2016, then the first Contract Conveyance year shall start on April 1, 2016 and continue to March 31, 2017, the second Contract Conveyance Year shall start on April 1, 2017 and continue to March 31, 2018, etc.).

C. **Effective Date.** As defined in Section X. A.

D. **Extended Term.** As defined in Section X.B.2.

E. **Flow Monitoring**. The measurement of Sewage flow volume per unit time. An example includes but is not limited to flow rates such as gallons per minute or gallons per day.

F. **IDEM**. The Indiana Department of Environmental Management, an administrative agency of the State of Indiana.

G. **Initial Conveyance Date.** As defined in Section X. B.1.b.

H. **Industrial User**. Any non-domestic source of Sewage that is discharged into the Sewer System. This term includes but is not limited to an Significant Industrial User.

I. **Original Term.** As defined in Section X.B.2.

J. **Prohibited Discharge**. A waste pollutant or other substance which is prohibited to be discharged into Aqua's WPCP or Sewer System pursuant to any and all of Aqua's operating rules and regulations ("Rules"), the City's operating rules and regulations, state or federal laws, or applicable rules and regulations of any regulatory agency having jurisdiction (collectively the "Standards"). In the event that any of the Standards set different levels of prohibition for any of the same Prohibited Discharge, the most restrictive level shall control.

K. **Sampling**. The taking of an actual portion of the Sewage for analysis and which could occur by taking a "grab sample", which is a single aliquot taken at a single discrete point in time or a "composite sample" which is the taking of a series of samples via automatic mechanical or manual means over defined multiple time increments that are compiled for analysis pursuant to a methodology designed to produce the most accurate measurement reasonably possible under the circumstances.

L. **Sewage**. The water-carried wastes from residences, businesses, buildings, institutions and industrial establishments, singularly or in any combination that is introduced or discharged into the City's Sewer System.

M. **Sewer System**. The City's network of sewers and appurtenances used for the collection, conveyance and transmission of Sewage to the Connection Point.

N. **Significant Industrial User / (SIU)** An Industrial User of the City Sewer System as defined by the City's Code of Ordinances or Rules or other applicable state or federal rules or regulations.

O. **Strength of Waste Surcharge**. The surcharge the City imposes on Industrial Users of its Sewer System for concentration strength measurement in excess of the limits imposed by the City as provided in

the City's Code of Ordinances, Rules or other state or federal applicable rules or regulations.

P. **User**. Any domestic or non-domestic source of Sewage that is introduced or discharged into the Sewer System.

Q. **Water Pollution Control Plant (WPCP)**. The arrangement of devices, structures and equipment used for treating and disposing of Sewage. The City and Aqua both own and operate WPCPs. In this Contract, Aqua's Water Pollution Control Plant refers to Aqua's Midwest Waste Water Treatment Plant, located at 6811 Engle Road, Fort Wayne IN.

II. CONNECTION OF SEWER SYSTEM.

A. The point of connection shall be the point where the City's Sewer System enters and connects to the Aqua-owned vault ("Vault") which shall be located on Aqua's WPCP ("Connection Point"). The approximate location of the Connection Point is shown on Exhibit A. The major components and further details of the Vault shall be attached hereto and incorporated herein as an amendment to Exhibit A following the execution of this Contract. The Parties agree that the details of the Vault shall be approved by each party and said approvals shall not be unreasonably withheld, conditioned or delayed.

B. The City shall be responsible for all construction of its Sewer System necessary to convey Sewage up to the Vault as shown on Exhibit A, including but not limited to all costs, expenses, capital, design, permitting, acquisition or any required easements or rights of way, and the installation and construction of any necessary pumping station(s), tank(s), pipe, controls and telemetry. The City shall own, maintain and be responsible for all components of its Sewer System up to the Connection Point.

1. Aqua shall provide the City, at no cost to the City, with an appropriate easement on the property upon which the WPCP is located for the portions of the City's Sewer System, including telemetry equipment, necessary to transmit the Sewage to the Connection Point. The

easement shall terminate automatically upon the termination of this Contract and City shall thereupon have a period of thirty (30) days to access said easement solely for the purpose of removing portions of the City Sewer System from the easement, including but not limited to City's personal property and equipment.

2. The City's design shall include flow controls and telemetry to avoid exceedances of flow limitations described in Section IX of this agreement. The City's telemetry shall be designed to permit Aqua to connect to it and transfer information from it to Aqua's control center.

3. The City's design plans for facilities that will be constructed on Aqua property and for connection to the Vault shall be submitted to Aqua for review and approval prior to initiation of construction. Aqua agrees that such approval shall not be unreasonably withheld, conditioned or delayed.

C. Aqua shall construct and install the Vault on the property upon which Aqua's WPCP is located. The City Sewer System shall connect to the Vault for purposes of metering and sampling of the Sewage.

1. The Vault shall include appropriate meter and sampling equipment, telemetry equipment as well as connections and meter bypass piping and valves necessary to convey the Sewage to Aqua's WPCP.
2. Aqua shall be responsible for the design, permitting, installation and construction of the Vault and any attendant conveyance pipes and control equipment necessary to convey the Sewage from the Vault at the Connection Point to the WPCP.
3. Aqua shall present the plans of and costs proposals for the Vault, including meter, sampling equipment, telemetry equipment and any attendant conveyance pipe and infrastructure necessary to convey the Sewage to Aqua's WPCP from the Vault, to the City for review and approval. The City agrees that such approval shall not be unreasonably withheld, conditioned or delayed. The City

will design and construct its Sewer System extension in a manner that is compatible with Aqua's Vault design, and with the capability to provide adequate pressure to deliver flow through the vault and into Aqua's equalization tank and shall present the plans for design and construction of the Sewer System extension to Aqua for Aqua's review and approval, which approval Aqua agrees shall not be unreasonably withheld, conditioned or delayed.

4. Upon completion of construction of the Vault and attendant conveyance pipe and appurtenances necessary to convey the Sewage through the Vault at the Connection Point to Aqua's WPCP and the installation of the meter and sampling equipment, the City shall pay Aqua for all costs actually paid by Aqua to third parties for such construction and installation related to such installation and construction of the Vault and any attendant conveyance pipe and appurtenances necessary to convey the Sewage through the Vault at the Connection Point to Aqua's WPCP, as well as the costs of the meter, sampling equipment, telemetry, related appurtenances and their installation. Aqua agrees to bid out the work for such construction and select a contractor or contractors which, in its best judgment, shall complete the work with the highest quality at the most competitive price.

5. Aqua shall own and maintain the Vault, meter, sampling equipment and any attendant conveyance pipe and appurtenances necessary to convey the Sewage through the Aqua owned Vault at the Connection Point to Aqua's WPCP.

6. City shall own and maintain the telemetry equipment necessary to transmit meter information back to City and to Aqua's control center.

D. Aqua, at its sole cost and expense and except as set forth in Section E.1 immediately below, will, to the extent necessary, be solely responsible for any improvement, expansion, or permitting for Aqua's WPCP necessary to (i) accommodate the maximum average and peak flow rates of Sewage

from the City specified in Section IV of this Contract, and (ii) meet the preliminary determination of revised effluent limitations for Aqua's WPCP's NPDES permit, as described in the Indiana Department of Environmental Management's letter dated January 2, 2012, and attached to this Contract as Exhibit "B" (the "Preliminary NPDES Standards").

1. Should the improvement and expansion of Aqua's WPCP be different due to changes in the Preliminary NPDES Standards and as required by the final NPDES permit issued by the Indiana Department of Environmental Management, the City shall pay for its proportional share of the costs of such upgrades or changes in excess of the sum of Eight Hundred Thousand and No/100 Dollars ($800,000.00) based on the average flows or loading from the City in proportion to the total of such flows or loading of Sewage to Aqua's WPCP from all sources in the previous twelve calendar months.

2. Following the Effective Date of this Contract, should subsequent upgrades of treatment at Aqua's WPCP become necessary due to any change in the discharge limits of metals, including but not limited to cadmium, chromium, copper and lead, that are required by IDEM, the City shall pay for the proportional share of the costs of such upgrades or treatment of Aqua's WPCP based upon the average flows or loading from the City in proportion to the total of such flows or loading of Sewage to Aqua's WPCP from all sources in the previous twelve calendar months prior to such requirements being issued or promulgated.

3. Following the Effective Date of this Contract, should subsequent upgrades of treatment at Aqua's WPCP become necessary due to any other change in the discharge limits of Aqua's WPCP's NPDES permit that are required by IDEM, Aqua shall be solely responsible for such upgrades at Aqua's sole cost.

E. Except as specifically set forth in this Contract, each Party shall be responsible for the maintenance and operation of its own sewer system.

F. Should it become necessary or desirable for the Parties to change or modify the Connection Point or to connect at a different or additional Connection Point, the Party requesting the different or additional Connection Point shall notify the other Party of its request in writing. The required change shall be subject to good faith negotiations toward approval or denial by the non-requesting party. The Requesting Party shall be responsible for construction of and costs of any such different or additional Connection Point. If no approval is given and no agreement is reached, then there shall be no change in the Connection Point.

III. CONVEYANCE AND TREATMENT OF SEWAGE.

A. **Responsibility for Conveyance**. The City shall be solely responsible for delivery of the Sewage to the Connection Point in a form compliant with Section V through Section VIII.

B. **Responsibility for Treatment**. Aqua shall be solely responsible for the proper treatment of Sewage received from the City and that is compliant with Sections V through VIII of this Contract at Aqua's WPCP in accordance with the laws, regulations, requirements and standards of all applicable state and federal agencies and authorities including, but not limited to IDEM, the Indiana State Department of Health and United States Environmental Protection Agency, Region 5, as is in effect as of the Effective Date and as may be amended from time to time.

IV. VOLUME AND CAPACITY.

A. **Average and Peak Volume.** The City may convey and Aqua agrees to accept an Average Flow Rate ("Average") of 1.5 million gallons of Sewage per day (based on a 365 day annual average) but such conveyances shall not exceed a maximum of 5.0 million gallons in any 24-hour period. Instantaneous peak flow rates of more than 3,500 gallons per minute but never more than 5,250 gallons per minute shall not exceed 15 minutes in duration during any consecutive twenty four (24) hour period unless there is more than 75,000 gallons of storage available in the Aqua WPCP's equalization basin. Absent such conditions, the City

may convey up to 3500 gallons per minute for the remainder of the 24 hour period. To maximize the equalization basin volume available to the City during a wet weather event, upon request by the City and at the beginning of a wet weather event, Aqua will increase the Aqua WPCP treatment rate to peak treatment capacity as soon it is reasonably possible and within sound operating parameters, and it shall maintain the peak treatment until such time as it determines that it is no longer required. Except that during the Extended Term of this Contract such conveyances shall not exceed 3.5 million gallons in any 24-hour period, or a peak flow rate of 3,500 gallons per minute not exceeding 15 minutes in duration, unless both parties agree during planning and design of Aqua's WPCP improvements that higher flow rates are reasonable and Aqua notifies the City in writing that it is capable of receiving a flow in excess of those amounts.

B. **Exceedances**. No Exceedance Charges shall be assessed for exceedances of average day discharge. Should the City's flow of Sewage to the WPCP exceed the daily maximum volume or instantaneous Peak flow limits stated in this section, then the City shall pay to Aqua Exceedance Charges of $10.00 per 1,000 gallons times the volume in excess of the peak day allowance for each day of such exceedance, and $10,000 per day for each day the instantaneous flow rate exceeds the instantaneous Peak flow rate allowance, unless such exceedances are permitted by Aqua. If a maximum day exceedance and an instantaneous Peak flow rate exceedance occur on the same day, the greater of the two charges will be applied, but not both. These charges will be subject to the same CPI adjustment provisions as stated in Section XI of this agreement. The remedy as stated herein for any exceedance violation shall be in addition to any other remedy Aqua may have at equity or law..

V. METERING.

A. All Sewage flow conveyed by the City to Aqua shall be metered by the meter installed in the Aqua owned Vault at Aqua's WPCP.

B. Aqua shall install the meter in Aqua's Vault at the Connection Point as provided in Section II. C. Aqua shall own and operate the metering equipment for the purpose of measuring the volume of Sewage delivered to the metering point(s) for treatment and shall be responsible for the designing, installing, daily operation, calibration, updating and replacement, as necessary, of metering devices. Any meter installed shall have telemetry or other electronic reading and transmission capability compatible with Aqua's and the City's ability to receive such meter readings at the time of installation.

C. Metering equipment and remote readouts shall be tested and calibrated in accordance with the industry standards, United States Environmental Protection Agency and/or IDEM requirements and applicable equipment manufacturer's recommendations, with the cost of such testing to be shared equally by City and Aqua, and shall be maintained and repaired as necessary by Aqua at Aqua's cost. If the City requests any additional tests, calibration, maintenance and/or repair of the metering equipment, such actions shall be at the City's cost.

D. The following testing and calibration may be performed by City and the cost shall be the responsibility of the City:

> Testing and calibration of the metering equipment while remaining in place at Aqua's Vault may be conducted no more often than annually, unless approved by Aqua, which approval Aqua agrees shall not be unreasonably withheld, conditioned or delayed.

E. If the Parties cannot agree as to the inaccuracy of any meter, the meter shall be tested by an independent testing facility mutually agreed by to by the Parties and such independent testing facility's determination of accuracy shall be conclusive.

F. If upon any test, the percentage of inaccuracy of any metering equipment is found to be in excess of five per cent (5%), the inaccuracy thereof shall be corrected, followed by confirmatory retesting, and any billing shall be adjusted, for a period extending back no more than a period of three (3)

months or to the time when such inaccuracy began, if such time is ascertainable. If for any reason any meters are out of repair so that the amount of Sewage conveyed cannot be ascertained or computed from the reading thereof, the Sewage conveyed through the period such meters are out of service or out of repair shall be estimated and agreed upon by the parties hereto upon the basis of the best data available. For such purpose, the best data available shall be deemed to be the registration of any check meter or meters if the same have been installed and are accurately registering. Otherwise, the amount of Sewage conveyed during such period may be estimated (i) by correcting the error if the percentage of the error is ascertainable by calibration tests or mathematical calculation, or (ii) estimating the quantity of delivery by deliveries during the preceding periods under similar conditions when the meter or meters were registering accurately.

VI. QUALITY OF SEWAGE.

A. During the Original Term and Extended Term of this Agreement, the City agrees:

1. That it shall maintain and administer an Industrial Pretreatment Program ("IPP") and Strength of Waste Surcharge applicable to all Industrial Users discharging to the Sewer System. In administering the IPP and surcharges on strength of waste, the City shall not apply less stringent requirements on Industrial Users discharging to the Sewer System connected to the WPCP than are applicable to Industrial Users discharging to other of the City's sewers that lead to the City's wastewater treatment facility. The City may, though, after consulting with Aqua, find it necessary in some cases, in satisfying all applicable regulatory requirements, to impose more stringent IPP and surcharge requirements on Industrial Users that discharge to sewers connected to Aqua's WPCP. The City's program shall include measures to periodically survey the system to ensure that all dischargers of high strength waste are included in the Strength of Waste Surcharge program,

and measures to periodically check any self-reporting done by Users to confirm that accurate information is being used for calculation of the Surcharge.

2. The City shall provide Aqua annually within thirty (30) days of each anniversary of the Initial Conveyance Date a list of all Significant Industrial Users and Industrial Users subject to the Strength of Waste Surcharge discharging to the Sewer System and whose Sewage is conveyed to Aqua.

3. The City shall provide Aqua copies of all reports and sewage analysis results from Significant Industrial Users and Users subject to the Strength of Waste Surcharge discharging to the Sewer System and whose Sewage is transmitted to Aqua. These reports and analysis results will be provided to Aqua within thirty (30) days of receipt by the City.

4. The City shall provide Aqua copies of all invoices and charges for Strength of Waste Surcharges charged to any Users discharging to the Sewer System and whose Sewer is transmitted to Aqua. These copies will be provided within thirty (30) days of such invoicing.

B. During the Original Term, and the Extended Term, except as modified by Section VI.C below, the following conditions apply with respect to Strength of Waste Surcharges assessed by the City against Users discharging to the portion of the Sewer System connecting to the Connection Point:

1. The City shall remit to Aqua sixty percent (60%) of the Strength of Waste Surcharges received from each User paying Strength of Waste Surcharges for discharging into the portion of the Sewer System which flows into the Connection Point up to the aggregate of the first $100,000 received by the City in the Contract Conveyance Year from all such Users.

2. After the City receives the initial $100,000 from all Users in any Contract Conveyance Year, as described in sub-section 1. above,

the City shall then remit to Aqua one hundred percent (100%) of any Strength of Waste Surcharges received from each User paying Strength of Waste Surcharges for discharging into the portion of the Sewer System which flows into the Connection Point until the end of the same Contract Conveyance Year.

3. These payments will be made to Aqua within thirty (30) days of receipt by the City. In the event of non-payment to the City by a User within sixty (60) days of City invoicing, City will remain obligated to pay Aqua its appropriate share of the amount billed within ninety (90) days of respective City invoicing.

C. During the Extended Term, if the City conveys less than an Average Flow Rate of 1.0 million gallons of Sewage per day (based on a 30 day monthly average) then the City shall not be required to remit any funds collected by it with respect to the Strength of Waste Surcharges.

VII. PROHIBITED DISCHARGE.

A. The City shall not convey Prohibited Discharges to Aqua, and Aqua shall be under no obligation whatsoever to accept any type of Prohibited Discharge. Upon discovery that a Prohibited Discharge is being conveyed by the City Sewage System to Aqua's WPCP:

1. A Party shall immediately notify the other Party of a Prohibited Discharge being made to the City's Sewer System or to Aqua's WCPC. Upon receipt of notification by Aqua or upon City obtaining actual knowledge or a Prohibited Discharge, the City shall promptly take reasonable steps to compel the Industrial User responsible for such Prohibited Discharge to immediately cease such discharge and provide confirmation thereof in writing, within seventy-two (72) hours of Aqua's notification.

2. If the City fails to bring about a cessation of a Prohibited Discharge after receiving a notice from Aqua and promptly taking reasonable steps to compel the Industrial User to immediately cease such discharge, Aqua may, at its option, without liability and

at the City's cost, cease accepting Sewage from that portion of the City's Sewage System that is conveyed to Aqua until the cause of the Prohibited Discharge is remedied by the City to the satisfaction of Aqua, the Indiana Department of Environmental Management and/or the United States Environmental Protection Agency Region 5.

3. The remedies stated herein are not exclusive and the Parties reserve any and all remedies, whether at law or equity, in relation to Prohibited Discharges.

B. To the fullest extent allowed by law, the City agrees to defend, indemnify and hold harmless Aqua from any and all costs, expenses, losses, expenses, claims or actions resulting from the discharge of a Prohibited Discharge from the Sewer System that is conveyed to Aqua's WPCP, including but not limited to any fines, judgments, costs, suits or other actions or any other violation of this Contract by the City not resulting from any Prohibited Discharge by Aqua, including but not limited to any fines, judgments, costs, suits or other actions.

C. To the fullest extent allowed by law, Aqua agrees to defend, indemnify and hold harmless City from any and all costs, expenses, losses, claims or actions resulting from the discharge of a Prohibited Discharge, or violation of law regarding Aqua's operation of the Connection Point, Vault, or Aqua's WPCP, or other violation of this Contract by Aqua not resulting from any Prohibited Discharge of City including, but not limited to, any fines, judgments, costs, suits or other actions.

VIII. SAMPLING AND MONITORING OF QUALITY.

A. Aqua shall install the sampling and monitoring equipment in Aqua's Vault at the Connection Point as provided in Section II. C. Aqua shall own and operate the sampling and monitoring equipment for the purpose of sampling and analyzing the Sewage delivered to the Connection Point for treatment and shall be responsible for the designing, installing, daily

operation, updating and replacement, as necessary, of such sampling and monitoring equipment.

B. Sampling and monitoring facilities shall include but shall not be limited to electrical and mechanical provisions for 24-hour composite sampling.

C. Aqua shall own and operate the sampling and monitoring facilities and equipment. The City shall have full and complete access to the sampling and monitoring facilities and equipment upon twenty-four (24) hours' notice to Aqua.

D. Aqua shall:

1. Test and calibrate the sampling and monitoring facilities annually, the costs of which shall be paid equally by City and Aqua.

2. Maintain and repair the sampling and monitoring facilities on a continuous basis, the costs of which shall be paid by Aqua.

E. Aqua shall collect all samples in accordance with the following protocol:

1. Aqua shall collect and arrange for testing of samples at intervals determined at Aqua's discretion, and in compliance with NPDES permit requirements.
2. Aqua shall determine the parameters for all such sampling and testing.
3. Aqua will provide the results of any sampling to the City at the City's request.
4. The City may request a portion of samples taken by Aqua if the City wishes to conduct its own analyses.
5. The City may request additional sampling and analysis at the City's cost.

F. If the Parties cannot agree as to the results of any sampling or testing by the other samples shall be sent to and tested by an independent laboratory mutually agreed by to by the Parties and such independent laboratory's determination of sampling or testing shall be conclusive.

IX. INSPECTION AND ENFORCEMENT.

A. The City may apply to IDEM to become a co-permittee under Aqua's NPDES permit for the limited purpose of implementing an IPP. In such event, the City agrees that it shall not unreasonably withhold, condition, or delay its approval of any application to IDEM, including withholding, conditioning, or delaying its signature as co-permittee, if required, for any permit modification or renewal.

B. As a part of its IPP, the City shall maintain a current Industrial Waste Survey list ("IWS List") in accordance with the following:

1. The IWS List shall include: (i) the facility name and address of all commercial and industrial users whose sewage passes through the Connection Point, (ii) the nature of each user's business, and (iii) the name and contact information of a responsible person to be contacted at each user.

2. An updated List shall be provided to Aqua within thirty (30) days of the Effective Date of the Contract.

3. The City shall provide an updated List to Aqua annually within thirty (30) days of each anniversary of the Effective Date of the Contract.

C. Whenever Aqua revises its Rules, it will forward a copy of the revisions to City. If the IDEM requires that Aqua implement an IPP, the City will implement the IPP through appropriate ordinance or rules and regulation for any portion of its Sewer System that ultimately discharges to Aqua's WPCP. The City will forward to Aqua for review its proposed revisions to City's regulations relating to Sewer Use for compatibility with Aqua's Rules within 90 days of receipt of Aqua's revisions. City will finalize and adopt its revisions within 90 days of receiving approval from Aqua of the content thereof.

D. City will take all actions reasonable and necessary to ensure that Industrial Users discharging to the City's Sewer System are subject to an

approved IPP in accordance with Chapter 51 of the Fort Wayne Code of Ordinances ("Sewer Use Ordinance") and to the extent required by 40 CFR 403.8, including the performance of all technical and administrative duties necessary to implement and enforce its Sewer Use Ordinance against such Industrial Users.

E. City will issue permits to all Industrial Users that are: (i) required to be permitted under its Sewer Use Ordinance, (ii) located in its jurisdiction, and (ii) discharge to that portion of the City's Sewer System connecting to the Connection Point. Required permits must be issued prior to any discharge by any such industrial user.

F. City will take all reasonable steps to enforce the provisions of its Sewer Use Ordinance and permits with respect to Industrial Users of the City's Sewer System. In the event City fails to take adequate enforcement action against noncompliant users of its Sewer System on a timely basis, Aqua may, to the extent possible under applicable law, take such action on behalf of and as agent for City. The Parties agree to review and revise this Contract to ensure compliance with the Federal Clean Water Act (42 U.S.C §1251 et. Seq.) and federal rules and regulations (see 40 CFR 403) issued thereunder, as necessary.

X. EFFECTIVE DATE AND TERM.

A. Effective Date.

1. It is understood and agreed between the Parties that this Contract shall become effective (hereinafter referred to as the "Effective Date") on the latest of the following dates:

   a. The effective date of approval by the Indiana Utility Regulatory Commission;

   b. The effective date of approval by the Indiana Department of Environmental Management (effective date of issuance of amended NPDES discharge permit) in a manner and

upon discharge parameters that are consistent with the Preliminary NPDES Standards.

c. The date of the Purchased Assets Closing, as defined in the AAA. If the AAA does not close, this Contract shall be null and void.

2. It is understood and agreed that this Contract may also be subject to the approval of other state and federal agencies as may be legally required.

B. **Term of Contract /Renewals.**

1. **Original Term.**

a. This Contract shall commence on the Effective Date. The Original Term of this Contract shall continue in full force and effect for and through ten (10) consecutive years following the Initial Conveyance Date.

b. The Initial Conveyance Date will commence on the earlier of:

i. The completion of necessary construction of additional City Sewer Systems to the Connection Point and the construction by Aqua of any necessary additional facilities, including but not limited to the Vault and attendant metering and sampling equipment; or

ii. two (2) years after the Effective Date.

c. The Parties will use commercially reasonable efforts to complete construction of their respective facilities prior to two years after the Effective Date. It is understood and agreed by the Parties that the Initial Conveyance Date and related payments shall begin as stated hereunder regardless of whether any Sewage is conveyed unless Aqua is not able to fully provide for the acceptance and

treatment of Sewage conveyed from the City. If Aqua is not able to fully provide for the acceptance and treatment of Sewage from the City as contemplated by this Contract, then the Initial Conveyance Date shall be postponed until the date that Aqua is able to fully provide for the acceptance and treatment of Sewage from the City.

d. The pricing and volumes for such Original Term are set forth in Section XI.

2. **Extended Term.**

a. Following completion of the Original Term, the Contract shall automatically continue in full force and effect for and through five (5) additional consecutive years ("Extended Term"). The Extended Term shall provide for a reduced flow volume maximum such that the conveyance of Sewage by the City shall not exceed a maximum of 3.5 million gallons in any 24-hour period. If Aqua is able to accept more than the 3.5 million gallons, it shall inform the City in writing of the higher daily maximum flow volume and the City may convey up to such amount of Sewage.

b. The pricing and volumes for such Extended Term are set forth in Section XI.

3. **Contract Renewal.** Except as stated in Section X.B.2 of this Contract, this Contract does not renew automatically. An additional extensions or renewals will only occur if the Parties agree in writing to such terms and conditions.

XI. COST OF CONVEYANCE AND TREATMENT.

A. **Beginning of Billing and Payment.** Aqua shall commence invoicing under the terms of this Contract at the end of the first calendar month following the Initial Conveyance Date.

B. **Billing.** Aqua shall be responsible for reading the metering devices and billing the City in accordance with this Contract. Billing shall be made one (1) month in arrears on a monthly basis for Sewage conveyed in the preceding month. All bills will be paid by the City in thirty (30) days after submission. Any bills not paid when due shall incur the lesser of a 0.5% monthly late fee or the maximum amount allowed by law on the balance outstanding.

C. **Rate.** The City agrees to pay Aqua for the conveyance and treatment as agreed herein, and other charges applicable as follows:

1. For and through the first five (5) Contract Conveyance Years following the Initial Conveyance Date the City shall pay Aqua as follows:

   a. a flat Minimum Monthly Amount of $125,468.75 per month; plus,

   b. In the event the City sends to Aqua more than 547,500,000 gallons ("Annual Minimum") in any one Contract Conveyance Year, Aqua shall assess and the City shall pay at the end of such Contract Conveyance Year an additional $2.75 ("Excess Annual Minimum Amount") for each one thousand (1,000) gallons of Sewage conveyed to Aqua in excess of the Annual Minimum.

Contract Conveyance Year	**Minimum Monthly Amount**	**Excess Annual Minimum Amount**
Year 1	$125,468.75	$2.75 per (1,000) gallons
Year 2	$125,468.75	$2.75 per (1,000) gallons
Year 3	$125,468.75	$2.75 per (1,000) gallons
Year 4	$125,468.75	$2.75 per (1,000) gallons
Year 5	$125,468.75	$2.75 per (1,000) gallons

2. For and through Contract Conveyance Years six (6) through ten (10) following the Initial Conveyance Date the City shall pay Aqua as follows:

   a. an Adjusted Minimum Monthly Amount that shall be equal to the previous Contract Conveyance Year's Minimum Monthly Amount as adjusted, plus the applicable CPI escalation as described herein times the previous Contract Conveyance Year's Minimum Monthly Amount as adjusted; plus,

   b. In the event the City sends to Aqua more than 547,500,000 gallons ("Annual Minimum") in any one Contract Conveyance Year, Aqua shall assess and the City shall pay at the end of such Contract Conveyance Year an additional $2.75 plus the applicable CPI escalation as described herein times the previous Contract Conveyance Year's Excess Annual Minimum Amount as adjusted ("Adjusted Excess Annual Minimum Amount") for each one thousand (1,000) gallons of Sewage conveyed to Aqua in excess of the Annual Minimum.

Contract Conveyance Year	Adjusted Minimum Monthly Amount			Adjusted Excess Ann. Min. Amt		
Year 6	Year 5 min. monthly amt	+	Year 5 min. monthly amt x CPI Escalator	Year 5 Excess Annual Min per 1,000 gallons	+	Year 5 Annual Min per 1,000 gallons x CPI Escalator
Year 7	Year 6 adj.min. monthly amt	+	Year 6 min. adj. monthly amt x CPI Escalator	Year 6 Adj. Excess Annual Min per 1,000 gallons	+	Year 6 Adj. Excess Annual Min per 1,000 gallons x CPI Escalator
Year 8	Year 7 adj. min. monthly amt	+	Year 7 min. adj. monthly amt x CPI Escalator	Year 7 Adj. Excess Annual Min per 1,000 gallons	+	Year 7 Adj. Excess Annual Min per 1,000 gallons x CPI Escalator

Contract Conveyance Year	Adjusted Minimum Monthly Amount			Adjusted Excess Ann. Min. Amt		
Year 9	Year 8 adj.min. monthly amt	+	Year 8 min. adj. monthly amt x CPI Escalator	Year 8 Adj. Excess Annual Min per 1,000 gallons	+	Year 8 Adj. Excess Annual Min per 1,000 gallons x CPI Escalator
Year 10	Year 9 adj.min. monthly amt	+	Year 9 min. adj. monthly amt x CPI Escalator	Year 9 Adj. Excess Annual Min per 1,000 gallons	+	Year 9 Adj. Excess Annual Min per 1,000 gallons x CPI Escalator

3. For and through the five years of the Extended Term the City shall pay Aqua as follows:

a. A flat minimum monthly amount for an Availability Charge of $10,000.00 per month; plus,

b. A "Flow Charge" for each and every 1,000 gallon of Sewage (without regard to an Annual Minimum Amount) conveyed by the City to Aqua as follows:

i. For year 11 of the Contract Conveyance Year (Year 1 of the Extended Term) the Flow Charge shall be equal to the rate of the Adjusted Excess Annual Minimum Amount in Year 10 of the Contract Conveyance Year plus the applicable CPI escalation as described herein times the Adjusted Excess Annual Minimum Amount in Year 10 of the Contract Conveyance Year; and

ii. For the Contract Conveyance Years 12 through 15 the Flow Charge shall be equal to the previous Conveyance Year's Flow Charge plus the applicable CPI escalation as described herein times previous Conveyance Year's Flow Charge.

Contract Conveyance Year	Monthly Availability Charge	Flow Charge		
Year 11	$10,000.00	Year 10 Adj. Excess Ann. Min. Amt.	+	Year 10 Adj. Excess Ann. Min. Amt. x CPI Escalator
Year 12	$10,000.00	Year 11 Flow Charge	+	Year 11 Flow Charge x CPI Escalator
Year 13	$10,000.00	Year 12 Flow Charge	+	Year 12 Flow Charge x CPI Escalator
Year 14	$10,000.00	Year 13 Flow Charge	+	Year 13 Flow Charge x CPI Escalator
Year 15	$10,000.00	Year 14 Flow Charge	+	Year 14 Flow Charge x CPI Escalator

4. The CPI escalation/escalator shall be

a. For the sixth year of the Contract Conveyance Year, the percent increase change in the Consumer Price Index for All Urban Consumers, U.S. City Average, not adjusted, measured from published by the Bureau of Labor Statistics, United States Department of Labor, measured from the fifth year of the Contract Conveyance Year to the beginning of sixth Contract Conveyance Year for the months of which such indexes are published as of first day of the month beginning on the Sixth Contract Conveyance Year, unless such change is less than zero in which case the CPI escalation/escalator shall be zero. (For example, if the sixth Contract Conveyance Year begins May 1, 2022, and the last published CPI index for 2022 is as of March, the CPI percent change shall be measured from March 2021 to March 2022).

b. For all but the sixth year of the Contract Conveyance Year, the twelve month percent increase change in the

Consumer Price Index for All Urban Consumers, U.S. City Average, not adjusted, published by the Bureau of Labor Statistics, United States Department of Labor, for which the last twelve months of which such indexes are published as of first day of the month beginning on a new Conveyance Year, unless such change is less than zero in which case the CPI escalation/escalator shall be zero. (For example, if the new Conveyance Year begins May 1, 2024, and the last published CPI index is as of March, the CPI percent change shall be measured from March 2023 to March 2024).

c. If the CPI-U is no longer officially published at the time of adjustment, the Parties agree to utilize a substitute index published by the Bureau of Labor Statistics which most closely approximates the CPI-U approved by both Parties, which approval the Parties agree shall not be unreasonably withheld, conditioned or delayed.

D. **Other Rates, Fees, Penalties and Charges**. Aqua shall be responsible for invoicing the City for any other rates, costs, fees, penalties and charges assessed pursuant to the Contract, unless otherwise provided herein.

XII. COMPLIANCE WITH RULES, REGULATIONS, STANDARDS AND LAWS.

A. The Parties to this Contract shall comply with all local, state and federal regulations, standards and laws currently in effect and as amended, adopted or enacted regarding the collection and treatment of sewage that are applicable to the subject matter of this Contract.

B. The Parties shall adopt and enforce policies providing for rates, rules and regulations, and use of their Sewer Systems that conform with the reasonable eligibility requirements for the Parties, on a continuing basis, to be awarded grants and loans from the State of Indiana and from United

States Environmental Protection Agency and other agencies which may now or in the future offer such financing opportunities.

XIII. MISCELLANEOUS.

A. Notices and Invoices.

1. Any notices required under this Contract shall be served by certified mail, return receipt requested, postage prepaid, addressed to the party to be served at the last address filed by such party with the other party.

2. Invoicing by Aqua under this Contract shall be served by first class mail addressed to the City at the address filed by the City.

3. At the Effective Date of this Contract, Aqua's address is:

   Aqua Indiana, Inc., Attention of the President
   5750 Castle Creek Parkway N. Dr. Suite 314
   Indianapolis, Indiana 46250

4. At the Effective Date of this Contract, the City's address is:

   Fort Wayne City Utilities, Attention of the Director
   200 E. Berry St. Suite 270
   Fort Wayne, Indiana 46802

B. Amendments. Any alteration, modification, waiver or amendment of the terms and conditions of this Contract must be set forth in a written amendment to this Contract executed and approved by the Parties. Verbal modifications do not constitute a legally binding amendment, and shall not alter, modify or waive any provision of this Contract.

C. Change of Conditions or Legal Environment. Subject to Section XIII.B, if a party believes there has been a material change in conditions or legal regulations applicable to the Contract, the Contract terms and conditions may be renegotiated in good faith to reflect the effect of such change. Such a request must be initiated by a notice provided from a

party to the other in accordance with this Section that includes the following:

1. Desire of party to discuss and renegotiate;

2. Description of substantial change in conditions; and

3. Description of conceptual relief or change desired.

D. **Termination by Both Parties**. This Contract may be terminated in writing with agreement by both Parties.

E. **Successors and Assignment.** This Contract is binding on any successors of either party unless amended per the terms of this Contract. Aqua may assign this Contract to a parent, subsidiary or affiliate of Aqua, or an entity that acquires all, or substantially all the operational sewer assets of Aqua and is authorized by the IURC to operate a sewer utility in Aqua's then applicable service area, provided such assignment shall not render Aqua of liability pursuant to this Contract. Except as stated herein, assignment or delegation of this Contract requires written notice to the other party of its intent to assign rights or delegate duties to a third party and written assent by the other party to the assignment or delegation.

F. **Dispute Resolution.** Except for the seeking of injunctive relief under this Agreement, the Parties agree to the following steps regarding any disputes:

1. The Parties agree that, before resorting to any formal dispute resolution process concerning any dispute, claim, or controversy arising out of or in any way relating to this Contract, they will use their best endeavors to settle such dispute, claim or controversy by negotiating with each other in good faith within thirty (30) days of a written notice of a dispute from one party to the other party. To this end, executives with full authority to settle the dispute shall negotiate and consult with each other in an effort to find a just and equitable resolution that serves their respective and mutual interests, including their continuing business / professional

relationship. The complaining party must give the other party written notice of any dispute, claim, or controversy (the "Notice").

2. If the Parties are unable to completely resolve the dispute through negotiation, the Parties may mutually agree to proceed to binding arbitration administered by the American Arbitration Association (or any other mutually agreeable arbitration service) to the extent permitted by applicable law. The arbitration hearing will be conducted in accordance with the AAA's Rules of Commercial Arbitration. Either party may commence the arbitration by filing a written demand for arbitration. The Parties' covenant that they shall participate in the arbitration in good faith and that they will share equally in the costs. The arbitration will take place in Fort Wayne or Indianapolis, Indiana before three arbitrators, one selected by each of the Parties and the third selected by the other two. The Parties may mutually agree to a single arbitrator. The award rendered by the arbitrator(s) is final and binding, and may be entered into any court or tribunal having jurisdiction thereof. Any court of competent jurisdiction may enforce the provisions of this paragraph.

G. **Default.** In the event of a default pursuant to this Contract which is not resolved pursuant to Section F above, the non-defaulting party shall give the defaulting party written notice of the specific nature of the default, and the alleged defaulting party shall have a period of thirty (30) days to cure said default and, if not so cured, the party shall be deemed in default.

H. **Remedies**. Upon an event of Default, the non-defaulting party shall be entitled to all remedies available at law for damages attributable to the Default. In addition to any remedies that may be available at law, temporary, preliminary and permanent injunctive relief may be granted to enforce any provision of this Contract in the event of an actual breach or violation, or a threatened breach or violation, of any restriction or covenant under this Contract. The prevailing party in any litigation shall

be entitled to recover from the non-defaulting Party, its reasonable attorneys' fees and court costs.

I. **Severability.** Invalidity or unenforceability of any covenant, condition, term or provision in this Contract shall not affect the validity and enforceability of any other covenant, condition, term or provision in this Contract.

J. **Waiver**. The failure of either party to exercise any right or power given hereunder or insist upon strict compliance with any obligation specified herein shall not constitute waiver of such party's rights to demand exact compliance with the terms hereof.

K. **No Third Party Beneficiaries.** This Contract does not and is not intended to confer any rights or remedies upon any other persons or entities other than the Parties hereto.

L. **Headings**. The headings to the paragraphs of this Contract are solely for the convenience of the Parties and shall not be used to explain, modify, simplify, or aid in the interpretation of the provisions of this Contract.

M. **Applicable Law**. This Contract shall be governed by, construed and interpreted in accordance with the laws of the State of Indiana. Any reference to a particular law, rule or regulation shall refer to such law as may be amended or otherwise substituted from time to time.

END.

CITY OF FORT WAYNE, INDIANA ("CITY")

By: Thomas C. Henry

Printed: THOMAS C. HENRY

Title: MAYOR

Date: 12/4/2014

UTILITY CENTER, INC. d/b/a
AQUA INDIANA, INC. ("AQUA")

By: Thomas M. Bruns

Printed: Thomas M. Bruns

Title: President

Date: 12/4/2014

Exhibit A

Location of Connection Point Map.

Midwest WPCP Site Plan Showing Point of Connection at Vault

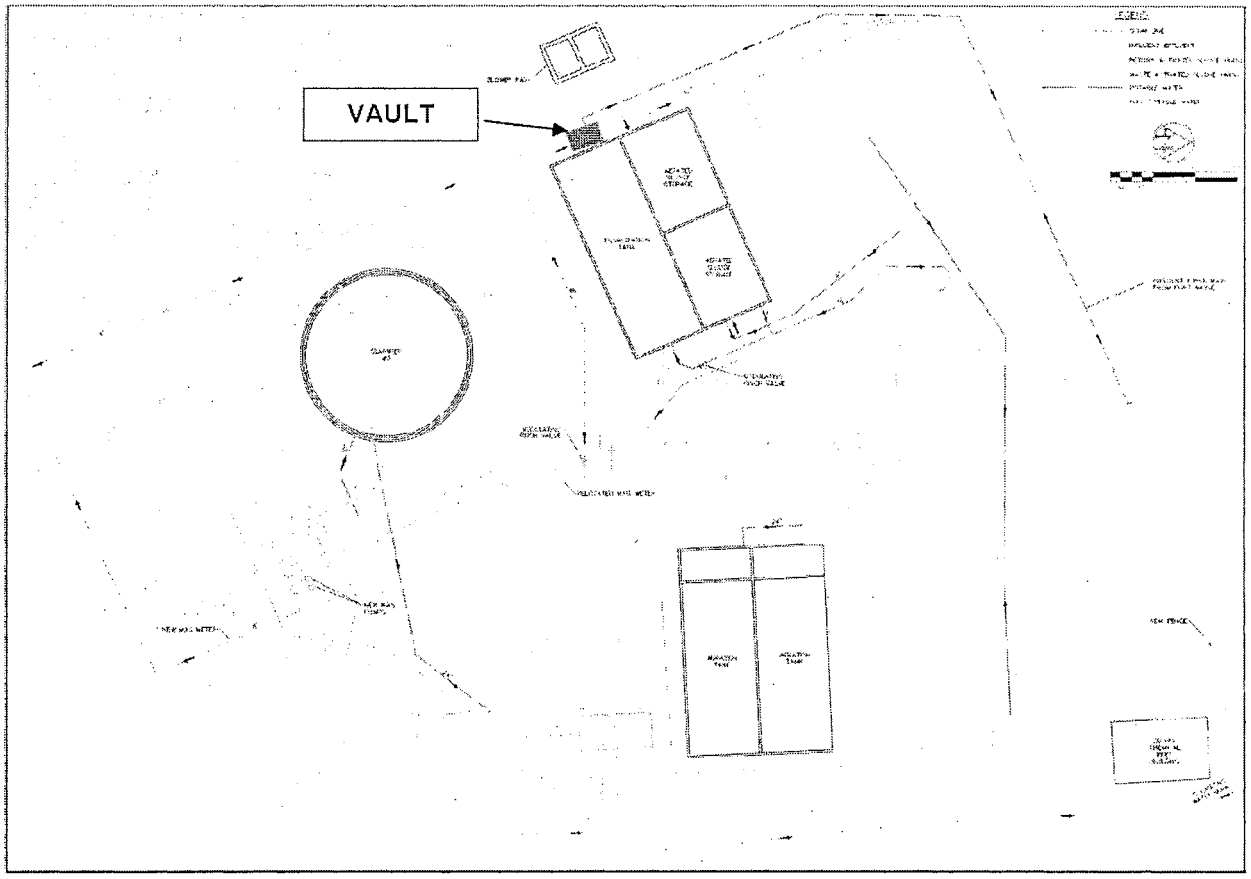

Exhibit B

Indiana Department of Environmental Management's letter dated January 2, 2012.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.

Michael R. Pence
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
Toll Free (800) 451-6027
www.idem.IN.gov

January 2, 2014

VIA ELECTRONIC MAIL

Ms. Cynthia Fort, PE
American Structurepoint, Inc.
7260 Shadeland Station
Indianapolis, Indiana 46256

Dear Ms. Fort:

Re: Preliminary Effluent Limitations
Proposed Upgrade of the Aqua Indiana, Inc.
Midwest Wastewater Treatment Plant
NPDES Permit No. IN0042391
Allen County

This letter is in response to your April 23, 2013 request for preliminary effluent limitations for a proposed upgrade of the Aqua Indiana, Inc. Midwest Wastewater Treatment Plant. As indicated in your request, the average design flow of the WWTP will be increased from 1.7 MGD to 3.1 MGD. The treatment type would continue to be bio-mechanical. The facility would continue to discharge via the existing outfall location to Graham McCulloch Ditch. The $Q_{7,10}$ low-flow of the receiving stream at the point of discharge is considered to be 0.1 cfs.

A Wasteload Allocation (WLA) analysis (WLA001979) was performed by this Office's Permit Branch staff on June 27, 2013. The following effluent limits are appropriate for the aforementioned bio-mechanical wastewater treatment plant with an average design flow of 3.1 MGD with continuous discharge to Graham McCulloch Ditch:

TABLE 1

	Summer		Winter		
Parameter	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Units
$CBOD_5$	10	15	10	15	mg/l
TSS	10	15	10	15	mg/l
Ammonia-nitrogen [1]	1.5	2.3	2.2	3.3	mg/l

TABLE 2

Parameter	Daily Minimum	Monthly Average	Daily Maximum	Units
pH	6.0	-----	9.0	s.u.
Dissolved Oxygen				
Summer	6.0	-----	-----	mg/l
Winter	5.0	-----	-----	mg/l
E. coli	-----	125	235	count/100 mls

[1] The wasteload allocation analysis calculated a summer ammonia-nitrogen limit of 1.7 mg/l as a monthly average (2.6 mg/l as a weekly average) and a winter ammonia-nitrogen limit of 3.1 mg/l as a monthly average (4.7 mg/l as a weekly average). If the permittee is willing to accept the ammonia-nitrogen limitations in Table 1 (which are the permittee's existing NPDES permit limitations and have been determined to not cause a significant lowering of water quality), then the design of the upgrade may proceed without having to submit an antibacksliding exception request or an antidegradation demonstration.

If the permittee chooses to pursue the less stringent ammonia-nitrogen limits mentioned above, then the permittee would need to submit an antibacksliding exception request that satisfies the antibacksliding provisions contained in 327 IAC 5-2-10(11). In addition, the permittee would need to submit an antidegradation demonstration for ammonia-nitrogen in accordance with the antidegration provisions included in 327 IAC 2-1.3-5. These submittals would be a prerequisite to application for a construction permit.

Additional monitoring for metals and/or non-conventional parameters may be required dependent on the amount and type of industrial contributions.

For the above-referenced discharge scenario, the following requirements will apply: Flow must be measured. The mass limits for $CBOD_5$, NH_3-N, and TSS are calculated by multiplying the average design flow (in MGD) by the corresponding concentration value and by 8.345. Summer effluent limits apply from May 1 through November 30 of each year. Winter effluent limits apply December 1 through April 30 of each year. The effluent limitations for *E. coli* are 125 colonies/100 ml as a monthly average calculated as a geometric mean and 235 colonies/100 ml as a daily maximum.

If you have any questions regarding design requirements of the construction permit, please contact Mr. Don Worley at 317/232-5579. The NPDES permit modification will not be issued to reflect the upgrade until the construction permit is finalized. At a minimum, the modification request should be submitted at least 180 days prior to completion of the upgrade activities. Please be advised that the modification request must be accompanied by a $50.00 fee in accordance with IC 13-18-20-12.

Mr. Cynthia Hart, PE
Page 2

If there are any questions regarding the NPDES permit requirements, please feel free to contact Leigh Voss at 512/239-4608.

Sincerely,

Jerry Burnett, Chief
Municipal NPDES Permits Section
Office of Water Quality

IDEM

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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100 N. Senate Avenue • Indianapolis, IN 46204
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Michael R. Pence
Governor

Thomas W. Easterly
Commissioner

March 11, 2015

VIA CERTIFIED MAIL 91 7190 0005 2710 0038 9428

Mr. Derek Sutton, State Engineer
Aqua Indiana, Inc.
5750 Castle Creek Parkway N. Drive, Suite 314
Indianapolis, Indiana 46250

Dear Mr. Sutton:

Re: 327 IAC 3 Construction
Permit Application
Plans and Specifications for
Midwest Wastewater Treatment
Plant Expansion
Permit Approval No. 21291
Fort Wayne, Indiana
Allen County

The application, plans and specifications, and supporting documents for the above-referenced project have been reviewed and processed in accordance with rules adopted under 327 IAC 3. Enclosed is the Construction Permit (Approval No. 21291), which applies to the construction of the above-referenced proposed Wastewater Treatment Plant (WWTP) Expansion to be located at 6811 Engle Road.

Please review the enclosed permit carefully and become familiar with its terms and conditions. In addition, it is imperative that the applicant, consulting architect/engineer (A/E), inspector, and contractor are aware of these terms and conditions.

It should be noted that any person affected or aggrieved by the agency's decision in authorizing the construction of the above-referenced facility may, within fifteen (15) days from date of mailing, appeal by filing a request with the Office of Environmental Adjudication for an adjudicatory hearing in accordance with IC 4-21.5-3-7 and IC 13-15-6. The procedure for appeal is outlined in more detail in Part III of the attached construction permit.

Plans and specifications were prepared by URS Corporation, and certified by Mr. Jeffrey Ponist, P.E., and submitted for review on December 12, 2014, with additional information submitted on February 17, March 2, March 5, and March 9, 2015.

Any questions concerning this permit may be addressed to Mr. Dharmendra Parikshak, of our staff, at 317/232-8660. Questions concerning appeal procedures should be addressed to the Office of Environmental Adjudication, at 317/232-8591.

Sincerely,

Dale T. Schnaith, Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

Project No. PS-1469
Enclosures
cc: Allen County Health Department
Allen County Commissioner
Jeffrey Ponist, P.E., URS Corporation
Marty Blake, INDOT
Jack Delaney, Chicago Airports District Office

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
AUTHORIZATION FOR CONSTRUCTION OF
WATER POLLUTION TREATMENT/CONTROL FACILITY
UNDER 327 IAC 3

DECISION OF APPROVAL

AQUA Indiana, in accordance with the provisions of IC 13-15 and 327 IAC 3 is hereby issued a permit to construct the proposed Wastewater Treatment Plant (WWTP) Expansion to be located at 6811 Engle Road. The permittee is required to comply with requirements set forth in Parts I, II and III hereof. The permit is effective pursuant to IC 4-21.5-3-4(d). If a petition for review and a petition for stay of effectiveness are filed pursuant to IC 13-15-6, an Environmental Law Judge may be appointed for an adjudicatory hearing. The force and effect of any contested permit provision may be stayed at that time.

NOTICE OF EXPIRATION DATE

Authorization to initiate construction of the proposed WWTP Expansion shall expire at midnight April 1, 2016. In order to receive authorization to initiate construction beyond this date, the permittee shall submit such information and forms as required by the Indiana Department of Environmental Management. It is requested that this information be submitted sixty (60) days prior to the expiration date to initiate construction. This permit shall be valid for a period of five (5) years from the date below for full construction completion.

Signed this 11th day of March, 2015, for the Indiana Department of Environmental Management.

Dale T. Schnaith, Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

WATER POLLUTION TREATMENT/CONTROL FACILITY DESCRIPTION

The permittee currently operates a Class III, 1.25 MGD (rated at 1.7 MGD as the design flow in accordance with the January 12, 2006 Joint Stipulation for Stay and Agreed Entry between IDEM and the permittee) activated sludge treatment facility consisting of raw sewage lift station, fine screens, single stage nitrification biological treatment, two circular final clarifiers, post aeration, ultraviolet (UV) light disinfection, and effluent pump station (to be used during higher water levels in the receiving stream). Waste sludge is stored in aerated sludge holding tanks and a belt filter press is used to dewater solids prior to disposal of dewatered sludge.

The proposed improvements to expand existing WWTP to 3.5 MGD include:

- Installation of two new 1,400 gpm @ 35' TDH each pumps in the existing raw sewage lift station.
- Construction of new flow metering vault to meter influent wastewater flows from the Fort Wayne City Utility (FWCU).
- Conversion of one of the existing aeration tanks to flow equalization tank and conversion of the other aeration tank to two additional aerated sludge holding tanks.
- New piping, valves, control structure, etc. to divert influent wastewater flows from FWCU to either screen structure or to flow equalization tank.
- Construction of two new phased isolation oxidation ditches with anaerobic selector tanks.
- Improvements to the existing clarifier flow splitter structure.
- Construction of one additional circular secondary clarifier.
- Installation of two additional 970 gpm @ 15' TDH each RAS/WAS pumps in the existing RAS/WAS pump station.
- Modification to existing post aeration tank.
- Modification to existing UV disinfection system.
- Installation of one additional 5,600 gpm @ 18' TDH pump in the effluent pump station well.
- Demolition, site work, site piping, valves, electrical and instrumentation and process control to support the proposed project.

Two new influent samplers will be installed to sample influent wastewater flows from FWCU going into either the screen structure or to the flow equalization tank.

CONDITIONS AND LIMITATIONS TO THE AUTHORIZATION FOR CONSTRUCTION OF WATER POLLUTION TREATMENT/CONTROL FACILITY

During the period beginning on the effective date of this permit and extending until the expiration date, the permittee is authorized to construct the above described water pollution treatment/control facility. Such construction shall conform to all provisions of State Rule 327 IAC 3 and the following specific provisions:

PART I

SPECIFIC CONDITIONS AND LIMITATIONS TO THE CONSTRUCTION PERMIT

Unless specific authorization is otherwise provided under the permit, the permittee shall comply with the following conditions:

1. All local permits shall be obtained before construction is begun on this project.

2. If pollution or nuisance conditions are created, immediate corrective action will be taken by the permittee.

3. Additional treatment facilities shall be installed if the proposed facilities prove to be inadequate or cannot meet applicable federal or state requirements.

4. If construction is located within a floodway, a permit may also be required from The Department of Natural Resources prior to the start of construction. It is the permittee's responsibility to coordinate with that agency and obtain any required approvals if applicable. Questions may be directed to the Technical Services Section, Division of Water at 317/232-4160.

5. If this project includes a change in design flow, addition of new treatment unit(s), or modification/removal of existing treatment unit(s), an NPDES Permit modification will likely be required. This would include any CSO treatment addition/modification. Questions may be directed to the NPDES Permit Section, Office of Water Quality at 317/233-0469.

6. After construction and before startup of the sewage treatment facilities, the Commissioner shall be notified of the date of startup and the name of the properly certified operator in responsible charge.

7. AQUA Indiana must submit an application for a modification to the National Pollutant Discharge Elimination System permit.

8. The sewage treatment plant must be capable of providing the same degree of treatment during construction as prior to expansion of the existing facilities. If this is not feasible, the plans for reduced degree of treatment must be submitted to the Department of Environmental Management for consideration of approval.

9. All force mains must be pressure and leak tested in accordance with 327 IAC 3-6-19(e).

10. Air relief valves shall be installed at high points in the force main.

11. All force mains must be pressure and leak tested in accordance with 327 IAC 3-6-19(e).

Failure to meet guidelines as set forth in the above conditions could be subject to enforcement proceedings as provided by 327 IAC 3-5-3.

PART II

GENERAL CONDITIONS

1. No significant or material changes in the scope of the plans or construction of this project shall be made unless the following provisions are met:

   a. Request for permit modification is made 60 days in advance of the proposed significant or material changes in the scope of the plans or construction;

   b. Submit a detailed statement of such proposed changes;

   c. Submit revised plans and specifications including a revised design summary; and

   d. Obtain a revised construction permit from this agency.

2. This permit may be modified, suspended, or revoked for cause including, but not limited to the following:

   a. Violation of any term or conditions of this permit;

   b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

3. Nothing herein shall be construed as guaranteeing that the proposed water pollution treatment/control facility shall meet standards, limitations or requirements of this or any other agency of state or federal government, as this agency has no direct control over the actual construction and/or operation of the proposed project.

PART III

APPEALS PROCEDURE

Anyone wishing to challenge this agency's decision for authorizing the construction of this facility may do so, provided that a petition for administrative review is filed as required by IC 4-21.5-3-7. The petition must be submitted within fifteen (15) days of the date of mailing of this permit notification. The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by this decision, or otherwise entitled to review by law. Additionally, IC 13-15-6-2 requires that your petition include:

1. The name and address of the person making the request;

2. The interest of the person making the request;

3. Identification of any persons represented by the person making the request;

4. The reasons, with particularity, for the request;

5. The issues, with particularity, proposed for consideration at the hearing; and

6. Identification of the permit terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing permits of the type granted or denied by the Assistant Commissioner's action.

7. Pursuant to IC 4-21.5-3-1(f), any document serving as a petition for review or review and stay must be filed with the Office of Environmental Adjudication. Filing of such a document is complete on the earliest of the following dates:

    a. The date on which the petition is delivered to the Office of Environmental Adjudication, Indiana Government Center North, 100 North Senate Avenue, Room 501, Indianapolis, Indiana 46204;

    b. The date of the postmark on the envelope containing the petition, if the petition is mailed by United States mail; or

    c. The date on which the petition is deposited with a private carrier, as shown by a receipt issued by the carrier, if the petition is sent by private carrier.

Checklist for Construction Project
Design Summary

I. GENERAL

1. Applicant: AQUA Indiana

2. Project Name and Location: Midwest Wastewater Treatment Plant (WWTP) Expansion (Formerly Utility Center)

3. Project Number: PS-1469

4. Engineer (Consultant): URS Corporation

5. NPDES Permit Number: IN00042391

   A. Date of Final Permit Issuance: December 6, 2013 (Effective June 1, 2014)

   B. Expiration Date: May 31, 2019

6. Remarks:

   A. Description of Present Situation: The permittee currently operates a Class III, 1.25 MGD (rated at 1.7 MGD as the design flow in accordance with the January 12, 2006 Joint Stipulation for Stay and Agreed Entry between IDEM and the permittee) activated sludge treatment facility consisting of raw sewage lift station, fine screens, single stage nitrification biological treatment, two circular final clarifiers, post aeration, ultraviolet (UV) light disinfection, and effluent pump station (to be used during higher water levels in the receiving stream). Waste sludge is stored in aerated sludge holding tanks and a belt filter press is used to dewater solids prior to disposal of dewatered sludge.

   B. Description of Proposed Facilities: The proposed improvements to expand existing WWTP to 3.5 MGD include:

      - Installation of two new 1,400 gpm @ 35' TDH each pumps in the existing raw sewage lift station.
      - Construction of new flow metering vault to meter influent wastewater flows from the Fort Wayne City Utility (FWCU).
      - Conversion of one of the existing aeration tanks to flow equalization tank and conversion of the other aeration tank to two additional

aerated sludge holding tanks.

- New piping, valves, control structure, etc. to divert influent wastewater flows from FWCU to either screen structure or to flow equalization tank.
- Construction of two new phased isolation oxidation ditches with anaerobic selector tanks.
- Improvements to the existing clarifier flow splitter structure.
- Construction of one additional circular secondary clarifier.
- Installation of two additional 970 gpm @ 15' TDH each RAS/WAS pumps in the existing RAS/WAS pump station.
- Modification to existing post aeration tank.
- Modification to existing UV disinfection system.
- Installation of one additional 5,600 gpm @ 18' TDH pump in the effluent pump station well.
- Demolition, site work, site piping, valves, electrical and instrumentation and process control to support the proposed project.
- Two new influent samplers to sample influent wastewater flows from FWCU going into either the screen structure or to the flow equalization tank.

7. Estimated Project Cost: $7.0 million

II. DESIGN DATA

1. Current Population: Not determined

2. Design Year and Population: Year 2024 and population not known

3. Design P.E.: 51,168 based on design CBOD loading of 8,699 lbs/day divided by 0.17 lbs/capita/day

4. Design Flow: 3.5 MGD

5. Average Design Peak Flow: 13.1 MGD

6. Maximum Plant Flow Capacity: 13.1 MGD

7. Design Waste Strength

   A. CBOD: 298 mg/l (8,699 lbs/day)

   B. TSS: 238 mg/l (6,947 lbs/day)

C. NH_3-N: 21 mg/l (613 lbs/day)

D. P: 5 mg/l (146 lbs/day)

8. NPDES Permit Limitation on Effluent Quality (January 2, 2014 PEL):

A. CBOD: 10 mg/l

B. TSS: 10 mg/l

C. NH_3-N: 1.5 mg/l (summer), 2.2 mg/l (winter)

D. P: 1.0 mg/l (anticipated after NPDES permit modification request is received by IDEM)

E. E. Coli: 235 count/100 ml (daily maximum)
125 count/100 ml (monthly average)

F. Chlorine Residual: N/A

G. pH: 6.0 – 9.0 s.u.

H. D.O. (daily minimum): 6.0 mg/l (summer), 5.0 mg/l (winter)

9. Receiving Stream:

A. Name: Graham McCulloch Ditch

B. Tributary to: Little Wabash River

C. Stream Uses: Full body contact recreation use and shall be capable of supporting a well-balanced warm water aquatic community

D. 7-day, 1-in-10 year low flow: 0.13 CFS

III. TREATMENT UNITS

Flow Meters (Existing and New)

1. Type: Magnetic full body and ultrasonic

2. Location: Influent (Existing 16" Magnetic Meter), FWCU influent (New 14" Magnetic Meter), Flow equalization return (New 10" Magnetic Meter), WAS (Replacement of existing, 8" Magnetic Meter), RAS (New 12" Magnetic Meter), Effluent (Existing Ultrasonic)

3. Indicating, recording and totalizing: Yes

Raw Sewage/Plant Site Lift Station (Existing, addition of two new pumps)

1. Location: WWTP site

2. Type of pump: Submersible centrifugal

3. Number of pumps: Five (three existing and two new)

4. Constant or variable speed: Variable speed (VFD)

5. Capacity of pumps: Three, 2,500 gpm @ 42' TDH (Existing) and two, 1,400 gpm @ 35' TDH (New)

6. RPM: 1,150 rpm @ 42' TDH (Existing pumps) and 1,200 rpm @ 35' TDH (new pumps)

7. Volume of the wet well: Variable

8. Detention time in the wet well: Variable

9. A plug valve and a check valve in the discharge line: Yes

10. A gate valve on suction line: N/A

11. Ventilation: Yes

12. Standby power: Yes

13. Alarm: Yes

14. Breakwater tank: N/A

15. Bypass or overflow: N/A

Wastewater flow from Raw Sewage Lift Station is and will be pumped to → Screen Structure (Upstream of coarse screen and fine screens)

Wastewater flow from FWCU will be pumped into WWTP → Flow Metering Vault → Screen Structure (downstream of coarse screen and upstream of fine screens) or Flow Equalization Tank (Note – Wastewater stored in the flow equalization tank will be metered and returned back to raw sewage lift station).

Flow Equalization Tank (Converted from one of the existing aeration tanks)

1. Number and size of units: One @ 68,000 CF (100' x 34' x 20' SWD) or 507,000 gallons

2. Method of flow diversion to unit: (a) New FWCU force main, and (b) by gravity from existing splitter box

3. Air and mixing provided: Yes (Existing fine bubble diffusers, and two 2,800 SCFM each and one 800 SCFM blowers)

4. Method and control of flow return: Auto control valve and flow meter

5. Description of unit operation: Flow from FWCU can be sent either to channel upstream of the existing fine screens or to flow equalization tank as selected by the operator. Wastewater stored in the flow equalization tank will be returned back to raw sewage lift station and automatically controlled.

6. Lagoon sealing: N/A

7. Method of sludge removal: Gravity drain to raw sewage lift station from new control valve vault

Screens (Existing, some structural modifications to receive flow from FWCU force main to channel upstream of the existing mechanical fine screens)

1. Type: (a) coarse bar screen (located upstream of the mechanical fine screens and bypass manual bar screen), (b) mechanical fine screen, and (c) manual bypass bar screen

2. Number and capacity: (a) one, (b) two @ 6.5 MGD each, and (c) one

3. Bar spacing and slope: (a) 2" and 45 degree, (b) ¼" and 47 degree, and (c) ½" and 45 degree

4. Method of cleaning: (a) manual, (b) automatic, and (c) manual

5. Disposal of screenings: Landfill

Oxidation Ditch (New)

1. Number and size of units: Two phased isolation ditches (2.746 MG) with upstream anaerobic selector tanks (0.226 MG), total volume approximately 2.97 MG or 397,425 CF

2. Detention time (hrs): 20.4

3. Organic loading (lb BOD /1000 CF): 21.9

4. Type and efficiency of aeration equipment (lbs 02 /HP-hr): Eight brush rotors with 2.93 lbs 02/HP-hr or 176 lbs/hr SOTR each

5. Oxygen required: 31,736 lbs/day or 1,322 lbs/day SOR (assuming AOR/SOR of 0.5)

6. Oxygen provided: 33,792 lbs/day or 1,408 lbs/hr SOTR with eight brush rotors

7. Flow velocity in ditch: 1 fps minimum

8. Number and capacity of return sludge pump: Three @ 970 gpm each (Existing), two @ 970 gpm each (New) used for RAS and WAS

9. Method of return sludge rate control: Telescoping valves and RAS/WAS pump station operation controls

10. Return sludge rate as % of design flow: Up to 150%

11. Provisions for return sludge metering: New 12" magnetic flow meter

12. Location of return sludge discharge: First anaerobic selector tank

13. Facilities to isolate units: Yes

14. Facilities for flow split control: N/A

Nitrification System (New)

1. Type of nitrification system: Phased isolation ditches with anaerobic selector tanks

2. Ammonia loading: 613 lbs/day

3. Additional oxygen demand: 2,820 lbs/day (based on 4.6 lbs/day O2 per lb of NH3-N)

4. Air supply system: Eight brush rotors with 2.93 lbs 02 /HP-hr or 176 lbs/hr SOTR each

5. Hydraulic detention time: 20.4 hrs

6. Mean cell residence time (days): 13.1 days assuming 3,500 mg/l MLSS and 0.7 sludge yield

Secondary Clarifiers (Two existing, one new)

1. Type of clarifiers: Circular center feed

2. Number and size of units: 80' diameter and 14' SWD each

3. Surface settling rate (gpd/sf):

   a. at the design flow: 348 gpd/sf @ 3.5 MGD with two clarifiers, and 232 gpd/sf @ 3.5 MGD with three clarifiers

   b. at the average design peak flow: 869 gpd/sf at 13.1 MGD with three clarifiers

c. at the equalized flow rate: N/A

4. Detention time (hrs): 10.8 hrs @ 3.5 MGD or 2.9 hrs @ 13.1 MGD with three clarifiers

5. Type of sludge removal mechanism: Rotating scraper arms with sludge withdrawal pipes

6. Weir overflow rate: 4,642 gpd/ft @ 3.5 MGD or 17,374 gpd/ft @ 13.1 MGD

7. Disposal of scum: Sludge holding tanks

8. Facilities for unit isolation: Yes

9. Facilities for flow split control: Yes

Note – The secondary clarifiers may not be capable of being isolated at design peak hourly flow of 13.1 MGD due to hydraulic conditions in the clarifier splitter box. Also, effective flow split between the secondary clarifiers may not be controlled at design peak hourly flow of 13.1 MGD due to hydraulic issues since clarifier effluent weirs and flow splitter box weirs may be completely submerged at design peak hourly flow of 13.1 MGD based on utilizing a C factor 100.

Phosphorus Removal Facilities (New, repurpose existing chemical pumps)

1. Type of chemical to be used: 48% Alum solution

2. Location of chemical injection: Phased isolation ditch effluent header

3. Number and size of chemical feed pumps: Two @ 16 gph each (Existing)

4. Size of chemical storage tank: One 6,500 gallon (10.25' diameter and 14.25' high) insulated (and heat panels) high density cross-linked SAFE-TANK® double wall polyethylene tank

5. Capacity of spill storage space: N/A (SAFE-TANK® double wall tank)

6. Chemical dosage: Approximately 3 gallons of 48% Alum solution/lb of P removed (assuming no P removal via biological phosphorous removal)

7. Daily chemical consumption expected: 354 gpd

8. Rapid mix tank: None

9. Slow mixing equipment: None

10. Other facilities: Eye Wash (Existing)

Post-aeration (Existing, new fine bubble diffusers)

1. Type of aeration: Diffused aeration (New fine bubble diffusers)

2. Number of units: One

3. Size of units: 26,295 gallons (30' x 14' x 8.37' SWD)

4. Aeration provided: Yes (New fine bubble diffusers, and two 2,800 SCFM each and one 800 SCFM existing blowers)

5. Expected effluent D.O.: 6 to 7 mg/l

UV Disinfection (Existing system expanded with addition of two new UV modules and new controls)

1. Type: Open channel

2. Location: After post aeration

3. Size of channel: 32' L x 4.25' W x 8.8' D (5.01' SWD)

4. Contact time: 4.7 minutes

5. Dosage: 29,600 microwatts-second/cm2@ 60% minimum UV transmittance

6. Safety equipment: Yes

7. Cleaning equipment: Automatic

8. Intensity monitoring: Yes

Effluent Lift Station/Pumps (To be used to alleviate hydraulic backwater effect through the UV disinfection system at or greater than 100 year flood)

1. Location: Downstream of the UV disinfection system
2. Type of pump: Submersible centrifugal
3. Number of pumps: Three (two existing and one new)
4. Constant or variable speed: Constant
5. Capacity of pumps: 5,600 gpm @ 18' TDH
6. RPM: 880
7. A gate valve and a check valve in the discharge line: Yes
8. Standby power: Yes
9. Diameter of force main: Existing 16"

Sludge Holding Tanks (Three existing and two new tanks)

1. Number and size of units: One @ 236,665 gallons (46' x 34' x 20.23' SWD, New); one @ 271,393 gallons (52.75' x 34' x 20.23' SWD, New); two 33,000 gallons each (Existing); and one 54,000 gallon (Existing) with total volume of 628,058 gallons or 83,965 CF
2. Detention time: 17 days @ assumed 36,506 gallons of 2% sludge (not including chemical sludge)
3. Organic loading: 72.5 lbs/1,000 CF (assuming 0.7 sludge yield factor)
4. Air supply: Yes (Coarse/fine bubble diffusers, and two 2,800 SCFM each and one 800 SCFM existing blowers)
5. Decanting method: Telescoping valves

Mechanical Dewatering (Existing)

1. Type of dewatering units: Belt filter press
2. Number and size of dewatering units: One, 2 meter belt
3. Capacity of dewatering units: 250 gpm
4. Daily solids production for dewatering: approximately 6,089 lbs/day (assuming 0.7 sludge yield factor and no chemical sludge)
5. Type of chemicals to be used: Polymer

Sludge Disposal (Existing)

1. Ultimate disposal method of sludge: Landfill
2. Expected solids content of sludge (by the principal method of disposal): 18 – 22%
3. Location of disposal site: National Serv-All
4. Ownership of the disposal site: Private
5. Availability of sludge transport equipment: Contract service with Republic Services

IV. MISCELLANEOUS

A. Laboratory equipment: Existing

B. Safety equipment: Existing

C. Plant site fence: Yes

D. Handrail for the tanks: Yes

E. Units, unit operation, and plant bypasses: Post aeration only

F. Flood elevation (10, 25, or 100 year flood): 756 (100 year flood)

G. Provisions to maintain the same degree of treatment during construction: yes

H. Standby power equipment: Yes

I. Site inspection: Yes

J. Statement in the specifications as to the protection against any adverse environmental effect (e.g., dust. noise, soil erosion) during construction: Yes

L. Hoists for removing heavy equipment: Yes

M. Adequate sampling facilities: Yes

N. Hydraulic Gradient: Yes

Wastewater Treatment Plant Design Summary

1. General

A. Applicant name: AQUA Indiana

B. Project Name: Midwest WWTP Expansion

C. Location: Fort Wayne

D. Engineer (consultant): URS Corporation

F. NPDES permit number: IN00042391

1. Date of final permit issuance *(month, day, year)*: June 1, 2014

2. Expiration date *(month, day, year)*: May 31, 2019

F. Remarks

1. Description of present situation: Plant Expansion necessary to accommodate additional flow and loadings from AQUA sewer system and City of Fort Wayne connection.

2. Description of proposed facility(s): Expand WWTP to an average daily capacity of 3.5 MGD with new Phased Isolation Ditches and Anaerobic Selector to provide BNR. Peak capacity to be 11.0 MGD

3. Inspection during construction to be provided by: URS

G. Estimated project cost

1. Source of funding (Revenue bond, state grant, SRF, etc.): N/A

2. Total cost: $7 million

H. Certification seal and signature of engineer and date:

Printed name of engineer:
Jeffrey Ponist

Signature of engineer:

Date signed *(month, day, year)*:
2/27/15

rec'd
3/2/15

2. Design Data

A. Current population: Not Determined within service area

B. Design year and population: 2024

C. Design population and equivalent P.E.: 51,168 at 0.17 lbs. BOD/ PE

D. Design flow: 3.5 MGD

1. Domestic: 1.5

2. Industrial/commercial: 1.5 MGD from FWCU

3. infiltration/inflow: 0.5

E. Average design peak flow: 11.0 MGD

F. Maximum plant flow capacity: 13.1 MGD Peak Hourly

G. Design waste strength

1. CBOD: 298 mg/l

2. TSS: 238 mg/l

3. NH_3-N: 21 mg/l

4. P: 5 mg/l

5. Other:

2. Design Data *(continued)*

H. NPDES permit limitation on effluent quality

1. CBOD: 10 mg/l
2. TSS: 10 mg/l
3. NH_3-N: 1.5 mg/l summer 2.2 mg/l winter
4. P: 1.0 mg/l Anticipated after NPDES Permit Modification Request
5. E-coli: 125 cfu/100 ml
6. Chlorine Residual: N/A
7. pH: 6-9
8. D.O.: 6.0 mg/l Summer 5.0 mg/l Winter

I. Receiving stream

1. Name: Graham McCulloch Ditch
2. Tributary to: Little Wabash River
3. Stream uses: Full Body Rec
4. 7-day, 1-in-10 year low flow: 0.13 CFS (0.084 MGD)

3. Treatment units *(Fill out the ones that apply and if needed create a new entry that follows the format.)*

A. Plant site lift station

1. Location: WWTP Site
2. Type of pump: Submersible Centrifugal
3. Number of pumps: 3 Existing 2 NEW
4. Constant or variable speed: Variable Speed (VFD)
5. Capacity of pumps: 3 at 2,500 GPM (3.6 MGD) at 42 ft. TDH 2 at 1,400 GPM (2.02 MGD) at 35 ft. TDH
6. RPM and TDH: 1150 RPM at 42 ft.(existing) and 1200 RPM at 35 ft. TDH
7. Volume of the wet well: 3,500 gallons
8. Detention time in the wet well: 1.6 min.
9. A gate valve and a check valve in the discharge line: YES
10. A gate valve on suction line: N/A
11. Ventilation: YES
12. Standby power: YES
13. Alarm: YES
14. Breakwater tank: N/A
15. Bypass overflow: N/A

B. Flow equalization

1. Number and size of units: 1 at 507,000 gallons
2. Method of flow diversion to unit: Option 1: FWCU Force Main. Option 2: Gravity from Existing Splitter Box
3. Air and mixing provided: Fine Bubble at 30 SCFM/1000 cubic feet (2,000 SCFM full)
4. Method and control of flow return: Auto flow control valve and meter
5. Description of unit operation: Flow from FWCU will be sent to influent screens and to Secondary Treatment or sent directly to EQ Tank as selected by operator. Flow return will be automatically controlled.
6. Lagoon sealing: N/A
7. Method of sludge removal: Gravity drain to Main Lift Station from new control valve vault

C. Flow meters

1. Type: Magnetic Full Body & Ultra Sonic
2. Location: RAS (12" Mag) , EQ Return (10" Mag), FWCU Flow (14" Mag), WAS (8" Mag replacement), Influent(Existing16" Mag) Effluent (Existing Ultra Sonic)
3. Indicating, recording and totalizing: YES

D. Grit chamber

1. Type of grit chamber: N/A
2. Number of units:
3. Size of unit:
4. Method of velocity (aeration) control:
5. Velocity (aeration) in the chamber:
6. Drain provided:
7. Flow restrictions:

8. Facilities to isolate:

3. Treatment units *(continued)*

E. Comminutors
1. Type: N/A
2. Location:
3. Maximum capacity:
4. By-pass (overflow) bar screen:

F. Screens
1. Type: Mechanical Fine Course Rake: 2" Spacing @45 Deg. By Pass Screen ½" spacing @ 45 Deg.
2. Number and capacity: 2 at 6.55 MGD each at 47 Deg.
3. Bar spacing and slope: ¼ inch Perforations
4. Method of cleaning: Automatic
5. Disposal of screenings: landfill

G. Primary settling
1. Type of clarifier: N/A
2. Number and size of units:
3. Surface settling rate (gpd/sf)
   a. At the design flow:
   b. At the influent pumping rate:
   c. At the equalized flow rate:
4. Detention time (hrs):
5. Type of sludge removal mechanism:
6. Weir overflow rate:
7. Disposition of scum:
8. Location of overflow weir:
9. Facilities to isolate:

H. Activated sludge
1. Type of activated sludge process:
2. Number and size of units:
3. Detention time (hrs):
4. Organic loading (lb BOD/1000 cf):
5. Type of aeration equipment:
6. Type and size of blowers:
7. Air required (itemize, dfm):
8. Provisions of speed adjustment:
9. Air provided:
10. Ventilation in the blower room:
11. Number and capacity of return sludge pump:
12. Method of return sludge rate control:
13. Return sludge rate as % of design flow:
14. Provisions for return rate metering:
15. Location of return sludge discharge:
16. Facilities to isolate units:
17. Facilities for flow split control:

I. Oxidation ditch
1. Number and size of units: Phased Isolation Ditches with Anaerobic Selectors
2. Detention time (hrs): 20
3. Organic loading (lb BOD/1,000 cf): 22.3
4. Type and efficiency of aeration equipment (lb O2/HP-hr): Brush Rotors at 2.93 Lb O2/HP/hr SOTR
5. Oxygen required: AOR at 16,286LbO2/day 679 Lb O2/hr (no allowance for denitrification credit)
6. Oxygen provided: SOTR 27,840 LbO2/day Max
7. Flow velocity in ditch: Min 1 FPS
8. Number and capacity of return sludge pump: 3 Existing at 970 GPM 2 NEW at 970 GPM
9. Method of return sludge rate control: Telescopic Valves

3. Treatment units *(continued)*

10. Return sludge rate as % of design flow: 150%
11. Provisions for return sludge metering: YES 12" mag Meter
12. Location of return sludge discharge: Anaerobic Selector
13. Facilities to isolate units: YES
14. Facilities for flow split control: N/A

J. Trickling filters
1. Number and size of units:
2. Type of media:
3. Hydraulic loading (gpm/cf):
4. Organic loading (lb BOD/1,000 cf):
5. Recirculation:
6. Ventilation:

K. Rotating biological contactor
1. Size and number of units:
2. Type of media:
3. Detention time (min.):
4. Organic loading (lb BOD/1,000 sf):
5. Hydraulic loading (gpd/sf):
6. Method of shaft drive:
7. Supplemental air:
8. Facilities to isolate:
9. Facilities for flow split control:

L. Sequential batch reactors
1. Type of activated sludge process:
2. Number and size of units:
3. Detention time (hours):
   a. Low water level:
   b. High water level:
   c. Total cycle:
4. Organic Loading (lb BOD/1,000 cf)
   a. At low water level:
   b. At high water level:
5. Type of aeration equipment:
6. Type and size of blowers:
7. Air required (itemize, cfm):
8. Provisions of speed adjustment:
9. Air provided:
10. Ventilation in the blower room:
11. Number and capacity of waste sludge pump:
12. Decanter rated at average flow (GPM):
    Decanter rated at peak flow (GPM):
13. Facilities to isolate units:
14. Facilities for flow split control:

M. Lagoons
1. Type of lagoons:
2. Number and size of lagoons
3. Organic loading:
4. Type of aeration equipment (if applicable):
5. Type and size of air blowers (if applicable):
6. Air required (if applicable):
7. Air provided (if applicable):
8. Controlled discharge facilities:
9. Maximum water level:

3. Treatment units *(continued)*

10. Freeboard:
11. Soil boring data and permeability date:
12. Slope of embankment and top width:
13. Fence:
14. Detention time:
15. Stream gage:
16. Lagoon seal:
17. Facilities for multi-level lagoon discharge:
18. Scum control:

N. Secondary clarifier

1. Type of clarifiers: Circular Center Feed
2. Number and size of units: 2 Existing at 80 Ft Diam. x 14 ft. SWD 1 NEW 80ft. Diam. X 14 ft. SWD
3. Surface settling rate (gpd/sf):
   a. at the design flow: 348 at two clarifiers 232 at three clarifiers
   b. at the influent pumping rate: Peak Hourly 866 with three clarifiers
   c. at the equalized flow rate:
4. Detention time (hrs): 10.8 at ADF (3 tanks) 7.2 at ADF (2 tanks) 2.9 at Peak Hourly Flow (13.1 MGD)
5. Type of sludge removal mechanism: Rotating scraper arms with sludge withdrawal pipes
6. Weir overflow rate: 4,,644 gpd/ft at 3.5 MGD (ADF) 17,374 gpd/ft. Peak Hourly (13.1 MGD)
7. Disposal of scum: to Sludge Holding Tanks
8. Facilities for unit isolation: YES
9. Facilities for flow split control: YES Weir Gates

O. Constructed wetland

1. Design flow:
2. Type of wetland:
3. Type of solids removal/pretreatment:
4. Number and size of cells:
5. Number of zones per cell:
6. Surface area of each zone:
7. Organic loading:
8. Liner:
9. Detention time:
10. Type of media:
11. Media depth:
12. Media void rate:
13. Operating capacity:
14. Length/width ratio:
15. Type of plants:
16. Expected % of BOD and NH3-N removal:
17. Recirculation:
18. Dosing tank information:
    a. Dimensions:
    b. Capacity:
    c. Pumps:

P. Rapid sand filtration

1. Number and size of filters:
2. Filtration rate:
   a. at peak flow rate:
   b. at average flow rate:
3. Type, depth, and gram size of filter media:
4. Backwash rate:
5. Air scour:
6. Capability to chlorinate ahead of the filter:
7. Backwash pumps (number and capacity):

3. Treatment units *(continued)*

8. Method of rate control:
9. source of capacity of backwash water:
10. Holding capacity or dirty water tank:
11. Facilities for unit isolation:

Q. Micro-strainers

1. Number and size of strainers:
2. Screen material:
3. Filtration rate:
4. Backwash rate:
5. Number and capacity of backwash pumps:
6. Facilities for unit isolation:
7. Slime control provisions:

R. Two-day lagoon

1. Number and size of lagoon cells:
2. Detention time (days):
3. Type of chemical:
4. Location of chemical injection:
5. Number and size of chemical storage tank:
6. Rate adjustment capabilities:
7. Capacity of chemical storage tank:
8. Capacity of spill storage tank:
9. Expected daily use of chemical (dosage and solution):
10. Lagoon seal:
11. Parallel or series operation:
12. Sludge removal facilities:
13. Method of draining:
14. Multi-level discharge:
15. Scum control:

S. Post-aeration

1. Type of aeration: Fine Bubble NEW
2. Number of units: one
3. Size of units: 30 ft. x 14 ft. x 8.37ft SWD
4. Aeration provided: 466 SCFM peak 175 SCFM Average Ext. Blowers 2 @ 2800 SCFM (VFD) 1@ 800 SCFM
5. Expected effluent DO: 6-7 mg/l

T. Nitrification system

1. Type of nitrification system: Multi Stage Phased Aerobic & Anoxic
2. Ammonia loading: 21 lbs./day
3. Additional oxygen demand: 4.6 lbs O2/lb TKN
4. Air supply system: See Oxidation Ditch Section
5. Hydraulic detention time: 20 hrs.
6. Mean cell residence time (days): 10-15 days

U. Phosphorus removal facilities

1. Type of chemical to be used: Alum Based
2. Location of chemical injection: Ditch Effluent Header
3. Number and size of chemical feed pumps: 2 at 16 GPH (Existing Pumps)
4. Size of chemical; storage tank: 6500 gal. Heated for outdoor conditions
5. Capacity of spill storage space: Double Wall tank
6. Chemical dosage: 1.75 Gal @ 48% per Lb. P removed
7. Daily chemical consumption expected: 218 GPD @ ADF 300 GPD at Peak Day
8. Rapid mix tank: N/A
9. Slow mixing equipment: N/A
10. Other facilities – describe: Eye Wash Existing

3. Treatment units *(continued)*

V. Disinfection
1. Type of disinfectant used:
2. Size of contact tank:
3. Contact time:
4. Type of disinfectant feeders:
5. Capacity of the feeders:
6. Disinfectant dosage:
7. Scum control baffle:
8. Source of the disinfectant feed water:
9. Breakwater tank for the feed water:
10. Bypass:
11. Drain for tank:
12. Ventilation in chlorine room:
13. Safety equipment:

W. De-chlorination
1. Chemical used:
2. Type of feeders:
3. Capacity of feeders:
4. Dosage:
5. Type of diffuser:
6. Diffuser location:
7. Equipment location:
8. Ventilation provided:
9. Safety equipment

X. UV Disinfection (Existing System Existing System Expanded with 2 New Modules & Controls)
1. Type: Open channel High Intensity
2. Location: After Post Aeration
3. Size of channel: 32 ft. 4.3 ft. x 5.01 ft. SWD (at 11 MGD)
4. Contact time: 4.7 min
5. Dosage: 29,600 mWs/cm2
6. Bypass: YES
7. Safety equipment: YES Safety Shield
8. Cleaning equipment: Auto
9. Intensity Monitoring: YES

Y. Effluent Pumps
1. Type: Submersible Centrifugal
2. Number of Pumps: 3 @ 5600 gpm (One New)
2. Constant or Variable: Constant
4. RPM & TDH: 880 RPM at 18 ft TDH
5. Stand By Power: Yes

Z. Anaerobic digesters
1. Number and size of units:
2. Total volume:
3. Organic loading:
4. Hydraulic detention time:
5. Volume per capita:
6. Type of mixing:
7. Heating: ☐ internal or ☐ external

AA. Sludge Storage Tanks
1. Number and size of units: 1 @ 215,000 (NEW) 1 @ 292,000 (new) 2 @ 33,000 gallons 1 @ 54,000 gallons
2. Detention time: 20 days
3. Organic loading: 72 lbs VSS/1000 cu ft
4. Air supply: 2 @ 2800 cfm, 1 @ 800 cfm 2 @ 350 cfm
5. Decanting method: Telescopic valves

3. Treatment units *(continued)*

BB. Wet-oxidation
1. Number of units:
2. Type of heat treatment:
3. Temperature and pressure to be used:
4. Capacity of the unit:
5. Daily sludge production for heat treatment:

CC. Sludge drying beds
1. Number and size of drying beds:
2. Filter area per capita:
3. Under-drain system:
4. Discharge location of filtrate:
5. Accessibility of dry sludge removal equipment:

DD. Mechanical dewatering
1. Type of dewatering units: Belt Filter Press
2. Number and size of dewatering units: 1 @ 2 meters
3. Capacity of dewatering units: 250 gpm
4. Daily solids production for dewatering: 6000 lbs/day
5. Type of chemicals to be used: Polymer

EE. Sludge disposal
1. Ultimate disposal method of sludge: landfill
2. Expected solids content of sludge (by the principal method of disposal): 18-22%
3. Location of disposal site: National Serv-All
4. Ownership of the disposal site: Private
5. Availability of sludge transport equipment: Contract service with Republic Services

4. Sewer Collection System

A. Lift Stations
1. Location:
2. Type of pump:
3. Number of pumps:
4. Constant or variable speed:
5. Capacity of pumps:
6. RPM and TDH:
7. Volume of the wet well:
8. Detention time in the wet well:
9. A gate valve and a check valve in the discharge line:
10. A gate valve on the suction line:
11. Ventilation:
12. Standby power:
13. Alarm:
14. Breakwater tanks:
15. Bypass or overflow:
16. Type of force main:
17. Diameter and length of force main:

B. Sewer
1. Type of sewer material:
2. Diameter and length of sewer (indicate length for each size):
3. Stream, highway, and railroad crossing:
4. Separation of combined sewer or new sewer:
5. Number of manholes:
6. Water main protection:

4. Sewer Collection System *(continued)*
C. Individual grinder pumps
1. Location:
2. Number of pumps:
3. Capacity of pumps:
4. RPM and TDH:
5. Volume of the wet well:
6. A gate valve and a check valve in the discharge line:
7. Ventilation:
8. Alarm:
5. Miscellaneous
A. Laboratory equipment: Existing
B. Safety equipment: Existing
C. Plant site fence: Yes
D. Handrail for the tanks: YES
E. Units, unit operation, and plant bypasses: Post Aeration Only
F. Flood elevation (10, 25, or 100 year flood): 756.00
G. Provisions to maintain the same degree of treatment during construction: YES
H. Standby power: YES
I. Site inspection: TBD
J. Statement in the specifications as to the protection against any adverse environmental effect (e.g., dust, noise, soil erosion) during construction: YES
K. Hoists for removing heavy equipment: YES
L. Adequate sampling facilities: YES
M. Hydraulic gradient: 10.75 Ft.
N. Septage receiving facilities
1. Screening:
2. Location of discharge:

IDENTIFICATION OF POTENTIALLY AFFECTED PERSONS

Please list any and all persons whom you have reason to believe have a substantial or proprietary interest in this matter, or could otherwise be considered to be potentially affected under law. Failure to notify a person who is later determined to be potentially affected could result in voiding our decision on procedural grounds. To ensure conformance with Administrative Orders and Procedures Act (AOPA) and to avoid reversal of a decision, please list all such parties. The letter on the opposite side of this form will further explain the requirements under the AOPA. Attach additional names and addresses on a separate sheet of paper, as needed.

Name: Jefferson Place Homeowners Assn	Name: Allen County Surveyor
Street: 4327 Octagon Square	Street: 200 East Berry Street, Suite 350
City/State/Zip: Ft. Wayne, IN 46804	City/State/Zip: Ft. Wayne, IN 46802
Name: Allen County Highway Dept	Name: Aboite New Trails
Street: 200 East Berry Street, Suite 280	Street: 5750 Covington Road
City/State/Zip: Ft. Wayne, IN 46802	City/State/Zip: Ft. Wayne, IN 46804
Name: Allen County Plan Dept.	Name: Allen County Council
Street: 200 East Berry Street, Suite 150	Street: Rousseau Center, 1 E. Main St. Suite754
City/State/Zip: Ft. Wayne, IN 46802	City/State/Zip: Ft. Wayne, IN 46802
Name: Allen County Dept. of Health	Name: Ft. Wayne City Council
Street: 200 East Berry Street, Third floor	Street: 200 East Berry Street, Suite 110
City/State/Zip: Ft. Wayne, IN 46802	City/State/Zip: Ft. Wayne, IN 46802
Name: Little River Wetlands Project	Name:
Street:7209 Engle Road	Street:
City/State/Zip: Ft. Wayne, IN 46804	City/State/Zip:
Name: Mayor Tom Henry	Name:
Street: 200 East Berry Street, Suite 420	Street:
City/State/Zip: Ft. Wayne, IN 46802	City/State/Zip:
Name: Allen County Board of Commissioners	Name:
Street: 200 East Berry Street, Suite 410	Street:
City/State/Zip: Ft. Wayne, IN 46802	City/State/Zip:

Proposed facility name AQUA Midwest Wastewater Treatment Facility	Printed Name Derek Sutton, State Engineer
Fort Wayne	Signature
Allen County	Date (*month, day, year*) / /

Evaluation of Midwest WWTP

Aqua Indiana, Inc.

Aqua Indiana, Inc.
1111 W. Hamilton Road S
Fort Wayne, Indiana 46814

May 1, 2013

AMERICAN STRUCTUREPOINT INC.

7260 SHADELAND STATION
INDIANAPOLIS, INDIANA 46256
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1.0 Introduction

1.1 Purpose

In 2013, Aqua Indiana, Inc. commissioned a project with American Structurepoint to evaluate the Midwest Wastewater Treatment Plant (WWTP), which is owned and operated by Aqua Indiana, Inc. The main objectives of the project are to:

1. Evaluate the condition, hydraulic capacity, and biological capacity of the unit processes at the WWTP.
2. Provide recommended Capital Improvement Plan for the WWTP to allow for acceptance of additional flows up to the anticipated flows and loadings outlined in Sections 2.3 and 2.4. Specifically, the infrastructure impacts of accepting waste streams known as Coverdale and Junk Ditch, which are currently under the jurisdiction of City of Fort Wayne Public Works, are investigated.
3. Provide recommendations to meet upcoming effluent phosphorus limits.

The evaluation and recommendations are presented in this report.

1.2 Background and Existing Treatment Process

The existing WWTP is a Class III, 1.7 million gallons per day (MGD) complete mix single stage nitrification - activated sludge facility. The WWTP is located in Fort Wayne, Indiana. The existing treatment process consists of influent pumping, fine screening, complete mix single-stage nitrification biological treatment, two (2) final clarifiers, return activated sludge (RAS)/waste activated sludge (WAS) pump station, clarifier scum pump station, post aeration, and ultraviolet disinfection. Waste sludge is stored in three aerated sludge holding tanks and a belt filter press is utilized to dewater the sludge prior to disposal at a landfill. The collection system is a separate sanitary sewer by design. WWTP effluent flows by gravity to Graham McCulloch Ditch. The existing WWTP location is shown in Figure 1.1.1.

The original WWTP was constructed as a sequencing batch reactor (SBR) treatment process. The WWTP was modified in 2001 to a complete mix single-stage nitrification activated sludge facility. Revisions included, but were not limited to, converting the existing SBR tanks to aeration tanks and the addition of two (2) 80-foot diameter final clarifiers. Refer to Section 3.0 for a brief description of the unit processes, including photographs, for the existing WWTP.

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Site Layout

Aqua Indiana
1111 W Hamilton Road South
Ft. Wayne, IN 46814

Midwest WRRF Evaluation

Date: 04/09/2013

Fig. 1.1.1

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2.0 Existing WWTP Data Evaluation

2.1 Discharge Permit

The current IDEM NPDES Permit for the Midwest WWTP became effective on June 1, 2009 and expires on May 31, 2014 (refer to Appendix A). Table 1.3.1 (Table 1) and Table 1.3.2 (Table 2) below show the permissible loadings in effect.

Table 2.1.1: Table 1 from the IDEM NPDES permit effective June 1, 2009

TABLE 1

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Weekly Average	Units	Monthly Average	Weekly Average	Units	Measurement Frequency	Sample Type
Flow [1]	Report	Report	MGD	----	----	----	Daily	24-Hr. Total
$CBOD_5$	333.6	500.4	lbs/day	10	15	mg/l	5 X Weekly	24-Hr. Composite
TSS	333.6	500.4	lbs/day	10	15	mg/l	5 X Weekly	24-Hr. Composite
Ammonia-nitrogen								
Summer [2]	50.0	76.7	lbs/day	1.5	2.3	mg/l	5 X Weekly	24-Hr. Composite
Winter [3]	73.4	110.1	lbs/day	2.2	3.3	mg/l	5 X Weekly	24-Hr. Composite

Table 2.1.2: Table 2 from the IDEM NPDES permit effective June 1, 2009

TABLE 2

	Quality or Concentration				Monitoring Requirements	
Parameter	Daily Minimum	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
pH [4]	6.0	----	9.0	s.u.	5 X Weekly	Grab
Dissolved Oxygen [5]						
Summer [2]	6.0	----	----	mg/l	5 X Weekly	4 Grabs/24-Hrs.
Winter [3]	5.0	----	----	mg/l	5 X Weekly	4 Grabs/24-Hrs.
E. coli [6]	----	125 [7]	235 [8]	colonies/100 ml	5 X Weekly	Grab
Influent Mercury [9]	----	----	Report	ng/l	6 X Annually	Grab
Effluent Mercury [9] [10]						
Interim	---	Report	Report	ng/l	6 X Annually	Grab
Final	---	12	20	ng/l	6 X Annually	Grab

2.2 Current WWTP Performance

The Monthly Report of Operations (MRO) data for the period of January 2010 through December 2012 was analyzed. By analyzing this data, the WWTP's effectiveness at the current flow and loading can be determined and a benchmark can be set for anticipated additional flow and loading. The following figures illustrate the observed effluent versus the IDEM NPDES allowable loadings. As can be seen, the plant is meeting permit limits in all categories.

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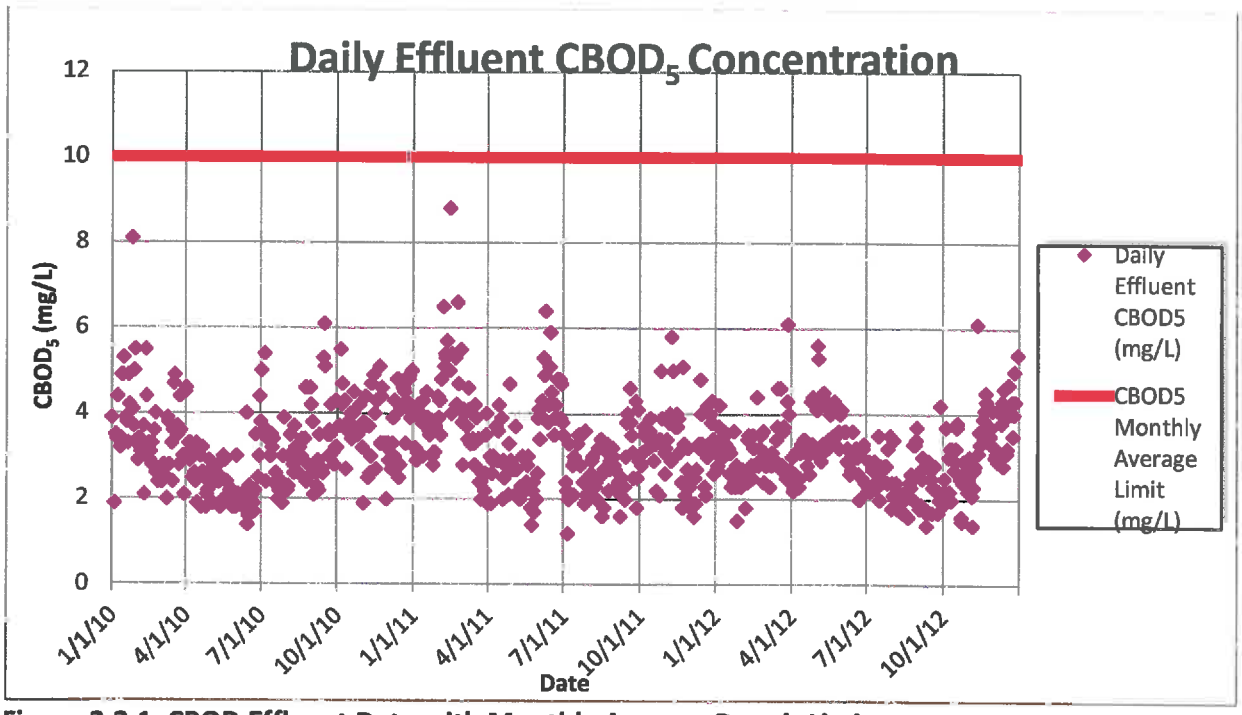

Figure 2.2.1: CBOD Effluent Data with Monthly Average Permit Limits

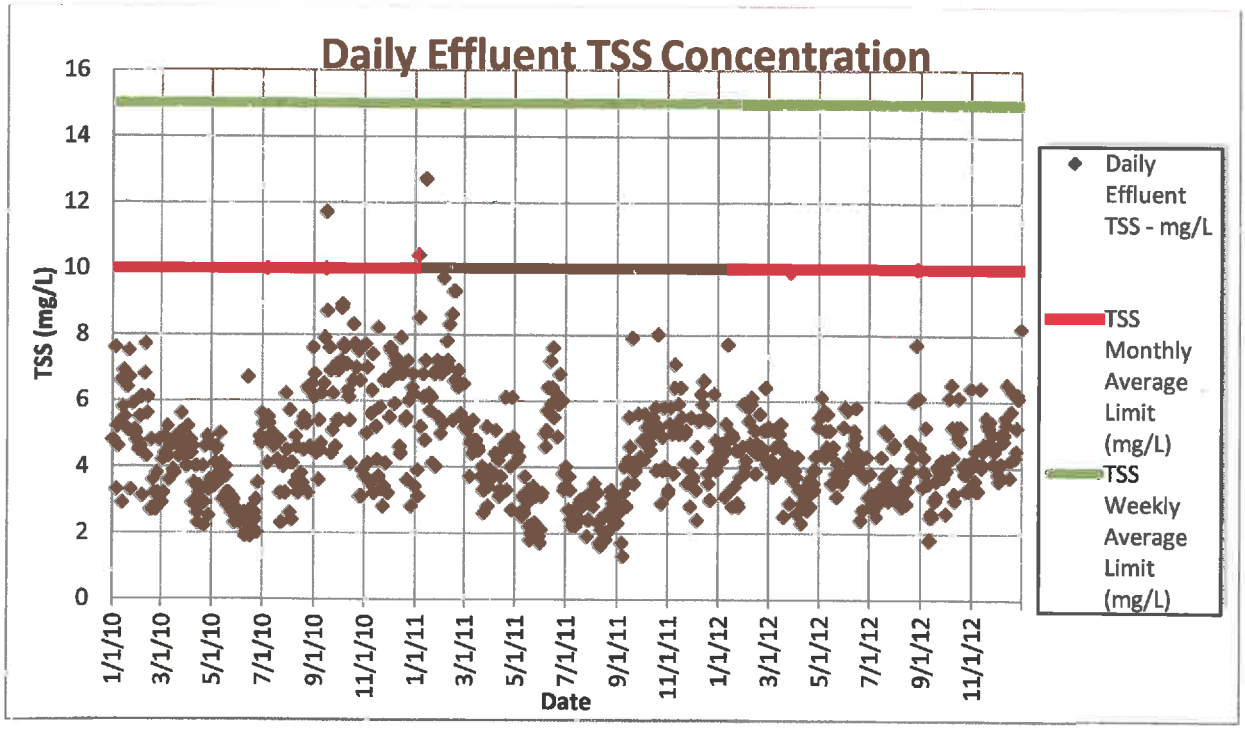

Figure 2.2.2: TSS Effluent Data with Weekly and Monthly Permit Limits

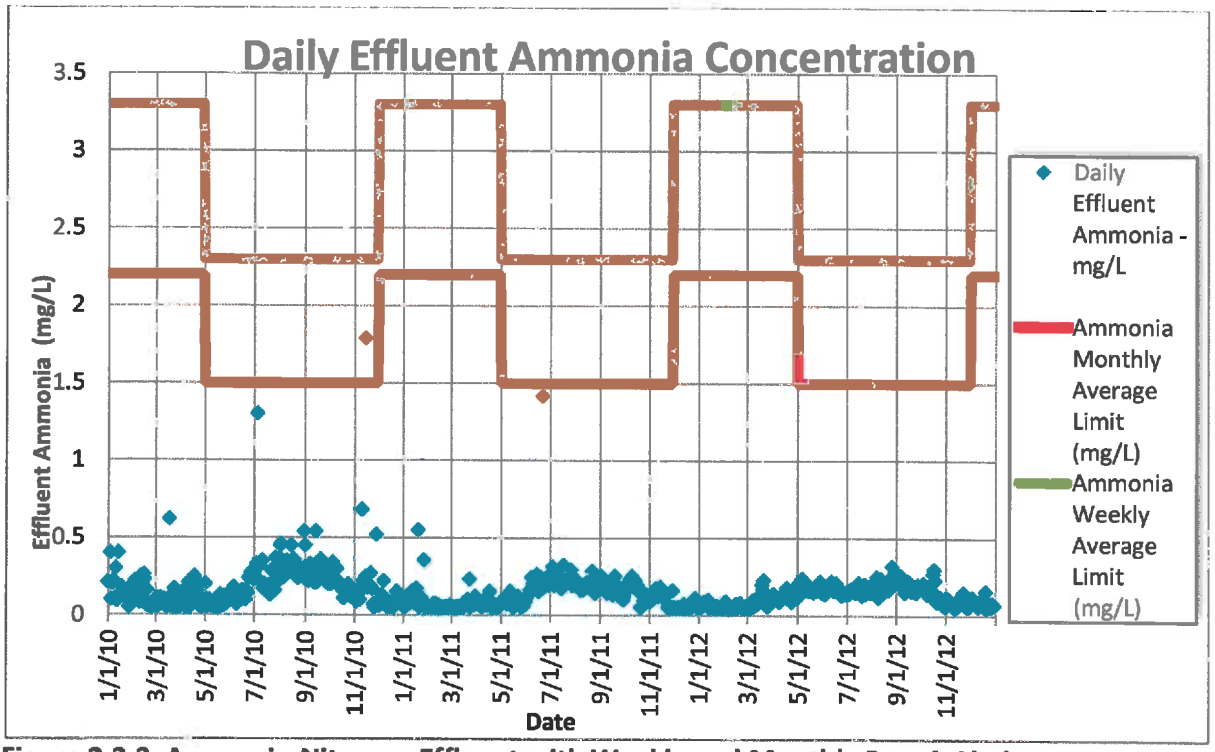

Figure 2.2.3: Ammonia-Nitrogen Effluent with Weekly and Monthly Permit Limits

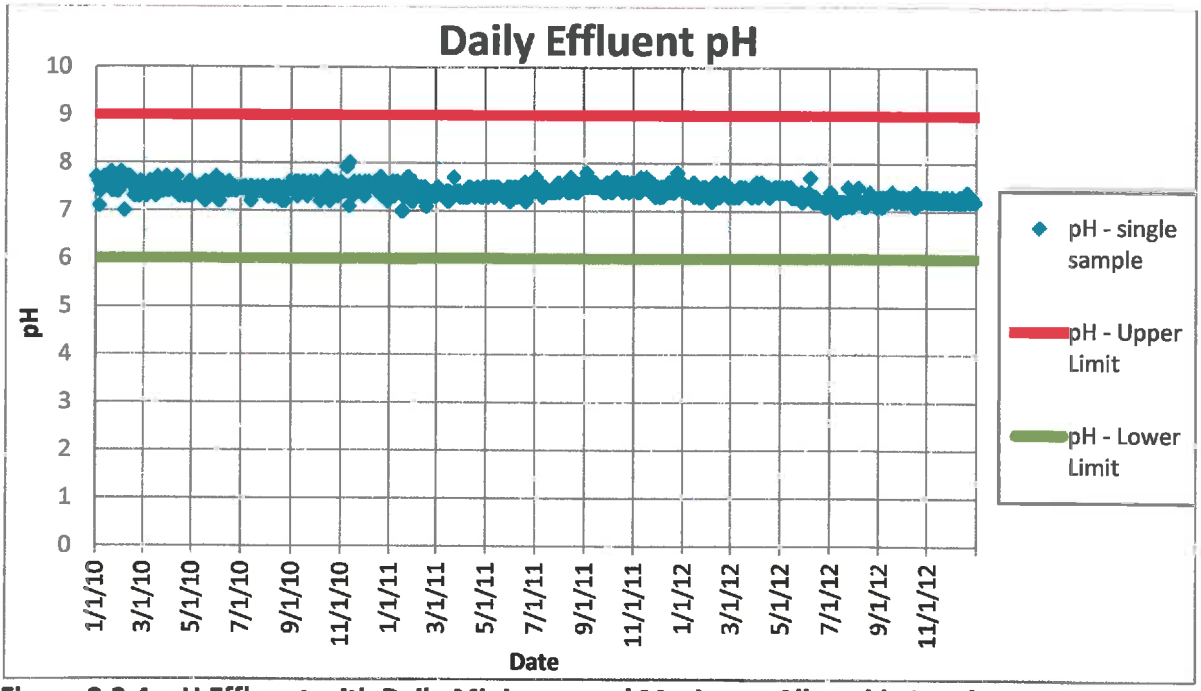

Figure 2.2.4: pH Effluent with Daily Minimum and Maximum Allowable Levels

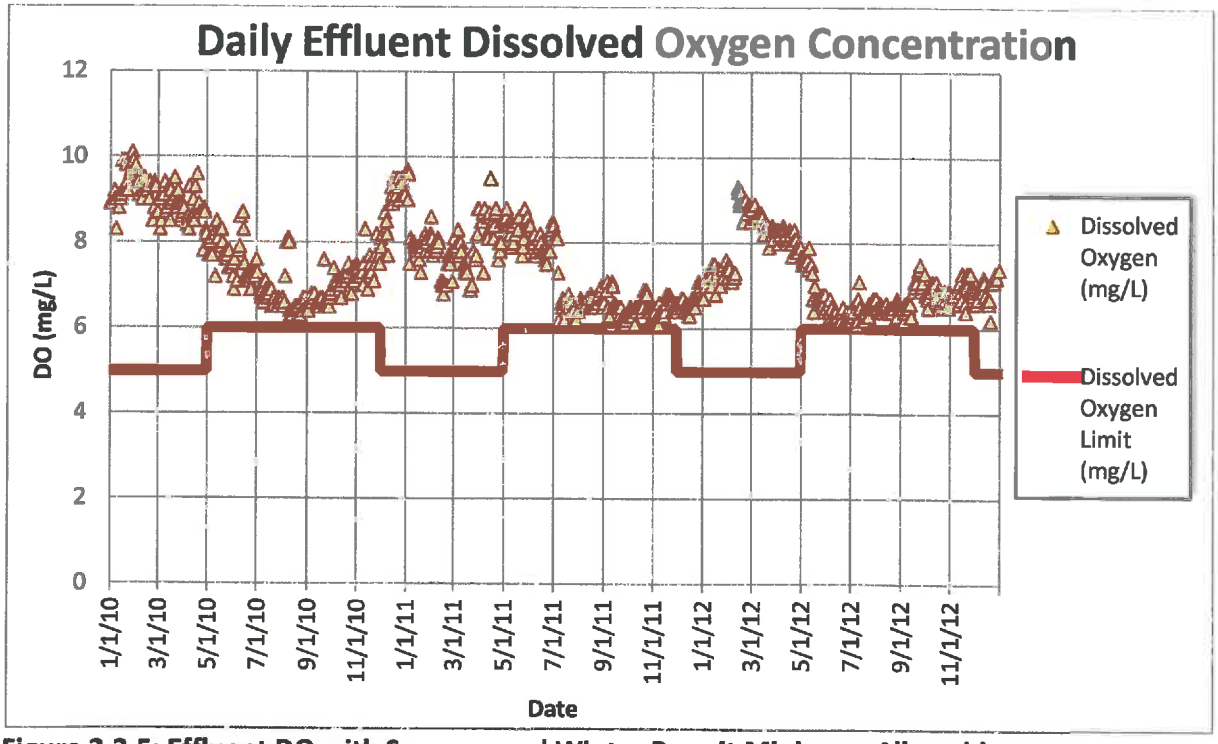

Figure 2.2.5: Effluent DO with Summer and Winter Permit Minimum Allowable Concentrations

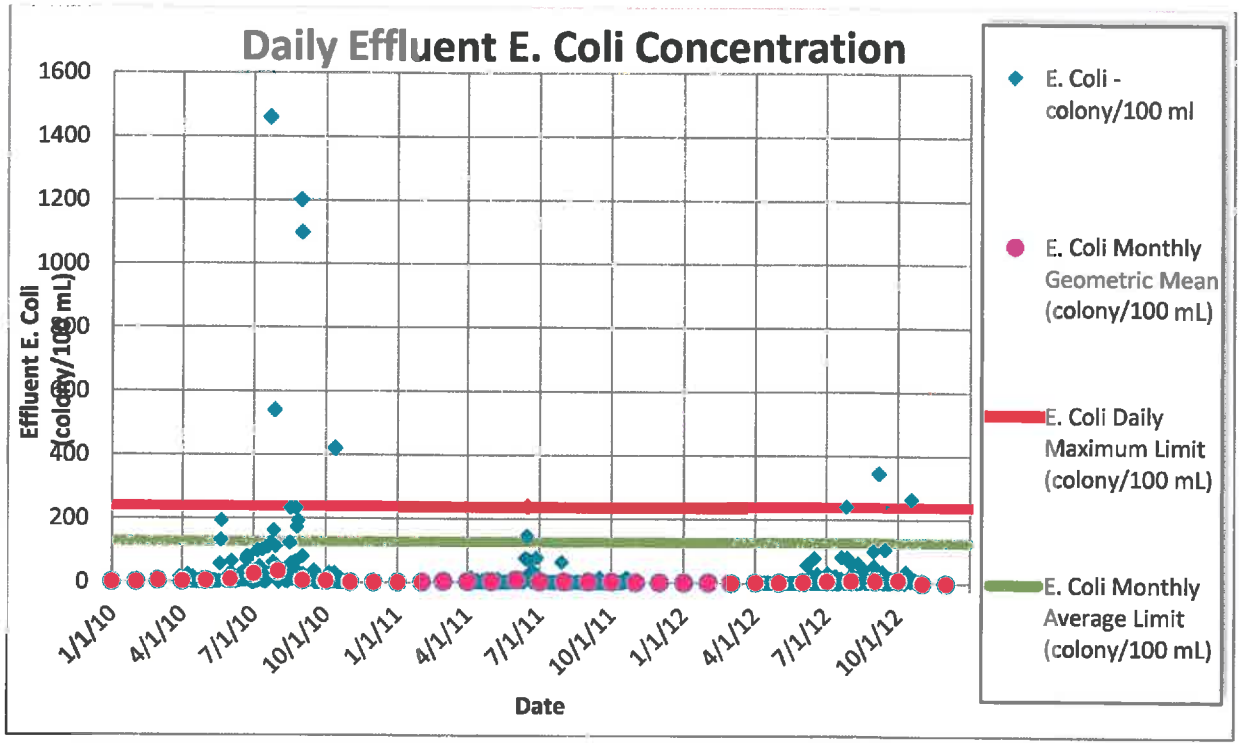

Figure 2.2.6: E. Coli Effluent with Daily and Monthly Limits

2.3 Current Flows

Monthly Reports of Operation (MRO) information was obtained for the period of January 2010 through December 2012. Analyzing the general flow characteristics reveals that the average flow during the Study period was approximately 1.1 MGD. The minimum daily flow was 0.5 million gallons per day (MGD) and the maximum daily flow was 4.3 MGD based on daily reporting of effluent flow. Peaks in flow tended to coincide with rain events. Figure 2.3.1 shows the daily effluent flow rate plotted with daily precipitation.

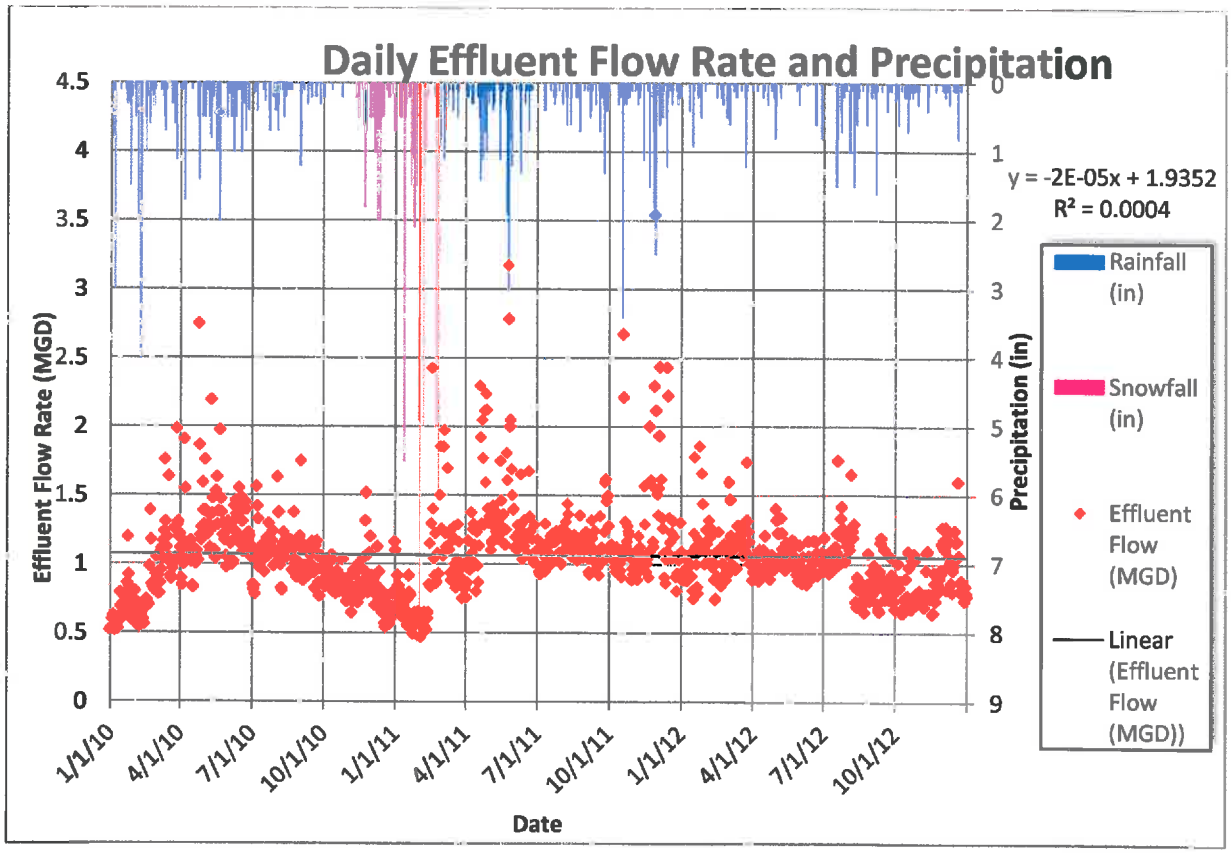

Figure 2.3.1: Effluent Flow Rate and Precipitation over Time

2.4 Current Influent Loadings

The total suspended solids (TSS) average concentration from 2010 through 2012 is 203.1 mg/L and the carbonaceous biological oxygen demand ($CBOD_5$) average concentration during this time period is 202.6 mg/L. The average ammonia concentration is 23.8 mg/L.

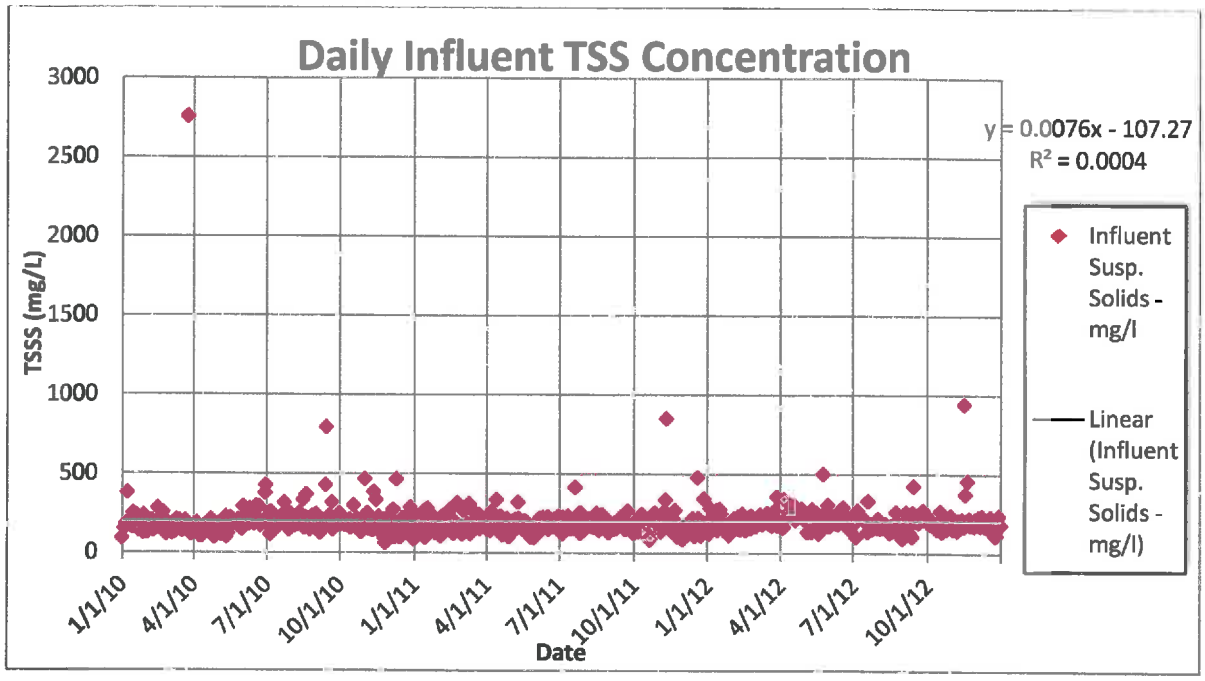

Figure 2.3.1: TSS Influent Concentration over Time

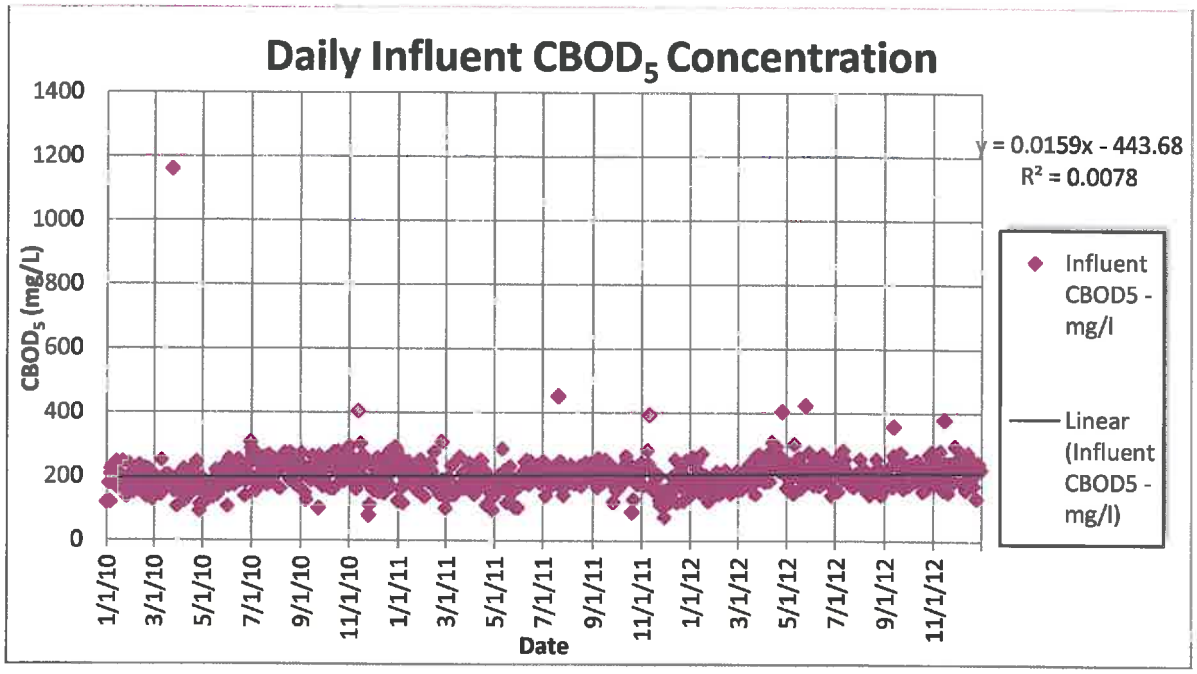

Figure 2.3.2: $CBOD_5$ Influent Concentration over Time

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3.0 Projected Flows and Loadings

3.1 Projected Influent Flows

This Study investigates the ability of the WWTP to accept additional waste streams currently treated by City of Fort Wayne Public Works. For this Study, the waste streams are known as Junk Ditch and Coverdale. The Junk Ditch waste stream includes wastewater from Saratoga Potato Chips, LLC, which is a potato chip food processing plant. Junk Ditch also includes residential and commercial components. The Coverdale waste stream includes a General Motors (GM) plant and comparatively small residential and commercial components. The total flow from Fort Wayne is projected to be 1.5 MGD with a peak flow of 5 MGD.

Initially, this evaluation considered the current average day flow of 1.1 MGD plus the proposed 1.5 MGD from Fort Wayne for an average flow of 2.6 MGD. Aqua Indiana determined it would be in their best interest to provide some capacity for their own growth. Specifically, there is a need to transfer wet weather flows from their Sycamore Lift Station. The Sycamore Lift Station currently discharges to Aqua's Main Aboite WWTP. Two additional 0.507 MG complete mix aeration basins will allow 3.1 MGD to be treated (assuming 28 lbs BOD/1000 CU Ft and a BOD of 311mg/l). Therefore, the analysis was revised to provide treatment of 3.1 MGD average day flow at 311 mg/l BOD. Hydraulic analysis is based upon the flows outlined in Table 2.3.1. The total average day flow for purposes of this report is 3.1 MGD. The total peak flow is 10.6 MGD.

Table 3.1.1 – Midwest WWTP Future Flow Summary

Flow Component	Average Flow (MGD)	Peak Flow (MGD)
Existing Flow at Midwest WWTP	1.1	4.3
Junk Ditch (including Saratoga Potato Chips)	0.5	2.0
Coverdale (including GM)	1.0	3.0
Additional Growth within Current Aqua Indiana Service Area or Acceptance of Flow from Main-Aboite WWTP	0.5	1.3
Total Midwest WWTP Flow	**3.1**	**10.6**

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3.2 Projected Influent Loadings

Influent loadings were projected by Aqua America based on information they had about the current and proposed flows and loadings. The treatment plant processes were evaluated with the loadings provided:

311 mg/L carbonaceous biochemical oxygen demand ($CBOD_5$)

34 mg/L total kjeldahl nitrogen (TKN)

We utilized the maximum week ammonia concentration of 30 mg/l for the analyses.

During the evaluation, Aqua Indiana collected samples for seven days from the Junk Ditch system and the Coverdale Lift Station. This data was received on April 16th. The data is presented below along with data for the existing plant past 3 years of influent testing.

Table 3.2.1 Proposed Loading Calculation

Concentration mg/l

	Flow, MGD	CBOD	SURFACT	O/G	T. PHOS	TKN	TSS	NH3-N
Existing	1.1	202.00					203.00	30.0
Future	0.5	202.00					203.00	30.0
Junk Ditch	0.5	1,125.86	1.67	201.79	8.86	65.96	772.57	23.20
Coverdale	1	62.86	0.41	15.83	2.14	15.54	41.71	10.41

Note: concentration of CBOD was 220 in the previous design and the design ammonia concentration was 20 mg/l.

Pounds

	Flow, MGD	CBOD	SURFACT	O/G	T. PHOS	TKN	TSS	NH3-N
Existing	1.1	2018.28	0.00	0.00	0.00	0.00	1,862.32	218.34
Future	0.5	917.4	0.00	0.00	0.00	0.00	846.51	99.25
Junk Ditch	0.5	4,694.82	6.96	841.45	36.95	275.04	3,221.62	96.74
Coverdale	1	524.23	3.40	132.01	17.87	129.63	347.90	86.86
Total	3.1	8,154.73	10.36	973.46	54.82	404.67	6,278.35	501.19
combined concentration, mg/l		306	0.4	38	2	16	243	23

Note: When the design concentration is used to calculate the future CBOD concentration, the value is 315 mg/l

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4.0 Evaluation of Existing Wastewater Treatment Plant Processes

4.1 Influent Pump Station

The Influent Pump Station was built in 2001 as a 24 feet wide by 25 feet 8-inches long rectangular structure (3,500 gallon capacity) located on the west side of the Blower Building. Raw sewage is pumped from the Influent Pump Station wet well 23 feet below the top of the structure to the Influent Screening Room approximately 70 feet away. The Influent Pump Station has three Fairbanks Morse submersible non-clog, variable speed pumps, each with an approximate capacity of 4.0 MGD. The pump station has a firm capacity of approximately 7.5 MGD with two pumps on. The pump station has a total of five flanges on the 24-inch ductile iron raw force main capable of connecting to pumps. Currently, three pumps are connected, thus two additional pumps could be installed in the future. Pump retrieval is done by a monorail mounted crane system elevated 12 feet above the structure. The pumps are on slide rails. The overall condition of the equipment is good; however, the pumps are pulled out approximately once per week to remove debris which has clogged the pump. This is largely because there are no screens in front of the pumps. The following photos illustrate the overall condition and configuration of the Influent Pump Station.

Figure 4.1.1: Exterior View of Influent Pump Station

Figure 4.1.2: Pump Retrieval System

Figure 4.1.3: View Of Raw Sewage Force Main Inside Influent Pump Station

Figure 4.1.4: View Of Check Valves Inside Influent Pump Station

4.2 Influent Screening

The Influent Screening is located on the south side of the Blower Room, and directly above one of the Sludge Storage tanks. Raw wastewater is pumped into the Influent Screening channel from the Influent Pump Station, and, after screening, is transported to the splitter box via gravity flow. The raw sewerage is screened by a Helisieve screen manufactured by Parkson Corporation. According to the manufacturer, the screen is rated for 2.0 MGD average day flow and 6.0 MGD peak day flow. A coarse screen diversion measuring 36-inches by 30-inches is installed for high-flow events adjacent to the aeration tanks. When the flow is too great for one screen, the wastewater flows through the manual screen directly to the aeration basins.

An electrical hoist and trolley are installed for lifting equipment up to 2 tons. The Influent Screening Room is in good condition. Aqua Indiana is currently planning to install a second Helisieve screen that would increase the firm capacity to 4.0 MGD and the peak capacity to 12.0 MGD. The following photos illustrate the overall condition and configuration of the Influent Screening Room.

Figure 4.2.1: View Of the Helisieve Configuration

Figure 4.2.2: View Of the Primary Screening Channel

Figure 4.2.3: Close Up of Helisieve Screening Process

Figure 4.2.4: View Of Course Screen Diversion

4.3 RAS/Influent Splitter Box

The screened wastewater flows by gravity into the RAS/Influent Splitter Box which is located south of the Screen Room. The return activated sludge (RAS) also enters this splitter box where it is mixed with the raw screened influent. The RAS/Influent Splitter Box was designed to accommodate 4 aeration tanks. The function of the splitter box is to evenly distribute the screened wastewater and the RAS into the aeration basins. It appears to be in good condition.

4.4 Complete Mix Single-Stage Nitrification

4.4.1 Aeration Basins

The Complete Mix Single-Stage Nitrification Aeration Basins (Aeration Basins) were converted from Sequential Batch Reactor (SBR) Basins in 2001. The Aeration Basins are located east of the Screen Room and south of the Control Building. Wastewater is gravity fed from the RAS/Influent Splitter Box to the Aeration Basins, and from the Aeration Basins to the Final Clarifiers. There are two Aeration Basins. Each Basin contains two tanks, which will be referred to as Zone A and Zone B for this Study. Figure 4.4.1.1 shows how the configuration is being described in this Study. Currently, both Zone A and Zone B are aerated.

Zone A is 15 feet long by 34 feet wide, and Zone B is 84 feet long by 34 feet wide in each basin. Each Aeration Basin has an approximate 507,000 gallon capacity at a design side water depth (SWD) of 20.1 feet. Zone A has an approximate capacity of 77,000 gallons and Zone B has an approximate capacity of 430,000 gallons. The basins are in good condition. Figures 4.4.1.2 and 4.4.1.3 are photographs showing the overall condition and configuration of the Aeration Basins.

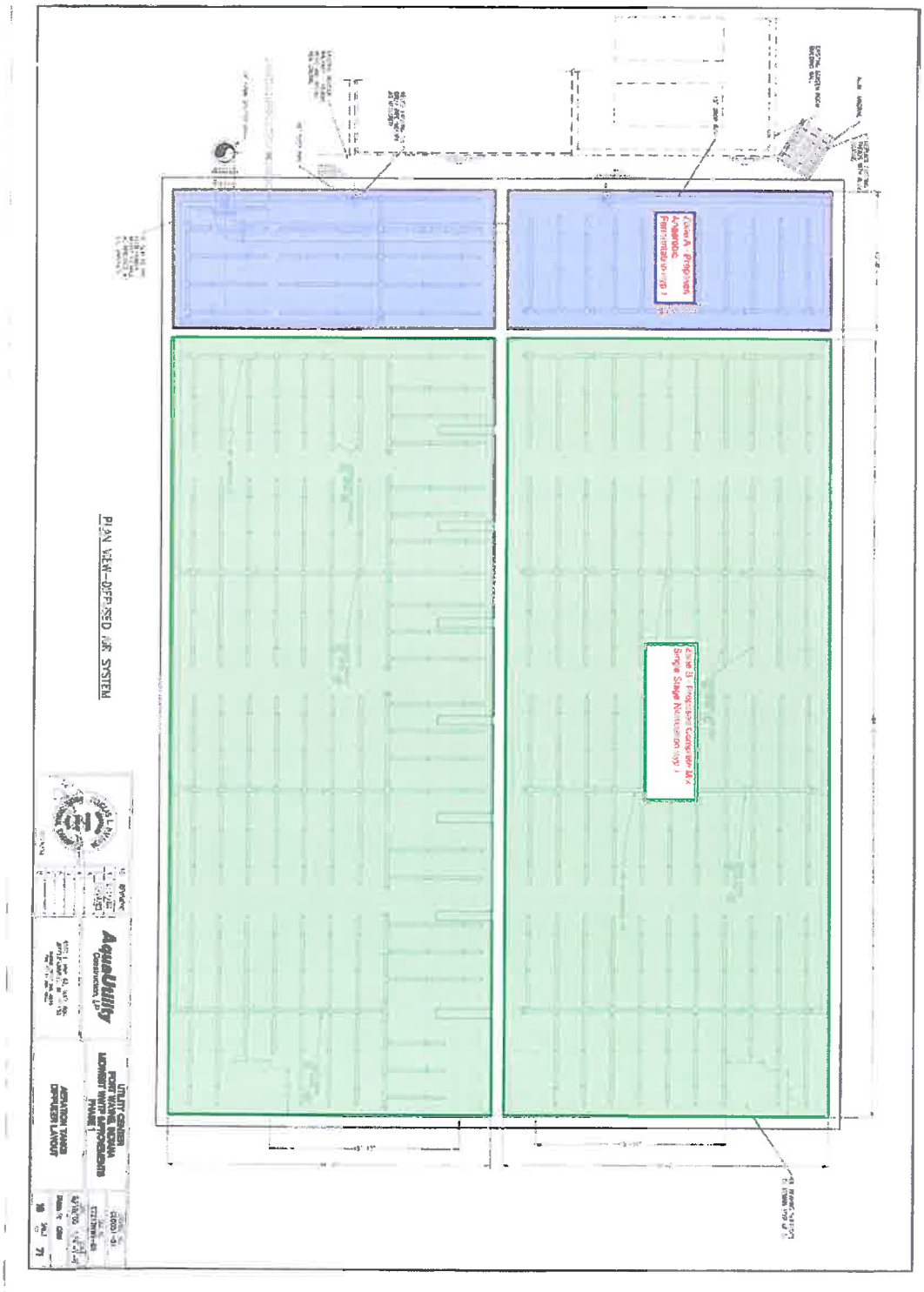

Figure 4.4.1.1 Zones in existing aeration basin

Figure 4.4.1.2: View Of The North Aeration Basin Train

Figure 4.4.1.3: View Of The South Aeration Basin Train

4.4.2 Blowers

The Blower Building houses three blowers which provide air for the Aeration Basins. In total, there are three blowers in the Blower Building. Manufactured by Spencer in 2001, the two main blowers are centrifugal blowers rated at 2,800 cubic feet per minute (SCFM) each at full speed. The backup blower, a centrifugal blower manufactured by Lamson in 1968, provides 800 SCFM at full speed. According to the previous construction permit, the total air requirement for aeration and post aeration is approximately 2,100 SCFM. One main blower is capable of meeting all current aeration needs. An additional blower pad is available to install a fourth blower if necessary. The backup blower is rarely used and only operated once per month to ensure it is in operable condition. Overall, the main blowers are in good condition, the backup blower is in fair condition, and the 14-inch steel air header is in good condition. Figures 4.4.2.1 through 4.4.2.4 are photos photograhs of the interior of the Blower Building and blowers.

Figure 4.4.2.1: View Of A Main Blower

Figure 4.4.2.2: View Of The Available Blower Pad

Figure 4.4.2.3: View Of The Blower Air Piping Configuration

Figure 4.4.2.4: View Of The Backup Blower

4.4.3 Membrane Diffusers

Air is diffused into the mixed liquor by tube-style fine bubble membrane diffusers (i.e. Wyss diffusers). These diffusers were installed during the last plant upgrade.

4.5 Splitter Box to Final Clarifiers

During the field visit to the Midwest WWTP, the clarifiers were undergoing a "stress test". Due to this testing, the splitter box was hydraulically overloaded (i.e. there was no nappe at the weir). The splitter box was installed during the 2001 Phase I improvements and was designed to direct flow to as many as four clarifiers. Figures 4.5.1 and 4.5.2 are photos of the splitter box.

Figure 4.5.1: View of Weir in Flow Splitter box Looking Northeast.

Figure 4.5.2: Flow Splitter Box for up to Four Clarifiers.

4.6 Final Clarifiers

There are currently two 80-foot diameter clarifiers, each with a side water depth (SWD) of 14 feet, built in 2001. The clarifiers are on the south end of the WWTP site. During the field visit one of the clarifiers was undergoing a "stress test" to determine the maximum capacity each clarifier can handle. Typically, only one clarifier is in operation. The clarifiers are in good working condition. Figures 4.6.1 through 4.6.3 are photos of the clarifiers.

Figure 4.6.1: Clarifier #1 showing the weir and scum baffle.

Figure 4.6.2: Clarifier #2, empty showing scrapper, sidewall deflection baffles, sludge suction lines and scum beach.

Figure 4.6.3: Inlet stilling well of Clarifier #1.

4.7 RAS/WAS Pump Station

The return activated sludge (RAS) and waste activated sludge (WAS) pumps are located in the RAS Splitter Box and Lift Station which is on the south end of the WWTP site, north of the clarifiers. There are currently three RAS pumps, installed during the 2001 Phase I improvements, with room for two more pumps in the

station. The pumps are Fairbanks-Morse M&W 6-inch submersible pumps. They are rated at 970 gpm and 12 feet TDH. RAS is pumped back to the RAS/Influent Splitter Box from the bottom of the clarifier. The RAS/WAS flow is metered by a magnetic flow meter. Valves in the yard are positioned to direct the WAS to the Aerated Sludge Holding Tanks (Section 4.12) or to the RAS/Influent Splitter Box. The RAS/WAS pumps are in good condition. Figure 4.7.1 is a photo on top of the RAS Splitter Box and Lift Station.

Figure 4.7.1: RAS Splitter Box and Lift Station

4.8 Scum Pump Station

Scum from the clarifiers is scrapped from the surface of the clarifiers and discharges by gravity to the RAS Splitter Box and Lift Station where two scum pumps are located. The scum pumps are Meyers 4V rated at 250 GPM and 40 feet TDH. The scum pumps discharge to the Aerated Sludge Holding Tanks. The pumps and pump station were installed with the last upgrade in 2001 and are in good condition according to the plant operator.

4.9 Post Aeration

The treated effluent is discharged from the clarifiers to the post aeration basin. Coarse bubble (stainless steel tube type) diffusers are used to reaerate the effluent prior to discharge. The diffusers were relocated from the SBR aeration system during the last upgrade to the plant. The Post Aeration Basin has a gate which can be opened to route the flow directly to the Effluent Pump Station. The Post Aeration Basin appears to be in good condition.

4.10 UV Disinfection

The Ultraviolet Disinfection (UV) unit is located outdoors near the south end of the WWTP, directly upstream of the effluent flow measurement and discharge point. The disinfection process takes place after post aeration. The UV unit at the Midwest WWTP is a Trojan UV 4000 and was installed in 2003. The unit is self-cleaning and the bulbs are also taken out once per month and cleaned by hand with Lime-A-Way. It currently operates from April 1 through October 31 per permit requirements. The UV unit currently has two modules operating with space available for a third module. The UV unit has a current design capacity

of 7 MGD and is expandable to 14 MGD. Overall, the UV unit is in good working condition. WWTP staff noted that the main disadvantage of the unit has been the high cost of replacement parts and the inability to find aftermarket parts. Figures 4.10.1 and 4.10.2 are photos of the UV disinfection unit.

Figure 4.10.1: Trojan UV 4000 Unit

Figure 4.10.2: UV unit upstream of discharge outfall

4.11 Effluent Flow Measurement

Effluent flow measurement is accomplished via an ultrasonic flow meter that measures the flow over a weir. The meter was installed in 2001. The unit, according to the plant's operator, is in good working condition. The WWTP operator noted that a chart recorder would be advantageous in recording diurnal flow changes.

4.12 Aerated Sludge Holding Tanks

Two of the Aerated Sludge Holding Tanks are located on the north side of the Control Building. In 2001, these aerobic sludge holding tanks were modified by replacing the air diffusion system. The adjacent clarifiers were abandoned in place by installing concrete caps. The third aerated sludge holding tank is located adjacent to the Screen Room. In total, there are three Sludge Holding Tanks, two with 33,000 gallon capacity, and one with 54,000 gallon capacity. The Sludge Holding Tanks are aerated by two blowers rated at 350 SCFM each. Sludge is thickened by turning the blowers off for several hours and allowing the sludge to settle. The supernatant is removed from the tank with telescopic valves. The Aerated Sludge Holding Tanks equipment and process is in fair condition; however, the walkway and safety railing system for the two 33,000-gallon tanks is highly corroded and in need of replacement.

Figure 4.12.1: View Of Sludge Holding Tank #1 During Decanting

Figure 4.12.2: Sludge Holding Tank #2

4.13 Biosolids Dewatering

The biosolids dewatering operation includes a belt filter press (BFP), a polymer feed system, a waste activated sludge (WAS) feed pump, and washwater pumps. The BFP is a two-meter Klampress model manufactured by Ashbrook Corporation. Through polymer addition, it is able to achieve between 14 and 22 percent solids for disposal. The BFP has a hydraulic capacity of 250 gallons per minute (gpm) and a solids capacity of 1,200 pounds per hour.

Polymer is used to achieve coagulation of the particulates in the sludge to allow the slurry to be dewatered. The polymer feed system is manufactured by US Filter and is a Polyblend system. The BFP feed pump, installed in 2001, is a Seepex progressing cavity pump. To keep the belts clean, high-pressure potable water is used at various locations to wash the belts. Potable water pressure is boosted with washwater pumps which are manufactured by Aurora. Wash Water Pump 2 is currently out of service and is being replaced.

Sludge cake is discharged from the BFP onto a Serpentix conveyor belt which discharges the cake into dumpsters in the adjoining room. The Serpentix conveyor can be rotated to discharge into one of two dumpsters. The conveyor is in good condition. Overall, the BFP, polymer feed, and BFP feed pump equipment and piping are in good condition. Wash Water Pump 1 is in operational condition, but has corrosion on the motor and housing.

The BFP building also houses a chlorine feed system, also installed in 2001. The chlorine feed pumps are Prominent Sigma diaphragm pumps and are used to control filamentous bacteria. The chlorine feed pumps have not been used since 2003; therefore, their operational status is unknown.

Figures 4.13.1 through 4.13.7 are photos of the Belt Filter Press Dewatering process equipment and chlorine feed equipment.

Figure 4.13.1: Two-meter Belt Filter Press

Figure 4.13.2: Thickened Sludge Disposal Area

Figure 4.13.3: Sludge Thickening Process

Figure 4.13.4: Washwater Pumps

Figure 4.13.5: Polymer Feed System

Figure 4.13.6: BFP Feed Pump

Figure 4.13.7: Chlorine Feed Pumps and Controls

4.14 Laboratory and Control Room

The Laboratory and Control Room are located in the Control Building on the north end of the site by the entrance gate. The laboratory has separate rooms for water testing and wastewater testing. The laboratory was renovated in 2001 as part of the Phase I upgrades to the WWTP. It is in good working condition and currently meets the testing and sampling needs of the WWTP. The electrical room is across the hall from the laboratory and contains the breakers, starters, and some controls for all of the WWTP operations. The main motor control center (MCC) is a Cutler-Hammer Advantage Series 2100. There are several spare "buckets" for additional equipment in the MCC.

Allen-Bradley variable frequency drives (VFDs) are used for the raw sewage pumps and aeration system blowers. Figures 4.14.1 and 4.14.2 are photos of the Control Room.

Figure 4.14.1 Main MCC in the Control Room


Figure 4.14.2 Cutler-Hammer Main MCC

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5.0 Evaluation of WWTP Processes for Phosphorus Removal

5.1 General Discussion

Of the three practical options for phosphorus removal (biological, chemical and membrane), only the biological and chemical removal options are being considered in this report due to the high cost of membrane installation and operation and the fact that the WWTP will likely be facing a total phosphorus (total P) limit of only 1.0 mg/L. Biological phosphorus is being given favorable consideration due to the following:

1. The existing basins can be easily modified to create an anaerobic zone for fermentation,
2. a limit of 1.0 mg/L total P is achievable without tertiary filtration,
3. it is more cost effective to operate since chemical feed costs are avoided and no additional sludge is created as with chemical addition, and
4. the recycle of nitrates in the RAS to the anaerobic zone reduces BOD to aeration between 10 and 15 percent.

However, biological phosphorus removal systems are subject to many factors that impact their performance including toxicity, hydraulic overload, temperature deviations, etc. and therefore it is recommended that a chemical system be installed to provide back-up should issues arise with biological removal.

5.2 Proposed Upgrades

5.2.1 Biological Phosphorus Removal System

For systems that both nitrify and remove phosphorus biologically, the sizing of the anaerobic zone must take into consideration due to the nitrates in the RAS. Optimally, between 60 and 90 minutes of anaerobic detention time is desired for this design. Modifying the two existing Aeration Basins to create an anaerobic zone is simple since a partition in each Aeration Basin exists (a carryover from the SBR system) allowing the separation of the Aeration Basins into a Zone A and Zone B (see Figure 4.4.1.1). Using Zone A for the anaerobic zone (77,000 gallons) in each Basin will allow for 87 minutes of detention at an average flow rate of 3.1 MGD with a RAS rate of 65 percent (i.e. total flow to four basins of 5.12 MGD or 1.28 MGD per basin). The two new Aeration Basins would be designed similarly to allow for biological phosphorus removal. Mixing in Zone A would be accomplished by using two (2) 5-horsepower submersible mixers per Aeration Basin. Figure 5.2.1.1 is a schematic showing biological phosphorus removal.

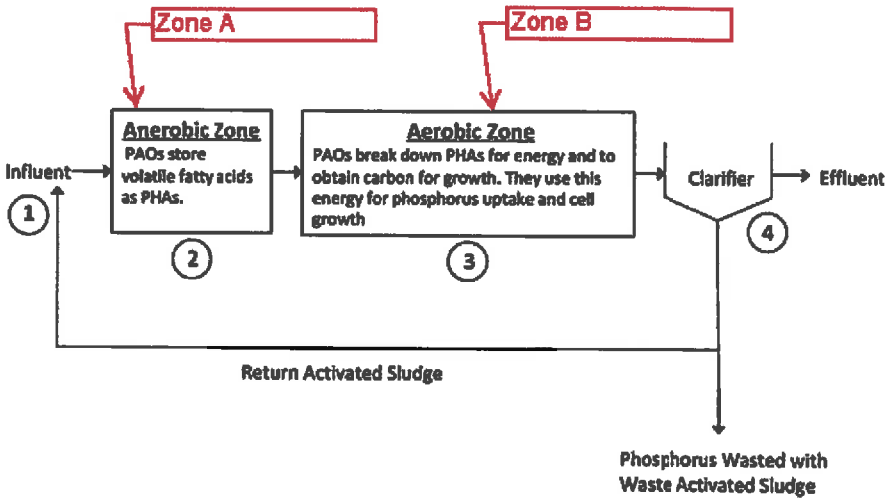

Figure 5.2.1.1 – Biological Phosphorus Removal Schematic [1]

5.2.2 Chemical Phosphorus Removal Back-up System

For the chemical back-up system, Polyaluminum Chloride (PAC) solution is proposed for phosphorus removal. Typical solution concentration is 24 percent as PAC. This solution freezes at 23 degrees Fahrenheit and has an extended shelf life. A feed rate of between 4 and 5 mg/L would be needed for phosphorus removal assuming the following:

- An inlet total P concentration of 8 mg/L,
- a biological uptake of 3 mg/L,
- an effluent concentration of less than 1 mg/L, and
- 50 percent PAC loss due to competing ions.

This equates to 100 gpd of 24 percent PAC at an average day flow rate of 3.1 MGD. PAC costs are typically in the $2 per gallon range; thus a daily cost of $200 should be anticipated if chemical feed is required to completely supplement the biological phosphorus removal system in case of process upset. At this feed rate, sludge production is estimated at 870 pounds per day at 14 percent dry weight. If alum is the preferred chemical of choice for phosphorus removal, it is recommended to provide the feed system with heated housing (to maintain a temperature of greater than 45 degrees F) because all feed equipment could be used for either chemical. Bulk quantities and the appropriate storage vessels are recommended to keep operational costs minimal.

A 30 x 45 foot building, chemical storage and feed pump system was developed conceptually to provide chemical feed for backup phosphorous removal. We anticipate the building could be located where the sludge storage tanks are located next to the control building after those tanks are demolished. We sized the building to accommodate chemical feed system for odor control in the event it becomes necessary.

[1] The Cadmus Group, Inc. *Nutrient Control Design Manual*. Cincinnati, OH: U.S. Environmental Protection Agency, National Risk Management Research Laboratory, 2010. Print

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6.0 Evaluation of Biological Processes for $CBOD_5$ and Ammonia Removal

6.1 Aeration Basins

As noted in Section 4.3, the existing biological process is Complete Mix Single Stage Nitrification, occurring in two Aeration Basins. In the existing system, both Zone A and Zone B in each Aeration Basin are aerated to provide oxidation of $CBOD_5$ and ammonia (see Figure 4.4.1.1). However, because Zone A is proposed to be converted to anaerobic to provide biological phosphorus removal (see Section 5), the total existing aeration volume will be reduced from 1,014,000 gallons to 860,000 gallons. Table 6.1.1 provides a summary of the existing Aeration Basin Volume.

Table 6.1.1 – Existing Aeration Basin Volume Breakdown

	Zone A (anaerobic)	Zone B (aerated)	Total Aeration Basin Volume
Volume (Gallons)	154,000	860,000	1,014,000

In addition to the decrease in available aeration volume, there are also projected increases in total loading and flow. Below is a summary of the projected parameters, which are outlined in greater detail in Section 3.2.

- 311 mg/L $CBOD_5$
- 34 mg/L TKN (30 mg/l ammonia)
- 3.1 MGD average daily flow

Based on information provided by Aqua Indiana, a maximum loading of 28 pounds of $CBOD_5$ per day per 1,000 cubic feet (lbs $CBOD_5$/d/1000 CF) was used in determining the required aeration basin (Zone B) volume. Assuming 10 percent reductions to $CBOD_5$ due to both screening and nitrate consumption within the anaerobic Zone A, a total aerated volume of 1,727,000 gallons is required for Zone B. This equates to a total of four Aeration Basins of equal size and configuration to the existing Basins (i.e. the addition of two basins).

The required detention times to meet $CBOD_5$ and ammonia effluent limits were also calculated, based on the assumptions set forth in the 2001 design. However, the 28 lbs $CBOD_5$/d/1000 CF requirement was the controlling parameter.

Therefore, two additional Aeration Basins of the same size and configuration as the existing Basins are required to meet the projected flow and loading.

6.2 Diffused Air System

The existing diffusers in the aeration basins are tube-style membrane diffusers. They are supplied with air from two main 2,800 SCFM centrifugal blowers and one backup 800 SCFM centrifugal blower. This equates to an existing firm capacity of 3,600 SCFM of air supply. Two main factors affect the new air requirements for the WWTP:

1. Because Zone A will be anaerobic, the oxygen uptake immediately after Zone A will be higher than at the end of Zone B.
2. Increased loading and flow.

The higher oxygen uptake immediately after Zone A requires a higher amount of the diffused air to be supplied at the front of Zone B rather than an even distribution across all of Zone B. Because the existing diffused air system supplies an even distribution of air across all of Zone B, additional diffusers will be required near the front of the zone. This study assumes that either Parkson Panel diffusers or the Ovivo Aerostrip diffusers will be used due to their higher efficiency. However, both the Parkson and Aerostrip diffusers have a slightly higher pressure loss than the tube style diffusers in place now, so they cannot be used effectively alongside tube diffusers in the same Aeration Basin. Therefore, this analysis assumes replacement of all existing Zone B diffusers with either the Parkson or Aerostrip diffusers. Note that these diffusers are more efficient than the existing diffusers and significant energy savings is likely (refer to Appendix H).

Based on the projected loadings and flows, the projected actual oxygen demand is approximately 13,600 pounds of oxygen per day. This equates to an air requirement of 3,400 SCFM. One additional Spencer Blower rated at 2,8000 SCFM is proposed in the blower building. The existing 800 SCFM centrifugal blowers would be retired.

6.3 Final Clarifiers

There are currently two 80-foot diameter clarifiers, each with a side water depth (SWD) of 14 feet. During typical current plant operation, only one clarifier is used. In determining the final clarification requirements to meet the projected flow and loading outlined in Section 3, the following assumptions were made:

- Maximum return rate of 3.1 MGD (100 percent of average daily flow),
- Mixed liquor suspended solids (MLSS) concentration of 3,500 mg/L,
- Peak solids loading rate (SLR) of 35 pounds per day per square foot (per Ten States Standards),
- Average day SLR of 20 pounds per day per square foot, and
- No additional solids loading during wet weather due to dilution.

Based on these assumptions, two clarifiers are required as shown in Table 6.3.1 (see Section 7.5 for discussion of clarifier hydraulics). Therefore, no new clarifiers are required. However, both clarifiers would need to be in service during an average day at the solids loading rates noted above. From an operational perspective, this may create problems since neither clarifier can be taken out of service.

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Table 6.3.1 - Clarifier Solids Loading Rates

Flow Scenario	Q (MGD)	Area – 1 Clarifier (ft^2)	SLR – 1 Clarifier ($lb/d/ft^2$)	Area – 2 Clarifiers (ft^2)	SLR – 2 Clarifiers ($lb/d/ft^2$)	Comments
Q_{ave} (proposed)	3.1	5,025	36.0	10,050	18.0	See Note 1
Q_{peak} (proposed)	10.6	5,025	36.0	10,050	18.0	See Note 2

Notes:

1. Meets proposed criteria of 20 $lb/d/ft^2$ average solids loading rate with two clarifiers
2. Meets Ten States Standard of 35 $lb/d/ft^2$ peak solids loading rate with two clarifiers.

This Study assumes that a third clarifier of equal size to the existing clarifiers will be provided to allow for operational flexibility.

6.4 Return Activated Sludge

The Return Activated Sludge (RAS) pumps are in the RAS Splitter Box and Lift Station and are located between the existing Final Clarifiers. There are currently three (3) 10-Hp submersible pumps that are used to pump return activated sludge to the RAS/Influent Splitter Box adjacent to the Aeration Basins and to pump WAS to sludge storage. According to the 2001 design plans and IDEM construction permit (Appendix C), each pump is rated to pump 970 gpm (1.4 MGD) at 12 feet total dynamic head.

A hydraulic analysis was performed as part of this evaluation to determine actual pumping capabilities of the existing RAS pumps. A pump curve provided by BBC Pump was utilized. Minimum and maximum wet well free surface elevations were not noted on the plans. For this analysis, it was assumed that the minimum wet well free surface is 759 feet and the maximum is 762 feet. System curves were developed based on an assumption of 1 percent solids in the return activated sludge, and are shown in Figure 6.4.1.

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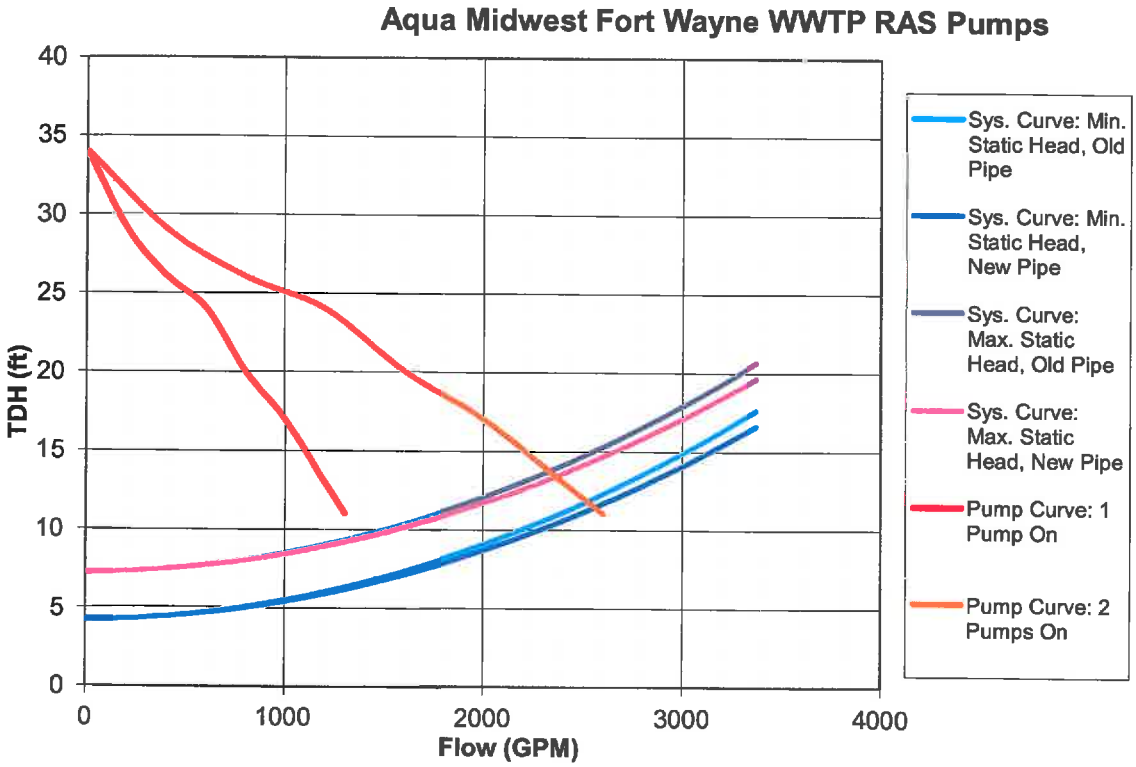

Figure 6.4.1: RAS System Curves

Two different pumping requirements were analyzed with results as follows:

1. Design Return Rate = 65 Percent of Influent: The proposed design rate of 65 percent of average day flow of 3.1 MGD, or 2.02 MGD, was considered. It was determined that two pumps have an estimated pumping capacity of approximately 3.5 MGD and are therefore capable of meeting the requirements of this return rate.

2. Design Return Rate = 100 Percent of Influent: Ten States Standards generally requires that a return rate of 50 percent to 150 percent be provided. For the purpose of this analysis, 100 percent return is assumed since this was the return rate provided according to the 2001 IDEM construction permit. This equates to a proposed return rate of 3.1 MGD (2,150 gpm) based upon a design average day flow of 3.1 MGD. It was determined that two pumps are required to meet the requirements of this return rate.

During this analysis, it was observed that the stated operating point of 970 gpm at 12 feet total dynamic head does not fall on the pump curve provided. It appears that the pumps are capable of 1,250 gpm at 12 feet, assuming the lowest impeller size on the pump curve. Also, based on the system curves in Figure 6.4.1, it appears that the pumps may be oversized and operating in or near the cavitation zone. It is recommended to confirm the actual pumps installed match the pump curve provided. Based on the information available, it does not appear that additional RAS capacity is required.

The pumps are not provided with variable frequency drives, according to the 2001 design plans. In order to provide more advanced control and flow pacing, installation of variable frequency drives is recommended but is not included in the Engineer's Opinion of Probable Costs at this time.

6.5 Waste Activated Sludge

The WWTP currently utilizes the 10-Hp submersible RAS pumps in the RAS Splitter Box and Lift Station to waste sludge to the three existing sludge storage tanks onsite. The flow and total dynamic head are not indicated on the design plans and IDEM construction permit. Wasting is currently completed manually by adjusting the valves on the common RAS/WAS pump discharge line.

For the proposed improvements, we suggest dedicated WAS pumps be installed in the RAS/WAS wetwell. These pumps will discharge to the new sludge holding tanks. The RAS pumps will be dedicated for returning sludge. The pump size for the WAS pumps will need to be confirmed during design.

6.6 Proposed Upgrades

The proposed upgrades to the biological $CBOD_5$ and ammonia removal processes are summarized as follows:

- Construct two (2) new 507,000 gallon Aeration Basins, partitioned for Zone A and Zone B.
- Install two (2) new 3400SCFM blower.
- Remove existing diffusers in Zone A and add two (2) 5-Hp mixers in each Zone A.
- Replace existing diffusers in existing Zone B with high efficiency diffusers (Aerostrip or similar). Add high efficiency diffusers to Zone B in new Aeration Basins.
- Construct one (1) new clarifier, 80 feet in diameter for operational flexibility.
- Install two (2) new WAS pumps.

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7.0 Hydraulic Evaluation of WWTP Processes for Projected Flows

7.1 Equalization Tank

Current information indicates that the flow from Coverdale Lift Station will be comprised mostly of effluent from the General Motors (GM) plant and that GM's entire flow (1 MGD) will be discharged over a 12-hour period. Following discussions with Aqua Indiana, it was decided that an Equalization (EQ) Tank will be provided to dampen the effects of receiving GM's flows over a half-day period. The proposed plan includes the installation of a 0.5 MG EQ Tank. The proposed EQ Tank would be built with common-wall construction adjacent to the proposed Aerated sludge storage just south of the Belt Filter Press Building. Under normal operating conditions, flow from the Fort Wayne system would be pumped directly to the EQ Tank and gravity fed from the EQ Tank to the Influent Lift Station. The EQ Tank would be equipped with submersible mixers in lieu of diffused aeration because aeration would remove volatile fatty acids which aid in phosphorus removal. Provisions to bring some of the RAS to the influent equalization tank are anticipated to assist with odor control.

7.2 Influent Pumping

According to the IDEM construction permit application, the Influent Lift Station pumps are rated at 2,500 gpm (3.6 MGD) each. The pumps share a common 24-inch force main (FM) that pumps raw influent to the Screen Room. The Influent Lift Station currently utilizes three (3) pumps with one (1) pump as a backup. The Influent Lift Station was designed to allow for two (2) additional pumps and the existing 24-inch FM header has 12-inch blind flanges where the additional pumps can be connected. This analysis assumes that one (1) additional pump is installed to increase the firm capacity of the lift station to 7,360 gpm (10.6 MGD) and that the operating levels indicated on the design plans are accurate. A system head curve was developed to assist this analysis in determining the approximate pumping capacity of the existing system with two pumps on and the approximate capacity of the system with three pumps on (i.e. assumes the addition of one pump). The pump curve for the existing 30 horsepower submersible Fairbanks Morse pumps was obtained from the local pump representative (BBC Pump and Equipment). The analysis indicates that the Influent Lift Station is capable of pumping approximately 5,500 gpm (7.9 MGD) with two pumps on and that the addition of one more duty pump will increase the pumping capacity to approximately 7,600 gpm (10.9 MGD). These calculated pumping rates assume that the existing pump elevations noted on Sheet 8B of the Phase I Plant Improvement plans and the free surface elevations in the Screen Room on Sheet 6 reflect field conditions. Therefore, three pumps should be capable of meeting the projected peak flow demands of 10.6 MGD. The proposed EQ Tank can also be utilized to reduce the peak flow demands on the Influent Lift Station.

Pump installation layout information was obtained from the Fairbanks Morse representative to verify that the pump spacing provided in the Influent Pump Station is sufficient to eliminate hydraulic pumping problems such as vortexing. According the information obtained and the dimensions indicated on Sheet 8A, the installation of an additional pump will not cause hydraulic problems and all pumps should be capable of simultaneous operation if required. Refer to Appendix E for information developed and obtained for the influent pumps during this study.

7.3 Influent Screening

Influent screening is currently provided by the combination of a 2-inch manual bar screen and one Parkson rotating screen (Helisieve) that deposits solids removed from the influent flow into a dumpster located in the lower level of the Screen Building. In addition, the Screen Room is equipped with two manual screens designed for high-flow periods. The first manual screen is located in a channel adjacent (west) of the rotating screen. The spacing on this bar screen is not known. The other high-flow screen is located adjacent (east) to the rotating screen under a walkway. This 1/2-inch screen allows high flows to discharge directly to the aeration basins over a "leaping" weir.

According to the IDEM construction permit, the mechanical rotating screen is rated at 900 gpm (1.3 MGD) flow capacity. The Midwest WWTP operator indicated that the screen is capable of handling a peak flow equivalent to approximately two pumps under "normal wet well levels". The analysis of the Influent Lift Station above indicates that two pumps at normal wet well levels are capable of delivering approximately 4,900 gpm (7 MGD). The local manufacturer's representative for the Parkson rotating screen (HP Thompson Company) was contacted to determine the manufacturer's average day and peak flow ratings for the unit. A representative from Parkson indicated that the existing screen is rated for an average flow of 2.0 MGD and a peak sustained flow of 6 MGD. Based upon this, it will be assumed that the existing screen is capable of handling a maximum flow of approximately 6 MGD.

According to the owner, another Helisieve rotating screen will be installed in the near future in the channel west of the existing mechanical screen. The additional screen will increase the average day flow capacity of influent screening to 4.0 MGD and the maximum flow screening capacity to approximately 12 MGD. Based upon a proposed average design flow capacity of 3.1 MGD and a peak flow capacity of 10.6 MGD, the additional screen will meet the projected future flow demands. The leaping weir adjacent to the east manual bar screen provides additional flow relief during wet-weather periods.

7.4 Complete Mix Single-Stage Nitrification

7.4.1 Flow from RAS/Influent Splitter Box to Aeration Basins

The proposed WWTP upgrades include the addition of two (2) aeration basins identical to the existing two 507,000-gallon basins. The existing WWTP currently includes a RAS/Influent Splitter Box that is designed for four basins. Therefore, flow distribution to the additional basins will require the installation of new 7' wide x 3' tall handwheel actuated weir gates in the existing flow splitter box similar to the existing weir gates and approximately 40 linear feet of new 24-inch pipe to feed proposed Aeration Basin No. 4. Flow to proposed Aeration Basin No. 3 will be channel flow similar to the flow to existing Aeration Basin No. 2.

The hydraulic profile on the Phase I Plant Improvement plans indicates the free surface in the RAS/Influent Splitter Box is 766.25 based upon a design flow of 2.8 MGD and RAS return rate of 1.5 MGD or 5.3 MGD total. The depth over the weir on the plans is 0.52 feet. A hydraulic analysis indicates that this depth assumes that all flow (5.3 MGD) is sent to one of the aeration basins (i.e. one aeration basin is offline). The design flow to each aeration basin for the proposed design flows of 3.1 MGD average and 10.6 MGD peak will be 3.16 MGD (refer to notes for Table 4.4.2.1). However, assuming one aeration basin offline, this equates to 4.21 MGD per basin which would lower the free surface indicated on the hydraulic profile of

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the existing plans by about 0.09 feet to 766.16. Therefore, the existing RAS/Influent Splitter Box will operate with less head than it is currently designed to do so with one basin out of service.

7.4.2 Flow from Aeration Basins to RAS Splitter Box and Lift Station

A preliminary hydraulic analysis was completed for the effluent piping from the Aeration Basins to the RAS Splitter Box and Lift Station which feeds the clarifiers. Flow from the existing aeration basins flows to the RAS Splitter Box and Lift Station via a 48-inch pipe. Assuming that effluent flow from all four aeration basins is conveyed by the 48-inch pipe now in use, the additional head to convey the peak flow of 12.62 MGD (refer to notes below) would be approximately 0.2 feet more than the head required to convey the design average day flow of 4.3 MGD (refer to note on Sheet 6 of Phase I Plant Improvement plans). This additional head should not cause hydraulic problems in the system since the weirs in the RAS Splitter Box and Lift Station should be adjustable to allow for minor free surface adjustments.

Table 7.4.2.1 – Flows and Estimated Free Surfaces in Aeration Basins

Pipe Segment	Average Flow (MGD) See Notes 1 and 2	Peak Flow (MGD) See Note 3	Velocity (fps) at Peak Flow	Free Surface (Estimated – See Note 5)
24-inch from Aeration Basin No. 1	1.28	3.16	1.56	764.86
48-inch at Connection to Aeration Basin No. 2	2.56	6.32	0.78	764.89
48-inch at Connection to Aeration Basin No. 3	3.84	9.47	1.17	764.91
48-inch at Connection to Aeration Basin No. 4	5.12	12.62	1.56	764.94

Notes:

1. Four aeration basins are capable of treating an average day flow (ADF) of 3.1 MGD. Therefore, this analysis assumes maximum load to aeration basins (i.e. 0.77 MGD per basin).
2. RAS flow is assumed to be 65% of ADF up to 3.1 MGD with no increase in RAS to aeration basins for flows exceeding 3.1 MGD. Therefore, maximum RAS flow is 2.02 MGD for a total ADF to the four basins of 5.12 MGD or 1.28 MGD per basin.
3. Peak flows to the aeration basins is 10.6 MGD (influent) plus 2.02 MGD (RAS) for a total flow of 12.62 MGD or approximately 3.16 MGD per basin.
4. Flow velocities assume that four (4) aeration basins are in use.
5. Free surface elevations are assumed to be controlled by the Peak Flow over the effluent weir at the end of each Aeration Basin and that a free discharge is provided (i.e. nappe discharge). Phase I Plant Improvement plans indicate that the overflow weir elevation is 764.81.

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7.5 Final Clarifiers

7.5.1 Clarifier Splitter Box

The flow splitter box to the clarifiers is part of the RAS Splitter Box and Lift Station located between the clarifiers and is similar to the RAS/Influent Splitter Box that feeds the aeration basins in that it has the ability to split flow evenly four ways and utilizes 7' wide x 3' tall handwheel actuated weir gates.

7.5.2 Hydraulic Loadings on Clarifiers

An analysis of the existing Final Clarifiers was performed in terms of hydraulic loading to the clarifiers. The requirements used in this analysis are from the *Recommended Standards for Wastewater Facilities* (i.e. Ten States Standards), 2004 edition. According to Ten States Standards, the following hydraulic loading limitations should be considered for the Midwest WWTP:

1. Surface Overflow Rate at Design Peak Hourly Flow (Extended Aeration/Single Stage Nitrification) ≤ 1,000 gpd/ft^2. The overflow rate requirement for activated sludge with chemical addition to mixed liquor for phosphorus removal is 900 gpd/ft^2 when phosphorus removal to a concentration of less than 1.0 mg/L is required. It is anticipated that the phosphorus limits will be 1 mg/L initially. However, this may be reduced in the future. This analysis was performed with a more conservative approach assuming that phosphorus limits will be reduced below 1 mg/L in the future. Therefore, use 900 gpd/ft^2.

2. Weir Loadings (for flows greater than 1 MGD) ≤ 30,000 gpd/lf.

Tables 7.5.2.1 and 7.5.2.2summarize the information utilized and the results from the analysis.

Table 7.5.2.1 - Clarifier Surface Overflow Rates

Flow Scenario	Q (MGD)	Area – 1 Clarifier (ft^2)	SOR – 1 Clarifier (gpd/ft^2)	Area – 2 Clarifiers (ft^2)	SOR – 2 Clarifiers (gpd/ft^2)	Comments
Q_{ave} (current)	1.1	5,025	218	10,050	109	See Note 1
Q_{peak} (current)	4.3	5,025	856	10,050	428	See Note 1
Q_{ave} (proposed)	3.1	5,025	617	10,050	309	See Note 1
Q_{peak} (proposed)	10.6	5,025	2,110	10,050	1,055	See Note 2

Notes:

1. Meets Ten States Standards
2. Does not meet current Ten States Standards of 1,000 gpd/ft^2 or proposed standard of 900 gpd/ft^2 for surface overflow rate at peak flow.However since the loading to the clarifier is diluted, the loading rate is more important.

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Table 7.5.2.2 - Clarifier Weir Loadings

Flow Scenario	Q (MGD)	Weir Length – 1 Clarifier (ft)	Weir Loading – 1 Clarifier (gpd/lf)	Weir Length – 1 Clarifier (ft)	Weir Loading – 1 Clarifier (gpd/lf)	Comments
Q_{ave} (current)	1.1	251	4,380	502	2,190	See Note 1
Q_{peak} (current)	4.3	251	17,130	502	8,565	See Note 1
Q_{ave} (proposed)	3.1	251	12,350	502	6,175	See Note 1
Q_{peak} (proposed)	10.6	251	42,230	502	21,115	See Note 2

Notes:

1. Meets Ten States Standards for one clarifier in use up to a maximum flow of 7.5 MGD.
2. Does not meet current Ten States Standards of 30,000 gpd/lf for one clarifier for flows greater than 7.5 MGD. Meets Ten States Standards for all flows with two clarifiers in use.

7.5.3 Return Activated Sludge (RAS)

An analysis of RAS pumping is provided in Section 6.4.

7.5.4 Waste Activated Sludge (WAS)

An analysis of WAS pumping is provided in Section 6.5.

7.6 Post Aeration

The hydraulic profile for the original design indicates that the free surface in the Post Aeration Tank is 760.9 and in the UV Disinfection Tank 759.83 at a peak flow of 7.0 MGD. The free surface in the UV Disinfection Tank upstream of the UV equipment at a peak flow of 10.6 MGD was estimated to be 760.3 (see UV Disinfection below). At a peak flow of 10.6 MGD, it is estimated that the free surface in the Post Aeration Tank will be approximately 0.2 feet higher than the UV Disinfection Tank or 760.5. The existing post aeration system includes coarse-bubble diffusers in the 14'x24' tank. The sidewater depth (SWD) will be approximately 8.2 feet based upon a free surface of 760.5 in the Post Aeration Tank. This provides a total tank volume of approximately 21,000 gallons. This equates to a contact time of about 4.3 minutes at the current peak design flow of 7.0 MGD and 2.9 minutes at the proposed peak flow of 10.6 MGD.

The current plan is to replace the existing coarse bubble diffusers with fine bubble diffusers in order to achieve the necessary dissolved oxygen requirements with the reduced contact time. The existing coarse bubble diffusers are mounted to the Post Aeration Tank floor and therefore will need to be removed in order to install the proposed fine bubble diffusers. The proposed revisions to the Aeration Basins include removal of existing fine bubble diffusers from the influent end of the Aeration Basins where mixers will be installed. For the purposes of this analysis, it is assumed that the existing diffusers will be removed and replaced with fine bubble diffusers salvaged from the Aeration Basins during the WWTP upgrade. The diffusers will be installed by bypassing flow from the Post Aeration Tank to the Effluent Pump Station while utilizing the existing 42-inch tank drain line on the east side of the Post Aeration Tank. Therefore, estimated costs for these improvements do not include bypass pumping

7.7 UV Disinfection

According to the IDEM construction permit, the existing UV system (i.e. Trojan UV4000) is designed for an average flow of 2.8 MGD and a peak flow of 7.0 MGD. The construction permit also indicates that the unit is capable of being expanded to handle a peak flow of 14 MGD.

The existing UV system was installed with a 10-foot long level control weir. The Phase I Plant Improvement plans (Sheet 25) indicate that the weir was designed to handle a peak flow of 14 MGD. The following information is included in the Phase I Plant Improvement plans and will be utilized for this analysis:

Table 7.7 – Estimated Free Surfaces in UV Disinfection Tank

Location	Q (MGD)	Free Surface (Design)	Free Surface (Estimated)	Comments
Upstream of UV	7	759.83		Free surface elevation from design plans
Upstream of UV	10.6	N/A	760.3	(See Note 1)
Upstream of UV	14	760.86		Free surface elevation from design plans
Downstream of UV	7	758.94		Free surface elevation from design plans
Downstream of UV	10.6	N/A	759.1	(See Notes 1 and 2)
Downstream of UV	14	759.27		Free surface elevation from design plans
Downstream of Level Control Weir	7	757.80		Free surface elevation from design plans
Downstream of Level Control Weir	10.6	N/A	758.0	(See Note 1)
Downstream of Level Control Weir	14	758.13		Free surface elevation from design plans

Notes:

1. Estimated free surface assumes that free surfaces on design plans are accurate.
2. Level control weir downstream of UV equipment (10 feet long) set at elevation 758.38 according to Sheet 25 of the design plans.

Based upon the above information, it appears the existing UV Disinfection Tank does not require any modifications to provide for the proposed increase in peak flow other than the installation of additional UV equipment.

7.8 Effluent Pumping

The Effluent Pump Station is designed to pump the WWTP's effluent flow when the water level in the receiving stream (Graham McCulloch Ditch) is too high to allow gravity discharge from the WWTP. The Effluent Pump Station was constructed with three pump slots to pump flow to a 16-inch common header. The Effluent Pump Station currently has two pumps installed with room for a third pump. A hydraulic analysis was developed to assist this analysis in determining the approximate pumping capacity of the existing system with one pump on and the approximate capacity of the system with two pumps on (i.e.

assumes the addition of one pump). The pump curve for the existing 40 horsepower submersible Fairbanks Morse pumps was obtained from the local pump representative (BBC Pump and Equipment). The analysis indicates that the Effluent Pump Station is capable of pumping approximately 5,800 gpm (8.3 MGD) with one pump on and that the addition of one more duty pump will increase the pumping capacity to approximately 8,200 gpm (11.8 MGD). These calculated pumping rates assume that the existing pump elevations noted on Sheet 25B and a maximum free surface discharge elevation of 763.0 reflect field conditions. The information provided did not include the design free surface in Graham McCulloch Ditch so an assumption of the maximum free surface was made for this analysis. Based upon the above, two pumps are capable of meeting the projected peak flow demands of 10.6 MGD.

Pump installation layout information was obtained from the Fairbanks Morse representative to verify that the pump spacing provided in the Effluent Pump Station is sufficient to eliminate hydraulic pumping problems such as vortexing. According the information obtained and the dimensions indicated on Sheet 25A, the installation of an additional pump will not cause hydraulic problems and all pumps should be capable of simultaneous operation if required. Refer to Appendix F for information developed and obtained for the effluent pumps during this study.

7.9 Proposed Hydraulic Upgrades

The following is a summary of the proposed hydraulic upgrades to expand the WWTP for an average day flow of 2.6 MGD and a peak day flow of 10.6 MGD.

- Influent Pumping
  - Construct a new 0.5 MG EQ Tank with flow controlled release
  - Install a new influent pump, piping and controls
- Influent Screening
  - Install new 2.0 MGD Helisieve screen
- Complete Mix Single-Stage Nitrification
  - Install two (2) new 7'Wx3'T Handwheel Actuated Slide Gate at Existing Splitter Box
  - Demolish masonry units in existing splitter box to Aeration Basin No. 3
  - Install new 24-inch piping to Aeration Basin No. 4
- Final Clarifiers
  - Install one (1) new 6'Wx3.5'T adjustable weir gate at existing splitter box
  - Install one (1) new 16-inch telescoping valve
  - Install new 30-inch influent piping, 24-inch effluent piping, 16-inch RAS piping, and 6-inch drain piping for new Final Clarifier
- Post Aeration
  - Replace existing coarse bubble diffusers with salvage fine bubble diffusers from Aeration Basins
- UV Disinfection
  - Install additional UV modules to meet average day and peak flows
  - Replace existing controller with new controller
- Effluent Pumping
  - Install a new effluent pump, piping and controls

STRUCTUREPOINT

8.0 Evaluation of WWTP Processes for Sludge Handling

8.1 General Discussion

As discussed in Section 4.12, the aerated sludge holding tanks were modified in 2001. The existing tanks have a capacity of 66,000 gallons. There is also a third sludge holding tank located below the fine screens, with a capacity of 54,000 gallons. Based on a future average day capacity of 3.1 MGD, the required amount of sludge holding is estimated to be between 350,000 and 750,000 gallons depending on the amount of digestion desired and the amount of storage space desired for equipment outages. Therefore, as the WWTP currently operates sludge storage capacity is undersized prior to dewatering by the belt filter press.

The belt filter press (BFP), as discussed in Section 4.13, is in good operating condition. The WWTP staff operates it 1-2 days per week for approximately 6 hours each time. Operating the BFP for this duration of time fills one box to be picked up and sent to a landfill. The BFP has a half-hour startup procedure. By operating more days per week, the BFP, pumps and conveyors are sufficient for the proposed increase in plant flow.

8.2 Proposed Upgrades

Based on an increase of flow capacity for the WWTP to 3.1 MGD, the proposed upgrades for sludge handling include demolishing the existing sludge tanks 1 and 2 and abandoning tank 3 in place. Two additional aerated sludge holding tanks will be constructed. These new tanks will be located on the south end of the Belt Filter Press Building. The capacity between these two tanks is estimated at 500,000 gallons based on 20 days of storage and providing an additional 25% volume for decanting. This calculation also includes several assumptions, including that 0.9 lbs of TSS are created per pound of BOD applied to the sludge aeration tanks, a 1.0% WAS stream,. Assuming two tanks are provided, each new tank will be approximately 40 feet by 40 feet with a 20-foot side water depth and allows for freeboard. The total air requirement is approximately 2000 scfm. We anticipate installing two new turbo blowers to meet the aeration needs. It may be possible to utilize the existing Spencer Blowers for the aerated sludge storage and install new larger turbo blowers for the activated sludge process. If this is possible, there may be enough room in the existing blower building to install the new turbo blowers in the existing building, thus saving the cost for housings required for the blowers to be outside. This alternative can be evaluated further during design.

STRUCTUREPOINT

9.0 Engineer's Opinion of Expected Construction Costs

The costs for the proposed upgrades were estimated by itemizing costs and estimating quantities for each item. Labor, materials, electrical and controls, and additional treatment processes were included.

Table 9.0.1 summarizes the results.

Table 9.0.1: Summary of Engineer's Opinion of Probable Construction Costs

Item	Cost
Influent Pump Station	$61,000
Aeration Basins	$2,597,000
Final Clarifier	$835,000
RAS/WAS Pump Station	$115,000
Post Aeration	$14,000
UV Disinfection	$306,000
Digester and Equalization	$2,216,000
Belt Filter Press	$0
Effluent Pumping	$101,000
Yard Piping and Fencing	$472,000
By-Pass Pumping	$400,000
Dewatering	$250,000
Electrical and I&C	$737,000
Total (rounded)	**$8,100,000**

The following are the assumptions utilized during the development of the Engineer's Opinion of Probable Construction Costs:

1. Sheeting – it was assumed that the only requirement for sheeting support during construction will be along the north and east sides of the proposed Aeration Basins.
2. Bypass Pumping – the costs for bypass pumping assumes that a total of 16 weeks of bypass pumping, at $25,000/week, will be required during the construction phase to allow for construction

or improvements to A) Influent Pump Station, B) modifications to the existing RAS/Influent Splitter Box, C) new Aeration Basins, D) modifications to the existing RAS Splitter Box and Lift Station, and E) connection of the new 24-inch Final Clarifier effluent pipe to existing 42-inch effluent pipe.

3. Dewatering – it was assumed that a total cost of $250,000 would cover dewatering required during the construction phase. (Note: geotechnical report of WWTP site was not available during development of these costs.)
4. Electrical Ductbank Relocation – relocation of all existing electrical feeds and/or ductbanks onsite is not required.
5. Electrical and I&C - construction costs for electrical and I&C work is 10% of all other construction costs.
6. Contingency – a contingency of 15% was assumed.

STRUCTUREPOINT

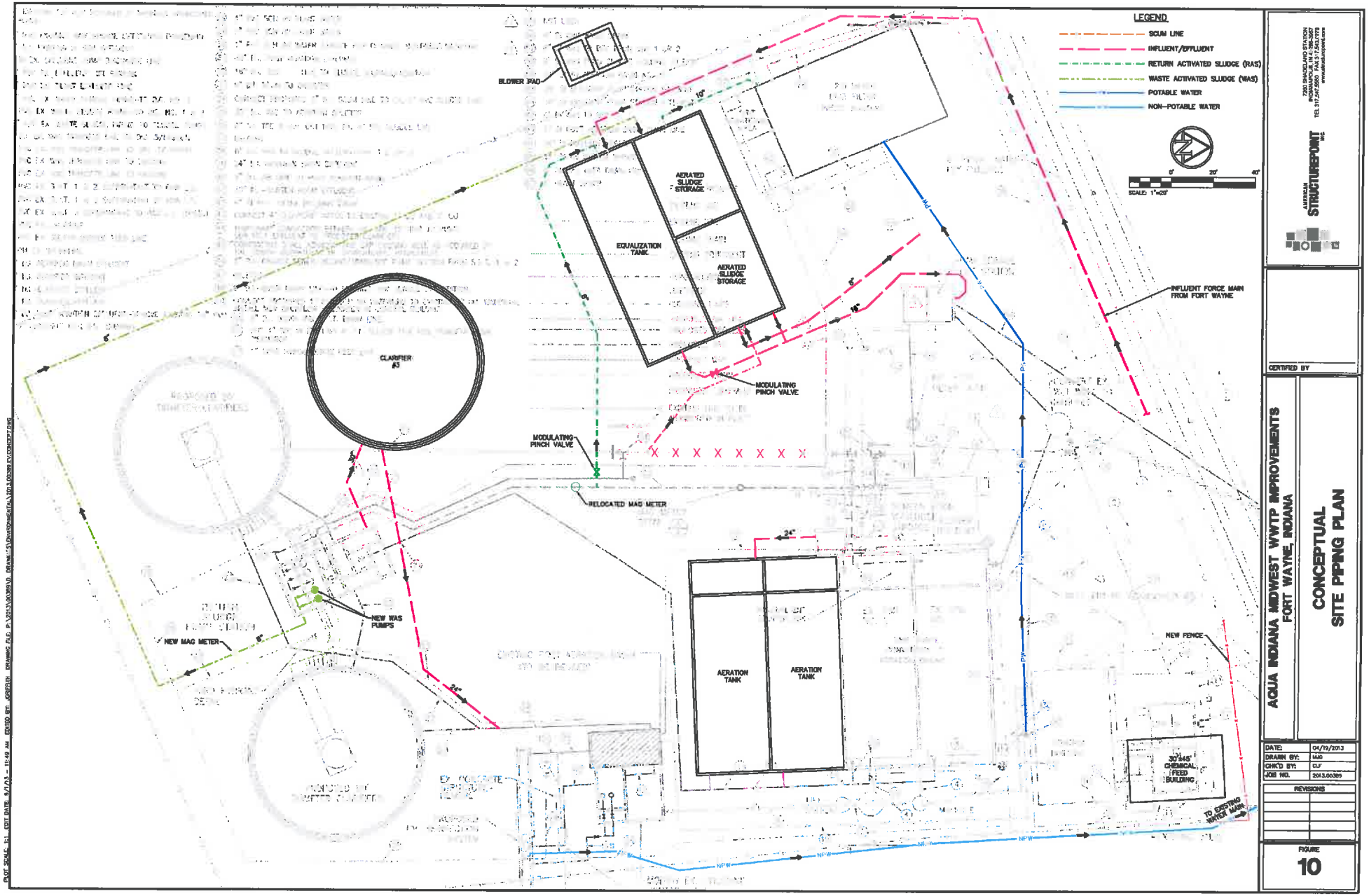
10.0 Summary and Conclusions

Several WWTP modifications are necessary to increase capacity to the projected average daily flow of 3.1 MGD at the projected loadings. The major modifications are shown on Figure 10 and include:

- 0.5 million gallons of equalization storage,
- influent pumping upgrades,
- chemical feed systems for odor control and backup for bio-P removal
- two (2) new aeration basins,
- one (1) final clarifier,
- one (1) additional blower for biological aeration,
- 150-gpm plant water system
- 0.5 million gallons of aerated sludge holding,
- two (2) new blowers for aerated sludge holding,
- VFDs on RAS pumps,
- two (2) new WAS pumps, and
- effluent pumping upgrades.

In order to meet the anticipated upcoming phosphorus limits, it is recommended to convert the Aeration Basins into an Anaerobic Zone A and Aerobic Zone B to promote biological phosphorus removal. This change utilizes existing walls within the Basins, but requires modification to the existing diffused air system to allow for higher oxygen uptake following Anaerobic Zone A. A backup chemical feed is recommended for phosphorus removal.

The entire new infrastructure is proposed on property currently owned by Aqua Indiana, and only the blowers for aerated sludge holding are outside the fence for the current plant site. The Engineer's Opinion of Probable Construction Cost is $8.1 Million.


LEGEND
SCUM LINE
INFLUENT/EFFLUENT
RETURN ACTIVATED SLUDGE (RAS)
WASTE ACTIVATED SLUDGE (WAS)
POTABLE WATER
NON-POTABLE WATER
SCALE: 1"=20'
BLOWER PAD
AERATED SLUDGE STORAGE
EQUALIZATION TANK
AERATED SLUDGE STORAGE
CLARIFIER #3
MODULATING PINCH VALVE
MODULATING PINCH VALVE
RELOCATED MAG METER
INFLUENT FORCE MAIN FROM FORT WAYNE
NEW WAS PUMPS
NEW MAG METER
AERATION TANK
AERATION TANK
NEW FENCE
30'x45' CHEMICAL FEED BUILDING
TO EXISTING WATER MAIN
AQUA INDIANA MIDWEST WWTP IMPROVEMENTS
FORT WAYNE, INDIANA
CONCEPTUAL
SITE PIPING PLAN
CERTIFIED BY
DATE: 04/19/2013
DRAWN BY: MJG
CHK'D BY: CLF
JOB NO. 2013.00389
REVISIONS
FIGURE
10

EXECUTIVE SUMMARY

Mr. Tom Bruns, President
AQUA Indiana Inc.
March 21, 2014

RE: Request for Proposal for Expansion of Midwest Wastewater Treatment Facility

Dear Tom,

URS engineers and regulatory experts are ready to team with AQUA Indiana to move forward with the necessary expansion of the Midwest Wastewater Treatment facility. We have developed an alternate approach to that which was offered in the original planning report for AQUA to consider. This approach provides enhanced biological nutrient removal, offers greater flexibility to handle varying organic loading and wet weather flows, and reduces the need for construction of new structures. Integration of existing facilities will be maximized while overall construction costs will be reduced.

The recommendation of this alternative approach is based upon my 35 years of experience designing innovative and state of art treatment facilities across Indiana and is supported by other engineering expertise on our proposed project team As is discussed in our this proposal, I managed and designed a Princeton, Indiana WWTP project that is similar in approach to that which we are recommending for Aqua Indiana's Midwest expansion. The Princeton project involved expansion of existing facilities to accommodate the new Toyota Assembly plant and future growth under very similar NPDES permit requirements. This alternative approach provides a proven process design utilizing a biological nutrient removal process that incorporates significant process flexibility.

We have attempted to cover all of the planning, design, and construction permitting associated with the engineering phase of the project. For clarification, our proposal does not include costs associated with odor control structures or covers or treatment systems for the aerobic storage tanks. This would need to be further defined in the Basis of Design Report. Additionally, the proposed new NPDES permit prohibits industrial contribution to the Midwest facility. In order to provide an accurate estimate for our regulatory/compliance staff involvement, we would need to have additional insight into any past discussions/negotiations between the City of Fort Wayne and AQUA Indiana as well with IDEM. As part of our proposed engineering fee schedule, we have provided an allocation of 120 man-hours as an estimate, which will need to be further defined.

With this proposal, we have provided a concise discussion of our alternative approach as well as the basic qualifications of our team. We would like to further discuss our ideas and concepts with you and staff after you have had a chance to review our submittal.

We appreciate the opportunity to provide our thoughts on this very critical and sensitive project for Aqua Indiana.

Sincerely

Jeff Ponist, PE
Water Resources Business Leader

URS Corporation
One Indiana Square
Suite 2100
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Water Resources
Business Leader
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Table of Contents

PROJECT APPROACH

Based upon a recent visit Aqua Indiana's Midwest WWTP, our review of the planning report completed by American Structurepoint, and our experience with the City of Princeton, Indiana and Wooster, Ohio treatment facilities, we propose a different method to address the future plant expansion. Our plan will also address potential operational issues we foresee with the current recommendations. Proposed project manager, Jeff Ponist, worked with the City of Princeton and designed the WWTP expansion necessary to bring the Toyota Assembly plant on-line. This project doubled the plant capacity, utilizing phased isolation ditch (PID) technology and incorporating biological nutrient removal (BNR). The design provided an innovative utilization of the ditches in an automatic storm mode to reduce solids loading to the clarifiers without any flow equalization facilities.

In Wooster, Ohio, URS evaluated the existing WWTP and designed improvements to address very similar issues which the future AQUA Midwest WWTP will face with the diversion of the Junk Ditch interceptor. The Wooster facility receives flow from a Frito-Lay plant with COD varying from 1000 to 4000 mg/l. The FOG concentration indicated in the Midwest WWTP report also indicates that a significant level of FOG will be received similar to Wooster. Modifications for AQUA Midwest would include enhanced scum collection mechanisms at key locations in the WWTP to improve O&G capture and reduce the associated maintenance problems. There is a potentially significant TSS load from the new service areas as well. This will put a strain on the solids handling portion of the plant. In Wooster, we worked with Quasar Energy Group and the City to develop a public-private partnership to reduce the capital cost of the solids improvements necessary.

Based upon the lessons learned and the successes gleaned in the aforementioned projects, we offer the following comments and concerns:

1. Future design loading of secondary combined BOD/Nitrification process will exceed IDEM acceptable parameters.
2. The location of RAS mixing of Raw Wastewater will reduce effectiveness of biological nutrient removal by not providing de-aeration of RAS.
3. The new WWTP facilities will be negatively affected by peak flows if they were to exceed 10 MGD.
4. Raw solids production could increase by a factor of 4 times current operations. Evaluation of long term solids processing costs should be conducted which may warrant additional volatile solids destruction processes prior to dewatering and landfill disposal. For example, Jeff Ponist designed a Class A ATAD process for the City of Decatur, Indiana prior to dewatering, reducing solids production by over 50% and eliminating the landfilling costs.
5. The proposed new structures identified in the planning report will be placed in the 100-year flood zone.

PROJECT APPROACH

Our approach offers a more cost-effective alternative to the proposed improvements that will provide more efficient BNR operation, provide additional wet weather flow treatment capability and minimize construction of multiple new structures.

In order to address these concerns, our cost-reducing alternative approach would include the following improvements/changes:

Influent Pumping

- Utilize *existing Aeration Tank No. 1 for EQ tank* with flow controlled release (if required).
- Install *two* new influent pumps, piping and controls
- Install new 2.0 MGD Helisieve screen
- *Construct new anaerobic selector and dual-phased isolation ditches (loading approximately 20 lbs/1000 cu/ft). Process will provide enhanced biological P removal below 1 mg/l , reduction in total nitrogen and allow recovery of alkalinity and DO*.
- Add backup chemical feed for P removal with *lower chemical demand with phased ditch process*.
- Construct new 80 ft diameter final slarifier (*this could possibly be differed utilizing the storm mode of ditches after further flow evaluation in bases of design report*).
- Install two (2) new WAS pumps.
- Post aeration, replace existing coarse bubble diffusers with new fine bubble diffusers.
- UV disinfection; install additional UV modules to meet average day and peak flows and replace existing system controls.
- Effluent pumping; install a new effluent pump, piping and controls.
- *Modify the existing Aeration Basin No. 2 into three separate aerobic sludge storage tanks with the smaller tank utilized for gravity thickening*.

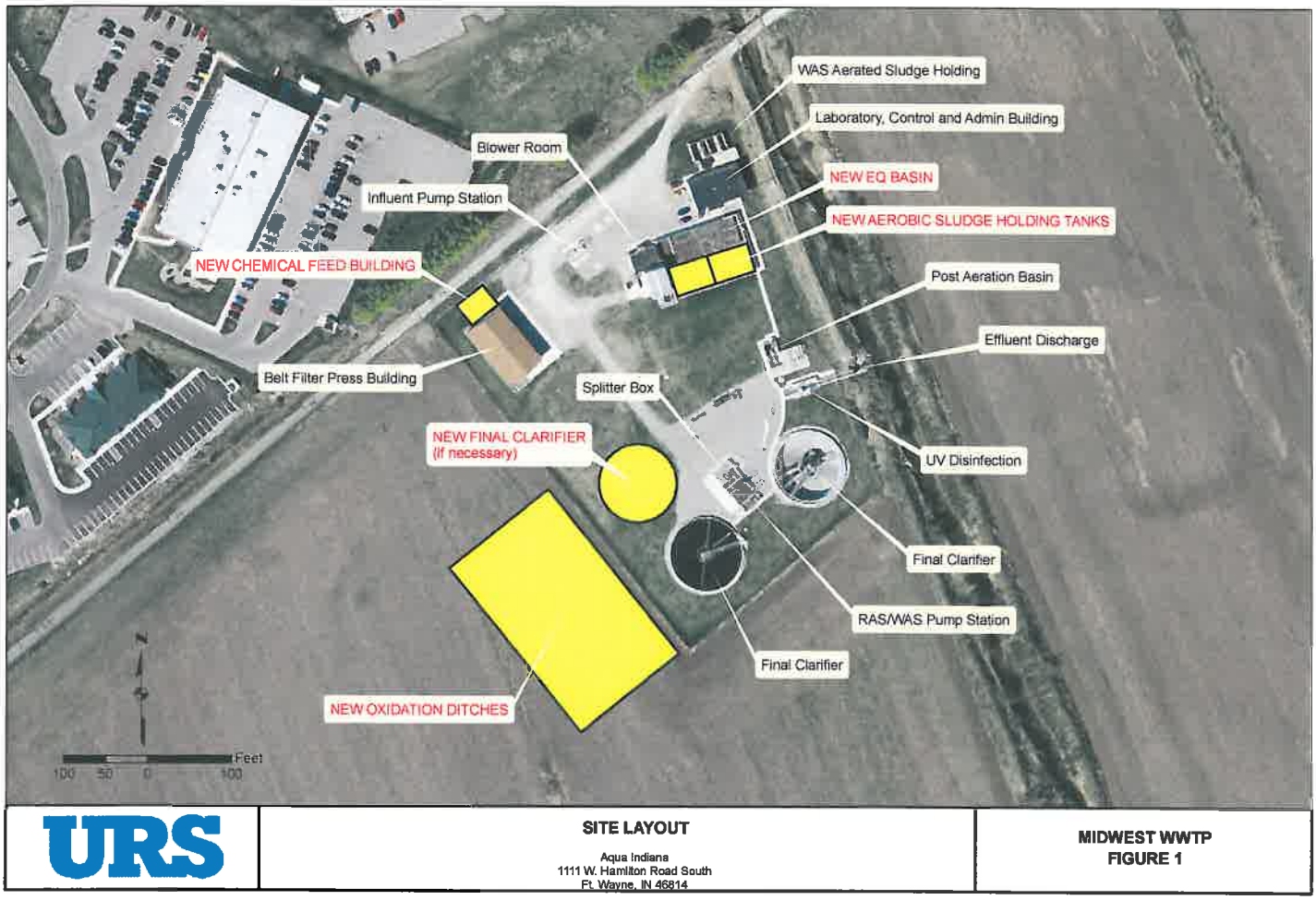


Figure I provides a conceptual site layout for the proposed improvements.

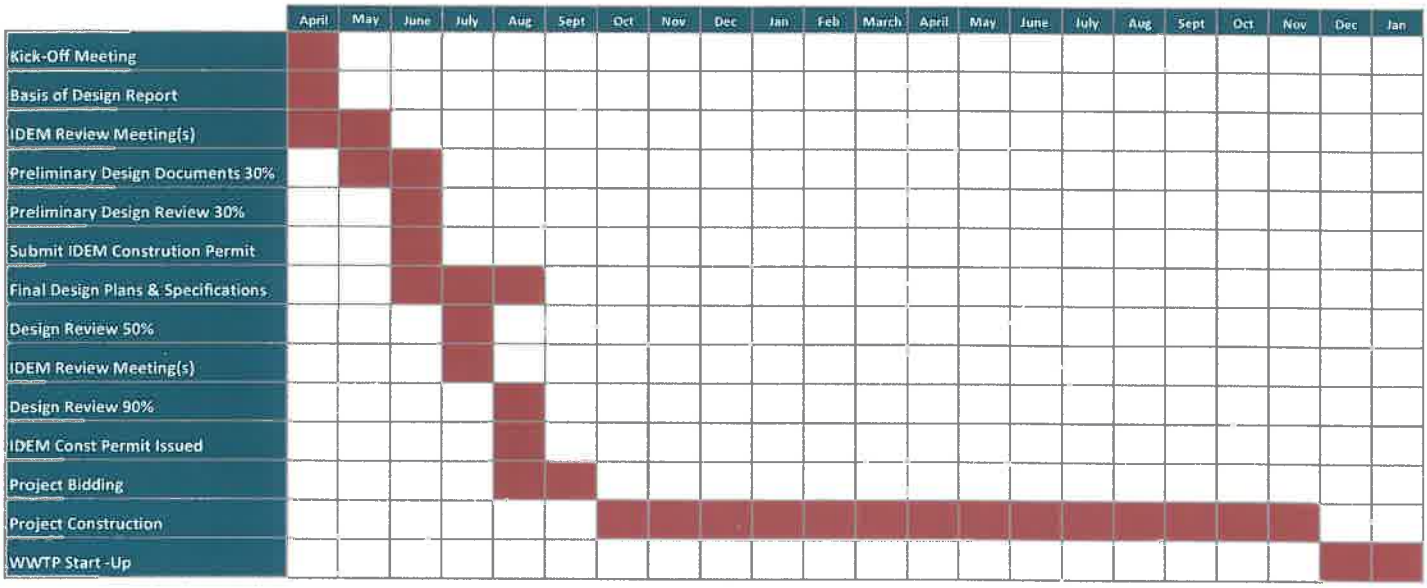
AQUA IN Ft Wayne Midwest WWTP Expansion — % Complete Status

Drawing Description	MAY	JUNE	JULY	AUGUST
G-1 Title Sheet				
G-2 Index and General Project Notes				
G-3 Existing Site Plan				
G-4 Existing Yard Piping				
G-5 Proposed New Site Plan				
G-6 Proposed New Yard Piping				
G-7 Erosion Control Plan & Details				
P-1 Existing Process & Sludge Schematics				
P-2 Existing Hydraulic Profile				
P-3 New Process & Sludge Schematics				
P-4 New Hydraulic Profile				
P-6 Existing Main Pump Station & Sections				
P-7 Proposed Main Pump Station Improvements Plan & Sections				
P-8 New Main Pump Station Details				
P-9 Existing Influent Screening Structure				
P-10 New Influent Screen Plan & Sections (if required)				
P-11 Existing RAS/Raw Wastewater Diversion Box Plan & Sections				
P-12 Modifications to RAS/Raw Wastewater Diversion Box Plans & Sections				
P-13 Existing Aeration Tanks No.1 & No.2 Plan & Sections				
P-14 Modifications of Existing Aeration Tank No1 to Flow Equalization- Plan				
P-15 Modifications of Existing Aeration Tank No1 to Flow Equalization- Sections				
P-16 Modifications of Existing Aeration Tank No2 to Aerobic Sludge Storage- Plan				
P-17 Modifications of Existing Aeration Tank No2 to Aerobic Sludge Storage- Sections				
P-18 Existing Aeration Tank Modification Details				
P-19 New Phased Oxidation Ditch No.1 & No.2 Plan				
P-20 New Phased Oxidation Ditch No.1 & No.2 Sections 1				
P-21 New Phased Oxidation Ditch No.1 & No.2 Sections 2				
P-22 New Phased Oxidation Ditch No.1 & No.2 Details 1				
P-23 New Phased Oxidation Ditch No.1 & No.2 Details 2				
P-24 Existing Clarifier Splitter Box Plan & Sections				
P-25 Modifications to Existing Clarifier Splitter Box Plan & Sections				
P-26 New Final Clarifier – Plan				
P-27 New Final Clarifier Sections				
P-28 New Final Clarifier Details 1				
P-29 New Final Clarifier Details 2				
P-30 Existing RAS Pumping Station Plan & Sections				
P-31 Modification of Existing RAS Pumping Station Plan & Sections				
P-32 Existing UV Chamber Plan & Sections				
P-33 Modifications of Existing UV Chamber Plan & Sections				
P-34 New UV System Control Schematics & Details				
P-35 Existing Post Aeration Tank Plan & Sections				
P-36 Modifications to Existing Post Aeration Tank Plan & Sections				
P-37 Existing Plant Effluent Pump Station Plan & Sections				
P-39 Modifications to Existing Plant Effluent Pump Station Plan & Sections				
P-40 Demolition of Existing Aerated Sludge Holding Tanks Plan				
P-41 Demolition of Existing Aerated Sludge Holding Tanks Sections				
P-42 New Chemical Feed Building Plan & Sections				

AQUA IN Ft Wayne Midwest WWTP Expansion — % Complete Status

Drawing Description	MAY	JUNE	JULY	AUGUST
P-43 Chemical Feed Pumps, Tanks and Piping Schematics				
P-44 Chemical Feed System Details				
P-45 Miscellaneous Details 1				
P-46 Miscellaneous Details				
PC-1 Existing Plant Instrument & Control Schematic				
PC-2 New Main Pump Station Controls				
PC-3 New Screen Controls				
PC-4 New Oxidation Ditch Controls 1				
PC-5 New Oxidation Ditch Controls 2				
PC-6 New Final Clarifier Controls				
PC-7 New RAS Pump Controls				
PC-8 New Plant Effluent Pump Controls				
PC-9 New UV System Controls				
S-1 General Notes & Details 1				
S-2 General Notes & Details 2				
S-2 New Oxidation Ditches Plan & Sections				
S-3 New Oxidation Ditch Sections & Details 1				
S-4 New Oxidation Ditch Sections & Details 2				
S-5 New Oxidation Ditch Details				
S-6 New Final Clarifier Plan & Sections				
S-7 New Final Clarifier Sections & Details				
S-8 New Final Clarifier Details				
S-9 Existing Aeration Tank Modifications Plan & Sections				
S-10 Chemical Feed Building Plan & Sections				
S-11 Chemical Feed Building Sections & Details				
S-13 Chemical Feed Building Details				
E-1 General Notes and Details				
E-2 Existing Power Schematics				
E-3 Existing MCC Layouts				
E-3 New Electrical Feeder Schematics				
E-4 Modifications to Exiting MCC Sections				
E-5 Main Pump Station				
E-6 Raw Sewage Screen				
E-7 Oxidation Ditches				
E-8 New Final Clarifier				
E-9 RAS Pump Station				
E-10 Plant Effluent Pump Station				
E-11 Chemical Feed Building				
E-12 Instrument Power Diagram				
M-1 General Notes & Details				
M-2 Chemical Feed Building HVAC				

PROJECT SCHEDULE



COMPENSATION

Estimated Alternative Construction Cost

Influent Pump Station	$150,000 *(with additional FOG handling and cutter pumps)*
Phased Ditches	$3,200,000
Final Clarifier	$835,000 *(if necessary)*
Chemical Feed Systems:	$340,000
RAS/WAS Pump Station	$115,000
Post Aeration	$45,000
UV Disinfection	$306,000
Existing Aeration Tanks Mod	$200,000
Belt Filter Press	$0
Effluent Pumping	$101,000
Yard Piping and Fencing	$400,000
By-Pass Pumping	$150,000
Dewatering	$250,000
Electrical and I&C	$737,000
Total Estimated	**$6,829,000**

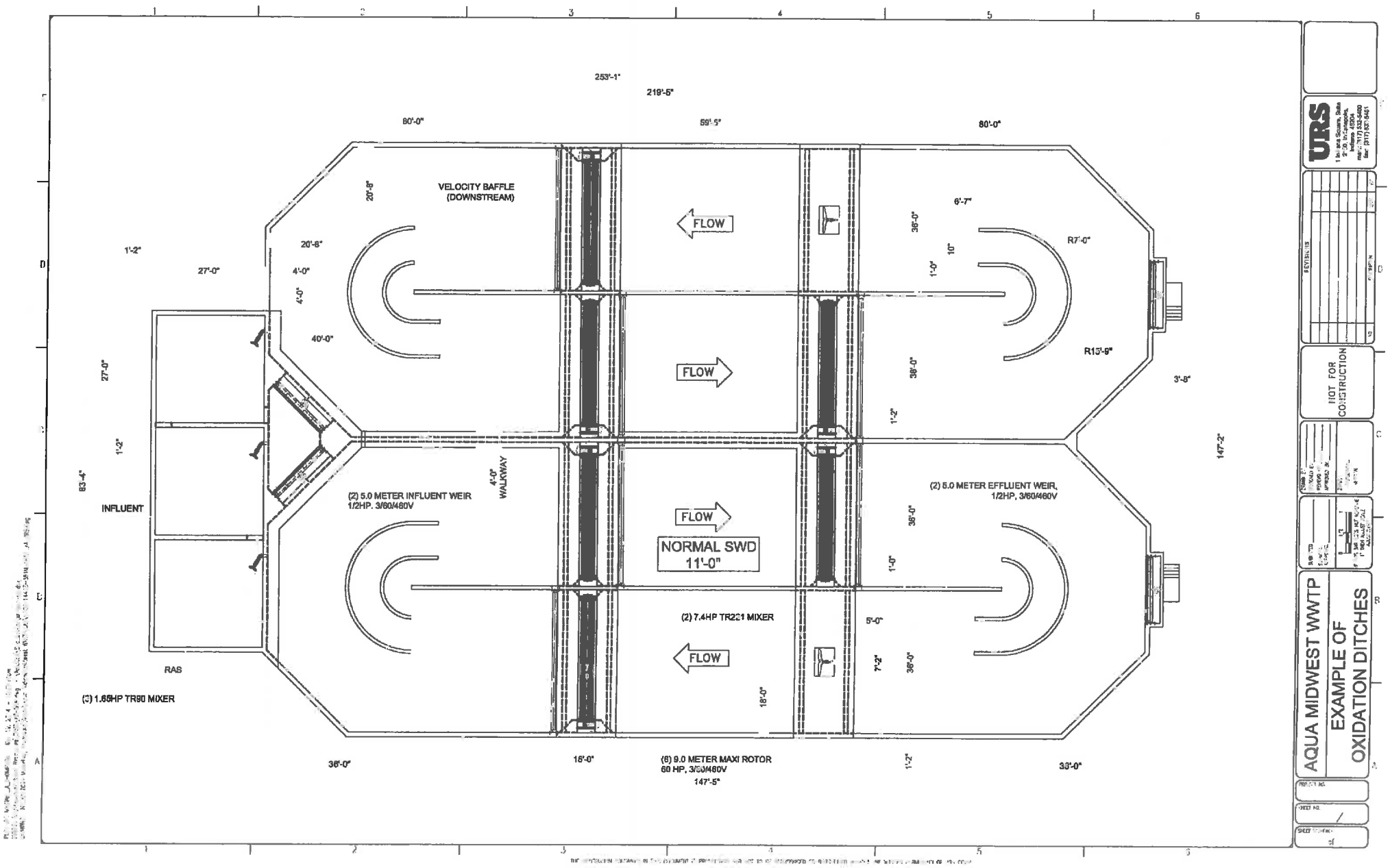
Proposed Engineering Fee Schedule

Basis of Design Report	$19,000
Preliminary Design 30%	$55,000
Final Design	$260,000
IDEM Construction Permitting	$8,200
IDNR Flood Plain Permitting	$15,000
Bidding Assistance	$15,000
IDEM Industrial NPDES Modification	$13,300*

Fee Rate Schedule

Senior Project Manager	$201
Project Engineer	$100
CADD Technician	$77
Architect	$125
Structural Engineer	$150
Electrical Engineer	$150
Mechanical Engineer	$125
Regulatory Advisor	$99
Survey Crew	$169
Administrative Assistant	$56
QA/QC Reviewer	$142
Mileage	*@ current federal rate*

**see cover letter for details*



URS

NOT FOR CONSTRUCTION

AQUA MIDWEST WWTP

EXAMPLE OF OXIDATION DITCHES

STATEMENT OF QUALIFICATIONS

Introduction of Services

URS Corporation is a fully integrated engineering, construction and technical services organization with the capabilities to support every stage of the project life cycle. Our company offers a full range of program management; planning, design and engineering; systems engineering and technical assistance; information technology; construction and construction management; operations and maintenance; and decommissioning and closure services.

We provide these services for the U.S. federal government, national governments of other countries, state and local government agencies in the United States and internationally, and multinational corporations. URS has more than 50,000 employees in a network of offices in nearly 50 countries.

URS provides all the services required to design, build, expand and modernize water resources and other public infrastructure. The URS Indianapolis office offers a muli-disciplined, in-house staff to provide full support for facility design, environmental services, and water resources. Our commitment to client service is the foundation of our business, and we bring a local, hands-on commitment to each project.

Engineering News Record (ENR) ranks URS as one of the Top Design Firms in the US.

Our 2013 rankings are:

- #2 firm in the Top 500 Design Firms
- #1 firm in Green Design
- #2 firm in Environmental Design
- #4 firm in Wastewater/Water Treatment Design

Water Resources

URS capabilities in water resources include:

Planning, Design and Construction/ Rehabilitation

- Wastewater treatment plants
- BNR & MBR
- Pump stations
- Odor control
- Biosolids processing
- Co-generation
- Effluent reuse

Wastewater Studies/Evaluations

- Process evaluation/stress test
- Process modeling
- Operations & maintenance manuals

Regulatory and Compliance Assistance

Wastewater Treatment Plant Capacity Evaluation, Wooster, Ohio

URS was selected by the City of Wooster to perform a capacity evaluation of their 7.5 MGD facility. In 2007, the City completed an expansion of the plant to increase the peak flow capacity from 15 MGD to 27 MGD to maximize treatment capacity during wet weather events. These improvements included a conversion of the existing extended aeration tanks to a five-stage vertical loop reactor (VLR), which provides treatment of the peak flows and is designed for future nutrient limits.

Also, a modified cannibal process was also constructed to reduce the sludge yield from the plant which has proven to be less effective than originally proposed.

Subsequent to start-up of the improvements, the plant had violations of their NPDES permit and the Ohio EPA required that an engineering evaluation be performed of the plant. URS was hired to evaluate each unit process to ascertain where deficiencies existed based on the current organic and hydraulic loading.

URS' work also included a hydraulic model to confirm the 27 MGD peak hydraulic capacity and a GPS-X model to evaluate the process performance. Stress testing in coordination with plant staff was scheduled for the fall of 2011 to calibrate the GPS-X model and to determine the failure point from an organic loading standpoint.

7.8 MGD BNR Facility
City of Logan, Ohio

URS was selected to prepare a wastewater master plan for the City of Logan, Ohio in order to comply with Ohio EPA – NPDES regulations. URS evaluated short-term and long-term wastewater treatment needs for the city over a 20-year planning period. The existing plant had been experiencing peak flows greater than the plant could handle during major rain events, thus causing overflows and plant bypassing.

The project included evaluation of existing trickling filter treatment plant capacities and capabilities and projecting future needs for treatment.

URS developed a list of alternatives ranging from upgrades to the existing facilities, to constructing flow equalization basins, to constructing an entire new treatment plant. Numerous treatment processes were evaluated including oxidation ditch, vertical loop reactor, sequencing batch reactor, membrane bioreactor, and conventional activated sludge.

The WWTP has the following treatment processes:

Screening: a fine screen is provided to remove large particles that could harm downstream equipment as well as smaller trash that would otherwise accumulate in the plant and the biosolids are disposed of at the landfill.

Grit Removal: a vortex grit tank and classifier are provided to remove easily settled solids (gravel to fine sand).

Biological Treatment: a three channel oxidation ditch (operated in series) is provided to biologically treat the sewage and also achieve ammonia and phosphorous removal.

Clarification: two final clarifiers are provided to settle and return the suspended solids to the oxidation ditch.

Disinfection: two banks of ultraviolet (UV) disinfection lamps are provided to reduce pathogens in the clarified wastewater.

Post-aeration: a tank with fine bubble diffusers is provided to raise the dissolved oxygen (DO) concentration of the effluent prior to discharge to the Hocking River.

The Oxidation Ditch is equipped with Siemens Orbal disc aerators. The channels operate in series to allow biological nutrient removal (BNR) to occur by keeping the outer channel in an "aerated anoxic" condition (DO close to zero). This is controlled by the PLC which monitors the oxidation reduction potential (ORP) and adjusts the disc aerator speed as necessary. DO in the inner channel should be maintained at 3.0 mg/L by monitoring the DO concentration and adjusting the disc aerator speed as necessary. The BNR process should produce an effluent with a total phosphorous (TP) less than 1.0 mg/L and total nitrogen (TN) less than 10 mg/L.

Some of the existing clarifiers were converted to digesters and others were reused as biosolids thickeners. This enabled continuous decanting and the allowed the blowers to run continuously instead of turning them off to decant using telescopic valves. The plant belt filter press system was reused for sludge dewatering.

The expansion of the Logan Wastewater Treatment Plant was designed by URS Corporation in 2010. The plant was sized for a maximum day "wet weather" flow of 7.8 MGD. The OEPA issued a Permit to Install for the plant on June 28, 2010. The construction of the plant improvements began in December of 2010, and was placed in operation in July, 2013. The general contractor was Mechanical Construction Inc., Portsmouth, Ohio.

Wastewater Treatment Plant Expansion, Village of Sabina, Ohio

URS provided professional engineering and construction management services to the Village of Sabina for the expansion of their wastewater treatment plant. The purpose of this expansion was to increase the peak hourly treatment capacity of the plant from 1.7 to 4.0 MGD as well as to upgrade several treatment processes. The expansion included a new raw sewage pump station, a screening system, a new 60 foot diameter clarifier, new variable frequency drives for the oxidation ditches, new return sludge pumps, converting a chlorine contact tank to a post aeration tank, a booster pump station, an ultraviolet disinfection tank and electrical improvements.

The plant was designed as part of a multi-phase project which included the Rose Avenue Relief Sewer and the School Pump Station replacement. A Permit to Install (PTI) was issued by the Ohio EPA on May 15, 2012. The construction of the plant improvements began in August of 2012 and, and were completed in July of 2013. The general contractor was Peterson Construction Company, of Wapakoneta, Ohio and the construction management was performed by URS.

The project was funded by an Ohio EPA Water Pollution Control low interest loan and an Ohio Public Works commission grant. URS prepared the funding applications and managed the pay requests to the funding agencies throughout the project.

The project was bid at $2, 293,000 and the final construction cost after change orders was $2,219,358 which was below the construction budget by $73,641. URS also prepared the operation and maintenance manual for this project.

60 MGD Water Pollution Control Plant, Fort Wayne, Indiana

The City of Fort Wayne implemented Phase 1 of the WPCP aeration system improvements project in 2007-2009.

Phase I included replacing roots blower no. 5 with a Turblex blower and upgrades to roots blower no. 3. The city initiated Phase 2 of the aeration system in 2009 by retaining URS to further investigate the existing blower conditions and capacities, as well as investigating existing electrical and control components of the blower equipment.

The findings and recommendations of these investigations are documented in a tech memorandum dated March 4, 2010. The recommendations included in this technical memorandum forms the basis for design which are included in this detailed design phase.

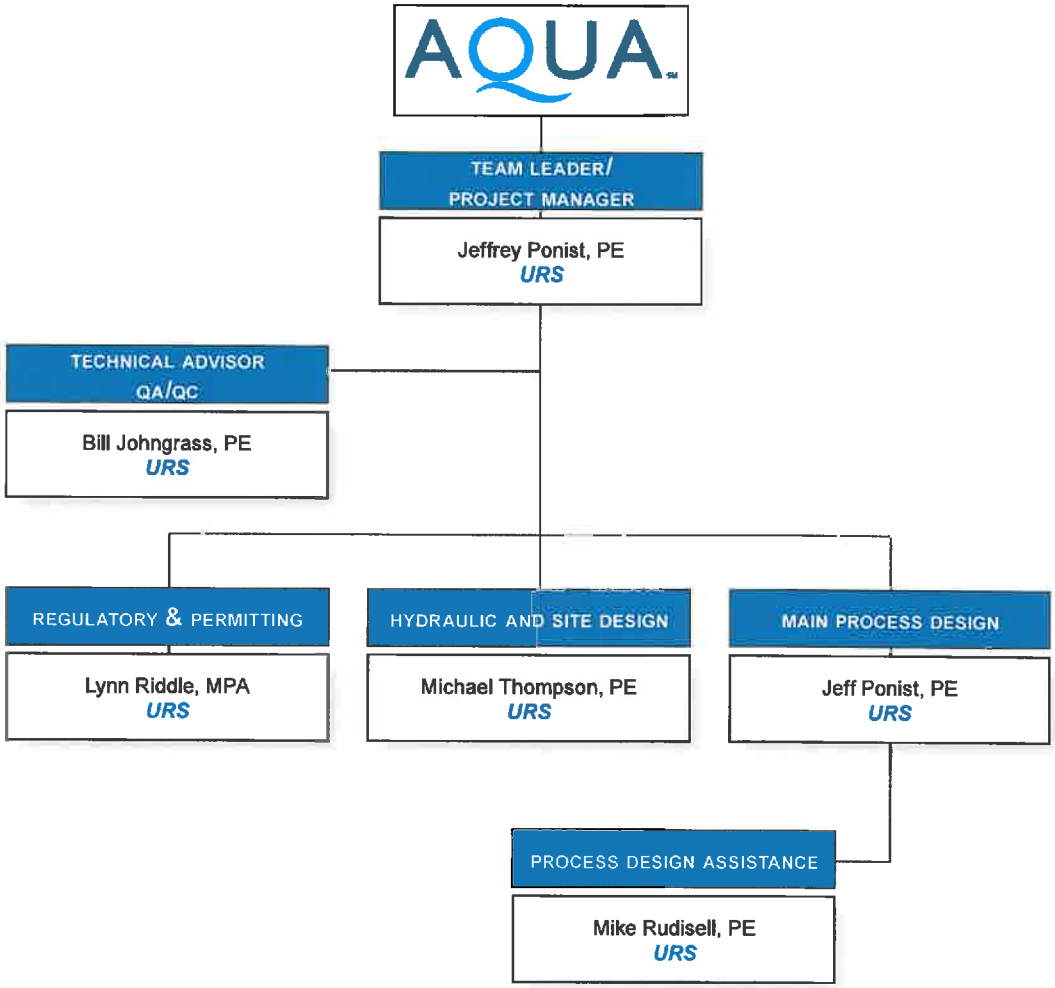
URS provided detailed design, permitting, bidding, construction services, shop drawings and samples, and post construction services.

ORGANIZATIONAL CHART

Outstanding Project Team

This project will be led by professionals in our Indianapolis office, who can call upon specific expertise from within URS, if needed. Proposed team members and a brief reference to relevant project experience follows.

Included as an appendix to this proposal are our team members' full resumes.



Project Manager
Jeff Ponist, PE

Sample Projects:

- **Sewer System Renovation & Rehabilitation, North Vernon, IN, Jennings Northwest Regional Utilities, $17 million**: Replacement of the community sewer collection system, pump stations and treatment plant. This project included the replacement of 26 miles of existing vacuum sewer system and seven pump stations, while maintaining the system in operation. Treatment consisted of an innovative and sustainable process. Total (100% grant).
- **New Wastewater Treatment Facility (Phase I), Town of Princes Lakes, IN, Phase I & II $10 Million:** Replacement of the wastewater treatment plant with a new 2 MGD nitrification process. Project included UV and new Geo Bag sludge dewatering system.
- **Evaluation Study of Wastewater Treatment Facility, Town of Speedway, IN:** Outlined a long-term capital needs assessment for the pure oxygen facility. The planning study led the Town to implement one of the first full scale dual digester (anaerobic/aerobic) processes in the nation.
- **Wastewater Treatment Facility Expansion, City of Decatur, IN, $5.0 million:** Expansion to 7 MGD Nitrification Facility with wet weather screening, new primary screen , new primary and secondary clarifiers. Included conversion of anaerobic biosolids system to Class A ATAD and SNDR process with scrubber and Biofilter.
- **CSO Storage and Treatment Facility (Phase I), Town of Speedway, IN, Total Phase I & II $13 million**: Included new 1.5 MG storage tanks, for 10 year storm event, new UV system and utilization of existing main interceptor for inline storage utilizing new SCADA controls.
- **New Wastewater Treatment Facility, City of Princeton, IN, $8.4 million:** Design and construction of a new 4.5 MGD Biological Nutrient Removal Facility with Gravity Belt Thickeners for WAS, Autothermal Thermophilic Aerobic Digestion (ATAD), Dewatering and 1.3 MGD Pump Station & 5 mile force main from Toyota Assembly plant.

Technical Advisor
Bill Johngrass, PE

Sample Projects:

- **City of Wooster, OH Wastewater Treatment Plant Evaluation:** Performed a capacity evaluation of the 7.5 MGD facility. Completed an expansion of the plant to increase the peak flow capacity from 15 MGD to 27 MGD to maximize treatment capacity during wet weather events. These improvements included a conversion of the existing extended aeration tanks to a five-stage vertical loop reactor(VLR), which provides treatment of the peak flows and is designed for future nutrient limits.
- **City of Logan, OH Wastewater Treatment Plant Improvements:** A list of alternatives ranging from upgrades to the existing facilities, to constructing flow equalization basins, to constructing an entire new treatment plant. Numerous treatment processes were evaluated including oxidation ditch, vertical loop reactor, sequencing batch reactor, membrane bioreactor, and conventional activated sludge.

Hydraulic and Site Design
Michael Thompson, PE

Sample Projects:

- **Indianapolis Belmont & Southport AWT:** Infrastructure assessment and asset management equipment condition assessment.
- **Utility coordinator, Indianapolis Belmont Advanced Wastewater Treatment Plant:** Wet-Weather Secondary Treatment Expansion Project

Regulatory & Permitting
Lynn Riddle, MPA

Sample Projects:

- **Associate Project Manager; CMOM; Evansville, Indiana:** Assisted on the compilation and writing of the Utility's CMOM Program, and associated Project Management tasks. Included in this was a base level fats oils and greases plan and sewer overflow response pan program documentation.
- **Environmental Planner; National Pollutant Discharge Elimination System (NPDES) Permit Application, Indianapolis, Indiana Department of Public Works (DPW):** Preparation of the City of Indianapolis's NPDES Permit application, and relevant sections related to the CSO discharges.
- **Environmental Planner; SRF Applications and PERs:** Provided assistance in response to Federal stimulus programs for Kokomo, Marion, Madison, Washington, and Tell City, Indiana.

Process Design Assistance
Mike Rudisell, PE

Sample Projects:

- **Columbia City WWTP, Columbia City, Indiana, Phase IIA Equalization Basin and Interceptor Sewer Design:** Project engineer responsible for the design of all process systems including a 3.2 MG storage basin, a 40 MGD submersible pump station, coarse bubble aeration blower system, sodium hypochlorite and bisulfite feed systems, and a tipping bucket wash down system.
- **Bunker Hill WWTP, Town of Bunker Hill, Indiana:** Project engineer involved in the development of detailed drawings and specifications for the construction of a wastewater treatment plant. The design included raw sewage influent pumping, fine screening, flow equalization, single stage activated sludge treatment, final clarifiers, aerobic digesters, ultraviolet disinfection, and sludge drying.
- **Plain City WWTP, Village of Plain City, Ohio, WWTP Expansion:** Project engineer responsible for the preliminary design report, preparation of detailed drawings, and specifications for an expansion project at the wastewater treatment plant. The design included additional influent pumping, fine screening, grit removal, oxidation ditches, final clarifiers, aerobic digesters, ultraviolet disinfection, and sludge drying. Tasks also included funding assistance and construction oversight.

Mid-West Wastewater Treatment Facility Basis of Design Report

July 30,2014

Prepared by

URS

AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report

AQUA Indiana Mid-West Wastewater Treatment Facility Basis of Design Report

APPENDIX

A. Preliminary IDEM Construction Permit Application
B. AQUA Completed Basis of Design Check List

AQUA Indiana Mid-West Wastewater Treatment Facility Basis of Design Report

1 General

1.1 Introduction

In 2013, Aqua Indiana, Inc. commissioned a preliminary design study of their existing Mid-Western Wastewater Treatment Facility (WWTP) which was conducted by American Structurepoint. The main purpose was to evaluate the WWTP in order to:

1. Evaluate the condition, hydraulic capacity, and biological capacity of the unit processes at the WWTP.
2. Provide recommended Capital Improvement Plan for the WWTP to allow for acceptance of additional flows and loadings of accepting waste streams known as Coverdale and Junk Ditch.
3. Provide recommendations to meet upcoming effluent phosphorus limits.

In April of 2014, AQUA requested engineering proposals and subsequently selected URS Corporation to proceed with the detailed design of the WWTP expansion. URS recommended adding a new secondary treatment process using Phased Isolation Ditch technology to allow biological nutrient removal (nitrogen and phosphorous) for compliance with potential future NPDES limits as well as modifications to the plan for EQ and sludge storage.

The existing WWTP is a Class III, 1.7 million gallons per day (MGD) average daily flow (ADF), complete mix, single stage nitrification activated sludge facility. The existing treatment process consists of influent pumping, fine screening, complete mix single-stage nitrification biological treatment, two (2) final clarifiers, return activated sludge (RAS)/waste activated sludge (WAS) pump station, clarifier scum pump station, post aeration, ultraviolet disinfection, and an effluent pump station. WWTP effluent is discharged to Graham McCulloch Ditch.

Waste sludge is stored in three aerated sludge holding tanks, and a belt filter press is utilized to dewater the sludge prior to disposal at a landfill.

Under the new NPDES permit, the following requirements are the basis of the new facility:

Parameter	Daily Min	Monthly Avg.	Daily Max	Units
CBOD5		10		mg/l
TSS		10		mg/l
Ammonia-N				
Summer		1.5		mg/l
Winter		2.2		mg/l
Dissolved Oxygen				
Summer	6.0			mg/l
Winter	5.0			mg/l
E.Coli		125	235	cfu/100ml
pH	6.0		9.0	s.u.

AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report

Influent Mercury	report	report	
Effluent Mercury	12	20	ng/l
Phosphorus (projected)	*1.0*	*1.0*	*mg/l*

The purpose of this report is to identify the Basis of Design for the required process expansion/modifications prior to proceeding into the final design phase.

1.2 Major Plant Components

Following the construction of the recommended improvements, the WWTP will be capable of treating 3.2 MGD ADF and 11.0 MGD peak day flow (PDF). The anticipated major design components for the plant expansion and the various modifications will be as follows:

A. Fort Wayne Force Main Metering Vault
B. Increased Pumping Capacity at the existing Influent Pumping Station
C. Influent Mechanical Screen (to be added by AQUA)
D. Two (2) Phased Isolation Oxidation Ditches with Anaerobic Selector Tanks
E. One (1) Final Clarifier to match existing
F. Expansion of the existing UV Disinfection System
G. Modifications to the existing Post Aeration Tank and Effluent Pump Station
H. Conversion of the Existing Aeration Tanks to flow equalization and Waste Activated Sludge (WAS) Storage

See **Figure 1** for proposed process flow schematic.

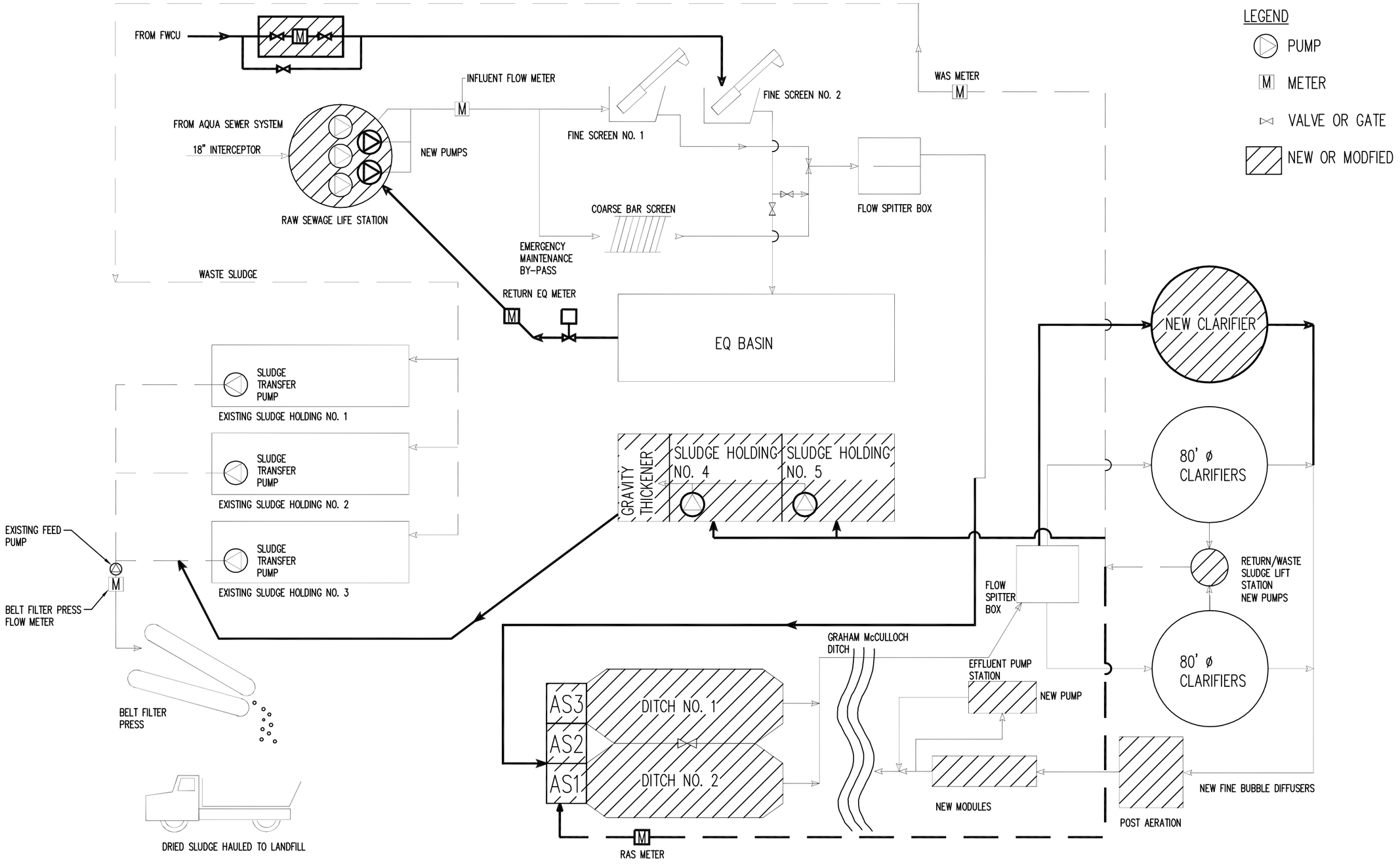
1.3 Design Loadings

The current and future loadings where evaluated based upon the 2013 planning study and the 2013/2014 Monthly Report of Operations (MRO) data.

Based upon the updated MRO data and the past sampling data, the proposed design loading is presented in **Table 1**.

Table 1 Design WWTP Loadings

	Avg. Flows MGD	Peak Flow MGD	cBOD Lbs/day	Surfact Lbs/day	O/G Lbs/day	Phos. Total Lbs/day	TKN Lbs/day	NH3-N Lbs/day	TSS Lbs/day
Existing	1.2	4.7	2071	0		55	230	275	2056
Future	0.5	1.3	842	0		25	104	125	846
Junk Ditch	0.5	2	4712	6.96	841	37	275	104	3252
Coverdale	1	3	525	3.4	132	17	130	92	350
Total	3.2	11.00	8150	10.36	973	134	739	596	6504
Design Concentration (mg/l)			**305**	**0.4**	**36**	**5**	**28**	**22**	**244**



PROCESS FLOW SCHEMATIC

TITLE
AQUA MIDWEST WWTP

URS CORPORATION, INDIANAPOLIS, IN., 317-532-5400

DATE	JOB NO.
07/28/14	
DR.	SKETCH NO.
CK.	FIG. 1

AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report

Section 2 Influent Pumping Station

2.1 Introduction

The Influent Pump Station (submersible type) was built during 2001 Phase I improvements with wet well dimensions of 24'-0" wide x 25'-8" in length with an approximate capacity of 3,500 gallons. Raw sewage is pumped from the Influent Pump Station to the Influent Screening Room. The Influent Pump Station has three (3) Fairbanks Morse submersible, non-clog, pumps equipped with variable frequency drives. Each pump has a design capacity of 2,500 gallons per minute (gpm). The pump station has a firm capacity of approximately 7.5 MGD with two pumps in operation at full speed. Space for two additional pumping units has been provided future expansion. Pump retrieval is conducted by a monorail bridge crane system. The preliminary design report indicated that the existing pumping system experiences significant plugging, therefore, installing two (2) chopper-type pumps for normal daily operation will be considered during design.

2.2 Design Criteria

A. Existing Pumps: 3@ 2,500 GPM (Non-Clog Submersible) (3.6 MGD)
B. Additional Pumps: 2 @ 1,400 GPM (2.02 MGD) @42 Ft TDH (Chopper Type Submersible)
C. New Firm Pump Station Capacity: 11.23 MGD (largest pump out of service)
D. New Maximum Pumping Capacity: 14.8 MGD (to be confirmed during design)

2.3 Equipment List

A. Two (2) Vaughn Chopper Model 6W 25 HP or equal
B. VFD controls Allen Bradley

Section 3 Fort Wayne Connection Vault

3.1 Introduction

AQUA Indiana and the City of Fort Wayne (FWCU) have executed a Wholesale Agreement which will allow treatment of a portion of the City's wastewater. The Agreement outlines various criteria for receiving average and peak flow rates for specific durations, as well as, stipulating requirements for measuring/recording of flows and water quality parameters of the City's wastewater. The City will be installing a force main to the location of a new flow monitoring vault.

3.2 Description

A new vault, referred to as the Fort Wayne Connection Vault (FWCV), will be constructed in the vicinity of the existing Influent Pump Station. The interior of the FWCV will house isolation valves, a 16 inch diameter magnetic flow meter, and meter by-pass line. A designated sampling point for the City's wastewater flow will be located in the existing influent screening channel where the flow discharges. The FWCU force main will directly discharge into the existing influent channel and can utilize a dedicated mechanical screen. Following screening, the FWCU wastewater flow can either be routed to a new flow equalization (EQ) tank or mix with raw sewage at the existing distribution chamber before being sent to the new secondary process. It is the intent to convert a portion of the existing aeration tanks to an EQ tank for this purpose.

3.3 Design Criteria New Metering & Sampling Vault (FWCV)

1. Average Daily Flow: 1,040 gpm (1.50 MGD)
2. Peak Instantaneous Rate: 5,250 gpm (7.56 MGD)
3. Estimated Meter Size: 14 Inch Diameter
4. Force Main Discharge: Influent Screening Channel
    a. EQ Tank
    b. New Secondary Process
5. Sampling Point at Screen Channel

3.4 Equipment List

1. Magnetic Flow Meter: Endress & Hauser, Siemens or equal
2. Vault Isolation Valves: Plug Valve and Check Valve (weight and lever type)
3. SCADA Telemetry: TBD
4. Automatic Sampler: ISCO or SIGMA

AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report

Section 4 Raw Sewage Screening

4.1 Introduction

Raw wastewater is pumped into the influent screening channel from the Influent Pump Station, and following screening, is transported to the distribution chamber via gravity. The raw wastewater is screened in the influent channel by a Helisieve screen manufactured by Parkson Corporation. According to the manufacturer, the mechanical screen is rated for 2.0 MGD average daily flow and 6.5 MGD peak flow. A manual bar screen measuring 36" x 30" is located adjacent to the existing screens to provide coarse screening in the event the mechanical screen's capacity is exceeded during high flow periods.

4.2 System Description

Currently, AQUA is installing an additional Helisieve type screen in parallel with the existing unit for screening of additional flow.

4.3 Design Criteria

A. Average Capacity: 2 MGD per Screen (4 MGD Total)
B. Peak Capacity : 6.5 MGD per Screen (13 MGD Total)
C. Screen Opening: ¼ inch perforations
D. Bypass: Manual Bar Rack

4.4 Equipment List

A. Model S500XL Helisieve Screen by Parkson Corporation
B. Mechanical Screen Control Panel

Section 5 Flow Equalization Basin Conversion

5.1 Introduction

The preliminary design report recommended the construction of a new EQ Tank with a total volume of 500,000 gallons to receive flow directly from the City of Fort Wayne's connection. However, URS recommends the conversion of one of the existing aeration basins to serve as temporary storage of the FWCU flow. Flow control gates will allow AQUA the option of discharging directly to the EQ Tank or to the new secondary process following screening.

5.2 System Description

Flow received from the FWCU system will be metered in the new connection vault and be discharged into the existing screening channel. The detailed design will evaluate utilizing one mechanical screen for the FWCU flow and the other screen for remaining flow. Following screening, the FWCU flow can be directed to either the EQ Basin or to the new secondary treatment process. During the detailed design phase, an evaluation will be conducted to determine which existing aeration tank will be converted to flow equalization. However, for this report, it has been assumed that Aeration Tank No. 2 is planned for this conversion. The existing aeration blowers and diffuser system can be utilized for mixing the EQ Tank contents to prevent odors.

The EQ Tank will include a new flow control vault and level controls to regulate tank return flow to the Influent Pump Station.

5.3 Design Criteria

A. Storage Volume: 507,000 gallons
B. Return Control Meter: 8 Inch magnetic
C. Return Control Valve: 10 inch Pinch Valve with electric actuator
D. Aeration Capacity: 2 @ 2,800 SCFM and 1 @ 800 SCFM
E. Mixing: 30 SCFM/1000 cu. ft. (one blower) 2,000 SCFM at full tank
F. Diffusers: tube style membrane

5.4 Equipment List

A. Magnetic Meter: Endress & Hauser or equal
B. Valves: Plug Valve DeZurik or equal
C. Control Valve: Red Valve or equal
D. Level Instrument: Ultrasonic Endress & Hauser, Siemens or equal

Section 6 Phased Isolation Ditch Secondary Process

6.1 Introduction

The original planning report completed in 2013 recommended modifying the existing aeration tanks into two zones and construction of two additional aeration tanks. In the 2013 planning report, the proposed design loading was established at 28 lbs. BOD5 per 1000 cubic feet per day. This level of organic loading significantly exceeds the typical loading of Ten States Standards and typically what IDEM approves for combined Nitrification systems.

6.2 System Description

URS recommends the implementation of a phased isolation ditch technology called the BIO-DENIPHO biological treatment process for the removal of carbon, nitrogen, and phosphorous. This will include the addition of new anaerobic selector tanks and two (2) new oxidation type ditches. The control system will be programmed to operate the system under two different modes.. The main BIO-DENIPHO® Mode will integrate phased control of the two ditches during normal operation. The AE-DENIPHO mode will be provided for each ditch in the event one of the ditches needs to be taken out of service for maintenance.

A. THREE STAGE ANAEROBIC SELECTOR
The BIO-DENIPHO® system includes a 3-stage anaerobic selector. Submersible mixers are installed in the anaerobic zones to maintain complete mixed conditions without introducing oxygen. The anaerobic environment provides conditions which selects against filamentous growth while promoting the growth of Phosphorus Accumulating Organisms (PAOs).

B. BIO-DENIPHO® PHASE CONTROL
The BIO-DENIPHO® mode involves operating the ditches by sequencing/alternating aerobic and anoxic conditions in each ditch to facilitate nitrification and denitrification. Also, an anaerobic tank is located upstream of the ditches as the first stage where the influent and the return activated sludge are mixed. As the biomass is then exposed to the alternating aerobic and anoxic conditions, the growth of certain micro-organisms capable of 'uptaking' and storing excess phosphorous will be enhanced.

The phasing algorithm controls the operation of all equipment including weirs, rotors, and submersible mixers). Automated influent and effluent weirs control the direction of flow and submergence of the rotors. The automatic control of weir submergence provides reduced energy consumption by matching DO demand. On/Off operation of the rotors controls the alternating aerobic/anoxic conditions. During aerobic phases, dissolved oxygen (DO) control is used to bring individual rotors online or offline to maintain aerobic conditions without over-aerating. Proper sequencing will reduce levels of ammonia-

nitrogen and phosphorous in the plant's effluent. In this mode the process will have a continuous discharge.

If a ditch needs to be taken out of service for maintenance, the remaining ditch can be operated in the AE-DENITRO® mode of operation. In AE mode, flow enters and discharges a single oxidation ditch and two alternating treatment phases are used, nitrification (aerobic) and denitrification (anoxic). The process uses phased isolation ditch technology by alternating between aerobic (nitrification) and anoxic (denitrification) phases in a single ditch to help reduce the effluent's total nitrogen. The phasing works by separating aeration and mixing in the ditch, as well as incorporating automated dissolved oxygen (DO) control.

C. STORM-WATER MODE

The storm water mode can be implemented by the operator or automatically when influent flows exceed a predetermined threshold. The storm water mode incorporates a settling phase in the sequence whereby the rotors and mixers in the ditch that is directly discharging to the clarifiers are shut down. Therefore, the MLSS is allowed to settle in that ditch. By alternating the phase sequence, the wastewater receives biological treatment and the solids distribution remains balanced between the pair of ditches as MLSS temporarily accumulates in the system. This mode prevents washout of the solids in the system due to a temporary high hydraulic loading caused by a storm event.

6.3 Design Criteria

A.	Organic Loading:	23 lbs./1000 cu.ft./day
B.	Anaerobic Selector HRT:	1.5 Hours
C.	Ditch HRT:	17.8 Hours
D.	Total Volume:	2.7MG (361,000 cu.ft.)
E.	Target MLSS:	3,500 ppm
F.	Food/Mass(F/M):	0.16
G.	Effluent Ammonia:	< 1 ppm
H.	Effluent cBOD5:	<10 ppm
I.	Effluent Total Nitrogen:	<10 ppm
J.	Effluent Phosphorus:	<1 ppm

6.4 Equipment List

A.	Anaerobic Selector Submersible Mixers:	3 @ 1.65 HP
B.	Influent Weirs:	2 @ ½ HP
C.	Ditch Rotors:	6 @ 60 HP
D.	Ditch Submersible Mixers:	2 @ 7.5 HP
E.	Effluent Weirs:	2 @ ½ HP
F.	Dissolved Oxygen Meters/ ORP:	2

Section 7 Final Clarifier

7.1 Introduction

There are currently two (2) 80-foot diameter final clarifiers, each with a side water depth (SWD) of 14 feet, built in 2001. Typically, only one clarifier is in operation based current average hydraulic loadings.

7.2 System Description

Based upon anticipated peak hydraulic conditions, a third final clarifier is required.
The new clarifier to be provided will match the existing units' design for sludge collection and withdrawal.
Based on an influent peak hourly rate of 13.1 MGD (15-30 minutes) and a peak RAS rate of 3.5 MGD, the maximum solids loading rate (SLR) will be approximately 32 pounds/sq.ft./day with three clarifiers in service at a design MLSS target of 3,500 mg/l.

However with the Storm Mode operation during the Phased Isolation Ditch process, the peak hydraulic rate capacity may allow higher rates and for longer duration since one ditch will be utilized for solids storage. This may allow the option of utilizing only two clarifiers; however, actual performance will dictate the number of clarifier tanks required to be in service.

7.3 Design Criteria

A. Total Surface Area: 5,027 sq.ft. per tank (Total 15,080 sq.ft.)
B. Weir Length: 251 ft. per tank (Total 754 ft.)
C. Average Daily SOR : 318 GPD/Sq. Ft @ 2 Clarifiers
D. Average Daily SOR : 212 GPD/Sq. Ft @ 3 Clarifiers
E. Peak Hourly SOR : 869 GPD/Sq. Ft @ 3 Clarifiers (< 900 GPD/Sq. Ft required for chemical P Removal)
F. Average Daily SLR: 13-15 Lbs./Sq. Ft/Day (50% RAS and 3,500 ppm MLSS)
G. Peak Hourly SLR: 32 Lbs. /Sq. Ft/Day (< 35 Lbs./Sq. Ft/Day Max. Allowed)
H. Peak Weir Loading Rate at 13.1 MGD: 17,400 gpd/lin. Ft. (<30,000 gpd/lin. ft. required)

7.4 Equipment List

A. Clarifier: Amwell
B. Density Baffles: NEFO or MFG

Section 8 RAS/WAS Pumping

8.1 Introduction

There are currently three (3) sludge pumps installed during the 2001 Phase I improvements which are used for both the return and waste activated sludge. In the sludge wet well, there is space for two (2) additional pumps. The three (3) existing pumps are 10-HP Fairbanks-Morse 6-inch submersible pumps; each pump is rated at 970 gpm at 12 feet TDH. The sludge is either recycled back to the RAS/Influent Splitter Box from the bottom of the clarifier as return activated sludge (RAS) or pumped to the Aerated Sludge Holding Tanks as waste activated sludge (WAS). The RAS/WAS flow is metered by an existing magnetic flow meter on a common discharge pipe. Valves in the yard are positioned to direct WAS or RAS to the Aerated Sludge Holding Tanks or to the RAS/Influent Splitter Box, respectively.

8.2 System Description

The preliminary design report indicated that no additional RAS pumps would be required based on the initial hydraulic analysis. The analysis indicated that the actual output is approximately 2,400 GPM (with two pump operation) and about 1,000 GPM with one pump. This would provide a RAS rate ranging from 51% to 113% of the new Average Design Capacity.

The preliminary design report also recommended two additional pumps for WAS pumping. As part of these plant improvements, it is recommended that two (2) additional pumps equipped with VFD controls be installed to function as either additional RAS units or dedicated WAS pumps. A dedicated WAS line and metering vault is also recommended in the final design.

Further hydraulic analysis will be completed during design to confirm future pump outputs/capacity.

8.3 Design Criteria

A. RAS/WAS Pump Ratings: 3 @ 970 GPM (existing)
B. New WAS Meter: 6 inch Magnetic
C. New WAS/RAS Pumps: 2 @ 970 GPM @ 15 Ft. TDH
D. Maximum RAS Capacity: 150-180% of ADF (4 pumps in operation)

8.4 Equipment List

A. WAS/RAS Pumps: Fairbanks-Morse Submersible
B. VFD Controls: Allen Bradley
C. Flow Meter: Endress & Hauser, Siemens, or equal

Section 9 Post Aeration

9.1 Introduction

The treated effluent is discharged from the clarifiers to the post aeration basin. Coarse bubble (stainless steel tube type) diffusers are currently used to aerate the effluent prior to discharge. The Post Aeration Basin has a gate which can be opened to route the flow directly to the Effluent Pump Station in the event that the ditch is at a high level and pumping is required for discharge.

9.2 System Description

The new design will include replacement of the course bubble diffusers with fine bubble membrane diffusers. Tank dimensions are 30 ft. x 14 ft. with an 8.62-foot side water depth.

9.3 Design Criteria

A. ADF Hydraulic Retention: 12.2 Minutes
B. PDF Hydraulic Retention: 3.5 Minutes
C. Air Demand: 840 SCFM @ 2 CFM/Sq.Ft.

9.4 Equipment List

A. Diffusers: OVIVO AEROSTRIP Ultra-Fine Bubble or equal

Section 10 UV Disinfection

10.1 Introduction

The UV unit at the Mid-West WWTP is a Trojan UV 4000 and was installed in 2003. The unit is self-cleaning. However, the bulbs are also removed once per month and cleaned by hand with a hard water stain removal product. The UV unit currently has two modules in operation with space available for a third module. The UV unit has a current design capacity of 7 MGD and is expandable to 14 MGD. WWTP staff noted that the main disadvantage of the unit has been the high cost of replacement parts.

10.2 System Description

In order to upgrade the existing UV system, the following will be included in the design:

A. Model and Make: Trojan Standard System UV4000TWTM module each with 8 lamps (2x4)
B. Quantity: 2 UV Modules (1 IN & 1 OUT)
C. Material of Construction: 316 stainless steel for all steel parts in contact with effluent 304 stainless steel for all non-wetted steel parts
D. Approximate Weight: 1200 lb. for each complete UV Module
E. System Control Center (SCC): Installed to replace the existing Type M microprocessor
F. Controller Type: Allen Bradley Compact Logix Model L23
G. Operator Interface: Allen Bradley Panelview Plus 700
H. Material of Construction: 304 Stainless Steel with sunshield
I. Enclosure Rating: Type 4X

10.3 Design Criteria

A. Peak Design Flow: 14 MGD
B. UV Transmission: 60 %, minimum
C. Total Suspended Solids: 10 mg/l, monthly average
D. Discharge Limit: 125 *E. coli*/100 ml, 30 day geometric mean

Section 11 Chemical Feed System

11.1 Introduction

We anticipate that the Phased Isolation Ditch technology and anaerobic selectors will be sufficient to achieve compliance with future Phosphorous limits of 1 ppm. However, IDEM has recently required that any Biological Nutrient Removal Facility must provide a chemical feed system for backup.

For the chemical backup system, Polyaluminum Chloride (PAC) or aluminum sulfate solution is proposed for phosphorus removal due to the use of UV Disinfection and the potential to affect light transmission with iron based chemicals.

11.2 System Description

The basis of the backup chemical system is to supplement potential biological upset or performance difficulties. It assumed that under these conditions the biological process will still have the ability to uptake some P to a 50% level but would require chemical addition to meet a future limit of 1.0 mg/l utilizing metal salts.

Typical aluminum sulfate solution concentration is 48-51 percent. This solution freezes at 23 degrees Fahrenheit and has an extended shelf life. A feed rate of between 10 and 15 mg/L would possibly be needed for phosphorus removal assuming the following:

- An inlet total P concentration of 6 mg/L,
- A reduced biological uptake of 3 mg/L,
- An effluent concentration of less than 1 mg/L, and
- Design ratio of 2-3:1 Moles Al to P

11.3 Design Criteria

A. Storage Tank: 1,200 gallons
B. Chemical Feed Pumps: 2@ 10 GPH
C. Injection Point: Effluent from oxidation ditches and Clarifier Splitter Box

Section 12 Sludge Holding Tank Conversion

12.1 Introduction

The existing facility consists of three (3) aerated sludge holding tanks. Two (2) of these sludge tanks are located on the north side of the Control Building, and the third tank is located adjacent to the Screen Room.. In 2001, these aerobic sludge holding tanks were modified by replacing the air diffusion system. In total, the three sludge tanks have a capacity of 120,000 gallons. Sludge holding tanks No. 1 & No.2 are aerated by two blowers rated at 350 SCFM each. The supernatant is removed from the tanks with telescopic valves and returned to head of the plant.

12.2 System Description

The original planning report required the construction of two (2) new 250,000 gallon tanks. URS recommends that one of the existing aeration tanks will be converted to operate in this capacity. This will be accomplished by constructing a dividing wall and modifying the existing aeration system to accommodate the individual tanks. The existing sludge holding tanks will remain for addition storage. With the significant increase in organic loading, there will also be an increase in waste sludge production that will result in extended run time of the Belt Press up to 4-5 times a week. Since no additional volume is required, the existing blower systems should be adequate.

The converted aeration tank will include decanting systems and connections to the Belt Filter Press Pump suction line.

Conversion of the small section of the aeration tank will be evaluated in the design for utilization as a gravity sludge thickener zone prior to dewatering.

12.3 Design Criteria

A. Storage Volume:
   1. 2 @ 215,000 gallons (new/converted)
   2. 2 @ 33,000 gallons (No. 1 & No.2)
   3. 1 @ 54,000 gallons (No. 3)
B. Blower Capacity:
   1. 2 @ 2800 SCFM
   2. 1 @ 800 SCFM
   3. 2 @ 350 SCFM
C. Gravity Thickener: 1 @ 77,000 gallons
D. Estimated Sludge Production: 30,000-40,000 GPD @ 2.5%
E. Estimated WAS Production: 0.90 lbs. MLSS per Lb. of BOD Removed

12.4 Equipment List

A. Decant Devices each tank
B. Existing Blowers
C. Existing Diffusers
D. Submersible Gravity Thickener Transfer Pumps (2)

Section 13 Site Layout

13.1 Flood Plan

The current five acre site west of the WWTP as well as a significant portion of the existing WWTP is located in the 100 year flood plain. The new oxidation ditches and the new Final Clarifier will be located in the flood plain.

During the design and permitting phase, the need to develop a compensatory area onsite may be necessary and will be evaluated.

13.2 Alternatives

To allow for future plant expansion the alignment of the new ditches is proposed to parallel the north property line. The assumption is the setback distance of 327 IAC 3-2-6 of 500 feet applies to new WWTP sites (as stated in the rule) and therefore the expansion is part of the existing WWTP.

See **Figure 2** for site layout.

Section 14 SCADA

14.1 System Description

The existing system is monitored via a proprietary interface provided by SCADATA. The main operator station is located in the Electrical/MCC room.

14.2 New Facility Interface

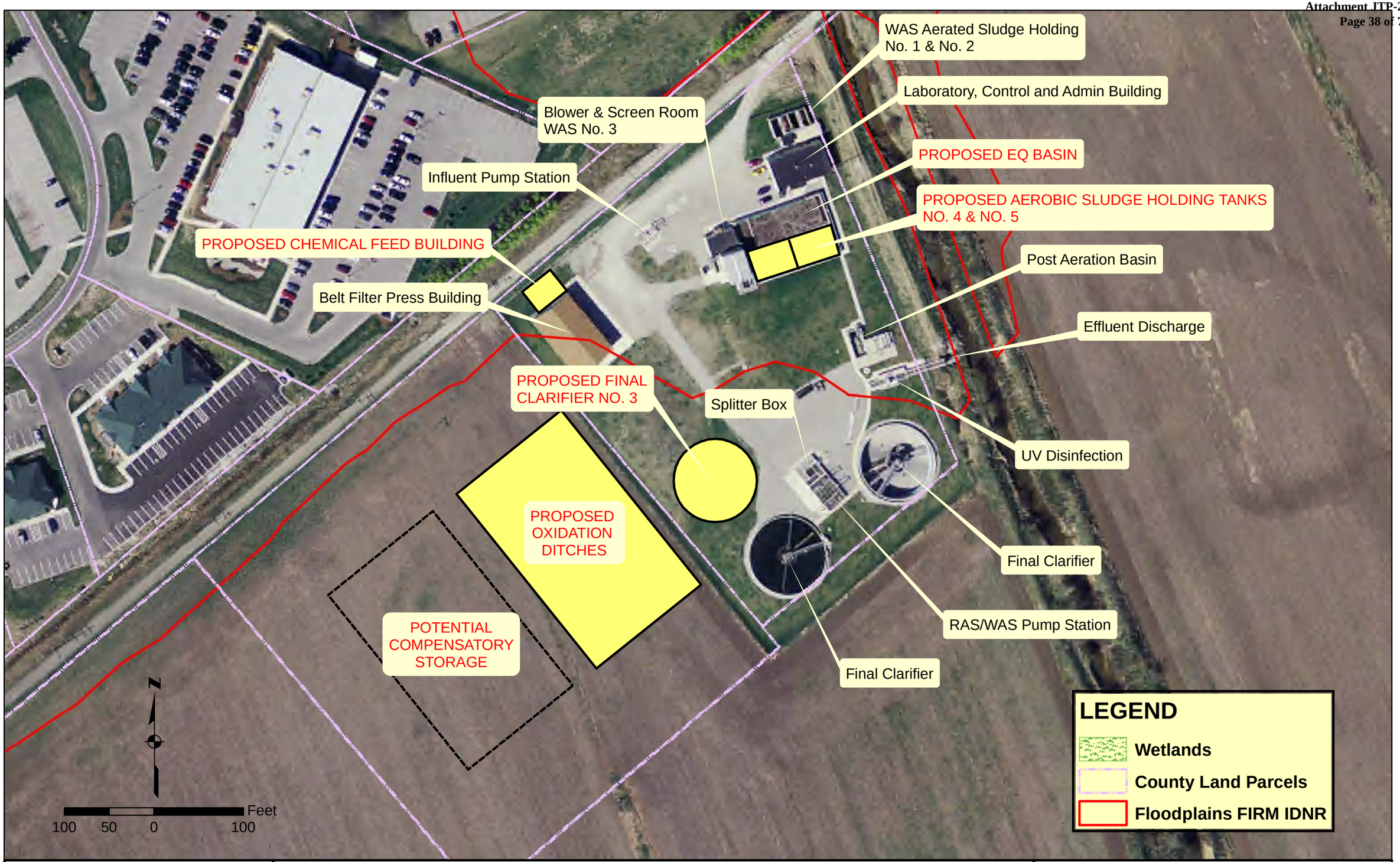
Based upon the proposed new process addition, we are planning to utilize a distributed control method for the following processes:

A. Oxidation Ditches with remote dedicated PLC
B. UV System with remote dedicated PLC

Each process PLC will be networked to the existing SCADA system for monitoring of the process status and alarming.

Section 15 Project Schedule

Based upon our proposal, Figure 3 indicates the anticipated project schedule.



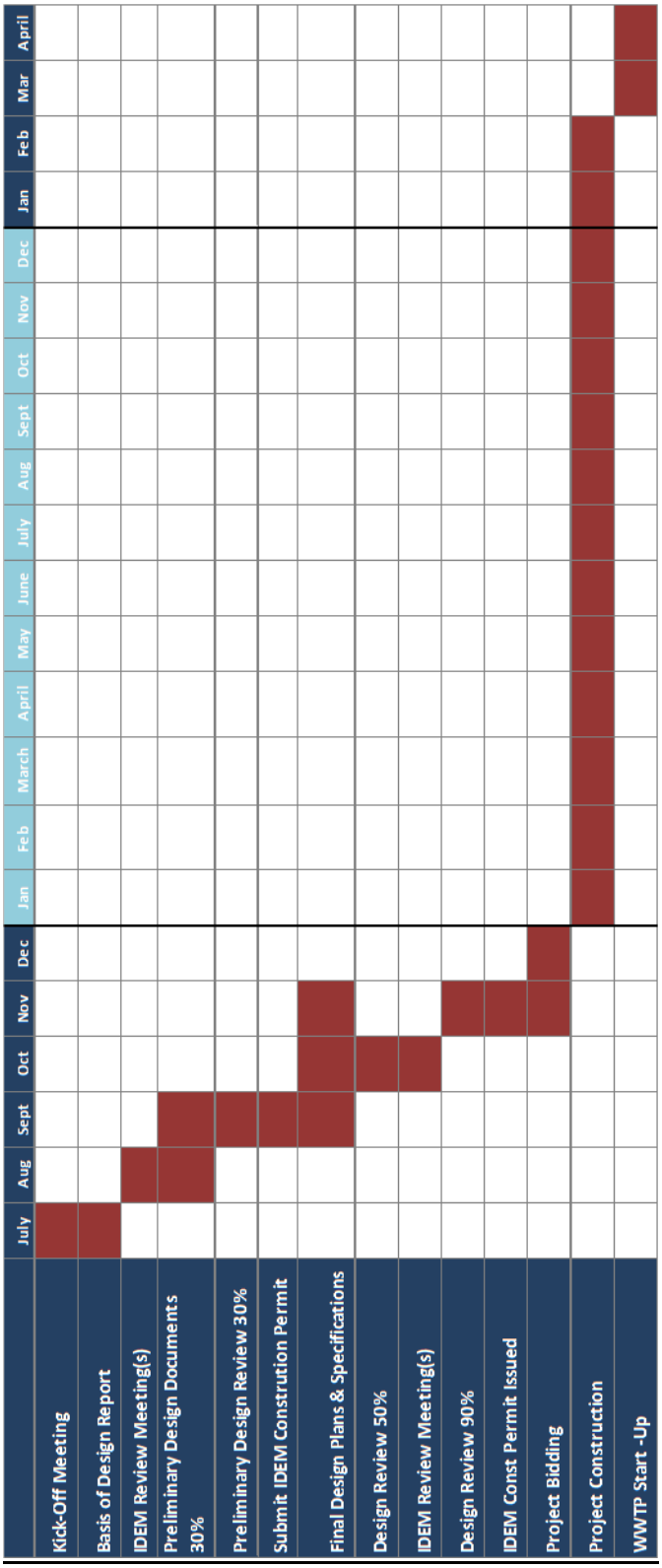
URS

SITE LAYOUT

Aqua Indiana
1111 W. Hamilton Road South
Ft. Wayne, IN 46814

MIDWEST WWTP
FIGURE 2

AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report



AQUA Indiana Mid-West Wastewater Treatment Facility
Basis of Design Report

Section 16 Owner Approval of Report

AQUA Indiana acknowledges that they have reviewed the Basis of Design Report and approve the proposed design concepts and design criteria contained in this document. AQUA acknowledges that the criteria presented in this report will be utilized to design the Expansion of the Mid-West Wastewater Treatment Facility.

AQUA Indiana
Approved by:

_____

Date: _____

URS Corporation
Certified by:

Jeffrey Ponist P.E.
PE 60027401

Date: July 31, 2014

APPENDIX

A. Preliminary IDEM Construction Permit Application

APPLICATION FOR WASTEWATER TREATMENT PLANT CONSTRUCTION PERMIT PER 327 IAC 3

STATE FORM 53160 (R2 / 9-08)
Approved by State Board of Accounts, 2007

Indiana Department of Environmental Management
Office of Water Quality – Mail Code 65-42
Facilities Construction Section
100 North Senate Avenue, room N1255
Indianapolis, IN 46204-2251

INSTRUCTIONS:

1. *This form must be filled out completely.*
2. *Additional pages (attachments following this form) are part of this application form and must be filled out completely.*
3. *Submission of plans, flow charts and/or schematic drawings are part of the application.*
4. *Submit the application form, additional pages, plans and specifications to the above address.*
5. *If you have any questions regarding this application, call IDEM's Office of Water Quality at (317) 232-8670.*

APPLICANT		**APPLICANT'S ENGINEER**	
Name		Name Jeffrey Ponist	
Company Name AQUA Indiana		Company Name URS Corporation	
Address 5750 Castle Creek Pkwy N. Dr. Suite 314		Address One Indiana Sq Suite 2100	
City Indianapolis		City Indianapolis	
State IN	ZIP code 46250	State IN	ZIP code 46204
Telephone number (*including area code*) (317) 577 1390		Telephone number (*including area code*) (317) 532 5443	

NAME AND LOCATION OF PROPOSED FACILTY	**ATTACHMENT CHECKLIST**
Name Mid-West Wastewater Treatment Facility	A. Wastewater treatment plant design summary form: ☒ Yes
Location (*Referenced to two existing streets)*	B. Plans and specifications: ☒ Yes
Location 6811 Engle Road	C. The appropriate fee (if applicable, no fees for state or federal projects): ☒ Yes
Location	D. Identification of Potentially Affected Persons (*see note below*): ☒Yes
City Fort Wayne 46804	E. Mailing Labels for Potentially Affected Persons: ☒Yes
County ALLEN	

Note Regarding item (D) above:
Fully identify all persons, by name and address, who may be potentially affected by the issuance of this permit, such as adjoining landowners, persons with a propriety interest, and/or persons who have complained or submitted comments about your facility. ***Under IC 4-21.5-3-4, IDEM is required to notify potentially affected persons of its permit decision.***

PERMIT APPLICATION FOR CONSTRUCTION, EXPANSION, OR MODIFICATION OF (*Check all that apply*)	**FUNDING**
A. Municipal wastewater treatment facility: ☐Yes	SRF Funding: ☐Yes ☒No
B. Semipublic wastewater treatment facility: ☐Yes	
C. New facility: ☐Yes	
D. Expansion or modification of existing facility: ☒Yes	

CERTIFICATION AND SIGNATURE

Application is hereby made for a permit to authorize the activities described herein. I certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete and accurate.

Printed name of person signing	Title
Signature of Applicant	Date application signed (*month, day, year*)

Please refer to IC 13-30-10 for penalties of submission of false information

Dear Applicant:

To complete your construction application, you must submit **all** of the necessary items. If your application materials are incomplete, you will be sent a deficiency notice, and your application will be retained for 60 days. If the information is not received within the 60 day period your application will be denied due to incompleteness. You can get a copy of this application package on the Internet at: http://www.in.gov/idem/4875.htm or http://www.in.gov/idem/5157.htm#waterforms. Please complete the following steps (only one copy of the requested documents needs to be submitted):

- Complete all the information on the wastewater design summary and certify it with a professional engineer's stamp. The general information, Part I, and design data, Part II, should be completely filled out and also other areas that pertain. Only one copy of the design summary needs to be submitted.

- Submit NPDES limits verification for projects that increase the capacity at the wastewater treatment facility. (This information can be obtained from the NPDES permitting section at 317/232-8760.)

- Enclose the proper processing fee (see attached fee schedule).

- Sign and date the application form and fill it out completely. Municipal projects must be signed by a city or town official. Others, such as private wastewater treatment plant projects can be signed by the owner or a representative. Only one copy of this form needs to be submitted.

- Submit one set of complete plans. Every page must be stamped and signed by a professional engineer.

- List all affected parties. This list should include: officials of affected counties, cities or towns; adjacent property owners; and all other potentially affected parties, their names and mailing addresses. A complete set of mailing labels with the mailing code 65-42FC listed above each name on each label is required.

- Please be advised that if your project will disturb one (1) or more acres of land area, coverage under 327 IAC 15-5 (Rule 5) is required. Rule 5 is the General Permit for Storm Water Runoff Associated with Construction Activity. You can review the Rule 5 web site for information at: http://www.in.gov/idem/4902.html or contact Permits Coordinator at 317/233-1864 for more information.

Please send construction applications to:

Indiana Department of Environmental Management
Office of Water Quality- Mail Code 65-42
100 North Senate Avenue, Rm N1255
Indianapolis, IN 46204-2251
Attention: Don Worley
Telephone number: (317) 232-5579

Wastewater Construction Permit Fees		
A. The applicants listed below must remit with each application a fee of fifty dollars (*$50). These applications must be signed by an official of the entity (*check all that apply*).		
☐	County, Municipality, or Township which is defined as a unit under IC 36-1-2-23	
☐	A Nonprofit Organization	
☐	A Conservancy District	
☐	A School Corporation that operates a sewage treatment facility	
☐	A Regional Water or Sewage District	
*Only pay $50 for a new wastewater treatment plant or expansion of an existing facility.		
B. All other applications will pay the following revised fees per project type:		
New Wastewater Treatment Plant (Except industrial)		
☐	A. Up to 500,000 gallons per day	$1,250.00
☐	B. Greater than 500,000 per day	$2,500.00
New Industrial Wastewater Treatment Plant (Including pretreatment)		
☐	A. Up to 500,000 per day for:	
☐	1. Biological or chemical treatment	$1,250.00
☐	2. Physical Treatment	$250.00
☐	B. Greater than 500,000 gallons per day:	
☐	1. Biological or chemical	$2,500.00
☐	2. Physical Treatment	$250.00
Wastewater Treatment Plant Expansion:		
☐	A. Up to fifty percent (50%) design capacity:	
☒	1. Greater than 500,000 per day	$2,500.00
☐	2. Up to 500,000 per day	$625.00
☐	B. Greater than fifty percent (50%) design capacity	
☐	1. Greater than 500,000 gallons per day	$2,500.00
☐	2. Up to 500,000 gallons per day	$1,250.00
Checks should be made payable to the **Indiana Department of Environmental Management**. Fees shall not be refundable once staff review and processing of the Permit Application has commenced.		

Wastewater Treatment Plant Design Summary

1. General

A. Applicant name: AQUA Indiana

B. Project Name: Mid West WWTP Expansion

C. Location: Fort Wayne

D. Engineer (consultant): URS Corporation

F. NPDES permit number: IN00042391

1. Date of final permit issuance *(month, day, year)*: June 1, 2014

2. Expiration date *(month, day, year)*: May 31, 2019

F. Remarks

1. Description of present situation: Plant Expansion necessary to accommodate additional flow and loadings from AQUA sewer system and City of Fort Wayne connection.

2. Description of proposed facility(s): Expand WWTP to an average daily capacity of 3.2 MGD with new Phased Isolation Ditches and Anaerobic Selector to provide BNR. Peak capacity to be 11.0 MGD

3. Inspection during construction to be provided by: URS

G. Estimated project cost

1. Source of funding (Revenue bond, state grant, SRF, etc.):

2. Total cost: $7 million

H. Certification seal and signature of engineer and date:

	Printed name of engineer: Jeffrey Ponist
	Signature of engineer:
	Date signed *(month, day, year)*:

2. Design Data

A. Current population:

B. Design year and population: 2024

C. Design population and equivalent P.E.: 47,940 at 0.17 lbs. BOD/ PE

D. Design flow:

1. Domestic:

2. Industrial/commercial: 1.5 MGD from FWCU

3. infiltration/inflow:

E. Average design peak flow: 3.2 MGD

F. Maximum plant flow capacity: 11.0 MGD

G. Design waste strength

1. CBOD: 305 mg/l

2. TSS: 244 mg/l

3. NH_3-N: 22 mg/l

4. P: 5 mg/l

5. Other:
2. Design Data *(continued)*
H. NPDES permit limitation on effluent quality
1. CBOD: 10 mg/l
2. TSS: 10 mg/l
3. NH_3-N: 1.5 mg/l summer 2.2 mg/l winter
4. P: N/A
5. E-coli: 125 cfu/100 ml
6. Chlorine Residual: N/A
7. pH: 6-9
8. D.O.: 6.0 mg/l Summer 5.0 mg/l Winter
I. Receiving stream
1. Name: Graham McCulloch Ditch
2. Tributary to: Little Wabash River
3. Stream uses: Full Body Rec
4. 7-day, 1-in-10 year low flow: 0.13 CFS (0.084 MGD)
3. Treatment units *(Fill out the ones that apply and if needed create a new entry that follows the format.)*
A. Plant site lift station
1. Location: WWTP Site
2. Type of pump: Submersible Centrifugal
3. Number of pumps: 3 Existing 2 NEW
4. Constant or variable speed: Variable Speed (VFD)
5. Capacity of pumps: 3 at 2,500 GPM (3.6 MGD) at 42 ft. TDH 2 at 1,400 GPM (2.02 MGD) at 42 ft. TDH
6. RPM and TDH: 1150 RPM at 42 ft. TDH
7. Volume of the wet well: 3,500 gallons
8. Detention time in the wet well: 1.6 min.
9. A gate valve and a check valve in the discharge line: YES
10. A gate valve on suction line: N/A
11. Ventilation: YES
12. Standby power: YES
13. Alarm: YES
14. Breakwater tank: N/A
15. Bypass overflow: N/A
B. Flow equalization
1. Number and size of units: 1 at 507,000 gallons
2. Method of flow diversion to unit: Gravity
3. Air and mixing provided: Fine Bubble at 30 SCFM/1000 cubic feet (2,000 SCFM full)
4. Method and control of flow return: Auto control valve and meter
5. Description of unit operation: Flow from FWCU will be directed to EQ after Screening or sent to Secondary Treatment to be selected by operator.
6. Lagoon sealing: N/A
7. Method of sludge removal: Gravity drain to Main Lift Station
C. Flow meters
1. Type: New; Magnetic Full Body
2. Location: RAS, EQ Return, FWCU Flow,
3. Indicating, recording and totalizing: YES
D. Grit chamber
1. Type of grit chamber: N/A
2. Number of units:
3. Size of unit:
4. Method of velocity (aeration) control:
5. Velocity (aeration) in the chamber:
6. Drain provided:
7. Flow restrictions:
8. Facilities to isolate:

3. Treatment units *(continued)*
E. Comminutors
1. Type: N/A
2. Location:
3. Maximum capacity:
4. By-pass (overflow) bar screen:
F. Screens
1. Type: Perforated
2. Number and capacity: 2 at 6.5 MGD each
3. Bar spacing and slope: ¼ inch
4. Method of cleaning: Automatic
5. Disposal of screenings: landfill
G. Primary settling
1. Type of clarifier: N/A
2. Number and size of units:
3. Surface settling rate (gpd/sf)
a. At the design flow:
b. At the influent pumping rate:
c. At the equalized flow rate:
4. Detention time (hrs):
5. Type of sludge removal mechanism
6. Weir overflow rate:
7. Disposition of scum:
8. Location of overflow weir:
9. Facilities to isolate:
H. Activated sludge
1. Type of activated sludge process:
2. Number and size of units:
3. Detention time (hrs):
4. Organic loading (lb BOD/1000 cf):
5. Type of aeration equipment:
6. Type and size of blowers:
7. Air required (itemize, dfm):
8. Provisions of speed adjustment:
9. Air provided:
10. Ventilation in the blower room:
11. Number and capacity of return sludge pump:
12. Method of return sludge rate control:
13. Return sludge rate as % of design flow:
14. Provisions for return rate metering:
15. Location of return sludge discharge:
16. Facilities to isolate units:
17. Facilities for flow split control:
I. Oxidation ditch
1. Number and size of units: Phased Isolation Ditches with Anaerobic Selectors
2. detention time (hrs): 20
3. Organic loading (lb BOD/1,000 cf): 22.6
4. Type and efficiency of aeration equipment (lb 0/HP-hr):
5. Oxygen required:
6. Oxygen provided:
7. Flow velocity in ditch: Min 1 FPS
8. Number and capacity of return sludge pump: 3 Existing at 970 GPM 2 NEW at 970 GPM
9. Method of return sludge rate control: Telescopic Valves

3. Treatment units *(continued)*
10. Return sludge rate as % of design flow: 175%
11. Provisions for return sludge metering: YES
12. Location of return sludge discharge: Anaerobic Selector
13. Facilities to isolate units: YES
14. Facilities for flow split control: N/A
J. Trickling filters
1. Number and size of units:
2. Type of media:
3. Hydraulic loading (gpm/cf):
4. Organic loading (lb BOD/1,000 cf):
5. Recirculation:
6. Ventilation:
K. Rotating biological contactor
1. Size and number of units:
2. Type of media:
3. Detention time (min.):
4. Organic loading (lb BOD/1,000 sf):
5. Hydraulic loading (gpd/sf):
6. Method of shaft drive:
7. Supplemental air:
8. Facilities to isolate:
9. Facilities for flow split control:
L. Sequential batch reactors
1. Type of activated sludge process:
2. Number and size of units:
3. Detention time (hours):
a. Low water level:
b. High water level:
c. Total cycle:
4. Organic Loading (lb BOD/1,000 cf)
a. At low water level:
b. At high water level:
5. Type of aeration equipment:
6. Type and size of blowers:
7. Air required (itemize, cfm):
8. Provisions of speed adjustment:
9. Air provided:
10. Ventilation in the blower room:
11. Number and capacity of waste sludge pump:
12. Decanter rated at average flow (GPM):
Decanter rated at peak flow (GPM):
13. Facilities to isolate units:
14. Facilities for flow split control:
M. Lagoons
1. Type of lagoons:
2. Number and size of lagoons:
3. Organic loading:
4. Type of aeration equipment (if applicable):
5. Type and size of air blowers (if applicable):
6. Air required (if applicable):
7. Air provided (if applicable):
8. Controlled discharge facilities:
9. Maximum water level:

PART OF STATE FORM 53160 (R2 / 9-08)

3. Treatment units *(continued)*	
10. Freeboard:	
11. Soil boring data and permeability date:	
12. Slope of embankment and top width:	
13. Fence:	
14. Detention time:	
15. Stream gage:	
16. Lagoon seal:	
17. Facilities for multi-level lagoon discharge:	
18. Scum control:	
N. Secondary clarifier	
1. Type of clarifiers:	Circular Center Feed
2. Number and size of units:	2 Existing at 80 Ft Diam. x !4 ft. SWD 1 NEW 80ft. Diam. X 14 ft. SWD
3. Surface settling rate (gpd/sf):	
a. at the design flow:	318 at two clarifiers 212 at three clarifiers
b. at the influent pumping rate:	Peak Hourly 866 with three clarifiers
c. at the equalized flow rate:	
4. Detention time (hrs):	11.8 at ADF 2.9 at Peak Hourly Flow (13.1 MGD)
5. Type of sludge removal mechanism:	Rotating scraper arms with sludge withdrawal pipes
6. Weir overflow rate:	4,246 gpd/ft at 3.2 MGD (ADF) 17,400 gpd/ft. Peak Hourly (13.1 MGD)
7. Disposal of scum:	to Sludge Holding Tanks
8. Facilities for unit isolation:	YES
9. Facilities for flow split control:	YES
O. Constructed wetland	
1. Design flow:	
2. Type of wetland:	
3. Type of solids removal/pretreatment:	
4. Number and size of cells:	
5. Number of zones per cell:	
6. Surface area of each zone:	
7. Organic loading:	
8. Liner:	
9. Detention time:	
10. Type of media:	
11. Media depth:	
12. Media void rate:	
13. Operating capacity:	
14. Length/width ratio:	
15. Type of plants:	
16. Expected % of BOD and NH3-N removal:	
17. Recirculation:	
18. Dosing tank information:	
a. Dimensions:	
b. Capacity:	
c. Pumps:	
P. Rapid sand filtration	
1. Number and size of filters:	
2. Filtration rate:	
a. at peak flow rate:	
b. at average flow rate:	
3. Type, depth, and gram size of filter media:	
4. Backwash rate:	
5. Air scour:	
6. Capability to chlorinate ahead of the filter:	
7. Backwash pumps (number and capacity):	

3. Treatment units *(continued)*
8. Method of rate control:
9. source of capacity of backwash water:
10. Holding capacity or dirty water tank:
11. Facilities for unit isolation:
Q. Micro-strainers
1. Number and size of strainers:
2. Screen material:
3. Filtration rate:
4. Backwash rate:
5. Number and capacity of backwash pumps:
6. Facilities for unit isolation:
7. Slime control provisions:
R. Two-day lagoon
1. Number and size of lagoon cells:
2. Detention time (days):
3. Type of chemical:
4. Location of chemical injection:
5. Number and size of chemical storage tank:
6. Rate adjustment capabilities:
7. Capacity of chemical storage tank:
8. Capacity of spill storage tank:
9. Expected daily use of chemical (dosage and solution):
10. Lagoon seal:
11. Parallel or series operation:
12. Sludge removal facilities:
13. Method of draining:
14. Multi-level discharge:
15. Scum control:
S. Post-aeration
1. Type of aeration: Fine Bubble NEW
2. Number of units: one
3. Size of units: 30 ft. x 14 ft. x 12ft SWD
4. Aeration provided: 840 SCFM
5. Expected effluent DO: 7 mg/l
T. Nitrification system
1. Type of nitrification system: Multi Stage Phased Aerobic & Anoxic
2. Ammonia loading: 22 lbs./day
3. Additional oxygen demand:
4. Air supply system: See Oxidation Ditch Section
5. Hydraulic detention time: 20 hrs.
6. Mean cell residence time (days): 15-20 days
U. Phosphorus removal facilities
1. Type of chemical to be used: Alum Based
2. Location of chemical injection: Final Clarifier Splitter Box
3. Number and size of chemical feed pumps: 2 at 10 GPH
4. Size of chemical; storage tank: 1,200 gal.
5. Capacity of spill storage space: 1,200
6. Chemical dosage: 10-15 mg/l
7. Daily chemical consumption expected: Zero based on BNR process
8. Rapid mix tank: N/A
9. Slow mixing equipment: N/A
10. Other facilities – describe:

3. Treatment units *(continued)*
V. Disinfection
1. Type of disinfectant used:
2. Size of contact tank:
3. Contact time:
4. Type of disinfectant feeders:
5. Capacity of the feeders:
6. Disinfectant dosage:
7. Scum control baffle:
8. Source of the disinfectant feed water:
9. Breakwater tank for the feed water:
10. Bypass:
11. Drain for tank:
12. Ventilation in chlorine room:
13. Safety equipment:
W. De-chlorination
1. Chemical used:
2. Type of feeders:
3. Capacity of feeders:
4. Dosage:
5. Type of diffuser:
6. Diffuser location:
7. Equipment location:
8. Ventilation provided:
9. Safety equipment:
X. UV disinfection
1. Type: Open channel High Intensity
2. Location: After Post Aeration
3. Size of channel: 32 ft. 4.25 ft. x 8.8 ft. SWD
4. Contact time:
5. Dosage:
6. Bypass:
7. Safety equipment:
8. Cleaning equipment:
9. Intensity Monitoring:
Y. Sludge thickening
1. Number and size of thickeners: 1
2. Type of sludge thickeners: Gravity
3. Hydraulic loading:
4. Solids loading:
5. Provisions to chlorinate: No
Z. Anaerobic digesters
1. Number and size of units:
2. Total volume:
3. Organic loading:
4. Hydraulic detention time:
5. Volume per capita:
6. Type of mixing:
7. Heating: ☐ internal or ☐ external
AA. Aerobic digesters
1. Number and size of units: 2 @ 215,000 (NEW) 2 @ 33,000 gallons 1 @ 54,000 gallons
2. Detention time:
3. Organic loading:
4. Air supply: 2 @ 2800 cfm, 1 @ 800 cfm 2 @ 350 cfm
5. Decanting method:

3. Treatment units *(continued)*
BB. Wet-oxidation
1. Number of units:
2. Type of heat treatment:
3. Temperature and pressure to be used:
4. Capacity of the unit:
5. Daily sludge production for heat treatment:
CC. Sludge drying beds
1. Number and size of drying beds:
2. Filter area per capita:
3. Under-drain system:
4. Discharge location of filtrate:
5. Accessibility of dry sludge removal equipment:
DD. Mechanical dewatering
1. Type of dewatering units: Belt Filter Press
2. Number and size of dewatering units: 1 @ 2 meters
3. Capacity of dewatering units: 250 gpm
4. Daily solids production for dewatering: 6000 lbs/day
5. Type of chemicals to be used: Polymer
EE. Sludge disposal
1. Ultimate disposal method of sludge: landfill
2. Expected solids content of sludge (by the principal method of disposal): 18-22%
3. Location of disposal site: National Serv-All
4. Ownership of the disposal site: Private
5. Availability of sludge transport equipment: Contract service with Republic Services
4. Sewer Collection System
A. Lift Stations
1. Location:
2. Type of pump:
3. Number of pumps:
4. Constant or variable speed:
5. Capacity of pumps:
6. RPM and TDH:
7. Volume of the wet well:
8. Detention time in the wet well:
9. A gate valve and a check valve in the discharge line:
10. A gate valve on the suction line:
11. Ventilation:
12. Standby power:
13. Alarm:
14. Breakwater tanks:
15. Bypass or overflow:
16. Type of force main:
17. Diameter and length of force main:
B. Sewer
1. Type of sewer material:
2. Diameter and length of sewer (indicate length for each size):
3. Stream, highway, and railroad crossing:
4. Separation of combined sewer or new sewer:
5. Number of manholes:
6. Water main protection:

4. Sewer Collection System *(continued)*
C. Individual grinder pumps
1. Location:
2. Number of pumps:
3. Capacity of pumps:
4. RPM and TDH:
5. Volume of the wet well:
6. A gate valve and a check valve in the discharge line:
7. Ventilation:
8. Alarm:
5. Miscellaneous
A. Laboratory equipment: Existing
B. Safety equipment: Existing
C. Plant site fence: Yes
D. Handrail for the tanks: YES
E. Units, unit operation, and plant bypasses:
F. Flood elevation (10, 25, or 100 year flood):
G. Provisions to maintain the same degree of treatment during construction: YES
H. Standby power: YES
I. Site inspection:
J. Statement in the specifications as to the protection against any adverse environmental effect
(e.g., dust, noise, soil erosion) during construction: YES
K. Hoists for removing heavy equipment: YES
L. Adequate sampling facilities: YES
M. Hydraulic gradient: 10.75 Ft.
N. Septage receiving facilities
1. Screening:
2. Location of discharge:

IDENTIFICATION OF POTENTIALLY AFFECTED PERSONS

Please list any and all persons whom you have reason to believe have a substantial or proprietary interest in this matter, or could otherwise be considered to be potentially affected under law. Failure to notify a person who is later determined to be potentially affected could result in voiding our decision on procedural grounds. To ensure conformance with Administrative Orders and Procedures Act (AOPA) and to avoid reversal of a decision, please list all such parties. The letter on the opposite side of this form will further explain the requirements under the AOPA. Attach additional names and addresses on a separate sheet of paper, as needed.

Name		Name	
Address (*number and street*)		Address (*number and street*)	
City		City	
State	ZIP	State	ZIP

Name		Name	
Address (*number and street*)		Address (*number and street*)	
City		City	
State	ZIP	State	ZIP

Name		Name	
Address (*number and street*)		Address (*number and street*)	
City		City	
State	ZIP	State	ZIP

Name		Name	
Address (*number and street*)		Address (*number and street*)	
City		City	
State	ZIP	State	ZIP

CERTIFICATION

I certify that to the best of my knowledge I have listed all potentially affected parties, as defined by IC 4-21.5-3-4.

Proposed facility name	Printed Name
City	Signature
County	Date (*month, day, year*) / /

IDENTIFICATION OF POTENTIALLY AFFECTED PERSONS *(CONTINUED)*

To: Applicant

Subject: Identification of Potentially Affected Persons

The Administrative Orders and Procedures Act (AOPA), IC 4-21.5-3-4, requires that the Indiana Department of Environmental Management (IDEM) give notice of its decision on your application to the following persons:

- Each person to whom the decision is specifically directed,
- Each person to whom a law requires notice be given.

IC 13-15-3-1 requires IDEM to provide notice of receipt of a permit application to the following:

1. **The county executive of a county affected by a permit application,**
2. **The executive of a city affected by a permit application,**
3. **The executive of a town council of a town affected by a permit application.**

Under IC 13-15-3-1 (b) IDEM is requesting information necessary to provide such notice to the appropriate officials.

Attention:

Since June 17, 1999, mailing labels are required to be submitted with your project. Having these labels with your application is helpful to you as well as our office. These mailing labels need to have the names and addresses of the affected parties along with our mailing code (which is 65-42FC) listed above each affected party listing.

For Example: 65-42FC
JOHN DEERE
111 CIRCLE DR
YOUR CITY IN 44444

B. AQUA Completed Basis of Design Check List

BASIS OF DESIGN REPORT

GUIDELINE CHECKLIST FOR DEFINING

PROJECTS REQUIREMENTS

AQUA Indiana Midwest Wastewater Facility

CATEGORY	RESPONSE or REFERENCE
PROJECT MANAGEMENT	
Drawings	
Eng D (22"x34")	Arch D (24”x36”) & 11”x17”
Eng E (34"x44")	
Other	
Title Block	
AutoCad	DWG files saved to 2010
MicroStation	No
Final Quantity	2 sets each
Electronic Backup	DWG and PDF
Stamp Drawings	
Other	
Specifications	
Contract Conditions (Div 0)	
AE Contract Docs (Div 0)	
EJCDC Contract Docs (Div 0)	
Client Contract Docs (Div 0)	
Insurance Requirements	
Bonding Requirements	
Liquidated Damages	
SDBE Contracting Rights	
MBE Requirements	None
Construction Completion Date	12/31/2015

Stamp Specifications	
General Conditions (Div 1)	
Construction Working Hours	7:00 AM – 5:00 PM
Interface to Existing Operations	Mark Aurich, Facility Supervisor
Utilities	Water, electric available
Safety	Aqua Contractor Safety program
Security	Restricted access to facility buildings
Sanitary	To be provided by contractor
Technical Specifications (Div 2-17)	
CSI	
AIA	
AE	
ISA Data Sheets	
AE Mech Data Sheets	
Client Mech Data Sheets	
"Or Equal"	
Word for Windows	Yes
WordPerfect	No
Other?	
Binding	
Electronic Backup	Word, PDF
Final Quantity	2 sets each
Other	
Project Management Plan	
Short Form (<$100,000)	
Long Form (=/>$100,000)	
Other	
Progress Reports	
Contents	Milestone completion; % complete; due date
Monthly	Yes
Weekly	Monday on-site work schedule meetings
Other	
Client Reviews	
BODR	Yes
30%	Yes
60%	Yes
90%	Yes
Other	

Accounting	
Invoice by Acct Period	
Invoice Monthly	Yes
Other	Estimate for accruals due 3rd of each month

PROCESS	
Process Flow Diagrams	
Mass Balance	Yes
Flow Balance	Yes
Hydraulic Profile	Yes
Other	

CIVIL	
Survey	
Horizontal Control	IN83EF
Vertical Control	NAVD88
Site Bench Mark	
USGS Reference	
Permits	
SCS	
DOT	Construction – use PEL dated 1/2/2014
IDNR/Corps	
IDEM	
FEMA (Flood Plain)	
Local Utilities	
Other	
Zoning	
Site Zoning Jurisdiction	N/A
Constr Setbacks	
Front	
Back	
Left	
Right	
Deed Restrictions	
Parking Requirements	
Review Agencies	
Fire District	
Other	

Roadways	
Traffic Patterns	To be directed on-site
Vehicle Requirements Load Rating Pavement Materials Curb & Gutter Storm Water Drainage Asphalt Mix Design Foundation Design Max Gradient Min Width Min/Max Crown Min Curve Radii Signage Required	
Site Work	
Site Finish Grade Elev	
Landscaping Grass Type	Park Mix
Stone Type	#53 finish grade
Laydown Area	Gravel areas only
Spoil Area	TBD
Borrow Area	-
Sidewalk Width	36”
Underground Utilities	
Tie-ins to Existing	Per code / standard
Tie-ins by... Min Cover Marking Pre-cast Manholes Pre-cast Elec Pullboxes Encasement Bedding Criteria Compaction Criteria	Tracer wire for piping Yes Access to junction boxes, slightly above grade
Erosion Control	
Review Agency	
Erosion Standards	

Design Storm Event	
Design Storm Duration	N/A
Design Storm Frequency	
Storm Water Detention	
Storm Water Trmt/Monitoring	
Fencing	
Height	Match existing (believed to be 8')
Barb	Yes
In/Out Angle	Out angle
Gates	New gate southwest side back (10' roller gate)
Security	
Materials	Galv. steel
Battery Limits	
STRUCTURAL	
CONCRETE (incl FOUNDATIONS)	
Concrete Materials	Per code / standard
Water Bearing Class	
ACI Code	
Non-water Bearing Class	
ACI Code	
Equip Pads Class	
Cement Class	
Reinforcing Materials	
Finishes	
Chamfer Corners	
Fillet Corners & Edges	
Grout	
Rubbed	
Coatings	
Forms	
Design Criteria	
Soil Bearing Capacity	
Seismic Zone	
Wind Loads	
Snow Loads	
Uplift Loads	
Water Bearing Concrete (psi)	
Non-Water Bear Concrete (psi)	

Misc Concrete (psi)	
Waterstop Size	
Waterstop Type	
Isolated Equip Foundations	
Wall Penetrations - Wet	
Wall Penetrations - Dry	
Codes	
SBC	
UBC	
BOCA	
Local	
Other	

STRUCTURAL STEEL (incl FRAMING)	
Framing Welded	Per code / standard
Anchor Bolts	
Shop Primer	
Welder Certification	
Plant Hot Work Permit	To be approved by Facility Supervisor
Pipe Rack	
Galvanized	Yes
Fiberglas	No
Painted Steel	No
Type	
Horiz Spacing	
Vert Spacing	
Support Types	Uni-strut galvanized; stainless pipe clamps
Insul Allowance	Yes, where necessary
Materials Handling	
Overhead Cranes	
Conveyors	
Other	
Stairs	
Galvanized	
Fiberglas	
Painted Steel	
Aluminum	Yes
Handrails	

Galvanized	
Fiberglas	
Painted Steel	
Aluminum	Yes
Platforms	
PSF Loading	Per code / standard
Checker Plate	Yes – above liquid
Grating	Yes – above grass / non-liquid
Galvanized	
Fiberglas	
Painted Steel	
Aluminum	Yes
Kick plates	Yes
Other	

MECHANICAL	
PROCESS	
Tanks	Per code / standard
Service	
Steel	
Concrete	Yes – to be discussed
Coatings	
Above Ground	
In Ground	
Leak Detection	
Vapor Control	
Pressure Rating	
Codes	
Overfill Protection	
Freeze Protection	
Insulation	
Piping	Per code / standard
Service	
Materials	To be discussed
Pressure Class	
Double Wall	
Leak Detection	
Flanged	
Welded	

	Threaded	
	Expansion Fittings Gaskets Freeze Protection Marking/Tagging Color Codes Support Spacing	Yes – industry standard
Valves		Per code / standard
	Service	
	Materials Pressure Class Type Operator Fail Safe By-pass Marking/Tagging Gaskets	Resilient wedge gate/knife valve Wastewater – open right ; Water – open left Color coded
Pumps & Blowers		Per code / standard
	Service	
	Materials Max RPM Type Noise Control Local Valves Suction Isolation Discharge Isolation Check Valve Type PI Isolation Sample Ports Drains Flush Points Local Ctrls & Monitoring Pressure Indicator Start/Stop HOA Elec Disconnect Vibration Meter Temp Meter	

XP	
VFD	
Gaskets	
Freeze Protection	
Insulation	
Heat Tape	
Impedance Type	
Steam	
Doghouses	
Other	
Gas Detection	
Type	
Areas	
Odor Control	
Type	
Areas	
PLANT UTILITIES	
Plant Water	Yes
Plant Air	Yes
Plant Instr Air	No
Fuel Oil	No
Natural Gas	Yes – main bldg., press bldg.
Fire Water Loop	Yard hydrants
Plant Steam & Condensate	No
HVAC	
Design Criteria	N/A
Elevation (altitude)	
Relative Humidity	
Temperature	
HVAC Type	
Steam	
Hot Water	
Forced Air	
Heat Pump	
Electric Resistance	
Air Conditioning	
Humidity Control (dry/wet)	
Occupied Areas	

Air Changes per Hour	
Min Temp Max Temp Min Humidity Max Humidity HVAC System	
Process Areas	
Air Changes per Hour	
Min Temp Max Temp Min Humidity Max Humidity HVAC System	
Fire Protection	
Design Criteria	N/A
Coverage Area	
GPM/Sq. Foot	
Type	
Dry	
Wet Sprinklers Flush Mount Std Mount	
ARCHITECTURAL (Buildings)	
Building Type	
Structural Steel Frame	N/A
Pre-Engineered Metal Siding Cast-in-Place Tilt-up Pre-cast Panels Masonry Wood	
General	
Codes	
SBC (southeast) UBC (west) BOCA (northeast)	

NFPA	
Factory Mutual (FM) Industrial Risk Insurers (IRI) OSHA Local Plant Water Potable Water Process Water Welding Receptacles Air Receptacles Handicap Access Unisex Restroom	
Laboratory	
Hood	N/A
Oven Incubator No. Sinks D.I./Distilled Water Bench Air Bench Vacuum Bench Gas Safety Shower/Eye Wash Sta	
Roof	
Multi-Ply	N/A
Standing Seam Precast Panel	
Insulation Type	
Doors/Hardware	
Type	N/A
Trim Insulation Security	
Windows	
Type	N/A
Trim Insulation Security	
Occupied Areas	

Wall Finishes	N/A
Ceiling Finishes Floor Finishes Color Schemes	

Process Areas

Wall Finishes	N/A
Ceiling Finishes Floor Finishes Color Schemes	

ELECTRICAL

POWER DISTRIBUTION

Design Criteria	Per code / standard
Frequency	
Fractional HP Less Than Fractional Voltage Non-Fractional Voltage Short-Circuit Analysis Lighting Voltage Lightning Protection	
Transformer	
Oil Filled	
Pad Mounted	
Switch Gear	
Secondary Feeder	
Emergency Generator	On-site 1100 kw Caterpillar diesel
What Motors	
0Prime Mover Type Auto/Manual Restart Balanced/Synchronized Restart Inrush Control Fuel Storage Capacity Fuel Storage Type Day Tank Capacity	
MCCs	Existing Cutler Hammer; VFD – Allen Bradley

	Horiz Bus Rating	
	Vert Bus Rating Neutral Bus Feeder Entry Point Breakers Molded Case Thermal Overload Magnetic Overload Lockout Location Additional Lockouts NEMA Rating	All equipment lockout/tagout capable
Meters		
	Voltage	
	Current kW Demand Power Factor	Amp meter for each phase
Wiring		Per code / standard
	Cable Tray	
	Conduit Duct Bank Spares Materials Shielding Support Spacing	
Panels		Match existing
	NEMA Rating	
	Materials Switch/Light NEMA Rating Explosion Proof Power Supply to Prim Elem Cable Entry Point Cooling Surge Protection Isolation Indicating Light Colors Spares	
Motors		Wash down motors as required

Service Factor 1.15	
High Efficiency	When applicable
RTD	
TEFC	
Class	
Division	
Quality Standard	
Junction Boxes	
Grounding	Per code / standard
Rod	
Delta	
Lighting	
Mercury Vapor	No
High Pressure Sodium	No
Flood	
Local	
Site Lighting Criteria	Use high efficiency LED – smart sensor, manual switch
Interior Lighting Criteria	
Fluorescent	
Incandescent	
Controls	
Photocell	
Manual Switch	
Cathodic Protection	
Sacrificial Anode	
Impressed Current	
Plant Communications	
Commercially Avail	Yes - cellular
In-Plant Secure	
PBX	
Paging	
Security System	
Computer Based	Phone line (intrusion alarms)
Card Access	
CCTV	
Vehicle Control	
Pedestrian Control	
Fire Detection	Yes – MCC room

Hazardous Gas Detection	

Other

INSTRUMENTATION

Control Philosophy

DCS	
SCADA PLC RS-232 Topology Single Loop Ctrl Interlock Philosophy Valve Actuation Local Ctrl Panels Main Ctrl Panels Alarms Recorders Indicators Annunciators Graphic Panel Instr Power UPS Primary Element Standard Control Element Standard Controller Standard Other Vendor Std	Use SCADATA system – control computer on-Site. No remote control. Must acknowledge/ Reset alarms on-site. Dial out alarms from remote auto dial service To cell phones. On radio sending units and master computer.

P&ID Nomenclature	
ISA	
Client Std Instr Loop Nomenclature Piping Nomenclature Equip Nomenclature	

AFFIRMATION

I affirm, under the penalties for perjury, that the foregoing representations are true.

James T. Parks
Indiana Office of Utility Consumer Counselor

June 24, 2016
Date

Cause No. 44752
Aqua Indiana, Inc.
Aboite Wastewater Division

CERTIFICATE OF SERVICE

This is to certify that a copy of the foregoing ***OUCC Testimony of James T. Parks: Public's Exhibit No. 3*** has been served upon the following counsel of record in the captioned proceeding by electronic service on June 24, 2016.

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