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**Rubber Ducky Resort &
Campground
Water and Sewer Expansion
Design Brief**

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Prepared for:

Rubber Ducky Resort & Campground

June 2012

File No: 300031279

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1.0 Background

1.1. Project Description

The Rubber Ducky Resort & Campground retained RJ Burnside & Associates Ltd. (RJB) to complete Design Drawings and a Design Brief to satisfy the requirements of the Manitoba Conservation and Water Stewardship Office of Drinking Water (ODW) to obtain a Permit to Construct/Alter a Public Water System.

The campground is located along Road 76.5 in the RM of Woodlands, approximately 12 km west of Stonewall, MB (Refer to Drawing Cover Page in Appendix A). The existing campground consists of 80 serviced RV campsites; 7 unserviced sites; 4 Bed and Breakfast suites; and a restaurant/recreational centre building with public washrooms and showers.

The project includes the expansion of the existing campground to include an additional 118 RV campsites with water and sewer servicing.

The Design Brief provides a description of the existing water and wastewater servicing, the proposed expansion, and the project schedule. Following discussion with the ODW, the existing system will be evaluated with respect to chlorine contact time and the capacity of the existing system pumps.

1.2. Reason for Project

The existing Rubber Ducky Resort & Campground has been operating at maximum capacity during recent summer seasons. The Owner has decided to install additional campsites to meet the demand. A portion of the proposed campsites have been claimed by deposit, with a substantial waiting list, indicating the demand for this expansion.

Serviced campsites with both water and sewer connections are required for long term RV camping. The proposed campsites will connect to the existing water system, while sewage servicing will be provided by new sewage holding tanks. Sewage holding tanks will be pumped out as required with sewage hauled to the Warren Lagoon.

2.0 Existing Water System Description

2.1. Groundwater Source

The existing water system draws raw water from a single well source located approximately 30 m south of the recreational centre building (Refer to Drawing G1 in Appendix A). The well was installed in 2005 by Interlake Water Supply. It consists of a 30.5 m (100 feet) deep, 150 mm PVC casing, with an open hole extending to a depth of 61 m (200 feet). At the time of the site visit the wellhead extended approximately 30 cm above the ground level, and had positive grading around the wellhead.

Two drawdown tests are noted on the well drillers' log. One test pumped at a rate of 614 L/min (135 imp. gallons/min) for 3 hours, and recorded a drawdown to 17.7 m (58 feet). The other test pumped at a rate of 909 L/min (200 imp. gallons/min) for 2 hours and recorded a drawdown from an initial water level of 2.4 m (8 feet) to a final level of 22.9 m (75 feet). A copy of the well drillers' log is included in Appendix C.

Water is pumped from the well by a 5 HP Franklin Electric submersible well pump through a 50 mm polyethylene line to the pumphouse, located within the campground recreational centre building.

2.1.1. GUDI Status of the Well

Based on a desktop analysis, the raw water supply well is not considered to be groundwater under the direct influence of surface water (GUDI). The 2010 Water System Audit Report indicated no exceedances for total coliform and E.Coli. in treated and distribution water. The 2011 Audit Report noted that one treated water sample and one distribution sample tested positive for total coliform, but re-samples from the same location were negative.

Based on the criteria in Section 2(1)(b) of the Drinking Water Safety Regulation (CCSM c D101), the well is not deemed to be GUDI, since:

- The well has a thick limestone overburden;
- It is not within 200 m of a surface water body;
- It is not in a karst or unconfined aquifer;
- It is not part of an enhanced recharge and infiltration project, and;
- It is a vertical, drilled well.

2.1.2. Water Quality

General chemistry samples from June 2010 for raw and treated water provided by the Owner were reviewed to determine any aesthetic and health-based concerns. The key

parameters from those sample results are summarized in Table 2.1, with the full results included in Appendix B.

Based on these available testing results, the water exhibits levels at or near the Guidelines for Canadian Drinking Water Quality (GCDWQ) limits for the aesthetic parameters of iron and total dissolved solids. There were no exceedances found for health-based maximum allowable concentrations.

The required free chlorine residual concentration for water leaving the treatment facility is 0.5 mg/L. According to the 2010 Water System Audit Report the chlorine residual concentration was in 95.8% compliance for that year, while the 2011 Audit Report indicated 100% compliance.

Table 2.1 Rubber Ducky Campground Water System Raw and Treated Water Chemical Analysis					
Parameter	Units	Sample Date: June 8, 2012		GCDWQ Maximum	
		Raw	Treated		
Arsenic	mg/L	0.00121	0.00122	0.01	MAC
Benzene	mg/L	<0.00050	-	0.005	MAC
Calcium	mg/L	63.8	62.6		
Chloride (Dissolved)	mg/L	3.83	27.8	250	AO
Colour	TCU	<5.0	5.0	15	AO
Fluoride (Dissolved)	mg/L	0.48	0.42	1.5	MAC
Hardness (as CaCO3)	mg/L	431	429	500	AO
Iron	mg/L	0.702	0.627	0.3	AO
Lead	mg/L	0.000533	0.000371	0.01	MAC
Magnesium	mg/L	65.9	66.2		
Manganese	mg/L	0.00294	0.00290	0.05	AO
Nitrate & Nitrite-N (Dissolved)	mg/L	0.420	0.357	10	MAC
pH	pH units	7.75	7.85	6.5 - 8.5	AO
Total Carbon	mg/L	113	112		
Total Inorganic Carbon	mg/L	117	113		
Total Organic Carbon	mg/L	<1.0	<1.0		
Total Dissolved Solids	mg/L	480	536	500	AO
Turbidity ¹	NTU	0.57	0.11	1.0	-
Uranium	mg/L	0.00214	0.00212	0.02	IMAC

¹ The turbidity guidelines from the GCDWQ do not apply to a non-GUDI groundwater source.

Results in bold and shaded in grey indicate parameters exceeding the CDWQG objective. IMAC = interim maximum acceptable concentration, MAC = maximum acceptable concentration, AO = aesthetic objective

2.2. Disinfection & Treated Water Storage

Within the pumphouse, water is dosed with chlorine (12% sodium hypochlorite solution) before it is discharged into the 5680 L (1250 imp. gallon) treated water holding tank. The Chem-Tech Series 100 chlorine dosing pump is adjusted by the Operator to maintain a minimum 0.5 mg/L free chlorine residual concentration in water leaving the pumphouse.

The treated water holding tank is filled with 15 ¾-inch baffle balls, which force the water to follow a more circuitous path through the tank and improve the overall disinfection by increasing contact time. The baffle ball supplier confirmed that the product is made from FDA-approved polyethylene and are frequently used in liquid transport trucks.

There is a 2 HP Franklin Electric variable speed submersible pump in the treated water storage tank which supplies the distribution system. The pressure for water entering the distribution system is maintained at 360 kPa (52 psi).

2.3. Existing Water Consumption

The existing water consumption, including the average daily demand (ADD), maximum daily demand (MDD) and peak hour flow (PHF) are important parameters in determining the required size of the treated water storage, the required pumping capacity and design of the distribution system.

The system does not have historical water flow records prior to 2012. However, according to the campground owners, another similar campground recorded an average water consumption of 83 L/day (22 US gallons/day) per campsite. No detailed records were available from this site.

While Rubber Ducky Campground does not have historical water flow data, sewage hauling was recorded in 2011 and was used to determine the average wastewater production. This is discussed in detail in Section 4.1. This wastewater production can also be used to inform the estimate for average and maximum day water consumption.

The average daily wastewater production from each campsite, based on the 2011 sewage hauling data, was 52 L/day when the campground is at full capacity (summer weekend day). However, the owners reported that a portion of the water consumption is used for activities such as gardening and watering lawns, and therefore would not enter the wastewater holding tanks.

The Owners installed a water meter at the beginning of the 2012 season, and reported measurements from the May Long Weekend shortly before the completion of the Design

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Brief. The maximum daily water consumption during this weekend, with the campground at full capacity, was 2,700 L (31 L/campsite assuming all the water was used by the 87 campsites.)

Therefore, the average water consumption of 83 L/day per campsite is taken to be an acceptable, conservative value, even though it is lower than typical values presented in design literature such as the Ontario Ministry of the Environment (MOE) Design Guidelines for Drinking Water Systems.

Based on discussion with the campground owners, other sources of water demand can be summarized as follows:

- Water consumption from the public toilets and washroom sinks is 880 L/day (assuming 20 users for each of the men’s and ladies’ washrooms.)
- Water consumption from the public showers would be 190 L/day (assuming 5 total users, 5 minute showers, with low flow (7.6 L/min) shower heads).
- Water consumption by the restaurant is 200 L/day.
- The campground owners’ house with 4 residents is assumed to have a water consumption of 225 L/capita/day, or 900 L/day.
- The 4 Bed and Breakfast units are assumed to have water consumption equivalent to 450 L/day, assuming occupancy of 2 people and a water consumption of 225 L/capita/day.
- The 7 unserviced campsites are assumed to have water consumption equivalent to a serviced campsite.

The total average daily demand (ADD) is estimated to be 11,191 L/day (11.2 m3/day).

The Ontario Ministry of the Environment (MOE) Design Guidelines also provide recommendations for the maximum day factor and peak hour factor. The rationale for using these Ontario guidelines is that they provide specific recommendations for small systems serving under 500 people. The recommendations are summarized below in Table 2.2.

# Dwelling Units Serviced	Maximum Day Factor	Peak Hour Factor
10	9.5	14.3
50	4.9	7.4
100	3.6	5.4
150	3.0	4.5
167	2.9	4.3

Source: MOE Design Guidelines for Drinking Water Systems (2008)

The number of dwelling units is taken to be 91, based on the 87 campsites and 4 Bed & Breakfast units. Using linear interpolation of the above figures from Table 2.2, the Maximum Day Factor is 3.8, and the Peak Hour Factor is 5.8. Applying these factors, the MDD is 42.6 m³/day, and the Peak Hour Flow is 45.1 L/min.

2.4. Projected Water Consumption

The proposed campground expansion will add an additional 118 serviced campsites. Assuming the same design water consumption of 83 L/day/campsite, this would be an additional daily demand of 9.8 m³/day, for a total projected ADD of 21.0 m³/day. With a projected population of above 500 when the expanded campground is at full capacity, using the MOE Design Guidelines, the Maximum Day Factor would be 2.75 and the Peak Hour Factor would be 4.13. The projected MDD is therefore 57.8 m³/day and the projected Peak Hour Flow is 60.2 L/min.

2.5. Chlorine Contact Time

Chlorine contact time is required by Manitoba law to ensure the system provides effective disinfection. The requirement for a secure groundwater source is 20 minutes of effective chlorine contact time at the peak hour flow rate.

The peak hourly flow rate, as discussed above, is taken to be 45.1 L/min for the existing system and 60.2 L/min for the system after the proposed expansion.

The actual volume of the treated water storage tank is 1250 imperial gallons (5680 L). The effective volume of the tank is obtained by multiplying the actual volume by a baffling factor. The Office of Drinking Water advised that a contact time study is planned to determine the baffling factor for baffle balls such as those used in Rubber Ducky Campground, but that an interim value of 0.3 should be used (Refer to correspondence in Appendix D).

The chlorine contact time for the existing system is determined by the calculation below:

$$\begin{aligned}
 [\text{Contact time}] &= [\text{Storage volume}] * [\text{Baffling factor}] / [\text{Peak hour flow rate}] \\
 &= (5680 \text{ L}) * (0.3) / (45.1 \text{ L/min}) \\
 &= \mathbf{37.8 \text{ min}}
 \end{aligned}$$

While the contact time for the system including the proposed expansion is:

$$= (5680 \text{ L}) * (0.3) / (60.2 \text{ L/min})$$

$$= \mathbf{28.3 \text{ min}}$$

Therefore the system meets the requirement for 20 minutes of contact time for the existing system and the proposed expansion.

Through communication with Kim Barlishen from the Office of Drinking Water it was noted that the actual and projected water consumption values per campsite are lower than design values from available literature, and that there is limited data available to accurately document the typical consumption in an RV campground. However, it was also noted that some campgrounds are beginning to install meters and record this data, including Rubber Ducky Campground. Therefore, it is recommended that the above contact time calculations be reviewed at the end of the 2012 season and revised if necessary based on the data from the system itself. Additionally, if a study is completed by the province to determine the baffling factor provided by baffle balls, the results should also be used to revise the calculations. If the revised calculations result in the need to upgrade the treated water storage system, this would be completed after the 2012 season has ended.

Waiver of Baffling Factor

The Director of the Office of Drinking Water approved a policy that allows certain public water systems to calculate the hydraulic retention time of the contact tank without applying a baffling factor. To be eligible the system must meet the following criteria:

- Seasonal system
- Serves fewer than 500 people
- Uses a secure groundwater source (i.e. no indication of bacterial contamination)
- Individually approved by the Office of Drinking Water to calculate hydraulic retention time in this manner

The Office of Drinking Water has confirmed that the baffling factor would need to be considered if the proposed expansion caused the projected occupancy of the campground at peak conditions to rise above 500 people. Based on an occupancy of 3 persons/ campsite, this would allow a maximum of 166 campsites maintaining a population under 500, or 75 additional campsites beyond the existing 87 campsites and 4 Bed & Breakfast suites. However, based on the calculations above, even with the baffling factor of 0.3 considered, the existing treated water storage tank provides adequate contact time to meet Manitoba regulations.

3.0 Proposed Water System Description

The proposed upgrade to the water system consists of a major expansion to the distribution system to service 118 proposed new RV campsites. No changes will be made to the existing well source or pumphouse.

The design for the distribution system expansion was completed with general conformance to the Ten State Standards. Some deviations from the Ten State Standards were justified due to the small scale and seasonal nature of the system, and the lower water consumption when compared to a municipal application. The deviations are identified as appropriate below.

The expanded campground area is located to the west of the existing facility. It will be connected to the existing distribution system through a 50 mm CSA Series 75 polyethylene watermain to be connected and an existing curb stop and installed by directional drilling. The location of the directional drilling line is shown in Drawing SW1 in Appendix A.

The watermains will be shallow bury, with a minimum depth of 0.5 m. The Ten State Standards recommend sufficient cover or insulation to prevent freezing. However, the system will operate seasonally, and therefore it is not necessary to provide freeze protection. The watermains will be shock chlorinated and flushed prior to the beginning of each season, and drained at the end of the season.

All watermains will be 50 mm or 32 mm CSA Series 75 polyethylene, while services will be 19 mm polyethylene with an individual standpipe service connection provided at each campsite (refer to water service detail in SW2 in Appendix A). Where possible watermains will be connected in loops to improve circulation in the system and reduce the risk of water remaining stagnant in the watermain at a dead end, leading to a loss of chlorine residual. As recommended in the Ten State Standards, where it is not possible to avoid a dead end means will be provided to flush the line. One dead end is present in the cul-de-sac containing Campsites 111-118 (refer to Drawing SW1 in Appendix A). This dead end will be flushed via a 50 mm valve located at the end of the main line.

The Ten State Standards recommend continuous and uniform bedding, tamped in layers, for all buried pipe. However, this system will be shallow bury with small diameter pipe and will be used seasonally. Therefore, it is recommended that pipe be installed as per the manufacturer's recommendations, with installation at a uniform grade to minimize local high and low points to limit air accumulation, but that compacted bedding material is not required along the full length of the watermains. The Ten State Standards also recommend the use of air relief valves at all high points in the water lines. However, due to the seasonal use of the system, with the distribution system

drained each fall, and flushed and recharged each spring, air relief valves were not included in the design.

Control valves will be installed along the watermain as shown in Drawing SW1 to allow for isolation of watermain sections for repair or maintenance. The Ten State Standards recommend a maximum valve spacing of 244 m (800 feet), which is achieved in the proposed system.

The Ten State Standards recommend a minimum watermain diameter of 75 mm (3") unless justified by hydraulic analysis and in special circumstances. Given the seasonal operation of the system, and based on head loss calculations to the farthest point in the distribution system, 50 mm and 32 mm watermains were determined to be appropriate.

The Ten State Standards also recommend reaction blocking, tie rods or joints designed to prevent movement at all tees, bends and plugs. Based on the seasonal application of the system, low average flows and small diameter pipe, adequately compacted bedding material at these locations was considered an appropriate alternative.

3.1. Proposed Construction Schedule

Time is of the essence for this project. The Owner has indicated an intention to install the new distribution system lines as soon as the permit is issued, with completion of the installation prior to the required in-service date of July 1, 2012.

3.2. Capacity of the Existing System

The Office of Drinking Water requested that this Design Brief discuss the capacity of the existing treatment system to support the additional load from the proposed expansion. In particular, the size of the treated water storage tank and the capacity of the distribution pumps were to be discussed.

3.2.1. Treated Water Storage Tanks

As calculated above, the existing baffled treated water storage tank is projected to provide a contact time of 28.3 minutes after the full campground expansion is complete. Therefore the installation of an additional treated water storage tank is not required.

As noted, it is recommended that this be reviewed once additional data on the water consumption and baffling factor are available.

3.2.2. Distribution Pumps and Lines

The water line from the pumphouse to the existing curb stop is a 50 mm line, while the secondary watermain off the central line are 32 mm. A head loss calculation was completed to determine the anticipated pressure drop for water to the farthest point in the expanded distribution system. The calculation was based on the conservative assumption that 100% of the expanded campground peak flow (29.5 L/min) would flow along the central watermain and a peak flow proportional to the number of campsites on each separate loop would flow along the watermain loop to the farthest points in the distribution system. An additional factor was applied to account for losses due to fittings and valves. Based on these assumptions the pressure loss was projected to be no greater than 35 kPa (5.0 psi) under peak conditions.

The Ten State Standards require a minimum pressure of 240 kPa (35 psi) to be maintained in the distribution system under normal operating conditions. With the pressure set at 360 kPa (52 psi) in the pumphouse, it is not anticipated that the system will have difficulties meeting this requirement.

A pump curve for the 2 HP distribution pump was not available. While no documentation was available, the Owner reported that the nominal flow of the pump was 189 L/min (50 USGPM). Based on the pump curve for another model of submersible pump with a 2 HP motor, and based on the projected peak hour flow, it is anticipated that the pump will be of sufficient size. Confirmation that the pump capacity is adequate will be acquired by operation of the system; if the pressure in the distribution system falls below 240 kPa (35 psi) during peak conditions a larger distribution pump may be required.

The well supply pump, with a 5 HP motor, will be of sufficient size to meet the projected system demands, as its pumping capacity is greater than that of the 2 HP distribution pump.

3.3. Protection of Public Health during Construction

The expansion of the distribution system will be completed in such a manner as to not impact the existing system. The tie-in point, the curb stop located in the existing campground area (Refer to Drawing SW1 in Appendix A) will be closed while the new watermain is installed, so the existing system is able to operate normally.

After the new watermain and services are installed, the system should be disinfected through shock chlorination, using the same procedure that is used at the beginning of each season. The following procedures should be followed:

- During construction, protect exposed pipe ends to prevent excess water or debris from entering.

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- Pump chlorinated water, with a residual of at least 50 mg/L, into the system, bleeding water through all outlets.
- Thoroughly flush the water lines and services with normal chlorinated water (0.5 mg/L residual) before the system is put into service.
- Collect representative samples from the distribution system for bacteriological analysis.

If the shock chlorination of the expanded campground area requires a shutdown of the entire campground water system, the regional Office of Drinking Water representative should be contacted to review the planned procedure.

4.0 Existing Wastewater System Description

The existing wastewater disposal system consists of five 1500 imp. gallon (6819 L) holding tanks. The holding tanks are pumped out as required, with the sewage taken to the Warren Lagoon. The lagoon has provided authorization to the Rubber Ducky Campground to discharge sewage there.

Each campsite is serviced by a 100 mm SDR wastewater connection. The sewage mains in the system are also 100 mm. The system owners reported that they have had no operational concerns related to sewer mains becoming plugged during their operation of the facility (7 years).

4.1. Existing Wastewater Production

While the Rubber Ducky Campground began to record water flow data in 2012, sewage hauling was recorded in 2011 (Table 4.1) and can be used to determine the average wastewater production. This wastewater production can also be used to determine an estimate for average and maximum day water consumption.

Table 4.1 Rubber Ducky Campground 2011 Sewage Holding Tank Pumpout Records	
Date	Number of Loads (1500 imp. gallons each)
May 3	4
May 17	3
May 23	4
June 2	4
June 7	2
June 14	3
June 23	2
July 7	3
July 13	1
July 20	2
July 27	4
Aug 3	3
Aug 9	3
Aug 22	3
Sep 1	3
Sep 9	2
Sep 16	1
Sep 23	1
Sep 29	1
Oct 5	3
TOTAL	52

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There were a total of 52 loads over a period of 155 days. Based on the conservative assumption that each load represents 100% of the maximum capacity (6819 L), the total sewage volume was 354,588 L for the 2011 season. The pumpouts occurred approximately each week, with the largest weekly pumpout being 4 loads, or 27,276 L.

To determine the maximum day wastewater production, it was considered that weekend days (Saturday or Sunday) would be operating at peak capacity, while weekdays (Monday to Friday) would operate at 30% of the peak capacity. The May 23 pumpout date covers the "May long weekend" period which is assumed to include 3 days at full capacity. Therefore, the July 27 pumpout date is considered to be the critical date with the highest peak day wastewater generation in the preceding week.

Based on discussion with the campground owners, the following assumptions were used to determine the peak day wastewater generation:

- Wastewater production from the toilets and washroom sinks would be 880 L/day (assuming 20 users for each of the men's and ladies' washrooms).
- Wastewater production from the showers would be 190 L/day (assuming 5 total users, 5 minute showers, with low flow (7.6 L/min) shower heads).
- Wastewater generation in the restaurant is 200 L/day.
- The campground owners' house with 4 residents is also connected to the holding tank at the recreational centre. Therefore their wastewater generation is included in the pumpout figures above. The wastewater production at the house is assumed to be 225 L/capita/day, or 900 L/day. This value is at the low end of typical average day water consumption values, and will apply to both weekend days and weekdays.
- The remaining wastewater is assumed to originate from the campgrounds and Bed & Breakfast units.
- The 4 Bed and Breakfast units are assumed to have wastewater production equivalent to a campsite.
- The 7 unserviced campsites are assumed to have wastewater production equivalent to a serviced campsite. These sites discharge sewage via on-board containers to the northwest holding tank.

Based on the above assumptions, the calculations to determine the peak day wastewater production are summarized in Table 4.2.

Table 4.2			
Rubber Ducky Campground			
Peak Day Wastewater Production Volumes			
Wastewater Source	Weekend Day (100% capacity)	Weekday (30% capacity)	Total (2 weekend days and 5 weekdays)
Washrooms	880	264	3080
Showers	190	57	665
Restaurant	200	60	700
House	900	900	6300
Bed & Breakfast units (4)	208 <i>(52 L/unit)</i>	62	726
Campsites (87)	4516 <i>(52 L/site)</i>	1355	15807
Total	6,894	2,698	27,278

All units are litres (L)

As shown in Table 4.2, the maximum day (peak July weekend) wastewater production is calculated to be 6,894 L. These calculations indicate a wastewater production of 52 L/campsite.

The proposed expansion would add an additional 118 RV campsites for a total of 205 campsites. The entire expansion area would operate seasonally. Assuming a similar wastewater production in the new campsites of 52 L/day per campsite, the projected peak daily wastewater production for the expanded facility, including existing sites, would be 13,030 L/day.

5.0 Proposed Wastewater System Description

The proposed campground expansion will be serviced by individual wastewater holding tanks to be shared between two campsites each. The tanks will be located between each pair of campsites, with a 100 mm service to a service connection at each site (refer to Drawing SW1 for the holding tank layout and Drawing SW2 in Appendix A for the wastewater service connection detail).

This system was selected for its simplicity, and to avoid the need for manholes and large diameter sewer mains specified in the Ten State Standards. All wastewater treatment will be handled off site at the Warren Lagoon.

To reduce the risk of contamination from a damaged line, the proposed wastewater holding tanks will be installed with a minimum of 3.0 m separation from water mains and water services. The wastewater services will have a minimum of 1.0 m separation from water service lines, while the water and wastewater service connections will have a minimum 3.0 m separation (refer to site servicing plan detail on Drawing SW2 in Appendix A). Where it is necessary for water and wastewater lines to cross, the water line will pass a minimum of 450 mm above the sewer line.



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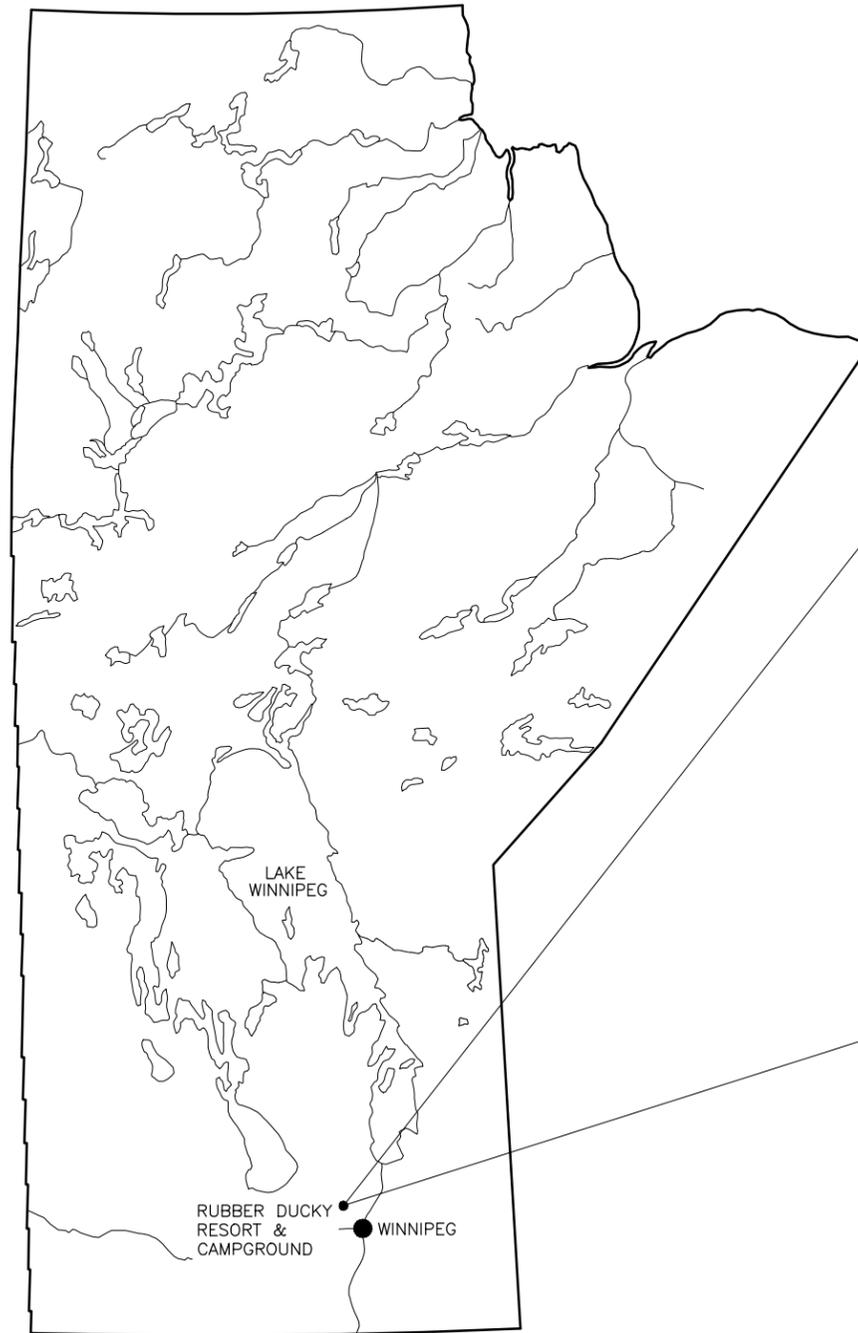
Appendix A
Drawings

RUBBER DUCKY RESORT & CAMPGROUND

RM OF WOODLANDS, MANITOBA
WATER & SEWER EXPANSION
JOB# 300031279

DRAWING LIST

- G-1 GENERAL SITE PLAN
- WS-1 WATER & SEWER
SERVICING PLAN
- WS-2 WATER & SEWER DETAILS
AND SPECIFICATIONS



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PRELIMINARY
FOR DISCUSSION
PURPOSES ONLY

1. This drawing is the exclusive property of R. J. Burnside & Associates Limited and the reproduction of any part without prior written consent of this office is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. Do not scale the drawings.

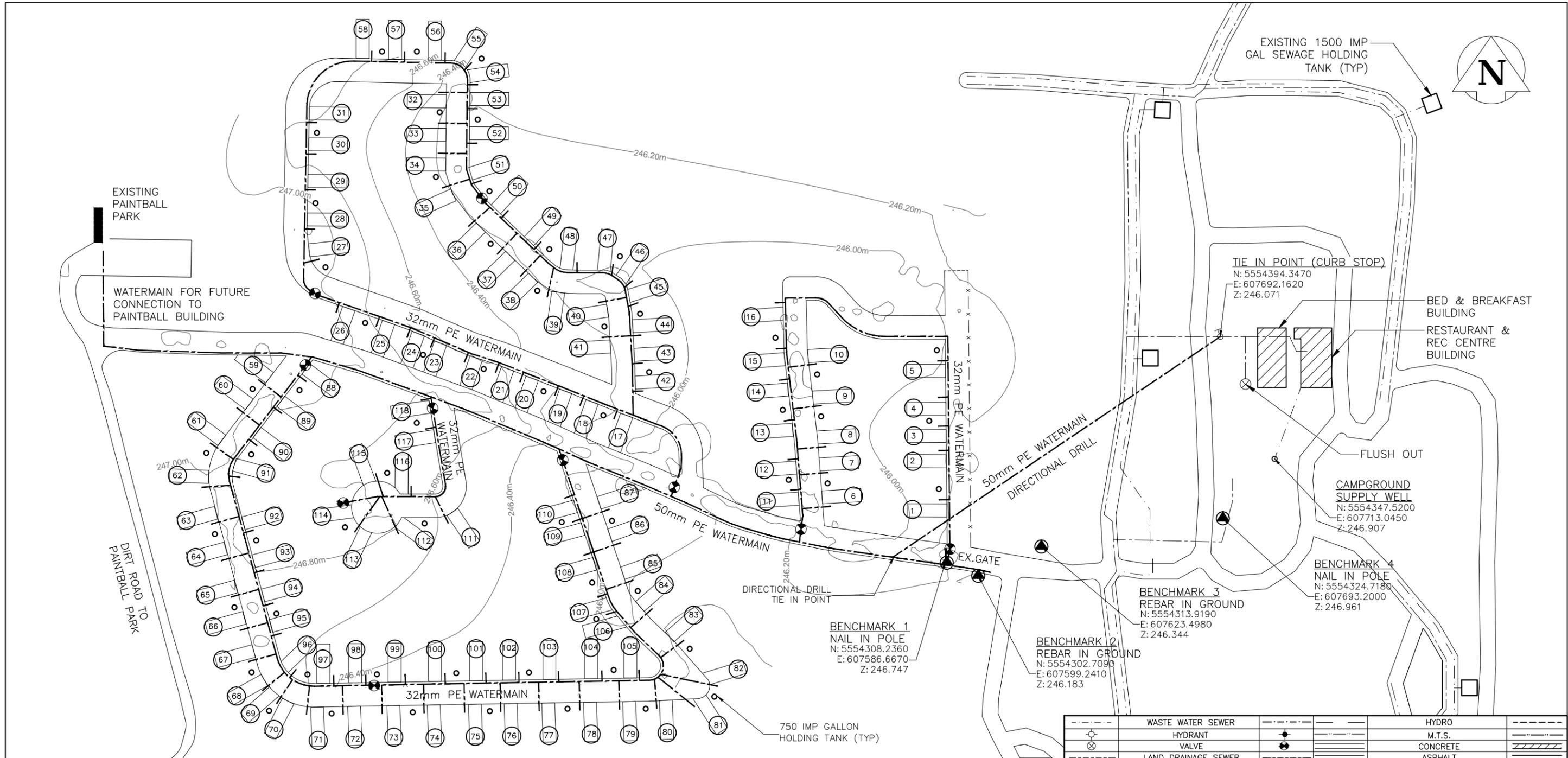
No.	Issue / Revision	Date
1	ISSUED FOR REVIEW	JUNE 2, 2012

Client
RUBBER DUCKY RESORT & CAMPGROUND
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 R.M. OF WOODLANDS, MB

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Drawing/Project Title
 GENERAL SITE PLAN

Drawn By J. JUACALLA	Checked By P. KLASSEN	Drawing No. G-1
Scale 1:2000	Project No. 300031279	



PRELIMINARY
FOR DISCUSSION
PURPOSES ONLY

---	WASTE WATER SEWER	---	---	---	HYDRO
⊕	HYDRANT	⊕	---	---	M.T.S.
⊗	VALVE	⊗	---	---	CONCRETE
---	LAND DRAINAGE SEWER	---	---	---	ASPHALT
---	WATERMAIN	---	---	---	FENCE LINE
○	MANHOLE	○	TP1	---	TEST PIT
32.45	ELEVATIONS	33.10	---	---	CURB STOP
→	FLOW DIRECTION	→	---	---	C.B. LEAD
●	BENCHMARK	---	---	---	FENCE
---	CULVERT	---	---	---	SEWAGE HOLDING TANK
OHP	HYDRO POLE	●HP	---	---	---
---	EXISTING	---	---	---	LEGEND - PLAN
---	LEGEND - PLAN	---	---	---	PROPOSED

1. This drawing is the exclusive property of R. J. Burnside & Associates Limited and the reproduction of any part without prior written consent of this office is strictly prohibited.

2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.

3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

4. Do not scale the drawings.

No.	Issue / Revision	Date
1	PRELIMINARY DRAWING FOR HOLDING TANK PERMIT APPLICATION	MAY 2012
2	ISSUED FOR REVIEW	JUNE 2, 2012

Client
RUBBER DUCKY RESORT & CAMPGROUND

WATER AND SEWER EXPANSION, R.M. OF WOODLANDS, MB

Drawing/Project Title
WATER & SEWER SERVICING PLAN



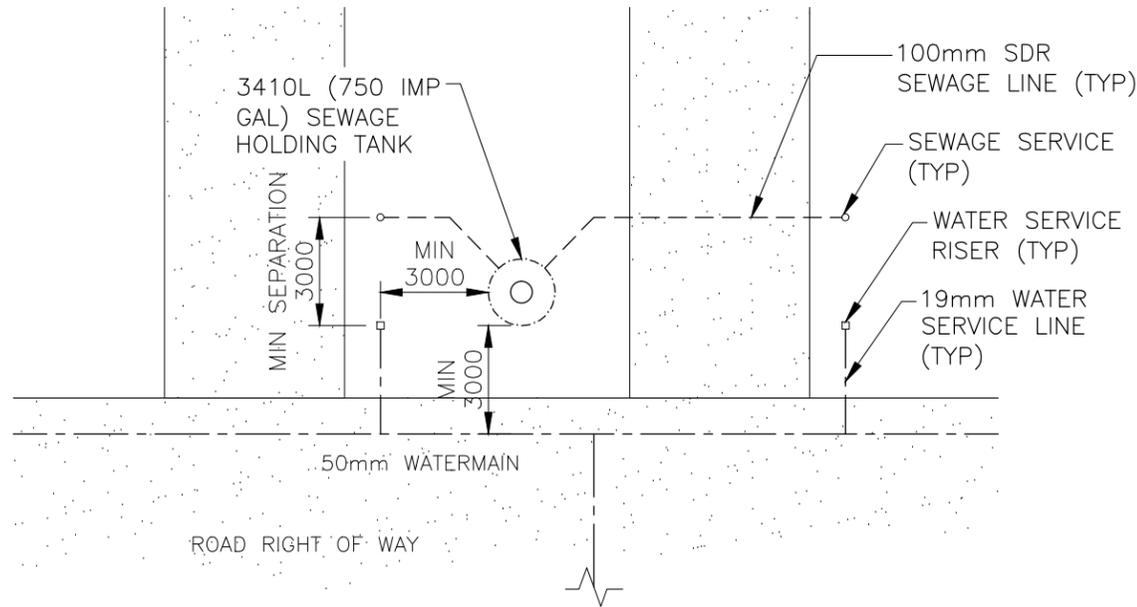
BURNSIDE

R. J. Burnside & Associates Limited
106 B Scurfield Blvd, Winnipeg MB R3Y 1G4
telephone (204) 949-7110 fax (204) 949-7111

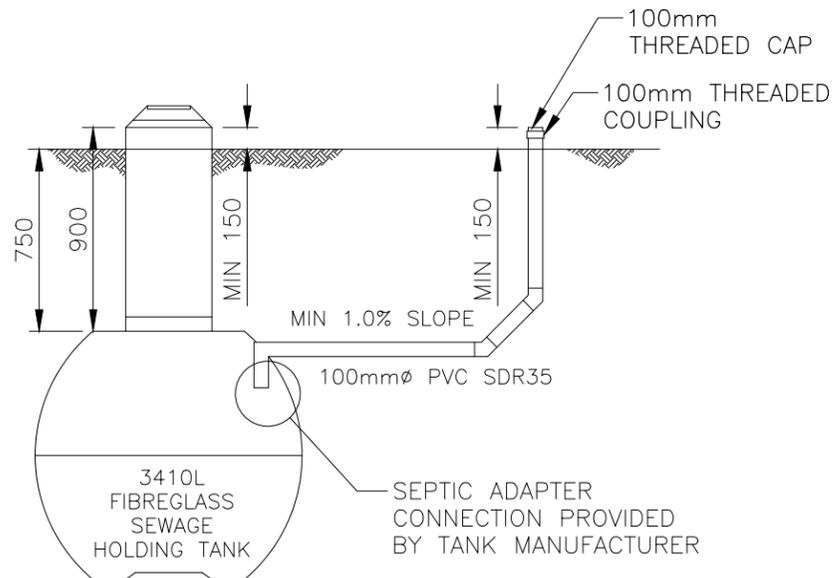
Drawn By J. JUACALLA	Checked By P. KLASSEN	Drawing No. WS-1
Scale 1:1500	Project No. 300031279	

NOTES

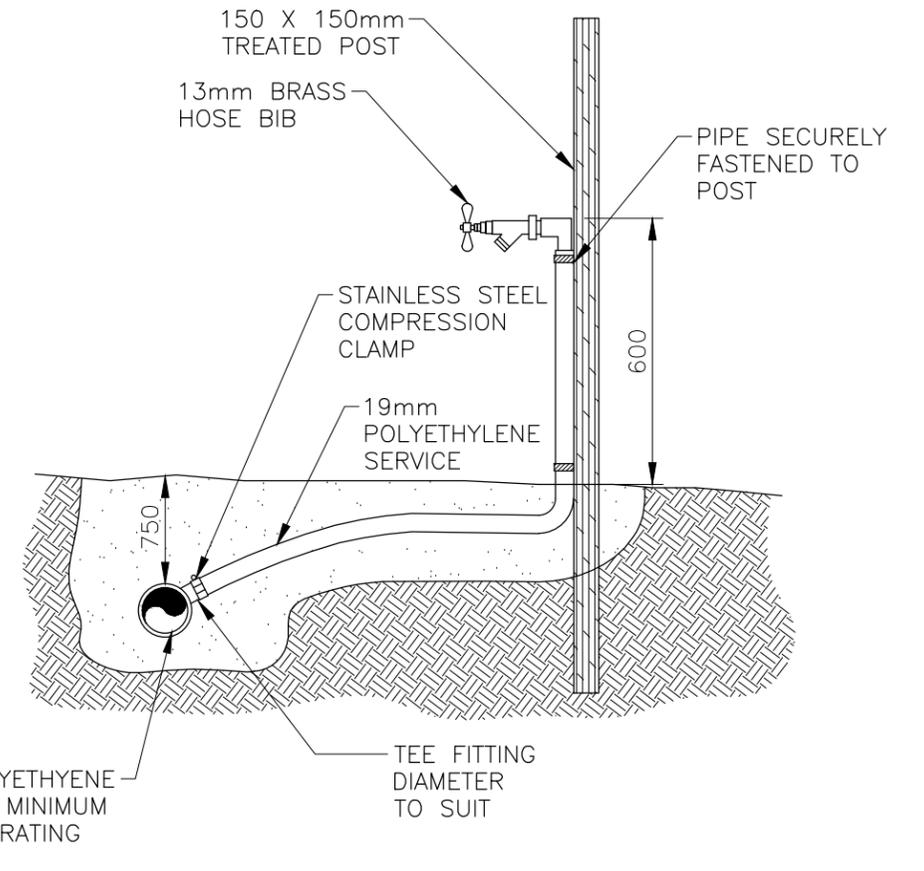
1. WATERMAINS TO HAVE A MINIMUM 3.0m HORIZONTAL SEPARATION FROM SEWAGE HOLDING TANKS OR SEWAGE SERVICE LINES.
2. WATER SERVICE LINES TO BE A MINIMUM OF 3.0m FROM SEWAGE HOLDING TANK AND 1.0m FROM SEWAGE SERVICE LINES.
3. WHERE WATER AND SEWER SERVICING MUST CROSS, WATER SERVICE SHALL BE A MINIMUM 450mm BELOW THE SEWER SERVICE.
4. MINIMUM BURY DEPTH TO BE 0.5m FOR WATERMAINS.
5. WATERMAINS SHALL BE INSTALLED WITH A CONSTANT GRADE TO MINIMIZE LOCAL HIGH POINTS IN THE LINE.
6. ALL SEWAGE SERVICE ELBOWS TO BE 45° OR 22.5°.
7. ALL MATERIALS INCLUDING PIPE FITTINGS AND VALVES SHALL CONFORM TO THE LATEST STANDARDS ISSUED BY ASTM, AWWA AND ANSI/NSF WHERE SUCH STANDARDS EXIST.
8. ALL WATERMAIN FITTINGS TO BE BRASS OR PVC INSERT FITTINGS FASTENED WITH STAINLESS STEEL GEAR CLAMPS.
9. SEWAGE HOLDING TANK TO BE INSTALLED TO MANUFACTURER'S SPECIFICATIONS



TYPICAL SITE SERVICING PLAN
N.T.S.



TYPICAL SEWER SERVICE
N.T.S.



TYPICAL WATER SERVICE
N.T.S.

PRELIMINARY
FOR DISCUSSION
PURPOSES ONLY

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2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. Do not scale the drawings.

No.	Issue / Revision	Date
1	ISSUED FOR REVIEW	JUNE 2, 2012

Client
RUBBER DUCKY RESORT & CAMPGROUND

WATER & SEWER EXPANSION, R.M. OF WOODLANDS, MB

Drawing/Project Title
WATER & SEWER DETAILS AND SPECIFICATIONS



BURNSIDE
R. J. Burnside & Associates Limited
106 B Scurfield Blvd, Winnipeg MB R3Y 1G4
telephone (204) 949-7110 fax (204) 949-7111

Drawn By J. JUACALLA	Checked By P. KLASSEN	Drawing No. WS-2
Scale NTS	Project No. 300031279	



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[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

Water Quality Data



Environmental Division

Certificate of Analysis

Office of Drinking Water
ATTN: Derek Clarke
75 - 7th Avenue
Gimli MB R0C 1B0Q

Report Date: 21-JUN-10 15:54 (MT)
Version: FINAL

Lab Work Order #: **L895633**

Date Received: **09-JUN-10**

Project P.O. #: NOT SUBMITTED
Job Reference: MJD351
Legal Site Desc:
CofC Numbers:

Other Information:

Comments:

Robert S. Kitlar
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Physical Tests (WATER)

		ALS ID		L895633-1	L895633-2
		Sampled Date		08-JUN-10	08-JUN-10
		Sampled Time		-	-
		Sample ID		RUBBER DUCKY 1 - RAW	RUBBER DUCKY 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Color, True	T.C.U.	15	-	<5.0	5.0
Conductivity	umhos/cm	-	-	825	897
Langelier Index (4 C)	No Unit	-	-	0.47	0.56
Langelier Index (60 C)	No Unit	-	-	1.2	1.3
pH	pH units	6.5-8.5	-	7.75	7.85
Total Dissolved Solids	mg/L	500	-	480	538
Transmittance, UV (254 nm)	% T	-	-	95.6	94.1
Turbidity	NTU	-	-	0.57	0.11

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Anions and Nutrients (WATER)

		ALS ID		L895633-1	L895633-2
		Sampled Date		08-JUN-10	08-JUN-10
		Sampled Time		-	-
		Sample ID		RUBBER DUCKY 1 - RAW	RUBBER DUCKY 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Alkalinity, Total (as CaCO3)	mg/L	-	-	442	449
Ammonia (NH3) - Dissolved	mg/L	-	-	<0.050	<0.050
Bicarbonate (HCO3)	mg/L	-	-	539	548
Carbonate (CO3)	mg/L	-	-	<0.60	<0.60
Chloride (Cl) - Dissolved	mg/L	250	-	3.83	27.8
Fluoride (F) - Dissolved	mg/L	-	1.5	0.48	0.42
Hardness (as CaCO3)	mg/L	-	-	431	429
Hydroxide (OH)	mg/L	-	-	<0.40	<0.40
Ion Balance	%	-	-	95.6	101
Nitrate+Nitrite-N - Dissolved	mg/L	-	-	0.420	0.357
Total Kjeldahl Nitrogen	mg/L	-	-	<0.20	<0.20
TDS (Calculated)	mg/L	500	-	451	470
Sulphate (SO4) - Dissolved	mg/L	500	-	37.3	36.9

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Organic / Inorganic Carbon (WATER)

		ALS ID		L895633-1	L895633-2
		Sampled Date		08-JUN-10	08-JUN-10
		Sampled Time		-	-
		Sample ID		RUBBER DUCKY 1 - RAW	RUBBER DUCKY 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Total Carbon	mg/L	-	-	113	112
Total Inorganic Carbon	mg/L	-	-	117	113
Total Organic Carbon	mg/L	-	-	<1.0	<1.0

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limit listed on this report.

Total Metals (WATER)

Analyte	Unit	ALS ID		L895633-1	L895633-2
		Guide Limit #1	Guide Limit #2	08-JUN-10	08-JUN-10
				RUBBER DUCKY 1 - RAW	RUBBER DUCKY 2 - TREATED
Aluminum (Al)-Total	mg/L	-	-	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	-	<0.00020	<0.00020
Arsenic (As)-Total	mg/L	-	-	0.00121	0.00122
Barium (Ba)-Total	mg/L	-	-	0.0604	0.0600
Beryllium (Be)-Total	mg/L	-	-	<0.00020	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	<0.00020	<0.00020
Boron (B)-Total	mg/L	-	-	0.147	0.175
Cadmium (Cd)-Total	mg/L	-	-	0.000015	0.000013
Calcium (Ca)-Total	mg/L	-	-	63.8	62.6
Cesium (Cs)-Total	mg/L	-	-	<0.00010	<0.00010
Chromium (Cr)-Total	mg/L	-	-	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	-	-	0.00055	0.00067
Copper (Cu)-Total	mg/L	-	-	0.0116	0.0421
Iron (Fe)-Total	mg/L	-	-	0.702	0.627
Lead (Pb)-Total	mg/L	-	-	0.000533	0.000371
Lithium (Li)-Total	mg/L	-	-	0.0350	0.0372
Magnesium (Mg)-Total	mg/L	-	-	65.9	66.2
Manganese (Mn)-Total	mg/L	-	-	0.00294	0.00290
Molybdenum (Mo)-Total	mg/L	-	-	0.00282	0.00342
Nickel (Ni)-Total	mg/L	-	-	0.0090	0.0101
Phosphorus (P)-Total	mg/L	-	-	<0.20	<0.20
Potassium (K)-Total	mg/L	-	-	6.81	7.45
Rubidium (Rb)-Total	mg/L	-	-	0.00368	0.00417
Selenium (Se)-Total	mg/L	-	-	0.0014	0.0010
Silicon (Si)-Total	mg/L	-	-	5.44	5.47
Silver (Ag)-Total	mg/L	-	-	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	9.90	26.1
Strontium (Sr)-Total	mg/L	-	-	0.366	0.403
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.00010	<0.00010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.00141	0.00114

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limit listed on this report.

tal Metals (WATER)

		ALS ID		L895633-1	L895633-2
		Sampled Date		08-JUN-10	08-JUN-10
		Sampled Time		-	-
		Sample ID		RUBBER	RUBBER
Analyte	Unit	Guide Limit #1	Guide Limit #2	DUCKY 1 - RAW	DUCKY 2 - TREATED
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010
Uranium (U)-Total	mg/L	-	-	0.00214	0.00212
Vanadium (V)-Total	mg/L	-	-	0.00043	0.00041
Zinc (Zn)-Total	mg/L	-	-	0.0213	0.0157
Zirconium (Zr)-Total	mg/L	-	-	<0.00040	<0.00040

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

Volatile Organic Compounds (WATER)

		ALS ID		L895633-1
		Sampled Date		08-JUN-10
		Sampled Time		-
		Sample ID		RUBBER
Analyte	Unit	Guide Limit #1	Guide Limit #2	DUCKY 1 - RAW
Benzene	mg/L	-	0.005	<0.00050
Ethylbenzene	mg/L	0.0024	-	<0.00050
Toluene	mg/L	0.024	-	<0.00050
o-Xylene	mg/L	-	-	<0.00050
p-Xylenes	mg/L	-	-	<0.0010
m-Xylenes	mg/L	0.3	-	<0.0015
Surrogate: Toluene-d8 (SURR)	%	-	-	97

Federal Guidelines for Canadian Drinking Water Quality (JUN, 2008)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum and Interim Maximum Acceptable Concentrations

 Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limit listed on this report.

Reference Information

Methods Listed (if applicable):

Test Code	Matrix	Test Description	Method Reference**
ALK-TOT-WP	Water	Alkalinity	APHA 2320B
<p>Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO₃⁻ and H₂CO₃ endpoints indicated electrometrically.</p>			
BTX-MS-PT-WP	Water	BTX by GCMS	EPA SW846 8260B REV 2 SEPT 1994
<p>Samples are extracted by purging the sample with helium and trapping the extractives onto an adsorbent. Analysis is performed using a gas chromatograph equipped with a mass selective detector.</p>			
C-TOT-INORG-WP	Water	Total Inorganic Carbon	APHA 5310 B-Instrumental
<p>This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.</p> <p>The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.</p>			
C-TOT-ORG-WP	Water	Total Organic Carbon	APHA 5310 B-INSTRUMENTAL-WP
<p>This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.</p> <p>The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.</p>			
C-TOT-WP	Water	Total Carbon	APHA 5310 B-Instrumental
<p>This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.</p> <p>The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC. TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.</p>			
CL-DIS-LOW-WP	Water	Chloride Dissolved	APHA4500/LACHAT
<p>The thiocyanate ion is liberated from mercuric thiocyanate by the formation of soluble mercuric chloride. In the presence of ferric ion, the free thiocyanate forms a highly colored ferric thiocyanate complex. The intensity of the complex is proportional to the original chloride concentration and is measured by a colorimeter at 480 nm.</p>			
CL-DIS-WP	Water	Chloride Dissolved	APHA4500/LACHAT
<p>The thiocyanate ion is liberated from mercuric thiocyanate by the formation of soluble mercuric chloride. In the presence of ferric ion, the free thiocyanate forms a highly colored ferric thiocyanate complex. The intensity of the complex is proportional to the original chloride concentration and is measured by a colorimeter at 480 nm.</p>			
COL-TRU-WP	Water	True Colour	APHA, AWWA, WPCF
<p>Colour is measured by visual comparison against a routinely calibrated color disk. True color is the color of water from which turbidity has been removed by centrifugation.</p>			
CON-WP	Water	Conductivity	APHA 2510B
<p>Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.</p>			
ETL-LANGELIER-4-WP	Water	Langelier Index 4C	Calculated

Monthly Chlorination Report - Portable Instruments

WATER SYSTEM: Rubber Duck Resort

WATER SYSTEM CODE: 188.75



Water Stewardship

MONTH: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR: 20 11

OPERATOR-IN-CHARGE: Dennis + Sheri Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	9:00	se	1.58	1.61	
2.	9:30	se	1.56	1.59	
3.	9:00	se	1.59	1.55	
4.	9:00	se	1.55	1.60	
5.	9:15	se	1.57	1.63	
6.	9:30	se	1.55	1.57	
7.	10:00	se	1.95	1.99	turn down
8.	10:00	se	1.81	1.85	
9.	9:00	se	1.80	1.85	
10.	9:00	se	1.82	1.84	
11.	9:30	se	1.81	1.84	
12.	9:30	se	1.78	1.83	
13.	9:00	se	1.77	1.80	
14.	9:00	se	1.76	1.83	
15.	9:00	se	1.77	1.82	
16.	10:00	se	1.80	1.86	
17.	10:00	se	1.79	1.84	
18.	9:30	se	1.78	1.83	
19.	9:30	se	1.50	1.60	
20.	10:00	se	1.45	1.50	
21.	9:30	se	1.55	1.59	
22.	10:00	se	1.57	1.61	
23.	9:00	se	1.58	1.59	
24.	10:00	se	1.63	1.66	
25.	9:30	se	1.60	1.63	
26.	10:00	se	1.61	1.66	
27.	9:30	se	1.60	1.64	
28.	10:00	se	1.63	1.66	
29.	9:30	se	1.65	1.69	
30.	10:00	se	1.62	1.65	
31.					

Total Number of Measurements, A:

A: 30

Minimum Free Chlorine Standard:

0.5 mg/L

Number Meeting Standard, B:

B: 30

COMPLIANCE, C = B/A X 100%:

100%

Number of Days in this Month, D:

D: 30

COMPLIANCE, E = A/D X 100%:

100%

Submitted by (Print): Sheri Crockett

Signature: [Signature]

DISTRIBUTION:

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RETAIN A COPY FOR YOUR RECORDS

PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY
COMMENTS, QUESTIONS OR CONCERNS

Monthly Chlorination Report - Portable Instruments



WATER SYSTEM: Rubber Duck Resort WATER SYSTEM CODE: _____

Water Stewardship

MONTH: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR: 20 10

OPERATOR-IN-CHARGE: Dennis + Sheri Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	9am	SC	.74		
2.	10am	SC	.76		
3.	9am	SC	.78		
4.	9:30am	SC	.77		
5.	10am	SC	.76		
6.	10am	SC	.76		
7.	9am	SC	.79		
8.	9am	SC	.80		
9.	9am	SC	.78		
10.	10am	SC	.75		
11.	9:30am	SC	.60		
12.	10am	SC	.60		
13.	10am	SC	.64		
14.	9am	SC	.62		
15.	9am	SC	.63		
16.	10am	SC	.60		
17.	9am	SC	.50		
18.	10am	SC	.45		
19.	10am	SC	.55		
20.	9am	SC	.59		
21.	9am	SC	.58		
22.	10am	SC	.59		
23.	9am	SC	.61		
24.	10am	SC	.62		
25.	9am	SC	.62		
26.	10am	SC	.62		
27.	9am	SC	.65		
28.	11am	SC	.64		
29.	9am	SC	.63		
30.	9am	SC	.62		
31.					

Total Number of Measurements, A:	A: <u>30</u>
Minimum Free Chlorine Standard:	0.5 mg/L
Number Meeting Standard, B:	B: <u>29</u>
COMPLIANCE, C = B/A X 100%:	<u>96%</u>
Number of Days in this Month, D:	D: <u>30</u>
COMPLIANCE, E = A/D X 100%:	<u>100</u>

Submitted by (Print): Sheri Crockett

Signature: SC

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Monthly Chlorination Report - Portable Instruments

WATER SYSTEM: Rubber Duck Resort

WATER SYSTEM CODE: 188.25



Water Stewardship

MONTH: Jan Feb Mar Apr May Jun (Jul) Aug Sep Oct Nov Dec YEAR: 2010

OPERATOR-IN-CHARGE: Dennis + Sheri Cocker

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.			.64		
2.	11am	SC	.64	.17	
3.	9am	SC	.65		
4.	10am	SC	.67		
5.	9am	SC	.67		
6.	9:30a	SC	.68		
7.	9:30a	SC	.69		
8.	10a	SC	.68		
9.	9a	SC	.70		
10.	11a	SC	.70		
11.	1p	SC	.69		
12.	9a	SC	.70		
13.	10a	SC	.71		
14.	10:30	SC	.70		
15.	10a	SC	.71		
16.	12p	SC	.74		
17.	9a	SC	.78		
18.	10a	SC	.79		
19.	11a	SC	.79		
20.	12p	SC	.81		
21.	9a	SC	.80		
22.	10a	SC	.79		
23.	11a	SC	.78		
24.	12p	SC	.78		
25.	10a	SC	.65		
26.	11a	SC	.66		
27.	10a	SC	.70		
28.	11:30	SC	.70		
29.	11:30	SC	.69		
30.	12p	SC	.69		
31.	1p	SC	.68		

Total Number of Measurements, A: 31
 Minimum Free Chlorine Standard: 0.5 mg/L
 Number Meeting Standard, B: 31
 COMPLIANCE, C = B/A X 100%: 100
 Number of Days in this Month, D: 31
 COMPLIANCE, E = A/D X 100%: 100

Submitted by (Print): Sheri Cocker
 Signature: [Signature]

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Monthly Chlorination Report - Portable Instruments



WATER SYSTEM: Rubber Duck Resort

WATER SYSTEM CODE: 188.75

MONTH: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR: 20 11

Water Stewardship

OPERATOR-IN-CHARGE: Dennis + Sheri Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	9am	SE	.80	.82	
2.	2pm	SE	.85	.87	
3.	1pm	SO	.83	.84	
4.	10a.	SE	.84	.86	
5.	11a	SO	.86	.89	
6.	9a	SE	.82	.83	
7.	1p	SE	.75	.78	
8.	2p	SE	.74	.78	
9.	9a	SE	.73	.77	
10.	10a	SE	.77	.80	
11.	11a	SE	.78	.80	
12.	1p	SE	.80	.82	
13.	5p	SE	.83	.85	
14.	4p	SE	.86	.88	
15.	9a	SE	.83	.86	
16.	10a	SE	.78	.81	
	11a	SE	.77	.80	
18.	9a	SE	.80	.84	
19.	1p	SE	.83	.87	
20.	10a	SE	.84	.88	
21.	11a	SE	.79	.83	
22.	1p	SE	.81	.84	
23.	2p	SE	.83	.85	
24.	11a	SE	.81	.83	
25.	10a	SE	.79	.82	
26.	9a	SE	.78	.80	
27.	10a	SE	.80	.83	
28.	11a	SE	.79	.80	
29.	9a	SE	.80	.85	
30.	10a	SE	.79	.83	
31.	11a	SE	.78	.80	

Total Number of Measurements, A:	A: 31
Minimum Free Chlorine Standard:	0.5 mg/L
Number Meeting Standard, B:	B: 31
COMPLIANCE, C = B/A X 100%:	100
Number of Days in this Month, D:	D: 31
COMPLIANCE, E = A/D X 100%:	100

Submitted by (Print): Sheri Crockett
 Signature: [Signature]

DISTRIBUTION:
 FORWARD THE ORIGINAL TO YOUR DRINKING WATER OFFICER
 RETAIN A COPY FOR YOUR RECORDS

PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY
 COMMENTS, QUESTIONS OR CONCERNS

Monthly Chlorination Report - Portable Instruments



WATER SYSTEM: Rubber Duckly Resort

WATER SYSTEM CODE: 188.75

Water Stewardship

MONTH: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR: 20 11

OPERATOR-IN-CHARGE: Dennis Fisher Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	9am	SC	1.25	1.28	
2.	9:30am	SC	1.27	1.29	
3.	9am	SC	1.24	1.28	
4.	9am	SC	1.26	1.29	
5.	10a	SC	1.24	1.30	
6.	9:30am	SC	1.26	1.29	
7.	9am	SC	1.24	1.27	
8.	8:30am	SC	1.25	1.29	
9.	9a	SC	1.25	1.29	
10.	8:45a	SC	1.26	1.30	
11.	9a	SC	1.27	1.28	
12.	10a	SC	1.35	1.36	
13.	9a	SC	1.55	1.58	
14.	9:30am	SC	1.58	1.60	
15.	9:30am	SC	1.60	1.65	
16.	10am	SC	1.63	1.65	
17.	9a	SC	1.66	1.68	
18.	9a	SC	1.65	1.69	
19.	10am	SC	1.67	1.68	
20.	9:30am	SC	1.68	1.70	
21.	10am	SC	1.67	1.69	
22.	10:30am	SC	1.67	1.69	
23.	9a	SC	1.66	1.69	
24.	8:30am	SC	1.68	1.70	
25.	9a	SC	1.66	1.70	
26.	10am	SC	1.65	1.68	
27.	9a	SC	1.63	1.65	
28.	10am	SC	1.63	1.66	
29.	9:30am	SC	1.64	1.67	
30.	10am	SC	1.65	1.70	
31.	9:30am	SC	1.66	1.69	

Total Number of Measurements, A:

A: 31

Minimum Free Chlorine Standard:

0.5 mg/L

Number Meeting Standard, B:

B: 31

COMPLIANCE, C = B/A X 100%:

100

Number of Days in this Month, D:

D: 31

COMPLIANCE, E = A/D X 100%:

100

Submitted by (Print): Sheri Crockett

Signature: [Handwritten Signature]

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PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY
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Monthly Chlorination Report - Portable Instruments



WATER SYSTEM: Rubber Ducky Resort WATER SYSTEM CODE: _____

MONTH: Jan Feb Mar Apr May Jun (Jul) Aug Sep Oct Nov Dec YEAR: 20 11

Water Stewardship

OPERATOR-IN-CHARGE: Dennis + Sheri Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	noon	SL	1.34	1.41	
2.	2p	SL	1.39	1.45	
3.	3p	SL	1.23	1.30	
4.	2p	SL	1.36	1.43	
5.	1p	SL	1.31	1.33	
6.	2p	SL	1.25	1.26	
7.	9a	SL	1.87	1.95	
8.	10a	SL	1.18	1.24	
9.	10a	SL	1.33	1.35	
10.	11a	SL	1.31	1.36	
11.	noon	SL	1.29	1.34	
12.	noon	SL	1.32	1.35	
13.	11a	SL	1.60	1.63	
14.	10a	SL	1.57	1.59	
15.	9a	SL	1.74	1.76	
16.	10a	SL	1.65	1.67	
17.	1p	SL	1.66	1.68	
18.	11a	SL	1.70	1.74	
19.	1p	SL	1.22	1.25	
20.	11a	SL	.87	.88	
21.	10p	SL	1.99	1.02	
22.	10a	SL	1.01	1.06	
23.	11a	SL	1.56	1.60	
24.	noon	SL	1.27	1.29	
25.	1p	SL	1.30	1.32	
26.	9a	SL	1.34	1.37	
27.	10a	SL	1.24	1.27	
28.	11a	SL	1.03	1.04	
29.	1p	SL	1.25	1.27	
30.	noon	SL	1.26	1.28	
31.	10a	SL	1.28	1.31	

Total Number of Measurements, A:	A: 31
Minimum Free Chlorine Standard:	0.5 mg/L
Number Meeting Standard, B:	B: 31
COMPLIANCE, C = B/A X 100%:	100
Number of Days in this Month, D:	D: 31
COMPLIANCE, E = A/D X 100%:	100

Submitted by (Print): Sheri Crockett

Signature: _____

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Monthly Chlorination Report - Portable Instruments



WATER SYSTEM: Ruther Derry Resort

WATER SYSTEM CODE: 188.75

MONTH: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec YEAR: 2010

OPERATOR-IN-CHARGE: Dennis + Shen Crockett

TYPE OF MEASUREMENT DEVICE (Check Box): Colorwheel Electronic

Date	TIME	Operator's Initials	Chlorine Residual in mg/L		Comments:
			Free Chlorine	Total Chlorine	
1.	9am	SC	.85		
2.	9am	SC	.87		
3.	9am	SC	.84		
4.	10am	SC	.87		
5.	9am	SC	.84		
6.	9:30a	SC	.87		
7.	9am	SC	.90		
8.	10a	SC	1.03		
9.	11a	SC	1.21		
10.	9a	SC	1.01		
11.	10a	SC	.90		
12.	10:30a	SC	.75		
13.	9am	SC	.41		increase
14.	10am	SC	.46		
15.	10am	SC	.52		
16.	9:30a	SC	.60		
17.	9am	SC	.61		
18.	10am	SC	.60		
19.	10:30am	SC	.62		
20.	9am	SC	.58		
21.	10a	SC	.63		
22.	9:30a	SC	.65		
23.	10a	SC	.70		
24.	10a	SC	.77		
25.	10:30a	SC	.81		
26.	11a	SC	.90		
27.	11:30a	SC	1.10		
28.	9a	SC	.70		
29.	10a	SC	.18		increase.
30.	9:30am	SC	.30		
31.					

Total Number of Measurements, A:	A: <u>30</u>
Minimum Free Chlorine Standard:	0.5 mg/L
Number Meeting Standard, B:	B: <u>26</u>
COMPLIANCE, C = B/A X 100%:	<u>87%</u>
Number of Days in this Month, D:	D: <u>30</u>
COMPLIANCE, E = A/D X 100%:	<u>100</u>

Submitted by (Print): Sheni Crockett

Signature: [Signature]

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RETAIN A COPY FOR YOUR RECORDS

PLEASE CONTACT YOUR DRINKING WATER OFFICER WITH ANY COMMENTS, QUESTIONS OR CONCERNS



Water Stewardship

Office of Drinking Water
Box 6000, Gimli, Manitoba, Canada R0C 1B0
T 204-642-6134 F 204-642-6108
Derek.Clarke@gov.mb.ca
<http://www.manitoba.ca/drinkingwater>

PWS 188.75

February 17, 2011

Dennis and Sherri Crockatt
Rubber Ducky Resort and Campground
Box 165
Warren, MB R0C 3E0

Dear Mr. and Mrs. Crockatt:

Please find enclosed the 2010 Audit Report for Rubber Ducky Resort and Campground Public Water System (PWS). Public water systems in Manitoba are provided audit reports on an annual basis to identify compliance rates with licence and regulatory requirements, and to identify important upcoming compliance dates. As Rubber Ducky began reporting and disinfecting in 2010 please use this audit as an educational tool.

As the Audit reflects, Rubber Ducky Resort and Campground - PWS fulfilled their obligations in 2010 with regard to complying with the terms and conditions set forth in the system's Operating Licence (PWS-10-475) with the exception of the following items:

Monitoring Requirements:

- The utility did not report chlorine residual levels in distribution in 2010.
- The utility failed to report the required number of bacterial samples in 2010.

The Audit Report is based on information submitted to this office. If your records conflict with the audit information, or if you have any questions concerning this report, or any other drinking water related issues, please call me at (204) 642-6134.

Sincerely,

Derek Clarke
Drinking Water Officer

Enclosures

Water Quality Standards		Percent Compliance	Corrective Action Forms
Bacterial			
Total coliform and E. coli	Less than one E. coli and total coliform bacteria detectable per 100mL in all treated and distributed water	100%	
Comments:			
Disinfection			
Chlorine residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes	95.8%	
	A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system	NR	
Comments:	The utility reported free chlorine entering distribution less than 0.5 mg/l on 5 occasions after beginning to report chlorine residual on June 16. In the future corrective action forms (enclosed) should be forwarded to the Office of Drinking Water in the event bacterial levels drop below 0.5 mg/l. The corrective action form should identify the actions taken to increase residual levels.		
Chemical		Performance (mg/l)	
Chlorine	Less than or equal to 0.01 mg/L	0.00122	
Fluoride	Less than or equal to 1.5 mg/L	0.42	
Lead	Less than or equal to 0.01 mg/L	0.000371	
Nitrate	Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen)	0.357	
Uranium	Less than or equal to 0.02 mg/L	0.00212	
Benzene	Less than or equal to 0.005 mg/L	<0.005	
Comments:	Water chemistry samples were collected in 2010 by the Office of Drinking Water and complete analysis is appended to this report.		

Monitoring Requirements		Percent Compliance
Bacterial		
Total coliform and E. coli	Bi-weekly sampling program with each set of samples consisting of one raw, one treated and a minimum of one distribution sample. Consecutive sample sets must be separated by at least 12 days.	44%
Comments:	Rubber Ducky is required to report bi-weekly bacteria samples when the campground is open and monthly samples when only the recreational centre is open. Throughout the course of a year the	

	facility should report approximately 18 sample sets. In 2010 the facility reported 8 sample sets.	
Disinfection		
Free chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time.	99.2%
Free chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling.	0%
Total chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time.	0%
Total chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling.	0%
Comments:	Following the start of chlorination in June of 2010 the utility had a good track record reporting free chlorine entering distribution in 2010, missing only one sample on August 31, 2010. Total Chlorine entering distribution and free and total chlorine in distribution was not reported in 2010.	
Chemistry		
General chemistry (to include arsenic, fluoride, nitrate, and uranium)	For systems with up to 10,000 people: One raw and one treated water sample once every three years.	
Benzene, trichloroethylene, and tetrachloroethylene	For systems with less than 5,000: One treated sample every three years	
Lead	As per the instructions of the Drinking Water Officer	
Comments:	Office of Drinking Water collected chemistry samples in 2010 and will plan to collect chemistry samples again in 2013. You will be notified if the facility is required to collect chemistry samples as part of regulatory compliance.	

Other Regulatory Requirements

Emergency Response Plan	
Due Date	January 1, 2013
Date Received	
Comments:	
Engineering Assessment	
Due Date	July 1, 2012
Date Received	
Comments:	
Compliance Plan	
Due Date	July 1, 2012
Date Received	

Comments:	
2009 Annual Report	
Issue Date	
Date Received	
Comments:	Annual reports are required for public water systems that serve 1000 or more people.

Inspection	
System Inspected	June 8, 2010
Inspection Letter Sent	June 8, 2010
Comments:	The inspection noted the need to purchase a colorimeter designed for chlorine residual levels in drinking water (free and total), the need for spare parts for the chlorinator, and signage and a backflow preventer on the sewage dump station.

Enforcement	
Type of Enforcement	No enforcement documents were issued in 2010.
Issue Date	
Act/Regulation/Section	
Offence Description	
Compliance Date	
Comments:	



Office of Drinking Water
Box 6000, Winnipeg, Manitoba, Canada R0C 0B0
T 204-642-6134 F 204-642-6108
Derek.Clarke@gov.mb.ca
<http://www.manitoba.ca/drinkingwater>

PWS 188.75

February 2, 2012

Dennis and Sheri Crockatt
Box 165
Warren, MB R0C 3E0

Dear Mr. and Mrs Crockatt:

2011 Annual Audit Report Rubber Ducky Resort PWS 188.75

Please find enclosed the 2011 Audit Report for the Rubber Ducky Public Water System (PWS). As the Audit Report reflects, the PWS is not in compliance with the following critical terms and conditions of your Operating Licence:

Bacterial monitoring and reporting; and
Disinfectant monitoring and reporting.

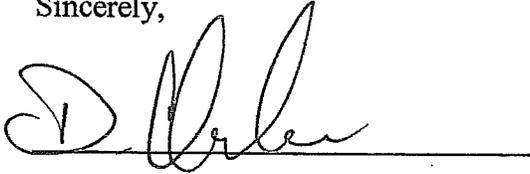
In the 2012 operating season please ensure you review the terms and conditions of your operating licence including the following items that require improvement for the 2012 operating season:

- Implement start up and shut down protocol (attached) including two bacteria samples on start-up and notification of campground shut down;
- Ensure free and total chlorine residual measurements are taken at the same time and place as distribution bacteria samples;
- Ensure bi-weekly bacteria samples are collected during the time the campground is open and monthly sampling is conducted when the campground is closed, but the recreation centre open.
- As you have installed chlorine contact time a compliance plan can be submitted noting that you've done so under permit PWS 11-P06, and the date of installation. A guideline for completing a compliance plan is attached;
- Finally, an engineering assessment is due in 2012. A document respecting terms of reference for this study can be found at the following link:

http://www.gov.mb.ca/waterstewardship/odw/reg-info/approvals/engineering_assessment_tor_pws_july_2008.pdf

The Audit Report is based on information submitted to this office. If your records conflict with the audit information, or if you have any questions concerning this report, or any other drinking water related issues, please call me at (204) 642-6134.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Clarke", is written over a solid horizontal line.

Derek Clarke
Drinking Water Officer

Enclosures:

Seasonal start up and shut down protocol

List of Consulting Engineers

Statement of Compliance



Water Stewardship
Office of Drinking Water

Public Water System
Annual Audit Report

Reporting
Period:

2011

Date:

January
2012

Water System:

Rubber Ducky Resort

Code:

188.75

Owner:

Dennis and Sheri Crockatt

Operator in Charge:

Sheri Crockatt

Address:

Warren, MB

Phone:

322-5286

Owner Representative:

Dennis or Sheri Crockatt

Operating Licence Number:

PWS 10-475

Water Quality Standards

Percent
Compliance

Corrective
Action Forms

Bacterial

E. coli	Less than one E. coli bacteria detectable per 100mL in all treated water	100%	
Total coliform	Less than one total coliform bacteria detectable per 100mL in all treated water	88%	
E. coli	Less than one E. coli bacteria detectable per 100mL in all distributed water	100%	
Total coliform	Less than one total coliform bacteria detectable per 100mL in all distributed water	88%	
Comments:	One treated water sample and one distributed water sample was reported positive for Total Coliform >10 TC/100mL. Re-samples requested by this office did not confirm the presence of total coliform bacteria.		

Disinfection

Chlorine residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes	100%	
	A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system	100%	
Comments:	The public water system has met the disinfection water quality standard for 2011.		

Monitoring Requirements

Percent
Compliance

Bacterial

Total coliform and E. coli	Bi-weekly sampling program with each set of samples consisting of one raw, one treated, and a minimum of one distribution sample	57%
	Consecutive sample sets must be separated by at least 12 days	100%
Comments:	The utility did not meet the bacterial monitoring standard in 2011.	



Water System:

Rubber Ducky Resort

Code:

188.75

Owner:

Dennis and Sheri Crockatt

Operating Licence Number:

PWS 10-475

Disinfection

Free chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time	100%
Free chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling	43%
Total chlorine (treated water)	One sample per day of water entering the distribution system following at least twenty minutes of contact time.	100%
Total chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling	36%
Comments:		

Chemistry

General chemistry (to include arsenic, fluoride, nitrate, and uranium)	One raw and one treated water sample once every three years	NA
Benzene, trichloroethylene, and tetrachloroethylene	One treated sample every three years	NA
Comments: The Office of Drinking Water submitted water samples for chemical analysis in 2010. This action is considered to fulfill the general chemistry monitoring requirement outlined in Table 2 of the Operating Licence.		

Reporting Requirements

Disinfection	Submit original monthly disinfection report forms within seven days after the end of each calendar month	100%
Comments:		

Other Regulatory Requirements

Engineering Assessment

Due Date	July 1, 2012
Date Received	
Comments:	A link to the terms of reference is included on the cover letter, and a list of consulting engineers is attached.

Compliance Plan

Due Date	July 1, 2012
Date Received	
Comments:	Steps to achieve compliance with section 2.10 of your operating licence have already been



Water Stewardship
Office of Drinking Water

Public Water System
Annual Audit Report

Reporting
Period:

2011

Date:

January
2012

Water System:

Rubber Ducky Resort

Code:

188.75

Owner:

Dennis and Sheri Crockatt

Operating Licence Number:

PWS 10-475

implemented. Please complete the enclosed statement of compliance and return it to my office at Box 6000 Gimli, MB R0C 1B0.

Operating Licence Expiry Date

Expiry Date

December 31, 2011

Comments:

Please be advised that you are required to apply for renewal of your operating licence 60 days prior to its expiry

Inspection

System Inspected

July 7, 2011

Inspection Letter Sent

July 7, 2011

Comments:

The inspection noted the need for improved bacterial sampling frequency. This did not occur.

Enforcement

Comments:

No enforcement action was taken during 2011



BURNSIDE

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Appendix C
Well Drillers' Log

well log

line
Well PID: 135031
LOCATION: NE26-13-1W
UTMX:608039.1 UTM Y:5554612.8 XY Accuracy:No Accuracy
Owner: RUBBER DUCKY
Driller: Interlake Water Supply
Well Name:
Date Completed: 2005 Jul 07
Well Use: PRODUCTION
WATER USE: Domestic, Air conditioning
Well Status: ACTIVE Aquifer: LIMESTONE OR DOLOMITE

REMARKS:
PUMPED 135 IGPM FOR 3 HRS WITH DRAWDOWN TO 58 FT

WELL LOG (Imperial units)
From To(ft.) Log
0.0 1 TOPSOIL
1.0 32 TILL AND BOULDERS
32.0 85 WHITE LIMESTONE WITH LAYERS OF RED SHALE
85.0 145 GREY LIMESTONE
145.0 200 REDDISH GREY SHALE

WELL CONSTRUCTION

From	To(ft)	Const.Method	Inside Dia.(in)	Outside Dia.(in)	Slot Size(in)	Type	Material
0.0	100.0	CASING	6.0			INSERT	PVC
100.0	200.0	OPEN HOLE	5.8				

Top of Casing: 1.5 ft. above ground

PUMPING TEST

Date : 2005 Jul 07 Pumping 200.0 Imp. gallons/minute
Water level before test : 8.0 ft below ground
Water level at end of test : 75.0 ft below ground
Test duration: 2:00:00
Test Zone: from 100.0 ft to 200.0 ft



BURNSIDE

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Appendix D
Relevant Correspondence



RE: Rubber Ducky Campground Questions
Barlischen, Kim (MWS)
to:
Paul.Klassen@neeganburnside.com
06/01/2012 03:21 PM
Show Details

1 Attachment



image001.gif

Hi Paul.

Q1. Hose bibb vacuum breakers are required by the Office of Drinking Water for the wash-down hose connections at trailer dump stations or similar wash-down stations. The Office of Drinking Water recommends but does not require these devices for regular camp site standpipe connections.

Q2. As per industry guidelines, the Office of Drinking Water recommends 50mm minimum for main distribution lines in a campground; however, where supported by engineering calculations, use of smaller diameter pipe would not be opposed.

Kim Barlischen, P.Eng.

Senior Approvals Engineer

Office of Drinking Water

Manitoba Conservation and Water Stewardship

1007 Century Street

Winnipeg, Manitoba R3H 0W4

phone: (204) 945-5936

fax: (204) 945-1365

email: Kim.Barlischen@gov.mb.ca

website: www.manitoba.ca/drinkingwater

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From: Paul.Klassen@neeganburnside.com [<mailto:Paul.Klassen@neeganburnside.com>]

Sent: June-01-12 2:48 PM

To: Barlischen, Kim (MWS)

Subject: Rubber Ducky Campground Questions

Hi Kim,

A couple more questions have come up regarding this project:

-Are vacuum breakers required on all service connections?

-Can water mains smaller than 50 mm be used for portions of the system if a calculation is completed to show a reasonable head loss?

Thanks

Paul

NEEGAN BURNSIDE

Paul Klassen, P. Eng.

Neegan Burnside Ltd.

106-B Scurfield Blvd.

Winnipeg, Manitoba R3Y 1G4

Paul.Klassen@neeganburnside.com

tel: 204.949.7110 x623

fax: 204.949.7111

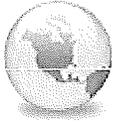
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Thank you.



RE: Baffling Factor for Baffle Balls

Barlিশen, Kim (MWS) to: Paul.Klassen@neeganburnside.com
Cc: "Coulibaly, Housseini (MWS)"

05/18/2012 09:19 AM

Hi Paul.

The Office of Drinking Water was unable to find any data or information to support the assignment of a baffling factor for 'baffle balls'. Our Research & Program Support Unit expects to complete a contact time study this fall of baffle balls to assist in establishing a baffling factor. Until data are available, a baffling factor of 0.3 should be assumed.

Before you proceed with the calculations, please confirm with the water system owner that the baffle balls are safe for use in a potable water application (ex: NSF certification, FDA approved).

Kim Barlিশen, P.Eng.

Senior Approvals Engineer

Office of Drinking Water

Manitoba Conservation and Water Stewardship

1007 Century Street

Winnipeg, Manitoba R3H 0W4

phone: (204) 945-5936

fax: (204) 945-1365

email: Kim.Barlিশen@gov.mb.ca

website: www.manitoba.ca/drinkingwater

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From: Paul.Klassen@neeganburnside.com [<mailto:Paul.Klassen@neeganburnside.com>]

Sent: May-16-12 11:09 AM

To: Barlিশen, Kim (MWS)

Subject: Baffling Factor for Baffle Balls

Hi Kim,

I'm preparing the design brief for the Rubber Ducky Campground, and need to calculate the chlorine contact time in their tank. They have a tank with baffle balls (see picture). I couldn't find a baffling factor for this setup in any of the province's updated approval guideline from June 2010, but I suppose it would be defined as a 'baffled tank'. Is there a baffling factor that you have seen in the past for this setup, or should I select a value in the 0.3-0.6 range?

Thanks

Paul

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Thank you.



RE: ODW Guideline - Separation Between Water & Sewer

Barlischen, Kim (MWS) to: Paul.Klassen@neeganburnside.com

04/30/2012 10:45 AM

Cc: "Stibbard, James (MWS)"

History: This message has been replied to.

Hi Paul.

As we discussed, water-sewer main separation standards apply to water and sewer service lines for RV or transient camp sites and standpipes. Application of these standards is also recommended for municipal service lines. If 3m separation cannot be reasonably accommodated at the campsites, a variation to this standard with closer placement or common trench installation of the service lines is acceptable as long as a minimum of 1m horizontal separation and a minimum of 0.45m vertical (water line above) separation is maintained. Wherever possible, 0.45m separation should be maintained at water-sewer pipe crossings, with preference to the water pipe being located above the sewer pipe.

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From: Paul.Klassen@neeganburnside.com [mailto:Paul.Klassen@neeganburnside.com]

Sent: April-26-12 6:09 PM

To: Barlischen, Kim (MWS)

Cc: Stibbard, James (MWS); Gerry.Popowich@neeganburnside.com

Subject: RE: ODW Guideline - Separation Between Water & Sewer

Hi Kim,

What is provincial requirement for separation of the services while they are in the ground? We can separate the risers by 3m but our client is telling us that it is not practical to have sewer on one side of the site and water on the other side, based on how RVs are designed, with both connections on the same side.

Thanks

Paul

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Thank you.

From: "Barlিশen, Kim (MWS)" <Kim.Barlিশen@gov.mb.ca>
To: "Paul.Klassen@neeganburnside.com" <Paul.Klassen@neeganburnside.com>
Cc: "Stibbard, James (MWS)" <James.Stibbard@gov.mb.ca>
Date: 04/26/2012 02:22 PM
Subject: RE: ODW Guideline - Separation Between Water & Sewer

Hi Paul.

You are correct in that water-sewer separation requirements in the Ten State Standards apply to water and sewer mains only; the Ten State Standards reference local and/or state plumbing codes for water services. The Ten State Standards were developed for municipal/year-round water systems; specific requirements for seasonal systems are not addressed. Service lines to buildings are addressed under the Manitoba Plumbing Code and municipal standards.

The provincial requirement is minimum 3m separation between RV water and sewer connections (risers). In our opinion, these temporary connections pose a greater risk to the water supply from leakage, and are not addressed under local or provincial codes.

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From: Paul.Klassen@neeganburnside.com [<mailto:Paul.Klassen@neeganburnside.com>]
Sent: April-23-12 4:07 PM
To: Barlishen, Kim (MWS)
Subject: Re: ODW Guideline - Separation Between Water & Sewer

Hi Kim,

As we have discussed any new water servicing system will need 3.0 m separation between water mains and sewer mains (or 0.45 m of vertical separation where the pipes cross). However does this apply to individual site services as well? For instance, would the RV connections for water and sewer on one campsite have to also have that 3.0 m separation? The 10-State Standards use the term 'mains' in the applicable section.

Thanks
Paul

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Thank you.



From: Barlisen, Kim (MWS)
Sent: Monday, April 02, 2012 11:38 AM
To: Rubber Ducky Resort
Cc: Clarke, Derek (MWS) ; Baert, Mike (CON)
Subject: Rubber Ducky PWS - Permit Application Requirements
Dennis and Sheri:

I reviewed the permit application you faxed in for a proposed major expansion (120 additional serviced campsites) to the Rubber Ducky Resort and Campground Public Water System. A number of issues were identified with the approval submission which consisted of a semi-public water system permit application form, a short project description and two hand-drawn sketches.

- As per Subsection 3(1) of the Drinking Water Safety Regulation 40/2007, submission of project specifications and engineering design plans (prepared by an engineer registered to practice in the province of Manitoba) is required for alteration of a public water system. The Director, pursuant to *The Drinking Water Safety Act*, can approve minor alterations without submission of engineering plans for small-scale projects such as minor watermain extensions (ex: < 300 metres and < 5 service connections) or minor treatment upgrades (ex: installation of a small pre-engineered tank or an NSF certified UV disinfection unit).
- The form you submitted is for construction or alteration of a Semi-Public Water System.
- The size of the water system is being more than doubled. Approval had previously been granted for installation of a storage tank to address a regulatory requirement for primary disinfection. Approval was based, in part, on the fact that your system was considered a small seasonal system (< 500 people served) using a secure groundwater source so only hydraulic retention time was required. The proposed expansion would push the system outside of this size category and require installation of additional storage based on contact time calculations performed in accordance with Office of Drinking Water guidelines.
- The project includes installation of wastewater collection mains and 5 common holding tanks. Approval for the wastewater system works is required through the Environmental Assessment and Licensing Branch of Manitoba Conservation and Water Stewardship (<http://www.gov.mb.ca/conservation/eal/contact.html>). A regional contact is Mike Baert, Regional Supervisor, at 945-0788.
- Placement of the watermains relative to the sewer mains was not indicated in the sketches. Public water system mains and sewer mains must be installed to ensure minimum 3m horizontal separation where the piping runs parallel and 0.45m at water-sewer main crossings with the watermain above the sewer main wherever possible.
- No details were provided for a typical standpipe service connections. Placement of any flush-outs, isolation valves or other appurtenances to allow seasonal flushing and disinfection of the lines and watermain repairs was not clear.
- The expansion represents a more than doubling of water demands for the system. In

addition to meeting contact time requirements for the expanded resort, confirmation is required that the raw water supply and distribution pumping systems are adequately sized. The drawings also suggest additional future expansion.

Information on the Public Water System permitting process is available on our website including:

- **the permit application form for a public water system that must be completed and submitted for approval of this project**
http://www.gov.mb.ca/waterstewardship/odw/reg-info/forms/pws_permit_application_form_dec10-final.pdf
- general information on the review process and criteria
<http://www.gov.mb.ca/waterstewardship/odw/reg-info/approvals/index.html>
- guidelines for the permit process
http://www.gov.mb.ca/waterstewardship/odw/reg-info/forms/approval_guideline_ag01_dec_10-permit_process.pdf
- contact time calculation guidelines
http://www.gov.mb.ca/waterstewardship/odw/reg-info/approvals/approval_guidelines_ag_03.pdf

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