5. Promote street tree planting to help preserve the residential character and tree-lined streets of the City.

6. Promote safe management of disposal of all waste materials, both hazardous and non-hazardous, which are generated within or transported through the City through coordination with state and local agencies to ensure that contaminated sites are returned to an acceptable environmentally safe condition.

7. Reduce noise and air pollution and site lighting levels so as to minimize their impact on residential areas.

8. Continue to concentrate efforts on wellhead protection and groundwater quality to protect this vital community resource through the protection program initiated by the City.

9. Protect the water quantity and quality of the City's rivers, streams, groundwater, springs, lakes, ponds, wetlands, and creeks, particularly the Huron River and Mill Creek, as a single interconnected hydrologic system.

10. Continue to monitor and improve the City's wastewater treatment and stormwater management systems to minimize negative impacts on City residents, the Huron River and Mill Creek.

11. Utilize progressive stormwater management and erosion control techniques to ensure that development will not adversely impact natural resources and surrounding property. Incorporate Federal Phase II Stormwater Requirements and Guidelines into planning review process of the City.

12. Encourage the use of best management practices and low impact development (LID) strategies to minimize stormwater run-off.

Recreation / Open Space

Provide various passive and active recreational opportunities for all residents of the City including programs and activities offered by the City and other agencies.

Objectives:

1. Meet present and future community needs for parks, greenways, trails and recreation by planning and developing a system of parks, greenways, open space and recreation facilities and encouraging the preservation of green space and the development of new parks and/or recreation assets when opportunities arise.

Transportation

Provide a variety of safe, efficient modes of transportation to meet the needs of City residents and visitors.

Objectives:

1. Maintain a transportation network that maximizes the capacity of existing roads while maintaining roadways and facilitating safe and efficient movement of vehicles and pedestrians throughout the Village.

2. Continue to evaluate and resolve issues with Village "through traffic" constraints by coordinating and cooperating with the County Road Commission.

3. Evaluate the impact of traffic generated by existing development and new or expanded land uses, including extractive uses, and work toward improvements, compatibility with other existing and planned uses, and safety concurrent with new development and uses.

4. Continue to implement access management standards for new development in order to improve the function and appearance of local streets, streetscapes and alleys; providing adequate rights-of-ways and appropriate improvements for traffic volume.

5. Encourage new streets to be designed in an interconnecting network with flexibility within the neo-traditional residential pattern, similar to the existing street network.

6. Coordinate transportation improvements with the County Road Commission and state agencies, including participation in Washtenaw Area Transportation Study (WATS).

7. Provide a variety of transportation choices including public transit and non-motorized transportation, and areas for bike parking.

8. Expand upon existing connections to create a City-wide, non-motorized network to provide opportunities for pedestrian activity such as walking, jogging and bicycling.

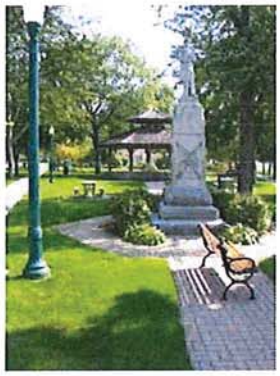
Community Facilities + Services

Provide timely, efficient and quality governmental services to City residents.

Objectives:

1. Provide and maintain open space, parks and recreation facilities to meet the needs of Village residents as formulated in the Parks and Recreation Master Plan.
2. Work with adjacent municipalities and Washtenaw County to provide area residents with high quality community services and facilities.
3. Provide adequate level of services regarding police, fire and safety services.
4. Provide adequate and affordable sewer and water service for Village residents.

5. Provide a public restroom facility in the Downtown area.
6. Provide adequate storm and seasonal services to Village residents.
7. Initiate stormwater upgrades as necessary and investigate whether a stormwater utility would be cost-effective for the Village.
8. Work with adjacent communities, Washtenaw County Water Resources Department, and the Huron River Water Shed Council to protect the area watershed.
9. Evaluate impact of new development and new and expanded land uses on community services and facilities, such as police, fire, and parks, and work to ensure there are adequate regulatory tools and resources available to support new development and uses while protecting existing and planned uses and environmental quality, in particular where uses involve a higher risk of release, discharge, or spill of hazardous substances, pollutants, or similar substances.



Light Industrial

Intent: The Future Land Use Map establishes only one (1) area for Light Industrial use. This designation is intended to allow the continued operation of the current industrial uses.

Description: The Light Industrial area is located along Huron River Drive in the northeast corner of the City.

Relationship to Physical and Natural Features: Direct access to this area is provided via Huron River Drive. Municipal sewer and water are also available within this area.

Appropriate Uses: Desirable land uses and elements of the Light Industrial category are:

- Light manufacturing, assembly, packaging, and testing facilities that provide:
  - Abundant landscaping
  - Screening of services and loading areas
  - Landscape buffering to protect adjacent residential uses
- Oil and gas exploration and development, and similar extractive activities, to the extent the activities and uses are: sufficiently setback from incompatible uses, such as residential, office, commercial, recreation/conservation, and environmentally sensitive areas and natural resources; and the ancillary activities and uses generating potential nuisance effects such as traffic, lights, vibration, and noise will not be incompatible with surrounding existing or planned uses.

Land intensive industrial uses should not be permitted within the City limits due to the associated off-site impacts that have the potential to significantly detract from the quality of life in the City's residential neighborhoods.

Compatible Zoning Districts: The I-1, Light Industrial zoning district is compatible to the Light Industrial future land use classification.

Research/Development

Intent: The Research/Development land use classification provides for a diverse range of wholesale, parts assembly, high-tech industry, research facilities, laboratories and light fabrication operations.

Description: The Future Land Use Map designates two (2) areas for Research/Development use. The Dexter Business and Research Park is located south of Dan Hoey Road and is a subdivided industrial park targeted toward research and development activities. A second Research/Development area is located between Second Street and the Railroad. In this area, the Research/Development designation is intended to allow the continued operation of its current uses.

Relationship to Physical and Natural Features: Utilities are available throughout the Dexter Business and Research Park development area, and soils are generally good for building construction. A woodlands buffer exists to the south of the industrial park providing screening from uses within Scio Township.

The area between Second Street and the railroad has access via Second Street with proximity to rail available to the rear. Municipal sewer and water are also available within this area. Additional screening of the existing facility is appropriate due to its proximity to an established single-family neighborhood.

Appropriate Uses: Desirable land uses and elements of the Research/Development category are:

- Wholesale, parts assembly, high-tech industry and light fabrication operations that provide:
  - Well-designed circulation systems
  - Supportive facilities such as utilities
  - Abundant landscaping, screening of services and loading areas
  - Landscape buffering to protect adjacent residential uses.
- Oil and gas exploration and development, and similar extractive activities, to the extent the activities and uses are: sufficiently setback from incompatible uses, such as residential, office, commercial, recreation/conservation, and environmentally sensitive areas and natural resources; and the ancillary activities and uses generating potential nuisance effects such as traffic, lights, vibration, and noise will not be incompatible with surrounding existing or planned uses.

Compatible Zoning Districts: The RD, Research and Development, zoning district is compatible to the Research/Development future land use designation.

Public/Semi-Public

Intent: The Future Land Use Map designates uses such as existing and planned municipal buildings and facilities, parks, churches, cemeteries, public schools, and other uses providing public or semi-public services within this category. The Master Plan also designates areas for additional neighborhood parks in the City to assist in meeting the recreational needs associated with future population increases and the

2010, a Tree Replacement Account was set up with a significant contribution from the United Methodist Retirement Community for tree removal that occurred as part of the Cedars of Dexter site development. When considering land to be annexed, saving existing natural features and protecting habitats should be a priority.

The Village's northeastern border along the Huron River remains the most naturally preserved. This section of town is within the Village's Public Park Zone, as can be seen in the City zoning map. The Public Park Zone has the greatest potential for becoming a link to the Washtenaw Counties regional greenway system due to its location adjacent to the Huron River and the abundant natural resources and recreation opportunities available.

The Mill Creek within the City provides residents with considerable access to natural resources. The Mill Creek, just west of downtown, was re-established in 2008 following the removal of the dam built by Henry Ford in 1932. In 2011-12 the City will begin the process of reclaiming the former dam impoundment into the Mill Creek Park with assistance from several grants, general funds and Washtenaw County Parks. Stream restoration efforts, habitat enhancement, boardwalks, fishing and observation decks, boat launches, an amphitheater and stone seating areas will be constructed within Mill Creek Park. Washtenaw County Parks and Huron Clinton Metropolitan Authority (HCMA) will also complete a portion of the Border-to-Border Trail north of the City by the fall of 2012. A subdivision connector to the Westridge Subdivision will also be completed in 2011. The combined trails north and east of the City will compile over fifteen (15) miles of non-motorized pathways around the Village's borders. The Mill Creek Park and the newly accessible areas will remain a place for wildlife to subsist and for residents and visitors to enjoy.

The City of Dexter is within the scenic and natural open areas of the Middle Huron River Watershed, which consists of plans to further develop the existing natural areas within the City to enhance the small town feel. The Village's goal is also to provide wildlife habitat and recreation opportunities for City residents and guarantee that the resources that exist today continue to be preserved into the future.

Water Resources

The Huron River and its largest tributary, the Mill Creek, encircle the City of Dexter. The Huron River constitutes primarily the northern border of the Village, with some minor exceptions. The Mill Creek is the west border of the Village, although a site condominium project (Westridge of Dexter) was also annexed beyond the Mill Creek. It is essential to the health of these water bodies to conserve and protect

water quality and quantity and to regulate in a manner that recognizes that groundwater, springs, creeks, streams, lakes, ponds, and wetlands are a single interconnected hydrologic system.

The Huron River Watershed Council (HRWC) is staffed with experts in the fields of watershed management, river ecosystems and river habitats. The HRWC provides information on watershed management and protection and organizes community groups and volunteers for river clean-up days and other habitat monitoring and restoration projects. The HRWC is a regional organization that the City participates with and is a member of, although the HRWC has taken the lead in the conservation and education of the river and its tributaries.

The Village, as well many communities along the middle stretch of the Huron River, is under a total maximum daily load for phosphorous into the Huron River. The City is working to address this through a cooperative effort with other impacted municipalities to reduce loading.

School Facilities

Dexter Community Schools are ranked in the top twenty percent (20%) of schools within the State of Michigan. The Dexter Community School District campus size has also dramatically increased in the past decade along with the Village's population. In 1998, two (2) new schools were built, Cornerstone Elementary and Mill Creek Middle School, and in 2002 a new high school opened.

Dexter Community School facilities include: two (2) kindergarten through second grade elementary schools (Bates and Cornerstone); one (1) third and fourth grade elementary school (Wylie); one (1) fifth and sixth grade intermediate school (Creekside); one (1) seventh and eighth grade middle school (Mill Creek); and Dexter High School for grades nine through twelve. The City collaborates with the school district on many initiatives given that a majority of the school's campus is located within the City limits.

Implementation

The Master Plan is essentially a statement of goals and objectives designed to accommodate future growth and redevelopment. As stated in the introduction of this document, the Master Plan is the officially-adopted document that sets forth an agenda for the achievement of goals and policies. It helps develop a balance of orderly change in a deliberate and controlled manner that permits controlled growth. As such, it provides the basis upon which zoning and land use decisions are made.

The Plan forms the philosophical basis for the more technical and specific implementation measures. It must be recognized that development and change will occur either with or without planning, and that the Plan will have little effect upon future development unless adequate implementation programs are established. This section identifies actions and programs that will be useful if the Plan is to be followed.

A variety of programs or administrative tools are available to allow the Plan to succeed. These include:

Zoning Requirements

Zoning is the development control that has been most closely associated with planning. Originally, zoning was intended to inhibit nuisances and protect property values. However, zoning should also serve additional purposes that include:

* To promote orderly growth in a manner consistent with land use policies and the Master Plan.
* To promote attractiveness in the Village's physical environment by providing variation in lot sizes, architectural design guidelines and appropriate land uses.
* To accommodate special, complex or unique uses through mechanisms such as planned unit developments, overlay districts, or special land use permits – specifically within the areas designated for mixed use in order to allow complimentary uses and design guidelines.
* To guide development away from conflicting land uses (i.e. industrial uses adjacent to residential areas).
* To preserve and protect existing land uses, natural resources, air, land, water, and other significant natural features in accordance with the Master Plan.
* To promote the positive redevelopment of underutilized areas of the Village.

* To balance the increased interest in activities and land uses related or ancillary to oil and gas exploration and development with other community goals to ensure the uses occur in a manner consistent with other existing and planned uses, and in a manner that protects the open space, natural resources, recreation, and other priorities in the City.

The Zoning Ordinance and Future Land Use map by themselves should not be considered as the major long range planning policy of the Village. Rather, the Master Plan should be regarded as a statement of planning policy, and zoning should be used to assist in implementing that policy.

Zoning Adjustments

Certain areas of the City have been designated for a land use classification in the Master Plan which conflicts with either existing zoning or existing land uses. These designations were developed in order to guide the desired development of these areas. Certain areas may benefit from a Village-initiated rezoning in order to provide more consistency. Additionally, other areas may continue with an existing zoning designation that, although currently conflicting with the Future Land Use designation, may be rezoned in the future once the existing use terminates or conditions change. It is at this future time the land use recommendations will provide guidance as to the proper zoning. The City Planning Commission should further study and make decisions with regard to which areas warrant Village-initiated rezoning. The following should be considered for Village-initiated rezoning:

1. Encourage new residential developments to provide contiguous internal recreational amenities.
2. Modify the CBD zoning district to ensure redevelopment, increased viability, adequate parking, walkability and the reuse of the upper floors of the existing structures.
3. Create a tree preservation ordinance.
4. Create a Huron River, Mill Creek overlay zone to ensure natural feature preservation.
5. Evaluate the adequacy of the noise, air and light standards of the Zoning Ordinance.
6. Create provisions requiring bike parking for government, commercial and educational institutions.
7. Evaluate likely potential effects of mineral, sand and gravel, and oil and gas exploration and development, on the public health, safety, and welfare; and review existing zoning and other police power ordinances to ensure they balance the need for those sues with their effects on other existing and planned uses in a manner that furthers and protects community goals and priorities, including land use, land preservation and

the protection of natural resources and water quantity and quality, transportation, and safety and community facilities and services.

Adopt land development regulations that provide standards and regulations specific to various elements within the Village:

1. Develop Stormwater Management Regulations that comply with Phase II and encourage use of Best Management Practices.
2. Adopt regulations that recognize the connection of groundwater and surface water, and include limitations that protect, and prevent pollution, impairment or diminishment of, the quantity and quality of available water resources, including aquifers, springs, rivers, creeks, ponds, and wetlands, for existing and future water needs for residential recreation, commercial, industrial, and for protection and preservation of water bodies and their natural resources and uses.
3. Review City Ordinances to ensure the City is sufficiently reviewing and collecting data and information regarding the likely effects of land uses on the public health, safety, and welfare, including the effects on the City's environmental and natural resources.
4. Review ordinances to ensure the City requires sufficient disclosure of information and permits, with sufficient conditions, to allow the fire and police to provide an emergency response adequate to protect the public health, safety, and welfare to the spill or other release of hazardous or other dangerous substances or pollutants during transport of use.
5. Create development design guidelines as a means of preserving the existing architectural character of the Village. The emphasis of the guidelines shall be placed upon major renovation projects and new construction.
6. Work to create incentives for the maintenance and rehabilitation of the existing residential structures, such as Rental Rehabilitation and Façade Rehabilitation programs through the MEDC.
7. Continue coordination with the Washtenaw County Brownfield Authority and upon identifying a site, adopt a Brownfield Redevelopment Plan.
8. Pursue a property maintenance ordinance, a component of which would recognize property owners who further the historic character of the Village.
9. Continue to coordinate a Village-wide path system that requires developers to construct a pathway and/or contribute to the system which links new residential developments to downtown, local parks and/or schools.

OFFICE OF THE CITY MANAGER
8140 Main Street • Dexter, Michigan 48130-1092 • (734) 426-8303 • Fax (734) 426-5614

Memorandum

To: Mayor Keough and City Council

From: Courtney Nicholls, City Manager
Dan Schlaff, Public Services Superintendent

Re: Maximum Allowable Headworks Loading Study

Date: March 9, 2016

In 2013 the City of Dexter contracted with Fleis & Vandenbrink to perform a Maximum Allowable Headworks Loading (MAHL) Study for the Wastewater Treatment Plant. The purpose of the study is to determine the capacity of the plant to deal with certain components of the waste stream, such as phosphorous and BODs. A copy of the current draft plan is attached.

Though the study was substantially completed, it was never formally approved by the State of Michigan Department of Environmental Quality (MDEQ). We expect to receive a review letter from Deb Snell of the MDEQ with some follow up questions on the phosphorous limits. We would also like to update the document with actual data from the recently completed sludge project and data from the soon to be completed blower replacement project.

Finalizing the document and getting approval by the State will increase our allowable loading capacities. A summary that shows the amount of the proposed increases is attached based on the 2013 report. These could change based on the updated data.

F & V has submitted a not to exceed quote of $3,400, which includes one review meeting with the State of Michigan and attendance at one meeting with Council to discuss the results.

Staff is requesting that Council approve the proposal from F & V so that we can get the document updated, finalized and approved by the State. The funds to pay for the update will come from Sewer – Professional Services – 590-548-802-000.

MEMO

To:	**Courtney Nicholls** **City of Dexter**
From:	Elaine Venema, PE **Fleis & VandenBrink**
CC:	**Dan Schlaff, City of Dexter** **Blair Selover, FVOP**
Date:	**2/2/2016**
Re:	**Comparison of Current and Proposed MAHL & Local Limits**

Table 1 presents the design basis on file with the MDEQ (from the 1998 project) compared to the Maximum Allowable Headworks Loading (MAHL) determined by F&V in 2013. The table also shows that the City's current average BOD5 loading is near the 1998 design basis.

Table 1 – Proposed Standard Local Limits for Non-Domestic Users

Parameter	1978 Design Basis (lb/d)	1998 Design Basis (lb/d)	Proposed MAHL (lb/day)	Avg WWTP Influent (2015) (lb/d)	Current Avg NUBCO (lb/day)
BOD5	1329	975	**1495**	923	437
TSS	1208	1288	**1583**	799	35.4
Phosphorus	N/A	N/A	**40.8**	22.1	5.1

Table 2 is a comparison of the current concentration based local limits and the proposed local limits.

Parameter	Avg WWTP Influent (2013) (mg/L)	Current Limit (mg/L)	Proposed Monthly Avg (mg/L)	Proposed Daily Max (mg/L)	Proposed Alpha Metals (mg/L)	Proposed* Avg NUBCO (lb/day)
BOD5	311	300	550	550	550	280
TSS	247	350	600	1,000	350	216
Phosphorus	6.5	16	12	12	16	1.5

*NUBCO's current discharge permit includes a lower BOD5 (150 lb/d) and TSS (100 lb/d) limit than proposed as part of the 2013 MAHL work

The 2013 MAHL also evaluated non-compatible pollutants. Table 3 provides a comparison of the City's current local limits for non-compatible pollutants and the proposed limits.

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com

Table 3 – Draft Standard Local Limits – Non-compatible Pollutants

Parameter	Avg WWTP Influent (2013) (mg/L)	Current Local Limit (mg/L)	Proposed Monthly Avg Limit (mg/L)	Proposed Max Daily Limit (mg/L)
Arsenic*	0.0012	0.08	0.042	0.044
Cadmium	0.00013	0.013	0.034	0.069
Chromium, Total	0.0072	0.50	0.514	1.59
Chromium, Hex.		0.10	0.325	0.325
Copper	0.202	0.94	0.266	0.266
Cyanide*	0.0025	0.10	0.105	0.148
Lead	0.0026	0.20	0.248	0.495
Mercury	0.000037		ND†	ND†
Molybdenum	0.0063		0.001	0.2
Nickel	0.0067	0.14	0.443	0.692
Selenium*	0.0004		0.075	0.214
Silver*	0.001	0.02	0.003	0.111
Zinc	0.340	0.58	1.77	3.54
Pthalate Esters		0.94	0.94	0.94

*Note that analytical results below detection limit were taken as half of the detection limit when calculating the average concentration for these parameters.

†ND = Non-detectable in accordance with USEPA Method 245.1 at a detection level of 0.2 µg/L or USEPA Method 1631 at a detection level of 0.0005 µg/L, unless a higher detection level is appropriate due to demonstrated sample matrix interference.

March 3, 2016

Courtney Nicholls
City of Dexter
8140 Main Street
Dexter, MI 48130

RE: Maximum Allowable Headworks Loading (MAHL) Updates

Hi Courtney,

We have developed a scope and budget for revising the MAHL evaluation and finishing the MDEQ approval process as requested. At your request, we have made contact with MDEQ regarding their remaining comments on the draft that was submitted to MDEQ in March 2013.

We propose to update the 2013 Maximum Allowable Headworks Loading evaluation report based on MDEQ comments and allowances for aeration system improvements, and present the final report to City Council.

We propose to perform the work on a time and materials basis, under our existing as-needed wastewater services PSA. Our current billing rate table is attached. The budget to complete this task is estimated at $3,400, based on one meeting with MDEQ staff and one presentation to City Council. Should further meetings be required to complete the scope of work, the additional hours and expenses will be discussed and approved prior to incurring charges beyond the estimated budget.

Please call me at 616.977.1000 if you have any questions.

Sincerely,

Elaine J. Venema

Elaine Venema, PE
Project Manager

Enclosure

CC: Blair Selover, FVOP

2960 Lucerne Drive SE, Suite 100
Grand Rapids, MI 49546
P: 616.588.2900
F: 616.977.1005
www.fv-operations.com

HOURLY BILLING RATE SCHEDULE (2015)

CLASSIFICATION	BILLING RATE
Principal-In-Charge	$155 - $192
Sr. Operations & Maintenance (O&M) Manager	$112 - $175
Project Engineer	$109 - $155
Engineer EIT	$81 - $109
Project Assistant, Field Assistant	$50 - $81

Note – Hourly rates are typically adjusted annually in April

PAGE LEFT INTENTIONALLY BLANK

1.0 Background & Purpose

Maximum Allowable Headworks Loadings (MAHLs) were evaluated for selected compatible and incompatible (e.g. metals) pollutants in order to determine appropriate Local Limits to include in an updated Sewer Use Ordinance. The Village selected the following pollutants for the MAHL evaluation: BOD_5, Total Suspended Solids, Ammonia, Phosphorus, Arsenic, Cadmium Cyanide, Chromium, Hexavalent Chromium, Copper, Mercury, Molybdenum, Nickel, Selenium, Silver, Lead, and Zinc. It was determined that local limits for volatile and semi-volatile compounds are no longer needed because a local plastics producer moved out of town several years ago and no industries are using these chemicals currently.

The timing for the MAHL evaluation was chosen to correlate to the planned site relocation and expansion of a local brewery facility to minimize the need for future revisions to the local limits.

This report discusses the approaches, data, and calculations used to develop the updated Maximum Allowable Headworks Loading (MAHL) Evaluation and Local Limits recommendations for the Village of Dexter.

The MAHL evaluation was done in accordance with MDEQ and US EPA guidelines. Detailed descriptions and justification are provided where procedures or methods varied from those standard procedures outlined in the guidance.

Because of the high organic strength of the brewery wastewater, F&V recommended that the Village of Dexter adopt Tiered Local Limits for the compatible pollutants, specifying both a maximum allowable headworks loading to the POTW (in pounds per day) and Standard Local Limits for Non-Domestic Users. Local Limits for the non-compatible pollutants were determined using a uniform allocation methodology.

2.0 Data Collection

Wastewater Treatment Plant (WWTP) influent, effluent, and representative domestic wastewater samples were collected during September, October, November, and December 2012 to provide a basis for the MAHL evaluation; particularly for metals and other pollutants that are not routinely monitored at the WWTP. In addition, historic plant performance and influent and effluent analytical data were used in calibrating the various MAHL models, where appropriate.

The average concentrations (mg/L) for WWT influent, effluent, and domestic wastewater samples are shown in Table 1.

Table 1 - Data Collection Average Results

PARAMETER	WWTP INFLUENT	DOMESTIC SAMPLE	WWTP EFFLUENT
Arsenic*	0.0012	0.0003	0.0004
Cadmium	0.00013	0.0001	0.00003
Chromium	0.0072	0.0037	0.0015
Copper	0.202	0.185	0.0125
Cyanide*	0.0025	0.0025	0.0025
Lead	0.0026	0.0016	0.0004
Mercury	0.000037		0.0000003
Molybdenum	0.0063	0.0059	0.0046
Nickel	0.0067	0.0065	0.0066
Selenium*	0.0004	0.0004	0.0004

Silver*	0.001	0.0002	0.0001
Zinc	0.340	0.109	0.018

*Note that analytical results below detection limit were taken as half of the detection limit when calculating the average concentration for these parameters.

The full analytical results are presented in Appendix A for reference.

3.0 Non-Compatible Pollutants – Methods

The non-compatible pollutant MAHL results were determined using a Fleis and VandenBrink Engineering, Inc (F&V) modified version of a U.S. EPA-developed spreadsheet model, customized for use at the Village of Dexter.

The following parameters are key user inputs in the non-compatibles MAHL spreadsheet:

- Influent flows, including: domestic/residential, Significant Industrial Users (Northern United Brewing Company and Alpha Metals), and other non-domestic flows
- Domestic, industrial, and WWTP influent wastewater characteristics
- Receiving water (Mill Creek) 95%-exceedence flow & hardness
- Biosolids flows and percent solids
- Treatment plant % removals

Table 2 summarizes the key flow and miscellaneous variables used in the Dexter MAHL.

Table 2 – Variables and Values Used for Non-Compatible Pollutant MAHL

VARIABLE	VALUE	UNITS
Q_{dom}, Village Domestic Flow	0.275	MGD
$Q_{brewery,fut}$, Brewery 2013/14 Flow (Broad St site)	0.013	MGD
Q_{alpha}, Metal Finisher Flow	0.013	MGD
$Q_{ind/comm}$, other industrial/commericial Flow	0.076	MGD
Q_{ind}, Total Industrial (SIU/IU/commericial) Flow	0.103	MGD
Q_{POTW}, Total Avg WWTP Influent Flow	0.377	MGD
Q_{Max}, Maximum WWTP Influent Flow	1.3	MGD
Q_{Dig}, Sludge Flow to Digester	0.002	MGD
Q_{Sludge}, Sludge Flow to Disposal	0.002	MGD
Sludge (to disposal) % Solids	4.0	%
Mill Creek 95% Exceedence Flow	15 (9.69)	cfs (MGD)
Mill Creek (assumed) background hardness	255	mg/L

Table 3 summarizes the percent removals used and the source for the value chosen. Site specific percent removals were used where applicable and appropriate. If insufficient data was available to determine a site specific percent removal, an appropriate literature value (e.g. US EPA Local Limits Development Guidance appendices) was used.

Table 3 – Primary Process and Treatment Plant % Removals

PARAMETER	% REMOVAL (PRIMARY)	% REMOVAL (OVERALL)	SOURCE
Arsenic	NA	70%	Site Specific
Cadmium	15%	80%	Literature, Site Specific
Chromium, Total	27%	79%	Literature, Site Specific
Chromium, Hexavalent	0%	10%	Literature
Copper	22%	94%	Literature, Site Specific
Cyanide	27%	69%	Literature
Lead	57%	84%	Literature, Site Specific
Mercury	10%	91%	Literature, Site Specific
Molybdenum	0%	27%	Literature, Site Specific
Nickel	14%	42%	Literature
Selenium	0%	0%	Site Specific
Silver	20%	90%	Literature, Site Specific
Zinc	27%	95%	Literature, Site Specific

The allowable headworks loading for each parameter was calculated for the following criteria:

- Activated sludge inhibition
- Nitrification inhibition
- Digestion inhibition
- Water quality based on chronic toxicity pass-through
- Water quality based on acute toxicity pass-through
- Biosolids (sludge) quality for land application

Non-compatible Pollutants – Loading Calculations

The formula and a table summarizing the results for each criterion are described below.

Allowable Loading Based on Activated Sludge Inhibition (Secondary Treatment Inhibition)

$$L_{INHIB,Sec} = \frac{Q_{POTW} * 8.34 * C_{INHIB,Sec}}{1 - R_{PRIM}}$$

Where:

$L_{INHIB, Sec}$ = Loading based on biological secondary inhibition (lbs/day)

Q_{POTW} = Total flow to the WWTP (MGD)

$C_{INHIB, Sec}$ = Concentration that inhibits biological treatment of the secondary process (mg/L), literature values were used

R_{PRIM} = Removal % across the primary clarifiers (expressed as a decimal)

Table 4 – MAHLs based on Secondary Treatment Inhibition

PARAMETER	C_{INHIB} (mg/L)	MAHL (lb/day)
Arsenic	0.1	0.314
Cadmium	1.0	3.70
Chromium, Total	1.0	4.31
Chromium, Hexavalent	0.2	NA
Copper	1.0	4.03
Cyanide	0.1	0.43
Lead	0.1	7.32
Mercury	0.1	0.35
Molybdenum	NA	NA
Nickel	1.0	3.66
Selenium	NA	NA
Silver	0.25	0.98
Zinc	1.0	21.55

Allowable Loading Based on Nitrification Inhibition

$$L_{INHIB,Nit} = \frac{Q_{POTW} * 8.34 * C_{INHIB,Nit}}{1 - R_{Avg}}$$

Where:

$L_{INHIB, Nit}$ = Loading based on nitrification inhibition (lbs/day)

Q_{POTW} = Total flow to the WWTP (MGD)

$C_{INHIB, Nit}$ = Concentration that inhibits nitrification (mg/L), literature values were used

R_{AVG} = Removal % across the primary clarifiers (expressed as a decimal)

Table 5 – MAHLs based on Nitrification Inhibition

PARAMETER	C_{INHIB} (mg/L)	MAHL (lb/day)
Arsenic	1.5	15.6
Cadmium	5.2	83.0
Chromium, Total	1.0	15.0
Chromium, Hexavalent	NA	NA
Copper	0.48	24.6
Cyanide	NA	NA
Lead	0.5	10.2
Mercury	NA	NA
Molybdenum	NA	NA

Nickel	0.5	2.7
Selenium	NA	NA
Silver	NA	NA
Zinc	0.5	30.2

Allowable Loading Based on Digestion Inhibition

$$L_{INHIB,Dig} = \frac{Q_{Sludge} * C_{INHIB,Dig}}{R_{Avg}} * 8.34$$

Where:

$L_{INHIB, Dig}$ = Loading based on digester inhibition (lbs/day)

Q_{Sludge} = Sludge flow to the digester (MGD)

R_{Avg} = Average removal % (expressed as a decimal)

Table 6 – MAHLs based on Digestion Inhibition

PARAMETER	C_{INHIB} (mg/L)	MAHL (lb/day)
Arsenic	1.6	0.037
Cadmium	20	0.401
Chromium, Total	100	2.06
Chromium, Hexavalent	50	NA
Copper	40	0.69
Cyanide	4.0	0.094
Lead	340	6.53
Mercury	NA	NA
Molybdenum	NA	NA
Nickel	10	0.387
Selenium	NA	NA
Silver	13	0.236
Zinc	400	6.86

Allowable Loading Based on Water Quality (Chronic toxicity pass-through)

Chronic Loading Formula: $L_{Chronic} = Q_{POTW} * 8.34 * \frac{WQBEL_C / 1000}{(1 - R_{Avg})}$

Where:

$L_{Chronic}$ = Loading based on chronic toxicity pass through (lbs/day)

Q_{POTW} = Total flow to the WWTP (MGD)

R_{avg} = average overall removal fraction for the treatment plant (fraction)

$WQBEL_C$ = Water quality based effluent limit for chronic toxicity protection (µg/L)

$$WQBEL_C = C_{WQS} * \frac{(Q_{MAX} + (25\% * Q_{STREAM})}{Q_{MAX}}$$

Where:

C_{WQS} = Michigan water quality standard concentration, Part 57 Rules (µg/L)

Q_{MAX} = Maximum flow to the WWTP (MGD)

Q_{STREAM} = 95% exceedence flow for receiving water (MGD). Note that 25% of the applicable receiving water flow is utilized in accordance with the current MDEQ policy on mixing zones.

Table 7 – MAHLs based on Chronic Toxicity Pass-through

PARAMETER	$WQBEL_C$ (mg/L)	MAHL (lb/day)
Arsenic	0.15	15.4
Cadmium	0.005	0.235
Chromium, Total	0.011	0.471
Chromium, Hexavalent	NA	NA
Copper*	0.02	2.92
Cyanide	0.0052	0.151
Lead	0.043	2.54
Mercury	0.0008	0.080
Molybdenum	0.005	0.062
Nickel	0.115	1.78
Selenium	0.005	0.045
Silver	0.00006	0.005
Zinc	0.26	45.2

*Dexter has an NPDES permit limit for copper of 0.14 mg/L, however the more restrictive WQBEL value of 0.02 mg/L was used.

Allowable Loading Based on Water Quality (Acute toxicity pass-through)

Acute Toxicity Loading Formula: $$L_{Acute} = Q_{POTW} * 8.34 * \frac{WQBEL_A / 1000}{(1 - R_{Avg})}$$

Where:

L_{Acute} = Loading based on acute toxicity pass through (lbs/day)

Q_{POTW} = Total flow to the WWTP (MGD)

R_{avg} = average overall removal fraction for the treatment plant (expressed as a fraction)

$WQBEL_A$ = Water quality based effluent limit for acute toxicity protection (µg/L)

$$WQBEL_A = C_{WQS} * \frac{(Q_{WWTP} + (25\% * Q_{STREAM})}{Q_{WWTP}}$$

Where:

C_{WQS} = Michigan water quality standard concentration,Part 57 Rules (µg/L)

Q_{POTW} = Influent flow to the WWTP (MGD)

Q_{STREAM} = 95% exceedence flow for receiving water (MGD). Note that 25% of the applicable receiving water flow is utilized in accordance with the current MDEQ policy on mixing zones.

Table 8 – MAHLs based on Acute Toxicity Pass-through

PARAMETER	$WQBEL_A$ (mg/L)	MAHL (lb/day)
Arsenic	0.68	20.26
Cadmium	0.013	0.594
Chromium, Total	0.032	1.37
Chromium, Hexavalent	0.032	0.32
Copper*	0.032	4.76
Cyanide	0.044	1.28
Lead	0.831	48.67
Mercury	0.0028	0.292
Molybdenum	0.12	1.49
Nickel	2.07	32.12
Selenium	0.12	1.08
Silver	0.0011	0.095
Zinc	0.518	89.7

*Dexter has an NPDES permit limit for copper of 0.14 mg/L, however the more restrictive WQBEL value of 0.032 mg/L was used.

Allowable Loading Based on Biosolids Quality

$$L_{Sludge} = Q_{Sludge} * \frac{TSS_{Sludge}}{100} * 8.34 * \frac{C_{Sludge}}{R_{avg} * F_{Sorp}}$$

Where:

L_{Sludge} = Loading based on biosolids quality (lbs/day)

Q_{Sludge} = Average daily sludge generation rate (MGD)

TSS_{Sludge} = Average sludge % solids (%)

C_{Sludge} = Target standard for biosolids quality (mg/kg) – use Part 24 “Clean” or “Ceiling” limit as applicable

R_{avg} = average overall removal fraction for the treatment plant (expressed as a fraction)

F_{Sorp} = fraction of removal that occurs by sorption to biosolids (this was assumed to be 1.0 for all parameters)

Table 9 – MAHLs based on Biosolids Quality for Land Application

PARAMETER	C_{Sludge} (mg/kg)	MAHL (lb/day)
Arsenic	37	0.035
Cadmium	35	0.029
Chromium, Total	NA	NA
Chromium, Hexavalent	NA	NA
Copper	1338	0.95
Cyanide	NA	NA
Lead	268	0.213
Mercury	15	0.011
Molybdenum	75	0.182
Nickel	375	0.596
Selenium	89	0.180
Silver	NA	NA
Zinc	2498	1.75

The most restrictive loading was chosen as the controlling MAHL and safety factors were then applied to the resultant MAIL as follows.

Table 10 – Controlling MAHL, Criteria, MAIL, and Safety Factor

PARAMETER	Controlling Criteria	MAHL (lb/day)	Domestic Loading (lb/day)	Safety Factor	**MAIL after SF (lb/day)**
Arsenic	Biosolids Quality	0.035	0.0006	10%	**0.031**
Cadmium	Biosolids Quality	0.029	0.0003	10%	**0.026**
Chromium, Total	Chronic Toxicity	0.471	0.0086	10%	**0.386**
Chromium, Hex.	Acute Toxicity	0.320	0.0101	10%	**0.244**
Copper	Digestion Inhib	0.694	0.4238	10%	**0.200**
Cyanide	Digestion Inhib	0.094	0.0057	10%	**0.079**
Lead	Biosolids Quality	0.211	0.0038	10%	**0.186**
Mercury	Biosolids Quality	0.011	0.0001	10%	**0.010**
Molybdenum	Chronic Toxicity	0.062	0.0134	5%	**0.001**
Nickel	Digestion Inhib	0.387	0.0149	10%	**0.333**
Selenium	Chronic Toxicity	0.067	0.001	10%	**0.036**
Silver	Chronic Toxicity	0.005	0.0005	10%	**0.003**
Zinc	Biosolids Quality	1.758	0.2497	10%	**1.332**

4.0 Non-compatible Pollutants – Allocation & Local Limit Development

After the MAHL was determined for each of the non-compatible parameters, the Maximum Allowable Industrial Loading (MAIL) was determined by subtracting out the domestic background portion of the total loading.

The Village has chosen to utilize a uniform allocation of the MAIL. The MAIL in lbs/day was converted to a local limit by dividing by the total non-domestic flow of 0.1026 MGD and the conversion factor 8.34. The draft Standard Local Limits for the incompatible pollutants are summarized in Table 11 below.

Table 11 – Draft Standard Local Limits – Non-compatible Pollutants

POLLUTANT	Current Local Limit (mg/L)	Proposed Monthly Avg Limit (mg/L)	Proposed Max Daily Limit (mg/L)
Arsenic	0.08	0.042	0.044
Cadmium	0.013	0.034	0.069
Chromium, Total	0.50	0.514	1.59
Chromium, Hex.	0.10	0.325	0.325
Copper	0.94	0.266	0.266
Cyanide	0.10	0.105	0.148
Lead	0.20	0.248	0.495
Mercury		ND*	ND*
Molybdenum		0.001	0.2
Nickel	0.14	0.443	0.692
Selenium		0.075	0.214
Silver	0.02	0.003	0.111
Zinc	0.58	1.77	3.54
Pthalate Esters	0.94	0.94	0.94

*ND = Non-detectable in accordance with USEPA Method 245.1 at a detection level of 0.2 µg/L or USEPA Method 1631 at a detection level of 0.0005 µg/L, unless a higher detection level is appropriate due to demonstrated sample matrix interference.

5.0 Compatible Pollutants – Methods

MAHL evaluations for 5-day biochemical oxygen demand, total suspended solids, phosphorus, and ammonia were also developed.

Table 12 summarizes the compatible pollutant sampling results for WWTP influent and effluent, domestic, and SIU sources.

Table 12 - Data Collection Average Results

PARAMETER	WWTP INFLUENT (mg/L)	DOMESTIC SAMPLE (mg/L)	WWTP EFFLUENT (mg/L)	ALPHA METALS (mg/L)	NUBCO (Brewery) (mg/L)
BOD5	311	263	5	27	4623
TSS	247	278	6.5	389	411
Phosphorus	6.5	5.7	0.3	3.6	33
Ammonia	37	31.8	0.3	22.3	6.2

The MAHLs for the compatible pollutants were determined based on the treatment plant capacity or NPDES limitations, whichever loading was lowest. The allowable headworks loading based on the NPDES permit limit was calculated in accordance with the EPA Local Limits Development Guidance using the following equation:

NPDES Limit Formula: $$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{(1 - R_{Avg})}$$

Where:

L_{NPDES} = Loading based on NPDES permit limit (lbs/day)

Q_{POTW} = Total flow to the WWTP (MGD)

R_{avg} = average overall removal fraction for the treatment plant (fraction)

Biochemical Oxygen Demand MAHL

Dexter has an average monthly $cBOD_5$ limit of 25 mg/L. MOR data from 2011 indicates the average removal efficiency for BOD was 98.7%. Inserting these values into the NPDES limit formula shown above yields can NPDES based AHL for BOD_5 of 6,046 lb/day. Calculations using standard loadings recommended in *Ten States Standards* demonstrate that the Dexter treatment plant is currently capable of handling an average BOD_5 loading of up to 1,495 lb/day. The controlling AHL for BOD_5 is the plant capacity; therefore it was determined that the MAHL for BOD5 is 1,495 lb/day. The spreadsheet calculations are attached for reference.

BOD Allocation and Local Limits Development

The MAIL for BOD was calculated as the MAHL after the 10% safety factor was applied (1346 lb/day) minus the average domestic loading (600.5 lb/day) and reserve loading (113 lb/day, or approximately 200 additional REUs). The MAIL for BOD is 633 lb day. The average monthly local limits were developed based on the MAIL.

Because the brewery wastewater has a high concentration of BOD_5 and Alpha Metals has a very low concentration of BOD, the Village has chosen to allocate the MAIL non-uniformly. Alpha Metals doesn't currently have a BOD limit listed in their industrial discharge permit. Their average BOD is 28 mg/L; in order to be conservative, 30 mg/L was used to determine the BOD loading from Alpha Metals. The resultant average loading was calculated as 3.3 lb/day.

A standard local limit was developed for all non-domestic users who do not have an industrial discharge permit. The proposed average monthly standard local limit is 550 mg/L. Multiplying the proposed standard local limit by the corresponding non-domestic flow and the conversion factor of 8.34 yields a loading of 350 lb/day.

It is the Village's intent to allocate the a portion of the remaining BOD MAIL to the brewery. The BOD available to NUBCO after allocating to all other sewer customers is 280 lb/day. It is proposed that the Village issue a mass and concentration based permit for the brewery. NUBCO is estimating their 2013/14 flow as 13,000 gpd. Dividing the average 280 lb/day limit by the anticipated flow rate yields a monthly average concentration limit of 2,600 mg/L.

The maximum daily and monthly average limits for BOD will be the same for the purposes of this evaluation.

Total Suspended Solids MAHL

The MAHL for TSS was determined similarly to the method described for the BOD MAHL. Dexter has an average monthly TSS limit of 30 mg/L. MOR data from 2011 indicates an average removal efficiency for TSS of 95.5%. Inserting these values into the NPDES limit formula shown above yields can NPDES based AHL for TSS of 2,096 lb/day. Calculations using standard loadings recommended in *Ten States Standards* demonstrate that the Dexter treatment plant is currently capable of handling an average TSS loading of 1583 lb/day and a peak hour loading 3,534 lb/day. The controlling AHL for TSS is the average plant capacity; therefore it was determined that the MAHL for TSS is 1,583 lb/day. The spreadsheet calculations are attached for reference.

TSS Allocation and Local Limits Development

The MAIL for TSS was calculated as the MAHL after the safety factor (1,425 lb/day) minus the average domestic loading (662 lb/day) and reserve loading (128 lb/day, or approximately 200 additional REUs). The MAIL for TSS is 635 lb day. The average monthly local limits were developed based on the MAIL.

As previously discussed, the Village has chosen to allocate the MAIL non-uniformly for compatible pollutants. Alpha Metals has a permit limit of 350 mg/L for TSS, so this concentration was used to determine the TSS loading from Alpha Metals. The resultant average loading was calculated as 37.9 lb/day.

As with BOD, a standard local limit was developed for all non-domestic users who do not have an industrial discharge permit for TSS as well. The proposed average monthly standard local limit is 600 mg/L. Multiplying the proposed standard local limit by the corresponding non-domestic flow and the conversion factor of 8.34 yields a loading of 381 lb/day.

It is the Village's intent to allocate the remaining TSS MAIL to the brewery. The TSS available to NUBCO after allocating to all other sewer customers is 216 lb/day, corresponding to 2,000 mg/L at the anticipated 2013/14 flows.

The daily maximum limits was developed based on the second lowest AHL, which was 2,096 lb/day based on the NPDES calculation. The MAIL was calculated as 1,096 lb/day after allocating to the domestic users, reserve loading, and applying the 10% safety factor. The proposed maximum daily standard local limit is 1,000 mg/L. The available loading for NUBCO was calculated as 556 lb/day. The proposed maximum day limit for NUBCO is 423 lb/day, or 3,900 mg/L at the anticipated 2013/14 flow.

The daily maximum local limits were verified using the dynamic wastewater treatment process model GPSx.

Phosphorus MAHL

The MAHL for phosphorus was determined similarly to the method described for the BOD and TSS MAHLs. Dexter has a seasonal average monthly phosphorus limit of 0.6 mg/L from October through March. MOR data from 2011 indicates an average removal efficiency for phosphorus of 96%. Inserting these values into the NPDES limit formula shown above yields can NPDES based AHL for phosphorus of 47 lb/day. Calculations based on the ferric chloride feed system at the WWTP demonstrate that the WWTP is currently capable of handling an average phosphorus loading of 40.8 lb/day. The controlling AHL for phosphorus is the plant capacity; therefore it was determined that the MAHL for phosphorus is 40.8 lb/day. The spreadsheet calculations are attached for reference.

Phosphorus Allocation and Local Limits Development

The MAIL for phosphorus was calculated as the MAHL after the safety factor (36.7 lb/day) minus the average domestic loading (13.9 lb/day) and reserve loading (12 lb/day). The MAIL for phosphorus is 10.9 lb day. The average monthly local limits were developed based on the MAIL.

As previously discussed, the Village has chosen to allocate the MAIL non-uniformly for compatible pollutants. Alpha Metals has a permit limit of 16 mg/L, so this concentration was used to determine the phosphorus loading from Alpha Metals. The resultant average loading was calculated as 1.7 lb/day.

As with BOD and TSS, a standard local limit was developed for all non-domestic users who do not have an industrial discharge permit for phosphorus. The proposed average monthly standard local limit is 12 mg/L. Multiplying the proposed standard local limit by the corresponding non-domestic flow and the conversion factor of 8.34 yields a loading of 8 lb/day.

It is the Village's intent to allocate the remaining phosphorus MAIL to the brewery. The phosphorus available to NUBCO after allocating to all other sewer customers is 1.5 lb/day, corresponding to 14 mg/L at the anticipated 2013/14 flows.

The proposed daily maximum limit is equal to the average monthly limit for phosphorus because of the stringent NPDES permit limitations, current ferric feed pump capacity, and pending TMDL.

Ammonia MAHL

The MAHL for ammonia was determined using the NPDES formula. Dexter has a seasonal ammonia limit of 12 mg/L from May 1 through October 31. MOR data from 2011 indicates an average ammonia removal of 96.3%. Inserting these values into the NPDES limit formula shown above yields an NPDES based AHL for ammonia of 1020 lb/day. The spreadsheet calculations are attached for reference.

Ammonia Allocation and Local Limits Development

The MAIL for ammonia was calculated as the MAHL after the safety factor (918 lb/day) minus the average domestic loading (83 lb/day) and reserve loading (100 lb/day). MAIL for ammonia is 735 lb day. The average monthly local limits were developed based on the MAIL.

As previously discussed, the Village has chosen to allocate the MAIL non-uniformly for compatible pollutants. Alpha Metals does not currently have a permit limit for ammonia, so the average concentration was used to determine the ammonia loading from Alpha Metals. The resultant average loading was calculated as 2.7 lb/day.

As with BOD, TSS, and phosphorus, a standard local limit was developed for all non-domestic users who do not have an industrial discharge permit for ammonia. The proposed average monthly standard local limit is 42 mg/L. Multiplying the proposed standard local limit by the corresponding non-domestic flow and the conversion factor of 8.34 yields a loading of 27 lb/day.

The brewery does not have a high concentration of ammonia in its wastewater; therefore it was determined that the brewery's limit should be equal to the standard local limit of 42 mg/L.

The proposed daily maximum limits are equal to the average monthly limit for ammonia.

The daily maximum local limits were verified using the dynamic wastewater treatment process model GPSx.

Compatible Pollutant MAHL & Local Limits Summary

The MAHL, domestic loading, and MAILs for the compatible pollutants are summarized in Table 13 on the next page.

Table 13 – Compatible MAHL, MAIL, and Safety Factor

PARAMETER	MAHL (lb/day)	Domestic Loading (lb/day)	Reserve Loading (lb/day)	Safety Factor	**MAIL after SF (lb/day)**
BOD5	1495	600	113	10%	**633**
TSS	1583	662	128	10%	**635**
Phosphorus	40.8	13.9	12	10%	**10.9**
Ammonia	1020	83	100	10%	**735**

As previously discussed, the Village has chosen to allocate the MAIL non-uniformly because the brewery has a need for a higher allocation of BOD5, TSS, and phosphorus. Non-domestic users who do not have an industrial permit will be subject to standard local limits. The proposed standard local limits are summarized in Table 14 below.

Table 14 – Proposed Standard Local Limits for Non-Domestic Users

PARAMETER	Monthly Average (mg/L)	Daily Max (mg/L)
BOD5	550	550
TSS	600	1,000
Phosphorus	12	12
Ammonia	42	42

A draft allocation of the average monthly MAIL is summarized in Table 15 below.

Table 15 – Allocation of MAIL to Non-Domestic Users

PARAMETER	MAIL (lb/day)	Alpha Metals Allocation* (lb/day)	NUBCO Allocation (lb/day)	Other Non-Domestic Users (lb/day)	Unallocated Amount (lb/day)
BOD5	633	3.3	280	350	-
TSS	635	38	216	381	-
Phosphorus	10.9	1.7	1.5	7.6	-
Ammonia	735	2.7	4.6	27	719

*Alpha Metals is a categorical metal finisher and has permit limits of 350 mg/L TSS and 16 mg/L phosphorus.

6.0 Summary of Discharge Permit Limits for Approval

The Village desires NUBCO to have a mass-based discharge permit for compatible pollutants. Alpha Metals will continue to have a concentration based discharge permit using categorical or the MAHL-determined concentration limits, whichever is more stringent for each parameter.

Tables 16 and 17 summarize the industrial limits the Village is seeking approval on for NUBCO and Alpha Metals, respectively.

Table 16 – Draft NUBCO Discharge Permit Limits

POLLUTANT	Proposed Monthly Avg Limit (lb/day)	Proposed Max Daily Limit (lb/day)
$cBOD_5$	280	280
TSS	216	423
Phosphorus	1.5	1.5
Ammonia	4.6	4.6

Note that NUBCO is subject to the concentration-based non-compatible Standard Local Limits presented in Table 11.

Table 17 – Draft Alpha Metals Discharge Permit Limits

POLLUTANT	Proposed Monthly Avg Limit (mg/L)	Proposed Max Daily Limit (mg/L)
TSS	350	350
Phosphorus	16	16

The proposed discharge limits for compatible pollutants for Alpha Metals are unchanged from the current industrial discharge permit. Alpha Metals would also be subject to the non-compatible concentration-based Standard Local Limits presented in Table 11.

|::

TABLE A1

Local Limits Determination Based on Activated Sludge Inhibition Level

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE								MAXIMUM LOADING		INDUSTRIAL		
	IU Pollut. Flow (MGD) (Qind)	POTW Flow (MGD) (Qpotw)	Removal Efficiency (%) (Rprim)		Activated Sludge Inhibition Level (mg/l) (Ccrit)		Domestic and Commercial Conc. (mg/l) (Cdom)	Flow (MGD) (Qdom)	Allowable Headworks (lbs/day) (Lhw)	Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)	Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377			0.1		0.00025	0.2748	0.3146	0.0006	0.2826	0.33034	10
Cadmium	0.1026	0.377	15		1		0.000115	0.2748	3.7015	0.0003	3.3311	3.89395	10
Chromium	0.1026	0.377	27		1		0.00375	0.2748	4.3100	0.0086	3.8704	4.52436	10
Hex. Chrom.	0.1026	0.377	0				0.0044	0.2748	-	0.0101	-	-	10
Copper	0.1026	0.377	22		1		0.185	0.2748	4.0337	0.4238	3.2065	3.74833	10
Cyanide	0.1026	0.377	27		0.1		0.0025	0.2748	0.4310	0.0057	0.3822	0.44675	10
Lead	0.1026	0.377	57		1		0.001645	0.2748	7.3169	0.0038	6.5815	7.69354	10
Mercury	0.1026	0.377	10		0.1		0.000037	0.2748	0.3496	0.0001	0.3145	0.3676916	10
Molybdenum	0.1026	0.377					0.00585	0.2748	-	0.0134	-	-	10
Nickel	0.1026	0.377	14		1		0.0065	0.2748	3.6585	0.0149	3.2777	3.83157	10
Selenium	0.1026	0.377					0.000425	0.2748	-	0.0010	-	-	10
Silver	0.1026	0.377	20		0.25		0.000215	0.2748	0.9832	0.0005	0.8844	1.03384	10
Zinc	0.1026	0.377	27		5		0.109	0.2748	21.5498	0.2497	19.1451	22.38014	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.

(R_{prim}) Removal efficiency across across primary treatment as percent.

(C_{crit}) Activated sludge threshold inhibition level, mg/l.

(Q_{dom}) Domestic/commercial background flow in MGD.

(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.

(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).

(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).

(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.

(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.

(SF) Safety factor as a percent.

8.337 Unit conversion factor

$$L_{hw} = \frac{8.337 * C_{crit} * Q_{potw}}{1 - R_{prim}}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{dom}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

|::

TABLE A2

Local Limits Determination Based on Nitrification Inhibition Level

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE								MAXIMUM LOADING		INDUSTRIAL			
	IU Pollut. Flow (MGD) (Qind)	POTW Flow (MGD) (Qpotw)	Removal Efficiency (%) (Rsec)		Nitrification Inhibition Level (mg/l) (Ccrit)		Domestic and Commercial Conc. (mg/l) (Cdom)	Domestic and Commercial Flow (MGD) (Qdom)		Allowable Headworks (lbs/day) (Lhw)	Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)		Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377	69.8		1.5		0.00025	0.2748		15.6045	0.0006	14.0435		16.41644	10
Cadmium	0.1026	0.377	80.3		5.2		0.000115	0.2748		83.0426	0.0003	74.7381		87.36671	10
Chromium	0.1026	0.377	79.0		1		0.00375	0.2748		14.9469	0.0086	13.4436		15.71518	10
Hex. Chrom.	0.1026	0.377	10.0				0.0044	0.2748		-	0.0101	-		-	10
Copper	0.1026	0.377	93.9		0.48		0.185	0.2748		24.5622	0.4238	21.6822		25.34588	10
Cyanide	0.1026	0.377	69.0				0.0025	0.2748		-	0.0057	-		-	10
Lead	0.1026	0.377	84.6		0.5		0.001645	0.2748		10.2214	0.0038	9.1955		10.74927	10
Mercury	0.1026	0.377	91.4				0.0000370	0.2748		-	0.0001	-		-	10
Molybdenum	0.1026	0.377	27.4				0.00585	0.2748		-	0.0134	-		-	10
Nickel	0.1026	0.377	42.0		0.5		0.0065	0.2748		2.7123	0.0149	2.4262		2.83614	10
Selenium	0.1026	0.377	33.0				0.000425	0.2748		-	0.0010	-		-	10
Silver	0.1026	0.377	89.6				0.000215	0.2748		-	0.0005	-		-	10
Zinc	0.1026	0.377	94.8		0.5		0.109	0.2748		30.2255	0.2497	26.9532		31.50754	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.

(R_{sec}) Removal efficiency across primary treatment and secondary treatment as percent.

(C_{crit}) Nitrification threshold inhibition level, mg/l.

(Q_{dom}) Domestic/commercial background flow in MGD.

(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.

(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).

(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).

(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.

(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.

(SF) Safety factor as a percent.

8.337 Unit conversion factor

$$L_{hw} = \frac{8.337 * C_{crit} * Q_{potw}}{1 - R_{sec}}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{dom}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

|::

TABLE A3

Local Limits Determination Based on Anaerobic Digester Inhibition Level

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE										MAXIMUM LOADING		INDUSTRIAL		
	IU Pollut. Flow (MGD) (Qind)	POTW Flow (MGD) (Qpotw)	Sludge Flow to Digester (MGD) (Qdig)	Sorption Removal Fraction (%)	Removal Efficiency (%) (Rpotw)		Anaerobic Digeste Inhibition Level (mg/l) (Ccrit)	Domestic and Conc. (mg/l) (Cdom)		Commercial Flow (MGD) (Qdom)	Allowable Headworks (lbs/day) (Lhw)	Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)		Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377	0.00195	100	69.8		1.6	0.00025		0.2748	0.037289127	0.000572706	0.032987509		0.038561	10
Cadmium	0.1026	0.377	0.00195	100	80.3		20	0.000115		0.2748	0.404917862	0.000263445	0.364162632		0.425696	10
Chromium	0.1026	0.377	0.00195	100	79.0		100	0.00375		0.2748	2.059163156	0.008590585	1.844656255		2.156351	10
Hex. Chrom.	0.1026	0.377	0.00195	0	10			0.0044		0.2748	-	0.01007962	-		-	10
Copper	0.1026	0.377	0.00195	100	93.9		40	0.185		0.2748	0.692888343	0.423802217	0.199797291		0.233557	10
Cyanide	0.1026	0.377	0.00195	100	69		4	0.0025		0.2748	0.094244348	0.005727057	0.079092856		0.092457	10
Lead	0.1026	0.377	0.00195	100	84.6		340	0.001645		0.2748	6.532882438	0.003768404	5.87582579		6.868675	10
Mercury	0.1026	0.377	0.00195	100	91.4			0.000037		0.2748	-	8.47604E-05	-		-	10
Molybdenum	0.1026	0.377	0.00195	100	27.4			0.00585		0.2748	-	0.013401313	-		-	10
Nickel	0.1026	0.377	0.00195	100	42		10	0.0065		0.2748	0.387075	0.014890348	0.333477152		0.389825	10
Selenium	0.1026	0.377	0.00195	100	33			0.000425		0.2748	-	0.0009736	-		-	10
Silver	0.1026	0.377	0.00195	100	89.6		13	0.000215		0.2748	0.235974995	0.000492527	0.211884969		0.247688	10
Zinc	0.1026	0.377	0.00195	100	94.7953216		400	0.109		0.2748	6.859895497	0.249699685	5.924206262		6.925230	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.

(Q_{dig}) Sludge flow to digester in MGD.

(R_{potw}) Removal efficiency across POTW as percent.

(C_{crit}) Anaerobic digester threshold inhibition level in mg/l.

(Q_{dom}) Domestic/commercial background flow in MGD.

(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.

(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).

(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).

(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.

(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.

$F_{(sorp)}$ Fraction of overall removal due to sorption as a percent

(SF) Safety factor as a percent.

8.337 Unit conversion factor

$$L_{hw} = \frac{8.337 * C_{crit} * Q_{dig}}{R_{potw} * F_{sorp}}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{dom}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

|::

|::

TABLE A4

Local Limits Determination Based on Chronic Water Quality Standards

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE										MAXIMIM LOADING		INDUSTRIAL		
	IU Pollut. Flow (MGD) (Qind)	Avg POTW Flow (MGD) (Qpotw)	Max POTW Flow (MGD) (Qmax)	River 95% Exceedence Flow (MGD)	Nonvolatile Removal Fraction (%)	Average Removal Efficiency (%) (Ravg)	Water Quality Standard (mg/l)	Chronic WQS (mg/l) (Ccrit)	Domestic and Commercial Conc. (mg/l) (Cdom)	Domestic and Commercial Flow (MGD) (Qdom)	Allowable Headworks (lbs/day) (Lhw)	Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)	Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377	1.3	9.69	100	69.8	0.15	0.42964	0.00025	1.1974	15.3963	0.0025	13.8542	16.195	10
Cadmium	0.1026	0.377	1.3	9.69	100	80.3	0.005	0.01471	0.000115	1.1974	0.2349	0.0011	0.2102	0.246	10
Chromium	0.1026	0.377	1.3	9.69	100	79.0	0.011	0.03151	0.00375	1.1974	0.4709	0.0374	0.3864	0.452	10
Hex. Chrom.	0.1026	0.377	1.3	9.69	100	10		0.00000	0.0044	1.1974	-	0.0439	-	-	10
Copper	0.1026	0.377	1.3	9.69	100	93.9	0.02	0.05708	0.185	1.1974	2.9210	1.8468	0.7821	0.914	10
Cyanide	0.1026	0.377	1.3	9.69	100	69	0.0052	0.01489	0.0025	1.1974	0.1512	0.0250	0.1111	0.130	10
Lead	0.1026	0.377	1.3	9.69	100	84.6	0.043	0.12418	0.001645	1.1974	2.5386	0.0164	2.2683	2.652	10
Mercury	0.1026	0.377	1.3	9.69	100	91.4	0.0008	0.0022055	0.000037	1.1974	0.08023	0.0004	0.0718	0.083979	10
Molybdenum	0.1026	0.377	1.3	9.69	100	27.4	0.005	0.01432	0.00585	1.1974	0.0621	0.0584	0.0006	0.001	5
Nickel	0.1026	0.377	1.3	9.69	100	42	0.115	0.32885	0.0065	1.1974	1.7839	0.0649	1.5406	1.801	10
Selenium	0.1026	0.377	1.3	9.69	100	33	0.005	0.01432	0.000425	1.1974	0.0673	0.0042	0.0563	0.066	10
Silver	0.1026	0.377	1.3	9.69	100	89.6	0.00006	0.00017	0.000215	1.1974	0.0052	0.0021	0.0025	0.003	10
Zinc	0.1026	0.377	1.3	9.69	100	94.79532164	0.26	0.74794	0.109	1.1974	45.2135	1.0881	39.6040	46.296	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.

(Q_{95ex}) MDEQ Designated 95% exceedence flow for receiving stream (MGD)

(Ravg) Average removal efficiency across POTW as percent.

(C_{crit}) State chronic water quality standard for a particular pollutant in mg/l.

(Q_{dom}) Domestic/commercial background flow in MGD.

(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.

(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).

(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).

(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.

(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.

$F_{(nonvol)}$ Fraction of overall POTW removal not due to volatilization as a percent

(SF) Safety factor as a percent.

(Q_{max}) Maximim permitted POTW flow

8.337 Unit conversion factor

$$C_{crit} = \frac{C_{std} * (Q_{max} + 25\%*Q_{95ex})}{Q_{max}}$$

$$L_{hw} = \frac{8.337 * Q_{potw} * (C_{crit} * (Q_{max} + 25\% * Q_{95ex})/Q_{max})}{(1 - R_{avg} * F_{nonvol})}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{don}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

|::

TABLE A5

Local Limits Determination Based on Acute Water Quality Standards

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE										MAXIMIM LOADING		INDUSTRIAL		
	IU Pollut. Flow (MGD) (Qind)	Avg POTW Flow (MGD) (Qpotw)	Max POTW Flow (MGD) (Qmax)	River 95% Exceedence Flow (MGD)	Nonvolatile Removal Fraction (%)	Average Removal Efficiency (%) (Ravg)	Water Quality Standard (mg/l)	Acute WQS (mg/l) (Ccrit)	Domestic an Commercial Conc. (mg/l) (Cdom)	Flow (MGD) (Qdom)	Allowable Headworks (lbs/day) (Lhw)	Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)	Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377	1.3	9.69	100	69.8	0.68	1.94769	0.00025	1.1974	20.2618	0.002496	18.2331	21.3140	10
Cadmium	0.1026	0.377	1.3	9.69	100	80.3	0.013	0.03719	0.000115	1.1974	0.5940	0.001148	0.5334	0.6236	10
Chromium	0.1026	0.377	1.3	9.69	100	79.0	0.032	0.09166	0.00375	1.1974	1.3700	0.037435	1.1955	1.3975	10
Hex. Chrom.	0.1026	0.377	1.3	9.69	100	10	0.032	0.09166	0.0044	1.1974	0.3204	0.043924	0.2445	0.2858	10
Copper	0.1026	0.377	1.3	9.69	100	93.9	0.032	0.09299	0.185	1.1974	4.7583	1.846790	2.4357	2.8472	10
Cyanide	0.1026	0.377	1.3	9.69	100	69	0.044	0.12603	0.0025	1.1974	1.2791	0.024957	1.1262	1.3165	10
Lead	0.1026	0.377	1.3	9.69	100	84.6	0.831	2.38099	0.001645	1.1974	48.6741	0.016421	43.7903	51.1896	10
Mercury	0.1026	0.377	1.3	9.69	100	91.4	0.0028	0.008020	0.000037	1.1974	0.291754	0.000369	0.2622	0.30651524	10
Molybdenum	0.1026	0.377	1.3	9.69	100	27.4	0.12	0.34371	0.00585	1.1974	1.4905	0.058398	1.2830	1.499806882	10
Nickel	0.1026	0.377	1.3	9.69	100	42	2.07	5.92158	0.0065	1.1974	32.1223	0.064887	28.8452	33.7192	10
Selenium	0.1026	0.377	1.3	9.69	100	33	0.12	0.34371	0.000425	1.1974	1.6140	0.004243	1.4484	1.6931	10
Silver	0.1026	0.377	1.3	9.69	100	89.6	0.0011	0.00315	0.000215	1.1974	0.0950	0.002146	0.0833	0.0974	10
Zinc	0.1026	0.377	1.3	9.69	100	94.79532164	0.518	1.48374	0.109	1.1974	89.6933	1.088109	79.6358	93.0920	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.

(Q_{95ex}) MDEQ Designated 95% exceedence flow for receiving stream (MGD)

(Ravg) Average removal efficiency across POTW as percent.

(C_{crit}) State acute water quality standard for a particular pollutant in mg/l.

(Q_{dom}) Domestic/commercial background flow in MGD.

(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.

(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).

(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).

(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.

(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.

$F_{(nonvol)}$ Fraction of overall POTW removal not due to volatilization as a percent

(SF) Safety factor as a percent.

(Q_{max}) Maximim permitted POTW flow

8.337 Unit conversion factor

$$C_{crit} = \frac{C_{std} * (Q_{max} + 25\%*Q_{95ex})}{Q_{max}}$$

$$L_{hw} = \frac{8.337 * Q_{potw} * (C_{crit} * (Q_{max} + 25\% * Q_{95ex})/Q_{max})}{(1 - R_{avg} * F_{nonvol})}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{dom}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

TABLE A6

Local Limits Determination Based on USEPA 503 Sludge Regulations

Pollutant	ENVIRONMENTAL CRITERIA AND PROCESS DATA BASE										MAXIMUM LOADING		INDUSTRIAL		
									Domestic and Commercial						
	IU Pollut. Flow (MGD) (Qind)	POTW Flow (MGD) (Qpotw)	Sludge Flow (MGD) (Qsldg)	Sorption Removal Fraction (%)	Percent Solids (%) (PS)	Average Digester Removal (%)	Maximum Removal Efficiency (%) (Rmax)	503 Sludge Criteria (mg/kg) (Cslcrit)		Conc. (mg/l) (Cdom)	Flow (MGD) (Qdom)	Allowable Headworks (lbs/day) (Lhw)		Domestic/ Commercial (lbs/day) (Ldom)	Allowable Loading (lbs/day) (Lind)	Local Limit (mg/l) (Cind)	Safety Factor (%) (SF)
Arsenic	0.1026	0.377	0.002	100	4.0	0	69.8	37		0.00025	0.2748	0.0354		0.0006	0.0313	0.036550	10
Cadmium	0.1026	0.377	0.002	100	4.0		80.3	35		0.000115	0.2748	0.0291		0.0003	0.0259	0.030277	10
Chromium	0.1026	0.377	0.002	100	4.0		79.0			0.00375	0.2748	-		0.0086	-	-	10
Hex. Chrom.	0.1026	0.377	0.002	0	4.0		10			0.0044	0.2748	-		0.0101	-	-	10
Copper	0.1026	0.377	0.002	100	4.0		93.9	1338		0.185	0.2748	0.9509		0.4238	0.4320	0.504959	10
Cyanide	0.1026	0.377	0.002	100	4.0		69			0.0025	0.2748	-		0.0057	-	-	10
Lead	0.1026	0.377	0.002	100	4.0		84.6	268		0.001645	0.2748	0.2113		0.0038	0.1864	0.217856	10
Mercury	0.1026	0.377	0.002	100	4.0		91.4	15		0.000037	0.2748	0.0110		0.0001	0.0098	0.011423	10
Molybdenum	0.1026	0.377	0.002	100	4.0		27.4	75		0.00585	0.2748	0.1823		0.0134	0.1506	0.176090	10
Nickel	0.1026	0.377	0.002	100	4.0		42	375		0.0065	0.2748	0.5955		0.0149	0.5211	0.609104	10
Selenium	0.1026	0.377	0.002	100	4.0		33	89		0.000425	0.2748	0.1799		0.0010	0.1609	0.188106	10
Silver	0.1026	0.377	0.002	100	4.0		89.6			0.000215	0.2748	-		0.0005	-	-	10
Zinc	0.1026	0.377	0.002	100	4.0		94.79532164	2498		0.109	0.2748	1.7575		0.2497	1.3321	1.557172	10

(Q_{ind}) Industrial User total plant discharge flow in Million Gallons per Day (MGD) that contains a particular pollutant.

(Q_{potw}) POTW's average influent flow in MGD.
(Q_{sldg}) Sludge flow to disposal in MGD.
(PS) Percent solids of sludge to disposal.
(R_{max}) Maximum removal efficiency across POTW as a percent.
(C_{slcrit}) 503 sludge criteria in mg/kg dry sludge.
(Q_{dom}) Domestic/commercial background flow in MGD.
(C_{dom}) Domestic/commercial background concentration for a particular pollutant in mg/l.
(L_{hw}) Maximum allowable headworks pollutant loading to the POTW in pounds per day (lbs/day).
(L_{dom}) Domestic/commercial background loading to the POTW for a particular pollutant in pounds per day (lbs/day).
(L_{ind}) Maximum allowable industrial loading to the POTW in pounds per day.
(C_{ind}) Industrial allowable local limit for a given pollutant in mg/l.
$F_{(sorp)}$ Fraction of overall removal due to sorption as a percent
$R_{(dig)}$ Average removal fraction of digester as a percent
(SF) Safety factor as a percent.
8.337 Unit conversion factor

$$L_{hw} = \frac{8.337 * C_{slcrit} * (PS/100) * Q_{sldg}}{R_{max} * F_{sorp} * (1 - R_{dig})}$$

$$L_{ind} = L_{hw} * (1\text{-}SF/100) - L_{don}$$

$$C_{ind} = \frac{L_{ind}}{Q_{ind} * 8.337}$$

TABLE A7

Summary of Determined Limits

				Arsenic	Cadmium	Chromium	Hex. Chrom.	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Activated Sludge Inhibition	Allowable Headworks Load	(lbs/day)	(Lhw)	0.315	3.702	4.310	-	4.034	0.431	7.317	0.34959	-	3.658	-	0.983	21.550
	Domestic/	(lbs/day)	(Ldom)	0.001	0.000	0.009	0.010	0.424	0.006	0.004	0.00008	0.013	0.015	0.001	0.000	0.250
	Allowable Industrial Load	(lbs/day)	(Lind)	0.283	3.331	3.870	-	3.207	0.382	6.581	0.31454	-	3.278	-	0.884	19.145
	Local Limit (Cind)	(mg/l)	(Cind)	0.330	3.894	4.524	-	3.748	0.447	7.694	0.36769	-	3.832	-	1.034	22.380
Nitrification Inhibition Level	Allowable Headworks Load	(lbs/day)	(Lhw)	15.605	83.043	14.947	-	46.687	-	10.221	-	-	2.712	-	-	30.225
	Domestic/	(lbs/day)	(Ldom)	0.001	0.000	0.009	0.010	24.562	0.006	0.004	0.00008	0.013	0.015	0.001	0.000	0.250
	Allowable Industrial Load	(lbs/day)	(Lind)	14.043	74.738	13.444	-	0.424	-	9.195	-	-	2.426	-	-	26.953
	Local Limit (Cind)	(mg/l)	(Cind)	16.416	87.367	15.715	-	21.682	-	10.749	-	-	2.836	-	-	31.508
Anaerobic Digester Inhibition	Allowable Headworks Load	(lbs/day)	(Lhw)	0.037	0.405	2.059	-	0.693	0.094	6.533	-	-	0.387	-	0.236	6.860
	Domestic/	(lbs/day)	(Ldom)	0.001	0.000	0.009	0.010	0.424	0.006	0.004	0.00008	0.013	0.015	0.001	0.000	0.250
	Allowable Industrial Load	(lbs/day)	(Lind)	0.033	0.364	1.845	-	0.200	0.079	5.876	-	-	0.333	-	0.212	5.924
	Local Limit (Cind)	(mg/l)	(Cind)	0.039	0.426	2.156	-	0.234	0.092	6.869	-	-	0.390	-	0.248	6.925
Chronic Water Quality Standards	Allowable Headworks Load	(lbs/day)	(Lhw)	15.396	0.235	0.471	-	2.921	0.151	2.539	0.08023	0.062	1.784	0.067	0.005	45.213
	Domestic/	(lbs/day)	(Ldom)	0.002	0.001	0.037	0.044	1.847	0.025	0.016	0.00037	0.058	0.065	0.004	0.002	1.088
	Allowable Industrial Load	(lbs/day)	(Lind)	13.854	0.210	0.386	-	0.782	0.111	2.268	0.07184	0.001	1.541	0.056	0.003	39.604
	Local Limit (Cind)	(mg/l)	(Cind)	16.195	0.246	0.452	-	0.914	0.130	2.652	0.08398	0.0007	1.801	0.066	0.003	46.296
Acute Water Quality Standards	Allowable Headworks Load	(lbs/day)	(Lhw)	20.262	0.594	1.370	0.320	4.758	1.279	48.674	0.29175	1.490	32.122	1.614	0.095	89.693
	Domestic/	(lbs/day)	(Ldom)	0.002	0.001	0.037	0.044	1.847	0.025	0.016	0.00037	0.058	0.065	0.004	0.002	1.088
	Allowable Industrial Load	(lbs/day)	(Lind)	18.233	0.533	1.196	0.244	2.436	1.126	43.790	0.26221	1.283	28.845	1.448	0.083	79.636
	Local Limit (Cind)	(mg/l)	(Cind)	21.314	0.624	1.398	0.286	2.847	1.317	51.190	0.30652	1.4998	33.719	1.693	0.097	93.092
USEPA 503 Sludge Regulations	Allowable Headworks Load	(lbs/day)	(Lhw)	0.035	0.029	-	-	0.951	-	0.211	0.01095	0.182	0.596	0.180	-	1.758
	Domestic/	(lbs/day)	(Ldom)	0.001	0.000	0.009	0.010	0.424	0.006	0.004	0.00008	0.013	0.015	0.001	0.000	0.250
	Allowable Industrial Load	(lbs/day)	(Lind)	0.031	0.026	-	-	0.432	-	0.186	0.00977	0.151	0.521	0.161	-	1.332
	Local Limit (Cind)	(mg/l)	(Cind)	0.037	0.030	-	-	0.505	-	0.218	0.01142	0.1761	0.609	0.188	-	1.557

TABLE A8

Allowable Headworks Load

			Arsenic	Cadmium	Chromium	Hex. Chrom.	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Activated Sludge Inhibition AS	(lbs/day)	(Lhw)	0.315	3.702	4.310	-	4.034	0.431	7.317	0.350	-	3.658	-	0.983	21.550
Nitrification Inhibition Level NI	(lbs/day)	(Lhw)	15.605	83.043	14.947	-	46.687	-	10.221	-	-	2.712	-	-	30.225
Anaerobic Digester Inhibition DI	(lbs/day)	(Lhw)	0.037	0.405	2.059	-	**0.693**	**0.094**	6.533	-	-	**0.387**	-	0.236	6.860
Chronic Water Quality Standards C	(lbs/day)	(Lhw)	15.396	0.235	**0.471**	-	2.921	0.151	2.539	0.080	**0.062**	1.784	**0.067**	**0.005**	45.213
Acute Water Quality Standards A	(lbs/day)	(Lhw)	20.262	0.594	1.370	**0.320**	4.758	1.279	48.674	0.292	1.490	32.122	1.614	0.095	89.693
USEPA 503 Sludge Regulations BS	(lbs/day)	(Lhw)	**0.035**	**0.029**	-	-	0.951	-	**0.211**	**0.011**	0.182	0.596	0.180	-	**1.758**
Monthy Average	(lbs/day)		0.035	0.029	0.471	0.320	0.693	0.094	0.211	0.011	0.062	0.387	0.067	0.005	1.758
Basis			BS	BS	C	A	DI	DI	BS	BS	C	DI	C	C	BS
Daily Maximum	(lbs/day)		0.037	0.058	1.370	0.320	0.951	0.151	0.423	0.022	0.182	0.596	0.180	0.095	3.515
Basis			DI	2xBS	A	A	BS	C	2xBS	2xBS	BS	BS	BS	A	2sBS

TABLE A9

Allowable Industrial Load

			Arsenic	Cadmium	Chromium	Hex. Chrom.	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Activated Sludge Inhibition AS	(lbs/day)	(Lind)	0.283	3.331	3.870	-	3.207	0.382	6.581	0.315	-	3.278	-	0.884	19.145
Nitrification Inhibition Level	(lbs/day)	(Lind)	14.043	74.738	13.444	-	0.424	-	9.195	-	-	2.426	-	-	26.953
Anaerobic Digester Inhibition	(lbs/day)	(Lind)	0.033	0.364	1.845	-	**0.200**	**0.079**	5.876	-	-	**0.333**	-	0.212	5.924
Chronic Water Quality Standards	(lbs/day)	(Lind)	13.854	0.210	**0.386**	-	0.782	0.111	2.268	0.072	**0.001**	1.541	**0.056**	**0.003**	39.604
Acute Water Quality Standards	(lbs/day)	(Lind)	18.233	0.533	1.196	**0.244**	2.436	1.126	43.790	0.262	1.283	28.845	1.448	0.083	79.636
USEPA 503 Sludge Regulations	(lbs/day)	(Lind)	**0.031**	**0.026**	-	-	0.432	-	**0.186**	**0.010**	0.151	0.521	0.161	-	**1.332**
Monthy Average	(lbs/day)		0.031	0.026	0.386	0.244	0.200	0.079	0.186	0.010	0.001	0.333	0.056	0.003	1.332
Basis			BS	BS	C	A	DI	DI	BS	BS	C	DI	C	C	BS
Daily Maximum	(lbs/day)		0.033	0.052	1.196	0.244	0.400	0.111	0.373	0.020	0.151	0.521	0.161	0.083	2.664
Basis			DI	2xBS	A	A	2xDI	C	2XBS	2xBS	BS	BS	BS	A	2xBS

TABLE A10
Standard Local Limits - Uniform Allocation

		Arsenic	Cadmium	Chromium	Hex. Chrom.	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Monthy Average	(mg/L)	0.042	0.034	0.514	0.325	0.266	0.105	0.248	0.013	0.001	0.443	0.075	0.003	1.770
	(ug/L)	42	34	514	325	266	105	248	13	1	443	75	3	1770
Basis		BS	BS	C	A	DI	DI	BS	BS	C	DI	C	C	BS
Daily Maximum	(mg/L)	0.044	0.069	1.589	0.325	0.266	0.148	0.495	0.026	0.200	0.692	0.214	0.111	3.541
	(ug/L)	44	69	1589	325	266	148	495	26	200	692	214	111	3541
Basis		DI	2xBS	A	A	DI	C	2XBS	2xBS	BS	BS	BS	A	2xBS

TABLE A11 "DEFAULT" VALUES

Highlighted Data Was Used In This Local Limts Determinations

The following tables are taken from the EPA's Local Limits Development Guidance Appendixes

	Appendix R tables				Appendix V		Appendix G tables			
	Removal Efficiencies				Domestic	@h=100	Inhibition Levels			
	Primary	Activated sludge	Trickling Fltr	Tertiary	Level	WQS*	Activated sludge	Trickling Fltr	Nitrification	Digestion
Ag	20%	75%	66%	62%	0.019	0.0001	0.25	0.25		13
As	NA	45%	NA	na	0.007	0.19	0.1	0.1	1.5	1.6
Cd*	15%	67%	68%	50%	0.008	0.0011	1	1	5.2	20
CN	27%	69%	59%	66%	0.082	0.005	0.1	0.1		4
Cr	27%	82%	55%	72%	0.034	0.2	1	1	1	100
Cr6		10%								
Cu*	22%	86%	55%	85%	0.061	0.012	1	1	0.48	40
Hg	10%	60%	50%	67%	0.002	1.2	0.1	0.1		NA
Ni*	14%	42%	29%	17%	0.047	0.16	1	1	0.5	10
Pb*	57%	61%	55%	52%	0.058	0.032	1	1	0.5	340
Se		33%								
Zn*	27%	79%	67%	78%	0.231	0.11	5	5	0.5	400

*Hardness Dependent (This table assumes Hardness=100)

all values in mg/l unless stated

	Appendix E - Land Application of Sludge		
	Ceiling Concentration	Cumulative Pollutatnt Loading	Annual Pollutant Loading Rate
As	75	37	1.8
Cd*	85	35	1.7
Cu*	4300	1338	67
Hg	57	15	0.76
Mo	75	-	-
Ni*	420	375	19
Pb*	840	268	13
Se	100	89	4.5
Zn*	7500	2498	125

MWEA committee 2012 survey Fixed Film Total Plant removal	
Ag	68
As	70
Cd*	67
CN	-
Cr	43
Cu*	87
Hg	-
Mo	20
Ni*	34
Pb*	83
Zn*	85

Site Specific Data from Dexter WWTP Samplings	
Ag	89.6
As	69.8
Cd*	80.3
CN	-
Cr	79.0
Cu*	93.9
Hg	91.4
Mo	27.4
Ni*	5.7
Pb*	84.6
Se	-
Zn*	94.80

Michigan Part 57 Water Quality values

	Final Chronic Values	
Ag	0.0001	=.06/1000
As	0.150	=150/1000
Cd*	0.005	=(EXP(0.7852*(LN(255))-2.715))/1000
CN	0.0052	=5.2/1000
Cr	0.0110	=11/1000
Cu*	0.0199	=(EXP(0.8545*(LN(255))-1.702))*0.96/1000
Hg	0.00077	=.77/1000
Mo	0.005	=5/1000
Ni*	0.115	=(EXP(0.846*(LN(255))+0.0584))*0.997/1000
Pb*	0.043	=(EXP(0.9859*(LN(255))-1.270))*(1.46203-((LN(255))*(0.14571)))/1000
Se	0.005	=5/1000
Zn*	0.261	=(EXP(0.8473*(LN(255))+0.884))*0.986/1000

Michigan Part 57 Water Quality values

	Acute Values	
Ag	0.0011	=1.1/1000
As	0.68	=680/1000
Cd*	0.013	=(EXP(1.128*(LN(255))-3.6867))/1000
CN	0.044	=44/1000
Cr	0.032	=32/1000
Cu*	0.032	=(EXP(0.9422*(LN(255))-1.7))*0.96/1000
Hg	0.0028	=2.8/1000
Mo	0.120	=120/1000
Ni*	2.07	=(EXP(0.846*(LN(255))+2.255))*(0.998*2)/1000
Pb*	0.831	=(EXP(0.9859*(LN(255))+0.9904))*(1.46203-((LN(255))*(0.14571)))*2/1000
Se	0.120	=120/1000
Zn*	0.518	=(EXP(0.8473*(LN(255))+0.884))*0.978*2/1000

*Hardness Dependent (This table assumes Hardness=255 as reported by DEQ sampling)

Monthly average Wqbel=[(25%(95%exc) + effluent flow)*FCV-(background conc)*Qr]/effluent flow

Village of Dexter WWTF
Compatibles MAHL

BOD Loading - NPDES Permit Basis

$$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{1 - R_{Avg}}$$

$C_{NPDES,\ Monthly\ avg\ BOD5}$ =	25	mg/L
$R_{Avg,\ BOD5}$ =	0.987	
Q_{POTW} =	0.377	MGD
$L_{NPDES,\ BOD5\ (monthly\ Avg)}$ =	6046	lb/day

BOD Capacity Analysis

Current avg domestic flow	0.2748	MGD
Avg NUBCO Flow	0.013	MGD
Avg Alpha Metals Flow	0.013	MGD
Current other nondomestic flow	0.0762	MGD
Average Influent BOD	262	mg/L
Average primary effluent BOD	226	mg/L
Primary Clarifier Performance		
BOD % removal	14%	
No. of aeration tanks	3	
Volume, each	79,000	gals
Total volume	237,000	gals
	32,250	cf
10 States Loading	40	lb BOD5/1000 cf
Aeration Tank BOD capacity	1290	lb BOD5/day

Total Maximum Allowable Headworks Loading	1495	lb BOD5/day
MAHL (after 10% SF)	1346	lb BOD5/day
Domestic Loading	600	lb BOD5/day
Reserve Loading	113	lb BOD5/day
MAIL BOD (after 10% SF)	633	lb BOD5/day

Allocation of avg. BOD MAIL to Non-Domestic Users

Alpha Metals Flow	0.013	MGD
Alpha Metals BOD Conc.	30	mg/L
Alpha Metals Loading	3.3	lb BOD5/day
Proposed Std Local Limit (non-domestic users)	550	mg/L
Non permitted, non domestic loading	350	lb/day
BOD Loading Available for NUBCO	**280**	**Lb/day**
NUBCO Flow	0.013	MGD

DRAFT NUBCO Avg Monthly Limit for BOD5	**2,600**	**mg/L**

TSS Loading - NPDES Permit Basis

$$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{1 - R_{Avg}}$$

$C_{NPDES,\ Monthly\ avg\ TSS}$ =	30	mg/L
$R_{Avg,\ TSS}$ =	0.955	
Q_{POTW} =	0.377	MGD
$L_{NPDES,\ TSS\ (monthly\ Avg)}$ =	2096	lb/day

TSS Capacity Analysis

Primary Clarifiers		
Surface Area	1414	sf
Design Avg Solids Loading Rate*	1.12	lbs/sf
Design Avg Loading (MAHL)	1,583	lbs/day
Design Peak Solids Loading Rate*	2.5	lbs/sf
Design Peak Loading	3,534	lbs/day

*Source - September 2011 Dexter O&M Manual by OHM

Avg Domestic TSS	250	mg/L
Avg raw influent TSS loading	573	lb/day
Avg NUBCO TSS	530	mg/L
Avg NUBCO Loading	57	lb/day
Avg WAS Flow Rate	0.0015	MGD
Avg WAS TSS	7,127	mg/L
WAS Loading	89	lb/day
MAHL (with 10% SF)	1425	lb/day
Domestic Loading, Current	662	lb/day
Reserve Loading	128	lb/day
MAIL TSS w/ 10% SF	635	lb/day

Allocation of Avg. MAIL to IUs

Alpha Metals Flow	0.013	MGD
Alpha Metals TSS Conc. (permit limit)	350	mg/L
Alpha Metals Loading	37.9	lb BOD5/day
Proposed Std Local Limit (non-domestic users), avg monthly	600	mg/L
Non permitted, non domestic loading	381	lb/day
TSS Loading Available for NUBCO	**215.7**	**Lb/day**
NUBCO Future Flow	0.013	MGD
DRAFT NUBCO Avg Monthly Limit for TSS	**2,000**	**mg/L**

Allocation of Max Day MAIL to IUs

Max Daily Allowable Headworks Loading	2,096	lb TSS/day
MAHL with 10% SF	1,887	lb TSS/day
Max Day Domestic Loading	662	lb TSS/day
Reserve Loading	128	lbs TSS/day
Max Daily MAIL (after 10% safety factor)	1,096	lbs TSS/day
Alpha Metals Flow	0.013	MGD
Alpha Metals TSS Conc. (permit limit)	350	mg/L
Alpha Metals Loading	37.9	lb BOD5/day
Proposed Std Local Limit (non-domestic users), max day	1000	mg/L
Non permitted, non domestic loading	636	lb/day
TSS Loading Available for NUBCO	**422.9**	**Lb/day**
NUBCO Future Flow	0.013	MGD
Calculated NUBCO Daily Max Allowed	3,900	mg/L

Phosphorus Loading - NPDES Permit Basis

$$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{1 - R_{Avg}}$$

$C_{NPDES, Monthly\ avg\ Phos}$ =	0.6	mg/L
$R_{Avg, Phos}$ =	0.96	
Q_{POTW} =	0.377	MGD
$L_{NPDES, Phos\ (monthly\ Avg)}$ =	47	lb/day

Phosphorus Capacity Analysis

Existing ferric chloride feed system consists of two 48 gpd metering pumps
In general 3.6 lbs of iron is required per lb of phosphorus loaded
Feeding 38% ferric chloride, which contains 1.53 lbs iron per gallon of solution
ASSUMING: all phosphorus is soluble and needs FeCl3 treatment

Avg daily iron dosage =	146.88	lbs Fe, capacity of one mete
Avg phosphorus MAHL (with 10% SF) =	**36.7**	lbs P
	15.3	mg/L if uniform allocation
Domestic influent phosphorus conc. =	6.05	mg/L
Domestic phosphorus loading	13.9	lb/day
Reserve Loading	12	lb/day
MAIL phosphorus w/ 10% SF	10.9	lb/day
Allocation of MAIL to IUs		
Alpha Metals Flow	0.013	MGD
Alpha Metals phos. conc. (permit limit)	16	mg/L
Alpha Metals Loading	1.7	lb phos/day
Proposed Std Local Limit (non-domestic users)	12	mg/L
Non permitted, non domestic loading	7.6	lb/day
Phosphorus Loading Available for NUBCO	**1.5**	**Lb/day**
NUBCO Future Flow	0.013	MGD
DRAFT NUBCO Limit for phosphorus	**14**	**mg/L**

Daily Max = Monthly Avg for Phosphorus due to relatively low phosphorus NPDES limitation and pending TM

Ammonia Loading - NPDES Permit Basis

$$L_{NPDES} = \frac{8.34 * C_{NPDES} * Q_{POTW}}{1 - R_{Avg}}$$

$C_{NPDES,\ Monthly\ avg\ Ammonia}$ =	12	mg/L
$R_{Avg,\ Ammonia}$ =	0.963	
Q_{POTW} =	0.377	MGD
$L_{NPDES,\ Ammonia\ (monthly\ Avg)}$ =	1020	lb/day
Ammonia MAHL (with 10% SF)	918	lb/day
Avg Influent Ammonia	36	mg/L
Domestic Loading	83	lb/day
Reserve Loading	100	lb/day
MAIL w/ 10% SF	**735**	**lb/day**

Allocation of Ammonia MAIL

Alpha Metals Flow	0.013	MGD
Alpha Metals avg ammonia conc.	25	mg/L
Alpha Metals Loading	2.7	lb/day
Proposed Std Local Limit (non-domestic users)	42	mg/L
Non permitted, non domestic loading	27	lb/day
Ammonia Loading Available for NUBCO	**706**	**Lb/day**
NUBCO Future Flow	0.013	MGD
Available NUBCO Limit for ammonia	6,510	mg/L
Draft NUBCO Limit for ammonia	**42**	**mg/L**

WWTP Raw Influent

Date	Arsenic	Cadmium	Chromium, Total	Chromium, Hexavalent	Copper	Cyanide	Lead	Molybdenum	Nickel	Selenium	Silver	Zinc	Mercury	TKN	Ammonia N	BOD	TSS	Total Phos
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
9/13/2012	0.0024	0.0001	0.0086	0.0025	0.21	0.0025	0.0026	0.001	0.0063	0.0004	0.0001	0.16		53	39.8	333	284	7.06
9/18/2012	0.0013	0.0001	0.0052	0.0025	0.18	0.0025	0.0026	0.0098	0.0062	0.0004	0.0012	0.49		64	33	277	250	5.58
9/19/2012	0.0012	0.0002	0.0082	0.0025	0.18	0.0025	0.0025	0.0054	0.0064	0.0004	0.002	0.8		78	36.5	367	230	6.51
9/27/2012	0.001	0.0002	0.0042	0.0025	0.22	0.0025	0.0027	0.0055	0.0072	0.0004	0.0006	0.15	0.000031	45	36	363	207	5.97
10/2/2012															31.05	312	232	6.31
10/3/2012													0.000043		30.2	403	209	6.29
10/4/2012															51.8	332	315	6.65
10/5/2012															37.15	235	226	6.21
11/28/2012															41.15	279	273	7.18
12/12/2012	0.0003	0.0001	0.01	0.0025	0.22	0.0025	0.0024	0.01	0.0091	0.0004	0.0009	0.11				213	242	7.41
AVG	0.0012	0.0001	0.00724	0.0025	0.202	0.0025	0.0026	0.00634	0.007	0.0004	0.0010	0.34	0.000037	60	37.4	311.4	246.8	6.517

WWTP Effluent

Date	Arsenic	Cadmium	Chromium, Total	Chromium, Hexavalent	Copper	Cyanide	Lead	Molybdenum	Nickel	Selenium	Silver	Zinc	Mercury	TKN	Ammonia N	BOD	TSS	Total Phos
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
9/13/2012	0.0009	3E-05	0.0023	0.012	0.014	0.0025	0.0005	0.0014	0.0066	0.0004	0.0001	0.021		0.8	0.035	6	11	0.68
9/18/2012	0.0003	3E-05	0.00084	0.0056	0.0083	0.0025	0.0002	0.0061	0.0056	0.0004	0.0001	0.014		1.9	0.13	5	7	0.3
9/19/2012	0.0003	2E-05	0.00084	0.0083	0.0068	0.0025	0.0001	0.0047	0.0052	0.0004	0.0001	0.014		2	0.1	8	5	0.32
9/27/2012	0.0003	2E-05	0.00054	0.0025	0.021	0.0025	0.0008	0.0047	0.0076	0.0004	0.0001	0.023	2.7E-06	0.83	0.45	5	5	0.23
10/2/2012															0.065	5	10	0.27
10/3/2012													3.7E-06		0.08	3	4	0.26
10/4/2012															0.63	5	7	0.33
10/5/2012															1.22	4	6	0.36
11/28/2012															0.08	4.5	5	0.18
12/12/2012	0.0003	2E-05	0.0031	0.0073	0.012	0.0025	0.0003	0.0061	0.0082	0.0004	0.0001	0.017				4	5	0.11
AVG	0.0004	0.00003	0.001524	0.00714	0.0124	0.0025	0.0004	0.0046	0.0066	0.0004	0.0001	0.0178	3.2E-06	1.3825	0.31	4.95	6.5	0.304

Jolly Pumpkin Brewery Discharge

Bishop Circle Site (Current Location)

Date	Arsenic mg/L	Cadmium mg/L	Chromium, Total mg/L	Chromium, Hexavalent mg/L	Copper mg/L	Cyanide mg/L	Lead mg/L	Molybdenum mg/L	Nickel mg/L	Selenium mg/L	Silver mg/L	Zinc mg/L	Mercury mg/L	TKN mg/L	Ammonia N mg/L	BOD mg/L	TSS mg/L	Total Phos mg/L
9/27/2012	0.0012	0.0001	0.014	0.0025	0.15	0.0025	0.0056	0.0037	0.01	0.0004	0.0001	0.12		40	0.44	3427	279	22.4
10/1/2012													0.000026		6.5	6340	665	36.5
10/2/2012															3	5623	641	40.8
Avg															3.3	5130	528	33

Different Brewery that is expected to be similar to new Broad Street Site

Date	Ammonia N mg/L	BOD mg/L	TSS mg/L	Total Phos mg/L	pH SU
3/9/2011	15	3100	60		6.68

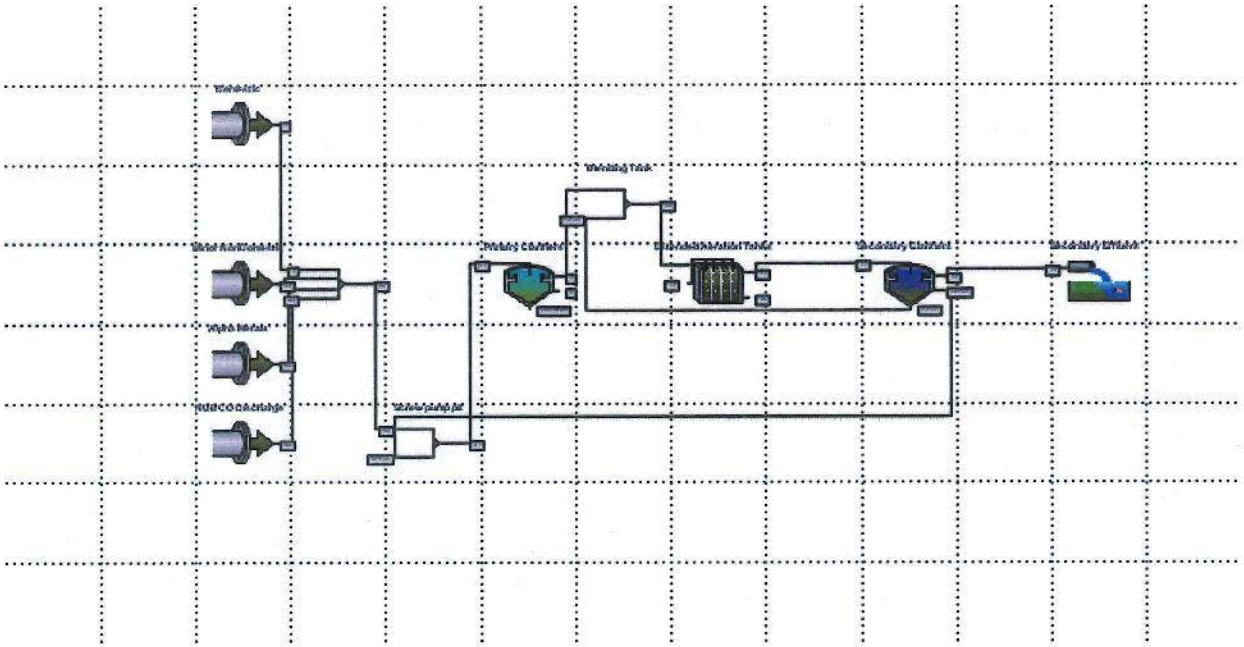
Alpha Metal Discharge

Date	Arsenic mg/L	Cadmium mg/L	Chromium, Total mg/L	Chromium, Hexavalent mg/L	Copper mg/L	Cyanide mg/L	Lead mg/L	Molybdenum mg/L	Nickel mg/L	Selenium mg/L	Silver mg/L	Zinc mg/L	Mercury mg/L	TKN mg/L	mmonia mg/L	BOD mg/L	TSS mg/L	otal Pho mg/L
10/3/2012													0.0003		32	28	348	5.36
10/4/2012	0.0019	0.0006	0.2	0.0025	0.37	0.0025	0.038	0.0077	0.12	0.0004	0.003	0.58		27	17	28	337	1.9
10/5/2012															17.9	24	483	3.65
urrent Permit Limits		**0.013**	**0.5**		**0.94**	**0.1**	**0.2**		**0.14**		**0.02**	**0.58**					**350**	**16**

Residential Manhole Wastewater

Date	Arsenic	Cadmium	Chromium, Total	Chromium, Hexavalent	Copper	Cyanide	Lead	Molybdenum	Nickel	Selenium	Silver	Zinc	Mercury	TKN	mmonia	BOD	TSS	otal Pho
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
9/27/2012	0.00025	0.0001	0.0027	0.0063	0.25	0.0025	0.001	0.0064	0.0064	0.0004	0.0001	0.098		35	23.5	248	192.5	5.01
10/2/2012															40	315	295	6.71
10/3/2012															42	293	262	6.44
11/28/2012															29.65	236	245	4.61
12/12/2012	0.00025	0.0001	0.0048	0.0025	0.12	0.0025	0.0023	0.0053	0.0066	0.0004	0.0003	0.12			23.7	222	393	5.59
Avg	0.00025	0.0001	0.00375	0.0044	0.185	0.0025	0.0016	0.00585	0.0065	0.0004	0.0002	0.109		35	31.77	262.8	277.5	5.672

dxtr_all_nondomestics_mahl Thu Feb 07 10:44:22 EST 2013 **Max Daily MAHL**



Simulation Setup

Time

stopping time	0	[d]
communication interval	0.05	[d]
date and time at t=0	2006	[yr,m,d,h,min,s]
	1	
	1	
	0	
	0	
	0	
initial time	0	[d]

Rounding

Wastewater Influent

codstates	Domestic	Minor NonDomestic	Alpha Metals	NUBCO Discharge
Influent Composition				
Influent Composition				
total COD	490 [gCOD/m3]	1500 [gCOD/m3]	80 [gCOD/m3]	5800 [gCOD/m3]
total TKN	40 [gN/m3]	60 [gN/m3]	40 [gN/m3]	50 [gN/m3]
free and ionized ammonia	35 [gN/m3]	42 [gN/m3]	25 [gN/m3]	42 [gN/m3]
Dissolved Oxygen				
dissolved oxygen	0 [gO2/m3]	0 [gO2/m3]	0 [gO2/m3]	0 [gO2/m3]
Nitrogen Compounds				
nitrate and nitrite	0 [gN/m3]	0 [gN/m3]	0 [gN/m3]	0 [gN/m3]
dinitrogen	0 [gN/m3]	0 [gN/m3]	0 [gN/m3]	0 [gN/m3]
Alkalinity				
alkalinity	7 [mole/m3]	7 [mole/m3]	7 [mole/m3]	7 [mole/m3]
Influent Stoichiometry				
Local Model Selection				
base composite variables on ...	Mantis	Mantis	Mantis	Mantis
Influent Fractions				
XCOD/VSS ratio	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]
BOD5/BODultimate ratio	0.66 [-]	0.66 [-]	0.66 [-]	0.8 [-]
VSS/TSS ratio	0.75 [gVSS/gTSS]	0.75 [gVSS/gTSS]	0.4 [gVSS/gTSS]	0.8 [gVSS/gTSS]
Mantis Nutrient Fractions				
N content of active biomass	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]
N content of endogenous/inert mass	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]
ASM1 Nutrient Fractions				
N content of active biomass	0.086 [gN/gCOD]	0.086 [gN/gCOD]	0.086 [gN/gCOD]	0.086 [gN/gCOD]
N content of endogenous/inert mass	0.06 [gN/gCOD]	0.06 [gN/gCOD]	0.06 [gN/gCOD]	0.06 [gN/gCOD]
ASM3 Nutrient Fractions				
N content of active biomass	0.07 [gN/gCOD]	0.07 [gN/gCOD]	0.07 [gN/gCOD]	0.07 [gN/gCOD]
N content of particulate inert material	0.02 [gN/gCOD]	0.02 [gN/gCOD]	0.02 [gN/gCOD]	0.02 [gN/gCOD]
N content of particulate substrate	0.04 [gN/gCOD]	0.04 [gN/gCOD]	0.04 [gN/gCOD]	0.04 [gN/gCOD]
N content of soluble inert material	0.01 [gN/gCOD]	0.01 [gN/gCOD]	0.01 [gN/gCOD]	0.01 [gN/gCOD]
N content of soluble substrate	0.03 [gN/gCOD]	0.03 [gN/gCOD]	0.03 [gN/gCOD]	0.03 [gN/gCOD]
Organic Fractions				
soluble inert fraction of total COD	0.05 [-]	0.05 [-]	0.05 [-]	0.03 [-]
readily biodegradable fraction of total COD	0.2 [-]	0.2 [-]	0.2 [-]	0.2 [-]
particulate inert fraction of total COD	0.13 [-]	0.13 [-]	0.13 [-]	0.13 [-]
part. cell decay products fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
heterotrophic biomass fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
autotrophic biomass fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
stored fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]

Nitrogen Fractions

ammonium fraction of soluble TKN	0.9 [-]		0.9 [-]		0.9 [-]		0.9 [-]

Load Type Options

Load Type

loadtype	Data		Data		Data		Data

Optional Load Type Data

Sinusoidal Load

amplitude scaling factor	0.2 [-]		0.2 [-]		0.2 [-]		0.2 [-]
time shift	0.35 [d]		0.35 [d]		0.35 [d]		0.35 [d]
sine wave frequency	1 [1/d]		1 [1/d]		1 [1/d]		1 [1/d]

Diurnal Data

diurnal COD data	0	130 [mg/L]	0	130 [mg/L]	0	130 [mg/L]	0	130 [mg/L]
	1	135	1	135	1	135	1	135
	2	140	2	140	2	140	2	140
	3	140	3	140	3	140	3	140
	4	140	4	140	4	140	4	140
	5	160	5	160	5	160	5	160
	6	180	6	180	6	180	6	180
	7	190	7	190	7	190	7	190
	8	200	8	200	8	200	8	200
	9	225	9	225	9	225	9	225
	10	250	10	250	10	250	10	250
	11	235	11	235	11	235	11	235
	12	220	12	220	12	220	12	220
	13	225	13	225	13	225	13	225
	14	230	14	230	14	230	14	230
	15	245	15	245	15	245	15	245
	16	260	16	260	16	260	16	260
	17	255	17	255	17	255	17	255
	18	250	18	250	18	250	18	250
	19	225	19	225	19	225	19	225
	20	200	20	200	20	200	20	200
	21	150	21	150	21	150	21	150
	22	100	22	100	22	100	22	100
	23	115	23	115	23	115	23	115
diurnal TKN data	0	13 [mgN/L]	0	13 [mgN/L]	0	13 [mgN/L]	0	13 [mgN/L]
	1	13	1	13	1	13	1	13
	2	14	2	14	2	14	2	14
	3	14	3	14	3	14	3	14
	4	14	4	14	4	14	4	14
	5	16	5	16	5	16	5	16
	6	18	6	18	6	18	6	18
	7	19	7	19	7	19	7	19
	8	20	8	20	8	20	8	20
	9	22	9	22	9	22	9	22
	10	25	10	25	10	25	10	25
	11	24	11	24	11	24	11	24
	12	22	12	22	12	22	12	22

	13	22		13	22		13	22		13	22	
	14	23		14	23		14	23		14	23	
	15	24		15	24		15	24		15	24	
	16	26		16	26		16	26		16	26	
	17	26		17	26		17	26		17	26	
	18	25		18	25		18	25		18	25	
	19	23		19	23		19	23		19	23	
	20	20		20	20		20	20		20	20	
	21	15		21	15		21	15		21	15	
	22	10		22	10		22	10		22	10	
	23	12		23	12		23	12		23	12	
diurnal ammonia data	0	13	[mgN/L]	0	13	[mgN/L]	0	13	[mgN/L]	0	13	[mgN/L]
	1	13		1	13		1	13		1	13	
	2	14		2	14		2	14		2	14	
	3	14		3	14		3	14		3	14	
	4	14		4	14		4	14		4	14	
	5	16		5	16		5	16		5	16	
	6	18		6	18		6	18		6	18	
	7	19		7	19		7	19		7	19	
	8	20		8	20		8	20		8	20	
	9	22		9	22		9	22		9	22	
	10	25		10	25		10	25		10	25	
	11	24		11	24		11	24		11	24	
	12	22		12	22		12	22		12	22	
	13	22		13	22		13	22		13	22	
	14	23		14	23		14	23		14	23	
	15	24		15	24		15	24		15	24	
	16	26		16	26		16	26		16	26	
	17	26		17	26		17	26		17	26	
	18	25		18	25		18	25		18	25	
	19	23		19	23		19	23		19	23	
	20	20		20	20		20	20		20	20	
	21	15		21	15		21	15		21	15	
	22	10		22	10		22	10		22	10	
	23	12		23	12		23	12		23	12	
Diurnal Fractions												
diurnal COD factor	0	0.74	[-]	0	0.74	[-]	0	0.74	[-]	0	0.74	[-]
	1	0.68		1	0.68		1	0.68		1	0.68	
	2	0.64		2	0.64		2	0.64		2	0.64	
	3	0.63		3	0.63		3	0.63		3	0.63	
	4	0.62		4	0.62		4	0.62		4	0.62	
	5	0.83		5	0.83		5	0.83		5	0.83	
	6	1.05		6	1.05		6	1.05		6	1.05	
	7	1.07		7	1.07		7	1.07		7	1.07	
	8	1.11		8	1.11		8	1.11		8	1.11	
	9	1.07		9	1.07		9	1.07		9	1.07	
	10	1.05		10	1.05		10	1.05		10	1.05	
	11	1.06		11	1.06		11	1.06		11	1.06	
	12	1.06		12	1.06		12	1.06		12	1.06	
	13	1.03		13	1.03		13	1.03		13	1.03	

	14	1.01	14	1.01	14	1.01	14	1.01
	15	1.03	15	1.03	15	1.03	15	1.03
	16	1.09	16	1.09	16	1.09	16	1.09
	17	1.13	17	1.13	17	1.13	17	1.13
	18	1.21	18	1.21	18	1.21	18	1.21
	19	1.27	19	1.27	19	1.27	19	1.27
	20	1.35	20	1.35	20	1.35	20	1.35
	21	1.2	21	1.2	21	1.2	21	1.2
	22	1.06	22	1.06	22	1.06	22	1.06
	23	1.02	23	1.02	23	1.02	23	1.02
diurnal TKN factor	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]
	1	0.68	1	0.68	1	0.68	1	0.68
	2	0.64	2	0.64	2	0.64	2	0.64
	3	0.63	3	0.63	3	0.63	3	0.63
	4	0.62	4	0.62	4	0.62	4	0.62
	5	0.83	5	0.83	5	0.83	5	0.83
	6	1.05	6	1.05	6	1.05	6	1.05
	7	1.07	7	1.07	7	1.07	7	1.07
	8	1.11	8	1.11	8	1.11	8	1.11
	9	1.07	9	1.07	9	1.07	9	1.07
	10	1.05	10	1.05	10	1.05	10	1.05
	11	1.06	11	1.06	11	1.06	11	1.06
	12	1.06	12	1.06	12	1.06	12	1.06
	13	1.03	13	1.03	13	1.03	13	1.03
	14	1.01	14	1.01	14	1.01	14	1.01
	15	1.03	15	1.03	15	1.03	15	1.03
	16	1.09	16	1.09	16	1.09	16	1.09
	17	1.13	17	1.13	17	1.13	17	1.13
	18	1.21	18	1.21	18	1.21	18	1.21
	19	1.27	19	1.27	19	1.27	19	1.27
	20	1.35	20	1.35	20	1.35	20	1.35
	21	1.2	21	1.2	21	1.2	21	1.2
	22	1.06	22	1.06	22	1.06	22	1.06
	23	1.02	23	1.02	23	1.02	23	1.02
diurnal ammonia factor	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]
	1	0.68	1	0.68	1	0.68	1	0.68
	2	0.64	2	0.64	2	0.64	2	0.64
	3	0.63	3	0.63	3	0.63	3	0.63
	4	0.62	4	0.62	4	0.62	4	0.62
	5	0.83	5	0.83	5	0.83	5	0.83
	6	1.05	6	1.05	6	1.05	6	1.05
	7	1.07	7	1.07	7	1.07	7	1.07
	8	1.11	8	1.11	8	1.11	8	1.11
	9	1.07	9	1.07	9	1.07	9	1.07
	10	1.05	10	1.05	10	1.05	10	1.05
	11	1.06	11	1.06	11	1.06	11	1.06
	12	1.06	12	1.06	12	1.06	12	1.06
	13	1.03	13	1.03	13	1.03	13	1.03
	14	1.01	14	1.01	14	1.01	14	1.01
	15	1.03	15	1.03	15	1.03	15	1.03

16	1.09	16	1.09	16	1.09	16	1.09
17	1.13	17	1.13	17	1.13	17	1.13
18	1.21	18	1.21	18	1.21	18	1.21
19	1.27	19	1.27	19	1.27	19	1.27
20	1.35	20	1.35	20	1.35	20	1.35
21	1.2	21	1.2	21	1.2	21	1.2
22	1.06	22	1.06	22	1.06	22	1.06
23	1.02	23	1.02	23	1.02	23	1.02

Operating Cost

Pumping Cost

hydraulic head	0 [ft]	0 [ft]	0 [ft]	0 [ft]
pump efficiency	0.7 [-]	0.7 [-]	0.7 [-]	0.7 [-]
pumping headloss	0 [ft]	0 [ft]	0 [ft]	0 [ft]

Flow Data

Flow Type

flow type	Data	Data	Data	Data

Data

influent flow	0.29 [MGD(US)]	0.0762 [MGD(US)]	0.013 [MGD(US)]	1300 [gpd(US)]

Other Flow Options

Sinusoidal

amplitude scaling factor	0.2 [-]	0.2 [-]	0.2 [-]	0.2 [-]
time shift	0.35 [d]	0.35 [d]	0.35 [d]	0.35 [d]
sine wave frequency	1 [1/d]	1 [1/d]	1 [1/d]	1 [1/d]

Diurnal Flow

diurnal flow data	0	0.391 [MGD(US)]	0	0.391 [MGD(US)]	0	0.391 [MGD(US)]	0	0.391 [MGD(US)]
	1	0.365	1	0.365	1	0.365	1	0.365
	2	0.338	2	0.338	2	0.338	2	0.338
	3	0.333	3	0.333	3	0.333	3	0.333
	4	0.328	4	0.328	4	0.328	4	0.328
	5	0.441	5	0.441	5	0.441	5	0.441
	6	0.555	6	0.555	6	0.555	6	0.555
	7	0.571	7	0.571	7	0.571	7	0.571
	8	0.586	8	0.586	8	0.586	8	0.586
	9	0.571	9	0.571	9	0.571	9	0.571
	10	0.555	10	0.555	10	0.555	10	0.555
	11	0.557	11	0.557	11	0.557	11	0.557
	12	0.56	12	0.56	12	0.56	12	0.56
	13	0.547	13	0.547	13	0.547	13	0.547
	14	0.534	14	0.534	14	0.534	14	0.534
	15	0.555	15	0.555	15	0.555	15	0.555
	16	0.576	16	0.576	16	0.576	16	0.576
	17	0.608	17	0.608	17	0.608	17	0.608
	18	0.639	18	0.639	18	0.639	18	0.639
	19	0.676	19	0.676	19	0.676	19	0.676
	20	0.713	20	0.713	20	0.713	20	0.713

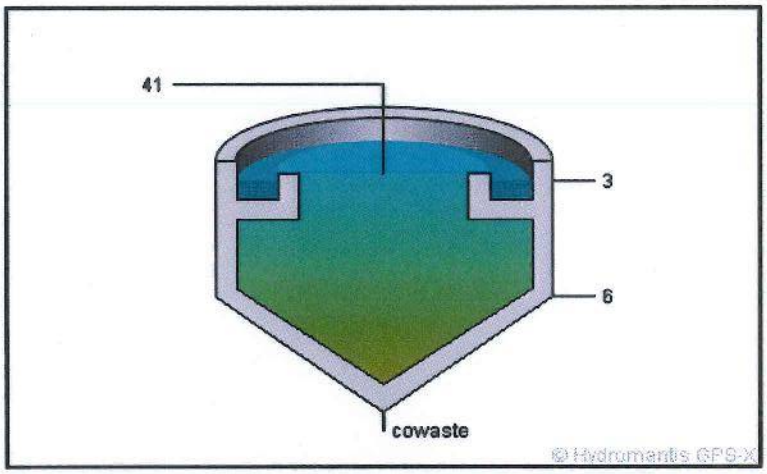
	21	0.637	21	0.637	21	0.637	21	0.637
	22	0.56	22	0.56	22	0.56	22	0.56
	23	0.476	23	0.476	23	0.476	23	0.476
Diurnal Flow Factor (to average)								
diurnal flow factor	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]	0	0.74 [-]
	1	0.68	1	0.68	1	0.68	1	0.68
	2	0.64	2	0.64	2	0.64	2	0.64
	3	0.63	3	0.63	3	0.63	3	0.63
	4	0.62	4	0.62	4	0.62	4	0.62
	5	0.83	5	0.83	5	0.83	5	0.83
	6	1.05	6	1.05	6	1.05	6	1.05
	7	1.07	7	1.07	7	1.07	7	1.07
	8	1.11	8	1.11	8	1.11	8	1.11
	9	1.07	9	1.07	9	1.07	9	1.07
	10	1.05	10	1.05	10	1.05	10	1.05
	11	1.06	11	1.06	11	1.06	11	1.06
	12	1.06	12	1.06	12	1.06	12	1.06
	13	1.03	13	1.03	13	1.03	13	1.03
	14	1.01	14	1.01	14	1.01	14	1.01
	15	1.03	15	1.03	15	1.03	15	1.03
	16	1.09	16	1.09	16	1.09	16	1.09
	17	1.13	17	1.13	17	1.13	17	1.13
	18	1.21	18	1.21	18	1.21	18	1.21
	19	1.27	19	1.27	19	1.27	19	1.27
	20	1.35	20	1.35	20	1.35	20	1.35
	21	1.2	21	1.2	21	1.2	21	1.2
	22	1.06	22	1.06	22	1.06	22	1.06
	23	1.02	23	1.02	23	1.02	23	1.02
Runoff								
rainfall depths		0 [mm/h]		0 [mm/h]		0 [mm/h]		0 [mm/h]
catchment area		1.25E+09 [ft2]		1.25E+09 [ft2]		1.25E+09 [ft2]		1.25E+09 [ft2]
direct runoff coefficient		0.15		0.15		0.15		0.15
indirect runoff coefficient		0.2		0.2		0.2		0.2
direct decay		0.9 [1/d]		0.9 [1/d]		0.9 [1/d]		0.9 [1/d]
indirect decay		0.5 [1/d]		0.5 [1/d]		0.5 [1/d]		0.5 [1/d]
initial direct volume		0 [gal(US)]		0 [gal(US)]		0 [gal(US)]		0 [gal(US)]
initial indirect volume		0 [gal(US)]		0 [gal(US)]		0 [gal(US)]		0 [gal(US)]
Output Variables(influent)		1		63		64		45
Model Information								
Biological Model								
biological model ID		4		4		4		4
biological model								
Flow								
Flow								
flow		0.29 [MGD(US)]		0.0762 [MGD(US)]		0.013 [MGD(US)]		0.0013 [MGD(US)]
Composite Variables								

Volatile Fraction				
VSS/TSS ratio	0.75 [gVSS/gTSS]	0.75 [gVSS/gTSS]	0.4 [gVSS/gTSS]	0.8 [gVSS/gTSS]
Composite Variables				
total suspended solids	272 [mg/L]	833 [mg/L]	83.3 [mg/L]	3100 [mg/L]
volatile suspended solids	204 [mg/L]	625 [mg/L]	33.3 [mg/L]	2480 [mg/L]
total inorganic suspended solids	68.1 [mg/L]	208 [mg/L]	50 [mg/L]	620 [mg/L]
total carbonaceous BOD5	265 [mgO2/L]	812 [mgO2/L]	43.3 [mgO2/L]	3900 [mgO2/L]
total COD	490 [mgCOD/L]	1500 [mgCOD/L]	80 [mgCOD/L]	5800 [mgCOD/L]
total TKN	40 [mgN/L]	60 [mgN/L]	40 [mgN/L]	50 [mgN/L]
Additional Composite Variables				
filtered carbonaceous BOD5	64.7 [mgO2/L]	198 [mgO2/L]	10.6 [mgO2/L]	928 [mgO2/L]
particulate carbonaceous BOD5	201 [mgO2/L]	614 [mgO2/L]	32.7 [mgO2/L]	2970 [mgO2/L]
filtered ultimate carbonaceous BOD	98 [mgO2/L]	300 [mgO2/L]	16 [mgO2/L]	1160 [mgO2/L]
particulate ultimate carbonaceous BOD	304 [mgO2/L]	930 [mgO2/L]	49.6 [mgO2/L]	3710 [mgO2/L]
total ultimate carbonaceous BOD	402 [mgO2/L]	1230 [mgO2/L]	65.6 [mgO2/L]	4870 [mgO2/L]
filtered COD	123 [mgCOD/L]	375 [mgCOD/L]	20 [mgCOD/L]	1330 [mgCOD/L]
particulate COD	368 [mgCOD/L]	1130 [mgCOD/L]	60 [mgCOD/L]	4470 [mgCOD/L]
filtered TKN	38.9 [mgN/L]	46.7 [mgN/L]	27.8 [mgN/L]	46.7 [mgN/L]
particulate TKN	1.11 [mgN/L]	13.3 [mgN/L]	12.2 [mgN/L]	3.33 [mgN/L]
total nitrogen	40 [mgN/L]	60 [mgN/L]	40 [mgN/L]	50 [mgN/L]
State Variables				
Inorganic Suspended Solids				
inert inorganic suspended solids	68.1 [mg/L]	208 [mg/L]	50 [mg/L]	620 [mg/L]
Organic Variables				
soluble inert organic material	24.5 [mgCOD/L]	75 [mgCOD/L]	4 [mgCOD/L]	174 [mgCOD/L]
readily biodegradable substrate	98 [mgCOD/L]	300 [mgCOD/L]	16 [mgCOD/L]	1160 [mgCOD/L]
particulate inert organic material	63.7 [mgCOD/L]	195 [mgCOD/L]	10.4 [mgCOD/L]	754 [mgCOD/L]
slowly biodegradable substrate	304 [mgCOD/L]	930 [mgCOD/L]	49.6 [mgCOD/L]	3710 [mgCOD/L]
active heterotrophic biomass	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]
active autotrophic biomass	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]
unbiodegradable particulates from cell decay	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]
internal cell storage product	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]	0 [mgCOD/L]
Dissolved Oxygen				
dissolved oxygen	0 [mgO2/L]	0 [mgO2/L]	0 [mgO2/L]	0 [mgO2/L]
Nitrogen Compounds				
free and ionized ammonia	35 [mgN/L]	42 [mgN/L]	25 [mgN/L]	42 [mgN/L]
soluble biodegradable organic nitrogen	3.89 [mgN/L]	4.67 [mgN/L]	2.78 [mgN/L]	4.67 [mgN/L]
particulate biodegradable organic nitrogen	0 [mgN/L]	0.0733 [mgN/L]	11.5 [mgN/L]	0 [mgN/L]
nitrate and nitrite	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]
dinitrogen	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]
Alkalinity				
alkalinity	350 [mgCaCO3/L]	350 [mgCaCO3/L]	350 [mgCaCO3/L]	350 [mgCaCO3/L]
Runoff Variables				
Runoff Variables				
stored direct volume	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]
stored indirect volume	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]	2.64E-08 [gal(US)]
stored direct volume change	-2.4E-08 [gal(US)]	-2.4E-08 [gal(US)]	-2.4E-08 [gal(US)]	-2.4E-08 [gal(US)]
stored indirect volume change	-1.3E-08 [gal(US)]	-1.3E-08 [gal(US)]	-1.3E-08 [gal(US)]	-1.3E-08 [gal(US)]
excess rainfall	0 [MGD(US)]	0 [MGD(US)]	0 [MGD(US)]	0 [MGD(US)]
Model Stoichiometry				

Organic Fractions				
XCOD/VSS ratio	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]
BOD5/BODultimate ratio	0.66 [-]	0.66 [-]	0.66 [-]	0.8 [-]
Nutrient Fractions				
N content of soluble inert organic material	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]
N content of readily biodegradable substrate	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]
N content of particulate inert organic material	0.0174 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.00442 [gN/gCOD]
N content of slowly biodegradable substrate	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]	0 [gN/gCOD]
N content of unbiodegradable particulates from cell decay	0.0174 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.00442 [gN/gCOD]
N content of active heterotrophic biomass	0.0174 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.00442 [gN/gCOD]
N content of active autotrophic biomass	0.0174 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.00442 [gN/gCOD]
Operating Cost				
Pumping Energy Cost				
pumping power	0 [hp]	0 [hp]	0 [hp]	0 [hp]
cumulative pumping energy required	0 [kWh]	0 [kWh]	0 [kWh]	0 [kWh]
cumulative pumping energy cost	0 [$]	0 [$]	0 [$]	0 [$]
Influent Composition				
Influent Composition				
total COD	490 [mgCOD/L]	1500 [mgCOD/L]	80 [mgCOD/L]	5800 [mgCOD/L]
total TKN	40 [mgN/L]	60 [mgN/L]	40 [mgN/L]	50 [mgN/L]
free and ionized ammonia	35 [mgN/L]	42 [mgN/L]	25 [mgN/L]	42 [mgN/L]
Dissolved Oxygen				
dissolved oxygen	0 [mgO2/L]	0 [mgO2/L]	0 [mgO2/L]	0 [mgO2/L]
Nitrogen Compounds				
nitrate and nitrite	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]
dinitrogen	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]	0 [mgN/L]
Alkalinity				
alkalinity	350 [mgCaCO3/L]	350 [mgCaCO3/L]	350 [mgCaCO3/L]	350 [mgCaCO3/L]
Influent Stoichiometry				
Local Model Selection				
base composite variables on ...	4	4	4	4
Influent Fractions				
XCOD/VSS ratio	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]	1.8 [gCOD/gVSS]
BOD5/BODultimate ratio	0.66 [-]	0.66 [-]	0.66 [-]	0.8 [-]
VSS/TSS ratio	0.75 [gVSS/gTSS]	0.75 [gVSS/gTSS]	0.4 [gVSS/gTSS]	0.8 [gVSS/gTSS]
Mantis Nutrient Fractions				
N content of active biomass	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]
N content of endogenous/inert mass	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]	0.068 [gN/gCOD]
ASM1 Nutrient Fractions				
N content of active biomass	0.086 [gN/gCOD]	0.086 [gN/gCOD]	0.086 [gN/gCOD]	0.086 [gN/gCOD]
N content of endogenous/inert mass	0.06 [gN/gCOD]	0.06 [gN/gCOD]	0.06 [gN/gCOD]	0.06 [gN/gCOD]
ASM3 Nutrient Fractions				
N content of active biomass	0.07 [gN/gCOD]	0.07 [gN/gCOD]	0.07 [gN/gCOD]	0.07 [gN/gCOD]
N content of particulate inert material	0.02 [gN/gCOD]	0.02 [gN/gCOD]	0.02 [gN/gCOD]	0.02 [gN/gCOD]
N content of particulate substrate	0.04 [gN/gCOD]	0.04 [gN/gCOD]	0.04 [gN/gCOD]	0.04 [gN/gCOD]
N content of soluble inert material	0.01 [gN/gCOD]	0.01 [gN/gCOD]	0.01 [gN/gCOD]	0.01 [gN/gCOD]
N content of soluble substrate	0.03 [gN/gCOD]	0.03 [gN/gCOD]	0.03 [gN/gCOD]	0.03 [gN/gCOD]
Organic Fractions				
soluble inert fraction of total COD	0.05 [-]	0.05 [-]	0.05 [-]	0.03 [-]
readily biodegradable fraction of total COD	0.2 [-]	0.2 [-]	0.2 [-]	0.2 [-]

particulate inert fraction of total COD	0.13 [-]	0.13 [-]	0.13 [-]	0.13 [-]
part. cell decay products fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
heterotrophic biomass fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
autotrophic biomass fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
stored fraction of total COD	0 [-]	0 [-]	0 [-]	0 [-]
Nitrogen Fractions				
ammonium fraction of soluble TKN	0.9 [-]	0.9 [-]	0.9 [-]	0.9 [-]
Load Type Options				
Load Type				
loadtype	1	1	1	1
Optional Load Type Data				
Sinusoidal Load				
amplitude scaling factor	0.2 [-]	0.2 [-]	0.2 [-]	0.2 [-]
time shift	0.35 [d]	0.35 [d]	0.35 [d]	0.35 [d]
sine wave frequency	1 [1/d]	1 [1/d]	1 [1/d]	1 [1/d]
Operating Cost				
Pumping Cost				
hydraulic head	0 [ft]	0 [ft]	0 [ft]	0 [ft]
pump efficiency	0.7 [-]	0.7 [-]	0.7 [-]	0.7 [-]
pumping headloss	0 [ft]	0 [ft]	0 [ft]	0 [ft]
Flow Data				
Flow Type				
flow type	1	1	1	1
Data				
influent flow	0.29 [MGD(US)]	0.0762 [MGD(US)]	0.013 [MGD(US)]	0.0013 [MGD(US)]
Other Flow Options				
Sinusoidal				
amplitude scaling factor	0.2 [-]	0.2 [-]	0.2 [-]	0.2 [-]
time shift	0.35 [d]	0.35 [d]	0.35 [d]	0.35 [d]
sine wave frequency	1 [1/d]	1 [1/d]	1 [1/d]	1 [1/d]
Runoff				
rainfall depths	0 [mm/h]	0 [mm/h]	0 [mm/h]	0 [mm/h]
catchment area	1.25E+09 [ft2]	1.25E+09 [ft2]	1.25E+09 [ft2]	1.25E+09 [ft2]
direct runoff coefficient	0.15	0.15	0.15	0.15
indirect runoff coefficient	0.2	0.2	0.2	0.2
direct decay	0.9 [1/d]	0.9 [1/d]	0.9 [1/d]	0.9 [1/d]
indirect decay	0.5 [1/d]	0.5 [1/d]	0.5 [1/d]	0.5 [1/d]
initial direct volume	0 [gal(US)]	0 [gal(US)]	0 [gal(US)]	0 [gal(US)]
initial indirect volume	0 [gal(US)]	0 [gal(US)]	0 [gal(US)]	0 [gal(US)]

Primary Clarifiers



		41	3	6	cowaste
Flow	MGD(US)	0.382	0.378	0	0.004

Simulation Results

		41	3
Flow	MGD(US)	0.382	0.378
TSS	mg/L	424.66141	47.838631
VSS	mg/L	317.59474	35.777438
cBOD5	mg/L	384.19987	125.02762
COD	mg/L	735.76276	236.54119
TKN	mgN/L	46.720937	40.704409
Alkalinity	mgCaCO3/L	348.96698	348.96698

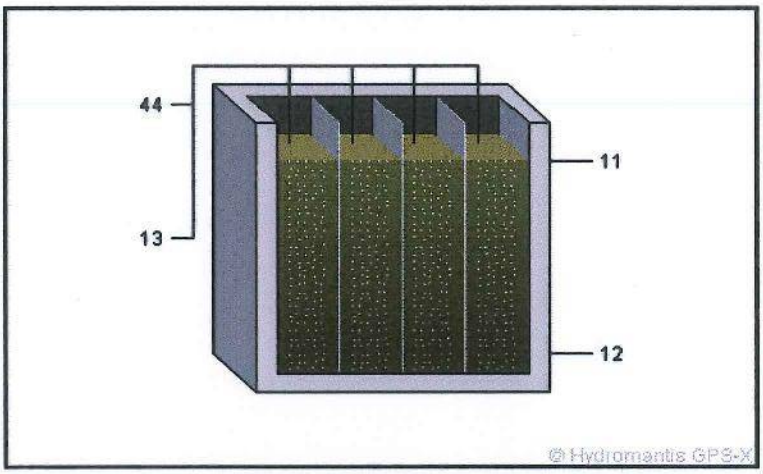
Operational Variables

		3	cowaste
HRT	h	7.2546917	-
Surf. Overflow Rate	gal(US)/(ft2.d)	267.32748	-
Solids Loading Rate	lb/(ft2.d)	0.9574231	-
TSS Rem. Eff.	%	88.734877	-
cBOD5 Rem. Eff.	%	67.457663	-
TN Rem. Eff.	%	12.841004	-
Water Level	ft	12.75	-
Sludge Blanket Height	ft	5.4554555	-
Raw Sludge Flow	MGD(US)	-	0.004
Raw Sludge Solids	mg/L	-	36042.085
Raw Sludge Production	lb/d	-	1203.1393

Mass Flows

		41	3	6	cowaste	Total In	Total Out
TSS	lb/d	1353.7963	150.90989	0	1203.1393	1353.7963	1354.0492
COD	lb/d	2345.5695	746.18365	0	1599.7209	2345.5695	2345.9046
TN	lb/d	149.36796	128.8244	0	20.547601	149.36796	149.372

Extended Aeration Tanks



		44	11	12	13
Flow	MGD(US)	0.658	0.658	0	0

Simulation Results

		44	11(1)	11
MLSS	mg/L	4186.6656	4185.7056	4185.7056
MLVSS	mg/L	3092.642	3091.6787	3091.6787
Soluble COD	mg/L	114.89295	36.227412	36.227412
Ammonia N	mgN/L	20.848897	0.4701629	0.4701629
Nitrite/Nitrate N	mgN/L	14.499522	33.894205	33.894205
Alkalinity	mgCaCO3/L	237.45965	86.924747	86.924747
HRT	h	-	8.6443471	-
DO	mgO2/L	-	2.0000001	-
Total OUR	mgO2/(L.h)	-	21.140792	-
Nitrification Rate	mgN/(L.h)	-	2.5983888	-
Nitrate Util. Rate	mgN/(L.h)	-	0.1821336	-
Air Flow	cfm	-	440.56557	-
SOTE	%	-	30	-
Actual OTR	lb/h	-	42.271019	-

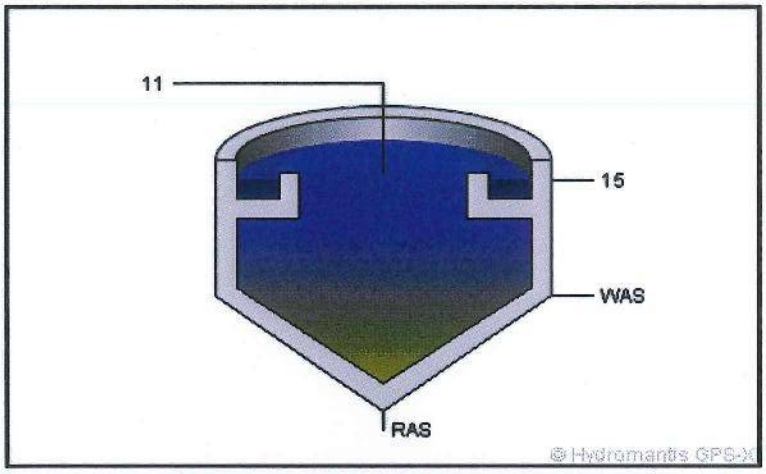
Operational Variables

		11
Total Air Flow	cfm	440.56557
Total Actual OTR	lb/h	42.271019
F to M Ratio	lbBOD5/(lbMLVSS	0.6685168
Vol. Org. Loading	lbBOD5/(1000ft3.d	129.02858
RAS Recycle Ratio	%	0

Mass Flows

		44	13	11	12	Total In	Total Out
TSS	lb/d	22990.125	-	22984.853	0	22990.125	22984.853
COD	lb/d	25797.963	-	25325.268	0	25797.963	25325.268
TN	lb/d	1906.6599	-	1899.2549	0	1906.6599	1899.2549

Secondary Clarifiers



		11	15	WAS	RAS
Flow	MGD(US)	0.658	0.3765	0.0015	0.28

Simulation Results

		11	15
Flow	MGD(US)	0.658	0.3765
TSS	mg/L	4185.7056	7.4121591
VSS	mg/L	3091.6787	5.4748271
cBOD5	mg/L	677.58238	2.3882542
COD	mg/L	4611.9119	44.330156
Ammonia N	mgN/L	0.4701629	0.4701629
Nitrite/Nitrate N	mgN/L	33.894205	33.894203
TKN	mgN/L	311.97364	1.7181299
TN	mgN/L	345.86785	35.612333
Alkalinity	mgCaCO3/L	86.924747	86.924746

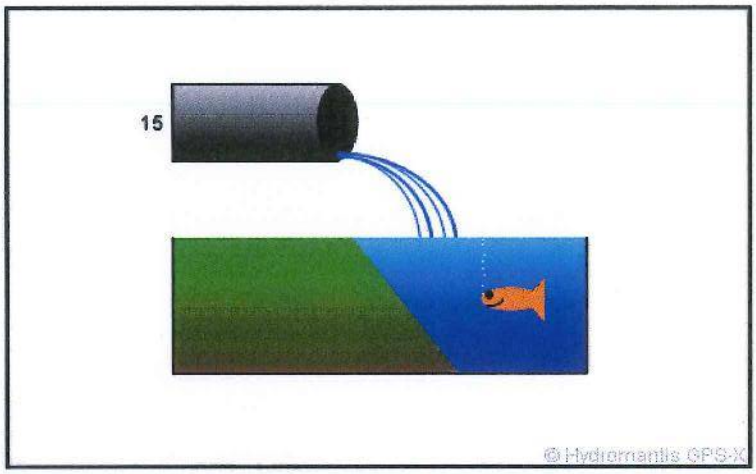
Operational Variables

		15	RAS	WAS
HRT	h	4.3402915	-	-
Surf. Overflow Rate	gal(US)/(ft2.d)	266.26666	-	-
Solids Loading Rate	lb/(ft2.d)	16.2552	-	-
Water Level	ft	13.75	-	-
Sludge Blanket Height	ft	3.0256808	-	-
RAS Flow	MGD(US)	-	0.28	-
RAS Solids	mg/L	-	9774.0822	-
WAS Flow	MGD(US)	-	-	0.0015
WAS Solids	mg/L	-	-	9774.0822
WAS Production	lb/d	-	-	122.35261

Mass Flows

		11	15	WAS	RAS	Total In	Total Out
TSS	lb/d	22984.853	23.289324	122.35261	22839.215	22984.853	22984.857
COD	lb/d	25325.268	139.28726	134.20561	25051.78	25325.268	25325.273
TN	lb/d	1899.2549	111.89549	9.5240938	1777.8355	1899.2549	1899.2551

Secondary Effluent



		15
Flow	MGD(US)	0.3765

Simulation Results

		15
Flow	MGD(US)	0.3765
TSS	mg/L	7.4121591
VSS	mg/L	5.4748271
cBOD5	mg/L	2.3882542
COD	mg/L	44.330156
Ammonia N	mgN/L	0.4701629
Nitrite/Nitrate N	mgN/L	33.894203
TKN	mgN/L	1.7181299
TN	mgN/L	35.612333
Alkalinity	mgCaCO3/L	86.924746

Mass Flows

		15	Total In	Total Out
TSS	lb/d	23.289324	-	-
COD	lb/d	139.28726	-	-
TN	lb/d	111.89549	-	-

CITY OF DEXTER **cnicholls@dextermi.gov**
8140 Main Street Dexter, MI 48130-1092 Phone (734)426-8303 ext 17 Fax (734)426-5614

MEMO

To: Mayor Keough and Council Members
From: Courtney Nicholls, City Manager
Date: March 9, 2016
Re: Council Rules

Presented for Council's consideration is the updated Council Rules document, based on the changes that were discussed at the January 23, 2016 work session and grammatical updates provided by Council Member Michels.

CITY OF DEXTER COUNCIL RULES

Adopted: April 1986
Amended: August 24, 1987
Amended: September 14, 1987
Amended: March 26, 1991
Amended: September 23, 1991
Amended: April 13, 1992
Amended: June 8, 1992
Amended: September 28, 1992
Amended: May 12, 2003
Amended: October 27, 2003
Amended: April 12, 2004
Amended: May 9, 2005
Amended: January 28, 2008
Amended: December 22, 2008
Amended: January 14, 2013
Amended: December 22, 2014
Amended: March 14, 2016

RULE 1: MEETING OF THE COUNCIL

All meetings, regular and special, of the Council shall be held in Dexter Senior Center, 7720 Dexter Ann Arbor Road. However, any meeting of the Council can be adjourned to another location in order to accommodate the public.

The Council shall hold its regular meetings on the second and fourth Mondays of each month at 7:30 p.m.

Whenever a regular meeting falls on a legal holiday or Election Day, it shall be held on the following day (Tuesday) at 7:30 P.M., or as determined by Council with adequate public notice.

RULE 2: REGULAR MEETING AGENDA

2 .1 Preparation of agenda and materials

The Mayor and City Manager and/or other responsible administrative officers or employees at the City office, shall prepare the agenda of business for regularly scheduled council meetings. Any other member or representative of committees, boards or commissions desiring to place a matter on the agenda shall notify the Mayor and City Manager and/or other responsible administrative officers or employees at the City office of such items by 5 p.m. on the Monday preceding the next meeting. Items that are not received by the stated deadline shall not be considered by the Council except upon the unanimous consent of the members present.

2.2 Distribution of agenda and materials

Upon completion of the agenda, the City Manager and/or other responsible administrative officer or employee at the City office, shall distribute the agenda and support materials, and post it to the website, on Wednesday prior to the next meeting. If the packet needs to be delayed, the Manager or other responsible administrative officer shall send an e-mail notification to the Mayor and Council. If a delay is necessary, the agenda shall still be posted online by the end of the day Wednesday. The City Manager and/or other responsible administrative officer or employee or designee at the City office may distribute such material by mail, email or personal delivery.

2.3 Order of Business

The City Manager in accordance with the following shall prepare an agenda for each Council Meeting:

A CALL TO ORDER / PLEDGE OF ALLEGIANCE

B ROLL CALL OF MAYOR AND COUNCIL MEMBERS

C APPROVAL OF THE MINUTES

D PRE-ARRANGED PARTICIPATION

Pre-arranged participation will be limited to those who notify the City office before 5:00 p.m. Monday preceding the meeting, stating their name, intent and time requirements. (10-minute limit)

E APPROVAL OF AGENDA

F PUBLIC HEARINGS/SHOW CAUSE HEARINGS

Action on each public hearing or show cause hearing will be taken immediately following the Hearing.

G NON-ARRANGED PARTICIPATION

Non-arranged participation will include those not listed on the printed agenda that wish to speak. A time limit of 5 minutes will apply, unless speaking for a bona fide group, in which case ten minutes shall be allowed. A notation will appear on the agenda. The Mayor, at his discretion, may call on members of the audience to speak at any time, or respond to their concerns. Any questions posed at this time will be responded to by the City Manager or his/her designee within 48 hours.

H COMMUNICATIONS SPOKEN or WRITTEN

I REPORTS "As Scheduled"

1. CITY STAFF AND DEPARTMENTS – Written & Oral Reports
   a. Exoffico representatives of Planning and Parks & Recreation Commission - monthly
   b. Community Development Manager – Minimum Quarterly, or as circumstances require
   c. Sheriff Department – Minimum Quarterly, or as circumstances require
   d. Finance Officer/Treasurer – Minimum Quarterly, or as circumstances require
   e. Public Services Superintendent – Minimum Quarterly, or as circumstances require

2. BOARDS AND COMMISSIONS – Written & Oral Reports
   Minimum once per year, on a pre-arranged schedule.

   a. Arts, Culture & Heritage Committee
   b. Chamber of Commerce
   c. Dexter Area Fire Board (DAFD)
   d. Downtown Development Authority (DDA)
   e. Farmers Market / Community Garden Oversight Committee
   f. Gateways Initiative
   g. Gordon Hall Management Team
   h. Healthy Communities Committee/5-H
   i. Huron River Watershed Council (HRWC)
   j. Library Board
   k. Parks & Recreation Commission
   l. Planning Commission
   m. Tree Board
   n. WATS
   o. WAVE

3. SUB COMMITTEES – Monthly report from active committees, oral or written.

4. CITY MANAGER/ASSISTANT TO THE CITY MANAGER REPORT

5. MAYOR WRITTEN REPORT

J CONSENT AGENDA

Bills & Payroll will be a standing item under consent agenda. Discussion of Budget and Financial Matters will be covered as a standing item on the Mayor

Report, as needed under the City Manager's report or during a quarterly Financial Report by the Treasurer. Items under Consent Agenda are considered routine by the City Council and will be enacted in one motion. There will no separate discussion of these items, unless a Council Member so requests, in which event, the items will be removed from Consent Agenda and added to the regular agenda at the end of Old or New Business.

K OLD BUSINESS

This portion of the agenda is for action items previously tabled or postponed from a prior meeting.

L NEW BUSINESS

This portion of the agenda is for consideration of action items as well as discussion of items not previously tabled or postponed by Council.

M COUNCIL COMMENTS

This portion of the agenda is intended to provide elected officials an opportunity to share comments that benefit the ~~Board~~ Council as well as the community. These will not be actionable items, except that issues may be referred to committee or placed on an upcoming agenda.

N NON-ARRANGED PARTICIPATION

Non-arranged participation will include those not listed on the printed agenda that wish to speak. A time limit of 5 minutes will apply, unless speaking for a bona fide group, in which case ten minutes shall be allowed. A notation will appear on the agenda. The Mayor, at his discretion, may call on members of the audience to speak at any time, or respond to their concerns. Any questions posed at this time will be responded to by the City Manager or his/her designee within 48 hours.

O ADJOURNMENT

RULE 3: RECORD OF MEETINGS:

3.1 Recording responsibility

The Clerk shall be responsible for maintaining the official record and minutes of each meeting of the Council. The minutes shall include all the action of the Council with respect to motions. The record shall include the names of the mover and seconded and the vote of the Council. The record shall also state whether the vote was by voice or by roll call, and when by roll call, the record shall show the "yes", "no" and abstention for each member. The Clerk shall be responsible for maintaining a written record of the summary of comments made by members of the public. The Clerk shall maintain copies of minutes, resolutions and ordinances or other matters acted upon by the Council.

3.2 Requests for remarks to be included

Any member of the Council may request to have his or her comments printed as part of the record. If there are no objections by any members of Council, the comments may be included. If there is an objection to such printing of the comments, the Council-shall decide the matter by majority vote. Such comments to be included, as part of the official record, shall be provided in writing by the member or transcribed exactly by the Clerk.

3.3 Public access to meeting records

The Clerk shall make available to members of the public the records and minutes of official meetings in accordance with the Freedom of Information Act. Minutes prepared by the Clerk, but not yet approved by the body, shall be available for public inspection not more than 8 business days following the meeting ~~or less~~. Minutes approved by the body shall be available within 5 business days from the date of the meeting at which they were approved. The Clerk shall also promptly send copies of minutes to persons who have requested them.

3.4 Publication of minutes

The Clerk shall be responsible for posting minutes as established by Council by Resolution.

RULE 4: BEHAVIOR OF COUNCIL MEMBERS

The Mayor or any Council Member may request a roll call of the Council, and the Clerk shall note the names of absentees. The Council shall take such action, as it deems appropriate to reprimand Council members absent without reasonable excuse.

The Council shall determine if the behavior of any of its members, or any City Official present at the meeting, is interfering with Council business. Upon concurrence of 2/3 (5 of 7 members) of Council, any member or official shall be excused from the Council meeting.

RULE 5: VOTING

All votes of the Council shall be by roll call, except approval of the minutes, agenda, and the consent agenda~~,~~ and adjournment. The Mayor shall be the last to vote on all roll call votes, and all other Council Members shall vote in random order. All Council Members shall vote on all matters before the Council, unless a Council Member has a financial interest in any matter before the Council, in which case the Council Member shall not vote on the matter (Abstain). For a motion or resolution to pass it must receive ~~four votes~~a majority vote of the members of ~~c~~ Council (minimum of 4 votes).

RULE 6: CONDUCT OF DISCUSSION – DEBATE

During Council discussion and debate, no Council Member shall speak until recognized by the Mayor. Discussion and debate must be addressed to the Mayor not other Council Members or public. A Council Member shall confine their comments to the question at hand and avoid personalities and or character insult. Each Council Member shall speak no more than two times on a given question and for no longer than five minutes each time, unless the Council Members give unanimous consent. Debate will be limited to voting members of Council and those participants recognized by the Mayor.

Conduct Norms

Council Members shall:

- Be prepared for the meeting and contact the Manager to get questions answered prior to the meeting;~~.~~
- Listen to one another;
- Debate issues not persons;
- Respect one another's views in spite of differences in opinion;
- Respect the fact that we will not always agree on issues; indeed, the diversity of views and perspective may strengthen the decision-making process;
- Members must abide by the decision of the Council once a decision has been made;~~.~~

- Resist the temptation, when you disagree with a decision, to try and undermine the decision; continuing concerns about a decision should be expressed privately.

Formatted: Bulleted + Level: 1 + Aligned at: 0.25" + Tab after: 0.5" + Indent at: 0.5"

RULE 7: PUBLIC HEARINGS

Any citizen may address Council at a Public Hearing. The citizen must give their name and address to be recorded by the City Clerk. The citizen must limit their presentation to five minutes. Any citizen representing a bona fide group may speak for ten minutes.

RULE 8: RIGHT TO DELAY CERTAIN PROCEEDINGS

No resolution or proceeding of the Council imposing taxes or assessments or requiring the payment, expenditure of money or property, or creating a debt or liability, shall be allowed at the same meeting at which it is introduced, if objection be made by one member, unless by a two-thirds vote of the members present. Two-thirds = for 7 members present 5 votes, 6 members present 4 votes, 5 members present 4 votes. Any motion to adjourn shall always be in order, except when the last preceding business was a motion to adjourn. That and motions to lie on the table and to limit debate, shall be decided without debate.

RULE 9: ORDER OF MOTIONS DURING DEBATE

When any question is under debate, no motion shall be received but the following, and they shall have precedence in the order listed below:

MOTION TO ADJOURN
MOTION TO LAY ON TABLE
MOTION TO LIMIT DEBATE
MOTION TO POSTPONE TO A CERTAIN DAY
MOTION TO REFER TO COMMITTEE
MOTION TO AMEND
MAIN MOTION

RULE 10: MOTION TO LIMIT DEBATE

At any time during a discussion or debate of a question, a Council Member may move to limit debate. This motion, after receiving the affirmative votes of at least two-thirds of the Council Members present, (Two-thirds = or 7 members present 5 votes, 6 members present 4 votes, 5 members present 4 votes.) will have the effect of limiting any member to speak for not more than one additional five-minute period on the basic question, provided that member has not spoken twice, in which case they may not speak again. This motion, upon being made and ~~supported~~ seconded, shall not be debated.

RULE 11: RECONSIDERATION OF QUESTION

When a question has been taken, it shall be in order for any member voting with the prevailing side to move a reconsideration thereof at the same or next regular meeting, but no question shall be considered a third time.

RULE 12: ALTERING AND AMENDING COUNCIL RULES

Council rules shall be reviewed and adopted within 60 days after the General Election and/or a change in the membership of the Council. Council ~~–~~adopted rules may be altered or amended by a vote of a majority of the members, if notice of the proposed change shall have been given at a preceding meeting of the Council, and a written copy of the proposed change has been distributed to all members.

RULE 13: TAPING OF COUNCIL MEETINGS

Any citizen may tape a Council meeting by audio or video machines. All recording equipment or personnel shall be positioned ~~behind the last row of the audience chairs~~ in such a manner as to not ~~to~~ interfere with the audience's view.

RULE 14: ABSENCE OF RULES

In the absence of a Council rule, Robert's Rules of Order will prevail. An abbreviated version of Robert's Rules shall be made part of this document.

RULE 15: WAIVING COUNCIL RULES –SUSPEND RULES

Any Council rule shall be waived by a two-thirds majority of the Council members present, unless the rule to be waived requires more than a simple majority of consent. (7 members present 5 votes, 6 members present 4 votes, and 5 members present 4 votes)

RULE 16: BOARDS & COMMISSIONS

Council members may serve as regular members of City Boards and Commissions. The Mayor shall annually appoint during the organizational meeting Council Members to serve on Boards and Commissions. Commissions will include, but not be limited to the following:

Planning Commission
Zoning Board of Appeals
Parks & Recreation Commission
Dexter Area Fire Department
Farmers Market/Community Garden Oversight Committee
Arts, Culture & Heritage

Appointments: The Mayor shall make appointments to all Boards and Commissions upon confirmation by City Council, with the exception of the Zoning Board of Appeals (ZBA). ZBA members shall be appointed by a majority of Council. ~~.~~ Appointment recommendations will be affirmed by a majority of Council (Requires 4 votes to affirm an appointment)

To avoid issues of incompatible offices or legal liability, other than the appointments under this section, the Mayor and Council Members will not be permitted serve Boards and Commissions as paid staff or contracted employees.

RULE 17: FILLING VACANCY ON COUNCIL

When an elected position becomes vacant for any reason~~, the following process shall be followed and~~ the position shall be filled ~~as quickly as possible~~within 60 days, unless the term expiration date is within 90 days of the day the office is vacated (City Charter Section 5.05). In this case the position will remain open until the election. ~~An exception shall be made if~~If the vacancy occurs in the office of Mayor~~. In this case~~, the Mayor Pro-Tem will serve as Mayor until the Council appoints a replacement. ~~the remaining Council Members may immediately elect a Mayor from the current membership with a simple majority vote. If no Council Member obtains majority support, the process will proceed as stated below.~~The appointment to fill the position of Mayor or Council Member shall proceed as below.

1. Officially vacate the Council Member position if required.
2. Provide adequate notification to the public regarding the open position through the city newsletter, a newspaper, the Internet, or any other means deemed appropriate.

3. The applicant will write a letter of intent or fill out an application in accordance with the advertised deadline, a copy of which will be provided to the Council in the Council packet.
4. At the next council meeting, the Mayor or Presiding Officer will announce all the applicants and provide copies of applications or letters of intent.
5. The Mayor or Presiding Officer makes a nomination from the applications received.
6. The nominee is then voted on.
7. If this nominee received four votes, he or she is then appointed and sworn into office.
8. In the event this nominee does not receive 4 votes, the process begins again at step 5.