City of Valparaiso

Stormwater Quality Management Plan
Part B
Baseline Characterization Report
327 IAC 15-13-7

Update

October 26, 2010

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Section One

Summary of Data Collection and Evaluation

A. Summary of General Data on MS4 Entity and System

Summary of changes in this section:

1. The City of Valparaiso's population grew from approximately 29,000 in 2004 to approximately 30,400 in 2008.
2. Valparaiso University enrollment rate rose from approximately 3,700 in 2004 to approximately 4,000 in 2009.
3. Compared to a total land of 12.38 square miles in 2004, the City of Valparaiso has grown since 2004, adding approximately 3.23 square miles of land to a total of 15.61 square miles.
4. The City of Valparaiso started to consider from 2007 the creek known as Pepper Creek with HUC 04040001050030 as a receiving water of the City of Valparaiso. A portion of the watershed of Pepper Creek and the area containing the creek itself was annexed into the City in September of 2006.
5. The City of Valparaiso will now consider the drain from Flint Lake known as Flint Lake Garden Terrace Drain and with HUC 07120001090060 for the watershed as a receiving water of the City of Valparaiso. This drain flows into the Hutton Ditch downstream. A portion of the watershed containing Flint Lake Garden Terrace Drain was annexed into the City in 2005, and another portion in 2006.
6. The City of Valparaiso will now officially have 5 receiving waters, including: Salt Creek – HUC 04040001050010, Sager Run – HUC 04040001050010, Beauty Creek – HUC 04040001050020, Pepper Creek – HUC 04040001050030, and Flint Lake Garden Terrace Drain – HUC 07120001090060. An updated list of the City of Valparaiso's receiving waters is attached as Appendix A.

B. Summary of Baseline Data Collection and Evaluation

In addition to the sources listed in the original SWQMP-Part B submitted in May 2004, the Valparaiso Water Reclamation Department (VWRD) and Valparaiso University (VU) have been conducting annual monitoring of the City's Receiving Waters in the Salt Creek Watershed since 2004.

C. Summary of Evaluation Approach

1. Land-Use Evaluation

As of 2010, the area within city limits, including Valparaiso University, is approximately 15.61 square miles. This area was evaluated and grouped into 15 categories, including general commercial, heavy industrial, light industrial, multi-family, manufactured home, natural, office, parking lot, public (parks, schools, churches and government), right-of-way, residential transition, single family residence, two family residences, townhomes and vacant. An updated map of the city's land use is attached as Appendix B.

As of 2010, the City of Valparaiso has 51 facilities defined by the Valparaiso Water Reclamation Department (VWRD) as industrial users, and 18 industrial stormwater dischargers that are permitted under IDEM's Rule 6 (information from IDEM website http://www.in.gov/idem/6560.htm). The lists of these 51 industrial users and 18 industrial dischargers are attached as Appendices C and D, respectively, of this report.

2. Evaluation of Structural/Nonstructural BMPs

Storm sewer systems and/or structural BMPs have been installed in all the residential land developments. These systems are functioning satisfactorily and succeeded in controlling/ detaining the stormwater runoff.

In addition to the developments with dedicated structural BMPs, the Valparaiso Public Works Department also conduct catch basins/intakes cleaning, street sweeping, trash collection, brush/yard waste pickup, and leaf collection during leaf seasons. Catch basins and intakes are cleaned and treated every year during the permit cycle and annual volumes collected (yd^3) are recorded. All City Streets are swept twice a year on average with additional sweeping on heavily traveled routes when needed; annual amount of debris collected are recorded in tons. Trash is collected weekly. Curbside brush and yard waste

(including limbs, brush, bushes, roots, leaves, etc.) collection takes place throughout the week. Leaves were picked up during leaf seasons by Public Works department from every neighborhood once a week during the leaf season (totally 6 or 7 times). The annual amount collected is recorded in tons. The leaves, brush and yard waste picked up are taken to the city-owned state-sanctioned composting facility located at 2150 W. Lincolnway, where they are composted to produce the compost and mulch available to residents.

The City of Valparaiso currently has three ordinances in place to manage the quantity and quality of stormwater runoff from the City's MS4 area: Erosion Control Ordinance, Floodplain Management and Stormwater Runoff Control Ordinance, and Illicit/Illegal Discharges and/or Connections to Storm Drainage Ordinance. The details of these ordinances are included as follows.

An updated list of BMPs evaluated and potential new sites for structural and non-structural BMPs is attached as Appendix E.

2.1 Erosion Control Ordinance

The City of Valparaiso has in place in 2005 an ordinance for Erosion Control on Sites with Land Disturbing Activities. This ordinance provides for the administration, enforcement, and amendment of this ordinance for controlling soil erosion within the City of Valparaiso, Indiana. The objective of this ordinance is the control of wind borne and/or water borne soil erosion and the resulting sedimentation that is accelerated by land disturbing activities in the City of Valparaiso. Measures taken to control erosion and sedimentation should assure that sediment is not transported to improper locations by wind or water. The intent of this ordinance is to require practices that will control soil erosion and thereby minimize the amount of soil and sediment leaving sites where the vegetative cover has been disturbed. The ordinance applies to land disturbing activities including those associated with agricultural, commercial, industrial, institutional, residential and highway development.

2.2 Floodplain Management and Stormwater Runoff Control Ordinance

The City Council updated on July 14, 2008 its Floodplain Management and Stormwater Runoff Control Ordinance (ordinance number 26-2008), an ordinance creating Chapter 55 in the Municipal Code of the City of Valparaiso, to incorporate revisions requested by IDNR to be in compliance with the National Flood Insurance Program. The purpose of the Floodplain Management

subchapter of the ordinance is "*to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: (1) restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, which result in damaging increases in erosion or in flood heights or velocities; (2) require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (3) control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of flood waters; (4) control filling, grading, dredging, and other development which may increase erosion or flood damage; (5) prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands; and (6) make federally subsidized flood insurance available for structures and their contents in the city by fulfilling the requirements of the National Flood Insurance Program."*

The purpose of the Stormwater Runoff Control subchapter of the ordinance is to provide for the adequate control of stormwater runoff so that certain natural resources are preserved and the quality of the water and the health, safety, and welfare of the residents is not compromised. The ordinance states that "*Any new development, or construction, addition or renovation requiring a building permit from the city, shall provide stormwater runoff controls as provided herein. Appropriate reference shall be made to the latest revision of the Specifications and Standards for Acceptance of Municipal Improvements for specific requirements."* From the ordinance, "d*rainage plans are required for all activities covered under this chapter. All drainage plans must be approved by the City Engineer before permits are issued or formal approvals granted. Said approval by the City Engineer shall mean that the plan appears to meet the requirements of the city and shall not be interpreted to provide any guarantee or warrantee against damage or inconvenience by flooding or the runoff related problem."*

2.3 Illicit/Illegal Discharges and/or Connections to Storm Drainage Ordinance

An Illicit/Illegal Discharges and/or Connections to Storm Drainage Ordinance was adopted by Valparaiso's City Council on September 11, 2006, as Ordinance No. 40-2006 – an ordinance creating Chapter 54 in the Municipal Code of the City of Valparaiso. This ordinance provides for the health, safety, and general welfare of the citizens of the City of Valparaiso, Indiana through the regulation of

non-stormwater discharges to the drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are: (1) to regulate the contribution of pollutants to the MS4 by stormwater discharges by any user; (2) to prohibit illicit connections and discharges to the MS4; (3) to establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance.

3. Identification of Sensitive Waters

As defined by the Indiana Department of Environmental Management (IDEM), sensitive areas include: the areas having threatened or endangered species or their habitat; usage as a public surface water supply intake; usage for full body contact recreation; and outstanding state resource water classification.

3.1 Habitat for Threatened or Endangered Species

The Division of Nature Preserves of Indiana Department of Natural Resources (IDNR) conducted an Indiana Natural Heritage Data Center database search for the City of Valparaiso area on September 1, 2010. The database includes endangered, threatened, and rare species, high quality natural communities, and significant natural areas.

The database reflects specific field studies conducted by independent research groups. As threatened or endangered species are located, the findings are reported to the State and entered in the database specified by USGS Quadrangle Map Township, range, and section numbers. The search indicated that there is no endangered, threatened, or rare (ETR) species in the Valparaiso MS4 area.

3.2 Intake Areas for Public Surface Waters Supplies

There are no public drinking water intakes in the City of Valparaiso MS4 area.

3.3 Full-Body Contact Recreation Areas

Salt Creek is designated by IDEM for the use of full-body contact recreation, but it does not currently meet IDEM designated-use standard for a full body contact recreational stream. IDEM identified sections of Salt Creek and its tributaries on the 303 (d) list of impaired waters as impaired for excessive *E. coli* concentrations and impaired biotic communities (IBC).

3.4 Outstanding State Resource and Exceptional Use Waters

As defined in 327 IAC 2-1-11(b), there are no exceptional use waters in the City of Valparaiso MS4 area. As defined in 327 IAC 2-1-2 (3), there are no waters of high quality designated as outstanding state resource waters within the City of Valparaiso MS4 area.

4. Review of Existing/Available Water Quality Data

4.1 Salt Creek Total Maximum Daily Loading (TMDL)

Salt Creek - Clark Ditch subwatershed (HUC 04040001050020) is listed on the 2008 Indiana Integrated Monitoring and Assessment Report (IR) 303(d) List of Impaired Waters (Category 5A) as impaired for high *E. coli* contamination and impaired biotic communities. Salt Creek - Sagers Lake (HUC 04040001050010) and Salt Creek - Pepper Creek (HUC 04040001050030) subwatersheds are listed on the 2008 303(d) List as impaired for IBC. Available data and/or information indicate that for these watersheds, at least one designated use is not supported impaired or is threatened.

The Salt Creek TMDL for *E. coli* has been developed by IDEM and was approved by U.S. EPA on September 27, 2004. The TMDL report includes a description of the Salt Creek watershed, and inventory of existing water quality data, and the results of source assessment and modeling analysis.

4.2 Salt Creek Watershed Management Plan

Save the Dunes Conservation Fund (SDCF) was contracted by IDEM in 2006 to develop a watershed management plant to address the nonpoint source pollution problem in Salt Creek. The Salt Creek Watershed Management Plan was approved by IDEM in July 2008. In this plan, Save the Dunes Conservation Fund reported the water quality results from 16 sampling sites within the

watershed, including water chemistry data from all the sampling sites, and biological community data from 8 sampling sites. Two of these sampling sites (Site 5, Salt Creek Headwaters, and Site 6, Sager's Lake Outlet) were at the City of Valparaiso's limits before the Salt Creek and Sager run enter the City, and one site (Site 7 Beauty Creek) was close to the City's limits at upstream of the Beauty Creek.

The results show that water quality in the Salt Creek headwaters (Site 5) ranked among the poorest of all the sampled sites, with the highest nutrients, suspended solids, and *E. coli* levels observed in the watershed. For this site, the physical habitat scores fell below IDEM guidelines, and the biological community exhibited signs of impairment.

The Plan shows that Sager's Lake Outlet (Site 6) exhibited better water quality than most other sites with relatively low nutrient concentrations. However, the nutrient loading rates suggest that this site is one of the largest sources of nutrients to Salt Creek, even though concentrations themselves with the stream are low compared to other sites. *E. coli* concentrations at this site exceeded the Indiana state standard during six of eight sampling events. The physical habitat at this site was better than at most other sites. No macroinvertebrate data was available for this site from the plan.

Beauty Creek at site 7 exhibited some of the best water quality in the watershed, and the best physical habitat of all sites. However, despite the high qulity of the physical habitat, biological communities in Beauty Creek were among the worst of all the assessed sites, indicating that moderate impairment likely applies to this site.

5. Identification of Potential Areas of Concern

Salt Creek has been identified on IDEM's 303(d) list as being impaired for *E. coli* and impaired biotic communities. Valparaiso's Salt Creek Watershed consists of a great deal of commercial area. This area is of particular concern due to the size of the watershed and the land usage within it.

The downtown area has combined sewers that flow to the waste water treatment plant (WWTP) and the treatment plant's Long Term Control Plan (LTCP) addresses combined sewer overflows (CSOs). However, public education and outreach along with erosion control measures and strict

stormwater release rates for new developments in the area should help remedy CSOs and improve water quality with the Salt Creek Watershed.

D. Definition of MS4 System and Waters of the State

The City of Valparaiso is continuing to define its "Waters of the State" (receiving waters) as those shown as a solid blue line on a United States Geological Survey 7.5-minute quadrangle map. The City of Valparaiso started to consider from 2007 the creek known as Pepper Creek with HUC 04040001050030 as a receiving water of the City of Valparaiso. A portion of the watershed of Pepper Creek and the area containing the creek itself was annexed into the City in September of 2006. The City of Valparaiso will now consider the drain from Flint Lake known as Flint Lake Garden Terrace Drain and with HUC 07120001090060 for the watershed as a receiving water of the City of Valparaiso. This drain flows into the Hutton Ditch downstream. A portion of the watershed containing Flint Lake Garden Terrace Drain was annexed into the City in 2005, and another portion in 2006.

The City of Valparaiso will now officially have 5 receiving waters, including: Salt Creek – HUC 04040001050010, Sager Run – HUC 04040001050010, Beauty Creek – HUC 04040001050020, Pepper Creek – HUC 04040001050030, and Flint Lake Garden Terrace Drain – HUC 07120001090060.

E. Report on New Data

1. Biological Monitoring

The City of Valparaiso signed an agreement with Valparaiso University on February 12, 2004 to have the university conduct monitoring of the City's receiving waters in the Salt Creek Watershed. An undergraduate biology lab class at Valparaiso University, under the supervision of their university instructor, biology professor Dr. Laurie Eberhardt, collects benthic macroinvertebrates and calculates a Pollution Tolerance Index (PTI) based on *DNR's Hoosier Riverwatch*: *Volunteer Stream Monitoring Training Manual*. Benthic macroinvertebrates are animals that are big enough (macro) to be seen with the naked eye. They lack backbones (invertebrate) and live at least part of their lives in or on the bottom (benthos) of a body of water.

Biological stream monitoring is based on the fact that different species react to pollution in different ways. Pollution-sensitive organisms such as mayflies, stoneflies, and caddisflies are more susceptible to the effects of physical or chemical changes in a stream than other organisms. These organisms act as indicators of the absence of pollutants. Pollution-tolerant organisms such as midges and worms are less susceptible to changes in physical and chemical parameters in a stream. The presence or absence of such indicator organisms is an indirect measure of pollution. When a stream becomes polluted, pollution-sensitive organisms decrease in number or disappear; pollution-tolerant organisms increase in variety and number.

The monitoring is conducted in the fall (usually at the last week of October and the first week of November) at five sites immediately upstream and downstream of where our creeks enter and leave the City to provide regular water quality conditions and check for the maintenance or improvement of said water. These sites are site 1: the outflow of Sager's lake below the road bridge; site 2: waterway where it crosses under highway 2 at the Highway department site next to the old Porter county home; site 3: back of parking area east of Horseprairie road across creek from CVS pharmacy where Sager's run goes under Highway 2; site 4: just after Salt Creek crosses highway 30 access from west side bank from parking area near Applebees; and site 5: just after Salt Creek crosses under Joliet Road and downstream of the wastewater treatment plant. A map indicating the specific sampling locations is attached as Appendix F.

The calculated pollution tolerance index values based on collected benthic macroinvertebrates from 2004 to 2009 are shown in Table 1. The PTI numbers can be categorized into four classes, with 23 or more as excellent, 17-22 as good, 11-16 as fair, and 10 or less as poor. Our monitoring results indicate that for most of the time the City’s receiving waters at the monitored sites are in excellent condition, with only site 5 for two years (2005 and 2008) had condition in good category. The results also show that generally, the PTI increases from 2004 to 2009, with PTI numbers a little lower in 2008 due to probably the stormwater resulted flooding that occurred in early September, 2008 in the City.

Table 1. Pollution tolerance index (PTI) of benthic macroinvertebrates of the City of Valparaiso's receiving waters in the Salt Creek Watershed at five sites upstream and downstream of the City from 2004 to 2009

	2004	**2005**	**2006**	**2007**	**2008**	**2009**
Site 1	23	32	48	44	37	44
Site 2	29	39	32	33	37	45
Site 3	NA	41	31	38	24	53
Site 4	42	42	52	57	37	46
Site 5	34	21	28	48	22	39

2. Chemical Monitoring

The City of Valparaiso Water Reclamation Department (VWRD) has agreed to conduct chemical monitoring of the City's receiving waters in the Salt Creek Watershed starting with a trial run in October of 2004 and continuing to monitor once a year for the length of the City's permit.

Many types of chemical tests can be performed to assess varying aspects of stream water quality. The VWRD tests several parameters including: (1) Dissolved Oxygen; (2) pH; (3) Biochemical Oxygen demand; (4) Phosphate (Ortho- and Total); (5) *E. coli* and Coliform Bacteria; (6) Water Temperature Change; (7) Nitrate and Nitrite; (8) Transparency/Turbidity.

The monitoring is also conducted in the fall at six sites immediately upstream and downstream of where our creeks enter and leave the City. The first 5 sites are the same as the sampling points for Biological Monitoring by VU. A map indicating the specific sampling locations is attached as Appendix F. The results of the analysis for years 2004 to 2009 are shown in Table 2 to Table 7, respectively.

Table 2. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2004.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100
1	10/28/04	8:47 AM	12.0	N	8.0	10.3	<0.02	0.060	4	3	25
2	10/28/04	8:30 AM	10.5	N	7.6	7.4	0.200	0.121	17	2	215
3	10/28/04	8:18 AM	11.5	N	7.8	9.6	0.170	0.200	7	2	100
4	10/28/04	8:24 AM	11.5	N	7.6	7.9	0.170	0.090	9	2	120
5	10/28/04	7:45 AM	13.0	N	7.7	9.0	0.400	0.390	5	2	50
6	10/28/04	8:08 AM	11.0	N	7.6	9.9	0.030	0.100	4	2	65
1	11/04/04	10:30 AM	9.9	Y	7.7	10.4	<0.02	0.093	8	3	80
2	11/04/04	10:10 AM	9.8	Y	7.3	7.5	0.040	0.249	35	2	285
3	11/04/04	9:48 AM	10.0	Y	7.5	9.1	0.070	0.109	10	2	105
4	11/04/04	9:57 AM	10.0	Y	7.5	8.4	0.110	0.140	45	2	102
5	11/04/04	9:25 AM	10.5	Y	7.6	9.1	0.150	0.284	20	4	108
6	11/04/04	9:37 AM	10.0	Y	7.8	9.7	0.110	0.609	25	4	158
1	11/11/04	8:46 AM	8.9	N	8.6	11.9	<0.02	0.100	5	3	10
2	11/11/04	8:38 AM	9.5	N	7.8	8.5	0.170	0.058	18	<2	192
3	11/11/04	8:12 AM	10	N	7.8	9.9	0.190	0.160	4	<2	38
4	11/11/04	8:25 AM	8.8	N	7.9	9.6	0.180	0.114	11	2	85
5	11/11/04	7:50 AM	10.2	N	7.9	9.5	0.150	0.167	6	2	1000
6	11/11/04	8:05 AM	9.9	N	7.9	10.4	0.070	0.140	4	<2	90
1	11/18/04	9:10 AM	9.0	N	8.2	11.6	<0.02	0.132	8		40
2	11/18/04	8:40 AM	10.0	N	7.6	7.9	0.120	0.125	17		187
3	11/18/04	8:17 AM	12.0	N	7.7	8.9	0.120	0.151	2		60
4	11/18/04	8:25 AM	10.0	N	7.6	8.3	0.150	0.098	17		TNTC
5	11/18/04	7:46 AM	12.5	N	7.6	8.8	0.260	0.365	4		1760
6	11/18/04	8:09 AM	12.5	N	7.7	9.8	0.050	0.068	4		370

Table 3. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2005.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100
1	10/27/05	10:10 AM	11.0	N	7.7	7.6	0.075	0.014	29	2	12
2	10/27/05	9:52 AM	9.0	N	7.8	9.1	0.153	0.082	26	<2	248
3	10/27/05	9:40 AM	9.0	N	7.8	9.5	0.160	0.005	13	<2	40
4	10/27/05	9:44 AM	9.0	N	8.0	9.4	0.170	0.097	10	<2	148
5	10/27/05	8:48 AM	10.0	N	8.2	8.9	0.232	0.372	27	<2	75
6	10/27/05	9:27 AM	10.0	N	8.0	9.8	0.124	0.019	7	<2	57
1	11/3/05	9:10 AM	11.0	N	7.8	10.6	0.105	0.553	4	2	4
2	11/3/05	8:54 AM	9.0	N	7.6	8.7	0.130	0.134	20	<2	141
3	11/3/05	8:45 AM	12.0	N	7.6	8.8	0.183	0.218	8	2	26
4	11/3/05	8:38 AM	10.0	N	7.6	8.0	0.182	0.464	8	<2	178
5	11/3/05	8:11 AM	13.0	N	7.6	8.6	0.239	0.266	5	<2	276
6	11/3/05	8:19 AM	11.0	N	7.6	8.8	0.175	0.162	3	<2	56

Table 4. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2006.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100
1	10/12/06	8:58 AM	12.0	N	7.4	8.9	0.36	0.070	3	<2	18
2	10/12/06	8:39 AM	12.5	N	7.5	8.6	0.119	0.060	10	<2	461
3	10/12/06	8:25 AM	12.5	N	7.6	9.2	0.139	0.040	4	<2	23
4	10/12/06	8:30 AM	12.5	N	7.6	8.9	0.157	0.060	9	<2	155
5	10/12/06	8:00 AM	12.0	N	7.6	9.1	0.179	0.270	6	<2	111
6	10/12/06	8:14 AM	12.0	N	7.7	10.0	0.097	0.020	3	<2	112
1	10/19/06	2:14 PM	11.0	N	7.6	10.1	0.190	0.502	7	2	365
2	10/19/06	1:57 PM	12.0	N	7.3	7.0	0.240	0.094	25	<2	411
3	10/19/06	1:47 PM	12.5	N	7.6	8.6	0.230	0.147	5	<2	50
4	10/19/06	1:45 PM	12.5	N	7.5	8.4	0.170	0.100	23	2	261
5	10/19/06	8:00 AM	12.5	N	7.7	8.4	0.040	0.135	14	2	461
6	10/19/06	8:12 AM	11.5	N	7.7	9.6	<0.02	0.270	38	2	>2420
1	10/26/06	8:47 AM	8.0	Y	8.4	10.9	0.030	0.052	3	2	11
2	10/26/06	8:29 AM	8.0	Y	7.6	9.0	0.090	0.054	11	<2	83
3	10/26/06	8:14 AM	10.0	N	7.7	9.6	0.130	0.033	3	<2	50
4	10/26/06	8:17 AM	10.0	N	7.6	9.6	0.130	0.068	1	<2	72
5	10/26/06	7:40 AM	10.0	N	7.6	9.6	0.160	0.102	2	<2	35
6	10/26/06	8:05 AM	10.0	N	7.7	10.1	0.110	0.032	3	<2	291
1	11/02/06	8:29 AM	6.0	N	8.3	11.2	<0.02	0.037	5	4	3
2	11/02/06	8:11 AM	3.0	N	7.5	10	<0.02	0.032	5	<2	96
3	11/02/06	7:55 AM	9.0	N	7.4	9.7	<0.02	0.009	4	<2	7
4	11/02/06	8:02 AM	4.0	N	7.2	10.5	<0.02	0.028	6	<2	53
5	11/02/06	7:38 AM	8.0	N	7.6	10.1	<0.02	0.136	3	<2	326
6	11/02/06	7:48 AM	8.5	N	7.6	10.5	<0.02	0.018	3	<2	36

Table 5. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2007.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100
1	10/24/07	8:38 AM	13.5	N	8.6	9.2	0.104	0.061	10	<2	79
2	10/24/07	8:22 AM	10.0	N	7.9	7.7	0.060	0.056	7	<2	326
3	10/24/07	8:05 AM	12.0	N	8	9.1	0.070	0.024	4	<2	161
4	10/24/07	8:10 AM	12.0	N	8	8.2	0.080	0.053	8	<2	142
5	10/24/07	7:28 AM	12.0	N	8	8.8	0.090	0.141	3	<2	172
6	10/24/07	7:57 AM	11.0	N	8.3	9.7	0.090	0.022	3	<2	68
1	11/1/07	9:15 AM	10.0	N	7.8	9.9	0.010	0.058	7	<2	25
2	11/1/07	8:59 AM	8.0	N	7.6	9.0	0.040	0.052	6	<2	184
3	11/1/07	8:45 AM	11.0	N	7.8	9.9	0.129	0.077	4	<2	167
4	11/1/07	8:39 AM	9.0	N	8	9.2	0.080	0.171	4	<2	67
5	11/1/07	8:15 AM	10.0	N	7.7	9.4	0.070	0.176	7	<2	67
6	11/1/07	8:24 AM	9.0	N	7.8	9.2	0.024	0.024	3	<2	16
1	11/8/07	9:15 AM	7.0	N	8.0	11.2	0.103	0.041	4	<2	Est. 13
2	11/8/07	8:58 AM	6.5	N	7.8	9.9	0.092	0.036	3	<2	Est. 107
3	11/8/07	8:45 AM	10.0	N	7.8	9.8	0.165	0.025	2	<2	Est. 1986
4	11/8/07	8:39 AM	6.0	N	7.8	10.7	0.103	0.049	3	<2	Est. 91
5	11/8/07	8:18 AM	9.5	N	7.8	10.2	0.107	0.262	3	<2	Est. 571
6	11/8/07	8:29 AM	9.0	N	7.9	10.5	0.135	0.014	3	<2	Est. 45

Table 6. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2008.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100
1	10/30/08	9:45 AM	7.0	N	7.7	10.8	0.099	0.044	4	3	3
2	10/30/08	9:29 AM	5.0	N	7.8	9.4	0.105	0.041	5	<2	98
3	10/30/08	9:20 AM	9.0	N	7.8	10.2	0.106	0.033	3	<2	64
4	10/30/08	9:17 AM	10.0	N	7.8	9.8	0.108	0.044	19	<2	41
5	10/30/08	9:04 AM	8.0	N	8.0	11.0	0.200	0.407	9	2	26
6	10/30/08	8:46 AM	8.0	N	7.8	9.8	0.134	0.019	6	<2	31
1	11/6/08	9:32 AM	11.0	N	7.8	9.9	0.010	0.016	3	<2	35
2	11/6/08	9:15 AM	11.0	N	7.7	7.9	<0.01	0.027	8	<2	67
3	11/6/08	8:55 AM	12.0	N	7.8	9.1	<0.01	0.007	3	<2	16
4	11/6/08	9:02 AM	11.0	N	7.8	8.4	<0.01	0.021	4	<2	54
5	11/6/08	8:31 AM	12.0	N	7.7	8.4	0.132	0.154	4	2	>2420
6	11/6/08	8:43 AM	11.0	N	7.9	9.4	0.024	0.008	4	<2	26
1	11/13/08	9:09 AM	7.0	N	7.7	10.9	0.106	0.033	3	<2	6
2	11/13/08	8:51 AM	8.5	N	7.6	8.4	0.091	0.055	12	<2	82
3	11/13/08	8:33 AM	10.5	N	7.7	9.4	0.089	0.019	4	<2	23
4	11/13/08	8:40 AM	8.0	N	7.7	9	0.073	0.046	8	<2	44
5	11/13/08	8:10 AM	10.0	N	7.7	9.3	0.071	0.133	4	<2	214
6	11/13/08	8:21 AM	10.0	N	7.9	10.4	0.056	0.019	3	<2	30

Table 7. Water quality data of the City of Valparaiso's receiving water in Salt Creek Watershed at six sites upstream and downstream of the City for 2009.

Site	Date	Time	Temp °C	Rain Y/N	pH	D.O mg/l	NH4 mg/l	PO4 mg/l	TSS mg/l	TBOD mg/l	E.Coli CFU/100ml
1	11/13/09	8:25 AM	8.0	N	7.7	10.9	<0.01	0.069	6	2	2
2	11/13/09	8:04 AM	5.0	N	7.4	8.2	0.069	0.060	6	<2	411
3	11/13/09	7:46 AM	9.0	N	7.7	8.8	0.106	0.040	4	<2	186
4	11/13/09	7:50 AM	6.0	N	7.6	8.4	0.044	0.063	6	<2	70
5	11/13/09	7:20 AM	7.0	N	7.5	8.6	0.120	0.176	4	<2	2420
6	11/13/09	7:34 AM	8.0	N	7.7	9.1	0.056	0.033	4	<2	40
1	11/24/09	10:38 AM	8.0	N	7.7	11.0	0.077	0.082	3	2	*23
2	11/24/09	10:22 AM	6.5	N	7.5	9.2	0.106	0.064	4	<2	*67
3	11/24/09	10:08 AM	10.0	N	7.7	10.2	0.156	0.044	4	<2	*17
4	11/24/09	10:14 AM	7.0	N	7.6	9.8	0.088	0.056	7	<2	*48
5	11/24/09	9:45 AM	9.0	N	7.6	10.4	0.163	0.278	4	<2	*233
6	11/24/09	9:56 AM	9.0	N	7.8	10.6	0.083	0.077	31	<2	*178
1	12/1/09	9:41 AM	5.5	N	7.8	11.5	0.091	0.055	4	<2	49
2	12/1/09	9:29 AM	4.5	N	7.6	10.0	0.114	0.071	7	<2	68
3	12/1/09	9:16 AM	7.5	N	7.8	10.5	0.168	0.042	3	<2	73
4	12/1/09	9:19 AM	5.0	N	7.7	10.6	0.113	0.056	4	<2	68
5	12/1/09	8:50 AM	7.5	N	7.5	11.0	0.151	0.209	3	<2	1203
6	12/1/09	9:02 AM	8.5	N	8.0	11.0	0.118	0.039	3	<2	39

Section Two
Results of Data Evaluation

A. Characterization of MS4 Conditions

There are no changes for this section.

B. Characterization of Water Quality Data

Based on existing water quality data, the City of Valparaiso's receiving waters are in good condition and are supporting a variety of water dwelling organisms. The monitored chemical parameters including Dissolved Oxygen, pH, Biochemical Oxygen Demand, Phosphate, *E. coli* and Coliform Bacteria, Water Temperature Change, Nitrate and Nitrite, Transparency/Turbidity, and biological parameters including macroinvertebrates and calculated Pollution tolerance index are good indicators of water quality, and will continue to be used as a way of monitoring the City's receiving waters in the Salt Creek Watershed.

C. Strategy for Continued Characterization Efforts

The Valparaiso Water Reclamation Department and Valparaiso University will continue to do annual monitoring of the City's receiving waters in Salt Creek Watershed to provide regular water quality conditions and check for the maintenance or improvement of said water. The results of the monitoring will be submitted to the City's MS4 operator. The monitoring will occur at least three times annually at locations agreed upon by the City of Valparaiso, Valparaiso Water Reclamation Department and Valparaiso University.

D. Follow-up Work Prior to Submittal of Stormwater Quality Management Plan – Part C

Not applicable.

Appendices

Appendix A: Updated List of Waters of the State
Appendix B: Land Use Characterization Map
Appendix C: List of facilities defined by the Valparaiso Water Reclamation Department (VWRD) as industrial users
Appendix D: List of City of Valparaiso's industrial stormwater dischargers permitted under IDEM's Rule 6
Appendix E: List of BMPs Evaluated and Potential New Sites for Structural and Non-Structural BMPs
Appendix F: Map of stream monitoring sites for Valparaiso MS4 program by VWRD and VU

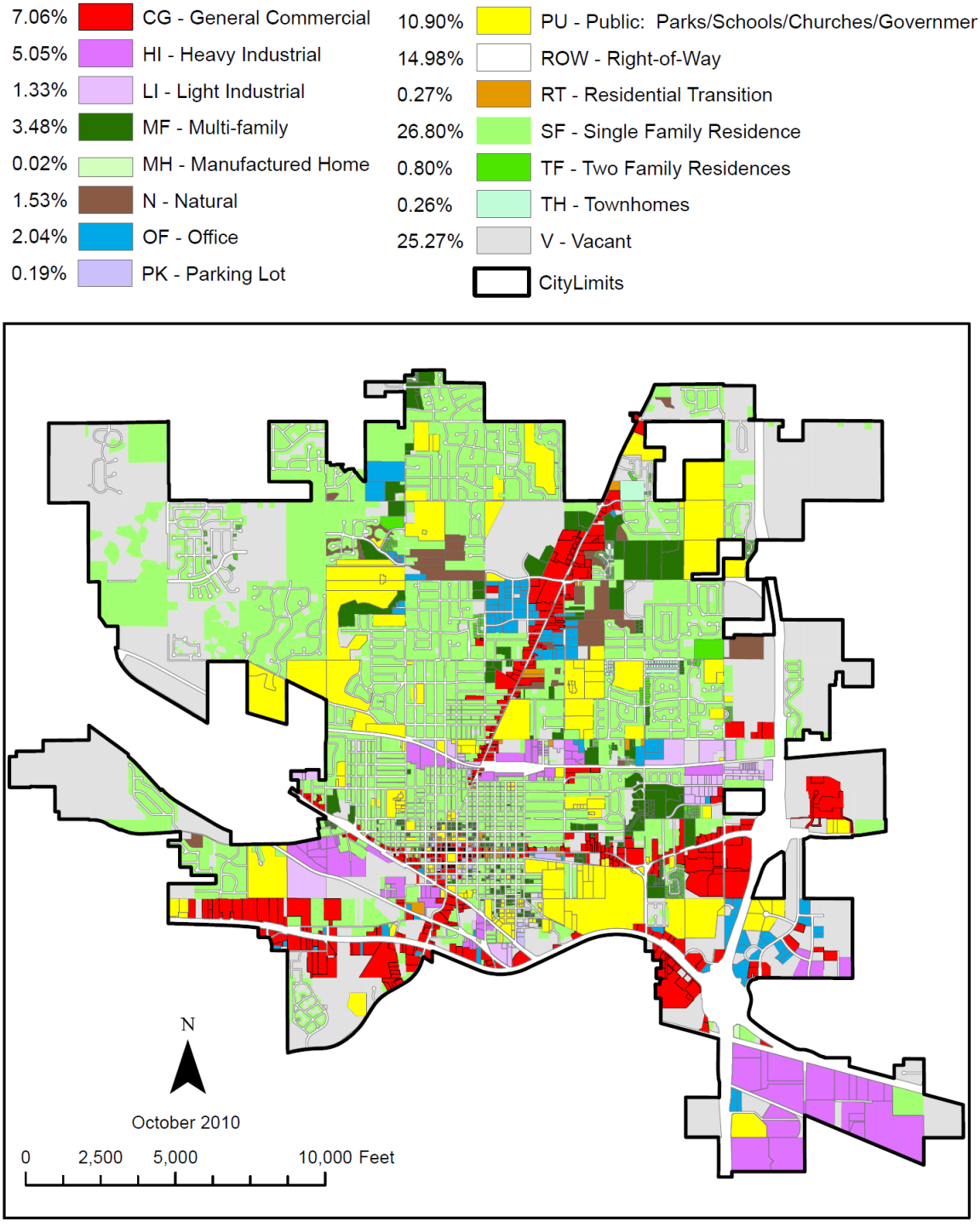
Appendix A: Updated List of Waters of the State

The following is a complete list of Waters of the State (receiving waters of discharges from MS4), including the original list submitted in the NOI and updated based on the data evaluation completed for the Characterization Report.

	Waters of the State Receiving Discharges from MS4
1	Salt Creek (HUC 04040001050010)
2	Sager Run (HUC 04040001050010)
3	Beauty Creek (HUC 04040001050020)
4	Pepper Creek (HUC 04040001050030)
5	Flint Lake Garden Terrace Drain (HUC 07120001090060)
6	
7	
8	
9	
10	

Appendix B: Land Use Characterization Map

The total land of the City of Valparaiso is approximately 15.61 square miles.



Appendix C: List of facilities defined by the Valparaiso Water Reclamation Department (VWRD) as industrial users

Significant Industrial Users, 2010	
1	McGill Manufacturing Company, Incorporated Emerson Power Transmission East Evans Avenue Plant
2	Pratt Industries (USA) Corrugating Division Valparaiso Facility
3	Task Force Tips, Incorporated South Plant
4	Urschel Laboratories, Incorporated
Non Significant Industrial Users, 2010	
1	A & A Manufacturing Gortrac Division
2	AOC
3	Arch Wood Protection, Incorporated
4	Block Heavy & Highway Products Company
5	Cathay Pigments (USA), Incorporated Indiana Plant
6	Elite Crete Systems
7	El Popular Sausage Factory, LLC
8	Family Express Corporation Central Distribution Center
9	Figure Eight Brewing
10	Home Mountain Publishing Co., Incorporated
11	Homewood Disposal
12	Hoosier Bat Company
13	Hoosier Fire Equipment, Incorporated
14	Huck Fasteners
15	McDaniel Fire Systems
16	McGill Manufacturing Company, Incorporated Bearing Division Lafayette Street Plant
17	North America Packaging Corporation, Incorporated
18	North Coast Distributing, Incorporated
19	Ozinga Indiana RMC, Incorporated
20	Porter County Municipal Airport
21	Porter County Jail
22	Porter - Valparaiso Hospital Campus
23	Powder Processing & Technology

24	Prairie Cable, LLC
25	Quality Oil Company
26	Quality Rebuilding Corporation
27	Ralston Paving Corporation
28	Reith-Riley Construction Company @ US 30
29	Reith-Riley Construction Company @ Montdale Industrial Park
30	Rexam Beverage Can Company
31	Sensit Technologies
32	Smith Ready Mix, Incorporated
33	Soft Touch Car Wash, Incorporated
34	Surtec, Incorporated
35	Test America - Valparaiso
36	ThelPack, Incorporated
37	The Times
38	Thorgren Tool & Molding Company, Incorporated
39	UGN, Incorporated
40	Union Electric Steel Corporation
41	Valparaiso City Utilities Water Department Flint Lake Water Treatment Plant
42	Valparaiso City Utilities Water Department Airport Road Water Treatment Plant
43	Valparaiso High School
44	Valparaiso University
45	Valpo Velvet Ice Cream
46	Veolia ES Technical Solutions, LLC
47	Walsh & Kelly, Incorporated

Appendix D: List of City of Valparaiso's industrial stormwater dischargers permitted under IDEM's Rule 6

	Permit #	Facility Name	Facility Address	Expiration Date	Permit Status	Approval Date
1	INR00B099	Beach Asphalt Co. Inc.	900 Locust Street	01-Dec-04		06-Jun-97
2	INR00N016	Owens-Corning Fiberglass Tank Division	2252 Industrial Drive			13-Jul-93
3	INR00N041	Ozinga Brothers Inc.	2750 Raystone Drive, Valparaiso	01-Dec-04		14-Jul-98
4	INR00U016	Ugimag Inc. / Magnequench-Ug, Inc.	405 Elm Street	01-Dec-04		25-Mar-94
5	INR110246	UGN, Inc.	2252 Industrial Drive	20-Jan-11		25-Jan-06
6	INR110410	McGill Manufacturing Co.	2300 East Evans Avenue	09-Mar-14	Exempt	18-Mar-09
7	INR140051	Pratt Industries, Inc.	3155 State Road 49	20-Sep-10		23-Sep-05
8	INR200030	Continental/Midland, LLC	4001 Redbow Drive	25-May-09		20-Dec-04
9	INR200082	Kane Magnetics Acquisitiion, LLC ("KANE")	405 Elm Street	28-Jun-09		13-Dec-04
10	INR200365	Rexam Beverage Can Company	4001 Montdale Park Drive	26-Feb-13	Exempt	06-Mar-08
11	INR200384	Veolia ES Technical Solutions LLC	3601 Enterprise St.	08-Oct-13	Sufficient	08-Oct-08
12	INR21N039	Smith Nuppnau Ready Mix	251 Brown Street	01-Dec-04		25-Oct-94
13	INR230078	AOC, L.L.C.	2552 Industrial Drive	27-Jul-14	Sufficient	08-Jun-09
14	INR230121	ISK Magnetics Inc.	4901 Evans Avenue	07-Mar-10		14-Mar-05
15	INR230186	Block Heavy & Highway Products	4201 Montdale Drive	13-Sep-06	Sufficient	02-Oct-06
16	INR600246	L&S Metals, LLC	551 Factory Street	06-Nov-13	Deficient	10-Nov-08
17	INR700023	Aggregate Industries - Valparaiso Express Asphalt	910 East Morthland Drive	13-Sep-09	Terminated	13-Dec-04
18	INR700045	Rieth-Riley Construction Co., Inc.	2352 Industrial Drive	10-May-11	Sufficient	01-Jun-06

Appendix E: List of BMPs Evaluated and Potential New Sites for Structural and Non-structural BMPs

E= Existing P= Proposed S= Structural N=Non-structural

	BMP Location	E	P	S	N	Condition
1	Candlewood Pond	X	X	X	☐	Smaller release rate available
2	Fairgrounds Park Basin	X	☐	X	☐	Good
3	Hotter Lagoon	X	X	X	☐	Good; vulnerable to spills
4	Knode Creek Basin	X	☐	X	☐	Good
5	Wall Street Basin	X	X	X	☐	Good; propose expansion and improve water quality
6	Thorgren Basin	X	X	X	☐	Good; propose expansion and improve water quality
7	Catch Basins	X	☐	X	☐	Maintained as prioritized/needed
8	Roadside Swales	X	☐	X	☐	Maintained as needed
9	Porter County Jail Rain Garden	X	☐	X	☐	Good
10	Forest Park Golf Course Hole 1 Rain Garden	X	☐	X	☐	Good
11	Forest Park Golf Course Hole 16 Rain Garden	X	☐	X	☐	Good
12	Water Department Rain Garden	X	☐	X	☐	Good
13	North Calumet Avenue Rain Garden	X	☐	X	☐	Good
14	City's Roundabout Rain Garden	X	☐	X	☐	Good
15	Valparaiso University North Loop Rain Garden	X	☐	X	☐	Good
16	Valparaiso University South Loop Rain Garden	X	☐	X	☐	Good
17	Valparaiso University Tennis Court Rain Garden	X	☐	X	☐	Good
18	Valparaiso University Engineering Addition Rain Garden	☐	X	X	☐	Propose to complete in 2011
19	Evan's Avenue Interceptor	☐	X	X	☐	Under design
20	Forest Park Wash Station	X	☐	X	☐	Good
21	Silva Cells at Indiana Ave. & Lafayette St.	X	☐	X	☐	Good
22	Rain barrels	X	X	X	☐	Distributed at workshops
23	6 Watershed signs, 2 informational signs	X	☐	☐	X	Good
24	Street Sweeping	X	☐	☐	X	At least twice per year
25	Catch Basins/Intakes Cleaning	X	☐	☐	X	Once per year
26	Brush/yard waste pickup	X	☐	☐	X	Collection takes place throughout the week
27	Leaf collection	X	☐	☐	X	Every week during leaf season
28	Erosion Control Ordinance	X	☐	☐	X	Being enforced
29	Floodplain Management and Stormwater Runoff Control Ordinance	X	☐	☐	X	Being enforced
30	Illicit/Illegal Discharges and/or Connections to Storm Drainage System Ordinance	X	☐	☐	X	Being enforced

Appendix F: Map of stream monitoring sites for Valparaiso MS4 program by VWRD and VU